RUM team placed runner-up in NASA competition [1]

Submitted by Ariadna S. Rubio Lebrón [2] on 20 June 2023 - 10:03am

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The Students for the Exploration and Development of Space (SEDS) student chapter of the University of Puerto Rico (UPR) Mayagüez Campus (RUM) won second place in the 2023 Revolutionary Aerospace Systems Concepts Academic Linkage (RASC-AL) Forum of the National Aeronautics and Space Administration (NASA).

This is the fifth time the students have participated in the competition, in which they achieved three consecutive championships from 2018 to 2021. This year, they presented the PROMISE: Permanent Research Outpost for Mars and Interplanetary Space Exploration mission, which met the challenge imposed in this edition to send four astronauts to Mars and have them survive there for seven years.

"This accomplishment is extremely special to me for several reasons. First, it is the fifth project for this competition that I have led since I started the team five years ago and the last, as I graduated from Mechanical Engineering just a week ago. In fact, I briefly celebrated my graduation, as we left for Florida the next day. Second, it is the most challenging, complex and encompassing project, essentially a mix of all the previous projects. In a way, we benefited from it being so, as we then applied previous knowledge. Third, I felt particularly committed to my colleagues this year, as I have a very talented group with a very bright future ahead of them. From the beginning I wanted to provide them with the best possible experience and pass on my knowledge while learning from them. Now many of them are left with the legacy of these five projects to carry on. Fourth, through this participation I identified my innate interest in space mission design and set my sights on working as an aerospace engineer at the Space Mission Analysis Branch, the NASA branch that sponsors the competition, an accomplishment I achieved a few months ago when I was hired for the job. In a few weeks I start my full time career at NASA, but this week I shared with several of my future colleagues who have seen me grow since my second year of study and first project so far. This runner-up finish, which tastes like a championship, is the best conclusion to this adventure that includes five runner-up finishes, three first places overall, three first places per category, three professional publications, a special innovation award, and several presentations at renowned international conferences," said Wilbert Andrés Ruperto Hernández, outgoing team captain and graduate of the 110th class of the Department of Mechanical Engineering (INME).

This year's winners were doctoral students from Massachusetts Institute of Technology (MIT).

"This second place is very important, as the MIT team presented their doctoral theses. In the case of RUM, all the students are undergraduates with the exception of one master's student. The proposal they worked on is highly complex interdisciplinary, which required continuous effort and dedication from the entire team. They started working in August last year to deliver the proposal and a video of the Mars mission. With this, they entered the final for which they had to complete the project and deliver a poster and an article in which, in 15 pages, they had to summarize the mission and demonstrate that what they were proposing. Not only did it have to cover all the requirements of the competition, but it is a real mission that NASA can carry out to establish the first terrestrial colony on Mars. It was amazing to see these 15 students deliver the presentation in English, with a confidence and clarity that comes only after long hours of rehearsal. It was an enriching experience, both for them and for me, that I wouldn't trade for the world!" said Dr. Barbara O. Calcagno, Ph.D., professor in the Department of Engineering and Materials Sciences

and advisor to the student body.

She added that most of the teams that made it to the finals come from universities that have the Aerospace program.

"By winning second prize in the RASC-AL competition, the RUM team won the right to present at one of the largest aerospace conferences and to publish the paper with their proposed Mars mission. The conference is in Las Vegas, October 23-25 this year," he said.

The purpose of this competition, unique to NASA, is to challenge students to develop innovative and realistic concepts that could solve potential problems in space missions.

"In fact, we usually work on a mission or system with the same requirements and characteristics that NASA requires of its contractors. In addition, our out-of-the-box ideas help them refine those requirements to reflect today's technological realities. At other times, as we did this time, we work on a more distant mission. Unlike previous concepts, a duration of seven years or more is something entirely new, as current plans are to conduct missions of 30 days and, at most, a year and a half. This single requirement, among others, permeates through all areas of the project from interplanetary transportation systems, to how to live in different modules on the surface and what food to grow and consume to maintain a balanced diet for the astronauts. Since we wanted to innovate further, we found a way to take multiple crews of six astronauts to Mars while maintaining a continuous human presence for over 20 years. This is why our mission is called PROMISE," explained Wilbert Andres.

"I would like to highlight the importance of the experience my colleagues gained at the event. There they presented and defended the project in front of a panel of experts, including NASA's Chief Technology Officer and Chief of Space Architectures, and over 100 participants, professors and special guests. For most of my team, this was their first time at the event and I noticed how they were filled with joy, excitement and hope to know, firsthand, the importance of their work for NASA and how far they can go if they keep working on this. That fills me with great satisfaction and pride," he said.

The young man, who will begin working at NASA Langley Research Center in Virginia in August, thanked his mentors and collaborators, among them Dr. Calcagno, Dr. Gustavo Gutiérrez, Eduardo Quintero, a medical graduate from RUM, and Douglas Trent from NASA.

Dr. Agustín Rullán Toro, RUM Rector, congratulated the RUM SEDS student chapter for this achievement.

"It is admirable to see how this team of students has demonstrated their dedication, ingenuity and talent once again. Taking second place in such a prestigious competition is a testament to their hard work, commitment and passion for space exploration.

Their achievement inspires future generations of space explorers and highlights Puerto Rico's talent and excellence in the field of space exploration and development. Keep going and continue to reach new heights!" stated the Rector.

Poster of the presentation at: https://rascal.nianet.org/wp-content/uploads/RASC-AL_2023_Digital-Poster_University-of-Puerto-Rico-Mayaguez.pdf [3]

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