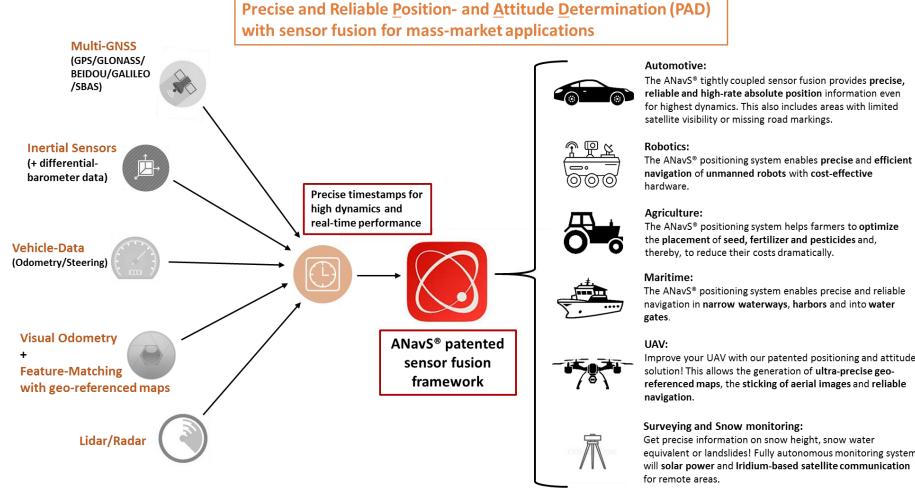
Precise and Reliable RTK Positioning in the ASEAN region



Dr. Patrick Henkel, Managing director of ANavS GmbH



Business of ANavS



The ANavS® tightly coupled sensor fusion provides precise. reliable and high-rate absolute position information even for highest dynamics. This also includes areas with limited satellite visibility or missing road markings.

The ANavS® positioning system helps farmers to optimize

the placement of seed, fertilizer and pesticides and, thereby, to reduce their costs dramatically.

The ANavS® positioning system enables precise and reliable navigation in narrow waterways, harbors and into water

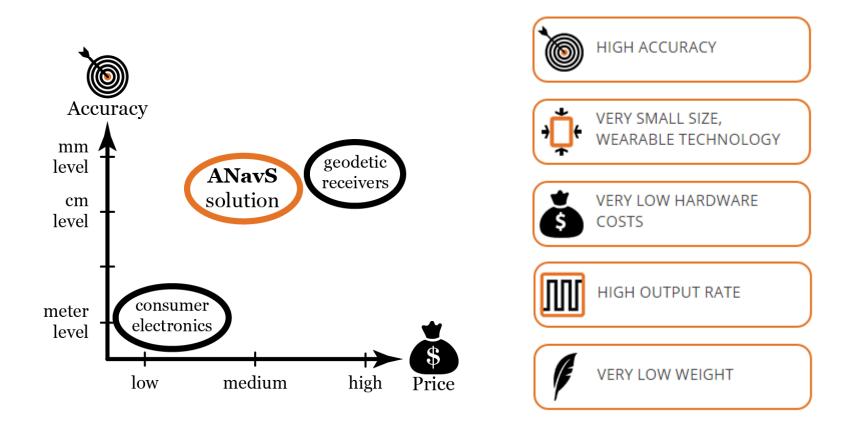
Improve your UAV with our patented positioning and attitude solution! This allows the generation of ultra-precise georeferenced maps, the sticking of aerial images and reliable

Surveying and Snow monitoring:

Get precise information on snow height, snow water equivalent or landslides! Fully autonomous monitoring system will solar power and Iridium-based satellite communication



Target Market Sector of ANavS





ANavS RTCM Base Station





ANavS Multi-Sensor Modules



Multi-Sensor RTK Positioning:

- Positioning accuracy: Horizontal: 1 cm, Vertical: 2 cm
- Tight coupling of GNSS with other sensors for robust positioning

Integrated Sensors:

- Multi-GNSS receiver with either internal or external GNSS antenna
- Inertial sensor with accelerometer, gyroscope and magnetometer
- Barometric sensor





ANavS Multi-Sensor RTK module

Key features:

- 1 to 3 integrated Multi-GNSS receivers for RTK positioning and attitude determination
- integrated inertial sensor and barometer for robust positioning
- integrated CAN-bus interface for odometry and CSI interface for camera
- integrated LTE module for reception of RTK corrections
- integrated processor for Multi-Sensor, Multi-GNSS tightly coupled RTK positioning





Track of test drive in Hanoi





RTK fixing for centimeter-level accuracy

ANav5 GUI _ 🗆 🗙 RTK Last corrections: 0.8 s Attitude Wednesday, Jun 21 7:27 am 15:33 ANavs[×] Overview Solution Settings Filters Sensors Total in use: 16 Select Filter Absolute Position accuracy level 1 cm Latitude 21.03193831° Longitude 105.87822124 ° Height 27.047 m 白11 **Relative Position** 3027.094 m North 3564.653 m East 44.965 m Down 4676.758 m Length Signal (dB-Hz): 20 O GPS 10 GLONASS 6 Attitude reference △ Galileo 0 ♦ SBAS 0 Heading 295.39° Heidou 0 ? Unknown 0 -0.35 ° Pitch -0.09 ° Roll Network initialization 230.6 kB/s Data rate 8 Match ✓ Grid ✓ Image Track Clear



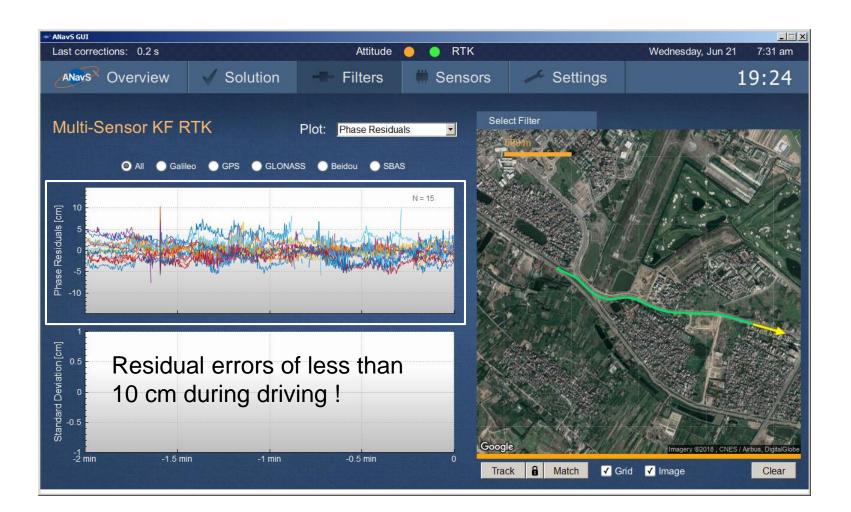
Distance

station

during

to

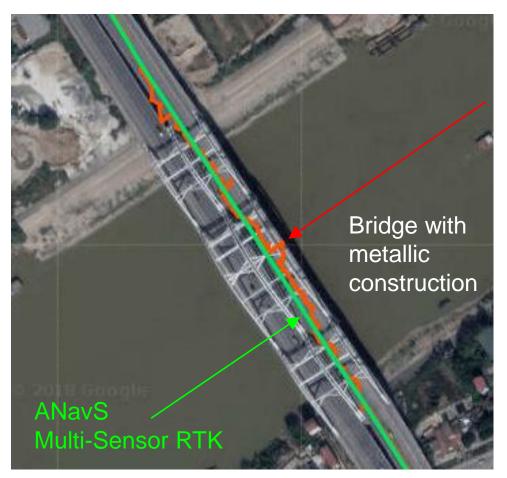
Phase residuals of less than 10 cm during drive





ANavS – Advanced Navigation Solutions – www.anavs.de

Testing of challenging conditions



Single point positioning

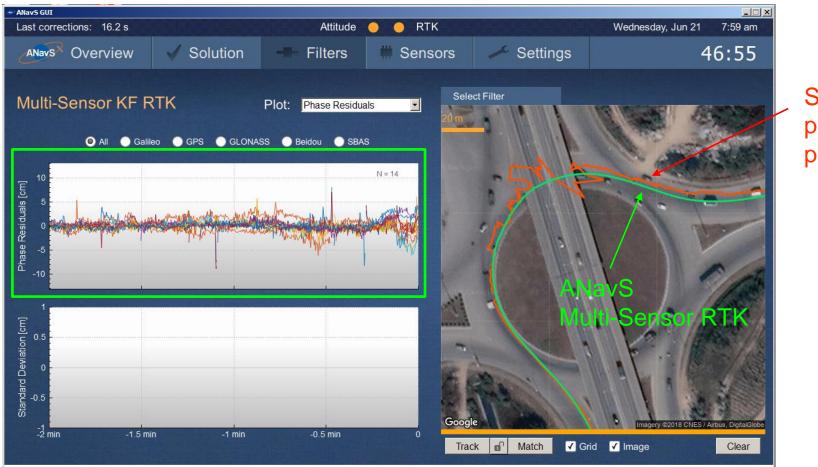
Accurate and jump-free position information

provided by

ANavS Multi-GNSS/ INS tight coupling !



Testing of challenging conditions with bridges

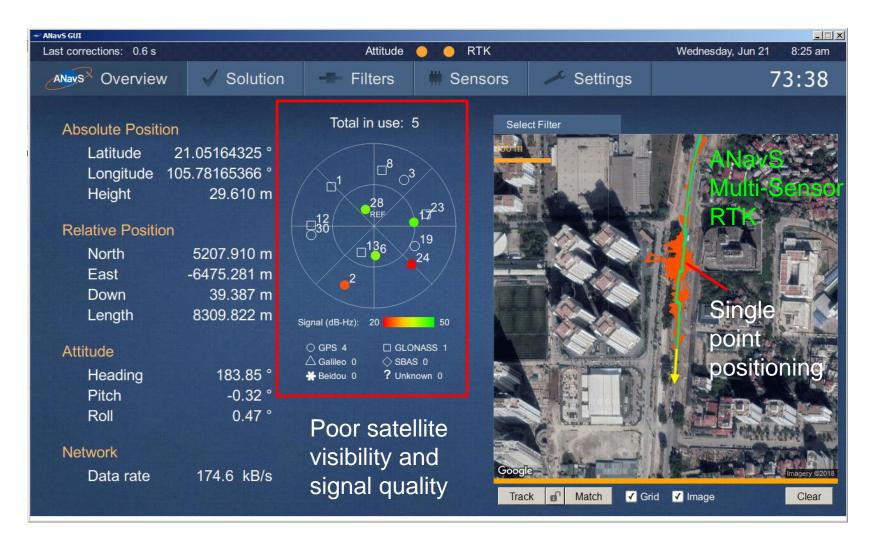


Single point positioning



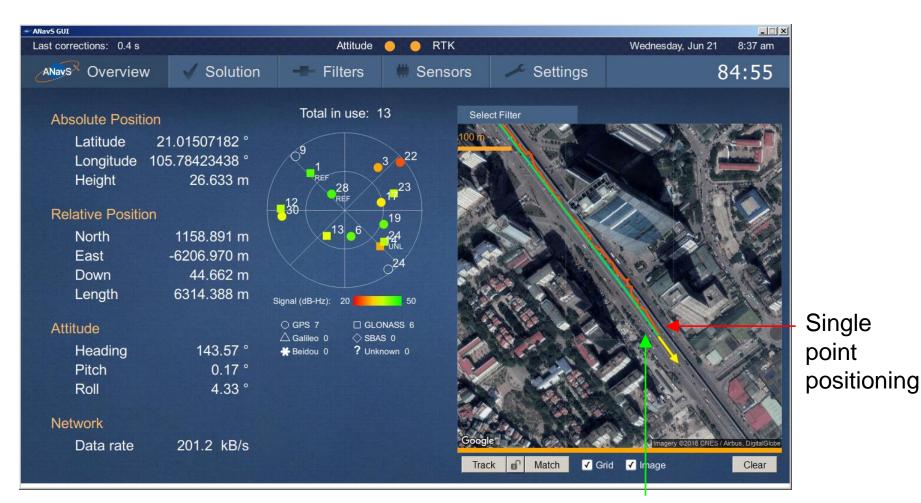
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High performance even close to skyscrapers





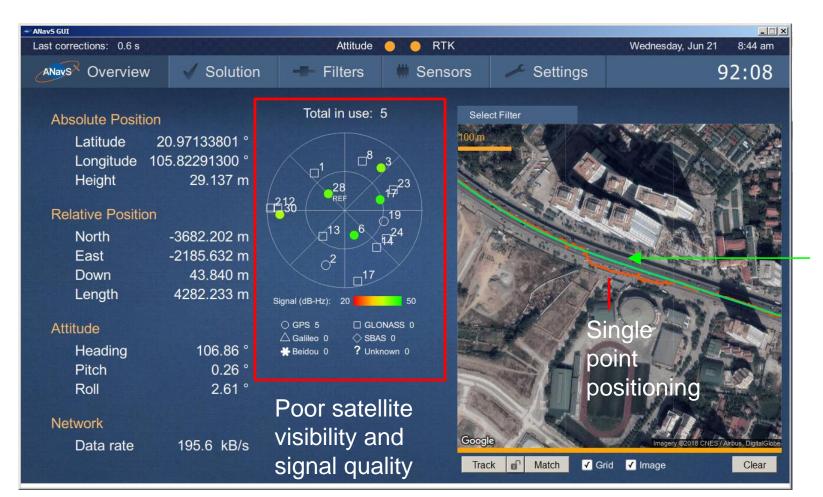
High performance even close to skyscrapers



ANavS Multi-Sensor RTK



High performance even close to skyscrapers



ANavS Multi-Sensor RTK



Key outcomes from ASEAN collaborations

- Cooperation with NAVIS Centre in Hanoi has enabled ANavS to expand its network of RTK reference stations into the ASEAN region
- Cooperation with NAVIS centre in Hanoi has enabled ANavS to demonstrate the performance of its RTK positioning systems in the ASEAN region



 ANavS is developing a name and a presence in the ASEAN region thanks to BELS





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Providing Orientation

Advanced Navigation Solutions