SRTM Mission

When the Space Shuttle Endeavour was launched into space on February 11, 2000, it carried on board a 60 meter long extendable mast and two radar antennas, one of which was mounted at the end of the mast. Over the course of 11 days scientists at the German Aerospace Center (DLR) used it to generate a three-dimensional elevation model of large parts of the earth. DLR now makes these data available free of charge to scientists.

Even the configuration of the experiment set a record: the mast, which was extended out from the shuttle bay during the flight, was at the time the longest manmade object in space. While the shuttle hovered over the surface of the earth, a transmitter-receiver in the cargo bay sent radar beams to Earth. When reflected back to the shuttle they were received and recorded both by this equipment and by the antenna at the end of the mast. The radar images thus depicted the earth's surface from two different viewing positions, which allowed the scientists at DLR's German Remote Sensing Data Center (DFD) to calculate a precise elevation model of the surface of the earth. "For the first time, this gave us a data set of uniform quality worldwide," explained DFD director Stefan Dech. When the shuttle landed on February 22, 2000 at Kennedy Space Center in the USA, DLR had measured 113 million square kilometers of the earth's surface from an altitude of about 230 kilometers, providing the basis for a "map for the 21st century," as it was then called.

Thanks to radar technology the scientists could record Earth's elevation data during the Shuttle Radar Topography Mission (SRTM) independently of time of day and weather conditions. Endeavour's orbit determined which areas could be measured with the radar signals. The data from the SRTM mission depicted areas between the 60° north and 57° south latitudes. For this reason such places as the poles were out of view. While NASA recorded the entire land surface with its radar system at an altitude precision of +/- ten meters, DLR generated for a smaller land area an elevation model with a precision of +/- six meters. "The accuracy of these global elevation models remains unbeaten to the present day," stressed Dech. Accordingly, many scientists continue to rely on these 11-year-old data sets.

But the Shuttle Radar Topography Mission was not only a milestone for precise recording of Earth from space: It was also a precursor and thus a test for today's TanDEM-X mission, in which DLR participates. In this mission, two structurally identical German radar satellites overfly the earth and scan it strip for strip with radar beams in order to record by 2013 a data set for a comprehensive digital elevation model of even higher accuracy.

The digital elevation model from the SRTM mission has a grid resolution of 25 meters and can be downloaded free of charge. The data can be accessed via an EOWEB order, whereby the entire area of the elevation model has been scaled to one hundred segments, called "tiles," for which scientists at the German Remote Sensing Data Center (DFD) have produced elevation models. Registered EOWEB users can download these data sets from a separate FTP server. Via a standardized Web Mapping Service (WMS) SRTM data can also be incorporated directly online into digital maps or geographical information systems.