

THE DEVELOPMENT OF THE CHINESE ANTI-SATELLITE WEAPON SYSTEM. ENVIRONMENTAL IMPLICATIONS AT INTERNATIONAL LEVEL

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***Abstract:** According to the official program of the NASA Orbital Residues in outer space, there are more than 35,000 hazardous pieces with diameter greater than one centimeter. Threats exposed after test ballistic missile contribute to a hazard that impede work satellites in low Earth orbit (LEO), including the International Space Station (ISS).*

***Keywords:** direct-ascent anti-satellite weapon, ASAT weapon testing, international security.*

1. Direct-ascent anti-satellite weapons

China engaged in the research and development of anti-satellite weapons (ASAT) since 1960. ASAT development is a component of a multidimensional program conceived for the limitation or the prevention of spatial activities use by potential adversaries during conflict periods. Chinese military planners followed closely the way that spatial activities gave the U.S. army the cyber domination on the battlefield during 1990-1991, Operation Desert Storm, in 1998 during the war from Kosovo and during Iraq invasion from 2003. During these operations, the satellites utility has been emphasized, together with the U.S. army dependence on them in the battlefield monitoring and control, communications, navigation and positioning.

The anti-satellite weapon system has been built in the view of engaging and destroying the enemy satellites, under the guidance of a terrestrial radar. This system has never been tested, but some of the components of this technology have been used and tested during the Shi Jian 2B satellite launching in 1981 [1].

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The research and development in the space field have been focused on spatial flights with human staff, antiballistic shield and ASAT technologies.

The directory components of the ASAT weapon system are fundamented on a low energy laser used for target pursue and illumination, a high energy laser beam generator and a mirror for the remote control of the powerful laser beam towards the target satellite.

2. ASAT weapon testing

On January 11, 2007, China performed an anti-satellite missile testing for the destruction of a Fengyun-1C meteo satellite of they own. The direct-ascent anti-satellite missile (ASAT) has been launched by a TEL missile launcher (mobile transporter-erector launcher) and obtained a real success in the destruction of the satellite at a distance of about 854 km to the terrestrial surface. The test was held in Sichuan Province, near the Chinese Xichang space center. The propellant launch destruction vehicle is a medium range ballistic missile Dong Feng-21, which runs on solid fuel with a maximum range of 2,700 km [2].

Anti-satellite missile tests contribute to the formation of cosmic residues that may remain in the cosmic orbit for a long period of time and can show a direct threat to other space activities. After the experiment has been released the largest amount of space debris containing over 1,335 pieces the size of a golf ball or larger [2].

According to the official program of the NASA Orbital Residues in outer space, there are more than 35,000 hazardous pieces with diameter greater than one centimeter. The analysis conducted by the Center for Space Standards and Innovation (CSSI) from Colorado, U.S., residual materials are spread from a height of 200 km and extending to 4,000 km [2], citing the serious dangers of many operational satellites.

Threats exposed after the test ballistic missile contribute to a hazard that impede work satellites in low Earth orbit (LEO), including the International Space Station (ISS). In Figure 1 are presented the path, green, of the International Space Station at the South Pole intersecting circle consisting of residual material and illustrated by the red link. Further, Figure 1 shows the residual material found on Earth orbit on July 9, 2007, highlighting the high level of cosmic debris resulting from China's ASAT test. It emphasizes the density debris cloud that

formed after the destruction of the Chinese satellite against the presence of other wastes into Earth orbit.

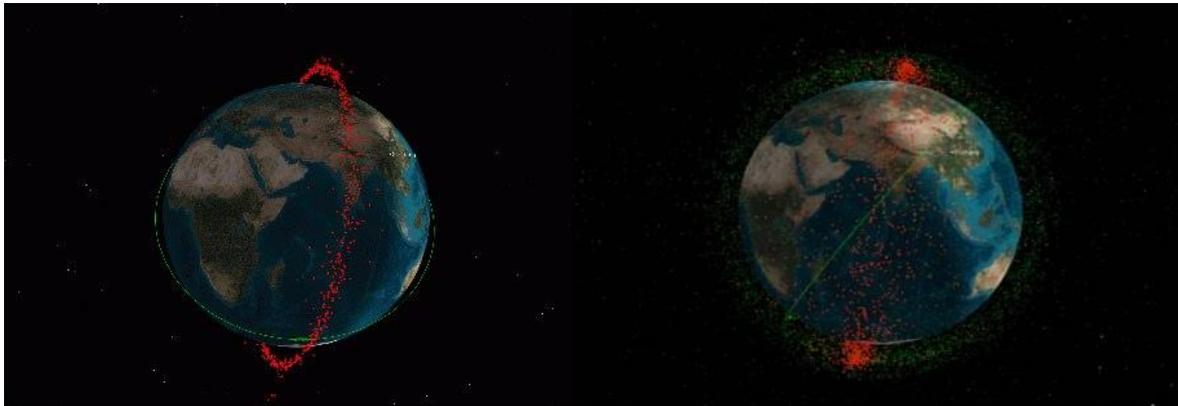


Figure 1. ISS trajectory and Cosmic wastes after Fengyun-1C satellite destruction [1]

In May 2013, China announced a suborbital space mission of testing from Xichang Satellite Launch Center. The engine used reached an altitude of 10,000 km, which released a cloud of barium sulphate for terrestrial optical observation. Although scientists have claimed that it was actually an anti-satellite test of a new engine with direct-ascent, Dong Neng 2, the Chinese have denied altogether [3]. Unlike SC-19 that was built to engage targets in low Earth orbit, DN-2 is built to destroy targets under high Earth orbit.

3. Impact on international security

Critical danger of space debris is the intentional destruction resultant. Such a satellite destruction by ASAT tests was conducted during the Cold War by the U.S. and the Soviet Union in the 1980s. Since then, neither the U.S. nor Russia have destroyed satellites in space, while many civilian and military satellites have been used by countries and companies.

In LEO (up to 2,000 km, or 1,242 miles altitude), recognition and weather satellites and manned space missions (including the International Space Station, space shuttle and China manned flights), are vulnerable to increased waste China's space action resulting from the destruction of the satellite. This debris threatens space assets in LEO.

China's test was at a LEO higher altitude and debris resulting are seen as a threat to space assets for more than 20 years. According to Air Force Space Command, the space debris increased the risk of collision for 700 spacecrafts. China CRS-3 Program development for ASAT weapons could constitute a risk to

military and intelligence U.S. satellites, needed for rapid military reaction or other operations.

China's future space war attention was also determined by considerations such as the potential conflict concerning Taiwan and the U.S. desire to deploy missile defense systems. These developments have not only strained Sino-U.S. relations, but also did so to see China as U.S. defense strategies target.

References

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