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TWTAS AND SSPAS : FUTURE PROSPECTS FOR SATCOM APPLICATIONS

Abstract

Internet and media companies like Google and Facebook are looking at fielding a variety of technologies to vastly improve their services, especially in underserved and underwired regions of the globe. They are looking to offer services to customers, directly, via satellite links. They are also interested in providing quicker links and faster access for an array of innovative services that is aided by the new generation of mobile systems, like smartphone technologies, without dependence on terrestrial fiber. Among the critical reasons cited for this strategy is the need for control; to provide privacy for customers via secure, encrypted links without the worry of eavesdropping that is an issue with current leased fiber services. Whereas traditional satcom operators have based their space segment assets in the geosynchronous belt, and offer their services via leased terrestrial fiber providers, these new companies seek to field multiple smaller satellites in low Earth orbits to directly access and offer services the customer. Since power requirement for data throughput are considerably reduced in LEO compared to GSO, satellite architectures can be designed to be quite frugal in power needs. Travelling Wave Tube Amplifiers(TWTAs) have been the mainstay of satellite bus high power amplifiers, but more and more, it appears that SSPAs that used to serve lower power needs, are now able to match or outperform TWTA based satellite systems. Major developments in critical technologies, including SSPAs, digital processors and antenna design and electronic beam switching and steering, are game changing, driving new payload architectures. This will allow efficient small satellite systems engineering and integration, all of which have major ramifications for the industry. This paper discusses current state of the art in these new technologies, implications on satellite payload architectures, and current trends and potential for applications in the light of recent developments and needs in the fast evolving age of the internet of things. While the technologies may exist to field multiple, low power smallsat constellations in LEO, will the crowding affect other users of the skies? What are the rules that the International Telemetering Union(ITU) will impose on potential licenses to stave off interference and other bandwidth allocation problems ? While we can be assured of several new modes of satcom deployment and data delivery services, challenges in service delivery remain, that this paper will touch on.