

Navigation

Navigation satellites were one of the earliest military applications of space technology, and among the most useful to military forces on earth.

Space-based navigation systems provide three-dimensional positioning data and a standard timing source to military, civil and commercial users worldwide. Precision navigation and timing provide targeting and geolocation information critical to coordinated and accurate force application by any platform in any medium.

The growing importance of space-based navigation systems to a variety of non-military needs such as civil aviation and emergency management has created the need for significant upgrades and modifications to this space constellation. Thus additional civil signals separate from military signals are being added to new generation navigational satellites. Plans are being formulated in the US to conduct an architecture study for the next generation satellite navigation system, capable of meeting military and civil needs through 2030.

Early warning

Space-based satellite systems perform ballistic missile warning functions. Ballistic missile warning satellites use infrared sensors to detect heat from a rocket's engine. The systems are used not only for early warning of missile attack but also to monitor missile launches to ensure compliance with arms control and weapon testing treaties. Certain systems are capable of detecting missile launches, space launches and nuclear detonations. The primary mission of such systems is to provide tactical warning and limited assessment of ballistic missile attack.

Meteorology

Weather satellites provide vital information to military forces allowing military aircraft to avoid bad weather and enabling ground forces to take advantage of breaks in cloud cover. Weather satellites provide continuous visual and infrared imagery of cloud cover over wide areas.

Direct Military Force Application in and from Outer Space

Ballistic Missiles

A ballistic missile (BM) is a missile that has a ballistic trajectory over most of its flight path, regardless of whether or not it is a weapon-delivery vehicle. Ballistic missiles are categorized according to their range, the maximum distance measured along the surface of the earth's ellipsoid from the point of launch of a ballistic missile to the point of impact of the last element of its payload. Various schemes are used by different countries to categorize the ranges of ballistic missiles.

Ballistic missile technology involves a vehicle which is propelled into outer space by rocket engines. During its propulsion, smaller portions of the missile, re-entry vehicles, detach themselves from the vehicle and then enter into a free-fall via the pull of gravitational forces to reach the ground or sea-level. The range covered by such missiles varies from intermediate (1,000-5,500 km) to intercontinental range (more than 5,500km). Missiles exist in different basing modes: fixed and mobile, and sea-launched. Military application of such missiles were first test-validated in the late 1950's and early 1960's, hence before the drafting of any multilateral space related treaty.

A considerable portion of a missile's flight time (as much as 80%) occurs in outer space and not within the atmosphere. Regardless, ballistic missiles are not recognized as being space