



exail

**INERTIAL SOLUTIONS
FOR MOBILE MAPPING**

Exail, a global partner in the field of resilient navigation

Mobile mapping refers to the collection of geospatial data using mapping sensors mounted on moving vehicles such as cars, trains or airplanes. These sensors must be coupled and time-synchronized with a GNSS receiver and an Inertial Navigation System (INS) to enable fast and accurate computation of the vehicle's position, velocity and attitude relative to a target object.

Leveraging 30 years of experience in inertial navigation, Exail offers a range of INS based on Fiber-Optic Gyroscope (FOG) technology, renowned for their high performance and reliability.

Capable of operating in GNSS-restricted environments, Exail's navigation systems are the perfect answer to the challenges posed by terrestrial and aerial mobile mapping, by ensuring undisturbed navigation and accurate georeferencing with high quality data.

exail at a glance

80

YEARS OF
EXPERIENCE

250+

MILLION EUROS
OF TURNOVER

1500+

EMPLOYEES

25K+

FIBER-OPTIC
GYROSCOPES SOLD

100+

OPERATIONAL MAPPING
VEHICLES EQUIPPED

80%

OF TURNOVER
ACHIEVED ABROAD

0.002°

HEADING DRIFT FOR
10MIN STRAIGHT LINE

15+

YEARS ONBOARD
MOBILE MAPPING
SYSTEMS

24/7

TECHNICAL
SUPPORT

SPECIFICATIONS

	Atlans 3	Atlans A7	Phins E
Dimensions (mm)	122 x 103 x 73	160 x 160 x 113	180 x 180 x 160
Weight (kg)	0.850	2.9	5.5

PERFORMANCE*

	Atlans 3	Atlans A7	Atlans A7	Phins E
	Typical terrestrial trajectory, with DMI		Typical airborne trajectory	
Real time	With GNSS RTK		With natural GNSS	
Heading accuracy	0.050°	0.015°	0.05°	0.01°
Roll - pitch accuracy	0.025°	0.008°	0.02°	0.0025°
Heading drift 10min straightline	N/A	N/A	0.008°	0.002°
Horizontal position accuracy (m)	0.01	0.01	1.20	1.20
Vertical position accuracy (m)	0.02	0.02	1.90	1.90
Horizontal position drift 1 min GNSS outage (m)	0.80	0.40	1.80	0.60
Post-processed with Delph INS	With GNSS RTK		With GNSS RTK	
Heading accuracy	0.035°	0.012°	0.012°	0.005°
Roll - pitch accuracy	0.015°	0.005°	0.005°	0.002°
Horizontal position accuracy (m)	0.01	0.01	0.01	0.01
Vertical position accuracy (m)	0.02	0.02	0.02	0.02
Horizontal position drift 1 min GNSS outage (m)	0.20	0.08	0.15	0.05

* Typical RMS performance

INERTIAL SOLUTIONS FOR MOBILE MAPPING APPLICATIONS



Atlans 3

Atlans A3 is a lightweight all-in-one positioning and orientation system for land and air applications. It combines a unique MEMS-FOG hybrid technology and a high-quality dual-antenna RTK GNSS receiver within the same housing.



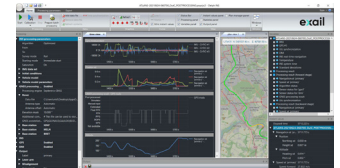
Atlans A7

Atlans A7 is the best cost/performance north seeking INS on the market for mobile mapping applications. Offering smart coupling between a FOG Inertial Measurement Unit (IMU) and an embedded GNSS receiver, it has been specially designed for quick and simple installation, as well as "set and forget" operations.



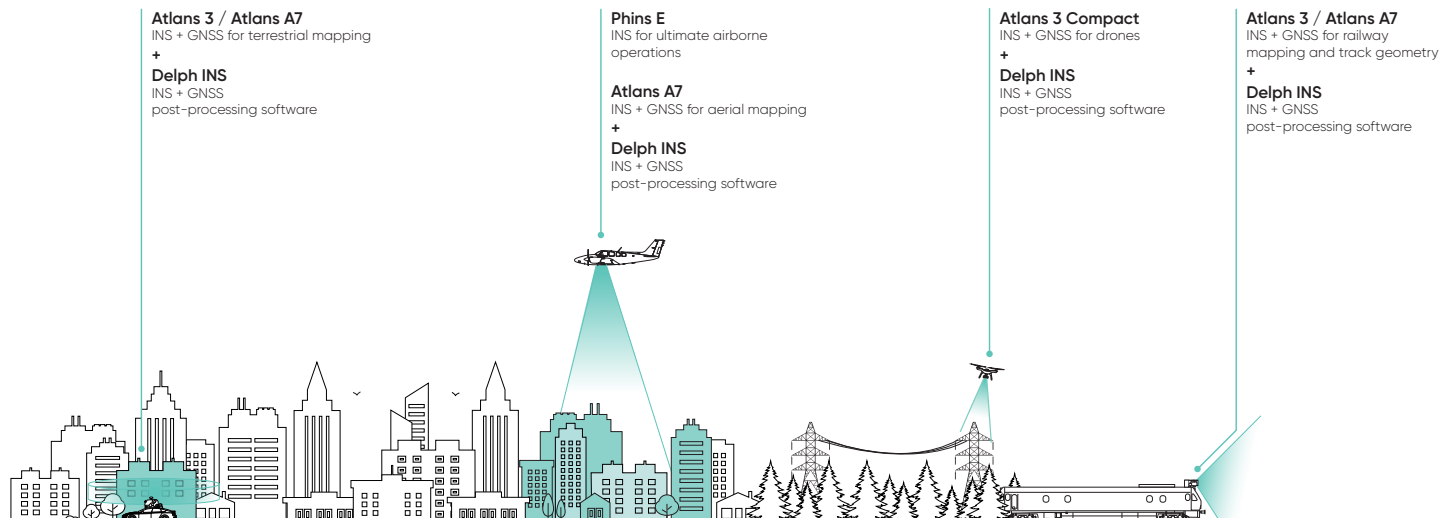
Phins E

Phins E is an ITAR-free high-performance north seeking INS based on FOG technology. Coupled with an external GNSS receiver, it provides continuous and accurate 3D position, speed and orientation information for all terrestrial and airborne applications.



Delph INS

Delph INS is the post-processing software dedicated to Exail survey INS. The smart coupling between Exail advanced inertial algorithm and a GNSS post-processing engine offers quick and precise optimal trajectory computation.



RAIL AND ROAD ASSET MANAGEMENT

Real-time positioning

Paired with measurement systems such as Laser Crack Measurement Systems (LCMS), the Atlans Series enhances the efficiency of road and railroad inspections and scans. It offers real-time positioning, allowing precise localization of road and track deterioration.

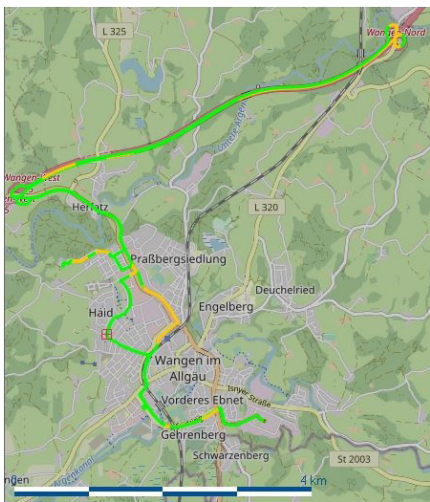
Accurate without post-processing

For land vehicles, the Atlans Series operates accurately in all operational situations, including the most challenging ones such as tunnels, parking lots (with up to 60-90 seconds of GNSS outages), forests, and narrow streets. The Atlans Series is a 'set and forget' system that does not require any additional processing or analysis after the run, resulting in significant time and cost savings.

Great cost-performance ratio

The Atlans 3 boasts outstanding heading and positioning performance in GNSS-restricted environments, despite its small size. Built upon MEMS-FOG hybrid technology, it offers an excellent cost-to-performance ratio.

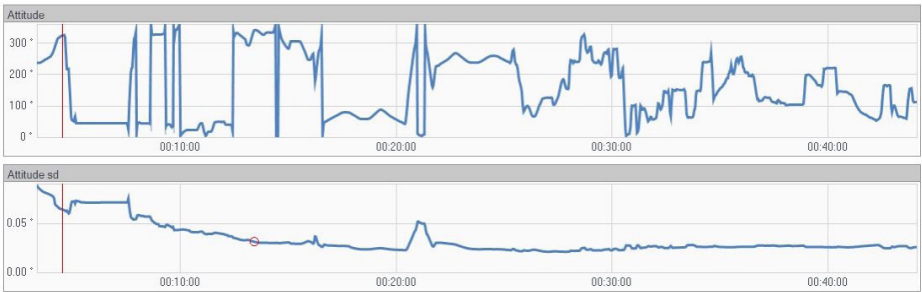
- 0.05° heading accuracy in real time
- 20cm horizontal accuracy in post-processing for 1 min GNSS outage
- Very compact device : 122mm x 103mm x 73mm



Real-time Atlans A7 trajectory with SBAS GNSS coloured according to position accuracy

Green: Sd < 0.5m – Orange: 0.5m < Sd < 1m

Mean Sd: 0.45m

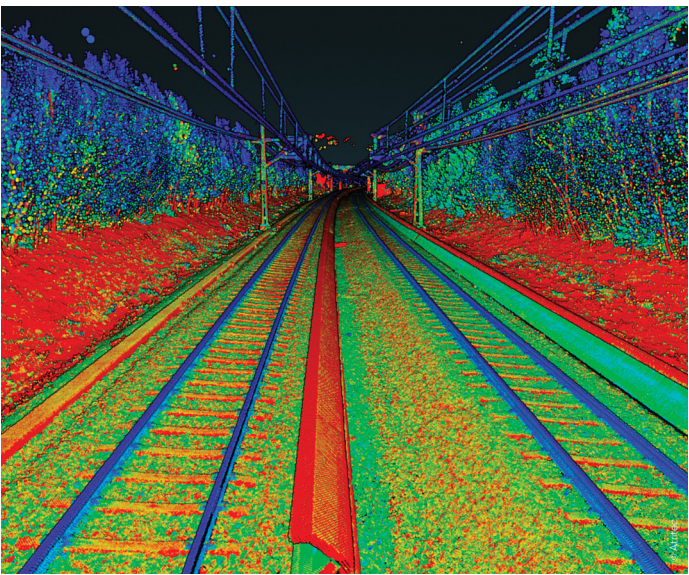


Nominal heading accuracy with SBAS: 0.03°
Reached 13min after powering on

DIGITAL TWINS AND DIGITAL MAPPING

High accuracy in dense GNSS-restricted urban areas

The Atlans Series is perfectly suited for creating digital rail maps or digital twins in urban areas. It enables the acquisition of large amounts of georeferenced point clouds, images, or 3D reality models with the highest accuracy, even in obstructed environments such as tunnels or urban canyons, where GNSS coverage is often limited but the need for georeferenced data is critical.



LiDAR point cloud based on Atlans A7 trajectory in Rail mode

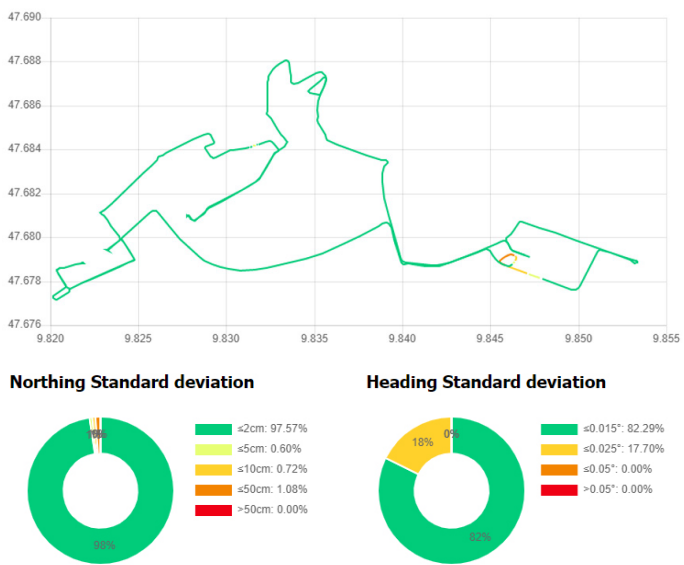
Reliable centrimetric georeferencing

The Atlans Series comes with a tool dedicated to quick field assessment of the INS/GNSS raw data acquisition.

This data can be computed using the Delph INS software to provide the best trajectory, achieving centimeter accuracy:

- 98% better than 5cm on a typical trajectory
- 0.012° heading accuracy
- precise and continuous point cloud georeferencing
- sharply focused images

With its batch processing capacity and its user-friendly interface, Delph INS fits perfectly into an operational workflow.



Atlans A7 trajectory in Land mode optimized with Delph INS

AERIAL MAPPING

High altitude and long-straight line georeferencing

The Atlans Series can be effortlessly mounted on all types of aircraft, facilitating direct georeferencing during extended straight-line flights. It delivers precise absolute positioning and inertial measurement data, enabling the georeferencing of point clouds even at high altitudes.

For demanding airborne operations where performance is non-negotiable, Exail's Phins E INS comes highly recommended. Equipped with high-grade accelerometers and gyros within a compact housing, the Phins E delivers real-time position and orientation performance at altitudes of up to 50,000 feet.

Excellent heading accuracy

The Atlans A7 and the Phins E can determine True North within minutes thanks to their inertial sensors and a single antenna GNSS receiver. Capable of flying long straight lines with exceptional heading accuracy, they significantly simplify operations and flight planning.

i.e.: on 45km straight lines (10min), the Phins E provides a heading drift of 0.002° and the Atlans A7 of 0.008° . After post-processing with Delph INS, the attitude accuracy of the Phins E can reach 0.005° for heading and 0.002° for roll and pitch.

Specially designed for Unmanned Aerial Vehicles (UAVs)

The Atlans 3, with its small size, light weight, and low power consumption, is also available in an even more compact version known as the Atlans 3 Compact. This compact variant is specially designed for integration into mobile mapping payloads and UAVs, making it ideal for aerial mapping applications performed with the smallest UAVs.



LiDAR survey over Chantilly Castle (France) © OPSIA