Ensuring Space Security

A Project of the Union of Concerned Scientists | Fact Sheet No.2

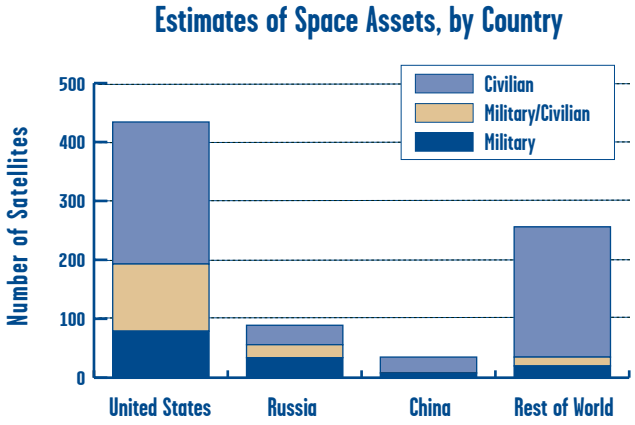
What's in Space?

Satellites: Basic Facts

There are more than 800 active satellites currently in orbit. They represent four percent of the total number of objects currently cataloged by the U.S. space surveillance network; the rest includes abandoned satellites, spent rocket boosters, and other debris.

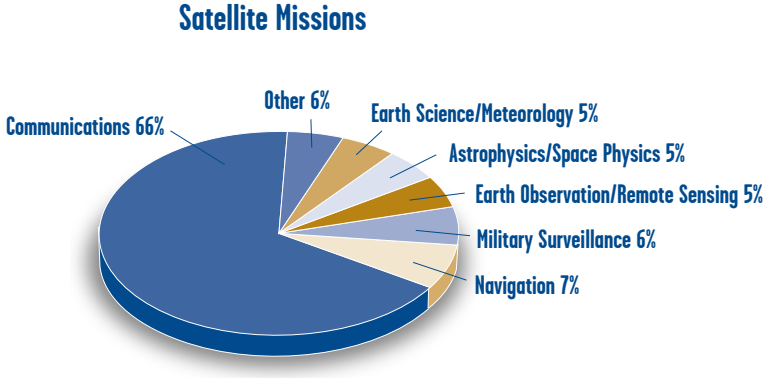
The United States owns more than 400 active satellites, just over 50 percent of all satellites. Russia and China have the second and third highest number of space assets, owning 89 and 35 satellites, respectively.

Civilian satellites, which perform tasks for the commercial, scientific, and government sectors, make up the majority of U.S. satellites. Russia's space assets are split nearly evenly between military and civil missions, though there are not separate military and civilian space programs. Only a very small percentage of other countries' satellites are military in nature.



Uses for Satellites

Approximately two-thirds of all active satellites are used for communications. Satellites for navigation, military surveillance, Earth observation and remote sensing, astrophysics and space physics, and Earth science and meteorology missions each comprise about five to seven percent of total satellites.



Satellite Orbits

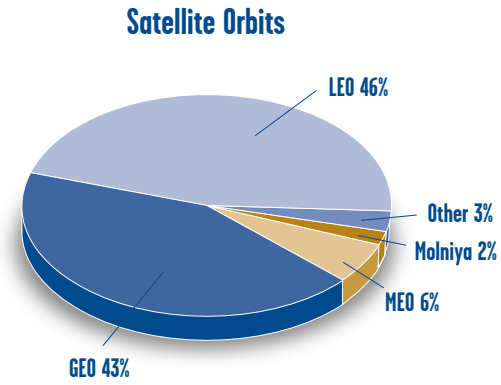
Satellites orbit Earth in several distinct regions of space:

Low Earth orbits (LEO)—about 80 kilometers (km) to 2000 km above Earth
Includes: military intelligence satellites, weather satellites

Geosynchronous orbits (GEO)—36,000 km above Earth
Includes: commercial and military communications satellites, satellites providing early warning of ballistic missile launch

Medium Earth orbits (MEO)—between LEO and GEO
Includes: navigation satellites (Navstar, Glonass)

Molniya orbit—a highly elliptical orbit with a 12-hour period
Includes: communication satellites for regions near the North Pole



Orbital Debris

Orbital debris is any human-made object in orbit that no longer serves a useful purpose, including discarded equipment, abandoned satellites, bolts and other hardware released during satellite deployment, and particles from explosions or collisions.

The table below gives current estimates of orbital debris in three size categories. As the table shows, approximately 40 percent of all orbital debris larger than one millimeter in size is in LEO. Large numbers of naturally occurring particles ("meteoroids") add to the total number of orbital objects less than one centimeter in size, but are not included in this table.

Estimates of Orbital Debris			
Average Size	**1 mm – 1 cm**	**1 cm – 10 cm**	**> 10 cm**
Pieces of LEO debris	140,000,000	180,000	9,700
Total pieces of debris	330,000,000	560,000	18,000

Source: Klinkrad, H. 2006. *Space debris: Models and risk analysis.* Berlin: Springer Praxis, 96.

For more information, contact David Wright or Laura Grego at (617) 547-5552 or Stephen Young at (202) 331-5429.
All charts in this fact sheet are based on data from the UCS Satellite Database (www.ucsusa.org/satellite_database) *unless otherwise noted.*

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