

# Japan's Engagements for the Implementation of VDES

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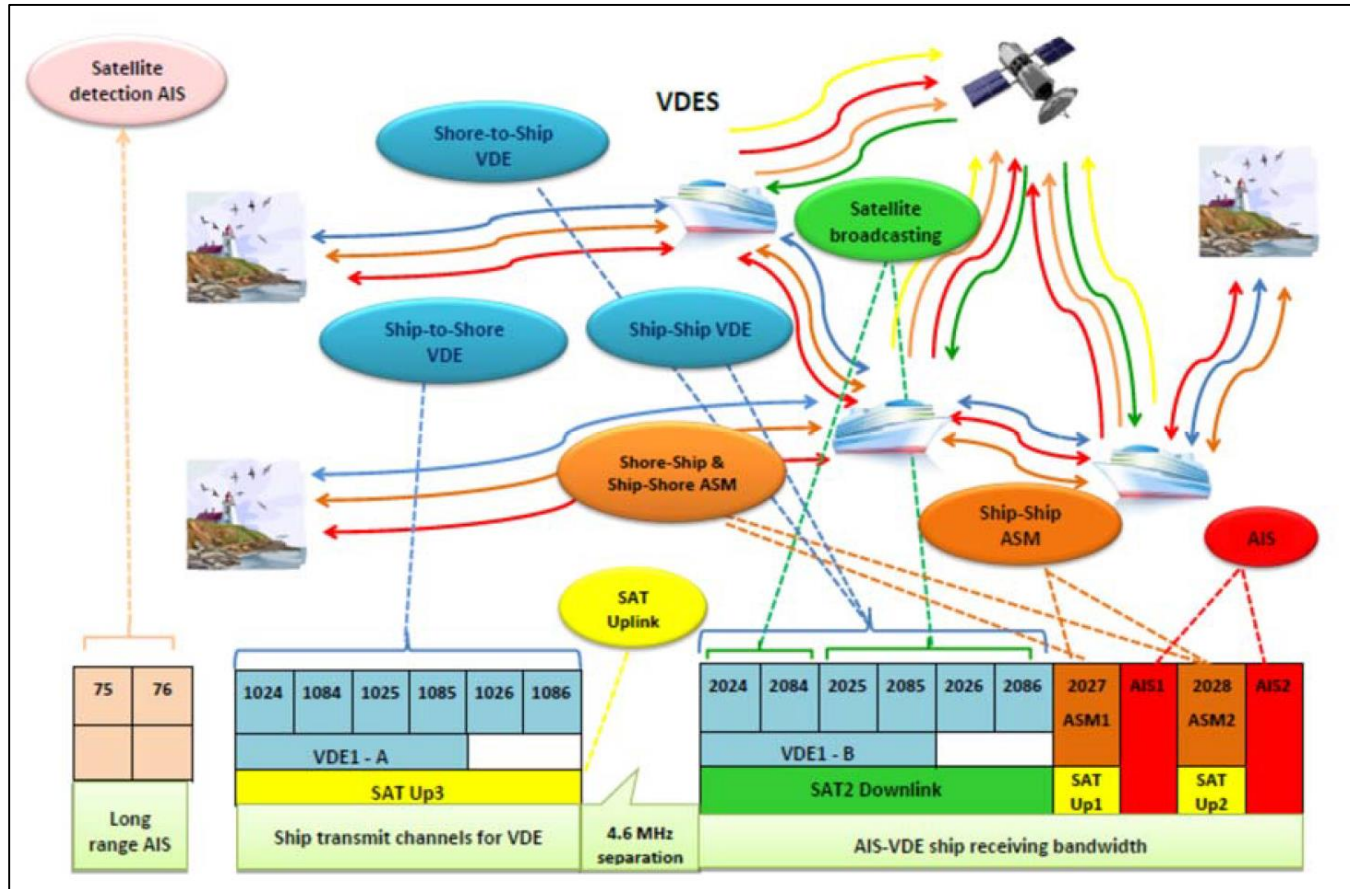
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Maritime Traffic Department,  
Japan Coast Guard

Expert Meeting on the Use of Digital  
Communication Technology in VTS (March 2019)

- VHF Data Exchange System (VDES)
- Trends of VDES
- Japan's steps for VDES utilization
- Focus group of using VDES for maritime traffic safety
- Conclusion

## What is VHF Data Exchange System(VDES) ?

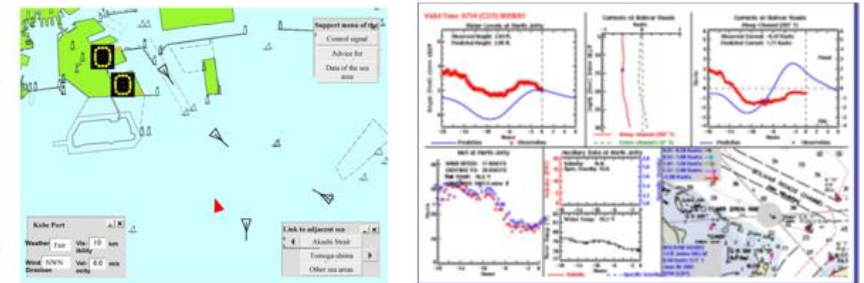


### Example

AIS



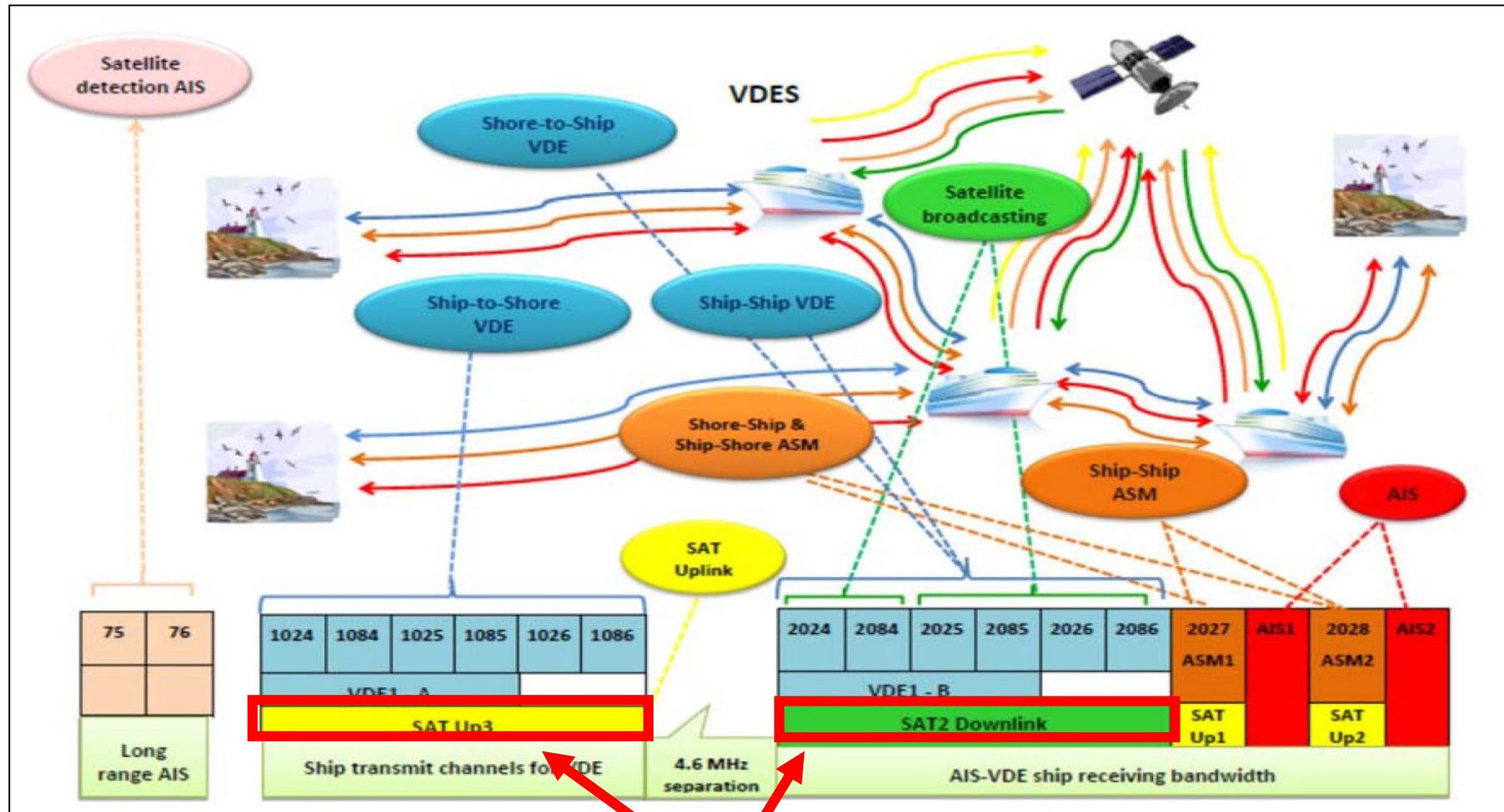
VDES



**VDES=AIS+ASM+VDE TER+VDE SAT**

**Voice + Text message  
→ Data exchange**

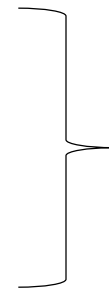
- Radio frequency for ASM and VDE TER allocated at WRC-15
- Radio frequency for VDE SAT will be discussed at WRC-19



Discuss at WRC-19

## Technical standard

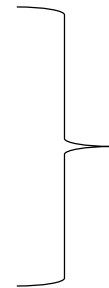
- ITU-R M.2092-0
- IALA guideline G1139
- ITU-R M.[VDE-SAT]



Being amended by IALA  
(Amended to ITU-R M.2092-1  
after WRC-19)

## Operational Standard

- IALA guideline G1117



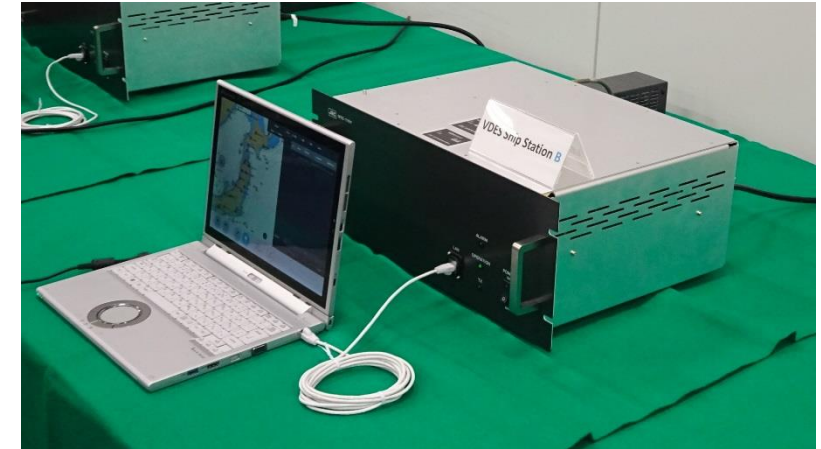
Not mandatory  
(show the examples for VDES usage)



Mandatory guidelines for VDES operation is necessary



- Technical measures
  - MIC: Research the effects to existing marine communication in the VHF band by using VDES
  - JRC: Make the VDES test platform
- Holding of international meeting
  - OPRF and the JCG:
    - Workshop on international standardization of VDES (2012~2014)
      - Developed the concept and made operational requirements of VDES
  - IALA, JANA and the JCG:
    - IALA workshop on development of VDES (2016)



- The group was established in FY2017
- Objective: To discuss possible operations and utilizations of VDES in Japan.
- Participants :
  - Industry
  - Maritime stakeholders
  - Academia
  - Governmental agency
- Output in 2017
  - Collect needs about the use of VDES
    - Maritime Service Portfolio (MSP)
    - ASM
  - Make a test platform for field trial



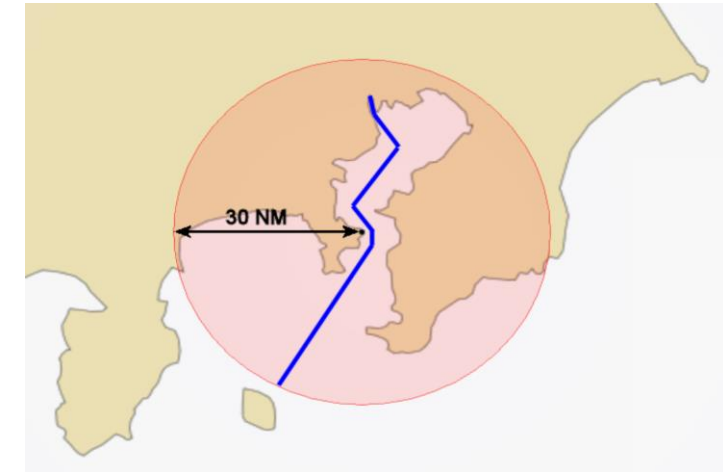
MSP		ASM use
1	VTS Information Service (IS)	
3	VTS Traffic Organization Service (TOS)	
4	Local Port Service (LPS)	○
6	Pilotage service	○
9	Tele-medical Maritime Assistance Service (TMAS)	
16	Search and Rescue (SAR) Service	○
Others (fishing gear)		

High needs especially for MSP1,4,6→ Reflected in the test platform



## Field trial by JCG and TUMST

- Schedule: December 11-13, 2018
- Trial location: Tokyo Bay
- Stations used:
  - Coastal Station: Kannon-saki Radar site
  - Vessel Station 1: Shioji-maru
  - Vessel Station 2: Yayoi



Planned route for test platform



Kannon-saki Radar site  
(previously Tokyo-wan VTS centre)



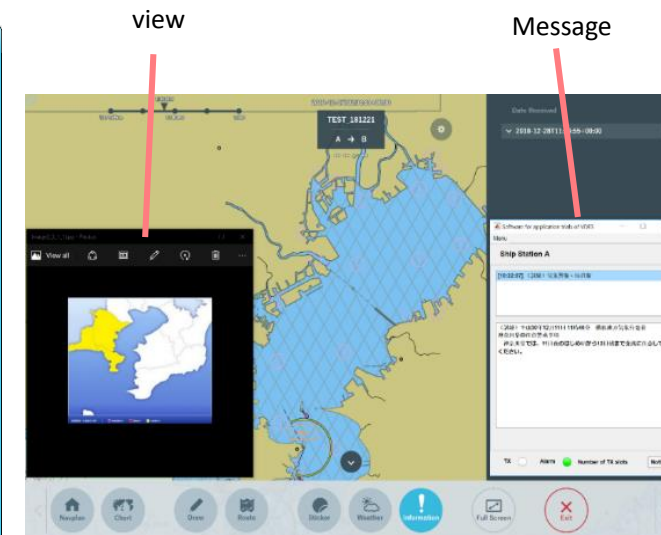
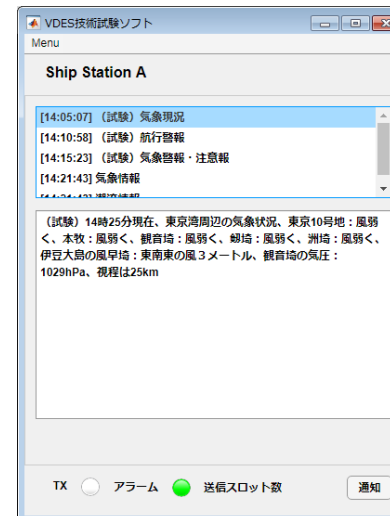
Shioji-maru (425GT, 49.9m)



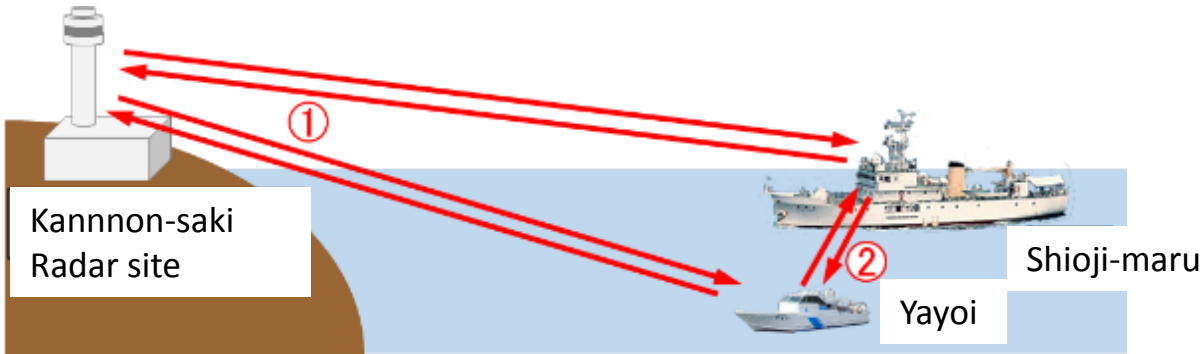
Yayoi (19GT, 19.7m)

- Participants
  - 36 people (government, academia, stakeholders)
- Test1 : Comments on the example of operation
  - Observe the result of demonstration and it was evaluated by 5 levels
  - Opinions on the result of demonstration
- Test2 : Quality of communication
  - Evaluated the success rate by communicating three types of information
    - Text message
    - Symbol (Weather, Maritime safety info, way point etc.)
    - Image (around 100kB)

## Example of user interface



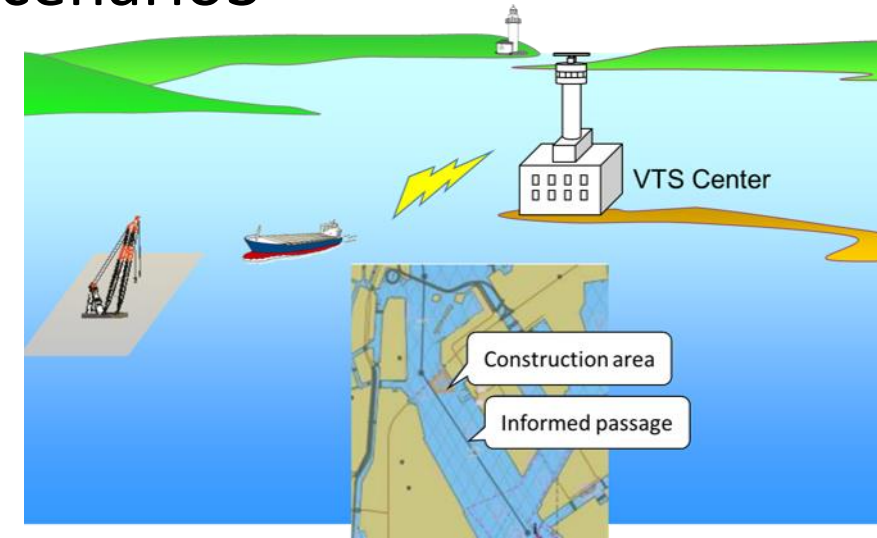
# Test platform for VDES operations



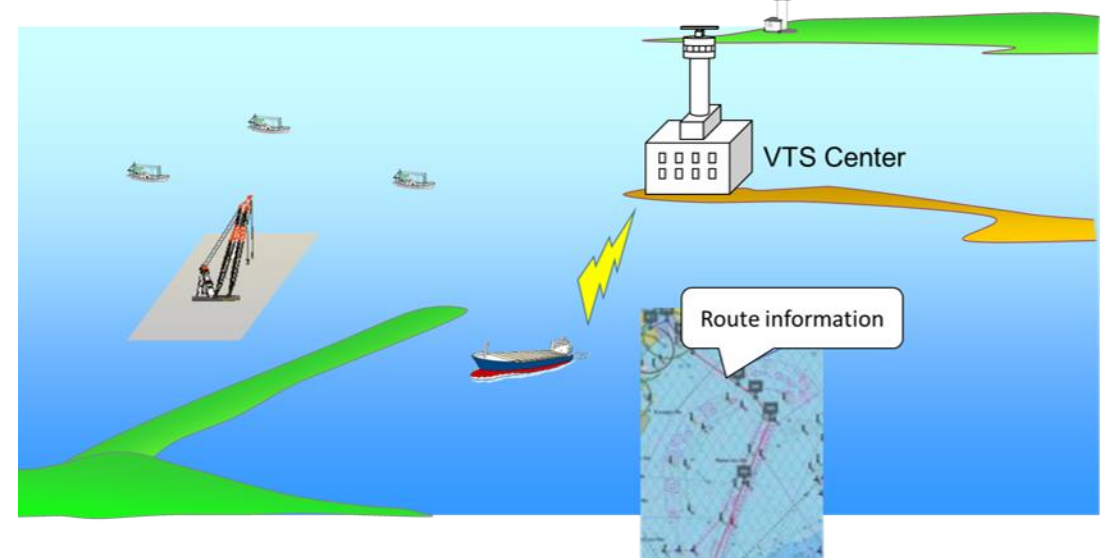
Type	Scenario	Outline	Types of information
①	1	【Replacement of voice communication】	Exchange text message(Chat)
		Data exchange	
	2	【Vessel traffic support (Management)】	Exchange text message(Chat)
		Management for inbound or outbound vessel	Provide information from vessels (ex:WayPoint)
	3	【Vessel traffic support (Advice)】	Exchange text message(Chat)
		Advice for vessel for approaching constructing area	Provide area information from coast
	4	【Vessel traffic support (Support)】	Exchange text message(Chat)
		Exchange navigational plan or reception	Provide route information from vessel
			Provide area information from coast
			Provide route information from vessel
	5	【Vessel traffic support (Support)】	Provide information by text message
		Provide information	Provide area information from coast



## Scenario3

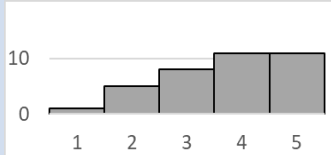
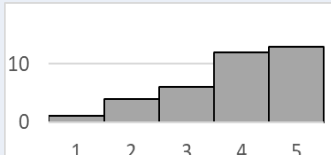
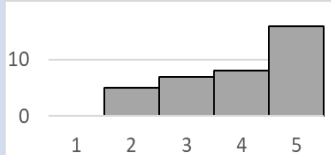
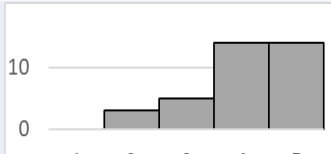



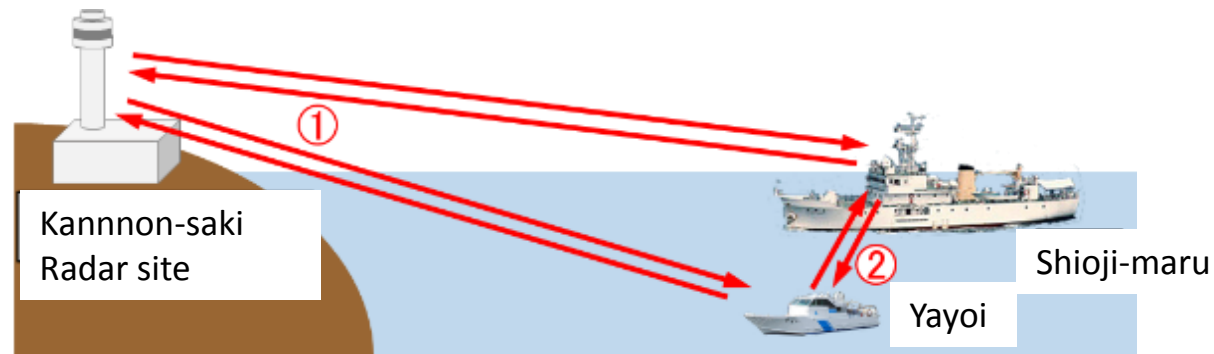
## Scenario5





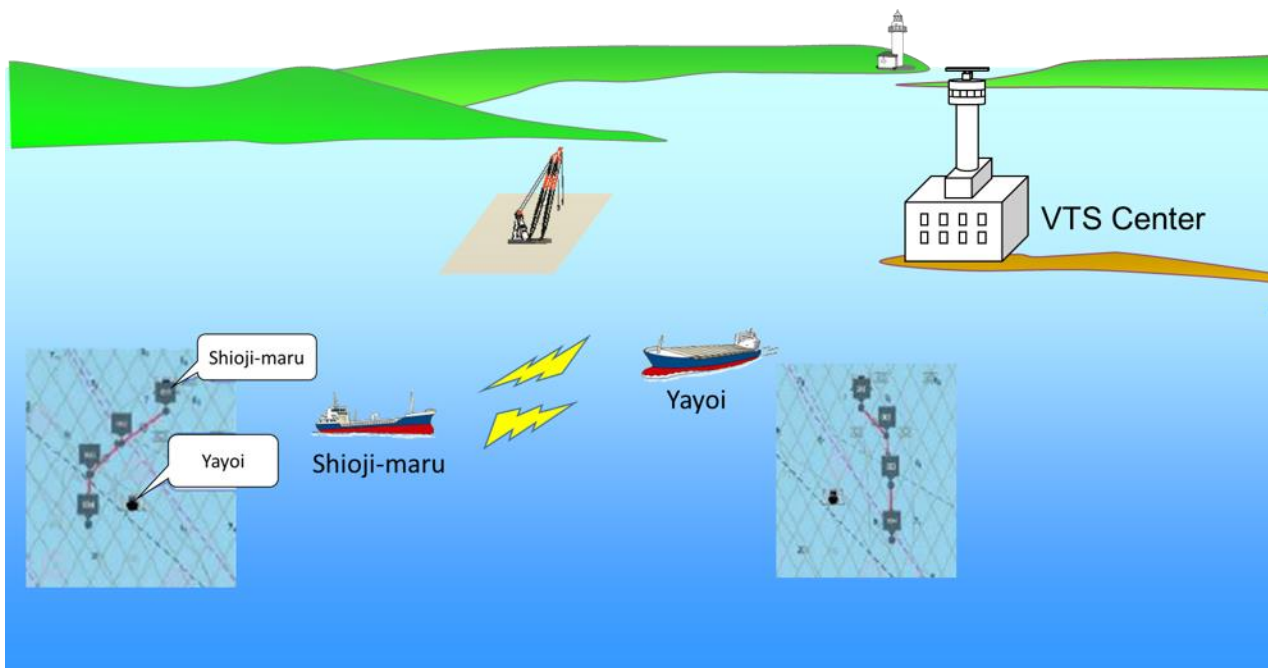
## Evaluation(type1) : Comments in each scenario (5 scales)

Scenario	Item	Evaluation	Score
1	【Replacement of voice communication】 Data exchange		3.7
2	【Vessel traffic support (Management)】 Management for inbound or outbound vessel		3.9
3	【Vessel traffic support(Advice)】 Advice for vessel for approaching constructing area		4.0
4	【Vessel traffic support (Support)】 Exchange navigational plan or reception		4.1
5	【Vessel traffic support (Support)】 Provide information		3.9

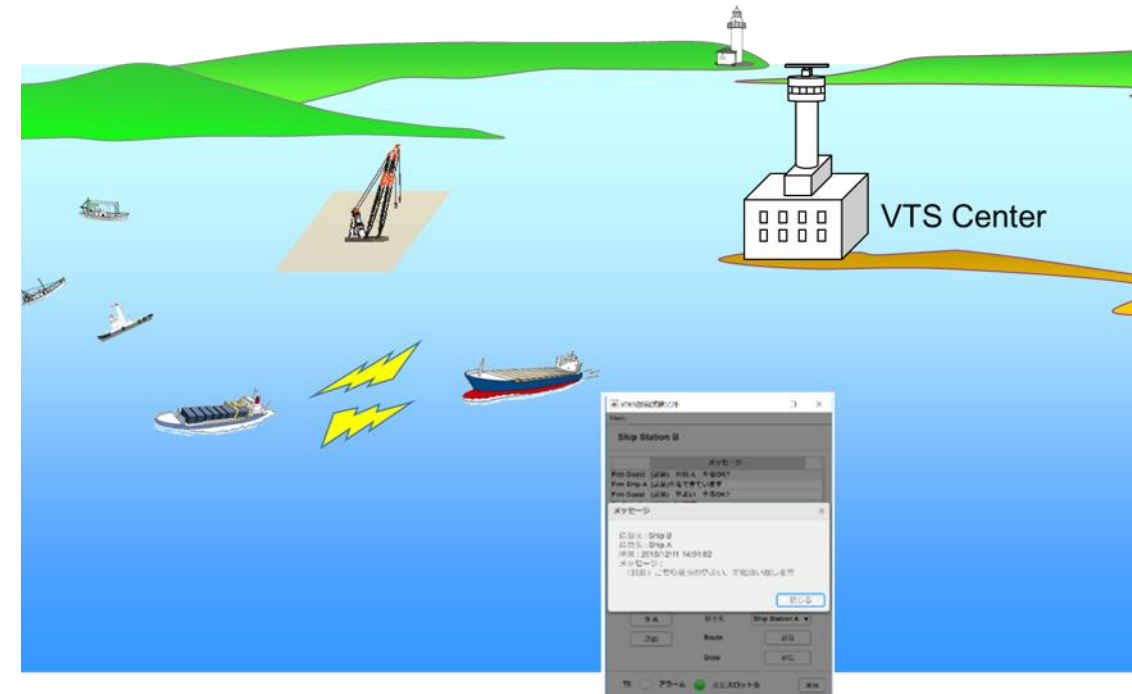


Type	Scenario	Outline	Type of information
②	1	【Substitute for voice communication】	Exchange text message(Chat)
		Data exchange	Provide or exchange information
	2	【Vessel traffic support】	Exchange text message(Chat)
		Mutual understanding	

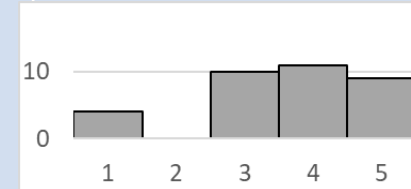
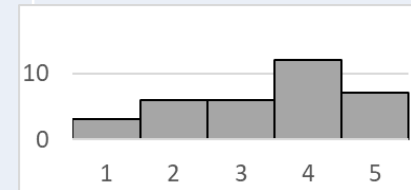
## Scenario1



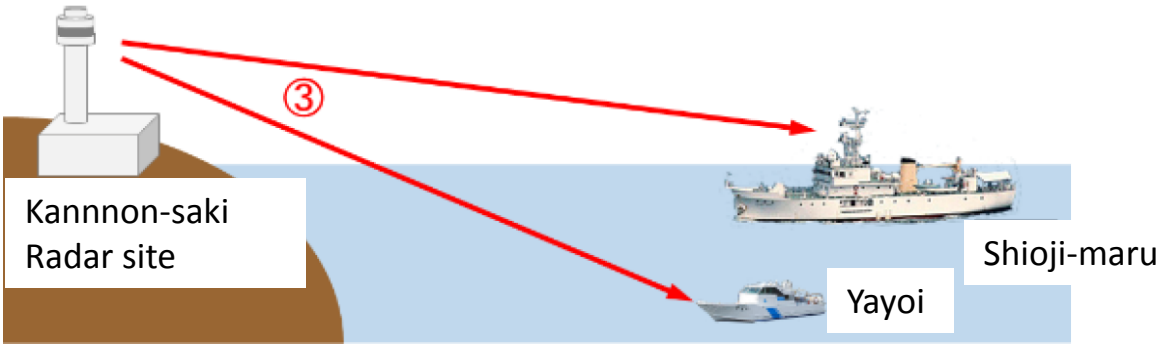
## Scenario2



## Evaluation(type2) : Comments in each scenario (5 scales)

Scenario	Item	Evaluation	Score
1	【Replacement of voice communication】 Data exchange		3.6
2	【Vessel traffic support】 Mutual understanding		3.4

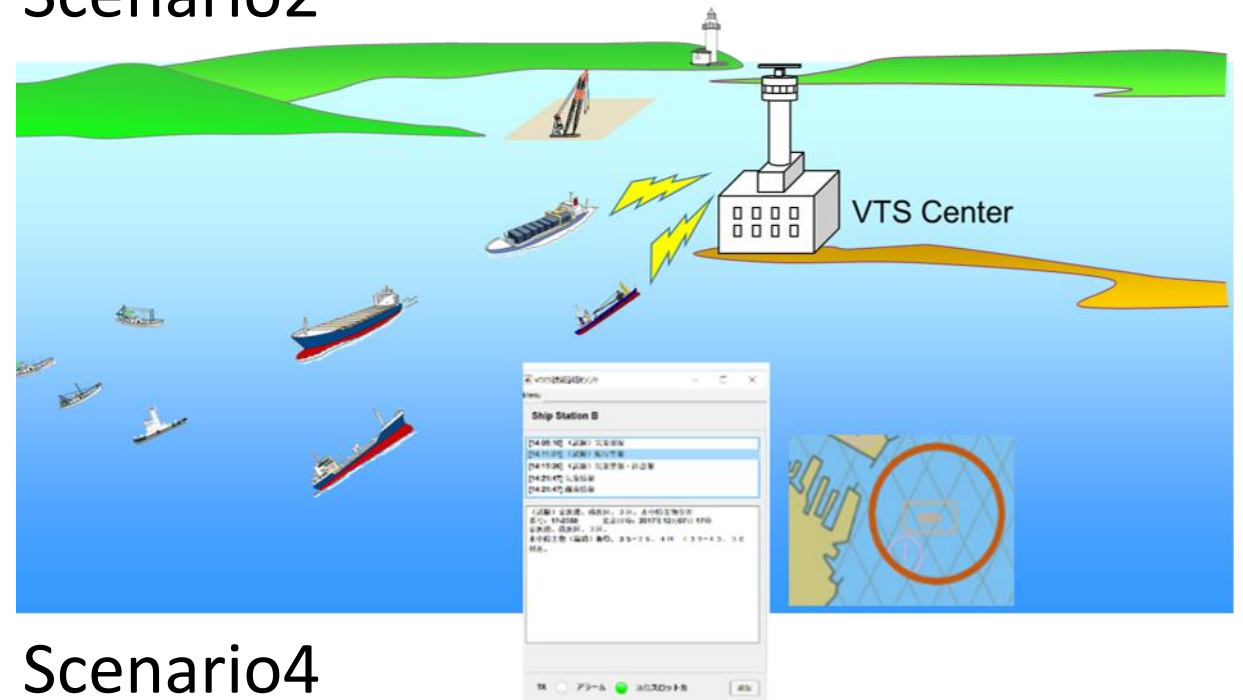
# Test platform for VDES operations



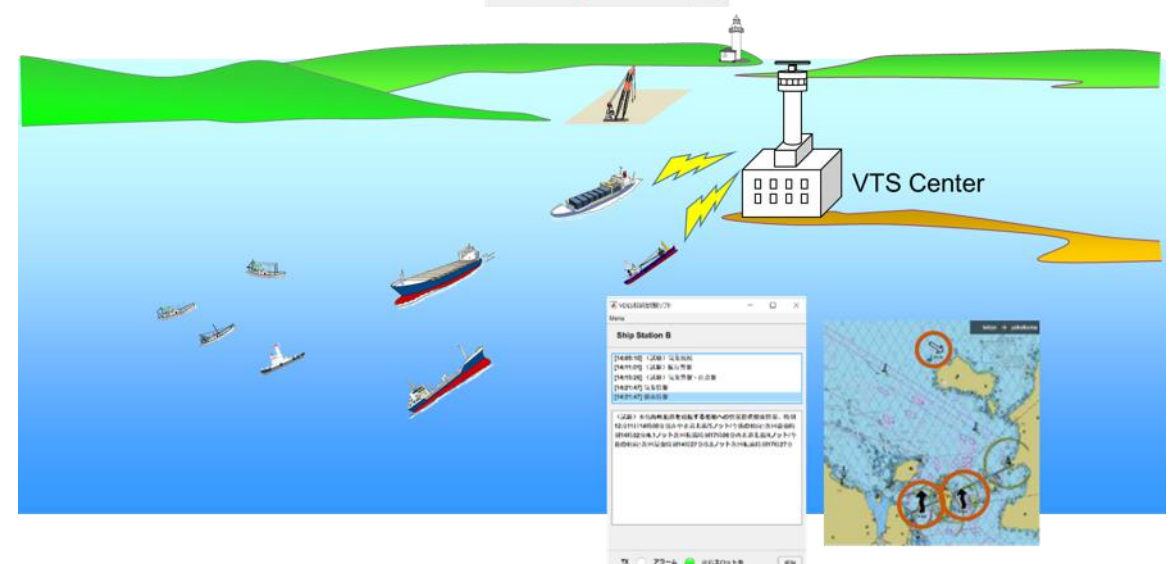
Type	Scenario	Outline	Type of information
③	1	【Replacement of voice communication】	Provide information from coast
		Maritime information and communication system	
	2	【Navigational warnings】	Provide navigational warnings by text from coast and area information
		Navigational warnings	
	3	【Maritime information and communication system】	Provide maritime information and communication system by text from coast and area information
		Weather or maritime safety information	
	4	【Marine or weather information】	Provide information by text from coast and area information
		Tidal or weather information in Kurushima strait	



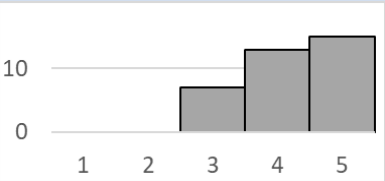
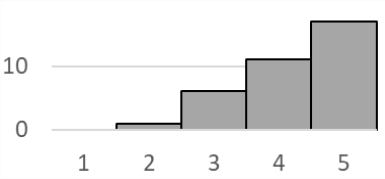
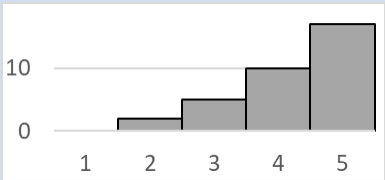
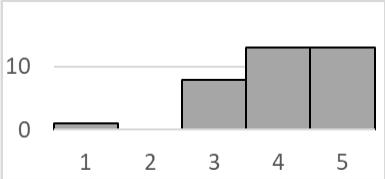
## Scenario2



## Scenario4



## Evaluation(type3) : Comments in each scenario (5 scales)

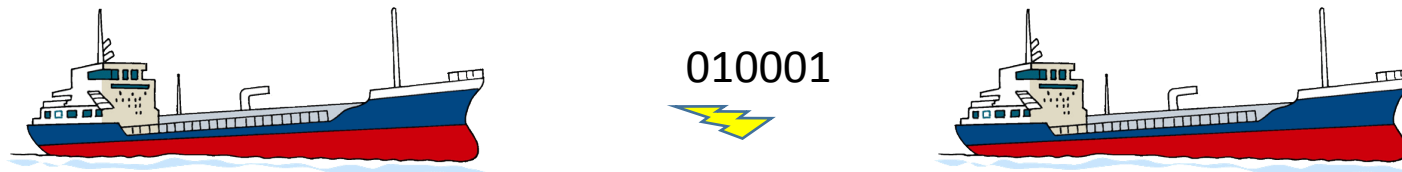
Scenario	Item	Evaluation	Score
1	【Replacement of voice communication】 Maritime information and communication system		4.1
2	【Navigational warnings】 Navigational warnings		4.2
3	【Maritime information and communication system】 Weather or maritime safety information		4.3
4	【Marine or weather information】 Tidal or weather information in Kurushima strait		4.2

- Result of questionnaire
  - High score as a tool of sending information from shore to vessels
  - Relatively low score as an substitute of voice communication



High expectation for sending information at ordinary situations

- Comments
  - It is not appropriate to use VDES in urgent situations.
  - It is necessary to cover the language gap in chatting.



It is important to use the fixed data (Additional use of ASM?)

- Quality : Gets worse as data size becomes bigger

Item	Chat	Nautical data	Image data
Number	137	37	34
Success number	129	24	13
Success rate	94%	64%	38%
Receive rate	—	96%	80%



Consider the means to send large data + Encourage the use of smaller size data

- $VDES = AIS + ASM + VDE\ TER + VDE\ SAT$
- Future events for VDES operation
  - WRC-19
  - Update for technical standards of VDES
- Japan's activities
  - Held international meetings 4 times
  - Focus group of operational use of VDES
    - Collect needs about the use of VDES
    - Test for operation
      - Needs for providing information in the ordinary case
      - Important to the quickness for data exchange
      - Challenge for sending large size data



Thank you for your attention.