OpenCube-α: A Plug&Play Nanosatellite Demonstrator

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United Nations / Japan Nanosatellite Symposium
10-13 October 2012
Nagoya, Japan
Presentation Outline

- Objectives
- Service Modules
- Services
- Resources management
- OpenCube-α
- Conclusions
Objectives

- Ease the payload development by decoupling the development of satellite bus and payload

- Why?
  - To allow the payload developer to treat the satellite bus as a black box that provides required resources on request

- How?
  - By mission independent plug&play interfaces between payload and satellite bus
Service Modules

Inter-Module Interface (IMI)

0.5U service module

Payload Interface (PI)

2.5U payload module

solar board
The subsystems of a Service Module make their capabilities available to the payload through a standardised set of services.

Examples are:

- Resource management service
- Housekeeping service
- Centralised data storage service
Resources Management Service

- Ensures the distribution of on-board resources
- Aims at maximising resource utilization and serves as a safeguard against excessive use

- Quantitative resources (power, bandwidth)
  - Are counters which are decremented when allocated
  - Can be predefined or established dynamically by producers

- State resources (pointing, ground station connection)

- Resources are handled in an abstract way

- Bookings should be made well in advance

- Conflicts are handled via priorities
OpenCube-α

- The first OpenCube service module
- Test, demonstrate and improve hardware and software design
- Includes three camera payloads of ascending complexity
- A full featured simulator for service module and payloads is developed in parallel
Conclusions

- The OpenCube design aims at decoupling payload and satellite bus development
- The bus provides services to the payloads
- Central service is the resource management service
- A first implementation of the presented approach in software and hardware is currently being developed as OpenCube-α
Questions?

Thank you for your attention!

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