

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

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INITIATION AND DEVELOPMENT OF INTERNATIONAL COLLABORATION AMONG THE
FUTURE SPACE WORKFORCE VIA THE DESIGN AND DEVELOPMENT OF A STEM TOOL**Abstract**

Over the past 20 years exploration of the “final frontier” has transformed from an endeavor often pursued by competing and rival nations to one of cooperation; primarily due to the end of the Cold War, economic feasibility and promotion of international relations. The development of the International Space Station (ISS) provides the optimal scenario of the resulting success achieved by the conglomeration of skills and talents of individuals from the United States (US), Russia, Canada, Japan and Europe. In order to continue to foster an internationally cooperative workforce that will have the desire and skillset necessary to achieve future spacefaring goals, a collaborative effort has been initiated 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). This joint effort - referred to as the ALLiance for International Excellence among the future Space workforce, or ALLIES - commenced with an initial emphasis upon the cross-integration of design methods and tools utilized at the respective universities within capstone engineering design classes. The second phase of the ALLIES program focused upon the design and development of a Science, Technology, Engineering and Mathematics (STEM) tool to be delivered to a primary or secondary education school in South Africa. Past STEM tool designs developed at UAH include a fluid flow circuit, interactive solar system, trebuchet, ballistic pendulum, and a pulley system to name a few. Interactive, hands-on STEM tools motivate younger students to pursue a STEM education as interacting with hardware reinforces theoretical concepts presented in the classroom. The goal of the ALLIES program is to foster international understanding and cooperation among the CPUT and UAH students the future space workforce that will continue to achieve lofty spacefaring goals. However, the result of the ALLIES effort a STEM tool designed, analyzed, fabricated and tested by CPUT and UAH students will inspire and motivate the youth of South Africa to seek a STEM education and career that will further accelerate the development of future space professionals. The current paper provides an overview of the ALLIES program, a detailed description of the means of integrating various shared design methods and tools at CPUT and UAH, a description of the resulting STEM tool design and development, and metrics conveying the learning outcome and impact that the ALLIES program had upon the engineering students at CPUT and UAH.