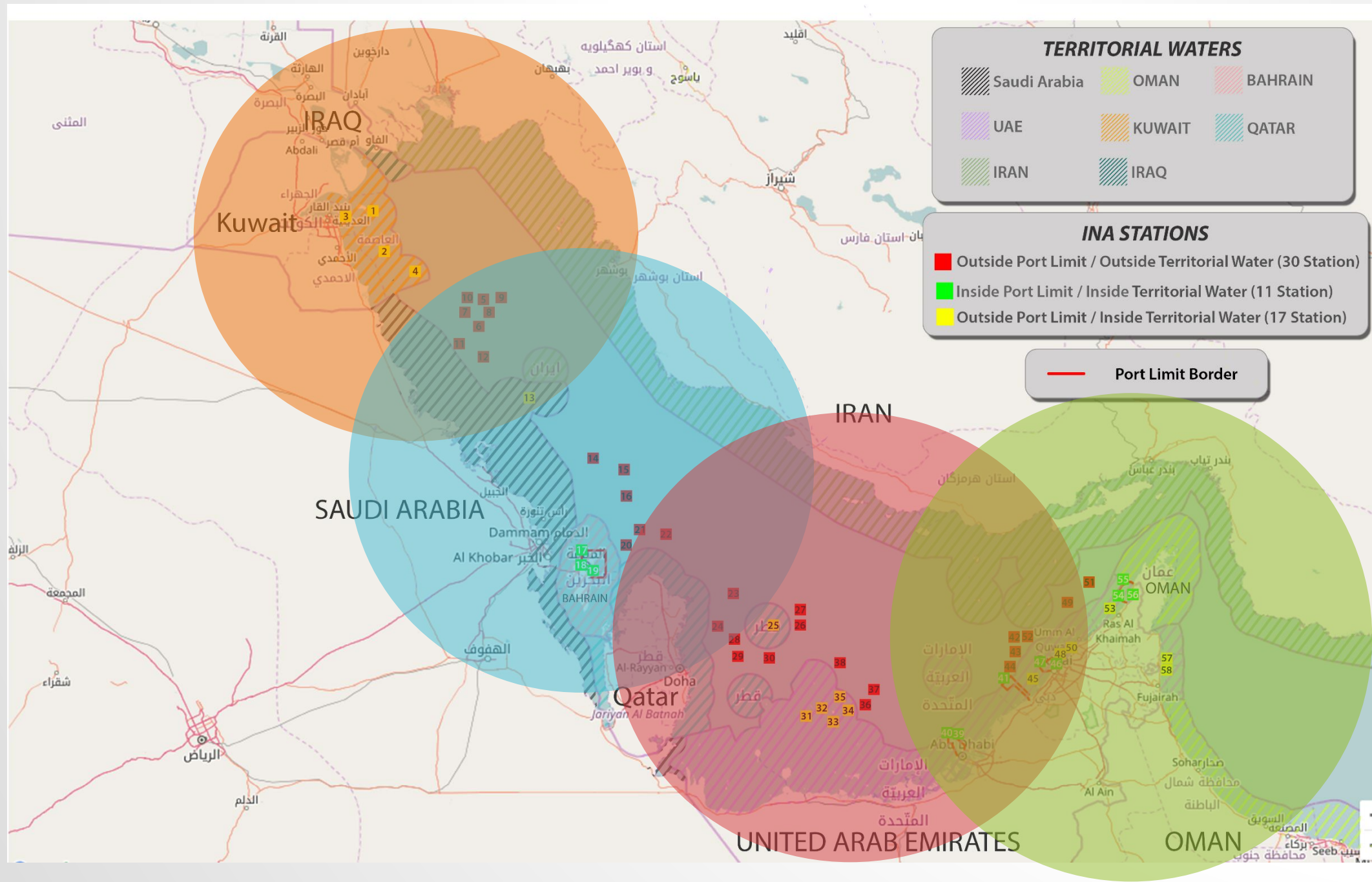


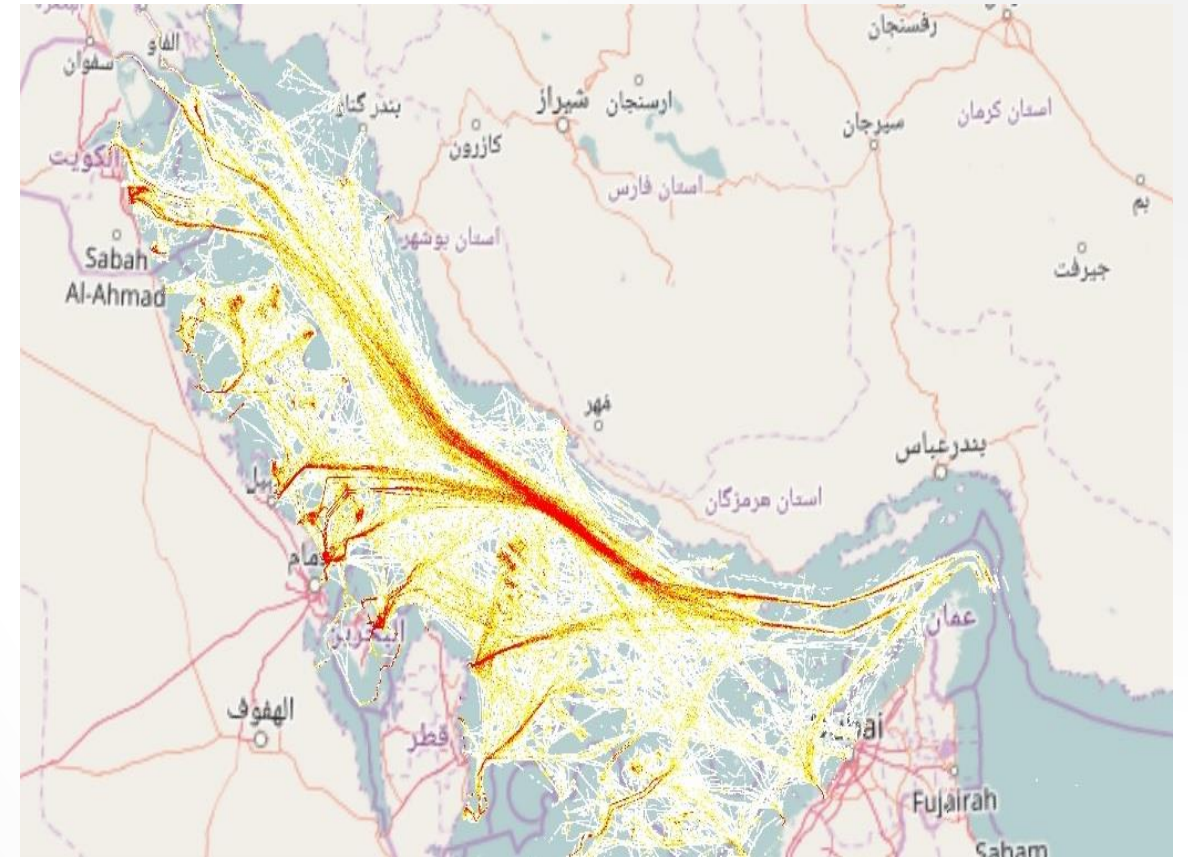
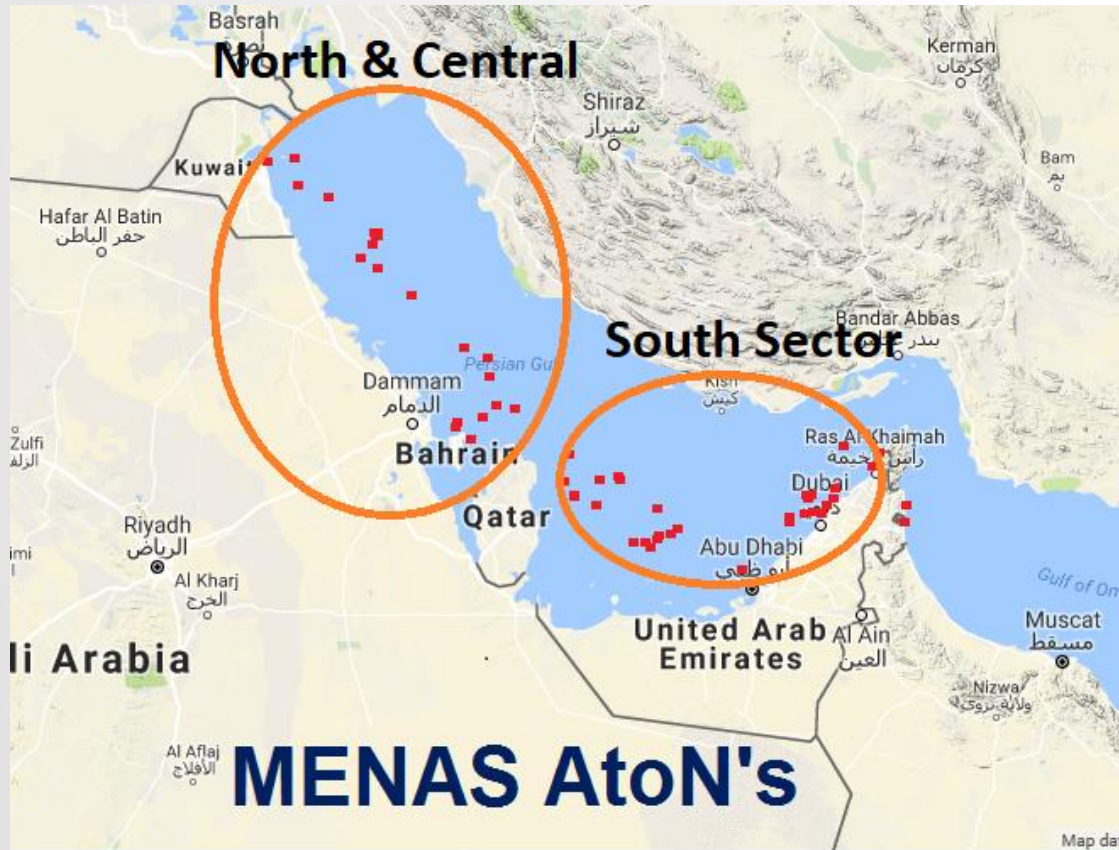


**INTERNATIONAL
FOUNDATION FOR
AIDS TO NAVIGATION**

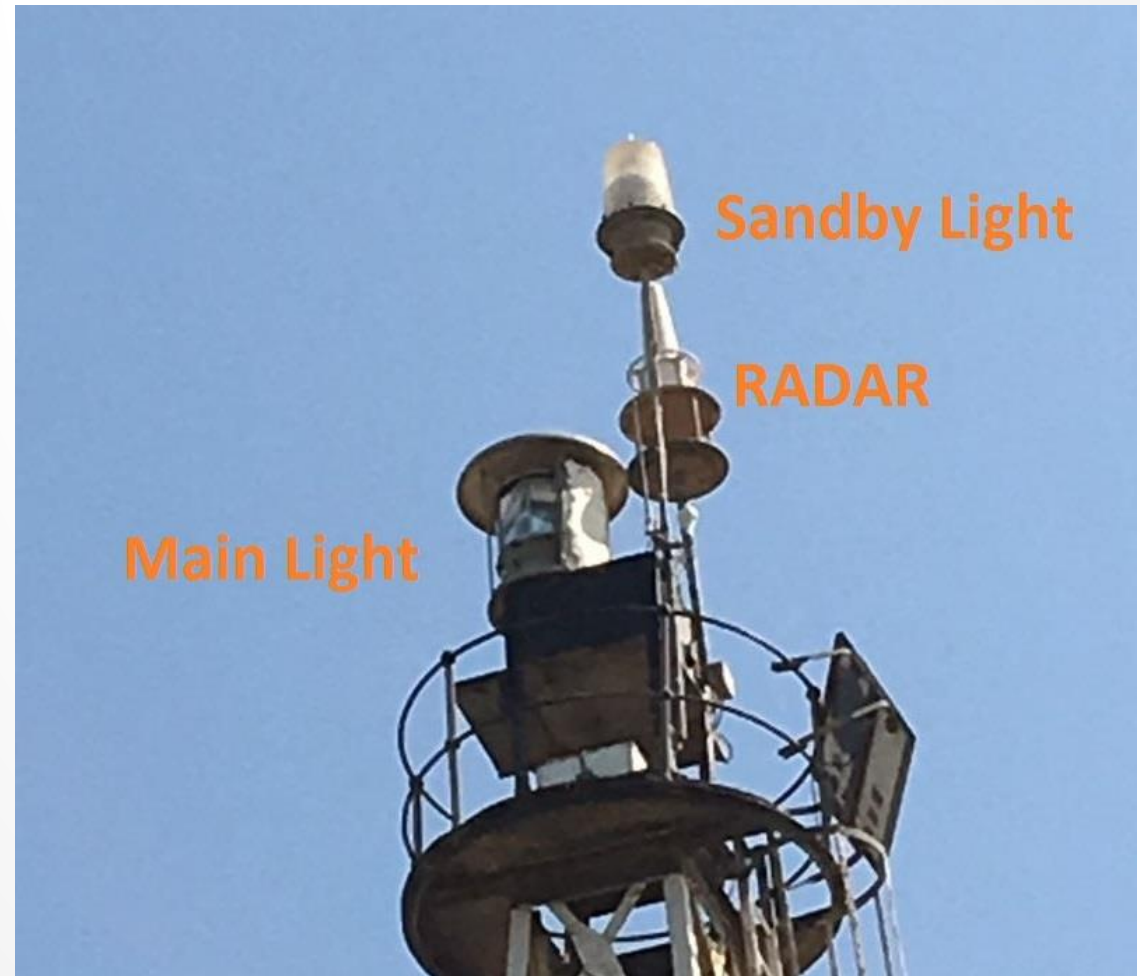
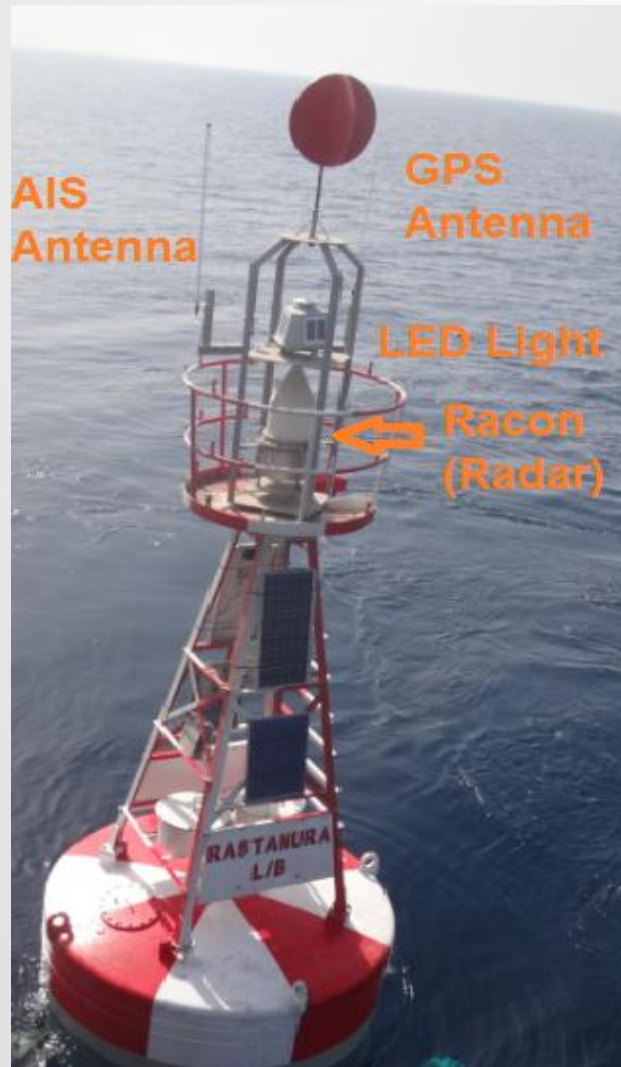


MENAS ATON MONITORING PROJECT

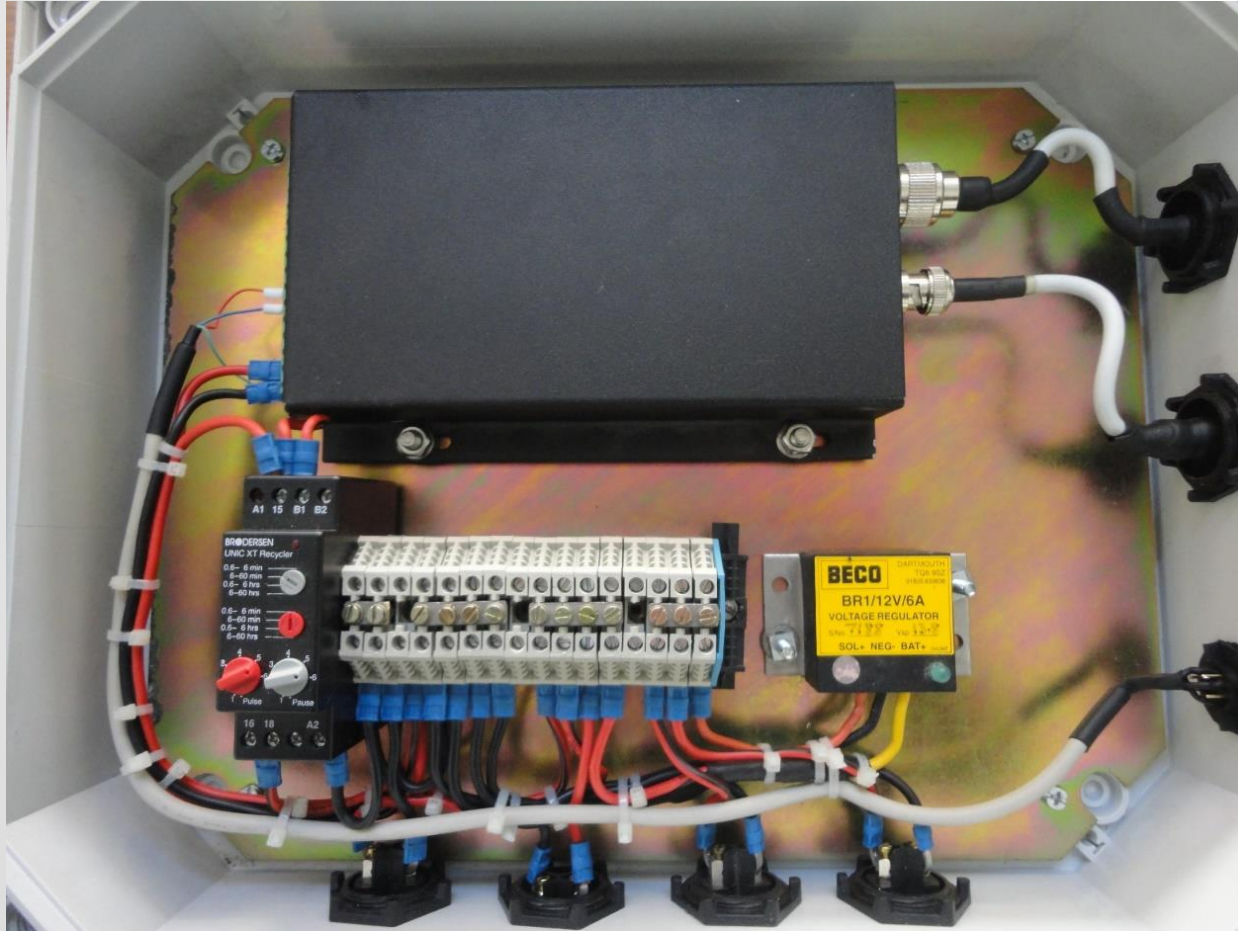




- **AtoN's located in the International routes**
- **All fitted with satellite & AIS monitoring systems**
- **Risk assessments implemented regularly**

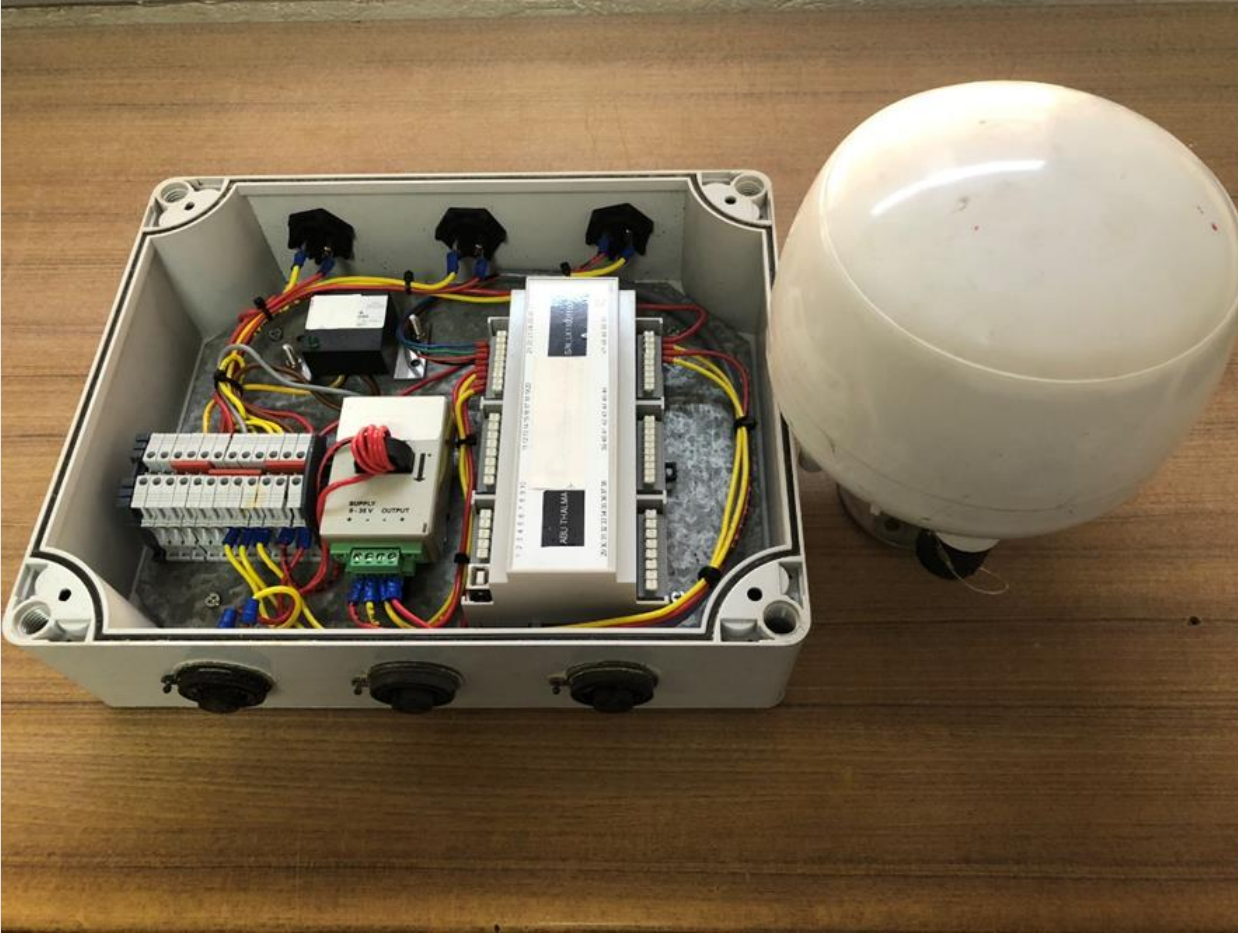


Type 1 AIS transponder



- Plugging System
- Voltage regulator
- Slots arrangement
- Timer to restart transponder

Type 3 AIS Transceiver



- Voltage sensor
- Current sensor
- Voltage Regulator
- Interface Board

MESSAGE 6 DETAILS

The screenshot displays a maritime monitoring interface. On the left, a map of the Persian Gulf shows various vessels and beacons. A yellow callout box identifies a specific beacon: "Name: CAISSON WRECK", "MMSI: 994081016", "Sector: Bahrain", and "Last msg: 23/9/2018 10:16:15".

On the right, a detailed view of the beacon is shown. It includes the following information:

- MMSI: 994081016
- Date: 2018-09-23 05:48
- Beacon Status: Operational
- RACON Status: Not installed
- Light Status: Off
- Drifting: No

Below this information is a table of historical messages. The table has columns for MMSI, Name, Date, Beacon State, and Light. The messages are as follows:

MMSI	Name	Date	Beacon State	Light
994081016	CAISSON WRECK	2018-09-23 07:52	Operational	O
994081016	CAISSON WRECK	2018-09-23 07:40	Operational	O
994081016	CAISSON WRECK	2018-09-23 07:10	Operational	O
994081016	CAISSON WRECK	2018-09-23 07:04	Operational	O
994081016	CAISSON WRECK	2018-09-23 06:43	Operational	O
994081016	CAISSON WRECK	2018-09-23 05:48	Operational	O

At the bottom of the detailed view, there is a red-bordered box containing three analogue readings:

- Analogue 0: 280 - 13.00 v
- Analogue 1: 80 - 4.00 v
- Analogue 2: 259 - 12.95 v

Three yellow callout boxes with red arrows point to these readings, identifying them as:

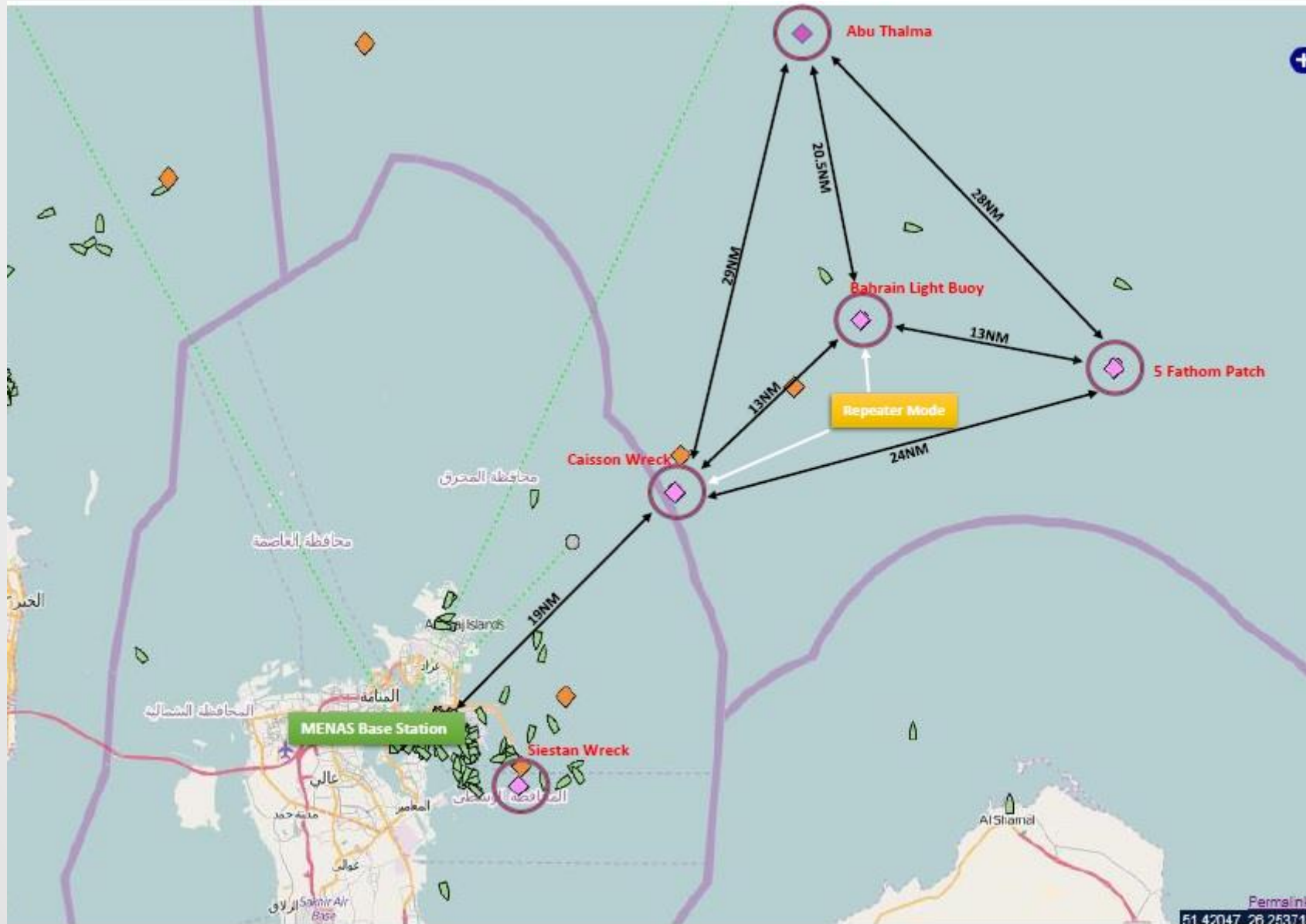
- AIS Voltage (pointing to Analogue 0)
- Light Ampere (pointing to Analogue 1)
- Battery Voltage (pointing to Analogue 2)

The interface also includes a "Close" button at the bottom right of the detailed view.

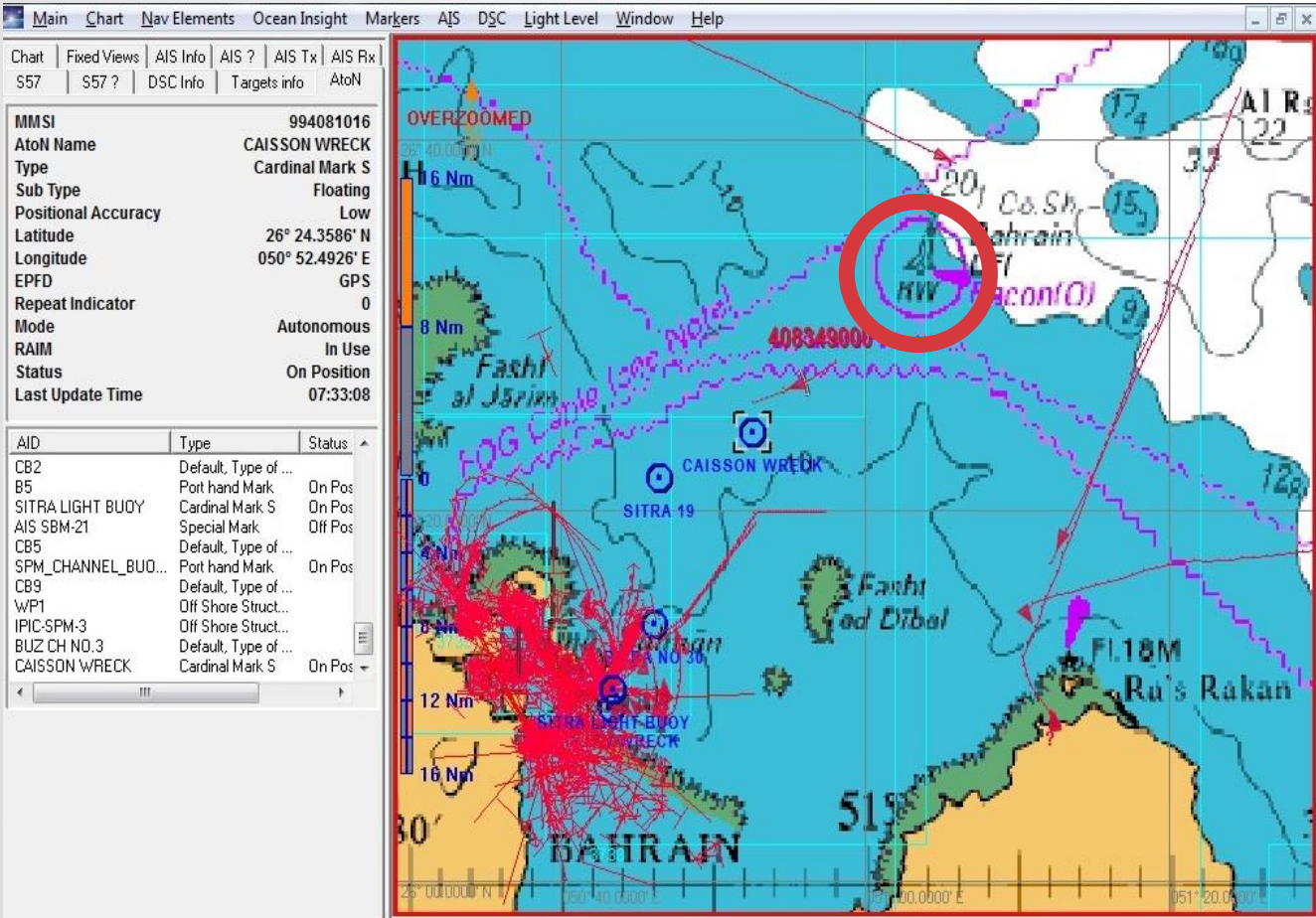
AIS COVERAGE CHALLENGES



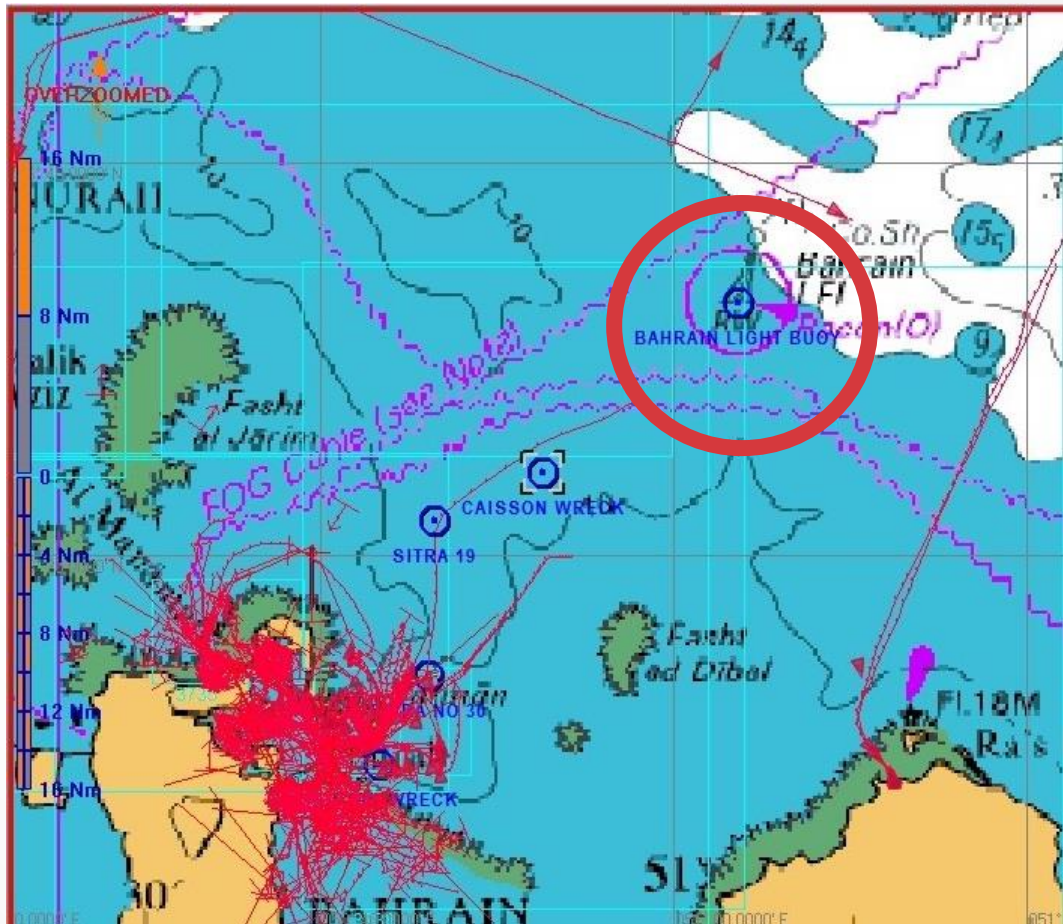
AIS REPEATING TRAIL



REPEATING RESULT



Before



After

REPEATED AIS SIGNAL

Beacon Base Station Alarms (Opened) Alarms (History) Logbook Message

Start Date : 09/11/2018 Time : 4:49 End Date : 10/13/2018 Time : 10:49 Refresh All

Sector : * MMSI : 994081001

MMSI	Name	Date	Beacon State	Light Status	RACON
994081001	BAHRAIN LIGHT BUOY	2018-09-13 02:00	Operational	Off	Operatic
994081001	BAHRAIN LIGHT BUOY	2018-09-13 01:51	Operational	Off	Operatio
994081001	BAHRAIN LIGHT BUOY	2018-09-13 01:15	Operational	Off	Operatic
994081001	BAHRAIN LIGHT BUOY	2018-09-13 01:09	Operational	Off	Operatic
994081001	BAHRAIN LIGHT BUOY	2018-09-12 23:27	Operational	Off	Operatic
994081001	BAHRAIN LIGHT BUOY	2018-09-12 23:03	Operational	Off	Operatic
994081001	BAHRAIN LIGHT BUOY	2018-09-12 22:54	Operational	Off	Operatic
994081001	BAHRAIN LIGHT BUOY	2018-09-12 22:51	Operational	Off	Operatic
994081001	BAHRAIN LIGHT BUOY	2018-09-12 22:45	Operational	Off	Operatic
994081001	BAHRAIN LIGHT BUOY	2018-09-12 22:39	Operational	Off	Operatic
994081001	BAHRAIN LIGHT BUOY	2018-09-12 22:33	Operational	Off	Operatic
994081001	BAHRAIN LIGHT BUOY	2018-09-12 22:15	Operational	Off	Operatic
994081001	BAHRAIN LIGHT BUOY	2018-09-12 21:54	Operational	Off	Operatic
994081001	BAHRAIN LIGHT BUOY	2018-09-12 21:51	Operational	Off	Operatic
994081001	BAHRAIN LIGHT BUOY	2018-09-12 21:42	Operational	Off	Operatic
994081001	BAHRAIN LIGHT BUOY	2018-09-12 20:51	Operational	Off	Operatic
994081001	BAHRAIN LIGHT BUOY	2018-09-12 20:45	Operational	Off	Operatic
994081001	BAHRAIN LIGHT BUOY	2018-09-12 19:57	Operational	Off	Operatic

MMSI : 994081001

Name : BAHRAIN LIGHT BUOY

Date : 2018-09-13 01:51

Beacon Status : Operational

Light Status : Off

RACON Status : Operational

Drifting : No

Repeat Indicator : 0

Nature of the Mark : Safe Water

Position Accuracy : 0

Longitude : 51°3.5962' E

Latitude : 26°33.0007' N

Dimensions (A,B,C,D) : 1, 1, 1, 1

Positioning : GPS

RAIM Flag : 1

Flag AIS virtual : 0

Flag Assigned Mode : 0

Beacon Extension Name :

Close

Beacon Base Station Alarms (Opened) Alarms (History) Log

Start Date : 09/11/2018 Time : 4:49 End Date : 10/13/2018 Time : 10:49 Refresh

Sector : * MMSI : 994081001

MMSI	Name	Date	Beacon State	Light Status
994081001	BAHRAIN LIGHT BUOY	2018-09-12 21:42	Operational	Off
994081001	BAHRAIN LIGHT BUOY	2018-09-12 20:51	Operational	Off
994081001	BAHRAIN LIGHT BUOY	2018-09-12 20:45	Operational	Off
994081001	BAHRAIN LIGHT BUOY	2018-09-12 19:57	Operational	Off
994081001	BAHRAIN LIGHT BUOY	2018-09-12 19:36	Operational	Off
994081001	BAHRAIN LIGHT BUOY	2018-09-12 19:03	Operational	Off
994081001	BAHRAIN LIGHT BUOY	2018-09-12 18:54	Operational	Off
994081001	BAHRAIN LIGHT BUOY	2018-09-12 02:45	Operational	Off
994081001	BAHRAIN LIGHT BUOY	2018-09-12 02:36	Operational	Off
994081001	BAHRAIN LIGHT BUOY	2018-09-12 00:39	Operational	Off
994081001	BAHRAIN LIGHT BUOY	2018-09-12 00:27	Operational	Off
994081001	BAHRAIN LIGHT BUOY	2018-09-12 00:03	Operational	Off
994081001	BAHRAIN LIGHT BUOY	2018-09-11 23:57	Operational	Off
994081001	BAHRAIN LIGHT BUOY	2018-09-11 23:45	Operational	Off
994081001	BAHRAIN LIGHT BUOY	2018-09-11 23:36	Operational	Off
994081001	BAHRAIN LIGHT BUOY	2018-09-11 23:27	Operational	Off

MMSI : 994081001

Name : BAHRAIN LIGHT BUOY

Date : 2018-09-12 02:45

Beacon Status : Operational

Light Status : Off

RACON Status : Operational

Drifting : No

Repeat Indicator : 1

Nature of the Mark : Safe Water

Position Accuracy : 0

Longitude : 51°3.5878' E

Latitude : 26°32.9983' N

Dimensions (A,B,C,D) : 1, 1, 1, 1

Positioning : GPS

RAIM Flag : 1

Flag AIS virtual : 0

Flag Assigned Mode : 0

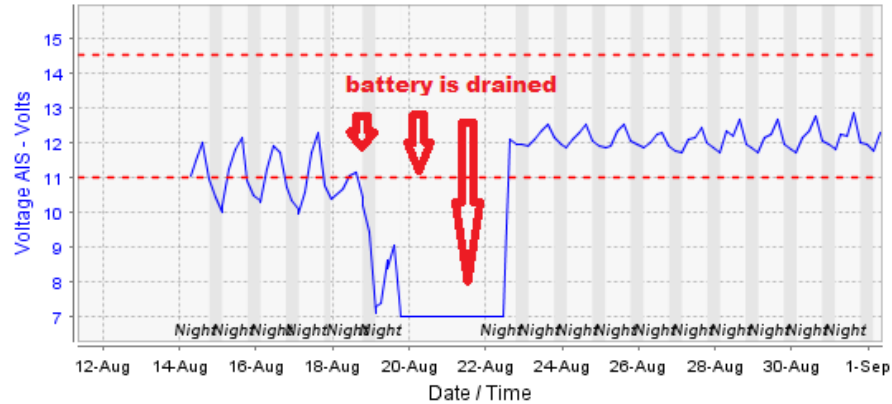
Beacon Extension Name :

Close

SATELLITE BASE DETAILS

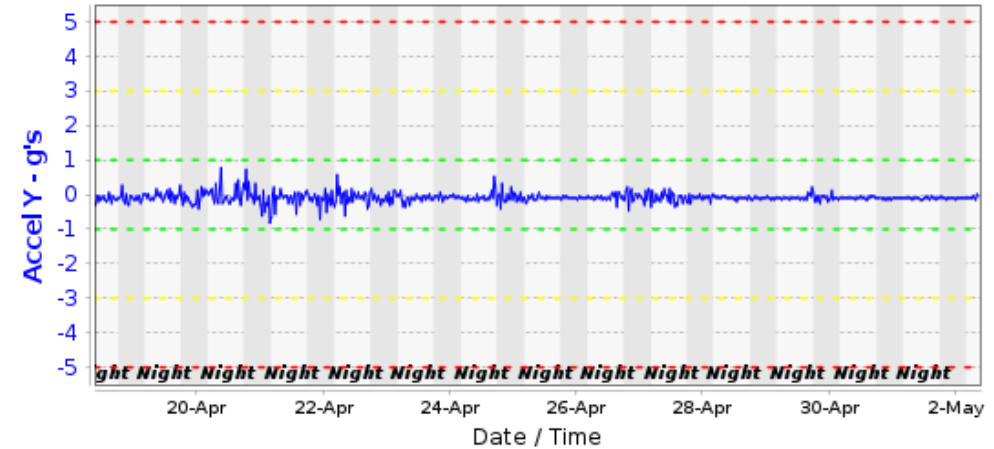
Voltage AIS (PSV)

Last value PSV: 12.27 Volts

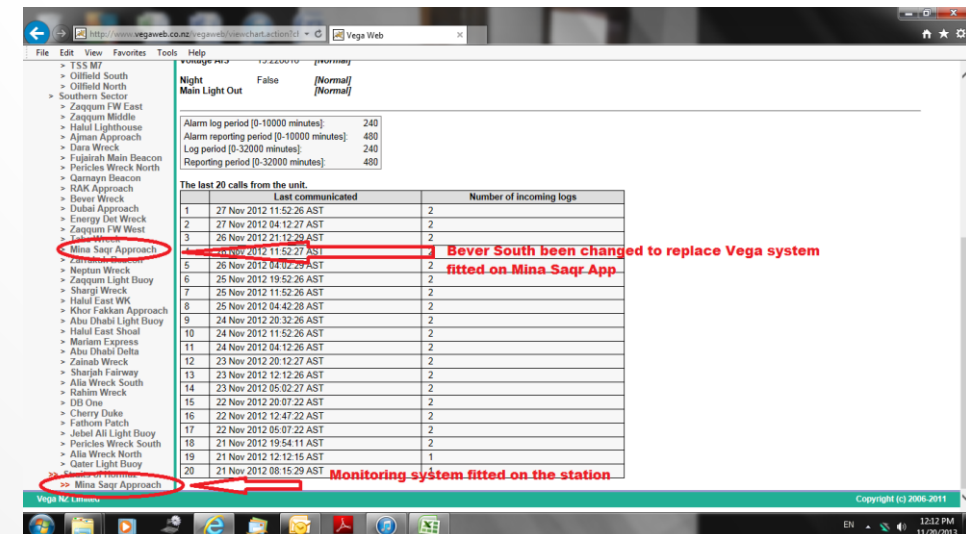
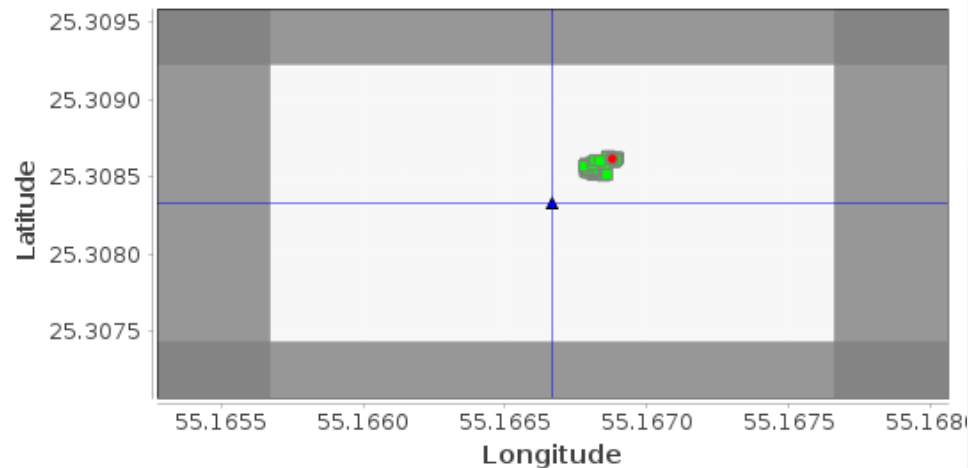


Accel Y (AI6)

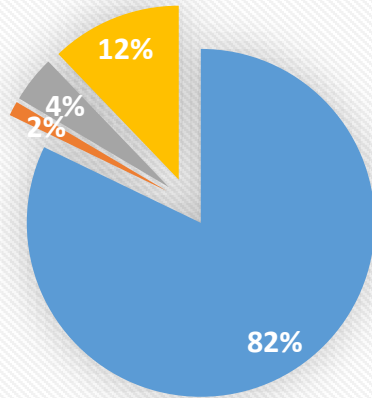
Last value AI6: -0.05 g's



Satellite Positioning (GPS)

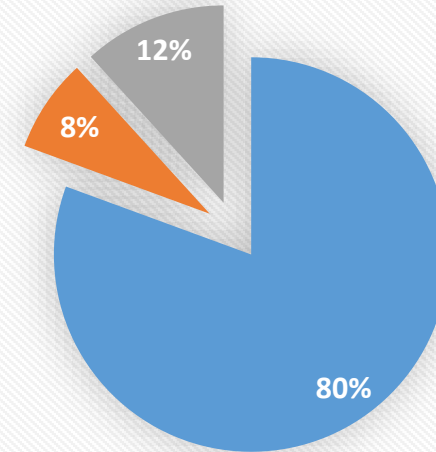


Satellite Based

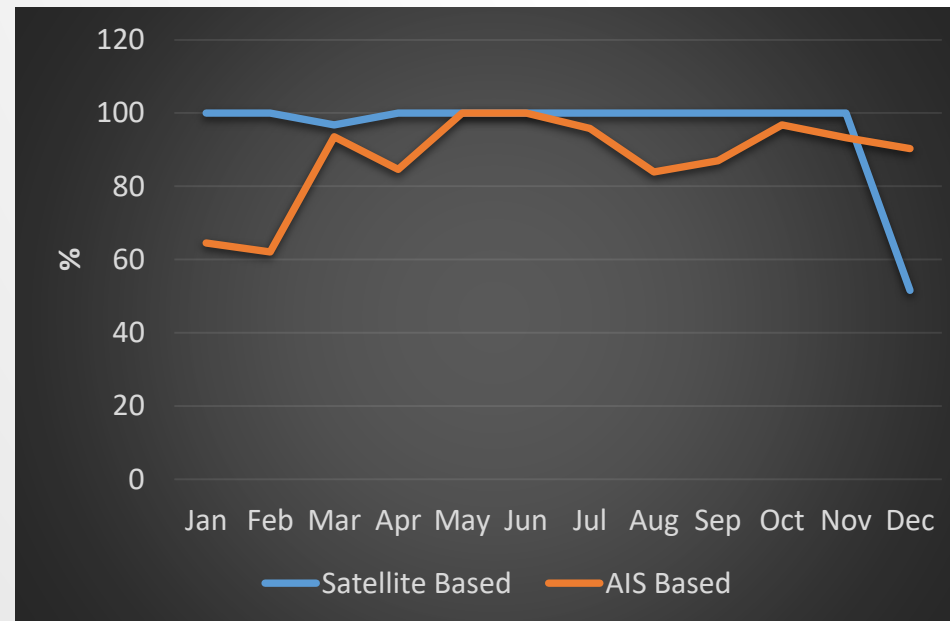


■ Functioning ■ System Down
■ Poor Reception ■ Equipment Failure (Collision)

AIS Based Msg. 6



■ Functioning ■ System Failure ■ Poor Reception



Systems Comparison

Satellite Based Numbers (Days)		AIS Based Numbers (Days)	
Functioning	304	Functioning	295
Poor Reception	16	Poor Reception	43
Equipment Failure *	45	System Failure **	28
Reliability	95%	Reliability	87%

*** Equipment failure due to buoy Collision**

**** System failure due to software crash**

AIS Base

Pros:

- Low running cost
- Easy to integrate
- Robust
- Host/control system
- Real time AtoN status
- AIS data can be used for other purposes (Risk assessment, Investigation & Tracking vessels)
- Mariners able to receive Message 21
- Capability of sending virtual AtoN
- E-Navigation element

Cons:

- Reception/Signal limitation
- Signal Degradation
- Requires shore stations

SAT Base

Pros:

- AtoN detailed information
- Easy to change AtoN sittings remotely
- Accelerometer can be used for investigation
- Immediate failure report via SMS/Email
- No base station required as the service provider bares it.
- Data analysis
- System connectivity not effected by weather conditions

Cons:

- High running cost
- Supplier host/control system
- Delicate components
- Cyber attack
- Satellite jamming, comms issues...etc

COMPARISON ATON MONITORING SYSTEMS USED BY MENAS

OPTIONS	AIS data provider (Shore stations/Satellite)	Independent AIS Shore Stations (address msg 6 & repeated transponders)	GNSS monitoring system
REQUIREMENTS			
Broadcasting Virtual AtNs	NA	Yes	NA
Support monitoring AtN status	NA	Yes	Yes
Broadcasts Regional DGPS Corrections	NA	Has the capability –but Restricted for local service only (Port limits)	NA
Coverage	All the entire Gulf region in summer with some Signal Degradation in winter months. (reduced to approx. 40 to 50 % of the entire Gulf)	All the entire Gulf region in summer with some Signal Degradation in winter months. (reduced to approx. 50 to 60 % of the entire Gulf)	All the entire Gulf region. (No call issue occurred due to lack of communication between the AtoN & satellites)
Signal Degradation due to weather conditions	High	High	Not noticed
Storage of Historical Data	One week	Minimum one year	One year
Can be used for Commercial service	No	Yes	NA
Support AtoN transceiver repeater	No	Yes	NA
Row data can be used with IALA Risk assessment tool IWRAP MK II	No	Yes	NA
Capable for Metrological data	Yes	Yes	NA



QUESTIONS?

Many thanks!