Application of BDS for Safety Communication and Search and Rescue

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China Transport Telecommunications & Information Center
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CONTENTS

01

Background

01: BDS Open Services

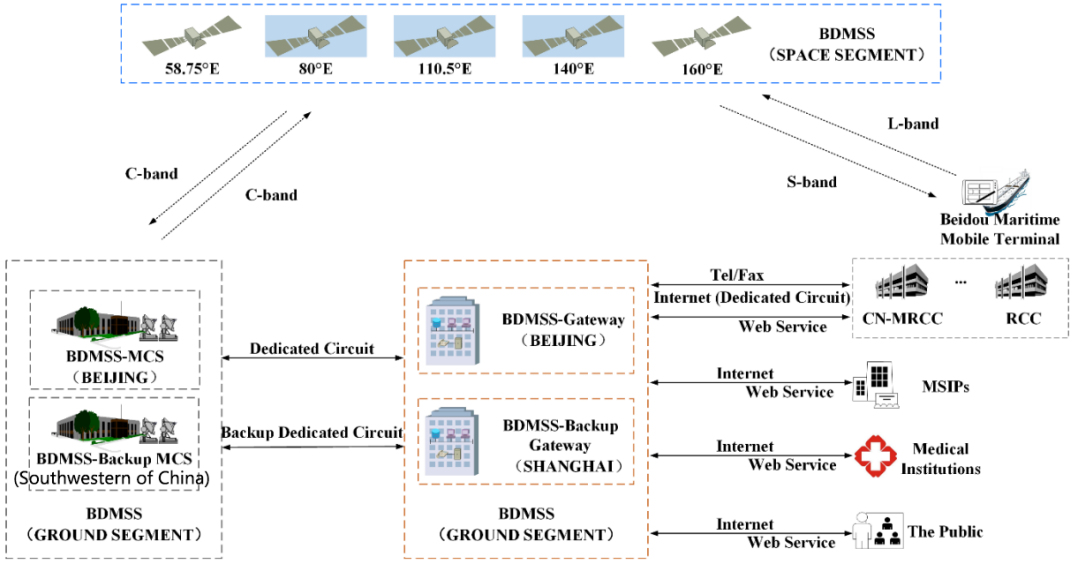
Service Types		Signal(s)/Band(s)	Service Satellites
Worldwide	Positioning, Navigation and Timing (PNT)	B1I, B3I	3GEO+3IGSO+24MEO
		B1C, B2a, B2b	3IGSO+24MEO
	Global Short Message Communication	Uplink: L Downlink: GSMC-B2b	Uplink: 14MEO Downlink: 3IGSO+24MEO
	International Search and Rescue	Uplink: UHF Downlink: SAR-B2b	Uplink: 6MEO Downlink: 3IGSO+24MEO
China and Surrounding Areas	Satellite-based Augmentation System (SBAS)	BDSBAS-B1C, BDSBAS-B2a	3GEO
	Ground Augmentation System (GAS)	2G, 3G, 4G, 5G	Mobile communication networks, Internet
	Precise Point Positioning (PPP)	PPP-B2b	3GEO
	Regional Short Message Communication	Uplink: L Downlink: S	3GEO

China and surrounding areas means 75°E to 135 °E, 10°N to 55°N.

01: BeiDou Message Communication

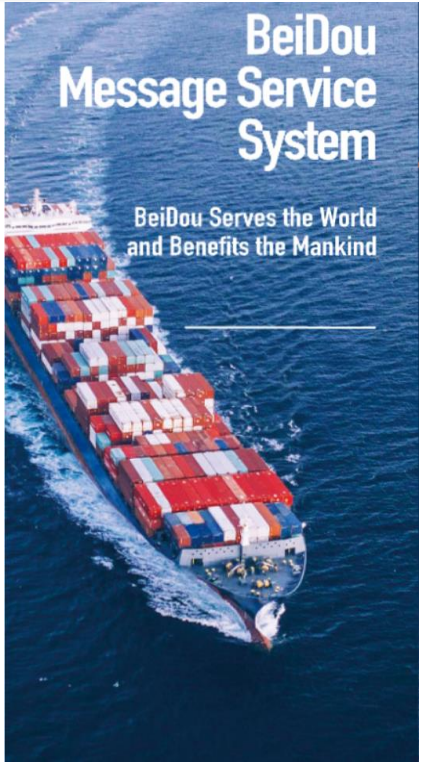
IMO recognized GMDSS service

- Distress alerting
- MSI broadcast
- SAR coordination
- General communications

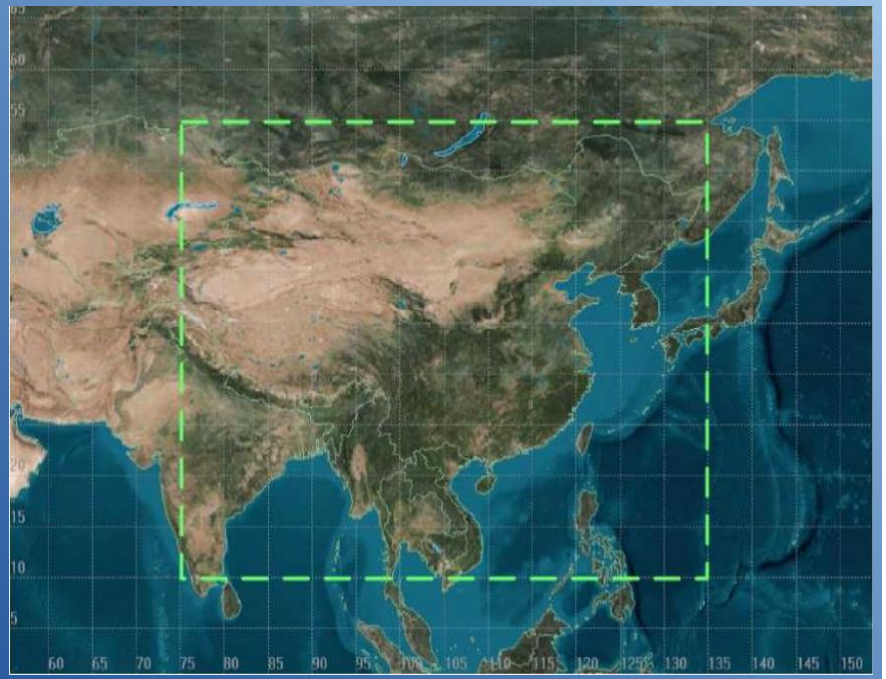


Pending to the resolution of a few implementation issues before commencing GMDSS service.

01: GMDSS Service Area



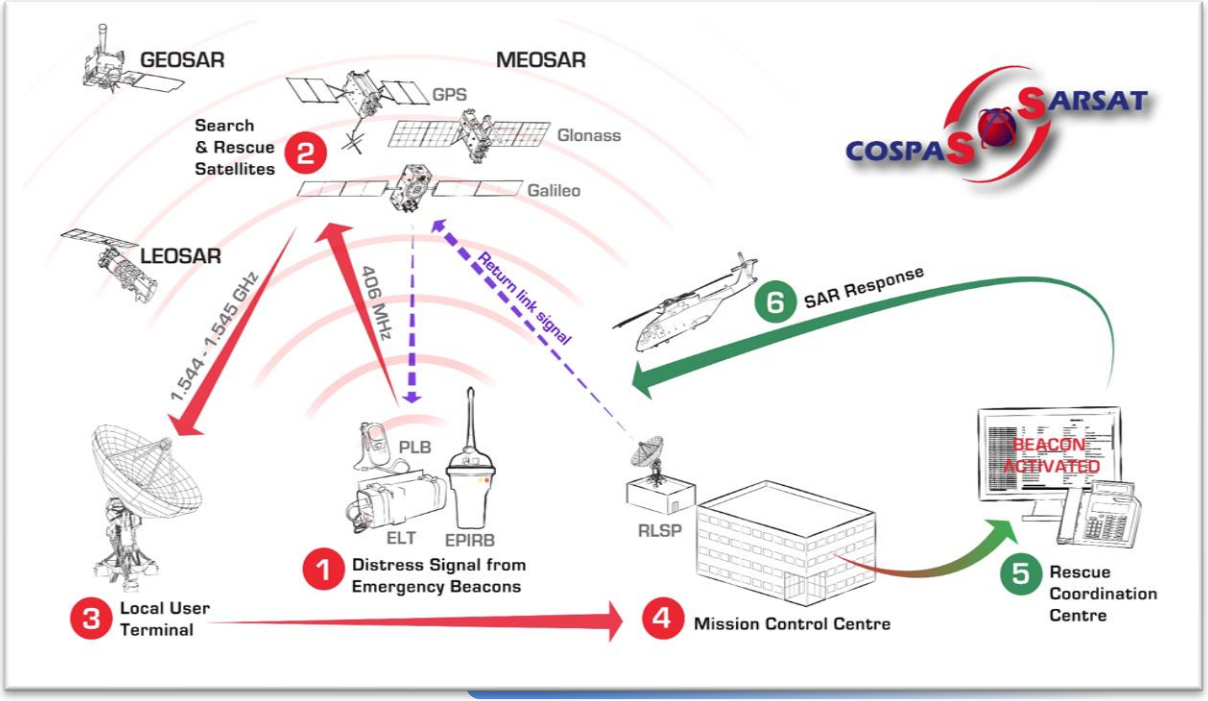
As recognized by IMO, BDS could provide GMDSS services to the Asia-Pacific region within the geographical area of 10°N-55°N latitude and 75°E-135°E longitude.



01: International Search and Rescue

Cospas-Sarsat Space Segment

- **Forward Link Alerting**
- **Return Link Service**
- **Two-way Communications**
- **Early Warning Service**



02

Updates at International Levels

02: At ITU Level

RESOLUTION 365 (WRC-23)

Provisional application of the Radio Regulations for the introduction of new geostationary satellite networks into the global maritime distress and safety system

The World Radiocommunication Conference (Dubai, 2023),

considering

a) the growing demand for global maritime distress and safety system (GMDSS) communications capabilities to enhance maritime safety;

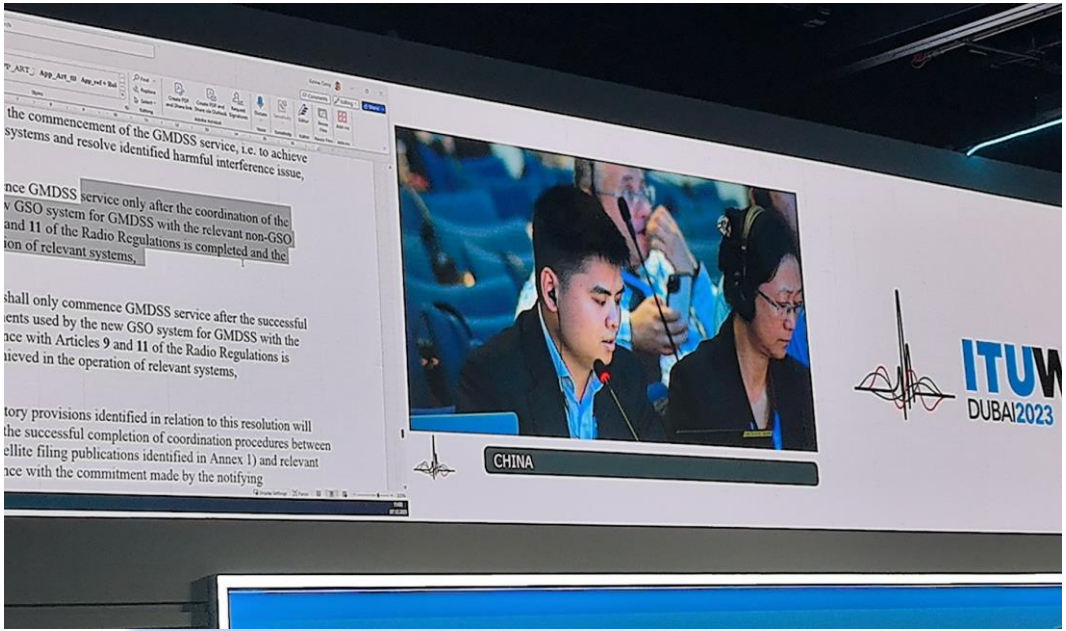
b) that the Maritime Safety Committee (MSC) of the International Maritime Organization (IMO), in its resolution MSC.529(106), recognized a new geostationary (GSO) mobile satellite communication system[1] for the use of a regional messaging system in the GMDSS limited to the service area within 75°E to 135°E longitude and 10°N to 55°N latitude, hereinafter referred to as "the GSO Networks"; and that it is necessary for the coordination process to be completed before the GSO system commences GMDSS services;

c) that this conference considered a revised radio regulatory framework for reflecting the frequencies for GMDSS on a provisional basis in Appendix **15** and Articles **5** and **33** of the Radio Regulations,

considering further

a) that the GSO Networks currently operate using frequency assignments recorded in the Master International Frequency Register under No. **11.41** (see Annex 1);

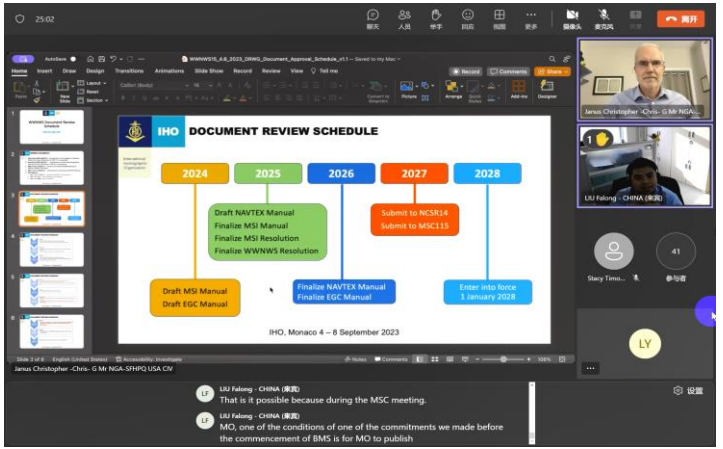
b) that the primary mobile-satellite service (MSS) allocations in the frequency bands 1 614.4225-1 618.725 MHz or 1 616.3-1 620.38 MHz and 2 483.59-2 499.91 MHz are also used by non-GSO MSS systems and radiodetermination-satellite service (RDSS) systems operating in the same recognized service area, and that further coordination is required with these notified satellite systems and networks as identified in accordance with No. **9.27**;



02: At IHO Level

In September 2023, the IHO WWNWS agreed to include the review of BDMSS EGC service manual into its working items.

In March 2024, the IHO DRWG completed the technical review of BDMSS EGC service manual, which is now ready for further review and approval.



02: At Cospas-Sarsat Level

4.2.10 Return Link Service (RLS) Procedures

4.2.10.1 Procedure

An MCC shall initiate a Return Link Service (RLS) message to the MCC associated with the Return Link Service Provider (RLSP) as specified in Table 4-16 when the position of a 406 MHz beacon with Return Link capability is confirmed to be in the MCC's service area. An RLS message is only sent for beacons with Return Link capability, based on the Location Protocol encoded in beacon message bits 37 – 40 for FGBs and beacon message bit 42 for SGBs. Beacon position is confirmed, as specified in section 3.2.4. The MCC associated with the RLS provider shall distribute RLS messages to the designated RLSP, as specified in Table 4-16. If the designated RLSP is not known (i.e., PDF-2 of the FGB beacon message is not usable, an SGB message with a usable RLS Rotating Field is not available, or the associated MCC is not specified in Table 4-16 for an RLS Provider ID), then a position confirmation alert shall be sent to each MCC associated with a designated RLS provider.

Table 4-16 : Associated MCCs for Return Link Service Providers

Satellite Constellation RLSP	Associated MCC
SAR/Galileo	FMCC
Glonass*	CMC
SAR/BDS**	CNMCC

Notes: * Glonass is not currently a designated RLS provider but may provide this capability in the future.

** The space segment for RLS/BDS is available for service. However, the commencement of service is pending the completion of upgrade and commissioning of associated ground segment and successful RLS/BDS testing.

In October 2023, the Cospas-Sarsat Open Council meeting approved the revisions to its operational, technical and general system documents to include SAR/BDS as a Return Link Service provider.

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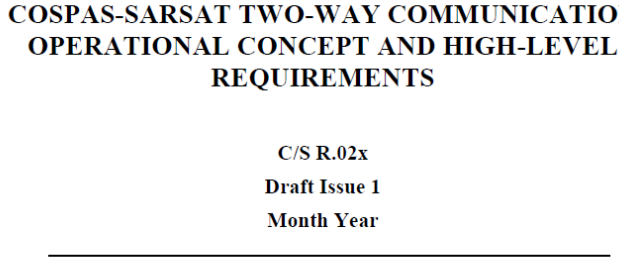
INTERNATIONAL SATELLITE SYSTEM FOR SEARCH AND RESCUE
406™ DISTRESS ALERTING SERVICE

02: At Cospas-Sarsat Level



COSPAS-SARSAT TWO-WAY COMMUNICATION OPERATIONAL CONCEPT AND HIGH-LEVEL REQUIREMENTS

C/S R.02x

Draft Issue 1

Month Year

In March 2024, the Cospas-Sarsat EWG/6 updated the draft system document on Two-way Communication, which includes following key contents:

- TWC operational concept
- Roles and responsibilities
- Guidelines to concerned parties
- Implementation timeline
- High level requirements

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03

Detailed Application Introduction

03: Application Scenarios

Position Report

Dynamic Vessel Monitoring

Meteorological Warning

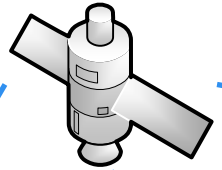
Safety Information Broadcasting

Emergency Response and Search and Rescue

Maritime Distress Alerting

03: Distress Alerting Service

BDS Message Service



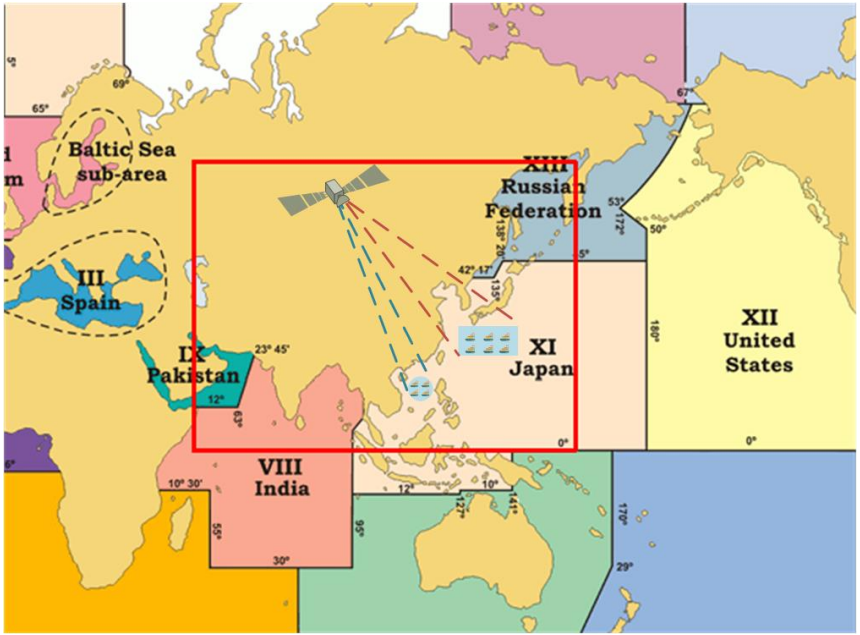
SAR forces

Object in distress

SAR Authorities

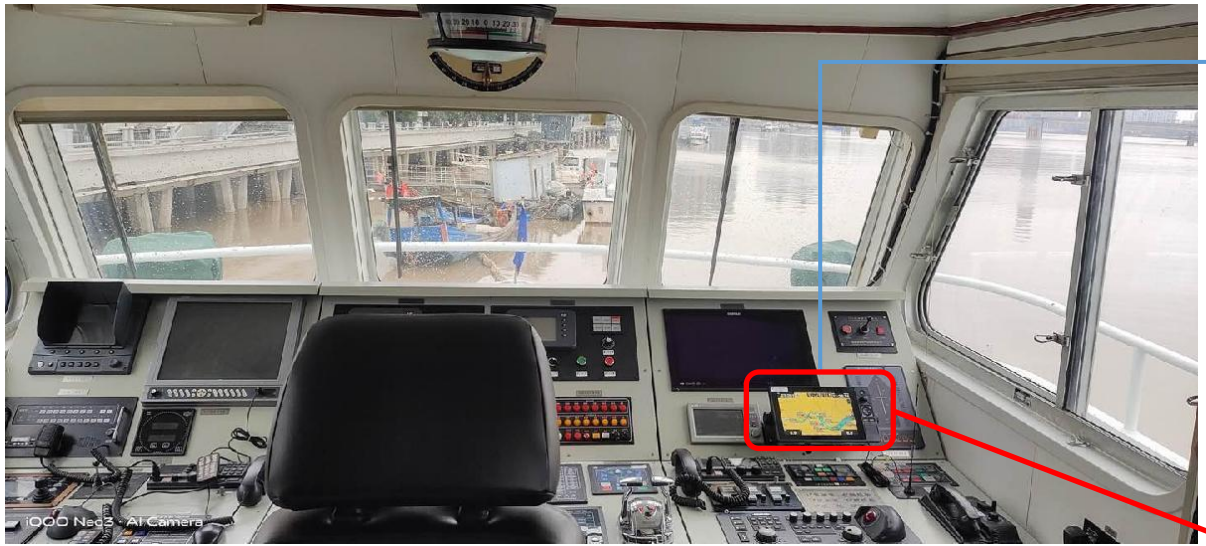
03: MSI Broadcast

Different types of shore to ship Maritime Information broadcast to customized areas.



Demonstrated in Zhejiang Province

03: Data Transmission



Connected with *11* group users and over *20,000* users for data transmission

03: Return Link Service

Three types of RLMs

Type I

Automatic acknowledgement from the SAR service system to the distress beacon when receiving the distress alert

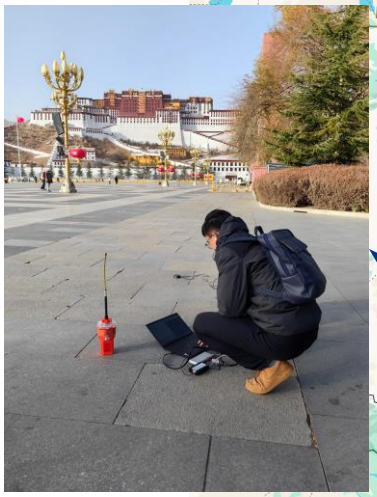
Type II

Pre-defined messages sent by authorized authorities to the distress beacon

Type III

Similar to Type II but providing customized text function

03: Return Link Service



03: Return Link Service

The delay of RLS meets the C/S requirement.

Testing Site	Requirement	Average Delay	Success Rate
Northeast (Mohe)	≤2 mins	12.24s	100%
Western (Lasa)	≤2 mins	8.72s	100%
Southwest (Langcang River)	≤2 mins	10.43s	100%
Eastern (Ningbo)	≤2 mins	13.4s	100%

03: Road Safety Service

Road Transportation Safety Service System

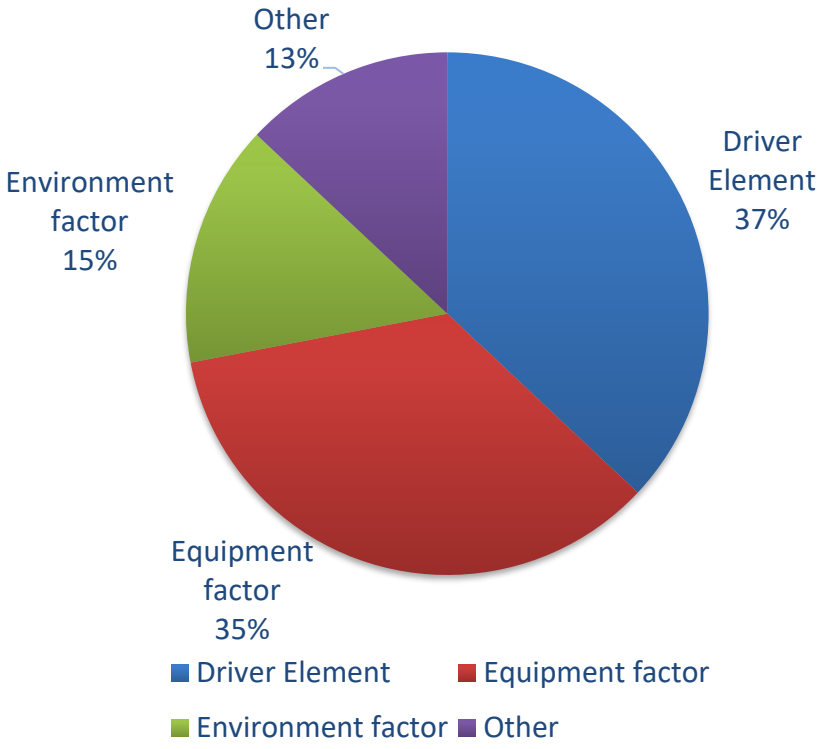
Over 8 million registered, biggest Internet of Vehicles

Main Functions

- Real-time Monitoring
- Driving safety warning
- Road information distribution
- Data statistics

03: Road Safety Service

Road Accident Cause

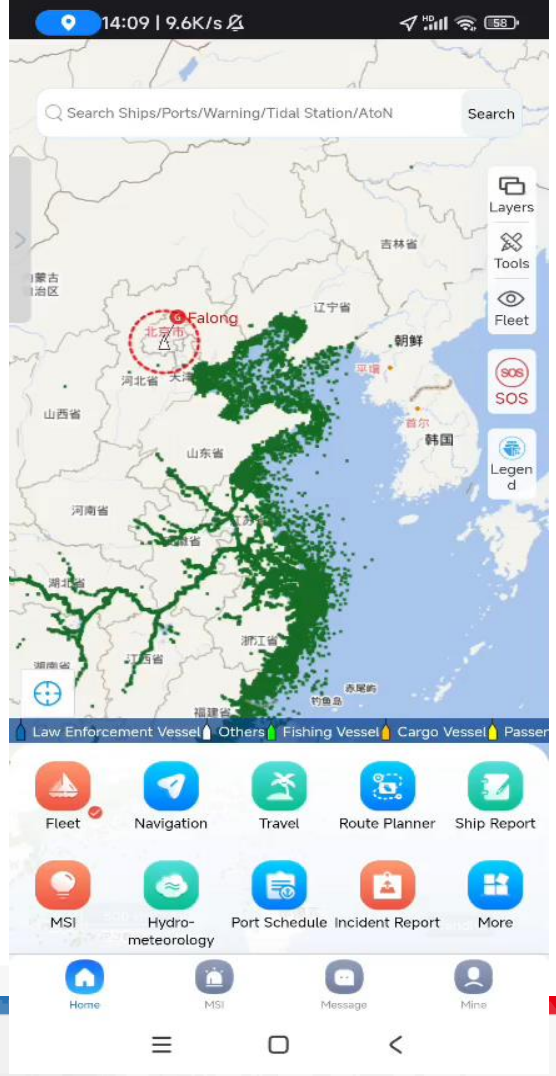


- Over 8,500 million driving risk warnings delivered since its operation from 2013
- Overspeed correction: 97%
- Fatigue driving correction: 57%

03: Mobile Applications

iSailing

- Shore-based AIS data
- Static/Dynamic information inquiry
- Real-time navigation
- Ship report
- Maritime safety information
- SOS



04

Future Workplan

04: Commencement of GMDSS Service

ITUWRC DUBAI 2023

Frequency Coordination

Radio Regulations

IHO International Hydrographic Organization

EGC Service Manual

IMSO INTERNATIONAL MOBILE SATELLITE ORGANIZATION

Letter of Compliance

04: BDS Application and Cooperation

Application + **Demonstration**

- Distress Alerting
- General Message Communication
- Position Reporting
- SAR and RLS
- Early Warning Service

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Thank you!