**Technical Area: Aerospace & Aeronautics**

**Keywords:** peaceful exploration and use of outer space, earth observation applications

---

**General Information**

The Institute's activities range from astrophysical research and theoretical and experimental investigations of the processes in the upper layers of the Earth environment to the design and manufacturing of scientific instrumentation both for the space parameters measurement onboard spacecraft and industrial geophysical applications.

The Space Research Institute (SRI) was established in 1996. The Institute participated in the development and implementation of the National Space Program of Ukraine, which emphasized the “creation of the conditions under which the space technologies can be used in other branches of economy”, i.e. commercialization of space science results. SRI participated in the development of the first Ukrainian Earth observation satellite SICH-1 performing theoretical calculations and designing a system of data processing.

The Institute has been a participant in a number of space experiments onboard the International Space Station (ISS) aimed at continuous monitoring of electromagnetic state of the ionosphere (e.g., Environment-1 launched in 2006).

- SRI developed scientific payload for a new Russian-Ukrainian experiment aimed at observations of space weather effects onboard Chibis micro satellite, which allowed to measure electromagnetic parameters of the ionosphere responsible for space weather effects.
- The Institute is also a participant in the Russian Coronas-Photon project, which wants to find links between solar activity and physical and chemical processes in the Earth's upper atmosphere.

**Institute’s Focus**

During its short history, the Institute has built a considerable set of core competencies in:
- Earth remote sensing data acquisition, processing and distribution
- Physics of ionosphere and space weather
- Spacecraft navigation and control systems
- Mathematical modeling of complex processes and systems
- Information infrastructure and systems for satellite data processing
- Geographic information systems for environmental monitoring, geospatial data archiving and visualization.

**Valuable Technology Offerings**

The Institute has significant capability in information technology development. For example, the Department of Space Information Technologies and Systems is involved in the development of GRID technologies for environmental monitoring using satellite data, neural networks applications, mathematical modeling of complex processes and systems and satellite data processing. Noteworthy are efforts to integrate remote sensing data and technologies in the National Monitoring Environmental System, which is hoped to be the Ukrainian component of the Global Earth Observation System of Systems (GEOSS) and the Global Monitoring for Environment and Security (GMES) program. SRI was designated a main contractor for the assessment of capacities of Ukrainian institutions and proposals of scientific programs for the creation of a pilot GEO-UA architecture.

**Scientific Cooperation and Technology Transfer**

The Institute has cooperative relationships with a number of Ukrainian research institutions and organizations that either take part in joint R&D or use satellite data and geographical information in their activities, such as:
- the Institute of Ecology Problems,
- the Institute of Forestry,
- the Institute of Hydrometeorology,
- Dniprocosmos State Company of the National Space Agency of Ukraine,
- Center for Aerospace Research of the Earth of the Institute of Geological Sciences,
- Marine Hydrophysical Institute, Technological Institute of Instrument Engineering,
- Kalmykov Center for Radiophysical Sensing of the Earth,
- and Pryroda State Scientific Production Center of Aerospace Information,
- Earth Remote Sensing and Environmental Monitoring.

The Institute actively participates in international collaborative research with a number of projects having been funded by INTAS, STCU, IDRC (Canada), UNDP-GEF, and USAID. Cooperation with Western partners is on the rise, including:
- the European Space Research Institute of European Space Agency (ESRIN),
- Joint Research Centre of European Commission (JRC),
- the National Center of Spatial Studies (CNES, France),
- Canada Centre for Remote Sensing (CCRS, Canada),
- International Development Research Centre (Canada),
- Institute of Informatics,
- Slovak Academy of Sciences,
- U.S. Geological Survey (USGS, USA),
- National Remote Sensing Center of China.

**Contact Details**

Fedorov Oleg Pavlovych  
Director, Dr. Sc.  
40, Acad. Glushkov ave., Kyiv-187, 03680, Ukraine  
phone: +38 044 266-41-24  
fax: +38 044 266-41-24  
e-mail: fedorov@ikd.kiev.ua

Michail Korbakov  
Chief Technology Commercialization Officer  
phone: +38 044 526-25-53  
fax: +38 044 266-41-24  
e-mail: korbakov@ikd.kiev.ua

web-site: www.ikd.kiev.ua
The Space Research Institute NASU-NSAU (SRI) was created in 1996 and is today one of the leading Ukraine centers of organization, realization and coordination of scientific and technical activity in space. The institute has 5 scientific departments and branches in Lviv and Kharkiv.

PRIMAR Y SCIENTIFIC DIRECTIONS

- solar-Earth connections and space weather
- space information systems and technologies, aerospace data processing methods
- space material science research
- development of new devices for space research
- theory and methods of complex dynamic space systems control

DISTINCTIVE COMPETENCIES

The SRI is the leading organization in R&D of methods and information technologies, provision of information services in the Earth observation (EO) domain. SRI has a strong experience in solving applied problems in agriculture and natural disasters using modern data assimilation and data fusion techniques (fig. a, fig. b);

SRI is a center of excellence in the field of ionosphere exploration and space weather forecasting. In addition is has strong experience in solar-terrestrial physics and is a center of excellence in the field of development, testing and implementation of the advanced instrumentation for space research.

SRI NASU-NSAU extensively collaborates with the Group on Earth Observations (GEO), the Working Group on Information Systems and Services (WGISS) of the Committee on Earth Observing Satellites (CEOS), and participates in several international and national projects in collaboration with the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER), the European Space Agency (ESA), the National Aeronautics and Space Administration (NASA), the National Oceanic and Atmospheric Administration (NOAA), the International Federation of Red Cross (IFRC), University of Florida, Max-Planck institute and SPIE.

IONOSAT mission is included into Ukrainian National Space Program on 2008-2012, is also proposed for the First European Space Program, Space Weather Program and GMES. SRI NASU-NSAU maintain intensive research collaboration with leading international Institutions in field of space physics: Sweden Institute for Space Physics, Stockholm, Sweden, Laboratoire de Physique et Chimie de l’Environnement (LPCE/CNRS), Orleans, France, Center for Space Research of Polish Academy of Sciences, Warsaw, Poland, Institute of Space Research of Bulgarian Academy of Sciences, Sofia, Bulgaria, Institute of Space Research of Russian Academy of Sciences, Moscow, Russia; Institute of Terrestrial Magnetism, Ionosphere and Radiowave Propagation of Russian Academy of Sciences, Troizk, Russia.

The Institute participated in a number of international projects funded by STCU, CRDF, as well as in inter-government programs of scientific cooperation.
PARTNERING OPPORTUNITIES

SRI has a strong interest in joint development and commercialization of new technologies and services in the following areas:

- geo-information technologies and services
- environmental monitoring and natural disaster management
- grid and distributed computing
- satellite data processing. Fundamental study of upper atmosphere and ionosphere wave activity
- investigations of ionosphere response on anthropogenic and natural hazards
- experiments on LEO satellites:
  - experiment “Variant” onboard Ukrainian remote sensing satellite Sich-1M launched in 2004,
  - preparation of new mission IONOSAT onboard constellation of 3 LEO satellites (fig. c).
- space weather forecasting
- space instruments damage due to space weather impacts
- development of methods and devices for remote sensing of vegetation

---

a) Example of integration of multi-source data: land temperature derived from satellite observations and meteorological stations
b) Digital map of flooded area
c) Satellite constellation proposed for IONOSAT mission
d) Device for remote sensing of vegetation state