IAF MATERIALS AND STRUCTURES SYMPOSIUM (C2)
Specialized Technologies, Including Nanotechnology (8)

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A NOVEL APPROACH FOR PAYLOAD DESIGN TO STREAMLINE DEEP SPACE MISSIONS : MOLECULAR NANOSCIENCE

Abstract

Nanoscience greatly influences space science exploration to make it more practically feasible.This paper focuses on employing Nanoscience in the aspects of rocket's payload.Nanoscience can serve the purpose that the scientific instruments used for sensing and mapping the elements on the surface of the targeted planet or other celestial bodies (e.g. Asteroids) such as Very High-Resolution Radiometer(VHRR), Synthetic Aperture Radar(SAR),Terrain Mapping Camera(TMC) and other optical payloads are fabricated with the help of Molecular Nanoscience Technology(MNT). The proposed payload design is accomplished with the help of Utility Fog simulation that has an antenna in the micron wavelength region.Utility Fog is a conglomeration of nano-scale devices that sense and transmit data and change shape.Utility Fog is a polymorphic, smart material that is transformable at the creators' will.MNT achieves the same result as macro-scale instruments,but the materials are 50 times smaller.It can also be used in the structural aspect of the whole rocket.This design renders the payload as well as the spacecraft to be in a kind of constricted state during the launch.After reaching the targeted celestial body, it would function in the same manner as that of the existing scientific instruments of the spacecraft and other components of the rocket.That way will significantly reduce propellants used for the mission.Hence, this paper's proposed idea helps achieve more specific impulse (Isp) as the propellant mass fraction is directly linked to Isp. In this manner,it will simultaneously increase the payloads' and the mission's cost-effectiveness.It also serves space missions to achieve the maximal outcomes from small payloads.This paper emphasizes the electronics and the physics aspects of the materials used to accomplish Utility Fog simulation (the virtual reality). In a nutshell, this paper aims at revolutionizing the interplanetary missions that pave the path for space agencies and astronomers to study the Universe more flexibly and affordably.