

IAF SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)
Advanced Technologies for Space Communications and Navigation (7)

Author: Dr. Meng CAO
China Aerospace Science & Industry Corporation (CASIC), China, redfire03@163.com

APPLICATION OF TERAHERTZ TECHNOLOGY FOR COMMUNICATION AND DETECTION IN
SPACE EXPLORATION

Abstract

Terahertz technology has been used in fields such as satellite remote sensing imaging and security imaging in recent years for it combines the advantages of microwave and infrared visible light with narrow beamwidth, wide system bandwidth, and large doppler shift characteristics. The attenuation of wave of the terahertz band is seriously in atmosphere, however it can be reduced greatly in space environment. Therefore, the terahertz detection system can be used as the payload of satellites and aircraft to realize long-range detection with high resolution in space environment. In this paper, several applications of terahertz technology are proposed for the application environment outside the atmosphere: the first one is communication between aircraft. Terahertz technology is suitable for instant messaging among multiple aircraft due to high frequency which makes terahertz wave can modulate a large amount of information. Second one is communication through the black-out area. Terahertz technology can be used as an effective means of spacecraft communications within the black-out area, for it can effectively penetrate the plasma. Space micro, small garbage detection and recognition, because it can achieve high-precision, long-distance imaging, terahertz technology can be achieved for small and micro space debris detection and positioning. The last application is detection and identification of micro and small garbage in space. Terahertz technology can realize high precision and long distance imaging, which makes it possible to realize the detection and positioning of micro and small space junk.