



Space Defense and Orbital Threats

Published on 01/05/2025

Space is now recognized as a potential theater for military operations. The United States has formalized this concept with the establishment of the Space Force, dedicated to protecting orbital assets and developing deterrence technologies and countermeasures. Recently, the X-37B Orbital Test Vehicle-7 (OTV-7) completed a 434-day mission, landing at Vandenberg Air Force Base on March 7, 2025, after experimenting with maneuvers in elliptical orbits and testing advanced autonomy systems. This reusable vehicle, managed by the Air Force Rapid Capabilities Office, demonstrates how the Pentagon aims for flexible platforms for long-term technological experiments.

Russia and China are not standing by: Moscow has conducted ASAT tests with electromagnetic pulses in low orbit, while Beijing has enhanced the Yaogan constellation for anti-ship radar surveillance. These actions highlight the unprecedented risk of “space war-gaming,” where a single ASAT test can generate thousands of dangerous debris.

Surveillance Technologies and Directed Energy Weapons

Hyperspectral satellites collect images in hundreds of spectral bands, identifying camouflaged materials, disguised vehicles, and logistical activities with centimeter precision. European and national companies (Leonardo, Thales Alenia Space) collaborate on developing payloads that integrate AI for onboard processing, reducing latency in generating tactical alerts.

Space Defense and Orbital Threats - brigatafolgore.net

Space Defense and Orbital Threats - brigatafolgore.net

Orbiting lasers and pulsed microwaves are the future of “soft-kill” space offense. Demonstrations like those conducted by Raytheon in terrestrial exercises show the ability to disrupt or damage electronic components of hostile satellites without physically destroying them. The advantages are numerous: few space debris, remote-controlled operations, and reduced resource consumption compared to kinetic missiles.

3. International Cooperation and European Projects

To avoid an uncontrolled space arms race, NATO has established the Combined Space Operations Center (CSpOC) and the Centre of Excellence for Space in Torrance, USA, to standardize collision avoidance procedures and data sharing. The EU has launched the IRIS² program, a dual-use civil-military constellation expected in orbit by 2027, which will provide secure communication services and continuous surveillance.

In Italy, the Ministry of Defense funds projects on lasers aboard high-altitude drones for DEW countermeasures and supports the development of advanced ground stations for hyperspectral data management. The synergy between industries (Leonardo, Avio) and universities aims to position the country at the center of defensive space technology supply chains.

News link: https://militarnyi.com/en/news/us-space-force-returned-x-37b-spacecraft-to-earth/?utm_source=chatgpt.com