SPRINT Subsea INS

Description

SPRINT is an Aided Inertial Navigation System (AINS) highly optimised for cost, size, weight, and power (C-SWaP). The instrument is a turn-key solution comprised of carefully selected high-grade and highly reliable inertial sensors integrated into a Sonardyne in-house designed inertial measurement unit (IMU).

The selected inertial sensors are the standard for commercial aviation with a proven 20+ year track record. These sensors have a highly desirable characteristic being insensitive to vibration, temperature changes and having very limited initial errors. The result is a system which is highly suitable for the marine environment where performance, robustness and data integrity need to be available from initialisation, even during the harshest conditions.

SPRINT’s dual AHRS & INS algorithm capability is unique in the market and allows for automatic on-board integrity checking between algorithms as well as having instantaneous INS start up with north alignment from the on-board AHRS. This capability allows for simultaneous use from one instrument, e.g. AHRS plus DVL for ROV piloting and INS plus DVL for survey operations. Internal battery backup provides continuous on-board navigation and data storage supporting post-mission diagnostics and post-processing, even throughout brownout periods.

SPRINT INS interfaces to aiding sensors such as USBL, DVL, pressure sensor and sound speed.

Power-pass through to aiding sensors is supported to ease integration enabling the SPRINT to be interfaced using a single connection.

SPRINT has a proven track record spanning 10 years in the field in diverse applications from ROV guidance and autopilot to demanding survey applications such as multibeam Out-Of-Straightness surveys and sparse-LBL using tightly coupled 6G acoustics.

The instrument is available in 4,000 and 6,000 metre depth ratings and as an OEM version and is one of the smallest form factor subsea inertial instruments available.

Applications Include

- Vehicle guidance & control
- Station keeping and autopilot including mid-water applications
- USBL aided INS survey
- DVL aided relative navigation
- AUV’s
- ROV and tow fish positioning
- Hydrographic survey
- Offshore construction
- As-laid and out of straightness
- Multibeam survey
- Touchdown monitoring
- Structure placement

Key Features

- Turn-key solution for motion sensor, gyrocompass and INS
- SPRINT provides concurrent AHRS and INS capability for dual use
- Fast follow up speed of 900º/sec
- Choice of depth ratings: 4,000 and 6,000 metres
- Choice of connectors: Seacon (standard) or Seanet® (for use with FMC Schilling Robotics ROV)
- Transport approved rechargeable li-ion battery back-up as standard
- 8 GB internal memory allows post processing and remote diagnostics
- Export is not ITAR controlled
- Ethernet and serial interfaces
## Specifications

### SPRINT Subsea INS

![Image of SPRINT Subsea INS](image)

<table>
<thead>
<tr>
<th>Performance</th>
<th>SPRINT 300</th>
<th>SPRINT 500</th>
<th>SPRINT 700</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heading</td>
<td>0.05º Secant Latitude</td>
<td>0.04º Secant Latitude</td>
<td>0.02º Secant Latitude</td>
</tr>
<tr>
<td>INS initialisation</td>
<td>Instantaneous</td>
<td>Instantaneous</td>
<td>Instantaneous</td>
</tr>
<tr>
<td>Roll and Pitch</td>
<td>0.01º</td>
<td>0.01º</td>
<td>0.01º</td>
</tr>
<tr>
<td>USB/LBL Aided</td>
<td>3x precision improvement</td>
<td>3.5x precision improvement</td>
<td>4.5x precision improvement</td>
</tr>
<tr>
<td>USB/LBL and DVL Aided</td>
<td>3 to 7 x precision improvement</td>
<td>4 to 10 x precision improvement</td>
<td>6 to 13 x precision improvement</td>
</tr>
<tr>
<td>LBL/DVL Aided</td>
<td>3 cm confined area, 20 cm wide area (dynamic)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DVL Aided</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Typical Survey</strong></td>
<td>0.03%</td>
<td>0.03%</td>
<td>0.02%</td>
</tr>
<tr>
<td><strong>Distance From Origin</strong></td>
<td>0.15%</td>
<td>0.10%</td>
<td>0.08%</td>
</tr>
<tr>
<td>DVL Aiding Loss/Drift</td>
<td>1.2 m over 1 min, 5 m over 2 mins</td>
<td>0.8 m over 1 min, 3.2 m over 2 mins</td>
<td>&lt;0.5 m over 1 min, 2 m over 2 mins</td>
</tr>
<tr>
<td>Station Keeping</td>
<td>&lt;1 m over 24 hours (Syrinx DVL)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Power

- Power Requirement: 20–50 V dc, 15 W nominal, 35 W max
- Power Pass Through: 3 x for external aiding sensors (up to 3A per sensor)
- Back Up Battery Type/Life: Li-ion/5 minutes

### Data/Comms

- Data Storage: 8 GB internal memory
- Serial Ports/Protocol: 4x RS232 or RS485
- Other Ports: Ethernet, 4x Triggers
- Output Rate: Up to 100 Hz

### Mechanical

- Connectors options: 4 x Seacon / Seanel®
- Mechanical Construction: Titanium
- 4,000 m (Seacon): Ø205 x 260 mm
- 6,000 m (Seacon): Ø205 x 280 mm
- 4,000 m (Seanel): Ø205 x 250 mm
- Weight in Air: 4,000 m: 18.5/11.5 kg
- Water: 6,000 m: 22/14 kg

### Environmental

- Depth Rating: 4,000/6,000 metres
- Temperature: -20 to +55°C (operating), -20 to +60°C (storage)
- Shock Rating: 22 g, 11 ms half sine

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1. CEP50 (Assumes use of a high performance DVL such as the Sonardyne Syrinx 600)
2. SPRINT-Nav performance achievable by co-locating with Syrinx DVL
3. Estimated Weights

Specifications subject to change without notice - 01/2020