



SCHILDKNECHT
SMART DATA COMMUNICATION

Practical examples



APPLICATION IN CABLE RAILWAYS

DATAEAGLE 3702A provides for trouble-free transport

Application

Roosevelt Island Tramway is an aerial cableway in New York City (USA), connecting Roosevelt Island and Manhattan. It is the oldest urban aerial cableway in North America serving for local public transport. Built in 1976, it was replaced by a completely new cableway system of POMA. The objective is to transfer information between the terminal and both cabins. Moreover, the emergency stop function shall be ensured via PROFIsafe.

Challenges

Since the terminal is located in Manhattan at the corner 2nd Avenue/E 60th Street directly and at Queensboro bridge but the cableway has to utilize the airspace above this street, it cannot run parallel, but only in a very acute angle to the bridge. The cable railway is 945 m in length and has three aerial lift pylons of up to 76 metres. This steep ascent of 76 metres in the center of

Manhattan with many radio interferences such as for example WLAN represents a challenge for automation technology. These restricted space conditions and contorted travel paths without any direct visual contact are a particular challenge to each transmission path.

Solution

The system equipped with a PROFIBUS Safety PLC should at no time cause any disturbances. The system features the **DATAEAGLE 3702A** for wireless PROFIBUS transmission with Bluetooth as the radio technology applied.

Result

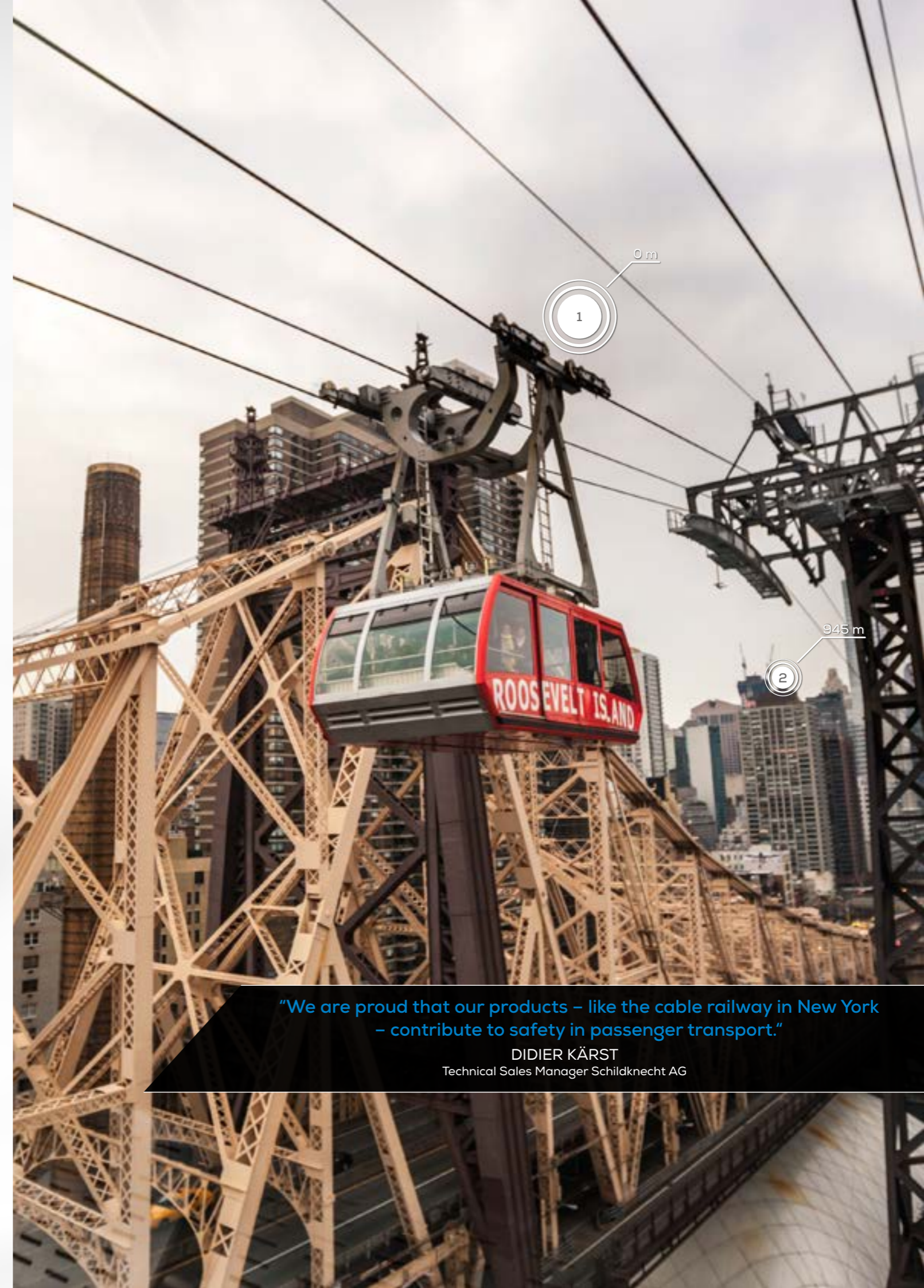
Despite thousands of additional radio communications around the cable railway, the devices have been running since 2010 without malfunctions and downtimes of the cable railway.



1. Directional antennas of the **DATAEAGLE Classic 3702A master** at the control cabinet at a mast.



2. **DATAEAGLE Classic 3702A** in the protection cabinet at one of the two cabins.



"We are proud that our products – like the cable railway in New York – contribute to safety in passenger transport."

DIDIER KÄRST
Technical Sales Manager Schildknecht AG



DATA TRANSMISSION IN CRUDE OIL PRODUCTION

DATAEAGLE on an oil drilling ship

"100% availability and maximum requirement
by Safety, ATEX and ship approval."

THOMAS SCHILDKNECHT
CEO of Schildknecht AG

Application

Seadrill Limited is a Norwegian company dealing with the oil production industry. Operated are: Jack-up drilling rigs, semi-submersibles and drilling vessels for sinking drillings for crude oil and natural gas. The 253 m long drilling ship West Navigator relies on a **DATAEAGLE radio link to the driller**. The driller is the fully automatic machine unit, screwing the drilling rod weighing up to 750 tons together.

Challenges

The challenge consisted in establishing a highly reliable radio link for replacing the very susceptible cable connection to the driller. One-day failure causes up to 600,000.00 euro costs. Requirements to technical solutions on an oil drilling ship are safety, ATEX and ship approval.

Solution

On the ship, a wireless PROFIBUS and PROFIsafe radio link to the driller is built up. As radio technology, Bluetooth is applied since thanks to frequency hopping it enables extremely stable and robust communication. Due to the very sophisticated application, the **DATAEAGLE 3000** was installed in an explosion-protected housing.

Result

In a two-years test, DATAEAGLE has successfully asserted itself against all market players and so saves the operator downtimes and costs amounting to millions.



1. **DATAEAGLE** at the fixed side in the Ex-protective housing.



2. **DATAEAGLE** at the mobile side of the plant by which the drill pipe is installed.



SHAFT ACCESS SYSTEM OF A HIGHWAY TUNNEL

DATAEAGLE in emergencies

Application

Since its extension in 2013, the Pfänder tunnel has been in operation with two tubes. By 2020, a traffic load of 46,000 vehicles per day is expected. In the shaft access systems, serving for investigating supply air and exhaust shafts in the Pfänder tunnel and carrying out rescues from the tunnel in the event of an emergency, our customer STB Beck GmbH relies on the proven radio technology of Schildknecht AG.

Challenges

The particular challenge consisted in implementing a safety critical radio transmission via a travel distance of up to 320 m through the lift shaft to the moved basket of the shaft access control system. In case of rescue the system is required to work reliably for example for transporting rescue service personnel into the tunnel.

Solution

After installing the DATAEAGLE 3000 system the lift could be put into smooth operation with special functions such as e.g. access control and hooking and unhooking the lift car. The proven Bluetooth technology provides for trouble-free radio connection here despite interfering transmitters in the environment.

Result

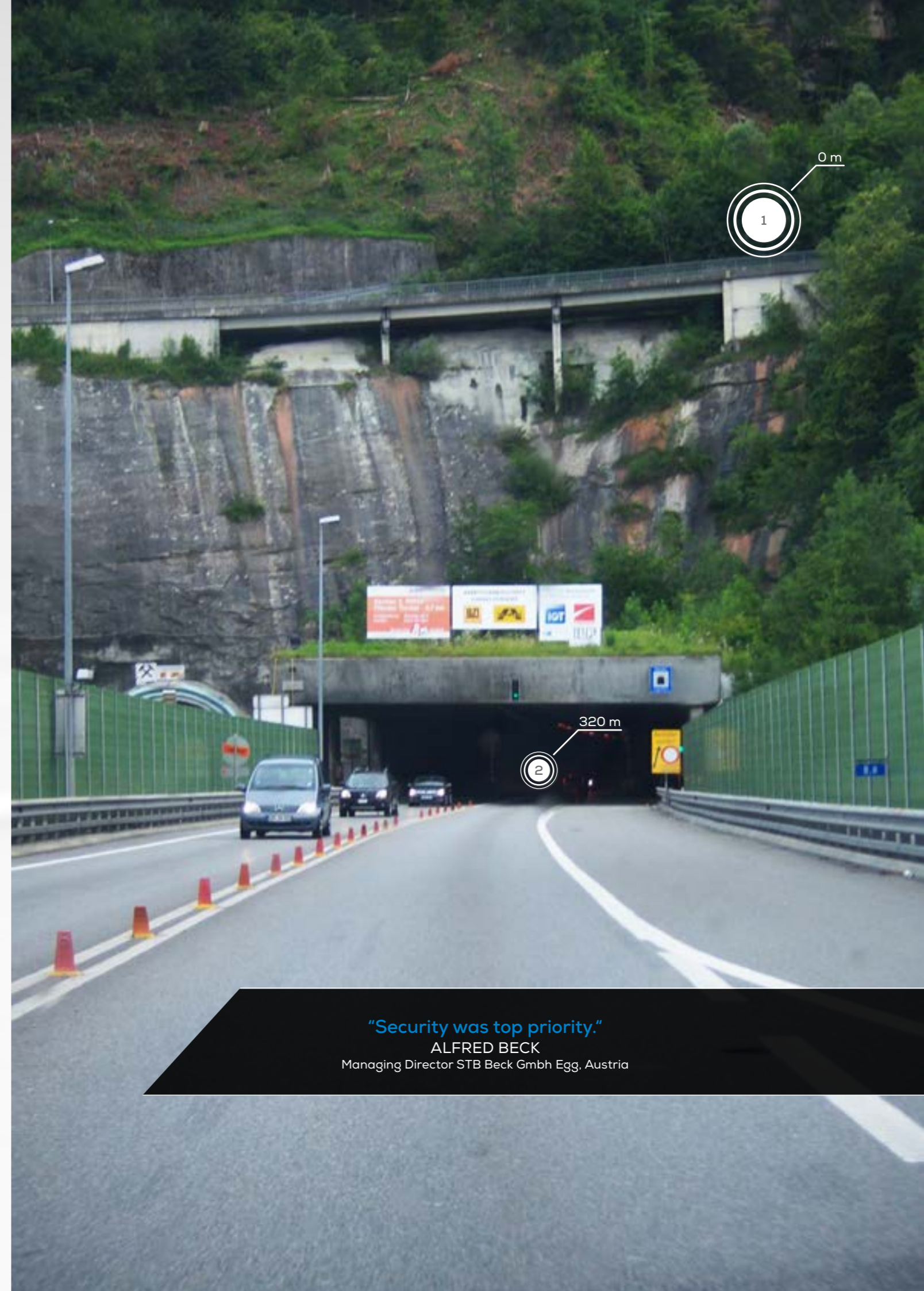
After successful conversion of the control technology by STB Beck GmbH, the shaft access system of the tunnel has been running successfully for several years now without interferences and failures. Therefore, DATAEAGLE radio communications systems are planned to be applied also in further systems with a shaft depth of up to 700 m in the future.



1. Access to the shaft access system.



2. DATAEAGLE Classic 3000 applied at Pfänder tunnel.



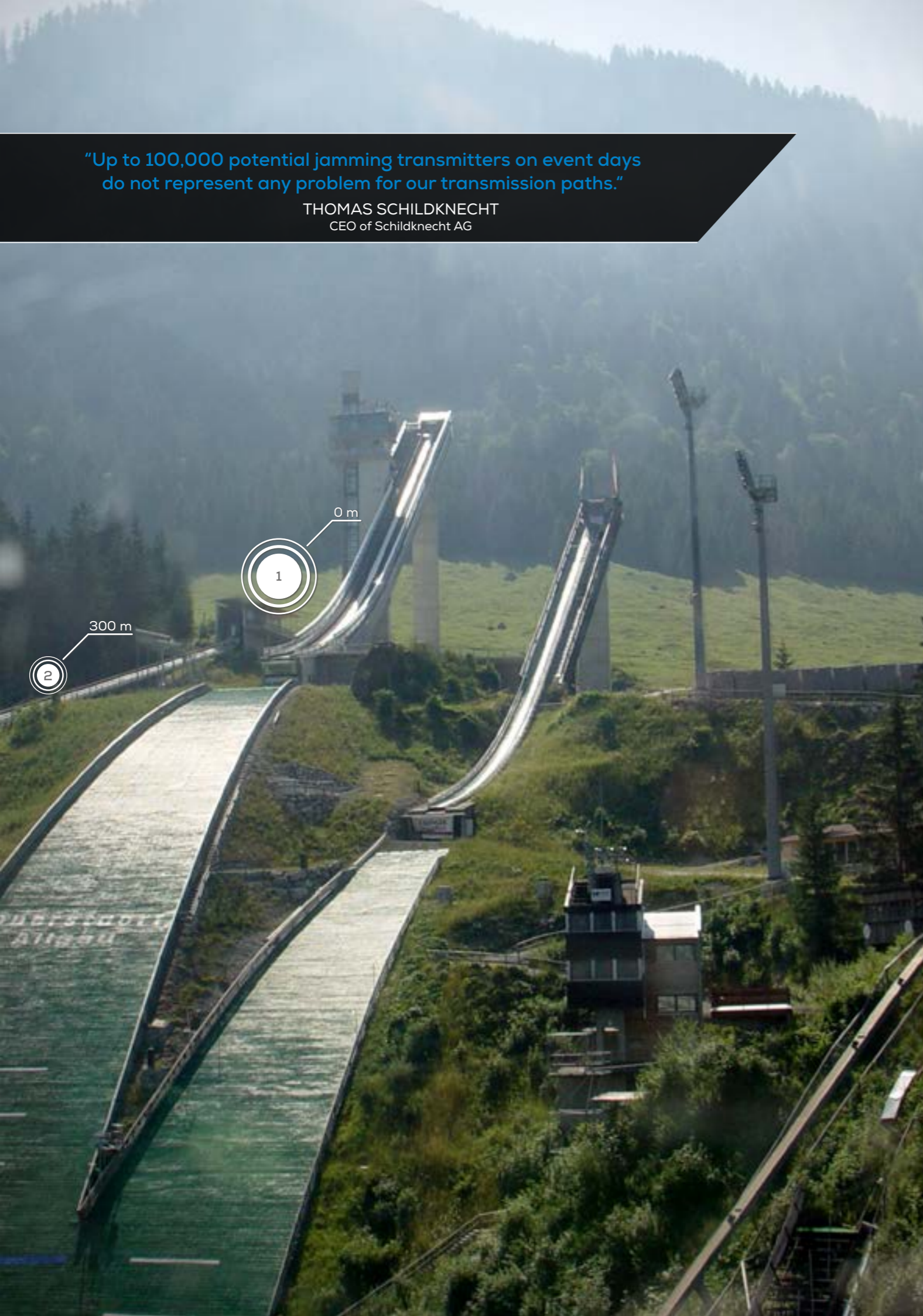
"Security was top priority."

ALFRED BECK

Managing Director STB Beck GmbH Egg, Austria

“Up to 100,000 potential jamming transmitters on event days do not represent any problem for our transmission paths.”

THOMAS SCHILDKNECHT
CEO of Schildknecht AG



DATAEAGLE LETS THE EAGLES FLY

DATAEAGLE provides for uplift in Erdinger Arena

Application

Erdinger Arena is located in Oberstorf and comprises five ski jumps. In this arena, the opening ski jumping of the Four Hills Tournament takes place every year at the end of December. The inclined lift with automatic levelling specified according to European Lift Directive which is installed therein is actuated via radio modules. In November 2011, the control unit of the system control was refurbished completely.

Challenges

Due to the high degree of susceptibility, radio modules installed hitherto have been replaced by **DATAEAGLE 3000**. The particular challenge consisted in the fact that along the approx. 300 m travel distance of the inclined lift there was no visual contact between the central control unit and the cabin. On event days, there are thousands of interfering transmitters for example by video transmission, mobile and radio in within close proximity.

Solution

The **DATAEAGLE 3000** applied transmits PROFIBUS signals to the cabin via radio. Like a lift in self-propelled mode with fully automated doors in the cabin it drives to mountain and valley stations. The entire control unit was manufactured and conducted according to EN81.1 safety rules for construction and installation of lifts for transporting persons or persons and loads.

Result

Shortly before the Four Hills Tournament the lift was released by TÜV for operation without any rework. “After the first two years we found that availability of the lift was almost 100%”, reports STB Steuerungstechnik Beck 2014.



1. Cabin of inclined lift of Erdinger Arena with beam antenna.



2. Up to now, **DATAEAGLE 3000** Master in the control cabinet has been communicating reliably with the cabin.



HELENE FISCHER STAGE TECHNOLOGY

And the bird flies smoothly at every concert

Application

Stage technology on the occasion of Helene Fischer concerts could hardly be more sophisticated. Singing "Von hier bis unendlich", Helene Fischer flies over her passionate audience in up to 20 m, preferably also upside down. After the spectacular air show she lands with her gigantic bird on a central stage in the middle of the event hall. The fanciful bird is actuated via radio with [DATAEAGLE](#).

Challenges

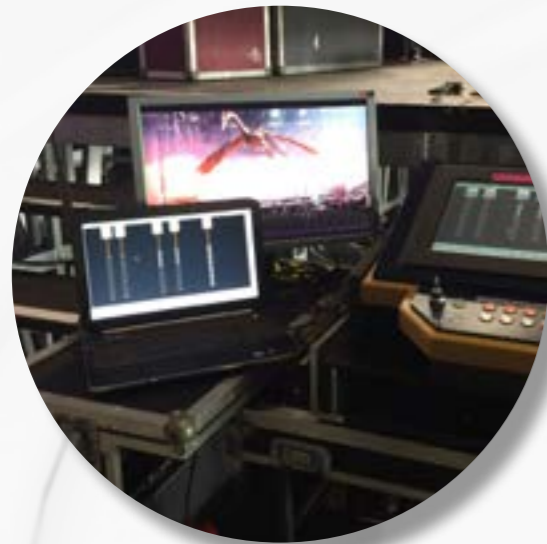
Stage technology usually requires highest availability of the transmission path as well as security of people in the interaction with technology. Due to the 80 m long and winding rails, no trailing cable connection to the bird could be realized. Power supply was via a bus bar. This system as well as the radio link is required to work smoothly during each event with complete reliability and security.

Solution

The entire power electronics (5x Füllung & Partner Highline Slave) goes with the rail. [DATAEAGLE 3702](#) is applied for the PROFIBUS connection between Highline Master and Slaves. In parallel, there is also an independent system for emergency stop. Transmission is realized via 2.4 GHz Bluetooth without interferences and failures. In approx. 90% of all systems, Bluetooth is meanwhile applied instead of WLAN since its robustness is a hundred times higher.

Result

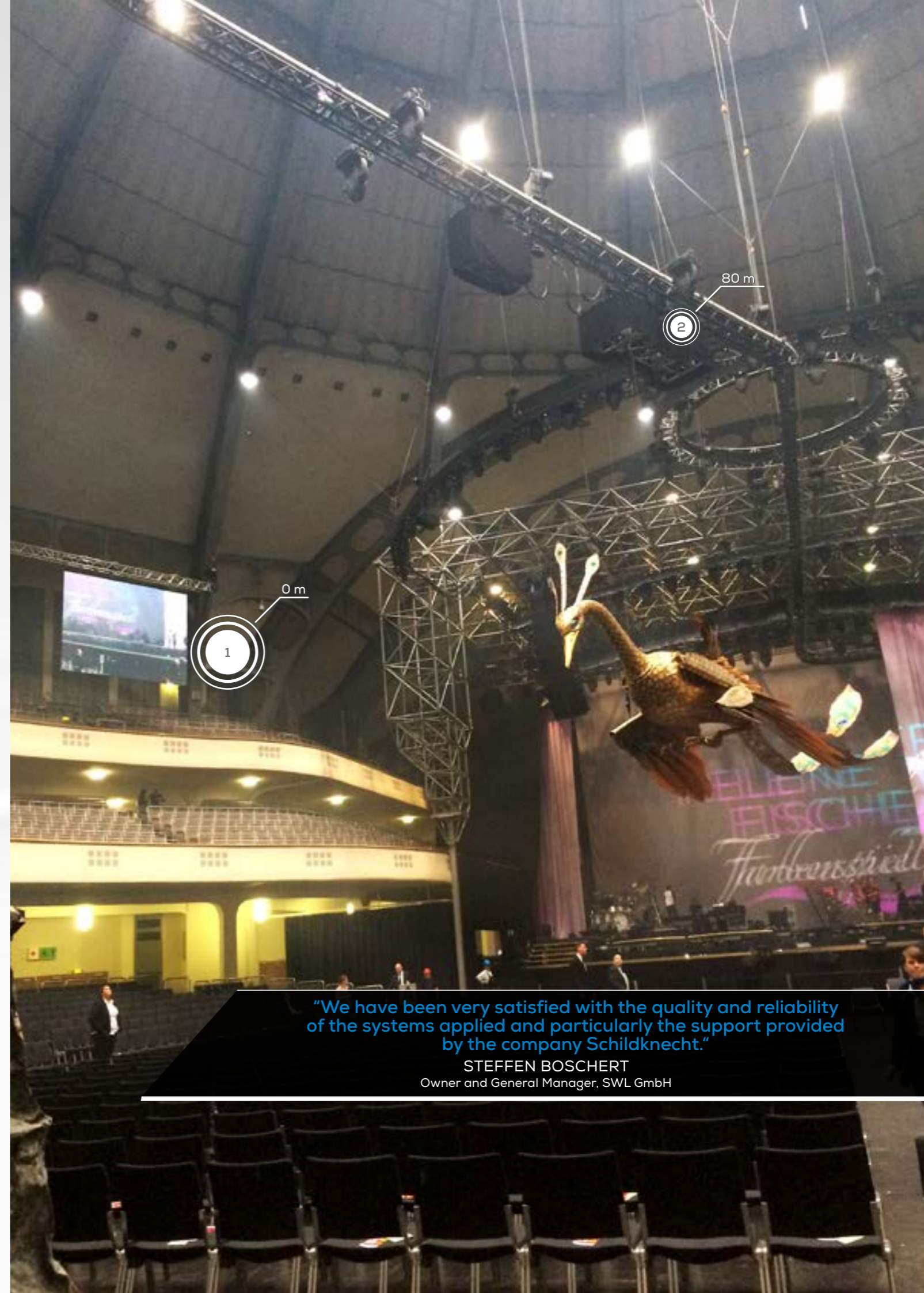
Thanks to the patent for stabilizing a radio connection the team of [Schildknecht AG](#) as well as stage technology SWL and Füllung & Partner does not remain breathless (German: atemlos – according to the Helene Fischer song). All concerts as well as many further applications in the field of stage technology went smoothly without interferences and failures. For example the musicals [Aladdin in Hamburg](#), [Rocky in Stuttgart](#), [Beauty and the Beast in the tour version for Barcelona and Moscow](#) or also the wing carriage at the [Bavarian Theatre in Munich](#).



1. Behind the scenes, the bird is controlled and monitored.



2. Via this rail construction the bird is controlled accompanied by the power electronics with [DATAEAGLE](#).



"We have been very satisfied with the quality and reliability of the systems applied and particularly the support provided by the company Schildknecht."

STEFFEN BOSCHERT
Owner and General Manager, SWL GmbH

"For many years, we have been relying on applying
fieldbus radio links in crane technology."

DIPL.-ING. KURT KIMM

Technical Manager Electronics, Scheffer Krantechnik GmbH



SCHEFFER CRANE TECHNOLOGY

Appliance in the highly automated galvanizing plant

Application

Within automation of modern crane and lifting systems, fieldbus systems are part of the standard equipment for controlling operations.

Nowadays, radio links are applied within the fieldbus network, replacing conductor lines applied so far in applications with moved plant components. In 2011, OBO Bettermann established a metal competence centre as a highly integrated production facility with hot-dip galvanizing as the core element of the plant.

Challenges

Galvanization is always connected with movement processes: The workpieces run through a series of treatment steps for cleaning and pre-treatment, followed by the actual galvanizing process and completed by baths for follow-up treatment. Temporally changing restrictions of the transmission conditions by steel girders or other cranes should remain without any impact on the availability of the radio link. In addition, the fully transparent PROFIBUS connection should provide for comfortable start-up and

maintenance possibilities for conveyor components hardly or incapable of being accessed.

Solution

Via the **DATAEAGLE 3000** PROFIBUS radio link, data is reliably transmitted every 30 milliseconds from the central control unit S7 CPU 319 to the assigned mobile monorail crane travel units of the system over a distance of 50 metres. Thereby, their current position indications and driving tasks are continuously exchanged bidirectionally and safely actuated. Since galvanization plants are highly automated, highest availability is indispensable. In this process, Bluetooth has proved particularly interference-free.

Result

The radio modules have proved in operation. **Despite restricted line of sight there are no failures** which is presented in an increased efficiency of production and secured production quality.



1. The crane trolley in the galvanizing plant receives and sends data via **DATAEAGLE** slave.



2. **DATAEAGLE** is located directly in the ceiling construction and is the base station (Master).



WIRELESS TECHNOLOGY IN TREATMENT PLANTS

Wireless connection of sensor technology of any kind

Application

In treatment plants, careful monitoring of relevant parameters is essential for effective wastewater treatment. The company Endress +Hauser recommends DATAEAGLE in treatment plants where they successfully install radio systems in the control unit for transmitting measuring data.

Challenges

For ensuring a better monitoring of a treatment plant, measuring values of several locations of the plant must be collected. However, due to the extensive outdoor areas it is extremely elaborate and expensive to establish a wired sensor network of measurement points far away from each other. At a swing bridge at the aeration basin installing a cable connection is even impossible. Moreover, no further inputs were available at the control unit.

Solution

Sensors, fittings and transducers were installed at the required locations. For transmitting measuring values the DATAEAGLE 3703 radio modules of were installed, transmitting data transparently like a cable using PROFIBUS DP and up to 1.5 Mbit/s. Thanks to the applied 2.4 GHz Bluetooth technology with frequency hopping, measuring data always finds a free transmission channel.

Result

The benefits of the radio path are a better process control thanks to additional measuring values and above all time saving for employees since they are not required to carry out these measurements by hand. Further measurement parameters may be added without much effort and employees monitor the system at any time using a signal system.

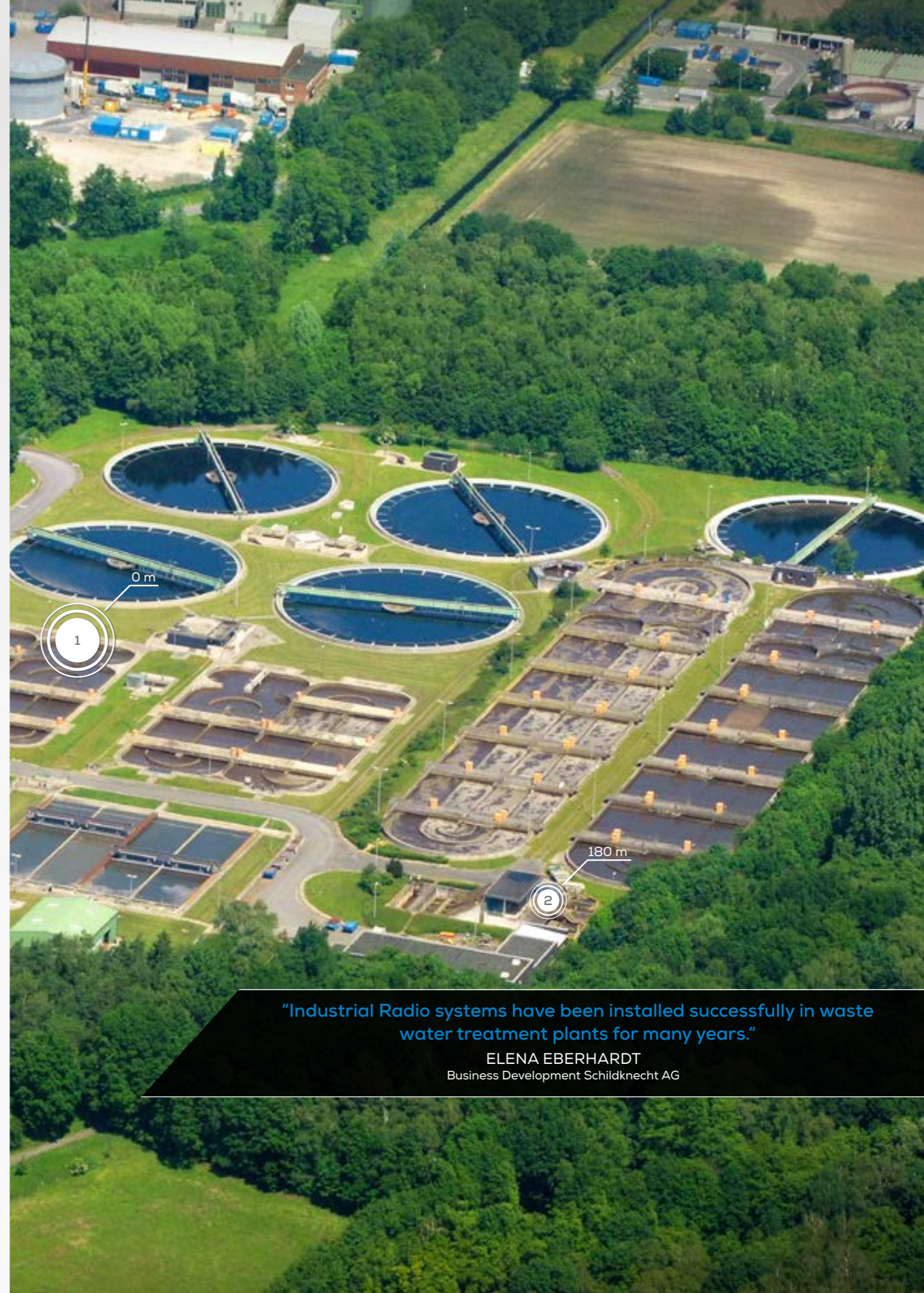
Since 2013, the system has been running trouble-free and reliably.



1. DATAEAGLE Slave in exterior use.



2. DATAEAGLE Master in the control cabinet directly at the clarification tank.



"Industrial Radio systems have been installed successfully in waste water treatment plants for many years."

ELENA EBERHARDT
Business Development Schildknecht AG

