Input paper: [[1]](#footnote-1) DTEC2-5.2.2.4

Input paper for the following Committee(s): check as appropriate Purpose of paper:

**□** ARM **□** ENG **□** PAP **☑** Input

X DTEC **□** VTS **□** Information

Agenda item [[2]](#footnote-2) n.n

Technical Domain / Task Number 2 …………………………………

Author(s) / Submitter(s) …China MSA………………

PROPOSALs on CERTAIN key aspects for the development and implementation of digital fairway

# 1 Summary

The deployment of intelligent waterway sensing equipment and the extensive applications of new technologies in the field of navigation marks have brought about profound changes in many ways such as the service functions, quality and management mode of traditional marine AtoNs, and have greatly enriched the capabilities of marine AtoNs service, as well as promoting the development of marine AtoNs into a new era of digitalization, informationization and intelligence, laying a foundation for the digital development and implementation of AtoN services on digital fairway.

Based on the discussion of DTEC1 on the development and implementation of digital fairway, the China Maritime Safety Administration puts forward suggestions on certain key aspectsof digital AtoNs .

## 1.1Purpose of the document

This document suggests that in the preparation of digital fairway development and implementation guidelines, focus should be placed on digital application of marien AtoN to collect the data and information of digital fairway and provide digital service.

## 1.2Related documents

Non.

# 2 Background

In its 1st meeting report, the DTEC Committee discussed and adopted the contents of its 2023-2027 work plan. One of the plans is to develop new guidelines for the development and implementation of digital fairway, which will be discussed as a working group task during DTEC2.

# 3 Discussion

Digital fairway development and Implementation, within the field of IALA, mainly involves research and discussion on the role and functionality of marine AtoNs.

China has already launched several digtial AtoN projects on marine environmental data collection and brodcast and regional navgation pre-warnning system (electronic fence application) in large ports such as Shanghai Port, Ningbo Zhoushan Port, Guangzhou Port, and Tianjin Port.

Through China's practice in the field of digital AtoNs, it is believed that three key aspects need to be considered in the process of developing and implementing digital navigation fairway:

First, the digitization of traditionnal AtoNs , that mainly through such ways as AIS AtoN, remote moritor and control system, etc., to provide digital information of the characteristics and status on marine AtoN. It is also necessary to evaluate the current degree of digitization of AtoN and future development goals；

Secondly, the certain types of data and information of digtial fairway which can be collecxted and served by marine AtoNs. For exmple, collection and dissemination of environmental information such as channel water depthsuch, hydrology and meteorology, identification and monitoring of abovewarter objectis information; and marking and early warning of construction, operations and buildings around waterways. The comlimentary use and electronic fence applicationof AtoNs can provide sound solution by carrying related sensors, developing service and data system, and updating structure, power system and communicaitons links.

Thirdly, the AtoN service level and maintenance requirements are special requirements in digital fairways. The new service methods of digital development of AtoN, especially the construction of multi-functional AtoN, have to meet new requirements in terms of availability, reliability, and AtoN maintenance and frequency. It is necessary to pay special attention during implementation.

For example, China has conducted research on the planning of Maritime Data Sensoring Network in the East China Sea Area through visua and has determined the construction mode, to fully utilize the advantages of all parties to comprehensively plan and integrate marine data resources systems, establish a unified data management and service quality system, achieve interconnection and mutual recognition of various marine data among departments.

China has implemented a test project of the Yangtze Estuary Intelligent Navigation Service Area, benchmarking the technical route for e-navigation construction. Through interviews and surveys with maritime Authorities, companies, and ship crews, the project gains an understanding of the user needs, including ships and Authorities in the Yangtze Estuary, conducts gap analysis, and proposed a solutions plan for the Yangtze Estuary Intelligent Navigation Service.

China develops the real-time collection and broadcast of channel environmental information by installing sensors on traditional navigation marks. Correspondingly China is formulating relevant national technical standards to specify the requirements of the application scenarios, construction and implementation of channel environmental data. It mainly clarifies the application scope, deployment requirements, system components, service provision, etc. The framework content of this document is attached as an annex.

Therefore, it is recommded that the guidelines for the development and Implementation of digital fairways could fully consider China’s practice and experience and the following content be included: first, the goals and tasks of digital AtoN in digital fairways; second, the goals and tasks of data sensing and dissemination in digital fairways; third, the key steps, processes and content of the construction and implementation of digital fairway through marine AtoNs.

**4 Actions requested OF the CommiTTEE**

The committee is invited to consider the three key aspects proposed by China when formulating new guidelines for the development and implementation of digital routes, and take actions as appropriate.

**Annex**

Technical requirements for sensing and broadcasting of fairway environment data by marine AtoNs (Abstract)

## 1 Scope

### Suitable for including but not limited to the following three application scenarios:

* 1. Assisted navigation function
  2. Monitoring function
  3. Assisted decision-making function

## 2 Design requirements

### 2.1 The principle of design

* 1. The principle of adaptability
  2. The principle of functionality
  3. The principle of economy
  4. The principle of expandability
  5. The principle of standardization

### 2.2 Location selection

### According to the actual application requirements, the following locations should be preferred:

* 1. Important ports, waterways and navigation routes
  2. The narrow waterway
  3. The mouth door, the steering point
  4. Reef shoals and other water flow change in large areas
  5. Environmental monitoring requirements area
  6. Where accidents occur frequently
  7. Dense traffic area
  8. Fairway warning area

## 3 System components

### 3.1 System composition

### Consists of six parts: information collection terminal, information integration terminal, information communication terminal, information service system and energy support system.

* 1. Information collection terminal
  2. Information integration terminal
  3. Information communication terminal
  4. Information service system
  5. Energy support system
  6. Operation and maintenance system

### 3.2 Technical requirement

* 1. Installation requirements

### (1) Standardization requirements

### (2) Fast and simple requirements

* 1. Environmental suitability
  2. Communication requirements

Choose one or more of the following modes of communication:

### (1) 4G / 5G communication capability

### (2) AIS communication

### (3) Beidou communication

### (4) Satellite communication

* 1. Energy requirements

### (1) Power supply adaptability

### (2) Energy support system

## 4 Service provision

### 4.1 Data flow

### 4.2 Regional information services

### According to the recommendations of the International Navigation Association e-Navigation Construction Guide (G1139) and the Maritime Radio Communication Program (MRCP), the service to users should be broadcast directly by the beacon sub-station.

* 1. Service mode
  2. Information category
  3. Frequency of information sending

### 4.3 Data service interface

### 4.4 Information safety

1. Input document number, to be assigned by the Committee Secretary [↑](#footnote-ref-1)
2. Leave open if uncertain [↑](#footnote-ref-2)