Distributed voice and data radio communication systems for coastal marine VHF+AIS with secure IP-based access

According to best practices of developing e-solutions, these systems make extensive use of off-the-shelf hardware and open source software to guarantee a short deployment phase and trouble free life cycle support. Key factors guaranteeing open architecture approach, reliability, security, and optimal life cycle costs include the use of following:

- Standard VHF radio transceiver equipment (Sailor / Thrane)
- Standard protocol for transceiver control (SparcBus by Thrane)
- Hardware platform: x86-compatible industrial PC's
- Sound processing: standard sound cards, pre-tested and approved
- Reliable and secure software platform: Linux, redundant servers
- Site LAN: standard network routers, switches, etc
- Secure tunneling through public IP networks (built-in VPN and PKI)
- Built-in test equipment (BITE), remote diagnostics and system status statistics
- Standard databases for recording of time stamped voice and traffic data
- Automatic recording of all sound and data messages
- Operative and database based replay features
- Selection of various audio interfaces for operator convenience
- Interfaces to other communication networks (PSTN, TETRA, etc)
- Open system architecture - standard AIS transponders are supported
- Support to single or multiple operator centres, no distance limitations
- Automatic selection of a radio transceiver station providing best reception and transmitting quality for the actual connection
- The number of operator workplaces is restricted only by customer needs
- All operators can use all stations and any available radio channels

![Figure 1. Simplified diagram of a VHF for VTS system with two radio sites](image-url)
The user interface of the VHF for VTS software application is intuitive and simple (Figure 2), providing necessary user authentication and access rights management. Up to 6 radio transceivers can be installed at any remote radio server site. The VHF/AIS base-station with radio server is housed inside an environmentally protected 19’ stainless steel rack.

The system can be customized for application in solutions other than marine VHF/AIS communications. Main feature of this IP based communications solution is provision of technology to enable use of established radio communication infrastructure by multitude of users, possibly from several relevant organizations, allowing to reduce and share costs.