Ruf Group

- We are a privately held Swiss company founded in 1917 and employ 170 people. Ruf Group consist of three business divisions:
  - **ICT public** – solutions for public authorities,
  - **ICT transportation** – passenger information systems for public transportation,
  - **ICT enterprises** – solutions in digital signage and data security.

- Ruf Telematik is an engineering and systems integrator company that specializes in Mobile Passenger Information Systems (PIS) for public transportation. Our systems are designed for harsh and demanding applications, are scalable and designed for easy configuration and adaption to changing demands.

- We are a leading international supplier for PIS systems, with headquarters in Schlieren, Switzerland, production in Ammersbek, Germany and a worldwide customer base.
Company History and Key Milestones

1917  • Foundation of Ruf AG by Alfons Ruf
1997  • Acquisition of Teleinform AG
2001  • SBB (Swiss Railway) gained as client
2004  • Foundation of Ruf Deutschland GmbH
2009  • Start of export business with projects outside Switzerland
2012  • Acquisition of C.O.P.S Electronics GmbH and merger into Ruf Deutschland GmbH
2015  • Expansion of Ruf Deutschland GmbH (larger production facility)
Ruf Offices and Worldwide Partners
VisiWeb® – in daily operation in more than 2300 train sets worldwide
# Core Competences

| Domain Knowhow | Consulting  
Pre-Sales Support |
|----------------|------------------|
| PIS Inhouse Engineering and R&D | Agile  
Quick reaction to customer requests |
| Full System Provider | Fully Integrated System  
Single Point of Contact |
| System Integrator | Own and 3rd Party Systems |
| Project Management | Risk Management  
Transparency |
| After Sales Support | Training  
Tech Support  
Documentation  
Consignment Stock  
Obsolescence Management |
Fully Integrated Passenger Information Systems

VisiWeb® PIS.NG

Train
- Visual Information
  - Information Stops
  - Infotainment
- Acoustic Information
  - Announcements
- Security
  - Video Surveillance
  - Passenger Intercom
- Statistics
  - Passenger Counting
- Seat Reservation
  - Management and Display

Maintenance
- CMT
  - Commissioning and Maintenance Tool
- Authentication
  - Authentication Manager
- Tools
  - Schedule Editor
  - Layout Editor
  - Playlist Editor

Control Center
- Real Time Data
  - Information
- Seat Reservation
  - Administration
VisiWeb® solution

Integrated system for:

- PIS System Controller
- Communication
- Acoustic Announcement & Intercom System
- Displays & Monitors
- CCTV System
- Infotainment System
- Passenger Counting System
- Seat Reservation System
Testfloor
References Manufacturers

- Stadler
- CAF
- Alstom
- Siemens
- Newag
- Bombardier
- Hyundai Rotem
- INAUTEC GmbH
- Scomi
Rolling Stock Structure

Rolling Stock

<table>
<thead>
<tr>
<th>Railway Vehicles</th>
<th>Mass Transit Vehicles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tractive Vehicles</td>
<td>Cars</td>
</tr>
<tr>
<td>Electric Locomotives</td>
<td>Diesel Locomotives</td>
</tr>
<tr>
<td>High-Speed Trains</td>
<td>Electric Multiple Units</td>
</tr>
<tr>
<td>Electric Multiple Units</td>
<td>Diesel Multiple Units</td>
</tr>
<tr>
<td>Passenger Coaches</td>
<td>Freight Wagons</td>
</tr>
<tr>
<td>Light Rail Vehicles</td>
<td>Metro Vehicles</td>
</tr>
</tbody>
</table>

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ICT Transportation Division – Ruf Telematik AG
World Market Overview EMU DMU Trains

Key statements:
- Around EUR 9.5 billion currently being invested in new multiple units worldwide and EUR 7.9 billion invested in after sales
- Nearly 90% of the volume is accounted for EMUs
- The **TOP 5 markets are Germany, France, Japan, United Kingdom and Australia** with almost half of the worldwide market volume
- The OEM-markets for EMU and DMU growth between **2% - 4% up until 2020**
- Growth mainly driven by the increasing demand for mobility, particularly in the conurbations in Asia and South America.
# World Market Overview Metro Trains

<table>
<thead>
<tr>
<th></th>
<th>WORLD</th>
<th>Metro</th>
<th>Trend</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Installed Base</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cars 2016</td>
<td></td>
<td>103,800</td>
<td></td>
</tr>
<tr>
<td>Average development 2016-2021 (p. a.)</td>
<td></td>
<td>5.5%</td>
<td>↑</td>
</tr>
<tr>
<td>Average age 2016 (in years)</td>
<td></td>
<td>14.3</td>
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<tr>
<td><strong>Market For New Vehicles</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average volume 2015-2017 (EUR million p. a.)</td>
<td></td>
<td>8,110</td>
<td></td>
</tr>
<tr>
<td>Average development 2016-2021 (p. a.)</td>
<td></td>
<td>1.5%</td>
<td>→</td>
</tr>
<tr>
<td>Volatility market volume 2016-2021 (SAW)</td>
<td></td>
<td>13.4%</td>
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</tr>
<tr>
<td><strong>Market For After Sales</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Average volume 2015-2017 (EUR million p. a.)</td>
<td></td>
<td>4,900</td>
<td></td>
</tr>
<tr>
<td>Average development 2016-2021 (p. a.)</td>
<td></td>
<td>4.6%</td>
<td>↑</td>
</tr>
<tr>
<td>Volatility market volume 2010-2021 (SAW)</td>
<td></td>
<td>11.7%</td>
<td></td>
</tr>
</tbody>
</table>

↑ Boom/Strong Growth  
↓ Clear Decline  
Small Growth  
Stagnation  
Small Decrease  
Volume:  
> +5% p.a.  
+2 to +5% p.a.  
0 to +2% p.a.  
-2 to 0% p.a.  
< -2% p.a.  
Installed base:  
> +1.5% p.a.  
+0.5 to +1.5% p.a.  
-0.5 to +0.5% p.a.  
-1.5 to -0.5% p.a.  
< -1.5% p.a.
World Market Overview EMU DMU Trains

**EMU**
- Bombardier: 17%
- Japanese Manufacturers: 14%
- Stadler: 5%
- Alstom: 4%
- Siemens: 9%
- CRRC: 6%
- Hyundai Rotem: 6%
- CAF: 15%
- Transmashholding: 13%
- Others: 13%

In total: ~5,500 Units

**DMU**
- Alstom: 21%
- Stadler: 18%
- ICF: 13%
- Pesa: 13%
- CRRC: 12%
- TMH: 7%
- CAF: 6%
- Other: 3%

In total: ~1,500 Units
World Market Overview Metro Trains

- CRRC: 57%
- Other Suppliers: 11%
- Kawasaki: 4%
- Hyundai Rotem: 4%
- CAF: 4%
- Transmashholding: 6%
- Alstom: 7%
- Bombardier: 7%

In total: 30,500 Cars
Challenges & Obstacles

- Financially challenging projects
- Incomplete specifications at project order
- Obsolescence – long term component availability
- Our customers are train manufacturers, our system must be compatible with the operator’s systems
- Digitalization
- Local content (governmental projects)
- Work permissions for commissioning and acceptance tests
- Reaction time during project execution and in the after sales period
Swiss quality from the railway country
for operators, manufacturers and passengers