

Towards Satcom On The Move?

Technologies and Challenges

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I. INTRODUCTION

Satcom-On-The-Move (SOTM) offers true broadband communications capabilities for civil and military users. While the desire is to use satellite earth stations which are as small and light as possible, several trade-offs affect the coverage areas and communications data rates these systems can provide. For the choice of a SOTM solution, it's important to understand which technology can be supported, what are the main challenges related to the different solutions and which systems are mature technology with predictable performance.

II. TECHNOLOGY

If we refer to circular parabolic antenna based SOTM systems, there are three broad areas where SOTM systems deviate from fixed systems: Antenna pointing, radome effects and power to bandwidth ratio. Antenna pointing is accomplished by either open loop or closed loop tracking. Radome effects are of great concern for aerodynamic radomes because of the non-orthogonal incident angle at some azimuth/elevation angles. Concerning, the power to bandwidth ratio, the users must carefully weigh the impact of a disadvantaged SOTM terminal on available satellite resources.

III. CHALLENGES

Current challenges vary widely depending on the platform the SOTM system will be used on. Ground-based, airborne, and sea-based all pose different challenges due to the motion profile of the platform and the operational concept for that system. The fundamental problem facing all satellite communications systems is to provide suitable performance on the RF link through the desired satellite while minimizing interference energy towards adjacent satellites. The aperture size of the SOTM earth terminal has also a significant effect on both the uplink and downlink performance of the satellite communications link. Finally, Satcom-On-The-Move is a heterogeneous network with variable terminal types and mobility requirements, variable carrier to noise ratio and system throughput and variable transmission capacity that affect not only the modulation and coding schemes but also the 'Layer 3' level.

IV. CONCLUSION

SOTM allows communication even when no infrastructure exists. The terminal mobility and the characteristics of the SOTM antenna aperture have a significant impact on operation and represent the main challenges in the system design. Today, ground and sea-based systems are mature technology with predictable performance while airborne systems have been used in commercial SATCOM for years as receive only and more recently in a transmit/receive capacity that is becoming more prevalent also in MILSATCOM.