



Inmarsat Monitoring System

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1- INTRODUCTION

1.1- General

This Proposal describes a basic Inmarsat monitoring system that provides automated interception and recording of selected Inmarsat calls within a single Ocean Region. The system is designed to be expanded very easily, or tailored to specific customer requirements as desired.

The Proposal should be read in conjunction with any attached TRL Technology Ltd (TRL) Commercial Letter.

1.2 Principles of IMS Operation

The Inmarsat series of satellites provide world-wide communications capability through a number of geostationary satellites, strategically located to provide overlapping coverage of the earth's surface to latitudes in excess of 80° North and South of the equator.

Communication between the satellite and Mobile Earth Stations (MES) is effected using frequencies around 1.6 GHz and 1.5 GHz for the uplink and downlink frequencies respectively. The fixed Land Earth Stations (LES) that provide connections to the terrestrial communications network communicate with the satellite using frequencies around 6.4 GHz and 3.6 GHz for the uplink and downlink frequencies. Additional channels are used for command and control/monitoring purposes.

Satellites currently providing the service are of the Inmarsat 3 generation. The older Inmarsat 2 series satellites used single, shaped beam antennas to optimise coverage over their designated areas. The current Inmarsat 3 satellites use a number of spot beams for communication with the MES which can be combined and reconfigured from the ground for optimum performance against changing operational needs. The IMS has been optimised to cater for spot beam operations, whilst retaining the flexibility required to revert to Inmarsat 2 standards if necessary.

Provided that the monitoring system is located within the coverage region of the satellite, the downlink to any MES can be monitored in the 1.5 GHz band. However, it is extremely unlikely that the corresponding uplink channel can be monitored directly, unless the MES is physically close to the monitoring system. MES uplink channels are therefore monitored by using the corresponding LES downlink channel around 3.6 GHz. This downlink channel may be Right or Left hand circularly polarised according to Inmarsat operational requirements.

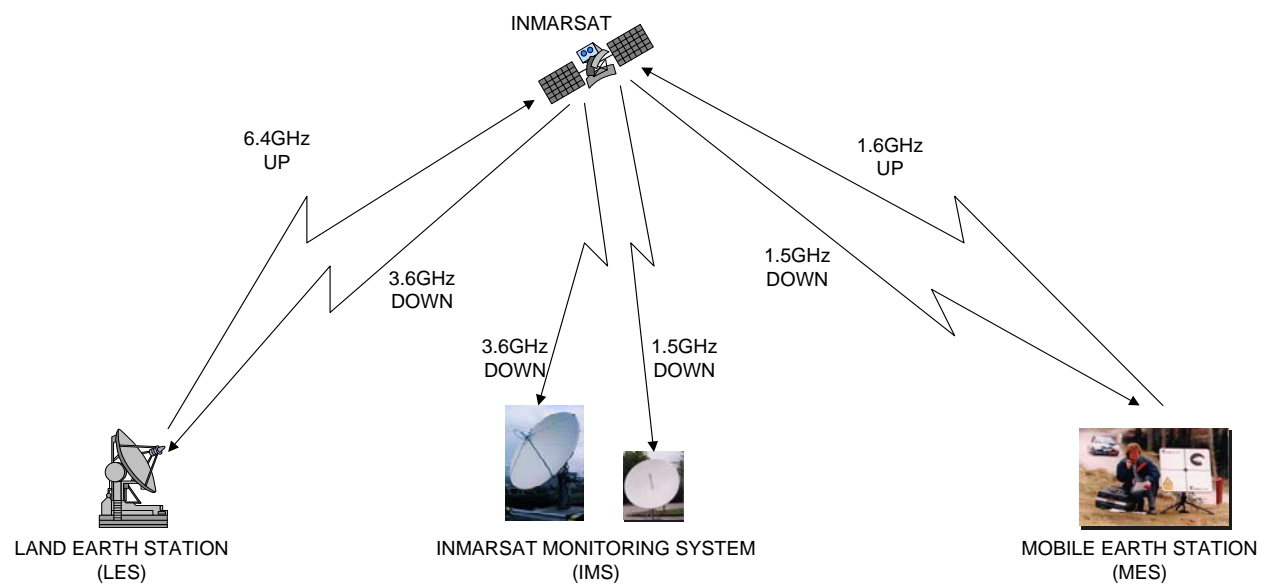


Figure 0-1 Principle of IMS operation

The Inmarsat system provides world-wide communications via a number of LES, several of which access the same satellite concurrently. A Network Control Station (NCS) co-ordinates the various LES to ensure that communications channels are allocated between the LES without conflict. The control channels between the NCS and LES also pass through the satellite, and are utilised by the IMS.

1.3- Call Intercept System Overview

The TRL Inmarsat Monitoring System (IMS) is designed to intercept and record voice, facsimile and data calls to and from selected terminals using the Inmarsat communications system. The IMS can be extensively configured to select terminals whose full identity is not known, or to log and/or record particular types of call, or to record calls made to particular parts of the world or to specific telephone numbers.

Voice calls may be monitored in real-time, or recovered and played back from the system database. Facsimile and data calls may generally be displayed with the simple viewer incorporated in the system, or exported for analysis or manipulation by other systems or with user-specific software. The intercept system configuration and analysis capabilities are discussed in greater depth in Section **Fehler! Verweisquelle konnte nicht gefunden werden..**

The generic system is capable of monitoring and recording Inmarsat A, B, C, D, M and mini-M signals, including High Speed Data (HSD) signals used by B and M4 (GAN) terminals.

2- TECHNICAL REQUIREMENT

The flexibility of the IMS is such that it can be difficult for a Customer to decide on the system configuration that best satisfies his operational needs, until he has operated the system in his own environment. The IMS is designed to be expanded and modified by the addition of extra hardware and software as a Customer's requirements change and new services become available.

This technical proposal describes a basic, balanced Inmarsat monitoring system that can form the basis for more complex systems tailored to a Customer's specific requirements.

2.1- Intercept functionality

The baseline system is capable of receiving Inmarsat B, C, M, and mini-M transmissions from a single satellite, and for a single Ocean Region. This includes high speed data traffic from Inmarsat B and M4 terminals. Inmarsat A reception is also possible with this system, although decoding of A facsimiles requires an additional, and optional, software add-on.

The basic system is to capture and record up to ten simultaneous duplex communications with Inmarsat terminals against criteria selected by the users (IMS).

The basic system provides three workstations for signal analysis of recorded traffic, and for monitoring voice traffic "live".

2.2- Location of equipment

It is assumed that all the equipment will be located together at a single site.

A set of RF equipment, comprising antennas and other necessary hardware, must be located such that the length of cable between the antennas and the system rack does not exceed 80 metres, and the Ethernet cabling between the racks and computers does not exceed 100 metres.

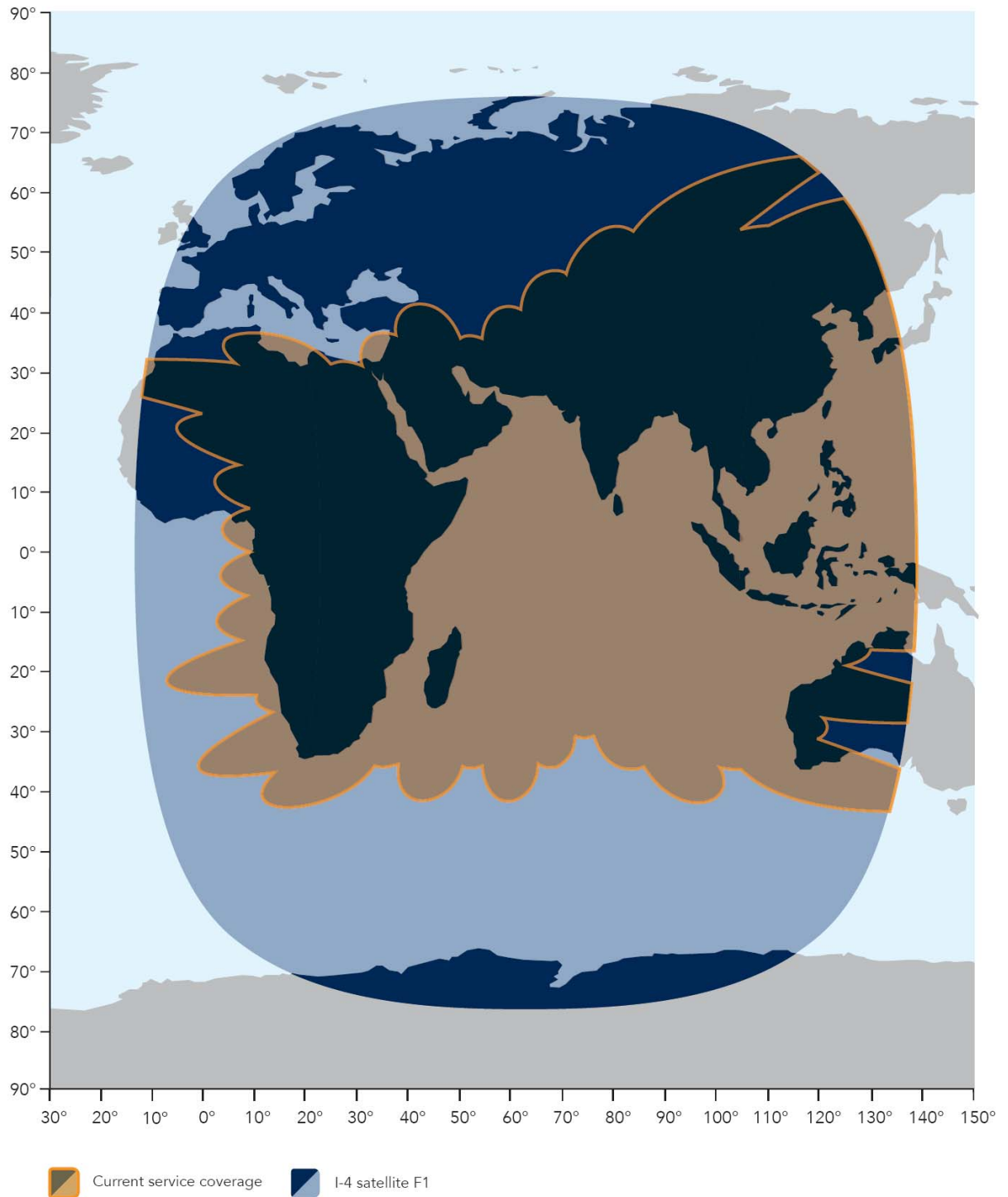
2.3- Implementation

The offer is for the provision of a turnkey baseline system to be installed by TRL personnel at the Customer's nominated site, complete with all necessary training, handbooks and support to enable the end users to operate and maintain the equipment. TRL will provide all the electronic equipment and antenna facilities required for the system.

The Customer must provide a suitable site with accommodation and furniture for the equipment, and suitable power supplies to operate the equipment and antennas.

It is assumed that access to Customer's sites is restricted. TRL will co-operate with the Customer to utilise cleared/approved sub-contractors to perform the antenna civil works tasks. The antennas and equipment rack will be installed by TRL technicians and subcontractors. All necessary security passes and clearances shall be provided by the Customer.

Service coverage for IsatPhone, LandPhone and FleetPhone



The map depicts Inmarsat's expectations of coverage, but does not represent a guarantee of service. The availability of service fluctuates depending on various conditions. Voice services coverage May 2007



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