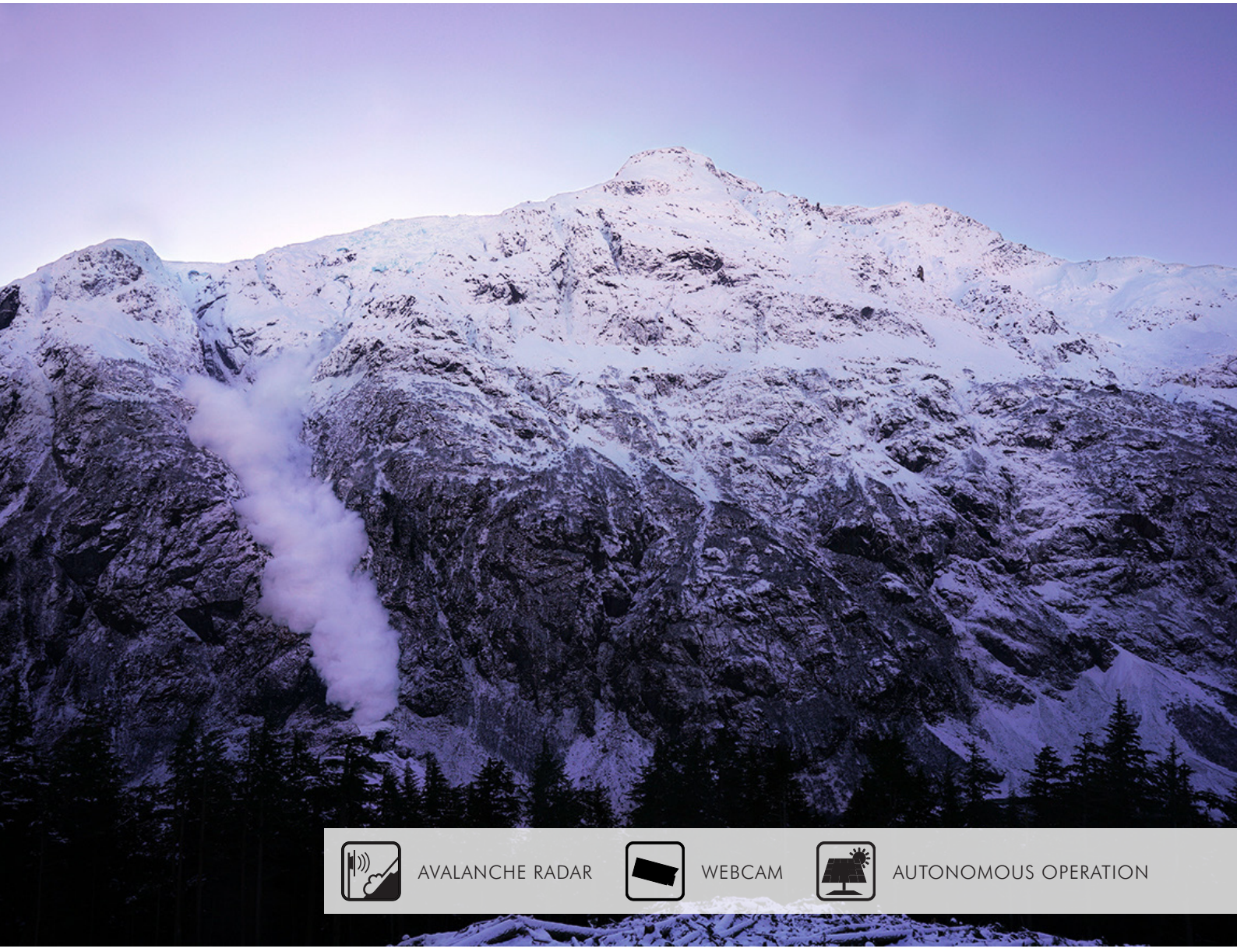
GEOPREVENT

AVALANCHE RADARS BEAR PASS, CANADA



PART OF HEXAGON

The autonomous avalanche detection system at Bear Pass with two avalanche radars and a repeater station reduces closure times on Highway 37A by more than half and significantly supports avalanche forecasters in their work.

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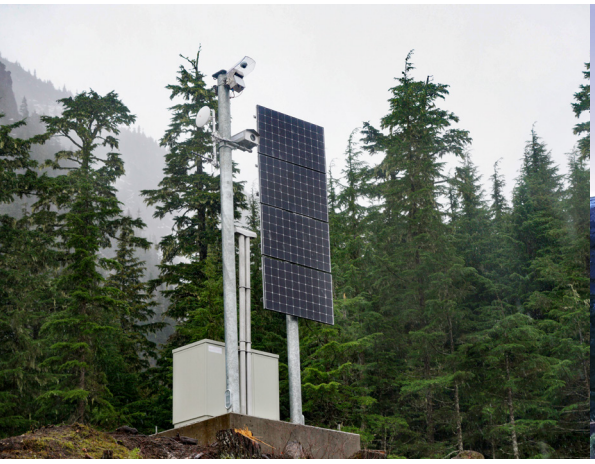

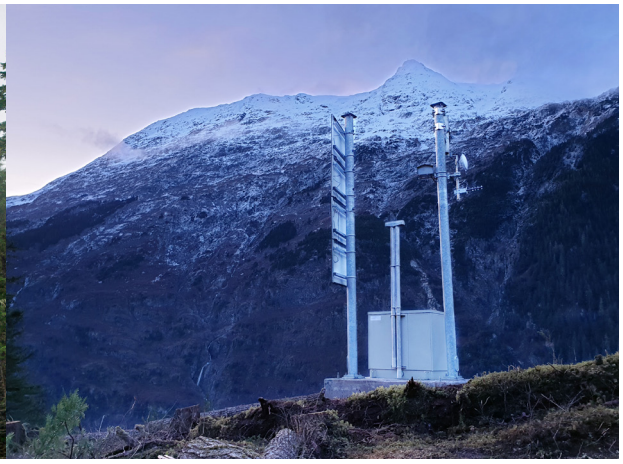

Title Page: Avalanche at Bear Pass in November 2019.

Figure 1: Radar stations George Copper (left) and Little Bears (right): The autonomous radar stations reliably monitor the opposite avalanche paths at a distance of up to 3 km in all visibility and weather conditions.

CHALLENGE

Highway 37A is the only road connecting the coastal town of Stewart (Canada) and Hyder (USA). Stewart serves as Canada's northernmost year-round ice-free port and is strategically important. The only land-based access road, Highway 37A, leads from Terrace via scenic Bear Pass to the coastal town of Stewart. A total of 72 active avalanche paths line the Bear Pass section on both sides and often affect Highway 37A between November and May. On average, the road is closed for about 90 hours every winter and considerably more in snowy winters. In order to improve avalanche forecasts and road safety for Highway 37A, we installed an autonomous avalanche detection system on behalf of the Ministry of Transport and Infrastructure.

SOLUTION

The avalanche detection system monitors two critical locations along Highway 37A since winter 2019/2020: Little Bears and George Copper. Both stations have no direct line of sight to Stewart. Therefore, a repeater station for data transmission was set up at Mt Johnson. The prevailing, often harsh snow and storm conditions are a challenge for the reliable functioning of the system, but it is precisely under these conditions that avalanches frequently occur. For this reason, we developed a sophisticated system concept with solar panels and fuel cells for autonomous energy supply as well as an anti-snow system for a snow-free radar head. Upon avalanche detection yb the radar, the system activates the integrated, high-resolution camera to automatically generate an event image series. The radar tracks the avalanche and measures speed, duration and dimension of the avalanche.

All data is uploaded via repeater station and Stewart to the online data portal and is accessible at any time by authorized users via desktop, tablet or smartphone. In addition, the system automatically notifies a defined list of recipients via SMS or email in case of a detected event. This way, avalanche forecasters are informed about every event in real-time.In the first and very snowy winter season of 2019/20, the avalanche detection system detected more than 1200 avalanches and allowed to significantly reduce the closure times of Highway 37A due to the avalanche situation (by more than 50% to only 39 hours).

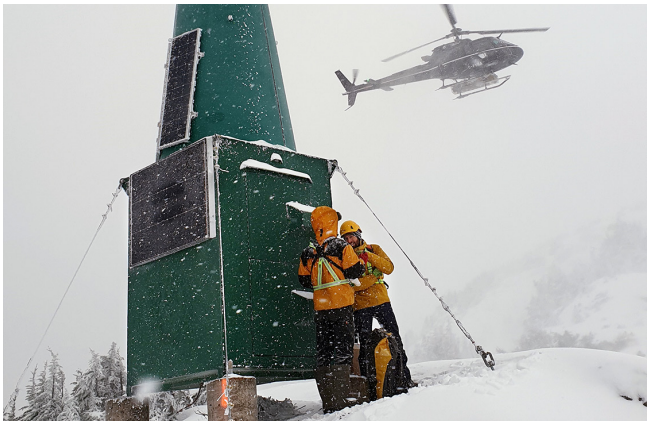

Figure 2: Mt Johnson repeater station: The region is characterized by harsh weather conditions that pose a challenge to installation and system operation.

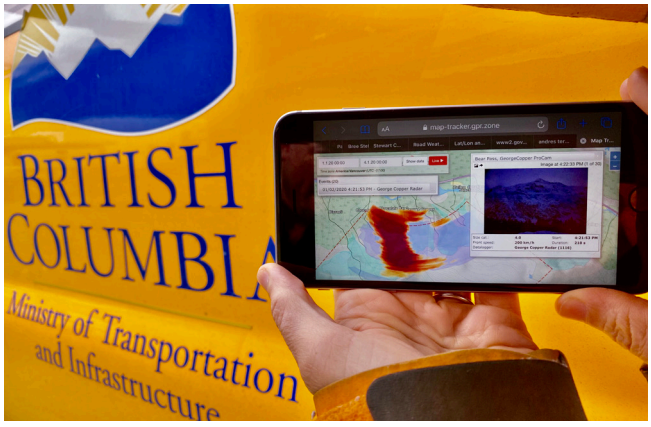

Figure 3: All data such as avalanche map, event images and event parameters are displayed in the online data portal with access at any time.