

# Korean National AIS Project

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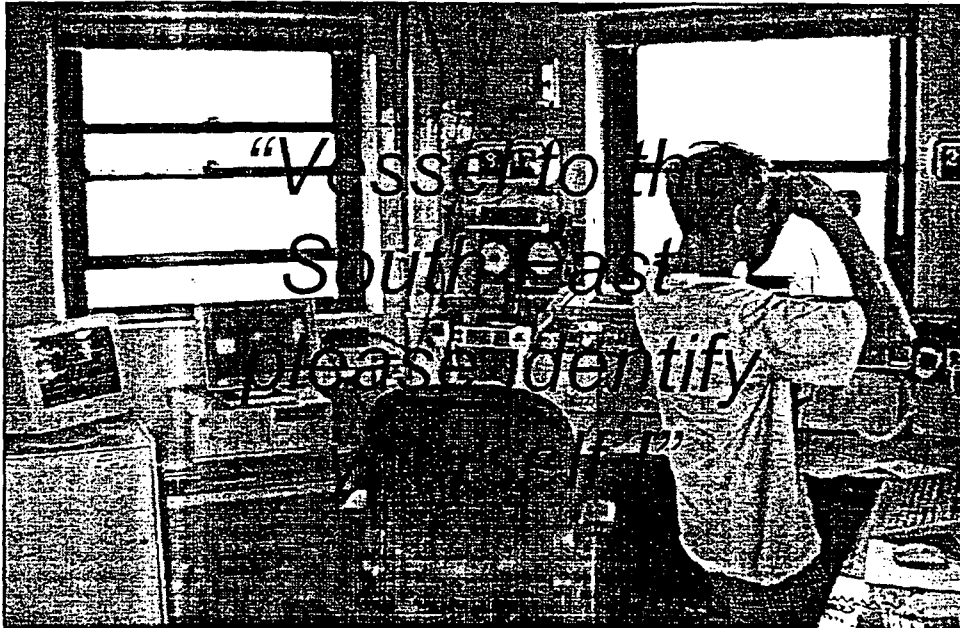
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## Presentation Content

- Background
- Description of Universal AIS
- Shore Network (Plan)
- Applications for Universal AIS
- Further Consideration



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## AIS - background

- A need for identification and better situation awareness in many areas
- DSC-transponder (GMDSS), with limited functions, not approved by IMO
- New techniques with new possibilities
  - GPS/DGPS
  - ENC/ECDIS
  - Self-Organised TDMA



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## AIS - basic idea

- Broadcast own ship data to other ships and shore stations
- Receive information from other ships and shore stations
- Use of an autonomous organisation method for the transmissions
- A cellular concept for an effective use of the frequencies



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Automatic and continuous  
broadcast of own ship data

- Dynamic data
- Static data
- Voyage related data



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## Dynamic data

- Position (latitude/longitude in WGS 84)
- Course and speed over ground
- Heading
- Rate of turn
- Navigational status
- Position accuracy



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## Dynamic data

### Report rate

<u>Speed (knots)</u>	<u>Update rate</u>	<u>Increased rate</u>
0 - 14	12 seconds	4 seconds
14 - 23	6 seconds	2 seconds
23 +	3 seconds	2 seconds
At anchor	180 seconds	

*Increased rate when ship turning more than 10 degrees/min.*



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## Static data

- MMSI number
- IMO Number
- Name of the ship
- Call sign
- Length and Beam
- Type of Ship
- Location of the GPS antenna on the ship



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## Voyage related data

- Ships draught
- Type of cargo
- Destination
- Estimated time of arrival
- (Waypoints)
- (Number of persons on-board)

*Voyage and static data are updated once every 6 minutes or  
on request (interrogation)*



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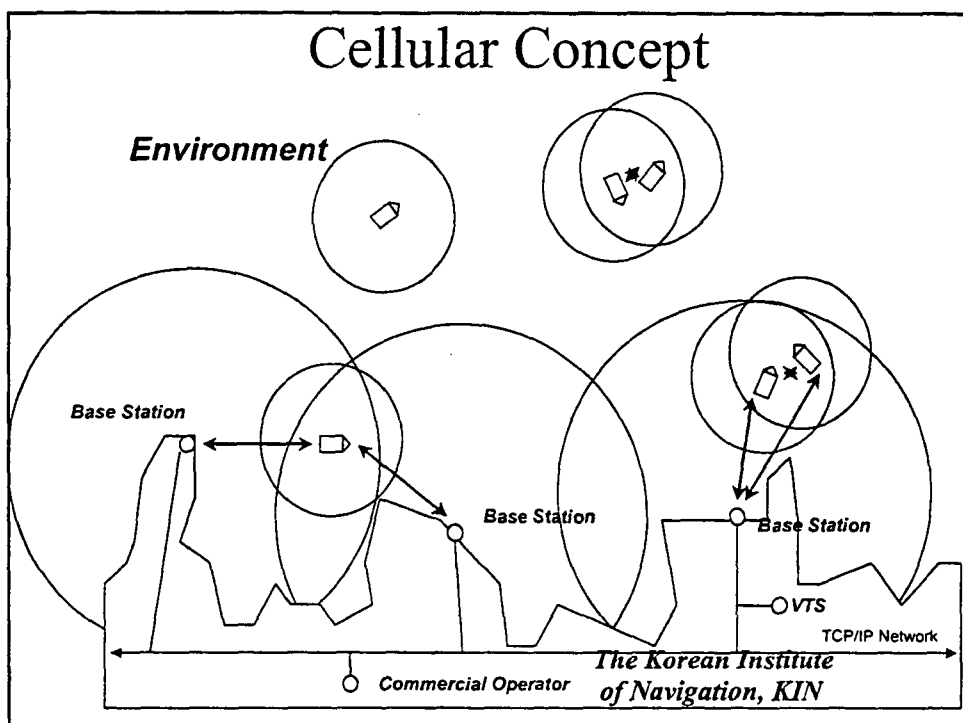
## Text and Binary data

- Broadcast and point-to-point messages for application specific purposes.
- In point-to-point transmissions, the receiving station responds with an ACK.
- Short message communication between vessels or vessel to VTS or vice versa

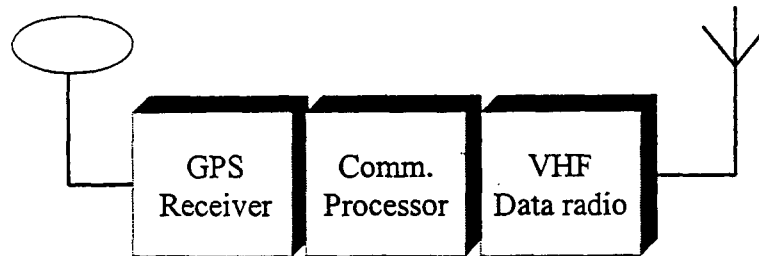


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## Cellular Concept



# The AIS transponder



### GPS Receiver

- Synchronization
- Position
- Speed Over Ground
- Course Over Ground

### Comm. Processor

- Access VHF data link
- Pack information
- Unpack information
- Control

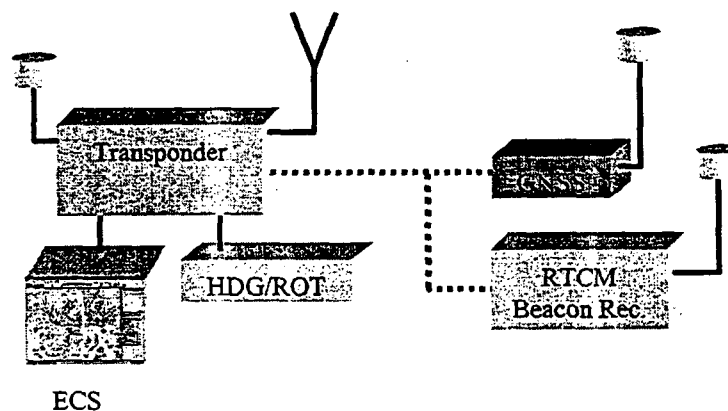
### Radio Unit

- Transmit Data
- Receive Data



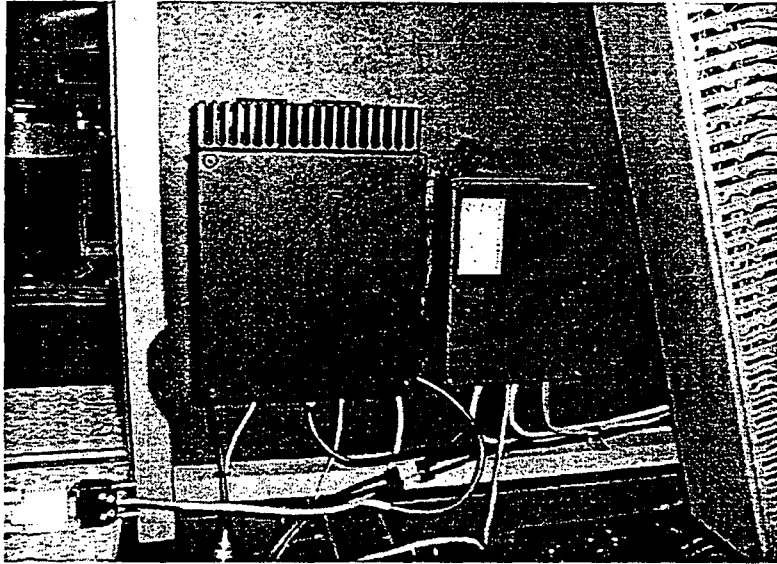
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# Ship Installation



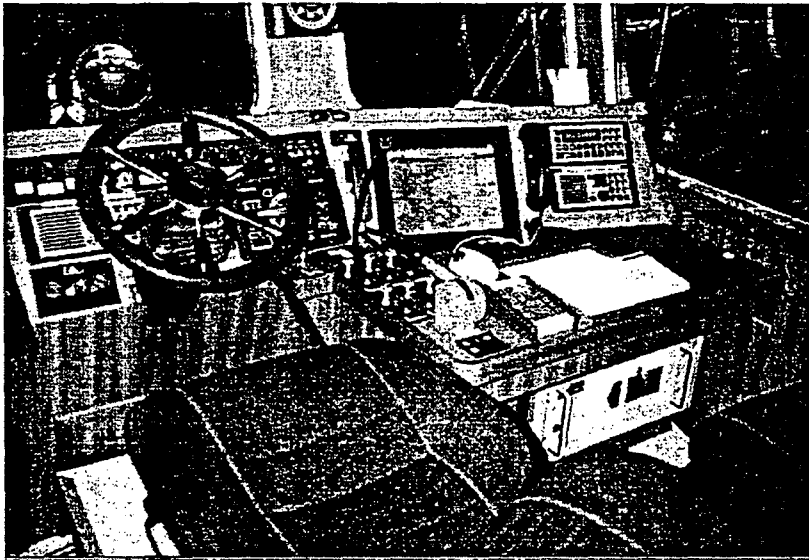
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## Ship installation of AIS



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## Ship Installation of AIS



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## Applications of AIS technology

- Ship-to-ship for collision avoidance
- For littoral states to obtain information about ships and its cargo
- As a VTS tool
- Broadcast of differential corrections
- Search And Rescue (SAR) purpose



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## Applications of AIS technology

- Fleet Management
- Supervision of Aids-to-navigation
- Sending Weather data
- Broadcast of Navigational warnings
- Port Management



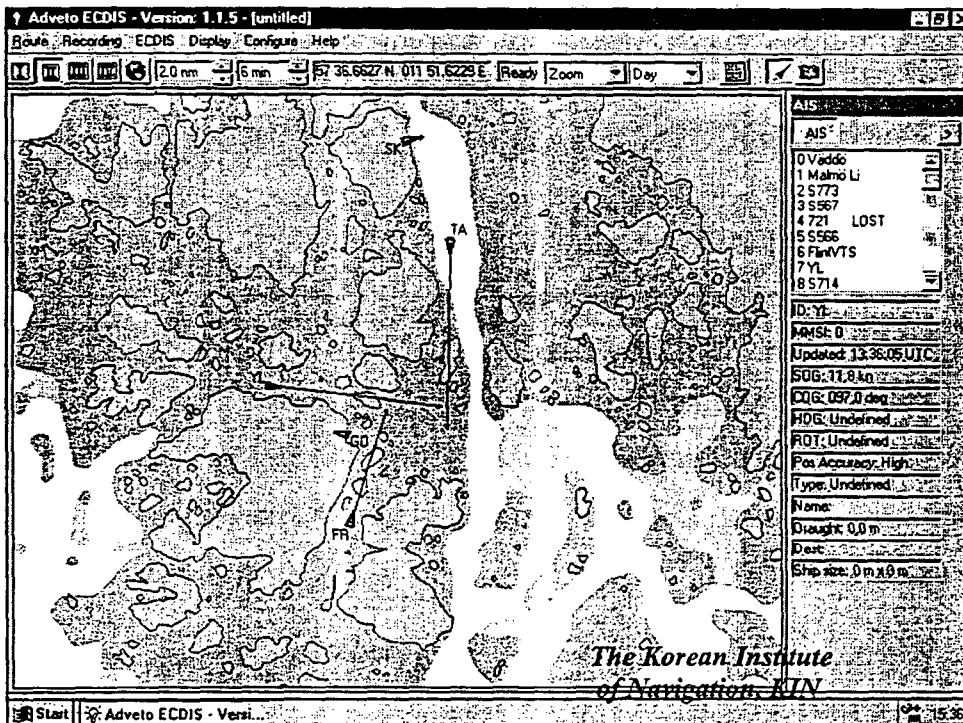
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# Benefits of AIS

- Real time tracking and identification of AIS equipped ships on the ECS/ECDIS display regardless of weather situation
- Awareness of vessels behind islands or river bends



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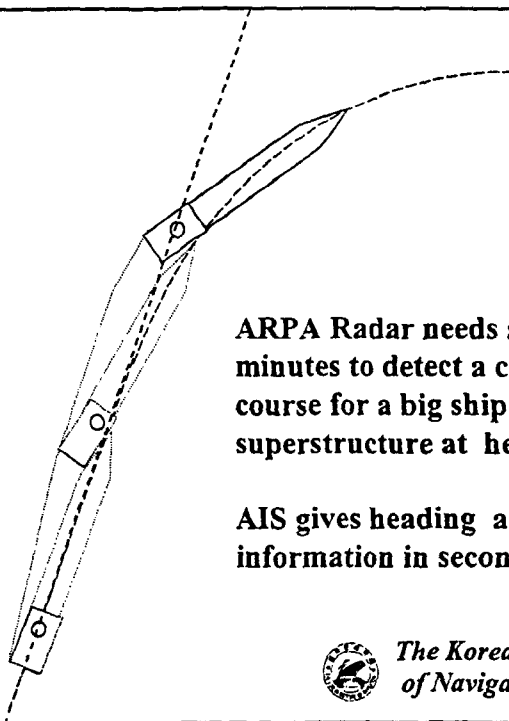


## Benefits of AIS

- Real time tracking and identification of AIS equipped ships on the ECS/ECDIS display regardless of weather situation
- Awareness of vessels behind islands or river bends
- Information about change in course over ground, heading and speed of ships in real time



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**ARPA Radar needs several  
minutes to detect a change of  
course for a big ship with her  
superstructure at her stern.**

**AIS gives heading and ROT  
information in seconds**



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## Benefits of AIS

- Real time tracking and identification
- Awareness of vessels behind islands or river bends
- Information about change in course over ground, heading and speed of ships in real time
- Broadcast of weather and navigational warnings
- Short message Service



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## Aids to Navigation

- Position of AtoN
- Status of Lights
- Status of Racon
- Position Indicator
- Local parameters



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## AIS benefits summary

- More information available
- Reduced need for voice communication
- Improved man-machine interface
- **Improved situation awareness!!!**



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## AIS as a source of information for administrations

- With a network of AIS base stations on shore information is captured automatically
- AIS is one source of information for a VTMISS - Vessel Traffic Management Information System
- Identity, size, type of ship, type of cargo
- ETA and destination



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## AIS base stations (Plan)

- Entire Korean coast covered
- About 30 Base Stations
- Control Centres
  - \* PTMS
  - \* Coastal VTC
- Pilot test (2001)



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## Base Stations

- Basic Idea : Joint Operation of KT sites
- Matters into Consideration
  - \* Service Area
  - \* Tower
  - \* Blind Sector
  - \* Power & Communication Lines



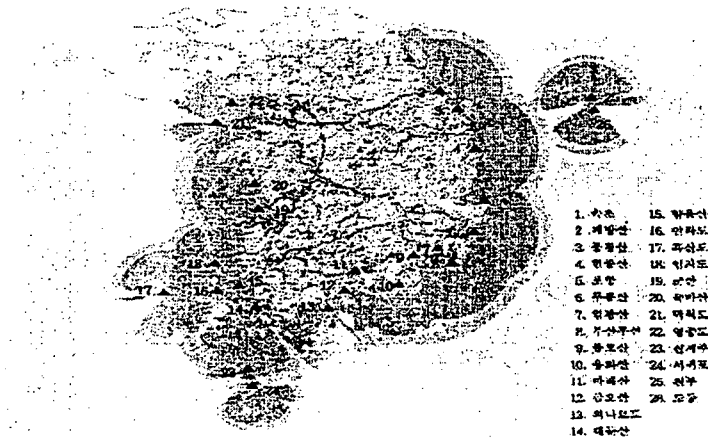
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## Present VHF Sites (13 sites)



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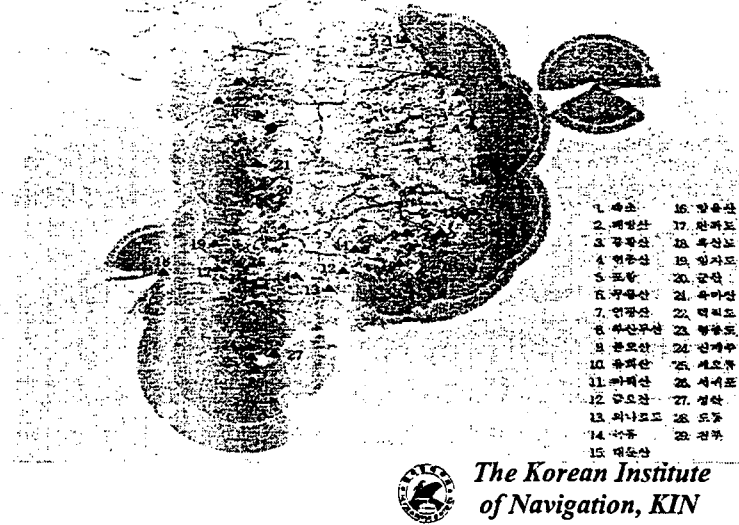
## Expansion Plan (1st - 26 sites)



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## Expansion Plan (2nd – 29 sites)



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## Distribution of AIS Information

- PTMS (Port Traffic Management System)
  - \* *Regional VTS & Port management*
- Coastal VTS centre in future
  - \* *Coastal VTS*
- RCC
  - \* *Search and Rescue*
- Shipping Company
  - \* *Fleet management*



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## AIS as a VTS tool

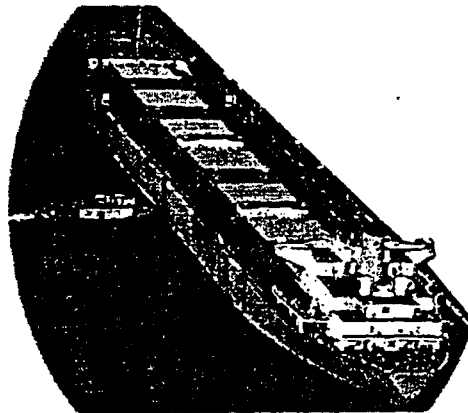
- Vessel ID and other information are automatically displayed on the VTS Display.
- Problems related to radar systems, such as radar target swapping and degradation due to weather, are non-existing
- More information such as rate of turn, heading, and ship dimensions is available.
- Transponder targets can generally be received from positions where radar signals can not reach.



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## Portable AIS Transponder

- “Portable AIS” containing a PC with Electronic Charts and AIS Transponder
- The VTS Controller can communicate with the Pilot over the datalink.
- Communicate with Tugs using AIS



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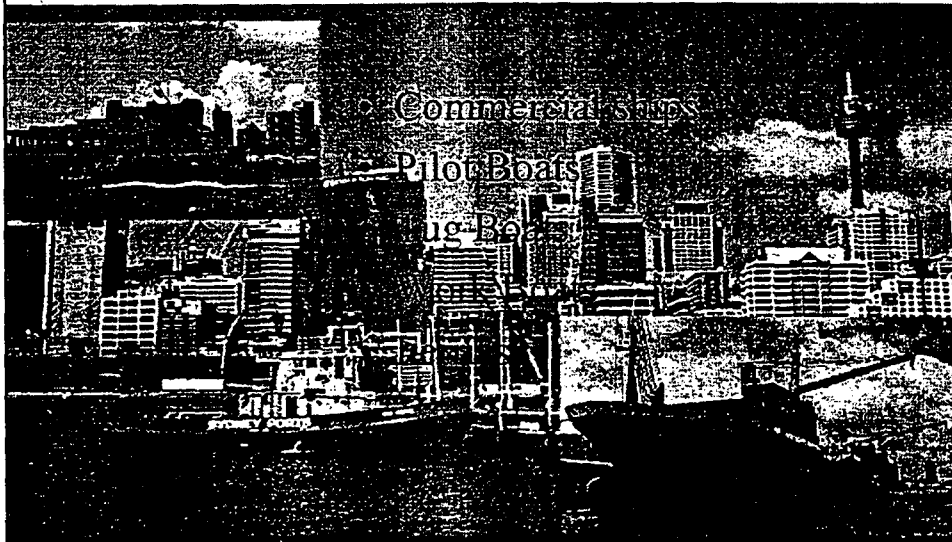
## Benefits for the VTS Operator

- Real time tracking and identification
- Data logging
- Awareness of vessels behind islands or river bends
- Automatic viewing of extensive ship data by connection to Ship database server.
- Fleet management of pilots boats, tugboats and other port vessels can be made more efficient.
- Exchange of text messages, (silent communication)

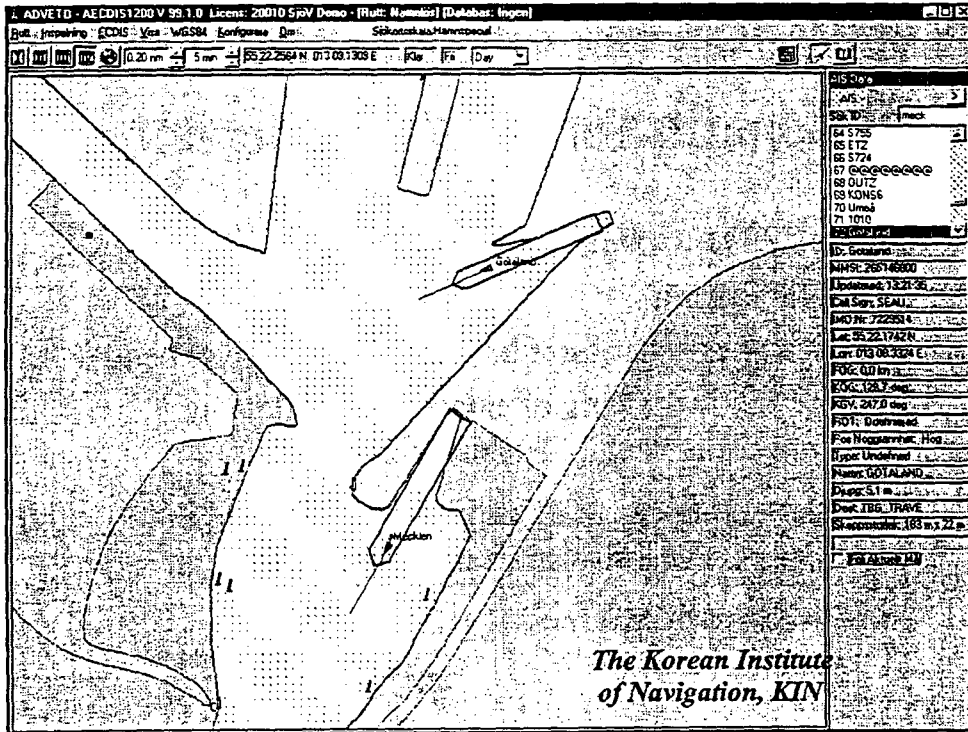


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## Port Management




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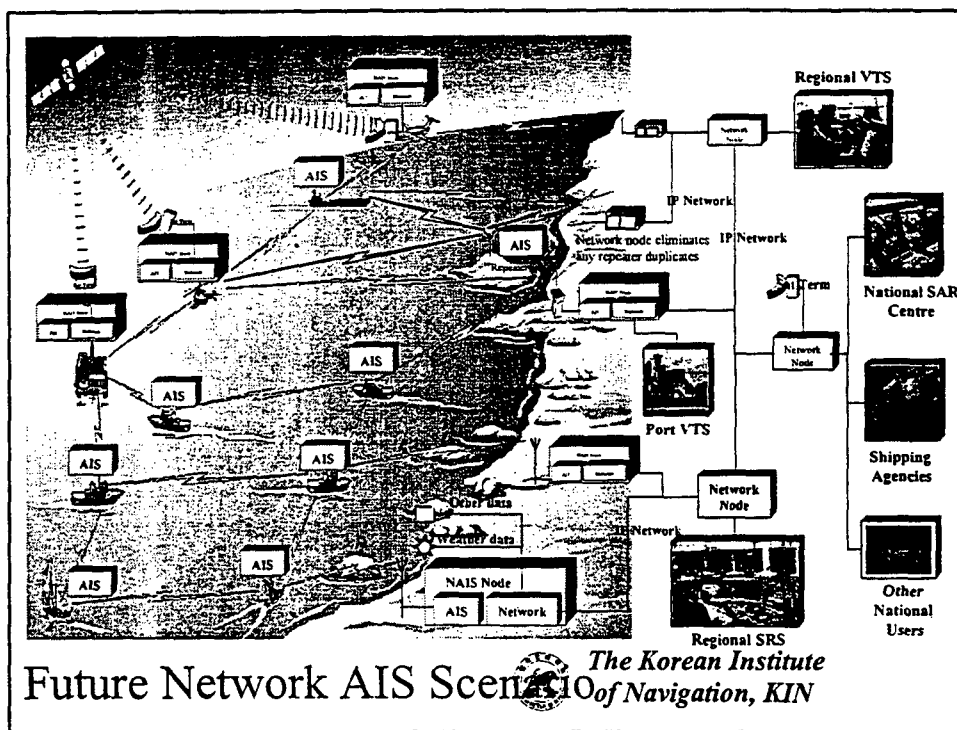


# Fleet Management

Cargo vessels

Liners


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## Summary

Universal AIS technology is effective and could enhance navigational safety

- The AIS provides an improved method of vessel traffic surveillance
- Complement to radar in collision avoidance
- Invaluable in Search And Rescue operations
- Reduce voice communications
- Effective Fleet management



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## AIS standardization

- Carriage requirement in SOLAS Ch. V
- Drafted by IMO NAV 45 Sept -99
- Approved by IMO Maritime Safety Committee May -00.



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## AIS - Drafted carriage requirement

- AIS on all new passenger ships and new cargo ship above 300t constructed after 1 July 2002
- Passenger ships and tankers on int. voyage, 1/7 2003
- Cargo ships above 50 000 t, int. voyages, 1/7 2004
- Cargo ships 10 000 - 50 000 t, int. voyages, 1/7 2005
- Cargo ships 3 000 - 10 000 t, int voyages, 1/7 2006
- Cargo ships 300 - 3000 t, int voyages, 1/7 2007
- Ships >300 t, not in int voyages, 1/7 2008



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## AIS standardization

<b>Carriage requirement</b> <b>IMO</b>		
<b>Frequencies</b> <b>ITU WRC</b>	<b>Technical Characteristics</b> <b>ITU-R</b>	<b>Teststandard</b> <b>IEC</b>
<b>Performance standard</b> <b>IMO</b>		



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## Installation steps(Korean)

- 2000. 7. 1 : New ships ( ? )
- 2003. 7. 1 : 35 (5 pass. + 30 tanker)
- 2004. 7. 1 : 24 (24 cargo)
- 2005. 7. 1 : 78 (78 cargo)
- 2006-2007: 233 ships (pass+ cargo+tanker)
- 2008. 7. 1 : 438 ships (Non-int.)
- About 808 ships



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## Time Schedule of AIS Project

- 2000. 4 – 2001. 4 : Design of AIS Network
- 2001. 3 – 2001. 12 : Stage 1 (Pilot test)  
(Pusan or Inchon area)
- By 2002. 6: Shore network
- July 2002 : Full operation



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## Further Consideration

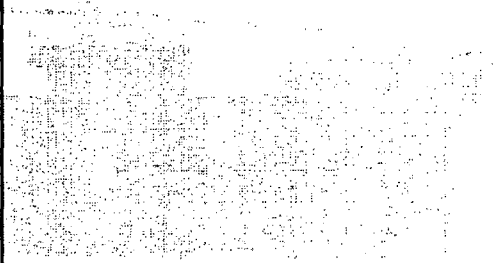
- Packaging and Distribution of AIS  
information to various parties  
*(PTMS, Coastal VTCs, RCCs, Ship Operators, etc.)*
- AIS/ECDIS/VTS Interface



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Thank you



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