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Space Technologies - Series (2)

Today, part 2 - Space technologies are generally of dual-use

The term “dual-use” refers to a usage which is both of a civil and a military type. Due to their technical characteristics and unique possible applications, the majority of space technologies is dual use by nature.

The technologies required to manufacture sophisticated weapons, including nuclear weapons and ballistic missiles, are very similar if not identical to those used in developing a launch vehicle. Both use the same propulsion and propellant, they need similar navigation and guidance equipment and consist of one or more stages. Historically, the first launch vehicles were derived from intercontinental or medium-range ballistic missiles, designed to carry nuclear warheads. Sputnik 1 was launched in 1957 on board aRussian 8K71 rocket, a modified version of the R-7, the world's first ICBM. Explorer 1, the first satellite launched by the United States in outer space in 1958, was carried on a modified version of a PGM-19 Jupiter, the first nuclear tipped, medium-range ballistic missile of the United States Air Force.

However, the differing needs of space rockets and strategic missiles have caused the development of space launch vehicles and missiles to diverge. The dual-use character of spacecraft is generally not depending on their capacity to carry weapons, but on their potential end-user application and because single components may be deemed militarily sensitive Satellite services may be of great strategic advantage to military and intelligence operations. Communication satellites provide for wireless communication in battlefield situations, navigation satellites guide missiles to their targets and surveillance satellites deliver high resolution photos of enemy territory.

Suborbital spaceflight is important for national security as well (surveillance, verification of experimental systems).

Single components of a spacecraft with characteristics exceeding certain performance parameters may also be considered dual use. Typically, radiation hardened devices, ultra-high resolution image sensors or certain propulsion systems are considered as militarily sensitive. Ground support equipment can be used for military purposes as well. Delivery systems of nuclear warheads can be re-purposed as launch vehicles. Furthermore, certain technologies applied in spacecraft, including structural materials, communications equipment, avionics equipment and certain computers, also find use in nuclear weapons.