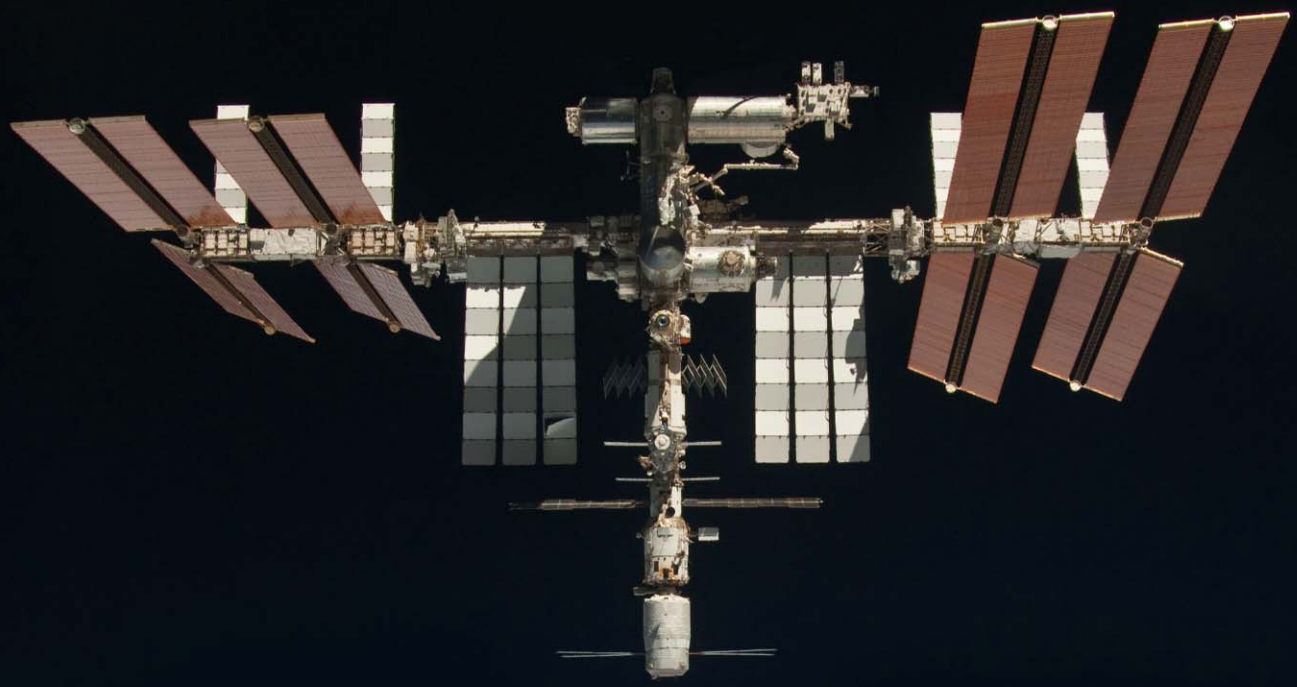
# International Space Station Utilization Statistics



CSA ASC

esa

JAXA

РОСКОСМОС

NASA

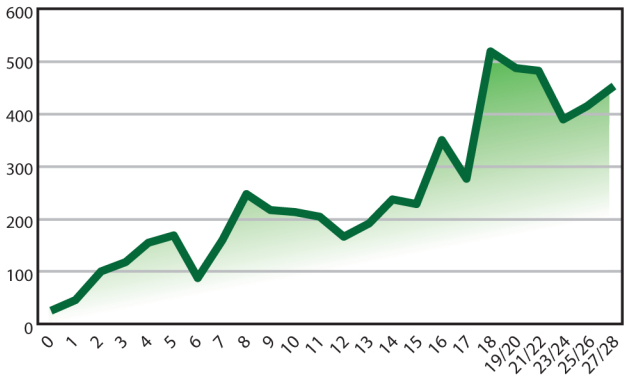
## Fall 2011

## *Number of Investigations Performed on the International Space Station*

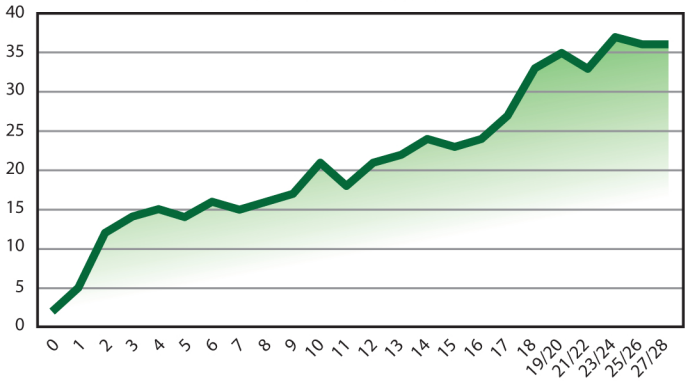
The information below provides an overview of ISS utilization up to the end of October 2011. Assembly of the ISS took place during this time limiting utilization over the corresponding Expeditions 0-28. An expedition refers to the nominal 6-month period that a single crew is on ISS. The utilization reflects activities of all of the ISS International Partners: the Canadian Space Agency (CSA), the European Space Agency (ESA), the Japan Aerospace Exploration Agency (JAXA), the National Aeronautics and Space Administration (NASA), and Russian Federal Space Agency (Roscosmos). An investigation is defined as a set of activities and measurements (observations) designed to test a scientific hypothesis, related set of hypotheses, or set of technology validation objectives. Investigators include the principle investigator(s) and co-investigator(s) that are working to achieve the objective of the investigation.

| | ISS Expeditions 25/26 Sept 2010 – Mar 2011 | ISS Expeditions 27/28 Mar 2011 – Oct 2011 | ISS Expeditions 0-28 Dec 1998 – Oct 2011 |
|---|---|---|---|
| **Number of Investigations** | 183 | 241 | 1251 |
| *New Investigations* | 41 | 87 | -- |
| *Completed/Permanent Investigations* | 88 | 92 | 1055 |
| **Number of Investigators with Research on the ISS** | 413 | 449 | 1309 |
| **Countries with ISS Investigations** | 36 | 36 | 63 |

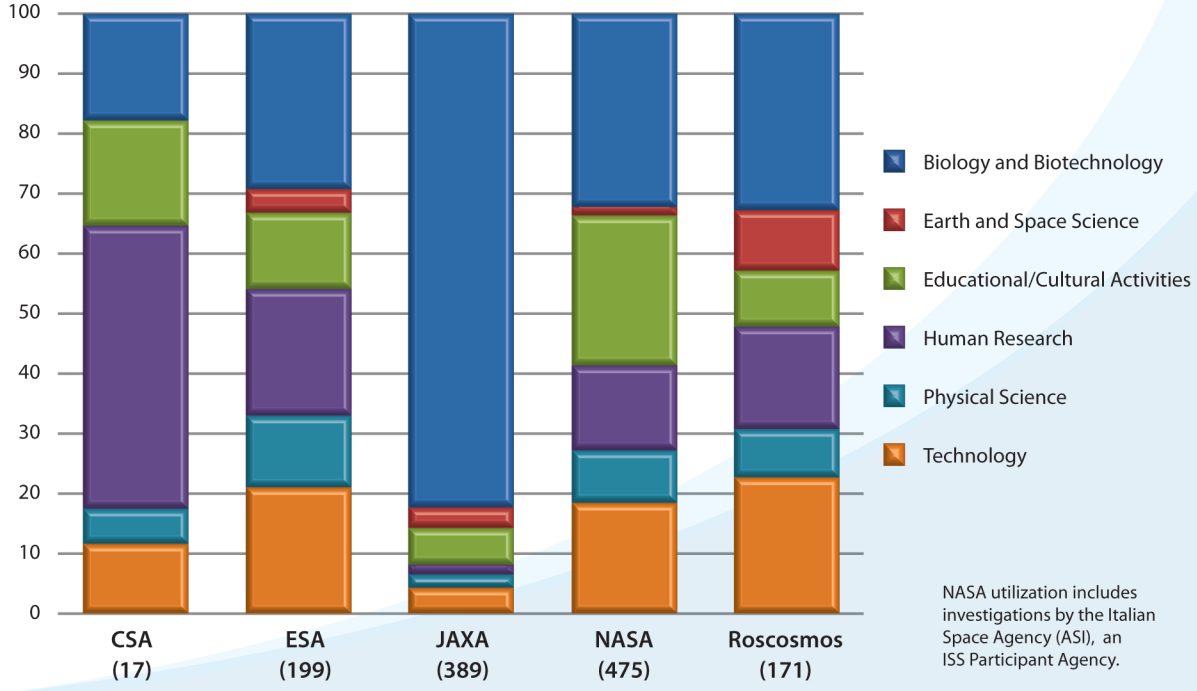
**Investigators per Expedition**
**December 1998 – October 2011**



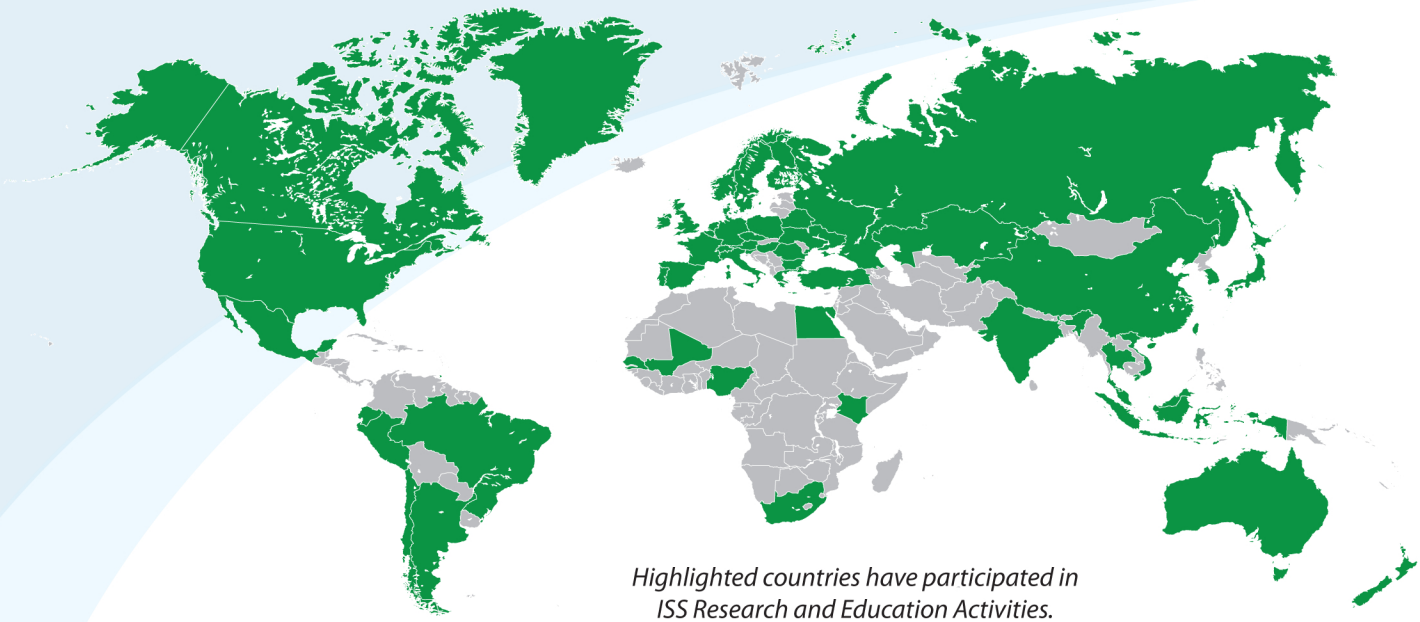

**Countries per Expedition**
**December 1998 – October 2011**




**Research Disciplines of ISS Investigations by Partner Agency: Expeditions 0-28**
**December 1998 – October 2011**




NASA utilization includes investigations by the Italian Space Agency (ASI), an ISS Participant Agency.



*Highlighted countries have participated in ISS Research and Education Activities.*

## *Research Resources*

Resources for the ISS are often described as upmass (mass of material brought to the ISS), downmass (mass of material returned from ISS) and crewtime (amount of time crew dedicates to an activity). During the ISS assembly, the majority of the resources were needed to construct the ISS. However, significant upmass and crewtime were set aside to deliver and then outfit and configure large research facilities as part of ISS laboratory outfitting. No future large facilities are planned; therefore, the profile of future research resources will likely not resemble that of the past reported below. These figures are provided for historic and reference value only and will not be predictive.

| Research Resources | ISS Expeditions 25/26<br>Sept 2010 – Mar 2011 | ISS Expeditions 27/28<br>Mar 2011 – Oct 2011 | ISS Expeditions 0-28<br>Dec 1998 – Oct 2011 |
|---|---|---|---|
| **Upmass** | 3518.4 kg | 7945.2 kg | 37800.6 kg |
| *Facility* | 2131.6 kg | 7556.9 kg | 25950.5 kg |
| *Resupply* | 1386.8 kg | 388.3 kg | 11805.1 kg |
| **Downmass** | 579.6 kg | 1349.7 kg | 8302.3 kg |
| **Crewtime** | 971.7 hrs | 1089.8 hrs | 11089.2 hrs |

## *Number of Current and Future Investigations on the International Space Station*

The investigations statistics represented below reflect research planned for Expeditions 29/30 and 31/32. The numbers of investigations actually performed can only be reported after completion of the expeditions.

| | ISS Expeditions 29/30<br>Sept 2011 – Mar 2012 | ISS Expeditions 31/32<br>Mar 2012 – Sept 2012 | ISS Expeditions 29 – 32<br>Sept 2011 – Sept 2012 |
|---|---|---|---|
| **Total Investigations** | 191 | 215 | 259 |
| ***New Investigations*** | 39 | 60 | 60 |
| **Number of Investigators with Research on the ISS** | 449 | 441 | 526 |
| **Countries with ISS Investigations** | 28 | 24 | 31 |

### *Did You Know?*

- The ISS is the longest inhabited space platform ever with continuous human habitation since November 2, 2000.
- In 2005, U.S. facilities on the ISS were designated as a U.S. National Laboratory open to other government agencies, non-profits and businesses.
- Virulence of microbes increases in space; researchers are using this discovery to create an approach to develop new candidate vaccines.
- Capillary flow experiments on the ISS have produced universal equations for modeling the behaviors of fluids in space.
- Nutrition studies conducted on the ISS show that diets rich in Omega-3 fatty acids are correlated with reduced bone loss.
- Candidate treatments for testicular cancer have been developed based on microencapsulation technology tested on the ISS.
- The ISS serves as a rapid-response platform to monitor climate change, disasters and urban growth on Earth.
- Balance studies conducted on ISS astronauts are being used to predict and reduce the risk of falls, a leading cause of mortality in the elderly.
- The same technology that went into building Canadarm2 and Dextre (the Canadian robots that assembled, service and maintain the ISS) has been adapted for NeuroArm to perform robotic surgery with pinpoint accuracy.
- Spinning fluids in concentric spherical shells in microgravity demonstrates how magma flows under the Earth's crust.
- Astrobiology research has discovered that common terrestrial organisms can survive in open space.
- High quality protein crystals grown on the ISS have been used in research to combat several diseases, such as muscular dystrophy.
- In the first 1.5 years of operation, the All-sky X-ray Image system on the ISS/Kibo exposed facility has located five new X-ray novas.
- Studies of plasma (ionized particles) onboard the ISS led to the discovery of new effects in plasma with strongly charged macroparticles.

### Top 10 Journals Publishing ISS Research Results (Based on 5 year impact factor)

Nature

Microbiology and Molecular Biology Reviews

PLoS One

Proceedings of the National Academy of Sciences, U.S.

Trends in Biotechnology

Journal of Neuroscience

Physical Review Letters

Journal of Bone and Mineral Research

NeuroImage

Molecular Ecology

Additional ISS Research Resources:

ISS Research and Technology on the Web: http://www.nasa.gov/iss-science/

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Blog: A Lab Aloft: http://go.usa.gov/atI

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