

SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
Open Space: Participatory Space Education and Outreach (8)

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PROMOTION OF SATELLITE TECHNOLOGY AND AEROSPACE ENGINEERING THROUGH AN
INTERNATIONALLY DESIGNED TABLETOP WIND TUNNEL

Abstract

The ALLiance for International Excellence among the future Space workforce (ALLIES), which was established between the Cape Peninsula University of Technology (CPUT) in Cape Town, South Africa and the University of Alabama in Huntsville (UAH) in Huntsville, Alabama (AL) in 2012, has delivered a second, jointly designed, Science, Technology, Engineering, and Mathematics (STEM) tool- specifically, a tabletop wind tunnel. The wind tunnel will be utilized to promote the awareness of satellite technology and aerospace engineering among the future space workforce of these two countries. The purpose of the tabletop wind tunnel is to function as a STEM tool for St. John's Middle School in Madison, AL and a typically disadvantaged high school, Elsevier, in South Africa. The tabletop wind tunnel allows for the visual testing of flow patterns around various geometrically shaped test articles in order for the students to observe the flow streamlines. The learning outcomes in association with the wind tunnel will be incorporated in the curriculum of each Kindergarten through 12th grade (K-12) school to promote learning in the STEM fields with an emphasis upon satellite technology and aerospace engineering, in general. The learning materials will reflect how airflow, lift, and thrust are directly related to the design of various vehicles, aircraft, and rockets which launch the satellites into orbit. Apart from promoting STEM and satellite technology amongst the learners of the K-12 schools, the engineering students from UAH and CPUT incorporated the design process in accordance with the United States (US) National Aeronautics and Space Administration (NASA) Systems Engineering (SE) handbook. Thus, the university students garnered tremendous international collaboration and design experience that accelerated their ability to work on international efforts in their future careers. The present paper will provide a brief overview of the tabletop wind tunnel design process, the learning materials developed, and the proposed implementation of these learning materials. Early details of the learning outcomes and benefit of the STEM tools upon US and South African K-12 students will be reported.