

**ELECTRONICS & DEFENSE**



# **LAND INERTIAL NAVIGATION SYSTEMS**

**Highly reliable navigation and precision strikes  
under any conditions**

 **SAFRAN**

# HIGH PRECISION FOR SUCCESSFUL MISSIONS

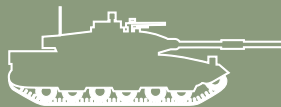
ALL YOUR MISSIONS  
require precision  
navigation & pointing,  
even in GNSS\* denied  
environment.



VEHICLE  
NAVIGATION



APC\* / IFV\*



MBT\*



TARGET  
ACQUISITION



Forward Observer



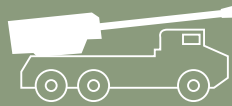
Radars



ARTILLERY  
POINTING



Ground-air  
defense systems



Howitzers



75 YEARS OF EXPERIENCE  
AS A MARKET LEADER



PERFORMANCE & RELIABILITY  
AT YOUR SERVICE



TAILORED TO YOUR  
REQUIREMENTS



COMBAT PROVEN



OPTIMIZED LIFE CYCLE COST



SPACE & AERONAUTICS  
HERITAGE



ANTI SPOOFING CAPACITY

\* Definitions on the last page

# SAFRAN INS<sup>(1)</sup> PORTFOLIO: TAILORED TO YOUR MISSIONS

## FOR ALL YOUR PLATFORMS

- WHEELED OR TRACKED
- HOWITZER
- MORTAR
- MILITARY VEHICLE & TRUCK
- MAIN BATTLE TANK
- LIGHT VEHICLE & TRUCK
- MOBILE RADAR
- AMPHIBIOUS VEHICLE

## FOR ALL YOUR NEEDS

- POSITION
- NAVIGATION
- POINTING
- LAYING
- STABILIZATION
- FORWARD OBSERVATION

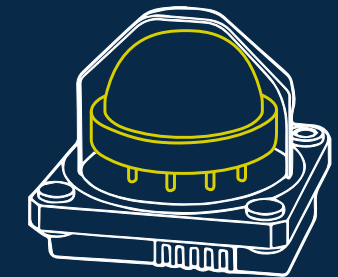
## IN ALL ENVIRONMENT

- GNSS-DENIED
- SPOOFING
- JAMMING

# CORIOLIS GYROS: THE NEW HEART OF LAND NAVIGATION & POSITIONING

Epsilon™ and Geonyx™ are based on the resonator gyros. This technology has already proven its superiority in terms of performance, robustness, SWAP-C\* and unparalleled reliability in all environments.

➤ Two complementary gyros exploiting the same Coriolis resonating principles



**HRG CRYSTAL™**  
Navigation grade resonator gyroscope

**QUAPASON™**  
Tactical grade resonator gyroscope



\*Definitions on the last page

THE FURTHER YOU GO OR STRIKE, THE MORE PRECISION YOU NEED

## EPSILON™ Family



### GNSS\* BACK-UP SYSTEM

Product	EPSILON™ ONE	EPSILON™ 10	EPSILON™ XP North Finding capacity
Heading RMS* @70° ↔ seclat	< 0.85°	< 0.85°	< 0.85°
Alignment	Aided alignment with GNSS	Aided alignment with GNSS	Autonomous alignment without GNSS Full performance < 10 min
Pitch & Roll (RMS)	0.3° (static)	0.3° (dynamic)	0.2° (dynamic)
H.Position (CEP*)	1% DT	1% DT	1% DT
GNSS-denied survival	Tens of minutes		Hours
Size	1 L		
Weight	1.5 kg		
MTBF*	> 100,000 h		

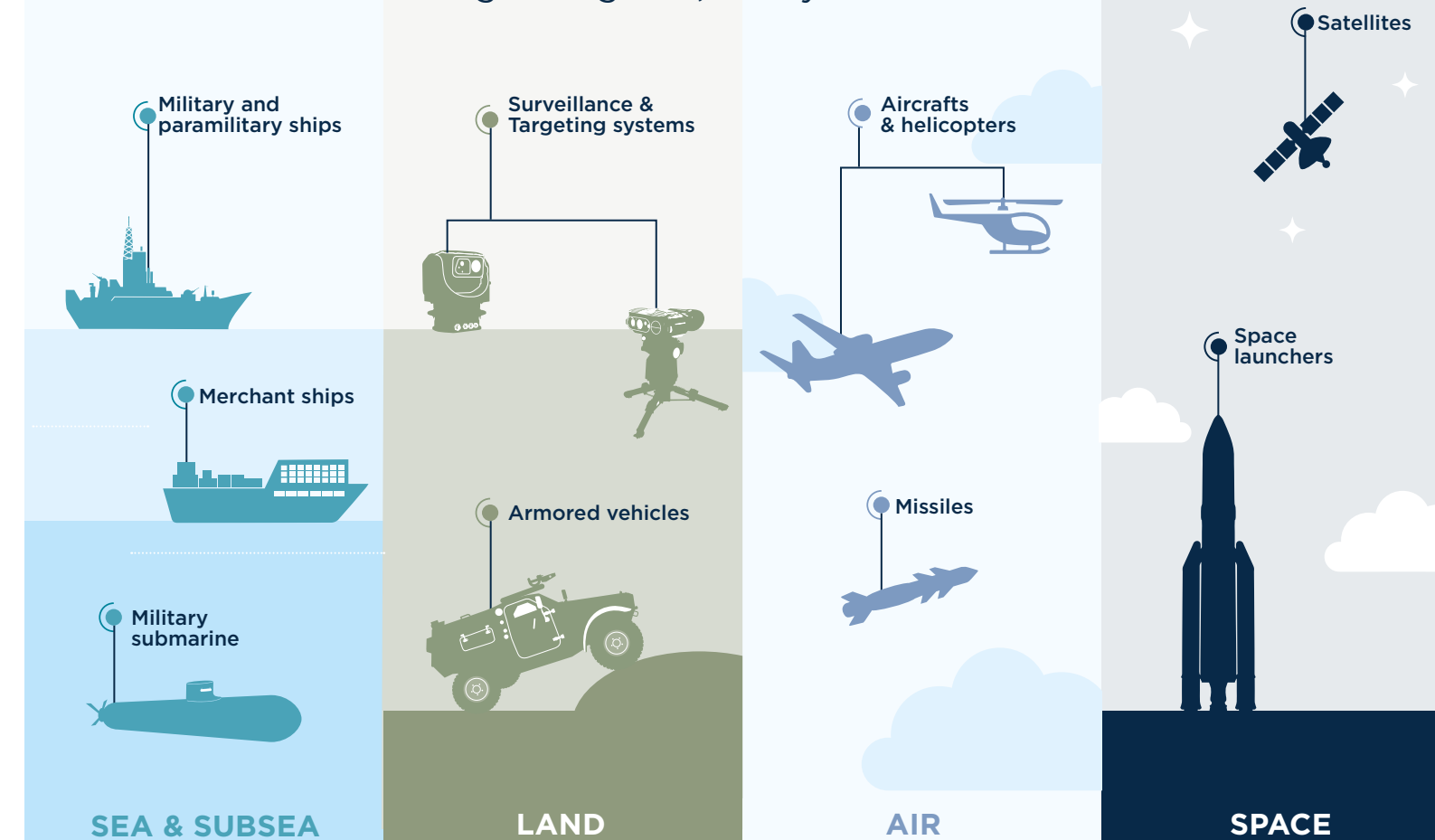
## GEONYX™ Family



### INS\* FOR HIGH PRECISION NAVIGATION & POINTING

Product	GEONYX™ One	GEONYX™ SP	GEONYX™ HP/M	GEONYX™ XP	GEONYX™ XP+
Heading RMS* @70° ↔ seclat	4 mils ↔ 1.40 mils	2 mils ↔ 0.70 mils	1 mils ↔ 0.35 mils	0.9 mils ↔ 0.30 mils	< 0.50 mils ↔ < 0.20 mils
Alignment	Autonomous alignment without GNSS Full performance < 10 min	Autonomous alignment without GNSS Full performance < 5 min	Autonomous alignment without GNSS Full performance < 5 min	Autonomous alignment without GNSS Full performance < 5 min	Autonomous alignment without GNSS Full performance < 10 min
Pitch & Roll (RMS)	1 mils	0.75 mils	0.5 mils	0.35 mils	0.20 mils
H.Position (CEP*)	0.30% DT	0.15% DT	0.1% DT	0.05% DT	0.04% DT
GNSS-denied survival	Unlimited				
Size	6 L				
Weight	6.4 kg				
MTBF*	> 100,000 h				

➤ Safran's Coriolis gyros cover any demanding applications, from tactical to navigation grade, in any environment



\* Definitions on the last page

# EPSILON™ FAMILY

## TRUSTFUL COORDINATES UNDER ANY CONDITIONS

With the Epsilon™ family, Safran offers long lasting navigation performance INS\*/GNSS\* hybrid land navigation systems. Even in GNSS\*-denied environment, Epsilon™ provides accurate position and heading for hours thanks to the outstanding inertial performance of the Quapason™. Epsilon™ can also be integrated with small caliber guns like RCWS\* to provide precision pointing.

As a full inertial navigation system, Epsilon™ systems are insensitive to magnetic disturbances, providing higher accuracy and easier vehicle integration. Highly reliable and fully interchangeable, the Epsilon™ family offers the most cost-effective navigation solutions for any vehicle platform.

# GEONYX™ FAMILY

## RELIABLE STRIKES UNDER ANY CONDITIONS

Integrating the HRG\* Crystal™, Geonyx™ offers a real breakthrough in the INS navigation grade market in terms of:

- **Operational efficiency:** Geonyx™ pointing accuracy is first-of-class under the harshest conditions and offers the market's shortest alignment time in any configuration (with or without hybridization).
- **Flexible systems integration:** Geonyx™ is the most compact INS for its class of performance and can be mounted on any orientation on vehicles, turrets and artillery weapons.
- **Robustness and reliability:** being hard-mounted, Geonyx™ withstands high shocks of artillery guns, without the need of external support. Moreover, Safran has extended its INS lifetime by integrating the most reliable gyroscope of the market, the HRG Crystal™.
- **PNT resilience:** Safran offers the latest resilient Positioning, Navigation and Timing (PNT) solutions for military forces, especially in GNSS-denied, spoofing or jamming environment.

**EPSILON™**  
Most compact & life-cycle cost effective  
Northfinding and/or GNSS back-up system



Long-lasting navigation performances



Connectable to any BMS\*



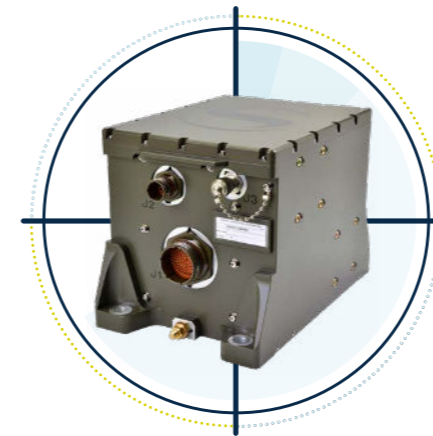
Gyrocompass capacity



Small caliber RCWS\* pointing

 Optimized SWAP*	 Up to date INTERFACES	 Compliant with latest NAVIGATION STANDARDS
Dimensions (mm) 110 x 110 x 83	GNSS (embedded or external)	Environnement MIL-STD-810
Weight < 1.5 kg	CANBUS Ethernet RS-422	Electrical I/F MIL-STD-1275
Consumption < 13 W		
Reliability MTBF* > 100,000 h		EMC MIL-STD-461

**GEONYX™**  
High performance & ultra effective life-cycle cost  
Inertial Navigation System



Pointing accuracy < 0.5 mils



Quick & flexible alignment



Hard-mounted on guns



Anti spoofing capacity



Space & aeronautics heritage



Gyrocompass capacity

 Optimized SWAP*	 Up to date INTERFACES	 Compliant with latest NAVIGATION STANDARDS
Dimensions (mm) 205/245 x 158 x 169	GNSS Embedded (external GNSS possible)	Environnement MIL-STD-810
Weight 6.4 kg	CANBUS Ethernet RS-422	Electrical I/F MIL-STD-1275
Consumption < 17 W		
Reliability MTBF* > 100,000 h		EMC MIL-STD-461

\*Definitions on the last page

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# MY E&D SERVICES

SAFRAN ELECTRONICS & DEFENSE OFFERS SPECIAL ACCESS TO A FULL RANGE OF CUSTOMER SUPPORT SERVICES VIA AN ONLINE PORTAL.

## ONLINE CONTRACT MANAGEMENT

- Full online access to your repair status, contract information technical documentation

## CYBER-SECURED ONLINE PLATFORM

- Data sharing and documents transfer

## E-LEARNING

- Access to e-Learning modules

## HELPDESK AND TICKETING

- 24/7 access to Safran Service Managers

If you have any other questions or if you would like our assistance, please contact us by email.

We look forward to hearing from you.  
Your Safran Support Team.



Email: [contact-defense@safrangroup.com](mailto:contact-defense@safrangroup.com)



SafranDefense



SafranElecDef



## OUR REFERENCES

More than 75 different land platforms equipped worldwide



Our understanding of your requirements combined with our expertise in inertial and electro-optics solutions.



**APC:** Armoured Personnel Carrier - **BMS:** Battle Management System - **CEP:** Circular Error Probable - **GNSS:** Global Navigation Satellite System  
**HMI:** Human Machine Interface - **HRG:** Hemispherical Resonator Gyro - **IFV:** Infantry Fighting Vehicle - **INS:** Inertial Navigation System - **MBT:** Main Battle Tank - **MTBF:** Mean Time Between Failure - **RCWS:** Remote Controlled Weapon Station - **RMS:** Root Mean Square Error - **RLG:** Ring Laser Gyro - **SWAP:** Size Weight & Power - **SWAP-C:** Size, Weight, Power and Cost - **TAT:** Turn Around Time.

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# POWERED BY TRUST

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