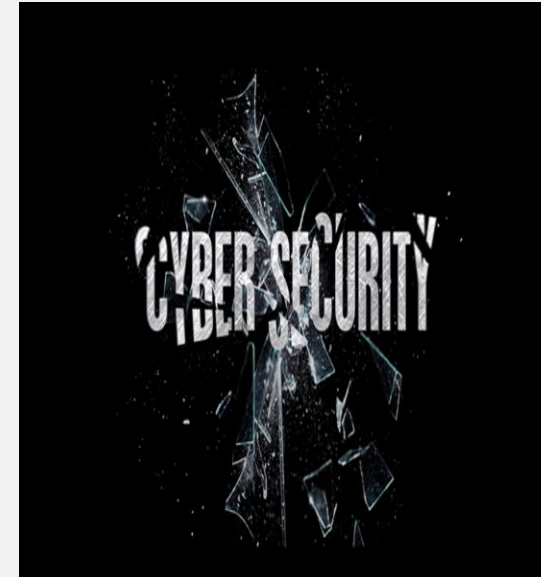
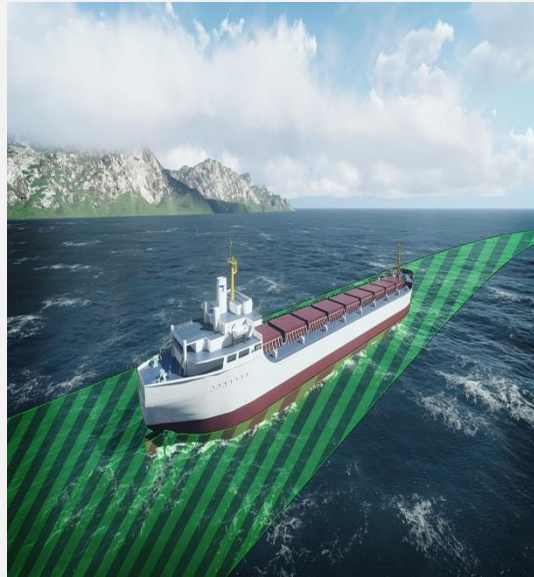
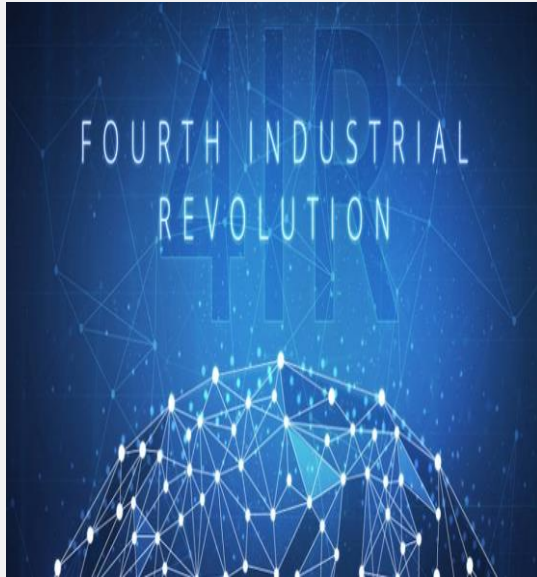
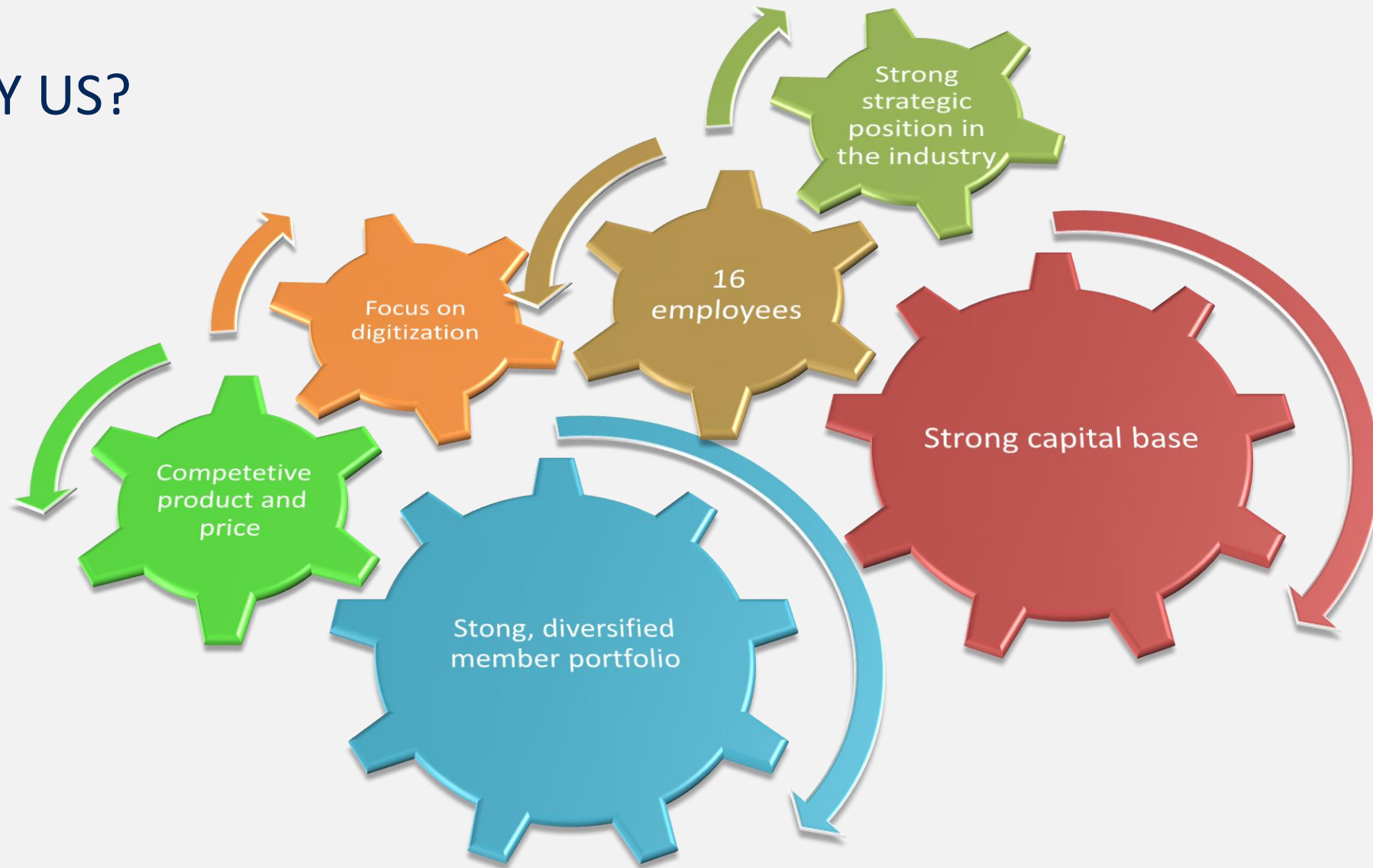


IOT, AUTOMATION & DIGITALISATION IN INSURANCE



DNK TODAY – WHY US?

- Largest marine war risk insurance facility world wide, ca.
 - 3400 vessels
 - USD 217 Billion insured value
 - 16 employees
- Insures interests attached to vessels, drilling rigs and similar movable units against war risks
- Nature of war risks product



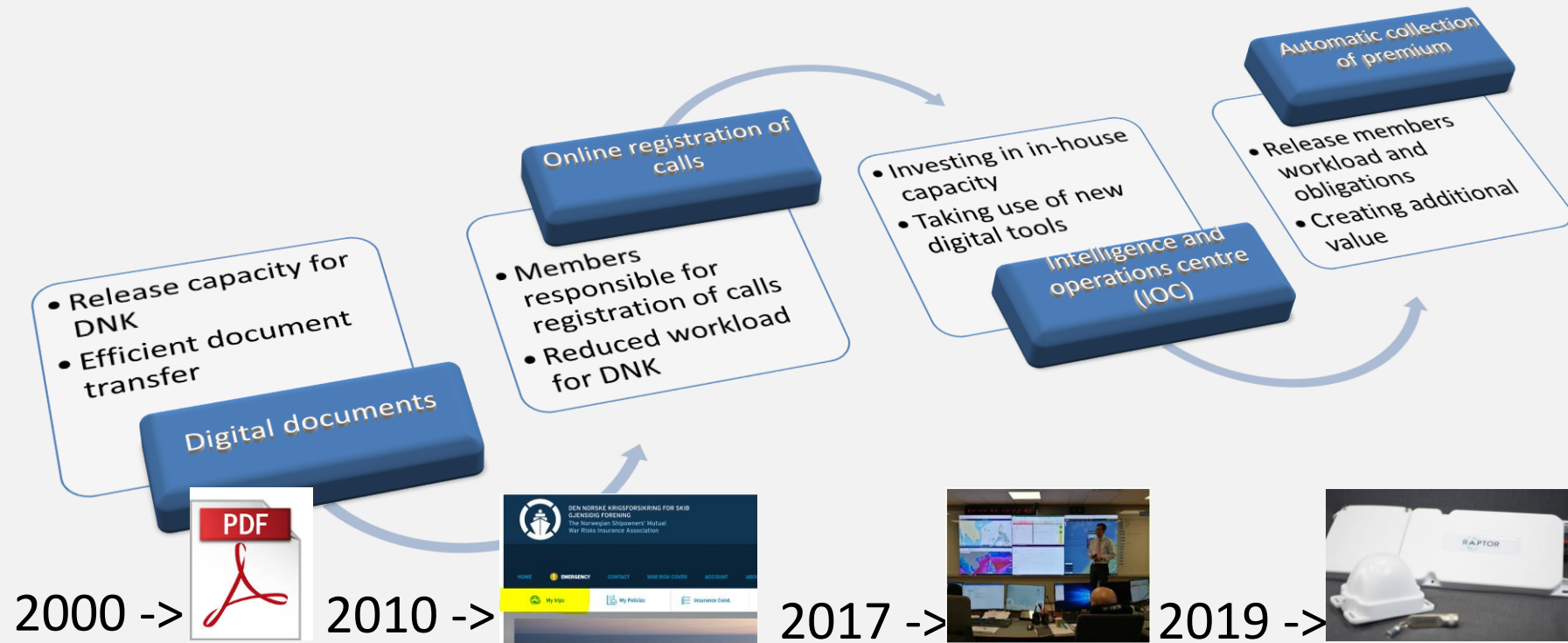
FOURTH INDUSTRIAL REVOLUTION

- Largest transformation in history of industry – fusion of technologies
- Blurring the lines between the physical, digital and biological spheres
- Emerging technology breakthroughs
- Changes way manufacture, communicate, learn work and do business

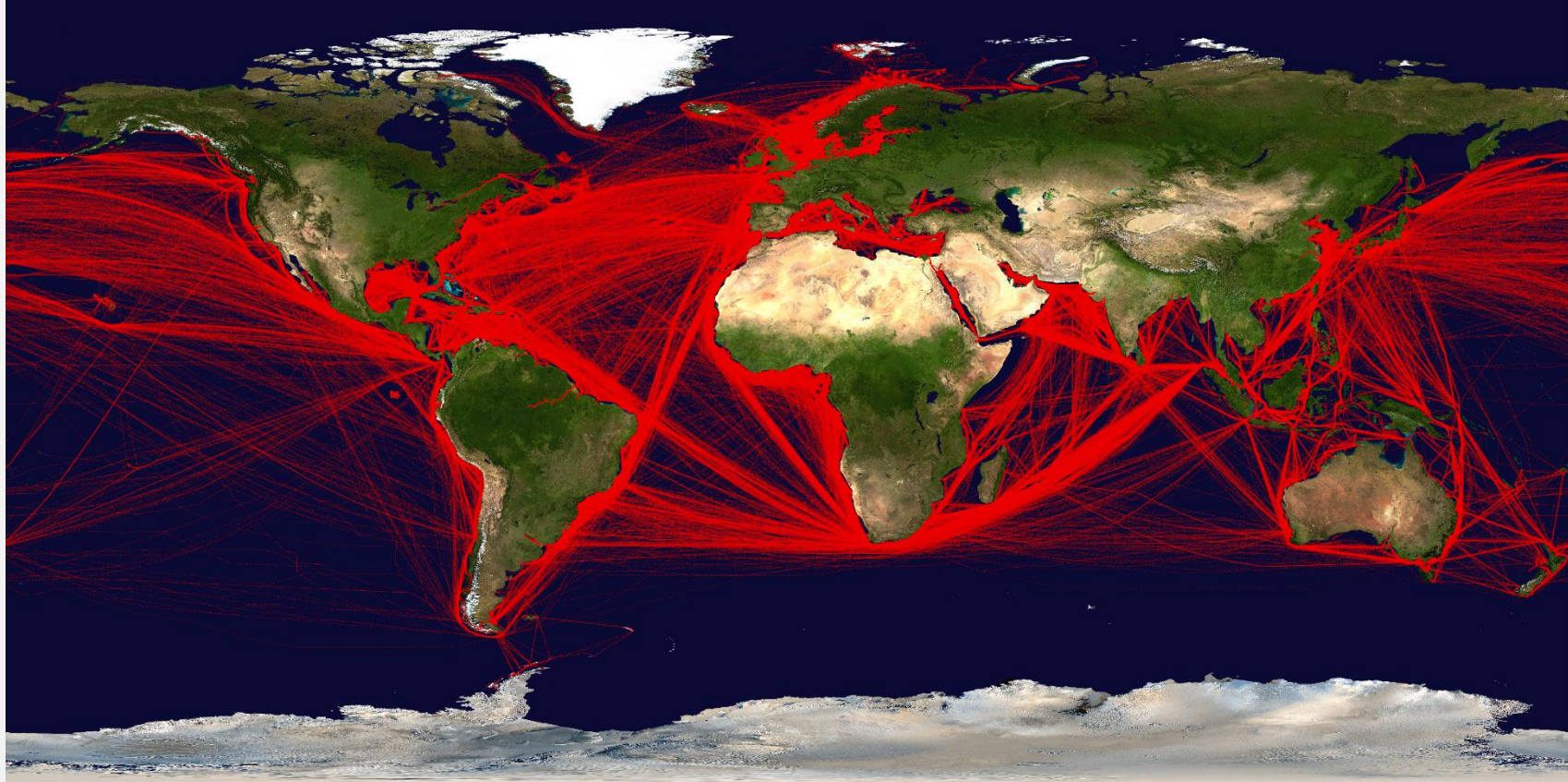
- Driven by digitalization - early stages already behind us in consumer markets
- Smartphones, Internet, flow of data & information extraterritorial



DNK'S DIGITAL JOURNEY



AUTOMATING REPORTING BY SHIPS – HOW?



AUTOMATING REPORTING OF PRESENCE IN AP AREAS

- Free Raptor-transceiver offered to automate manual processes
- IoT-solution – 2700 units
- Risk-transfer –reporting duty
- «Connected policies»
- Battery-back up – security/redundancy
- Encrypted signal
- GPS jamming/spoofing



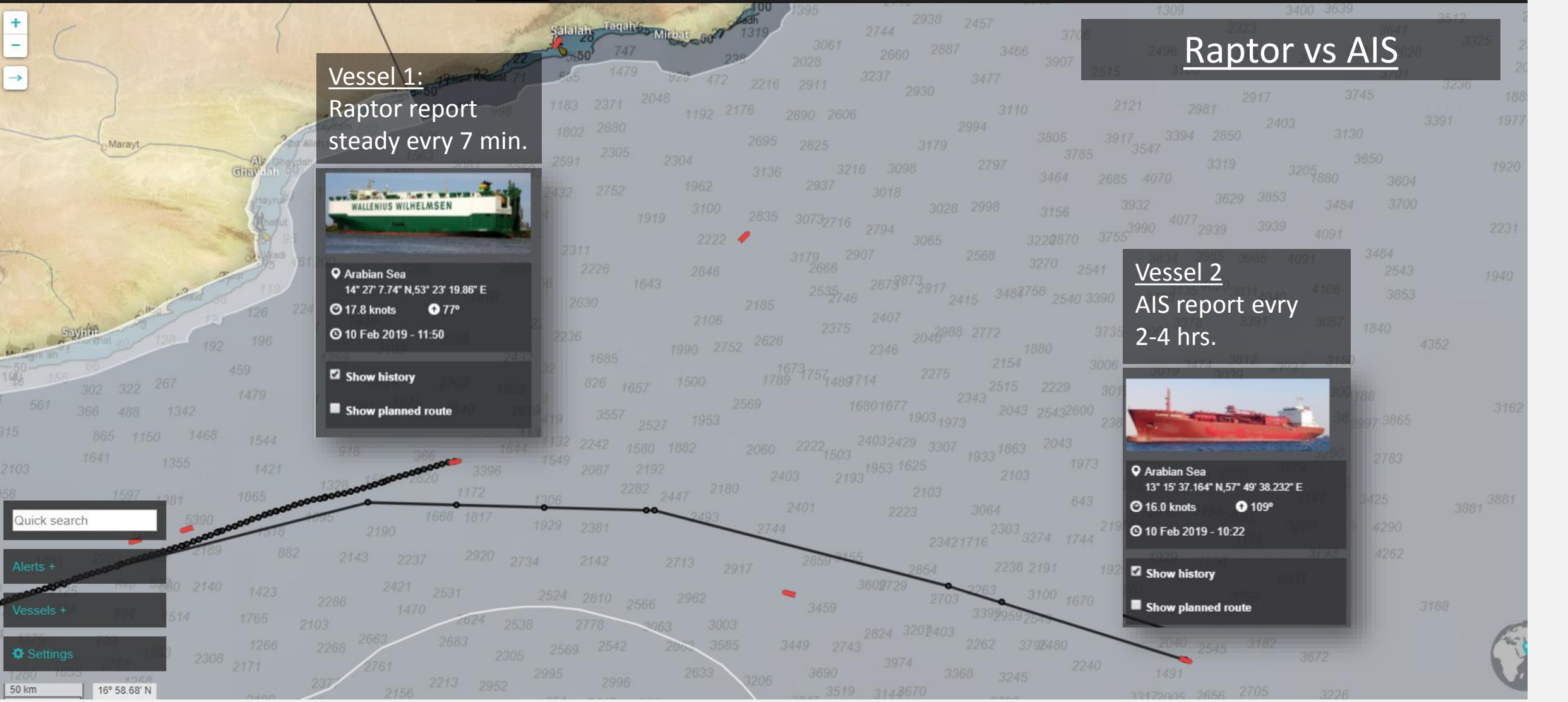
AUTOMATING REPORTING OF PRESENCE IN AP AREAS

The screenshot shows the DNK web interface for a PARIS breach. The breadcrumb trail is "PARIS / Breaches / PARIS breach 11148". The main heading is "PARIS breach 11148". Below this is a "Summary" section with the following details:

Vessel	Area	First report	Latest report	Duration
GOLAR ICE	INDIAN OCEAN JWC AREA WAR RISK	10 Feb 2019 03:02:08 17.8 knots 203°	10 Feb 2019 17:45:40 18.4 knots 232°	14 hours 43 minutes

Below the summary is a map of the Indian Ocean region, showing the breach area with a black line and a yellow dot. The map includes labels for "SAUDI ARABIA", "YAMA", and "Siyān Hmf". A "Racon" label is also visible on the map.





Vessel 1:
Raptor report
steady evry 7 min.

Arabic Sea
14° 27' 7.74" N, 53° 23' 19.86" E
17.8 knots 77°
10 Feb 2019 - 11:50

Show history
 Show planned route

Raptor vs AIS

Vessel 2
AIS report evry
2-4 hrs.

Arabic Sea
13° 15' 37.164" N, 57° 49' 38.232" E
16.0 knots 109°
10 Feb 2019 - 10:22

Show history
 Show planned route

[Alerts +](#)[Vessels +](#)[Settings](#)

50 km 16° 58.68' N



ADDITIONAL BENEFITS FOR THE SHIPOWNERS – USE IN THEIR OWN OPERATIONS

- Very detailed position reports – currently every 7 min
- Pitch & roll, turns, start/stops, acceleration, GPS jamming etc
- Additional sensors
- Firmware/software changes over air
- Joint-venture DNK/Clearwater (innovation/tech skills)
- APIs available for integration in ship-operations systems

- **MAYBE THE MOST VALUABLE BENEFIT OF THE SYSTEM - NEW USE CASES DISCOVERED IN EVERY DIALOGUE!**



HOW THE DATA IS USED TODAY

When collected data from on-board systems is gathered and analysed as a whole, it leads to a world of opportunities in terms of optimisation and increased knowledge.

Since 2014, Wallenius Marine has saved in excess of 30,000 tonnes of fuel as a direct result of optimisation based on data.



In on-board decision support systems, warning criteria for heavy weather are improved, based on knowledge acquired from monitoring of operations.

Cargo environment can be monitored including motions, accelerations and temperature in the cargo hold. The information serves to optimise use of cargo lashing and improve cargo safety and comfort.

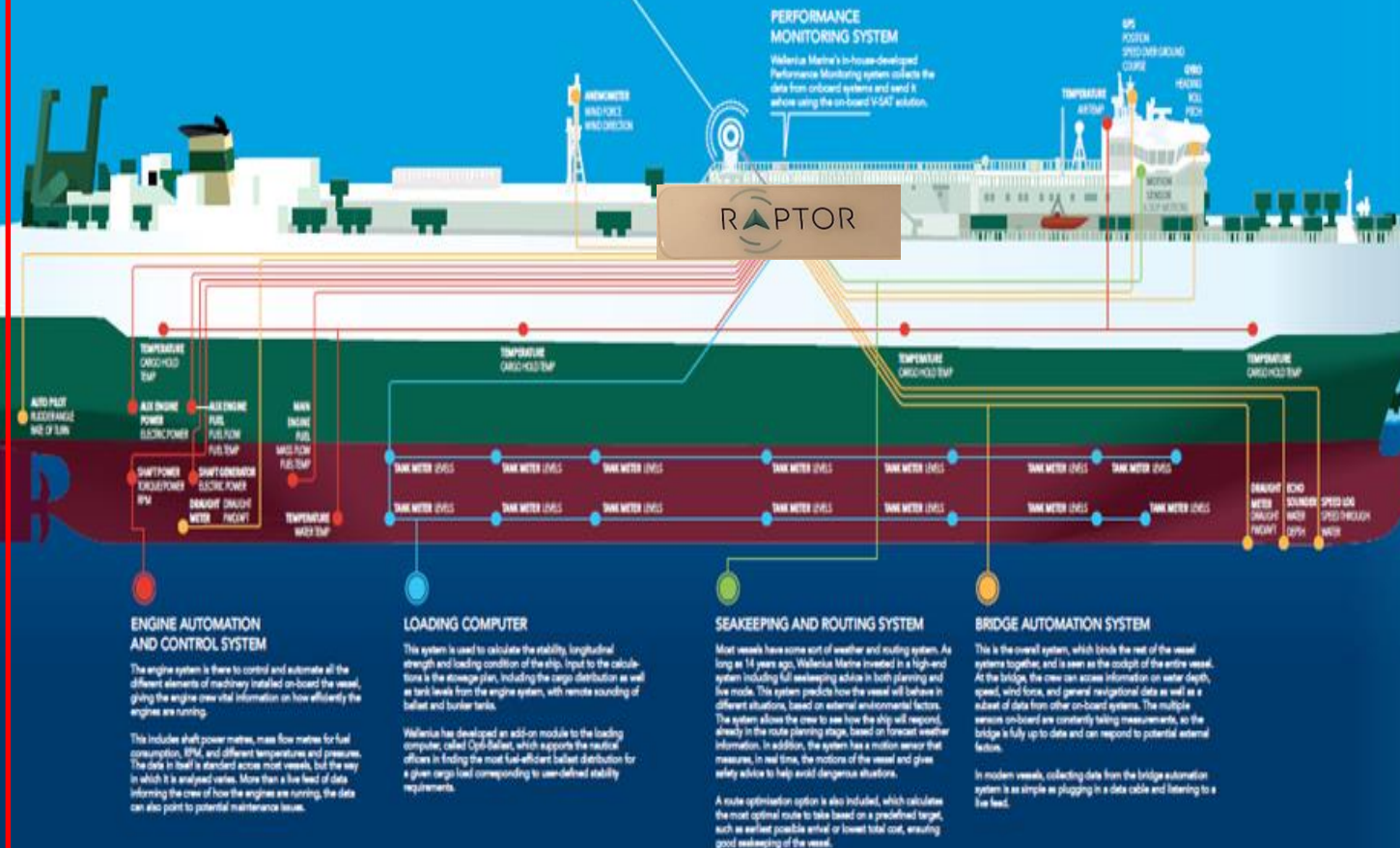
Advanced efficiency performance identifies whether a vessel is meeting set targets, or it can be benchmarked against other vessels to identify areas of improvement.

Verification of ECA compliance is enabled, as the fuel quality used at any location and time can be closely monitored through the temperature of the fuel injected in the engine.

-50%

Fuel aside boiler fuel oil consumption has been reduced by 50%, thanks to technical measures developed along with improved operational procedures.

RAPTOR GIVES CONNECTIVITY & POSITION IN ONE GO



HOW THE DATA CAN BE USED IN THE FUTURE

There are already many uses for the data collected, but they will expand even further in the future, for example remote maintenance and e-navigation. Here are a few other potential applications.



More detailed cargo monitoring services will allow for a detailed history file for each unit of cargo, combining time, position, moisture at sea, and temperature. This data together with energy consumption could be shared with cargo owners in proof of safe and efficient operations.



Stress fatigue monitoring is possible by vessel motion monitoring combined with detailed structural angles. The actual load stress can be monitored in real time and the cumulative fatigue estimated based on real service history. This enables more efficient survey programmes.



Data is further informing vessel design decisions, as recent concept studies have shown that sailing ships could make again be a viable option. The analysis which have led to optimised routes, along with increased automation in the industry, mean that wind power could be used in the foreseeable future.



Development in shipping is going towards centralisation, using shore operations centres and remote control centres to increase safety and efficiency. Full centralisation will require real-time data communication and monitoring.



DATA COLLECTION –*ICING ON THE CAKE?*

- Big-data opportunities
- DNK collect data on anonymized basis
- DNK neutral party subject to financial regulation & FSA compliance
- Raptors generate more than 500 000 reports per day
- 200 million datapoints per annum
- Unique dataset to access in the future



RAPTOR DISTRIBUTION PROJECT



Dashboard

Alerts

Vessels

Areas

Map

PARIS

My account

User Guide

PARIS

Dashboard

Vessels

Areas

Breaches

Trips

Vessels from PARIS

2576

Tracked by Clearwater

2576

Insured value

\$187bn

Raptor installations

Total installs

612

Percent of fleet

23%

Past 24 hours

4

Past 7 days

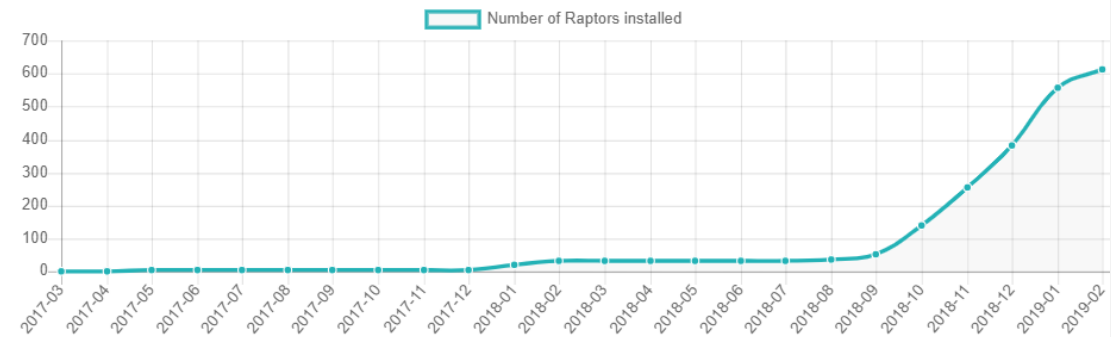
42

Past 14 days

85

Past 30 days

175



Synced 5 hours ago. Update due in 6 hours.



CONCLUSION

- New technologies and digitalization will drive change in the maritime & marine insurance industries going forward
- We have to change the way to do business to utilize the opportunities through existing tech to start with
- Integration in customers' systems to increase operational efficiencies and cost reductions
- Successful digitalization projects in insurance should have 4 elements: Automation, IoT, smart/connected policies and Big-data capture.



IT and OT connected – what now?

CYBER SECURITY

*“...shift cyber-risk **away from a defensive approach to a proactive method** of thinking about maritime **OT and IT risks...***”

Pantelis Skinitis - ABS Advanced Solutions about lessons learnt on the cyber attack affecting Maersk Line in 2017 (USD 300 million)



DEN NORSKE KRIGSFORSIKRING FOR SKIB
GJENSIDIG FORENING
The Norwegian Shipowners' Mutual
War Risks Insurance Association



Norges
Rederiforbund
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Shipowners'
Association

www.warrisk.no