Visual System for Browsing, Analysis, and Retrieval of Data (ViSBARD)

Goddard Space Flight Center, Greenbelt, Maryland

ViSBARD software provides a way of visualizing multiple vector and scalar quantities as measured by many spacecraft at once. The data are displayed three-dimensionally along the orbits that may be shown either as connected lines or as points. The data display allows the rapid determination of vector configurations, correlations among many measurements at multiple points, and global relationships. Things such as vector field rotations and dozens of simultaneous variables are very difficult to see in (complementary) panel plot representations.

The current and next generations of space physics missions require a means to display from tens to hundreds of time series of data in such a way that the mind can comprehend them for the purposes of browsing data, retrieving them in directly useful form, and analyzing them in a global context. Sets of many spacecraft, each carrying many instruments yielding nearly continuous data at high time resolution, have become one of the most effective ways to make progress in understanding the extended, ionized (plasma) atmosphere of the Earth and the Sun. For large collections of data to be effective, they must be extremely readily accessible, with simple, comprehensible overviews of what is available. ViSBARD provides a means to answer these concerns.

The ViSBARD package also acts as a remote repository browser; an interface to a Virtual Observatory. Therefore, data can be pulled directly into the application, as opposed to searching for it and downloading separately.

This work was done by Aaron Roberts and Ryan Boller of Goddard Space Flight Center, and Carl Cornwell of Aquilent, Inc. Further information is contained in a TSP (see page 1). GSC-15744-1

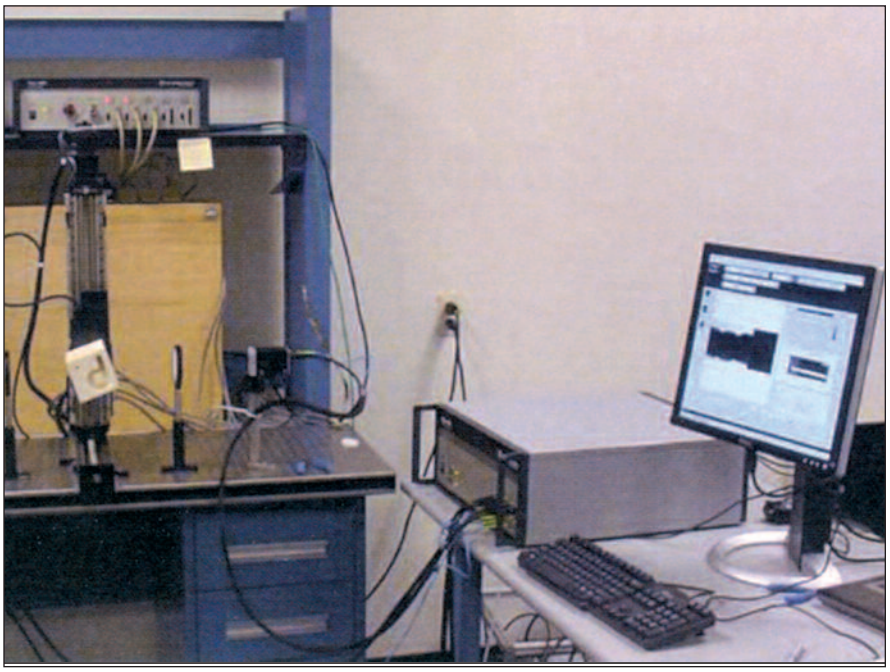
Time-Domain Terahertz Computed Axial Tomography NDE System

3D terahertz tomography can characterize aging, durability, and flaw conditions in materials for thermal protection systems and composite overwrap pressure vessels.

John H. Glenn Research Center, Cleveland, Ohio

NASA has identified the need for advanced non-destructive evaluation (NDE) methods to characterize aging and durability in aircraft materials to improve the safety of the nation's airline fleet. 3D THz tomography can play a major role in detection and characterization of flaws and degradation in aircraft materials, including Kevlar-based composites and Kevlar and Zylon fabric covers for soft-shell fan containment where aging and durability issues are critical.

A prototype computed tomography (CT) time-domain (TD) THz imaging system has been used to generate 3D images of several test objects including a TUFI tile (a thermal protection system tile used on the Space Shuttle and possibly the Orion or similar capsules). This TUFI tile had simulated impact damage that was located and the depth of damage determined. The CT motion control gantry was designed and constructed, and then integrated with a T-Ray 4000® control unit



The **CT TD-THz System** testbed with the gantry (left) and TD-THz control unit (right).