



## Using AIS to identify and investigate ferry accidents

**David Hewson**

Antenna Network Manager

Genscape Vesseltracker



# Background

- Vesseltracker is the **world's leading professional AIS service**. We work with clients and partners throughout the maritime sector, as well as the broader market of logistics, energy and commodities trading.
- AIS is a powerful and cost-effective tool for the ferry industry to improve **safety**, operational **efficiency** and the **customer experience**.
- I will assume you are somewhat familiar with AIS. For more background information, see the webinar I did with Dr. Weisbrod in November 2017:

[AIS: Increasing Ferry Safety with the Big Data Tool You Already Have on Board](#)

## Ship-to-ship collision avoidance system

- Developed to avoid collisions between large vessels at sea, outside the range of shore-based systems
- VHF signal (approx. 160-162 MHz)
- Frequent position updates
  - Moving vessels - several times per minute
  - Stopped vessels – once every several minutes
- IMO mandate took full effect 31 December 2004



# AIS 101 cont'd

## Static Data

- Name
- IMO number\*
- MMSI number\*
- Call Sign\*
- Length
- Width

## Voyage Data

- Draft
- Destination
- ETA

## Position Data

- Longitude
- Latitude
- Speed
- Heading
- Course
- Navigational Status

\*all different vessel identification numbers.

An **IMO number** is unique to a vessel throughout its lifespan and does not change if a vessel is renamed or reflagged, whereas **MMSI numbers** (Maritime Mobile Service Identity) are granted by flag states and may therefore change if a vessel is reflagged. Vessels use their **Call Sign** primarily to identify themselves in VHF communications with other vessels and coastal authorities.

# Antenna stations receive AIS signals in real-time



- VHF range – line-of-sight +10% (usually 30+ nm)

## Vesseltracker antenna partnership model

- Find **reliable partners** who are interested in tracking vessels in their area.
- Provide all AIS antenna equipment **free of charge**, including shipping.
- Partner installs antenna and connects it to the Internet.
- Partner receives free access to a Vesseltracker Coastal Account (value: \$1200 USD/year) for as long as their antenna remains online!

# Which vessels use AIS?

1. Required by IMO mandate to use AIS:

- All passenger vessels with 12+ fare-paying customers (eg. NYC ferries)
- All cargo vessels >500 GRT, or >300 GRT and on international voyage

**Individual countries must enforce.**

## Others

2. Required by local regulations to use AIS
3. Voluntary users eg. pleasure crafts that don't want to get run over!

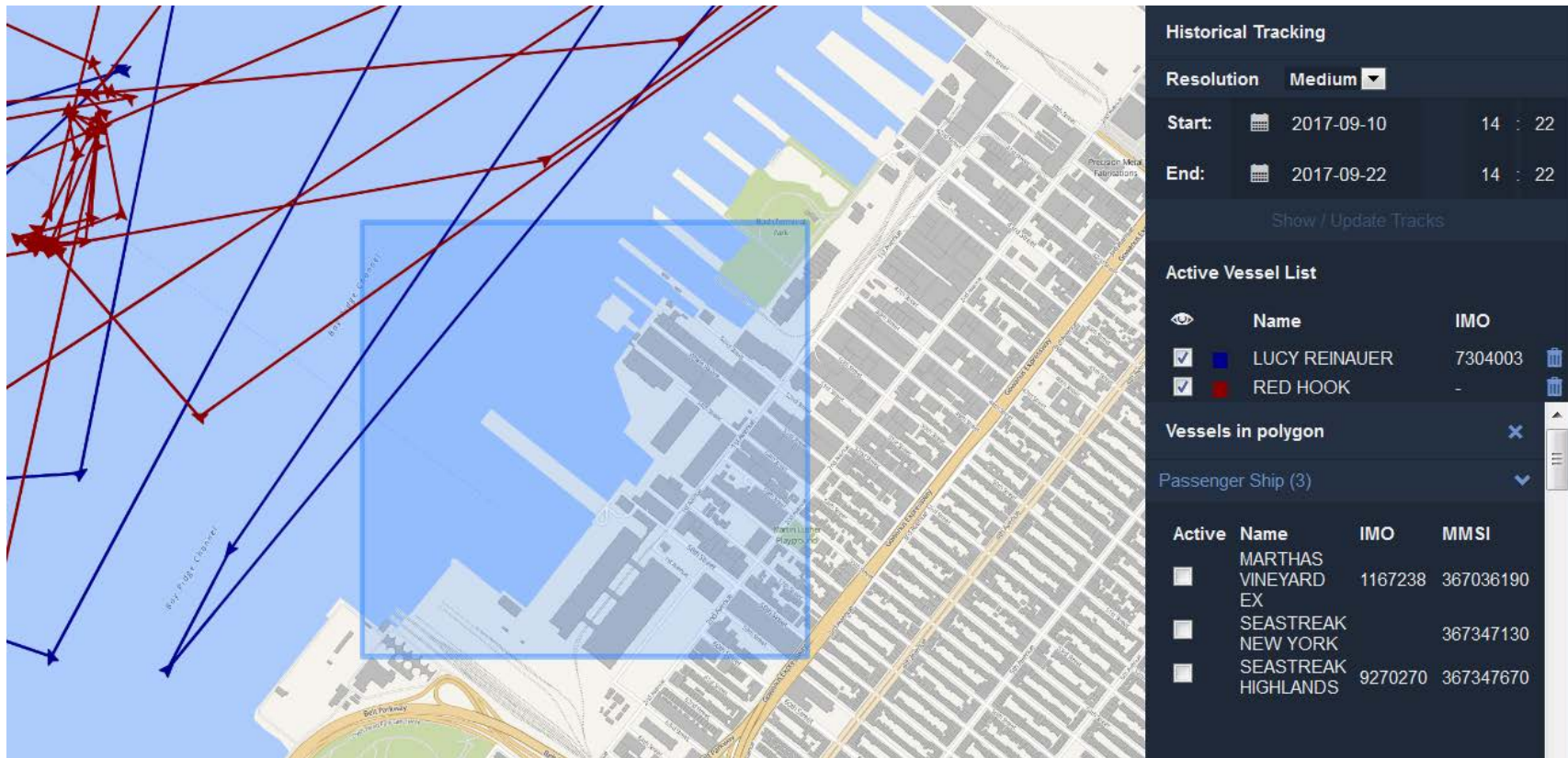


# Accident investigation project with WFSA

- AIS is an excellent tool for investigating maritime incidents, similar to the flight recorder (or “black box”) used in airplane crashes on airplanes
- AIS is mandated by the IMO for all passenger vessels – **but enforcement of this mandate is left to individual countries!** A quick look on Vesseltracker showed that some countries that were known to have many ferries (eg. Bangladesh) had very little AIS data from these vessels.
- Goal: cross-check WFSA ferry accident database for Vesseltracker AIS data.
  1. If yes → investigate what happened.
  2. If no → take note. Accidents without an AIS track provide compelling evidence for the need for AIS.

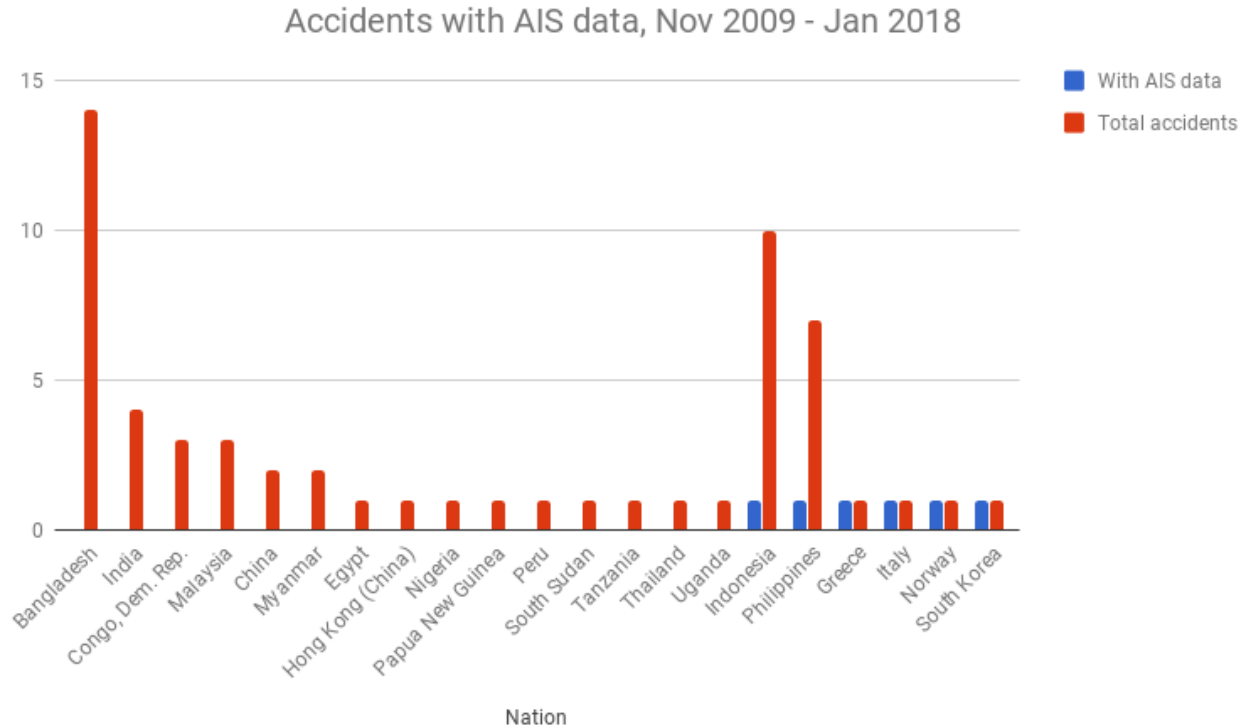


# Methodology - searching for historical data within a geofence





# Results – by country



# Only MV St. Thomas Aquinas had enough AIS data for animation



## Next steps – WFSA Paper

Working Title: “Expanding the Adoption and Use of AIS on Ferries”

Goal is to communicate research and address possible issues blocking AIS adoption:

1. AIS antenna coverage (but Vesseltracker will provide free equipment!)
2. AIS transponder cost: most are at least \$500 USD, but there are open-source plans to bring the cost down
3. Bureaucratic hurdles eg. issuing MMSI numbers to all vessels who need them
4. Training coast guard and vessel traffic control services to make the most of the AIS data available to them

## Next steps – Big Data solutions

Goal is to harness Vesseltracker's 3000+ AIS messages/second to **find events** that could be ferry accidents.

Example criteria:

Large difference between course over ground and rate of turn + Low speed

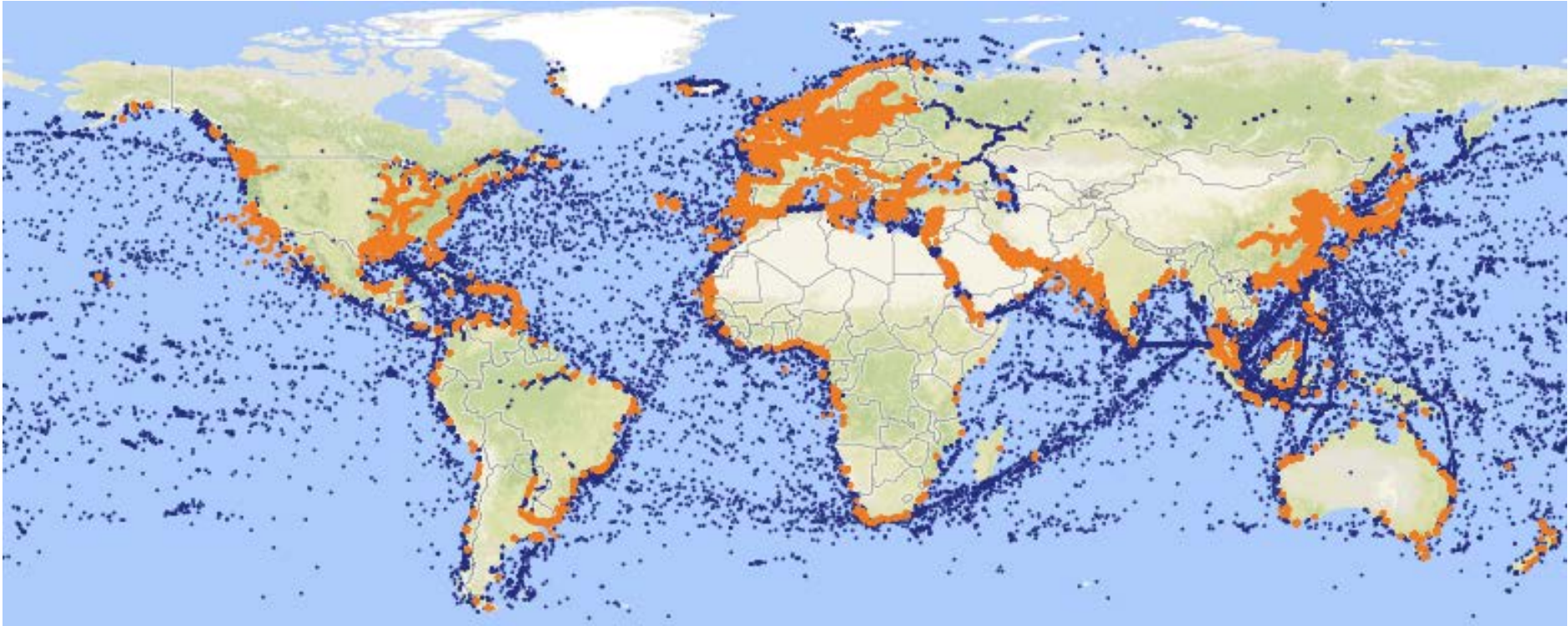
= **Possible collision**

Large difference between course over ground and rate of turn + high speed

= **Vessel possibly unmanned or out of control / drifting**



# Join the Maritime Revolution!



**GENSCAPE™**



# Questions?



# GENSCAPE™



## Thank you!

David Hewson

Antenna Network Manager

Email: [hewson@vesseltracker.com](mailto:hewson@vesseltracker.com)

Tel: +49 40 97 07 86 - 17