IIC TECHNOLOGIES

Bathy Lidar Survey for the Panama Canal

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IIC Technologies Inc.

OVERVIEW

IIC TECHNOLOGIES

- Description of Panama Canal Hydrographic Operations
- Project Motivation and Description
- Challenges and Solutions
- Results

DESCRIPTION OF PANAMA CANAL AND HYDROGRAPHIC OPERATIONS

The Panama Canal

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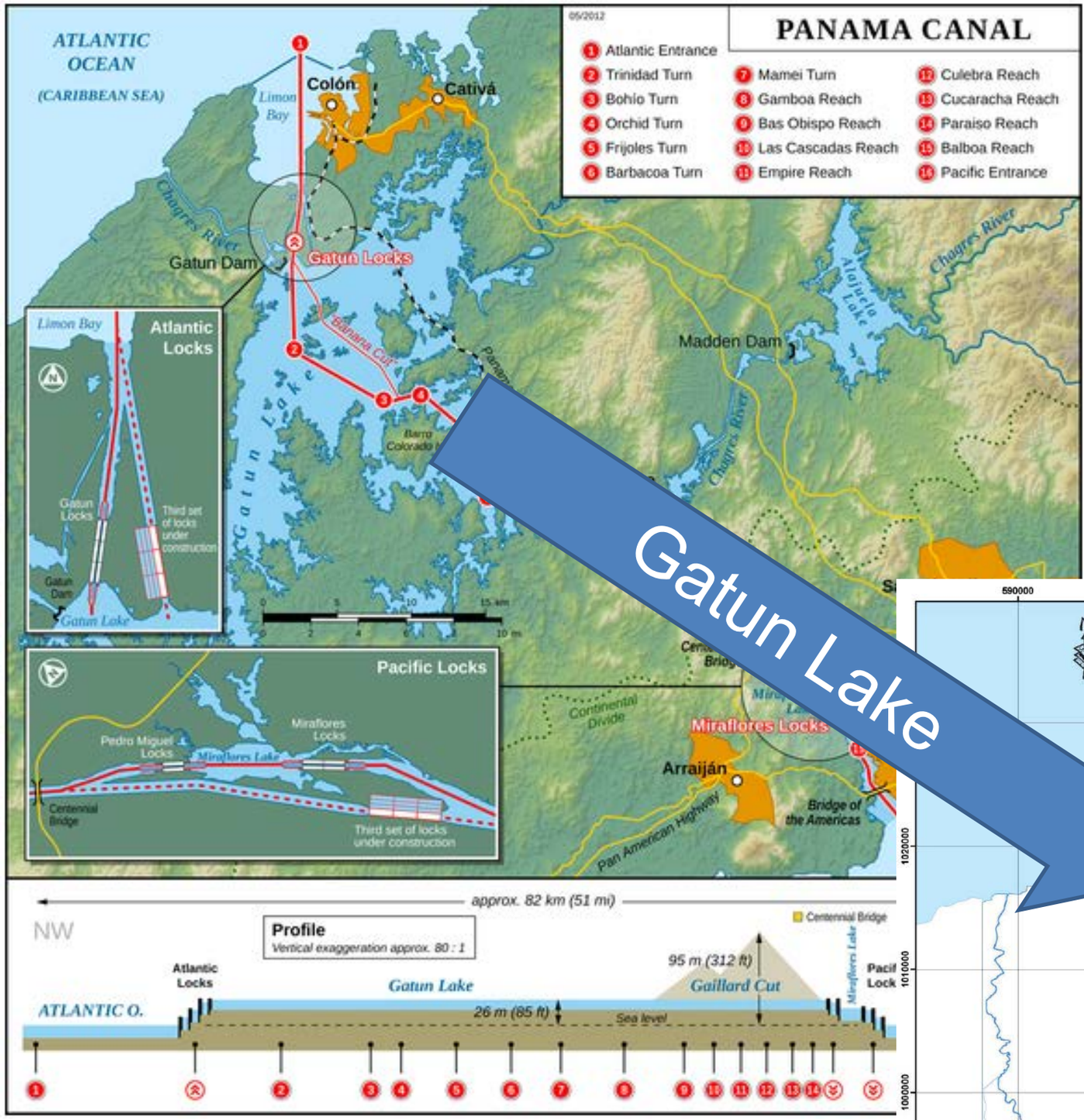
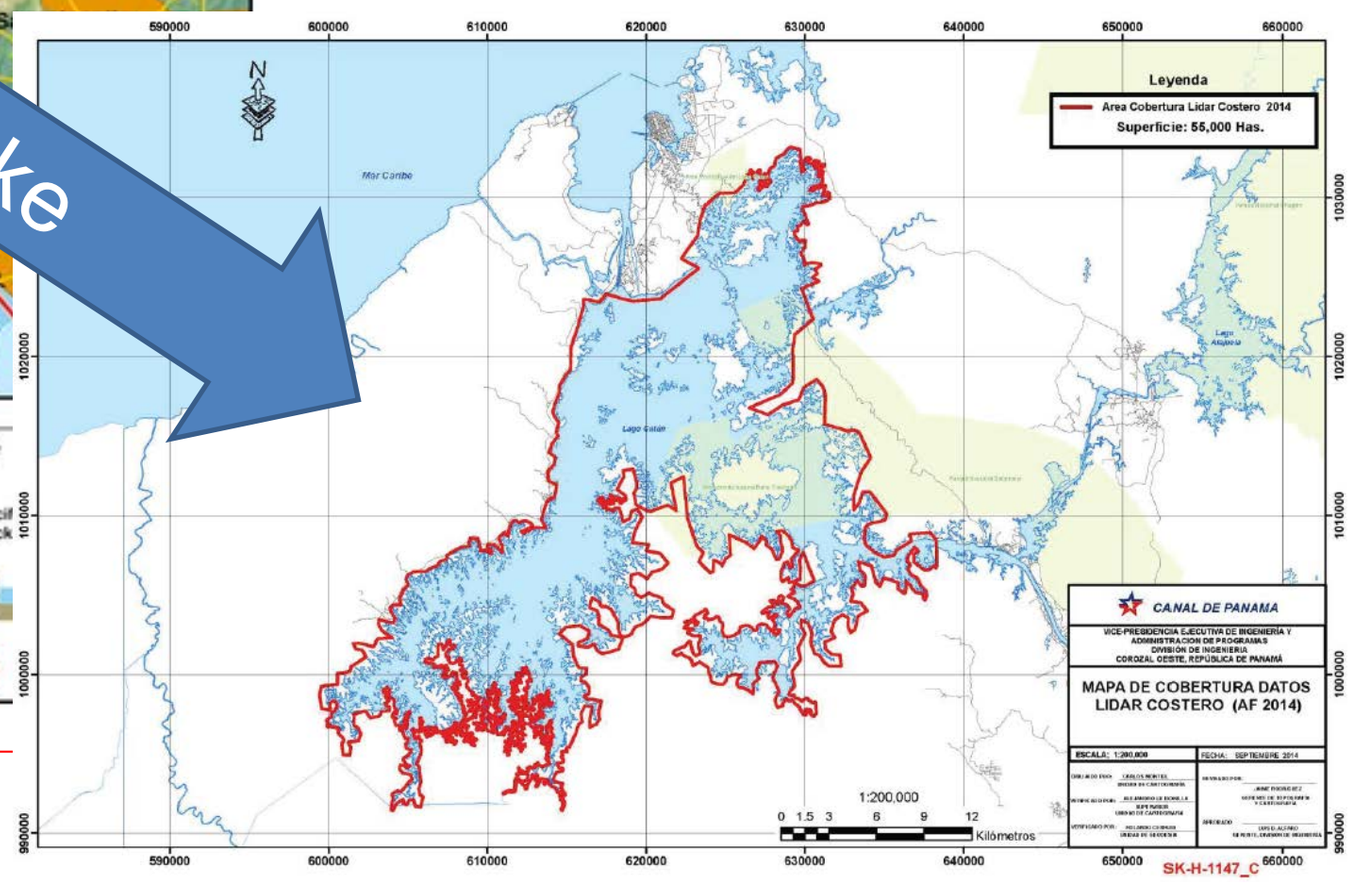


Gatun Lake

77 km long
14,702 ships in 2008

Man made
33 km of Panama Canal
Elevation 26m



Gatun Lake

Busy

Vast

Hydrographic Operations

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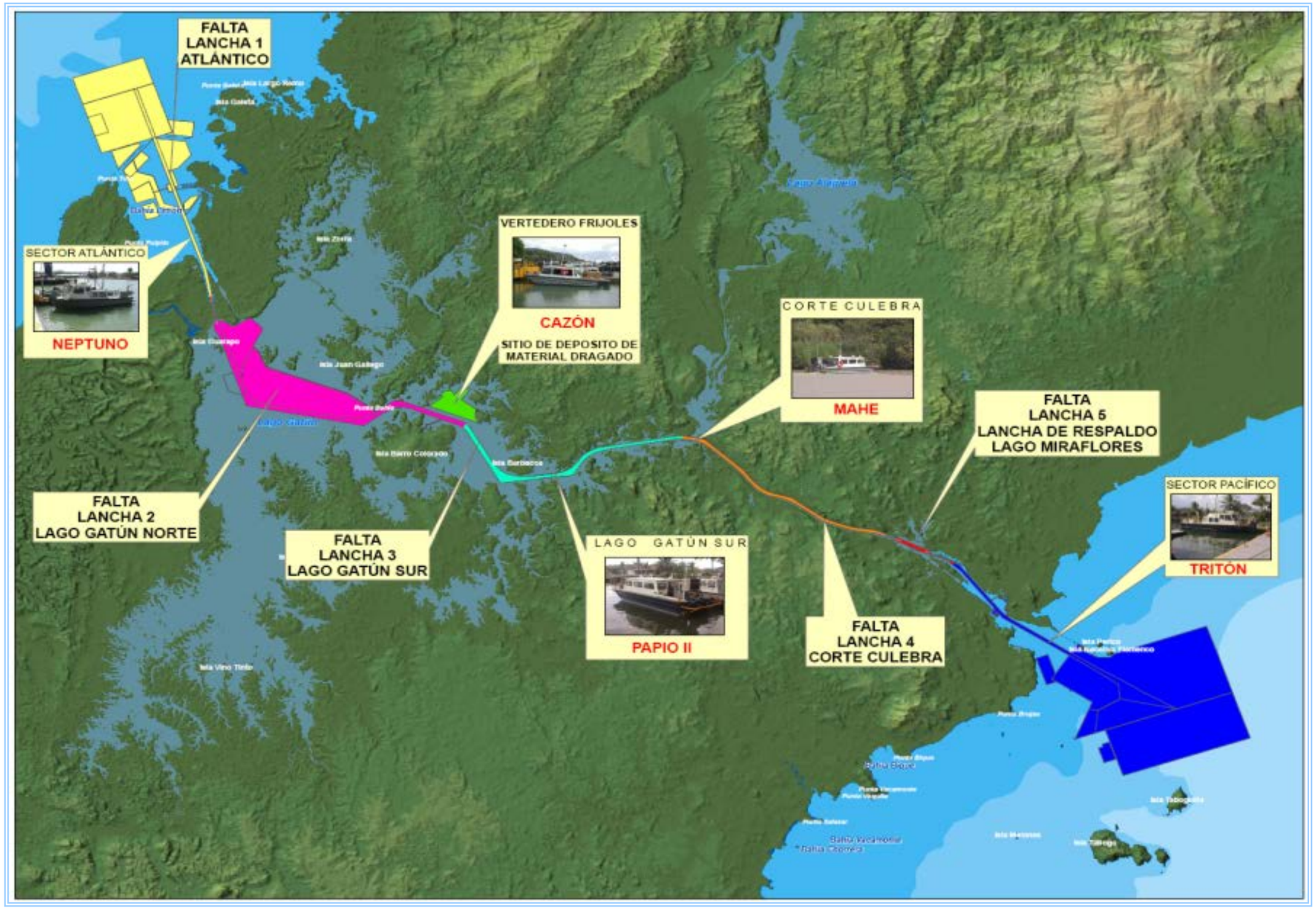

PROJECT MOTIVATION AND DESCRIPTION

Project Motivation

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14,000+ vessels per year with 200,000 cubic meters of water per vessel

El Nino (climate change) adding more stress to supplying water to the locks

Hydrology assists in addressing issues relating to disaster management, water security, environmental management, urban planning and infrastructure design

Gatun Lake Tree Stumps

Optech CZMIL Bathy Lidar

Flight Lines

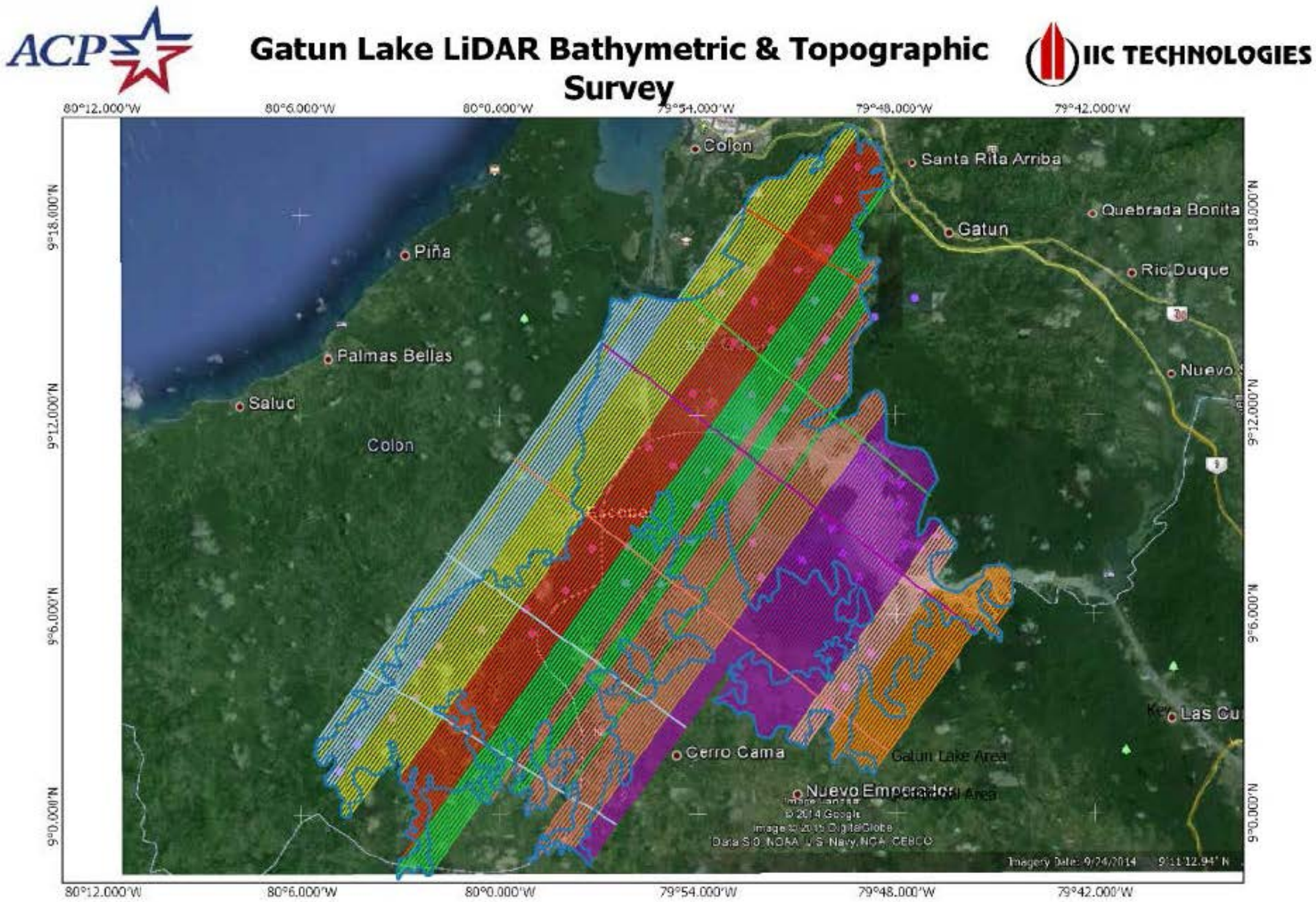
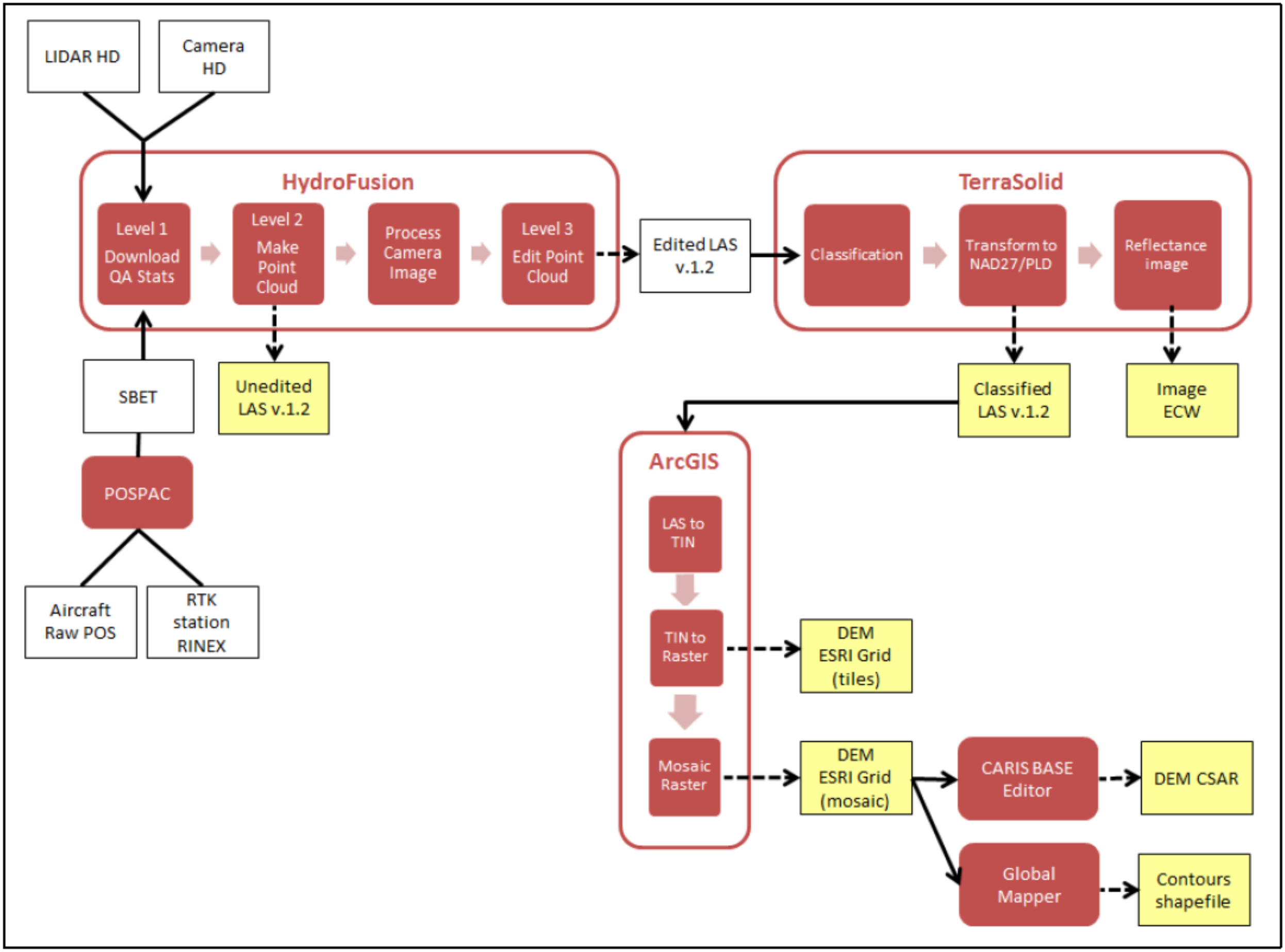


Figure 10: Survey Lines – Main lines

The vessel was mobilized with a SBES, motion sensor and Trimble RTK GPS system (see Figure 16) and utilized Hypack hydrographic software to integrate the system and act as line guidance for the survey.

Figure 16: Offshore Benchmark Area set-up


LIDAR HD
Camera HD
HydroFusion
Level 1 Download QA Stats
Level 2 Make Point Cloud
Process Camera Image
Level 3 Edit Point Cloud
Edited LAS v.1.2
TerraSolid
Classification
Transform to NAD27/PLD
Reflectance image
SBET
Unedited LAS v.1.2
Classified LAS v.1.2
Image ECW
POSPAC
Aircraft Raw POS
RTK station RINEX
ArcGIS
LAS to TIN
TIN to Raster
Mosaic Raster
DEM ESRI Grid (tiles)
DEM ESRI Grid (mosaic)
CARIS BASE Editor
DEM CSAR
Global Mapper
Contours shapefile

The collected digital camera images are linked to each survey point. So the images were used to QC and analyze the data (e.g. to remove temporary objects like boats while keeping navigation hazards such as tree stumps).

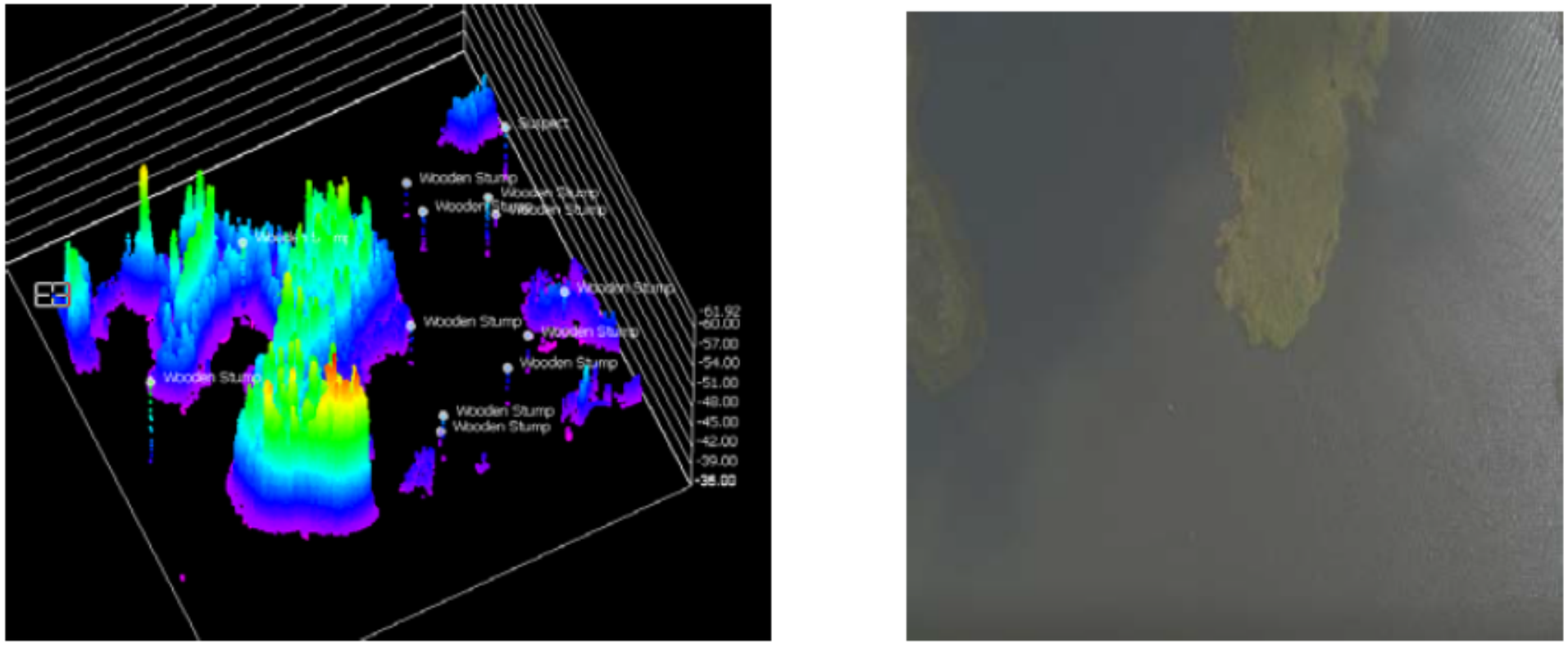


Figure 22: HydroFusion Point Cloud Editor

CHALLENGES AND SOLUTIONS

Key Challenges

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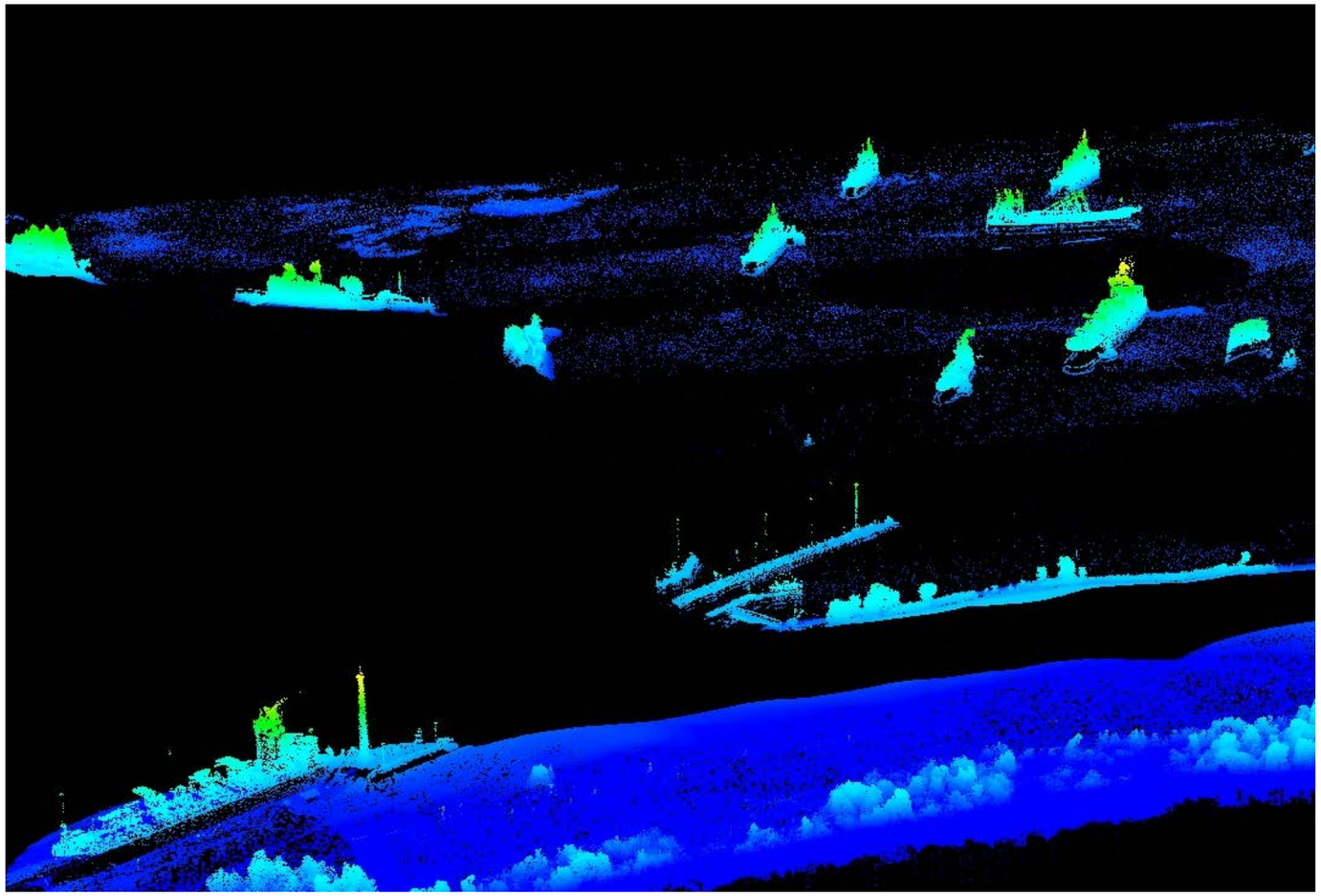
Fit and Weight

Cooling

Key Challenges

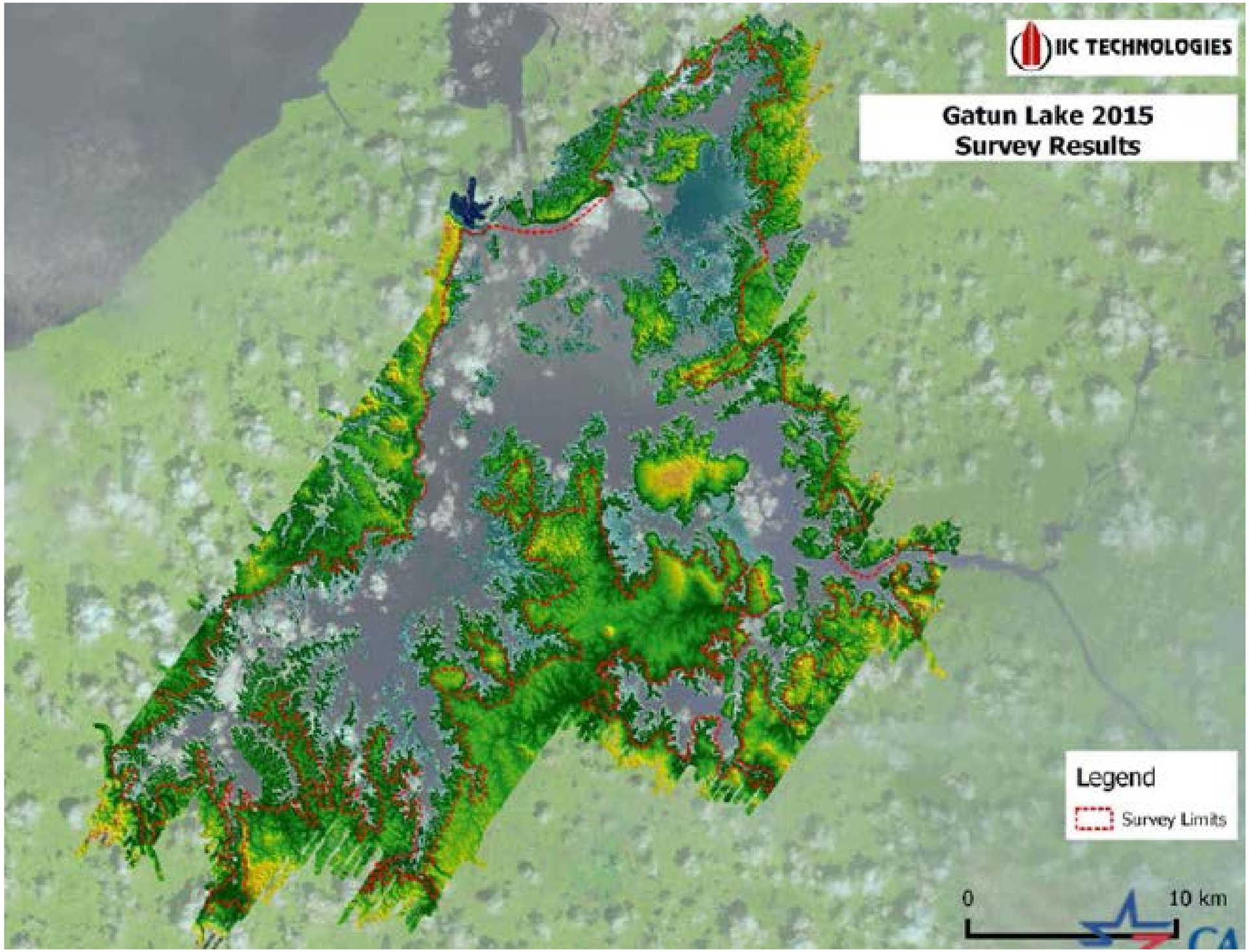


Tubidity &
Low Lakebed Reflectivity

Sea Surface Objects

RESULTS

Results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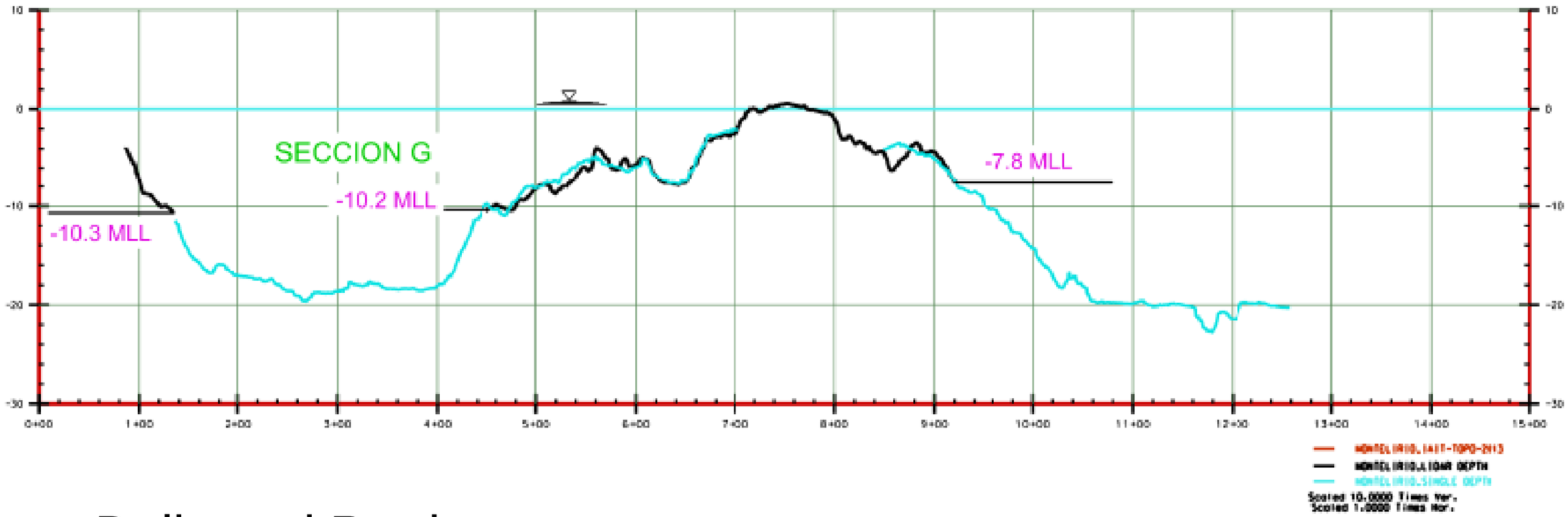
Gatun Lake 2015
Survey Results
Legend
Survey Limits
0
10 km

Results

Topo / Bathy Integration met client requirements



Delivered Products

- Classified lidar point cloud and DEM with contours
- Reflectance Imagery
- wrecks and tree stumps were detected and reported

Thanks for Listening