

Selestar Radar SSRS



When Safety Matters



Shoreside Surveillance
Radar Systems

Shore-side Surveillance Radar System (SSRS)

Consilium is a major supplier of radar sensor, offering in-depth knowledge of navigational radar and VTS.

We delivered our first radar equipment to Saint Petersburg Port Authority (Russia) in 1990; today we have delivered over 110 installations world-wide.

Our SELESMAR radar solution can be delivered as part of an integrated system (VTS) or as a standalone shore-side surveillance system suitable for applications such as:

- Marine protected areas (marine parks)
- Marinas
- Oil rig platforms

A Shore-side Surveillance Radar System (SSRS) mainly consists of a network of one or more Radar Sites (RS), connected to a Control Center (CC) where the scenario "as-seen" by them is fused together, thus presenting a unique vision of the area under control.

The SSRS performs the following main functions related to the continuous control of the traffic situation in the surveillance area:

- Monitoring of the vessels traffic and automatic warnings related to vessels violating predetermined alarm criteria.
- Monitoring of the vessels in the anchoring areas, buoys, and guard zones.
- Collecting information regarding vessel movement data in order to observe the ships traffic and avoid collision courses towards predetermined fixed installations such as oil platforms.
- Increasing the navigation safety and preventing environmental pollution.
- Supporting Search and Rescue (SAR) operations.



History

The concept of managing ship movements via a shore-side radar station first appeared in 1949 at the Port of Liverpool, England. In 1956, the Netherlands established a system of radar stations for the surveillance of traffic at the port of Rotterdam.

Since then the concept has rapidly evolved and a number of additional sensors have been integrated with the radar. These sensors are CCTV, Automatic Identification System (AIS), telecommunication, meteo etc connected by a data network to a Control Center.

This system is known as Vessel Traffic Service (VTS), or sometimes Vessel Traffic Management & Information System (VTMIS). A VTS is defined by the International Maritime Organization as "a service implemented by a Competent Authority designed to improve safety and efficiency of vessel traffic and to protect the environment. The service should have the capability to interact with traffic and respond to traffic situations developing in the VTS area." (IMO RES. A.587 20).

The main target for a VTS is to identify and proactively manage risks in order to improve safety, efficiency and security of maritime operations and its infrastructure by providing optimal situational awareness.

Typical application of VTS is the monitoring of harbors, territorial waters and exclusive economic zones.

Customer Support

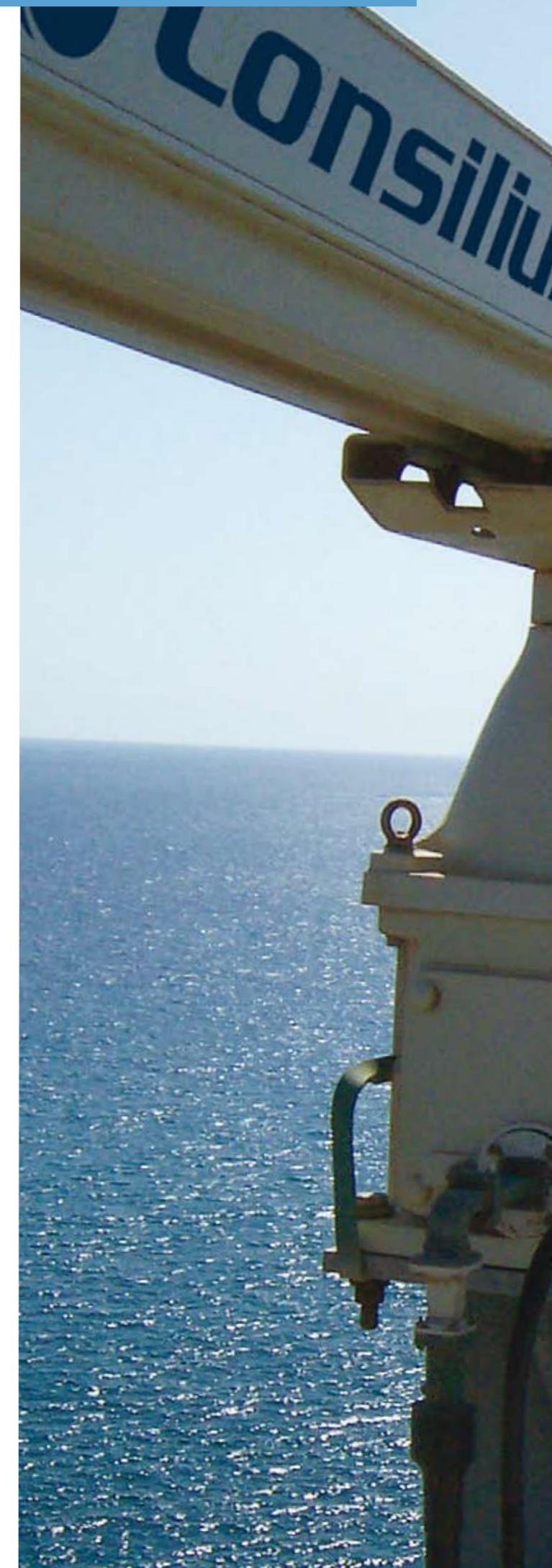
Consilium has developed, designed, delivered and commissioned Shore-side Radar Surveillance Systems for more than 20 years, either as standalone equipment or as part of complex Vessel Traffic Services to the major system integrators world-wide.

Since our first delivery to Saint Petersburg Port Authority we have gained a great deal of knowledge in this specific market segment. Today our experience includes delivering installations to China, Mexico, Spain, India, Argentina, France, United Kingdom, Finland, Norway, Russia and Italy.

We are committed to delivering first-class solutions and providing our customers with first-class support throughout the entire product life cycle.

Our Customer Service provides an integrated logistic support that includes:

- 24/7 full service support at all locations, using our international service network
- 365/365 telephone help-desk
- spare parts delivery to all destinations within 24 hours after the receipt of order
- training courses for operators and maintenance engineers either at our Training Centre or at Customers' locations
- on site inspection and evaluation of existing installations for refitting solutions with full backward compatibility



System description

System Configuration

The Selesmar ssrs configuration is based on an open architecture consisting of:

- one or more Radar Sites (rs), including the Antenna Group, the Transceiver, the Radar Site Controller (RSC) and the Service Display;
- one or more Operator Workstations (ows's);
- link between rs's and Control Center (cc)

Thanks to the modular structure, the system can be expanded by adding extra rs's or Operator Workstations in local or remote position.

Each RS can be operated in unmanned mode remotely controlled by the Workstation, by exchanging data via an extended LAN using a standard TCP/IP protocol. The video extraction, target detection, tracking and video conversion in digital form are performed at the Radar Site, thus allowing the use of narrow band link to transfer the Tracked Data and the digitalized Video to the workstation for an accurate presentation of a synthetic and clear radar picture.

Each Operator Workstation has the same capability in terms of performance, but in the case of a wider configuration one can be selected as supervisor of the system.

The customer can choose from a variety of cost-effective link options between Radar Site (rs) and Control Center (cc)

- By UTP (Unshielded Twisted Pair)/STP (Shielded Twisted Pair) cable with switch/router connection, whenever

the various modules can be installed in a close position (maximum 100m distance between rs and cc).

- DSL line 640K bps
- WIFI or WAN connection
- Optical fibers
- Microwave link with router

One of the main tasks of the Control Center is running the application software of the ssrs Operator Workstation, programmed in C language and operated under a Linux Operating System.

The choice for this operating system has been driven by its unique advantages:

- Really open system allowing software portability on hardware platforms more powerful and sophisticated than Intel pc's. It is used in many high professional applications.
- Very flexible X-Window graphic environment allowing an easy connection to other consoles.
- Because Linux architecture is not very well known there is far less likelihood of software security breaches.

The ssrs system involving more than one (two) Operator Workstations, is completed by a System Processing Unit (SPU) in order to make possible the correct assignment of the operative tasks to each Operator Workstation.

Only one SPU is needed to manage the task assignment in a ssrs System and the installation is possible anywhere, regardless the number of Operator Workstations and depending only on where the customer want to have the "decision center" and the ssrs supervisor.

Redundancy at all levels

Being a critical application, a number of redundant solutions have been implemented in the Consilium ssrs to improve the system availability.

Radar Site

Two Transceivers operating in the same frequency, X Band, provide the needed redundancy allowing full operation with at least one Transceiver and possibility to carry-out planned maintenance without affecting the operative functions.

Similar redundancy can be provided by a dual X & S Band Radar Sensor allowing the proper performance in all weather conditions.

As option, the RSC can be made redundant too by using a dual electronic set.

Control Center

The redundancy of the cc is provided by installing more Workstations linked to the same LAN and performing same functions assigned by the VTS operator by properly setting the System Processing Unit (SPU) acting as a system server.

The SPU can be redundant too, both computers working together processing and storing all data, but only one being master and sending/receiving data to/from the radars and consoles. In case of failure, after 10 seconds of communication lack from the network, the other SPU server takes the control.

Manning

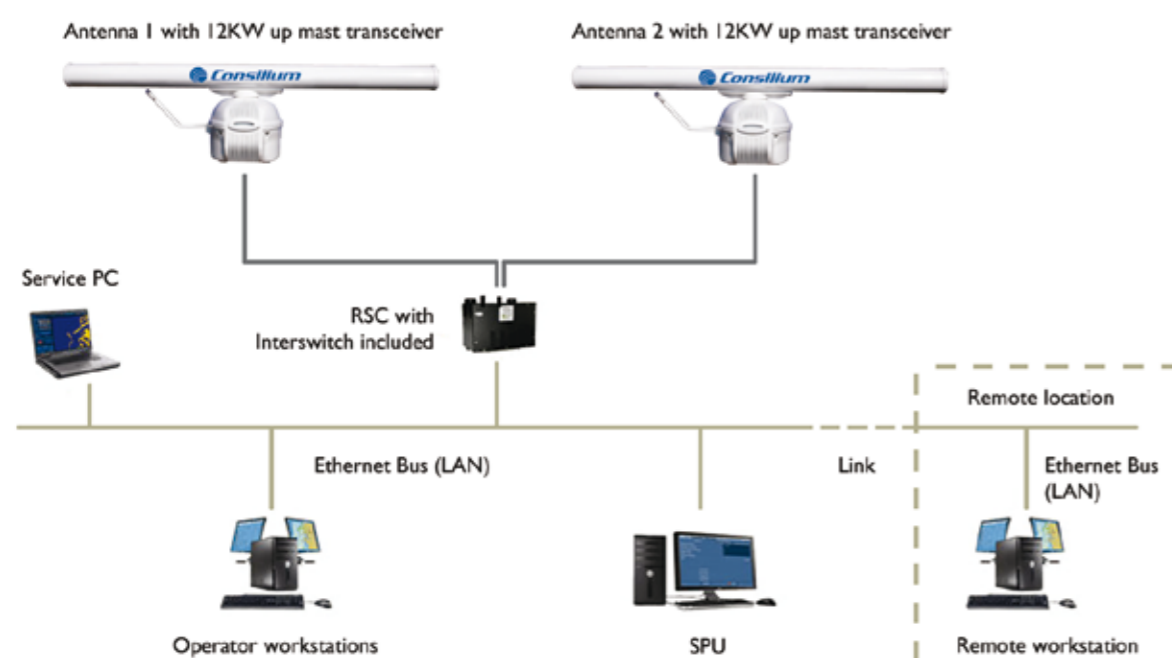
The Radar Site can be operated in an unmanned mode directly from the Control Center where the radar status can be remotely monitored and controlled by the VTS operator.

For service purpose only, a Service Display, based on a portable Lap-top PC, is supplied in order to make possible a local control of the radar site and the adjustment of relevant parameters with reference to a digitalized video presentation.

Such Service Display can be moved site by site depending on the need for maintenance or corrective services.

Expansion capability

Due to the ssrs open architecture and modular design, future expansion is easily accommodated, whether it involves the addition of sensors, relocation of existing component or additional functionalities.



Geographical Processing

The Selesmar ssrs makes possible to define geographical areas to distinguish between processing modes in terms of video generation, tracking and target detection.

Geographical Processing mode

GEOGRAPHICAL AREA	VIDEO PROCESSING & DISPLAYING	TARGET DETECTION ACQUISITION & TRACKING
Littoral Mask - Defined shore areas	Enabled	Disabled
Land Mask - Masking out land areas	Disabled	Disabled
Auto-Acquisition - Defines areas for auto acquiring	Enabled	Enabled in manual & automatic mode

Consilium SSRS Features

FEATURE	STANDARD	OPTIONAL
Linear Polarised Antenna	<input type="checkbox"/>	
Circular Polarised Antenna	-	Yes
AIS interface	<input type="checkbox"/>	
Tx nominal peak power X band	25 kW	
Tx nominal peak power S band	30 kW	
Max number of radar sites	4	More
Tracking capability for each radar site	500 targets	Extended
Recording and Replaying	7 days	Extended



SSRS Units and and main functions

Radar Site/s

Antenna Group & Transceiver

The Antenna Group & the Transceiver, combined together, are the "active sensor" of the SSRS assuring the radar surveillance and target detection in the assigned area.

Antenna Control Unit (ACU) for Dual Transceiver configuration only
Since the Antenna driver is always powered by the Transceiver electronics, the ACU is needed whenever same antenna group can be powered by different Transceivers (redundant configuration only).

Either under the local control of the service display, or the remote control originated by the control center, the ACU makes possible the right combination between the selected Transceiver and the common antenna group.

Radar Site Controller (SELUX RSC)

The RSC performs the following main functions:

- Video processing
- Scan conversion
- Target extraction
- Target Tracking
- Local Radar control
- Performance monitoring
- Transmission to the Workstation of
- Tracked Target Data
- Digitalized Video
- Radar Status
- Alarms
- Receiving Radar Control and Setting from Control Center:
 - transceiver selection (X or S), (in the extended multiple configuration only)
 - transceiver on/off;
 - PRF and Pulse length setting
 - receiver tuning
 - STC and FTC controls
 - alarm criteria

Service Display (Lap-top PC)

- Local radar presentation
- Local radar control and setting-up
- Service

Control Center

Operator Workstation

- Data reception from one or more radar sites through LAN
- Rebuilding the video radar image
- Providing the presentation of the electronic chart related to the surveyed area
- Overlapping the combined video radar image onto the electronic chart
- Presentation of the tracked radar targets
- Presentation of the Tracked AIS Target
- Radar surveillance and monitoring of the surrounding area: anchoring areas, buoys, channels and guard zones
- Automatic warnings related to vessels breaking predetermined alarm criteria
- Printing (from the operator console) of screen/target data

Additional functions as specified below are performed by the same station in case of single radar site linked to one workstation only.

System Processing Unit (SPU)

The System Processing Unit (SPU) is a "server" station operated by the VTS supervisor when more than one Operator Workstation is involved in the VTS configuration.

In case of VTS including one workstation only, the following functions are processed by the Operator Workstation using the resources provided by the same computer.

Task assignment

This function allows the VTS supervisor to assign different operative tasks in a control center with different Operator Workstations.

Radar Control (local or remote) and Setting

- Transceiver on/off
- RTM selection (X or S), in the extended configuration only
- PRF and Pulse length setting
- Receiver tuning
- STC and FTC

Ships Database handling

Information relevant to tracked targets such as name, international call sign, type of vessel, characteristics, dimensions, etc., are stored in a permanent database. Stored data can be automatically retrieved at time of identification carried out by the operator.

Multi-sensor-tracking management

The multi-radar-tracking is the function at system level allowing the correlation of data relevant to the same tracked target being "seen" by two or more radar systems. The same function and the same logic are also correlating the information made available by ship-borne Automatic Identification System (AIS).

Recording

Continuous recording and storing of the last 7 days history on hard disk for:

- tracked targets data, from both AIS and radar source
- digital video from all radars

Replaying

This function can be enabled on all VTS workstations without interference with other modules in the VTS. The following replaying functionality can be provided:

- Fast forward and reverse
- Stop
- Stand still picture
- Play (real time speed)
- Adjustable play speed, up to 50 times normal speed
- Time search functions, by year / month / date / time
- Provision to print user selected views

SSRS Data Link

Since the video processing, extraction, tracking and video conversion in digital form are performed at the radar site, the most significant data exchange between the radar site and the control center is reduced to the transfer of the tracked data and the digitalized video map. Therefore it is possible to use a narrow band link.

As already mentioned, the customer can select among a variety of cost-effective link options between the RS and CC:

- direct connection via UTP/STP cable, whenever the various modules can be installed in a close position (maximum 100 m distance between RS and CS).
- DSL line 640K bps
- WIFI or WAN connection
- Optical fibers
- Microwave link with router

As standard, the data links are not included in the proposed scope of supply, in order to leave the customer free to select the most convenient solution and service provided by other telecommunication companies.

Global Service Network

Consilium Navigation is represented in more than 50 countries and has a presence in the most frequently used ports around the world. Customers are able to obtain spare parts or conduct servicing via the network of subsidiaries and agents so no matter where they are they're never far from a Consilium expert.

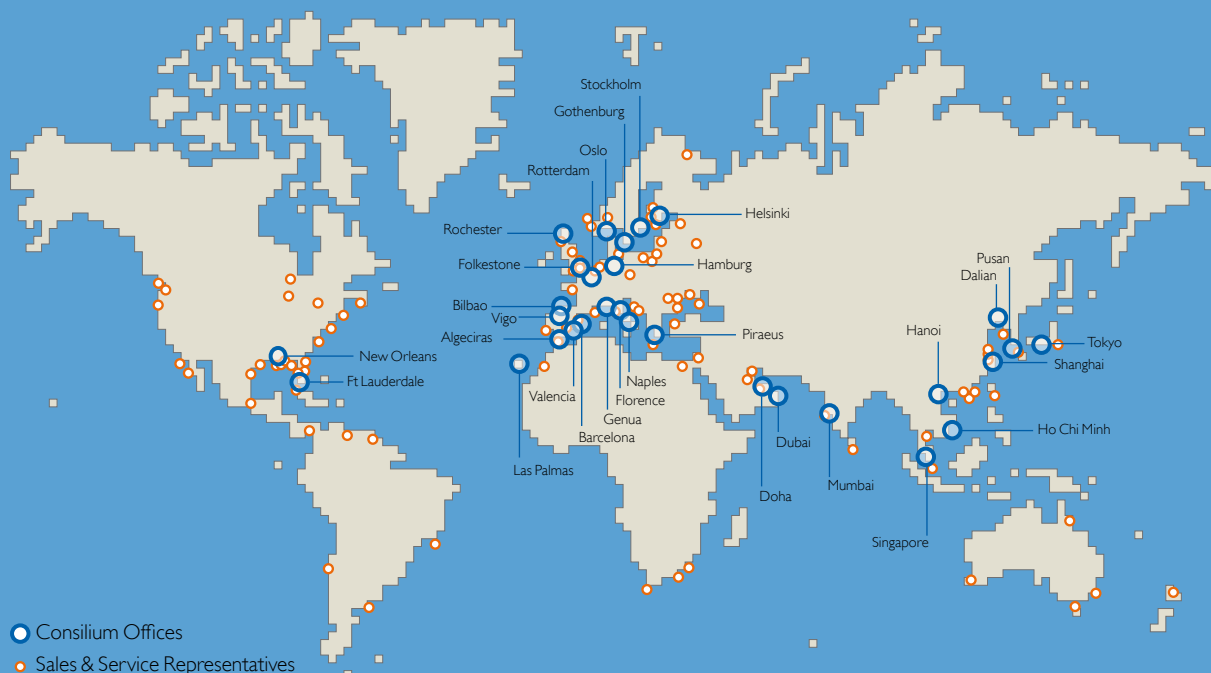
After sales support you can rely on

Consilium prides itself on providing customers with the benefit of a highly trained and resourceful after sales team. Each member of the team is fully experienced so customers have the added assurance of knowing that when they buy from Consilium complete customer satisfaction is an essential part of the deal.

Training on demand

To help customers to get the most out of their equipment Consilium provides comprehensive educational courses and training seminars from their global network of offices. So should a customer have a special requirement Consilium representatives can help make all the necessary arrangements to conduct teaching seminars where attendees can discover everything there is to know about a particular product and its functions.

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