SENSING AND DATA ACQUISITION
SMART DATA MANAGEMENT

It's a rare combination.

Under one roof, sensing excellence, processing know-how, manufacturing and integration experience.

Our sensors measure virtually every parameter – acceleration, speed, pressure, force, temperature, distance, position, vibration and level – performing in almost unimaginable extremes of heat and vibration.

And we know how to concentrate, manage and transmit the data we have collected from them, whether it is for immediate operational decision-making and control or the continuous performance analysis needed for smart maintenance planning.

We create the raw material at the heart of our sensors. We design the brains of our systems – the software algorithms and the process electronics. And we make the cables, connectors and networking tools that constitute the nervous system of our data acquisition products.

It's this combination that makes us one of the industry's most attractive partners when it comes to integrating fully-certified sensing and data acquisition packages into primary avionics architecture.

And it's why airframers trust us to deliver everything from simple signal conditioners processing data on one parameter, to complex, engine interface power management systems processing multiple inputs from up to four engines.

MEGGITT
smart engineering for extreme environments

SENSING

Working with the world's engine makers for over 50 years has enabled us to develop one of the widest ranges of passive and active sensors for extreme environments and acquire extensive knowledge of the specific measurements needed for engine control and monitoring.

We know where and when to take an absolute measurement or analyse a large amount of information within a frequency spectrum. And long experience optimising sensor packages means we can secure the most information from the fewest sensors, cutting cost and delivering control and diagnostic data from one set of measurements.

We cut our teeth on vibration, one of the most complex fields of signal processing. But we continue to work with the latest analytic techniques and research the science of measurement. This encompasses piezoelectric, piezoresistive, optical, microwave and eddy current sensing, changes in electrical parameters such as charge, capacitance, reluctance and resistance and the use of dissimilar metals in temperature sensors.

SENSING AND IGNITION PACKAGES

Today's gas turbine engines need a wider range of sensors than ever to hone performance and conform to environmental regulation. That's why engine manufacturers are increasingly turning to suppliers who can integrate the supply of these critical system components.

Our sensors measure air and fluid temperature, shaft speed, vibration, the level, pressure, debris and flow of oil, actuator position and dynamic pressure. Our integrated packages include the technologies of carefully selected sub-tier partners where necessary and, where specified, high energy engine ignition systems which Meggitt covers in-house.

Recent successes include the contract to supply Rolls-Royce with the sensor and ignition systems for the BR725 engine – the exclusive power plant for the new Gulfstream G650 business jet – and multiple sensors to Hamilton Sundstrand for the Pratt & Whitney revolutionary PurePower™ PW1000G geared turbofan engine.

HOTTER ENGINES, GREENER SKIES

The watchwords of aeronautical endeavour used to be *further*, *faster*, *higher*. Today, they are *cheaper*, *cleaner*, *quieter*, which means putting sensors closer to the centre of power – the hotter-running, cleaner-burning, more efficient engines of the future.

We are known for sensors which can function in spite of temperature extremes but we continue to raise the bar.

The problem

Advanced turbofan engines use as much of their main gas stream air as possible to optimise thrust, so the amount of air needed to cool engine equipment will be severely limited.

For engines to emit fewer pollutants and cost less to run, they must burn fuel more efficiently and use less of it. That often means running them at higher temperatures.

To boost performance and assess efficiency gains in such conditions, engine designers and developers need data from sensors with astonishing temperature tolerance – up to 750°C for some parts of a gas turbine – with no loss of signal strength.

Innovating safely on the ground

To meet the need for high temperature sensing, we are pushing material science to the limit in-house, embracing strategic partnerships and proving innovative technology in the industrial gas and steam power turbine market where we are well-established. Its monster machines can be ten times bigger than the largest aero-engines – with the same requirement for protection, optimal economic operation and conformance to environmental regulation.

Combustion monitoring

Today, it's the high temperature, high sensitivity dynamic pressure sensors we have developed for industrial power generators that will feature on tomorrow's greener aero-engines.

To curb emissions of harmful, ozone-forming oxides of nitrogen and sulphur, modern gas turbine designers must control fuel burn and combustion stability tightly. Our dynamic pressure sensors can survive indefinitely within the harsh environments of combustion chambers, providing continuous outputs to control systems so the signs of damaging instabilities can be detected early.

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DATA ACQUISITION SYSTEMS

What are they?
Meggitt's data acquisition units are microprocessor-based signal processing systems that save weight and space by collecting information from multiple aircraft inputs, eliminating the need for individual signal conditioning boxes.

Typically, they provide information in real time to support operational decision-making by aircrew or record information for trend analysis and exceedance monitoring by maintenance personnel and system operators.

WHAT SETS US APART

Meggitt has mastered collecting, conditioning, processing, storing and transferring data to multiple instruments across many different aircraft types and many applications. What sets us apart is our mastery of sensor design as well as data acquisition systems. Our complete understanding of sensor characteristics gives us superior insights into developing the interfaces needed to extract the desired information from hugely diverse and varying analogue signals.

INTELLIGENT SENSORS OF THE FUTURE

Space is at a premium on every engine so we make sure we get as much out of our allocation as possible. Our digital sensors provide even more information on multiple measurement parameters, transferring it via high speed digital networks.

Our latest fluid quantity sensors have the potential to offer additional data on fluid quantity and temperature, sharing one set of cabling – a useful weight saving when every kilogram counts. All our digital devices are self-aware with built-in test and internal watchdogs to alert acquisition systems to sensor problems.

KEY PRODUCTS

In-house engine sensing
- accelerometers
- speed
- fuel flow
- fuel and oil pressure
- oil temperature
- exhaust gas temperature
- oil debris
- oil quantity

Integration
And we integrate others' sensors for operational decision-making and control
- altitude
- air speed
- global positioning systems
- engine parameters
  - propeller tachometer
  - horsepower or torque
  - internal turbine temperature
  - outside air temperature
- elevator and rudder trim and flap positions
- hydraulic pressure

KEY APPLICATIONS

- Data acquisition for engine instrument display systems – multiple configurations for commercial and military aircraft with single or multiple engines with high level redundancy and built-in test
- System interface units for electronic flight instrumentation systems on turbo-props
- Engine interface power management for large commercial jets
- Dynamic monitoring acquisition units for helicopter health and usage monitoring systems linked to avionics and ground stations.
- Signal conditioning fuel quantity data for light aircraft, commercial transports, helicopters and military jets

WHO WE WORK WITH

Rolls-Royce
Airbus
Boeing Commercial
Eurocopter
Piper
Cessna
Republic of China Air Force (Taiwan)
Sikorsky

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SENSING AND DATA ACQUISITION
Just one of the Meggitt capabilities covered in Meggitt in a Minute, the group's new e-tour.
See also Health Monitoring, Fluid Gauging, Flight Test, Ignition

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