

# The present situation, matters and conceivable future needs for the maritime traffic observation

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**요 약** : The maritime traffic system research has been studied for the safety and efficiency of the Marine Navigation. In order to evaluate the maritime traffic system, the vessel traffic observation is playing important roll. Recently, the way of collecting the vessel traffic information has been become fixed by using the radar, the AIS and the visual observations. However, it is still difficult to get the information about ships without the AIS. In this paper, the past vessel traffic observation results are shown. From those data and introducing the way of Japanese traffic survey, the recent matters of the vessel traffic observation are discussed. 충돌위험도의 정량적인 평가는 항해·충돌방지 전문가 시스템 개발에 있어서 중요한 역할을 한다. 이 연구에서는 *sech* 함

**핵심용어** : AIS, the Maritime traffic survey, Radar

The present situation, matters and conceivable future needs for the maritime traffic observation

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### The Maritime Traffic System Research

- The maritime traffic system research has been studied for the safety and efficiency of the Marine Navigation.
- In order to evaluate the maritime traffic system, the vessel traffic observation is playing important roll.

### AIS

**AIS ( SOLAS )**

- International
  - Passenger (ALL)
  - Others(from 300 tons)
- National
  - From 500 tons

Information exchange diagram by AIS

From the Ship →  
Name, Type, Position,  
Speed, Destination, ETA

From the VTS →  
Dangers, works, weather,  
other useful inf. for Nav.

### AIS for the traffic survey

- Everyone might be possible to survey the maritime traffic without going the actual site.
- International survey is also possible.

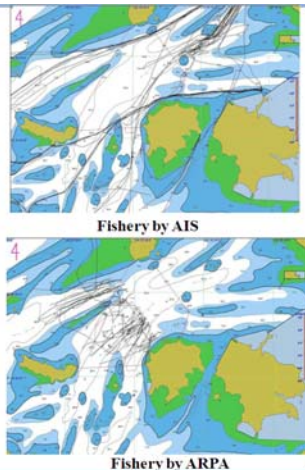
AIS 관측 선박의 전체 광역(06.23~06.27)

Loop Analysis Example

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## How about NON-AIS ships?

- Comparing the route tracking result between AIS and ARPA.



## The AIS and NON-AIS ships

	Fishery	Cargo	Tanker	Gas	Container	Car carrier	Chemical	Passenger	Special	Others
Incheon	17	69	23	9	34	13	23	67	11	113
Pyeontec	1	59	19	5	9	17	5	11	0	66
Mokpo	38	37	11	0	2	5	2	131	6	178
	342							70		7

Comparing AIS and NON-AIS ships by Type

Incheon	AIS	379	22.3%
	NON	109	
Pyeontec	AIS	192	26.2%
	NON	68	
Mokpo	AIS	410	50.5%
	NON	419	

The percentage of NOA-AIS ships

## NON-AIS ships percentage

Comparing by Ships' size

- Only found less than 500GT.
- Almost under 100 GT

Incheon	AIS/Non	Under 100	100 to 500	500 to 1k	1k to 3k	3k to 10k	10k to 20k
Fishery	AIS	15	1	1			
	Non	102	2				
Special Ship	AIS	1	2	4	3	1	
	Non	1	3				
Other	AIS	74	10	9	4	5	12
	Non	1					

Pyeongtaek	AIS/Non	Under 100	100 to 500	500 to 1k	1k to 3k	3k to 10k	10k to 20k
Fishery	AIS	1					
	Non	43	1				
Special Ship	AIS	0	0	0	0		
	Non	4	12	4			
Other	AIS	18	24	4	4	10	
	Non	4					

Mokpo	AIS/Non	Under 100	100 to 500	500 to 1k	1k to 3k	3k to 10k	10k to 20k
Fishery	AIS	15	10	5	1	7	
	Non	337	5				
Special Ship	AIS	0	1	2	1	2	
	Non	67	3				
Other	AIS	38	44	50	43	1	
	Non	6	1				

## Summary of observation

Total	AIS/Non	Under 100	100 to 500	500 to 1k	1k to 3k	3k to 10k	10k to 20k
Fishery	AIS	31	11	6	1	7	0
	Non	482	8	0	0	0	0
Special Ship	AIS	1	3	6	4	3	0
	Non	72	18	4	0	0	0
Other	AIS	130	78	63	51	16	12
	Non	11	1	0	0	0	0
Total	AIS	162	92	75	56	26	12
	Non	565	27	4	0	0	0
	Non(%)	77.7	22.7	5.1	0.0	0.0	0.0

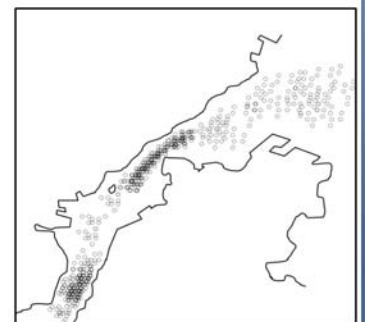
## Do you need those less than 100 class ships for traffic survey?

The data is using for

- Simulation
- Simulator
- Traffic observation
- Route analysis
- Fishery area survey
- Distribution density of fishery ships
- Etc.

## The distribution analysis

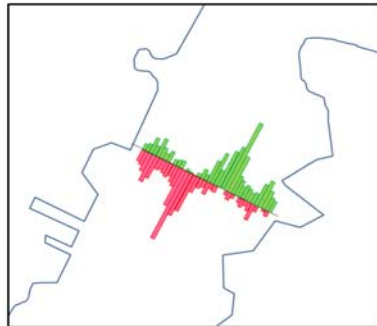
- The fishery distribution analysis is very important especially in the narrow water.



Example of the fishery ships' distribution analysis

## The distribution of ship's route

- The gate line observation is normally carried out for knowing the ships' route.



The route distribution survey image

## How can you observe those ships?

- By eye observation
  - At night?
  - Coverage?
- AIS class B
  - Less than 100 GT?
- Radar
  - Noise and distance
- Using the image device
  - At night, distance, coverage?

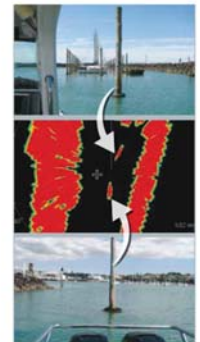
## The research about this area

- Combined radar images
- Image matching between AIS and Radar
- Using the VDR

No research for the small ships without AIS.

## The Solution Possibility

- Using a few radars including the FM-CW radar
- FM-CW Radar
  - Possible detect near object
  - Low power consumption
  - Small



Example image from the FM-CW Radar

[http://www.maritimeconnect.com/visio/02mar03/Professional/Doc/center/Navico\\_Broadband\\_Radar\\_Essential\\_Guide\\_28-09-11.pdf](http://www.maritimeconnect.com/visio/02mar03/Professional/Doc/center/Navico_Broadband_Radar_Essential_Guide_28-09-11.pdf)

## Conclusion

- The Maritime Traffic Research is much easier than before because of AIS
- More demand for the small ships' traffic information
- The radars including the FM-CW radar could be one of the solution.