

LoRa power for avalanche monitoring in Switzerland



Overview

This study tested Long Range (LoRa) technology on drones for avalanche Search and Rescue (SaR). LoRa shows promise for victim localization in snow, outperforming traditional beacons in challenging environments. Wireless communication is vital for avalanche Search and. Avasense measures snow height and multilayer snowpack temperatures on representative mountain slopes, then remotely transmits the data to avalanche services throughout the winter season. The partners aim to develop and test a long-endurance (multi-hour) autonomous aircraft, that will use on-line adaptive planning techniques and machine learning to identify and map avalanches using near-infrared. Avalmapper project is a joint project between SLF (WSL Institute for Snow and Avalanche Research SLF), and the Autonomous Systems Lab in ETH Zurich More information: Automatische Detektion von Lawinen in Fernerkundungsdaten For AVALMAPPER, one of the most important metrics for data quality is to. Abstract—This contribution outlines an experimental setup and methodology employed to extensively characterize LoRa propagation in the demanding scenario of avalanche search and rescue (SaR), where the transmitter is buried under snow.



Article Content

An experimental dataset using UAVs and LoRa technology in

To address this, the study evaluates the propagation characteristics and localization potential of wireless LoRa (Long Range) technology under controlled yet realistic field conditions.

Performance evaluation of LoRa LPWAN technology for

The emerging Low-Power Wide Area Network (LPWAN) technology is very promising thanks to its extended range and to the low power consumption. LoRa (Long Range) is one of the

An Experimental Dataset for Search and Rescue Operations in Avalanche ...

In avalanche scenarios, the snow depth and the snowpack profile significantly influence the wireless propagation of technologies used to locate victims, such as ARVA (in French: appareil de recherche

EGUsphere

We present a monitoring system using low cost LiDAR and optical sensors, which we use to monitor snow depth variations in an avalanche release area. The system is operational since

Dr. Frank Techel

Backcountry skiing is a popular form of recreation in Switzerland and worldwide, yet little is known about where and when people venture outside and methods to monitor skiing behaviour are limited by the

Whispers in the Snow: Exploring LoRa Technology for Avalanche

In recent years, Long-Range (LoRa) protocol has become one of the more commonly adopted low-power wide-area network (LPWAN) technologies because of its kilometric coverage, which is

Whispers in the Snow: Exploring LoRa Technology for Avalanche

Abstract—This contribution outlines an experimental setup and methodology employed to extensively characterize LoRa propagation in the demanding scenario of avalanche search and rescue (SaR),

An integrated model framework for snow avalanche detection and

The goal of this project is therefore to take advantage of recently developed avalanche models and detection systems to setup a model framework for avalanche forecasting in Switzerland and to

LoRa Snow

In this context, Avalanche Transceiver Devices (ARTVA) have been adopted for many years to locate mountain enthusiasts involved in avalanche incidents. These tools have gained widespread use

An Experimental Dataset for Search and Rescue Operations in

In this work, we explore the potential of LoRa technology under challenging realistic conditions. For the first time, we collect radiopropagation data and the contextual snow profile when

Continuous Snow-Cover Monitoring and Avalanche Detection with a

In addition, time-lapse and continuous video monitoring have become an important tool for both validating avalanche events and improving forecasting accuracy. Over the past decade, several

An experimental dataset using UAVs and LoRa technology in avalanche ...

LoRa technology on UAVs demonstrates potential for effective avalanche SaR. The dataset supports research in UAV-based localization and resilient SaR communication systems.

Real-Time Avalanche Detection with Long-Range, Wide

We present a near-real time automatic avalanche monitoring system that outputs detected avalanche polygons within roughly 10 min after Sentinel-1 SAR data are download.

Monitoring snow depth variations in an avalanche release area using

We de-veloped a monitoring system using low-cost lidar and optical sensors to measure snow depth variations in an avalanche re-lease area at a high spatiotemporal scale (centimetre to low decimetre

REMOTE DETECTION OF SNOW AVALANCHES IN SWITZERLAND USING INFRASOUND

...

Remote detection of snow avalanches is an appealing instrument for monitoring snow avalanche activity during periods of bad visibility. It supports local avalanche management professionals with

Avasense — Autonomous Snowpack Monitoring

Avasense is designed for continuous monitoring of snow cover conditions in mountainous terrain. The system collects factual field observations from representative slopes and remotely transmits them to

Continuous Snow-Cover Monitoring and Avalanche Detection with a

The avalanche risk assessment by the avalanche commissions relies on high-altitude weather data, historic events, local insights, route-specific weather forecasts, and the regional

Autonomous Avalanche Detection and Mapping

The AVALMAPPER project aims to fill this gap by creating an aerial system for collecting high-resolution avalanche occurrence data over affected regions in the

An experimental dataset using UAVs and LoRa technology in avalanche ...

The dataset presented in this article explores the feasibility and the performance of LoRa (Long Range) technology on board of a UAV for use in SaR scenarios. The transmitter was buried in snow across a

Autonomous Avalanche Detection and Mapping

ETH student Andri Bisaz recently completed his semester thesis titled “Vehicle-based photogrammetry system for avalanche detection” as part of the... The first winter testing of the new platform was

An Experimental Dataset for Search and Rescue Operations in Avalanche ...

Overview: The dataset contains measurements of Received Signal Strength Indicator (RSSI) and Signal-to-Noise Ratio (SNR) collected from Long-Range (LoRa) devices in avalanche

Real-Time Avalanche Hazard Monitoring System Based on

Avalanche hazard prediction remains a crucial task for mountainous regions worldwide. This study presents the development and field testing of a prototype automated avalanche hazard

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