OVERVIEW OF LEO SATELLITE SYSTEMS

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A new generation of communications satellites operating in the low earth orbit (LEO) will soon provide cellular-like telephone and broadband data services anywhere in the world. Under development for the past decade, these satellites are now being deployed in large numbers. A number of competing LEO satellite systems plan to blanket the globe from a combined constellation of over 500 satellites by 2004. The new satellite systems amalgamate some of the attributes of cellular telephone systems with those of traditional satellite communication networks to provide users with seamless global communications. The network is divided into two elements, the satellite constellation and the terrestrial segment, where interconnection between the two is provided via terrestrially-based gateway stations that are strategically positioned within each particular network. Voice communications are provided via hand-held telephones where users will be able to place or receive calls by way of the local terrestrial service provider or, in the absence of such service, directly to the satellite. Data services will also be accessible via hand-held devices or computers.

LEO satellites operate at orbital altitudes between 500 and 2000 km and can be separated into three classes, Litte LEOs, Big LEOs and Broadband LEOs. Little LEO systems are those which support non-voice services such as messaging, e-mail, and remote monitoring. Systems that fall into this class are Orbcomm and Leo One. Big LEO systems consist of larger non-geostationary satellites and are adapted primarily for voice but also provide data services. Examples of such systems are Iridium and Globalstar. Broadband LEO systems provide high speed data, video conferencing, and other high speed applications. Teledesic and SkyBridge are examples of such systems. Several factors contribute to the success of LEO satellites communication. The lower orbital altitude produces lower signal propagation delays (critical for adequate voice quality of service), requires lower transmit power from the handset to the satellite, and reduction in satellite deployment costs due to multiple satellites deployed per orbital launch. These factors combined with advancements in satellite design and production are enabling LEO communication to become a reality.