

光电系统与工程

机载光学整流罩与扫描反射镜尺寸及渐晕的设计分析

赵洪卫¹;侯天晋¹;朱斌¹;邓敏²

1.西南技术物理研究所, 四川成都610041; 2.中国人民解放军驻209所军代室, 四川成都610041

摘要:

为满足机载光电系统的成像作用距离要求,对机载光学整流罩以及扫描反射镜的设计尺寸进行了理论仿真分析计算,并对研制的样机进行了试验研究。以实例形式给出了整流罩设计的作用距离与相关参量的计算结果,讨论了整流罩扫描系统的渐晕大小。装备该整流罩系统的样机,在近万米高空对音速某战机的红外长波扫描搜索距离可达到86km,红外中波跟踪达到180km,激光测距达到47km。结果表明:根据探测作用距离理论模型分析计算,研制的机载光学整流罩及扫描反射镜光学系统达到了设计要求。

关键词: 光学整流罩 通光口径 渐晕 光学设计

Design analysis for optical dome and scanning mirror

ZHAO Hong-wei¹; HOU Tian-jin¹; ZHU Bin¹; DENG Min²

1. Southwest Institute of Technical Physics, Chengdu 610041, China;
2. Military Representative Agent at the 209th Institute, Chengdu 610041, China

Abstract:

In order to obtain images with an airborne electro-optical system at the required distance, the theoretical analysis and simulation calculation of an optical dome and a mirror system were conducted, and a prototype was tested. The relationship between dome aperture and received light energy at different spectra were calculated, and the vignetting coefficient of the optical system was discussed. At the flight altitude of 8.4km, the prototype incorporated with this dome could detect a fighter aircraft at a distance of 86km with a LWIR scanning system, track the same target at a distance of 180km with a MWIR staring system, and obtain a laser ranging of 47km. An optical dome and mirror system was designed successfully based on the theoretical analysis and simulation calculation.

Keywords: optical dome clear aperture vignetting optical design

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作者简介:

作者Email: hwzhao123@sina.com

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