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MONITORING OF DYNAMIC BLADE LOADING

FOR AEROSPACE ENGINES

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Application: Aerospace Engine Dynamic Blade Loading Monitoring

Wireless torque telemetry of strain gage signals on inducer and quill shafts of an axial flow pump

Industry: Aerospace

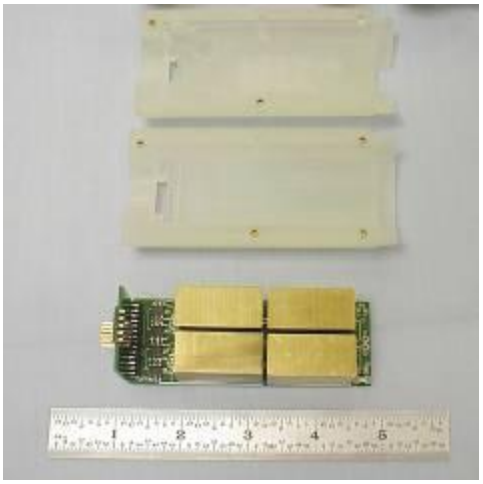
Product: AT-7000

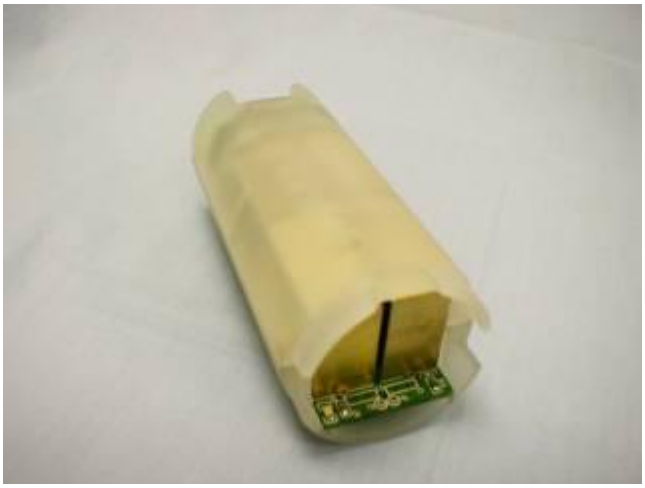
Parameters measured: Torque

A major aerospace company needed a reliable and compact method of monitoring the dynamic blade motion of a rocket's pump at 6000 RPM. The wireless transmission of strain measurements through use of a center-of-shaft mounted AT-7000 multichannel digital telemetry system provided the desired dynamic torque information. With an easy to operate turn-key installation, signals were measured, digitized, and transmitted from eight channels of 350 ohm strain gages. The AT-7000 provided all excitation and signal conditioning necessary for the strain gages, and also provided remotely controlled shunt calibration for all channels. Sample rates of 5888 samples per second provided DC to 2 kHz bandwidth signal reconstruction at the remote Receiver.

Benefits:

- Compact center of shaft design for high G force
- Induction powered- no batteries
- EMI resistant digital telemetry
- Anti-aliased data
- Precision measurements with good bandwidths
- No slip rings; nothing to wear or maintain





The picture above-left shows the Transmitter's electronics modular design for the 8 strain measurements; on the upper right, the electronics are shown in a rapid-prototype housing prior to insertion in a metal coupling. The exterior of the coupling, with a glass laminate induction power pickup coil assembly is shown in the lower left picture. The Receiver (digital to analog outputs device) is shown on the lower right.

The AT-7000 can also be configured in a clamp collar for mid-shaft mounting, and can be used to measure rotor temperatures, voltages and currents, detection of ground faults, and torsional vibration.

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6 British American Boulevard, Suite 103-F, Latham, NY 12110 USA

accumetrix.com | telemetry@pcb.com | 888 684 0012 | +1 518 393 2200

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