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Author: Mr. Fabio Curreli
OHB System AG-Bremen, Germany

Mr. Willem Bode
OHB System AG-Bremen, Germany

Mr. GUY PEREZ
OHB System AG, Germany

DIGITAL AND OPTICAL COMMUNICATION CAPABILITIES FOR HIGH THROUGHPUT
CONSTELLATIONS

Abstract

This paper describes the mission concept of a MEO telecommunication constellation that embarks two main technology enablers: a regenerative processor and optical terminals.

In the past years the telecommunication market has seen an unprecedented increase of satellite constellations, mainly in the Low and Medium Earth Orbit. The nature of these orbits imposes that in order to minimise the number of Gateways, to achieve a high availability requirement and to avoid interruption of the service, the data link between Gateway-User has to be routed through different satellites of the constellation through Inter Satellite Links. This solution typically leads to the trade-off between RF-links vs Optical links, and imposes several constraints for the operation: the orchestration of the satellite positions, the network topology, the service area to be served and the distribution of data packets to multiple users in each service area.

At satellite level, the implementation of such telecommunication mission requires the utilization of regenerative On Board Processors, which improve the RF spectrum utilisation, by enabling the routing of the packets from/to different beams, allowing the re-allocation of frequency among users, and distributing the BandWidth in an optimised way.

The advent of more affordable and lighter Laser Communication Terminals in the market, has also brought the benefit of increasing the data-rate for Inter Satellite Link, despite the increase of system level complexity including microvibration, pointing accuracy and pointing stability, which the satellite BUS needs to respect at any time.

Combining all these elements together, and accommodating them onto a flexible platform like a Smart-MEO, OHB will present an innovative and appealing Satellite concept that can be a solution for several types of telecom constellation missions.