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ISR REPORT

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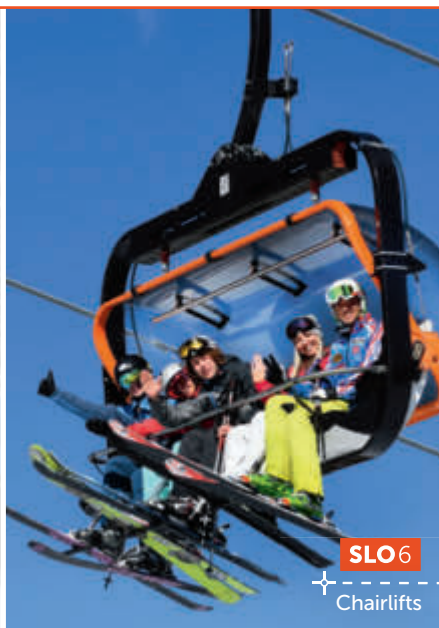


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MAG. CLAUDIA MANTONA

Editor-in-chief

EDITORIAL



This satirical image was created after the Czech ski resorts, which were ordered by the government to remain closed due to the Covid-19 pandemic for virtually the entire 2020/21 winter season, i.e. until May 9, 2021, were finally given permission to reopen on May 10.

DEAR READERS,

The picture on the right is a satirical illustration of the disastrous situation confronting ski resorts in the Czech Republic, Slovakia, Bulgaria, Romania and Poland in the 2020/21 winter season, which governmental Covid-19 regulations turned more or less into a non-event (except for a few days before Christmas). The consequence was heavy losses for the ropeway operators and for all sectors of the economy involved in this key driver of tourism.

At the moment, numerous ski resorts have already opened for the summer season. The decisive factor for the final result in 2021 will be the extent to which the summer season manages to take off in the winter sports destinations in the face of the current public health rules. The Corona vaccination programs, which have begun worldwide and in some cases are already well advanced, are clearly an advantage in this respect. Apart from that, the success of this year's summer season and especially the upcoming 2021/22 winter season will also depend on whether national and international travel restrictions remain in place or are lifted. For its part, the ropeway supply industry has taken all possible measures to maintain deliveries as usual and in addition has in-

vested a lot of time and money in new products (see pages 10, 20 and 22). Our highly experienced international correspondent Roman Gric has again been on tour for ISR: In this issue he reports on the funiculars in the Czech resort of Karlovy Vary (p. 6). We also take pleasure in providing information on a range of exciting new products and services for winter sports destinations – from new ropeway installations, summer slides and a year-round training facility for ski and snowboard crossers, to snowmaking systems and efficient snow grooming.

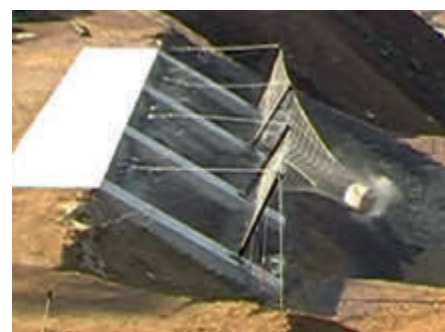
I would like to close by thanking everyone who has made a contribution to our ISR 5 Countries Special, and I wish you, dear readers, an interesting and enjoyable read.

Kind regards,

Claudia Mantona
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PHOTO: SKIBUKOVKA

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The Karlovy Vary funiculars

ISR REPORT At the beginning of the previous century, three funicular railways were built in the largest, most famous and most popular Czech health resort of Karlovy Vary. A start was also made on a fourth funicular, but it was never completed. After several refurbishments, two of these installations still attract spa visitors, day trippers and locals.



The two cars of the *Diana* funicular meet in the mid-station at *Jelení skok* (Stag's Leap).

According to legend Charles IV, King of Bohemia and Holy Roman Emperor, discovered the curative hot spring in the middle of the 14th century when he was out hunting and chased a stag to the edge of a gorge in the forested valley of the *Teplá* River. At all events, the history books tell us that Charles was the founder of the health resort that bears his name. Periods of prosperity in Karlovy Vary alternated with disasters caused by floods and major fires. Carlsbad, as the town was once known, was slow to recover after the Thirty Years' War. It was not until the middle of the 19th cen-

tury that "taking the waters" became fashionable again. The spa was particularly popular with rulers, the nobility, prominent artists and later also with the affluent middle classes. Seeing and being seen was just as important in those days as it is today.

HEYDAY IN THE BELLE EPOQUE

As it stands today, the center of the spa dates from the 19th and the beginning of the 20th century. At the turn of the 19th to the 20th century, during the *Belle Epoque*, Karlovy Vary's fame was at its peak. The curative springs and the leading hotels and cultural facilities are located in the narrow valley along the *Teplá*, but other facilities, hotels, guest-houses, woodland restaurants and viewpoints are spread out on the adjoining steep slopes and hills. For visitors to travel down to the spa facilities in the valley for their daily ritual, funiculars were recognized as the ideal means of transport.

THE IMPERIAL FUNICULAR

The oldest of the funiculars runs from the bottom station in *Divadelní náměstí* (Theater Square) in the immediate vicinity of the *Vřídlo* (hot spring), the most famous of Karlovy

Vary's medicinal springs, to the *Helenin Dvůr Café*. It was built as a conventional funicular railway with two wooden cars running on a single track with an Abt passing loop at the midpoint. In the first few years of operation, it also served as a material-handling ropeway for the construction of a large world-class hotel, the *Imperial*, and has been known as the *Imperial* funicular since the hotel opened in 1912. The 127 m long funicular is an underground installation. This solution was chosen so as not to detract from the scenery on the hill above the *Vřídlo* and also to avoid the need to purchase expensive land in the center of the resort. The funicular was designed by Emil Viktor Strub and built by Ludwig von Roll'sche Eisenwerke Gerlafingen. The wooden cars were supplied by the Ringhoffer Smíchov company of Prague. The funicular opened on May 18, 1907, but it only ran during the summer when there were visitors taking the waters in the resort. It was operated by the Karlsbader elektrische Standseilbahn Westbury company. Although the Hotel *Imperial* is only a stone's throw from the hot spring colonnade as the crow flies, managing a vertical difference of almost 60 meters every day would



Today's car no. 1 in the bottom station of the *Imperial* funicular



A wooden car for 32 people in the first years of operation of the *Imperial* funicular



Drive of the *Imperial* funicular with the twin-groove bullwheel



The Abt passing loop on the 127 m long line of the *Imperial* funicular

PHOTOS: ROMAN GRIC (6), ARCHIVE OF DPKV (1)



First-generation car at the bottom station of the Diana funicular



The Diana funicular car built in 1961 with the dominating Hotel Imperial in the background has become a popular photo motif.



Car built in 1987 on the Abt passing loop of the Diana funicular

have been an insurmountable obstacle for the mainly elderly and infirm visitors to the spa without the funicular.

1955 saw the start of the first major refurbishment of the funicular, including rehabilitation of the tunnel (shotcrete lining) and replacement of all the electrical equipment. In 1961, the old wooden cars were replaced with metal bodies supplied by Vagonka Tatra Smíchov. Despite these improvements, material testing conducted at the end of the 1970s revealed significant wear and tear, and the funicular was closed in December 1980.

With no foreign exchange available in communist Czechoslovakia in the 1980s for such items as ropeway equipment manufactured in the West, and no domestic companies working in the field of heavy ropeway engineering, an offer was accepted from the Polish Budimex company for a turnkey refurbishment of the installation. Apart from the trackbed, all the components of the installation were replaced, and the interiors of the two stations were also modernized. The work was carried out between 1983 and 1985 but it took another two years for the Polish tramway manufacturer Konstal to supply the new cars. Delivering the new cars through the narrow access corridor to the bottom station was a particularly challenging operation requiring precision maneuvering. On November 13, 1987, the funicular reopened after almost seven years.

The controls for the funicular were modernized in 2017 and 2021 by the Czech company J-controls, s.r.o.,

Plzeň. Today the Imperial funicular is integrated into Karlovy Vary's public transport network. After the Tünel funicular in Istanbul, which opened in 1875, the Imperial is now the second oldest operating underground funicular in the world.

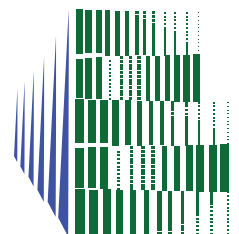
THE SLOVENSKÁ FUNICULAR

Simultaneously with the construction of the Hotel Imperial, the second Karlovy Vary funicular was also built. It ran above ground to the Hotel Imperial from Mariánskolázeňská Street, later renamed Slovenská Street, on the other side of the hill. This 126 m long funicular was an identical design to the Imperial funicular and was built and operated by the same companies. It went into service on June 15, 1912, but the bottom station occupied a less convenient location than that of the Imperial funicular and did not attract many passengers. It was finally shut down in 1959.

THE DIANA FUNICULAR

In view of the success of the first two funiculars and the hilly scenery around the center of the resort, the construction of further ropeways was proposed. Of the various ideas put forward, only the funicular to Výšina přátelství (Friendship Hill) was actually built. The

560 m high wooded hill was a popular attraction for visitors to the resort. The bottom station is near the Grand Hotel Pupp on Stará Louka (Old Meadow). The funicular has a 453 m line with a mid-station at the Abt passing loop at Jelení skok (Stag's Leap). It was built by the Viennese Leo Arnoldi construction company on the basis of Swiss models, with the ropeway engineering supplied by Österreichische Siemens Schuckert Werke. The go-



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Wheelset of the *Diana* funicular on the side of the guiding rail on the Abt switch for car no 1. The red arrow marks the track brake and the blue arrow the flangeless wheel. The dual-flanged wheel ensures that one of the wheels of each wheelset always follows the guiding rail.



Drive of the *Diana* funicular installed in 2013 with the asynchronous drive motor and twin-groove bullwheel



Drum for haul rope attachment to the car (*Diana* funicular)



Today's controls of the *Diana* funicular

ahead for the construction works was given in 1911, and the funicular was opened on August 5, 1912 already, just a few weeks after the *Slovenská* funicular. Unlike the private installations built to serve the

Hotel *Imperial*, the *Diana* funicular was financed and operated by the municipal authority. The funicular was named after the *Diana* woodland restaurant and observation tower at the top of the hill, which

TECHNICAL DATA

Funiculars in Karlovy Vary (Carsbad), Czech Republic

	<i>Imperial</i>	<i>Diana</i>
Elevation of bottom station	381 m	389 m
Elevation of top station	435 m	556 m
Line length	127 m	453 m
Gage	1,000 mm	1,000 mm
Vertical difference	54 m	167 m
Haul rope diameter	28 mm	28 mm
Drive	top station	top station
Rated output	51 kW	55 kW
Car capacity	50 pax	49 pax
Max. gradient	495 ‰	432 ‰
Max. line speed	2.04 m/s	2.04 m/s
Ride time	1.0 min	6.6 min
Rated transport capacity	790 pph	365 pph
Contractors		
Manufacturer	Ludwig von Roll'sche Eisenwerke, Gerlafingen	Österreichische Siemens Schuckert Werke
Period of operation	1907 – 1980	1912 – 1980
General contractor for the refurbishments	Budimex	
Construction works	Przedsiębiorstwo budownictwa przemysłowego, Poznań	
Ropeway engineering	Mostostal, Zabrze	
Car manufacturers	Konstal, Chorzow	
Today's control system	J-controls, s.r.o, Plzeň	
Opening after refurbishment	November 13, 1987	December 21, 1988

opened in 1914 and made a major contribution to the success of the funicular. The original wooden cars for 36 seated and 12 standing passengers were in operation until the 1963 refurbishment, when they were replaced by metal cars as in the case of the *Imperial* funicular. The drive motor and the electrical equipment were also replaced.

Subsequent developments on the *Diana* funicular followed the same pattern as the *Imperial*. The *Diana* ceased operating on December 31, 1980, and after several years of closure was rebuilt by the Polish Budimex company and reopened on December 21, 1987. In addition to the replacement of the actual ropeway components and refurbishment of the bottom and middle stations, a completely new building was constructed for the top station. In 2013, an asynchronous drive motor with frequency converter was installed and the controls were also modernized. Today the funicular is highly popular with visitors and is in service all year round. The *Imperial* and *Diana* funiculars are operated by the local public transport executive Dopravní podnik Karlovy Vary, a.s. (DPKV).

THE UNFINISHED TŘI KŘÍŽE FUNICULAR

Tři kříže (Three Crosses) is a wooded hill on the opposite side of the valley to the *Diana*. The idea of a ropeway was proposed in 1907, and lengthy debates on various alternatives followed. As a result, work on the finally agreed installation, a funicular from *Vřídelská* (Hot Spring) Street to Three Crosses Hill, did not start until 1913. Following the outbreak of the First World War in the summer of 1914, work on the funicular was stopped and never resumed. All subsequent efforts and plans to complete the project came to nothing, and today's municipal council has no interest in reviving them. All that remains of the unfinished project are the concreted cuttings for the planned line of the funicular and the remains of the *Panorama* mid-station.

Roman Gric



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Insights – inspired by motion

DOPPELMAYR/GARAVENTA At the beginning of May 2021 the global player in the field of ropeway engineering presented several technical innovations and exciting projects to an international audience in a dedicated online event.



Since the beginning of March 2021, Mexico City residents in the Cuauhtēpec district have been able to ride a new 10-passenger gondola lift (D-Line) from the Doppelmayr/Garaventa Group. The Tlalpexco–Campos Revolución link is the first stage of *Cablebús Línea 1* to go into service.



The new *Peak Line* station concept for reversible aerial tramways is a modular solution with clearly defined interfaces to planners, architects and civil engineers for shorter project planning and completion times.

In addition to site visits to interesting ropeway installations, in which the respective CEOs gave informative reports on their experiences with system operation and the extremely positive effects in terms of ski area development, the ropeway experts from the Doppelmayr/Garaventa Group also pre-

sented new products in the three areas of digitization, ropeway engineering and bike transport: *Clair* is a new resort management software for resort operators, *Peak Line* redefines reversible aerial tramways, and *Bike Cab* is an innovative solution for the efficient transport of mountain bikes.

PEAK LINE

Garaventa's new modular station concept is for twin-track reversible aerial tramways with permanently tensioned track ropes and no track rope brakes. The development brief for the *Peak Line* included provision for autonomous ropeway operation (AURO). What distinguishes the *Peak Line* from conventional aerial tramway station systems is its modular design in the sizes "small" (with cabins for 30 to 55 passengers) and "large" (with cabins for 60 to 100 passengers), with clearly defined interfaces to planners, architects and civil engineers. This is the key to shorter project planning and completion times. The *Peak Line* is based on an optimized structural and mechanical station concept: All ropeway components are installed and positioned on and around central concrete masts, which act as the connecting element between the electromechanical equipment and the station building. The compact dimensions of the stations mean lower construction costs. With the various structural elements fully separated from the track, the gage in the stations can always be calculated in accordance with the geometry of the line. Despite the emphasis on standardization, the *Peak Line* also offers scope for customization with various design options. A modern, open structure and individual facade options round off the attraction of the *Peak Line*.

BIKE CAB

For many winter sports destinations, the summer season is be-



Eight bikes can be transported in a single *Bike Cab*. Loading and unloading is a fast and easy process, which passengers handle themselves.



The new *clair* resort management software gives resort operators a full overview of their facilities and systems.

coming increasingly important. They are developing their mountain infrastructures accordingly, including new bike parks and mountain bike routes. The Doppelmayr/Garaventa Group has reacted to this trend with its *Bike Cab*, a new and convenient solution for the safe and comfortable uphill transport of bicycles by gondola lift. The cabin is designed to carry eight bikes, including mountain bikes, downhill bikes and fat bikes. The *Bike Cab*'s suspension and detachable grip are identical to those of the passenger cabins. The heart of the affair is a central pole with a bike rack comprising holders for the front and rear wheels of eight bikes. As the *Bike Cab* passes slowly through the station, the assembly rotates around its own axis, and the rack can be filled by the passengers themselves before boarding the next cabin. The bikes are then transported safely up the mountain to the top station, where passengers have enough time to lift their bikes off the rack again. The *Bike Cab* has been designed for use with D-Line gondolas, although retrofit options for other systems in the Doppelmayr/Garaventa portfolio are planned for the future.

RESORT MANAGEMENT SOFTWARE CLAIR

A tourism resort has a highly varied infrastructure, including cable cars, snowmaking installations, snow grooming equipment and

service buildings. Currently their operation, maintenance and repairs are mostly organized separately. This is a disadvantage in terms of the time and effort involved. In addition, it is often difficult to maintain a clear overview. Optimizing the flow of information and work schedules is becoming increasingly critical in ensuring smooth-running processes for all employees across the resort – especially with the increasing complexity of the work involved. The new *clair* resort management software from the Doppelmayr/Garaventa Group gives resort operators a full overview of their facilities and systems. “*Clair* brings together on a single user interface the information and operations of all systems that were previously organized independently of one another. This gives all personnel a perfect overview at all times so that they can complete their jobs with maximum efficiency,” says *clair* product manager Saša Maretić. With *clair*, work activities are centrally managed, defined and assigned – in line with the specific needs of the individual resort. All employees can view detailed information on the installations in real time via a dashboard. In addition, machine data can be retrieved and compared and daily operations subsequently optimized. The result is maximum transparency and efficiency in terms of operation, maintenance and repairs. *Clair* is a web-based application that is open to

all installations and systems – completely vendor-independent. The software interface has a clear structure. *Clair* will be continuously enhanced with additional functionalities in the future so as to further facilitate employees' daily work routines.

CABLEBÚS LÍNEA 1 IN MEXICO CITY

Since the beginning of March 2021, Mexico City residents in the northern Cuauhtémoc district have been able to ride a new 10-passenger gondola lift (D-Line) from the Doppelmayr/Garaventa Group. The Tlalpexco–Campos Revolución connection is the first stage of *Cablebús Línea 1* to become operational and offers a foretaste of the high-performance transport solution that will be completed in June 2021. Almost ten kilometers of ropeway with six stations will then become part of the public transport network, offering a direct link for residents of Cuauhtémoc to Indios Verdes. That is the busiest public transport hub in Mexico City, with the attraction of fast, convenient and barrier-free transfer to bus and metro.

To close, Thomas Pichler, Executive Director of Doppelmayr Holding SE, presented an outlook on the future of mobility with the Urban Future Concept.

The entire event and more detailed information can be viewed at <https://insights.doppelmayr.com/>

CM

New Lärchkogelbahn chairlift with a “wow”

LEITNER The *Lärchkogelbahn* 8-seater chairlift serving the Planai in the Austrian resort of Schladming went into service at the beginning of the 2020/21 winter season. With its *EVO premium chairs*, stations in the *Pininfarina* look and a transport capacity of 3,500 pph, the new chairlift is a quantum leap for Planai-Hochwurzen-Bahnen GmbH.



Lärchkogelbahn top station with panorama deck in the Planai look



The *EVO premium chairs* on the new *Lärchkogelbahn* are designed for maximum comfort. The seats and backrests can be replaced individually.

With one million rides per year and a line leading to the top of three of the Planai's main downhill trails, the *Lärchkogelbahn* is a central item in the ski area infrastructure. In the planning for the new chairlift, that made it all the more important for Planai-Hochwurzen-Bahnen to

TECHNICAL DATA

Lärchkogelbahn 8-seater chairlift (detachable, with bubbles)

Elevation of bottom station	1,337 m
Elevation of top station	1,759 m
Line length	1,228 m
Vertical difference	422 m
Number of towers	14
Rope diameter	52 mm
Drive	top station
Rope tensioning	bottom station
Rated output	747 kW
Number of chairs	61
Line speed	5.5 m/s
Ride time	3.7 min
Rated capacity	3,500 pph

combine the required capacity increase with a quality ride and also “something special”. “For the period up to 2025, we are planning five new chairlifts. As with the *Lärchkogelbahn*, our aim in all cases is to create a product with a wow effect,” says Georg Bliem, Managing Director of Planai-Hochwurzen-Bahnen GmbH, and he adds that the starting date for work on the next lifts will depend on the economic prospects in the upcoming months.

PREMIUM CHAIR AS A USP

The top and bottom stations of the *Lärchkogelbahn* are in the familiar Planai look: The clean lines and the generous use of glass and wood provide a harmonious solution in combination with the station enclosures designed by the Italian *Pininfarina* company. Like the chairs, the enclosures are also in the Planai's yellow and green

colors. “The new *Lärchkogelbahn* from Leitner features a number of technical innovations that make our work much easier. From the visitor's point of view, however, what counts most apart from safety is the quality of the ride – and this is where the chairs come in, also as a way of standing out from the competition,” says Operations Manager Silvester Groggl, who is responsible for the running of the *Lärchkogelbahn*. That explains the decision in favor of Leitner's *EVO premium chairs* with their characteristic design and heated seats. Groggl also mentions the practical advantages such as seats and backrests that can be replaced individually, and fast and easy access to the locking mechanism.

CONTROLS WITH CLEAR VISUALIZATION

System monitoring for the new *Lärchkogelbahn* is located in the

top station. All significant operating processes are visualized on a touch screen and can be controlled there. “The control system has been designed for ease of use, with a clear overview and logical information. Shutdowns can be quickly identified, with a distinction made between shutdown alarms and other fault messages,” Silvester Grogl explains. Thanks to the CCTV system with cameras and lighting on every second tower, the *Lärchkogelbahn* can also be operated in the dark. This is an advantage for skiers from the Austrian national squads, who make frequent use of the trails for training sessions in the early hours. The Leitner *DirectDrive* in an overhead configuration was chosen for the new *Lärchkogelbahn* and located in the top station.

SPACE-SAVING SOLUTION FOR THE BOTTOM STATION

The bottom station had to be designed to fit into a limited space. The main factors to be taken into account were the steep gradient of the line immediately after the station exit and the need to reach a line speed of 5.5 m/s for a transport capacity of 3,500 pph. “The new bottom station of the *Lärchkogelbahn* really needed to be about one third longer, but this had to be avoided so as not to restrict the width of the trail behind it,” says Georg Bliem, and he talks about the intensive work performed in collaboration with Leitner to find the optimum solution: “The dwell time of the chairs in the bottom station is extremely short, but thanks to the 90° loading configuration and other measures taken, this does not detract from the lift experience for visitors.”

DEAD-END RAIL CARRIER PARKING SYSTEM FOR PLANAI

Because of frequent groundwater problems with the basement parking system on the old *Lärchkogelbahn*, the new installation was designed with carrier parking located adjacent to the bottom station at ground level. For reasons of space,



The low-maintenance Leitner *DirectDrive* in an overhead configuration in the top station

the operating company decided to switch to a dead-end rail system for parking the chairs: “We found Leitner’s proposal to park the chairs on three dead-end rails convincing, especially as we could not see any disadvantages compared to a loop parking configuration,” says Operations Manager Grogl. Carrier parking and launching is a fully automatic process, with the chairs traveling at a speed of 3.0 m/s. Should the need arise, the operator can override the automatic system using a simple remote control. The whole process takes about the same amount of time as loop parking, but the latter takes up more space. The ground-level chair parking facility has been designed with large windows so that maintenance work can be performed in natural daylight – and visitors can get a backstage view of ropeway operations.

ROPEWAY ENGINEERING MEANT TO BE SEEN

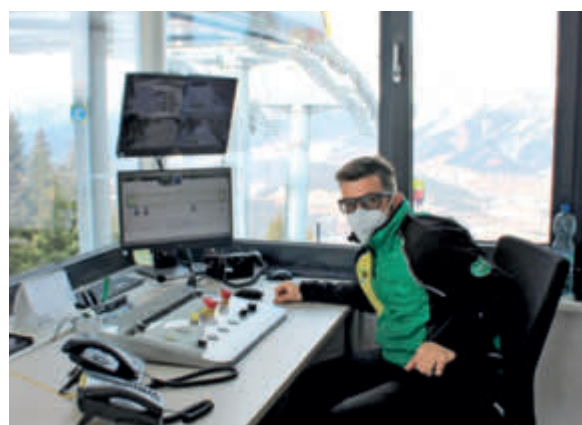
In general, it is the policy at Planai-Hochwurzen-Bahnen to make the ropeway engineering visible to visitors. At an early stage of the *Lärchkogelbahn* replacement project, the company’s employees formed a “Shape the Future Team”, and they submitted various proposals relating to the new installation. One suggestion that has been implemented in this context is the *Planai Digital App*. With the help of an *augmented reality* function, technical information about the



The bottom station of the new *Lärchkogelbahn* chairlift with 90° loading/unloading was designed with the about same length as the old station so as not to encroach on the ski trail behind it. The 3-rail parking shed on the right is located at ground level next to the bottom station in order to avoid groundwater problems.



Operations Manager Silvester Grogl standing in front of the interactive information boards on the panorama deck on the roof of the top station. With the *Planai Digital App* installed on your smartphone, you simply hold the camera in front of one of the panels to activate the *augmented reality* function and receive further technical information about the ropeway.



Operator Günter Schmid in the control room. All basic operating processes are visualized on a single touch screen and can be controlled from there. The monitor above it is part of the chairlift’s CCTV system.

Lärchkogelbahn can be called up on a smartphone, including the experience of standing on the panorama deck on the roof of the new top station.

Dieter Krestel



The Jahorina Mountain Coaster in Bosnia and Herzegovina opened in August 2019. Riders reach speeds of up to 40 km/h on a 2,300 m rail.

The Mountain Coaster comes to Eastern Europe

SUNKID The Mountain Coaster is one of the biggest selling summer toboggan runs in the world. Several Sunkid Mountain Coasters have been installed in the last two years, including in Eastern Europe. The facilities are proving to be big tourism attractions there.

One of the Mountain Coaster's characteristic features is the closed-loop system: The rider gets on the Mountain Coaster in the bottom station. A T-bar lift toes them to the start of the ride, where the toboggan automatically disengages and is launched down the fast track. At the destination, the rider gets off the toboggan and hands it over to the next visitor, who starts the fun all over again. This not only reduces personnel requirements but also precisely determines the number of toboggans needed in advance.

FACT BOX

Jahorina (BIH)

Downhill length	2,300 m
Toboggans	70
Inclination	ø 16%
Speed	max. 40 km/h
Uphill ride	chairlift

The Mountain Coaster system offers a number of advantages: use of existing infrastructure for cost-efficient transportation of the toboggans, quick and easy disassembly, and a minimum operating personnel requirement.

In ISR 2/21 (p. 48) there was a report on the year-round Mountain Coaster in La Rosière (FR). Successful projects have also been implemented in the Balkans and Eastern Europe:

JAHORINA (BIH)

The Jahorina mountains are located only 30 km from Sarajevo. Having served as the center for the ladies' alpine skiing events at the 1984 Olympics, the region is currently developing into an up-and-coming tourism destination. As before, the area stands out for its original charisma, dense forests

and almost untouched nature. The Jahorina Mountain Coaster, which opened in August 2019 and has since become a special experience for many visitors, is designed to harmonize with the idyllic landscape. Photo spots integrated into the line record special moments for a photographic souvenir of an impressive experience.

DURAU (RO)

The Romanian town of Durau gained several new attractions in the summer of 2020. The Durau Mountain Coaster plus a tubing track about 150 meters in length, and two Moving Carpets formed part of a considerable investment package for the summer and winter seasons.

Visitors who are or still feel young particularly enjoy the intelligent line of the track and the ground-



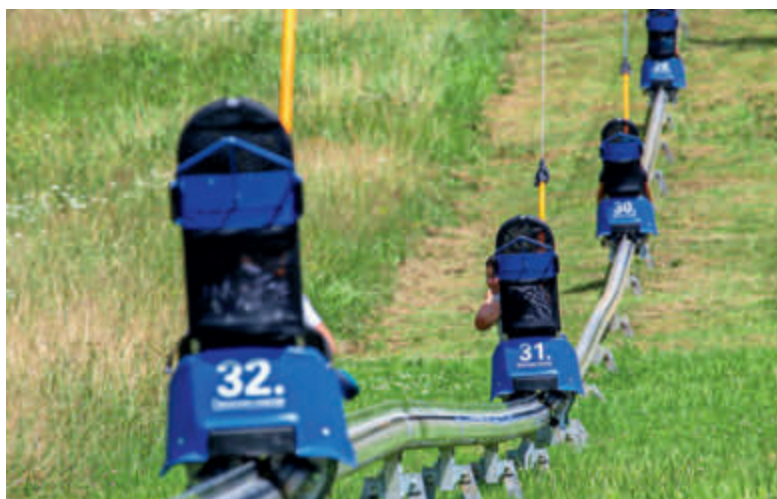
In the Jahorina mountains, 30 km from Sarajevo, the Mountain Coaster harmonizes perfectly with the idyllic landscape.

hugging installation of the facility. They can speed downhill through a flowering mountain meadow on the ski slope, which is not in use in summer, at a speed of up to 40 km/h. Just as the downhill run is all about speed, the entire Durau facility was installed in the record time of just 12 days.

BORSEC (RO)

The small town of Borsec is located less than 50 kilometers to the west of Durau. It is becoming increasingly popular with tourists and has had the additional attraction of another Sunkid Mountain Coaster since summer 2020. The closed-loop system is 1,440 meters long, which makes the Borsec Mountain Coaster one of the longest summer toboggan runs in Romania.

The existing infrastructure with a T-bar lift proved ideal for the Mountain Coaster in Borsec, reducing the total cost of the installation and offering many benefits in terms of day-to-day operation.



In Borsec, an existing T-bar lift was integrated into the Mountain Coaster, which was built in 2020, for convenient transportation to the starting point of the downhill ride.

FACT BOX

Durau (RO)

Total length	776 m
Downhill length	444 m
Uphill length	332 m
Toboggans	25
Inclination	ø 12.8%
Speed	max. 40 km/h
Uphill ride	T-bar lift
Features	closed system

FACT BOX

Borsec (RO)

Total length	1,440 m
Downhill length	865 m
Uphill length	575 m
Toboggans	32
Inclination	ø 14.7%
Speed	max. 40 km/h
Uphill ride	T-bar lift
Features	closed system

IMPRINT

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New year-round Startpark for Reiteralm's Crosspark

NEVEPLAST At Schladming (AT), the famous site of two FIS Alpine World Ski Championships in the past, the new Startpark with Neveplast material provides cross experts with a year-round opportunity to train.



Ski and snowboard cross athletes from all over the world will be able to improve their skills all year round at the *Neveplast Startpark Reiteralm* in Austria.

Nestled in the wild Styrian landscape, Schladming has gained a special place in the hearts of skiing enthusiasts over the years. The Austrian resort has hosted the FIS Alpine World Ski Championships twice and since 1981 has been home to the iconic slalom on the Planai, the most closely followed of the World Cup events.

Another highlight within the Schladming resort is the Reiteralm area, where ski and snowboard cross specialists from every corner of the world come to train in the Crosspark. There a new "Startpark" with Neveplast material for year-round training will be inaugurated in summer 2021, and Neveplast will be its title sponsor. That explains the name: *Neveplast Startpark Reiteralm*.

This project greatly enhances Reiteralm's attraction for visitors: a summer park created with Neveplast artificial material is a valuable opportunity for ski and snowboard

cross experts to train even in the hottest summer without the need for real snow. This is a great advantage for Olympics and World Cup races, because the *Startpark* enables Athletes to practice their skills the whole year round.

TECHNICAL AND TITLE SPONSOR

The layout of the *Neveplast Startpark Reiteralm* includes six different training lines with whoops, jumps and parabolic turns especially designed to replicate racetracks on which athletes will compete during the winter season. The lines perfectly suit the characteristics and needs of ski and snowboard cross specialists. They are entirely covered with Neveplast material, an eco-friendly and totally regenerative material, which replicates the feeling of skiing and snowboarding on a layer of compact snow. Once laid on the ground, the Neveplast material also remains where it is during the winter season

to help when there is a lack of snow or temperatures are high. In such cases just a few centimeters of snow are enough to train efficiently and in total safety.

REALIZATION OF THE PROJECT

Willibald Zechner aka Willi is the Head Coach of China's National Alpine Skiing Team. Previously he was Head Coach of Austria's National Ski Cross Team for many years and was the main supporter of the Crosspark project.

With regard to the idea for the new *Startpark* and its realization he says: "When I was training the Austrian National Ski Cross Team I looked for an efficient solution which would allow my athletes to train all year long. It was thanks to one of my top athletes, Katrin Ofner (recent winner of a World Cup race in Val Thorens), that I was introduced to Neveplast. Katrin has been training for a few years now on a pump track and a start section especially created for her, and she is very enthusiastic about this solution. After talking to Katrin I immediately contacted Neveplast and in a very short time we closed a deal for the supply and sponsorship of the *Startpark*. The contract was finalized thanks to the Unterkofler family and the Reiteralm ski area, who have always supported me in the realization of interesting projects aimed at tourists and athletes visiting the resort."

INTERNATIONAL ATHLETES EXPECTED

Zechner is convinced that the *Neveplast Startpark Reiteralm* will be a true success: "The winter

Crosspark in Reiteralm is the flagship of the ski area, and the training slope entirely dedicated to ski and snowboard cross athletes is used by national teams from all corners of the world. Our Austrian athletes especially, but also the whole World Cup entourage and the various ski clubs using it are all enthusiastic and thrilled about the new *Neveplast Startpark Reiteralm*. From summer 2021, I expect to see a lot of bookings from athletes of multiple nationalities, who will come to Reiteralm specially to train in the Neveplast summer park.”

ALL-IMPORTANT STARTING SECTION

The starting section is very important for the overall performance of the athletes. “Every athlete in a cross discipline, whether on skis or snowboard, knows how important the starting section is, the one that begins at the starting gate and ends at the first few whoops. In ski and snowboard cross the athletes start together, and those who get out of the whoops first have a great advantage over the others when they find themselves fighting it out to get to the front. It is way better to be in the front from the beginning because pursuing and overtaking others becomes more and more difficult,” explains coach Zechner. He believes that the possibility to train in a summer park on high performance material like Neveplast will raise the bar for all the athletes. “It takes continuous repetition of the movements, in different circumstances all year long, to improve performance from the starting gate. We are very proud that Neveplast accepted our offer. I must say I have not tried Neveplast yet, but I will do so as soon as the *Startpark* opens. Looking forward to inaugurating the *Neveplast Startpark*, I would like to invite you all to follow the adventures of the winter Crosspark Reiteralm on our official social media channels.”

SUCCESSFUL PARTNERSHIP

Niccolò Bertocchi, Managing Director of Neveplast, says they are



The *Neveplast Startpark Reiteralm* will be inaugurated this summer – as a valuable addition to the existing Crosspark Reiteralm for effective training irrespective of the snow conditions.

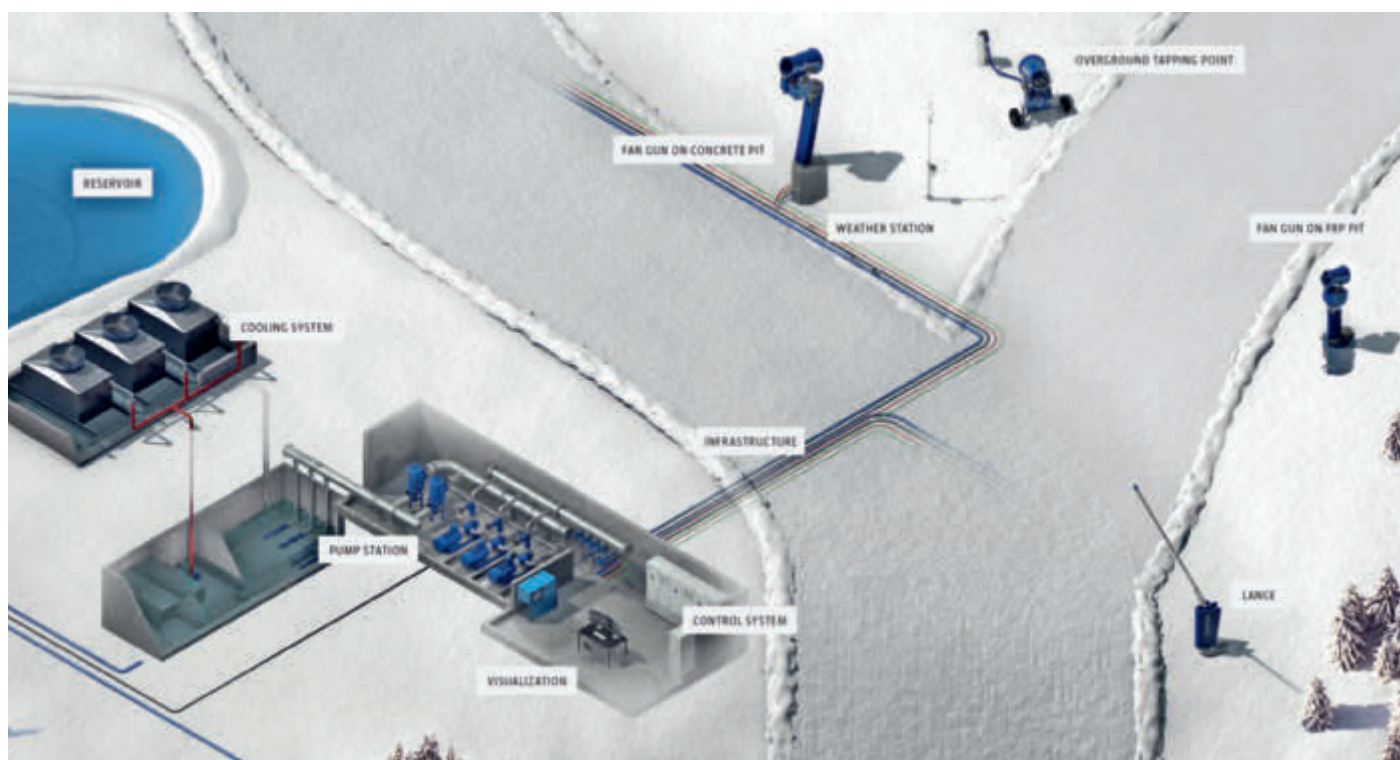


The starting section is especially important for a successful race in the cross discipline, and training on Neveplast material in the summer park is a real advantage in this respect.

extremely happy and proud that Neveplast was chosen by the Reiteralm company for its summer Crosspark and he adds, “We deeply believe in the potential of our product for training on the start section. The ski and snowboard cross athletes who use Neveplast all year long to improve their skills are very satisfied with the results, and for us this is worth more than any other marketing operation. The fact that our name for the partnership with the Crosspark in Reiteralm was suggested by Katrin Ofner, who already trains on a Neveplast pump track, is a great payback for us, and for all the sacrifices we have made to constantly improve. We are an Italian company exporting worldwide, but every time we find a way

into Austrian hearts life is a bit sweeter for us. In a country where winter sports are a true religion, being appreciated for our hard work is even more gratifying.”

Bertocchi is grateful to everyone involved: “I would like to thank Willi Zechner for thinking of us, and naturally our Sunkid colleagues who served as intermediaries for this contractual operation. I am very much looking forward to personally seeing and testing the *Neveplast Startpark Reiteralm* when it is finalized. I really hope it will become a favorite destination for international athletes from all continents and a forge of champions, who can grow and take the international scene by storm thanks to this year-round training facility.”



A turnkey solution for snowmaking involves many components like pump stations, flowcharts, reservoirs, pipelines, cooling systems and snow guns. Everything has to be carefully planned and adapted to the specific requirements of the terrain.

Turnkey snowmaking for the most demanding requirements

DEMACLENKO Various specializations are involved in the construction of snowmaking systems and must be brought into perfect harmony. As a professional full-service supplier, the Italian manufacturer Demaclenko has long years of experience and a proven track record with turnkey systems.

For the construction of snowmaking systems, extensive knowledge in the fields of hydraulic engineering, structural engineering, pipeline construction, control systems and electrical, mechanical and apparatus engineering is required. Demaclenko, an Italian snowmaking company, offers turnkey solutions for customers who are looking for quality products, competent all-round consulting and professional project and construction site management.

GOOD PLANNING IS ESSENTIAL

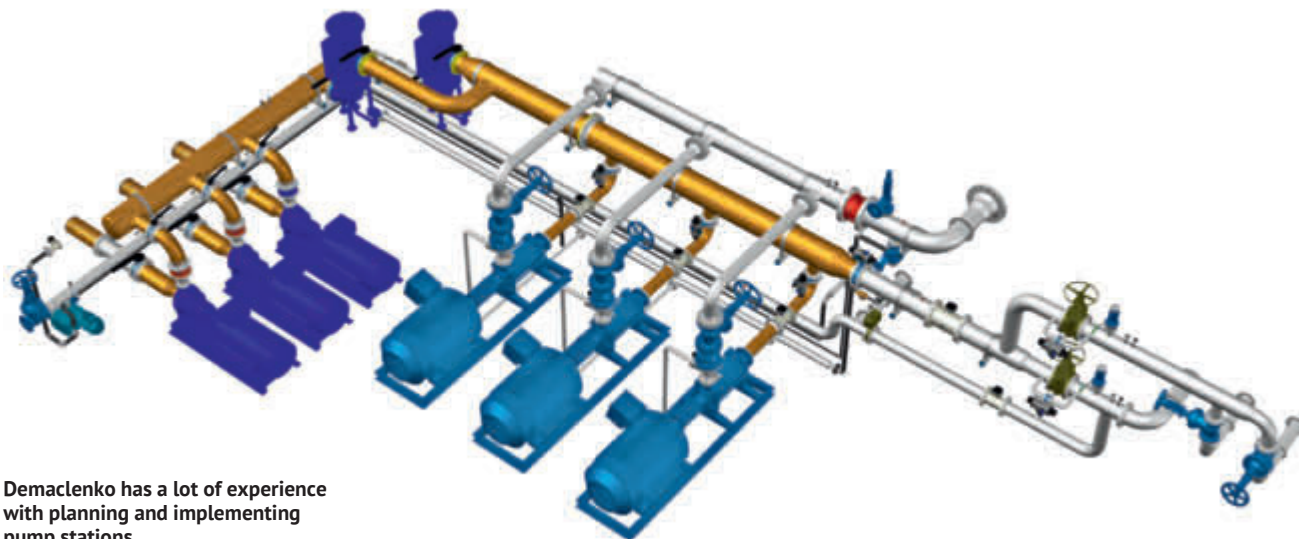
The reservoirs and snow guns along the trails are all that is usu-

ally visible in a snowmaking system, which is mostly underground infrastructure. It is a complex network of various components that need to be individually adapted to the local terrain and perfectly coordinated with one another. This requires detailed planning and intelligent layout solutions, and the process begins by drawing up a project plan. At Demaclenko, the pump stations, flowcharts, water reservoirs, pipelines, cooling systems and snow guns are individually designed and graphically displayed on a site plan of the ski resort based on local inspections and snowmaking schedule calculations. The project plan forms the framework for Demaclenko's ex-

perts, who guide clients and offer comprehensive support throughout.

RELIABILITY THROUGH TOP QUALITY

Only high-quality and extremely robust materials are used, which are designed to withstand the high operating pressures and use in alpine terrain. It should also be borne in mind that a snowmaking system is only in operation for a few weeks of the year, but during this period operational readiness is essential. That is why 100% reliability of each individual component is so important. At Demaclenko no compromises are made in this respect, and only those com-



Demaclenko has a lot of experience with planning and implementing pump stations.

ponents and products are installed that meet the highest industry standards. This is how the company implements turnkey solutions that guarantee absolute system availability during the snowmaking phase.

PUMP STATION: THE HEART OF THE AFFAIR

The pump station is the heart of the snowmaking system, and the relevant planning and implementation has been one of Demaclenko's core competencies for years. The pump station and the pipelines to the snow guns are designed by a team of experts to perfectly match the resort's requirements, with careful attention paid to such aspects as total flow rate and water level for pumping. Demaclenko uses pumps from the most reputable manufacturers for pumping water and boosting pressure. With the help of detailed 3D visualization, all the components – with the exception of less sensitive connectors – are engineered for a perfect fit under strict quality controls in the in-house metalworking shop. This greatly simplifies the work on the mountain, as the parts are simply assembled on site with no further adjustments needed. The components are hot-dip galvanized as standard for extra load-bearing capacity and protection from corrosion.



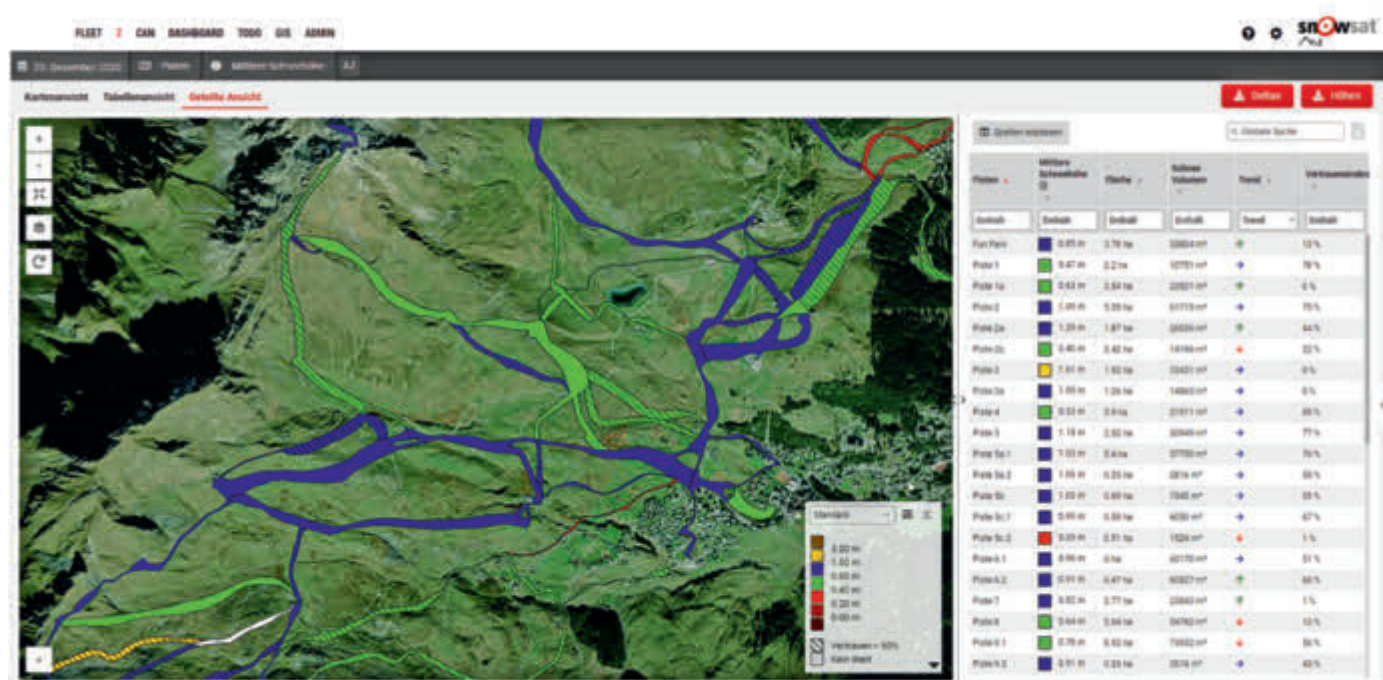
The pump station is the heart of a snowmaking system and is designed to meet the ski resort's needs by a team of experts.



Most of the pump station components are engineered for a perfect fit under strict quality controls in the in-house metalworking shop. This simplifies on-site assembly.

Perfect slopes from the first day to the last

KÄSSBOHRER Professional snow management is the key to safe, efficient and economical ski operations and optimal slope quality throughout the season. *SNOWsat*, the data-based snow management system from Kässbohrer, has been a reliable partner for ski resorts around the world for more than ten years and provides data-based decision support.



Snow depth measurement and snow management are part of the *SNOWsat* platform.

In the beginning was snow depth measurement: it forms the basis for professional data-driven snow management. Over 350 customers worldwide benefit from a real-time overview of the current snow situation on their slopes provided by *SNOWsat*. Thanks to seamless documentation of all relevant data, no one has to rely on gut feeling alone. It is a perfect combination: the experience of the drivers – they know where the snow reserves are, for example – is backed up with data as the basis for further optimization. In this way, everyone benefits from the data: Slope managers and snowmakers at the operational level, and ski area and operations management in their strategic decisions.

SNOW DEPTH MEASUREMENT

An impressive advancement is now to be had in the form of predictive snow depth measurement with *SNOWsat LiDAR*. It provides the driver with real-time data on snow depth – not only under the vehicle but also in front of it (up to 50 m) and to the sides. The resulting addition to the database provides for anticipatory working and optimizes the use of available resources. From the planning in the office to the work in the groomer, not a single pile of snow remains unused, according to the manufacturer Kässbohrer.

IDEAL USE OF RESOURCES

One of the biggest cost factors in ski resorts is the production of arti-

ficial snow. *SNOWsat* provides detailed information on where unexpected snow deposits are located and where the snow cover is only very thin. It determines when and which snow guns need to be activated. That permits groomer operating hours to be optimized and snow to be produced according to demand. This financial advantage helps to pay off the investment in a short time while maintaining or even improving the quality of the slopes.

Bogusław Broda, Technical Manager of Słotwiny Arena in Poland, sums up these advantages: "We have seen the most savings in diesel consumption and maintenance costs. The system is clear and easy to use. It allows us to precisely



SNOWsat LiDAR provides the driver with real-time data on snow depth up to 50 m in front of and to the sides to the vehicle.



The Słotwiny Arena in Poland is seeing extensive savings and optimization thanks to **SNOWsat**.

identify critical areas where the snow cover needs to be supplemented. We have also optimized the working time of our employees and machines. Thanks to **SNOWsat**, we were able to significantly extend the winter season at our ski resort."

REMARKABLE SAVINGS, SATISFIED GUESTS

In Kotelnica, Poland, **SNOWsat** has been in use since the 2016/2017 winter season and has been installed on 10 machines (including three third-party vehicles) and 14 snowmobiles. Technical Director Piotr Misztal quickly recognized the many advantages: "Particularly in the production of artificial snow, we save enormously with **SNOWsat**. We can continuously monitor

snow depth in the entire ski area and determine in detail which slopes need to be covered with artificial snow. We manage our snow stocks much more efficiently today. This results in savings on energy and water consumption and on fuel."

There are also many positives with regard to his team and the skiers: "The system has made the drivers' work much easier. The constantly updated graphic display of the slope proved to be indispensable when distributing the snow piles and preparing the slopes at night. Thanks to **SNOWsat**, our slopes are now better prepared, and that is reflected in terms of visitor satisfaction and the growing numbers of visitors to our ski resort from year to year."

When regular ski operations start next winter, maximum efficiency and operational reliability will be even more in demand. Professional snow management is the guarantee for perfect slope quality and safe and economical operation from the first to the last day of the season.

OVERVIEW

The benefits of snow management with **SNOWsat**

- Basis for decision-making
- Identification of snow reserves and their efficient use
- Selective and targeted snow replenishment
- Savings in resources and costs
- Good snow conditions on the slopes throughout the season (timely detection of thin snow cover and avoidance of dirt ingress into the slope)
- Sustainable slope construction for a successful season from day one

THE ADVANTAGES AT A GLANCE

- Worldwide Unique monorail System
- Best Price-Performance Ratio
- Easy and Quick to disassemble
- Theming possibilities
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Two brand-new snow groomers

PRINOTH The Italian manufacturer Prinoth has announced the launch of the new generation of its best-selling snow groomers, the *Leitwolf* and the *Bison*. The new machines feature a completely new control unit design, clean *Stage V* engines with low fuel consumption and low emissions, and new looks.



With its low-emission but high-performance *Stage V* engine, the new *Leitwolf* is an efficient machine for creating perfect slopes, also thanks to an impressive working width of 4.5 m.



Prinoth's new user-friendly control unit in the groomer cockpit includes a joystick-in-joystick feature for simultaneous operation of all blade functions.



The follow-up model of Prinoth's *Bison* snow groomer scores with its massive power and agility. It is perfectly suited both for building park features and for preparing slopes.

Like their predecessors, the two follow-up models of Prinoth's *Leitwolf* and *Bison* snow groomers deliver ideal conditions on the slopes and in parks. The innovative features of the new generation include a new control unit, a high-performance, clean *Stage V* engine and a redesigned body in a different finish.

OPTIMIZED DRIVING EXPERIENCE

Based on feedback from groomer operators, the Prinoth *control unit* has been designed to maximize the driving experience through increased comfort and simplified operation. The joystick has been optimized to make handling even more straightforward. It incorporates a joystick-in-joystick feature for blade operation using only the thumb and simultaneous control of all blade functions.

The 12" touchscreen gives faster access to the most important features. With a single touch, operators can switch between options: From adjusting the lights or using the rear camera to checking the setting of the tiller, the new display has everything covered.

EFFICIENT ENGINE

"From the feedback we've already received in the field, customers are delighted with the new models. *Bison* operators have commented on

its massive power and agility. Reactions to the *Leitwolf* confirm the performance of the engine and its excellent efficiency," says Horst Haller, CEO of snow groomers at Prinoth, and he adds, "We are delighted to receive such positive input. It's great to be at the forefront of helping ski resorts not only prepare perfect slopes and build exciting parks but also remain efficient and green."

VISUAL REDESIGN

In addition to the features that have long made Prinoth machines so popular in the industry, such as the wide range of tracks, excellent tiller designs and the *Automatic* winch, the new snow groomers also bring a brand-new look to the market.

"With the redesigned body in a new *nightshade gray* finish, the distinctive looks reflect on the outside what we've done on the inside," says Andreas Muigg, Product Manager of snow groomers at Prinoth.

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