



Saab R4S

Secure AIS Solutions

The AIS Class A broadcasting standard is excellent for information sharing between commercial ships at sea and between ships and shore stations. The AIS system will enhance safety and security in ports and out at sea as the population of AIS users grows. This open information sharing is however not suitable for users like Navy, Coast Guard, Police, etc., who have a need to exchange secure information between their own assets and still be able to receive the open AIS information. Saab TransponderTech has developed the R4S AIS, which satisfies these requirements.

The Secure AIS functionality has been developed concurrently for the R4S shipborne AIS transponder, the R4A Airborne AIS transponder and the Saab R40 Base Station, in order to create a complete solution. Upgrade options will become available for existing, qualified users of Saab TransponderTech R4, R4A and R40 products.

Crypto solutions

Saab TransponderTech will supply the R4S with a built-in crypto solution with unique keys for each user. Other schemes for crypto key handling and encryption algorithms, as well as external crypto solutions, can be implemented as an option.

Qualified users

The R4S products and upgrades will be strictly controlled and will only be licensed to organisations that can be approved by the relevant authorities in their country. A key scheme is used that ensures that the R4S functionality is only available in those transponder units that have a valid license for the R4S functionality.

Secure Link

The user defines a data channel, here called Secure Link, for exchange of encrypted binary messages between participating units within the organisation. This can either be one of the AIS channels or any other VHF frequency, tuneable by the R4S and under control of the user. Please note that government approval may be required to use AIS channels for Secure Link purposes.

The following message types can be broadcast on the Secure Link:

- type 6: addressed binary message
- type 7: binary acknowledgement
- type 8: broadcast binary message

Transmission modes

Transmission modes in the R4S can either be:

- **Unrestricted**, meaning that transmission of standard AIS messages on the AIS frequencies as well as encrypted binary messages on the Secure Link can take place.
- **Secure only** will allow transmission of encrypted binary messages on the Secure Link. There will be no broadcast of standard AIS messages or responses to interrogation messages.
- **Silent**. There will be no transmission at all.

Operational modes

There are four different operational modes for the R4S. For each mode applies that the information received in the standard AIS format as well as via the Secure Link can be displayed and output on the serial interfaces.

1. Normal AIS mode

The R4S performs all the functions of a normal Saab R4 Class A AIS system. Outgoing messages are broadcast in the open format on both AIS frequencies. The Secure Link is not active in this mode.

2. Silent mode

This is the default start-up mode for the R4S. The unit will not broadcast any messages and it will not respond to any interrogation message from other units. The R4S will receive standard

AIS messages, like any normal Class A AIS. If a Secure Link has been defined in the Set up function, the unit will also be able to receive and decrypt these messages.

3. Tactical mode

The R4S receives and processes standard AIS messages and messages on the Secure Link.

The R4S will automatically generate Position and Status reports. These reports are broadcast only on the Secure Link. The user can reduce the reporting rates, compared to normal AIS, in order to minimize transmission and to reduce the load on the Secure Link. User generated messages can also be broadcast on the Secure Link.

The Secure Link has to be defined in the Set up function, in order to make this mode operational.

4. Hybrid mode

This mode can be used before the fleet switches to Tactical mode and after operation in Tactical mode. The Secure Link is active and the R4S receives both open AIS messages and messages on the Secure Link. The R4S will transmit standard AIS messages on the AIS frequencies and also user generated messages on the Secure Link. There is no automatic generation of position reports for the Secure Link in this mode.

The Secure Link has to be defined in the Set up function, in order to make this mode operational.

Summary

Operational mode	Transmission mode	Received message	Transmitted message
Normal AIS	Standard AIS	Standard AIS only	Standard AIS only
Silent	Silent	Standard AIS and messages on the Secure Link (if defined)	No transmission
Tactical	Secure only	Standard AIS and messages on the Secure Link	Position reports, status messages and user generated messages on the Secure Link
Hybrid	Unrestricted	Standard AIS and messages on the Secure Link	Standard AIS and user generated messages on the Secure Link

Specifications subject to change without notice

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