

IAF HUMAN SPACEFLIGHT SYMPOSIUM (B3)
Utilization & Exploitation of Human Spaceflight Systems (3)

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UPDATE ON THE IMPLEMENTATION OF THE ICARUS SYSTEM FOR ANIMAL TRACKING
FROM ISS**Abstract**

Today we are monitoring our planet with a multitude of technical sensors: Earth observation satellites take pictures of the surface and measure many variables of our environment, ground-based stations help to predict the weather and monitor earthquake-prone regions, sea-based buoys take measurements of the salinity of our oceans, register the flow of currents or detect the signs of tsunamis in order to save human lives. These sensors become more and more sophisticated and increase the knowledge about our planet. But one type of sensors, which have been perfected over millennia, is still rarely used by human scientists: the vast variety of animals inhabiting our ecosphere. The International Cooperation for Animal Research Using Space (ICARUS) is working to utilize this treasure trove of data. ICARUS is a cooperation between the German Aerospace Center (DLR) and Roscosmos. Scientists from the Max Planck Institute of Ornithology in Germany and the Institute of Geography of the Russian Academy of Science are leading this project. The space segment of ICARUS consists of a large antenna that was launched to the International Space Station (ISS) in February 2018. It will be accommodated on the exterior of the Russian ISS service module Zvezda. An On-Board Computer inside the station will decode the received data and will relay it to the Russian Mission Control Center in Moscow. The ground segment consists of small radio transmitter and sensor units called tags that will be attached to the respective animal. Their small size and mass, about 25 x 15 x 5 millimeters and 5 grams, will allow the fixation to small animals like singing birds without altering their natural behavior. The tags record data about the movements of its host and its environment. It sends its data to the ISS antenna once the ISS passes over the subject. The goal of the ISS project is to test the technology of the ICARUS system and to gather first scientific data about the migration of animals. Scientists are looking forward to learning more about the life of their experiment subjects which still holds a lot of mysteries. The behavior of these animals is obviously also affected by their changing environment. Thus insights about the effects of global climate change, the spread of diseases or even the prediction of natural disasters seem possible. The ICARUS system will start commissioning in summer/fall 2018. This paper will give an update on its status.