une porte plombée de l'équipement de bord du véhicule, mais on pourrait prévoir également que les informations recueillies par l'équipement de bord du véhicule, quant à l'importance et au nombre des infractions commises, sont enregistrées sur carte magnétique, ce qui permet un traitement commode, par moyens informatiques, desdites informations.

Dans ce cas, on peut traiter très facilement les informations recueillies sur la carte magnétique par tous moyens informatiques appropriés, et on pourra supprimer le bouton de remise à zéro mentionné plus haut en contrôlant la mise en service régulière de ladite carte magnétique.

A cet effet, on pourra prévoir par exemple que lesdits circuits logiques d'équipement de bord des véhicules comprennent un circuit propre à permettre l'enregistrement, à intervalles de temps déterminés (par exemple toutes les 10 minutes), d'une information analogue à celle qui est fournie lors d'une infraction grave si ladite carte magnétique n'est pas mise en service -volontairement ou involontairement- par le conducteur, ce défaut de mise en service étant par ailleurs rappelé à celui-ci par un signal lumineux ou sonore.

Pour éviter d'autres fraudes, une installation conforme à l'invention pourra encore être caractérisée en ce que lesdits circuits logiques comprennent un circuit propre à permettre l'enregistrement, à intervalles de temps déterminés (par exemple toutes les 10 minutes), d'une information analogue à celle qui est fournie lors d'une infraction grave, notamment dans le cas où l'utilisateur aurait tenté de blinder l'organe capteur ou aurait tenté de frauder par débranchement de la batterie, l'installation pouvant dans ce dernier cas continuer à fonctionner grâce à une batterie interne de l'équipement de bord.

Un mode d'exécution de l'invention va maintenant être décrit à titre d'exemple nullement limitatif, avec référence aux figures du dessin annexé dans lequel :

- la figure 1 représente schématiquement, en plan, une section d'équipement fixe d'infrastructure, installée sur une chaussée pour la surveillance des dépassements de vitesse autorisée des véhicules ;

- la figure 2 représente schématiquement, en plan, une section d'équipement fixe d'infrastructure pour la surveillance des franchissements des bandes de marquage continues par les véhicules ;

- la figure 3 représente schématiquement, en plan, une section d'équipement fixe d'infrastructure pour la surveillance des franchissements d'un signal "stop" par les véhicules ;

- la figure 4 montre schématiquement, en plan, quel peut être l'emplacement, sur un véhicule, de l'organe capteur d'un équipement de bord ;

- la figure 5 représente schématiquement, en perspective, le "boîtier d'interprétation", à savoir l'ensemble d'un équipement de bord, à l'exclusion de l'organe capteur auquel ce boîtier est relié par un câble de liaison blindé ;

- la figure 6 est le schéma synoptique d'un poste d'alimentation d'une section d'équipement fixe d'infrastructure ;

- la figure 7 représente schématiquement, en plan, encore un autre type de section d'équipement fixe d'infrastructure avec, aux extrémités, des séquences d'identification ;

- les figures 8-I à 8-VI montrent schématiquement différentes phases et formes de signaux fournis par des organes capteurs de type magnétique ;

- la figure 9 montre le schéma électrique synoptique d'un boîtier d'interprétation ; et

- la figure 10 montre le schéma électrique synoptique

d'un circuit d'alimentation de sécurité d'un tel boîtier.

Pour ce qui est tout d'abord de l'infrastructure, on pourra prévoir, noyée dans la chaussée 1 ou collée sur celle-ci, comme certaines signalisations horizontales, une ligne 2 de transmission dite de type "B2" (voir figure 1), qui sera parcourue par un courant alternatif de basse puissance et d'une fréquence de l'ordre de 50 à 100 kHz (à définir), fourni par un générateur 3.

Les croisements 4 de cette ligne 2 définissent des séquences dont la longueur L est représentative de la vitesse que l'on veut imposer en ce point.

Si un véhicule muni d'un capteur approprié (de faibles dimensions) passe sur cette ligne de transmission, l'équipement de contrôle (de la taille maximum d'une petite auto-radio) recevra autant d'impulsions qu'il y a de croisements 4 sur la ligne, donc de séquences.

Si un véhicule parcourt une séquence en un temps inférieur à un temps de base To, il va trop vite. Le temps réel Tr de parcours d'une séquence par rapport au temps de base To permet de déterminer la survitesse par rapport à la vitesse qu'impose la séquence.

En effet, si l'on veut contrôler une vitesse de 90 km/h, soit de 25m/s, le temps de base étant 0,2 seconde, les séquences auront une longueur L égale à $\frac{25}{5}$ = 5 mètres.

Si un véhicule parcourt une séquence de 5 m en 180 milli-secondes, sa survitesse sera de $\frac{To}{Tr} = \frac{200}{180}$ soit 11 %, d'où un vitesse de 100 km/h.

On voit qu'il est facile de mesurer et par conséquent de prendre en mémoire tout excès de vitesse, et d'en connaître l'écart en pourcentage par rapport à la vitesse affichée au sol.

En pratique, la ligne de transmission 2 installée au sol ne comporterait que cinq séquences pour chaque point que l'on souhaite contrôler. Trois séquences sur cette ligne parcourues en survitesse pénaliseraient le conducteur d'une faute (par exemple).

Deux niveaux de faute pourraient être considérés, donc pris en mémoire :

1° - Survitesse comprise entre 5 % et 25 % de la vitesse affichée ;

2° - Survitesse supérieure à 25 %.

Pour l'exemple choisi, 90 km/h, la longueur à installer serait de : cinq séquences x 5 m = 25 m + environ deux fois 2 mètres avant le premier croisement et après le dernier, soit en tout environ 29 à 30 mètres.

Un générateur 3 de faible puissance (de l'ordre de 1 watt), donc de coût relativement faible, alimenterait le point de contrôle.

Cet équipement ponctuel et permanent de contrôle pourrait être installé partout où nécessaire.

Même si les points de contrôle ne sont pas aussi nombreux que souhaités au départ, il est probable que l'attitude de conduite s'en trouverait profondément modifiée. En effet, les conducteurs ne connaissent pas la position des points de contrôle, sauf peut-être dans la zone immédiate de leur domicile ; mais éventuellement des points mobiles installés pour quelques jours peuvent être une dissuasion efficace dans ce cas.

Pour contrôler les signaux de "Stop" et les bandes continues, une ligne de transmission identique serait utilisée mais avec des séquences courtes correspondant par exemple à une vitesse de 10 km/h, soit 2,77 m/s ; longueur de séquence = 0,55 m. Cette ligne de transmission 5, étroite dans le cas des bandes continues 6, serait disposée telle que représentée figure 2. Tout véhicule dont le capteur parcourrait ces séquences serait, pour des vitesses normales de conduite, en survitesse apparente très élevée et ainsi pénalisé par un compteur spécial.

Le contrôle des signaux de "Stop" tels que 7 relève du même principe, la disposition de la ligne de transmission 8 étant représentée figure 3.

Pour la surveillance des franchissements de feux rouges, le même principe pourrait être mis en oeuvre, mais lesdites séquences courtes (de 0,55 m par exemple) pourraient alors être posées derrière la ligne d'arrêt

imposée par le feu, et non pas en avant, comme c'est le cas pour les "Stop". Bien entendu, en outre, l'équipement fixe ne devra être actif, dans le cas d'un feu, que pendant les phases de fonctionnement de ces feux, qui interdisent leur franchissement.

Pour ce qui est maintenant de l'équipement de bord, on pourra prévoir qu'il comprend essentiellement deux organes :

- un capteur de lecture, encore appelé "organe capteur" ; et
- un boîtier d'interprétation (avec mémoire et visualisation).

Le capteur de lecture pourra être essentiellement constitué de deux bobines détectrices destinées à lire les séquences au sol ; ce capteur aura de préférence de faibles dimensions, au maximum environ 200 x 100 x 60 mm. Surmoulé dans une résine époxy, d'un poids faible (maximum 2 kg si possible), le capteur, référencé en 10 sur la figure 4, pourrait être situé sous le véhicule 11, approximativement au tiers gauche latéral et environ au niveau du siège du conducteur dans le sens longitudinal.

Cette disposition permettrait de ne pénaliser les franchissements des bandes continues qu'après engagement notable du véhicule, tout en réduisant la largeur des points de contrôle de vitesse, en évitant que ceux-ci n'aillent jusqu'à la limite latérale de la chaussée.

Enfin, il serait souhaitable que le capteur soit constitué de bobines détectrices à air, plus facilement reproductibles. La fréquence préconisée (50 à 100 kHz) devrait permettre facilement d'atteindre cet objectif. La liaison capteur-boîtier d'interprétation étant relativement courte, la capacité du câble de liaison sera faible, ce qui permettra de disposer d'un capteur passif.

Il sera peut-être nécessaire de réaliser deux modèles de capteur, en fonction de la hauteur de captation : l'un pour des hauteurs comprises entre 150 et 300 mm, l'autre pour une hauteur allant de 300 à 500 mm (à titre indicatif).

Afin d'éviter les fraudes , l'organe capteur 10, si

jugé nécessaire, pourrait comporter un circuit accordé oscillant qui fournirait en permanence (lorsque le véhicule roule) un signal alternatif au boîtier d'interprétation 12. Si l'on voulait masquer l'organe capteur 10 avec un blindage magnétique quelconque, ce circuit oscillant s'arrêterait et ne pourrait plus inhiber le dispositif spécial de pénalisation décrit plus bas avec référence à la figure 9.

Si cette disposition était retenue, l'organe capteur 10 ne serait probablement plus exclusivement passif.

Quant au boîtier d'interprétation 12, représenté schématiquement à la figure 5, il sera aussi de faibles dimensions, au maximum si possible de la taille d'une petite auto-radio.

Avec un micro-processeur, la fiabilité de ce boîtier sera excellente, et avec une production en série, le coût en sera très faible.

Les fonctions demandées au boîtier d'interprétation 12 sont simples, et comprennent pour l'essentiel :

- une interface d'entrée "capteur logique",
- des chaînes de comptage,
- une base de temps,
- une logique de sélection,
- des prises en mémoire,
- quatre visualisations (en principe à cristaux liquides)
  - une, référencée 13, pour les survitesses comprises entre 5 et 25 %,
  - une, référencée 14, pour les survitesses supérieures à 25 %,
  - une, référencée 15, pour les fautes graves (stop et bandes continues),
  - une, référencée 16, pour le compteur horaire du temps de marche,
- un circuit d'alimentation avec batterie rechargeable,
- un poussoir 17 de remise à zéro, disposé derrière une porte plombée 18.

Ce petit équipement serait normalement alimenté par la batterie du véhicule, par les prises 19, mais afin d'éviter les fraudes, une petite batterie spéciale pourra être prévue, par exemple dans le logement fermé par ladite porte 18.

Enfin, on a référencé en 20, sur cette figure 5, un câble blindé de liaison entre ce boîtier d'interprétation 12 et l'organe capteur 10.

Pour ce qui est maintenant des équipements fixes d'infrastructure, ils seront constitués pour l'essentiel :

- d'une ligne de transmission ; et
- d'un coffret d'alimentation de cette ligne.

La ligne de transmission pourra être de type dit B2 et constituée d'un câble unifilaire multibrins classique de 1,5 ou 2,5 mm^2.

Sur la figure 7, on a représenté schématiquement une configuration possible de ligne 21, avec aux extrémités des séquences d'identification 22 et 23. Ces séquences d'identification permettront une certaine libéralisation des limitations de vitesse pour les véhicules très performants. On prévoit alors une séquence d'identification, 22 dans un sens, 23 dans l'autre, avant les cinq prévues à la ligne de transmission 21. Cette séquence d'identification 22 ou 23 aurait une longueur telle que des véhicules la parcourraient en un temps supérieur à 0,5 seconde. La logique du boîtier d'interprétation 12 affecterait dans ces conditions le compteur de lecture des séquences d'un coefficient approprié. Le point de contrôle étant franchi, à la perte d'information, par absence d'énergie, la logique retrouverait son état initial. Dans ces conditions, il est facile de maintenir le contrôle des vitesses affichées à leurs valeurs propres, et d'affecter d'un coefficient approprié seulement les autres.

Dans la pratique, cela reviendrait par exemple, pour les véhicules particuliers, à autoriser 100 km/h sur route, et 140 km/h sur autoroute. La séquence d'identification ne pouvant être interprétée que par les poids lourds afin d'introduire un coefficient abaisseur, par

exemple de 0,8 pour leur limitation de vitesse (-20 %), et par les véhicules de hautes performances, afin d'introduire pour eux, au contraire, un coefficient, par exemple 1,1, multiplicateur de leur limitation de vitesse ("libéralisation" de + 10 %).

La ligne 21, collée sur la chaussée 1 comme le sont certaines signalisations horizontales, ou légèrement enfouie dans celle-ci, est bouclée sur son impédance caractéristique Zc. Elle est alimentée par une fréquence pure sous faible puissance (environ 1 W) par le générateur 3 déja mentionné. Le rayonnement d'une telle ligne est faible ; la fréquence choisie (entre 50 et 100 KHz, à définir) permet de garantir qu'aucune perturbation radioélectrique n'est à craindre.

Ces lignes 21, ou ayant toute autre configuration appropriée, seront disposées partout où cela sera jugé nécessaire au respect des vitesses, ainsi qu'aux "points noirs" ou points particulièrement dangereux, tels que certains "Stop" tels que 8 ou certaines bandes continues de signalisation horizontale telles que 6.

Le coffret d'alimentation, de dimensions raisonnables, référencé en 24 sur la figure 6, sera de faible volume, et pourra être fixé sur un petit socle cimenté à proximité de la ou des lignes de transmission 21 à alimenter.

Une alimentation électrique basse tension est bien entendu nécessaire à l'alimentation de ce coffret 24 (au maximum 10 VA). Cette alimentation électrique ne devrait pas être un obstacle majeur. En effet, dans les villes, les villages, a priori il n'y a pas de problème. En campagne, les carrefours dangereux sont très souvent éclairés et très souvent, ailleurs, le réseau EDF basse tension est facilement ou relativement facilement accessible.

Le coffret d'alimentation 24, destiné par conséquent à constituer ledit générateur 3, comprendrait pour l'essentiel :

- un transformateur d'entrée 25 avec protection électrique par fusibles 26,
- un pont redresseur 27 et cellule de filtrage 28,

- un oscillateur 29 de bonne stabilité, et
- un amplificateur de sortie 30 avec transformateur 31 à prise d'adaptation d'impédance.

Cet ensemble ne nécessite qu'une électronique simple, qui pourra facilement avoir une excellente fiabilité. Les variations de température extrêmes de fonctionnement, de l'ordre de -20 à +60 degrés centigrades, ne présentent pas de difficulté.

On a représenté à la figure 8-I la ligne 21, et, par les signes conventionnels habituels, le sens du champ magnétique produit par les boucles que constituent les croisements 4 successifs des conducteurs 21a et 21b.

L'organe capteur 10 est constitué de deux bobines détectrices A et B (figure 8-II) dont le plan des spires est horizontal. Ces bobines détectent le champ vertical de la ligne de transmission 21. Celle-ci émet un champ vertical inversé d'une boucle à la suivante, comme cela ressort de l'examen de la figure 8-I. Lors du déplacement des bobines A et B au-dessus de cette ligne 21, comme représenté sur la figure 8-II, le signal recueilli par induction aux bornes de chaque bobine est en phase, puis en opposition de phase lorsque chaque bobine est sur une boucle différente, puis à nouveau en phase etc., comme cela est représenté sur la figure 8-III.

Si l'on couple en phase ces deux bobines A et B entre elles, comme représenté sur la figure 8-IV, le signal recueilli à la sortie S aura la forme représentée à la figure 8-V.

Après mise en forme par un circuit électronique de mise en forme 35 (figure 9) situé dans le boîtier d'interprétation 12, par simple détection de niveau (en 34), ces signaux seront transformés en impulsions 36, comme représenté à la figure 8-VI. Le temps entre deux impulsions 36 est caractéristique de la vitesse de déplacement du véhicule sur la ligne de transmission 21.

Pour la commodité, on peut appeler ces impulsions 36 "impulsions d'espace".

Une seule bobine pourrait sembler nécessaire à la

réalisation du circuit de captation décrit. Il est cependant nécessaire de disposer de deux bobines, afin d'éviter que ce soit le niveau capté qui produise les impulsions d'espace 36.

En pratique, le circuit de mise en forme 35 délivrera des impulsions d'espace 36 en fonction de la rotation de phase entre les bobines A et B. Ce traitement est déjà couramment réalisé pour d'autres systèmes. Il offre l'avantage d'immuniser la captation des variations de hauteur, des parasitages éventuels, et de l'intensité du champ émis par la ligne de transmission 21. Par ailleurs, il améliore la précision de la captation.

La figure 9 représente un schéma synoptique possible du boîtier d'interprétation 12, hors alimentation.

Le fonctionnement du circuit tel que représenté est le suivant.

A l'entrée d'un compteur d'impulsions 40, une base de temps 41 constituée d'un oscillateur stable délivre des impulsions. Le compteur 40 et sa base de temps 41 sont réalisés de manière telle qu'après 500 milli-secondes, la sortie 0 du compteur 40 passe à 1. Les sorties du compteur 100 ms - 150 ms - K 150 - 200 ms - et K 200 sont au niveau logique 1 quand le compteur est à 0.

Lorsqu'une impulsion d'espace 36 est délivrée par le circuit de mise en forme 35, elle met le compteur 40 à 0.

A l'apparition de l'impulsion d'espace 36 suivante, si le temps de parcours est supérieur à 200 ms, aucun transfert ne se fera dans la logique d'interprétation. En effet, l'ensemble des sorties est passé de 1 à 0, car lorsque le compteur 40 progresse, il change l'état logique des sorties. Si, au contraire, l'impulsion d'espace apparaît avant par exemple 200 ms mais après 150 ms, la porte ET 42 aura à son entrée à la fois le 1 de 200 ms et le 1 de l'impulsion d'espace 36. A sa sortie, une impulsion apparaîtra et sera appliquée à l'entrée de la porte OU 47. Celle-ci appliquera son impulsion de sortie à l'entrée d'un diviseur par 3 référencé en 50. Ce cir-

cuit 50 délivre une impulsion à sa sortie lorsqu'il reçoit sur son entrée trois impulsions venant de la porte OU 47.

Si trois comptages consécutifs sont inférieurs à 200 ms et supérieurs à 150 ms, le diviseur par 3 référencé en 50 appliquera son impulsion de sortie à l'entrée de la mémoire 54. Les informations de cette mémoire, après décodage, sont visualisées par l'affichage 13 à cristaux liquides ou à diodes électro-luminescentes, dont il a déjà été question plus haut.

Dans le cas qui vient d'être décrit, la visualisation affiche une faute supplémentaire de survitesse comprise entre 5 et 25 %. Les mémoires ne peuvent être remises à 0 que grâce au poussoir 17 situé derrière la petite porte plombée 18 du boîtier d'interprétation 12.

Afin d'éviter que l'impulsion d'espace 36 ne se trouve simultanément appliquée à l'entrée de la remise à 0 du compteur 40 et des cinq portes ET 42, 43, 44, 45 et 46, un petit retard pur θ (0,1 à 0,2 µs) est situé uniquement à l'entrée à 0 (RAZ) du compteur 40, afin que la prise en mémoire s'effectue avant celle-ci. Le principe de fonctionnement est le même pour toutes les sorties du compteur 40 (Porte OU 48, diviseur par trois 51, mémoire 55, etc.).

La porte ET 60 fait changer d'état une bascule 61 lorsqu'une séquence d'identification est parcourue. Ce changement d'état inhibe dans ces conditions les sorties des portes ET 42 et 44 et rend actives les sorties des portes ET 43 et 45.

Les deux chaînes K 200 et K 150 de sortie du compteur 40 permettent au système de libéraliser ou de minorer les limitations de vitesse après identification d'une séquence d'entrée parcourue en un temps supérieur à 500 ms.

Les diviseurs par trois 50, 51 et 52 sont remis à 0 à la sortie de la ligne de transmission 21 par perte d'énergie aux bornes des deux bobines A et B. Le circuit de mise en forme 35 délivre un niveau logique 1 permanent

tant que les bobines A et B sont soumises au champ de la ligne. Lorsque ce niveau logique passe à 0, un circuit monostable 63 délivre une impulsion qui remet à 0 l'ensemble des diviseurs par trois 50, 51 et 52, ainsi que la bascule 61, ayant pour effet d'inhiber les sorties des portes ET 43 et 45 et de rendre à nouveau actives les sorties des portes ET 42 et 44.

Il est proposé ici sur les chaînes de survitesse de confirmer trois fois avant la prise en mémoire, ceci simplement à titre d'exemple. La ligne de transmission 21 ne possédant que cinq séquences de mesure de vitesse, un seul des deux registres (en cas de survitesse à frontière 150 ms) pourra être pris en mémoire, assurant ainsi la levée de doute.

La chaîne 100 ms, quant à elle, est destinée à lire les séquences courtes (0,55 mètre) des lignes de transmission 21 disposées en protection de "Stop" ou de bandes continues. Le choix des chiffres qui a été fait ici pour illustrer le fonctionnement permettrait dans ce cas de pénaliser les Stop franchis à + de 20 km/h par une faute grave, à + de 14 km/h par une faute de survitesse supérieure à 25 %, et à + de 10 km/h par une faute de survitesse comprise entre 5 et 25 %, toujours à titre d'exemple.

Un circuit inhibiteur 64 est prévu au niveau des entrées d'impulsions "espace" des quatre portes ET 42 à 45, lorsqu'il y a un temps de parcours des séquences inférieur à 100 ms. Cette disposition permet de ne pas faire progresser les compteurs de survitesse lors de la mémorisation de fautes graves.

Le diviseur par trois 52 de cette chaîne par la troisième entrée de la porte ET 46 se verrouille après la première faute grave commise sur un point de contrôle. Il faudra attendre la remise à 0 par le circuit perte d'énergie captée, pour, après trois autres impulsions, mémoriser une faute grave. Cette disposition permet de ne compter qu'une faute grave par franchissement de bande continue. Les séquences dans l'exemple choisi étant de 0,55 mètre, il suffit donc de parcourir 1,65 mètre sur

la bande continue pour être pénalisé d'une faute grave. C'est donc le franchissement de la bande qui est pénalisé et non la distance de parcours sur celle-ci.

Entre le diviseur par trois 52 et la mémoire 56 de la chaîne 100 ms est insérée une porte OU 49 qui par sa seconde entrée peut faire progresser le compteur de fautes graves.

En effet, la base de temps 41 est appliquée, par l'intermédiaire de la porte ET 68, à l'entrée d'un compteur spécial 65 (compteur 10 minutes), qui délivre une impulsion de sortie toutes les 10 minutes.

De ce fait, si la tension de la batterie du véhicule n'inhibe pas le signal de la base de temps appliquée à ce compteur, une faute grave sera mémorisée toutes les 10 minutes, pénalisant ainsi ceux qui essaieraient de frauder. Il sera expliqué plus bas comment l'alimentation électrique de l'ensemble est proposée. La tension de batterie du véhicule inhibe le circuit de pénalisation 10 minutes grâce à une porte ET 66 dont la seconde entrée 69 reçoit l'information permanente (lorsque le véhicule roule), délivrée par le circuit oscillant de contrôle de l'organe capteur 10.

De cette manière, il faut avoir à la fois la tension de batterie et l'information "capteur actif" pour inhiber le circuit de pénalisation 10 minutes, par l'intermédiaire de l'inhibiteur 67. Ce circuit 65, au lieu de pénaliser toutes les 10 minutes d'une faute grave, pourrait disposer d'une visualisation spéciale. Un troisième compteur 70 reçoit les signaux de la base de temps 41 ; c'est le compteur de temps de marche. Ce compteur, classique, est suivi d'un décodeur 71 et de la visualisation 16 mentionnée plus haut.

Cette chaîne permet de connaître le temps d'utilisation du véhicule, car l'alimentation électrique de ce compteur est fournie par la batterie du véhicule. La remise à 0 du temps de marche se fait par le poussoir 17 situé derrière la porte plombée 18.

La figure 10 représente ce que pourrait être l'alimentation électrique du boîtier d'interprétation . Afin

d'éviter les fraudes, la tension fournie par la batterie 72 du véhicule transite par le câble blindé 20 de liaison entre le boîtier d'interprétation 12 et l'organe capteur 10 , évitant ainsi toute interruption de cette liaison. Par ailleurs, cette alimentation maintient la charge de la petite batterie intérieure 73. Celle-ci alimente la logique, référencée globalement en 74, et, par l'intermédiaire des mémoires 75, la visualisation 76 grâce à un contact inertiel 77. A l'arrêt du véhicule, cette disposition permet de déconnecter la batterie interne 73 afin d'éviter qu'elle ne se décharge.

D'autre part, véhicule à l'arrêt, contact 78 du véhicule établi, le compteur de temps de marche 70 ne peut progresser, car l'alimentation de la base de temps 41 est fournie par la batterie interne 73.

Ceci peut être intéressant si l'on exploite le dispositif en affectant un quota de fautes par heure de conduite.

Le contact inertiel 77 aura une sensibilité suffisante pour assurer l'alimentation grâce aux trépidations du véhicule. Une petite temporisation de maintien 79 peut être envisagée afin de pallier les mini-coupures d'alimentation.

Il est donc possible, avec un tel principe d'alimentation , de déconnecter la batterie 72 du véhicule pour travaux, puisque celui-ci est alors à l'arrêt. Un problème peut être posé lors d'un remorquage en cas de panne ou d'accident, le contact inertiel 77 établissant l'alimentation, et la batterie 72 du véhicule n'étant pas raccordée. Dans ce cas, il sera de la responsabilité du conducteur ou du remorqueur de maintenir l'alimentation.

De toute manière, un remorquage est rarissime et de faible durée. Quoi qu'il en soit, des solutions sont possibles pour pallier cette difficulté, mais elles alourdiraient un peu la logique du système.

La batterie interne 73, du type de celles alimentant les calculateurs scientifiques de poche, aura dans ces conditions une capacité très largement suffisante.

REVENDICATIONS

1. Installation pour le contrôle individuel de la conduite des véhicules automobiles, caractérisée en ce qu'elle comporte essentiellement, d'une part des équipements de bord (10,12) comprenant des organes capteurs (10), de calcul et enregistreurs, montés sur lesdits véhicules (11), et d'autre part des équipements fixes d'infrastructure (3,21), destinés à fournir ponctuellement des signaux particuliers aux équipements de bord (10,12), en fonction de leur emplacement sur la chaussée (1), du genre de véhicule (11) concerné, et de l'infraction visée.

2. Installation selon la revendication 1, caractérisée en ce qu'un équipement fixe d'infrastructure comprend, à l'emplacement de la chaussée (1) auquel on désire effectuer une surveillance, essentiellement une ligne de transmission (21) divisée en séquences par les croisements successifs (4), espacés de façon appropriée, en fonction de la vitesse limite imposée audit emplacement, des deux conducteurs (21a,21b) qui la constituent, cette ligne (21) étant alimentée en courant alternatif de fréquence déterminée par un poste d'alimentation individuel (24) et étant avantageusement bouclée sur son impédance caractéristique (Zc), et en ce que lesdits organes capteurs (10), qui font partie de l'équipement de bord des véhicules (11), comprennent chacun deux bobines détectrices (A,B) branchées de manière à fournir à leur sortie, lors du franchissement de ladite ligne de transmission par le véhicule, des signaux ponctuels qui, après mise en forme par un circuit approprié (35), fourniront aux organes de calcul et enregistreurs du véhicule (boîtier d'interprétation 12) des impulsions d'espace (36) dont l'espacement dans le temps sera représentatif, au moins, de la vitesse moyenne dudit véhicule entre les deux croisements correspondants (4) de ladite ligne de transmission (21) et pourra être comparé à un temps de base (To).

3. Installation selon la revendication 2, caracté-

risée en ce que, pour un contrôle de vitesse proprement dit, ladite ligne de transmission (21) s'étend sur la chaussée (1) (en étant éventuellement incluse dans le revêtement) en chevauchant deux voies de roulement adjacentes , de sorte que, tout en ayant une largeur notablement inférieure à celle de la chaussée (1), elle puisse permettre un contrôle de la vitesse des véhicules passant sur l'une ou l'autre desdites voies, dans un seul sens ou dans les deux sens.

4. Installation selon l'une quelconque des revendications précédentes, caractérisée en ce que, sur chaque véhicule (11) équipé, ledit organe capteur (10) sera disposé sous le véhicule de sorte à être à une distance relativement faible de la surface de roulement, et (pour les véhicules ayant le volant à gauche) approximativement au tiers latéral gauche de la largeur du véhicule.

5. Installation selon la revendication 3 ou 4, caractérisée en ce que la ligne de transmission (21) est divisée en séquences de longueurs égales (croisements (4) des conducteurs (21a, 21b) équidistants), à l'exception de deux séquences d'identification (22,23) de longueur notablement plus grande, placées aux extrémités de la ligne (21) et permettant de différencier les limitations de vitesse imposées en fonction du type de véhicule concerné (véhicules à hautes performances, véhicules à performances moyennes, poids lourds).

6. Installation selon l'une quelconque des revendications 1 à 4, caractérisée en ce que, pour le contrôle du franchissement des bandes continues (6) (d'interdiction de dépassement ou analogues), la ligne de transmission (5) est disposée au-dessus de ladite bande (6), en dépassement de chaque côté, mais en étant notablement moins large qu'une ligne de transmission de contrôle de vitesse, et en ce que les séquences ont une longueur réduite, correspondant à une vitesse maximale autorisée très faible (de l'ordre de 10 km/h).

7. Installation selon l'une quelconque des revendications 1 à 4, caractérisée en ce que, pour le contrôle

des franchissements interdits sans arrêt, tels que signaux de "Stop" ou feux rouges, ou encore pour le contrôle d'interdiction d'emprunter certaines parties de la chaussée (telles que voies de gauche des chaussées à plusieurs voies pour les poids lourds ou voies d'urgence d'autoroutes pour tous les véhicules sauf les véhicules autorisés), la ligne de transmission (8) s'étend sur au moins une partie notable de la largeur de la zone à surveiller et est constituée de séquences relativement courtes correspondant à une limitation de vitesse maximale très faible (de l'ordre de 10 km/h).

8. Installation selon la revendication 7, caractérisée en ce que, pour le contrôle du franchissement des signaux de "Stop", ladite ligne de transmission (8) est située en amont du signal, tandis que pour le contrôle du franchissement des feux rouges (de carrefours et analogues), ladite ligne de transmission est située en aval du feu et est contrôlée par l'état dudit feu.

9. Installation selon la revendication 7 ou 8, caractérisée en ce que la longueur des séquences successives de la ligne de transmission (8) suit, vue dans le sens de la circulation, un décrément calculé pour permettre de contrôler la décélération des véhicules.

10. Installation selon l'une quelconque des revendications 2 à 9, caractérisée en ce que la ligne de transmission (21) présente une configuration qui lui est propre, par exemple quant à la longueur variable et à la répartition des séquences successives qui la composent, ce qui permet de coder les signaux qu'elle fournit et de l'identifier.

11. Installation selon l'une quelconque des revendications précédentes, caractérisée en ce que lesdits moyens de calcul et enregistreurs des équipements de bord (12) des véhicules sont du type à circuits logiques en faisant avantageusement appel à la technique des microprocesseurs, et sont associés à des moyens d'affichage, notamment digitaux, permettant au conducteur, ainsi qu'aux autorités concernées, de constater le nombre des

pénalités encourues, et éventuellement le temps total de marche du véhicule entre deux contrôles.

12. Installation selon la revendication 11, caractérisée en ce que les informations recueillies par l'équipement de bord du véhicule, quant à l'importance et au nombre des infractions commises, sont enregistrées sur une carte à mémoire, ce qui permet un traitement commode, par moyens informatiques, desdites informations.

13. Installation selon la revendication 12, caractérisée en ce que lesdits circuits logiques d'équipement de bord des véhicules comprennent un circuit propre à permettre l'enregistrement, à intervalles de temps déterminés, (par exemple toutes les 10 minutes), d'une information analogue à celle qui est fournie lors d'une infraction grave si ladite carte à mémoire n'est pas mise en service -volontairement ou involontairement- par le conducteur, ce défaut de mise en service étant par ailleurs rappelé à celui-ci par un signal lumineux ou sonore.

14. Installation selon l'une quelconque des revendications 11 à 13, caractérisée en ce que lesdits circuits logiques comprennent un circuit propre à permettre l'enregistrement, à intervalles de temps déterminés (par exemple toutes les 10 minutes), d'une information analogue à celle qui est fournie lors d'une infraction grave, notamment dans le cas où l'utilisateur aurait tenté de blinder l'organe capteur (10) ou aurait tenté de frauder par débranchement de la batterie, l'installation pouvant dans ce dernier cas continuer de fonctionner grâce à une batterie interne (73) de l'équipement de bord, ou encore aurait tenté de supprimer la liaison entre l'organe capteur et le boîtier d'interprétation.

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FIG.1.

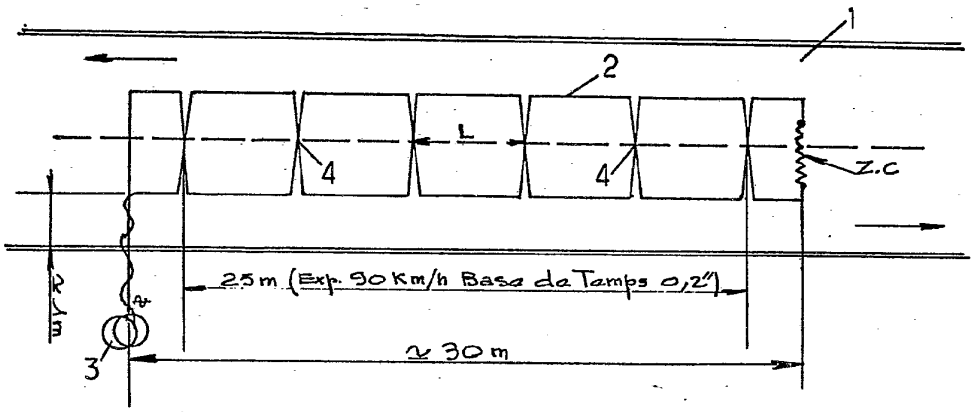


FIG.2.

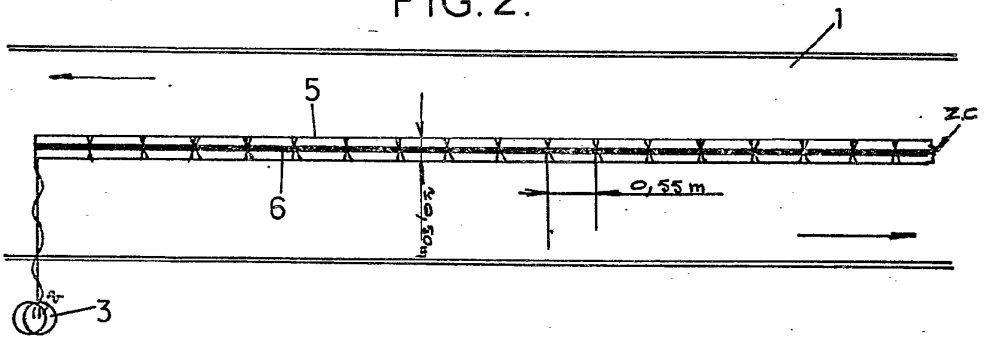


FIG.3.

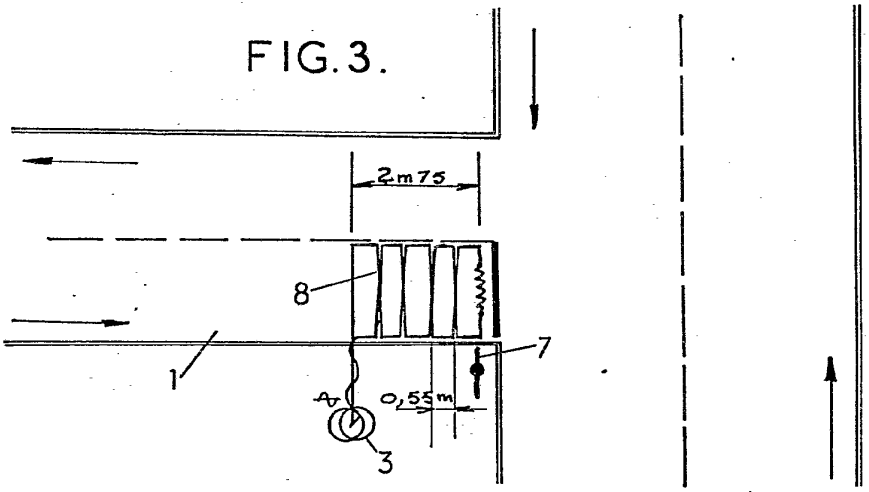


FIG.4.

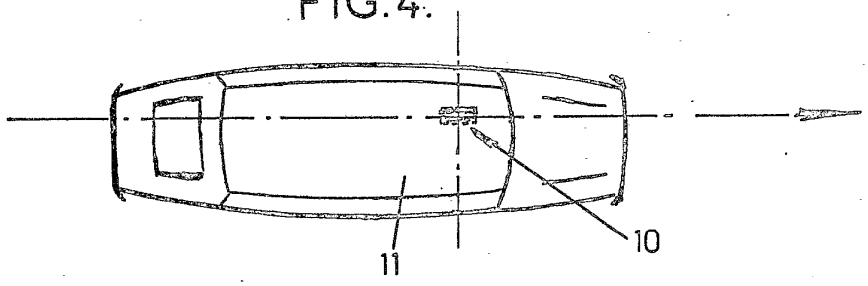
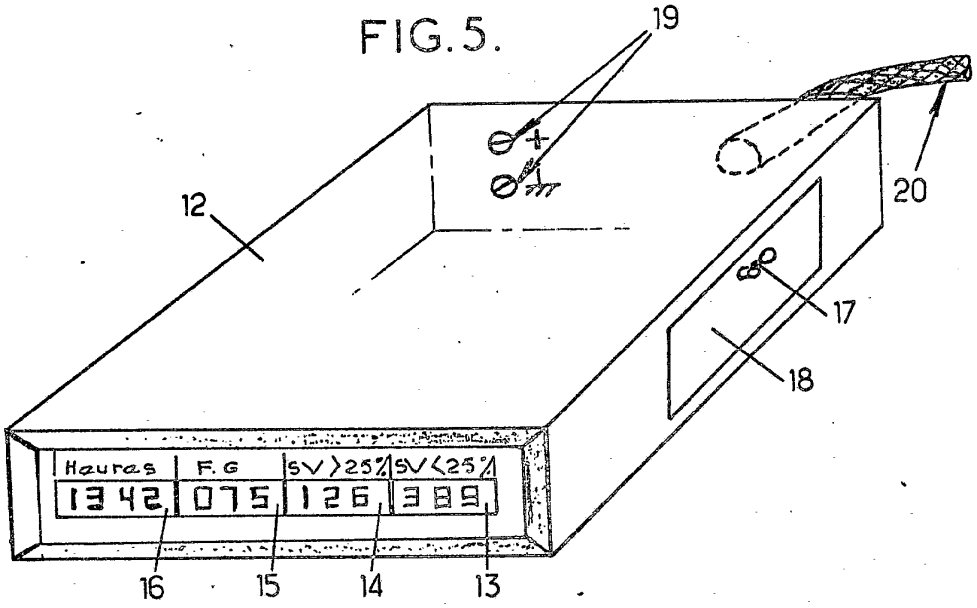

11
10

FIG.5.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12
20
17
18
Heures
F.G
SV>25%
SV<25%
1342
075
126
389
16
15
14
13

FIG.6.

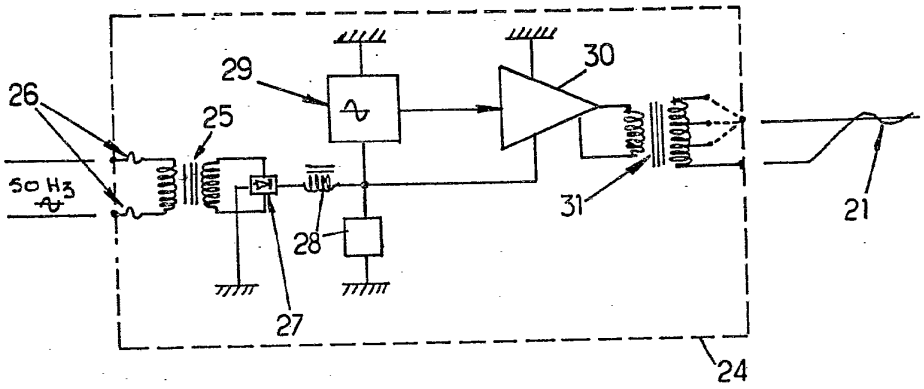


FIG.7.

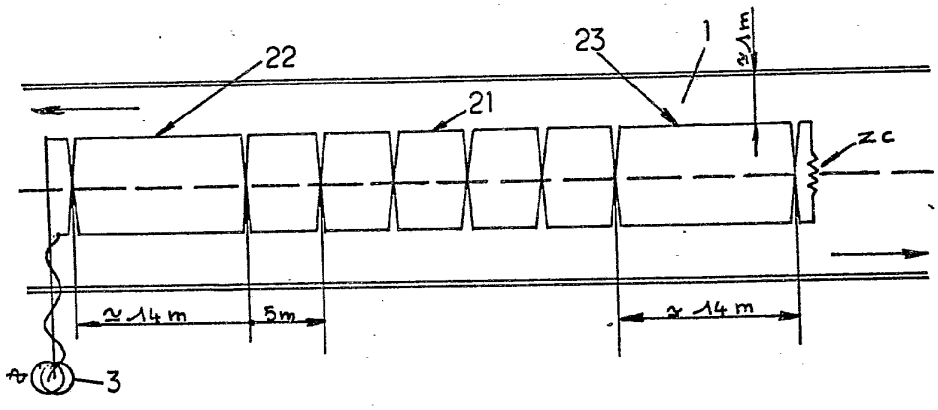


FIG.8.

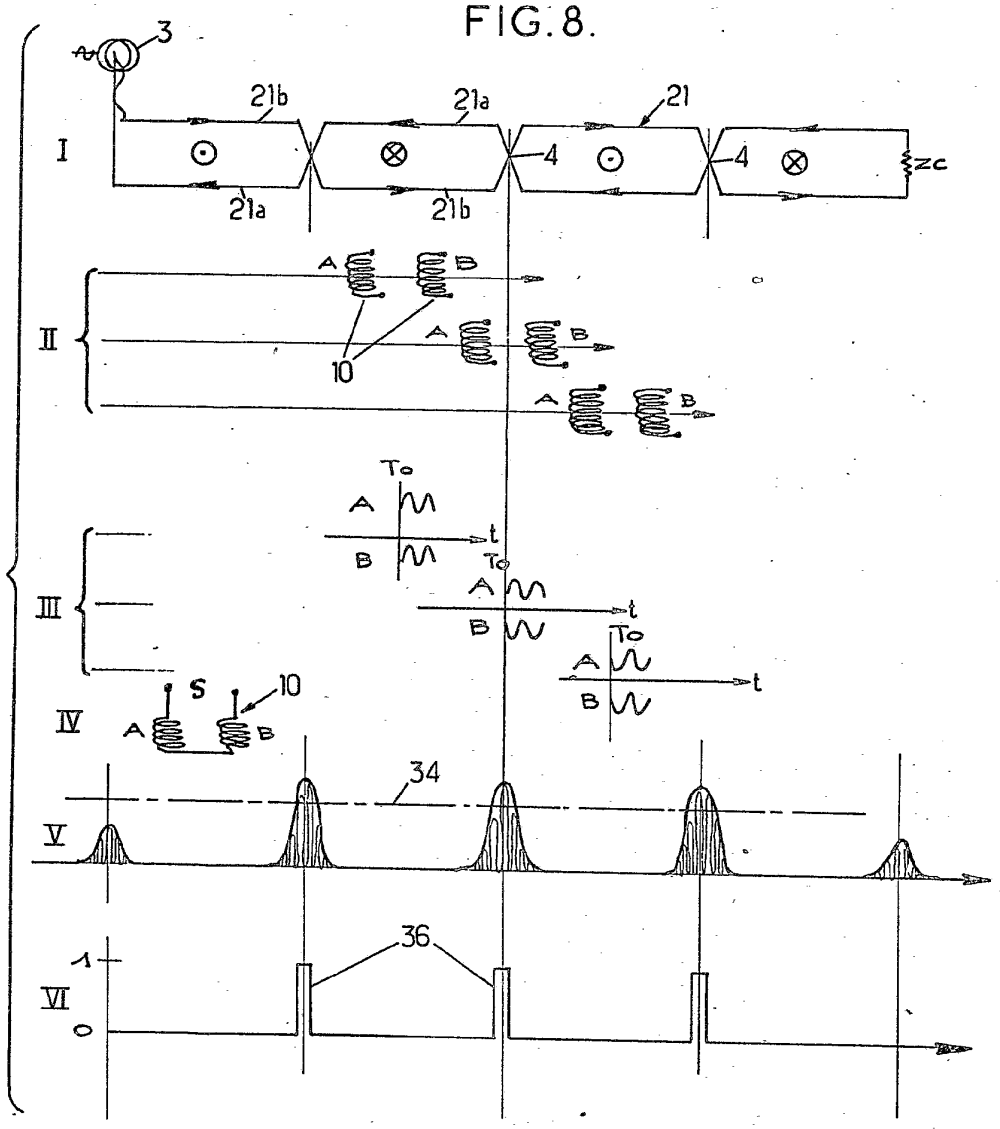
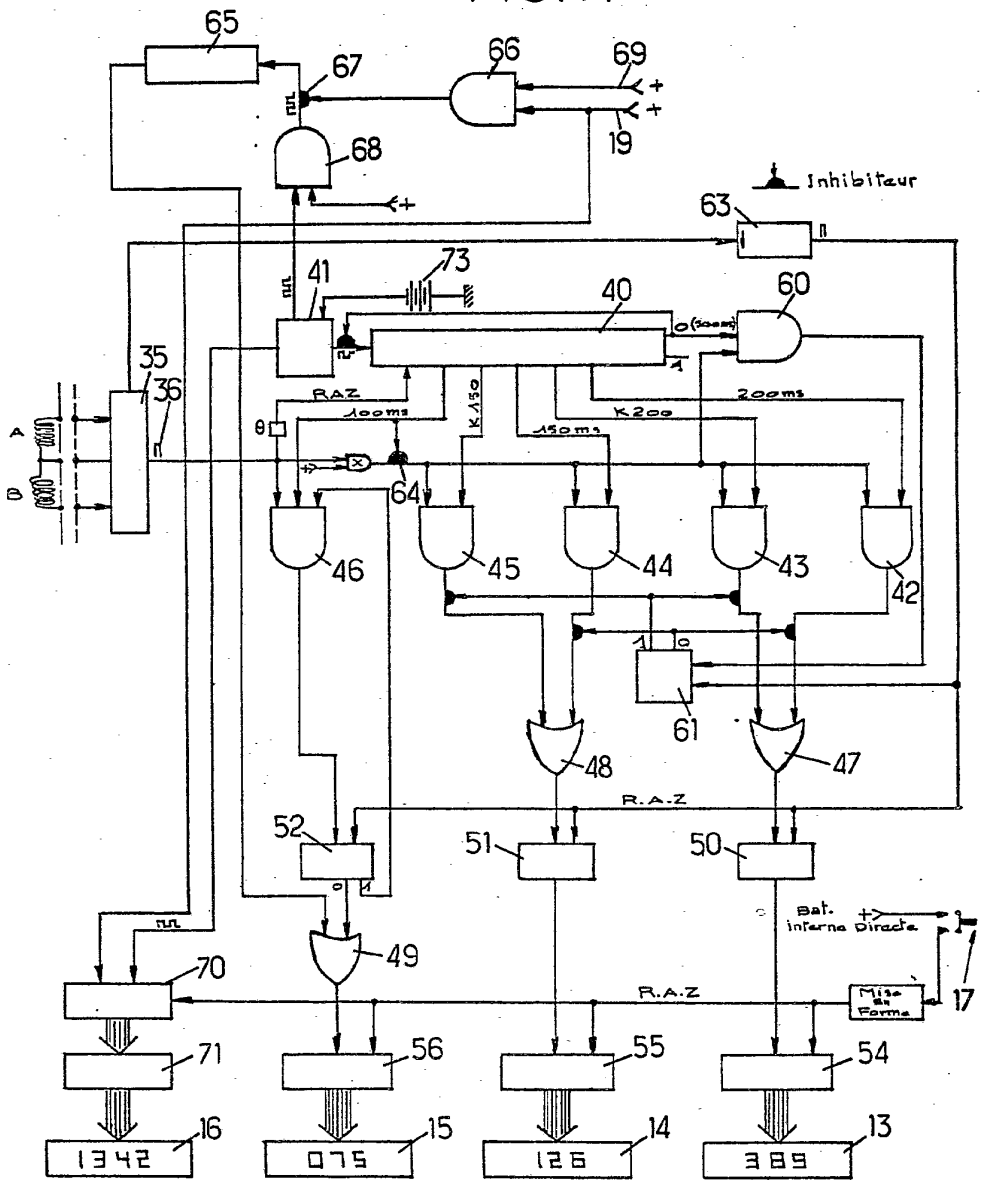


FIG. 9.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68
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Inhibiteur
63
73
41
40
60
35
36
A
B
RAZ
100ms
150ms
200ms
64
46
45
44
43
42
61
48
47
R.A.Z
52
51
50
Bat. interne Directe
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15
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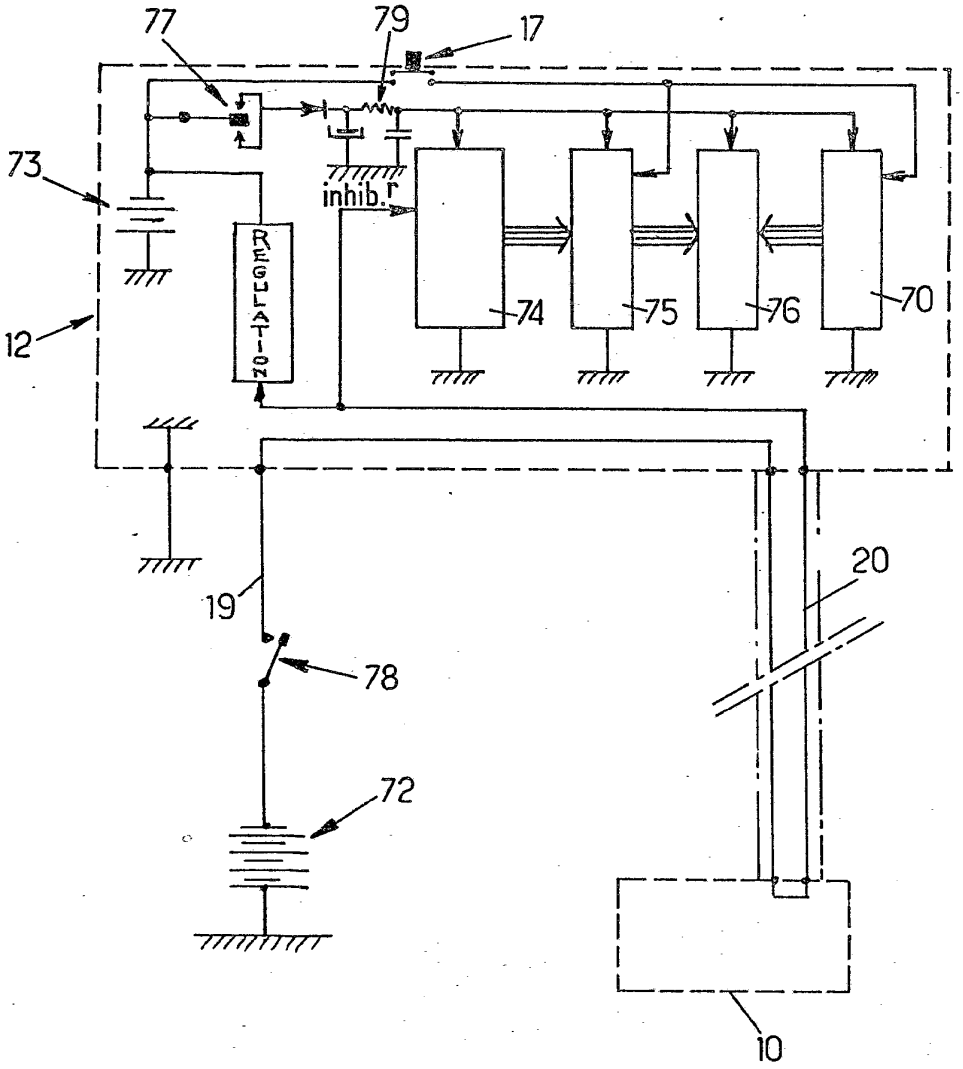
075
126
389

FIG. 10.



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U1S 1820 G4N

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(58) Field of search
G4N

(71) Applicant
William David Devine,
40 Rostherne Road, Sale, Cheshire M33 2RX

(72) Inventor
William David Devine

(74) Agent and/or Address for Service
M'Caw & Co,
41–51 Royal Exchange, Cross Street, Manchester
M2 7BD

(54) Vehicle safety device

(57) A vehicle safety device comprises a switch (18) controlled sensor (10) operable to detect the movement due to fatigue, illness or the like of a vehicle driver from a normal driving position, and to activate a warning device (11,12,13) either audible (11) and/or visual (12,13). If the normal position is restored within a predetermined time the sensor (10) detects this and deactivates the warning device (11,12,13). If not the clutch (22) may be disengaged, vehicle brakes (15,17) applied, and/or engine stopped by interruption of fuel supply (27) or electrical supply (24). A programmable activating device (48) for the solenoid operated locks (47) of the vehicle (43) may immobilise the vehicle (43) and/or activate the warning device (11,12,13), the activating device (48) being operable in response to selection of predetermined digits stored in a memory of the activating device (48).

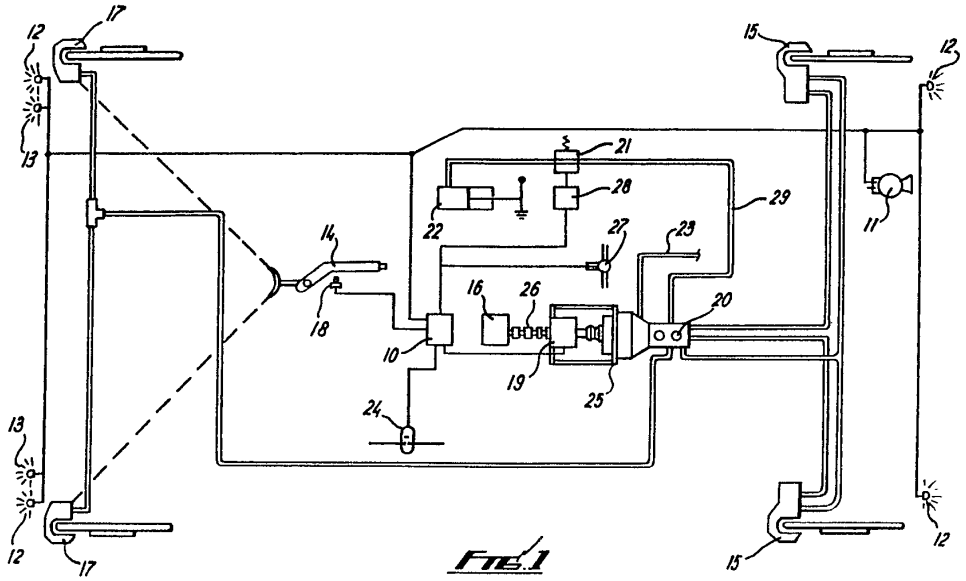
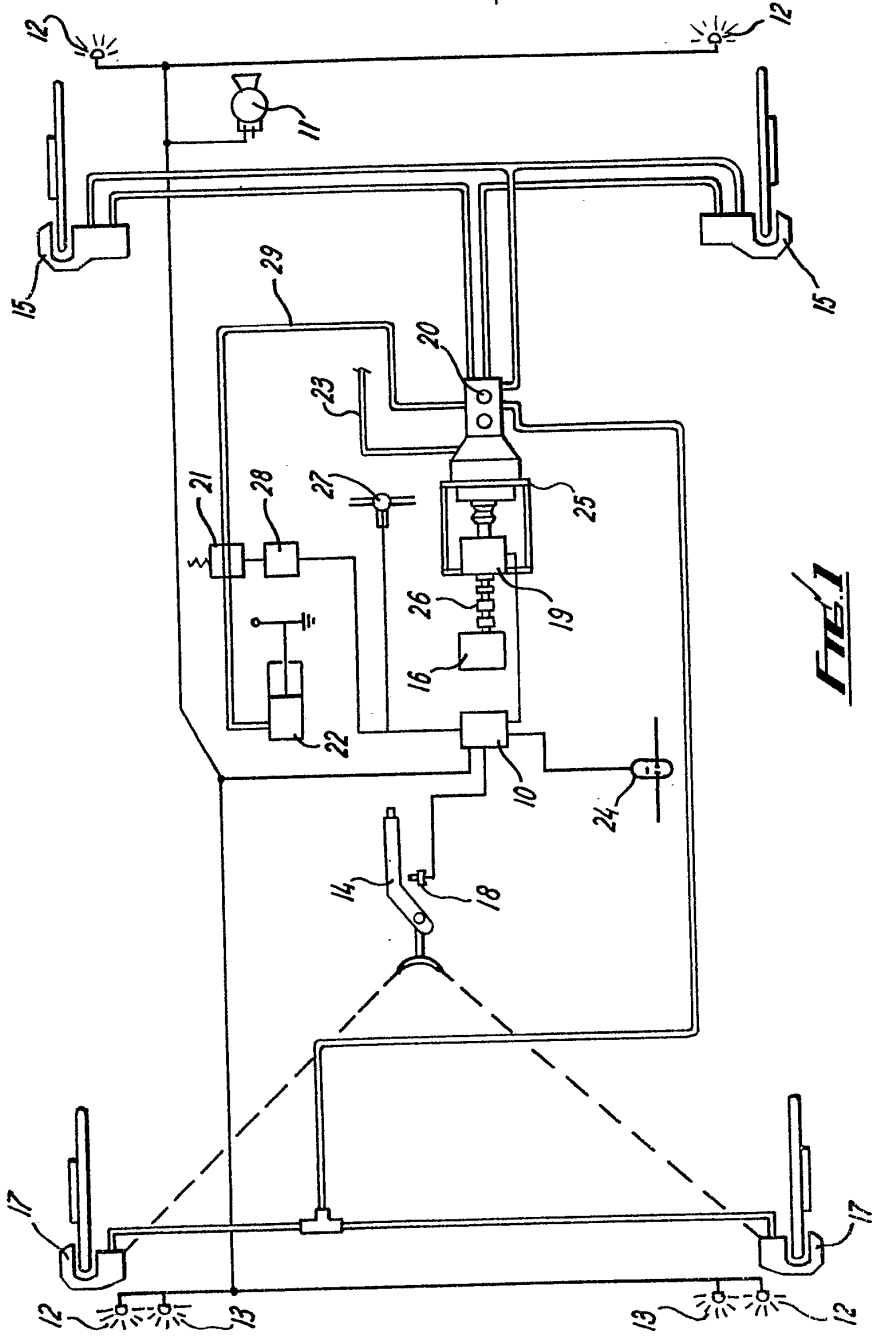


Fig.1

GB 2 143 978 A

The drawings originally filed were informal and the print here reproduced is taken from a later filed formal copy.

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1982.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12

Fig.1

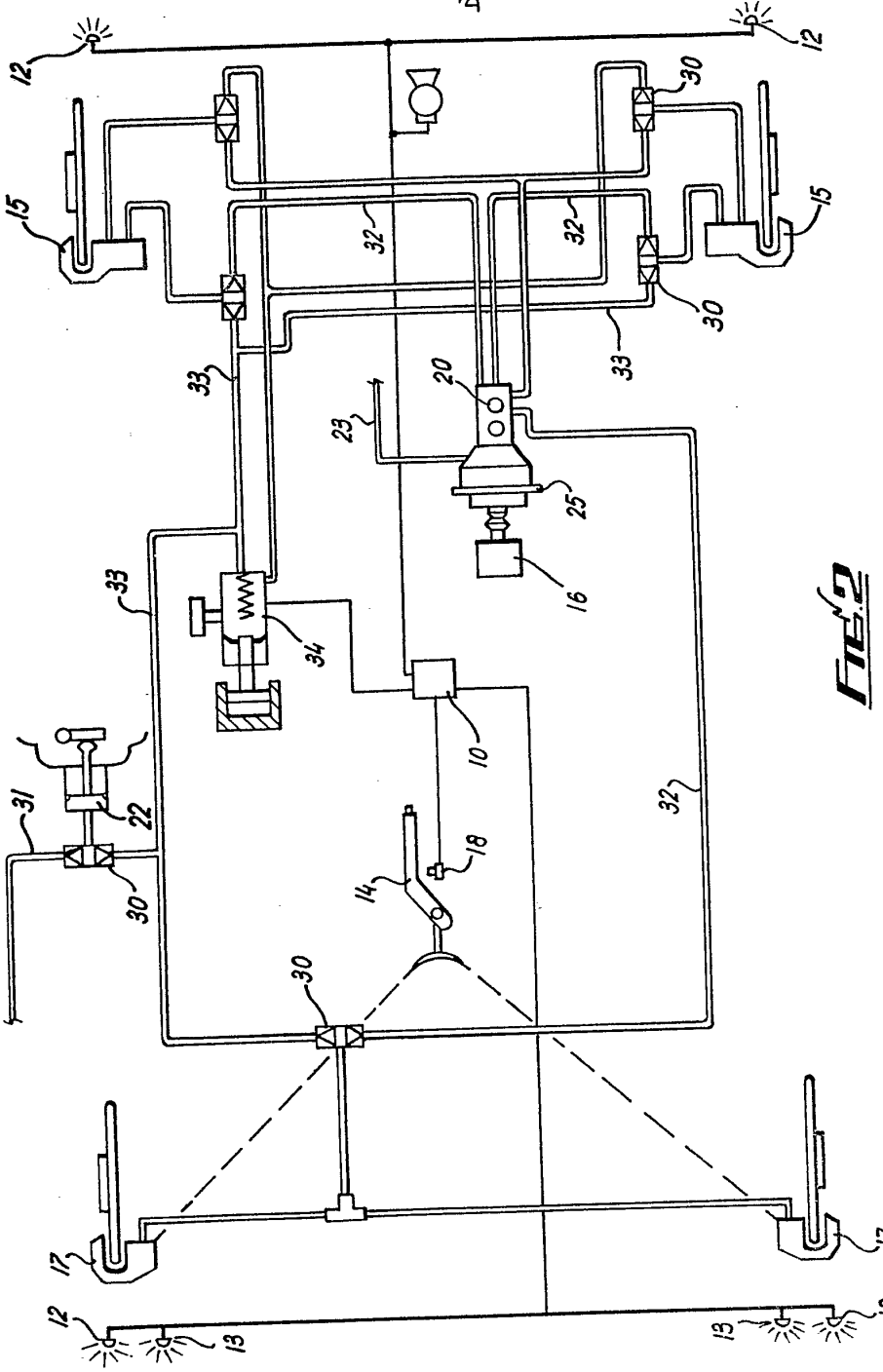
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FIG.2

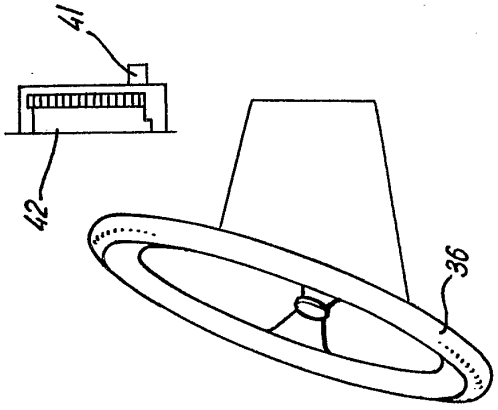


FIG. 3

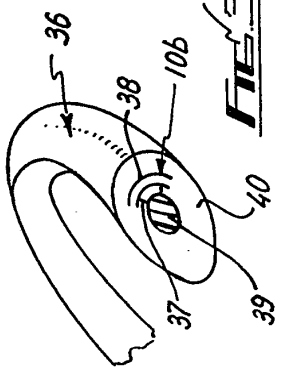
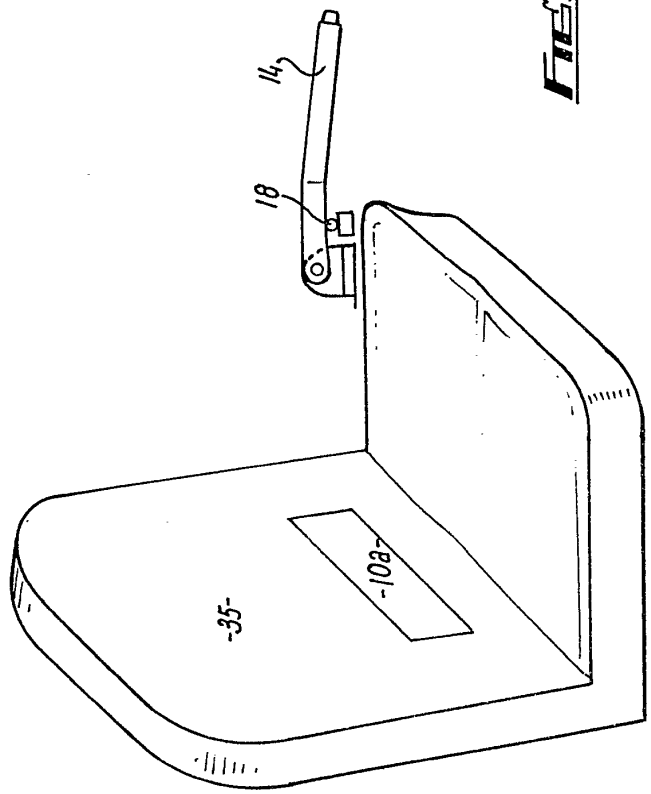


FIG. 3A



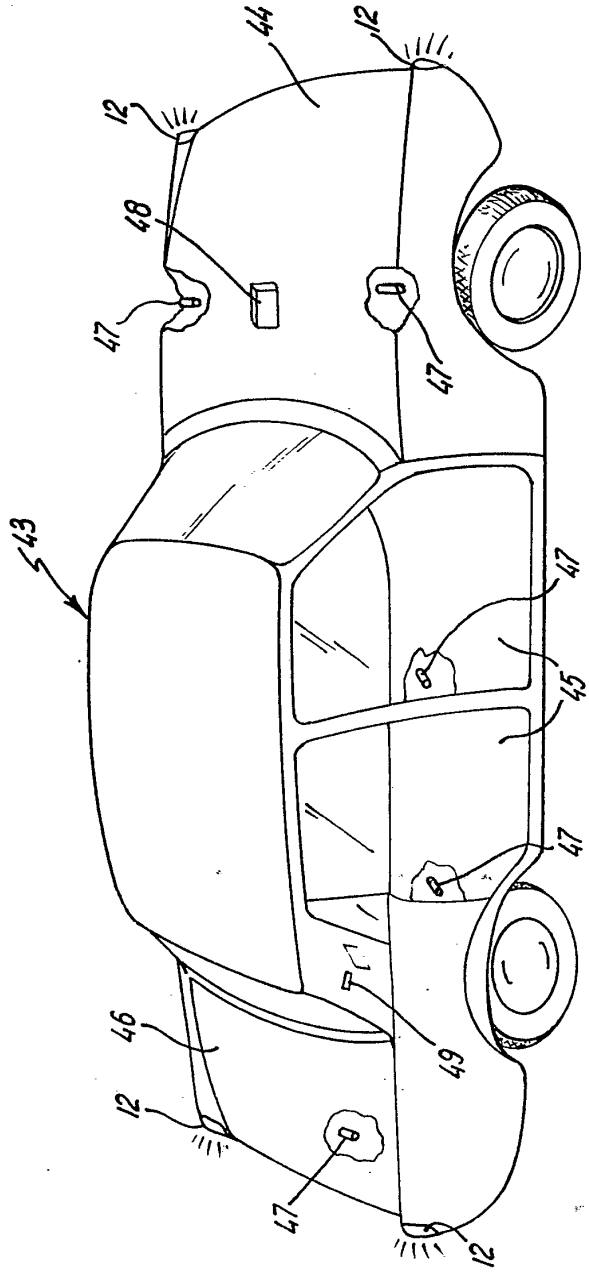


Fig. 4

SPECIFICATION

Vehicle safety device

This invention relates to vehicle safety devices.

Many accidents occur as a result of a driver of a vehicle losing control of that vehicle due to a personal disability such as a heart attack, dizziness, fainting, sleep or the like or due to a vehicle disability such as brake or steering failure. In many instances of personal disability, and in most cases of vehicle disability, there is little or no warning of the onset of the trouble, which can occur at any time. It is an object of the present invention to provide means whereby the repercussions usually associated with the occurrence of any of the abovementioned disabilities are avoided or at least substantially mitigated.

The invention provides a vehicle safety device comprising a warning device, and a sensor operable to detect the movement of a vehicle driver from a normal driving position and to initiate operation of said warning device.

The warning device may comprise an audible and/or a visual warning device. In the former case it may comprise a horn of the vehicle or an independent audible device. In the latter case it may include hazard warning flashing lights and/or rear braking indicator lights.

The sensor may also be operable to interrupt the normal driving operation of the vehicle, and may be operable to apply braking to the vehicle and/or interruption of the vehicle driving system. In the former case the braking may be effected by a normally driver operated braking system or by braking means independent of the normally driver operated system. In the latter case the interruption of the vehicle driving system may be by disengagement of a clutch and also by stopping the engine, for example, by interruption of fuel flow to the engine or by interruption of the ignition circuit.

The sensor may be operable to interrupt the normal driving operation of the vehicle a predetermined period after initiating operation of the warning device. The sensor may also be operable to detect the movement of the vehicle driver back into a normal driving position and to cause cessation of operation of the warning device and non-interruption of the normal driving operation of the vehicle.

A plurality of sensors may be provided, each operable to detect the movement of a respective part of the vehicle driver from its normal position during driving different from that part of the vehicle driver whose position is sensed by the or each other sensor. In this case operation of the warning device may be effected only in response to signals from all of the sensors.

Switch means may be provided whereby said sensor or sensors may be in an operational or non-operational condition. The switch means may be operable by an ignition circuit of the vehicle, or by movement of a handbrake lever to brake-off position.

By means of the invention it is believed that loss of life, serious injury and damage to vehicles and other property as a result of the occurrence of a personal or vehicle disability can be prevented or substantially mitigated. However, another cause for concern is that of the number of vehicles stolen or otherwise taken without the owner's consent. It is another object of the present invention to provide means whereby such theft or unauthorised removal may be prevented or the risk thereof substantially reduced.

The invention provides a vehicle safety device comprising vehicle locking means and actuating means therefor, said actuating means being operable to activate said vehicle locking means and to interrupt the normal driving operation of the vehicle. The normal driving operation of the vehicle may be interrupted by engagement of brakes to the vehicle and/or interruption of the vehicle driving system. Interruption of the vehicle driving system may be by disengagement of a clutch of the vehicle and/or by prevention of fuel and/or ignition supply to the engine. The vehicle safety device may also include a warning device and a second actuating means operable to activate said warning device, which may be an audible and/or visual warning device. Said second actuating means may be operable in response to opening of said vehicle whilst said vehicle locking means is actuated.

Preferably said actuating means is operable in response to the selection of a predetermined plurality of digits, and said actuating means may include a programmable device having memory means in which said predetermined plurality of digits may be stored.

Embodiments of safety device in accordance with the invention will now be described with reference to the accompanying drawings in which:–

Figure 1 is a schematic layout of a first embodiment,

Figure 2 is a schematic layout of a second embodiment,

Figure 3 is a schematic perspective view of part of a vehicle inporating the safety device of Fig. 1 or Fig. 2,

Figure 3a is a scrap section of the steering wheel of Fig. 3, and

Figure 4 is a schematic perspective view of a vehicle incorporating a third embodiment of safety device.

Referring now to Fig. 1 there is shown a sensor 10 which when activated causes operation of warning devices in the form of a horn 11, hazard warning flashing lights 12 and

rear braking indicator lights 13 of a vehicle (not shown). In order that there may not be an undue drain of the vehicle's battery (not shown) the sensor 10 provides a pulsed signal to the warning devices 11, 12 and 13 so that these devices operate intermittently. The sensor 10 is operable to detect movement of a driver of the vehicle from a normal driving position but is only operable when a switch 18 is switched to an on-position by movement of the hand-brake lever 14 to the brakes-off position. In this way activation of the warning devices 11, 12, 13 is prevented when the driver gets out of the vehicle or simply moves about whilst the vehicle is parked. As an alternative the sensor 10 may be operable only when the ignition circuit of the vehicle is switched on, or for added security when both handbrake lever 14 is in the brakes-off position *and* the ignition circuit of the vehicle is switched on.

If the movement of the driver from his normal driving position is due to drowsiness, he may be aroused by the operation of the horn 11 and/or by an indicator light (not shown) usually provided on the dashboard of the vehicle to indicate operation of the hazard warning lights. In such circumstances he will probably return rapidly to the normal driving position, in which case the sensor 10 will sense the same and cease activation of the warning devices 11, 12, 13. By this means an accident as a consequence of the drowsiness of the vehicle driver may be avoided.

If the driver does not return to the normal driving position within a predetermined time interval, for example 2 second, the sensor 10 is then operable to interrupt the normal driving operation of the vehicle. In this case the sensor 10 causes activation of a stepping motor 19 to apply the front and rear brakes 15, 17. The stepping motor 19 is connected to the piston (not shown) of the master cylinder 20 and brake fluid reservoir by means of a screwed and slotted shaft 26 whilst the lever carrying the brake pedal 16 is slidable in the slot of shaft 26. By this means rotation of the shaft 26 by stepping motor 19 does not affect the position of brake pedal 16 and operation of the brake pedal 16 does not affect the shaft 26 or stepping motor 19. A brake servo unit 25 of conventional form and having a vacuum inlet 23 may be provided as shown if required.

At the same time the sensor 10 is operable to open circuit a relay 24 in the ignition circuit of the vehicle and/or close a valve 27 to interrupt the fuel supply to the engine in the case of petrol driven engines, or close valve 27 to interrupt the fuel supply to the engine in the case of diesel engined vehicles.

In addition, the sensor 10 energises a solenoid 28 to open a valve 21 in a hydraulic fluid supply line 29 from the master cylinder 20 to the clutch operating cylinder 22, thereby causing disengagement of the clutch. Such disengagement of the clutch would not occur on normal operation of the brake pedal 16 since valve 21 would be closed.

By means of the above, if the driver does not return to his normal driving position a predetermined time after actuation of the warning devices 11, 12, 13, the vehicle is brought to rest with the brakes 15, 17 on, the engine stopped and clutch disengaged.

Referring now to Fig. 2 there is shown an arrangement which is similar in many respects to that shown in Fig. 1 and like parts are indicated by the same reference numerals in the two cases. In the case of the embodiment of Fig. 2 the brakes 15, 17 are applied normally by means of brake pedal 16 operating through brake servo unit 25 and master cylinder 20 and the clutch disengaged normally by operation of the clutch cylinder 22 under pressure in the normal hydraulic fluid supply line 31. However, in each hydraulic fluid supply line 32 to the brakes 15, 17 and line 31 to the clutch cylinder 22 is provided a separator valve 30. Each valve 30 comprises a cylinder having inlets at opposed ends thereof and an outlet disposed centrally, and a valve member slidable within the cylinder so as to seal a low pressure inlet and provide a fluid flow path between the outlet and a high pressure inlet. One of the inlets is connected to a normal supply line 32 or 31 whilst the other inlet is connected to an auxiliary supply line 33. The outlet is connected to a brake 15 or 17 or the clutch cylinder 22 as appropriate. By this means operation of the normal brake or clutch mechanisms does not affect the fluid in the auxiliary supply system and vice-versa. The auxiliary supply system comprises a second master cylinder and fluid reservoir 34 to which the auxiliary supply line 33 is connected. The auxiliary supply system is activated by the sensor 10 a predetermined time interval after activation of the warning devices 11, 12, 13 as in the previous embodiment, and interruption of the fuel supply to the engine and/or open circuiting of the ignition circuit may occur as described in respect of the previous embodiment.

Referring now to Figs. 3 and 3a there is shown two sensors 10*a* and 10*b*. As previously mentioned the sensors 10*a*, 10*b* are only operable when the switch 18 is switched to the on position by means of handbrake lever 14 being moved to the brake-off position shown in Fig. 3. Sensor 10*a* is located in the back of the driver's seat 35 and is responsive to pressure thereon by the driver when he is in a normal driving position. To avoid actuation of the warning devices 11, 12, 13 by sensor 10*a* in the event that a driver leans forward deliberatly whilst driving, a second sensor 10*b* is provided in the steering wheel 36. Only when both sensors 10*a* and 10*b* detect movement of the driver from his nor-

mal driving position are the warning devices 11, 12, 13 activated. The sensor 10*b* comprises sensor strip contacts 37, 38, contact 37 being secured to the core 39 of the wheel 36 whilst contact 38 is embedded in a resiliently flexible outer sheath 40.

So as to avoid either unduly harsh braking when a vehicle is moving slowly or insufficient braking when the vehicle is moving at high speed the braking effort applied to the vehicle may be dependent upon the vehicle's speed. For this purpose a speed sensor 41 incorporated in the speed indicator 42 of the vehicle is connected in circuit with the sensor 10. The speed sensor 41 comprises a potentiometer operable so that at high speed a relatively large current output from sensors 10 and 41 is transmitted to the stepper motor 19 or auxiliary master cylinder 34 to provide heavy braking, whilst at low speed a relatively small current output is transmitted to provide only light braking.

Referring now to Fig. 4 there is shown a vehicle 43 of conventional form having a bonnet 44, doors 45 and boot 46, each of which has a solenoid operated lock 47. All of the locks 47 are operated by a programmable controller 48 located within the vehicle 43, for example under the bonnet 44 as shown in Fig. 4. Mounted on the side of vehicle 43 is a keyboard 49 connected with the controller 48 and the controller 48 is programmed so that the input of a predetermined selection of digits on the keyboard 49 causes unlocking of locks 47 whilst the input of any other selection of digits activates one or more of the warning devices 11, 12, 13, in particular the horn 11 and hazard warning flashing lights 12. Such an arrangement is preferably additional to the conventional key-operated locks so that the vehicle may be used by persons other than the owner, for example at a garage during servicing or repair, without revealing the predetermined digit selection. To facilitate such security a module, programmed by the vehicle owner himself may be inserted in the controller 48 after purchase of the vehicle so that only the vehicle owner can known the correct digit selection. By this means vehicle theft may be prevented or the risk thereof substantially reduced, possibly leading to lower insurance premiums for the vehicle owner.

The solenoid operated locks 47 are preferably of the mechanically latched type so that there is no undue loss of current to run down the vehicle's battery.

CLAIMS

1. A vehicle safety device comprising a warning device and a sensor operable to detect the movement of a driver of a vehicle from a normal driving position and to initiate operation of said warning device in response to such movement.

2. A vehicle safety device according to claim 1 wherein said warning device comprises audible warning means.

3. A vehicle safety device according to claim 1 or claim 2 wherein said warning device comprises visual warning means.

4. A vehicle safety device according to any one of claims 1 to 3 wherein said sensor is operable to interrupt the normal driving operation of a vehicle in response to such movement.

5. A vehicle safety device according to claim 4 wherein said sensor is operable to interrupt the normal driving operation of a vehicle a predetermined period after initiating operation of said warning device.

6. A vehicle safety device according to claim 5 wherein said sensor is operable to detect the return movement of a driver of a vehicle to a normal driving position and to cause cessation of operation of said warning device and non-interruption of the normal driving operation of a vehicle in response to said return movement.

7. A vehicle safety device according to any one of claims 4 to 6 comprising a plurality of sensors, each operable to detect the movement of a respective part of a driver of a vehicle from its normal driving position different from that part of said driver whose position is sensed by the or each other sensor.

8. A vehicle safety device according to claim 7 wherein operation of said warning device is effected only in response to signals from all of said sensors.

9. A vehicle safety device according to any one of claims 4 to 8 comprising switch means operable to put said sensor or sensors in an operational condition.

10. A vehicle safety device according to claim 9 when fitted to a vehicle having an ignition circuit wherein said switch means is operable on activation of said ignition circuit.

11. A vehicle safety device according to claim 9 or claim 10 when fitted to a vehicle having a hand operated brake means wherein said switch means is operable on release of said hand operated brake means.

12. A vehicle safety device according to any one of claims 1 to 11 comprising vehicle locking means and actuating means therefor, said actuating means being operable to actuate said vehicle locking means and to interrupt the normal driving operation of a vehicle.

13. A vehicle safety device according to claim 12 wherein said locking means comprises a plurality of solenoid operated locks.

14. A vehicle safety device according to claim 13 wherein each of said locks has a mechanical latch operable to retain said lock in a locked position after actuation of said solenoid thereof.

15. A vehicle safety device according to any one of claims 12 to 14 comprising an activating device operable to initiate operation

of said warning device in response to opening of said vehicle whilst said locking means is actuated.

16. A vehicle safety device according to any one of claims 12 to 15 wherein said actuating means is operable in response to the selection predetermined plurality of digits.

17. A vehicle safety device according to claim 16 wherein said actuating means comprises a programmable device having memory means in which said predetermined plurality of digits may be stored.

18. A vehicle safety device according to any one of claims 4 to 17 when fitted to a vehicle having brake means wherein said interruption comprises activation of said brake means.

19. A vehicle safety device according to claim 18 comprising a vehicle speed sensor operable to detect the speed of said vehicle and to adjust the activation of said brake means in accordance with the detected speed.

20. A vehicle safety device according to any one of claims 4 to 19 when fitted to a vehicle having a drive transmission operable to drivingly engage drive wheels with an engine of said vehicle wherein said interruption comprises interruption of said drive transmission to disengage said drive wheels from said engine.

21. A vehicle safety device according to claim 20 wherein said drive transmission means includes a clutch and said interruption comprises disengagement of said clutch.

22. A vehicle safety device according to any one of claims 4 to 21 when fitted to a vehicle having an engine and a fuel supply therefor wherein said interruption comprises interruption of said fuel supply to said engine.

23. A vehicle safety device according to any one of claims 4 to 22 when fitted to a vehicle having an engine and an electrical supply therefor wherein said interruption comprises interruption of said electrical supply to said engine.

24. A vehicle safety device according to any one of claims 1 to 23 wherein said sensor is operable to transmit a pulsed signal to said warning device.

25. A vehicle safety device substantially as hereinbefore described with reference to and as illustrated in Fig. 1 or Fig. 2, Figs. 3 and 3a, or Fig. 4 of the accompanying drawings.

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(71) Applicant
Stellar International Limited

(Incorporated in Ireland)

Pan Atlantic House, Quincentennial Drive, Galway, Ireland

(72) Inventors
Anthony O'Donovan Johnstone
Mary Veronica Lonergan

(74) Agent and/or Address for Service
Serjeants
25 The Crescent, King Street, Leicester, LE1 6RX, United Kingdom

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G06F 15/21

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G4A AUX
U1S S1820

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None

(58) Field of search
UK CL (Edition J) **No search possible**

(54) **Computer system for car insurance**

(57) The invention provides for computing a range of car insurance premiums in response to data being entered into the computer 2, by means of terminals 3, in a predetermined data entry format. The entry format and entered data are displayed on the left hand side of a visual display screen 6 simultaneously with the display of premiums on the right hand side of the screen. Specific data fields are provided on the screen for data to be entered and for the premiums. Data is entered sequentially in the data fields, and sub routines control the entry and reading of the data, and validation of the entered data using look-up tables 10.

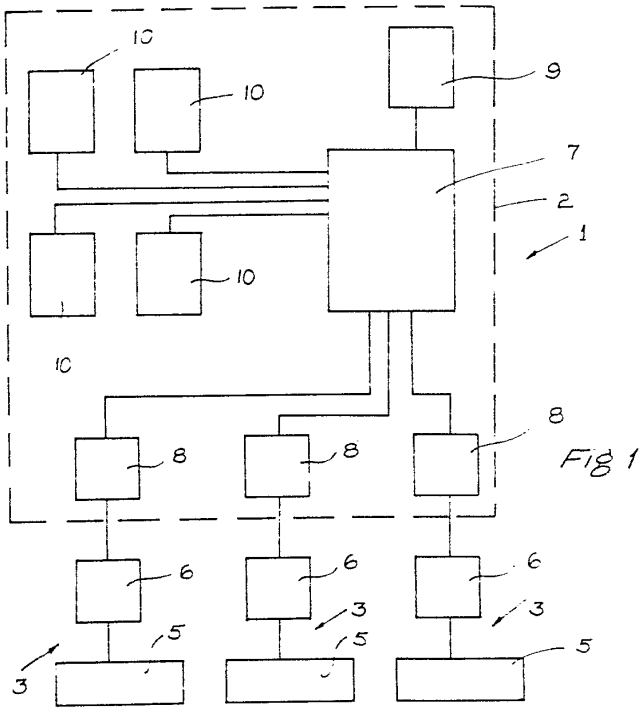

Fig 1

GB 2 225 461 A

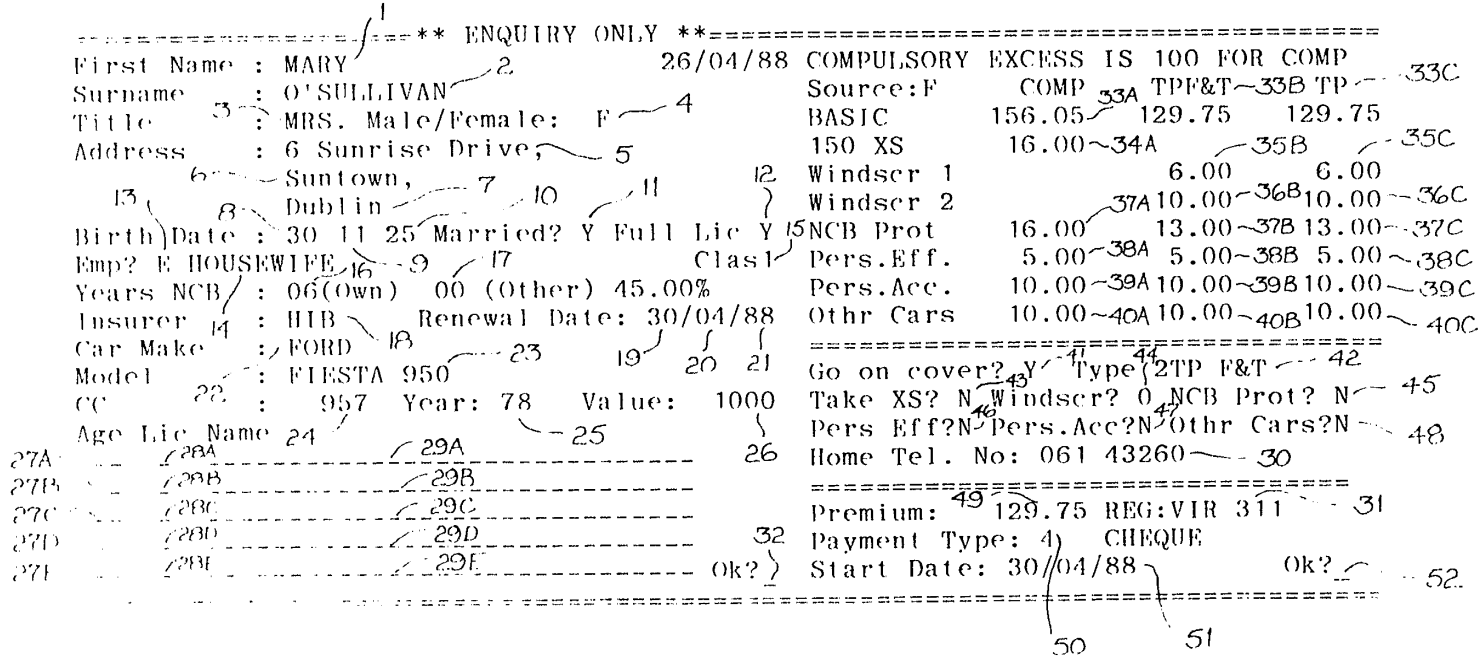
** ENQUIRY ONLY **
First Name : MARY
Surname : O'SULLIVAN
Title : MRS. Male/Female: F
Address : 6 Sunrise Drive,
Suntown,
Dublin
Birth Date : 30 11 25 Married? Y Full Lic Y
Emp? E HOUSEWIFE
Years NCB : 06(Own) 00 (Other) 45.00%
Insurer : HIB Renewal Date: 30/04/88
Car Make : FORD
Model : FIESTA 950
CC : 957 Year: 78 Value: 1000
Age Lic Name
Ok?
26/04/88
COMPULSORY EXCESS IS 100 FOR COMP
Source:F COMP TPF&T TP
BASIC 156.05 129.75 129.75
150 XS 16.00
Windscr 1 6.00 6.00
Windscr 2 10.00 10.00
NCB Prot 16.00 13.00 13.00
Pers.Eff. 5.00 5.00 5.00
Pers.Acc. 10.00 10.00 10.00
Othr Cars 10.00 10.00 10.00
Go on cover? Y Type 2TP F&T
Take XS? N Windscr? 0 NCB Prot? N
Pers Eff?N Pers.Acc?N Othr Cars?N
Home Tel. No: 061 43260
Premium: 129.75 REG:VIR 311
Payment Type: 4) CHEQUE
Start Date: 30/04/88
Ok?

Fig 2

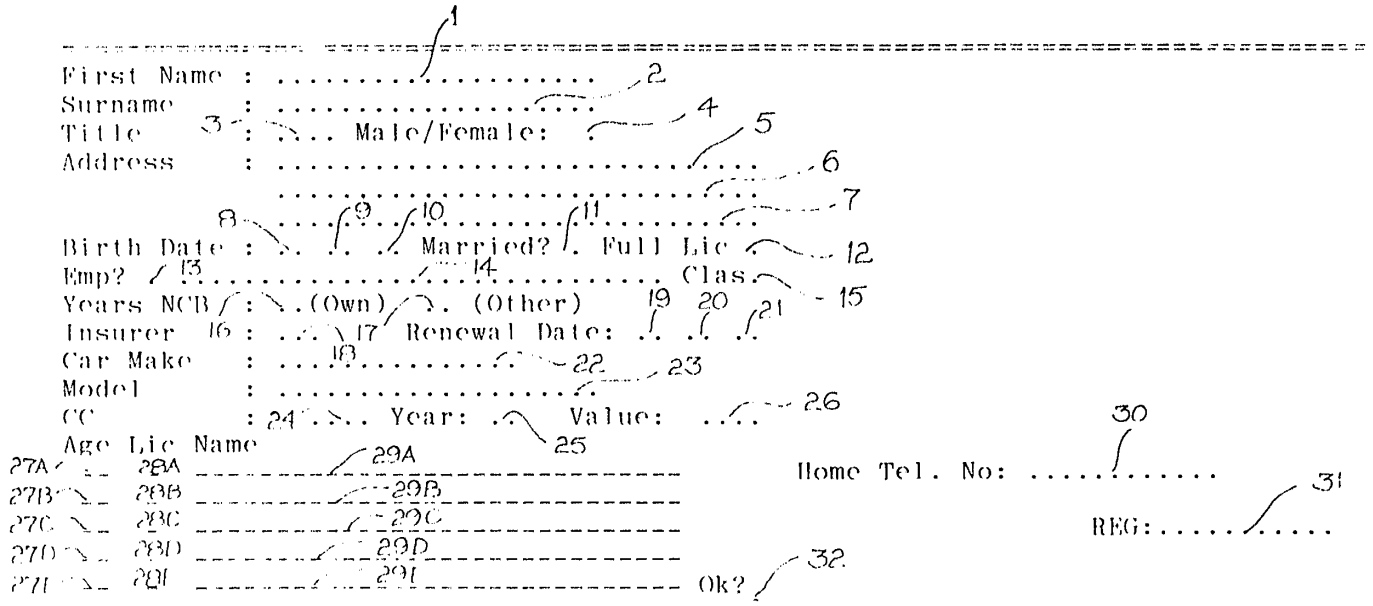

Fig 3

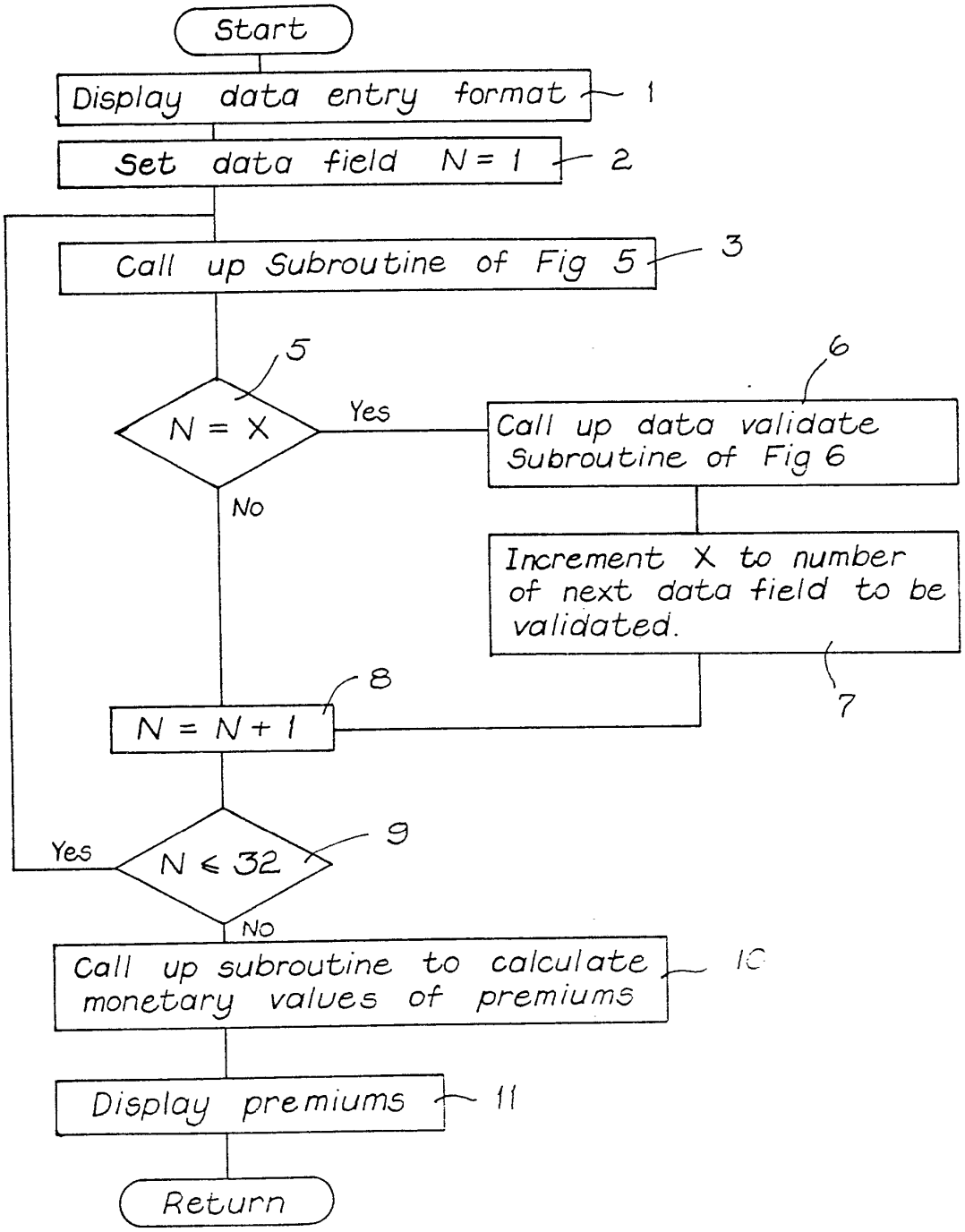
Start
Display data entry format
1
Set data field N = 1
2
Call up Subroutine of Fig 5
3
5
N = X
Yes
6
Call up data validate Subroutine of Fig 6
No
Increment X to number of next data field to be validated.
7
8
N = N + 1
9
Yes
N ≤ 32
No
Call up subroutine to calculate monetary values of premiums
10
Display premiums
11
Return

Fig 4

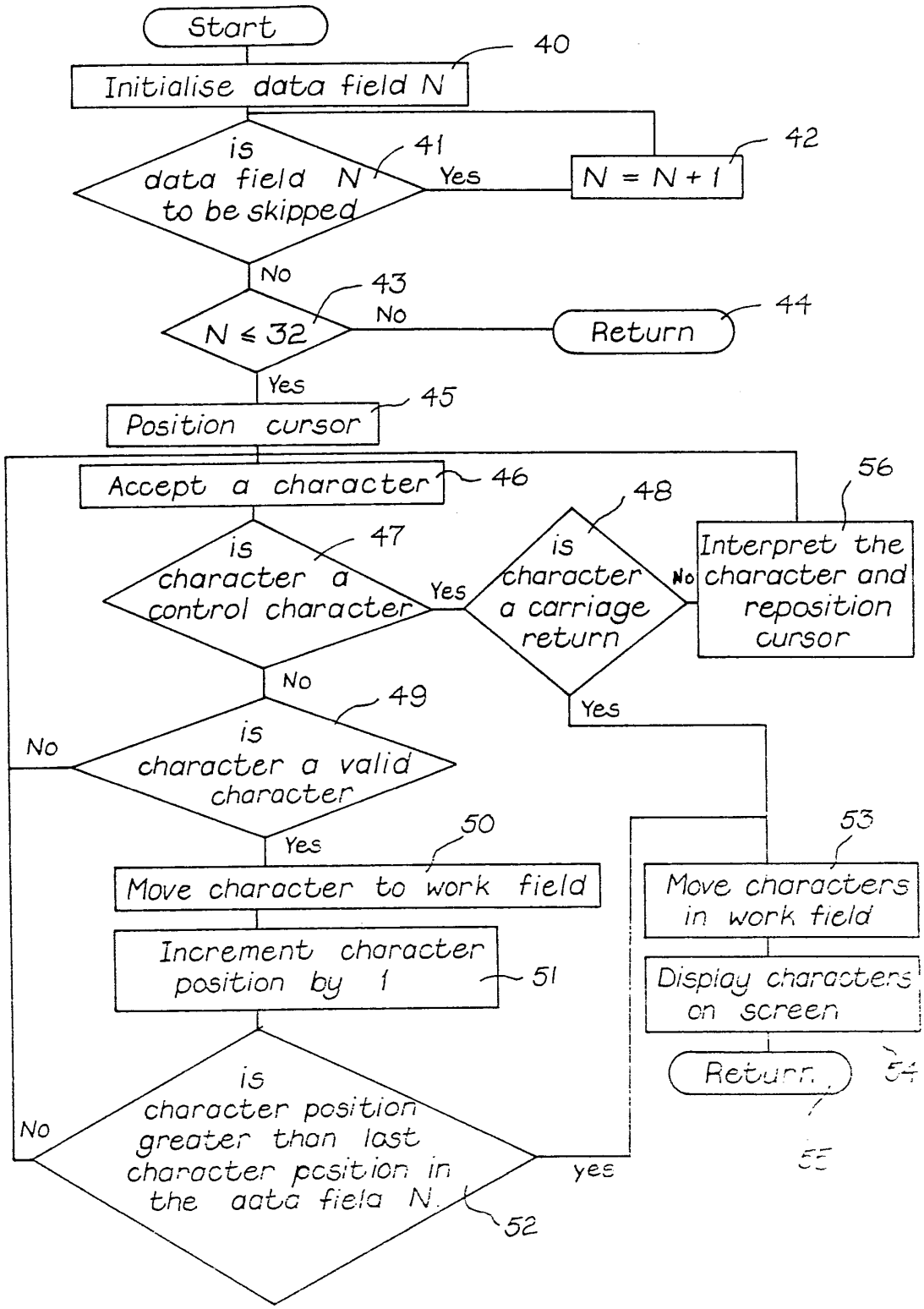
Start
Initialise data field N
40
is data field N to be skipped
41
Yes
N = N + 1
42
No
N ≤ 32
43
No
Return
44
Yes
Position cursor
45
Accept a character
46
is character a control character
47
Yes
is character a carriage return
48
No
Interpret the character and reposition cursor
56
No
is character a valid character
49
No
Yes
Move character to work field
50
Increment character position by 1
51
is character position greater than last character position in the data field N
52
yes
Move characters in work field
53
Display characters on screen
Return
54
55

Fig 5

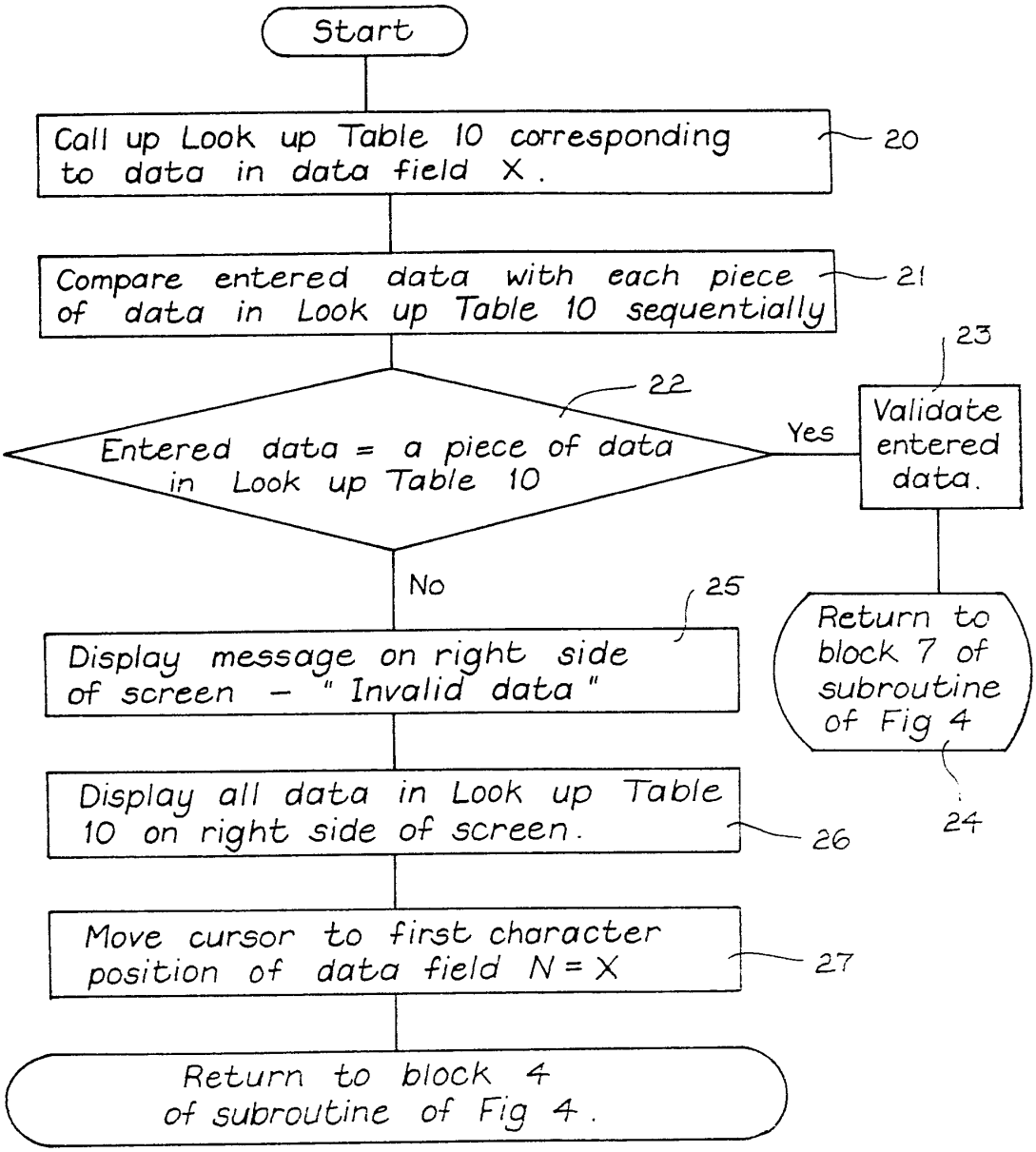
Start
Call up Look up Table 10 corresponding to data in data field X.
20
Compare entered data with each piece of data in Look up Table 10 sequentially
21
23
22
Entered data = a piece of data in Look up Table 10
Yes
Validate entered data.
No
25
Return to block 7 of subroutine of Fig 4
24
Display message on right side of screen - "Invalid data"
Display all data in Look up Table 10 on right side of screen.
26
Move cursor to first character position of data field N = X
27
Return to block 4 of subroutine of Fig 4.

Fig 6

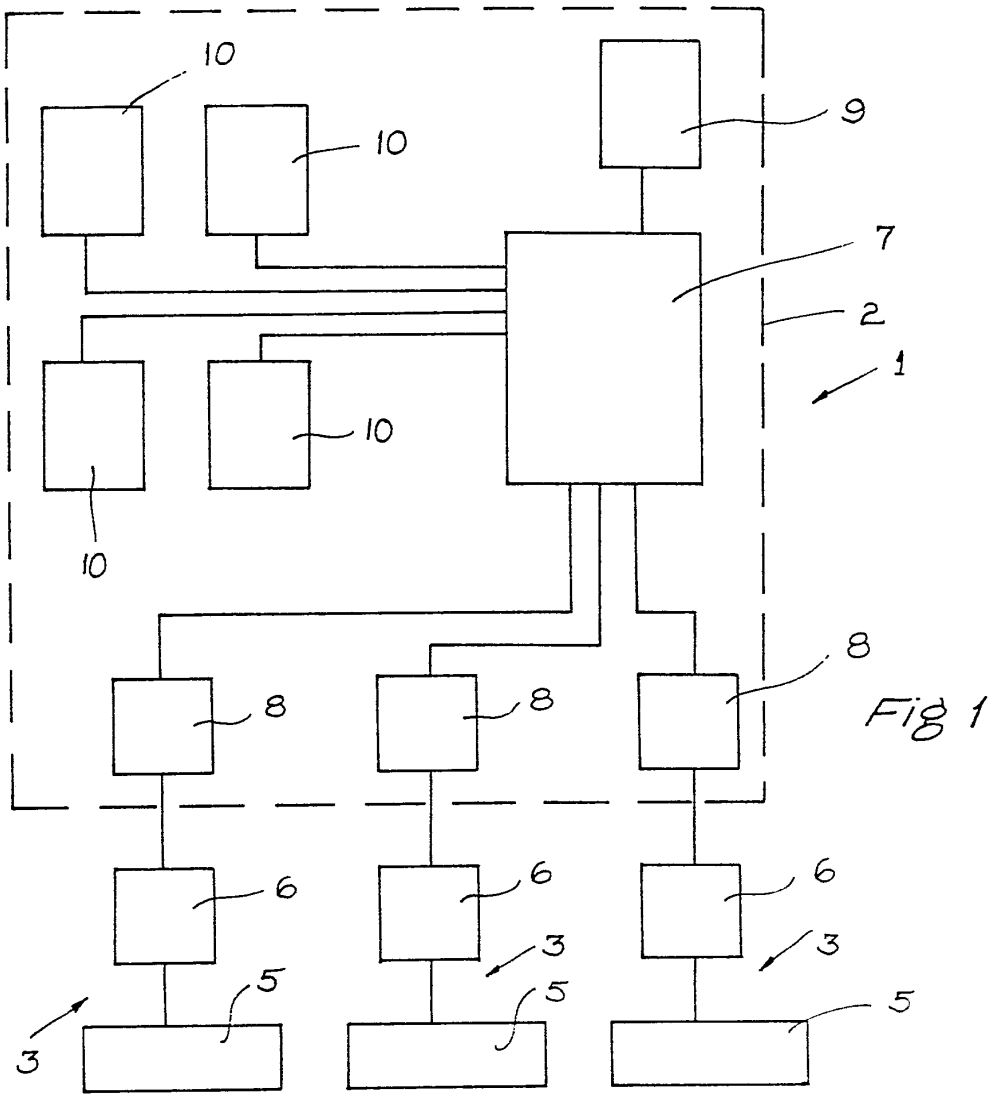

Fig 1

Street
Avenue
Close
Park
Road
Cresent
Grove
Way
Place
Square
Row
Terrace

10

Fig 7

2225461

A method for programming a computer

The present invention relates to a method for operating a computer, and in particular for operating a computer to compute premiums of different types of insurance policies for vehicle insurance in response to data being entered into the computer in respect of an individual and a vehicle. The invention also relates to a computer programme operating according to the method of the invention and to a computer operating under the control of the computer programme.

Computers under the control of a computer programme are used to compute premiums for insurance policies in respect of motor vehicles and the like. In general, data in respect of the motor vehicle and the individual, the owner of the motor vehicle is entered into the computer through a keyboard. The entered data is displayed on a visual display screen, normally in a predetermined format and is accordingly entered in that format. Data fields are set aside for each piece of data to be entered and each piece of data is entered in the appropriate data field in response to a cursor appearing at the beginning of the field on the visual display screen. The premiums for different types of insurance, for example, comprehensive, third party fire and theft and the like, are then computed and subsequently displayed on the screen. Unfortunately, in all cases it has been necessary to

use a number of pages of data to display all the entered data and the premiums. Thus, one has to switch from page to page on the visual display screen to review the entered data and the premiums. This it will be appreciated causes considerable inconvenience for an individual operating the computer. If the operator is dealing directly with a client while entering the data, after having the premiums displayed on the screen if the operator wishes to check a particular piece of data which has been entered, it is necessary to switch back to another page on the computer screen. This is time consuming and in many cases can lead to embarrassment.

There is therefore a need for a method for programming a computer to compute premiums for vehicle insurance which overcomes these problems. There is also a need for a computer programme operating according to the method of the invention which overcomes the problems of the prior art. Further, there is a need for a computer operating under the control of the computer programme.

According to the invention, there is provided a method for programming a computer for computing the premiums of different types of vehicle insurance in response to data being entered into the computer in a

predetermined data entry format, and displaying the entered data and premiums on a display means, wherein the method comprises the step of displaying the entered data and the premiums simultaneously on the display means, the entered data being displayed in the predetermined data entry format and the premiums also being displayed in a predetermined format. Preferably, the data to be entered comprises details of an individual and of a vehicle to be insured. Advantageously, the data displayed in respect of the premiums includes a plurality of costs for each type of premium based on certain predetermined loadings and reductions.

In one embodiment of the invention, the data entry format together with the entered data is displayed substantially on one side of the display means, and the premiums displayed substantially on the other side of the display means. Preferably, the display means is a visual display screen.

In a further embodiment of the invention, the data to be entered is entered in fields of predetermined lengths and positions in the data entry format.

In a further embodiment of the invention, the method comprises the step of validating at least some of the

data entered by comparing a piece of entered data with corresponding data in a look up table and stored in the computer, and if the entered data compares with any of the data in the look up table, displaying the valid status of the entered data on the display means, and in the event of the entered data not comparing with any of the data in the look up table, displaying the invalid status of the entered data on the display means. Advantageously, the method comprises the step of displaying the data in the look up table corresponding to the piece of entered data on the display means in the event of the entered data not comparing with any of the data in the look up table.

In a still further embodiment of the invention, the method comprises the additional step of computing the premiums from the entered data.

Advantageously, the method for computing the premiums comprises the step of retrieving the appropriate premiums from look up tables stored in the computer in response to the entered data, and computing additional loadings or reductions to be respectively added to or deducted from the premiums by multiplying the premiums by predetermined percentage points retrieved from look up tables stored in the computer in respect of the loadings or the reductions selected in response to the

entered data.

Addtionally, the invention provides a computer programme comprising the method of the invention.

Further, the invention provides a medium carrying the computer programme of the invention.

Additionally, the invention provides a computer comprising and operating under the control of the computer programme of the invention.

The invention will be more clearly understood from the following description of a preferred embodiment thereof, given by way of example only, with reference to the accompanying drawings, in which:

Fig. 1 is a diagrammatic representation of a computer system according to the invention,

Fig. 2 is a representation of data displayed on a screen of a visual display unit of the computer system of Fig. 1,

Fig 3 is a representation of data displayed on portion of a screen of a visual display of the computer system of Fig. 1,

Fig. 4 illustrates a flow chart of a sub routine of a computer programme for use in the computer system of Fig. 1,

Fig. 5 illustrates a flow chart of another sub routine of the computer programme of the computer system of Fig. 1,

Fig. 6 illustrates a flow chart of another sub routine of the computer programme of the computer system of Fig. 1, and

Fig. 7 is a representation of a typical look up table stored in the computer system of Fig. 1.

Referring to the drawings, and initially to Fig. 1 a computer system according to the invention which is controlled by a computer programme of the invention is illustrated and indicated generally by the reference numeral 1. In this case, the computer system is programmed to compute and display a range of insurance premiums in response to data on a motor vehicle and the individual owner of the vehicle being entered. The computer system 1 comprises a main computer 2 having a plurality of teminals 3 connected thereto. Needless to say, any number of terminals 3 may be connected to the computer 2. Each terminal comprises

a keyboard 5 through which the data is entered and a cathode ray visual display screen 6 which displays the entered data and premiums as is described below. The computer 2 comprises a main central processing unit 7 and drivers 8, which drive the terminal 3 under the control of the central processing unit 7. A computer memory 9 stores a computer programme which will be described below, which controls the operation of the system 1.

Storage registers form a plurality of look up tables 10 only four of which are illustrated. Each look up table 10 contains specific data which is described in more detail below, however, briefly the look up tables comprise rates of premiums for different types of insurance cover, for example comprehensive cover, third party cover and third party fire and theft cover. These premiums are tabulated against various cubic capacities of car engine. Various loadings, for example, age loading for drivers based on the age of the driver and the age of the car are also stored in look up tables. These loadings are given as a percentage, in other words, the percentage increase which is to be added on to the basic premium. Reductions relating to various aspects of the motor vehicle or the owner of the vehicle are also stored in look up tables 10. Look up tables 10 also store data

for use in validating data entered on both the individual and the vehicle through the keyboards 5 of the terminals 3. Typical validating data stored in the tables 10 comprises the valid names of the counties of the country in which the insurance is to be given, in this case the counties of Ireland. The valid names of towns of particular counties are also stored in look up tables 10 for validating a town of a particular county. Valid street designators, such as, for example, "street", "park", "avenue", "close" and the like are stored in a look up table 10 so that the designator used in a street address may be validated. Names of other insurance companies and their valid abbreviation are stored in a look up table 10. Thus, where an individual gives the details of his or her previous insurance company, the company name can be validated.

All the operations carried out in the computer under the control of the computer programme are carried out in the central processing unit 7. Thus, where data entered is validated by comparing the data entered with the valid data in the appropriate look up table 10, the comparison is carried out in the central processing unit 7. Similarly, the basic premiums having been obtained from the appropriate look up tables 10 the loadings and reductions are computed in

the central processing unit 7 by operating on the basic premium by the appropriate percentages obtained from the appropriate look up tables 10.

The data entered on the individual and motor vehicle through the keyboard 5 of each terminal 3 is displayed on the screen. When the premium has been computed by the central processing unit 7 of the computer 2, the range of premiums is also simultaneously displayed on the screen of the visual display unit 6. A typical display on a screen 6 is illustrated in Fig. 2. As can be seen, substantially all the data entered in respect of the individual and the motor vehicle is displayed on the left hand side of the screen while the range of premiums is simultaneously displayed on the right hand side of the screen. This has many advantages and the principal advantage is that an operator can immediately inspect both the entered data and the premiums simultaneously without the need to switch from page to page on the screen.

This display is achieved by setting aside a specific data field for each piece of data to be entered and each piece of premium data to be displayed. In the present case, the left hand side of the screen is formatted so that data titles are provided against the data fields in which the data is to be entered.

Prompts are provided to the operator to enter the data in sequence by a cursor moving from one field to the next as each field is completed. In each case, the cursor is moved by the computer programme to the first character position of each data field.

Referring to Figs. 2 and 3, the data fields will now be described. The first data field, data field 1 receives the first name of the individual. Data field 1 commences on the fifth line at character position 14 and extends to character position 33. The words "First Name" appear on the screen followed by a colon at the beginning of the fifth line to identify data field 1. The second data field, data field 2 is provided on the sixth line and receives the surname, and accordingly is preceded by the word "Surname" followed by a colon. The data field 2 extends from character position 14 to character position 33. Two data fields 3 and 4 are provided on line seven. The data field 3 extends from character positions 14 to 17 and receives the title of the individual, namely, "Mr.", "Mrs.", "Miss" or the like. The word "Title" identifying the data field is provided on the seventh line in front of the data field 3. The data field 4 is provided at character position 33 to indicate the sex of the individual by receiving the letters M or F to indicate male or female. Lines 8, 9 and 10 from

characters 14 to 43 form the address data fields 5, 6 and 7. Data fields 8, 9 and 10 provide for the date of birth of the individual to be entered at line 11. The data fields 8, 9 and 10 are provided at character positions 14 to 15, 17 to 18 and 20 to 21 for the day, month and year respectively. Data field 11 to receive the marital status of the individual is provided on line 11 at character position 32. A "Y" or an "N" indicating "yes" or "no" respectively as to whether the individual is married or not is entered in data field 11. Data field 12 appears on line 11 and is provided by character position 43 to receive a "Y" or an "N" to indicate whether one is a licence holder or otherwise.

Data field 13 on line 12 comprises one character at character position 6 to receive an indication of the employment status of the individual, "E" indicating employed, "U" indicating unemployed. Data field 14 on line 12 extends from character position 8 to character position 37 to receive details of an individuals employment. Data field 15 also in line 12 at character position 43 receives a single digit indicating the class of vehicle use required for premium calculation purposes. A sub routine in the computer programme displays the various categories and types of employment together with the normal class of

vehicle use which would be required on the right hand side of the screen when data field 15 is being completed. This provides the operator with assistance when classifying the class of vehicle use required.

Data field 16 is provided to indicate the number of years one has had a no-claims bonus on their own insurance and data field 17 is provided to receive the number of years one has had a no-claims bonus on another insurance policy. Data fields 16 and 17 are provided on line 13 at character positions 14 and 15, and 23 and 24 respectively.

Data field 18 comprises three character positions, namely character positions 14 to 16 in line 14 to indicate the details of the previous insurer of the individual. A three letter abbreviation of the insurer is entered in data field 18. A look up table 10 comprising the valid names of insurers with their corresponding three letter abbreviation is provided in the computer and on the request of an operator, this is displayed on the right hand side of the screen. Data fields 19 to 21 are provided at line 14 character positions 36 and 37, 39 and 40, and 42 and 43 for entering the renewal date of the previous insurers insurance policy.

Data field 22 comprising character positions 14 to 28 at line 15 is provided to receive the make of the car. Data field 23 at line 16 character positions 14 to 33 receives the model type of the car. The cubic capacity of the engine is entered in data field 24 at line 17 character positions 6 to 9. Data field 25 at line 17 character positions 17 and 18 receives the year of manufacture of the vehicle. Data field 26 at line 17 character positions 40 to 43 receives the value of the vehicle. Data fields 27 A to E, 28 A to E and 29 A to E receive the age, type of licence and name respectively of individual drivers who are to be named on the policy. These data fields are provided on lines 19 to 23 at character positions 2 and 3, 6, and 9 to 38. The home telephone number and car registration are entered in data fields 30 and 31. Data fields 30 and 31 are provided at line 19 character positions 60 to 71 and line 21 character positions 68 to 78. Data field 32 at line 23, character position 43 receives a "Y" or "N" indicating Yes or No as to whether all data has been entered or not.

In all cases. a title identifying the data to be entered in each data field is provided in front of or adjacent each data field.

On all data being entered and a "Y" being entered in data field 32, sub routines of the computer programme compute the insurance premiums. On the insurance premiums having been computed in the central processing unit 7, the computer premiums are displayed in the format illustrated on the right hand side of the screen, illustrated in Fig. 2. As can be seen, a plurality of data fields are provided on the right hand side of the screen to display this data.

Data field 33A gives the monetary value of the basic premium for comprehensive insurance. Data field 33B gives the monetary value of the basic premium for third party fire and theft insurance, while data field 33C gives the monetary value of the basic premium for third party insurance only. From here, the actual positions of only some of the data fields will be given, however, the remainder will be clear from Fig. 2. Data field 34A gives the monetary value of the reduction if one bears the first £150 of a comprehensive claim. There is no similar reduction for third party fire and theft, and third party insurances. Data field 35B and C and 36B and C gives the monetary value of the additional premium to be added to the third party fire and theft and third party premiums respectively if one wishes to cover damage to their windscreen. Since the windscreen is

covered automatically in a comprehensive policy, there is no need for a monetary value in respect of the windscreen for the comprehensive premium. The term windscreen 1 relates to cover up to a certain value of windscreen, while the term windscreen 2 relates to cover to a higher value. Data fields 37A to C gives monetary values for the additional premiums if one wishes to insure their no claims bonus. Data fields 38A to C indicate the additional premium if one wishes to insure their personal effects, while data fields 39A to C gives the additional premiums if one wishes to insure personal accident. Data fields 40A to C indicate the additional premiums if the insured wishes to be covered to drive other cars. In all cases, the data fields A are provided from character positions 56 to character positions 63 on the appropriate line. The data fields B extend from character positions 65 to character positions 72. The data fields C extend from character positions 74 to character positions 80.

Data field 41 provides for the entry of three characters Y, N or H to indicate respectively "Yes" the individual wishes to go on cover immediately, "No" does not wish to be covered, or "Hold" where the individual wishes to hold the quotation open for a period of time. In the event that the answer in data field 41 is "Y", the type of cover selected is entered

in data field 42. Data fields 43 to 45 indicate respectively whether one wishes to take the reduction of data field 34A by bearing the excess, which type of windscreen cover is required, and whether no claims bonus protection is required. The data field 43 receives a "Y" or "N" indicating "yes" or "no", the data field 44 receives a 0, 1 or 2, "0" indicating no windscreen protection is required and "1" and "2" indicating the type of protection required. "Yes" or "No" is entered in the data field 45 to indicate "Yes" or "No as to whether or not "no claims bonus protection" is required. Data fields 46 to 48 are provided to receive a "Y" or an "N" indicating Yes or No as to whether or not personal effects, personal accident are required to be protected and whether or not the insured wishes to drive other cars.

The gross premium is then computed and displayed in data field 45. The form of payment is entered in data field 50. The date of commencement of the insurance policy is entered in data field 51. Data field 52 is provided to receive a "Y" or an "N" indicating whether or not everything in the right hand side has been completed.

Referring now to Fig. 4. there is illustrated a flow chart of a sub routine of the computer programme which

controls the entry of data into the computer. Block 1 displays the format on the left hand side of the screen in which the data is to be entered. Block 2 sets the data field number N = 1, in other words, the first data field. Block 3 calls up the sub routine of Fig. 5 which reads each character entered in the data field N. This sub routine is described below. When all characters in the data field N have been read, the sub routine of Fig. 5 returns the programme to block 5 of the sub routine of Fig. 4. Block 5 checks if the value of the field number N is equal to a value X. If the value of N is equal to the value X, the sub routine moves to block 6. Depending on the value of X, block 6 calls up the appropriate sub routine to validate the value of the data entered. This is described below. When the validating sub routine has validated the data in the appropriate field, the sub routine moves on to block 7, which increments the value of X to the value of the next data field in which the entered data is to be validated. The sub routine then moves on to block 8. Where the value of N is not equal to X, the sub routine moves directly from block 5 to block 8. Block 8 increments the value of the data field N by 1. Block 9 checks if all the data in all the data fields up to data field 32 has been entered, in other words, if N is less than or equal to in this case 32. Where N is less than or

equal to 32, the sub routine moves to block 3 which calls up the sub routine of Fig. 5 to read the characters in the next data field. Where all data has been entered when N is greater than 32 the sub routine moves to block 10 which calls up the sub routine for calculating the premium and data in fields A to C.

The sub routine then moves to block 11 which displays this data. The computer programme then calls up a further sub routine with steps substantially similar to those of blocks 3 to 20 for inputting the data in the data fields 41 to 48 and 50 to 52. A further sub routine is then called up for calculating the gross premium which is displayed in data field 49.

Referring now to Fig. 5, the flow chart of the sub routine for reading the characters in each data field is illustrated. In fact, this subroutine is used for reading all entered characters and is a general sub routine which may be called up by any part of the computer programme or other sub routines for reading a character or characters. However, since we are dealing mainly with the entry of data into the data fields, we will describe it particularly with reference to reading such characters from the data fields. The parameters which specify the screen location, namely the line number and column number for

the characters in each data field, as well as the validation codes are passed to this sub routine. The sub routine accepts the data from the screen and then returns the accepted field number and value contents which may be either numeric or alphanumeric to the calling programme or sub routine.

Block 40 initialises the data field N in which the data is to be entered and read. Block 41 checks if data field N is to be skipped. If the data field N is to be skipped, the sub routine moves on to block 42, which increments the value of the data field by one. If the data field is not to be skipped, the sub routine moves on to block 43 which checks if the data field is less than or equal to 32. If not, in other words, if the data field is greater than 32, the sub routine moves to block 44, which returns control of the computer to the next block in the calling programme or sub routine which called up the sub routine of Fig. 5, in this case the control of the computer would be returned to block 5 of Fig. 4.

If the data field N is less than or equal to 32 the sub routine of Fig. 5 moves on to block 45. Block 45 positions the cursor at the first character position to be read in data field N. The sub routine then moves on to block 46, which accepts the character.

Block 47 checks if the character accepted by block 46 is a control character. If the character is a control character, the sub routine moves on to block 48, which is described below. If the character accepted by block 46 is not a control character, the sub routine moves on to block 49. Block 49 checks if the character is a valid character and if it is not, the sub routine moves back to block 46 to receive another character. If the character is a valid character, the sub routine moves on to block 50, which moves the character to a work field in the memory of the computer for storage until all characters in the data field N have been read. The sub routine then moves on to block 51, which increments the character position by one. Block 52 checks if the character position is greater than the last character position in the data field N. If it is not, the cursor is moved to the next character position in the data field N and the sub routine returns to block 46 which accepts the next character entered.

If the character position is greater than the last character position in the data field, the sub routine moves to block 53. On block 52 determining that the character position is greater than the last character position in the data field, all data to be entered into the data field N will have been entered and read.

and stored in the work field by block 50. Thus, block 53 moves all the characters stored in the work field to the appropriate location in the computer memory for subsequent operation. The sub routine then moves to block 54, which displays the characters on the screen, and block 55 returns control of the computer to the next block in the calling computer programme or sub routine which called up the sub routine of Fig. 5, In this case, control of the computer is returned to block 5 of Fig. 4. Returning now to block 48 of the sub routine of Fig. 5, if block 48 determines that the character entered is a carriage return, then the sub routine moves on to the block 53 and as already described the characters stored in the work field are moved to the appropriate location in the computer memory and the sub routine continues through block 54 and 55. Should block 48 determine that the control character is not a carriage return, the computer programme then moves to block 56 which interprets the control character and repositions the cursor in the appropriate position and then returns the sub routine to block 46 to accept the next character.

Referring now to Fig. 6 the sub routine for validating entered data in particular data fields is illustrated. Block 20 of the flow chart calls up the look up table 10 which contains the valid data corresponding to the

data in the field X. Block 21 compares the entered data sequentially with each piece of valid data in the look up table 10. If the entered data is similar to a piece of data in the look up table 10, block 22 moves the sub routine to block 23 which validates the data. The sub routine then proceeds to block 24 which returns the control of the computer to block 7 of the sub routine of Fig. 4. Should the entered data not compare with any piece of data on the look up table, the sub routine moves to block 25. Block 25 displays a message on the top portion of the screen that the data entered is invalid data and the programme moves to block 26. Block 26 displays all the data in the look up table 10 on the right hand side of the screen showing the operator the type of data which would be accepted as valid data. Block 27 moves the cursor to the first character in the data field X to enable the operator to re-enter the data in data field X. The programme then moves on to block 28 which returns the sub routine to block 20 and the sub routine is repeated until the sub routine finally gets to block 23 where the data is validated and moves on to block 24 which returns control of the computer to block 7 of the sub routine of Fig. 4.

In this case, the data fields which are validated are as follows. Data field 4 is validated to check if the

sex entered corresponds with the title of the individual in data field 3. The street designator in data field 5 is validated. The town in data field 6 is validated. The previous insurer in data field 18 is validated. The car make and model in data fields 22 and 23 are validated. The cubic capacity of the engine in data field 24 is validated.

A typical look up table 10 is illustrated in Fig. 7. This look up table 10 contains valid street designators. If the entered data contains a street designator then the street designator is flagged so that searches for valid street/town names will not be conducted on the designator. In this way, the speed of table lookup for valid street/town names is greatly enhanced.

Additional loadings for particular areas of residence of the individual seeking the insurance in the territory are also stored in look up tables against the particular areas. Thus, on all the data being entered, when computing the insurance premium, the appropriate sub routine applies the appropriate loading, if any, depending on the address entered in data fields 5, 6 and 7.

The sub routines for computing the values of insurance

premiums will be known to those skilled in the art and it is not intended to describe them here.

In use, when all the data has been entered and validated in data fields 1 to 32 under the control of the sub routines of Figs. 4, 5 and 6, the appropriate sub routines are called up to compute the insurance premiums, which are then displayed as already described. The remaining sub routines are then called up to enter the data in data fields 41 to 48 and 50 to 52 and the gross value of the premium is computed by a further sub routine and displayed in data field 49.

While not illustrated, it will be appreciated that a printer may also be networked to the computer 2 which then issues the insurance policy and an appropriate letter to the individual.

The advantages of the invention are many, however, the main advantage of the invention is achieved by virtue of the fact that the entered data and range of premiums are displayed on one page of the screen simultaneously, thereby permitting the operator to see simultaneously the data entered and the premium. This substantially facilitates the operator when dealing with a client.

A further advantage of the invention is that by virtue of the fact that certain of the data is validated, errors in computing the premium are reduced to a minimum.

While particular data has been described as being validated, only some of the data described may be validated, indeed in certain cases, more of the data may be validated. It will also be appreciated that while a particular configuration of computer has been described other suitable configurations may be used.

While the data fields have been described as being in particular positions on the screen and being of particular character lengths, data fields of other character lengths could be provided, and needless to say, it will be appreciated that the data fields may be provided in any other suitable or desired position on the screen without departing from the scope of the invention.

CLAIMS

1. A method for programming a computer for computing the premiums of different types of vehicle insurance in response to data being entered into the computer in a predetermined data entry format, and displaying the entered data and premiums on a display means, wherein the method comprises the step of displaying the entered data and the premiums simultaneously on the display means, the entered data being displayed in the predetermined data entry format and the premiums also being displayed in a predetermined format.

2. A method as claimed in Claim 1 in which the data to be entered comprises details of an individual and of a vehicle to be insured.

3. A method as claimed in Claim 1 or 2 in which the data displayed in respect of the premiums includes a plurality of costs for each type of premium based on certain predetermined loadings and reductions.

4. A method as claimed in any preceding claim in which the data entry format together with the entered data is displayed substantially on one side of the display means, and the premiums are displayed substantially on the other side of the display means.

5. A method as claimed in any preceding claim in which the display means is a visual display screen.

6. A method as claimed in any preceding claim in which the data to be entered is entered in fields of predetermined lengths and positions in the data entry format.

7. A method as claimed in Claim 6 in which the method includes providing a prompt means to the operator in respect of the piece of data to be entered.

8. A method as claimed in Claim 7 in which the prompt means comprises an illuminated cursor on the visual display screen.

9. A method as claimed in Claim 8 in which the method comprises the step of moving the cursor to the beginning of the data field in respect of the piece of data to be entered.

10. A method as claimed in any preceding claim in which the method comprises the step of validating at least some of the data entered by comparing a piece of entered data with corresponding data in a look up table and stored in the computer, and if the entered

data compares with any of the data in the look up table, displaying the valid status of the entered data on the display means, and in the event of the entered data not comparing with any of the data in the look up table, displaying the invalid status of the entered data on the display means.

11. A method as claimed in Claim 10 in which the method comprises the step of displaying the data in the look up table corresponding to the piece of entered data on the display means in the event of the entered data not comparing with any of the data in the look up table.

12. A method as claimed in Claim 10 or 11 in which the method comprises the validating of a street designator.

13. A method as claimed in Claim 12 in which the method comprises the step comparing the entered street designator with street designators in a look up table stored in the computer.

14. A method as claimed in any of Claims 10 to 13 in which the validity of a town of an address of the individual is validated, the method comprising the step of comparing the entered town with towns on a

look up table of towns for the area of the address stored in the computer.

15. A method as claimed in Claim 14 in which the towns of specific counties are stored on respective look up tables.

16. A method as claimed in any preceding claim in which the method includes the step of validating the details of a previous insurer of the individual entered in the entered data.

17. A method as claimed in any of Claims 10 to 16 in which the method comprises the step of validating the car make and model, the entered car make and model being compared to valid car makes and models in look up tables stored in the computer.

18. A method as claimed in any of Claims 10 to 17 in which the cubic capacity entered in respect of the vehicle is validated by comparing the entered cubic capacity with valid cubic capacities corresponding to the particular make and model of the vehicle stored in a look up table.

19. A method as claimed in any preceding claim in which the method comprises the additional step of

computing the premiums from the entered data.

20. A method as claimed in Claim 19 in which the method for computing the premiums comprises the step of retrieving the appropriate premiums from look up tables stored in the computer in response to the entered data, and computing additional loadings or reductions to be respectively added to or deducted from the premiums by multiplying the premiums by predetermined percentage points retrieved from look up tables stored in the computer in respect of the loadings or the reductions selected in response to the entered data.

21. A method substantially as described herein with reference to and as illustrated in the accompanying

22. A computer programme comprising the method of any of Claims 1 to 21 for programming a computer.

23. A computer programme substantially as described herein with reference to and as illustrated in the accompanying drawings.

24. A medium carrying the computer programme of Claim 22 or 23.

25. A medium as claimed in Claim 24 in which the medium is a magnetic tape or disc.

26. A medium as claimed in Claim 24 or 25 in which the medium is a hard disc.

27. A computer comprising a computer programme as claimed in Claim 22 or 23.

28. A computer substantially as described herein with reference to and as illustrated in the accompanying drawings.

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RISK EVALUATING DEVICE AND INSURANCE PREMIUM DETERMINING DEVICE

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Applicant(s): OMRON TATEISI ELECTRONICS CO +
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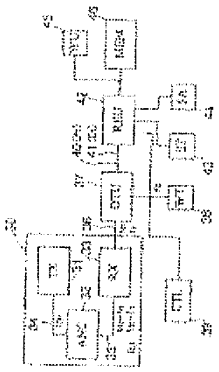
Abstract of **JP 4182868 (A)**

PURPOSE:To obtain an accurate risk evaluated value by providing a detection state for a risk contribution state to be evaluated and a risk evaluation part which employs fuzzy reasoning. CONSTITUTION:The state of the contribution of a moving body or its driver to be evaluated to risk is detected by a Doppler radar main body 30, a speed detector 38, a main engine rotating speed detector 43, and a steering operation detection part 44 respectively. A risk evaluation unit 42 receives their signals indicating the risk contribution state as fuzzy input values and performs the fuzzy reasoning to perform continuous risk evaluation. When the evaluated value exceeds a constant value, an alarm 45 warns the driver.; Thus, the risk can be evaluated matching human empirical evaluation without measuring the absolute value of an object distance, so wrong risk evaluation based upon a false signal is not performed.



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審査請求　未請求　請求項の数 17　（全13頁）

⑭発明の名称　リスク評価装置および保険料決定装置

⑳特　願　平2－313737

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⑫発明者　香坂　正恒　京都府京都市右京区花園土堂町10番地　オムロン株式会社内

⑪出願人　オムロン株式会社　京都府京都市右京区花園土堂町10番地

⑭代理人　弁理士　小森　久夫

明　細　書

1.発明の名称

リスク評価装置および保険料決定装置

2.特許請求の範囲

(1)　リスク評価対象のリスクに寄与する状態を検出するリクス寄与状態検出手段と、

その状態に基づいてリスクを評価するリスク評価手段と、

を備え、前記リスク評価手段はファジィ推論によるリスク評価部を有することを特徴とするリスク評価装置。

(2)　リスク評価対象は操縦されている移動体またはその操縦者であり、リスク寄与状態検出手段は先行移動体との相対速度を検出する相対速度検出手段およびその積分手段と、先行移動体からの反射波レベルを検出する手段とを備え、前記ファジィ推論は前記積分手段の出力および前記反射波レベルを入力値として行うことを特徴とする、請求項1記載のリスク評価装置。

(3)　移動体の移動状態を検出する手段を備え、この検出値が前記ファジィ推論の入力値に含まれることを特徴とする、請求項1記載のリスク評価装置。

(4)　移動体の操縦操作密度の評価値を検出する手段を備え、この評価値が前記ファジィ推論の入力値に含まれることを特徴とする、請求項3記載のリスク評価装置。

(5)　評価されたリスクの度合いが一定以上のときに警報を発する手段を備える、請求項1記載のリスク評価装置。

(6)　請求項1記載のリスク評価装置と、リスク評価対象を保険客体としてリスク評価値より保険客体に対する保険料変動分を決定する保険料変動分決定手段とを有することを特徴とする保険料決定装置。

(7)　決定した保険料変動分に基づく金額を前払い金に対して決済する手段を有することを特徴とする請求項6記載の保険料決定装置。

(8)　決定した保険料変動分に基づく金額を与信決済する手段を有することを特徴とする請求項6

記載の保険料決定装置。

(9) リスク評価対象である保険客体のリスクに寄与する状態を検出するリスク寄与状態検出手段と、

その状態に基づいてリスクを評価するリスク評価手段と、

前記リスクの評価値から保険客体に対する保険料変動分を決定する保険料変動分決定手段と、

を備えてなる保険料決定装置。

(10) 決定した保険料変動分に基づく金額を前払い金に対して決済する手段を有することを特徴とする請求項9記載の保険料決定装置。

(11) 決定した保険料変動分に基づく金額を与信決済する手段を有すること特徴とする請求項9記載の保険料決定装置。

(12) リスク寄与状態検出手段が保険客体内部の状態を検出する手段である、請求項9記載の保険料決定装置。

(13) リスク寄与状態検出手段が保険客体の外部の状態を検出する手段てある請求項9記載の保険料決定装置。

(14) リスク寄与状態検出手段およびリスク評価手段はリアルタイムで動作することを特徴とする請求項9記載の保険料決定装置。

(15) 保険料変動分決定手段もさらにリアルタイムで動作することを特徴とする請求項14記載の保健料決定装置。

(16) リスク評価手段はファジィ推論によるリスク評価部を有することを特徴とする請求項9記載の保険料決定装置。

(17) リスク寄与状態検出手段は静水圧センサおよび水温センサからなる外界センサと、ダイバーの脈拍を検出する脈拍センサからなる内界センサとで構成され、リスク評価手段および保険料変動分決定手段はリアルタイムで動作することを特徴とする請求項9記載の保険料決定装置。

3.発明の詳細な説明

(a)産業上の利用分野

この発明は、移動体（乗物）または保険客体に対するリスクを評価するリスク評価装置、およびそのリスク評価装置を使用した保険料決定装置に関する。

(b)従来の技術

移動体（乗物）に対するリスク評価は、従来、特開昭60－85045，特開昭62－58181，特開昭63－32388などに示されているように、先行移動体や固定物体などに対する対物距離を計測することによって評価情報を形成し、この評価情報に基づいて警報信号の発生有無などを判断している。

また、従来の保険料決定システムは書面による保険契約をそのままオンライン化したもので、契約客体の静的属性からリスクを評価して料率を決定している。

(c)発明が解決しようとする課題

上記公開公報に示されている技術は、対物距離を計測するためにパルスレーダ方式を採用している。ところが、この方式は回路が複雑化することと、路上または内水面で使用するときに多重反射伝搬路の影響により偽信号が受信されその識別が極めて困難であるという問題がある。

また、従来の書面による保険契約を単にオンライン化したシステムでは、保険契約客体の環境と行動がリスク確率を支配しているにも係わらず、保険契約後の状態に無関係な保険料が算出されるという問題がある。

例えば、書面による保険契約の一つである自動車賠償責任保険では、常に安全運転を行っている運転者と時折危険な運転を行う運転者とで、保険料に差がないのが普通である。しかし、両者を同じ保険料にするのは不公平であると考えられる。

この発明の目的は、計算と推論によって対物距離の絶対値に代替可能なリスク評価値を求めるリスク評価装置を提供することを目的とする。また、保険客体のリスクに起因する状態を検出することにより、保険料変動分を継続的に求めて保険料を増減することのできる保険料決定装置を提供することを目的とする。

(d)課題を解決するたの手段

この発明のリスク評価装置および保険料決定装置は以下の構成からなっている。

リスク評価対象のリスクに寄与する状態を検出するリクス寄与状態検出手段と、

その状態に基づいてリスクを評価するリスク評価手段と、

を備え、前記リスク評価手段はファジィ推論によるリスク評価部を有することを特徴とする。

リスク評価対象は操縦されている移動体またはその操縦者であり、リスク寄与状態検出手段は先行移動体との相対速度を検出する相対速度検出手段およびその積分手段と、先行移動体からの反射波レベルを検出する手段とを備え、前記ファジィ推論は前記積分手段の出力および前記反射波レベルを入力値として行う。

また、移動体の移動状態を検出する手段を備え、この検出値が前記ファジィ推論の入力値に含まれることを特徴とする。移動体の操縦操作密度の評価値を検出する手段を備え、この評価値を前記ファジィ推論の入力値に含ませることも出来る。

上記リスク寄与状態検出手段は保険客体内部の状態を検出する手段であり、或いは、保険客体の外部の状態を検出する手段である。

また、上記リスク寄与状態検出手段およびリスク評価手段はリアルタイムで動作することを特徴とし、保険料変動分決定手段もさらにリアルタイムで動作することを特徴とする。

また、上記リスク評価手段はファジィ推論によるリスク評価部を有することを特徴とする。

さらに、リスク寄与状態を検出手段としては、静水圧センサおよび水温センサからなる外界センサと、ダイバーの脈拍を検出する脈拍センサからなる内界センサとで構成され、リスク評価手段および保険料変動分決定手段はリアルタイムで動作することを特徴とする。

(e) 作用

請求項(1)記載のリスク評価装置は、リスク評価対象のリスクに寄与する状態、例えば移動体（乗物）と先行する乗物（移動体）との相対速度を検出し、その状態に基づいてファジィ推論によりリスクを評価する。ファジィ推論により人間の経験的な評価に整合したリスク評価値を得ることができる。

請求項(2)ではファジィ推論によるリスク評価部の入力値として、先行移動体の相対速度の積分値および先行移動体からの反射波レベルを用いる。これにより、先行する移動体（前方の移動体）に関するリスク評価値を得ることができる。

請求項(3)，(4)では更にファジィ推論の入力値として、移動体の移動状態および操縦操作密度の評価値を用いる。これにより、移動体自身の状態と運転者（自己）の内部状態に関するリスク評価値も加えることができる。つまり、乗物および操縦者の状態を総合評価して人間の経験的な評価に整合したリスク評価値を得られる。

請求項(5)では上記のようにして得られたリスクの度合が一定以上の時に警報を発する。この警報手段により運転者に安全運転の注意を喚起することができる。

請求項(6)ではリスク評価対象を保険客体として評価されたリスクの度合いが一定以上のときに警報を発する手段を備えることもできる。

また、前記リスク評価装置と、リスク評価対象を保健客体としてリスク評価値より保険客体に対する保険料変動分を決定する保険料変動分決定手段とで構成される。

上記決定した保健料変動分に基づく金額を前払い金に対して決済する手段を有し、また、与信決済する手段を有する。

また、この発明は、リスク評価対象である保健客体のリスクに寄与する状態を検出するリスク寄与状態検出手段と、

その状態に基づいてリスクを評価するリスク評価手段と、

前記リスクの評価値から保険客体に対する保険料変動分を決定する保険料変動分決定手段と、

を備えてなることを特徴とする。

決定した保険料変動分に基づく金額を前払い金に対して決済する手段を有し、また、与信決済する手段を有する。

、ファジィ推論により得られたリスク評価値より保険客体に対する保険料の変動分を決定する。これにより、時事または日々変動するリスク評価対象の外界または内界の状態に応じて変化するリスク評価値に相応した保険料を決めることができる。

請求項(7)においては、前記決定した保険料変動分に基づく金額を前払い金に対して決済する。例えばプリペイドカードからの引落等が考えられる。この前払い金に対する決済に代えて、クレジットカードを使用した与信決済も可能である。

請求項(9)ではリスク評価対象である保険客体のリスクに寄与する状態を検出し、その状態に基づいてリスクを評価し、更にそのリスクの評価値から保険客体に対する保険料変動分を決定する。

請求項(10)，請求項(11)では、保険料変動分に基づく金額を前払い金または与信により決済する。

また、請求項(12)，(13)では、保険客体のリスクに寄与する状態を検出する手段として、保険客体内部の状態を検出したり、保険客体の外部の状態を検出したりする。

請求項(14)，(15)では、保険客体のリスクに寄与する状態の検出やリスクの評価がリアルタイムで行われたり、更に保険料変動分の決定もリアルタイムで行われる。

また、請求項(16)ではリスク評価手段がファジィ推論部を備える。リスク評価をファジィ推論で行うことにより、人間の経験的知識が導入され、実際に則した総合的なリスク評価値が求められる。

また、請求項(17)では保険客体のリスクに寄与する状態を検出する手段として、静水圧センサおよび水温センサからなる外界センサと、ダイバーの脈拍を検出する脈拍センサからなる内界センサとで構成し、リスク評価と保険料変動分決定をリアルタイムで作動させる。つまり、ダイバーの水中での作業中に水深やダイバー自身の肉体的，精神的な状態に基づいてリスクを時事評価していき、その評価値に基づいて保険料の変動分を決定していく。

(f)実施例

第1図はこの発明の実施例の保険料決定システムの構成図である。

リスク評価対象である保険客体のリスクに寄与する状態を検出する手段として、外界センサ1および内界センサ2を使用する。外界センサ1は、保険客体のリスクに寄与する外界の環境データを取得する。例として陸上の乗物においては気温、宇宙の乗物においては宇宙船暴露当量の計測手段がある。また、内界センサ2は保険客体内部に存在するリスクに寄与するデータを取得する。例として乗物においては乗物の物理的状態のまたは操縦者の生理的または心理的状態の計測手段がある。

上記外界センサ1および内界センサ2の出力はファジィ推論部3にファジィ入力値として与えられる。このファジィ推論部3は内界計測データおよび外界計測データを入力として曖昧な経験的知識を活用した推論により総合的なリスクを求める。ファジィメモリ4は予めオフラインでファジィ推論が実行された時のリスク評価値を記憶する。料金計算部6はリスク評価値を時間積分演算して保険料金（保険契約の特約に係属する変動性料金）を算出する。時間積分を行うためにこの料金計算部6にはシステム時計5が接続される。出力インターフェース7はインターロック系を持つ前払金額消去手段や為替送金依頼電文発行手段等を備える。金額ファイル部8は前払金残高の記録されたメモリや送元側為替オンラインシステムで構成される。

第2図は上記保険料決定システムを潜水用計器と組み合わせた実施例を示す。図の10はダイバーの手首に巻かれるウォッチ型の潜水用計器本体である。この計器本体10は表示部11，12、静水圧センサ13、水温センサ14および表示部切換スイッチ15を備える。表示部11は静水圧センサ13，水温センサ14，後述の脈拍センサの計測値やリスク評価値、料金，前払金残額等を表示する。表示部切換スイッチ15はこれらの表示データを表示部11または12に切換表示し、また各データの変化率の最大の値の自動表示を行

うモードを選択したりする。光通信結合部を兼用する脈拍センサ１６はダイバーの人差指先端部に取り付けられる。このセンサは指先を流れる血流を検出する近赤外光センサで構成される。また、計器本体１０が前払金更新モードに設定されている時には擬似指（図示せず）に内蔵した光通信結合部との間でデータの転送を行う。第１図の内界センサ２はこの脈拍センサ１６に対応する。また第１図の外界センサ１は静水圧センサ１３，水温センサ１４に対応している。また、ダイバーの足に取り付けられる足鰭１７には電磁波を送信するためのアンテナ１８が取り付けられる。このアンテナ１８は、計器本体１０での推論出力が緊急レベルの時、浮標あるいは支援艇の受信器に向けて緊急信号を送信する。なお、アンテナ１８に代えて超音波発信子を設け超音波で緊急信号を送信することも可能である。

第３図は上記保険料決定システムが組み合わされた潜水用計器のブロック図である。

表示部１１，１２，静水圧センサ１３，水温センサ１４，脈拍センサ１６，表示部切換スイッチ１５，アンテナ１８はそれぞれ論理部２１に接続される。この論理部２１は例えばマイクロプロセッサユニットやＡ／Ｄ変換器内蔵のＡＳＩＣで構成することができる。また、この論理部２１にはＲＯＭ１９およびＲＡＭ２０も接続されている。

第４図（Ａ）～（Ｃ）は、上記論理部２１の概略の動作を示すフローチャートである。

第４図（Ａ），（Ｂ），（Ｃ）はタイマ割り込みによって一定時間毎に実行される。まず、第４図（Ａ）に示す動作が実行されると、最初に静水圧センサ１３の読取りが行われる（ｎ１）。そして、この静水圧の値が一定以上であれば、つまり水深が一定以上の大きさであればインターロックＡをアンロック状態にして（ｎ３）、ファジィ推論によるリスク評価値を読み出せるようにする。なお、インターロックＡがロック状態であると、後述の前払い金更新モードとなる。

ｎ４では、水温データを読取りｎ５で脈拍データを読取りｎ１，ｎ４，ｎ５で読み取ったデータをファジィ入力値としてファジィ推論を行う。なお、実際にはオフラインでＲＯＭ１９上にファジィＲＯＭが形成されているために、これらのデータに対応したアドレスに記憶されているリスク評価値を読み取る（ｎ７）。なお、ここでＲＯＭに記憶されているリスク評価値はタイマにセットする値である。この値が小さいほどリスクが大きい。ＲＯＭから読み出されたリスク評価値が“ＮＵＬ”であれば現在の状況では保険料を増減する程度のリスクがないと判定し、ｎ１１に進んでインターロックＢをロック状態におく。インターロックＢはアンロック状態において前払金額の消却を行うモードを設定する。ｎ８で、ＲＯＭから読み出されたデータが“ＮＵＬ”でなければインターロックＢをアンロック状態にし（ｎ９）、更にそのＲＯＭの内容をタイマにセットする（ｎ１０）。一方、上記ｎ２で静水圧センサ１３の検出データが一定値ｄ０未満であればｎ１２に進む。ここではインターロックＡをロック状態にし、前払金の更新モードを設定する。

次に第４図（Ｂ）の動作について説明する。

ｎ２０，ｎ２１においてインターロックＡ，Ｂの状態を判定し、両方が共にアンロック状態であれば、前払金から単位料金分の消去を行うモードとなり、ｎ２２以下に進む。まず、ｎ２２では第４図のｎ１０でセットされたタイマがカウントアップしたかどうかの判定を行う。カウントアップしていなければこのフローを抜ける。カウントアップしていればｎ２３に進みカウンタを一つ進める。なお、タイマがカウントアップしたかどうかは、タイマカウントアップと呼ばれるフラグの状態から判定する。このフラグがセットしていればタイマがカウントアップ状態にある。上記ｎ２３でカウンタを一つ進めた後は、このフラグをリセットして再びタイマがカウントアップするのを待つ。タイマはカウントアップすると再び０からカウントを開始する。上記カウンタの内容をｎ２５で判定し、このカウンタが“ＦＵＬ”になればｎ２６に進んで前払金から単位料金の消去処理を行う。なお、論理部２１には予め地上で支払われた

前払金が記憶されており、この前払金から単位料金の消去処理が行われる。

第4図（C）は前払金の更新モードの動作を示している。

n30でインターロックAがロック状態がどうかの判定を行う。このインターロックAがロック状態であれば前払金の更新モードである。この時には、まず光通信結合部を兼用する脈拍センサ16からデータを読み取る。この時、脈拍センサ16には擬似指が内蔵され、潜水用計器本体10に対して、払い込まれた前払金に対応するデータが入力される（n32）。また、図示はしていないが前払金の入力に際して暗証コードの確認も行っているためにn33でこの確認を行う。暗証コードが一致した場合にのみn34以下に進む。n34では更新モードを"1"に設定し、n35で前払金の更新処理を行う。続いて更新モードを"0"に設定し（n36）、脈拍センサ16を脈拍データを検出できる状態に設定する（n37）。

なお、n7でROM19から読み出されたデータのリスク評価値が非常に高い場合にはアンテナ18を駆動して支援艇受信器または浮標に対して緊急信号を送信する。

以上の動作によって、この潜水用計器では時々刻々変化するリスクを評価しながらその評価値に応じて保険料を決定し、保険料変動分の決済を前払金に対して行うことができる。

なお、決済を前払金に対して行うのではなく、クレジットカードを使用して与信決済とすることもできる。さらに、為替送金依頼電文を作成して送信することも出来る。また、実施例では外界センサと内界センサを共に使用したが、この何れか一方であってもよい。また、外界センサおよび内界センサによるリスクに寄与する状態の検出やファジィ推論によるリスク評価値の演算をリアルタイムで行うようにしたが、リスク評価値を後に求めることもでき、またその求めたリスク評価値から保険料変動分を後で計算することも可能である。更にこの実施例ではリスク評価値を求める手段にファジィ推論を使用したが、必ずしもファジィ推論によらなくてもよく、予め決めた通常の保険用テーブルを使用することも可能である。

次にこの発明の他の実施例について説明する。

第5図は乗物（自動車）に搭載されたリスク評価装置に保険料決定システムを組み合わせた装置の構成図である。

図において30はドップラーレーダー本体であり、極超短波の電波または10kHz帯のFO波を用いて対物相対速度を検出する。超音波を使用する場合には水路を伝播経路とすることができる。

このドップラー本体30は送信部31、ふく射および結合部32、受信部33を備える。送信部31は、出力が安定化された発振器を含んでいる。ふく射および結合部32は例えば極超短波を使用する場合送受共用の指向性アンテナと導波管型結合器で構成され、空中超音波を使用する場合には反射器付き環状圧電セラミック素子で構成され、水中超音波を使用する場合には整合機付きランジュバン型圧電セラミック素子で構成され、それぞれに3巻線変成器が組み合わされる。また、受信部33は、ふく射および結合部32を介して漏えいする微弱な送信波成分34を局部発振周波数としてホモダイン検波を行い、ドップラー成分を分離する。この送信波成分34は伝播媒体中を監視対象物に向けて複写される信号f_{oo}である。また、受信波35は監視対象物で反射し、ドップラー周波数の偏移を受けた信号、即ち$f_{oo}+f_o$および$f_{oo}+f_x$である。第6図は送信波と受信波のスペクトルを示している。

前記ドップラーレーダ本体30からは検波出力として得られたドップラー成分36、すなわちf_oおよびf_xが出力される。f_oは不動構造物からの反射で自車（艇）の対地速度に相当し、f_xは前方の移動体からの反射に相当する。この信号は信号前処理ユニット37に入力する。このユニット37はドップラーレーダの出力から移動体の速度の成分を分離し、速度信号とレベル信号（反射波の強度に相当）を得る。この処理のために信号前処理ユニット37に対しては、速度検出器38からの出力が導かれている。この速度検出器は

自己の対地速度を計測する。例えば自動車の場合は車軸に係合するエンコーダで構成され、船の場合には流速補正された曳航ログで構成される。この速度検出器３８の出力Ｖ。は、上記信号前処理ユニット３７に導かれるとともに、システム起動制御部３９にも導かれている。このシステム起動制御部は、自己の速度Ｖ。が整定値を超えた時にシステムを作動状態にする制御を行う。なお、これに代えて移動体が関門通過時に地上からの信号を受けてシステムを作動状態にするようにしてもよい。

前記信号前処理ユニット３７で得られた速度信号４０（P_x）と反射波の強度に相当する差信号４１（E_x）とはリスク評価ユニット４２に出力される。このリスク評価ユニット４２は、これらの情報とともに、自車（艇）の状態信号からファジィ推論を含む信号処理過程により操縦中のリスクの度合をリアルタイム評価する。自車（艇）の状態信号は、上記速度検出器３８からの自己の対地角度をＶ。とともに、主機関回転数検出器４３、主機関回転数検出器４３および操縦操作検出部４４でそれぞれ検出される。リスク評価ユニット４２はこれらのリスク寄与状態を表す信号をファジィ入力値としてファジィ推論を行いリスク評価を連続的に行っていく。そしてその評価値がある一定値を超えた場合に警告器４５で操縦者に対して警告を行う。このような構成により、対物距離の絶対値を計測しなくても人間の経験的な評価に整合したリスクを評価することができるために、偽信号によって誤ったリスク評価が行われたりすることがない。なお、ファジィ推論の入力値としては、移動体の移動状態の移動状態のみを使用してもよい。この実施例では、それに加えて移動体の操縦操作密度の評価値をファジィ入力として加えているために、よりファジィ推論の結果が適正なものとなる。更に、この実施例では、リスク評価を行うだけでなく保険料決定システムを組み合わせているが、このようにすることで旅行中に時々刻々と変化するリスク評価を保険料に反映させることができるようになる。

で検出される回転数を含む。さらに、この実施例では、操縦操作検出部４４の検出データもファジィ入力値とする。操縦操作検出部４４は、例えば操舵機構の整定値以上の偏移等、明らかに意識的な操作を検出する。

前記リスク評価ユニット４２の出力は警告器４５と金額ファイル部４６に出力される。警告器４５はリスク評価ユニット４２の作動により音響，音声，振動その他のリスクの存在を警告する。金額ファイル部４６は前払金残高が記録されたメモリを有する。この金額ファイル部４６は、リスク評価ユニット４２から出力されたリスク評価値に対応する保険料変動分を前払金残高から消却していく。なお、この金額ファイル部４６を送元側為替オンラインシステムで構成することも可能である。また、データ通信端末を設けることによりクレジット処理を行うことも可能である。

上記の構成において、リスク評価対象である移動体またはその操縦者のリスクに寄与する状態は、ドップラーレーダー本体３０、速度検出器３８

第７図以下は上記第５図に示すシステムの要部の詳細な構成図等を示す。

第７図は信号前処理ユニット３７の具体的な構成図である。

５０は平衡変調器であり、例えばリング変調器で構成される。（f_o，f_x）とf_{vo}の信号波の積値を出力する。第８図はこの信号処理部における各信号のスペクトルを示す。図において、f_xは前方の移動体によるドップラー成分を示す。f_oは不動の構造物によるドップラー成分を示す。また、$f_{vo}+f_x$はf_xの上側帯波である。この信号はf_{vo}の区分範囲に応じたチャンネルの帯域通過ろ波器により阻止される。f_o-f_{vo}は擬似搬送波との差による下側帯波である。この信号は、理想的な計測条件で車輪の滑走，空転がなければ発生しない。なお、この信号を利用することにより位相比較によって車輪の滑走，空転の検出を行うことができる。

５１は可変周波数発振器である。この可変周波数発振器５１は自己の対地速度Ｖ。を表すアナロ

ク信号を入力として線型関係の周波数を出力する。例えば、可変容量ダイオードを有するＬＣ発振器で構成される。また、自己の対地速度を表す信号がパルスレートであるアナログ信号の時にはこの可変周波数発振器５１を周波数ていばい器で構成することができる。この可変周波数発振器５１て形成された周波数は平衡変調器５０に導かれる。

前記平衡変調器５０の出力は、可変帯域通過フィルタ５２に出力され、ここでフィルタ処理が行われる。このフィルタ５２は、例えばスイッチドキャパシタフィルタで構成することができる。$f_{vo}-f_x$ を $f_{vo}+f_x$, $f_{vo}-f_o$, $f_{vo}+f_o$ から分離して出力する。このフィルタは、ＰＬＬ検波器で構成することも可能である。５３はチャンネル選択部であり、対地速度Ｖｏの値の領域に応じて可変帯域通過フィルタ５２の通過帯域を離散的に選択する。５４はＡＭ検波器である。ここでは $f_{vo}-f_x$ 信号波の振幅成分、即ち前方の移動体からの反射波の強さを表すアナログ信号を検出し、P_x としてリスク評価ユニット４２に出力する。また５５はＦＭ検波器であり、ここで $f_{vo}-f_x$ 、即ち前方の移動体の対地速度を表すアナログ信号をＥ（$f_{vo}-f_x$）として出力する。作動増幅器５６は、この信号と自己の対地速度を表すアナログ信号Ｖｏを受けて、前方の移動体との相対速度を表すアナログ信号Ｅ（ｘ）を復元してリスク評価ユニット４２に出力する。

第９図はリスク評価ユニット４２の具体的な構成図である。６０は積分器である。この積分器６０は移動体の相対速度を表す信号Ｅ（ｘ）を積分して相対速度から接近した距離を算出する。初期化部６１は反射波レベルを信号P_x上で監視して、その反射波レベルが整定値以下の時にリセット信号を発生して積分器６０をリセットする。６２は第１のファジィ推論部である。この第１のファジィ推論部ではＭＩＮ－ＭＡＸ出力を平滑化した後に非ファジィ化する機能を有する。

もう一つの積分器６３は、操縦操作検出部４４からの出力をイベント信号として予め定義されているインパルス波形を積分し、平滑した後にその平滑値から操作頻度指標を求める。この値はリスク評価のためのファジィ入力値として第２のファジィ推論部６４に出力される。また、この第２のファジィ推論部６４には、更に対地速度信号Ｖｏと主機関回転数がファジィ入力値として導かれる。結局、この第２のファジィ推論部６４は自己の内部状態に関するリスク評価値を推論する。また、第１のファジィ推論部６２は前方の移動体に関するリスク評価値を推論する。

上記第１のファジィ推論部６２と第２のファジィ推論部６４の出力は第３のファジィ推論部６５にファジィ入力値として導かれる。そしてこの第３のファジィ推論部６５で総合判定されたリスク評価値は出力制御部６６に出力され、ここで推論出力のレベルと保持時間のレベルに応じて出力を警報器４５と金額ファイル部４６に配信される。

第１０図（Ａ）～（Ｅ）はファジィ推論部６２，６４，６５のそれぞれの言語値メンバシップ関数を示している。同図（Ａ）は第１のファジィ推論部６２の入力関数を示す。同図（Ｂ）は第１のファジィ推論部６２の出力関数および第３のファジィ推論部６５の第１の入力関数を示す。この関数を使用することで前方の移動体に関するリスク評価値を得る。同図（Ｃ）は第２のファジィ推論部６４の入力関数を示す。同図（Ｄ）は第２のファジィ推論部６４の出力関数および第３のファジィ推論部６５の第２の入力関数を示す。この関数で自己の内部状態に関するリスク評価値を得る。同図（Ｅ）は第３のファジィ推論部６５の出力関数を示す。この関数で最終的に総合判定によるリスク評価値を得る。

第１１図（Ａ）～（Ｃ）は各ファジィ推論部のルールを示している。図において＊は後件部が存在しないことを表す。

以上の構成によって、この実施例ではパルスレーダー方式を使用しなくても、経験的な評価を加えた認識経路によりリスク評価を行うことができ、その評価値が一定以上の時に操縦者に対して警報を発することができる。また、保険料決定シス

テムと組み合わされているために、時々刻々と変化するリスクに応じた保険料変動分をその都度消却して決済していくことが可能である。したがって、従来の損害保険事務とは異なった、より公平な保険システムを構築することができる。

(6)発明の効果

この発明のリスク評価装置によれば、ファジィ推論を利用することによってリスク評価に対して経験に基づいた評価を加えることができるために、外来ノイズ等に影響され難いより正確なリスク評価値を期待することができる。この場合、このリスク評価装置を移動体に適用した場合、従来使用されていたパルスレーダー方式を採用する必要がないために、回路が複雑化することがなく、また多重反射伝送路の影響を受けることもない。このため、より正確な警報を出すことのできる安全装置を構成することができる。この正確さは移動体の移動状態を検出するのに加えて移動体の操縦操作密度の評価値を検出することによって更に向上させることが可能である。また、評価されたリスクの度合が一定以下の時には警告されないようにしているために、ノイズの影響を更に少なくできる一方直ぐに回復できるような単発的なリスクに対する警告を避けることができる。また、このファジィ推論によるリスク評価部を有するリスク評価装置と保険料決定システムを組み合わせることで、常に変動するリスク評価値に対応した保険料変動分をリアルタイムで決済していくことができ、保険をより公平化することができる。そして、保険料変動部の決済を前払金や与信によって行うようにすれば、プリペイドカードやクレジットカードを使用する従来のシステムをそのまま利用できるためにより使い易いものとなる。

更に、この発明では、リスク評価を行うことのできるリスク評価手段を含むリスク評価装置と上記の保険料変動分を決定する手段とを組み合わせることにより、時々変化するリスク評価対象のリスクの度合に応じた保険料を決定できることにより、より公平な保険システムにできる利点がある。この場合、リスク評価手段はファジィ推論による評価部を必ずしも含まなくてもよい。そして、この保険料決定システムでは、上記に述べたように従来のプリペイドカードやクレジットカードのシステムをそのまま流用できるために簡単な構成でより使い易いシステムを構築することができる。

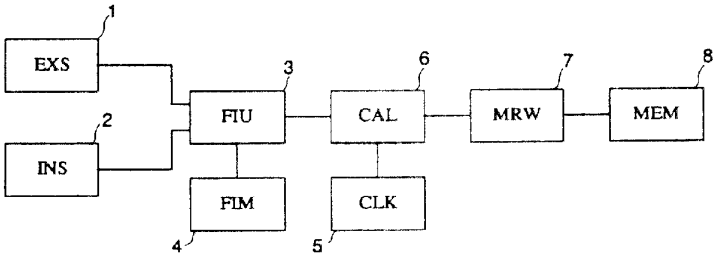
4.図面の簡単な説明

第1図はこの発明の実施例の保険料決定システムの構成図、第2図は上記保険料決定システムを潜水用計器に組み合わせた場合の潜水用計器の外観図、第3図は潜水用計器の構成図、第4図（A）～（C）は同潜水用計器の動作を示すフローチャートである。また、第5図はこの発明の第2の実施例を示し、リスク評価装置と保険料決定システムを組み合わせた場合の構成図を示し、第6図は同実施例の送信波と受信波のスペクトルを示し、第7図は信号前処理ユニットの構成図、第8図は信号前処理ユニットにおけるスペクトル示し、第9図はリスク評価ユニットの構成図、第10図（A）～（E）は同リスク評価ユニットのファジィ推論部に使用されるメンバシップ関数、第11図（A）～（C）はファジィルールを示す図である。

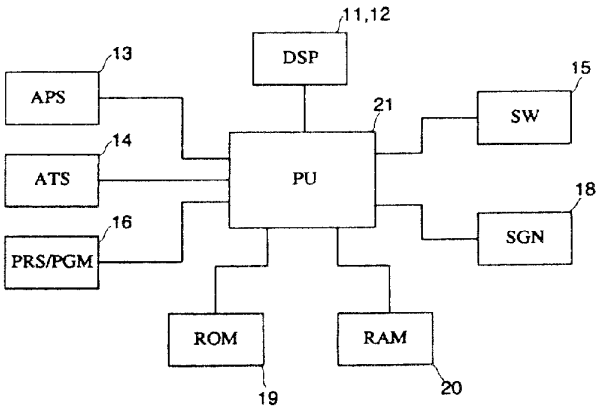
1－外界センサ、2－内界センサ、3－ファジィ推論部、4－ファジィメモリ、6－料金計算部、7－出力インターフェース部、8－金額ファイル部。

出願人　オムロン株式会社
代理人　弁理士　小森久夫

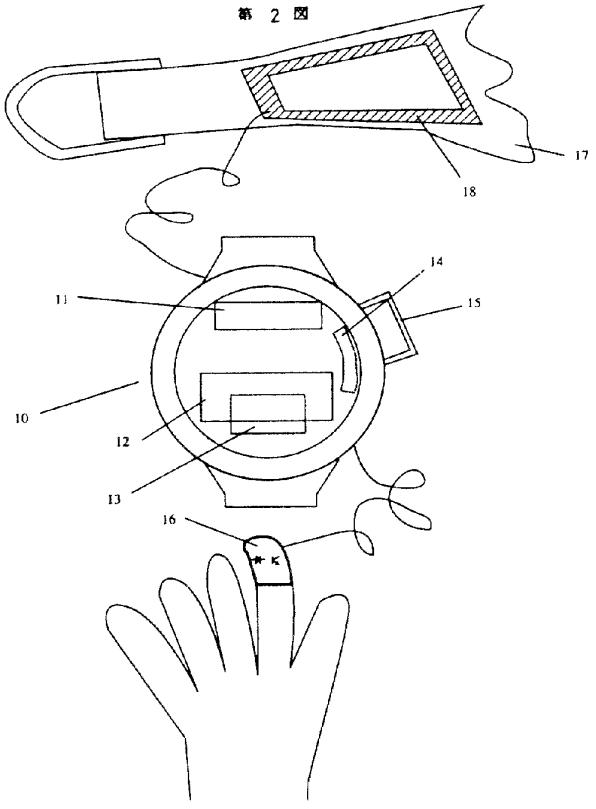
第 1 図



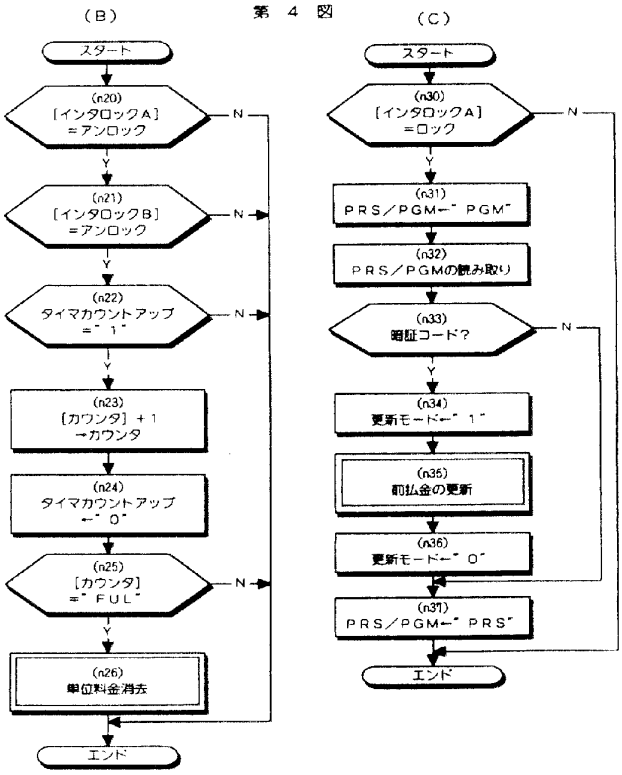
第 3 図



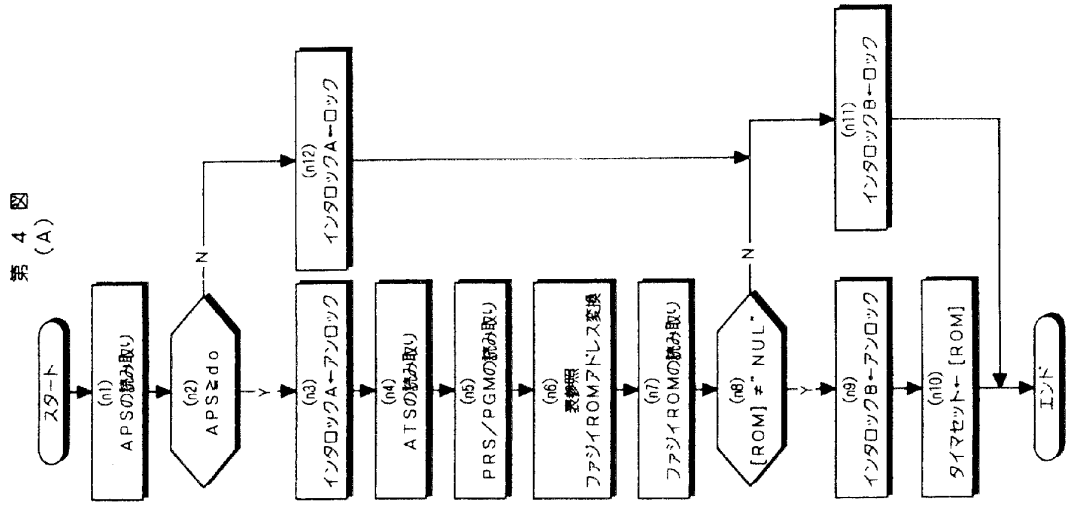
第 2 図



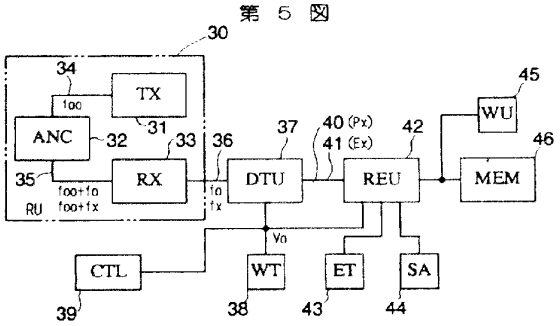
第 4 図



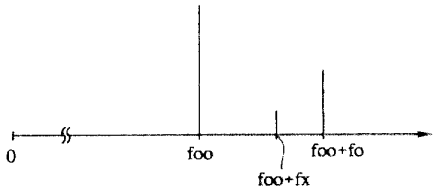
第4図(A)



第5図

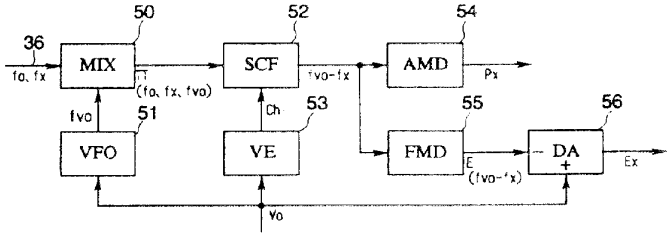


第6図

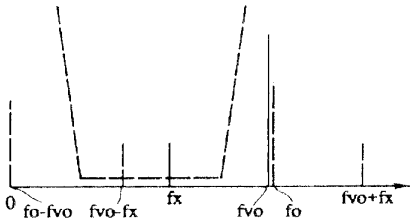


送信波と受信波のスペクトル
foo：結合器を通って漏洩した送信波　ホモダイン検波器の局部発振周波数になる。
foo+fo：不動の構造物からの反射波
foo+fx：前方の移動体からの反射波

第 7 図

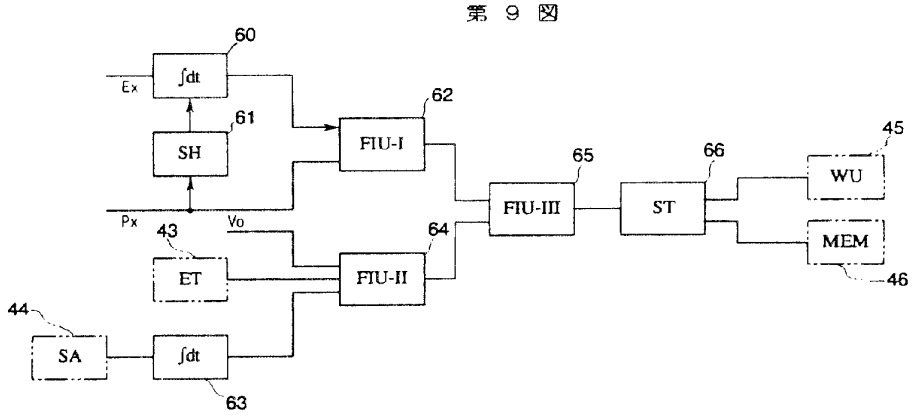


第 8 図

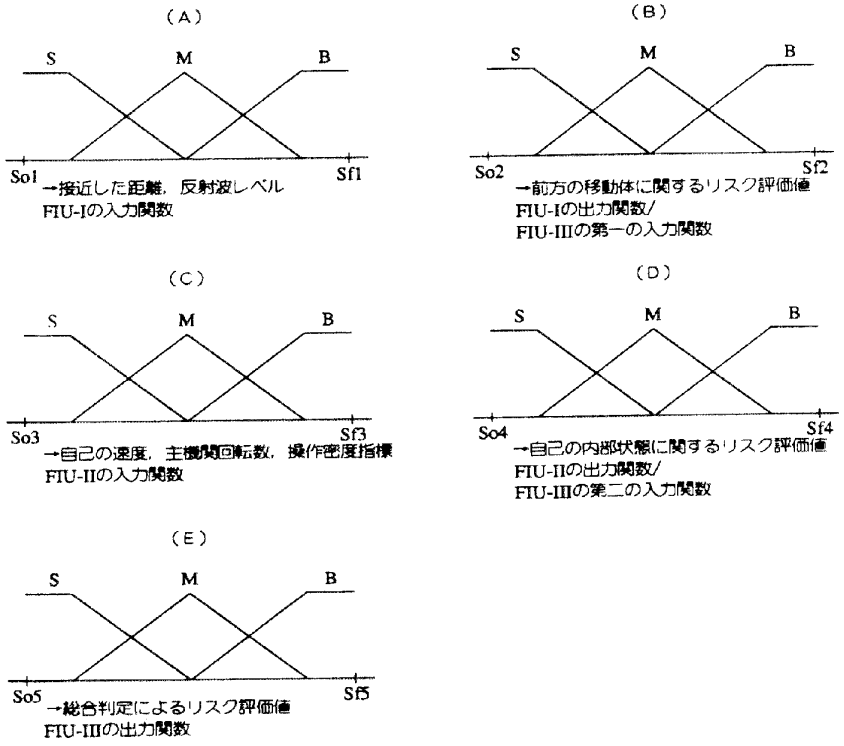


信号処理部におけるスペクトル
fx：前方の移動体によるドップラ成分
fo：不動の構造物によるドップラ成分
fvo+fx：fxの上側帯波　fvoの区分範囲に応じたチャンネルの帯域通過濾波器により阻止される。
fo-fvo：疑似搬送波との差による下側帯波　理想的な計測条件で車輪の滑走・空転がなければ発生しない。

第 9 図



第１０図



第１１図

(A)

∫Exdt / Px	S	M	B
S	*	S	M
M	S	M	B
B	S	M	B

FIU-Iのルール　　*は後件部が存在しない

(B)

VO	ET \ AT	B	M	S
S	B	*	*	S
M	M	*	S	M
	B	*	M	B
B	S	S	S	M
	M	S	M	B
	B	M	B	B

FIU-IIのルール　　*は後件部が存在しない

(C)

FIU-I / FIU-II	S	M	B
S	*	S	S
M	S	M	M
B	M	B	B

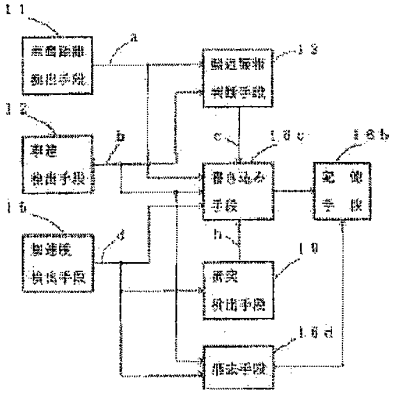
FIU-IIIのルール　　*は後件部が存在しない

DATA COLLECTOR FOR ANALYZING VEHICLE ACCIDENT

Publication number: JP6004733 (A)
Publication date: 1994-01-14
Inventor(s): NISHITANI KATSUO +
Applicant(s): YAZAKI CORP +
Classification:
- international: ***G01D21/00; B62D41/00; G06F17/40; G07C5/00;*** **G01D21/00; B62D41/00; G06F17/40; G07C5/00;** (IPC1-7): G07C5/00; G01D21/00; G06F15/74
- European:
Application number: JP19920159369 19920618
Priority number(s): JP19920159369 19920618

Abstract of **JP 6004733 (A)**

PURPOSE:To collect data before and after an accident and to easily analyze the accident by using a storage means having small memory capacity. CONSTITUTION:Based on a distance signal (a) and a car speed signal (b) from an inter-car distance detecting means 11 and a car speed detecting means 12, an approach alarm judging means 13 judges that a car approaches to close so that the danger of a rear-end collision is generated, and outputs an alarm signal (c.) Corresponding to an acceleration signal (d) from an acceleration signal generating means 15, a collision detecting means 19 generates a collision signal (h.) A writing means 16c writes the data of (b) and (d) in a storage means 16b during first fixed time after the generation of (c) and during second fixed time after the generation of (h.) When car speed is turned to '0' while the signal (h) is generated, an erasing means 16d automatically erases data after the data are completely written.



(19)日本国特許庁（ＪＰ）　(12)公開特許公報（A）　(11)特許出願公開番号

特開平6－4733

(43)公開日　平成6年（1994）1月14日

(51)Int.Cl.[5]	識別記号	庁内整理番号	ＦＩ	技術表示箇所
Ｇ０７Ｃ　5/00		Ｚ　9146－3Ｅ		
Ｇ０１Ｄ　21/00		Ｑ　7809－2Ｆ		
Ｇ０６Ｆ　15/74	３１０	Ｚ　7218－5Ｌ		

審査請求　未請求　請求項の数２（全８頁）

(21)出願番号　特願平4－159369

(22)出願日　平成4年（1992）6月18日

(71)出願人　000006895
矢崎総業株式会社
東京都港区三田1丁目4番28号

(72)発明者　西谷　勝男
静岡県島田市横井1－7－1　矢崎計器株式会社内

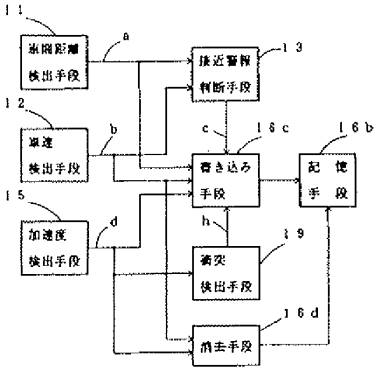
(74)代理人　弁理士　瀧野　秀雄　（外１名）

(54)【発明の名称】車両事故解析用データ収集装置

(57)【要約】

【目的】　事故前後のデータを収集し、事故解析を容易に行うことが、小さな記憶容量の記憶手段の使用によって実現できる車両事故解析用データ収集装置を提供する。

【構成】　車間距離検出手段１１及び車速検出手段１２からの距離信号ａ，車速信号ｂに基づいて、接近警報判断手段１３が追突の危険性が生じる程接近したと判断して警報信号ｃを出力する。加速度信号発生手段１５からの加速度信号ｄにより衝突検出手段１９が衝突信号ｈを発生する。ｃの発生から第１の一定時間の間と、ｈの発生から第２の一定時間の間に書き込み手段１６ｃが、ｂ、ｄのデータを記憶手段１６ｂに書き込む。ｈを発生している間に車速が０になったとき、データ書き込み終了後、消去手段１６ｄがそのデータを自動的に消去する。



1

【特許請求の範囲】

【請求項１】　自車両と検知物体との距離を検出し距離信号を出力する車間距離検出手段と、

自車両の車速を検出し車速信号を出力する車速検出手段と、

前記車間距離検出手段及び車速検出手段からの距離信号及び車速信号に基づいて追突の危険性が生じる程接近したと判断して警報信号を出力する接近警報判断手段と、

車両に設けられ加速度を検出して加速度信号を出力する加速度検出手段と、書き替え可能な記憶手段と、

前記加速度検出手段が発生する加速度信号に基づいて衝突を検出して衝突信号を発生する衝突検出手段と、

前記接近警報判断手段による警報信号の発生から第１の一定時間の間と、前記衝突検出手段による衝突信号の発生から第２の一定時間の間に、前記車速信号、加速度信号を取り込んで得たデータを前記記憶手段に書き込む書き込み手段とを備えることを特徴とする車両事故解析用データ収集装置。

【請求項２】　前記衝突検出手段が衝突信号を発生している間に、前記車速検出手段が発生する車速信号による車速が０になったとき以外、前記書き込み手段によるデータの書き込みの終了後、前記記憶手段に書き込まれたデータを自動的に消去する消去手段を更に備えることを特徴とする請求項１記載の車両事故解析用データ収集装置。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明は、車両事故を解析するのに有効なデータを収集するための車両事故解析用データ収集装置に関するものである。

【０００２】

【従来の技術】従来、車両事故の解析に当たって、事故の加害者であるか或いは被害者であるかの判断はその時点での当事者間の話し合いや警察官による事故検証等で決めていた。このため、多重衝突等においては判断の正確性が欠けてしまい、保険損失補充率等に不公平が生じる。

【０００３】従来、貨物車両やタクシー車両では、時々刻々変化する車速や走行距離などをチャート紙に記録するタコグラフ（運行記録計）を車載することが義務付けられている。このチャート紙上の記録は車両の運行の履歴を示しているので、例えば事故が起こったとき、この記録を参照することによって、事故前の車両運行に無理がなかったかどうかを判断することができる。

【０００４】このように、この運行記録は車両運行の大きな流れの中での状況を判断するには有効であるが、事故前の車両の走行状況を詳細に知るにはあまり役に立たない。

【０００５】そこで、車速信号をＡ／Ｄ変換して車速データを得、その最新の一定時間分を書き換え可能なメモリに書き込み保持することによって、事故が起こったときにこの車速データを解析することにより事故直前の車両の走行状態を知り、事故解析の一助とするようにしたデータ収集装置が提案さている。

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【０００６】

【発明が解決しようとする課題】しかし、この提案の装置では、事故解析に利用できるデータとして車速データしかないので、解析を正確に行うのにあまりにも情報量が少ないという問題がある。そこで、事故の前後の状況を記録し、そのデータを回収解析して正確な事故判断を行うことができるようにした装置が望まれている。

【０００７】よって本発明は、上述した従来の問題点に鑑み、事故前後のデータを収集し、事故解析を容易に行うことができるようにした車両事故解析用データ収集装置を提供することを目的としている。

【０００８】本発明は、上述した従来の問題点に鑑み、事故前後のデータを収集し、事故解析を容易に行うことが、小さな記憶容量の記憶手段の使用によって実現できるようにした車両事故解析用データ収集装置を提供することを他の目的としている。

【０００９】

【課題を解決するための手段】上記目的を達成するため本発明により成された車両事故解析用データ収集装置は、図１の基本構成図に示すように、自車両と検知物体との距離を検出し距離信号ａを出力する車間距離検出手段１１と、自車両の車速を検出し車速信号ｂを出力する車速検出手段１２と、前記車間距離検出手段１１及び車速検出手段１２からの距離信号ａ及び車速信号ｂに基づいて追突の危険性が生じる程接近したと判断して警報信号ｃを出力する接近警報判断手段１３と、車両に設けられ加速度を検出して加速度信号ｄを出力する加速度検出手段１５と、書き替え可能な記憶手段１６ｂと、前記加速度検出手段１５が発生する加速度信号ｄに基づいて衝突を検出して衝突信号ｈを発生する衝突検出手段１９と、前記接近警報判断手段１３による警報信号ｃの発生から第１の一定時間の間と、前記衝突検出手段１９による衝突信号ｈの発生から第２の一定時間の間に、前記車速信号ｂ、加速度信号ｄを取り込んで得たデータを前記記憶手段１６ｂに書き込む書き込み手段１６ｃとを備えることを特徴としている。

【００１０】本発明により成された車両事故解析用データ収集装置は、前記衝突検出手段１９が衝突信号ｈを発生している間に、前記車速検出手段１２が発生する車速信号ｂによる車速が０になったとき以外、前記書き込み手段１６ｃによるデータの書き込みの終了後、前記記憶手段１６ｂに書き込まれたデータを自動的に消去する消去手段１６ｄを更に備えることを特徴としている。

【００１１】

【作用】上記構成により、自車両と検知物体との距離を検出し距離信号ａを出力する車間距離検出手段１１及び

自車両の車速を検出し車速信号ｂを出力する車速検出手段１２からの信号ａ，ｂに基づいて、接近警報判断手段１３が追突の危険性が生じる程接近したと判断して警報信号ｃを出力する。車両に設けられた加速度検出手段１５が、加速度を検出して加速度信号ｄを出力する。加速度検出手段１５が発生する加速度信号ｄに基づいて、衝突検出手段１９が衝突を検出して衝突信号ｈを発生する。接近警報判断手段１３による警報信号ｃの発生から第１の一定時間の間と、衝突検出手段１９による衝突信号ｈの発生から第２の一定時間の間に書き込み手段１６ｃが、車速信号ｂ、加速度信号ｄを取り込んで得たデータを記憶手段１６ｂに書き込む。

【００１２】よって、事故前後の車両の状況として車速の他に加速度が分かり、特に車速と加速度との対応を解析することよって衝突発生時に自車両が加害車である或いは被害車であるかが簡単に分かる。

【００１３】また、衝突検出手段１９が衝突信号ｈを発生している間に、車速検出手段１２が発生する車速信号ｂによる車速が０になったとき以外、書き込み手段１６ｃによるデータの書き込みの終了後、消去手段１６ｄが記憶手段１６ｂに書き込まれたデータを自動的に消去するようになっている。よって、事故発生の危険性が生じたとき毎に書き込んだデータは、事故が発生せず事故解析の必要ないときには保持されることがなく、限られた小さな記憶容量の記憶手段によって必要なデータを収集できる。

【００１４】

【実施例】以下、本発明の実施例を図面に基づいて説明する。図２は本発明による車両事故解析用データ収集装置の一実施例を示し、同図において、１１は自車両と検知物体との距離を検出し距離信号ａを出力する車間距離検出手段、１２は自車両の車速を検出し車速信号ｂを出力する車速検出手段である。１３は上記車間距離検出手段１１と車速検出手段１２からの信号ａ，ｂを入力して演算を行う接近警報判断手段であり、この接近警報判断手段１３は先行車との相対速度を検出し追突の危険性が生じる程接近したと判断したとき警報信号ｃを出力する。

【００１５】１４は接近警報判断手段１３からの警報信号ｃを入力して警報音を発生する例えばブザーからなる警報手段、１５は車両の前後左右４ヶ所に設けた加速度（Ｇ）検出手段であり、これは加速度（Ｇ）を検出し加速度信号ｄを出力する。１６は上記距離信号ａ、車速信号ｂ、加速度信号ｄ及びブレーキ信号ｅ等のその他の信号を入力するマイクロコンピュータ（ＭＰＵ）である。このＭＰＵ１６はその動作を規定する制御プログラム等を格納したＲＯＭ１６ａと収集データ等の各種のデータを書き替え自在に記憶するＲＡＭ１６ｂとを内蔵し、制御プログラムに従って動作し、後述する書き込み信号ｆの入力に応じて上記入力信号をＡ／Ｄ変換して得たデータをＲＡＭ１６ｂの所定の領域に書き込むと共に、後述するキャンセル信号ｇの入力に応じてこの書き込んだデータを消去する。

【００１６】１７はワンショットマルチバイブレータによって構成され得る第１書き込み信号発生手段であり、これは接近警報判断手段１３が発生する警報信号ｃの立ち上がりに応じて例えば４５秒の一定時間の間継続する第１書き込み信号f_1を発生し、これをＯＲ回路１８を介してＭＰＵ１６に入力する。１９はコンパレータによって構成され得る衝突検出手段であり、これは加速度検出手段１５が発生する加速度信号ｄを入力して±0.4 Ｇに相当する大きさの加速度信号ｄに応じて衝突信号ｈを発生する。２０はワンショットマルチバイブレータによって構成され得る第２書き込み信号発生手段であり、これは衝突検出手段１９が発生する衝突信号ｈの立ち上がりに応じて例えば２０秒の一定時間の間継続する第２書き込み信号f_2を発生する。この第２書き込み信号f_2は第１書き込み信号発生手段１７をリセットして第１書き込み信号f_1の発生を終了させると共に、ＯＲ回路１８を介してＭＰＵ１６に入力される。

【００１７】２１はキャンセル信号発生手段であり、これは第２書き込み信号f_2と車速信号ｂが所定の状態にないとき以外、書き込み信号ｆによって書き込んだデータをその書き込みの終了後直ちに消去するキャンセル信号ｆを常時ＭＰＵ１６に印加しているが、第２書き込み信号f_2が入力されている状態で車速信号ｂが０となると、衝突によって車両が止まったと判断し、その出力を反転してキャンセル信号ｇをＭＰＵ１６に印加しなくなる。このように、キャンセル信号ｇの印加がなくなることによって、書き込み信号ｆの印加により書き込まれたデータはその後も保持されるようになる。なお、この保持したデータは、キャンセル信号発生回路２１に対してマニアル操作によってマニアル消去信号ｉを入力し、その出力を反転させることによってキャンセルすることができる。

【００１８】２２は事故によってＭＰＵ１６の電源がなくなってもＲＡＭ１６ｂに記憶したデータを保持することができるようにするためのバックアップ電源、２３はＲＡＭ１６ｂにデータが記録済みのとき点灯によってその旨のを指示する記録済インジケータランプである。

【００１９】ＲＡＭ１６ｂに記憶されたデータは、別途用意された解析装置３０からＭＰＵ１６に読み出し信号が印加されることによって解析装置３０に読み取られる。そして、この読み取られたデータに基づいて図示しないプリンタが事故前後の車速や加速度の変化状況をプリンタ用紙３１に出力する。

【００２０】以上構成を説明した装置の動作を、第３図の各部の波形図を参照して説明する。今、車間距離検出手段１１が出力する距離信号ａが車間距離４０ｍに相当するものであるとき、車速検出手段１２が１００ｋｍ／

hに相当する車速信号bを出力すると、接近警報判断手段１３が警報信号cを出力し、これに応じて第１書き込み信号発生手段１７が第１書き込み信号f1を発生し、これに応じてＭＰＵ１６に書き込み信号ｆが入力されるようになる。よって、ＭＰＵ１６はこれに入力されている距離信号ａ、車速信号ｂ、加速度信号ｄ及びブレーキ信号ｅを取り込み、ＲＡＭ１６ｂの所定領域に書き込む。

【００２１】上記警報信号ｃによって警報手段１４が動作されて警報を発生するようになるので、ドライバが危険を感じてブレーキ操作を行って車速を落とすことを行う。しかし、ブレーキ操作の開始が遅かったため、最終的に先行車両に追突するようになると、加速度検出手段１５が発生する加速度信号ｄが±0.4 Ｇを越えて大きくなって衝突信号ｈが発生されるようになる。

【００２２】この衝突信号ｈが第２書き込み信号発生手段２０に入力されると、第２書き込み信号発生手段２０が第２書き込み信号を発生し、これによって第１書き込み信号発生手段１７がリセットされる。しかし、書き込み信号ｆがその後も２０秒の間継続するので、ＭＰＵ１６は距離信号ａ、車速信号ｂ、加速度信号ｄ及びブレーキ信号ｅを取り込み、ＲＡＭ１６ｂの所定領域に書き込む動作を継続する。

【００２３】また、このとき第２書き込み信号f2があるとき車速信号ｂが０になることによって、キャンセル信号発生手段２１の出力がＨからＬレベルに反転されるため、書き込み信号ｆがなくなって書き込み動作が終了しても、ＲＡＭ１６ｂに書き込まれたデータは消去されることなく保存される。そして、書き込んだデータが保存されたときには、記録済インジケータランプを点灯してその旨を通知する。

【００２４】なお、ＲＡＭ１６ｂ中に保存したデータは、マニアル消去信号ｉを入力することによって、キャンセル信号発生手段２１の出力をＬからＨレベルに反転することにより消去される。

【００２５】上述したような衝突信号ｈが発生されないときには、警報信号ｃの発生によって４５秒間持続する第１書き込み信号f1が発生され、これにより書き込みが４５秒の間行われるが、キャンセル信号ｇがＨレベルになっているので、書き込みの終了と同時に書き込まれたデータが消去される。このように保存する必要のないデータが順次消去されるので、限られた容量のメモリであるＲＡＭ１６ｂを使用して、事故発生時にはその解析に必要なデータを収集することができる。

【００２６】上述のように加速度検出手段１５が発生する加速度信号ｄをＲＡＭ１６ｂに書き込み、事故発生時にはこれを保持するようにしているので、この加速度信号の記録を利用して以下のような事故解析を行うことができる。

【００２７】一般に、加速度信号は自車両が他車両に追突したときには負となり、逆に追突されたときには正となる。従って、書き込み保持した加速度データを解析することによって、事故前後の車両の状況を把握でき、加害車か被害車かの判定を行うことができる。特に、多重事故の場合には、１次、２次被害の判定に有効に役立つ。

【００２８】図４は解析装置３０による解析の結果プリント用紙３１にプリントされた車速信号と加速度信号の例を示す。同図（ａ）では、車速が０になったときの加速度のピークが負であることから、自車両が追突加害車であると判断できる。これに対し、同図（ｂ）では、車速が０になったときの加速度のピークが正であることから、自車両が追突被害車であると判断できる。

【００２９】なお、上述した実施例では、書き込み時間は衝突検出から２０秒後、接近を警報する警報信号の発生から４５秒後に書き込みを停止するようにしているが、これらの時間はメモリ容量や時間分解能によって任意に設定することができる。また、衝突検出のための加速度判定レベルを±0.4 Ｇとしているが、これも任意にせていでき、例えば周波数×Ｇに設定できる。

【００３０】以上概略説明したデータの書き込み動作を、ＭＰＵ１６が予め定めた制御プログラムに従って行う仕事を示す図５のフローチャートを参照して以下説明する。ＭＰＵ１６は例えばイグニッションスイッチのオンによるその電源の投入によって動作を開始し、その最初のステップＳ１において初期設定を行ってからステップＳ２に進んで書き込み信号ｆが入力さているか否かを判定する。このステップＳ２の判定がＹＥＳのときにはステップＳ３に進んで距離信号ａ、車速信号ｂ、加速度信号ｄ及びブレーキ信号ｅをＡ／Ｄ変換して取り込み、取り込んだデータをＲＡＭ１６ｂの所定の領域にそれぞれ書き込む。

【００３１】その後ステップＳ４に進んで書き込み信号ｆが入力されているか否を再度判定し、この判定がＹＥＳのときには上記ステップＳ３に戻り、以下ステップＳ４の判定がＮＯとなるまでステップＳ３及びＳ４を繰り返し実行する。ステップＳ４の判定がＮＯになるとステップＳ５に進んでキャンセル信号ｇが入力されているか否を判定する。ステップＳ５の判定がＹＥＳのときにはステップＳ６に進んで上記ステップＳ３においてＲＡＭ１６に書き込んだデータを消去し、判定がＮＯのときにはステップＳ７に進んで記録済インジケータランプ２３を点灯させてから上記ステップＳ２に戻る。

【００３２】上記ステップＳ２の判定がＮＯのとき、すなわち書き込み信号ｆが入力されていないときにはステップＳ８に進んで読み出し信号ｉが入力されているか否を判定し、この判定がＮＯのときにはステップＳ２に戻り、ＹＥＳのときにはステップＳ９に進んでステップＳ３においてＲＡＭ１６に書き込んだデータを読み出して外部に出力し、その後ステップＳ１０に進んで記録済イ

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ンジケータランプ２３を消灯してから上記ステップＳ２に戻る。

【００３３】以上、図５のフローチャートを参照して行ったＭＰＵ１６の動作の説明から明らかなように、ＭＰＵ１６は、第１及び第２書き込み信号発生手段１７及び２０と協同して接近警報判断手段１３による警報信号ｃの発生から第１の一定時間の間と、衝突検出手段１９による衝突信号ｈの発生から第２の一定時間の間に、距離信号ａ、車速信号ｂ、加速度信号ｄを取り込んで得たデータをＲＡＭ１６ｂに書き込む書き込み手段１６ｃとして働く他、キャンセル信号発生手段２１と協同して衝突検出手段１９が衝突信号ｈを発生している間に、車速検出手段１２が発生する車速信号ｂによる車速が０になったとき、書き込み手段１６ｃによるデータの書き込みの終了後、ＲＡＭ１６ｂに書き込まれたデータを自動的に消去する消去手段１６ｄとして働いている。

【００３４】

【発明の効果】以上説明したように本発明によれば、事故前後の車両の状況として車速の他に加速度が分かり、特に車速と加速度との対応を解析することよって衝突発生時に自車両が加害車である或いは被害車であるかが簡単に分かるので、事故解析を容易に行うことができる。

【００３５】また、事故発生の危険性が生じたとき毎に

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書き込んだデータは、事故が発生せず事故解析の必要ないときには保持されることがないので、事故解析を容易に行うことが小さな記憶容量の記憶手段の使用によって実現できる。

【図面の簡単な説明】

【図１】本発明による車両事故解析用データ収集装置の基本構成を示すブロック図である。

【図２】本発明による車両事故解析用データ収集装置の一実施例を示す図である。

【図３】図２中の各部の状態を示す波形図である。

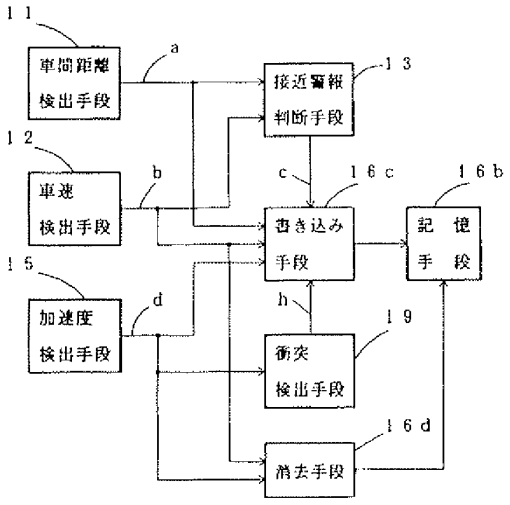
【図４】収集したデータによって得られる解析のためのプリント波形図である。

【図５】図２中のＭＰＵが行う仕事を示すフローチャートである。

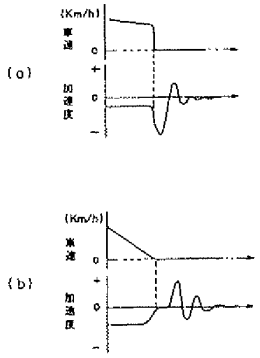
【符号の説明】

１１	車間距離検出手段
１２	車速検出手段
１３	接近警報判断手段
１５	加速度検出手段
１６ｂ	記憶手段（ＭＰＵ）
１６ｃ	書き込み手段（ＭＰＵ）
１６ｄ	消去手段（ＭＰＵ）
１９	衝突検出手段

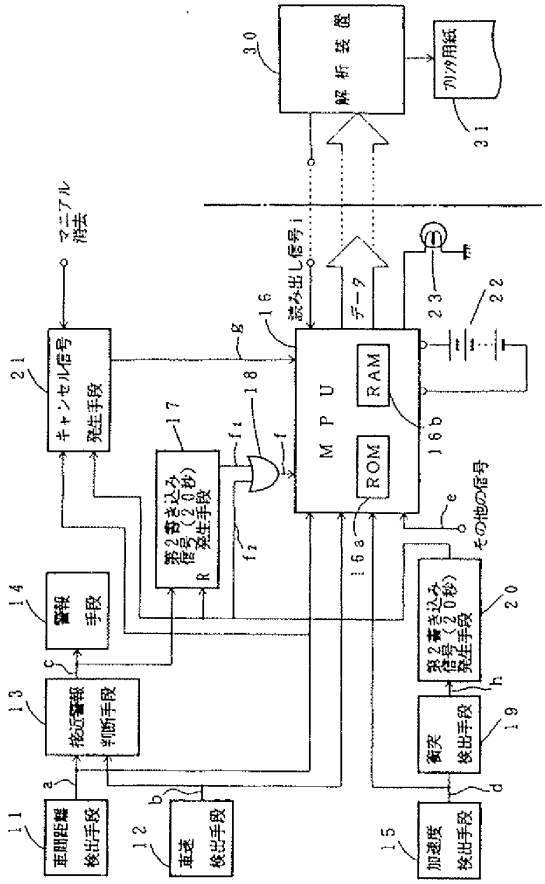
【図１】



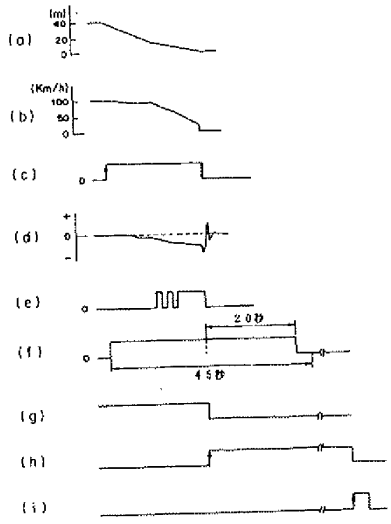
【図４】



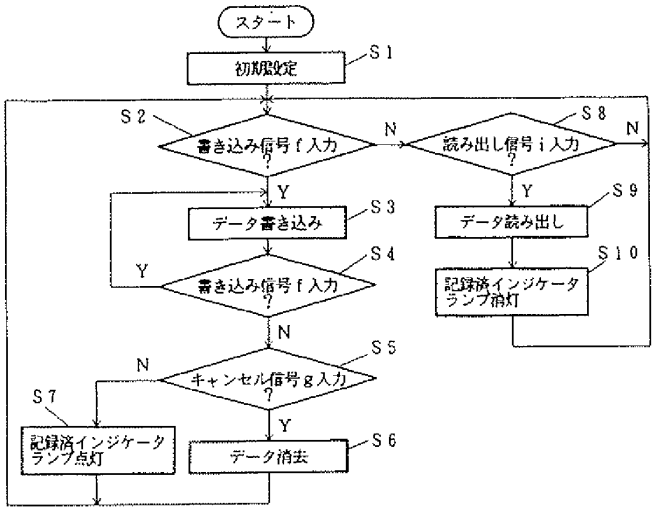
【図2】


10
解析装置
31
カット用紙
マニアル消去
21
キャンセル信号発生手段
16
読み出し信号i
データ
23
22
MPU
RAM
ROM
16b
16a
17
第2書き込み信号(20秒)発生手段
18
f1
f2
f
g
e
その他の信号
14
警報手段
c
13
後近警報判断手段
a
b
11
車間距離検出手段
12
車速検出手段
15
加速度検出手段
d
19
衝突検出手段
h
20
第2書き込み信号(20秒)発生手段

【図3】



【図5】

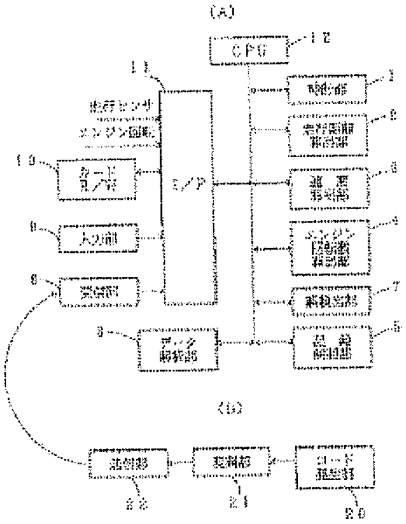

スタート
初期設定
S1
S2
書き込み信号f入力?
N
S8
読み出し信号i入力?
N
Y
Y
S3
データ書き込み
S9
データ読み出し
S4
書き込み信号f入力?
Y
S10
記録済インジケータランプ消灯
N
S5
キャンセル信号g入力?
N
S7
記録済インジケータランプ点灯
Y
S6
データ消去

VEHICLE OPERATION CONDITION RECORDER

Publication number: JP6259632 (A)
Publication date: 1994-09-16
Inventor(s): OZEKI TADASHI +
Applicant(s): YAZAKI CORP +
Classification:
- international: ***G07C5/00; G08G1/00;*** **G07C5/00; G08G1/00;** (IPC1-7): G07C5/00; G08G1/00
- European:
Application number: JP19930049233 19930310
Priority number(s): JP19930049233 19930310

Abstract of **JP 6259632 (A)**

PURPOSE:To automatically record data without requiring driver's input work by providing a signpost at a pass or stop point of a vehicle and recording the place name code and the time received there. CONSTITUTION:The place name code of a pass or stop point of the vehicle is transmitted from a transmission part 22 of the signpost provided at this point. When the vehicle approaches the signpost, a reception part 6 attached to the vehicle receives and outputs the place name code transmitted from the signpost. A recording control part 5 records the received place name code and the time on a recording medium when the place name code is received by the reception part 6. It is preferable that the time to be recorded on the recording medium is calibrated by the time added to the place name code transmitted from the signpost. Thus, driver's labor is omitted.



(19)日本国特許庁（ＪＰ）　(12) **公開特許公報（Ａ）**　(11)特許出願公開番号

特開平6－259632

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(51)Int.Cl.[5]	識別記号	庁内整理番号	ＦＩ	技術表示箇所
Ｇ０７Ｃ　5/00		Ｚ　9146－3Ｅ		
Ｇ０８Ｇ　1/00		Ｄ　2105－3Ｈ		

審査請求　未請求　請求項の数２　ＯＬ　（全　６　頁）

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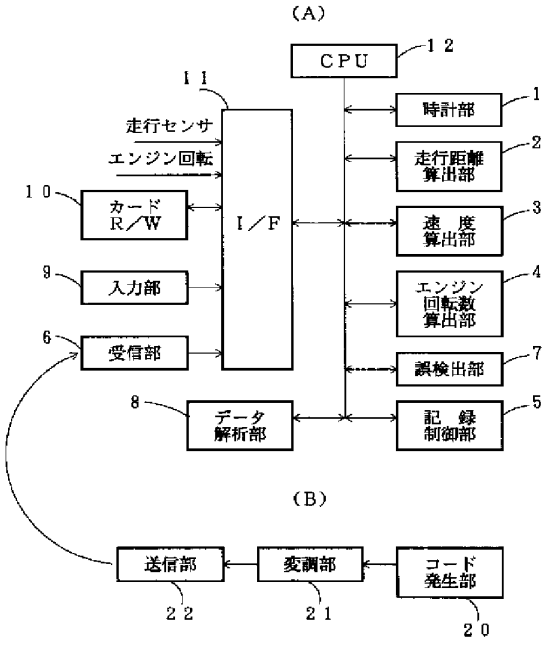
(22)出願日　平成５年(1993)３月10日

(71)出願人　000006895
矢崎総業株式会社
東京都港区三田１丁目４番28号
(72)発明者　大関　忠
静岡県島田市横井１－７－１　矢崎計器株式会社内
(74)代理人　弁理士　瀧野　秀雄　（外１名）

(54)【発明の名称】　車両運行状況記録装置

(57)【要約】
【目的】　本発明の車両の運行状況を記録する装置に関し、自動的に通過または立寄地点の地名が記録されるよう改良した車両運行状況記録装置を提供することを目的とする。
【構成】　車両の通過または立寄地点に通過または立寄地点の地名コードを送信するサインポストを設け、車両に、前記サインポストより送信された地名コードを受信する受信部と、前記受信部で受信された地名コードを時刻と共に記録媒体に記録する記録制御部と、を備える。



【特許請求の範囲】
【請求項１】　車両の運行状況を記録する装置において、
（ａ）車両の通過または立寄地点に通過または立寄地点の地名コードを送信するサインポストを設け、
車両に、
（ｂ）前記サインポストより送信された地名コードを受信する受信部と、
（ｃ）前記受信部で受信された地名コードを時刻と共に記録媒体に記録する記録制御部と、を備えたことを特徴とする車両運行状況記録装置。
【請求項２】　前記記録媒体に記録する時刻の較正を、前記サインポストより送出される地名コードに加えた時刻によって行なうようにしたことを特徴とする請求項１記載の車両運行状況記録装置。
【発明の詳細な説明】
【０００１】
【産業上の利用分野】本発明の車両の運行状況を記録する車両運行状況記録装置に関する。
【０００２】
【従来の技術】車両の運行状況の記録としては、古くはタコグラフによって車両の運行速度を記録させていたが、今日では速度に加えて車両の通過点や立寄地点を時刻と共に記録するようにして、より詳細な運行状況を記録させるようにしている。
【０００３】このような車両運行状況の記録においては、運転者は、予め決められた通過点または立寄地点を車両が通過したときは通過点の地名コードを、また立寄点では立寄点に到着したときおよび出発したとき立寄点の地名コードを入力して記録させるようにしている。
【０００４】
【発明が解決しようとする課題】前述したように、従来の車両運行状況記録装置では、運転者が、予め決められた通過点または立寄点を車両が通過または立寄毎に、通過点または立寄点の地名コードを入力して記録させるようにしていた。
【０００５】このため、運転者は、車両の運転の他に、地名コードを入力するという煩雑な作業を必要とし、またコードの入力誤りも発生する。本発明は、運転者による地名コードの入力作業を無くし、自動的に地名コードが記録されるよう改良した車両運行状況記録装置を提供することを目的とする。
【０００６】
【課題を解決するための手段】前述の課題を解決するために、本発明が採用した手段を説明する。車両の運行状況を記録する装置において、（ａ）車両の通過または立寄地点に通過または立寄地点の地名コードを送信するサインポストを設け、車両に、（ｂ）前記サインポストより送信された地名コードを受信する受信部と、（ｃ）前記受信部で受信された地名コードを時刻と共に記録媒体に記録する記録制御部と、を備えたことを特徴とする。
【０００７】
【作用】車両の通過点または立寄点に設けられたサインポストから通過点または立寄点の地名コードを送信する。車両に取付けられた受信部では、車両がサインポストに近づくと、サインポストより送信され地名コードを受信して出力する。
【０００８】記録制御部では、受信部で地名コードを受信すると記録媒体に受信した地名コードと時刻を記録する。以上のように、車両の通過または立寄点にサインポストを設け、車両がサインポストを通過する際サインポストより送信される地名コードを受信し、受信した地名コードと時刻を記録させるようにしたので、運転者の入力作業を必要とせずに自動的に記録させることができる。
【０００９】
【実施例】本発明の一実施例を、図１～図４を参照して説明する。図１は本発明の実施例の構成図、図２はサインポストより送信される信号フォーマットの具体例、図３は同実施例のサインポストよりの信号受信時の動作フローチャート、図４は同実施例の動作フローチャートである。
【００１０】まず、図１を参照して、実施例の構成について説明する。図１（Ａ）は車両に搭載された車両運行状況記録装置の構成、（Ｂ）はサインポストの構成を示す。図１（Ａ）において、１は現在時刻を発生する時計部、２は車両の走行距離を算出する走行距離算出部、３は速度を算出する速度算出部、４はエンジン回転数を算出するエンジン回転数算出部、５は車両運行状況データを記録させる記録制御部、６はサインポストよりの信号を受信する受信部、７は受信信号の誤を検出する誤検出部、８は受信信号のデータを解析するデータ解析部、９は入力部、１０は記録媒体であるカードへの書込読出しを行なうカード書込読出器、１１はインタフェース（Ｉ／Ｏ）、１２は処理を行なうプロセッサ（ＣＰＵ）である。
【００１１】また、図１（Ｂ）において、２０は送信するコードを発生するコード発生部、２１は変調部、２２は送信部である。コード発生部２０からは、図２（Ａ）に示すフォーマの信号を発生する。すなわち、最初にデータの始まりを示すＳＯＤが、続いて送信地点の地名コードまたは時刻を表わす信号であるＤＡＴＡ、ＤＡＴＡの誤りをチェックする信号ＣＲＣ、およびデータの終りを示すＥＯＤで構成される。
【００１２】図２（Ａ）のＤＡＴＡは、送出するデータが地名コードならば、（Ｂ）に示すように、ＤＡＴＡの始めに地名であることを示す符号が、時刻ならば（Ｃ）に示すように、時刻であることを示す符号が付けられている。また、通常のサインポストから（Ｂ）で示す地名のみが、特定、例えば、車両の基地となるサインポスト

からは（Ｂ）と（Ｃ）で示す地名と時刻が交互に発生する。

【００１３】このような信号がコード発生部２０より、例えば０．１秒おきに送出され、変調部２１で搬送波を変調し、送信部２２より送出される。送信部２２より送信される搬送波としては、例えばＬＥＤ等の光であってもよいし、微弱電波を使用しても良い。

【００１４】車両がサインポストに近づくと、受信部６は送信部２２より送信した信号を受信して出力する。つぎに実施例の動作を説明する。まず、図４を参照して、速度およびエンジン回転の記録動作を説明する。

【００１５】処理Ｓ１０

処理Ｓ１０では、カードＲ／Ｗ１０は記録カードがセットされているか否かを判定し、判定結果がＮＯの場合はＹＥＳになるまで待つ。

処理Ｓ１１

処理Ｓ１１では、走行距離算出部２は図示しない走行距離を積算するメモリの記録値を０にする。

【００１６】処理Ｓ１２

処理Ｓ１２では、走行距離算出部２はＩ／Ｆ１１を介して入力される走行センサよりの信号に基づいて、車両の走行距離を算出して図示しない積算メモリに加算する。

【００１７】処理Ｓ１３

速度算出部３は、Ｉ／Ｆ１１を介して入力される走行センサよりの信号に基づいて、Ｎ分間（例えば３分間）の平均速度とＮ分間内の最高速度を算出する。

処理Ｓ１４

エンジン回転数算出部４は、Ｉ／Ｆ１１を介して入力されるエンジン回転センサよりの信号に基づいて、Ｎ分間内の平均エンジン回転数とＮ分間内の最大回転数を算出する。

【００１８】処理Ｓ１５

処理Ｓ１５では、記録制御部５は処理Ｓ１４およびＳ１５で算出した平均および最大速度と平均および最大回転数と時計部１が発生する現在時刻とをカードＲ／Ｗ１０にセットされている磁気カードに記録する。

【００１９】処理Ｓ１６

処理Ｓ１６では、磁気カードがカードＲ／Ｗ１０にセット状態であるか否かを判定し、ＹＥＳの場合は処理Ｓ１２に移って、処理Ｓ１２～Ｓ１６が繰返され、ＮＯの場合は処理を終了する。

【００２０】また、磁気カードは車両基地の計算機にデータを読込ませ、車両の日報や、その他の必要なデータの収計が行なわれる。つぎに、図３を参照して、車両がサインポストに近づいた場合の動作を説明する。

【００２１】この動作は、受信部６でサインポストよりの信号が受信されると割込処理として開始する。

処理Ｓ１

処理Ｓ１では、誤検出部７は受信信号のＣＲＣチェックを行ない、誤り無しならば処理Ｓ２に移る。

【００２２】処理Ｓ２

データ解析部８は、図２で説明したように、受信信号が地名であるか時刻であるかを解析し、時刻ならば処理Ｓ３に、地名ならば処理Ｓ４に移る。

処理Ｓ３

処理Ｓ３では、時計部１は図示しない現在時刻を示しているカウンタのカウント値を受信した信号に書替える。

【００２３】処理Ｓ４

処理Ｓ４では、記録制御部５は、図示しないメモリに、現在受信部６を介して受信した地名コードが過去Ｍ分（例えば５分）以内に記録されているか否かを調らべ、記録されておれば処理を終了し、記録されておらなければ処理Ｓ５に移る。

【００２４】処理Ｓ５

処理Ｓ５では、受信した地名コードと走行距離算出部２で積算記録されている走行距離と時計部１が示す現在時刻とをカードＲ／Ｗ１０にセットされている図示しない磁気カードに記録して処理を終了する。

【００２５】処理Ｓ４の処理は、サインポストからは例えば０．５秒おきに信号が送出されるが、送出される毎に磁気カードに記録する必要はなく、通過または立寄の１回のみを記録するようにさせるためである。実施例では、車両走行速度、エンジン回転数、地名コードを磁気カードに記録させるようにしたが、車両運行状況の記録としては、この実施例に限定されるものではなく、例えば車両の重量、ガソリン量等も合せて記録させるようにしても良い。

【００２６】また、サインポストが設けられていない地点では従来例と同様に入力部９より入力する。以上説明したように、本発明はこの実施例に限定されるものではなく、その発明の主旨に従った各種の変形が可能である。

【００２７】

【発明の効果】以上説明したように、本発明によれば次の効果が得られる。

車両の通過または立寄点にサインポストを設け、車両がサインポストを通過する際サインポストより送信される地名コードを受信し、受信した地名コードと時刻を記録させるようにしたので、運転者の入力作業を必要とせずに自動的に記録させることができる。

【００２８】また、サインポストより現在時刻も送出させ、時計部の時刻を較正させるようにしたので、運転者の手間がはぶける。

【図面の簡単な説明】

【図１】本発明の実施例の構成図である。

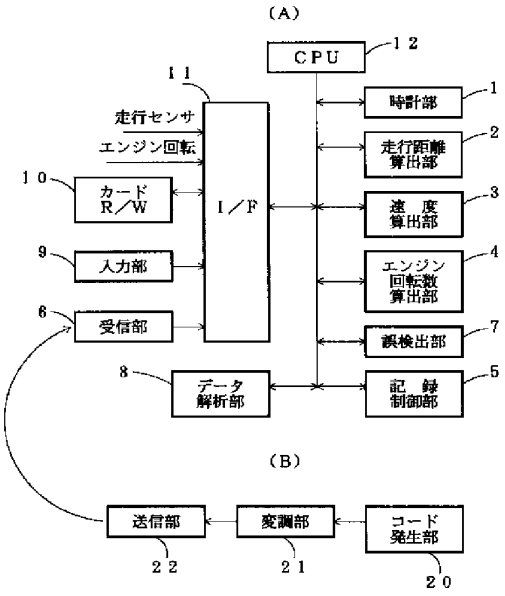
【図２】サインポストより送出される信号フォーマットの具体例である。

【図３】サインポストよりの信号受信時の動作フローチャートである。

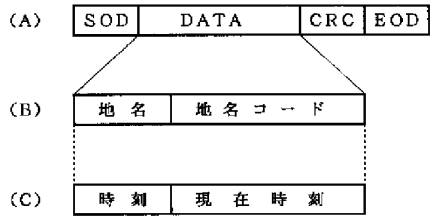
【図４】同実施例の動作フローチャートである。

【符号の説明】
１　時計部
２　走行距離算出部
３　速度算出部
４　エンジン回転数算出部
５　記録制御部
６　受信部
７　誤検出部
８　データ解析部
９　入力部
１０　カード書込読出器
１１　インタフェース（Ｉ／Ｏ）
１２　プロセッサ（ＣＰＵ）
２０　コード発生部
２１　変調部
２２　送信部

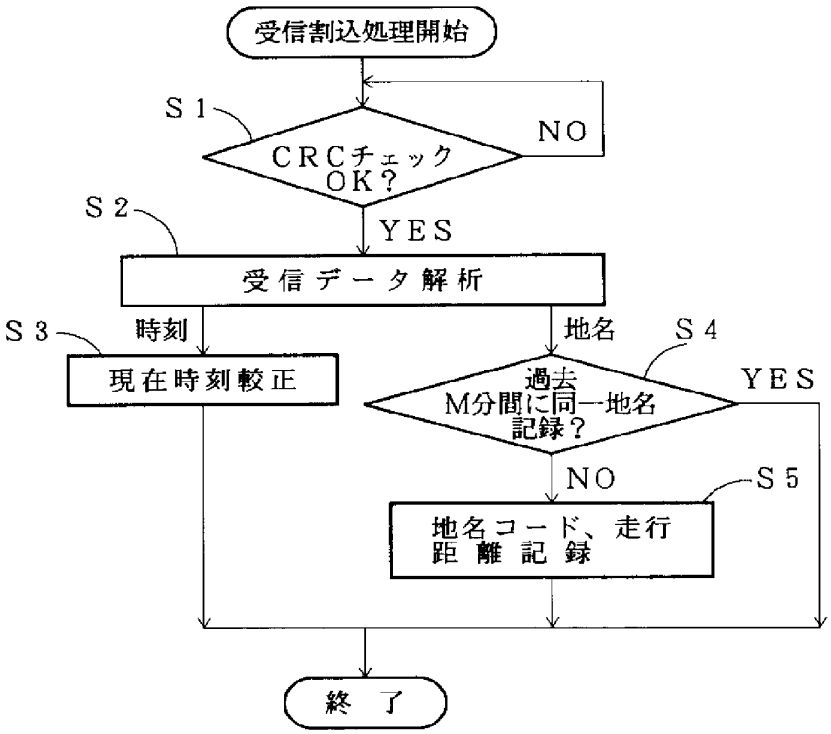
【図１】



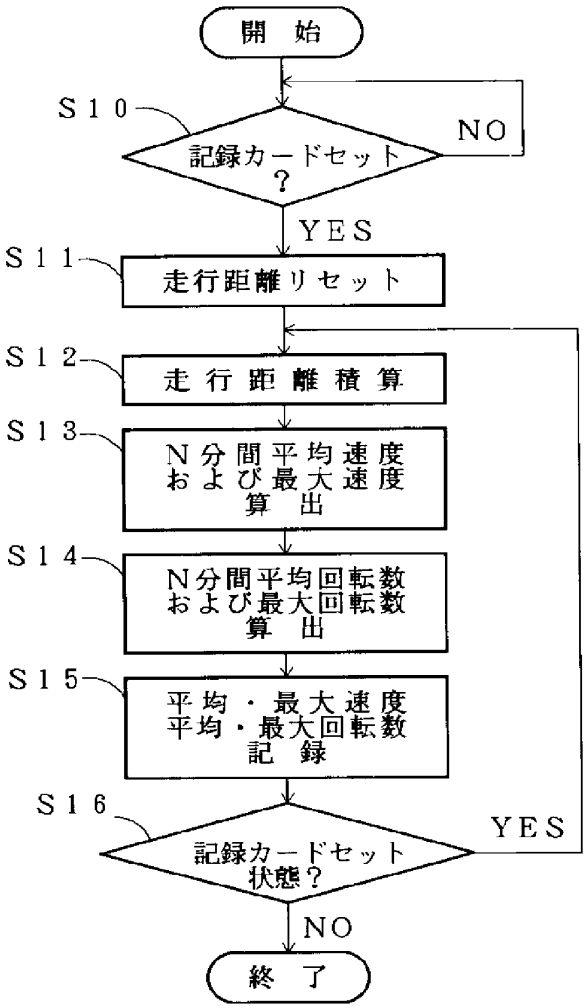
【図２】



【図３】


受信割込処理開始
S１
CRCチェック OK？
NO
YES
S２
受信データ解析
時刻
地名
S３
現在時刻較正
S４
過去M分間に同一地名記録？
YES
NO
S５
地名コード、走行距離記録
終了

【図４】

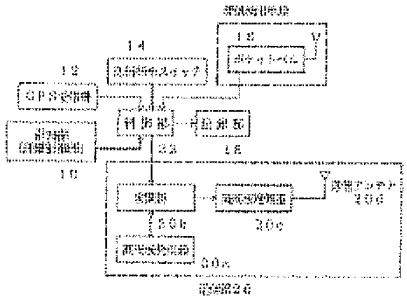

開　始
S１０
記録カードセット？
NO
YES
S１１
走行距離リセット
S１２
走行距離積算
S１３
N分間平均速度
および最大速度
算　出
S１４
N分間平均回転数
および最大回転数
算　出
S１５
平均・最大速度
平均・最大回転数
記　録
S１６
記録カードセット
状態？
YES
NO
終　了

MOVING PROGRESS RECORDING DEVICE

Publication number: JP7159192 (A)
Publication date: 1995-06-23
Inventor(s): NAKAMURA TAKESHI; MATSUMOTO SATOSHI +
Applicant(s): KANSAI MEDICAL SERVICE KK +
Classification:
- international: ***G01C21/00; G01S19/14; G01S19/34; G07C5/00; G08G1/123;*** **G01C21/00; G01S19/00; G07C5/00; G08G1/123;** (IPC1-7): G01C21/00; G01S5/14; G07C5/00; G08G1/123
- European:
Application number: JP19930340120 19931206
Priority number(s): JP19930340120 19931206

Abstract of **JP 7159192 (A)**

PURPOSE:To record positions of a moving body such as a vehicle continuously at every specified time or for every specified moving distance for utilizing recorded information for operation management of the moving body such as a truck, bus, or taxi effectively. CONSTITUTION:This device is provided with a GPS receiver 12 to output current position information based on electric waves from an artificial satellite in a GPS system, a control part 22 to generate position information recording instructions at every specified time set based on time information from a timer, and a recording part 18 to record the current position information outputted from the GPS receiver 12 based on the position information recording instruction from the control part 22.



(19)日本国特許庁（ＪＰ）　(12) **公開特許公報（Ａ）**　(11)特許出願公開番号

特開平7－159192

(43)公開日　平成７年(1995)６月23日

(51)Int.Cl.[6]	識別記号	庁内整理番号	ＦＩ	技術表示箇所
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Ｇ０１Ｓ　5/14		4240－5Ｊ		
Ｇ０７Ｃ　5/00	Ｚ			
Ｇ０８Ｇ　1/123	Ａ	7740－3Ｈ		

審査請求　有　　請求項の数４　ＦＤ　（全　７　頁）

(21)出願番号　特願平5－340120

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(71)出願人　591244074
株式会社関西メデイカル．サービス
大阪府枚方市大垣内町３丁目３番16号

(72)発明者　中村　健
枚方市大垣内町３丁目３番16号　株式会社関西メディカル．サービス内

(72)発明者　松本　敏
枚方市大垣内町３丁目３番16号　株式会社関西メディカル．サービス内

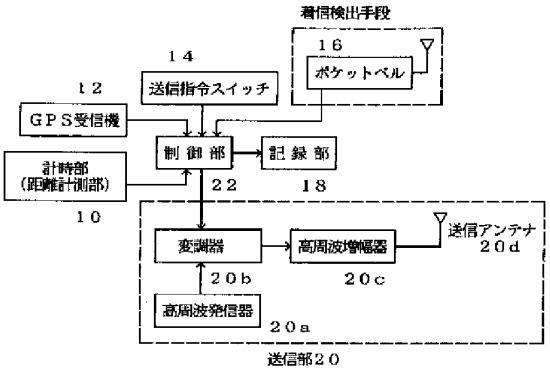
(74)代理人　弁理士　高良　尚志

(54)【発明の名称】　移動経過記録装置

(57)【要約】

【目的】　車両等の移動体の位置を、一定時間経過ごとに又は一定距離移動ごとに継続的に記録することができ、トラック、バス、タクシー等の移動体の運行管理等に有効に利用し得る。

【構成】　ＧＰＳシステムにおける人工衛星からの電波に基づいて現在位置情報を出力するＧＰＳ受信機１２と、計時部１０からの時刻情報に基づき、設定された所定時間経過ごとに位置情報記録指令を発する制御部２２と、制御部２２からの位置情報記録指令に基づき、ＧＰＳ受信機１２から出力される現在位置情報を記録する記録部１８とを有する。



【特許請求の範囲】
【請求項１】移動体に備えられて移動体の移動経過を記録するための移動経過記録装置であって、外部情報に基づいて現在位置情報を出力する位置情報出力手段と、設定された所定時間経過ごとに位置情報記録指令を発する計時指令手段と、計時指令手段からの位置情報記録指令に基づき、位置情報出力手段から出力される現在位置情報を記録する記録手段とを有することを特徴とする移動経過記録装置。
【請求項２】移動体に備えられて移動体の移動経過を記録するための移動経過記録装置であって、外部情報に基づいて現在位置情報を出力する位置情報出力手段と、入力される移動距離情報に基づき、設定された移動距離ごとに現在位置情報記録指令を発する計距指令手段と、計距指令手段からの位置情報記録指令に基づき、位置情報出力手段から出力される現在位置情報を記録する記録手段とを有することを特徴とする移動経過記録装置。
【請求項３】送信指令入力手段と、送信指令入力手段により入力された送信指令に基づき、位置情報出力手段から出力された現在位置情報を基地局に送信する送信手段とを有する請求項１又は請求項２記載の移動経過記録装置。
【請求項４】基地局からの呼を検出する着信検出手段と、この着信検出手段が呼を検出すると、位置情報出力手段から出力された現在位置情報を基地局に送信する送信手段とを有する請求項１又は請求項２記載の移動経過記録装置。
【発明の詳細な説明】
【０００１】
【産業上の利用分野】本発明は、移動体に備えられて移動体の移動経過を記録するための移動経過記録装置に関する。
【０００２】
【従来の技術及び解決しようとする課題】トラックやバス等の移動体の運転管理用の計器として、速度変化を所定の用紙に自動的に記録するタコグラフが従来より用いられている。このタコグラフによれば、最大速度、発進・停止、全走行距離、時間等を運転管理者が事後に点検することができるが、移動体の位置の移動経過を記録することはできず、運転管理上必ずしも満足し得るものではなかった。
【０００３】本発明は、従来技術に存した上記のような問題点に鑑み行われたものであって、その目的とするところは、車両等の移動体の位置を、一定時間経過ごとに又は一定距離移動ごとに継続的に記録することができ、トラック、バス、タクシー等の移動体の運行管理等に有効に利用し得る移動経過記録装置を提供することにある。
【０００４】
【課題を解決するための手段】上記目的を達成するための請求項１の移動経過記録装置の発明は、移動体に備えられて移動体の移動経過を記録するための移動経過記録装置であって、外部情報に基づいて現在位置情報を出力する位置情報出力手段と、設定された所定時間経過ごとに位置情報記録指令を発する計時指令手段と、計時指令手段からの位置情報記録指令に基づき、位置情報出力手段から出力される現在位置情報を記録する記録手段とを有することを特徴とする。
【０００５】また請求項２の移動経過記録装置の発明は、移動体に備えられて移動体の移動経過を記録するための移動経過記録装置であって、外部情報に基づいて現在位置情報を出力する位置情報出力手段と、入力される移動距離情報に基づき、設定された移動距離ごとに現在位置情報記録指令を発する計距指令手段と、計距指令手段からの位置情報記録指令に基づき、位置情報出力手段から出力される現在位置情報を記録する記録手段とを有することを特徴とする。
【０００６】また請求項３の移動経過記録装置の発明は、請求項１又は請求項２記載の移動経過記録装置において、送信指令入力手段と、送信指令入力手段により入力された送信指令に基づき、位置情報出力手段から出力された現在位置情報を基地局に送信する送信手段とを有するものである。
【０００７】また請求項４の発明は、請求項１又は請求項２記載の移動経過記録装置において、基地局からの呼を検出する着信検出手段と、この着信検出手段が呼を検出すると、位置情報出力手段から出力された現在位置情報を基地局に送信する送信手段とを有するものである。
【０００８】
【作用】請求項１の発明において、位置情報出力手段は、移動経過記録装置が備えられている移動体の現在位置情報を、外部情報に基づいて出力する。設定された所定時間経過ごとに、計時指令手段が位置情報記録指令を発すると、記録手段は、その位置情報記録指令に基づき、位置情報出力手段から出力される移動体の現在位置情報を記録する。
【０００９】請求項２の発明において、位置情報出力手段は、移動経過記録装置が備えられている移動体の現在位置情報を、外部情報に基づいて出力する。入力される移動距離情報に基づき、設定された移動距離ごとに、計距指令手段が位置情報記録指令を発すると、記録手段は、その位置情報記録指令に基づき、位置情報出力手段から出力される移動体の現在位置情報を記録する。
【００１０】請求項３の発明においては、送信指令入力手段により送信指令が入力されると、送信手段は、その送信指令に基づき、位置情報出力手段から出力された現在位置情報を基地局に送信する。
【００１１】請求項４の発明においては、着信検出手段が基地局からの呼を検出すると、送信手段は、位置情報出力手段から出力された現在位置情報を基地局に送信す

る。

【００１２】

【実施例】本発明の実施例を、図面を参照しつつ説明する。図１乃至図３は、主としてトラックやタクシー等の自動車に搭載される本発明の１実施例としての移動経過記録装置に関するものであって、そのうち図１はブロック図である。図２及び図３は制御部の制御動作を表わすフローチャートであって、図２はメインフロー、図３はサブルーチンを示す。

【００１３】図１に示されるように、この移動経過記録装置は、計時手段（距離計測手段）としての計時部１０（又は距離計測部、或は計時部及び距離計測部）と、位置情報出力手段としてのＧＰＳ受信機１２と、送信指令スイッチ１４と、着信検出手段としてのポケットベル１６と、現在位置情報並びに現時刻情報（又は現移動距離情報、或は現時刻情報及び現移動距離情報）を記録する記録部１８と、現在位置情報を基地局に送信するための送信部２０と、記録部１８及び送信部２０を制御するための制御部２２とを備えてなる。

【００１４】ポケットベル１６は、電話局からの呼び出し信号の着信を検出すると、内蔵のベルを鳴動させる受信専用機である。

【００１５】ＧＰＳ受信機１２は、ＧＰＳシステム（ＧＲＯＢＡＬ　ＰＯＳＩＴＩＯＮＩＮＧ　ＳＹＳＴＥＭ）に用いられる受信機である。ＧＰＳシステムは、米国国防省のプロジェクトにより実現しているもので、２４個の人工衛星が地球を取り囲むようにして回り、地球上のあらゆる地点、あらゆる時間で、これら人工衛星からの電波（外部情報の一例）をキャッチできるようにしてあり、ＧＰＳ受信機１２がこの電波を受信して、受信位置の緯度、経度及び高度の３次元の位置情報を得ることができるものである。検出位置精度としては約２５メートルＲＭＳ（Ｒｏｏｔ　Ｍｅａｎ　Ｓｑｕａｒｅ）のものがある。なお、このＧＰＳ受信機１２は、算出した位置情報をデジタル信号の形式で出力する。

【００１６】計時部１０としては、例えば、デジタル形式で現在時刻情報を出力する周知の種々の装置を用いることができる。距離計測部としては、移動距離を計測し、デジタル形式又はアナログ形式で移動距離を出力する自動車の距離計等を用いることができる。送信指令スイッチ１４としては、例えば、押しボタンを押すことにより送信指令パルスを発生させるものを使用し得る。

【００１７】記録部１８としては、例えば、マイクロディスク等のフロッピーディスク、ハードディスク、光ディスク、光磁気ディスク、ＩＣカード、磁気テープ等の記録媒体に情報を記録する記録装置を用いることができる。送信部２０は、高周波発振器２０ａと変調器２０ｂと高周波増幅器２０ｃと送信アンテナ２０ｄから構成されている。高周波発振器２０ａは、搬送波としての高周波信号を発生させる周知の機器である。変調器２０ｂは、高周波信号をＧＰＳ受信機１２の位置情報信号に対応させて周波数変調する。高周波増幅器２０ｃは、周波数変調した高周波信号を所定の出力レベルに増幅する。この高周波信号が、送信アンテナ２０ｄから基地局に送信される。

【００１８】制御部２２は、入力部とＣＰＵと出力部からなる（図示を略す。）コンピュータで構成されている。入力部は、計時部１０（又は距離計測部、或は計時部及び距離計測部）、ＧＰＳ受信機１２、送信指令スイッチ１４及びポケットベル１６からの情報を受入れ、ＣＰＵは、これらの情報に基づき所定の処理を行い、出力部は、ＣＰＵの処理結果に基づき、記録部１８へ現在位置情報並びに現時刻情報（又は現移動距離情報、或は現時刻情報及び現移動距離情報）を送り、それらを記録させるか、或は、送信部２０へ現在位置情報を送り、それを基地局へ送信させる。これらの計時部１０と制御部２２とにより計時指令手段を構成する。計時部と制御部は、同じコンピュータ応用機器に組み込まれていてもよい。また距離計測部が用いられる場合は、制御部２２は計距指令手段を構成する。

【００１９】なお、記録部１８及び送信部２０への給電を記録及び送信を要する際に開始し、記録及び送信完了信号を受けることにより、或は記録及び送信に要する所定時間経過により給電を停止する構成とすることにより、電力消費の節約を図るようにすることも勿論可能である。記録部１８における現在時刻情報の記録は、先ず開始時刻を記録し、一定時間経過毎に現在位置情報を順次記録するようにしてその記録順を時刻情報として利用することもできる。

【００２０】制御部２２の動作の例としては、図２に示されるように、先ずポケットベル１６に着信信号があるかどうか判定し（Ｓ１）、着信信号があったと判定すると図３に示される送信処理が行われる（Ｓ２）。また送信指令が入力された場合（Ｓ３）も送信処理が行われる（Ｓ２）。送信処理においては、ＧＰＳ受信機１２が算出した現在位置情報が入力されると（Ｓ９）、その位置情報を変調器２０ｂに送出し（Ｓ１０）、送信が行われる。

【００２１】送信の有無にかかわらず、計時部１０（又は距離計測部、或は計時部１０及び距離計測部）からの情報に基づきｎ×設定時間（距離）経過（移動）［この時間又は距離は適宜選択して設定することができる。］したかｎは正の整数を判定し（Ｓ４）［但し、ｎは正の整数。］、ＧＰＳ受信機１２が算出した位置情報が入力されると（Ｓ５）、記録部１８に対し現在位置情報並びに現時刻情報（又は現移動距離情報、或は現時刻情報及び現移動距離情報）を送り、それらの記録が行われる（Ｓ６）。記録完了後（Ｓ７）、制御を終了する場合（Ｓ８）を除き、以上の動作が繰り返される。

【００２２】なお、基地局の構成は図示しないが、高周

波増幅器と復調器と表示器とを備えており、携帯装置から送信されてくる高周波信号を高周波増幅器で増幅し、復調器で復調して、位置情報を取り出し、表示器で表示することで携帯装置の現在位置を知らせることができる。

【００２３】また、位置情報出力手段はＧＰＳ受信機に限定されるものではない。例えば周囲の地形、ランドマーク、星などから現在位置を割り出すものでもよい。また例えば、交通信号機等に位置情報（又はＩＤ情報）電波発信装置を備えさせて国内の道路をくまなくカバーさせ、その位置情報電波を利用して直接現在位置を割り出したり、又はＩＤ情報電話を利用して、予めデータとして保有している対応する交通信号機等の位置から現在位置を割り出すようなものでもよい。

【００２４】更にまた、送信部２０における変調器２０ｂに周波数変調を採用しているが、本発明は、これに限定されるものではなく例えば位相変調、振幅変調を採用してもよい。また、変調器２０ｂで高周波信号に乗せる位置情報を、雑音混入や波形の歪みに強いデジタルにして、携帯装置の基地局に対する送信可能距離を広げるものとしているが、位置情報をアナログにしてもよい。

【００２５】図２、図４及び図５は、主としてトラックやタクシー等の自動車に搭載される本発明の別の実施例としての移動経過記録装置に関するものであって、そのうち図４はブロック図である。図２及び図５は制御部の制御動作を表わすフローチャートであって、図２は前記実施例と共通のメインフロー、図５はサブルーチンを示す。

【００２６】図４に示されるように、この移動経過記録装置は、計時手段（距離計測手段）としての計時部３０（又は距離計測部、或は計時部及び距離計測部）と、位置情報出力手段としてのＧＰＳ受信機３２と、送信指令スイッチ３４と、着信検出手段としてのポケットベル３６と、現在位置情報並びに現時刻情報（又は現移動距離情報、或は現時刻情報及び現移動距離情報）を記録する記録部３８と、ＩＤ情報記憶部４０と、関連付け部４２と、現在位置情報を基地局に送信するための送信部４４と、記録部３８及び送信部４４を制御するための制御部４６とを備えてなる。

【００２７】計時部３０（又は距離計測部、或は計時部及び距離計測部）、ＧＰＳ受信機３２、送信指令スイッチ３４、ポケットベル３６、記録部３８及び送信部４４については、前記実施例と同様である。また制御部４６も、前記実施例とほぼ同様である。

【００２８】ＩＤ情報記憶部４０は、この携帯装置のポケットベル３６の呼び出し番号を記憶しているメモリーである。

【００２９】関連付け部４２は、制御部４６からの現在位置情報とＩＤ情報記憶部４０からの呼び出し番号を受入れ、ＨＤＬＣ（ハイレベル・データリング制御手順）で用いられるデータフレームに編成して後段の変調器４４ａに送出する。このデータフレームにおいては、始まりに開始フラグが置かれ、終りに終了フラグが置かれ、その両フラグ間に現在位置情報と呼び出し番号が収まる。制御部４６は、入力部とＣＰＵと出力部からなる（図示を略す。）コンピュータで構成されている。入力部は、計時部３０（又は距離計測部、或は計時部及び距離計測部）、ＧＰＳ受信機３２、送信指令スイッチ３４及びポケットベル３６からの情報を受入れ、ＣＰＵは、これらの情報に基づき所定の処理を行い、出力部は、ＣＰＵの処理結果に基づき、記録部３８へ現在位置情報並びに現時刻情報（又は現移動距離情報、或は現時刻情報及び現移動距離情報）を送り、それらを記録させるか、或は、関連付け部４２へ現在位置情報を送り、送信部４４を通じてそれを基地局へ送信させる。

【００３０】なお、この実施例では、関連付け部４２と制御部４６は同じコンピュータ応用機器に組み込まれている。関連付け部４２を含む制御部４６の動作例としては、図５に示される送信処理のサブルーチンを除いて上記実施例と同様である。

【００３１】送信処理においては、ＧＰＳ受信機３２が算出した現在位置情報が入力されると（Ｓ１１）、関連付け部４２がＨＤＬＣフレームを作成し（Ｓ１２）、ＩＤ情報記憶部４０から呼び出し番号を読出し、ＨＤＬＣの情報フィールドに書き込む（Ｓ１３）。書き込みを完了すると（Ｓ１４）、関連付け部４２が、現在位置情報を前記情報フィールドにおける呼び出し番号の後に書き込む（Ｓ１５）。書き込みが完了すると（Ｓ１６）、ＨＤＬＣフレームを変調器に送出し、変調器４４ａが、このＨＤＬＣフレームに基づき、高周波発振器４４ｂから発生した高周波信号を変調し、変調された高周波信号を高周波増幅器４４ｃが増幅し、送信アンテナ４４ｄから基地局に送信される（Ｓ１７）。

【００３２】なお、この実施例のように、ＩＤ情報を記憶するＩＤ情報記憶部と、このＩＤ情報を上記現在位置情報と関連付ける関連付け手段とを有し、送信手段が、現在位置情報及びそれと関連付けられたＩＤ情報を基地局に送信するものである場合、送信手段により、現在位置情報及びそれと関連付けられたＩＤ情報が基地局へ送信される。このような移動経過記録装置によれば、ＩＤ情報により移動体を弁別し得るので、単一の通信手段（例えば一定周波数の電波を用いた一定方式の通信）により、基地局を通じて多数の移動体の位置をそれぞれ把握することができる。

【００３３】基地局からこの移動経過記録装置を呼び出す場合、次のようにして行い得る。基地局は、図６のブロック図に示されるように、移動経過記録装置を呼び出す電話５０、呼び出した番号を記憶する第１記憶部５２、移動経過記録装置からの送信を受信する受信部５４、受信信号を増幅する増幅部５６、増幅した受信信号

から搬送波を取り除き情報を取り出す復調部５８、取り出した情報から位置情報と呼び出し番号を解読する解読部６０、呼び出し番号が異なる複数の移動経過記録装置とその移動経過記録装置を備えている自動車等の対象とを関連づけて記憶する第２記憶部６２、呼び出し番号と位置情報を表示する表示部６４、これら各部の動きを制御する制御部６６を備えている。なお、この制御部６６は、操作者からの指示を受け付ける入力部を備えたコンピュータにより構成されている。電話回線を通じた基地局からの電話による呼び出しにより、電話局から発信局を経て、各移動経過記録装置に対し呼出しの高周波信号が発信される。

【００３４】図７乃至図９は、複数の移動経過記録装置を管理する基地局における制御部の動作を示すフローチヤートであって、そのうち図７は移動経過記録装置への発呼と移動経過記録装置からの信号の受信とを行なうメインフロー、図８は、図７の発呼処理のサブルーチン、図９は、同じく受信処理のサブルーチンである。移動経過記録装置を備えた自動車等の対象の行方を探索する場合を例にとり説明する。

【００３５】図８に示されるように、制御部６６が行方の分からなくなった対象の移動経過記録装置を呼び出す指示を受け付けると（Ｓ２０）、第２記憶部６２から当該移動経過記録装置の呼び出し番号を読み出し、この呼び出し番号を第１記憶部５２に記憶させる（Ｓ２１）と共に、その番号を用いて発呼する（Ｓ２２）。この処理は、他の移動経過記録装置を呼び出す指示がある度に行なわれる。なお、発呼されている移動経過記録装置は、前述したような手順で、現在位置情報と呼び出し番号とをＨＤＬＣフレームにして基地局に送信してくる。

【００３６】次に受信の場合は、図９に示されるように、移動経過記録装置からの信号をキャッチすると（Ｓ２３）、復調部５８で復調した後、解読部６０で位置情報と呼び出し番号を解読し、解読した呼び出し番号と発呼の際に第１記憶部５２に記憶させた呼出し番号とが一致するか否かを判定する（Ｓ２４）。一致した場合は、その現在位置情報及び呼び出し番号を表示部に表示させる（Ｓ２５）。その後、同じ移動経過記録装置の現在位置情報及び呼び出し番号の繰り返し表示を回避するために、この表示した呼び出し番号を第１記憶部５２から消去する（Ｓ２６）。この処理は移動経過記録装置からの信号を受信する度に繰り返し行なわれる。

【００３７】

【発明の効果】請求項１の移動経過記録装置によれば、設定された所定時間経過ごとに、記録手段が車両等の移動体の現在位置情報を記録するので、トラック、バス、タクシー等の移動体の運転管理等に資するところが大きい。請求項２の移動経過記録装置によれば、設定された移動距離ごとに、記録手段が車両等の移動体の現在位置情報を記録するので、トラック、バス、タクシー等の移動体の運転管理等に資するところが大きい。

【００３８】請求項３の移動経過記録装置によれば、送信指令入力手段により、移動体から随時現在位置情報を基地局に送信することができるので、緊急事態の発生及び現在位置の通報等を容易且つ確実に行うことができる。請求項４の移動経過記録装置によれば、基地局からの呼に応じて移動体の現在位置情報が基地局に送信されるので、基地局を通じて移動体の位置を随時確認することができる。

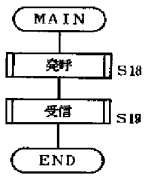
【図面の簡単な説明】

【図１】ブロック図である。
【図２】メインフローのフローチャートである。
【図３】サブルーチンのフローチャートである。
【図４】ブロック図である。
【図５】サブルーチンのフローチャートである。
【図６】ブロック図である。
【図７】メインフローのフローチャートである。
【図８】サブルーチンのフローチャートである。
【図９】サブルーチンのフローチャートである。

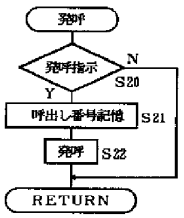
【符合の説明】

１０　　計時部
１２　　ＧＰＳ受信機
１８　　記録部
２２　　制御部

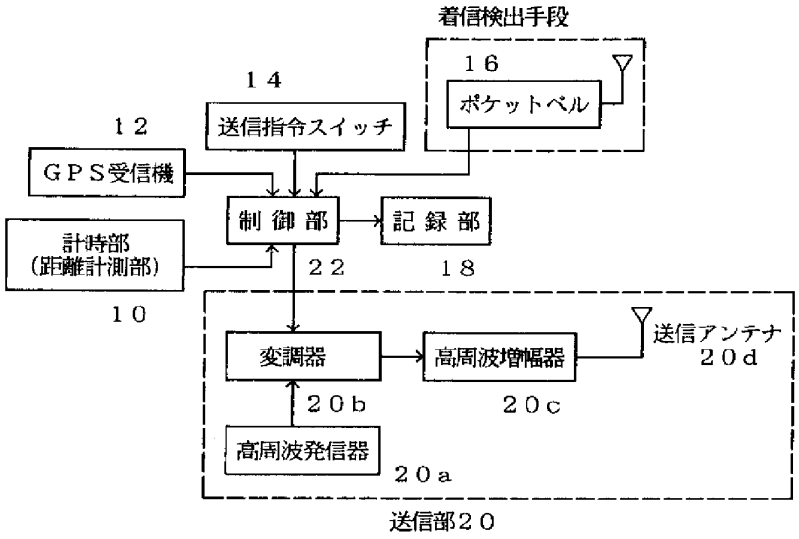
【図７】



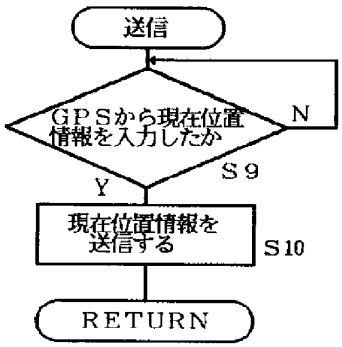
【図８】



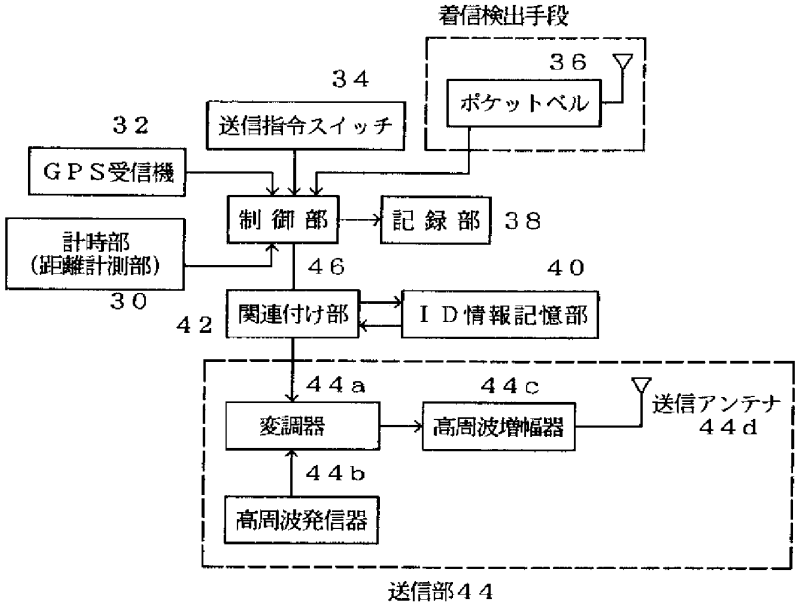
【図１】


着信検出手段
１６
ポケットベル
１４
送信指令スイッチ
１２
ＧＰＳ受信機
制 御 部
記 録 部
計時部
（距離計測部）
１０
２２
１８
変調器
高周波増幅器
送信アンテナ
２０ｄ
２０ｂ
２０ｃ
高周波発信器
２０ａ
送信部２０

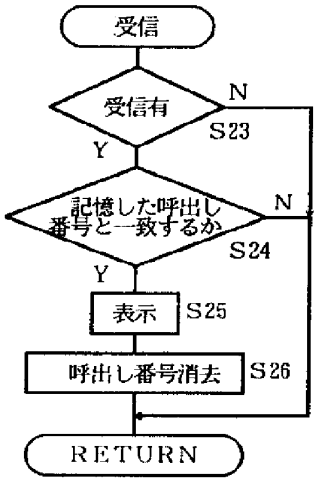
【図３】


送信
ＧＰＳから現在位置情報を入力したか
N
Ｓ９
Y
現在位置情報を送信する
Ｓ10
RETURN

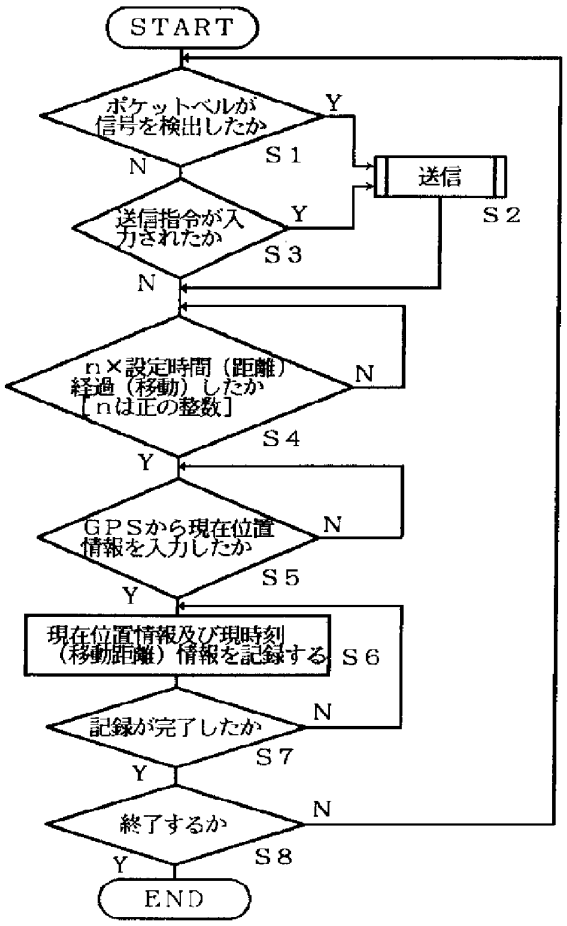
【図４】


着信検出手段
３６
ポケットベル
３４
送信指令スイッチ
３２
ＧＰＳ受信機
制 御 部
記 録 部
３８
計時部
（距離計測部）
３０
４６
４０
４２
関連付け部
ＩＤ情報記憶部
４４ａ
４４ｃ
変調器
高周波増幅器
送信アンテナ
４４ｄ
４４ｂ
高周波発信器
送信部４４

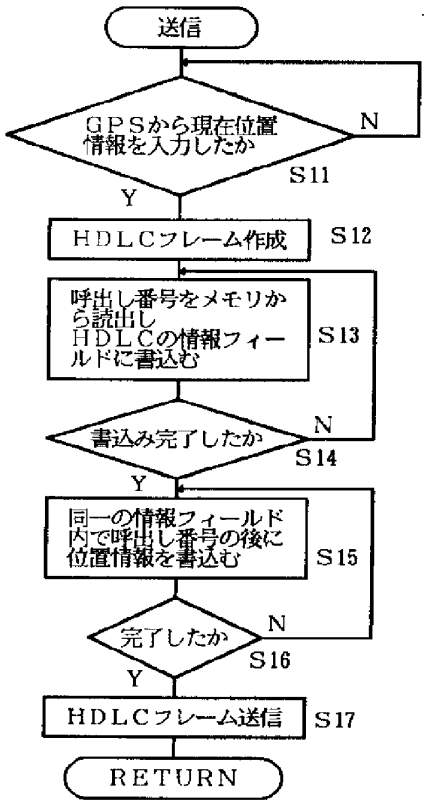
【図９】


受信
受信有
N
Ｓ23
Y
記憶した呼出し番号と一致するか
N
Ｓ24
Y
表示
Ｓ25
呼出し番号消去
Ｓ26
RETURN

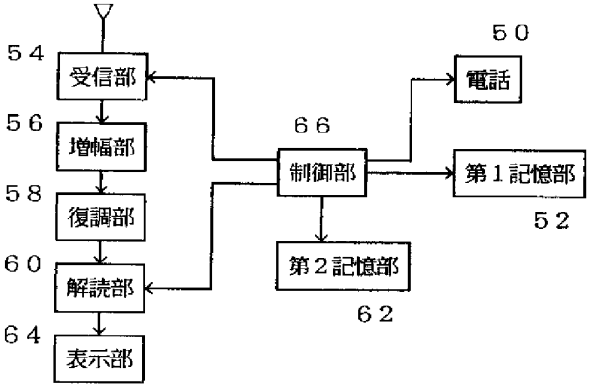
【図２】


START
ポケットベルが信号を検出したか
S１
Y
N
送信
S２
送信指令が入力されたか
S３
Y
N
ｎ×設定時間（距離）経過（移動）したか［ｎは正の整数］
S４
N
Y
GPSから現在位置情報を入力したか
S５
N
Y
現在位置情報及び現時刻（移動距離）情報を記録する
S６
記録が完了したか
S７
N
Y
終了するか
S８
N
Y
END

【図５】


送信
GPSから現在位置情報を入力したか
S11
N
Y
HDLCフレーム作成
S12
呼出し番号をメモリから読出しHDLCの情報フィールドに書込む
S13
書込み完了したか
S14
N
Y
同一の情報フィールド内で呼出し番号の後に位置情報を書込む
S15
完了したか
S16
N
Y
HDLCフレーム送信
S17
RETURN

【図６】


５４
受信部
５６
増幅部
５８
復調部
６０
解読部
６４
表示部
６６
制御部
５０
電話
第１記憶部
５２
第２記憶部
６２

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(71) Applicant *(for all designated States except US)*: NORWEGIAN BIOTRONICS A/S [NO/NO]; Hanaveien 4, N-4300 Sandnes (NO).

(72) Inventor; and
(75) Inventor/Applicant *(for US only)* : PETTERSEN, Kjell [NO/NO]; Hanaveien 4, N-4300 Sandnes (NO).

(74) Agent: HÅMSØ, Eivind; Håmsø Patentbyrå, P.O. Box 171, N-4301 Sandnes (NO).

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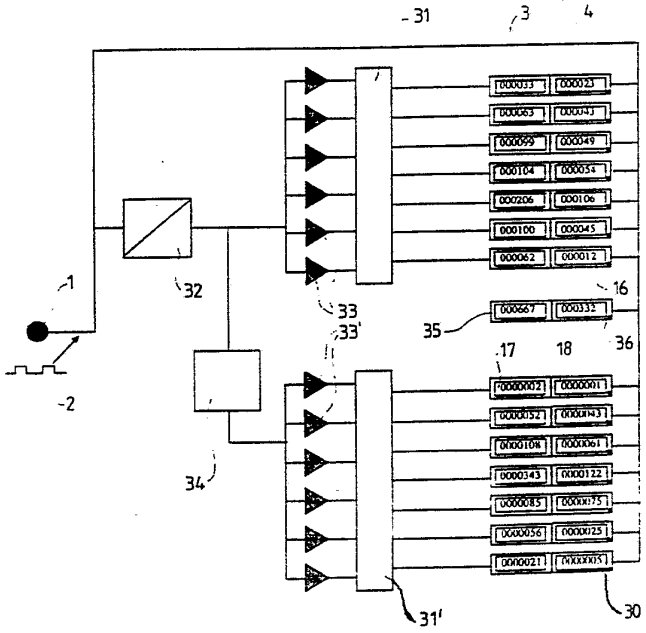
(54) Title: A METHOD FOR THE REGISTERING OF THE DRIVING PATTERN OF A MOTOR VEHICLE, AND AN APPARATUS IN THE FORM OF AN INTERVAL COUNTER FOR CARRYING OUT THE METHOD

(57) Abstract

A method and an apparatus for the registering of the driving pattern of a motor vehicle are adjusted to enable an evaluation of the total driving behavior. The speeds and the accelerations/retardations of the motor vehicle are being converted into pulse signals (2) and sorted into two different groups, one speed counter group (3-16) and one acceleration/retardation counter group (17-30), each being divided into sub-groups indicating number of kilometers driven within a first, a second, a third, etc., speed interval and a first, a second, a third, etc., acceleration/retardation interval, respectively. The sum of the kilometer statements of the sub groups of each group corresponds to the totally driven distance of the motor vehicle measured in kilometers. The apparatus comprises a pulse generator (1) adapted to be mountd to the propulsion system of the motor vehicle, e.g. wheels or gear box, and adapted to supply a pulse signal (2) simultaneously to all counters of both groups, each of which is assigned a logic circuit (31, 31') controlled by comparators (33, 33'). The pulse generator (1) is connected to the comparators (33) of the speed counters via a pulse frequency/voltage-converter (32) connected to the comparators (33') of the acceleration/retardation counters via a derivation circuit (33') deriving speed into acceleration/retardation.



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A METHOD FOR THE REGISTERING OF THE DRIVING PATTERN OF A MOTOR VEHICLE, AND AN APPARATUS IN THE FORM OF AN INTERVAL COUNTER FOR CARRYING OUT THE METHOD

This invention relates to a method for the registering of the driving pattern of a motor vehicle, and an apparatus in the form of an interval counter for carrying out the method.

Recording of the driving pattern of a motor vehicle may be of interest for car owners as well as car insurance companies. The car insurance companies may fit the motor vehicles of their policy holders with the apparatus and read the same at equal intervals. On the basis of these readings, the company may e.g. set a more fair bonus arrangement, i.e. that policy holders having a "careful" driving pattern - low speeds and low accelerations - may be allotted a higher bonus. By that very fact that the policy holders know that their driving pattern is being controlled and recorded, many will be stimulated to change their driving pattern; this will again reduce driving speed, number of accidents, and consequently also the size of the disbursements from the insurance companies. Moreover, when leasing or renting motor vehicles it will be possible to control how the driving has occured. When motor vehicles are to be resold, the apparatus will give an indication of how the motor vehicle has been driven, whereby favorable/unfavorable driving pattern may influence the selling price quite substantially. Car owners may also take an interest in seeing their own driving pattern, for possibly comparing it with others.

The object of the present invention is to provide a method and an apparatus for the registering of the driving patterns of motor vehicles and thereby enable an evaluation of the total driving behavior.

This object is achieved through the features as set forth in the following claims.

In contrast with prior art apparatus for the purpose concerned, which only measure speed above a certain limit, i.e. record speed excesses and take note of these, the method and apparatus according to the invention are based on the registering of speed and acceleration/retardation and and on the sorting of these in different groups.

The apparatus uses the speed of the motor vehicle, i.e. driven distance per unit of time, to generate data describing the driving pattern of the motor vehicle. The apparatus is connected to the propulsion system of the motor vehicle, i.e. wheels or gear box, via a pulse generator adapted to generate a signal proportional to the speed of the motor vehicle. This signal is processed further in the apparatus so that individual kilometer counters are incremented; there being one counter for each speed interval, e.g. 0-10 km/h; 10-20 km/h and so forth. The sum of all counters will constitute the totally driven distance.

On the basis of the speed signal, the apparatus also generates a signal representing the acceleration/retardation (the time derivative of the speed) of the motor vehicle. This signal will be positive when accelerating and negative when decelerating. The acceleration/retardation-signal controls the kilometer counters counting the number of kilometers driven by the motor vehicle in the different areas of acceleration/retardation. Thus, the apparatus comprises two sets of counters, one set of which is

controlled by the speed signal of the motor vehicle, the other set being controlled by the acceleration/retardation-signal of the motor vehicle. Both sets of counters count the number of kilometers driven. By reading the apparatus, one may form oneself an idea of the driving pattern of the motor vehicle, the apparatus stating exact number of kilometers in the different speed zones and acceleration/retardation zones.

The interval counter according to the invention is far more versatile and advanced than prior art technique; this should also appear from the following description of an embodiment of the invention.

Said embodiment is diagrammatically illustrated in the accompanying drawing figure showing a circuit design of an interval counter for motor vehicles.

The interval counter shown comprises a pulse generator 1 which, in a manner not closer shown, is fitted for mounting on a propulsion system of a motor vehicle, i.e. wheels or gear box. The pulse generator 1 having a pulse frequency proportional to the speed of the vehicle, is adapted to give a certain number of pulses per kilometers driven.

Reference numeral 2 denotes a square wave puls from the pulse generator 1. The pulse signal 2 is simultaneously supplied to all of a row of counters.

The counters comprise fourteen speed counters 3, 4 ....16 in two sets, one set of which can be reset to zero, as well as fourteen acceleration/retardation counters 17, 18 ....30 in two sets, one set of which can be reset to zero, and being arranged in two separate groups each of which is assigned a logic circuit 31 and 31', respectively. When supplying the pulse signal 2, only one speed counter, say 3, and one

acceleration/retardation counter, say 17, activated at a time. The respective logic circuit 31, 31' controls which counter that is counting.

The pulse signal 2 enters simulatenously a pulse frequency/ voltage converter 32 adapted to convert from pulse frequency to voltage. From the voltage converter 32, a voltage signal proportional to the speed of the motor vehicle is generated. This voltage signal is supplied to a set of comparators 33 assigned the logic circuit 31 for the speed counters 3, 4 .... 16. The comparators 33 are each set on a separate speed level. The signal from these comparators 33 controls the logic circuit 31 which selects which of the speed counters that is to be active.

The voltage signal from the converter 32 is also supplied to a derivation circuit 34. From this circuit 34, a voltage signal proportional to the acceleration/retardation of the motor vehicle is achieved. This voltage signal is supplied to a set of comparators 33' assigned the logic circuit 31' for the acceleration/retardation counters 17, 18 ....30. The signal from these comparators 33' controls the logic circuit 31' which selects which of the acceleration/retardation counters that is to be active.

The apparatus/interval counter shown is likewise equipped with a total counter 35 acting as an ordinary kilometer counter. The sum of the speed counters 3, 4 .... 16 will show the very same distance driven as the total counter 35.

As mentioned, one set of counters in each group may be reset to zero. Also the total counter 35 is assigned such a counter 36. The resetable counters are being counted up in parallel to the other counters and will show the same figure. The only difference is that the users of the apparatus have the opportunity of resetting these counters

whenever this might be desirable. These counters will function in the same manner as a trip counter on a motor vehicle.

For the speed counters, an actual division would be in speed groups of 10 km/h, i.e. that a first counter counts the number of kilometers driven in the speed interval of 0-10 km/h, a second counter counting number of kilometers driven in the speed interval 10-20 km/h, and so forth. In order to restrict the number of counters, the apparatus may possibly be so adapted that all kilometers driven above an upper speed limit, e.g. 180 km/h, are counted by one counter.

For the acceleration/retardation counters, an actual division may be into accelerations/retardations from -10 $m/sec.^2$ to +10 $m/sec.^2$, using an interval width of 1 $m/sec.^2$

The physical implementation of the apparatus might comprise more counters than shown in the figure. However, only one display may be used and one multiplexer fetching one figure at a time. The method fo the invention may also be carried out using a microprocessor.

C l a i m s

1. A method for the registering of the driving pattern of a motor vehicle, i.e. the number of kilometers driven within a first, a second, a third, etc., speed interval, and the number of kilometers driven within a first, a second, a third, etc., acceleration/retardation interval, c h a r a c t e r i z e d i n that the speeds and accelerations/retardations of the motor vehicle are converted into pulse signals and sorted into different groups, each of which being divided into sub groups stating the number of kilometers driven within a first, a second, a third, etc., speed interval and a first, a second, a third, etc., acceleration/retardation interval, respectively, the sum of each group's sub groups' kilometer statements corresponding to the totally driven distance of the motor vehicle measured in kilometers.

2. An apparatus for carrying out the method as defined in claim 1, c h a r a c t e r i z e d i n that it comprises two groups of counters (3-16, 17-30), one speed counter group (3-16) and one acceleration/retardation counter group (17-30), each assigned their separate logic circuit (31, 31') controlled by comparators (33, 33'), the comparators (33) of the speed counter group each being set at a separate speed level (e.g. 0-10 km/h, 10-20 km/h, etc.), the comparators (33') of the acceleration/retardation counter group each being set at a separate acceleration/retardation level (e.g. -1m/sec. , +1m/sec. , etc.), a pulse generator (1) having a pulse frequence proportional to the speed of the motor vehicle being adapted for mounting to the propulsion system of the motor vehicle, preferably wheels or gear box, and adapted to give a pulse signal (2) simultaneously to all counters of both groups, said pulse generator (1) being connected to the comparators (33) of the speed counters via a pulse frequence/voltage-converter (32)

connected to the comparators (33') of the acceleration/ retardation counters via a derivation circuit (34) deriving speed into acceleration/retardation.

3. Apparatus in accordance with claim 2, c h a r a c t e r i z e d i n that each counter of said two groups in series is connected to a similar counter resetable to zero.

4. Apparatus in accordance with claim 2 or 3, c h a r a c t e r i z e d i n that it is equipped with a total counter (35), to which, preferably, a resetable total counter (36) is connected in series, said total counters acting as ordinary kilometer counters.

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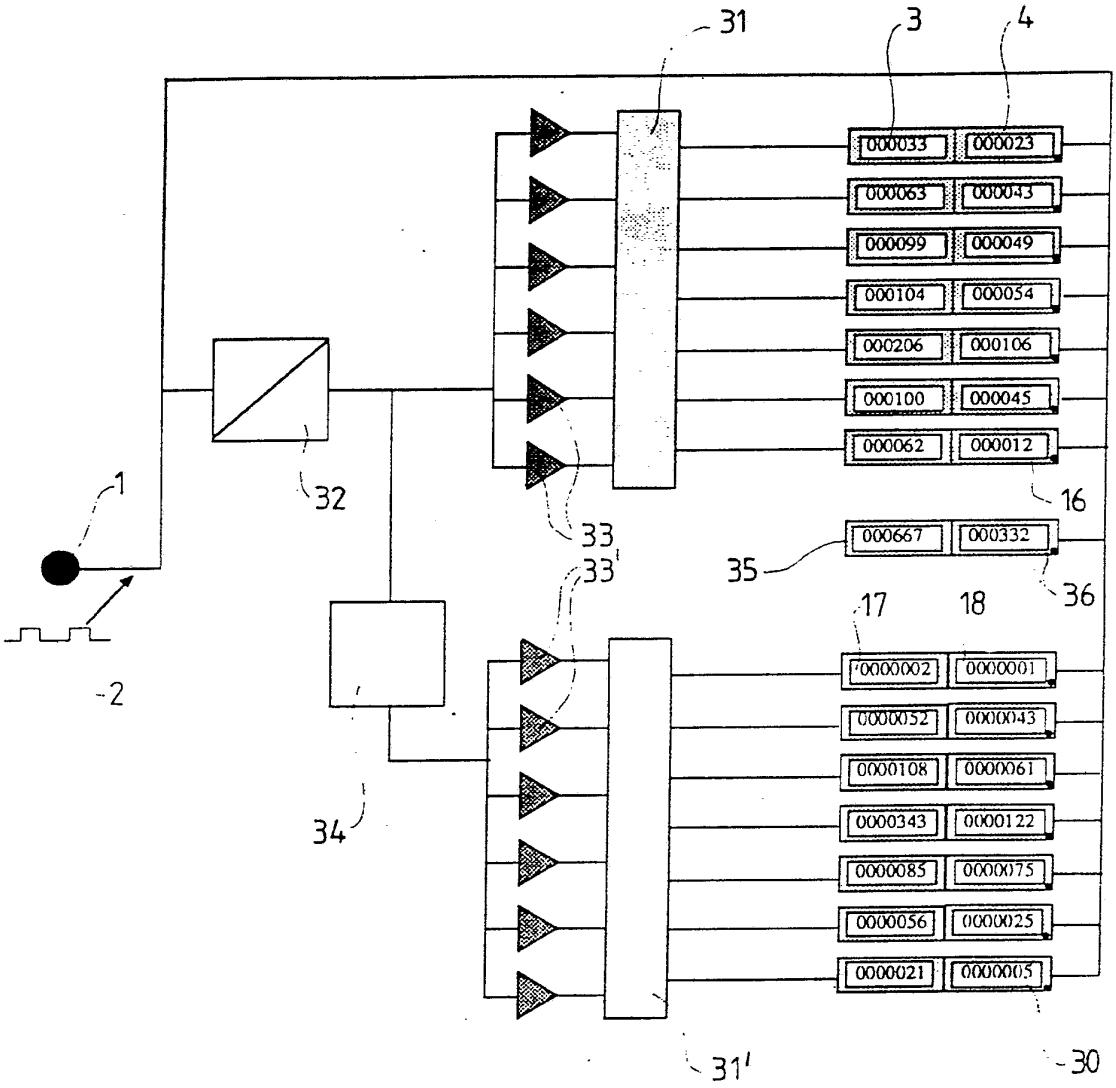
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INTERNATIONAL SEARCH REPORT

International Application No PCT/NO 89/00081

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [6]

According to International Patent Classification (IPC) or to both National Classification and IPC

IPC4: G 07 C 5/10

II. FIELDS SEARCHED

Minimum Documentation Searched [7]

Classification System	Classification Symbols
IPC4	G 07 C

Documentation Searched other than Minimum Documentation to the Extent that such Documents are included in the Fields Searched [8]

SE,DK,FI,NO as above

III. DOCUMENTS CONSIDERED TO BE RELEVANT [9]

Category *	Citation of Document, [11] with indication, where appropriate, of the relevant passages [12]	Relevant to Claim No. [13]
A	US, A, 4644368 (MUTZ) 17 February 1987, see column 7, line 59 - column 8, line 19; figure 4 --	1,2
A	EP, A2, 0189204 (CATERPILLAR MITSUBISHI LTD) 30 July 1986, see page 13, line 5 - line 11 --	1,2
A	EP, A2, 0129949 (HIDDEN-1 (PROPRIETARY) LIMITED) 2 January 1985, see page 13, line 3 - line 25 --	1,2
A	WO, A1, 87/04253 (TACOM LTDA) 16 July 1987, see page 6, line 26 - page 7, line 6 --	1,2

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* Special categories of cited documents: [10]

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IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
1989-11-24	1989 -11- 30
International Searching Authority	**Signature of Authorized Officer**
SWEDISH PATENT OFFICE	HANS BANDELIN

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ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO. PCT/NO 89/00081

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A- 4644368	17/02/87	DE-A- 3505068	19/06/86
		EP-A- 0191413	20/08/86
		JP-A- 61190687	25/08/86
EP-A2- 0189204	30/07/86	JP-A- 61170883	01/08/86
		CA-A- 1247743	27/12/88
		US-A- 4853859	01/08/89
		JP-A- 61170884	01/08/86
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WO-A1- 87/04253	16/07/87	AU-D- 68410/87	28/07/87
		EP-A- 0256026	24/02/88

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(71) Applicant: PROGRESSIVE CASUALTY INSURANCE COMPANY [US/US]; 6300 Wilson Mills Road, East Campus, Mayfield Village, OH 44143 (US).

(72) Inventors: McMILLAN, Robert, J.; 809 Orleans Avenue South, Tampa, FL 33606 (US). CRAIG, Alexander, D.; 20 Stonehill Lane, Moreland Hills, OH 44022 (US). HEINEN, John, P.; 18115 Longwater Run Drive, Tampa, FL 33647 (US).

(74) Agent: MOLDOVANYI, Jay, F.; Fay, Sharpe, Beall, Fagan, Minnich & McKee, Suite 700, 1100 Superior Avenue, Cleveland, OH 44114-2518 (US).

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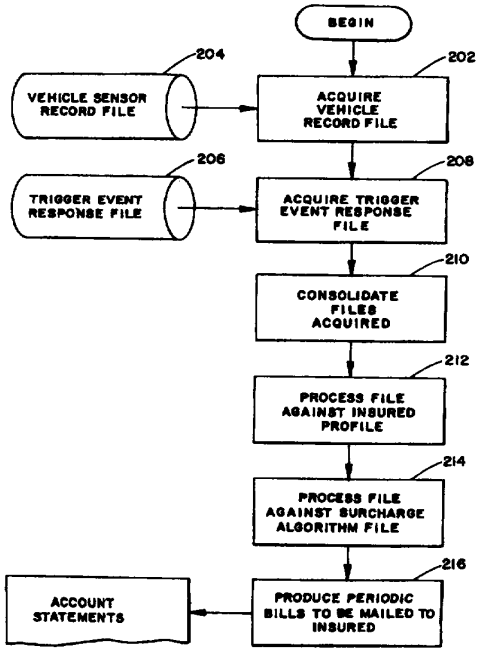
(54) Title: MOTOR VEHICLE MONITORING SYSTEM FOR DETERMINING A COST OF INSURANCE

(57) Abstract

A method and system of determining a cost of automobile insurance based upon monitoring, recording and communicating data representative of operator and vehicle driving characteristics (202). The cost is adjustable retrospectively and can be prospectively set by relating the driving characteristics to predetermined safety standards. The method comprises steps of monitoring a plurality of raw data elements (208) representative of an operating state of the vehicle or an action of the operator. Selected ones of the raw data elements are recorded when the ones are determined to have an identified relationship to safety standards. The selected ones are consolidated (210) for processing against an insurer profile and for identifying a surcharge or discount (214) to be applied to a base cost of automobile insurance. A final cost (216) is produced from the base costs and the surcharges and discounts.



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MOTOR VEHICLE MONITORING SYSTEM FOR DETERMINING A COST OF INSURANCE

Background of the Invention

The present invention relates to data acquisition and processing systems, and particularly to a system for monitoring motor vehicle operational characteristics and driver behavior to obtain increased amounts of data relating to the safety of use for purposes of providing a more accurate determination of a cost of insurance for the vehicle.

Conventional methods for determining costs of motor vehicle insurance involve gathering relevant historical data from a personal interview with the applicant for the insurance and by referencing the applicant's public motor vehicle driving record that is maintained by a governmental agency, such as a Bureau of Motor Vehicles. Such data results in a classification of the applicant to a broad actuarial class for which insurance rates are assigned based upon the empirical experience of the insurer. Many factors are relevant to such classification in a particular actuarial class, such as age, sex, marital status, location of residence and driving record.

The current system of insurance creates groupings of vehicles and drivers (actuarial classes) based on the following types of classifications.

Vehicle:

- Age;
- manufacturer, model; and
- value.

Driver:

- Age;
- sex;
- marital status;
- driving record (based on government reports),
  - violations (citations);

at fault accidents; and

place of residence.

Coverage:

Types of losses covered,

liability,

uninsured motorist,

comprehensive, and

collision;

liability limits; and

deductibles.

The classifications, such as age, are further broken into actuarial classes, such as 21 to 24, to develop a unique vehicle insurance cost based on the specific combination of actuarial classes for a particular risk. For example, the following information would produce a unique vehicle insurance cost.

Vehicle:

Age	1993 (three years old)
manufacturer, model	Ford, Explorer XLT
value	$ 18,000.

Driver:

Age	38 years old
sex	male
marital status	single

driving record (based on government reports)

violations	1 point (speeding)
at fault accidents	3 points (one at fault accident)
place of residence	33619 (zip code)

Coverage:

Types of losses covered

liability	yes
uninsured motorist	no
comprehensive	yes
collision	yes
liability limits	$100,000./$300,000./$50,000.
deductibles	$500./$500.

A change to any of this information would result in a different premium being charged, if the change resulted in a different actuarial class for that variable. For instance, a change in the drivers' age from 38 to 39 may not result in a different actuarial class, because 38 and 39 year old people may be in the same actuarial class. However, a change in driver age from 38 to 45 may result in a different premium because of the change in actuarial class.

Current insurance rating systems also provide discounts and surcharges for some types of use of the vehicle, equipment on the vehicle and type of driver. Common surcharges and discounts include:

Surcharges:

Business use.

Discounts:

Safety equipment on the vehicle
- airbags, and
- antilock brakes;

theft control devices
- passive systems (e.g. "The Club"), and
- alarm system; and

driver type
- good student, and
- safe driver (accident free).

A principal problem with such conventional insurance determination systems is that much of the data gathered from the applicant in the interview is not verifiable, and even existing public records contain only minimal information, much of which has little relevance towards an assessment of the likelihood of a claim subsequently occurring. In other words, current rating systems are primarily based on past realized losses. None of the data obtained through conventional systems necessarily reliably predicts the manner or safety of future operation of the vehicle. Accordingly, the limited amount of accumulated relevant data and its minimal evidential value towards computation of a fair cost of insurance has generated a long-felt need for an improved system for more reliably and accurately accumulating data having a highly relevant evidential value towards predicting the actual manner of a vehicle's future operation.

Many types of vehicle operating data recording systems have heretofore been suggested for purposes of maintaining an accurate record of certain elements of vehicle operation. Some are suggested for identifying the cause for an accident, others are for more accurately assessing the efficiency of operation. Such systems disclose a variety of conventional techniques for recording vehicle operation data elements in a variety of data recording systems. In addition, it has also been suggested to provide a radio communication link for such information via systems such as a cellular telephone to provide immediate communication of certain types of data elements or to allow a more immediate response in cases such as theft, accident, break-down or emergency. It has even been suggested to detect and record seatbelt usage to assist in determination of the vehicle insurance costs (U.S. Patent No. 4,667,336).

The various forms and types of vehicle operating data acquisition and recordal systems that have heretofore been suggested and employed have met with varying degrees of success for their express limited purposes. All possess substantial defects such that they have only limited economical and

practical value for a system intended to provide an enhanced acquisition, recordal and communication system of data which would be both comprehensive and reliable in predicting an accurate and adequate cost of insurance for the vehicle. Since the type of operating information acquired and recorded in prior art systems was generally never intended to be used for determining the cost of vehicle insurance, the data elements that were monitored and recorded therein were not directly related to predetermined safety standards or the determining of an actuarial class for the vehicle operator. For example, recording data characteristics relevant to the vehicle's operating efficiency may be completely unrelated to the safety of operation of the vehicle. Further, there is the problem of recording and subsequently compiling the relevant data for an accurate determination of an actuarial profile and an appropriate insurance cost therefor.

Current motor vehicle control and operating systems comprise electronic systems readily adaptable for modification to obtain the desired types of information relevant to determination of the cost of insurance. Vehicle tracking systems have been suggested which use communication links with satellite navigation systems for providing information describing a vehicle's location based upon navigation signals. When such positioning information is combined with roadmaps in an expert system, vehicle location is ascertainable. Mere vehicle location, though, will not provide data particularly relevant to safety of operation unless the data is combined with other relevant data in an expert system which is capable of assessing whether the roads being driven are high-risk or low-risk with regard to vehicle safety.

The present invention contemplates a new and improved motor vehicle monitoring, recording and communication system, which primarily overcomes the problem of determining cost of vehicle insurance based upon data which does not take into consideration how a specific vehicle is operated. The subject invention will base insurance charges with regard to current material data representative of actual driving characteristics of the vehicle and driver operation

to provide a classification rating of the operator and the vehicle in an actuarial class which has a vastly reduced rating error over conventional insurance cost systems. Additionally, the present invention allows for frequent (monthly) adjustment to the cost of coverage because of the changes in operator behavior and driving patterns. This can result in automobile insurance charges that are readily controllable by individual operators. The system is adaptable to current electronic operating systems, tracking systems and communication systems for the improved extraction of selected insurance related data.

Brief Summary of the Invention

In accordance with the present invention, there is disclosed a method of determining a cost of automobile insurance based upon monitoring, recording and communicating data representative of operator and vehicle driving characteristics, whereby the cost is adjustable by relating the driving characteristics to predetermined safety standards. The method is comprised of steps of monitoring a plurality of raw data elements representative of an operating state of a vehicle or an action of the operator. Selected ones of the plurality of raw data elements are recorded when they are determined to have an identified relationship to the safety standards. The recorded elements are consolidated for processing against an insured profile and for identifying a surcharge or discount to be applied to a base cost of automobile insurance. The total cost of insurance obtained from combining the base cost and surcharges or discounts is produced as a final cost to the operator.

In accordance with another aspect of the present invention, the recording comprises identifying a trigger event associated with the raw data elements which has an identified relationship to the safety standards so that trigger information representative of the event is recorded.

In accordance with a more limited aspect of the present invention, the method comprises a step of immediately communicating to a central control

station via an uplink, information representative of the trigger event and recording response information generated by the control station.

In accordance with yet another aspect of the present invention, the method comprises steps of generating calculated data elements and derived data elements from the raw data elements, and accumulating the calculated and derived data elements in a recording device.

The present invention will use information acquired from the vehicle to more accurately assess vehicle usage and thereby derive insurance costs more precisely and fairly. Examples of possible actuarial classes developed from vehicle provided data include:

Driver:

Total driving time in minutes by each driver of the insured vehicle;

number of minutes driving in high/low risk locations (high/low accident areas);

number of minutes of driving at high/low risk times (rush hour or Sunday afternoon);

safe driving behavior,

using seat belts,

use of turn signals,

observance of speed limits, and

observance of traffic control devices;

number of sudden braking situations; and

number of sudden acceleration situations.

Vehicle:

Location vehicle is parked at night (in garage, in driveway, on street); and

location vehicle is parked at work (high theft locations, etc.).

These new and more precise actuarial classes are considered to be better predictors of loss because they are based on actual use of the vehicle and the behaviors demonstrated by the driver. This will allow the consumers unprecedented control over the ultimate cost of their vehicle insurance.

In accordance with the present invention, additional discounts and surcharges based on data provided by the insured vehicle will be available. Examples of surcharges and discounts based on vehicle provided data include:

Surcharges:

Excessive hard braking situations occurring in high risk locations; and intermittent use of a safety device, such as seat belts.

Discounts:

Regular selection of low/high risk routes of travel;
regular travel at low/high risk times;
significant changes in driving behavior that results in a lower risk;
vacation discount when the vehicle is not used;
regular use of safety devices; and
unfailing observance of speed limits.

There is some overlap between the use of actuarial classes and discounts and surcharges. Until data has been gathered and analyzed it is not possible to determine which vehicle provided data will be used to determine actuarial classes and which will be used for surcharges or discounts.

One benefit obtained by use of the present invention is a system that will provide precise and timely information about the current operation of an insured motor vehicle that will enable an accurate determination of operating characteristics, including such features as miles driven, time of use and speed of the vehicle. This information can be used to establish actual usage based insurance charges, eliminating rating errors that are prevalent in traditional

systems and will result in vehicle insurance charges that can be directly controlled by individual operators.

It is another benefit of the subject invention that conventional motor vehicle electronics are easily supplemented by system components comprising a data recording, a navigation system and a communications device to extract selected insurance relevant data from the motor vehicle.

It is yet another object of the present invention to generate actuarial classes and operator profiles relative thereto based upon actual driving characteristics of the vehicle and driver, as represented by the monitored and recorded data elements for providing a more knowledgeable, enhanced insurance rating precision.

The subject new insurance rating system retrospectively adjusts and prospectively sets premiums based on data derived from motor vehicle operational characteristics and driver behavior through the generation of new actuarial classes determined from such characteristics and behavior, which classes heretofore have been unknown in the insurance industry. The invention comprises an integrated system to extract via multiple sensors, screen, aggregate and apply for insurance rating purposes, data generated by the actual operation of the specific vehicle and the insured user/driver.

Other benefits and advantages of the subject new vehicle insurance cost determination process will become apparent to those skilled in the art upon a reading and understanding of the specification.

Brief Description of the Drawings

The invention may take physical form in certain parts and steps and arrangements of parts and steps, the preferred embodiments of which will be described in detail in this specification and illustrated in the accompanying drawings which form a part hereof and wherein:

FIGURE 1 is a flowchart generally describing a data gathering process from a vehicle;

FIGURE 2 is a flowchart detailing the gathering and consolidating of appropriate information for determining a cost of insurance and the resulting insurance billing process;

FIGURE 3 is a suggestive perspective drawing of a vehicle including certain data element monitoring, recording and communicating devices;

FIGURE 4 is a block diagram of a vehicle on-board computer and recording system implementing the subject invention for selective communication with a central control center and a global positioning navigation system;

FIGURE 5 is a flowchart generally illustrating a method for acquiring and recording vehicle insurance related data; and

FIGURE 6 a tabular illustration of various sources of insurance-related data, a necessary interface for acquiring the data and an exemplary sample rate therefor.

Detailed Description of the Invention

Referring now to the drawings, wherein the showings are for purposes of illustrating the preferred embodiments of the invention only and not for purposes of limiting same, the FIGURES show an apparatus and method for monitoring, recording and communicating insurance related data for determination of an accurate cost of insurance based upon evidence relevant to the actual operation and in particular the relative safety of that operation. Generally, a vehicle user is charged for insurance based upon statistical averages related to the safety of operation based upon the insurer's experience with other users who drive similar vehicles in a similar geographic area. The invention allows for the measure of the actual data while the motor vehicle is being driven. Such data measurement will allow the vehicle user to directly control

his/her insurance costs by operating the vehicle in a manner which he/she will know will evidence superior safety of operation and a minimal risk of generation of an insurance claim. Examples of data which can be monitored and recorded include:

1. Actual miles driven;
2. Types of roads driven on (high risk vs. low risk); and,
3. Safe operation of the vehicle by the vehicle user through:
   - A. speeds driven,
   - B. safety equipment used, such as seat belt and turn signals,
   - C. time of day driven (high congestion vs. low congestion),
   - D. rate of acceleration,
   - E. rate of braking,
   - F. observation of traffic signs.

With reference to FIGURE 3, an exemplary motor vehicle is shown in which the necessary apparatus for implementing the subject invention is included. An on-board computer **300** monitors and records various sensors and operator actions to acquire the desired data for determining a fair cost of insurance. Although not shown therein, a plurality of operating sensors are associated with the motor vehicle to monitor a wide variety of raw data elements. Such data elements are communicated to the computer through a connections cable which is operatively connected to the vehicle data bus **304** through an SAE-J1978 connector, or OBD-II connector or other vehicle sensors **306**. A driver input device **308** is also operatively connected to the computer **300** through connector **307** and cable **302**. The computer is powered through the car battery **310** or a conventional generator system (not shown). Tracking of

the vehicle for location identification can be implemented by the computer **300** through navigation signals obtained from a GPS (global positioning system) antenna or other locating system **312**. The communications link to a central control station is accomplished through the cellular telephone, radio, satellite or other wireless communication system **314**.

FIGURE 4 provides the block diagram of the in-vehicle computer system. The computer **300** is comprised of four principal components, an on-board data storage device **402**, an input/output subsystem **404** for communicating to a variety of external devices, a central processing unit and memory device **406** and a real time operating kernel **408** for controlling the various processing steps of the computer **300**. The computer **300** essentially communicates with three on-board vehicle devices for acquisition of information representative of various actual vehicle operating characteristics. A driver input console **410** allows the driver to input data representative of a need for assistance or for satisfaction of various threshold factors which need to be satisfied before the vehicle can be operated. The physical operation of the vehicle is monitored through various sensors **412** in operative connection with the vehicle data bus, while additional sensors **414** not normally connected to the data bus can be in direct communication with the computer **300** as will hereinafter be more fully explained.

The vehicle is linked to an operation control center **416** by a communications link **418**, preferably comprising a conventional cellular telephone interconnection. A navigation sub-system **420** receives radio navigation signals from a GPS **422**.

The type of elements monitored and recorded by the subject invention comprise raw data elements, calculated data elements and derived data elements. These can be broken down as follows:

Raw Data Elements:

Power train sensors

RPM,

transmission setting (Park, Drive, Gear, Neutral),

throttle position,

engine coolant temperature,

intake air temperature,

barometric pressure;

Electrical sensors

brake light on,

turn signal indicator,

headlamps on,

hazard lights on,

back-up lights on,

parking lights on,

wipers on,

doors locked,

key in ignition,

key in door lock,

horn applied;

Body sensors

airbag deployment,

ABS application,

level of fuel in tank,

brakes applied,

radio station tuned in,

seat belt on,

door open,

tail gate open,

odometer reading,
cruise control engaged,
anti-theft disable;

Other sensors

vehicle speed,
vehicle location,
date,
time,
vehicle direction,
IVHS data sources.

Calculated Data Elements:

rapid deceleration;
rapid acceleration;
vehicle in skid;
wheels in spin;
closing speed on vehicle in front;
closing speed of vehicle in rear;
closing speed of vehicle to side (right or left);
space to side of vehicle occupied;
space to rear of vehicle occupied;
space to front of vehicle occupied;
lateral acceleration;
sudden rotation of vehicle;
sudden loss of tire pressure;
driver identification (through voice recognition or code or fingerprint recognition);
distance travelled; and
environmental hazard conditions (e.g. icing, etc.).

Derived Data Elements:

vehicle speed in excess of speed limit;

observation of traffic signals and signs;

road conditions;

traffic conditions; and

vehicle position.

This list includes many, but not all, potential data elements.

With particular reference to FIGURE 1, a flowchart generally illustrating the data gathering process of the subject invention is illustrated. Such a process can be implemented with conventional computer programming in the real time operating kernel **408** of the computer **300**. The process is identified with initially a begin step **100** (key in ignition?) and a check of whether the vehicle is operating at step **102**. If the vehicle is not operating a reverification occurs every two (2) minutes as shown at step **104**. It should be noted that the computer is continually powered by at least the vehicle battery **310** (FIGURE 3), but it can be appreciated that during operation the generator (not shown) will supply the energy. If the vehicle is operating, then there is a step of recording sensor information **106**. The recording comprises monitoring a plurality of raw data elements, calculated data elements and derived data elements as identified above. Each of these is representative of an operating state of the vehicle or an action of the operator. Select ones of the plurality of data elements are recorded when the ones are determined to have an identified relationship to the safety standards. For example, vehicle speed in excess of a predetermined speed limit will need to be recorded but speeds below the limit need only be monitored and stored on a periodic basis. The recording may be made in combination with date, time and location. Other examples of data needed to be recorded are excessive rates of acceleration or frequent hard braking.

The recording process would be practically implemented by monitoring and storing the data in a buffer for a selected period of time, e.g., thirty seconds. Periodically, such as every two minutes, the status of all monitored sensors for the data elements is written to a file which is stored in the vehicle data storage **402**. The raw, calculated and derived data elements listed above comprise some of the data elements to be so stored.

Certain of the recorded sensor information may comprise a trigger event of which inquiry is identified at step **108**. "Trigger events" are defined as a combination of sensor data requiring additional action or which may result in a surcharge or discount during the insurance billing process. Certain trigger events may require immediate upload **110** to a central control which will then be required to take appropriate action. For example, a trigger event would be rapid deceleration in combination with airbag deployment indicating a collision, in which case the system could notify the central control of the vehicle location. Alternatively, if the operator were to trigger on an emergency light, similarly the system could notify the central control of the vehicle location indicating that an emergency is occurring. The trigger information is recorded, as at step **116**, and whatever response is taken by the central control is also recorded at step **118**. The trigger information recording step **116** and the recording sensor information step **106** may impart recording of information in the on-board data storage device **402** or memory **406**. The event response information recording at step **118** will usually occur in the central control station. Such response information could be the dispatch of an emergency vehicle, or the telephoning of police or an EMS unit.

Trigger events are divided into two groups: those requiring immediate action and those not requiring immediate action, but necessary for proper billing of insurance. Those required for proper billing of insurance will be recorded in the same file with all the other recorded vehicle sensor information. Those trigger events requiring action will be uploaded to a central

control center which can take action depending on the trigger event. Some trigger events will require dispatch of emergency services, such as police or EMS, and others will require the dispatch of claims representatives from the insurance company.

The following comprises an exemplary of some, but not all, trigger events:

Need for Assistance:

These events would require immediate notification of the central control center.

1. Accident Occurrence. An accident could be determined through the use of a single sensor, such as the deployment of an airbag. It could also be determined through the combination of sensors, such as a sudden deceleration of the vehicle without the application of the brakes.
2. Roadside assistance needed. This could be through the pressing of a "panic button" in the vehicle or through the reading of a sensor, such as the level of fuel in the tank. Another example would be loss of tire pressure, signifying a flat tire.
3. Lock-out assistance needed. The reading of a combination of sensors would indicate that the doors are locked but the keys are in the ignition and the driver has exited the vehicle.
4. Driving restrictions. The insured can identify circumstances in which he/she wants to be notified of driving within restricted areas, and warned when he/she is entering a dangerous area. This could be applied to youthful drivers where the parent wants to restrict time or place of driving, and have a record thereof.

Unsafe Operation of the Vehicle

These events would be recorded in the in-vehicle recording device for future upload. Constant trigger events would result in notification of the driver of the exceptions.

1. Excessive speed. The reading of the vehicle speed sensors would indicate the vehicle is exceeding the speed limit. Time would also be measured to determine if the behavior is prolonged.
2. Presence of alcohol. Using an air content analyzer or breath analyzer, the level of alcohol and its use by the driver could be determined.
3. Non-use of seatbelt. Percent of sample of this sensor could result in additional discount for high use or surcharge for low or no use.
4. Non-use of turn signals. Low use could result in surcharge.
5. ABS application without an accident. High use could indicate unsafe driving and be subject to a surcharge.

With particular reference to FIGURE 2, a general flowchart describing the steps of the gathering of appropriate information for billing insurance on a periodic basis is illustrated.

At the initiation of the vehicle insurance billing process, the central billing system of the insurer will acquire **202** the vehicle sensor record file from the sensor record file **204** from each vehicle to be billed. This process of data acquisition will involve a periodic uploading of the vehicle file **204**. This file will be uploaded to the central system when the storage device **402** in the vehicle approaches capacity, on command, or when the billing process starts. All the information from the combination of files stored in the vehicle will be used to determine the bill for the insurance on the vehicle for the prior insurance period. Data acquisition is also made from the trigger event response file **206** in the acquisition step **208**. This data is stored in the central control center, and includes information for response activities listed above which require additional billing for services rendered to the insured.

At step **210**, the vehicle sensor record file and the trigger event response file are consolidated. Such files will include all the activity for which the insured is to be billed for the prior period. At step **212**, all the information

comprising the insured profile, which is already maintained and stored in other insurance files, is applied to the consolidated activity files for the immediately prior period. This insured profile includes the information about coverages including limits and deductibles, which are necessary for establishing the appropriate cost of insurance for the subject insured. At step **214**, the acquired consolidated file information from step **210** and the overall insured profile acquired at step **212** are combined and processed against a surcharge or discount algorithm file, which include the specific factors for the various usage patterns and trigger events. The surcharges and discounts are continuously adjusted based on the loss results associated with driving behaviors demonstrated. Finally at step **216**, the appropriate billing is produced showing the charges for insurance and other services for the prior period. The billing can be sent electronically or in printed form to the insured for payment.

With particular reference to FIGURE 5, a general diagram of the process for acquiring and recording vehicle insurance related data is illustrated. At step **502**, the raw data elements are collected from the vehicle sensors that provide the raw data elements identified above. Calculated data elements are generated in step **504** and derived data elements are generated at step **508**. As noted, it is necessary to collect certain database information elements at step **506** prior to generating the derived data elements. A sample of all the data elements is stored in the vehicle at step **510**. The sample rate or the recording of the information is controlled based upon the particular insurance billing recording needs predetermined by an algorithm developed by the insurance company. The algorithm will change depending on the particular type of insurance related requirements for the information. At step **512**, if a certain incident, for example collision, occurs then a snapshot is generated of all the relevant data elements at the time of the incident, **514**.

With reference to FIGURE 6, various examples of sources of insurance related data, the interface required to acquire the data and an example

of the sample rate are illustrated for a preferred embodiment of the subject invention. Accordingly, it can be seen that for a certain information database comprised of maps, speed limits, traffic signs, and highway conditions is stored in the data storage device of the computer and can be obtained on demand therefrom. Acquiring data from vehicle sources such as engine data, body data and electrical data is obtained through a conventional SAEJ 1978 connector with an exemplary sample rate of 10-15 Hz. The other sources of relevant data, such as IVHs, GPS, security system or any additional systems are obtained through various I/O ports and the sample rate can be varied in accordance with the desired goals of the insurer.

One of the useful consequences of the subject invention is that other products could be marketed to a particular vehicle operator based on information provided from the subject invention from the operator's motor vehicle. Since the invention includes processes for gathering, extracting and analyzing information provided by the vehicle, a more informed judgment can be made about a determination of when and which products could be marketed to that motor vehicle operator. For example, by knowing that a vehicle operator travels on vacation in that vehicle to a certain resort location may give rise to a marketing of a package of products particular to the type of travel or the location. Another example would relate to the knowledge that the vehicle operator attends particular types of sporting events which may give rise to certain types of products catered to fans of that sporting event.

The invention has been described with reference to preferred embodiments. Obviously, modifications and alterations will occur to others upon a reading and understanding of the specification. It is our intention to include all such modifications and alterations insofar as they come within the scope of the appended claims or the equivalents thereof.

Having thus described our invention, we claim:

1. A method of determining a cost of automobile insurance based upon monitoring, recording and communicating data representative of operator and vehicle driving characteristics, whereby the cost is adjustable by relating the driving characteristics to predetermined safety standards, the method comprising:

monitoring a plurality of raw data elements representative of an operating state of a vehicle or an action of the operator;

recording selected ones of the plurality of raw data elements when said ones are determined to have a preselected relationship to the safety standards;

consolidating said selected ones for processing against an insured profile and for identifying a surcharge or discount to be applied to a base cost of automobile insurance; and,

producing a final cost from the base cost and the surcharge or discount.

2. The method as described in claim 1 wherein said recording comprises identifying a trigger event associated with a one of the raw data elements having the preselected relationship and recording both the one raw data element and trigger information representative of the trigger event.

3. The method as described in claim 1 further including immediately communicating to a central control station via an uplink information representative of a trigger event associated with a one of the raw data elements.

4. The method as described in claim 3 further including recording trigger event response information generated by said control station.

5. The method as described in claim 1 further including generating calculated data elements from said raw data elements.

6. The method as described in claim 5 further including generating derived data elements from said raw data elements.

7. The method as described in claim 6 wherein said consolidating comprises accumulating said calculated and derived data elements.

8. The method as described in claim 1 wherein at least a portion of the plurality of raw data elements are within an awareness and selected control of the operator and wherein the method further comprises adjusting by the operator of operator driving behavior thereby causing a change in the portion of raw data elements to obtain the surcharge or discount in the final cost.

9. The method as described in claim 8 wherein the base cost is for a predetermined period of time and wherein the adjusting by the operator is set to occur at predetermined intervals within the predetermined period.

10. The method as described in claim 9 wherein the predetermined period of time comprises two years and the predetermined intervals comprise monthly intervals.

11. A process for acquiring and recording vehicle insurance related data via an on-board computer and recording system comprising steps of:

monitoring a plurality of raw data elements representative of vehicle operating states and driver actions;

recording selected ones of the raw data elements in a vehicle record file of an on-board data storage device when said ones are identified as having a relationship material to determination of a cost of insurance;

identifying whether said selected ones comprise a trigger event, and if so identified, communicating information representative of the trigger event to a central control station for storage in a trigger event file; and,

consolidating said vehicle record file and said trigger event file in a form for determining a vehicle cost of insurance.

12. The process as defined in claim 11 further including communicating from the central control station an order for dispatch of an emergency or assist vehicle in response to the identifying of a special trigger event determined to require driver assistance.

13. A system of determining a cost of automobile insurance based upon monitoring, recording and communicating data representative of operator and vehicle driving characteristics, whereby the cost is adjustable by relating the driving characteristics to predetermined safety standards, the system comprising:

means for monitoring a plurality of raw data elements representative of an operating state of a vehicle or an action of the operator;

means for recording selected ones of the plurality of raw data elements when said ones are determined to have a preselected relationship to the safety standards;

means for consolidating said selected ones for processing against an insured profile and for identifying a surcharge or discount to be applied to a base cost of automobile insurance; and,

means for producing a final cost from the base cost and the surcharge or discount.

14. The system as described in claim 13 further including means for immediately communicating to the central control station via an uplink information representative of a trigger event associated with the run of the raw data elements.

15. The system as described in claim 13 further including means for generating calculated data elements from said raw data elements.

16. The system as described in claim 15 further including generating derived data elements from said raw data elements.

17. A method of generating an actuarial class system for determining vehicle insurance costs for retrospectively adjusting and prospectively setting premiums based on data derived from motor vehicle operational characteristics and driver behavior, comprising:

monitoring a plurality of raw data elements representing vehicle operating states and driver actions;

recording selected ones of the raw data elements in a vehicle record files when said ones are identified as having a relationship material to determination of a cost of insurance;

setting a plurality of actuarial classes associated with corresponding degrees of safety of operation of the vehicle wherein said actuarial classes are derived from aggregating selected ones of the raw data elements; and,

consolidating said vehicle record files with selected actuarial classes for determining a corresponding cost of insurance for the vehicle in correspondence with a one of the actuarial classes.

18. The process for determining a cost of insurance as defined in claim 17 wherein said monitoring and recording steps occur concurrently with actual vehicle operation for acquiring the raw data elements during actual vehicle use.

19. The process for determining a cost of insurance as defined in claim 18 wherein at least a portion of the plurality of raw data elements are within an awareness and selective control of a driver, the process further comprising adjusting by the driver of driving behavior to changesaid portion of raw data elements for consolidating said vehicle record with an other one of the actuarial classes.

20. An integrated system for extracting from multiple sensors, screening, aggregating and applying for insurance rating purposes, data generated by an actual operation of a specific motor vehicle comprising:

means for extracting a plurality of raw data elements from the multiple sensors wherein the elements are representative of vehicle operating states and driver actions;

means for screening the raw data elements and aggregating selected ones of the raw data elements in a vehicle record file of an on-board storage device when said selected ones are identified as having a relationship material to determination of a cost of insurance for the vehicle;

means for associating the aggregated selected raw data elements with predetermined actuarial classes indicative of a degree of safety of operation of the vehicle; and

means producing a cost of insurance for the vehicle associated with selected ones of the actuarial classes.

data elements, said calculated and derived data elements being further aggregated for association with the selected one of the actuarial classes.

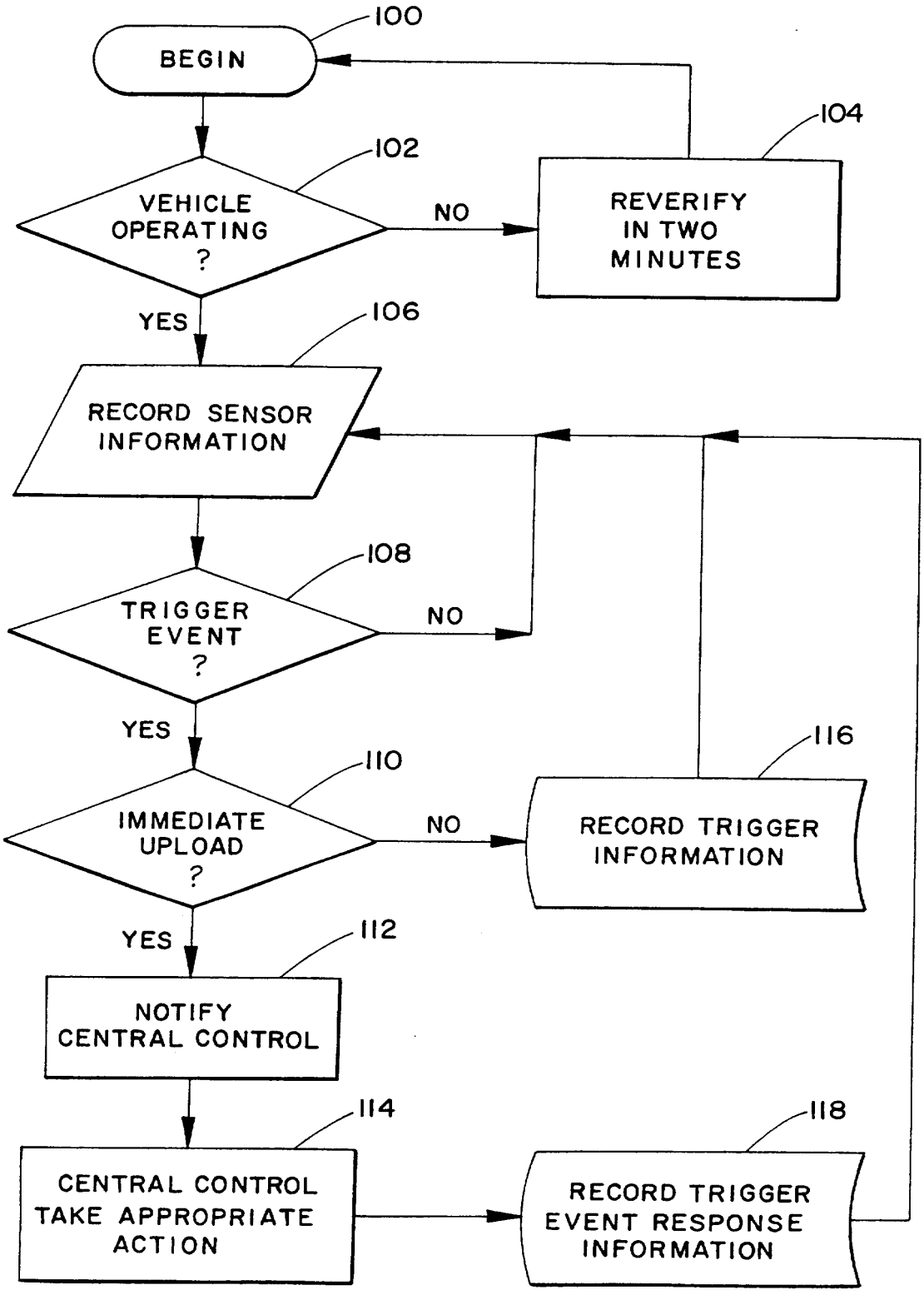
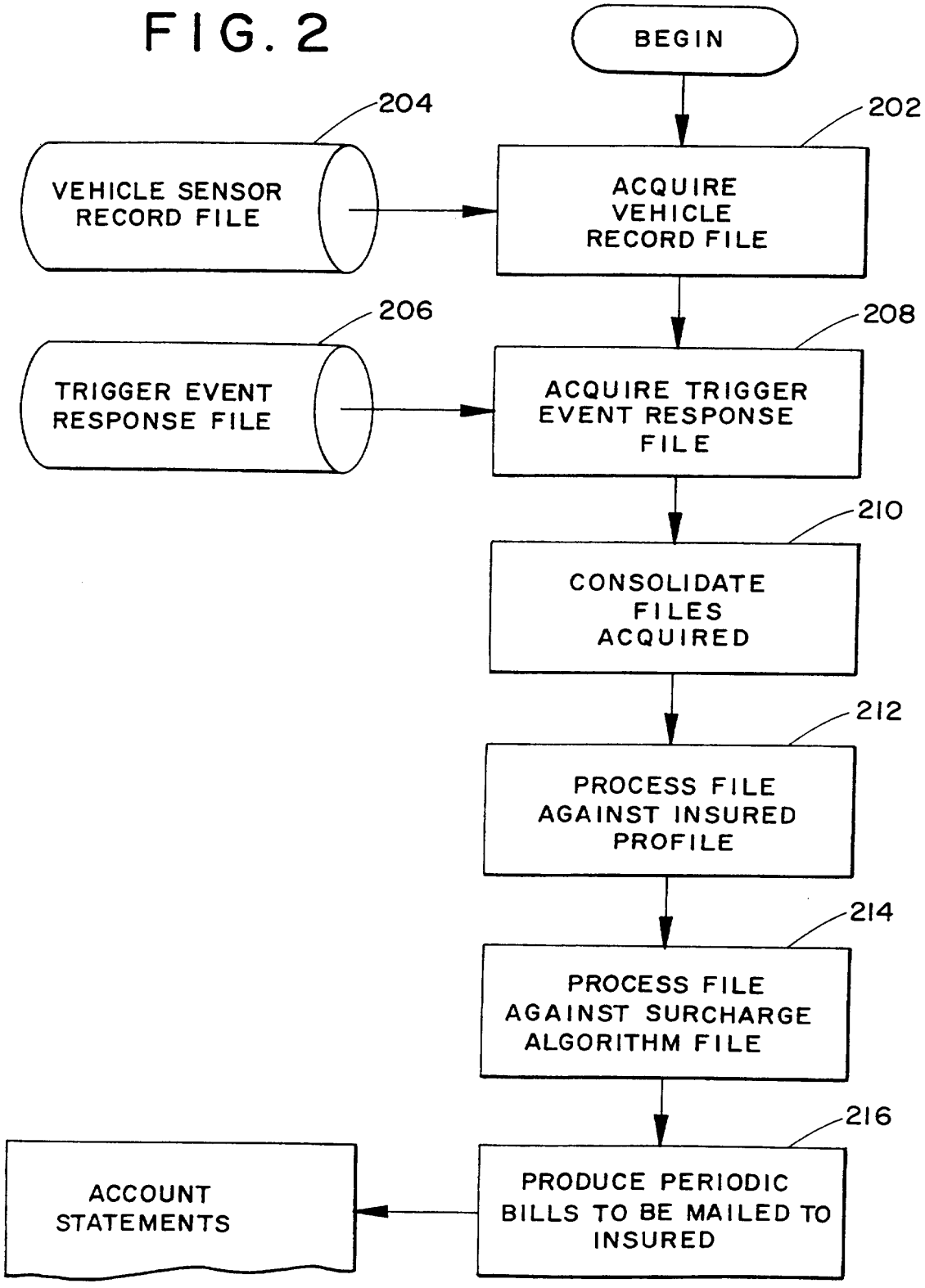

100
BEGIN
102
VEHICLE OPERATING ?
NO
104
REVERIFY IN TWO MINUTES
YES
106
RECORD SENSOR INFORMATION
108
TRIGGER EVENT ?
NO
YES
110
IMMEDIATE UPLOAD ?
NO
116
RECORD TRIGGER INFORMATION
YES
112
NOTIFY CENTRAL CONTROL
114
CENTRAL CONTROL TAKE APPROPRIATE ACTION
118
RECORD TRIGGER EVENT RESPONSE INFORMATION

FIG. 1

FIG. 2


BEGIN
204
VEHICLE SENSOR RECORD FILE
202
ACQUIRE VEHICLE RECORD FILE
206
TRIGGER EVENT RESPONSE FILE
208
ACQUIRE TRIGGER EVENT RESPONSE FILE
210
CONSOLIDATE FILES ACQUIRED
212
PROCESS FILE AGAINST INSURED PROFILE
214
PROCESS FILE AGAINST SURCHARGE ALGORITHM FILE
216
PRODUCE PERIODIC BILLS TO BE MAILED TO INSURED
ACCOUNT STATEMENTS

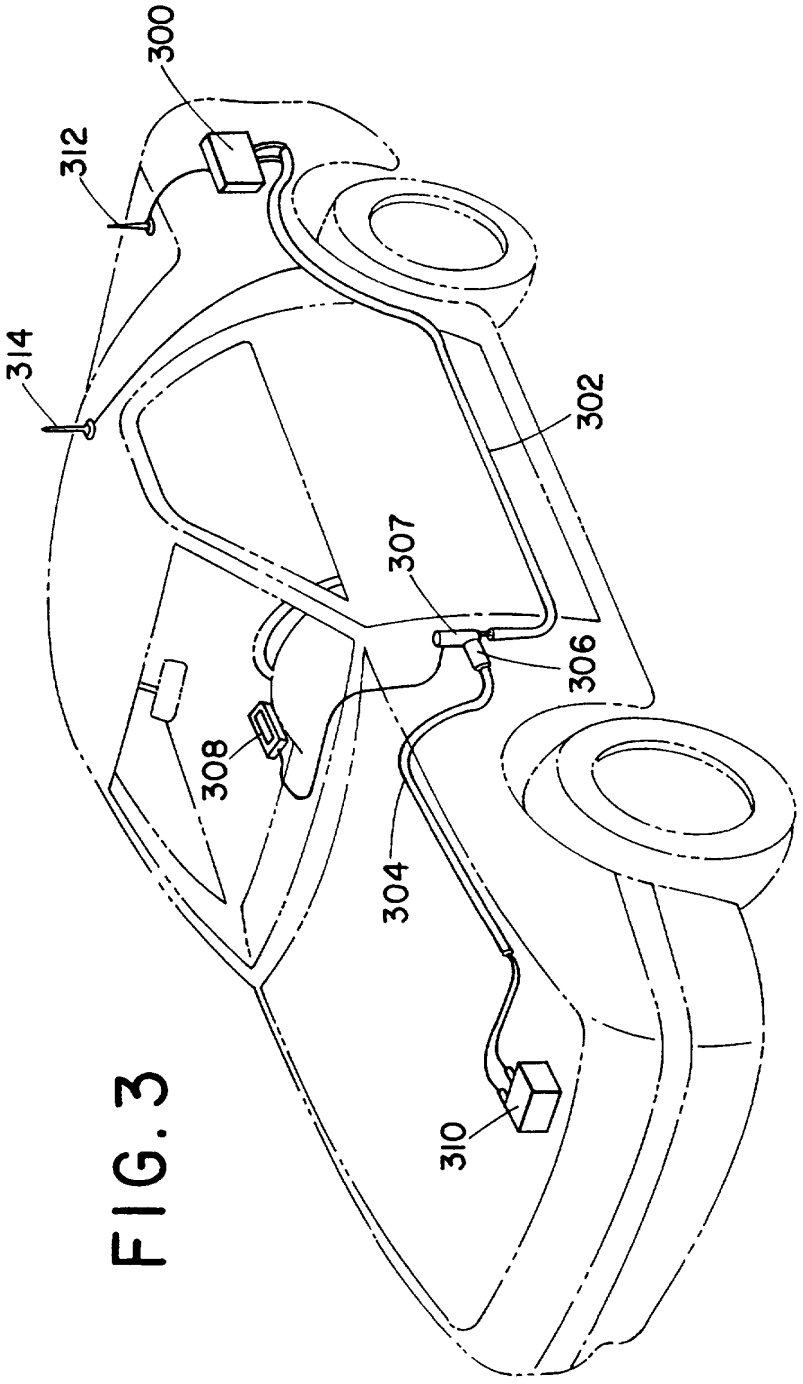


FIG. 3

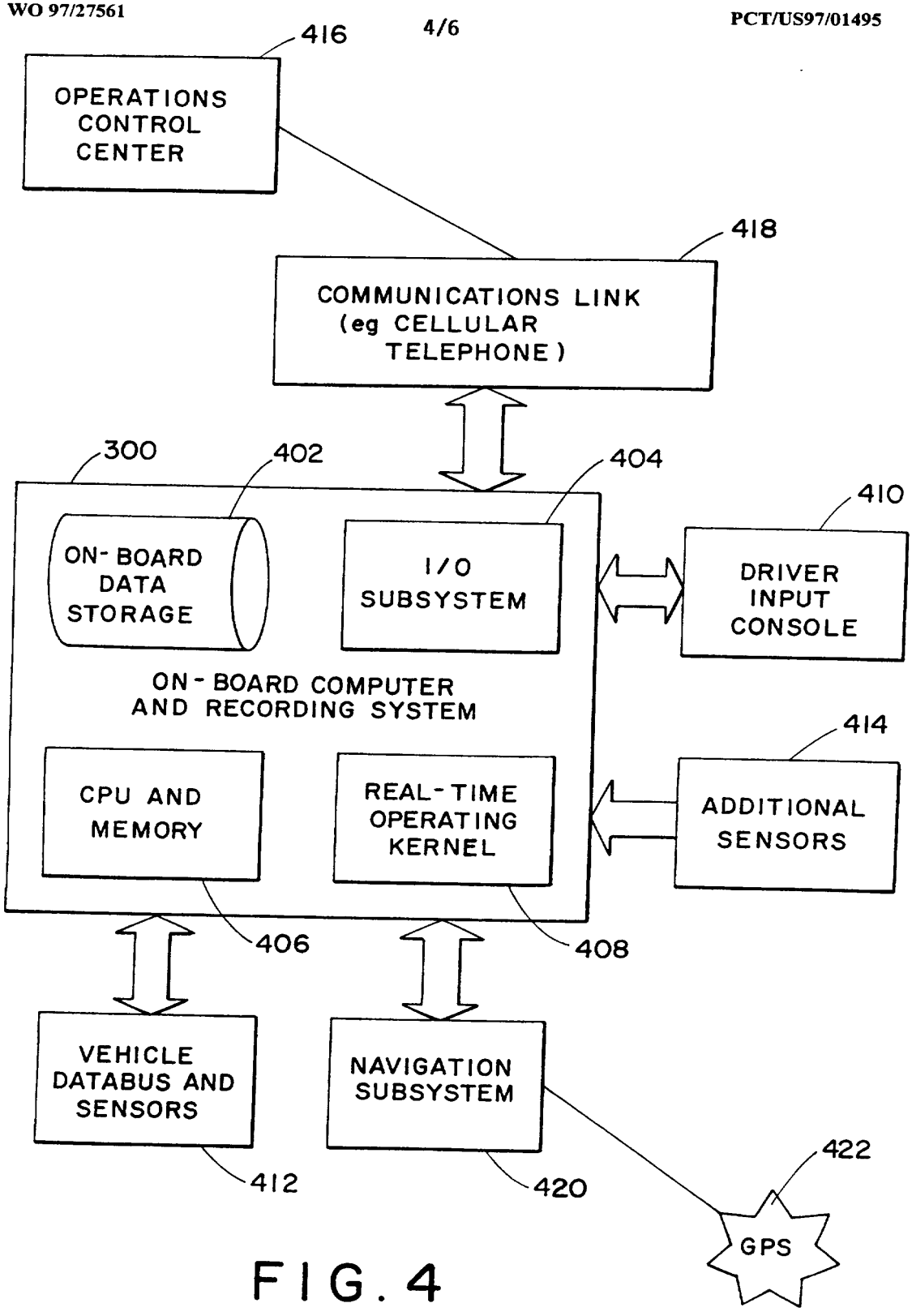
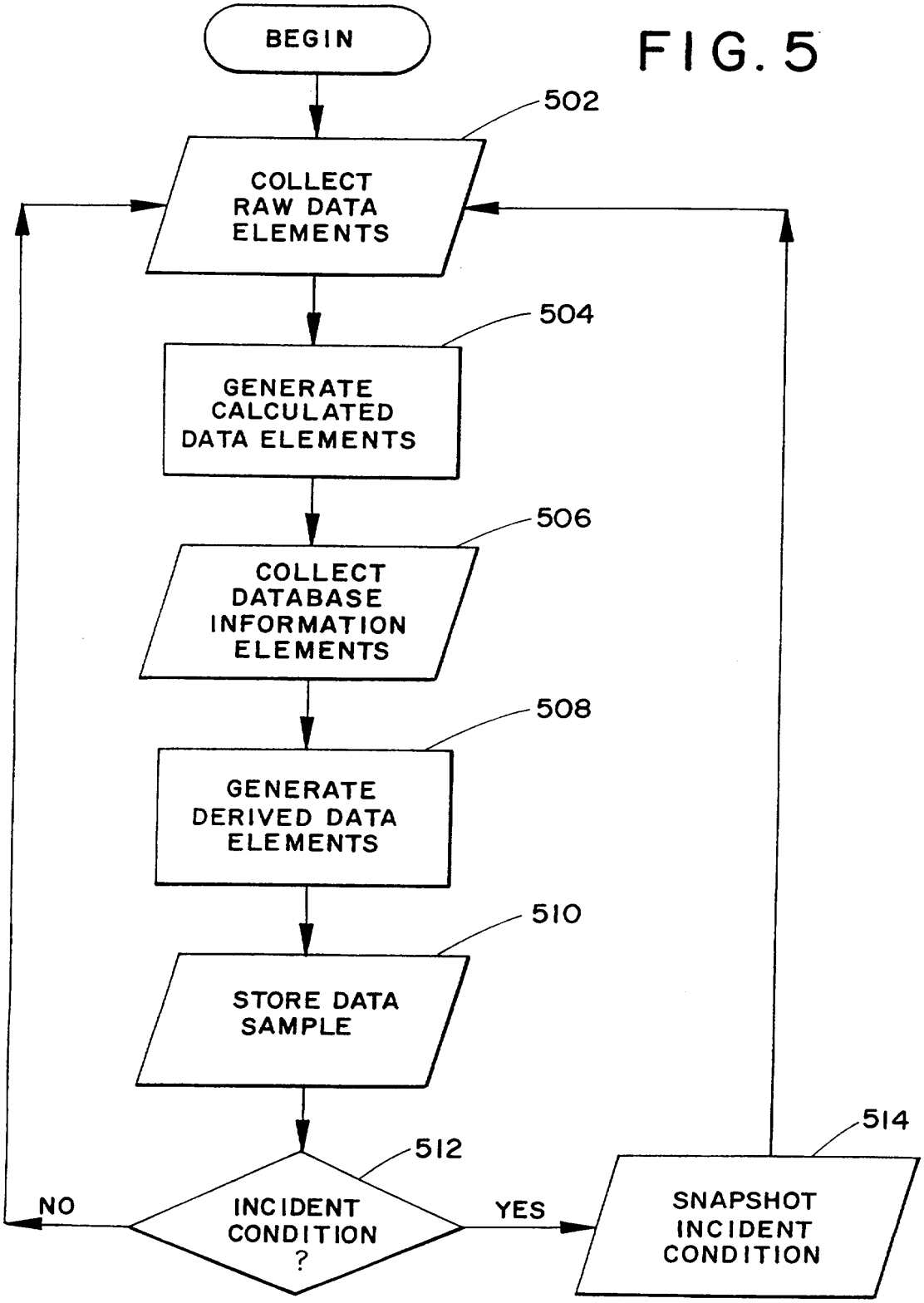

416
OPERATIONS CONTROL CENTER
418
COMMUNICATIONS LINK (eg CELLULAR TELEPHONE)
300
402
404
410
ON-BOARD DATA STORAGE
I/O SUBSYSTEM
DRIVER INPUT CONSOLE
ON-BOARD COMPUTER AND RECORDING SYSTEM
414
CPU AND MEMORY
REAL-TIME OPERATING KERNEL
ADDITIONAL SENSORS
406
408
VEHICLE DATABUS AND SENSORS
NAVIGATION SUBSYSTEM
412
420
422
GPS

FIG. 4

FIG. 5


BEGIN
502
COLLECT RAW DATA ELEMENTS
504
GENERATE CALCULATED DATA ELEMENTS
506
COLLECT DATABASE INFORMATION ELEMENTS
508
GENERATE DERIVED DATA ELEMENTS
510
STORE DATA SAMPLE
512
INCIDENT CONDITION ?
NO
YES
514
SNAPSHOT INCIDENT CONDITION

INFORMATION DATABASE - MAPS - SPEED LIMITS - TRAFFIC SIGNS - HIGHWAY CONDITIONS - (FUTURE TBD)	INTERFACE -COMPUTER STORAGE	SAMPLE RATE - ON DEMAND
VEHICLE SOURCES - ENGINE DATA - BODY DATA - ELECTRICAL DATA	INTERFACE -SAE J1978 CONNECTOR	SAMPLE RATE - 10 - 15 HZ
OTHER SOURCES - IVHS DATA - GPS DATA - SECURITY SYSTEM - ADDITIONAL SYSTEM(S)	INTERFACE - VARIOUS I/O PORTS (eg, RS-232/422, ETC.)	SAMPLE RATE - VARIES

FIG. 6

MOTOR VEHICLE INSURANCE PROCESS
VEHICLE DATA ACQUISITION PROCESS FLOW

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US97/01495

A. CLASSIFICATION OF SUBJECT MATTER
IPC(6) : G06F 165/00
US CL :395/204; 364/ 424.01, 424.04, 565; 340/441; 346/18
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S.395/204; 364/424.01, 424.04, 565; 340/441; 346/18 :

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
APS, DIALOG

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 4,843,578 A (WADE) 27 June 1989, figure 1-2 and col. 1, line 54 to col. 4, line 11.	1,2,4-8,11, 13, 15-20
Y	BAIG, Edward. The safest cars of '91, U.S. News & World Report, v109, n22, p71	1, 8, 9-11, 13, 17, 19-20
Y,P	US 5,550,551 A (ALESIO) 27 August 1996, figures 1-3 and col. 3, lines 4-41.	3, 12, 14
A	US 5,055,851 A (SHEFFER) 08 October 1991, col. 2, line 44 to col. 3, line 68.	1-20
A	US 5,430,432 A (CAMHI et al.) 04 July 1995, col. 3, line 65 to col. 10, line 39.	1-20
A,P	US 5,499,182 A (OUSBORNE) 12 March 1996, col. 3, line 46 to col. 6, line 65.	1-20

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier document published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
24 MARCH 1997	05 MAY 1997
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer GAIL HAYES Telephone No. (703) 305-9711

Form PCT/ISA/210 (second sheet)(July 1992)★

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US97/01495

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DRIERLEIN, Robert. Vendors spice up services. Beverage World, v109, n1467, p82	1-20

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(71) Applicant *(for all designated States except US)*: CREDITLAND, INC. [US/US]; 321 11th Street, San Francisco, CA 94103 (US).

(72) Inventors; and
(75) Inventors/Applicants *(for US only)*: JOHANSSON, Henrik [SE/US]; Apt. 306, 2370 Chestnut St., San Francisco, CA 94123 (US). BROWNING, Ronald, Rockwell [US/US]; Apt. 703, 2030 Vallejo, San Francisco, CA 94123 (US). WILBERT, Anthony [US/US]; 321 11th Street, San Francisco, CA 94103 (US).

(74) Agent: BAZERMAN, Steven, H.; Bazerman & Drangel, P.C., The Lincoln Building, #1158, 60E 42nd Street, New York, NY 10165 (US).

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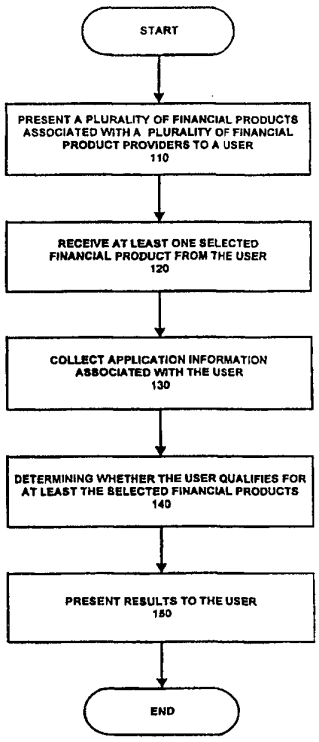
(54) Title: METHOD FOR QUALIFYING A USER FOR FINANCIAL PRODUCTS FROM MULTIPLE FINANCIAL PRODUCT PROVIDERS

(57) Abstract

A method for qualifying a user for financial products from multiple financial product providers is described. At a single source such as a website or phone call, a user is presented with financial services or products associated with multiple financial product providers. The user may then select one or more financial products or a category of products such as credits card or car loans. The user may then apply for all products simultaneously and be qualified in real–time for each product, as well as compare similar products offered by different financial product providers.



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METHOD FOR QUALIFYING A USER FOR FINANCIAL PRODUCTS FROM MULTIPLE FINANCIAL PRODUCT PROVIDERS

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a method for qualifying a user for financial products from multiple providers. More particularly, the present invention relates to a method for allowing a user to be approved and qualified for multiple financial products offered from multiple providers at a single source such as a website or phone call.

Description of Related Art

A user who desires to obtain a financial product such as a home loan, car loan, or credit card, typically completes a paper application and submits it to the provider of the financial product. The user must spend a considerable amount of time to complete and submit the application, and wait a length of time before the application is processed by the financial product provider. To reduce the amount of time and make it easier for the user to obtain financial products, some financial product providers accept applications by asking a series of questions over the phone or over their websites on the Internet. Some financial product providers are able to give the user instant approval by immediately applying underwriting criteria.

However, the user must still complete an application for each individual financial product and for each individual financial product provider. Moreover, the user must begin the process anew if they are not approved for the particular financial product or if the user wishes to apply for a different financial product.

Some financial product providers take information previously received about a user in connection with a previous application for financial products, and use this information to determine what other financial products the user might qualify for or be

interested in, and perform targeted marketing. However, this kind of targeted marketing is limited to products offered by a single provider.

What is needed is a method for qualifying a user for financial products from multiple financial product providers. What is needed is a method for facilitating application and qualification of multiple financial products or categories of product from multiple financial product providers.

SUMMARY OF THE INVENTION

The present invention is a method for qualifying a user for financial products from multiple financial product providers. The method comprises: presenting a plurality of financial products associated with a plurality of financial product providers to a user, each financial product having a plurality of underwriting criteria; receiving at least one selected financial product or product category from the user; collecting application information associated with the user; and determining approval for the user for at least the selected financial products based on the application information and the underwriting criteria; and presenting results to the user

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 shows one embodiment of a method of the present invention for qualifying a user for financial products from multiple financial product providers.

FIG. 2 shows one embodiment of a multiple provider server of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

FIGURE 1 shows one embodiment of a method of the present invention for qualifying a user for financial products from multiple financial product providers. The method includes: (1) presenting a plurality of financial products associated with a plurality of financial product providers to a user, each financial product having a plurality of underwriting criteria (block 110); (2) receiving at least one selected financial product or product category from the user (block 120); (3) collecting application information associated with the user (block 130); (4) qualifying the user

for at least the selected financial products (block 140): and (5) presenting results to the user (block 150).

Presenting a plurality of financial products associated with a plurality of financial product providers to a user, each financial product having a plurality of underwriting criteria (block 110) may include allowing a user to select one or more financial products or category of financial products offered by more than one financial product provider.

The financial product providers may include banks, savings and loans, credit unions, insurance carriers, credit card issuers, retail card issuers, credit card companies, auto companies, and other financial institutions that offer credit, lending, or insurance.

The user may first be presented with a list of choices, such as a specific product from a specific provider, a category of products, or a general qualification. A particular product from a particular provider may be, for example, a specific credit card from a specific credit card issuer. A category of products may be, for example, car loans from multiple car loan providers. A general qualification may be a general inquiry where the user wishes to find out what home loans, car loans, credit cards, and other financial products are available to the user from multiple financial product providers. Financial products include credit cards (including debit, secured, retail, private label, and corporate cards), smart cards, home loans (including first mortgages, refinancing, and home equity loans), auto loans, auto leasing, boat loans, motorcycle loans, aircraft loans, student loans, unsecured consumer lending, small business lending, equipment financing, purchase financing, auto insurance, boat insurance, motorcycle insurance, renter's insurance, homeowner's insurance, life insurance, health insurance, and other credit, lending, or insurance related products.

Receiving at least one selected financial product or product category from the user (block 120) may include determining the financial product or products, or category of products, for which the user wishes to apply. The user may also make a general query, where all financial products for which the user qualifies is determined.

Collecting application information associated with the user (block 130) may include obtaining the necessary application information for the financial product or products in which the user is interested, such as address, social security number,

phone number, and financial products currently used. A list of necessary application information for each financial product or products may first be retrieved from a database of applications. If the user is interested in more than one financial product, repetitive entries may be eliminated to create one unified application in which the user need only provide information once to apply for all desired financial products. The application is dynamically created based on the required fields. The database contains a table of all possible fields. Each product has an entry in this table indicating what fields are required for that application. When applying for multiple products on one category or for all product categories, a parsing routine will retrieve the minimum required subset of application fields required for all products in the selected categories. This application information may also be stored for later use and augmented at a later time, in case the user returns and wishes to apply for other financial products, thus greatly simplifying future applications from the same user. The security of this application information may be ensured by using one or a combination of a cookie, a username and password scheme, and an IP address check.

Collecting application information associated with the user may also include obtaining credit bureau data associated with the user, through established electronic connections with the major credit bureaus. In the U.S., these credit bureaus include Experian, Trans-Union, Equifax, Dun & Bradstreet, and Experian Business. In other countries other sources may be used. Depending on the financial product, obtaining information from yet other third parties may be necessary. For example, for home mortgages, information may be obtained from title companies, county recorder's office, appraisers, escrow companies, tax records, employers for income verification, previous lenders for pay-off information, and homeowners insurance providers. The credit bureaus and third parties from which information is needed are determined based on what is required for a particular financial product. This is stored in the database and credit bureau reports may be retrieved based on this information.

Determining approval for the user for at least the selected financial products based on the application information and the underwriting criteria (block 140) may include evaluating the application information received from the user in conjunction with the credit bureau data, and then applying underwriting criteria for the products either selected by the user or otherwise to determine whether the user qualifies for

each product. Credit underwriting may be performed through a combination of policy and scoring. Policy includes criteria such as minimum age, absence of bankruptcies, and minimum income. Scoring is based on assigning scores to different values of different characteristics in the application or the credit bureau report. For example, different points are given to whether the user owns or rents housing. The scores for a number of characteristics make up a scorecard and are then added up and if the total sum is higher than a predefined cutoff score the application is approved, otherwise it is declined.

The combination of third party data and application data provides the raw data used for the underwriting. The raw data may be organized into derived variables, like "number of delinquent trade lines", "debt-to-income ratio", and "applicant age". The pertinent derived variables may be included in rules, such as "less than 3 delinquent lines", "debt ratio greater than 25%", and "age greater than 18 years". The rules may be organized into rules bases, that determine requirement in a certain area such as "missing data rules", "credit rules", or "conformance rules". The decision process may determine the sequence and relation between different rules bases and/or neural networks. Finally, multiple decision processes may be combined into steps. All the steps together create the workflow that constitutes the entire application and approval process.

Presenting results to the user (block 150) includes showing whether the user was approved for the products in which the user was interested, or a list of all products for which the user was approved. The results may include a list of the financial products for which the user applied and whether the user was qualified to receive them. The results may also include a list of financial products for which the user did not apply but is nevertheless qualified to obtain. The results may be presented in a uniform format to facilitate comparison of similar financial products from competing financial product providers. The user may then be given the opportunity to indicate their interest in completing the transaction, at which point the application information is forwarded to the particular financial product provider. Some financial products such as credit cards may be automatically approved online, while other financial products such as mortgages may require some manual intervention. If manual intervention is required, the user will be informed of this and

a human representative will contact the user, or additional information such as forms to be signed will be sent to the user. The final verification and validation is required by law for certain products or by certain lenders' policies and may include submitting a handwritten and signed application, performing an appraisal of the property, and performing a fraud check.

FIGURE 2 shows one embodiment of a multiple provider server 200 of the present invention. Multiple provider server 200 may include an application server 210, a web server 220, a database server 230, and an underwriting server 240. Application server 210, web server 220, database server 230, and underwriting server 240 may or may not be physically separate machines.

Application server 210 integrates the functions of the separate servers, and provides the functionality of multiple provider server 200, such as qualifying a user for financial products in real time.

Web server 220 is connected to a wide area network such as the Internet, and allows a user to access multiple provider server 200 with a client browser or other method of access.

Database server 230 includes a list of required information, or "blank applications", for each financial product and each financial product provider. These blank applications may be updated and stored on database server 230 on a regular basis, or they may be obtained from the financial product provider in real time. Database server 230 may also store old applications and user information as well as product information. Database server 230 allows multiple provider server 200 to obtain the necessary application information from the user or a third party.

Underwriting server 240 includes underwriting criteria for each financial product and each financial product provider. These underwriting criteria may be updated and stored on underwriting database server 230 on a regular basis, or they may be obtained from the financial product provider in real time. Underwriting server 240 is capable of executing the logic for each set of underwriting criteria. The underwriting criteria may be stored on database server 230. Underwriting server 240 may also be connected to an information server 244 which connects underwriting server 240 to data sources 246 such as credit bureaus and title companies.

Underwriting server 240 may thus obtain relevant user information such as credit history and tax records in real time.

EXAMPLE 1

A user looking to refinance her home mortgage accesses multiple provider server 200 through the Internet, where she is given several links on a webpage including multiple lending and insurance options. These links are extracted from database server 230. If the user has visited before, the links will be tailored specifically for the user. The user navigates the links to reach the home loans webpage. On the home loans webpage she is again offered a number of different links. The user navigates the options to examine various home loan products offered by multiple providers. After examining the rates, she obtains more information about a specific home loan. She enters basic application information such as property value and loan amount to allow multiple provider server 200 to calculate an estimate of her total closing costs.

If the user decides to continue with the application process, multiple provider server 200 accesses and presents the user with the proper application form. Multiple provider server 200 obtains the credit history for the user and the underwriting criteria for the home loan, and processes her application immediately. A short while later the user receives approval for the home loan she selected, and is presented with a list of documentation, such as bank statements and proof of income, she must provide to complete the application process. The user may be given contact information for a human representative.

Multiple provider server 200 also presents a list of other financial products for which the user qualifies. Multiple provider server 200 uses the information received for the home loan to determine other financial products for which the user is qualified. Multiple provider server 200 presents the user with a home equity loan, three credit cards from three different issuers, two retail cards from a department store and a hardware store, an unsecured installment loan, and a refinance loan for her car, along with basic details such as interest rates and other terms.

The user selects one of the credit cards, and the credit card issuer sends the new credit card to her without requiring any further action from her. Multiple

provider server 200 also provides the user with the option of being notified if home loan interest rates drop.

EXAMPLE 2

A user wishing to obtain a credit card accesses multiple provider server 200 and selects a specific credit card from a list of several credit cards offered by different financial product providers. Multiple provider server 200 determines the required application information for the specific credit card, and prompts the user for the necessary personal information. Multiple provider server 200 also obtains credit history information from a credit bureau, and then applies the underwriting criteria for the specific credit card in real time. Both the required application information and the underwriting criteria were obtained earlier from each financial product provider and stored until needed.

Multiple provider server 200 does not approve the user for the specific credit card. However, multiple provider server 200 has taken the application information and credit history information and applied the different underwriting criteria for other credit cards offered by other financial product providers, and is able to approve the user for credit cards with similar terms as the one originally selected. Although the user is not approved for the specific card originally selected, the user now has the option of choosing from several other cards for which the user is qualified. The user may have the option of immediately transferring a balance from another credit card to one of these new credit cards.

EXAMPLE 3

A user wishing to consolidate a mix of debts accesses multiple provider server 200 and selects the debt consolidation function. Multiple provider server 200 obtains personal information from the user including current debt information and obtains credit history information from a credit bureau.

Multiple provider server 200 then generates three debt consolidation options: (1) a credit card with a low interest rate; (2) a home equity loan; and (3) a home refinance loan with cash out. Multiple provider server 200 takes the application information and credit history information and applies the underwriting criteria for

various financial products in real time. Multiple provider server 200 is thus able to provide the user with the three debt consolidation options as well as specific financial products for which the user qualifies and the respective financial product providers. Multiple provider server 200 also calculates and displays the potential savings with each of the options over the existing debt situation of the user.

The foregoing description of the invention has been presented for purposes of illustration and description. It is not intended to be exhaustive or to limit the invention to the precise forms disclosed. Obviously, many modifications and variations will be apparent to practitioners skilled in this art. It is intended that the scope of the invention be defined by the following claims and their equivalents.

What is claimed is:

CLAIMS

1. A method for qualifying a user for financial products from multiple financial product providers, the method comprising:

presenting a plurality of financial products associated with a plurality of financial product providers to a user, each financial product having a plurality of underwriting criteria;

receiving at least one selected financial product or product category from the user;

collecting application information associated with the user; and

determining approval for the user for at least the selected financial products based on the application information and the underwriting criteria; and

presenting results to the user.

2. The method of claim 1, wherein the financial products include a credit card.

3. The method of claim 1, wherein the financial products include a home loan.

4. The method of claim 1, wherein the financial products include an automobile loan.

5. The method of claim 1, wherein the financial products include a student loan.

6. The method of claim 1, wherein the financial products include an automobile insurance policy.

7. The method of claim 1, wherein the financial products include a homeowner's insurance policy.

8. The method of claim 1, wherein the financial products include a life insurance policy.

9. The method of claim 1, wherein the financial products include a health insurance policy.

10. The method of claim 1, wherein the financial products include all financial products presented to the user.

11. The method of claim 1, wherein the application information includes information obtained directly from the user.

12. The method of claim 1, wherein the application information includes information obtained from a third party.

13. The method of claim 12, wherein the third party is a credit bureau.

14. The method of claim 12, wherein the third party is a repository of public records.

15. The method of claim 1, wherein the results include other financial products for which the user qualifies.

16. The method of claim 1, wherein determining approval is performed real-time.

17. The method of claim 1, wherein determining approval takes less than one minute.

18. The method of claim 1, wherein determining approval takes less than 30 seconds.

19. A method for qualifying a user for financial products from multiple financial product providers, the method comprising:

obtaining a plurality of financial product offerings from a plurality of financial product providers, each financial product offering being associated with a financial product and application criteria;

obtaining application information associated with a user, the application information including information from the user and from at least one third party;

determining in real-time whether the user meets the application criteria based on the application information; and

presenting the user with each financial product offering for which the user meets the application criteria.

20. The method of claim 19, wherein the financial products include a credit card.

21. The method of claim 19, wherein the financial products include a home loan.

22. The method of claim 19, wherein the financial products include an automobile loan.

23. The method of claim 19, wherein the financial products include a student loan.

24. The method of claim 19, wherein the financial products include an automobile insurance policy.

25. The method of claim 19, wherein the financial products include a homeowner's insurance policy.

26. The method of claim 19, wherein the financial products include a life insurance policy.

27. The method of claim 19, wherein the financial products include a health insurance policy.

28. The method of claim 19, wherein the financial products include all financial products presented to the user.

29. The method of claim 19, wherein the third parties include a credit bureau.

30. The method of claim 19, wherein the third parties include a title company.

31. The method of claim 19, wherein determining in real-time whether the user meets the application criteria takes less than one minute.

32. The method of claim 19, wherein determining in real-time whether the user meets the application criteria takes less than 30 seconds.

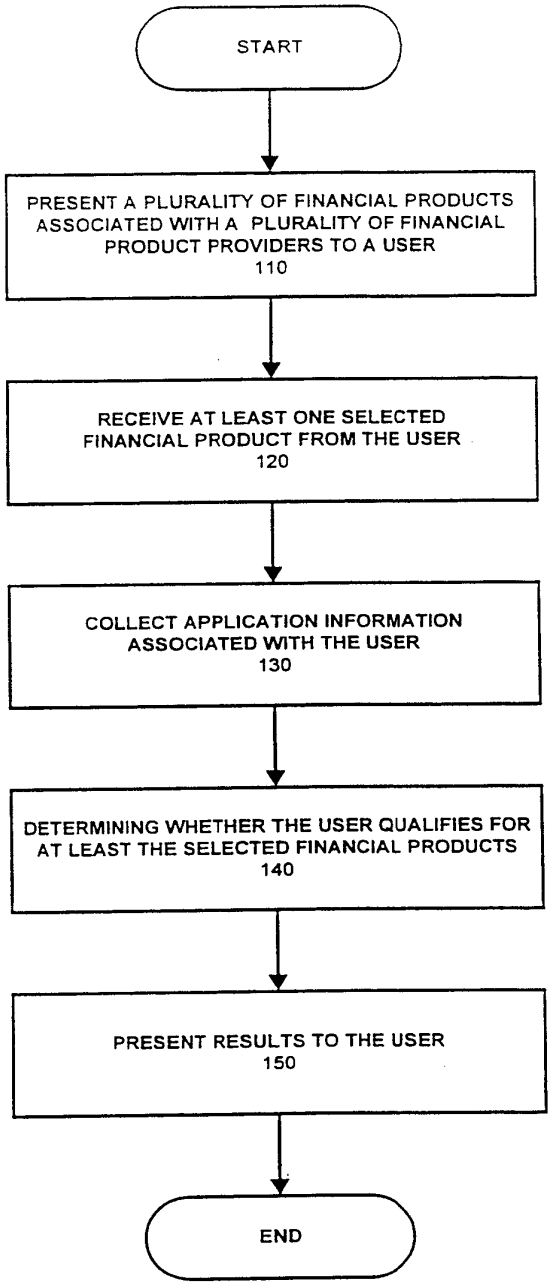
START
PRESENT A PLURALITY OF FINANCIAL PRODUCTS ASSOCIATED WITH A PLURALITY OF FINANCIAL PRODUCT PROVIDERS TO A USER
110
RECEIVE AT LEAST ONE SELECTED FINANCIAL PRODUCT FROM THE USER
120
COLLECT APPLICATION INFORMATION ASSOCIATED WITH THE USER
130
DETERMINING WHETHER THE USER QUALIFIES FOR AT LEAST THE SELECTED FINANCIAL PRODUCTS
140
PRESENT RESULTS TO THE USER
150
END

FIGURE 1

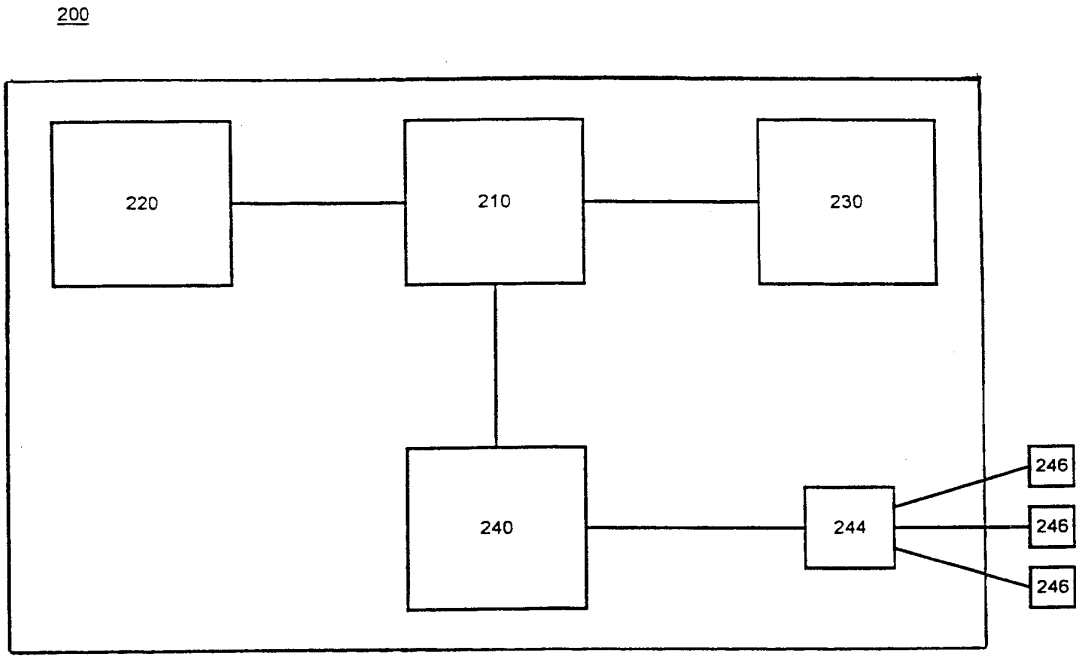

FIGURE 2

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(71) Applicant *(for all designated States except US)*: **IVOX, INC.** [US/US]; 115 Perimeter Center Place, Suite 150, Atlanta, GA 30346 (US).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **WARREN, Gregory, S.** [US/US]; 4333 Dunwoody Park #1210, Atlanta, Georgia 30038 (US). **GREENLEE, Michael, R.** [US/US]; 1230 Old Woodbine Road, Atlanta, Georgia 30319 (US).

(74) Agent: **LAVA GROUP LAW BY SMITH & FROHWEIN, LLC**; P.O. Box 88148, Atlanta, GA 30346 (US).

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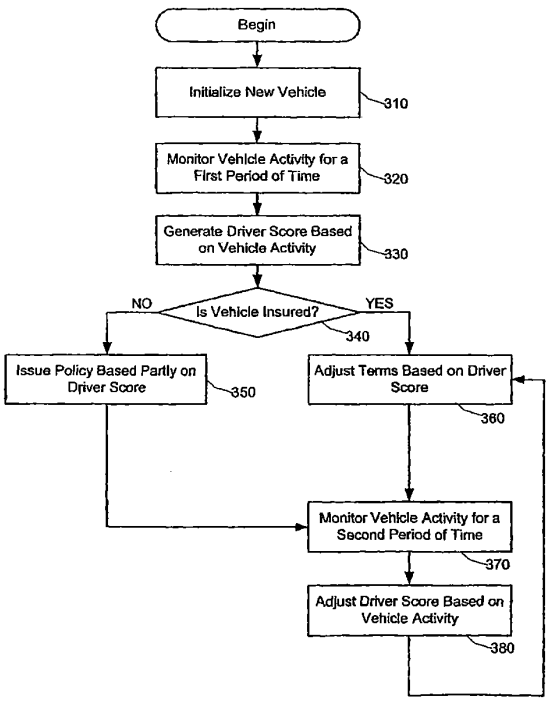
(54) Title: CALCULATION OF DRIVER SCORE BASED ON VEHICLE OPERATION



(57) Abstract: The monitored use of a vehicle provides accurate and reliable data that can be used to determine the insurable risk of a vehicle operator. What is disclosed is a system and method for monitoring vehicle operation and using the collected data to calculate a driver score. The driver score can then be applied to ascertain the risk of insuring a particular driver, as well as being used as a tool for defining or adjusting the terms of an insurance policy for an insured driver. The collection of data such as the times the vehicle is operated, the locations the vehicle is operated and the speeds or other characteristics of how the vehicle is operated can all be used to calculate the driver score. By installing a vehicle monitor within a vehicle and extracting this or similar data, more accurate and profitable insurance policies can be developed.

WO 2006/028484 A1

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

CALCULATION OF DRIVER SCORE BASED ON VEHICLE OPERATION

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] Not applicable.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0002] Not applicable.

REFERENCE TO SEQUENCE LISTING, A TABLE, OR A COMPUTER PROGRAM LISTING COMPACT DISK APPENDIX

[0003] Not applicable.

BACKGROUND OF THE INVENTION

[0004] The present invention is directed towards data acquisition and processing of information related to various driver characteristics and, more particularly to collecting driver characteristic data and generating and driver score based on the collected driver characteristic data. The driver score can then be applied in the calculation of insurance premiums or risk analysis.

[0005] The insurance industry can be likened to an evening at a Las Vegas Black Jack table. The casino has picked the game and established the rules in such a manner that statistically over a period of time, the casino will win. Sure, some individual tourist will walk away with hundreds or thousands of dollars; however, compared to the number of visitors that leave tens, hundreds, thousands, and even tens or hundreds of thousands of dollars behind, these infrequent winners are negligible. This is quite evident upon staying at one of the casinos and viewing the elaborate

decorations, the granite tiling in the bathrooms, the reduced pricing for food and of course, the open bar for active gamblers.

[0006] How does this relate to the insurance industry? Similar to the odds setters in Las Vegas, insurance companies have their own odds setters. The odds setters in the insurance industry include highly compensated and highly educated and trained actuarial scientists. The actuarial scientists acquire and analyze large amounts of varied data that is even remotely related to the calculation of insurance risks, and apply the results of this analysis in the calculation of insurance premiums. The task faced by the actuarial scientists is to derive insurance premiums for a large domain of individuals that in the long run, will result in the amount of premiums collected by the insurance company to be significantly larger than the amount of required insurance payouts.

[0007] Traditionally, the insurance industry generates individual policies that are more likely than not to be profitable to the insurance company. The various aspects of the policies include premiums, deductibles, exclusions, liability limitations, etc. The policies are developed based on various characteristics of the individual seeking the policy, the characteristics of the general populous, and the characteristics of categories of the general populous that may be applicable.

[0008] In the automotive insurance industry, the data related to the various characteristics of the individual are gathered through the use of standard forms, personal interviews, obtaining the applicant's public motor vehicle driving record maintained by governmental agencies or a combination of any of these methods. This data results in a classification of the applicant to a broad actuarial class for which insurance rates are assigned based upon the empirical experience of the insurer. Many factors are relevant to such classification in a particular actuarial class. These factors can include age, sex, marital status, vehicle type, vehicle color, location of residence, driving record including accidents, past insurance claims, at fault accidents, types of losses covered, liability levels desired, inclusion of uninsured motorists, inclusion of comprehensive coverage, inclusion of collision coverage, deductibles, etc. Some of these classifications can be further sub-divided into additional sub-classes, such as age ranges, and vehicle types (i.e., trucks, sports cars, sedans).

[0009] Similar to the goal of the Las Vegas Black Jack table attracting patrons, the insurance companies need to provide competitive pricing of their insurance policies. However, the insurance companies walk a fine line between offering competitive pricing while maintaining viable operating profits. Thus, insurance companies continually seek ways in which to provide competitive pricing without compromising their profit margins. Presently, some insurance companies address this need

by providing discounts and surcharges for some types of use of the vehicle, equipment on the vehicle, and type of driver. For instance, the insurance company my add surcharges if the vehicle is being used for business. Likewise, the insurance company may provide discounts for vehicles that include airbags, antilock brakes, and theft deterrent devices, or if the driver has a good driving record or is a good student.

[0010] However, the insurance industry is faced with significant problems based on their current methodologies. For instance, the information obtained by the insurance company is time constrained. As and example, an insured party may live in a large city when obtaining the policy and subsequently move to the suburbs. Or the insured party may change jobs and consequently have a drastic change in the number of miles traveled during an insurance policy period. Unless the insured party notifies the insurance company regarding the address change, the expected mileage change or other such parameters, the insured party may end up paying a higher premium than would otherwise be available. Thus, the insurance company is vulnerable to churn based on lower premiums that may be offered by a competitor. In addition, the information collected by the insurance company may not be verifiable, and even existing public records may include limited or erroneous information. Thus, there is a need in the art for a more reliable and non-time sensitive mechanism for collection of information regarding the insured party.

[0011] Techniques have been suggested for addressing this problem in the art, such as the use of vehicle operating data recording systems. Such systems reside within a vehicle, measure various operating parameters, and report the information to a central recording system. In addition, the use of wireless or radio transmission of the data to the central recording system has also been suggested. However, there are no methods of applying this information in the insurance industry in an effort to improve the competitive nature of the insurance policy offerings. Thus, there is a need in the art for a method to identify pertinent vehicle operation information to be collected and to apply the collected information in a manner to generate a score that identifies the risks or insurability of a driver.

BRIEF SUMMARY OF THE INVENTION

[0012] The present invention addresses these needs in the art, as well as other needs that are not herein identified, by providing a system and method for monitoring the use of a vehicle and calculating a driver score based on the monitored use. The driver score can then be applied in a

variety of manners to achieve a variety of results, including but not limited to, determining or adjusting the terms of an insurance policy, such as changing the premium, the deductibles, the exclusions, the duration or the like. More specifically, a vehicle monitor is installed or coupled to a vehicle to be monitored. The vehicle monitor collects data from various sensors to identify vehicle operation data. Based at least in part on the vehicle operation data, a driver score is calculated and then the driver score is applied in setting or modifying the terms of the insurance policy either on a retroactive basis or on a forward looking basis.

[0013] In one embodiment of the invention, the vehicle monitor may be used to determine a driver score that serves as input for calculating the terms of a new insurance policy. In another embodiment, the vehicle monitor may be used to determine a driver score that serves as input for modifying the terms of an existing insurance policy. In another embodiment, the driver score can be used to determine whether a party qualifies for insurance.

[0014] The vehicle monitor may operate to collect a variety of information or operating parameters including the times during which the vehicle is operated, the geographic areas or sub-areas within which the vehicle is operated and the speeds at which the vehicle is operated. Other parameters could also be monitored by the vehicle monitor and all or only subsets of this information may be used in the determination of the driver score.

[0015] The determination of the driver score can be accomplished by the vehicle monitor, by a central system or by a combination of both. In addition to the driver score, other extrinsic data such as claim propensities, vehicle types, driver records and demographics may also be used in determining or adjusting the terms of the insurance policy. In addition, this extrinsic data may also be applied in the calculation of the driver score.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

Fig. 1 is a block diagram of an environment suitable for various embodiments of the present invention.

Fig. 2 is a mapping diagram of a geographic region that is divided into sub-areas that illustrates the second parameter – where the vehicle is used.

Fig. 3 is a flow diagram illustrating the steps involved in an embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0016] The present invention is directed towards acquiring performance and usage data through various sensors and monitors within and without a vehicle, utilizing the performance and usage data to generate a driver score, and then utilizing the driver score in the calculations of insurance premiums or rating factors. In general, the present invention includes at least four distinct aspects. These aspects include: (1) the methods and devices utilized in the acquisition of performance and usage data; (2) the types of performance and usage data collected and the treatment of the ranges of the data values; (3) the method to calculate the drivers score based at least in part on the performance and usage data; and (4) the application of the driver score in the calculation of insurance premiums, rating factors, risk analysis, etc.

[0017] Fig. 1 is a block diagram of an environment suitable for various embodiments of the present invention. Three vehicles 111-113 are shown, for illustrative purposes, operating within the environment. Each of the vehicles is equipped with a data collection and recording system 140 but the details are only shown with respect to one of the vehicles 111. The data collection and recording system is shown as including two data collection interfaces: a GPS interface 120 and a vehicle bus interface 130. It should be understood that the present invention is not limited to these two interfaces nor are these two interfaces required for the present invention. Other interfaces are also anticipated such as weather information interfaces, clock interface, or other similar interfaces. The vehicle bus interface 130 can acquire information such as the speed of the vehicle, state of the windshield wipers, state of the lights (on, off, fog lights, brights, etc.), amount of pressure applied to the brakes, motion through the use of an accelerometer, time of day, temperature, vehicle maintenance, operation of equipment within the vehicle such as radios, cellular telephones, DVD players or the like, the volume at which audio equipment is operated, and the identity of the driver based on the entry of an identification number, seat settings, weight or the like, status of seat belts, number of passengers, etc. The GPS interface 120 can acquire information such as the location of the vehicle, time of day, direction of motion, speed of the vehicle, etc. A recording system 140 collects information from the data collection interfaces and either stores the information locally, transmits the information through transmitter 150, or applies processing to the information prior to either storing or transmitting the information. For instance, in an exemplary embodiment of the present invention, the system may only operate to collect time of day, location and speed information. In such an embodiment, the data recording system 140 operates to filter the data available from the data

collection interfaces and only provide the necessary information to the central system. In an alternative embodiment, the data recording system 140 may operate to transmit all available information and a central system 170 operates to filter out the unnecessary information.

[0018] The data from the various vehicles 111-113 is received by a receiver 160 and then provided to a central system 170. The central system can perform processing on the received data, either alone or in conjunction with back end processing 180. The back end processing 180 may include input from actuarial scientist or other data collection and processing systems.

[0019] The data collected for the various vehicles may be transferred to the central system using a variety of different technologies and those skilled in the art will understand the benefits and limitations of each such technology. For instance, the invention may be embodied within an environment that uses wireless technology to periodically transmit collected data to the central system 170. The wireless technology may include pager technology or cellular technology conforming to any of a variety of past, existing or future technologies including FLEX, REFLEX, POCSAG, AMPS, NAMPS, TDMA, CDMA, GSM, GPRS or the like. Alternatively, the system may store the data and only transmit it when requested. In yet another embodiment, the data recording system 140 may store the data for later retrieval. Such later retrieval could be accomplished through a local wireless system, such as blue tooth, INFRARED, FM, AM, or I.E.E.E. 802.11 technology, or through a physical wired technology or even through the use of a memory card, storage media or print out.

[0020] Once the data is received by the central system 170, the data is used to generate a driver score. The driver score is based at least in part on the data collected by the vehicles and provided to the central system 170. However, additional data that is received independent from the data collection systems in the individual vehicles could also be used in calculating the driver score. This information may include the traditional information that has been collected by insurance companies for years as is listed in the background section, or may include other information such as satellite tracking of the vehicle, cellular signal tracking of the vehicle, weather information, mapping information, hazardous road condition information, or the like.

[0021] The driver score is basically a value that encompasses a variety of parameters. The driver score reflects a qualitative view of the driving characteristics for a particular vehicle or a combination of a vehicle and driver. Depending on the parameters that are used to calculate the driver score, the driver score can reflect various characteristics. In the preferred embodiment, the

driver score operates to establish a risk level associated with insuring a particular driver. Other uses of the driver score may include, but are not limited to, verifying the accuracy of information provided to an insurance company, verifying compliance of a teenaged driver within guidelines established by his or her parents, verify compliance of teenaged drivers with local/regional laws such as curfew and number of passengers, etc.

[0022] Advantageously, an insurance company can offer a product embodying aspects of this invention to its customers and offer a discount based on the inclusion of the product. The customer can further agree to be bound by restrictions to gain other discounts. For instance, an insured party can agree to maintain within the speed limit to obtain a premium discount in exchange for allowing the insurance company the ability to actively monitor compliance. The present invention can also be utilized as a theft deterrent, similar to a LO-JACK type system in that the location of the vehicle can be monitored.

[0023] In the preferred embodiment, the driver score reflects an insurance risk and is used to either increase or decrease an insurance premium or otherwise modify the terms of an insurance policy.

Driver Score Example

[0024] The present invention can be illustrated through the use of an exemplary embodiment that bases the driver score on the following information: when the vehicle is in use, where the vehicle is used, and how the vehicle is used.

[0025] Table 1 illustrates a simple heuristic that can be applied to determine a weighted score reflecting the first parameter - when the vehicle is in use.

Time of Day	Normal Traffic	Peak Traffic	Risk Traffic	Weighted Score
Risk Factor	0.60	1.40	2.50	
Driver A	20%	75%	5%	1.295
Driver B	80%	20%	0%	0.760
Driver C	20%	20%	60% (capped at 50%)	1.900 1.650

Table 1

[0026] Various sensors or collection interfaces could be used to determine the time of day that a vehicle is operated such as through the GPS system, the vehicle bus, or through notifying the central system through a wireless interface. Regardless of the technique used, the time of day operational characteristics of a vehicle can be determined over a period of time and continually updated over time. The actual times that the vehicle is operated can be recorded by the recording system 140 and reported to the central system 170 or categories of times can be reported. Table 1 shows one

technique to breakdown the operation of a vehicle within three time-categories, normal traffic, peak traffic and risk traffic. For instance peak traffic could include the times between 7:00-9:00 AM and 4:00-7:00 PM, risk traffic could include late night driving, such as between 11:00 PM to 4:00 AM and normal traffic would include the remainder. It will be appreciated that these categories are for illustrative purposes only and the present invention is equally applicable to other sets of categories. For instance, one or more of the following categories could be added to or substitute any of the already listed categories: weekend, particular day of the week, morning rush, evening rush, holiday travel, lunch time rush, garaged, parked, Sunday morning, Friday/Saturday evening, etc.

[0027] The second block in the left most column of Table 1 defines a risk factor for each of the listed time categories. The values listed in this table define a risk factor that is associated with driving during the identified time periods. This information can be derived using various techniques such as empirical data or information that is obtained from actuarial tables published by insurance companies. The risk factors can be based on a national average or could be regionally based as well.

[0028] Table 1 lists driving characteristics for three vehicles or drivers (Driver A, B and C). The driving characteristics provide a percentage of driving time that the vehicle is operated, or the driver operates a vehicle during the listed time categories.

[0029] Based on the risk factor and the driving characteristics, a weighted score, as shown in Table 2, is calculated by multiplying the percentage of time that a vehicle is operated in a particular category by the risk factor associated with that category and then summing the products for each of the categories. For the provided example, Driver A's weighted score is determined as follows:

Time-Category	Claim Propensity		% of Time	Products
Normal Traffic	0.6	*	20%	0.12
Peak Traffic	1.4	*	75%	1.05
Low Traffic	2.5	*	5%	0.125
			Weighted Score	**1.295**

Table 2

[0030] Driver B has more of a tendency to drive during normal traffic (80%) and thus, has a much lower weighted score of 0.76. Driver C has a tendency to drive late at night in the risk traffic category and thus has a weighted score of 1.9. Thus, Driver C has the highest weighted score. If it is desired not to penalize a driver that happens to be assigned to night shift work, one technique to

alleviate an adverse affect based on Driver C's weighted score would be to apply a cap. For instance, if the late night percentage is capped at 50%, then the weighted score for Driver C drops to 1.65. This illustrates how the driver score can be flexible and fair by basing the data on more than just the actually measured data. For instance, if the driver score is being utilized by an insurance company to determine premium rates, the insurance company may decide not to penalize a night shift worker simply because his job forces him to travel within a higher risk time period.

[0031] It should be understood that this example is provided for illustrative purposes only and that the present invention may use other techniques to calculate such a weighted score. For instance, rather than percentages of time, the actual number of hours averaged over a period of time, such as a day, week, month or quarter could be utilized. In addition, the application of risk factors to the various time categories can be adjusted based on a variety of factors, some of which may include, but are not necessarily required, are type of vehicle, driver's record, population of the area, etc.

[0032] Fig. 2 is a mapping diagram of a geographic region that is divided into sub-areas that illustrates the second parameter – where the vehicle is used.

[0033] The region includes 5 sub-areas A-E. The sub-areas can be defined based on any of a variety of techniques including zip codes, area codes, counties, states, cellular cells, longitude and latitude, traffic density, population, road density, or any of a variety of other techniques of combinations of techniques. Regardless of the technique used to sub-divide a region, risk factor data for the region can be obtained and applied in the determination of a weighted score for this parameter. Table 3 illustrates a simple heuristic that can be applied to determine a weighted score reflecting the second parameter - where the vehicle is used.

Area	Rural Streets	Suburb Streets	Metro Streets	Rural H'way	Metro H'way	Weighted Score
Risk Factor	0.55	1.75	2.20	1.55	1.35	
Driver A	15%	20%	30%	15%	20%	1.5950
Driver B	70%	15%	10%	5%	0%	0.9450
Driver C	15%	0%	15%	70%	0%	1.4975

Table 3

[0034] The risk factor data for each region identifies a driving risk associated with that region. Thus, in the example provided, a high risk factor indicates that the area has a higher probability of

resulting in an incident, such as a traffic accident, when a vehicle is operated in the area. Similar to the time of day calculations in Table 1, the risk factor values are multiplied by the percentage of time that the vehicle/driver is within that region or sub-area and then the products are summed to obtain the weighted score.

[0035] Again, the use of percentages is just an example and other criteria could also be applied such as accumulative hours over a period of time, average number of hours over a period of time, number of miles driven in the particular area, or the like.

[0036] In an alternative embodiment, the tables used to calculate a weighted score based on time of day and area can be combined into a multi-dimensional table. Thus, each of the sub-areas in the region could include a time of day table that includes different risk factors based on sub-area and time of day. For instance, the area surrounding a subway station may have a high risk factor during peak traffic but a very low risk factor during normal traffic. Thus, those skilled in the art will appreciate that various techniques can be applied to calculate the weighted scores and the examples provided in this description are simply to illustrate calculation of a value that rates driver characteristics. However, certain aspects of the selection of parameters and assignment of risk factors and techniques to calculate the score that are disclosed herein are also considered novel.

[0037] Table 4 illustrates a simple heuristic that can be applied to determine a weighted score reflecting the third parameter - how the vehicle is used. This example shows one alternative for calculating the driver score, or elements of the driver score by using an offset rather than a weighted score.

Speed	Highway	Streets	Limited Access	Penalty Offset
Speed limit ± 5mph	**+0.015**	**+0.025**	**+0.02**	
Speed limit ± 15 mph	**+0.05**	**+0.10**	**+0.08**	
Driver A	10/4	4/2	4/1	0.81
Driver B	2/1	8/0	4/2	0.52
Driver C	5/0	5/0	4/0	0.28

Table 4

[0038] The illustrated heuristic identifies offsets to be added to the weighted scores calculated in accordance with the first two parameters. The offset is based on ranges of miles per hour centered on the speed limit and the types of roadways being traveled. For instance, a set of offsets are

provided for the highways, streets, and limited access roadways for speeds that are 5 mph above or below the posted speed limit and speeds that are 15 mph above or below the posted speed limit. This particular configuration is once again provided as an example only and the present invention is not limited to this particular configuration. For example, one set of offsets could also be used when the vehicle is a particular threshold below the speed limit and another set of offsets could be used when the vehicle is above the posted speed limit. In addition, the structure defined in Table 4 is set up as a penalty system. An award system could also be established to subtract offsets from the score based on conforming to the speed limit.

[0039] The values entered for Driver A, Driver B and Driver C illustrate an alternative method to the percentages used in the previous examples. In this example, the propensity of the driver on a scale of 0 to 10 is listed for the various conditions. This number could also represent a frequency over a period of time – for instance over a given period of time, Driver A will be over the speed limit by more than 5 mph 10 times and over the speed limit by more than 15 mph 4 times. For each occurrence, the offset is added for the particular driver. Thus, for Driver A, the total offset penalty of 0.81 is calculated as follows:

$$10 * 0.015 + 4 * 0.05 + 4 * 0.025 + 2 * 0.1 + 4 * 0.02 + 1 * 0.08 = 0.81$$

[0040] As previously mentioned, the examples that have been provided are for illustrative purposes only and other factors and weighting systems could also be incorporated into the present invention and the present invention is not limited to any particular arrangement. The main focus of the present invention is to provide a means for calculating a driver score that is based on various operational parameters. In the example provided, these parameters have included when the vehicle is in use, where the vehicle is used and how the vehicle is used.

[0041] Once the various parameters have been determined and the weighted scores and penalties calculated, then the driver score can be determined. For the illustrated example, the driver score is simply the sum of the "when" and "where" parameters plus the penalty or offset determined by the "how" parameters. Table 5 illustrates the calculation of the driver score for Driver A, Driver B and Driver C. Alternatively, the driver score could be calculated in different manners, such as multiplying the weighted score for the "when" with the weighted score for the "where" and than adding in the offsets. It will be appreciated that the particular technique employed, although novel in and of itself, in no way limits other aspects of the present invention.

	Driver A	Driver B	Driver C
Time of day (When)	1.295	0.760	1.150
Area (Where)	1.5950	0.9450	1.4975
Speed (How)	0.81	0.52	0.28
Driver Score	3.7	2.225	2.9275

Table 5

[0042] Thus, in the illustrated example, Driver A has a driver score of 3.7, Driver B has a driver score of 2.225 and Driver C has a driver scored of 2.9275. Based on the particular parameters and structure of the provided examples, in this situation Driver A is a higher risk driver than Driver B or Driver C. The driver score can then be used in a variety of manners. For instance, the driver score could be used as one of several parameters entered into the calculation of an automobile insurance premium or, as an offset or adjustment to an automobile insurance premium. The driver score could also be used for providing discounts or rate adjustments for life and/or health insurance. Other uses for the driver score may include, but are not limited to State tax credits, purchase price discounts or rebates for automobiles, discounts for extended warranties, discounts for vehicle registration, access to High Occupancy Vehicle (HOV) lanes or the like.

[0043] Table 6 illustrates one method of applying the driver score. In this example, the driver score is used to select a rating factor. The rating factor is a multiplier to the insurance premium derived using other available rating mechanisms.

Driver Score	Rating Factor
0.0 to 0.9	0.85
1.0 to 1.75	0.90
1.76 to 2.49	0.95
2.50 to 3.19	1.00
3.20 to 3.59	1.05
3.60 to 3.99	1.10
4.0 to 4.29	1.15
4.30 +	1.30

Table 6

[0044] In accordance with Table 6 and the calculated driver scores, Driver A would have a rating factor of 1.10, Driver B would have a rating factor of 0.95 and Driver C would have a rating factor of 1.00. Thus, in this example, based on the rating factors, Driver A's premium would be increased by 10% based on his driver score, Driver B's premium would be reduced by 5% and Driver C's premium would not be adjusted.

[0045] Thus, the present invention has been described by way of example as a system that includes a vehicle based component and a central component. The vehicle based component collects usage data through one or more interfaces and then provides the usage data to the central system either by means of wireless transmission or other methods. The central system then calculates a driver score based at least in part on the usage data received, as well as claim propensity information. Finally, the driver score can be applied in adjusting the premium of an insurance policy or other terms and conditions of the policy.

[0046] Fig. 3 is a flow diagram illustrating the steps involved in an embodiment of the present invention. The process begins at step 310 where a new vehicle is selected for driver score based insurance. At step 310 the new vehicle is initialized. This process can include a variety of tasks, such as but not limited to nor requiring, installation of the monitoring and recording system into the vehicle, provisioning the system including provisioning of any wireless communication systems, entry of user data into the central system and verification of operation. These tasks can include gathering initial information about the driver, the vehicle, the topographical area in which the vehicle is operated, the identification of what drivers will be utilizing the vehicle, matching the identification of the monitoring and recording system with the drivers, etc.

[0047] Once the system is initialized, the monitoring and recording system begins to monitor the vehicle activity for a first period of time 320. The data collected can be provided to the central system either on-line in real-time, periodically over a wireless interface, or through physically docking the vehicle with the central system either locally or remotely. The first period of time can vary depending on the particular embodiment but generally is sufficiently long to obtain data that is an accurate portrayal of the vehicle activity. Logically an entire year would seem like a valid period when calculating a driver score for insurance premium purposes but realistically, this would not be practical. Thus, a shorter period of time that encompasses enough variants in the individuals schedule should suffice. For instance, a two to four week period of time may be sufficient if during

that period of time, no extreme conditions occur, such as the driver going on vacation, the driver taking an extended road trip or the vehicle being in the shop.

[0048] Once the first period of time has been satisfied, the system can operate to generate the driver score 330. As previously described, the driver score may include a variety of parameters with various weights applied to the parameters. Several examples have been previously provided, each of which may contain novel aspects of the invention, yet do not operate to limit the generality of the invention to utilize various other parameters, combinations of parameters and the application of various weighting factors.

[0049] Once the driver score is determined, if the vehicle or user is currently uninsured 340, the processing continues at step 350 where the driver score is applied in the selection and definition of an insurance policy. On the other hand, if the vehicle or user is already insured, processing continues at step 360 where the terms of the insurance policy can be adjusted. In steps 350 and 360, the typical application of the driver score is in the adjustment of the insurance premium, however, other adjustments or term settings could also be made, such as but not limited to, changing deductibles, changing exclusions, changing the duration of the policy, etc.

[0050] After the completion of steps 350 or 360, processing continues at step 370 where the vehicle activity continues to be monitored. At step 370, the monitoring process continues for a second duration of time. The second duration of time can be as insignificant as seconds or fractions of seconds or, could be substantial such as days, weeks, etc. Preferably, the second period of time is less in duration than the first period of time but this is not a requirement.

[0051] Upon completion of the second period of time, the driver score is then adjusted at step 380. The adjusted driver score is then reapplied in step 360 for adjusting the terms of the insurance policy. Thus, the driver score and the terms of the insurance policy can be continually updated as the system collects further information about the vehicle activity.

[0052] In an alternate embodiment, an insurance policy can simply be issued to an insured party at premiums and terms calculated in the normal fashion. Subsequent premiums and terms can then be adjusted over time by employing the monitoring and driver score calculation aspects of the present invention.

[0053] The present invention has been described using detailed descriptions of embodiments thereof that are provided by way of example and are not intended to limit the scope of the invention. The present invention can be implemented as a process that runs within a variety of system

environments or as an entire system including various components. The described embodiments comprise different features, not all of which are required in all embodiments of the invention. Some embodiments of the present invention utilize only some of the features, aspects or possible combinations of the features or aspects. Variations of embodiments of the present invention that are described and embodiments of the present invention comprising different combinations of features noted in the described embodiments will occur to persons of the art.

CLAIMS

What is claimed is:

1. A method of quantifying vehicle activity, the method comprising the steps of:

monitoring particular parameters of the activity of a vehicle for a first period of time; and

calculating a driver score based at least in part on the particular parameters of the vehicle activity during the first period of time.

2. The method of claim 1, further comprising the step of applying the driver score to adjust the terms of an insurance policy for the vehicle.

3. The method of claim 2, wherein the terms of the insurance policy that are adjusted include the deductibles.

4. The method of claim 2, wherein the terms of the insurance policy that are adjusted include the premiums.

5. The method of claim 1, wherein the step of calculating a driver score further comprises the steps of:

identifying time of day classes in which the vehicle can be utilized;

determining the amount of driving time that the vehicle is used in each of the time of day classes;

calculating a time of day weighted value based at least in part on the amount of driving time that the vehicle is used in each of the time of day classes; and

applying the time of day weighted value in the calculation of the driver score.

6. The method of claim 5, wherein the step of calculating a time of day weighted value further comprises calculating a time of day weighted value based at least in part on risk tendencies for the time of day classes.

7. The method of claim 5, wherein the step of calculating a driver score further comprises the steps of:

identifying geographical sub-areas in which the vehicle can be utilized;

determining the amount of driving time that the vehicle is used in each of the geographical sub-areas;

calculating an area weighted value based on the amount of driving time that the vehicle is used in each of the geographical sub-areas; and

applying the area weighted value in the calculation of the driver score.

8. The method of claim 7, wherein the step of calculating an area weighted value further comprises calculating an area weighted value based at least in part on risk tendencies for the geographical sub areas.

9. The method of claim 7, wherein the step of calculating a driver score further comprises the steps of:

identifying speed classes in which the vehicle can be utilized;

determining the frequency at which the vehicle is used in each of the speed classes;

calculating a speed weighted value based at least in part on the frequency at which the vehicle is used in each of the speed classes; and

applying the speed weighted value in the calculation of the driver score.

10. The method of claim 1, wherein the step of calculating a driver score further comprises the steps of:

identifying geographical sub-areas in which the vehicle can be utilized;

determining the amount of driving time that the vehicle is used in each of the geographical sub-areas;

calculating an area weighted value based on the amount of driving time that the vehicle is used in each of the geographical sub-areas; and

applying the area weighted value in the calculation of the driver score.

11. The method of claim 1, wherein the step of calculating a driver score further comprises the steps of:

identifying speed classes in which the vehicle can be utilized;

determining the frequency at which the vehicle is used in each of the speed classes;

calculating a speed weighted value based at least in part on the frequency at which the vehicle is used in each of the speed classes; and

applying the offset value in the calculation of the driver score.

12. The method of claim 1, further comprising the steps of:

monitoring the activity of the vehicle for a second period of time; and

adjusting the driver score based at least in part on the vehicle activity during the second period of time.

13. A method of generating a rating factor that can be used as the basis for adjusting the terms of an insurance policy, the method comprising the steps of:

installing a vehicle monitor within a vehicle;

monitoring the activity of the vehicle for a first period of time;

calculating a driver score based at least in part on the vehicle activity during the first period of time;

applying the driver score to determine the terms of an insurance policy for the insured vehicle;

monitoring the activity of the vehicle for a subsequent period of time; and

adjusting the driver score based at least in part on the vehicle activity during the subsequent period of time.

14. The method of claim 13, wherein vehicle monitor includes a wireless interface and the step of calculating a driver score further comprises the steps of:

wirelessly transmitting data obtained from the monitoring step to a central system; and

the central system calculating the driver score based at least in part on the transmitted data.

15. The method of claim 14, wherein the step of calculating a driver score further comprises the steps of:

identifying time of day classes in which the vehicle can be utilized;

determining the amount of driving time that the vehicle is used in each of the time of day classes;

calculating a time of day weighted value based on the amount of driving time that the vehicle is used in each of the time of day classes and claim propensities for the time of day classes;

applying the time of day weighted value in the calculation of the driver score;

identifying geographical sub-areas in which the vehicle can be utilized;

determining the amount of driving time that the vehicle is used in each of the geographical sub-areas;

calculating an area weighted value based on the amount of driving time that the vehicle is used in each of the geographical sub-areas and claim propensities for the geographical sub-areas;

applying the area weighted value in the calculation of the driver score;

identifying speed classes in which the vehicle can be utilized;

determining the frequency at which the vehicle is used in each of the speed classes;

calculating an offset value based on the frequency at which the vehicle is used in each of the speed classes; and

applying the offset value in the calculation of the driver score.

16. The method of claim 13, wherein the step of monitoring the vehicle during the first period of time further comprises the steps of:

identifying times during the first period of time at which the vehicle was operated;

identifying geographical sub-areas in which the vehicle was operated during the first time period; and

identifying the speeds at which the vehicle was operated during the first period of time.

17. The method of claim 16, wherein the step of calculating a driver score further comprises the steps of:

applying the identified times, geographical sub-areas and speeds in the calculation of the driver score.

18. A system for calculating a driver score and applying the driver score in the determination of the terms of an insurance policy, the system comprising:

a recording system that is installable within a vehicle;

a GPS interface that is couple to the recording system;

a vehicle bus interface that is couple to the recording system;

a transmitter coupled to the recording system for transmitting vehicle operation data obtained by the recording system through the GPS interface and the vehicle bus interface;

a receiver that is communicatively coupled to the transmitter for receiving the vehicle operation data; and

a central system that is coupled to the receiver and operable to:

calculate a driver score based at least in part on the vehicle operation data; and

apply the driver score determine the terms of the insurance policy.

19. The system of claim 18, wherein the transmitter and the receiver are communicatively coupled over a wireless interface.

20. The system of claim 18, wherein the wireless interface is a cellular interface.

21. The system of claim 18, wherein the wireless interface is a pager interface.

22. The system of claim 18, wherein the vehicle operation data comprises:

times at which the vehicle is operated;

locations in which the vehicle is operated; and

speeds at which the vehicle is operated;

23. The system of claim 22, further comprising a back end processor that is coupled to the central system and is operable to provide the central system with claim propensity data related to time, locations and vehicle speeds.

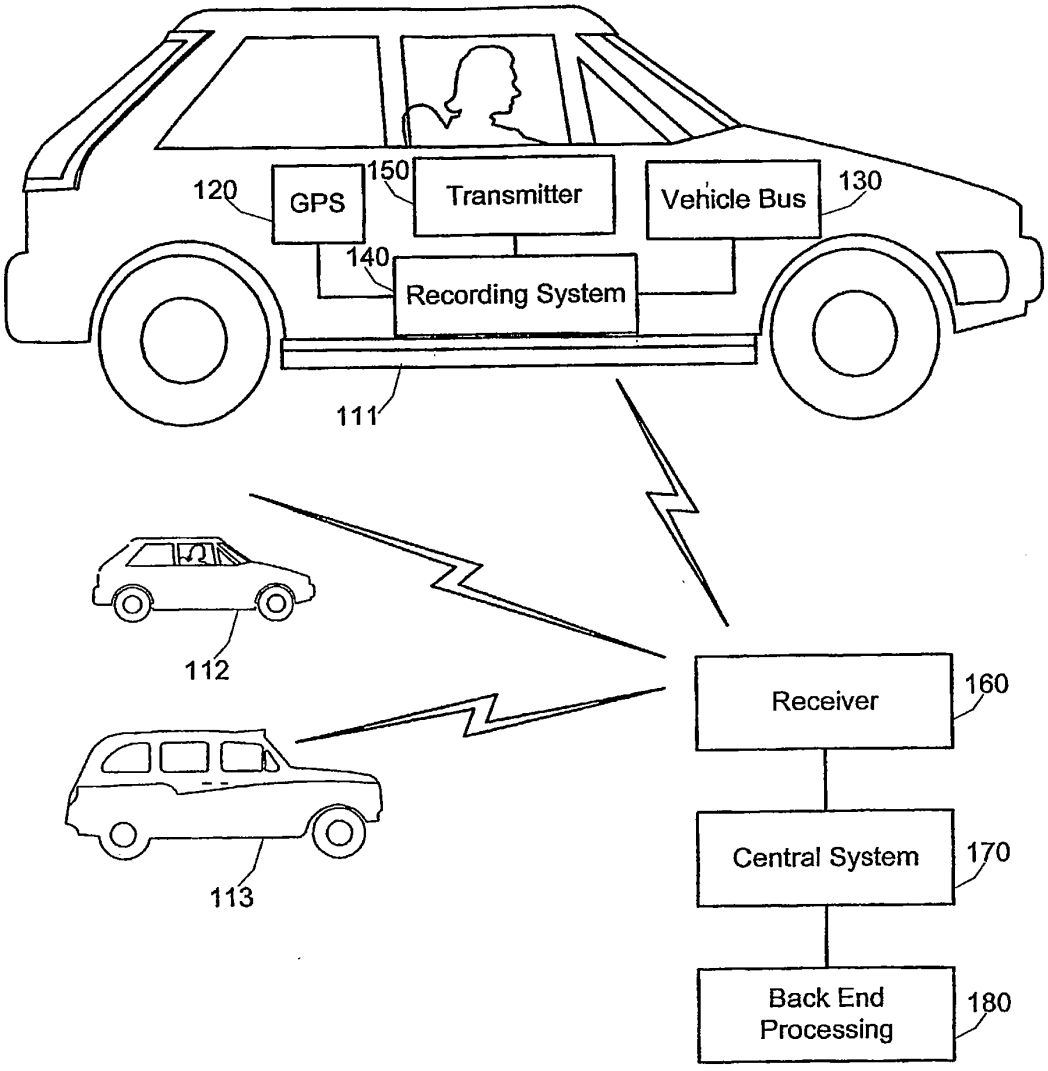

120
GPS
150
Transmitter
Vehicle Bus
130
140
Recording System
111
112
113
Receiver
160
Central System
170
Back End
Processing
180

Fig. 1

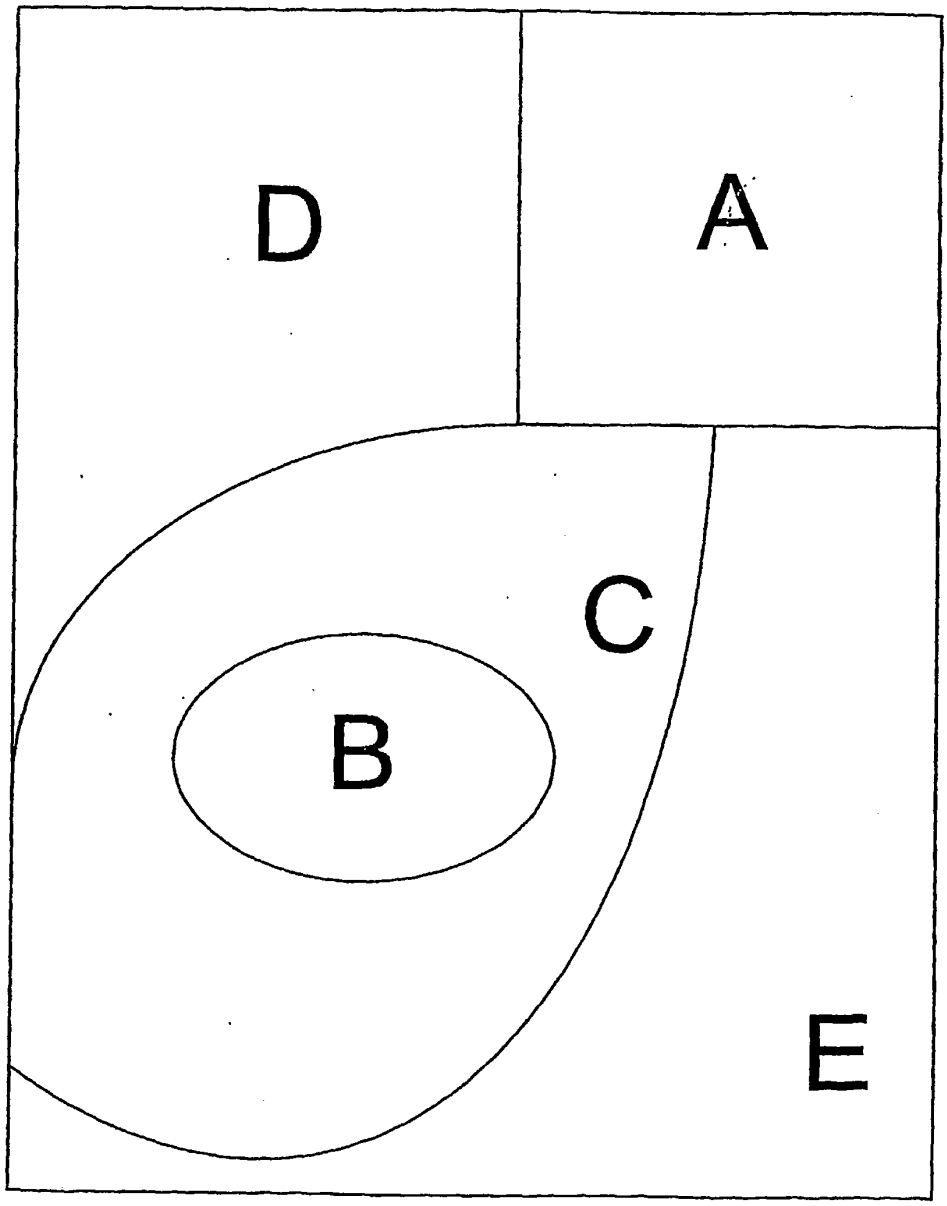


Fig. 2

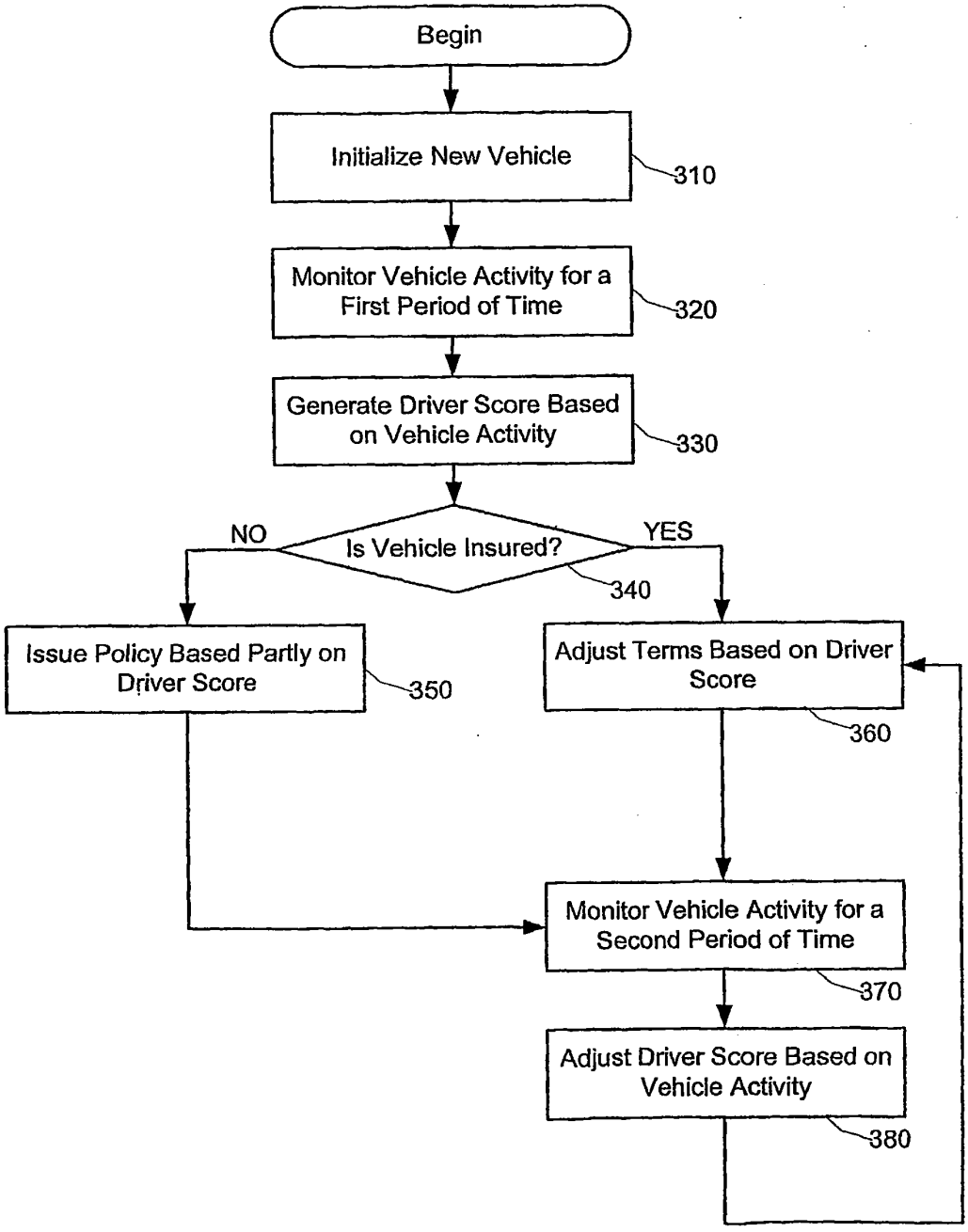


Fig. 3

SUBSTITUTE SHEET (RULE 26)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US05/00914

A. CLASSIFICATION OF SUBJECT MATTER
IPC(7) : G06F17/60
US CL : 705/4
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 705/4

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
Please See Continuation Sheet

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,797,134 A (McMillan) 18 August 1998 (18.08.1998), column 6, lines 45-56.	1-23
A	US 6,182,048 B1 (Osborn et al) 30 January 2001 (30.01.2001), column 1, line 53-column 2, line 13.	1-23
X	US 6,711,495 B1 (Ukai et al) 23 March 2004 (23.03.2004), column 6, lines 15-31 and column 16, lines 48-62.	1-23

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search
20 October 2005 (20.10.2005)

Date of mailing of the international search report
23 NOV 2005

Name and mailing address of the ISA/US
Mail Stop PCT, Attn: ISA/US
Commissioner of Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
Facsimile No. (703) 305-3230

Authorized officer
for Joseph Thomas
Telephone No. (571) 272-6776

Form PCT/ISA/210 (second sheet) (July 1998)

INTERNATIONAL SEARCH REPORT

PCT/US05/00914

Continuation of B. FIELDS SEARCHED Item 3:
EAST/WEST Files: USPAT, USPGPUB, EPO, JPO, Derwent and IBM_TDB. Search Terms: insurance, vehicle, sensor, premium, parameters, vehicle activity, GPS and monitoring.

Electronic Acknowledgement Receipt

EFS ID:	7297013
Application Number:	12132487
International Application Number:	
Confirmation Number:	7812
Title of Invention:	VEHICLE MONITORING SYSTEM
First Named Inventor/Applicant Name:	Raymond Scott Ling
Customer Number:	00757
Filer:	James A. Collins/Magdalena Pieczonka
Filer Authorized By:	James A. Collins
Attorney Docket Number:	12654/42
Receipt Date:	26-MAR-2010
Filing Date:	03-JUN-2008
Time Stamp:	17:09:59
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		12654-42_IDS.pdf	770928 c7ea47c68adf579d853af6c98632d730ec119c94	yes	14

	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Miscellaneous Incoming Letter		1	1	
	Transmittal Letter		2	8	
	Information Disclosure Statement (IDS) Filed (SB/08)		9	14	
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Information:					
2	Foreign Reference	EP_0700009A2_Abstract.pdf	250640 56bcefb49254a5a4ba3863b31425c761ce40e290	no	5
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Information:					
3	Foreign Reference	EP_0935208A2.pdf	1574848 14fc66787cd73b500a391ae74bf6198b4d690891	no	49
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4	Foreign Reference	FR_2533049A1_Abstract.pdf	1416556 e67ed3219bc485d6e3ceca79dceac67e792215ec	no	31
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5	Foreign Reference	GB_02143978A.pdf	472607 b4abab5f556dddcb9cebcb53f65c436f599cc85e	no	9
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6	Foreign Reference	GB_02225461A.pdf	1114472 7c653b268ad3e7c9dc716591eb19af5e522d5472	no	38
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8	Foreign Reference	JP_6-4733_Abstract.pdf	402993 9046b991ad9359e4b32ca37807102258ffda6781	no	9
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9	Foreign Reference	JP_6-259632_Abstract.pdf	219120 69b443d0686cb33e62224bc20d13c7621f86fa57	no	7
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11	Foreign Reference	WO_90-02388.pdf	457358 2ae10728f94e0a7b16f4a597d568090281ad5fd5	no	12
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12	Foreign Reference	WO_97-27561A1.pdf	1218690 cfe1b9ed9f43241c6248e0eeec050b3c309ef587	no	36
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13	Foreign Reference	WO_00-52616A2.pdf	641461 106ed16fc20b89399e4441bd20f3bd346491ea4f	no	17
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14	Foreign Reference	WO_2006-028484A1.pdf	1094985 4bdc571aeb3d810e908ef6db3e05cbd45f9d1bc9	no	27
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15	NPL Documents	A107--AutoWatch_product_description.PDF	205152 a9962b34ddba96dd7a82a535d102984b1873ce95	no	2
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29	NPL Documents	A121--Ease_Simulation_Inc_Invoice_with_Visa_receipt.PDF	32335 1a562060ab2039c19cee1a713159973a70ba9a2d	no	2
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47	NPL Documents	A139--Road_Safety_Safe_Driving_Starts_with.pdf	118380 5dc47bba7b1f2f168edc8dc2a7072a7a672a8263	no	2
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56	NPL Documents	A147--Final_Report_Vehicle_Data_Collection.PDF	59748 3249986f529a6a65ccef94731609678 7f15b0e16	no	1
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Information:					
57	NPL Documents	A148--Users_Manual_for_AutoWatch.pdf	6011215 689df92099feec1a4d9a2f12d4ac1701e14f7db6	no	71
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58	NPL Documents	A149--Vetronix_Corp_CDRS_FAQ.pdf	256842 bf63e9afc2a072313f63793c9414fe47049943ac	no	5
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Information:					
			Total Files Size (in bytes):	60101835	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

<u>New Applications Under 35 U.S.C. 111</u>
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

<u>National Stage of an International Application under 35 U.S.C. 371</u>
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

<u>New International Application Filed with the USPTO as a Receiving Office</u>
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

CERTIFICATE OF EFS FILING UNDER 37 CFR §1.8

I hereby certify that this correspondence is being electronically transmitted to the United States Patent and Trademark Office, Commissioner for Patents, via the EFS pursuant to 37 CFR §1.8 on the below date:

Date: March 26, 2010 Name: James A. Collins Signature: /James A. Collins/

BRINKS HOFER GILSON &LIONE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Appln. of:	Raymond Scott Ling et al.		
Appln. No.:	12/132,487	Examiner:	James A. Kramer
Filed:	June 3, 2008	Art Unit:	3693
For:	VEHICLE MONITORING SYSTEM	Conf. No.:	7812
Attorney Docket No.:	12654-42		

TRANSMITTAL

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Sir:

Attached is/are:

☒ Information Disclosure Statement (7 pages); Form PTO 1449 (6 pages); Thirteen Copies of Foreign Patent References (A94-A106); and Forty-Eight Copies of Non-Patent Literature References (A107-A154).

Fee calculation:

☒ No additional fee is required.

☐ Small Entity.

☐ An extension fee in an amount of $_____ for a _____-month extension of time under 37 CFR § 1.136(a).

☐ A petition or processing fee in an amount of $_____ under 37 CFR § 1.17(_____).

☐ An additional filing fee has been calculated as shown below:

						Small Entity			Not a Small Entity	
	Claims Remaining After Amendment		Highest No. Previously Paid For	Present Extra		Rate	Add'l Fee	OR	Rate	Add'l Fee
Total		Minus				x $26=			x $52=	
Indep.		Minus				x 110=			x $220=	
First Presentation of Multiple Dep. Claim						+$195=			+ $390=	
						Total	$		Total	$

Fee payment:

☐ Please charge Deposit Account No. 23-1925 in the amount of $_____ for _____.

☐ Payment by credit card in the amount of $_____ (Form PTO-2038 is attached).

☒ The Director is hereby authorized to charge payment of any additional filing fees required under 37 CFR § 1.16 and any patent application processing fees under 37 CFR § 1.17 associated with this paper (including any extension fee required to ensure that this paper is timely filed), or to credit any overpayment, to Deposit Account No. 23-1925.

Respectfully submitted,

March 26, 2010
Date

/James A. Collins/
James A. Collins (Reg. No. 43,557)

I hereby certify that this correspondence is being Electronically Transmitted on the date noted below to:
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450
March 26, 2010
Date of Deposit
James A. Collins
Name of applicant, assignee or Registered Representative
/James A. Collins/
Signature
March 26, 2010
Date of Signature

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Appln. of:	Raymond Scott Ling et al.		
Appln. No.:	12/132,487	Examiner:	James A. Kramer
Filed:	June 3, 2008	Art Unit:	3693
For:	VEHICLE MONITORING SYSTEM	Confirmation No.:	7812
Attorney Docket No:	12654-42		

INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

In accordance with the duty of disclosure under 37 CFR §1.56 and §§1.97-1.98, and more particularly in accordance with 37 CFR §1.97(b), Applicants cite the references listed in the accompanying PTO Form 1449. The references were previously cited by the Examiner or by Applicants in connection with the parent applications 10/764,076; 09/571,650; 09/135,034; and 08/592,958. Although the listed references need not be resubmitted in the present continuing application, according to MPEP 609.02(A)(2), Applicants desire this information to be printed on any patent that may issue from this application. Accordingly, it is respectfully requested that this Information Disclosure Statement be entered and the references be considered by the Examiner and made of record.

U.S. PATENT DOCUMENTS		
DOCUMENT NO.	**DATE**	**NAME**
US 3,504,337	03/31/1970	Ekman
US 4,067,061	01/03/1978	Juhasz
US 4,234,926	11/18/1980	Wallace et al.
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Applicants are enclosing Form PTO-1449 (six sheets), along with a copy of each listed reference for which a copy is required under 37 CFR §1.98(a)(2). Pursuant to the undersigned attorney's obligation and duties under 37 CFR §§ 1.56 and 1.98(a)(3) and (c), either English language abstracts, partial translations, or full translations are included for patent documents which are not in English for the express purpose of providing a concise explanation of the references to the Patent and Trademark Office with the opportunity to evaluate the same. Applicants respectfully request the Examiner's consideration of the above reference(s) and entry thereof into the record of this application.

By submitting this Statement, Applicants are attempting to fully comply with the duty of candor and good faith mandated by 37 CFR §1.56. As such, this Statement is not intended to constitute an admission that any of the enclosed references, or other information referred to therein, constitutes "prior art" or is otherwise "material to patentability," as that phrase is defined in 37 CFR §1.56(a).

The Applicants have calculated no fee to be due in connection with the filing of this Information Disclosure Statement. However, the Director is authorized to charge any fee deficiency associated with the filing of this Information Disclosure Statement to a deposit account, as authorized in the Transmittal accompanying this Information Disclosure Statement.

Respectfully submitted,

March 26, 2010
Date

/James A. Collins/
James A. Collins
(Reg. No. 43,557)

CERTIFICATE OF EFS FILING UNDER 37 CFR §1.8

I hereby certify that this correspondence is being electronically transmitted to the United States Patent and Trademark Office, Commissioner for Patents, via the EFS pursuant to 37 CFR §1.8 on the below date:

Date: September 3, 2008 Name: James A. Collins Signature: /James A. Collins/

BRINKS HOFER GILSON &LIONE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Appln. of:	William Curtis Everett et al.	
Appln. No.:	12/132,487	
Filed:	June 3, 2008	
For:	VEHICLE MONITORING SYSTEM	Conf. No.: 7812
Docket No:	12654/42	

TRANSMITTAL

Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Sir:

Attached is/are:

☒ Transmittal; Power of Attorney; Statement Under 37 CFR 3.73(b); and Assignment.

Fee calculation:

☒ No additional fee is required.

☐ Small Entity.

☐ An extension fee in an amount of $_____ for a _____-month extension of time under 37 CFR § 1.136(a).

☐ A surcharge in the amount of $ under 37 CFR § 1.16(F).

☐ An additional filing fee has been calculated as shown below:

						Small Entity			Not a Small Entity	
	Claims Remaining After Amendment		Highest No. Previously Paid For	Present Extra		Rate	Add'l Fee	OR	Rate	Add'l Fee
Total		Minus				x $25=			x $50=	
Indep.		Minus				x 105=			x $210=	
First Presentation of Multiple Dep. Claim						+$185=			+ $370=	
						Total	$		Total	

Fee payment:

☐ Please charge Deposit Account No. 23-1925 in the amount of _____ .

☐ Payment by credit card in the amount of $_____ (Form PTO-2038 is attached).

☒ The Director is hereby authorized to charge payment of any additional filing fees required under 37 CFR § 1.16 and any patent application processing fees under 37 CFR § 1.17 associated with this paper (including any extension fee required to ensure that this paper is timely filed), or to credit any overpayment, to Deposit Account No. 23-1925.

Respectfully submitted,

September 3, 2008
Date

/James A. Collins/
James A. Collins (Reg. No. 43,557)

Attorney Docket No.: 12654/42

Inventors: Raymond Scott Ling, Richard Ashton Hutchinson, Wilbert John Steigerwald III, William Andrew Say, Patrick Lawrence O'Malley, Dane Allen Shrallow, and William Curtis Everett

Title of Appln.: VEHICLE MONITORING SYSTEM

POWER OF ATTORNEY BY ASSIGNEE AND CORRESPONDENCE ADDRESS INDICATION

The specification of the above-identified patent application:

☐ is attached hereto.

☒ was filed on June 3, 2008 as U.S. application No. 12/132,487

As required by 37 CFR 3.73(b)(1), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

Progressive Casualty Insurance Company, a corporation organized and existing under the laws of the State of Ohio, ("ASSIGNEE") certifies that it is the assignee of the entire right, title and interest in the patent application identified above by virtue of either:

☐ An assignment from the inventor(s) of the patent application identified above, a copy of which was recorded in the Patent and Trademark Office at Reel , frame , or a copy thereof is attached which is being recorded concurrently herewith pursuant to 37 CFR 3.11; OR

☐ A chain of title from the inventor(s) of the patent application identified above, to the current assignee as shown below:

1. From to .
   The document was recorded in the Patent and Trademark Office at Reel , Frame , or a copy thereof is attached.
2. From to .
   The document was recorded in the Patent and Trademark Office at Reel , Frame , or a copy of which is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet.

ASSIGNEE hereby revokes all previously granted powers of attorney in the above identified patent application and appoints the Practitioners associated with the following Customer Number as its attorneys, with full power of substitution and revocation, to prosecute this application and any continuations, divisions, reissues, and reexaminations thereof, to receive the patent(s), to transact all business in the United States Patent and Trademark Office connected therewith, and to act on ASSIGNEE'S behalf before the competent International Authorities in connection with any and all international applications filed by ASSIGNEE:

Customer No. 00757 - Brinks Hofer Gilson Lione

Please recognize or change the correspondence address for this application to the address associated with the above-mentioned Customer Number. Please direct all telephonic and facsimile communications to:

James A. Collins - Reg. No. 43,557
Tel.: (312) 321-4200; Fax: (312) 321-4299

The undersigned hereby authorizes the Practitioners associated with the above Customer Number to accept and follow instructions from James A. Collins as to any action to be taken in the Patent and Trademark Office regarding this application without direct communication between the Practitioners and the undersigned. In the event of a change in the persons from whom instructions may be taken, the Practitioners will be so notified by the undersigned.

The undersigned (whose title is supplied below) is empowered to act on behalf of ASSIGNEE.

I hereby declare that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true; and further, that these statements are made with the knowledge that willful false statements, and the like so made, are punishable by fine or imprisonment, or both, under 18 U.S.C. §1001, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Signature Dane A. Shrallow Date: June 4, 2008
Name: Dane A. Shrallow
Title: Associate General Counsel

PTO/SB/96 (01-08)
Approved for use through 07/31/2008. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Raymond Scott Ling

Application No./Patent No.: 12/132,487 Filed/Issue Date: June 3, 2008

Entitled: VEHICLE MONITORING SYSTEM

Progressive Casualty Insurance Company, a corporation
(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. ☑ the assignee of the entire right, title, and interest; or

2. ☐ an assignee of less than the entire right, title and interest
(The extent (by percentage) of its ownership interest is_____ %)

in the patent application/patent identified above by virtue of either:

A. ☑ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 021360, Frame 0881, or for which a copy thereof is attached.

OR

B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

2. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

3. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet.

☐ As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (*i.e.*, a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/James A. Collins/	September 3, 2008
Signature	Date
James A. Collins	(312) 321-4200
Printed or Typed Name	Telephone Number
Attorney for Applicant	
Title	

Case No. 12654/42

ASSIGNMENT

WHEREAS, **RAYMOND SCOTT LING, RICHARD ASHTON HUTCHINSON, WILBERT JOHN STEIGERWALD III, WILLIAM ANDREW SAY, PATRICK LAWRENCE O'MALLEY, DANE ALLEN SHRALLOW,** and **WILLIAM CURTIS EVERETT** hereinafter called the "Assignors", have made the invention described in the United States patent application entitled **VEHICLE MONITORING SYSTEM**, executed by the Assignor on the same date as, or on a date prior to, this Assignment;

WHEREAS, Progressive Casualty Insurance Company, a corporation organized and existing under the laws of the State of Ohio, having a place of business at 6300 Wilson Mills Road, N72, Mayfield Village, OH 44143, hereinafter called the "Assignee", desires to acquire the entire right, title and interest in and to the invention and the patent application identified above, and all patents which may be obtained for said invention, as set forth below;

NOW, THEREFORE, in consideration of the sum of One Dollar ($1.00), and other valuable and legally sufficient consideration, the receipt of which by the Assignors from the Assignee is hereby acknowledged, the Assignors have sold, assigned and transferred, and by these presents do sell, assign and transfer to the Assignee, the entire right, title and interest for the United States in and to the invention and the patent application identified above, and any patents that may issue for said invention in the United States; together with the entire right, title and interest in and to said invention and all patent applications and patents therefor in all countries foreign to the United States, including the full right to claim for any such application all benefits and priority rights under any applicable convention; together with the entire right, title and interest in and to all continuations, divisions, renewals and extensions of any of the patent applications and patents defined above; together with the right to recover all damages, including, but not limited to, a reasonable royalty, by reason of past, present, or future infringement or any other violation of patent or patent application rights; to have and to hold for the sole and exclusive use and benefit of the Assignee, its successors and assigns, to the full end of the term or terms for all such patents.

The Assignors hereby covenant and agree, for both the Assignors and the Assignors' legal representatives, that the Assignors will assist the Assignee in the prosecution of the patent

My Commission Expires:

DATED: 6/9/08 William Andrew Say
William Andrew Say

STATE OF OHIO)
) ss.
COUNTY OF CUYAHOGA)

I, Raymond Ling, a Notary Public in and for the County and State aforesaid, do hereby certify that William Say, personally known to me to be the same person whose name is subscribed to the foregoing instrument, appeared before me this day in person and acknowledged that (s)he signed, sealed and delivered the said instrument as his/her free and voluntary act for the uses and purposes therein set forth.

IN WITNESS WHEREOF, I have hereunto set my hand and Notarial Seal, this 9th day of June, 2008.

Notary Public
RAYMOND S. LING, Attorney
NOTARY PUBLIC - STATE OF OHIO
My commission has no expiration date,
Section 147.03 R.C.

My Commission Expires:

DATED: June 4, 2008
Patrick Lawrence O'Malley

STATE OF OHIO)
) ss.
COUNTY OF CUYAHOGA)

I, Raymond Ling, a Notary Public in and for the County and State aforesaid, do hereby certify that Patrick O'Malley, personally known to me to be the same person whose name is subscribed to the foregoing instrument, appeared before me this day in person and acknowledged that (s)he signed, sealed and delivered the said instrument as his/her free and voluntary act for the uses and purposes therein set forth.

IN WITNESS WHEREOF, I have hereunto set my hand and Notarial Seal, this 4th day of June, 2008.

Notary Public
RAYMOND S. LING, Attorney
NOTARY PUBLIC - STATE OF OHIO
My commission has no expiration date,
Section 147.03 R.C.

application identified above; in the making and prosecution of any other patent applications that the Assignee may elect to make covering the invention identified above; in vesting in the Assignee like exclusive title in and to all such other patent applications and patents; and in the prosecution of any interference which may arise involving said invention, or any such patent application or patent; and that the Assignors will execute and deliver to the Assignee any and all additional papers which may be requested by the Assignee to carry out the terms of this Assignment.

The Commissioner of Patents and Trademarks is hereby authorized and requested to issue patents to the Assignee in accordance with the terms of this Assignment.

IN TESTIMONY WHEREOF, the Assignors have executed this agreement.

DATED: 6/5/08

William Curtis Everett

STATE OF OHIO)
) ss.
COUNTY OF CUYAHOGA)

I, Raymond Ling, a Notary Public in and for the County and State aforesaid, do hereby certify that William Everett personally known to me to be the same person whose name is subscribed to the foregoing instrument, appeared before me this day in person and acknowledged that (s)he signed, sealed and delivered the said instrument as his/her free and voluntary act for the uses and purposes therein set forth.

IN WITNESS WHEREOF, I have hereunto set my hand and Notarial Seal, this 5th day of June, 2008.

Notary Public
RAYMOND S. LING, Attorney
NOTARY PUBLIC - STATE OF OHIO
My commission has no expiration date
Section 147.03 R.C.

My Commission Expires:

DATED: 06/05/08

Richard Ashton Hutchinson

STATE OF OHIO)
) ss.
COUNTY OF CUYAHOGA)

I, Raymond Ling, a Notary Public in and for the County and State aforesaid, do hereby certify that Richard Hutchinson, personally known to me to be the same person whose name is subscribed to the foregoing instrument, appeared before me this day in person and acknowledged that (s)he signed, sealed and delivered the said instrument as his/her free and voluntary act for the uses and purposes therein set forth.

IN WITNESS WHEREOF, I have hereunto set my hand and Notarial Seal, this 5th day of June, 2008.

Notary Public
RAYMOND S. LING, Attorney
NOTARY PUBLIC - STATE OF OHIO
My commission has no expiration date,
Section 147.03 R.C.

My Commission Expires:

DATED: JUNE 9, 2008

Wilbert John Steigerwald III

STATE OF OHIO)
) ss.
COUNTY OF CUYAHOGA)

I, Raymond Ling, a Notary Public in and for the County and State aforesaid, do hereby certify that Wilbert Steigerwald, personally known to me to be the same person whose name is subscribed to the foregoing instrument, appeared before me this day in person and acknowledged that (s)he signed, sealed and delivered the said instrument as his/her free and voluntary act for the uses and purposes therein set forth.

IN WITNESS WHEREOF, I have hereunto set my hand and Notarial Seal, this 9th day of June, 2008.

Notary Public
RAYMOND S. LING, Attorney
NOTARY PUBLIC - STATE OF OHIO
My commission has no expiration date,
Section 147.03 R.C.

My Commission Expires:

DATED: June 10, 2008 Dane A. Shrallow

Dane Allen Shrallow

STATE OF Ohio)
) ss.
COUNTY OF Cuyahoga)

I, Maryann Hespen a Notary Public in and for the County and State aforesaid, do hereby certify that Dane Shrallow personally known to me to be the same person whose name is subscribed to the foregoing instrument, appeared before me this day in person and acknowledged that (s)he signed, sealed and delivered the said instrument as his/her free and voluntary act for the uses and purposes therein set forth.

IN WITNESS WHEREOF, I have hereunto set my hand and Notarial Seal, this 4th day of June, 2008.

NOTARY PUBLIC STATE OF OHIO
MARYANN C. HESPEN
Notary Public - State of Ohio
Recorded in Lake County
My Commission Expires
April 8, 2011

Maryann C. Hespen
Notary Public

My Commission Expires:

DATED: June 10, 2008 Raymond Scott Ling

Raymond Scott Ling

STATE OF Ohio)
) ss.
COUNTY OF Cuyahoga)

I, Maryann Hespen a Notary Public in and for the County and State aforesaid, do hereby certify that Raymond Ling personally known to me to be the same person whose name is subscribed to the foregoing instrument, appeared before me this day in person and acknowledged that (s)he signed, sealed and delivered the said instrument as his/her free and voluntary act for the uses and purposes therein set forth.

IN WITNESS WHEREOF, I have hereunto set my hand and Notarial Seal, this 10th day of June, 2008.

Maryann C. Hespen
Notary Public

My Commission Expires:

NOTARY PUBLIC STATE OF OHIO
MARYANN C. HESPEN
Notary Public - State of Ohio
Recorded in Lake County
My Commission Expires
April 8, 2011

Electronic Acknowledgement Receipt

EFS ID:	3881390
Application Number:	12132487
International Application Number:	
Confirmation Number:	7812
Title of Invention:	VEHICLE MONITORING SYSTEM
First Named Inventor/Applicant Name:	Raymond Scott Ling
Customer Number:	00757
Filer:	James A. Collins/Olivia Lopez
Filer Authorized By:	James A. Collins
Attorney Docket Number:	12654/42
Receipt Date:	03-SEP-2008
Filing Date:	03-JUN-2008
Time Stamp:	16:45:52
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Miscellaneous Incoming Letter	transforpoa.PDF	39191 6cdc887dec9462b63b2f473bb9de0c77f1278b77	no	1

Warnings:	
Information:	

2	Power of Attorney	poa373.PDF	392256 468ab6f2640027de5792d56b9190de2d3d3af473	no	8

Warnings:	
Information:	
Total Files Size (in bytes):	431447

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
12/132,487	06/03/2008	2628	8760	12654/42	130	13

CONFIRMATION NO. 7812

UPDATED FILING RECEIPT

757
BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, IL 60610

OC000000031542279

Date Mailed: 08/14/2008

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

Raymond Scott Ling, Westlake, OH;
Richard Ashton Hutchinson, Chagrin Falls, OH;
Wilbert John Steigerwald III, Kirtland, OH;
William Andrew Say, Macedonia, OH;
Patrick Lawrence O'Malley, Kirtland, OH;
Dane Allen Shrallow, Solon, OH;
William Curtis Everett, Hudson, OH;

Assignment For Published Patent Application

Progressive Casualty Insurance Company, Mayfield Village, OH

Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a CIP of 10/764,076 01/23/2004
which is a CIP of 09/571,650 05/15/2000 PAT 6,868,386
which is a CIP of 09/135,034 08/17/1998 PAT 6,064,970
which is a CON of 08/592,958 01/29/1996 PAT 5,797,134

Foreign Applications

If Required, Foreign Filing License Granted: 06/13/2008

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/132,487**

Projected Publication Date: Request for Non-Publication Acknowledged

Non-Publication Request: Yes

Early Publication Request: No
Title

VEHICLE MONITORING SYSTEM

Preliminary Class

345

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where

the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/132,487	06/03/2008	Raymond Scott Ling	12654/42

CONFIRMATION NO. 7812

757
BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, IL 60610

IMPROPER CPOA LETTER

Date Mailed: 08/14/2008

NOTICE REGARDING POWER OF ATTORNEY

This is in response to the Power of Attorney filed 08/05/2008. The Power of Attorney in this application is not accepted for the reason(s) listed below:

- The Power of Attorney is from an assignee and the Certificate required by 37 CFR 3.73(b) has not been received.

/thailemariam/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

CERTIFICATE OF EFS FILING UNDER 37 CFR §1.8

I hereby certify that this correspondence is being electronically transmitted to the United States Patent and Trademark Office, Commissioner for Patents, via the EFS pursuant to 37 CFR §1.8 on the below date:

Date: August 5, 2008 Name: James A. Collins Signature: /James A. Collins/

Case No. 12654/42

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

William Curtis Everett et al.

Serial No.: 12/132,487

Filed: June 3, 2008 | Confirm. No.: 7812

For: VEHICLE MONITORING SYSTEM

RESPONSE TO NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION FILED UNDER 37 CFR 1.53(b) FILING DATE GRANTED

Mail Stop Missing Parts
Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In accordance with the Notice to File Missing Parts of Nonprovisional Application Filed Under 37 CFR 1.53(b) Filing Date Granted dated June 3, 2008, enclosed herewith for filing are the following documents for the above-referenced patent application:

- ☒ Fully executed Declaration for Patent Application
- ☒ Fully executed Power of Attorney
- ☐ Fully executed Combined Declaration and Power of Attorney
- ☐ Petition for Ext. of Time (37 C.F.R. § 1.136(a)) to File Missing Parts (if by mail, in dup)
- ☒ Other: Replacement Drawings (1-17, 30-34)

Applicant is: ☐ small entity (per 37 CFR 1.27) ☒ other than small entity

Fees Associated with Payment:

- ☒ Filing Fee: $310
- ☒ Surcharge: $130
- ☒ Addtl. Claim Fees: $7600 for 120 additional claims
- ☒ Search Fee: $510
- ☐ Examination Fee: $210
- ☐ App. Size Fee: $_____ (for each additional 50 sheets that exceeds 100 sheets, including specification and drawings)

Payment Method:

- ☐ Payment by credit card in the amount of $ to cover the fees listed above. Form PTO-2038 is enclosed for this purpose.
- ☒ The Commissioner is hereby authorized to charge $8,760 to cover the fees listed above to Deposit Account No. 23-1925.
- ☒ The Commissioner is hereby authorized to charge any deficiencies in fees or credit overpayment to Deposit Account No. 23-1925.

Respectfully submitted,

Dated: August 5, 2008

/James A. Collins/
James A. Collins, Reg. No. 43,557
Attorney for Applicants

BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, IL 60610
(312) 321-4200

DECLARATION FOR PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled, **VEHICLE MONITORING SYSTEM**, the specification of which:

☐ is attached hereto.

☒ was filed on June 3, 2008 as Application Serial No. 12/132487.

☐ and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the patentability as defined in Title 37, Code of Federal Regulations, § 1.56(a).

I hereby claim foreign priority benefits under 35 U.S.C. § 119(a)-(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate or § 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)			Priority Claimed	
(Number)	(Country)	(Day/Month/Year Filed)	☐ Yes	☐ No

I hereby claim the benefit under 35 U.S.C. § 119(e) of any United States provisional application(s) listed below:

(Application Serial No.)	(Filing Date)

I hereby claim the benefit under 35 U.S.C. § 120 of any United States application(s), or § 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. § 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR § 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application:

(Application Serial No.)	(Filing Date)	(Status-patented, pending, abandoned)
10/764,076	January 23, 2004	pending
09/571,650	May 15, 2000	patented
09/135,034	August 17, 1998	patented
08/592,958	January 29, 1996	patented

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Inventor's Signature		Date: 6/5/08
Full name of first inventor	Raymond Scott Ling	
Residence	Westlake, OH	
Citizenship	USA	
Post Office Address	28205 Edgepark Blvd., Westlake, OH 44145	
Inventor's Signature		Date: 06/05/08
Full name of second inventor	Richard Ashton Hutchinson	
Residence	Chagrin Falls, OH	
Citizenship	USA	
Post Office Address	511 North Main Street, Chagrin Falls, OH 44022	
Inventor's Signature		Date: 6/9/8
Full name of third inventor	Wilbert John Steigerwald III	
Residence	Kirtland, OH	
Citizenship	USA	
Post Office Address	10731 Beechwood Drive, Kirtland, OH 44094-5119	
Inventor's Signature		Date: 6/9/08
Full name of fourth inventor	William Andrew Say	
Residence	Macedonia, OH	
Citizenship	USA	
Post Office Address	1104 Bull Creek Lane, Macedonia, OH 44056	
Inventor's Signature		Date: June 4, 2008
Full name of fifth inventor	Patrick Lawrence O'Malley	
Residence	Kirtland, OH	
Citizenship	USA	
Post Office Address	7123 Giuliano Drive, Kirtland, OH 44094	
Inventor's Signature		Date: June 4, 2008
Full name of sixth inventor	Dane Allen Shrallow	
Residence	Solon, OH	
Citizenship	USA	
Post Office Address	32680 Shadowbrook Drive, Solon, OH 44139	
Inventor's Signature		Date: June 5, 2008
Full name of seventh inventor	William Curtis Everett	
Residence	Hudson, OH	
Citizenship	USA	
Post Office Address	1573 Waynesboro Drive, Hudson, OH 44236	

Customer No. 00757
BRINKS HOFER GILSON & LIONE
P.O. Box 10395
Chicago, IL 60610
(312) 321-4200

Attorney Docket No.: 12654/42

Inventors: Raymond Scott Ling, Richard Ashton Hutchinson, Wilbert John Steigerwald III, William Andrew Say, Patrick Lawrence O'Malley, Dane Allen Shrallow, and William Curtis Everett

Title of Appln.: VEHICLE MONITORING SYSTEM

POWER OF ATTORNEY BY ASSIGNEE AND CORRESPONDENCE ADDRESS INDICATION

The specification of the above-identified patent application:

☐ is attached hereto.

☒ was filed on June 3, 2008 as U.S. application No. 12/132,487

As required by 37 CFR 3.73(b)(1), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

Progressive Casualty Insurance Company , a corporation organized and existing under the laws of the State of Ohio, ("ASSIGNEE") certifies that it is the assignee of the entire right, title and interest in the patent application identified above by virtue of either:

☐ An assignment from the inventor(s) of the patent application identified above, a copy of which was recorded in the Patent and Trademark Office at Reel , frame , or a copy thereof is attached which is being recorded concurrently herewith pursuant to 37 CFR 3.11; OR

☐ A chain of title from the inventor(s) of the patent application identified above, to the current assignee as shown below:

1. From to .
   The document was recorded in the Patent and Trademark Office at Reel , Frame , or a copy thereof is attached.
2. From to .
   The document was recorded in the Patent and Trademark Office at Reel , Frame , or a copy of which is attached.

   ☐ Additional documents in the chain of title are listed on a supplemental sheet.

ASSIGNEE hereby revokes all previously granted powers of attorney in the above identified patent application and appoints the Practitioners associated with the following Customer Number as its attorneys, with full power of substitution and revocation, to prosecute this application and any continuations, divisions, reissues, and reexaminations thereof, to receive the patent(s), to transact all business in the United States Patent and Trademark Office connected therewith, and to act on ASSIGNEE'S behalf before the competent International Authorities in connection with any and all international applications filed by ASSIGNEE:

Customer No. 00757 - Brinks Hofer Gilson Lione

Please recognize or change the correspondence address for this application to the address associated with the above-mentioned Customer Number. Please direct all telephonic and facsimile communications to:

James A. Collins - Reg. No. 43,557
Tel.: (312) 321-4200; Fax: (312) 321-4299

The undersigned hereby authorizes the Practitioners associated with the above Customer Number to accept and follow instructions from James A. Collins as to any action to be taken in the Patent and Trademark Office regarding this application without direct communication between the Practitioners and the undersigned. In the event of a change in the persons from whom instructions may be taken, the Practitioners will be so notified by the undersigned.

The undersigned (whose title is supplied below) is empowered to act on behalf of ASSIGNEE.

I hereby declare that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true; and further, that these statements are made with the knowledge that willful false statements, and the like so made, are punishable by fine or imprisonment, or both, under 18 U.S.C. §1001, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Signature Dane A. Shrallow Date: June 4, 2008
Name: Dane A. Shrallow
Title: Associate General Counsel

CERTIFICATE OF EFS FILING UNDER 37 CFR §1.8

I hereby certify that this correspondence is being electronically transmitted to the United States Patent and Trademark Office, Commissioner for Patents, via the EFS pursuant to 37 CFR §1.8 on the below date:

Date: August 5, 2008 Name: James A. Collins Signature: /James A. Collins/

Case No. 12654/42

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

William Curtis Everett et al.

Serial No: 12/132,487

Filed: June 3, 2008 Conf. No.: 7812

For: VEHICLE MONITORING SYSTEM

SUBMISSION OF FORMAL DRAWINGS

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

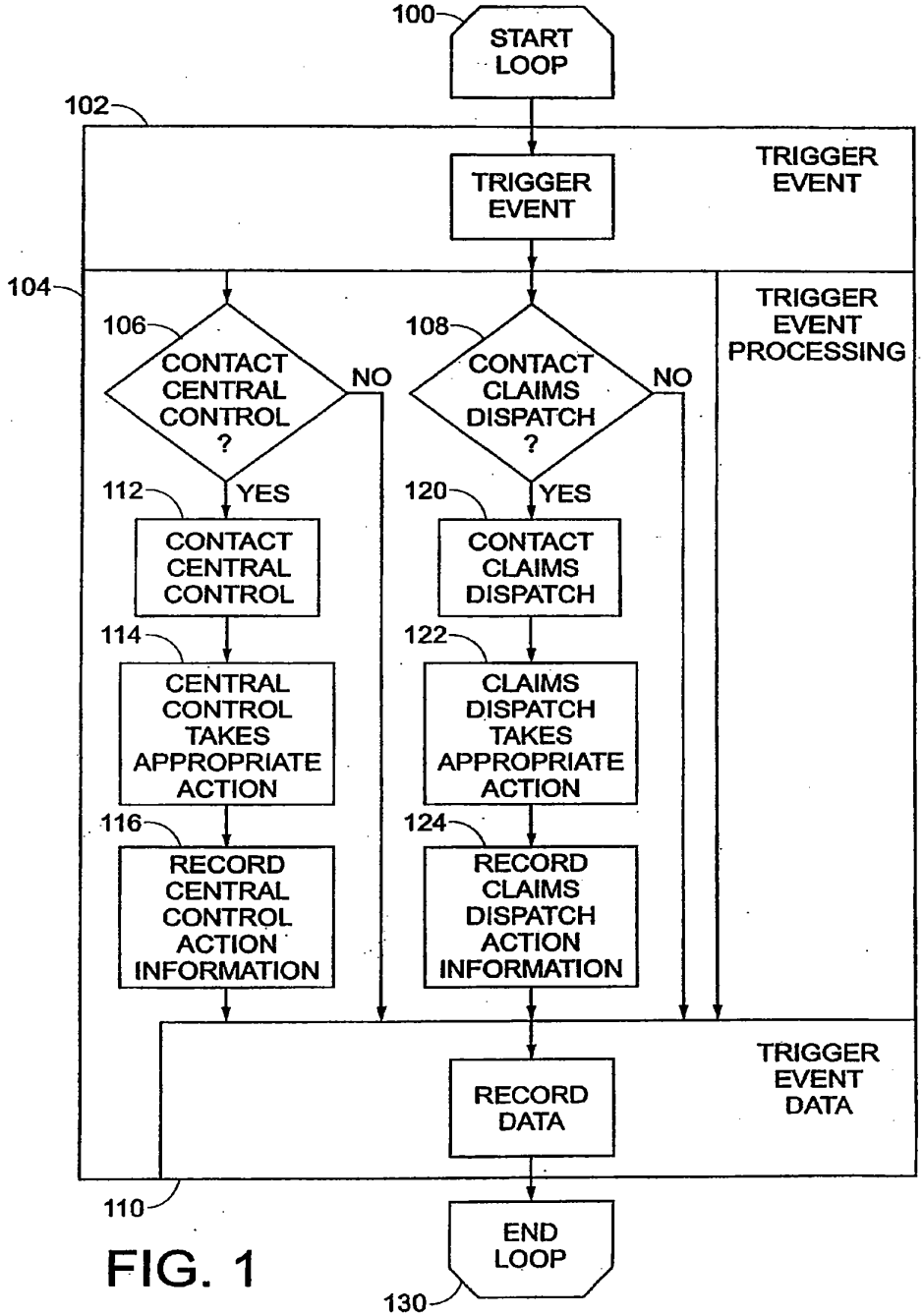
In response to the Notice to File Missing Parts dated June 16, 2008, Applicants have enclosed 23 sheets of formal drawings (Figures 1-17 and 30-34 A & B). The original Figure 34 has been changed to Figure 34 A and Figure 34 B.

Respectfully submitted,

Dated: August 5, 2008

/James A. Collins/
James A. Collins, Reg. No. 43,557
Attorney for Applicants

BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, IL 60610
(312) 321-4200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TRIGGER EVENT
104
TRIGGER EVENT PROCESSING
106
CONTACT CENTRAL CONTROL ?
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YES
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CONTACT CLAIMS DISPATCH ?
NO
YES
112
CONTACT CENTRAL CONTROL
114
CENTRAL CONTROL TAKES APPROPRIATE ACTION
116
RECORD CENTRAL CONTROL ACTION INFORMATION
120
CONTACT CLAIMS DISPATCH
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CLAIMS DISPATCH TAKES APPROPRIATE ACTION
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RECORD DATA
110
END LOOP
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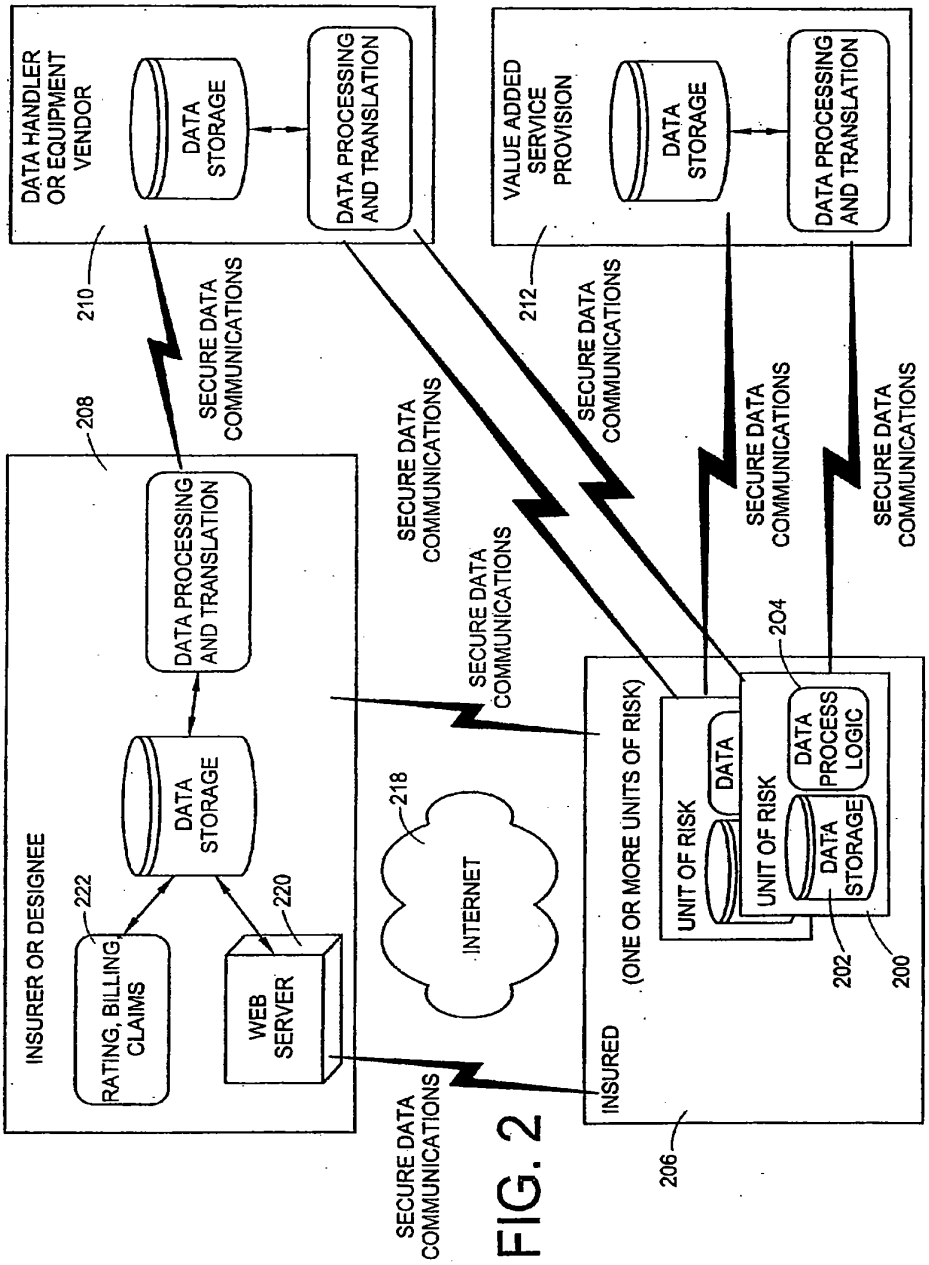
FIG. 1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DATA STORAGE
DATA PROCESSING AND TRANSLATION
210
VALUE ADDED SERVICE PROVISION
DATA STORAGE
DATA PROCESSING AND TRANSLATION
212
SECURE DATA COMMUNICATIONS
SECURE DATA COMMUNICATIONS
SECURE DATA COMMUNICATIONS
SECURE DATA COMMUNICATIONS
208
INSURER OR DESIGNEE
DATA PROCESSING AND TRANSLATION
DATA STORAGE
222
RATING, BILLING CLAIMS
220
WEB SERVER
218
INTERNET
SECURE DATA COMMUNICATIONS
204
(ONE OR MORE UNITS OF RISK)
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DATA
UNIT OF RISK
DATA PROCESS LOGIC
DATA STORAGE
202
200
INSURED
206

FIG. 2

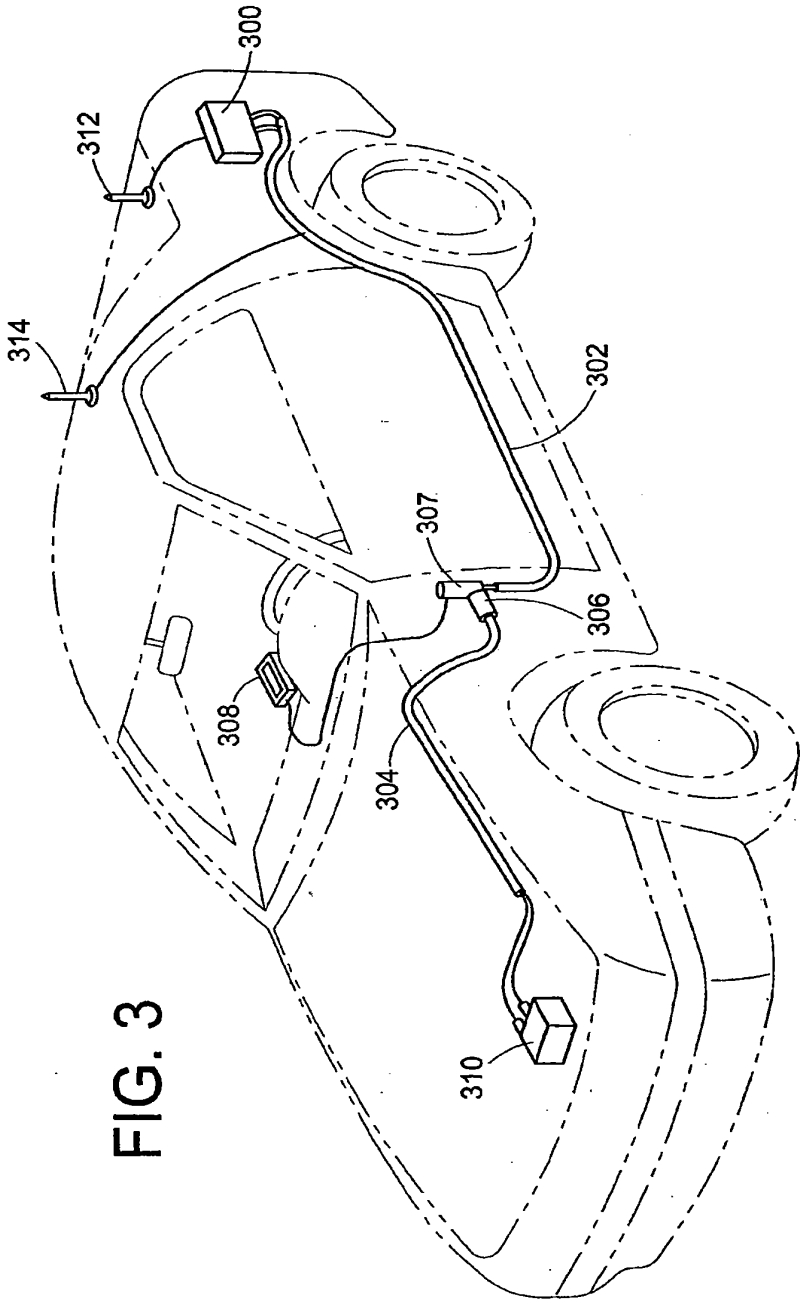


FIG. 3

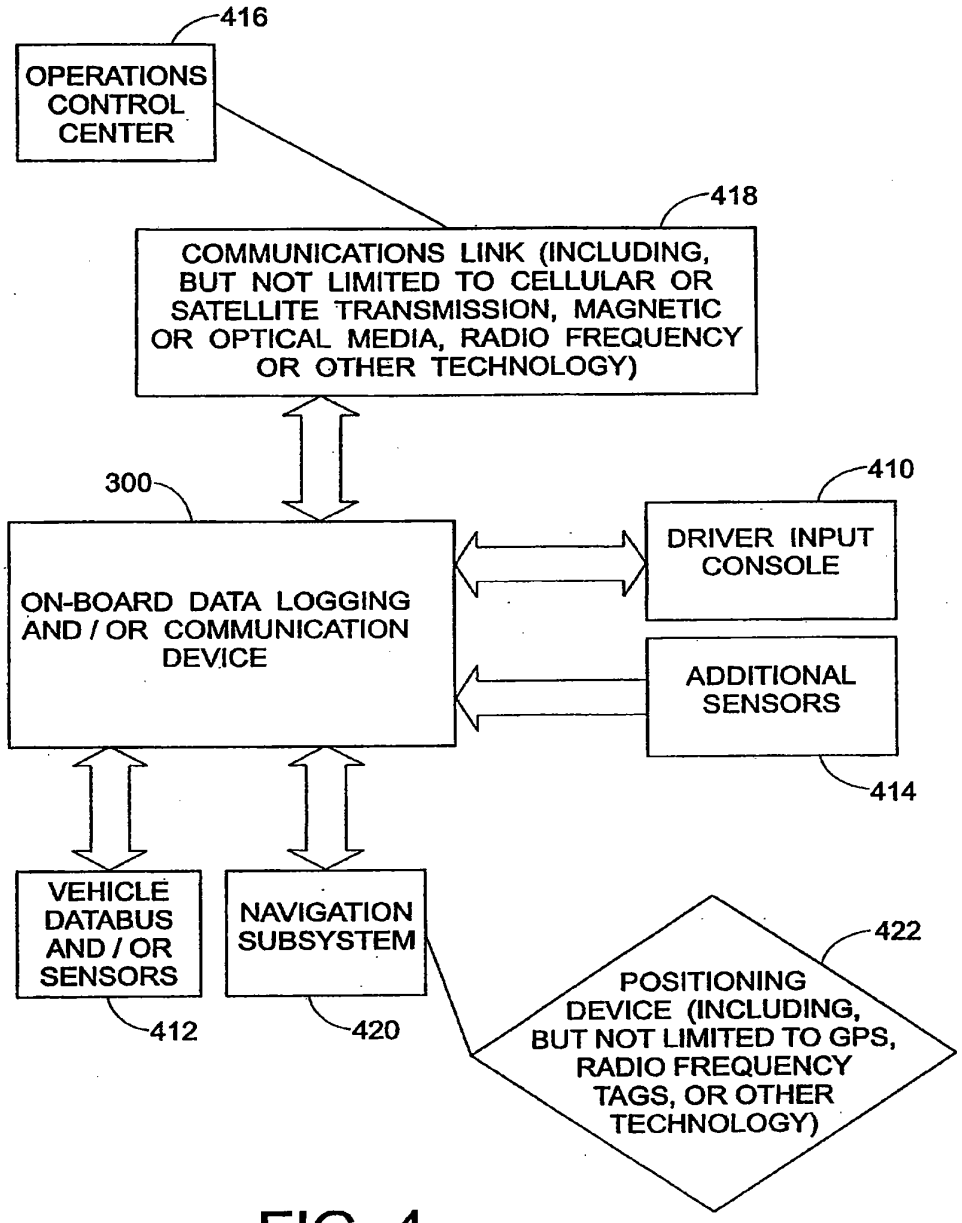
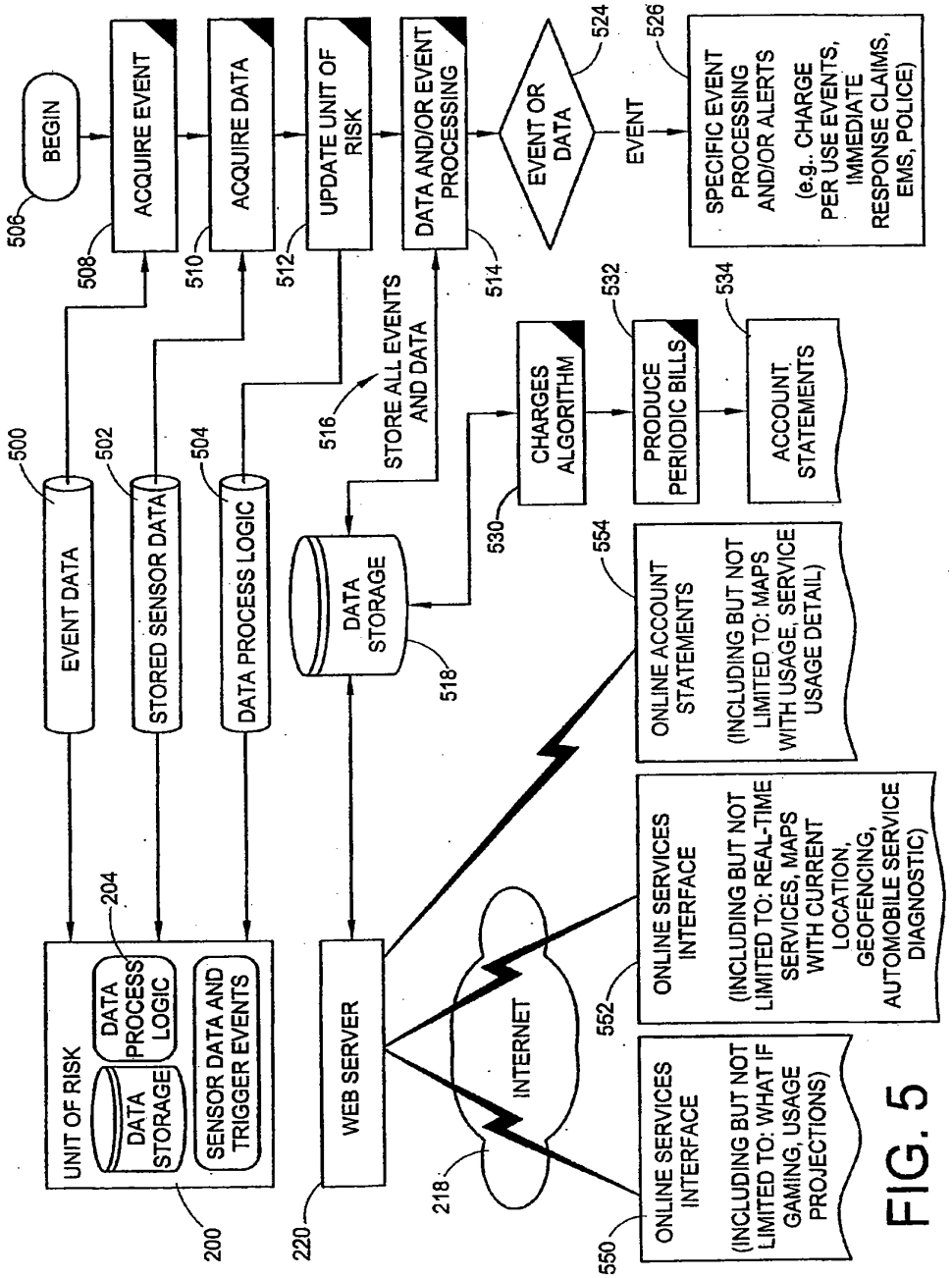

416
OPERATIONS CONTROL CENTER
418
COMMUNICATIONS LINK (INCLUDING, BUT NOT LIMITED TO CELLULAR OR SATELLITE TRANSMISSION, MAGNETIC OR OPTICAL MEDIA, RADIO FREQUENCY OR OTHER TECHNOLOGY)
300
ON-BOARD DATA LOGGING AND / OR COMMUNICATION DEVICE
410
DRIVER INPUT CONSOLE
ADDITIONAL SENSORS
414
VEHICLE DATABUS AND / OR SENSORS
412
NAVIGATION SUBSYSTEM
420
422
POSITIONING DEVICE (INCLUDING, BUT NOT LIMITED TO GPS, RADIO FREQUENCY TAGS, OR OTHER TECHNOLOGY)

FIG. 4


BEGIN
506
ACQUIRE EVENT
508
ACQUIRE DATA
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UPDATE UNIT OF RISK
512
DATA AND/OR EVENT PROCESSING
514
EVENT OR DATA
524
EVENT
526
SPECIFIC EVENT PROCESSING AND/OR ALERTS
(e.g., CHARGE PER USE EVENTS, IMMEDIATE RESPONSE CLAIMS, EMS, POLICE)
EVENT DATA
500
STORED SENSOR DATA
502
DATA PROCESS LOGIC
504
STORE ALL EVENTS AND DATA
516
DATA STORAGE
518
CHARGES ALGORITHM
530
PRODUCE PERIODIC BILLS
532
ACCOUNT STATEMENTS
534
ONLINE ACCOUNT STATEMENTS
554
(INCLUDING BUT NOT LIMITED TO: MAPS WITH USAGE, SERVICE USAGE DETAIL)
UNIT OF RISK
DATA PROCESS LOGIC
204
DATA STORAGE
SENSOR DATA AND TRIGGER EVENTS
200
WEB SERVER
220
INTERNET
218
ONLINE SERVICES INTERFACE
552
(INCLUDING BUT NOT LIMITED TO: REAL-TIME SERVICES, MAPS WITH CURRENT LOCATION, GEOFENCING, AUTOMOBILE SERVICE DIAGNOSTIC)
ONLINE SERVICES INTERFACE
550
(INCLUDING BUT NOT LIMITED TO: WHAT IF GAMING, USAGE PROJECTIONS)

FIG. 5

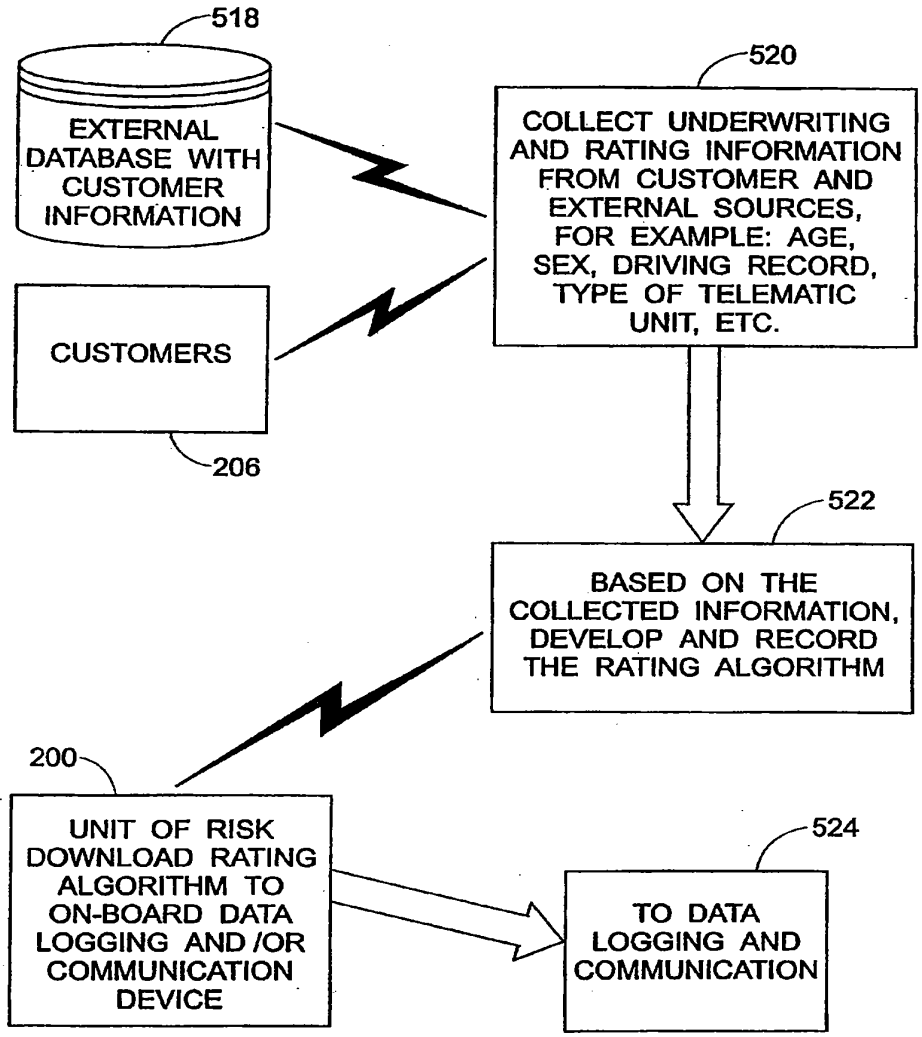
518
EXTERNAL DATABASE WITH CUSTOMER INFORMATION
520
COLLECT UNDERWRITING AND RATING INFORMATION FROM CUSTOMER AND EXTERNAL SOURCES, FOR EXAMPLE: AGE, SEX, DRIVING RECORD, TYPE OF TELEMATIC UNIT, ETC.
CUSTOMERS
206
522
BASED ON THE COLLECTED INFORMATION, DEVELOP AND RECORD THE RATING ALGORITHM
200
UNIT OF RISK DOWNLOAD RATING ALGORITHM TO ON-BOARD DATA LOGGING AND /OR COMMUNICATION DEVICE
524
TO DATA LOGGING AND COMMUNICATION

FIG. 6

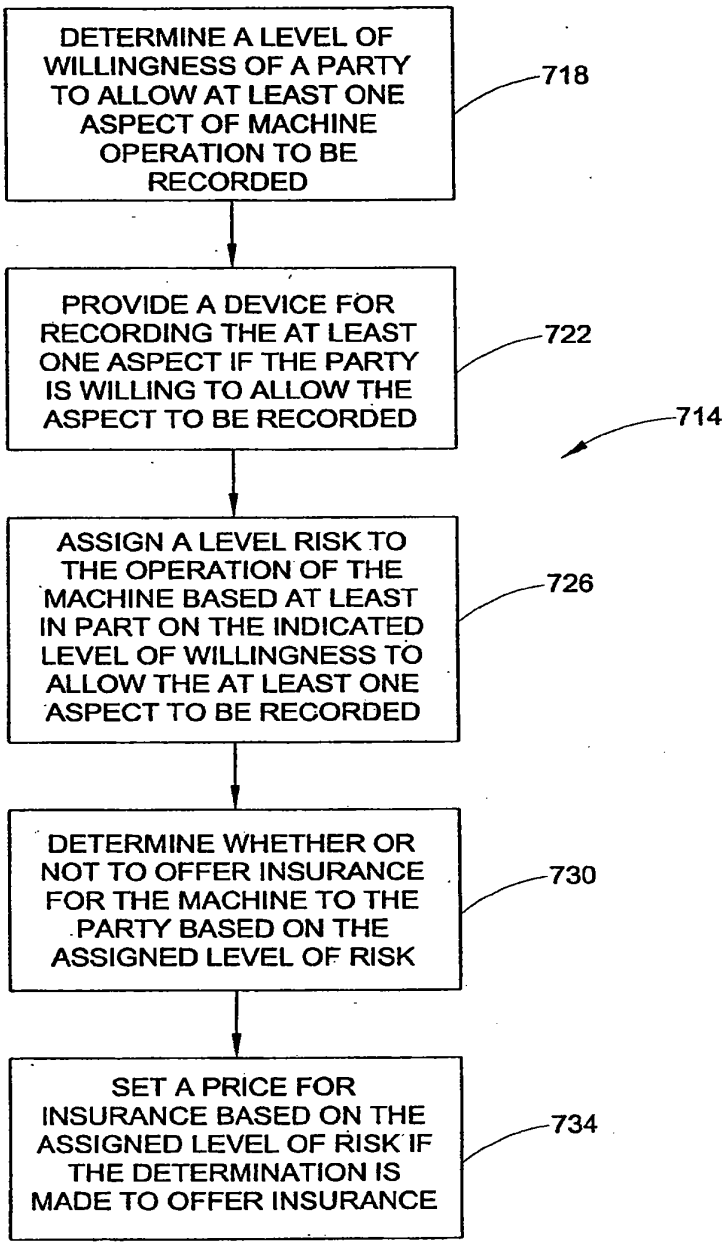
DETERMINE A LEVEL OF WILLINGNESS OF A PARTY TO ALLOW AT LEAST ONE ASPECT OF MACHINE OPERATION TO BE RECORDED
718
PROVIDE A DEVICE FOR RECORDING THE AT LEAST ONE ASPECT IF THE PARTY IS WILLING TO ALLOW THE ASPECT TO BE RECORDED
722
714
ASSIGN A LEVEL RISK TO THE OPERATION OF THE MACHINE BASED AT LEAST IN PART ON THE INDICATED LEVEL OF WILLINGNESS TO ALLOW THE AT LEAST ONE ASPECT TO BE RECORDED
726
DETERMINE WHETHER OR NOT TO OFFER INSURANCE FOR THE MACHINE TO THE PARTY BASED ON THE ASSIGNED LEVEL OF RISK
730
SET A PRICE FOR INSURANCE BASED ON THE ASSIGNED LEVEL OF RISK IF THE DETERMINATION IS MADE TO OFFER INSURANCE
734

FIG. 7

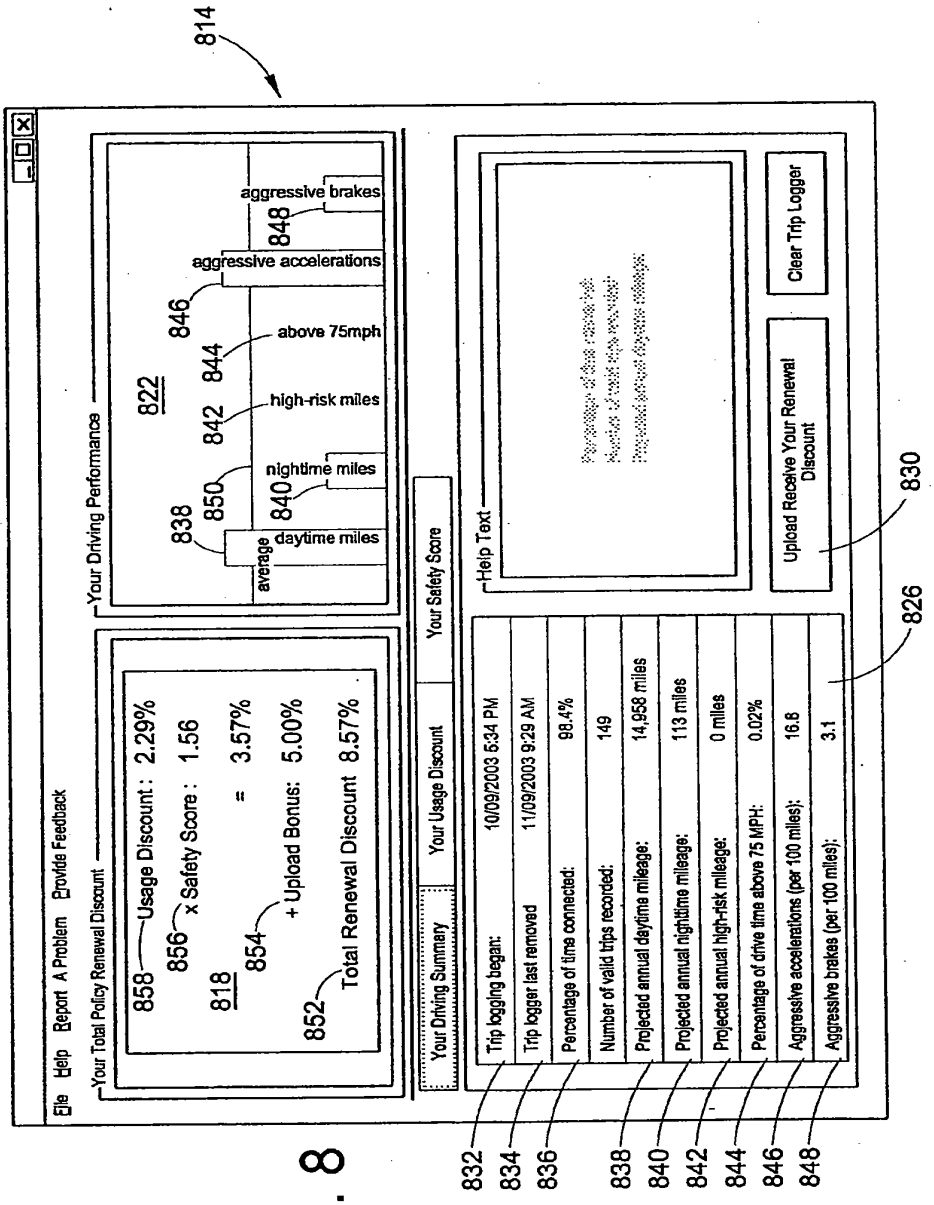
814
File Help Report A Problem Provide Feedback
Your Total Policy Renewal Discount
858 Usage Discount : 2.29%
856 x Safety Score : 1.56
818 = 3.57%
854 + Upload Bonus: 5.00%
852 Total Renewal Discount 8.57%
Your Driving Summary
Your Usage Discount
Your Safety Score
Your Driving Performance
822
838 average daytime miles
850 840 nighttime miles
842 high-risk miles
844 above 75mph
846 aggressive accelerations
848 aggressive brakes
Help Text
Upload Receive Your Renewal Discount
Clear Trip Logger
830
826
832 Trip logging began: 10/09/2003 5:34 PM
834 Trip logger last removed 11/09/2003 9:29 AM
836 Percentage of time connected: 98.4%
Number of valid trips recorded: 149
838 Projected annual daytime mileage: 14,958 miles
840 Projected annual nighttime mileage: 113 miles
842 Projected annual high-risk mileage: 0 miles
844 Percentage of drive time above 75 MPH: 0.02%
846 Aggressive accelerations (per 100 miles): 16.8
848 Aggressive brakes (per 100 miles): 3.1

FIG. 8

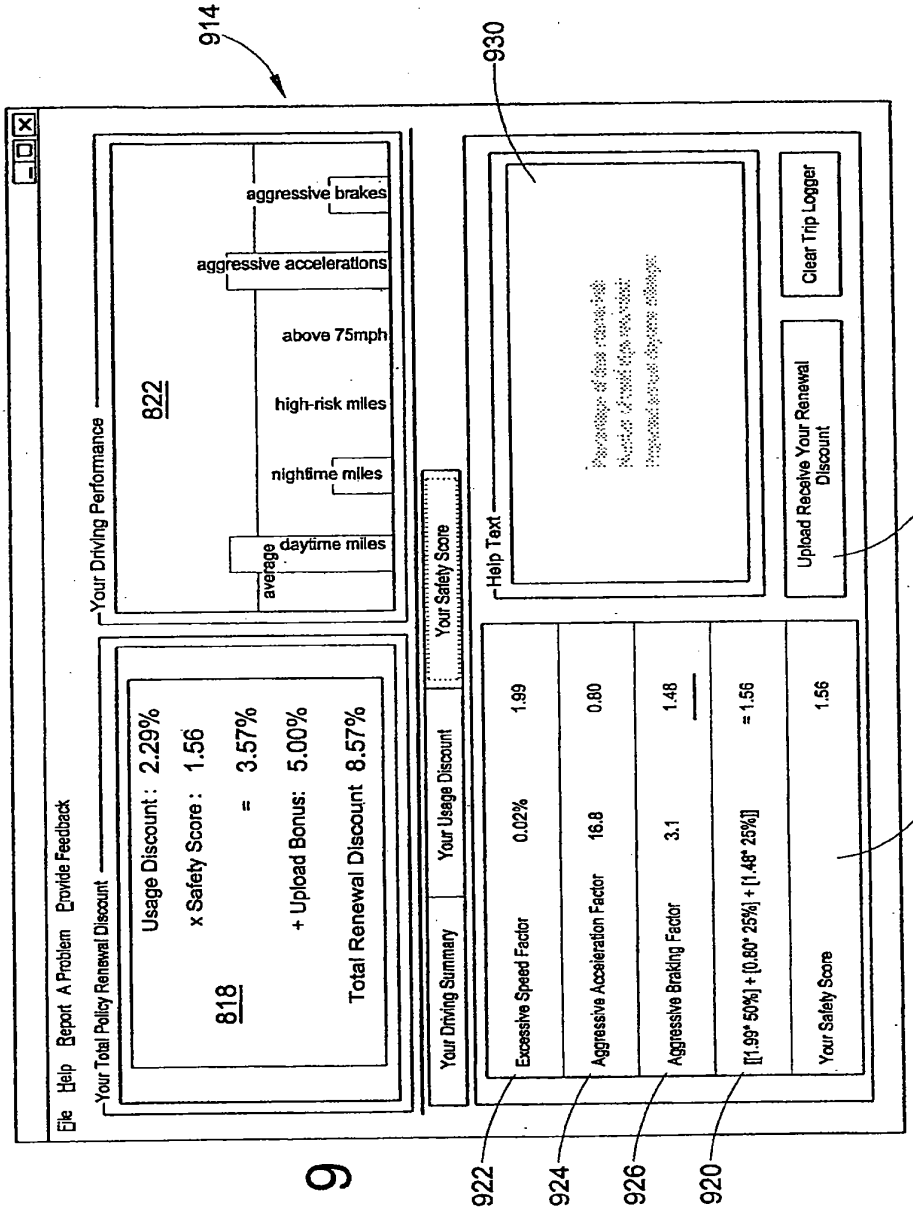
914
930
File Help Report A Problem Provide Feedback
Your Total Policy Renewal Discount
Usage Discount : 2.29%
x Safety Score : 1.56
818
= 3.57%
+ Upload Bonus: 5.00%
Total Renewal Discount 8.57%
Your Driving Performance
822
aggressive brakes
aggressive accelerations
above 75mph
high-risk miles
nighttime miles
daytime miles
average
Your Driving Summary
Your Usage Discount
Your Safety Score
Help Text
Clear Trip Logger
Upload Receive Your Renewal Discount
830
Excessive Speed Factor 0.02% 1.99
Aggressive Acceleration Factor 16.8 0.80
Aggressive Braking Factor 3.1 1.48
[[1.99* 50%] + [0.80* 25%] + [1.48* 25%]] = 1.56
Your Safety Score 1.56
918
922
924
926
920

FIG. 9

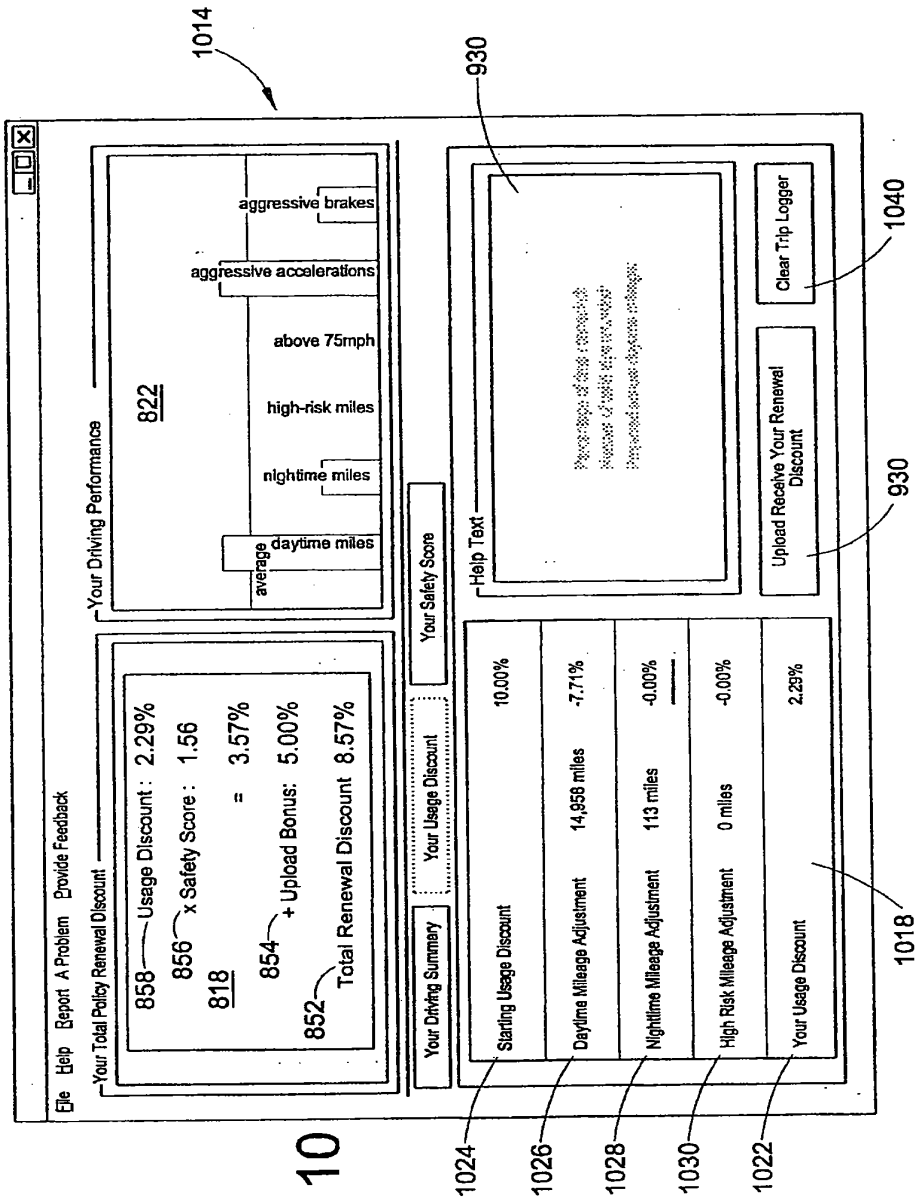
1014
930
File Help Report A Problem Provide Feedback
Your Total Policy Renewal Discount
858 Usage Discount : 2.29%
856 x Safety Score : 1.56
818 = 3.57%
854 + Upload Bonus: 5.00%
852 Total Renewal Discount 8.57%
Your Driving Performance
822
aggressive brakes
aggressive accelerations
above 75mph
high-risk miles
nightime miles
daytime miles
average
Your Driving Summary
Your Usage Discount
Your Safety Score
Help Text
Clear Trip Logger
1040
Upload Receive Your Renewal Discount
930
Starting Usage Discount 10.00%
Daytime Mileage Adjustment 14,958 miles -7.71%
Nightime Mileage Adjustment 113 miles -0.00%
High Risk Mileage Adjustment 0 miles -0.00%
Your Usage Discount 2.29%
1018
1024
1026
1028
1030
1022

FIG. 10

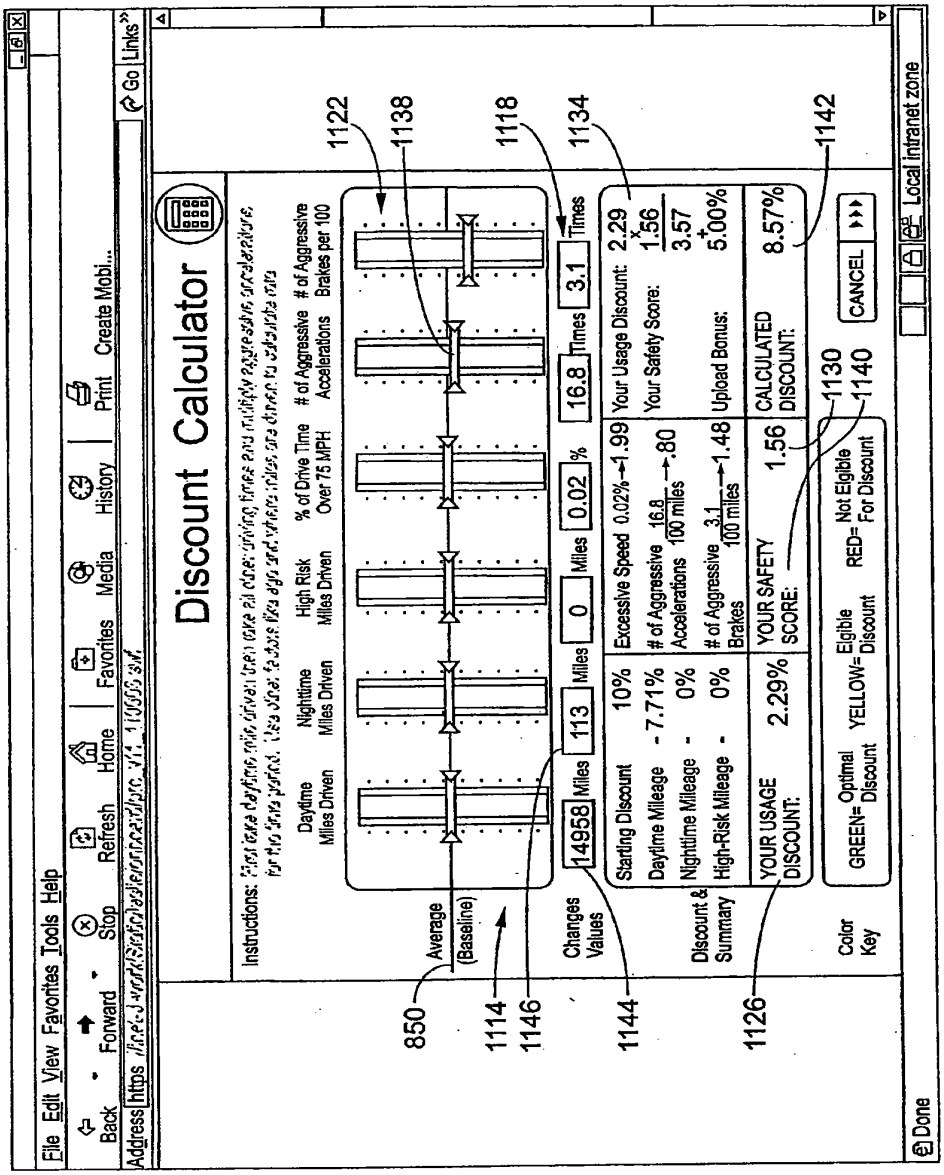
Discount Calculator
Instructions:
Daytime Miles Driven
Nighttime Miles Driven
High Risk Miles Driven
% of Drive Time Over 75 MPH
# of Aggressive Accelerations
# of Aggressive Brakes per 100
Average (Baseline)
Changes Values
Discount & Summary
Color Key
14958 Miles
113 Miles
0 Miles
0.02 %
16.8 Times
3.1 Times
Starting Discount 10%
Daytime Mileage - 7.71%
Nighttime Mileage - 0%
High-Risk Mileage - 0%
YOUR USAGE DISCOUNT: 2.29%
Excessive Speed 0.02% → 1.99
# of Aggressive Accelerations 16.8 / 100 miles → .80
# of Aggressive Brakes 3.1 / 100 miles → 1.48
YOUR SAFETY SCORE: 1.56
GREEN= Optimal Discount
YELLOW= Eligible Discount
RED= Not Eligible For Discount
Your Usage Discount: 2.29 x 1.56
Your Safety Score: 3.57 + 5.00%
Upload Bonus:
CALCULATED DISCOUNT: 8.57%
CANCEL
1122
1138
1118
1134
1142
1130
1140
850
1114
1146
1144
1126
Done
Local intranet zone

FIG. 11

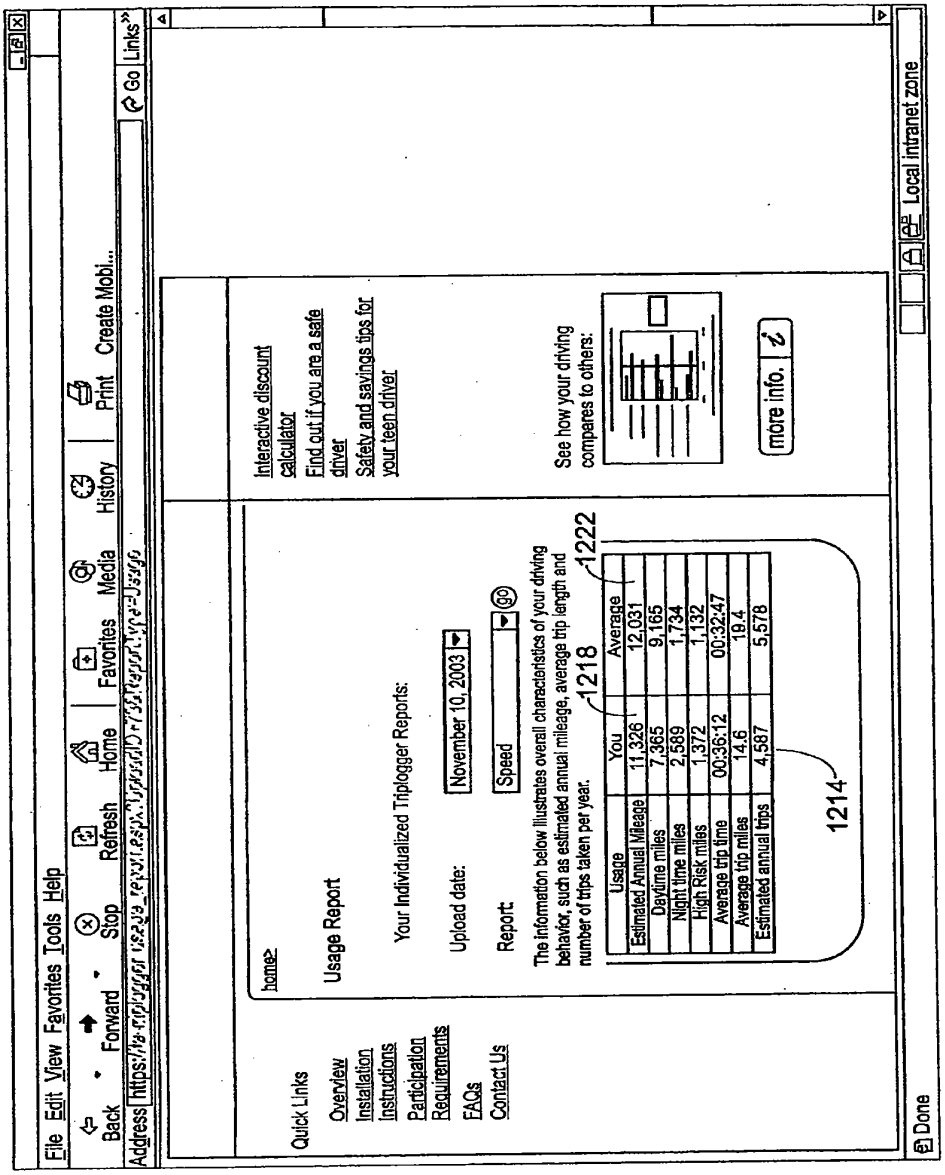
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Favorites Media History Print Create Mobi...
Address
Go Links
Quick Links
Overview
Installation Instructions
Participation Requirements
FAQs
Contact Us
home>
Usage Report
Your Individualized Triplogger Reports:
Upload date:
November 10, 2003
Report:
Speed
go
The information below illustrates overall characteristics of your driving behavior, such as estimated annual mileage, average trip length and number of trips taken per year.
1218
1222
Usage
You
Average
Estimated Annual Mileage
11,326
12,031
Daytime miles
7,365
9,165
Night time miles
2,589
1,734
High Risk miles
1,372
1,132
Average trip time
00:36:12
00:32:47
Average trip miles
14.6
19.4
Estimated annual trips
4,587
5,578
1214
Interactive discount calculator
Find out if you are a safe driver
Safety and savings tips for your teen driver
See how your driving compares to others:
more info.
Done
Local intranet zone

FIG. 12

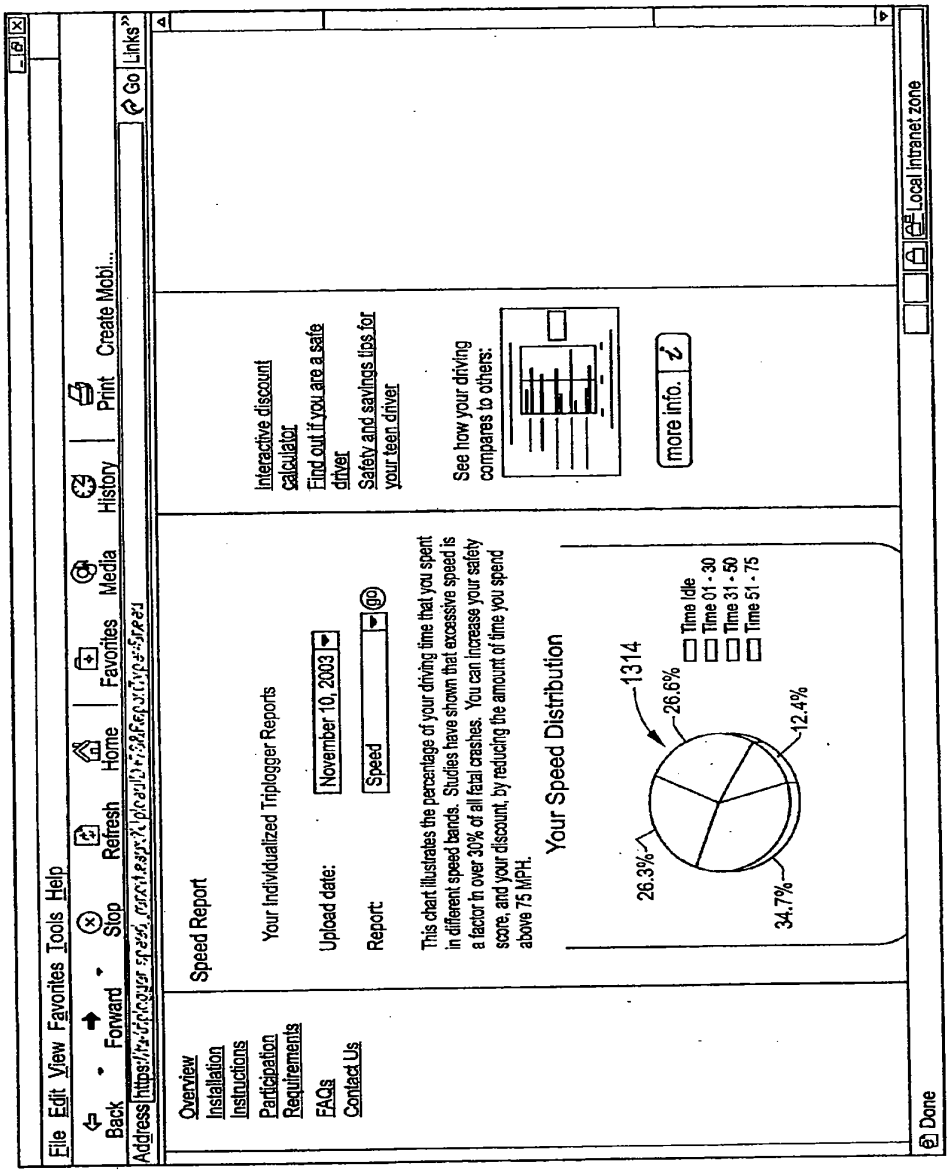
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Favorites Media History Print Create Mobi...
Address
Go Links
Overview
Installation Instructions
Participation Requirements
FAQs
Contact Us
Speed Report
Your Individualized Triplogger Reports
Upload date:
November 10, 2003
Report:
Speed
go
This chart illustrates the percentage of your driving time that you spent in different speed bands. Studies have shown that excessive speed is a factor in over 30% of all fatal crashes. You can increase your safety score, and your discount, by reducing the amount of time you spend above 75 MPH.
Your Speed Distribution
1314
26.6%
12.4%
34.7%
26.3%
Time Idle
Time 01 - 30
Time 31 - 50
Time 51 - 75
Interactive discount calculator
Find out if you are a safe driver
Safety and savings tips for your teen driver
See how your driving compares to others:
more info.
Done
Local intranet zone

FIG. 13

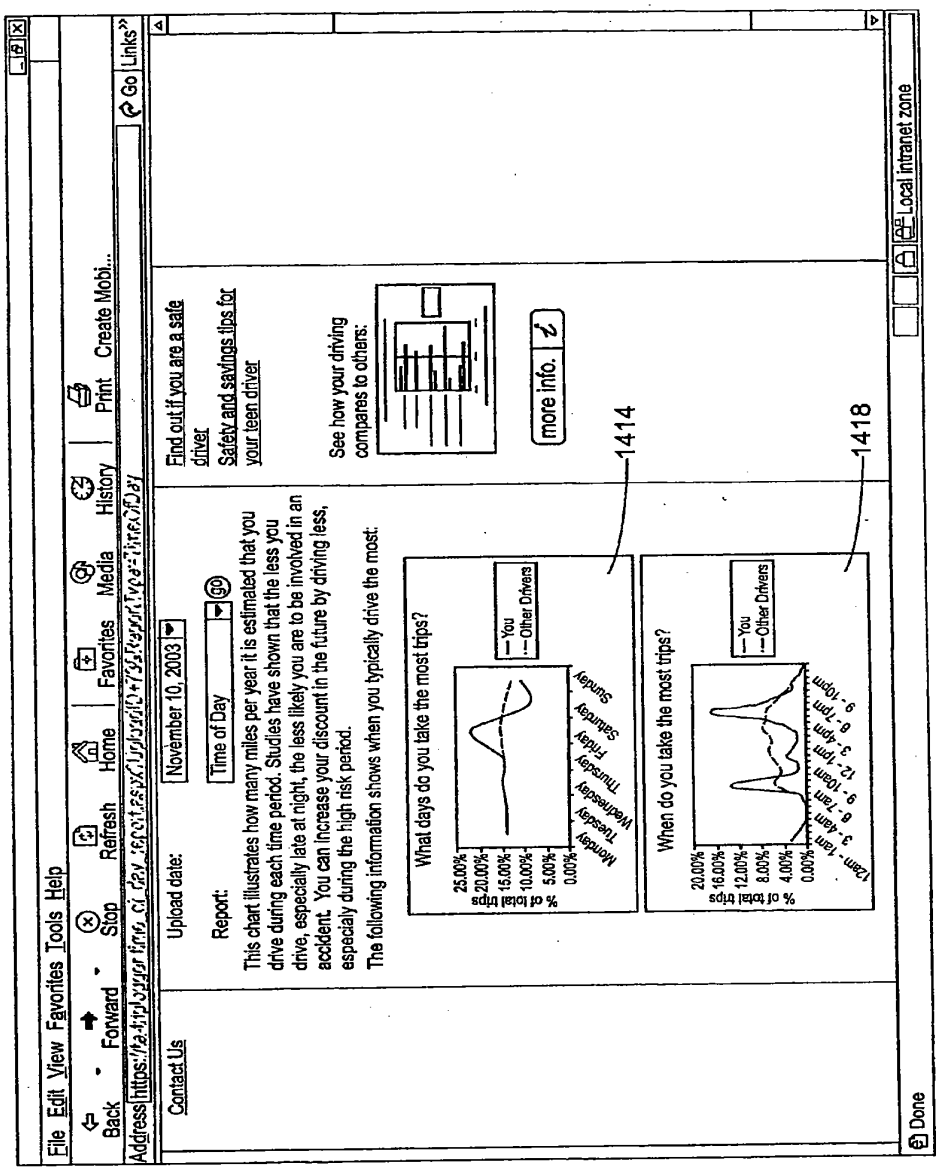
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Favorites Media History Print Create Mobi...
Address
Go Links
Contact Us
Upload date:
November 10, 2003
Report:
Time of Day
go
This chart illustrates how many miles per year it is estimated that you drive during each time period. Studies have shown that the less you drive, especially late at night, the less likely you are to be involved in an accident. You can increase your discount in the future by driving less, especially during the high risk period.
The following information shows when you typically drive the most:
What days do you take the most trips?
% of total trips
25.00%
20.00%
15.00%
10.00%
5.00%
0.00%
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday
Sunday
You
Other Drivers
1414
When do you take the most trips?
% of total trips
20.00%
16.00%
12.00%
8.00%
4.00%
0.00%
12am - 3am
3 - 6am
6 - 9am
9 - 12pm
12 - 3pm
3 - 6pm
6 - 9pm
9 - 12pm
You
Other Drivers
1418
Find out if you are a safe driver
Safety and savings tips for your teen driver
See how your driving compares to others:
more info.
Done
Local intranet zone

FIG. 14

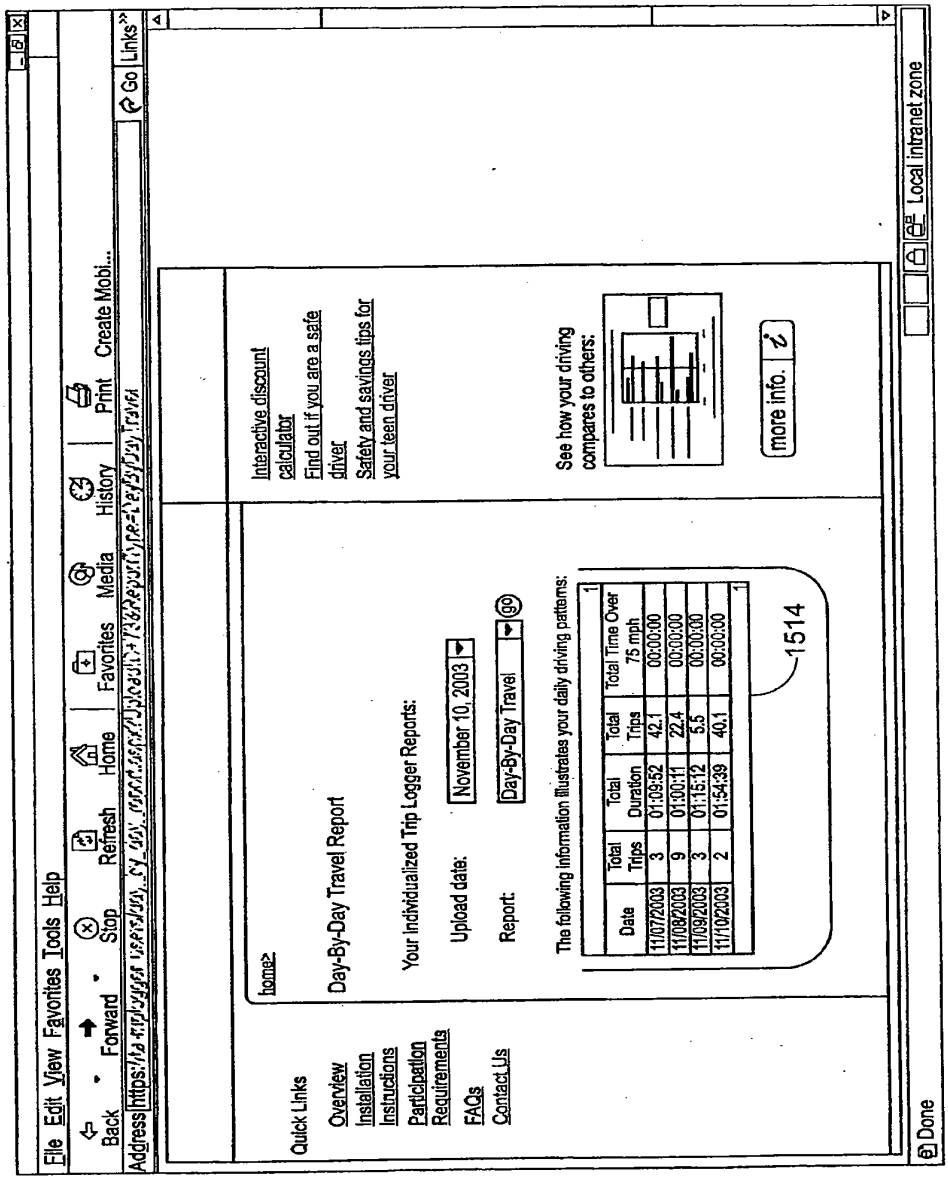
File Edit View Favorites Tools Help
Back
Forward
Stop
Refresh
Home
Favorites
Media
History
Print
Create Mobi...
Go
Links
Address
Quick Links
Overview
Installation Instructions
Participation Requirements
FAQs
Contact Us
home>
Day-By-Day Travel Report
Your individualized Trip Logger Reports:
Upload date:
November 10, 2003
Report:
Day-By-Day Travel
go
The following information illustrates your daily driving patterns:
Date
Total Trips
Total Duration
Total Trips
Total Time Over 75 mph
11/07/2003 3 01:09:52 42.1 00:00:00
11/08/2003 9 01:30:11 22.4 00:00:00
11/09/2003 3 01:15:12 5.5 00:00:30
11/10/2003 2 01:54:39 40.1 00:00:00
1514
Interactive discount calculator
Find out if you are a safe driver
Safety and savings tips for your teen driver
See how your driving compares to others:
more info.
Done
Local intranet zone

FIG. 15

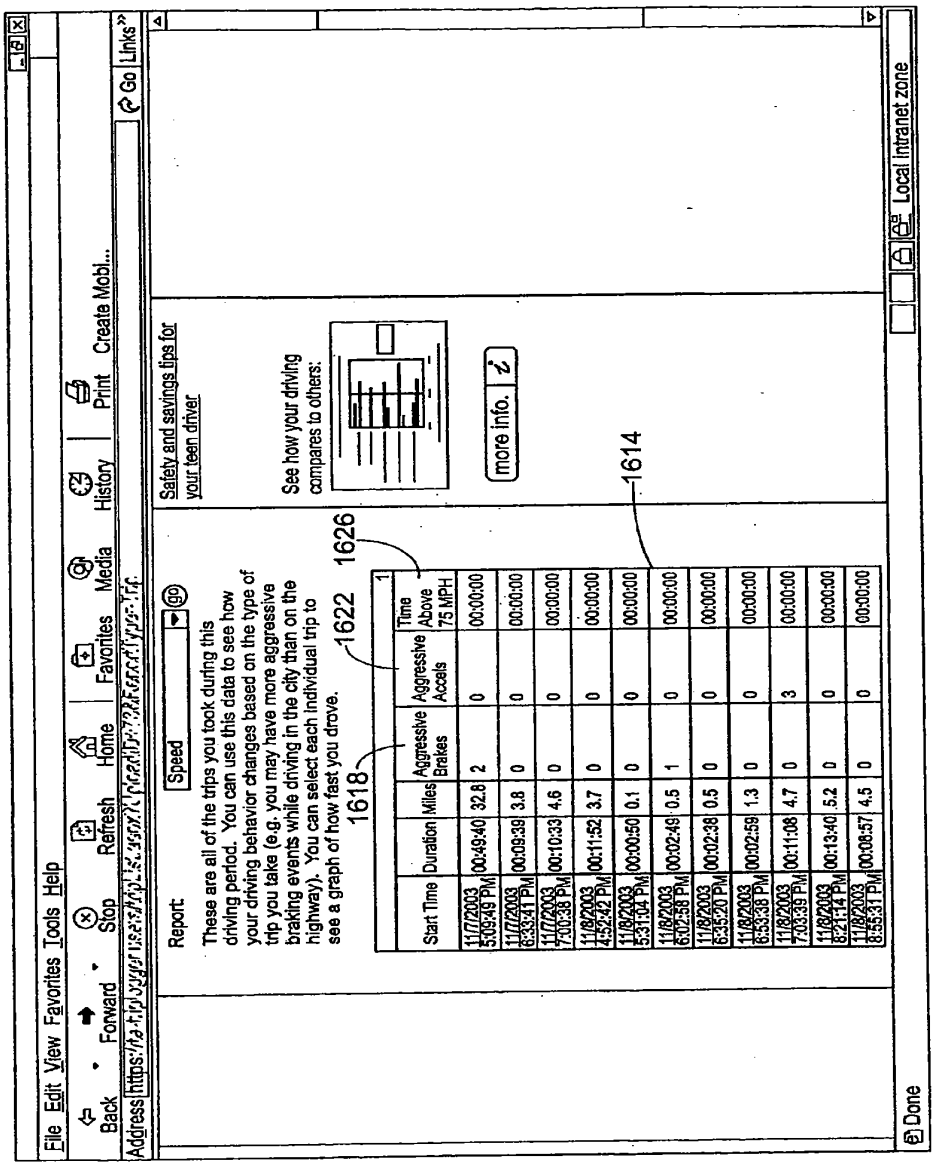
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Favorites Media History Print Create Mobi...
Address
Links
Report:
Speed
go
These are all of the trips you took during this driving period. You can use this data to see how your driving behavior changes based on the type of trip you take (e.g. you may have more aggressive braking events while driving in the city than on the highway). You can select each individual trip to see a graph of how fast you drove.
Safety and savings tips for your teen driver
See how your driving compares to others:
more info.
1618
1622
1626
1614
Start Time
Duration
Miles
Aggressive Brakes
Aggressive Accels
Time Above 75 MPH
11/7/2003 5:09:49 PM 00:49:40 32.8 2 0 00:00:00
11/7/2003 6:33:41 PM 00:09:39 3.8 0 0 00:00:00
11/7/2003 7:30:38 PM 00:10:33 4.6 0 0 00:00:00
11/8/2003 4:52:42 PM 00:11:52 3.7 0 0 00:00:00
11/8/2003 5:31:04 PM 00:00:50 0.1 0 0 00:00:00
11/8/2003 6:02:58 PM 00:02:49 0.5 1 0 00:00:00
11/8/2003 6:35:20 PM 00:02:38 0.5 0 0 00:00:00
11/8/2003 6:53:38 PM 00:02:59 1.3 0 0 00:00:00
11/8/2003 7:03:39 PM 00:11:08 4.7 0 3 00:00:00
11/8/2003 8:21:14 PM 00:13:40 5.2 0 0 00:00:00
11/8/2003 8:55:31 PM 00:08:57 4.5 0 0 00:00:00
Done
Local intranet zone

FIG. 16

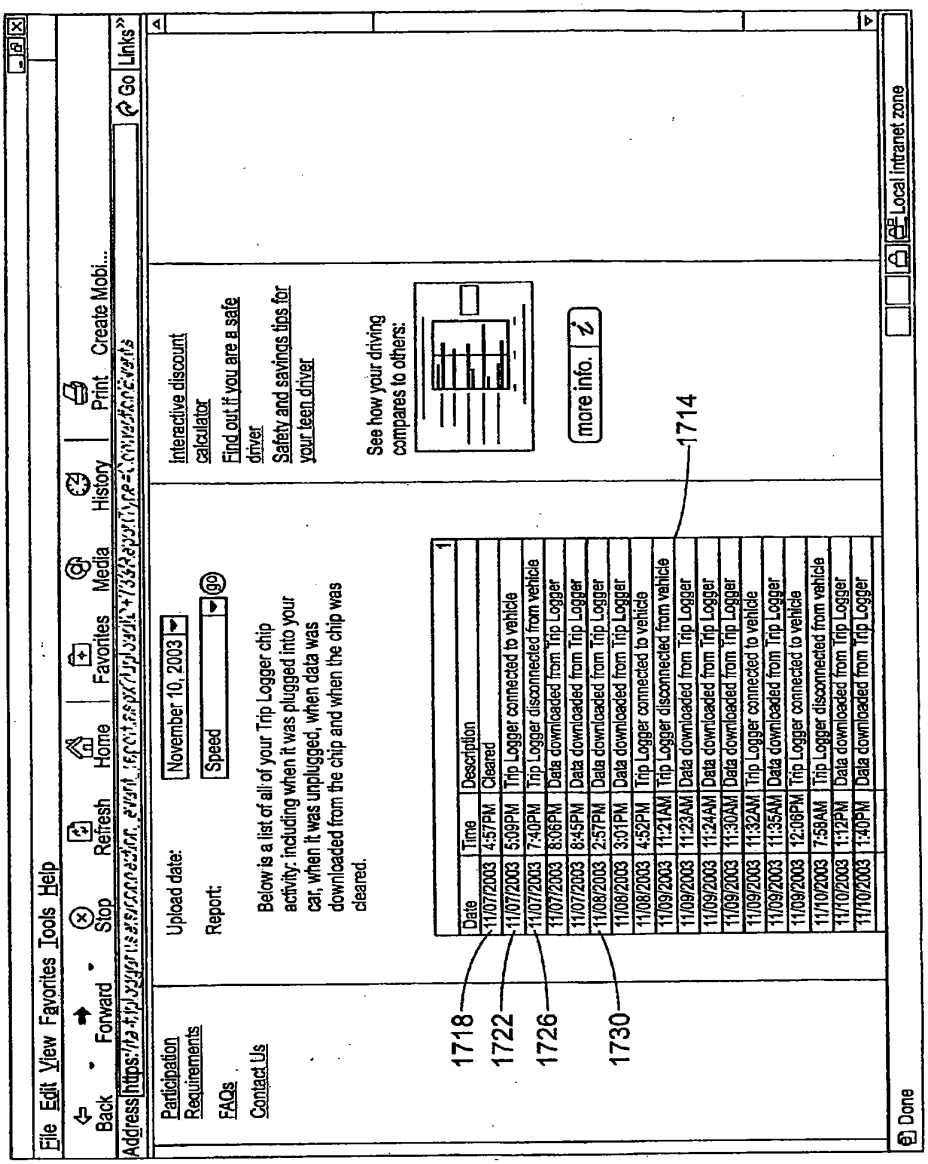
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Favorites Media History Print Create Mobi...
Address
Go Links
Participation Requirements
FAQs
Contact Us
Upload date:
November 10, 2003
Report:
Speed
go
Below is a list of all of your Trip Logger chip activity; including when it was plugged into your car, when it was unplugged, when data was downloaded from the chip and when the chip was cleared.
Interactive discount calculator
Find out if you are a safe driver
Safety and savings tips for your teen driver
See how your driving compares to others:
more info.
1
Date
Time
Description
11/07/2003 4:57PM Cleared
11/07/2003 5:09PM Trip Logger connected to vehicle
11/07/2003 7:40PM Trip Logger disconnected from vehicle
11/07/2003 8:06PM Data downloaded from Trip Logger
11/07/2003 8:45PM Data downloaded from Trip Logger
11/08/2003 2:57PM Data downloaded from Trip Logger
11/08/2003 3:01PM Data downloaded from Trip Logger
11/08/2003 4:52PM Trip Logger connected to vehicle
11/09/2003 11:21AM Trip Logger disconnected from vehicle
11/09/2003 11:23AM Data downloaded from Trip Logger
11/09/2003 11:24AM Data downloaded from Trip Logger
11/09/2003 11:30AM Data downloaded from Trip Logger
11/09/2003 11:32AM Trip Logger connected to vehicle
11/09/2003 11:35AM Data downloaded from Trip Logger
11/09/2003 12:06PM Trip Logger connected to vehicle
11/10/2003 7:58AM Trip Logger disconnected from vehicle
11/10/2003 1:12PM Data downloaded from Trip Logger
11/10/2003 1:40PM Data downloaded from Trip Logger
1714
1718
1722
1726
1730
Done
Local intranet zone

FIG. 17

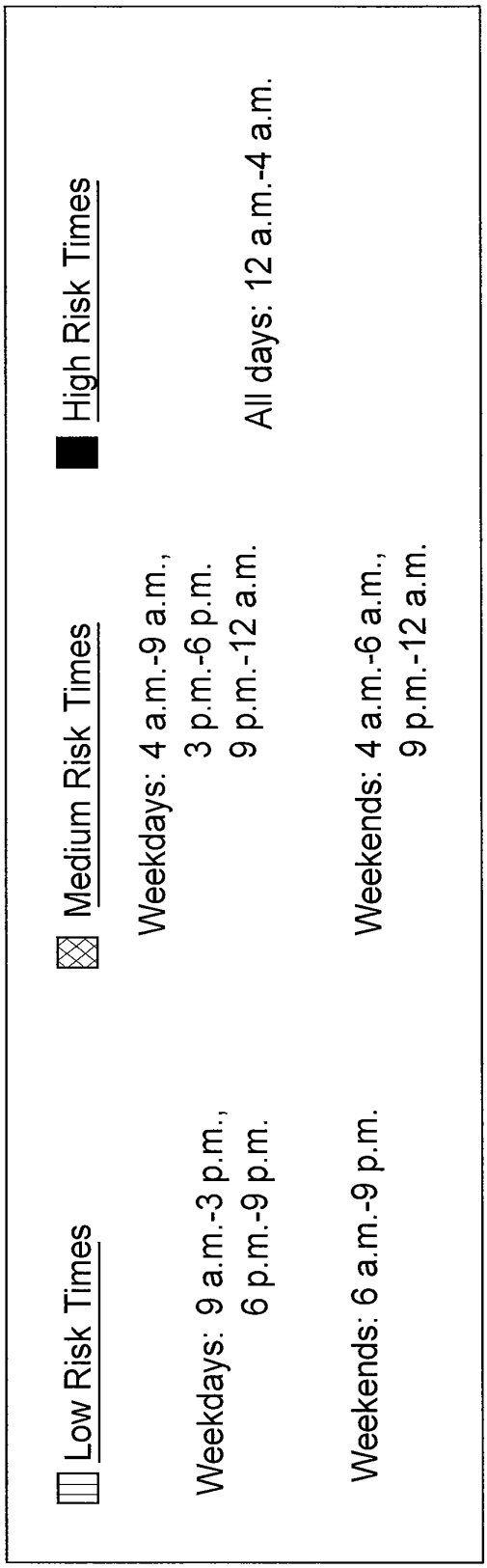
Low Risk Times
Weekdays: 9 a.m.-3 p.m.,
6 p.m.-9 p.m.
Weekends: 6 a.m.-9 p.m.
Medium Risk Times
Weekdays: 4 a.m.-9 a.m.,
3 p.m.-6 p.m.
9 p.m.-12 a.m.
Weekends: 4 a.m.-6 a.m.,
9 p.m.-12 a.m.
High Risk Times
All days: 12 a.m.-4 a.m.

FIG. 30

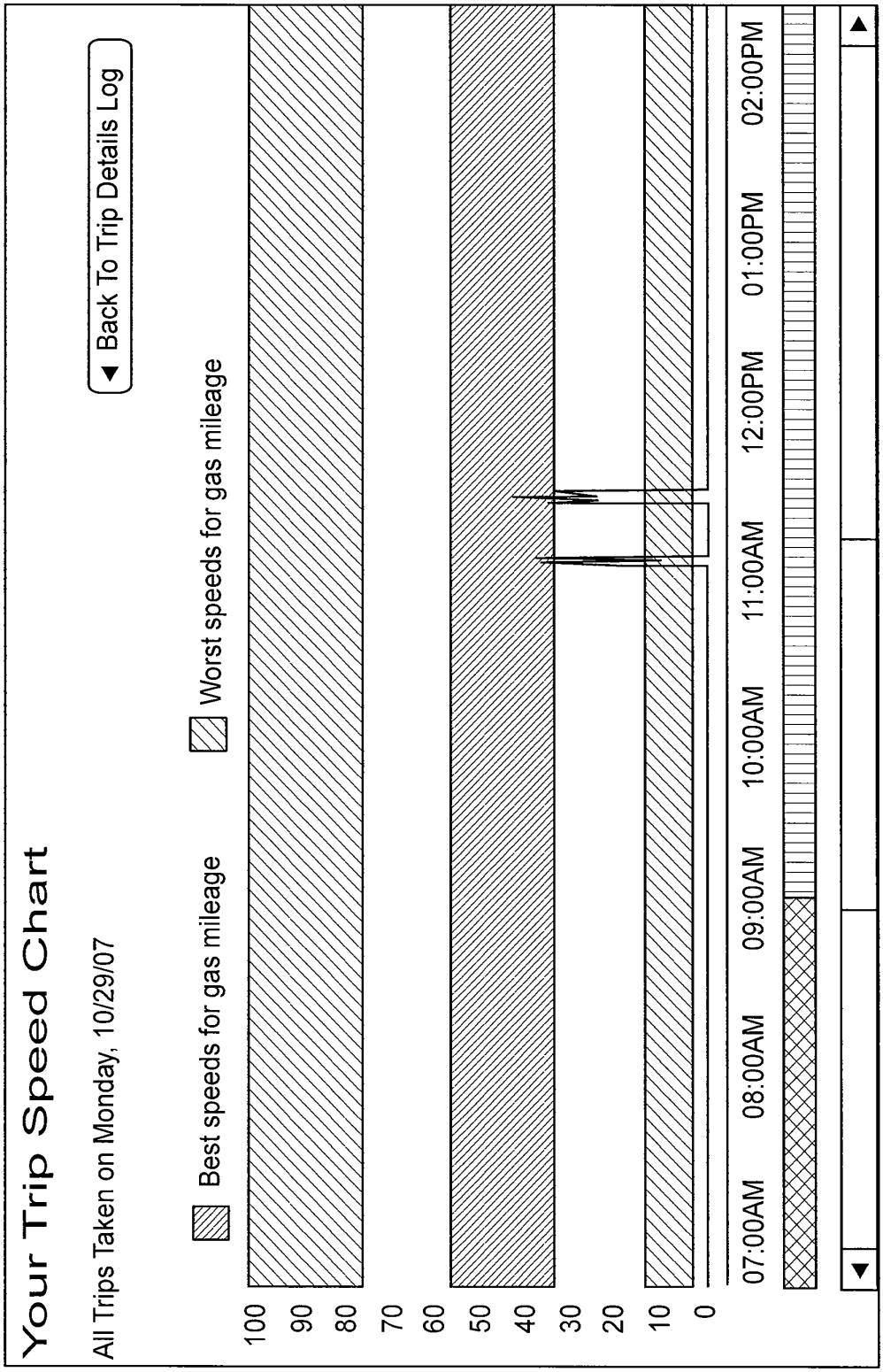
Your Trip Speed Chart
All Trips Taken on Monday, 10/29/07
◄ Back To Trip Details Log
Best speeds for gas mileage
Worst speeds for gas mileage
100
90
80
70
60
50
40
30
20
10
0
07:00AM
08:00AM
09:00AM
10:00AM
11:00AM
12:00PM
01:00PM
02:00PM

FIG. 31

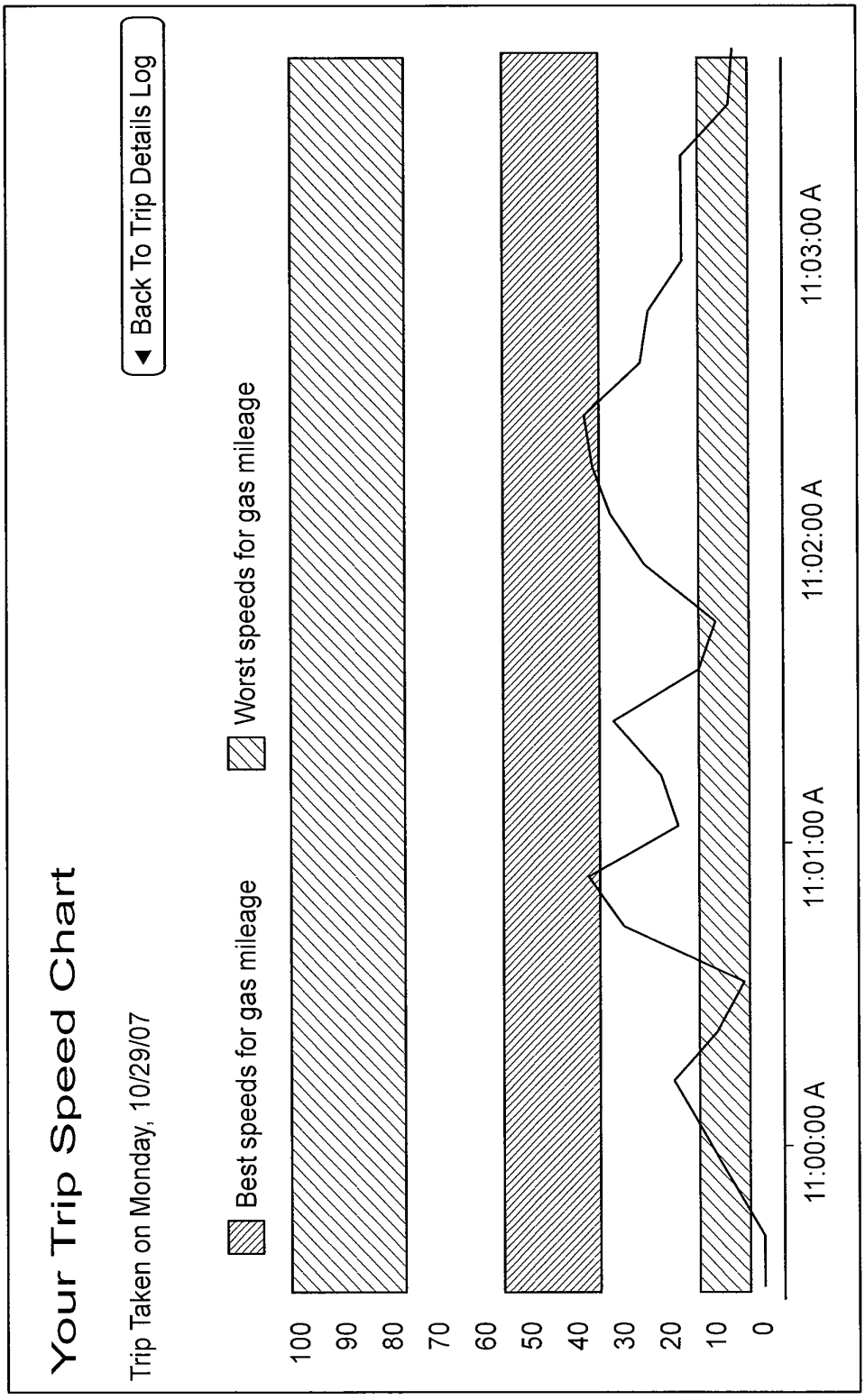
Your Trip Speed Chart
Trip Taken on Monday, 10/29/07
◄ Back To Trip Details Log
Best speeds for gas mileage
Worst speeds for gas mileage
100
90
80
70
60
50
40
30
20
10
0
11:00:00 A
11:01:00 A
11:02:00 A
11:03:00 A

FIG. 32

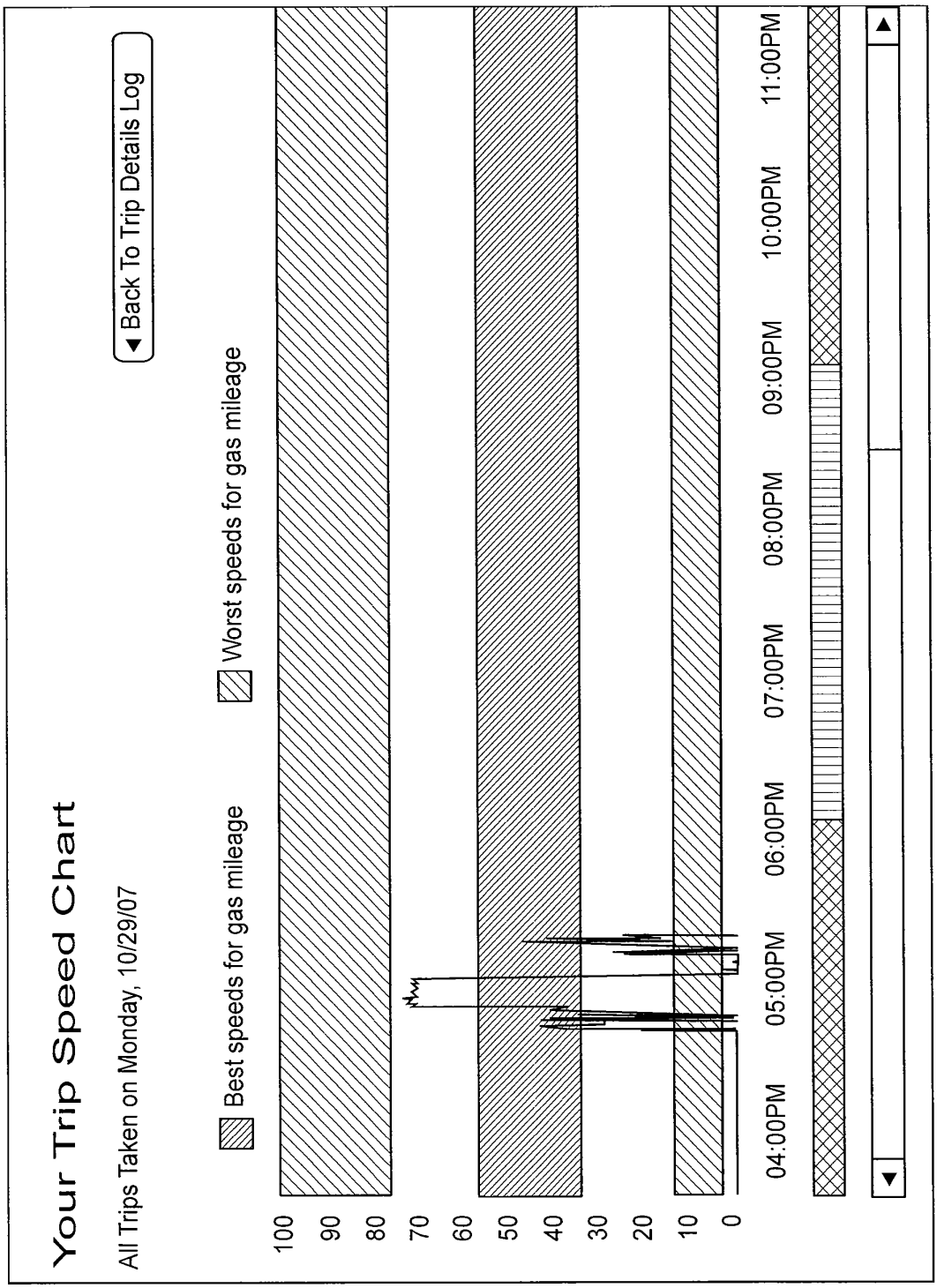
Your Trip Speed Chart
All Trips Taken on Monday, 10/29/07
◄ Back To Trip Details Log
Best speeds for gas mileage
Worst speeds for gas mileage
100
90
80
70
60
50
40
30
20
10
0
04:00PM
05:00PM
06:00PM
07:00PM
08:00PM
09:00PM
10:00PM
11:00PM

FIG. 33

Your Trip Details Log

Use Your Trip Details Log to review specific trips. Sort by date and type of trip. Click on the arrow beside a date to see details for all trips taken that day.

Select a Trip Type ▼

All Trips — Click on Day or Trip to View Your Trip Speed Chart

TRIP DATE	NUMBER OF TRIPS	RISK LEVELS	DRIVING TIME hr:min	OVER 75 MPH min:sec	MILEAGE	SUDDEN STARTS/STOPS
Fri. 10/26/07	3	⊗	001:11	000:00	46.0	0 | 1
Mon. 10/29/07	6	⊖⊗	001:20	000:00	42.7	1 | 0
Tue. 10/30/07	6	⊖⊗	001:23	000:00	52.4	0 | 3
Wed. 10/31/07	2	⊗	000:56	002:01	42.5	0 | 2
Thu. 11/01/07	4	⊖⊗	001:23	000:00	55.7	1 | 5
Fri. 11/02/07	5	⊖⊗	001:22	000:00	50.1	0 | 5
Sat. 11/03/07	5	⊖	000:37	000:00	16.2	1 | 0
Mon. 11/05/07	5	⊗	001:21	000:10	49.1	0 | 3
Tue. 11/06/07	3	⊗	001:00	000:00	42.4	0 | 0
Wed. 11/07/07	4	⊖⊗	001:07	000:00	45.3	0 | 3
Thu. 11/08/07	2	⊗	000:58	000:00	42.3	0 | 2
Fri. 11/09/07	4	⊖⊗	001:13	000:00	46.4	1 | 4
Sat. 11/10/07	2	⊖	000:17	000:00	6.9	0 | 0
Sun. 11/11/07	2	⊖	000:18	000:00	7.8	0 | 1
Mon. 11/12/07	4	⊖⊗	001:12	000:00	46.5	1 | 6
Tue. 11/13/07	2	⊗	000:55	000:00	42.3	0 | 1
Wed. 11/14/07	3	⊗	001:01	000:00	42.4	0 | 0
Thu. 11/15/07	4	⊖⊗	001:10	000:00	43.2	1 | 2

FIG. 34A

Your Trip Details Log

Use Your Trip Details Log to review specific trips. Sort by date and type of trip. Click on the arrow beside a date to see details for all trips taken that day.

Select a Trip Type ▼

All Trips

Click on Day or Trip to View Your Trip Speed Chart

TRIP DATE	NUMBER OF TRIPS	RISK LEVELS	DRIVING TIME hr:min	OVER 75 MPH min:sec	MILEAGE	SUDDEN STARTS|STOP
▶ Fri. 10/26/07	3		000:00	000:00	46.0	0 | 1
▼ Mon. 10/29/07	6		000:00	000:00	42.7	1 | 0
06:01am-06:36am			000:35	000:00	18.2	1 | 0
10:59am- 11:03am			000:04	000:00	1.3	0 | 0
11:21am- 11:27am			000:06	000:00	2.4	0 | 0
04:37pm-05:01pm			000:24	000:00	17.9	0 | 0
05:01pm-05:04pm			000:02	000:00	0.0	0 | 0
05:07pm-05:14pm			000:07	000:00	2.9	0 | 0
▶ Tue. 10/30/07	6		000:00	000:00	52.4	0 | 3
▶ Wed. 10/31/07	2		000:00	000:00	42.5	0 | 2
▶ Thu. 11/01/07	4		000:00	000:00	55.7	1 | 5
▶ Fri. 11/02/07	5		000:00	000:00	50.1	0 | 5
▶ Sat. 11/03/07	5		000:00	000:00	16.2	1 | 0
▶ Mon. 11/05/07	5		000:00	000:00	49.1	0 | 3
▶ Tue. 11/06/07	3		000:00	000:00	42.4	0 | 0
▶ Wed. 11/07/07	4		000:00	000:00	45.3	0 | 3
▶ Thu. 11/08/07	2		000:00	000:00	42.3	0 | 2
▶ Fri. 11/09/07	4		000:00	000:00	46.4	1 | 4

FIG. 34B

Electronic Patent Application Fee Transmittal

Application Number:	12132487
Filing Date:	03-Jun-2008
Title of Invention:	VEHICLE MONITORING SYSTEM
First Named Inventor/Applicant Name:	William Curtis Everett
Filer:	James A. Collins/Tina Sieczkowski
Attorney Docket Number:	12654/42

Filed as Large Entity

Utility Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Utility application filing	1011	1	310	310
Utility Search Fee	1111	1	510	510
Utility Examination Fee	1311	1	210	210
Pages:				
Claims:				
Claims in excess of 20	1202	110	50	5500
Independent claims in excess of 3	1201	10	210	2100
Miscellaneous-Filing:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Late filing fee for oath or declaration	1051	1	130	130
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**8760**

Electronic Acknowledgement Receipt

EFS ID:	3730660
Application Number:	12132487
International Application Number:	
Confirmation Number:	7812
Title of Invention:	VEHICLE MONITORING SYSTEM
First Named Inventor/Applicant Name:	William Curtis Everett
Customer Number:	757
Filer:	James A. Collins/Olivia Lopez
Filer Authorized By:	James A. Collins
Attorney Docket Number:	12654/42
Receipt Date:	05-AUG-2008
Filing Date:	03-JUN-2008
Time Stamp:	15:24:39
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$8760
RAM confirmation Number	734
Deposit Account	231925
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)
1	Miscellaneous Incoming Letter	transformissingparts.PDF	43314 8776ba6d7b382b8d26139b1eb2cb8a46cfff22aa	no	1
Warnings:					
Information:					
2	Applicant Response to Pre-Exam Formalities Notice	responsetomp.PDF	62398 14e4360a89cf92033fbefb691ba15118e6718f4f	no	2
Warnings:					
Information:					
3	Oath or Declaration filed	declaration.PDF	106967 45fe4c3212b3b0de5e4f19948ea629b453ab78bd	no	2
Warnings:					
Information:					
4	Power of Attorney	poa.PDF	76809 3d0bfe7d5ba2485112707d163a8021a0b3314573	no	2
Warnings:					
Information:					
5	Miscellaneous Incoming Letter	subofformdrawings.PDF	28133 21a4c756f188bc5629b9141543a1faa290a70578	no	1
Warnings:					
Information:					
6	Drawings-only black and white line drawings	correcteddrawings.PDF	877622 81f979ac86d68cd62111eb8c24c0b31bd1a558fd	no	23
Warnings:					
Information:					
7	Fee Worksheet (PTO-06)	fee-info.pdf	8751 f76608657e515325d7cb97e30edba79b427dc9ed	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	1203994		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Electronic Acknowledgement Receipt

EFS ID:	3730660
Application Number:	12132487
International Application Number:	
Confirmation Number:	7812
Title of Invention:	VEHICLE MONITORING SYSTEM
First Named Inventor/Applicant Name:	William Curtis Everett
Customer Number:	757
Filer:	James A. Collins/Olivia Lopez
Filer Authorized By:	James A. Collins
Attorney Docket Number:	12654/42
Receipt Date:	05-AUG-2008
Filing Date:	03-JUN-2008
Time Stamp:	15:24:39
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$8760
RAM confirmation Number	734
Deposit Account	231925
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)
1	Miscellaneous Incoming Letter	transformissingparts.PDF	43314 8776ba6d7b382b8d26139b1eb2cb8a46cfff22aa	no	1
Warnings:					
Information:					
2	Applicant Response to Pre-Exam Formalities Notice	responsetomp.PDF	62398 14e4360a89cf92033fbefb691ba15118e6718f4f	no	2
Warnings:					
Information:					
3	Oath or Declaration filed	declaration.PDF	106967 45fe4c3212b3b0de5e4f19948ea629b453ab78bd	no	2
Warnings:					
Information:					
4	Power of Attorney	poa.PDF	76809 3d0bfe7d5ba2485112707d163a8021a0b3314573	no	2
Warnings:					
Information:					
5	Miscellaneous Incoming Letter	subofformdrawings.PDF	28133 21a4c756f188bc5629b9141543a1faa290a70578	no	1
Warnings:					
Information:					
6	Drawings-only black and white line drawings	correcteddrawings.PDF	877622 81f979ac86d68cd62111eb8c24c0b31bd1a558fd	no	23
Warnings:					
Information:					
7	Fee Worksheet (PTO-06)	fee-info.pdf	8751 f76608657e515325d7cb97e30edba79b427dc9ed	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	1203994		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

CERTIFICATE OF EFS FILING UNDER 37 CFR §1.8

I hereby certify that this correspondence is being electronically transmitted to the United States Patent and Trademark Office, Commissioner for Patents, via the EFS pursuant to 37 CFR §1.8 on the below date:

Date: August 5, 2008 Name: James A. Collins Signature: /James A. Collins/

BRINKS HOFER GILSON &LIONE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Appln. of:	William Curtis Everett et al.
Appln. No.:	12/132,487
Filed:	June 3, 2008
For:	VEHICLE MONITORING SYSTEM
Docket No:	12654/42

Conf. No.: 7812

TRANSMITTAL

Mail Stop Missing Parts
Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Sir:

Attached is/are:

☒ Transmittal; Response to File Missing Parts of Nonprovisional Appl., Declaration; Power of Attorney; Submission of Formal Drawings; Figures 1-17 & 30 -34 A & B).

Fee calculation:

☐ No additional fee is required.

☐ Small Entity.

☐ An extension fee in an amount of $_____ for a _____-month extension of time under 37 CFR § 1.136(a).

☒ A surcharge in the amount of $130.00 under 37 CFR § 1.16(F).

☐ An additional filing fee has been calculated as shown below:

						Small Entity			Not a Small Entity	
	Claims Remaining After Amendment		Highest No. Previously Paid For	Present Extra		Rate	Add'l Fee	OR	Rate	Add'l Fee
Total		Minus		110		x $25=			x $50=	5500
Indep.		Minus		10		x 105=			x $210=	2100
First Presentation of Multiple Dep. Claim						+$185=			+ $370=	
						Total	$		Total	$7600

Fee payment:

☒ Please charge Deposit Account No. 23-1925 in the amount of $8,760.00 for Filing Fee ($310), Surcharge ($130), Search Fee ($510), Examination Fee ($210) and Additional Claims Fee ($7600).

☐ Payment by credit card in the amount of $_____ (Form PTO-2038 is attached).

☒ The Director is hereby authorized to charge payment of any additional filing fees required under 37 CFR § 1.16 and any patent application processing fees under 37 CFR § 1.17 associated with this paper (including any extension fee required to ensure that this paper is timely filed), or to credit any overpayment, to Deposit Account No. 23-1925.

Respectfully submitted,

August 5, 2008
Date

/James A. Collins/
James A. Collins (Reg. No. 43,557)

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
12/132,487	06/03/2008	2628	0.00	12654/42	130	13

CONFIRMATION NO. 7812

757
BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, IL 60610

FILING RECEIPT

OC000000030481841

Date Mailed: 06/16/2008

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

William Curtis Everett, Hudson, OH;
Richard Ashton Hutchinson, Chagrin Falls, OH;
Wilbert John Steigerwald III, Kirtland, OH;
William Andrew Say, Macedonia, OH;
Patrick Lawrence O'Malley, Kirtland, OH;
Dane Allen Shrallow, Solon, OH;
Raymond Scott Ling, Westlake, OH;

Assignment For Published Patent Application

Progressive Casualty Insurance Company, Mayfield Village, OH

Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a CIP of 10/764,076 01/23/2004
which is a CIP of 09/571,650 05/15/2000 PAT 6,868,386
which is a CIP of 09/135,034 08/17/1998 PAT 6,064,970
which is a CON of 08/592,958 01/29/1996 PAT 5,797,134

Foreign Applications

If Required, Foreign Filing License Granted: 06/13/2008

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/132,487**

Projected Publication Date: Request for Non-Publication Acknowledged

Non-Publication Request: Yes

Early Publication Request: No
Title

VEHICLE MONITORING SYSTEM

Preliminary Class

345

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where

the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/132,487	06/03/2008	William Curtis Everett	12654/42

CONFIRMATION NO. 7812

757
BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, IL 60610

FORMALITIES LETTER

OC000000030481842

Date Mailed: 06/16/2008

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

Items Required To Avoid Abandonment:

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The statutory basic filing fee is missing.
  *Applicant must submit $**310** to complete the basic filing fee for a non-small entity. If appropriate, applicant may make a written assertion of entitlement to small entity status and pay the small entity filing fee (37 CFR 1.27).*
- The oath or declaration is missing.
  A properly signed oath or declaration in compliance with 37 CFR 1.63, identifying the application by the above Application Number and Filing Date, is required.
  Note: If a petition under 37 CFR 1.47 is being filed, an oath or declaration in compliance with 37 CFR 1.63 signed by all available joint inventors, or if no inventor is available by a party with sufficient proprietary interest, is required.

The application is informal since it does not comply with the regulations for the reason(s) indicated below.

The required item(s) identified below must be timely submitted to avoid abandonment:

- Replacement drawings in compliance with 37 CFR 1.84 and 37 CFR 1.121(d) are required. The drawings submitted are not acceptable because:
  - Numbers, letters, and reference characters on the drawings must measure at least 0.32 cm (1/8 inch) in height. See Figure(s) 8-17 and 34.
  - The drawings submitted to the Office are not electronically reproducible because portions of figures 1-17,30-34 are missing and/or blurry.

Applicant is cautioned that correction of the above items may cause the specification and drawings page count to exceed 100 pages. If the specification and drawings exceed 100 pages, applicant will need to submit the required application size fee.

The applicant needs to satisfy supplemental fees problems indicated below.

The required item(s) identified below must be timely submitted to avoid abandonment:

- Additional claim fees of $**7600** as a non-small entity, including any required multiple dependent claim fee, are required. Applicant must submit the additional claim fees or cancel the additional claims for which fees are due.
- To avoid abandonment, a surcharge (for late submission of filing fee, search fee, examination fee or oath or declaration) as set forth in 37 CFR 1.16(f) of $**130** for a non-small entity, must be submitted with the missing items identified in this notice.

SUMMARY OF FEES DUE:

Total additional fee(s) required for this application is $**8760** for a non-small entity
- $**310** Statutory basic filing fee.
- $**130** Surcharge.
- The application search fee has not been paid. Applicant must submit $**510** to complete the search fee.
- The application examination fee has not been paid. Applicant must submit $**210** to complete the examination fee for a non-small entity.
- Total additional claim fee(s) for this application is $**7600**
  - $**2100** for **10** independent claims over 3.
  - $**5500** for **110** total claims over 20.

Replies should be mailed to:

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web.
https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html

For more information about EFS-Web please call the USPTO Electronic Business Center at **1-866-217-9197** or visit our website at http://www.uspto.gov/ebc.

If you are not using EFS-Web to submit your reply, you must include a copy of this notice.

/tketsela/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

CERTIFICATE OF EFS FILING UNDER 37 CFR §1.8

I hereby certify that this correspondence is being electronically transmitted to the United States Patent and Trademark Office, Commissioner for Patents, via the EFS pursuant to 37 CFR §1.8 on the below date:

Date: June 3, 2008 Name: James A. Collins Signature: /James A. Collins/

BRINKS HOFER GILSON &LIONE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Appln. of: William Curtis Everett et al.

For: VEHICLE MONITORING SYSTEM

Attorney Docket No: 12654/42

UTILITY PATENT APPLICATION TRANSMITTAL

Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

1. TRANSMITTED HEREWITH: New application under 37 CFR §1.53(b), which is a:

☐ Continuation,

☐ Divisional, or

☒ Continuation-in-Part (CIP)

Under 37 CFR §1.53(b) of prior application no. 10/764,076 filed January 23, 2004 which is a continuation-in-part of 09/571,650 filed May 15, 2000 which is a continuation-in-part of 09/135,034 filed August 17, 1998 which is a continuation of 08/592,958 filed January 29, 1996.

☐ Maintenance of copendency of prior application: A request for extension of time and the appropriate fee have been filed in the pending prior application (or are being filed in the prior application concurrently herewith) to extend the period for response until _____.

☐ Certified copy of priority document(s) has been filed in prior application no. _____/_____.

For Continuation or Divisional Applications only: The entire disclosure of the prior application, from which an oath or declaration is supplied as indicated below, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference.

2. ATTACHMENTS: The following application elements and other papers are attached:

☒ Application Data Sheet. See 37 CFR § 1.76.

☐ Title page

☒ Specification, including claims and Abstract (89 pages)

☒ Drawings (35 sheet(s))

☐ Appendices: _____

☐ Declaration or ☐ Combined Declaration and Power of Attorney (_____ pages):

☐ newly-executed (original or copy)

☐ copy from a prior application (37 CFR §1.63(d))

☐ This application is filed by fewer than all the inventors named in the prior application, 37 CFR §1.53(d)(4). Please DELETE the following inventors(s) named in prior nonprovisional application no. _____/_____:

_____

☐ English Translation Document:

☐ is attached or ☐ has been filed in prior application no. _____/_____.

☐ Preliminary Amendment (Note: Related application data required under 37 CFR §1.78, if any, appears in the Amendments to the Specification section of the Preliminary Amendment, including incorporations by reference.)

☐ Petition to Suspend Prosecution for the Time Necessary to File an Amendment (New Application Filed Concurrently).

☐ Information Disclosure Statement, including Form PTO-1449 (_____ sheets) and copies of references cited, if required.

☐ Assignment to: _____:

☐ with accompanying Assignment Recordation Cover Sheet, is attached.

☐ was previously recorded on _____ at Reel _____, Frame _____.

☐ Power of Attorney (_____ pages; ☐ by inventor ☐ by _____.

☐ The power appears in the original papers in the prior application.

☐ The power doesn't appear in the original papers in the prior application, but was filed on _____.

☐ A new power has been executed and is attached.☐ The power of attorney in the prior application is to: _____ (Reg. No. _____).

☒ Nonpublication Request under 35 USC §122(b)(2)(B)(i).

☐ Other: _____.

3. SMALL ENTITY STATUS:

☐ Applicant is small entity (per 37 CFR §1.27).

☐ A small entity statement was filed in prior application no. _____/_____ and such status is still proper and desired.

☐ Small entity status is no longer desired.

4. FEE CALCULATION (AFTER ENTRY OF ANY PRELIMINARY AMENDMENT(S) IN ITEM #2 ABOVE):

Claims as Filed	Col. 1	Col. 2		Small Entity			Not a Small Entity	
For	No. Filed	No. Extra		Rate	Fee	or	Rate	Fee
Basic Fee					$ 75	or		$ 310
Total Claims	-20			x$25=	$	or	x$50=	$
Independent Claims	-3			x$105=	$	or	x$210=	$
Multiple Dependent Claims Present				+$185=	$	or	+$370=	$
Utility Application Size Fee (for each additional 50 sheets that exceed 100, including spec. & drawings)				x$130=	$	or	x$260=	$
Search Fee				+$255=	$	or	+$510=	$
Examination Fee				+$105=	$	or	+$210=	$
*If the difference in col. 1 is less than zero, enter "0" in col. 2.				Total	$	or	Total	$

5. FEE PAYMENT:

☐ Payment by credit card in the amount of $_____ (Form PTO-2038 is attached).

☐ Please charge Deposit Account No. 23-1925 in the amount of $_____.

☐ The Director is hereby authorized to charge payment of the following fees associated with this communication or credit any overpayment to Deposit Account No. 23-1925.

☐ Any additional filing fees required under 37 CFR § 1.16.

☐ Any patent application processing fees under 37 CFR §1.17.

☐ The Director is hereby authorized to charge payment of the following fees during the pendency of this application or credit any overpayment to Deposit Account No. 23-1925.

☐ Any filing fees under 37 CFR § 1.16 for presentation of extra claims.

☐ Any patent application processing fees under 37 CFR § 1.17.

☐ The issue fee set in 37 CFR § 1.18 at or before mailing of the Notice of Allowance, pursuant to 37 CFR § 1.311(b).

6. CORRESPONDENCE ADDRESS: Please recognize the correspondence address for this application as the address associated with the following Customer Number:

Customer No.: 00757 - Brinks Hofer Gilson Lione

7. PLEASE DIRECT all telephonic communications to: James A. Collins (tel: (312) 321-4200).

Respectfully submitted,

June 3, 2008
Date

/James A. Collins/
James A. Collins (Reg. No. 43,557)

PTO/SB/35 (01-08)
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U.S. Patent and Trademark Office; U. S. DEPARTMENT OF COMMERCE

NONPUBLICATION REQUEST UNDER 35 U.S.C. 122(b)(2)(B)(i)

First Named Inventor	William Curtis Everett et al.
Title	VEHICLE MONITORING SYSTEM
Attorney Docket Number	12654-42

I hereby certify that the invention disclosed in the attached application **has not and will not be** the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

I hereby request that the attached application not be published under 35 U.S.C. 122(b).

Signature — Date: Jan 3, 2008

James A. Collins — Typed or printed name

43,557 — Registration Number, if applicable

(312) 321-4200 — Telephone Number

This request must be signed in compliance with 37 CFR 1.33(b) and submitted with the application **upon filing.**

Applicant may rescind this nonpublication request at any time. If applicant rescinds a request that an application not be published under 35 U.S.C. 122(b), the application will be scheduled for publication at eighteen months from the earliest claimed filing date for which a benefit is claimed.

If applicant subsequently files an application directed to the invention disclosed in the attached application in another country, or under a multilateral international agreement, that requires publication of applications eighteen months after filing, the applicant **must** notify the United States Patent and Trademark Office of such filing within forty-five (45) days after the date of the filing of such foreign or international application. **Failure to do so will result in abandonment of this application (35 U.S.C. 122(b)(2)(B)(iii)).**

VEHICLE MONITORING SYSTEM

INVENTORS:

William Curtis Everett
Richard Ashton Hutchinson
Wilbert John Steigerwald III
William Andrew Say
Patrick Lawrence O'Malley
Dane Allen Shrallow
Raymond Scott Ling

BACKGROUND OF THE INVENTION

1. Priority Claim.

[0001] This application is a continuation-in-part application of U.S. Ser. No. 10/764,076, filed January 23, 2004, which is a continuation-in-part application of U.S. Ser. No. 09/571,650, filed May 15, 2000, now U.S. Pat. No. 6,868,386, which is a continuation-in-part of U.S. Ser. No. 09/135,034, filed Aug. 17, 1998, now U.S. Pat. No. 6,064,970, which is a continuation of U.S. Ser. No. 08/592,958, filed Jan. 29, 1996, now U.S. Pat. No. 5,797,134.

2. Technical Field.

[0002] This disclosure relates to data acquisitions, and particularly to a system that acquires data related to evaluating risk.

3. Related Art.

[0003] Methods that determine costs of insurance may gather data from personal interviews and legacy sources. The data may be used to classify applicants into actuarial classes that may be associated with insurance rates.

[0004] Some data used to classify risk is not verified and has little relevance to measuring risk. Systems may accumulate and analyze significant amounts of data and yet discover that the data does not accurately predict losses. The data may not be validated, may be outdated, and may not support new or dynamic risk assessments.

SUMMARY

[0005] A data logging device tracks the operation of a vehicle and/or operator behavior. The device includes a storage device (which may be removable or portable) having a first memory portion that may be read from and may be written to in a vehicle and a second memory portion that may be read from and may be written to in a vehicle. The second memory portion may retain data attributes associated with the data stored in the first memory portion. A processor reads data from an automotive bus that transfers data from vehicle sensors to other automotive components. The processor writes data to the first memory portion and the second memory portion that reflect a level of safety. A communication device links the data logging device to a network of computers. The communication device may be accessible through software that may be retained on a computer readable media. The software allows a user to access files related to a level of risk or safety and other software that may be related to those files.

[0006] Other systems, methods, features, and advantages will be, or will become, apparent to one with skill in the art upon examination of the following Figures and detailed description. It is intended that all such additional systems, methods, features, and advantages be included within this description, be within the scope of the invention, and be protected by the following claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] The system may be better understood with reference to the following drawings and description. The components in the Figures are not necessarily to scale, emphasis instead being placed upon illustrating the principles of the invention. Moreover, in the Figures, like referenced numerals designate corresponding parts throughout the different views.

[0008] Figure 1 describes a data capture method used in a claim process.

[0009] Figure 2 is a block diagram of a network that includes a response center and a data handling center.

[0010] Figure 3 is an exemplary vehicle with a monitoring device.

[0011] Figure 4 is an exemplary vehicle architecture that includes a vehicle processor or onboard computer interfaced to a monitoring device that communicates selective data to a remote destination.

[0012] Figure 5 is a data flow process illustrating communication through an Internet access.

[0013] Figure 6 is an exemplary underwriting and rating method.

[0014] Figure 7 is an exemplary underwriting and rating method.

[0015] Figure 8 is an interface displaying vehicle data that includes exemplary information that may relate to a cost of insurance.

[0016] Figure 9 is a second interface displaying vehicle data that includes exemplary information that may relate to a cost of insurance.

[0017] Figure 10 is a third interface displaying vehicle data that includes exemplary information that may relate to a cost of insurance.

[0018] Figure 11 is an exemplary Web page displaying in-vehicle data that includes exemplary information that may relate to a cost of insurance and an interface enabling "what-if" evaluations.

[0019] Figure 12 is an exemplary Web page displaying trip information and relationships with other vehicles.

[0020] Figure 13 is an exemplary Web page that includes speed information.

[0021] Figure 14 is an exemplary Web page that includes trip information by date.

[0022] Figure 15 is an exemplary Web page that includes trip log data.

[0023] Figure 16 is another exemplary Web page that includes trip log data.

[0024] Figure 17 is another exemplary Web page that includes data identifying an exemplary installation, disconnection, and data transfer events.

[0025] Figure 18 is a block diagram of an exemplary device that monitors vehicle data.

[0026] Figure 19 is a network in communication with a vehicle monitoring device.

[0027] Figure 20 is a network in communication with remote clients.

[0028] Figure 21 is a backend of a network based risk management system.

[0029] Figure 22 is a risk management system communicating with a vehicle monitoring device.

[0030] Figure 23 is a block diagram of an in-vehicle device that may communicate with an in-vehicle local processor or controller.

[0031] Figure 24 is an initialization process.

[0032] Figure 25 is a process in which a vehicle monitoring device communicates through a network.

[0033] Figure 26 is a process where a vehicle monitoring device communicates in response to an event.

[0034] Figure 27 is a power management process.

[0035] Figure 28 is a software update process.

[0036] Figure 29 is an alternative backend of a network based risk management device.

[0037] Figure 30 is a graphical interface summarizing exemplary periods of risk.

[0038] Figure 31 is a graphical user interface displaying a summary.

[0039] Figure 32 is a second graphical user interface displaying a summary.

[0040] Figure 33 is a third graphical user interface displaying a summary at a higher resolution.

[0041] Figure 34 are multiple graphical user interfaces displaying selected trip details.

[0042] Figure 35 is a sample data file generated by a vehicle monitoring device.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0043] The following terms may be used in this detailed description.

[0044] Internet refers to interconnected (public and/or private) networks that may be linked together by protocols (such as TCP/IP and HTTP) to form a globally accessible distributed network. While the term Internet refers to what is currently known (e.g., a publicly accessible distributed network), it is also encompasses variations which may be made in the future, including new protocols or any changes or additions to existing protocols.

[0045] World Wide Web ("Web") refers to (i) a distributed collection of user-viewable or accessible documents (that may be referred to as Web documents or Web pages) or objects that may be accessible via a publicly accessible distributed network like the Internet, and/or (ii) the client and server software components which provide user access to documents and objects using communication protocols. A protocol that may be used to locate, deliver, or acquire Web documents or objects through HTTP (or other protocols), and the Web pages may be encoded using HTML, tags, and/or scripts. The terms "Web"

and "World Wide Web" encompass other languages and transport protocols including or in addition to HTML and HTTP that may include security features, server-side, and/or client-side scripting.

[0046] Web Site refers to a system that serves content over a network using the protocols of the World Wide Web. A Web site may correspond to an Internet domain name, such as "progressive.com," and may serve content associated or provided by an organization. The term may encompass (i) the hardware/software server components that serve objects and/or content over a network, and/or (ii) the "backend" hardware/software components, including any standard, non-standard or specialized components, that may interact with the server components that provide services for Web site users.

[0047] The drawings illustrate exemplary embodiments and are not intended to limit the subject matter claimed. Some of the figures show systems and/or methods that monitor, record and/or communicate risk-based or insurance-related data. The data may be used to quantify risk, determine a level of risk, or determine a rating or a cost of insurance. The metrics can be used to monitor the operation and/or location of a machine, or measure the relative safety of its operation. The device may monitor a vehicle or other machine through an interface or may be a unitary part of the vehicle or machine. It may generate data that may determine the cost to protect against a risk of loss, such as damage or injury to the vehicle or machine itself, to the operator of or passengers in the vehicle or machine, or to other vehicles or property. The data may be processed to determine an insurance cost that may be based on statistical analysis, models, comparisons, or other evaluations.

[0048] For example, based on operational information or data, an insurer may make predictions about how and/or where a machine may be operated. The system or method may measure or monitor machine operation. Where the machine is a vehicle, a user may monitor and/or adjust his/her insurance costs by adjusting his/her driving behavior. The data may establish a safe driving record a lower risk of being subject to a claim. Such monitoring may generate insurance scores, safety scores, rating factors, and/or affect current, retrospective or prospective costs of insurance. Data that may be monitored and recorded include, for example, any one or more of the following:

1. Actual miles driven;
2. Types of roads driven on (high risk vs. low risk); and,
3. Safe or unsafe operation of the vehicle by the vehicle user through:

A. speeds driven,

B. safety equipment used, such as seat belt and turn signals,

C. time of day driven

D. rate of acceleration,

E. rate of braking (deceleration),

F. observation of traffic signs (signals);

G. traffic conditions (high congestion vs. low congestion); and/or

H. road conditions

I. acceleration events;

J. deceleration events; and/or

K. force/lateral acceleration or characteristics that indicate a hard turning maneuver.

4. Driver identification

5. Temporal characteristics (e.g., period of time an ignition is active or internal power bus is sustained).

[0049] Figure 3 shows an exemplary motor vehicle. An on-board portable mobile device 300 (the device 300) monitors and records output of diverse sensors and operator actions to assess a level of risk or determine a price or cost of insurance. One, two or more operating sensors (e.g., physically or wirelessly linked to a physical or virtual vehicle data bus) within the vehicle may monitor a variety of raw data elements. The data may be transmitted to in-vehicle OEM (Original Equipment Manufacturer) processors that manage powertrain, safety, entertainment, comfort, or ancillary functions. Such data elements may be communicated directly to the device 300 (e.g., from the sensors), or from the in-vehicle OEM or out-of-vehicle processor(s) through a physical or wireless connection that may interface an in-vehicle data bus 304. The in-vehicle data bus 304 may be connected to the on-board device 300 through a virtual or physical connector, such as, for example, a vehicle connector compliant with SAE-1962 or On Board Diagnostic connector (e.g., ODBI, ODBII, ODBIII, etc.) and the protocols they convey.

[0050] In some systems, in-vehicle or network communication occurs through a wireless protocol or network. Transceivers may provide short and/or long range radio, optical link, or operational links that may not require a physical communication path to receive or transmit data. The communication protocol or network may provide an interoperable

communication link with other in-vehicle or external applications and/or devices. In some systems, a wireless network may provide connectivity when the wireless network or a wireless service provider indicates a channel capacity or excess channel capacity to transfer some or all of the desired data to a destination. A device push may load the desired data to a destination and may keep the connection open to allow the device 300 to continue sending the desired data or respond to external requests (e.g., queries). A device 300 may pull data to the device 300 too, in which a connection may or may not remain open.

[0051] In some systems, the transceivers may be compliant with a low-cost, low-power, wireless mesh network, such as Zigbee (e.g., 868 MHz in Europe, 915 MHz in countries such as USA and Australia, and 2.4 GHz in other jurisdictions), or a short range protocol, such as Bluetooth RTM. The Bluetooth word mark and logos may be owned by Bluetooth SIG, Inc. Bluetooth may encompass the wireless specification defined by IEEE 802.15, 802.15.4 (TG4), 802.15.3 (TG3), or other standards. The standard may include multiple sub-layers including an RF layer that may be based on an antenna power range starting at about 0 dBm up to a range of about 20 dBm in the abut 2.4GHz band and having a link range from about 10 centimeters to about 10 meters. It may include a baseband layer that establishes a physical link between devices forming a piconet (e.g., a network of devices that may be connected in an ad hoc fashion). It may include a link manager that sets up the link between Bluetooth devices. Other functions of the link manager may include security, negotiation of baseband packet sizes, power mode and duty cycle control of the communication portion of the device, and the connection states of a compliant device in a piconet. Also, it may include a logical link control and adaptation protocol (L2CAP) that provides the upper layer protocols with connectionless and connection-oriented services.

[0052] An optional driver input device 308 may be operatively connected to the device 300 through a virtual or physical connector (e.g., a cable 302 and 307). The device 300 may receive power through the vehicle battery 310, a remote generator, an alternator, fuel cell, an internal source (e.g., battery or elements that temporarily store charge) or other sources, such as a solar based system (not shown). In some systems, a power source may be part of the device 300 even when a primary power is drawn from the machine (vehicle). For instance, an internal battery may source power to a timing device, such as

internal clock, device memory and/or allow the device to record connection and disconnection events. In other systems, the device may draw power from the vehicle or a network it interfaces.

[0053] A second receiver or transceiver in the device 300 may track location through navigation signals that may comprise a GPS (global positioning system) protocol, a differential GPS protocol, a trilateraleralism of external encoded signals (e.g., may be in the radio frequency range), protocols that monitor continuously transmitted coded signals, or other locating protocols or systems 312 (referred to as the location protocols). In Figure 3, a cellular or wireless protocol, a wireless or cellular telephone, a radio, a satellite, or other wireless communication system may link the device to a privately accessible or publicly accessible distributed network or directly to an intermediate surrogate or central control station. The communication link may comprise Mobile-FI or a low-cost, always-on, mobile broadband wireless network that may have IP (Internet Protocol) roaming & handoff (at more than about 1 Mbit/s), MAC and PHY with IP and adaptive antennas, full mobility or substantial mobility up to vehicle speeds of about 88.7 – 162 km/h or higher (e.g., 250 km/h), operate in frequency bands (below 3.5 GHz), and/or utilize a packet architecture and have a low latency. In some applications, the device 300 may be Ultra-wideband compliant and may transmit information by generating radio energy at specific time instants and occupying large bandwidth, thus enabling a pulse-position or time-modulation communications. This protocol may be different from other wireless protocols that transmit information by varying the power level, frequency, and/or phase of a sinusoidal wave. In other applications, the system may be complaint with WiMax or IEEE 802.16a or may have a frequency band within a range of about 2 to about 11 GHz, a range of about 31 miles, and a data transfer rate of about 70 Mbps. In other applications, the device 300 may be compliant with a Wi-Fi protocols or multiple protocols or subsets (e.g., ZigBee, High Speed Packet Access (e.g., High Speed Downlink Packet Access and/or High Speed Uplink Packet Access), Bluetooth, Mobile-Fi, Ultrawideband, Wi-Fi, WiMax, mobile WiMax, cellular, satellite, etc., referred to as the transceiver protocols) that may be automatically detected and selected (through a handshaking, for example, that may automatically determine the source type of the transmission e.g., by a query for example, and may attempt to match it) and may enable this automatic access through one or more communication nodes. In

some systems, automatic selection and/or detection may occur through an exchange of signals that acknowledge a communication or a transfer of information or data may occur at a desired or predetermined channel capacity. In some alternative systems, a device 300 may not directly communicate or connect to a central base station. Like a mesh network, the devices 300 may transmit information between themselves (like an electronic bucket brigade) which may be relayed to a destination. Built-in logic may allow some devices 300 to relay information from one device 300 to another when wireless networks are unavailable, device 300 failures occur, bandwidth restrictions occur, or other conditions warrant. In some applications, a receive-and-relay feature in some devices 300 may allow devices 300 to conserve power by not transmitting data or messages continuously and directly to base stations. Some devices 300 may communicate data across relatively short distances (e.g., a few yards or 100 yards between mobile or stationary devices 300, for example) instead of the larger distances a communication to a stationary wireless base station may require.

[0054] Figure 4 is a block diagram of an exemplary in-vehicle computer system. The on-board portable mobile device 300 may include an on-board data storage device (or storage devices), an input/output interface that may communicate with one or more external devices, one or more central processing units, a local memory that may be separated into multiple partitions or portions, and/or a real-time operating kernel. In alternative in-vehicle systems, the portable mobile device 300 comprises one or more controllers or microprocessors that may be interfaced through expansion connectors. The device 300 may support two or more (e.g., multiple) modulation schemes and may include two or more input/outputs to different wireless networks or protocols. The inclusion of multiple protocols and/or inputs/outputs may allow the device 300 to support higher throughputs as wireless networks and connections become available or accessible. The exemplary in-vehicle systems are shown in Figures 4, 18 and 23 may be non-portable or a unitary part of a vehicle too. Each of the systems may include memory accessible only to a remote site or an insurer. The memory may be inaccessible to other in-vehicle OEM or aftermarket systems to ensure data integrity. Hardware, data encryption, or software may maintain data security. Data accuracy and/or conformity may be important to users or applications that insure risk or monitor safety.

[0055] The device 300 may communicate with one or more machine or vehicle components to acquire information from the vehicle that describe or represent vehicle operation or characteristics, or driving behavior. An optional driver input interface or console 410 may allow the driver to input data to satisfy or respond to one or more threshold factors or requests. For instance, the interface or console 410 may allow the machine operator to enter an identifier (e.g., identification number) so that recorded characteristics may be associated with a particular machine operator. Alternatively, the console may include or interface a biometric sensor, such as a fingerprint or retinal scanner to identify an operator, for example. A driver authentication system may validate a driver when multiple drivers (e.g., same family members, multiple users, etc.,) operate a vehicle. Each may have different ratings (e.g., driver rating, safety score, insurance rating/score, etc.) that may be used in insurance or risk computations.

[0056] Vehicle operation may be monitored through one or more sensors 412 (e.g., powertrain sensors, safety sensors, entertainment and comfort sensors, ancillary sensors, etc.). Additional sensors 414 may communicate wirelessly or across a physical or virtual data bus directly to the device 300.

[0057] A vehicle may be linked to a network or remote control center 416 through one or more communication links 418. In some systems the communication link comprises a wireless link (e.g., cellular link, a satellite link, a radio frequency link, etc.), a magnetic or optical link, or other tangibly free links. A navigation sub-system 420 may receive navigation signals from a positioning device 422 that may include, but is not limited to, a GPS, radio frequency tags, or other locating technology. The navigation sub-system 420 may communicate directly with the device 300 or through surrogates.

[0058] Some of the elements monitored and/or recorded by the device 300 include raw data elements, calculated data elements, derived data elements, and subsets of these elements (hereinafter data elements).

Raw Data Elements:

Information from powertrain or related sensors may include:

RPM,

transmission setting (Park, Drive, Gear, Neutral, etc.),

throttle position,

engine coolant temperature,
intake air temperature,
barometric pressure,
vehicle speed,
manifold absolute pressure,
oxygen sensor,
coolant sensor.

Information from electrical sensors may include:
entertainment status (e.g., visual or audio systems integrated or interfaced to vehicle)
brake light on,
turn signal indicator,
headlamps on,
hazard lights on,
back-up lights on,
parking lights on,
wipers on,
doors locked,
key in ignition,
key in door lock,
horn applied,
battery voltage,

Information from body sensors,
airbag deployment,
ABS application,
level of fuel in tank,
brakes applied,
accelerator applied,
radio station tuned in,
seat belt on or off,
door open,
tail gate open,
odometer reading,

cruise control engaged,
anti-theft disable,
occupant in seat,
occupant weight,
accelerator/ brake pedal depression (e.g., measured in degrees or force applied)
accessories (e.g., mirror settings, dash light status, etc.,)

Information from other elements may include:
vehicle speed,
vehicle location (e.g., navigation related information),
date,
time,
vehicle direction,
IVHS data sources (e.g., wide-area Intelligent Vehicle Highway Systems),
pitch and/or roll,
relative distance to other objects (e.g., may be monitored to assure compliance with an assured clear distance rule that may require drivers to be able to stop their vehicles within a distance they may clearly see).

Calculated Information may include:
deceleration,
acceleration,
vehicle in skid,
wheels in spin,
closing speed on vehicle in front,
closing speed of vehicle in rear,
closing speed of vehicle to side (right or left),
space to side of vehicle occupied,
space to rear of vehicle occupied,
space to front of vehicle occupied,
lateral acceleration,
rotation of vehicle (e.g., sudden),
loss of tire pressure (e.g., sudden);

driver identification (e.g., through voice recognition, code, fingerprint, retinal, or other recognition);
distance traveled; and
environmental conditions (e.g., potential hazards, rain, ice, etc.).

Derived Data Elements may include:
vehicle speed in excess of speed limit;
observation of traffic signals and signs;
relative braking or acceleration or deceleration events;
road conditions;
traffic conditions; and
vehicle position.

Other elements may be monitored and retained in local memory with optional metadata. The time a file is created or written to such as a timestamp or size of a file may comprise metadata.

[0059] Figure 1 is a flowchart of a data capture process. The data may be processed for insurance, risk management or assessment and/or claims processing purposes. The process may be implemented through a real-time operating kernel within the device 300. In some systems and processes, users employ a unique logic (e.g., a circuit and/or software) associated with that user's machine or unit of risk. When the system is started 100, a data capture may be initiated by a trigger event 102 which may include, but is not limited to:

Ignition On/Off (e.g., may measure length of time an ignition switch is activated)
Airbag Deployment
Acceleration Threshold
Velocity Threshold
Elapsed Time
Battery Voltage Level
System Health
Date
Time
User Activation/Panic Button
Traction

Location/Geofencing

Driver Identification

Remote Activation

Vehicle Motion

Revolutions per Minute

Transmission or Clutch Engagement or Disengagement

Power Bus Activation (may measure the length of time power is sourced to a bus or a conductor)

[0060] Trigger event processing 104 may comprise multiple elements that may include: a flow process for contacting a central control 106, contacting a claims dispatch, and/or recording trigger event data 110. Trigger event processing may include, but is not limited to:

Contact External Entities

EMT (Emergency Medical Transport), Claims Dispatch, Other External Entity Takes Appropriate Action

Record Sensor Information

Transmission of Data

Message transmissions

Recalibration

Load Software

[0061] If trigger event processing comprises a contact to a central control 112, the inquiry may be transmitted and confirmed by a message exchange. At 114, the central control 112 may take appropriate action and a record may be made by the central control at 116. In some instances, a central control 112 or the device 300 may transmit an alert directly or indirectly to third parties. An alert may occur when another party or user is monitoring another's driving behavior or vehicle performance. For example, a text message (e.g., a Short Message Service), a telephone call, or other messages may be transmitted to a party or a destination when an incident occurs (e.g., a parameter is exceeded or violated). An incident may occur when a commercial, teen, or inexperienced driver exceeds a programmed speed threshold or exceeds a designated speed limit (e.g., tracked by GPS, local mappings, and a vehicle speed output), exceeds a mileage limit, or is not wearing a seatbelt, for example. In some devices 300, an incident may allow the party or

destination to communicate with a driver or passenger by phone, voice, text, or other messaging service through a wireless processor (e.g., see Figure 23).

[0062] In some circumstances, the central control 112 or the device 300 may service a vehicle (e.g., through an in-vehicle or external speech recognition system, a telephone call to the device 300, etc.). Upon an authentication, the central control 200 and the device 300, or the device 300 itself may lock or unlock vehicle doors or execute some other action. In some systems, one or more in-vehicle recognition systems may authenticate a user (e.g., an in-vehicle speech recognition system may authenticate a user's voice, one or more in-vehicle biometric scanners may identify a user's retina, touch, or other biological feature(s), or other in-vehicle devices may identify other user characteristics) when a user is remote from or in proximity to a vehicle. Once authenticated, the device 300 may service a user request or service a vehicle without receiving directions, and in some cases, communications from a remote destination, such as a remote control center. Entertainment and/or comfort settings may also be adjusted in some alternative systems to a user's preference with or without directions or commands from a remote destination. In other circumstances, powertrain and service reminders may also be transmitted to a designated party through an aural and/or visual alert.

[0063] When processing a claims dispatch in Figure 1 at 108, the system may contact the claims dispatch service department of the insurer at 120. The claims dispatch takes appropriate action at 122 and a recording 124 of the claims dispatch action information may be logged to a file before the process concludes at 130.

[0064] The recording of trigger event data may include, but is not limited to:

The Trigger Event
Location information, such as latitude and longitude
Time, such as, Greenwich Mean Time
Velocity
Acceleration
Direction
Deceleration
Vehicle Orientation
Seatbelt Status
Turn Status (e.g., a hard turn or lateral force detection)

[0065] The recording may include one or more raw data elements, calculated data elements, and/or derived data elements. Each element may describe an operating state of the vehicle or an action of an operator or passenger. One or more selected data elements may be stored in a local memory of the device 300 before the data elements are transferred to a remote memory. Element selection may occur before the device 300 interfaces the vehicle or when a data element has a relationship to a safety standard, operational metric, or measure of risk. For example, vehicle speed may be related to safety. Therefore, speed may be recorded synchronously (e.g., on a regular basis or may occur at fixed programmable time intervals, such as every 10 seconds). Alternatively, where memory or storage space is a factor, speed may be recorded asynchronously or less often when the speed is below a predetermined or programmable threshold. In alternative systems, data may be recorded at synchronous intervals and during or after asynchronous events. The recording may include or may be associated with date, time, and/or location information. Other examples of data that may be recorded include rates of acceleration, deceleration, and/or hard braking events. Some of these data elements or events may be remotely or locally derived. For example, acceleration or distance may be derived from speed measurements made at a fixed interval (e.g., every second) or derived from measured data retained locally within the device or remotely at a remote server. In some devices, acceleration or deceleration data elements may be monitored directly or indirectly from one or more vehicle accelerometers or devices that may measure acceleration and/or deceleration.

[0066] In a synchronous mode, the recording process may be implemented by monitoring and storing the data in a local buffer after/at pre-selected selected time periods (e.g., that may comprise a cycle time of a processor or controller of the device 300 or a longer period, such as about every thirty seconds of vehicle use, for example). In an exemplary operation, the output of the monitored sensors (e.g., the data elements) may be written to a file (e.g., at a fixed programmable interval such as every two minutes, in this example) which is stored in a portion of the local memory of the vehicle data storage within or accessible to the device 300. The raw, calculated, and/or derived data elements may comprise some of the data elements that may be stored locally or remotely. Desired data elements or those determined or deemed to be relevant to an insurer or an assessment of risk may be stored in this exemplary device 300.

[0067] Some "trigger events" may occur when a condition is detected by one, two, or more sensors. The sensor data may indicate the need for an action. In an insurance application, it may result in an assessment of a premium, or a surcharge or discount to a premium, during an insurance billing process. In some systems, a trigger event may cause an immediate or almost immediate transfer or exchange of data, such as a data upload 106 to a network, surrogate, or a central control. For example, a rapid deceleration and an airbag deployment may be a trigger indicating a collision event, in which the system may notify the central control of the vehicle location and status at a rate the data may be received (e.g., real-time). Alternatively, if an operator were to cause an emergency light to activate or an alert to issue, the system may notify the central control of the emergency, and in some systems, vehicle location.

[0068] Some systems may classify or divide trigger events into two or more classes or grouping. Two groupings may include those requiring immediate action and those not requiring immediate action, but useful for determining a cost of insurance, measuring risk, or monitoring performance. Those useful for determining a cost of insurance or measuring risk may be stored in a file with other recorded vehicle sensor information in a logically distinct portion of a memory. Those trigger events requiring action may be stored in a second logically distinct portion of a memory before being transferred to a network or central control center which may take further action. Some trigger events may indicate the need to send emergency services, such as police or EMS, and may be stored in another logically distinct portion of a memory and others may indicate the need to dispatch of a claims representative or agent that may be associated with an insurance company that are stored in another logically distinct portion of memory.

[0069] The following comprises an exemplary list of some, but not all, trigger events.

Need for Assistance:

These are some of the exemplary events that may require immediate notification of a surrogate or central control center.

1. Accident Occurrence. An accident could be determined by monitoring an output of a single sensor, such as the deployment of an airbag or a sustained lateral acceleration. It could also be determined by monitoring a combination of outputs

from two or more sensors that may indicate, for example, a sudden deceleration of the vehicle without the application of the brakes.

2. Roadside assistance needed. This could be determined through the pressing of a "panic button" in the vehicle or through the reading of a sensor output, such as the level of fuel in the tank. Another example may be a rapid loss of tire pressure, signifying a flat tire.

3. Lock-out assistance needed. The reading of two or more sensor outputs may indicate that the doors are locked, but the keys are in the ignition or in the vehicle and the driver has exited the vehicle.

4. Driving restrictions. The insured or another user may identify circumstances or restricted areas in which he/she requests notification of driving (outside of a designated area or) within restricted areas, and warned when he/she or another is entering a dangerous or restricted area (or leaving a designated area). This may apply to youthful drivers, where the parent wants to restrict time or place of driving, driving behaviors in predetermined areas and have a record thereof.

Unsafe Operation of the Vehicle:

These exemplary events may be recorded and stored in the in-vehicle portable recording device 300 for future upload. Individual or repeated trigger events may result in notification of the driver of the exceptions.

1. Excessive speed. A reading of the output of the vehicle speed sensors might indicate the vehicle is exceeding the speed limit. Time may also be measured to determine if the behavior is prolonged.

2. Presence of alcohol or controlled substances. Using an air content analyzer, breath analyzer or other identifying device outputs or combinations that may identify driver impairment (e.g., touch or a pattern matching behavior), the level of alcohol or other substance and/or their use may be determined.

3. Non-use of seatbelt. Frequent or infrequent use may result in a discount (to a premium for high use) or surcharge (to a premium for low or no use).

4. Non-use of turn signals. Low use could result in surcharge. Frequent use may result in a discount.

5. ABS application without an accident. High use could indicate unsafe driving and may be subject to a surcharge. Low use may result in a discount.

[0070] Figure 2 is a block diagram/flowchart of a network design for gathering information for insurance billing at synchronous or asynchronous intervals. A machine or unit of risk 200 (or device 300) may interface and monitor an industrial machine, farm machine, an airplane, boat, RV, a motorcycle, or other vehicle (e.g., a device or structure that transports person or things). The device may include a local data storage 202 and data process logic 204. The insured or potential customer 206 associated with or responsible for each unit of risk may communicate with an insuring entity 208 or a designee. A "designee" may be an intermediary acting for an entity or an insurer, such as a dedicated data collection agent, data handler or equipment vendor 210 and/or a value added service provider 212. The data handler may be a third party entity verifying that the operating equipment of the system is in proper working order and may be a subcontractor. A value added service provider may be a third party entity, such as a directional assistance service, a security firm, a vehicle monitoring company, telephone service provider, or another entity whose communications with the units of risk may be important or relevant to assess risk or may be used in insurance computation algorithms.

[0071] In some systems, the insured or potential customer 206 may communicate directly with the insurer 208 through a wireless or a physical communication link 418 (Figure 4) that may include a publicly accessible distributed network, such as the Internet 218. Such access may allow users to view documents, access files, and access software related to those files while on the move or at fixed location. Access to a Web server 220 and the insurer's Web site may allow an insured or potential customer 206 to observe, and in some instances verify, recorded data, derived data, calculated data, claim processing, insurance costs and risk scores and the occurrence and state of trigger events, and billing 222. Access may further allow an insured or potential insured to acquire insurance cost estimates through a relational database or other storage systems and view content that may reduce current, future or prospective premiums. The content may describe how to reduce or control insurance costs by modifying machine or vehicle operating behavior.

[0072] Figure 5 provides a more detailed exemplary description of a distributed system's use of data acquired from a unit of risk 200. Some units of risk 200 (device 300) may synchronously or asynchronously transfer one, two, three, or more classes of data to an insurer. The event data 500 and stored sensor data 502 may capture data from the unit of risk 200. Data process logic 504 may be transferred to the unit of risk 200 from the insurer. The data process logic 504 may be adapted or programmed to acquire data that may be relevant to assess a unit's insurance cost or level of risk. For example, if an insurer or entity has a need for information about brake pedal use or application, data process logic 504 may be programmed or configured to store data related to that use or application. For alternative assessments, such data may be unnecessary and so the unit of risk 200 may not interface with data process logic 504, or it may acquire other data. The data process logic 504 may be programmed, configured or customized and may be updated as the insured, the insurer, or the potential customer desires. The data process logic 504 may be programmed, configured or customized while interfaced to a vehicle (may be field-programmable). In some applications, the data process logic may 504 be programmed to acquire data related to breathalyzer or other analysis.

[0073] In Figure 5, the flowchart starting at 506 describes an exemplary communication between an insurer and the unit of risk 200. The insurer may acquire event data at 508, acquire sensor data at 510, update data process logic at 512, and process data elements at 514. The result may generate data elements, such as a safety rating, insurance rating/score, or a driver score at a remote site. In alternative embodiments, the device 300 processes data elements in the vehicle and stores the raw, calculated and/or derived elements (including the ratings and/or scores) in an in-vehicle memory. The data may be uploaded to a network and a remote computer that may display or render the data locally or may be transmitted to another remote location with or without raw data elements. In some systems, data is stored 516 in a media or nonvolatile memory, such as a data storage device 518. If the stored item is an event 524, an insurer may transmit an event response. For example, when an airbag deploys data may be delivered to the insurer as the data is received (e.g., in real-time) or after a minimal delay. The insurer may communicate or attempt to communicate with the vehicle when the data is received. If the communication fails, the insurer may contact emergency medical or police services.

[0074] In some systems, if specific events processing and/or alerts 526 occur, the system may charge a user on a per-use, a subscription, or an event-basis. In some applications charges may reflect an immediate response claim, EMS charges, and/or dispatch charges. The data or events may be stored in a remote server 220 or in a remote storage device 518 that may be accessed by a billing or estimating algorithm 530 programmed and executed in a controller. The data may be used to generate a cost of insurance for the unit of risk 200 with some or all other relevant data. The cost may reflect one or more occurrences that are recorded and stored in the storage device 518.

[0075] In some applications, the cost of insurance may be based, in part on, the operating characteristics of the vehicle and/or operator behavior within a time period. A usage-based insurance cost may be based on the real-time data that is generated contemporaneous with or near a billing event. In some applications, the system may generate an invoice based on a driver's own data instead of an estimate based on interviews and historical trends. Alternatively, customized discounts or surcharges (to premiums) may be determined for a next billing period (e.g., a prospective period) based on operational aspects or behaviors captured by the recorded information. The data may be processed during a current or previous billing period. When a cost is computed, a bill or estimate may be generated and mailed, transmitted, or otherwise communicated as an account statement 534 or as an offer of insurance.

[0076] Figures 10 - 17 illustrate documents and screens that a server may retrieve or generate and transmit in response to requests received at a proxy or origin Web server 220. The Web server 220 may allow a user to request and access content through a publicly accessible distributed network like the Internet 218. Through remote software that allows users to view documents and files and software related to those documents, a user may view sensor data, event data, ratings, and/or analysis.

[0077] Different types of on-line services' interfaces may be accessed through the Web server 220. The figures illustrate exemplary documents and screens that may be rendered through different interfaces. The interfaces include a prospective on-line services interface 550 and an interface for reporting acquired data and relationships 552. The data reports rendered through the acquired service interface 552 may comprise all or selected stored events, sensor data, metadata, and/or relationship data (that may describe relationships between selected data or events to other data and events). The acquired

service interface 552 may provide enhanced processing maps showing travel routes (e.g., during a desired or a billing period) and other maps, such as maps that identify current locations of the unit of risk. A site's ability to report a geofence may allow a user to identify when a unit of risk or device 300 travels outside of an imaginary boundary. When a unit travels outside the boundary (e.g., set by a user, the insurer, or another) the site may identify the unit's location and travels. In some systems, the location coordinates (e.g., GPS-coordinates) may be transmitted by a short-message-service and a wireless (e.g., the transceiver protocols described above) network. Some sites determine whether automobile maintenance service is appropriate through a diagnostic analysis of the sensor and event data.

[0078] A prospective interface may relate to "what if" evaluations, in which a customer may change or enter certain values that may reflect the actual or hypothetical operation of the unit of risk or a driver's actions. The system may render or reveal the effects of those changes or values (e.g., in a risk assessment or an estimated cost or a proposal of coverages). The "what-if" evaluations may be based on historical data, customer profiles, logical relationships (e.g., relationships between relative levels of risk and monitored vehicle data), matrices, or other analysis (or any combination thereof) that may quantify risk in a use of the device 300. Through an interface, a user may determine, in advance, what behavior may reduce risk or cost, or what coverages may be available for such a profile (e.g., an insurance estimate). Enhanced account statements 554 may also be rendered and transmitted to remote interfaces on-line. The account statements 554 may include maps of usage, detailed explanations, and accountings of costs.

[0079] Monitoring the unit of risk 200 or using the device 300 may generate improved rating determinations or driver scores due to an improved acquisition and retention of user data. In some applications, a database 518 retains data from many customers and/or potential customers 206 and/or other drivers/operators. In time, an insurer may use the accumulated underwriting, rating, or driver score information from individual customers 520 to establish relationships between users or user profiles and levels of risk. Direct data acquisition may improve rating algorithms 522, 530. The algorithms and relationship may be retained in databases 518 remote from or within the unit of risk 200 or device 300.

[0080] Data acquired by the unit of risk 200 or device 300 may be used for insurance and non-insurance purposes, such as advertising and marketing; site selection; transportation services; land use planning; road design, surface or composition analysis, traffic planning or design; or monitoring road conditions. For example, a method 714 for underwriting insurance related to the operation of a machine is shown in Figure 7. The method includes determining a willingness of the party to allow one or more aspect of machine operation to be recorded at 718 and providing a device for recording one or more aspect at 722. At 726, a site or insurer may assign or assess a level of risk to the operation of the machine based in part on the indicated level of willingness of the party to allow aspects to be recorded. At 730, the insurer or site may determine whether or not to offer insurance based on the level of risk. At 734, a site or insurer may set a price for insurance coverage based on an assessed level of risk.

[0081] Since the price or cost (of insurance) may be determined (at 734) based on an assessed risk (at 726) and the level of risk may be based on willingness of a party or operator to allow an aspect to be recorded, the process may reward users based on their driving abilities and the driver's acceptance of a usage-based (insurance) program. Aspects of the method of underwriting and pricing insurance shown in Figure 7, such as the presentation of cost and other information that may influence machine operator behavior and affect insurance costs. The safety and savings may be marketed to sell insurance.

[0082] A measure of a parties' willingness to allow an aspect of a machine to be recorded at 718 may be made in many ways. For example, if an unsolicited request for the device (e.g. 300) for recording is received, it may indicate a relatively high level of willingness or enthusiasm to have one or more aspects of machine operation to be monitored and/or recorded. In time, data may show that machine operators or owners who are not customers of an insurer, but who request the device for recording, are more enthusiastic or have a greater willingness to have one or more aspects of their machine operation monitored. Their willingness may be greater than current customers of that insurer who request the device. In other circumstances, it may be determined that current customers that have access to contact information and may request the device with less effort are less enthusiastic than a non-customer. A request for the device after receiving an offer may indicate a similar willingness or may indicate a somewhat diminished level of

willingness. Responding to an offer may require less effort than someone who has not received an offer but requests the device.

[0083] In some circumstances, a level of willingness to have an aspect of machine operation monitored may be related to a user's driving behavior. For instance, some may assume that users that believe they are careful drivers will be more willing to have one or more aspects of their driving, such as, for example, the speed at which they drive, monitored. In contrast, others that may be more reckless may be less willing to have one or more aspects of their driving monitored. In some circumstances, these assumptions may not be true. Over time, an insurer may acquire and compile data in a database (e.g., 518) that includes information correlating to or establishing relationships between the willingness (or unwillingness) to have an aspect of machine operation monitored and a level of risk for one or more classes or categories. The data may be correlated with other user's data that describes actual vehicle use.

[0084] In some situations, parties that use the device 300 or unit of risk 200 may indicate a greater willingness to allow one or more aspects of machine operation to be recorded than do those who merely request the device, but fail to use it. In some uses, it may be assumed that those parties who install the device 300 and allow it to record machine data are more likely to be careful machine operators than are those who do not. Furthermore, those who review the recorded information locally or on-line may show a greater willingness to allow monitoring and may be among the more careful drivers. These users who provide the recorded information to an end-user may show an even greater willingness to be monitored and may be the most careful operators.

[0085] Each assumption may be subject to verification and change. Verification may analyze the collected data, correlate the data to actual losses, and relate the data to actuarial classes.

[0086] A level of risk assigned or associated with a party and/or the operation of a machine may be based on many factors, including demographics such as the sex, age, marital status, and/or address of an insured party or machine operator. Assigning a level of risk at 726 or establishing relationships (that may be retained in one or more databases) to the operation of the machine may be based in part on a measure of willingness to allow one or more aspects of vehicle operation to be recorded. This association may be assessed on known factors or through an analysis of retained data.

[0087] Assigning a level of risk at 706 to the operation of a machine may include an evaluation of selected data recorded by the device 300, or a copy thereof. Where the machine is a vehicle, such as an automobile, truck, motorcycle, RV, boat or airplane, one or more recorded aspects of machine operation may include speed, acceleration events, deceleration events and/or locations where the vehicle was operated and/or any individual or combination of those events or elements. Other individual or collective aspects that may be recorded include seat belt use, turn signal use and/or the times and dates of vehicle use. One or more of these aspects of machine operation, either alone or in combination with one or more other characteristic (that may include operator age, sex, location, selected demographics, etc.) may be compared to assess risk. The conclusions may be compared against assumptions about safe operation determined by an insurer or through actuarial data acquired or compiled from similar data to validate or adjust risk assessments. The results of such comparisons may be used to assign a level of risk at 726 to a driver or owner that is retained in a database, database management system, or other storage systems.

[0088] The collection and assessments may have many applications. For example, if the data received from the device 300 indicates that a relatively high percentage of vehicle operation is done at a speed deemed to be unsafe, the operator and/or machine may be placed in or assigned a high risk category. Additionally, or alternatively, if the recorded aspect(s) indicates a relatively large number of aggressive accelerations and/or decelerations for a number of miles driven, the operator and/or vehicle/operator may be assigned a high risk category or actuarial tier. In these applications, previously known actuarial parameters may be processed when evaluating the recorded aspect(s). In some analysis, location-based actuarial data may indicate that the safest class of drivers may perform rapid decelerations frequently in urban settings when compared to safe drivers traveling through rural areas. In this analysis, allowances may be made for location or other factors. When location information is not available, a location may be determined from other data.

[0089] Data may be stored or processed in relation to a trip. A trip may start when motion is detected or when the vehicle ignition is turned on (or data, such as speed data, is first detected or received and vehicle voltage exceeds a programmable threshold) and ends when motion ends or when the ignition of the vehicle is turned off (or when data,

such as speed data, is not detected or no communication occurs within a programmable time period or vehicle voltage falls below a programmable threshold, or in response to an insurer's or other entities command). In alternative devices 300, one or more combinations of these conditions may identify trips (e.g., a beginning and/or end of a trip). When motion sensors are used, a physical mechanism or electronic sensor may quantify motion. The device may be integrated with or in communication with the device 300 or a vehicle. In many applications, the device 300 may provide data that allow programs to reach conclusions. If a high percentage of the recorded trips are short (e.g., below some threshold distance and/or time), then a system may conclude that the vehicle is garaged in an urban area or is used primarily for city driving. In some analyses, the speed at which the vehicle is driven during the short trips may influence (or be a factor in) such conclusions.

[0090] Data validation or verification may also be part of the process of assigning the level of risk at 726 and/or in setting the price or cost of insurance at 734. For instance, the device 300 may log vehicle identification information (e.g., vehicle identification number or "VIN") and/or or network protocol information when the device initially interfaces a vehicle control system. Some information may be available from an in-vehicle network and may be requested, transmitted, received, and written to a non-volatile memory of the device 300. Additionally, where the device 300 or machine include an optional interface that allows a user to enter information (e.g., operator identification, code numbers, I.D. cards, biometric scans), this information may be received and stored in the memory of the device 300. Where the device 300 or vehicle include, or communicates with, location determining systems (e.g., GPS, wireless triangulation, trilateraleralism of encoded signals, etc.), this information may be stored in a logically distinct or common portion memory. The recorded and stored information may be compared against information recorded or transmitted earlier by the party. A recorded VIN may be compared against a vehicle description provided by the party when applying for insurance. Similarly, location information retained in the device may be compared against "garage location" information provided by a user (e.g., in a policy renewal form, for example). Operator identification and vehicle mileage information may be compared against operator lists and mileage estimates provided by the user (e.g., in policy application forms).

[0091] When incorrect data is found it may be corrected and the inconsistency (that may be found through comparisons with applications or renewals, for example) may be considered in cost calculations. In some circumstances, incorrect data may indicate a fraud. The detection may place a party in a lower or uninsurable underwriting class or in a higher risk tier.

[0092] The assigned level of risk at 726 may include an assignment of one or both of an underwriting tier and an insurance rate. The level of risk at 726 may be used to determine whether or not to offer insurance at 734 or establish a price for the insurance at 734.

[0093] The marketing method 714 may serve current customers or potential customers (e.g., those who are not current customers). Potential or current customers of an insurer may access stored data of one or more aspects of the operation of a machine through customizable software that allows users to access documents and files and software related to those files. These users may review data regarding one or more aspects of machine operation and, in some instances, relationships between many users and the relative levels of risk associated with those users. This may occur on a regular basis, at policy renewal time, when a potential customer is evaluating insurers, or at other times. In reviewing the data, the current or potential customers may indicate a willingness to allow an aspect to be recorded. Furthermore, after such reviews, or instead of them, the current or non-customer may transmit the recorded data to the insurer for the insurer's review and analysis. The analysis may determine a price (e.g., prospective or retrospective) for insurance coverage. In some circumstances, a retroactive discount may be offered against an insurance premium for a period that was monitored. Alternatively, assumptions may be made about future behavior based on the recorded data and/or the established relationships. The analysis may result in a discounted or a higher premium for prospective insurance periods. Non-customers may receive estimates or offers of insurance electronically or by courier (e.g., postal mail) that may include pricing information based the non-customer willingness to review recorded data.

[0094] The system may also serve a prepaid customer. When a customer contracts for insurance on a prepaid basis (e.g., per mile, kilometer, or per minute, or other unit of time), a user interface may allow the user to review the recorded data. The review may allow users to display a number of miles driven or number of minutes or miles remaining

on an account. It may allow users to estimate when a prepaid insurance balance may be consumed.

[0095] Decisions about insurance levels and insurance periods may be based on a willingness to allow one or more aspects of machine operation to be recorded at 718 and be transferred to an insurer. These determinations may be considered when deciding whether or not to offer insurance at 730 and its term. For example, it may not make sense to enter into a long term agreement with an operator or machine owner associated with or assigned to a high risk level (or high underwriting tier). However, a shorter term may represent an acceptable risk.

[0096] Assumptions may be tested. For example, a non-customer may request a device 300 for recording one or more aspects of a machine. The non-customer may install the device and store one or more aspect of machine operation for a trial period. The data may be transmitted or uploaded through a wireless, tangible, or combination network to a remote server at an insurer. In this example, it may be assumed, or it may be supported by actuarial information, that the non-customer is a responsible, law abiding, careful vehicle operator. Nevertheless, the uploaded data may indicate that, for example, the non-customer drove at excessive speed and/or with overly aggressive accelerations and decelerations. For these reasons, the insurer may be unwilling to extend certain insurance coverage to the non-customer and/or make a long term commitment. However, the insurer may be willing to minimize risk and improve an expected return by underwriting a limited coverage for a shorter term or by charging an additional premium. Less coverage, a shorter term, and/or continued data monitoring may cause the non-customer to change his/her driving behavior. As driving behavior improves, the likelihood of a better assessment may increase. If successful, the insurer may determine 730 to underwrite more coverage for a longer period and/or set a lower premium for such coverage.

[0097] The behavior modification and/or cost control aspects of the method for marketing insurance 714 may also include providing a remote interface to access "what-if" evaluations. The interface may allow users that record vehicle data to transmit the data to a remote insurance server cluster or site that provides the user with an opportunity to enter or change values to reveal the effect of those submissions. A user may adjust or evaluate different parameters, such as speed and distance traveled, to learn how these changes may affect their costs over time, such as an insurable term. The software may

accept a user's changes or even recommend changes automatically to highlight differences.

[0098] Behavior may change when users have access to data. A remote interface may allow users to view documents and access files and software related to those documents at a remote location. The remote interface may be customized to the user's preferences and may allow the party to upload or transfer the recorded information, or a copy thereof, from the device 300 to a remote computer or an insurer's remote server. The remote interface may transfer or render some or all of the data retained in the device 300 or selected information. In some systems, the remote interface may display graphs, animations, or graphics that may include one or more stored data elements (e.g., the recorded speed of a vehicle, distance traveled, the duration of trip(s): on a minute by minute or other time related basis, metadata, etc.). Alternatively, the remote interface may render information indicating a percentage of time the vehicle was operated within particular speed ranges, and/or at high risk or low risk locations (routes), and/or times, with aggressive accelerations or decelerations, summaries or information about another aspect (e.g., turn signal use, seat belt use, vehicle roll, vehicle yaw, entertainment system on or off status, radio or television station, compact disc, digital video disks, or other entertainment being played, telephone use, convertible top up or down status and/or tire pressure, etc.). Where the machine is industrial or farm equipment, other aspects may include line speeds, operating pressures, safety gate status, temperatures, operator run times, machine configuration information (e.g., harvester, plow, planter, or other configurations), etc.

[0099] In some systems, client-side software executed by a remote interface may allow users to review information. The content may indicate how the recorded information may affect a prospective or retrospective cost of insurance. For example, the software may display the recorded information with a message indicating that a five percent discount may be available if the data is transmitted to an insurer or a service provider. Additionally, or alternatively, the software may automatically highlight portions of the stored data that may qualify the party for additional discounts or surcharges. These highlights may be explained through hyperlinked documents or tags that may not be visible to the user, but may be activated by selecting or hovering an absolute or relative pointing device over a link or tag.

[00100] In some systems, the interface that allows a party to review recorded information about one or more aspects of machine operation allows users to compare operational behavior to the operational behavior of others. For instance, a party's recorded data may be compared against an average or aggregate set of data received from other users. Statistical or other comparisons may be made. These comparisons may compare a user's data to an average or aggregate of some or all parties who have uploaded data, an average, or aggregate of data provided by operators with similar demographics or characteristics (e.g., age, sex, location, etc.), an average or aggregate of data provided by parties associated with similar machines (same model car, same model milling machine, same size heat treating furnace, same model tractor or same model combine) or a combination of other classes of data.

[00101] In some systems, the interface that allows a party to review recorded information may include a transceiver or transmitter that may transfer the recorded information, or a copy thereof, from the on-board portable mobile device 300 to a device or destination that may deliver a portion of the information to the user. A transfer may be made by a wireless or physical link. The connection may be made by a cable that links the device 300 to a communications port (e.g., and RS-232, USB port or a parallel port) of a computer, programmable digital assistant, or other device. Alternative, complimentary, or backup connections may be made by devices compliant with low-power, wireless mesh networks (such as Zigbee), a multilayered communication protocol (such as Bluetooth RTM) or other wireless networking or communication technology (including the transceiver protocols described above).

[00102] In some systems, a compatible interface may enable the device to connect to a remote computer (e.g., a home computer), a work station, or personal digital systems (that may include a display device). If the ancillary device is portable or is in proximity to the on-board portable mobile device 300, a physical or wireless connection may be made. For example, a cable may link a personal digital assistant or laptop computer to the on-board portable mobile device 300 while the device 300 is physically connected to an OBDII connector or virtually connected to a vehicle interface.

[00103] Through a wireless interface, data may be delivered to a user and displayed even when the display is remote from the on-board portable mobile device 300. For example, the on-board portable mobile device 300 may establish a connection with a remote

computer when the vehicle is parked in proximity to a home or a remote network interface. A vehicle may be parked in a driveway or a garage and be within range of a wireless connection. When a connection is established, the technology may transfer a copy of the recorded information from the on-board portable mobile device 300 to a remote destination.

[00104] In some applications, the on-board portable mobile device 300 may be removed from the vehicle and connected to a remote transmitter, transceiver, display, or other device. In some applications, the device may be removed from the vehicle on a regular basis (e.g., monthly, quarterly, or yearly) to enable communication with a remote device, such as a display device. A wireless or physical connection may be established between a personal computer or other computational platform to allow the on-board portable mobile device 300 to transmit the record data. After a connection is made, some or all of the recorded data may be transferred or copied to a second device. The data may be displayed, processed, manipulated, analyzed, and/or compared to other data. In some systems, the data retained in the on-board portable mobile device 300 is stored and/or is transmitted in an encrypted format. When received in an encrypted format, the intermediary or destination may include software or hardware that restores the data to its original form.

[00105] In another application, an interchangeable component of the on-board portable mobile device 300 may be physically removed from the device 300 to transfer data. Some devices may include a self-contained assembly of components and circuitry, such as a removable memory card or stick. Data may be stored on the removable storage element. When the storage element is interfaced to a remote device, the data may be transferred to a remote site. In some systems, the removable element may be erased after a data transfer. Once transferred, the removable element may be reconnected to the on-board portable mobile device 300. Should the removable element not be erased, the data may be archived and a replacement may be reconnected to the on-board portable mobile device 300. If the interchangeable device comprises a memory, it may comprise memory sticks or other devices that may store and retrieve data. Some interchangeable devices may comprise movable media, such as floppy disks, recordable compact disks, digital video disks, static media such as block-oriented memory, etc.

[00106] Data transfer may occur automatically or in response to user commands. When a transfer occurs, a party may be rewarded with a discount for transmitting the data to a remote destination, such as an insurer's server cluster. The data may indicate that an insured party is entitled to an additional discount or subject to a surcharge. If a party is not a customer, a quote may be transmitted to the user.

[00107] In some systems, data is stored in multiple forms in the device 300. The first form may comprise an encrypted form for communication with a display device, node, or an external device. A second set of data may be encrypted in a second format through a second encryption algorithm or device. The second set of data may be transmitted to a second node or service provider, such as an insurer. The encryption schemes may prevent unauthorized access to the data.

[00108] The interface that allows a party to review the recorded information may be local to a user (e.g., installed locally on the parties' personal computer or computing platform), may be remote to a user (e.g., installed on a remote computer or server and communicated through a wireless and/or physical link that may comprise an internet link), or may be distributed among a different platforms or locations. For example, the software and hardware that comprises an interface that provides a preview portion may be installed and run locally, (e.g., on a party's computing), while other detail or display functions may be served by a remote content provider through a server or cluster (e.g., a Web page server).

[00109] Some parties may be reluctant to provide information to an insurer unless the party is assured that the data will lower their expenses (e.g., reduce insurance costs). Through a distributed transaction processor or processing, a local computer may allow a user to review and analyze the data and control its distribution to a service provider, such as an insurance company. A separate computer or cluster may be programmed to analyze the data, assess risk, assess performance, or establish an insurance rate, and transmit some or all of the results of the analysis to the local computer. By distributing the analysis to a separate computer, some systems may provide the user with an incentive to transmit the recorded data to a third party.

[00110] For example, in Figure 8, preview software retained and running, for example, on a personal or local computer may receive and render a driving summary display 814. The driving summary display 814 includes a policy discount section 818, a graphical

operating performance section 822, and a numerical operating performance section 826. Clicking or selecting an upload button 830 may direct the software to transmit encrypted data from the device 300 or local computer to a remote computer, server, or cluster. The remote computer, server, or cluster may belong or may be associated with an insurer or a third party service provider. When selected, hardware and software may activate a program that transmits the data through a physical or wireless link (e.g., an internet or telephone based connection).

[00111] When received, the remote server or cluster may analyze and/or transmit data that cause a display of the information in one or many formats. The display may include a numerical performance display section 826 that includes a logging start time stamp 832, a logging stop time stamp 834, and a percentage of time connected parameter 836. The start and stop time stamps 832, 834 may indicate the time period in which the data was monitored. The percentage of time connected parameter may indicate how faithfully the device 300 or interchangeable component of the device 300, (e.g., a memory module) was used during that period. For example, if the percentage of time connected 836 was relatively low, it may indicate that the device 300 or interchangeable component was disconnected and did not record machine performance during long periods of time. This may suggest that the machine was operated in an unsafe manner during that time. A relatively high value, on the other hand, may indicate that the submitted data is representative of machine performance or driver behavior. In some systems, the percentage of time connected parameter 836 may be used to determine a driver's willingness to record operational data at 718. This measure may influence underwriting decisions and rating scores. For example, when the percentage of time connected to a vehicle bus or controller is low, the low use may be associated with a higher level of risk that reduces or eliminates a discount.

[00112] The numerical driving performance section 826 may also display summary information about recorded parameters recorded by the device 300. When appropriate, the information is presented on an annualized or customized basis. In Figure 8, the logging start and stop parameters 832 and 834 indicate that the summarized data was collected over a 31 day period. Software and hardware allows users to review machine use or mileage estimates based on a predetermined logging period (e.g., the 31 day logging period) through the remote interface. In some systems, projections may be based

on the ratio of recorded days versus the number of days in a year; in other systems; the projections may be seasonally adjusted. The interface (and preview software) may project an annual daytime mileage of 14,958 miles based on the number of miles recorded in the logging period. Additionally, the interface and (preview software) may display a nighttime mileage projection 840 of 113 miles and a high risk mileage projection 842 of 0 miles.

[00113] In Figure 8, a client-side scripting may add interactivity and may customize the viewing or delivery of documents that may be updated dynamically. The page may include numerical performance display 826, including indications 844, 846, and 848 that the vehicle is driven above 75 miles per hour 0.02 percent of the time, aggressively accelerated 16.8 times per 100 miles driven and was aggressively braked or decelerated 3.1 times for every 100 miles driven. The graphical operational performance section 822 may display these parameters 838 - 848 as pictorial representations, such as graphics or charts in relation to a comparison value, such as an average or nominal values 850. The inclusion of a comparison value may allow the operator to compare individual operating habits or profiles to other operators or drivers or profiles.

[00114] In Figure 8, the discount section 818 of the operational summary 814 indicates that a total discount 852 may be based upon an upload bonus 854 or a rating factor, such as a safety score 856 and/or a usage discount 858. Current customers may apply the discount 852 to a premium to determine a cost of insurance. Non-customers may apply the discount to a cost presented in an insurance quote. The insurance quote may be estimated, or, if the data is delivered to an insurer, delivered electronically in real-time, after a delay, or through a postal service, and may be a firm offer. In some systems, a cost of insurance notification is transmitted after the recorded data is transmitted or transferred to the insurer.

[00115] In some exemplary systems, an upload bonus 854 may reflect a portion of a discount applied to an insurance premium. It may reflect the willingness to monitor machine operation and the uploading, transmitting, or otherwise providing recorded data to an insurer. Other (e.g., lesser or greater) discounts may also be given. A discount may be given to users that record and review their machine (e.g., vehicle) data, but do not transmit the data to an insurer. A smaller discount may be given to those who request and install the device 300, but do not review the data or transmit the data to an insurer. In

some applications, a willingness less than that willing to transmit data to the insurer may be assigned 726 a level of risk that results in no discount, or may result in the assessment of a surcharge. The safety score 856 and usage discount 858 of Figure 8 may be explained through secondary screens, windows, or documents that may be linked by tags or a markup language associated with text, icons, or other elements.

[00116] In Figure 9, a server side scripting may add additional interactivity and customizes the viewing or delivery of documents or objects that may (be updated dynamically and may) include a safety score or rating. The page or documents may include a score display 914 (that may include graphical objects) in proximity to a safety score explanation section 918. Some safety score displays 914 may include the discount summary 818 and graphical performance section 822.

[00117] In some systems, the safety score may be based on one or more driving or operational characteristics. In some systems, the characteristics may include a speed factor 922, an acceleration (and/or deceleration) factor 924, and/or a braking factor 926. An on screen help feature in the form of a help window 930 or a cartoon like dialog balloon may appear when a user positions a cursor over an icon or element to further explain the elements or objects on the page or document(s). For example, a help feature may explain that an excessive speed factor 922 may be programmed to a predetermined value (e.g., such as 2.0), but is thereafter reduced at a fixed or variable programmable factor based on one or more parameters. In some systems, the predetermined value is thereafter reduced by a programmable factor of 1 for every 1.5 percent of driving done at a speed over 75 miles per hour (a predetermined amount). A help feature, such as a help window 930, may explain that a braking factor, such as an aggressive braking factor 926, may be programmed to a predetermined value (e.g., such as 2) and thereafter is reduced at a fixed or variable programmable factor based on one or more parameters. In some systems, the predetermined value is reduced 1/6 times the number of observed, recorded, or detected aggressive braking events normalized to a per 100 miles driven basis. A help feature or window 930 may also explain, for example, that an acceleration factor, such as an aggressive acceleration factor 924, may programmed to a predetermined value (e.g., such as 2.0), and is thereafter reduced at a fixed or variable programmable rate. In Figure 9, the rate may comprise a fraction (e.g., 1/14) times the number of aggressive acceleration events recorded in the device 300 normalized to a per 100 miles driven basis.

In Figure 9, the safety score or rating may be adjusted or weighted by a function, such as the function 920 that comprises a combination of speed factors 922, acceleration factors 924, and braking factors 926, or may be based on a single factor that may be a raw data element, calculated data element, and/or derived data element alone.

[00118] In Figure 10, a server-side scripting adds additional interactivity and customizes the viewing or delivery of documents or objects (that may updated dynamically) to render a usage discount display 1014 having a usage discount detail section 1018. The usage discount display 1014 may also include the discount summary display 818 and a graphical operation performance section 822. The usage discount usage discount 1022 may be a function of one or more elements. In Figure 10 the elements include a starting discount 1024 and rating factors. The rating factors rendered in the exemplary page reflect a daytime mileage adjustment 1026, a nighttime mileage adjustment 1028, and a high risk mileage adjustment 1030.

[00119] In some systems, a help feature, such as a help window 930, may explain that the usage discount 1022 may be programmed to the value of the starting usage discount 1024, but is thereafter reduced by one or more adjustment values. In some systems, the adjustment values may be based on daytime driving 1026, nighttime driving 1028, and/or a high risk adjustment 1030. For example, a starting usage discount may be programmed to a fixed percent (e.g., 10 percent). The usage discount 1022 may be adjusted higher or lower based on one or more adjustment values. In Figure 10, the usage discount may be adjusted downward based on the number of annualized miles driven during the day, driven during the night, and/or classified as high risk. Daytime miles might, for example, may be miles driven between a programmed range (e.g., the hours of 5 a.m. and 10 p.m. local time). Miles driven between the hours of 10 p.m. and 5 a.m. Monday-Friday may be classified as nighttime miles. Miles driven during the hours of 12 a.m. to 4 a.m. on Saturday and Sunday might be classified as high risk miles.

[00120] A help feature or window 930 may explain that a daytime adjustment may reduce the starting usage discount by a predetermined programmable value (e.g., 1 percent for every 1000 miles driven) beyond a predetermined limit (e.g., 7250 miles per year). Miles driven during nighttime may reduce the usage discount by, for example, a fixed programmable percent (e.g., 2.5 percent for every 1000 nighttime miles driven) in excess of another predetermined limit (e.g., 250 miles). High risk miles may reduce the

usage discount at a predetermined programmable rate (e.g., 12 percent per 1000 high risk miles driven).

[00121] In some pages and documents, the total discount 852 may be calculated by multiplying the usage discount 858 by the safety score 856 and adding the upload bonus 854 to that product. In other applications, the usage discount may be based on other factors and/or functions.

[00122] If the party selects or decides to provide recorded data from the device 300 to the insurer, the user may click or select the upload button 930. The interface and preview software may server as an intermediary that transmits encrypted data from the device 300 to a server or cluster of the insurer or to a third party through a publicly or privately accessible distributed network. In some systems, the device 300 transmits encrypted data. When a data transfer is complete a party may elect (e.g., by clicking or selecting) or enable a clear logger button 1040 that directs the preview software to issue commands to erase selected recorded data from the device 300. The device may be cleared in blocks or bytes to free up resources and allow a dynamic memory allocation process to reallocate memory to functions within the device 300.

[00123] In Figure 11, a server side scripting adds more interactivity and customizes the viewing or delivery of documents or objects (that may updated dynamically) to render recorded information regarding one or more aspect of machine operation. Through these documents, a party associated with a machine may further review the data through the pages that may be served through a Web site. The Web site may transmit tools 1114 associated with files, graphical elements, and scripts that may examine how adjusting operational behaviors or characteristics may affect a cost of insurance (or a discount or surcharge on insurance) in the future or from the past. For example, the Web site may transmit dialog boxes such as text entry boxes 1118 or graphical sliders 1122 that may manipulate or edit summary information. The summary information may include information received by the insurer or the third party service provider of the insurer. A party may log in or otherwise associate him or herself with the uploaded data and summary information. The uploaded data may be preloaded into tools 1114, 1118, and 1122. A usage discount summary 1126, safety score summary 1130 and/or discount calculation 1134 portions of the Web page may be preloaded with summary information. A party may use the text windows 1118 or sliders 1120 to change the displayed

performance summary information to reveal how different machine operational behavior may affect a (prospective or retrospective) cost of insurance, discount, surcharge, or coverage (not shown).

[00124] For instance, a party may change a position of an aggressive accelerations slider 1138 and observe, for instance, how reducing the number of aggressive accelerations that may occur when driving may affect a (or their) safety score 1140 and/or a discount 1142. Similarly, increasing the number of daytime 1144 or nighttime 1146 miles driven may reveal changes in a usage discount 1126 and a calculated or total discount 1142. Other pictorial or graphical display techniques may highlight the significance of these changes. For example, the colors of the slider 1122 or entered text 1118 (e.g., that may yield an impression characteristic) may be changed to indicate the level of risk, safety, and/or cost associated with the current or adjusted values.

[00125] In Figure 12 a server side scripting adds more interactivity and customizes the viewing or delivery of documents or objects (that may updated dynamically) to provide a review or comparison to other parties. A party may compare one or more aspect of operation of the machine or a party's behavior to other parties and machine operations. For example, a table 1214 or graphic may compare operational aspects 1218 of the machine to historical and/or statistical data such different averages 1222.

[00126] Server side scripting customizes the viewing or delivery of documents that illustrate a speed distribution graph 1314. The speed distribution shown in Figure 13 illustrates a percentage of time a vehicle is operated within predetermined or programmable speed ranges. In alternative pages data comparisons are provided between a user and the speed distribution of an average driver (that may have a similar or differing demographic), neighboring drivers, and other drivers of the same model vehicle or any other comparison. Information about other operational parameters may also be delivered to a user's remote interface. For example, a distribution graph displays the percentage of time a seatbelt is used, a radio is played, or a cell phone or wireless device is used or frequency (e.g., the number of times) turn signals are used per a predetermined distance (e.g., 100 miles).

[00127] Summary information about the received recorded data may be transmitted in other contexts that a user may request. For example, a distribution 1414 may be generated by a server-side script that correlates driving activity to the days of the week

(Figure 14). Additionally, or alternatively, driving activity may be correlated to a time of the day and presented in graphical format 1418. In alternative pages or documents, the data may be presented through comparisons to other machine operators or drivers. If the data is presented in comparison to neighboring drivers, the party may determine a time of day for driving when traffic is light, which may reduce the driver's level of risk.

[00128] In Figure 15, a Web site delivers the tags, text, pictorial objects, and/or scripts that provide the exemplary summaries of machine operation in the form of a log. When summarizing a vehicle's operation, the data may comprise a trip log 1514. Asynchronous vehicle events, such as an ignition cycle, the detection of speed, or other data may identify the beginning or the end of a trip. In Figure 15, ignition start and stop events are used to identify the beginning and the end of trips. The length of time and the number of miles driven for each trip or for the total number of trips on a given day may be tracked and transmitted to a user's remote interface. Where a fuel consumption aspect is included in the recorded data, fuel economy may be included in the trip log. When presented in a graphical format, fuel economy may be used to detect an engine, system or other failure, the onset of a failure, or to remind a user to schedule or perform preventive maintenance that may allow the user to avoid a failure.

[00129] Trip log information may assist a user account for miles driven. When used for work-related purposes, it may assist a user to account for business expenses. When delivered to a server or cluster hosted by an insurer, miles driven or the number of hours a machine is operated may be transmitted to a user's remote interface with a cost of insurance on a per trip basis. When serving a prepaid user, the server or cluster may transmit the monitored parameter (e.g., miles driven or the number of hours a machine is operated) with its associated costs (e.g., as a bill or debit from a pre-paid amount).

[00130] Some server-side scripts adds interactivity and customizes the viewing or delivery of documents or objects (that may updated dynamically) by automatically selecting and/or highlighting parameters. Figure 16 highlights behavior or data that may increase insurance costs, such as aggressive braking 1618, aggressive deceleration 1622 events, excessive number of trips, duration of trips, distance of trips and time spent above a threshold speed 1626. The highlights may be delivered through a context-sensitive script or program that that highlights high risk parameters relevant to a user that may be based on a user and/or context (e.g., information may be highlighted if it reflects risks

associated with an actuarial class). The highlights may assist a user in modifying their behavior.

[00131] A server-side scripting may add other interactivity and customizes the viewing or delivery of documents, objects, or records (that may updated dynamically) related to the device 300. A record may indicate when the device 300 was cleared 1718, when the device 300 was installed in or interfaces a machine 1722, was removed from the machine 1726 and/or when data was transferred 1730. It may allow a user to review data processed through local software (such as their preview software described in Figure 8). It may allow a user to review a percentage of time installed parameter (e.g., 836) and/or other data retained in an interchangeable component, such as the removable storage element.

[00132] In some systems, a network connection to the insurer or a service provider may maintain the device 300. For example, software updates may be provided to the device through a Web site. If the device 300 is to be interfaced to a different machine or through a different protocol, device software may be changed to accommodate differences between machines (e.g., firmware updates). Device updates may occur through hardware changes (e.g., memory chips or cards) or through magnetic or optical media physically delivered to the party. In yet other alternatives, updates are provided through wired telephone or wireless connections to the insurer or the service provider or directly to the device itself.

[00133] The hardware, software, and scripts that allow a party to review recorded information described above is exemplary only. In some embodiments, the hardware, software, and scripts may be run on a local computing platform. In other embodiments, the software and scripts may be delivered from a remote Web site or other communications network. In still other embodiments, a party may not be able to review the recorded data. Instead, the data is provided to and processed by the insurer without review.

[00134] The device 300 may be embodied in various combinations of hardware and software. For instance, an embodiment adapted for use with factory machinery may be embodied in software that may be stored, for example, in a programmable logic controller (PLC) or supervisory computers controlling factory machinery. An exemplary embodiment 1810 of the device 300 may include a processor 1814, program storage

1818, a data log 1822, a clock 1826, an optional internal power source 1830, a machine interface 1834, and a display interface 1838. The program storage 1818 may comprise storage medium, which may be a read only memory (ROM), Electrically Erasable Read Only Memory (EEPROM), a Flash memory or other non-volatile storage medium. The program storage 1818 retains instructions for controlling or directing the processor 1814 to record one or more aspects of machine operation. The processor 1814 may process signals received through the machine interface 1834 and store information in the data log 822. In some embodiments, data may be stored in the data log 1822 with a time stamp indicating the time of day information is received, generated, or changed. In some systems, a timestamp may comprise a time value based off of the clock 1826, the vehicle, or a wireless bus or network.

[00135] In some systems, the program storage 1818 may store instructions for encrypting data. For example, data to be transmitted to an insurer or a service provider may be encrypted before or as it is being stored in the data log 1822 (or when it is transmitted to a remote destination). In some embodiments, a second (or backup) copy of the data or information may be retained in the data log 1822 using a second layer or technique of or for encryption. A first layer or technique may be used for data to be transmitted to a user or local device or may be maintained as a backup or duplicate copy. A second layer or technique may be used for the data to be transmitted or delivered to an insurer or a third party service provider.

[00136] In some embodiments, the program storage 1818 may retain instructions for monitoring sensor output or measuring vehicle parameters (such the acceleration and/or deceleration rate of a vehicle). The device 1810 may monitor vehicle speed data (based on output of speed sensor) through the machine interface 1834. The speed information may be processed at a synchronous rate (e.g., once per second) by the processor 1814. The difference between consecutive speed measurements may be continuously measured in the vehicle or after the device 1810 transmits data (e.g., may comprise synchronously recorded speed) to a remote site. A positive difference between a current speed and a previous speed may indicate, for example, an acceleration event. A negative difference may indicate a deceleration event. An aggressive acceleration event may be identified when an acceleration value exceeds a programmable threshold. When analyzed in the vehicle, the rate of acceleration may be stored in the data log 1822 and time stamped

(and/or date stamped) by the processor 1814. When a deceleration rate exceeds a threshold, the rate of deceleration may be stored in the data long 1822 and time stamped (and/or date stamped) by the processor 814 when aggressive deceleration events are identified in the vehicle.

[00137] In some systems, the rate of acceleration or deceleration may not be derived in the vehicle or at a remote site. In these systems, one or more accelerometers may transmit acceleration and deceleration rates that may be processed as described above.

[00138] In some systems, the program storage 1818 may retain relationship data and instructions to preserve other data for retrieval. Program storage 1818 may direct the processor 1814 to monitor and store raw data elements (such as vehicle speed) through the machine interface 1834 at a synchronous rate. Speed and other data may be recorded, and time stamped, at a regular interval and/or upon an asynchronous event (e.g., when a speed threshold is exceeded). Other data may include trip start and stop times, device 1810 installation and de-installation times, seat belt use, turn signal use, location or route information, entertainment system use, cell phone use, tire pressure, other safety and performance parameters, and relationship data. Relationship data may comprise data that establishes a connection between the monitored or recorded data and one or more vehicle or driver characteristics. In some systems, data that establishes a connection between the monitored or recorded data and an identifier (e.g., a unique identifier to the system) or user account may comprise relationship data.

[00139] When physically connected to a vehicle, the machine interface 1834 may mate with an in-vehicle connector (e.g., an onboard diagnostic connector), such as an OBDI, OBDII and/or OBDIII connectors. Additionally, or alternatively, the machine interface 1834 may include connectors that mate with other connectors (e.g., such as those known as SAE J-1962 connectors). Furthermore, the machine interface 1834 may include electronic components that generate signals that interface the networks associated with those connectors. For instance, the machine interface 1838 may comprise electronic components compatible with a Controller Area Network (CAN) protocol, Media Oriented Systems Transport/Transfer (MOST), J1850 Variable Pulse Width (VPW), J1850 Pulse Width Modulated (PWM), Keyword Protocol 2000 (KWP2000), J1939, ISO9141, and/or protocols adopted by the International Organization for Standardization (ISO), Society of Automotive Engineers, or an automotive (in-vehicle protocols) or OEM protocol.

[00140] In some systems, an optional display interface 1838 may include one or more connector and associated electronic components for communicating with a display, computational platform, personal computer, and/or digital personal assistant. Some display devices include an RS-232 connector and/or USB connector for receiving and transmitting signals using one or more protocols. Additionally, or alternatively, one or both of the interfaces 1834, 1838 may include wireless communication software and hardware compliant with some or all of the wireless standards described above. These interfaces may automatically identify and connect with other computers and devices.

[00141] In yet another alternative, the data log 1822 may comprise a removable storage element, such as, for example, a memory chip, card or stick, or a movable media (e.g., rotatable media), such as, for example, a floppy disk, or recordable CD or DVD. In these systems, the optional display interface 1838 may also comprise the removable storage element. The removable storage element may communicate with a display device through, for example, a memory reader or drive that transfers or copies data from the removable storage element to a display device.

[00142] In some embodiments, the device 1810 receives power from the vehicle through the machine interface 1834. In these embodiments, the internal power source 1830, such as, for example, a battery, "super capacitor," or capacitor, may maintain the optional clock 1826 when the device 1810 is disconnected from the vehicle. Additionally, in some embodiments, the power source 1830 may provide power to the data log 1822 for maintaining the recorded data when the device 1810 is separated from the vehicle or machine. For example, if the data log 1822 includes CMOS memory, the internal power source 1830 may serve as a battery backup for retaining the data.

[00143] In some embodiments, the device 1810 may receive power from the display interface 1838 when the device 1810 is connected to the computational platform, display, personal computer, and/or PDA. In some embodiments, the device 1810 may interface a remote clock or timing device that synchronizes to remote time signals. Time may be received from governmental or standards organizations, such as, for example, the National Institute of Standards and Technology and associated radio stations, such as WWVB, or through a wireless network. In some systems, the clock 1826 is calibrated when the device 1810 connects to a vehicle. In other embodiments, the clock 1826 calibrates when the device connects to a computational platform, display, or a network.

For example, a Web page, GPS network, or wireless network may provide a timing signal that synchronizes the clock 1826. In these embodiments, an internal power source 1830 may be used to maintain the clock between update events.

[00144] Figure 19 is a network that may communicate with on-board portable mobile devices 300. The host system may comprise two or more trip monitoring servers 1916 and 1918 or 1920 and 1922 (e.g., server farm or clusters) that operate and appear to the on-board portable mobile devices 300 as if they were a single unit. The clusters 1916 and 1918 or 1920 and 1922 improve network capacity through load balancers 1912 and 1914 that spread work (e.g., requests and responses) between the servers 1916 and 1918 or 1920 and 1922. Before a request is parsed and forwarded, it must be passed through a firewall 1908 or 1910 that incorporates filters that allow or deny a request to enter or leave one or more local area networks serving the clusters. A packet filtering may be used to accept or reject packets, including the exchange of short text messages that may be exchanged between the device 300 and the clusters 1916 and 1918 or 1920 and 1922. Some packet filtering may accept or reject packets based on their origin or content.

[00145] To access a cluster 1916 and 1918 or 1920 and 1922, the device 300 may access a plurality of Access Point Names (APN) 1902 and 1904 that may interface external wireless network nodes. One of many APNs 1902 and 1904 may be automatically selected based on signal strength and a series of signal exchanges that acknowledge a communication or the transfer of data without an error. The order of selection of an APN 1902 or 1904 may be based on configuration files that are automatically executed by a communication controller or by one or more processors. The configuration files may comprise files (e.g. text files, batch files) that identify the device 300 (e.g., a unique identifier) and/or control the device 300 operating behavior. Commands or priorities in the configuration files may enable or disable features, set limits on resources (e.g., memory allocations, number of sensor outputs that may be monitored, etc.) and extend the functions of the device 300. Device extension may occur by loading device drivers that control or support hardware specific to the device 300 or to a customized use (e.g., monitor specific outputs, derive specific elements, enable or drive an audio, text, and/or video transmission, transmit in a selected wireless protocol, etc.). An exemplary configuration file may be created or modified by an insurer or third party (e.g., in other versions, by the operating system at system installation) at any time, and contain

commands that configure the system to establish monitoring (e.g., sample frequency, storage frequency, error tracking, etc.,) and/or communication (e.g., sequential protocol detection, network selection, connection conditions, network connection frequencies, file formats, signal monitoring, transfer protocols, etc.).

[00146] System installation may set up applications in the device 300 to monitor a vehicle 1902 or 1904 and communicate with remote destination(s). When a voltage threshold is detected or reached (or the unit 300 identifies the desired vehicle), an initialization file containing information about the initial configuration of the device 300 may be executed by a communication controller or one or more processors of the device 300. The initialization file may include commands that determine the source and transmission protocol of the physical or virtual in-vehicle data bus. In-vehicle bus protocol may be identified through a sequential handshake. The device 300 may cycle through a plurality of protocols by transmitting requests in different protocols while waiting for a valid response. When a valid response is received, the communication controller or processors may store the identity of the validated protocol (or if more than one protocol is used, store the identity of the valid protocols) in a cache or a non-volatile memory and loads software routines (or a Basic Input / Output System, BIOS, from a non-volatile to an operational memory) that support data transfer or exchanges between the device 300, the vehicles 1902 and 1904, and input/output nodes. Some devices 300 may synchronize an internal timing device or clocks to an in-vehicle clock. In other devices 300, clock synchronization to the vehicle does not occur when the internal timing devices synchronizes to local time maintained on the out of vehicle networks (e.g., external networks).

[00147] When a connection is established between the device 300 and the in-vehicle data bus, the initialization file may request vehicle attributes and manufacturers' data. Some systems may request Vehicle Identification Numbers (VIN) through the in-vehicle bus. A VIN may establish a manufacturer, assembly location, and vehicle characteristics, such as the engine, transmission, differential ratio, year, make, model, and/or a unique vehicle identifier of that vehicle. The initialization file may also establish other defaults and/or user preferences that may be edited, modified, or updated by the operating system or through software releases and/or updates from the insurer or third party.

[00148] Before a device 300 initiates a connection with an external network and then a session with a content provider (e.g., an insurer or third party), it may select between multiple wireless nodes. In some cellular applications, one or more nodes may support a Wireless Application Protocol APN and other node(s) may support a World Wide Web APN. The Wireless Application Protocol APN may provide access to known destinations and/or information services provided to the users of that proprietary network. World Wide Web APN may provide access to known destinations and any content (or server) accessible through a publicly accessible distributed networks like the Internet.

[00149] Upon an initialization event, after a synchronous period (e.g., after a predetermined time such as twenty-four hours from a plug-in event), and/or an asynchronous event (e.g., a trigger event), a wireless connection may be made and a session established between the device 300 and the external wireless network. When established, the device 300 may synchronize its internal timing device or clock (e.g., time of day, date, and/or month) to the time, date, and/or month maintained by the external network. In some networks, including cellular networks, data exchanges may occur through wireless control protocols, wireless encryption protocols, and/or other communication protocols. Wireless control protocol and a wireless transaction facilitator may control the communication throttle (e.g., transmission rates across the network) based on the available bandwidth of the network. Programming and instructions stored in non-volatile memory (e.g. firmware) may be updated through a wireless control protocol and/or a wireless transaction facilitator.

[00150] A dynamic memory allocation processor or a dynamic memory allocation process may allocate memory to maintain existing firmware (e.g., a legacy version that may include startup routines, input/output instructions, etc.) when updated firmware is transferred to the device 300 through a physical or virtual link. If a device self-diagnostic or an error-detection coding detects an error during storage or transmission, the legacy firmware may be automatically restored and the device 300 may be reset to the preferences and defaults observed before the unsuccessful update. When an error correction coding is used, a detection and correction of errors may be made during the transfer or installation of the firmware to assure an error-free version is stored or installed within the device 300. The update may be installed or the legacy firmware sustained before the memory allocation processor or the dynamic memory allocation process de-

allocates the memory retaining the uninstalled or inactive version of the firmware to free the previously allocated memory.

[00151] An APN selection may select one of two private front end branches that comprise substantially similar or identical processing functions in Figure 19. Firewalls 1908 and 1910 allow or deny entry to or exit from the local area network. Load balancers 1912 and 1914 pass commands, firmware, and/or data between two or more trip monitoring servers 1916 and 1918 or 1920 and 1922 (e.g., to improve throughput and response times). The servers 1916 - 1922 may support wireless control protocols (e.g., a Web service), wireless encryption protocols, a wireless transaction facilitator, a Short Message Service (e.g., a Web service that may support up to about 160 characters) and other communication facilitators and protocols. The device 300 and servers 1916 – 1922 may be File Transfer Protocol compliant to support the download firmware to or upload files from the device 300. Firewalls 1924 and 1926 may secure the middle tier and backend networks shown in Figure 21 from the front-end networks shown in Figures 19 and 20.

[00152] A client may access a similar network of firewalls, load balancers, and servers 2008 - 2026 shown in Figure 20. Through a publicly accessible distributed network 2006, distributors 2002, customers 2004, and other authorized users may transmit requests, and receive, parse and render responses from an on-line services cluster 2016 and 2020 (that may communicate through Web services) and/or Trip monitoring servers 1916 - 1922. Some response may include scripts that display responses in a common window where the request originated or in a different window. Some presentation choices may be made by the user, by a selected link, or may be made as a result of a response as described through this written description. Some responses contain scripts that may cause an output to be rendered in a different visual window. In some instances, such as when output highlights safety or cost content, a separate visual window may be rendered to attract the user's attention or focus. The impression characteristic of a response (e.g., choice of fonts, color, graphics, positions, animations, styles, etc., may indicate a designator of source) may be selected by or tailored to a sender's desired format at the server-side (e.g., through an active server page).

[00153] Two or more application servers (e.g., clusters) 2102 and 2106 may reside in the middle-tier of the server centric architecture. The servers 2102 and 2106 may provide

middleware service for security and maintenance. In Figure 21, the application servers 2102 and 2106 are wireless transaction facilitator and device data transform compliant. In some systems, the middle tier servers 2102 and 2106 may comprise batch servers serving as a first location in which the raw data elements, calculated data elements, and/or derived data elements may be temporarily stored, locally or across a distributed storage devices or database(s) 2108. For longer term storage or data analysis, data may be retained in database(s) 2108 and 2114 (e.g., relational databases that may comprise one or more flat files (2-dimensional arrays) that may be transformed to form new combinations because of relations between the data in the records or other databases, such as hierarchical databases that retain searchable indices that reference distinct portions within that database and/or other storage devices or databases accessible through an archive file server 2104 and/or a database management server. A parallel database system (not shown) may be accessed by one, two, or more processors that may service database management requests, such as structured query language, transaction logging, input/output handling, and data buffering. It may provide quick access to databases across multiple storage devices.

[00154] While a data warehouse may be distributed across several servers and may contain several databases and information from many devices in multiple formats, it also may be accessible through a backup server 2112 as shown in Figure 21. Access to the data warehouse 2114 may be transparent to the user, who may use commands to retrieve and analyze all the data, details, metadata, summaries, etc. The data warehouse 2114 may include data about the organization of the data warehouse 2114, where the data or information may be found, sources of the data, and any relationships that have been automatically or manually established between data.

[00155] Figure 22 is a high level view of an alternative risk management system 2200 that may communicate with the device 300 through a wireless medium. The device 300 may communicate with an insurer or other entity (through a publicly accessible or privately accessible distributed network) through transceivers (e.g., transmitters or receivers), antenna signaling controllers and base station controllers. Some exemplary communication may occur because of a:

Call Reason	Description

Call Reason	Description
Schedule	Through the configuration file, the device 300 may call at synchronous intervals (e.g., a programmable or repeatable period) and/or after asynchronous events (e.g., after each "trip," after a number of "trips," etc.).
Short Message Service Page	A non-speech alert received from an insurer or other entity.
Device Failure	A hardware and/software failure occurs.
Memory Threshold	Memory use approaches or exceeds a programmable threshold (e.g., a percentage of a capacity).
Power-up	When the device 300 receives power.
First Detection of Protocol	After device initialization (e.g., source voltage exceeds a programmable threshold, a vehicle is detected, a vehicle protocol is detected, etc.).
Speed Delta Threshold	For a fixed or variable programmable period, a difference in sequential speed readings exceeds a programmable threshold.
International cell	The device locks to or interfaces an "international" cell or wireless site.
Callback	If a call is interrupted or the device 300 may terminate communication to respond to a request (e.g., install a firmware upgrade). The device 300 may report the status of the last command the device 300 executed during the subsequent communication or later call.

[00156] Information that may be transmitted through the wireless medium to an insurer or other entities (such as their Web site or private server or cluster) may include:

Parameter	Description
Identifiers	A wireless network identifier (e.g., may be retained in a portable subscriber identity module within the device 300 that identifies a unique user account to a wireless network, may handle device 300

Parameter	Description
	authentication, and may provide data storage)
Firmware Versions	May include version numbers of one or more processors, firmware, wireless or cellular site protocol, vehicle protocol, and/or GPS versions, etc.
Vehicle Protocol	The protocol the device 300 uses to communicate with the vehicle.
Vehicle Identification	Vehicle Identification Number
Mileage	Distance traveled (e.g., may comprise an end of a trip odometer reading or a discrete measure of distance a user may travel for each trip).
Memory Use	Memory currently in use.
Call Reason	Why a device 300 is communicating with the insurer or other entity
Signal Strength	Magnitude of a desired electric field at a reference point.
Trip Identifier	A marker of some type (e.g., a flag) that identifies when a vehicle's engine is started.

[00157] A list of some of the commands that an insurer or other entity may send to the device 300 and some of the expected results may include:

Command	Result
Upload (!UL)	The device 300 may transmit complete trips and events recorded by the device 300 since a last memory clear command was executed. The data may include a calculated value to test data (through a sequential combination) to detect errors during transmission and/or storage. Some systems data may be encoded through an error-correction encoding that allows the detection and correction of errors that may occur during transmission.

Command	Result
Update (!UD)	The device 300 may be given a type and filename for firmware and/or configuration files(s) that may be downloaded into the device 300. Through some update processes, the device 300 may disconnect from content or other provider (e.g., an insurer or other entity) and connect to another server to download the firmware and/or configuration files to update the device 300.
Run Diagnostics (!DG)	Initiates one or more diagnostic tests that one or more processors may perform (e.g., a main processors, wireless processors, vehicle interface processors, and/or GPS processor, etc.). If requested, the success or failure may be transmitted to the insurer or entity.
Memory Clear (!MC, !MC0, !MC1, !MC2)	The memory clear commands clear the content retained in local memory of the device 300. Some commands will restore the device 300 to a default others may clear memory to different initialization levels (e.g., !MC may clear only existing trip data).
Reset (!RS)	Resets the device 300. If a multiprocessing architecture, parallel processing architecture, coprocessor architecture, or modular architecture is used in the device 300, a rest command may reset each or selected processors or modules.

[00158] When an upload command is received, the device 300 may transmit information to a destination (e.g., an insurer or entity). Each response may be unique to a request. Some of the information that may be transmitted by the device 300 may include:

Information	Description
Upload date and time:	The date and time the device started the upload to insurer or entity. (Always provided in some applications).
Trip start time:	The date and time that a trip was started. (Only provided if a trip has been made since the last memory clear in some applications.)

Information	Description
Duration and speed:	For each duration, (e.g., may be configured for a synchronous interval, e.g., about every 1 second) the speed in kilometers (or miles) per hour.
Trip end time:	The date and time that a trip ended. (For each trip stored in local memory, the information may include a trip start value, trip details, and a trip end value in some applications)
Connect event:	The date and time the device 300 was connected to the vehicle. This is when the device gets power from the vehicle or is in communication with the vehicle. (May be recorded once until the next memory clear command is received in some applications.)
Disconnect event:	The device 300 may record a date and time stamp with the stored data at synchronous intervals (e.g., a predetermined time period such as every 5 minutes). The time stamp may be stored in non-volatile memory (e.g., flash memory) when the device is in communication with the vehicle, receives power from the vehicle, an ignition or speed event is detected, etc.
Protocol event:	The protocol that the device 300 is using to communicate with the vehicle. (In some applications, this event may only occur after the first ignition cycle or the starting of the vehicle and may be cleared when a memory clear command is received).
Specific events:	A - Processor-version, On Board Diagnostic-version, Global Positioning System-version B - Wireless (e.g., cellular) connection failure C - Data connection failure on wireless network D - Unable to contact destination E - Firmware, software, and/or configuration file(s) access failure F - Checksum failure (e.g., firmware, software, configuration files, etc.) G - Network "roaming" H - Memory threshold event I - Unknown trip log file entry J - Unknown event log file entry K - Number of records transmitted not equal number of records stored L - Battery voltage exceeds alternator threshold, in-vehicle communication enabled M - In-vehicle communication terminated due to an ignition off event

The parenthetical information included in the table above reflects exemplary guidelines that enable an efficient exchange of data and/or software. The frequency at which information, data, etc., and inclusion of objects will change in alternative implementations.

[00159] In some systems, the following settings may be configured in the device 300.

Setting	Description
Profile Name	The name of this configuration file reported when the device 300 calls or transmits to a destination.
Checkin Interval	The number of hours the device 300 should wait until it calls a destination for a scheduled call. A predetermined value (e.g., of "0") may indicate the device 300 should call the destination after a trip has been completed.
GPRS Retry Count	Number of times the device 300 should try to connect to a destination if a communication failure occurs.
GPRS Retry Pause	The amount of time (e.g., number of minutes) the device 300 should wait before retrying to connect to destination
Port Read Frequency	The amount of time (e.g., number of seconds) the device 300 should read information during a trip.
PortRead Multiple	Based on the above Port Read Frequency, how many samples should be stored in memory for the trip.
Speed Threshold	Speed in kilometers (or miles) per hour; the device 300 may use this parameter to initiate call home event.
On Net MCC/MNC	Defines up to a predetermined number (e.g., 10) of networks that may be considered "non-roaming" networks.
Apply OnNet	For each call to a destination, represents the number of times the device 300 may call a destination if roaming.
APN	Up to a predetermined number (e.g., 10) of APN or wireless nodes the device should cycle through when attempting to connect to a wireless network (e.g., a cellular network).
WCP Name	The domain name service that should be used to contact the Wireless Communication Protocol server or other server to reach a destination.
WCP Port	What Transmission Control Protocol/Internet Protocol port that may be used for communications.

Setting	Description
FTP Name	The domain name service name for the FTP server at the destination used to download firmware and/or configuration files.
FTP Username	Username to login to the FTP Server
FTP Password	Password to login to the FTP Server
FTP Directory	The directory that the files are located

[00160] A block diagram of an alternative on-board portable mobile device 300 that may communicate with in-vehicle local processor(s), controller(s), and/or directly with sensors is shown in Figure 23. The device 300 may store executable programs, configuration files, and vehicle based data. The data may include raw data elements, calculated data elements, derived data elements, and/or subsets of these elements.

[00161] In Figure 23, the usage based monitor or device 300 comprises two or more processors that execute multiple tasks (through programs or instructions sets) in tandem. Each processor may work on a different instruction set or different part of the common process of monitoring vehicle operation and/or driving behavior. While the functions assigned to each processor may occur dynamically (assigned by the main processor 2302 and software), in Figure 23 the functions are pre-assigned. The processors 2302 – 2308 share a local and/or distributed memory 2310 and 2316 and an input/output bus or data path. In some systems, the device 300 may have an asymmetric like architecture.

[00162] A single copy of the operating system and configuration file(s) may coordinate program execution in the device 300. In alternative devices 300, each processor may have its own operating system and/or memory, and in some cases, share memory and interconnected data paths used to exchange data, receive firmware, or configuration files. The coordinated processing of the architecture increases speed or computing power, like a parallel processor or co-processor architectures used in other alternative devices 300.

[00163] To monitor vehicle operation or driver behavior, a main processor 2302 may coordinate the wireless processor 2304, in-vehicle communication processor 2306, and optional location processor 2308. In some devices 300, the main processor 2302 may access the entire memory map and execute applications in support of its input and output

nodes. The input/output nodes may include an optional video 2312 node, audio node, and/or tactile node 2314 that transmit video, sound, and output perceptible to a sense of touch, respectively. The transmitted media may be transmitted directly to a user or conveyed through an in-vehicle system (through in-vehicle amplifiers and loudspeakers, for example).

[00164] In Figure 23, the main processor 2306 and/or firmware may offload an out-of network communication component to the wireless microprocessor 2304. The wireless microprocessor 1204 and transceivers 2318 may be compliant with one or more wireless protocols that include the transceiver protocols described above. In some systems, the wireless microprocessor 2304 may comprise a single-chip cellular (or wireless) baseband processor that may be GSM ("Global System for Mobile Communication" that may include enhanced data rates for GSM Evolution (EDGE)) and/or GPRS (General Packet Radio Service) and/or CDMA (Code Division Multiple Access) compliant. Some single-chip cellular processors include a power amplifier controller and speaker-phone/car-phone audio circuitry that may drive the audio output 2314. Some of the single-chip cellular processors contain all analog and digital GSM, CDMA, and/or multi-slot GPRS baseband processing functions within the single chip. Interface software, circuitry, and drivers are integrated in the single-chip cellular (or wireless) processor to enable auxiliary components, such as microphones, loud speakers, display devices or screens, keypads, data terminal equipment and SIM modules (or other memory modules) to connect directly to the wireless microprocessor 2304. A flexible baseband control interface supports a wide range of transceivers, including GSM850, E-GSM900, GSM1800 and GSM1900 frequency bands.

[00165] In-vehicle communication may be offloaded to the in-vehicle processor 2306 and transceivers 2318 that may include one, two, or more embedded antenna element(s). The embedded antenna element(s) may be configured and mounted such that a portion of an upper surface, adjacent surface, or an entire upper or adjacent surface of the device 300 may be part of the radiating element (and/or the receiving element). In alternative systems, the antenna element is configured and mounted such that, once the device 300 is fully assembled, the device case itself or portions of it may be used as part of the radiating and/or receiving element. In some systems, the embedded antenna may utilize integrated circuit board designs and connecting links without additional parts. Since some

embedded antenna elements are not be buried or embedded between other circuits in some alternative devices, these antenna elements may better control radiation patterns. The in-vehicle processor 2306 and transceivers 2318 may be compliant with one or more in-vehicle communication standards that may include the in-vehicle protocols described above. An optional navigation component may be offloaded to a location processor 2308 (or global positioning processor). The location processor 2308 may be compliant with one or more navigation protocols that may include the location protocols described above.

[00166] Figure 24 is an initialization process 2400 that may be implemented through an initialization file. The initialization file may include the hardware configuration information necessary to interface a vehicle and information about the initial configuration of device-based data exchanges. At 2402 and 2404 a vehicle voltage is detected and compared to a programmed threshold (e.g., falls below a threshold in alternative devices 300). When the vehicle voltage exceeds the programmed threshold, a request is transmitted at 2406 across a vehicle bus while waiting for a response at 2408. When a valid response is not received, the process repeats the cycle by sequentially transmitting signals in different vehicle bus protocols at 2406 and 2408. A response may be compared against a list of valid response, and if the process detects a match at 2408, software that supports data transfer or exchanges between the device 300, the vehicle, and a remote destination is loaded into operating memory. With a validated response, vehicle attributes and manufacturers' data requests are transmitted across a vehicle bus. Defaults and/or user preferences within the device 300 may be established.

[00167] Figure 25 is a process 2500 in which a device 300 transfers data to a destination. The destination may be associated with an identifying number or may be contacted by specifying or detecting a communication protocol. The data migration from the device 300 to the destination (e.g., an insurer's or entities privately or publicly accessible site) begins when data is not being recorded (e.g., in other devices 300, data transfer may occur at anytime). That may occur at the end of a trip at 2502 and 2504. The process 2500 may automatically cycle through a programmable number of APNs or wireless nodes as the process attempts to connect to a wireless network at 2506 and 2508. If a connection fails, an error is stored at 2510 while the process waits to monitor additional data or reconnect to the network at 2502 and/or 2506. When a connection occurs, the

process 2500 transmits an identifier to the network that identifies a unique user account. The identifier may include a device 300 authentication.

[00168] When a connection is established and a destination acknowledged at 2508, automated scripts or programs may attempt to transfer data from the local memory of the device 300 to a remote memory at a destination (e.g., such as an insurer or other entities' site) at 2512. In some processes, a method encodes data before the transfer so that errors that may occur during storage or transmission of the data may be detected (e.g., error-detection coding). In alternative processes, the method encodes the data before the transfer to allow for the detection and correction of errors that may occur during storage or transmission (e.g., error-correction coding). Error codes that correlate to a fault (e.g., error codes that may identify corrupted data, failure to contact a destination) may be stored locally or at the destination and a diagnostic test performed at the request of the destination (e.g., the insurer's or entity). If a data migration is successful, a memory clear command may be received from the destination that directs the device 300 to clear some or all of the local memory at 2514.

[00169] An exemplary record that may be transferred to an insurer's or other entities destination may look like the text file shown in Figure 35. The data may comprise a single file with the more recent entries appended to the end of the file or separated into distinct files (such as an operational log, an error log, trigger log, etc.) that includes user specific information. A device log analyzer that may be resident to or distributed across the application servers 2102 and 2106 and/or archive servers 2104 of Figure 21 may parses the log files and derive indicators about vehicle operation, driving behavior, or other usage based metrics. Documents and/or reports may be transmitted to remote interfaces. Alternatively databases or database management servers may parse the log files, derive indicators, and in some systems generate reports through server-side scripts. The exemplary pages of Figures 9 – 17 and 30 – 34 may be derived by device log analyzers and/or database management servers. An exemplary explanation of the entries shown in Figure 35 explains that

Entry	Description
U,89014104211472857203,2008/04/01,16:16:00 (Name of transferred file)	

Entry	Description
89014104211472857203	A unique user account to a wireless network that may handle device authentication
2008/04/01	Date the log was uploaded
16:16:00	Time the log was uploaded
H,2008/04/01,16:09:01 (Header)	
2008/04/01	Date trip was started (e.g., date/time based on wireless network)
16:09:01	Time trip started
D,1.000,10 (Detailed record: time & speed)	
1.000	Frequency in time (seconds) from last monitored parameter (e.g., speed)
10	Speed value (e.g., raw data element in kilometers per hour)
T,2008/04/01,16:15:21 (Trailer record identifying the end of a trip)	
2008/04/01	Date trip was ended (e.g., date/time based on wireless network)
16:15:21	Time trip ended
X,7,E,832,2008/04/01,16:09:00 (Found Battery voltage above alternator threshold)	
832	Measure of battery voltage
2008/04/01	Date of measurement
16:09:00	Time of measurement
X,7,D,0,2008/04/01,16:15:38 (Disabled communication after communication stopped due to an ignition off event)	
2008/04/01	Date when communication was disabled
16:15:38	Time when communication was disabled

Entry	Description
X,7,E,744,2008/04/01,16:15:41 (Found Battery voltage above alternator threshold)	
744	Measure of battery voltage
2008/04/01	Date of measurement
16:15:41	Time of measurement
X,1,0102A,7203,006f,0001 (Versions & identifiers)	
0102A	Main microprocessor version
7203	Wireless microprocessor version
006f	In-vehicle communication identifier
0001	Global Positioning Sensor version

[00170] When a trigger event occurs, a connection through a wireless network is made and an interactive session begins with an entity or insurer at 2502 – 2508 or an error logged at 2510. In Figure 26, a trigger event may direct the destination to perform an action. The trigger event may be automatically evaluated at the destination (and in some alternatives, by the device 300). In some circumstances additional data or information may be needed. When needed, the destination may issue a command that causes the device 300 to receive, parse, process a request, and transmit a reply at 2616 (if resolved locally, cause the device to harvest additional information). If the trigger event relates to a safety concern, the destination (or device 300) may automatically seek assistance by sending a message or another alert to a call center, medical center, technical center, or initiate another action. If a trigger event relates to an operational concern, the destination may issue diagnostic or repair commands or firmware updates that may diagnose or repair the device 300 (and/or vehicle in alternative processes).

[00171] When no activity is detected through an in-vehicle bus or out of vehicle network or motion or changes in engine load are not detected (e.g., through a motion sensor, manifold absolute pressure sensor, or another sensor that may detect changes in engine load or speed), the device 300 may reduce power consumption by powering down the

physical-layer circuitry to enter a sleep mode at 2702 of Figure 27. When an in-vehicle or out-of vehicle activity or request is detected, the device 300 may automatically negotiate the connection if it is available. To reduce battery drain, the transmission rate may be automatically reduced to link to a predetermined transmission rate when on battery power (whether it be from the vehicle and/or device 300). This power management characteristic may comprise a built-in power management feature of the device 300. If a connection to a destination is sought, a network connection may be established at 2506 – 2508 and data transmitted at 2512, a text message sent, or an error logged at 2510. If a connection to the vehicle bus is sought (e.g., when an activity is detected) the device 300 may negotiate a connection through the vehicle bus.

[00172] A device 300 may receive firmware, configuration files(s), and other updates that may be received from a destination associated with an insurer or entity such as a vendor as shown in Figure 28. When an update is sought, a network connection may be established at 2506 – 2508 or an error logged at 2510. A dynamic memory allocation process may allocate additional memory from a device heap (e.g., memory reserved for program or temporary data storage use) before receiving an update. Existing firmware, configuration files, and other files (e.g., legacy versions) may be retained before software, data, or other files are transferred from a destination to the device 300. The transfer of software, data, or other files may fail. If that occurs, the update process may repeat a predetermined number of cycles (e.g., three or more, for example) at 2804 - 2810. When the error cannot be corrected the legacy versions may be automatically restored and the device 300 may be reset to the preferences and defaults observed before the unsuccessful update. The error may be logged and the dynamic memory allocation process may de-allocate the memory retaining the uninstalled versions from the heap to free some allocated memory. If a device self-diagnostic, an error-detection coding, error-correction coding, or other method confirms or establishes a successful transmission and storage or fails to identify an error, the updates may be installed and the memory allocation process may de-allocate the memory retaining the legacy versions.

[00173] The methods and descriptions of Figures 1, 5, 6, 7, and 24 - 28 may be encoded in a signal bearing medium, a computer readable medium or a computer readable storage medium such as a memory that may comprise unitary or separate logic, programmed within a device such as one or more integrated circuits, or processed by a controller or a

computer. If the methods are performed by software, the software or logic may reside in a memory resident to or interfaced to one or more processors or controllers, a wireless communication interface, a wireless system, a powertrain controller, an entertainment and/or comfort controller of a vehicle or non-volatile or volatile memory remote from or resident to a the device 300. The memory may retain an ordered listing of executable instructions for implementing logical functions. A logical function may be implemented through digital circuitry, through source code, through analog circuitry, or through an analog source such as through an analog electrical, or audio signals. The software may be embodied in any computer-readable medium or signal-bearing medium, for use by, or in connection with an instruction executable system or apparatus resident to a vehicle or a hands-free or wireless communication system. Alternatively, the software may be embodied in media players (including portable media players) and/or recorders. Such a system may include a computer-based system, a processor-containing system that includes an input and output interface that may communicate with an automotive or wireless communication bus through any hardwired or wireless automotive communication protocol, combinations, or other hardwired or wireless communication protocols to a local or remote destination, server, or cluster.

[00174] A computer-readable medium, machine-readable medium, propagated-signal medium, and/or signal-bearing medium may comprise any medium that contains, stores, communicates, propagates, or transports software for use by or in connection with an instruction executable system, apparatus, or device. The machine-readable medium may selectively be, but not limited to, an electronic, magnetic, optical, electromagnetic, infrared, or semiconductor system, apparatus, device, or propagation medium. A non-exhaustive list of examples of a machine-readable medium would include: an electrical or tangible connection having one or more links, a portable magnetic or optical disk, a volatile memory such as a Random Access Memory "RAM" (electronic), a Read-Only Memory "ROM," an Erasable Programmable Read-Only Memory (EPROM or Flash memory), or an optical fiber. A machine-readable medium may also include a tangible medium upon which software is printed, as the software may be electronically stored as an image or in another format (e.g., through an optical scan), then compiled by a controller, and/or interpreted or otherwise processed. The processed medium may then be stored in a local or remote computer and/or a machine memory.

[00175] When a device initiates a session with a destination (e.g., an insurer or other entity such as a data repository or other content providers) in Figure 29, it may send and receive discrete digital information such as objects through a wireless network. Objects may be received in real-time or after some delay by the input and output nodes that may interface one or more devices 300 at 2902 – 2906. Firewalls allow or deny entry or exit from the local area or distributed network at 2908, 2922, and 2926. A correlation analysis, inference programs or engines, insurance computational programs, data modeling, or other statistical analysis may evaluate or assign a level of risk, insurance scores, safety scores, and/or rating factors at 2910 – 2914. The level of risk scores or factors may be based at least in part on the raw data elements, calculated data elements, derived data elements, and/or other objects received from the device 300.

[00176] A quote, cost (e.g., an amount due or bill), or adjustment (e.g., cost, term, or some other parameter) may be derived at 2916. While the quotes, costs, and adjustments may comprise a fixed value, in alternative systems the value may comprise a fluid range that may vary by user, a user's behavior, or by an insurance parameter (e.g., an actuarial class). Distributed databases 2918 may store the quotes, costs, adjustments, raw data elements, calculated data elements, derived data elements, assigned levels of risk, insurance scores, safety scores, rating factors, and/or other objects.

[00177] In some systems like those shown in Figure 29, one or more or of the collective, distributive, or discrete databases may manipulate information in a way a user may find logical or natural to use (e.g., an intelligent database). Intelligent database searches may rely not only on traditional structured query language data-finding routines, but also rely on predetermined rules governing associations, relationships, and/or inferences regarding the data that may be established by the destination (e.g., the insurer or other entity) and that may be retained (e.g., stored) in the database.

[00178] Clients or internal users may access the local area or distributed network through firewalls 2926 and 2922, load balancers (not shown), and server clusters 1916, 1918, 2016, 2020 shown in Figure 29. Through publicly accessible or privately accessible distributed networks, distributors, customers, vendors and other authorized users may transmit requests, and receive, parse, and render responses from clusters of on-line services 2106 and 2020 (that may communicate through Web services) and/or Trip monitoring servers1916 - 1922.

[00179] An information management resource management server (or service within an on-line server) may manage the resources for collecting and delivering content from a destination to the user. The information management resource management server may serve dynamic resources (through an active server side platform) or static resources such as the risk classification page shown in Figure 30. Other exemplary content that may be delivered to a remote interface is shown in Figures 31 – 34. In Figures 31 through 33 a speed is graphically presented. The continuously plotted speed versus time data may provide immediate feedback about the length of time a driver may have been on the road, the driver's continuous speed, and its effect on fuel economy. The level of detail or resolution (compare Figure 31 to 32) delivered to a remote interface may be automatically customized to the content delivered to a remote interface to highlight the significance of certain high risk behavior such as driving at excessive speeds.

[00180] Additional trip details may be accessed by user activated links that may lead the user to other content such as a trip log. The trip log may provide details that may be sorted or searched and viewed. The exemplary log shown in Figure 34 provides a chronological record of activities that may enable trip reconstruction or examination of a sequence events and/or changes. The record of events may include the number of trips made on a given date, a pictorial or textual based risk assessment, a measure of drive time, time spent driving at or over a predetermined velocity, mileage, and/or a measure of risk events. In Figure 34, a sudden acceleration or braking may suggest an aggressive or unsafe driving behavior.

[00181] Other alternate systems and methods may include combinations of some or all of the structure and functions described above or shown in one or more or each of the figures. These systems or methods are formed from any combination of structure and function described or illustrated within the figures. Some alternative systems or devices compliant with one or more of the transceiver protocols may communicate with one or more in-vehicle displays, including touch sensitive displays. In-vehicle and out-of-vehicle wireless connectivity between the device 300, the vehicle, and one or more wireless networks provide high speed connections that allow users to initiate or complete a transaction at any time within a stationary or moving vehicle. The wireless connections may provide access to, or transmit, static or dynamic content (live audio or video streams, for example). The content may include raw data elements, derived data elements, or

calculated data elements (e.g., vehicle-related data). Other content may be related to entertainment and comfort, or facilitate electronic commerce or transactions. Some devices 300 allow users to amend or enter into insurance policies through the wireless connections of the vehicle or the wireless processor 2304 of the device 300. Some devices 300 may provide turn-key access to insurance coverage to new vehicle buyers before the vehicle leaves a sales lot. The interoperability of some devices 300 to in-vehicle networks and external wireless protocols allows some devices 300 to provide primary or back-up functionality to in-vehicle equipment, including OEM and/or aftermarket equipment.

[00182] Other alternative systems facilitate device 300 recovery. When a disconnection event occurs or an unexpected motion is detected, some devices 300 may initiate an asynchronous or periodic communication with a remote destination, like a control center or another device 300. The device 300 may communicate raw, derived, or calculated data elements including a current location of the device 300. The location may be provided through a radio-navigation system such as a global positioning system, for example. In some applications, devices 300 may monitor real-time traffic conditions. Through synchronous or asynchronous communications, the devices 300 may transmit speed and location readings to a remote destination (e.g., a central control). The remote destination may retain data that may create a real-time picture of traffic speeds, travel times, and/or other travel/road conditions. When compliant with a mesh network, some devices 300 may generate these profiles in areas where wireless service is unavailable. Some devices 300 not only conserve power, but also conserve bandwidth by not moving data continuously across a persistent network. Instead, data is moved across stationary or non-stationary nodes (e.g., a device 300) across relatively short distances until a wireless network transceiver or destination is reached.

[00183] While various embodiments of the invention have been described, it will be apparent to those of ordinary skill in the art that many more embodiments and implementations are possible within the scope of the invention. Accordingly, the invention is not to be restricted except in light of the attached claims and their equivalents.

What is claimed is:

1. (New) A risk management device comprising:

an automotive device that provides an interface that filters data that is sent and received across an in-vehicle bus by selectively acquiring vehicle data related to a level of insurable risk or safety of operation, the interface acquires the selected vehicle data from one or more in-vehicle sensors;

a memory that stores the selected vehicle data with relationship data within the vehicle that establishes a connection between the selected vehicle data and one or more risk factors, safety standards, or operating characteristics, together with a unique identifier and a user account; and

a wireless service provider interface that provides access to the selected vehicle data and relationship data retained in the memory, where the wireless service provider interface is responsive to a wireless request from a remote user to transfer the selected vehicle data and selected relationship data retained in the memory to a remote server when a wireless service provider indicates a capacity to transfer the vehicle data and relationship data across a wireless network.

2. (New) The risk management device of claim 1 where the wireless service provider interface is compliant with a wireless transaction facilitator that throttles the transmission rates across the wireless network based on an available bandwidth of the wireless network.

3. (New) The risk management device of claim 1 further comprising a dynamic memory allocation processor that allocates a portion of the memory to retain a copy of a legacy version of firmware that comprises input/output instructions when an updated firmware is received through the wireless network and written to the memory, the dynamic memory allocation processor de-allocates the portion of the memory when an error-free version of the updated firmware is stored or installed in the risk management device.

4. (New) The risk management device of claim 1 where the wireless network comprises a mobile broadband wireless network that provides full data exchange mobility to two or more vehicles.

5. (New) The risk management device of claim 1 where the interface, the memory, and the wireless service provider interface are linked within a portable device.

6. (New) The risk management device of claim 1 where the wireless service provider interface comprises a single-chip cellular baseband processor.

7. (New) The risk management device of claim 6 where the single-chip cellular baseband processor is Global System for Mobile Communication compliant, Code Division Multiple Access compliant, or General Packet Radio Service compliant.

8. (New) The risk management device of claim 6 where the single-chip cellular baseband processor is Global System for Mobile Communication compliant and General Packet Radio Service compliant.

9. (New) The risk management device of claim 6 where the single-chip cellular baseband processor comprises integrated interface drivers that enable auxiliary components comprising loudspeakers, display, and memory modules to connect directly to the single-chip.

10. (New) The risk management device of claim 1 where the wireless service provider interface comprises an embedded antenna element positioned adjacent to the interface and the memory.

11. (New) The risk management device of claim 10 where the embedded antenna element comprises a circuit board element.

12. (New) The risk management device of claim 1 where the wireless service provider interface is further responsive to a trigger event by transmitting an alert to a third party

when a driving incident occurs.

13. (New) The risk management device of claim 12 where the driving incident comprises exceeding a speed threshold, traveling outside of a designated area, or a lock out condition.

14. (New) The risk management device of claim 13 where the wireless service provider interface is further responsive to receive a communication from a third party and the alert comprises a text or an aural message.

15. (New) The risk management device of claim 3 where the wireless service provider interface is compliant with two or more multiple packet architectures that are automatically detected and one or more multiple packet architectures that are automatically selected through two or more handshakes.

16. (New) The risk management device of claim 15 where the automatic detection and automatic selection includes Internet Protocol roaming that maintains connectivity as the vehicle moves from a first coverage area of a selected network to a second coverage area of a second selected network.

17. (New) The risk management device of claim 15 where the wireless service provider interface is responsive to a monitored event-driven request to transfer the selected vehicle data and selected relationship data retained in the memory to a remote server when the wireless service provider indicates the capacity to transfer data across the wireless network.

18. (New) The risk management device of claim 15 where a unique identifier comprises a unique identifier to the risk management device.

19. (New) The risk management device of claim 15 where a unique identifier comprises a unique vehicle identifier.

20. (New) The risk management device of claim 15 further comprising a transceiver tuned to receive continuously transmitted trilateral encoded signals through a bandwidth that is separate from the wireless network.

21. (New) A system that monitors data transferred among components within a vehicle that is used to determine one or more levels of risk or is used to determine a cost of insurance comprising:

a vehicle bus that sends and receives data between two or more in-vehicle controllers;

an in-vehicle monitor that filters the data that is sent and received across the vehicle bus by selectively polling one or more of the in-vehicle controllers to transmit vehicle data related to a level of risk in operating the vehicle, the selected vehicle data is acquired at a predetermined interval or upon an event;

a processor programmed to store the selected vehicle data in an in-vehicle memory inaccessible to the two or more in-vehicle controllers, the memory retains relationship data that links the selected vehicle data to a vehicle identifier and a wireless network;

a wireless transceiver configured to encrypt and encode the relationship data and the selectively acquired vehicle data and transmit the encoded data through a mobile communication network that provides access to a distributed network.

22. (New) The system that monitors data transferred among components within a vehicle of claim 21 where the wireless transceiver is configured to transmit the encoded data through a pulse position protocol without varying the power level or phase of a transmitting signal.

23. (New) The system that monitors data transferred among components within a vehicle of claim 21 where the wireless transceiver is compliant with a wireless transaction facilitator that throttles the transmission rates across the mobile communication network based on an available bandwidth of the mobile communication network.

24. (New) The system that monitors data transferred among components within a vehicle of claim 21 further comprising a dynamic memory allocation processor that allocates a portion of the memory to retain a copy of a legacy version of firmware that comprises

input/output instructions when an updated firmware is transferred to the in-vehicle memory through the mobile communication network, the dynamic memory allocation processor de-allocates the portion of the in-vehicle memory when an error-free version of the updated firmware is stored or installed in the risk management system or when a copy of the legacy version of the software is restored.

25. (New) The system that monitors data transferred among components within a vehicle of claim 21 where the mobile communication network comprises a mobile broadband communication network that provides full data exchange mobility to one, two or more vehicles in motion.

26. (New) The system that monitors data transferred among components within a vehicle of claim 21 where the wireless service provider interface is compliant with two or more multiple packet architectures that are automatically detected and one or more multiple packet architectures that are automatically selected when a series of signals acknowledge that a communication or transfer of information may occur are received by the wireless transceiver.

27. (New) The system that monitors data transferred among components within a vehicle of claim 21 where the wireless transceiver is responsive to an internal event-driven request to transfer the selected vehicle data and the selected relationship data retained in the in-vehicle memory to a remote server when the wireless service provider indicates an available channel capacity to transfer the selected vehicle data and the selected relationship data across the mobile communication network within a predetermined time period.

28. (New) The system that monitors data transferred among components within a vehicle of claim 21 further comprising a location processor that processes external navigation signals that are stored in the in-vehicle memory and are transmitted through the mobile communication network.

29. (New) The system that monitors data transferred among components within a vehicle of claim 21 further comprising a receiver tuned to receive continuously transmitted trilateral encoded signals through a bandwidth that is separate from the mobile communication network.

30. (New) The risk management system of claim 21 where the in-vehicle monitor, the processor, and the wireless transceiver are linked within a portable device.

31. (New) The risk management system of claim 21 where the wireless transceiver comprises a single-chip cellular baseband processor.

32. (New) The risk management system of claim 31 where the single-chip cellular baseband processor is Global System for Mobile Communication compliant, Code Division Multiple Access compliant, or General Packet Radio Service compliant.

33. (New) The risk management system of claim 31 where the single-chip cellular baseband processor is Global System for Mobile Communication compliant and General Packet Radio Service compliant.

34. (New) The risk management system of claim 31 where the single-chip cellular baseband processor comprises integrated interface drivers that enable auxiliary components comprising loudspeakers, display, and memory modules to connect directly to the single-chip.

35. (New) The risk management system of claim 21 where the wireless transceiver comprises an embedded antenna element positioned adjacent to the in-vehicle monitor, the processor, and the memory.

36. (New) The risk management system of claim 35 where the embedded antenna element comprises a circuit board element.

37. (New) The risk management system of claim 21 where the wireless transceiver is

further configured to respond to a trigger event by transmitting an alert to a third party when a driving incident occurs.

38. (New) The risk management system of claim 37 where the driving incident comprises exceeding a speed threshold, traveling outside of a designated area, or a lock out condition.

39. (New) The risk management system of claim 38 where the wireless transceiver is further configured to receive a communication from a third party and the alert comprises a text or an aural message.

40. (New) A system that monitors and facilitates a review of data collected from a vehicle that is used to determine a level of safety or cost of insurance comprising:

a processor that collects vehicle data from a vehicle bus that represents aspects of operating the vehicle;

a memory that stores selected vehicle data related to a level of safety or an insurable risk in operating a vehicle;

a wireless transmitter configured to transfer the selected vehicle data retained within the memory to a distributed network when a wireless network indicates a capacity to receive the selected vehicle data; and

a monitor to display the selected vehicle data that represents one or more aspects of operating the vehicle with data that reflects how the selected vehicle data affects a premium of an insurance policy, safety or level of risk.

41. (New) A system that monitors and facilitates a review of data collected from a vehicle of claim 40 where the wireless transmitter is configured to transfer the selected vehicle data retained within the memory through a pulse position protocol without varying the power level or phase of a transmitting signal.

42. (New) The system that monitors and facilitates a review of data collected from a vehicle of claim 40 where the wireless transmitter is compliant with a wireless transaction

facilitator that throttles the transmission rates across the wireless network based on an available bandwidth of the wireless network.

43. (New) The system that monitors and facilitates a review of data collected from a vehicle of claim 40 further comprising a dynamic memory allocation processor that allocates a portion of the memory to retain a copy of a legacy version of firmware that comprises input/output instructions when an updated firmware is transferred to the memory through the wireless network, the dynamic memory allocation processor de-allocates the portion of the memory when an error-free version of the updated firmware is stored or installed in the system or when a copy of the legacy version of the software is restored to control the processor of the system.

44. (New) The system that monitors and facilitates a review of data collected from a vehicle of claim 40 where the wireless network comprises a mobile broadband communication network that provides full data exchange mobility up to vehicle speeds of about 100 miles per hour.

45. (New) The system that monitors and facilitates a review of data collected from a vehicle of claim 40 where the wireless transmitter is compliant with two or more multiple packet architectures that are automatically detected and one or more multiple packet architectures that are automatically selected when a series of signals acknowledge that a communication or transfer of information or data may occur.

46. (New) The system that monitors and facilitates a review of data collected from a vehicle of claim 40 where the wireless transmitter is responsive to an in-vehicle event-driven request to transfer the selected vehicle data retained in the memory to a remote server when the wireless network indicates an available channel capacity to transfer the selected vehicle data across the wireless network.

47. (New) The system that monitors and facilitates a review of data collected from a vehicle of claim 40 further comprising a receiver tuned to receive continuously

transmitted trilateral encoded signals through a bandwidth that is separate from the wireless network.

48. (New) The risk management system of claim 40 where the processor, the memory, and the wireless transmitter are in communication within a portable device.

49. (New) The risk management system of claim 40 where the wireless transmitter comprises a single-chip cellular baseband processor.

50. (New) The risk management system of claim 49 where the single-chip cellular baseband processor is Global System for Mobile Communication compliant, Code Division Multiple Access compliant, or General Packet Radio Service compliant.

51. (New) The risk management system of claim 49 where the single-chip cellular baseband processor is Global System for Mobile Communication compliant and General Packet Radio Service compliant.

52. (New) The risk management system of claim 49 where the single-chip cellular baseband processor comprises integrated interface drivers that enable auxiliary components comprising loudspeakers, display, and memory modules to connect directly to the single-chip.

53. (New) The risk management system of claim 40 where the wireless transmitter comprises an embedded antenna element adjacent to the processor and the memory.

54. (New) The risk management system of claim 53 where the embedded antenna element comprises a circuit board element.

55. (New) The risk management system of claim 40 where the wireless transmitter is further configured to respond to a trigger event by transmitting an alert to a third party when a driving incident occurs.

56. (New) The risk management system of claim 55 where the driving incident comprises exceeding a speed threshold, traveling outside of a designation, or a lock out condition.

57. (New) The risk management system of claim 56 where the wireless transmitter comprises a transceiver configured to receive a communication from a third party and the alert comprises a text or an aural message.

58. (New) A system that monitors data collected from a vehicle bus that is used to determine a cost of insurance comprising:

a data monitor that monitors a vehicle bus that transfers data among electronic components within a vehicle;

a storage device that receives vehicle data from the vehicle bus to a first memory within the vehicle, the storage device retains content when not connected to an external power source;

a second memory within the storage device that receives metadata that is logically linked to the vehicle data written to the storage device within the vehicle each time the vehicle data is written to the storage device;

a first processor programmed to link the storage device to a network of computers associated with an identifying number on a publicly accessible distributed network and is accessible through software retained in a computer readable storage medium that allows a user to access insurance files related to an existing insurance policy or a renewal of an insurance policy and allows the user to access other software related to the insurance files;

a database operatively linked to the storage device to store the vehicle data and the metadata written to the storage device, the database comprising a storage system comprising records; and

a second processor programmed to generate a rating factor based on the vehicle data and metadata written to the database;

where the second processor is programmed to calculate a premium of an insurance policy, or a surcharge or a discount on the premium of the insurance policy, based on the vehicle data and the metadata stored in the database.

59. (New) The system of claim 58 where the second processor is further programmed to generate a display in which a vehicle operator may review the vehicle data stored in the database related to the operator's vehicle accelerations, decelerations, seat belt usage, vehicle speed, time of day, date, location, identity, vehicle identity, tire pressure, telephone usage, entertainment status, vehicle mileage, or turn signal usage.

60. (New) The system of claim 58 where the second processor is further programmed to compare a category of the vehicle data to a similar category of data monitored in other vehicles.

61. (New) The system of claim 58 where the second processor and the database reside at a Web site operatively linked to the first processor through the Internet, the Web site being programmed to deliver customized insurance data related to a usage based insurance and an operator of the vehicle.

62. (New) The system of claim 58 where the second processor is programmed to determine a cost of renewing insurance based on the vehicle data and metadata written to the database.

63. (New) The system of claim 58 where the second processor is programmed to determine a prospective cost of insurance based on receiving the vehicle data and meta data written to the storage device at a Web site.

64. (New) The system of claim 58 further comprising a third processor in communication with the data monitor, the third processor integrated within an electronic management system within the vehicle.

65. (New) The system of claim 58 where the data monitor is compliant with an OBD protocol or an SAE J-1962 protocol.

66. (New) The system of claim 58 where the second processor is programmed to access

the database of vehicle data and metadata and process at least a portion of the vehicle data to generate a cost of insurance.

67. (New) The system of claim 58 where the second processor is programmed to access the database of vehicle data and metadata and process at least a portion of the vehicle data to generate a prospective cost of insurance.

68. (New) The system of claim 67 where the cost of insurance comprises a cost of renewing an existing insurance policy.

69. (New) The system of claim 67 where the vehicle data is generated by one or more devices that monitor, measure, and control the operation of the vehicle.

70. (New) A data logging device that tracks the operation of a vehicle, comprising:

a storage device comprising a first memory portion that may be read from and is written to in a vehicle and a second memory portion that may be read from and is written to in the vehicle, the second memory portion retains attributes of datum or data logically associated with the data stored in the first memory portion;

a processor that reads data from an in-vehicle automotive bus that transfers data from vehicle sensors to other automotive components, the processor writes data that reflect a level of safety to the first memory portion and the second memory portion; and

a communication device that links the storage device to a network of computers associated with a publicly accessible distributed network, the communication device is accessible through software retained on a computer readable storage medium that allows a user to access insurance files related to an insurance policy and allows the user to access other software related to the insurance files,

where the first memory portion and the second memory portion retain data when an external power source is not coupled to the first memory portion and the second memory portion, respectively, and are inaccessible to an in-vehicle OEM system or an automotive scan tool.

71. (New) A data logging device that tracks the operation of a vehicle, comprising:

a first storage device comprising a first memory portion that may be read from and is written to in a vehicle;

a second storage device comprising a second memory portion that may be read from and is written to in the vehicle that retains attributes of data logically associated with one or more data elements stored in the first storage device;

a central processing unit that reads data from an automotive bus that transfers data from vehicle sensors to other automotive components and writes data to the first memory portion;

a circuit that generates a steady stream of pulses that synchronizes the transfer of data from the automotive bus to the first memory portion; and

a communication device that links the storage device to a network of computers associated with an identifying number on a publicly accessible distributed network and is accessible through software that allows a user to access insurance files related to an existing insurance policy or a renewal of an insurance policy and allows the user to access other software related to the insurance files,

where the first memory portion and the second memory portion retain data when an external power source is not coupled to the first memory portion and the second memory portion, respectively.

72. (New) The data logging device of claim 71 where the circuit that generates the steady stream of pulses is remote from the vehicle.

73. (New) The data logging device of claim 72 where the circuit that generates the steady stream of pulses generates the attributes of data associated with one or more data items stored in the first storage device.

74. (New) A data logging device that tracks the operation of a vehicle, comprising:

a storage device comprising a first memory portion that is read from and is written to in a vehicle and a second memory portion that is read from and is written to in the vehicle that retains attributes of data logically associated with one or more data items stored in the first storage device;

a central processing unit that reads data from an automotive bus that transfers data

from vehicle sensors to other automotive components and writes data to the first memory portion; and

a wireless communication device that links the storage device to a network of computers associated with an identifying number on a publicly accessible distributed network and is accessible through software retained on a computer readable storage medium that allows a user to access insurance files related to an existing insurance policy or a renewal of an insurance policy and allows the user to access other software related to the insurance files,

where the first memory portion and the second memory portion retain data when an external power source is not coupled to the first memory portion and the second memory portion, respectively; and

where the software is configured to allow a party to change some or all of the data written to the storage device and where a second software retained on a computer readable storage medium remote from the vehicle is configured to allow the party to transmit the unchanged data and transmit the changed data to a Web server at the party's discretion.

75. (New) A device that monitors the operation of a vehicle, comprising:

a vehicle bus that transfers data from vehicle sensors within a vehicle;

a first processor in communication with the vehicle bus and operative to track one or more of vehicle speed data, position data, and aggressive driving behavior data from the vehicle bus;

a global positioning receiver in communication with the first processor that processes position data, time data, and velocity data;

an on board vehicle diagnostic connector interfaced to the vehicle bus and the first processor; and

a data logger interfaced to the on board diagnostic connector and operative to receive the one or more of vehicle speed data, position data, and aggressive driving behavior data in a memory in the data logger,

where the data logger is operative to upload the one or more of vehicle speed data, position data, and aggressive driving behavior data from the memory to a second processor remote from the first processor,

where the second processor is programmed to generate Internet documents based on the uploaded data and an assigned level of risk.

76. (New) The device of claim 75 where the aggressive driving behavior data comprises data that exceeds a first predetermined threshold or does not exceed a second predetermined threshold.

77. (New) The device of claim 75 where the data logger comprises a machine interface operative to communicate with the first processor and the second processor and a virtual interface operative to interface a computer.

78. (New) The device of claim 75 where the data logger is operative to store metadata in a second memory of the data logger each time any of the vehicle speed data, the position data, or aggressive driving behavior data is written to the memory.

79. (New) The device of claim 75 where the data logger uploads vehicle speed data or position data to an Internet site.

80. (New) The device of claim 75 where the data logger uploads vehicle speed data, aggressive driving behavior data, and/or position data to an Internet site.

81. (New) The device of claim 75 where the data logger comprises a removable storage device and a non-removable storage device.

82. (New) A system that determines a cost of insurance comprising:

a device that writes and records one or more characteristics related to a level of risk of operating a vehicle through an automotive communication link;

means for a party associated with the vehicle to review the recorded characteristics and review how the recorded characteristics affect a vehicle safety, a level of risk, or a cost of insurance;

means to enable the transmission of the recorded characteristics to an insurer through a wireless network;

means to transmit the recorded characteristics to the insurer automatically through a distributed network from the vehicle;

means for assigning a level of risk to the operation of the vehicle based on the recorded characteristics; and

means for determining a cost of an insurance policy based on the assigned level of risk.

83. (New) The system of claim 82 where the means for assigning the level of risk to the operation of the vehicle based on the recorded characteristics and the means for the party associated with the vehicle to review the recorded characteristics and review how the recorded characteristics affect a cost of insurance reside on a computer remote from the publicly accessible distributed network and remote from a Web server.

84. (New) The system of claim 82 further comprising software retained on a computer readable storage medium that compares at least one of the recorded characteristics to at least one characteristic of one or more parties.

85. (New) The system of claim 82 further comprising software retained on a computer readable storage medium that compares at least one of the recorded characteristics to an averaged characteristic of a plurality of parties.

86. (New) The system of claim 82 further comprising a wireless interface configured to link the device that writes and records characteristics related to the level of risk of operating the vehicle to the means for the party associated with the vehicle to review the recorded characteristics and review how the recorded characteristics affect the cost of insurance.

87. (New) The system of claim 82 further comprising a graphical user interface in communication with the means for the party associated with the vehicle to review the recorded characteristics and review how the recorded characteristics affect a cost of insurance.

88. (New) The system of claim 82 where the device that writes and records characteristics related to the level of risk of operating the vehicle through the automotive communication link comprises a portable plug-in module that does not lose its content when the portable plug-in module is not connected to an external power source and the portable plug-in module comprises a storage medium that may only be erased in blocks.

89. (New) The system of claim 82 further comprising an application that translates data received from the device that writes and records characteristics related to the level of risk of operating the vehicle from a first format to a second format and transmits the translated data to an insurer's Web site that is remote from the application by specifying a protocol to transmit the translated data and by identifying a server that serves the insurer's Web site.

90. (New) The system of claim 89 where the application comprises software retained on a computer readable storage medium executed by a processor that generates user-centric screens that summarize a user's driving behavior by processing one or more types of coded data received through a second separate wireless communication link, where the software is configured to allow the party to change a portion of the data or change all of the data transmitted to the insurer's Web site.

91. (New) The system of claim 82 where the means for determining the cost of the insurance policy based on the assigned level of risk comprises means for determining a prospective cost adjustment for an existing insurance policy or a renewal of an insurance policy based on the assigned level of risk.

92. (New) A method of monitoring, communicating, and reviewing data collected from a vehicle that is used to determine a cost of insurance comprising:

monitoring one or more devices that monitor, measure, or control the operation of the vehicle;

writing data from one or more selected devices within a vehicle to an in-vehicle storage device, the data being related to the level of risk of operating the vehicle;

transmitting a portion of the data written to the storage device through a wireless link

to a server that is remote from the vehicle by specifying a communication protocol to transmit the portion of data and by identifying a destination; and

calculating a premium of an insurance policy based on the portion of data transmitted through the wireless link.

93. (New) The method of claim 92 further comprising transmitting, to a party associated with the vehicle, data associated with a premium of the insurance policy, a surcharge to the premium of the insurance policy or a discount to the premium of the insurance policy.

94. (New) The method of claim 93 further comprising developing an operational profile of an insured party that comprises comparing data about the insured party with data from one or more other vehicle operators based on a selected characteristic of some of the one or more other vehicle operators.

95. (New) The method of claim 94 further comprising classifying groups of vehicle operators based on one or more characteristics of the operators.

96. (New) The method of claim 95 where the premium for the insurance policy comprises a premium for renewing the insurance policy.

97. (New) The method of claim 95 where the premium for the insurance policy comprises a current or prospective premium for an existing insurance policy.

98. (New) The method of claim 93 further comprising writing metadata about each of the data written to the storage device and transmitting the metadata written to the storage device through the publicly accessible distributed network to the server that is remote from the vehicle.

99. (New) The method of claim 92 further comprising calculating a current or a prospective cost of insurance based on a portion of data written to the storage device.

100. (New) The method of claim 92 further comprising transmitting a portion of the data

written to the storage device to a publicly accessible distributed network through the wireless network that provides substantial mobility up to vehicle speeds of about 55 miles per hour.

101. (New) The method of claim 92 further comprising developing an operational profile of an insured party comprising characteristics related to a level of risk of operating a vehicle.

102. (New) The method of claim 101 where the operational profile further comprises characteristics associated with a driver of the vehicle.

103. (New) The method of claim 92 where the storage device is operative to interface an on-board diagnostic port coupled to a vehicle bus that is coupled to a first processor local to the vehicle and is further operative to interface a second processor remote from the vehicle.

104. (New) A method of monitoring and reviewing data collected from a vehicle bus that is used to determine a cost of insurance comprising:

monitoring a vehicle bus that transfers data among electronic components within a vehicle;

writing data received from the vehicle bus to a device that retains content when not connected to an external power source at a rate the data is received;

executing a first program that enables the wireless transmission of a portion of the data written to the device through a publicly accessible network to a server that is remote from the vehicle by specifying a communication protocol to transmit the portion of data;

executing a second program that calculates a premium of an insurance policy based on the portion of data ; and

executing a third program that generates a document summarizing the premium of the insurance policy;

where the first program, the second program, and the third program are stored on a distributed computer readable storage medium.

105. (New) The method of claim 104 where writing data comprises logging data in a plug-in module configured to interface a processor coupled to an on board diagnostic port in the vehicle, where the plug-in module is operative to store a number of miles traveled in a predetermined time period.

106. (New) The method of claim 104 where writing data comprises writing vehicle speed data, vehicle acceleration data, vehicle deceleration data, turn signal usage data, seat belt usage data, time of day data, date data, location data, operator identity data, vehicle identity data, tire pressure data, telephone usage data, entertainment status data, revolutions per minute data, trip start data, trip end data, relative speed data, or vehicle mileage data in the device.

107. (New) The method of claim 106 where writing data further comprises writing data that indicates a level of willingness of a party to monitor an aspect of the vehicle operation.

108. (New) The method of claim 106 where writing data further comprises writing data that records a connection event of the device or a disconnection event of the device.

109. (New) The method of claim 104 where the second program comprises software that enables the user to observe a vehicle's position determined by processing two kinds of coded signals received from a source external to the vehicle.

110. (New) The method of claim 104 where the calculation of the premium of the insurance policy, or a surcharge or a discount to the premium of the insurance policy, is determined only when requested by a party associated with the vehicle or a party associated with the insurance policy.

111. (New) The method of claim 104 further comprising processing the data received from the vehicle bus and displaying a cost of insurance based on the data written to the device.

112. (New) The method of claim 104 further comprising modifying the data received from the vehicle bus and processing the modified data to determine a cost of insurance based on the modified data when requested by a party associated with the vehicle or a party associated with the insurance policy, where the data comprises vehicle speed data, vehicle acceleration data, vehicle deceleration data, turn signal usage data, seat belt usage data, time of day data, date data, location data, operator identity data, vehicle identity data, tire pressure data, telephone usage data, entertainment status data, revolutions per minute data, trip start data, trip end data, relative speed data, or vehicle mileage data.

113. (New) The method of claim 104 further comprising receiving a continuously transmitted code from a communication link remote from the vehicle bus and remote from the publicly accessible network and writing a portion of the continuously transmitted code in the device.

114. (New) The method of claim 113 further comprising receiving a portion of the data written to the device at an insurer's Web site, and transmitting second data based on the received data to a client application that generates a Web document that comprises variable content.

115. (New) The method of claim 104 further comprising receiving software updates to the device through a Web site and the wireless network.

116. (New) A method of monitoring and reviewing data collected from a vehicle that is used to determine a cost of insurance comprising:

collecting vehicle data from a vehicle bus that represents aspects of operating the vehicle;

writing the collected vehicle data to a storage device inaccessible to original equipment manufacturer's systems;

transferring the collected vehicle data written to the storage device to a processor that is remote from the vehicle; and

displaying the collected vehicle data that represents the aspect of operating the vehicle with data that reflects how the collected vehicle data affects a safety score, rating factor or a premium or an adjustment to a premium of an insurance policy.

117. (New) The method of claim 116 further comprising entering additional vehicle data that reflects a different aspect of operating the vehicle and displaying how the additional vehicle data would affect the safety of operating a vehicle or the premium of the insurance policy.

118. (New) The method of claim 116 where collecting vehicle data comprises reading powertrain sensor data from a vehicle bus that transfers data from electronic components of the vehicle.

119. (New) The method of claim 116 where collecting data further comprises reading sensor data through an on board diagnostic connector of the vehicle.

120. (New) The method of claim 116 further comprising determining a rating factor based on an analysis of the collected vehicle data.

121. (New) The method of claim 116 further comprising analyzing the collected vehicle data and determining a safety score based on the analysis of the collected vehicle data.

122. (New) The method of claim 116 further comprising receiving the collected vehicle data, determining an insurance risk rating, and analyzing the collected vehicle data to determine the premium of the insurance policy or adjust the premium of the insurance policy, where the collected vehicle data comprises mileage data and the pricing is based, in whole or in part, on miles driven.

123. (New) The method of claim 117 where entering additional vehicle data further comprises manually entering data or manually modifying data through a graphical user interface.

124. (New) The method of claim 116 where the act of displaying the cost data comprises generating a document that summarizes the premium of the insurance policy or generating a document that summarizes a surcharge or discount to the premium of the insurance policy.

125. (New) The method of claim 116 further comprising executing software that is operative to receive the collected vehicle data that represents aspects of operating the vehicle at a Web server; generating a Web page that comprises a risk rating and portions of the collected vehicle data at the Web server; and transmitting the Web page to a computer remote from the Web server and the vehicle by specifying a protocol to transmit the data and by identifying the computer.

126. (New) The method of claim 125 further comprising executing software at the computer remote from the vehicle and the Web server that allows the operator to change data related to the operation of the vehicle; transmitting the changed data to the Web server by specifying a protocol to transmit the changed data and by identifying the Web server; generating a second Web page that comprises updated insurance cost data based on the changed data; and transmitting the second Web page to the computer remote from the Web server and the vehicle by specifying a protocol to transmit the updated insurance cost data and by specifying an address of the computer.

127. (New) The method of claim 126 where the second Web page comprises a second risk rating.

128. (New) A method of providing a cost, or an adjustment to the cost, of an insurance policy comprising:

monitoring a vehicle bus that transfers data among electronic components within a vehicle;

writing mileage data from the vehicle bus to a device that retains content when not connected to an external power source at a predetermined interval or at a same rate the mileage data is received;

executing a first program retained on a computer readable storage medium that

enables a user to wirelessly transmit the mileage data written to the device from the vehicle through a publicly accessible network to a server that is remote from the vehicle and the device; and

determining a cost of insurance based on the mileage data transmitted to a second program resident to the server.

129. (New) The method of claim 128 where the cost of insurance is further based on one or more additional sets of data selected from the group consisting of: vehicle speed data, brake data, turn signal data, seat belt usage data, clock data, vehicle user data, and vehicle identification data.

130. (New) The method of claim 129 where the cost of insurance is further based on any one or more of vehicle acceleration data, vehicle deceleration data, location data, environmental conditions data, relative speed data, or relative distance data.

ABSTRACT

A data logging device tracks the operation of a vehicle or driver actions. The device includes a storage device, which may be removable or portable, having a first memory portion that may be read from and may be written to in a vehicle and a second memory portion that may be read from and may be written to in the vehicle. The second memory portion may retain data attributes associated with the data stored in the first removable storage device. A processor reads data from an automotive bus that transfers data from vehicle sensors to other automotive components. The processor writes data to the first memory portion and the second memory portion that reflect a level of risk or safety. A communication device links the storage device to a network of computers. The communication device may be accessible through software that allows a user to access files related to a level of risk or safety and other software that may be related to those files.

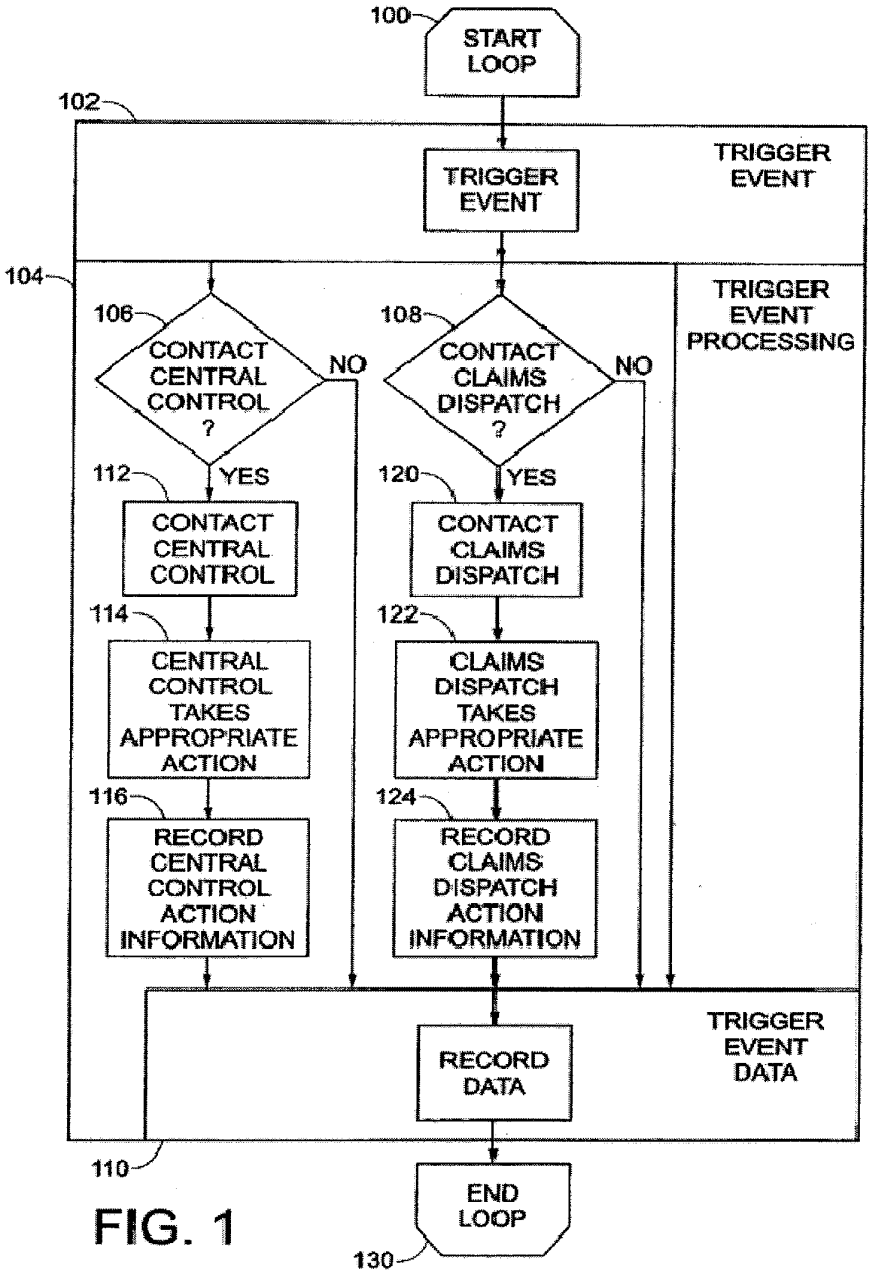
100
START LOOP
102
TRIGGER EVENT
TRIGGER EVENT
104
TRIGGER EVENT PROCESSING
106
CONTACT CENTRAL CONTROL ?
NO
YES
108
CONTACT CLAIMS DISPATCH ?
NO
YES
112
CONTACT CENTRAL CONTROL
120
CONTACT CLAIMS DISPATCH
114
CENTRAL CONTROL TAKES APPROPRIATE ACTION
122
CLAIMS DISPATCH TAKES APPROPRIATE ACTION
116
RECORD CENTRAL CONTROL ACTION INFORMATION
124
RECORD CLAIMS DISPATCH ACTION INFORMATION
RECORD DATA
TRIGGER EVENT DATA
110
END LOOP
130

FIG. 1

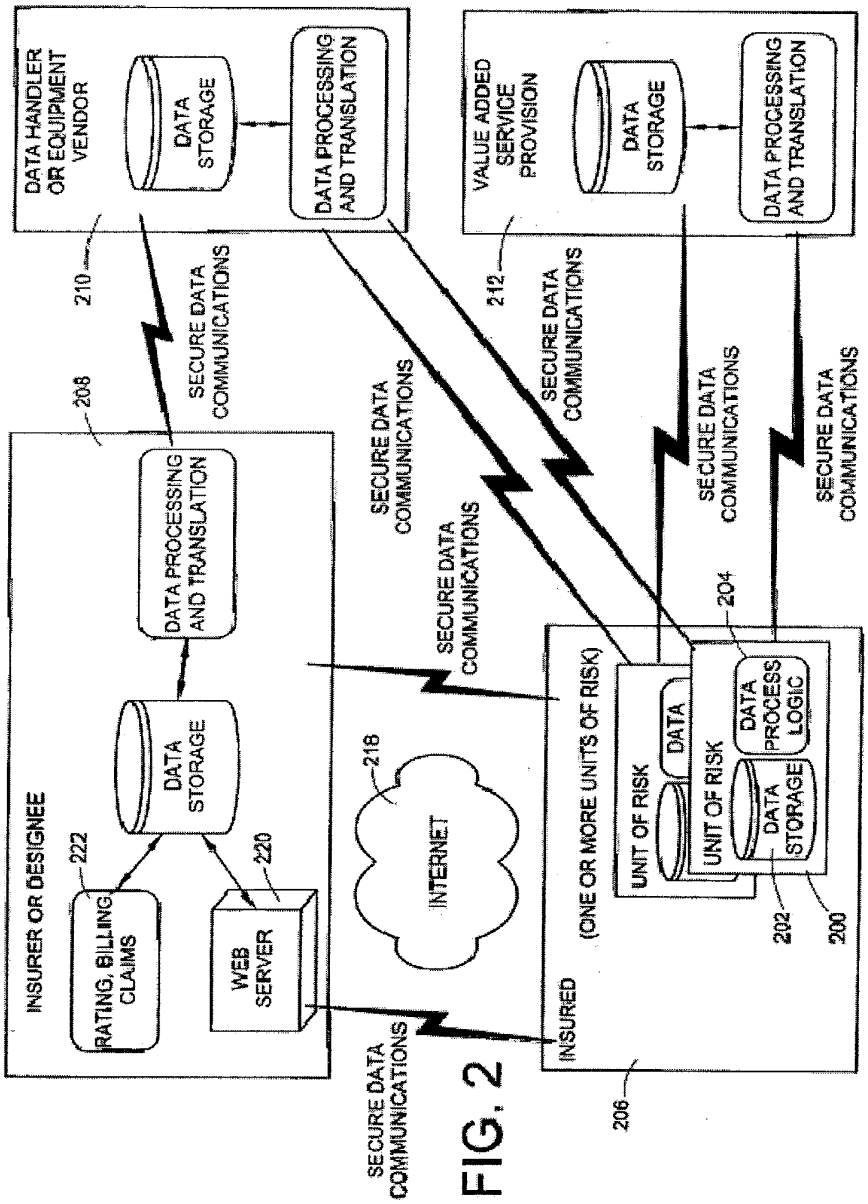
DATA HANDLER OR EQUIPMENT VENDOR
DATA STORAGE
DATA PROCESSING AND TRANSLATION
210
VALUE ADDED SERVICE PROVISION
DATA STORAGE
DATA PROCESSING AND TRANSLATION
212
SECURE DATA COMMUNICATIONS
SECURE DATA COMMUNICATIONS
SECURE DATA COMMUNICATIONS
SECURE DATA COMMUNICATIONS
208
INSURER OR DESIGNEE
DATA PROCESSING AND TRANSLATION
DATA STORAGE
222
RATING, BILLING CLAIMS
220
WEB SERVER
218
INTERNET
SECURE DATA COMMUNICATIONS
INSURED
(ONE OR MORE UNITS OF RISK)
UNIT OF RISK
DATA
UNIT OF RISK
DATA STORAGE
DATA PROCESS LOGIC
204
202
200
206

FIG. 2

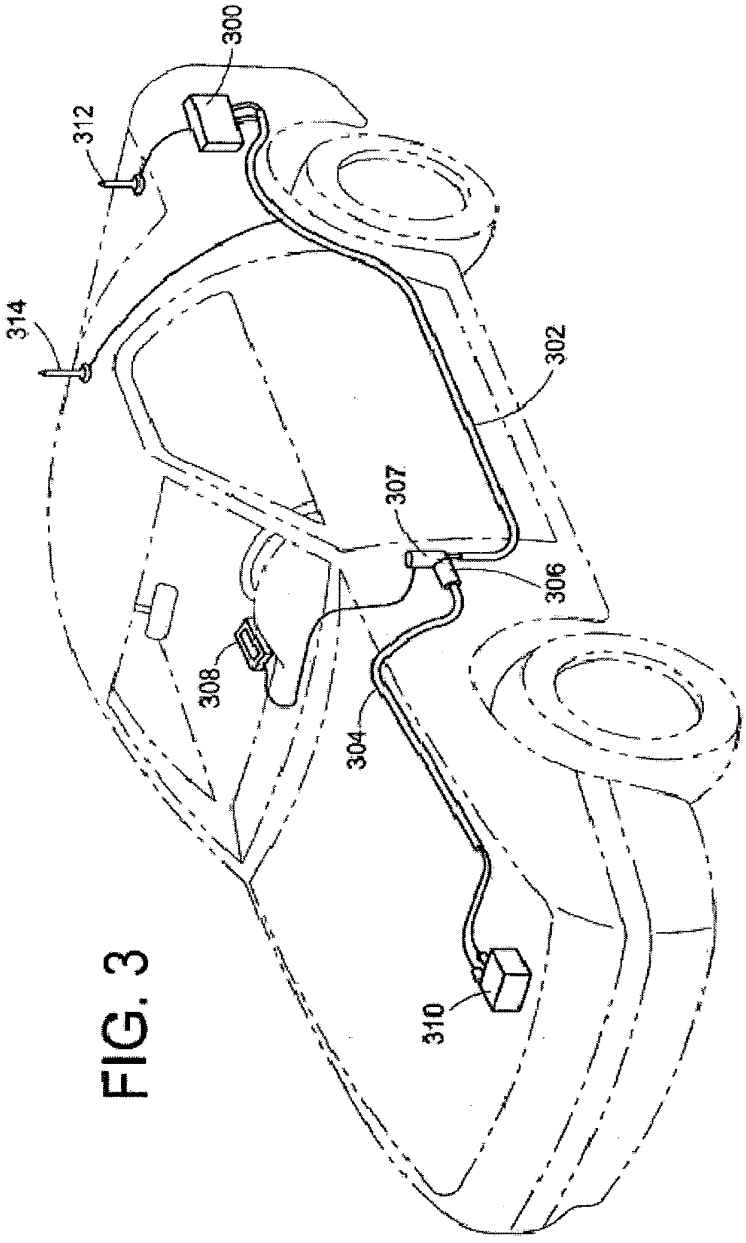

FIG. 3

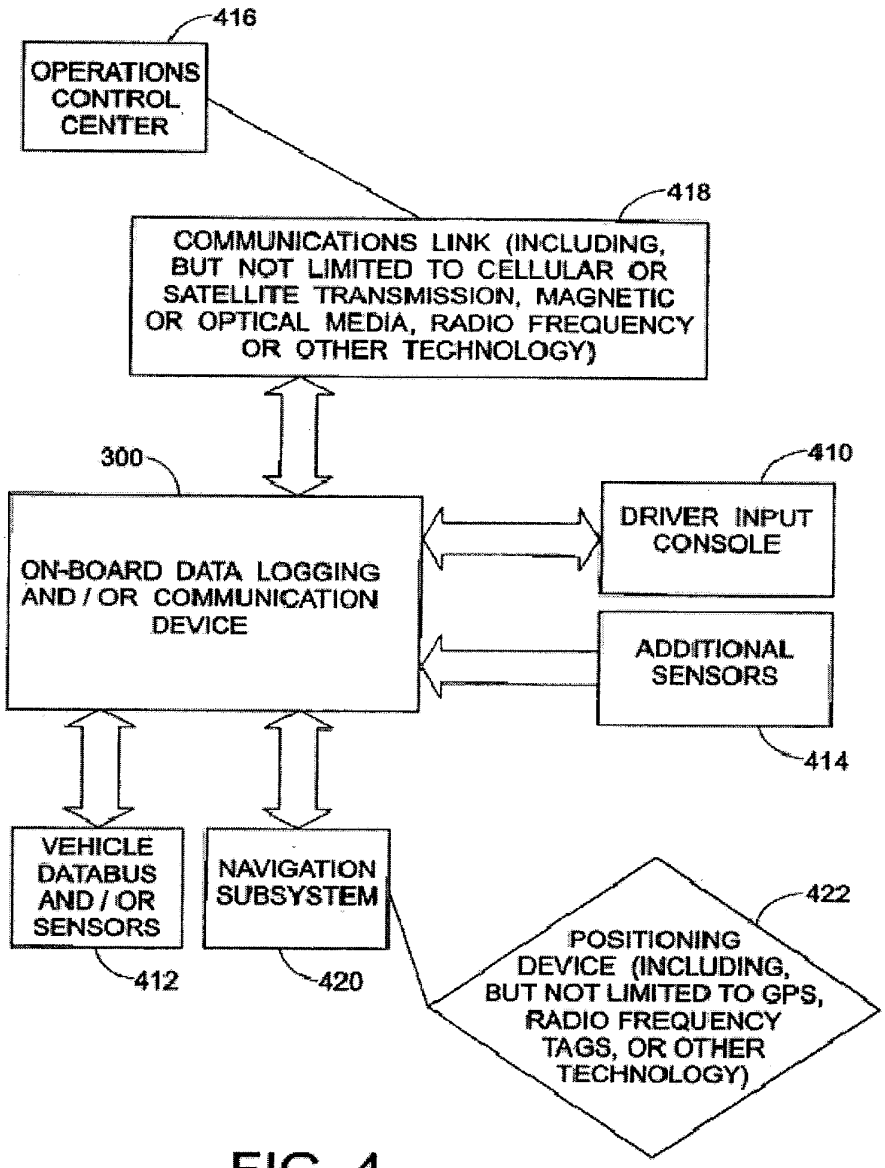
416
OPERATIONS CONTROL CENTER
418
COMMUNICATIONS LINK (INCLUDING, BUT NOT LIMITED TO CELLULAR OR SATELLITE TRANSMISSION, MAGNETIC OR OPTICAL MEDIA, RADIO FREQUENCY OR OTHER TECHNOLOGY)
300
ON-BOARD DATA LOGGING AND / OR COMMUNICATION DEVICE
410
DRIVER INPUT CONSOLE
ADDITIONAL SENSORS
414
VEHICLE DATABUS AND / OR SENSORS
412
NAVIGATION SUBSYSTEM
420
422
POSITIONING DEVICE (INCLUDING, BUT NOT LIMITED TO GPS, RADIO FREQUENCY TAGS, OR OTHER TECHNOLOGY)

FIG. 4

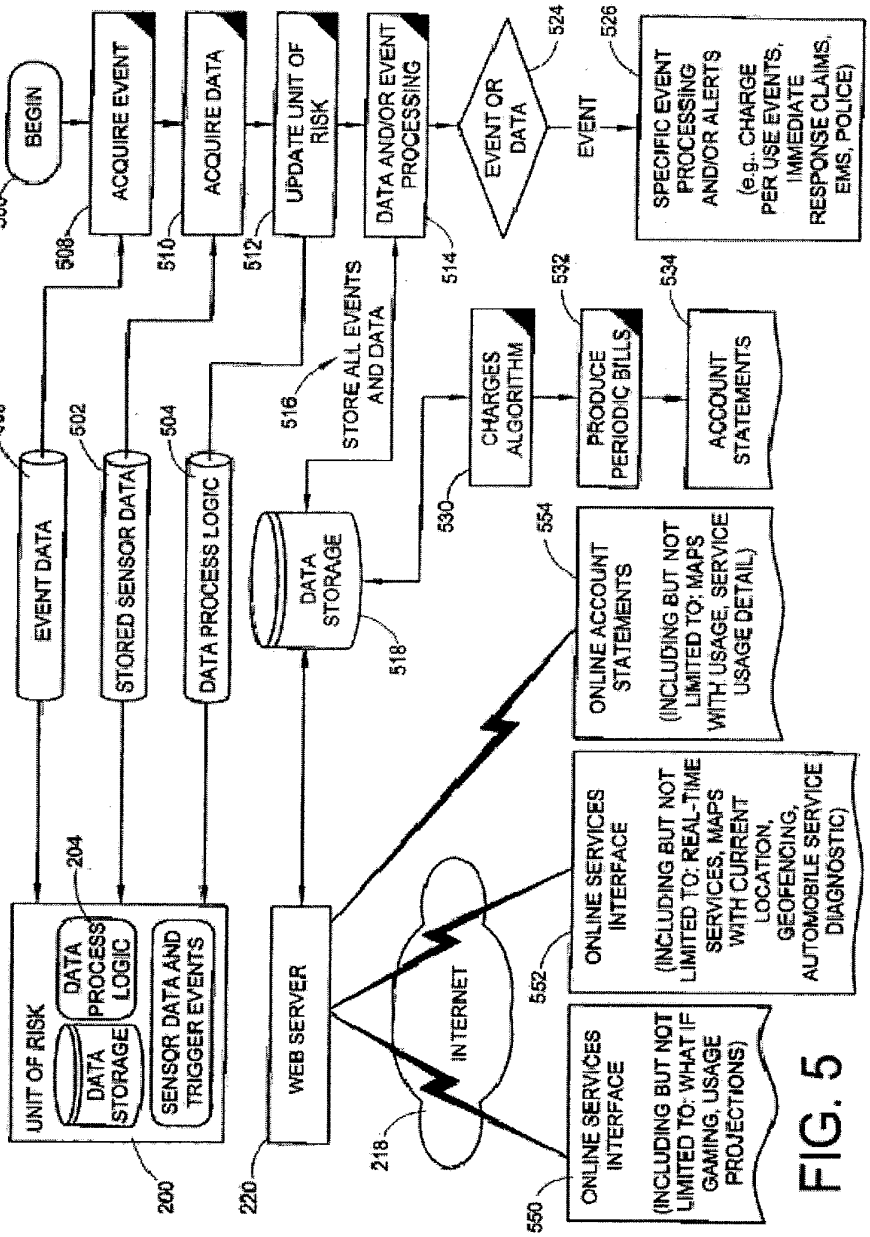
BEGIN
506
ACQUIRE EVENT
508
ACQUIRE DATA
510
UPDATE UNIT OF RISK
512
DATA AND/OR EVENT PROCESSING
514
EVENT OR DATA
524
EVENT
526
SPECIFIC EVENT PROCESSING AND/OR ALERTS
(e.g., CHARGE PER USE EVENTS, IMMEDIATE RESPONSE CLAIMS, EMS, POLICE)
STORE ALL EVENTS AND DATA
516
EVENT DATA
500
STORED SENSOR DATA
502
DATA PROCESS LOGIC
504
DATA STORAGE
518
CHARGES ALGORITHM
530
PRODUCE PERIODIC BILLS
532
ACCOUNT STATEMENTS
534
ONLINE ACCOUNT STATEMENTS
554
(INCLUDING BUT NOT LIMITED TO: MAPS WITH USAGE, SERVICE USAGE DETAIL)
UNIT OF RISK
204
DATA PROCESS LOGIC
DATA STORAGE
SENSOR DATA AND TRIGGER EVENTS
200
WEB SERVER
220
INTERNET
218
ONLINE SERVICES INTERFACE
552
(INCLUDING BUT NOT LIMITED TO: REAL-TIME SERVICES, MAPS WITH CURRENT LOCATION, GEOFENCING, AUTOMOBILE SERVICE DIAGNOSTIC)
ONLINE SERVICES INTERFACE
550
(INCLUDING BUT NOT LIMITED TO: WHAT IF GAMING, USAGE PROJECTIONS)

FIG. 5

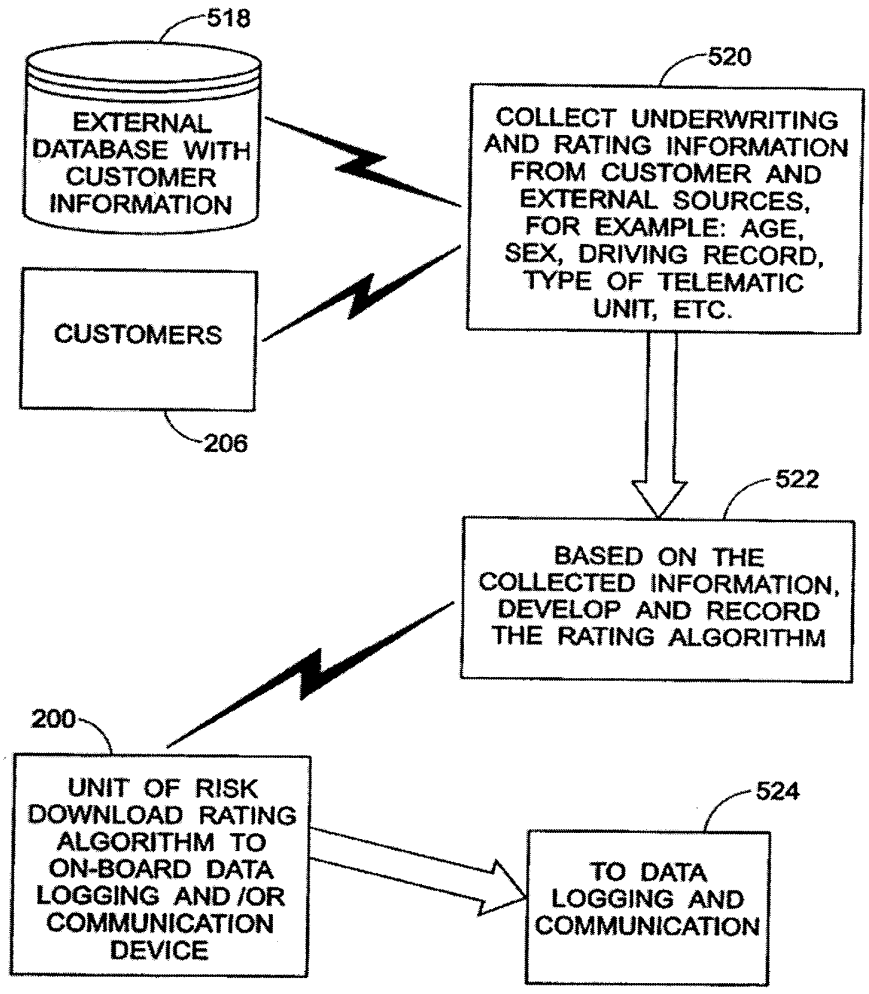
518
EXTERNAL DATABASE WITH CUSTOMER INFORMATION
520
COLLECT UNDERWRITING AND RATING INFORMATION FROM CUSTOMER AND EXTERNAL SOURCES, FOR EXAMPLE: AGE, SEX, DRIVING RECORD, TYPE OF TELEMATIC UNIT, ETC.
CUSTOMERS
206
522
BASED ON THE COLLECTED INFORMATION, DEVELOP AND RECORD THE RATING ALGORITHM
200
UNIT OF RISK DOWNLOAD RATING ALGORITHM TO ON-BOARD DATA LOGGING AND /OR COMMUNICATION DEVICE
524
TO DATA LOGGING AND COMMUNICATION

FIG. 6

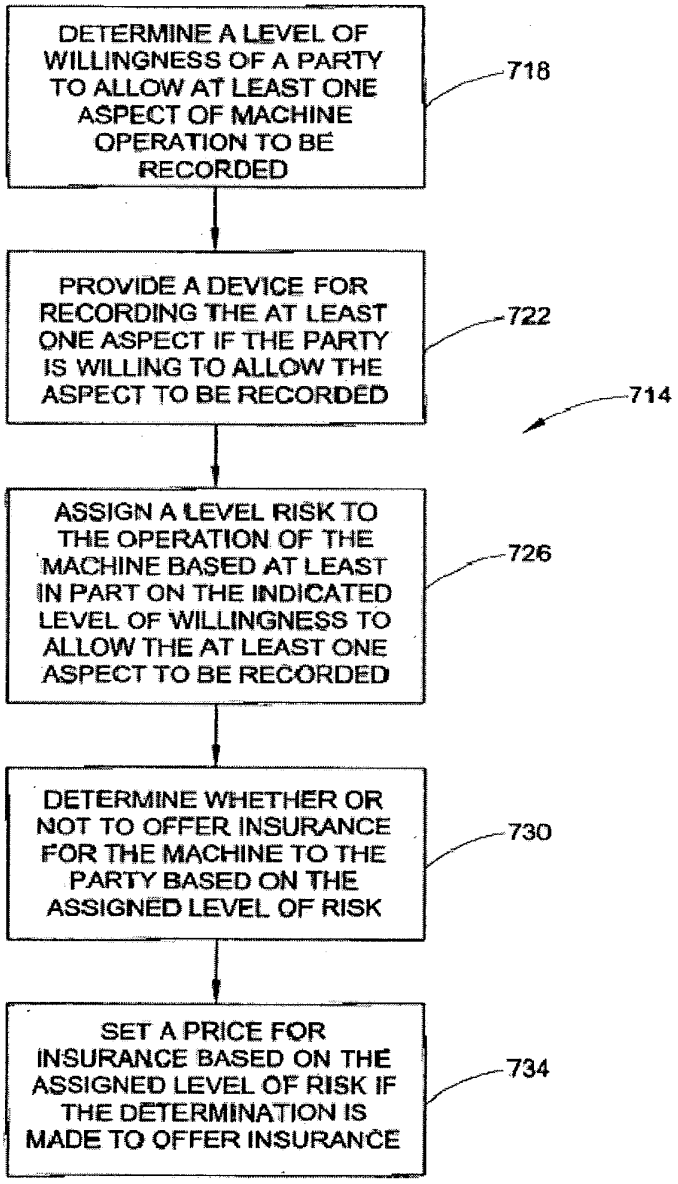
DETERMINE A LEVEL OF WILLINGNESS OF A PARTY TO ALLOW AT LEAST ONE ASPECT OF MACHINE OPERATION TO BE RECORDED
718
PROVIDE A DEVICE FOR RECORDING THE AT LEAST ONE ASPECT IF THE PARTY IS WILLING TO ALLOW THE ASPECT TO BE RECORDED
722
714
ASSIGN A LEVEL RISK TO THE OPERATION OF THE MACHINE BASED AT LEAST IN PART ON THE INDICATED LEVEL OF WILLINGNESS TO ALLOW THE AT LEAST ONE ASPECT TO BE RECORDED
726
DETERMINE WHETHER OR NOT TO OFFER INSURANCE FOR THE MACHINE TO THE PARTY BASED ON THE ASSIGNED LEVEL OF RISK
730
SET A PRICE FOR INSURANCE BASED ON THE ASSIGNED LEVEL OF RISK IF THE DETERMINATION IS MADE TO OFFER INSURANCE
734

FIG. 7

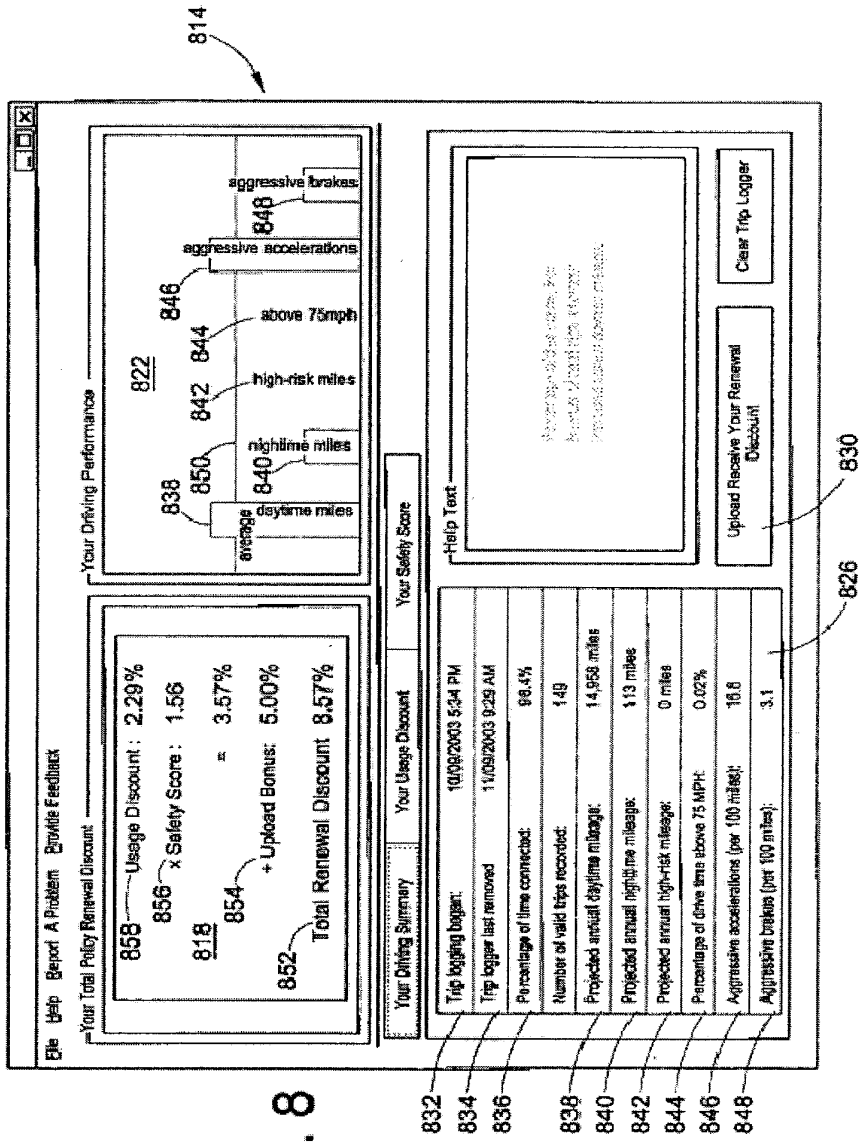
814
File Help Report A Problem Provide Feedback
Your Total Policy Renewal Discount
858 Usage Discount : 2.29%
856 x Safety Score : 1.56
818 =
854 + Upload Bonus: 5.00%
852 Total Renewal Discount 8.57%
Your Driving Performance
822
838 average
850 daytime miles
840 nighttime miles
842 high-risk miles
844 above 75mph
846 aggressive accelerations
848 aggressive brakes
Your Driving Summary
Your Usage Discount
Your Safety Score
Help Text
Upload Receive Your Renewal Discount
830
Clear Trip Logger
826
832 Trip logging began: 10/08/2003 5:34 PM
834 Trip logger last removed 11/09/2003 9:29 AM
836 Percentage of time connected: 98.4%
838 Number of valid trips recorded: 149
840 Projected annual daytime mileage: 14,958 miles
842 Projected annual nighttime mileage: 113 miles
844 Projected annual high-risk mileage: 0 miles
846 Percentage of drive time above 75 MPH: 0.02%
848 Aggressive accelerations (per 100 miles): 16.8
Aggressive brakes (per 100 miles): 3.1

FIG. 8

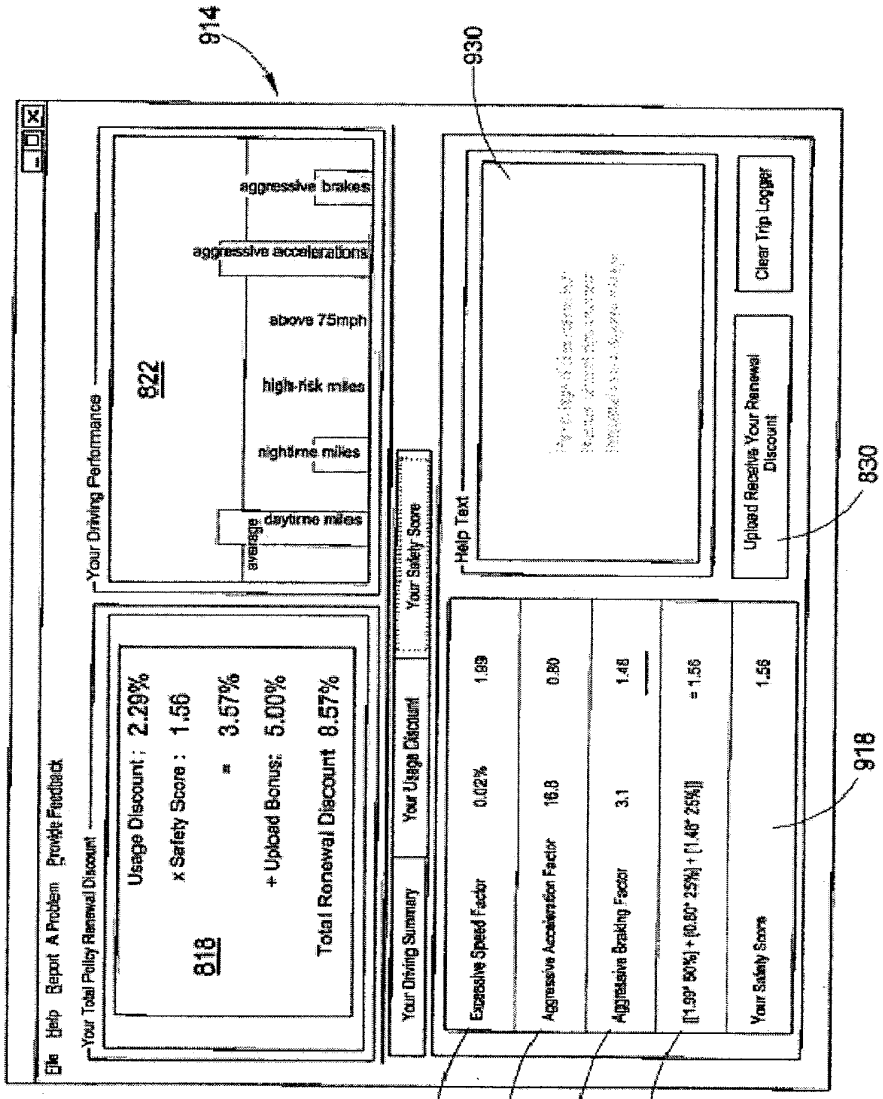
914
930
File Help Report A Problem Provide Feedback
Your Total Policy Renewal Discount
Usage Discount : 2.29%
x Safety Score : 1.56
818
= 3.57%
+ Upload Bonus: 5.00%
Total Renewal Discount 8.57%
Your Driving Performance
822
aggressive brakes
aggressive accelerations
above 75mph
high-risk miles
nighttime miles
daytime miles
average
Your Driving Summary
Your Usage Discount
Your Safety Score
Help Text
Clear Trip Logger
Upload Receive Your Renewal Discount
830
Excessive Speed Factor 0.02% 1.99
Aggressive Acceleration Factor 16.8 0.80
Aggressive Braking Factor 3.1 1.48
[[1.99* 50%]+[0.80* 25%]+[1.48* 25%]] = 1.56
Your Safety Score 1.56
918
922
924
926
920

FIG. 9

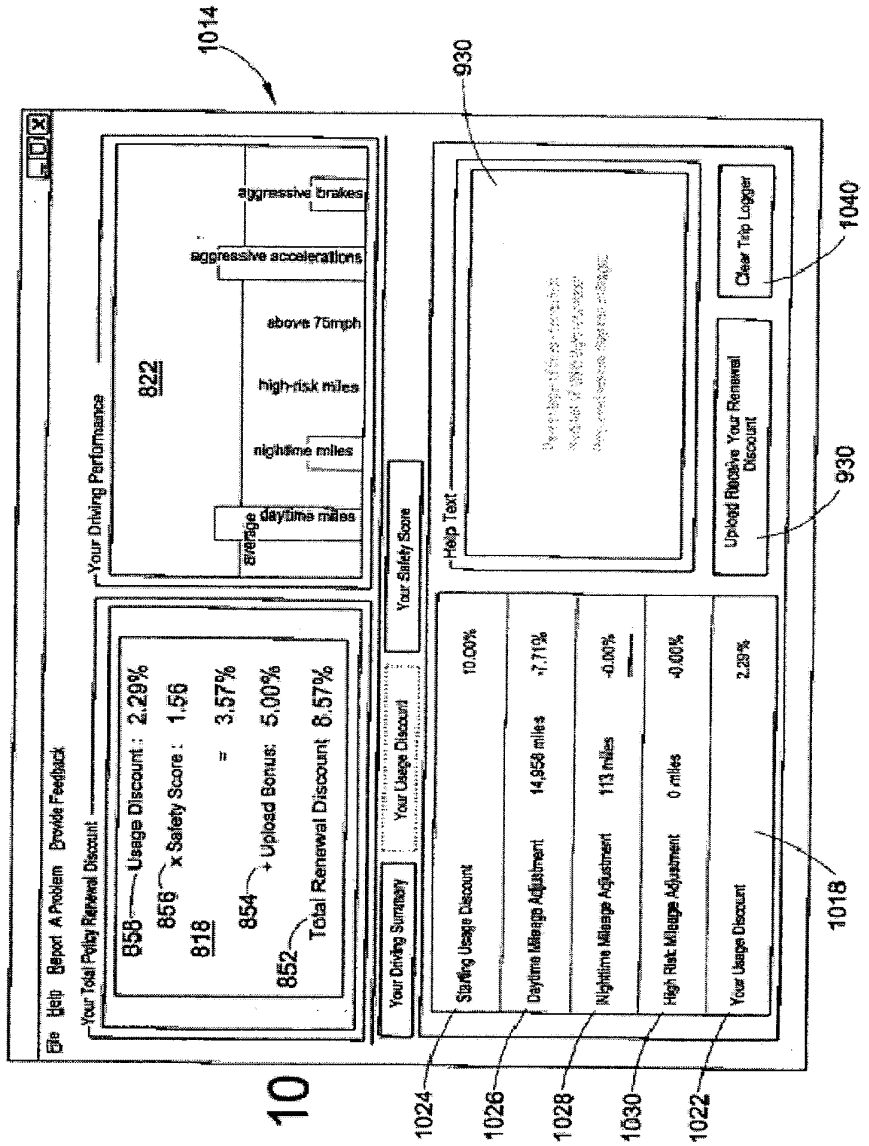
1014
930
File Help Report A Problem Provide Feedback
Your Total Policy Renewal Discount
858 Usage Discount : 2.29%
856 x Safety Score : 1.56
818 = 3.57%
854 + Upload Bonus: 5.00%
852 Total Renewal Discount 8.57%
Your Driving Performance
822
aggressive brakes
aggressive accelerations
above 75mph
high-risk miles
nighttime miles
daytime miles
average
Your Driving Summary
Your Usage Discount
Your Safety Score
Help Text
Clear Trip Logger
1040
Upload Receive Your Renewal Discount
930
Starting Usage Discount 10.00%
Daytime Mileage Adjustment 14,958 miles -7.71%
Nighttime Mileage Adjustment 113 miles -0.00%
High Risk Mileage Adjustment 0 miles -0.00%
Your Usage Discount 2.29%
1018
1024
1026
1028
1030
1022

FIG. 10

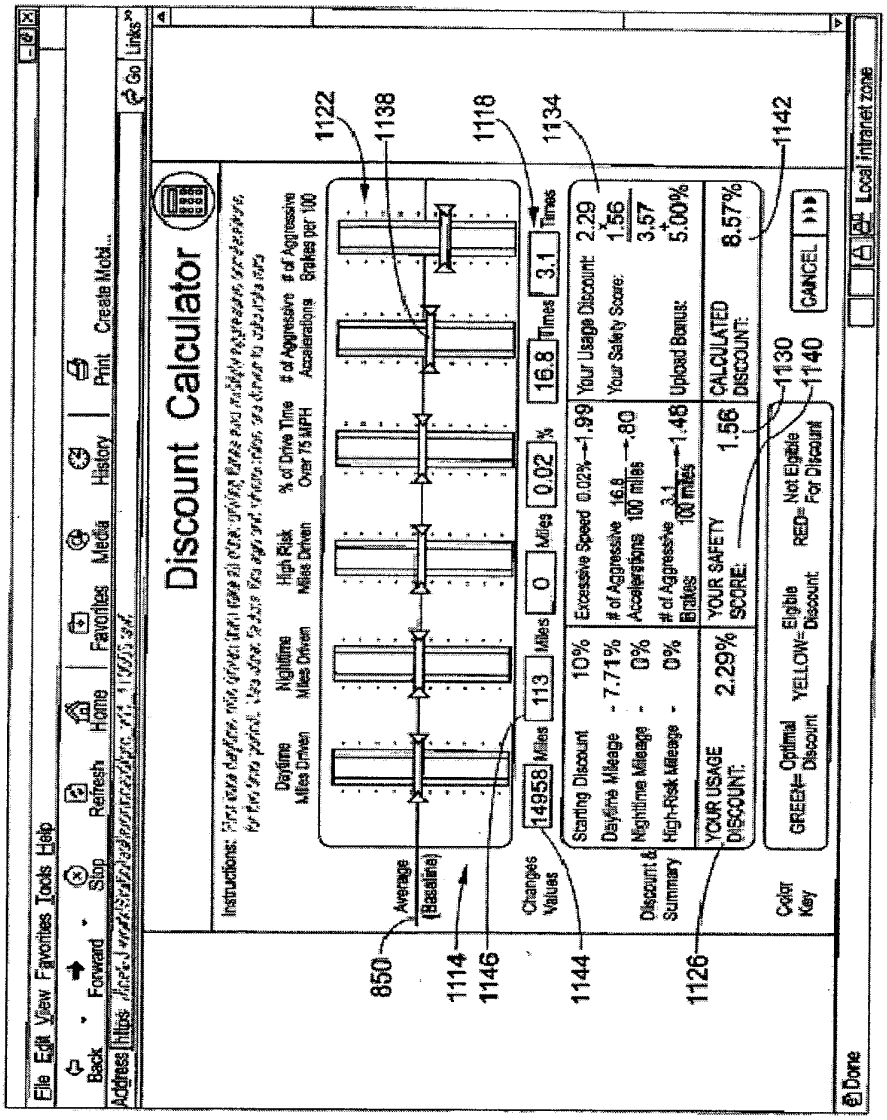
Discount Calculator
Instructions:
Daytime Miles Driven
Nighttime Miles Driven
High Risk Miles Driven
% of Drive Time Over 75 MPH
# of Aggressive Accelerations
# of Aggressive Brakes per 100
Average (Baseline)
Changes Values
Discount & Summary
Color Key
Starting Discount 10%
Daytime Mileage - 7.71%
Nighttime Mileage - 0%
High-Risk Mileage - 0%
YOUR USAGE DISCOUNT: 2.29%
YOUR SAFETY SCORE: 1.56
CALCULATED DISCOUNT: 8.57%
Your Usage Discount: 2.29
Your Safety Score: 1.56
Upload Bonus: 5.00%
GREEN= Optimal Discount
YELLOW= Eligible Discount
RED= Not Eligible For Discount
CANCEL
Miles
Times
%
850
1114
1146
1144
1126
1122
1138
1118
1134
1142
1130
1140
Done
Local intranet zone

FIG. 11

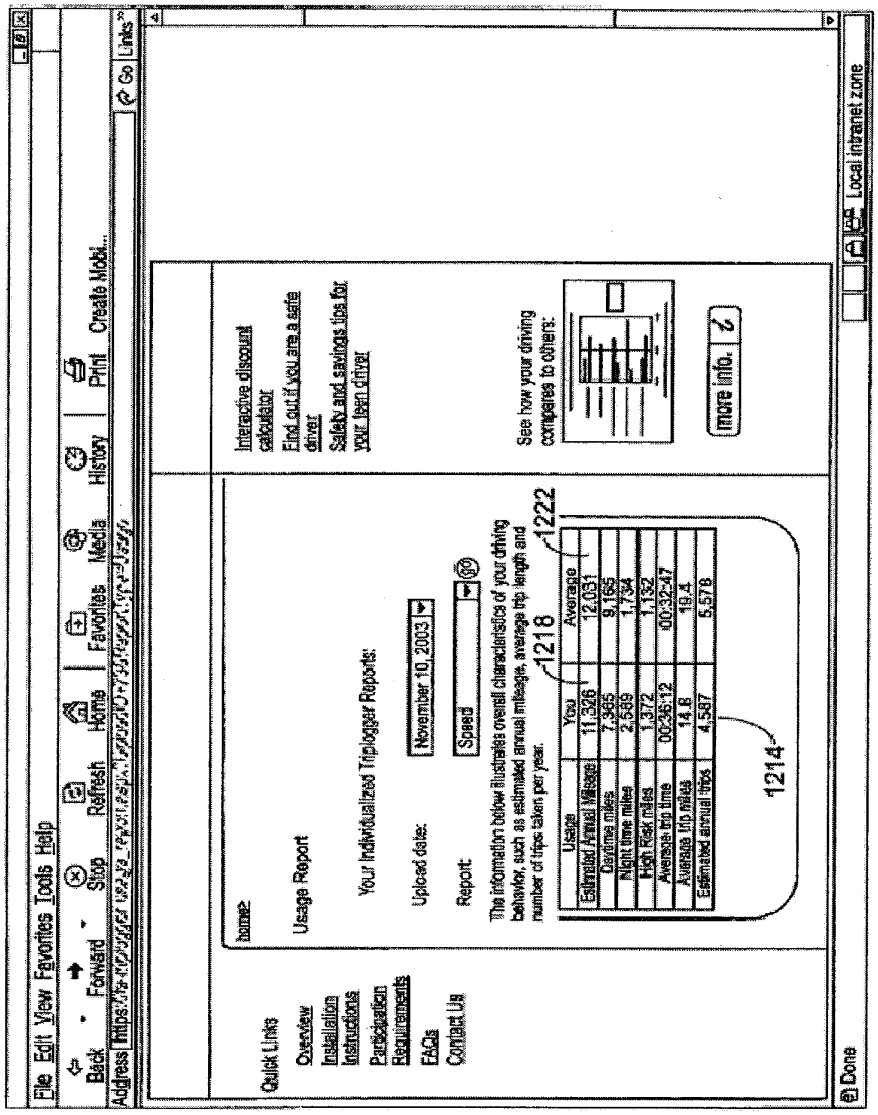
File Edit View Favorites Tools Help
Back
Forward
Stop
Refresh
Home
Favorites
Media
History
Print
Create Mobi...
Address
Links
Done
Local intranet zone
Quick Links
Overview
Installation Instructions
Participation Requirements
FAQs
Contact Us
home
Usage Report
Your Individualized Triplogger Reports:
Upload date:
November 10, 2003
Report:
Speed
Go
The information below illustrates overall characteristics of your driving behavior, such as estimated annual mileage, average trip length and number of trips taken per year.
1218
1222
Usage
You
Average
Estimated Annual Mileage
11,306
12,031
Daytime miles
7,365
9,165
Night time miles
2,569
1,734
High Risk miles
1,372
1,132
Average trip time
00:36:12
00:32:47
Average trip miles
14.8
19.4
Estimated annual trips
4,587
5,578
1214
Interactive discount calculator
Find out if you are a safe driver
Safety and savings tips for your teen driver
See how your driving compares to others:
more info.

FIG. 12

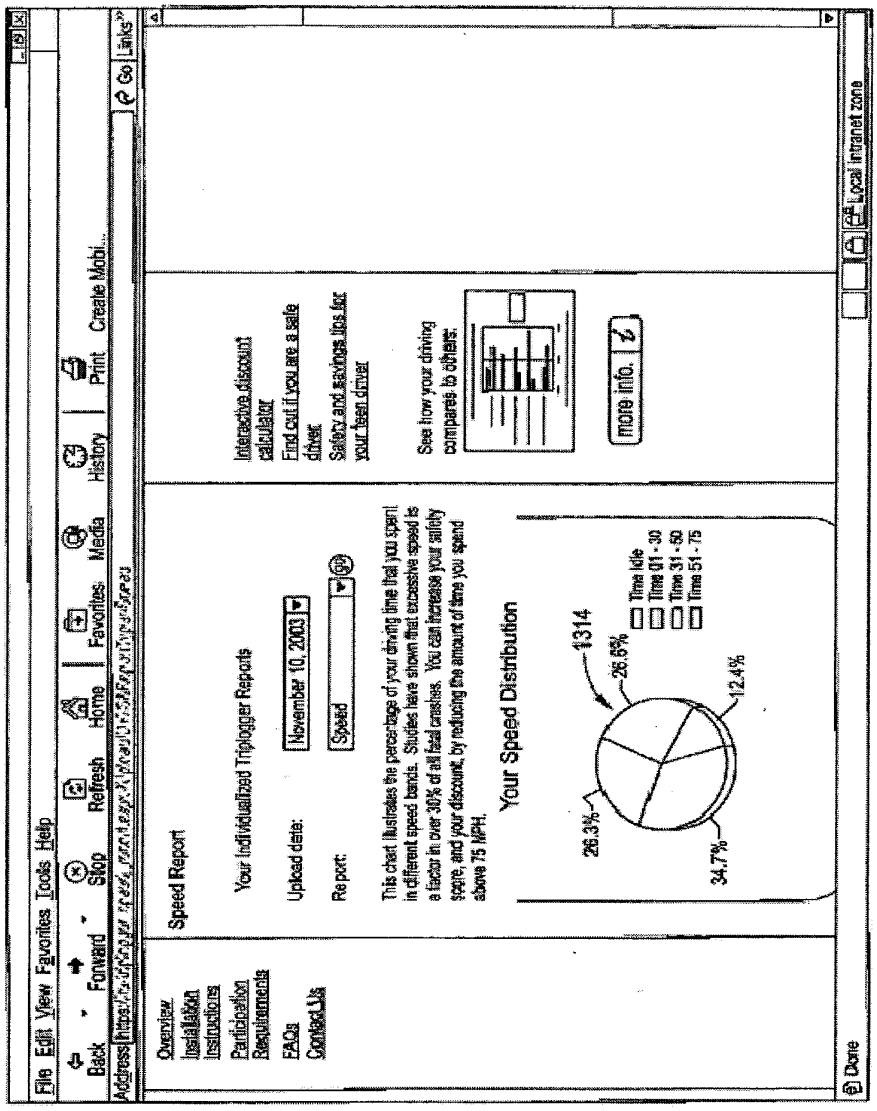
File Edit View Favorites Tools Help
Back
Forward
Stop
Refresh
Home
Favorites
Media
History
Print
Create Mobi...
Address
Links
Overview
Installation Instructions
Participation Requirements
FAQs
Contact Us
Speed Report
Your Individualized Triplogger Reports
Upload date:
November 10, 2003
Report:
Speed
This chart illustrates the percentage of your driving time that you spent in different speed bands. Studies have shown that excessive speed is a factor in over 30% of all fatal crashes. You can increase your safety score, and your discount, by reducing the amount of time you spend above 75 MPH.
Your Speed Distribution
1314
26.6%
12.4%
34.7%
26.3%
Time Idle
Time 01 - 30
Time 31 - 50
Time 51 - 75
Interactive discount calculator
Find out if you are a safe driver
Safety and savings tips for your teen driver
See how your driving compares to others
more info.
Done
Local intranet zone

FIG. 13

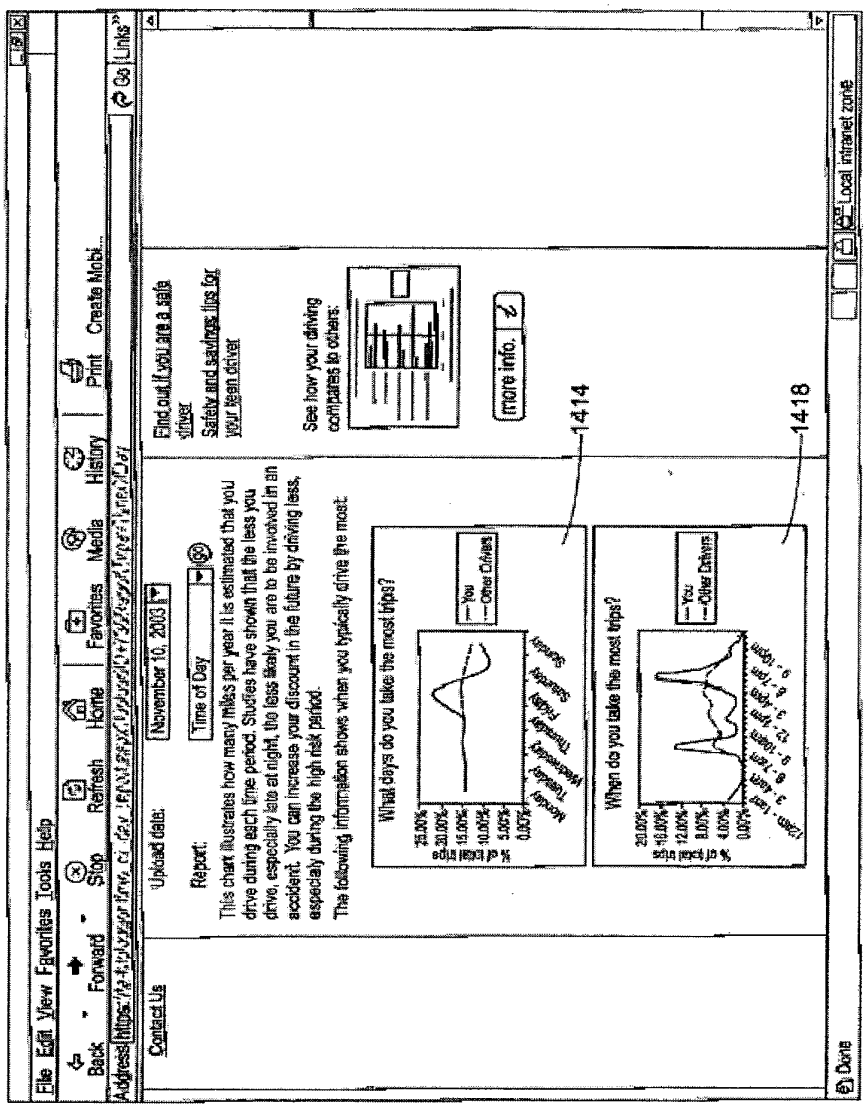
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Favorites Media History Print Create Mobi...
Address
Links
Contact Us
Upload data:
November 10, 2003
Report:
Time of Day
This chart illustrates how many miles per year it is estimated that you drive during each time period. Studies have shown that the less you drive, especially late at night, the less likely you are to be involved in an accident. You can increase your discount in the future by driving less, especially during the high risk period.
The following information shows when you typically drive the most.
Find out if you are a safe driver
Safety and savings tips for your teen driver
See how your driving compares to others:
more info...
What days do you take the most trips?
% of total trips
You
Other Drivers
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday
Sunday
1414
When do you take the most trips?
% of total trips
You
Other Drivers
1418
Done
Local intranet zone

FIG. 14

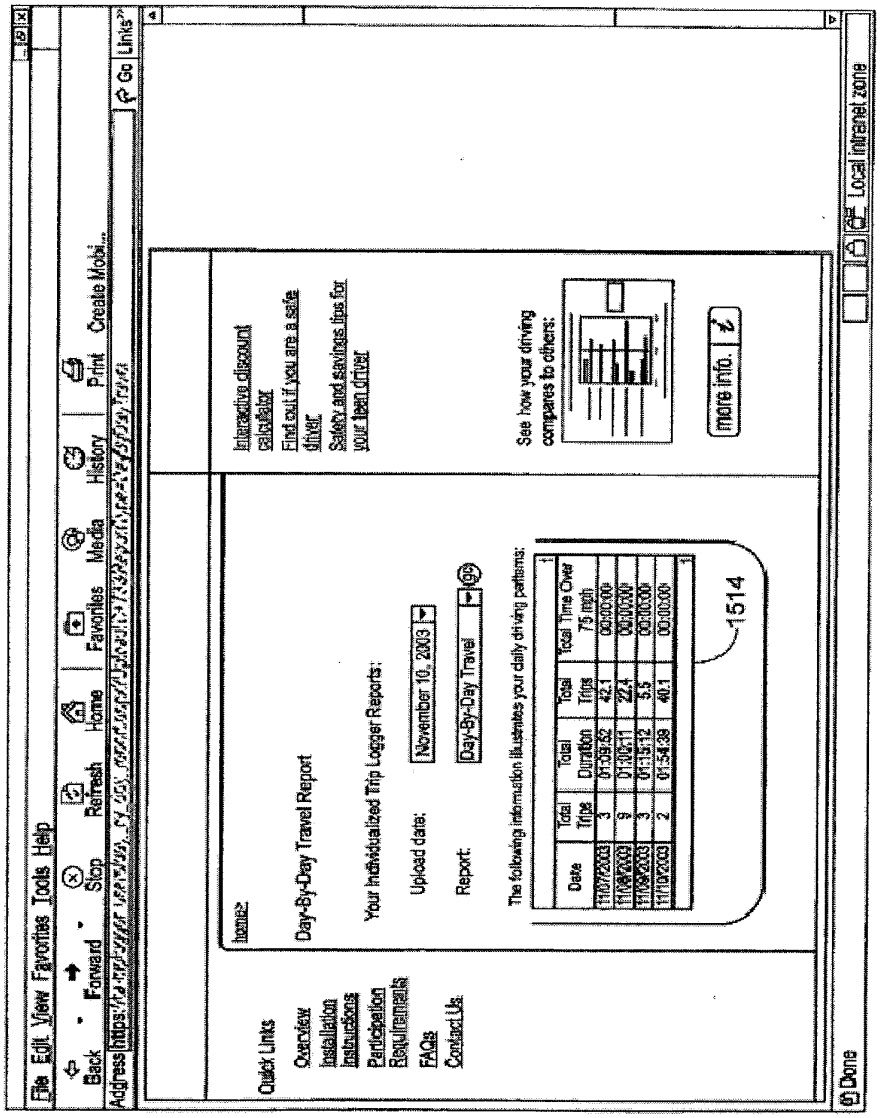
File Edit View Favorites Tools Help
Back
Forward
Stop
Refresh
Home
Favorites
Media
History
Print
Create Mobi...
Address
Go
Links
Quick Links
Overview
Installation Instructions
Participation Requirements
FAQs
Contact Us
Home
Day-By-Day Travel Report
Your Individualized Trip Logger Reports:
Upload date:
November 10, 2003
Report:
Day-By-Day Travel
The following information illustrates your daily driving patterns:
Date
Total Trips
Total Duration
Total Trips
Total Time Over 75 mph
11/7/2003
3
01:39:52
42.1
00:00:00
11/8/2003
9
01:00:11
22.4
00:00:00
11/9/2003
3
01:15:12
5.5
00:00:00
11/10/2003
2
01:54:39
40.1
00:00:00
1514
Interactive discount calculator
Find out if you are a safe driver.
Safety and savings tips for your teen driver
See how your driving compares to others:
more info.
Done
Local intranet zone

FIG. 15

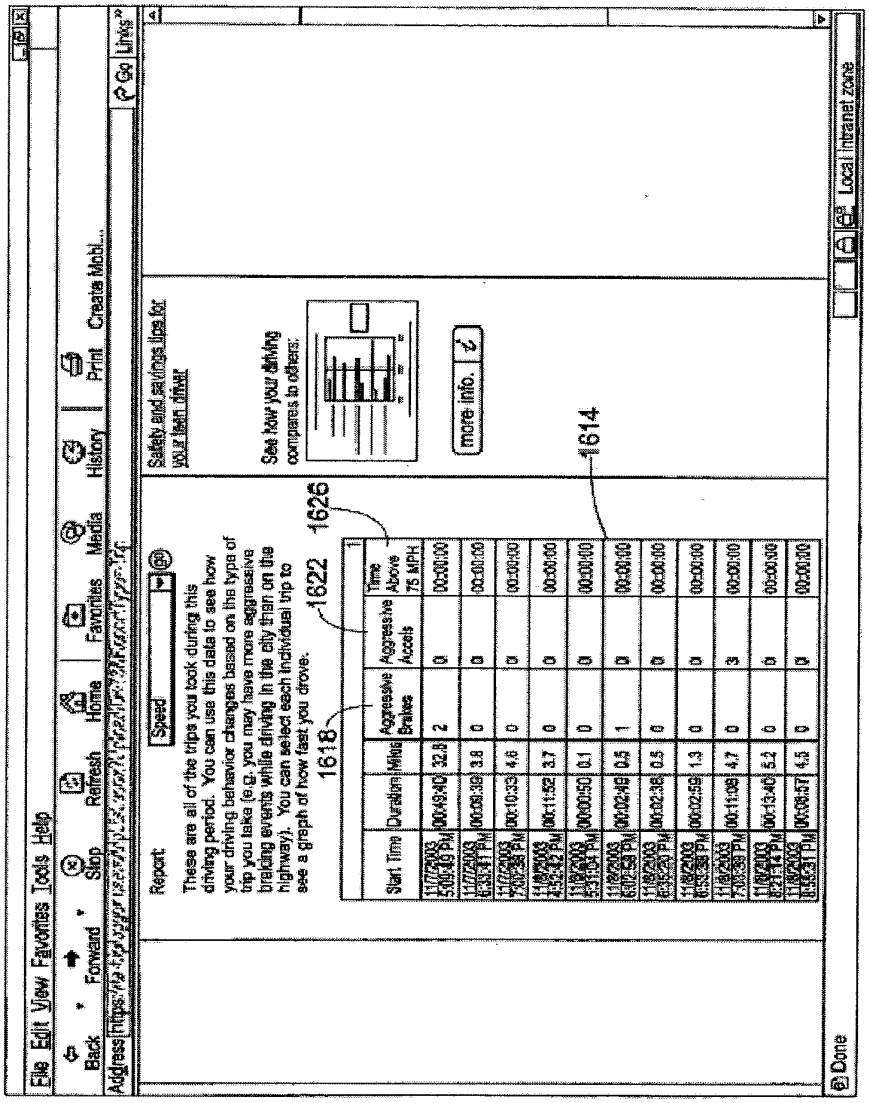
File Edit View Favorites Tools Help
Back
Forward
Stop
Refresh
Home
Favorites
Media
History
Print
Create Mobi...
Address
Go
Links
Report:
Speed
These are all of the trips you took during this driving period. You can use this data to see how your driving behavior changes based on the type of trip you take (e.g. you may have more aggressive braking events while driving in the city than on the highway). You can select each individual trip to see a graph of how fast you drove.
1618
1622
1625
1614
Start Time
Duration
Miles
Aggressive Brakes
Aggressive Accels
Time Above 75 MPH
11/7/2003 5:05:45 PM 00:49:40 32.8 2 0 00:00:00
11/7/2003 6:33:41 PM 00:08:38 3.8 0 0 00:00:00
11/7/2003 7:20:38 PM 00:10:33 4.6 0 0 00:00:00
11/8/2003 8:58:42 PM 00:11:52 3.7 0 0 00:00:00
11/8/2003 9:31:04 PM 00:00:50 0.1 0 0 00:00:00
11/8/2003 6:07:58 PM 00:02:48 0.5 1 0 00:00:00
11/8/2003 8:32:29 PM 00:02:38 0.5 0 0 00:00:00
11/8/2003 8:55:38 PM 00:02:59 1.3 0 0 00:00:00
11/8/2003 7:20:38 PM 00:11:08 4.7 0 3 00:00:00
11/8/2003 8:21:14 PM 00:13:40 5.2 0 0 00:00:00
11/8/2003 8:46:31 PM 00:06:57 4.5 0 0 00:00:00
Safety and savings tips for your teen driver
See how your driving compares to others:
more info.
Done
Local intranet zone

FIG. 16

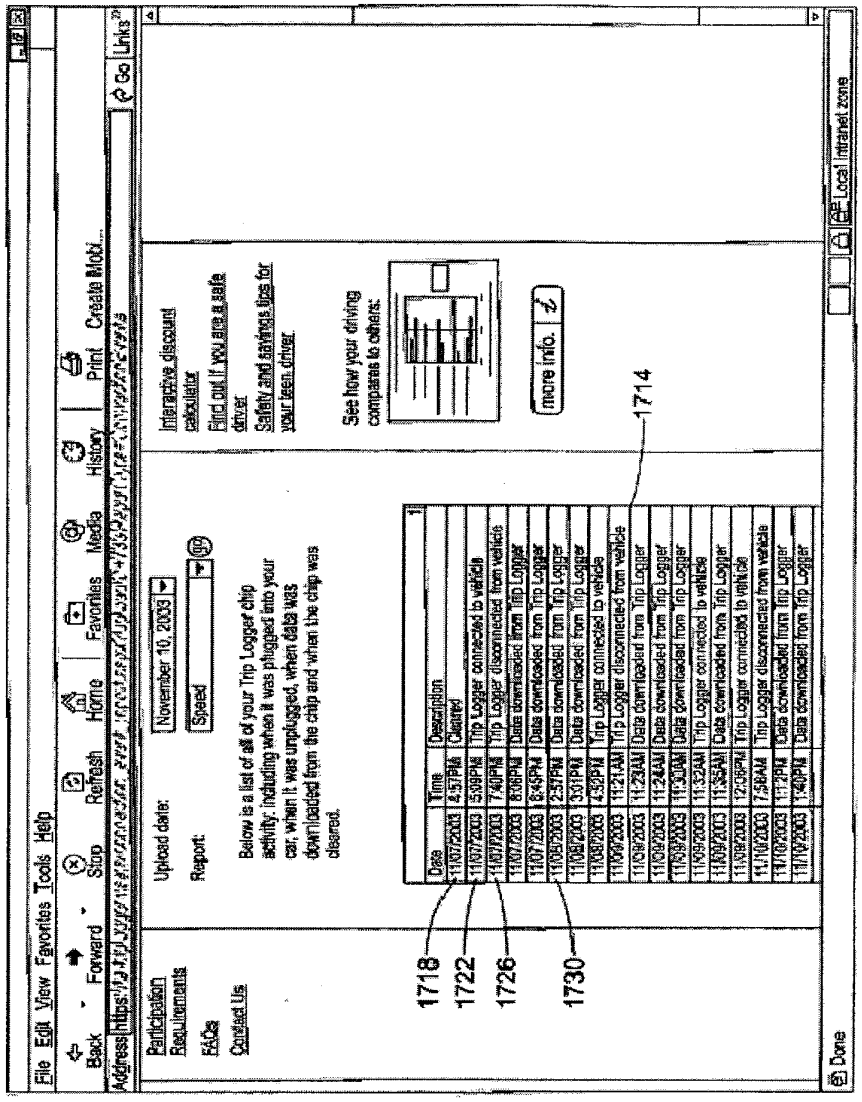
File Edit View Favorites Tools Help
Back
Forward
Stop
Refresh
Home
Favorites
Media
History
Print
Create Mobi...
Links
Participation Requirements
FAQs
Contact Us
Upload date:
November 10, 2003
Report:
Speed
Below is a list of all of your Trip Logger chip activity, including when it was plugged into your car, when it was unplugged, when data was downloaded from the chip and when the chip was cleared.
Interactive discount calculator
Find out if you are a safe driver
Safety and savings tips for your teen driver
See how your driving compares to others:
more info
Date
Time
Description
11/07/2003 4:57PM Cleared
11/07/2003 5:39PM Trip Logger connected to vehicle
11/07/2003 7:40PM Trip Logger disconnected from vehicle
11/07/2003 8:08PM Data downloaded from Trip Logger
11/07/2003 6:43PM Data downloaded from Trip Logger
11/08/2003 2:57PM Data downloaded from Trip Logger
11/08/2003 3:01PM Data downloaded from Trip Logger
11/08/2003 4:52PM Trip Logger connected to vehicle
11/09/2003 11:21AM Trip Logger disconnected from vehicle
11/09/2003 11:23AM Data downloaded from Trip Logger
11/09/2003 11:24AM Data downloaded from Trip Logger
11/09/2003 11:30AM Data downloaded from Trip Logger
11/09/2003 11:32AM Trip Logger connected to vehicle
11/09/2003 11:35AM Data downloaded from Trip Logger
11/09/2003 12:39PM Trip Logger connected to vehicle
11/10/2003 7:58AM Trip Logger disconnected from vehicle
11/10/2003 11:27PM Data downloaded from Trip Logger
11/10/2003 1:40PM Data downloaded from Trip Logger
1718
1722
1726
1730
1714
Done
Local intranet zone

FIG. 17

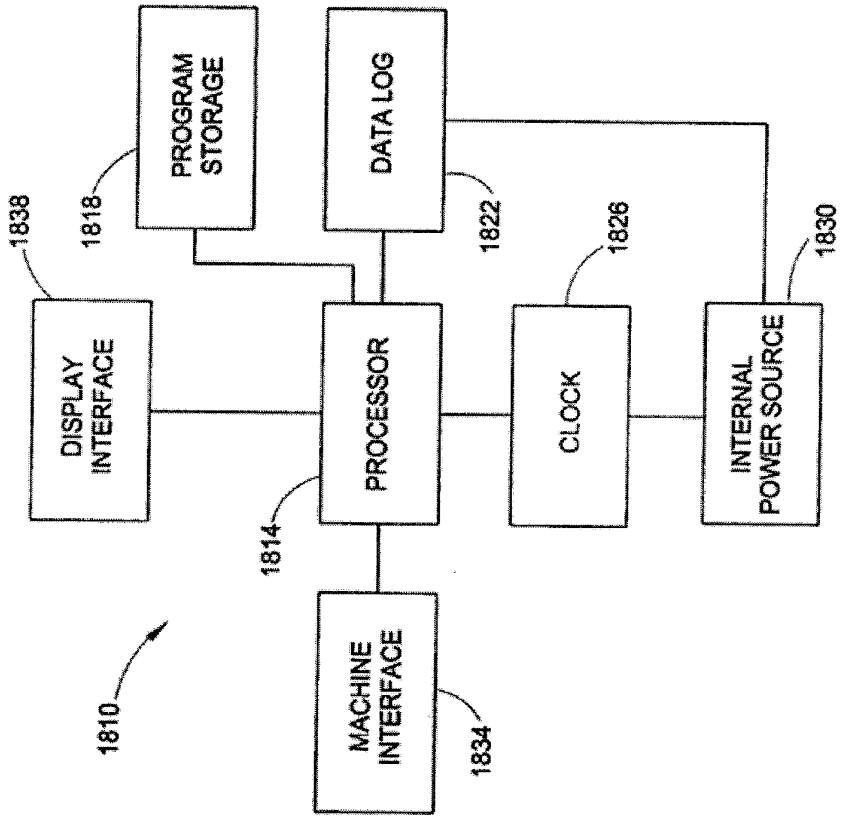
PROGRAM STORAGE
DATA LOG
DISPLAY INTERFACE
PROCESSOR
CLOCK
INTERNAL POWER SOURCE
MACHINE INTERFACE
1810
1814
1818
1822
1826
1830
1834
1838

FIG. 18

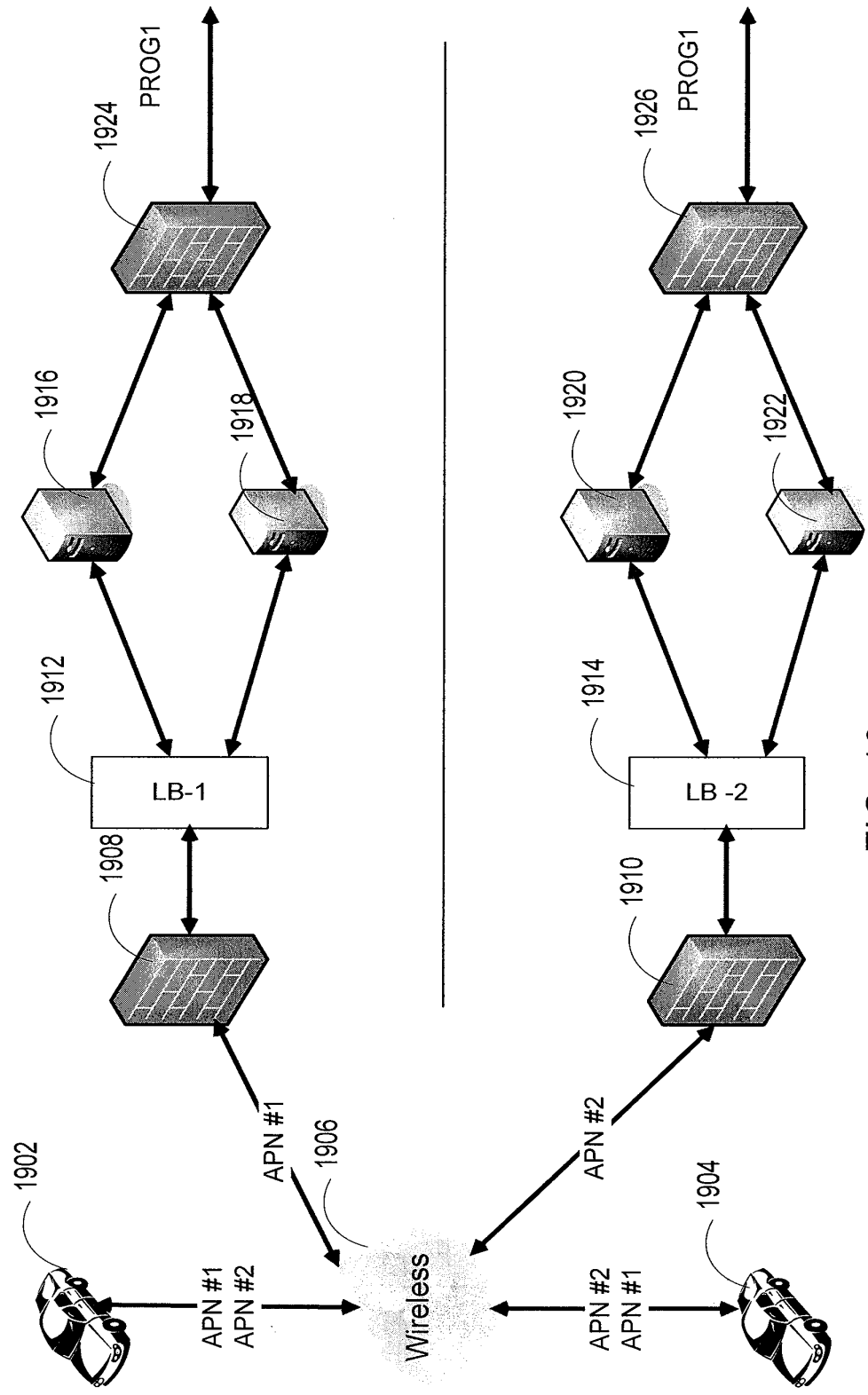
PROG1
1924
1916
1918
1912
LB-1
1908
1902
APN #1
APN #2
1906
Wireless
PROG1
1926
1920
1922
1914
LB -2
1910
1904
APN #2
APN #1

FIG. 19

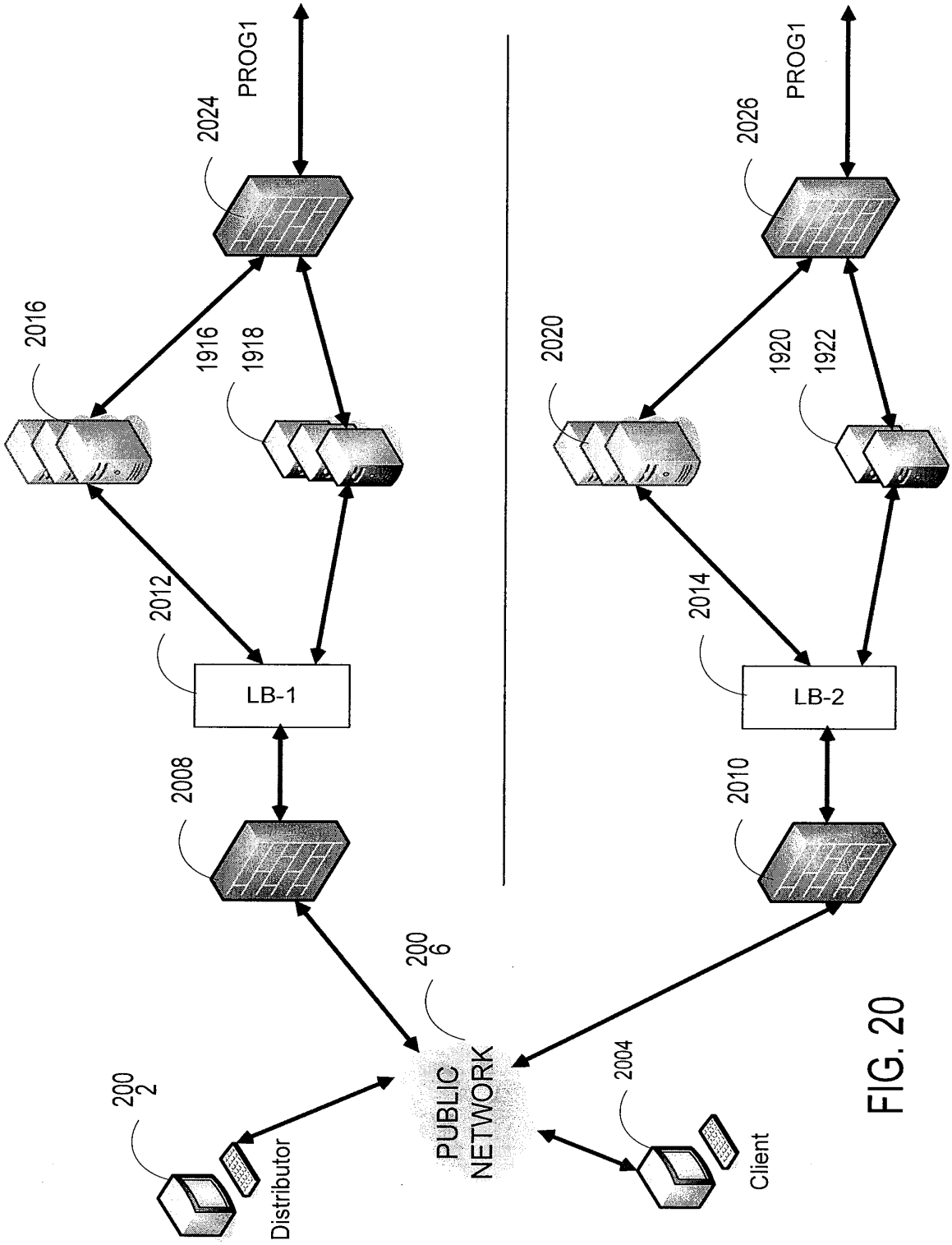
PROG1
2024
2016
1916
1918
2012
LB-1
2008
2002
Distributor
2006
PUBLIC NETWORK
2004
Client
2010
LB-2
2014
1920
1922
2020
2026
PROG1

FIG. 20

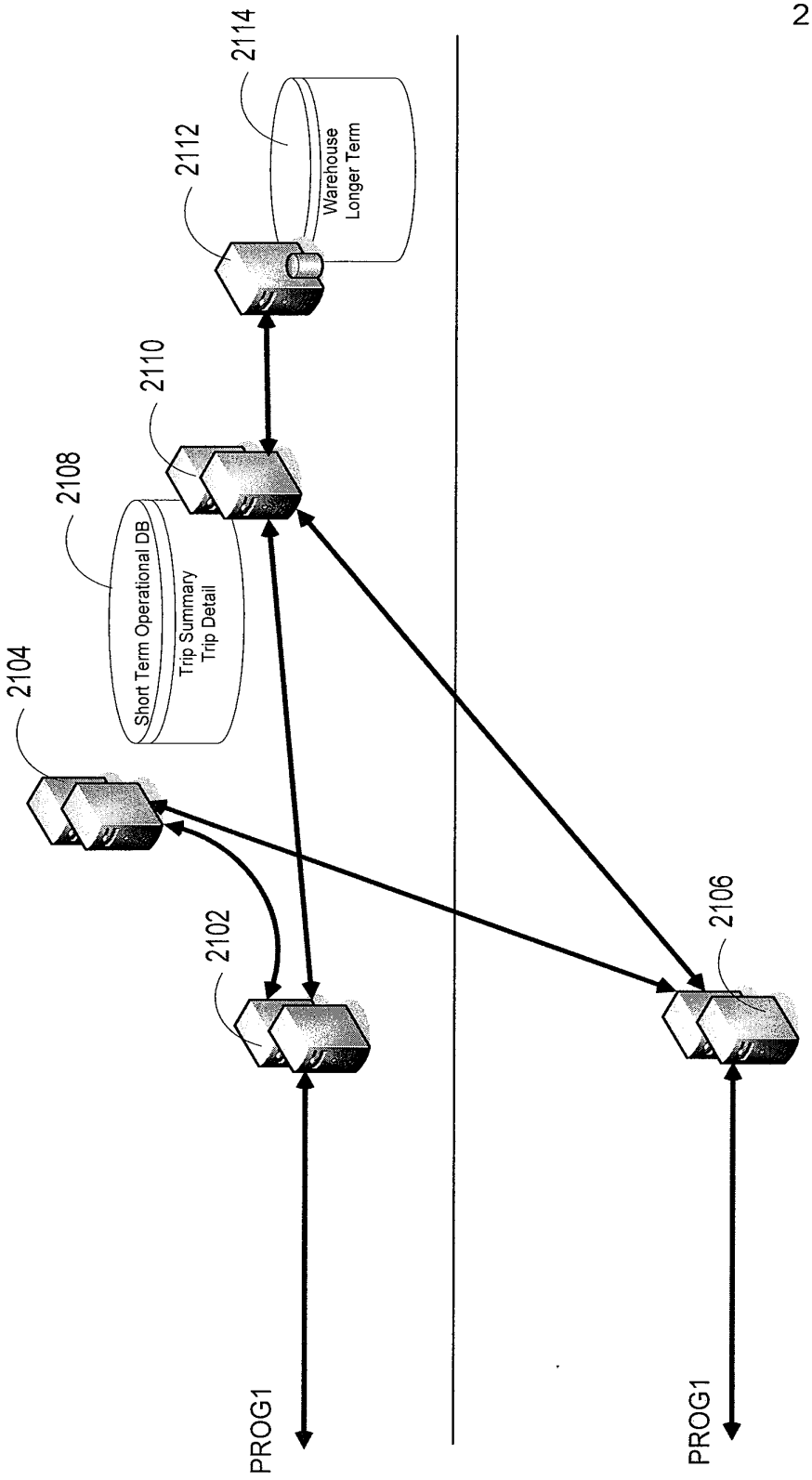
2114
2112
Warehouse
Longer Term
2110
2108
Short Term Operational DB
Trip Summary
Trip Detail
2104
2102
2106
PROG1
PROG1

FIG. 21

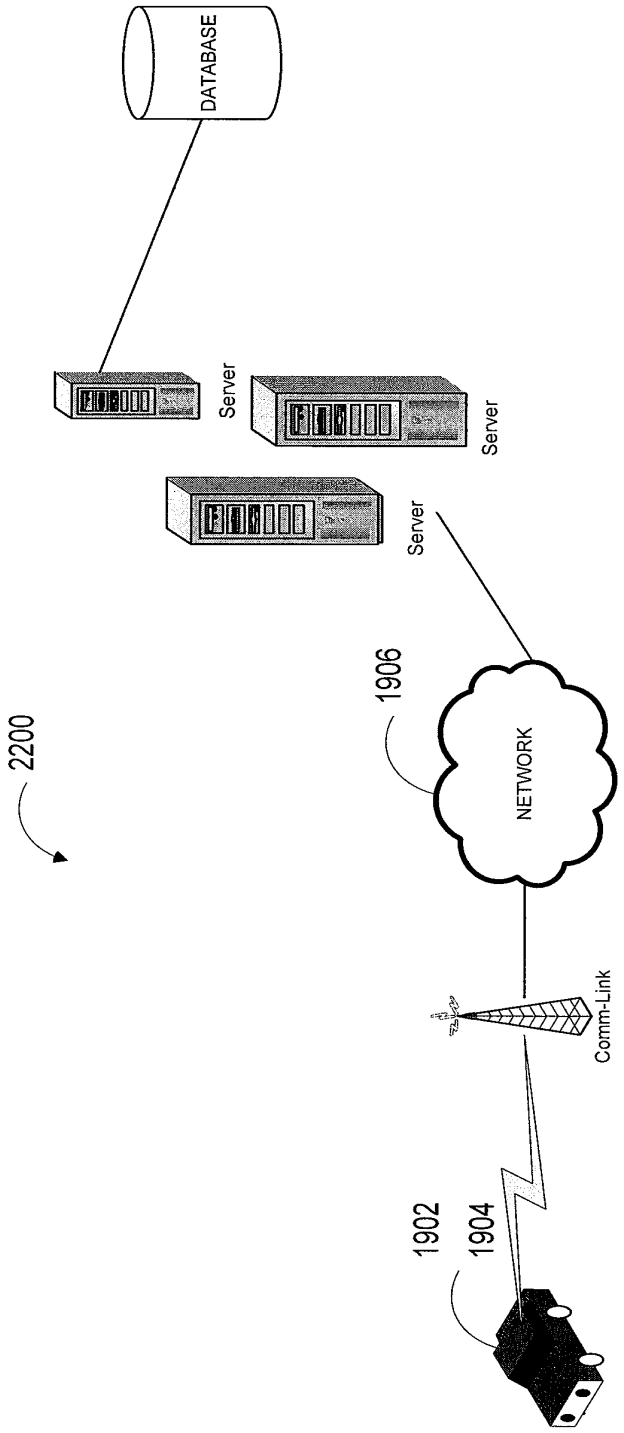
DATABASE
Server
Server
Server
1906
NETWORK
2200
Comm-Link
1902
1904

FIG. 22

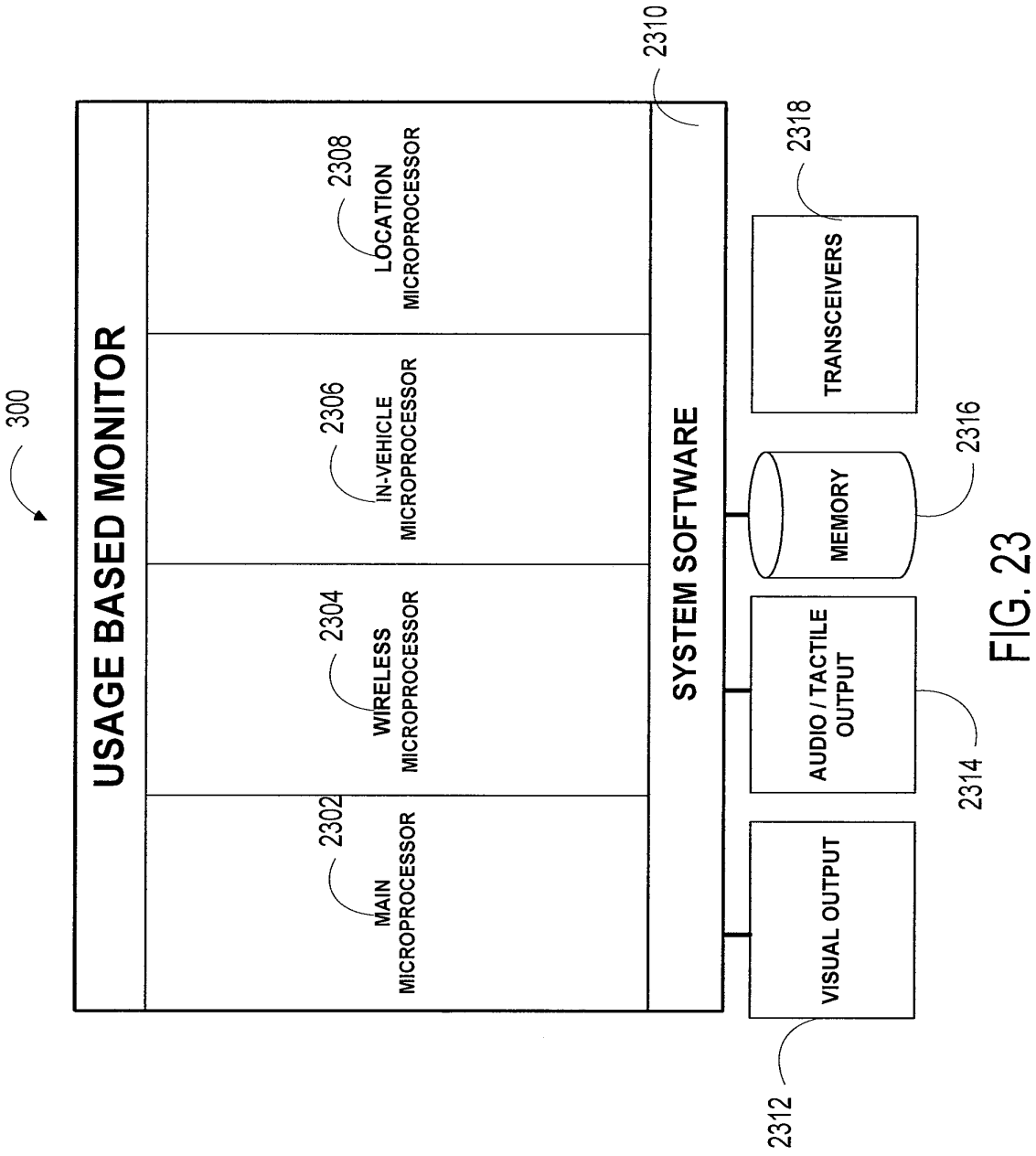
300
USAGE BASED MONITOR
2302
MAIN MICROPROCESSOR
2304
WIRELESS MICROPROCESSOR
2306
IN-VEHICLE MICROPROCESSOR
2308
LOCATION MICROPROCESSOR
2310
SYSTEM SOFTWARE
2312
VISUAL OUTPUT
2314
AUDIO / TACTILE OUTPUT
2316
MEMORY
2318
TRANSCEIVERS

FIG. 23

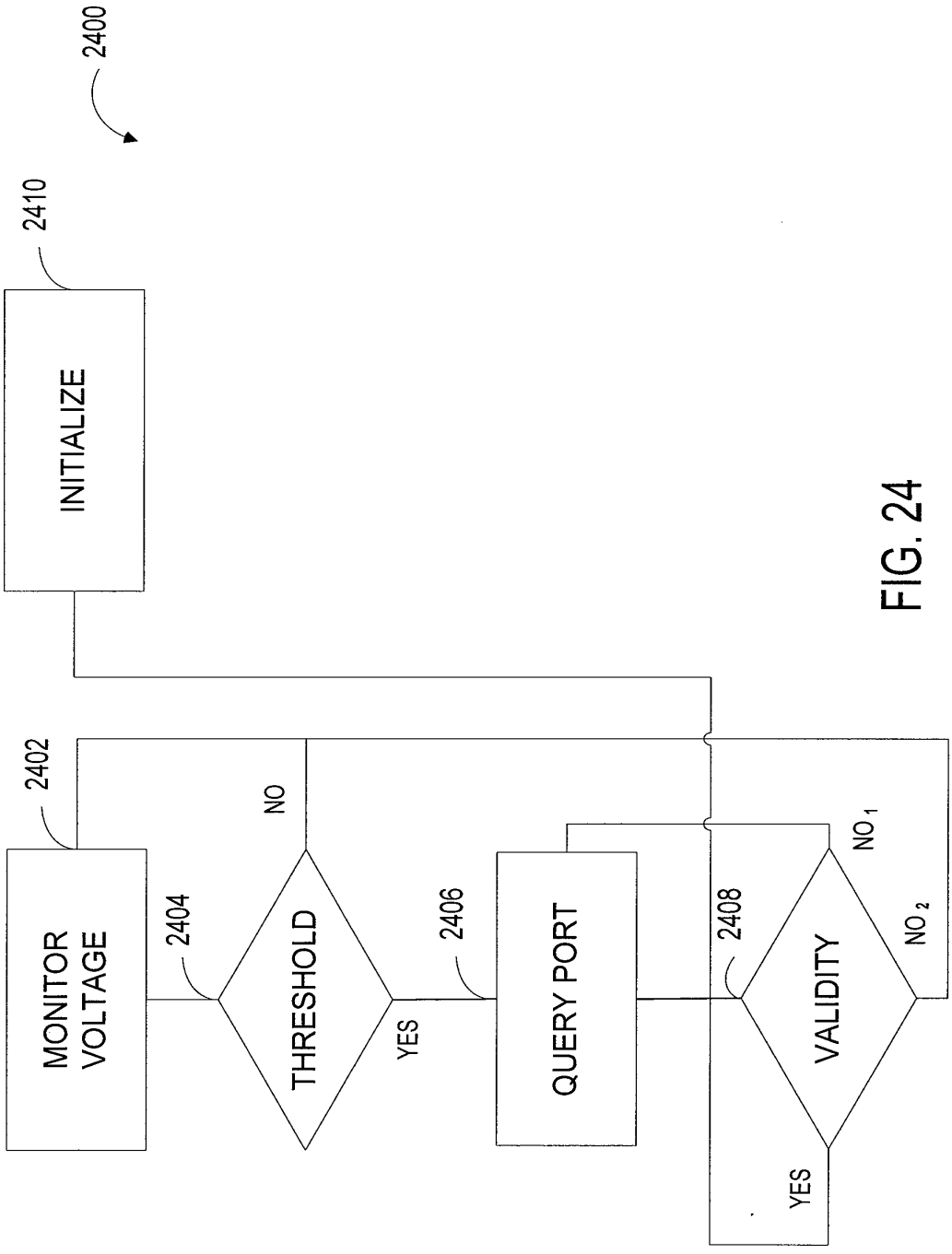
2400
2410
INITIALIZE
2402
MONITOR VOLTAGE
2404
THRESHOLD
NO
YES
2406
QUERY PORT
2408
VALIDITY
NO 1
NO 2
YES

FIG. 24

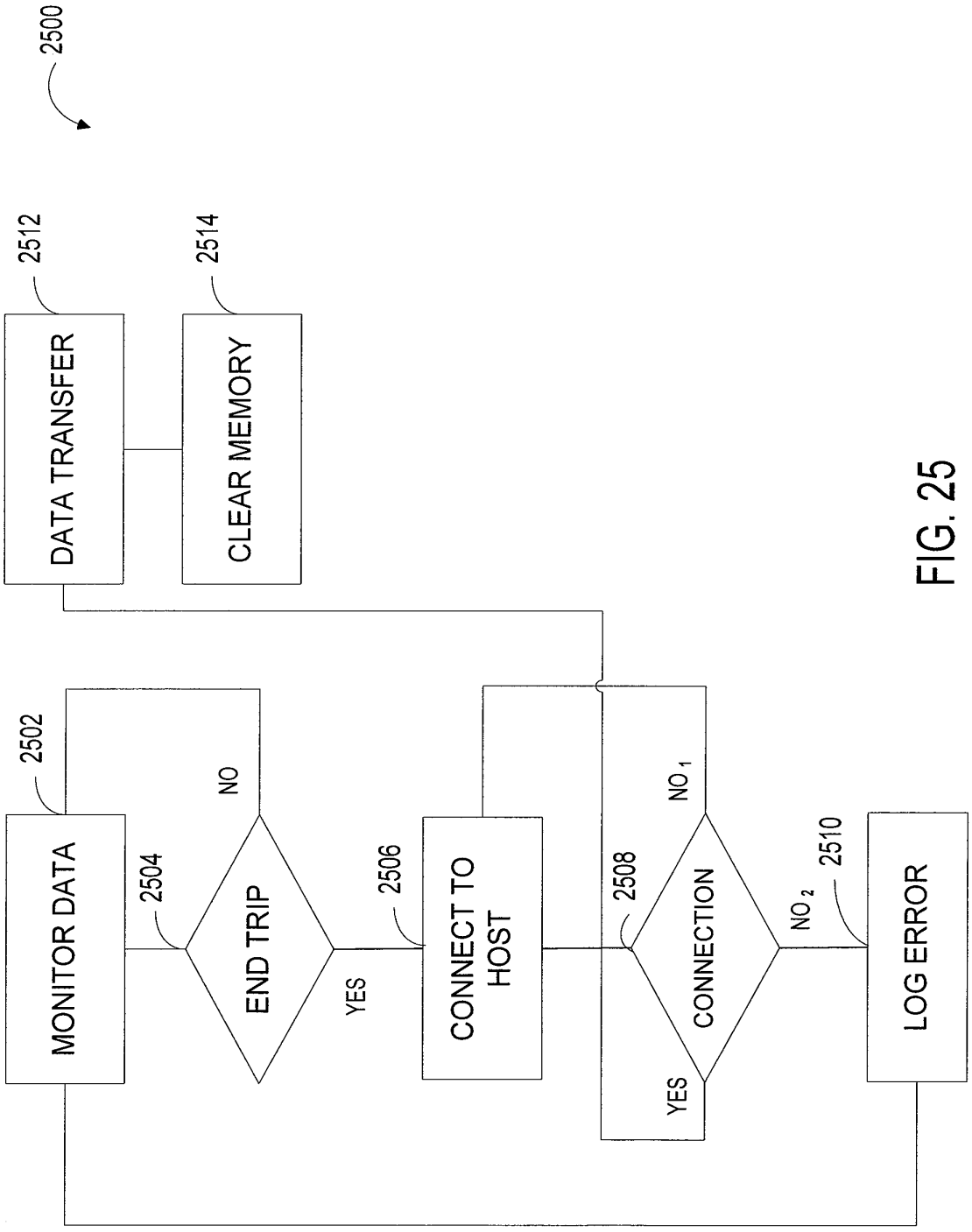
2500
2512
DATA TRANSFER
2514
CLEAR MEMORY
2502
MONITOR DATA
2504
END TRIP
NO
YES
2506
CONNECT TO HOST
2508
CONNECTION
NO 1
YES
NO 2
2510
LOG ERROR

FIG. 25

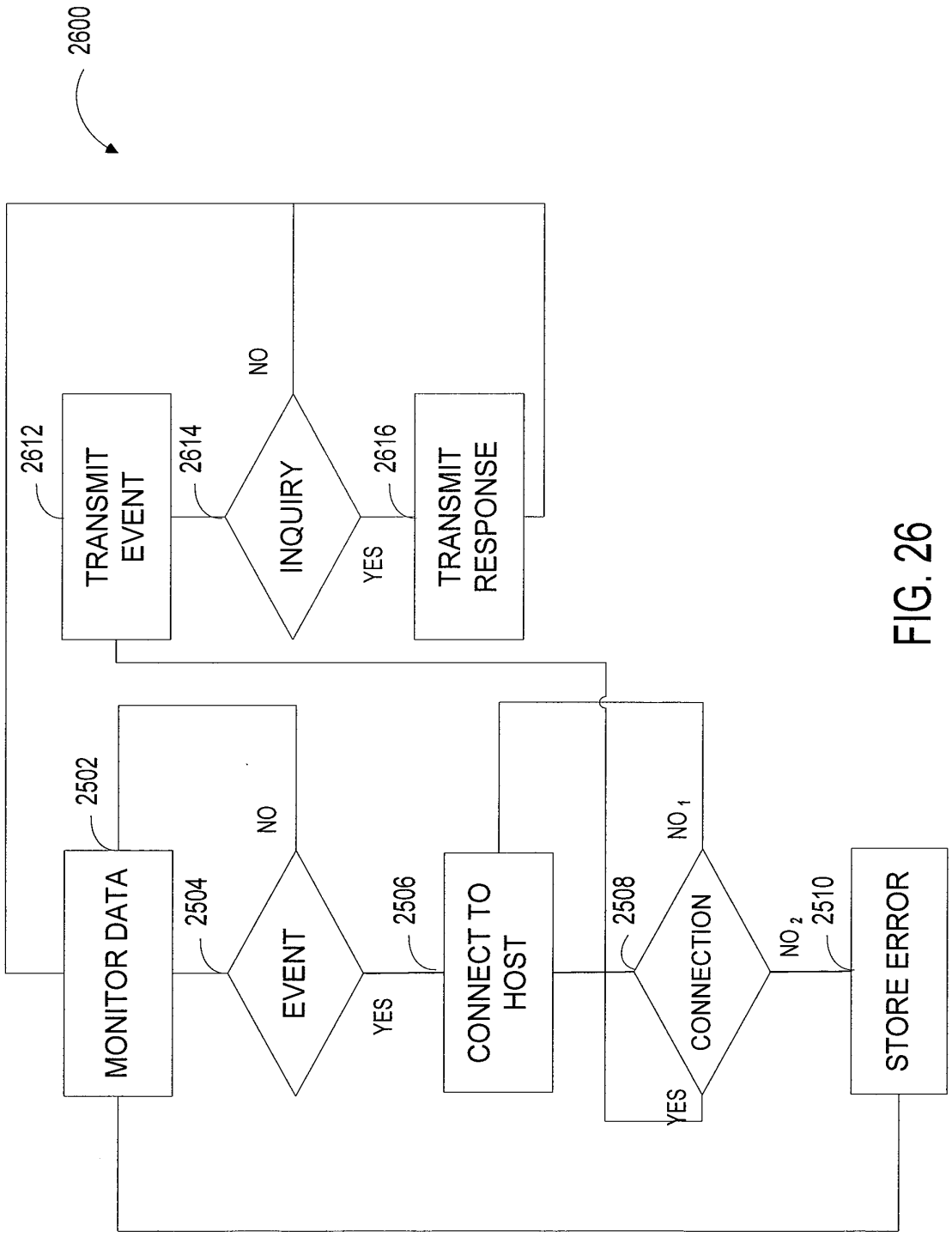
2600
2502
MONITOR DATA
2504
EVENT
NO
YES
2506
CONNECT TO HOST
2508
CONNECTION
NO 1
YES
NO 2
2510
STORE ERROR
2612
TRANSMIT EVENT
2614
INQUIRY
NO
YES
2616
TRANSMIT RESPONSE

FIG. 26

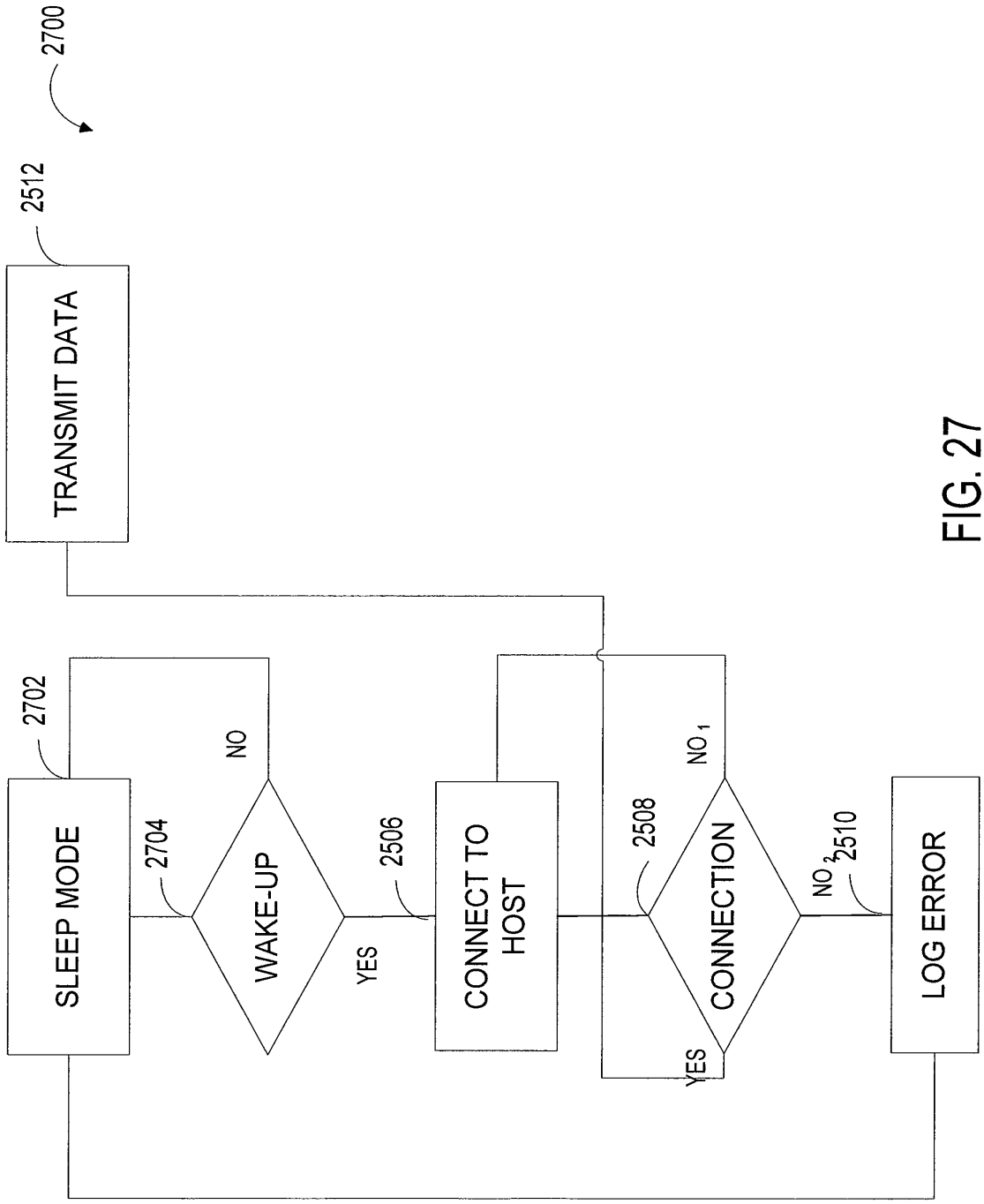
2700
2512
TRANSMIT DATA
2702
SLEEP MODE
2704
WAKE-UP
NO
YES
2506
CONNECT TO HOST
2508
CONNECTION
NO 1
YES
NO 2
2510
LOG ERROR

FIG. 27

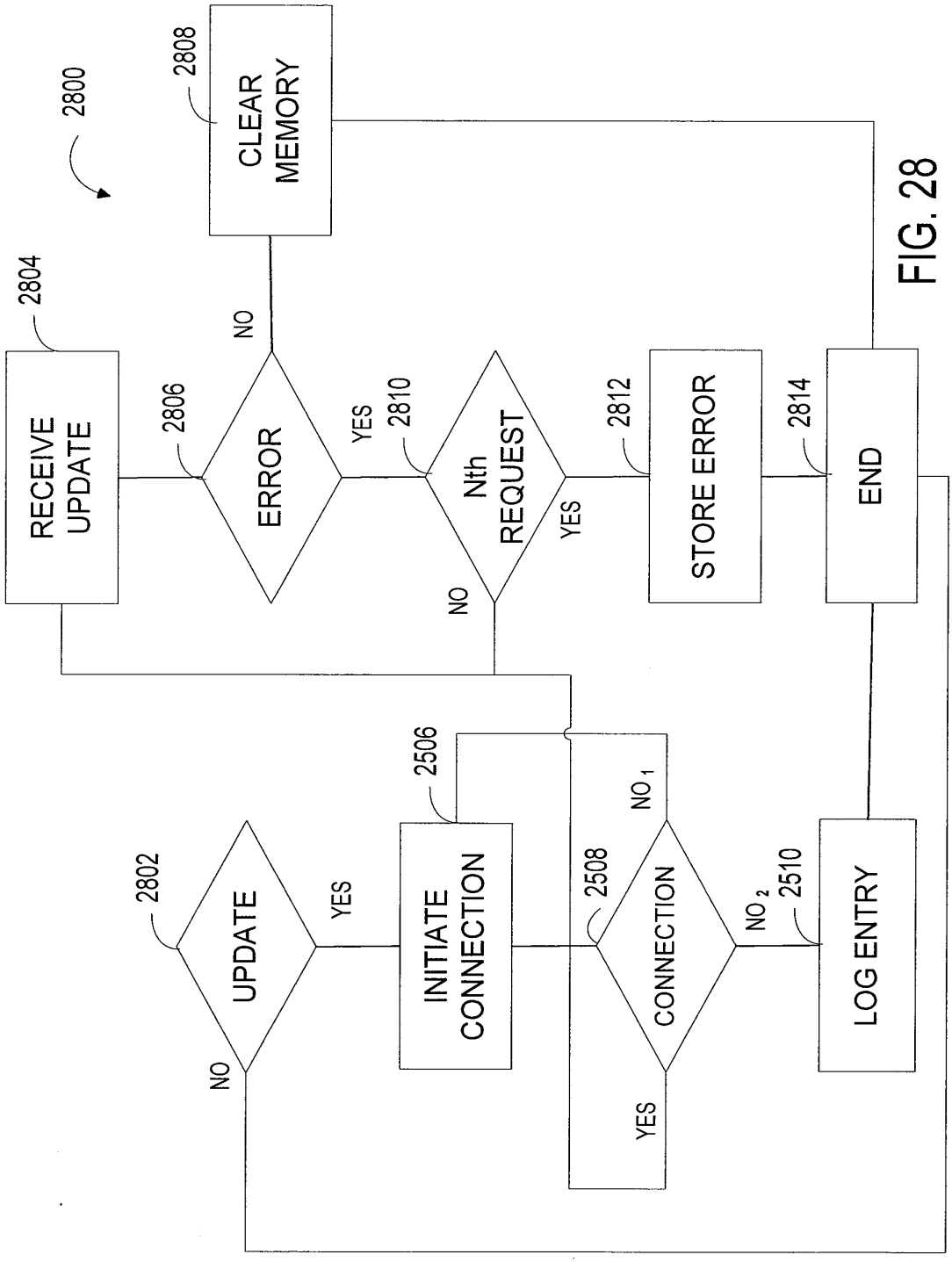
2800
2808
CLEAR MEMORY
2804
RECEIVE UPDATE
NO
2806
ERROR
YES
2810
Nth REQUEST
YES
2812
STORE ERROR
2814
END
NO
2506
2802
UPDATE
YES
INITIATE CONNECTION
2508
CONNECTION
NO 1
NO 2
2510
LOG ENTRY
NO
YES

FIG. 28

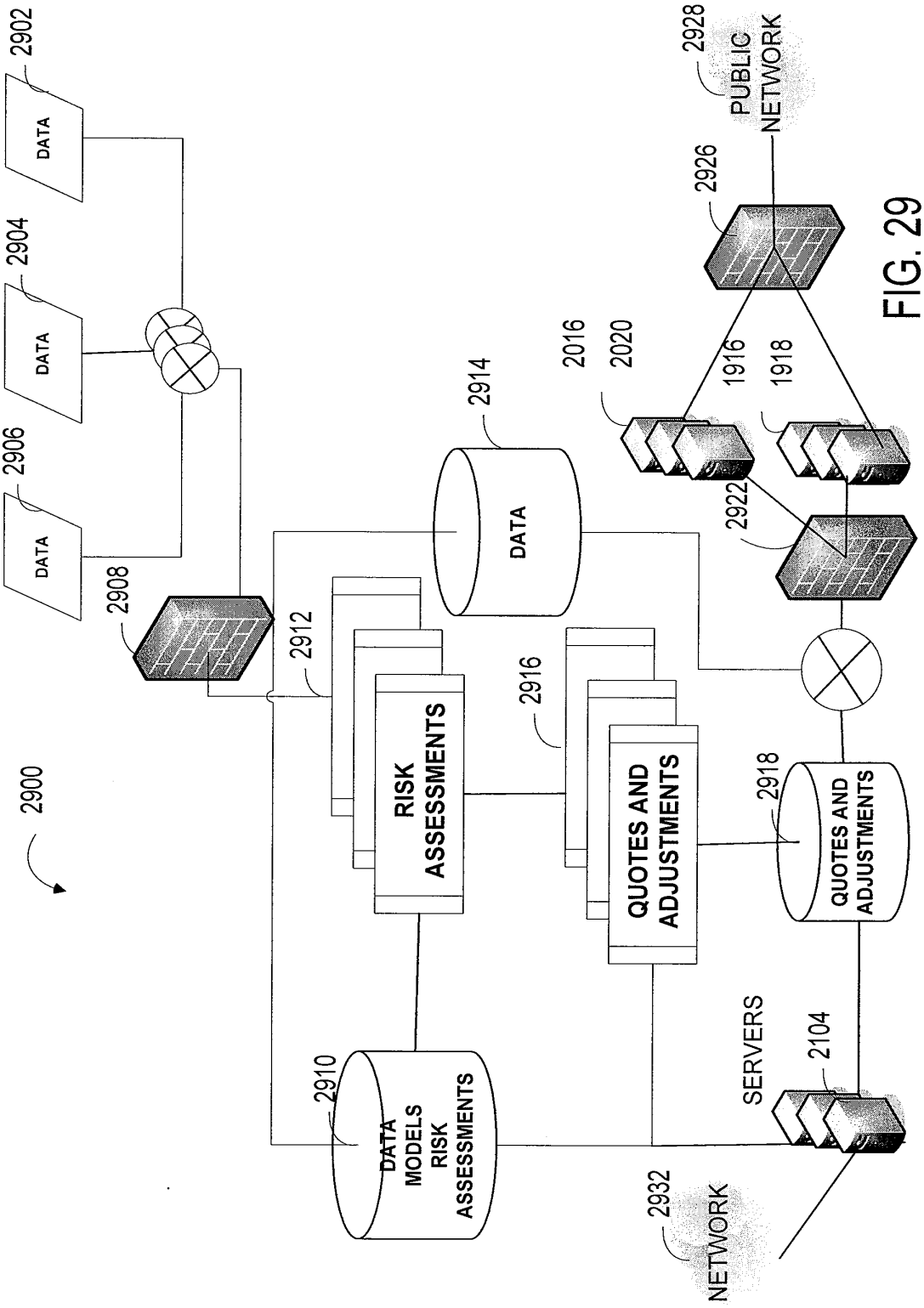
2900
2902
DATA
2904
DATA
2906
DATA
2908
2910
DATA MODELS RISK ASSESSMENTS
2912
RISK ASSESSMENTS
2914
DATA
2916
QUOTES AND ADJUSTMENTS
2918
QUOTES AND ADJUSTMENTS
2920
SERVERS
2104
2922
2926
2928
PUBLIC NETWORK
2932
NETWORK
2016
2020
1916
1918

FIG. 29

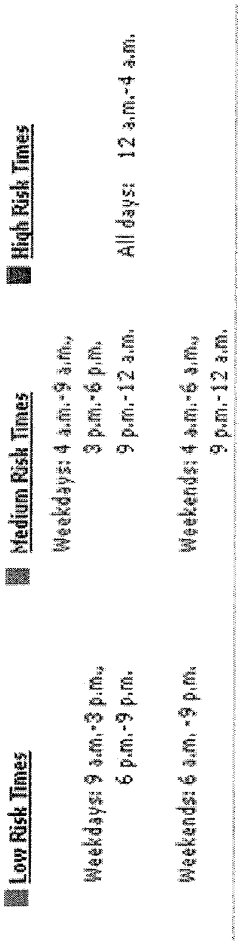
Low Risk Times
Weekdays: 9 a.m.-3 p.m.,
6 p.m.-9 p.m.
Weekends: 6 a.m.-9 p.m.
Medium Risk Times
Weekdays: 4 a.m.-9 a.m.,
3 p.m.-6 p.m.
9 p.m.-12 a.m.
Weekends: 4 a.m.-6 a.m.,
9 p.m.-12 a.m.
High Risk Times
All days: 12 a.m.-4 a.m.

FIG. 30

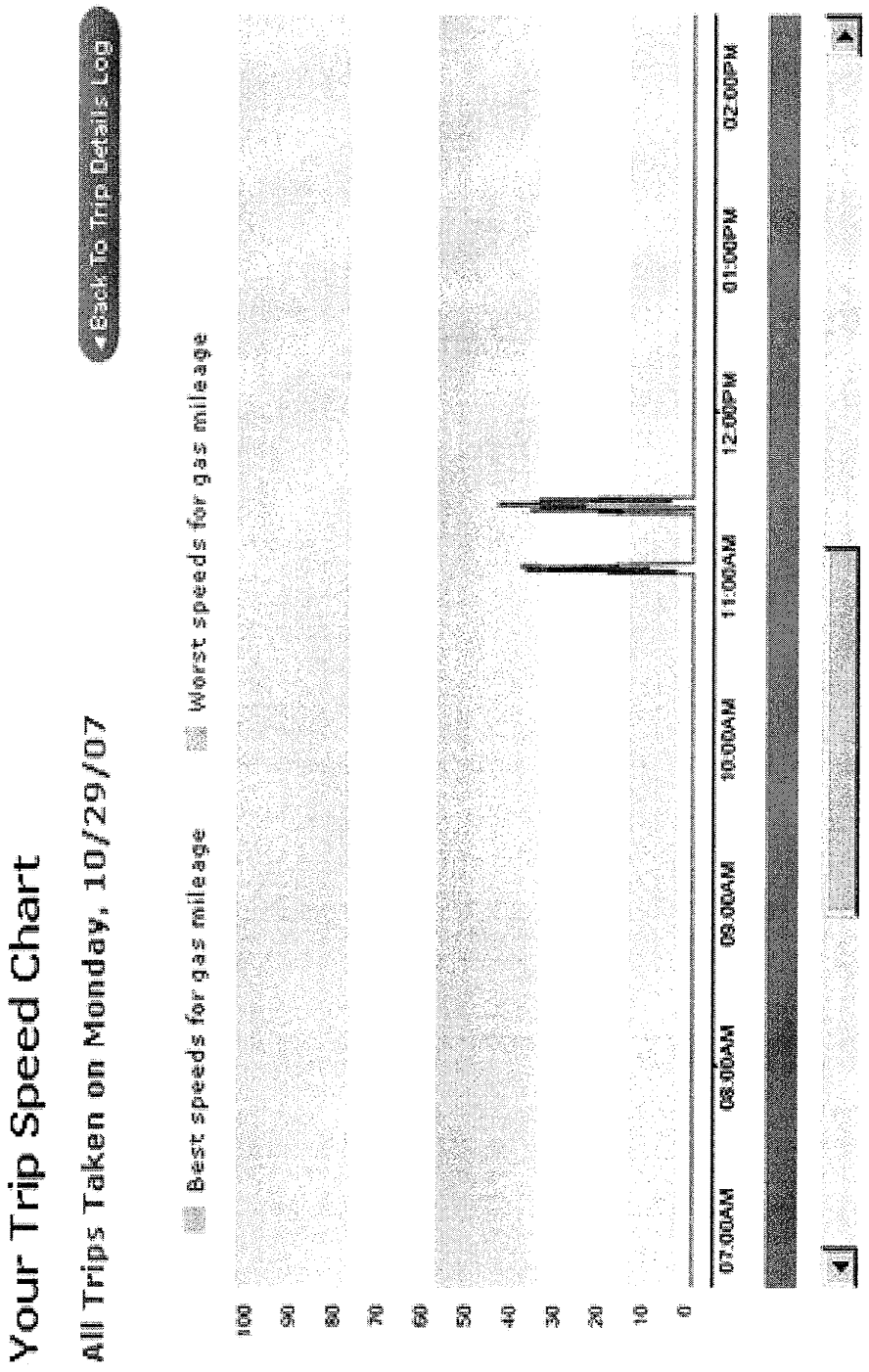
Your Trip Speed Chart
All Trips Taken on Monday, 10/29/07
Back To Trip Details Log
Best speeds for gas mileage
Worst speeds for gas mileage
100
90
80
70
60
50
40
30
20
10
0
07:00AM
08:00AM
09:00AM
10:00AM
11:00AM
12:00PM
01:00PM
02:00PM

FIG. 31

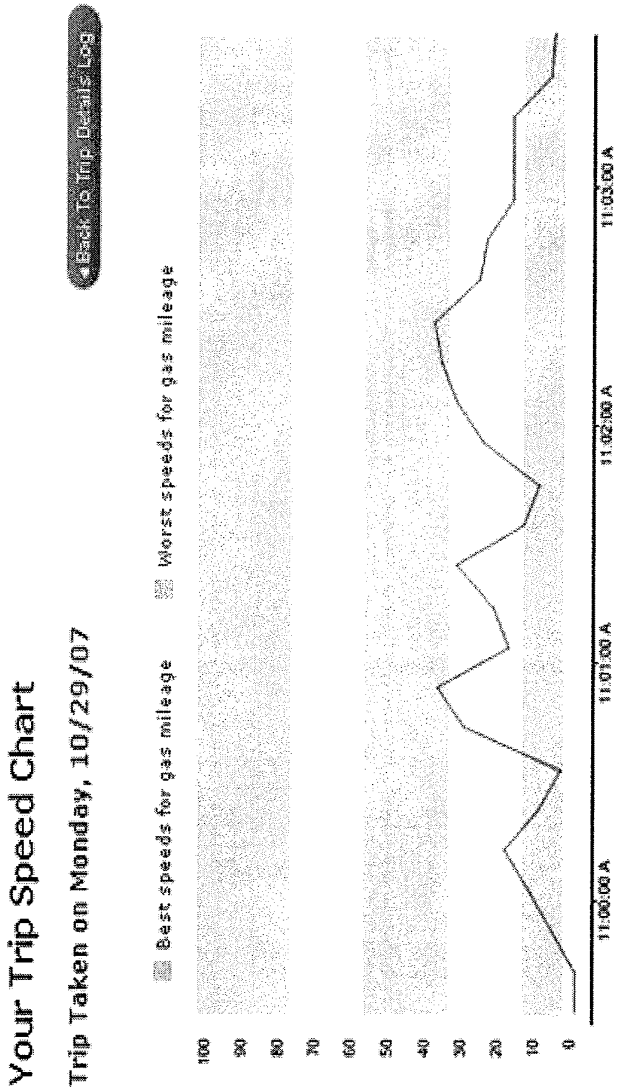
Your Trip Speed Chart
Trip Taken on Monday, 10/29/07
Back To Trip Details Log
Best speeds for gas mileage
Worst speeds for gas mileage
100
90
80
70
60
50
40
30
20
10
0
11:00:00 A
11:01:00 A
11:02:00 A
11:03:00 A

FIG. 32

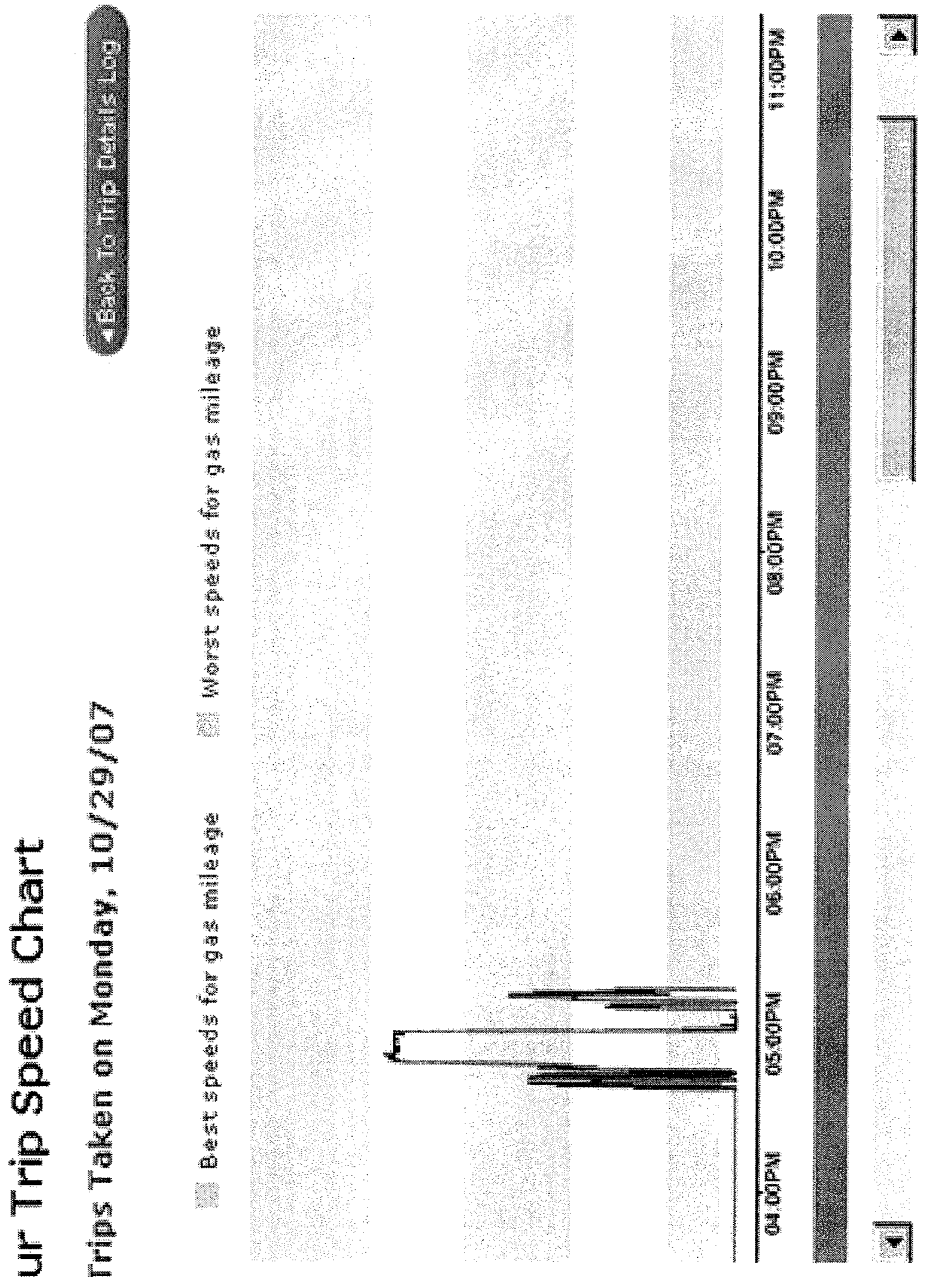
Your Trip Speed Chart
All Trips Taken on Monday, 10/29/07
Back To Trip Details Log
Best speeds for gas mileage
Worst speeds for gas mileage
100
90
80
70
60
50
40
30
20
10
0
04:00PM
05:00PM
06:00PM
07:00PM
08:00PM
09:00PM
10:00PM
11:00PM

FIG. 33

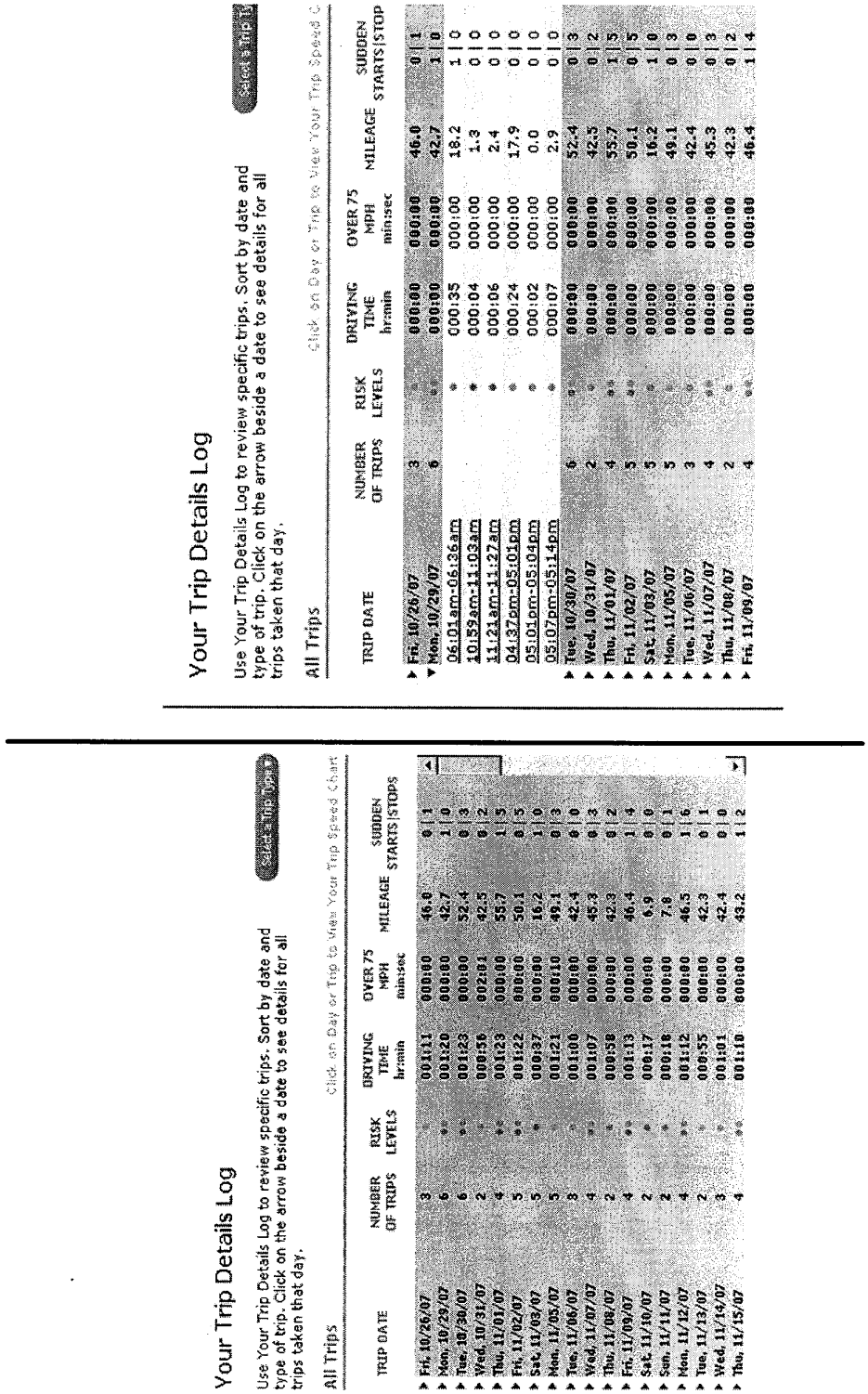
Your Trip Details Log
Use Your Trip Details Log to review specific trips. Sort by date and type of trip. Click on the arrow beside a date to see details for all trips taken that day.
All Trips
Select a Trip
Click on Day or Trip to View Your Trip Speed Chart
TRIP DATE
NUMBER OF TRIPS
RISK LEVELS
DRIVING TIME hr:min
OVER 75 MPH min:sec
MILEAGE
SUDDEN STARTS|STOPS
Fri, 10/26/07 3 00:00 00:00 46.0 0 | 1
Mon, 10/29/07 6 00:00 00:00 42.7 1 | 0
06:01am-06:36am 00:35 00:00 18.2 1 | 0
10:59am-11:03am 00:04 00:00 1.3 0 | 0
11:21am-11:27am 00:06 00:00 2.4 0 | 0
04:37pm-05:01pm 00:24 00:00 17.9 0 | 0
05:01pm-05:04pm 00:02 00:00 0.0 0 | 0
05:07pm-05:14pm 00:07 00:00 2.9 0 | 0
Tue, 10/30/07 6 00:00 00:00 52.4 0 | 3
Wed, 10/31/07 2 00:00 00:00 42.5 0 | 2
Thu, 11/01/07 4 00:00 00:00 55.7 1 | 5
Fri, 11/02/07 5 00:00 00:00 50.1 0 | 5
Sat, 11/03/07 5 00:00 00:00 16.2 1 | 0
Mon, 11/05/07 5 00:00 00:00 49.1 0 | 3
Tue, 11/06/07 3 00:00 00:00 42.4 0 | 0
Wed, 11/07/07 4 00:00 00:00 45.3 0 | 3
Thu, 11/08/07 2 00:00 00:00 42.3 0 | 2
Fri, 11/09/07 4 00:00 00:00 46.4 1 | 4
Sat, 11/10/07 2 00:00 00:00 6.9 0 | 0
Sun, 11/11/07 2 00:00 00:00 7.6 0 | 1
Mon, 11/12/07 4 00:00 00:00 46.5 1 | 6
Tue, 11/13/07 2 00:00 00:00 42.3 0 | 1
Wed, 11/14/07 3 00:00 00:00 42.4 0 | 0
Thu, 11/15/07 4 00:00 00:00 43.2 1 | 2

FIG. 34

```
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D,1.005,8  D,1.000,39  D,1.005,32  D,0.995,15  D,1.000,58  D,1.005,68  D,1.000,46
D,1.000,10  D,0.990,41  D,1.015,34  D,1.005,19  D,1.005,58  D,0.990,66  D,1.005,46
D,1.005,12  D,1.005,41  D,0.995,34  D,1.005,23  D,1.020,57  D,1.005,64  D,0.995,46
D,0.990,13  D,1.000,41  D,1.000,34  D,1.010,27  D,0.980,57  D,1.000,61  D,1.005,47
D,1.005,14  D,1.005,40  D,1.005,31  D,1.015,33  D,0.995,59  D,1.025,58  D,1.005,47
D,1.025,19  D,0.990,41  D,0.985,27  D,0.965,37  D,1.005,61  D,0.970,54  D,0.990,47
D,0.975,22  D,1.025,41  D,1.015,23  D,1.005,41  D,1.030,63  D,1.000,50  D,1.005,47
D,1.000,25  D,0.980,42  D,1.005,19  D,1.005,43  D,0.990,65  D,1.005,43  D,1.000,48
D,1.000,28  D,1.005,41  D,0.975,15  D,0.990,46  D,0.980,67  D,1.030,36  D,1.020,48
D,1.000,29  D,1.000,38  D,1.005,11  D,1.005,48  D,0.995,68  D,0.965,29  D,0.980,48
D,0.995,29  D,0.990,36  D,1.005,5  D,1.000,50  D,1.005,69  D,1.000,22  D,0.995,48
D,1.000,29  D,1.000,35  D,0.990,1  D,1.000,52  D,1.005,69  D,1.005,15  D,1.000,48
D,1.005,26  D,1.005,33  D,1.005,0  D,0.995,55  D,0.990,70  D,1.030,9  D,1.005,48
D,1.005,21  D,1.000,28  D,1.000,0  D,1.010,58  D,1.000,70  D,1.000,5  D,1.000,47
D,1.000,17  D,1.015,26  D,1.010,0  D,0.990,59  D,1.005,71  D,0.970,2  D,1.000,47
D,0.985,17  D,0.980,26  D,0.990,5  D,1.005,60  D,0.995,71  D,1.010,1  D,1.000,45
D,1.045,21  D,1.000,25  D,1.010,14  D,1.005,60  D,1.000,71  D,0.995,4  D,1.000,44
D,0.965,25  D,1.000,25  D,0.990,16  D,1.010,61  D,1.005,72  D,1.020,11  D,1.005,42
D,1.015,29  D,1.005,25  D,1.020,18  D,0.980,61  D,0.995,72  D,0.995,17  D,0.990,40
D,0.985,33  D,0.995,25  D,1.015,20  D,1.000,61  D,1.010,72  D,0.995,23  D,1.000,37
D,1.005,34  D,1.000,26  D,0.965,22  D,1.005,61  D,0.990,71  D,0.985,27  D,1.000,33
D,0.990,34  D,1.000,27  D,1.000,25  D,1.000,61  D,1.005,71  D,0.995,30  D,1.005,31
D,1.005,34  D,1.005,27  D,1.025,30  D,1.000,61  D,1.005,72  D,1.055,33  D,0.995,29
D,1.000,31  D,1.005,27  D,0.970,35  D,0.995,60  D,0.995,72  D,0.950,36  D,1.005,25
D,1.000,27  D,1.000,26  D,1.005,39  D,1.000,60  D,1.000,73  D,0.995,39  D,1.060,21
D,1.015,21  D,1.015,26  D,0.995,42  D,1.005,59  D,1.000,73  D,1.005,41  D,0.940,18
D,0.985,16  D,0.975,25  D,1.005,43  D,1.005,59  D,0.990,73  D,1.005,42  D,1.015,14
D,1.010,11  D,1.005,24  D,1.000,43  D,0.990,59  D,1.005,74  D,0.990,42  D,0.980,11
D,0.985,7  D,1.015,23  D,1.000,43  D,1.005,58  D,1.000,74  D,1.025,42  D,1.000,9
D,1.005,9  D,1.000,21  D,1.050,40  D,1.000,58  D,1.005,73  D,0.995,43  D,1.005,6
D,1.015,12  D,1.005,19  D,0.950,37  D,0.995,58  D,1.025,73  D,1.000,44  D,1.000,2
D,0.985,17  D,1.000,18  D,1.005,32  D,1.000,58  D,0.975,72  D,1.005,45  D,0.995,0
D,1.065,22  D,1.005,19  D,0.990,26  D,1.005,58  D,0.995,71  D,0.985,45  D,1.000,0
D,0.965,28  D,0.970,21  D,1.000,19  D,0.995,58  D,1.000,71  D,0.990,45  D,1.000,0
D,1.005,33  D,1.010,25  D,1.070,13  D,1.000,58  D,1.005,70  D,1.005,46  D,1.005,0
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X,7,D,0,2008/04/01,16:15:38
X,7,E,744,2008/04/01,16:15:41
X,1,0102A,7203,006f,0001

D,1.000,2
D,0.995,0
D,1.000,0
D,1.000,0
D,1.005,0
D,1.000,0
D,1.000,0
D,1.005,0
D,0.990,0
D,1.000,0
D,1.000,0
D,1.005,0

FIG. 35

Electronic Acknowledgement Receipt

EFS ID:	3398426
Application Number:	12132487
International Application Number:	
Confirmation Number:	7812
Title of Invention:	VEHICLE MONITORING SYSTEM
First Named Inventor/Applicant Name:	William Curtis Everett
Customer Number:	00757
Filer:	James A. Collins/Tina Sieczkowski
Filer Authorized By:	James A. Collins
Attorney Docket Number:	12654/42
Receipt Date:	03-JUN-2008
Filing Date:	
Time Stamp:	18:29:27
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)
1	Application Data Sheet	adssigned.PDF	272935 06df9f79c2f022f6058a55b291b5c3042c322145	no	5

Warnings:	
Information:	

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3	Nonpublication request from applicant.	nonpubreq.PDF	56685 580fe0e654a2d7553eb3377284647bb85354e056	no	1
Warnings:					
Information:					
4		spec.PDF	4868520 d9007c8b4fbdf53c91f3f278b47d95a9c618de48	yes	89

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	Specification	1	64
	Claims	65	88
	Abstract	89	89

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Information:					
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Information:					
		Total Files Size (in bytes):	7468413		

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New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/14 (02-07)
Approved for use through 02/28/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	12654/42
	Application Number	
Title of Invention	VEHICLE MONITORING SYSTEM	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Applicant Information:

Applicant 1

Applicant Authority	◉ Inventor	○ Legal Representative under 35 U.S.C. 117	○ Party of Interest under 35 U.S.C. 118

Prefix	Given Name	Middle Name	Family Name	Suffix
	William	Curtis	Everett	

Residence Information (Select One)	◉ US Residency	○ Non US Residency	○ Active US Military Service

City	Hudson	State/Province	OH	Country of Residence	US

Citizenship under 37 CFR 1.41(b)	US

Mailing Address of Applicant:

Address 1	1573 Waynesboro Drive
Address 2	

City	Hudson	State/Province	OH

Postal Code	44236	Country	US

Applicant 2

Applicant Authority	◉ Inventor	○ Legal Representative under 35 U.S.C. 117	○ Party of Interest under 35 U.S.C. 118

Prefix	Given Name	Middle Name	Family Name	Suffix
	Richard	Ashton	Hutchinson	

Residence Information (Select One)	◉ US Residency	○ Non US Residency	○ Active US Military Service

City	Chagrin Falls	State/Province	OH	Country of Residence	US

Citizenship under 37 CFR 1.41(b)	US

Mailing Address of Applicant:

Address 1	511 North Main Street
Address 2	

City	Chagrin Falls	State/Province	OH

Postal Code	44022	Country	US

Applicant 3

Applicant Authority	◉ Inventor	○ Legal Representative under 35 U.S.C. 117	○ Party of Interest under 35 U.S.C. 118

Prefix	Given Name	Middle Name	Family Name	Suffix
	Wilbert	John	Steigerwald III	

Residence Information (Select One)	◉ US Residency	○ Non US Residency	○ Active US Military Service

City	Kirtland	State/Province	OH	Country of Residence	US

PTO/SB/14 (02-07)
Approved for use through 02/28/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	12654/42
	Application Number	
Title of Invention	VEHICLE MONITORING SYSTEM	

Citizenship under 37 CFR 1.41(b)	US				
Mailing Address of Applicant:					
Address 1	10731 Beechwood Drive				
Address 2					
City	Kirtland	**State/Province**	OH		
Postal Code	44094-5119	**Country**	OH		

Applicant 4

Applicant Authority	(•) Inventor	( ) Legal Representative under 35 U.S.C. 117	( ) Party of Interest under 35 U.S.C. 118	
Prefix	**Given Name**	**Middle Name**	**Family Name**	**Suffix**
	William	Andrew	Say	

Residence Information (Select One)	(•) US Residency	( ) Non US Residency	( ) Active US Military Service		
City	Macedonia	**State/Province**	OH	**Country of Residence**	US
Citizenship under 37 CFR 1.41(b)	US				
Mailing Address of Applicant:					
Address 1	1104 Bull Creek Lane				
Address 2					
City	Macedonia	**State/Province**	OH		
Postal Code	44056	**Country**	US		

Applicant 5

Applicant Authority	(•) Inventor	( ) Legal Representative under 35 U.S.C. 117	( ) Party of Interest under 35 U.S.C. 118	
Prefix	**Given Name**	**Middle Name**	**Family Name**	**Suffix**
	Patrick	Lawrence	O'Malley	

Residence Information (Select One)	(•) US Residency	( ) Non US Residency	( ) Active US Military Service		
City	Kirtland	**State/Province**	OH	**Country of Residence**	US
Citizenship under 37 CFR 1.41(b)	US				
Mailing Address of Applicant:					
Address 1	7123 Giulliano Drive				
Address 2					
City	Kirtland	**State/Province**	OH		
Postal Code	44094	**Country**	US		

Applicant 6

Applicant Authority	(•) Inventor	( ) Legal Representative under 35 U.S.C. 117	( ) Party of Interest under 35 U.S.C. 118	
Prefix	**Given Name**	**Middle Name**	**Family Name**	**Suffix**
	Dane	Allen	Shrallow	

Residence Information (Select One)	(•) US Residency	( ) Non US Residency	( ) Active US Military Service		
City	Solon	**State/Province**	OH	**Country of Residence**	US
Citizenship under 37 CFR 1.41(b)	US				

PTO/SB/14 (02-07)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	12654/42
	Application Number	
Title of Invention	VEHICLE MONITORING SYSTEM	

Mailing Address of Applicant:			
Address 1	32680 Shadowbrook Drive		
Address 2			
City	Solon	State/Province	OH
Postal Code	44139	Country	US

Applicant 7

Applicant Authority	◉ Inventor	○ Legal Representative under 35 U.S.C. 117	○ Party of Interest under 35 U.S.C. 118

Prefix	Given Name	Middle Name	Family Name	Suffix
	Raymond	Scott	Ling	

Residence Information (Select One)	◉ US Residency	○ Non US Residency	○ Active US Military Service		
City	Westlake	State/Province	OH	Country of Residence	US
Citizenship under 37 CFR 1.41(b)	US				

Mailing Address of Applicant:			
Address 1	28205 Edgepark Blvd.		
Address 2			
City	Westlake	State/Province	OH
Postal Code	44145	Country	US

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	00757		
Email Address	jcollins@usebrinks.com	Add Email	Remove Email

Application Information:

Title of the Invention	VEHICLE MONITORING SYSTEM		
Attorney Docket Number	12654/42	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Suggested Class (if any)		Sub Class (if any)	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)	35	Suggested Figure for Publication (if any)	

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	12654/42
	Application Number	
Title of Invention	VEHICLE MONITORING SYSTEM	

Publication Information:	
☐	Request Early Publication (Fee required at time of Request 37 CFR 1.219)
☒	Request Not to Publish. I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application has not been and will not be the subject of an application filed in another country, or under a multilateral agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Enter either Customer Number or complete the Representative Name section below. If both sections are completed the Customer Number will be used for the Representative Information during processing.

Please Select One:	◉ Customer Number	○ US Patent Practitioner	○ US Representative (37 CFR 11.9)
Customer Number	00757		

Domestic Priority Information:

This section allows for the applicant to claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c). Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78(a)(2) or CFR 1.78(a)(4), and need not otherwise be made part of the specification.

Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	Continuation in part of	10764076	2004-01-23
Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	Continuation in part of	09571650	2000-05-15
Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	Continuation in part of	09135034	1998-08-17
Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	Continuation of	08592958	1996-01-29

Additional Domestic Priority Data may be generated within this form by selecting the **Add** button.

Foreign Priority Information:

This section allows for the applicant to claim benefit of foreign priority and to identify any prior foreign application for which priority is not claimed. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(a).

PTO/SB/14 (02-07)
Approved for use through 02/28/2007. OMB 0651-0032
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	12654/42
	Application Number	
Title of Invention	VEHICLE MONITORING SYSTEM	

Remove

Application Number	Country	Parent Filing Date (YYYY-MM-DD)	Priority Claimed
			◉ Yes ○ No

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button.

Assignee Information:

Providing this information in the application data sheet does not substitute for compliance with any requirement of part 3 of Title 37 of the CFR to have an assignment recorded in the Office.

Assignee 1

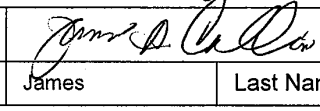
If the Assignee is an Organization check here. ☒

Organization Name	Progressive Casualty Insurance Company		
Mailing Address Information:			
Address 1	6300 Wilson Mills Road, N72		
Address 2			
City	Mayfield Village	**State/Province**	OH
Country	US	Postal Code	44143
Phone Number		Fax Number	
Email Address			

Additional Assignee Data may be generated within this form by selecting the **Add** button.

Signature:

A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 10.18. Please see 37 CFR 1.4(d) for the form of the signature.

Signature				Date (YYYY-MM-DD)	2008-06-03
First Name	James	Last Name	Collins	Registration Number	43557

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

PTO/SB/06 (12-04)

Filing Date: 06/03/08

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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 12/132,487

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	**310**
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	**510**
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	**210**
TOTAL CLAIMS (37 CFR 1.16(i))	**130** minus 20 =	**110**	X$ 25		OR	X$50	**5500**
INDEPENDENT CLAIMS (37 CFR 1.16(h))	**13** minus 3 =	* **10**	X$105			X$210	**2100**
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $260 ($130 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR						
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))			185			370	
			TOTAL			TOTAL	**8630**

* If the difference in column 1 is less than zero, enter "0" in column 2.

APPLICATION AS AMENDED – PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					N/A		OR	N/A	
						TOTAL ADD'T FEE		OR	TOTAL ADD'T FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)	OR	RATE ($)	ADDITIONAL FEE ($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					N/A		OR	N/A	
						TOTAL ADD'T FEE		OR	TOTAL ADD'T FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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