



Materials, Coatings & Processes



Automation & Robotics



Mechanical Components & Systems



Electronics & Optoelectronics



Digitisation, Computer Hardware & Software



Communication & Information



Sensors & Measurement Techniques



Life sciences, Pharmacy & Medicine



Precision Mechanics & Optics



Energy



Services



Other technologies

TECH DESCRIPTION CARDS – SPAIN

04/11/2025

[Contact ESA Technology Broker Spain](#) for
additional Technology Descriptions from
the ESA Technology Brokers Network.



TECHNOLOGY DESCRIPTION

Nanostine has developed a nanoparticle-based coating that mitigates the multipactor effect in RF devices on satellites. This coating serves as a non-toxic alternative to Alodine coatings, which are currently used but pose environmental and health risks.

Nanostine employs a unique methodology based on the ultra-high vacuum sputtering technique, enabling the synthesis of ultra-pure nanostructures. This is particularly valuable for high added-value applications, where material purity and precision are critical.



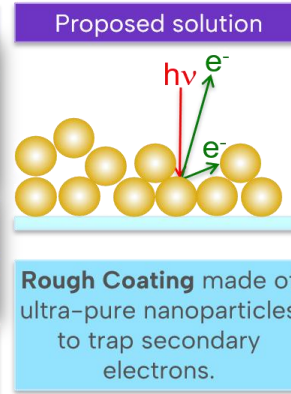
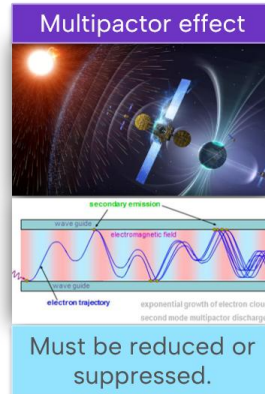
INNOVATIVE ASPECTS

- Non-chemical synthesis
- Ultra-pure nanoparticles with no surface impurities
- Controlled nanoparticle size and composition
- Zero waste generation



TECHNOLOGY READINESS (in space application)

TRL 5 (2024)



COUNTRY OF ORIGIN

Spain

LATEST UPDATE

05/2024

SPACE
FOR BUSINESS
BUSINESS
FOR SPACE

TECH CARD



TAGS

#coating

#nanoparticles

#radiofrequency

#non-toxic

#insulation

#electrical
protection

APPLICATION AREAS

Energy

Health

Electrical &
Electronic
Engineering

Aviation

Transports &
Logistics

End-to-end RF
& Optical
Systems

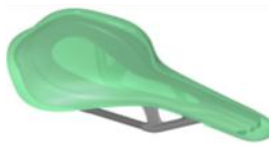
Products for
Nav., Comm. &
Remote Sensing



TECHNOLOGY DESCRIPTION

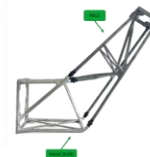
CFIP technology is designed to be fully automatable and scalable. For this reason, CFIP is based on pushing the fibres and injecting the resin from the inlet of the tubular cavity, rather than on pulling the fibres from the outlet, which would lead to a non-efficient solution in terms of productivity, automation, cleaning and easy-to-use.

CFIP can **reinforce parts made by any manufacturing technology and material**. This includes **flexible and high-performance polymers** processed by FFF, **metals** processed by SLM or even **ceramic** materials.



INNOVATIVE ASPECTS

Besides the AM market and, more specifically, the CFRAM (continuous fibre reinforce additive manufacturing) segment, **CFIP technology also aims to address the composites market**, where it is conceived as a new mouldless technology for reinforcing parts made by any manufacturing technology (AM, extrusion, machining, traditional composite processing methods...), as a joining technology or both. The main vertical markets targeted by CFIP technology are aerospace, automotive, sporting goods, health and construction.



TECHNOLOGY READINESS (in space application)

TRL 8 (2024)

COUNTRY OF ORIGIN

Spain

LATEST UPDATE

05/2024

TECH CARD



TAGS

#simulate

#health

#process

#produce

#generate

#model

#mechanisms

APPLICATION AREAS

Aviation

Health

Transport and
Logistics

Mechanical
Engineering

Construction &
Civil
Engineering

Consumer
Products

Structures/Material
s/Thermal



Method for Producing Removable Pressure-Sensitive Adhesives (PSA's) Using Biobased Starting Materials

Reference: TD-ES-1024



TECHNOLOGY
BROKER



TECHNOLOGY DESCRIPTION

The present invention relates to a method for producing a preferably water-based dispersion, particularly to be used as or in an adhesive, especially a pressure-sensitive adhesive (=PSA), particularly a pressure-sensitive adhesive removable under neutral or basic (alkaline) conditions, as well as to the polymeric composition thus produced and to its various uses, usages and applications.



INNOVATIVE ASPECTS

Adhesives used to attach or adhere labels etc. to surfaces should be removable, especially using an economic and environmental-friendly method.

No reports about the synthesis of waterbone PSAs with remarkable properties and high bio-content using bio-based ASRs as stabilizers containing isosorbide methacrylate monomers have been found.

The present invention allows the one-post synthesis of high performance waterbone PSAs with bio contents ranging from 0% to 71% stabilized with ASR-type electrostatic stabilizers promoting excellent removable properties.



TECHNOLOGY READINESS (in space application)

TRL 4 (2024)

COUNTRY OF ORIGIN

Spain

LATEST UPDATE

05/2024

SPACE
FOR BUSINESS
BUSINESS
FOR SPACE

TECH CARD



TAGS

#PSA

#biobased

#recycle

#assemble

#adhesive

#textile

APPLICATION AREAS

Health

Chemical
Engineering

Transport and
Logistics

Fashion &
Creative
industries

Electronics

Glass recycling
industry

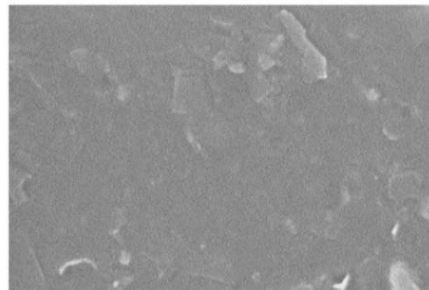
Plastic
Recycling
industry



TECHNOLOGY DESCRIPTION

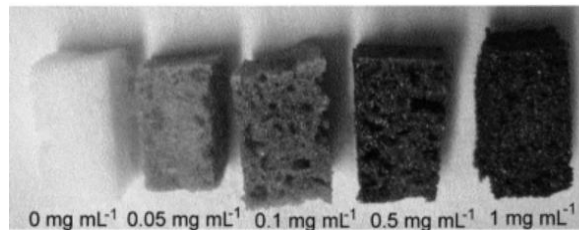
The coating technology to which this patent refers enable achieving conductivity onto complex plastic surfaces ranging from films, or fibers to porous sponges. This technology facilitates coating plastics to achieve new functional products. This could comprise:

- Catalysis, Sensing, Electronics, Electromagnetic shielding
- Power generation, Communications, functional surfaces



INNOVATIVE ASPECTS

- Low resistivity exfoliated graphene/nano-graphite-coated fiber or complex surface
- Embodiments, the weight fraction of exfoliated nanographite platelets on the outer surface of the fiber or complex plastic surfaces is typically ranges from about 0.01 wt% to about 1.0 wt%
- The graphene is primarily located on the surface, where its concentration is significantly higher, enabling electrical conduction.



TECHNOLOGY READINESS (in space application)

TRL 5 (2024)

COUNTRY OF ORIGIN

Spain

LATEST UPDATE

05/2024

SPACE
FOR BUSINESS
BUSINESS
FOR SPACE

TECH CARD



TAGS

#EEE

#photonics

#assemble

#MEMS

#EMC

#materials

APPLICATION AREAS

Materials

Mechanisms

Thermal

Avionic
Architecture

Electronics

Mechanical Components & Systems



TECHNOLOGY DESCRIPTION

This technology can provide heat, cooling, and propulsion to low Earth orbit satellites while occupying almost zero space, being ultra-light, and consuming very little power.

Ideal partners would be low Earth orbit satellite manufacturers. However, other non-space applications include heating, cooling, wind turbines (improving aerodynamics and providing heating), chips (cooling), automotive (aerodynamics, heating, and cooling), agriculture (sanitization), and more.



INNOVATIVE ASPECTS

- Ultra-light.
- Super compact.
- Low cost.
- Capable of providing heat up to 300 °C (or more).
- Fast cooldown to ambient temperature.
- Generates propulsion.
- Can modify the aerodynamics of any surface on Earth.



TECHNOLOGY READINESS (in space application)

TRL 5 (2024)

COUNTRY OF ORIGIN

Spain

LATEST UPDATE

05/2024

TAGS

#thermal
control

#heating

#cooling

#propulsion

#plasma

#actuator

APPLICATION AREAS

Aviation

Energy

Data Processing

Software & AI

Food &
Agriculture

Automotive

Space
Technologies

SPACE
FOR BUSINESS
BUSINESS
FOR SPACE

TECH CARD





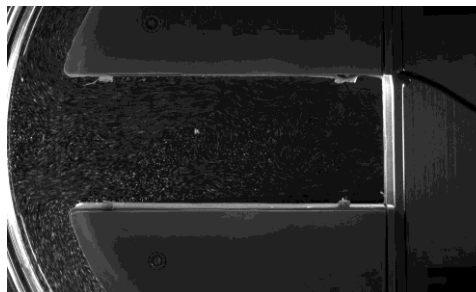
TECHNOLOGY DESCRIPTION

This technology uses ionic wind (electro-hydro-dynamics) to pump dielectric liquids without any moving parts. By applying electric fields between electrodes, it generates a flow that efficiently transfers heat. The system is low power, consuming less than 0.1W and achieving pressures up to 300Pa. Its advantages include low power consumption, no vibrations, improved sealing, and a modular design that can be adapted to various systems. Ideal for cooling electronic components like batteries and power electronics, it provides a safe, efficient alternative to traditional cooling methods.



INNOVATIVE ASPECTS

- Use of ionic wind (electro-hydro-dynamics) to pump dielectric liquids without moving parts.
- Low power consumption, with the system requiring less than 0.1W.
- Modular design, allowing precise placement of small pumping modules.
- Improved sealing and no vibrations due to the absence of mechanical components.
- High heat transfer capability with a dielectric fluid, making it suitable for electronic systems.
- Compatibility with existing commercial cooling systems.



TECHNOLOGY READINESS (in space application)

TRL 8 (2024)

COUNTRY OF ORIGIN

Spain

LATEST UPDATE

05/2024

TAGS

#plasma

#liquid cooling

#ionic wind

#modular

#low power

#no moving parts

APPLICATION AREAS

Aviation

Energy

Transport &
Logistics

Space
technologies

Propulsion

SPACE
FOR BUSINESS
BUSINESS
FOR SPACE

TECH CARD





Engineering, industrialization and manufacturing of all types of installations, machinery, subassemblies, fixtures and tools

Reference: TD-ES-1020



TECHNOLOGY DESCRIPTION

Engineering, industrialization, and manufacturing of all types of installations, machinery, subassemblies, fixtures, and tools. In the case of turnkey projects (custom installations and special machinery), this may include a simulation and digital twin of industrial processes as a preliminary phase. The electromechanical assembly and automation process can extend to commissioning and approval at our facilities or beyond, with integration at the client's premises.



INNOVATIVE ASPECTS

Imageryst, automates satellite image analysis using AI models tailored for multispectral, removing the need for geospatial expertise. It processes thousands of areas in parallel via cloud infrastructure. Compared to traditional GIS tools: ~ 80% faster insight generation ~ 50% lower costs over 12 months. Scales automatically, no manual data prep



TECHNOLOGY READINESS (in space application)

TRL 9 (2025)



COUNTRY OF ORIGIN

Spain

LATEST UPDATE

05/2025

SPACE
FOR BUSINESS
BUSINESS
FOR SPACE

TECH CARD



TAGS

#process

#model

#simulation

#design

#assemble

#verify

APPLICATION AREAS

Structures

Mechanisms

Materials

Thermal

Aviation

Energy

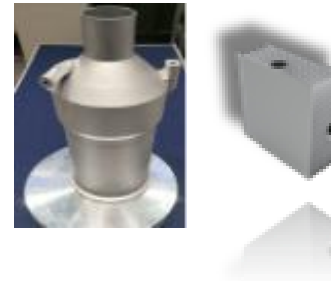
Transport



TECHNOLOGY DESCRIPTION

Additive manufactured thermo-structural structures with integrated two-phase thermal management systems. Spacecraft panels, battery enclosures, payload frames, propulsion subsystems, phased-array antennas, and RF systems, where both structural integrity and efficient thermal regulation are required. The main advantages in general terms are:

- >20% mass reduction compared to conventional solutions.
- High thermal conductivity (150 W/mK) ensuring uniform temperature distribution ($\leq 5^{\circ}\text{C}$ variance)
- Compact integration, reducing interfaces, assembly steps, and risk of failure.
- Potential non-space domains of application.



INNOVATIVE ASPECTS

The technology enables additive manufactured thermo-structural structures with integrated two-phase thermal management systems, extending beyond panels to multiple spacecraft subsystems. Innovative aspects:

- Embedding two-phase thermal transport networks directly within structural parts during AM fabrication.
- Use of AI-assisted generative design to create wight-optimized, multifunctional geometries.
- Realization of complex, non-machinable internal fluid channels for advanced thermal regulation.
- Application not only to thermo-structural panels, but also to battery enclosures, payload support frames, propulsion modules, phased-array antennas, and RF subsystems where high thermal loads and stability are critical.

Key Benefits:

- Higher performance-to-mass ratio, directly impacting mission economics.
- Increased manufacturing efficiency, reducing production cycles by at least 25-30%.
- Versatility across structural, thermal, and RF subsystems, enabling next-generation, multifunctional satellite.



TECHNOLOGY READINESS (in space application)

TRL 6 (2025)

COUNTRY OF ORIGIN

Spain

LATEST UPDATE

09/2025

TAGS

#thermal

#control

#multifunctional

#systems

#panels

#E-mobility

APPLICATION AREAS

Structures

Mechanisms

Materials

Thermal

EMC

Energy

Space
Transportation

SPACE
FOR BUSINESS
BUSINESS
FOR SPACE

TECH CARD



Electronics & Optoelectronics



TECHNOLOGY DESCRIPTION

Liquid crystal variable retarders is a mature technology for ground applications from biomedicine (i.e.: imaging diagnostic equipment) to astrophysics. This technology is scalable and can be used for a wide range of purposes.

Liquid crystal devices allow the polarization state of the light to be modified by applying a low voltage avoiding mechanisms and, therefore, reducing failure risks, mass, power consumption and volume.



INNOVATIVE ASPECTS

This technology manages to minimize the size and mass of the device while maximizing its useful aperture and performance. It avoids the use of standard solutions that rely on mechanisms with rotating polarization optical parts.

This approach preserves resources and ensures optimal functionality, making it particularly suitable for applications where space is a constraint.

The devices have a radiation tolerance of up to 100krads (TID) and a non-operational temperature range from -40°C to +90°C.



TECHNOLOGY READINESS (in space application)

TRL 9 (2024)

COUNTRY OF ORIGIN

Spain

LATEST UPDATE

06/2024

TAGS

#liquid crystal

#polarization

#quantum communication

#LiDAR sensing

#optical

APPLICATION AREAS

Health

Food & Agriculture

Maritime & Aquatic

Infrastructure and Smart Cities

Aviation

Environment - Wildlife and Natural Resources

Safety & Security

SPACE
FOR BUSINESS
BUSINESS
FOR SPACE

TECH CARD





TECHNOLOGY DESCRIPTION

Cedrion's Corona discharge heating technology rapidly generates heat on a metallic surface by ionizing air with high voltage, creating an ionic wind. The heat is precisely controlled, and once switched off, the system acts as an efficient thermal insulator, reducing the need for bulky foam insulation. With rapid heating startup, low heat momentum (allowing for quick temperature drop), and a compact design, it offers several advantages over traditional resistive heating elements. It can achieve higher temperatures in a shorter time without degrading sensitive materials like plastics. Cedrion offers customized development of parts, subsystems, or components using this technology. Unlike resistive elements, it minimizes the risk of overheating and material degradation, providing a safer and more efficient solution for sensitive applications.



INNOVATIVE ASPECTS

- Rapid heating startup without the need for long warm-up times.
- Low heat momentum, allowing for fast cooling once the system is turned off, reducing heat retention.
- Compact design.
- Thermal insulator once switched off, eliminating the need for bulky foam insulation.
- High temperature capability, reaching high temperatures in a short time, without degrading materials like plastics.
- Precise power control.
- Efficient energy use: provides significant power output (approximately 10 W/cm³) with low risk of overheating or material degradation.
- No degradation of sensitive materials unlike traditional resistive elements.
- Customization potential.



TECHNOLOGY READINESS (in space application)

TRL 3 (2024)

COUNTRY OF ORIGIN

Spain

LATEST UPDATE

05/2024

TAGS

#heater #ionic wind #power #thermal insulator

APPLICATION AREAS

Aviation Food & Agriculture Health Electrical & Electronic Engineering Transport & Logistics Space Technologies Space Technologies

SPACE
FOR BUSINESS
BUSINESS
FOR SPACE

TECH CARD





TECHNOLOGY DESCRIPTION

Clue Technologies provides a portfolio of state-of-art high-performance computing (HPC) platforms specifically design for the aerospace sector. These platforms combine advanced hardware solutions to create a robust, scalable, and efficient computing environment. They are capable of processing large datasets, supporting high-speed computations, and enabling real-time operations critical to aerospace applications.

Clue's HPC platforms are ideal for a wide range of space applications, with a special focus on launchers and other vehicles meant for LEO operations. Launcher platforms, especially future reusable launchers, can take advantage of Clue's state of the art systems which can be adapted to provide different functions through different operations/missions:

+ Launch phase + In-Flight Operations + Recovery and Reusability + Enhanced Applications for Advanced Lifecycle and Maintenance + Smart Vectoring Unit (SVU) + Smart Configurable Sensors + Distributed Engine Control System (DECS)



INNOVATIVE ASPECTS

- Adaptive Multi-Core Processing Architecture Unlike conventional HPC systems that often rely on static cores with pre-sets roles.
- High-Density, Lightweight Design Through innovations in component miniaturization and efficient cooling systems.
- Real-time data stream processing. Clue's technology leverages a unique high-bandwidth data bus architecture that supports real-time data processing directly within the computational platform
- Advanced Energy efficiency mechanisms
- Enhanced cybersecurity features
- Heterogeneous computing optimization



TECHNOLOGY READINESS (in space application)

TRL 6 (2024)

COUNTRY OF ORIGIN

Spain

LATEST UPDATE

05/2024

SPACE
FOR BUSINESS
BUSINESS
FOR SPACE

TECH CARD



TAGS

#avionics

#GNC

#Health

#DHS

#Datasytem

#Safety

APPLICATION AREAS

Avionics
Architecture

End-to-end RF
& Optical
Systems

Products for
navigation,
communication and
remote sensing

GNC

Aviation

Health

Safety and
security



TECHNOLOGY DESCRIPTION

In general, the present invention relates to optical fiber devices, and more particularly, to an interferometer that includes two segments of asymmetric multicore optical fiber of different lengths which are fusion spliced but rotated with respect to each other. The two segments of multicore fiber are spliced to conventional single mode optical fiber. The transfer function of the composed interferometer is the multiplication of the transfer functions of the individual multicore fiber interferometers. In this manner, the bending sensitivity of the composed interferometer is the multiplication of the sensitivities of the individual interferometers. The composed interferometer can distinguish the direction of bending (or curvature) along with the magnitude of bending (or curvature). The interferometer is particularly interesting in applications where high bending sensitivity and fast response are required.



INNOVATIVE ASPECTS

MCF interferometer and the methods of constructing and using said composed MCF interferometer herein described:

- ☐ The composed MCF interferometer provides a simple output spectrum pattern which results from the multiplication of the interference patterns of two MCF
- ☐ interferometers of lengths L1 and L2, respectively.
- ☐ The analysis of the resulting spectrum is simple as it has a well-defined maximum.
- ☐ The measuring range of the composed interferometer is wide.
- ☐ The sensitivity of the composed interferometer is amplified and higher than that of a single interferometer.



TECHNOLOGY READINESS (in space application)

TRL 3 (2024)

COUNTRY OF ORIGIN

Spain

LATEST UPDATE

05/2024

TAGS

#Interferometers

#optical

#supermodes

#sensitivity

#fiber

#Enhancement

APPLICATION AREAS

Civil
engineering

Aviation

Robotics

Health &
biomedical
engineering

Transport

Automation

Submarine
Industry

SPACE
FOR BUSINESS
BUSINESS
FOR SPACE

TECH CARD

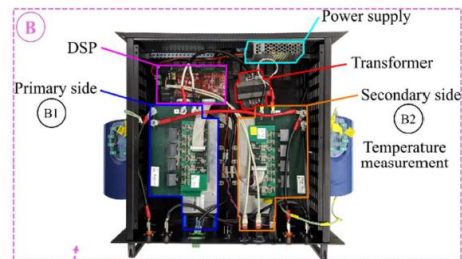




TECHNOLOGY DESCRIPTION

Partial Power Converters (PPCs) are very versatile converters due to their capability of managing energy between a direct current (DC) load and a DC source at different voltage levels. Potential applications of PPCs are among others:

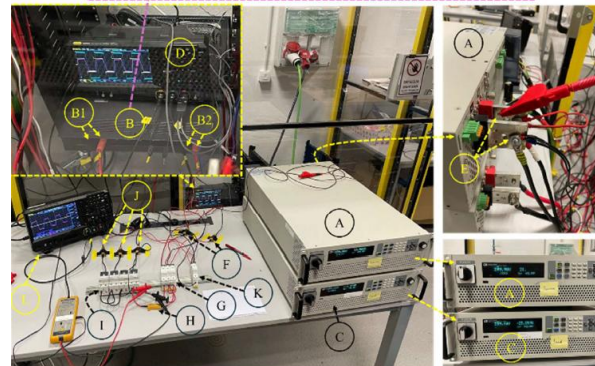
- Energy Storage Systems
- Photovoltaic Systems
- Applications where power converters of reduced size are required.



INNOVATIVE ASPECTS

The main advantages of the invention are:

- There are no specific protections in the market for ground fault protection in PPCs.
- It can locate faults in early stages.
- The impedance included in the system limits the current up to very low values even for solid earth faults, thus the system can continue operating at rated conditions and human safety is guaranteed.



TECHNOLOGY READINESS (in space application)

TRL 5 (2024)

COUNTRY OF ORIGIN

Spain

LATEST UPDATE

05/2024

TECH CARD



TAGS

#Ground

#Earth

#safety

#power&energy

#diagnosis

#EMC

APPLICATION AREAS

Electric
Architecture

Power & Energy

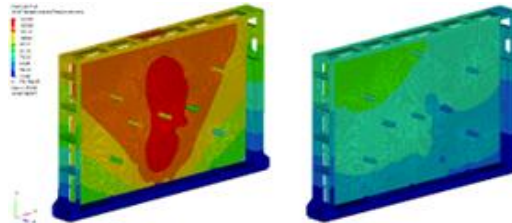
EMC

Electrical safety



TECHNOLOGY DESCRIPTION

THEAMS (Thermally Enhanced Additively Manufactured Structures) is a groundbreaking solution that redefines thermal and structural efficiency for high-performance electronic systems. By lowering peak temperatures by 15-30°C, it enables a 20-50% increase in power throughput and overall system value. Its optimized design enhances resilience, reduce mass, and supports high-performance data processing, especially in environments with extreme conditions.



INNOVATIVE ASPECTS

- **Two-phase fluid system:** Offers superior heat transfer, reducing peak temperatures by 15°-30° compared to traditional methods like passive heat sinks
- **Topology optimization:** Creates lightweight yet durable structures, improving vibration resistance without compromising strength.
- **Additive manufacturing:** Enables precise, custom geometries, reducing material waste and optimizing the system's design.



TECHNOLOGY READINESS (in space application)

TRL 5 (2025)

COUNTRY OF ORIGIN

Spain

LATEST UPDATE

05/2025

SPACE
FOR BUSINESS
BUSINESS
FOR SPACE

TECH CARD



TAGS

#topology_optimization

#thermal

#additive

#efficiency

#cooling

#structural

APPLICATION AREAS

Structures

Mechanisms

Materials

Thermal

Avionic
Architecture

DHS

GNC

Digitisation, Computer Hardware & Software



TECHNOLOGY DESCRIPTION

Developair AI is an advanced solution for optimizing embedded software verification and validation in functional safety environments. Using symbolic AI and mathematical models, it automates verification tasks, ensuring standardized software requirements, automated issue detection, and automatic test generation.

Based on formal methods, Developair guarantees traceability, dependability, and seamless integration with requirement management and testing tools. It features a Smart Editor for defining requirements, an Automatic Verification system for detecting inconsistencies, and an Automatic Test Generator to validate software specifications.

The SW uses connectors to export verified requirements and generated tests to other interconnected tools.



INNOVATIVE ASPECTS

- Automated Verification & Validation.
- Automatic Unit Test Generation, speeding up embedded SW unit verification.
- Symbolic AI & Formal methods, ensuring high precision, traceability, dependability and reliability.
- Integration with the V-model lifecycle, supporting architecture definition, SW requirements specification and unit testing.
- Scalability and flexibility.
- Cloud-based deployment.
- Significant cost & time reduction.



TECHNOLOGY READINESS (in space application)

TRL 6 (2024)

COUNTRY OF ORIGIN

Spain

LATEST UPDATE

09/2024

TAGS

#embedded software

#functional safety

#symbolic AI

#automated testing

#software validation

#software verification

APPLICATION AREAS

Transport & logistics

Health

Aviation

Electrical & Electronic Engineering

Data processing, Software & AI

Safety & Security

Space technologies

SPACE
FOR BUSINESS
BUSINESS
FOR SPACE

TECH CARD





TECHNOLOGY DESCRIPTION

The Touch and Play (T&P) Technology is a wireless, self-configurable interface designed for energy and data transfer in complex systems. It eliminates the need for physical connectors and reduces cables, making systems more energy-efficient, flexible, and durable. T&P uses magnetic flux for power transfer, allowing devices to draw power as needed, and can also perform mechanical fixation and release. This innovation is highly suited for space applications, and for harsh environments like marine or corrosive settings, offering enhanced robustness without exposed electrical pins. .



INNOVATIVE ASPECTS

- Automated Verification & Validation.
- Bidirectional Energy and Data Transfer, offering greater flexibility and versatility.
- High Power Transfer: Unlike Near Field Communication (NFC), which is limited to low-power devices.
- Wireless, Connector-Free Interface by using a magnetic flux-based approach for power transfer.
- Self-Configuring and Adaptable.
- Robust and Safe.
- Modular Design for System Compatibility, as the technology supports easy instrument and tool exchange.



TECHNOLOGY READINESS (in space application)

TRL 3 (2024)

COUNTRY OF ORIGIN

Spain

LATEST UPDATE

09/2024

TAGS

#wireless

#power
transfer

#magnetic

#flexible

#modular

#robust

APPLICATION AREAS

Maritime & Aquatic

Energy

Aviation

Electrical &
Electronic
Engineering

Space
technologies

SPACE
FOR BUSINESS
BUSINESS
FOR SPACE

TECH CARD

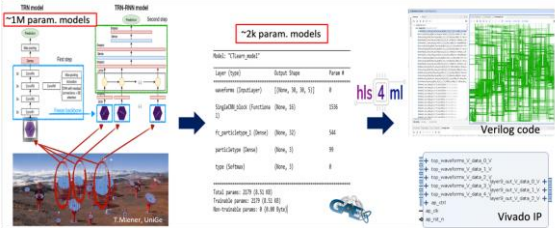
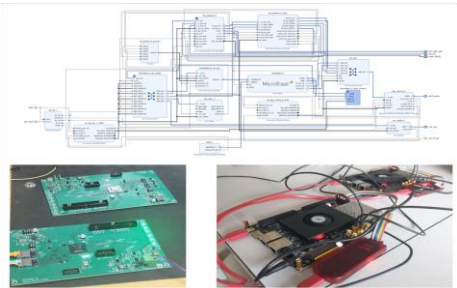




TECHNOLOGY DESCRIPTION

Real-time EdgeAI processing is expected to allow the running of AI algorithms in small FPGA devices, placed close to the final sensors with low fixed latency (down to ~1 microseconds), high performance, with low power consumption.

Other potential non-space applications would happen in self-driving vehicles. These vehicles have many sensors, providing a continuous data rate that allows an AI to make the right decisions in real time. The higher the number of sensors, the more data available thus increasing safety. In this line, data links between vehicles and the road are already foreseen, and LIDAR sensors also produce high data rates to process. Thus, self-driving vehicles would benefit from real-time AI algorithms running on low-power consumption FPGAs.



INNOVATIVE ASPECTS

AI has rapidly advanced due to powerful hardware like GPUs and TPUs, enabling complex ML computations. Simultaneously, IoT has integrated chips into everyday devices, driving energy-efficient processing. The fusion of AI and IoT has led to EdgeAI, which embeds ML into resource-limited systems, enhancing real-time applications like predictive maintenance and green computing. FPGAs offer efficient, low-latency AI processing, providing flexibility, parallelism, and low power consumption for AI-driven tasks.



TECHNOLOGY READINESS (in space application)

TRL 5 (2024)

COUNTRY OF ORIGIN

Spain

LATEST UPDATE

05/2024

SPACE
FOR BUSINESS
BUSINESS
FOR SPACE

TECH CARD

TAGS

#ML

#GPU

#TPU

#EdgeAI

#FPGAs

#LIDAR

APPLICATION AREAS

Digital
Engineering for
Space Missions

Avionic
Architecture

DHS

GNC

Software & AI

Robotics and
Automation

Chemical
Engineering &
biotechnology

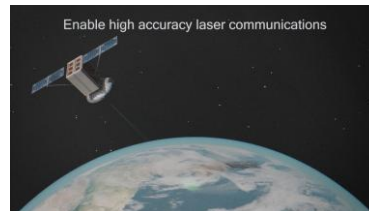


Communication & Information



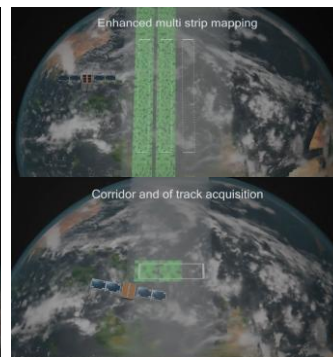
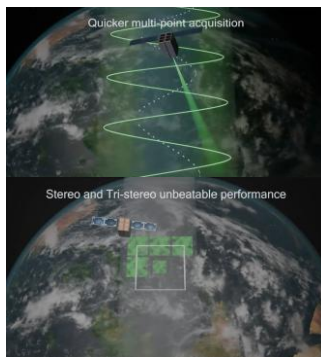
TECHNOLOGY DESCRIPTION

The whole ADCS with 4 CMGs fits inside a 1U CubeSat (0.097 x 0.097 x 0.097 m), making it easy to integrate in small satellites with our linear patented configuration and less than 1.4kg. The ADCS is built by modules that can be adapted and distributed to fit the customer's requirements and diverse satellite sizes. The ADCS comes with the software needed to control the satellite attitude.



INNOVATIVE ASPECTS

- Max precision of 0.0001 degree in all 3 axes of microsatellites
- Allows to rotate up to 21.8 degrees per second
- Reduces battery size and power requirements by a factor of 3
- CMGs provide up to 10 times more torque and momentum than a reaction wheel of the same mass and accuracy
- Allow for greater power efficiency and higher agility capabilities (especially in LEO)



TECHNOLOGY READINESS (in space application)

TRL 5 (2024)

COUNTRY OF ORIGIN

Spain

LATEST UPDATE

05/2024

SPACE
FOR BUSINESS
BUSINESS
FOR SPACE

TECH CARD



TAGS

#CMGs

#Satellite

#Control

#Communication

#Earth observation

APPLICATION AREAS

Health

Astrodynamics

Space Debris

Photonics

Components

Robotics and
automatization

GNC



TECHNOLOGY DESCRIPTION

Rydberg radiofrequency (RF) sensors provide several advantages with respect to classical antennas. They can operate in a wide range of frequencies, ranging from DC up to tens of THz, have increased sensitivity over traditional antennas while also having a reduced size and can also detect the polarisation of the RF signal. We propose a Rydberg RF sensor in the superheterodyne configuration, as the sensitivity compared to the standard configuration is greater and it can also measure the phase of the incoming RF signal and multiple frequencies. An extensive study of the requirements to be considered for the future integration in space application as payload would also be performed.



INNOVATIVE ASPECTS

- Rydberg-atom receivers present the capability of detecting weak RF signals with a fraction of the cost, size weight and power (SWaP) of traditional antennas. Their bandwidth covers from DC up to tens of THz their instantaneous bandwidth can reach 10 MHz, their sensitivity is on the order of dozens of nV-cm-1Hz-½ and their dynamic range covering from dozens of nV/m to V/m.
- Rydberg atom RF sensors can also detect the polarization of the RF signal
- In addition to these capabilities, Rydberg atom RF sensors in (super)heterodyne configurations can also detect phase modulations, directionality, increased sensitivity or multiple frequencies. This opens the room for full integration as a receiver for telecommunications, defence and aerospace applications, leveraging their enormous versatility, while also noting its reduced SWaP factor compared to classical antennas (which becomes extreme in MW and mm-Wave operational regimes)



TECHNOLOGY READINESS (in space application)

TRL ? (2024)

COUNTRY OF ORIGIN

Spain

LATEST UPDATE

05/2024

SPACE
FOR BUSINESS
BUSINESS
FOR SPACE

TECH CARD



TAGS

#Quantum

#RF

#SWaP

#Radiofrequency

#Monitoring

APPLICATION AREAS

End-to-end RF & optical systems

Products for Navigation

Products for Communication & remote sensing

Electrical & electronic engineering



TECHNOLOGY DESCRIPTION

The equipment is a AAA-Class solar simulator designed for illuminating any sample to extract the required parameters. It achieves AAA-Class performance (Spectral Match, Homogeneity, and Temporal Stability) according to the IEC 60904-9 standard, without the need for optics, making the system more robust, portable, and reducing maintenance costs.

With a compact size (16x16x32 cm) and weighing less than 1 kg, it can fit inside gloveboxes or vacuum chambers, a capability unmatched by other available technologies. The LED technology enables spectrum customization and extends the device's lifetime compared to conventional alternatives like xenon or halogen lamps.



INNOVATIVE ASPECTS

- AAA-Class performance without optics, making the system more robust, portable, and low-maintenance.
- Compact and lightweight design, with a size of 16x16x32 cm and weight under 1 kg, it can fit inside gloveboxes and vacuum chambers.
- LED technology for spectrum customization, extending device lifespan compared to xenon or halogen lamps, and offering greater efficiency.
- Intuitive control software, features an easy-to-use software that not only simulates sunlight but also enables customization of fractions of sunlight and individual power control for each of the 14 wavelengths, allowing the creation of customized spectra.



TECHNOLOGY READINESS (in space application)

TRL 5 (2024)

COUNTRY OF ORIGIN

Spain

LATEST UPDATE

05/2024

TAGS

#characterization

#illumination

#custom

#portable

#sun simulator

#lightweight

APPLICATION AREAS

Energy

Food &
Agriculture

Textiles, Fashion &
Creative Industries

Chemical
Engineering &
Biotechnology

Health

Space
technologies

SPACE
FOR BUSINESS
BUSINESS
FOR SPACE

TECH CARD





TECHNOLOGY DESCRIPTION

The fatigue test proposed presents a novel testing procedure called the stiffness method, which determines the fatigue resistance of metallic materials using only 3 specimens and requires just 1 day of testing per material and condition.

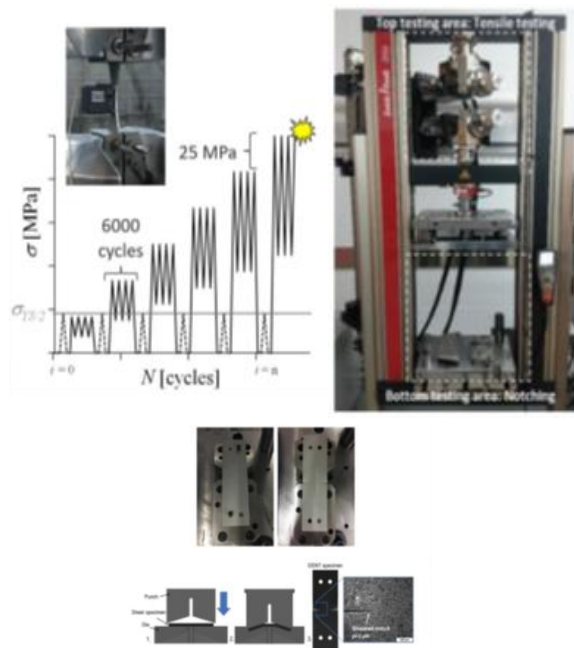
The method monitors the generation of fatigue damage in each specimen and uses it to establish the main fatigue parameters that define the S N curve and the material's fatigue limit.

The proposed test is intended to accelerate material development and streamline the screening process for material selection.



INNOVATIVE ASPECTS

- The new fatigue test has the potential to transform the automotive and aerospace industries by making fatigue testing faster, more accessible, and more efficient.
- Edge-cracking and crash resistance cannot be predicted from conventional lab tests.
- The new fracture method uses precracked specimens and extracts the energy for crack nucleation and propagation following the essential work of fracture (EWF) methodology.



TECHNOLOGY READINESS (in space application)

TRL 6 (2024)

COUNTRY OF ORIGIN

Spain

LATEST UPDATE

05/2024

SPACE
FOR BUSINESS
BUSINESS
FOR SPACE

TECH CARD



TAGS

#Predict

#Health

#Detect

#Measure

#Structures

#Mechanisms

APPLICATION AREAS

Aviation

Health

Transport and
Logistics

Mechanical
Engineering

Construction &
Civil
Engineering

Consumer
Products

Materials/Structure
s/Thermal



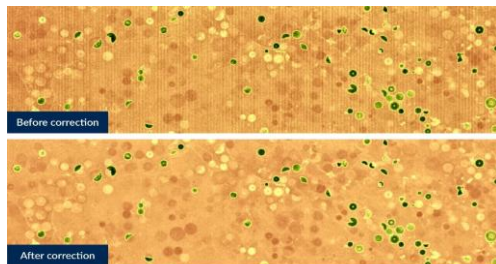
TECHNOLOGY DESCRIPTION

Image sensors produce background patterns that need to be corrected in every acquired image. These patterns depend on sensor temperature, among other parameters. Failing to correct them properly could result in images not meeting the required quality levels.



INNOVATIVE ASPECTS

- Accuracy: Correction performance is comparable to in-situ camera characterization.
- Simplicity: The algorithm can easily run in an embedded system, such as the camera itself.
- Flexibility: Works with any type of sensor, as it does not assume any specific pixel model.
- Heritage: Validated in three space missions featuring uncooled SWIR cameras.

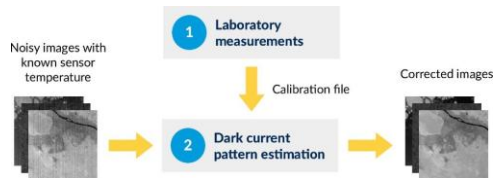
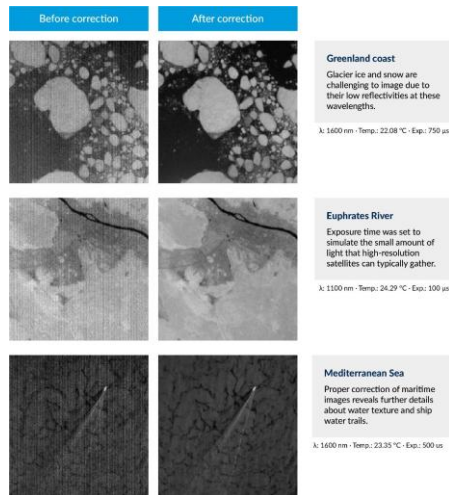


NDMI (Normalized Difference Moisture Index) - Sensor temperature: 29.02 °C - Exp. time: 300 µs



TECHNOLOGY READINESS (in space application)

TRL 9 (2024)



COUNTRY OF ORIGIN

Spain

LATEST UPDATE

05/2024

SPACE
FOR BUSINESS
BUSINESS
FOR SPACE

TECH CARD



TAGS

#sense

#detect

#measure

#electrical

#electronic

#RF

APPLICATION AREAS

Electronic
Engineering

Consumer
Products

Products for
Navigation

End-to-end RF
& Optical
Systems

Comm. &
Remote Sensing



TECHNOLOGY DESCRIPTION

An optical fiber comprising: a first optical fiber and a second optical fiber; the first optical fiber comprising a core extending between ends of the first optical fiber, and being a single mode fiber; the second optical fiber comprising a first core extending between first and second ends of the second optical fiber, and a second core extending between the first and second ends; the second core being apart from the first core such that there is optical coupling between the first and second cores; the second optical fiber being connected to the first optical fiber at the first end such that the first core is connected with the core of the first optical fiber and the second core not being connected with any core of the first optical fiber.

The amount of light in the cores in the coupled-core fiber with Bragg gratings changes when it is subjected to point or periodic bending. This alters the reflectivity of the Bragg gratings but the wavelength position of the same remains unaltered. Thus, the invention can be used to monitor bending (or curvature), its direction as well as temperature.



INNOVATIVE ASPECTS

In the present invention, a twin coupled-core fiber (TCF) is fusion spliced to a conventional single mode optical fiber (SMF). The FBG is inscribed in the TCF with standard procedures. In this manner, the interrogation of the grating is simplified.

- Relative intensity changes of the Bragg gratings can be monitored with an inexpensive system as there is no need to track wavelength changes, besides no fan-in/out devices are required.
- It is well known in the art that the position of the Bragg wavelength changes with temperature, but the intensity of the grating does not change with temperature. Thus, a single grating inscribed in a TCF can provide information about temperature and bending degree and direction of the bending.



TECHNOLOGY READINESS (in space application)

TRL 3 (2024)

COUNTRY OF ORIGIN

Spain

LATEST UPDATE

05/2024

TAGS

#twin-core

#optical fiber

#supermodes

#fiber Bragg

#vibration

#sensors

APPLICATION AREAS

Structural
Engineering

Automotion

Aviation

Robotics

Health

Sensors

Manufacture

SPACE
FOR BUSINESS
BUSINESS
FOR SPACE

TECH CARD





Non-contact and non-invasive disinfection and sanitizing of fluids and surfaces using photochemical solutions

Reference: TD-ES-1002



TECHNOLOGY
BROKER



TECHNOLOGY DESCRIPTION

Far Photonics' disinfection technology leverages advanced ultraviolet (UV) light through photochemical methods to disinfect and sanitize surfaces and fluids. This approach utilizes precise wavelengths of UV light to effectively target and destroy the DNA and RNA of bacteria, viruses, and fungi.

Photochemical methods have various potential applications in the space sector, particularly for cleaning and disinfecting surfaces. These methods can be used for cleaning materials or components that may degrade due to bacteria, viruses, or fungi, especially when traditional cleaning methods are unsuitable due to difficult access, sensitive surfaces, or the inability to use water or solvents.



INNOVATIVE ASPECTS

This technology introduces customizable UV light application during the photochemical disinfection process, optimizing efficacy against specific pathogens while reducing the need for harmful chemicals. It also integrates real-time monitoring and control systems, enabling precise adjustments and optimization of the disinfection process.

Some of the key advantages of this technology include its high efficacy, low maintenance and operating costs, extended equipment lifespan, compact design, fast disinfection cycles, operator and environmental safety, no residue left behind, and water conservation by eliminating the need for rinsing.



TECHNOLOGY READINESS (in space application)

TRL 4 (2024)

COUNTRY OF ORIGIN

Spain

LATEST UPDATE

05/2024

TAGS

#sterilize

#cleaning

#non-invasive

#photochemical

#non-contact

APPLICATION AREAS

Consumer
Products

Food &
Agriculture

Health

Textiles, Fashion
& Creative
Industries

Chemical
Engineering &
Biotechnology

Tourism

Maritime &
Aquatic

SPACE
FOR BUSINESS
BUSINESS
FOR SPACE

TECH CARD





TECHNOLOGY DESCRIPTION

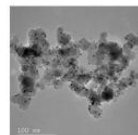
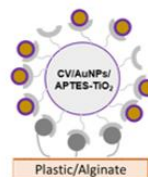
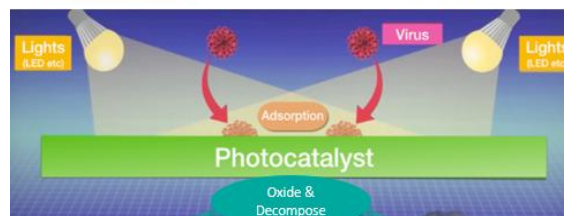
The technology relates to the preparation of metal nanoparticles which comprise a metal and a capping agent coordinated to the metal, wherein the nanoparticles and the capping agent are capable of absorbing visible light. This makes them ideal as a cost-effective elimination pathogen from air, particularly in closed environments like spaceships, preventing the spread of terrestrial life in the space.

Enabling Technical Concept: Semiconductor Metal Oxide Nanoparticles are created by incorporating the metal nanoparticles into a semiconductor metal oxide matrix. This combination leverages the properties of both components, resulting in enhanced photocatalytic activity.



INNOVATIVE ASPECTS

- **Disinfection:** as light activated NPs generate highly reactive radicals capable of destroying the membrane of viruses and microorganisms, reduction up to 99,99+ reduction of viruses (SARS-CoV-2 surrogates) and up to 99,99+ reduction of bacteria (E.Coli)
- **Self-sustainable:** Only visible light is needed, no power consumption.
- **Safe for humans**
- **Differentiation:** the solution is active under visible light (as well as UV)
- **IP Protection:** WO2024236162 (A1)
- **Size/Volume/Weight:** coated surfaces are lightweight and compact, making them suitable for use in confined spaces like spaceships.

0.1 mg/cm²

TECHNOLOGY READINESS (in space application)

TRL 3 (2025)

COUNTRY OF ORIGIN

Spain

LATEST UPDATE

05/2024

SPACE
FOR BUSINESS
BUSINESS
FOR SPACE

TECH CARD



TAGS

#Clean

#Sterilize

#Protect

#Pathogen

#nanoparticles

#visible light

APPLICATION AREAS

Life Support
SystemElimination of viruses and
bacteria inside spaceship



TECHNOLOGY DESCRIPTION

In this invention, we show that it is possible to synthesize by free-radical polymerization biobased and biodegradable copolymers with alternating composition by copolymerizing a cyclic ketene acetal (e.g., MDO) and crotonic acid esters (e.g., butyl crotonate). Furthermore, additional conventional commercial monomers (e.g., acrylates, methacrylates, vinyl acetate) can also be copolymerized with the mentioned comonomers to yield copolymers that do maintain degradability properties.



INNOVATIVE ASPECTS

The effects of environmental pollutions and greenhouse gases release have led to a clear change in the global environmental condition. This global crisis, together with the depletion of fossil resources, gave rise to an increasing attention towards degradable and/or bio-based polymers.

□ **Crotonic acid (CA) is an unsaturated carboxylic acid with;** indeed, it is an isomer of methacrylic acid which is the precursor of acrylate monomers which are used to produce a large variety of polymeric materials. Interestingly, crotonic acid can be obtained from the thermal degradation of poly(3-hydroxybutyrate) (that is synthesized by bacteria from biomasses) and therefore can be easily obtained 100% from renewable sources

□ **The reactivity of MDO** with common commercial monomers is very unfavorable and makes the production of homogeneous copolymers (a quality that is essential for their degradability) very challenging. MDO and CA derivatives hardly react either with themselves or with commercial monomers such as acrylates, methacrylates and vinyl acetate.

□ **Pairing crotonate monomers and MDO** allows a more efficient copolymerization with a third monomer (compared to their individual incorporation). This opens the portfolio of copolymers that can be produced with the ability to be degraded which of strong interest in many applications that require a single use of the polymeric materials.



TECHNOLOGY READINESS (in space application)

TRL 4 (2024)

COUNTRY OF ORIGIN

Spain

LATEST UPDATE

05/2024

TAGS

#polymer

#Biobased

#Recycle

#Health

#Transport

#Logistic

APPLICATION AREAS

Consumer
Products

Medicine and
Pharmacology

Coating

Clean Products

Agriculture

Cosmetics

SPACE
FOR BUSINESS
BUSINESS
FOR SPACE

TECH CARD





TECHNOLOGY DESCRIPTION

The technology offered are organic photovoltaic (OPV) cells designed for energy generation in space. These OPV cells are lightweight, flexible, and efficient, providing a reliable source of power for satellites, CubeSats, small spacecraft, and other orbital platforms. It can be used in space applications requiring lightweight energy solutions, such as powering scientific instruments, communications systems, or propulsion mechanisms.



INNOVATIVE ASPECTS

What it is offered is the unique opportunity to be among the first to test this promising technology in a real space environment. Despite its significant potential, OPV technology has been minimally tested in space, and this project aims to bridge that gap, paving the way for its broader adoption in orbital platforms and beyond.

- **Lightweight Design:** OPV cells weight significantly less than traditional silicon or III-V solar cells, reducing the cost of satellite launches and enabling greater payload capacity.
- **Radiation Resistance:** OPVs exhibit better resistance to cosmic radiation, ensuring longer operational lifetimes.
- **Thermal and Oxygen Stability:** In the vacuum of space, OPVs avoid common degradation issues caused by oxygen and temperature fluctuations.
- **Flexibility:** Enables integration into curved or non-standard surfaces, enhancing design freedom for space structures.
- **Efficiency:** Current OPV efficiencies are around 20%, making them competitive with other space-grade solar technologies.
- **Scalability:** OPVs are manufactured using low-cost printing techniques, which allow scalable production and potential for cost reduction compared to alternatives.
- **Deployability in Space:** The OPV modules can be designed to unroll in space, enabling efficient deployment and coverage of larger surface areas while minimizing storage requirements during launch.



TECHNOLOGY READINESS (in space application)

TRL 5 (2024)

COUNTRY OF ORIGIN

Spain

LATEST UPDATE

05/2024

TAGS

#energy #solarcells #photovoltaic #satellites #cubesats #OPV

APPLICATION AREAS

- Portable power solutions for consumer electronics
- Energy harvesting for indoor photovoltaics in IoT devices
- Lightweight and flexible solar panels for wearables
- Energy systems for remote or off-grid locations



TECH CARD





TECHNOLOGY DESCRIPTION

Its main function is to generate thermal energy using renewable electricity. The system heats water directly within a closed-loop hydraulic circuit- such as those used in heating or domestic hot water applications- without requiring any additional heat sources. It functions autonomously, using energy from photovoltaic modules to deliver reliable hot water in off-grid environments. This simplifies system architecture and eliminates the need for fossil-based or grid-powered heating systems.



INNOVATIVE ASPECTS

Its modular design (available in standardized 60kW and 100kW units) allows scalable deployment tailored to specific energy demands. Compared to traditional thermal systems powered by fossil fuels or electric grids, this technology offers significant benefits:

- Operational cost reduction
- Fossil fuel consumption reduction
- Minimal maintenance requirements
- High installation flexibility
- Eligibility for national and European energy-saving incentive schemes, such as energy savings certificates.



TECHNOLOGY READINESS (in space application)

TRL 9 (2025)

COUNTRY OF ORIGIN

Spain

LATEST UPDATE

07/2025



SPACE
FOR BUSINESS
BUSINESS
FOR SPACE

TAGS

#energy

#thermal

#EMC

#Robotics

#Convert

#Generate

APPLICATION AREAS

Electric
Architecture

Structures/Mechanisms

Energy

Electronic
Engineering

Power & Energy

Life support

Robotics &
Automation



TECH CARD

Other technologies



TECHNOLOGY DESCRIPTION

Functions: SunCoChem membranes are designed to efficiently separate CO₂ from the air without requiring external energy. This makes them ideal for cost-effective CO₂ capture from air, particularly in closed environments like spaceships.

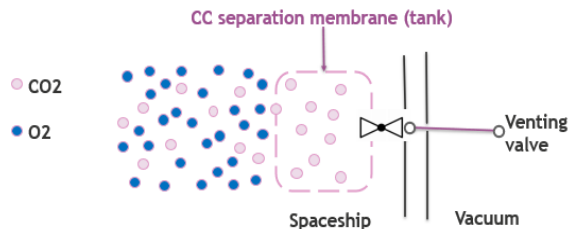
Enabling Technical Concept: The membranes utilize certain specific ionic liquids that allow them to selectively permeate CO₂. This process concentrates CO₂ inside permeable membrane-based cylindric tanks, improving air quality by removing excess CO₂. The filtered CO₂ is stored in the tank and can be evacuated into a vacuum by simply opening a venting valve.

Potential Applications: Spaceships (Enhancing respiratory health by improving air quality), Closed environments (Any enclosed space where CO₂ levels need to be managed efficiently and cost-effectively).



INNOVATIVE ASPECTS

- **Performance:**
 - High Filtering Efficiency: Achieves up to 90% CO₂ filtering efficiency in flue gas mixtures (CO₂, N₂)
 - Energy Efficiency: Operates passively, consuming no external energy, which significantly reduces operational costs (OPEX)
 - Eliminates the need for consumables, further reducing OPEX
 - Safety: no reactive chemicals required
- **Stability:** No water swelling
- **Ease of Use:** Simple CO₂ disposal; filtered CO₂ can be evacuated by simply opening a venting valve
- **Cost:** Reduced CAPEX: Easy production process lowers capital expenditure (CAPEX)
- **Size/Volume/Weight:** membrane tanks are designed to be lightweight and compact, making them suitable for use in confined spaces like spaceships.



TECHNOLOGY READINESS (in space application)

TRL 3 (2025)

COUNTRY OF ORIGIN

Spain

LATEST UPDATE

05/2025

SPACE
FOR BUSINESS
BUSINESS
FOR SPACE

TECH CARD



TAGS

#separate

#filtrate

#store

#protect

#encapsulate

#CO₂

APPLICATION AREAS

Structures

Life support

Aviation

Environment



TECHNOLOGY DESCRIPTION

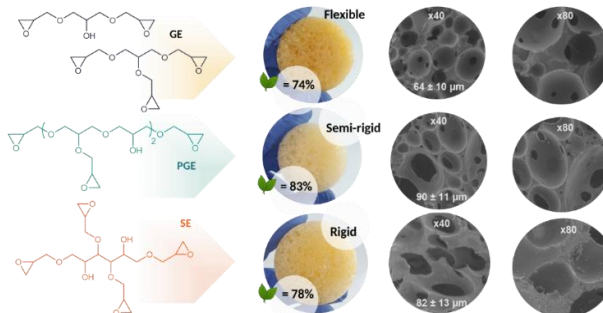
To produce self-foaming cellular materials such as foams – characterized by a cellular structure with gas bubbles embedded in a solid matrix – it is crucial to optimize and harmonize three key parameters:

- Viscosity of the Reaction Mixture: The reactive mixture must transition from a liquid-like state to a solid material at the right stage.
- Crosslinking Reaction: The crosslinking kinetics must be controlled to ensure that the polymer network forms in tandem with gas generation, effectively trapping the gas within the polymer cells.
- Foaming Reaction: Gas should be generated in situ at an appropriate rate and quantity to support uniform cell formation.



INNOVATIVE ASPECTS

- Versatile platform for producing self-expanding polymeric foams from a variety of polymerizable mixtures containing amine or hydroxyl groups through an innovative reaction with amino acid anhydrides.
- Flexible formulation approach, where the amino acid anhydride acts not only as a blowing agent (gas generation in situ) but also as a crosslinking agent (network formulation).
- Enables foams with varying levels of flexibility and rigidity.



TECHNOLOGY READINESS (in space application)

TRL 9 (2024)

COUNTRY OF ORIGIN

Spain

LATEST UPDATE

05/2024

SPACE
FOR BUSINESS
BUSINESS
FOR SPACE

TECH CARD



TAGS

#foams

#porous_materials

#amino_acid

#process

#NCA

APPLICATION AREAS

Infrastructure

Construction

Automotive

Environment

Electronics

Marine

Agriculture



TECHNOLOGY DESCRIPTION

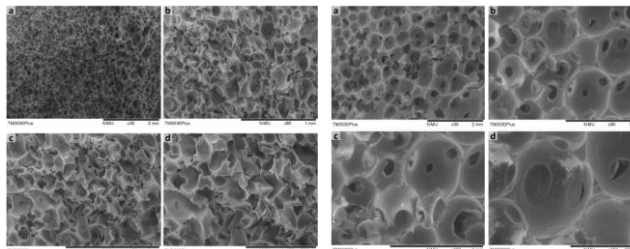
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- **Crosslinking Reaction:** The crosslinking kinetics must be controlled to ensure that the polymer network forms in tandem with gas generation, effectively trapping the gas within the polymer cells.
- **Foaming Reaction:** Gas should be generated in situ at an appropriate rate and quantity to support uniform cell formation.



INNOVATIVE ASPECTS

- **Flexible and rigid foams** → Applications in packaging, cushioning, insulation, construction, and aerospace.
- **Current challenge** → Production dominated by isocyanate-based polyurethanes (~50%), relying on non-renewable resources and toxic chemicals.
- **Sustainable alternative** → Development of NIPUs (Non-Isocyanate Polyurethanes) from cyclic carbonates: safer, less toxic, and with improved closed-cell properties.



TECHNOLOGY READINESS (in space application)

TRL 9 (2024)

COUNTRY OF ORIGIN

Spain

LATEST UPDATE

05/2024

TAGS

#foams

#porous_materials

#amino_acid

#process

#NCA

APPLICATION AREAS

Infrastructure

Construction

Automotive

Environment

Electronics

Marine

Agriculture

SPACE
FOR BUSINESS
BUSINESS
FOR SPACE

TECH CARD





TECHNOLOGY DESCRIPTION

It is an advanced freeze drying (lyophilization) system designed for precise and autonomous biological sample stabilization. It operates using fully solid-state cooling platform, completely eliminating the need for liquid refrigerants and traditional compressors. The system integrates a dry, scroll-type vacuum pump to maintain deep vacuum conditions without contamination or maintenance. This system addresses critical needs in biobanking, clinical sample logistics, life science R&D, and spaceflight medical payloads requiring long-term



INNOVATIVE ASPECTS

- Oil-free and compressor-free solid-state operation with highly precise freeze-drying conditions for sensitive biological materials
- CFC-free, climate-resilient cooling architecture
- Integrated low maintenance scroll vacuum pump
- Intuitive touchscreen with pre-programmed drying cycles
- Dual SBS-format shelf increases throughput and flexibility
- Precision stoppering mechanism for hermetic vial sealing
- Silent (<62dB) and compact form factor
- Excellent vacuum performance
- Tray and condenser temperature range: -65°C to +70°C
- Fully enclosed, transport and operation-safe system (IP20)



TECHNOLOGY READINESS (in space application)

TRL 9 (2024)



COUNTRY OF ORIGIN

Spain

LATEST UPDATE

07/2024

SPACE
FOR BUSINESS
BUSINESS
FOR SPACE

TECH CARD



TAGS

#drying

#biological

#liophilizer

#cooling

#R&D

APPLICATION AREAS

Health

Chemical
Engineering

Biotechnology

Space
environment



TECHNOLOGY DESCRIPTION

A modular hydrogen generation system based on catalytic steam reforming of bioethanol, designed to produce high-purity H₂ for use in fuel cells or as a chemical feedstock. The system integrates multiple stages: pre-heating, catalytic reforming, water-gas shift (WGS) conversion, and Pressure Swing Adsorption (PSA) purification. It operates in a fully electric configuration, enabling direct coupling with renewable sources such as solar arrays.

The unit is engineered for high automation, autonomous control, and robust performance under dynamic operating conditions (start-stop cycles). Its compact design facilitates deployment in isolated or off-grid environments, such as lunar or Martian habitats, planetary bases, or forward-deployed operations. Bioethanol acts as a safe, liquid, renewable hydrogen carrier – simplifying logistics compared to gaseous H₂.



INNOVATIVE ASPECTS

- Full integration of reforming: WGS(water gas shift), and PSA (Pressure Swing Adsorption) in one compact platform
- High-purity hydrogen: (>99%) meeting PEM fuel cell requirements
- Operation based on bioethanol: non-toxic, liquid, renewable and easy to transport.
- Fully electric operation: compatible with solar systems
- Easy to deploy and maintain.
- Start-stop optimized: for intermittent demand and variable power sources.
- In-situ regeneration or easy replacement of catalyst modules
- Design with embedded safety protocols (H₂ detection, purge systems)



TECHNOLOGY READINESS (in space application)

TRL 6 (2025)

COUNTRY OF ORIGIN

Spain

LATEST UPDATE

07/2025

SPACE
FOR BUSINESS
BUSINESS
FOR SPACE

TECH CARD



TAGS

#convert

#transform_energy

#produce

#robotics

#materials

APPLICATION AREAS

Space

Energy

Transport and
Logistics

Safety and
security



Materials, Coatings & Processes



Automation & Robotics



Mechanical Components & Systems



Electronics & Optoelectronics



Digitisation, Computer Hardware & Software



Communication & Information



Sensors & Measurement Techniques



Life sciences, Pharmacy & Medicine



Precision Mechanics & Optics



Energy



Services



Other technologies