GEOPREVENT

AVALANCHE RADAR HOLMBUKTURA

PART OF HEXAGON

State-of-the-art, remote avalanche alarm system for real-time detection of triggered and spontaneous avalanches at up to 4 km distance in Northern Norway.

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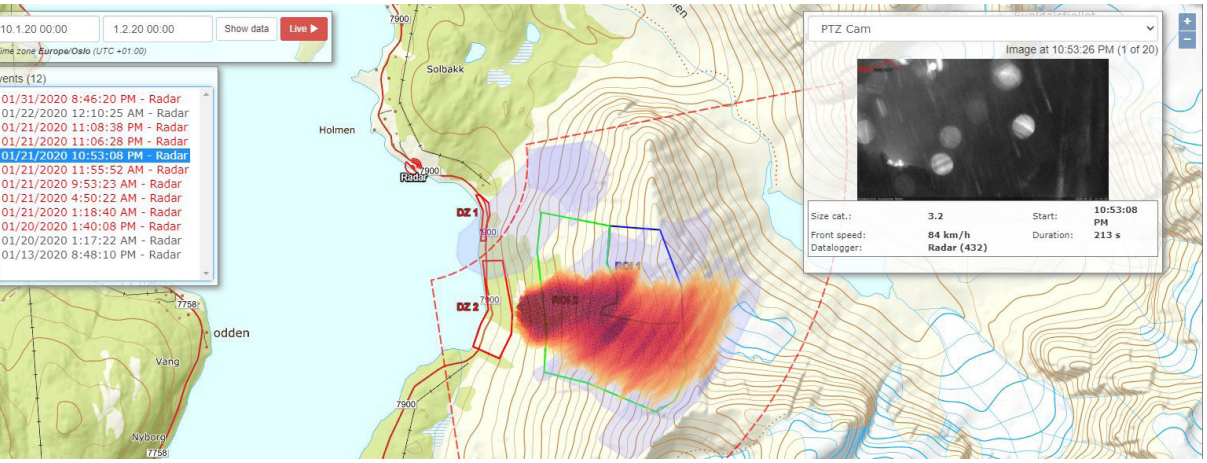

Title Page: The two avalanche radars at sunset in November 2020.

Figure 1: Online data portal: Avalanche map with event list and avalanche characteristics including image series (if visibility allows).

CHALLENGE

Holmbuktura is located in Northern Norway about 1h by road from Tromsø. The access road to the villages leads through a notoriously avalanche-prone area and road closures are necessary several times every winter. Statens vegvesen, the Norwegian Public Road Administration, provides avalanche danger assessments and acts as advisor to the local authorities in terms of preventative road closure and their reopening. Road closure periods should be minimized and isolation of the already remote villages should be avoided whenever possible. However, the road must be safe for passage at all times – a difficult task for the decision makers.

SOLUTION

In order to provide a cost-effective and reliable solution to this problem, Statens vegvesen chose to closely monitor the slope, detect avalanches in real-time by radar and automatically close dangerous sections of the road with traffic lights. The project requirements were challenging considering the location, extent and distance of the slope to be monitored. Whereas avalanche radars in mountain valleys are typically mounted on the counter slope, an equivalent approach is not feasible in this case due to the width of the fjord. Simulations for the Holmbuktura area revealed the northern bay side as ideal location for a long-range avalanche radar. We developed a radar solution with reach of up to 4 km to guarantee maximum slope coverage. The radar opening angles of 90° horizontally and 15° vertically allow for coverage of an even larger than the region of interest – in total 4 km². The setup includes a PTZ-camera (Pan-Tilt-Zoom) that automatically captures avalanches or smaller events of interest. It can further be used to remotely gain an overview of the situation at any time. All data and live pictures are accessible via the online data portal, where detected avalanches are also displayed on the area map.

The initial trial period of the avalanche radar has exceeded all expectations by Statens vegvesen so far. As geologist Andreas Persson, who is in charge of the project on behalf of Statens vegvesen, summarizes: «Unlike other years, we have not had any major avalanches in Holmbuktura this winter (2017). However, the radar has captured many small events on the slope very well. Both, the radar range and the level of detail have exceeded our expectations by far.»

Figure 2: The avalanche radar reliably detects avalanches in any weather and at any time of day and triggers camera images.

Figure 3: The only access road to the sea side villages is at the bottom of the avalanche prone slope (picture: Statens vegvesen).