

ORBITER

The Aerospace Corporation, El Segundo, Calif., July 3, 2002, Vol. 42, No. 12



Dr. Bill Ailor, center, joins other CORDS team members in front of a 570-pound stainless steel fuel tank that returned to Earth nine months after it was launched into space. The tank is on display at the El Segundo offices. From left are Dr. Richard Baker, Dr. Michael Weaver, Dr. Chung-Chu (C.C.) Wan, Ailor, Alice “Frankie” Shelton of Space and Missile Systems Center, and Dr. Russ Patera.

Black box to give clues about space debris

What goes up must come down. When it comes to satellites and other objects launched into space it's hard to think of them returning to Earth. Don't they just stay up there forever?

Some do and some don't.

“It's a mind-opening concept. We tend not to think of these spacecraft or portions of them coming back to Earth,” says Dr. Bill Ailor, director of the Center for Orbital and Reentry Debris Studies (CORDS). “It's such a different perspective,” he adds.

Ailor and others working for CORDS are dedicated to researching, tracking, and analyzing spacecraft in orbit as well as the pieces that fall back to Earth once these same spacecraft have completed their lifecycles in space.

To get a better handle on just where this “space junk,” as Ailor calls it, is going to land, the team at

Aerospace is working with the Space and Missile Systems Center on developing a black box similar to the flight data recorders found on commercial aircraft.

The black box, when installed on a launch vehicle or its payload, will be able to provide researchers information about changes in material temperatures and loads on the spacecraft during reentry.

It will also provide information helpful in determining the area or “footprint” where the space debris is predicted to land following reentry. Surviving pieces of varying sizes can be spread over hundreds of miles. Many factors, including atmospheric conditions and the aerodynamic characteristics of the object, influence the footprint's location.

“Data gathered from a black box could also help us design spacecraft components out of materials

so that they survive reentry and then just melt away,” explains Ailor.

Aluminum, for example, has a low melting temperature and is reduced to small droplets by the extremely high temperatures, he says. Data obtained using a black box could provide clues as to how changes in materials and construction might prevent large pieces from littering the planet on reentry.

Are there rules governing space debris ownership? Yes, Ailor says.

“A number of countries have entered into an agreement calling for space debris to be returned to the launching country,” he says.

For more information on CORDS, including predictions on upcoming reentries, visit the CORDS Web site at <http://www.aero.org/cords>.