SPACE SYSTEMS SYMPOSIUM (D1)
Enabling Technologies for Space Systems (2)

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PROMISING APPLICATIONS OF NANO-TECHNOLOGIES FOR SPACE SATELLITES BENEFITS AND ROAD-MAP

Abstract

Nanotechnologies are now widely expanding for a wide range of applications in different domains. Their development is supported by important RD's. On the basis of nano-technologies surveys, Thales Alenia Space, has identified which spacecraft elements could best benefit of nano-technologies. This has enabled to quantify the system benefit of the integration of nano-technologies.

- The structure could take best benefit of carbon-nanotubes for mass reduction of high performance high stability structure, for optical instruments.
- - The solar array efficiency can also be enhanced using nano-coating or quantum dot solar cells (extended sensitivity range).
- - The battery energy to mass ratio can be enhanced using nanostructured electrode.
- - Multifunctional coating to potentially enhance performance of space subsystems vs space environment (electromagnetic, thermal, radiation,. . .)

The paper will summarise first the most promising technologies, which could take benefit of spin-in from other domains, discuss their technology readiness and the necessary adaptation to use them for space domain; specific care (security, contamination) will also be addressed. Then the paper will identify their application on some space mission showing the benefit compared with current state of the art.