Integrated Sensor Platform (ISP)

WITH ANAVS SOFTWARE FRAMEWORK

ALL-IN-ONE sensor solution:

- **Multi-GNSS, Multi-Antenna Setup**
- **IMU**
- **Cameras**
- **3D-LiDAR**
- **Powerful processors**

Hardware-platform and software-framework for the combination of classical sensor fusion with artificial intelligence algorithms for autonomous driving, map creation and object detection/classification

PRELIMINARY
Available for pilot-customers in Q2 2021
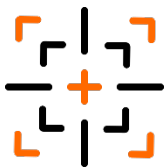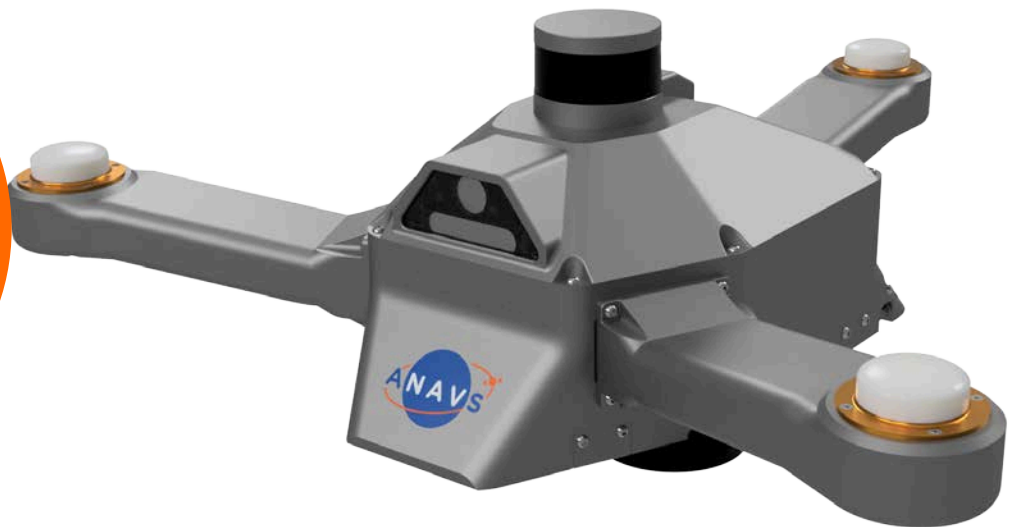
Accurate Position and Attitude

High Precision Maps (2D/3D)

Artificial Intelligence

✓ Complete Sensor-Setup for Autonomous Driving

✓ Easy System Integration

SENSOR FUSION PERFORMANCE

Accurate RTK Positioning * (1σ):
    Horizontal accuracy: 0.006 m + 1 ppm
    Vertical accuracy: 0.010 m + 1 ppm

Accurate PPP Positioning * (1σ):
    Horizontal accuracy: 0.15 m + 1 ppm
    Vertical accuracy: 0.20 m + 1 ppm

Accurate Attitude * (1σ):
    Accuracy: 0.25° (1m antenna spacing)

Velocity Accuracy: 0.03 m/s RMS
Time-Stamp Accuracy: 1 µs RMS
Solution Output-Rate: up to 120 Hz

RTK Initialization *:
    Initialization Time: < 7 sec
PPP Initialization *:
    Initialization Time: < 15 min

* Depends on Environment and used GNSS-Antenna

LIDAR FEATURES

Type: Velodyne LiDAR
Model: Puck (VLP-16)
Channels: 16
Measurement Range: 100m
Range accuracy: up to +/- 3 cm (typical)
Field of View (Vertical): +15° to -15° (30°)
Angular res. (Vertical): 2.0°
Field of View (Horizontal): 360°
Angular res. (Horizontal): 0.1° to 0.4°
Rotation rate: 5 Hz to 20 Hz

IMU FEATURES

Linear acceleration meas. range:
    +/-16 g (configurable)
Angular rate meas. range:
    +/- 4000 dps (configurable)
Linear acceleration sensitivity:
    0.061 mg/LSB with +/-2 g range
Angular rate sensitivity:
    4.37 mdps/LSB bei +/- 125 dps range
Angular random walk (T=25°C):
    0.21 deg/√h
Bias stability:
    3 degree/ hour (typical)

GNSS FEATURES

GNSS Constellations:
    Galileo, GPS, Glonass,
    Beidou, SBAS (Egnos, WAAS, GAGAN)
GNSS Const. concurrent:
    All
GNSS-Bands:
    GPS: L1C/A, L1C, L1PY, L2C, L2P, L5
    GLO: L1CA, L2CA, L2P, L3
    GAL: E1, E5a, E5b, E5 AltBoc, E6
    BDS: B1I, B1C, B2a, B2I, B3
    QZSS: L1C/A, L1C, L2C, L5, L6

Channels: 448
GNSS data rate: max 100 Hz
Jamming detection: Yes
Timepulse-Output: Yes

CAMERA 1 FEATURES

Type: FLIR Grasshopper3 USB3
Model: GS3-U3-23S6C-C
Description: High-quality color-camera with high frame-rate and global shutter
Frame rate: 163 FPS
Resolution: 1920 x 1200 (2.3 MP)
Image sensor: Sony IMX174

CAMERA 2 FEATURES

Type: Intel Real Sense Camera
Model: Tracking Camera T 265 or Depth Camera D435i
Description: Global shutter fisheye stereo-camera with integrated IMU and visual-inertial odometry, or depth camera (global shutter infrared stereo-camera) and RGB camera with integrated IMU

ODOMETRY FEATURES

Performance:
    Depends on resolution and quality of user-based wheel/steering measurements
Input/Output:
    Configurable with DBC-files or according to customer specification
Communication Interfaces:
    CAN, Ethernet, USB

PROCESSOR 1 PERFORMANCE

CPU: ARM 64Bit Quad-Core with 1.4 GHz
RAM: 1 Gbyte LPDDR2 RAM
Flash: 16 Gbyte
OS: Linux
Description: Used for classical ANavS sensor fusion with GNSS, IMU and Odometry sensors

PROCESSOR 2 PERFORMANCE

CPU: 6-core NVIDIA Carmel ARM®v8.2 64-bit CPU, 6 MB L2 + 4 MB L3
GPU: NVIDIA Volta™ architecture with 384 NVIDIA® CUDA® cores and 48 Tensor cores
Memory: 8 GB 128-bit LPDDR4x 51.2GB/s
Storage: microSD
OS: Linux
Description: Used for deep learning algorithms, object-detection/classification, semantic maps (LiDAR-based), HD-maps (Camera-based) and SLAM.

ELECTRICAL & INTERFACES

Power Connector:
Terminal connector with 12V
Power Consumption:
Peak: 25 W (5A)
Average: 15 W (3 A)
Communication Interfaces:
Gigabit-Ethernet, Wi-Fi, CAN, USB 2.0, LTE
Output format:
Standardized: NMEA format, ROS
Proprietary: ANavS binary format

INDUSTRIAL CASING

Dimension: 800 x 800 x 300 mm
Weight: 2000 g
Operating Temp.: -40°C to +85°C
Display: Yes

Mounting: Screwable or use of suction cups

ANAVS

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