Integrated Sensor Platform (ISP)

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.

ALL-IN-ONE sensor solution:
- Multi-GNSS, Multi-Antenna Setup
- IMU
- Cameras
- 3D-LiDAR
- Powerful processors

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
**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)

**准确的RTK定位** *(1σ):*
- 水平精度: 0.006 m + 1 ppm
- 垂直精度: 0.010 m + 1 ppm

**准确的PPP定位** *(1σ):*
- 水平精度: 0.15 m + 1 ppm
- 垂直精度: 0.20 m + 1 ppm

**准确的姿态** *(1σ):*
- 准确性: 0.25° (1m天线间隔)

**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

* Depending 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

**CAMERA FEATURES**

**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
ELECTRICAL & INTERFACES

Power Connector:
Terminal connector with 12V

Power Consumption:
Peak: 25 W (5A)
Average: 15 W (3A)

Communication Interfaces:
Gigabit-Ethernet, Wi-Fi, CAN, USB 2.0, LTE

Output format:
Standardized: NMEA format, ROS
Proprietary: ANavS binary format

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.

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