

ICE Cubes Service

Cost effective access to space for research & technology



Overview

The International Commercial Experiment Service (ICE Cubes) provides, regular, low cost and simple access to space and microgravity.

Launching multiple times each year ICE Cubes delivers – and returns - your payload to/from the International Space Station.

The ICE Cubes Facility is currently permanently installed on the ISS and can host a variety of types and sizes of modules or Experiment Cubes. The Experiment Cubes plug into the ICE Cubes Facility and the Facility provides power and data for the Cubes.

The Experiment Cubes have hosted a wide variety of experiments including: protein crystallization, seed germination, human skin microbiome, IOD/IOV of technologies and an interactive artwork.

You may develop the payload yourself or we can support.

Payload Accommodation

Inside the ICE Cubes Facility (ICF)

It is the simplest and most rapid access to space accommodating your mission content modules or cubes up to as large as 35*45*11 cm.

- Power: up to 40W per I/F connector (multiple connectors for large cubes)
- Thermal: forced airflow 22deg C
- Communication: Gb Ethernet
- Duration: from days to months

Overall power for cubes: 450 W

Aisle accommodation

In aisle/attached modules and free floating payloads:

- Power: up to 40 W
- Thermal: Cabin airflow
- Communication: Gb Ethernet, WI-FI, USB
- Duration: depends on the payload

As **single , large payload insert inside the ICF Container**

- Power: up to 560 W overall
- Thermal: Forced Airflow at 22
- Communication: Gb Ethernet
- Special resources: Vent/Vacuum line, fluid cooling loop, N2
- Duration: depends on the payload

ICE Cube customers can access:

- Real-time interaction with module from your location through own Mission Control Centre
- Temperature conditioned launch and return & Cold stowage on-orbit
- Astronaut time

Additional Services

ICE Cube customers can benefit from the following:

- **KIRARA (JAMSS)** is a 20°C incubator that supports protein (or other molecules) crystallization experiments in space via the counter-diffusion method
- **SCIENCE Cube** uses test tubes to host up to six experiments from fluid physics, bacteria, particles, plants, fungi and more

And in the future (December 2021):

APPLICATIONS

- Research in microgravity
- Physical science
- Biological science
- Radiation science
- Pharmaceutical & Biotech
- Food & AgBio
- In-orbit manufacturing & novel materials
- Technology demonstration and proof of concept
- STE(A)M Education

FEATURES

- Regular, simple and low cost access to microgravity and ISS
- Range of volumes for Experiment Cubes or modules
- Direct real-time interaction from your location via Internet



SERVICES AVAILABLE

- Establishing payload concept
- Payload development engineering
- Safety certification
- Payload operation support



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- **AI-Box** : is a AI-ML server to be used for the many AI application areas in space and for supporting experiments with edge computing and reducing data downlink
- **Media Set**: webcam based system for monitoring cabin payloads and to allow interactive session with ground audience.

In development :

- **BIO cube**: is an automated cell culture facility providing the appropriate conditions for cell culture research and can accommodate a six well plate (or equivalent) and provide media refresh / fixation for each culture chamber.
- **3D Tumor / Organoid / Spheroid** growth platform in Microgravity for Personalized Medication under study.

Communications

ICE Cubes provides secure IP communications in real time from your location:

- Uplink: 0.5Mpps
- Downlink: 4 Mbps

The ICE Cubes operational setup allows the user to interact in real-time with the experiment directly over the Internet from his/her User Home Base (UHB).

Through the UHB VPN, the Experiment Cube owners have a direct datalink to the Experiment Cubes.

As mission control software, YAMCS (OpenSource software developed and maintained by SpaceApps) can be used to efficiently operate the Cube.

The operational setup of the ICE Cubes Service is unique and allows for 21st century real-time operations in space.

Ownership

Each payload and all payload data is and remains the property of the customer.

The customer has a secure communications connection and ICE Cubes does not inspect the data generated.

Prepare for launch

The ICE Cubes service takes care of all safety and flight certifications.

Hence the ICE Cubes service is an end-to-end service that provides customers with a full suite of services from payload development, to integration and safety & flight certification, to flight, on-orbit operations, and payload return.

ABOUT SPACE APPLICATIONS SERVICES

Space Applications Services NV/SA is an independent Belgian company founded in 1987, with a subsidiary in Houston, USA.

Our aim is to research and develop innovative systems, solutions and products and provide services to the aerospace and security markets and related industries. Our activities cover manned and unmanned spacecraft, launch/re-entry vehicles, control centres, robotics and a wide range of information systems.



FOR MORE INFORMATION please visit:

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