Meggitt Avionics

Integrated health and usage monitoring – IHUMS

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smart engineering for
extreme environments

Integrated Health and Usage Monitoring – IHUMS

Meggitt Avionics has in excess of 40 years experience in the design and development of flight data acquisition systems. Drawing from this experience Meggitt Avionics has designed and manufactured a state-of-the-art integrated health and usage monitoring system (IHUMS) which is currently fitted to over 150 aircraft – 12 aircraft types, at 20 locations in over 13 countries.

Already in operation in most environments, including high temperatures and high humidity and with over two million flying hours, IHUMS offers a proven, flexible system delivering real benefits to operators.

In addition to satisfying regulatory requirements (FAA/CAA/EASA etc), IHUMS provides owners/operators with the benefits of safety improvements and reduced maintenance costs through:

- Reduced number of non-revenue test flights required
- Log book accuracy is improved
- Engine and fuel savings
- Improved equipment MTBF
- Improved dispatch reliability
- Reduced spares holdings
- Insurance savings

With these cost savings IHUMS can pay for itself in two years or less.

The system comprises airborne and ground-based equipment where the airborne equipment consists of the following:

- Data acquisition and processing unit (DAPU)
- Optical tracker (GATE)
- Card quick access recorder (CQAR)
- Pilot interface panel (PIP)
- Accelerometers
- Cockpit voice and flight data recorder (CVFDR)
- Cockpit warning panel (CWP)

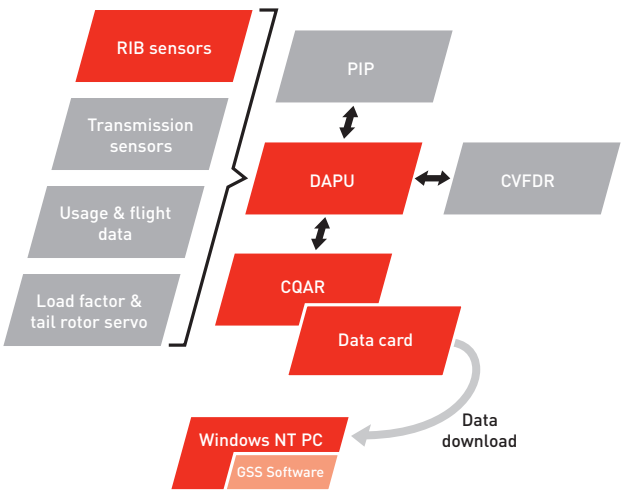
In addition the following ground station and data transfer hardware is included:

- Data transfer medium (PCMCIA card)
- HUMS ground station (GSS)

The on-board system automatically monitors and records data and performs diagnostics including:

- Engine performance monitoring
- Exceedance monitoring
- Rotor track and balance data
- Propulsion system, drive train and airframe usage monitoring
- Regime recognition

The system stores flight data on a PCMCIA card and also displays EXCEED and CAUTION messages on the CDU. After a flight the data is transferred via PCMCIA card from the CQAR to the ground station, which runs Meggitt Avionics' GSS software incorporating trend vector monitoring, rotor track and balance diagnostics, engine performance and usage monitoring algorithms.



The market-leading, user-friendly, easy-to-use ground station is the cornerstone of successful fleet and maintenance management systems. It is used to analyse, process and compile flight data into useful information for the maintenance, logistics and operations departments with functions such as:

- Exceedance detection
- Automatic diagnostic checks
- Flight data archive
- Creating electronic pilot logs
- Component usage tracking

- Managing component and assembly history
- Diagnoses gear, bearing and shaft assemblies requiring maintenance

Benefits

Maintenance

Cost reductions can be made by improving the ability to forecast and track maintenance actions by:

- Eliminating unnecessary inspections and removals (overhauls)
- Decreasing scheduled and unscheduled maintenance
- Early detection of transmission problems, reducing repair costs
- Smoothing the rotor system without the need for dedicated flights
- Providing longer part use with fewer manual inspections
- Maximizing the installed life of mechanical and electronic components

Operations

- Decreased down-time
- Improved safety
- Improved knowledge of current aircraft condition
- Reduced logistics footprint for deployed units

HUMS

- Increased aircraft availability
- Reduced pilot stress
- Improved equipment life
- State of the art data management via ground station
- Improved operational performance
- Military and civil installations

DAPU

- Meets current and anticipated requirements (FAA/CAA/EASA etc)
- Provides flight data recorder and CQAR outputs
- ½ and ⅜ ATR or modular avionic configurations available
- Military and civil applications

CQAR

- PCMCIA technology
- Low cost and lightweight
- Compatible with HOMP and FOQA
- Proven reliable data transfer
- Military and civil applications

Applications

Suitable for all civil or military aircraft, fixed or rotary wing

Integrated health and usage monitoring – IHUMS

Specification

Acquisition unit balance measurements		
	Amplitude accuracy	+/- 2%
	Phase resolution	2°
	Harmonics	1 to 5 – more available if required
	Simultaneous channels	8 vibration, 1 azimuth, 1 camera
	Vector operations	Proprietary algorithm
Track measurements with camera	Track height accuracy	+/- 2 mm
	Lead lag accuracy	+/- 0.5 mm
Spectrum	Frequency ranges	0.25 Hz to 70 KHz (filtered)
	Frequency resolution	Up to 350,000 lines
	Zoom	Yes
	Window types	Flat-top, Hanning – in the ground station
	Simultaneous channels	8 vibration, 1 azimuth
	Dynamic range	>90 dB
	Averaging	Linear
Interfaces		• 12 gearbox channels – vibration • 4 engine channels – vibration • 8 airframe – vibration • 3 azimuth – speed • tracking camera – input • cockpit control unit – input • serial interfaces – 3 each • PCMCIA type 1, card slot • Internal aircraft databus interface slot
Data acquisition and processing unit (DPAU)		
	Dimensions (W x H x L)	124 mm x 194 mm x 318 mm (4.9" x 7.6" x 12.5")
	Weight	6.2 kg (13.7 lbs)
	Power requirement	18 to 32 VDC
	Operating temperature range	-30° C to +60° C
	Storage temperature range	-55° C to +85° C
Ground station software		• Transmission vibration monitoring • Rotor track and balance • Engine performance monitoring • Usage monitoring • Trend vector monitoring • Diagnostic manual with comprehensive fault tree graphics for easy processing of alert messages • Runs on any Windows® computer • Ruggedized laptop option for outlying airfields • Interfaces to helicopter operations monitoring program (HOMP) option

Due to Meggitt's commitment to continual product improvement specifications are subject to change without notice.

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Meggitt Avionics is a Meggitt group company. Headquartered in the UK, Meggitt PLC is an international group operating in North America, Europe and Asia. Known for its specialised extreme environment engineering, Meggitt is a world leader in the aerospace, defence and electronics industries.

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