



DALIAN MARITIME UNIVERSITY

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Shipborne Communication Gateway for e-navigation

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Outline

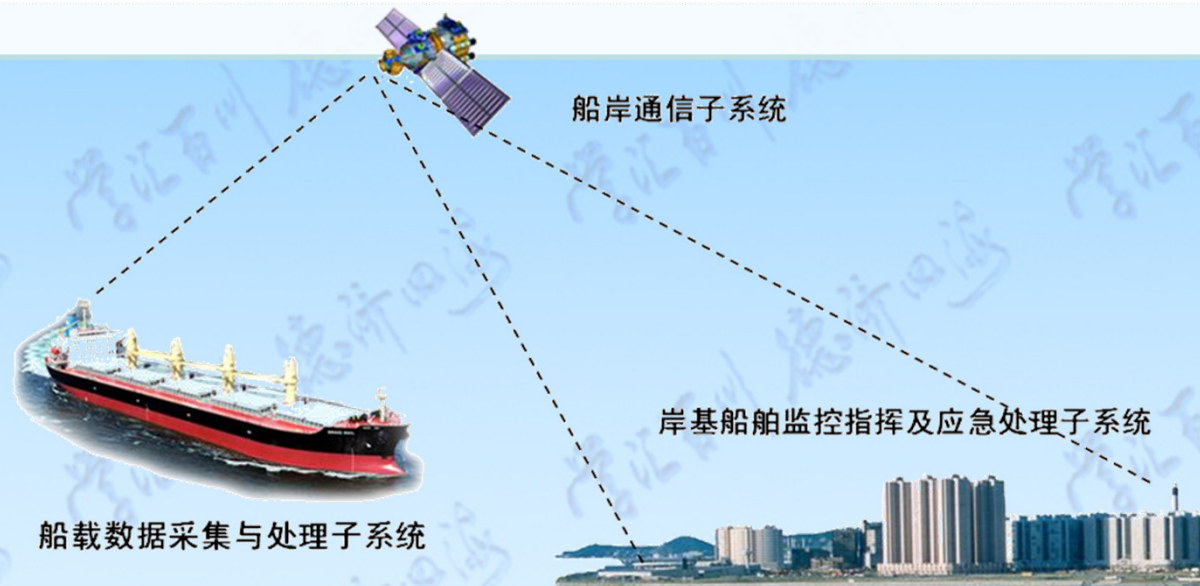
1. Background
2. Basic overview of SCOM
3. Requirements from e-Navigation
4. Discussions
5. Summary and conclusions



Background

The exchange of marine information/data between ship and shore is the key issue of e-navigation.

In 2006, the ship and cargo online monitoring system (SCOM) was developed by China.





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Basic overview of SCOM

■ Collect

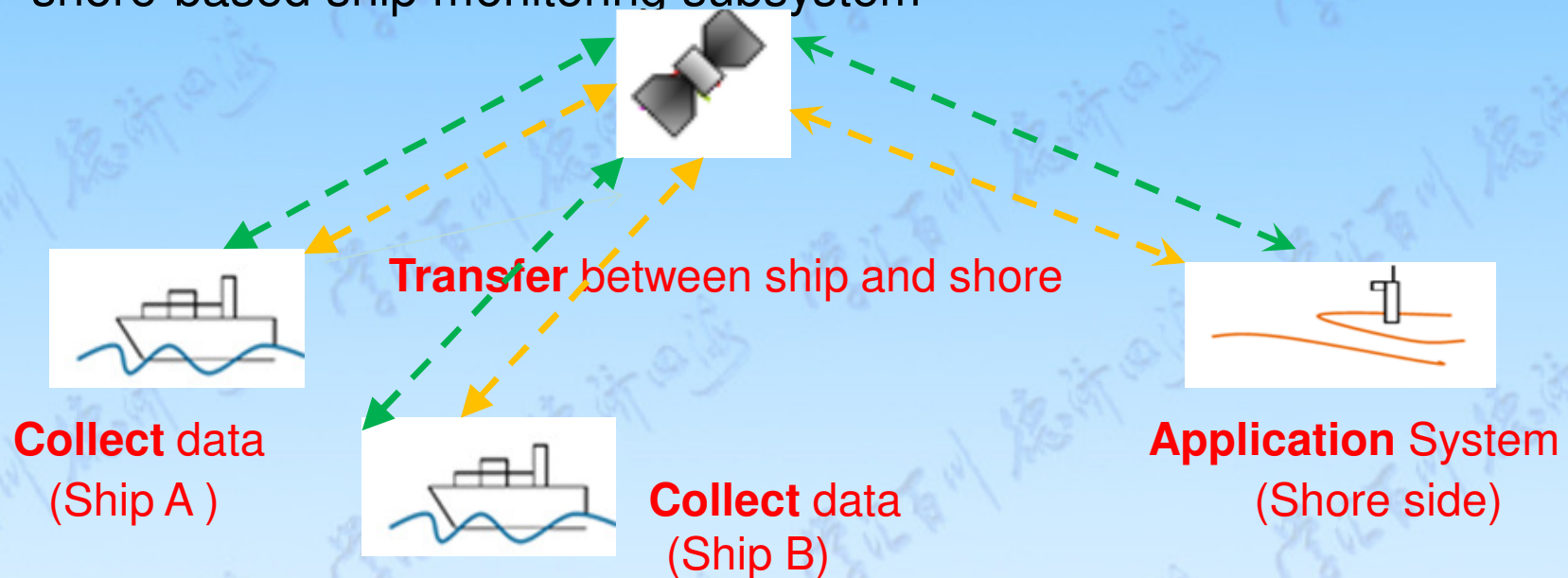
shipboard data acquisition and processing subsystem

■ Transfer

ship-shore communication subsystem

■ Application

shore-based ship monitoring subsystem

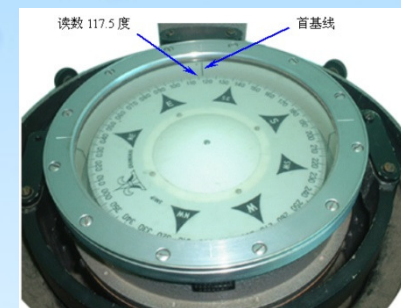




Basic overview of SCOM

■ Collect

- Four type of data: navigation information, engine information, cargo information, video information
- Type of navigation equipment: Compass, AIS, GPS, echo sounder, log, wind vane and anemometer, etc



5 February 2016



Basic overview of SCOM

■ Transfer

- Involved communication equipment

Inmarsat Mini C, Inmarsat F and Inmarsat Fleet Broad Band (FBB), etc

- **communication gateway**

The communication gateway which not only receive the control information sent by the systems on shore, but also select the best communication links according to the information types and sizes for sending the information to the systems on shore, was proposed.

■ Application

- Ship and cargo monitoring
- Installed by more than 40 ocean ships



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Requirements from e-Navigation

■ Six outputs have been identified and prioritized, based on the original 18 tasks for the five agreed solutions from the approved e-navigation SIP during MSC 95.

■ Three outputs are identified as high priority items, INS modules, ship reporting guidelines and display guidelines which base on information exchange between navigation equipment and communication equipment.



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Discussion -how to meet the requirements from e-Navigation

Accordingly, with the knowledge that has been gained on SCOM, the analysis is provided below to assist the work of data exchange between navigation equipment and communication equipment.

■ Current main communication channel between ship and shore

- dedicated data links
AIS, DSC, NAVTEX, VHF, HF, MF, SafetyNET...
- commercial data links
Inmarsat, VSAT, WiMax, WiFi, 3G/4G...

■ Current main shipborne navigation equipment

ECDIS, RADAR, AIS, GPS...



Discussion -how to meet the requirements from e-Navigation

■ how does INS connect to communication equipment

■ dedicated gateway

Because of the diversity of communication equipment, it is very difficult to connect navigation equipment with the different communication equipment directly.

With the knowledge that has been gained on SCOM, we propose that INS should contain a dedicated gateway which connect to different communication equipment. the gateway will support the extension of communication equipment, such as the emerging NAVDAT and VDES.

■ interfaces

support not only serial interface, but also Ethernet interface

■ standard

such as IEC 61162 series standard



Discussion -how to meet the requirements from e-Navigation

■ major function of gateway

■ duplex communication

One function is routing the received maritime safety information(MSI) from communication equipment into the integrated navigation systems, the other is routing the related information from navigation equipment into the communication systems, such as ship report.

■ filter

The gateway should distinguish the related navigation safety information from ordinary business information.

■ store-and-forward

In shore-ship communication, in order to avoid lack of situational awareness or information overload, the gateway should provide the function of store for the received related navigation safety information via communication equipment.



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Summary and conclusions

In order to meet the needs of e-navigation, without paying undue attention to the hazy communication infrastructure, the dedicated gateway for e-navigation which should:

- .1 support not only serial interface, but also Ethernet interface and TCP/IP protocol.
- .2 support duplex communication between navigation equipment and communication equipment.
- .3 distinguish the related navigation safety information from ordinary business information via ship-borne communication equipment.
- .4 provide the functionality of store-and-forward and routing.



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Thank you for your attention!

