



CHALLENGES IN DESIGNING RECONFIGURABLE ANTENNAS FOR BROADBAND IN-THE-SKY NETWORKS

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There is virtually no doubt in our minds that wireless broadband services are the key drivers behind the growth of the digital economy in the world we live in today. The demand for broadband services appears to be insatiable, no matter whether the users are on the road, at sea, in the air, or if they reside in remote and rural areas where broadband Wi-Fi is either unavailable or virtually inaccessible. To satisfy the demand for broadband services, various Ka-band communications satellites are currently being launched [1]. Such networks can be formed by a combination of various platforms such as low earth orbit satellites, aircraft fleets, high altitude platforms (HAP) and ground stations [2]. At present, to overcome the inherent drawback of long latency in geo-stationary satellite systems, the momentum around low earth orbit (LEO) satellites is gathering pace as evidenced by the plans announced by WorldVU Satellites to launch a constellation of low-earth-orbit satellites [3].

It goes without saying that designing broadband in-the-sky networks that are expected to deliver data rates comparable to those provided by terrestrial services presents a gargantuan challenge. To meet this challenge, it would be necessary to maximize the quality of wireless links between mounting platforms, to reduce the power consumption, and to design reconfigurable conformal antennas employing low complexity beamforming technology [4-6]. Such a system would enable us to beam and capture the signal energy most efficiently in the desired direction in the face of changes in the orientations of the mounting platforms.

This presentation will focus on the topic of reconfigurable antennas in the context of broadband in-the-sky network, and will review a number of options available to us today for designing such antennas to see which ones would be suitable for the broadband networks, keeping in mind that cost would be a big factor in determining which ones would win out as viable candidates.

References

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