DURABLE Forums on Robotic & Aeronautic Tech. for solar & wind O&M

Webinar and B2B virtual meetings
2nd April 2020

Interreg Atlantic Area European Regional Development Fund EUROPEAN UNION DURABLE

Presentation

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BEFORE STARTING

Recommendations

- We would love to hear from you during the presentation:

  Write us your questions by: 'Chat window'

- You will find later this webinar the B2B session:

  Book your latest meetings right now…

  https://robotic-aeronautic-tech-foro.b2match.io/

- Our website

  https://www.durableproject.eu/

- Please, keep your microphones off
- The webinar is been recorded
- Feel free to share this webinar in your social networks!!

ADVANCED TECHNOLOGY TO BOOST THE USE OF RENEWABLE ENERGY.

The European project DURABLE will apply drones and robots to accelerate the performance of wind and solar power in the Atlantic region.

SUMMARY

Technologies to be presented

1. **ALERION**
   - Intelligent drones: Autonomous up-close relative navigation ***Request a meeting***
   - Embedded edge computing: Real-time damage detection ***Request a meeting***

2. UNIVERSIDAD DE SEVILLA *Request a meeting*

- Intelligent navigation for autonomous aerial inspection
- Custom aerial manipulator design and development

3. **FADA-CATEC**

- Autonomous UAV inspection without contact - Visual
- Autonomous UAV inspection without contact - IR Thermography
- Autonomous UAV inspection with contact ***Request a meeting***

***4.* UWE BRISTOL**

- Custom UAV design and manufacture
- ***Request a meeting***

5.INSTITUTO SUPERIOR TECNICO *Request a meeting*

- Autonomous UGV inspection without contact
- Autonomous UGV inspection with contact
- Guidance, navigation and control of an UGV
- Ground mobile support
- 3D Reconstruction

6. **LORTEK**

- Metallic Additive Manufacturing technologies (SLM, LMD & WAAM) ***Request a meeting***
- Inspection by NDTs (Electroluminiscence & Thermography) ***Request a meeting***

7.* DUBLIN CITY UNIVERSITY *Request a meeting

- Radio Frequency: Near/Far Field Sensor
- Smart Grid intelligent sensors

8. ESTIA *Request a meeting*

- Mixed Reality (MR) Remote vehicle control
- Mixed Reality (MR) Remote arm robot control
- Mixed Reality (MR) Composite View
- Mixed Reality (MR) Additional environment information visualisation
- Abrasive water jet blind machining

Do not forget to request B2B meeting, please…

https://robotic-aeronautic-tech-foro.b2match.io/page-3781

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ALERION

WP4 webinars

Who we are

Alerion

ALERION

- Alerion was born in 2014 in Munich (Germany)
  - Incubated at **European Space Agency's** Business Incubation Centre
- Since 2016 we have been offering **custom automated industrial inspection solutions**
- Our dynamic team comprises engineers with research and industry experience in developing:
  - High-performance computational software
  - Machine learning based computer vision
  - High performance drones for extreme environments

Main lines of work

ALERION

Intelligent drones

- Autonomous and automated inspections
- Relative up-close navigation
- Complex multi-structure inspections

Embedded edge computing

- High-performance computing
- Real-time data analysis
- AI based detection

Custom UAV design

- Designed for extreme environments
- Longer flight-time

Autonomous up-close relative navigation

ALERION

Description

Autonomous navigation that allows the drone to be placed at a constant distance from the structure with the blade aligned perpendicular to the drone's body frame. The drone also determines which blade it's inspecting, which side of the blade, and the distance to the root.

Potential application

Implementation of inspection/maintenance robotic arm with autonomous control. Useful for maintenance operators and pilots

Benefits

Remote inspection and manipulation with high precision. Improved planning of O&M: automated and repeatable inspections. Minimizing personnel risks, costs (very high in this kind of works) and time.

Category	Aerial inspection
Application field	Wind
Current TRL	6

Real-time damage detection

ALERION

Description

Real-time damage detection while the inspection is being made based on AI algorithms. After landing, a damage-report is created with all the damages and their context, like, exact position, damage type, etc.

Potential application

Remote arm robot control by natural interaction.

Benefits

Flexible inspection solutions with a digital register (for example, onsite reports, etc.)Minimizing personnel risks, costs (very high in this kind of works) and time: no need for cloud based infrastructure, no need of internet access.

Category	Aerial inspection
Application field	Wind & Solar
Current TRL	4

If you are interested in requesting a B2B meeting, please do not hesitate to contact us to know more about the development of our technologies

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Technical presentations

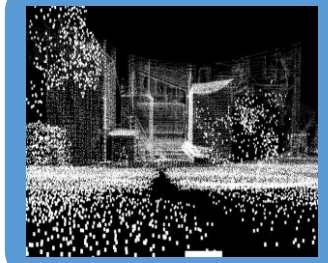
WP4 webinars

Who we are

University of Seville

- The Robotics, Vision and Control Group (GRVC) of the University of Seville is a large group consisting of more than 70 members, including 13 professors, researchers and engineers. GRVC plays a relevant international role in robotics, and particularly in aerial robotics and unmanned aerial systems.
- GRVC combines scientific research with technology development, technology transfer to companies and applications in collaboration with these companies.
- Moreover, in the last 5 years, GRVC has had more than 55 research projects and contracts obtaining an external funding of more than 12 million euros of funding from the European Commission, companies, the Spanish Research Programme and Regional Research Programme in the topics.

Main lines of work



Intelligent Navigation

- Navigation in GPS denied and confined spaces
- Collision detection and avoidance
- Simultaneous localization and mapping (SLAM)

Aerial robotic manipulation

- Design of efficient and interactive systems
- Control, perception and planning for aerial manipulation

Cooperation of multiple aerial systems

- Planning for the cooperation of multiple aerial systems
- UTM/U-space functionalities
- Physically interacting system

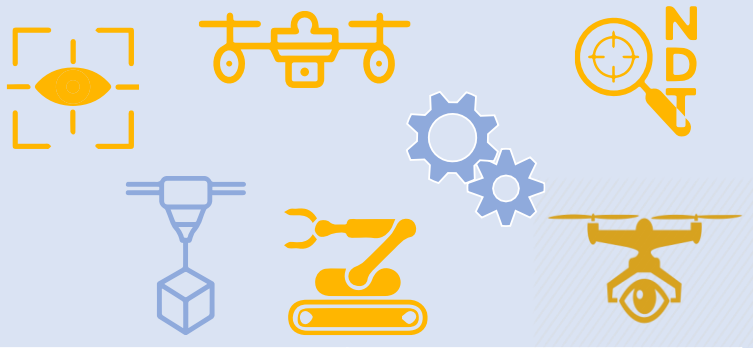
Technology catalogue

Intelligent navigation for autonomous aerial inspection

Description
UAV intelligent navigation technology for autonomous aerial inspection based on GNSS, LIDAR and vision. Simultaneous localization and mapping (SLAM) in GNSS-denied environments. Real-time collision avoidance using onboard sensors.

Potential application
Autonomous aerial inspection for industrial infrastructure. Autonomus and automated non contact NDT inspections using visual sensors.

Benefits
Minimizing personnel risks, costs (very high in this kind of works) and time. Inspecting diferent types of defects/malfunction. Reduced inspection time by enlarging the covered area.



Category	Aerial inspection
Application field	Wind & Solar
Current TRL	5

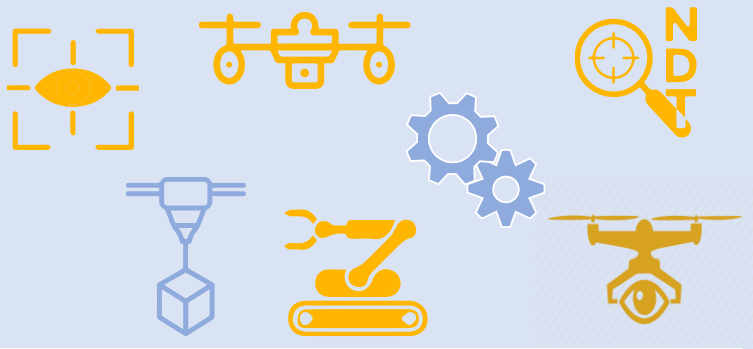
Technology catalogue

Custom aerial manipulator design and development

Description
Custom UAV with an onboard manipulator. Several manipulator configurations, including two arms and compliant joints. Aerial manipulator is completely automated from take-off to landing.

Potential application
Autonomous aerial inspection of infrastructure with contact using NDT sensors. Detection of defects in wind generator blades and PVT panels.

Benefits
Minimizing personnel risks, costs (very high in this kind of works) and time. Reduced inspection time by enlarging the covered area. Inspecting diferent types of defects/malfunction.



Category	Aerial inspection
Application field	Wind & Solar
Current TRL	5

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FUNDACIÓN ANDALUZA PARA EL DESARROLLO AEROESPACIAL

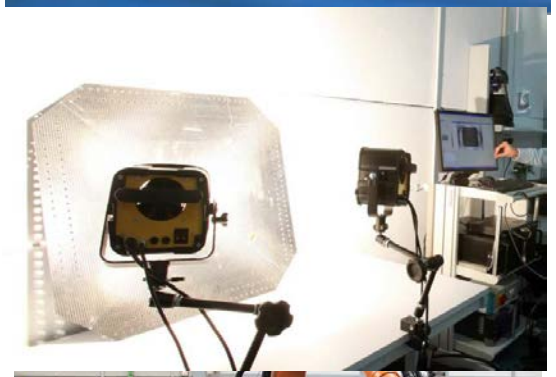
CATEC CENTRO AVANZADO de TECNOLOGÍAS AEROESPACIALES

Dr. Irene Heras Pérez, Senior Researcher

Who we are

FADA - CATEC

- The Andalusian Foundation for Aerospace Development (FADA) is a **non-profit organisation** for the management and control of **CATEC research centre**. The main goal of FADA-CATEC is the research and development in aerospace related technologies, supporting industries in collaboration with universities and other research organizations.
- FADA-CATEC develops technology in their three main research areas:
  - Materials and Processes
  - Avionics and Systems
  - Robotics and Automation.
- FADA-CATEC has a large experience in developing technological solutions and applications with UAS and aerial robotics as well as in material inspection by non-destructive tests (NDT). They will develop and adapt successful technologies from aerospace **sector to create robotic solutions for NDT inspections for O&M in renewable plants**



Main lines of work

Autonomous UAV inspection without contact - Visual

- Autonomous and automated noncontact inspections thorough visual sensor
- Mapping, recognition and detection of visible defects

Autonomous UAV inspection without contact - IR Thermography

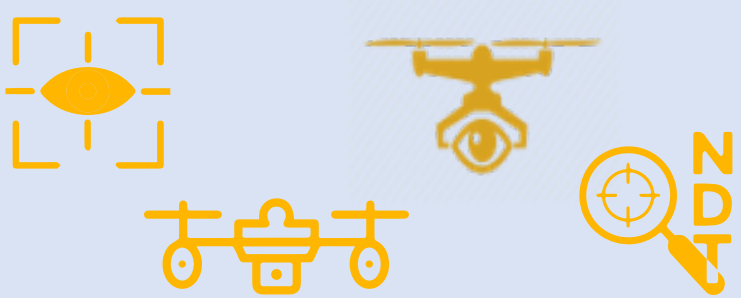
- Infrared inspection to analyse large amount of areas, analysis of internal structure defects
- Autonomous and automated aerial inspection georeferenced

Autonomous UAV inspection with contact

- Analysis of internal structure defects not detectable visually or by IR thermography sensors
- Autonomous and automated inspection with contact

Autonomous UAV inspection without contact - Visual

Description
Autonomous aerial visual inspection without contact with Unmanned Aerial Vehicles (UAVs)



Potential application
Performing autonomous and automated inspections thorough visual sensors, with adaptable solutions for multiple scenarios considering the same inspection systems and reducing costs of bespoken solutions. Mapping, recognition and detection of visible defects
Benefits
Analyzing large amounts of panels/blades in a short time, so a general overview of an energy plant is achieved at the same time/situation (easy to compare), obtaining a digital register

Category	Aerial inspection
Application field	Wind and solar
Current TRL	5

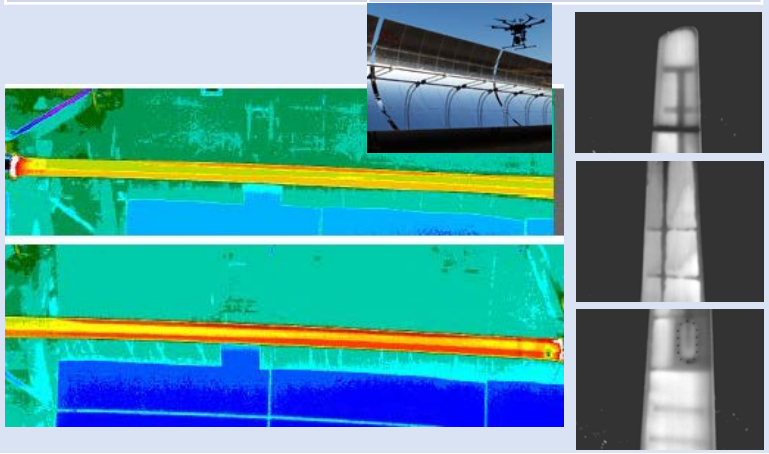
Autonomous UAV inspection without contact - IR Thermography

Description
Autonomous aerial inspection through infrared thermography (non contact) for O&M in renewable energy plants with Unmanned Aerial Vehicles (UAVs)

Potential application
Performing autonomous and automated non contact NDT inspections thorough infrared camera. Analyzing defects in solar panels, failures in absorber tubes or lack of efficient in molten salt tanks isolation of CSP Plants, not visually detectable

Benefits
Analyzing large amounts of panels/blades in a short time, so a general overview of the Plant is achieved at the same period of time/situation obtaining a digital register (georeferencing picture)

Category	Aerial inspection
Application field	Wind and solar
Current TRL	5



Autonomous UAV inspection with contact

Description
Autonomous aerial inspection with contact for O&M with Unmanned Aerial Vehicles (UAVs). This technology allows analyzing internal surface structure defects not detectable visually or by IR thermography sensor, thorough an ultrasonic sensor.

Potential application
Autonomous aerial inspection with contact thorough an ultrasonic sensor to analyze internal structural defects in wind generator blades, such as: detection of structure failures, mapping composite delamination or interface disbound in wind generator blades

Benefits
Performing autonomous and automated NDT inspections where contact is required thorough ultrasonic sensor, without additional support, minimizing personnel risks, costs and time.

Category	Aerial manipulation
Application field	Wind farms
Current TRL	3

If you are interested in requesting a B2B meeting, please do not hesitate to contact us to know more about the development of our technologies

Entity: CATEC. Advanced Center for Aerospace Technologies

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Technical presentations

WP4 webinars

Who we are

UWE Bristol

The University of the West of England, Bristol, is a public research university situated in the city of Bristol, in the United Kingdom.

Bristol Robotics Laboratory: largest academic centre for multi-disciplinary robotics research in the UK

DURABLE Team:

Dr. Matthew Studley – Associate Head of Department - Engineering Design and Mathematics (Research and Scholarship)

Dr. Steve Wright – Senior Research Fellow, Avionics and Aircraft Systems

Joonas Neelov – Research Associate (Aerial Robotics)

Main lines of work

Custom UAV design and manufacture

- Bespoke multi-rotor UAV plaforms for a variety of payloads
- Significant payload mass variation
- Significant operational environment variation
- High performance at relatively low cost

Custom UAV design and manufacture

Description
Custom multi-rotor UAVs for a wide variety of payloads and sensors. Payload and sensor mass variation: 100g to 10kg Flight endurance: 30 - 60 minutes, 90 minutes max Environmental resistance: Cold, hot, wet and windy

Potential application
Automated visual and thermal inspection of PV solar panels. Flying payloads developed by other DURABLE partners. Onboard real-time data collection and processing using machine learning.

Category	Aerial inspection
Application field	Solar
Current TRL	5

Benefits
Relatively low-cost, high-performance airborne platform. Aircraft adapted for specific payload, mission and environment. Provable reliability for aircraft systems.

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Entity: University of the West of England, Bristol

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Technical presentations

WP4 webinars

Who we are

Instituto Superior Técnico (IST)

- IST is the **largest Engineering School** in Portugal, with 19 undergraduate, 32 master and 33 PhD programmes.
- IST has 3 campus, more than 11.000 students (9% are PhD students, 21% of which are international) and 870 Professors/Researchers.
- IST accommodates **23 R&D units**, with a total of 1.200 PhD and **10 departments**
- **IST regularly participates and leads European, International and National R&D projects** in Robotics

Main lines of work

Inspection with autonomous mobile robots

- Remote inspection / manipulation
- Logistics management for optimization
- Cooperation of multiple robots in operation

Guidance, navigation and control of robots

- Security deployment with obstacle detection and avoidance.
- Mapping, planning and scheduling operations

3D reconstruction

- Planning and practice of operation and protocols with Virtual Reality/Augmented Reality.
- Human machine interface

Autonomous UGV inspection without contact

Description
Autonomous UGV performing **inspection of solar panels** with **contactless technologies**, such as cameras, depth sensors, sonars.

Potential application
UGV equipped with sensing technologies to perform inspection operation on solar panels without contact. Useful mainly for **maintenance operators and pilots**

Benefits
Efficient **remote inspection / manipulation**. Opportunity of inspection during solar panels operation or **during shutdown at night**, and without operators in the field. **Logistics management** to optimize the planned trajectories and sequence of operations, as well as the coordination of **multiple UAVs and UGVs in simultaneous operations**.

Category	Ground inspection
Application field	Solar
Current TRL	2

Autonomous UGV inspection with contact

Description
Autonomous UGV performing **inspection of solar frames** with contact technologies, such as **robotic manipulators** installed on the UGV to manipulate solar panels while performing inspection.

Potential application
Robotic manipulators installed on UGV with specific technologies at the end effector to perform **inspection and maintenance operations in interaction with solar panels**. Useful mainly for **maintenance operators and pilots**

Benefits
Micro inspection of the photovoltaic plates to detect **cracks, bubbles and dirt** on the panels. Ability to use **more than one manipulator** at the same time. Operations during day or night, **without human support in the field**.

Category	Ground inspection
Application field	Solar
Current TRL	2

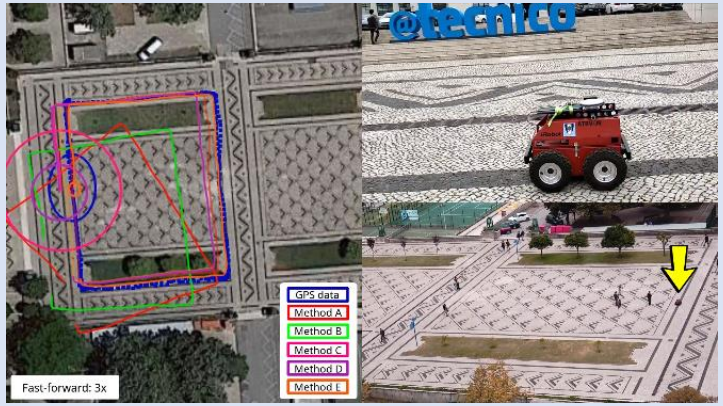
Guidance, navigation and control of an UGV

Description
Guidance, navigation and control (GNC) of an Unmanned Ground Vehicle (UGV), i.e., **localization in real-time** in a given scenario, **path planning** and **path following**, **obstacle detection and avoidance**.

Potential application
Navigation of UGV in solar farms and wind farms. To perform inspection/maintenance operations and to provide support in a **particular panel, set of panels or in the global farm** without human guidance neither manual mapping.

Benefits
Security and surveillance with obstacle detection and avoidance. **Plan and schedule automatic operations** in the farm, where transportation is required. **Logistic managements** to optimize the sequence of operations, sequence of panels and **cooperation of multiple UGV in operation**.

Category	Ground inspection
Application field	Wind and solar
Current TRL	5



Ground mobile support

Description
A UGV is able to provide **support for UAV**, namely **power support** as a **mobile charging station**, **communication support** as a mobile repeater and a **mobile landing platform**.

Potential application
UGV to provide support of guidance, communication and charging to **keep a fleet of UAV in continuous operation of inspection and maintenance of solar and wind farms**. Mobile charging station for the drones. Useful mainly for **maintenance operators and pilots**.

Benefits
UGV to provide support of guidance, communication and charging to keep a fleet of UAV in continuous operation of inspection and maintenance of solar and wind farms. **Mobile charging station** for the drones. Useful mainly for maintenance operators and pilots.

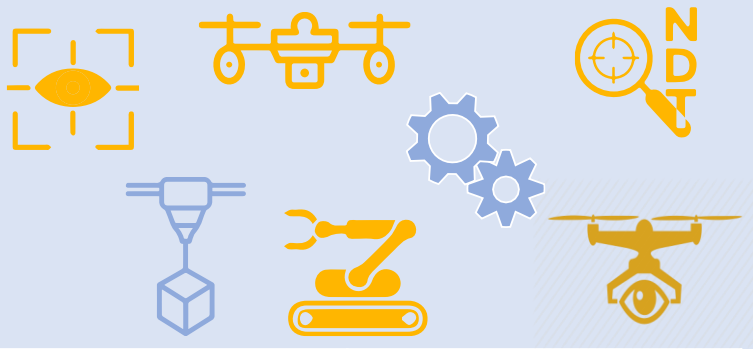
Category	Ground inspection
Application field	Wind and solar
Current TRL	4

3D Reconstruction

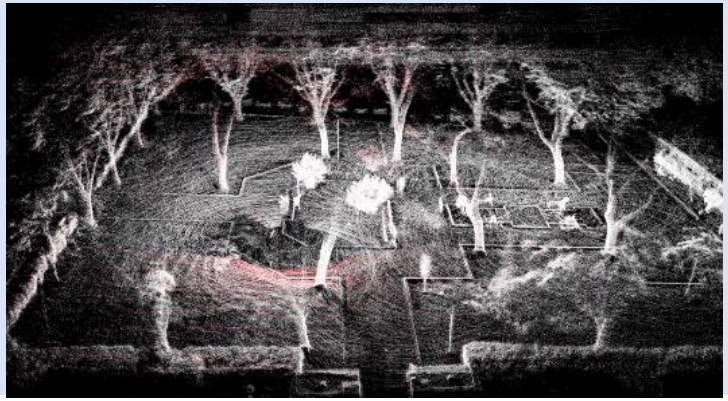
Description
Mapping the scenario in a **3D reconstruction** able to support navigation, **Virtual Reality** and **Augmented Reality** needs.

Potential application
Validation of **3D reconstruction in solar farms and wind farms**. **Planning and practice of operation** and protocols with VR/AR. **Track the status** of the fleet of UAV/UGV. Useful mainly for **maintenance operators and pilots**.

Benefits
Logistics management to optimize the planned trajectories and sequence of operations, as well as the coordination of multiple UAV and UGV in simultaneous operations. Characterization of the environment for monitoring vegetation to prevent shadows appearing on solar panels (trees, buildings, etc.).



Category	Monitoring
Application field	Wind and solar
Current TRL	5



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TÉCNICO LISBOA

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LORTEK

WP4 webinars (2, 8 & 22 April 2020)

Lexuri Vazquez - LORTEK

Who we are

LORTEK TECHNOLOGICAL CENTRE

LORTEK
MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

- LORTEK is a non-profit private technological centre highly specialised in advanced manufacturing and smart factories, specially in **joining technologies, additive manufacturing and industry 4.0 technologies including non destructive testing techniques** applied to metallic materials.
- Our **goal** is to generate and transfer excellent knowledge, based on the state of the art technologies, to multisectorial industrial network in order to improve their competitiveness.

Main lines of work

LORTEK
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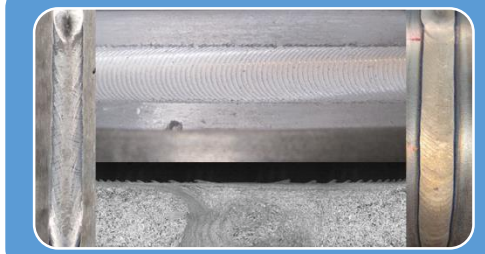
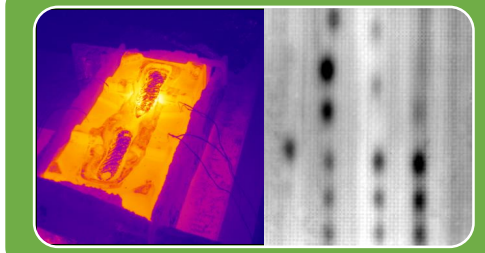


Joining technologies

- Laser, electric arc, friction, resistance spot and flash.
- Applied to a **wide extension of metallic materials**.

Additive manufacturing

- **Powder bed fusion** and **directed energy deposition** technologies.
- Manufacturing and repairing from CAD files of high complex geometries and/or large with minimum waste of material and short lead times.



Inspection by NDTs

- **Active thermography** based on induction and optical (flash and halogen lamps) excitation experience.
- Process monitoring via **passive thermography**.
- Defect detection in metallic and non-metallic components.

Technology catalogue

MAM-SLM (Selective Laser Melting)

LORTEK
MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

Description

Additive manufacturing PBF technology that uses **metallic powder** as feedstock and **laser** as power source for the manufacturing of **highly complex and detailed parts**. It only needs a CAD file with the design of the part and material to obtain the part in a sort lead time and with high accuracy.

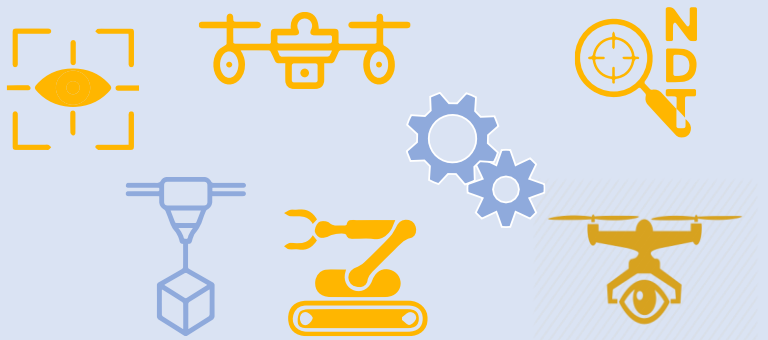
Potential application

Maintenance operations like **manufacturing of broken parts** on demand for substitution **avoiding long stoppages**.

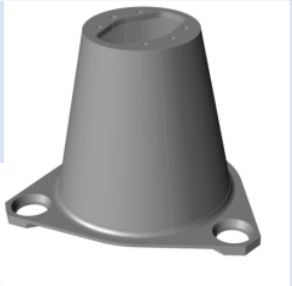
Benefits

Efficiently supporting the O&M activities for **substitution operations**:

- manufacturing of new parts in a short lead time
- possibility of redesign for weight saving
- possibility to avoid numerous part assemblies
- maximum material savings
- no need of stock
- no need of large production



Category	Additive manufacturing
Application field	Repairing and fabrication
Current TRL	6



Technology catalogue

MAM-LMD (Laser Metal Deposition)

LORTEK
MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

Description

Additive manufacturing DED technology that uses **metallic powder** as feedstock and **laser** as power source for the manufacturing and **repairing of complex and high value added parts**. It only needs a CAD file with the design of the part or the add-on and material to obtain the final part in a short lead time.

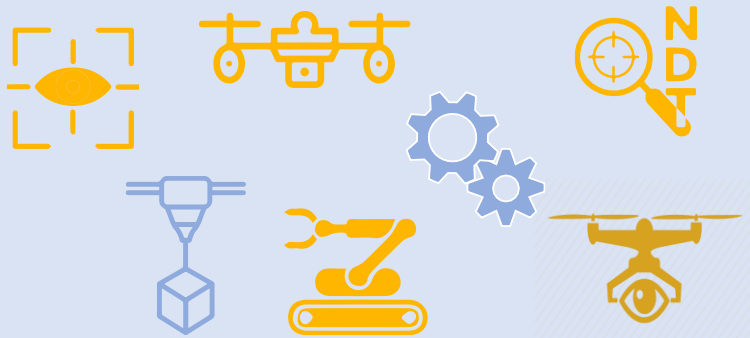
Potential application

Reparation of complex and detailed high value **broken parts or worn surfaces** avoiding long stoppages. Formation of **protective coatings** for extended live.

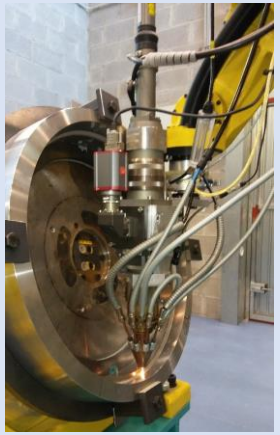
Benefits

Efficiently supporting the O&M activities for **repairing operations**:

- reparation of broken parts in a short lead time
- extended life of parts
- high quality reparations
- material savings
- no need of stock



Category	Additive manufacturing
Application field	Repairing and fabrication
Current TRL	6



Technology catalogue

MAM-WAAM (Wire and Arc Additive Manufacturing)

LORTEK
MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

Description

Additive manufacturing DED technology that uses **metallic wire** as feedstock and **electric arc** as power source for the **manufacturing and repairing** of **large** dimensions parts. It only needs a CAD file with the design of the part or the add-on and material to obtain the final part in a short lead time.

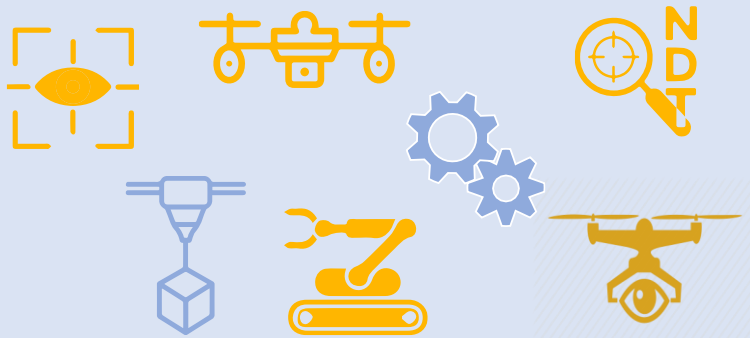
Potential application

Fabrication and reparation of broken large parts avoiding long stoppages.

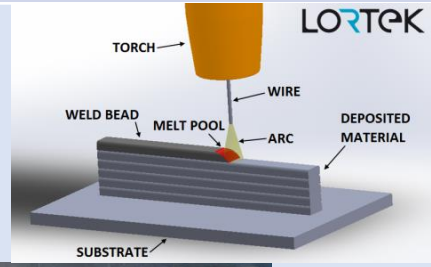
Benefits

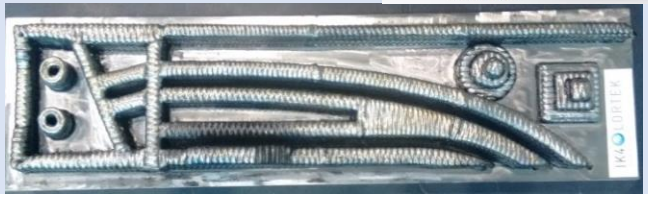
Efficiently supporting the O&M activities for **substitution and/or repairing** operations:

- manufacturing and reparation of broken parts in a short lead time
- extended life of parts
- maximum material savings
- possibility to avoid numerous part assemblies
- no need of stock
- no need of large production



Category	Additive manufacturing
Application field	Repairing and fabrication
Current TRL	6





Inspection by NDTs (Active Thermography)

LORTEK
MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

Description

Thermography (IRT): Non destructive technique in which the infrared radiation of the surface of a component is measured in order to detect possible defects that affect heat dissipation.
Active thermography includes an excitation source to increase the temperature and generate heat flux on the piece.
Excitation sources:

- Laser
- Flash / Halogen lamps
- Induction

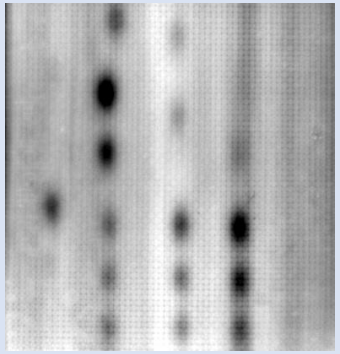
Potential application

- Defect detection in metallic and non-metallic components.
- Inspection of solar panels during non-active phase.
- Wind turbine inspection, assembled and disassembled.

Benefits

Clean
Repeatable
Automatization
Easily interpretable results

Category	NDT
Application field	Defect detection
Current TRL	5



Inspection by NDTs (Passive Thermography)

LORTEK
MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

Description

Thermography (IRT): Non destructive technique in which the infrared radiation of the surface of a component is measured in order to detect possible defects that affect heat dissipation.
Passive thermography benefits from the heat generated during a process in order to detect unusual thermal behavior.

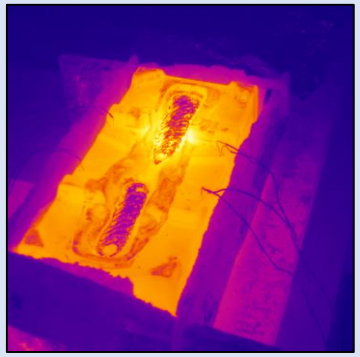
Potential application

- Lifetime assesment and process monitoring.

Benefits

Clean
Repeatable
Automatization
Easily interpretable results

Category	NDT
Application field	Defect detection
Current TRL	5

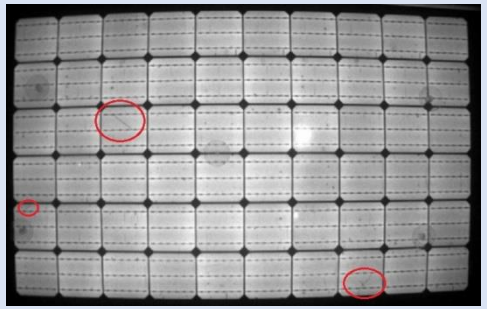


Inspection by NDTs (Electroluminiscence)

LORTEK
MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

Description
Electroluminiscence (EL): EL measurements take advantage of the radiative inter-band recombination of excited charge carriers in solar cells. It consists of applying a direct current to the PV module and measuring the photoemission by means of an infrared-sensitive camera. EL imaging provides insight into micro cracks and other defects within the cell material: • detecting electrical inhomogeneities caused by intrinsic defects: **(e.g. grain, boundaries, dislocations, shunts or other process failures)** • extrinsic defects: **(e.g. cracks or interrupted contacts)**
Potential application
• Inspection of solar panels during non-active phase.
Benefits
Clean Repeatable Automatization Easily interpretable results

Category	NDT
Application field	Defect detection
Current TRL	5



If you are interested in requesting a B2B meeting, please send a request to **Pablo Lopez de Uralde (NDTs)** and/or **Lexuri Vazquez (AM)**. Thank you.

Entity: LORTEK

Contact Person: Lexuri Vazquez

Telephone number: +34 943 88 23 03

Email: lvazquez@lortek.es / plopez@lortek.es

Website: www.lortek.es

LORTEK

MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

Radio Emission Spectroscopy for Wind Turbine Systems

DCU – Dublin City University

Prof. Patrick McNally & Alessio Di Liberto

patrick.mcnally@dcu.ie
alessio.diliberto@dcu.ie

Who we are

DCU – Dublin City University

- Prof. McNally is a world leader in the field of **advanced x-ray diffraction imaging technology, non-destructive radio frequency metrology for plasma processing (Radio Emission Spectroscopy), and copper halide materials.** He served as Head of the School of Electronic Engineering in DCU and is currently a Funded Investigator in Science Foundation Ireland's Advanced Manufacturing Research Centre (I-FORM) and Co-Director of the Nanomaterials Processing Laboratory (NPL) in DCU.

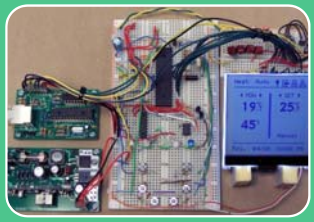
- Alessio Di Liberto is a Microwave and RF Designer Engineer with around 15 years of international experience on **Military defence systems** (Electronic Warfare), **Aerospace guidance and surveillance devices, RF ID-Identification and Tracking devices (RFID)** using mixed RF techniques, **IoT (Internet of Things) devices** for control and collection of remote data using multi RF/Internet based hybrid solutions.

Who we are

Main lines of work

Phase ALPHA

- DATA COLLECTION of RF emissions in the range 1 kHz – 2 GHz
- COTS devices at this stage (e.g. SDR)



Phase BETA

- DESIGN of Experiment (DoE)
- HW and SW OPTIMIZATION

Phase GAMMA

- First PROTOTYPE/CONCEPT
- PRE-ENGINEERING documentation

Technology catalogue

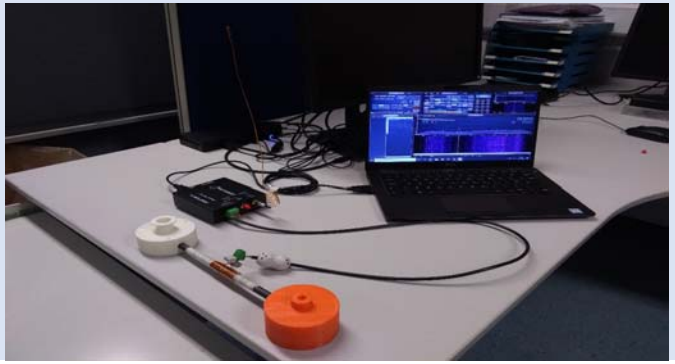
“Radio Emission Spectroscopy: Near/Far Field Sensors”

Description
Customized **E-FIELD and B-FIELD sensors (ELECTRIC and MAGNETIC FIELDS)** on board **drones** connected to **dedicated electronic circuitry** (HW and SW)

Potential application
Remote **health/status check analysis** of wind turbines **from drones**

Benefits
• **Reliability** of measurements • **No human resources** needed in loco • **Time and money saving**

Category	Arial Inspection
Application field	Wind & Solar
Current TRL	3



Technology catalogue

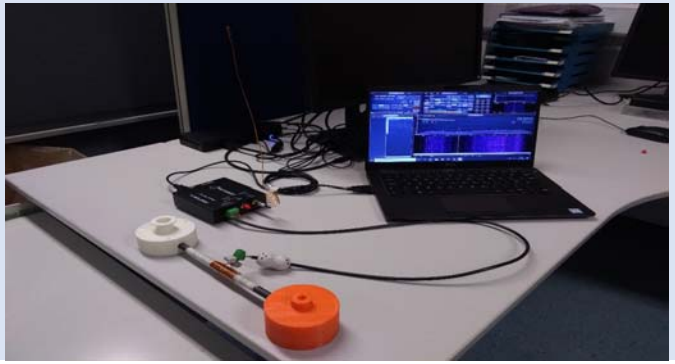
“Smart Grid intelligent sensors”

Description
Smart grid network using RF intelligent sensors **inside wind turbines** nacelles connected through *ad hoc* **wireless network** (e.g. mesh network) to share relevant data remotely

Potential application
Remote **health/status check analysis** of wind turbines **using a Gateway on board of a drone**

Benefits
• Real time **monitoring of an entire site at once (no single turbines)** • **Remote** access to **data** through **secured Internet** (e.g. IPv6)

Category	Arial Inspection
Application field	Wind and solar
Current TRL	2



If you are interested in requesting a B2B meeting, please do not hesitate to contact us to know more about the development of our technologies

Entity: DCU – Dublin City University

Contact Person: Alessio Di Liberto

Telephone number: +353 (0) 833 833 001

Email: alessio.diliberto@dcu.ie

Website: www.eeng.dcu.ie/npl/

Technical presentations

WP4 ESTIA webinars

Who we are

ESTIA

The **ESTIA** campus is an ecosystem which includes the following activities :

- **ESTIA – Formation** *Education* : Engineering school, bachelor, lifelong training
- **ESTIA – Entreprendre** *Entrepreneurship* : 3 thematic nurseries
- **ESTIA – Recherche** *Research* : Researchers teams & technical platforms

ESTIA manages 5 technical platforms.

Among the Research platforms, one is specialized in Human-Systems Interactions and develops research activities in augmented and virtual reality, with a dedicated prototyping platform named **PEPSS**. **Compositadour** is the technical platform from ESTIA specialized in the robotized processes for placement of composite materials.

ESTIA participates in several EU funded projects. Recently: POCTEFA: Transfron3D, Connect Innovation Bai, Transferrin, ORHI; SUDOE: Addispace; INTERREG EUROPE: Retrace; H2020: Hindcon, Neptune, Greenplay, Rezbuild, Cobomega.

Who we are

Research Platforms Activities (1/2)

PEPSS

HUMAN FACTORS FOR INTERACTIVE TECHNOLOGY

COMPOSITADOUR

COMPOSITES & ROBOTICS SOLUTIONS

ADDIMADOUR

ADDITIVE MANUFACTURING SOLUTIONS

Research Platforms Activities (2/2)

Who we are

SIMECOMP

NUMERICAL SIMULATION

ENERGEA

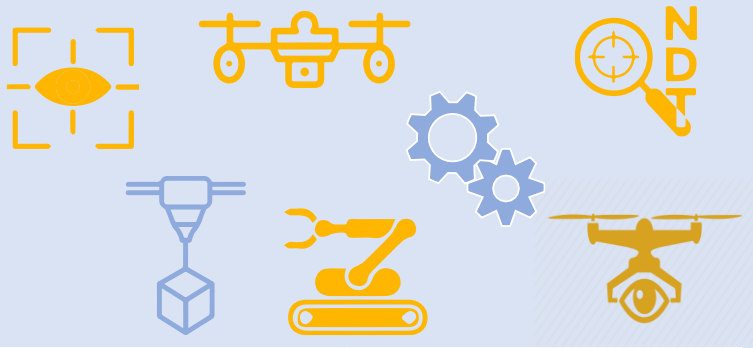
ENGINEERING FOR RENEWABLE ENERGIES

Technology catalogue

Mixed Reality (MR) Remote vehicle control

Description

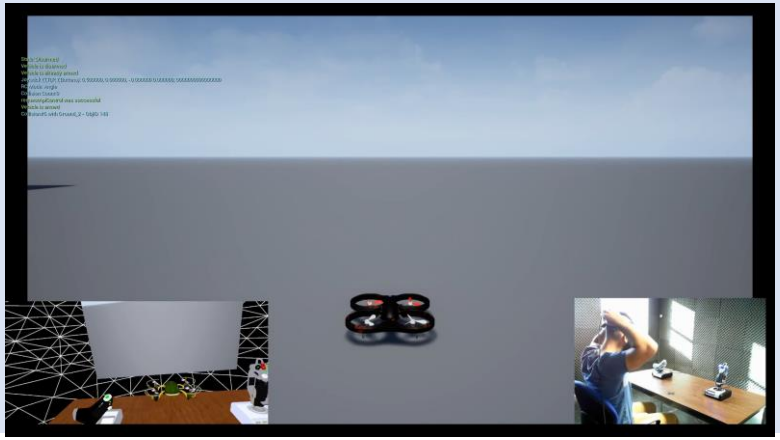
Virtual cockpit designed to be visualised into a 3D MR immersive system like HTC Vive. The cockpit allows to remote control a vehicle by physical interactors (SAITEK X52 e.g.).



Category	Remote control
Application field	wind&solar
Current TRL	2

Potential application

Remote vehicle driving useful mainly for maintenance operators and pilots.
Supervise & Control an UAV vehicle army with a global 3D.
Application fields : entertainment, industrial, training.



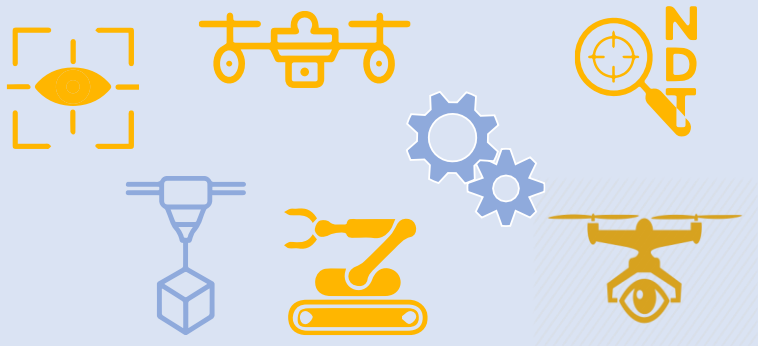
Benefits

- Advanced control, Easy to transport
- Customizable per operator
- Costless to maintain than a physic cockpit
- Flexible for future functionality
- Get surrounding environment
- Augmented reality displaying of real world additional information
- Same environment for training & operating

Mixed Reality (MR) Remote arm robot control

Description

From the virtual cockpit the pilot is able to remote control a robot arm by biomimetism through the use of a mocap (motion capture) system.



Category	Remote control
Application field	wind&solar
Current TRL	2

Potential application

The natural interaction by using the pilot´s own arm for biomimetism remote controlling facilitates the part manipulation and repairing.
Useful mainly for maintenance operators and pilots.

Benefits

- Advanced remote control by natural interaction
- Reduce cost of maintenance
- Allow to train a IA by biomechanical learning for future automatisation

Technology catalogue

Abrasive water jet blind machining

Description

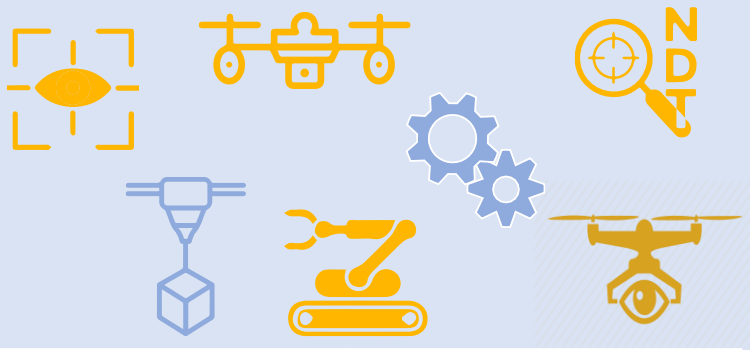
Portable robot for composite repair. It is a machine using water jet abrasion technology. It is the only handy system (<50kg) adapted to composite repair machining. It is composed of a portable machining robot linked to a mobile ground station.

Potential application

Patented effluent skimmer that drives out all carbon dust.
It favors a wholesome atmosphere for human and technical environment.
Guaranty of an automation with a maximum of simplicity of use and constant depth working

Benefits

- Fast and efficient repairing of pieces
- Efficient repair on site thanks to portable equipment



Category	Repairing
Application field	wind&solar
Current TRL	4

If you are interested in requesting a B2B meeting, please follow these steps depending of the purpose :

- About possible industrial parternship & research project opportunities. Please contact Olivier LARRE by the b2b tools or at o.larre@estia.fr
- If you have any technical questions about the water jet technology please contact Guillaume BAILLOU by the b2b tools or at g.baillou@estia.fr
- If you have any technical questions about the virtual cockpit & the bi-arm robot presented please contact Patxi BERARD by the b2b tools or at p.berard@estia.fr

Entity: ESTIA

Contact Person: Patxi BERARD

Telephone number: (+33)559438518

Email: p.berard@estia.fr

Website: https://www.estia.fr/