the latter scenario, the device would interface with a vehicle bus (or data bus performing functions similar to a vehicle bus) that interconnects components (*e.g.*, sensors) inside a vehicle to collect, for example, speed and acceleration data from sensors inside the vehicle that monitor these types of data. For example, the On-Board Diagnostics II (OBD-II) vehicle bus was used in vehicles since 1994 and has, in fact, been required in passenger vehicles and light duty trucks since January 1996, as mandated by the Environmental Protection Agency. Ex. 1014, OBD-II Background—Where'd It Come From?, http://www.OBDii.com/background.html (under "Where'd it come from?"). Moreover, multiplex networks, such as vehicle buses, have been in use in vehicles to connect components in a vehicle since the 1980s. The Society of Automotive Engineers, for example, released the draft specification for a serial automotive data bus designated SAE J-1850 in December of 1989. Ex. 1015, Shuji Mizutani, Car Electronics 250 (Nippondenso Co. Ltd. 1992.)

22. It was also well known that such in-vehicle monitoring devices would have memory, including volatile and non-volatile memory. Indeed, storing data in memory has been an integral part of any data processing system (including a telematics system) since long before 1996. Ex. 1016, David S. Boehner, Automotive Microcontrollers, in Automotive Electronics Handbook 11.24-11.29 (Ronald K. Jurgen, ed., 1995). Further, the idea of storing data in a

memory/storage system in an organized fashion that allows access to the stored data through, *e.g.*, searching, was well known in the art well before 1996. These database capabilities – including retrieving and relating stored data – were also understood at the time to be fundamental to analyzing vehicle telematics data. In particular, vehicle telematics analysis requires evaluation of changing data points over time (*e.g.*, changes in speed or acceleration). Thus, in order to retrieve varying data points to manipulate them, analyze them, compare them, etc., they must be stored in a way that would make them available for retrieval and analysis in a meaningful way, that is, in relation to other data collected at the same time or under similar circumstances.

23. Many different ways of transmitting vehicle telematics data in such telematics systems (from an in-vehicle device) were also known at the time. For example, wireless transmitters or receivers, configured to transmit and/or receive data between a vehicle or a device installed in a vehicle and a remote server by way of a distributed network, were well known prior to 1996. A wireless transmitter or receiver would have been a known component of a telematics device or server, or a stand-alone device that interfaces with a telematics device or server.

24. Indeed, it was well known in the art prior to 1996 that wireless transmitters or receivers could be configured to transmit and receive communication between a vehicle or driver and a third-party, such as a dispatcher or roadside assistance

operator. For example, it was well understood prior to 1996 that such a wireless transmitter or receiver would be capable of sending an alert, such as a textual or aural message, to a third-party when a certain vehicle event or emergency occurs—*e.g.*, when the vehicle exceeds a certain speed limit or acceleration or deceleration value (such as when a crash occurs), travels outside a designated area, or when the driver is locked out of the car.

25. Back-end aspects of these known telematics systems would have included computer networks comprising, for example, server(s), processor(s), and database(s) for retaining, analyzing, and processing the telematics data. Thus, in addition to an in-vehicle device with memory in which data points are associated and retrievable, a remote database to store the telematics data after transmission was also well known in the art. Among other things, such a database for a telematics system would have made the data available in a meaningful way for processing, would have made the data retrievable, and would have facilitated analysis of the data in pertinent groupings for purposes of, *e.g.*, insurance rating.

V. Opinions Regarding the Kosaka Reference

26. I have read Kosaka and, in my opinion,[1] it would have been understood by a person of ordinary skill in the art as a vehicle telematics system that monitors vehicle data, such as speed, in order to determine insurance premiums. In general, Kosaka discloses that an in-vehicle device monitors vehicle data (*e.g.*, speed), which is then used by an "insurance premium determination system" to evaluate the risk related to the monitored data for purposes of setting insurance premiums. *See* Ex. 1004, Kosaka at 4, 6-7.

27. As part of the risk evaluation system, Kosaka discloses storing monitored vehicle data, such as relative speed, in the memory of the in-vehicle device for the purpose of analyzing and grouping it as "input value[s] for risk evaluation." *Id.* at 8. A person of ordinary skill in the art would have understood that selected vehicle data (*e.g.*, speed data, following distance data, etc. relevant to risk evaluation) is stored in the in-vehicle device memory so it can be used as these "input values." Kosaka further explains that these input values are then output to a "second fuzzy logic part" as "fuzzy input value[s] for risk evaluation."

[1] As noted in paragraph 19, *supra*, the discussions herein all present my opinion of what a person of ordinary skill in the art would have understood as of January 1996.

28. Kosaka also discloses that the system is capable of operating "in real time." *See, e.g.*, *id.* at 2 (claim 14). A person of ordinary skill in the art would have recognized that to operate in real time, the internal and external sensors (*see id.* at 4, Fig. 1) disclosed in Kosaka must also operate in real time. Thus the state detection elements operate continuously.

29. However, one skilled in the art would also appreciate that Kosaka indicates that the "risk evaluation value [that] changes in accordance with the internal state or external state of the subject being evaluated for risk, which may vary by the hour or daily." *Id.* at 4; *see also id.* at 7. Since the vehicle data is gathered in real time, and the risk evaluation and premium calculations may be carried out hourly or daily, the system necessarily must store the vehicle state data and/or intermediate values of risk assessment data based on vehicle state data: "The fuzzy memory 4 stores risk evaluation values determined when fuzzy logic has been carried out in advance offline." *Id.* at 4. A person of ordinary skill would have understood that the memory that stores the data would need to be structured in such a way that different values corresponding to different operational times (*i.e.* the real time samples of vehicle state, or calculated elements to be used later in risk calculations) would subsequently be selected in order to carry out risk and premium calculations hourly or daily. *See also id.* at 6 ("risk evaluation values also may be determined subsequently"). Thus, in my

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