

The Shuttle Radar Topography Mission:
Fulfilling a Decades Old Promise of Global High Resolution Topographic Measurements

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The Shuttle Radar Topography Mission (SRTM) was joint National Aeronautics and Space Administration (NASA) and National Geospatial Agency (NGA) mission to generate the first high resolution global topographic map of the Earth's surface. SRTM consisted of a modified version of the NASA/JPL SIR-C C-band and X-band radars flown on the shuttle in 1994 that was equipped with an additional antenna deployed on a 60 m boom to make a radar interferometer capable of generating topographic maps. Additionally, the system included sophisticated position and attitude sensors and a metrology system capable of tracking the motion of the boom to millimeter accuracy. The shuttle was flown in February 2000 that during its eleven day mission collected covering 99.97% of the Earth's landmass between -57° and 60° latitude. Data collected during the mission was delivered to the Jet Propulsion Laboratory where imagery and height data has been processed into highest resolution global topographic map of the world ever generated that exceeded the mission requirements by a factor of two. This talk will discuss the basic scientific principles of radar interferometry, SRTM mission design, instrument calibration, data processing and accuracy of the delivered products.

This research was conducted at the Jet Propulsion Laboratory, California Institute of Technology, under contract with National Aeronautics and Space Administration.

Dr. Scott Hensley received his BS degrees in Mathematics and Physics from the University of California at Irvine. He received a Ph.D. in Mathematics from the State University of New York at Stony Brook where he specialized in the study of differential geometry. Subsequent to graduating, Dr. Hensley worked at Hughes Aircraft Company on a variety of radar systems, including the Magellan radar. In 1992, Dr. Hensley joined the staff of the Jet Propulsion Laboratory where he studies advanced radar techniques for geophysical applications. His research has involved using both stereo and interferometric data acquired by the Magellan spacecraft at Venus. Dr. Hensley has worked with ERS-1, JERS-1 and SIR-C data for differential interferometry studies of earthquakes and volcanoes. He was the GeoSAR Chief Scientist and led the processor development team for the Shuttle Radar Topography Mission. He is currently the principal investigator on a NASA Instrument Incubator to develop a repeat pass radar interferometry capability on a UAV aircraft and a co-investigator on a NASA Carbon cycle investigation using radar to infer vegetation canopy parameters.