

ENGINEERING  
COMPANY

LORETT

LoReTT LLC - startup (2017),  
engineering Company providing  
innovative solutions for Education and  
Meteo markets



- LoReTT technology developers - Vladimir and Olga Gershenzon, experts in the field of Earth remote sensing data reception and application.

- In the early 90s Vladimir and Olga created a company called "ScanEx" ([www.scanex.com](http://www.scanex.com)) which made a breakthrough in the approach towards the use of new technologies of receiving and analyzing data from space - space images.

- Almost 30 years of experience in the field of creating technologies for receiving, processing and using images of the Earth from Space.

- LoReTT technology - is a natural continuation of this work to democratize access to Earth images acquired from space.



## About the Company

# LORETT

- "LoReTT" LLC is innovative start-up, engineering company, founded in April 2017 with participation of Internet Initiatives Development Foundation (IIDF). Since 26 March, 2018 "LoReTT" LLC is the resident of "Skolkovo" Innovation Center.
- Founders of Company are experts in the Earth remote sensing systems and their applications. "LoReTT" LLC is the developer of the Laboratory complex for satellite monitoring "LoReTT", which is the basis of an [Interdisciplinary Laboratory "Earth from Space"](#) for additional schooling.
- We are transforming school geography into a modern "living" science with research and innovation components. We offer the subject of the future and technology for the conscious choice of a promising and in-demand profession!
- The Interdisciplinary Laboratory "Earth from Space" at the joint of geography, informatics, physics, biology and other subjects will allow to involve schoolchildren in project activities and participation in domestic and international competitions, hackathons, olympiads, conferences and exhibitions.

[www.eng.lorett.org](http://www.eng.lorett.org)

# The world is very changing... LORETT

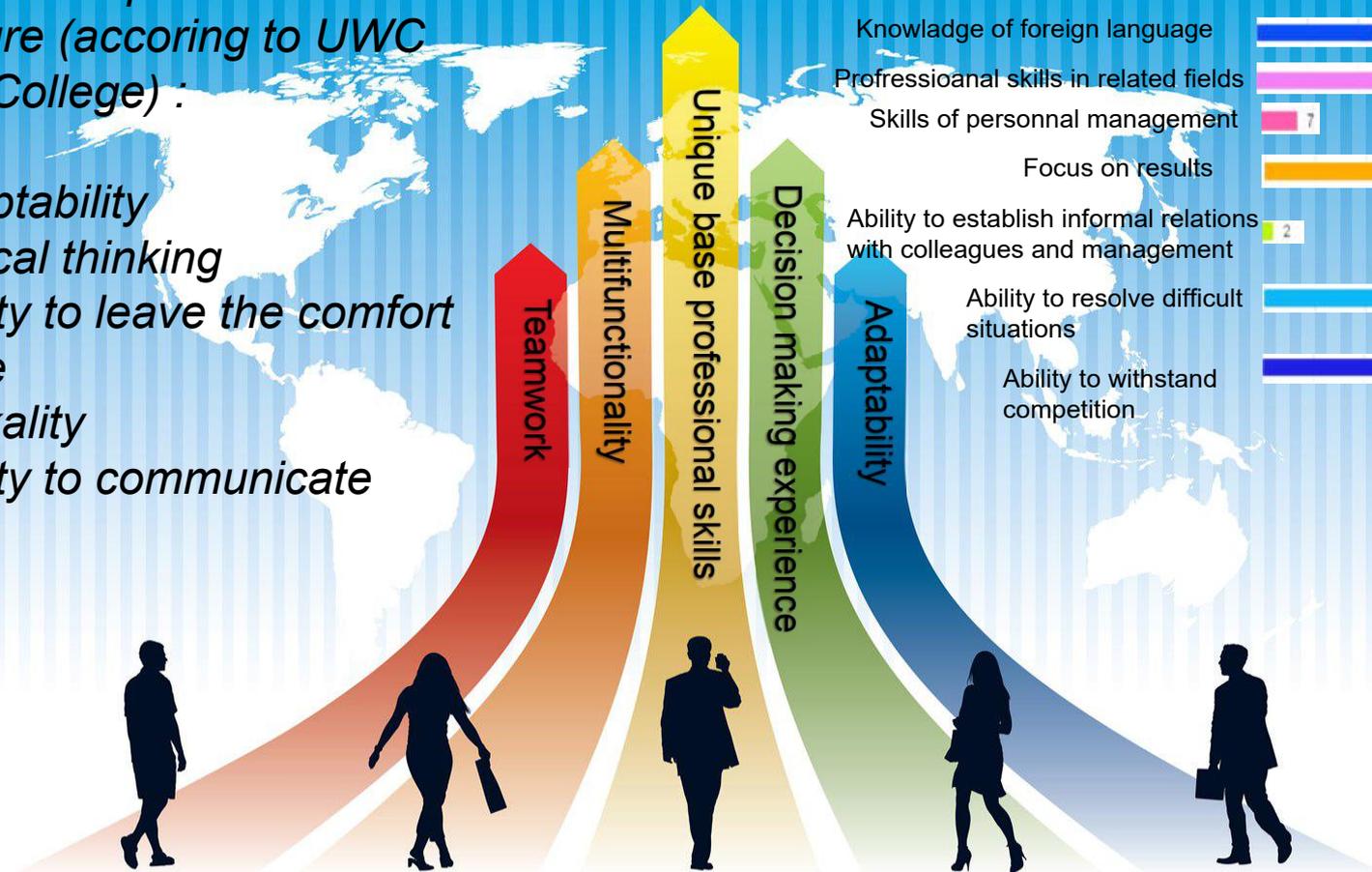
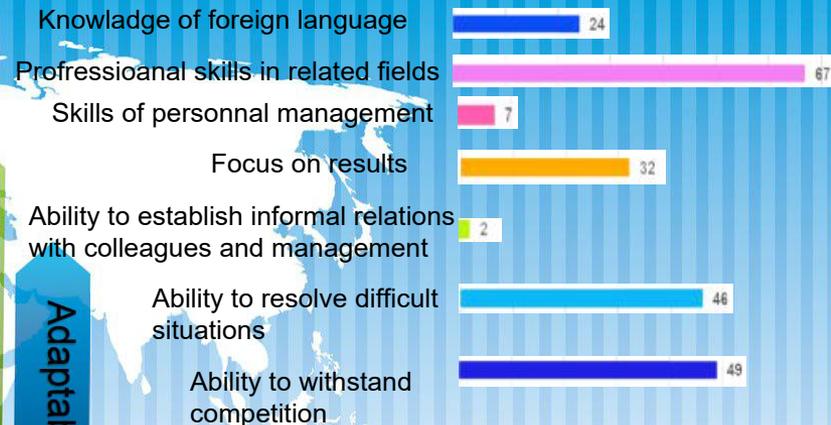


...THE WORLD IS VERY CHANGING - 65% OF NAMES OF FUTURE PROFESSIONS (2030-2035) ARE NOW UNKNOWN...

## Demands for professionals of the future (according to UWC Dilijan College) :

- ❖ *Adaptability*
- ❖ *Critical thinking*
- ❖ *Ability to leave the comfort zone*
- ❖ *Glokality*
- ❖ *Ability to communicate*

## Modern requirements for job seekers





## Goals



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- To form a holistic perception by the students of the essence of natural processes and results of human activities in our biosphere.
- To teach the independent research skills.
- To increase the environmental awareness.
- To invest in educating the specialists ready to implement high-tech projects and capable of not only generating, but also using the satellite products and rendering services in various sectors of the economy through the use of Earth remote sensing data.



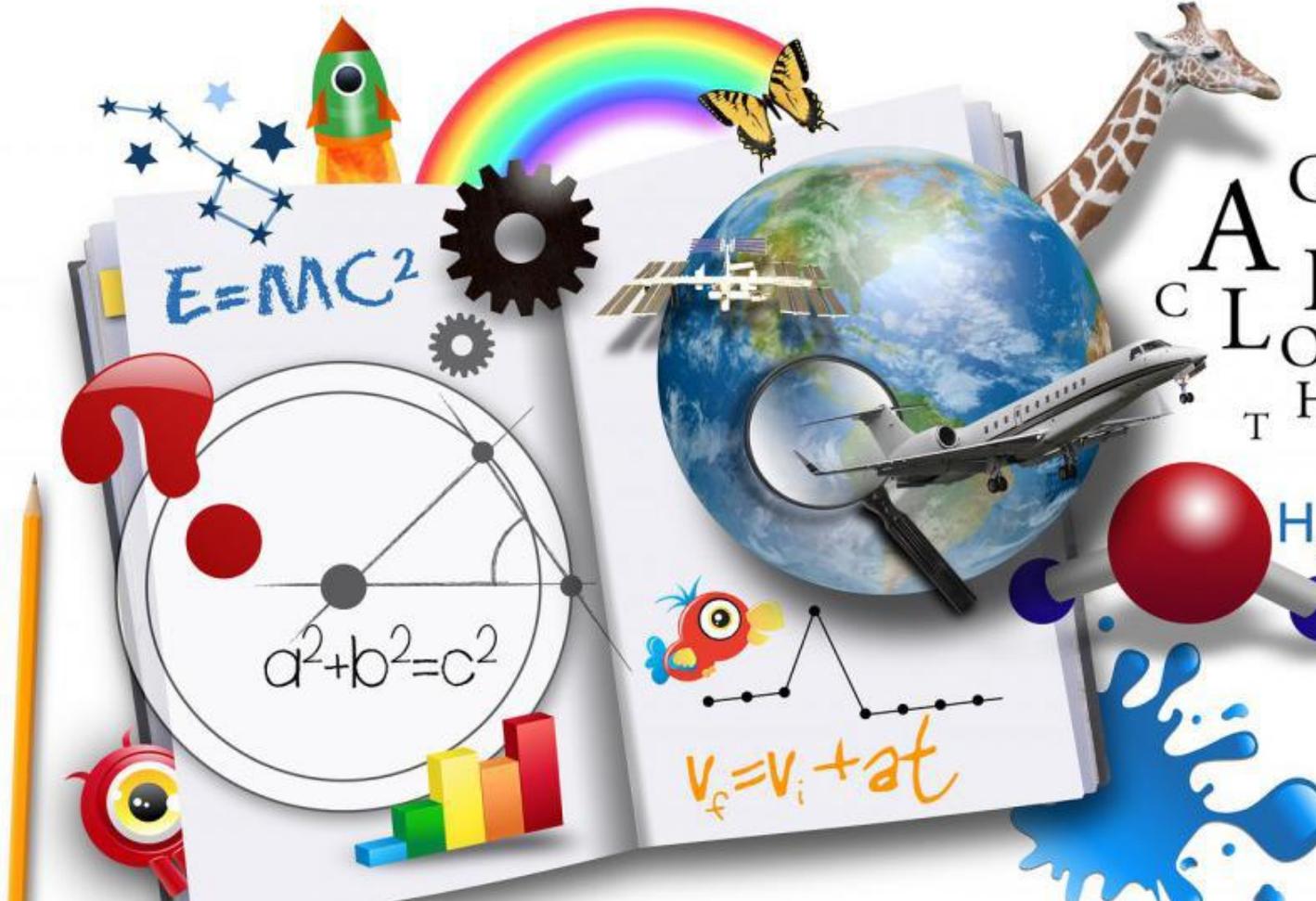
## Importance for education



- Generating students' interest in learning, research work and project activities;
- Training skills of outlining a problem on one's own in scientific and project studies;
- Development of the ability and readiness to seek solutions of practical problems, application of different methods of perception;
- Advanced organization of students' activities, aimed at not only conveying knowledge, but at teaching methods of such knowledge application as well;
- Early choice by students of future professions most demanded in today's world in the field of research, scientific and engineering studies for the benefit of high-tech industries.



# Multidisciplinary



$$E=MC^2$$

$$a^2+b^2=c^2$$

$$v_f = v_i + at$$

Geography

Ecology

Natural sciences

Informatics

Biology

Physics

Safety of vital functions

Chemistry

Astronomy

Mathematics

History

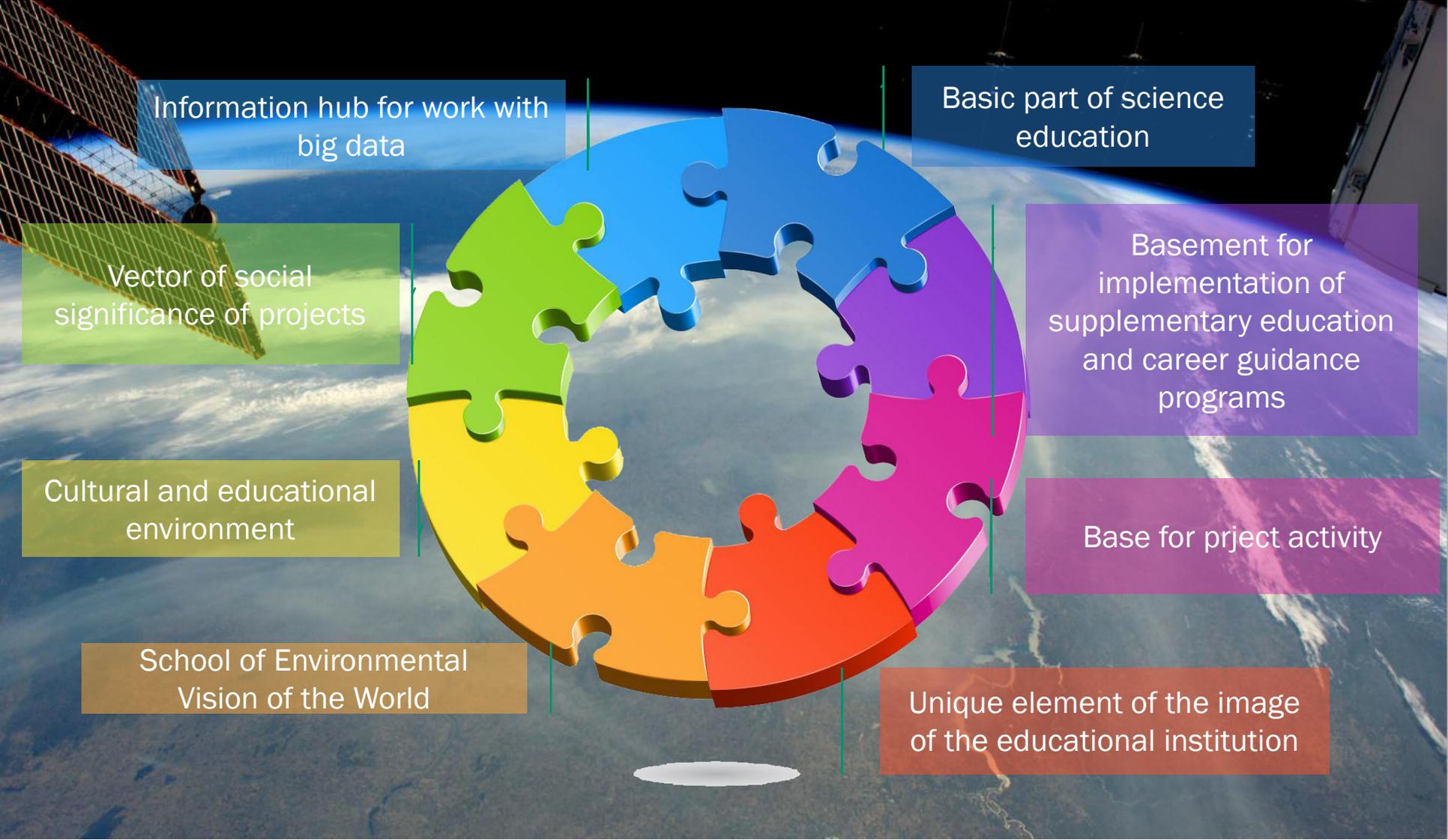
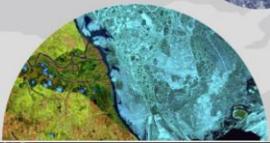
Technology



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# “Earth from Space” Laboratory in school education



Information hub for work with big data

Basic part of science education

Vector of social significance of projects

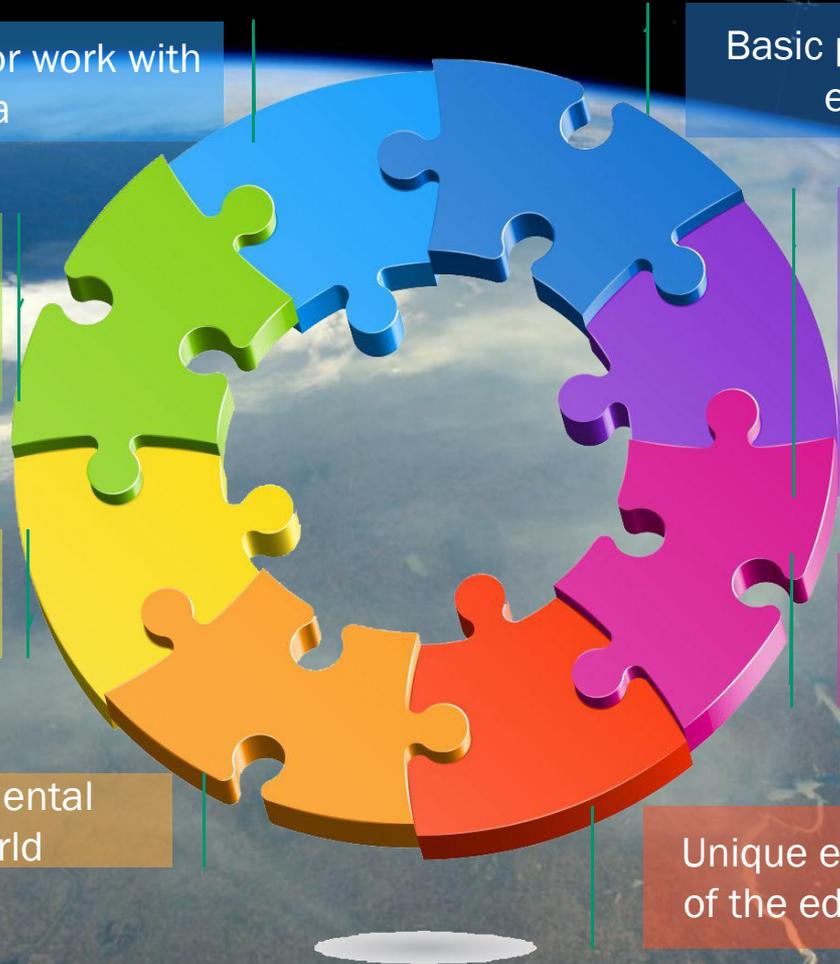
Basement for implementation of supplementary education and career guidance programs

Cultural and educational environment

Base for project activity

School of Environmental Vision of the World

Unique element of the image of the educational institution



# LoReTT - Local Real Time Tool



**Training students' skills in R&D, scientific and engineering project-exploratory activities based on the “Earth from Space” laboratory, consisting of:**

- Computer class.
- **LoReTT Ground Station**, which receives images of the Earth from space *in real time* at maximum scale and resolution: from 1 km down to 1 m. The station provides the possibility of receiving imagery data of any part of the world in direct broadcasting mode within a radius of  $\phi$ ищге 200 km and through the satellite on-board storage memory. The proprietary LoReTT receiving station ensures **reliability** of information, **confidentiality** of a request, **reception of operational data** (once a day or more often), **independence from the Internet**.
- License for data reception



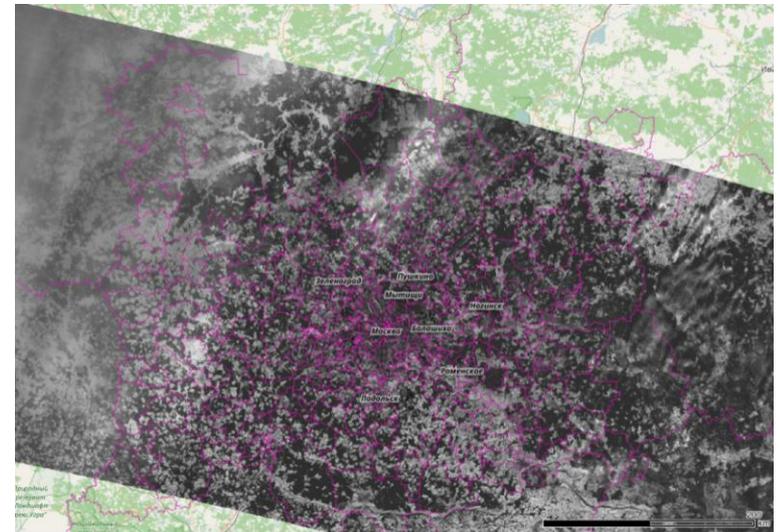


Today: beta-testing stage

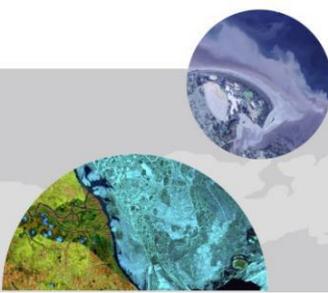
Successful reception of data with a resolution of 1 km down to several meters.



Ground track of the Terra satellite, which data was received by the LoReTT ground station



MODIS image from the Terra satellite, received by the Lorette ground station



## Results



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- New possibilities: involving in scientific and technical work, real thematic projects activity.
- Training specialists demanded on the modern labor market.
- Opportunity to partake in scientific and research, project studies, hackathons, Olympiad movement, international projects and to work in international educational centers.
- Acquiring knowledge and skills of processing and analyzing Earth observation images, based on geo-information systems (GIS) and web-technologies for solutions in forecasting weather and dangerous natural hazards& emergencies, ecology, agriculture and forestry, urban planning, territory management and many other.

# Possible scientific and practical projects



Evaluation of the fire season impacts in Russia and in Canada



Searching and mapping conifer forests damaged by bark beetle



Detection of infringements during salmon fishing with stationary nets off the coast



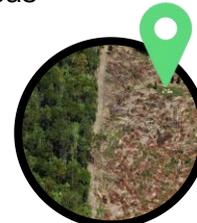
Search for rookeries of harp seals during breeding on ice



Searching for illegal construction within water protection areas



Monitoring elephants safari in national parks of Kenya



Detection of reasons for cutting tropical forests



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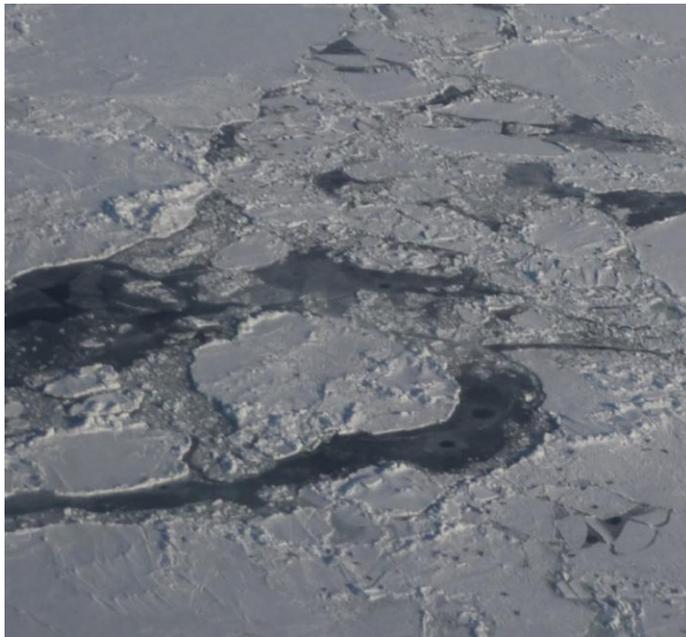
# Examples of Projects



## Search for harp seals rookeries during the breeding season on the ice of the White Sea

Seals on the ice in the White Sea waters. An aerial survey image, March 6, 2010 Photo by O.A. Panchenko

White Sea ice fields — harp seals "maternity" homes (photo by Timur Voronov)



## Purpose of the project:

Search for harp seal rookeries on the ice of the White Sea and provision of data in support of ice channeling of ships bypassing whelping areas at a sufficient distance





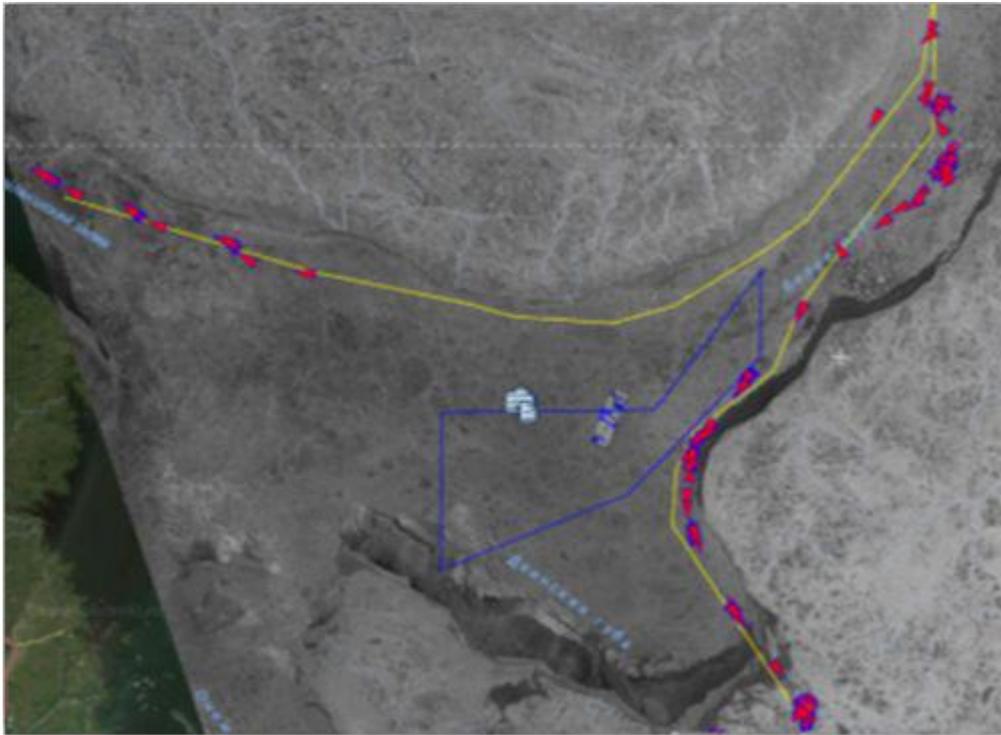
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Search for harp seals rookeries during the breeding season on the ice of the White Sea

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©MDA, 2010

In order to prevent the passage of ships through the seal rookery areas and prevent the death of animals, the Arkhangelsk port Ice Operations Headquarters prepares routes through the ice of the White Sea waters for all icebreakers and ships, regardless of their subordination.

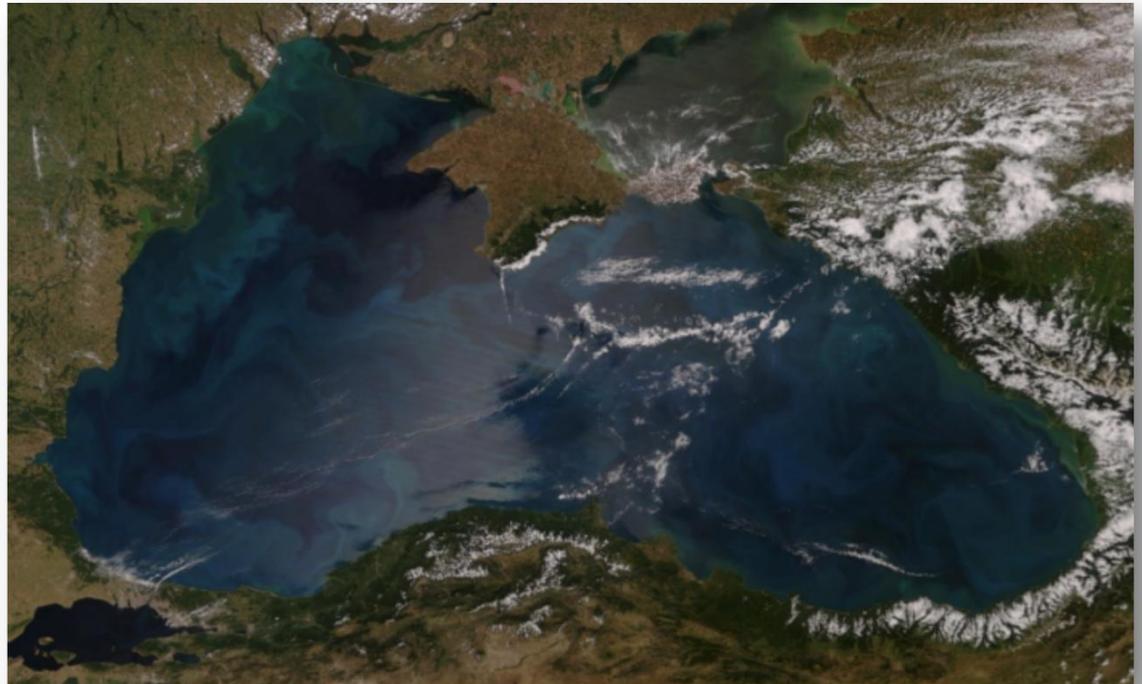


## Assessment of human impacts on the Russian part of the Black Sea



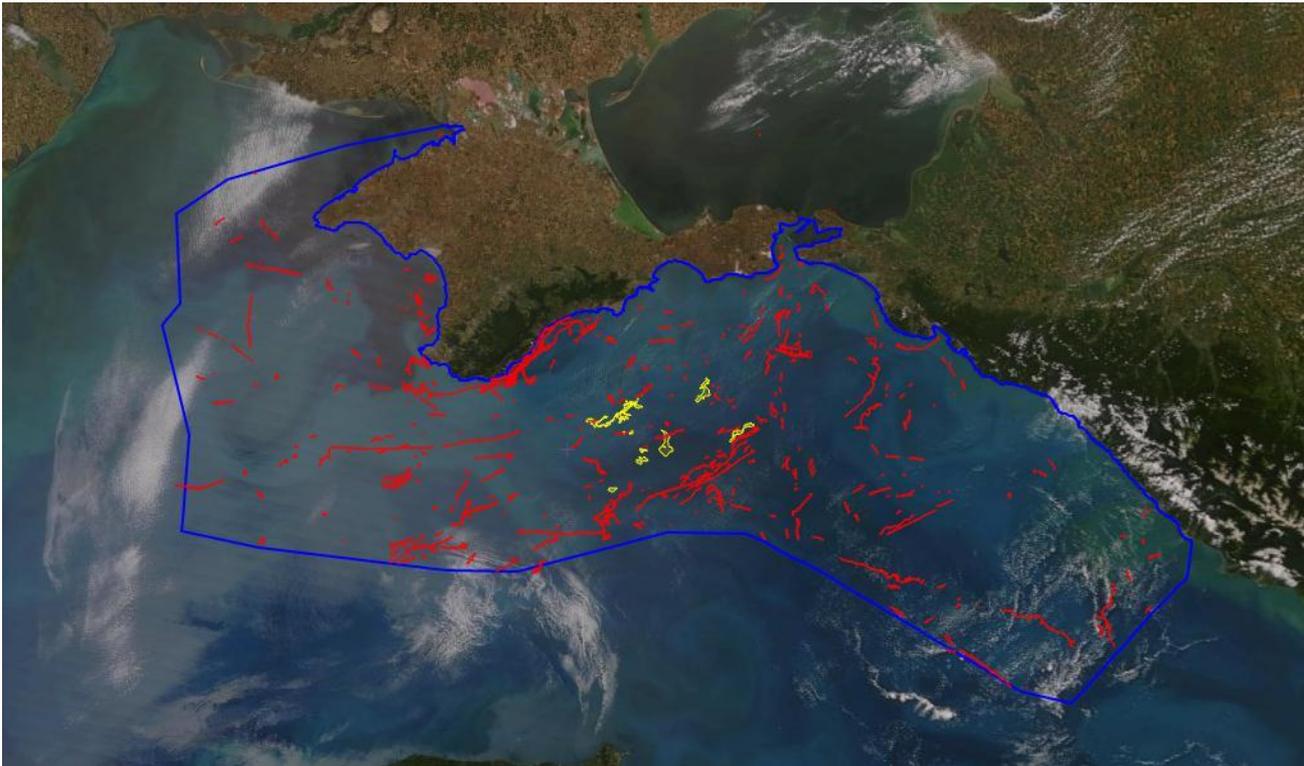
### Purpose of the project:

Outline the determining factor of the human impact and assess the extent of its influence on the ecological state of the Russian part of the Black Sea.





# Assessment of human impacts on the Russian part of the Black Sea



**Problem to be solved:**  
 Poor-quality environmental monitoring of water areas

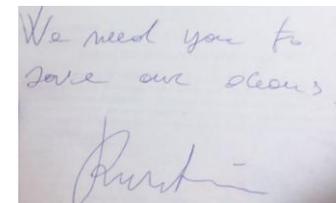
The determining factor of the human impact on the Russian part of the Black Sea are operational and accidental oil spills from ships. Based on satellite radar images of the **Sentinel 1** satellite interpretation of the images with oil spills was performed for the period June 2016 to June 2017.

- - ship spills
- - fish oil spills
- - border of the Russian part of the Black Sea

# Opinions of high professional international experts



Riccardo Valentini, a Nobel Laureate and Professor at the University of Tuscia (Italy) became interested in the project at the exhibition. The prominent climatologist, after talking with children, said that this important, interesting and serious project deserves highest scores.



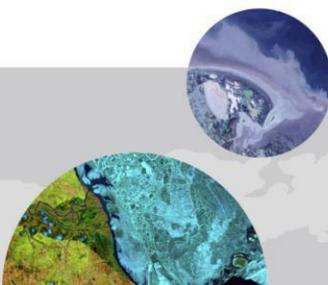
M. I. Sluch, Member of the Expert Council, Vice-President of the "Talent and Success" Foundation" in "Science" area of study: "A very important project! The main advantage: working with real data. Another plus: good analytics, ability to point out the essential. And other thing: the subject is absolutely topical, not a school one".



A. V. Leontovich, President of "Explorer" public movement, member of the Public Council of the RF Ministry of Education and Science: "I was very much interested in this project. It is important because it aims at studying the problems of the Black Sea applying available methods and shows, what kind of harm could rash acts of officials cause. Wishing you good luck!"



Y. A. Peskov, PhD candidate (technical), Prof. Admiral Ushakov Maritime State University , Head of Analytical Research Center of JSC "Novoship" during a video conference: "This work can become a kind of "trigger pulse" and help organizing an effective system for monitoring marine pollution (especially with regard to operational dumps) at the national level in order to stop the pollution of the waters adjacent to the coast of the Russian Federation".

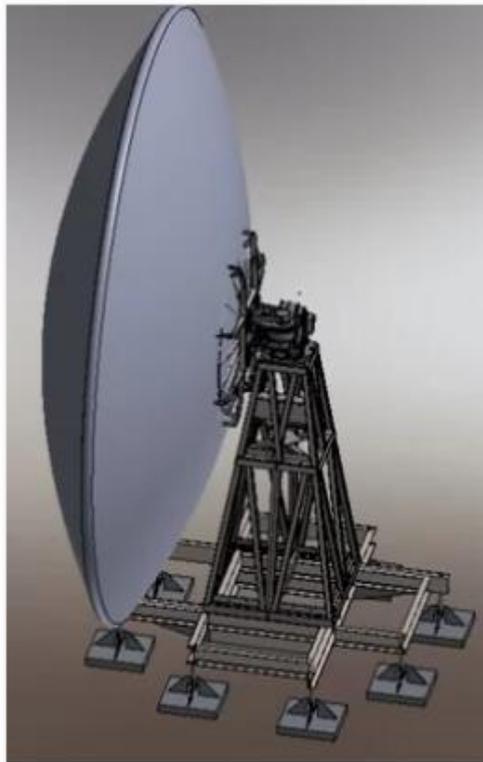


# Solutions for Meteo Market



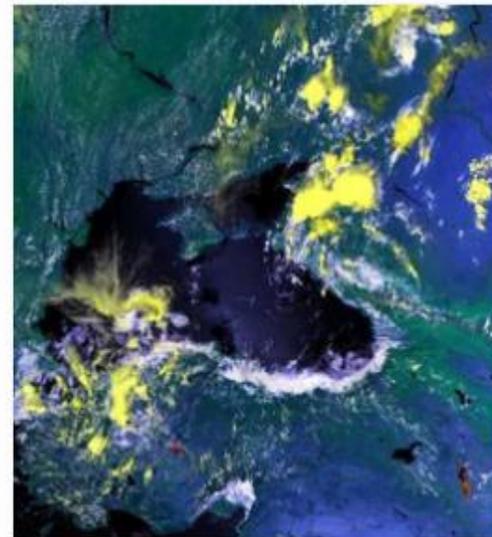
## Lenticularis

Laboratory Satellite Meteo Complex



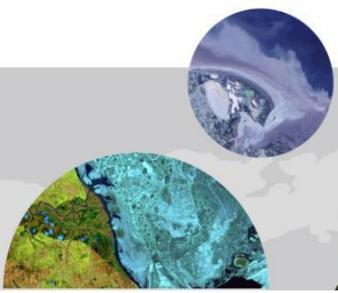
## Milk Thistle

X-band Ground Station for Remote Sensing



## MODIS Real Time

Provision of cloud weather data via MODIS Terra and Aqua data service in real time



## Contact us

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Board of Directors

[www.eng.lorett.org](http://www.eng.lorett.org)



Thank you for your kind attention!  
Welcome to cooperation!