

IAF/IAA SPACE LIFE SCIENCES SYMPOSIUM (A1)  
Interactive Presentations - IAF/IAA SPACE LIFE SCIENCES SYMPOSIUM (IP)

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INTERNATIONAL COOPERATION IN THE IMPLEMENTATION OF SCIENTIFIC MEDICAL AND  
BIOLOGICAL RESEARCH AND EXPERIMENTS ON THE ISS

**Abstract**

Human space exploration is characterized by the strengthening role of international cooperation due to the expansion of the scope of space research, the globality of the objectives, the use of advanced technologies, high costs of research, and other factors. The Russian biomedical research program on the ISS (including about 40 experiments in physiology, biology, medicine, and radiation safety) serves as a good basis for international cooperation. Foreign specialists can integrate their methodology into a Russian experiment or conduct a new experiment if Russian scientists are interested in it.

There are various examples of successful collaboration in: Matroshka project (in cooperation with ESA, DLR, CSA and scientific institutions from Hungary, Bulgaria and Japan) on the development of on-board tools to study the patterns in the formation of cosmic radiation doses in critical organs of the body; Biorisk project (with the participation of scientists from Germany and South Korea) to study space radiation effects on biological objects on the external surface and inside the ISS; Immuno-2 experiment (in cooperation with ESA and German scientists) to study neuroendocrine and immune responses in humans during and after a space flight to the ISS; EDOS-2 experiment (in cooperation with ESA, German and French scientists) to study the effectiveness of mineral metabolism pharmaceutical correction in conditions of prolonged exposure to microgravity. Joint development of research equipment and devices has become an extremely efficient form of cooperation. These activities are carried out both bilaterally and multilaterally. The most successful projects include the following: Neurolab project (in collaboration with DLR and Koralewsky Industrie-Electronik) to create a set of equipment for studying the features of the psychophysiological state of cosmonauts in a long-term flight; Cardiovector project (in collaboration with DLR and ESA) on the creation of equipment for the study of the influence of space flight factors on the spatial distribution of heart energy, etc.; Cardiomed project (in collaboration with CNES) on the creation of a set of equipment for the medical control of cosmonauts on the Russian segment of the ISS. Given the prospects of space exploration, the scientists are interested in further fostering of international cooperation, especially on such major issues as adaptation to the conditions of short-, long- and extremely long-term (interplanetary) flights, means and methods of directed correction of the negative influence of space flight factors on the human body, questions of human life support in a space flight, including extravehicular activities and the creation of future biological life support systems, the search for extraterrestrial life. The constant exchange of experience and interaction makes it possible to use advanced technologies on board of the ISS, to perform medical and biological research at the highest scientific level and obtain fundamentally new, significant scientific results.