ICE CUBES SERVICE

Introducing the new Media Set Mk2

- ICE Cubes Service   –   Who we are
- Introducing the new Media Set Mk2
- AI-ML at your fingertips
- Absolute mobility on board the ISS
- Availability and pricing policy
- Support to Other Payloads
- Videoconferencing with the World
- Crew Health Monitoring & Analysis
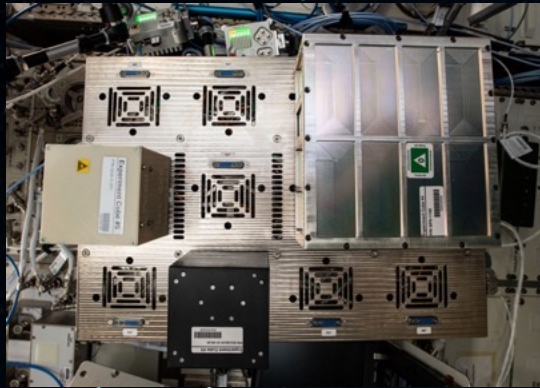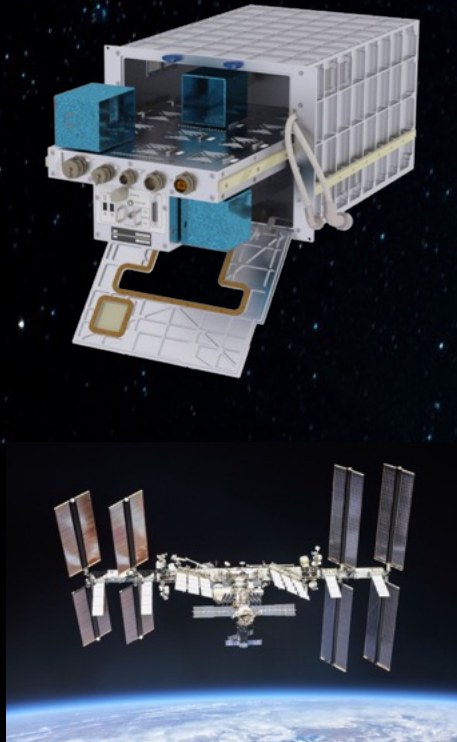- Possibility of Communications via NASA MFSC HOSC

ICE CUBES SERVICE

Cost effective end-to-end service to fly research and technology to the International Space Station (ISS)

ICE Cubes/AANA is implementation partner of ISS NL

WE OFFER

- Fast-track regular access to space
- Access to our facility/assets onboard the ISS
- Engineering support and payload development capabilities
- Unique real-time interaction
- IP rights owned by customer

Credit: NASA / ESA

END-TO-END SERVICE

- Scientific Ideation
- Feasibility study (business & technical)

- Experiment H/W selection & development

- Safety review
- Transportation documents
- Operations
- Testing
- Integration

- Transport to launch site
- Launch preparation & launch
- Late delivery to launch site

- On-board operations
- Ground control - real-time command & control

- Samples retrieval
- Transport to customer's site

Introducing the new Media Set Mk2

The Media Set Mk2 can operate through the whole ISS USOS and will offer AI-ML based edge computing to experiments/activities sponsored by ISS National Lab but also to commercial customers and user from various Space Agencies .

It may be connected to several types of devices via USB, Bluetooth or Gigabit Ethernet.

In addition to the on-board elaboration of data, the system allows for real time communication with ground and direct interaction from the User Home Base via the ICE Cubes Mission Control Center.

These features are in high demand, and there is currently no comprehensive offer of them in a single system, on board the station.

Achieving this goal will enable and simplify new R&D and STEM activities on ISS, with applications in computer vision, artificial intelligence, augmented reality, communications, in-space edge computing, etc., in line with the ISS National Lab mission of using microgravity for the benefit of humanity.

Introducing the new Media Set Mk2

- Support and control of STEM and R&D experiments
  - Edge computing using AI-ML
  - Remote Monitoring and Predictive Analytics
  - Audio/Video capabilities

- Videoconferences for STEM, medical and and private calls

- Enhancement of scene's illumination via software
- Mobile utilization in ISS USOS
- Continuous real time interaction from ground (User Home Base)

AI-ML at your fingertips

- Powered by NVIDIA Jetson Orin NX 16MB (100 TOPS)

- 2 TB on-board data storage media

- Hosting and processing of customer's software

- Access 24/7 directly from User Home Base (UHB)

- Data elaborated in real time and used for closed loop control or transmitted to the ground.

- Encryption of data transfer possible
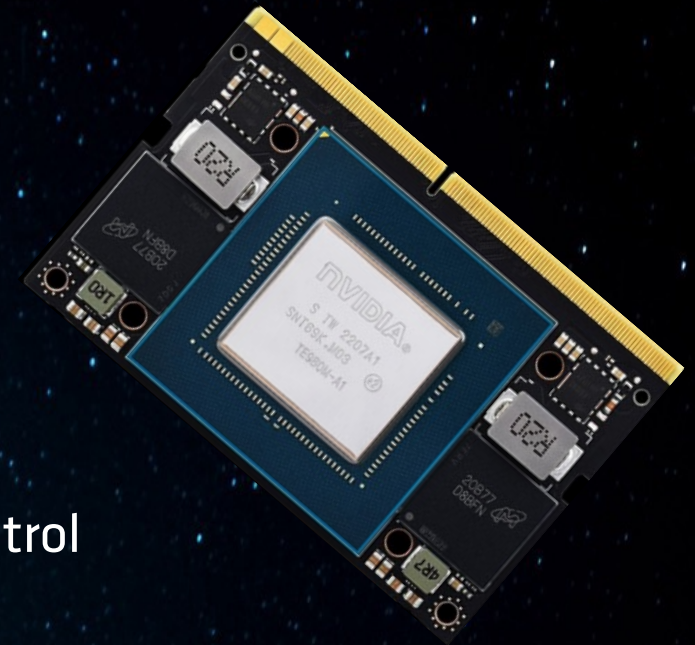
Absolute mobility on board the ISS

Can be used in various modules of ISS USOS

- Powered by removable Power Bank (72Wh) *
- Powered by its NVIDIA AC power supply **

- Connected via Wi-Fi or ISS Ethernet Switch

(*)   Chargeable at ISS USB charging port
(**)   Needs utilization of NASA DC/AC Inverter

Removable
Power Bank

Availability

The Media Set Mk2 will be permanently available on board the ISS from April 2025.

It will be available on demand.

Missions and utilization sessions will be coordinated and managed by Aerospace Applications North America.

Pricing Policy

It strongly depends on the type of activity and number of events. Level of Magnitude is reasonable: 15K to 100K.... Willing to work with you on pricing, to match your needs

Examples of Use Cases

A) Real time videoconference with audience worldwide distributed on ground. Typical duration 20 min.
B) Recorded event. Recorded on board (with or without interaction with ground operator) but not streamed in real time to audience on ground
C) Support to execution of an experiment on board : One of the cases A) or B) + the engineering support for the integration, certification and operation of the experiment, as required.
D) Coding activity (e.g. coding challenge) by using the Media Set-MK2 or the AI-Box, but without a speech of the astronaut

Support to Other Payloads

- Interface ports for connecting external payload (3 USB 3.2, 1 Gigabit Ethernet, BT)

- Hosting and elaboration of user's software

- NVIDIA Computer specifically conceived for AI-ML applications

- Real time elaboration of data for transmission to ground or control of the payload in closed loop

- Continuous access to the payloads in orbit

- Direct access of the user directly from their premises (through the ICE Cubes Mission Control Center – ICMCC) via Internet.

- Control via standard Internet Protocols

Interfacing and supporting wide range of devices/experiments

USB Radiation Sensor/Camera

Hyperspectral
USB camera

GoPro HERO9 camera
(already on board)

Corneometer

Webcam for real time
processing of 4K video

Cutometer

SELS (e.g. Visioscan®
VC 20plus)

Musculoskeletal (MSK)
imaging and analysis

Available I/F ports

- 3 USB 3.2 Type A 5V–3A each (10 Gbps)
- Bluetooth connectivity
- 1 Ethernet Port

TEWL-meter

Ultrasound
(e.g. DermaScan C)

And many more.....

Science Reference Model available for development of experiments

Ground Reference Models can be made available to possible users for evaluating the system and developing/testing the software in view of the mission. Representative of all S/W and H/W capabilities, except of crew interfaces.

- NVIDIA Jetson Orin NX 16 GB Developer Kit + Data Storage 2TB contained in commercial Aluminum case.

- 5.5inch Capacitive Touch AMOLED Display, with Protection Case, 1080×1920

- GoPro Hero9 Camera

- Commercial power supply and cables for connecting screen and computer

Videoconferencing with the World

- Videoconferences at 720p

- Participants located worldwide, connected via Internet (no VPN required). Ground segment already in place.

- Dual way Audio/Video (expected bandwidth ~4.5 Mb/sec)

- On board touch screen 5.5"

- Illumination of the scene via AI based software

- Compliant to ISS rules (real time life switch accessible to NASA, ISS-NL, Axiom, etc.)

- Near real time restreaming, on ground, to major platforms (YouTube, Vimeo, etc.)

- Real time interpretation service

- Private communications of the Customer Event's Director to the crew

- System operated from ground.

- "Switch-on and go on-air" approach. No special crew training needed for video conferences

Credit Axiom Space/John Shoffner

https://youtu.be/XlpfI62UyDA

More than 70 real time events held, with Media Set Mk1, during Axiom missions, including live TV broadcasting

Click on images or on the links for starting videos

https://player.vimeo.com/video/724817538?dnt=1&app_id=122963

Broadcasted real time interview during Axiom-1 mission (credit Axiom and WBNS 10TV)

Real time illumination of the scene via AI based software

Crew Health Monitoring & Analysis

- Remote Monitoring and Predictive Analytics

- Utilization of AI–ML based software for crew's self monitoring

- Possibility of private calls with medical staff complemented by the real time utilization of AI-ML apps on ground
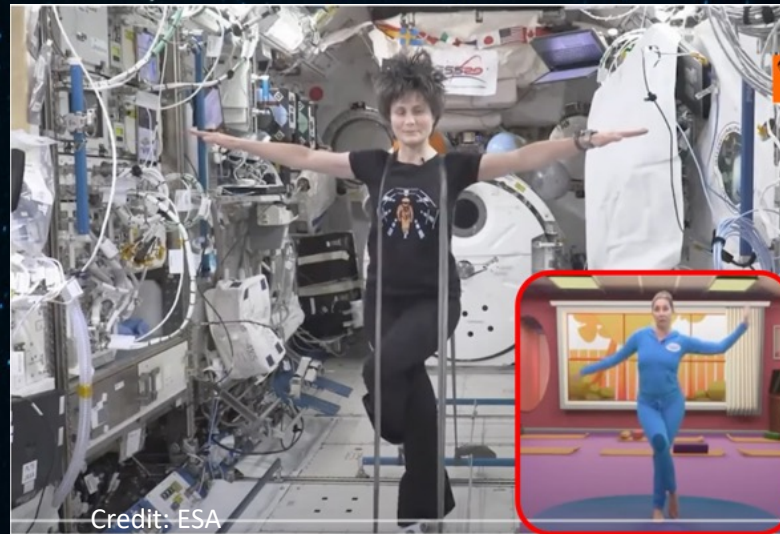
- Interfacing with wearable sensors

Credit NASA

AI-ML powered analysis of pace, posture, muscle tone, etc.

Interactive sessions with ground staff

Credit: ESA

On-board analysis of sensors data

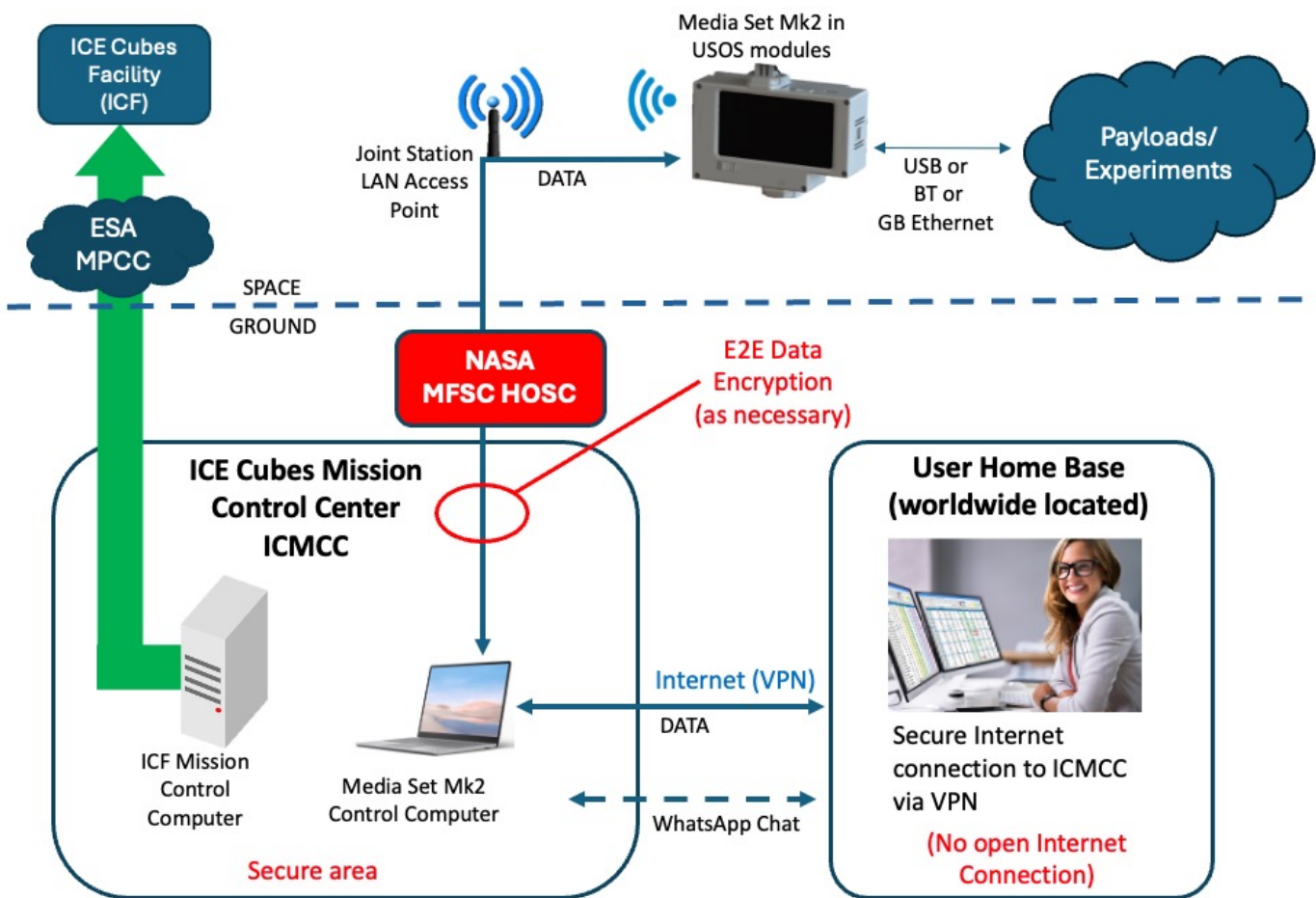# POSSIBILITY OF IMPLEMENTING COMMUNICATIONS VIA NASA MFSC HOSC

The ICE Cubes Mission Control Center is normally connected to the Columbus Control Center, in Europe, and the communication to the ISS goes through the ESA communication system called MPCC.

However, SpaceApps had experiences of controlling payloads directly via NASA MFSC HOSC (Meteron experiment) and the communications with the Media Set could also be implemented via MFSC HOSC

POSSIBILITY OF IMPLEMENTING COMMUNICATIONS VIA NASA MFSC HOSC
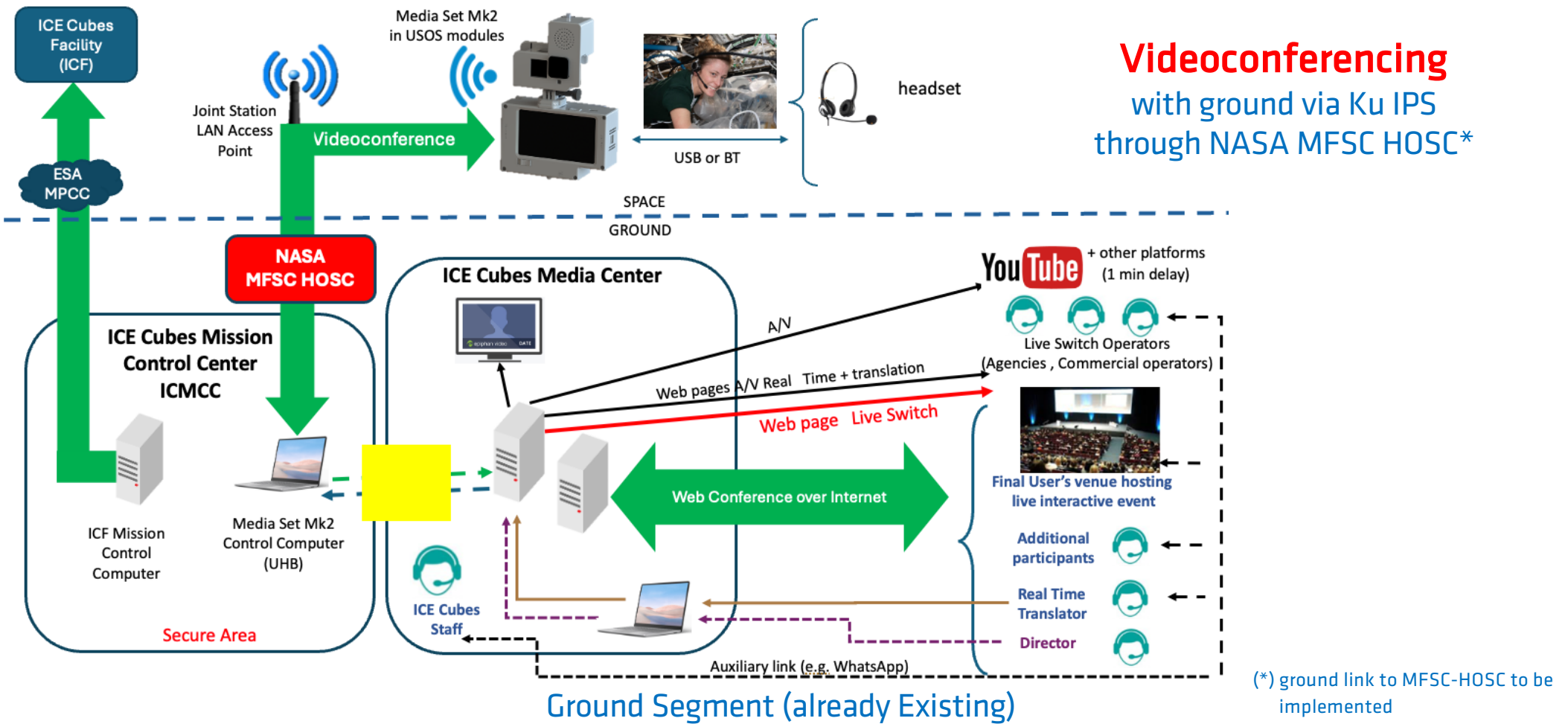
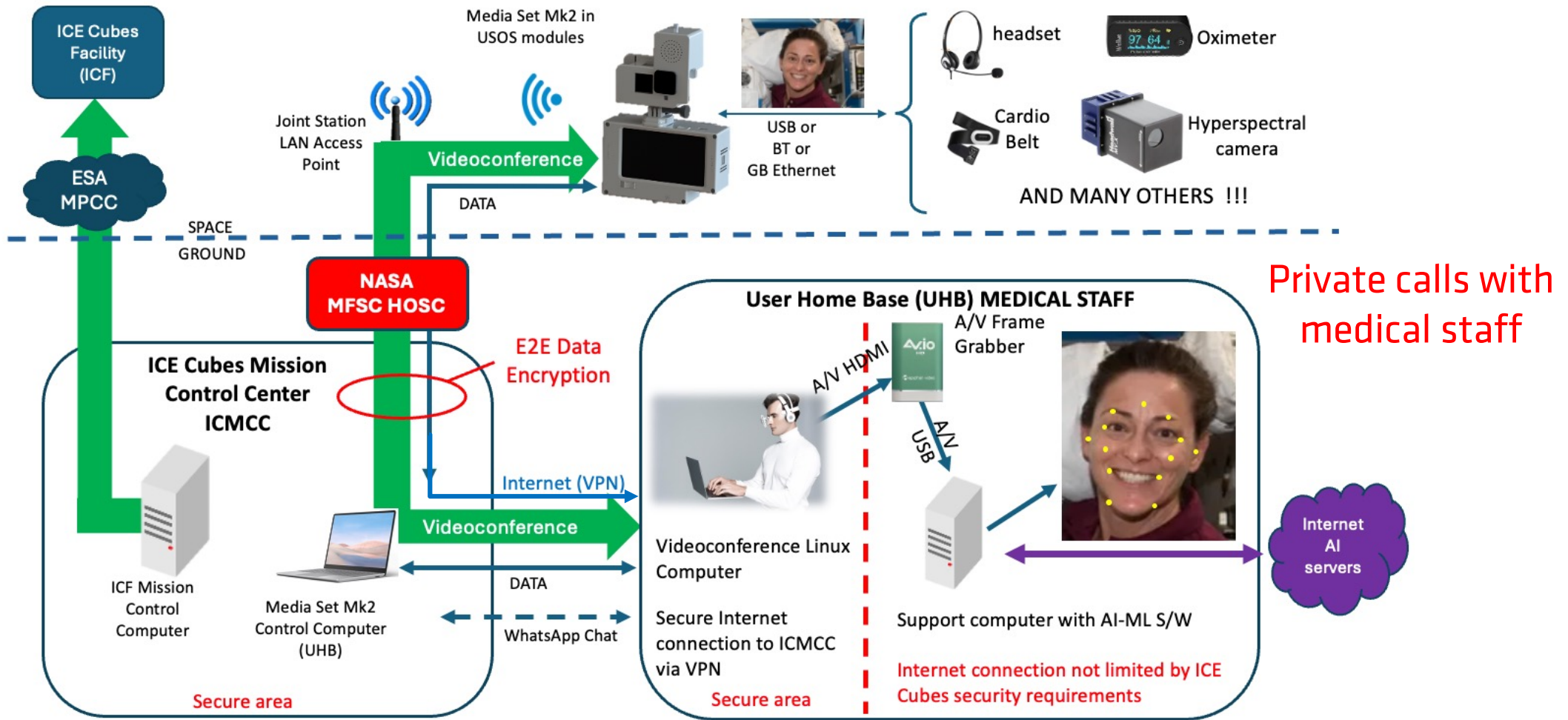# POSSIBILITY OF IMPLEMENTING COMMUNICATIONS VIA NASA MFSC HOSC

Support to other experiments
with ground via Ku IPS through NASA MFSC HOSC*

(*) ground link to MFSC-HOSC to be implemented

Ground Segment (already Existing)

POSSIBILITY OF IMPLEMENTING COMMUNICATIONS VIA NASA MFSC HOSC

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