

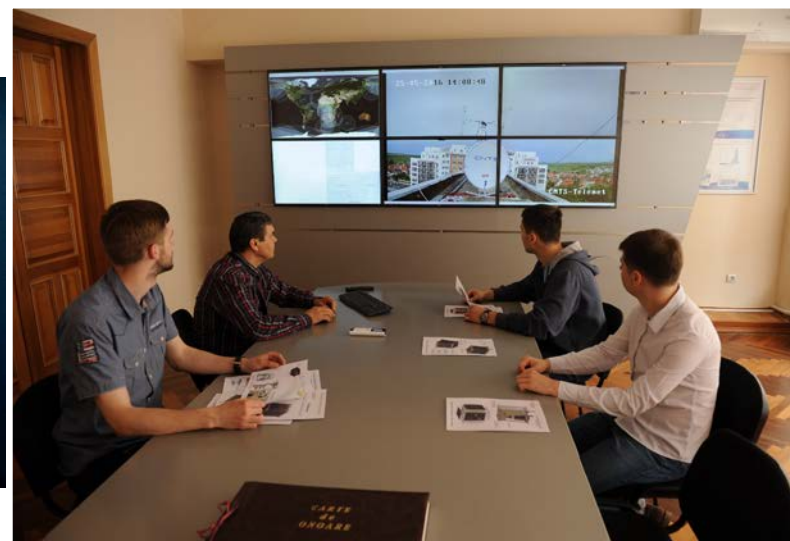
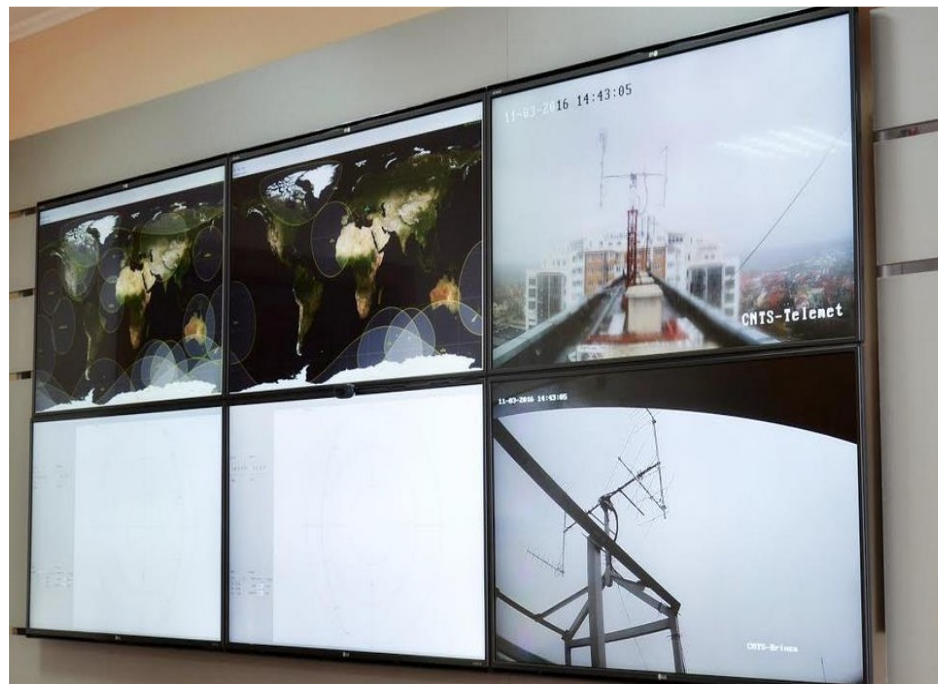


UNOOSA & JAXA  
KiboCUBE project, 4th round

KiboCUBE projects UNOOSA's webinar, October, 9th, 2020.

# 1. TUM Center of Space Technologies

- Established in 2012
- The only space related research center from Republic of Moldova
- 35 people directly involved (PhD, master, license students)
- Over 60 students attend Satellite Communication course
- Six laboratories
- Astronomic observatory
- 2 fully functional ground stations at 200 km away.



# 1. How did we get to know about the opportunity?

Our team found out about KiboCube projects in 2016 at the same time from 2 sources: the UNOOSA website and an email from Dr. Werner Balogh, Programme Officer, Space Science & Technology, Space Applications Section, Office for Outer Space Affairs (OOSA).



The screenshot shows a web browser window displaying the UNOOSA website. The address bar shows the URL: <https://www.unoosa.org/oosa/en/ourwork/psa/bsti/past/fellowship2016.html>. The page header includes the United Nations logo and the text "UNITED NATIONS Office for Outer Space Affairs". A navigation menu contains links for "About Us", "Our Work", "Space4SDGs", "Information for...", "Events", "Space Object Register", and "Documents". Below the menu, a breadcrumb trail reads: "Our Work > Programme on Space Applications > Basic Space Technology Initiative (BSTI) > Fellowship Programme". The main heading is "Basic Space Technology Initiative Fellowship Programme". Below this, the text reads: "United Nations/Japan Long-term Fellowship Programme 2016 Post-graduate study on Nano-Satellite Technologies (PNST) (Kitakyushu, Japan)". A notice states: "The application period for the 2016 intake has ended. Applications for the 2017 intake will be accepted starting from September/October 2016." At the bottom, there is a flyer for the "UN/Japan PNST Flyer" and a paragraph of text: "The United Nations Office for Outer Space Affairs and the Government of Japan in cooperation with Kyushu Institute of Technology (Kyutech) have established a United Nations/Japan Long-term Fellows Programme on Nano-Satellite Technologies for nationals of developing countries or non-space-far nations. The Programme will provide extensive research opportunities in nano-satellite systems through the use of the nano-satellite development and testing facilities available at Kyutech."

## 2016 Activities of the United Nations Programme on Space Applications



Werner BALOGH <werner.balogh@unoosa.org>

27 nov. 2015, 17:02



către bcc: eu

engleză > română Tradu mesajul

Dezactivează pentru: engleză

Dear colleagues,

We would like to take this opportunity to update you on the following activities of the United Nations Programme on Space Applications that may be of interest to you or your colleagues:

1) United Nations/Japan Long-term Fellowship Programme 2016 Post-graduate study on Nano-Satellite Technologies (PNST) (Kitakyushu, Japan)

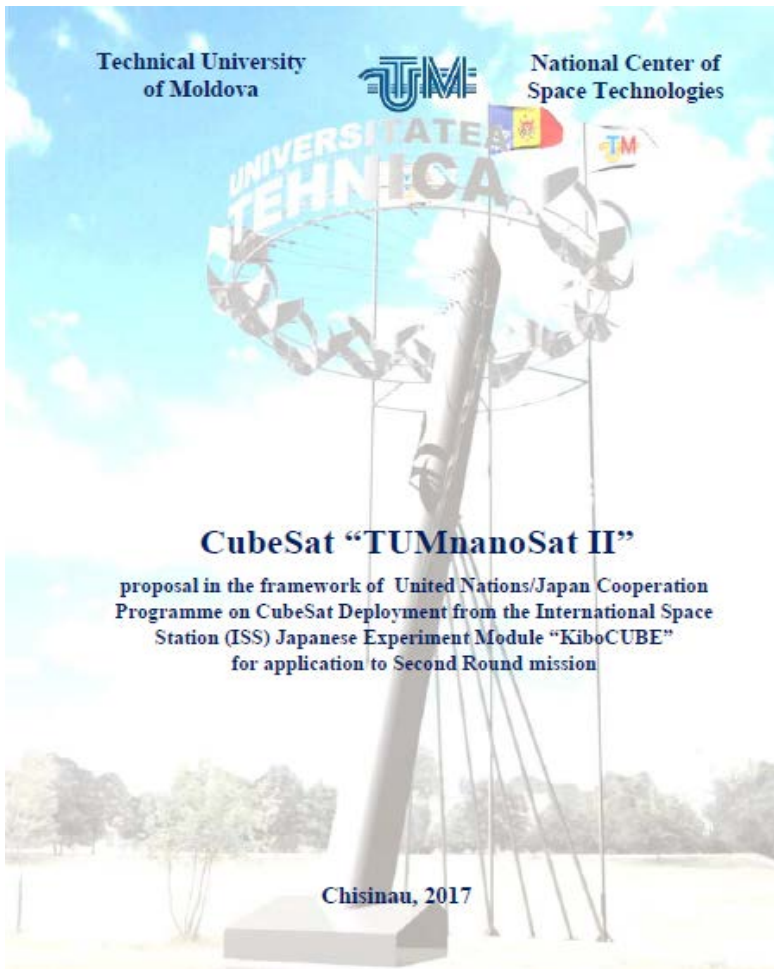
We are accepting applications for this programme until 24 January 2016.

For details please see <http://www.unoosa.org/oosa/en/ourwork/psa/bsti/fellowships.html>



## 2. Why did we apply to KiboCUBE ?

For a country with limited resources as Moldova, KiboCube provided an unique opportunity to boost educational and research project in space technologies. Our team made two different proposal for TUMnanoSAT deployment from the International Space Station (ISS) "KiboCUBE" at 2-nd (2017) and 4th (2019) rounds.



### Main missions at the 2-nd (2017):

- Development of **effective communication** subsystem "satellite-ground station" with the possibility to modify the communication rate range and ensure high reliability;
- Establishment of the **microsatellite decline** using optical signals by the LED and GPS data of satellite for tracking and measure of orbital parameters.

### Main missions at the 4-nd (2019):

- testing of **sensors subsystem for satellite attitude** determining (magnetometers, micro-gyroscopes, sun sensors) in order to optimize process control satellite attitude;
- endurance testing in conditions of space radiation of the **radiation nanosensors and electronic components** operation, including the onboard computer, digital memories.



## TUMnanoSAT

proposal for CubeSat Mission Application for the Fourth Round in the framework of United Nations/Japan Cooperation Programme on CubeSat Deployment from the International Space Station (ISS) Japanese Experiment Module "KiboCUBE"

Chisinau, 2019

# 3. What is the status of TUM nanoSAT satellite?

Twitter Like 26

## KiboCUBE: Team from the Republic of Moldova Selected for Fourth Round

June 10, 2019 (JST)

National Research & Development Agency  
Japan Aerospace Exploration Agency (JAXA)  
United Nations Office for Outer Space Affairs (UNOOSA)

The Japan Aerospace Exploration Agency (JAXA) and the United Nations Office for Outer Space Affairs (UNOOSA) have been cooperating under the KiboCUBE programme launched in 2015 to provide opportunities to deploy CubeSats from the Japanese Experiment Module "Kibo" of the International Space Station (ISS).

JAXA and COSA have selected a team from the National Center of Space Technologies of the Technical University of Moldova for the fourth round of KiboCUBE, which called for applications from October 1, 2018 to February 28, 2019. (Reference 1)

KiboCUBE contributes to the UN Sustainable Development Goals (SDGs), especially Goal 4 "Quality Education" and Goal 9 "Industry, Innovation, and Infrastructure," and this programme aims to contribute to the enhancement of space related technology in developing countries. Last year, JAXA and OOSA have agreed to extend the KiboCUBE programme, and we are welcoming many applications for the current fifth round of KiboCUBE. (Reference 2)

## KiboCUBE: Team from the Republic of Moldova Selected for Fourth Round

10 Jun

KiboCUBE Fourth Round Submit

28 Feb

Kick-off meeting TUM/JAXA

9 Sep

Expected Launch

2021

First model of satellite

3 May

2018

May

Aug

Nov

2019

May

Aug

Nov

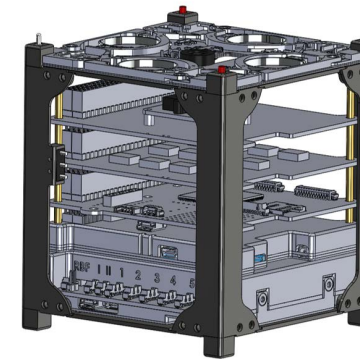
2020

May

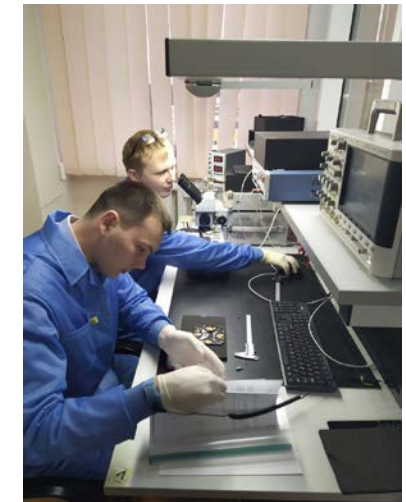
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Nov

2021

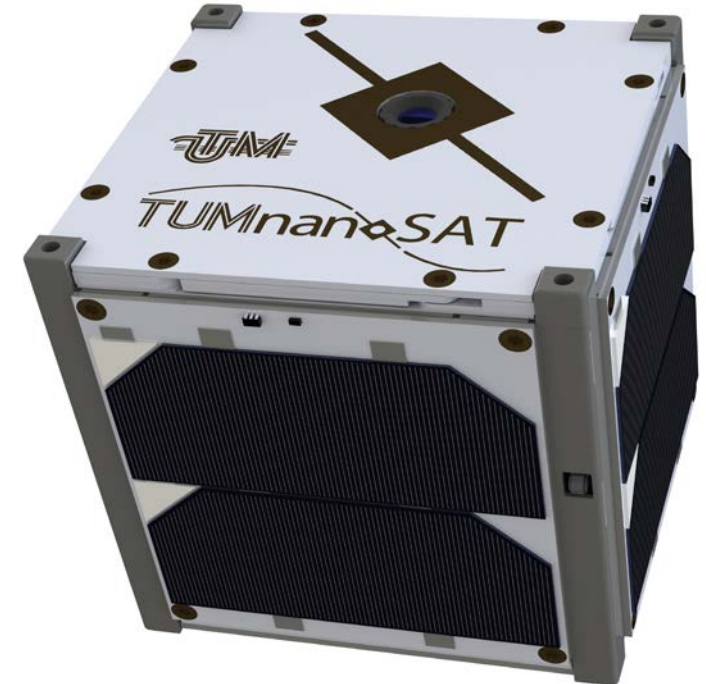


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# TUM nanoSAT satellite development, payload design and prototyping

- ✓ A series of typical modules for nanosatellites were purchased: structure, EPS module, solar panels from EnduroSat and Solar Space companies;
- ✓ Modules for payload (camera and testing of radiation nanosensors) were designed, prototypes were manufactured and their functionality was verified;
- ✓ The EPS power supply module has been upgraded to meet JAXA launch requirements from the ISS;
- ✓ The “satellite – ground station” communication protocol was developed and its functionality was verified.
- ✓ Critical Design Review Panel ongoing .





# Preparing the infrastructure for the project realization

✔ The laboratory and the necessary equipment for the execution of the assembly and verification procedures of the nanosatellite were made.

✔ The ground stations for communication with TUMnanoSAT have been finished and have been modernized for integration in the "SatNOGS" network.



## Legal and organizational assistance

- ✓ Final confirmation from **IARU** regarding registration of frequency. They confirmed our frequency.

TUMnanoSAT	Updated: 13 Jul 2020	Responsible Operator	Nicolae Secrieru ER1TUM
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- ✓ **API/ A and API/B** published after coordination of our national administration with ITU.

ID number (SNS)	adm	ORG or Geo.area	Satellite name	Earth station	long_nom	Date of receipt	ssn_ref	ssn_no	ssn rev/ Sup	ssn rev no	removal	Part/ Art.	WIC/IFIC (ifc.mdb)	WIC/IFIC date
<a href="#">119545144</a>	MDA		TUMNANOSAT		N-GSO	30.07.2019	API/A	12415					<a href="#">2907</a>	29.10.2019
<a href="#">119545144</a>	MDA		TUMNANOSAT		N-GSO	30.07.2019	API/B	1277					<a href="#">2918</a>	14.04.2020

- ✓ A request was made to the government of the Republic of Moldova to designate the satellite registration authority and we are waiting for the Government Decision to authorize the satellite registration: *GD no. 944/2010 on the approval of the Technical Concept of the Automated Information System "State Register of frequencies and radio communication stations" (Official Monitor of the Republic of Moldova, 2010, no. 202-205, art. 1038) on "registration of objects launched into space"*.



## 4. Hopes for the future

### Short term plans (2020-:-2021):

- ▷ Manufacture of payload flight modules of the TUMnanoSAT;
- ▷ Integration and connection of NCST ground stations in the *SatNOGS: Global Network of open source satellite ground stations*, that combine software and cloud platform which allows ground stations across the globe to directly offer their spare receiving capacity to companies operating satellites;
- ▷ Complex satellite tests with the support of the Institute of Space Sciences from ROSA;
- ▷ Preparing TUMnanoSAT for its launch from the ISS by supporting of JAXA.

### Long term plans (2021-:-2023):

- ▷ Elaboration of 2.5 / 3U CubeSat nanosatellite models with more complex scientific and educational missions within the project "*Development and launch of the series of nanosatellites with research missions from the International Space Station, their monitoring, post-operation and the promotion of space technologies*";