

# **THERMOCOAX**

*from vision to reality*

**Aeronautic  
&  
Defense**



Thermal and Temperature Measurement Solutions



# Our capabilities

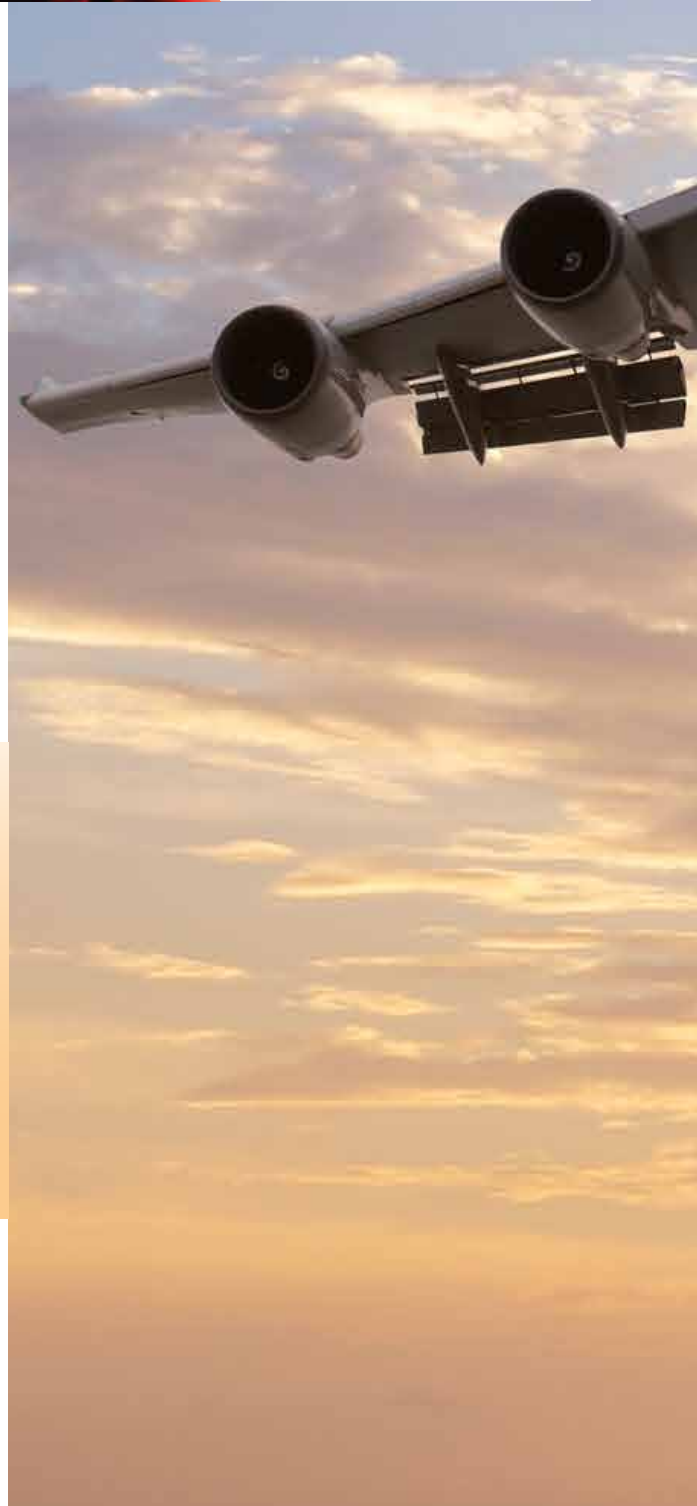
Our mission is to develop complete thermal solutions, through advance innovation : from conception to prototype development, all the way through to production.

Our custom thermal systems provide cleaner, cost effective and safer solutions :

- 3D design development
- Brazing (torch, vacuum brazing)
- Engineering solutions
- High temperature Ceramic/Metal brazing
- Temperature measurement
- Thermal simulation
- Thermal heating systems
- Customized development
- Welding (Laser, Plasma, TIG)




The industry's most trusted Mineral Insulated Cable



- Tier 1 supplier of Airbus, Dassault, Eurocopter
- Tier 2 supplier for Bombardier, Boeing, SAAB, Sukhoi, General Atomic, HAL, COMAC

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# In-house production of MI cable

## Applications

Anti-icing and heating for :

- Pitot tube
- Angle of Attack (AoA)
- Grey water Drain Mast
- Engine air inlet screen
- Nacelle edge, rudder and elevator horn
- UAV Camera lens
- Optronic pod gasket

Temperature for :

- Brake monitoring
- VF generator oil bearing
- Air cabin heat exchanger
- APU

Overheat detector for :

- Bleed air leakage detector

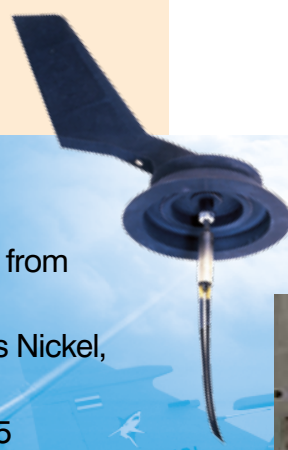
Ground equipment with :

- Temperature sensors for heat treatment furnaces qualified NADCAP
- Fuel heating systems for missile engine test bed

# Electrical Anti-Icing Systems

## Smart Heating Solutions for sensitive components

For many years THERMOCOAX has offered expertise in heating solutions to aerospace with unique designed systems. Our solutions are based on the Mineral Insulated Cable technology, developed and manufactured by THERMOCOAX to match the highest standards. Each anti-iced component is directly linked to the air frame behavior and we offer : **Safety, reliability and durability with all of our equipment.**



## Heated Drain Mast

THERMOCOAX can propose various designs to avoid ice projections against the fuselage or in the engine :

- Self or non self regulated
- High power density
- From 20 to 300 W
- Size adapted to small or long range aircraft
- Power supply 28 or 150 V 400 Hz
- Dielectric 1500 V
- Molded fiber glass shell
- Integrated overheat sensor

## Angle Of Attack Pilot Tube

AOA and Pilot tubes need to be operational in all weather conditions and free of ice. THERMOCOAX can provide the heater or complete sensor.

- Self or non self regulated
- Composite structure
- From 100 to 400 W
- Power supply 28 or 150 V 400 Hz
- Dielectric 1500 V

## General Specification

- Heating cable diameter from 0.25 up to 5 mm
- Various sheath alloys as Nickel, Inconel 600, SS304...
- Typical voltage 28 V, 115 or 200 Vac 400 Hz
- Dielectric test under 1500 V
- Insulation  $10^{12}\Omega$ .meter at room temperature



**INCREASE RATIO PERFORMANCE / COST**



## Air Inlet Screen

Rather for rotorcraft or turboprop engine, the design provides heated barrier to protect the engine from debris and ice.

- From 100 to 300 W
- 2 or 3 loops of heating system for redundancy
- Power supply 28 or 150 V or 200 V 3 phases 400 Hz
- Dielectric 1500 V
- Impact test  $\varnothing$  60mm foreign objects, 300 km/h, distance of 1 meter
- Composite or metallic borders

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# Temperature Probes

## Accurate measurement

THERMOCOAX provides Class 1 sensors in accordance with IEC 584.2 standards. THERMOCOAX is the Mineral Insulated Cable manufacturer ; we have the capability to make a vast array of probes.

- Cryogenic temperature up to 2 300°C,
- Smallest Outer Diameter 0.25mm,
- Single or Multi hot junctions for redundancy,
- In-house NIST calibration
- SS304, SS316, INCONEL® Alloy, Platinum, Tantalum, Rhenium and more.



## Brake Temperature Sensors

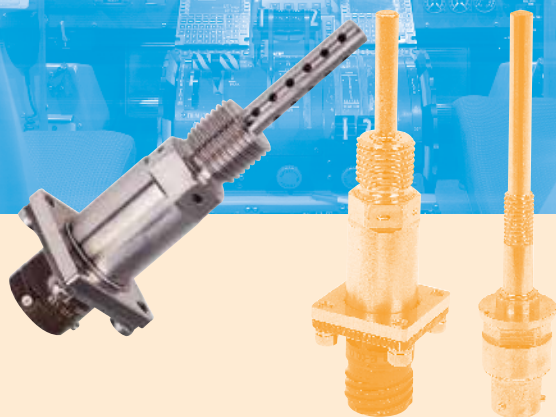
In real time, the sensor gives a «GO/NO GO» signal to the pilot, preparing for take off and gives signal for authorization to retract landing gear.

Design for :

- Twin aisle
- Single Aisle
- Regional and business jet
- Military fighter or trainer



**SECURE THE  
BRAKES WITH  
PRECISE  
TEMPERATURE  
MEASUREMENT**



## Sensors for Heat exchanger

- Thermocouple or RTD technology
- Swagged tip for faster response
- Single or duplex
- Robust construction
- Custom body for better integration



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## Temperature Harness for Engine and APU

Dedicated for missile, rotorcraft and turboprop engines.  
 Designed to fit any engine and simplify cabling.  
 Such component is strategic as it gives the engine temperature to the FADEC for piloting the engine.

- Up to 1200°C
- SS304, Inconel 600, Haynes 214
- Duplex design sensor, up to 12 thermocouples per harness



## Total Air Temperature Sensor

Integrated electrical anti-icing system

- From -60°C up to 80°C ±1 %
- Recovery factor not under 0.96
- SS304 body
- Heating system 28 V or 115 V - 400 Hz

## Bleed air leak and overheat detection systems

THERMOCOAX offers a wide range of overheat detectors based on our Mineral Insulated Cables.  
 Applications for : bleed air leak, Belly Fairing, cabin underfloor, APU duct, Pylon, wings.

- Alarm 104, 124, 154, 204, 215, 232°C...
- Temperature range from 100 up to 400°C
- 100 000 hours flying operation
- MD90, A340...



**SECURE DATA DURING ANALYSIS**

## Airborne Temperature

For monitoring gas or other fluids on aircraft :

- Air conditioning or gearbox oil
- RTD available : 100, 500, 1 000Ω up to 400°C
- Single or duplex designs.



# Custom Equipment

## Heating system for High altitude Camera

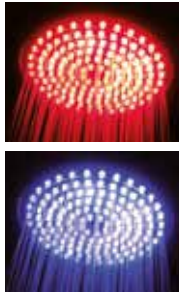
Heating system for High Altitude Camera :

- Circular gasket on 2 and 3 D rotation camera
- Altitude over 40 000 feet
- Stable temperature in lens area.



## Hot water system for airborne shower

Special equipment for VIP aircraft  
Heating system 4 KW under 28 V  
producing hot water at 45°C



## Qualification

### Analyze and draft

Documentation, procedures, standards and specifications

### Develop

Test program to comply with specifications

### Realize

Running the test program.

### Establish

Delivery Qualification report.

## NEW TECHNOLOGY

## MIL RTCA DO 160 Test Simulation Fatigue Analysis

- Concepts, Designs using Solidworks and Computing Model Techniques (CMT) simulating prototype performances
- Calibration and testing using COFRAC certified laboratory
- R&D department for static and dynamic thermal modeling

# THERMOCOAX

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## Our Company

With over 55 years experience in heating solutions and temperature measurement, THERMOCOAX has acquired a great deal of skill and expertise.

THERMOCOAX products are widely used and endorsed in many industries where the highest quality and utmost reliability are essential. All our mineral insulated cables are manufactured in-house with our proprietary and unique procedures.

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Thermocouples  
& Heating Elements  
ATEX  
certified and notified

