



Momentum Wheels Used in Spacecrafts-An Overview

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Abstract

Throughout the history of house flight, flywheels are accustomed stabilize and purpose satellite of every type. These flywheels area unit enforced as management moment gyros or reaction wheels, that are noted as momentum wheels. A reaction wheel could have a nominal mounted spin speed or a nominal spin speed of zero. once force is applied to the wheel the opposing moment rotates the satellite. Reaction wheels area unit helpful once the satellite should be turned by a awfully bit, like once inform at a star or target. Reaction wheels area unit additional common in smaller satellite. In distinction, CMGs spin incessantly making rotating mechanism moment. Mounted in motorized gizmo, tilting the spin axis of the CMG with regard to the reference system of the satellite will manufacture massive steering force with little power. CMGs area unit found in satellite of all sizes, up to and as well as the International satellite.

Keywords: Management moment gyros; Momentum wheels; Steering force; Flywheels

Momentum wheels measures satellite actuators of huge momentum used for the angle management and stabilization of spacecrafts. The on-orbit performance of spacecrafts depends mostly on the performance of the momentum wheels that successively depends on its bearings and its lubrication. Currently, the life cycle of spacecrafts square measure aimed to be around 20-30 years. However, the will increase in size, complexness and lifetime of spacecrafts demand advanced technologies particularly in mechanical engineering and successively the event of a lot of innovative lubrication systems for long operation [1]. This text reviews the tribological needs of momentum wheels and therefore the varied lubrication systems utilized in the past and raises a necessity to develop a brand new system to address the new needs.

The success of any satellite mission mostly depends upon the performance of the angle management systems like gyroscopes and momentum/reaction wheels. The specified life and performance quality of those rotating mechanisms square measure ensured by the choice of bearings and its lubrication. the planning and development of lubrication system to satisfy the long uninterrupted performance could be a challenging [2].

The success of a satellite mission depends to a good extent on the performance of the moving mechanical systems. the foremost common mode of failure in these systems is tribological. Tribological failures occur chiefly thanks to nonavailability of material at the operating zone of the bearings as a results of degradation, evaporation, and creep. The lifetime of these moving mechanical systems may well be extended if material is replenished by some suggests that. Therefore, to make sure long uninterrupted performance of those systems, Associate in Nursing economical material refilling system is important. This text describes the event of a completely unique material offer system that may offer material for quite thirty years at a controlled rate of many micrograms/hour [3]. Experimental analysis of the lubricating substance was disbursed below completely different operative conditions intimate with in an exceedingly satellite. Spacecraft, regardless of their mission's purpose, contain variety of moving mechanical assemblies like management moment gyros, momentum/reaction wheels, gyroscopes, scanners, solar panel drives, etc. Most issues encountered with these moving systems square measure associated with mechanical engineering and, specifically, lubrication. Lubrication issues result from the loss of material from the

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operating zone by evaporation, surface migration, etc. Therefore, to make sure long uninterrupted performance of those systems, Associate in Nursing economical material refilling system is important. this text describes varied lubricating ways and lubrication systems used for the no-hit operation of a number of these systems for the whole mission periods.

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