



Track 1: The Foundations of Trust

• Speaker: Arvid Van Essche

Trust, Sovereignty, and control in Maritime Digital Infrastructure

Navigating critical infrastructure, data residency, and operational resilience across global maritime trade routes.

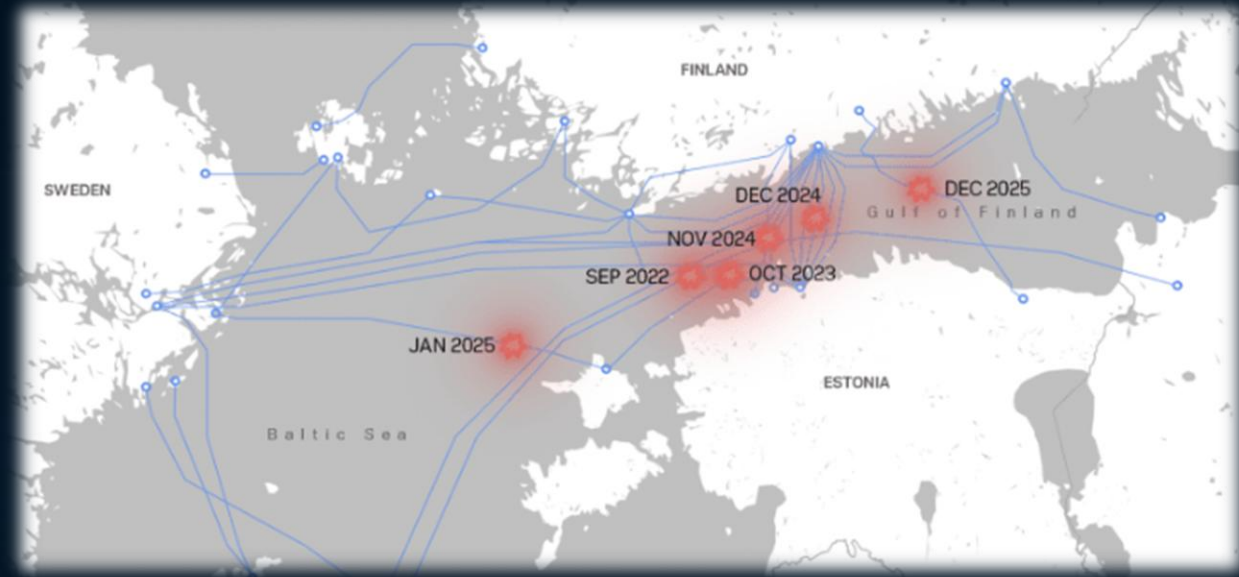
Sovereignty by data redundancy



31 DEC 2025

The Fitburg anchor-drag

Cargo ship *FitBurg* damaged seabed infrastructure in Estonia EEZ with a 10 km anchor drag.



01

Fault reported. Finnish telecom report fault on a line.

02

Intercept. Border guards notice intercept and notice anchor down.

03

10 KM drag. Drag marks have been observed on the sea bottom.

04

Helsinki Court. Court hearings have been started.

Controlling the Supply Chain



Supply chain updates

A large group of manned and unmanned vessels are open to compromise due to infected trusted update servers.



01

Compromise. Firmware was replaced on the 'trusted' update server

02

Automated deployment. Update rollout at next maintenance cycle.

03

Logic Bomb. Malicious software standby for activation

04

Loss of control. Full loss of control at port entrance.

Sovereignty by controlling GNSS



10 May 2025

Red Sea GPS Spoofing

Container ship MSC Antonia which ran aground in the Red Sea close to Jeddah Port, on May 10, likely did so due to GPS jamming.



01

GPS Spoofing. Fake GPS signals have disrupted the ships navigation system.

02

Course misdirection. Crew and automated systems make wrong course corrections

03

Stranded. MSC Antonia was stranded for several days

04

Recovery. Recovered by significant effort of tugboats

Sovereignty by data integrity



DEC 2025

Direct USB attack

A crew member, acting on external instructions, inserted a malware-laden USB drive directly into a bridge workstation.



01

Device inserted. A tool investigators call highly technical is connected to the ship's system.

02

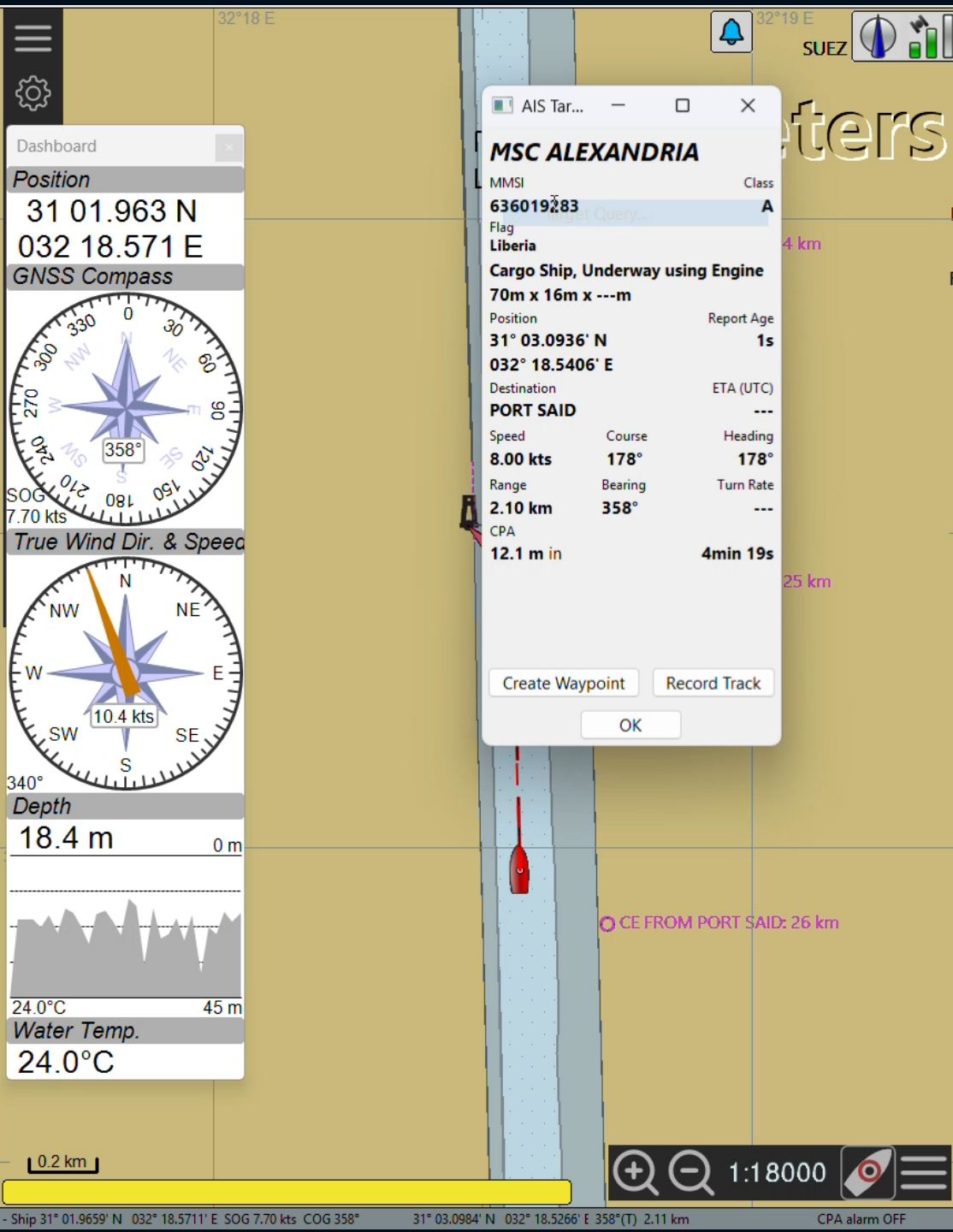
Italy warns France. The Vessel's computers are flagged as possibly compromised

03

Arrest at Sète. Two suspects detained, the device seized for examination

04

Paris takes over. A counter-intelligence investigation is opened



NMEA SPOOFER -- UNIFIED CONTROL
SPOOF/MITM IDLE SCENARIO 0 HEADR OFF

PHASES

1. Transient Distant Ship

2. Triangular Popping

3. V-Formation

4. Figure-8 Maneuver

5. Rapid Orbit

6. CPA Threat

7. Encirclement

8. Chaos (Integration)

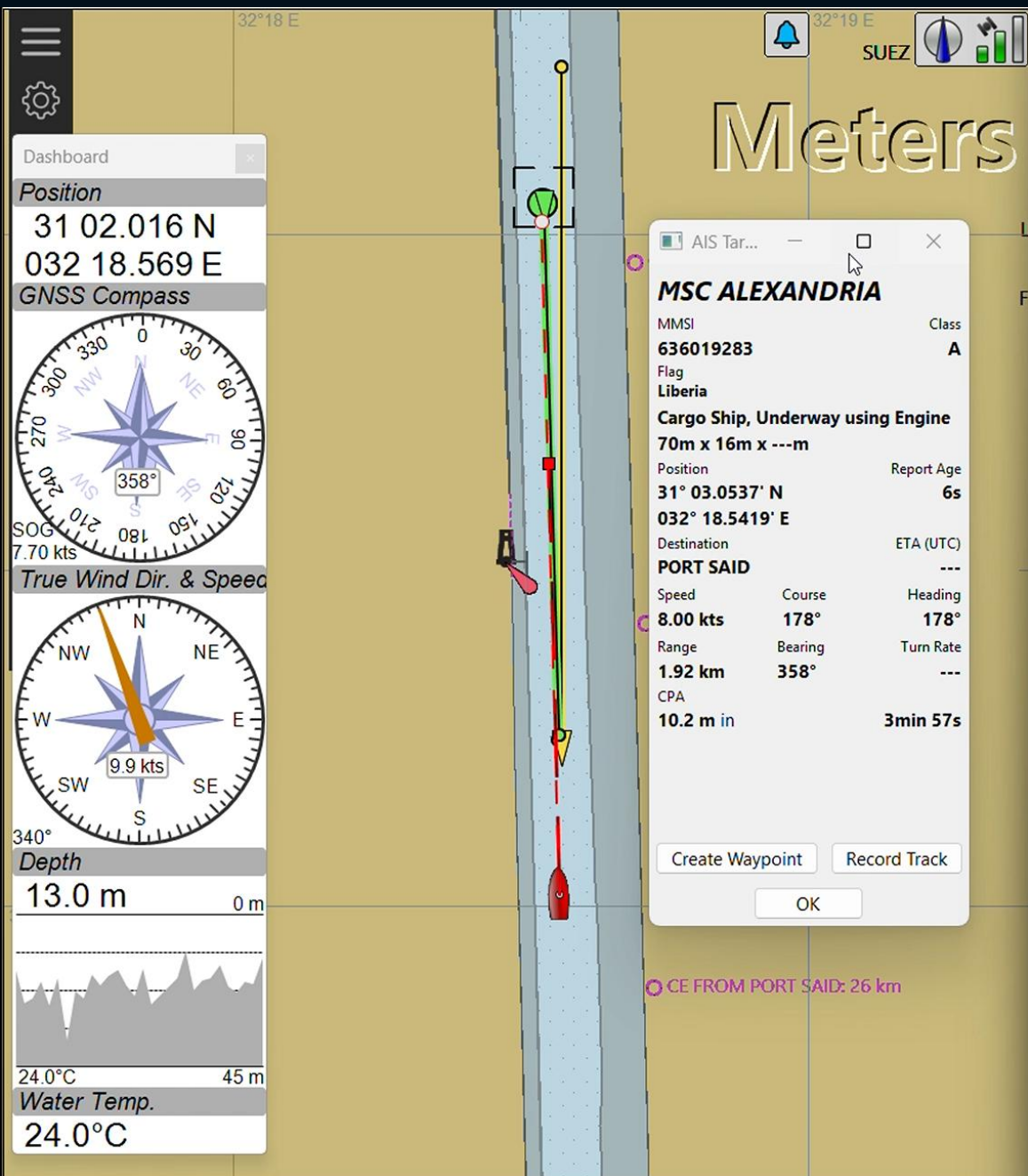
9. Approaching Threat

0. Experimental Synthetic DCU Frames

i. Intercept Approach

+xxxxxxxx+ @#####=
xxxxxxxxx @#####
:xxxxxxxxx #####
.xxxxxxxxx: ####=@
xxxxxxxxx: =@
xxxxxxxxx
+xxxxxxxxx
;xxxxxxxxx
xxxxxxxxx
xxxxxx;
xxxx;
;X
NAVAL GROUP

[1-9] PHASE 0 EXP z SUSPEND b SPOOF-ON n SPOOF-OFF h HEADER c CLEAR q



NMEA SPOOFER -- UNIFIED CONTROL
SPOOF/MITM ENGAGED SCENARIO11 HEADR OFF

PHASES

1. Transient Distant Ship
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9. Approaching Threat
0. Experimental Synthetic DCU Frames
- * i. Intercept Approach

```
+xxxxxxxxx+ @#####=  
xxxxxxxxxx @#####  
:xxxxxxxxx #####  
.xxxxxxxxx: ####=@  
xxxxxxxxxx: =@  
xxxxxxxxxx  
+xxxxxxxxxx  
;xxxxxxxxxx  
xxxxxxxxxx  
xxxxxx;  
xxxx;  
;X  
NAVAL GROUP
```

[USER ACTION] SPOOF/MITM engaged at 15:59:27

2026-09-17 15:59:27,469 INFO controller: Received SPOOF_START

2026-09-17 15:59:27,486 INFO net_spoof: Obtained MAC address: 98:fe:54:37:da:6e

2026-09-17 15:59:27,827 INFO net_spoof: ===== [SPOOF] TCP connection reset at WS1

2026-09-17 15:59:27,859 INFO net_spoof: ===== [SPOOF] TCP connection reset at DCU

2026-09-17 15:59:27,859 INFO net_spoof: ===== [SPOOF] both connections reset: awa

2026-09-17 15:59:32,830 INFO forwarder: Intercepted: ('10.8.1.101', 60686) -> ('10.

2026-09-17 15:59:32,831 INFO forwarder: ===== [MITM] intercepted connection ('10.8.

[USER ACTION] Scenario 'Phase 11: Intercept Approach' initiated at 15:59:41

2026-09-17 15:59:41,624 INFO controller: Received EMIT_PHASE 11

2026-09-17 15:59:41,625 INFO controller: Starting Phase 11: Intercept Approach ...

Global Trade & Regional Reliance

80%

Global Trade Transported by Sea

Disruptions immediately endanger food, energy, and medical supplies.



Belgium's 65 km coastline powers a disproportionate share of national GDP and regional logistics.



Digital blackouts halt container routing, stalling emergency goods flow across borders.

3 Focus domains



Data Domain



Data Residency



Encryption



Identity



Infrastructure Domain



Local Compute



Resilient networks



Supply chain



Operational Domain



Jurisdictional &
Governance
Shielding



European Incident
Response plan



Maritime Cyber
Skill

Look at the bright side



Increase of dedicated
(Maritime) Cyber Courses



Collaboration within the
industry



Long term supply chain
partnerships



11:35

Sovereignty by Design – How Architectural Choices Determine Who Is In Control



12:25

The Transition to Digital Sovereignty – From Trust to Capability

A stylized night landscape illustration. The sky is dark blue with a large, bright white full moon in the upper right. Faint white lines represent stars or distant galaxies. In the middle ground, several wind turbines are visible on the horizon. A dark silhouette of a ship is on the water, highlighted by a large, faint white circle. The water is represented by horizontal wavy lines. In the foreground, there are small white dots and a simple line drawing of a fish.

THANK YOU

Questions & Discussions