



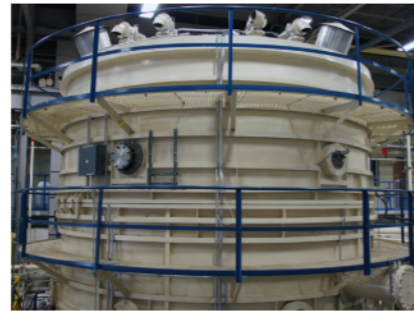
# CHASM

Community of Human Analogue Space Missions

Martin Holec, Academia & Industry in Space Projects III, 14.5.2026

“Analog missions take place in locations that have natural or engineered physical similarities to extreme space environments.”

NASA



### Altitude Chambers

These chambers simulate the pressure levels that astronauts encounter before and during spacewalks. Inside, volunteers help scientists test protocols designed to avoid decompression sickness during spacewalks.

**Learn More About Altitude Chambers** →



### Antarctic Stations

Antarctica's climate, terrain, temperature, and isolation provide a research environment on Earth that closely parallels the conditions of isolation and stress astronauts will face on long-duration missions in space.

**Learn More About Antarctic Stations** →



### ARGOS

The Active Response Gravity Offload System (ARGOS) provides a simulated reduced-gravity environment in which humans can move and work.

**Learn More About ARGOS** →



### CHAPEA

The Crew Health and Performance Exploration Analog (CHAPEA) is a series of research analog missions that will simulate year-long stays on the surface of Mars.

**Learn More About CHAPEA** →



### :envihab

NASA researchers use Germany's :envihab facility to simulate the effects of microgravity through studies that keep volunteers on strict bedrest, with their heads tilted slightly downward, for the duration of missions. This helps NASA investigate how weightlessness affects the human body.

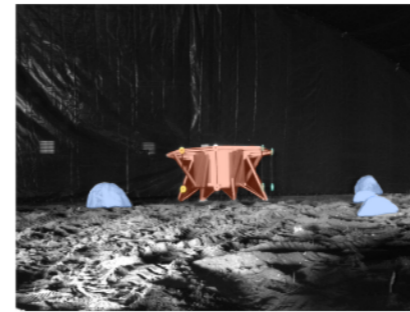
**Learn More About :envihab** →



### HERA

NASA's Human Exploration Research Analog (HERA) is a unique, 650-square foot habitat designed to serve as a simulated spaceflight environment for research and operational purposes, including investigating isolation, confinement, and remote conditions in exploration scenarios.

**Learn More About HERA** →



### In-situ Resource Utilization (ISRU)

ISRU aims to harness natural resources at planetary destinations. Analog tests include a challenge to develop new technologies to support life on the Moon and enhance the capabilities of human exploration.

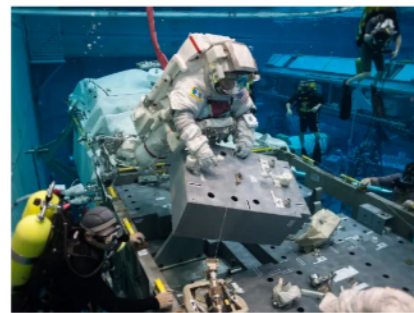
**Learn More About ISRU** →



### Kraken

NASA uses the Kraken, a 50-foot-long, 100-ton U.S. Navy research device that spins on multiple axes, to simulate space motion sickness and test possible recovery strategies.

**Learn More About Kraken** →



### Neutral Buoyancy Lab (NBL)

One of the world's largest indoor pools, NBL is used to refine mission protocols, instruments, spacesuits, and crew activities in support of astronaut spacewalks.



### NASA Space Radiation Lab (NSRL)

NSRL helps to assess health risks of space radiation. Scientists use beams of ions to simulate cosmic rays to develop strategies to protect our astronauts.

**Learn More About NSRL** →



### Parabolic Flight

Parabolic flights simulate space travel by providing short-term weightlessness and partial gravity. In addition to scientific experiments, these flights also test various space equipment technologies.

# About me

Analogue astronaut

- Mirror of Axiom 4 (Poland June 2025, Sławosz Uznański)
- Executive Officer @Astroland 2024 @LunAres 2023
- CHASM Committee member
- Czech Space Week 2023 & 2024  
CHASMxICEE.space and  
CHASMxHydronaut workshops



# About CHASM

Community of Human Analogue Space Missions

- CHASM's aim is to bring analogue space missions together and to the wider public; to improve research, mission quality and establish partnerships with academia, space agencies and businesses.
- CHASM conference, habitat workshops, CHASM wiki, CHASM CARD analog research database
- parastronaut research consortium (PARACHASM) — research and improvement of missions for astronauts with disabilities, IAC papers
- Member of International Astronautical Federation since 2025



# CHESA

CHESA = CHASM + ESA

- Partnership on standardisation process of habitat scientific data gathering with focus on sensors at this moment
- Practice across habitats varies — from start-of-mission baseline assessments with case-by-case additions, to standard documentation approaches without specific tools, to SOP-based risk matrices, to sign-off and walkthrough procedures.
- data storage and transmission, spacesuit sensors, radiation monitoring, food logging, crop growth
- Food is a high risk for Moon/Mars, identified as a major Artemis crew challenge. Recurring issues: preference overlap, survey fatigue when logging intake.

## **Safety Critical**

- +Carbon dioxide
- +Carbon monoxide
- +Smoke/fire

## **Air Conditions**

- +Temperature & Humidity
- +Air pressure
- +VOCs
- +Particular organic contaminants
- +Flammable gases
- +Airborne dust
- +Mould spores

## **Ambient Environment**

- +Illumination
- +Noise
- +Surface chemical contamination
- +Surface biological contamination
- +Ionising radiation

## **Water Conditions**

- +Temperature
- +pH
- +Chemical contamination
- +Biological contamination

## **External Environment**

- +Temperature & Humidity
- +Wind speed and direction
- +Precipitation and cloud cover
- +Air pressure
- +Sunlight
- +Airborne dust & pollen

## **Air System**

- +Airflow rates
- +Duct pressure and temperature
- +Fan speed and power

## **Power System**

- +Power generation rate
- +Battery/energy storage quantity
- +Circuit voltage
- +Circuit frequency
- +Power or current consumption

## **Water System**

- +Consumption rate
- +Storage quantity
- +Water pressure

# Opportunities

Academia & Industry in analogues

- Research in Isolated, Confined and Extreme spaces
- Human spaceflight or lunar surface products
- Be your field test lab, like Antarctic stations or parabolic flights are.

A word cloud of terms related to space exploration and research. The words are arranged in a roughly circular pattern and vary in size and color. The colors include shades of purple, blue, green, and pink. The words are: spacesuits, systems, instruments, software, hardware, microbiome, geology, space, water, algae, hydroponic, plant, fungi, architecture, psychology, habitats, rovers, environment, biology, research, human, air, scientific, stress.

# Next steps

## How to participate

- Swiss-Korean Innovation Week in June, CHASM-Asia
- CHESA workshop, end of October 2026, in person or online
- International Astronautical Congress 2026, Antalya, Turkey
- CHASM Conference in ESA HQ Paris, expected January 2027

# Future missions

Analogue missions in Czech Space?



“Per aspera ad astra”

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