Event_GpsReport_Handler() is the method invoked when the *GpsReport* signaled by the ATP is removed by the cluster process from its queue. The inputs to this method are:

(i) *ID_Remote_Vehicle* - which should be the unique IP address of the vehicle;

(ii) *GpsPosition* – which is a latitude-longitude coordinate pair, determined by the GPS receiver of the remote node and contained in the payload of the UDP segment received from the remote; and

(iii) *GpsHeading* – which is a heading determined by the GPS receiver of the remote node and contained in the payload of the UDP segment received from the remote.

```
Event_GpsReport_Handler ( ID_Remote_Vehicle, GpsPosition, GpsHeading )
{
    Remote_Vehicle  = GetRemote( ID_Remote_Vehicle);
    Proximity       = CompareGps(Remote_Vehicle, GpsPosition,
GpsHeading );
    If(Proximity ) {
      AtpRequest( Remote Vehicle, speed, frequency, duration, amplitude );
      AtpRequest( Remote_Vehicle, foot brake, 0, 0, 0 );
    }
}
```

Event_GpsReport_Handler carries out the following functions:

(i) Invokes the private function *GetRemote* using the input *ID_Remote_Vehicle*. (The term *private* signifies that the function is usable only by the cluster module and is not accessible to "external" software modules). This searches the cluster's container of remote vehicles for the object matching *ID_Remote_Vehicle*;

(ii) Uses the private function *CompareGps* to determine whether this vehicle is within a specified distance threshold. This function takes as inputs:

(a) pointer to the Remote Vehicle object; and

(b) the new GPS position and heading.

The GPS position and heading of the remote vehicle are compared to the position and heading of the "local" vehicle. The "local" position and heading are maintained in the DIB (diagnostic information base). Since the ATP is a peer-to-peer protocol, cluster intelligence request/response exchanges can be symmetrical. The DIB can therefore be used by the ATP client to obtain GPS information for comparison with reports from remote nodes, as well as by the local OBD server to respond to cluster intelligence requests from remote nodes.

The output of *CompareGps* is a boolean variable (*Proximity*) indicating whether ATP requests to this remote are warranted because the vehicle is within a specified distance threshold to require preventive measures if there is a sudden change in speed. Since the implementation of cluster intelligence is not within the scope of the present invention, the internal algorithm of CompareGps is not defined here. However, it should be noted that any implementation of CompareGps must account for margins of error in the accuracy of the GPS receiver where the remote position report originates. Furthermore, it may not be possible to distinguish between several remote vehicles moving in parallel in different lanes ahead of the "local" vehicle so that the identity of the vehicle directly in front may remain indeterminate. The cluster intelligence decision algorithm may have to assume that all of these vehicles are equally important to monitor.

If Proximity is TRUE, then ATP requests can be issued to the remote node's OBD server, the responses to which enable the cluster to provide decision support to other intelligent modules within the complete automotive system. A minimum set of requests could consist of speed reports, at values of frequency and duration established by the owner of the cluster, (i.e., one of the aforementioned automotive modules), and of notifications for the application of the foot brake.

Another embodiment of the present invention is shown in figure 7. A mobile automotive telemetry system is shown generally at 110 in Figure 1. System 410 comprises a diagnostic means 415 for monitoring the operational functions of the vehicle in which system 410 is installed and generating operational information. The generated operational information may be stored in a memory 420 until required. Both diagnostic means 415 and memory 420 are in communication with a server 425 which ultimately controls the operation of system 410.

Server 425 can communicate with a remote client 430 via a data link 435. To this end, server 425 comprises a means (440) to receive a request for information from remote client 430; a means (445a, 445b) to retrieve the generated operational information from memory 420; and a means (450) to transmit the retrieved generated operational information to remote client 430. Server 425 is a processor which is programmed to respond to requests for information from remote clients and to respond to control commands.

Diagnostic means 415 may be a conventional, computer-based OBD module which monitors various operational functions of the vehicle in which system 410 is located. Diagnostic means 415 may, for example, monitor exhaust emissions, fuel use, ignition timing, engine temperature, speed and/or distance travelled. Diagnostic means 415 receives inputs from the various vehicle sites via a plurality of communication lines 460 and, after interpreting the inputs and generating formatted operational information, passes the operational information to memory 420 via communication line 465. Diagnostic modules suitable for use in the present invention are known in the art and are referred to as Electronic Control Modules (ECM) or Electronic Control Units (ECU). The specifications for the diagnostic modules may be found in Society of Automotive Engineers, "On-Board Diagnostics for Light and Medium Duty Vehicle, Standards Manual" 1997 Edition, the contents of which are incorporated herein by reference.

Memory 420 may be any conventional computer memory, the size and operation of which will be dependent on the nature of the operational features of the vehicle a user wishes to monitor. The choice of suitable memory is believed to be within the purview of a person of skill in the art. In one embodiment of the present invention, system 410 comprises a memory 420 which includes 32k of non-volatile RAM and a configurable amount of additional RAM, allocated at run-time from the host processor system. Memory 420 receives the operational information, generated by diagnostic means 415, via communication line 465 and stores the operational information. Memory means 420 is in communication with server 420 and is capable of receiving instructions from server 425 and sending information to server 425 via communication lines 470a and 470b, respectively. As will be apparent to a person of skill in the art, communication lines 470a and 470b may be replaced by a single communication line if the appropriate communication protocol is used.

Server 425 acts as a gateway between remote client 430 and diagnostic means 415 and eliminates the requirement that remote client 430 has knowledge of the specialist OBD protocols of diagnostic means 415. Server 425 in effect acts as a "universal translator", allowing a remote client to interact with any diagnostic means of any vehicle. One way of achieving this end is through the implementation of a request/response protocol which acts as a proxy for the corresponding OBD protocols. Under this type of protocol, an abstract request from the remote client which is received by the server is mapped to the corresponding request under the specialist OBD protocols and is then transmitted on the diagnostic means or memory, as appropriate. In the other direction, the responses returned by the diagnostic means or memory to the server are then mapped to an abstract response which is sent back to the client.

Such request/response protocols are known in the art and include, for example, IAS protocol for infrared links and UDP/IP protocol for wide area network communications.

Data link 435 may be any conventional communication link, including, for example, telephony (wired and mobile wireless), specialized mobile radio (SMR), infrared and satellite (both low earth orbit (LEO) and geosynchronous). Server 425 may be provided with the hardware and operational protocols necessary for communicating with remote client 430 by a variety of means, thereby not restricting communication to a remote client having one particular type of data link. Providing server 425 with a plurality of communication protocols aids in making the system of the present invention universally acceptable.

In one embodiment, server 425 is provided with infrared data link capabilities. An infrared data link between the server and the remote client provides a local wireless method of acquiring data from an OBD module. It therefore removes the need for the client's equipment to incorporate a system-compatible connector (i.e, an OBD-connector as specified by the SAE) and to be physically joined by a cable in order to communicate with the system.

When, for example, the client is test equipment in a garage, the use of an infrared data link renders possible the development of service bays where information can

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