IAA Study Group Status Report

Responsible Commission: Multi-Commissions: 1, 2, 3 and 6

Study Number and Title: 6.16 Multi-Commission "STEM/STEAM for Space. Grand Challenges."

Short Study Description (from Study Group Proposal): 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:

On March 25, 2016 the first Symposium was held with outstanding presentations by participants and members of the Study Group. The program was created by selecting abstracts submitted by representatives of institutions around the globe. Several new members joined the Study group, as the study moved to the next stage after this first highly successful symposium.

Website Study Information update:

Preparation is under way for a Second Symposium of the Study Group via e-mail, Skype, and teleconferences.

Issues requiring resolution?

Completion of organization of the Second Symposium on STEM/STEAM for Space.

Product Deliveries on Schedule:

The First Symposium on STEM/STEAM for Space. Grand Challenges was successfully held on March 25, 2016 with the outstanding help of the IAA office in Paris.

Name of person providing Study Group Status:
Prof. Dr. Liya Regel (Chair)

Status Report Date:
August 21, 2016

Chair: Regel, Liya
Co-Chair: Harris, Wesley L.
Secretary: Maizza, Giovanni

Activity:
Study group Proposal Form
Status report, September 2014
Status report, March 2015
Study group meeting, 25 March 2015, Paris, France - Agenda of the meeting
1st IAA Symposium on STEM/STEAM for Space, Paris, France, March 25, 2016

Membership:
Alifanov Oleg M
Boy Guy Andre
Cai Guobiao
Duarte Carlos
Deng Yulin
Ercoli Finzi Amalia
Frischauf Norbert
Ghafoor Nadeem
Gany Alon
Gutierrez Jordi
Liu Qiusheng
Kozlovskaya Inessa B
Malina Roger F
Oliver Carol
Orlov Oleg
Ramachandran Radhika
Vavilova Irina B.
Ventskovsky Oleg
Zhuang Fengyuan

The Symposium was the first major function of the IAA Study Group on “STEM/STEAM for Space. Grand Challenges," which was proposed by Professor Regel and enthusiastically accepted by the IAA.

The academy invited Professor Regel to chair the study group with Professor Wesley Harris of MIT, a member of the prestigious National Academy of Engineering. Members of this study group included well-known scientists and educators from space agencies, government research organizations, universities, and aerospace companies from many countries.

The symposium included impressive lectures and lively discussions by the international participants on developments in STEAM relevant to space activities.

“Paris seemed to be the most appropriate venue for the first symposium on STEAM for space because its most notable landmark and cultural icon is the Eifel Tower, a perfect illustration of the union of the STEAM subjects," said Regel. "In 1889, Gustav Eiffel completed his magnificent beautiful creation using his knowledge of science, technology, engineering, art, and mathematics. And where does the tower point? To space! It reminds me of a rocket on its launch pad.”

Dr. Jean-Michel Contant, General Secretary of the IAA, opened the symposium with a remarkable lecture on the extraordinary history of the Academy.

Many impressive and informative abstracts were submitted for the selection of the program, and only these were included in the First Symposium:

- “On the application of STEAM principles in space project design,” Wesley L. Harris, Massachusetts Institute of Technology, Cambridge, Mass.

- “A model for enhancing STEM and space education for underserved students,” Julia Clark, Program Director in the Division of Research on Learning in Formal and Informal Settings at the National Science Foundation, Washington D.C.

- “The Mars Lab: An innovative and multidisciplinary integration of space engineering and science research with a self-sustaining space education and outreach project,” Carol Oliver and Brett Biddington, Australian Center for Astrobiology School of Biological, Earth and Environmental Sciences University of New South Wales, Kensington.

- “Partnering for success in STEM education and innovation: a statewide university system and a national laboratory,” Stacey S. Patterson, Associate Vice President for Research, The University of Tennessee and Vice President, UT Research Foundation.

- “From Leonardo da Vinci to future STEAM education for space,” Giovanni Maizza, Department of Applied Science and Technology, Center Director, Politecnico di Torino, Torino, Italy.

- “Best practices in STEM/STEAM education at the Mexican Space Agency,” Carlos Duarto, Deputy Director General for Space Education, Agencia Espacial Mexicana.

- “Creativity as integration: A crucial shift from STEM to STEAM,” Guy Boy, Florida Institute of Technology and NASA Kennedy Space Center.

- “Femtosatellites for space education,” Jordi L. Gutiérrez and Pilar Gil-Pons, Department of Physics, Universitat Politècnica de Catalunya, Spain.

- “Emerging STEM/STEAM and space: lessons learned from the FP7 project ICARUS – an SAR project with an innovative dissemination and public outreach strategy,” Norbert Frischauf, Philippe Carous, Stephane Ourevitch, Almudena Velasco Rodriguez, SpaceTEC Partners, and Geert de Cubber, Royal Military Academy of Belgium.

- “Nurturing creativity in youth to improve STEM education for the Space 4.0 era,” Oleg Ventskovsky, Director, Yuzhnoye Design Office European Representation in Brussels, Ukraine.

- “STEM education for space in Italy: girls can do it,” Amalia Finzi, Dipartimento di Scienze e Tecnologie Aerospaziali, Ingegneria Aerospaziale, Politecnico di Milano via La Masa, Milano, Italy.

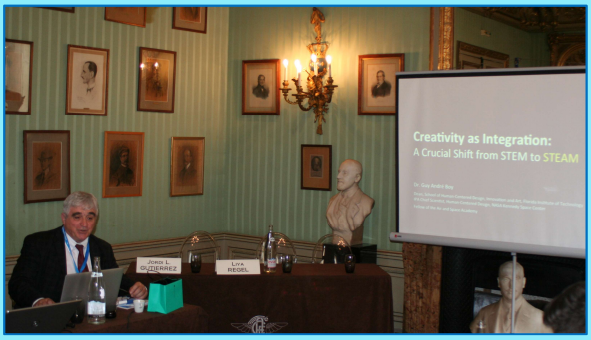
- “Integrating arts with STEM education - the Indian perspective,” Radhika Ramachadran, Space Physics Laboratory, Vikram Sarabhai Space Centre, India.

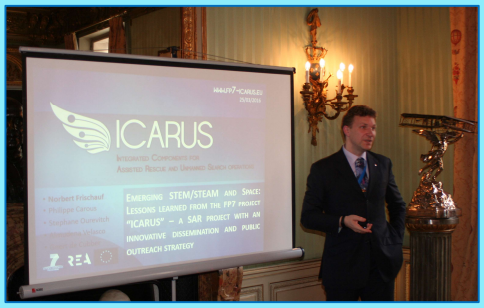
- “The study of Russian literature should be included in the training of physician-cosmonauts,” Vassily Loginov and Elena Yu. Bytchkova, Faculty of Basic Medicine, Lomonosov Moscow State University, Moscow, Russian Federation.

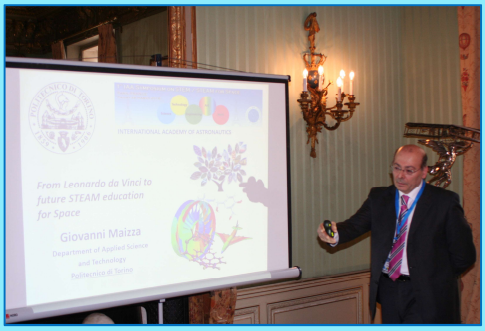
- “A proposal for a Space Engineering B.Sc. at the Universitat Politècnica de Catalunya,” Jordi L. Gutiérrez and Pilar Gil-Pons, Department of Physics, Universitat Politècnica de Catalunya, Spain.

Professor Regel said that the Symposium participants concluded that STEAM education for space will remain essential for continued progress in humanity’s journey to the stars.

Planning for the Second Symposium on “STEAM for Space” is underway with several countries vying to act as the host.







Presenters and participants from many countries gathering together for the First the IAA Symposium on "STEAM for Space. Grand Challenges", March 25, 2016 in Paris.