# AURO: Autonomous Ropeway Operation

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# Stepping into autonomous mobility

Pioneering innovations are the hallmark of a successful enterprise. Innovations that provide the right answers to what moves people. One example is autonomous operation. This is an area where Doppelmayr/Garaventa is thinking ahead with the introduction of AURO (Autonomous Ropeway Operation). AURO ropeways bring passengers safely and reliably to their destinations – with unmanned operations and cutting-edge digital network technology. This concept is pointing the way for the future of rope-propelled mobility.

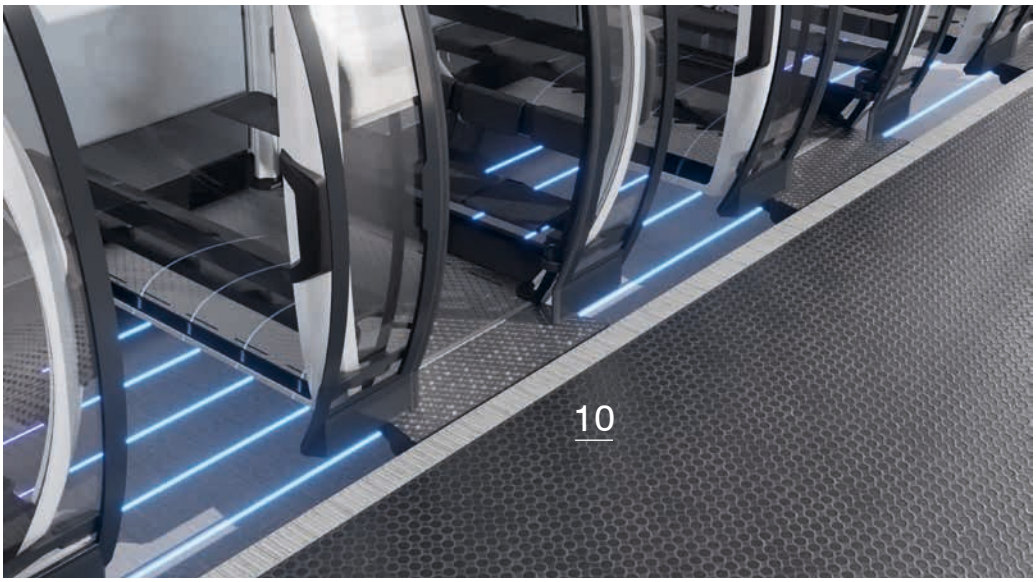
AURO ropeways from Doppelmayr/Garaventa operate with unmanned stations. They are equipped with intelligent integrated technology and impress with the highest safety levels. Cameras and sensors ensure smooth processes and monitor the installation – particularly cabin loading and unloading. The system independently identifies situations that deviate from “normal operation”. If, for instance, a passenger’s shoe or ski boot becomes caught in the cabin door, the system reacts immediately and the installation automatically shuts down. It is restarted by a ropeway operative who has an overview of operations from the Ropeway Operation Center (ROC). The perfect synergy of human and cutting-edge technology results in high availability of the ropeway.

## AURO ropeways are:

- high-capacity
- reliable
- safe
- barrier-free
- visionary

# Benefits of AURO ropeways

- Cost savings: no personnel required in the stations for passenger operations
- Top safety ensured by cutting-edge safety equipment
- Perfect overview in the ROC (Ropeway Operation Center) with the CCTV system in the stations
- Elimination of shutdowns in the ROC – top availability of the ropeway thanks to fast response
- Enhanced boarding comfort through additional cabin stabilization and gap-free cabin step geometry
- AURO operating concept can be extended to include several installations (only one ROC required)



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# AURO on the mountain and in the city

AURO ropeways provide huge benefits not only in tourist regions but also in cities, where they are seamlessly integrated into the transport infrastructure – thanks to their barrier-free access, reliability and efficiency in operation and maintenance. Because growing urbanization calls for visionary transport solutions. This is where the AURO concept can provide a host of answers.

# AURO elements

AURO ropeways have a series of technical components and digital features to enable unmanned operation. An AURO ropeway is a D-Line. It has all the components that set a ropeway of this generation from Doppelmayr/Garaventa apart. What distinguishes it from a "normal" D-Line is the AURO equipment for operations without station personnel. Alongside the technical components, an AURO ropeway offers a high level of comfort – as you would expect on ropeways from Doppelmayr/Garaventa.


**1. Ropeway Operation Center**
An AURO ropeway is operated from a central point, the Ropeway Operation Center (ROC). This does not have to be located immediately next to the ropeway. From here, the ropeway operative has a perfect overview. Troubleshooting can be performed remotely. An ROC can be used not only for several stations but also for several ropeway installations.

**2. CCTV system in the stations**
The loading and unloading area, the door closing area, the pit and the zone for incoming cabins are monitored with cameras. The images are transmitted to the ROC.

**3. Cabin stabilization**
Stabilizing rails ensure an absolutely stable position of the cabins as they transit through the station. This minimizes longitudinal swing and vertical movements of the cabins and enables safe boarding and disembarkation.

**4. Cabins**
The spacious OMEGA V cabins offer plenty of legroom. Sports equipment is transported inside the cabin with the TWISTIN system.

**5. Gap-free cabin step geometry**
The geometry of the cabin step is designed to match the edge of the platform in order to minimize the gap between platform and step.

**6. Platform gate with warning function**
The platform gate with warning function is located at the end of the loading and/or unloading area and prevents people from entering the cabin door closing area. If the swing gate is activated, an automatic acoustic and optical warning is generated.

**7. Platform gate with shutdown function**
The platform gate with shutdown function is located at the beginning of the loading and/or unloading area and prevents people from entering unauthorized areas. If the swing gate is activated, the ropeway is automatically shut down.

**8. Emergency stop button and intercom system for passengers**
Both platform gates are equipped with an emergency stop button and an intercom system on the passenger-facing side. This enables an immediate shutdown of the ropeway by a passenger as well as communication with the ROC, should this be necessary.

**9. Outline detection with shutdown function**
The outline detection system recognizes an object protruding out of a carrier after the door closing operation. The ropeway is shut down once the outline detection system is activated.

**10. Presence recognition in pit with shutdown function**
The presence recognition system in the pit with shutdown function monitors the carrier pit in the loading and unloading area. If the system detects the presence of a person or object, the ropeway is automatically shut down.

**11. Information banner**
Relevant information (max. number of passengers per cabin; automated, remotely monitored ropeway; SOS symbol; wheelchair user symbol) is displayed on an information banner near the ropeway in the loading and unloading areas.

**Barrier-free access**
On AURO ropeways, a large number of measures are implemented for passengers with impaired mobility so that everyone can use the installation with ease. Examples include marked areas designated to accommodate wheelchair users. Cabin stabilizing rails and gap-free cabin step geometry make boarding and disembarking very straightforward. In addition, passengers can contact the ropeway operative in the ROC – for example, to request a slower transit speed.


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