F-ait

FAKT - ARTIFICIAL
INTELLIGENCE TESTING

**Vehicle Testing with
F-ait products.
Smart.
Innovative.
Economic.**

AccelBot

NavBot

NavBase

NavCommander

Start — 00:00:00

AccelBot — 00:01:00

NavBot — 00:03:00

Start Testing — 00:05:00

The F-ait series bots: smart technology for conistent vehicle testing results

It wasn't a trivial job for our engineers. We wanted them to establish a testing kit for driving assistance systems, that could be installed in any model within minutes.

That alone would have been complicated enough, but we wanted to go beyond that in providing a testing success rate of more than 90 %.

Well. This sounds like squaring the circle.

And yet. We achieved these goals and even more with the **bots** of our **F-ait product series**.

Our product family provides solutions for scenarios like:

• Passby noise measurements
• Acoustic measurements on the dynamometer
• Exhaust and consumption measurements on the dynamometer
• NCAP brake assist test
and much more.

And the best: all this very smart, innovative and economic.

That's how it works:

1. **AccelBot** (Actuator/electronic accelerometer) is put and adjusted in the footwell of the vehicle without drilling, screwing or gluing.

2. **NavBot** is anchored for instance magnetically on the roof of the vehicle

3. Both bots communicate automatically with each other

4. Start testing after no more that 6-9 minutes.

Sounds too simple to be true, doesn't it? That's the idea, even when the processes running in the background are far from being trivial. In fact, they are state-of-the-art communication technology with highest system security based on artificial intelligence.

All components are parts of a modular system and are the basis of a growing product family.

AccelBot
electronic accelerator

• Control of velocity and acceleration

• Comfortable setup in minutes, without risking montage harm

• Ideal for noise measurements and vehicle testing with repeatable spead - and accleration regulation

• Test, route and vehicle profiles programmable. Storing, loading and changing of test arrangements

AccelBot
NavBot
FlatBot*

AccelBot (actuator/electronic accelerator) and **NavBot** are the core components of our vehicle testing suite.

AccelBot with Bluetooth connectivity for GPS- and RTK-data is installed parallel to the driver. The driver is permanently in control. Central feature is the infinitely variable pedal control with high velocity and precision. Primary requirement, to pass and repeat preset trips and preset target accelerations.

The **AccelBot** interface is connected to **NavBot** via Bluetooth, LAN and radio. **NavBot** receives correction signals from **NavBase** or a different compatible base station.

NavBot has GPS- and Glonass-satellite receivers and a special modem for receiving RTK-data. The integrated IMU provides further transaction data. All information is processed and handed over with up to 100 Hz.

For communication purposes with other equipment in the vehicle it has an integrated Bluetooth unit. For communication with different test participants it reproaches a long-range WLAN interface.

RTK-correction data is received via an integrated data modem on 433 MHz base.

The housing is water- and dustproof and designed for outdoor operation.

The fixation on the vehicle surface (hood, roof, trunk etc) works with integrated magnets, suction cups or optional straps.

NavBot integrates the following components:
• GPS/GLONASS-antenna
• GNSS receiver
• IMU sensor
• radio data transmission modem
• microcontroller
• WLAN-interface
• Bluetooth
• power supply
• fixing solution

The system is predestined for quick and uncomplicated testing, also for fast comparative valuation of different models or model variants. Setup time is neglectable, ease of use is unprecedented.

In a later product extension the **FlatBot*** is soon to come. It is robust and therefore ideal for assistance systems tests with sophisticated targets like pedestrians, cyclists, motorcyclists etc

FlatBot* is constructed for getting hit by vehicles - it will remain completely undamaged.

(*Coming soon – late 2018, early 2019)

NavBot

Vehicle Movement and Coordination Sensor

• Precision satnav-receiver for detection of position, velocity and acceleration

• Ease of use, virtually no setup time through quick magentic attachment

• Aerodynamic, water- and dustproof housing with optional antennas for range extension
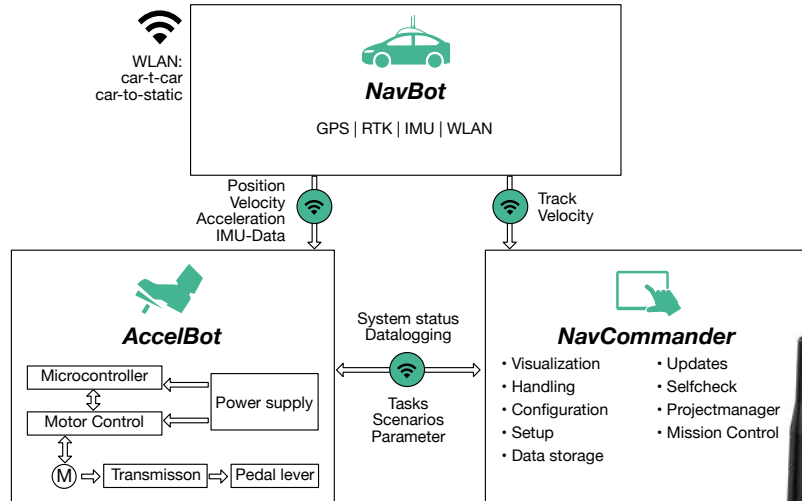
NavBase
NavCommander

NavBase provides the correction signal for **NavBot** and later for **FlatBot*** .

Last but not least the **NavCommander** software solution complements the **F-ait family.** It is optimized for pcs, laptops and tablets and facilitates monitoring and pre-setting of test series.

AccelBot Nav-Concept

WLAN:
car-t-car
car-to-static

NavBot
GPS | RTK | IMU | WLAN

Position
Velocity
Acceleration
IMU-Data

Track
Velocity

AccelBot
- Microcontroller
- Motor Control
- (M) ⇒ Transmisson ⇒ Pedal lever
- Power supply

System status
Datalogging

Tasks
Scenarios
Parameter

NavCommander
- Visualization
- Handling
- Configuration
- Setup
- Data storage
- Updates
- Selfcheck
- Projectmanager
- Mission Control

NavBase

- RTK base station (RTCM V3, WLAN, 433 MHz)

- Precision correction signal for **NavBot** and **FlatBot***

- Self sufficient positioning anywhere on test site

- Quick change battery system compatible with **NavBot**

GNSS System

- GPS, GLONASS
- RTK-Mode
- IMU integrated

NavBot
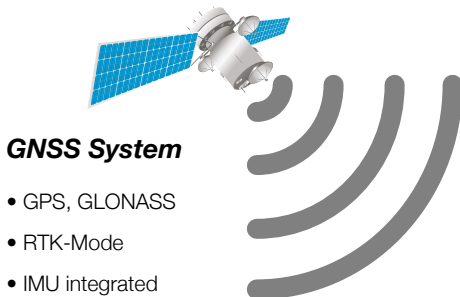
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Technical Specifications

AccelBot

Control Deviation	± 0.25 km/h	Storage Temperature	-20 °C – +60 °C
Pedal Force	100 N (top edge)		
Pedal Velocity	400 mm/s (top edge)	Battery Life	> 10 h
Actuator Resolution	10 µm	External 12V supply	optional
GPS Accuracy	< 9 mm (RTK DGPS)	Size	405 mm x 380 mm x 95 mm
GPS update rate	100 Hz	Pedal Size	250 mm x 80 mm
		Weight	9.1 kg
Operating Temperature	-10 °C – +55 °C	Protection Class	IP 35

NavBot

Frequencies	GPS L1, GLONASS L1	Output Rate	100 Hz
Cold Start	90 s	Data Protocol	NMEA 2000
Warm Start	35 s	RTK Protocol	RTCM V3.0/V3.1
Hot Start	12 s	RTK Radio Frequency	403 – 473 MHz
Re-acquisition	2 s		
Position Accuracy		Operating Temperature	-30 °C – +60 °C
Autonomous	< 2 m (95% Radius)	Storage Temperature	-40 °C – +85 °C
RTK DGPS	< 9 mm (95% Radius)	Battery Life	8 h
Velocity Accuracy	± 0.025 m/s	Size	338 mm x 200 mm x 60 mm
Time Accuracy	20 ns	Protection Class	IP 67

NavBot Datalogging

Logged Data	Range	Accuracy	
GNSS Time (UTC)	1/1/1970 - 6/3/2149	20 ns	
Latitude	-90° / +90°	< 9 mm	
Longitude	-180° / +180°	< 9 mm	
Altitude	-6.371 km / +20.000 km	< 15 mm	
Speed	0 m/s - 327.68 m/s	+/- 0.025 m/s	
Acceleration X	-20 m/s² / +20 m/s²	+/- 1 %	
Acceleration Y	-20 m/s² / +20 m/s²	+/- 1 %	
Acceleration Z	-20 m/s² / +20 m/s²	+/- 1 %	
Yaw	-3.14 rad / +3.14 rad	+/- 2.5 %	(drift: 1 °/s)
Pitch	-3.14 rad / +3.14 rad	+/- 2.5 %	(drift: 1 °/s)
Roll	-3.14 rad / +3.14 rad	+/- 2.5 %	(drift: 1 °/s)
GNSS Status	Operating / IMU Warmup / Initializing / Calibrating / RTCM y/n		
GNSS Quality	No GNSS / GNSS Fix / Precise GNSS / RTK Float / RTK Fixed Integer		
Logging Rate:	1 / 10 / 50 / 100 Hz		
Data Storage:	32 GB / 500 h @ 100 Hz (more storage on request)		

NavBase

Cold Start	90 s	RTK Radio Frequency	403 – 473 MHz
Warm Start	35 s	Operating Temperature	-30 °C – +60 °C
Hot Start	12 s	Storage Temperature	-40 °C – +85 °C
Time Accuracy	20 ns	Battery Life	12 h
Output Rate	1 – 10 Hz	Size	330mm x 187 mm x 55 mm
RTK Protocol	RTCM V3.0/V3.1	Protection Class	IP 67