

## FAQS

### *What is LIDAR?*

LIDAR - Light Detection and Ranging is an integration of airborne laser and global position system (GPS) technology. Laser pulses are directed at the earth's surface (early spring or late fall) from equipment aboard an aircraft flying a predetermined grid over an area of interest. The laser reflections are recorded and the range is calculated from the instrument's orientation in space and the time required for the laser's light reflection to travel back to the aircraft.

### *How accurate is the elevation information collected using LIDAR technologies?*

At a minimum, RRBMI LIDAR data must attain a specified 15cm Root Mean Square Error (RMSE<sub>(z)</sub>). RMSE is a measure of total error. Engineer's reports detailing accuracy of these data can be found online <http://www.internationalwaterinstitute.org/lidar.htm>

### *How much data is being collected?*

The project team estimates roughly 53 billion data points have been collected resulting in a total digital file space of roughly 6 terabytes.

### *Where can I access these RRBMI LiDAR Data and create elevation map products?*

An online viewer and data download portal have been created that allow anyone to access and view the LiDAR data and derived products (i.e. 2-foot contours) and generate maps of a selected location. The web pages can be found at: <http://gis.rrbdin.org/lidarapps.htm>.

## FUNDING PARTNERS

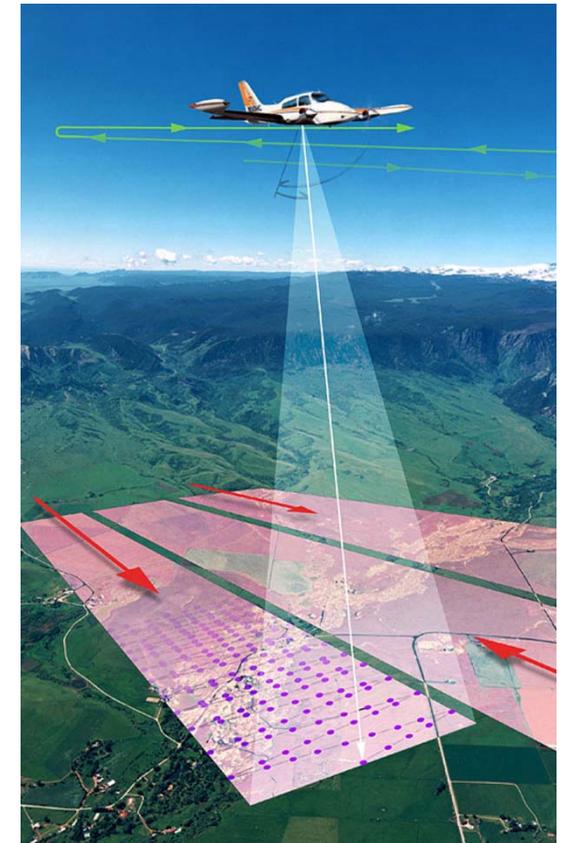
- US Geological Survey
- US Natural Resources Conservation Service (North Dakota)
- US Army Corps of Engineers
- ND Red River Joint Water Resources Board
- MN Red River Watershed Management Board
- MN Buffalo-Red Watershed District
- Southeast Cass Joint Water Resources District
- State of North Dakota
- State of Minnesota
- MN Department of Transportation
- City of Fargo, ND
- City of Moorhead, MN
- City of Breckenridge, MN
- City of Wahpeton, ND
- City of East Grand Forks, MN
- City of Grand Forks, ND

## PROJECT TEAM



## RED RIVER BASIN MAPPING INITIATIVE

### “REDEFINING THE LANDSCAPE”



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# BASIN MAPPING INITIATIVE

Project goal: to develop and publicly deliver a seamless highly accurate digital elevation map of the entire Red River Basin (RRB).

The unique geography of the RRB compromises the usefulness of standard national coverage topographic data sets (i.e. United States Geological Survey Quadrangle Maps) and their application to the decision-making process in the region. High-resolution topography has numerous public and private applications and is essential to developing disaster resiliency – our ability to predict, understand, and respond to disasters. Accurate topographical information greatly enhance the ability of decision makers and resource managers to make equitable and defensible decisions and provides the foundation for developing innovative and truly effective resource management strategies.

## PROJECT SPECIFICATIONS

The project scope included the entire U.S. portion of the RRB (including the Devils Lake Basin) and selected county add-on areas in MN. The approach maximized the economy of size benefits and resulted in consistent end products because the collect established one specification standard and used the same LIDAR sensors and platforms.

Data were collected to US Federal Emergency Management Agency flood plain mapping standards. The International Water Institute served as project manager and was responsible for securing and coordinating funding from federal and non-federal partners, ensuring data specifications are met, and contracting with the private firm selected to collect the data.

Project deliverables included:

- Raw classified data (< 15cm RMSE)

- Filtered bare earth data (< 15cm RMSE)
- 1 meter bare earth digital elevation model (< 15cm RMSE)
- Third party quality assurance of data accuracy
  - Engineers validation report
- 0.5 meter GSD ortho-imagery (Phase 1 area)
- An open web-based data archival, management, and distribution system <http://gis.rrbdin.org/lidarapps.htm>.
- Public outreach and education

## PROJECT BENEFITS

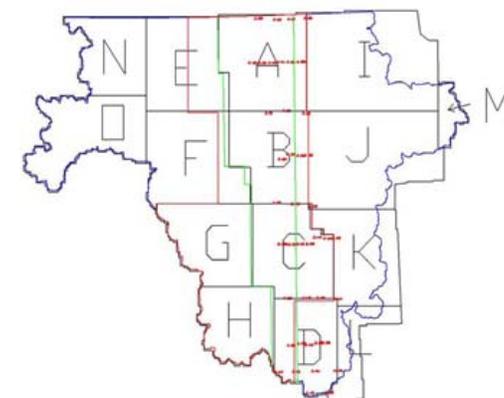
Benefits for resource managers, decision-makers, and residents of the RRB are profound; and will enhance resiliency, capacity, performance, and efficiency at every level of decision-making in each jurisdiction. Known benefits from highly accurate elevation data include:

- More accurate flood plain maps
  - Flood damage mitigation
  - Increased flood and drought resiliency
- Targeted restoration activities
- Enhanced planning and project development
  - Transportation infrastructure
  - Land use management
  - Human development
- Detailed surface hydrologic and hydraulic modeling
- More efficient/equitable natural resources management
- Innovative tools for conflict resolution
- Problem identification
- Increased agricultural productivity
- Credible flood damage and natural resource enhancement project site selection criteria
  - Enhanced project evaluation tools
- Major cost reduction in all civic projects

Future applications using high resolution topographic data are boundless and limited only by our ability to comprehend how these data will eventually be integrated with new technologies and used to make decisions that enhance the lives of RRB residents.

## PROJECT COST

Total Project Cost: \$5.0 million (50/50 non-federal/federal cost sharing).



## NEXT STEPS

The Institute is working with local partners and the US Corps of Engineers through a Watershed Feasibility Study authorization. LiDAR flight operations/data collection was completed in 2009.

The Institute is currently developing an online decision support system (DSS) for the general public and local and regional water managers that will rely heavily on these LiDAR elevation data. Tools being developed include a flood storage project permit evaluation tool and expanding the Fargo/Moorhead Flood Forecast Display Tool. These new DSS tools will be part of a more comprehensive effort to develop the next generation Red River Basin Decision Information Network <http://www.rrbdin.org/>.