150 YEARS
IUMI
BERLIN
2024
15.-18. SEPTEMBER

A new space-based Radio Frequency (RF) detection technology for maritime surveillance

Damien Pigasse

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#IUMI2024

The problem

Unknown vessels locations and missing routes

Fragmented base of **surveillance solutions**

Compromisable onboard cooperative systems

… and its stakes

+50% AIS spoofing from 2022 to 2023 [1]

10% of global tanker fleet are part of the **ghost fleet** [1]

11k annual claims for insurers on maritime domain with **>$1,2B annual costs associated** [2]

that's where RF data comes in

- Get an exhaustive view of the actual maritime traffic
- Better qualify illegal activities and liability associated
- Comply to regulations imposed

Sources: [1]Lloyds list Intelligence, IUMI[2]

What is space-based Radio Frequency data (RF)?

Every vessel at sea emits
many electronic navigation & communication
emitting **electromagnetic signals** (RF data).

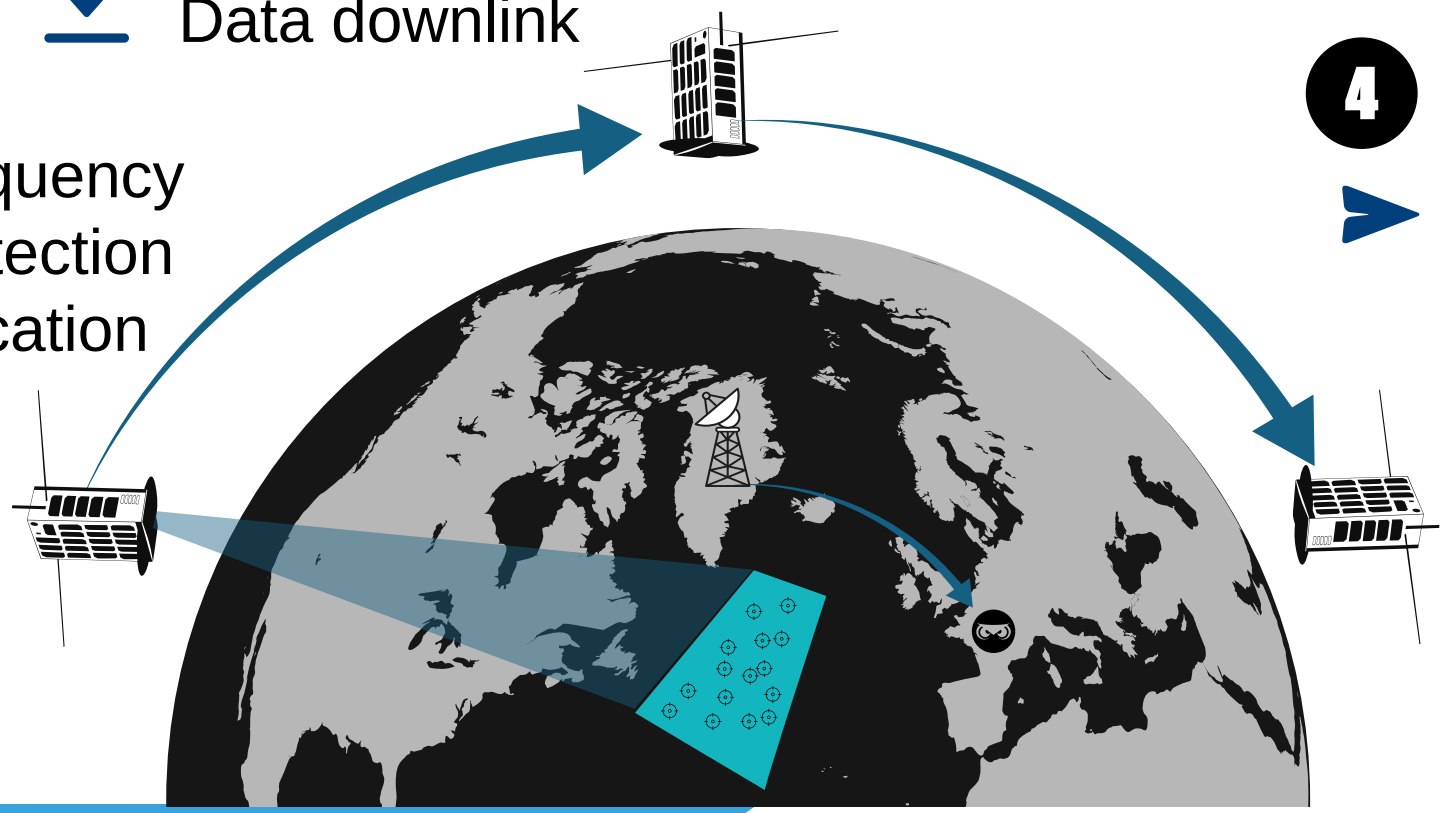
Data is collected by a satellite
intercepting those signals
to **detect and geolocate** all these emitters.

RF data **is not imagery**, it is

- a geolocation,
- a timestamp &
- technical parameters about the signals

How it works?

1. Radio Frequency signals detection and geolocation
2. Data downlink
3. Data processing
4. Data delivery



RF Data in Action

Where

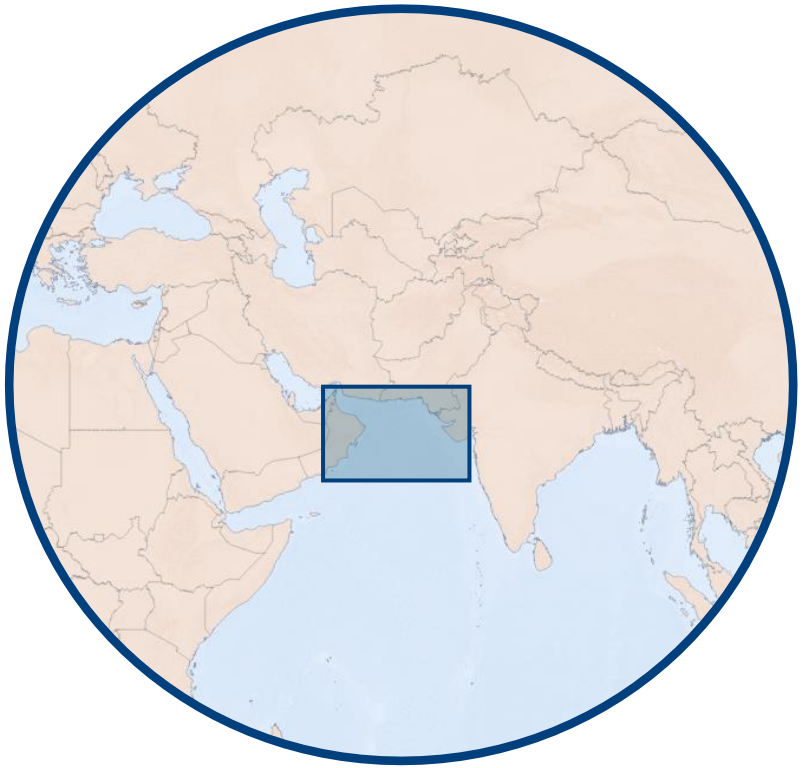
Arabian Sea

Context

Very dense area with high proportion of uncooperative vessels

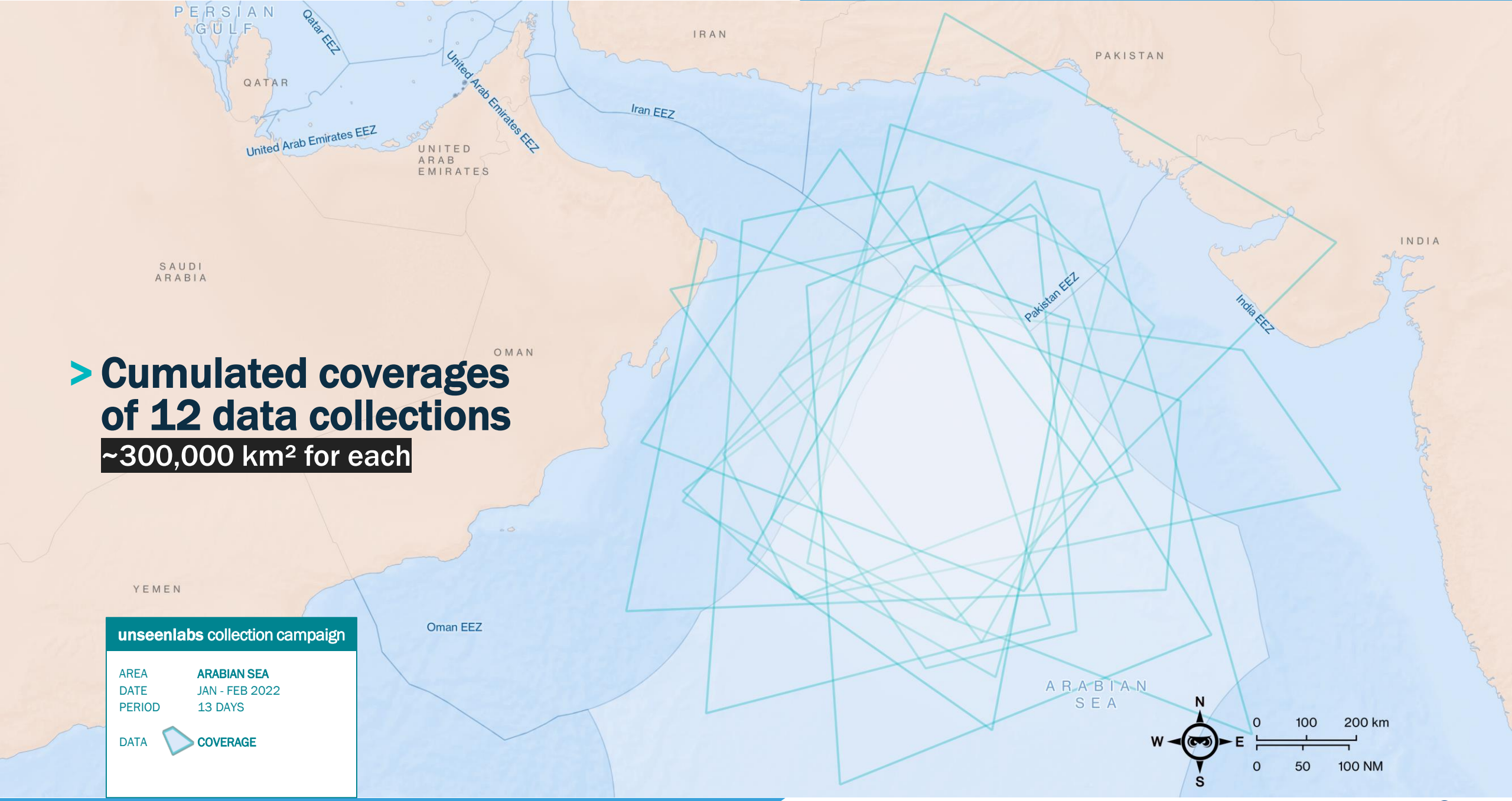
Objectives

Identify and track a dark ship



> Cumulated coverages of 12 data collections

~300,000 km² for each

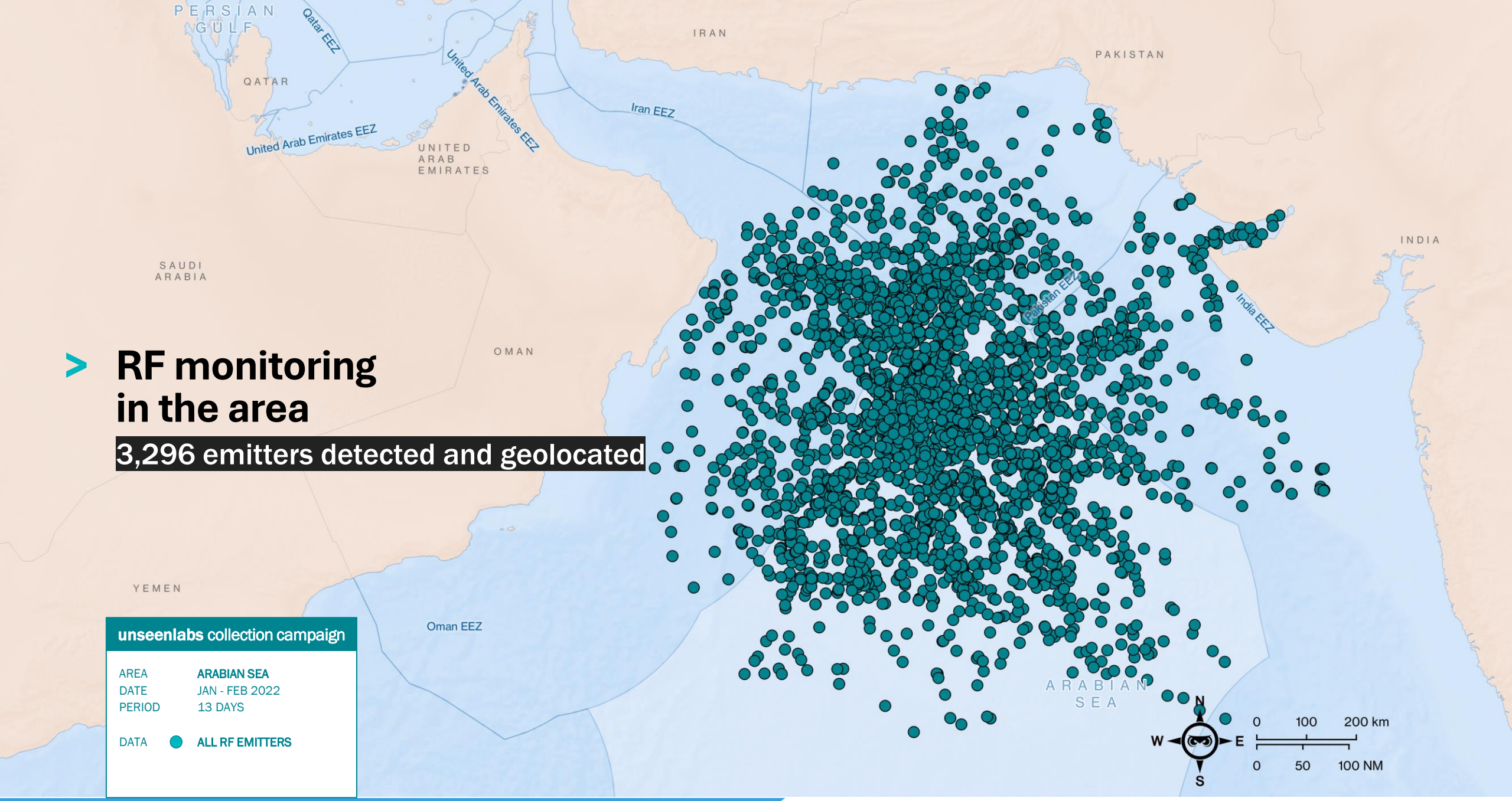


unseenlabs collection campaign

AREA	ARABIAN SEA
DATE	JAN - FEB 2022
PERIOD	13 DAYS
DATA	COVERAGE

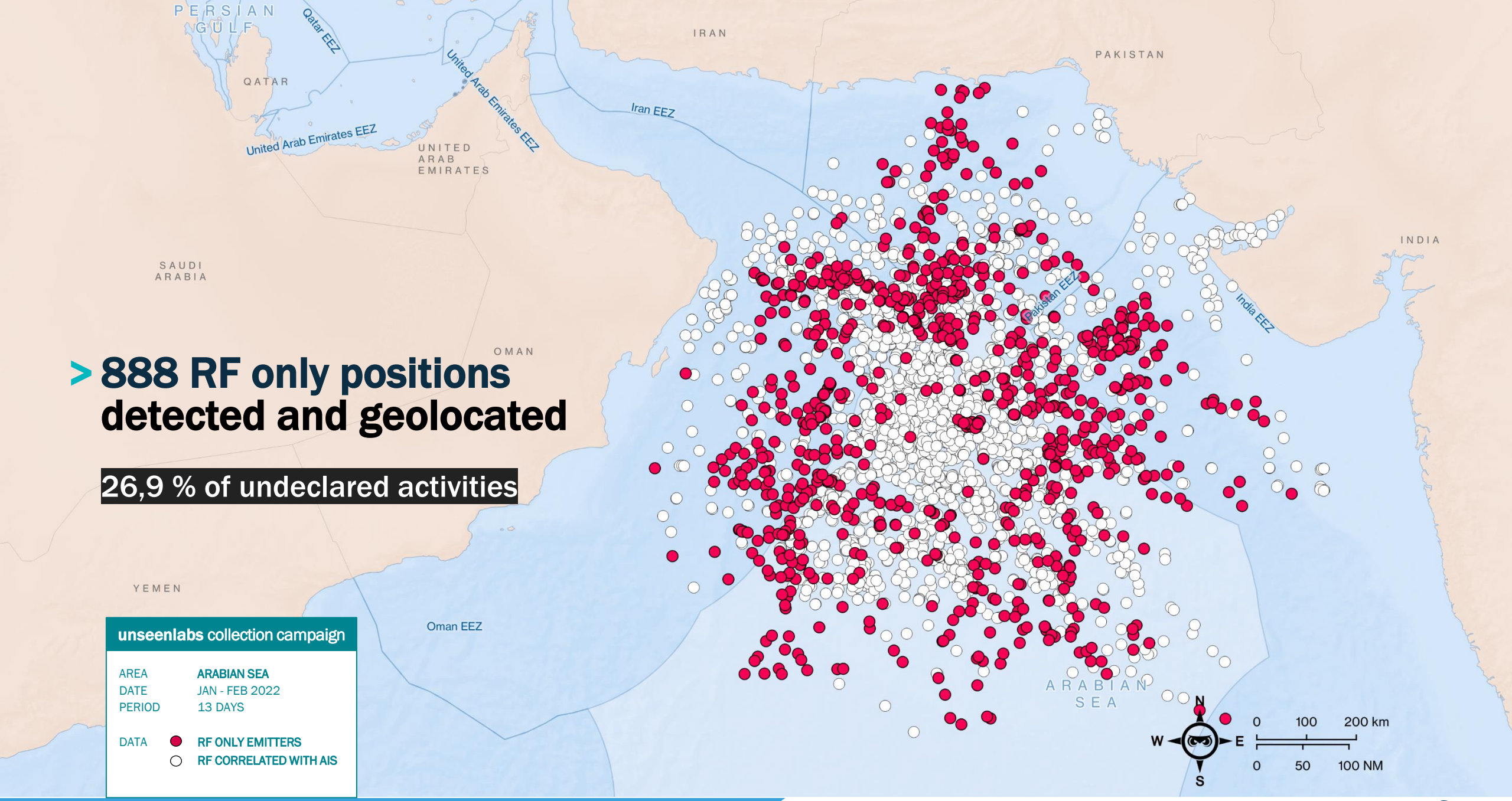
RF monitoring in the area

3,296 emitters detected and geolocated



unseenlabs collection campaign

AREA	ARABIAN SEA
DATE	JAN - FEB 2022
PERIOD	13 DAYS
DATA	ALL RF EMITTERS



> 888 RF only positions detected and geolocated

26,9 % of undeclared activities

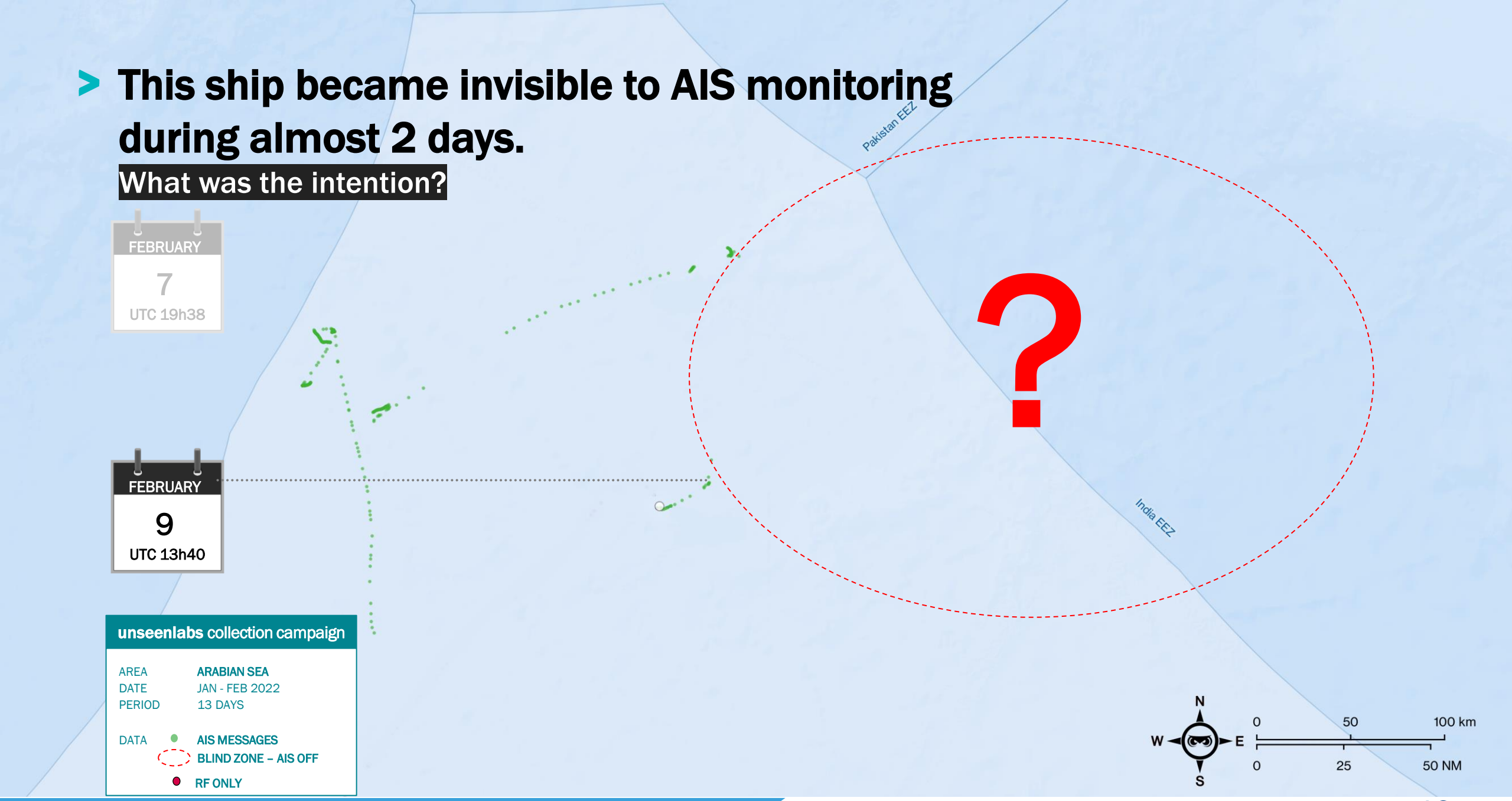
unseenlabs collection campaign

AREA	ARABIAN SEA
DATE	JAN - FEB 2022
PERIOD	13 DAYS
DATA	RF ONLY EMITTERS
	RF CORRELATED WITH AIS

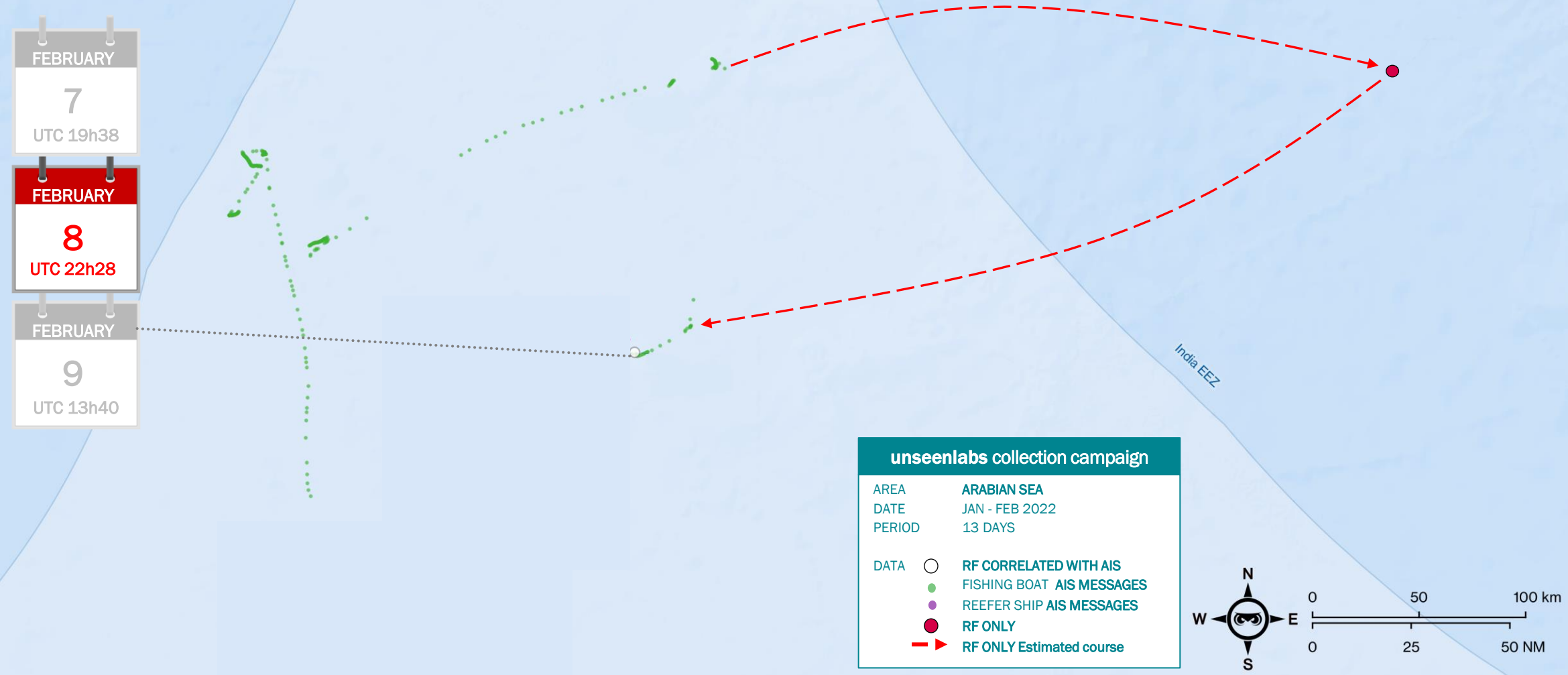
> **One vessel** (65 meters long, 11 meters width) **identified in the territorial waters switched off its AIS getting closer to the Indian EEZ**

This ship became invisible to AIS monitoring during almost 2 days.

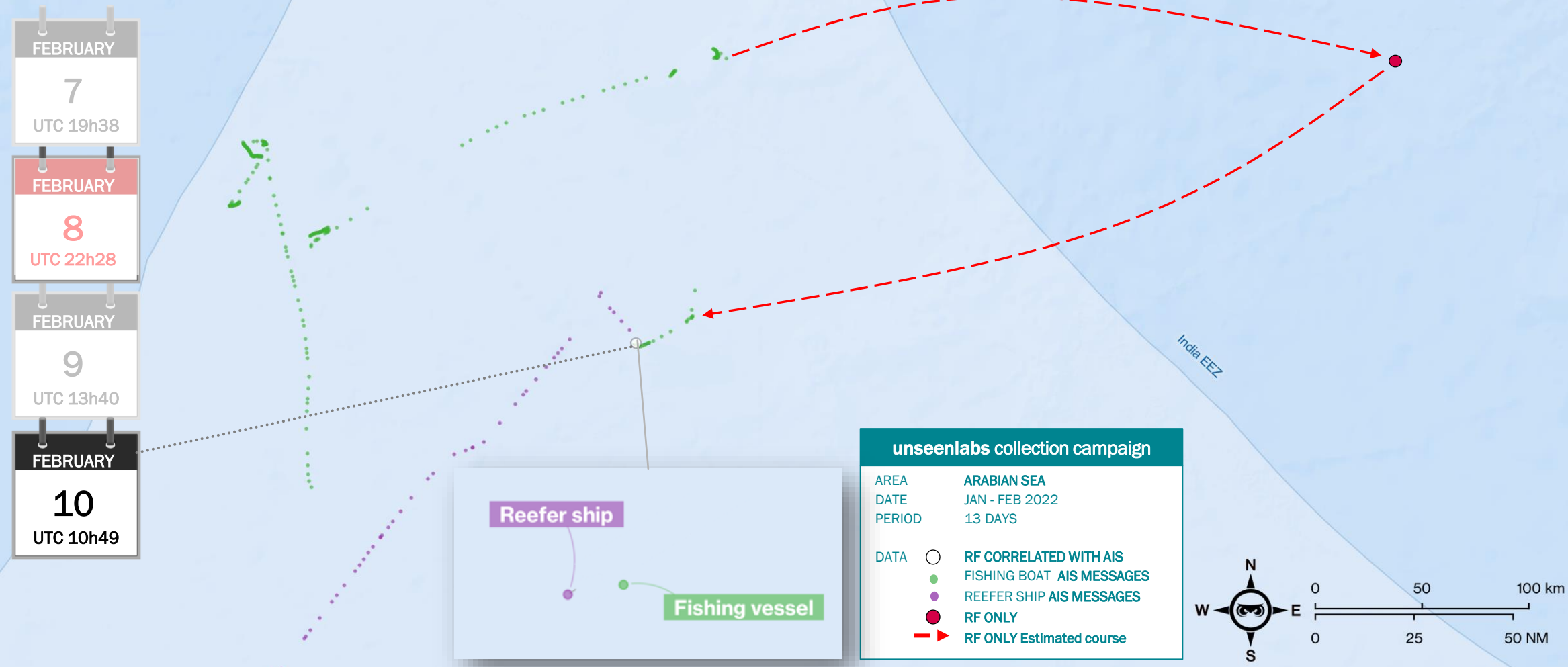
What was the intention?



We filled the gap as the same RF signal has been geolocated in the Indian EEZ



Meeting a Reefer (117 meters long, 19 meters width) from the same fleet outside the EEZ on day 4



How RF data helps for your reputation?

MONITOR

compliance of underwritten assets
to mitigate sanction and reputational risks

IDENTIFY

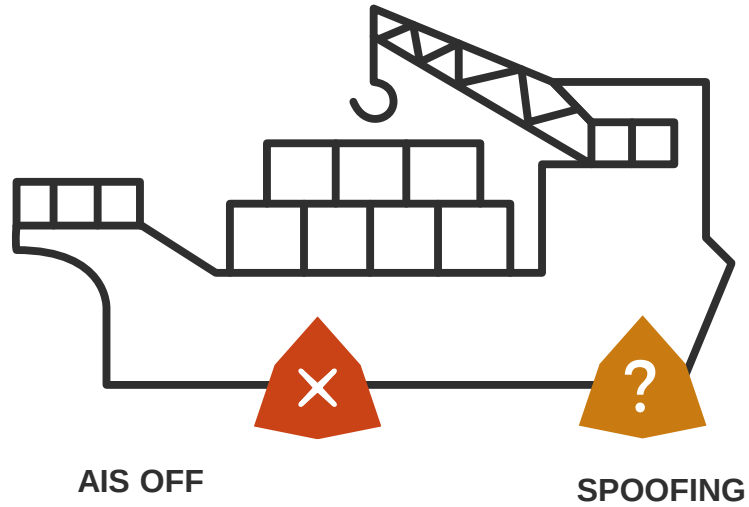
deceptive shipping practices
carried out by darks vessels, including AIS manipulation

INVESTIGATE

based **on historical data**
for due diligence and **forensics** purposes

Space-based RF data in a nutshell

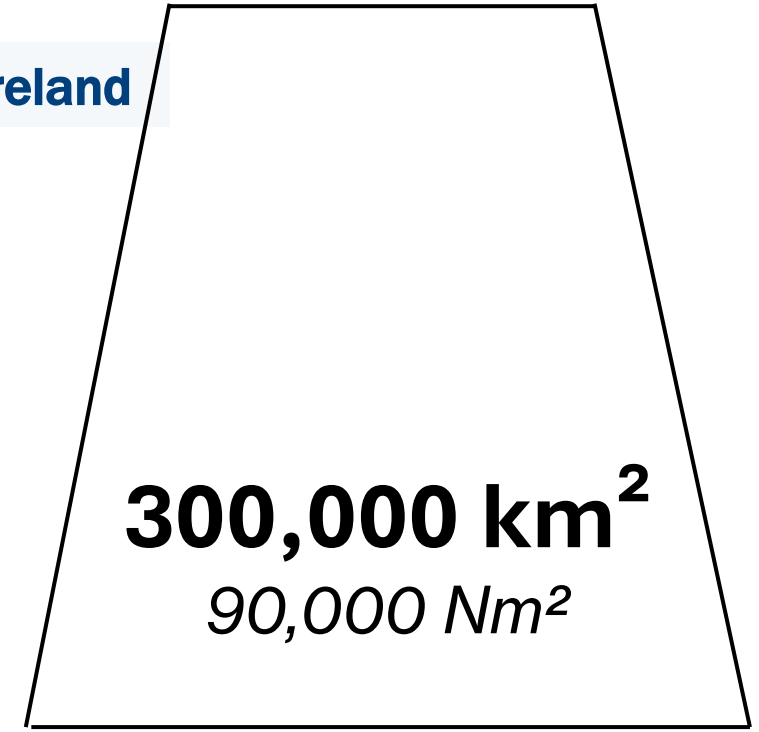
1. RF detection technology **can detect vessels where others cannot**



Space-based RF data in a nutshell

1 RF detection technology **can detect vessels where others cannot**

2 Data collection over vast areas **covering more than 4 times the size of Ireland**



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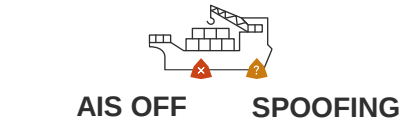
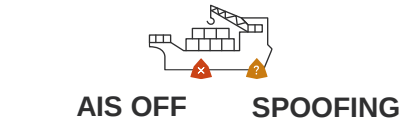


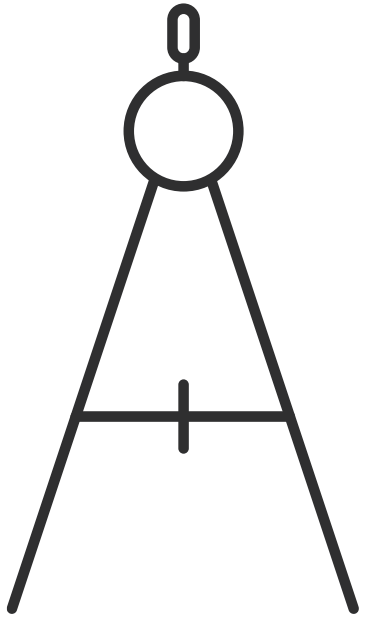
2 Data collection over vast areas **covering more than 4 times the size of Ireland**

3 **Unique RF fingerprinting** assignment enabling vessel tracking

Space-based RF data in a nutshell

1. RF detection technology **can detect vessels where others cannot**
2. Data collection over vast areas **covering more than 4 times the size of Ireland**
3. **Unique RF fingerprinting** assignment enabling vessel tracking
4. **Sub-kilometer accuracy** enabling precise geolocation





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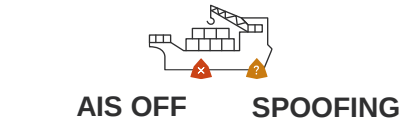

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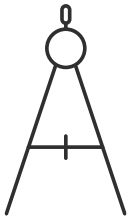

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Any question ?

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