

Executive Summary

Motorola Global Communications, Inc. (“Motorola”), a wholly-owned subsidiary of Motorola, Inc., hereby requests Commission authority to construct, launch and operate the Celestri Multimedia LEO System (“Celestri LEO System”), a non-geostationary orbit (“NGSO”) global satellite system, offering a wide range of real-time broadband communication services in the Fixed-Satellite Service (“FSS”). The Celestri LEO System will comprise a total of 63 operational satellites in low-Earth orbit (“LEO”) interconnected to virtually all of the populated land masses in the world. The Celestri LEO System will be an integral part of the Celestri System, whose other cornerstones are Motorola’s Millennium System and M-Star System.

The service and gateway links of the Celestri LEO System will operate in the 18.8-19.3 GHz and 19.7-20.2 GHz bands (space-to-Earth) and the 28.6-29.1 GHz and 29.5-30.0 GHz bands (Earth-to-space).¹ The TT&C high gain links will also operate in the service bands. The system will use optical inter-satellite links to interconnect the satellite network in space.

The Celestri LEO System comprises 63 satellites in 7 inclined orbital planes, up to 7 in-orbit spares, and the associated ground terminal equipment.² The satellites in each plane will rotate in circular orbits at an altitude of 1400 kilometers. The constellation is inclined at 48° with respect to the Equator.

The Celestri Architecture will allow for the use of relatively small, low power and low cost earth terminals. It will also permit real-time communication capabilities: the delays experienced by end-users will be essentially equivalent to terrestrial communication systems for global real-time services.

Each satellite contains all of the hardware necessary to route communications traffic through the network, including Earth-to-space, space-to-Earth and space-to-space connections. With this architecture, a signal received by a satellite may be transponded directly back to Earth in the same or a different beam, or relayed by optical inter-satellite links through other satellites from which it is then transmitted to Earth. This architecture allows global interconnection for the provision of real-time multimedia, data, video and voice services.

¹ Of these bands, the 18.8-19.3 GHz and 28.6-29.1 GHz bands have a primary domestic allocation for NGSO FSS. The 19.7-20.2 GHz and 29.5-30.0 GHz bands have a secondary domestic allocation for NGSO FSS. All bands have a worldwide primary FSS allocation. Motorola is cognizant of the obligations attendant upon system operators providing service pursuant to secondary allocations, and will comply with these obligations.

² Motorola is not requesting authorization for the ground segment facilities component of the system at this time.

The system is designed to avoid harmful interference with other service operators primarily through the use of space diversity. This technique will allow the Celestri LEO System to share the same spectrum with multiple NGSO and GSO systems, on a co-coverage and co-frequency basis. Implicit in the spectrum sharing approach is the assumption that all NGSO systems will participate in the spectrum sharing responsibility.

The system will utilize multi-beam phased arrays with fixed beams to provide ubiquitous coverage through the satellite footprint. Single or multiple earth terminals will provide access to the satellite constellation. The earth terminals will have equivalent antenna aperture sizes from 0.3 to 1 meter and will support bit rates from 2.048 to 155.52 Mbps.

The Celestri LEO System represents the third cornerstone in Motorola's plan to create the Celestri System global wireless broadband communications infrastructure. It complements the recently licensed GSO FSS Millennium System and the proposed LEO FSS M-Star System. Each system is optimized for discrete types of broadband FSS offerings aimed at different, yet overlapping market segments.

Together, the three systems will offer an integrated, "total" FSS solution. The Celestri Architecture will comprise LEO and GSO satellites, satellite-to-satellite communications links, space-to-ground interfaces, terrestrial gateways and a family of customer premises equipment designed to deliver a full range of wireless multimedia and other bandwidth-on-demand applications to consumers, small businesses, multinational corporations and telecommunications service providers anywhere in the world.

Motorola believes that this unified and open architecture for the delivery of GSO, LEO and "hybrid" services is an advanced and highly flexible framework for meeting explosive worldwide demand for broadband services as well as an effective approach to spectrum conservation and sharing.

In the Ka-band, services delivered by the LEO system described in this Application and services delivered by the Millennium System will allow a single terminal to receive and send video, data and voice signals that offers the most efficient and cost-effective medium for each application. For applications that require exceptionally large bandwidth, Motorola's proposed M-Star System leverages Ka-band user links into very high-capacity trunking and backhaul applications in the 40/50 GHz band.

Motorola has a proven record of developing and deploying new technologies that create new industries including two-way radio, paging, cellular mobile communications and, most recently, the IRIDIUM[®] global mobile communications system.³ As the recognized worldwide leader in wireless communications systems, Motorola believes that the Celestri Architecture will

³ IRIDIUM[®] is a registered trademark and service mark of Iridium LLC.

define another new industry -- the global wireless delivery of broadband communications services.

The Celestri Architecture will allow integrated systems to support four classes of service for four segments of the marketplace. These types of service are:

- point-to-point, real-time symmetric connection services ranging from 64 kbps to 155 Mbps;
- point-to-point, bursty asymmetric services, in which each direction of communication uses varying amounts of bandwidth as needed, ranging up to 16 Mbps;
- broadcast and multicast services using variable service areas and communication rates;
- interactive and integrated broadcast and real-time response services.

Combinations of these services will be integrated with applications to serve the following market segments:

- residential consumers purchasing multimedia applications (data, video and voice) for work-at-home, personal productivity, entertainment, education, health care and security purposes;
- small businesses purchasing in the multimedia marketplace;
- large multinational corporations seeking strategic multimedia applications that improve their business processes and customer responsiveness to all corners of the world;
- telecommunications carriers and service providers world-wide seeking to extend their reach, control and service quality to areas not presently covered well by their current service offerings.

The Celestri System is ideally suited to rapidly fulfill the Global Information Infrastructure initiative recognized by Vice President Gore because it is capable of providing communications services virtually everywhere in the world without geographic or price discrimination. No other technology can more effectively help close the telecommunications gap between rich and poor countries, alleviating the distinction between information “haves” and “have nots.”

While the cost of constructing the Celestri LEO System will be high in absolute terms, the system’s global reach makes it possible to spread that cost

over a large number of potential users, resulting in a fraction of the per-user cost that would be incurred to build out a terrestrial broadband network, whether nationwide or worldwide. The cost of a comparable terrestrial network infrastructure would be over a trillion dollars.

In addition, Motorola will achieve substantial cost savings through major design reuse of key space and ground-based components of the Millennium, M-Star and Celestri LEO Systems. This approach will dramatically reduce development time and costs, accelerate production of all elements of the architecture, and allow the start of service by the year 2002.

Motorola will operate the Celestri LEO System on a non-common carrier basis. Motorola does not anticipate selling services directly to end users. It intends to offer wholesale space segment capacity to carriers and service providers, who will, in turn, market a variety of services to their customers.