Next Generation Advanced Electro-Optical Boresight System for Existing and New Airborne and Ground Based Platforms
Main functionality and features

Metronor’s Boresight system is based on advanced spatial direction characterization methods of CCD cameras developed over a period of more than 15 years and initially introduced in Metronor’s Portable CMM systems.

By combining such spatial directions with known geometry of light sources (LEDs) which are embedded into boresight pads, 6 degrees of freedom of the pads and hence of LRU trays/mountings, can be determined with unique accuracy and speed.

- Snap on pads with no alignment requirements
- Orientation of each pad relative aircraft datum pad
- Flexible configuration of pads
  - No leap frogging or tie-in via other pads
  - No error stack-up
- Simultaneous measurement of datum pad and any other pad
  - No aircraft jacking or leveling needed
  - Offset/drift eliminated
  - Full freedom to move and operate on or inside aircraft while measurements are ongoing
Main functionality and features

Low Maintenance - Enables On-site Repairs
No scheduled maintenance required. Built-In-Test (BIT) system eliminates need for system calibration. Modular system build up enables on-site repair and eliminates need to ship system to Metronor for service and/or repair. The result being very low life support cost.

Fast, Efficient Results with Confidence
A single operator with minimal training can boresight an aircraft in minutes rather than hours. BIT functionality monitors operator’s actions and ensures trustworthy results.

Functionality for Tomorrow’s Needs
Designed for supporting current and future platforms
• Aircraft
• UAV/UCAV/TUAV
• Ground based vehicles
• Rotary Wing
Unique capability of not only orientation measurements, but also 3D position determination, facilitating alignment and mapping of Helmet Mounted Display & Sight Systems, all related to the vehicle’s main datum points / coordinate system.

Easy Adaptation and/or modification to Aircraft Type and versions
Minimal mechanical modification of adapters / brackets needed when adapting to new programs/platforms. No need to change software executable programs. Only text/graphical set-up files are being updated. Hence adaptation/modification is fast and affordable.

Product Quality
All HarmoLign components are sourced from ISO:9001:2000 certified companies. Final assembly and testing is done by Metronor.
## HarmoLign Technical Specifications

<table>
<thead>
<tr>
<th>Type</th>
<th>Electro-optical boresight system</th>
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</thead>
<tbody>
<tr>
<td>Principle</td>
<td>Volumetric, with camera continuously measuring all line replaceable units (LRUs) to weapon system platform datum</td>
</tr>
<tr>
<td>Accuracy</td>
<td>0.1 mRad (2σ)</td>
</tr>
<tr>
<td>No. of LRUs</td>
<td>No limit</td>
</tr>
<tr>
<td>Adapters</td>
<td>Carbon fibre with C matched LRU adapters</td>
</tr>
<tr>
<td>Temperature</td>
<td>-10ºC to +50ºC (15ºF to 120ºF) operating&lt;br&gt;-30ºC to +70ºC (-22ºF to 160ºF) storage</td>
</tr>
<tr>
<td>Range</td>
<td>20 - 25m (65 - 80ft.) max</td>
</tr>
<tr>
<td>Reliability</td>
<td>&gt; 2400h MTBF</td>
</tr>
<tr>
<td>Qualifications</td>
<td>Temperature, Altitude, Bench Handling, Loose Cargo, Transit Drop, Salt Fog, Rain, Fungus, ATEX, Contamination, EMC.</td>
</tr>
</tbody>
</table>

### Next Generation Boresighting

- Fast, Accurate and Easy to Use
- Fully Qualified to Military Standards
- Supports Diverse Fleet
- Low Maintenance
- Provides 6 DOF - Enables complete Helmet Tracker System Alignment
- Affordable Acquisition & Minimal Support Cost
- No Requirement for Calibration
- Enables on-site Repair
- Minimal Training Requirement
- Easily Adaptable to Future Platforms
- Low Volume & Weight - Highly Deployable
- Developed under Contract with BAE SYSTEMS
Metronor AS

Metronor is an international ISO9001: 2000 certified high technology company headquartered outside Oslo, Norway. Based on in-house innovation and research, Metronor has developed a range of high accuracy portable electro-optical coordinate measuring systems, popular among leading manufacturers worldwide. Based on the same core technology Metronor has also initiated a military product line. The majority of Metronor’s installations worldwide are among aerospace and automotive manufacturers and their upper-tier suppliers.

Metronor’s PCMM Business Unit develops and markets portable coordinate measurements machines.

The AIMS Business Unit markets the AIMS software solutions developed jointly by The Boeing Company and Metronor.

Metronor’s Military Systems Business Unit develops and markets custom boresighting applications. The product line includes equipment kits for 3 degrees of freedom (3-DOF) boresighting of sensors and weapon stations for various airborne and ground based platforms. Moreover, 6-DOF kits for full alignment/harmonization of Helmet Mounted Display and Sight tracker systems. The product line also includes “Drill-off” kits for production line establishment of platform coordinate reference system.

For more information visit www.metronor.com

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