Status and Future Plan of Radio Navigation in Korea

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DEPARTMENT OF COAST GUARD
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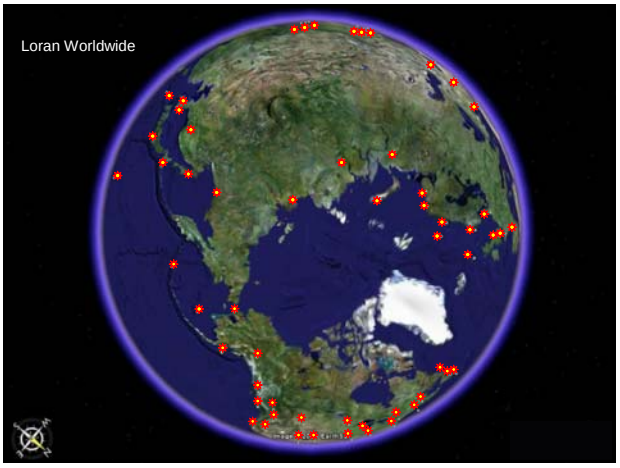
KOREA MARITIME UNIVERSITY

Contents

1. Status of the Infrastructure for radio navigation in Korea

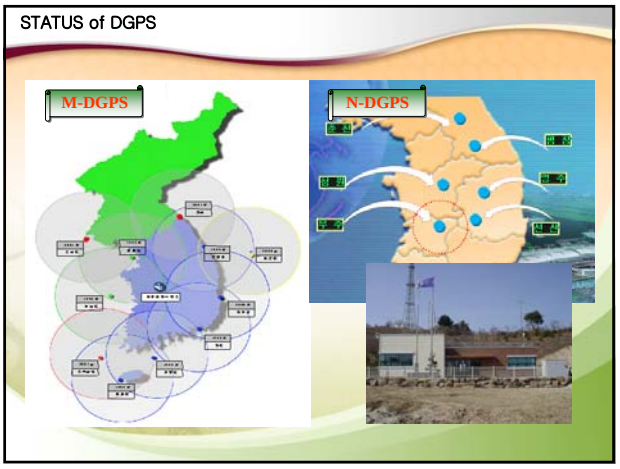
Type	Range	Status
Loran-C	1,100 nm	2 Stations Korea Chain -M1, S1 NWPC - S1
GPS/DGPS	100 nm	13(11 MDGPS, 2 NDGPS) stations
MF RADIO BEACON	100 nm	11 Stations
Radar Beacon (RACON)	5-9 nm	82(9) ea
Coastal VTS	20-30 nm	1(2) stations
AIS station (VTS)	50 nm	12 stations(VTS Center)

STATUS of LORAN-C

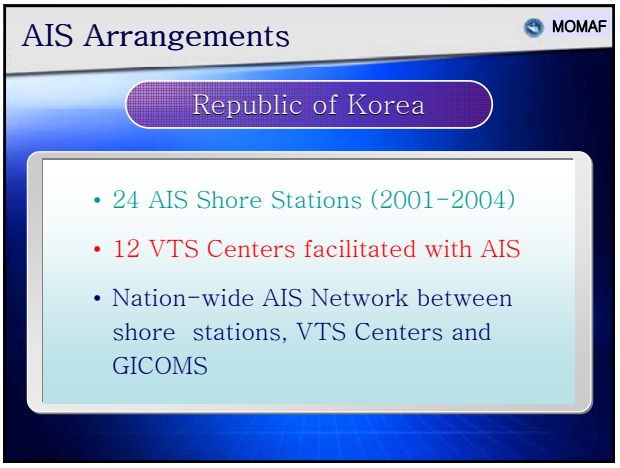


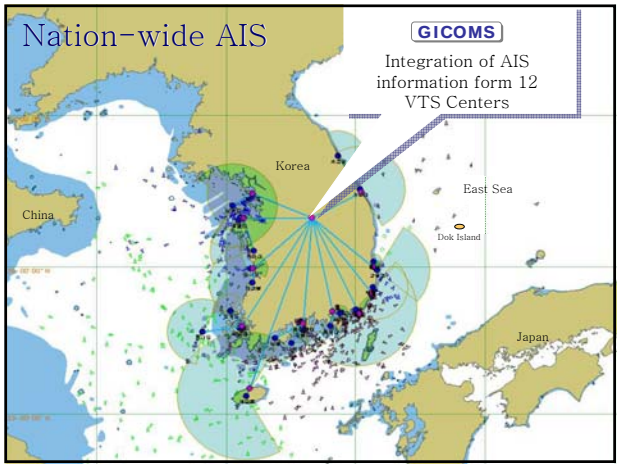
FUTURE of LORAN-C

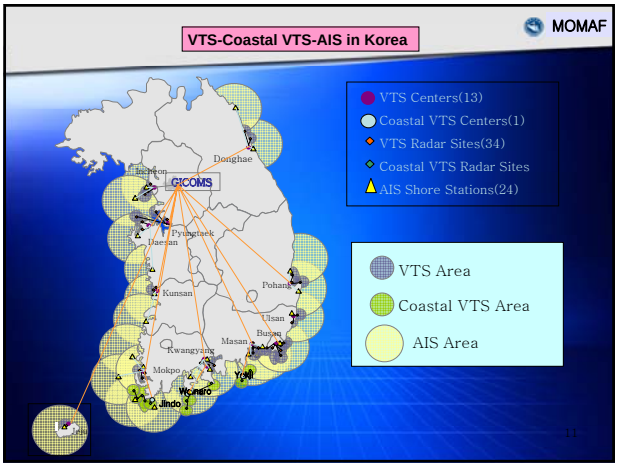
- Improvement of Communication Network between Japan and Korea
- Remote Control of Transmitting stations
- Introduction of eLORAN
- Construction of Independent Chain


STATUS of DGPS
M-DGPS
N-DGPS


MOMAF
Nation-wide AIS


AIS Arrangements
MOMAF
Republic of Korea
• 24 AIS Shore Stations (2001-2004)
• 12 VTS Centers facilitated with AIS
• Nation-wide AIS Network between shore stations, VTS Centers and GICOMS


Nation-wide AIS
GICOMS
Integration of AIS information form 12 VTS Centers
Korea
China
East Sea
Dok Island
Japan


VTS-Coastal VTS-AIS in Korea
MOMAF
VTS Centers(13)
Coastal VTS Centers(1)
VTS Radar Sites(34)
Coastal VTS Radar Sites
AIS Shore Stations(24)
GICOMS
VTS Area
Coastal VTS Area
AIS Area


National VMS
MINISTRY OF MARITIME AFFAIRS & FISHERIES

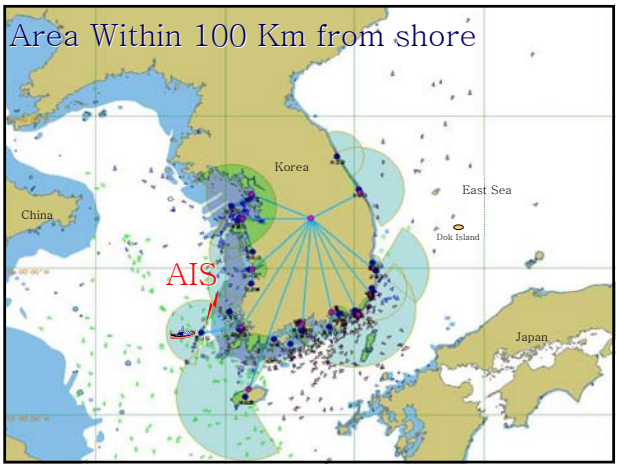
Vessel Monitoring System (VMS)

MOMAF

- to support prompt search and rescue operations
- to monitor all Korean flagged vessels in all waters
- to monitor all Foreign flagged vessels in Korean waters
- to improve the safety of shipping lanes and port areas
- to strengthen national and regional capacity in maritime safety and marine environment protection

Monitoring Safety and Security at Sea

Area Within 100 Km from shore



Area over 100Km from shore

MOMAF

Construction of VMS

MOMAF

Area	VMS Equipment	Coverage
Near Costal (A1 area)	AIS + Radar	Within 50 nm
Coastal (A2 area)	SSB, CDMA, TRS(VHF), Satellites	50 – 150 nm
Ocean (A3 area)	Satellite (Inmarsat, Argos, Orbcomm, Global Star)	Over 150 nm

FUTURE PLAN on VMS

MOMAF

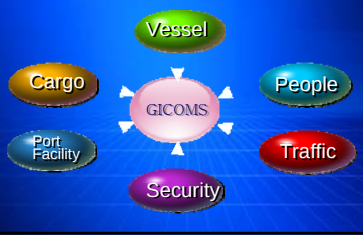
- Development class B AIS for domestic ships
- Extension of AIS application to all domestic ships
- Legislation for ship position reporting for all ships mandatory by regulation
- Establishment of more AIS shore stations to minimize the blind sector of AIS network
- AIS Information Exchange between related bodies and neighboring countries

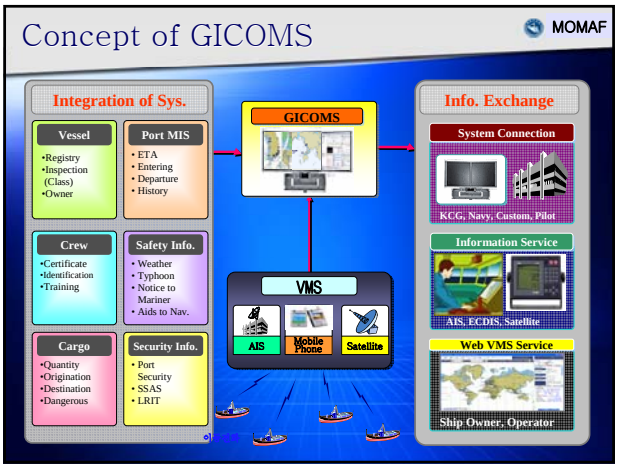
What is GICOMS ?

MOMAF

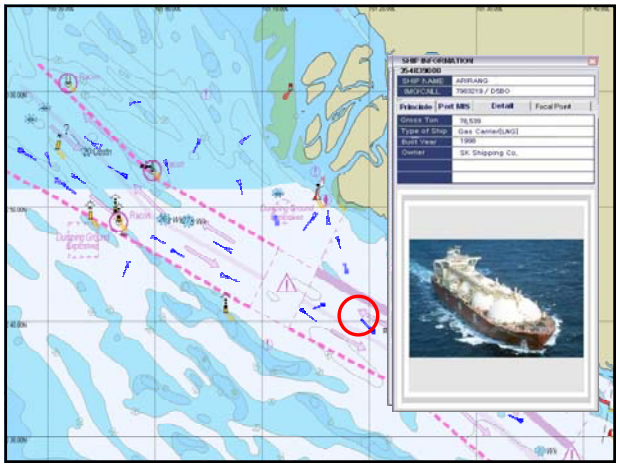
National Marine Crisis Managment System

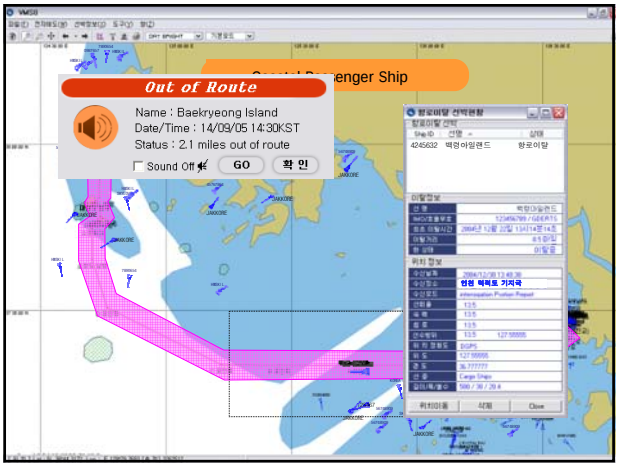
GICOMS aims at prevention of marine casualty, prompt reaction to casualty and minimization of damage.

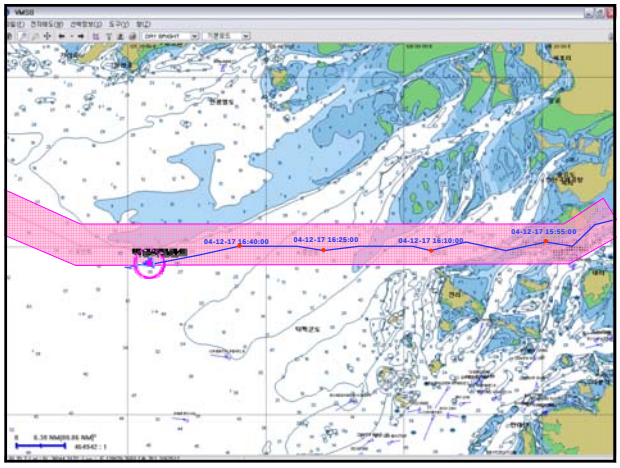


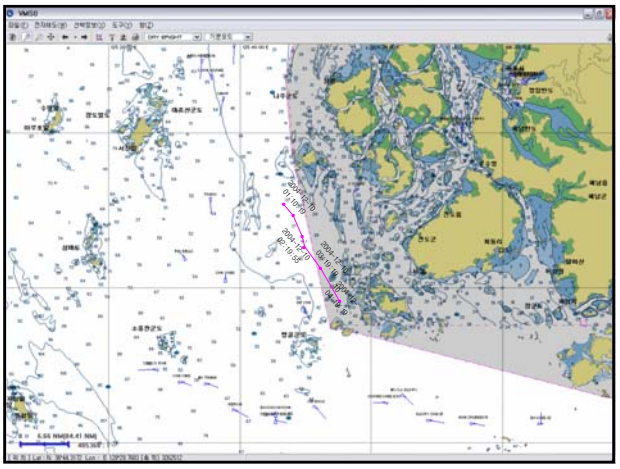

Concept of GICOMS
MOMAF
Integration of Sys.
Vessel
•Registry
•Inspection (Class)
•Owner
Port MIS
• ETA
• Entering
• Departure
• History
Crew
•Certificate
•Identification
•Training
Safety Info.
• Weather
• Typhoon
• Notice to Mariner
• Aids to Nav.
Cargo
•Quantity
•Origination
•Destination
•Dangerous
Security Info.
• Port Security
• SSAS
• LRIT
GICOMS
VMS
AIS
Mobile Phone
Satellite
Info. Exchange
System Connection
KCG, Navy, Custom, Pilot
Information Service
AIS, ECDIS, Satellite
Web VMS Service
Ship Owner, Operator

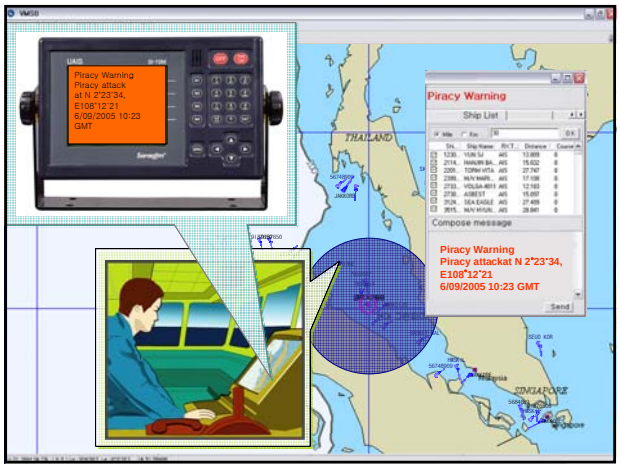

Functions of GICOMS
MOMAF
Monitoring Vessel
Web VMS Service
Traffic Control
Tracking Vessel
SSAS
Weather Information

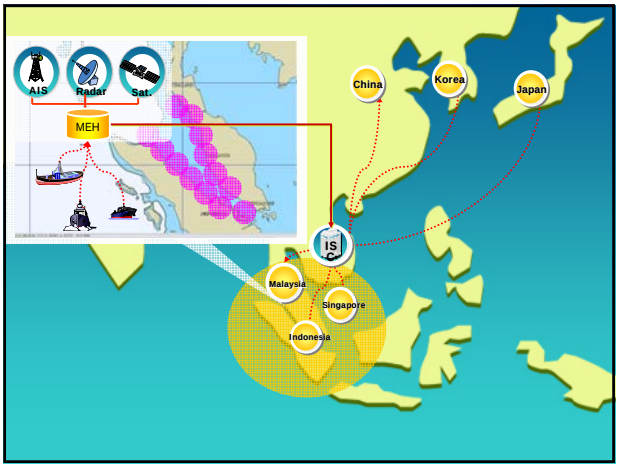


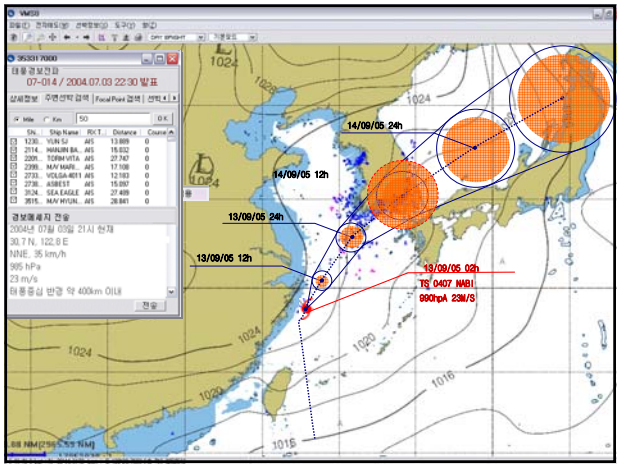

Out of Route
Name : Baekryeong Island
Date/Time : 14/09/05 14:30KST
Status : 2.1 miles out of route
Sound Off
GO
확 인

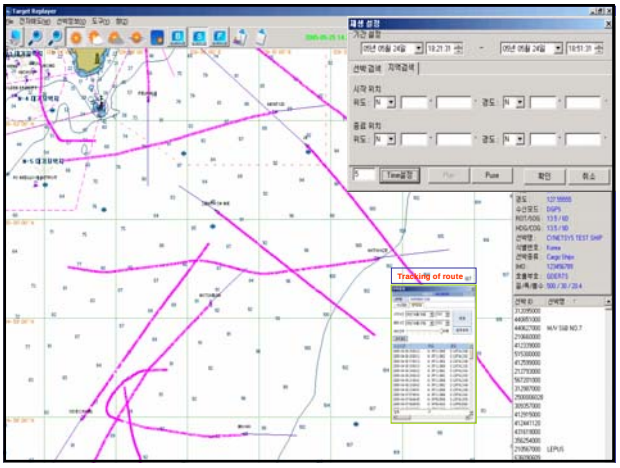


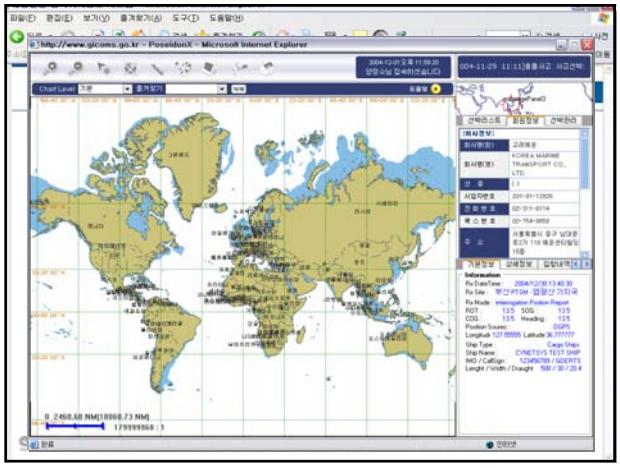



Piracy Warning
Piracy attack
at N 2°23'34,
E108°12'21
6/09/2005 10:23
GMT
Piracy Warning
Ship List
THAILAND
Compose message
Piracy Warning
Piracy attackat N 2°23'34,
E108°12'21
6/09/2005 10:23 GMT
Send
SINGAPORE


AIS
Radar
Sat.
MEH
China
Korea
Japan
IS
Malaysia
Singapore
Indonesia


07-014 / 2004.07.03 22:30 발표
14/09/05 24h
14/09/05 12h
13/09/05 24h
13/09/05 12h
13/09/05 02h
TS 0407 MAEI
990hpA 23M/S
1024
1020
1016


Tracking of route


http://www.gicoms.go.kr - PoseidonX - Microsoft Internet Explorer

Automatic Identification System
As an Aids To Navigation

Contents

1. Why we did field evaluation?

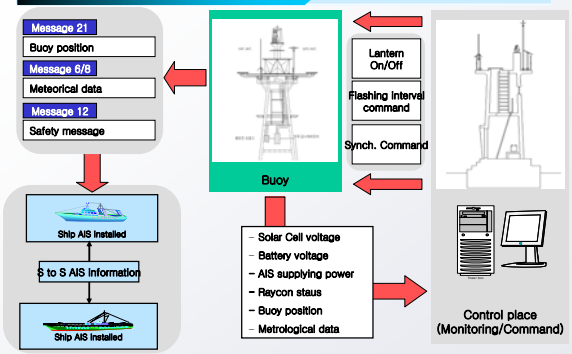
☐ Main Target

- Getting REAL TIME information using AIS
- Fundamental infrastructure for marine safety facilities

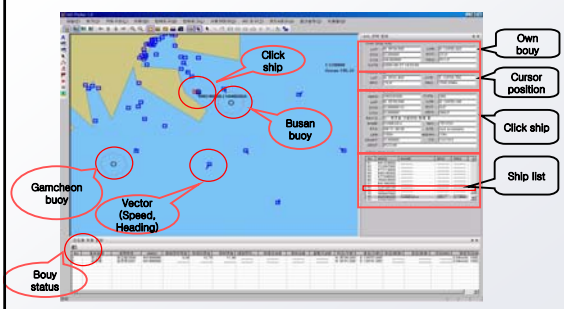
☐ Experiments

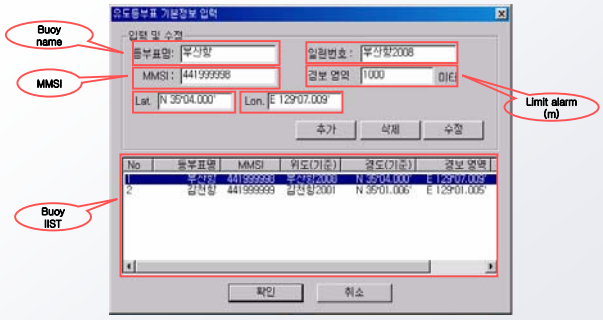
- 1st step : Testing receiving information from Buoy to Center (Power status etc.)
- 2nd step : Gathering each figure from several sensor which install in buoy
- 3rd step : Evaluation the information in Center and broadcasting nearby ships

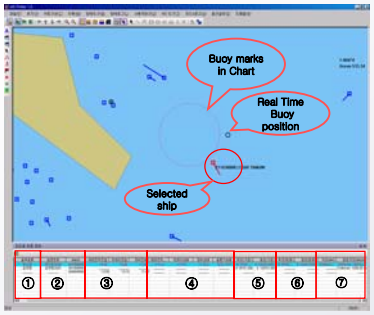
2. System configuration



b. Operation display view







Details buoy information

① Buoy name

② Serial Number

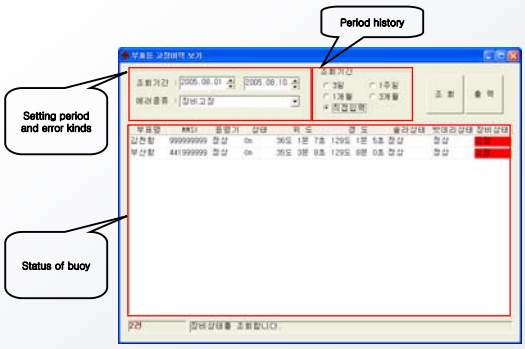
③ Solar cell voltage

④ Lantern status

⑤ Position of central

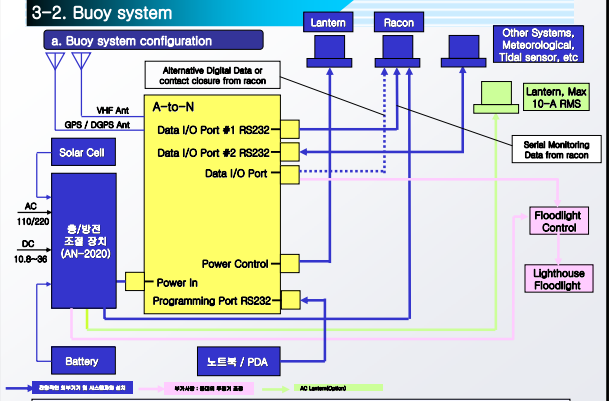
⑥ Real time position

⑦ Distance between center and present position

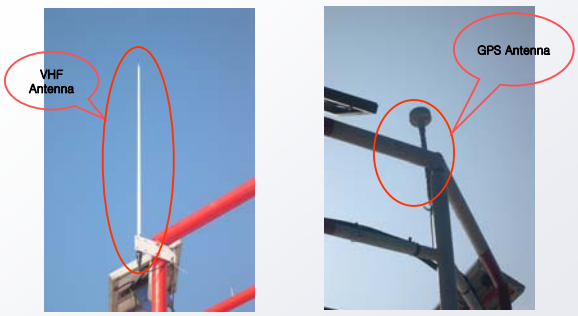


3-2. Buoy system

a. Buoy system configuration



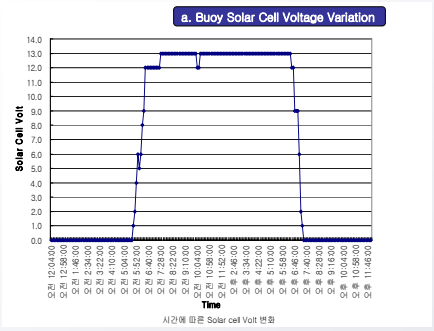
b. Buoy installation



해양수산부

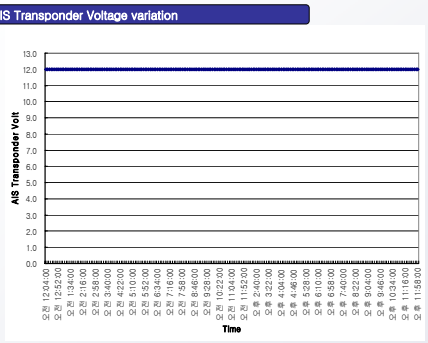
4. Test results

a. Buoy Solar Cell Voltage Variation



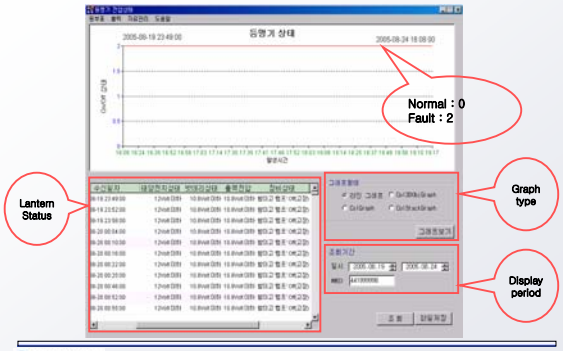
해양수산부

c. AIS Transponder Voltage variation



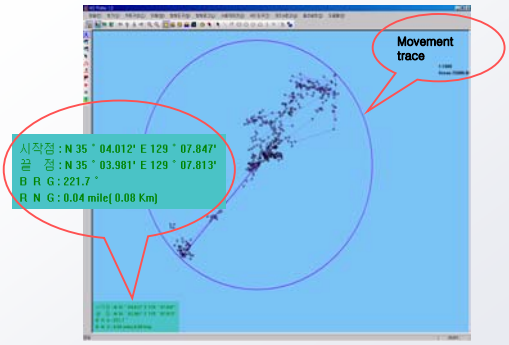
해양수산부

d. Lantern status

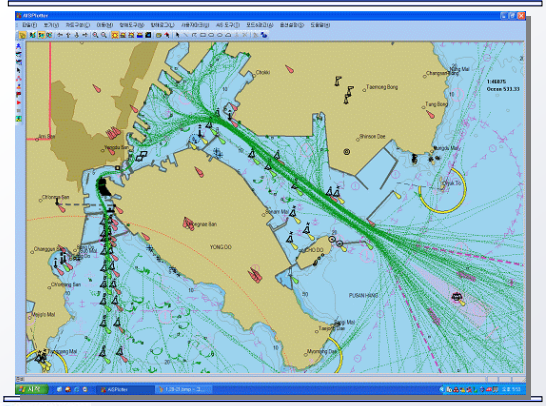


해양수산부

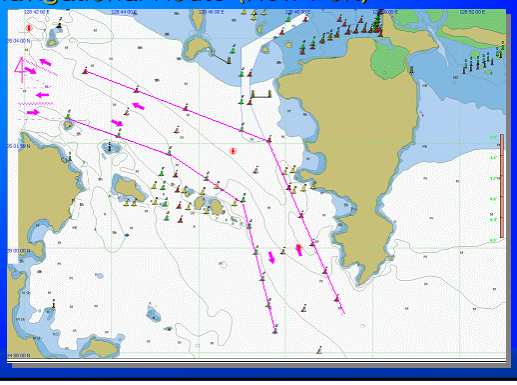
e. Buoy motion status in Busan



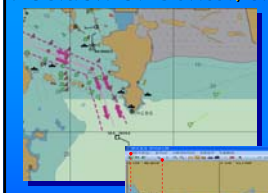
해양수산부



Navigational Route (New Port)



Position of Center/slave Station

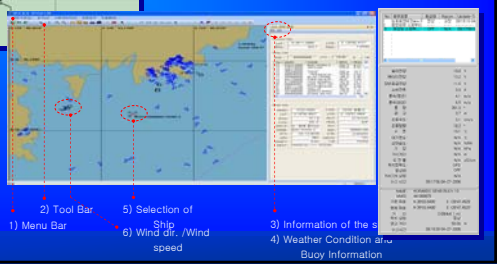


Center : Gadeokdo Lighthouse

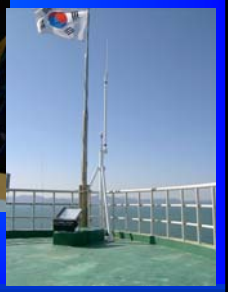
Slave 1 : New Port Lanby

Slave 2 : New Port 104 Spar Buoy

Slave 3 : New Port 108 Spar Buoy



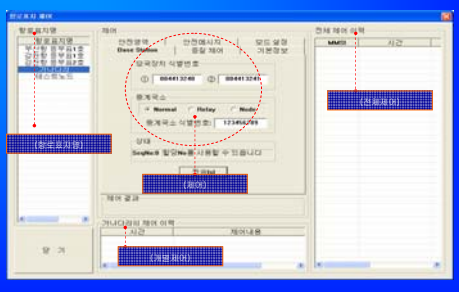
Equipments of Center (Gadeokdo Lighthouse)



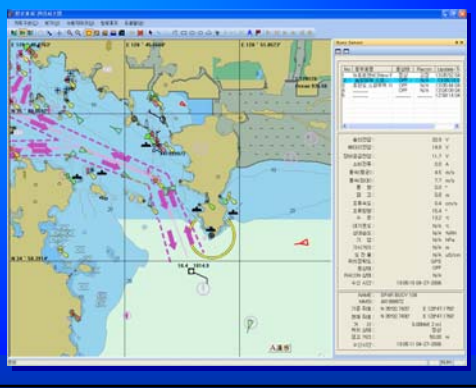
Equipments of Slave1(New Port Lanby)

Equipments of Slave 3(New Port 108 buoy)

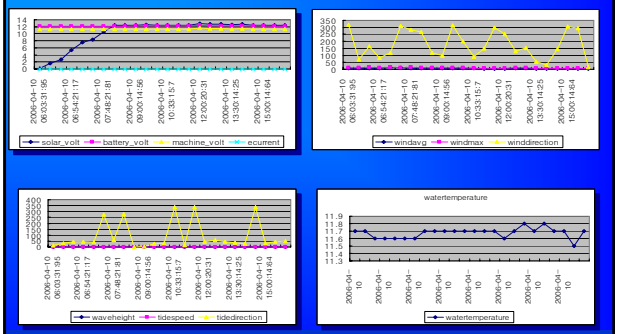
Control of the Functions for AtoN



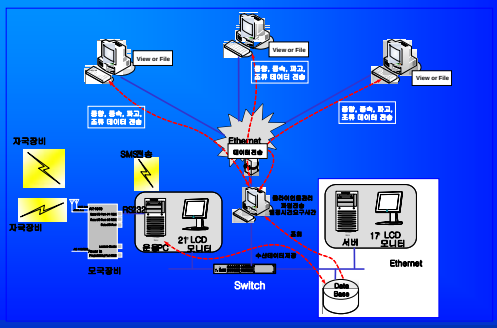
DISPLAY VIEW



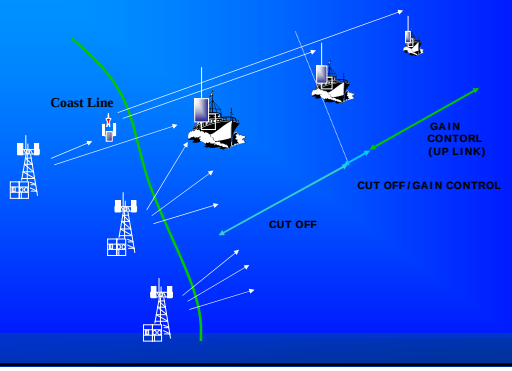
Weather and Sea Condition Information from slave 2 (New Port 104)



Outline of the Information Distribution



Distribution of the Information by using CDMA Network



Future Plan of the Infrastructure for radio navigation in Korea (till 2014)

- Construction of NDGPS
- Construction of Own Positioning System
- Expansion of GNSS Infrastructure
- Coastal VTS