



Warning & Integration Server WIS5060

The Warning and Integration Server (WIS5060) collects tracking information on targets and surveyed navigational aids (navaids) from all radars and transponders in the Vessel Traffic Management & Information System (VTMIS5060), correlates the information from the various sources to form an integrated result, and distributes the integrated view. When a target is tracked by more than one source, the integration process ensures that only a single target is presented to the VTS operator.

WIS5060 also monitors the targets and navaids against a set of warning criteria, and issues warnings when specific criteria are violated. WIS5060 is the central information manager in the VTMIS5060, providing the interface between the radars, AIS transponders, other tracking sensors, and the VTS operator.

Purpose

The main functions of WIS5060 are:

- ✦ Collection of track information from the radars, AIS transponders and other sensors
- ✦ Integration of multiple tracked targets and navaids
- ✦ Hand-over of targets between radars
- ✦ Monitoring against target and navaids warning criteria
- ✦ System monitoring
- ✦ System time synchronisation

Features

VTMIS5060 typically consist of a number of remote radars, each connected to a VET5070 Extractor and Tracker unit, which is in turn linked to the WIS5060 at a control centre. Each VET5070 detects and tracks targets and navaids within its specific coverage area. AIS transponder systems are normally included as an additional means of target tracking. The primary purpose of the WIS5060 is to manage track information from individual sensors such that the VOC5060 operator is presented with an integrated picture.

Each VET5070 registers the following data for the tracks detected within its coverage area:

- ✦ Internal identification
- ✦ Status (initial, established, predicted or lost)
- ✦ Moving or stationary
- ✦ Position, Speed & Course
- ✦ Length & Width
- ✦ Echo amplitude
- ✦ Tracking covariance radius (accuracy)
- ✦ Measure of tracking quality
- ✦ Time of measurement (global time)

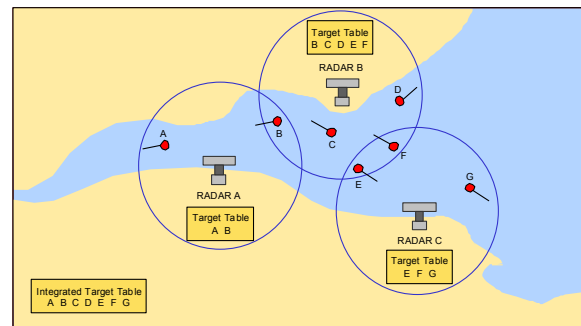
The track data is registered in a local Primary Target Table (PTT) within each VET5070. The track data are transferred to the WIS5060 in synchronism with antenna revolution.

In a multiple sensor system some targets are detected by only one sensor, while others are in an overlap area and are detected by more than one sensor. The WIS5060 reads the PTTs from all sources, and subjects each target to various tests designed to associate each real target with only one track.

The WIS5060 first checks the geographical position of the targets relative to each sensor. Those targets that are visible from only one sensor are designated as unique targets and entered into an Integrated Target Table (ITT).

The remaining targets are those lying in areas covered by multiple sensors. The data for each remaining target is adjusted for time differences, and subjected to a

correlation check. Several parameters are checked for match over a period of time; Position, Course and speed, Target circles of uncertainty, Target length and width, Target hand-over identifier (hand-over targets only) and Identifier.



When the WIS5060 determines that more than one source is tracking the same target, it registers the matched candidates as a single target in the ITT. The track representing the highest quality signal is selected as the reference for the specific target. Matched candidates are regularly subjected to the correlation tests against the reference target to ensure that any possible miss-match is identified, and to ensure that the best reference target is always used. New targets are subjected to the same tests. For AIS transponder tracks, a significant high quality will be defined.

The navaids will be integrated as explained for targets, always including identifier match, but excluding hand-over.

The ITT data is distributed to the VOC5060 Operator Workstations, which use the data to present target and navaid positions to the operators.

➤ Target Hand-Over

When targets move between adjacent radar areas, the WIS5060 ensures continuous tracking over the entire VTS coverage area. Target hand-over requires that the radar coverage areas overlap, to the extent that a target is detected by both radars as it passes between areas.

➤ Target Warnings and Information

The WIS5060 continuously monitors each integrated target and navaid against a set of criteria, and defines a warning or specific information whenever one of these criteria is fulfilled. The criteria may be pre-defined, or results from target assignments made by an operator.

The available target and navaid warnings and criteria dependant information are listed below.

Target Warnings

- ✦ Lost Target
- ✦ New Target
- ✦ Channel Exit
- ✦ Channel High Speed
- ✦ Channel Low Speed
- ✦ Channel Course Deviation
- ✦ Channel Encounter
- ✦ Channel Contravention
- ✦ Reporting Area Enter
- ✦ Reporting Area Deviation
- ✦ Grounding Prediction
- ✦ Striking Prediction
- ✦ Collision Prediction
- ✦ Domain Intruder
- ✦ Multipurpose Area Entering
- ✦ Multipurpose Area Leaving
- ✦ Multipurpose Area Inside
- ✦ Multipurpose Area Outside
- ✦ Multipurpose Area Approaching
- ✦ Multipurpose Area High Speed
- ✦ Multipurpose Area Acceleration/Deceleration
- ✦ Prohibited Anchoring
- ✦ Leaving Anchorage
- ✦ Dragging Anchor
- ✦ Sailing Route Course/Distance/ETA Deviation
- ✦ Turning Circle Deviation
- ✦ Tracking Deviation

Criteria dependant Target Information

- ✦ Check Point Entry

Target Warning Assignments

- ✦ Navigation Channel
- ✦ Anchor Position
- ✦ Anchoring Area
- ✦ Collision Survey
- ✦ Domain Watch
- ✦ Grounding Watch
- ✦ Reporting Area Enter
- ✦ Reporting Area Deviation
- ✦ Sailing Route
- ✦ Turning Circle
- ✦ Disabling of warning checks

Target Information Assignments

- ✦ Type & Size

Navaid Warnings

- ✦ Lost
- ✦ Off Position
- ✦ Domain Intruder

➤ System Warnings

The WIS5060 monitors the other VTMISS060 system components for irregularities, and reports via the LAN any detected failures or lack of response from VTMISS060 components. Present System Warnings are presented on request at the VOC5060 display. Automatic printing of new System Warnings is available, including accumulation of a predefined number of warnings before sending to printer.

➤ System Time

WIS5060 is responsible for distribution of the system time to all other VTMISS060 components, to ensure system synchronisation.

➤ Redundancy

In order to ensure system availability, multiple WIS5060 units can be supplied in a 'hot standby' configuration. The multiple units are run in an Active/Standby relationship. In the event that the active unit fails, a standby unit will automatically assume its role and all tracking information are retained. When reconnecting to Active WIS in a distributed VTS system, data from both WIS will be merged before one of them will remain as the only Active.

Technical Specifications

The following characteristics apply for the WIS5060 application with a standard computer.

- ✦ *Computer Type:* Rack-mounted server
- ✦ *Operating System:* Microsoft Windows 2000/XP®
- ✦ *Maximum number of radar tracking sources:* 32
- ✦ *Maximum number of ITT entries:* 2000
- ✦ *Clock Accuracy:* Equal to CMOS RTC using the internal Windows® TimeServ function. ± 0.45 seconds if updated daily from external time reference. ± 5.3E-08 seconds if updated hourly from external time reference.
- ✦ *Data distribution rate:* Instantaneous for event related data (e.g. target warnings). Every 5 seconds for target data (position, course, etc.)
- ✦ *LAN Connection:* RJ-45
- ✦ *LAN Protocol:* IEEE Standard 802.3, 10/100BaseT

Options

- ✦ **Optional Computer** - An Industry Standard PC is available as replacement for the standard computer.
- ✦ **Equipment Rack** - The WIS5060 can be mounted in a 19" equipment rack or placed on a desk or table.
- ✦ **External Time Reference** - Where high accuracy is required for time records, the WIS5060 can be supplied with an external time clock or interfaced to an external time reference. Any time source that is supported by Timeservice for Windows® can be used, such as
 - Hewlett-Packard's GPS receivers
 - Trimble GPS receiver
- ✦ **Health Monitoring System** - Scalable monitoring system, replacing WIS system monitoring.
- ✦ **Expanded Maximum Number of ITT entries** - 3000.

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