Trimble® Charisma™ software is a configurable Reference Station/Integrity Monitor architecture (C-RS/IM-A) enabling deployment of Differential Global Navigation Satellite System (DGNSS) infrastructure for high availability marine and inland navigation services. In addition, Charisma software may be configured to support a variety of government and commercial applications.

**FLEXIBLE, SCALABLE, RELIABLE**

Charisma provides a configurable architecture for deploying DGNSS navigation infrastructure to deliver high availability broadcast services for maritime harbor and harbor approach or inland navigation applications. The architecture supports a variety of reference station (RS) and integrity monitor (IM) configurations to satisfy your reliability and cost objectives. The new Virtual MSK (VMSK) technology provides a new dimension of deployment options in addition to previously unachievable service integrity features.

Charisma software is designed to enable compliance with the regulations of the International Convention for the Safety of Life at Sea (SOLAS) and is fully compliant with all applicable IALA, RSIM 1.1 and RSIM 1.2 standards. Differential correction broadcast and monitoring is fully supported in the RTCM 2.0, 2.1, 2.2, or 2.3 formats. Charisma-RS and Charisma-IM may be used in standalone beacon site configurations or may be combined with the advanced control station (CS) solution provided by Trimble Coastal Center® software for centralized infrastructure management.

Hundreds of Charisma installations operate at radio beacon sites worldwide providing high availability navigation services. Trimble provides the most flexible and complete fully standards compliant software package in the market and is committed to continued innovation and advancing standards to deliver increasing value to service operators.

**DGNSS MODERNIZATION**

Designed in partnership with the prominent worldwide Coast Guard authorities to achieve ongoing compliance with evolving standards and enable modernization of legacy infrastructure, the Charisma architecture supports RS or IM functions running in a distributed architecture on one or more host computers. Using generalized interfaces to site devices, this approach allows operation with a range of legacy or modernized components and enables incremental system upgrades based on service goals and capitalization budgets.

Trimble has been providing beacon and control station solutions for maritime navigation infrastructure for nearly two decades. Recognizing the importance of driving and complying with standards and recommendations that provide enhancements of value to our customers, Trimble is an active, contributing member of the IALA, RTCM, and RSIM maritime committees.

**VIRTUAL MSK (VMSK)**

Trimble pioneered the virtual reference station technology that improves the availability, performance, and integrity of RTK corrections through use of real-time network processing. A VRS™ data stream may be used in place of any RS or IM GNSS receiver, substantially expanding the options for adding redundant RS and/or IM functions. As long as no RS or IM GNSS receiver at a broadcast site is part of the VRS infrastructure, the VMSK data stream also enables protection against spoofing and jamming of GNSS signals at the local site. Jamming protection has become increasingly important with the proliferation of illegal “personal privacy devices”.

**INTEGRITY MONITORING**

Post-broadcast integrity monitoring verifies proper operation of both the reference station and the transmitter. Charisma-IM receives broadcast corrections using an MSK receiver and applies them to data from a DGNSS receiver/antenna located either at the broadcast site ("near field") or at a remote location ("far field"). RSIM messages continually report status to the RS. If processing detects excessive errors in corrections, an RSIM alarm is sent to the RS and triggers broadcast of satellite warnings to users.

Pre-broadcast integrity monitoring is performed by verifying corrections before they are broadcast and both virtually eliminates broadcast of erroneous corrections and reduces the time to user notification. Charisma was, in fact, used to develop and verify the RSIM 1.2 standard, which included pre-broadcast integrity monitoring and the combined mode using simultaneous pre- and post-broadcast integrity monitoring.
USER INTERFACE

The Charisma user interface provides complete control over configuration of all functions and devices on site along with communications links to Trimble Coastal Center, when used. While transmitting, the operator has full access to detailed status displays and event response control functions, but the system protects against inadvertent changes to the transmitting configuration. Password authentication may also be implemented for further security. The Charisma user interface meets US Section 508 software application accessibility requirements.

SUPPORTED DEVICES

For new sites and site modernization, we recommend the Trimble NetR9® as a future-ready GNSS receiver and the Trimble NetM3® MSK modulator as a fully RSIM 1.2 compliant solution, supporting either network communications or RS232/RS422 links for legacy sites. While we recommend the Nautel Vector D transmitter, any transmitter may be used that is compliant with the MSK modulator output signal voltage or can be adapted using attenuation. Trimble provides the Raven Invicta 210 MSK receiver for both local and remote integrity monitor installations. Consult with Trimble regarding legacy equipment support and possible upgrade opportunities for any existing sites.

TRIMBLE COASTAL CENTER SOFTWARE

Trimble Coastal Center (TCC) software provides a powerful solution for managing DGNSS navigation infrastructure that is fully compliant with all RSIM 1.2 requirements. When TCC is combined with Charisma-RS/Charisma-IM, maximum operations productivity can be achieved for installations ranging from a single station to a complex network spanning a continent.

MINIMUM SYSTEM REQUIREMENTS

- Operating systems- one of the following:
  - Windows® 7 Professional x64
  - Windows XP x32, SP 2+
  - Windows Server® 2003 x 32, SP 1+
- Processors- one of the following:
  - Single or dual processor, at least at 3.0 GHz
  - Dual core processor, at least at 1.5 GHz
- 1GB RAM
- At least 20 GB free hard disk space
- USB port

ORDER INFORMATION

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<thead>
<tr>
<th>Default Configuration</th>
<th>Part Number</th>
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<tbody>
<tr>
<td>Trimble Charisma</td>
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