



YUZHNOYE SDO PROPOSALS ON COOPERATION WITH SPACE SECTOR OF GREECE

RESEARCH AND SMALL MULTIPURPOSE SPACECRAFT



RADAR SURVEILLANCE SPACECRAFT



ADJUSTMENT AND CALIBRATION SPACECRAFT



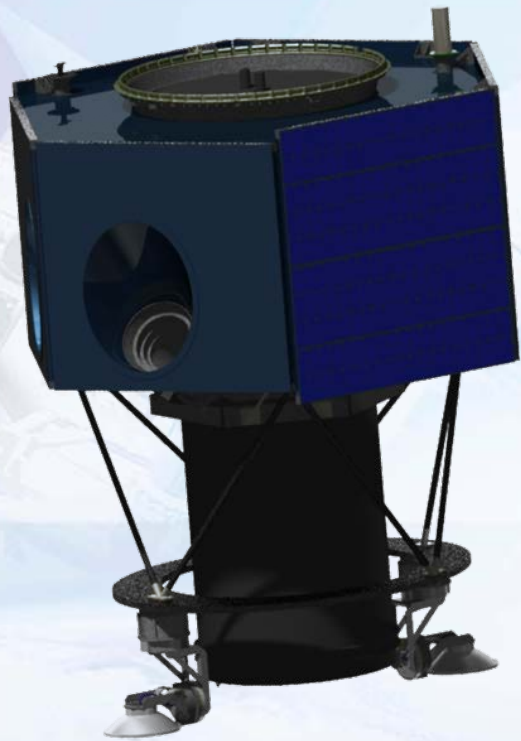
SCIENTIFIC AND EARTH REMOTE SENSING SPACECRAFT



EARTH OBSERVATION SATELLITES, SATELLITE BUSES AND INTERORBIT TRANSPORTATION SPACECRAFT

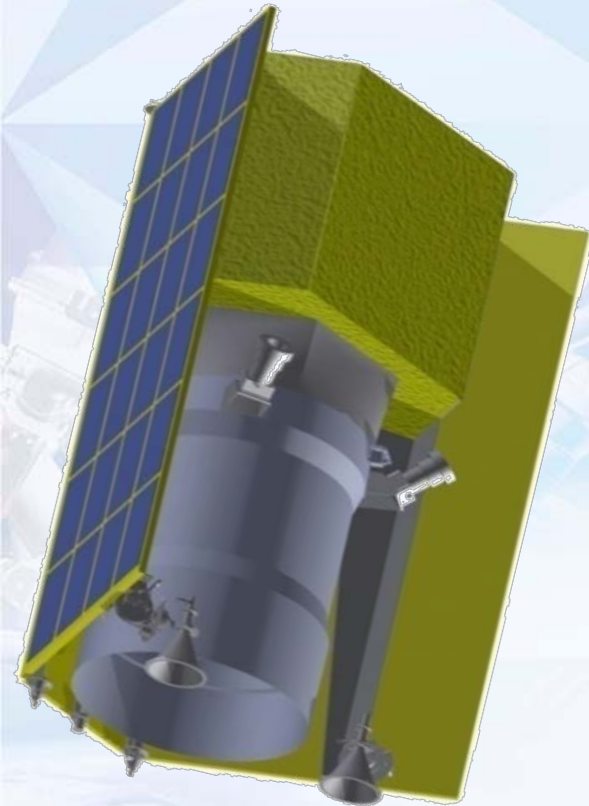
Main Parameters:

Mass	~300 kg
Orbit:	
- type	sun-synchronous
- altitude	~450 km
- inclination	~97.4°
Ground resolution (at imaging into nadir):	
- panchromatic	< 1 m
- multispectral	2 m
Swath width (at imaging into nadir):	
- panchromatic	10 km
- multispectral	10 km
Tilt angles	±40° from nadir
Lifetime	minimum 5 years



Main Parameters:

Mass	~900 kg
Orbit:	
- type	sun-synchronous
- altitude	~525 km
- inclination	~97.4°
Ground resolution (at imaging into nadir):	
- panchromatic	< 0.5 m
- multispectral	1.4 m
Swath width (at imaging into nadir):	
- panchromatic	15 km
- multispectral	15 km
Tilt angles	±40° from nadir
Revisit time	maximum 4 days
Lifetime	minimum 7 years





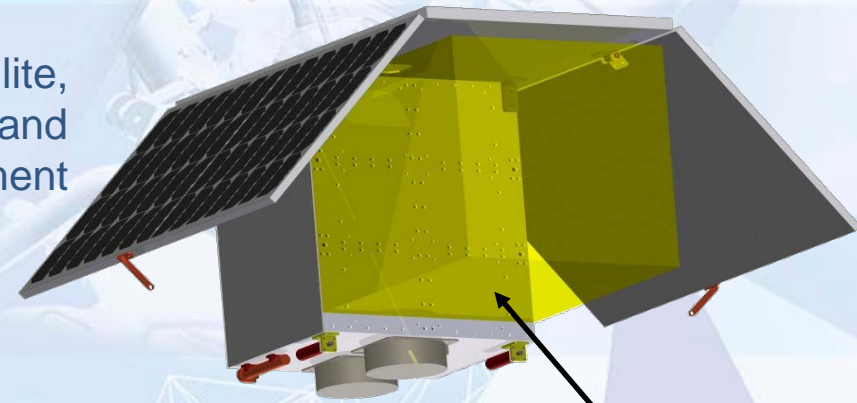
Main Parameters:

Mass	~600 kg
Orbit:	
- altitude	~555 km
- inclination	~60°
Ground resolution:	
- in the mode of spot imaging	2 × 2 m ²
- in the mode of track imaging	6 × 10 m ²
- in the mode of areal imaging	20 × 20 m ²
Swath width:	
- in the mode of spot imaging	10 × 8.5 km
- in the mode of track imaging	650 × 24.3 km
- in the mode of areal imaging	650 × 57 km
Revisit time	maximum 5 days
Lifetime	minimum 7 years

Designed for creation of the Earth remote sensing, scientific and technology demonstration microsattellites (with mass of about 50 kg).

Depending on the payload type used in microsattellite, selected orbit parameters, required attitude type and accuracy, the bus can accommodate additional equipment for the following purposes:

- increased data transmission rate;
- improved attitude accuracy;
- increased power performance.

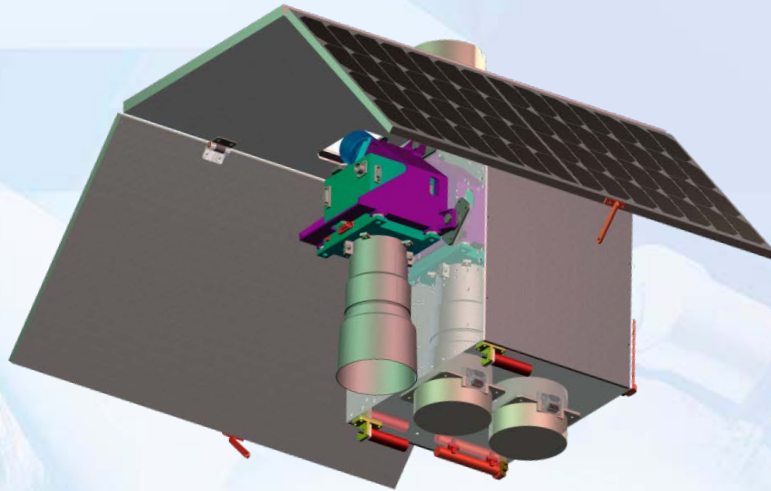


Payload accommodation volume:
~ 35-50 dm³

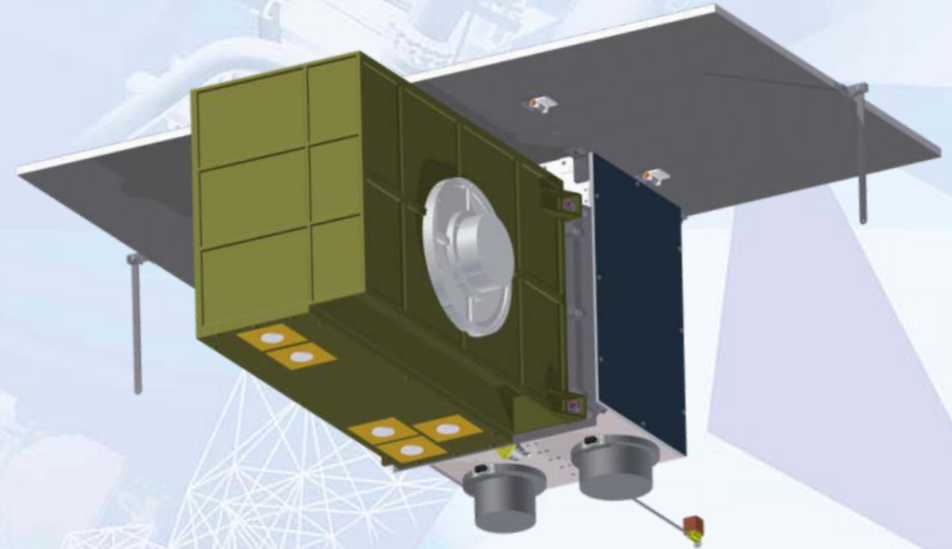
Main Parameters

Bus mass, kg	30
Payload mass, kg	about 20
Payload power consumption, W:	
-maximum	80
-daily averaged	20
Payload data transmission rate, Mbit/s	50 (X-band)
Roll and pitch tilt angles, deg	±35
Attitude accuracy, deg	<0.2
Stabilization accuracy, deg/s	<0.01
Attitude determination accuracy, deg	<0.1
Lifetime, years	>2

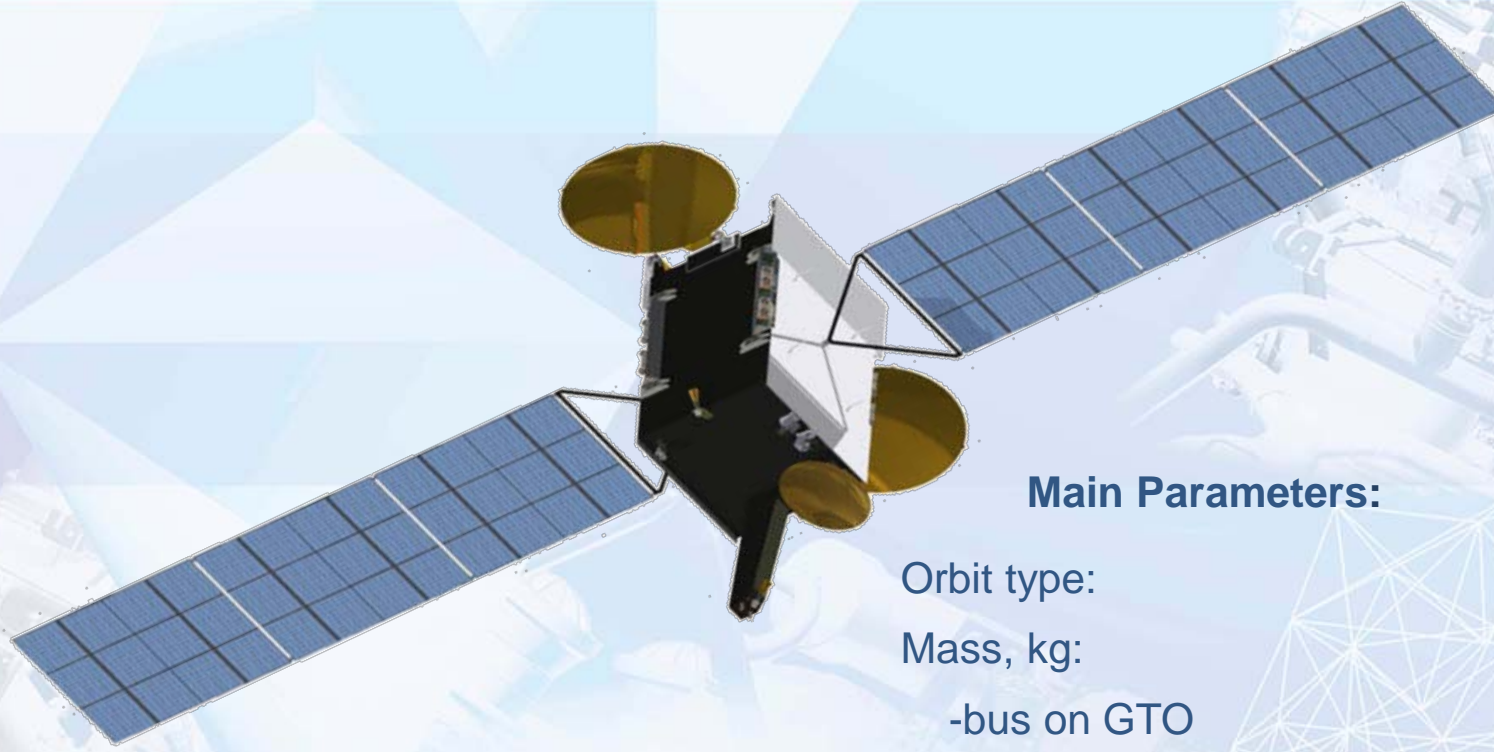
Examples of application for satellites development



Microsatellite for the Earth observation



Microsatellite for scientific researches

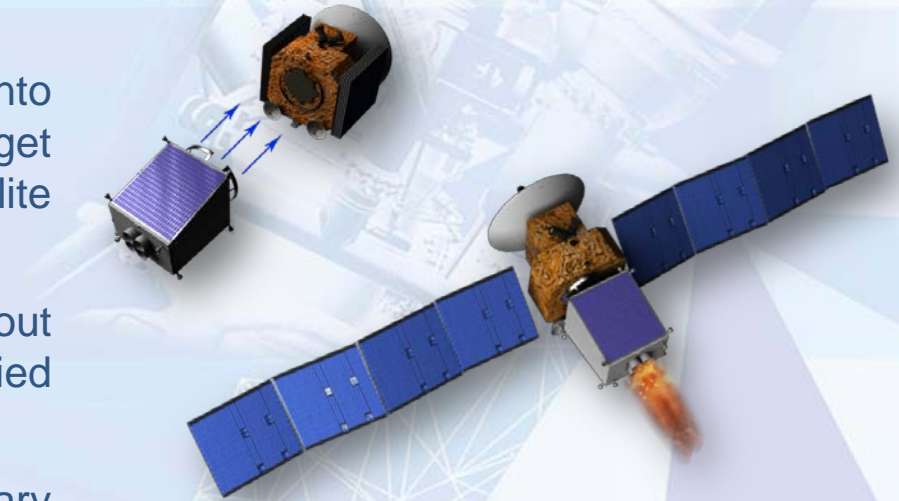


Main Parameters:

Orbit type:	geostationary
Mass, kg:	
-bus on GTO	~5000
-bus on GEO	~2400
-payload	350
Daily average power, kW:	
-power system output	minimum 6.0
-payload	about 5.4
Lifetime	minimum 15 years

Interorbit transportation spacecraft is currently being developed to provide the following servicing of geostationary satellites:

- Final injection of a customer satellite into geostationary orbit and/or its relocation into a target position in geostationary orbit in case of a satellite inaccurate injection;
- Keeping of a customer satellite (that is running out /has already run out of propellant) in specified position on geostationary orbit;
- Transfer of a customer satellite from geostationary orbit to disposal orbit following completion of its lifetime;
- Orbital inspection of geostationary satellites.



In the process of the above tasks solution, the Interorbit transportation spacecraft will perform such operations as rendezvous with customer satellites, capture of/docking with the satellites, as well as the satellites interorbit transportations.

6U circumlunar satellite for research or experiments, the results of which will be in demand in the planning and execution of future lunar missions

Tasks to be solved by the satellite:

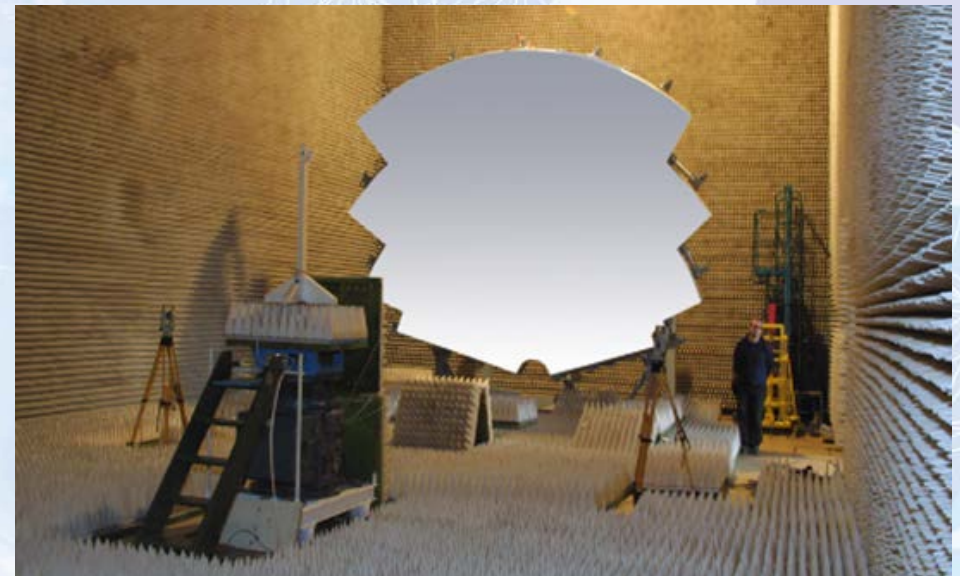
- determination of the terrain profile and measurement of the spectral characteristics of the lunar surface according to the survey;
- determination of the characteristics of lunar soils by measuring their polarization properties.





Yuzhnoye's state of the art manufacturing facilities for assembly and electrical testing can be used to manufacture satellites with mass up to 1000 kg.

- Total area - 1000 m²
- Cleanroom area - 300 m².
- Maintained temperature - 18-25°C.
- Class of air cleanliness - Class 8. according to ISO 14644-1:2015.



The ground control complex (GCC) provides the following:

- scheduling servicer operation and forming command data;
- transmission of command data to servicer;
- reception from servicer of telemetry and video data;
- trajectory measurements;
- calculation and prediction of servicer motion parameters;
- calculation of data for execution of servicer maneuvers;
- processing and analysis of telemetry data; servicer operation monitoring;
- data exchange between GCC components and GCC with external users.



The GCC composition:

- servicers flight control center;
- control stations;
- communication and data transmission means.



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