inmarsat
The mobile satellite company

IsatData Pro Service Overview

Version 1.0

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Contents

1: Introduction

1.1: Scope and purpose

This document is designed to provide Inmarsat's customers with an overview of the IsatData Pro (IDP) service operation.

1.2: Intended audience

This document is intended for technical users, support and system engineering resources.

2: IsatData Pro Service Summary

2.1: Overview

IsatData Pro (IDP) is a global L-band satellite network service optimized for Machine-to-Machine (M2M) and Internet of Things (IoT) applications. IsatData Pro is intended for event-driven data collection and remote control, but also enables applications such as forms and text messaging through Human-Machine Interfaces. Typical applications include tracking, fleet management, security, remote monitoring, telematics and SCADA.

Figure 1 illustrates the global coverage of the IsatData Pro service.

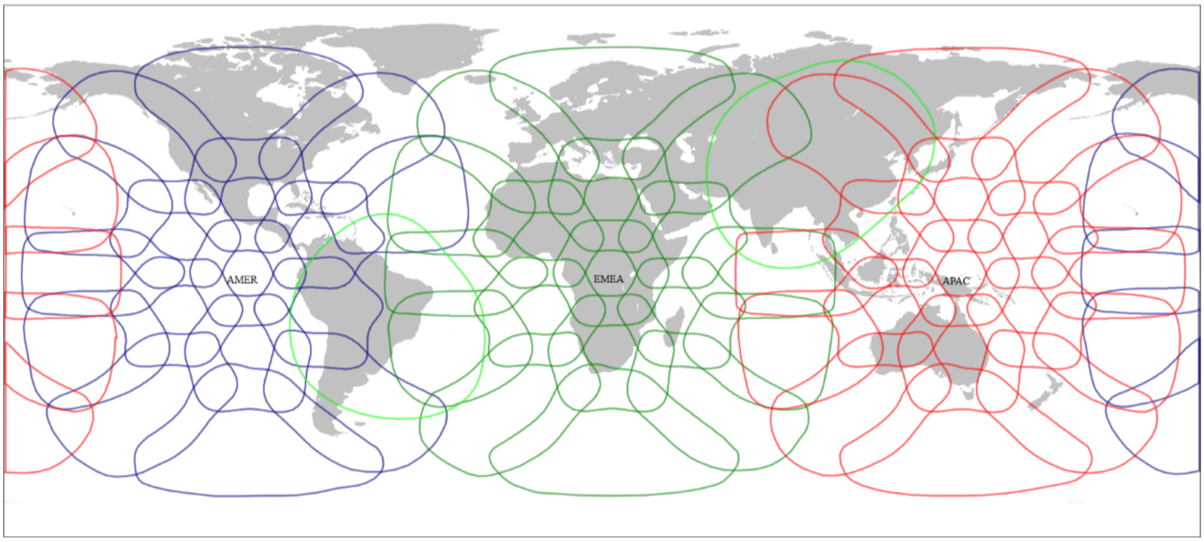

Figure 1. IsatData Pro Service Coverage

IsatData Pro offers two-way, fully acknowledged messaging communications operating at a low data rate. Most applications make use of event-driven data with near-real time alert delivery, but the system can also scale to support larger messages with a throughput approximately 150 bits per second. The system uses minimal overhead and includes acknowledgments, so customers pay only for delivered payload data.

Feature	Capability
From-mobile message size	2 - 6,400 bytes
From-mobile latency (typical)	100 bytes: 20s 1000 bytes: 45s
To-mobile message size	2 - 10,000 bytes
To-mobile latency (typical)	100 bytes: 12s 1000 bytes: 70s
Availability	99.9%
Reliability	Fully acknowledged
Broadcast	1 message to multiple units

Feature	Capability
Synchronous Low Power Operation	Automatic message delivery on wakeup

Table 1. IsatData Pro Service Highlights

2.2: System Architecture

The IsatData Pro service is based on the Inmarsat Global L-band Satellite network. In *Figure 2* the different system components are depicted that are used in the IDP network. In the paragraphs below a short description is given of the system components

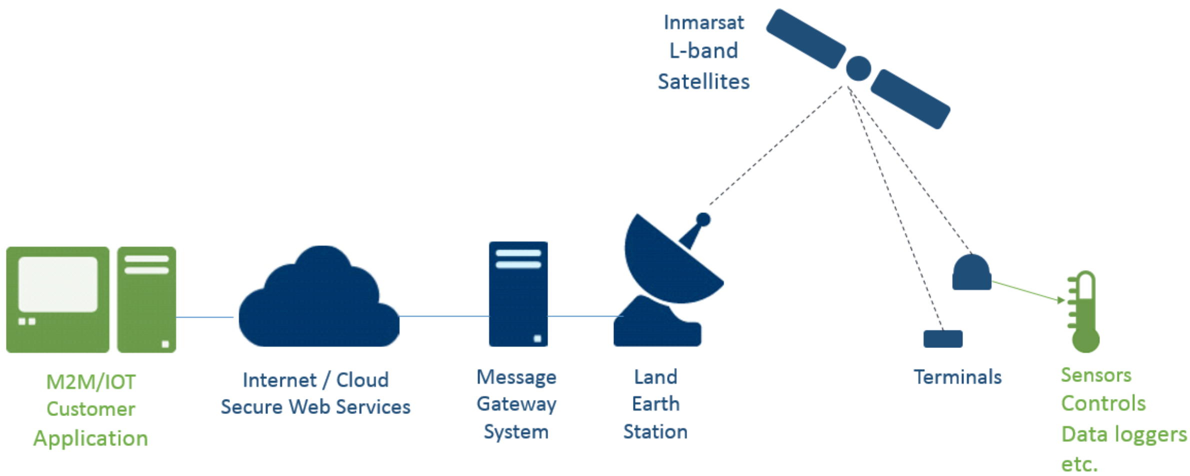

Figure 2. The IsatData Pro system Architecture

2.2.1: Terminal

Terminals, or Mobiles, are the physical devices that provide communication on the remote assets using the IsatData Pro system. A range of configurations are available from different manufacturers. Generally, a core modem is embedded within a dedicated satellite Terminal, or could be integrated into a larger Original Equipment Manufacturer (OEM) product simply as a communication subsystem. For convenience of terminology, this document refers to both these cases as Terminals.

Terminals are identified and addressed by a unique identifier, the Mobile ID, which is assigned by Inmarsat to the core modem manufacturer. It is conceptually like a hybrid of an IMEI and SIM number that customers may be familiar with from traditional carrier networks. Terminals must be activated on the network prior to use, using the Mobile ID and associated to a logical Mailbox (detailed below). The Mobile ID is used for message addressing to and from the terminal.

Activation of Terminals can be performed through an IDP service partner using API operations. Note that Mobile activation is typically a billable operation.

While specific functionality of a terminal is defined by each manufacturer, a standardized message set is defined to remotely control core functions for all type approved terminals. These **core modem messages** provide common methods to query and configure terminals on the network. The list of core modem messages can be found in appendix C.

Most IsatData Pro solutions involve some level of data manipulation within or associated with a terminal; often this takes the form of an embedded application. The respective manufacturers and their development partners provide more detail on such solutions.

2.2.1.1: Broadcast IDs

A Broadcast ID is a special case of a Mobile ID. Broadcast IDs may be uniquely assigned to service partners, by Inmarsat. The service partner activates a Broadcast ID in a similar way as a Terminal ID, but provisions it to operate on specific regional satellite beams.

Terminals may be configured with one or multiple Broadcast ID to receive broadcast messages. A single message addressed to a Broadcast ID will be received by all terminals configured with that Broadcast ID.

While reducing the cost of sending a message to a large field population, it is important to note that broadcast messages are not acknowledged and may need to be transmitted multiple times to be received by all target terminals.

2.2.2: Land Earth Station (LES)

Land Earth Stations (LES) provide the signal feed over the satellite network, which connect between remote terminals and customer applications. Three LES provide global connectivity for the IsatData Pro network, hosted in secure facilities shared by other Inmarsat services.

The LES equipment manages the data channels (frequencies and bandwidth) used in each region, message segmentation, terminal status on the network, synchronous low power message delivery, and message routing to and from the Message Gateway System.

2.2.3: Message Gateway System (MGS)

The IsatData Pro Message Gateway System (MGS) is located between the Customer application and the satellite network. It is responsible for authenticating access to terminals/data, segregating users, and optionally translating message formats between tagged fields and raw binary data encoded for satellite transport.

2.2.3.1: Mailboxes

Authentication and segregation of IsatData Pro terminals and data are managed using a mailbox concept, typically mapping a group of terminals to a specific customer application.

Mailboxes must be activated on the network prior to use. After terminals are activated they must be associated to a mailbox. A single mailbox is typically used for multiple terminals belonging to a common user or application.

A mailbox may optionally be configured with a manufacturer-specific codec file or message definition file (MDF). Such files convert tagged user-friendly data fields (typically in XML or JSON format) to efficient binary data for satellite transport. See the *Message Codec description* document for more information.

The customer interface to the mailbox uses a secure web service Messaging API with various functions for retrieval and submission of messages.

A set of administrative APIs also provide access to service partners for management of terminals, mailboxes, and message definition files.

2.2.4: Customer Application

Customers or application developers integrate to the Message Gateway System using a secure web service API to exchange messages with a population of terminals via a mailbox. Often, the application development also involves programming the terminal or attached device to process data and events remotely, sometimes referred to as embedded applications or agents.

Notes:
It is important to design IsatData Pro Customer Applications to avoid synchronizing transmissions from or to multiple terminals, as this may result in high message loss and/or high latency due to collisions or excessive queuing delays.

For example, terminals should not be configured so that they all transmit at a specific time of day. Various techniques are available to obtain time-sensitive data without compromising network performance. Please contact your service partner or Inmarsat representative to discuss a solution.

3: Terminal Operation

3.1: Normal Operation

Upon powering up, each terminal normally goes through the following sequence, which may take from 15 to 60 seconds depending on Global Navigation Satellite System (GNSS) e.g. GPS visibility:

1. Acquire location (GPS/GNSS 3D fix = latitude, longitude, altitude) and UTC time
2. Lookup channel acquisition information from internal data store based on location
3. Acquire Forward Channel
4. Send modem registration message on Return Channel
5. Upon registration acknowledgement, ready for data communications

3.2: Beam Switching

Mobile terminals may transition between multiple regional satellite beams in the course of their operation. The terminal maintains an algorithm to periodically check its location and/or signal strength to determine its preferred beam. Specific intervals and hysteresis are manufacturer-specific but typically attempt to avoid frequent beam switching. Once the determination is made to switch beams the terminal will transmit a beam registration message, which the LES then uses to deliver subsequent to-mobile messages.

3.3: Synchronous Low Power Operation

Terminals normally receive data using a 5-second frame structure on the Forward Channel, but may be configured to "sleep" for multiple frames in a low power application. Terminals supporting this feature will register a wakeup interval with the LES and MGS, which will automatically store to-mobile messages until the next scheduled wakeup time. The storage time effectively increases the maximum to-mobile message latency to conserve power.

The specific wakeup time of any given terminal on a wakeup interval will always be the same, but offset from other terminals with the same wakeup interval. Sleeping terminals wake up automatically and listen to at the configured interval, when the LES automatically delivers any stored messages.

Terminals supporting this feature can generally transmit from-mobile messages independent of the wakeup interval, to ensure that any local event or alarm data is sent immediately to the customer application.

The wakeup interval of a Terminal can be configured remotely using a modem message, or locally if the terminal supports this feature. A number of standard wake-up intervals are available to enable a balance of power conservation against to-mobile message latency. A full definition of the configuration and registration messages and list of possible wake-up intervals can be found in the *IsatData Pro Modem Message Specification*.

Upon wakeup, if there are no pending to-mobile messages the terminal will return to sleep. If there are pending to-mobile messages from the LES, the terminal will remains awake until the processing of these messages is complete. If there are multiple to-mobile messages queued, subsequent messages may be delivered on subsequent wakeup intervals. Section **4.3** provides additional detail on low power system operation.

3.4: Line of Sight Blockage

Since L-band signals do not permeate some materials, local blockage can impact service availability for a given terminal. Terminal blockage handling and recovery algorithms are manufacturer-dependent based on their target application(s). For example, one approach may be to periodically re-attempt acquisition on increasing intervals to conserve battery during long-duration blockages. Please consult your terminal manufacturer for details.

4: Network Operation

4.1: Satellite Coverage

IsatData Pro is a satellite based messaging service offering global coverage through the Inmarsat satellite network, operating over five geosynchronous satellites:

Satellite	Designation	Coverage	Longitude
I4F3	AMER	Global - Americas	98ºW
Alphasat	EMEA	Global - Europe, Middle-East, Africa	25ºE
I4F1	APAC	Global - Asia Pacific	142.5ºE
I3F4	AORW SC	Spot - Atlantic Ocean Region West South Central	53ºW
I3F1	IOR NE	Spot - Indian Ocean Region North East	64ºE

Table 2. Inmarsat IsatData Pro Satellites

The AMER, EMEA and APAC satellites provide global coverage using up to 19 regional beams (RB) per satellite. AORWSC and IOR NE provide overlapping coverage with higher elevation angle coverage for some key markets (*Figure 3*).

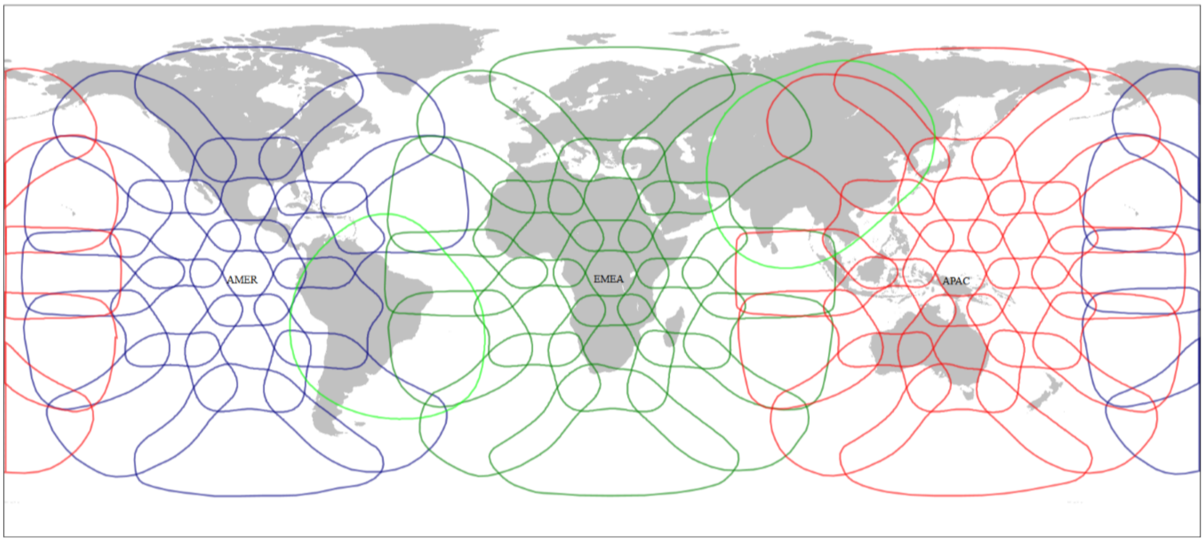

Figure 3. IsatData Pro Global Coverage

4.2: Service Channels

Three basic types of satellite channels (*Table 3*) are used in IsatData Pro:

> Bulletin Board channel for system use
> Forward channel for to-mobile data/traffic
> Return channel for from-mobile data/traffic.

Channel Type	Direction	Data
Bulletin Board (BB)	To-mobile	Failsafe system configuration
Forward Channel	To-mobile	System configuration To-mobile messages
Return Channel	From-Mobile	From-mobile messages

Table 3. Channel Types

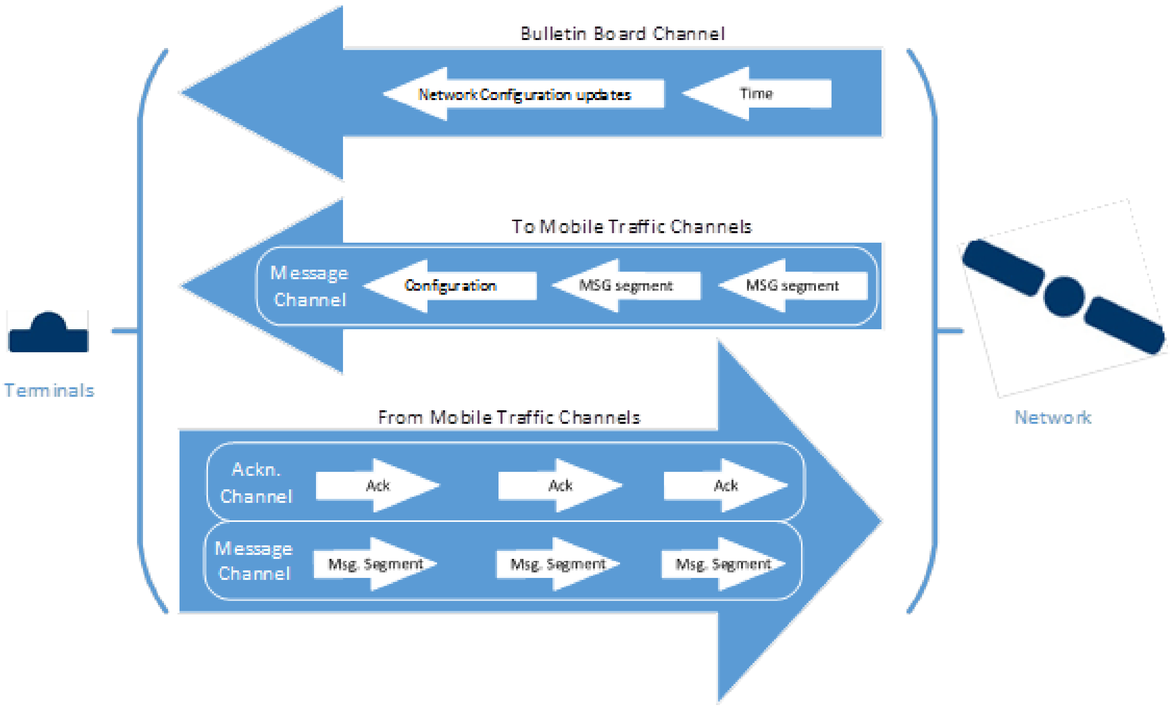

Figure 4. IsatData Pro Satellite Channels

4.2.1: Bulletin Board (BB)

The Bulletin Board (BB) is a fixed frequency channel guaranteed by Inmarsat and available on each operational satellite providing IsatData Pro coverage.

In normal operation, the terminal rarely tunes to the BB channel. Instead, it tunes directly to the forward channel. The terminal tunes to the BB in the following conditions:

> It has been in blockage for a long time and cannot find the forward channel

> It was powered off during a system reconfiguration and the system information became stale, resulting in a failed Forward channel acquisition

The BB continuously transmits the following information:

> Forward channel assignments

> Return traffic channel assignments

- Beam coverage area contours

Once the terminal has read the BB information, it updates its internal data store, tunes to the forward traffic channel and resumes normal operation.

4.2.2: Forward Channel

The forward channel delivers message segments, acknowledgements of from-mobile messages, and system information to the terminal. Forward channels are dynamic and can be re-allocated by Inmarsat from time to time, based upon traffic or spectrum needs.

The forward channel uses a five second frame, divided into ten half-second subframes. Terminals receive messages in a single predetermined receive subframe. Once a terminal has decoded messages in its assigned subframe, it can either go into idle mode or transmit from-mobile messages. Terminals operate in half-duplex mode so cannot receive and transmit simultaneously: to avoid message loss, terminals never transmit on their predetermined receive subframe.

The terminal saves all system information including a Forward Channel version number in non-volatile memory. If a terminal detects that the system information version has changed, it knows that it must wait and get the system messages containing new system configuration data. The system information includes the return channels assigned to the terminal.

4.2.2.1: Acknowledgements of From-Mobile Messages

Messages may be fragmented and transmitted in multiple segments. Each from-mobile data segment received at the LES is replied with a to-terminal acknowledgement that mitigates segment collision between terminals. If the terminal does not receive its acknowledgement then it retransmits its segment.

4.2.3: Return Channel

The Return Channel delivers from-mobile message segments and acknowledgements of to-mobile messages. It is synchronized with the forward channel.

From-mobile messages are transmitted in either half-second or one-second slots with varying code rates. Slots of the same duration are selected from an Aloha channel. The terminal selects the coding rate based on its estimation of the quality of the signal path back to the land earth station (LES), based on contour maps stored internally and broadcast on the Bulletin Board. As the slot duration and coding rates can vary, the terminal's transmission duration can vary depending on the terminal's geographic location.

4.2.3.1: Acknowledgements of To-Mobile Messages

After a terminal receives a to-mobile segment, it sends an acknowledgement to the LES using the return channel.

The acknowledgement slot is assigned to the terminal by the network based on the order of to-mobile segments in the associated forward channel receive subframe. Only one terminal transmits in any given acknowledgement slot. The network never assigns acknowledgement slots that overlap in time with the terminal's Forward Channel receive subframe.

4.2.4: Message Segmentation and Time-Out

Both to-mobile and from-mobile messages may be split into segments before transmission. Upon reception, all segments are individually acknowledged. If no acknowledgement is received, the terminal or LES retransmits the segment.

All segments must be acknowledged for a message to be delivered. If any segment fails after multiple retries, then the message is failed as undeliverable. Typical message failure times are summarized in *Table 4*.

Message segmentation is transparent to the customer and the service partner; the terminal and LES reassemble segments into messages before delivering on a message interface. If a segment can not be delivered, the message is not delivered and the message is not invoiced.

Failed to-mobile message segments use a dynamic retry algorithm. A single segment message (nominally up to 100 bytes) will retry up to 5 times within 6 minutes before timing out. A large multi-segment message may have a much longer time-out, up to 30 minutes from the last successful segment transmission.

If the terminal is using a low power wakeup mode, the LES will start sending the first segment of the message when the terminal wakes up. If the first segment is acknowledged the same algorithm is followed as for terminals in normal mode. If the first segment is not acknowledged, it is retransmitted up to 4 times within 3 minutes of the wakeup time.

Failed from-mobile segments also use a dynamic retry algorithm based on a number of factors which can result in message time-out ranging from about 4 minutes to 4 hours depending on message size and manufacturer limitations.

Message Size [bytes]	To-Mobile Time-Out	From-Mobile Time-Out
Up to 100	6 minutes	4 minutes
Over 100	30 minutes (nominal)	4 hours

Table 4. Message Segment Retry Parameters

4.2.5: Message Latency

Message latency in the IsatData Pro network is defined between the terminal and the customer interface of the Message Gateway System (*Figure 5*). Inmarsat carefully manages channel capacity to ensure that latency service level objectives are met. Delay between the Message Gateway System and the Customer Application depend on the customer's server configuration and Internet performance.

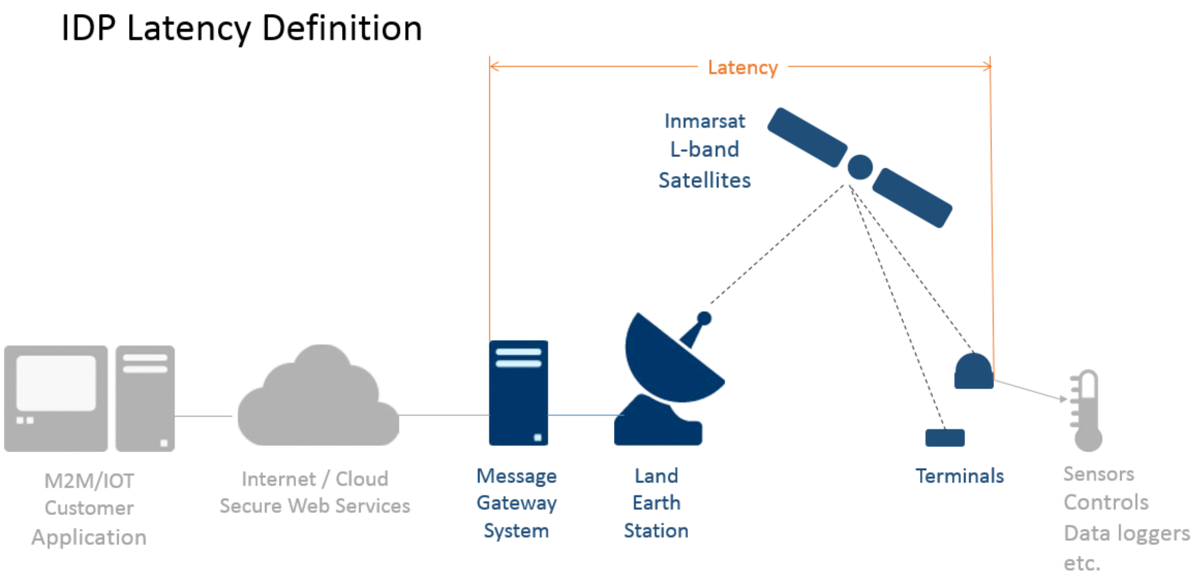

Figure 5. Message Latency Definition

4.2.5.1: To-Mobile Latency

To-mobile message latencies are determined by several factors: a buffer period during which message segments are assembled into a frame for transmission, the number of other message segments submitted for delivery over the same forward channel, and the size of the message. Larger messages require more segmentation and therefore incur greater delay. Inmarsat has established the following typical latencies for to-mobile messages:

Payload Size	Latency (typical)	Latency (95%)
100 bytes	12s	41s
1000 bytes	70s	140s

Table 5. To-Mobile Payload and Latency

Note: Additional time must be added for delivery notification requests.

4.2.5.2: From-Mobile Latency

From-mobile message latency depends on the number of messages in the terminal transmit queue which precede it, the readiness of the terminal to transmit, the size of the message and encoding rate that is being used. Inmarsat has established the following typical expected latencies for from-mobile messages:

Payload Size	Latency (typical)	Latency (95%)
100 bytes	20s	40s
1000 bytes	45s	90s

Table 6. From-Mobile Payload and Latency

Note: Additional time must be added for web service polling interval.

4.2.6: Message Order

IsatData Pro supports the queuing and delivery of multiple to-mobile and from-mobile messages to a single terminal. Since each message can have a different size and varying acknowledgement retries, if multiple messages are queued simultaneously, the service may not guarantee that messages are delivered in the order they were queued.

If message order is critical to the application, for each terminal, the Customer Application should wait for an acknowledgement notification prior to submitting the next message or add a sequence number into the message payload to be reassembled at the far end.

Note: The Message Gateway System may return an error message if a high number of to-mobile messages are placed in the queue for a single terminal.

4.2.7: Message Retention

IsatData Pro allows the retrieval of from-mobile messages for up to five days. Any customer application requiring access to messages older than five days must retrieve the messages when available and archive locally. However, the Message Gateway System supports multiple retrievals of the same message(s) within the retention period.

4.2.8: Message Data Payload Format

All IsatData Pro messages consist of at least two bytes of payload data, although billing terms may dictate a minimum billable message size. Customers are invoiced for all data delivered in the message payload. Typical message payload is illustrated in *Figure 6* and *Table 7*.

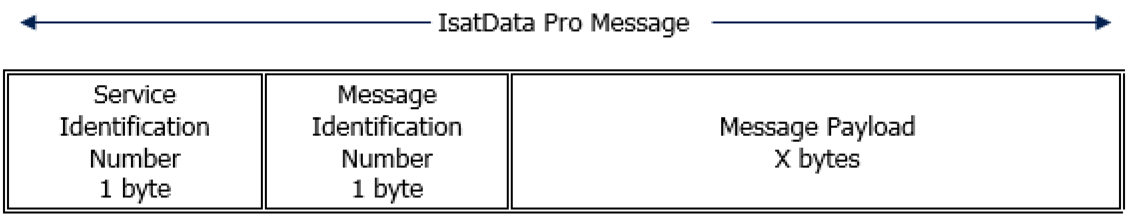

Figure 6. Message Format

Data Field	Content
SIN (1 byte)	Service Identification Number used to differentiate between various classes of message. SIN 0-15 are reserved for core network operation.
MIN (1 byte)	Message Identification Number may be used to define field encoding of user data.
USER DATA	Variable length user data. Typically, format and content defined by the combination of SIN and MIN.

Table 7. Message Payload Format

Note: User data access to SIN and MIN may be manufacturer-specific. Inmarsat reserves SIN in the range of 0-15 for system-only use.

All IDP terminals support a number of standard "core modem" messages with SIN value 0 (zero) that allow for remote configuration and control of the modem and information retrieval. In annex B An overview is provided of these standard messages.

4.3: To-Mobile Messages Using Synchronous Low Power Mode

The IsatData Pro service supports a synchronous low power "wakeup" feature, which may be supported by the terminal. The concept of operation is that the terminal spends most of the time in a sleep state and awakens at a pre-determined interval to listen for pending to-mobile messages. Typically the terminal can also transmit independently of the wakeup interval to ensure low latency of remote event notification to the customer application.

Terminals supporting this feature may be configured with a standard network command (or locally dependent on the manufacturer) to set the wakeup interval in a defined range. The terminal registers any new wakeup interval with the LES using a core modem message, which causes the LES and MPC to coordinate and store to-mobile messages submitted while the terminal is asleep, and deliver those messages as soon as the terminal wakes up. If there are more than a single message queued for a terminal and the network is congested, the system may deliver messages on subsequent wakeup intervals. *Figure 7* illustrates the behaviour of the network when message are submitted for a terminal in low power mode.

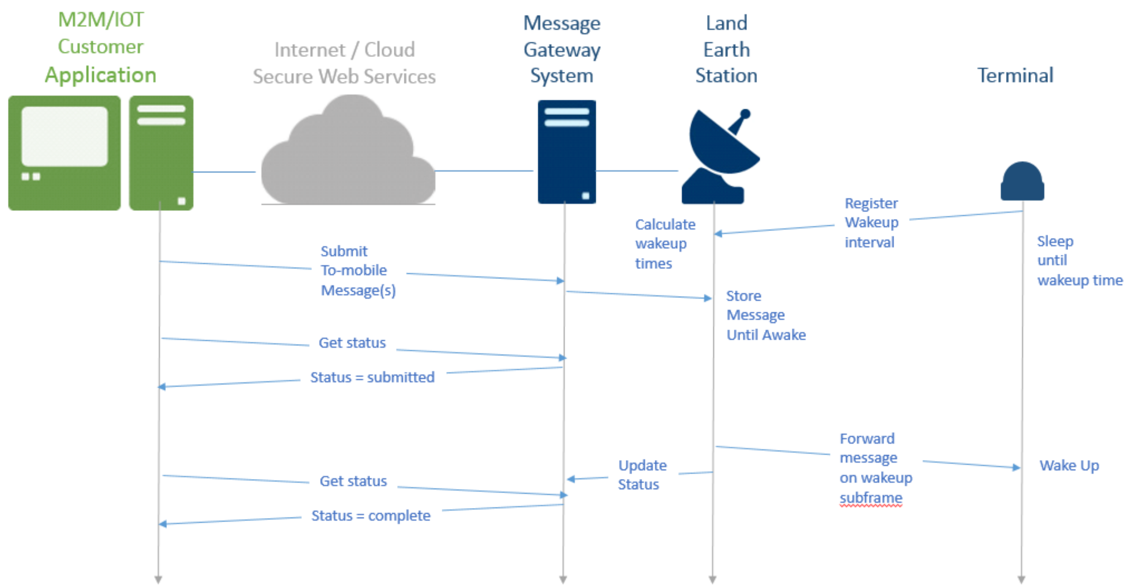

Figure 7. Synchronous Low Power System Operation

4.4: Broadcast Messaging

The IsatData Pro service supports sending an unacknowledged to-mobile message that can be received simultaneously by a large number of terminals. The broadcast approach provides economic benefit compared to sending identical individual messages to large numbers of terminals, so long as acknowledgement is not required.

To use the broadcast feature, a service provider must request the assignment of a Broadcast ID from Inmarsat, and specify various provisioning information. A broadcast ID is provisioned to operate on specific regional beams and allows automatic re-transmit at a specified interval. Individual terminals are then configured remotely as members of the broadcast group and will thereby receive all broadcast messages sent to that Broadcast ID. Some manufacturers may allow the provision of multiple broadcast memberships in a single terminal.

Note that broadcast messages cannot be delivered automatically to sleeping terminals. However a customer could remotely reconfigure (disable) the wakeup interval to allow for a broadcast operation to be received by a low power terminal.

4.5: Numbering System

4.5.1: Mobile ID

An IsatData Pro terminal is identified by a globally unique mobile ID, associated to the physical device and generally printed on the terminal or read electronically during the installation process. The Mobile ID is used to activate a terminal on the network, and used as a routing address by a Customer Application to send or receive messages.

The format of the Mobile ID is `NNNNNNNNAAAXXXX`

Where:

- `NNNNNNNN` is an 8-digit globally unique number assigned by Inmarsat
- `AAA` are alpha characters designating the terminal manufacturer
- `XXXX` is a hexadecimal (0 to F) checksum of the unique number

4.5.2: Broadcast ID

A Broadcast ID is similar to a Mobile ID, except that it is not associated with a single physical device. Rather, physical terminals can be provisioned to subscribe to one or more valid Broadcast IDs. The Broadcast ID is used to activate a broadcast group on the network, and used as a routing address by a Customer Application to send broadcast messages.

The format of the Broadcast ID is `NNNNNNNNGRPXXXX`

Where:

- `NNNNNNNN` is an 8-digit globally unique number assigned by Inmarsat
- `GRP` designates a broadcast (virtual) ID group
- `XXXX` is a hexadecimal (0 to F) checksum of the unique number

5: Message Gateway System (MGS)

The IsatData Pro Message Gateway System is located between the Customer Application and the satellite network. It is responsible for converting and relaying message traffic based on terminal to mailbox relationships provisioned through the IDP administrative interfaces. The MGS is responsible for the following functions:

> Authenticates data access by each Customer Application

> Delivers satellite messages to and from each Customer Application

> Segregates user data and determines ownership for billing purposes

> Enforces network access policies such as connection limits and data time/volume limits

> (Optionally) encodes/decodes messages presented for each Customer Application

5.1: Customer Access to the MGS

The Message Gateway System is connected to the Internet by diverse paths to ensure that at least one MGS address will be available in the event of an Internet or router fault (*Figure 8*).

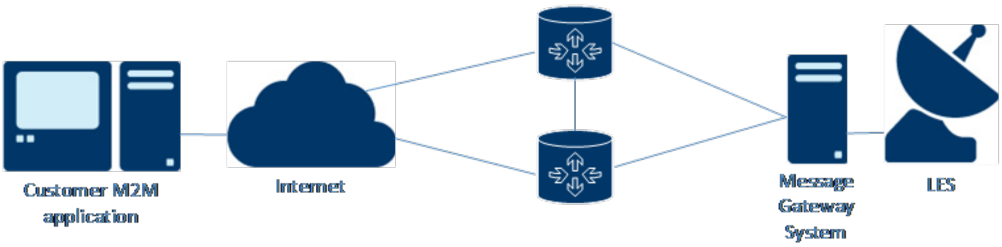

Figure 8. IsatData Pro MGS network access

Note: Inmarsat recommends customers configure their applications to occasionally refresh the MGS address through DNS to ensure routing remains valid.

5.2: IsatData Pro Messaging API

Customer Applications connect to the MGS using a secure web service, the Messaging API. The Messaging API uses industry standard web service protocols for RESTful implementations over secure socket layer.

The IsatData Pro Messaging API is detailed in *IsatData Pro APIs: Messaging*.

5.3: Mailbox

The MGS provides a mailbox concept for sending and retrieving messages to a population of terminals. Several terminals will typically be associated with a single mailbox, either per customer or per application. Each mailbox has a unique access ID and password for authentication. Multiple web service clients can connect to a mailbox as long as each has the correct access ID and password.

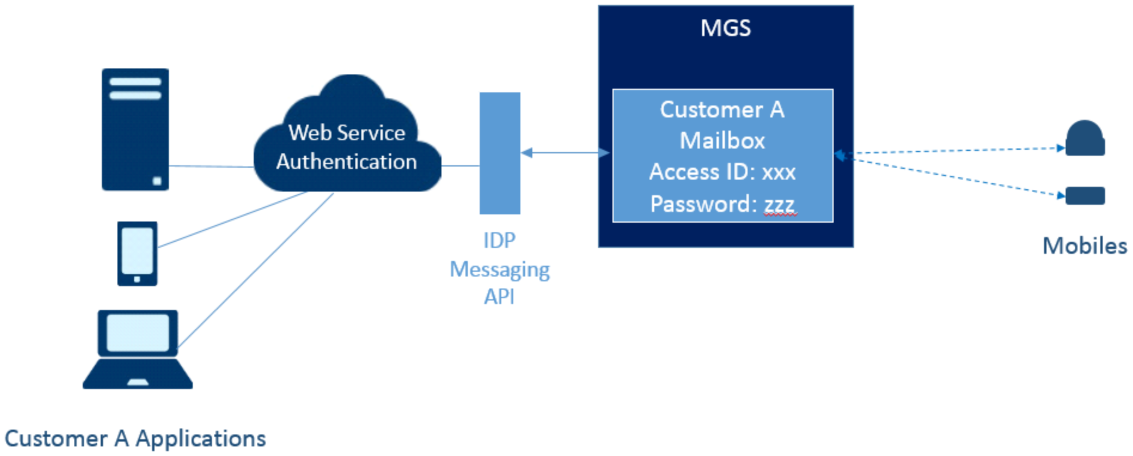

Figure 9. IsatData Pro Mailbox access

Mailboxes are activated by a service partner using an administration API, which automatically assigns a unique ID and generates the initial password. One or more terminals are then assigned to a mailbox as part of the terminal activation process.

Messages are retrieved from or submitted to a mailbox using explicit 'get' and 'submit' operations of the web service API, invoked by the Customer Application. The Customer Application needs to poll the mailbox regularly to check for new from-mobile messages or to check status of submitted to-mobile messages. To avoid congestion there is a maximum operation frequency for each mailbox, defined by Inmarsat.

5.3.1: Message Definition File

Mailboxes can optionally be provisioned with a codec or message definition file, which specifies rules for encoding to-mobile and decoding from-mobile messages between cost efficient, binary-packed over-the-air messages and abstract tagged data fields which are easier to integrate with the Customer Application.

Message Definition File structure is detailed in the *IsatData Pro Message Definition File Description* document.

6: Business Support Systems

In addition to the IDP Messaging API, Inmarsat provides three business support interfaces for the IsatData Pro service: Administration, Billing and Inventory. These interfaces interact with various internal support systems to manage daily business operations of the service.

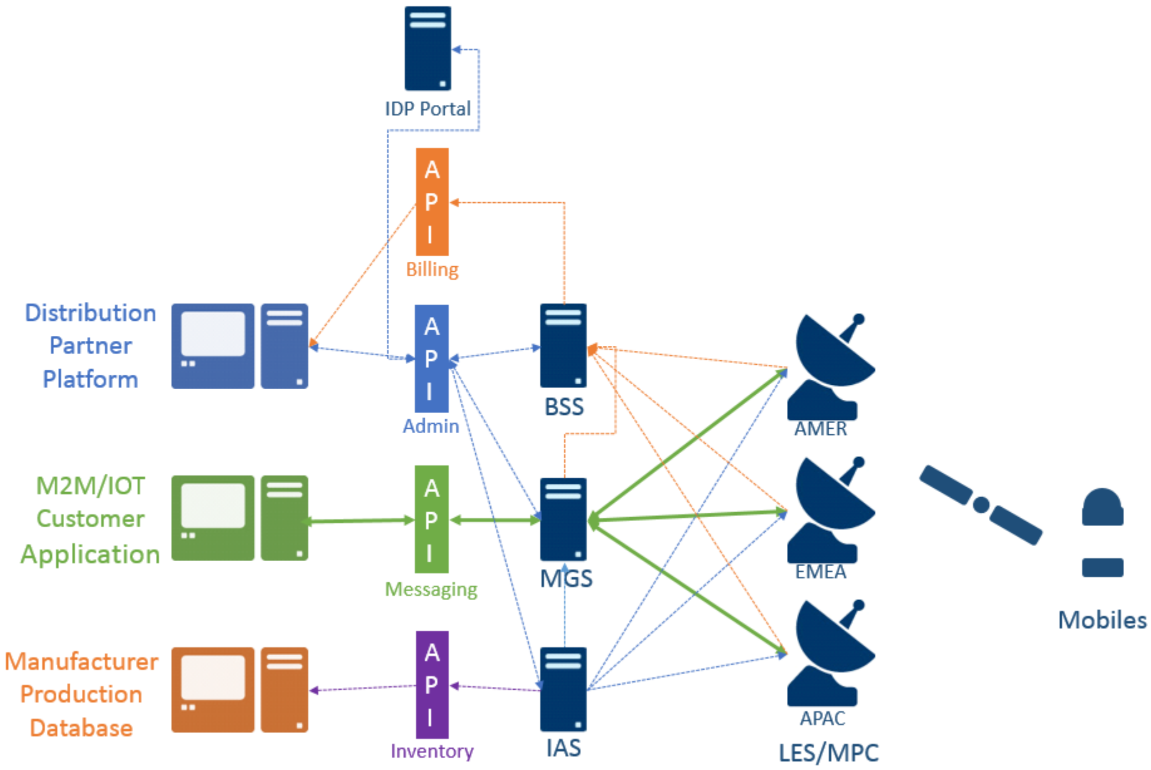

Figure 10. IsatData Pro system interfaces

6.1: IsatData Pro Administration API

The Administration API is used by a Distribution Partner to provision, administer and manage terminals, broadcast IDs, mailboxes and message definition files.

The Administration API is specified in *IsatData Pro APIs: Administration*.

6.2: IsatData Pro Billing API

The Billing API is used by a Distribution Partner to retrieve billing and data usage information about their customers' terminals. Data usage records are made available periodically throughout each day.

The Billing process record formats and API is specified in *IsatData Pro Billing description*.

6.3: IsatData Pro Inventory API

The Inventory API is used by core modem manufacturers to request new Mobile IDs prior to building equipment, and by gateway operators to assign new Broadcast IDs. The Inventory Assignment System (IAS) is responsible to ensure globally unique assignment of IDs.

The Inventory API is specified in *IsatData Pro Inventory APIs*.

6.4: IsatData Pro Administration Portal

Inmarsat provides a web portal to Distribution Partners for basic administration, provisioning and support functions. This portal implements a graphical user interface for a subset of the various API functions. Distribution Partners are expected to implement their own platform and/or portal services directly with the provided APIs.

The IsatData Pro Administration Portal is described in *IsatData Pro Portal User Guide*.

Appendix A: Acronyms/Glossary

Acronym	Definition
AMER	Americas
AORWSC	Atlantic Ocean Region West South Central
APAC	Asia Pacific
BB	bulletin board
Broadcast ID	unique identifier of a virtual terminal used for broadcast messaging
EMEA	Europe, Middle-East, Africa
Forward Channel	The satellite channel used to transport to-mobile traffic
Gateway Account	equivalent to a Mailbox
GPS	Global Positioning System
GNSS	Global Navigation Satellite System (GPS is one such system)
HTTP	Hypertext Transfer Protocol
HTTPS	HTTP over SSL
LES	Land earth station
Mailbox	logical entity on the Message Gateway System, which a customer application uses to send and receive messages to remote terminals
MIN	message identification number
Mobile ID	a unique identifier of an IsatData Pro terminal
Modem	The remote device that implements the IDP protocols (see also Terminal)
Partner	Inmarsat Partner, VAR or Distribution Partner
REST	Representational State Transfer (web service)
Return Channel	The satellite channel used to transport from-mobile traffic
SCADA	Supervisory Control and Data Acquisition
SIN	service identification number
SOAP	Simple Object Access Protocol (web service)
SP	Service Provider
SSL	Secure Sockets Layer
Segment	Depending on the size, Messages may be divided into several message segments before transfer via the satellite.
TCP/IP	A common Internet transport protocol
Terminal	A remote device utilising the IDP service. It consist of a Modem implementing the network interfaces and optionally additional functionality such as a scripting environment to process data received form the IDP network or before submitting it to the IDP network.
TLS	Transport Layer Security
UTC	Coordinated Universal Time

Appendix B: Core Modem Messages

In the table below an overview is given of the standard core modem messages that all IDP terminals support.

A more detailed description and the specification of each message is provided in *IDP Messaging API* document.

Direction	SIN	MIN	Description	Details
Modem operation (automatically generated)				
From-Mobile	0x00	0x00	Modem Registration	The modem registration message is sent by the modem when it is powered-on or reset.
From-Mobile	0x00	0x01	Beam Change Notification	The beam change notification message is sent by the modem when it changes to another satellite beam.
From-Mobile	0x00	0x02	Modem Error	The modem error message is returned when the modem encounters an error that prevents successful message delivery.
Remote Configuration				
To-Mobile	0x00	0x44	Reset Mobile	This message is used by the solution provider, customer or network operator to cause a reset of the terminal.
To-Mobile	0x00	0x48	Poll Modem Position Report	This message is used by the customer to poll for a position report.
From-Mobile	0x00	0x48	Modem Position Report	This position report is sent by the modem. This position report, which is 15 bytes long, is sent in response to a Poll Modem Position Report message.
To-Mobile	0x00	0x46	Set Wake-up Period	This message sets the wakeup period for a low power mode modem.
From-Mobile	0x00	0x46	Wake-up Period Changed	This message is returned from the modem to confirm that the new wakeup has been set.
To-Mobile	0x00	0x47	Mute/Unmute transmitter	This message is used to control modem transmit capability.
Remote Queries Services				
To-Mobile	0x00	0x61	Modem Configuration Request	This message is used to request configuration information from the modem.
From-Mobile	0x00	0x61	Modem Configuration Reply	The modem configuration reply is sent by the modem in response to the modem configuration request message.

Direction	SIN	MIN	Description	Details
To-Mobile	0x00	0x70	Forward Ping Request	This message is sent to the modem to request a standard reply from the modem.
From-Mobile	0x00	0x70	Forward Ping Reply	This message is sent by the modem in response to the forward Ping Request.
To-Mobile	0x00	0x71	Return Ping Reply	This message is posted at the modem AT Command interface and sent to the gateway
From-Mobile	0x00	0x71	Return Ping Request	This message is sent by the Messages Gateway in response to the Return Ping Request message.
From-Mobile	0x00	0x72	Automatic Modem Message	This message is generated automatically by the modem as a means to continually test the channel. The Command Line Interface (CLI) on the modem is used to start and stop the process.
To-Mobile	0x00	0x73	Modem subscribed broadcast IDs Query	This message is used to query broadcast IDs in a modem. The modem responds with a list of broadcast IDs.
From-Mobile	0x00	0x73	Modem subscribed broadcast IDs Response	This message is the response to the BroadcastIDs Query message. The response contains the entire list of 16 broadcast IDs.