Next Generation VTS

MARITIME COMMUNICATION AND INFORMATION SOLUTIONS

smartVTS

FREQUENTIS
ABOUT VTS

A vessel traffic service (VTS) is a service provided to shipping by a shore-based competent authority, with the VTS helping the ship’s navigational decision-making process. The main objectives of a VTS are to make sea transport safer and more efficient, but also to protect the marine environment from the detrimental effects of maritime traffic. These goals are primarily achieved by the VTS operator providing the ship’s master with accurate and usable information.

The quality of this information is closely dependent on the situational awareness of the operator. All technical systems contributing to a VTS solution must therefore be designed to help the operator provide better information. This is the premise behind the next generation of VTS: the FREQUENTIS smartVTS.

smartVTS VS. CONVENTIONAL VTS

A conventional VTS mainly focuses on the technology of the sensor systems. This is not an inappropriate approach, but is unsuited to improving service quality for the marine community. Such an improvement can only be achieved by making better information available to the operator, thereby improving the quality of the delivered VTS service and, in turn, the navigational decision process.

Conventional VTS systems only collate and display VTS sensor data. FREQUENTIS smartVTS also processes this data and presents it within an integrated display that enhances situational awareness. Together with the intuitive user interface, this frees up VTS operator time for more essential tasks, like communication with ships.

REALLY SMART – THE OPERATOR IS THE FOCUS

FREQUENTIS smartVTS is designed to help the VTS operator work more efficiently and effectively. All smartVTS usability engineering and development efforts revolve around the operator’s needs. After all, if operators are struggling to make sense of a collection of uncorrelated data or are prevented from focusing on the relevant information, then they cannot provide useful assistance to the ships in their VTS area.
With FREQUENTIS smartVTS, operators are no longer burdened with cross-referencing information from different sources. smartVTS first processes and fuses information before displaying it to the operator, delivering sound situational awareness that forms a reliable basis for decision making. Smart integration of all real-time and planning data ensures easy and hassle-free VTS operation.

→ REALLY SMART – INFORMATION FUSION

The core of the FREQUENTIS smartVTS is the ability to incorporate information derived from different sensors and sources within a common operational picture presented to the VTS operator. Information from different sources is not simply stacked on the display, but first fused within the information processing system. This results in higher-quality information. For example, the system can automatically place video from the strongest sensor in front of video from weaker sensors and digital system tracks can be supported by many sensors.

Another feature of the information fusion engine at the core of the FREQUENTIS smartVTS is the ability to identify faulty or erroneous data provided by individual sensors. The relevant data sources are isolated and corrective measures can be taken swiftly.

→ REALLY SMART – MODULAR ARCHITECTURE

The FREQUENTIS smartVTS uses a modular, component-based design architecture. The system is therefore very flexible and can be adapted to growing and changing operational needs. Additional sensors can be integrated at any time with little impact to system layout. New services can be provided through simple installation of additional software modules.

The modular design increases operational safety through smart monitoring of all components and identification of any faults. Any sensor problem is quickly isolated, while each software module can be updated independently. Only small parts of the system ever need restarting or servicing, minimising the time needed to re-establish normal operation.

→ REALLY SMART – COMMUNICATION FUSION

Smart information also needs to be communicated smartly. smartVTS achieves this by fusing communication across different media sources. smartVTS communication modules for voice and text-based messages process spoken and written communication in a uniform way.

This means that communications through different media, such as phone calls, radio, email or safety information broadcasts, are fused into a single information base. This results in higher-quality information and more reliable communications.
REALLY SMART – INTEGRATION OF OPERATION

The FREQUENTIS smartVTS is designed to integrate all the VTS operator’s tasks within one single system. The operator accesses this integrated operational platform through a single human-machine interface (HMI), and this HMI allows him or her to both view information received from all sensor and communication systems and operate those same systems.

Integrated operation through a smart HMI helps the VTS operator and minimises the risk of problems caused by human factors or stress. Frequentis is the only VTS supplier that has been actively researching human factors and usability for decades.

REALLY SMART – COLLABORATION

The FREQUENTIS smartVTS is designed to allow vertical and horizontal collaboration. It supports vertical collaboration between different levels of authority at one site e.g. VTS centre, pilot centre, harbourmaster’s office, police, security etc. It supports horizontal collaboration between adjacent authorities at different sites, e.g. between neighbouring VTS centres.

Collaboration is achieved by sharing dedicated pieces of data with another authority. Security and integrity aspects need to be accounted for using secure data exchange protocols. The FREQUENTIS smartVTS offers several ways to share information collaboratively, with configurable access rights for each collaboration partner.

REALLY SMART – COMPREHENSIVE TRAINING

As part of each VTS project, Frequentis provides a comprehensive training plan that is tailored to the customer’s precise operational needs. All levels of operation are included in the plan, enabling the customer to operate a reliable and professional VTS with their new system.
An integrative part of the comprehensive smartVTS training program is simulation of traffic scenarios. The sophisticated traffic simulator allows seamless integration of recorded or live data feeds. This guarantees a realistic training environment that matches the operational environment of the VTS operator. For example, the simulated scenarios are presented at the operator’s normal working position. This ensures that the training builds up real operational competence.

**REALLY SMART – INFRASTRUCTURE MONITORING**

The FREQUENTIS smartVTS permanently monitors the operation of all connected sensors, communication channels, subsystems and components. Monitoring proceeds automatically in the background, so does not require the manual intervention of system administrators or operators. Technical staff are alerted to any fault detected by background self-tests carried out by connected equipment or found through plausibility checks of sensor data. A detailed description of the faulty equipment’s type, location and other data is provided, in order to allow swift and accurate corrective action.

**REALLY SMART – SCHEDULED INFORMATION DISSEMINATION**

The FREQUENTIS smartVTS is equipped with a planning tool that allows advanced scheduling of information dissemination. Any kind of information source – oral or written – can be used in the planning process. Information is allocated to a communication channel and then distributed accordingly. This functionality includes, for example, text to speech conversion. This automation results in lower operator workloads and increases the quality and reliability of the information provided by the VTS. The communication planning tool also helps minimise errors due to human factors.

**REALLY SMART – ATM-GRADE QUALITY**

The FREQUENTIS smartVTS is based on the kinds of components, development processes and quality assurance system commonly used for air traffic control systems. This level of quality guarantees smooth, hassle-free and long-term operation of high-grade VTS systems.

Frequentis is permanently looking to improve the quality of its products, and active lifecycle management guarantees investment protection. Long-term support is provided for system components and there are regular midlife system upgrades to account for the latest developments. This is especially important in the IT industry and ensures the FREQUENTIS smartVTS enjoys an extended system lifetime.
A key feature of the smartVTS is its almost unlimited growth potential, thanks to the modular and open system architecture. This kind of flexibility ensures protection of the initial investment.

Enlarging the smartVTS is a simple task. New sensors can be incorporated through a simple reconfiguration, and installation of expansions and extensions – even during full system operation – will not cause any sleepless nights.

The FREQUENTIS smartVTS is built entirely from COTS components supplied by renowned vendors. Where possible, standard IT components and interfaces are used, so the system is not reliant on the availability of specific, short-lived IT industry components.

The system is, of course, designed with the long-term availability of spares for all core system parts as an important consideration. Frequentis has a proven track record of providing long-term support for its systems, including some that have been supported for over 15 years. This is an unrivalled level of commitment in a technology sector known for its ephemeral nature.

The FREQUENTIS smartVTS offers flexible maintenance concepts tailored to the customer’s maintenance organisation. Frequentis offers service agreements for authorities with and without their own experienced in-house technical staff. These agreements feature both preventative and corrective maintenance to ensure a minimum of operational downtime.

Secure remote login by competent engineers is one way of supporting system administrators, both with their daily tasks and when troubleshooting.
The above graphic presents an overview of the typical smartVTS architecture, including all relevant hardware system components. A typical smartVTS remote sensor site can be equipped with radar, CCTV, VHF, AIS and meteorological sensors.

The standard setup at the central facility consists of data processing systems and operator positions. Remote operator positions can be connected to the centre via an IP network. The centre includes interfaces to external systems, like other VTS or AIS systems, and can also host large screen displays. All physical sites are interconnected using a common IP-based communication network.