SPUTNIX
BY SITRONICS

Satellites ground control stations



Our solutions help to create a high-tech, safe and eco-friendly future

sitronics GROUP SPUTNIX BY SITRONICS

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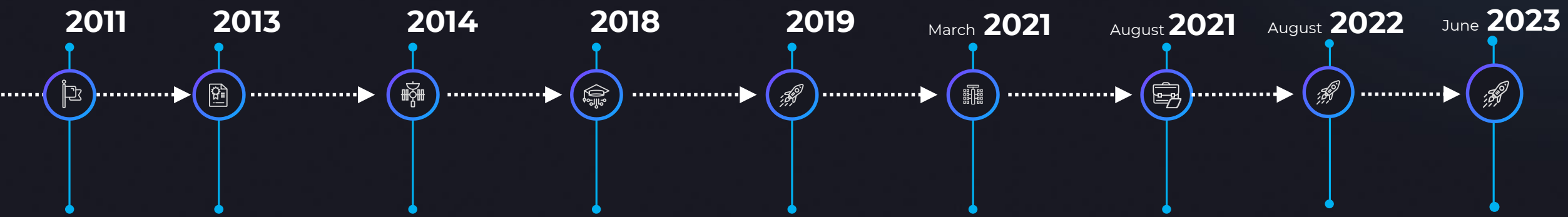
a full-cycle company in the field of design, production of satellite devices and platforms, as well as their operation in orbit

WHO WE ARE TODAY

The leading developer and supplier of small spacecraft (micro- and nanosatellites)



COMPETITIVE ADVANTAGES



High speed of spacecraft manufacturing at low cost of production and launch



Diversified commercial application of spacecraft and unique industry experience

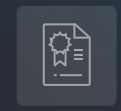
projects with RC Sirius, navigation monitoring, climate monitoring



Removal of several spacecraft in one launch, rapid deployment and operational replenishment of the grouping



Synergy of Sitronics group companies



FSA license for space activities



Experimental, scientific and educational missions

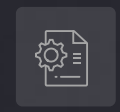


Own product line

aerospace systems, nano-and micro-satellites, development platforms, educational platforms, space modeling systems



Import substitution trend



The possibility of implementing large and complex projects



High investment potential

MAIN ACTIVITY



KEY DIRECTION

Space devices and satellites

A full cycle of development, production, assembly of own line of on-board devices and small spacecrafts



Providing satellite data and services

The company is working on the creation of its own system for receiving satellite data (IoT, AIS, etc.) and their commercialization



Testing facilities

Own test benches for the development and testing of small spacecraft ADCS



Educational programs

complex programs for training of students and professionals on the basis of own educational equipment



Launch into orbit

Creation and launch of spacecraft in cooperation with Glavkosmos, JSC



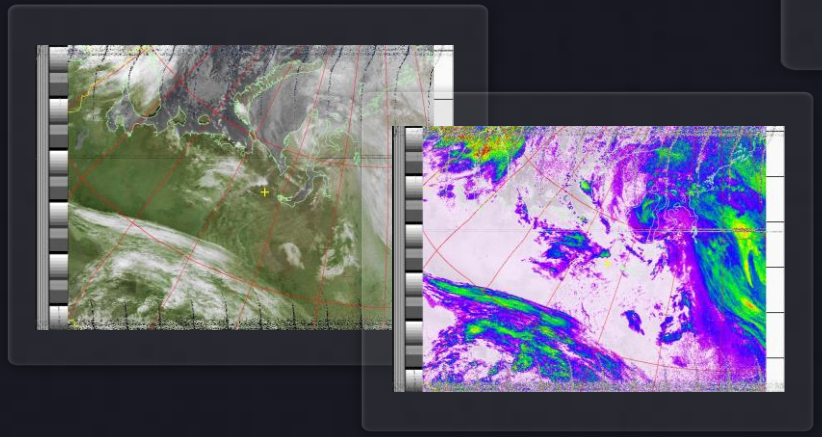
Satellite control

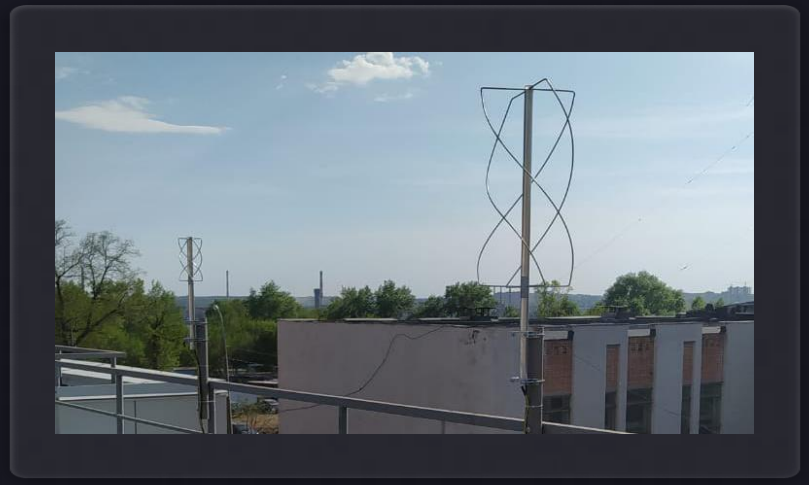
Own Mission Control Center (MCC) for data reception and satellite control

Satellite data receiving training station “Viewnok”

The following types of radio signals can be received:

- Telegraphic radio signals that allow you to receive Morse code signals "by ear" or demonstrate the Doppler effect;
- Images from NOAA, Meteor-M weather satellites, with which you can see the development of meteorological phenomena, study the temperature distribution;
- Telemetry of approximately 50 satellites to assess the altitude, temperature, and rotation speed of the satellite.







“Viewnok” includes two quadrifilar observation antennas in the bands 136...146 and 435..438 MHz, and a workstation with software.

Data receiving and satellite control station “Zavitok-M”

Thanks to a two-way communication channel, it is possible both to receive telemetry and data, and to transmit control commands.

- In addition to the functionality of “Viewnok” station, the complex includes a directional antenna with a satellite tracking algorithm, which allows to improve the quality of reception and transmission.
- “Zavitok” station has a modification "Zavitok-M" with an improved gain due to a doubled directional antenna.
- To control spacecraft manufactured by SPUTNIX, a license for a specialized software Houston CC is supplied.

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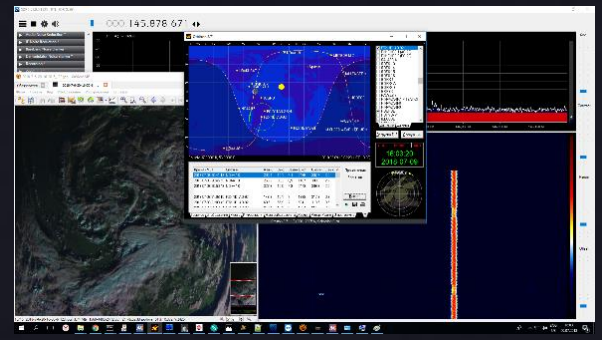
“Zavitok” includes two quadrifilar survey antennas in the ranges of 136...146 and 435..438 MHz, a directional helical antenna 435...438 MHz (401...402 MHz optionally) and a workstation with software.

Features of the complex



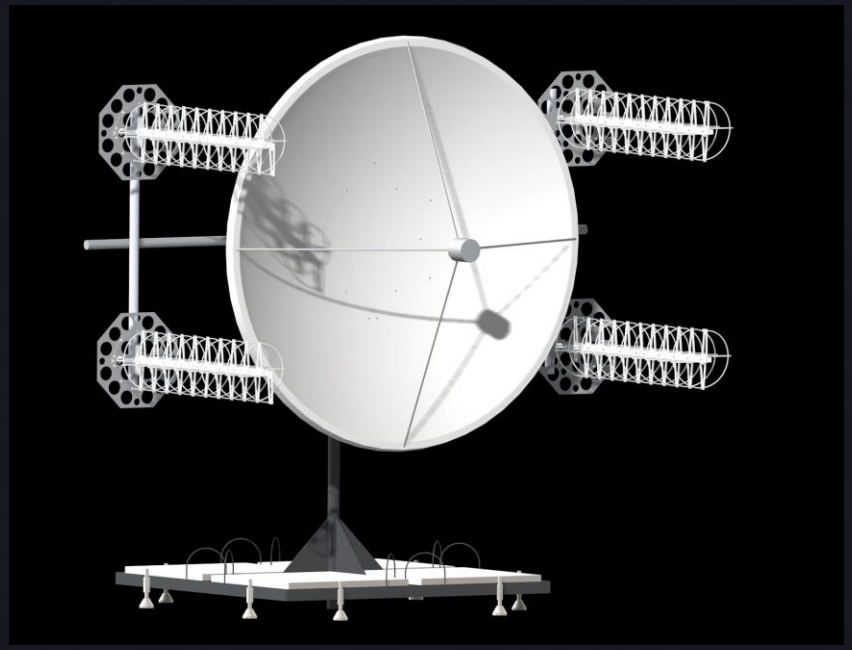


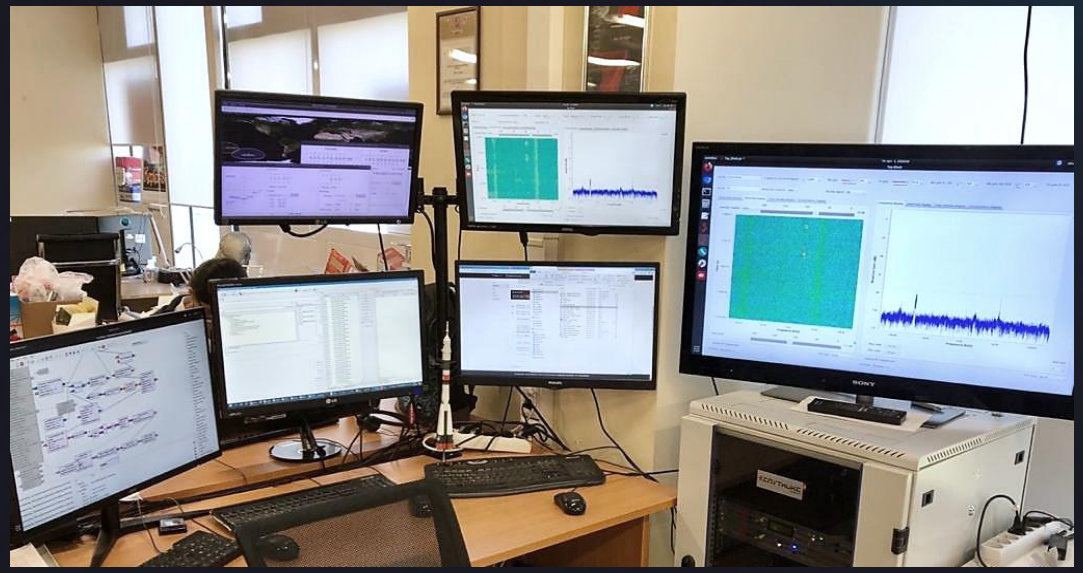
Directional antenna frequency range	**not narrower than 400 - 438 MHz**
Survey antennas frequency ranges	136-146 и 400-438 MHz
Max data speed rate (survey antennas)	not less than 9600 bps
Transmitter output power	not less than 4 W
Nominal rated gain (at least one antenna)	not less than 8dBi
Supported transport protocols	at least AX.25
Supported modulation types	FSK (GFSK, GMSK, etc.), PSK (QPSK, OQPSK)



Data receiving and satellite control station “Zavitok S”

“Zavitok-S” complex is intended for use as part of flight control centers, as well as for educational use. It provides telemetry receiving from small spacecraft in low Earth orbit and control commands transmitting in UHF range, as well as payload data receiving in S frequency band. The complex is aimed to operate in accordance with amateur radio regulations but can also operate in commercial ranges.





Antenna complex contains four antennas.
Two of them are survey antennas, which are fixed quadrifilar antennas. They can be used for receiving images from meteorological NOAA and Meteor satellites, receiving telemetry from spacecraft operating in 136-146 MHz frequency range, as well as receiving telemetry from spacecraft operating in 400-440 MHz frequency range, with the elevation being limited to more than 20 ... 30 degrees, but without the need for pointing the spacecraft antenna in the sky, which is convenient in the absence of data on the orbital parameters of the spacecraft and while working with several spacecraft.

Data receiving and satellite control station “Zavitok S”

Features

The complex allows:

- Autonomously tracking and receiving data from earth-orbiting satellites operating on VHF, UHF, and receiving in S-Band frequencies;
- to receive telemetry of spacecraft using open protocols (like AX.25 and variations);
- to transmit telecommands and receive receipts via similar protocols;
- receiving NOAA-satellites and Meteor-M satellite shots via UHF-range by APT and LRPT protocol.

Hardware of the complex uses open widespread interfaces, thereby it is compliant with many of opensource software:

- LRPT decoder;
- WxtoImg;
- GNURadio;
- Gpredict;
- Sound modem, etc.

Frequency Range	**Amateur: 2400 – 2450 MHz Commercial: 2200 – 2290 MHz**
Antenna type	Parabolic antenna
Antenna diameter	1,2 m
Antenna gain	27,5 dBi
Polarization	Circular, RHCP or LHCP
LNA noise figure	1,2 dB
RF Protocol type	DVB-S2
Modulation supported	QPSK, 8PSK, 16APSK
FEC	LDPC +BCH
Variable bitrate	Supported
Symbol Rate	0,5...5 Msym/sec
Bitrate	0,5...10 Mbit/sec *
Output data interface	TCP/IP
Rotator type	Two-axis, Azimuth-Elevation
Rotation speed	3,6...6 °/sec

Mission Control Center (MCC)

- The Mission Control Center (MCC) is designed to provide centralized automated control of spacecraft or satellite groupings in near-Earth orbit.





The MCC conducts:

- telemetry data processing and analysis of the state and functioning of spacecraft systems
- solving ballistic problems
- planning satellite control sessions
- formation of spacecraft flight cyclograms
- visual display of satellite
- status data exchange with ground stations

- The MCC receives all information from ground control stations. In the MCC, incoming information is processed, analyzed and used to form flight cyclograms and control commands for satellites

Mission Control Center (MCC)

In addition, the following tasks can be solved in the MCC:

- simulation of the activities of the MCC staff during training,
- working out actions in emergency situations,
- conducting classes for students and training operators, conducting excursions,
- familiarization with the space activities of the organization

Composition:

- displays
- a set of automation
- tools software
- special spacecraft control software
- information storage system
- more than 50 m2



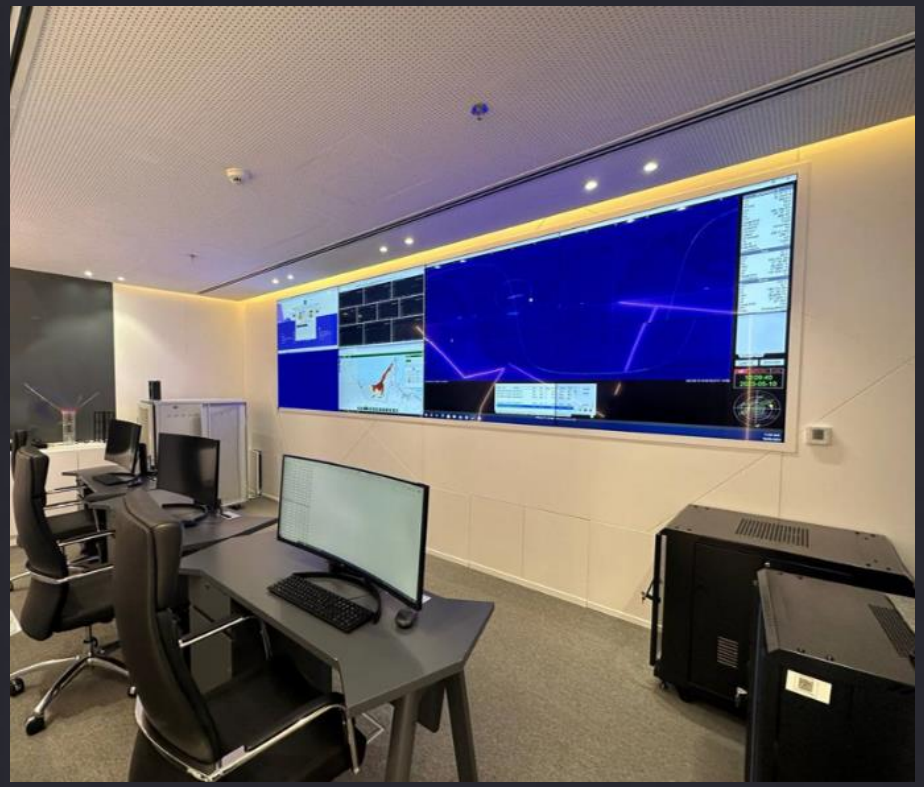




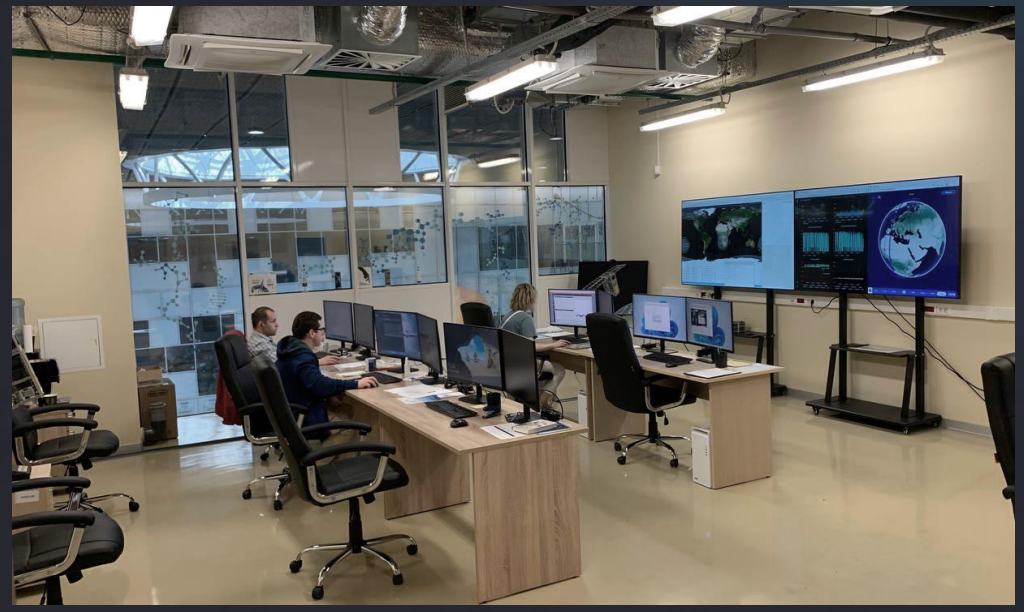
Professional Modification

* The image of the MCC is given for reference. The design can be different depending on the area, the configuration of the room and the design project

Mission Control Center (MCC)



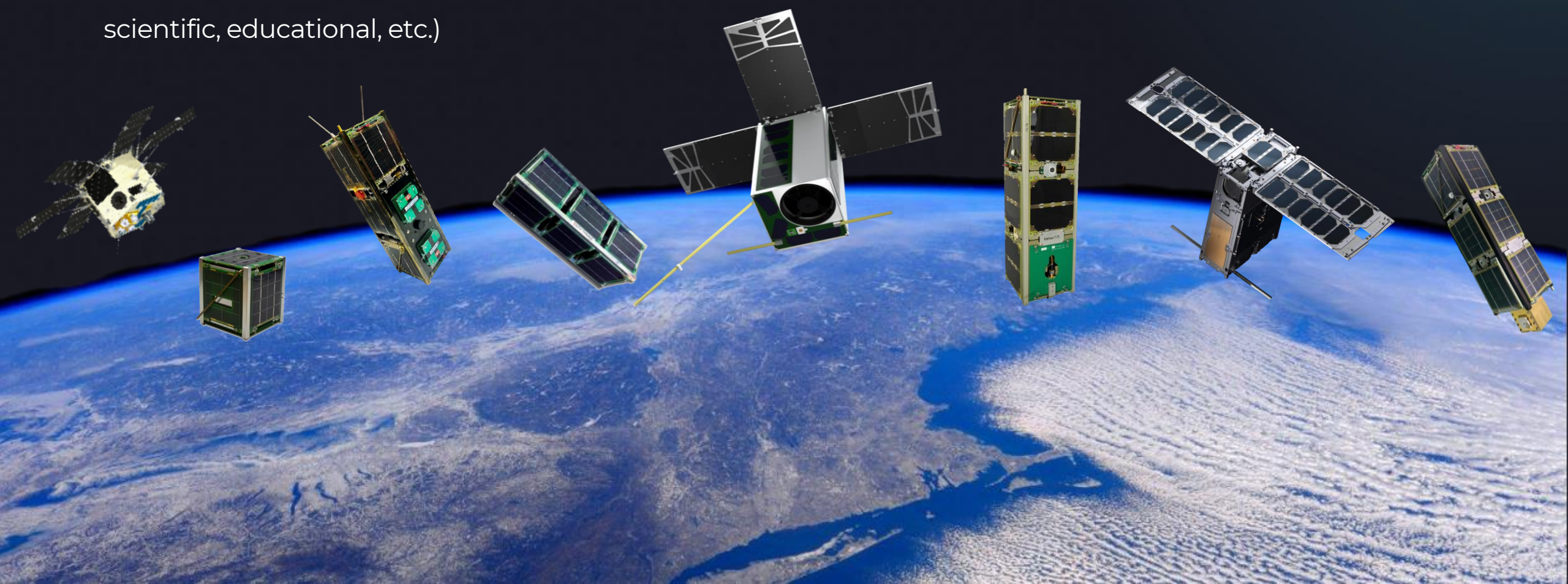
Modification Training
(up to 20 m2)



Modification Standard
(up to 50 m2)

Launched satellites

- A total of **40 satellites** were launched,
- There are **35 satellites** operating in orbit.
- Various purposes (IoT, remote sensing, AIS, AZNV, scientific, educational, etc.)

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