

MEDIA INFORMATION

#T-TeC 2021: information on awarded projects

1st place

- Project: **Multi-purpose modular satellite services**
- Macrotheme: In Orbit Servicing
- University: Alma Mater Studiorum - Bologna University

The “**Multi-purpose modular satellite services**” project is a new type of modular satellite that aims to extend the lifespan of space assets to help limit the growing amount of debris in orbit. In detail, it is a small satellite in the cubesat category (size 12U, or units) weighing about 24 kg and about the size of a shoebox. The various modules of which it is composed can be separated from the main body to perform independent missions. While the central module (6U) supplies fuel, the two 3U modules provide diagnostics, signal relaying and orbit stabilisation services.

Team: **Alessandro Lotti, Giacomo Curzi, Anton Bahu, Alfredo Locarini, Dario Modenini**

2nd place

- Project: **PULQUI XXI**
- Macrotheme: Space Exploration
- University: Universidad Nacional de La Plata, Universidad de Palermo, Universidad Buones Aires, Universidad Argentina de la Empresa (Argentina); Universidad Don Bosco (El Salvador); ETH Zurich (Switzerland).

To promote development of low-cost space missions to the Moon and other celestial bodies in the Solar System, a team of Argentinian, Salvadorean and Swiss universities propose the **PULQUI XXI** mission, a cubesat weighing about 6 kg intended to land on the moon, becoming the smallest, lightest and cheapest lander to touch ground on our satellite. The concept is based on a grid structure hooked onto a conventional transfer vehicle capable of breaking away from the Moon’s orbit and attempting to land on the Moon autonomously.

Team: **Franco Nicolás Ruffini, Facundo Julio Gavino, Sonia Alejandra Botta, Frida Angélica Alfaro Rodríguez** (Universidad Nacional de La Plata, AR) **Maria del Pilar Oubiña** (Universidad de Palermo, AR), **Lucila Sol Hermida** (Universidad de Buenos Aires, AR) **Santiago Manuel Labayen** (Universidad Argentina de la Empresa, AR) **Byron Thonatiu Escobar Benitez** (Universidad Don Bosco, SV), **Tomás Boschetto** (ETH Zürich, CH)

3rd place

- Project: **ESTATE** (Electromagnetic Skins in meTal By AddiTivE manufacturing)
- Macrotheme: Space Exploration
- University: CNRS Centre national de la recherche scientifique (France); Siena University (Italy)

The **ESTATE** (Electromagnetic Skins in meTal By AddiTivE manufacturing) project of CNRS Centre national de la recherche scientifique and Siena University aims to improve satellites’ payload carrying capacity by replacing their internal frame with smart materials known as smart skins, ultra-thin 3D-printed metal systems

that can contain sensors and apparatuses on their surface. The proposal reveals the potential for use of “smart skins” for satellites’ telecommunications, telemetrics and remote detection systems.

Team: **Enrica Martini, Marco Faenzi** (Università di Siena), **David González Ovejero** (CNRS).

Special Mentions

- Project: **A wireless drone charging system for space exploration**
- Macrotheme: Space Exploration
- University: Khalifa University (UAE)

The students of Khalifa University in Abu Dhabi aim to develop a **wireless power transfer system for recharging remote controlled vehicles** used in space exploration missions to other planets in our solar system. A wireless recharging system would make it possible to manage and recharge drone fleets during the course of their exploration missions, limiting the need to return to the base, maximising achievement of their scientific goals and minimising standby time between flights. The solution could be particularly useful for exploration of planets such as Mars, where long flight times and limited solar energy restrict the duration of missions and hugely inflate their cost.

Team: **Sean Shan Min Swei, Solomon Micheal Serunjogi**

- Project: **CASSANDRA (Computation Agent for Space Situational Awareness aNd Debris Remediation and Automation)**
- Macrotheme: Space Situational Awareness
- University: University of Strathclyde in Glasgow (UK);

CASSANDRA is a Space Traffic Management (STM) software for automatic, intelligent management of satellites’ operations in orbit, preventing possible collisions with space debris. CASSANDRA responds to the need for sustainable management of space, supplying innovative new tools for addressing the problem of the growing space population.

Team: **Luis Sanchez Fernandez-Mellado**

- Project: **CUSAT-WD** (Weed Discrimination based on satellite imagery and UAVs in precision farming framework)
- Macrotheme: GeoInformation Applications and Platforms
- University: University of Namur (Belgium)

CUSAT-WD aims to develop a tool for precision farming that will be capable of producing maps of harmful weeds infesting farmers’ fields. The maps will be produced applying advanced machine learning techniques to satellite images.

Team: **Antoine Hubermont** (Université de Namur), **Vito Trianni** (ISTC-CNR)

- Project: **PACLEAN** (Solution for Space Debris problem)
- Macrotheme: In-Orbit Servicing
- University: “Federico II” University in Naples (Italy)

PACLEAN is an innovative little satellite that autonomously collects debris in space to help solve the growing problem of pollution in space. As in the famous video game PACMAN, a satellite weighing about 40 kg will use artificial intelligence to identify debris under 5 centimetres, approach it and collect it in a special container.

Team: **Carla Cicala, Chiara Abbundo, Stefano Cannavacciuolo, Maria Daniela Graziano**

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