IAF SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
New Worlds - Non-Traditional Space Education and Outreach (7)

Author: Mr. Jason Crusan
National Aeronautics and Space Administration (NASA), United States, Jason.Crusan@nasa.gov

Ms. Carol Galica
National Aeronautics and Space Administration (NASA) / Stellar Solutions Inc, United States, Carol.A.Galica@nasa.gov
Mrs. Nikki Werkheiser
NASA Marshall Space Flight Center, United States, Niki.Werkheiser@nasa.gov
Ms. Deanne Bell
United States, Deanne.Bell@futureengineers.org

NASA AND ASME: PARTNERING TO DEVELOP FUTURE ENGINEERS THROUGH CROWDSOURCING CHALLENGES

Abstract

Future exploration missions in the space between the Earth and the moon or beyond will require complex operational activities to ensure that crew, cargo, and exploration systems safely and successfully reach their destination. NASA has a commitment to engage citizen scientists with opportunities to ideate on novel solutions to assist in bridging technology gaps related to human spaceflight missions. Four years ago, NASA entered into a Space Act Agreement with the American Society of Mechanical Engineers (ASME) Foundation to launch a series of engineering challenges that leverage the 3D Printing in Zero-G Technology Demonstration aboard the International Space Station to inspire students to solve real-world engineering problems.

Through this partnership and with technical assistance from NASA, ASME designs and conducts K-12 engineering design challenges using the Future Engineers challenge platform allowing participants to use their imaginations and 3D modeling software to design items related to future space exploration missions. The Future Engineers web presence that hosts challenges, provides links to free modeling software and an open hardware design repository that showcases student software models. At the end of each challenge, a committee from NASA and 3D printing in space experts review all submissions and select several designs for final review. Finalists are then interviewed by a judging panel with winners selected in Junior (ages 5-12) and Teen (ages 13-19) age groups. Through this innovative partnership winners have received behind the scene tours of NASA, SpaceX, Bigelow Aerospace, Digital Domain Visual Effects and MakerBot, as well as, had their designs printed on the 3D printer aboard the ISS.

Since 2014, the challenges have successfully engaged over 2,700 students from 45 states to use their imaginations to design and create 3D engineering models related to items our future astronauts may need. Forty percent of participants are female, a traditionally underrepresented group in science, technology, engineering and mathematics careers. This paper provides an overview of submissions received, winning designs, success stories, and lessons learned. It will also detail the partnership relationship, the unique assets of each partner and the roles of each organization in the implementation of the challenges. Details will be provided on the management, promotion, summative information on participants and next steps for the partnership. The designs received from the Future Engineers challenges were at a skill level beyond expectations and have increased NASA's body of knowledge in the area of In-Space Manufacturing while inspiring the next generation of space explorers.