Four Satellite Shoot Down Myths

Errors in fact abound regarding the recent shoot down of a non-functioning spy satellite.

By Mark Stout

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Even before the Navy recently destroyed the satellite known as USA 193, an unappealing combination of misinformation, hype, distortion, and ignorance had begun to coagulate. Let's unpack four of the major myths surrounding the event.

First, anti-satellite (ASAT) activity is far from "unprecedented." Actually, satellites have been destroyed by man since the space age was about five years old.

The Starfish Prime event of 1962 was an effective, if imprecise, satellite killer. It entailed exploding a nuclear weapon about 250 miles above the earth's surface. This created electromagnetic pulse effects both near and far and left an artificial radiation belt that disabled satellites indiscriminately. While there are still nuclear explosions in space—we call them the Sun—nuclear weapons in space were soon treaty outlawed and dropped for more sophisticated ASAT ideas.

Included in the next ASAT generation were the kinetic satellite killers. One such version was the Soviet co-orbital ASAT system. Developed in the 1960s and employed until the 1980s, an intercepting satellite would be placed in a co-orbiting plane near the target satellite and would then explode, kinetically killing its target. This system made seven orbital interceptions and five subsequent detonations. ASATs continued to evolve with the US development of a direct ascent ASAT, which could be fired from an airborne platform. Direct ascent offered the potentially significant advantage of reducing the amount of time from ASAT launch until target destruction. Tested in 1985, this ASAT system destroyed a satellite about 350 miles above the earth. The January 2007 Chinese ASAT event and the USA 193 shoot down were both direct ascent weapons.

The second myth regards space debris. While kinetic satellite killers all create debris fields, not all debris fields are created equally. For example, the Chinese ASAT event created a massive polar-orbiting debris field about 530 miles above the earth. Much of this debris will remain a hazard for centuries to come. NASA estimates there are over 150,000 pieces of debris associated with this event, and 2,600 of the pieces are 10cm (about four inches, the approximate diameter of a softball) or larger. Because of the high speeds in space—about 17,000 miles per hour for a polar orbit—if a satellite is struck by a one pound piece of metal about the size of a

Snicker's Bar, it can provide an impact force of almost 30,000 tons. For comparison, the impact of being stuck by a Chevy Suburban traveling 70 mph is about 54 tons. Polar orbits are used for environmental monitoring and reconnaissance missions, and already, at least one NASA satellite has maneuvered to avoid the Chinese debris. Any maneuver requires a satellite to use its limited on-board fuel and affects its life-cycle.

The Navy shoot down of USA 193 was different than the Chinese effort on several fronts. First, as opposed to the Chinese ASAT, the USA 193 shoot down was preannounced and transparent. Second, due to the satellite's frozen hydrazine tank, there was a plausible, albeit small, public safety issue. Next, the satellite was technologically advanced, and destroying it would prevent its secrets from being revealed. Finally, the debris field created was close to the earth and its decay—the way it burns up as it falls to earth—would be rapid, measured in days and not in centuries.

The third myth regards the call by some for a meaningful, verifiable ban on space weapons. In actuality, the only weapons that threaten space today are ground, sea, or air based, not space based. Today's kinetic kill vehicles look like ICBMs, surface to air missiles, and space launch vehicles, and they won't be banned. So what's the biggest threat to our space systems? It's not kinetic kill vehicles per se, but the aforementioned space debris. Meanwhile, the last decade has seen a number of counter-space activities in the form of ground based jamming of communications and GPS signals, and ground based satellite lasing. Although space is a contested environment, man made threats don't start in space; they start here on earth.

The final myth is that United States has a big, scary interest in space based weapons. First off, space weapons aren't funded, and without some sort of preceding space "Pearl Harbor," the President would not ask for, nor would the Congress allow a space based weapons program. Next, just placing space weapons on orbit—let alone developing them—is cost prohibitive. In fact, putting anything in space is a stunningly expensive proposition. Figures vary widely, but in 2006, the RAND Corporation talked about driving launch costs to orbit *down* to $10,000 to $12,000 per pound. As mentioned, that doesn't even address the costs of developing, fielding, and sustaining space weapons. Finally, we know kinetic space based weapons do little to enhance our security. Those debris fields can be quite pesky, persistent, and difficult to manage.

Rather than space weapons, we'll add more value to our national security by building redundant and robust space systems, hardening new satellites, and especially, by creating the space situational awareness (SSA) system we currently lack. Although we generally know what is *in* space, SSA is needed to understand what's *going on in* space. The Air Force only has one space-based space-surveillance sensor, the Space-Based Visible Sensor, and it was launched in 1996. While useful, that sensor is not nearly enough. Earth based space observation systems are largely limited to counting space objects, observing their orbits, and ascertaining their size. These ground-up views are limited by look angles, location, weather, and time of day. Among other things, SSA should be able predict and then ascertain if a satellite is being attacked, and if it is, to attribute that event back to the perpetrator.

The US military loves space power as it provides an asymmetric advantage no one else can

touch. That's because space offers world-class intelligence, reconnaissance, and surveillance (ISR), secure communications, and it can turn Vietnam-era bombs into brilliant weapons. But this asymmetric strength becomes a weakness if not properly defended.

The greatest effect of the USA 193 shoot down wasn't killing the satellite itself. Rather, the greatest effect was in destroying a nearly sub-orbital projectile, something kind of like a ballistic missile. The USA 193 event looked a lot like missile defense, and it was done on a big stage with lots of bright lights. In dramatic fashion, everybody has seen—again—that missile defense works. As a consequence, many nation-states are going to want more. What the iPhone was to people everywhere, missile defense is to nations like Israel, South Korea, Japan, and Taiwan—and eventually will be to others. Viable missile defense also means clenched jaws in Russia, China, North Korea, and Iran. Let's see how they respond.

Mark Stout is a researcher and analyst at Air University's National Space Studies Center and sometimes posts at the blog Songs of Space and Nuclear War. *The opinions expressed here are those of the author alone and may not reflect the views and policies of the US Air Force or the Department of Defense.*