

Military HUMS

Rugged, Reliable and Flexible Equipment Monitoring

Health and Usage Monitoring Unit

The Greeve Health and Usage Monitoring Unit (HUMS) is an affordable embedded data logging system that monitors and records the status and operation of mobile platforms. It provides the functionality of a HUMS for military vehicles and other land assets but is equally useful on commercial platforms and even remote fixed installations.

The unit interfaces to on-platform data sources and discrete sensors to measure the conditions of operation, the level of performance parameters, and the usage history.

Interfaces include CAN bus monitoring to record data (J1932, MilCAN and others) and discrete analogue and digital sensors such as switch states, temperatures and pressures. Typical vehicle CAN bus data includes fuel demand, engine temperature, boost pressure, vehicle speed and many others including fault codes.

The HUMS can also be used to monitor battery condition and provide battery management functions including split-charge control.

Data is stored on internal memory or (optional) removable Flash media and can be recovered by changing the Flash device or downloading the data via the USB interface or optionally Ethernet, GSM or WiFi. The HUMS can be interfaced to other vehicle system components to display relevant data or can be provided with its own dedicated display.

The HUMS is designed to operate in the harshest environments and reliably record the platform condition over long periods of time.

Expansion:

As well as the options detailed here, the HUMS is fully compatible with the Greeve Networked Power Control System and can interface directly with the Greeve Remote Interface Nodes (RINs) to expand digital and analogue sensing and power switching.



A version of Greeve's HUMS has been selected for SCOUT-SV



Standard Features:

- Environmental protection IP67
- Shock – 100g all axis
- Operational temperature -40°C to 80°C
- Dimensions 210 x 160 x 60mm (main body)
- Power 24v DC (10 to 40v DC)
- D38999 connectors
- 2 x CAN (MilCAN or J1939)
- 4 channels of 12 bit analogue input
- 4 channels of switched input
- 2 Frequency/pulse channels (uses 2 x DI)
- 4 channels switched/alarm output (2A max/ch)
- 3 axis motion and shock monitoring
- USB 2.0

Options:

- Alternative CAN interfaces
- 100Mb Ethernet
- Removable data storage – SD Flash
- GPS interface
- GSM interface
- WiFi
- Commercial packaging available

Software:

The HUMS is provided with a PC software application that enables the unit to be configured for the platform. The configuration includes the data rate and logging strategy.

Greeve can supply bespoke operational software if required.

Bespoke Development:

Greeve can provide systems to meet exact requirements.

Designed to meet:

- Def Stan 00-35 – environmental
- Def Stan 59-411 – EMC
- Def Stan 61-05 – electrical



Simple Legacy Vehicles

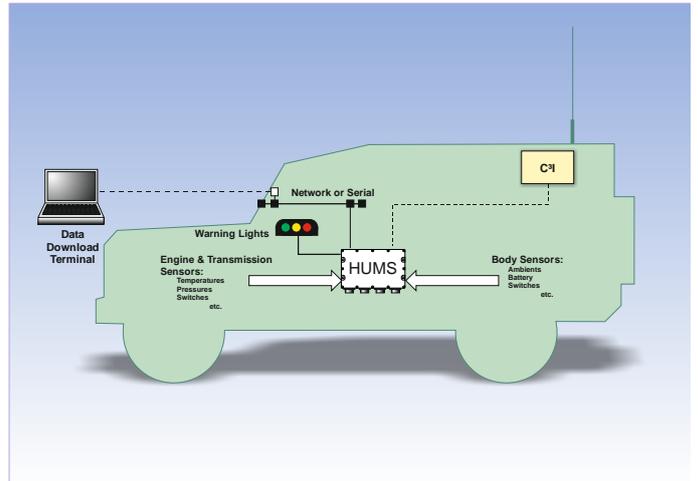
On some older vehicles there may be no ECUs and where they are fitted they may have limited external interfacing. As a result, for many legacy vehicles, it is necessary to use direct sensing of the automotive parameters and these include the main temperature and pressure levels as well as any other useful data such as fuel level.

Ambient temperature, battery monitoring, switch states, and mechanical excitation are all easily included in a basic package. The principle must be to achieve the maximum valuable data at the lowest cost and with minimum vehicle system intrusion.

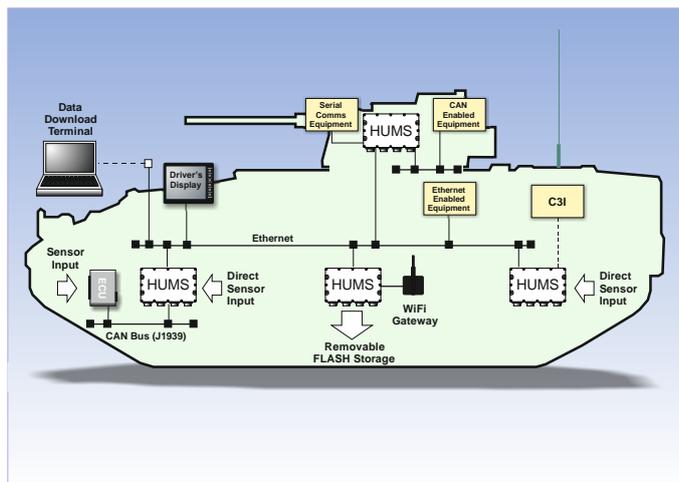
A simple installation may not include the cost or sophistication of a driver/crew information screen. In the example here, the driver is given a simple warnings-and-cautions style display. However, the exclusion of a screen is purely a cost and space consideration.

An example legacy vehicle fit on Land Rovers deployed in conflict zones monitored the following parameters:

- engine coolant flow and return temperatures
- engine oil pressure and temperature
- gearbox oil temperature
- vehicle speed
- engine speed
- external and cabin ambient temperatures
- time at terrain severity (from on-HUMS accelerometers)



Networked Application



On a more complex larger vehicle a networked solution is likely to provide the optimum fit and functionality. The example is of a typical tracked fighting vehicle, but it could be a vehicle transporter or large general support vehicle.

By using a MilCAN network the level of sensor wiring can be kept to a minimum. With its multiple CAN capability, HUMS can act as a gateway between CAN Bus above and below the slip rings, which considerably facilitates CAN Bus installation. It can also provide a gateway between CAN Bus and Ethernet networks.

Each HUMS unit can take in CAN data from automotive ECUs or CAN or Ethernet enabled mission equipment. Each HUMS unit can act as a gateway to legacy equipment by interfacing serial communications or status lines to the network.

A Driver's Information Screen is shown on the network and this can be used to present the driver with current system information as well as warnings and cautions. Typically the driver will be choosing options of data presentation or acknowledging a warning.

Data and Information Management

A wide audience will benefit from the implementation of HUMS technologies – from the vehicle crew, through the various levels of Defence ownership and responsibilities, to the original vehicle manufacturer. HUMS provides the opportunity for data to be gathered about the vehicle condition and use and for information to be made available across the spectrum of stakeholders in the vehicle and its deployment.

The driver and crew can be presented with more meaningful platform information and even limp-home advice or basic fault tracing and repair information. Local repair and maintenance crews can work with objective fault data and historic usage information. At the local management level the tactical use and deployment of vehicles can be made based on known vehicle condition and usage history thereby increasing the probability of mission success and reducing the likelihood of breakdown in-mission or in conflict.

Further up the chain HQ levels of planning will benefit from the actual vehicle usage and availability data. Both vehicle and fleet deployment can be better planned based on known and predicted availability. The vehicle owner will realize reduced cost of ownership through lower contracted maintenance costs, better driver training, and increased availability. The support authority may be the manufacturer, a third party contractor, or the customer team, and will get actual usage data and condition information that enables planned service and maintenance strategies and prevents false warranty claims. The data may be the basis for Contractor Logistic Support (CLS) billing. The manufacturer will get better in-service data that enables planning for vehicle upgrades and future vehicle design.

