Shuttle Radar Topography Mission

This research was carried out at the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.
Mission Overview

Launch
Feb 11, 2000 - STS99

12 Tbytes data recorded on-board on 330 tape cassettes

225 km C-band interferometric swaths map all landmass between ±60° latitude at least twice

Data returned with Shuttle to Ground Data Processing Facility

Digital elevation data delivered in 1°x1° mosaiced cells

NIMA data validation, editing and distribution to military users

EDC for public distribution

Three year processing
SRTM Patch Processing Example

- Burst Interferogram Brightness Images
- Burst Interferogram Phase Images

Patch Interferogram Brightness Images
Patch Interferogram Phase Images

Uncalibrated Strips

Beam 1
80 km
225 km
Motion compensation is required to account for boom dynamics as well as shuttle attitude changes. Left uncompensated these motions would generate hundreds of meters of height error.
Kinematic GPS

Fit Mean = 0.76 m

Mean = 0.71 m

Fit $\sigma$ = 3.09 m

$\sigma$ = 3.35 m

90% CL = 5.31 m

$dN/dE$ (m$^{-1}$)

Height Error (m)
SRTM Performance Summary

- Based on over hundreds of millions of comparisons, SRTM has an absolute height accuracy of 9.0m or better over a 1°x1° cell, at the 90% confidence level.

- Using the kinematic GPS data, probably the best ground truth data available, SRTM meets the absolute height requirement by a factor of 3.

- Both the absolute and relative SRTM height accuracy requirements are met.

- Using the kinematic GPS data, SRTM’s horizontal accuracy is better than 10 meters and we believe the results are consistent with no horizontal offset.

- Both the absolute and relative SRTM horizontal accuracy requirements are met.
SRTM Global Production
Continent by Continent*

* “Continent” defined by processing convention, not geography.
SRTM Look at Central America
SRTM Resolution Improvement

Lake Balbina, Brazil