IAF SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
Lift Off - Secondary Space Education (2)

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ARAPY PROJECT: USING PAYLOAD DESIGN FOR HIGH ALTITUDE BALLOONS AS A TOOL TO REDUCE THE ACCESS GAP BRING STEAM EDUCATION TO RURAL PARAGUAY

Abstract

This work describes the use of stratospheric platforms as an integrating tool among science education and research. It was carried out to spark interest in science, technology, research, and education in the aerospace field in Paraguay. Arapy aimed to relate two apparently different but strongly linked: the spread of scientific research in Paraguay and the interest in science and technology. It was intended to carry out research, workshops, training, and competitions that can establish new scientific experiences and the application of innovative educational methods in students from different communities in rural Paraguay. This was achieved through the application of dynamic, proactive pedagogical methods in the process, such as project-based learning, cooperative learning, emotional education, visual design, critical-constructive thinking, and technological trends. Arapy was strategically planned for a gradual learning manner. Courses such as Introduction to Programming focused on the use of open source microcontrollers. Other small workshops on basic electronics were also implemented. This was intended to help them becoming familiar with the flight electronics. This allowed us to acknowledge the importance of research in aerospace sciences. This activity started with emotional education to motivate positively and to capture interest. Then we continued explaining the theoretical notions of the essential concepts of Basic Sciences and Mathematics. This approach to science, experimentation and hypothesis formulation developed deductive and inductive thinking. Which lead us to teach in a more didactic way with experiments on: pressure, buoyancy, fluid flows and hydrogen generation. With the support of the local teachers, analytical calculations were carried out to solve problems related to physics associated to the launching of a high-altitude balloon. As a result of the success of this Arapy project, through supporting STEAM education, the Ministry of Education and Science (MEC) in cooperation with the Paraguay Space Agency (AEP) began the process of carry out similar projects at the 7 Regional Education Centers nationwide. Another positive outcome of this project was that five Arapy project members received awards for their participation. One of them is enrolled as a master's student in satellite technology. The other member

won the prize for the Teaching Excellence of the MEC. The third one was given the prestigious Ten Outstanding Young Persons of the year 2018. The fourth member is currently working on the development of a picosatellite as his final design project. And lastly, the fifth member was awarded the Outstanding Citizenship Award from the city council of Asuncion.