

**Input paper for the following Committee(s):**

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☐ ARM

☐ ENG

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☐ ENAV

☒ VTS

**Purpose of paper:**
☒ Input

☐ Information

**Agenda item** <sup>1</sup>

7.3

**Technical domain/ Task number** <sup>2</sup>

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**Author(s)/Submitter(s)**

Korea Coast Guard and Korea Maritime Institute

## PROPOSAL ON REVISION OF IVEF SERVICE TO ADD RADAR IMAGE AND VHF DIGITAL INFORMATION EXCHANGE FOR EXTERNAL ACCESS CONTROL IN CASE OF EMERGENCY<sup>2</sup>

### 1. SUMMARY

The purpose of this document is to highlight the need to update the Data Exchange Standard (Inter-VTS Exchange Format (IVEF) Service). By analyzing the current status of VTS operations, traffic flow, and marine accidents in the Republic of Korea, the necessity of information exchange to eliminate blind surveillance sectors in time and space was emphasized. In addition, the current status of information exchange and necessary information were confirmed through a survey of VTS operators. The current IVEF service is configured to for most of the information exchange but does not include the RADAR screen and VHF voice required for emergency situations. Therefore, we propose updating its standard.

#### 1.1. PURPOSE OF THE DOCUMENT

The purpose of this document is to present the necessity for VTS information exchange by introducing Korea's marine traffic and VTS operations' status, and to update the IVEF service for control through external access in case of an emergency.

#### 1.2. RELATED DOCUMENTS

IALA RECOMMENDATION R0145(V-145) THE INTER-VTS EXCHANGE FORMAT (IVEF) SERVICE

### 2. BACKGROUND

Since the successful completion of the IALA Recommendation R0145–Inter-VTS Exchange Format (IVEF) Service, the next important step is to apply it in the actual service. Discussions related to the IALA Recommendation R0145, which had not been held since 2011, were resumed by the 51st VTS committee. The Korean Coast Guard introduced the Cloud VTS concept to VTS 51, an example of the IVEF service. The

<sup>1</sup> Leave open if uncertain

<sup>2</sup> Footer will automatically populate

task group recognized the need to revise the current IVEF service recommendations. The Korea Maritime Institute (KMI) investigated the current status of the Republic of Korea's VTS related to IVEF and identified the perceptions of the VTS officers, the details of which are provided in the next section.

### 3. DISCUSSION

#### 3.1. INVESTIGATION OF THE VTS OPERATOR'S PERCEPTION OF INFORMATION EXCHANGE

The research team conducted a survey on information exchange targeting some VTS operators (66 people) working in the Republic of Korea. They mentioned that the data on the movement of vessels was the most important for the task, and that the VHF voice information and radar screen information were also important (Figure 1). Currently, information exchange methods between VTS centers are mostly hot-line or field management systems (messenger type) (Figure 2). That is, it appears that the information exchange format exists but is not currently active.

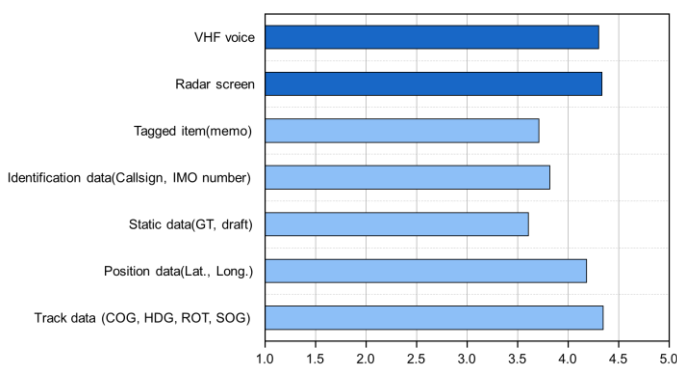


Figure 1 Required data

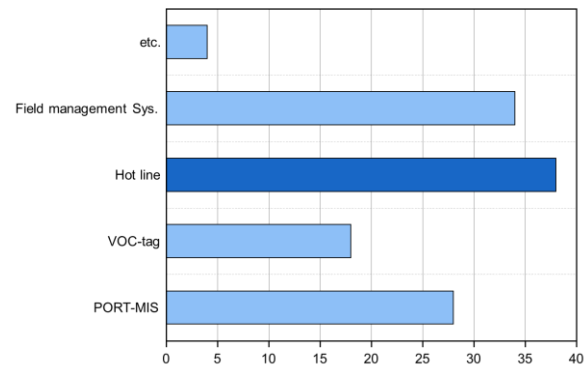


Figure 2 Information exchange method

71.4% suggested that an improvement in the method of information exchange was necessary (Figure 3) and that the system (VOC) currently in use required information exchange.

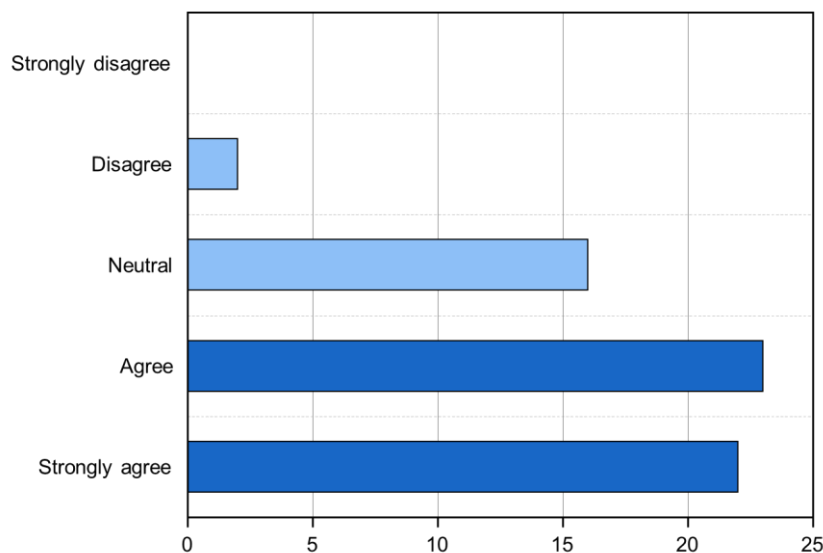


Figure 3 Need to update information exchange method

10.6% of the VTS operators knew quite a lot about the IVEF, but it was found that they did not use it well (Figure 4&5).

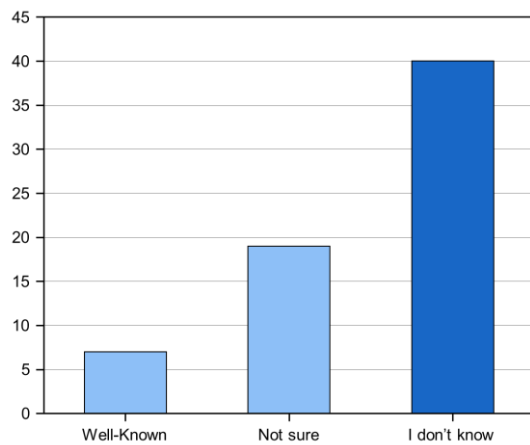


Figure 4 Understanding IVEF Service

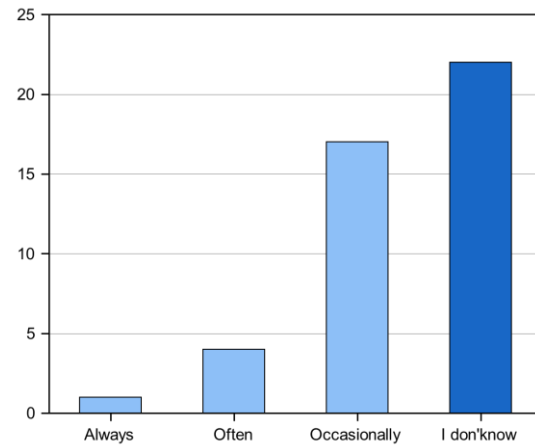


Figure 5 Frequency of use of IVEF Service

Although the IVEF service was presented as a standard for data exchange, it was judged that the current VTS operator awareness is insufficient. However, the VTS operator's need for data exchange using the system was high. In addition, information about the radar screen or VHF digital information is required. Therefore, it was determined that the activation of the IVEF service and the update of the IVEF information exchange are necessary.

## 3.2. REPUBLIC OF KOREA MARINE TRAFFIC STATUS

### 3.2.1. VTS OPERATION STATUS

The Republic of Korea first introduced the VTS system in Pohang Port in 1993 and currently operates it in 15 ports and five coasts. The VTS area is 28,425 km<sup>2</sup>, accounting for 33% of Korea's territorial sea area. Currently, continuous VTS areas are installed in the coastal waters of the South Sea, and a VTS area across the entire coast will be established in the East and West Seas, according to the Korea Coast Guard Master Plan. Vessel traffic safety management will be strengthened through the expansion of the VTS area.

In particular, in preparation for a situation where a VTS center cannot be operated because of a VTS operator's confirmation of a natural disaster or Covid 19, an emergency control plan is established, and an alternative control location is designated at a nearby VTS center to enable continuous operations. Korea's VTS is making efforts to eliminate spatial/temporal gaps to ensure maritime safety, and the smooth exchange of VTS information is essential to achieve this.

### 3.2.2. MARINE TRAFFIC STATUS

Korea is surrounded by sea on three sides, so there are many ships entering and leaving the country. In particular, The Republic of Korea is geographically located between China and Japan, so marine traffic flows are connected. There is a traffic flow of ships along the coast. The heat map shows the number of ships navigating the coast of Republic of Korea for one year in 2020, the red color means higher density (Figure 6). The traffic flow in the VTS area of Korea on 11th March. 2020 was analyzed using the AIS data of 24 hours. The data was represented using a GIS program. A grid of 0.01 (degree) was used to classify the VTS area, and the number of vessels operating within the grid was counted.

To the south of the VTS area of the Republic of Korea, the VTS was installed at Busan Port, Busan New Port, Masan, Wando Port, Yeosu Port, Mokpo Port, Tongyeong Coast, Yeosu Coast, and Jindo Coast. Although the VTS area was divided, it showed a continuous flow of traffic. (APPENDIX 1.1)

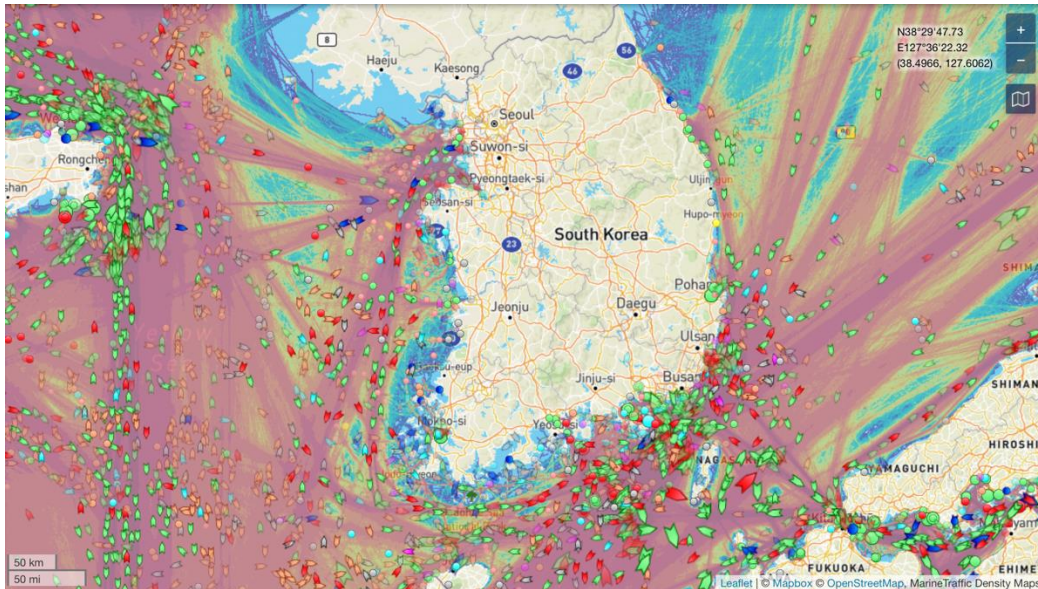


Figure 6 Republic of Korea marine traffic status (Source: marine traffic)

The Daesan Port, Pyeongtaek Port, Incheon Port, Gyeongin Port VTS, and Taean Coast VTS were installed in the VTS area on the west coast of Korea. Though the VTS area is divided, a continuous flow of traffic appears here, similar to the south side. (APPENDIX 1.2)

### 3.2.3. MARINE ACCIDENT IN THE VTS AREA

A total of 13,687 marine accidents have occurred over the last five years (2016-2020) in Korea. Among them, 5,692 cases (41.5%) occurred in the VTS area. VTS not only plays a role in pre-emptive response to prevent marine accidents, such as deviation from the route, approaching dangerous areas, and risk of collision, but also in prompt first response action and propagation in the event of a marine accident. (APPENDIX 2)

Therefore, it is important to exchange information in the case of an emergency such as a marine accident. On the southern and western coasts, where the VTS areas are connected, many marine accidents occur even at the boundaries of the VTS area.

### 3.2.4. IMPLICATIONS

Owing to the geographical characteristics of Korea, there is a lot of vessel traffic along the coast. Therefore, the VTS area is also connected to the port and coast, and a policy is being implemented to eliminate temporal/spatial blind sectors.

To eliminate blind sectors, both VTS operations and seamless VTS information exchange are essential.

## 3.3. PROPOSAL

### 3.3.1. IVEF SERVICE

The IALA Recommendation 0145 provides a framework with formats and protocols for data exchange between VTS systems, stakeholders, and relevant external parties to assist in the efficient deployment of services to the mariner and maritime community by facilitating the harmonization, connectivity, and the integration of components.

The composition of the IVEF exchange message can be divided into accessing information and exchanging content. Among them, ship-related information includes track data, vessel data, voyage data, and tagged item. If the current message is used, the location and information of the vessel of the other VTS center can be known through the exchange of IVEF messages with other centers (APPENDIX 3).

### **3.3.2. ADDITIONAL DATA IN IVEF**

The Korean Coast Guard is developing a system that can integrate VTS information across the country in a cloud format and share it in real time through the Cloud VTS project. In particular, this project will exchange radar images and VHF digital information, as well as IVEF exchange messages. Such technology can be operated in emergency situation, such as the closure of a center due to COVID-19 and the support of personnel in nearby centers in the event of a marine accident.

Therefore, we propose a recommendation update so that radar images and VHF information can be exchanged in the current IVEF exchange message.

## **4. REFERENCES**

- [1] Marine traffic website ([www.marinetraffic.com](http://www.marinetraffic.com), assessed on 28th Feb. 2022)
- [2] IALA RECOMMENDATION R0145(V-145) INTER-VTS EXCHANGE FORMAT (IVEF) SERVICE
- [3] IALA VTS MANUAL 2021 - EDITION 8

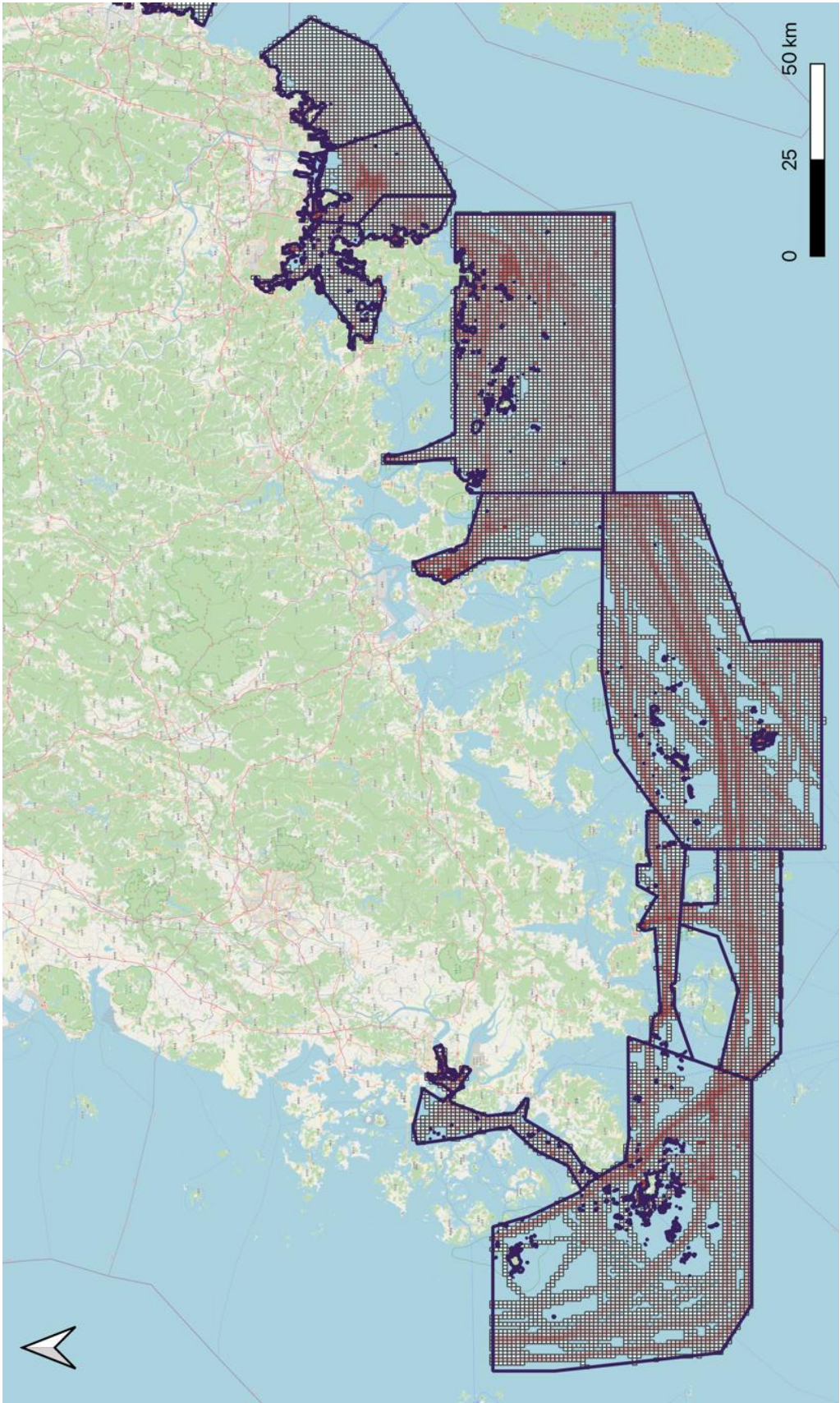
## **5. ACTION REQUESTED OF THE COMMITTEE**

The Committee is requested to discuss the given information and approve to revise the IVEF recommendations to exchange radar images and VHF digital information.



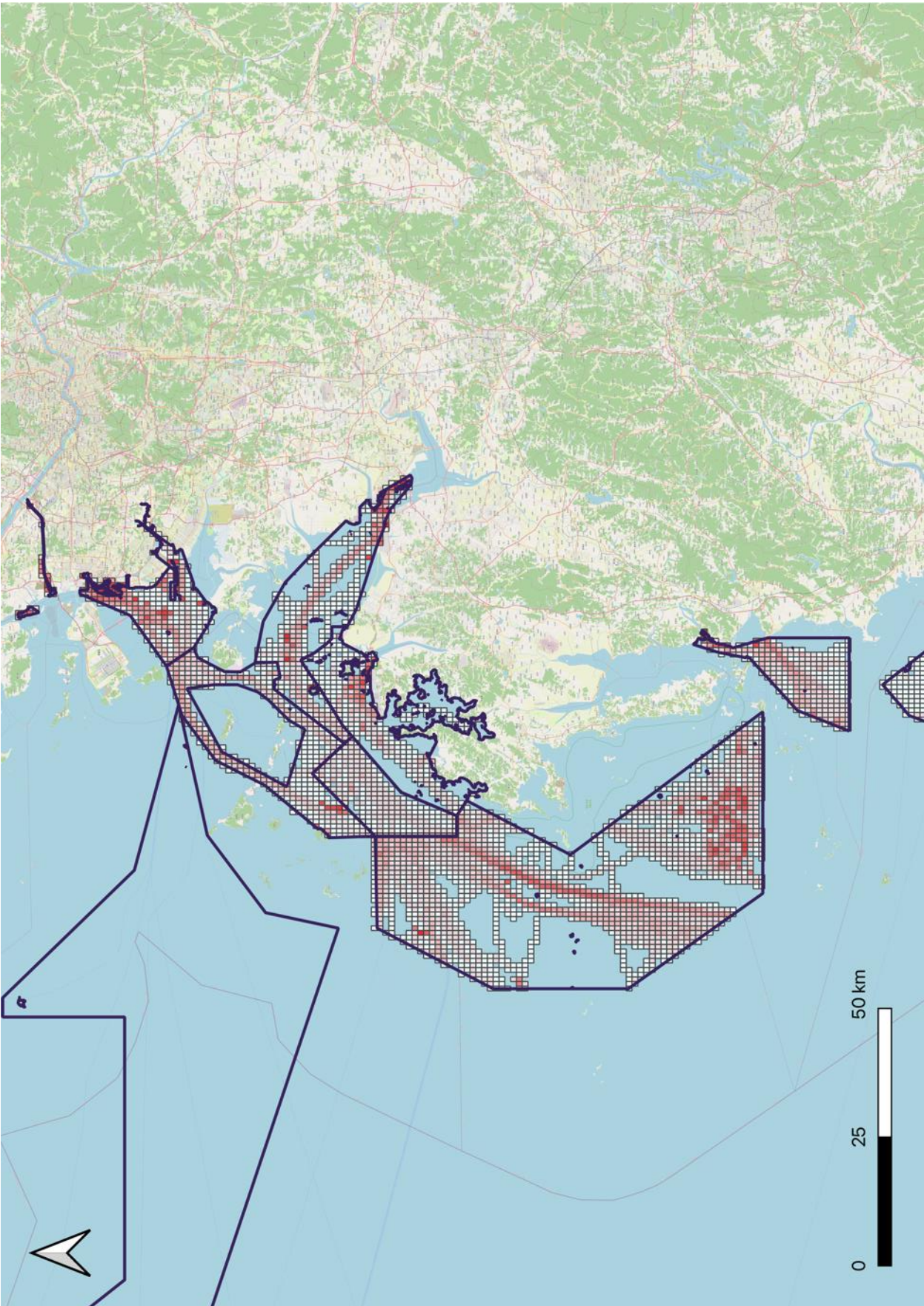
# APPENDIX 1 MARINE TRAFFIC IN REPUBLIC OF KOREA

## 1. SOUTHERN COASTAL REGION





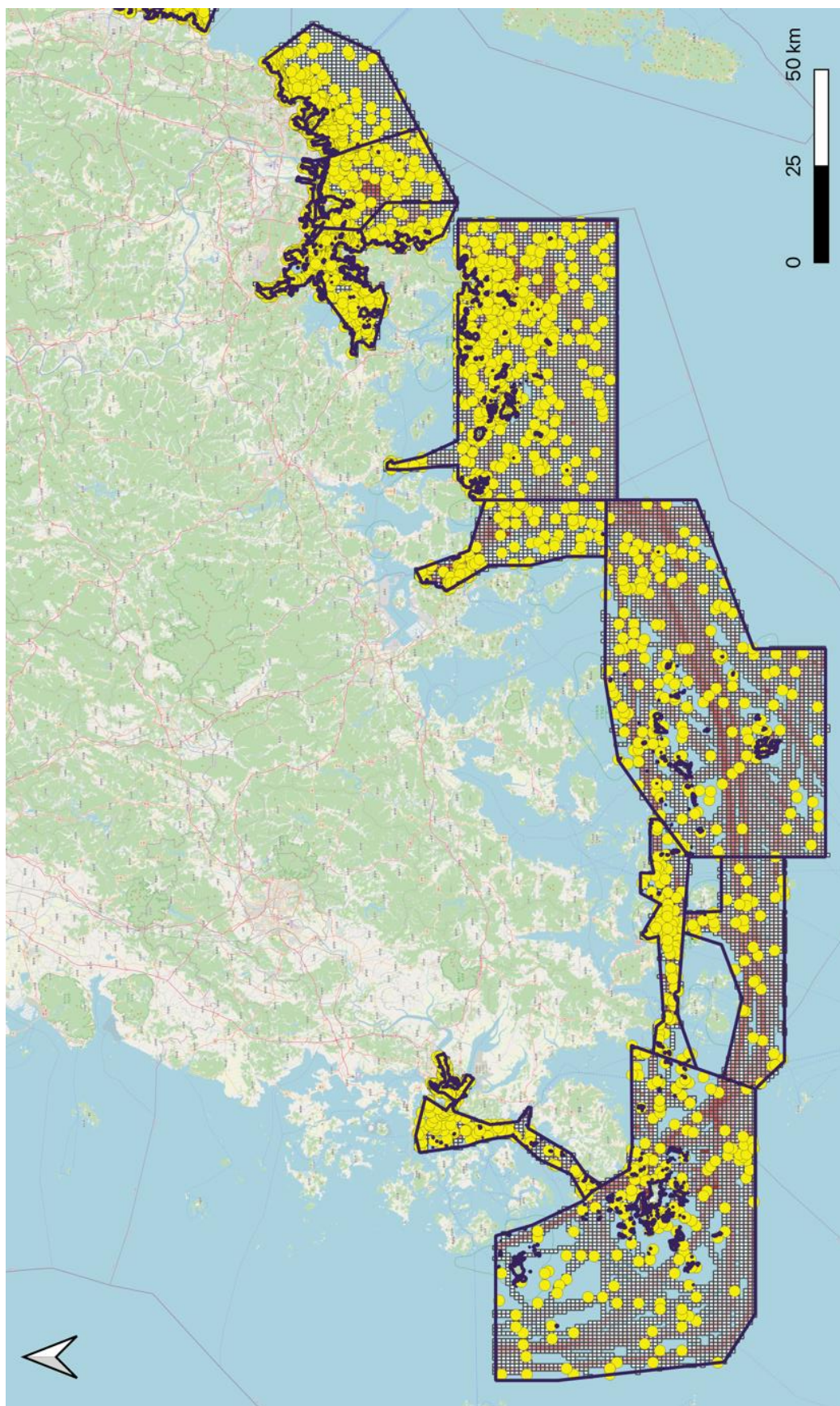
## 2. WESTERN COASTAL REGION





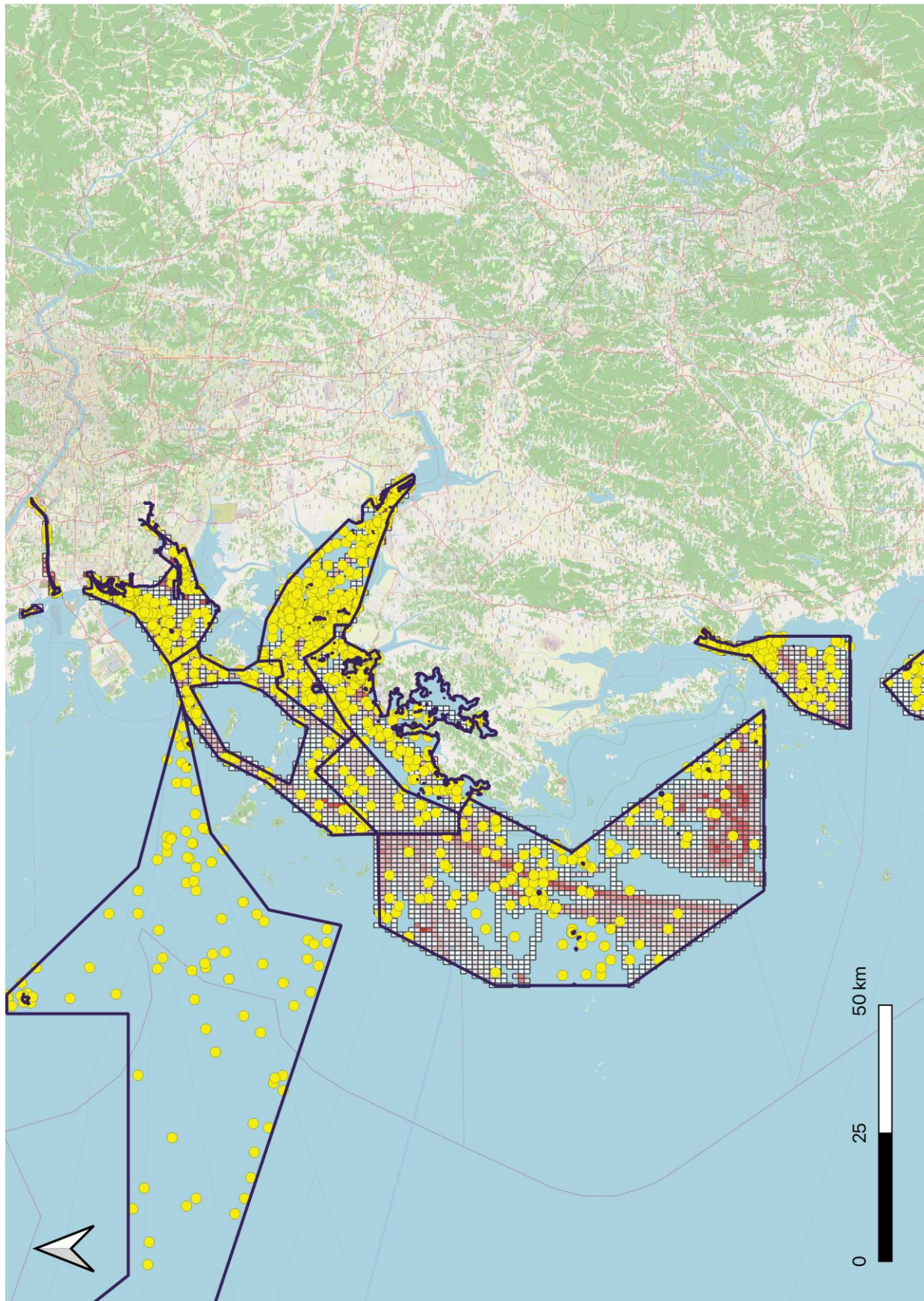
## APPENDIX 2 MARINE ACCIDENT IN THE REPUBLIC OF KOREA

### 1. SOUTHERN COASTAL REGION





## 2. WESTERN COASTAL REGION



## APPENDIX 3 IVEF DATA DEFINITION

