agenzia spaziale italiana

Microgravity Advanced Research and Support Center

Reti a larga banda a supporto della Sperimentazione Scientifica nello Spazio

Summary of Presentation

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ASI Highlights

- Founded in 1988, the Italian Space Agency has the responsibility, in the framework of the abilities of the Ministry of University and Scientific and Technological Research, to promote, coordinate and lead up to the national space programs
- Together with the other main international space agencies, ASI takes part in the International Space Station Program
- The acquired rights of utilization of the ISS, will allow the italian scientific community to perform experiments on the italian payloads onboard the ISS

MARS Center Highlights

- MARS (Microgravity Advanced Research and Support) Center was founded in 1988 as a consortium between the University of Napoli and Alenia-Finmeccanica
- MARS is located in Napoli, Italy
- MARS Center operates as:
  - ASI Italian USOC (User Support and Operation Center)
  - ESA FRC (Facility Responsible Center) for Fluid Science Laboratory (FSL)
- As ASI USOC MARS is responsible for the operations of the Italian Payloads onboard ISS; it will represent the ASI I/F of the Italian Scientific User Community
- As ESA FRC MARS will be responsible for the utilization control of the FSL

The National USOC provides support to Italian Investigators for experiments onboard ISS for:

- Preparation and validation of payload operations, including modeling and definition of procedures
- Interface with NASA P/L operation centers
- Management of Italian Users operations
- Coordination of space facilities operations, including experiment execution
- Support to ASI for the planning of ISS Italian utilization
- Data Base for data and videos from space experiments
- Scientific Support Services including knowledge and specific tools to support Users, training on operations, scientific tests support, post-flight analysis, etc.
- Facility planning for Italian payloads of class 1 and class 2
- Support for accessing other space platforms (sounding rockets, retrievable capsules, parabolic flights, balloons, etc.)

The ESA FRC provides support to worldwide Investigators for experiments onboard FSL:

- Preparation and validation of payload operations, including modeling and definition of procedures
- Interface with ESA and NASA P/L operation centers
- Interface with FSL users
- Coordination for operations on the facility, including experiment execution and coordination of users
- Facility utilization planning
- Data Base for data and videos from the facility
- Scientific Support Services including knowledge and specific tools to support users, facility and operations training, experiment containers/sample preparation, scientific tests support, post-flight analysis etc.
- Facility Models to support the preparation and validation of the relevant experiment containers

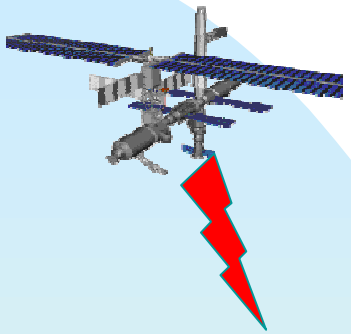
The ASI USOC in Support of the Italian Users (UHBs)

- The major function of the ASI USOC is to “hide” to the Users all the ground infrastructure between the facility onboard ISS and the UHB
- Monitoring and control equipment will be available at UHB to allow direct management of the experiments
- The Users will be free to monitor and control their experiments in the framework of “resource envelopes” depending on the actual state of the facility, other users, ISS state, etc.
- The ASI USOC will offer a continuous support to the Users from the experiment definition, to the execution, to the post-flight analyses

Operation Capabilities at ASI USOC

- Reception of all telemetry relevant to supported Payload/ experiment (scientific, H/K, ancillary,….) in Real Time (RT)
- Capability to uplink all the TeleCommands (TCs) relevant to supported Payload/experiment in RT
- Access/modification to/of NASA/HOSC stored data in parallel with mission operation
- Access to planning/re-planning facilities
- Access to off-line infrastructures for pre-flight tests and simulations
- Recording and playback of information received
- Talk/listen on TBD Voice loops (selectable on the basis of supported Payload/experiment)
- Reception of ancillary data relevant to ISS (upcoming LOS and AOS, MET, on-board time, position on-orbit,….)
- Videoconferences with ISS ground segment Personnel (SOPG,….)
- Access to on-line troubleshooting support (for NASA items)
- Access to Public Relations material (NASA TV,…..)
- Distribution of all or part of these information to UHBs in RT

User Support Architecture



PDSS

PPS+
EHS

ASI GATEWAY

CCSDS

VIDEO

VOICE

TC

PIMS

ASI USOC

ITALIAN PDSS

SCI FORWARDING WS

MONITORING WS

PLAYBACK WS

STORAGE WS

VoIP SERVER

COMMAND WS

COMMAND MANAG.

HOSC-WEB WS

NETWORK MANAGEMENT

USOC EXT WEB SRV

SCI DATA

ISS DATA

VIDEO

VIDEOCONF

VOICE

COMMAND

UHB Users

SCI HCI

ISS DATA WS

VoIP WS

COMMAND WS

#1

#2

#3

Data/Telecommands Scenario

ASI Gateway (USA)

TAT

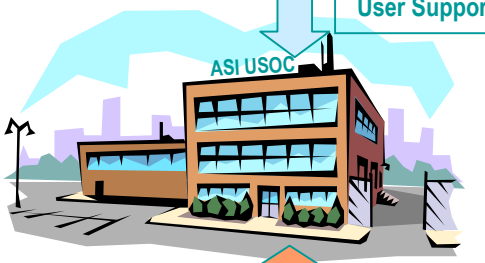
ASI-Net Central Node (Italy)

ASI-Net Backbone

UHBs can connect to the ASI USOC using the ASINet backbone connection…

ASI USOC
User Support and Operations Center

...or using leased lines to achieve an ASI USOC direct connection...



Scientific NET

Some Scientific NET requirements

- High Availability
- Quality of Service
- High Security
- High Speed
- Multicast Support

...or using public connections (e.g. the…GARR)

ASI 2002 ISS Tactical Plan

(including Taxi-Flight)

REV. F Interim Assembly Sequence Planning Reference

2001	2002	2003	2004	2005	2006	2007
M APCF * 7A.1(5 August 2001)	CHIRO	4 HPA (4STW) ULF-1(16 January 2003)	M OSTEO (TBD)	M BIO-REACTOR	M MDS	M MATERIAL STRUCTURE FACILITY
M APCF * UF1(10 December 2001)	ALTEINO	4 HPA (4STW) 12A (18 April 2003)	M OSTEO (TBD)	M BIO-REACTOR	4 1/2	M MATERIAL STRUCTURE FACILITY
	VEST	M ALTEA (MSTW) 13A.1(25 September 2003) TBC	M INCUBATOR	M MDS 4 1/2	M ENERGY MODULE	STEPS
	Soyuz 4S Taxi-Flight 'Marco Polo' (25 April - 5 May 2002)	M ALTEA (MSTW) (TBD)	M ELITE S2 M	M INCUBATOR	M ENERGY MODULE	
			M ELITE S2 M		M GLAD	
					M GLAD	
					EUROPA	
					EUROPA	
					STEPS	

Legend

- Upload
- Download
- M — Mid-deck Locker (MDL)
- 2M — Double Mid-deck Locker (2MDL)
- 4 — 4 PU Drawer
- External Payload Adapter (EPA)
- 4STW — 4PU Drawer Volume Equivalent Stowed Payload
- MSTW — Middeck Locker Volume Equivalent Stowed Payload
- * — ESA Facility