

无线侦察爬壁机器人专用离心风机

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收稿日期 2007-3-15 修回日期 网络版发布日期 2008-10-25 接受日期

摘要 为满足无线爬壁机器人在侦察环境下的工作要求, 设计了新型离心风机。首先分析了机器人在工况下密封系统漏气与离心风机排气动态平衡的气动热力学过程; 在此基础上, 应用现代计算流体力学方法(CFD)进行了风机流场仿真和特性分析, 设计了墙壁适应能力强、高效率低噪音的离心风机; 最后试验表明: 当墙壁缝隙小于1 cm时机器人可以安全工作, 续航时间为45~60 min, 噪音满足1 m距离小于70 dB的低噪音要求。

关键词 [自动控制技术](#); [离心风机](#); [计算流体力学](#); [爬壁机器人](#)

分类号 [TP24](#)

Centrifugal fan for wireless wall climbing reconnaissance robot

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Abstract

A novel centrifugal fan was designed to meet the demand of the wireless wall climbing robot under reconnaissance environment. The aerothermodynamic processes of the dynamic balance between the working leakage of the sealing system of the robot and the output of the centrifugal fan were analyzed, the flow field and performance of the centrifugal fan were simulated by the computational fluid dynamics (CFD), and a low noise and high efficiency centrifugal fan was designed which is characterized by stable negative pressure under variable flow. The experiment results showed that the robot can work stably for 45~60 min when the wall gap is less than 1 cm with the noise lower than 70 dB at a distomce of 1 m.

Key words [automatic control technology](#) [centrifugal fan](#) [CFD](#) [wall climbing robot](#)

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