Cable Propelled Transport
E-Mobility above our heads
<table>
<thead>
<tr>
<th>Statistic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installations worldwide</td>
<td>14,500</td>
</tr>
<tr>
<td>Export countries</td>
<td>88</td>
</tr>
<tr>
<td>Countries have a subsidiary / representation</td>
<td>35</td>
</tr>
<tr>
<td>Year of establishment</td>
<td>1892</td>
</tr>
<tr>
<td>Employees worldwide</td>
<td>2,378</td>
</tr>
<tr>
<td>Million euro turnover</td>
<td>795</td>
</tr>
<tr>
<td>Ownership</td>
<td>Family-owned</td>
</tr>
<tr>
<td>Turnover by 2013</td>
<td>*by 2013</td>
</tr>
</tbody>
</table>
Competition about the rights to use ground level
Solution for smart city concepts

Why not using the **third level** up in the air?

no emissions, no noise, no traffic jams, no accidents, timesaving,
low footprint, fast realization from planning to completion

Ground level

roads, rails, busses, etc…

Underground level

MRT, subway
The desire to use the third dimension

The future as we imagined it in the past:
Urban transport by flying saucers and other vehicles in the air
What is an Urban Cable Car?
What is an Urban Cable Car?
Ropeway systems - Monocable gondola detachable

- small cabins
- detachable cabins
- high frequency
- system capacity up to 3600 pphpd

circulating continuously

1 rope

detachable grip

up to 15 passengers

max. 22 km/h
Ropeway systems - Aerial tramway

- large cabins
- large spans between towers
- wind stability up to 100 kph
- system capacity up to 2000 pphpd

shuttling back and forth

1 haul rope
2 track ropes
fixed grip
up to 200 passengers
max. 45 km/h
Aerial tramway
Ropeway systems - Tricable gondola detachable

- detachable cabins
- high frequency and large cabins
- system capacity up to 6000 pphpd
- large spans between towers
- wind stability up to 100 kph

Source: Flickr. Photo: C.M. Keiner

circulating continuously

1 haul rope
2 track ropes
2 detachable grips
up to 38 passengers
max. 31km/h
Tricable Gondola Detachable (TGD)
This is what it takes to move 10,000 people in one hour…

In one hour, a ropeway carries up to...

...10,000 passengers (5,000 in each direction).

That means a ropeway can replace up to...

...100 bus journeys or...

...2,000 car trips.
Independent transport level

- Crossing rivers
- Overcoming hilly areas
- Avoiding congestion
- Connecting satellite cities
Applications for Cable Transit
Station concept: minimal footprint in the city

This solution reduces the footprint of the ropeway in urban areas.
Station concept: easy connection to a train station

Assumption 7.80m clearance

Public area

Ropeway

Building

Elevator

Ropeway

Escalator
Where are Urban Cable Cars?

- 78-ATW Marquam Hill, USA
- 20-ATW Bozen Kohlern, ITA
- 15-MGD Constantine, DZA
- 15-MGD Tlemcen, DZA
- 15-MGD Skikda, DZA
- 8-MGD San Agustin, VEN
- 35-TGD Seilbahn Koblenz, DEU
- 8-MGD Jewel Cable Car Ride, SGP
- 8-MGD Mileniumski Krst, MKD
- 8-MGD Teleférico de Gaia, PRT
- 10-MGD Emirates Air Line, GBR
- 10-MGD Providencia, BRA
- 8-MGD Mariche – Tramo Expreso, VEN
- 8-MGD Rio Chama, VEN
- 8-MGD Batumi Transit, GEO
- 10 MGD La Paz BOL
Communication and safety features

- WLAN
- GPS
- Loudspeaker
- Surveillance camera
- Monitor
- Intercom
- Announcement system with emergency button
- PC
Interior concepts
Interior concepts
Interior concepts
Accessibility for everyone: full DDA compliance
15-ATW Polinka Wrocław PL

Politechnika Wrocławska
15-ATW Polinka Wrocław PL

Politechnika Wrocławska

**Specifications:**
- **Length:** 371 m
- **Vertical Rise:** 1 m
- **Speed:** 5.0 m/s
- **Capacity:** 366 pphpd
- **Travel Time:** 2 min
15-ATW Polinka Wrocław PL
Portland: seamless integration

Source: Flickr. Photo: Sekkle
Portland: seamless integration
35-TGD Seilbahn Koblenz DE
### 35-TGD Seilbahn Koblenz DE

<table>
<thead>
<tr>
<th>Feature</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Length</td>
<td>948 m</td>
</tr>
<tr>
<td>Vertical Rise</td>
<td>114 m</td>
</tr>
<tr>
<td>Speed</td>
<td>4.5 m/s</td>
</tr>
<tr>
<td>Capacity</td>
<td>3600 pphpd</td>
</tr>
<tr>
<td>Travel Time</td>
<td>5 min</td>
</tr>
</tbody>
</table>
35-TGD Seilbahn Koblenz DE

- Bus
- Cable Car

Map showing routes to BUGA and shuttle bus stops, with estimated travel times of 5 min and 25 min.
London: a cable car for the city growth
London: a cable car integrated in TFL’s network
La Paz: the largest cable car network

Source and Photo: Doppelmayr
La Paz: The world’s largest cable car network

- **Línea Roja**
  - 3 Stations
  - 109 Cabins
  - 2,349 km

- **Línea Amarilla**
  - 4 Stations
  - 169 Cabins
  - 3,736 km

- **Línea Verde**
  - 4 Stations
  - 165 Cabins
  - 3,704 km
La Paz: The world’s largest cable car network

<table>
<thead>
<tr>
<th>Line</th>
<th>Stations</th>
<th>Cabins</th>
<th>Length [m]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>3</td>
<td>109</td>
<td>2348</td>
</tr>
<tr>
<td>Yellow</td>
<td>4</td>
<td>169</td>
<td>3736</td>
</tr>
<tr>
<td>Green</td>
<td>4</td>
<td>165</td>
<td>3704</td>
</tr>
</tbody>
</table>

Total stations: 443
Total length: 9788 m
La Paz: intermodal transport hubs
La Paz: The world’s largest cable car network

- Contract: 10 Sep 2012
- Less than 2 years of construction time
- 1 million passengers, each month, each line
- December 18th, 10 Million Passengers
Caracas: catalyst for development
Caracas: catalyst for development
Caracas: catalyst for development

initial proposal to improve access

status quo
Caracas: catalyst for development
8-MGD Singapore

An intermediate station integrated in a shopping centre

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>1800m</td>
</tr>
<tr>
<td>Vertical Rise</td>
<td>2 m</td>
</tr>
<tr>
<td>Speed</td>
<td>5,0 m/s</td>
</tr>
<tr>
<td>Capacity</td>
<td>2800 pphpd</td>
</tr>
<tr>
<td>Travel Time</td>
<td>10 min</td>
</tr>
</tbody>
</table>

Source and Photo: Doppelmayr
The future of urban mobility is above our heads!

wolfram.auer@doppelmayr.com
Operations Services throughout the lifecycle

1. Tender
2. Design
3. Manufacture
4. Construction
5. Commission
6. Public Operation

Operations Services Concept

- Training
- Set-up Organisation
- Consulting

Operations Readiness/ Mobilisation

Transition of Experience

Operations Services Contract

- Training
- Audits
- Consulting
London
10 steps to an urban cable propelled transit system (CPT)

- Develop a vision
- Identify stakeholders
- Partnership between stakeholders (LOI)
- Archive political commitment
- Identify and reserve the sites for stations, towers and line
- Contract relevant stakeholders
- Marketing and PR to create positive public perception
- Detail planning and designing the ropeway
- Building permit, operational permit
- Construction phase and Opening
The stations

- incoming area
- grip opening line
- decelerator
- curve conveyor
- outgoing area
- grip closing line
- accelerator
- carrier spacing
Urban station: Technical parts not visible to passengers