

# Space Technology Transfer

**Instituto Pedro Nunes - Associação para a Inovação e Desenvolvimento em  
Ciência e Tecnologia**

PTTI – Portuguese Technology Transfer Initiative  
Broker for ESA - ESA Technology Transfer Network

**Inês Plácido  
Lisbon, 31.01.2014**



## R&TD Laboratories

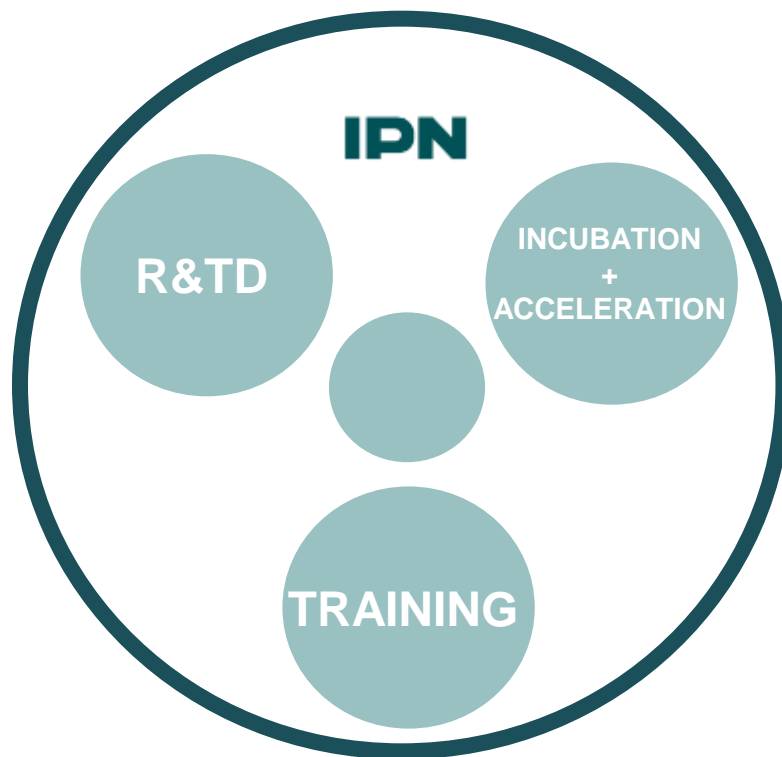
- Automation and Systems
- Wear, Testing and Materials
- Information Technology
- Electroanalysis and Corrosion
- Geotechnical Engineering
- Phytopathology

Projects, TT contracts > 200

Number of clients > 350

International projects:

FP5, FP6, FP7,...



## Business Incubation





technology transfer programme

## → DOWN TO EARTH

How space technology  
improves our lives

In Portugal, with Instituto Pedro Nunes

- PTTI: Portuguese Technology Transfer Initiative
- Brokerage activities for ESA

**PTTI**

**PORTUGUESE TECHNOLOGY  
TRANSFER INITIATIVE**

## **OUR GOAL**

**STRENGTHENING THE  
COMPETITIVENESS  
OF THE PORTUGUESE SPACE  
INDUSTRY BY SUPPORTING  
AND FACILITATING THE  
TRANSFER OF SPACE  
TECHNOLOGIES TO  
NON-SPACE MARKETS**

## **OUR PARTNERS**



**PTTI**

**PORTUGUESE TECHNOLOGY  
TRANSFER INITIATIVE**

**Entities working in space or interested in developing non-space applications based on ESA's technology or data**

**Demonstrators (Dem) and Feasibility Studies (FS)**

**Open call, co-funding up to 50%, 6-month projects**

**Total incentive: 225.000 €**

225.000 € total incentive distributed in 3 evaluations

18 proposals received

**9 PROJECTS**

6 Demonstrators

3 Feasibility Studies

7 different non-space markets  
automotive,  
logistics,  
renewable  
energy, pipeline  
insulation,  
medical devices,  
railway, UAVs

8 beneficiaries: 7 companies, 1 R&D center



**Portuguese space  
technology portfolio**

## Commercialization support

- Business development: ESA Brokers Network and EEN
- Technology needs by non-space industries!
- Non-space technology presented to ESA! (spin-in)
- Visibility sponsored by ESA (Success Stories)
- ESA trademark “Space Solutions”





## Funding

- Opportunities in H2020, national funding, regional funding, PTTI, Technology Transfer calls
- Partner search: ESA Brokers Network and EEN
- Investors



## New ventures (spin-offs, start-ups)

- Business incubation with ESA
- ESA intellectual property and licensing agreements
- Space Solutions University Challenge (S2UN)



## Portugal:

- ✓ 4 spin-out **Technology Descriptions**
- ✓ 3 “high-priority technologies” (Top 12/130)
- ✓ 2 spin-in Technology Descriptions
- ✓ 2 **Success Stories** in preparation
- ✓ 0 **Technology Transfers**

Umbilical Design

Turku Science Park

STFC Innovations

TNO

SatApps Catapult

MST

CREACTION Int. Belgium

REACTION Luxembourg

Tech2Market

Brimatech

Tecnia

D'Appolonia

IPN

KINNO Consultants



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## GNSS Galileo Code Receiver

### Abstract

The company is a private Portuguese Aerospace Engineering company, delivering advanced design solutions and turn-key space SW systems. Building on a solid team of highly motivated and specialized engineers, the company is now a reference player in the European space sector.

The company offers the Galileo Code Receiver (GCR) - an advanced GNSS receiver targeting cost effective, high navigation accuracy (down to 20cm) requirements for professional applications. Its high multipath resilience and low tracking noise is ideal for harsh environments (e.g. urban environments, close to tree canopies and other objects), outperforming the existing GPS solutions. The company is opened to set up technology licensing agreements with end users and system integrators (OEM and Value Added Resellers) willing to take advantage of early access to its technology for new applications or improved systems.

### Description

GPS satellite navigation technologies has been powerful enabler of new products/applications and drivers of productivity gains in many economic activities. Still, high precision, real time dependable applications are still limited by the error prone GPS in many contexts, therefore making the use of GPS receivers either practically complex (and expensive) or even impossible.



#### CATEGORY

Electronics & Opto-Electr

#### REFERENCE NO.

TDO0014

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#### DISCUSSION

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# IFAS – Intelligent Fault Alarm System

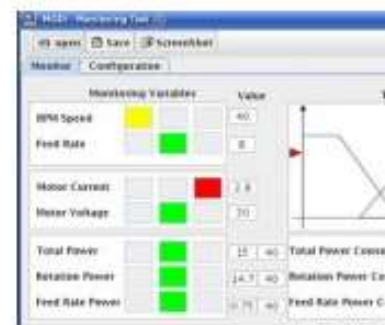
## Abstract

IFAS was developed by a Portuguese research group (CA3) within UNINOVA Research Institute. It is a software implementation of a monitoring and early warning system that can be applied to multiple domains involving multiple sensor data. It is a highly flexible mechanism that can be easily adapted to particular problem and has the capability of dealing with imprecision, allowing the system to issue levels of warnings before an error actually occurs. It extracts data from sensors, and semi-automatically transforms and represents it as linguistic variables - with a flexible reasoning process that can detect different levels of deviations (errors) from nominal behaviours.

## Description

Rule-based Systems have been successfully applied in many different fault detection and monitoring technical processes. However, most of these applications are related with decision making (automatic control processes) and not with decision support (human control processes). Further, there is not much work devoted to the application of specialized fuzzy inference concepts and tools to assist human operators in the task of control processes.

We developed an intelligent fault alarm system to monitor faulty behaviors during a drilling process and that includes an inference system for terrain hardness detection, both of which are based on fuzzy logic. Fuzzy logic has the advantage of capturing rules expressed as natural language in a very straightforward manner. It also provides a high degree of flexibility, which allows the system to issue levels of warnings before an error actually occurs



### CATEGORY

Computer Hardware & Software

### REFERENCE NO.

TDO0005

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## Silica-based Aerogel

### Summary

Active Aerogels is a Portuguese private owned company that produces and commercializes aerogels for several applications in space, oil & gas, aeronautics, building and wastewater treatment. Aerogel is a solid with unusual properties, such as ultra-light and very low thermal conductivity due to its high porosity. Aerogels can resist large temperature ranges (-180 °C to 350 °C), vibration and high vacuum and may be supplied in blocks, blankets or powder. Active Aerogels provides solutions for highly demanding thermal requirements and is namely looking to test new applications or to adapt aerogels to specific needs.

### Description

Aerogels are prepared by sol-gel technology which the most known bottom-up approaches to prepare nanomaterials. Sol-gel technology allows preparing materials in different shapes from fibres, powders, and monoliths. Particularly, the silica based aerogels monoliths offered by our team are extremely flexible as shown in figure 1.

The thermal conductivity of our aerogel is 39 mW m<sup>-1</sup> K<sup>-1</sup> and since this material does not have the glass transition temperature it can be applicable between -180 oC to 350 oC without any changes in its properties. Additionally, this aerogel is highly hydrophobic avoiding its degradation in contact with humid environments. This material can be applied for general thermal insulation, namely in space environments, buildings and pipelines. On the other hand, due to its high specific surface area they can be used as adsorbents for wastewater, oil, and others.



**CATEGORY**  
Materials

**REFERENCE NO.**  
TDO0006

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**DISCUSSION**

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# Verification and validation of safety-critical systems – Fault Injection

## Abstract

The solution is provided by an international company offering dependable solutions, services, and software technologies for safety-critical and business-critical information systems, namely embedded control systems in the Aeronautics, Space, Defence, Railway and Automotive segments. The fault injection technology is particularly appropriate for contexts of high availability, reliability, and safety requirements, where failures may lead to the loss of human life, or otherwise result in serious damage to property or cause significant financial losses to businesses. The company is looking for technical / strategic engineering partnerships for further technological developments, testing and roll-out of new applications, and adaptation of the technologies to novel business needs.

## Description

Aerospace, automotive, industry, defense, telecommunications are some of the areas posing new challenges to the software industry in term of high availability, reliability and safety requirements. New applications and systems must be intensively tested before deployment to guarantee that the system and built-in fault-tolerance mechanisms are working as expected. Ensuring the system responds appropriately to unusual or exceptional events is a problem that requires something more than traditional testing.

Used by space agencies around the world, the company's fault injection technology provides

### CATEGORY

Computer Hardware & Soft

### REFERENCE NO.

TDO0004

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### PRINTABLE VERSION

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### DISCUSSION

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