

Location Sharing System Using AIS and RADAR TT Information on Cloud Server

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Introduction/Background

A collision in the Ondo strait at 2014/12/18



A 635 GT Cargo Ship (AIS ship) collided with a 20GT fisher boat (non-AIS ship).

Two people died.



Introduction/Background

- Demands to reduce marine accidents
 - Information supports for sharing ships' position information including non-AIS ships are demanded.
- Demands to get non-AIS ships' position information



- **Development of Location Sharing System for ships (AIS and non-AIS ships) on cloud server**

Last Year Presentation

- using Smartphone/tablet GPS position on Maritime Cloud



Idea for detecting non-AIS ships

Distribute the own location information by ships

- (1.1)AIS for all ships
 - Including Class B AIS
- (1.2)Other than AIS
 - e.g. Smartphone/tablet GPS information (last year)

Cost/Benefit ?

Detection by outer sensors

- (2.1)Image Processing Technology
- (2.2)Using onboard (and shore) RADAR TT information

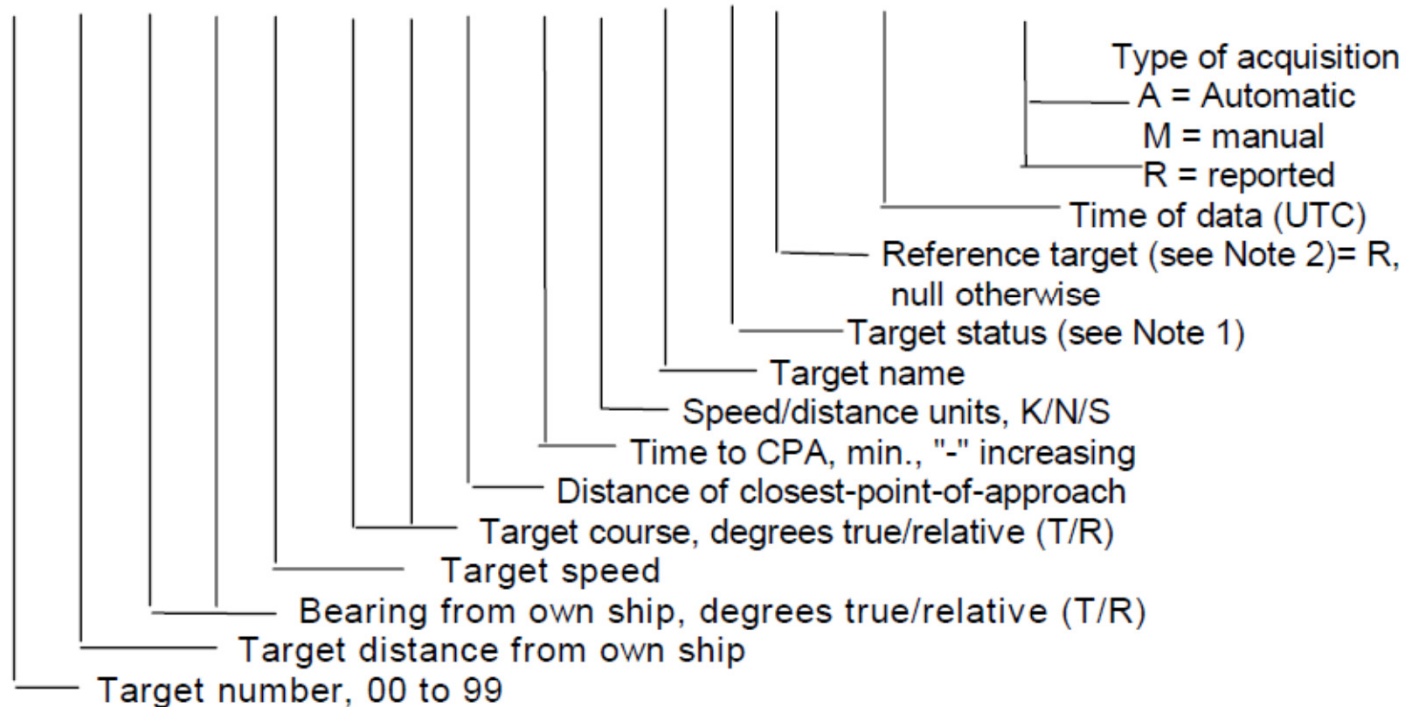
Integration: AIS and non-AIS on Cloud Server

RADAR TTM (Target Track Message)

- Most ships equip with RADAR
- RATTM sentence is TT information by RADAR

Data associated with a tracked target relative to own ship's position.

\$--TTM, xx, x.X, x.X, a, x.X, x.X, a, x.X, x.X, a, c--c, a, a, hhmmss.ss, a *hh<CR><LF>



- RATTM is relative information to own ship's position
- RATTM should be exchanged to absolute information

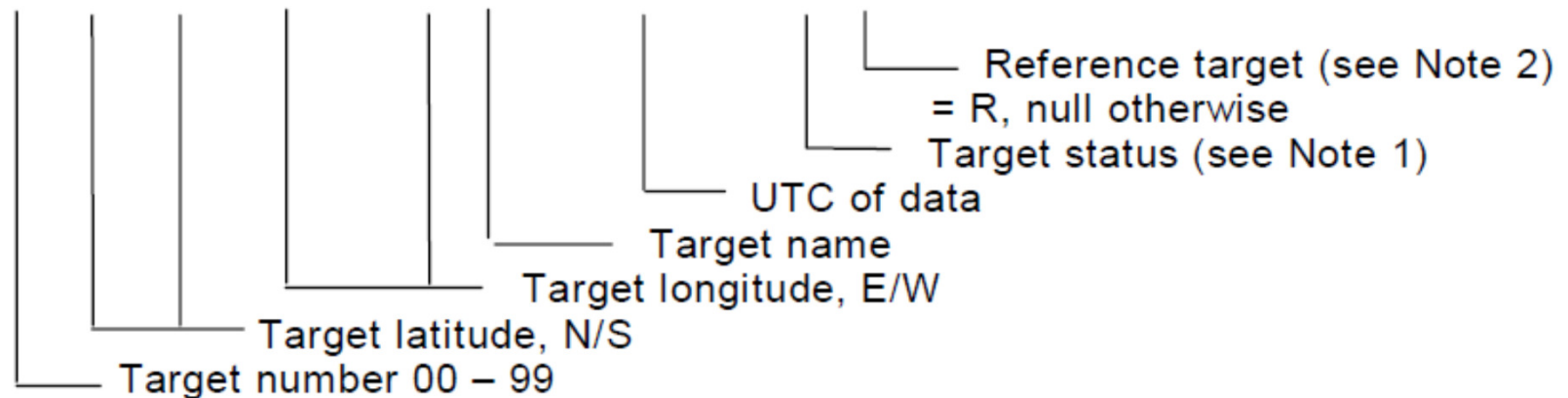
RADAR TLL

(Target Latitude and Longitude)

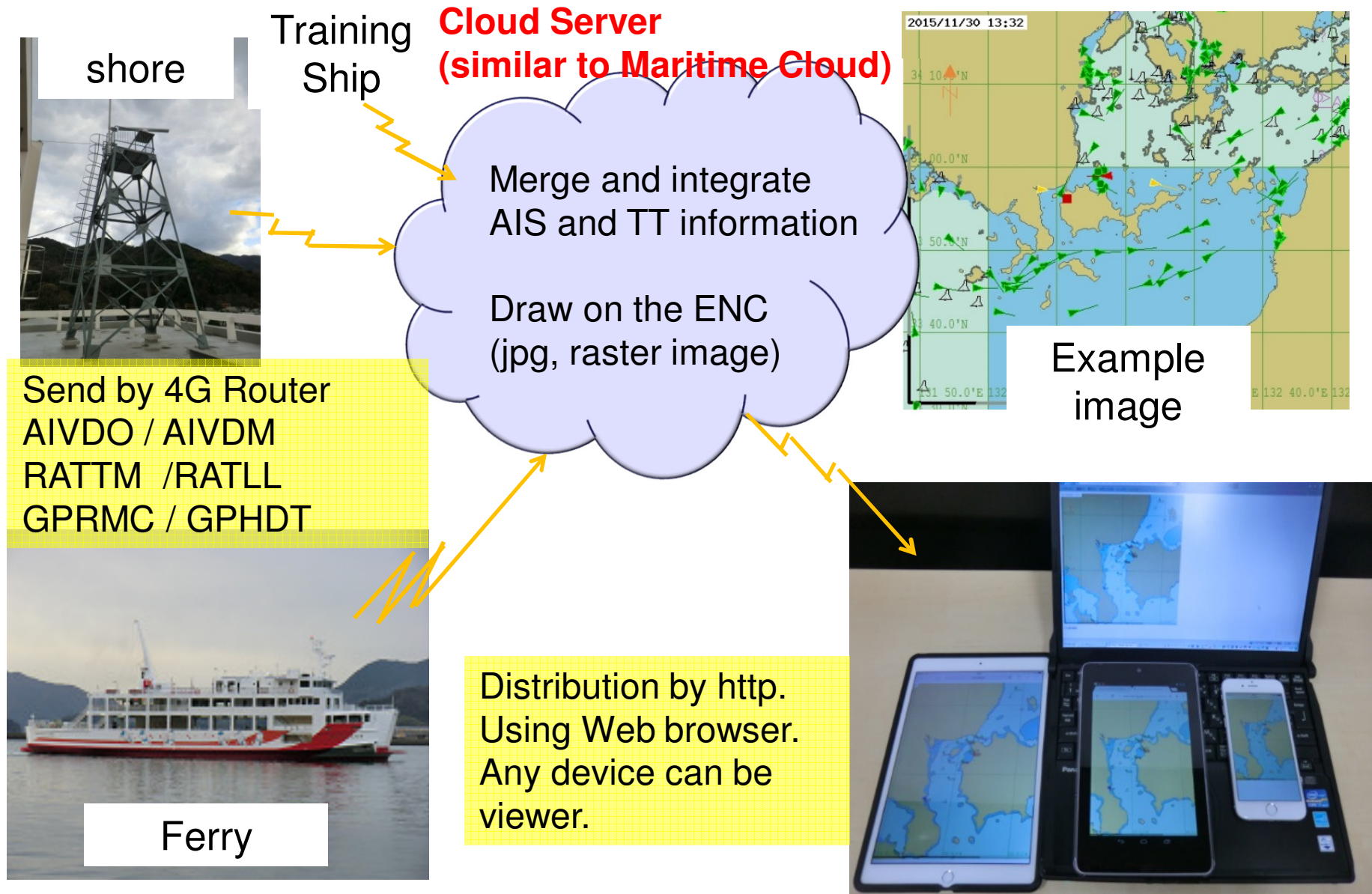
- RATLL

Target number, name, position and time tag for use in systems tracking targets.

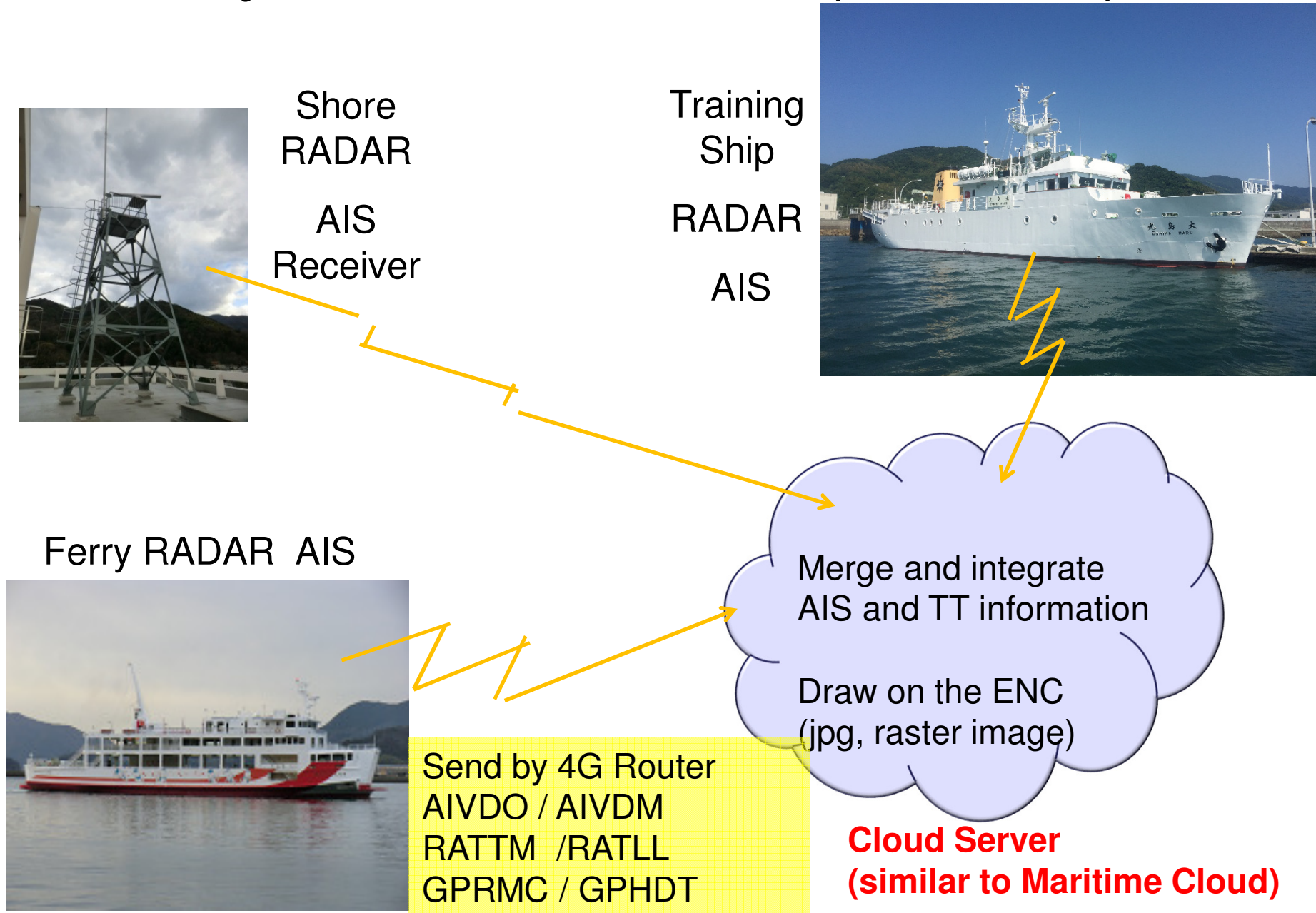
`$--TLL, xx, llll.ll, a, yyyyy.yy, a, c--c, hhmmss.ss, a, a*hh<CR><LF>`



System Architecture (Test bed)



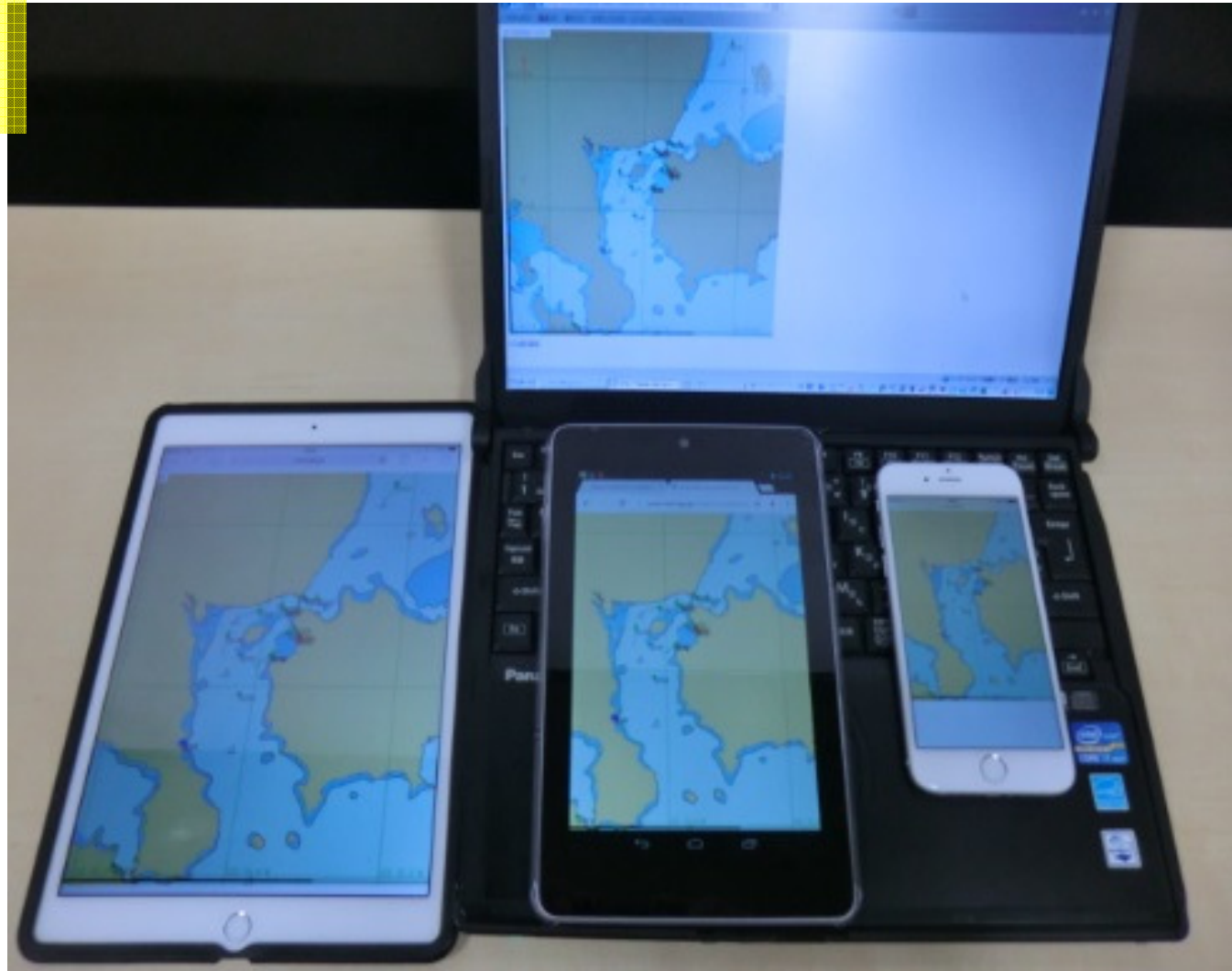
System Architecture (Test bed)



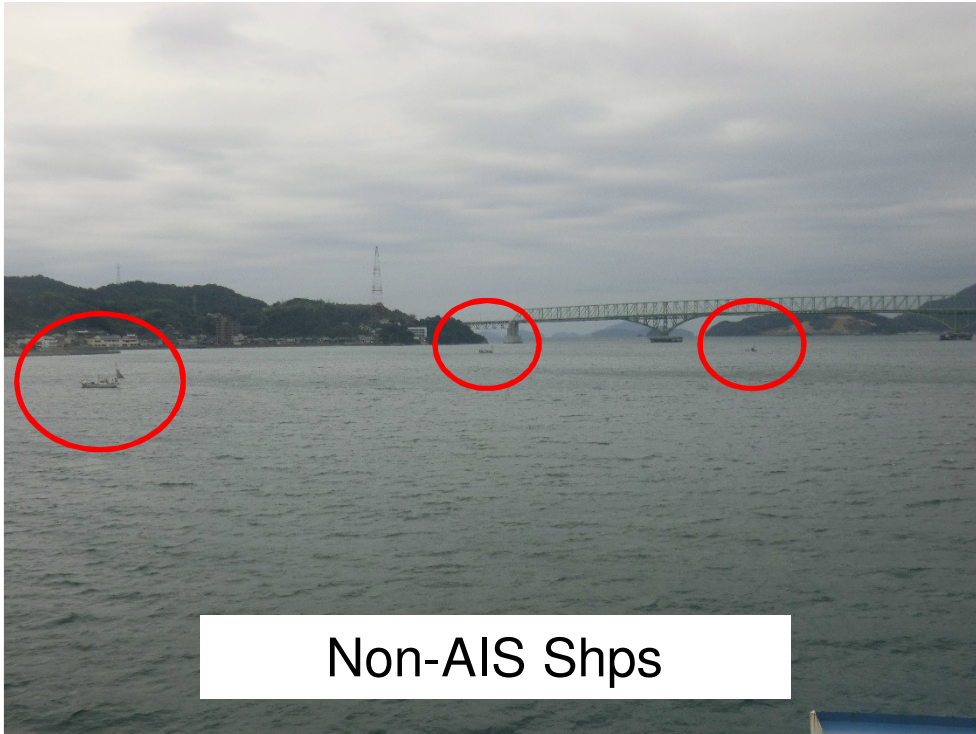
System Architecture of the System (Test bed)

Distribution by http.
Using Web browser.
Any device can be
viewer.

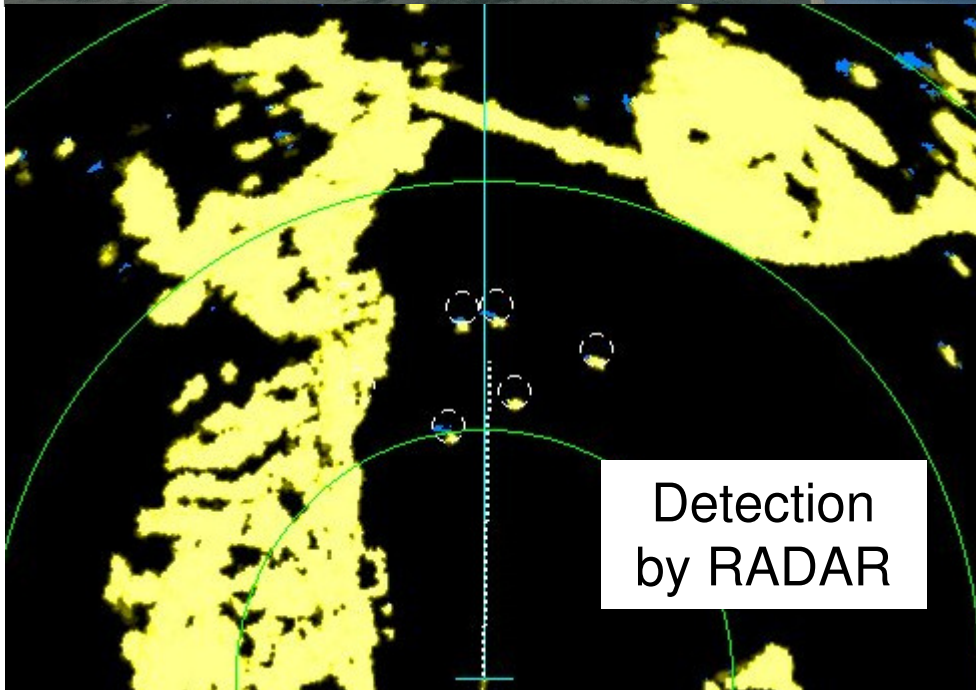
- PC
- iPad
- iPhone
- Android
- ...



example



Non-AIS Shps



Detection
by RADAR

9:01

柳井5

33.955216度 経度：132.166873度



Ferry

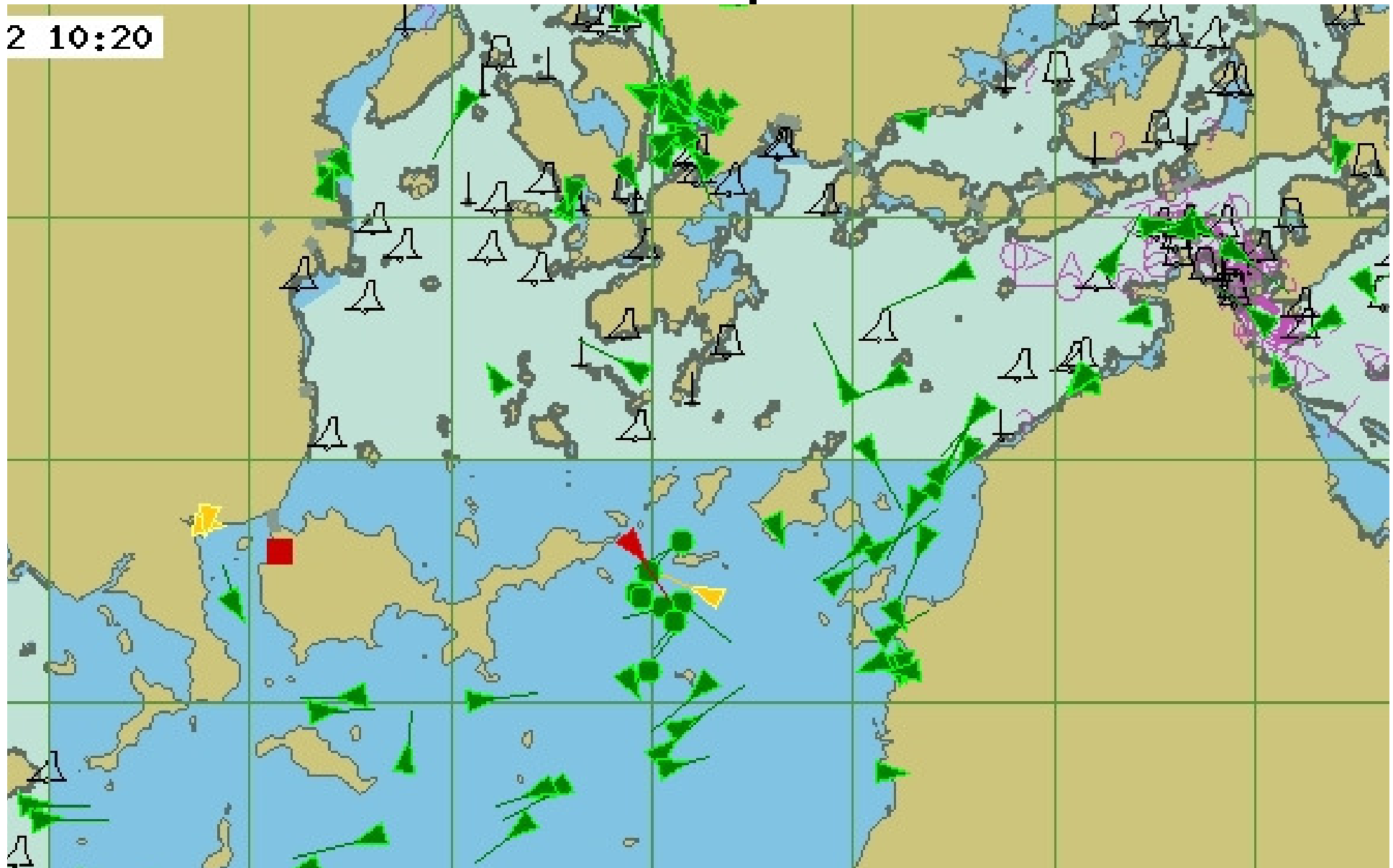
Shore
RADAR

View via
http



example

2 10:20





Characteristics, Advantage/Disadvantage of the System

- Most of the ships equip RADAR, GPS and COMPASS. No more additional navigational equipment. (4G/3G Router is needed)
- Recognize non-AIS ships position detected by other ships.
- Distributing raster image (jpg), not getting the detail information, but protecting the privacy information.
- When zooming up, low resolution, but Image data size is almost constant.
- Distributing by http, any device can be viewer. (Windows, iPad, iPhone, Android, Linux...)
- Monitoring System onshore
- Sharing the all Ships' TT information, this system has a great advantage.

Summary/Conclusion

- Developed Location Sharing System for ships
 - Using onboard (and onshore) RADAR TT information
 - Using Cloud server (similar to maritime cloud)
 - No more additional navigational equipment
 - TT information (RATTM; relative information) was exchanged to absolute information (Latitude and Longitude)
 - Recognize non-AIS ships position detected by other ships' RADAR.
 - Sharing the all Ships' TT information, this system has a great advantage.

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