



## TMI-Orion and Aerospace

- Over 20 years experience creating end to end solutions
- Corporate Capabilities in Harsh Industrial Environments
- Roadmap: Leverage 20 years of expertise creating end to end solutions
  - Industry leader in data logging solutions
  - Wired & Wireless
  - Embedded Systems
  - Hardware and Software
  - COTS and Custom Engineered
  - Exceptionally strong R&D team – Pioneer in harsh environment technology



## TMI-Orion and Aerospace

- Brick, Tile, Ceramics
  - Oil & Gas
  - Manufacturing, Automotive
  - Food
  - Pharmaceutical
  - Composites
  - Metallurgy – High Heat
  - Military
  - Aeronautics
- Aerospace
  - Nuclear
  - Military



# TMI-Orion

## TMI-Orion and Aerospace

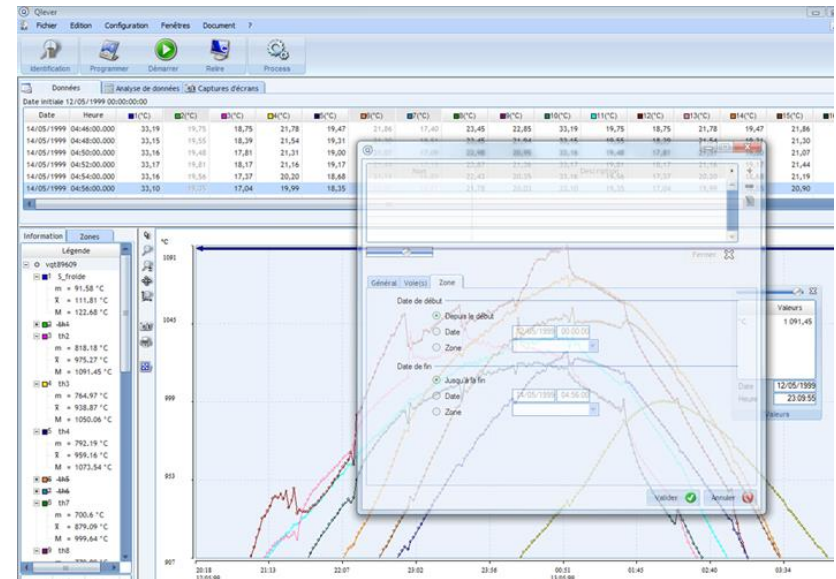
- Temperature
- Pressure
- Humidity
- Rotation
- Vibration
- Voltage
- Air Speed



**NIST & COFRAC traceable**

## TMI-Orion and Aerospace

- End to End Solutions
  - Software solutions
- Very well received globally



- We have identified Software as a passive wireless industry pain point that we do very well, globally.

## TMI-Orion and Aerospace

- Customers
- Collaborative Partners
- Strategic Alliances

To create COTS solutions to industry

To create custom solutions, embedded systems



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## TMI-Orion and aerospace

- Where are we ?



- Where are we heading to?

**Active data loggers, miniaturized, RF transmission, software platform per application.**

- **French based headquarter, subsidiary in USA**
  - 40 persons
  - Worldwide markets
- **Industrial markets**
- **Aero market**
  - Loggers used during flight tests
  - Technology suitable for composite manufacturing control
  - Two very robust military applications



**Our roadmap for penetrating space market is:**

**building on our current expertise:**

**Robustness in industrial markets**

## **Our challenges**

- **Move from industrial active data logging to passive sensing for aerospace and industrial markets**
- **Reduce dependencies on battery technology**
- **Reduce energy need**
- **Lighten equipment**

# TMI-Orion

	Where we are	Heading to	Partnership
Data logging	300 K acquisitions 48 channels, 10Hz		
Robustness	-90°C, 160°C 10's bar	Ionizing radiations 100's bar for sea market	
Data transfer	2.4 Ghz, multi loggers		PWS Acoustical/RFID/EM
Thermal barrier	1500°C	Low temperature robustness	
Energy	Battery optimization	Energy harvesting	
Metrology	0.06°C, 5 mbar, RH 2% ...		
Data treatment	Multi application platform		
Miniaturization	Body 3.8 cm <sup>3</sup> , Board 1.1 cm <sup>2</sup>		

## Ionizing radiations

- **PhD thesis in progress**
  - Effect of radiation and temperature on electronic board
- **Fields of investigation in progress**
  - Robustness analysis at component level ( $\mu$ pro, memory, ADC ... )
  - System level test
  - Rad tolerant  $\mu$ code
  - Hardware and temporal redundancies
  - Low temperature effects under radiation
  - Anti radiation shielding simulation (Geant 4)

## Energy harvesting

- **SuperCap to store energy.**
  - Voltage conditioning and charging boards done.
  - Implementation on TMI-Orion data loggers in progress. Autonomy before recharging: 13h. Charging time 5 mn. USB and Power outlet
- **Fields of investigation in progress**
  - Vibration
  - Solar
  - DeltaT
  - RF

## **Acoustical sensors**

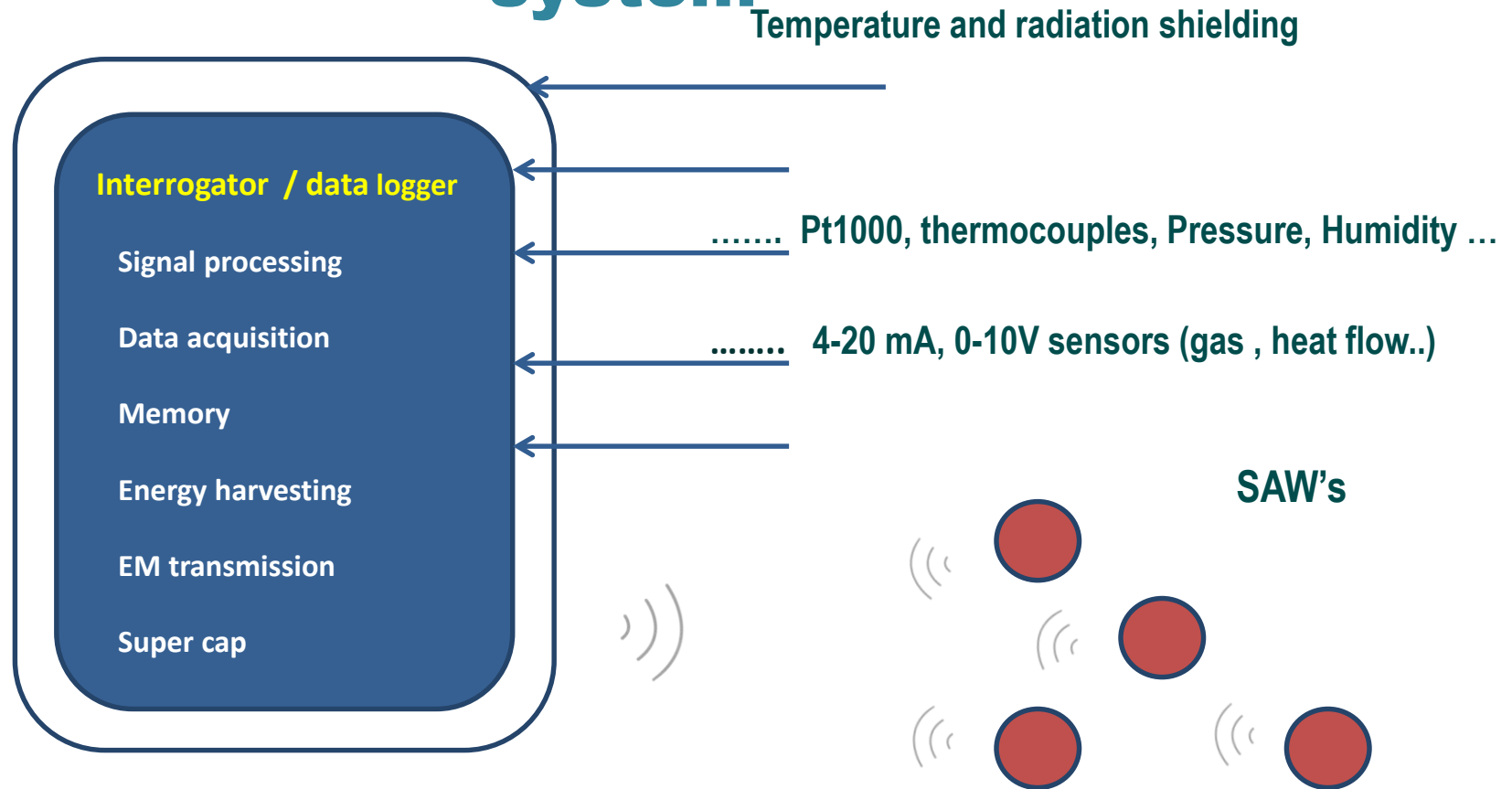
- **Work in progress with University on an acoustical cavity for gas detection in nuclear application**
- **Need partnership to develop SAW in parallel with our development of data acquisition system and interrogator**

## **Reliability engineering**

- **Early life fails**
- **Life Test**
- **Stress Screening**
- **Radiation robustness**
- **Failure analysis (statistical, physical)**

# TMI-Orion

## Conceptual all application acquisition system



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