



Since its inception in 1978 ROTADATA has been committed to providing cutting-edge technological solutions for the many and varied instrumentation problems encountered by its customers World-wide.

ROTADATA is well known for high quality instrumentation of complex turbo-machinery parts as well as providing complete Turn-Key solutions for Digital Telemetry, Pyrometry, Tip clearance and Probe Traversing systems. This is maintained by our continual heavy investment in Research and Development.



Hundreds of successfully completed instrumentation projects have been delivered to a wide range of customers world-wide. These include:-

ABB Stal, Sweden	DERA, UK	Korean Aero. Res.Inst., Korea	Serck Aviation, UK
ABB Power Gen., Switzerland	Deritend, UK	Land Infrared, UK	Siemens, Sweden
Abbey Panels,UK	DLR, Germany	LMZ, Russia	Siemens, UK
Accrofab, UK	Dynamic Ceramics, UK	LSS, Germany	Siemens, Germany
Acrumac, UK	European Gas Turbines, UK	Mal Tooling, UK	Snecma, France
Aero Stranrew, UK	Fiat Avio, Italy	MAN Turbo, Germany	Solar, USA
Agilis, USA	Gaugemaster, UK	MDS, Aero, USA	Sourcerer, UK
A.I.D.C., Taiwan	G.E. Aircraft Engines, USA	MHI, Japan	South African Air Force, South Africa
Aircraft Research Ass., UK	GE Energy Systems, USA	Micro Craft, USA	Sverdrup technology, USA
Alfa Romeo, Italy	GE Power Systems, USA	Minta, UK	Teledyne-Continental Motors, USA
Allied Signal (Garratt), USA	GEC/Alstom Turbine Gen., UK	MHI, Japan	Tom Walkinshaw Racing, UK
Alstom, France	GHH Borsig, Germany	M.T.U., Germany	Toshiba, Japan
ATC, UK	GTRE, India	Nasa, USA	Toyota, Japan
Atlas Aviation, South Africa	Hindustan Aero. Labs., India	Nat. Research Council, Canada	Turbomeca, France
Aviadvigatel, Russia	Hitachi, Japan	Northrup-Grumman, USA	Ulstein Turbines, Norway
B&F Sales,USA	Holset, UK	NPO Saturn, Russia	United Technologies, USA
Barthelemy, France	Honda, Japan	Nuovo Pignone, Italy	Vickers, UK
Belcan, USA	Honeywell, USA	Patterns, UK	Victrex, UK
Benetton Formula 1, UK	Howco, UK	Pratt & Whitney, USA	Volvo Aero Corporation, Sweden
BMW - Rolls Royce, Germany	Hurel Dubois, UK	Qantas Airways, Australia	Watts & Shepherd, UK
Boeingsiag, USA	IAE, USA	QinetiQ, UK	Westinghouse Electric Corp., USA
British Aerospace, UK	Instrumach, South Africa	RAF St. Athans, UK	Williams Racing, UK
Brush Traction, UK	IHI, Japan	Renault Automobiles, France	Wright Patterson Airforce Base, USA
Bulwell Engineering, UK	IHI Turbo-chargers, Japan	Rolls-Royce, Germany	YanmarDiesel, Japan
CAPI, China	Industria de Turbo Prop., Italy	Rolls-Royce Indianapolis, USA	
Caterpillar, USA	ITP, Spain	Rolls Royce, UK	
Centrax, USA	Japanese Aerospace, Japan	Rover Cars, UK	
CGTE, China	Jaguar Cars, UK	SAFOP, Italy	
CIAM , Russia	KHI, Japan	Samsung Aerospace, Korea	
Cranfield University, UK	Kawasho, Japan	SARI, China	
Cullum Detuners, UK	Kobe Steel, Japan	Saudi Arabian Airlines,	



Optical Pyrometers

ROTADATA provides a range of standard and unique instrumentation products, including specialized design, engineering and installation services



High & Low Temperature Strain Gauging

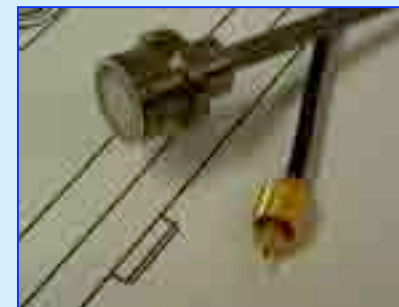
ISO 9001:2000 Accredited
Approved supplier to OEMs world wide



Digital Telemetry Systems



Aerothermal Rakes and Probes



Tip Clearance



DIGITAL TELEMETRY





DIGITAL TELEMETRY SYSTEM TYPES

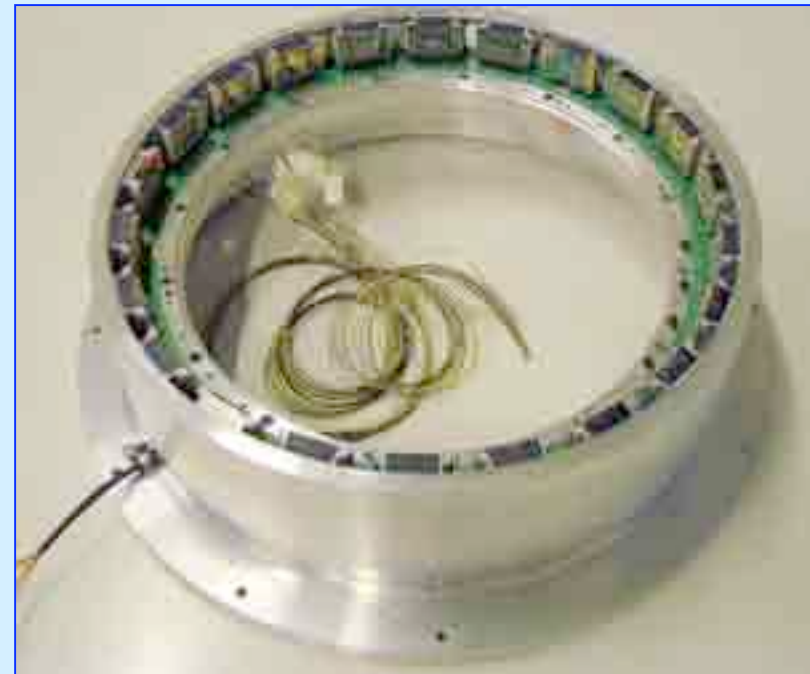
OPTICAL DATA TRANSFER

Used when access to the shaft end is possible



FM (Radio) DATA TRANSFER

Used around the shaft when no access to end of shaft is possible





ROTATEL End Of Shaft Applications using Optical Data Transfer

- *Turnkey system operating at speeds up to 25,000 rpm*
- *Up to 48 simultaneous strain channels at 42kHz*
- *Up to 216 steady state signals*
- *Data transfer rates up to 60Mb/sec*
- *Lower noise, an order of magnitude better than slip rings*
- *10 times operating life of high-speed slip rings*
- *Calibrated & pre-tested before shipment*
- *Independent IBA; plug and play connection allows multiple use on different vehicles*
- *Low cost of ownership over several tests*
- *Modular construction enables easy maintenance and system upgrades*





ROTATEL CASSETTE CONCEPT

5 cassettes per rotor

4 modules per cassette

1 cassette for system overheads

4 cassettes for signal handling

Each cassette reads:

12 simultaneous dynamic strains

*(or 4 x 12 multiplexed dynamic strains –
manual switch between A-B-C-D selections)*

Or 54 Thermocouple / pressure / DC signals

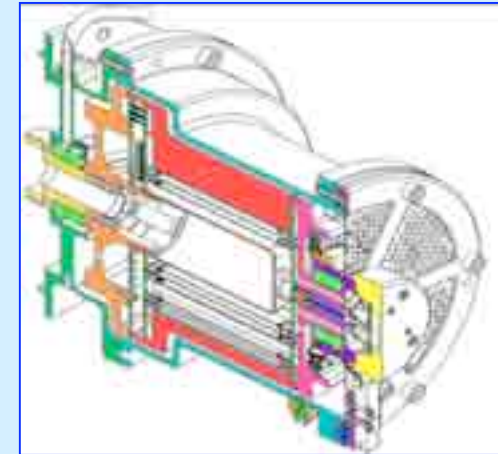
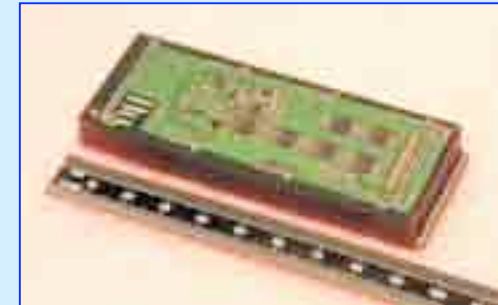
*Many other configurations available to suit
particular application*





RITATEL End Of Shaft Applications using Optical Data Transfer

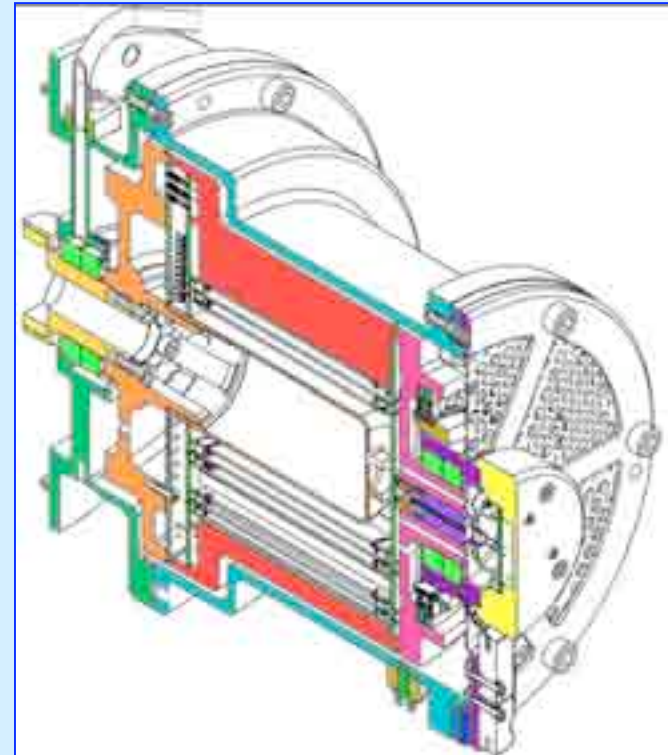
- *New Generation **RITA** Modules*
- *96 Simultaneous Dynamic Strain channels at 50KHz.*
- *Plus 112 steady state signals*
- *Data transfer rates over 620Mb/sec*
- *Lowest noise, order of magnitude better than slip rings*
- *10 times operating life of high-speed slip rings*
- *Calibrated & pre-tested before shipment.*
- *Independent IBA; plug and play connection allows multiple use on different vehicles*
- *Low cost of ownership over several tests.*
- *Modular construction enables easy maintenance and system upgrades*





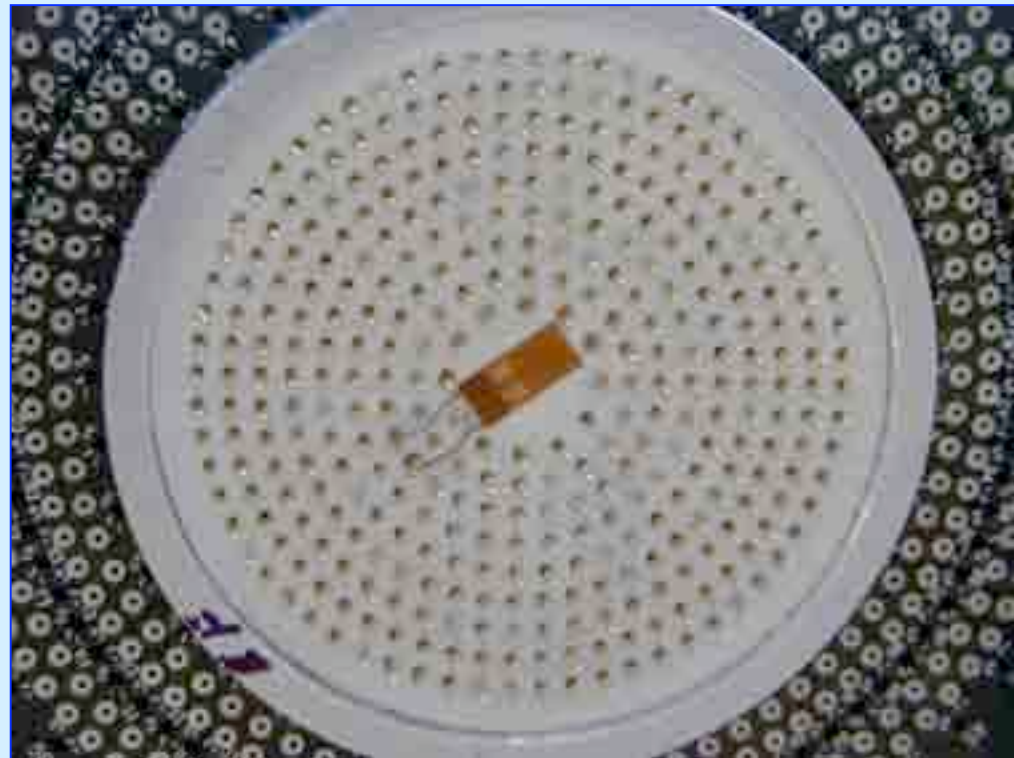
RITATEL Telemetry

- *96 simultaneous channels of dynamic strain @ 50KHz*
- *PLUS 112 channels of thermocouples / DC signals*
- *Small size / weight*





Interconnecting 'Hedgehog' used between the Intermediate Bearing Assembly (IBA) which is fitted to the vehicle with all instrumentation wires terminated to the connector PCB within the IBA, and the Telemetry unit itself. The pins are 'floating' gold plated for minimum noise and the assembly is made as an isothermal disc of Aluminium Nitride with integral temperature mat for accurate cold junction temperature compensation.





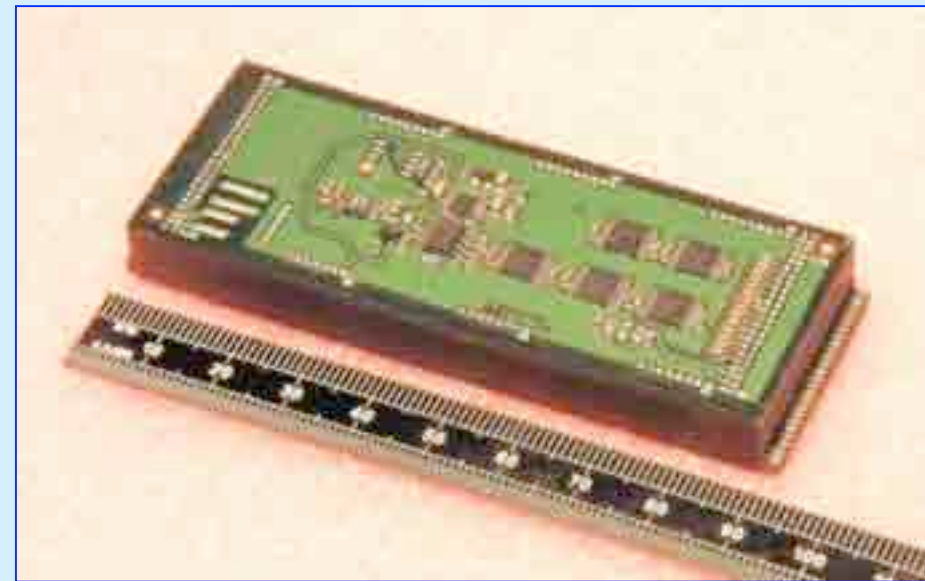
The Details:-

- *Based on the **R**otadata **I**ntegrated **T**elemetry **A**ssembly*
- *Each **RITA** is a complete multi-channel telemetry sub system with its own built in Power Supply*
- *Data transmission by Optical laser using advanced telecommunication techniques at over 620MB /sec*
- *Lightweight components used throughout*



RITA module

- *12 Channel Dynamic Strain @ 50KHz*
- *14 T/C Channels*
- *Encapsulated*
- *Self contained PSU*
- *Small size*
- *Light weight*

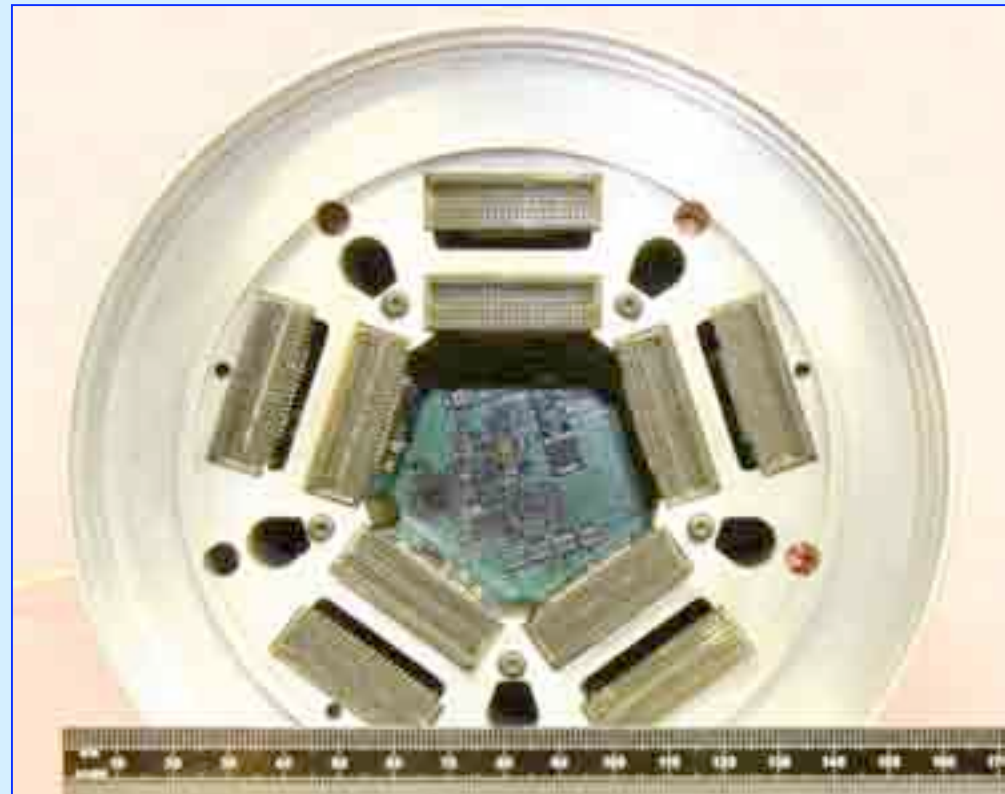




RITATEL

Telemetry Assembly

- *Provision for up to 10 **RITA**'s*
- *Lightweight construction*
- *Simple plug on / plug off interconnection to test vehicle*
- *High 'G' loading capability*





Other Customized Solutions

Example:-

Designed for LOX Turbo Pump on
Vulcain II - ESA's Ariane Launch Vehicle

- *Survived Installation in turbo-pump exhaust cone, (ultra hostile environment)*
- *Cryogenic to 600°C in < 2 Sec*
- *Angular Acceleration 0 to 14,000 rpm in < 2 Sec*
- *Off the scale acoustic noise*
- *12 Simultaneous Dynamic Strain signals & 10 Temperatures*
- *Clean Optical Data Transfer for low signal noise*
- *300m cable length to ground station*





High Speed Telemetry Unit *Up To 50,000 rpm*



*Power Supply
Module*

*12 Channel
Dynamic
Strain Module*

*8 Channel
Thermocouple
Module*

*4 Channel Static
Strain Module
(Auto Balance)*

HYPERTEL Telemetry Unit *Up To 100,000 rpm*



*HYPERTEL
12 Channel
Dynamic
Strain Module*



High Speed & HYPERTEL Telemetry Systems

For End of Shaft Applications

Operating speeds of 50,000 rpm and 100,000 rpm respectively

Up to 12 simultaneous channels dynamic strain with 50 kHz bandwidth

Up to 8 Thermocouple channels

Up to 4 Static Strain Channels with Auto Balance (High Speed Unit only)

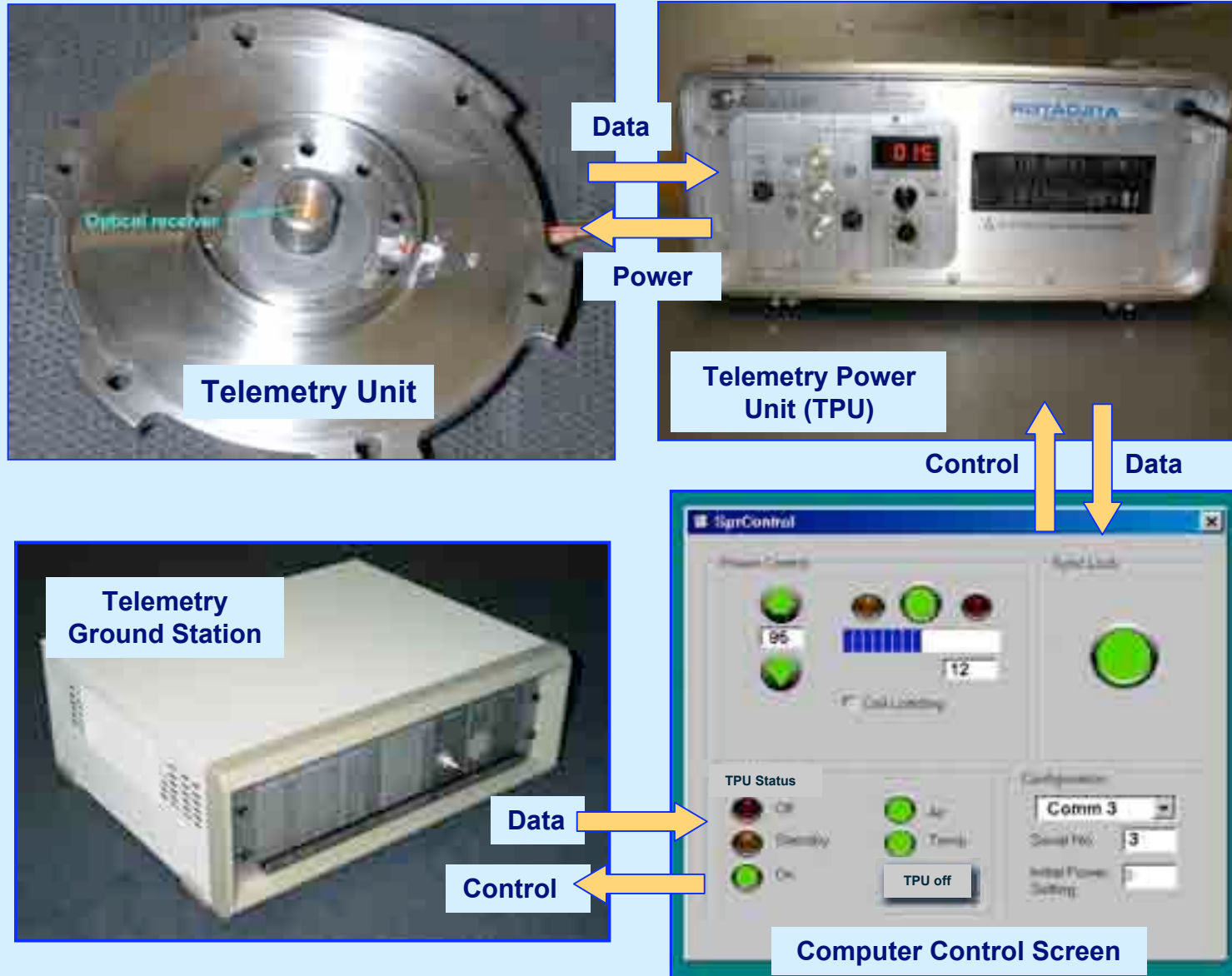
Optical data transfer for greatest signal to noise ratio

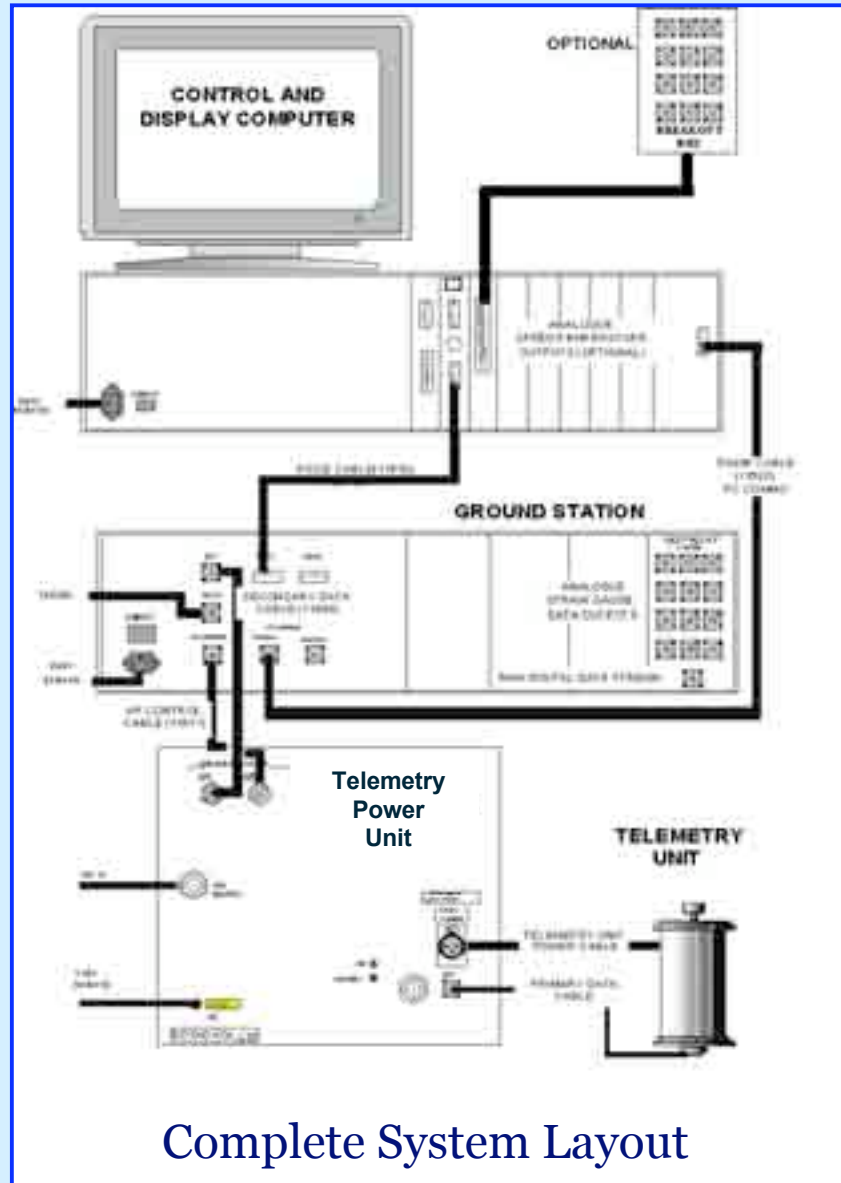
12 bit digitisation of data for increased accuracy

Independent IBA – Enables use on different vehicles

Quick assembly with engine

Designed for long life

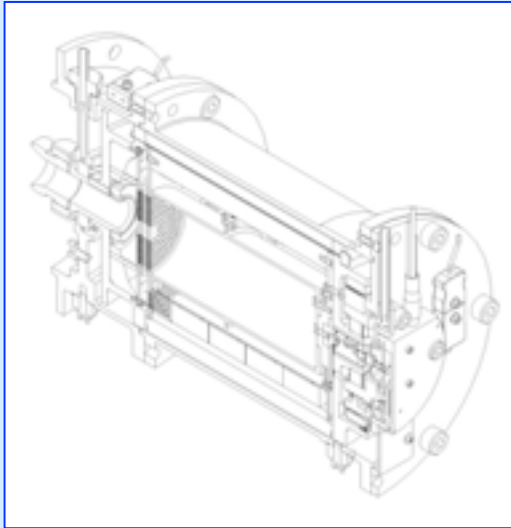




Prototype system :
 10 Dynamic Strain @ 13KHz,
 10 Temperatures.

First Developed system :
 12 Dynamic Strain @ 20KHz.
 10 Temperatures.

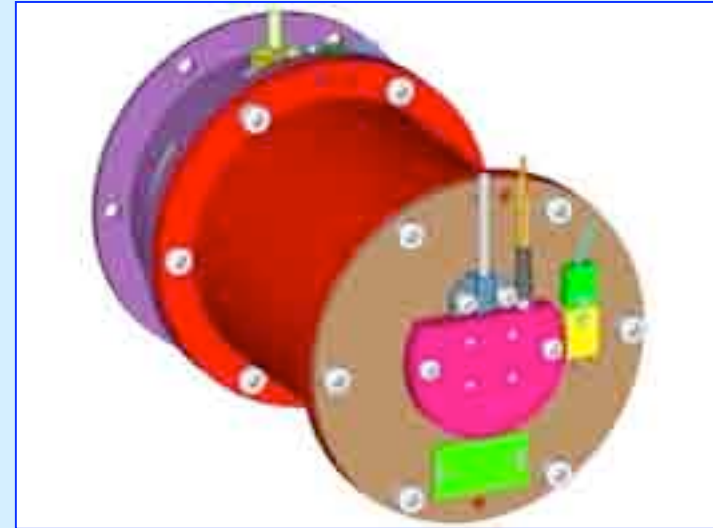
Latest systems :
 Up to 96 Dynamic Strain
 @ 50KHz.
 Up to 112 Temperatures.



From Design



To Full 3D Model



To Complete



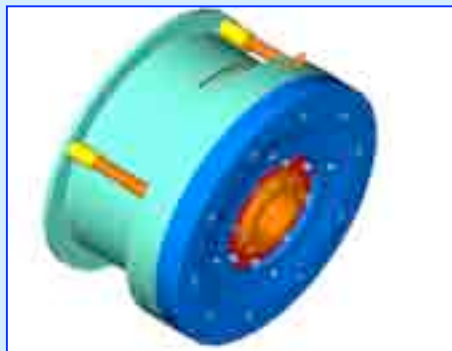
Tested and Calibrated Unit



Round The Shaft Applications

Using FM Data Transfer

- *36 simultaneous dynamic strain channels at 30KHz*
 - *216 steady state temperatures and pressures*
 - *Multiplexed outputs expanded to 144 dynamic channels. i.e. 4 carriers with 36 channels on each*
 - *Plug-in modular construction*
 - *Multi-layer PCB designed for minimum signal cross-talk and low noise*
 - *Fully integrated design using CAD –CAM and other design tools*
-
- *3D model and full stress analysis at initial design stage*





*OLD interconnection method
Uses hand wiring. Prone to
cross-talk, noise, wiring
errors and excessive
assembly time.*

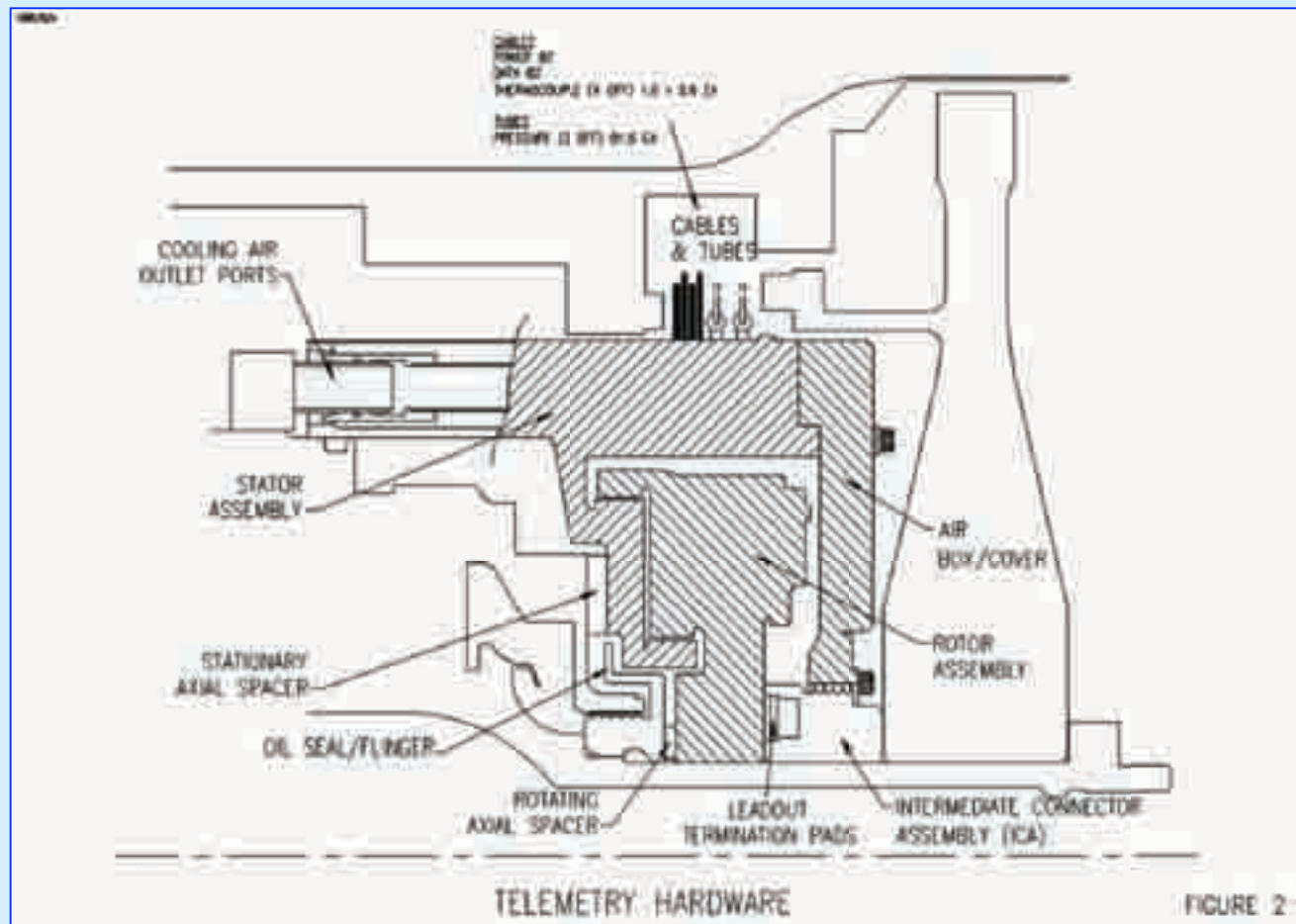
*NEW **ROTADATA** method uses low-noise multi layer PCB plug in interconnection system giving:-
Faster assembly time – design can be checked **BEFORE** the boards are manufactured – eliminating errors.
Low noise and channel cross talk.
Easy maintenance – module plug and swap.*





ROUND THE SHAFT TELEMETRY

(Typical installation)





Rotadata Advanced Turbine Engine Telemetry

1. **RITATEL**, *Up to 25,000 RPM – 96 Simultaneous Dynamic Channels plus up to 112 Thermocouples*
2. **High Speed**, *Up to 50,000 RPM – 12 Simultaneous Dynamic Channels plus 8 Thermocouples + 4 Static Strain (Auto Balance)*
3. **HYPERTEL**, *Up to 100,000 RPM – 12 Simultaneous Dynamic Channels plus 8 Thermocouples*

Dynamic Channels - 50kHz Bandwidth - all channels simultaneously

Ultra-low noise at all frequencies

Only raw signals transmitted (no filtering necessary)

1000 hours endurance

Lowest ownership cost due to multi-test applications and turn-key supply

Plug and Play connectivity

4. **E-Pinca**, *Custom designed systems for Round the Shaft (LP, HP Compressor) applications*



Some of the many **TELEMETRY INSTALLATIONS**

- *Rolls-Royce Aero Rigs (2) & HTDU (Including Video Transmission)*
- *ANTLE HP Compressor Rig*
- *ITP HP/IP Turbine Rig + TP400*
- *SNECMA M88 Core engine (2)*
- *AVIO – Ariane Lox Turbo-Pump (installed in exhaust cone) (2) + High Speed*
- *IHI CF34-10 Engine (installed in exhaust cone)*
- *Rolls-Royce Military (9)*
- *Rolls-Royce Pegasus*
- *NPO Saturn*



ROTADATA have over 25 years experience in all types of telemetry – Analogue, Digital, RF and Optical using inductive or Rotational Battery Power

Licensed technology from Rolls-Royce who have 1000's of man years of experience in radio telemetry

Mechanical and Electronic design teams to help you with every detail of the installation including any specialised instrumentation requirements

Highly trained and skilled technicians to install and help with your telemetry data acquisition