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FIRST RESULTS FROM THE GERMAN-RUSSIAN ICARUS SYSTEM FOR ANIMAL TRACKING FROM ISS

Abstract

Observing the ecosphere of our planet has been a major task of space activities right from the start of the Space Age. Today, an entire fleet of Earth observation spacecraft is orbiting Earth. The German-Russian ICARUS (International Cooperation for Animal Research Using Space) system is aiming to complement this fleet with a new set of sensors: the natural senses of animals. Over millennia these have evolved to be best suited for their environment. By learning more about how they migrate and how they react to natural disasters ICARUS scientists hope to gain new knowledge about our environment and how it changes. ICARUS is a joint project of the German Aerospace Center (DLR) and the State Space Corporation Roscosmos. Scientists from the Max Planck Institute of Animal Behavior in Germany and the Institute of Geography of the Russian Academy of Science are leading the project. Its technical aspects are coordinated by SpaceTech GmbH of Germany and RSC Energia in Russia. A large phased array antenna installed on the outside of the Russian segment of the International Space Station (ISS) receives signals from small transceiver tags. These tags are attached to the respective animal. Being just 25 x 15 x 5 millimeters in size and 5 grams in mass, the devices can be used even for small animals such as songbirds without altering their natural behavior. The tags record data about the movements of its host and its environment. They send their data to the ISS during an ISS overpass. An ISS on-board computer decodes the received data and relays it to the Russian Mission Control Center. The scientific data is stored in an easily accessible online database. ICARUS is supplemented by data from the Russian Uragan experiment which operates traditional Earth observation sensors aboard the ISS. Together these two projects enable scientists to make new discoveries about live on our planet. The ISS project is a first test of the ICARUS technology. It will provide scientific data from the area that is covered by ISS' orbit. The ISS system was commissioned in 2020. A scientific utilization Pilot Phase has since started. This paper will give an overview of the history of the project, its current status, its first results and its potential for future applications.