CoastWatch VTMIS

Traffic Management and Information System

SAAB SYSTEMS

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Saab can proudly present the CoastWatch VTMIS as an entirely in-house development. In order to achieve the world's best VTMIS solution, we have used the best of our 40-year long tradition in developing and integrating Command and Control systems including large scale maritime projects, advanced sensors integration and data fusion and also our 15-year development history in AIS and AIS networks.

Our solution provides the following key advantages:

- Extensive VTS Work Flow Support
- Highly versatile and efficient Graphical User Interface
- Integrated Management Information functions
- Efficient integration of all types of sensors; new or existing
- Scalable and extendable design. The CoastWatch can be tailored to suit a small harbour application, be a fully compliant, large scale IALA VTMIS or an extensive Coastal Surveillance System
- Extensive configuration capabilities

The CoastWatch VTMIS system by Saab has been developed to fully support the requirements as specified in the IALA VTS Manual and the IALA Recommendation V-128. It includes a variety of different sensors and sub-systems, such as radars, AIS presentation system, vessel database etc. Functions and sub-systems in the CoastWatch VTMIS are easily tailored to fit the customer's individual requirements.

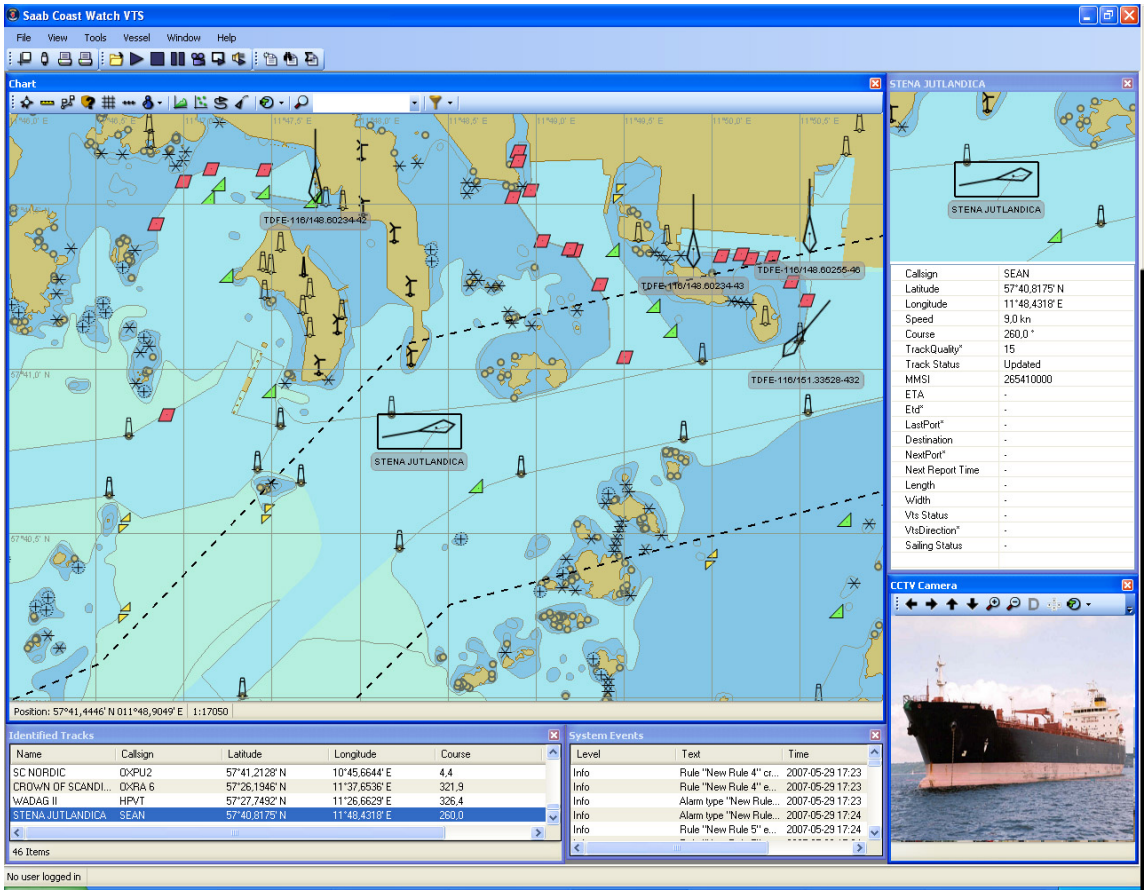
In designing the CoastWatch VTMIS, the main objective is to contribute to the safety and efficiency of the maritime operation. This forced us to apply the absolutely best solutions for all parts of the system; from sensor selection and sensor fusion to presentation systems and operator support, using the latest available technologies to offer the customer a flexible and future proof system.

Operator Workstation

The vessel traffic situation is presented on an electronic chart display that is capable of displaying:

- Chart information
- System tracks (from radar, AIS and other sources)
- Radar plots and radar video
- Sensor information
- Custom chart objects (areas, lines, points)
- Routes
- CCTV video

The presentation content and layout is configurable so that information overflow and cluttering is prevented making it intuitive and easy to use. The settings of the presentation views can be defined uniquely for each operator.



CoastWatch VTMIS presentation system

Work flow support

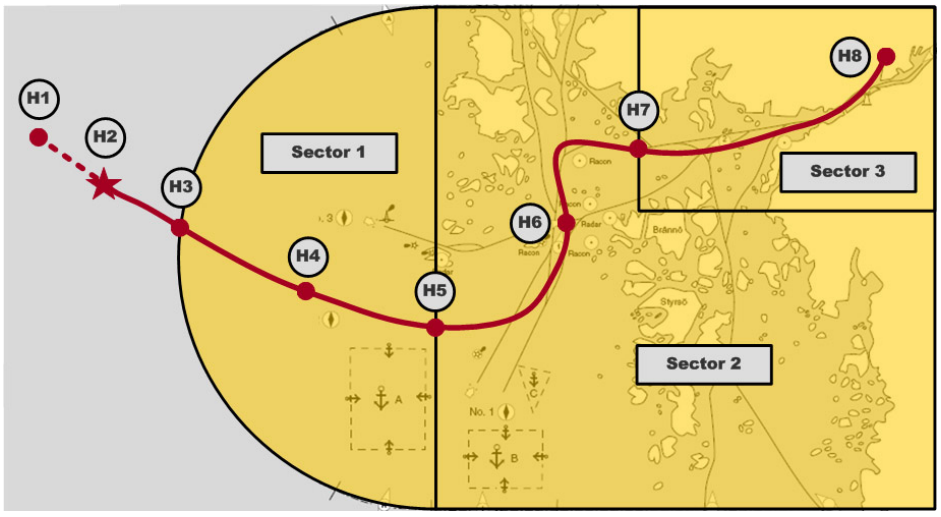
Integrated support for work flow by the use of alarms and reports. The system provides the operator with easy to use tools which support the workflow of a VTS. These tools allow the operators to easily save the information reported by mariners during their movement within the VTS area. To enter these reports the operator can simply click on the corresponding track/vessel in the chart and select to enter a specific report. Examples of standard reports are:

- Pre-entry report
- Entry report
- Position report
- Arrival report
- Pre-departure report
- Departure report
- Exit report
- Anchorage report
- Pilot report
- Incident report

When entering these reports, the system automatically provides all the information it has regarding the vessels current status, e.g. position, direction, time of report etc. in order to minimize the workload of the operator.

If the integrated workflow tools are utilised, the system can provide the operator with a better overview of the traffic situation. This is achieved through the use of special symbols in the chart window, e.g. if a vessel is carrying dangerous cargo; alarms which are raised if vessels with certain reported properties violate some rule, e.g. vessel with dangerous cargo passing through a sensitive area; special lists for different categories of vessels. Typical lists are:

- Arrivals (ships that have provided a pre-entry report)
- Departures (vessels that have provided a pre-departure report)
- Vessels under Surveillance (all vessels within the VTS area, which are actively monitored by the VTS)



Vessel management workflow

Charts and chart management

The system supports S57/63 charts, raster charts/images and custom charts. We have developed our own chart engine in order to achieve maximum performance and flexibility. This also ensures that we together with the customer easily can introduce new functions in the chart system.

The chart handling is hardware accelerated which enables the operator to very quickly zoom and pan the charts.

The management of the charts in the system is highly flexible. It includes configuration functions, e.g. to control by a keystroke the detail levels of the chart display.

Custom chart objects

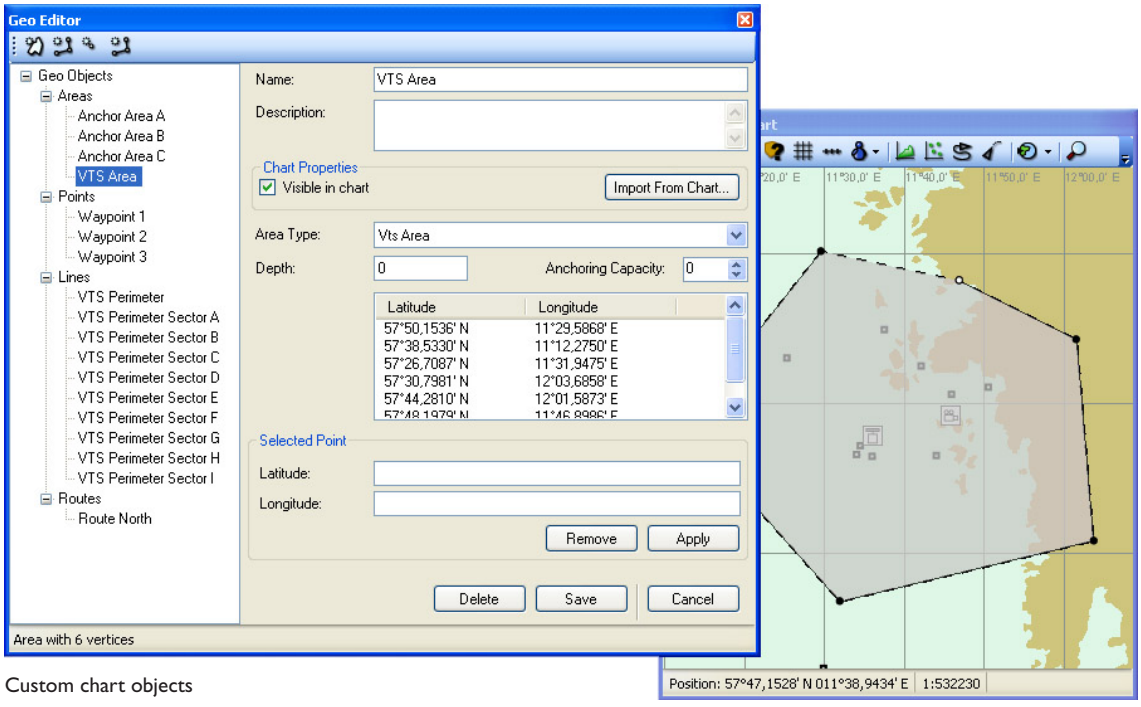
CoastWatch VTMIS supports user defined chart objects; areas, lines, points and routes. These are stored centrally and distributed to other operators within the system.

Track management

Real-time tracks are generated using the Saab high-quality Vessel Tracker Handler (VTH), derived from our military solutions. The system primarily uses plot-based data fusion, which gives the most reliable detection results. At the same time it is possible to use tracks from single radar trackers. The VTH is placed at the control centre. This tracker can handle multiple radars and other types of sensors such as AIS. Tracks are fused in to one system track which is displayed in system.

The presentation interface allows for a large number of track management operations such as:

- Display track status
- View individual track components of a system track
- Manual track creation
- Swapping tracks
- Custom track labelling etc.



Custom chart objects

Radar

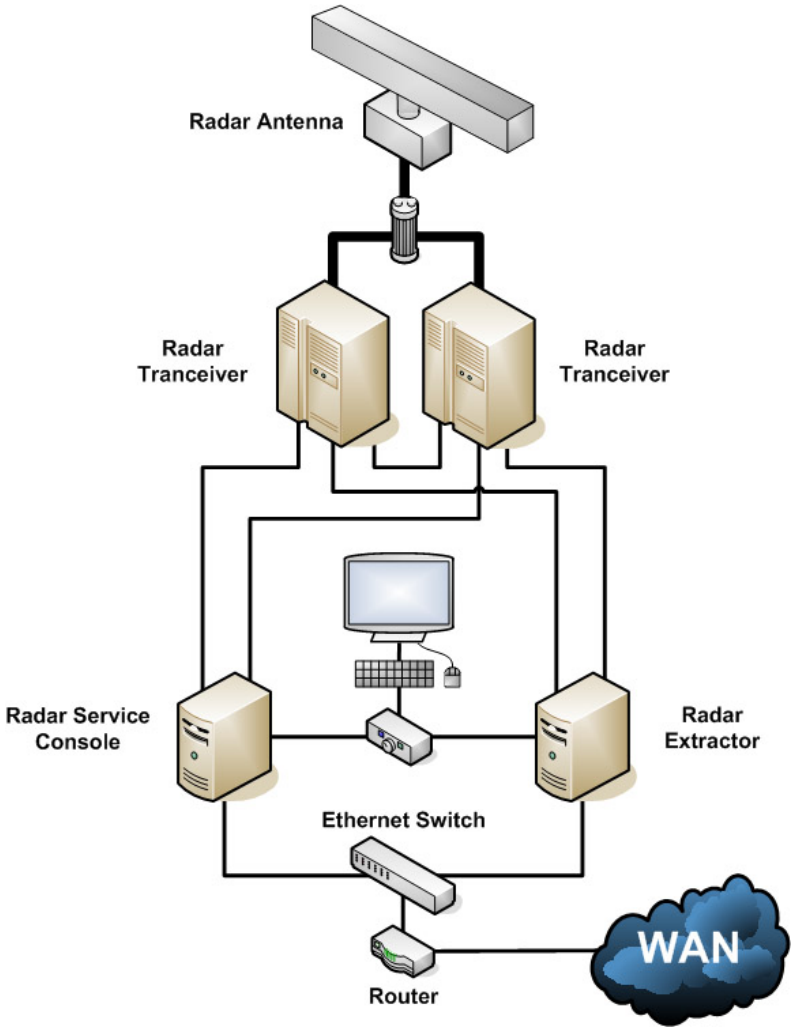
Saab can supply a variety of radars, depending on user requirements, or connect to existing radars. Each of the radar sites will be equipped with a radar with either single or dual transceivers, a radar maintenance console PC and Radar Extractor by Saab, hosted in a separate PC or in some situations in a shared PC. Both PC's are connected to one display, keyboard and mouse through a KVM Switch.

The radar site can have an Uninterruptible Power Supply (UPS). The UPS will shut down the equipment in a secure way if the battery expires. The UPS can be controlled using the LAN connection to reboot the radar and the other site equipment.

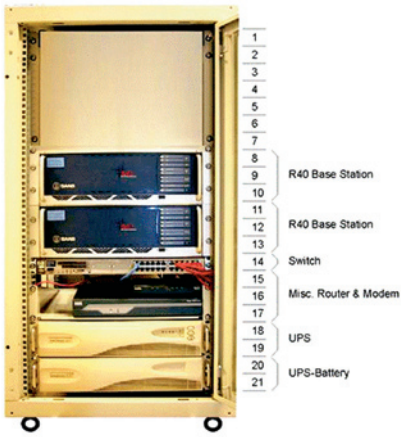
The radar operation can be configured and controlled on-site using the radar extractor PC and the maintenance console or remote by using the System Management Subsystem. Some of the radar function are also available from the operator workstations.

AIS

The AIS subsystem comprises one or several AIS base stations, normally configured as hot standby. A typical site installation is shown below.



Example of radar equipment and interconnection



AIS base station site equipment

Other sensors

CoastWatch VTMIS supports a variety of other sensors. CCTV, MetHydro, Direction finders etc. can be supplied to meet specific customer requirements.

Sensor control

The system has support for a large set of sensors and extensive sensor monitor and control, both in a chart and in a sensor specific controls. The CCTV camera can for instance be directed and zoomed towards a ship by clicking on the target on the chart.

Communication subsystem

The communications subsystem supports the following functions:

- Contacts (Operators, other VTS, Pilots, Tugs, Agents etc.)
- Messaging (instant messages and AIS messages)
- E-mail
- SMS
- Desktop sharing
- Hand-over of vessels between sectors
- Incoming AIS messages to responsible operator

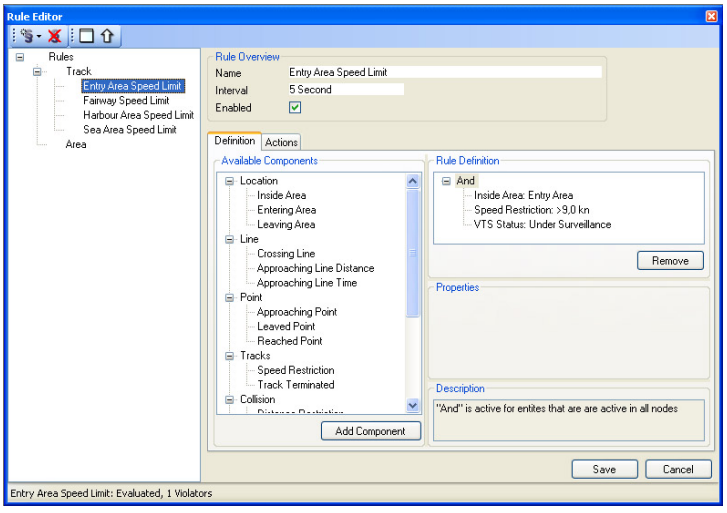
Route management

Route management and track route association can be handled in the CoastWatch VTMIS. A ship can be associated with a route and alarms be given on deviation. The system can predict ETA, based on a route definition.

Rule management

Rules can be set on vessels or on geographical objects. They are typically connected to predefined areas. The system includes an advanced rule engine which provides decision support to the operators. Examples of available rules are:

- Inside area
- Entering/Leaving area
- Crossing line
- Approaching/Leaving point
- Speeding
- Proximity
- Depth limitations
- Carrying dangerous cargo
- Track lost



Rule editor

Rules can be combined using logical operations to form complex sets of rules, e.g. if a ship with dangerous cargo enters the harbour and exceed a certain speed. Specific actions can be associated with a rule.

The action determines what happens when the rule is broken, examples of actions are;

- Generate an alarm
- Generate a report
- Send a message, etc.

The system includes decision support by the use of areas, alarms and rules

Alarm subsystem

Operational alarms are initiated on violations of defined rules and are displayed in an alarm window.

Record and replay

The record function is dimensioned to meet customer's requirements for readily available data storage as well as thinned data for a long term archiving.

A replay scenario can be exported to a replay file or a .AVI file.

Synchronized recording and replay capabilities for all core data sources in the systems;

Sensor information:

- Compressed radar video
- Plots
- Tracks (Radar, AIS, System tracks)
- CCTV images
- Hydrometeo
- RDF etc.

Operational events:

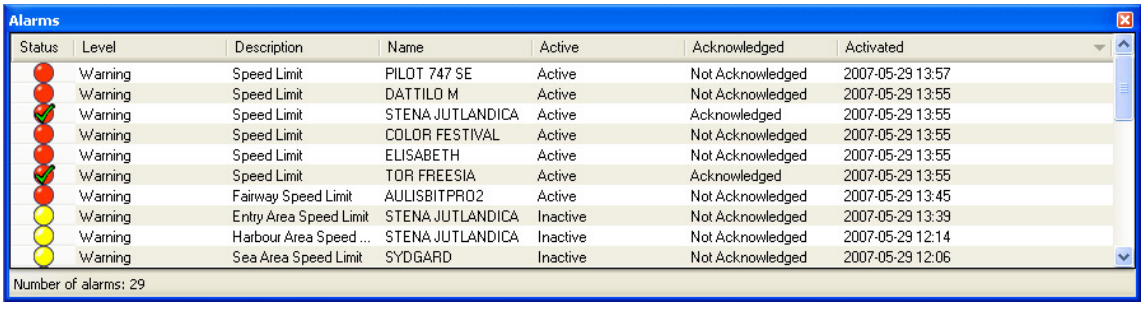
- Operators actions
- Alarms
- Voice communication

System events:

- Systems failures
- Configuration changes

Vessel information:

- Vessel identifications
- Vessel status

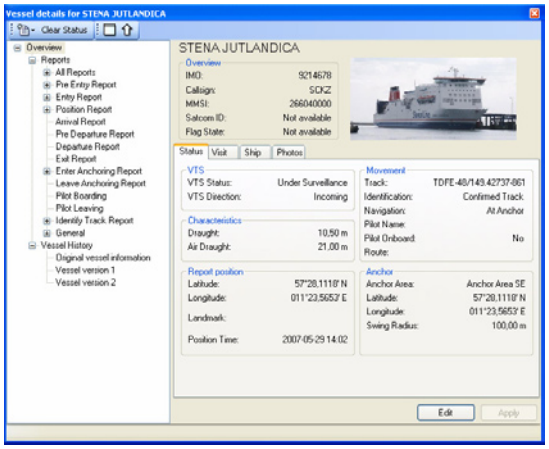


Alarm window

Vessel information system

The advanced Vessel Information System is integrated into the graphical user interface. The Vessel database stores external data, custom data and VTS generated reports. Data can be imported from external sources (e.g. Lloyds) or can be added by the operator (e.g. images).

Detailed vessel information is displayed simply by clicking on the target.



Vessel information form

CCTV handling

The CCTV can automatically track a target by clicking on the target in the chart view and choose "Track with CCTV". Photos can be taken of ships and stored in the vessel database. The system supports control of multiple cameras.

The camera can be controlled manually by using the mouse in the chart window, simply drag the cameras focus point to the position in the chart it should be covering

Single camera form

Multi camera form

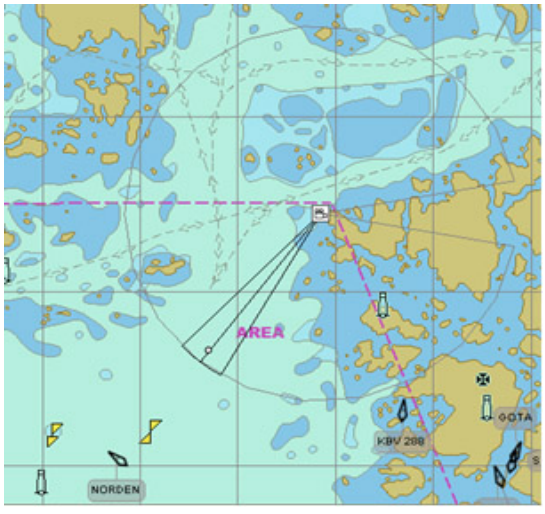
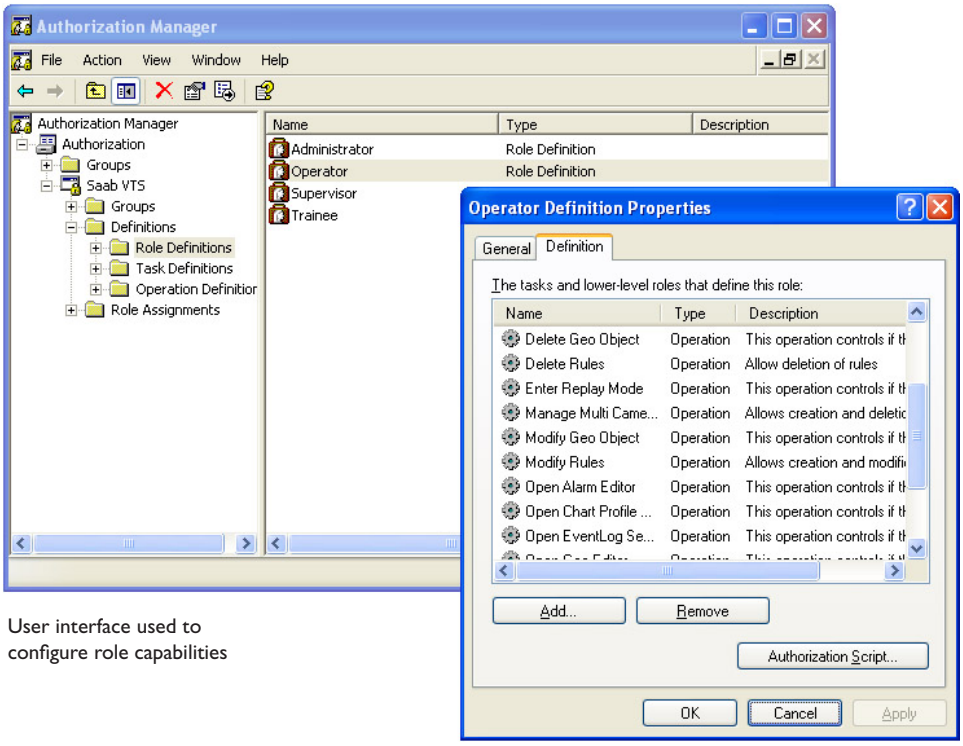


Chart integrated camera control

User roles and access rights

CoastWatch VTMIS includes versatile support for a variety of user roles which can be matched to meet each customer's needs. Different roles are given user rights by a dynamic configuration process.



User interface used to configure role capabilities

System management and monitoring

System management is centralised. There is continuous monitoring of software and hardware status, network connectivity and overall system performance. System alarms are generated with fault indication.

Configuration and software updates are handled in the central management function.

Availability and reliability

CoastWatch VTMIS employs flexible client/server architecture with centralised core functions. The system provides a modern, flexible and redundant system platform. It is fully compliant to the IALA requirements of an availability of at least 99.9%. The required level of availability and reliability is achieved by duplication of hardware as well as software modules. The most critical functions are run in Hot Standby, where the standby unit immediately (without any interruption) takes over when the primary unit fails. To further improve the availability all Operator Stations can be used for any task that is carried out within the system.

System design and scalability

All software used in the system has been developed by Saab which means that the Saab solution is not dependant on third party vendors. This also makes it easy to adopt new functions in the system as and when required by customers. The software is modular, making it easy to tailor with the use of standard components.

The operating system used in the CoastWatch VTMIS is Microsoft Windows. Saab uses the latest available technology such as .NET and C#. This allows for easy adoption of new user defined requirements in the system.

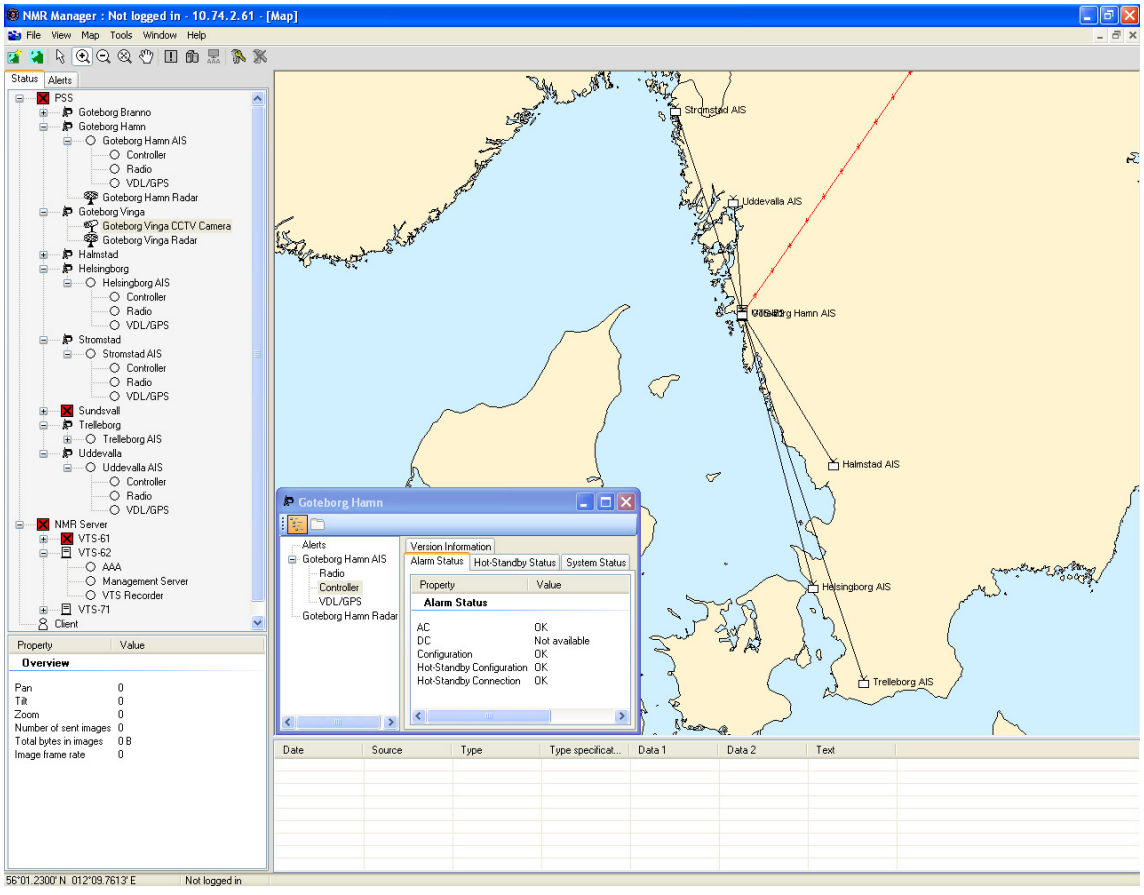
The system is easily scaled to fit the demands of different users, from the smallest system with only one user and a few sensors up to multi user system with several different sensors. CoastWatch VTMIS is also designed to exchange data with other VTSs if required.

Training

- Saab can offer operator training packages, compliant with IALA V-103.

Options

- Additional sensors can be added for maritime Security applications e.g.
- Simulation products can be provided to meet specific customer requirements



CoastWatch System Manager

Saab serves the global market with world-leading products, services and solutions ranging from military defence to civil security. Saab has operations and employees on all continents and constantly develops, adopts and improves new technology to meet customers' changing needs.

Saab has 13,500 employees. Annual sales are EUR 2,08 billion. Research and development corresponds to about 20 percent of annual sales.

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