

IAA Study Group Status Report

Study Number and Title:

6.16 - Multi-Commission - "STEM/STEAM for Space. Grand Challenges."

Short Study Description:

The launch of Sputnik in 1957 marked the beginning of a global surge in interest in science, technology, engineering and mathematics (STEM) education. The world was excited by each development in space exploration. Not only were there vast improvements in STEM education, but also an increase in participation in these disciplines by our youth. Many of them eventually joined this exciting endeavor, while others utilized their education to benefit mankind in a myriad of other ways. In the 50+ years of the space age, developments have continued apace in the physical sciences. Recent years have also seen impressive advances in the life sciences stemming from space research. These advances are steadily moving toward the enablement of humanity to go beyond near-earth orbit on into the cosmos.

Our objective: As space research has stimulated STEM education, improvements in technical education have benefitted space research and, indeed, all aspects of society. Less recognized is the interaction between the creative arts, space research and STEM education. Space research has stimulated the imagination of the art community in music, architecture, literature, and the graphic arts. Technical developments have made possible new methods of creating works of art. And conversely, the arts have stimulated creativity in science, technology, engineering, mathematics – and space research. It is this complex interaction we have dubbed STEAM. We propose to study this interaction with the objective of increasing the benefits to all.

The first step will be to gain a clearer picture of where we are today on the interaction between STEAM education and space research. Then we will address questions such as the following. How can we improve STEAM education for the benefit of space research and vice versa? How can we develop a coordinated initiative to support development of high quality STEAM education? Should we encourage the sort of competitions that have proved so successful in other fields, such as robotics, in our universities, high schools and, yes, even with younger students? If so, how can we persuade governmental space agencies, foundations and private industry to help?

While learning from the past, we need to look to the future to fully benefit from the complex interaction between space research and education in science, technology, engineering, art, and mathematics. We need a bright, enthusiastic generation for future space activities and they need us now.

Progress in the past six months:

The Multi-Commission Study group was officially formed at the 2014 just a couple of months before IAC in Toronto. Participants were recruited from different IAA Commissions, national academies, space agencies and universities. Numerous people have been eager to contribute to this vital effort. Communications have been via the internet, telecom, and meetings with a few of SG members last fall in Toronto (IAC).

The first SG members' meeting will be held during the IAA Spring Meeting in Paris on March 25 at 2:00 pm at the IAA office. The goals are the following:

Develop a STEM/STEAM in Space Workforce Strategic Roadmap

Establish IAA STEAM workforce projections for 2020

Consider a proposal for the first Symposium on "STEM/STEAM in Space" in June 2016:

Theme: **"Emerging STEM/STEAM and Space."**

Select and recommend host institutions and topics

Through the IAA office, invite distinguished speakers and presenters

Possible topics for this symposium are:

The Nature and History of enhancing STEM education:

Space Physics, Space Biology & Life Science, Space Technology, Planetary Science and more.

How & where should Space Agencies and Academies act?

How to develop talented future scientists and engineers for space activities?

What are the educational trends and expected new space fields?

Which fields are expected to lead to the next round of innovations in space science and technology, and their interactions with the creative arts?

The list of the SG members has been updated.

Name of person providing Study Group Status (Study Group Chair or Co-Chair):

Prof. Dr. Liya Regel, Chair

Status Report Date: March 8, 2015