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Author: Mr. Irfan Rashed
Korea Advanced Institute of Science and Technology (KAIST), Korea, Republic of

ROLE OF MEMS-BASED NANO-SATELLITES IN DETECTION OF NEAR EARTH OBJECTS (NEOS) FOR THEIR ENHANCED DETERRENCE AND COST-EFFECTIVE MONITORING

Abstract

During and subsequent to research for designing and optimizing MEMS-Based Attitude Determination System (ADS) with most compact and robust configurations specific to Nano-satellites, it was astonishing to observe that these cost-effective MEMS components under operation are highly stable under intense space environment conditions both statistically and experimentally when executed with precisely creative implementation techniques, set-ups and algorithms which broadened imagination towards distinct and higher space mission objectives through these miniature satellites much challenging than their traditional applications. This paper mainly emphasizes on overall scope of MEMS-Based Nano-satellite study, experimentation and critical analysis realized and mainly one of its aspired application researched out of several other applications under consideration which is detection of Near Earth Objects (NEOs).

The research for this application is extremely indispensable as these NEOs mostly consisting of asteroids and comets have been a serious peril for earth due to gravitational attractions of nearby planets into orbits that allow them to get into earth's region and clashing with it drastically. These incidents have been widely observed across the planet with severe cataclysms imperiling life on earth radically. Many studies have significantly projected to halt these entities from entering earth's gravity but still there is no specific precise device or system which can avoid adversities through perfect detection paving tremendous scope for exploration and its experimentation to achieve the same.

Hence, substantial research was devised to address this concern through MEMS-Based Nano-satellites appropriately by a detailed literature study and trend analysis for strategizing required skills and theories to get complete in-sight of defined concern surprisingly noting about 1500 NEOs declared potentially hazardous asteroids surrounding earth's expanse.

After an exhaustive study, a detailed research was scheduled and executed for both statistical and experimental needs through innovative configuration designs, skills, techniques and concepts specific to ADS but overall sub-systems broadly emphasized obtaining robustness system design. The simulations were obtained through extensively studying Astrodynamics and Astrophysics relevant to formation-flying and constellation techniques with possible experimental needs for system-orientation, thermal sustenance, appropriate sensor selection and detection process to track and characterize NEOs followed by systematic critical analysis to signify the importance of MEMS-Based Nano-satellites with its crucial parameters and techniques for the given application were accentuated which influenced the purpose followed by significant conclusions and future work are profoundly detailed with stress on possible utilization techniques of these satellites in under-developed countries to avoid any further tragedies due to NEOs are keenly highlighted.