



株式会社 インターナショナル・サーボ・データ

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Slip Ring Technologies

[aerodyn-global.com](https://aerodyn-global.com)





# WELCOME

Aerodyn are suppliers of instrumentation services and products, predominantly used in the development of turbomachinery for aerospace, power generation and industrial applications.

We offer global coverage through our facilities located worldwide and our global network of representatives.

**World class, high precision, turnkey instrumentation, manufacturing, design and analysis, assembly and test**

## **Specialists in:**

Design and Analysis

Precision Manufacturing

Instrumentation

Assembly

Slip Rings

Component and Subsystem Test

In-house and On-site Validation  
and Test Support

## **Our facilities include:**

State of the art Instrumentation Labs

Machine Shops

In-house Test Capabilities

# ABOUT US

04  
LOCATIONS  
WORLDWIDE

04  
GLOBAL  
REPRESENTATIVES



100K<sup>SQ.FT</sup>  
COMBINED SPACE

100+  
EMPLOYEES

\$25M  
TURNOVER

# LOCATIONS

## Expert capabilities across 4 locations

Consultancy

Design

Analysis

Project Management

Instrumentation

Manufacturing

Slip Rings

Subsystem Test

Flight Test Support

Rig Assembly

Gas Stand Testing

Turbocharger and Compressor Testing

Flow Calibration

**Aerodyn  
Engineering LLC**  
Indianapolis, IN, USA



**Aerodyn Testing &  
Technology Centre**  
Whitestown, IN, USA



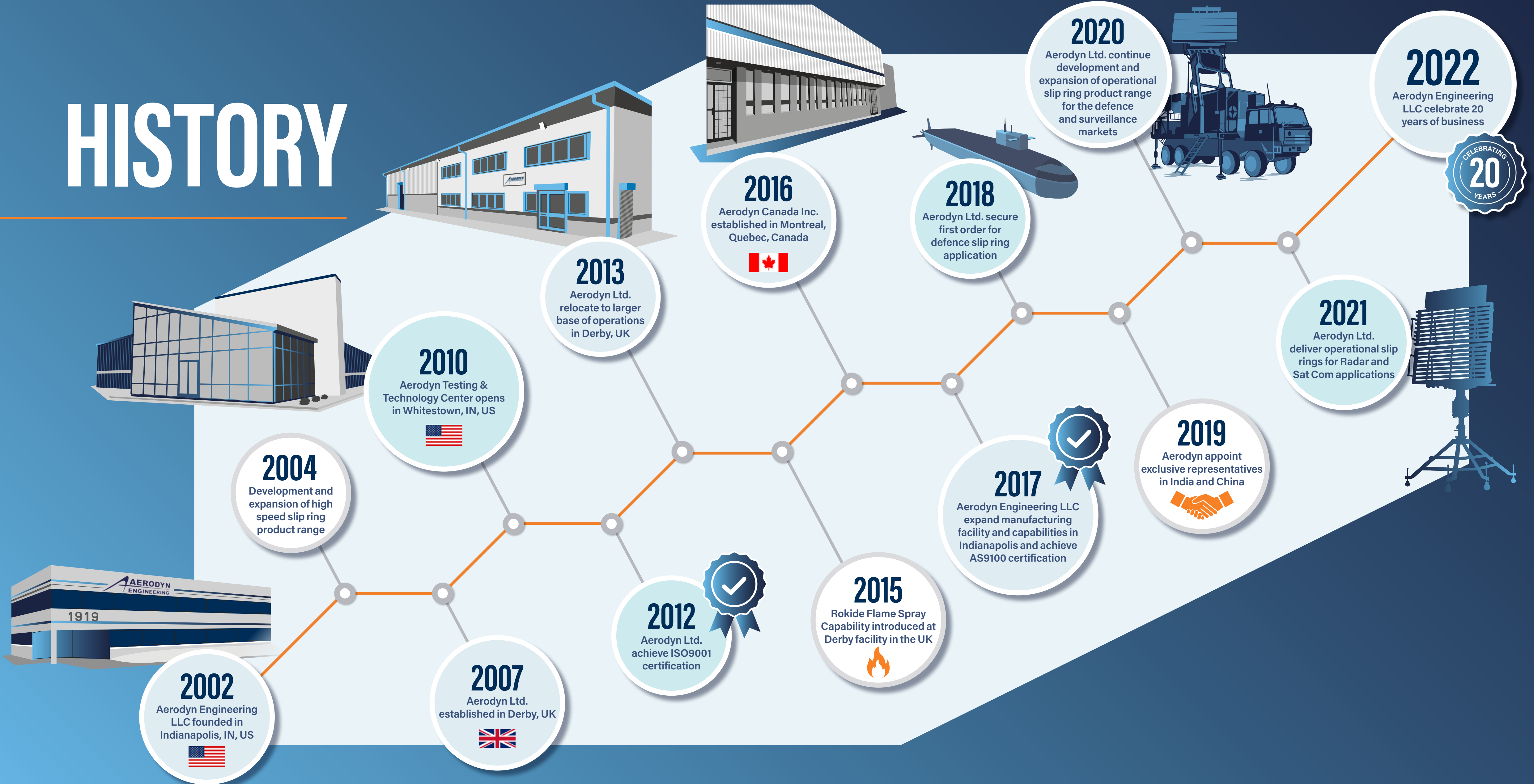
**Aerodyn Ltd.**  
Derby, UK



**Aerodyn Canada Inc.**  
Montreal, Canada



# HISTORY



# OUR VALUED CUSTOMERS

Aerospace

Power Generation

Industrial

Space

Defence

Automotive



# WHY WE'RE DIFFERENT

Turnkey solutions for all your Instrumentation and Testing needs...



ONE COMPANY...ONE SOURCE

# PRODUCT & PROCESS DEVELOPMENT

## Highly Experienced Engineering Support

Requirements / Specification  
Project Management  
Design  
Analysis  
Instrumentation  
Manufacturing  
Flight Test Support



Innovative technical  
solutions providing cost  
saving manufacturing,  
repairs and installations

New Product  
Introduction  
(NPI)

Reverse  
Engineering

Concurrent  
Engineering  
and First Article  
Programs

Tooling and  
Fixtures Design  
and Analysis

Design for  
Manufacture  
(DFM)

Prototype, Development  
and Low Rate Production  
Programs

## TOOLS

- › Siemens NX
- › Solidworks
- › ANSYS
- › Pro-E
- › Autocad
- › Gagemap
- › MastercamX-9
- › Calypso
- › Open Mind



# SLIP RINGS & ROTARY UNIONS

## STANDARD SIZES

16 Contacts to 744 Contacts

## OPERATING SPEEDS

Up to 150,000 rpm

## SIGNAL TRANSMISSION

Thermocouple

Strain Gauge (static and dynamic)

Pressure Transducer

RTD

Digital Signal

AC or DC Power

High Voltage

High Current

## HIGH DURABILITY

## LOW NOISE SIGNAL TRANSFER

<250 microvolts pk-pk noise  
at any discrete frequency  
(25mA drive current)

## BESPOKE DESIGNS

Pancake, Through Bore and Nosecone

2 Contacts to 1000 Contacts

Signal to High Power (1000+ Amps)

High Voltage (up to 100,000 Volts  
ring to ring)

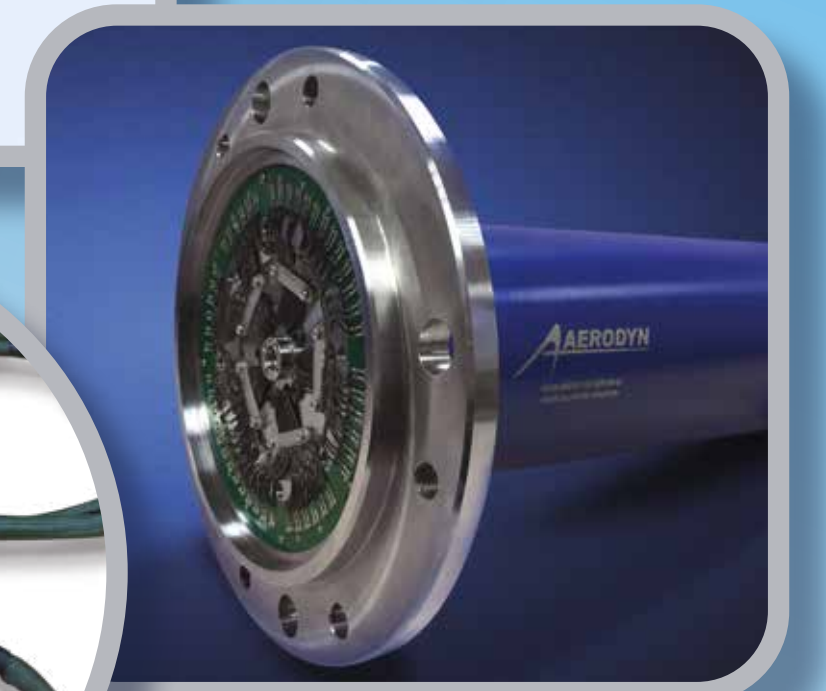
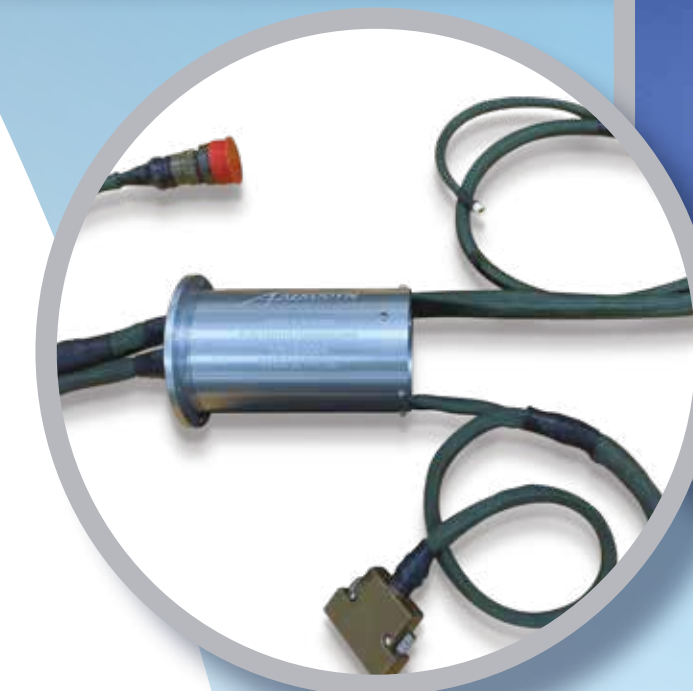
Integrated Rotary Union

Fibre Optics, RF or HF Union  
as required

Ethernet and Data Protocols

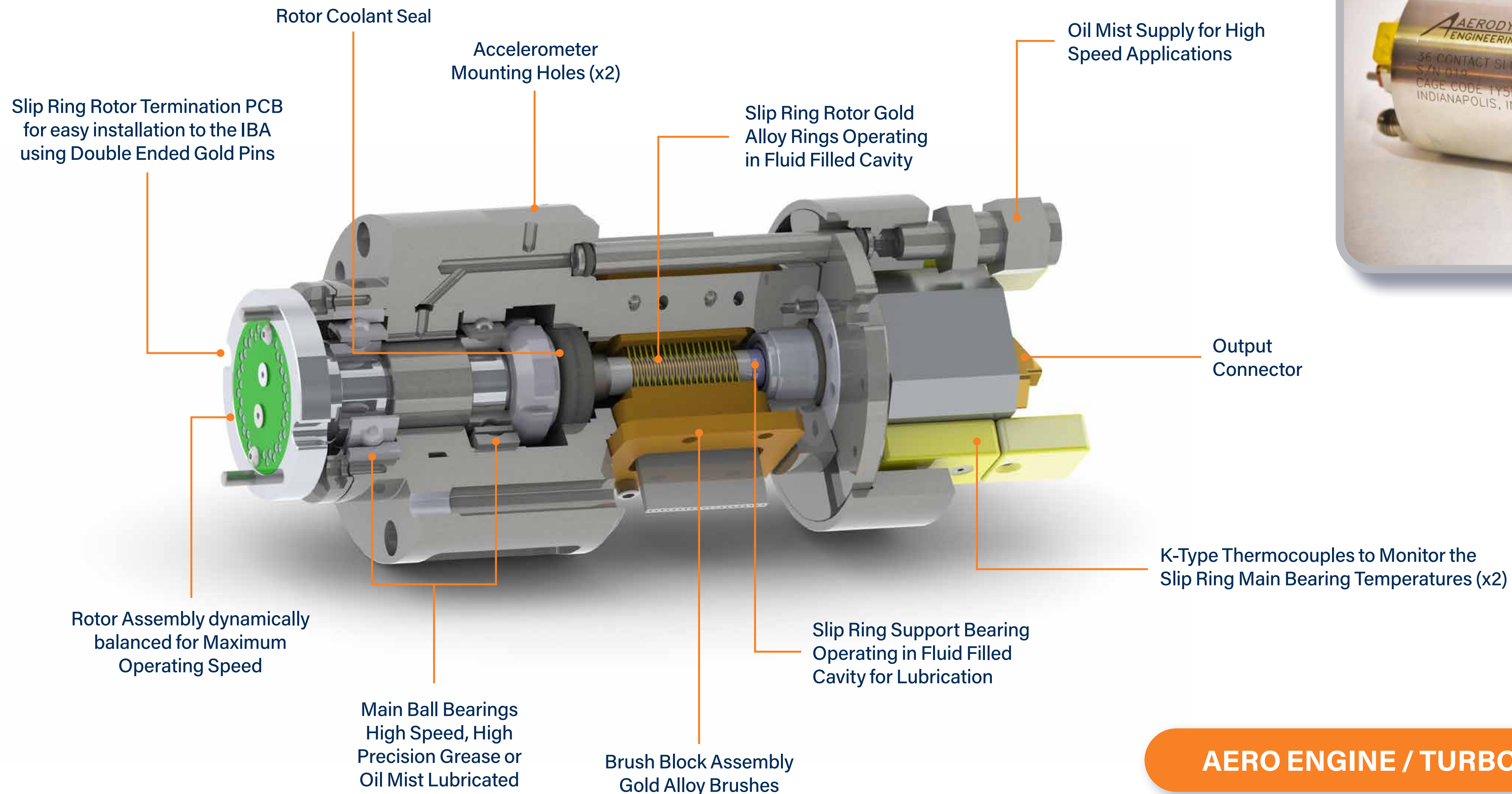
## NOISE MONITORING SYSTEMS

## SPIN TEST SERVICES



DESIGN | MANUFACTURE | TEST | INSTALLATION & ON-SITE SUPPORT

# STANDARD HIGH SPEED DATA QUALITY SLIP RINGS



**AERO ENGINE / TURBOMACHINERY TESTING**

# STANDARD HIGH SPEED DATA QUALITY SLIP RINGS

No. Rings (contacts)	Max. Speed* Grease (RPM)	Max. Speed* Oil/Air Mist. (RPM)
16	85,000	100,000
36	55,000	90,000
72	55,000	75,000
100	42,000	60,000
150	32,000	45,000
212	24,000	32,000
300	10,000	15,000
352	10,000	15,000
424	10,000	15,000
496	-	5,000
744	-	5,000

\*The maximum rotational speed is also very much dependent on the constant supply of a suitable recirculating cooling fluid to lubricate the contacts and remove frictional heat.



**AERO ENGINE / TURBOMACHINERY TESTING**

# STANDARD HIGH SPEED DATA QUALITY SLIP RINGS

## TYPES OF SIGNAL TRANSMISSION

Slip ring contacts are universal. They can be used for any type of sensor or power configuration

### SENSORS

Thermocouple  
Strain gauge  
(static and dynamic)  
Pressure transducer  
RTD  
Digital signal  
Virtually any electrical  
signal or sensor type

### POWER

AC or DC  
High voltage  
High current (combining  
multiple contacts)  
The slip ring can transmit  
signals, either from or to  
the test article



AERO ENGINE / TURBOMACHINERY TESTING

# COOLING CARTS

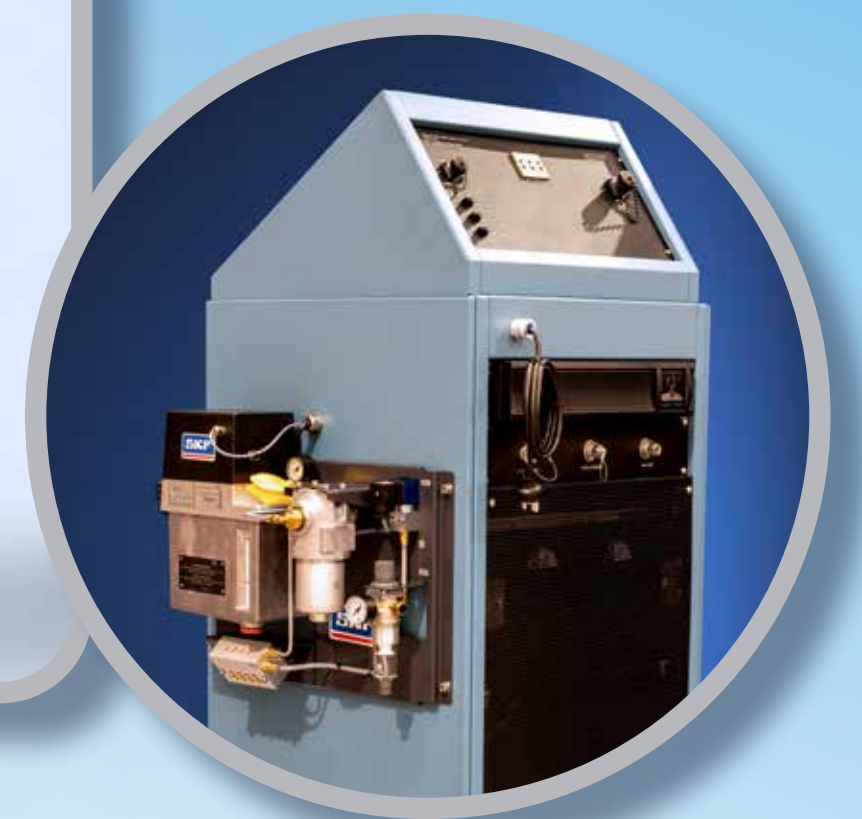
Standard or Refrigerated versions available for a range of ambient test conditions

Delivers filtered coolant directly to the slip ring ensuring long life

Integrated instrumentation showing flow rate and system pressures

On-board UPS in the event of site power failure and multiple alarms to safeguard investment in equipment

Optional lifting features for ease of positioning on-site



# NOISE MONITORS

64-channel (128 contact) dynamic noise measurement capability

Simultaneous data capture in 8-channel groups

Record and Playback data in time and frequency domains

Auxiliary Interface for flow, speed and temperature signals

Review data and generate reports

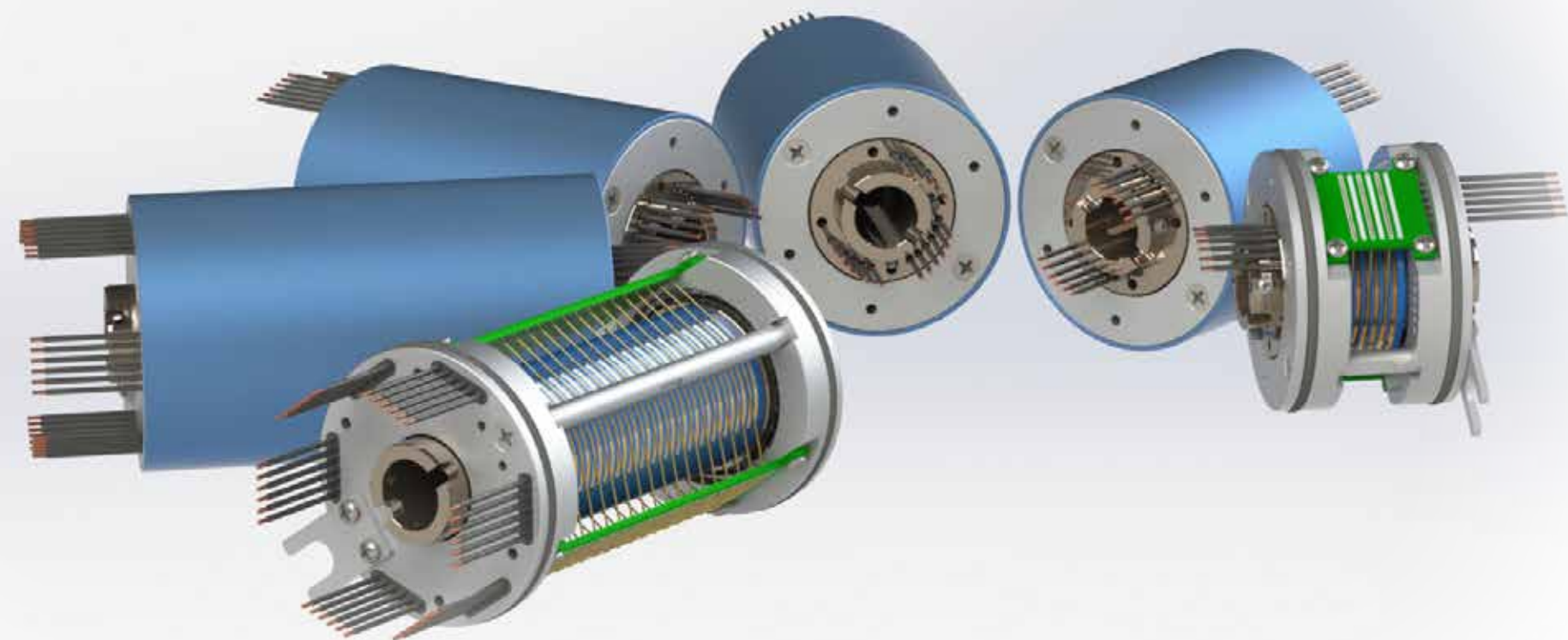


# STANDARD NON LIQUID COOLED SLIP RINGS

## ALCAP01

**Aerodyn have also developed a standard range of slip ring capsules for use in less harsh applications with typically lower speeds than those associated with gas turbine testing.**

These standard assemblies utilise contact material combinations that operate without the need for liquid cooling. Data sheets for our standard assemblies can be supplied on request.



### ALCAP01 - SERIES: HARD GOLD PLATED RINGS, GOLD ALLOY BRUSHES, MULTI-STRANDED #22 AWG ETFE LEAD WIRES

#### Description

The ALCAP01 Slip Ring is suitable for signal or low power applications. It features gold alloy wire brushes running on compatible hard gold plated rings. It is available with an IP54 or IP67 enclosure. The Capsule can be shaft mounted or, alternatively flange mounted leaving the 12.7mm H10 fit bore free for the passage of other media lines (fluid, gas or fiber optics).

#### Electrical

- › No. of Rings: 6, 12, 18, 24, 30 or 36 as standard
- › Current: 5 Amps per ring standard
- › Voltage: up to 250 Volts standard
- › Insulation Resistance: >200MΩ at 500 VDC
- › Hipot: 500 VAC for 15 seconds (all combinations)
- › Electrical Noise: Less than 10MΩ peak at 25 rpm

#### Non-Standard Modifications

- › Optional Rotor or Stator flanges
- › Mount/drive arrangement to suit customer's requirements
- › Higher current and voltage capacity (internally modified)
- › Can be supplied with Integrated Rotary Union, RF or Fibre Optics
- › Lead type and lengths to suit customer's requirements
- › Alternative materials for harsh environments

#### Mechanical

- › Contacts: Gold Alloy Brushes on Hard Gold Plated Rings
- › Housing: Anodised Aluminium and Shaft: Aluminium with E-Nickel
- › Leads: #22 awg, ETFE insulated, 300mm long standard
- › Operating Speed: 700rpm maximum - intermittent
- › Life: 10 x 10<sup>6</sup> revolutions minimum

*\*Please note that operating life of Capsule is dependant on rotational speed, environment and temperature*

**GENERAL PURPOSE INDUSTRIAL APPLICATIONS**

# STANDARD NON LIQUID COOLED SLIP RINGS

## ALCAP02

**Aerodyn have also developed a standard range of slip ring capsules for use in less harsh applications with typically lower speeds than those associated with gas turbine testing.**

These standard assemblies utilise contact material combinations that operate without the need for liquid cooling. Data sheets for our standard assemblies can be supplied on request.



### ALCAP02 SERIES: HARD GOLD PLATED RINGS, GOLD ALLOY BRUSHES, MULTI-STRANDED ETFE LEAD WIRES

#### Description

The ALCAP02 Slip Ring is suitable for signal or low power applications. It features gold alloy wire brushes running on compatible hard gold plated rings. It is available with an IP54 or IP67 enclosure. The Capsule can be shaft mounted or, alternatively flange mounted leaving the 25.4mm H10 fit bore free for the passage of other media lines (fluid, gas or fiber optics).

#### Electrical

- › No. Rings: 6, 12, 18, 24, 30, 36 or 48 standard
- › Current: 5, 10 & 15 Amps per ring standard
- › Voltage: up to 440 Volts standard
- › Insulation Resistance: >200MΩ at 1000 VDC
- › Hipot: 1000 VAC for 15 seconds (all combinations)
- › Electrical Noise: Less than 10 mΩ peak at 25 rpm

#### Non-Standard Modifications

- › Optional rotor or stator flanges
- › Mount/drive arrangement to suit customer's requirements
- › Higher current & voltage capacity (internally modified)
- › Can be supplied with Integrated Rotary Union, RF or Fiber Optics
- › Lead type & lengths to suit customer's requirements
- › Alternative materials for harsh environments

#### Mechanical

- › Contacts: gold alloy brushes on hard gold plated rings
- › Housing: Anodised Aluminium & Shaft: Aluminium with E-Nickel
- › Leads: 5A #22 awg, 10A #16 awg or 15A #14 awg, 300mm
- › Operating Speed: 500 rpm maximum – intermittent
- › Life: 10 x 10<sup>6</sup> revolutions minimum
- › Temperature Range: -35°C to +135°C

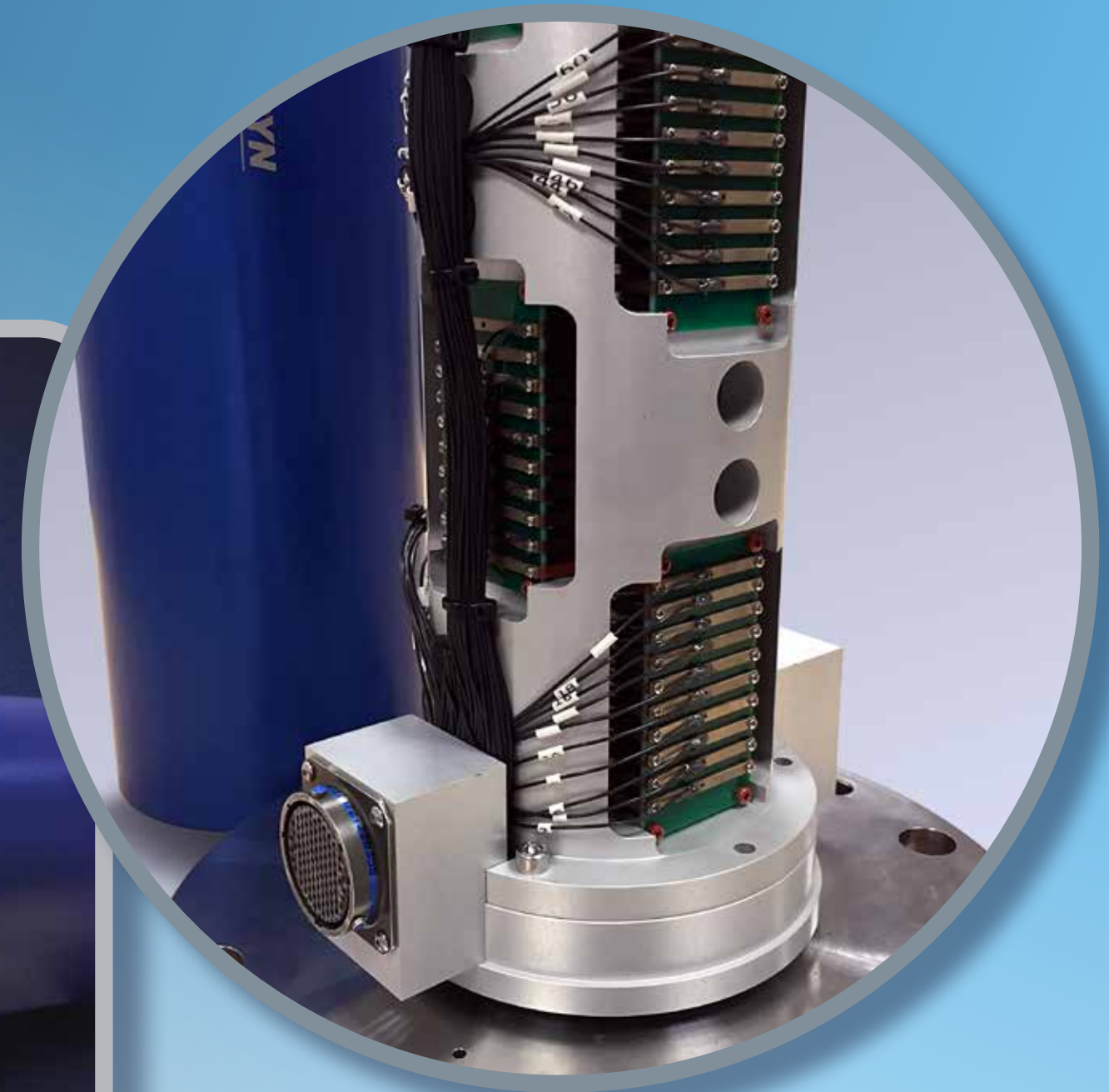
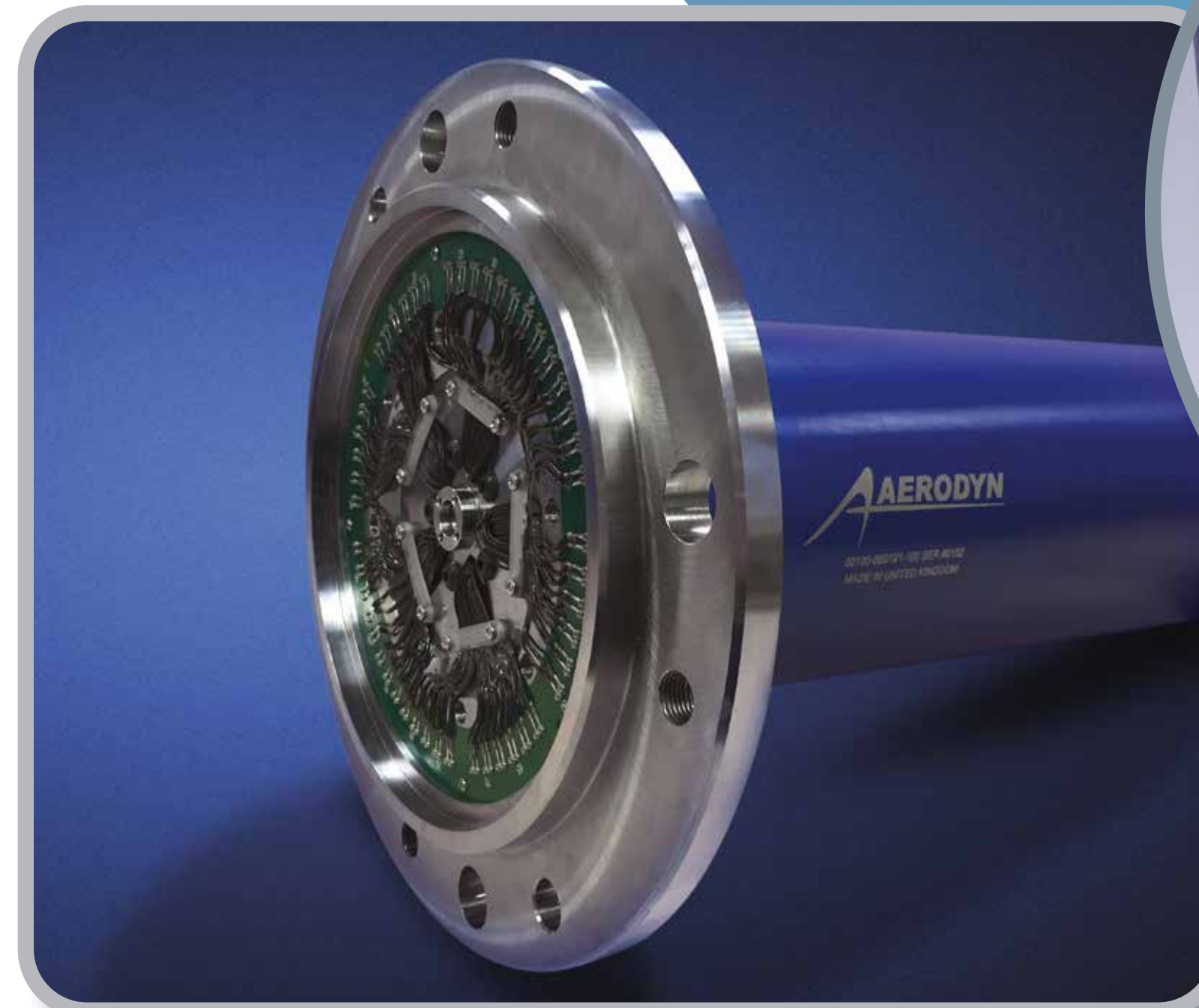
*\*Please note that operating life of Capsule is dependant on rotational speed, environment and temperature*



# CUSTOM NON COOLED SLIP RINGS

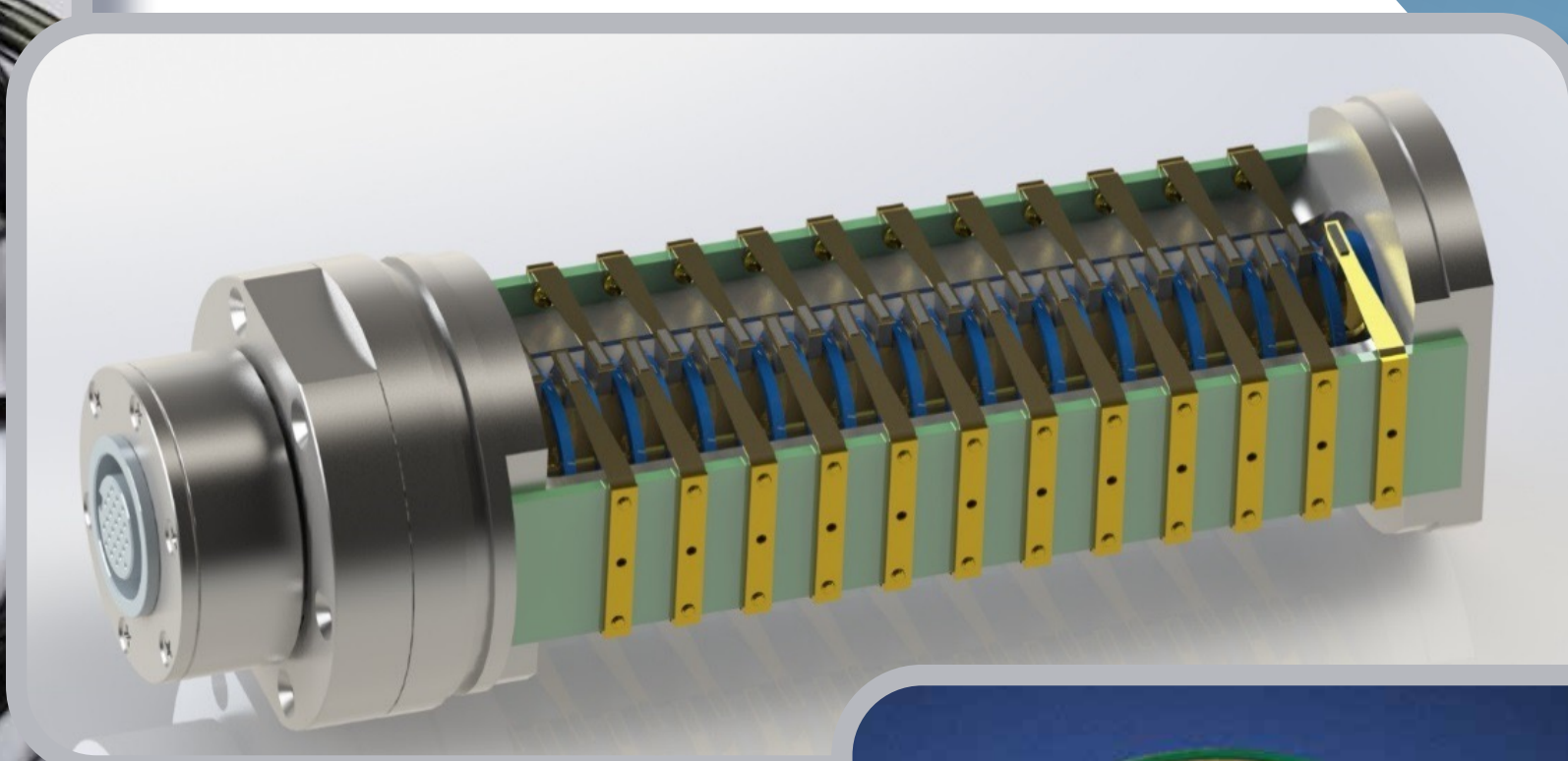
**Aerodyn also design and manufacture custom slip ring assemblies to suit Customer application requirements.**

Our slip rings can be supplied as part of a multimedia system with our own in house manufactured Fluid/Pneumatic Rotary Unions and or third-party sourced RF, HF or Fibre Optic Devices.



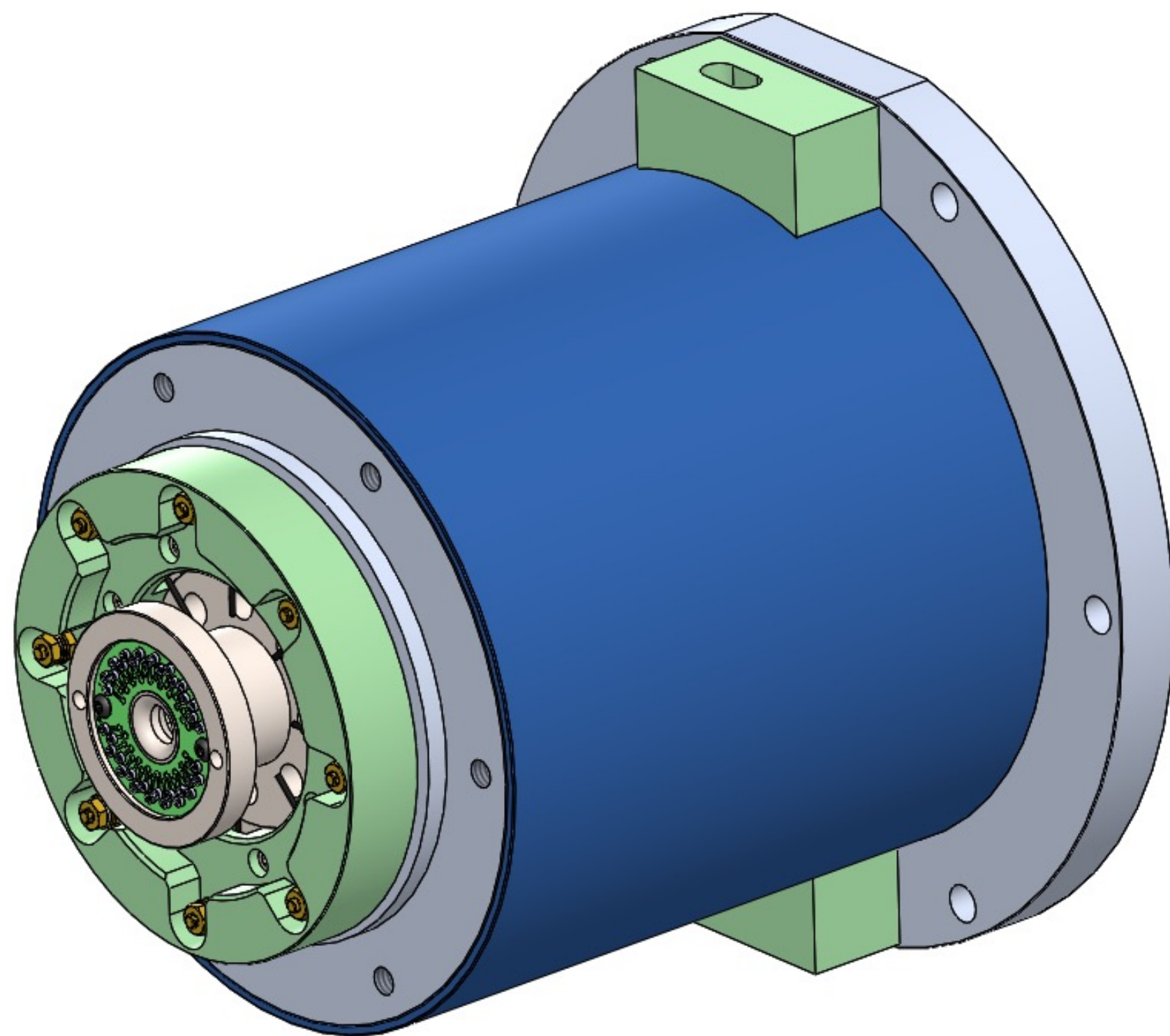
100 contact slip ring with silver graphite contacts running on hard gold plated rings – speed up to 4,500 rpm, no cooling.

# CUSTOM NON COOLED SLIP RINGS



TAILORED TO USERS NEEDS

# CUSTOM NON COOLED SLIP RINGS



Custom 8 way power slip ring  
with silver graphite brushes  
running on gold rings



36 contact, rental high speed data  
slip ring mounted to custom 8 way  
power slip ring on test

EXPLOSIVE CHARGE SIGNAL TRANSMISSION / BLADE-OFF TESTING

# DEFENCE & SURVEILLANCE SLIP RINGS

## DEFENCE SURVEILLANCE NAVAL PERISCOPE APPLICATION

156-way Gold-on-Gold Technology

Power

Signals

Gb Ethernet

4 x HD-Video

2 x RF (18GHz)

Multiple Unit Contract

Design, Qualification and Prototypes



NAVAL PERISCOPE APPLICATION

# DEFENCE & SURVEILLANCE SLIP RINGS

## ROTATING BASE JUNCTION (RBJ)

Design and Prototype Orders

Co-axial Slip Ring Modules  
(Signals on Inner module, Power on Outer)

Power, Ethernet and Discretets

Data Bus Comms

Bulkhead and Cable Mount Connectors

IP66



REMOTE WEAPON STATION TURRET

# DEFENCE & SURVEILLANCE SLIP RINGS

## INDIAN AIR FORCE

DC Power

Resolver signals

RS422 Data Bus Comms

Fully Connectorised

Thru-bore provision for 2-ch  
RF Rotating Joint (Kevlin)  
fitted by customer



LOW LEVEL LIGHT WEIGHT RADAR (LLLR)

# DEFENCE & SURVEILLANCE SLIP RINGS

## PLATTER / PANCAKE SLIP RING

6-way Pancake Style Slip Ring

Gold-on-gold contacts

Metal enclosure to maintain EMC requirements

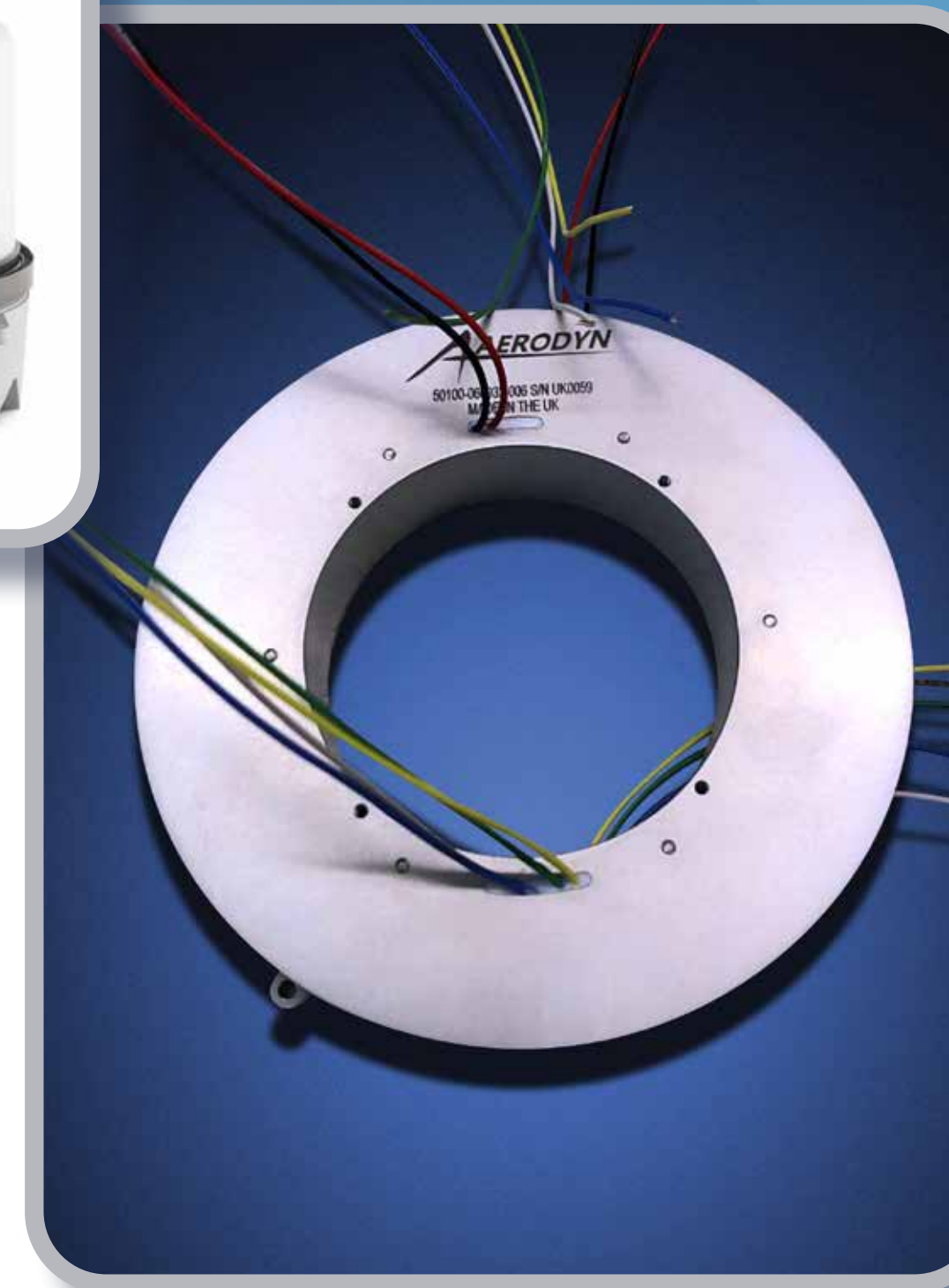
DC Power and signals

Tight space envelope with low height

Thru-bore for RF Joint

Reduced weight for airborne application

Multiple Units Delivered and in-service



SATCOM / SATELLITE-ON-THE-MOVE APPLICATION

# DEFENCE & SURVEILLANCE SLIP RINGS

## HYBRID SLIP RING ROTATING JOINT

175 Way Slip Ring

High Power AC and DC

Serial Comms and Gb Ethernet

Optical Encoder

20 Channels Fibre Optic Rotating Joint (FORJ)

2-Ch Fluid Media Joint

1-Ch Air

Environmental Qualification

3 systems ordered (Delivered Q1 2022)



GROUND BASED AIR DEFENCE RADAR



# LIVE PROJECTS

## ARTISAN BAE SYSTEMS RADAR - EXPORT

27-ch FORJ

3-ch RF (IFF)

Power and Signals

## TRACKING RADAR PEDESTAL SLIP RING - US AIR FORCE

94-way SRA

54mm thru-bore

## VARIOUS INDIAN MOD PROJECTS

Small radar, Multi-Media Slip Ring Rotary Joints

DESIGN | MANUFACTURE | TEST | INSTALLATION & ON-SITE SUPPORT





# THANK YOU

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We'd love the opportunity to discuss your next project

**PER EDWARDS**  
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