

Inclined MEO constellation to provide cost effective global high-speed trunking services

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Abstract

We define satellite trunking services as the provision of high data rate point-to-point links for professional use (B2B). The review of the global market for high-speed satellite trunking services shows an expected and sustained growth in the next five to ten years. Among the seven market segments that we have identified, the fastest growing segment will be in-flight connectivity for passenger aircraft. The demand for better connectivity on board cruise ships will make this the second-largest segment. Clearly, there is an opportunity to develop a global satellite system to provide high-speed trunk services. The equatorial MEO constellation of O3b has already shown the way. Through an ESA supported study, “Next Generation High Data Rate Trunking Systems”, an inclined MEO constellation has been identified and studied. Technically innovative and performing, it has also shown that it is economically viable. The system includes a 24-satellite MEO constellation with three 50 deg.-inclined orbits and a distribution/feeder ground network of 80 gateways worldwide spread over 20 sites.

Satellites carry a powerful payload (500kg/5kW) operating in Ka-band. Each payload provides a User mission connecting aircrafts and vessels with 175 agile narrow beams and a Feeder mission linking ground gateways in two steerable beams. The Ka-band allocated to NGSO systems is shared between User mission and Feeder mission. The payload is based on next generation technologies such as active planar direct radiating antennas (DRA), digital beam-former networks (DBFN) embedded in digital transparent processor (DTP).

The business model consists in the wholesale of volume of data (GByte) by the satellite operator, owner of the constellation and its feeder segment, to specialized Internet service providers who are active in aeronautical and maritime Internet Access markets. Although very expensive, the constellation and its large feeder ground network achieves profitability for wholesale prices of the same order of magnitude as those identified as affordable by service providers in the next five years.

This paper describes the global satellite trunking services and traffics, the MEO constellation and its feeder segment and it demonstrates the economic viability.