PRESS RELEASE

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Mountains and ski resorts:
AI comes to the mountains

AI is making its way into the world of mountain development. As it becomes more widespread and accessible (to local authorities, suppliers, professionals and citizens), artificial intelligence has entered the field of mountain development in recent years, acting on several major areas: optimisation of infrastructure and flows, improvement of safety and risk prevention, personalisation of the tourist experience, sustainable resource management and ecological transition, modelling and territorial planning. AI can offer a more intelligent, sustainable and resilient vision of mountain development by improving infrastructure management, safety, customer experience and ecological transition. It will also promote collaborative planning and innovation in the management of mountain areas. From 21 to 23 April 2026, Mountain Planet will bring together all the global players in mountain development and soft mobility in France at Grenoble for an event that is establishing itself as a showcase for innovations and achievements. Across more than 60,000 m² of exhibition space, manufacturers, builders, local authorities and operators will present the latest iconic French and international projects, some of which feature new uses of AI to transform the tourist experience, optimise the operation of ski areas and make the mountains even more connected, sustainable and forward-looking.

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Snow grooming and management

There are concrete and already operational examples of the use of AI to optimise ski slope grooming. The best known is the SNOWsat solution (by Kässbohrer, manufacturer of PistenBully snow groomers) used in several ski resorts in Europe. Algorithms guide snow groomers along optimal routes, saving fuel and maintaining optimal snow quality.

GPS sensors on the snow groomers + snow depth sensors transmit data to a platform that analyses snow depth, geolocation, terrain slope, etc. in real time. The algorithm suggests the optimal grooming routes to drivers so as not to damage areas with low snow cover, minimise unnecessary passes (saving fuel and reducing CO_2 emissions), maintain consistent grooming quality and thus reduce the use of artificial snow where it is not necessary.
In France, Switzerland, Austria and Germany, many ski areas use this system or similar solutions (such as LEITNER's Skadii).

Ski resorts in North America, Canada and the United States use comparable systems (such as SnowGroomer or TechnoAlpin).

The measured benefits include fuel savings of up to 15-20% for snow groomers. Depending on the ski area, there are also measurable results in terms of artificial snow production, with up to 30% savings in some resorts and a 10% reduction in Laax. As each ski area is different (exposure, altitude, snow cover, etc.), the percentages vary from one ski area to another.
TECHNOALPIN has developed the ATASSpro software, which is based on accurate weather forecasts, to provide a reliable prediction of the amount of snow that can be produced over the next seven days.

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Avalanche forecasting

AI now analyses meteorological, topographical and historical data to anticipate avalanche risks more accurately than traditional methods. AI cross-references weather data (snow, wind, temperature, humidity), terrain data (slope, altitude, orientation), satellite or lidar images with historical avalanche data. In Switzerland, the SLF (Federal Institute for Snow and Avalanche Research) developed AI models in April 2024 that can predict avalanche danger three days in advance with a high degree of reliability. Several machine learning algorithms analyse snow observation data, weather data and historical avalanche data (a library of more than 20 years of data), producing hazard assessments to improve automatic bulletins. In the United States, the Colorado Avalanche Information Centre (CAIC) uses machine learning classification models with AI to assign a hazard level (1–5) to specific areas. In the very near future, AI could bring more accurate and frequent bulletins to the mountains thanks to automation and rapid processing. However, given the complexity of weather phenomena and climate change, AI cannot yet replace human expertise in this area.

Search and rescue assistance

AI is now being used to assist in search and rescue operations. AI has many advantages, such as the speed of searches covering large areas. AI can identify victims that are invisible to the naked eye. It reduces the risks for rescuers as it requires fewer personnel to be exposed in the field, day or night. It optimises coordination by sharing precise coordinates with search teams and command in real time. In Europe, the Norwegian company AvalanchePRO, developed by ATLAS UAS, integrates an ARVA sensor on a drone (such as AtlasPRO) to locate victims buried under an avalanche. Tested in Norway by teams such as Norwegian People's Aid, the system can quickly cover large areas very efficiently. In Canada, North Shore Rescue integrates drones with thermal cameras and AI capable of identifying heat sources in steep terrain to quickly locate people (hikers/skiers) and enhance safety in remote areas. In Romania, Vodafone is testing SARUAV, an AI system that analyses live drone imagery to detect human forms and clothing, transmitting the coordinates to rescue services in a matter of minutes.

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AI-assisted ski lift systems

French company Bluecime has extensive experience in products for chairlifts and gondola lifts that rely directly on artificial intelligence and computer vision algorithms. Its intelligent computer vision system, SIVAO, analyses images in real time to detect faulty guardrail closures, risky behaviour, overcrowding in cabins, etc., and triggers alerts or instructions. New AI-based Bluecime products are currently being rolled out, such as queue analysis, and others are in development, such as solutions for analysing people flows in ski areas. All Bluecime systems, based on AI building blocks for optimal reliability, will be grouped together in a comprehensive solution called "SOFTEN" which uses AI to quantify the number of skiers on the slopes and in queues, model flows and make operational recommendations (particularly regarding lift speeds) to reduce energy consumption by up to 20%. For example, in France, Bluecime has equipped almost all the chairlifts in St Sorlin-d'Arves and Le Corbier in the Sybelles French ski area with its SIVAO chairlift system (improved safety for customers, better chairlift management with knowledge of line occupancy, etc.). Also, at Les Sybelles this winter, Bluecime will equip the Côte du Bois gondola lift in La Toussuire with a system for counting passengers in the cabins (improved management of the gondola lift to determine whether cabins are occupied or not, occupancy rates, etc.).

Swiss company Mantis Ropeway Technologies AG has developed a system called Mantis Autonomy that uses cameras and artificial intelligence software to monitor passengers' descent and detect hazards. This allows the arrival station of a chairlift to operate without permanent staff (this technology is not authorised in France, and Swiss and Austrian regulations require an operator to be within 5 minutes of the arrival station). After five years of development, the first operating licences were granted in December 2023, and six more ski lifts were put into service during the winter of 2024/25. Already successfully deployed in several ski resorts, this system has great potential for the future of the entire ski lift sector in countries that allow unstaffed ski lifts. In October 2025, Mantis Autonomy won the Swiss Mountain Award at the Swiss Cable Car Forum in Rapperswil-Jona.

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Predictive maintenance

AI is making its way into predictive maintenance for cable transport systems — ski lifts, gondola lifts and associated infrastructure — by monitoring equipment (cables, pylons, cabins) to anticipate breakdowns or wear and tear before they become a problem. Several manufacturers already offer this service to their customers. Doppelmayr has developed AURO (Autonomous Ropeway Operation). This semi-automated system with sensors (cameras, vibration, temperature) allows for unmanned operation in the cabin. The system includes predictive maintenance that anticipates technical needs through continuous data analysis.

AI is also involved in cable inspection. FATZER and LETSCAN are conducting research on TRUscan.deep, an automated magnetic induction rope inspection system designed to inspect and identify all damage, including minor surface damage. Leitner analyses data from sensors to automatically detect early signs of fatigue in cables, bearings or motors, triggering targeted interventions rather than non-specific periodic inspections. POMA's "mountain ropeways renovation" programme incorporates on-board sensors and advanced monitoring to improve the availability of facilities and reduce maintenance costs by identifying potential operational problems.

NZSki in New Zealand uses advanced monitoring technologies for ski lifts, enabling rapid incident detection and predictive maintenance, which reduces energy and resource waste and limits downtime.

Engineering processes for cable transport, snowmaking systems, mountain safety and thrill-seeking leisure facilities.

The integration of artificial intelligence into the engineering processes of the French group MND from 2026 onwards marks a new stage in the performance and reliability of its solutions for mountains and mobility. By relying on data and optimisation algorithms, teams can design more energy-efficient systems more quickly, better adapted to the constraints of each site. AI enriches all phases of development: equipment sizing, simulation of behaviour in real conditions, predictive maintenance and continuous improvement of installations. This approach reduces study cycles, secures technical choices and makes completion deadlines more reliable. Other manufacturers are also committed to integrating artificial intelligence into engineering processes to make projects more efficient, more sustainable and perfectly aligned with the climatic and economic challenges of mountain regions.

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Real-time monitoring

Real-time monitoring of slopes using AI opens up a new field for mountain safety, as detecting an impending debris flow as early as possible is essential for protecting human life, landscapes and property. By cross-referencing high-resolution satellite images with data from ground-based cameras or sensors, algorithms automatically detect micro-movements in the terrain, the appearance of glacial cracks or the formation of scree corridors, long before they are visible to the naked eye. These systems distinguish between slow changes (gradual deformation of a slope) and rapid phenomena (serac breakage, sudden landslides), allowing both alert thresholds and evacuation scenarios to be adapted. Already deployed in Switzerland, Norway and other mountain ranges, these combined solutions provide unprecedented foresight for ski area managers, local authorities and infrastructure operators, reducing the risk of disaster and improving protection for both people and equipment. Research projects (ETH Zurich, WSL, etc.) use seismic sensors with artificial intelligence and machine learning to detect debris flows and avalanches in alpine areas at an earlier stage.

Biodiversity monitoring: **AI is being used to protect flora and fauna using smart cameras to track their evolution.**

Among the tools that could be studied to assess their suitability for ski areas is DeepFaune, a free, collaborative French software programme that is a benchmark for wildlife census and monitoring of many species. DeepFaune automatically identifies animal species in images taken by camera traps, which are automatically triggered devices installed in the wild. It uses camera traps in the mountains to identify ungulates (wild boar, foxes, etc.) using around 150,000 photos per year taken in the Alps and processed by AI. DeepFaune incorporates cutting-edge AI algorithms, trained by a team of scientists from joint CNRS research units at the following universities: Université Grenoble Alpes (UGA), Université Savoie Mont-Blanc (USMB), Université Claude Bernard de Lyon (UCBL) and Université de Montpellier. Its development is based on a collaborative science approach and involves more than 60 partners – national parks, associations, conservatories, hunting federations, individuals, etc. – who contribute by sharing millions of annotated images, which are essential for training the models.

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This field network, structured around a science and society approach, is one of the pillars of the project. AI coupled with smart cameras in mountain environments makes it possible to automatically identify up to tens of thousands of images per year in a matter of minutes, achieve detection accuracies of over 97% (DeepFaune), and drastically reduce the time spent manually sorting data sets. A ski area that installs several camera traps strategically distributed around the ski area could then analyse the images using AI thanks to DeepFaune to generate seasonal inventories (winter/summer), track annual variations and produce biodiversity indicators on an ongoing basis.

About Mountain Planet: Created in 1974 in Grenoble (France), MOUNTAIN PLANET is the global trade fair for mountain development and industry, held at ALPEXPO, the event park in Grenoble, Auvergne-Rhône-Alpes. An international gathering for mountain development and a showcase for the latest innovations and market trends, this major event for mountain professionals brings together the entire global mountain ecosystem (manufacturers, elected officials, local authorities, accommodation providers, ski area operators, etc.) every two years. It enables professionals in the sector to unveil innovations and the latest trends/technologies for sustainable mountain development in summer and winter. Each year, MOUNTAIN PLANET welcomes more than 900 international exhibitors and brands. Its exhibition area covers 60,000 m^2. More than 20,000 professional visitors from over 68 countries attend. The 2026 edition of the MOUNTAIN PLANET trade fair will take place from 21 to 23 April 2026 at Grenoble-ALPEXPO (France). For more information, visit: mountain-planet.com

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