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Author: Ms. Xiao Li

China Academy of Launch Vehicle Technology (CALT), China, lixiao19871105@126.com

Mr. hua wang

China, e\_visawang@aliyun.com

Ms. zhiting fei

China Academy of Launch Vehicle Technology(CALT), China, feizhiting@hotmail.com

Mrs. zhijun deng

China, dzjdzj@sina.com

RESEARCH ON THE APPLICATION OF TERAHERTZ TECHNOLOGY IN AEROSPACE FIELD

**Abstract**

Terahertz (THz) technology is considered as a bridge to link macro-electronic and micro-photonics. It owns multiple unique properties which are different from electromagnetic waves in other frequency bands, and, therefore, has broad prospects of application in aerospace field. The research status of THz technology is briefly summarized in this paper, and the unique properties of THz wave are illustrated. Based on the characteristics of THz, this paper focuses on the application of THz technology in aerospace field, including radar imaging, communication, blackout TT&C, aerospace materials testing and so on. Finally, the development suggestion of THz technology in aerospace field is proposed.

1. THz radar imaging. As the wavelength of THz is much smaller than that of the ordinary microwave and millimeter wave, THz technology is suitable for the realization of maximum signal bandwidth and extremely narrow antenna beam. Therefore, the THz radar detection system can detect tiny target and identify target imaging with high resolution.

2. THz communication. THz communication can realize the short distance confidential communication of tactical data link, and the space communication such as the interstellar communication between satellites, air-to-air communication within the stratosphere.

3. Blackout TT&C. When the aircraft reenters into the atmosphere, it suffers from extremely high temperature due to the air friction. This makes the air around the aircraft be ionized to the plasma, and results in TT&C interrupt. In this case, the utilization of THz signal can greatly reduce transmission lose so as to solve the problem of blackout TT&C interrupt.

4. Aerospace materials testing. THz wave can penetrate the nonpolar substance and owns the characteristics of high spatial resolution, so the THz imaging technology can be applied to the aerospace materials nondestructive testing.