

# If it works in Singapore, it works anywhere



**e-Navigation**  
Intelligent Ship  
Traffic Management



KYSTVERKET



KONGSBERG

**MARINTEK**



**HSN**



# Content



- 1 Project background
- 2 Objectives
- 3 Partners & CONOPS
- 4 VDES Sea Trial Results

# SESAME Straits –



**Secure,  
Efficient and  
**SA**fe maritime traffic  
**M**anag**E**ment in the  
**Straits** of Malacca and Singapore**

# Project background - MEH



e-Navigation  
Intelligent Ship  
Traffic Management

- Marine Electronic Highway (MEH) demonstration project 2006-2010
- MEH was to improve **safety** and **efficiency** of shipping in the SOMS
- MEH focus was on accurate sea-bed surveys and **ship-shore data exchange**





# Project background – e-Navigation



**e-Navigation**  
Intelligent Ship  
Traffic Management

- Clear synergies between the MEH project and e-Navigation
- Ship owners and mariners need to see the benefits of any e-Navigation solution
- Seeing is believing and the importance of test-beds is identified in the IMO e-Navigation Strategic Implementation Plan (SIP)

Fig. 4. The 3 elements of a marine electronic highway.



Ref: *"three sides of a coin"*

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# SESAME Straits - objectives



The primary objective is to **develop** and **validate** shared situational awareness and collaborative decision making between ship's bridge team and shore based Vessel Traffic Service (VTS) personnel.

Secondary objectives are:

- Just In Time arrival within a Regional Maritime Service Portfolio
- Use existing systems/equipment as far as possible



# Content

1

Project background

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Objectives

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Partners & CONOPS

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VDES Sea Trial Results

# SESAME Straits - partners



- **Project members:** MPA, NCA, RCN, Vestfold University, Navtor, Marintek, SimPlus, KONGSBERG



- **Country Agreement:** Singapore/Norway R&D MoU

- **Funding - MAROFF programme:** Budget approx. NOK 25 mil



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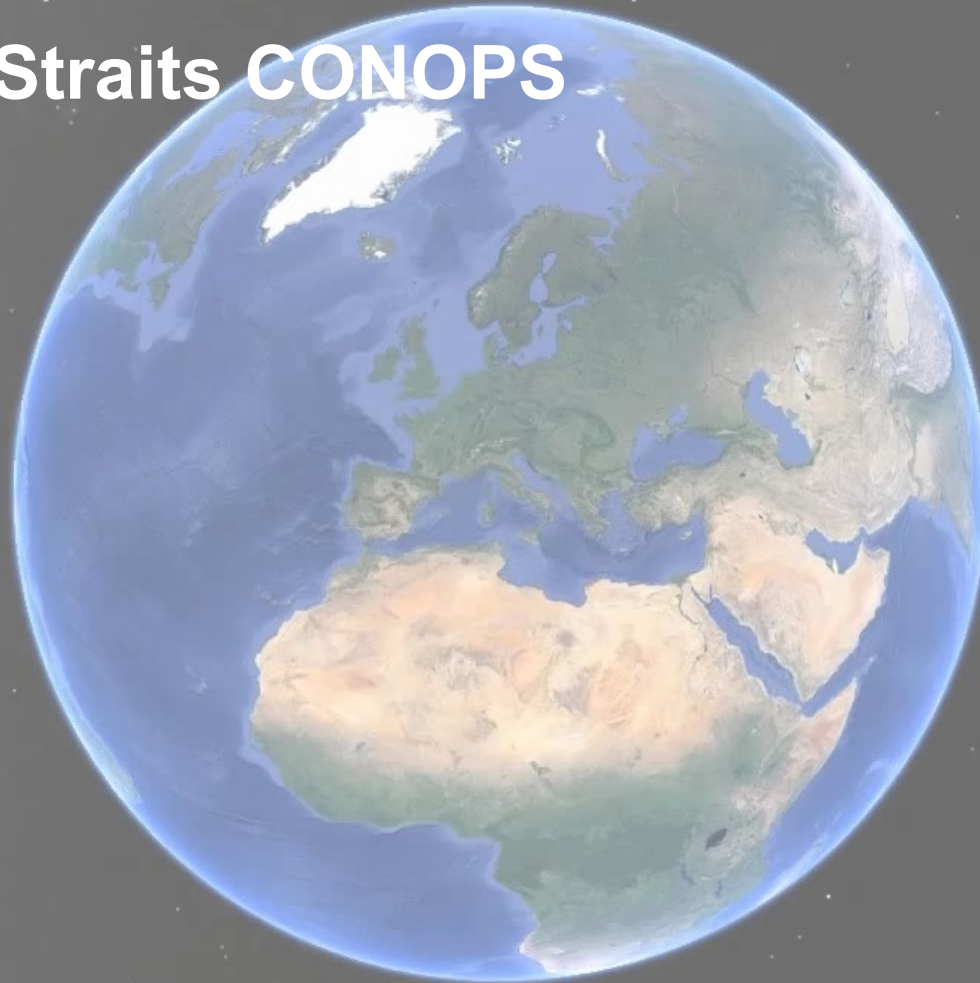
- **Project Owner:** Kongsberg Norcontrol



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# SESAME Straits CONOPS



# Content



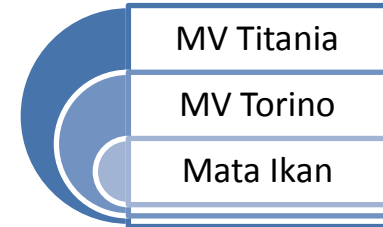
- 1 Project background
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# Sea Trial Description



**e-Navigation**  
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# Test setup VDES

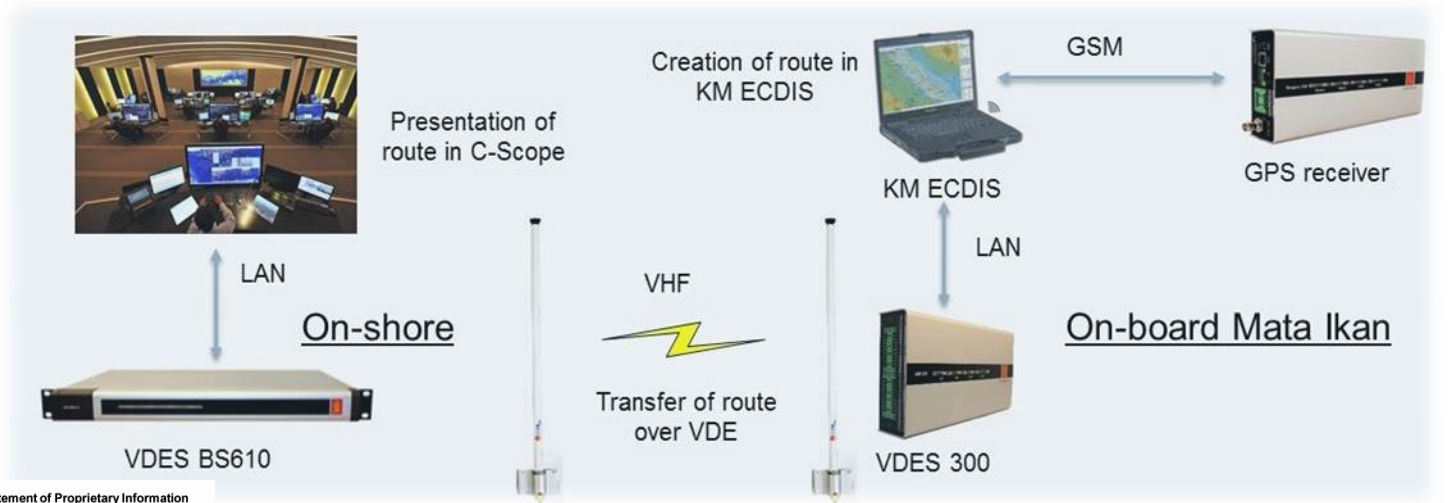


Prototype VDES BS610 base station on shore, and VDES 300 mobile station onboard Mata Ikan.

VDE channels used for route transfer

Route exchange between ECDIS and VTS, with ECDIS on shore side in order to get the demo effect. Position data transferred from Mata Ikan to shore side in order to localize vessel in ECDIS.

Temporarily antenna installations onboard Mata Ikan



# VDES prototype in testbed



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Channel plan A (upper and lower leg), 2\*50KHz channels was used for VDE

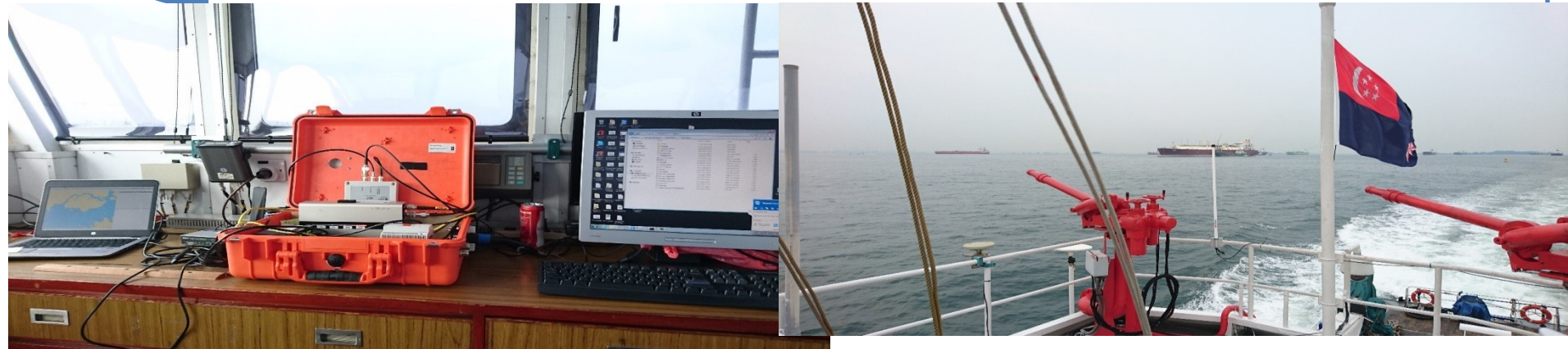
2W TX power

Data was compressed and retransmission supported, giving high throughput.

Modulation;  $\pi/4$  QPSK

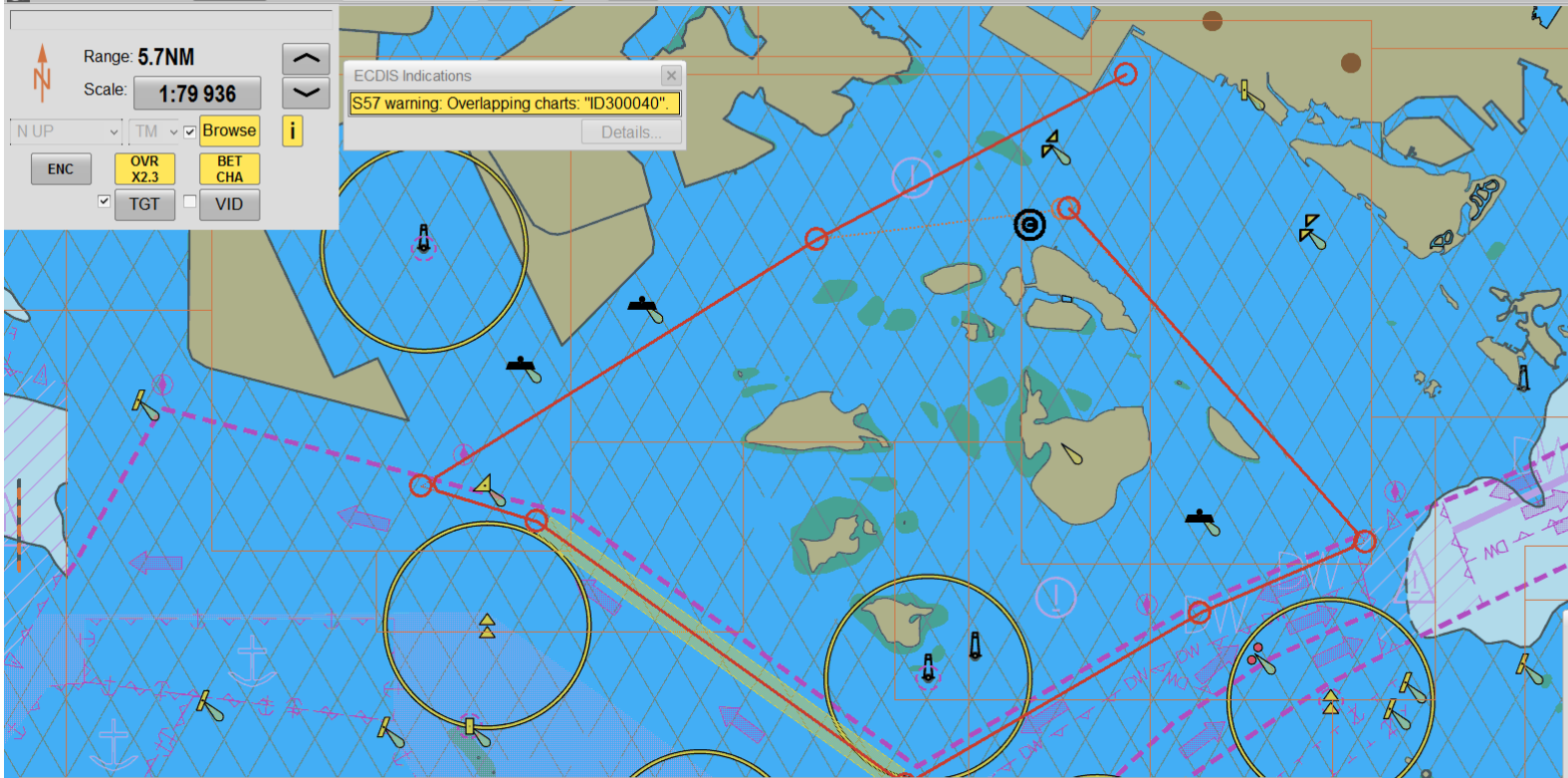
VDE upper leg is close to AIS channels and co-localization between AIS & VDE will be a challenge (standardization issue).

Assessed ASM but message size is not suitable. Coordination is needed between AIS & ASM to avoid interference.









ECDIS Indications  
 S57 warning: Overlapping charts: "ID300040"  
 Details...

Range: **5.7NM**

Scale: **1:79 936**

N UP TM  Browse

ENC  OVR X2.3  BET CHA

TGT  VID

CCR: Conning

TIME **09:24:25** Computer Bet Man

HDG **000.0°** GYRO1 Man

ROT **0.0°/min** GYRO1 Man

COG **166.0°** GPS1 Man

SOG **0.3 kn** GPS1 Man

POSN **01°14.610' N** GPS1 Man

Offset NO **103°45.676' E**

CENTER STD DISP SUPPRESS

ACT TURN AUTO PLAN AIS FILTER

L R View Targets Route OwnShip

Chart Options Tools System

Route List

Sort on:  Name  Distance  Date

Name	State	Vali...	Date
Mataalkan1	Alt...	EGW	170420 07
Mataalkan1(01)	Edit	Not	170420 07
Mataalkan2	----	----	170420 02
Titania-Shangh...	----	----	141030 03
Titania-Shangh...	----	----	170412 05
Torino-Shangha...	----	----	170420 01

New Edit WPT List WPT Delete

Display Undisplay Rename Validate

Monitor Unmonitor Print Weather...

Import... Export... VTS In... VTS Out

Waypoint List

Route Name: Mataalkan1(01) Close Save Route Not Changed. - Not Validated

W.	Name	Lat	Lon	Crs	Dist	Leg	TDist	RDist	Spd(...)	ETA	RTime	ETD/Wait	Radius	Offtrack	Max(...)	Message
1	Way...	01°14.795'N	103°46.103'E	138.2	4.7NM	RL	0.0NM	25.5NM	10.0	170420 09:05Z	02:33	170420 09:05Z	0.10NM	100m	0.0	
2	Way...	01°11.145'N	103°49.351'E	246.7	2.0NM	RL	4.7NM	20.8NM	10.0	170420 09:33Z	02:04	00:00	0.10NM	100m	0.0	
3	Way...	01°10.359'N	103°47.536'E	240.0	3.7NM	RL	6.8NM	18.8NM	10.0	170420 09:45Z	01:52	00:00	0.10NM	100m	0.0	
4	Way...	01°08.481'N	103°44.310'E	305.3	5.0NM	RL	10.4NM	15.1NM	10.0	170420 10:07Z	01:30	00:00	0.10NM	100m	0.0	
5	Way...	01°11.367'N	103°40.255'E	286.7	1.1NM	RL	15.4NM	10.1NM	10.0	170420 10:37Z	01:00	00:00	0.10NM	100m	0.0	
6	Way...	01°11.749'N	103°38.992'E	058.2	5.1NM	RL	16.6NM	9.0NM	10.0	170420 10:44Z	00:53	00:00	0.10NM	100m	0.0	
7	Way...	01°14.455'N	103°43.333'E	062.1	3.8NM	RL	21.7NM	3.8NM	10.0	170420 11:15Z	00:23	00:00	0.10NM	100m	0.0	
8	Way...	01°16.261'N	103°46.725'E				25.5NM	0.0NM	10.0	170420 11:38Z	00:00	00:00	0.10NM	100m	0.0	

Open Stream Close Stream

0699: \$GPRMC,072446.00,A,0114.59902,N,1034

0700: \$GPRMC,072447.00,A,0114.59904,N,1034

Stop Step Continue



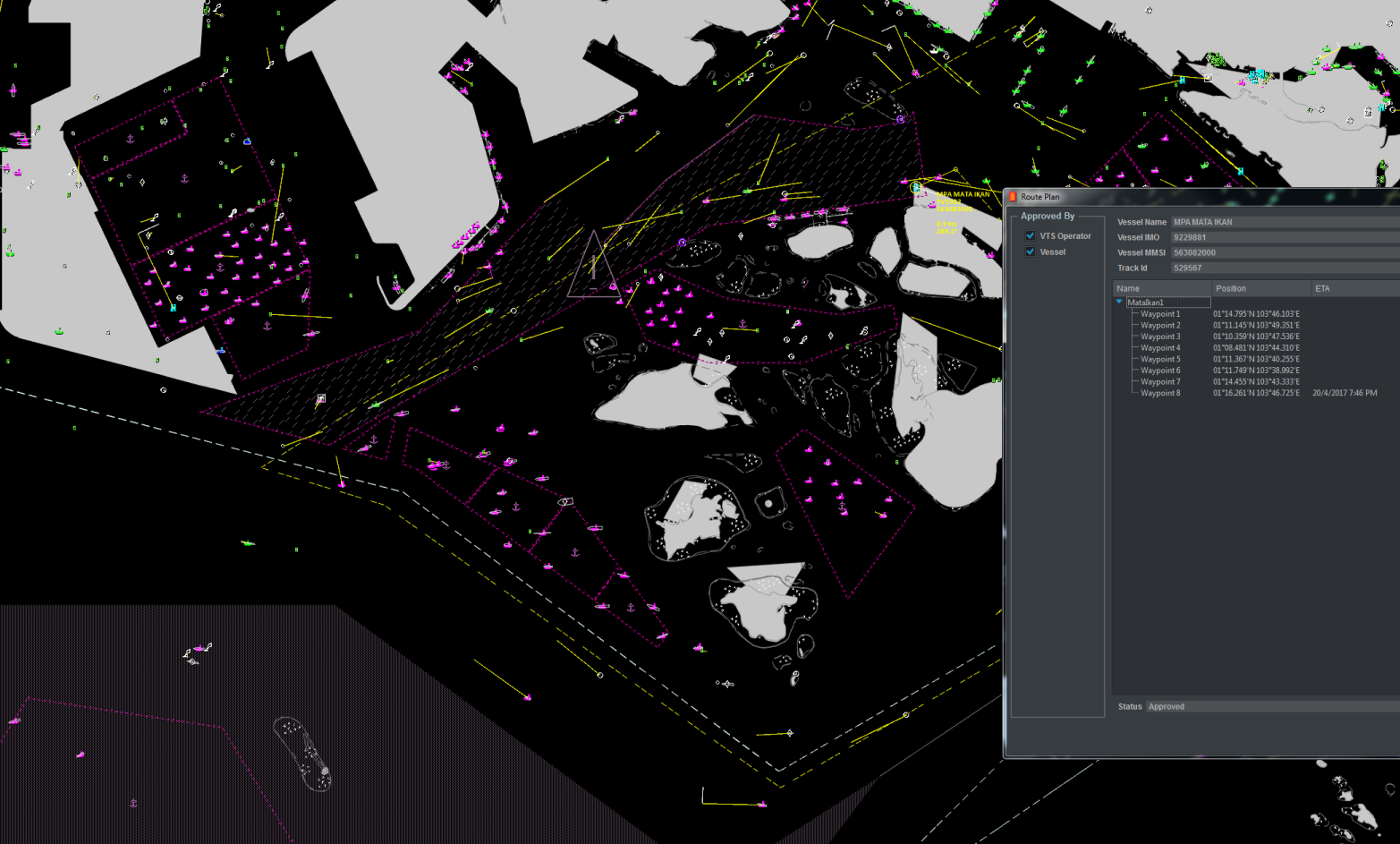


Sesame

Portrayals Display Prediction Create Drop List

ETA LEG ETA

All Sim Lost



Misc Alerts

Group by Type Acknowledge

Alert Type

- Route pl... Route plan alert

Route Plan

Approved By

- VTS Operator
- Vessel

Vessel Name: MPA MATA IKAN  
 Vessel IMO: 9229881  
 Vessel MMSI: 563082000  
 Track ID: 529567

Name	Position	ETA	ETD	Calculated Speed
Matalikani				
Waypoint 1	01°14.795' N 103°46.103' E		20/4/2017 5:05 PM	0 kts
Waypoint 2	01°11.145' N 103°49.351' E			0 kts
Waypoint 3	01°10.359' N 103°47.536' E			0 kts
Waypoint 4	01°08.481' N 103°44.310' E			0 kts
Waypoint 5	01°11.829' N 103°40.283' E			0 kts
Waypoint 6	01°11.749' N 103°38.992' E			0 kts
Waypoint 7	01°14.455' N 103°43.333' E			0 kts
Waypoint 8	01°16.261' N 103°46.725' E		20/4/2017 7:46 PM	0 kts

Status: Approved

OK Cancel





KONGSBERG

Route Monitor

Planned Passages

Filter

MPA MATA I...  
IMO: 9229881  
MMSI: 56308200

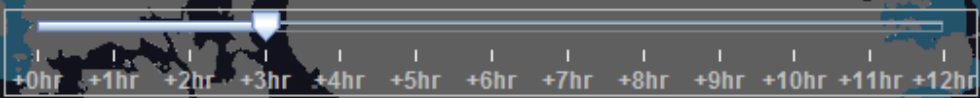
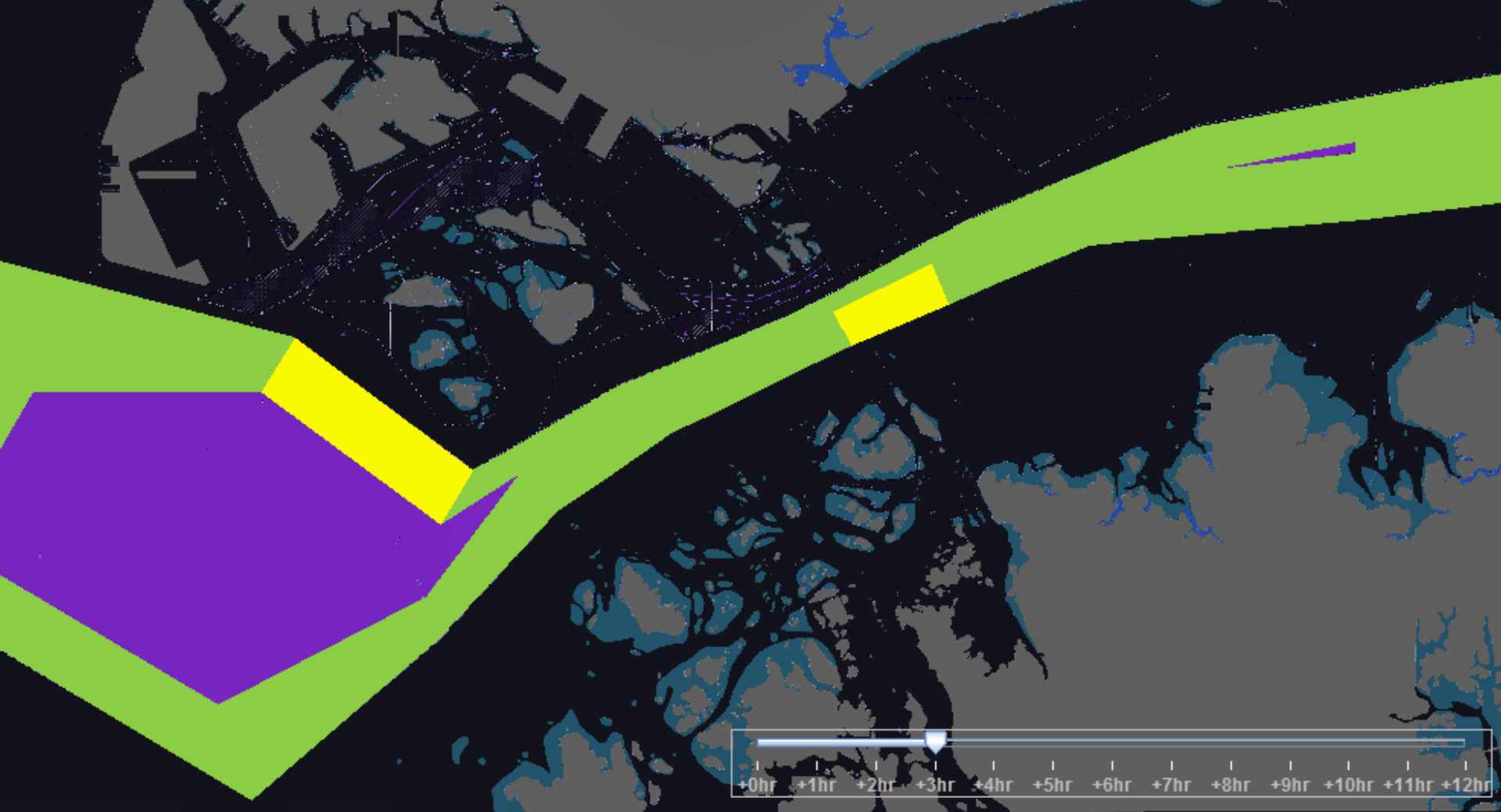


Traffic Congestion between 21/4/2017 14:33 and 21/4/2017 14:33

**Name:** MPA MATA IKAN  
**Callsign:** 9V5902  
**MMSI:** 563082000  
**IMO:** 9229881  
**Type:** Passenger  
**Destination:** MPA BRANI  
**AIS Status:** Receiving  
**Path Plan Status:** Accepted

**Arrival time:** 21/4/2017 14:40  
**Schedule offset:** -12 minutes  
**Next waypoint:** 13:59  
**Planned leg speed:** 19.7 kts  
**Current speed:** 8.0 kts

Waypoint	Planned	Calculated
Waypoint 1	13:35	13:35
Waypoint 2	N/A	13:45
Waypoint 3	N/A	13:52
Waypoint 4	N/A	13:59
Waypoint 5	N/A	14:07
Waypoint 6	N/A	14:12
Waypoint 7	N/A	14:18
Waypoint 8	N/A	14:33
Waypoint 9	14:40	14:40





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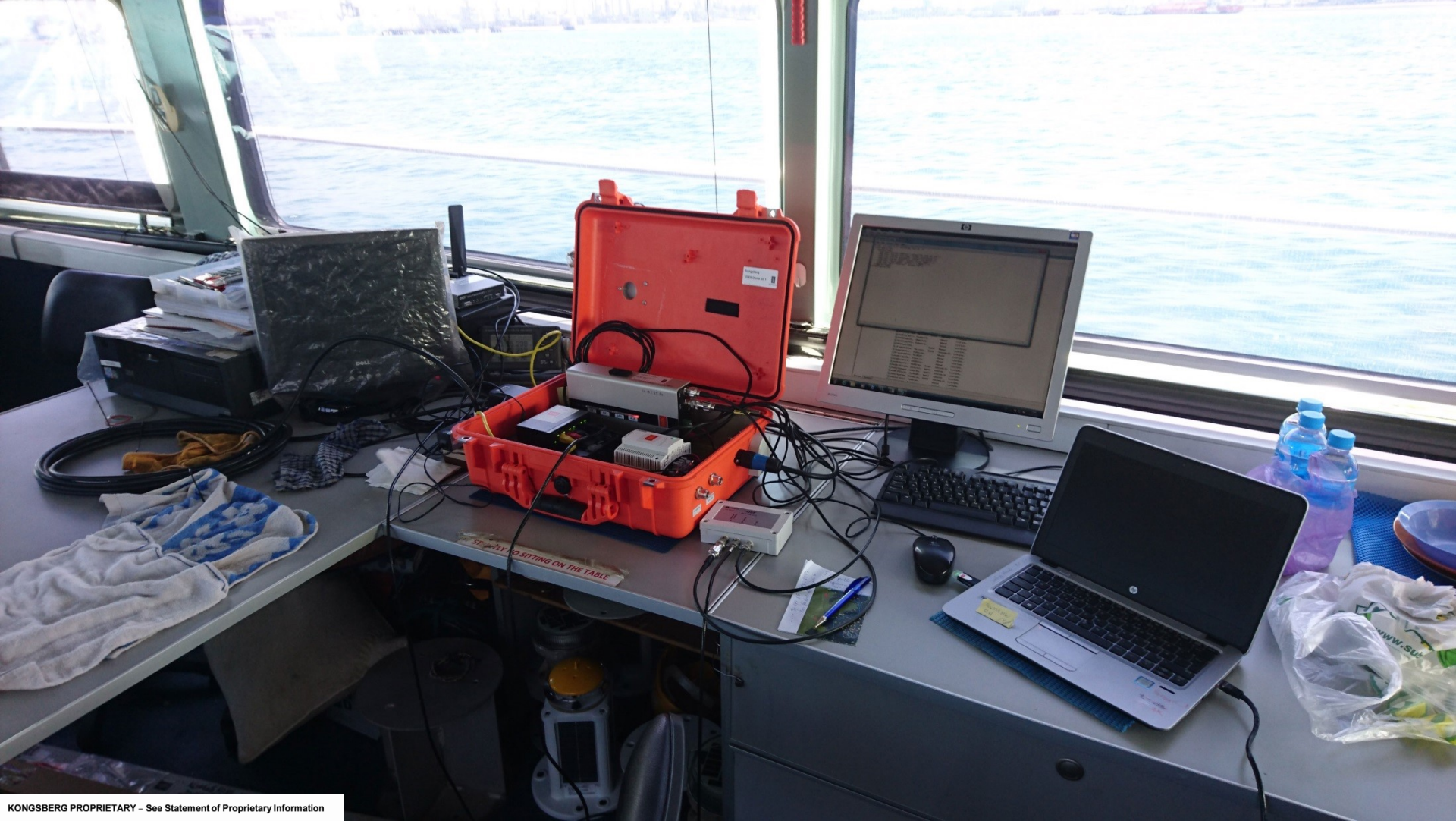


















# Automatic Reporting testbeds

- **Norway** - 2<sup>nd</sup> half 2016
  - 1<sup>st</sup> generation HW/SW/concept
  - VDES and mobile communication
  - Single Window integration
  - Ship<sup>2</sup>Shore & Shore<sup>2</sup>Ship
- **Singapore** - February 2017
  - 1<sup>st</sup> generation HW/SW/concept
  - VDES and mobile communication
  - Single Window integration



# Sea Trial – What did we learn?



**e-Navigation**  
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It works!



Collaboration limitation of the  
existing RTZ format



ASM vs. VDE



# The Future – SESAME Straits Solution II



- Automated Ship-to-shore reporting
- Expanding Just-in-time arrival
- Extending e-navigation services
- Harmonized Display of Navigation Information Received via Communications Equipment (HDNICE)
- Communications – Terrestrial and Satellite VDES, utilizing the Maritime Connectivity Platform (MCP)
- Cooperation with STM Validation
- Use existing equipment and international standards



# Future testbeds



Kongsberg Seatex's intention is join / drive new testbeds and to further develop the VDES prototypes, both mobile and base stations, in line with the evolving standards

All in one box



Technical questions?

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