



LIST OF ADVANCED TECHNOLOGIES FOR ATA GRANT (SHORT DESCRIPTION)

Advanced industrial solutions

1.- Materials processing and composites

Plastics and composites with better performances, improving mechanical properties, thermal conductivity, electrical conductivity, etc. Combinations of plastics with various additive packets (mineral, fibre and nanoadditive loads, etc.), biodegradable polymers with natural loads (wood, coconut and bamboo fibres, etc.)

Originally to be used in sectors with specific demands, such as: aeronautics, automation, medicine and packaging, etc.

2.- Nanomanufacturing

Solutions based on nanomaterials and nanostructures centred on new materials and nanotechnological processes:

- Adaptation of the micro and nanoencapsulation processes on an industrial scale.
- Production of oleo/hydro-phobic materials.
- Application of thermal and photochromic materials in products.
- Incorporation of hydrophobic properties to various surfaces and end products.

3.- Printed electronics

Flexible electronics (also known as printed or organic electronics) refers to the manufacture of electronic circuits on flexible substrates by means of printing techniques.

This technology is intended to replace the traditional rigid silicon-based technology so as to meet various recently emerged needs such as those for flexible screens and smart cards and textiles.

4.- High performance textiles

The use of materials like carbon fiber, high-performance fibers, resins or a combination of various fibers for composites are some of the basic materials you work of the research group,



for together with equipment for their own development and equipment for analysis and characterization of physical-chemical laboratory. The centre has a large textile laboratory containing a wide range of textile machinery, mainly of knitting machines appropriate for the production of weft and warp knitted fabrics for technical use. Among them, one of the newest acquisitions is the Comez Raschel machine with double needle bed suitable for the development of 3D knitted fabrics for technical applications.

5.- Biofunctional surfaces

Biofunctional surfaces integrates biosensors, analytical devices whose detection ability is based on biological interactions. It consists of a biological recognition element (enzymes, antibodies, micro-organisms, DNA, etc.) or a biomimetic recognition element attached to a physico-chemical (electrochemical, optical, thermal, piezoelectrical, etc.) transducer that converts the biological signal produced by the interaction between the recognition element and the analyte into an electric signal. This type of sensor is characterised by its specificity and extreme sensitivity.

6.- Advanced energy creation and management

Photovoltaic and flexible batteries / Flexible photonic devices

Flexible photonic devices which respond to a certain electrical stimulus by emitting light devices employing printing techniques. Optimization of the multi-layer structure (deposition materials and techniques) containing the electrodes and the electroluminescent substance in order to improve the luminic properties of the device.

More <http://www.cetemmsa.com/investigacion.php?id=000000014T> (english available)

Advanced digital solutions

1.- Indoor and outdoor positioning

Robust positioning technologies adaptable to satisfy the requirements of different specific use cases, using:

- Indoor positioning based on Wi-Fi and BLE (Bluetooth Low Energy) for smartphones , wireless tags, etc.
- Ubiquitous positioning combining indoor positioning and GNSS, with special emphasis on battery consumption optimization.



- Advanced positioning technologies for stringent use cases, based on innovative techniques (ToA, TDoA).
- Technology fusion (wireless signals, inertial sensors, map fusion...).

2.- Signal analysis (image, audio, social media) and interactive AV visualization

- *Image*: Computer-based image- and vision-processing technologies for images, videos, and 3D and multi-view content.
- *Audio*: Acoustics and technologies for the production, post-production and exhibition of 3D audio. The 3D audio technology developed by Eurecat offers truly immersive content.
- *Social Media*: We have designed and developed an experimental methodology that allows us to both uncover psychological and social aspects of human behaviour and extract information on social connections and personal preferences, which is highly valued by the marketing and customer-services departments of companies.

3.- Audience perceptual and cognitive analysis

The application of multisensorial integration processes in the measurement and manipulation of the user experience in virtual environments. Using experimental methodology based on the indirect measurement of the cognitive and/or emotional reactions of users.

4.- Internet of things / embedded processing

Adding digital functionality to objects: sensing, tracking, etc. to explore novel ways for human-computer interaction and independent but connected performance.