

i-Marine offers wide portfolio for Naval AIS requirements. In-house developed end to end solutions includes onboard and shore equipment with control and monitoring software.

NAVAL AIS SOLUTIONS

TRANSPONDERS

i-Marine Transponders are Class-A AIS transponders complies with the AIS requirements specified in :

- IMO Resolution MSC.74 Annex-3, Recommendation on Performance Standards for Universal Shipborne AIS,
- ITU-R M.1371-5, Technical Characteristics for an Automatic Identification System Using Time-Division Multiple Access in the VHF Maritime Mobile Band
- IEC61993-2, Maritime Navigation and Radio-communication Equipment and Systems - Automatic Identification Systems (AIS) - Part 2: Class A Shipborne Equipment of the Universal Automatic Identification System (AIS)- Operational and Performance Requirements, Methods of Test and Required Test Results,
- IEC60945, Maritime Navigation and Radio Communication Equipment and Systems General Requirements - Methods of Testing and Required Test Results.

and fulfills the military requirements specified in ;

- STANAG 4668 (Ed.2)
- STANAG 4669 (Ed.2)



i-ais-WTA Warship AIS Transponder

Class-A Transponder enhanced with;

- Warship functionalities defined by STANAG 4668&4669
- Additional warship functionalities with advance user interface software
- Scenario Generation Module
- Spoofing Capability



i-ais-STA Secure AIS Transponder

Class-A Transponder enhanced with;

- Warship functionalities defined by STANAG 4668&4669
- Additional warship functionalities with advance user interface software



i-ais-WSS Warship AIS Shore Station

Class-A Type Shore Station enhanced with;

- Warship functionalities defined by STANAG 4668&4669
- Simultaneous activity of two separate secure channels parallel to two AIS channels
- Additional warship functionalities with advance user interface software and remote control
- Scenario Generation and Spoofing Capability



i-ais-SST Secure AIS Shore Station

Class-A Type Shore Station enhanced with;

- Warship functionalities defined by STANAG 4668&4669
- Additional warship functionalities with advance user interface software and remote control



i-ais-ATA Airborne AIS Transponder

- Warship functionalities defined by STANAG 4668&4669
- Additional warship functionalities with advance user interface software
- Scenario Generation Module
- Spoofing Capability
- Overlapped AIS Message Extraction

TECHNICAL SPECIFICATIONS

GENERAL

Operating Temperature Range	-15°C to +55° C
Storage Temperature Range	-30°C to +70° C
Humidity	Up to 93% at 40°C non-condensing
Input Supply Voltage	12V / 24V DC (max 10V – 33V DC)
Power Consumption	Nominal <10W, max 50W during transmission
Size	222 x 290 x 111 mm
Weight	<3.2 kg
Connectors	VHF Antenna: N Female GPS Antenna: TNC Female Data Connector (MIL-DTL-38999 comp.) Power Connector (MIL-DTL-38999 comp.)

VHF TRANSMITTER

Operating Frequency Range	156.025 – 162.025 MHz (VHF-P frequencies are also supported)
Channel Spacing	25 kHz
Transmitter Output Power	12.5W (41dBm) nominal 1W (30dBm) low power mode
Modulation	GMSK

VHF RECEIVER

# of Receivers	3 x AIS 1 x AIS&DSC (all operates simultaneously)
Operating Frequency Range	156.025 – 162.025 MHz (VHF-P frequencies are also supported)
Channel Spacing	25 kHz
Receiver Sensitivity	Better than -107dBm
Co-Channel Rejection	Better than 10 dB
Adjacent Channel Selectivity	> 70 dB
Spurious Response Rejection	> 70 dB
Intermodulation Response Rejection	> 74 dB
Blocking or Desensitization	> 74 dB
Spurious Radiation (conducted)	< -57 dBm

INTERFACES

Sensor Input	3 x RS-422 (IEC61162-2 comp., can be configured as complies with IEC61162-1 as well)
Hi Speed Input/Outputs	4 x RS-422 (IEC61162-2 comp.) (All interface ports are software configurable)
Power Input	12/24 VDC
Additional Outputs	Tx Prepulse Output, Alarm Relay Output

GNSS RECEIVER (INTERNAL)

# of Channels	72
Time to First Fix	26s Cold Start 1s Hot Start 2s Aided Start
Receiver Sensitivity	-164 dBm Tracking & Navigation -159 dBm Reacquisition -147 dBm Cold Start -156 dBm Hot Start
Position Accuracy	< 2.0 m
Antenna Feed	5 VDC

PERIPHERAL UNITS



i-ais-WJB Junction Box

I/O Interface	7x RS-422 (Input / Output) 1x BIIT (Output) 1x Tx Pre-Pulse (Output)
Storage Temperature Range	-55°C to +125°C
Dimensions	105 x 351 x 270 mm
Weight	< 2.5 kg



i-ais-WPS Power Supply

Input Voltage	Typical: 115V AC Min: 85V AC
AC Input Frequency	60-400Hz (Min: 47Hz Max: 440Hz)
Output Voltage	2x24 VDC
Total Output Power	100W
Operating Temperature Range	-40°C to +85°C
Storage Temperature Range	-55°C to +125°C
Efficiency	>90%
Features	- Highly reliable - Over Voltage Protection - Over Temperature Shutdown - Current limit - Robust surge and spike protection
Dimensions	65 x 180 x 275 mm
Weight	1.45 kg

Standards

Conducted EMI :

- CE102 per MIL-STD-461 D/E (100 – 125VAC 60Hz)

Input Transients :

- MIL-STD-704A input transient protection
- IEC 60945 10.5 Immunity to Fast Transients on AC Power Lines
- IEC 60945 10.6 Immunity to Surges on AC Power Lines

Display Unit with;

i-ais-WHMI Warship AIS User Interface Software

i-ais-SHMI Secure AIS User Interface Software



Separate and various display unit alternatives are available according to operational requirements such as;

- Marine spec displays with various sizes and resolutions
- Portable and rugged displays (for small boat configurations)

In house developed HMI software offers various advanced functions.

FUNCTIONAL SPECIFICATIONS

Operating Modes

Active Mode: IMO approved Class A Mode, transmits and receive on commercial AIS Channels A and B

Passive Mode: No transmissions on VHF, receive only mode, listens commercial AIS Channels A and B, listens and decrypt secure channel messages

Protected Mode : Encrypted transmissions on secure channel making AIS information hidden for vessels other than Blue Force units , listens commercial AIS Channels A and B, spoofing on AIS channels

Off Mode : Software implementation of off mode without power down, No activity (receive and transmission)

Encryption

- AES Encryption (128,192,256 bits) and Blowfish Encryption (32-448 bits)
- Special encryption algorithms can be added to system according to customer requirements.
- Encryption keys can be entered manually via user interface software or can be uploaded through User Interface Unit using a USB device.

BFT and STEDS Mode for Secure Channel

Allows user to share tactical info among Blue Forces.

Allows user to create closed networks among Blue Forces.

Advanced User Interface Control Software

In house developed HMI software offers various advanced functions such as;

- Spoofing Mode Configuration (for Warship AIS only)
 - ◇ Graphical Scenario Generation Module on map
 - ◇ Integrity check for designed scenario
 - ◇ Preview of scenario
- Advanced Track List with filtering mechanism
- Track History with Visual indication of history on map, Detailed list of received messages and Export functionality
- S57 map view (night and day mode), S63-S57 map conversion and configuration module
- Ship category, affiliation type and battle dimension set and filter available among tracks
- Map indication compatible with APP6C
- Encryption key modification for Secure Communication
- Message viewer module to track ALL AIS messages as raw and parsed
- Easy integration option by runtime port configuration to choose which data types to be transferred through WAIS Junction Box
- OTH GOLD format conversion module
- User friendly with multiple language options

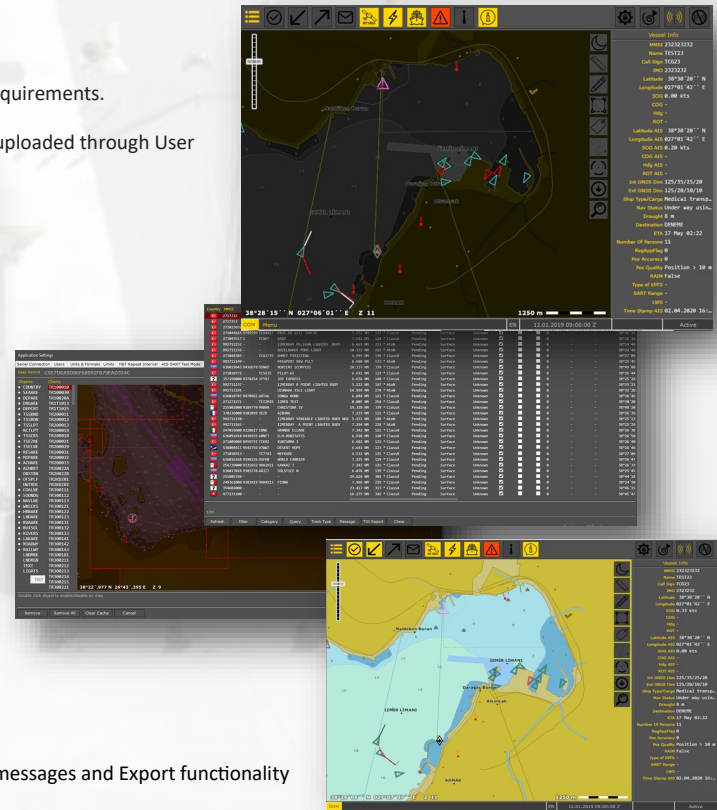
Management System Integration over IP

Ethernet interface in order to service external systems, commonly to Combat Management Systems, with protocol in order to control all functionality of the system remotely.

Redundancy

All systems are capable of redundant operation automatically.

** All system solutions are designed and developed by i-Marine and all solutions are open to add new functionalities, make modifications and integration purpose developments in order to meet customer requirements.*



Warship and Secure AIS Simulators

i-ais-Ws Warship AIS Simulator System

Composed of following units:

- **i-ais-WHMI** : Warship AIS HMI Interface software is fully functional within the simulator system
- **i-ais-WTAs** : Warship AIS Transponder simulator software implements all functionality of Warship AIS transponder
- **i-ais-AISS** : VHF network simulator which enables to generate VHF load for all types of tracks
- **i-ais-WJBs** : Junction Box Hardware serving seven (7) RS-422 NMEA interfaces as real system
- **i-ais-WLs** : User Interface Computer

i-ais-Ss Secure AIS Simulator System

Composed of following units:

- **i-ais-SHMI** : Secure AIS HMI Interface software is fully functional within the simulator system
- **i-ais-STAs** : Secure AIS Transponder simulator software implements all functionality of Secure AIS transponder
- **i-ais-AISS** : VHF network simulator which enables to generate VHF load for all types of tracks
- **i-ais-WJBs** : Junction Box Hardware serving seven (7) RS-422 NMEA interfaces as real system
- **i-ais-WLs** : User Interface Computer

- ◇ Enables user to create one or more AIS networks with multiple AIS units by using multiple simulators
- ◇ Implements all functionality of Warship and Secure AIS Systems

The screenshot displays the i-ais simulator interface, which includes several key components:

- THROTTLE, RUDDER, SPEED, RATE OF TURN**: Control panels for vessel movement, with speed shown in knots (kn) and rate of turn in degrees per minute (°/min).
- WAYPOINT LIST**: A table listing waypoints with their names, coordinates, and distances. For example:

Name	Route
1	38°50'51.999 N 025°51'28.978 E 20.0 kts
2	38°45'31.219 N 025°48'57.704 E 20.0 kts
3	38°47'56.073 N 025°56'07.445 E 20.0 kts
- INTERNAL GNSS SETTINGS**: A panel for configuring GNSS data, including Latitude (1 0 00000 S) and Longitude (116 0 00000 E).
- SERIAL**: A log window showing AIS data transmissions, such as:

```
12:57:13.297 - OUT - HMI - $-GLL,3901.52318,N,02639.24650,E,125712.23,V,S*75
12:57:12.800 - OUT - HMI - !AIVDM,1,1,A,142LR:0P44Qr=RF=2qrN0vH0400,0*5E
12:57:12.599 - OUT - HMI - !AIVDM,1,1,A,B42LR9P018Nw2C5OgsR2cwV4;P06,0*09
12:57:12.399 - IN - Port 7 - $-RMC,125711.23,A,3901.52171,N,02639.24503,E,0006.7,038.0,
12:57:12.399 - OUT - HMI - $-RMC,125711.23,A,3901.52171,N,02639.24503,E,0006.7,038.0,
12:57:12.399 - IN - Port 7 - $-GLL,3901.52171,N,02639.24503,E,125711.23,V,S*7E
```
- MAP**: A chart plotter showing the vessel's current position and planned route on a map.
- NETWORK SETTINGS**: A panel for configuring network parameters like Local IP (192.168.1.22) and ICMP IP (224.0.0.135).
- SERIAL PORT SETTINGS**: A table for configuring serial ports:

Port	Device	Baudrate	Units
Port 1	N/A	38400	bps
Port 2	N/A	38400	bps
Port 3	N/A	38400	bps
Port 4	N/A	38400	bps
Port 5	N/A	38400	bps
- WTA ALARM SETTINGS**: A panel for configuring various alarms, such as Tx malfunction, Rx channel malfunctions, and High Temperature.

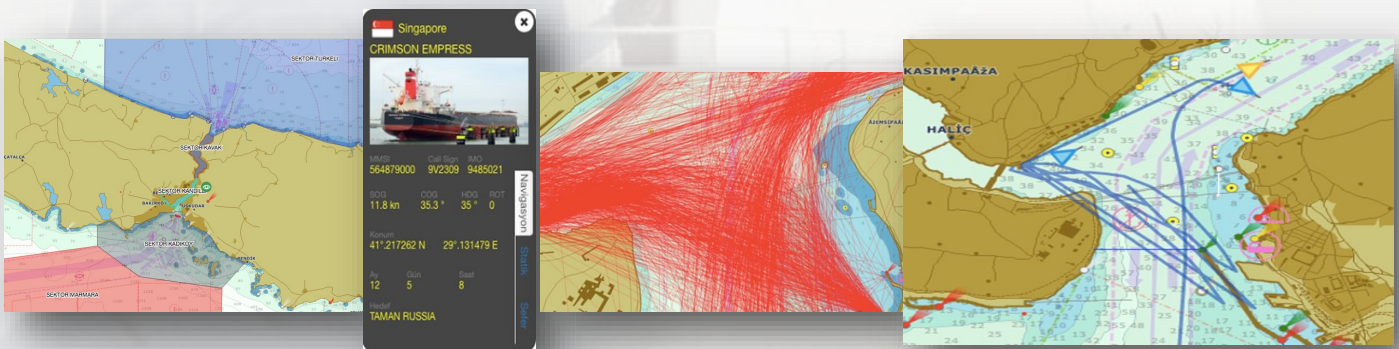
i-sea-W Vessel Traffic Monitoring and Control Software with Extended Naval Functions

Advanced software platform for command and control of whole AIS network including Secure and Warship AIS Stations.

- ◇ Spoofing capability
- ◇ Scenario generation
- ◇ Secure communication on multiple channels
- ◇ Track list
- ◇ Zone based rules
- ◇ Alarms (predefined and user defined)
- ◇ Geofencing
- ◇ CPA / TCPA calculation
- ◇ Various map types
- ◇ Bearing calculation
- ◇ Replay of ship movements
- ◇ Density Analysis
- ◇ Text messaging with ships
- ◇ Sensor fusion
- ◇ Integration with various sensors (AIS, Radar, Radio, Op.Con, MOS, DF, IR, CCTV, etc.)



* *i-sea-W is fully compatible with all shore-side and vessel-side solutions of i-Marine (refer to www.imarine.com.tr)*



Modular

Plug-in based software architecture



Scalable

Can meet future requirements via add-ons



Alternative Bases

Various base layers such as vector maps, ENCs, satellite maps etc.



Military Functionalities

Extended Naval Forces capabilities over i-SEA Platform



Easy-Integration

Data sharing interfaces via well-known standards such as XML
API and plugin interfaces available



Remote Control

Flexibility and multi-platform operation