Fabricating an Infrared-Radar Compatible Stealth Surface with Frequency Selective Surface and Structured Radar-Absorbing Material

Authors : Qingtao Yu, Guojia Ma

Abstract : Approaches to microwave absorption and low infrared emissivity are often conflicting, as the low-emissivity layer, usually consisting of metals, increases the reflection of microwaves, especially in high frequency. In this study, an infrared-radar compatible stealth surface was fabricated by first depositing a layer of low-emissivity metal film on the surface of a layer of radar-absorbing material. Then, ultrafast laser was used to generate patterns on the metal film, forming a frequency selective surface. With proper pattern design, while the majority of the frequency selective surface is covered by the metal film, it has relatively little influence on the reflection of microwaves between 2 to 18 GHz. At last, structures on the radar-absorbing layer were fabricated by ultra-fast laser to further improve the absorbing bandwidth of the microwave. This study demonstrates that the compatibility between microwave absorption and low infrared emissivity can be achieved by properly designing patterns and structures on the metal film and the radar-absorbing layer accordingly.

Keywords : frequency selective surface, infrared-radar compatible, low infrared emissivity, radar-absorbing material, patterns, structures
Conference Title : ICAM 2020 : International Conference on Advances in Metamaterials
Conference Location : London, United Kingdom
Conference Dates : May 21-22, 2020