WORLD METEOROLOGICAL ORGANIZATION

INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION (OF UNESCO)

JOINT WMO / IOC TECHNICAL COMMISSION FOR OCEANOGRAPHY AND MARINE METEOROLOGY (JCOMM)

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SHIP OBSERVATIONS TEAM

ITEM I-5.2

FIFTH SESSION

GENEVA, SWITZERLAND, 18-22 MAY 2009

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TELECOMMUNICATION FACILITIES

(Submitted by the Secretariat)

Summary and purpose of the document

This document includes reports by the INMARSAT, Argos, and Iridium on the status and operational use of channels allocated for data transmission via geostationary, polar orbiting, low earth orbit, and meteorological satellites respectively.

ACTION PROPOSED

The Team will review the information contained in this report, and comment and make decisions or recommendations as appropriate. See part A for the details of recommended actions.

Appendices: A. Report by IMSO
B. Inmarsat Maritime Safety Services and its use for meteorological applications
C. Report by EUMETSAT
D. Report by Service Argos

- A - DRAFT TEXT FOR INCLUSION IN THE FINAL REPORT

I-5.2 Telecommunication facilities

I-5.2.1 INMARSAT

IMSO

I-5.2.1.1 Andy Fuller (IMSO) presented a report on behalf of the International Mobile Satellite Organization (IMSO). IMSO is an inter-governmental organization that oversees maritime distress, safety and security communication services provided via Inmarsat and other mobile satellite service operators worldwide. These public interest services are dedicated to maritime safety within the Global Maritime Distress and Safety System (GMDSS) established by the International Maritime Organization (IMO), and include distress alerting, search and rescue co-ordinating communications, maritime safety information (MSI) broadcasts, and general communications.

I-5.2.1.2 The Team noted that IMSO also acted as the International LRIT Co-ordinator, appointed by IMO to coordinate the establishment and operation of the international system for the Long Range Identification and Tracking of Ships (LRIT) world-wide. LRIT provides for every ship on an international voyage to report automatically its position, at least four times every day, to a shore database operated by or on behalf of its Flag State, using mobile satellite communications.

I-5.2.1.3 In 2006, the IMO Maritime Safety Committee decided to appoint IMSO as the LRIT Coordinator, to perform specific functions defined in the IMO LRIT Performance Standard and Functional Requirements for LRIT. The central function of the LRIT Coordinator is the audit and review of Data Centres in the international LRIT system. However, IMSO has to perform a number of other tasks, for example

(i) participating in the development of technical specifications for the LRIT system and the testing of new or modified procedures or arrangements for communications
(ii) issuing requests for the submission of proposals for the establishment and operation of the International LRIT Data Centre and/or the International LRIT Data Exchange, evaluating any proposals received
(iii) participating in the testing and integration into the LRIT system of LRIT Data Centres, the International LRIT Data Centre and the International LRIT Data Exchange
(iv) investigation of operational or technical disputes or invoicing difficulties and making recommendations for their settlement
(v) review the performance of Application Service Providers providing services to the International LRIT Data Centre
(vi) audit the performance of the International LRIT Data Exchange and its fee structure, if any and
(vii) verify that Contracting Governments, Search and Rescue services receive only the LRIT information they have requested and are entitled to receive.

INMARSAT

I-5.2.1.1 Vladimir Maksimov provided an overview of the Inmarsat Maritime Safety Services and its use for meteorological applications.

I-5.2.1.2 The Team noted that the provision of some Short Access Codes (SACs) defined for distress and safety purposes is a national, optional matter. Routeing arrangement of all SAC codes, existing and new, is a national matter of each LES. Inmarsat has no influence on what or how such additional codes may be defined or used. IMO Assembly Resolution A.707(19) gives recommendations on the costs for SAC code 41 and others maritime safety-related codes and it is a matter for individual LESs whether or not to charge for these SAC services. It is also up to users to choose which service provider or LES to use to send messages to SACs and to find the best price and service quality.

I-5.2.1.3 Mr Maksimov reported that sending a message to SACs is a standard service that is supported by all Inmarsat C and mini-C maritime terminals, SOLAS and non-SOLAS compliant. He provided, to the best of Inmarsat knowledge, a list of Inmarsat C LESs with their access code in four ocean regions and provision of SAC 41.

I-5.2.1.4 The system comprises two types of mobile terminals – Inmarsat C and **mini-C** terminals. Mini-C is an evolution of the existing Inmarsat C technology and supports all Inmarsat C maritime services, depending on model, combined with a significantly reduced level of power consumption.

I-5.2.1.5 Data reporting service (which is not, in itself, a compression mechanism) is intended for transferring small quantities of data from an MES to a pre-determined terrestrial user and has potential to greatly reduce communication costs. The data may be deposited into a data-reporting file at the addressed LES and this file is retrieved by the terrestrial user or forwarded by an LES operator. The service depends on local arrangements between the terrestrial user and the service provider or the LES operator. The new enhanced data reporting service, recently developed, provides additional protection and reliability by means of an acknowledgement mechanism relayed to the mobile on the successful reception of the entire enhanced data report. It also provides a status request facility to ensure reliable data transfer.

I-5.2.1.6 The data reporting protocol can be used to initiate transmission of binary-encoded weather data, based on FM-13 ship code or SCADA applications. This is a user-defined service by e.g. a meteorological service provider who reached agreement with an associated LES to provide this service. For example, the service may be added to the existing TurboWin (and other) software as a separate module and connected to the main Inmarsat C or mini-C GMDSS terminals via a second communication port, which is available on some models. It is not mandatory for the manufacturers to provide a second communication port. However, Inmarsat undertakes to advise all Inmarsat C manufacturers that there is a clear demand for such a facility.

I-5.2.1.7 Since the Inmarsat C system is mandatory on certain types of SOLAS compliant ships and required by IMO SOLAS Convention, Inmarsat provides regular reports on its performance to the International Mobile Satellite Organisation (IMSO) for further submission to IMO. Inmarsat and LES operators, confirming that there are no capacity issue, are closely monitoring the system capacity.

I-5.2.1.8 The Team noted that Inmarsat developed a new maritime communication system, FleetBroadband, to provide simultaneous broadband data and voice through a compact mobile terminal via the Inmarsat fourth generation satellites on a global basis. Two types of FleetBroadband terminal are available, with different performance capabilities and size. Both terminals are designed specifically for the marine environment and support voice, fax and SMS.

I-5.2.1.9 Mr Maksimov reported on the Long Range Identification and Tracking of ships (LRIT), an IMO-defined service, for which Inmarsat is one of the communication providers. LRIT started on31st December 2008 but take-up is quite slow. The implementation period is extended until 30 June 2009, mainly due to some countries who need to decide on Data Centres and ASPs. There are some cost concerns that reporting rates are not finalised yet, with other funding issues still under discussion. Inmarsat C and mini-C terminals are part of the communication equipment for LRIT, using modified data reporting and polling protocol, i.e. enhanced data reporting or enhanced pre-assigned data reporting, and implemented on some models. More models are under type approval now. IMO Resolution MSC.210(81) provides the performance standards and functional requirements for LRIT. In addition to the GMDSS requirements, the shipborne equipment should comply with some minimum requirements.

I-5.2.2 Argos

I-5.2.2.1 The Meeting was presented with a report on the status and operational use of polar orbiting satellites through Service Argos. The Argos constellation includes six satellites, i.e. four NOAA satellites operational with Argos-2 instrument, one METOP satellite operational with Argos-3 instrument, and a NOAA satellite launched in February 2009 with Argos-3 instrument. The Argos ground network is composed of three global receiving stations (2 NOAA and 1 EUMETSAT) and fifty-three regional stations. The Argos processing network is composed of two redundant processing centres in Washington, USA and Toulouse, France. A third processing centre is operated in Toulouse inside CNES for higher security purposes.

I-5.2.2.2 The third generation Argos system, Argos-3, is now fully operational. The next satellite carrying Argos-3 will be launched in July 2010 (MetOp 2). The increased capabilities of Argos-3 should significantly improve the performance of existing Argos equipped meteorological stations. Argos-3 platforms are able to transmit more data with a secured data collection, enjoy longer lifetimes and can be remotely controlled (two-way). The real time data distribution of XBT through Argos-3 could be evaluated with the high data rate capability to transfer high-density XBT profiles. The CLS offered to assist the SOT in case it wished to evaluate these new capabilities through a dedicated SOT-SOOP program. The meeting invited SOOP operators interested in testing Argos-3 to make direct contacts with CLS (***action, SOOP operators, SOT-VI***).

I-5.2.2.3 The Team noted that CLS had improved the Argos processing system and was now able to decode most GPS manufacturer formats and provide GPS positions in real time. Since 2008 GTS, processing time has been improved (by nearly 10 minutes). The Team noted that CLS was now an Iridium Value Added Reseller (VAR) and had Iridium and Argos data processing capabilities, including for GTS distribution purposes (e.g. BUFR).

I-5.2.2.3 As already done with DBCP and Argo program, CLS is gradually improving the cooperation with SOT program through its day-to-day links with JCOMMOPS and Argos users.

I-5.2.3 EUMETSAT

I-5.2.3.1 The Meeting was presented with a written report by EUMETSAT on the status and operational use of channels allocated for data transmission via meteorological satellites.

I-5.2.3.2 The Team recalled that in recent years, problems with data transmission reliability experienced by the ASAP and VOS operators when using the Meteosat Data Collection Platform (DCP) system, resulted in the move to Inmarsat for the relay of data. Although it is not foreseen by ASAP or other ship operators to move back to Meteosat, EUMETSAT has been looking into methods of improving the DCP system for the benefit of all system users. EUMETSAT has been investigating the feasibility of High Rate Data Collection Platforms (HRDCP) for use on current and future generations of Meteosat. The HRDCP system will be tested during 2009, with the aim of offering an operational service in 2010. The system will be part of the Meteosat Third Generation System.

I-5.2.3.3 The team noted that the new HRDCP was expected to have several benefits for the user over the existing system i.e.

(i) Greater message size (maximum message size of 65535 bytes using the 90 second transmission window);
(ii) Increased transmission rate (1200 bps);
(iii) higher message repetition rate (e.g. sending the same 649 bytes in approximately 10 seconds);
(iv) efficient use of transmission channels thanks to more efficient and flexible use of the Meteosat DCP channels; and
(v) Improved data integrity thanks to modern encoding techniques of the DCP message).

I-5.2.4 Iridium

I-5.2.4.1 The Meeting was presented with a report on the status and operational use of Iridium low earth orbit satellites.

Appendices: 5

APPENDIX A

REPORT BY THE INTERNATIONAL MOBILE SATELLITE ORGANIZATION (IMSO)

(report submitted by Andy Fuller, Deputy Director General, IMSO)

1. Introduction

1.1 The International Mobile Satellite Organization (IMSO), is the London-based inter-governmental organization that oversees maritime distress, safety and security communication services provided via Inmarsat, and other worldwide mobile satellite service operators. These public interest services are dedicated to maritime safety within the Global Maritime Distress and Safety System (GMDSS) established by the International Maritime Organization (IMO), and include:

- distress alerting
- search and rescue co-ordinating communications
- maritime safety information (MSI) broadcasts
- general communications

1.2 Additionally, IMSO also acts as the International LRIT Co-ordinator, appointed by IMO to coordinate the establishment and operation of the international system for the Long Range Identification and Tracking of Ships (LRIT) world-wide.

2. IMSO as an institution

2.1 The IMSO is an intergovernmental organization, established by an international Convention, in which individual Governments sign-up, as they become members. The IMSO had 88 member states at the time of its privatization in April 1999. That number has now grown to 93 – and more countries are considering membership as the Organization's influence and responsibilities grow.

2.2 The Convention on the International Mobile Satellite Organization establishes the purposes of the Organization, as well as the most important organs of the institution. The Organization operates through:

- the Assembly of Parties, which generally meets every two years;
- the Directorate, headed by the Director General, with a small professional staff; and
- an Advisory Committee, comprising a number of selected Member States elected by the Assembly and which meets at least twice a year.

3. 2008 Amendments to the IMSO Convention

3.1 The original purpose of IMSO was to ensure that certain basic principles set forth in the IMSO Convention continue to be observed by Inmarsat, namely: the continued provision of global maritime distress and safety satellite communications services.

3.2 This fundamental purpose was amplified by a number of more general requirements concerning the way in which Inmarsat would be expected to conduct its business, including:

- Providing services without discrimination on the basis of nationality;
- Acting exclusively for peaceful purposes;
- Seeking to serve all areas where there is a need for mobile satellite communications; and
- Operating in a manner consistent with fair competition.

3.3 However, on 11 September 2001, the world changed, and that change has affected the maritime community in a number of ways. In addition to a range of stringent new security requirements placed on ships in the immediate aftermath of the 9/11 terrorist attacks, it became quickly apparent that the security services of the world possessed very incomplete information about the location and movements of ships worldwide. IMO began to address the problem through the development of a system for the long-range identification and tracking of ships - the LRIT system. LRIT provides for every ship on an international voyage to automatically, report its position, at least four times per day, to a shore database operated by or on behalf of its Flag State, using mobile satellite communications. In a similar way to the GMDSS, the Member States of IMO took the view that the central core of the new global LRIT infrastructure should be subject to intergovernmental audit and review. Unsurprisingly, IMSO was identified as the international body to perform this intergovernmental verification and oversight.

3.4 Within the same time scale, IMO had opened up the GMDSS to other potential maritime mobile satellite service providers for distress and safety communications, and the IMSO Convention was comprehensively amended towards the end of 2008 to reflect the broader responsibilities now to be undertaken by the Organization.

3.5 Thus the IMSO Convention now reads:

Article 3

Primary Purpose

(1) The Primary Purpose of the Organization 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.

(2) In implementing the Primary Purpose set out in paragraph (1), the Organization shall:

(a) act exclusively for peaceful purposes; and

(b) perform the oversight functions in a fair and consistent manner among Providers.

Article 4

Other Functions

(1) Subject to the decision of the Assembly, the Organization may assume functions and/or duties of LRIT Co-ordinator, at no cost to Parties, in accordance with the decisions of IMO.

(2) The Organization shall continue to perform the functions and/or duties of LRIT Co-ordinator, subject to the decision of the Assembly. In performing such functions and/or duties, the Organization shall act in a fair and consistent manner.

4. How does IMSO Function?

4.1 GMDSS Oversight

4.1.1 In effect, IMSO has the responsibility under the International Convention for the Safety of Life at Sea (SOLAS) for the provision of maritime distress and safety communications services under the GMDSS. However, IMSO has no assets of its own with which to provide these services and does so through a form of service contract with the satellite communications service provider(s). Therefore, IMSO has a form of public-private partnership contract, currently only with Inmarsat, called the Public

Services Agreement (PSA), which sets out the obligations of Inmarsat in respect of the relevant public services, as well as defining the oversight mechanism that exists between Inmarsat and IMSO.

4.1.2 While members of the IMSO Directorate maintain a close daily liaison with key members of Inmarsat staff, to ensure the smooth running of public services, the PSA provides for formal regular contact between the management of the company and the Director General of the Organization through a Public Services Committee (PSC), which meets every three months. A similar PSA with parallel practical arrangements will be put in place when and if IMO recognises any other mobile satellite service provider(s) for participation in the GMDSS.

4.1.3 For the time being, IMSO also owns a "special share" in Inmarsat, which provides a mechanism whereby IMSO could veto any formal proposal by the company to take decisions that might be detrimental to the GMDSS services.

4.1.4 In addition to these arrangements, Inmarsat cooperates with the IMSO Directorate to conduct regular exercises of the actions that would be taken in the event of a catastrophic failure of one of the operational satellites or its connected networks. This serves to review the standard operating procedures on a regular basis and provides the opportunity to revise those procedures in light of the experience. In addition, it has the very real benefit of making sure that everyone in the operational and technical support chain is fully aware of, and practised in exercising their responsibilities.

4.1.5 On a daily basis, IMSO is deeply involved in a wide range of technical and operational issues concerning the present management and future planning of the GMDSS safety communication services, particularly those involving the use of satellite communications. The Organization works with maritime administrations, coast guards and many other public and private bodies world-wide on subjects, as diverse as radio spectrum efficiency and planning; evolution of distress alert distribution systems; maritime safety information broadcasts, including the development of new broadcast services for the Arctic region; ship security alarm systems (SSAS) for use in piracy or hijack events; new satellite design studies and aspects of maritime safety regulation affecting all vessels at sea.

4.2 LRIT Coordination

4.2.1 In 2006, the IMO Maritime Safety Committee decided to appoint IMSO as the LRIT Coordinator, to perform specific functions defined in the IMO LRIT Performance Standard and Functional Requirements for LRIT. IMSO responded by amending the IMSO Convention to allow the Organization to accept this important role. In May 2008, the Performance Standard and Functional Requirements document, was entirely revised by, IMO and IMSO and is now in the process of establishing the practical, financial and administrative framework to allow it to perform its role as the LRIT Coordinator.

4.2.2 The central function of the LRIT Coordinator is the audit and review of Data Centres in the international LRIT system. However, a number of tasks has to be performed by IMSO, these include:

.1 participating in the development of technical specifications for the LRIT system and the testing of new or modified procedures or arrangements for communications

.2 issuing requests for the submission of proposals for the establishment and operation of the International LRIT Data Centre and/or the International LRIT Data Exchange, evaluating any proposals received

.3 participating in the testing and integration into the LRIT system of LRIT Data Centres, the International LRIT Data Centre and the International LRIT Data Exchange

.4 investigations of operational or technical disputes or invoicing difficulties and making recommendations for their settlement

.5 review of the performance of Application Service Providers providing services to the International LRIT Data Centre

.6 audit of the performance of the International LRIT Data Exchange and its fee structure, if any; and

.7 verifying that Contracting Governments and Search and Rescue services receive only the LRIT information they have requested and are entitled to receive.

4.2.3 The broadest, and perhaps the most difficult responsibility, is making recommendations to the Maritime Safety Committee, with a view to improving the efficiency, effectiveness and security of the LRIT system.

4.2.4 So, as the international LRIT system gets under way during 2009, IMSO will have a central position in the entire global implementation effort. At the same time, IMSO is preparing itself for the task ahead by developing its own audit software, procuring the computers necessary to run the audits, hiring, and training an expert member of staff to lead its LRIT effort.

4.2.5 Unusually for an international organization, IMSO is not funded by its Member States, but has to rely on recovering its costs from those companies and national administrations to which it provides mandatory oversight and audit services. The Organization is also engaged in building the financial structures that will allow it to charge for all the LRIT work it will be doing. In all, a formidable undertaking for a Directorate with only four permanent members of staff!

5. IMSO and Other Organizations

5.1 In order to achieve its aims and objectives, IMSO works closely with a wide range of other organizations. These include the United Nations and its specialised agencies: in particular the International Maritime Organization (IMO), the International Telecommunications Union (ITU) and the World Meteorological Organization (WMO). IMSO also cooperates with other international organizations, both intergovernmental and non-governmental, such as the International Hydrographic Organization (IHO) and the International Oceanographic Commission (IOC). The Comité International Radio Maritime (CIRM) and the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) with which IMSO has established Memoranda of Understanding are representing the interests of the telecommunications, maritime electronics and navigational equipment industries in IMSO. At the regional level, IMSO has established working relationships with the European Commission and the European Maritime Safety Agency (EMSA).

5.2 The relationship with WMO and IOC is exercised generally through IMSO attendance at JCOMM and the Ship Observations Team (SOT). However, there is an equally valuable interface established through the Expert Team on Maritime Safety Services (ETMSS), which works at an operational level on Maritime Safety Information (MSI) broadcasts via SafetyNET and NAVTEX. Similarly, IMSO extends a standing invitation to WMO to attend relevant IMSO meetings, especially the IMSO Assembly and Advisory Committee. IMSO is keen to extend these contacts whenever resources allow, and continues to look for opportunities to foster closer cooperation with JCOMM and its subsidiary bodies.

APPENDIX B

INMARSAT MARITIME SAFETY SERVICES AND ITS USE FOR METEOROLOGICAL APPLICATIONS

(report submitted by Vladimir Maksimov, Manager, Maritime Safety Operation, Inmarsat)

1. Status of SAC code 41 (sending weather observations to meteorological services). Ownership of the SAC Code 41 list. Regional/personalised SAC 41 codes.

1.1 Some Short Access Codes (SACs) defined for distress and safety purposes are used in the Inmarsat systems but their provision is a national matter (and optional); how and whether any or all of these are supported by a particular Inmarsat Land Earth Station (LES). Additional codes for general use, either numerical, alphabetical or alphanumerical may be defined separately and implemented by individual LESs. Routeing arrangement of all SAC codes, existing and new, is a national matter of each LES. Inmarsat has no influence on what or how such additional codes may be defined or used.

1.2 IMO Assembly Resolution A.707(19) gives recommendations on the costs for SAC41 and others maritime safety-related codes and it is a matter for individual LESs whether or not to charge for these SAC services. It is also up to users to choose which service provider or LES to use to send messages to SACs and to find the best price and service quality.

1.3 Sending a message to SACs is a standard service that is supported by all Inmarsat C and mini-C maritime terminals, SOLAS and non-SOLAS compliant.

1.4 The matrix below shows, to the best of Inmarsat knowledge, a list of Inmarsat C LESs with their access code in four ocean regions and provision of SAC 41.

LES Operator	Country	AOR-E	AOR-W	IOR	POR
Bezeq	Israel	127 no		327 no	
Embratel	Brazil	114*			
KDDI	Japan	103 no	003 no	303 yes	203 yes
MCN	China			311 no	211 no
Morsviazsputnik	Russia	117*		317*	217*
OTESAT	Greece	120 yes		305 yes	
Polish Telecom	Poland	116 no		316 no	
Singapore Telecom	Singapore			328 yes	210 yes
Stratos Mobile Networks	N Zealand				202 yes
	UK	102 yes	002 yes	302 yes	
	Netherlands	112 yes	012 yes	312 yes	212 yes
Telecom Italia	Italy	105 no		335 no	
Vizada	France	121 yes	021 yes	321 yes	221 yes
	Norway	104 yes	004 yes	304 yes	204 yes
	USA	101 yes	001 yes	301 yes	201 yes
VISHIPEL	Vietnam			330 no	
VSNL	India			306**	

*Note: * - information was not available at the time of the matrix update*
*** - the station accepts reports from within Metarea VIII only*

2. Inmarsat C communication system

2.1 **Inmarsat C** is the main system within the Inmarsat family to send (data) messages to SAC codes. The system is a cornerstone of the GMDSS, supporting 6 out of 9 communication functions defined in the IMO SOLAS Convention, Chapter IV and is required for certain types of GMDSS-compliant ships. It is a packet data communication system providing store and forward messaging, distress alerting and distress priority messaging to associated RCCs, e-mailing, transmission of information via SACs, reception of maritime safety information (MSI) via the International SafetyNET service and data reporting and polling service for position reporting, tracking, SSAS and LRIT.

2.2 The EGC SafetyNET service is one of the GMDSS communication functions and provides broadcasting of maritime safety information (MSI) to vessels at sea. It is used by meteorological, hydrographic, search and rescue (SAR), coastguard authorities and other registered MSI providers. Messages to ships at sea are addressed using IMO defined NAVAREAs/METAREAs, coastal areas, user defined sea areas, e.g. circular or rectangular addressed areas, or to all ships in within the Inmarsat satellite coverage area.

2.3 The system comprises two types of mobile terminals – Inmarsat C and **mini-C** terminals. Mini-C is an evolution of the existing Inmarsat C technology and supports all Inmarsat C maritime services, depending on model, combined with a significantly reduced level of power consumption. Lower power consumption also offers the possibility of using a solar-fed battery power source where required, e.g. on drifting buoys or on SCADA application terminals. Mini-C terminals with integrated GPS receiver are low-power and low-consumption terminals, smaller in size, supporting the same communication services as standard Inmarsat C terminals depending on model. Some maritime models are approved for GMDSS compliant vessels, support distress alerting/messaging, and reception of MSI via the EGC SafetyNET service. All maritime models also support using SACs.

2.5 EGC SafetyNET services.

2.5.1 Reception of MSI via the International SafetyNET and Navtex services is a mandatory requirement for SOLAS compliant ships. The table below is a status of the SafetyNET services in Jan-Mar'09 and shows a total number of messages and size per month in four Inmarsat ocean regions.

	Coastal (Nav/Met) warnings (C2=13)		NAVAREA METAREA warnings (C2=31)		Nav/Met warnings to circular area (C2=24)		Nav warnings to rectangular area (C2=04)	
Month	Number	Size*	Number	Size*	Number	Size	Number	Size
Jan'09	10264	136113	12268	502540	4390	96080	414	15128
Feb'09	8599	127539	11155	521062	2208	65790	520	16291
Mar'09	9403	134275	12167	511375	4186	96464	519	23225

*Note: * - size of messages is given in number of chargeable units of 32 bytes (32 characters)*

2.5.2 It should be noted that the table comprises both navigational and meteorological information MSI of different types, service codes C2=13, 31, 24 and 04. These service codes are defined for both types of MSI and it is not possible for Inmarsat to distinguish between meteorological and navigational information, which can only be done my MSI providers.

Note: SafetyNET service codes also include Ship-to-shore distress alerting (C2=14), SAR coordination to a circular area (C2=24) and SAR coordination to a rectangular area (C2=34).

2.5.3 IMO defined and approved 21 NAVAREAs/METAREAs, (including five new Arctic areas) and EGC SafetyNET meteorological services available to all 16 existing areas. Inmarsat is now working with manufacturers to implement new software for Inmarsat C and mini-C mobile terminals to support new Arctic services.

3. Use of Data reporting and polling communication protocol for sending weather observations and SCADA applications

3.1 Data reporting service (which is not, in itself, a compression mechanism) is intended for transferring small quantities of data from an MES to a pre-determined terrestrial user and has potential to greatly reduce communication costs. The data may be deposited into a data reporting (DNID – as a short form of data report addressing) file at the addressed LES and this file is retrieved by the terrestrial user or forwarded by the LES operator. DNIDs are downloaded and deleted using the polling protocol. The service depends on local arrangements between the terrestrial user and the service provider or LES operator.

3.2 The new enhanced data reporting service, which was developed recently, provides additional protection and reliability by using an acknowledgement mechanism to the mobile on successful reception of the entire enhanced data report. It also provides a status request facility to ensure reliable data transfer and gives a maximum payload capability up to 40 bytes of data and consists up to four data packets. The protocol also includes MES ID number that provides unambiguous identification of the mobile.

3.3 The data reporting protocol can be used to initiate transmission of binary-encoded weather data based on FM-13 ship code or SCADA applications. For example, each parameter from FM-13 code is inserted by the ship's operator into the appropriate application/service and binary coded by the software as a part of the data report. When all parameters are inserted (coded), the data report may be sent to a pre-defined shore address (set up as Data Network ID - DNID and associated with the addressed LES). This is a user-defined service by e.g. a meteorological service provider who reached agreement with an associated LES to provide this service.

3.4 The service may be added to the existing TurboWin (and other) software as a separate module and connected to the main Inmarsat C or mini-C GMDSS terminals via a second communication port, which is available on some models. The provision of a second communication port is not mandatory upon manufacturers. However, Inmarsat undertakes to advise all Inmarsat C manufacturers that there is a clear demand for such a facility.

4. System performance and capacity

4.1 Since the Inmarsat C, system is mandatory on certain types of SOLAS compliant ships and required by IMO SOLAS Convention, Inmarsat provides regular reports on its performance to the International Mobile Satellite Organisation (IMSO) for further submission to IMO. The table below illustrates an average availability percentage of various GMDSS systems for the 12-months period Mar'08-Feb'09.

	AOR-E			AOR-W		
	Satellite	Inm-B/F77*	Inm-C	Satellite	Inm-B/F77*	Inm-C
Availability	100%	99.9990%	100%	99.9997%	99.9990%	99.9990%

	IOR			POR		
	Satellite	Inm-B/F77*	Inm-C	Satellite	Inm-B/F77*	Inm-C
Availability	99.9997%	99.9979%	100%	99.9985%	99.9989%	100%

*Note: * - Inmarsat B and Fleet F77 system are also GMDSS compliant but are not mandated by IMO on SOLAS compliant ships.*

4.2 The system capacity is being closely monitored by Inmarsat and LES operators, confirming that there are no capacity issue.

5. Latest developments

5.1 Inmarsat developed a new maritime communication system, FleetBroadband, to provide simultaneously broadband data and voice through a compact mobile terminal via the Inmarsat 4th generation satellites on a global basis.

FleetBroadband services include:

- *Standard IP - up to 432kbps send and receive over a shared channel, for email, internet and intranet access;*
- Streaming IP - Guaranteed data rates available on demand 32, 64, 128, 256kbps (send and receive);
- Voice - phone calls that access data applications at the same time. 4kbps circuit-switched service, voicemail, call waiting, forwarding, holding and barring;
- ISDN - Supports ISDN at 64kbps for legacy applications;
- SMS text - send and receives text messages.

5.2 Two types of FleetBroadband terminals are available, with different performance capabilities and size. Both terminals are designed specifically for the marine environment and support voice, fax and SMS:

- FB250 - offers standard IP up to 284kbps and streaming IP up to 128kbps. Antenna is about 25cm in diameter.
- FB500 - offers standard IP up to 432kbps and streaming IP up to 256kbps. Antenna is about 50 cm in diameter.
- A smaller FB150 terminal is under development now and is expected to be available in the market in Q2 this year.

6. Long Range Identification and Tracking of ships (LRIT)

6.1 LRIT is an IMO-defined service, for which Inmarsat is one of the communication providers. LRIT started on time, 31st December 2008 but take-up is quite slow. An implementation period is extended until 30 June 2009 mainly due to some countries need to decide on Data Centres and ASPs. There are some cost concerns and reporting rates are not finalised yet, with other funding issues still under discussion.

6.2 Inmarsat C and mini-C terminals are part of the communication equipment for LRIT, using modified data reporting and polling protocol, i.e. enhanced data reporting or enhanced pre-assigned data reporting, and implemented on some models. More models are under type approval now.

6.3 IMO Resolution MSC.210(81) provides the performance standards and functional requirements for LRIT. In addition to the GMDSS requirements, the shipborne equipment should comply with the following minimum requirements:

- be capable of automatically and without human intervention on board the ship transmitting the ship's LRIT information at 6-hour intervals to an LRIT Data Centre;
- be capable of being configured remotely to transmit LRIT information at variable intervals;
- be capable of transmitting LRIT information following receipt of polling commands;
- interface directly to the shipborne global navigation satellite system equipment, or have internal positioning capability;
- be supplied with energy from the main and emergency source of electrical power; and;
- be tested for electromagnetic compatibility taking into account the recommendations developed by the Organization.

6.4 There are also a number of IMO MSC circulars on LRIT.

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APPENDIX C

EUMETSAT HIGH RATE DATA COLLECTION PLATFORMS (HRDCP) REPORT FOR JCOMM SOT MEETING

(report submitted by Sean Burns, EUMETSAT)
(EUM/OPS/REP/09/1043, v1, 20 March 2009)

1. Background

1.1 In recent years problems with data transmission reliability experienced by the ASAP and VOS operators when using the Meteosat Data Collection Platform (DCP) system, resulted in the move to Inmarsat for the relay of data.

1.2 Although it is not foreseen by ASAP or other ship operators to move back to Meteosat, EUMETSAT has been looking into methods of improving the DCP system for the benefit of all system users.

1.3 EUMETSAT has been investigating the feasibility of High Rate Data Collection Platforms (HRDCP) for use on current and future generations of Meteosat.

2. High Rate Data Collection Platforms (HRDCP)

2.1 The new HRDCP will have several benefits for the user over the existing system:

- greater message size:
  The current transmission rate for DCPs is 100 bps with a maximum message size of 649 bytes using a 90-second transmission window (including guard bands). The HRDCP data rate is increased to 1200 bps with a maximum message size of 65535 bytes, a significant increase in the amount of data that can be transmitted using the same 90-second transmission window.

- increased transmission rate:
  The increased transmission rate this will improve message timelines and return of data to the user, potentially leading to improvements in relief response times in the area of disaster monitoring.

- higher message repetition rate:
  Users wishing to send short data messages more frequently will be able to send the same 649 bytes in approximately 10 seconds (including guard bands). This will be ideally suited to users who need frequent measurements that are time critical, e.g. Tsunami Warning Systems

- efficient use of transmission channels:
  The increased message length and transmission rate will also allow a more efficient and flexible use of the Meteosat DCP channels to meet more diverse user network requirements. One channel for example, can be allocated to short messages repeated often, whereas another could use concatenated messages to transit many data once or twice a day.

- improved data integrity:
  Implementation of modern encoding techniques of the DCP message will lead to improved data integrity, i.e. a far higher probability of correct message reception.

2.2 The HRDCP system will be tested during 2009, with the aim of offering an operational service in 2010. The system will be part of the Meteosat Third Generation System.

APPENDIX D

ARGOS

(Submitted by CLS, Geopositioning and Data Collection Systems division)

This document contains an update on the Argos system, technical enhancements in data processing and some ideas on how cooperation between CLS, JCOMMOPS and SOT program could be improved.

1. Argos system

1.1 Space segment:

The Argos constellation includes 6 satellites:

- 4 NOAA satellites operational with Argos-2 instrument,
- 1 METOP satellite operational with Argos-3 instrument,
- 1 NOAA satellite launched in February 2009 with Argos-3 instrument.

1.2 Ground receiving stations:

The Argos ground network is composed of:

- 3 global stations of reception (2 NOAA and 1 EUMETSAT)
- 53 regional stations.

1.3 Processing centres:

The Argos processing network is composed of:

- Two redundant processing centres in Washington, US and Toulouse, Fr
- A third processing centre in Toulouse inside CNES for higher security

1.4 Argos-3 capabilities:

The third generation Argos system, Argos-3, is now fully operational. The next satellite carrying Argos-3 will be launched in July 2010 (MetOp 2). The increased capabilities of Argos-3 should significantly improve the performance of existing Argos equipped meteorological stations. Argos-3 platforms are able to transmit more data with a secured data collection, enjoy longer lifetimes and can be remotely controlled (two-way).

Argos-3 capabilities are being evaluated through various pilot programs, and in particular, the Argos-3 DBCP programs which involves the deployment of 50 SVPB drifters all over the world.

2. Data processing

2.1 CLS has improved the Argos processing system and, is now able to:

- Decode most GPS manufacturer formats and provide GPS positions in real time.

- Insert Iridium data flow (in sbd format only) to benefit from all the processing capabilities of the Argos system (GTS, GPS decoding …).

2.2 Here is the list of recent GTS enhancements implemented in the CLS processing centres:

- Since 2008 GTS, processing time has been improved (by nearly 10 minutes).

- Improvements in GPS decoding and quality control (wrong GPS positions are now filtered and replaced by Argos positions).

- Coordination with CLS, manufacturers and PI to implement new formats (decoding, transfer function, methods for computing time of observation…).

- Observation data available on ArgosWeb for all GTS platforms.

- Development of CFG tool (which replace GTSMOD) and FTP calibration for ATLAS. This tool permits to modify some GTS settings in Argos database by email or ftp.

- All WMO alphanumeric codes and BUFR code are in agreement with WMO regulation BUFR V.3. Next step is the implementation of BUFR V.4.

- GTS templates description: all GTS templates used in the CLS subsystem are documented (message length, binary cutting and WMO code) in an Excel file available on request via useroffice.

- WMO historical table updates and monitors of Argos system for JCOMMOPS.

3. Cooperation between CLS – JCOMMOPS - SOT

3.1 As already done with DBCP and Argo program, CLS is gradually improving the cooperation with SOT program through its day-to-day links with JCOMMOPS and Argos users.

3.2 Argos-3:

The real time data distribution of XBT through Argos-3 could be evaluated with the high data rate capability to transfer high-density XBT profiles. This is even more interesting as there are now two Argos-3 satellites in the air, and a third will come soon (July 2010). These new capabilities could be tested through a dedicated SOT-SOOP program.

3.3 Iridium system plus CLS data processing:

As CLS is Iridium VAR (Value Added Reseller) and has Iridium and Argos data processing capabilities, we can provide:

- A very good expertise in location and data collection satellite systems
- Monitoring tool solutions on processing time and data quality
- A unique database reporting for these two satellite systems

3.4 JCOMMOPS office is currently hosted by CLS so relationship and reactivity are improved with:

- monthly meetings with JCOMMOPS
- monthly reports on Argos Science activities and GTS monitoring
- GTS processing monitoring tools available and monthly statistics are reported to JCOMMOPS (average delivery time, number of bulletins sent on GTS, number of WMO IDs actives, and list of deallocated WMO IDs).