Leica Absolute Tracker
AT500 Applications
IWAA 2022, CERN
Matthias Saure, 01.11.2022
AT500 a new Absolute Tracker Generation

- **Compact**
  - All integrated system, no Controller

- **Battery Powered**
  - 6 hours working time, hot swappable batteries

- **Connected**
  - Integrated Bluetooth and Wi-Fi modules for wireless device handling

- **Performance**
  - Dynamic ADM with 100 Hz, Main components based on ATS600/AT9x0 platform

- **Productive**
  - B-Probe$^{\text{plus}}$ with real-time Probe tip coordinates

- **Portable**
  - Minimum number of components for maximum portability
AT500 Power Solutions
AT500 Battery Operation

GEB364 Battery Pack
(2 included with AT500 system)
Runtime: 6 hrs

GKL311 Charger PRO 3000
GKL341 Charger PRO 5000

MPB25 Battery External Li-Ion (299Wh)
Runtime per MPB25 battery: 10 hrs
Runtime with internal batteries: 16 hrs

MPB100 Battery External Li-Ion (90Wh)
– IATA compliant for hand luggage
Runtime per MPB100 battery: 3 hrs
Runtime with internal batteries: 9 hrs

Battery charging in the AT500 when system is switched off
Charging time: 8 hrs
AT500 Connectivity
Connectivity

• Wi-Fi connection, according to IEEE 802.11n, compatible with IEEE 80211b/g, providing a range of up to 60 meter.
• LAN connection using a standard RJ45 connector.
• Bluetooth® connectivity to connect a Bluetooth® object temperature sensor, configure the TCP/IP connection between application computer and instrument or display an electronic levelling bubble on a mobile device to support the orient-to-gravity process.
• LMF SDK compatible with all Leica Absolute Tracker for easy metrology software interface development.
Wireless Object Temperature Probe

Object temperature probe with magnetic base. The electronics contain a life-time battery and communicate via Bluetooth.

Range: ~ 30m (indoor)
Class: IP65
Temp. Range: -40 to +85°C
Runtime: 3 - 7 years
Leveling

“AT500 Mounting Options”
Mounting Options

Various stands/tripods from light weight to heavy duty, small to large

Consoles for fixed installations, upright, upside-down, tilted

Translation stage for 3.5” mount, in development
Sensor Levelling – Orient-to-Gravity

Sensor levelling made easy with the **AT500 Connect App** on your mobile phone. Adjusting the tripod legs or adapter can as an alternative also be carried out with the **Tracker Pilot** utility on your PC/Laptop. **AT500 Connect App** and **Tracker Pilot/Application Software** can be used simultaneously.
Further Orient-to-Gravity Options

- Dedicated levelling options for more convenience

MAL93 Levelling Unit

MAS70 Tripod Levelling Kit

Base Plate with footscrews

No height change when levelling
Transportation Cases
Transportation and Shipping Cases

Sensor trolley case AT500 containing all sensor components

MAS141 trolley case for MST 138/139 Precision tripods. 750mm center extension fits in case.

Optional backpack solution to carry AT500 onsite, currently in development. Planned release mid 2023.
Dynamic Absolute Distance Meter (ADM)

The new dynamic Absolute Distance Meter (ADM) is based on the well-established modulation of polarization working principle, first established with Kern Mekometer. The new dynamic ADM capable of providing 100 Hz of 3D measurements per second, in working range of 0.8 m up to > 160 m. Handheld measurements and applications using build mode benefit very much from the new dynamic capabilities.
Dynamic Feature Measurement - Comparison

Dynamic measurements of a circle with AT403 and AT500

39 points with AT403

462 points with AT500
Power-Lock Performance - Comparison

Power-Lock functionality of AT403 and AT500 at 4m distance

1.5s with AT403

0.75s with AT500
B-ProbePLUS
B-Probe\textsuperscript{plus} New Features

- DRO with real-time tip coordinate display
- Live measurement status indicated on probe and AT500
- Working range from 1.6 meter to 12 meter
- Improved power consumption (6 hours of operation, 5000 recordings)

Build Mode on CAD Surface with B-Probe/B-ProbePLUS of AT403 and AT500

Coordinate available \textbf{after recording} (3sec) with AT403

\textbf{Real-time} Probe tip coordinates (100Hz)
New ISO 10360-10:2021 Test Standard

Accuracy specifications of Leica Absolute Trackers are stated in accordance with ISO 10360-10:2021. The test comprises the following test items:

- Spatial length measurements ($E_{Vol:L:LT}$), traversal and in-line
- Location Error ($L_{Dia.2\times1:P&R:LT}$), two-face measurements
- Probing Size and Probing Form Error ($P_{Size,Sph.1\times25:xxx:LT}$, $P_{Size,Sph.All:ODR:LT}$, $P_{Form,Sph.1\times25:xxx:LT}$, $P_{Form,Sph.95\%:ODR:LT}$), for reflector (SMR), probes (SRC) and scanners (ODR)
- Orientation Test ($P_{Dia.15\times1:SRC:LT}$), for probes

Calibration certificates in accordance with ISO 10360-10 can be issued on request.

The default factory calibration certificate is now based on a new standardized and comprehensive test method, developed by the National Institute of Standards and Technologies (NIST), published in ISO 10360-10:2021 Annex E.
Summary

- New ADM with dynamic measurements 100Hz
- Faster motorization concept for Power-Lock and Automatic Inspection
- No sensor initialization process
- Build/Inspect mode with faster DRO update (no fine/coarse mode)
- AT500 positioning with wall mounts upside down or tilted
- Large working range 0.8 m to > 160 m
- B-Probe<sup>plus</sup> with live coordinate display and measurement status
Thank you!

matthias.saure@hexagon.com