



Inside AIS Spoofing **Patterns, risks, and real-time detection**

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GNSS Jamming vs GNSS Spoofing vs AIS spoofing

Oil tankers near Iran appear to be in rural Russia as signals jammed

'Spoofing' case might draw back curtain on high-speed trading firms

GPS Jamming, Spoofing and Hacking

GPS Jamming, Spoofing and Hacking – what, how and where.

Let's make clear the terminology first..

GNSS Jamming vs GNSS Spoofing vs AIS spoofing

GNSS Spoofing

- Broadcasts **fake GNSS signals in common frequencies**
- Counterfeit signals are just slightly **stronger than real ones**
- **Receiver calculates the wrong position, speed or time**

GNSS Jamming

- Floods the GNSS band with **very strong noise**
- **Real signals are blocked** → total loss of service
- Harder to execute than spoofing, but **easy to detect** because of the high power level

AIS Spoofing

- **The vessel itself** (not an external attacker)
- Transmits **false AIS identity, position or course** to hide real activity
- Affects only the spoofing vessel → **no area-wide interference**
- **Track may look believable** or obviously wrong, depending on attacker skill

**08 Jun
UKMTO**



**UKMTO
ADVISORY**

Hudaydah military activity: consider staying clear

**02 Jul
NAV WARN 026/25**

Baltic & Gulf of Finland:
GNSS/AIS/Radar/GP
S interference



**UKMTO
ATTACK**

Bulk carrier hit
51 nm SW
Advisory 008-25



**UKMTO
ATTACK**

Bulk carrier hit
51 nm SW
Hudaydah; fire
onboard



**02-08 Aug
LOCALISED EI**

Strong Electronic Interference in SoH & off Port Sudan; sporadic elsewhere



**UKMTO
ATTACK**

MAGIC SEAS & ETERNITY C attacked; later sank



**19-25 Jul
SUSPICIOUS ACTIVITY**

MERINOS LIVESTOCK detained; released

**06 Jul
UKMTO**

Bulk carrier
51 nm SW
Hudaydah; fire
onboard

**22 Jun
CMF/SMIC**

INTENSIFIED Red Sea interference spikes: use radar * visual fixes

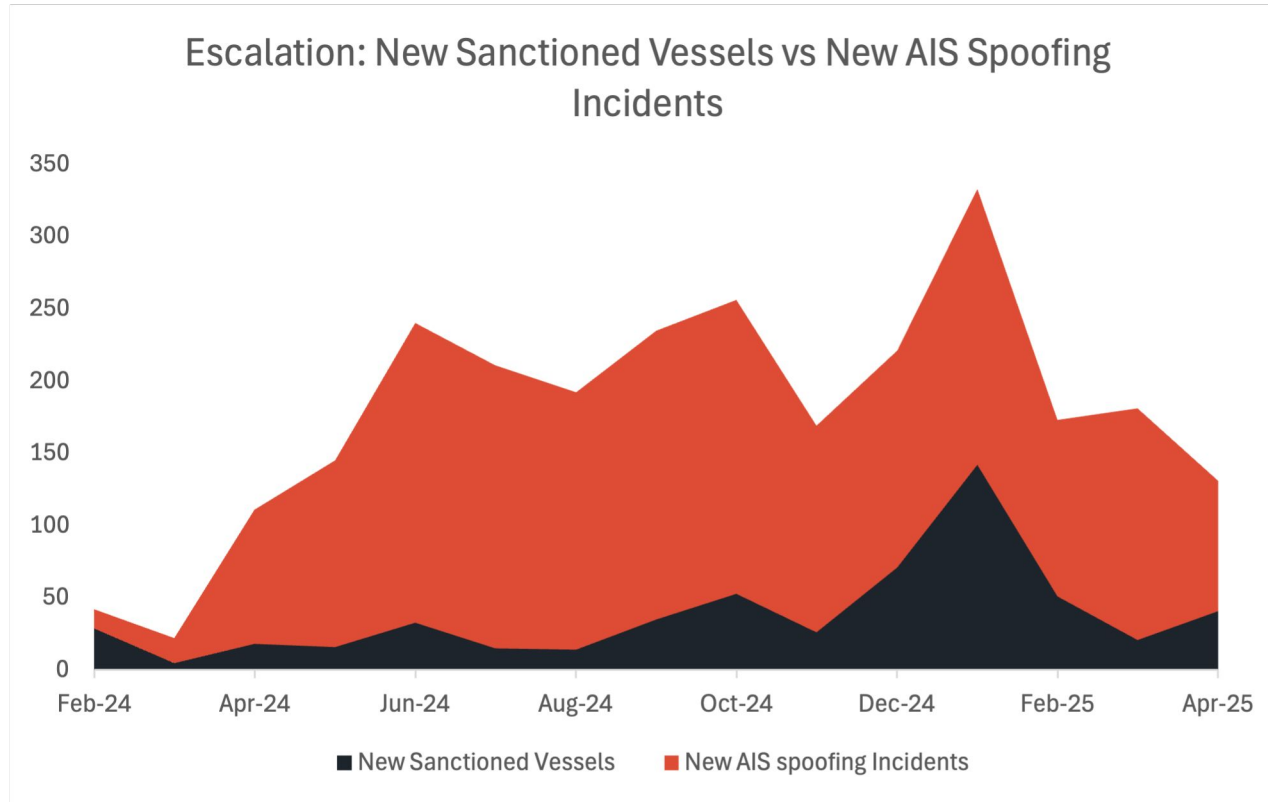
**16-22 Jun UKMTO
ADVISORY**

Extreme caution: AG/SoH/GOO

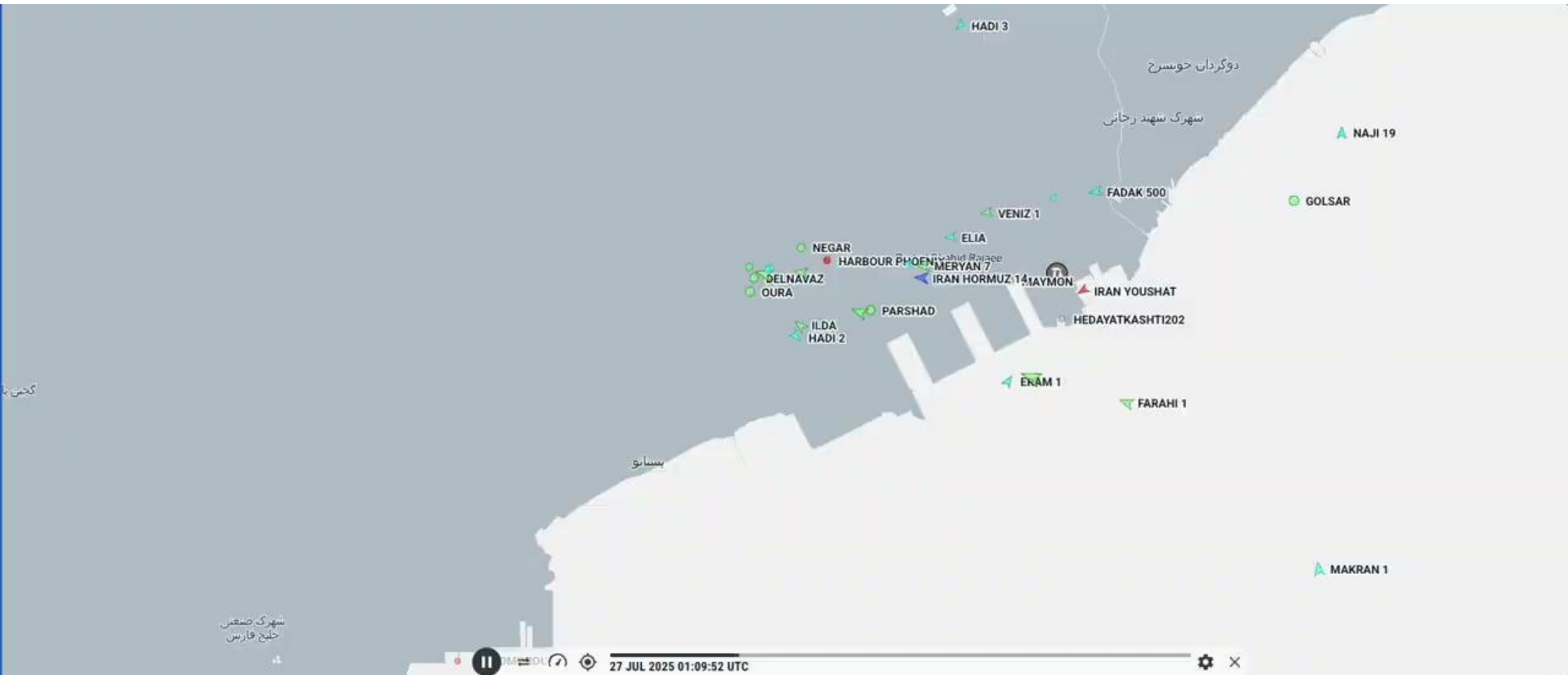
**16-22 Jun UKMTO
CMF/JMIC**

Jamming & interference surge

Why now?

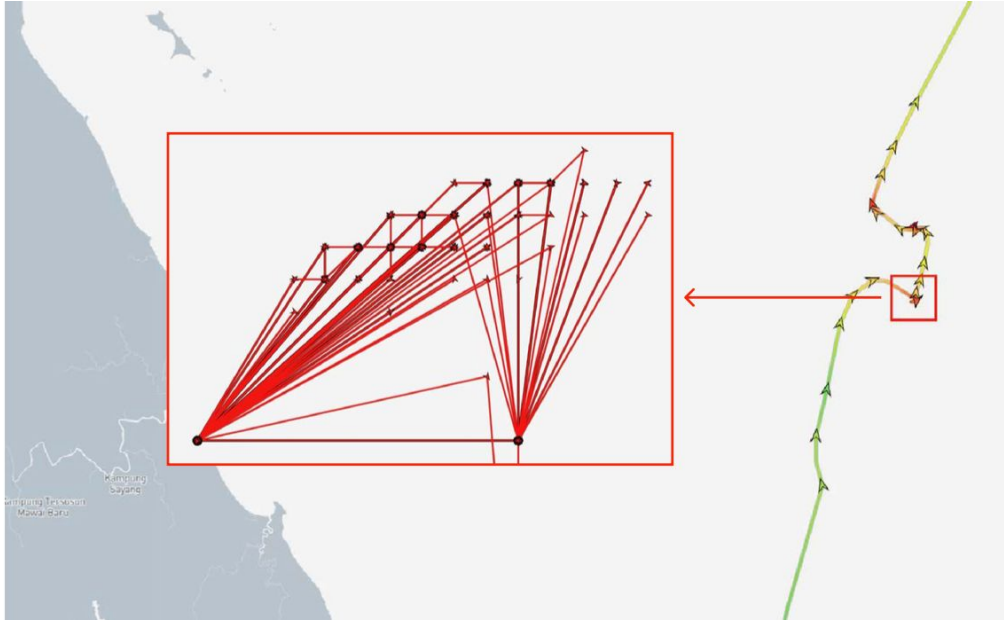


Anatomy of spoofing - GNSS spoofing



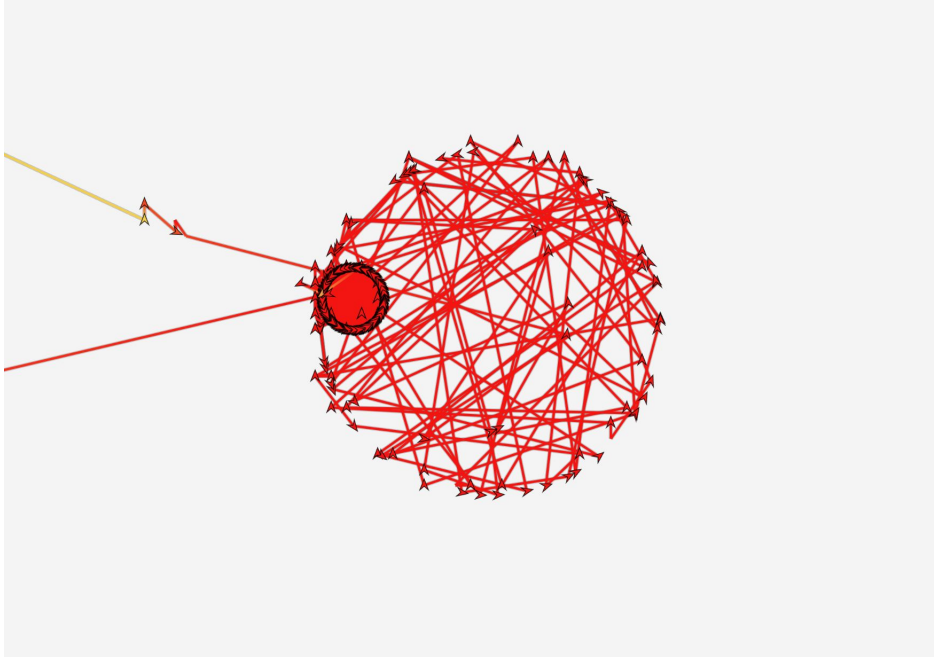
Anatomy of AIS spoofing

Trajectory shapes – dense symmetric stationary grids



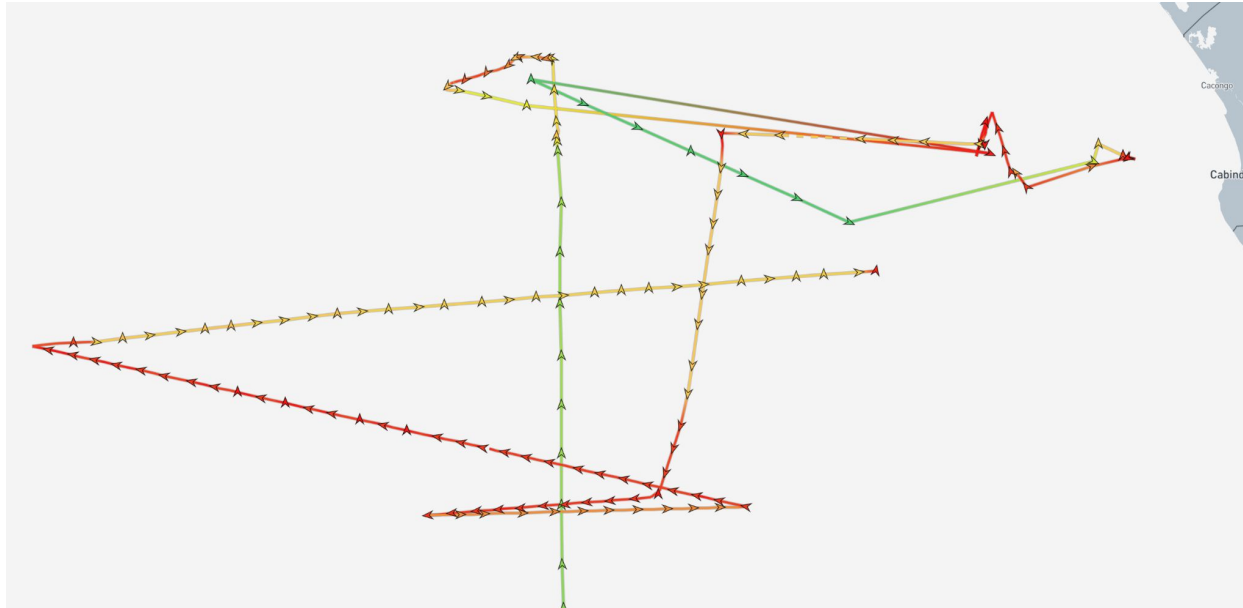
Anatomy of AIS spoofing

Trajectory shapes – dense symmetric circles



Anatomy of AIS spoofing

Trajectory shapes - erratic loitering



Anatomy of AIS spoofing

Trajectory shapes - leaks of true locations



Anatomy of AIS spoofing

Replays of traversed paths



Anatomy of AIS spoofing

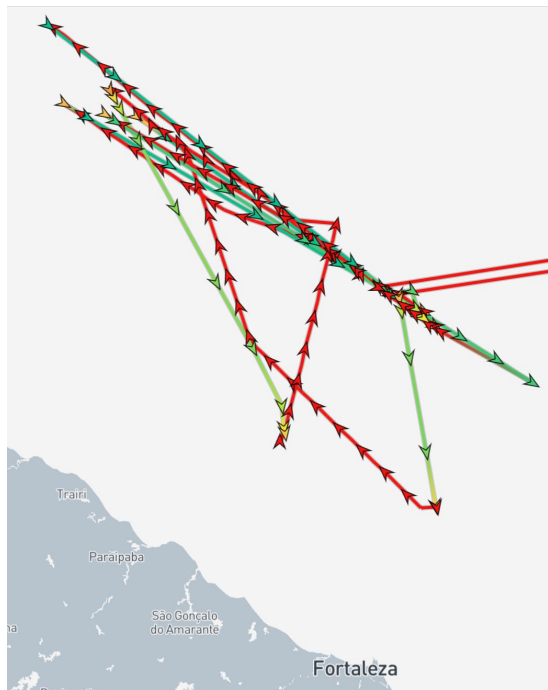
Detection methods:

- Kinematic analysis algorithms: detect non-viable vessel tracks **(AIS)**
- Ground station localisation algorithms: detect inconsistencies between AIS-reported tracks and expected range of terrestrial reception **(AIS + terrestrial station statistics)**
- Vessel identification in satellite imagery location inconsistent with AIS-reported location **(AIS + satellite imagery)**
- Human expertise

Anatomy of AIS spoofing

Detection methods:

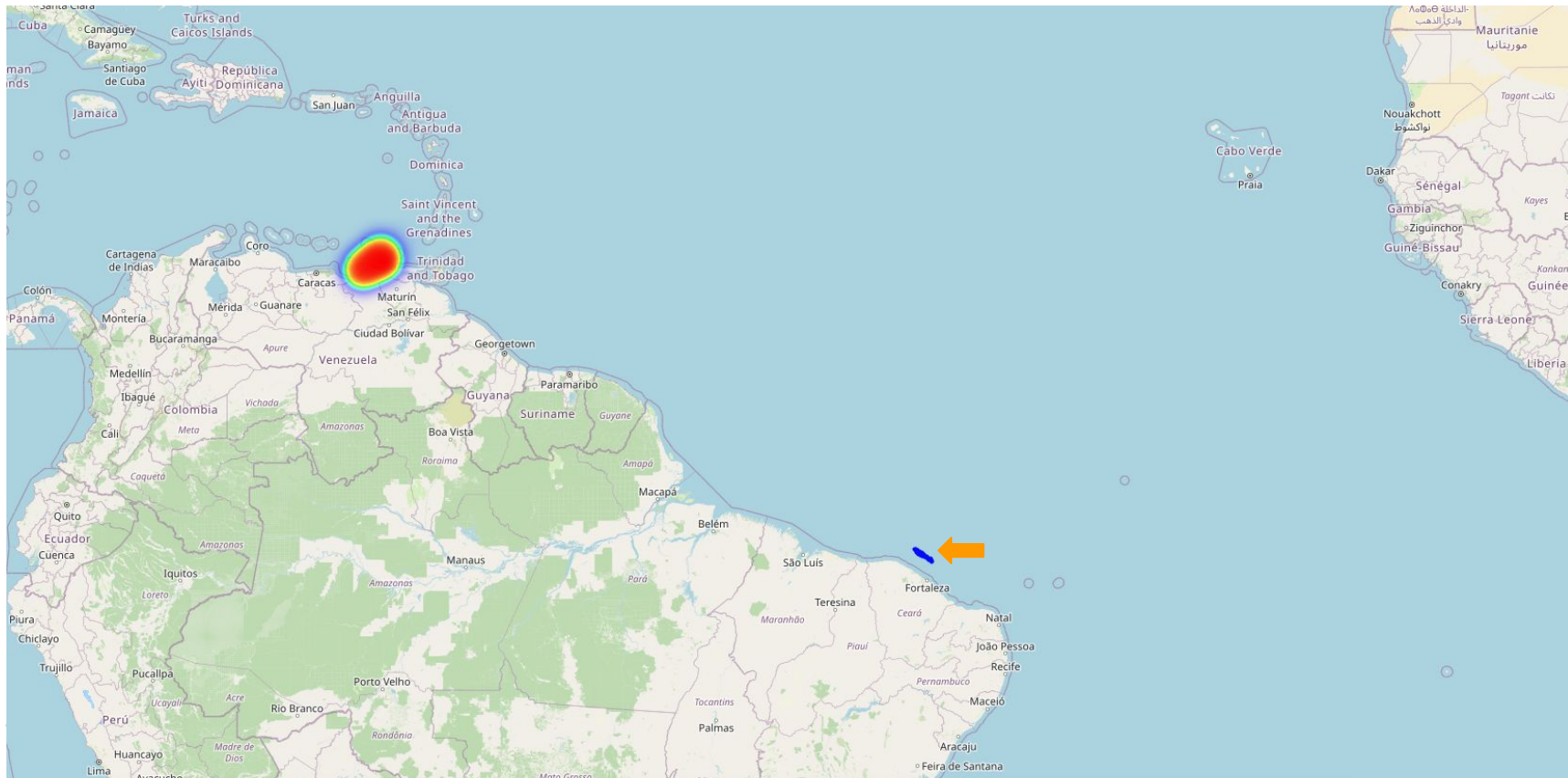
- Kinematic analysis algorithms: non-viable trajectories



Anatomy of AIS spoofing

Detection methods:

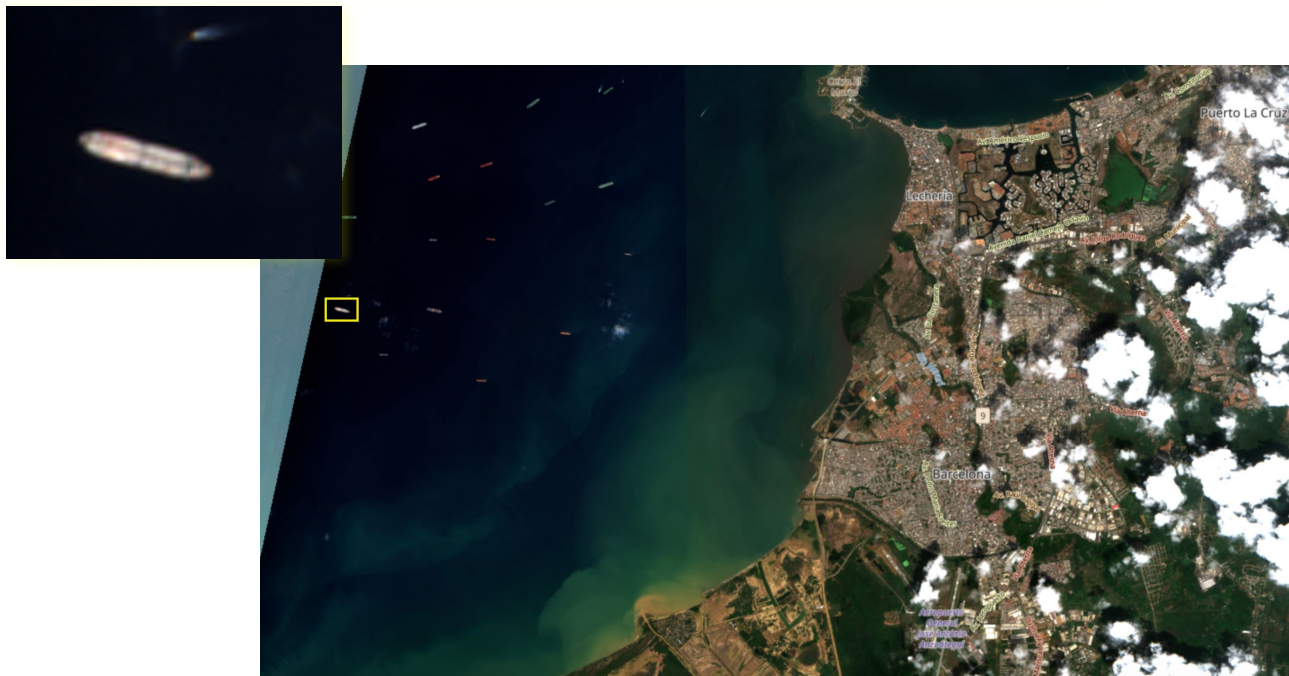
- Ground station localisation algorithms: out of range of terrestrial reception



Anatomy of AIS spoofing

Detection methods:

- Vessel identification in satellite imagery location inconsistent with AIS-reported location
- Analyst-validated



R&C Roadmap

for Q3/25-Q1/26

- **Operational Risks: Full Fleet Coverage** – Expanding from tankers and dry cargo vessels over 5k tonnes to the entire IMO-registered fleet in MarineTraffic.
- **Smarter Spoofing Detection** – Fusing multiple detection methods to deliver greater accuracy, especially for long-duration events.
- **Deeper Event Context** – Providing detection source details and visual evidence for spoofing incidents when available.



Thank you! Questions?

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