

FACT SHEET

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Space Security

Space Security is the secure and sustainable access to and use of space and the freedom of assets from space-based threats.

Space-based assets are rapidly becoming a critical part of our national and international infrastructure. From banking to satellite television, from search-and-rescue operations to weather forecasting, the world has become increasingly reliant on the benefits derived from space-based technologies. As our dependency on space assets has grown, so have legitimate concerns about the security of these assets, stimulating an important debate over the nature and direction of space security and how best to balance our civil, commercial and military uses of space. The key challenge is to maintain an environment in which peaceful applications continue to be used while keeping outer space from becoming a potential battlefield.

Concerns include:

The physical condition of the space environment: Some of the gravest threats to space security are environmental. Travelling at speeds of up to 7.8 km/s, each piece of space debris may destroy or severely disable a satellite upon impact. Each year, the number of objects in Earth orbit increases steadily. Today, the U.S. Department of Defense tracks more than 21,000 objects measuring at least 10cm in diameter. There are more than 300,00 objects with a diameter larger than 1cm.

The effectiveness of the legal space environment: The current regulatory framework is out of date and therefore insufficient to address current challenges to space security. Moreover, while recent negotiations have explored a range of non-binding governance tools, including principles, resolutions, confidence-building measures and guidelines, the establishment of a legally binding norm prohibiting the weaponization of space seems unlikely in the near future.

The continued growth in civil space programs and global utilities: Currently, there are more than 60 nations and consortia with assets in space and 10 countries with launch capabilities. The increased number of space-faring nations could enhance space security by encouraging international cooperation. A potentially negative impact is that space will become more crowded, thereby increasing the risk of accidental interference with space assets.

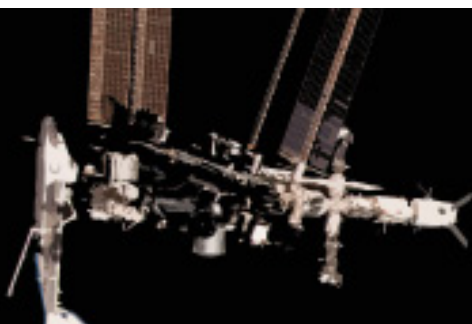
The users and operators of commercial space Assets: Commercial space revenues have steadily increased since the mid-1990's, with current annual revenues in excess of \$200-billion. Individual consumers are a growing source of demand for these services, particularly satellite television and personal GPS devices. Growth in the commercial space industry increases the pool of stakeholders with a direct interest in preserving space as a peaceful domain. However, if demand for space resources - such as orbital slots and radio frequencies - exceeds supply, the result could be friction among actors.

Space Support for terrestrial military operations: While U.S. dominance in space systems remains undisputed; the level of expenditures on multiuse space applications is increasing in other countries around the world. By the end of 2009, there were over 175 dedicated military satellites worldwide, of which the U.S. operated roughly half and Russia approximately one-quarter. In the absence of dedicated military satellites, many countries use their civilian satellites for military purposes. Given the growing reliance on military space systems, assets in space may increasingly be seen as strategic targets by adversaries.

Protection of Space Systems including their ground segments: Space security depends on the ability to detect, withstand and recover from attacks against space systems. The primary source of protection for satellites stems from the difficulties associated with launching an attack into space. Passive satellite protection measures also include system redundancy and interoperability, which have become a characteristic of satellite navigation systems. Nonetheless, physically protecting a satellite from a direct attack remains difficult. Also, because the vast majority of commercial space systems have only one operation centre and one ground station, ground components are particularly vulnerable to negation efforts.

Hostile interference with space systems: Ground segments, including command and control systems and communication links, remain the most vulnerable components of space systems. susceptible to attack by conventional military means, computer hacking and electronic jamming. The operations of some space systems can be compromised with relative ease by individuals, groups or governments, consequently reducing the security of space assets. Space surveillance capabilities for debris monitoring and transparency can also support satellite tracking for space negation purposes. The actual hostile use of a weapon against a space asset could result in a weapons race in space, thus considerably reducing space security.

Development of space-based strike capabilities: The majority of advanced, space-based strike-enabling technologies are dual-use and are developed through civil, commercial or military space programs. While there is no evidence to suggest that states are pursuing these enabling technologies intend to use them for space-based strike purposes, such developments do bring these actors technologically closer to this capability. Recently, the U.S. government seems to be voluntarily backing away from the pursuit of a space-based strike capability, which will have a positive impact on space security.



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