VALLES MARINERIS
space innovation and beyond

3dbio

Авиаком

S7 Space

# Space Exploration and Analog Astronaut Training Opportunities

UNISEC INDIA
University Space Engineering Consortium

GOOGLE LUNAR XPRIZE
SYNERGY MOON
OFFICIAL TEAM


**Jayakumar Venkatesan**
**CEO & CTO, Human Spaceflight Researcher**
**Valles Marineris International & AATC Poland**

ANALOG ASTRONAUT TRAINING CENTER

# ABOUT US

Valles Marineris is an Indian private company that preforms design analysis of spacecraft components and human spaceflight research

Our pioneering work with Synergy Moon,USA ( $40Million GLXP Finalist Team) as Mission partner for design, analysis of Lunar spacecraft and Exploration Rover.

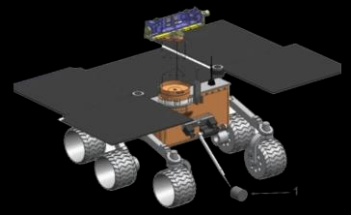
We also core team member in 75 Satellite Mission 2022 Consortium made by Indian Technology Congress Association an its partners

We are working since 2016, We are working as partner with Aviakom LLC,Professional Soyuz Spacecraft Training Simulators which is used by many astronauts and future astronauts

We also offer analog astronaut training programme in Poland and Russia.

The core team have the real experiences in worked in the design and operation of spacecraft, space missions and training simulators.

# VALLES MARINERIS SERVICE PORTFOLIO



## SPACE EXPLORATION ROVERS

- Lunar Rover (In Partnership with Synergy Moon, USA) 2025
- Mars Rover

## SPACE STATION EXPERIMENTS

- In collaboration with GLAVKOSMOS, S7 Space, Russia
- In collaboration with 3D Bio-printing Solutions, Russia

## ASTRONAUT TRAINING

In collaboration with Analog Astronaut Training Center, Poland

Professional Astronaut Training in collaboration with Aviakom Russia

## SPACE MISSIONS

CubeSAT Platforms (1U-27U) for Technology Demonstrations for Academia / Industry

- Luna-Orbiter and Lunar Impactor (2021-2022)
- Moon Landing Mission by 2025 (Partnership with Synergy Moon, USA and others
- We do sales for All types of Antennas for your space mission with partnership with ANYWAYS France

## STRATOSPHERIC MISSIONS

In collaboration with Analog Astronaut Training Center, Poland

## CONSULTING SERVICE

- Earth Observation Projects
- Space Education and Training
- Launch Services
- Human Spaceflight

240-суточный модельный изоляционный эксперимент

# SIRIUS-20/21

## Кандидаты в экипаж


**Хубенов Венелин Нейчев (Venelin Hubenov, Болгария)**
ассистент кафедры Национального научного центра Института микробиологии «Стефан Ангелов» Болгарской академии наук, г. София.

**Джаякумар Венкатесан (Jayakumar Venkatesan, Индия)**
технический директор Synergy Moon,
астропренер и главный исполнительный директор Valles Marineris International Private Limited, Индия.

**Носикова Инна Николаевна**
младший научный сотрудник Института медико-биологических проблем РАН.


the doctor of medical sciences, chief research associate at the Institute of Biological Medicine, RAS Ilyin EA
about experiments with animals that paved the way for man into space

# Space Exploration Scenario

**Mars, others**

Human Presence Expansion

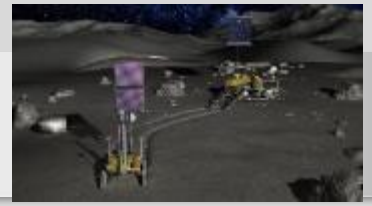
**MMX** FY2024

Activities on/beyond Mars

Synergy

**Moon**

**SLIM**
Pinpoint Landing
FY2022



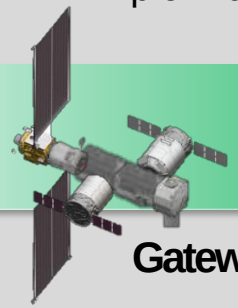
**Lunar Polar Exploration**
Water Prospecting
prox.2024-

**Robotic Sample Return (CHANDRA)**
Technology Demo
Approx.2026-

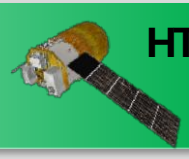
**Sustainable Exploration/Utilization**

OMOTENASHI EQUULEUS
**CubeSat launched by SLS/EM1**

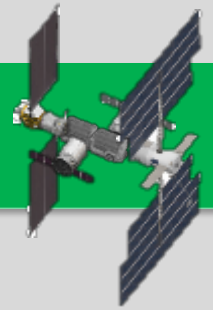
**Innovative small mission**



**Gateway (construction phase)**
2022-



**HTV-X derivatives**
Approx. 2026-



**Gateway Operation**

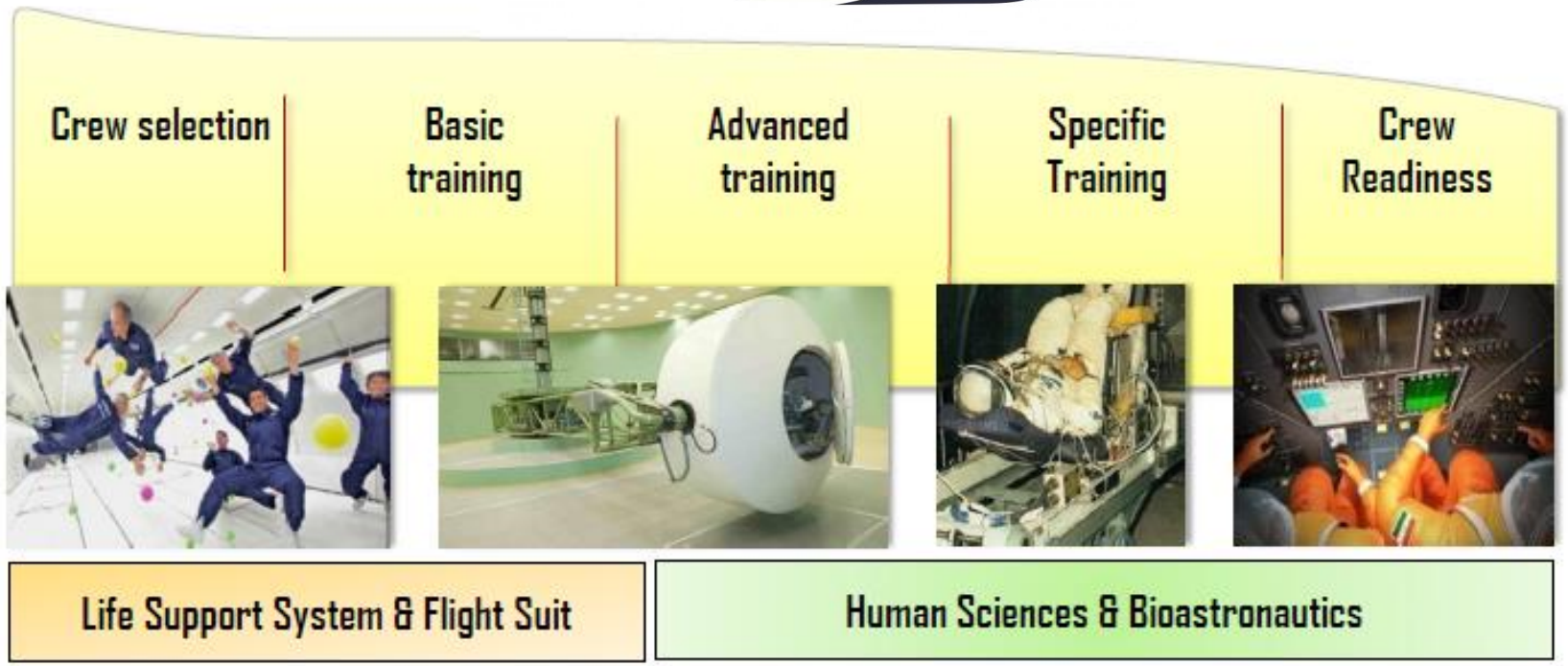
**Earth**

Image credits:JAXA

**Promote Commercialization**

**International Space Station**

# Human Factor Engineering

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# SCIENCE WITH(OUT) GRAVITY

## Dry immersion

Volunteers spend **3 to 21 days immersed in bath tubs** to simulate the changes the human body experiences in space.

In dry immersion, **the body is supported evenly without pressure points.**
This is much like floating astronauts in space.

**Affected areas:**



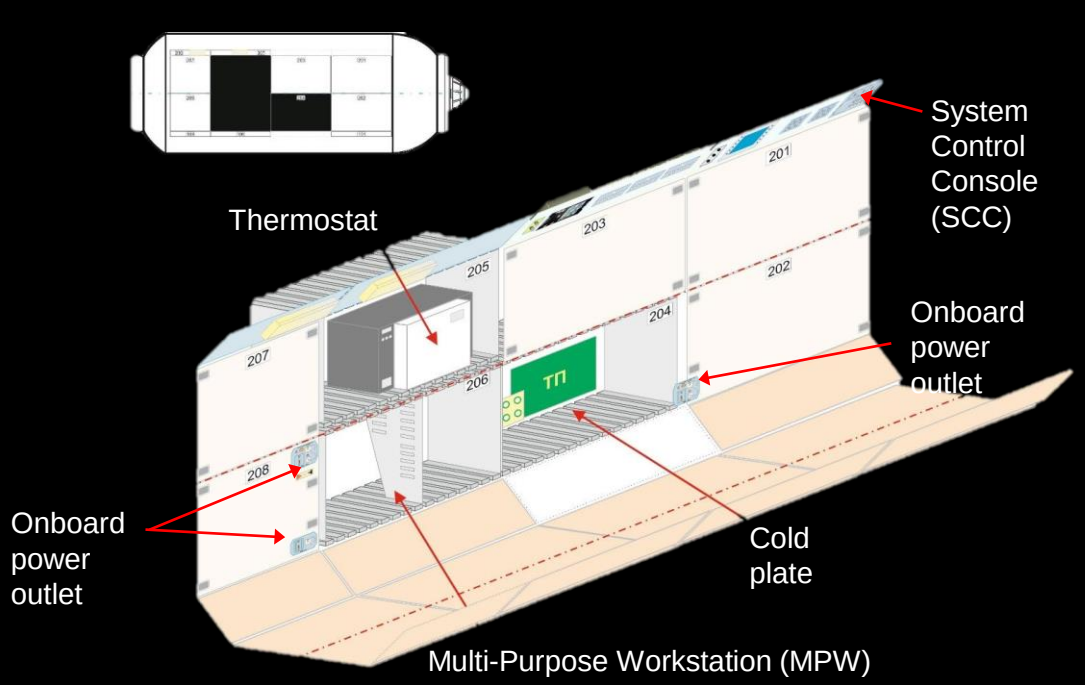
Results could help devise countermeasures for **astronauts and bedridden people on Earth.**

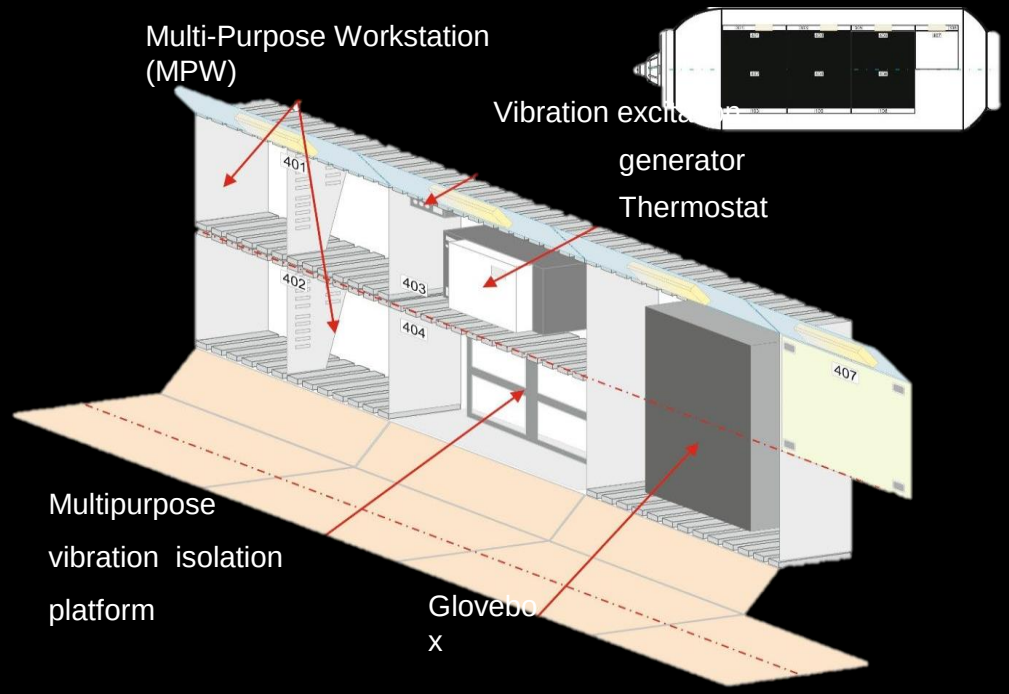
#ScienceAtESA

**Dry Immersion! Dry-immersion baths are used to create aspects of living in weightlessness on Earth**

# TECHNICAL IMPLEMENTATION

## Mini-research module “Rassvet” (MRM-1)



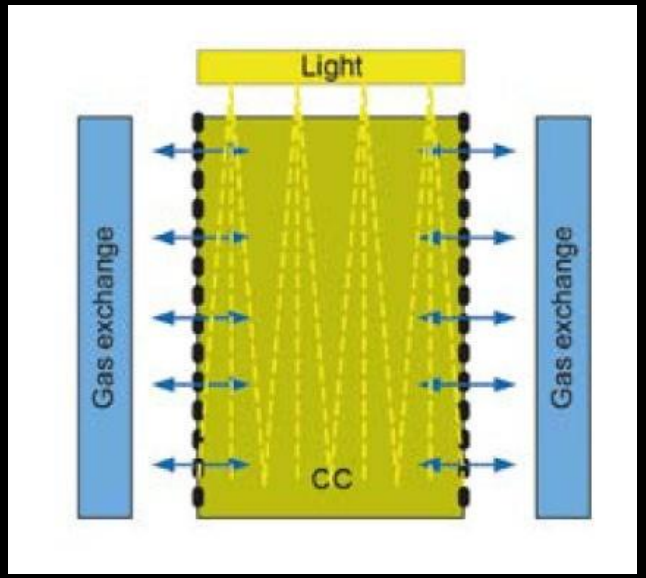

- MPW provides a mechanical interface and intended for installation of required equipment
- Onboard power outlet and SCC provide power supply of target equipment

# PLANNED EXPERIMENTS

**Experiment “Green”**

Cultivation food plats in mini-greenhouse:

- Testing of technologies for agriculture in space station environment;
- Evaluation of cultivated plants organoleptic properties;
- Ensuring an extra ration and psychological support of crew.

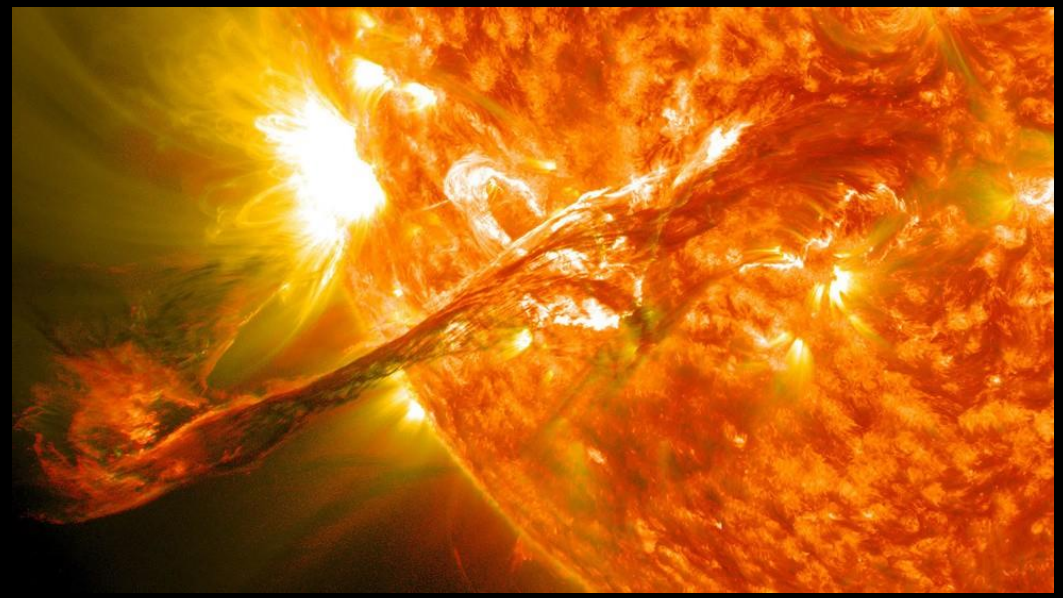


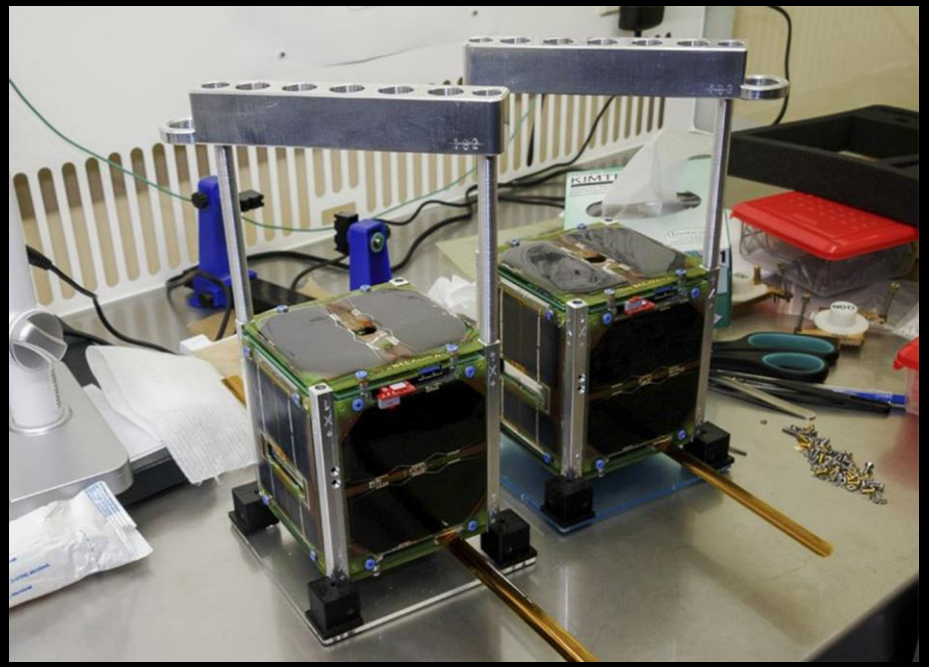

# PLANNED EXPERIMENTS

**Experiment “Outbreak”**

ISS radiation background monitoring for solar proton events registration and comparing data with our satellites

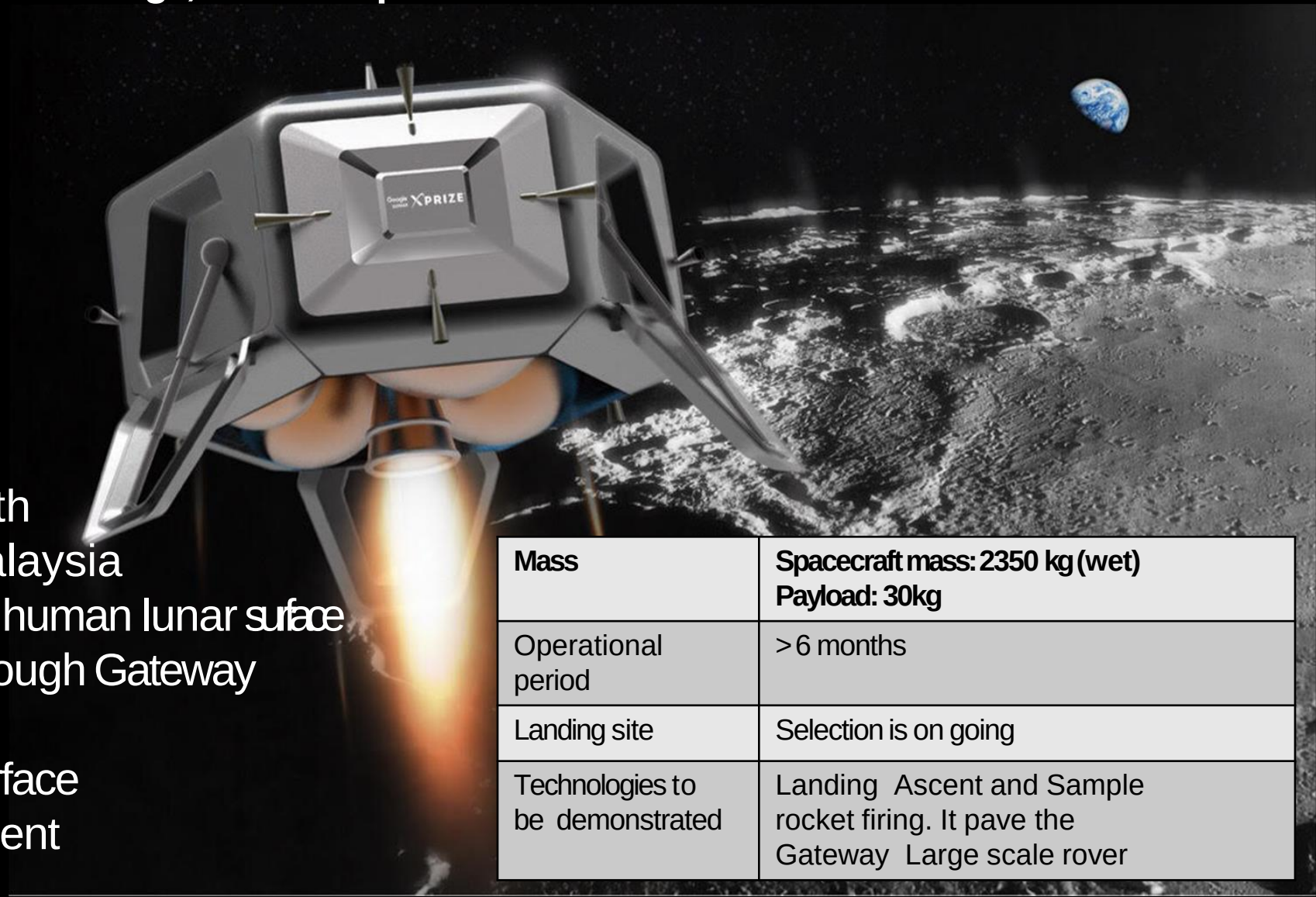
Objective – space weather properties research.





# Lunar Surface Exploration:

**Technology demonstrations for lunar landings, surface exploration**




- ✓ Targeted for FY2025, jointly with Russia, India, France and Malaysia
- ✓ Technology demonstration for human lunar surface mission and sample return through Gateway
- ✓ Contributing by;
  - collected sample on lunar surface
  - share-ride of mission equipment

| **Mass** | **Spacecraft mass: 2350 kg (wet)**<br>**Payload: 30kg** |
|---|---|
| Operational period | > 6 months |
| Landing site | Selection is on going |
| Technologies to be demonstrated | Landing Ascent and Sample rocket firing. It pave the Gateway Large scale rover |


MOON

# Significance of Space Exploration

## Expand Human Activities

## International Cooperation


## Gain Knowledge


## Promote Industry

## Inspire Young Generation

# Preparation for Full-Fledged Human Exploration : Partnering with the Industry

✓ **Space Exploration**

Cooperating with private companies/research institutes to bring together cutting-edge technologies for creating innovation in Space Exploration and on Earth.

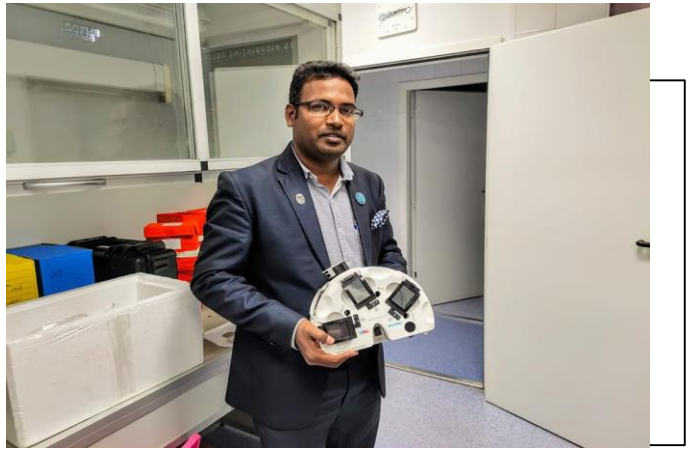
## Examples of Projects:

### 3D PRINTING ON MOON SURFACE/ MINING

Remotely contolled/ automated construction technology

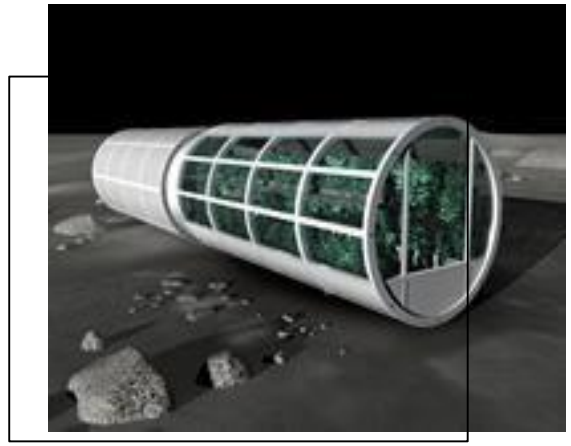
### 3D BIOPRINTING ON MOON

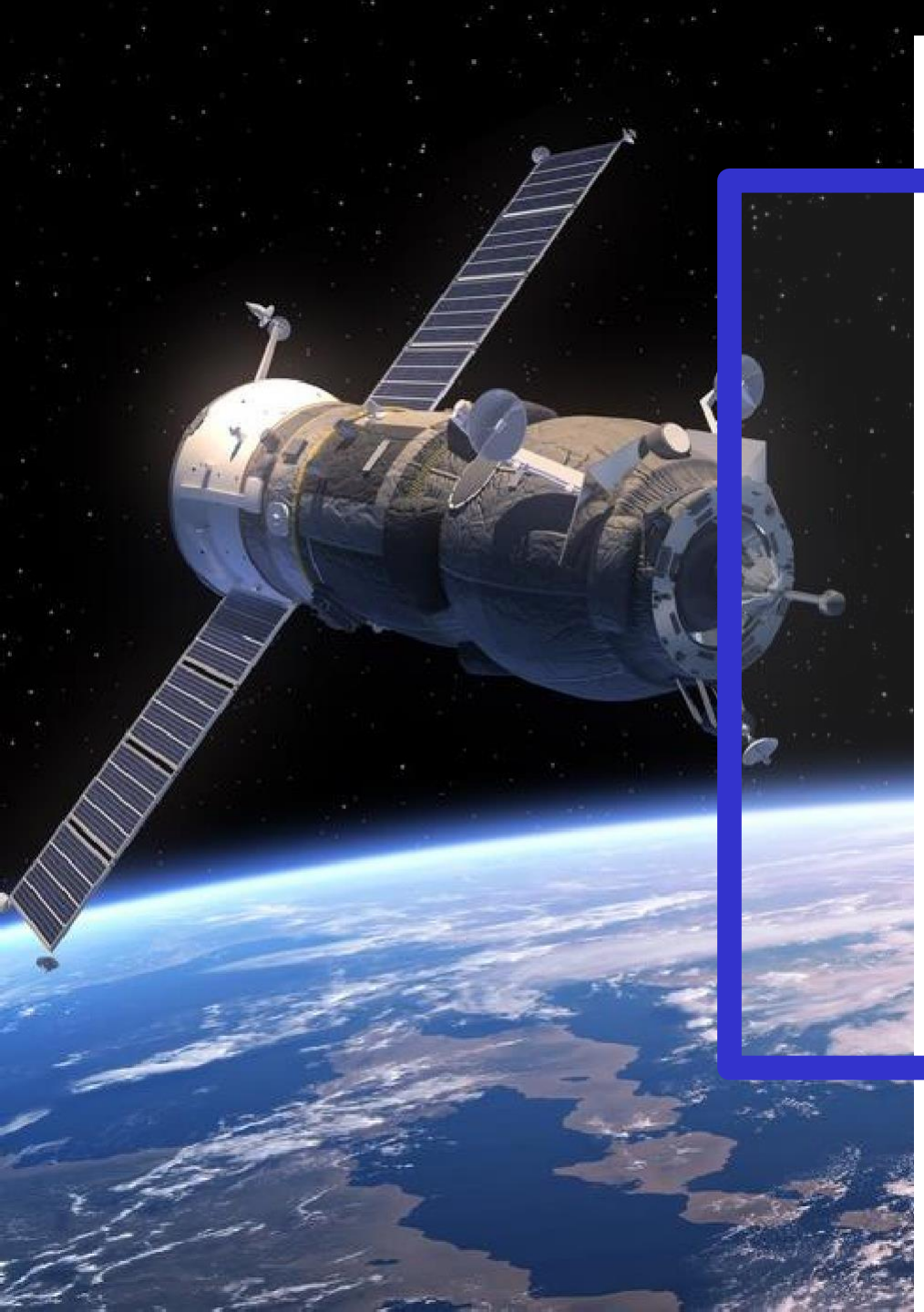
Worlds first bio-printing on Moon will be demonstrated



### AGRI TECHNOLOGY

Concept study for lunar plant factory





# *SOYUZ SPACECRAFT FLIGHT* **SIMULATOR**

Gives everybody an opportunity to **feel like an astronaut** – to fly into space, manoeuvre a spacecraft on Earth orbit and dock with the ISS.

# SOYUZ SPACECRAFT SIMULATORS


РОССИЯ

# PHOTOS



**Sergei Krikalev-Cosmonaut, Dmitry Medvedev-Prime Minister of Russian Federation, and Maxim Suraev is practicing our desktop version**

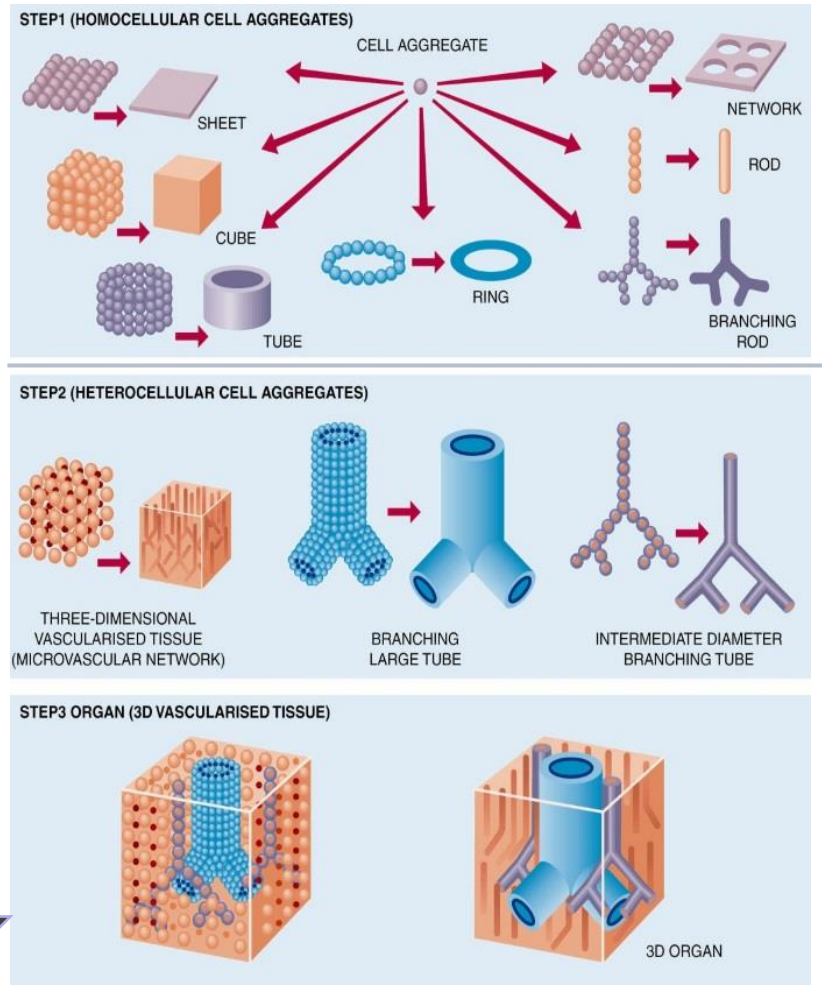
Flight with the ISS – is the unique attraction of virtual reality that combines innovative motion platform and VR goggles

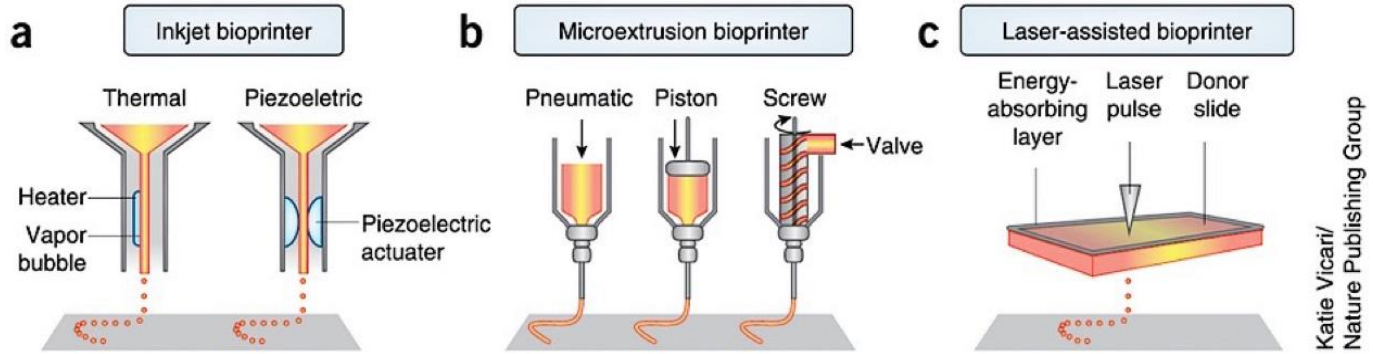
# Virtual Reality attraction

# Flight with the ISS

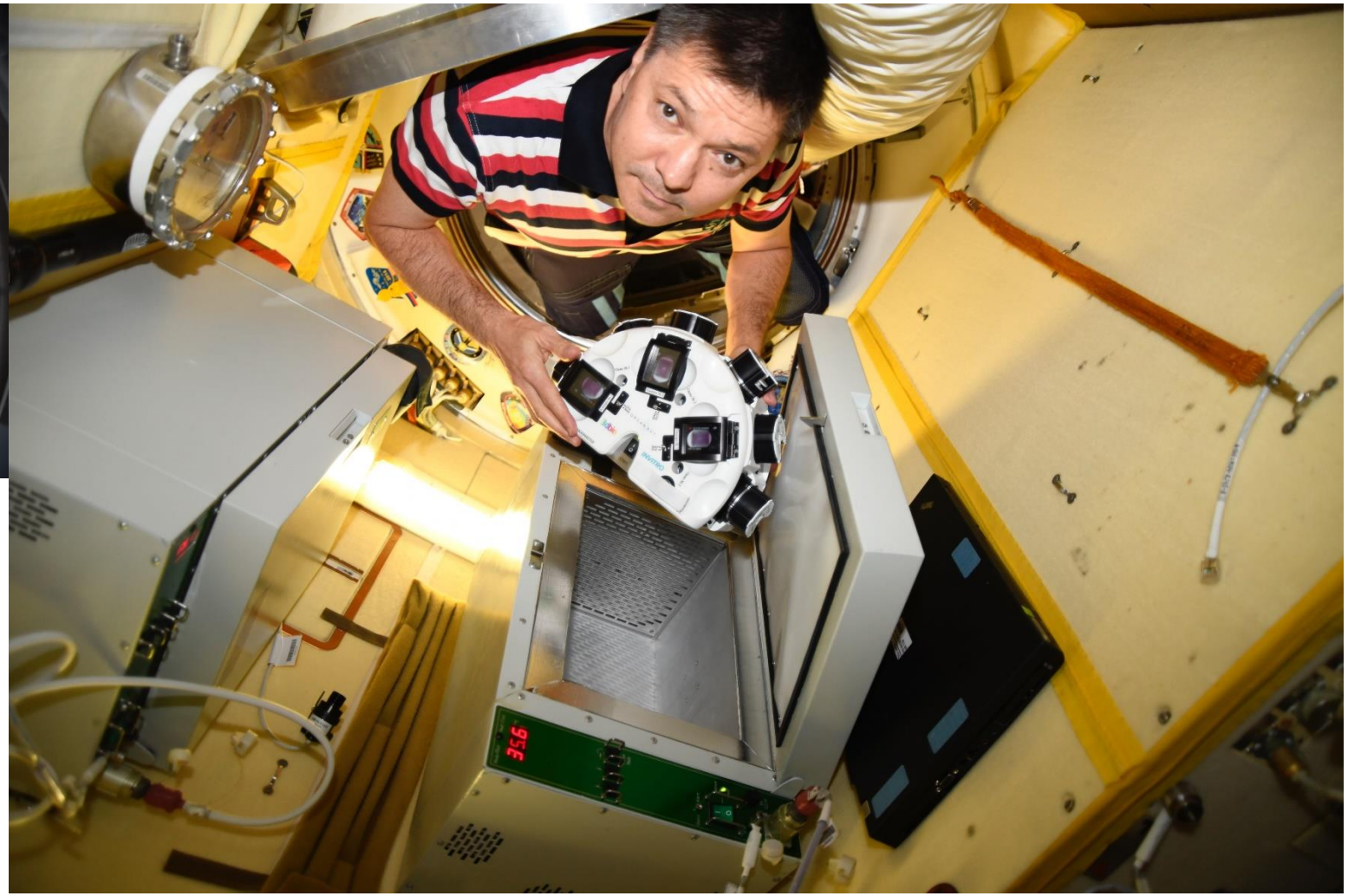
# Bioprinting in Space: New Opportunities in Biofabrication

COMPLEXITY



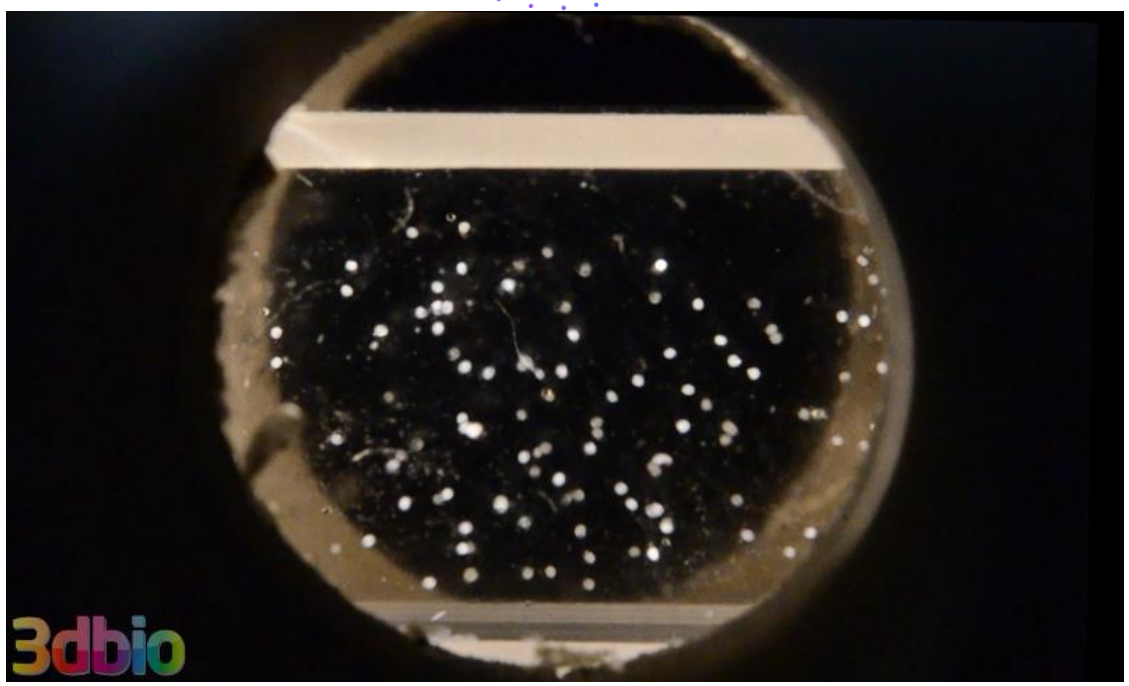

# Bioprinting Organs on ISS



# Magnetic Bioprinter OrganAut Uses Microgravity for Biofabrication


ORGAN·AUT

Biofabrication of cartilage tissue using microgravity



# Space Experiments- the study of the structure of the protein, in turn, will help to choose a medicine in order to block the virus

The experiment is unique in that Russian scientists grew protein crystals of coronavirus of different strains. These were the first such experiments in the world!

The size of coronavirus crystals grown on a 3D bioprinter is larger than those that can be grown on Earth: the larger the crystal, the more crystallography methods to determine their structure.


The cuvettes with the material for crystallization were delivered to the ISS a month ago and the results were returned to Earth at the end of March. Now scientists are working with might and main with them, very soon we will get the first results.

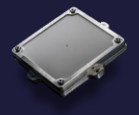
For those who are worried about the health of the astronauts: the cuvettes had several degrees of protection, and the proteins of the virus themselves do not pose a danger to humans.

Another shipment of coronavirus proteins is planned during the autumn manned launch of the Soyuz MS-22 spacecraft, and an intermediate one can be organized in the summer on the Progress MS-20 cargo spacecraft.

# Constellations Antennas Offers

## TT&C and Payload Telematry COTS Antennas

S-band Antenna



X-band Antenna

cnesadvance

Flight Heritage since December 2019 with EYESAT and ANGELS space programs

## Applications

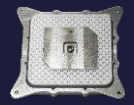
- Telecommunications
- Navigation
- Radar
- Earth Observation

## Benefits

- Compact and ligthweight
- High performance
- High quality

## Navigation COTS Antennas

GNSS all-bands Antenna



GNSS L1/E1 antenna

## Expertise & Services

Antennas simulations & measurements alone or on mockup

Bespoke antennas based on your specifications

# Synergy Moon/Valles Marineris

- Nov 2025, Synergy Moon with Valles Marineris
- We are looking for Partners in upcoming mission
- Delegation of Member of Parliament of Vietnam visited us in 2019

VALLES MARINERIS
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SYNERGY MOON
OFFICIAL TEAM

**THANK YOU**

**www.vallesmarineris.in**

https://www.astronaut.center/