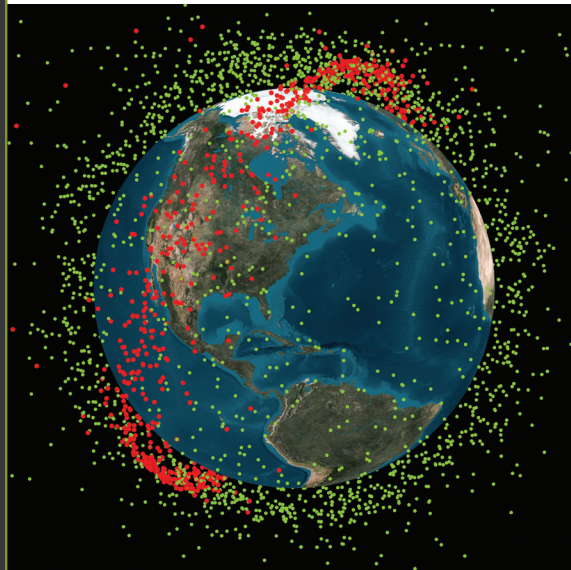


# InView

## Waste in SPACE



### China ASAT Test Swells Earth Orbit Debris Count

AT THE START OF 2007, APPROXIMATELY 7,000 PIECES of debris—from rocket bodies to a lost astronaut camera—littered Earth orbit. When China successfully launched an anti-satellite (ASAT) missile test against one of its aging polar-orbiting weather satellites—FENGYUN 1C—on January 11, 2007, nearly 1,700 pieces of debris large enough to be tracked (including the original payload) were added to the clutter. NASA's Orbital Debris Program Office estimates more than 35,000 pieces of debris larger than 1 cm from this event.

Dr. T.S. Kelso (shown above), senior research astrodynamacist for the Center for Space Standards & Innovation (CSSI), AGI's public research and educational outreach arm, has been closely following the growing debris field, and using AGI software to produce videos, high-resolution graphics, and interactive animations to explain the ASAT test's implications to scientific and non-scientific audiences alike. The graphics and animations are derived from information cataloged by the North American Aerospace Defense Command (NORAD) and released to the public via Space Track ([www.space-track.org](http://www.space-track.org)), operated by Air Force Space Command.

"The January 11 test is the largest debris-generating event in history, far surpassing the previous record set in 1996 when an exploded Pegasus rocket body produced 713 pieces," Kelso says. Further raising concern, the polar orbit of the debris field, which ranges from below 200 km in altitude

up to almost 4,000 km, poses a threat to many operational satellites. CSSI's SOCRATES—Satellite Orbital Conjunction Reports Assessing Threatening Encounters in Space—a service for the satellite operator community that posts the top 10 conjunctions by maximum probability and minimum range, has seen an increased number of possible conjunctions since the ASAT test. "We are now routinely seeing more than 2,000 conjunctions within 5 km over a seven-day period between the FENGYUN 1C debris and payloads in Earth orbit," Kelso says. Analysis of the total number of satellites affected is available on CelesTrak, a Web site managed by Kelso that is dedicated to tracking space objects and monitoring them for in-orbit collisions.

Ultimately, much of the ASAT debris will decay, but not for a very long time. Kelso's analysis has shown that only 5 percent of the 1,700 pieces of debris will decay within the first 10 years and almost 85 percent of it will still be on orbit a century after the event. "We must do more to avoid generating debris in Earth orbit and find ways to mitigate the impact of what's already up there on operational spacecraft," Kelso says.

Kelso's research, CelesTrak, and SOCRATES are all available at [www.centerforspace.com](http://www.centerforspace.com). Additionally, Kelso presented his findings at the Forum on National Security Space: *Examining Codes and Rules for Space* on June 27 and will share his work at the 8th annual AMOS Conference, September 12-15, Maui, Hawaii. ▲

ORIGINAL ARTICLE  
PRINTED JULY 2007



To subscribe to *InView*  
or read past issues, visit  
[www.agi.com/InView](http://www.agi.com/InView)

ANALYTICAL GRAPHICS, INC.  
220 VALLEY CREEK BLVD.  
EXTON, PA 19341

