
Fostering a relevant training on nanosat technology: Results and prospects from the NANOSTAR project

- **NANOSTAR is a collaborative platform to provide a relevant training on nanosat technology through Student Challenges, composed of 7 universities and 2 aerospace clusters, plus 3 ESA Business Incubation Centres as associates, in France, Spain and Portugal.**
- **After 40 months, the NANOSTAR project held its final event last May 11, where more than 25 speakers shared the project's achievements with the European nanosatellite community.**

May 2021

We are facing a revolution in Space where small satellites are increasingly important and getting better every year. In this race, it is key to improve the capabilities of young people in space related activities. This is the 'leitmotiv' of the NANOSTAR project funded by the [Interreg Sudoe Programme](#) through the European Regional Development Fund (ERDF). And that was the main message emphasized by **Philippe Lattes**, Director for Space Activities at Aerospace Valley, who introduced the NANOSTAR Final Event by thanking all the partners for the work done during the project and **Isabelle Roger**, Director of the Interreg Programme SUDOE, for their support and **Alexandre Legall**, Project Officer at Interreg Programme SUDOE.

NANOSTAR has developed a common software infrastructure to design nanosatellites with the same tools, homogenizing the process. And also a robust work methodology for the design, development and testing of nanosatellites. **Thibault Gateau**, from the Institut Supérieur de l'Aéronautique et de l'Espace presented the Software Suite and **José Miguel Álvarez**, from the Universidad Politécnica de Madrid, the common methodology. Afterwards, **Jean-Luc Le Gal**, from the Centre National d'Etudes Spatiales, explained the evolution of the IDM-CIC environment modules.

But the core of the project is the Student Challenges. **Filippo Cichocki**, from the Universidad Carlos III de Madrid and **Anthony Ghiotto**, from Bordeaux INP, gave some figures: almost 300 students from the NANOSTAR universities have been involved in 2 space missions p redesign challenges and more than 50 detailed design & test challenges.

In the first mission, developed between February and May 2019, 15 multidisciplinary teams of students redesigned a flyby mission to the Moon. The nanosatellite, equipped with a scientific payload, performs observations and measurements of the Moon's surface.

In the second mission, from September 2019 to January 2020, the goal was to verify the survivability in space of a marine photosymbiotic species of worms (the *Roscoff worms*), and their efficiency for air recycling, which may one day play an essential role in the creation of artificial ecosystems for deep space exploration missions. **Xavier Bailly**, CNRS, Roscoff Marine Station and **Olivier Marty**, B-INP / URISA – IESF NA, explained more in detail the worms project.

And from September 2019 to March 2021, the students from the NANOSTAR universities have been working on different detailed design & test challenges. In the morning final event, the best 10 teams presented their projects, and the NANOSTAR jury panel selected the best three teams, which were announced in the afternoon event by **Carlos Romero**, Managing Director of Madrid Aerospace Cluster:

- **1st Position: 'Development of an inertial morphing nanosatellite'**, is the result of the collaboration between Universidad Carlos III de Madrid, and Instituto Universitario de Microgravedad 'Ignacio Da Riva', from Universidad Politécnica de Madrid, with the support of the DZH student research group. Participating students: Jesús Muñoz Tejada, Miguel Segovia Mora, Alberto Rodríguez Amor, Ivan Castro Fernández, Carlos San Miguel Ortego and Carmen García Cabetas.
- **2nd Position: 'Telecom System Qualification: Sounding Balloon'**, from Bordeaux INP (B-INP). Participating students: Nigel Ignatowicz, Yohan Bellanger, Edgar De Oliveira Cruz, Antton Bodin and Vanlerberghe Francois.
- **3rd Position: 'Design and Analysis of Nanosatellite Additive Manufactured structures'** from Universidade da Beira Interior (UBI). Participating students: Pedro Neto, Marcos Rosa and Rose Teixeira.

During the event, also had the testimony of three students teams: 'UC3M StarWorms', the winners of the first challenge: **Alvaro Sanz Casado, Carlos Alvaro Arroyo Parejo, Miguel Renieblas Ariño, Sergio Sarasola Merino, Miguel Muñoz Lorente.** 'B-INP EirBalloon': **Nigel Ignatowicz, Yohan Bellanger.** And 'UBI Moon invader', the winners of the second challenge: **Francisca Oliveira and Pedro Dente**

Finally, **Jorge Monteiro**, from Universidade da Beira Interior, explained the paths for the future of NANOSTAR and next steps. The mission is to open satellite project engineering to everyone, by training professionals and developing open-source concurrent engineering tools for education and research. NANOSTAR is actively looking into the future!

The conductor of the event and the Nanostar Project Manager, **Maude Perier-Camby**, from Aerospace Valley, closed the session with the final video of the Project. Hope you enjoy! <https://youtu.be/AjN8eWiTCoI>

The NANOSTAR students will become the future main players in the field of nanosatellites in a more connected Europe.

For more information, please contact:

Maude PERIER-CAMBY perier@aerospace-valley.com

Press Contact: ftena@madridaerospace.es

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