



# ASTECH ELECTRONICS LTD



40 YEARS OF DESIGNING AND BUILDING  
ROTARY TELEMETRY EQUIPMENT



**IEC**  
**EV**

**INDUSTRIAL ELECTRONETICS CORPORATION**  
1363 SO. PATRICK DRIVE      SATELLITE BEACH, FLORIDA  
PHONE: (305) 262-4592      32935

**RADIO TELEMETRY REPLACES SLIP RINGS**      IN REPLY PLEASE REFER TO:

**REMOTE MEASUREMENT AND CONTROL**

**TELEMETRY**

- FM FM
- MULTIPLEX
- ULTRAMINIATURE FM
- RADIATING STRAIN GAGE
- TRANSMITTERS
- RECEIVERS
- CARRIER OSCILLATORS

**WIRED MEASUREMENT**

- D C
- CARRIER
- MULTIPLEX
- CONTROL AND SHUTDOWN
- RELAY CLOSURE
- PROPORTIONAL CONTROL

**COMMUNICATIONS**


**R.F. SYSTEMS**

**DATA ACQUISITION SYSTEMS**

**DATA PROCESSING SYSTEMS**

**PROTOTYPE DEVELOPMENT**

**CONSULTANT SERVICES**



FOR TESTING JET ENGINES RADIO TELEMETRY HAS REPLACED SLIP RINGS. The General Electric Company, Curtiss-Wright, and Pratt & Whitney Aircraft now use Industrial Electronetics Corporation radio telemetry to measure vibration, strain and temperature in jet engines. Developed to withstand high acceleration forces and high temperature simultaneously, the IEC radio telemetry does the measurement job and does not wear out. It operates at 30,000 g and temperatures to 175°C. Power is supplied to the unit by means of inductive coupling without any rubbing parts. Strain gages and thermocouples banded to the rotor blades are connected to the telemetry transmitters. A built-in calibration module permits accurate on-line calibration; it is activated by changing the frequency of the inductive supply.

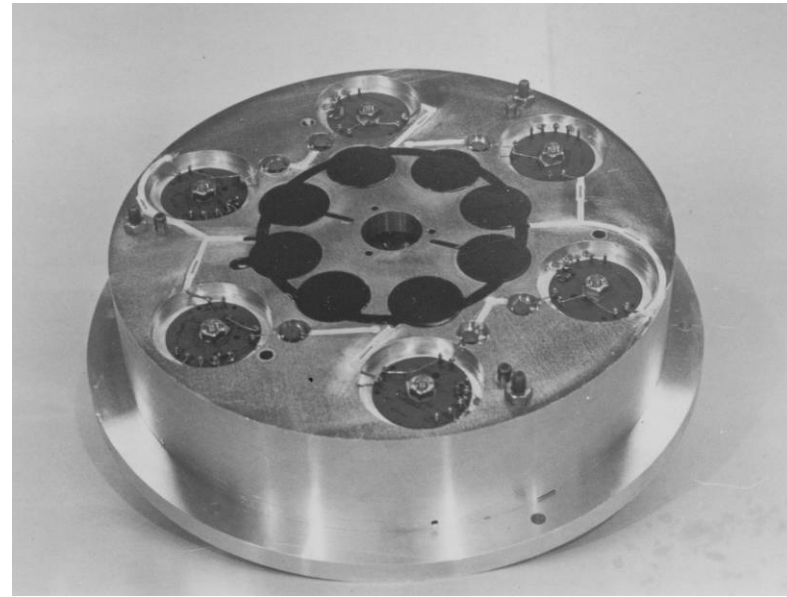
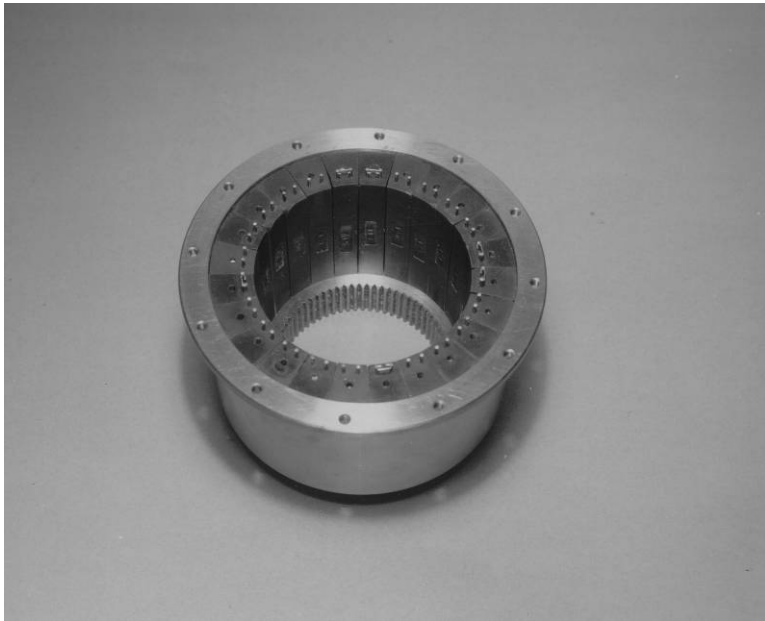
UNAFFECTED BY CORROSIVE OILS AND GASSES the tiny telemetry units are encapsulated in material consisting largely of fused quartz with a high temperature non-shrinking binder. The units are thoroughly tested at the factory for continuous operation in high temperature oil and are immersed in salt water in routine quality control testing.

TWO 40-CHANNEL SYSTEMS AND THREE 24-CHANNEL SYSTEMS HAVE BEEN SUPPLIED BY IEC TO DATE. Each telemetry module is approximately 1/2" x 1/4" x 2". They are shaped as segments of a circle to fit side by side in a single retaining ring located on the turbine rotor. A nearby stationary ring supplies power and picks up the radio frequency from the telemetry transmitters. A receiving station supplies output voltage to meters, indicators, and recorders.

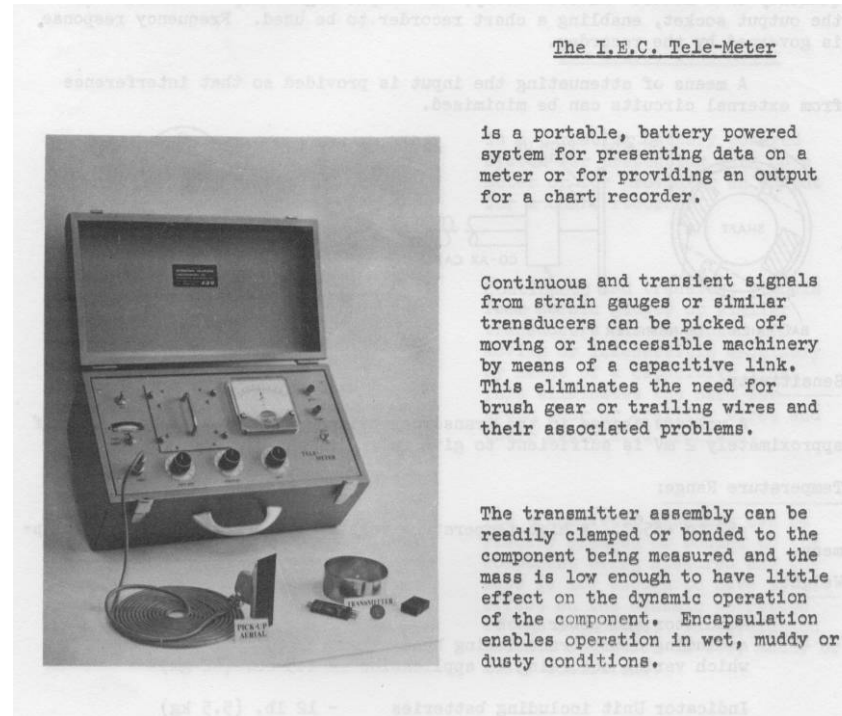
*Measurement is the beginning of knowledge*

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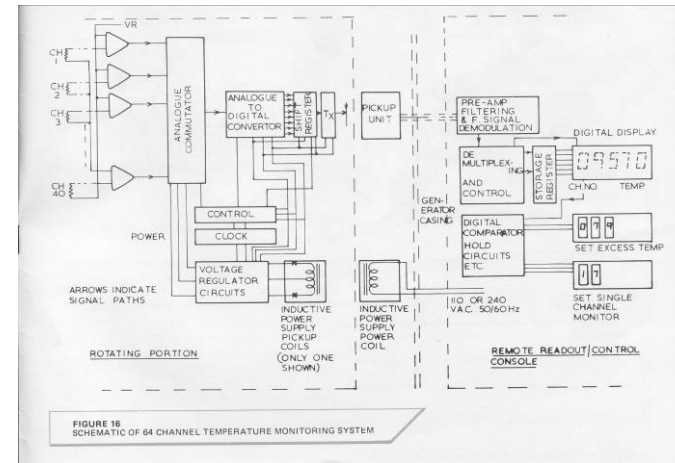
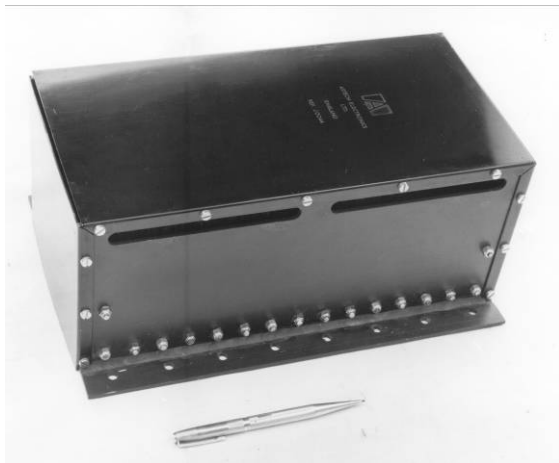
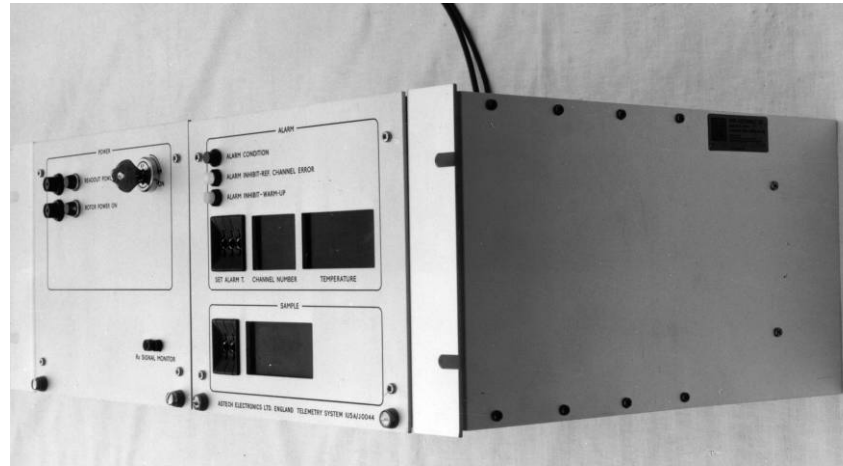
## GAS TURBINE ROTARY TELEMETRY BY INDUSTRIAL ELECTRONETICS CORP USA, CIRCA 1970



EXAMPLES OF IEC GAS TURBINE TELEMETRY

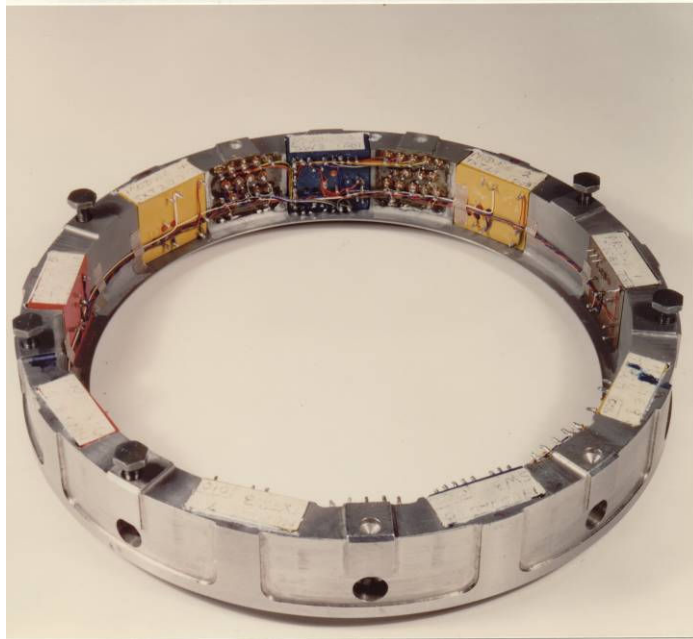


## OLD IEC ELECTRONICS (UK) ROTARY TELEMETRY SYSTEM

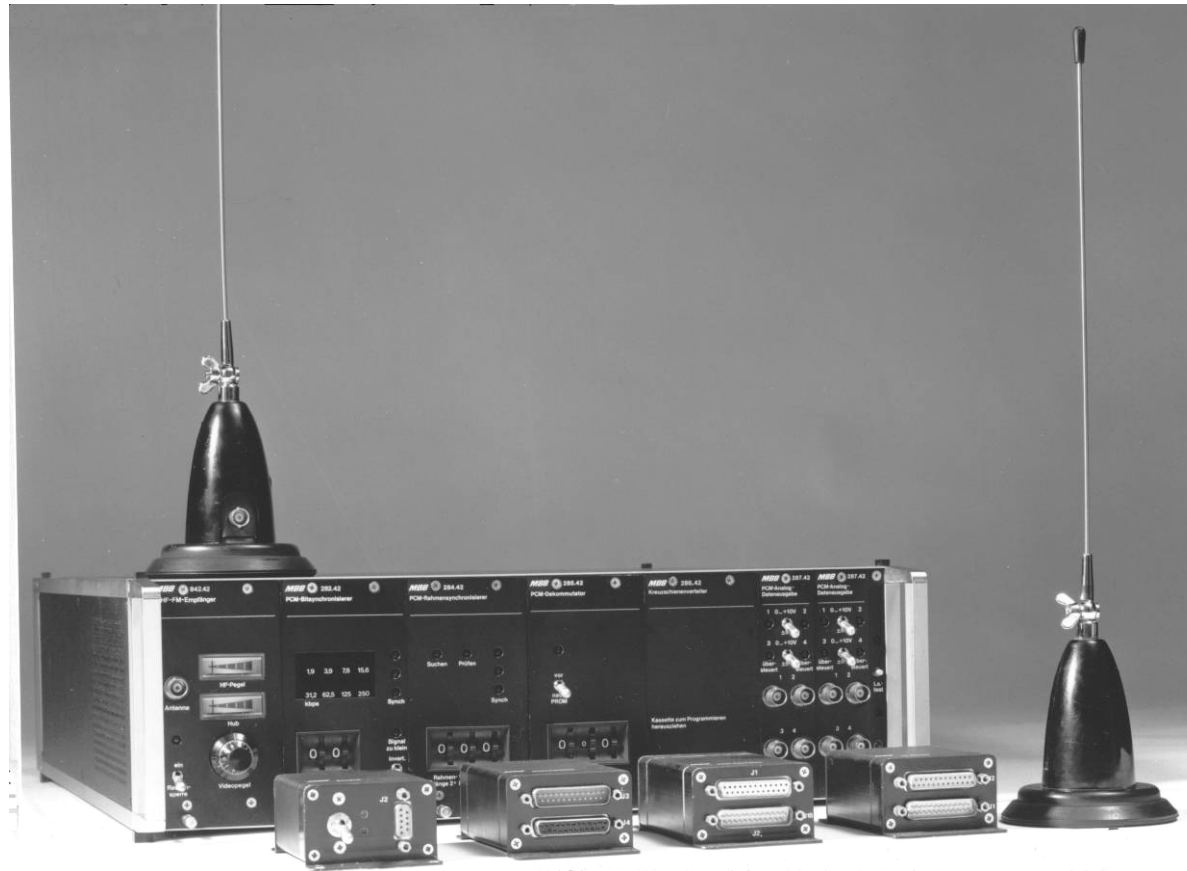


## FIRST ASTECH PCM ROTARY TELEMETRY – A 64 CHANNEL TEMPERATURE MONITORING SYSTEM

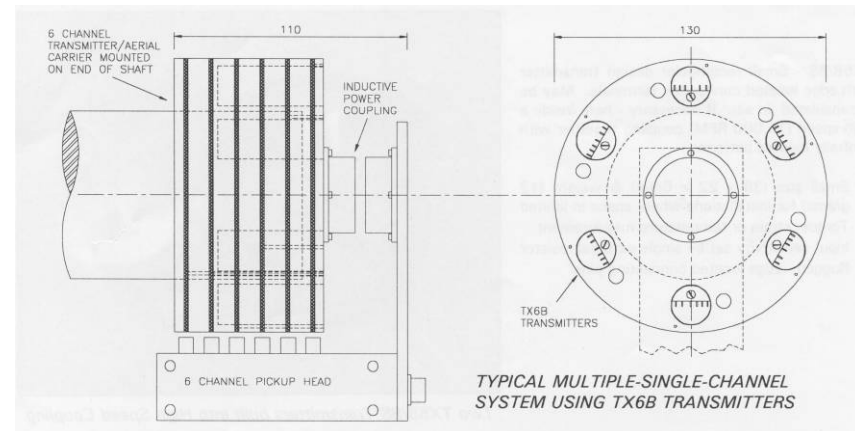
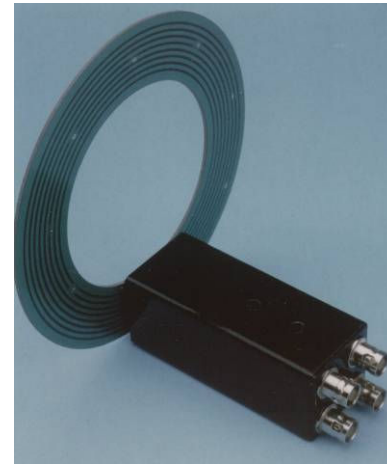
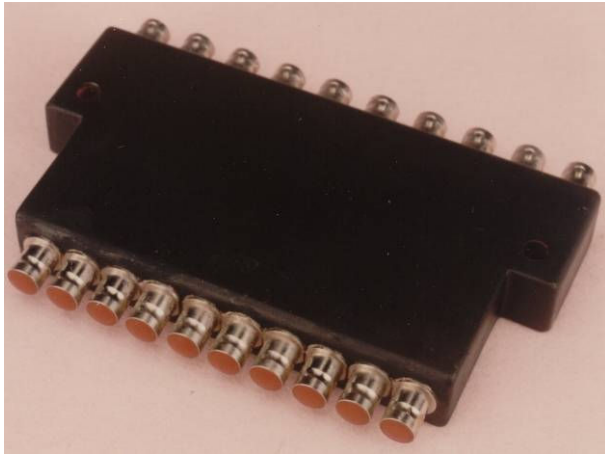




ROLLS ROYCE MK 16 ROTARY TELEMETRY

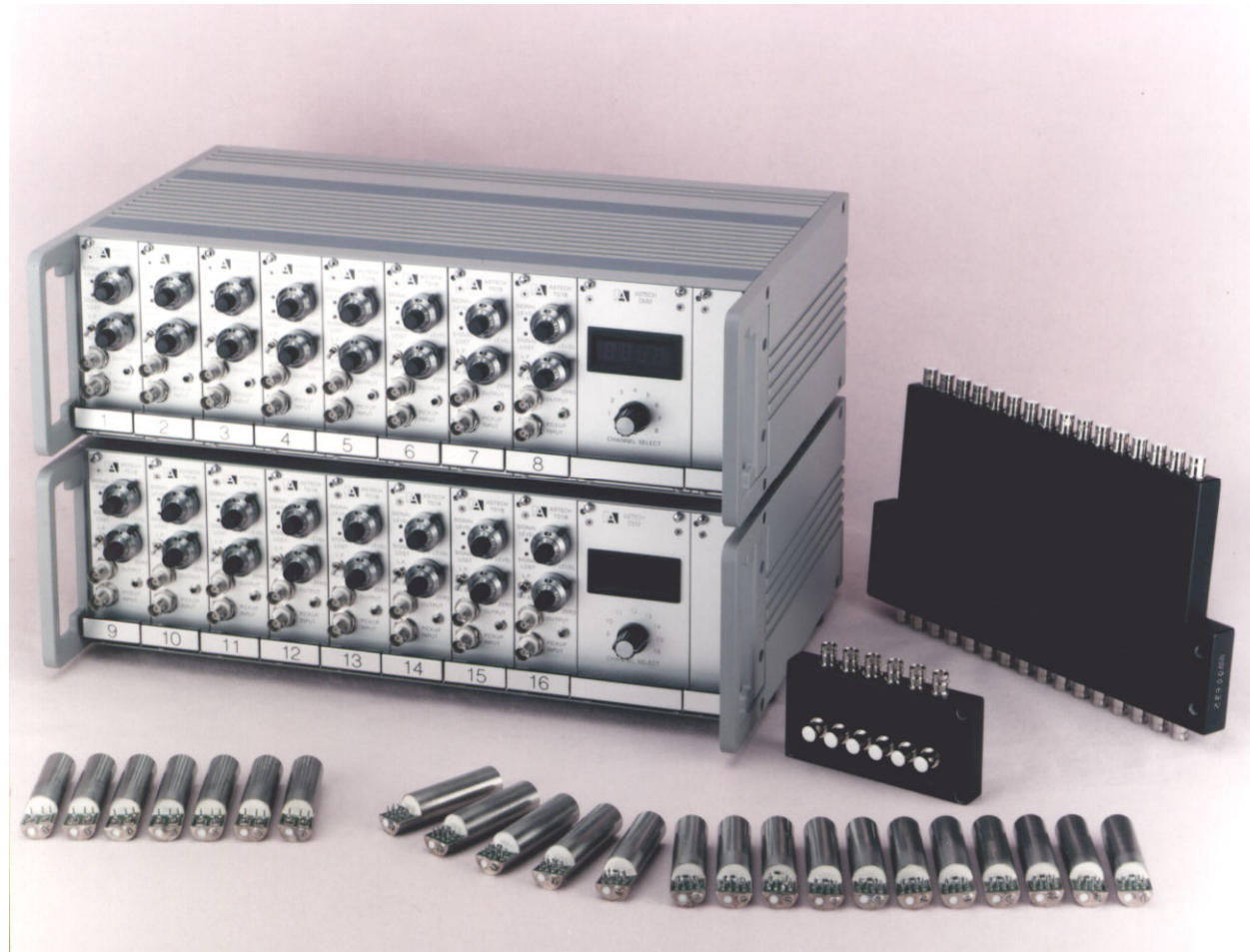


PCM TELEMETRY RADIO SYSTEMS

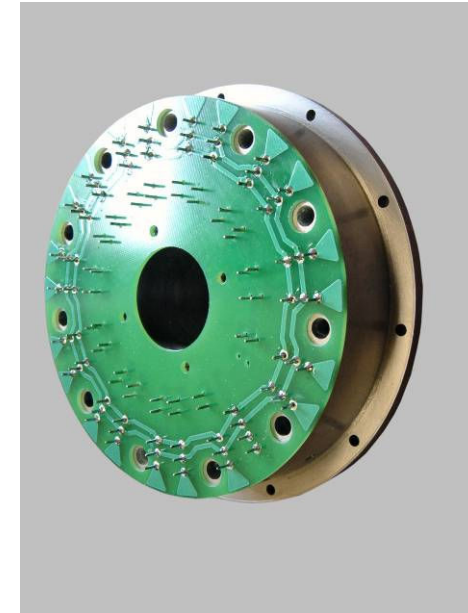
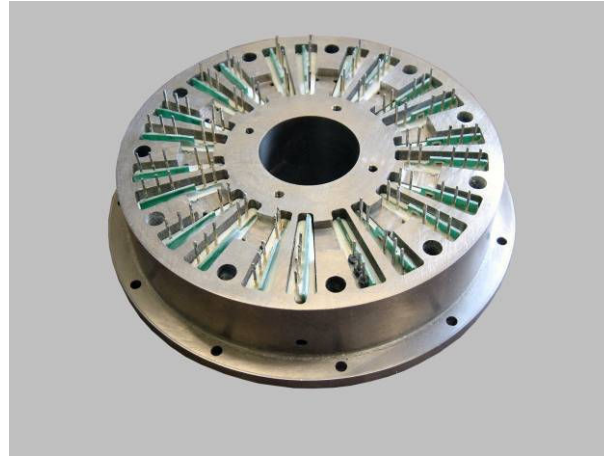
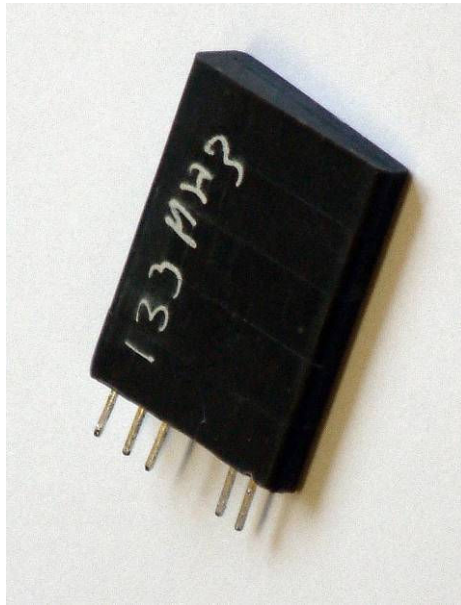


EARLY MULTI-CHANNEL GAS TURBINE ROTARY TELEMETRY  
SUPPLIED TO EUROPEAN GAS TURBINES AND ALSTOM GAS  
TURBINES

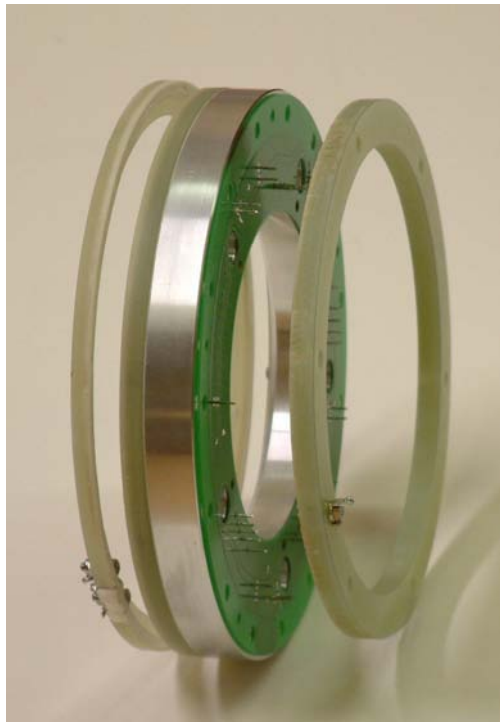




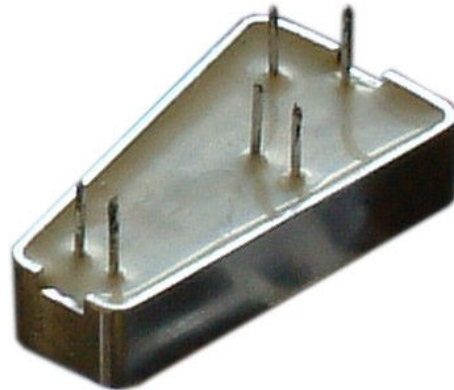
EARLY MULTI-CHANNEL GAS TURBINE ROTARY TELEMETRY  
SUPPLIED TO EUROPEAN GAS TURBINES AND ALSTOM GAS  
TURBINES



FREQUENCY MULTIPLEX FM/FM GAS TURBINE ROTARY  
TELEMETRY – TX MEASURES 1.25" X 1" X 0.25"



16 CHANNEL FREQUENCY MULTIPLEX GAS TURBINE  
TELEMETRY – OD 16" AND 2 CHANNEL GAS TURBINE COUPLING  
INTERFACE TELEMETRY TRANSMITTER

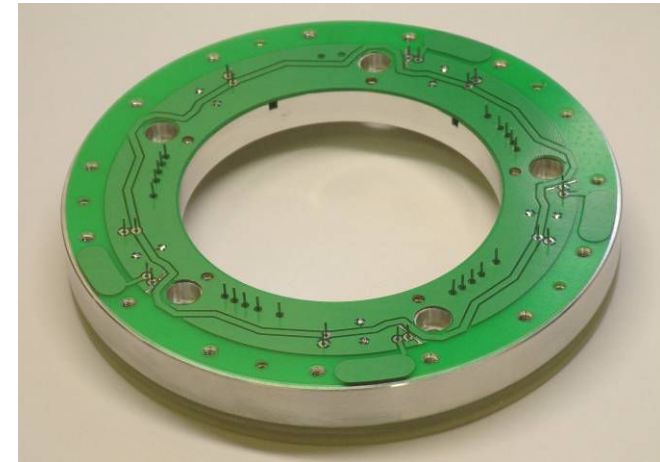
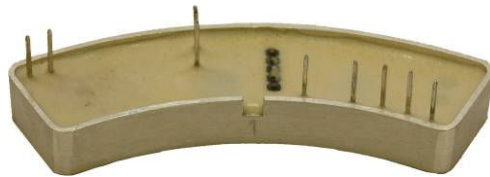


END OF SHAFT GAS TURBINE ROTARY TELEMETRY – 20  
CHANNELS FM/FM AND 14 CHANNELS THERMOCOUPLE PCM



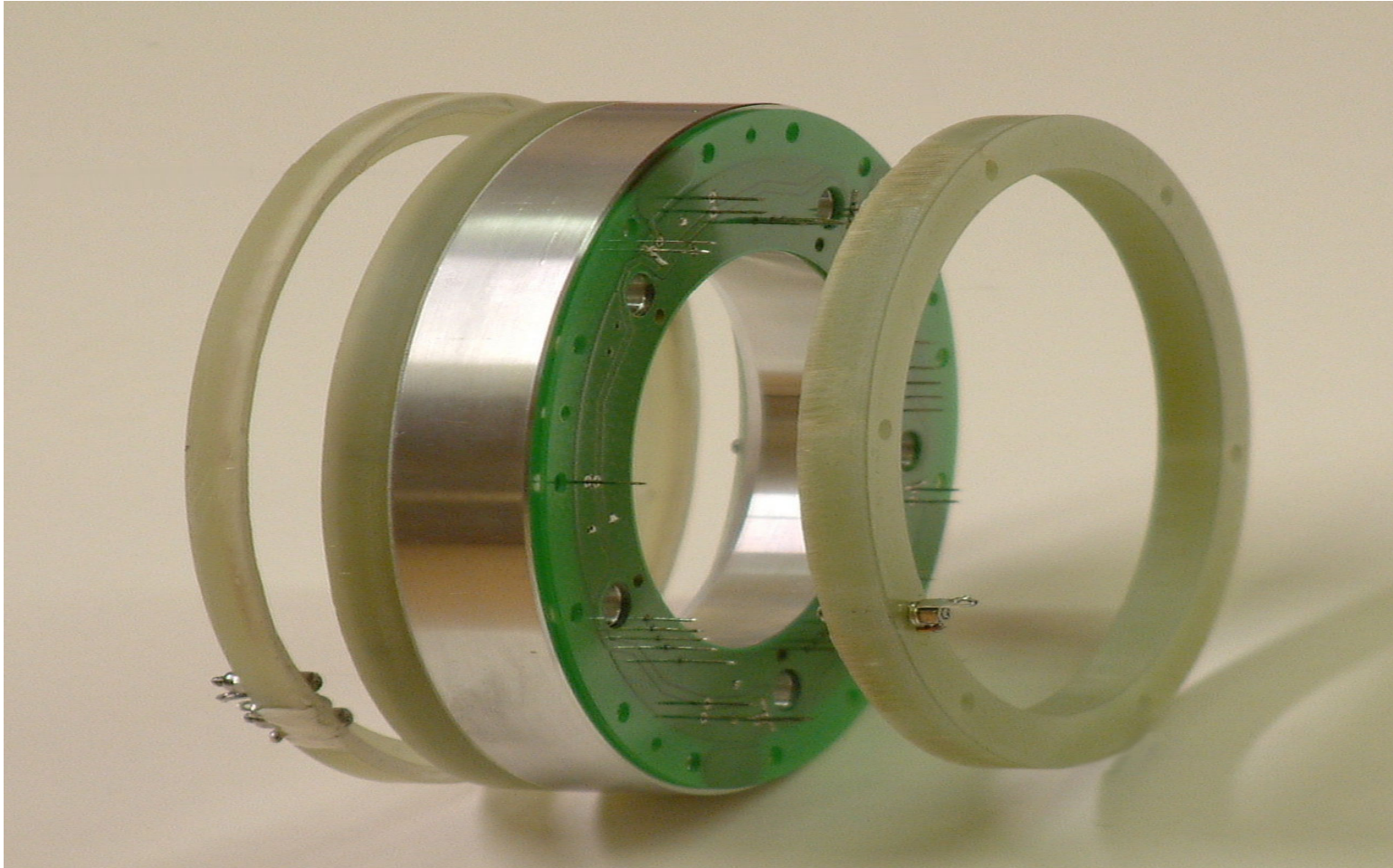
GAS TURBINE TELEMETRY – 15 TRANSMITTERS 15MM X 40MM  
IN TITANIUM HOUSING WITH INDIVIDUAL COIL POWER PICKUP





ROTARY TELEMETRY – 4 CHANNEL IN CUSTOM HOUSING FOR  
GAS TURBINE APPLICATION



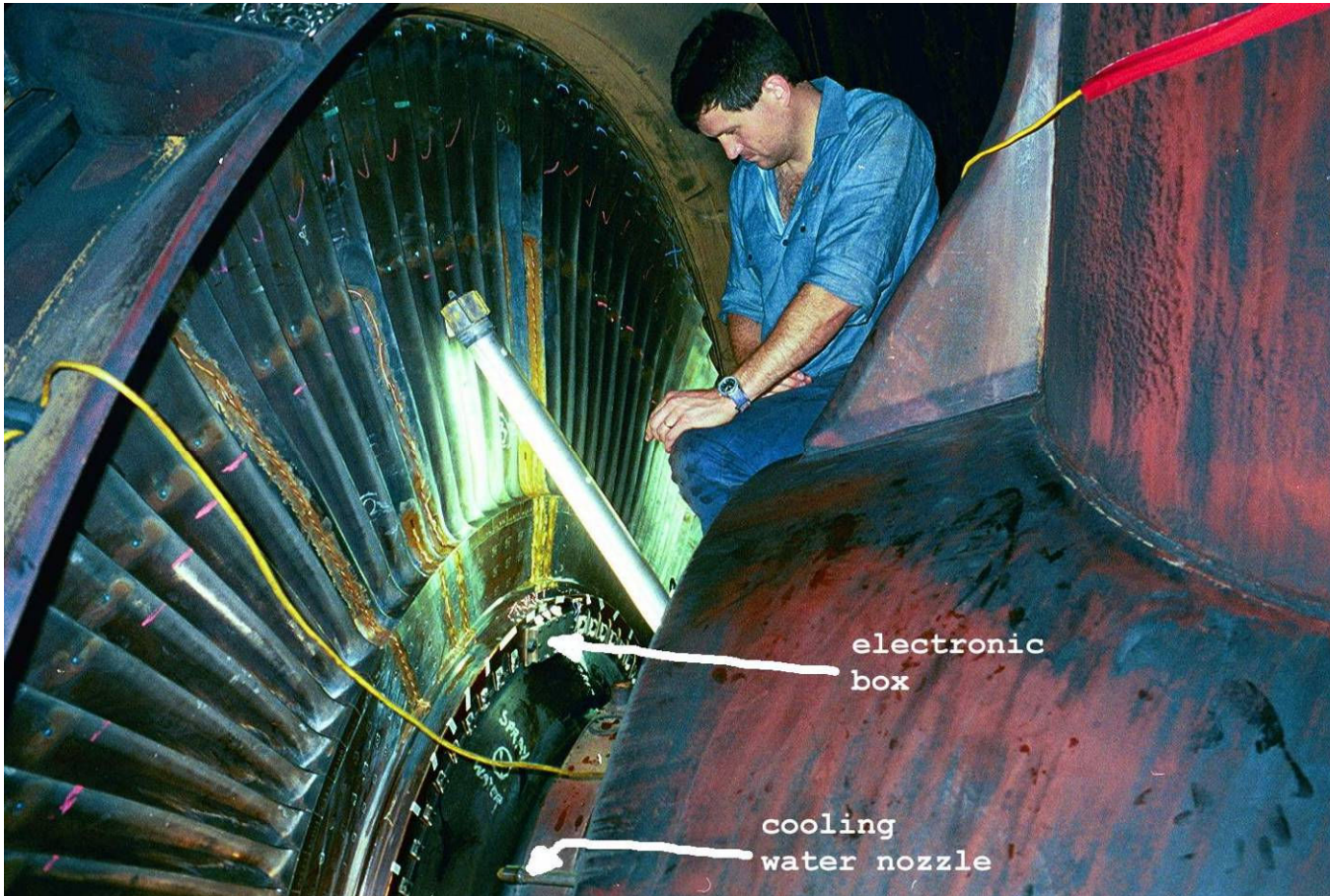


4 CHANNEL FREQUENCY MULTIPLEX GAS TURBINE ROTARY  
TELEMETRY – 27000RPM

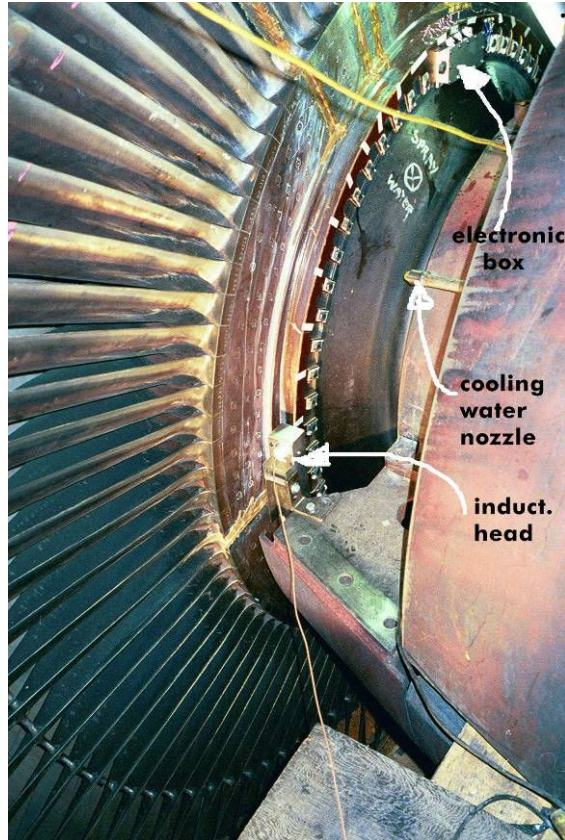


9 CHANNEL FREQUENCY MULTIPLEX TRANSMITTER ASSEMBLY  
FOR SHAFT BORE INSTALLATION IN GAS TURBINE COUPLING



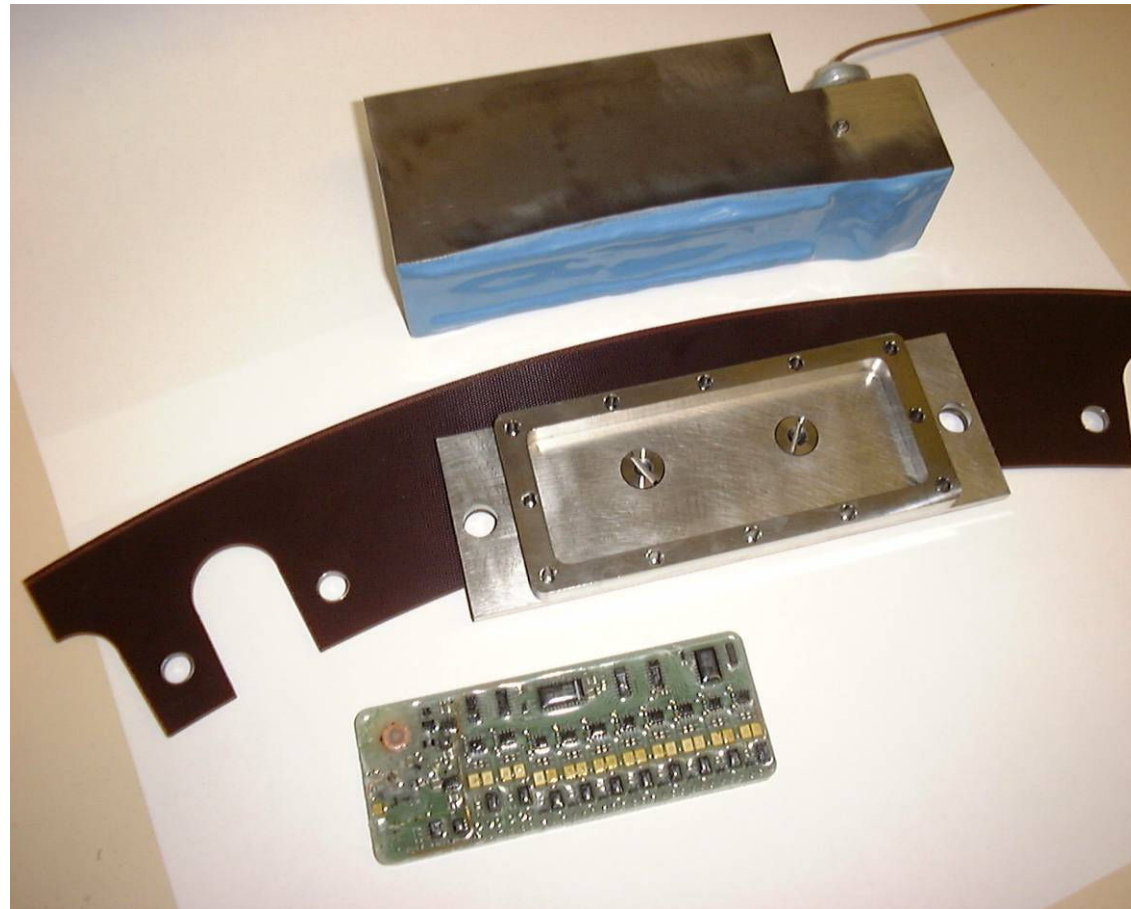


STEAM TURBINE  
INSTALLATION IN AUSTRALIA



## STEAM TURBINE TELEMETRY 10 CHANNEL BLADE STRAIN/VIBRATION



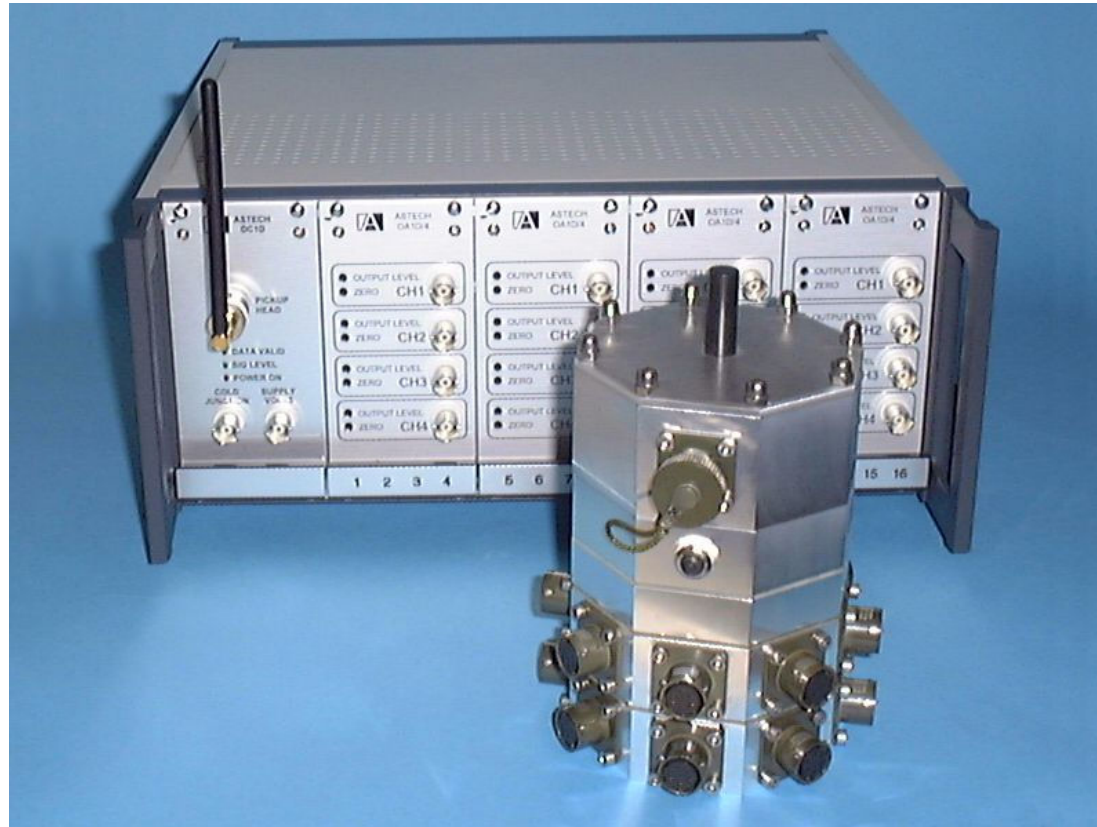


TRANSMITTER AND I.P. COIL FROM AUSTRALIAN STEAM  
TURBINE (120°C, 4000RPM ON 4 FEET DIAMETER RUNNING IN  
STEAM ENVIRONMENT)

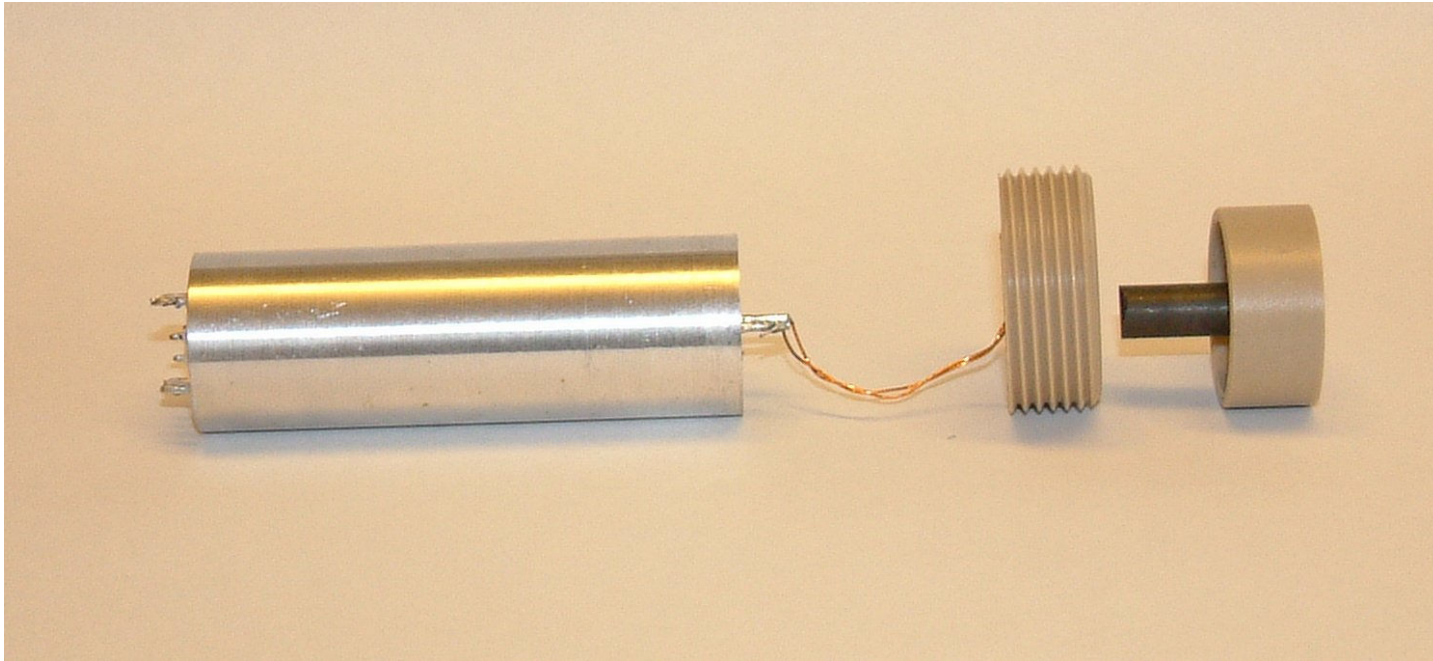


4 CHANNEL PCM ROTARY TELEMETRY – CUSTOM SPLIT RING  
ASSEMBLY FOR TOSHIBA STEAM TURBINE 4000RPM

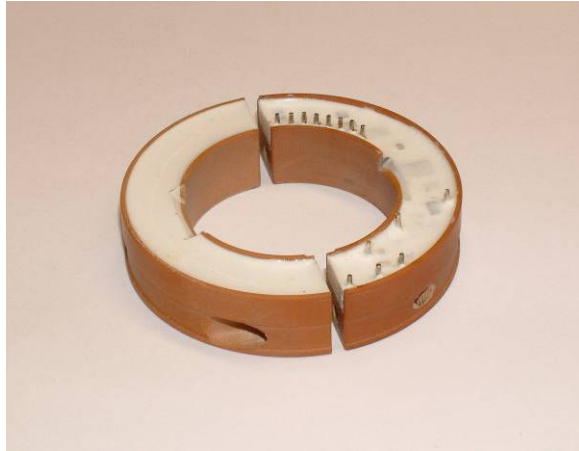




HELICOPTER ROTOR BLADE STRAIN TELEMETRY 16 CHANNELS DC-1kHz. 1.8GHz TRANSMITTER AND ASSOCIATED RECEIVER RACK



F1 RACING CAR GEARBOX TELEMETRY  
120°C 20,000RPM



2 CHANNEL STRAIN TELEMETRY INSIDE OIL PUMP



ROTARY TELEMETRY FOR TORQUE MEASUREMENT INSIDE GEARBOX. POWER AND SIGNAL TRANSMISSION VIA COILS.



16 CHANNEL THERMOCOUPLE RADIO TELEMETRY LARGE  
DIESEL ENGINE



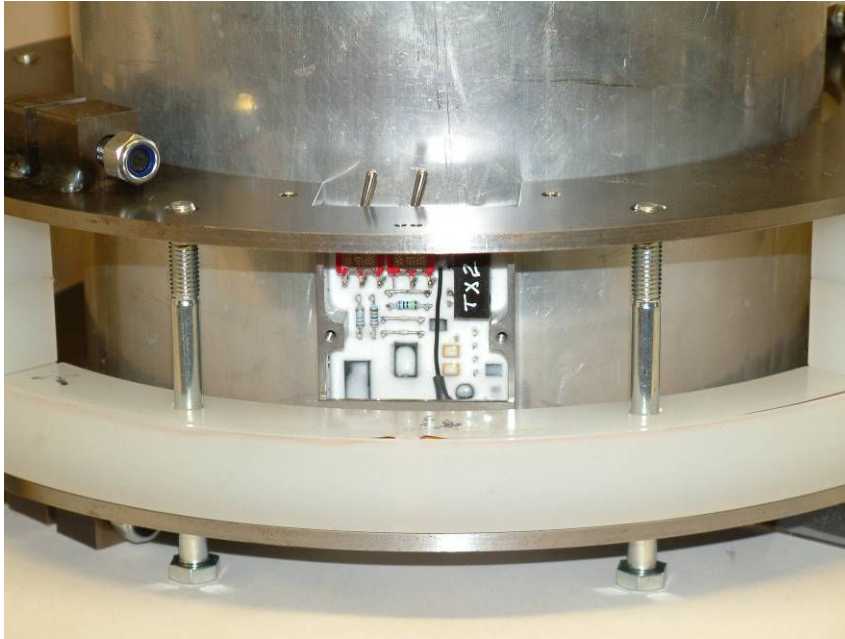


3 CHANNEL INDUCTIVE POWER TELEMTRY FOR INSTALLATION ON AIRCRAFT UNDERCARRIAGE – FLIGHT QUALIFIED SYSTEM





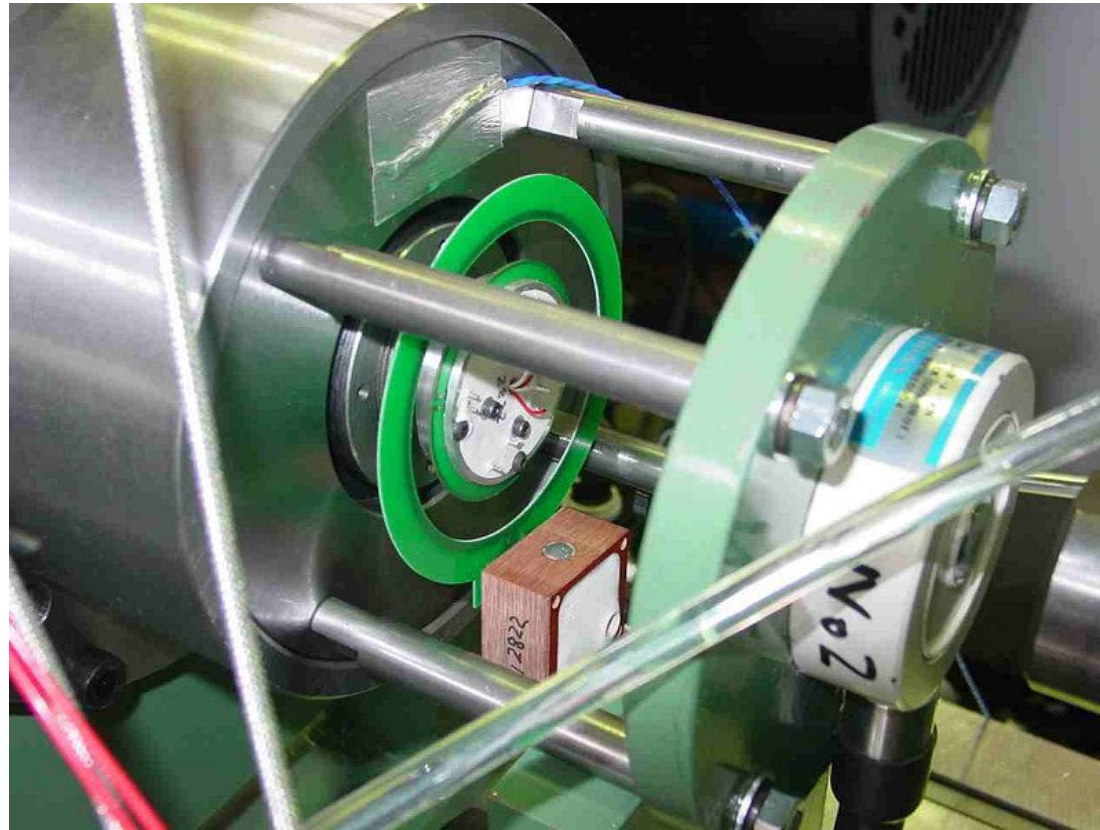
7 CHANNEL THERMOCOUPLE TELEMETRY FUEL TEST ENGINE  
PISTON (SHELL RESEARCH)



TORQUE TELEMETRY STEEL ROLLING MILL



4 CHANNEL TORQUE/STRAIN TELEMETRY STEAM TURBINE  
SHAFT



BALL RACE TEST RIG – 50,000RPM 100°C





STEERING WHEEL TELEMETRY – 8 CHANNEL ACCELERATION  
TORQUE ANGLE WITH REMOTE RE-ZERO





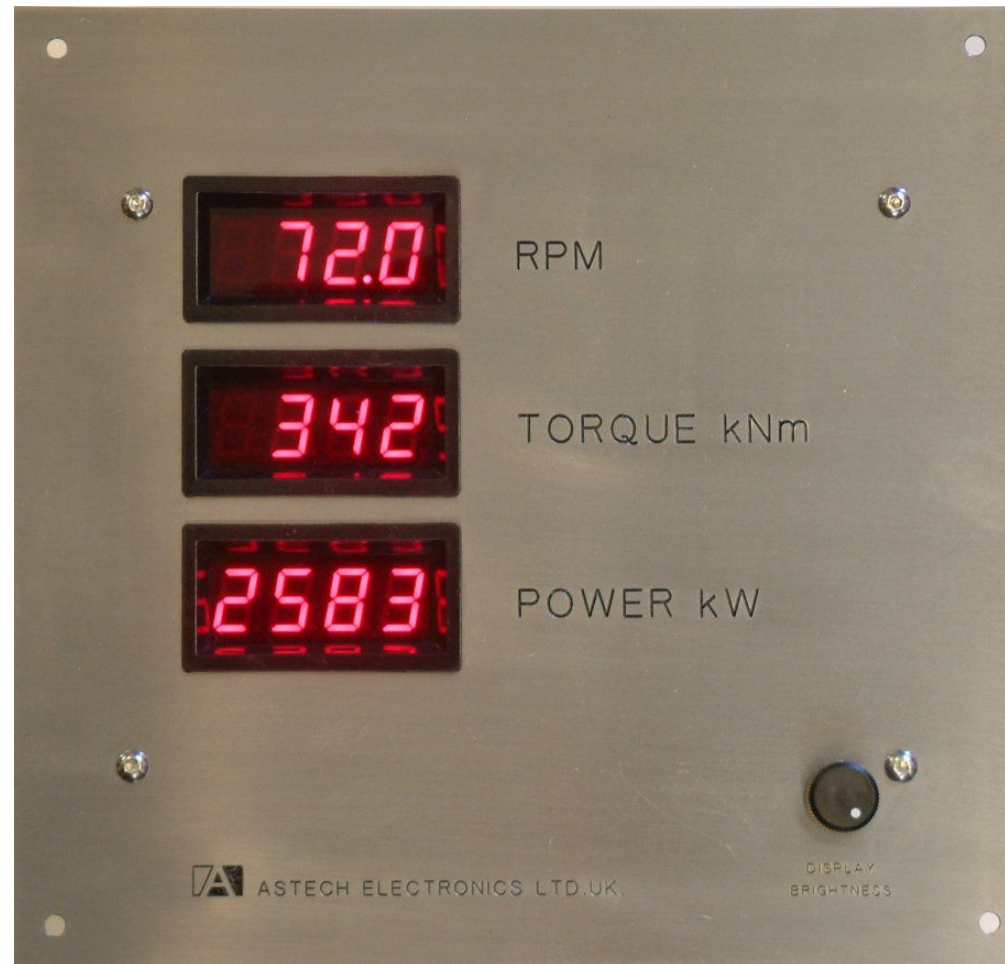
VARIOUS SMALL TRANSMITTERS



MARINE TORQUE AND POWER SYSTEM



MARINE TORQUE/POWER METER, CENTRAL  
PROCESSING UNIT



MARINE TORQUE/POWER METER, DISPLAY UNIT

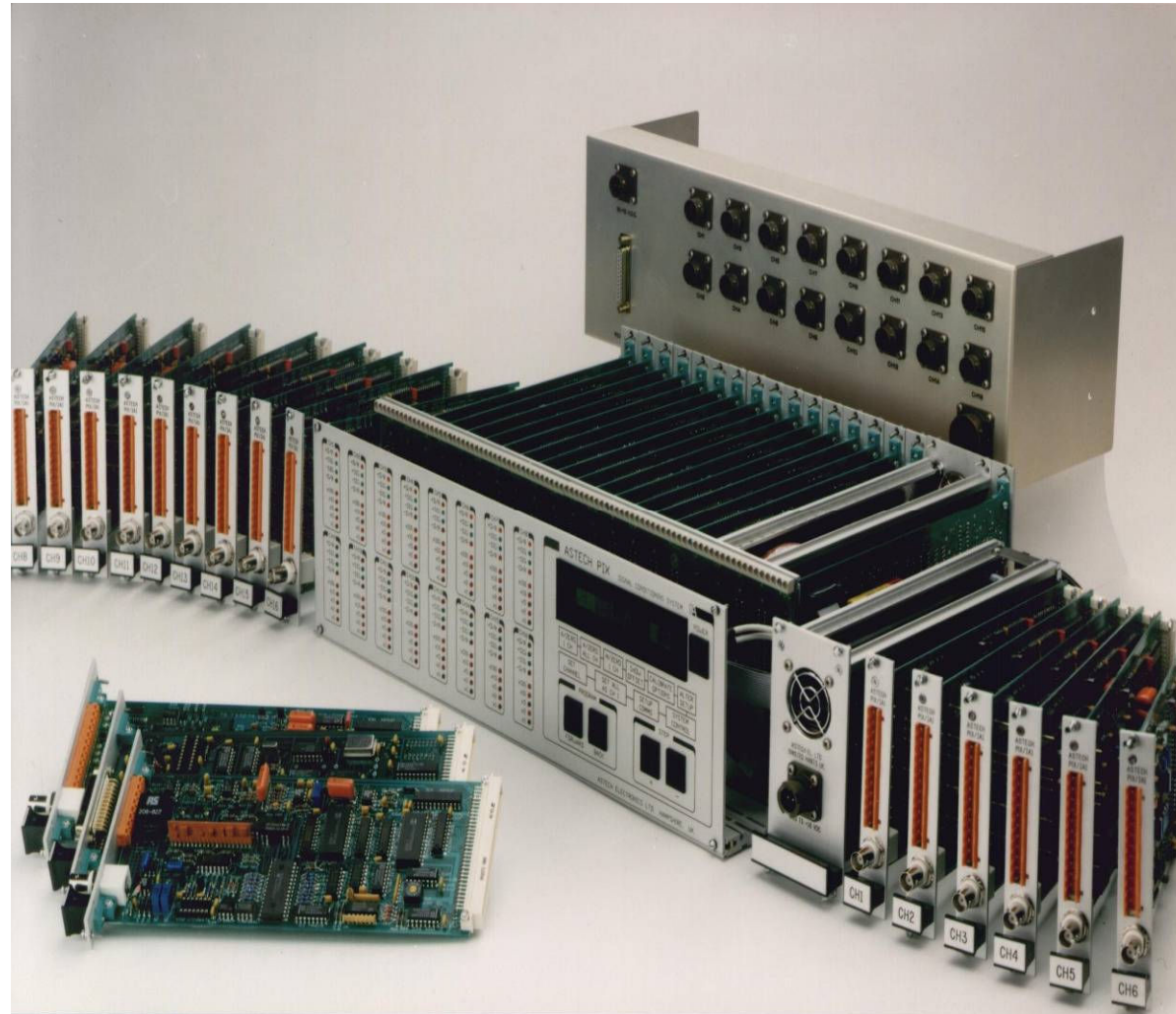




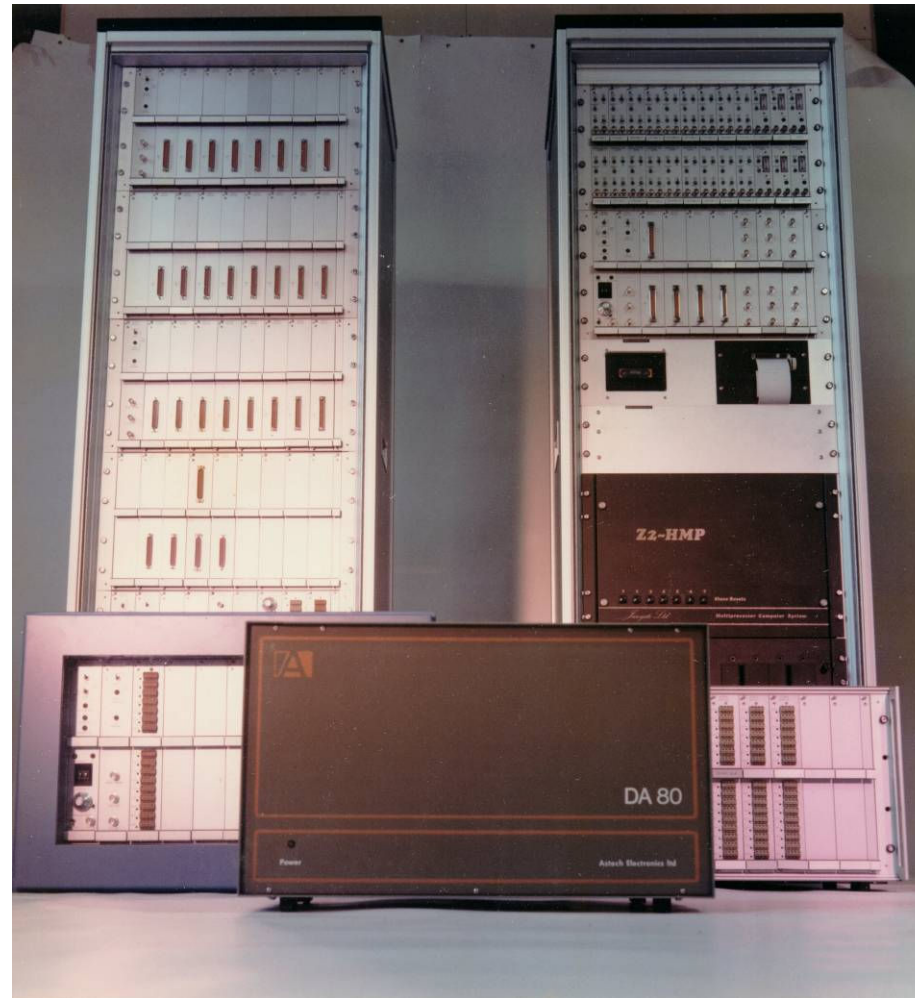
TYPICAL SHAFT INSTRUMENTATION



ARM DATA LOGGER AND WATERPROOF VARIANT



## COMPUTER INTERFACING DATA ACQUISITION EQUIPMENT



EXAMPLES OF LARGE SCALE DATA ACQUISITION SYSTEMS  
(COMPUTER CONTROLLED)





ONE QUARTER OF THE 810 CHANNEL (WORLDS LARGEST PCM ROTARY TELEMETRY SYSTEM)



30 MULTI-CHANNEL TRANSMITTERS ON 0.9 METRE  
DIAMETER CARRIER BEFORE INSTALLATION IN SPIN RIG.  
THE WHOLE ASSEMBLY IS SUSPENDED ON A 20mm  
DIAMETER SHAFT.



THE TRANSMITTER ASSEMBLY IS LOWERED INTO THE SPIN RIG CONTAINMENT CHAMBER. THE INDUCTIVE POWER STATOR IS SUSPENDED ABOVE THE TRANSMITTER ASSEMBLY.



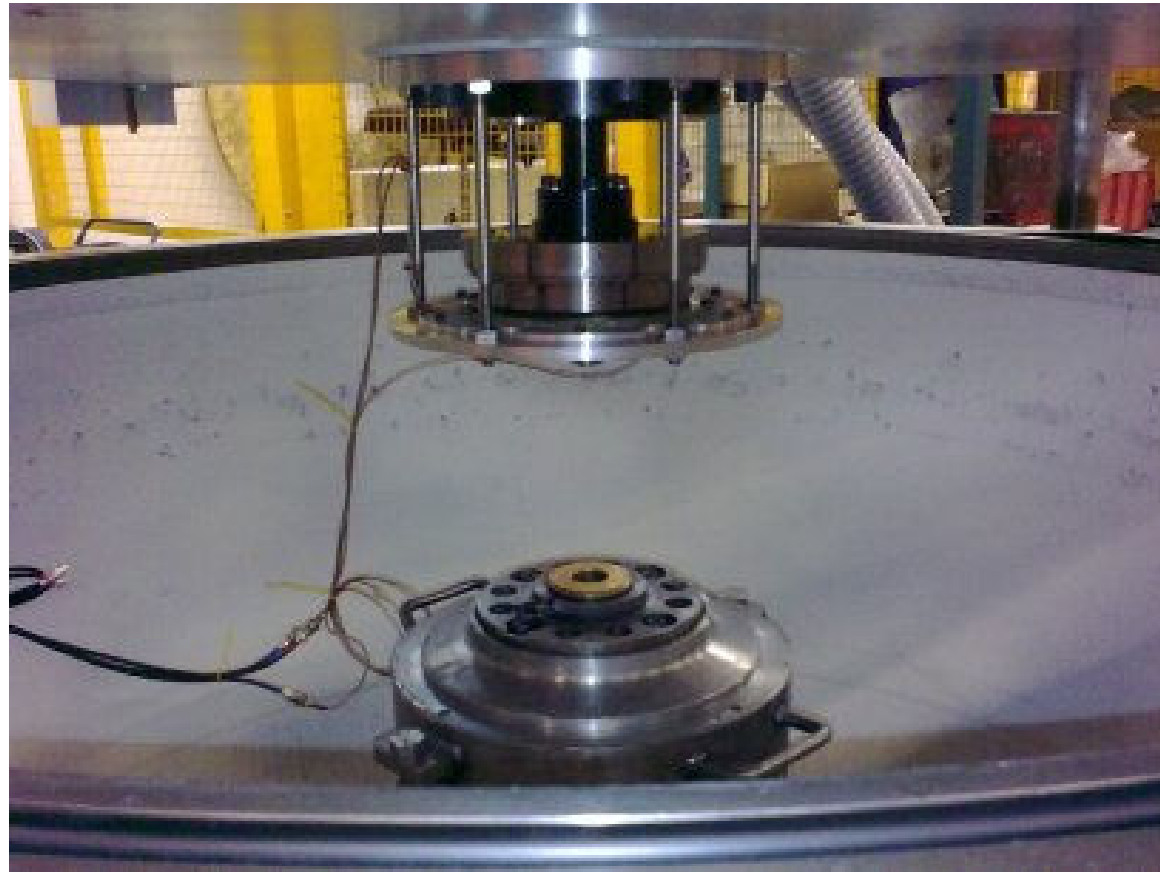


CUSTOMER LOADING UP SYSTEM TO TAKE TO FIRST TEST IN SOUTH WALES POWER STATION





82 CHANNEL TELEMETRY SYSTEM FOR AIRCRAFT GAS TURBINES. STRAIN AND THERMOCOUPLE TRANSMITTERS IN TITANIUM CARRIERS, TOGETHER WITH INDUCTIVE POWER AND SIGNAL PICKUP STATOR RINGS.



AIRCRAFT GAS TURBINE SYSTEM BEING LOWERED INTO SPIN RIG AT ELLIOTT TURBO-MACHINERY WORKS. INDUCTIVE POWER STATOR IS SUSPENDED BELOW THE TRANSMITTER ASSEMBLY



MONITORING SYSTEM DURING GAS TURBINE TELEMETRY  
SPIN TEST



EVEN THE M.D. HAS TO WORK OCCASIONALLY!





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