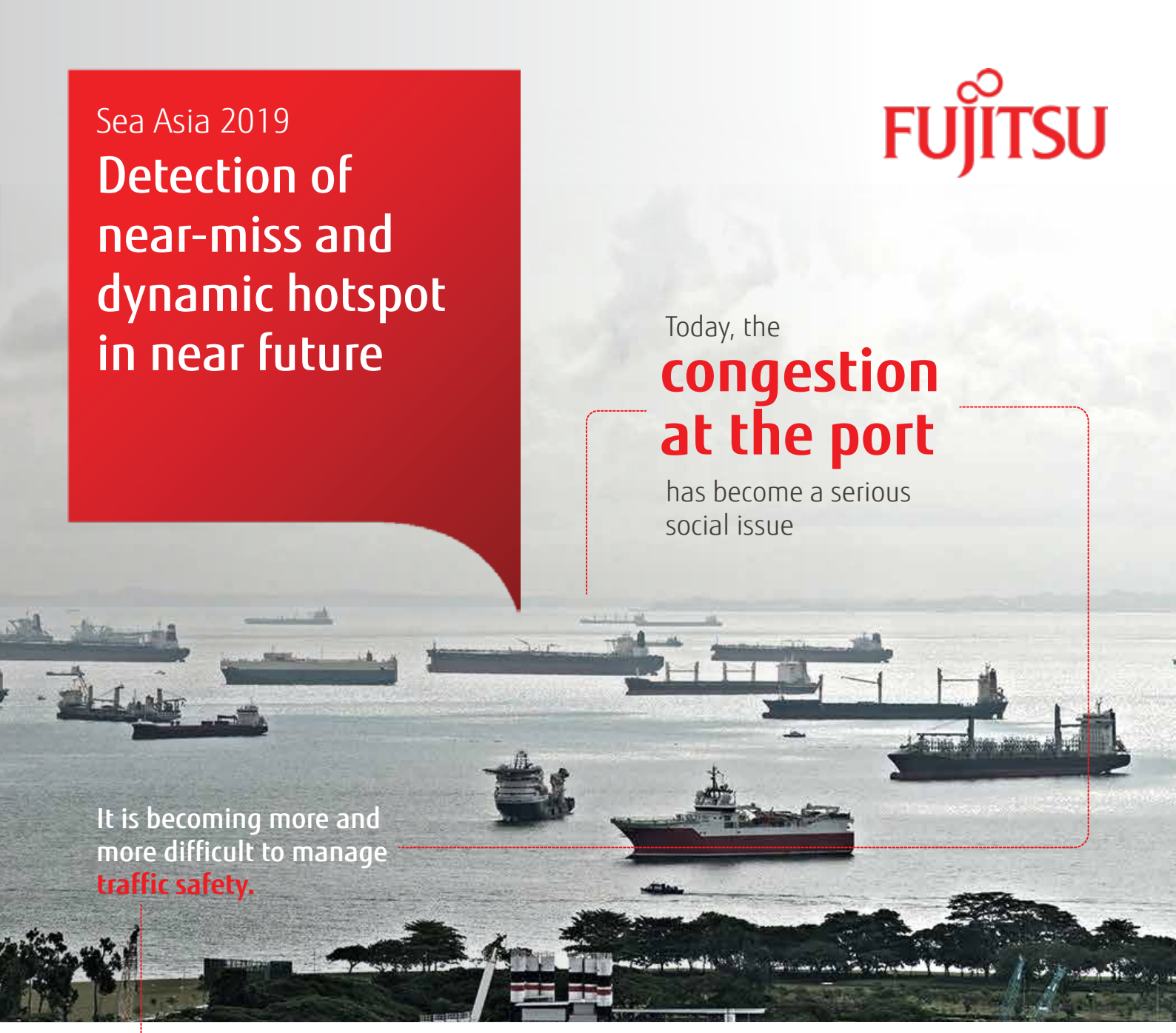
Sea Asia 2019

Detection of near-miss and dynamic hotspot in near future

FUJITSU



Today, the

congestion at the port

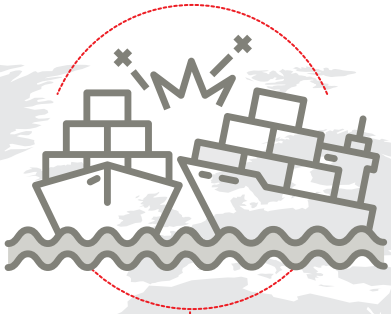
has become a serious social issue

It is becoming more and more difficult to manage **traffic safety.**

A serious vessel collision might be occurring somewhere in the world, at this moment.

In 2014, there were

1,642
serious vessel accidents



358
collisions

Reference：Ministry of Land, infrastructure, Transport and Tourism in Japan (December, 2017)

Causes of vessel accidents

Only for cargo ships and tankers in Japan (2014～2016)

10%

Mistake in vessel maneuvering

90%

Mistake in recognition & judgment

ROLE OF ICT:

Help in recognition & judgment

Reference: Ministry of Land, infrastructure, Transport and Tourism in Japan (December, 2017)

Situations leading to collision

Near-miss

Trajectories of two or three vessels come close and intersect to raise the probability of collision.

Dynamic hotspot

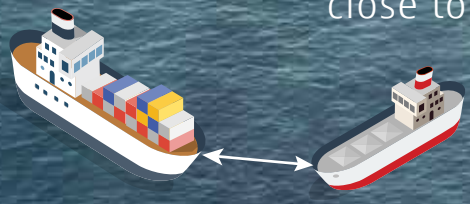
Vessels are populated densely enough to influence each other.

ROLE OF ICT:

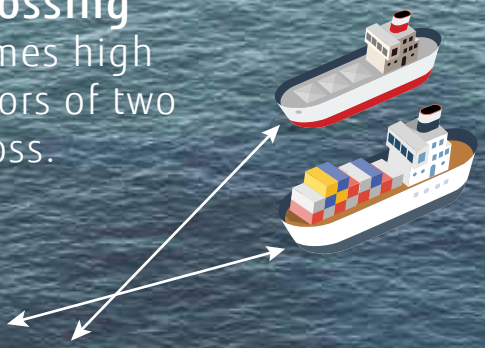
Detect risk proactively & accurately

Trade off problem of current technologies

Distance
Risk becomes higher when two vessels come close to each other



Vector crossing
Risk becomes high when vectors of two vessels cross.



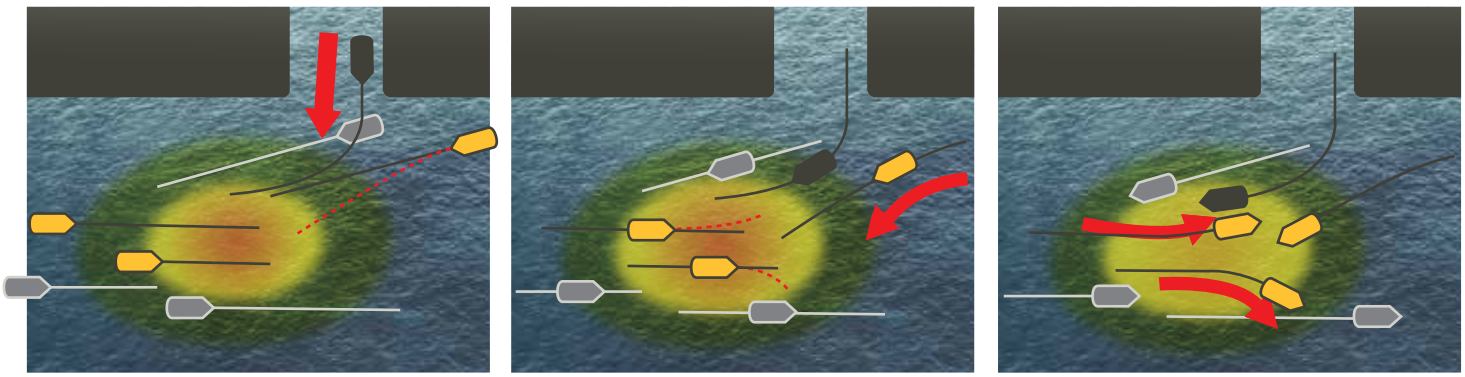
FALSE ALERT increases when lowering the threshold, **but** **DETECTION FAILURE** increases when raising the threshold

KEY CHALLENGE:

Solving trade-off problem

Challenge regarding Dynamic Hotspot

1. Dynamic and complex situation with high collision probability
2. Movement of one vessel has spillover effect on others
3. Hard to resolve by individual vessels.

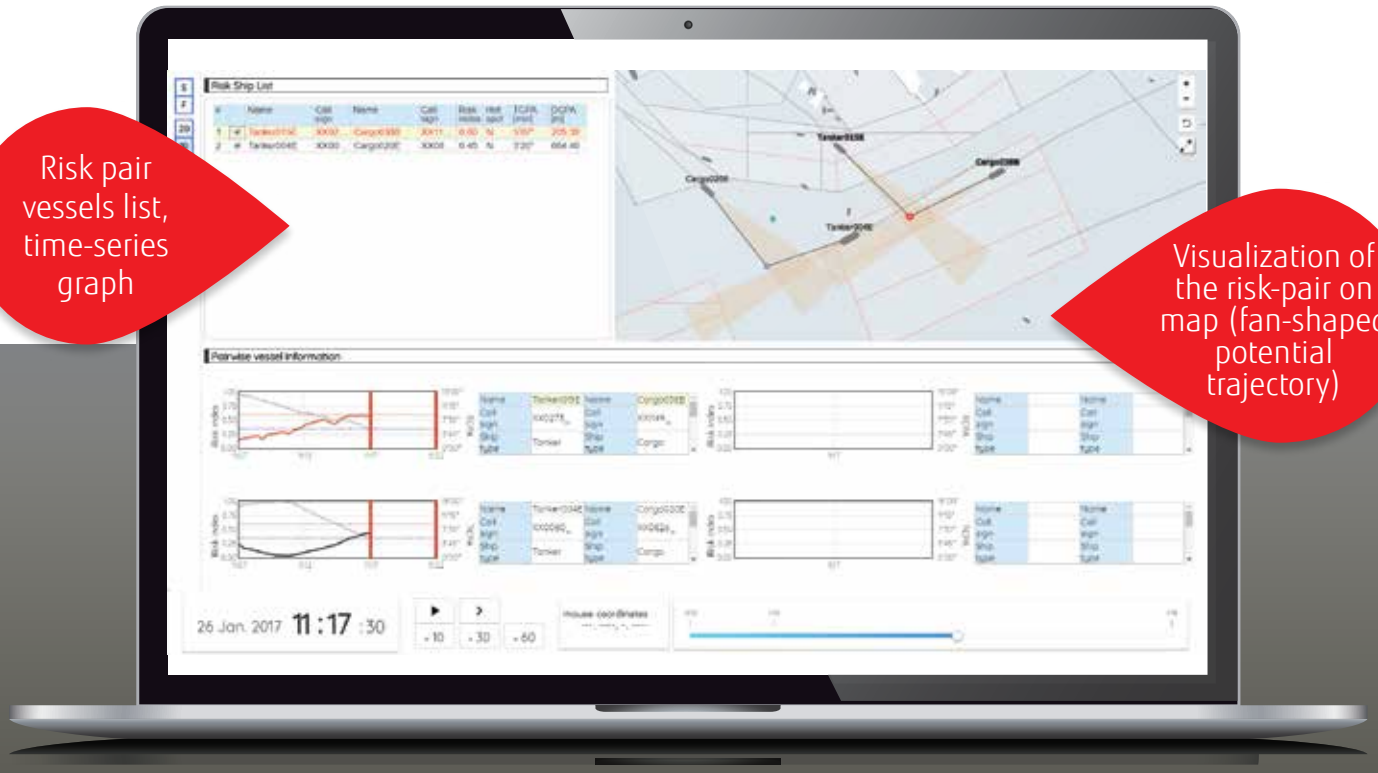


KEY CHALLENGE:

Knowing when and where hotspot will appear and specifying involved vessels

Prototype developed by FUJITSU

Near-miss risk detection

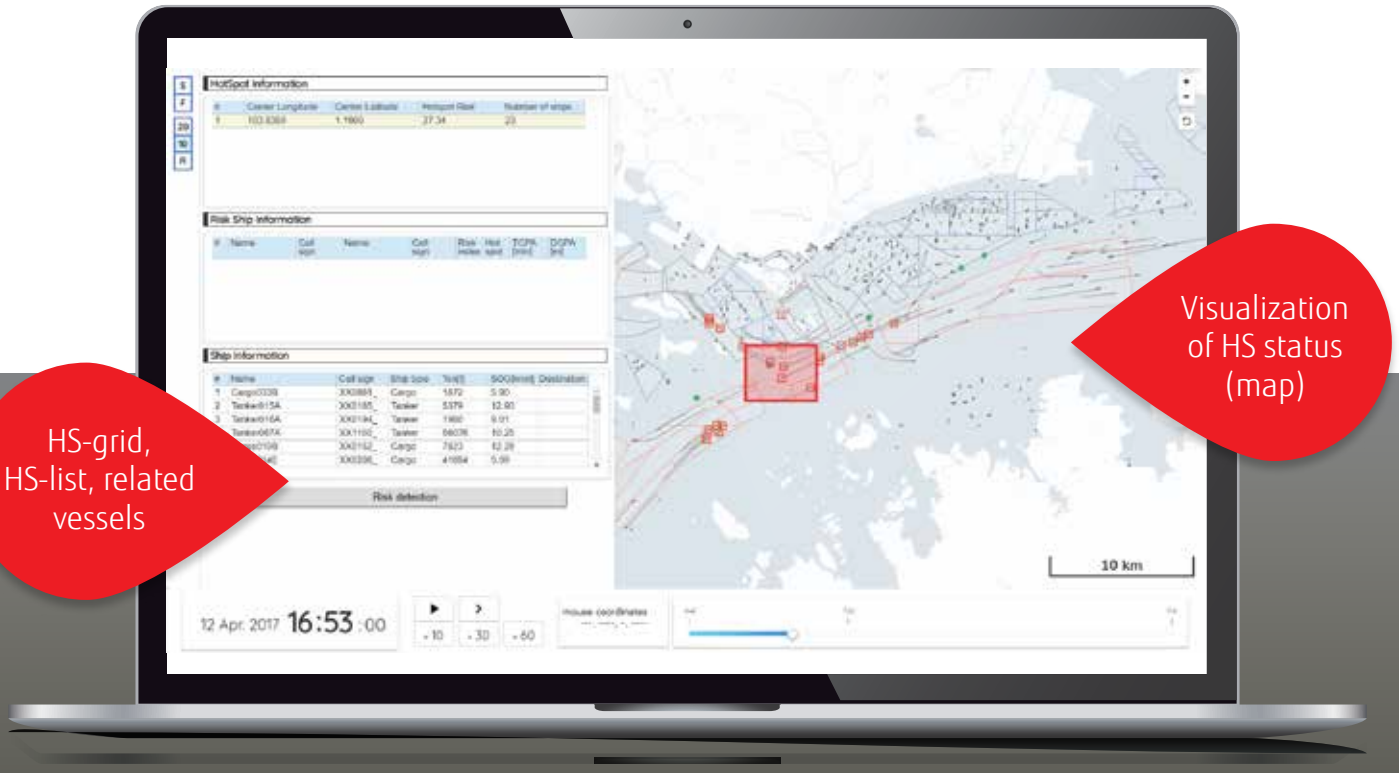


Risk pair vessels list, time-series graph

Visualization of the risk-pair on map (fan-shaped potential trajectory)

Supporting operations in the last minute

Hotspot forecasting



HS-grid, HS-list, related vessels

Visualization of HS status (map)

Realizing proactive traffic management

USE CASE

Traffic control centre

Detect and prioritize vessels at risk in proactive fashion

These are images for demonstration purposes and do not represent actual scenarios

Proactive planning and providing useful information to vessels

USE CASE

Vessel

Recognize near-miss risk accurately

These are images for demonstration purposes and do not represent actual scenarios

Plan and adjust how to maneuver strategically

Fujitsu to provide intelligent and proactive risk detection technology in the autonomous ship era.

References

PRESS RELEASE April 2, 2019

Fujitsu and Maritime and Port Authority of Singapore Determine Effectiveness of AI Ship Collision Risk Prediction Technology

YouTube

Safer navigation by proactive risk detection with AI

shaping tomorrow with you

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