

ICE Cubes Service

Cost effective access to space for research & technology



Overview

The International Commercial Experiment Service (ICE Cubes) ICE Cubes is an end-to-end service launching your research and technology to space.

We provide fast-track, easy, and reliable access to the uniqueness of microgravity and the space environment. With ICE Cubes you can make space part of your project and bring value to Earth and future space exploration.

Our motto? Space4Space & Space4Earth. Take your big leap to space with us and boost your research!

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 your scope

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 your scope

ICE Cube customers can access:

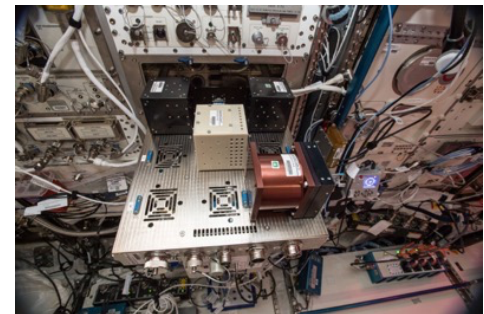
- Real-time interaction with module from your location through our own Mission Control Centre
- Temperature conditioned launch and return & Cold stowage on-orbit
- Astronaut time

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



Space Applications Services NV/SA

Leuvensesteenweg 325,
1932 Sint-Stevens-Woluwe
(Brussels Area) – Belgium

+32 (0)2 721 54 84
info@spaceapplications.com
www.spaceapplications.com



www.icecubesservice.com
www.aerospaceapplications-na.com

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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 launched recently (December 2021) available for your use:

- **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 download
- **Media Set**: webcam based system for monitoring cabin payloads and to allow interactive sessions 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 Tumours / Organoids / Spheroids in Space** growth platform in Microgravity for Personalized Medication under study (M4PM, lead Blue Horizon Lux, co-financed by ESA).

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 a VPN tunnel, the Experiment Cube owners have a direct datalink to their modules or 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 AAANA 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.



ABOUT AEROSPACE APPLICATIONS NORTH AMERICA

Aerospace Applications North America's (AANA) legacy of successful projects in the Aerospace Industry allows to quickly define and implement customized hardware and software solutions to every User Interface problem. Their expertise in human-machine interface design challenges related to highly automated and complex systems can be leveraged for development of research or technological solutions in ICE Cubes. AANA works with the ISS National Lab and NASA to provide the ICE Cubes end-to-end service in the US.

FOR MORE INFORMATION please visit:

<https://www.spaceapplications.com>
<https://www.icecubesservice.com>

or contact us:

mauro.ricci@spaceapplications.com
hilde.stenuit@spaceapplications.com
vromero@aerospaceapplications-na.com



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