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# 机载隐蔽式短波天线设计

王乃志* 李建周 许家栋*

西北工业大学电子信息学院 西安 710129

# Investigation of an Airborne Concealed HF Antenna

Wang Nai-zhi Li Jian-zhou Xu Jia-dong*

School of Electronic and Information, Northwestern Polytechnical University, Xi'an 710129, China



摘要 机载天线是飞机导航、通信等系统的重要组件；实现远距离通信主要依靠机载短波天线。新型复合材料的使用以及飞机尺寸的增大，是国际飞机发展的潮流。针对这一问题，该文利用电小天线及传输线相关理论设计一种新型大型飞机机载隐蔽式短波天线，设计过程中使用电磁仿真软件Ansoft HFSS建模计算天线输入阻抗及方向图并优化天线尺寸；在此基础上，制作缩比模型并在微波暗室中对其进行实测，所得数据与仿真结果相符。除此之外，对天线的阻抗匹配及效率进行分析并给出计算结果。计算及测试结果表明，此天线可与天线调谐系统(例如KHF950)良好调谐，方向图为水平全向，符合应用要求，可用于整个机身或仅垂尾为复合材料的大型飞机。

关键词： 机载短波天线 阻抗 全向 效率 调谐

Abstract: As an important module of aircraft navigation and correspondence systems, the remote distance communication depends mainly on the airborne High Frequency (HF) antenna. With the use of new materials and larger size of aircraft, HF antennas tend to be problematic for a number of reasons. In this paper, a novel HF antenna is designed which could be used on a large aircraft. It can be located on the front edge of the vertical wing and is well conformal with the configuration of the plane without degenerating the reasonable shape of the aircraft. Based on the simulation utilizing the software Ansoft HFSS, the impedance and radiation pattern of the antenna are calculated, and based on the simulation results, impedance matching and efficiency of the antenna are analyzed. A scaling test-piece has been made to authenticate the simulation results. It can be tuned satisfactorily with transceivers such as the KHF950 through the band. All indicate that this kind antenna can be used for remote communication on aeroplane.

Keywords: Airborne HF antenna Impedance Omni-directional Efficiency Tune

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通讯作者: 王乃志 Email: williamwnz@hotmail.com

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