



Development of Auto Releasing New Danger Mark Buoy

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Contents

I . Introduction

II . Auto Releasing New Danger Mark Buoy

III. Field Test

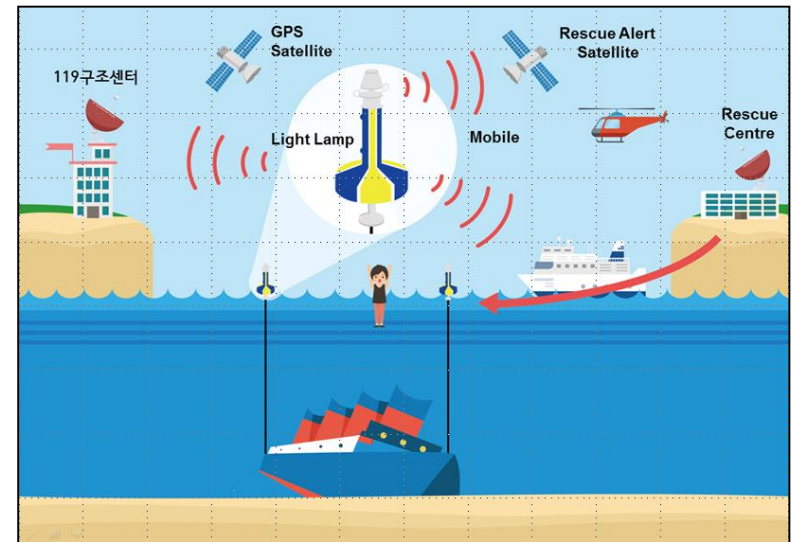
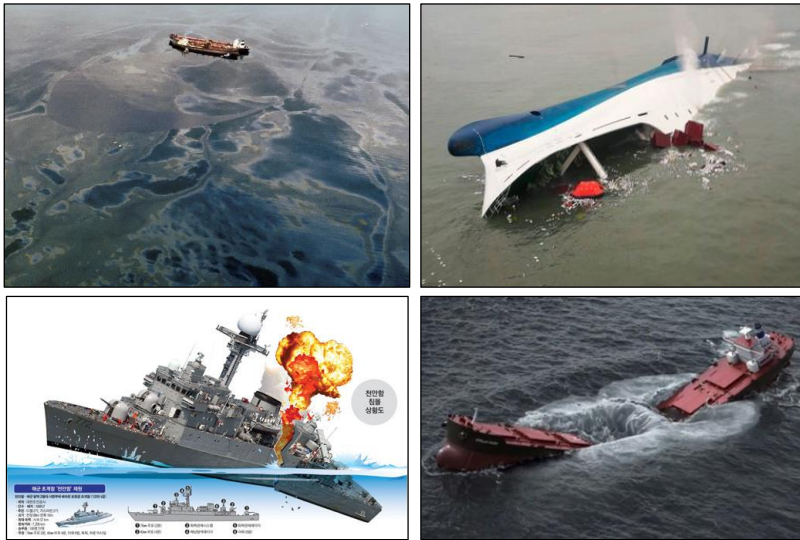
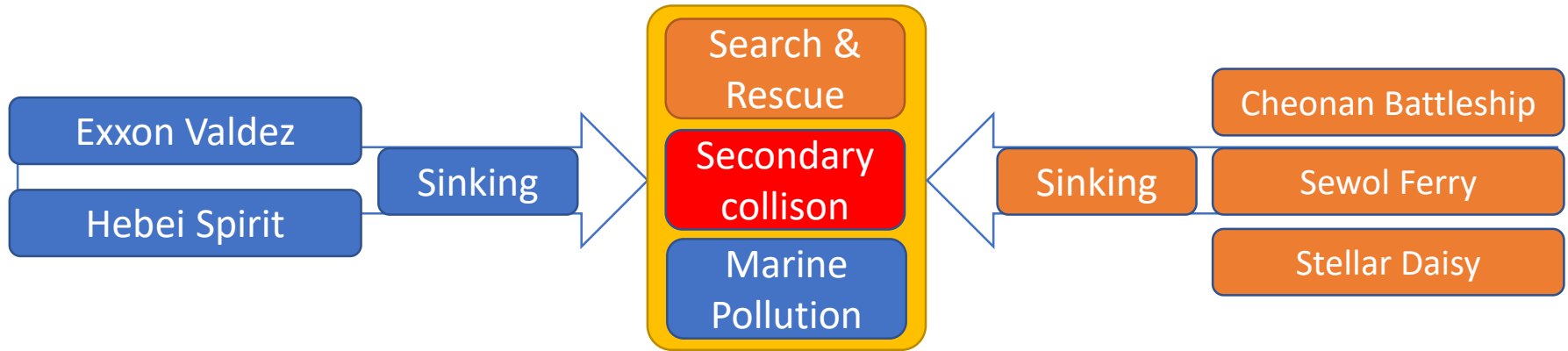
IV. Case of Installation

V. References

VI. Action Requested of the Committee

I . Introduction

I Introduction

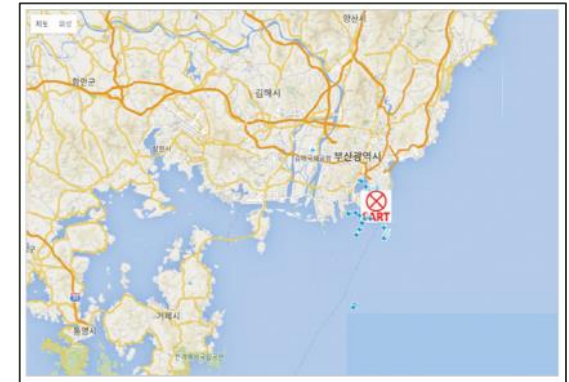


- Stellar Daisy
 - Cost : 3.8 million EUR (5 billion KRW)
 - Search : 2 years from the accident (only found VDR)
- Cheonan Battleship
 - Search : 1 month from the accident

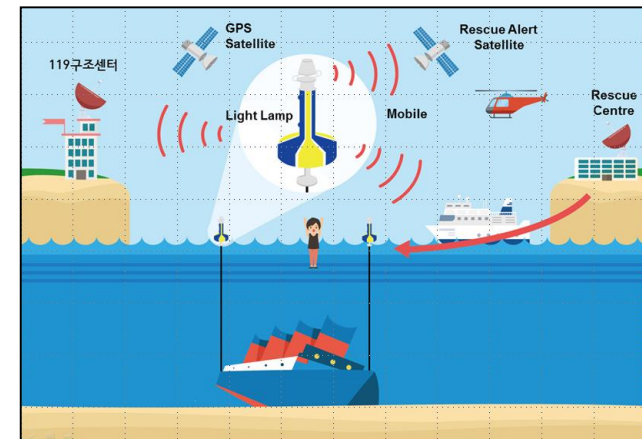
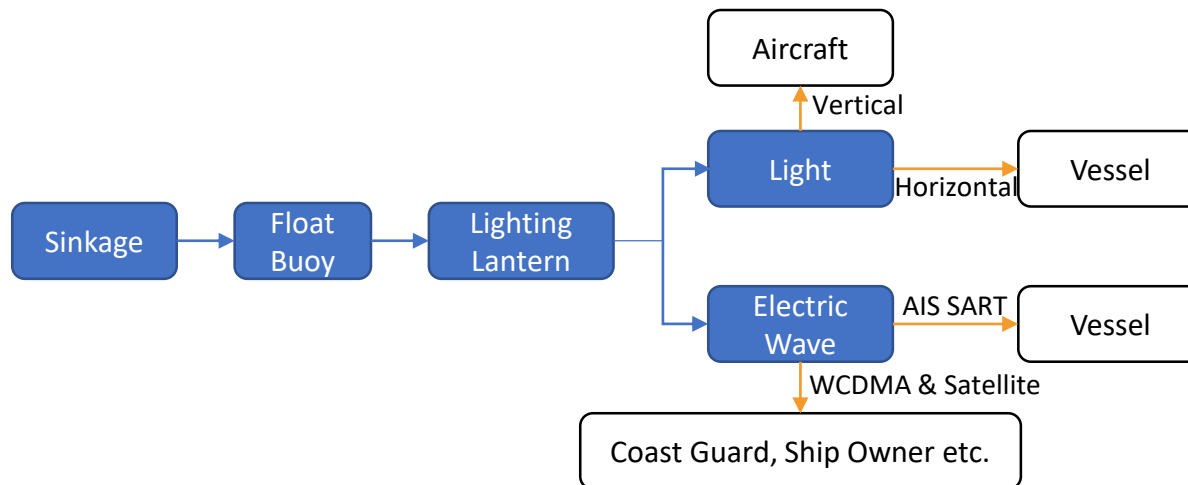
- o Rapid Search & Rescue
- o Prevent secondary collision
- o Prevent Marine Pollution
- o Discovery Vessel

I Introduction

Prompt Search & Rescue and Prevent Secondary Collision



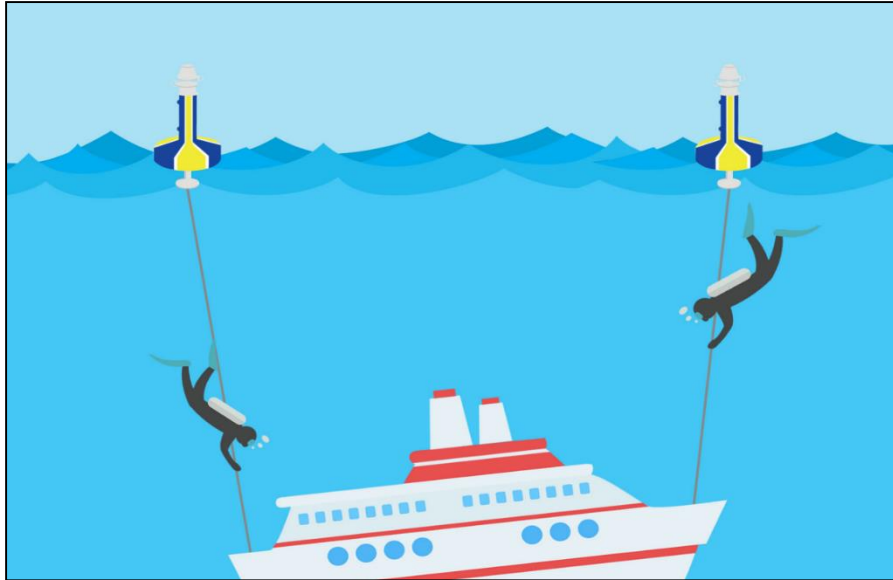
《 Location of sinkage shown on cell phone, AIS receiver and ECDIS 》



《 Auto Releasing New Danger Mark Buoy System 》

I Introduction

Prompt Search & Rescue

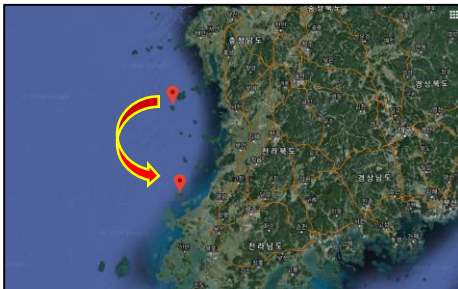


<Underwater Search Using Mooring Rope of Auto Release New Danger Mark Buoy>

Prevent Secondary Collisions



<The buoy will be used to reduce the risk of navigation and to prevent secondary collisions>



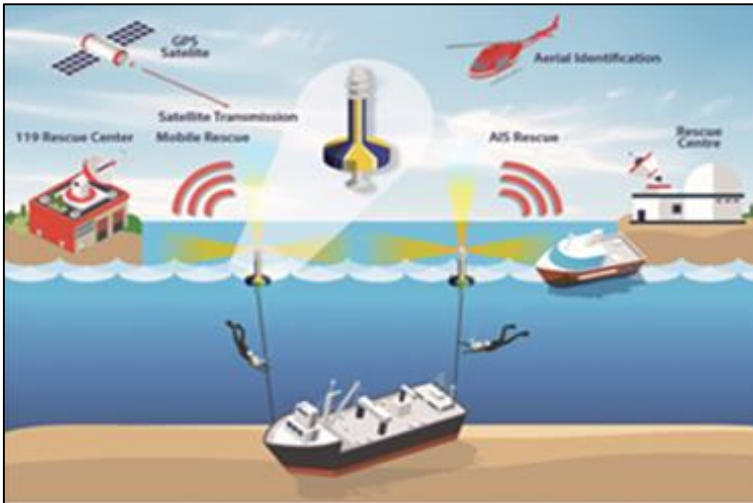
Sunken and Drifting Vessel can cause secondary collision

<Fishing Boat Capsized Accident>

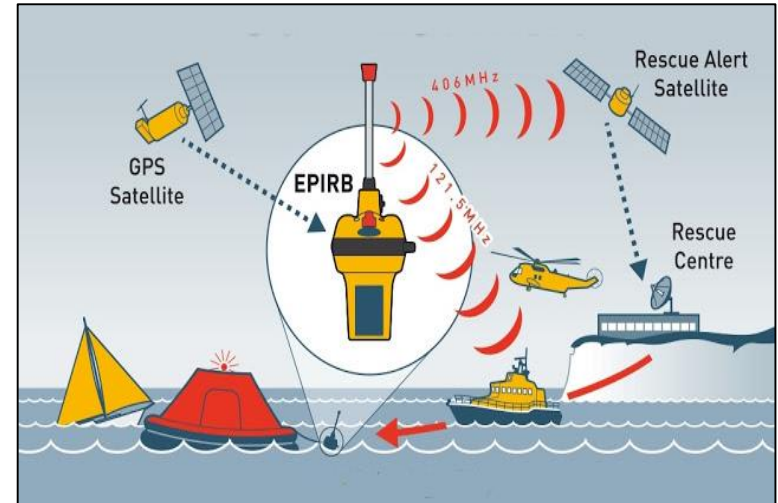
- Drift Period : 25th Dec. 2016 ~ 1st Jan. 2017 (8days)
- Drift Dist. : About 90NM(160km)
- Overview : A cargo ship (GT 1,600) and Fishing Boat (GT 13) collided in 13km NW of Eocheong Island. Fishing Boat was capsized and all five crews were rescued by KCG. It tried to salvage the boat, but it was suspended due to bad weather. The boat was not found two days later. It was found a week after accident in 80km N of Anma Island.

I Introduction

Compare Auto Releasing New Danger Mark with EPIRB



VS



- ✓ Clear Location of sinking
 - Rapid salvage & rescue
 - High-Value cargo and vessel recovery
 - Minimize secondary damage
- ✓ Vertical and horizontal light makes easy to find from rescue vessels & helicopters

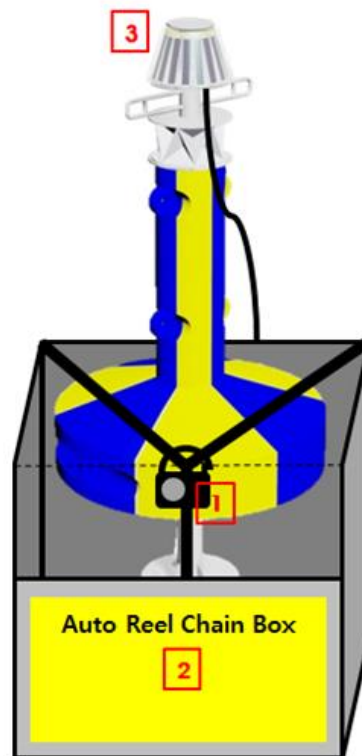
- ✓ Unable to locate of sinking
 - Difficult to rescue people who failed to escape
- ✓ People must escape with EPIRB
- ✓ Difficult to find with eye because of no light (need GMDSS receivers)

II. Auto Releasing New Danger Mark Buoy

I Auto Releasing New Danger Mark Buoy

Principle of Auto Releasing New Danger Mark Buoy

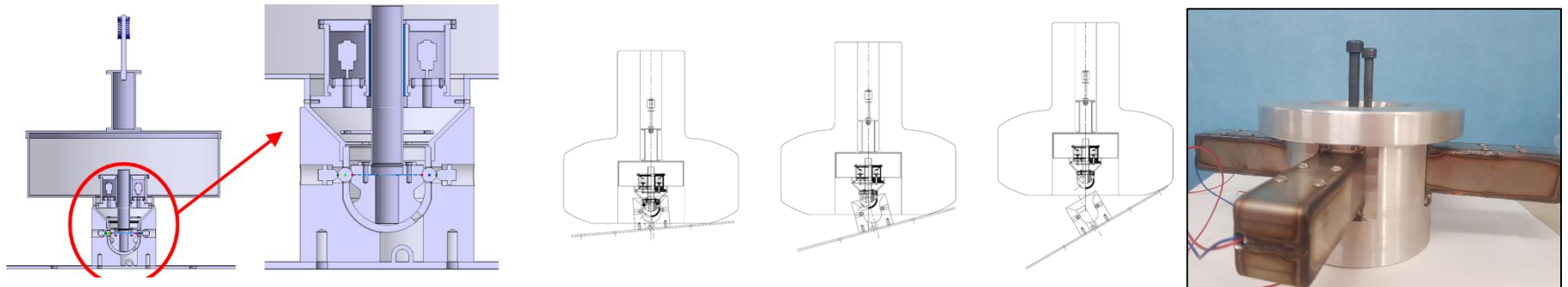
The Auto Release Danger Mark Buoy is consist of ① Auto release, ② Auto Reel Mooring Rope and ③ Auto Lighting Lantern technique and Information Transmission System. This is located on upper deck and released automatically under a certain hydraulic condition so that it could exactly indicate the position where accident happened.



I Auto Releasing New Danger Mark Buoy

① Auto Release Equipment for Auto Buoyance

New Danger Mark Buoy is always located on the upper deck fastened with a belt. When an accident occurred, the Buoy automatically released on 1.5m~4m water pressure. The built-in electronic control system that called solenoid escape device is designed to automatically open the lock on the buoy to release. Finally it float automatically

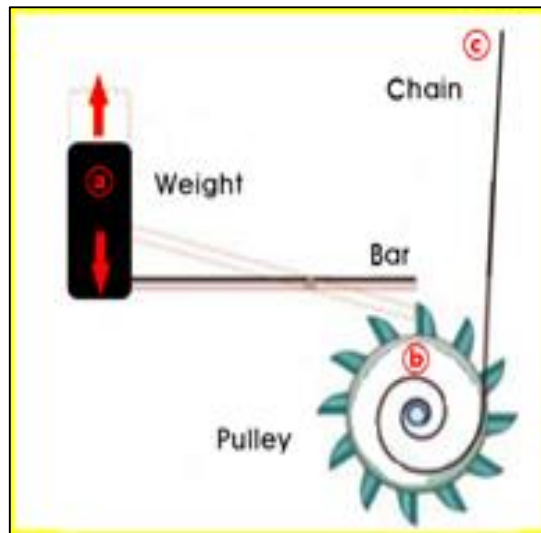


《Solenoid Escape Device in Auto Release Unit》

I Auto Releasing New Danger Mark Buoy

② Auto Reel Mooring Rope

Auto reel adjust the length of mooring rope. After a vessel is sunk a wrapped mooring rope is released by the gravity applied on weight furnished in the unit. By reaching under the sea surface, the force is made upward when the gravity and buoyancy on a weight becomes equivalent. Then an axis hanged on a pulley has fastened the mooring rope

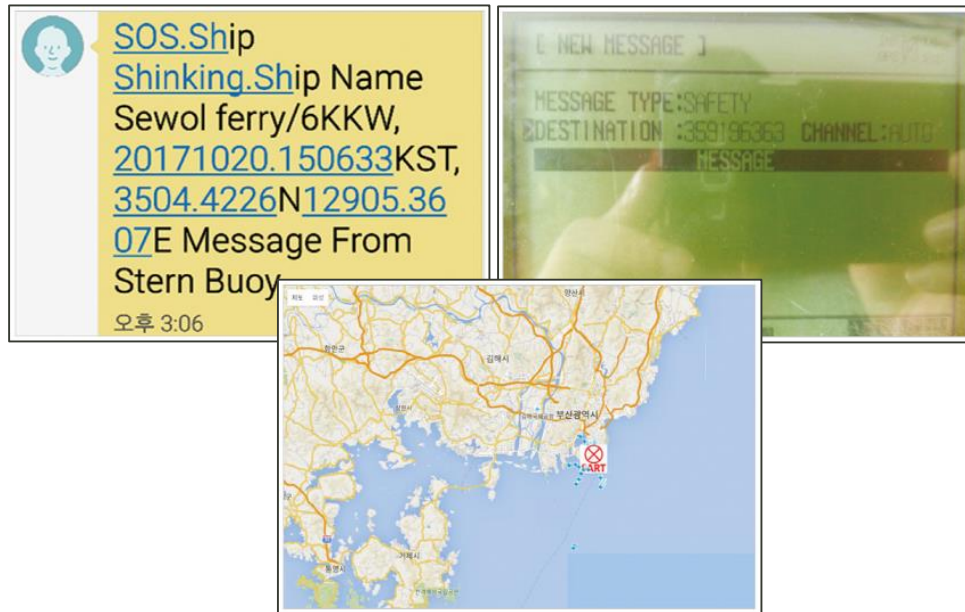


《 Auto Reel Mooring Rope 》

II Auto Releasing New Danger Mark Buoy

③ Auto Lighting Lantern and Information Transmission System

- Auto Lighting Lantern is automatically ignites when a buoy escapes.
- Vertical and horizontal light can be find from aircraft and vessels.
- Synchronization flashing using GPS.
- AIS SART, WCDMA and Satellite Transmission.



《 Location of sinkage shown on cell phone, AIS receiver and ECDIS 》

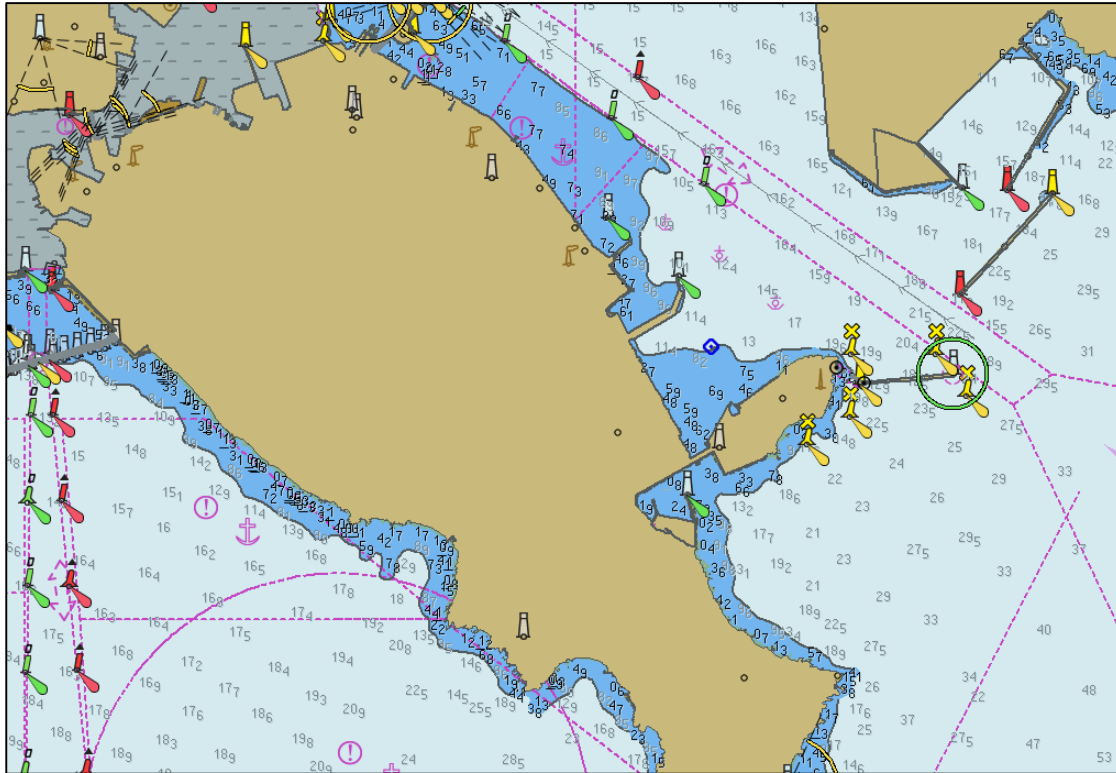


《 Auto Reel Mooring Rope 》 12

III. Field Test

Condition

- Location / Date : Busan Port (35-04.86N, 129-05.1483E) / 10:00 ~ 13:00 (Thu) 27th Dec. 2018
- Condition : depth 11.7m, Temperature 2 °C, wind direction NE, wind speed 1.6 m/s, pressure 1024.2 hpa.



《 Location of Field Test 》



《 Auto Releasing New Danger Mark Buoy 》



Result

Upon entering the water, buoy and mooring rope was automatically released. After the auto reel mooring rope box touched the sea floor, the mooring rope was fixed. Field test was successful.



《 Field Test 》

IV. Case of Installation

IV Case of Installation

Case of Installation on the Cheongjeong-Nuri

- Vessel Type : Radioactive Waste Carrier
- Specification : LOA 78.6m, Beam 15.8m, Draft 4.0m, GT 2,600, Nav. Full Spd. 12.0kts.
- Purpose of Installation : Rapid recovery of nuclear waste and search & rescue,
Prevent secondary collision



《 Case of Installation on Cheongjeong-Nuri 》

V. References

1. **International Association of Marine Aids to Navigation and Lighthouse Authorities (2018), IALA NAVGUIDE 2018**
2. **International Association of Marine Aids to Navigation and Lighthouse Authorities (2018), IALA NAVGUIDE 2018, MARITIME BUOYAGE SYSTEM**
3. **International Association of Marine Aids to Navigation and Lighthouse Authorities (2015), IALA Guideline 1046 A Response Plan for the Marking of New Wreck**
4. **International Association of Marine Aids to Navigation and Lighthouse Authorities (2015), IALA Recommendation O-133 Emergency Wreck Marking Buoy**
5. **Ministry of Oceans and Fisheries (2013), A study on the basic and working design for the mooring and special buoy.**
6. **Ministry of Oceans and Fisheries (2015), Aids to Navigation Act**

VI. Action Required of the Committee

VI Action Requested of the Committee

The Committee is requested to:

- 1. Note the information within this paper.**
- 2. Discuss the matter at an appropriate time and**
- 3. Include the proposed into the IALA documentation if so considered by the discussion**

THANK YOU

- Contact: cooksg@kmou.ac.kr