

SUB-COMMITTEE ON NAVIGATION,
COMMUNICATIONS AND SEARCH AND
RESCUE
8th session
Agenda item 9

NCSR 8/9/2
15 January 2021
Original: ENGLISH
Pre-session public release:

**DEVELOPMENTS IN GMDSS SERVICES, INCLUDING GUIDELINES
ON MARITIME SAFETY INFORMATION (MSI)**

Analysis and assessment of the GMDSS performance of Iridium

Submitted by IMSO

SUMMARY

Executive summary: This document contains the annual report by IMSO to IMO on Iridium's public service obligations for the provision of recognized mobile satellite communication services in the Global Maritime Distress and Safety System (GMDSS), as overseen by IMSO

Strategic direction, if applicable: 6

Output: 6.2

Action to be taken: Paragraph 31

Related documents: Resolutions MSC.451(99); A.707(17); A.801(19), as amended, A.814(19) and A.1001(25)

Introduction

1 This document contains the annual report to IMO by the International Mobile Satellite Organization (IMSO) on the performance of Iridium, as the mobile-satellite communication system recognized to operate in the GMDSS. The report is prepared and submitted in accordance with the provisions of the *Criteria for the provision of mobile satellite communication systems in the Global Maritime Distress and Safety System (GMDSS)* (resolution A.1001(25), annex, section 2.5).

2 The primary purpose of IMSO as it is enshrined in the IMSO Convention, is to ensure the provision by each provider of maritime mobile satellite communications services for the GMDSS according to the legal framework set up by IMO (IMSO Convention, article 3(1)). Pursuant to this requirement, IMSO executes a Public Services Agreement (PSA) with each provider and concludes such other arrangements as may be necessary to enable IMSO to perform its oversight functions, and to report as well as make recommendations, as appropriate (IMSO Convention, article 5(1)).

3 The PSA executed with Iridium on 12 March 2019 sets out the legal framework between IMSO and Iridium for the oversight of the recognized mobile satellite services provided by Iridium.

4 This report covers the period from 19 December 2019 to 31 October 2020.

Iridium communication services for use in the GMDSS

5 Iridium offers a range of communication services to fulfil the functional requirements listed in resolution A.1001(25), in particular, the maritime distress, urgency, safety and routine communications, including the broadcast of maritime safety information (MSI) and search and rescue (SAR) related information. The recognized Iridium services specified in resolution MSC.451(99) are:

- .1 Iridium Safety Voice;
- .2 Iridium Safety Messaging;¹ and
- .3 Iridium SafetyCast.²

Iridium space segment

6 The Iridium constellation remains unchanged since early 2019 when Iridium completed the replacement of the entire legacy constellation with 75 new "NEXT" satellites. The 66 operational satellites remain in their initial orbital slots and continue to function nominally. Iridium foresees no significant change to the constellation for the next 12 months.

Shown:

- Counter-rotating seam
- K-Band crosslink (make before break)
- L-Band Cell coverage

Configuration:

	P1	P2	P3	P4	P5	P6:
Slot 1	145 (5)	134 (92)	117 (29)	119 (36)	158 (18)	102 (112)
Slot 2	143 (43)	141 (51)	165 (23)	122 (44)	160 (90)	112 (17)
Slot 3	140 (39)	137 (104)	180 (50)	128 (78)	159 (49)	104 (110)
Slot 4	148 (77)	116 (28)	123 (48)	107 (115)	163 (3)	114 (26)
Slot 5	150 (40)	135 (93)	126 (71)	132 (89)	165 (23)	103 (103)
Slot 6	153 (8)	151 (111)	167 (67)	129 (79)	166 (96)	109 (4)
Slot 7	144 (74)	120 (38)	171 (81)	100 (73)	154 (94)	106 (114)
Slot 8	149 (30)	113 (24)	121 (42)	133 (89)	164 (13)	152 (22)
Slot 9	146 (107)	138 (109)	118 (33)	125 (69)	108 (2)	147 (7)
Slot 10	142 (82)	130 (85)	172 (72)	136 (99)	155 (25)	110 (9)
Slot 11	157 (6)	131 (87)	173 (65)	139 (57)	156 (46)	111 (16)
In orbit Storage						
	124	115	170	169	105	161
			176			162

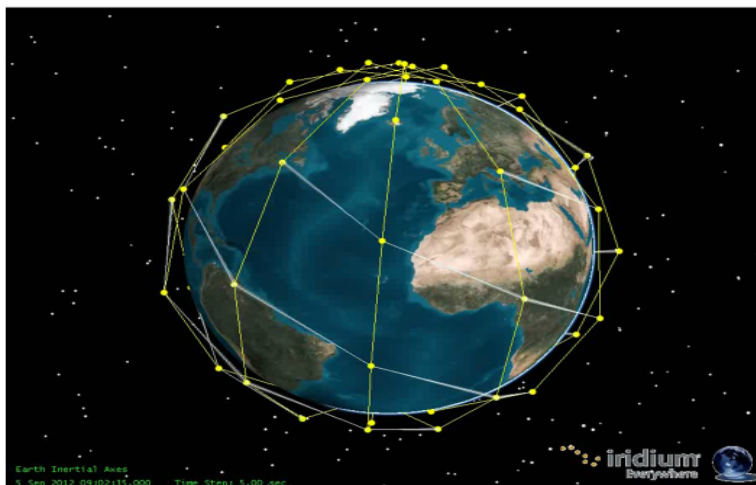


Figure 1: Operational satellites

Note: The number in the table shows the Satellite ID with the node ID³ in brackets.

7 In addition to the 66 operational satellites, Iridium maintains an additional nine in-orbit spare satellites. These have the same capabilities as the operational satellites, and all are operating nominally.

¹ This service was recognised as "Short Burst Data" at the time of adoption of MSC.451(99), but renamed commercially afterwards to avoid confusion with other services.

² This service was recognized as "Enhanced Group Calling" at the time of adoption of MSC.451(99), but renamed commercially afterwards as Iridium was informed that "Enhanced Group Calling" should be reserved as an IMO generic term and the recognized providers should use a commercial name.

³ The position in the constellation.

Iridium ground segment

8 The Iridium ground segment consists of satellite teleports (teleports) for the transfer of voice and data communications between the satellite constellation and the Iridium Gateway, which provide connection to the terrestrial voice and data networks.

9 The Satellite Network Operations Centre (SNOC) manages the satellite constellation and provides network management over the entire Iridium system. SNOC communicates with the satellites through Telemetry, Tracking and Control (TTAC) facilities. In addition to controlling communications between SNOC and the satellites, TTAC sites track the Iridium satellites and receive telemetry data from them.

10 Iridium currently operates teleports at geographically diverse locations around the globe, as part of its commercial network. The teleports use a Ka-band link to interconnect the satellite constellation with the Iridium Gateway for the transfer of communications to and from Iridium user terminals.

11 Operating as a switching centre, the primary Iridium Gateway in Tempe Arizona, United States, provides the connection between the Iridium network and terrestrial-based networks. Iridium also operates a backup Gateway in Chandler Arizona to enhance system redundancy and continuity. Gateway controls system access, call set-up, mobility management, billing, tracking and maintains all information pertaining to Mobile Earth Stations (MESs), such as user identity and geo-location.

12 According to the *Provision of radio services for the GMDSS* (resolution A.801(19), as amended), each LES "should have a registered associated rescue coordination centre (RCC) and have reliable communications by telephone, telex or other means". Table 1 provides the list of RCCs currently registered with Iridium.

Rescue coordination centre	Country	Status
RCC Atlantic Area Command	United States	Operational
RCC Pacific Area Command	United States	Operational
RCC Fareham	United Kingdom	Operational
RCC Stavanger	Norway	Operational
RCC New Zealand	New Zealand	Operational
RCC Australia	Australia	Expected Jan. 2021

Table 1: List of associated MRCCs

13 In the Iridium setup, the United States Coast Guard, acting as the "first RCC" (and back-up RCC) in accordance with the SAR Convention and the IAMSAR Manual, receives all unaddressed (geographically allocated) distress alerts. Addressed distress alerts are delivered directly to the associated RCC the alert was addressed to. In these cases, the United States Coast Guard acts as the back-up RCC and remains in standby to engage if the first RCCs does not respond to the distress alert. This ensures delivery of a distress alert to an RCC in any circumstances and also sets out the role of individual RCCs associated with the Iridium system.

14 Tables 2 and 3 provide information concerning the arrangements, as of beginning of October 2020, between Iridium and the NAVAREA and METAREA Coordinators, respectively.

Area	Country	Training	Agreement
NAVAREA I	United Kingdom	Done	Done
NAVAREA II	France		Done
NAVAREA III	Spain		
NAVAREA IV	United States	Done	Done
NAVAREA V	Brazil		
NAVAREA VI	Argentina		
NAVAREA VII	South Africa	Done	
NAVAREA VIII	India	Done	
NAVAREA IX	Pakistan	Done	Done
NAVAREA X	Australia	Done	Done
NAVAREA XI	Japan	Done	
NAVAREA XII	United States	Done	Done
NAVAREA XIII	Russian Federation		
NAVAREA XIV	New Zealand	Done	Done
NAVAREA XV	Chile	Done	Done
NAVAREA XVI	Peru	Done	Done
NAVAREA XVII	Canada	Done	Done
NAVAREA XVIII	Canada	Done	Done
NAVAREA IXX	Norway	Done	Done
NAVAREA XX	Russian Federation		
NAVAREA XXI	Russian Federation		

Table 2: List of NAVAREA Coordinators associated with Iridium

Area	Country	Training	Agreement
METAREA I	United Kingdom	Done	Done
METAREA II	France		
METAREA III	Greece	Done	Done
METAREA IV	United States	Done	Done
METAREA V	Brazil		
METAREA VI	Argentina	Done	Done
METAREA VII	South Africa	Done	
METAREA VIII	India		
	Mauritius		
METAREA IX	Pakistan	Done	Done
METAREA X	Australia	Done	Done
METAREA XI	Japan	Done	
	China	Done	Done
METAREA XII	United States	Done	Done
METAREA XIII	Russian Federation		
METAREA XIV	New Zealand	Done	Done
METAREA XV	Chile	Done	Done
METAREA XVI	Peru	Done	Done
METAREA XVII	Canada	Done	Done
METAREA XVIII	Canada	Done	Done
METAREA XIX	Norway	Done	Done
METAREA XX	Russian Federation		
METAREA XXI	Russian Federation		

Table 3: List of METAREA Coordinators associated with Iridium

Maritime mobile terminal

15 The Iridium GMDSS terminal, LT-3100S, is built by Lars Thrane of Denmark and it provides all GMDSS services alongside basic maritime satellite communications (voice, SMS and low-speed data for email). In the coming years Iridium manufacturers will also be building GMDSS options for Iridium Certus broadband equipment which combine faster data speeds and other features that will support future e-navigation requirements alongside GMDSS capabilities.

Availability of Iridium's space segment

16 In accordance with section 3.5.2 of resolution A.1001(25), IMSO is required to report to IMO on the availability of Iridium's space segment, provision of spare satellite capacity and network control function. The network availability of a recognized mobile satellite communication system is expected to achieve at least 99.9% in a given year.

17 The monthly availability figures provided by Iridium for its space segment are reflected in table 4. These figures assure that the GMDSS services provided by Iridium have achieved an availability equal to or above the 99.9% benchmark set out by resolution A.1001(25) during the reporting period.

Month	Availability
December-19	100.00%
January-20	100.00%
February-20	100.00%
March-20	100.00%
April-20	99.96%
May-20	100.00%
June-20	100.00%
July-20	100.00%
August-20	100.00%
September-20	100.00%
October-20	100.00%

Table 4: Space segment availability

Satellite outages

18 During April 2020, the Iridium space segment experienced micro-outages of a small number of minutes, each within a limited number of satellites and a limited number of beams, that caused a minor impact on availability (99.96%, see table above). These outages were unlikely noticed by the user community and, as the Iridium GMDSS system was still in testing during this period, there was no effect on any GMDSS users.

Ground segment outage

19 Since 1 January 2020, there have been 2 outage events impacting the Iridium GMDSS System. On 27 January 2020, there was a short ground segment outage of 1 minute and 20 seconds that affected the Iridium GMDSS system. On 29 July 2020, a planned outage of 6 minutes and 43 seconds was executed for the upgrade of switch equipment. As the system was still in testing during this period, there was no effect to any GMDSS users and the service resumed to normal afterwards.

Contingency exercises

20 In accordance with section 3.6.2 of resolution A.1001(25), IMSO and Iridium have agreed to conduct four contingency exercises to ensure that, in the event of a partial or total failure of the Iridium Gateway, the recognized mobile satellite distress and safety communication services can be restored not more than 1 hour after the failure occurs.

21 The contingency exercises were exceptionally conducted remotely due to restrictions imposed by the COVID-19 outbreak. Table 5 lists the exercises conducted in 2020.

	Date	Comments
1st exercise	11 June 2020	Remote
2nd exercise	23 July 2020	Remote
3rd exercise	1 October 2020	Remote
4th exercise	8 December 2020	Remote

Table 5: Contingency exercises in 2020

22 Following each exercise, IMSO provided its constructive comments and suggestions to Iridium with a view to improving the procedures and the user experience. These comments along with Iridium's own assessment of the exercise are incorporated into the exercise report prepared by Iridium after each exercise. The contingency exercise procedure is being kept under review by Iridium, in consultation with IMSO, and updated if/when need arises. Beside the regulatory aspect, these exercises are believed to create a unique opportunity for Iridium personnel to familiarize themselves with the GMDSS requirements.

Distress alerts through the Iridium systems

23 Since the Iridium GMDSS service had no subscriber during this reporting period, there were no actual distress alerts recorded. Equipment undergoing sea trials with participating Administrations have been used to conduct tests with participating RCCs.

False distress alerts

24 Since the Iridium GMDSS service had no subscriber during this reporting period, there were no false distress alerts recorded.

Broadcasting Maritime Safety Information

25 In accordance with the procedures of the IMO Enhanced Group Call Coordinating Panel, registered METAREA Coordinators and NAVAREA Coordinators have been making test transmissions of MSI using Iridium SafetyCast. These METAREA Coordinators and NAVAREA Coordinators will each declare their operational status in due course.

Resolution A.707(17) compliance

26 Iridium provides maritime distress, urgency and safety services, including distress alert/calls at no cost to the ships at sea in accordance with the provisions of resolution A.707(17) *on Charges for distress, urgency and safety messages through the Inmarsat system*.

27 There are no charges to the seafarers for the reception of SafetyCast messages. Iridium broadcasts SafetyCast messages with distress or urgency priority free-of-charge and messages with safety priority at a lower than standard messaging rates. As agreed with METAREA and NAVAREA Coordinators, Iridium does not intend to apply these charges until 2022, using this initial year of operation to clearly establish the messaging requirements of each user and refine the special rate accordingly.

Public Services Committee meetings

28 In accordance with section 6 of the PSA signed with Iridium, IMSO and Iridium regularly, or at the request of one party, hold Public Service Committee (PSC) meetings. These meetings are attended by the Director General, as accompanied by a member of the Directorate staff, the Vice-President of Iridium and Executive Officers of Iridium. PSC provides the fora to discuss high-level policy matters between Iridium and IMSO that falls under the scope of the PSA, including public service obligations of the company.

29 PSC meetings convened in 2020 are provided in table 6 below.

	Date	Comments
1st PSC	21 May 2020	Remote
2nd PSC	30 July 2020	Remote
3rd PSC	8 October 2020	Remote
4th PSC	11 December 2020	Remote

Table 6: PSC meetings in 2020

Conclusion

30 In view of the information provided in this document, it is IMSO's overall assessment that, during the period covered by this report, Iridium has remained compliant with the provisions of resolution A.1001(25) and fulfilled the company's public service obligation stated in the PSA as practically as possible under the current operational status of its recognized services.

Action requested of the Sub-Committee

31 The Sub-Committee is invited to consider the report in general and make any decision as it deems appropriate.
