



Skylight in IORIS

Presented to the MCG Meeting, Kenya

28 Feb 2025

Presented by
Elie El Sayah

MOVING FROM SITUATIONAL AWARENESS TO SITUATIONAL UNDERSTANDING AND ACTION



The Skylight API

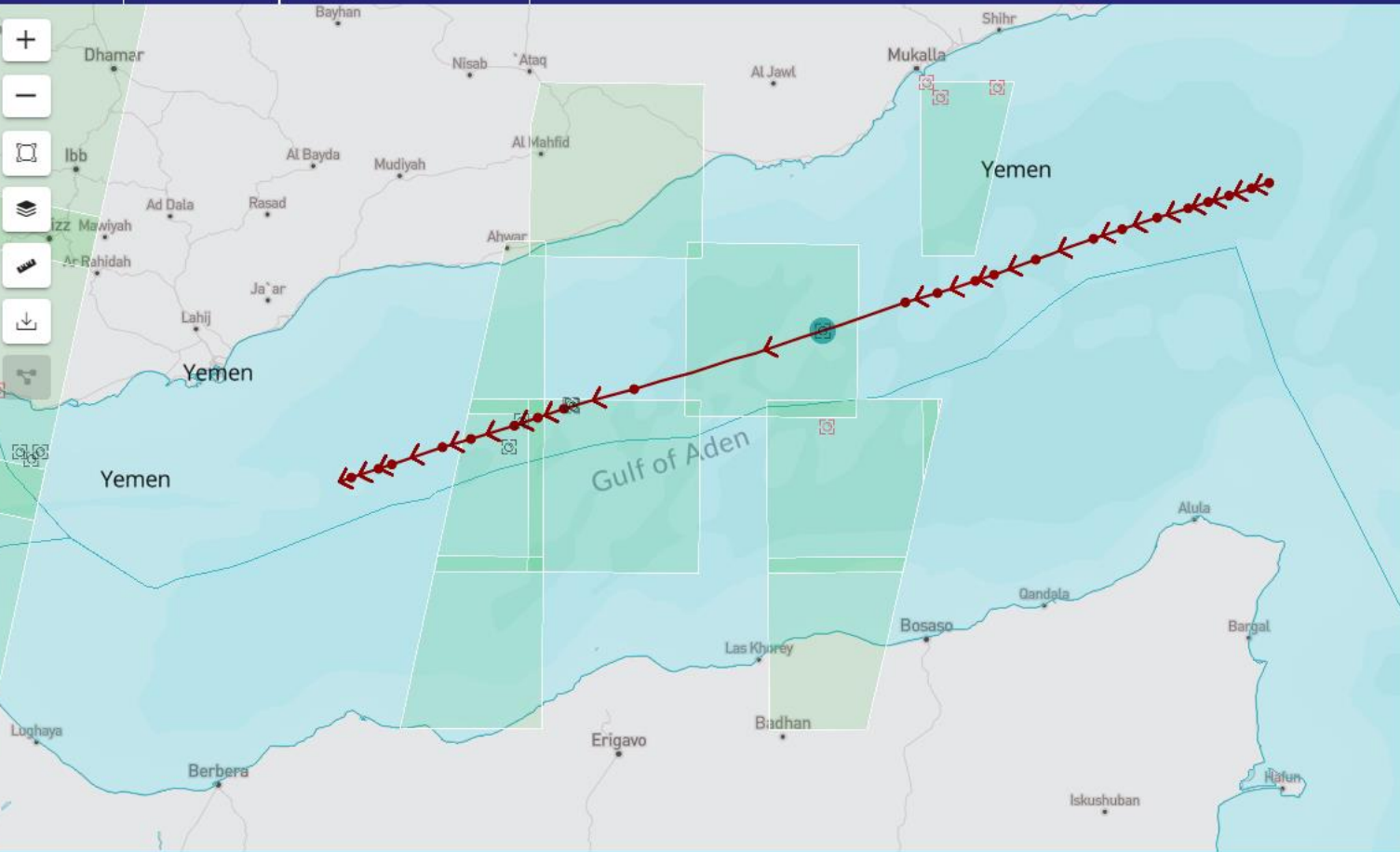
Skylight offers an application programming interface (API) to agencies that want to analyze Skylight data on the same screen as another application.

The integration of this API in IORIS:

- Enabled real-time **Skylight data access** in IORIS.
- Integrated **vessel tracking and detections**.
- **Overlaid** Skylight data with IORIS markers, AIS layer and Messages.
- Ensured secure data exchange within IORIS community Areas.
- Provided a **unified** operational picture on one Regional Map.



MOVING FROM SITUATIONAL AWARENESS TO SITUATIONAL UNDERSTANDING AND ACTION



TOREX


AIS Correlated Vessel Detection

TOREX
Barbados

MMSI	314981000
Vessel Type	Tanker
IMO	9257814
Length	246 M

Event History
8 AIS Correlated Vessel Detection Events ⓘ

Type
Optical Imagery



The optical imagery shows a satellite view of the vessel TOREX, a large tanker, moving through the water. A compass rose indicates North (N) and East (E) directions.



12.8591° N Lat, Lon: 57.2021° E

30 nm

Regional Map 29%

Marker Source Filters

- Custom Markers
- Collaboration Center Markers
- Imported Markers
- Custom Form Markers

Marker Type Filters

Map Layers

- Base Layer Standard
- Overlay Nautical Map
- Show EEZ Layer
- Draft Markers
- AIS Layer
- AIS Trace Layer

AIS Data Filters

Skylight Layers

Marker Time Filters

Range Indicators



TOREX

AIS Correlated Optical Imagery

Event Date/Time
2025-02-27 T 07:26:30 GMT
Lat, Lon: 13.0490, 48.5707

	TOREX
	Barbados
	MMSI 314981000
	Vessel Type Tanker
	IMO Number 9257814
	Length 246 m



Fusing Skylight and IORIS

What do we integrate the data in the current API?

Skylight Events:

Skylight Layers + -

- Fishing Events
- Standard Rendezvous Events
- Dark Rendezvous Events
- Satellite Radar Events
- Optical Imagery Events
- Night Light Events

- Show Tracks
- Show Satellite Frames

- Show As Heatmap

Regional Map 29%

Marker Tag Name Filter

Marker Source Filters + -

Marker Type Filters + -

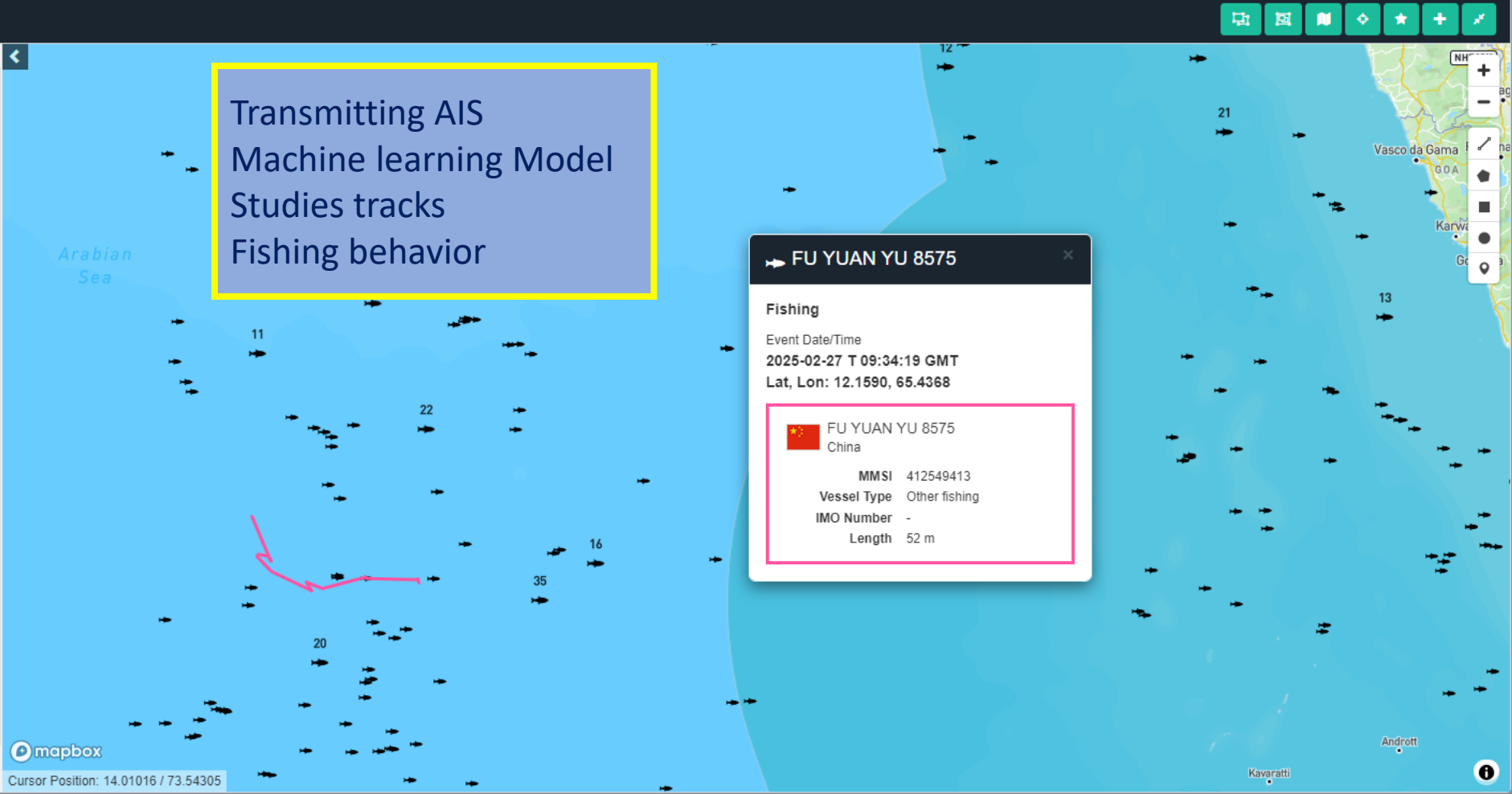
Map Layers + -

AIS Data Filters

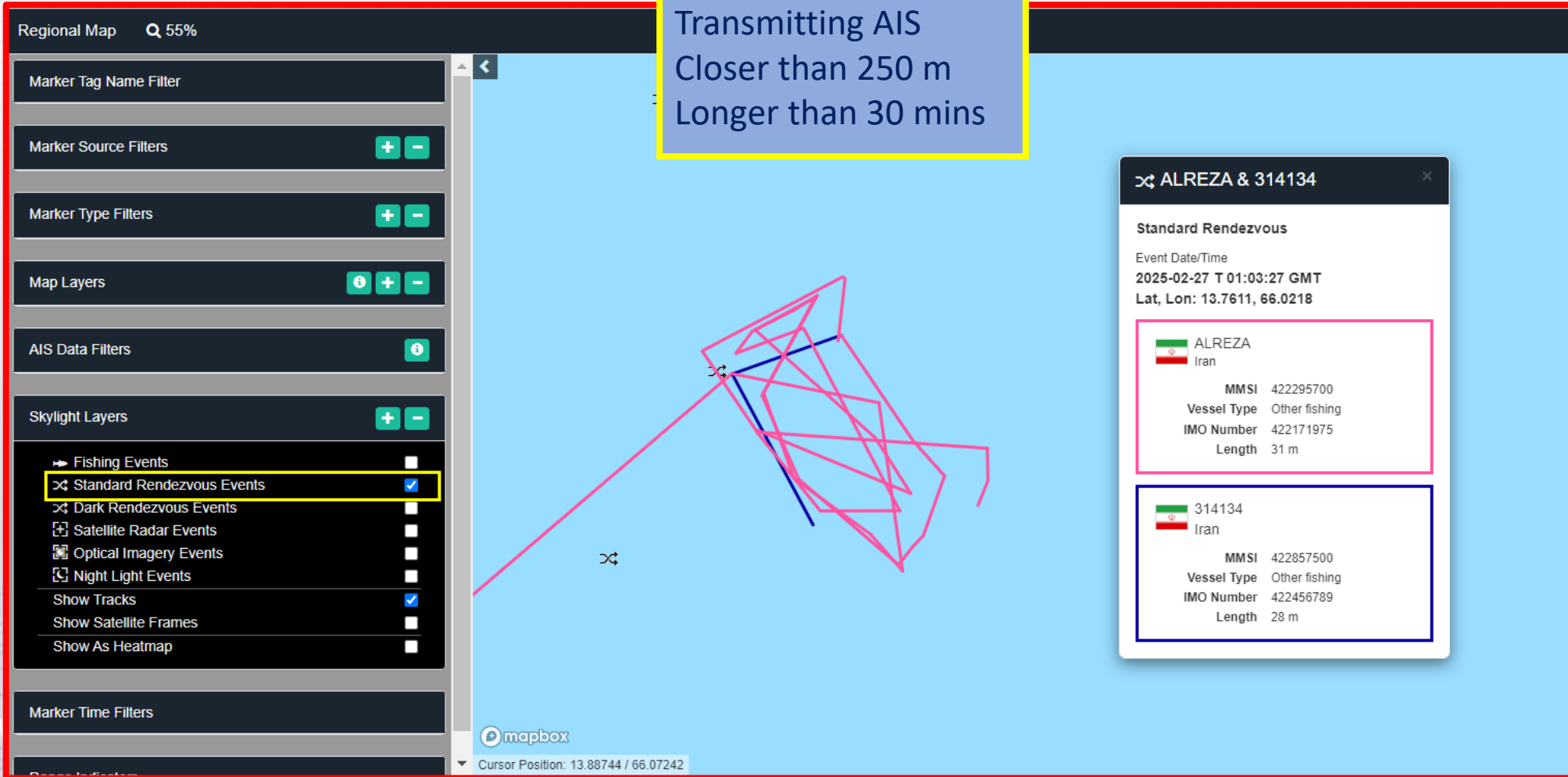
Skylight Layers + -

- Fishing Events
- Standard Rendezvous Events
- Dark Rendezvous Events
- Satellite Radar Events
- Optical Imagery Events
- Night Light Events
- Show Tracks
- Show Satellite Frames
- Show As Heatmap

Marker Time Filters



2 Vessels
Transmitting AIS
Closer than 250 m
Longer than 30 mins



The screenshot displays the IORIS Regional Map interface. On the left, a sidebar contains various filter and layer controls. The 'Standard Rendezvous Events' filter is highlighted with a yellow box and has a checkmark. The map shows two vessels, ALREZA and 314134, with their tracks and a pink polygon indicating a rendezvous event. A tooltip window on the right provides details for the event.

Standard Rendezvous
Event Date/Time: 2025-02-27 T 01:03:27 GMT
Lat, Lon: 13.7611, 66.0218

Vessel	MMSI	Vessel Type	IMO Number	Length
ALREZA	422295700	Other fishing	422171975	31 m
314134	422857500	Other fishing	422456789	28 m



Standard Rendezvous

Indian Ocean Hub

Regional Map 51%

COG +/- 0°

SOG

Search historic data

Apply Clear

Skylight Layers

- Fishing Events
- Standard Rendezvous Events
- Dark Rendezvous Events
- Satellite Radar Events
- Optical Imagery Events
- Night Light Events
- Show Tracks
- Show Satellite Frames
- Show As Heatmap

Marker Time Filters

Range Indicators

KAREN D & NAVIS FORTUNA

Standard Rendezvous

Event Date/Time: 2024-10-10 T 21:00:05 GMT
Lat, Lon: -37.3354, 176.8410

KAREN D
New Zealand
MMSI: 512004688
Vessel Type: Ship
IMO Number: -
Length: -

NAVIS FORTUNA
Marshall Islands
MMSI: 538009155
Vessel Type: Cargo
IMO Number: 9404455
Length: 190 m

Cursor Position: 37°19'56.046"S / 176°06'27.08"E

Indian Ocean Hub

Regional Map 51%

COG +/- 0°

SOG

Search historic data

Apply Clear

Skylight Layers

- Fishing Events
- Standard Rendezvous Events
- Dark Rendezvous Events
- Satellite Radar Events
- Optical Imagery Events
- Night Light Events
- Show Tracks
- Show Satellite Frames
- Show As Heatmap

Marker Time Filters

Range Indicators

KAREN D & NAVIS FORTUNA

Standard Rendezvous

Event Date/Time: 2024-10-10 T 21:00:05 GMT
Lat, Lon: -37.3354, 176.8410

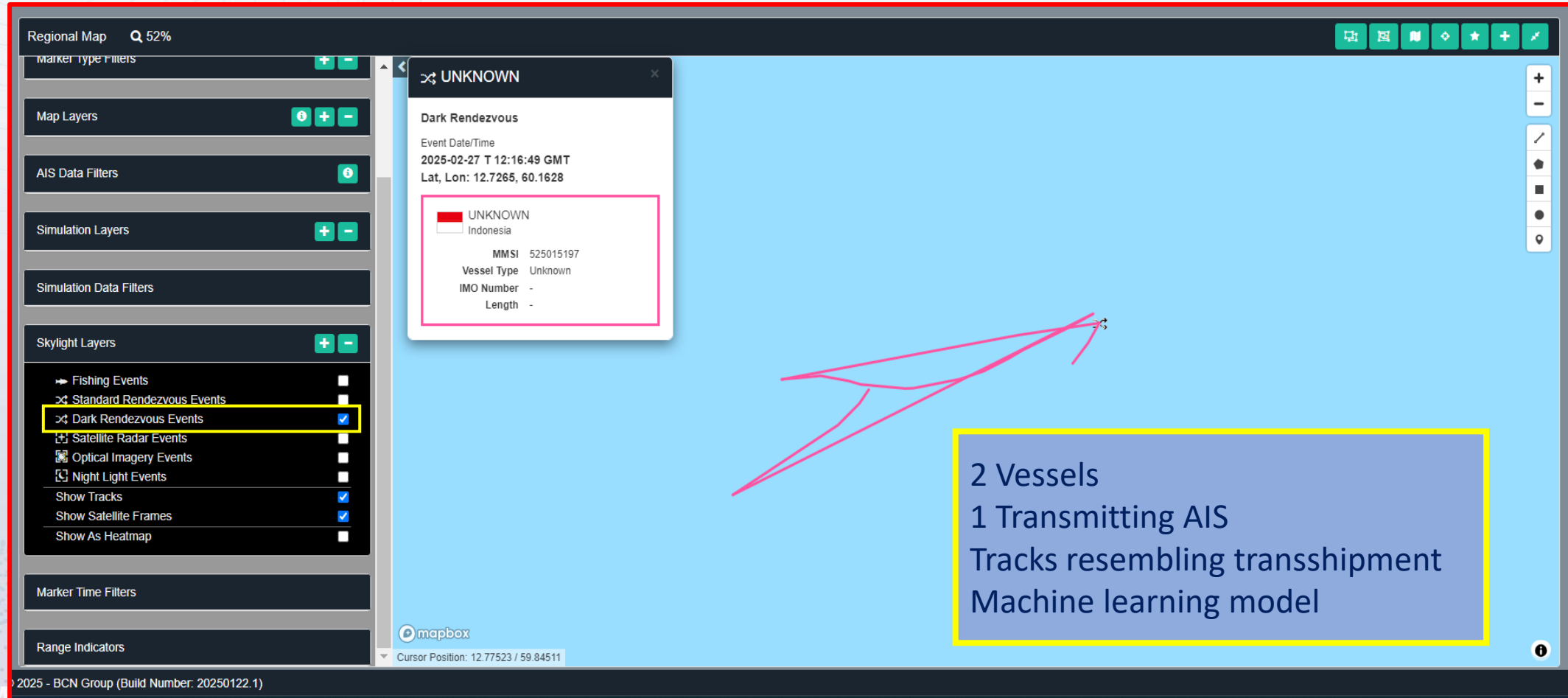
KAREN D
New Zealand
MMSI: 512004688
Vessel Type: Ship
IMO Number: -
Length: -

NAVIS FORTUNA
Marshall Islands
MMSI: 538009155
Vessel Type: Cargo
IMO Number: 9404455
Length: 190 m

Cursor Position: 37°32'40.411"S / 176°30'24.823"E

MOVING FROM SITUATIONAL

ION



Regional Map 52%

marker type Filters

Map Layers

AIS Data Filters

Simulation Layers

Simulation Data Filters

Skylight Layers

- Fishing Events
- Standard Rendezvous Events
- Dark Rendezvous Events**
- Satellite Radar Events
- Optical Imagery Events
- Night Light Events
- Show Tracks
- Show Satellite Frames
- Show As Heatmap

Marker Time Filters

Range Indicators

UNKNOWN

Dark Rendezvous

Event Date/Time
2025-02-27 T 12:16:49 GMT
Lat, Lon: 12.7265, 60.1628

UNKNOWN
Indonesia

MMSI 525015197
Vessel Type Unknown
IMO Number -
Length -

2 Vessels
1 Transmitting AIS
Tracks resembling transshipment
Machine learning model

mapbox
Cursor Position: 12.77523 / 59.84511

2025 - BCN Group (Build Number: 20250122.1)



Dark Rendezvous

Indian Ocean Hub

Regional Map Q 27%

Map Layers

- Base Layer Standard
- Overlay Nautical Map
- Show EEZ Layer
- Draft Markers
- AIS Layer
- AIS Trace Layer

AIS Data Filters

Skylight Layers

- Fishing Events
- Standard Rendezvous Events
- Dark Rendezvous Events
- Satellite Radar Events
- Optical Imagery Events
- Night Light Events
- Show Tracks
- Show Satellite Frames
- Show As Heatmap

SANWA FONTAINE

Dark Rendezvous

Event Date/Time
2024-10-10 T 11:14:09 GMT
Lat, Lon: -3.7178, 169.0467

SANWA FONTAINE
Panama

MMSI 353937000
Vessel Type Cargo
IMO Number 8204121
Length 93 m

Indian Ocean Hub

Regional Map Q 27%

Map Layers

- Base Layer Standard
- Overlay Nautical Map
- Show EEZ Layer
- Draft Markers
- AIS Layer
- AIS Trace Layer

AIS Data Filters

Skylight Layers

- Fishing Events
- Standard Rendezvous Events
- Dark Rendezvous Events
- Satellite Radar Events
- Optical Imagery Events
- Night Light Events
- Show Tracks
- Show Satellite Frames
- Show As Heatmap

SANWA FONTAINE

Dark Rendezvous

Event Date/Time
2024-10-10 T 11:14:09 GMT
Lat, Lon: -3.7178, 169.0467

SANWA FONTAINE
Panama

MMSI 353937000
Vessel Type Cargo
IMO Number 8204121
Length 93 m

MMSI No	353937000
Name	SANWA FONTAINE
IMO No	8204121
Call sign	3FMK4
Comment	
Hostility	
Vessel Type	Reefer
Gross Tonnage	1997
Latitude	03°40'52.716"S
Longitude	158°57'30.042"E
Nav. status	Not Under Command
Heading	065°
Speed	0.8
Time of fix	Thu, 10 Oct 2024 23:52 UTC
Fix Type	undefined

Edit Marker | View Trace | Set Target | Set Interceptor

MOVING FROM SITUATIONAL AWARENESS

Skylight Sensor Sources

Skylight sensor data available within IORIS:

- Sentinel-1;
- Sentinel-2; and
- VIIRS - Night Lights

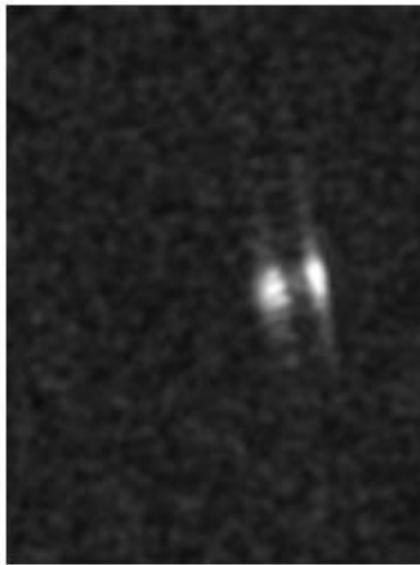
Dark Vessel Detection

Dark Vessel Detection

Event Date/Time

2024-05-10 T 12:12:27 GMT

Lat, Lon: 20.6255, 88.6552



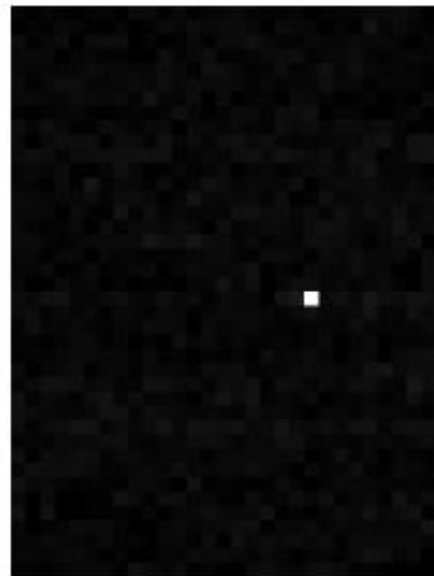
Dark Night Lights

Dark Night Lights

Event Date/Time

2024-05-10 T 19:30:00 GMT

Lat, Lon: -21.8200, 94.8700



Dark Optical Imagery

Dark Optical Imagery

Event Date/Time

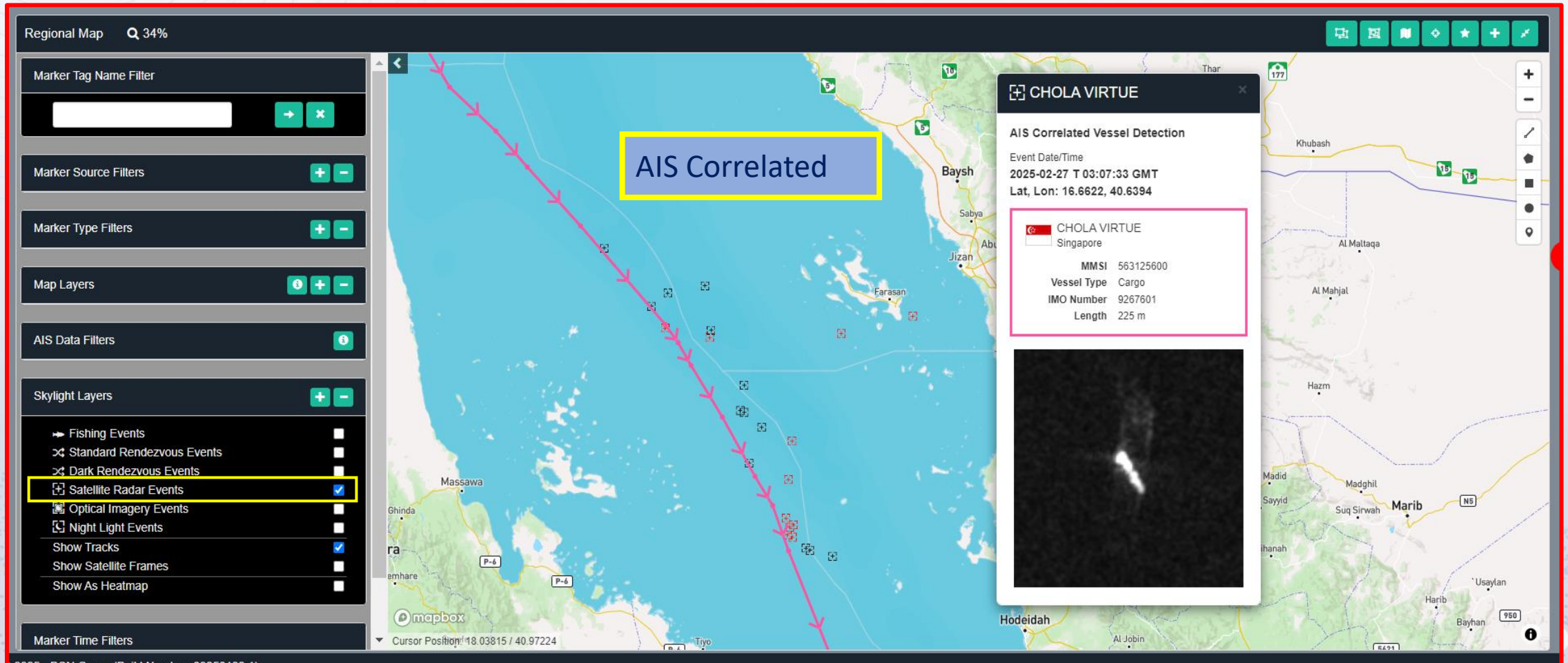
2024-05-11 T 04:15:15 GMT

Lat, Lon: 11.0135, 95.9558



MOVING FROM SI

DERSTANDING AND ACTION



The screenshot displays a maritime tracking application interface. On the left, a sidebar contains various filter and layer controls. The main map area shows a vessel track in the Red Sea, with a yellow box highlighting the text "AIS Correlated". A pop-up window for the vessel "CHOLA VIRTUE" is open, displaying event details and a satellite radar image.

Regional Map Q 34%

Marker Tag Name Filter

Marker Source Filters + -

Marker Type Filters + -

Map Layers + -

AIS Data Filters ⓘ

Skylight Layers + -

- Fishing Events
- Standard Rendezvous Events
- Dark Rendezvous Events
- Satellite Radar Events
- Optical Imagery Events
- Night Light Events
- Show Tracks
- Show Satellite Frames
- Show As Heatmap

Marker Time Filters

CHOLA VIRTUE

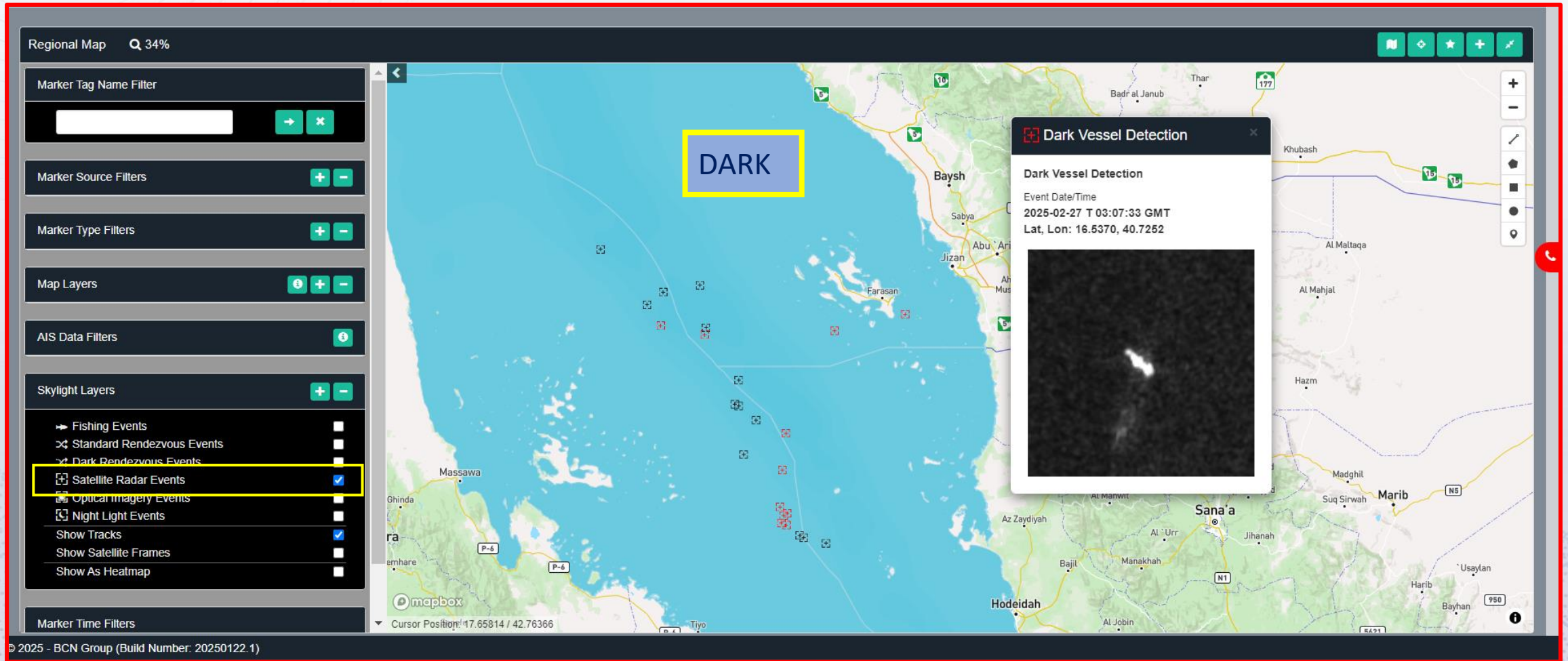
AIS Correlated Vessel Detection

Event Date/Time
2025-02-27 T 03:07:33 GMT
Lat, Lon: 16.6622, 40.6394

CHOLA VIRTUE
 Singapore

MMSI 563125600
Vessel Type Cargo
IMO Number 9267601
Length 225 m

Cursor Position: 18.03815 / 40.97224



The screenshot displays the IORIS satellite radar interface. On the left, a sidebar contains several filter panels: 'Marker Tag Name Filter' (with an input field), 'Marker Source Filters', 'Marker Type Filters', 'Map Layers', 'AIS Data Filters', 'Skylight Layers', and 'Marker Time Filters'. The 'Skylight Layers' panel is expanded, showing a list of event types with checkboxes. The 'Satellite Radar Events' checkbox is checked and highlighted with a yellow box. The main map area shows a satellite radar image of the Red Sea region, with a yellow box labeled 'DARK' highlighting a specific event. A pop-up window titled 'Dark Vessel Detection' is open, displaying the event details: 'Event Date/Time: 2025-02-27 T 03:07:33 GMT' and 'Lat, Lon: 16.5370, 40.7252'. Below the text is a small satellite radar image showing a bright white object against a dark background. The bottom of the interface shows the copyright notice: '© 2025 - BCN Group (Build Number: 20250122.1)'.

Regional Map 34%

Marker Tag Name Filter

Marker Source Filters

Marker Type Filters

Map Layers

AIS Data Filters

Skylight Layers

- Fishing Events
- Standard Rendezvous Events
- Dark Rendezvous Events
- Satellite Radar Events**
- Optical Imagery Events
- Night Light Events
- Show Tracks
- Show Satellite Frames
- Show As Heatmap

Marker Time Filters

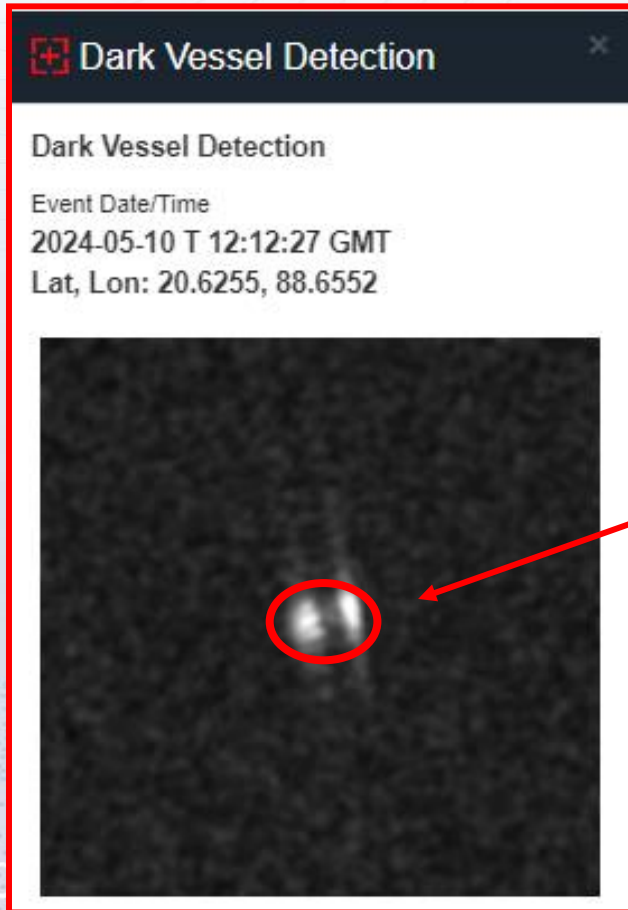
Cursor Position: 17.65814 / 42.76366

Dark Vessel Detection

Dark Vessel Detection

Event Date/Time
2025-02-27 T 03:07:33 GMT
Lat, Lon: 16.5370, 40.7252

© 2025 - BCN Group (Build Number: 20250122.1)



Sentinel-1 is a Synthetic Aperture Radar (SAR), providing continuous all-weather, day-and-night imagery.

SAR bounces a microwave radar signal off the earth's surface.

Rough surfaces appear brighter, as they reflect the radar in multiple directions.

MC L AWARENESS TO SITUATIONAL UNDERSTANDING AND ACTION

Indian Ocean Hub

Regional Map 🔍 24%

Map Layers ⓘ + -

- Base Layer: Standard
- Overlay Nautical Map:
- Show EEZ Layer:
- Draft Markers:
- AIS Layer:
- AIS Trace Layer:

AIS Data Filters ⓘ

Skylight Layers + -

- Fishing Events:
- Standard Rendezvous Events:
- Dark Rendezvous Events:
- Satellite Radar Events:**
- Optical Imagery Events:
- Night Light Events:
- Show Tracks:
- Show Satellite Frames:**
- Show As Heatmap:

Marker Time Filters

Cursor Position: 03°27'13.593"N / 072°11'19.921"E

Indian Ocean Hub

Regional Map 🔍 24%

Dark Vessel Detection

Dark Vessel Detection

Event Date/Time
2024-10-10 T 00:58:35 GMT
Lat, Lon: 6.7149, 72.9527

Dark Vessel Detection
2024-10-10 T 00:58:35 GMT


Cursor Position: 06°43'19.271"N / 072°53'54.267"E

Dark Optical Imagery

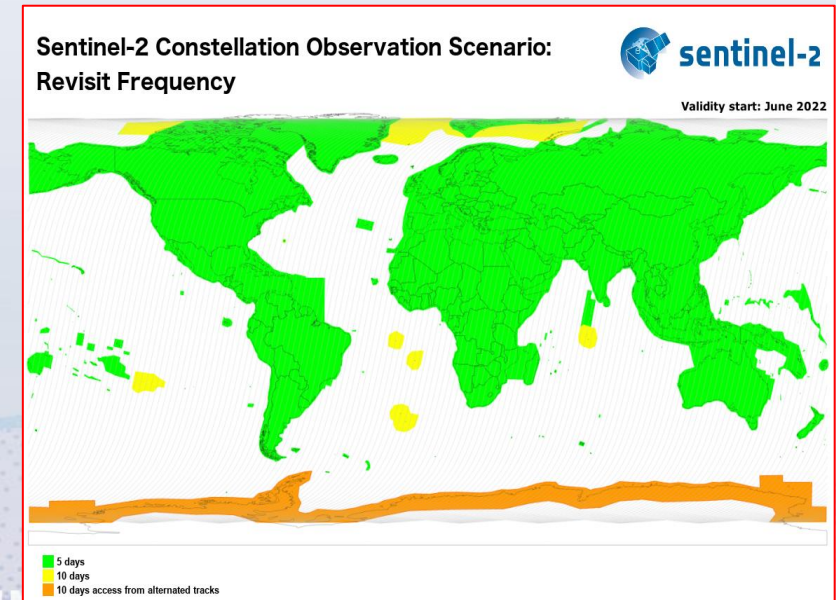
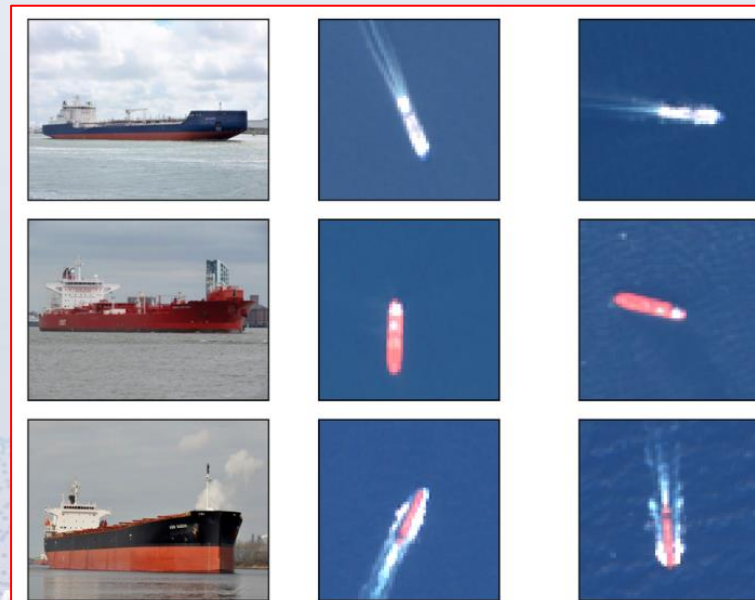
Dark Optical Imagery

Event Date/Time
2024-05-11 T 04:15:15 GMT

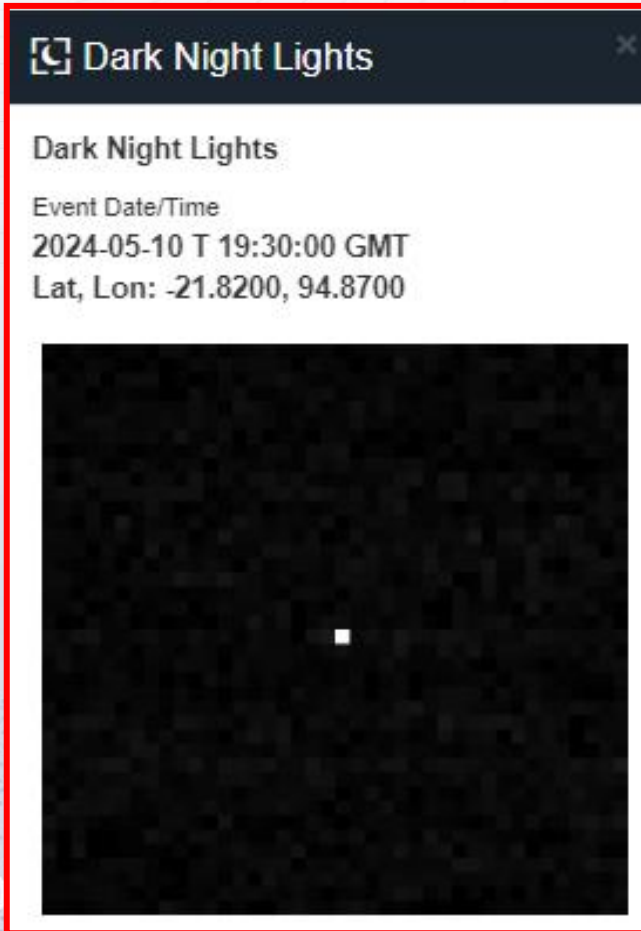
Lat, Lon: 11.0135, 95.9558



Sentinel-2 is an optical satellite constellation consisting of two Satellites.



Night Lights



Night Lights uses the data based on the Visible Infrared Imaging Radiometer Suite (**VIIRS**)

Night only capability – 01:00 – 04:00

Weather dependent

Focusing on vessels that use light

Indian Ocean Hub

[About](#)
[Contacts](#)
[Area Tools](#)

Regional Map Q 41%

Base Layer Standard

- Overlay Nautical Map
- Show EEZ Layer
- Draft Markers
- AIS Layer
- AIS Trace Layer

AIS Data Filters ⓘ

Skylight Layers + -

- Fishing Events
- ↔ Standard Rendezvous Events
- ↔ Dark Rendezvous Events
- 📡 Satellite Radar Events
- 📡 Optical Imagery Events
- 📡 Night Light Events
- Show Tracks
- Show Satellite Frames
- Show As Heatmap

Marker Time Filters

Range Indicators

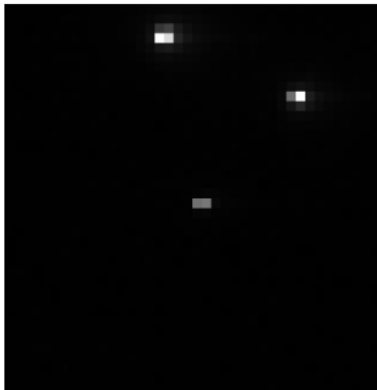
📡 FU YUAN YU 816

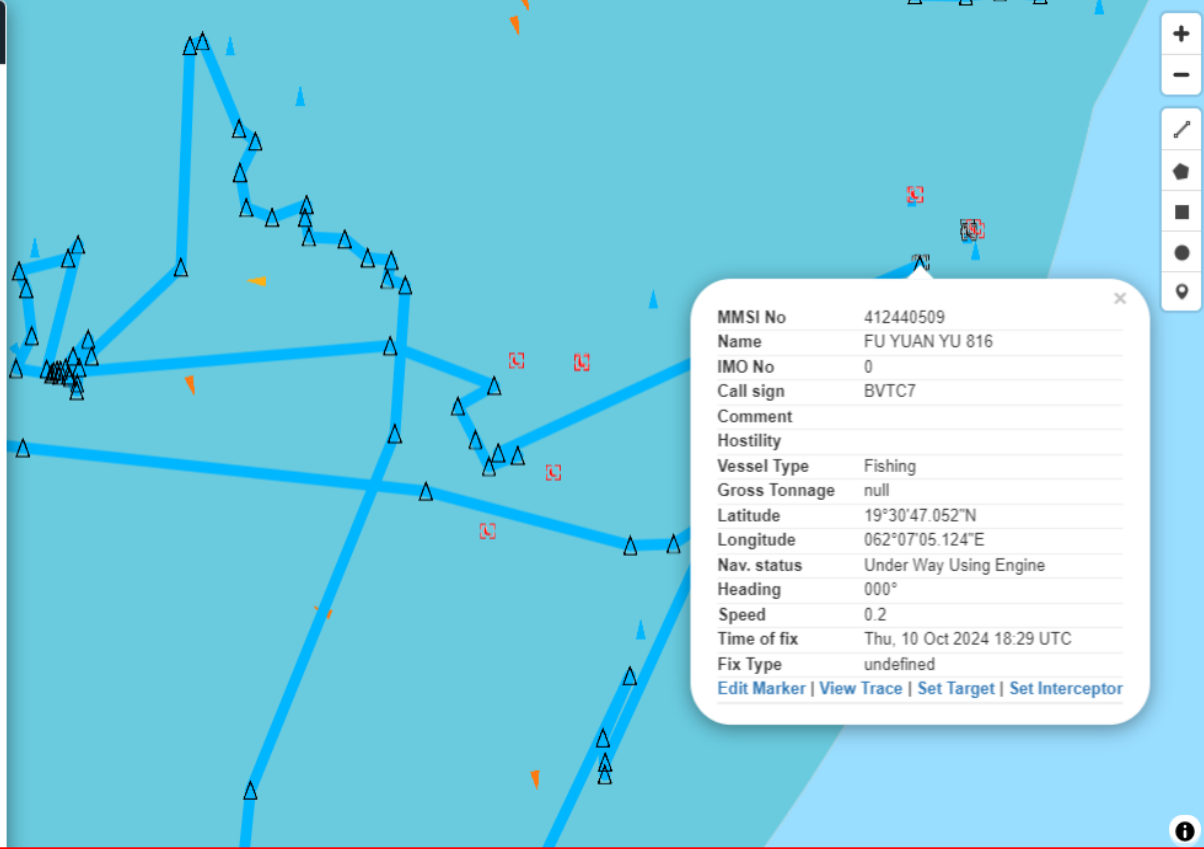
AIS Correlated Night Lights

Event Date/Time
2024-10-10 T 21:06:00 GMT
Lat, Lon: 19.5150, 62.1151

🇨🇳 FU YUAN YU 816
 China

MMSI 412440509
 Vessel Type Unknown
 IMO Number -
 Length -





MMSI No	412440509
Name	FU YUAN YU 816
IMO No	0
Call sign	BVTC7
Comment	
Hostility	
Vessel Type	Fishing
Gross Tonnage	null
Latitude	19°30'47.052"N
Longitude	062°07'05.124"E
Nav. status	Under Way Using Engine
Heading	000°
Speed	0.2
Time of fix	Thu, 10 Oct 2024 18:29 UTC
Fix Type	undefined

[Edit Marker](#) |
 [View Trace](#) |
 [Set Target](#) |
 [Set Interceptor](#)



ST Sounion

Operational Use

YEM: Tanker Sounion_240828 - O

Regional Map 77%

Dark Vessel Detection

Event Date/Time
2024-10-11 T 03:15:19 GMT

Lat, Lon: 18.3827, 39.1012

MMSI No 240542000
Name SOUNION (M/V)
IMO No 9312145
Call sign SWGE
Comment POSITION is accurate according to SAT Imagery. VESSEL IS BEING TOWED TO SAFETY. 22 Aug 2024 A crew of 25 has been rescued from a Greek-flagged oil tanker after it caught fire after multiple attacks in the Red Sea. The Sounion was attacked by more than a dozen people on

Hostility Neutral
Vessel Type Tanker_crude
Gross Tonnage 85206
Latitude 14.98857
Longitude 41.65260
Nav. status Under Way Using Engine
Heading 000°
Speed 0
Time of fix: Fri, 30 Aug 2024 18:58 UTC
Fix Type Simulation

YMN: Tanker Sounion_240828 - O

Regional Map 32%

Dark Optical Imagery

Event Date/Time
2024-08-30 T 07:55:46 GMT

Lat, Lon: 14.9900, 41.6536

MMSI No 240542000
Name Sounion
IMO No 9312145
Call sign SWGE
Comment 22 Aug 2024 A crew of 25 has been rescued from a Greek-flagged oil tanker after it caught fire after multiple attacks in the Red Sea. The Sounion was attacked by more than a dozen people on two small boats who fired multiple projectiles at the ship when it was about 77 nautical miles (143km) west of Yemen's port city of Hodeidah on 21 Aug 24. It now appears to be leaking oil

Hostility Neutral
Vessel Type Tanker_crude
Gross Tonnage 85206
Latitude 14.98857
Longitude 41.65260
Nav. status Under Way Using Engine
Heading 000°
Speed 0
Time of fix: Fri, 30 Aug 2024 18:58 UTC
Fix Type Simulation

ANNEX

HELLENIC REPUBLIC
MINISTRY OF MARITIME AFFAIRS AND INSULAR POLICY
HELLENIC COAST GUARD

Piranes, 29th August 2024
Ref. No.: 2060.0/61470/2024

URGENT NOTICE BY GREECE

SUBJECT: M/T "SOUNION", IMO 9312145

The Greek-flagged Oil Tanker "SOUNION", IMO 9312145, was attacked on 21 August 2024 by projectiles, while sailing 72 nm west of Yemen's port of Hodeidah in the Red Sea, resulting in loss of engine power.

After the first attack, on 22 August 2024, the ship was evacuated by its crew (25 seafarers) and anchored between Yemen and Eritrea. No death or injury of the crew was reported. The crew was transferred safely to Djibouti by a naval asset of the EU operation "EU NAVFOR ASPIDES".

Following a second attack, the vessel has been on fire in at least five locations on the main deck since 23 August. The continuing fire on board has been confirmed on 26 August by EU NAVFOR ASPIDES.

According to a satellite image obtained evening hours of 29 August 2024 by the Satellite Services of European Maritime Safety Agency (EMSA), a potential spill of about 2.2 nm. length has been detected. The position of the oil spill matches with the location of the ship.

Under the said circumstances, the condition of the tanker, which carries 150,000 tons of crude oil, poses a serious environmental hazard for the Red Sea marine environment.

Greece urges all nations and all actors involved to assist in preventing the environmental hazard and resolving the situation the soonest possible.

This information is submitted pursuant to Article 198 of the United Nations Convention on the Law of the Sea (UNCLOS).

It is kindly requested to disseminate the present notice to all IMO Member States.

THE DIRECTOR GENERAL FOR SHIPPING
REAR ADMIRAL H.C.G.
LAGADIANOS NIKOLAOS

Joint Maritime Information Center

JMIC INFORMATION NOTE 21_AUG_2024 (06)
INCIDENT NUMBER 93 - UPDATE 01

MULTIPLE ATTACKS INVOLVING GREEK-FLAGGED VESSEL CRUDE OIL TANKER SOUNION

INCIDENT REPORT

Ref. UKMTO Incident Advisory 110

1. On 21st August 2024 there was an attack on the Greek-flagged M/T SOUNION (IMO: 9312145) by small boats and unknown airborne projectiles. Events are as follows:

- 1) 0257 (UTC): Two skiffs approached the vessel 78 NM west of Al Hudaydah, Yemen.
- 2) 0315 (UTC):
 - i. The ship's Master reported that two skiffs approached to approximately 3-4 cables. One skiff had up to 5 personnel on board. The other skiff had up to 12 personnel onboard.
 - ii. The crew attempted to hail the skiffs on VHF radio with no reply.
 - iii. The onboard Armed Security Team fired warning shots at the skiffs who then returned fire. The vessel observed flashing lights from the two skiffs and eventually the distance between the skiffs and vessel opened up to beyond 1NM.
- 3) 0500 (UTC): The vessel reported being struck by two projectiles 84 NM NW of Al Hudaydah. The vessel lost propulsion and issued a Mayday call over VHF radio. The vessel reported to be Not Under Command.
- 4) 0528 (UTC): The UKMTO reported that the Master believed that there were two earlier explosions in the engine compartment at 0417 UTC, the cause of which remains unknown. Furthermore, the Master reported a skiff monitoring the vessel from a distance.





Improvements and future plans

IORIS will launch its **Version 4** in May 2025

Enhance SKYLIGHT interface with IORIS to offer:

- a multi-source
- single display
- fused and integrated maritime surveillance system and open standards for maritime data exchange



MOVING FROM SITUATIONAL AWARENESS TO SITUATIONAL UNDERSTANDING AND ACTION



Contact Us:

Website: www.ioris.org

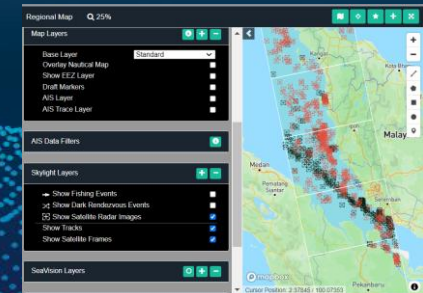
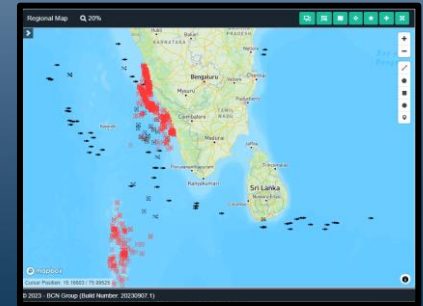
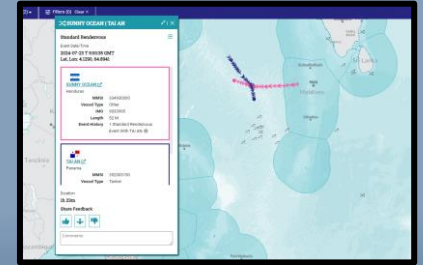
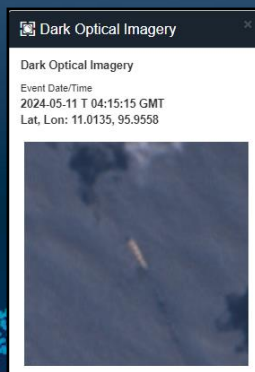
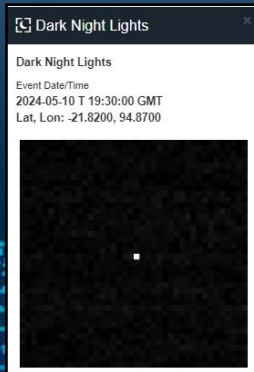
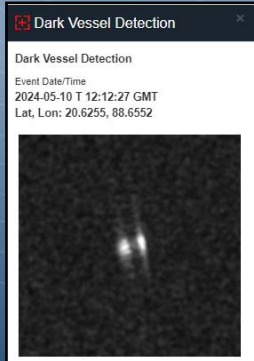
LinkedIn: [CRIMARIO II](#)

Facebook: [Crimario II - Project](#)

X: [CRIMARIO II](#)

YouTube: [EU CRIMARIO](#)

Email: info@ioris.org



MOVING FROM SITUATIONAL AWARENESS TO SITUATIONAL UNDERSTANDING AND ACTION



QUESTION?