

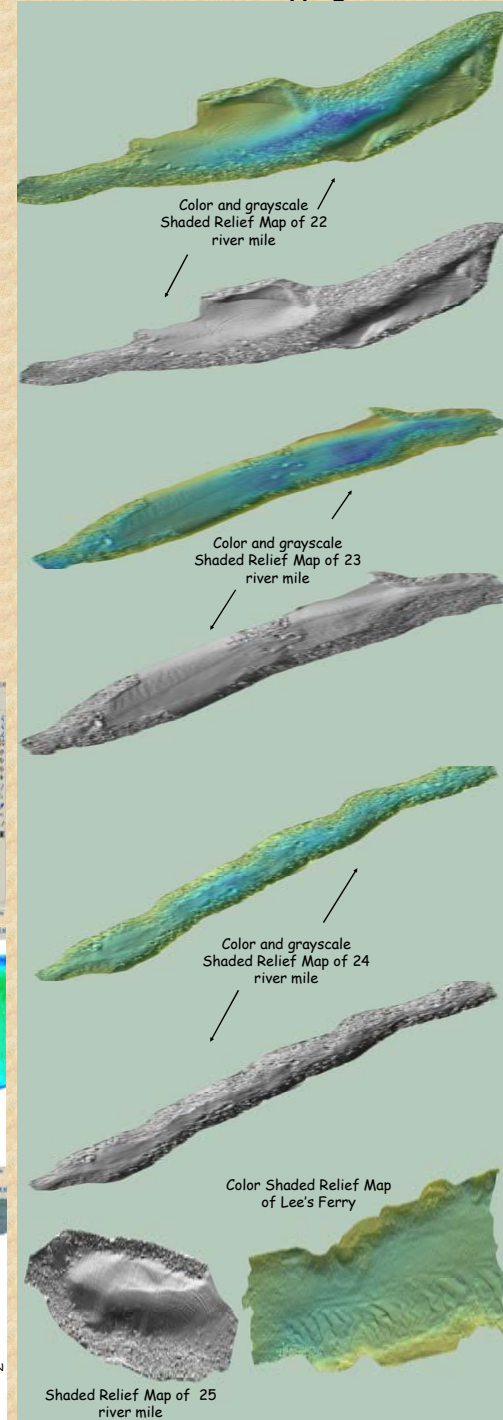
Multibeam Hydrographic Mapping Technology Used on the Colorado River Channel In Grand Canyon

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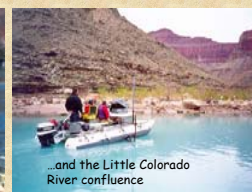


GCMRC, SURVEY
DEPARTMENT

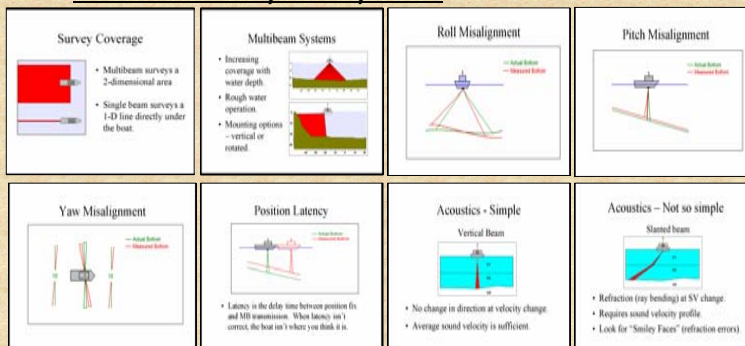
Multibeam Final Mapping Products



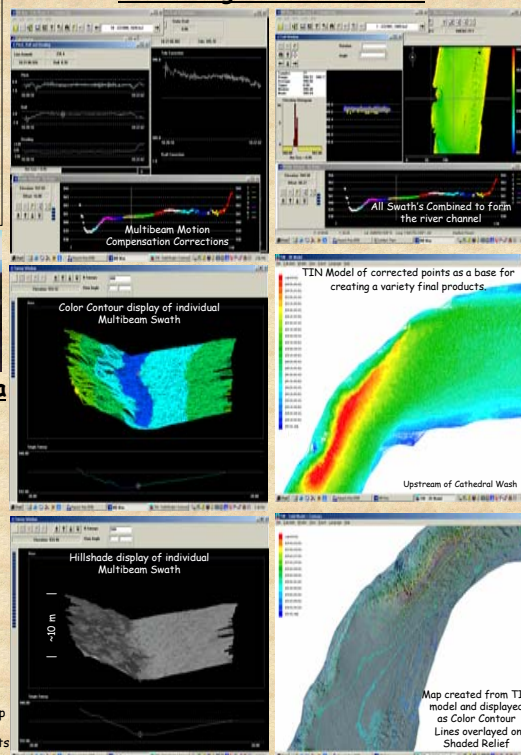
Collecting Multibeam Data



Multibeam Theory and Dynamics



Processing Multibeam Data



Introduction:

In 1999 GCMRC survey department began development of a multibeam hydrographic mapping system to facilitate all monitoring efforts requiring sub-aqueous measurements. Hydrographic data collection methods were designed to acquire monitoring products such as:

- * Topographic maps
- * Triangulated Irregular Network models (TIN)
- * Aquatic habitat models
- * Sediment aggregation and degradation
- * Hydrologic stage discharge modeling
- * Cross-section analysis



Purpose:

Hydrographic technology is used in the Grand Canyon primarily to measure changes in the river channel. The primary changes that occur are due to the movement of sediment.



These changes are monitored by hydro-acoustic measurements that are accurately positioned over the course of the river channel.

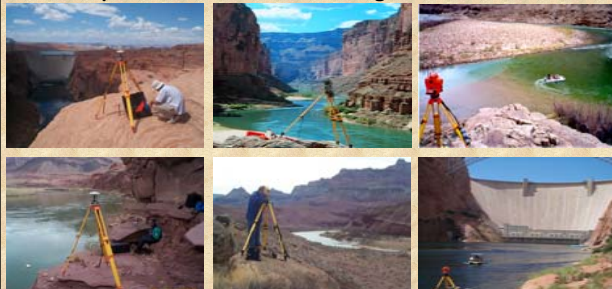


Objectives:

One of the GCMRC Survey Department objectives is to produce a channel map of the entire river in the Grand Canyon within a 5-year period. Multibeam technology is the only method currently available with sufficient productivity to accomplish the channel mapping objectives. This technology offers a swath coverage that results in a high resolution mapping product. Multibeam systems require extremely accurate positioning and motion compensation to successfully map the river bottom. A robotic total station tracking system is used to accomplish the positioning.



Summary of Accurate Positioning for Multibeam Data



1. GPS Control Network transfers accurate positioning from rim points to selected points along the river.
2. Conventional Measurements transfer accurate positioning to strategically located control points.
3. Positioning instruments are set up on accurately positioned control points and robotically track the boats position.