

Established in 1976, Sensor Technology is the world's leading high technology rotary torque measuring company. It has global patents protecting its developments in the use of Surface Acoustic Waves for non-contact monitoring of rotating drive shafts and other machine elements, which are at the heart of its Torqsense range of transducers.

The company has also developed sensor ranges for measuring strain, temperature and pressure in virtually every non-automotive sector.

Sensor Technology has over 25 years' experience in developing rotary torque systems and has a global network of distributors. It runs programmes of internal and external R&D to develop, perfect and introduce new products and ensure its technology remains a world leader in torque measurement well into the 21st Century. To assist with this process it has a network of world-renowned expert consultants and is currently involved in a number of university research projects.

Sensor Technology's strategy is to leverage its current technology and continue to secure new patents so that it retains its competitive advantage of being able to offer powerful products, and world class technical support from expert staff

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Torque transducer aids aircraft systems design

The new Nimrod MR4A is the latest in a line of maritime reconnaissance aircraft that have served naval and military operations for over fifty years. This latest incarnation, due to enter service in 2009, can be configured for multiple roles, including anti-submarine warfare, anti-surface unit warfare and search and rescue. The first MRA4 made its maiden flight last year and the project is now entering the pre-delivery development phase, during which its 'Iron Bird' test rig will be used to prove the designs of its critical subsystems.

The Iron Bird rig is the primary test tool for the integration and endurance testing of the Nimrod MRA4 mechanical systems. Using a

Sensor Technology's innovative non-contact torque transducer is currently satisfying a niche application in aircraft systems testing. It is now an important element in test rigs serving the development of a diverse range, from large military aircraft to executive jets

open up, changing their electrical resistance proportionally to the change in frequency of the surface acoustic waves (SAWs) caused by the rotating shaft. They are essentially frequency-dependent strain gauges that measure changes in the test shaft's resonant frequency throughout a test run.

A wireless coupling is used to transfer the data to a pick-up

Nimrod application, no slip-rings are required; instead, the transducer is used in conjunction with a piezoelectric comb mounted on the test shaft, with data being transferred via a wireless link.

As the ball screw driven flap actuators extend, a compressive load is applied due to aerodynamic forces acting on the flap surface; this has the effect of varying the torque levels within the flap actuator drive system. Each actuator is tested with a servo-hydraulic motor input drive in closed loop control of position against torque using the smaller 22Nm sensor. The load to the ball screw lateral motion is applied via a servo cylinder - again in closed loop control of position against load. Proof loading is applied manually to the input drive using a gearbox and the larger 200Nm Torqsense in open loop.

Typical tests performed on this rig include no-load input torque, compressive loads, tensile loads, running in, backlash, efficiency, performance and endurance.

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reclaimed Nimrod MR2 fuselage as a base, the landing gear, hydraulic system (including engine-driven pumps), primary and secondary flight controls are all mounted in their correct positions and connected to the appropriate interfaces. Flight forces are simulated via electro-mechanical actuators attached to the moving elements of the aircraft.

Sensors play a vital role, but they must have minimal influence on the systems under test, which is where the Torqsense non-contact torque transducer from Sensor Technology comes into its own. The unit is used in conjunction with two ceramic piezoelectric 'combs', glued to the surface of one of the shafts under test. As the torque increases, the combs

head, and this same coupling is used to supply the very low power requirement of the strain gauges. The arrangement entirely avoids the problem of having to fit slip-rings and maintain their contact quality over an extended test run.

Torqsense has also been used by Wolverhampton based Comar Engineering to test three flap system actuators on the new Falcon 7X, the world's first fly-by-wire business jet. Comar's flap actuator test rig (shown opposite) features 22Nm and 200Nm Torqsense transducers, chosen for their non-contact operation. As in the

