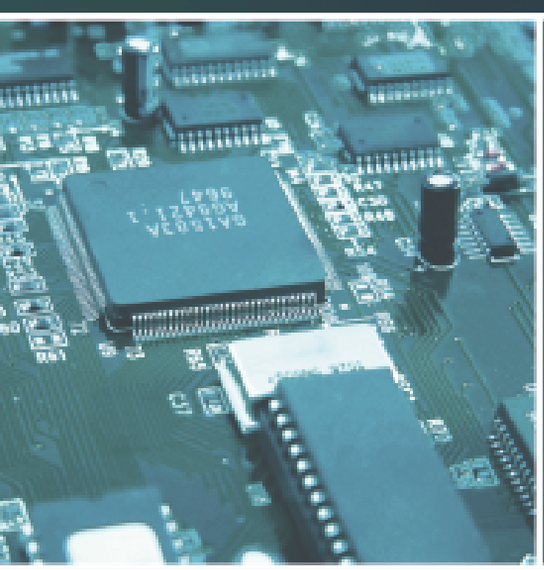
IBTP Koschuch e.U.

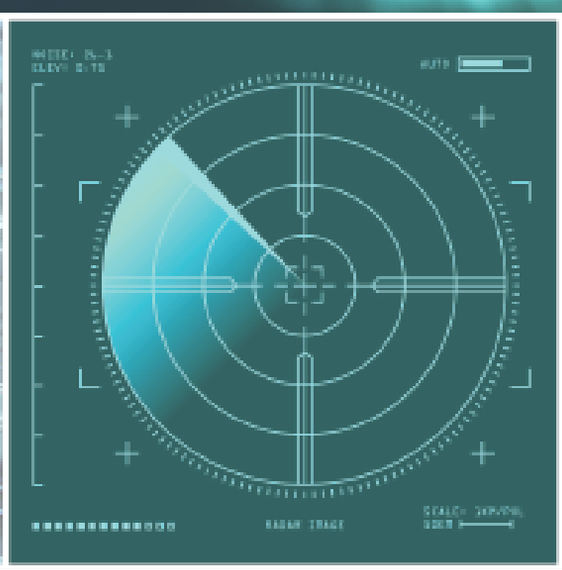
RADAR TECHNOLOGY

COMPACT • FLEXIBLE • RELIABLE

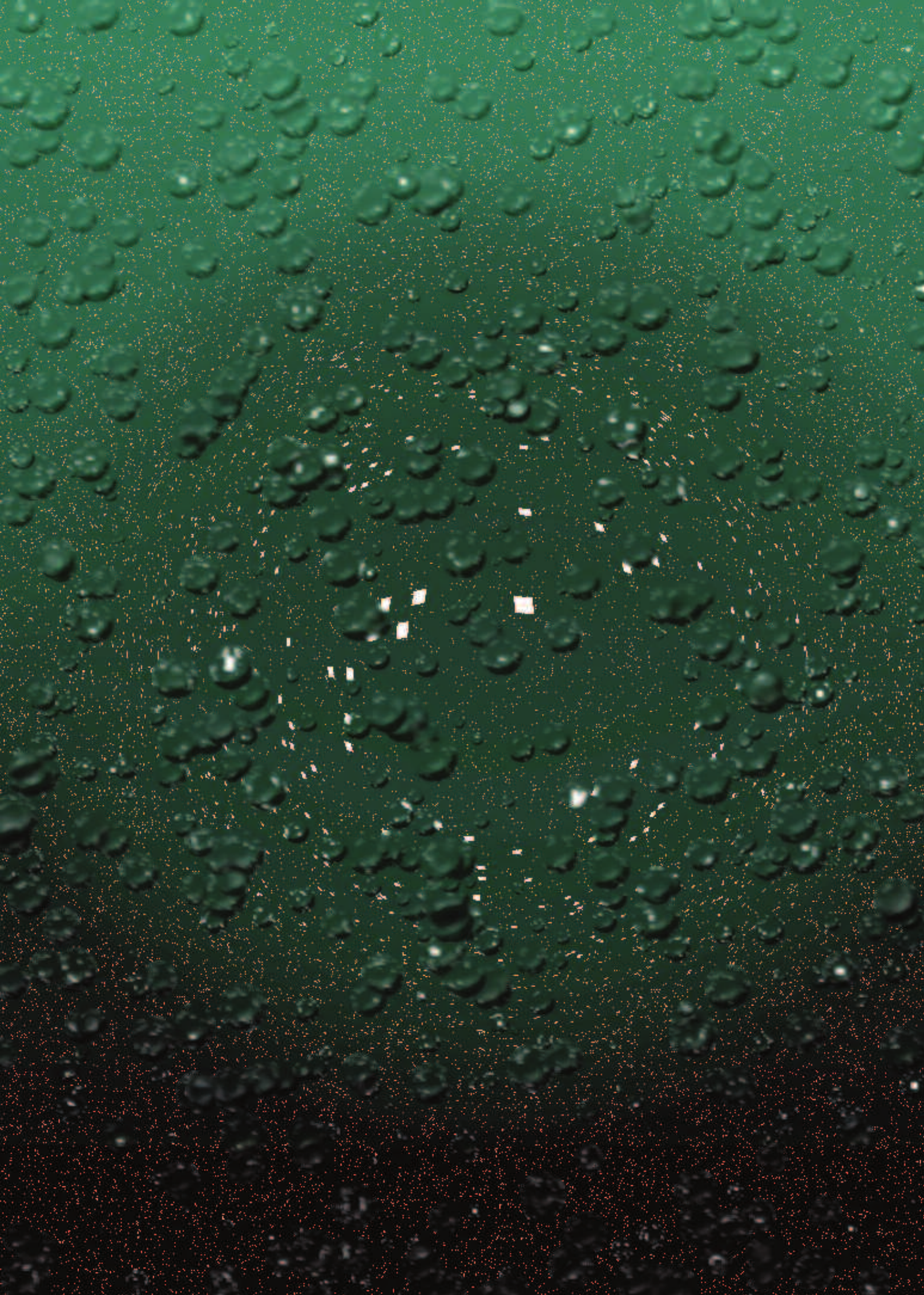
AREA OF APPLICATIONS

- SNOW AVALANCHE RADAR
- DEBRIS FLOW RADAR
- WATERLEVEL DETECTION
- RAIN DETECTION
- PERSON DETECTION





www.ibtp-koschuch.com
www.avalancheradar.com



Dear customer!

IBTP Koschuch is engaged in the areas of radar technology-, electronic- and software development.

Due to the completion of the development of radar equipment for the detection of snow avalanches, debris flows and mudslides the company possesses a worldwide unrivalled, marketable product.

The strengths of the radar set are

- a modular and sustainable system structure
- a wide range of applications
  for various environmental hazards and
- low energy utilization

The system is very versatile and can be adjusted to the requirements of the customer any time.

Decades of professional experience of our highly innovative team, which has also made its mark in space research, nano and x-ray technology guarantees you first-class, sustainable solutions.

The slender structure of the company makes it possible to provide you with fast, cost-effective and custom product development.

DI Dr. Richard Koschuch
IBTP Koschuch e.U.

Radar set for mudslides, snow avalanches and debris flows

In consequence of changing climates and therefore increased tendency to thunderstorms, the risk of uncontrolled debris and mud flow is going to rise worldwide in the coming years and it is present throughout the whole year.

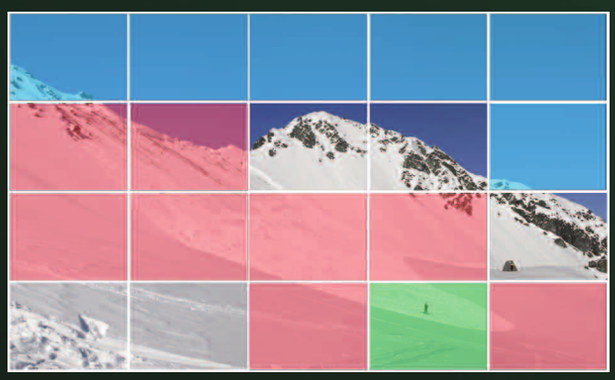
Our goal is to reliably detect movement of debris, mud or snow on endangered slopes by a novel radar technology that continuously scans the area and trigger alarming devices to warn of the posing risk.

A typical application is the triggering of traffic lights in order to block a road in case of a debris flow. Another example is the activation of an alarm siren in a winter sports region to call attention to an approaching snow avalanche.

The scan of endangered areas is carried out by a Pulse-Doppler radar which can reliably and accurately detect movement even within a distance of a few kilometres.
An alarm is set in case well-defined thresholds are exceeded. These alerts can be put out on site (audible signal, warning light) and/or can be transmitted to specific centres (regional emergency management agency, ambulance, road patrol) via mobile communication technology (GSM/GPRS/WLAN).

Additionally to triggering an alarm, video surveillance is activated and records the monitored area. The video is transmitted to a remote station for later analysis which can be helpful e.g. to locate buried disaster victims.

The radar is capable of measuring velocities ranging from 1 km/h to about 300 km/h. Furthermore, it provides the option to divide the monitored area into so-called range gates so as to use only a smaller section for analysis. False alarms are tremendously reduced by this technique, because movements lying out of the section are omitted. This is not possible with other conventional radar technology on the market.



In order to keep the emitted power low, the new radar technology evades a radar pulse procedure by a suitable type of modulation and constant output power. The system requires only a fraction of the power needed for a conventional radar set.

A substantial advantage of the system is, its low energy consumption so it can be powered by solar technology. Thus, it can be set up in any surrounding without public power supply. The consequences are significant cost savings and high flexibility concerning installation. Since the system weighs only a few kilograms (<30 kg), it can be employed mobile as well as stationary.

Target audience

Skiing areas

Operators of skiing areas with slopes endangered by snow avalanches, where permanent or surveillance in acute cases is imperative. The radar features remote monitoring of snow avalanche endangered slopes. Accordingly the cost-effective installation of sensors on the endangered slope, which are essential for other systems, is omitted.
Additionally, the radar system provides the opportunity to verify whether an avalanche blasting at poor visibility was successful. This allows a higher economic efficiency for operators of skiing areas:

- Fewer helicopter flights (snow avalanche commission)
- Avalanche blasting at night time or during poor visibility is rendered possible to reopen slopes the next day

Feasible additional features:

- Combination of video and locating system for buried disaster victims
- Identification of people causing an avalanche via video surveillance
- Identification of the person responsible for an accident

Emergency management

Public and private institutions which are responsible for emergency management and prevention (e.g. provincial government, Austrian emergency management agency…)

Transport networks operators

Operators of transport networks in the following domains

- Roadways
- Railways
- Waterways

Monitoring of endangered locations where natural hazards like avalanches, mudslides or rockfall may occur.
In case that a flow is detected, warning devices for traffic participants can be activated to avoid damage and accidents.
In addition a notification can be sent to a remote station (warning service headquarters, emergency management agency, broadcasters) via mobile communication technology.

Companies

Public and private companies requiring surveillance of e.g. embankment dams, receiving basins, waste sites for excavated material. In this context the radar system is a possible basis for a comprehensive security system that can be provided by IBTP Koschuch.

Products (examples, other specs on request):

Stationary radar systems:

SR1000-45-P:
Stationary system with range up to 1000m and an aperture of 45°

SR2000-10-P:
Stationary system with range up to 2000m and an aperture of 10°

SR5000-10-P:
Stationary system with range up to 5000m and an aperture of 10°

Mobil systems:

MR1000-10-P:
Mobile system with range up to 1000m and an opening angle of 10°

MR2000-05-P:
Mobile system with range up to 2000m and an opening angle of 5°

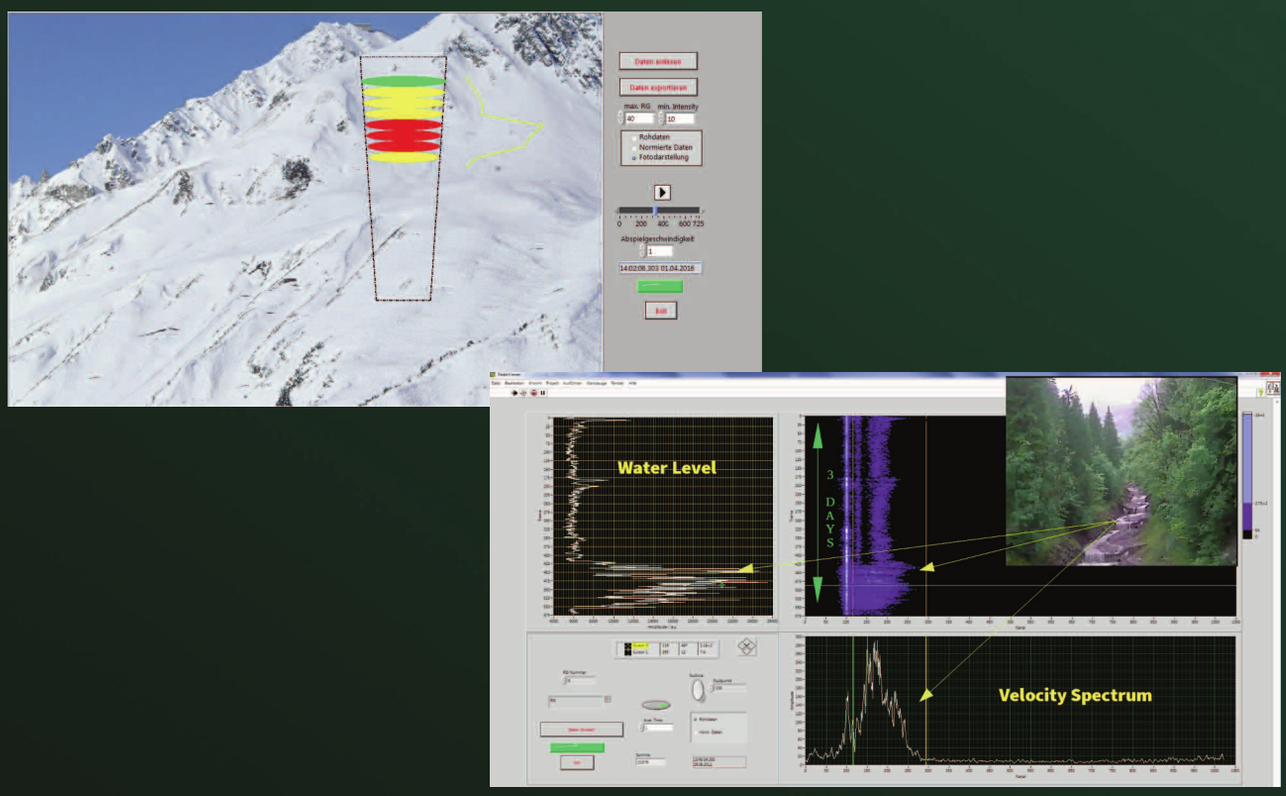
Since the system is modular, it can be adapted to the customer needs.

Specifications – Stationary Radar

Parameter	Quantity	Tolerance	Unit
Voltage Module	5	+/-5 %	V
Power Consumption Module	15	max	W
Power Consumption Overall	25-50		W
Temperature	-40 - +85	min/max	°C
Humidity	0 - 100 %	min max	Rel. Hum.
Frequency	10.1 - 10.5	min/max	GHz
Frequency Drift	+/-	30	ppm
Radar Power	25	+/- 1	dBm
Spurious Emission SFDR	-80		dBc
Spurious Emission 0-9 GHz	< -100		dBm
Spurious Emission 11-26 GHz	< -90		dBm
Modulation	Puls, PSK		
Bandwidth	50	max	MHz
Compliance	CE, ROHS		
Pulse Repetition Frequency	0.001 - 1		MHz
Connections Module	USB, RS232, Ethernet		
Rangegates	1-128		
Rangegate Resolution	1024 FFT		Lines
Velocity Resolution	0.5-100	min/max	m/s
Min. Target Cross-section at 2000m	1	min	m²
Min. Target Cross-section at 1000m	0,25	min	m²

Radar Control Software:

Our radar control software let you evaluate the data of each event.



Modular system

The radar system for the detection of snow avalanches, debris flows and mudslides is offered as a modular system. Hence, it can be combined according to the customers requirements and also provides expandability for already existing systems.

Modules

1. Radar + Mobile phone network
   radar system, electronics, software, communication via GSM-network
2. Pole for stationary applications suitable for all configurations
   (battery, solar, …), screw able onto concrete foundation
3. Image acquisition
   camera, data processing unit
4. Battery power supply
   Supplies the system for several days – particularly for mobile employment
5. Solar power supply
   solar panel, accumulator, charging electronics – for applications free of external power supplies
6. Radio transmission
   Radio transmission unit – for remote control of warning devices and for data trans mission. where mobile phone service is not available
7. Pole for mobile employment

Service and support

We offer every service in any phase of the project, starting from analysis of the landscape, project management and installation to the operating system.

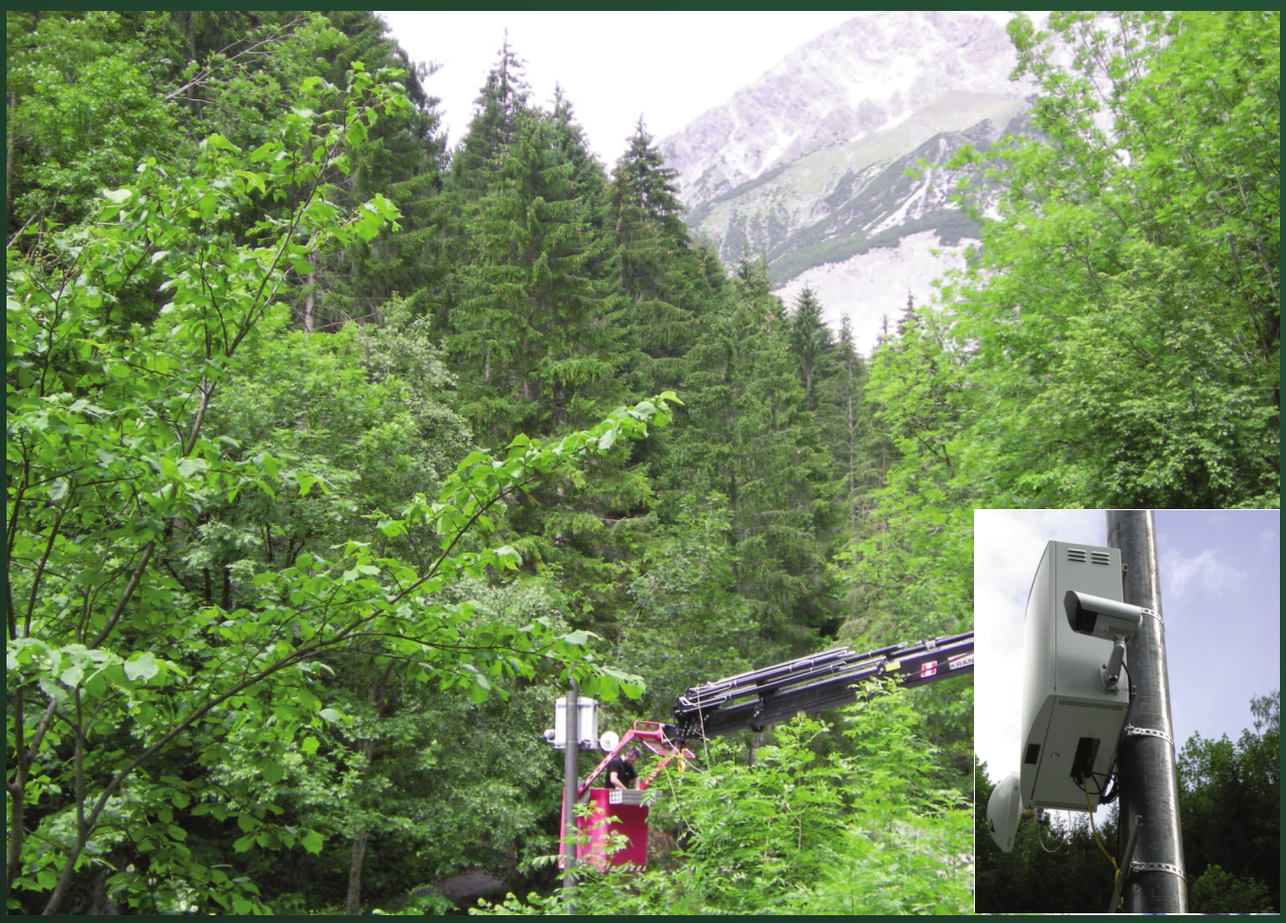
A maintenance contract offers even more safety and reliability of your system. It includes the following benefits:

- Software updates
- Remote maintenance via mobile phone network
- Support in case of questions from the operator
- Annual on-site service (battery, memory card, adjustment, …)

If problems occur we won’t let you down – qualified personnel are available 24/7.

Radar for mudslide - Reference

Austria - Tyrol - Lattenbach

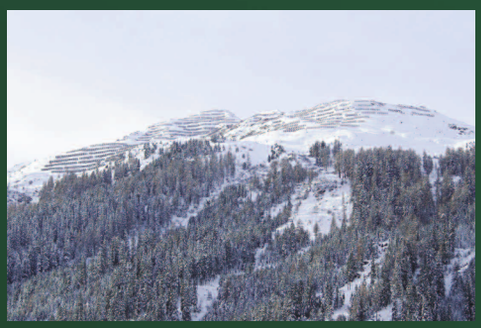


Austria - Tyrol - Oetz Valley

Radar for snow avalanche - Reference

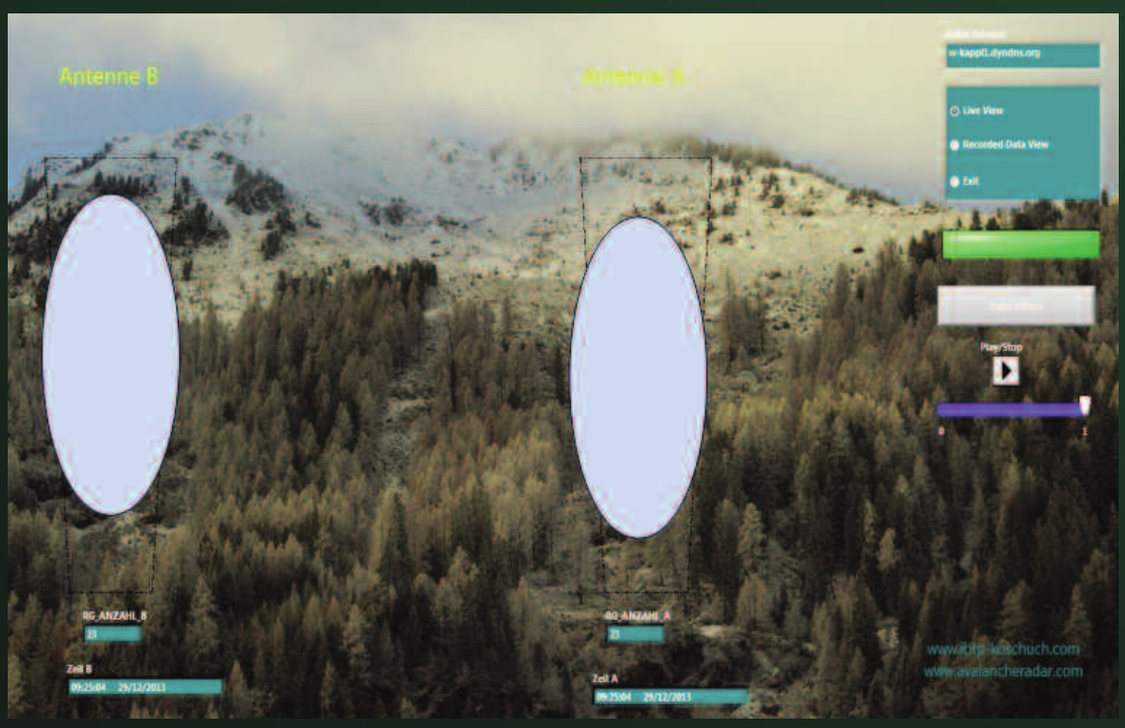
Austria - Tyrol - Ischgl

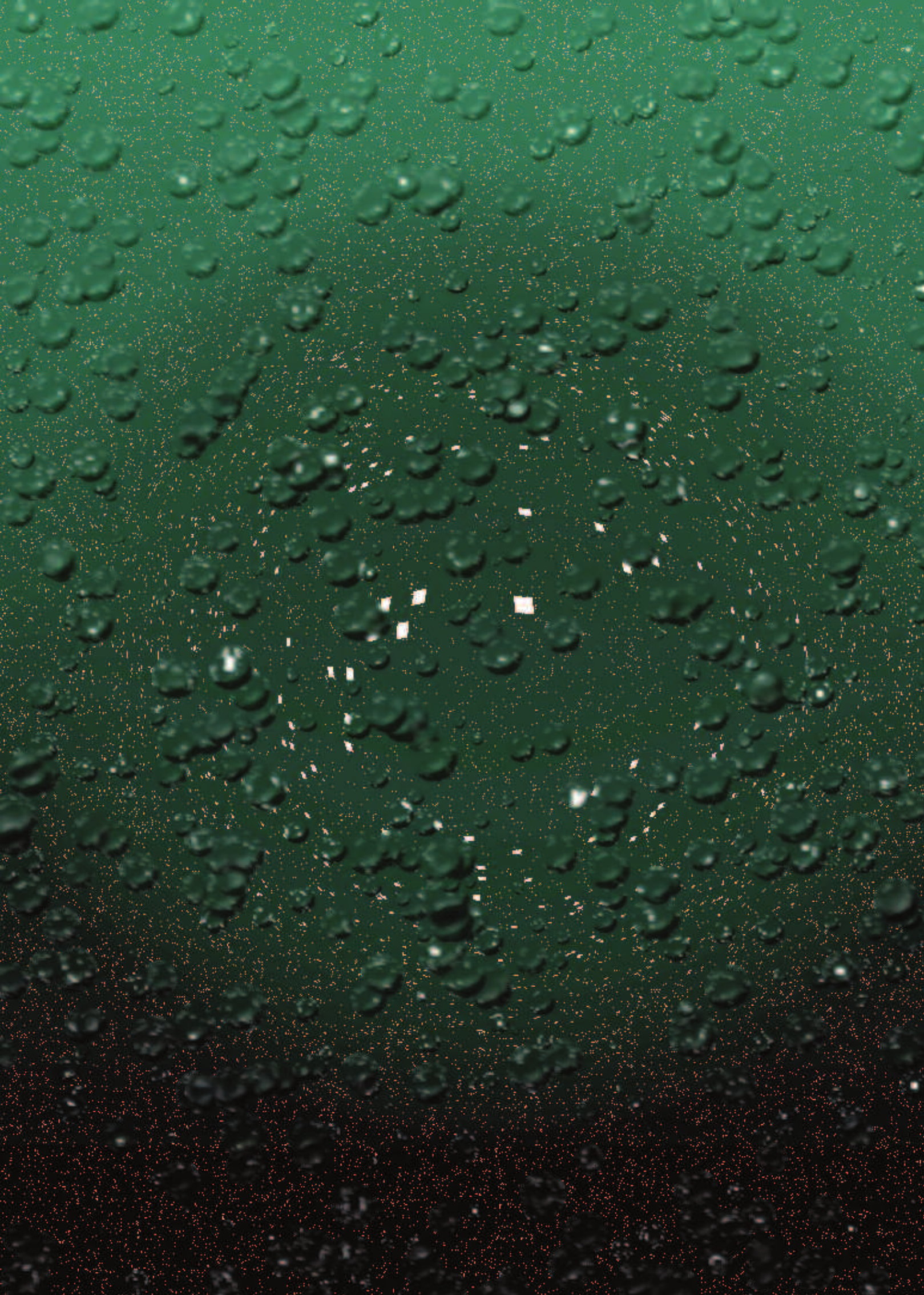
Austria - Tyrol - Kauner Valley



Austria - Tyrol - Kappl

Austria - Tyrol - Pitz Valley





Manufacturer

IBTP Koschuch e.U.
Consulting Engineer in Technical Physics

Langegg 31
A-8463 Leutschach an der Weinstrasse
Austria
Tel. : +43 699 18 44 85 42
office@ibtp-koschuch.com
www.ibtp-koschuch.com
www.avalancheradar.com