



## 半空间中机载甚低频双拖曳天线电磁辐射特性

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## Analysis of electromagnetic radiation for airborne very-low-frequency (VLF) dual trailing antenna in half-space

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摘要

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**摘要** 对半空间中机载甚低频双拖曳天线电磁辐射特性进行了研究. 基于有限元算法建立了机载甚低频双拖曳天线半空间全波仿真模型, 利用边界条件模拟了海面半空间环境, 深入分析了海面半空间环境对于机载甚低频双拖曳天线辐射特性的影响, 通过调整机载甚低频双拖曳天线长短比, 优化了机载甚低频双拖曳天线的输入阻抗、辐射效率等设计参数, 该研究结果与美国海空军发展中心公布的数据吻合较好, 验证了研究结论的有效性和可信性, 对机载甚低频双拖曳天线的设计及应用具有参考意义.

**关键词:** 半空间 甚低频 天线 电磁辐射特性 数值仿真

**Abstract:** Electromagnetic radiation characteristics of an airborne very-low-frequency (VLF) dual trailing antenna in the half-space (a space including air and seawater) were studied. The airborne VLF dual trailing antenna models in half-space were established and calculated by finite element method (FEM). The influences of the half-space to antenna radiation patterns were investigated using numerical results. In addition, through shifting feed locations (i.e., changing the ratio of long antenna and short antenna), variation trends of antenna characteristic parameters in half-space, including antenna input impedance and radiation efficiency were obtained. Good agreements of simulation results and the corresponding data announced by american naval and air development center were achieved, which validates the effectiveness and reliability of the proposed method and results. The achievements provide significance to the airborne VLF dual trailing antenna design in the future.

**Keywords:** half-space very-low-frequency antenna EM radiation simulation

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