A European Multifunctional Microsystem Program for Space

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Outline

- Background
- The MMS programme
- Nanospace 1
- Invitation to participation

Background

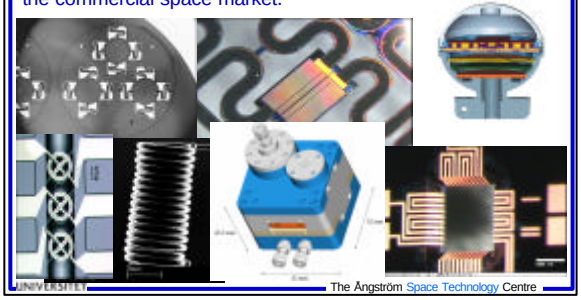
The space community keeps a healty lookout for possible ways of saving cost, improving performance or increasing the scientific return of new space missions. In these efforts, miniaturization of spacecraft and their subsystems have been recognized as a vital part with Micro System Technology as a key element.

The concept for Multifunctional Micro Systems, driven by the Ångström Space Technology Centre requires a European effort.

The goal is to have a paradigm shift in design and performance of spacecraft.

Background

Components and subsystems from ongoing developments all over Europe needs a flight validation to become attractive on the commercial space market.



A European Multifunctional Micro System Programme for Space -The EMMSP-

The EMMSP shall be a programme with the overall goal to push MEMS/MNT based components or subsystems in Europe from a development level to a flight proven hardware.

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The EMMSP...

...shall be focused around the NanoSpace satellite platform

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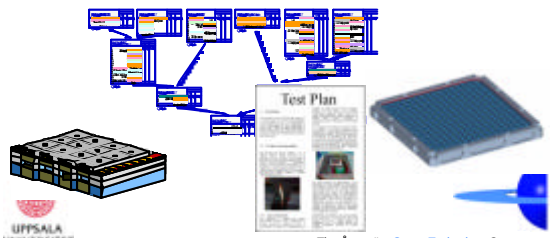
The EMMSP...

...supports the adaptation, integration, QA and test, together with the eventual launch on a NanoSpace satellite, of relevant and advanced microsystems.



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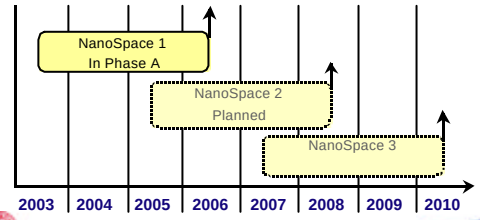
The EMMSP...

...will act as a central hub coordinating and utilizing all efforts to demonstrate competitive multifunctional microsystems by providing a regular access to space.



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The EMMSP...

...will encourage collaboration with European Industries and enterprises in the Multifunctional Micro System endeavor

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The EMMSP...

...will offer post-doc positions at the ÅSTC to spread the MMS concept throughout Europe.

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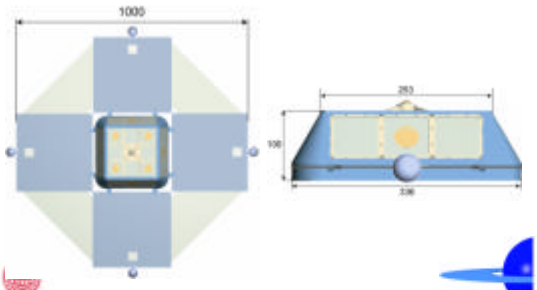
The NanoSpace satellite concept



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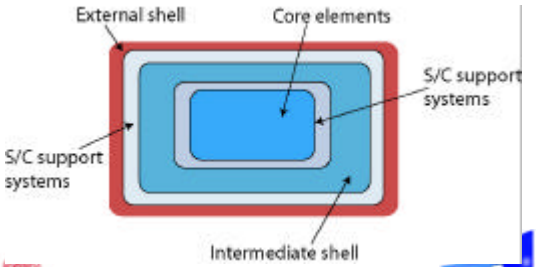
The Functional Shell Philosophy



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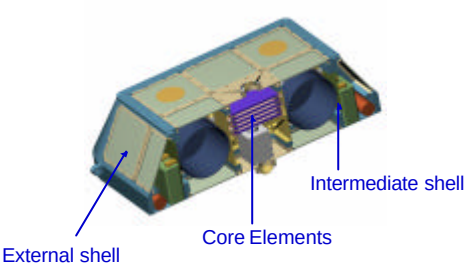
Cross-section NanoSpace 1



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System Unit Example

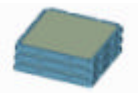
"CON" Unit of SMART-1

Current Design
Sum ~ 200 ICs
Weight: 9.2 kg
Dimensions: 259x286x208 mm

NanoSpace MMS

The equivalent is 50% of one MMS module if filled with naked dies. 3 MMS Modules includes also discrete components, resistors, capacitors, etc.

Total weight: ~ 120g
Total size: 74x74x22 mm
(NanoSpace Module Equivalent)
Reduction: 70 times in weight
120 times in volume



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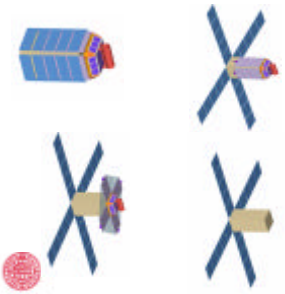
First mission for NanoSpace is on a technology demonstrator Technosat



- Several Micro propulsion experiments
- Demonstration of formation flying

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The EMMSP…

...invites partners in an advanced stage of Micro Systems development to adapt their systems from ongoing financed projects to the MMS programme and Nano Space concept.

In this framework the EMMSP supports the adaptation , integration, QA and test together with the eventual launch on a Nano space satellite.

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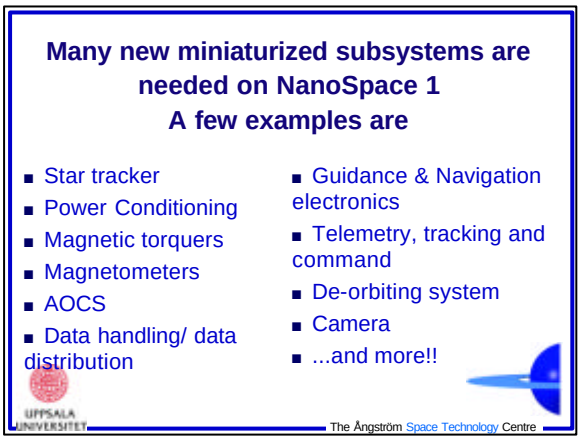
Many new miniaturized subsystems are needed on NanoSpace 1
A few examples are
Star tracker
Power Conditioning
Magnetic torquers
Magnetometers
AOCS
Data handling/ data distribution
Guidance & Navigation electronics
Telemetry, tracking and command
De-orbiting system
Camera
...and more!!
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