



SHIP INTEGRATED NAVIGATION SYSTEM (SINS)

The Kearfott KN-6000 is a newly developed Integrated Navigation System for marine applications (both surface and sub-surface ships).

The SINS consists of the following elements:

- Two Inertial Navigation Systems (INS's)
- GPS/TRANSIT/OMEGA
- Electronic Speed Log
- Echo Sounder
- Meteorologic Measurement Unit
- Accurate Time Clock
- Retransmission Unit
- Remote Display Units
- Ship's Course Indicators (Digital and Analog)
- Digital indicators of roll, pitch, speed and wind speed/direction

System sensors provide navigation data in several formats including digital, synchro and discrete information. The data is collected by a Retransmission Unit (RTU).

The RTU is the hub of the system. It collects data measured by the various navigation subsystem sensors, processes the data and distributes the data to various users throughout the vessel.

The RTU has been designed to optimally combine and process the available information into a Digital Navigation Master Message (DNMM). A high rate data bus transmits the DNMM to displays, alarms and multiple ship systems. The RTU also processes attitude data from the INS's and provides analog synchro data outputs of high accuracy and minimal latency to critical fire control systems and weapon systems.

The main output interface from the SINS is via distributed Signal Distribution Units (SDU's). Each SDU can provide multispeed synchro and digital information to a user or to indicators/displays. The system has the capability of driving up to six SDU's spread throughout the ship.

Included as an integral part of the Kearfott navigation system are two redundant high accuracy ship's INS's. In addition to position, velocity and attitude information, the INS provides way point navigation and at sea transfer alignment capabilities. The INS meets NATO requirements with proven performance aboard surface combatants and submarines.

System control is accomplished in a distributed manner. The major subsystems are operated by means of their own control/display units and interfaced through the RTU. In addition, system design enables control, display, updating and simulation mode operation to be performed via a central Combat Control System or by the RTU CDU. Display of navigation data is local for each subsystem, and retransmitted as a master navigation digital or analog message to various display units and users all over the vessel.

The SINS is available as a total package. This includes selection of the most effective available components, complete software configuration, technical supervision during installation, and operator training to ensure the effectiveness of the system. Kearfott's expertise and experience also provides the ship/submarine builder and operators with one responsible source for all issues relating to the integrated navigation system before, during, and after installation.

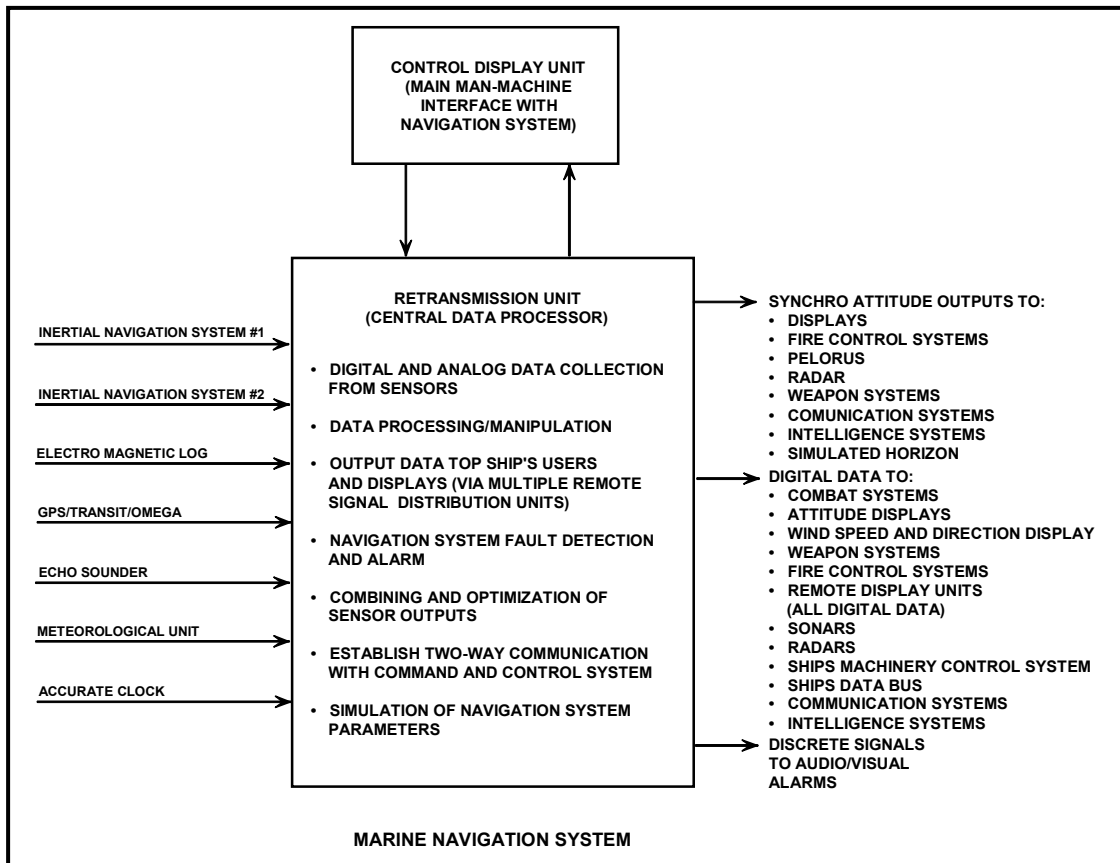
Inherent in the Kearfott system approach is the flexibility for future growth. Reconfigurable software makes it possible to support the wide variety of ships and submarines in use today without the need for costly hardware modifications. Selection of the Kearfott SINS will ensure the necessary technical expertise and experience to address each vessel's unique requirements. The integrated system approach results in a cost-effective system that is totally responsive to the combatant's needs.

NAVIGATION SYSTEM FUNCTIONS

- | | |
|---|---|
| <ul style="list-style-type: none"> • Navigation Position, velocity, and vertical acceleration determination and way point navigation. • Attitude an Heading Roll, pitch and true heading determination and angular rate information. • Depth Distance to sea bottom and to surface measurement. • Meteorology Measurement and display of air temperature, true and relative wind speed and direction, relative humidity, and barometric pressure. | <ul style="list-style-type: none"> • Lever Arm Compensation Calculation of vertical acceleration at specific ship locations. • Data Transmission To combat systems and other shipboard users. • System control and displays. • Subsystem control and displays • Timekeeping and synchronization. • Fault detection and error handling • Redundancy management. • Emergency power management. • Simulation modes. |
|---|---|

NAVIGATION SYSTEM PERFORMANCE

<table style="width: 100%;"> <tr> <td style="width: 20%;">Position</td> <td></td> </tr> <tr> <td> GPS</td> <td>50 m (50% CEP)</td> </tr> <tr> <td> INS</td> <td>Up to 1 nmi/18 H (50% CEP)</td> </tr> <tr> <td>Velocity</td> <td></td> </tr> <tr> <td> GPS</td> <td>0.2 m/s (rms)</td> </tr> <tr> <td> INS</td> <td>1.0 ft/s (rms)</td> </tr> <tr> <td>Roll/Pitch</td> <td>1.0 arc-min (rms)</td> </tr> </table>	Position		GPS	50 m (50% CEP)	INS	Up to 1 nmi/18 H (50% CEP)	Velocity		GPS	0.2 m/s (rms)	INS	1.0 ft/s (rms)	Roll/Pitch	1.0 arc-min (rms)	<table style="width: 100%;"> <tr> <td style="width: 20%;">Heading</td> <td>1.8 arc-min/cos latitude (rms)</td> </tr> <tr> <td>Roll/Pitch/Heading Rates</td> <td>0.1°/s rms</td> </tr> <tr> <td>Wind Speed</td> <td>0.5 m/s (maximum)</td> </tr> <tr> <td>Wind Direction</td> <td>±2.0° (maximum)</td> </tr> </table>	Heading	1.8 arc-min/cos latitude (rms)	Roll/Pitch/Heading Rates	0.1°/s rms	Wind Speed	0.5 m/s (maximum)	Wind Direction	±2.0° (maximum)
Position																							
GPS	50 m (50% CEP)																						
INS	Up to 1 nmi/18 H (50% CEP)																						
Velocity																							
GPS	0.2 m/s (rms)																						
INS	1.0 ft/s (rms)																						
Roll/Pitch	1.0 arc-min (rms)																						
Heading	1.8 arc-min/cos latitude (rms)																						
Roll/Pitch/Heading Rates	0.1°/s rms																						
Wind Speed	0.5 m/s (maximum)																						
Wind Direction	±2.0° (maximum)																						



*For further product information or additional applications, please contact
Kearfott Marketing at (973) 785-6555 or Fax (973) 785-5905
VISIT OUR WEBSITE: www.kearfott.com*