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### 微小型飞行器的MIMU系统结构设计方法

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### Research on MIMU System Design of Small Aircraft

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摘要

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**摘要** 针对微小型飞行器安装空间小、承载能力弱的特点,提出一种“T”型结构的微惯性测量单元(MIMU)系统设计方法,采用基于微机电系统(MEMS)技术的新一代微型惯性器件,在深入分析MIMU结构设计基本原则和方法的基础上,设计加工了“T”型支撑结构并组成了实际系统。该MIMU系统充分利用了空间,大大地减小了体积和重量。有限元分析表明:该MIMU力学性能较高,所研制的实际系统实现了微小型飞行器的自主飞行,各性能参数满足要求,是一款适用于微小型飞行器的MIMU。

**关键词:** 微机电系统 微惯性测量单元 结构设计 有限元分析 “T”型结构

**Abstract:** In view of the relative small installation space and loading capacity for a small aircraft, a “T” frame micro inertial measurement unit (MIMU) system is proposed in which inertial sensors based on micro electromechanical system (MEMS) technology are selected. Based on the research of MIMU basic design principles and methods, the “T” support frame is designed and machined and then the “T” frame MIMU system is composed. The volume and weight of this MIMU system are reduced by making the best use of the installation space. Analysis by the finite element model shows that this MIMU has high dynamic performance. This system is used in the practical independent flight of a small aircraft and the results show that this MIMU is applicable for small aircraft.

**Keywords:** micro electromechanical systems micro inertial measurement unit design of structure finite element analysis “T” frame

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