IAF SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)
Advances in Space-based Communication Technologies, Part 1 (4)

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OPTICAL COMMUNICATIONS FOR SMALL SATELLITES: A REVIEW OF POINTING STRATEGIES & REQUIREMENTS OPTIMIZATION

Abstract

The small satellite is part of a growing industry that caters to commercial, scientific and defense applications. Multiple launches and power constraints of small satellites require cost-effective and stable communication links. Free-space laser communication (Lasercom) is a promising candidate offering a high-speed broadband network, with less energy consuming and compact subsystem. Unlike radio frequency (RF), Lasercom alleviates the licensing problems of RF spectrum regulation.

Despite recognizable popularity, little research on Lasercom for small satellites has been conducted on a comprehensive scale. This review discusses the current improvement in laser communication for small satellites. It examines innovative approaches in on-board Photonics for pointing strategies in atmospheric disturbances and vibrations mitigations. Due to the infeasibility of in-orbit maintenance, the crucial role of the multidisciplinary optimization of requirements for flexible and agile Lasercom systems is also addressed.