

## **Spectrum Issues Related to Satellite Communications**

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### Abstract:

Satellite communications technology development is advancing at a tremendous pace. Changes are occurring in every aspect of the satellite industry and with each advancement there seems to come an accompanying requirement or new application. Recent advances in satellite technology, spacecraft mass production techniques, and increased launch capabilities, have led to entirely new industries such as proposed broadband “Internet-in-the-sky” using both geostationary (GEO) and non-geostationary (NGSO) satellite orbits, mobile communications using small handsets communicating through small low-earth-orbiting satellites, and others.

With these new systems and concepts have come additional demands for spectrum to fill the new requirements along with new challenges in managing the spectrum resource domestically and globally. Each new satellite communications system traverses one of two regulatory paths domestically and separately progresses through the international regulatory regime. Domestically, the National Telecommunications and Information Administration (NTIA), through the Interdepartment Radio Advisory Committee, regulates the Federal spectrum use of the spectrum while the Federal Communications Commission regulates the non-government spectrum use. The International Telecommunication Union establishes regulations and technical recommendations for coordinating and registering international telecommunications systems.

With the increased demands for the limited spectrum resources have come new methods to share spectrum between systems. Some of these methods involve using the time-varying aspects of the non-geostationary orbit to avoid interfering with other systems or to reduce the time that interference does occur to an acceptable level. However, non-geostationary orbiting satellites have the potential to transmit towards the Earth at relatively low look angles over wide areas that are constantly moving as compared to geostationary satellites which operate at low elevation angles but which remain essentially stationary. This may increase the possibility of interference to terrestrial radiocommunication services unless preventive measures are taken.

Technical and regulatory issues for NGSO satellite communications systems are being actively investigated internationally in the ITU and domestically in both the government and non-government sectors. As the demand for spectrum grows, and with the limited nature of this resource, new and innovative ways to share and manage the spectrum resource will become even more critical to satisfying government and non-government telecommunications requirements. The complex and time consuming task of spectrum management is becoming a more critical element of both Government and private sector satellite system development and one that is best addressed early in the development cycle for new systems.