

Man-made debris in orbit poses a hazard and must be tracked.

Space Junk

By Suzann Chapman, Associate Editor

TODAY, more than 8,000 man-made items circle the globe in space. Only some seven percent of these space objects are active satellites. The remainder, called debris, comprises inactive satellites, spent rocket bodies, and pieces that have broken off from spacecraft. Much of the debris reenters the atmosphere and burns up. Some falls back to Earth. Other debris can and does strike satellites and space shuttles.

Dots shown here are not drawn to scale. In this rendering, each appears to be about the size of Rhode Island. US space surveillance units currently track 8,168 space objects that range in size from that of a baseball to the Mir space station. An inactive satellite can weigh several tons, while pieces of rocket bodies may weigh only ten pounds. Smaller fragments about the size of paint chips have nicked windows on the space shuttle but are too small to track with present-day sensors.

The US started tracking satellites and debris in 1957, when the USSR launched Sputnik 1. Since then, the US Space Surveillance Network (SSN), now numbering twenty sites around the world, has tracked more than 23,700 space objects.

Eighty-four percent of space debris can be found approximately 800 kilometers out, well beyond the space shuttle's orbit of 300 kilometers above Earth, according to US Space Command officials. Under current conditions, they say, the shuttle is likely to collide with a significant piece of debris no more than once in 10,000 years.

Nevertheless, USSPACECOM's Space Control Center (SCC), Cheyenne Mountain AS, Colo., uses powerful computers to process 70,000 observations of space objects daily. Air Force Space Command's 1st Com-



This electronic image of the "junk" orbiting Earth looks dense enough to adversely affect navigation, if not to prevent the launch of anything new. The US Space Surveillance Network tracks and catalogs the debris daily, notifying NASA, other agencies, and foreign nations about potential problems.

mand and Control Squadron, located within the SCC, compiles and analyzes the data, creating a running catalog.

During space shuttle missions, the SCC and the squadron calculate the possibility of objects in orbit passing close to the shuttle's planned flight path. The center notifies NASA about any space debris that may come within twenty-five kilometers of the shuttle. The catalog also provides data for collision avoidance as new satellites are launched.

The cataloging process also ensures that the US and other countries don't mistake falling debris for evidence of an unfolding missile attack. To missile-

warning radars, space debris returning through Earth's atmosphere gives the appearance of a live reentry vehicle. By knowing where each significant piece is, and by predicting its fall, USSPACECOM can provide data to prevent a false alarm in missile-attack warning sensors of the US and other countries.

The lion's share of the space surveillance work load falls to the forty-six-member 1st Command and Control Squadron, which manages the tracking duties of USAF's twenty worldwide SSN radar and sensor sites. It maintains positional data on more than 97.3 percent of the man-made objects in orbit. ■