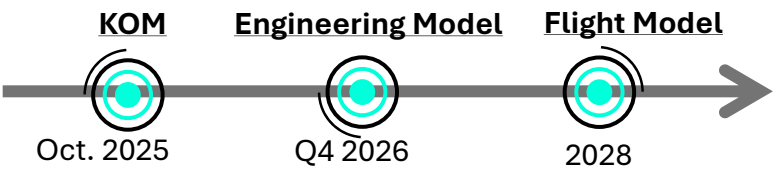


HNS μ-launchers

Compact Hybrid Navigation System for launch vehicles

Specifically designed for reusable and expandable launchers, HNS micro-launcher is an all-inclusive Inertial Navigation System that combines Exail’s state-of-the-art fiber-optic gyroscopes, accelerometers, and embedded GNSS. This project will provide a compact, high performance, and cost-effective navigation solution for micro-launcher Flight Termination System and GNC.



FEATURES & BENEFITS

- Exail-made inertial sensors.
- Embedded all bands multi-frequency GNSS receiver.
- Designed for robustness and reusability.
- Designed for Autonomous Flight Termination System.

A COMPREHENSIVE NAVIGATION SYSTEM

- Field-proven hybrid navigation algorithm.
- Complete range of data outputs: rotation rates, attitude, acceleration, velocity, position.
- With optional filtering and associated standard deviations.
- Multiple configurable reference frames handled.
- Multiple available inputs and outputs.
- Comprehensive health statuses.
- Compatible with additional external sensors.

TECHNICAL SPECIFICATIONS

FOG

ARW	• $7 \text{ m}^\circ/\sqrt{\text{h}}$
Bias stability	• $9 \text{ m}^\circ/\text{h}$ (1 σ)
Bias thermal residual	• $40 \text{ m}^\circ/\text{h}$ (1 σ)
Scale factor residual	• 30 ppm (1 σ)
Measurement range	• $2000^\circ/\text{s}$

ACC

VRW	• $10 \text{ }\mu\text{g}/\sqrt{\text{Hz}}$
Bias stability	• $10 \text{ }\mu\text{g}$ (1 σ)
Bias thermal residual	• $100 \text{ }\mu\text{g}$ (1 σ)
Scale factor thermal residual	• 20 ppm (1 σ)
Measurement range	• 100 g

HNS μ -launchers

Compact Hybrid Navigation System for launch vehicles

TECHNICAL SPECIFICATIONS

Environment

Temperature operating range	[-30° C ; +60°C]
Random vibrations operating	28 gRMS
Shocks operating	5000 g
Air pressure	Robust to vacuum and fast depressurisation/repressurisation
Flight environment	- Altitude: 2000 km - Velocity: 10 km/s - Quasi-static acceleration: 10 g - Angular rates: 360°/s - Angular accelerations: 150°/s²

Interfaces

Volume [HLW]	< 130 x 100 x 100 mm
Mass	< 2.5 kg
Voltage supply	20 – 34 V (DC)
Power consumption	< 14 W
Communication	Ethernet, RS422, RS232
Data rate	1 – 100 Hz

FOG TECHNOLOGY

Exail is recognized throughout the world for its pioneering work on the development of the ultimate-performance Fiber-Optic Gyroscope (FOG), a unique technology at the heart of its inertial navigation systems.

The FOG is an extremely high-performance rotation sensing device based on the Sagnac Effect discovered at the beginning of the 20th century.

A fiber-optic gyroscope uses optical waves propagating in a fiber-optic coil to accurately measure a rotation rate. This apparently simple design takes full advantage of the reciprocity principle in the propagation of light which enables a perfect device to be created from imperfect components.

Exail is providing FOG products for many challenging applications like submarines, deep-sea AUV, naval force, satellites...

