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A COMPETITIVE WAY TO PROVIDE GLOBAL HIGH SPEED TRUNKING SERVICES WITH A  
LEO CONSTELLATION

**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 value 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 for the development of a global satellite system for providing high speed trunking services to aeronautical and maritime Internet Service Providers. The global nature of these markets means that a LEO constellation seems to be one of the best solutions. Thanks to an ESA supported study, "Next Generation High Data Rate Trunking Systems", a LEO constellation that is both technically innovative and performing but also economically viable has been identified and studied. It includes a 70-satellite LEO constellation (five polar planes) and a distribution/feeder ground network of 45 gateways spread over 9 sites. The satellites, all the same, accommodate a powerful payload (600kg/5.5kW) operating in Ka-band. Each payload provides a regenerative User mission connecting aircrafts and vessels with 350 agile beams, a Feeder mission linking ground gateways in 3 steerable beams and an Inter-Satellite mission providing high speed optical communication with the two neighbouring satellites in the same orbital plane. The Ka-band allocated to NGSO systems is shared between the User mission and the Feeder mission. The payload is based on next generation technologies such as active planar Direct Radiating Antennas (DRA), Digital Beam-Forming Networks (DBFN), regenerative On-Board Processors (OBP) and Inter-Satellite compact optical terminals. 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 the aeronautical and maritime Internet Access markets. Although very expensive, the satellite constellation and its feeder ground network reaches profitability for wholesale prices of the same order of magnitude as that identified as affordable by service providers in the next five years. This paper describes the global satellite trunking services and traffics, the LEO the constellation and its feeder segment and it demonstrates the economic viability.