

ELECTRONICS & DEFENSE

LAND INERTIAL NAVIGATION SYSTEMS

Highly reliable navigation and precision strikes
under any NavWar conditions



HIGH PRECISION FOR SUCCESSFUL MISSIONS

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

VEHICLE NAVIGATION



APC* / IFV*

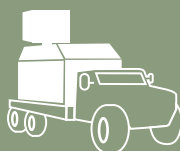


MBT*

TARGET ACQUISITION



Forward Observer

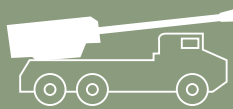


Radars

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**



**JAMMING, SPOOFING AND MEACONING
ALGORITHMS DETECTION**

** Definitions on the last page*

SAFRAN INS⁽¹⁾ 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
- MEACONING

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

	EPSILON™ Family 		
	GNSS* BACK-UP SYSTEM		
Product	EPSILON™ ONE	EPSILON™ 10	EPSILON™ XP <i>North Finding capacity</i>
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		
NavWar Capability	Not available		

	GEONYX™ Family 			
	INS* FOR HIGH PRECISION NAVIGATION & POINTING			
	GEONYX™ SP	GEONYX™ HP/M	GEONYX™ XP	GEONYX™ XP+
	2 mils ⇔ 0.70 mils	1 mils ⇔ 0.35 mils	0.9 mils ⇔ 0.30 mils	< 0.50 mils ⇔ < 0.20 mils
	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
	0.75 mils	0.5 mils	0.35 mils	0.20 mils
	0.15% DT	0.1% DT	0.05% DT	0.04% DT
	Unlimited			
	6 L			
	6.4 kg			
	> 100,000 h			
	Available			

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.

* Definitions on the last page

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



SafranDefense



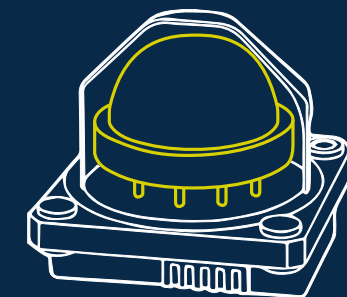
SafranElecDef



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

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



Military and paramilitary ships



Merchant ships

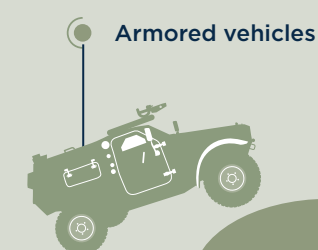


Military submarine

SEA & SUBSEA



Surveillance & Targeting systems

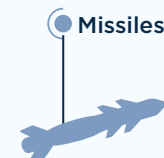


Armored vehicles

LAND

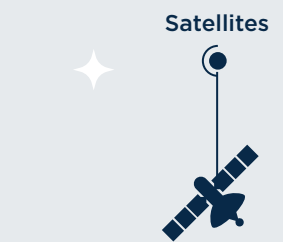


Aircrafts & helicopters

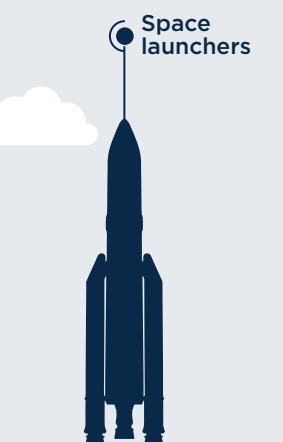


Missiles

AIR



Satellites



Space launchers

SPACE

EPSILON™ FAMILY

TRUSTFUL COORDINATES UNDER ANY

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:** Thanks to the new NavWar Option, Geonyx™ is now capable to detect any threat on GPS signal reception (jamming, spoofing and meaoning) and automatically stops GPS hybridization when necessary.

EPSILON™

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



Long-lasting navigation performances



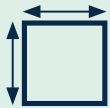
Connectable to any BMS*



Gyrocompass capacity



Small caliber RCWS* pointing



Optimized SWAP*



Up to date INTERFACES



Compliant with latest NAVIGATION STANDARDS

GNSS (embedded or external)

Environnement MIL-STD-810

CANBUS Ethernet RS-422

Electrical I/F MIL-STD-1275

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



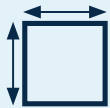
Space & aeronautics heritage



Gyrocompass capacity



Jamming, Spoofing and Meaoning Algorithms Detection



Optimized SWAP*



Up to date INTERFACES



Compliant with latest NAVIGATION STANDARDS

EMBEDDED GNSS (external GNSS possible)

Environnement MIL-STD-810

CANBUS Ethernet RS-422

Electrical I/F MIL-STD-1275

EMC MIL-STD-461

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POWERED BY TRUST

Scan for the website



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