Geological Services

Experts on the Ground



Economic Development - Resource Assessment Program

Using LiDAR to Evaluate the Geological Resources of the Cobequid Highlands

Londonderry iron workings

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LiDAR (Light Detection and Ranging) is an optical remote sensing technology which measures properties of scattered light to find range and / or other information of a distant target. Simply put, LiDAR technology combines lasers, GPS, and inertial navigation systems into a single system that acquires data to produce high-resolution topographic maps, digital elevation models (DEM), and digital surficial models (DSM) that are accurate to within a few decimetres.

LiDAR mapping technology is increasingly being recognized in Nova Scotia as an effective tool for mapping highly dynamic environments such as the coastal zone and to support longterm planning. LiDAR imagery is being used extensively within the Minerals Resources Branch (MRB) to map bedrock and surficial geology, map the coastline and identify areas at risk to erosion, and for the identification of geohazards such as karst topography and abandoned mine openings.

In December 2010 the MRB, with the financial support of the Geological Survey of Canada (GSC) through the Targeted Geoscience Initiative-4 (TGI-4) program, had a LiDAR survey flown over part of the Cobequid Highlands which resulted in a 1 meter bare earth Digital Elevation Model. The purpose of the survey is to look at the following:

- · Mineralization is structurally controlled and the structure at the deposit scale (e.g. faults) can't be seen on our best DEM but is obvious in the field (e.g. ~5-10 m topographic shift along faults) often due to vegetation cover.
- · To better interpret till/stream (surficial geochemical data) a detailed DEM is required. It's a glaciated terrane so LiDAR can help with glacial dispersion and to interpret the magnitude of geochemical anomalies if the till type/thickness is known. It will also be useful in creating watersheds to trace stream sediments back to source.
- · Radiometric surveys only sample a thin portion of the crust (cm's). To interpret them accurately an understanding of till thickness and origin is necessary.
- · Tectonomagmatic evolution of Cobequid Highlands with respect to mineralization (e.g. mineralization between peak plutonic activity and uplift of highlands, 365-325 Ma).

The use of the LiDAR DEM in helping to map and interpret the Cobequid Highlands has been tremendously successful and is a key tool that is being used in the creation of new geological maps and the identification of new mineral deposits.

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