Explorers Program

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An Explorer mission observes Sagittarius A\*, the Milky Way's central black hole, flaring

Explorers Program

• The Explorers Program is a United States space exploration program that provides flight opportunities for physics, geophysics, heliophysics, and astrophysics investigations from space.

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The Explorers Program is a United States space exploration program that provides flight opportunities for physics, geophysics, heliophysics, and astrophysics investigations from space. Launched in 1958, Explorer 1 was USA's first spacecraft to achieve orbit. Over

90 space missions have been launched since. Starting with Explorer 6, it has been operated by NASA, with regular collaboration with a variety of other institutions, including many international partners.

Launchers for the Explorer program have included Jupiter C (Juno I), Juno II, various Thor, Scout, Delta and Pegasus rockets, and Falcon 9.

Currently, the program is divided into MIDEX, SMEX, and UNEX, with select Missions of Opportunity operated with other agencies.

Explorer 1's Jupiter rocket ignites

Sputnik caused an uproar in the West

This artificially colored view of M101 maps ultraviolet light as blue while visible light is red since UV light does not have a "color" (the eye stopping at about violet). This view was taken by the Explorer SWIFT, which can also detect X-Rays, and has contributed to the study of Gamma-ray bursts and other topics

History

• The Explorer missions were at first managed by the Small Explorer Project Office at NASA's Goddard Space Flight Center (GSFC).

• Explorer 6 in 1959 was the first scientific satellite under the project direction of NASA's Goddard Space Flight Center.

• With drops in NASA's budget, explorer missions became infrequent in early 1980s.

The Explorers Program was the United States's first successful attempt to launch an artificial satellite. It began as a U.S. Army proposal (Project Orbiter) to place a, "civilian", scientific satellite into orbit during the International Geophysical Year; however, that proposal was rejected in favor of the U.S. Navy's Project Vanguard, which included the first sub-orbital flight Vanguard TV0. in December 1956. The Explorers Program was later reestablished to catch up with the Soviet Union its launch of Sputnik 1 on October 4, 1957 sparked the Sputnik crisis. Explorer 1 was launched on January 31, 1958, becoming the first U.S. satellite, as well as discovering the Van Allen radiation belt.

After NASA was established in 1958, the Explorers Program was transferred from the US Army. NASA continued to use the name for an ongoing series of relatively small space missions, typically an artificial satellite with a specific science focus. Explorer 6 in 1959 was the first scientific satellite under the project direction of NASA's Goddard Space Flight Center. Over the following two decades, NASA has launched over 50 explorer missions, some in conjunction to military programs, usually of an exploratory or survey nature or had specific objectives not requiring the capabilities of a major observatory. Explorers satellites have made many important discoveries on: Earth's magnetosphere and the shape of its gravity field; the solar wind; properties of micrometeoroids raining down on the Earth; ultraviolet, cosmic, and X-rays from the Solar System and universe beyond; ionospheric physics; Solar plasma; solar energetic particles; and atmospheric physics. These missions have also investigated air density, radio astronomy, geodesy, and gamma ray astronomy.

With drops in NASA's budget, explorer missions became infrequent in early 1980s. In 1988, the Small Explorer (SMEX) program was established with a focus on frequent flight opportunities for highly focused and relatively inexpensive space science missions in the disciplines of astrophysics and space physics. The first three SMEX missions were chosen in April 1989 out of 51 candidates, and launched in 1992, 1996 and 1998. The second set of two missions were announced in September 1994 and launched in 1998 and 1999.

By mid 1990s, NASA initiated the Medium-class Explorer (MIDEX) program to enable more frequent flights. These were larger than SMEX missions but smaller and less expensive than "Delta-class missions", and were to be launched aboard a new Med-Lite class launch vehicle. This new launch vehicle was not developed and instead, these missions were flown on a modified Delta II rocket. The first announcement opportunity for MIDEX was issued in March 1995, and the first launch under this new program was FUSE in 1999.

In May 1994 NASA also started a new, Student Explorer Demonstration Initiative (STEDI) pilot program, to demonstrate that high-quality space science can be carried out with small, low-cost missions. Of the three selected missions, only, SNOE was launched in 1998 and TERRIERS in 1999, but the latter failed after launch. The STEDI program was terminated in 2001. Later, NASA established the University-Class Explorers (UNEX) program for much cheaper missions, and is regarded as a successor to STEDI.

The Explorer missions were at first managed by the Small Explorer Project Office at NASA's Goddard Space Flight Center (GSFC). In early 1999, that office was closed and with the announcement of opportunity for the third set of SMEX missions NASA converted the SMEX program so that each mission was managed by its Principal Investigator, with oversight by the GSFC Explorers Project. The Explorers Program Office at Goddard Space Flight Center in Greenbelt, Maryland, provides management of the many operational scientific exploration missions that are characterized by relatively moderate costs and small to medium-sized missions that are capable of being built, tested, and launched in a short time interval compared to larger observatories like NASA's Great Observatories.

Excluding the launches, the MIDEX program has a current mission cap cost of US$250 million in 2018, with future MIDEX missions being capped at $350 million. The cost cap for SMEX missions in 2017 was $165 million. UNEX missions are capped at $15 million. A subprogram called Missions of Opportunity (MO) has funded science instruments or hardware components of onboard non-NASA space missions, and have a total NASA cost cap of $70 million.

The selection of the next MO includes the Compton Spectrometer and Imager Explorer balloon, Transient Astrophysics Observer on the ISS, and Contribution to ARIEL Spectroscopy of Exoplanets (CASE) in conjunction with ESA.

Programs

Medium-Class Explorers (MIDEX)

Small Explorers (SMEX)

University-Class Explorers (UNEX)

Missions of Opportunity (MO) and international missions

Launched spacecrafts

• Explorers name numbers can be found in the NSSDC master catalog, typically assigned to each spacecraft in a mission.

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WISE was restarted after it was turned off

Explorer 6 on a Thor-Able III launches in August 1959

ISEE-C in a dynamic test chamber, 1978

Cancelled missions

• Some missions failed upon reaching orbit including WIRE and TERRIERS.

• For example, in 2011, the Explorers Program received 22 full missions solicitations, 20 Missions of Opportunity, and 8 USPI.

• Examples of missions that were not developed or cancelled were:

• Many missions are proposed, but not selected.

• Galaxy Evolution Explorer - 2013

Many missions are proposed, but not selected. For example, in 2011, the Explorers Program received 22 full missions solicitations, 20 Missions of Opportunity, and 8 USPI. Sometimes mission are only partially developed but must be stopped for financial, technological, or bureaucratic reasons. Some missions failed upon reaching orbit including WIRE and TERRIERS.

Examples of missions that were not developed or cancelled were:

Owl 1 and 2 (cost, 1965)

MSS A (Magnetic Storm Satellite, Explorer-A, 1970)

CATSAT (STEDI 3) (cost)

IMEX (UNEX 2) (cost)

FAME (MIDEX 4)

SPIDR (SMEX 8) (technical, 2003)

GEMS (SMEX 13)

Recent examples of conclusions of launched missions, cancelled due to budgetary constraints:

FAST - 2009

TRACE - 2010 (Solar observatory, see Solar Dynamics Observatory)

Wilkinson MAP - 2010

WISE - 2011 (extended in 2013 as NEOWISE mission)

Rossi XTE - 2012

Galaxy Evolution Explorer - 2013

Launch statistics

• Approximate number of launches per decade:

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See also

• New Frontiers program

• Discovery program

• Cosmic Vision, a European Space Agency (ESA) programme

Cosmic Vision, a European Space Agency (ESA) programme

Discovery program

New Frontiers program

References

External links

• Explorer Program at Gunters Space Page (detailed list of explorers missions

• Explorer Program Profile by NASA's Solar System Exploration

• Goddard Space Flight Center.

• NASA.

• NASA Explorers Program missions page

• NASA Science - Explorers

• Retrieved 2009-12-05.

https://science.nasa.gov/missions-page

"Explorers Program". Goddard Space Flight Center. NASA. 2009. Retrieved 2009-12-05.

NASA Explorers Program missions page

NSSDC updated list of Explorers missions

Explorer Program Profile by NASA's Solar System Exploration

1957 Video (30 minutes) on launch and impact of Explorer[permanent dead link]

Master list of Names, Initialisms, and Abbreviations for un-manned satellites

U.S. Space Objects Registry

Explorer Program at Gunters Space Page (detailed list of explorers missions

NASA Science - Explorers