Inter-Satellite Data Relay System (IDRS) for LEO Satellites Using a Commercially Available GEO Satellite System

1. Inter-Satellite Data Relay Service Overview

IDRS Concept Explained

- WITHOUT IDRS
- WITH IDRS

Communication with your satellite is enabled to 99% of the orbit

2. Addvalue IDRS

Proof of Concept - Heritage Flight

With over 14 months of operation aboard the VELOX-II, a Singaporean GEO satellite
- Conducted In-orbit IDRS testing with an Adequate designed and built BGN terminal
- Added a LEO satellite operating above the Inmarsat-I satellite network
- Demonstrated good quality IDRS functionality in orbit
- Established and maintained two-way real-time data sessions
- Confirmed Inmarsat BGN network compatibility

3. The IDRS System

- The radio link between the IDRS terminal and the ground is secured and protected by a 3G-optimizing protocol
- The end-to-end IP data transmission between the customer premise and LEO spacecraft is secured over the global and private Inmarsat Data Connection Network

4. IDRS Service Capabilities

- Uninterrupted IP sessions while within Inmarsat GEO satellite coverage
- A few seconds interruption only in satellite handovers

5. The IDRS Terminal

The IDRS terminal - a compact, low-mass, space-resilient and affordable communications terminal that would fit to LEO satellites of all sizes starting from 6-U Nano-satellites. The terminal is a core element in the IDRS data relay service for supporting LEO satellite operations.

IDRS I100

The IDRS I100 terminal is designed to match the requirements of small LEO satellites down to 6-U Nano-satellites. The terminal is designed with an operational lifetime of 3 years in space. The terminal consists of a transceiver module plus one of three optional antenna configurations to match different satellite constraints, orbital characteristics and mission requirements.

6. IDRS – Applications and Benefits

- NEAR-REAL-TIME TT&C
- NEAR-REAL-TIME TASKING / RE-TASKING
- NEAR-REAL-TIME DELIVERY OF MISSION DATA
- AUGMENTATION OF EARTH STATION NETWORK SERVICES
- SUPPORT OF LAUNCH SERVICES

7. Conclusions

- IDRS provides "always on" on demand connectivity to LEO satellite
- Space proven
- Secure
- Available globally
- Affordable
- Product and service are commercially available now

OVERVIEW OF TERMINAL DIMENSIONING

The final connection to the Customer Mission Control is carried securely either via VPI over open Internet, or via a secured link. Each of the IDRS terminal transmits a remote IP address and is located by the mobility management function of the BGN network. This allows instant connectivity to be inflected "On-Demand" either by the LED spacecraft or the Mission Control at the enclave.

GENERIC POLAR VIEW OF INMARSAT-4 CONSTELLATION

Illustrates the extended coverage provided by the Inmarsat-4 outer ring of orbit (Orange ring in green). The coverage offered by the IDRS terminal is dependent on the LEOS satellite altitude and orbit, which is also dependent on the satellite. Mid LEO altitudes would benefit from 80% and up to 100% coverage.