TELEMATIC METHOD AND APPARATUS WITH INTEGRATED POWER SOURCE

CROSS-REFERENCE TO RELATED APPLICATION

This application is a divisional of U.S. patent application Ser. No. 12/237,977 filed on Sep. 25, 2008 issued on Nov. 24, 2009 with U.S. Pat. No. 7,621,361, which is a continuation of Ser. No. 11/288,724 filed on Nov. 28, 2005, now U.S. Pat. No. 7,374,003 issued on May 20, 2008, which is a continuation application of Ser. No. 10/626,877 filed on Jul. 23, 2003, now corresponding to U.S. Pat. No. 7,353,897 issued on Apr. 8, 2008.

BACKGROUND

1. Field of Invention

Invention relates to telematic devices and processing method integrated adaptively with a power source and sensors, particularly in fuel cell vehicle applications.

2. Related Art

Conventional power systems in vehicles such as automobiles rely on mechanical energy as primary power sources for vehicle systems. These systems include the growing number of telematic applications in vehicles including Internet, digital video broadcast entertainment, digital audio broadcast, digital multimedia broadcast, global positioning system navigation, safety services, intelligent transportation systems, and universal mobile telecommunications system.

The advent of fuel cell technology has initiated the genesis of a change in standard from the combustion engine in vehicles to vehicle engines powered by fuel cells. Similarly, a new industry standard has emerged that calls for a 42-volt electrical vehicle system as opposed to the conventional 12 to 14 volt electrical system. This transformation is due to higher electrical loads that vehicles face as a result in higher demands of hotel loads such as onboard computing navigation, electronically heated seats, video entertainment systems, and other telematic devices, along with the traditional electrical requirements for the body/powertrain control branch of the vehicle that includes throttle actuation, steering, active suspension and ride height adjustment, electric air conditioning, and electrically heated catalyst.

Unlike conventional vehicles with internal combustion engines that use mechanical energy as a primary source of power, fuel cell vehicles require greater on-board electric power to run the traction motor and increasing number of telematics in addition to the standard body/powertrain control components. Accordingly, there is need for an integrated telematic system in fuel cell vehicles that derive the necessary power requirement from on-board electric power sufficient to for electric requirements.

SUMMARY

Telematic apparatus with integrated power source in a vehicle utilizes a fuel cell as a primary source of power for the traction motor. The vehicle includes an integrated network comprising a power system, an electrical system, a telematic system, and a body/power train control system. These integrated systems are adaptively controlled by one or more microprocessors run by programmable software functions that allow a user to operate the vehicle using telematics and multimedia networks.

Central controller is a core element of this electro-mechanical vehicle scheme, and distributes and manages electricity preferably in a 42-volt system. The controller serves as a multimedia center for the user to control both electronic and mechanical segments of the vehicle through a gateway. Its main task is to control the user interaction with the system and serve as a front-end for many electronic control units. These units include telematic components in the vehicle such as wireless internet, digital video broadcast entertainment, digital audio broadcast, digital multimedia broadcast, global positioning system navigation, safety services, intelligent transportation systems, and universal mobile telecommunications system.

In order to communicate with the electronic control units, the central controller has access to one or more buses through a gateway controller, which acts as a router, switch or other selectable signal interconnect between various electrical buses in the vehicle. The control area network and local interconnect network protocol enable communication between electronic control units in the vehicle systems. The telematic systems use a media oriented systems transport, intelligent transportation system data bus and universal serial buses to connect to the gateway.

BRIEF DESCRIPTION OF DRAWINGS

FIG. **1** is a simplified system diagram showing vehicle subsystems according to an embodiment of the present invention.

FIG. **2***a* is functional diagram illustrating the vehicle power system according to an embodiment of the present invention.

FIG. **2***b* is a diagram illustrating a fuel cell stack according to an embodiment of the present invention.

FIG. **2***c* is a diagram illustrating a proton exchange membrane fuel cell according to an embodiment of the present invention.

FIG. **2***d* is a functional diagram illustrating tubular-design solid oxide fuel cell according to an embodiment of the present invention.

FIG. **2***e* is a functional diagram illustrating alkaline fuel cell according to an embodiment of the present invention.

FIG. **2***f* is a functional diagram illustrating phosphoric acid fuel cell according to an embodiment of the present invention.

FIG. **2***g* is a functional diagram illustrating molten carbonate fuel cell according to an embodiment of the present invention.

FIG. **3** is a block diagram illustrating interaction between the gateway and the vehicle central controller according to an embodiment of the present invention.

FIG. **4** is a block diagram illustrating the vehicle electrical subsystem according to an embodiment of the present invention.

FIG. **5** is a block diagram illustrating the vehicle body/powertrain control subsystem according to an embodiment of the present invention.

FIG. **6** is a block diagram illustrating the vehicle telematic subsystem according to an embodiment of the present invention.

FIG. **7** is an operational flowchart illustrating process steps performed by software functions in accordance with telematic and power functions in a vehicle system according to an embodiment of the present invention.

FIG. **8** is an architectural diagram illustrating a telematic sensor chip according to an embodiment of the present invention.

DETAILED DESCRIPTION

FIG. **1** shows a generalized embodiment of a vehicle (**100**) including main systems comprising a power system (**101**), an