

旋转弹用MEMS惯性测量组合数据硬回收系统设计

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摘要：

针对常规弹药在高温、高压、高过载等恶劣发射环境和弹体狭窄尺寸限制下，传统的弹载数据记录器无法可靠工作并无法安装等问题，提出了一种新型的适用于MEMS惯性测量组合数据硬回收系统的设计方法。该系统采用数字信号处理器控制高速模数转换芯片，将采集到的MEMS惯性器件输出模拟量转化为数字量后存入FLASH存储器中，实现对弹体整个飞行过程中相关飞行参量的准确记录。通过对某次靶场实验数据记录和显示，该系统能够完整地记录弹体飞行过程中的参量数据，具有小型化，抗高过载，采样率高，噪声输出小等优点，对常规弹药发射、飞行以及着地全过程的姿态、位置信息的动态测量有一定的工程应用价值。

关键词：旋转弹；MIMU；A/D转换；数据存储

The Design on Data Hard Recovery System of MEMS Micro Inertial Measurement Unit Used in Spinning Projectiles

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Abstract:

To improve the problem traditional recorder in ammunition can not work reliably in harsh launch environment such as high temperature, high pressure and high overload or can not be installed for the limitations with narrow dimensions of the missile body, this paper proposes a novel design method of data hard recovery system for MEMS inertial measurement unit. Using digital signal processor to control high-speed analog-digital conversion chip, the system converts analog output of MEMS inertial devices to digital quantity and stores them in FLASH memory. Through recording and displaying range experimental data, the system can completely record the flight parameter data of the missile body. With a number of advantages such as miniaturization, anti-high overload, high sampling rate and low output noise, the system is valuable for engineering implementation in dynamic measurement for location and attitude information of conventional ammunition's launch, flight and the whole process of touchdown.

Keywords: Spinning Projectile ; MIMU; A/D Conversion; Data Storage

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