Application of BDS for Safety Communication and Search and Rescue

LIU Falong
China Transport Telecommunications & Information Center
4/25/2024
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Background
## 01: BDS Open Services

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<th>Signal(s)/Band(s)</th>
<th>Service Satellites</th>
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<td><strong>Worldwide</strong></td>
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<tr>
<td>Positioning, Navigation and Timing (PNT)</td>
<td>B1I, B3I</td>
<td>3GEO+3IGSO+24MEO</td>
</tr>
<tr>
<td></td>
<td>B1C, B2a, B2b</td>
<td>3IGSO+24MEO</td>
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<td><strong>China and Surrounding Areas</strong></td>
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<tr>
<td>Satellite-based Augmentation System (SBAS)</td>
<td>BDSBAS-B1C, BDSBAS-B2a</td>
<td>3GEO</td>
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<tr>
<td>Ground Augmentation System (GAS)</td>
<td>2G, 3G, 4G, 5G</td>
<td>Mobile communication networks, Internet</td>
</tr>
<tr>
<td>Precise Point Positioning (PPP)</td>
<td>PPP-B2b</td>
<td>3GEO</td>
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<tr>
<td>Regional Short Message Communication</td>
<td>Uplink: L Downlink: S</td>
<td>3GEO</td>
</tr>
</tbody>
</table>

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

Object in distress

SAR forces

SAR Authorities
03: MSI Broadcast

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

Demonstrated in Zhejiang Province
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
The delay of RLS meets the C/S requirement.

<table>
<thead>
<tr>
<th>Testing Site</th>
<th>Requirement</th>
<th>Average Delay</th>
<th>Success Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northeast (Mohe)</td>
<td>≤2 mins</td>
<td>12.24s</td>
<td>100%</td>
</tr>
<tr>
<td>Western (Lasa)</td>
<td>≤2 mins</td>
<td>8.72s</td>
<td>100%</td>
</tr>
<tr>
<td>Southwest (Langcang River)</td>
<td>≤2 mins</td>
<td>10.43s</td>
<td>100%</td>
</tr>
<tr>
<td>Eastern (Ningbo)</td>
<td>≤2 mins</td>
<td>13.4s</td>
<td>100%</td>
</tr>
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</table>
03: Road Safety Service

Road Transportation Safety Service System

Main Functions

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

Over 8 million registered, biggest Internet of Vehicles
• 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
Future Workplan
04: Commencement of GMDSS Service

- ITU WRC
- Frequency Coordination
- Radio Regulations
- IHO
- EGC Service Manual
- IMSO
- Letter of Compliance
04: BDS Application and Cooperation

- Application
- Distress Alerting
- General Message Communication
- Position Reporting
- SAR and RLS
- Early Warning Service
- Demonstration
➢ Contact: Falong Liu
➢ Email: liufalong@cttic.cn
➢ Mobile: +86 182 1013 6059
Thank you!