



Case Study: TerraSAR-X and Direct Receiving Station

GeoNorth Responds to the Flooded Dalton Highway

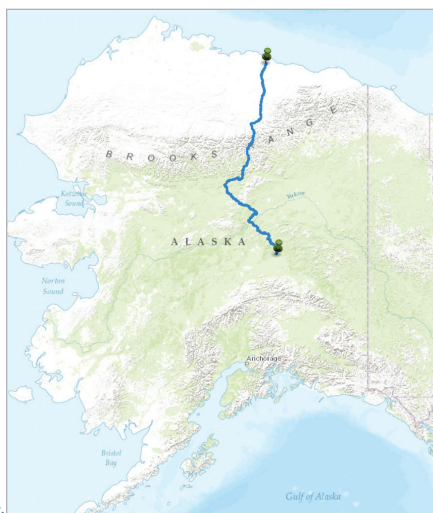
TerraSAR-X Helps Identify Flooded Regions Along Dalton Highway

Challenge

The Alaska Department of Transportation & Public Facilities (AKDOT & PF) crews have been fighting flood and ice overflow conditions on the northern end of the Dalton Highway in Northern Alaska between mileposts 390 and 405. Flooding of the Sagavanirtok River and subsequent freezing formed ice up to 30 inches thick throughout the stretch of road, prompting Alaska Governor Bill Walker to declare a state disaster at the request of the AKDOT & PF.

To be able to assess the flood impact and help decision-making, AKDOT & PF needed near real-time satellite imagery to be collected and delivered quickly for flood assessment, and to support the time sensitive planning activities along the Highway. AKDOT & PF contacted GeoNorth, Airbus Defense and Space's first multi-mission satellite Direct Receiving Station (DRS) partner, to support them for this emergency requirement.

The Dalton Highway runs for 414 miles between Fairbanks, Alaska and the Prudhoe Bay oil field near the Arctic Ocean. The highway runs parallel to the Trans-Alaskan Pipeline System, and is essential to the trucking industry, hauling critical supplies (including food, housing, tools, and equipment) to the oil fields near the Arctic.



Along this 414 mile stretch of road, there are only three service stations among the treacherous landscape, and drivers are warned to be well prepared to make the long haul on this roadway. Portions of the gravel road are sometimes closed due to zero visibility, inclement weather, enormous potholes, erosion and extreme weather. This roadway is featured in the TV show series *Ice Road Truckers* that showcases the struggles that drivers face due to the treacherous road conditions. Few roads in the world offer the degree of isolation that the Dalton Highway offers.

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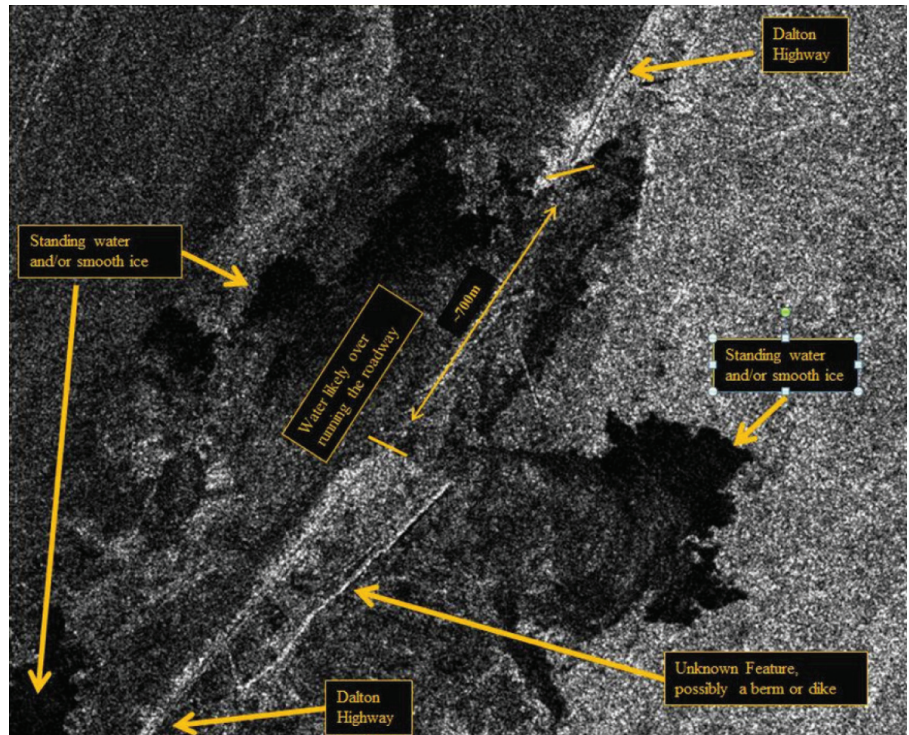
Solution

GeoNorth has the unique ability to collect, downlink and deliver both optical and radar imagery in just a few hours to clients who need imagery for disaster and risk management needs.

GeoNorth's multi-sat capability enables them to have access to task and downlink directly from Airbus DS optical and radar satellites. GeoNorth currently has access to Pleiades (50cm), SPOT 6/7 (1.5m), as well as TerraSAR-X (25cm – 40m) satellites.

AKDOT & PF contacted GeoNorth on the morning of April 7 with the request for near real time satellite imagery to assess the flooding situation along the Dalton Highway. GeoNorth was able to assess the flooding situation along the Dalton Highway, and recommended using TerraSAR-X (radar) imagery, as the satellite is capable of 'seeing through' clouds, which is tremendously advantageous where weather conditions are constantly changing. The Northern Slope of the Dalton Highway was experiencing high winds, blowing and drifting snow, and zero visibility. Additionally, TerraSAR-X imagery is ideal for discriminating standing water (or smooth ice) from shifting river ice, which was instrumental in helping AKDOT & PF in their assessment needs.

After assessment of the customer need, area of acquisition, and type of imagery, GeoNorth tasked TerraSAR-X and was able to downlink,



collect and delivery a 1.25m StripMap image to AKDOT & PF in less than 18 hours of the original request. AKDOT & PF immediately used the radar image to assess the flooding impact along the Highway, in particular to identify washed

road or iced sections. Pléiades (50cm) and SPOT 6/7 imagery was also delivered to help validate and confirm details of the flooded area. The image above shows some of the analysis on the portion of the highway that was flooded.

Key Benefits

- The rapid acquisition and delivery of optical and radar imagery allowed AKDOT and PF to remotely assess the damage and best course of action along the flooded Dalton Highway within a few hours after the original request.
- Using the TerraSAR-X weather independent satellite, GeoNorth enabled AKDOT and PF to quickly access important information for decision-making, despite bad weather conditions.
- The regular monitoring of the area and the fast delivery of the images helped to get access to important information in near real-time.
- Given the persistent winter storms in the region, the AKDOT and PF utilize the combination of high resolution optical (Pléiades and SPOT 6&7) and radar (TerraSAR-X) satellites to acquire high-resolution images regardless of the weather conditions. By utilizing GeoNorth's Direct Receiving station, the AKDOT and PF was able to acquire imagery over the flooded road surface every two days within 30 minutes of collection. This data provided by GeoNorth to the AKDOT and PF allowed emergency crews to accurately monitor ongoing flooding in the region and identify breaches to the roadway in order to support emergency repairs and quickly open this vital economic corridor.

Organisations Involved



The first private entity in the world to own and operate its own Multi-Mission Direct Receiving Station for both Optical and Radar imagery, GeoNorth is a full service firm specializing in the development of integrated end-to-end geospatial and web application solutions.



AKDOT

The Alaskan Department of Transportation and Public Facilities is based out of Juneau, Alaska and provides: safe and efficient infrastructure for moving people and goods, statewide access and connectivity, and access for exploration and development of Alaska's resources.