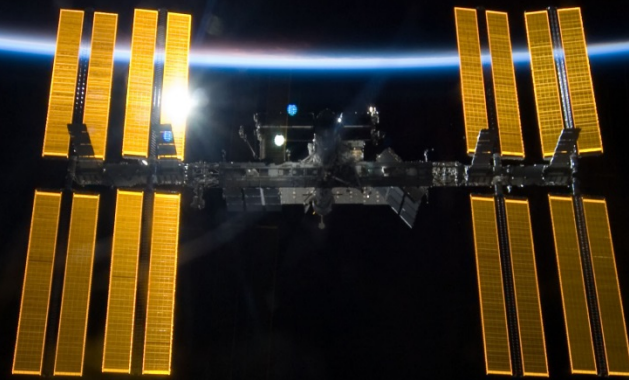


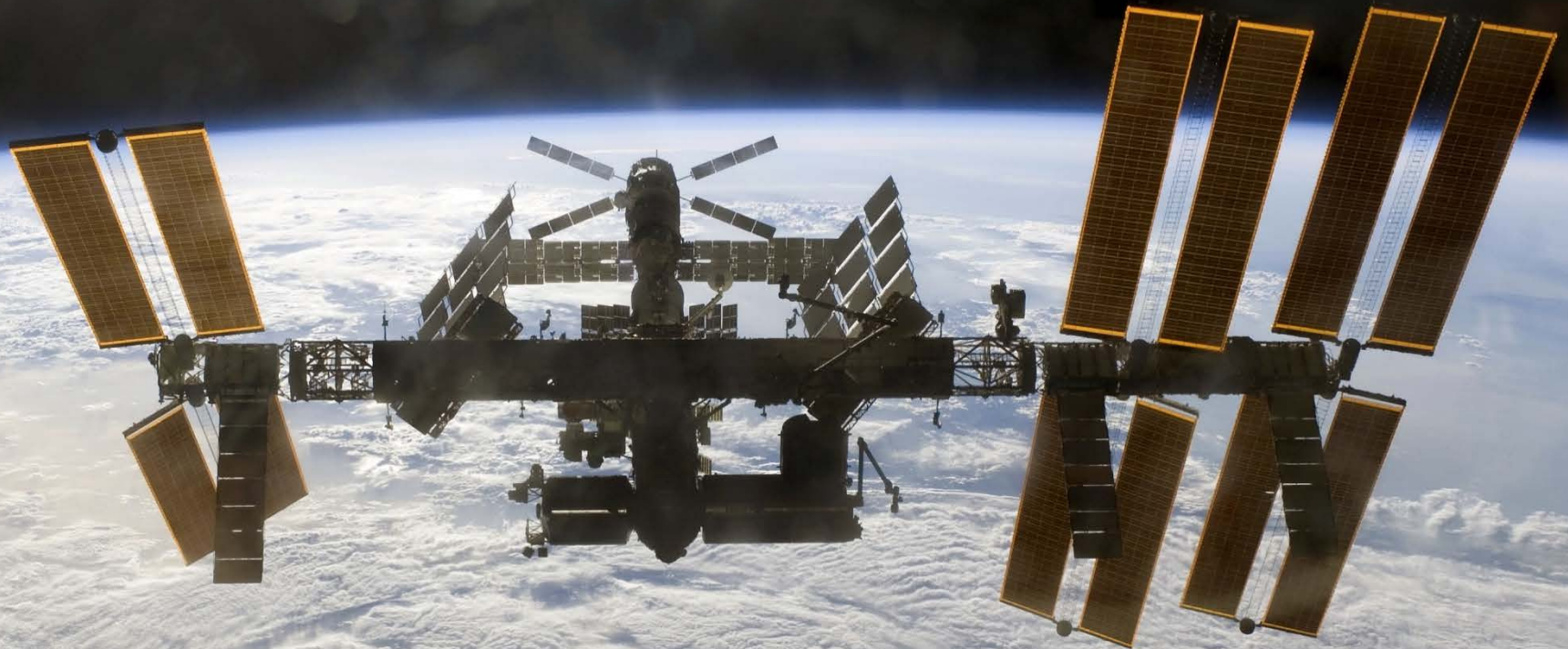
The Italian Space Agency ISS Science Directory



Sara Piccirillo

ASI, Italian Space Agency
Microgravity and Human Spaceflight Office

The Italian participation to ISS scientific utilization



Italy has a privileged, two lane, access to International Space Station:

- ✓ **Multilateral** (through the participation to ESA optional programmes)
- ✓ **Bilateral** (through the Memorandum of Understanding with NASA)

The Italian participation to ISS scientific utilization: the bilateral level

ASI provided to NASA three Multi-Purpose Logistics Modules (MPLM) designed to be transported in the Shuttle cargo bay.

the MPLM FM1(Leonardo) was modified and transported to the ISS before the Shuttle retirement, to become the Permanent Multipurpose Module (PMM).

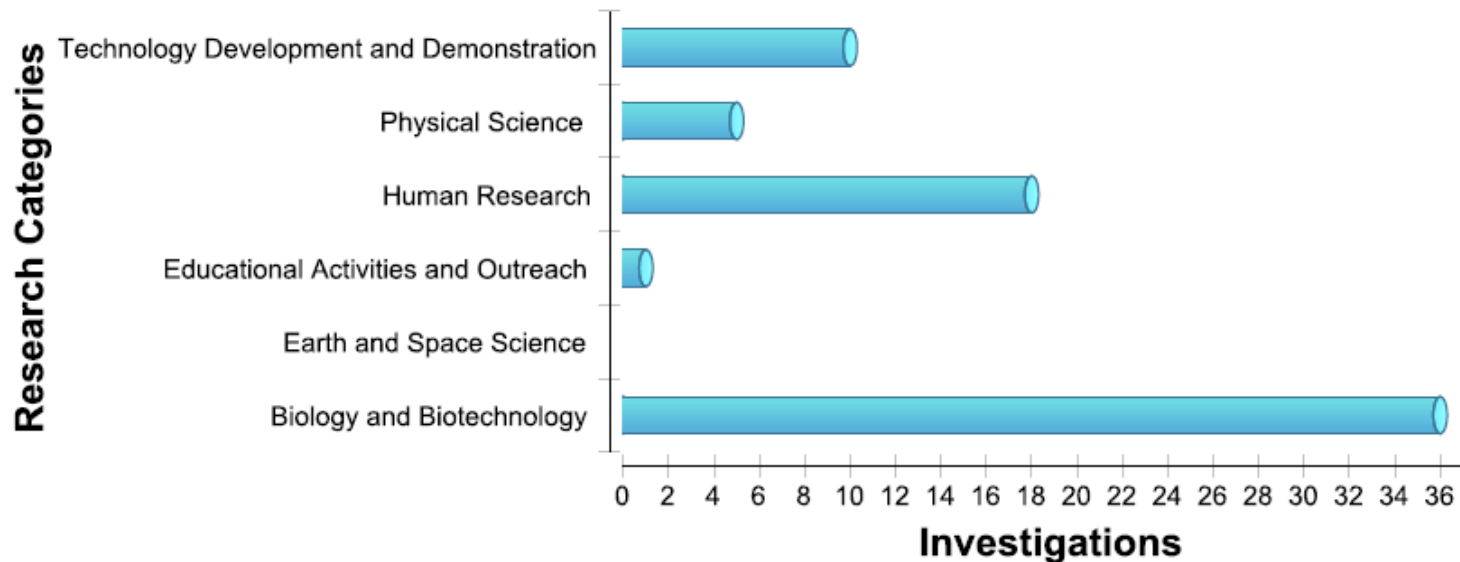


In exchange for the provision of these technological assets and the relevant support, ASI has acquired from NASA the right to:

- ✓ a share of 0,85% of the NASA pressurised & unpressurized user accommodations
- ✓ Italian astronaut flight opportunities during the life of the program

ISS Resources Exploitation

Since 2001 ASI has access to important International Space Station Resources



| | |
|------------------------------------|------|
| Sponsored payloads | 31 |
| On-board investigations | 71 |
| Principal Investigators and co-I's | >130 |

Facts & Objectives

The space investigations produce a variety of scientific results in different forms:

- ✓ Digital data
- ✓ Videos
- ✓ Physical samples
- ✓ Technological Reports



The ASI investigations have produced more than one hundred publications

It is required to handle an increasing number of non-homogenous scientific results and put more efforts on their dissemination

Facts & Objectives



Need of an e-infrastructure



Development of a web-based portal able to collect and provide access to comprehensive information relevant to ASI utilization products and outcomes including:

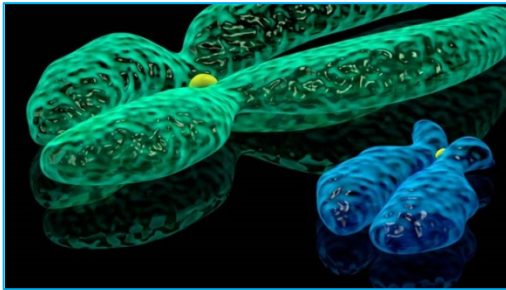
- ✓ Experiments overview
- ✓ Raw science data
- ✓ Available papers and references
- ✓ Dissemination opportunities

The final benefit of this initiative will be to increase the overall value of the research performed on ISS

Scientific Disciplines

Investigation and relevant publications are classified in six main research categories:

Biology and Biotechnology



Earth and Space Science



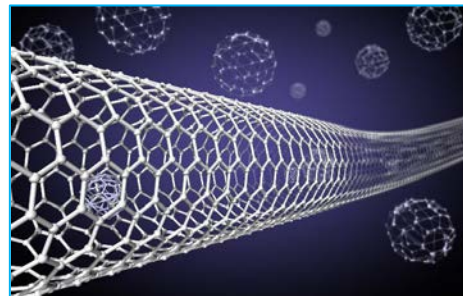
Educational Activities and Outreach



Human Research



Physical Science



Technology Development and Demonstration



Italian experiments in the six different scientific disciplines

Nanoparticles and Osteoporosis



AMS-02



LISS-Lessons on the International Space Station



Wearable Monitoring



ALTEA

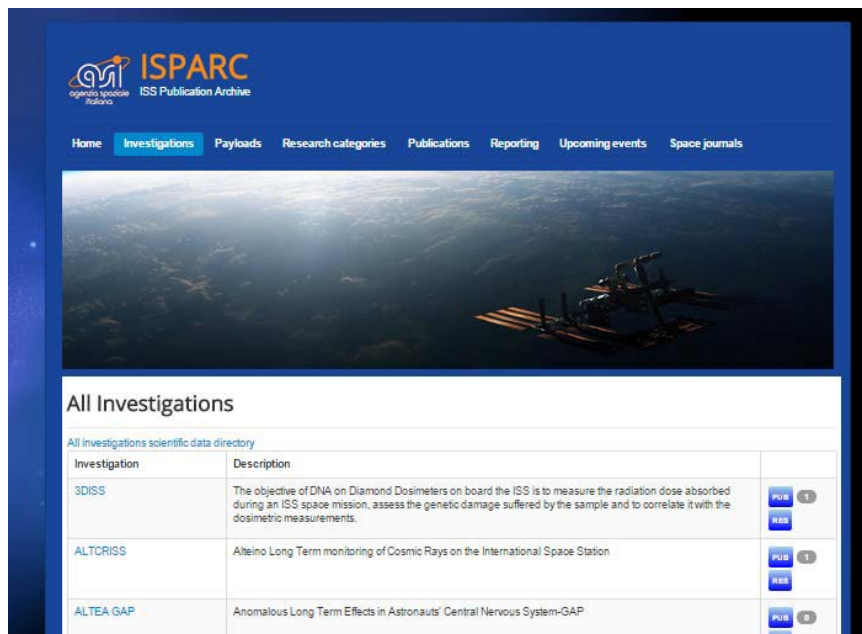


ISSpresso



Integrated Databases

Two separate databases have been developed for the publications and the data:



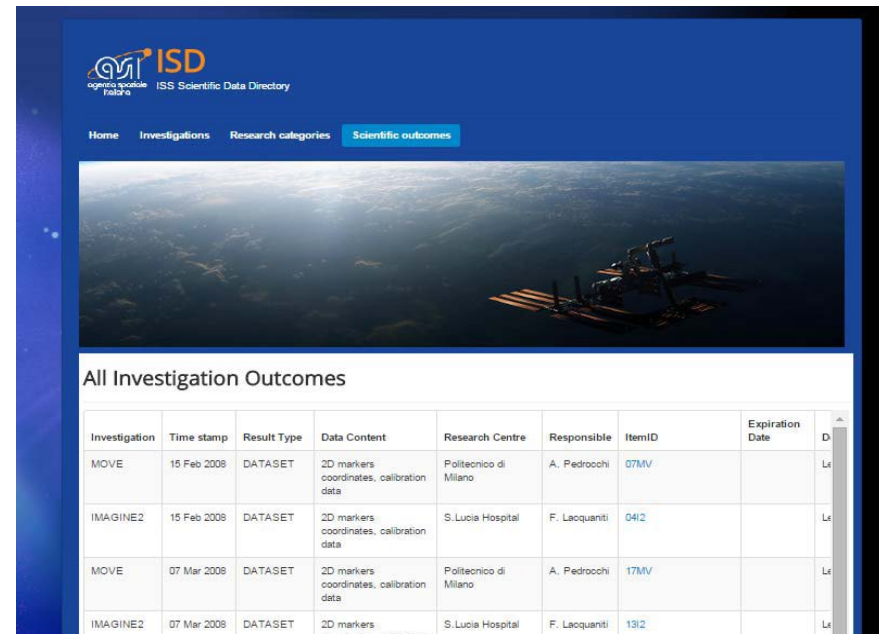
agenzia spaziale italiana
ISPARC
ISS Publication Archive

Home Investigations Payloads Research categories Publications Reporting Upcoming events Space journals

All Investigations

All Investigations scientific data directory

| Investigation | Description | PUB | RES |
|---------------|---|-----|-----|
| 3DISS | The objective of DNA on Diamond Dosimeters on board the ISS is to measure the radiation dose absorbed during an ISS space mission, assess the genetic damage suffered by the sample and to correlate it with the dosimetric measurements. | PUB | RES |
| ALTCRISS | Alteino Long Term monitoring of Cosmic Rays on the International Space Station | PUB | RES |
| ALTEA GAP | Anomalous Long Term Effects in Astronauts' Central Nervous System-GAP | PUB | RES |



agenzia spaziale italiana
ISD
ISS Scientific Data Directory

Home Investigations Research categories Scientific outcomes

All Investigation Outcomes

| Investigation | Time stamp | Result Type | Data Content | Research Centre | Responsible | ItemID | Expiration Date | D |
|---------------|-------------|-------------|--|-----------------------|----------------|--------|-----------------|----|
| MOVE | 15 Feb 2008 | DATASET | 2D markers coordinates, calibration data | Politecnico di Milano | A. Pedrocchi | 07MV | | Le |
| IMAGINE2 | 15 Feb 2008 | DATASET | 2D markers coordinates, calibration data | S. Lucia Hospital | F. Laoc quanti | 04I2 | | Le |
| MOVE | 07 Mar 2008 | DATASET | 2D markers coordinates, calibration data | Politecnico di Milano | A. Pedrocchi | 17MV | | Le |
| IMAGINE2 | 07 Mar 2008 | DATASET | 2D markers | S. Lucia Hospital | F. Laoc quanti | 13I2 | | Le |

ISPARC – ISS Publications ARChive



ISPARC includes a record for each publication and each publication is recorded by predefined fields (e.g. authors, title, journal)

The screenshot shows the ISPARC website interface. At the top, there is a navigation menu with links for Home, Investigations, Payloads, Research categories, Publications, Reporting, Upcoming events, and Space journals. Below the menu is a large image of the International Space Station in orbit. The main content area is titled 'All Investigations' and contains a table with the following data:

| Investigation | Description | FILE |
|---------------|---|---------|
| 3DISS | The objective of DNA on Diamond Dosimeters on board the ISS is to measure the radiation dose absorbed during an ISS space mission, assess the genetic damage suffered by the sample and to correlate it with the dosimetric measurements. | FILE 11 |
| ALTCRISS | Alteino Long Term monitoring of Cosmic Rays on the International Space Station | FILE 11 |
| ALTEA GAP | Anomalous Long Term Effects in Astronauts' Central Nervous System-GAP | FILE 03 |

ISPARC implements relationships among:

- ✓ Payloads
- ✓ Investigations
- ✓ Research Categories
- ✓ Publications references

ISPARC supports researchers in the selection of upcoming dissemination opportunities of their specific interest

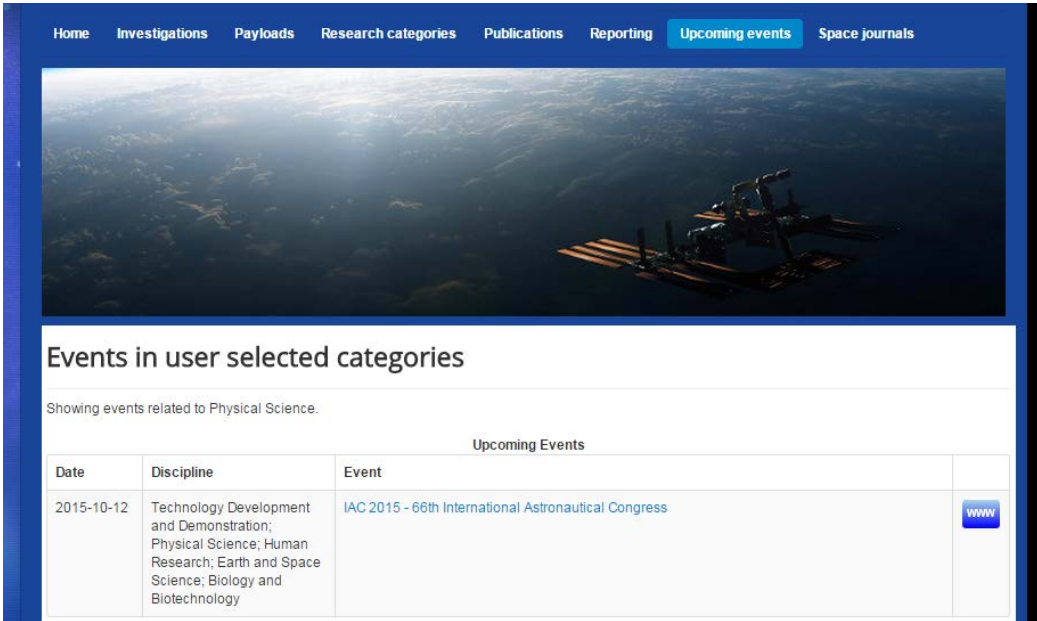
Preferred categories
(optional)

Physical Science X

user preferences



selected events



Home Investigations Payloads Research categories Publications Reporting **Upcoming events** Space journals

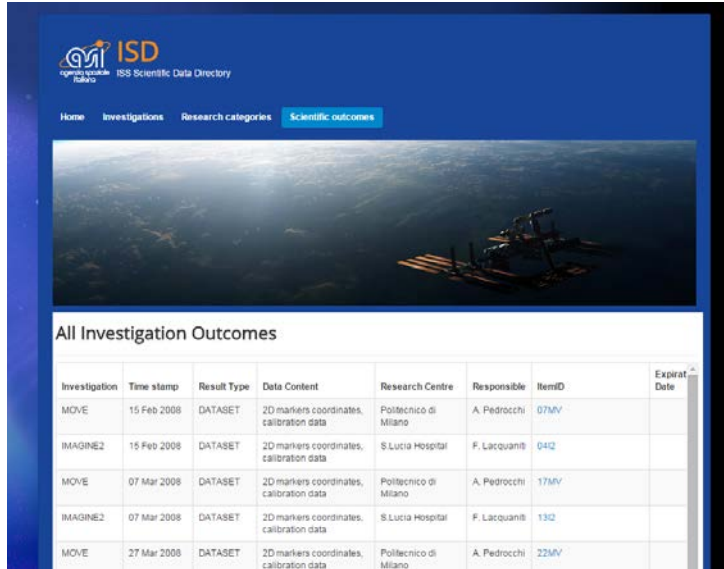
Events in user selected categories

Showing events related to Physical Science.

Upcoming Events

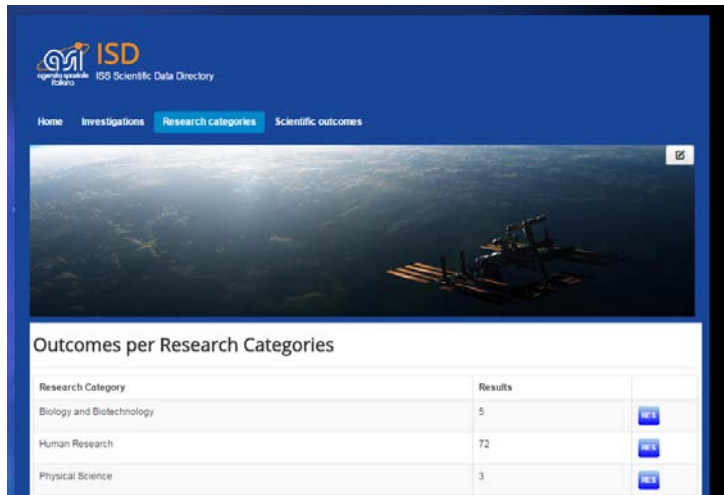
| Date | Discipline | Event | |
|------------|--|--|---------------------|
| 2015-10-12 | Technology Development and Demonstration; Physical Science; Human Research; Earth and Space Science; Biology and Biotechnology | IAC 2015 - 66th International Astronautical Congress | www |

ISD – ISS Scientific Data Directory



| Investigation | Time stamp | Result Type | Data Content | Research Centre | Responsible | ItemID | Expirat Date |
|---------------|-------------|-------------|--|-----------------------|---------------|--------|--------------|
| MOVE | 15 Feb 2008 | DATASET | 2D markers coordinates, calibration data | Politecnico di Milano | A. Pedrocchi | 07MV | |
| IMAGINE2 | 15 Feb 2008 | DATASET | 2D markers coordinates, calibration data | S.Lucia Hospital | F. Lacquaniti | 04Q | |
| MOVE | 07 Mar 2008 | DATASET | 2D markers coordinates, calibration data | Politecnico di Milano | A. Pedrocchi | 17MV | |
| IMAGINE2 | 07 Mar 2008 | DATASET | 2D markers coordinates, calibration data | S.Lucia Hospital | F. Lacquaniti | 13Q | |
| MOVE | 27 Mar 2008 | DATASET | 2D markers coordinates, calibration data | Politecnico di Milano | A. Pedrocchi | 22MV | |

- ✓ The ISS Scientific Data Directory collects and supports access to science data information



| Research Category | Results |
|---------------------------|---------|
| Biology and Biotechnology | 5 |
| Human Research | 72 |
| Physical Science | 3 |

- ✓ Reports on scientific outcomes can be filtered per investigation or research categories

The Portal



Kayser Italia s.r.l. has implemented a coordinated web based applications to manage all such information



- ✓ During the navigation, it is possible to pass through from ISPARC to ISD seamless
- ✓ The user has a complete view of the whole outcomes of an investigation

ISS Science Directory Benefits

Increase in the overall value of the research

- ✓ Support cooperation on the scientific outcomes analysis
- ✓ Prevent duplication of experiments
- ✓ Promote synergies among scientific topics and teams
- ✓ Identification of possible inter/multidisciplinary topics

