LAND INERTIAL NAVIGATION SYSTEMS

Highly reliable navigation and precision strikes under any conditions

HIGH PRECISION FOR SUCCESSFUL MISSIONS

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

VEHICLE NAVIGATION

TARGET ACQUISITION

ARTILLERY POINTING

POWERED BY TRUST

Safran Electronics & Defense
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**SAFRAN INS® PORTFOLIO: TAILORED TO YOUR NEEDS**

The farther you go or strike, the more precision you need.

**GPS BACK-UP SYSTEM**

<table>
<thead>
<tr>
<th>Product range</th>
<th>Epsilon*</th>
<th>Epsilon™ 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heading (GMS)</td>
<td>&lt; 0.75°</td>
<td>0.75°</td>
</tr>
<tr>
<td>Pitch &amp; Roll (HMS)</td>
<td>0.3° (static)</td>
<td>0.3° (dynamic)</td>
</tr>
<tr>
<td>Roll Position (RPS)</td>
<td>% DT</td>
<td>% DT</td>
</tr>
<tr>
<td>Size</td>
<td>1 L</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>1.5 kg</td>
<td>7 kg</td>
</tr>
<tr>
<td>Alignment time</td>
<td>15 s</td>
<td>&gt; 75,000 h</td>
</tr>
</tbody>
</table>

**INS FOR HIGH PRECISION NAVIGATION & POINTING**

<table>
<thead>
<tr>
<th>Product range</th>
<th>Geonyx™ SP</th>
<th>Geonyx™ HP</th>
<th>Geonyx™ XP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heading (RMS)</td>
<td>2 mins</td>
<td>1 mins</td>
<td>0.9 mins</td>
</tr>
<tr>
<td>Pitch &amp; Roll (RMS)</td>
<td>0.75 mins</td>
<td>0.75 mins</td>
<td>0.35 mins</td>
</tr>
<tr>
<td>Roll Position (RPS)</td>
<td>0.1% DT</td>
<td>0.1% DT</td>
<td>0.05% DT</td>
</tr>
<tr>
<td>Size</td>
<td>7 kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>7 kg</td>
<td>22.5 kg</td>
<td></td>
</tr>
<tr>
<td>Alignment time</td>
<td>&gt; 100,000 h</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**INS FOR SPECIFIC APPLICATIONS**

<table>
<thead>
<tr>
<th>Product range</th>
<th>Sigma 30-700</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heading (RMS)</td>
<td>0.6 mins</td>
</tr>
<tr>
<td>Pitch &amp; Roll (RMS)</td>
<td>0.5 mins</td>
</tr>
<tr>
<td>Roll Position (RPS)</td>
<td>0.1% DT</td>
</tr>
<tr>
<td>Size</td>
<td>22.2 L</td>
</tr>
<tr>
<td>Weight</td>
<td>22.5 kg</td>
</tr>
<tr>
<td>Alignment time</td>
<td>&gt; 17,000 h</td>
</tr>
</tbody>
</table>

* Definitions on the last page

**THE REFERENCES**

More than 50 different land platforms equipped worldwide.

**OUR REFERENCES**

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

**ACRONYMS**

- APC: Armoured Personnel Carrier
- BMS: Battle Management System
- CEP: Circular Error Probable
- EPS: Epsilon
- GC: Geonyx
- 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
- RLS: Residual Linear Acceleration
- SIL: Safety Integrity Level
- SWAP: Size Weight & Power
- TAT: Turn Around Time
- GNSS: Global Navigation Satellite System

* Definitions on the last page
Rezonator Gyros: The New Heart of Land Navigation & Positioning

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

Safran’s resonator gyros cover many demanding applications, from tactical to navigation grade, in any environment.

For decades, Sigma 30 has been the world reference in the artillery field. Safran will keep manufacturing and supporting the Sigma 30 in order to meet customers’ requirements. Since flexibility is part of Safran’s culture, interchangeability between Sigma 30 and Geonyx™ is ensured to provide customers with a wide range of options and prepare for the integration of the disruptive positioning & pointing inertial system.

Safran offers flexible training programs and cost effective service support to assist you in your operations.

Definitions on the last page
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.

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™.

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**Epsilon™ Family**

**TRUSTFUL COORDINATES UNDER ANY CONDITIONS**

Most compact & life-cycle cost effective GNSS back-up system

- Long-lasting navigation performances
- Connectable to any BMS*
- Small caliber RCWS pointing
- Optimal SWAP™
- Up to date INTERFACES
- Compliant with latest NAVIGATION STANDARDS
- GNSS Embedded (external GNSS possible)
- Environment MIL-STD-810
- Dimensions (mm) 110 x 110 x 83
- Weight < 1.5 kg
- Consumption < 13 W
- Reliability MTBF* > 75,000 h

**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™.

- Optimized SWAP™
- Up to date INTERFACES
- Compliant with latest NAVIGATION STANDARDS
- GNSS Embedded (external GNSS possible)
- Environment MIL-STD-810
- Dimensions (mm) 205/245 x 158 x 162
- Weight 7 kg
- Consumption < 17 W
- Interchangeable with SIGMA 30
- EMC MIL-STD-461
- MTBF* > 100,000 h