



AS-BUILT TRACK SURVEY AT ITS BEST

Extension of a revolutionary measuring principle

- Long-chord method with only one measurement trolley for as-built survey
- Combined survey of relative and absolute track geometry
- Unrivalled survey performance up to 5000 m/h
- Repeat accuracy down to 1 mm
- Up to 90% cost savings compared to traditional methods
- Unlimited use during day and night, rain and bright sunshine – no line of sight requirements
- Measurement of objects close to track

Modular system design

- Measuring trolley consisting of precision sensors for gauge, superelevation and distance and ruggedized notebook
- AMU 2010/2020/2030 (Amberg Measuring Unit) for unrivalled kinematic measurement precision
- Two different control point measuring devices:
 - Total station (IMS 1000)
 - Profiler 120 FX (IMS 3000)
- Modular system upgrading possibilities

Global 3D topographic track survey

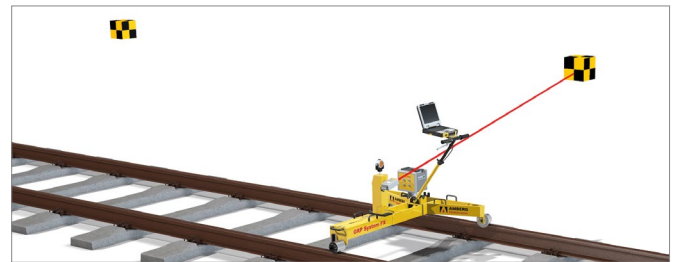
- Measuring performance up to 4000 m/h, typically 2500 m/h
- Absolute 3D control points given in global coordinate grid and used as transformation references
- Distance between CP measurements up to 500 m
- Fully compatible with other geodetic 3D survey data

Local 3D topographic track survey

- Measuring performance up to 4000 m/h, typically 2500 m/h
- Setup and survey of control points during initial track survey
- Track data available in local 3D coordinate grid
- Determination of local 3D coordinates for established control points
- Results can be used for local track design and track works as well as monitoring purposes



Front: Amberg IMS 3000
with Profiler 120 FX
Back: Total station for
Amberg IMS 1000



3D as-built survey with Amberg IMS 3000



Relative track geometry survey with Amberg IMS 1000

Relative track geometry survey

- Measuring performance up to 5000 m/h, typically 3500 m/h
- Stationing plates as references
- Measurement and calculation of track parameters horizontal versines (variable chord length), vertical versines (variable chord length), gauge, superelevation and twist
- Presentation and analysis of track data with sophisticated Track Geometry Record (TGR)

SYSTEM PERFORMANCE AND TECHNICAL DATA

System configuration			
	IMS 1000		IMS 3000
Gauge (mm)	1000, 1067, 1435, 1520/24, 1600, 1668/76		
Gauge measuring range (mm) (re nominal gauge)	-25 to +65		
Cross level (cant) at 1435 mm	+/- 260		
CP measuring device	Leica total station MS50/60, TS50/60, TS30, TS15/16	Amberg Profiler 120 FX	
Weight total system (kg) incl. batteries, notebook, all measuring devices	45	43	

System performance			
	Relative	Absolute	
	IMS 1000 IMS 3000	IMS 1000	IMS 3000
Measuring system			
Typical measuring speed (m/h) ¹⁾	3500	2500	2500
Max. measuring speed (m/h)	5000	4000	4000

System accuracy			
Track position and height (mm) ²⁾	not avail.	+/- 2	+/- 3
Cross level (cant) (mm)	+/- 0.5	+/- 0.5	+/- 0.5
Gauge (mm)	+/- 0.3	+/- 0.3	+/- 0.3
CP measurement (mm) relative to track axis	not avail.	+/- 1	+/- 3

AMU models			
	AMU 2030	AMU 2020	AMU 2010
Repeat accuracy @ 60 m CP interval [mm]	+/- 1	+/- 2	+/- 3
Repeat accuracy @ 120 m CP interval [mm]	+/- 2	+/- 4	+/- 6
Repeat accuracy @ 300 m CP interval [mm]	+/- 5	+/- 12	+/- 20

⁽¹⁾ Typical experience, may depend on project conditions.

⁽²⁾ Depending on e.g. control point density, control point quality, project conditions and used AMU model.

Environmental specifications	
	IMS 1000 / IMS 3000
Working temperatur range	- 10°C to +50°C
Humidity (non-condensing)	< 80 %

Measurement data (export)	
Supported data interfaces	ASCII DXF LandXML further formats on request

System approvals	
CE Conformity	EN 61326-1:2013 EN 61000-6-2:2005 EN 61000-6-4:2007/A1:2011 EN 60825-1:2014 EN 13848-4 EN 13977:2011 Directives 2014/30/EU Directives 2014/35/EU Directives 2011/65/EU
GRP System FX approvals from	Network Rail / London Underground (UK), Deutsche Bahn (DE), SBB (CH), SNCF (FR), ÖBB (AT), RFI (IT), Adif (ES), ProRail (NL), Infrabel (BE)

Extract of references	
Amberg's railway surveying solutions have proven their high performance all over the world. Demanding projects have been successfully realised in e.g. Germany, Austria, Belgium, the Netherlands, Denmark, France, Italy, Spain, Greece, Turkey, Australia, United Kingdom, Saudi Arabia, UAE, Korea, USA, PR China.	