

MOPS engineering kit (Mobile Operating Portable Station)



Transparent World



MOPS

Mobile
Operating
Portable
Station



MOPS engineering kit

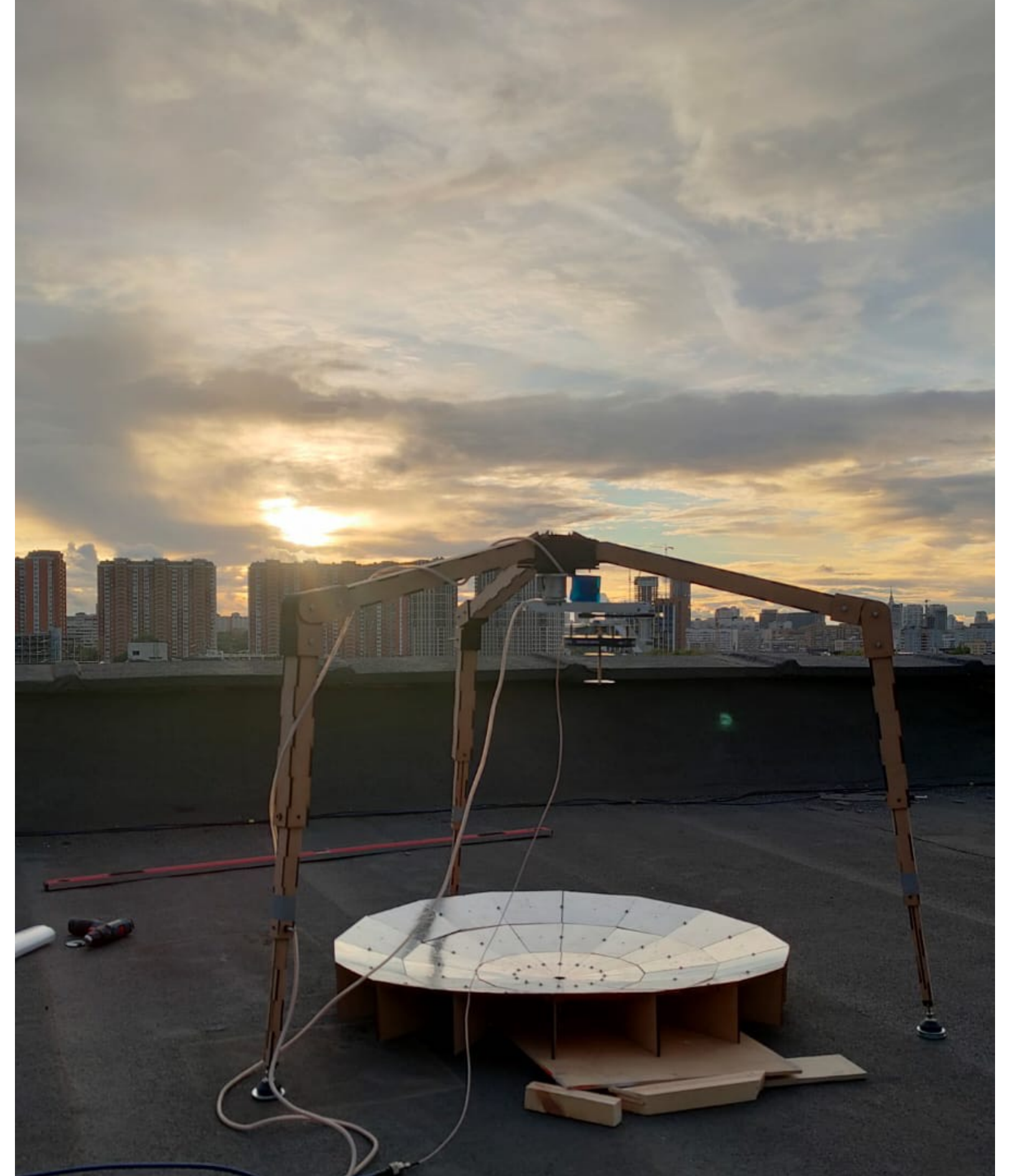
consists of:

- Prefabricated reflector
- Prefabricated manipulator frame
- Manipulator
- Power Supply
- Control block
- Irradiator
- SDR
- Cable set
- Spanners
- Data processing software



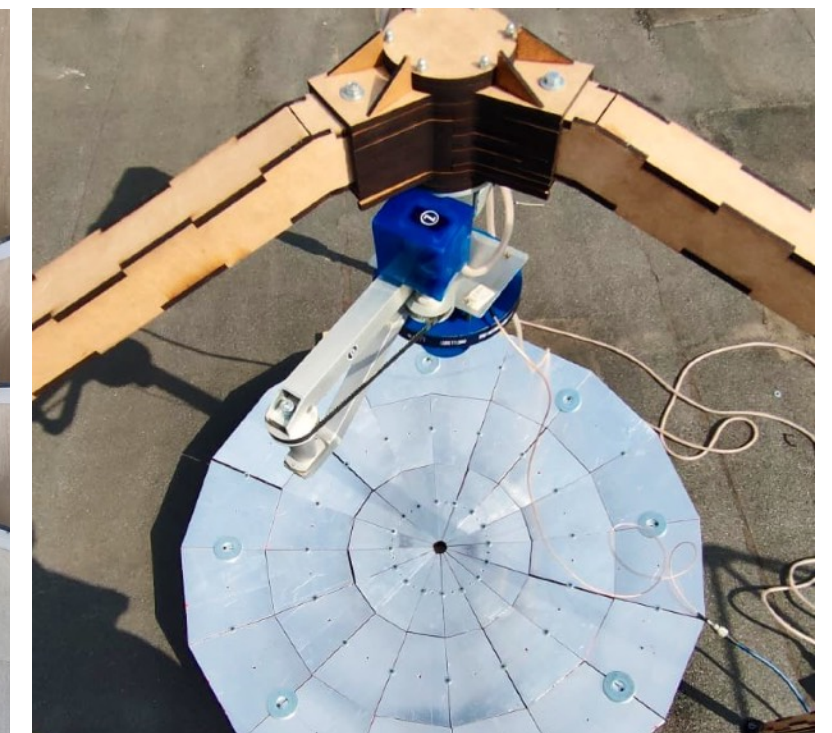
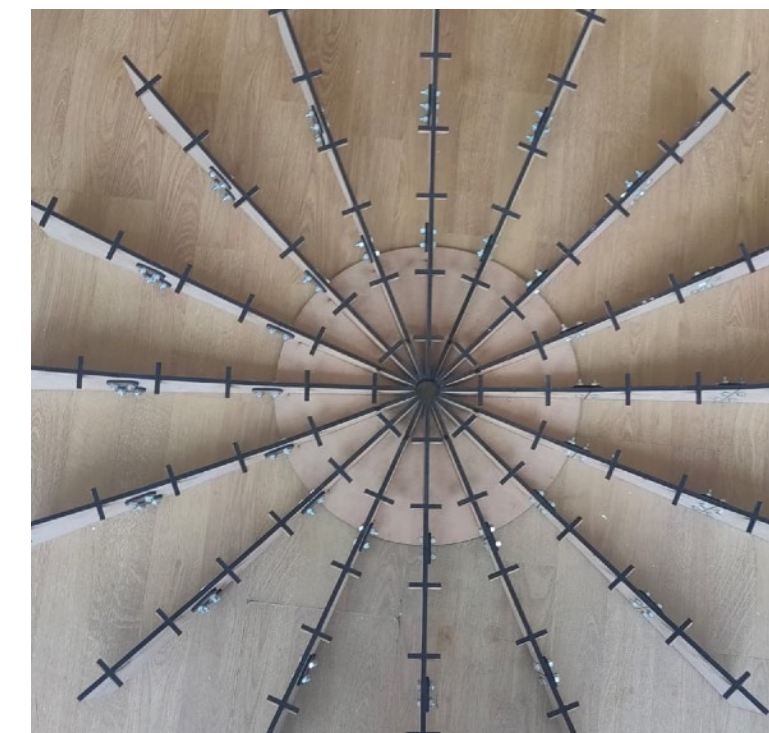
Key features of MOPS:

- It is possible to manufacture all structural parts if the necessary equipment is available and the recommendations of the manual are observed.
- Everything, except for the manipulator, can be assembled by schoolchildren at technology lessons or as part of extracurricular activities, project activities, vacation trainings etc.
- Schoolchildren assemble the structure and parts, and also make a reflector. It is possible to manufacture parts according to drawings.
- The weight of the constructor is 5 kg (excluding the set of cables).
- The packaging is compact and easy to transport.
- MOPS is designed for operational reception or short-term duty.



Principle of work with MOPS:

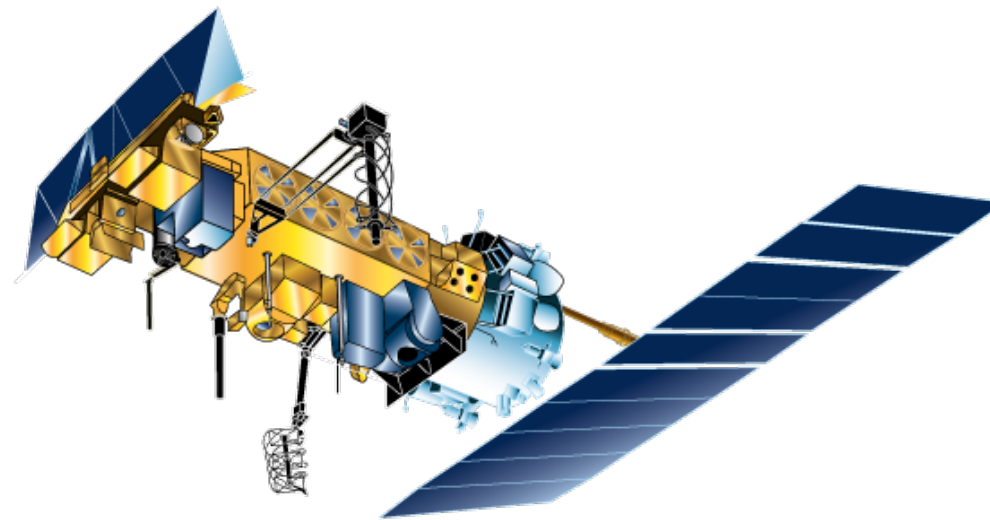
1. Assemble a kit and get a station (complex) for receiving satellite information.
2. Configure it and receive data from meteorological satellites such as Meteor-M No. 2, NOAA, MetOp, FengYun-3 via L-band radio channels in real time.
3. Process and analyse the received images of the Earth from space.



MOPS can receive data from the following meteorological satellites:



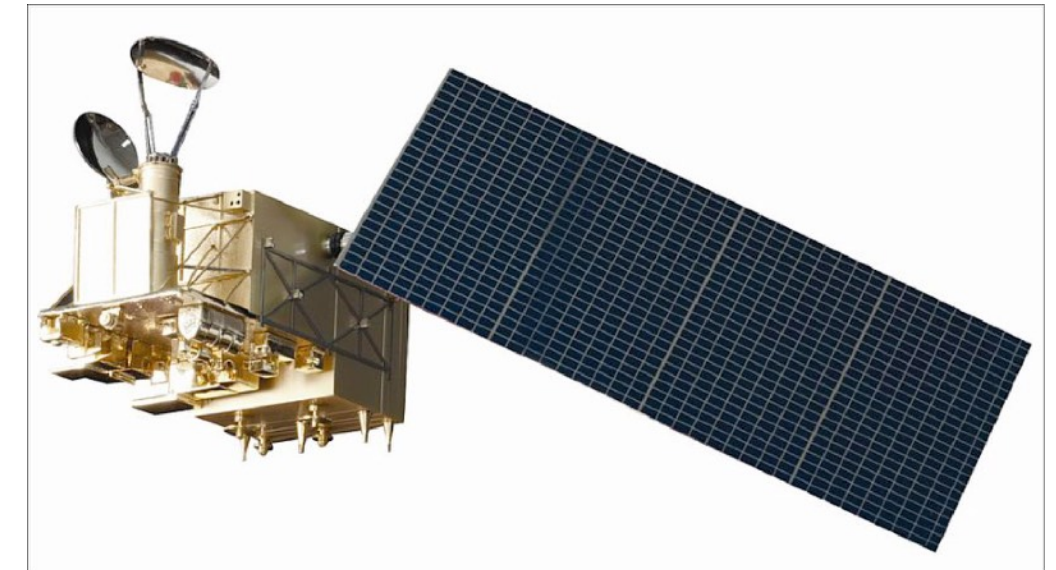
MetOp



NOAA

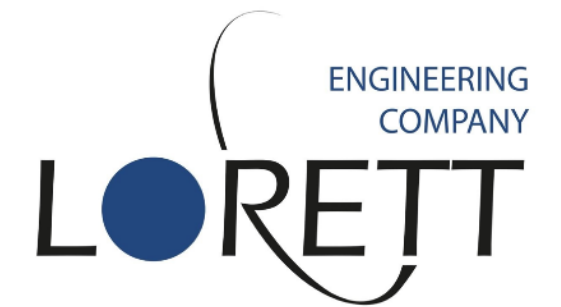
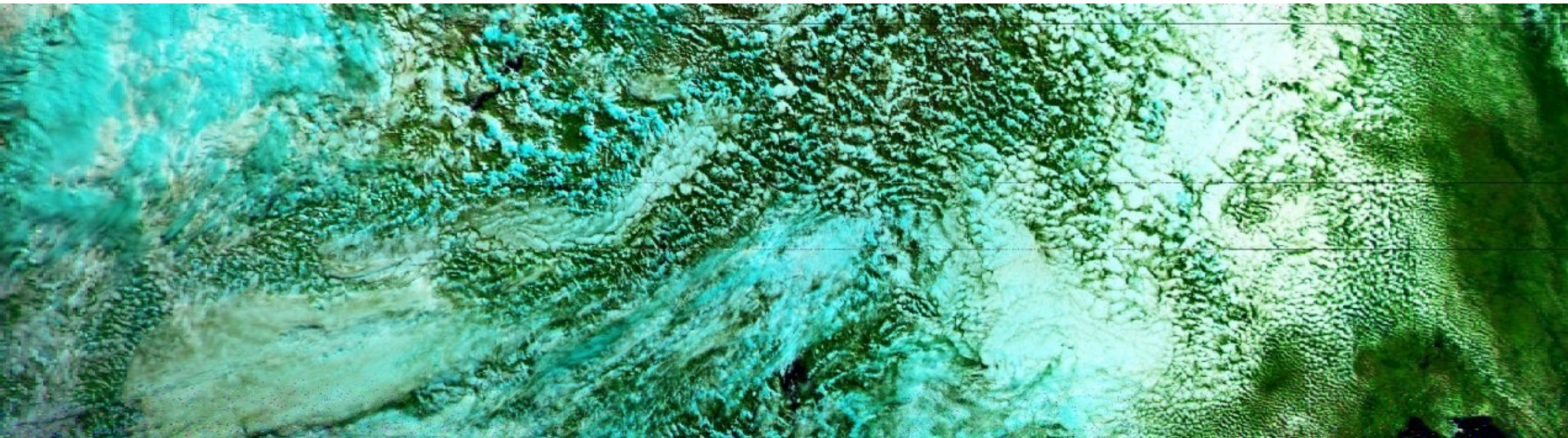
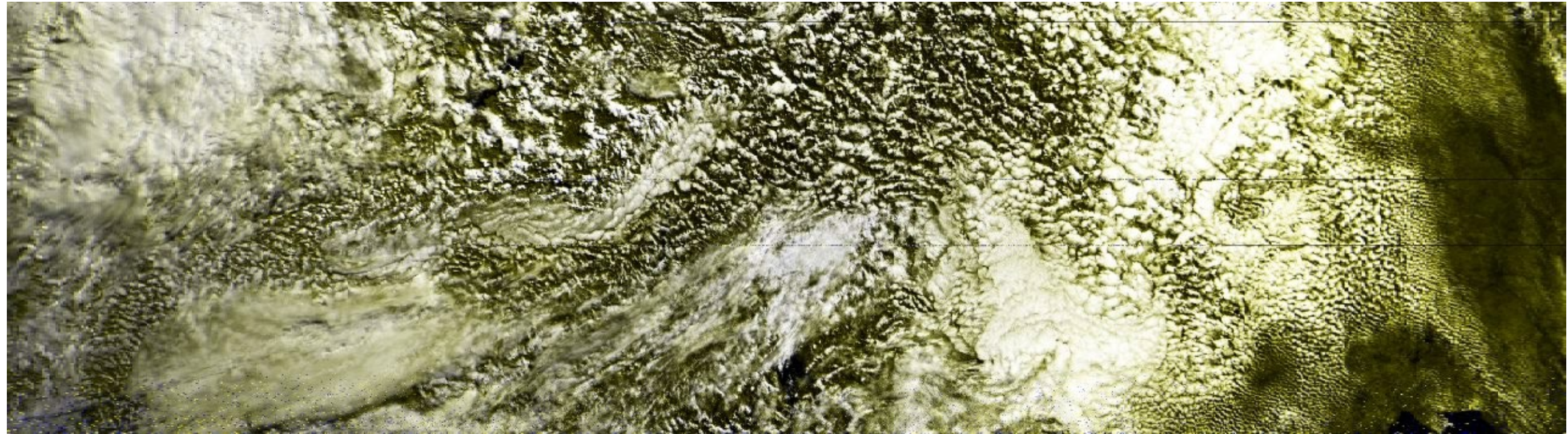


Meteor-M №2



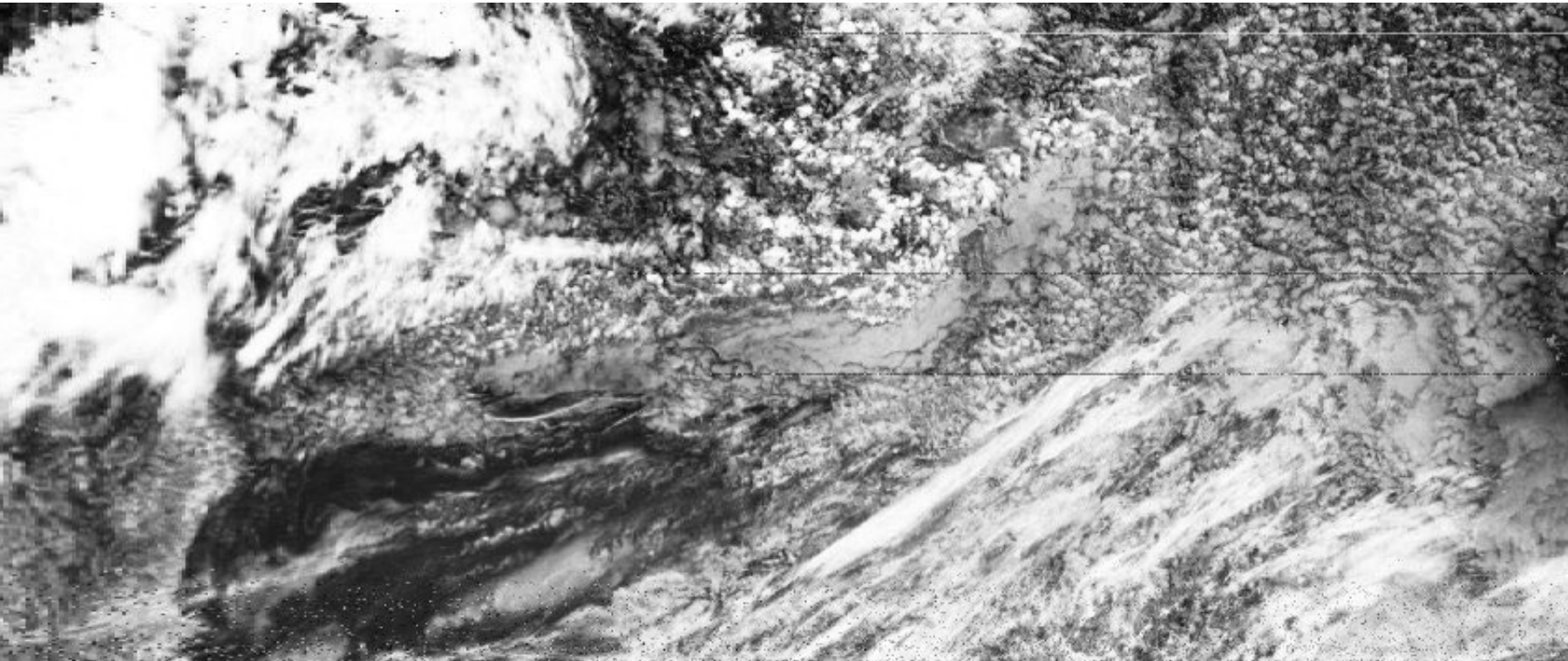
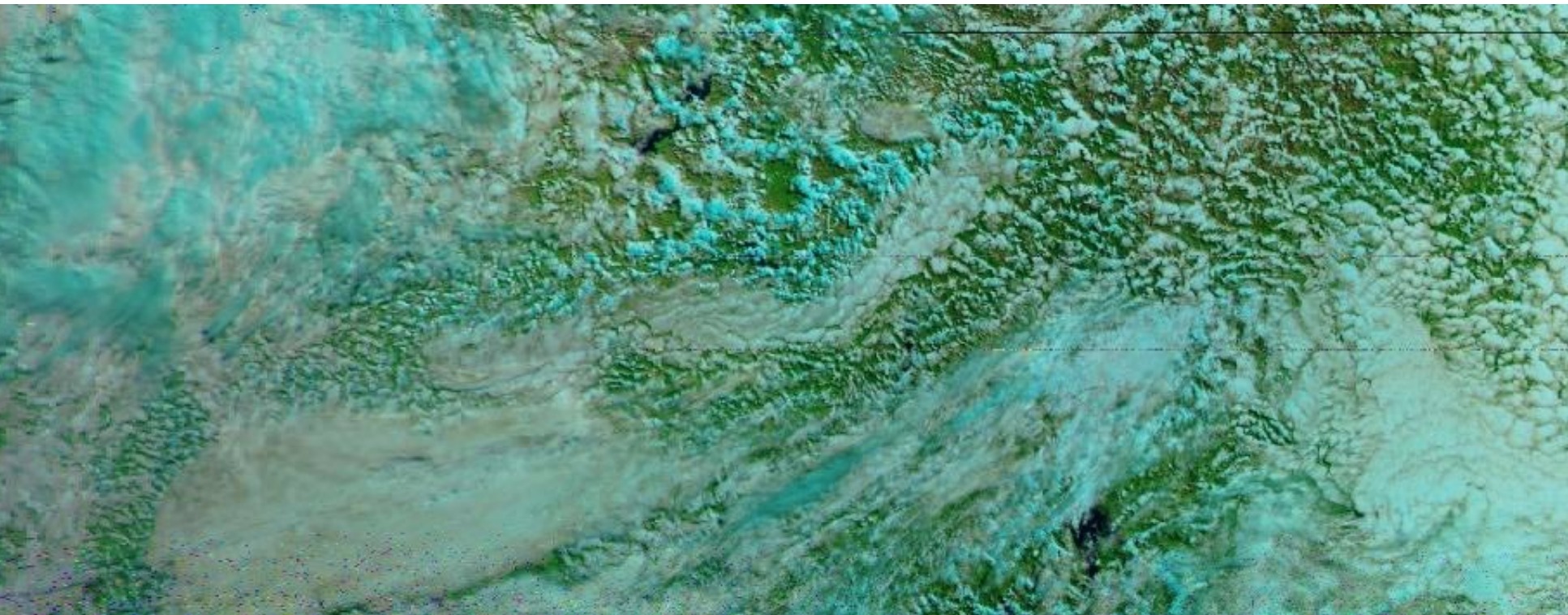
FengYun-3

Images received by MOPS (example):



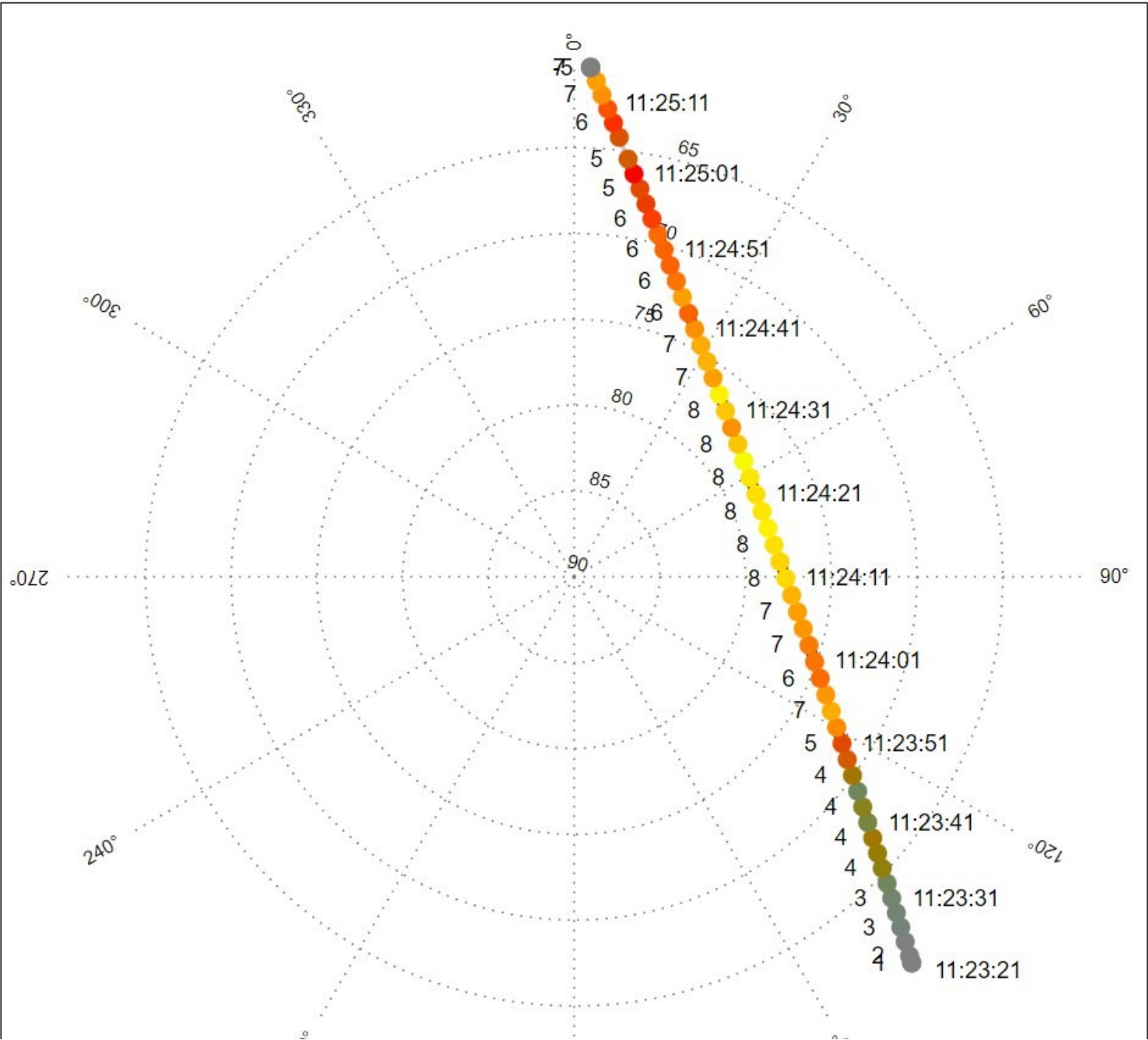
METEOR-M2 2 image received by MOPS in Moscow, Russia. Acquisition date September 6, 2022 (11:23 MSK)

Images received by MOPS (example):



Satellite: METEOR-M2 2
Pass start: 2022-09-06 11:23:23

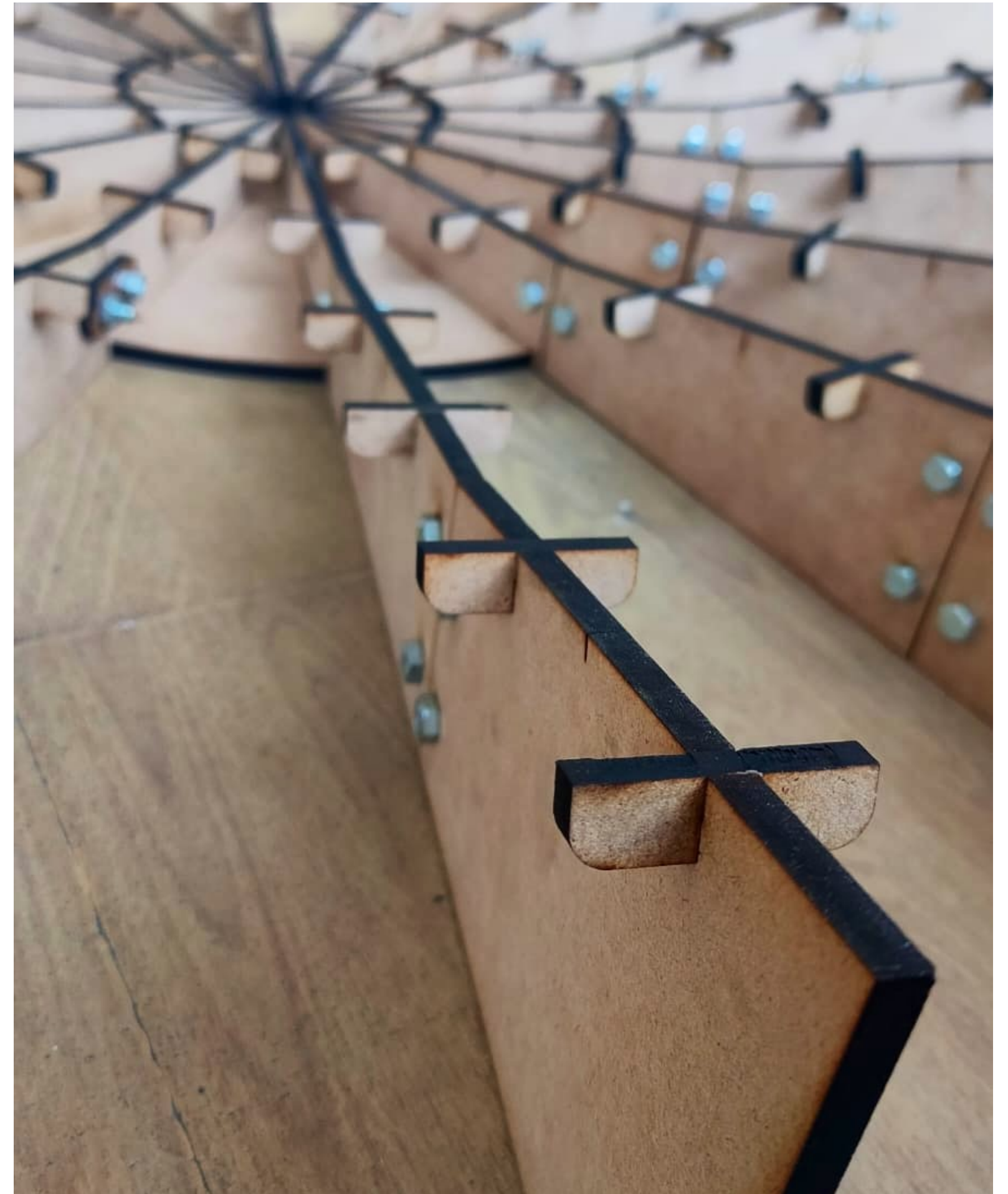
Reception energy



METEOR-M2 2 image received by MOPS in Moscow, Russia. Acquisition date September 6, 2022 (11:23 MSK)

Educational outcome of using MOPS (knowledge):

- Basic topics and concepts of physics, astronomy, geography, computer science, technology, mathematics;
- Key features of technologies for receiving, processing and using satellite imagery data;
- Basic principles of operation of ground-based hardware and software systems for receiving satellite data;
- The main list of modern devices used to work with satellite technologies, and their purpose;
- Concepts and terms related to the engineering of ground space systems and work with Earth remote sensing data;
- Areas of application of remote sensing data and the possibility of using satellite imagery to solve the applied problems;
- Possibilities of working with geoinformation systems (GIS) and geoportals.





Educational outcome of using MOPS (skills):

- formulate the purpose and objectives of the work;
- apply the knowledge gained in the lessons of physics, computer science and mathematics to solve practical problems in the course of work (calculations of the antenna design, satellite orbit parameters, solving problems about the relative position of the satellite and the station, etc.)
- apply the knowledge gained in computer science lessons to work with software;
- possess basic engineering design skills and apply the skills gained in technology lessons to create 3D models, work with structural materials and production equipment;
- create the necessary details from design to production;

Educational outcome of using MOPS (skills):

- Independently assemble MOPS engineering kit;
- Make adjustments and correct positioning of the assembled complex;
- Calculate the satellite flyby schedule;
- Receive real-time data from Meteor-M No. 2, NOAA, MetOp, FengYun-3 satellites via the L-band;
- Process the received data;
- Analyse the received images;
- Build time series of the received images;
- Evaluate the dynamics of processes and phenomena based on time series of satellite images.
- Present the results of your work.



Examples of educational activities based on MOPS:

1. **Engineering training** (as a separate event or as an integral part of the educational intensive).
2. **Engineering shift "Ground stations for receiving operational satellite data"** (5-6 days / 36 hours).
3. **Engineering club** (age 10+) (module as part of the course of additional education).



Thank you for attention! We invite you to cooperate!

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