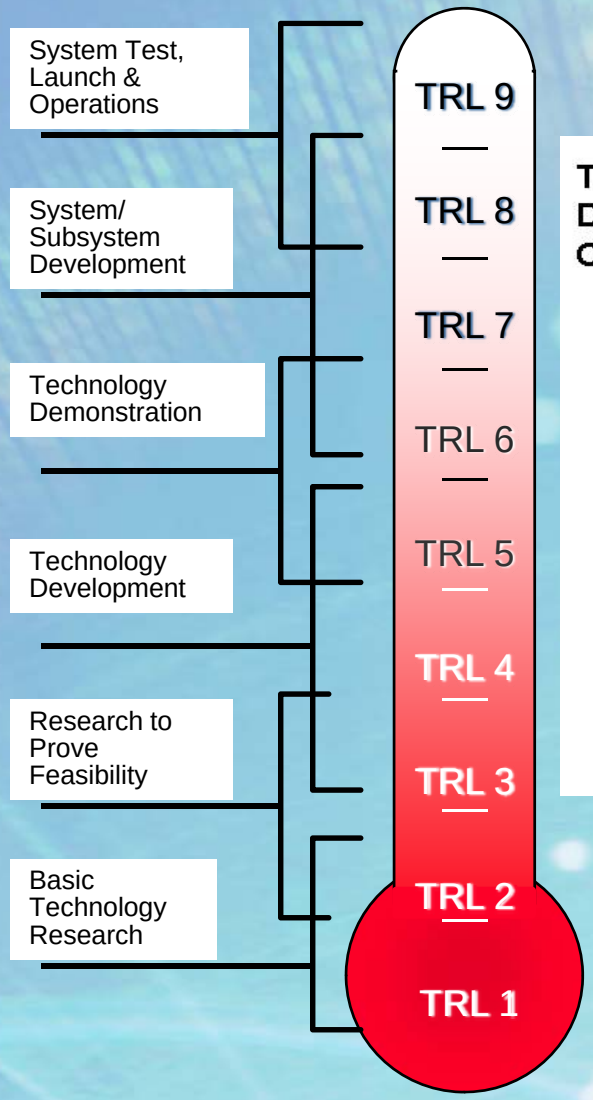
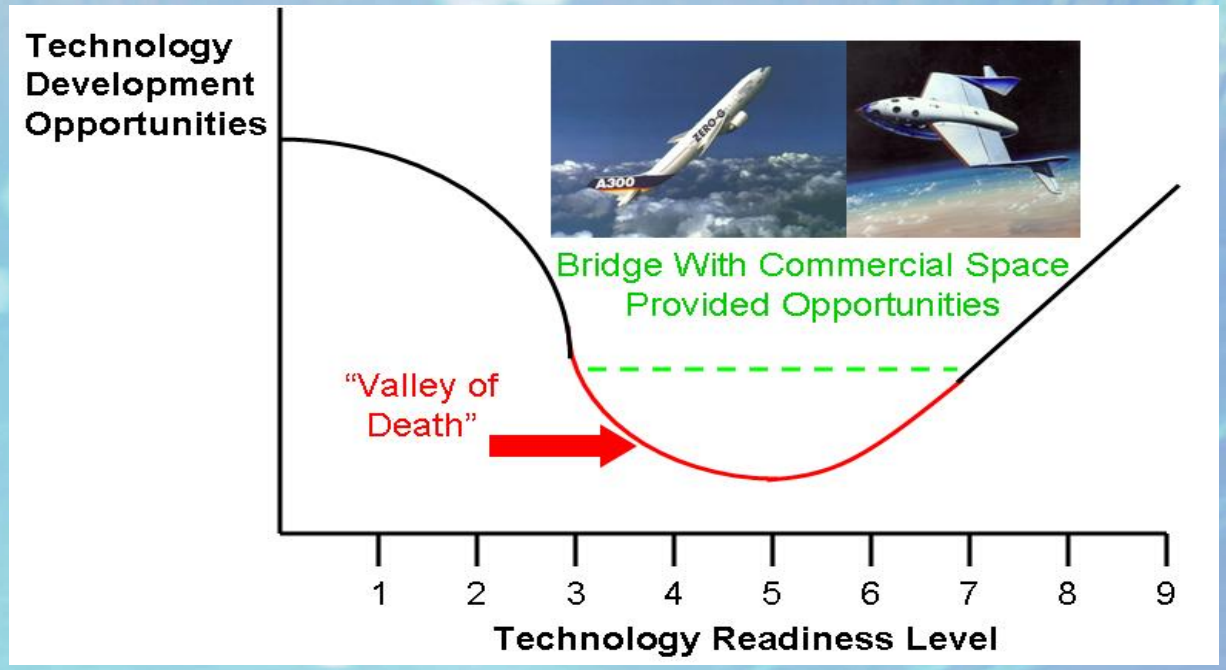
CANEUS 2009 WORKSHOPS

CANEUS 2.0

A Flexible, Virtual, International Collaboration

Crossing the Chasm





Collaborative Sector Consortia

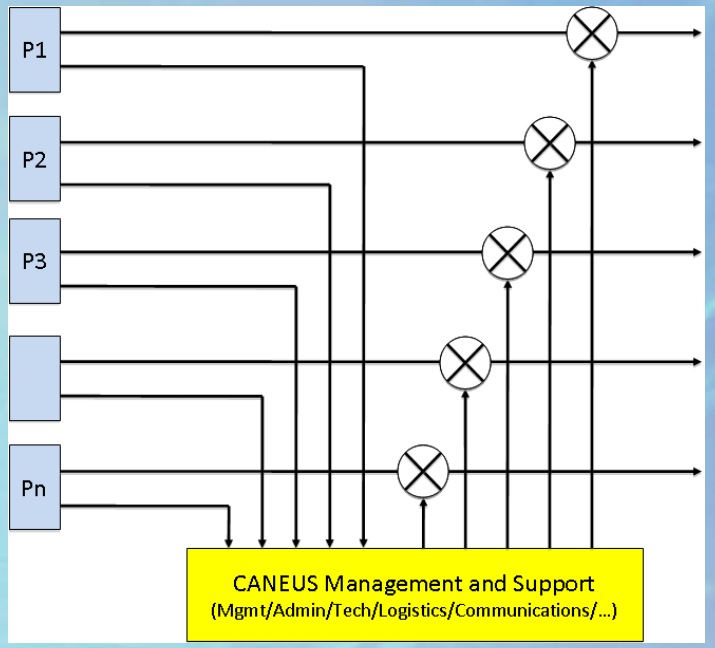
- Within this framework, the CANEUS Small Satellite Sector Consortium currently operates in collaboration with **four other consortia**.

- This enables the **sharing of benefits** with projects and initiatives undertaken in MNT **reliability testing** (“Reliability”), developing **wireless alternatives** (“Fly-by-Wireless”), responding to aerospace needs for **harsh environment sensors** (“Devices: Harsh Environment Sensors”), and more.

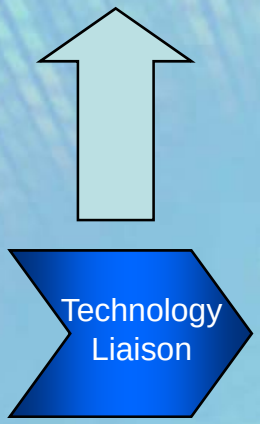
8 Stages of Project Life-Cycle

*Generally related to Mirco/Nano Technology (MNT), but not a requirement.

- The new CANEUS 2.0 Organization is actually a virtual organization
- Structured to support a Project based membership association
- Functional elements are managed by CANEUS Members
- CANEUS Staff offer specific services available to the international community



8 Stages of Project Life-Cycle



Possible 9th Stage

Possible New Service: Finding Helping find technologies to resolve know problem areas

Candidate CANEUS 2.0 Services

1. Conferences and Workshops
2. IP, ITAR, and Export Control Services
3. Consortia and Subgroup Support
4. International Launch Manifest
5. Mission Planners Guides
6. Stakeholder Liaison Services
7. International Plug-N-Play Standards Development
8. Payload Adaptor Integration and Certification Services
9. Launch Service Support
10. Payload Operations Support
11. Full Program Management Services

1. Conferences and Workshops

*Generally related to Mirco/Nano Technology (MNT), but not a requirement.

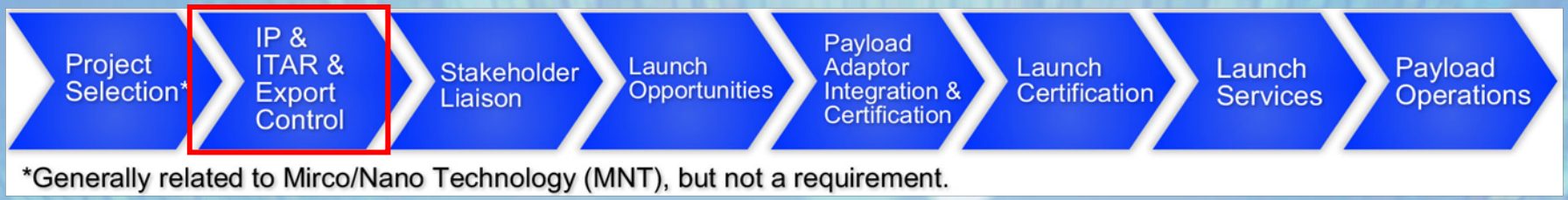
Service

CANEUS can organize and run Conferences and workshops

Fee Structure

To attend a conference or workshop, attendees will be required to pay the appropriate conference or workshop fees

2. IP, ITAR, and Export Control Services



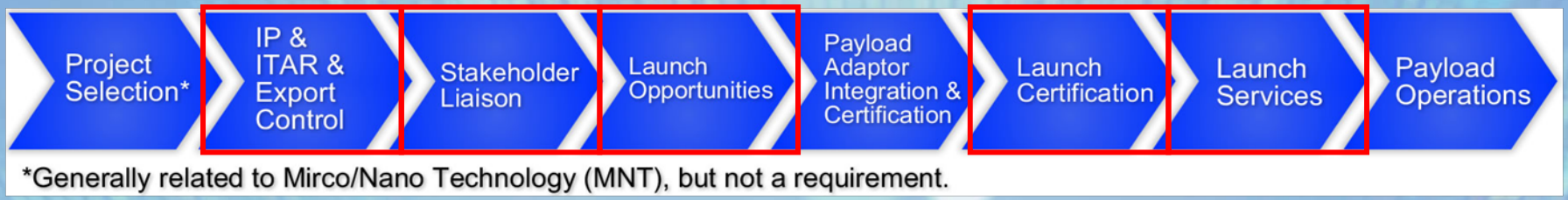
Service

CANEUS can provide documents with guidelines on how to manage intellectual property and export control issues. CANEUS can also support refinements to how IP is managed in SBIRs and other relationships. One of the most significant services would be CANEUShaving a mechanism to attain TAA licenses that would be more efficient and cost effective for CANEUS members or customers

Fee Structure

TBD

3. Consortia and Subgroup Support



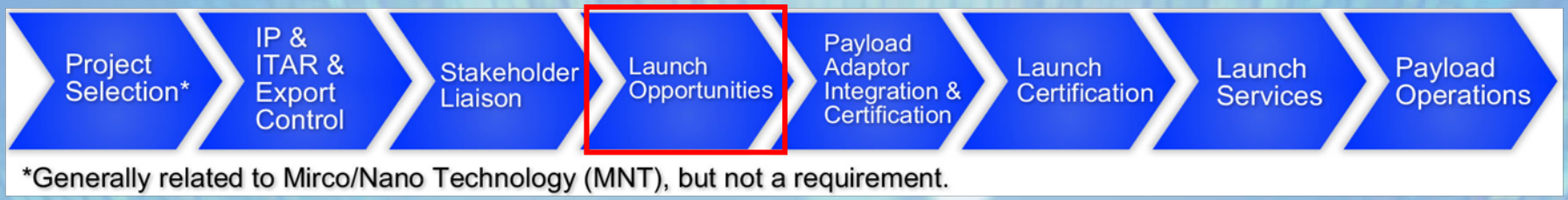
Service

CANEUS can provide support to organize meetings, teleconferences, and documentation of progress made by the 5 subgroups. CANEUS can facilitate fund raising and provide support for studies in certain areas

Fee Structure

TBD

4. International Launch Manifest



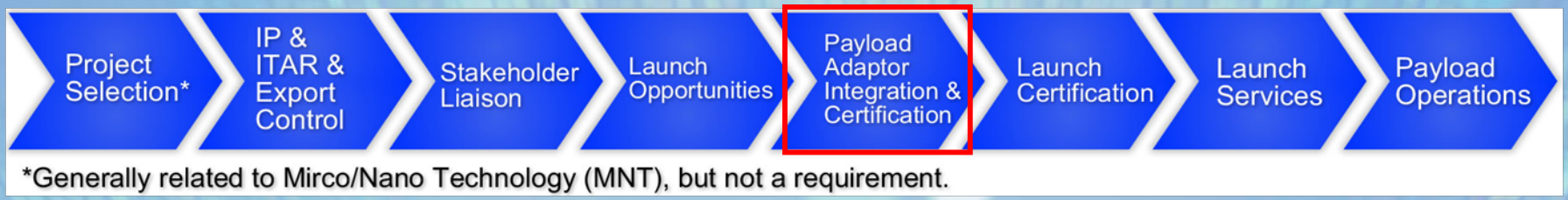
Service

CANEUS maintains a web site that can contain a searchable list of launch opportunities.

Fee Structure

Some can be free, or a service can be provided to provide a report of possible launch opportunities for a cost

8. Payload Adaptor Integration and Certification Services



Service

CANEUS can be trained to provide a global service on what is required for a Cubesat (or derivative) to be acceptable for one of the many secondary payload adaptors around the globe. An example is the NPS ESPA ring Cubesat adaptor that can carry up to 50 equivalent Cubesats. CANEUS can provide the service for integration and certification.

Fee Structure

TBD

CANEUS' Small Satellite Sector Consortium (SSSC)

- Provides support for 5 subgroups:
  - (a) developing **standards** so as to ensure international interoperability
  - (b) identifying **launch opportunities** and **services**
  - (c) providing **stakeholder liaison** and strategic development
  - (d) addressing **Intellectual Property** and **export control** (ITAR) issues in accordance with CANEUS International's broader mission, and
  - (e) organizing **launch certification** services.

CANEUS 2009 WORKSHOPS

Candidate Projects

Dosimeter Chip Space Qualification

BASIC INFORMATION

Project Title: Dosimeter Chip Flight Qual Acceleration

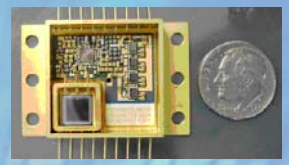
Project Classification: Air Force / Aerospace Sponsored

POC: Bill Crain

POC email: William.R.Crain@aero.org

POC Phone: (310) 336-8530

PROJECT DESCRIPTION



Problem Statement: spacecraft electronics degrade with radiation dose and environment models used in design are not accurate

Approach / Solution: custom microchip in small footprint package reduces cost and resources

Required Technologies/Facilities: Silicon detector & radiation test facilities

Affected Applications: all space electronics

Required Stake Holders/Experts: space radiation experts

BACKGROUND

Milestone TRL Risk Measure of Success: TRL 7

Deliverables: Flight Hardware, Total Dose Data, Report on Contribution to Models.

Outreach/Organizational Interfaces: Improved Models and findings will be shared with the space community as appropriate

Academic Contribution/Work Force Needs: TBD

Business Development and Govt Compliance Reqs: Validity of data collected

PROJECT EXECUTION

ROM Cost: $150K

Team Members and Roles: Aerospace, Teledyne, and Cubesat Bus

Potential Funding Sources: Aerospace and Air Force

Business Case: Lowest Cost Total Dose Sensor

Business Impact: More sensors flown, improved models, reduction in exaggerated flight hardware designs

Reentry Breakup Recorder (REBR)

BASIC INFORMATION

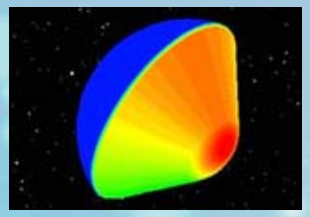
Project Title: Reentry Breakup Recorder (REBR)

Project Classification: Flight Demonstrator

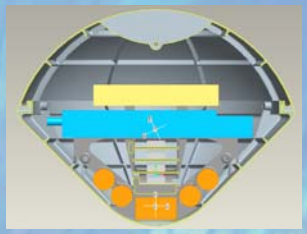
POC: Dr. Bill Ailor

POC email: William.H.Ailor@aero.org

POC Phone: (310) 336-1135



PROJECT DESCRIPTION



Problem Statement: Specifically what Happens during breakup

Approach / Solution: Sensor package used by NASA, other researchers to collect data on new thermal protection systems and sensors, upper atmosphere, rarified heating

Required Technologies/Facilities: new thermal protection system

Affected Applications: orbital debris and reentry impact

Required Stake Holders/Experts: debris and reentry experts

BACKGROUND

Milestone TRL Risk Measure of Success: TRL 7

Deliverables: Flight Hardware, Reentry Data, Report on Contribution to Models.

Outreach/Organizational Interfaces: Improved Models and findings will be shared with the space community as appropriate

Academic Contribution/Work Force Needs: TBD

Business Development and Govt Compliance Reqs: Validity of data collected

PROJECT EXECUTION

ROM Cost: $1M

Team Members and Roles: Aerospace, NASA, ESA

Potential Funding Sources: Aerospace, NASA, ESA, DOD

Business Case: New Data Source and Knowledge

Business Impact: Enabling technology for future missions

Distributed Miniature PnP Architecture*

BASIC INFORMATION

Project Title: Distributed Miniature PnP Architecture
Project Classification: Flight Demonstrator

POC: Dr. Fredrik Bruhn

POC email:

POC Phone:

PROJECT DESCRIPTION

Problem Statement: Easily integrated miniature distributed sensor interfaces

Approach / Solution: Using Angstrom Aerospace RTU and nRTU, and similar, devices to intergrete sensors into the common bus of a picosat class system

Required Technologies/Facilities: RTU, nRTU

Affected Applications:

Required Stake Holders/Experts:

BACKGROUND

Milestone TRL Risk Measure of Success: TRL 7 - 8

Deliverables:

Outreach/Organizational Interfaces:

Academic Contribution/Work Force Needs:

Business Development and Govt Compliance Reqs:

PROJECT EXECUTION

ROM Cost:

Team Members and Roles: Aerospace, NASA, ESA, Anstrom Aerospace

Potential Funding Sources: DARPA, ORS

Business Case:

Business Impact:

* Newly Proposed Candidate Project

Flight Demo of 4 Gram Computer on Cubesat*

BASIC INFORMATION

Project Title: Flight Demo of 4 Gram Computer on Cubesat

POC: Dr. Fredrik Bruhn

POC email:

POC Phone:

PROJECT DESCRIPTION

Problem Statement: Demonstration of Angstrom Aerospace RTUs as flight computers on cubesat class satellites

Approach / Solution: Using Angstrom Aerospace RTU and nRTU, and similar, devices to intergrete sensors into the common bus of a picosat class system

Required Technologies/Facilities: RTU, nRTU

Affected Applications:

Required Stake Holders/Experts:

BACKGROUND

Milestone TRL Risk Measure of Success: TRL 7 - 8

Deliverables:

Outreach/Organizational Interfaces:

Academic Contribution/Work Force Needs:

Business Development and Govt Compliance Reqs:

PROJECT EXECUTION

ROM Cost:

Team Members and Roles: Aerospace, NASA, ESA, Anstrom Aerospace

Potential Funding Sources: DARPA, ORS

Business Case:

Business Impact:

* Newly Proposed Candidate Project

Dosimeter Chip on a PocketQub*

BASIC INFORMATION

Project Title:

POC:

POC email:

POC Phone:

PROJECT DESCRIPTION

Problem Statement: Standfords new PocketQub as a platform to test the dosimeter chip from Aerospace

Approach / Solution:

Required Technologies/Facilities:

Affected Applications:

Required Stake Holders/Experts:

BACKGROUND

Milestone TRL Risk Measure of Success: TRL 7 - 8

Deliverables:

Outreach/Organizational Interfaces:

Academic Contribution/Work Force Needs:

Business Development and Govt Compliance Reqs:

PROJECT EXECUTION

ROM Cost:

Team Members and Roles:

Potential Funding Sources:

Business Case:

Business Impact:

* Newly Proposed Candidate Project

REBR-based Sample Return Vehicle*

BASIC INFORMATION

Project Title:

POC:

POC email:

POC Phone:

PROJECT DESCRIPTION

Problem Statement:

Approach / Solution:

Required Technologies/Facilities:

Affected Applications:

Required Stake Holders/Experts:

BACKGROUND

Milestone TRL Risk Measure of Success: TRL 7 - 8

Deliverables:

Outreach/Organizational Interfaces:

Academic Contribution/Work Force Needs:

Business Development and Govt Compliance Reqs:

PROJECT EXECUTION

ROM Cost:

Team Members and Roles:

Potential Funding Sources:

Business Case:

Business Impact:

* Newly Proposed Candidate Project

Pumpkin Standard Bus PnP Demo*

BASIC INFORMATION

Project Title:

POC:

POC email:

POC Phone:

PROJECT DESCRIPTION

Problem Statement:

Approach / Solution:

Required Technologies/Facilities:

Affected Applications:

Required Stake Holders/Experts:

BACKGROUND

Milestone TRL Risk Measure of Success: TRL 7 - 8

Deliverables:

Outreach/Organizational Interfaces:

Academic Contribution/Work Force Needs:

Business Development and Govt Compliance Reqs:

PROJECT EXECUTION

ROM Cost:

Team Members and Roles:

Potential Funding Sources:

Business Case:

Business Impact:

* Newly Proposed Candidate Project

Global Technical Service Agreement (GTAA)

BASIC INFORMATION

Project Title:

POC:

POC email:

POC Phone:

PROJECT DESCRIPTION

Problem Statement:

Approach / Solution:

Required Technologies/Facilities:

Affected Applications:

Required Stake Holders/Experts:

BACKGROUND

Milestone TRL Risk Measure of Success: TRL 7 - 8

Deliverables:

Outreach/Organizational Interfaces:

Academic Contribution/Work Force Needs:

Business Development and Govt Compliance Reqs:

PROJECT EXECUTION

ROM Cost:

Team Members and Roles:

Potential Funding Sources:

Business Case:

Business Impact:

* Newly Proposed Candidate Project

Projects

- Advocate to primary payloads for SP's
  - Approach funding agency for policy
  - Approach primary agency
- Launch/Bus Access to Space Service Database
  - Pointer to launch/bus service provider mission planner guide doc
  - Pointer to contact point for Q/A
  - Tabular listing of missions, dates, available mission margin carrier capabilities, orbits, point of contact, etc.
- Ground Service Database
  - Tabular listing of service providers, contacts, 1-pager capabilities
  - Point to the Cube-sat list from CalPoly and University of Aalborg Denmark
- Certification Service Database
  - Tabular listing of vendors, contacts, 1-pager service capabilities
  - Point to the gov't agency that accepts their certification

CANEUS SSSC Project Ideas

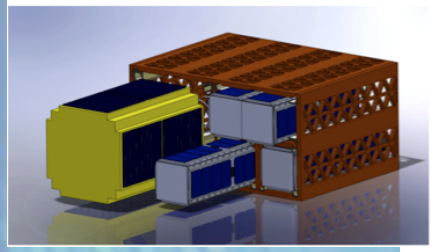
JW Hines 6 March 2009

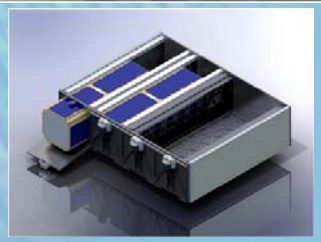
- Modular, Multi-Platform Nanosatellite Dispenser
- NextCube; “Cube-and-Play” Advanced Nanosatellite Architecture and Specialty Subsystems*
- Advanced Nanosatellite Attitude Determination and Control Systems and Technologies
- Quad-Cube Nanosatellite Bus Platform
- Recoverable Nanosatellite Payload System
- Wireless LV Interface System
- Smart, Reconfigureable Biotechnology Payload System

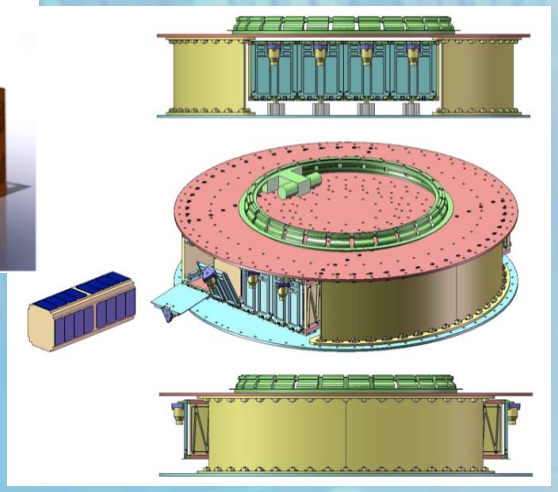
* Spacecraft Functional Subsystems *and* Payloads/Instrumentsa

Modular Nanosatellite Adapter/Dispensers

NASA-Ames Integrated Nanosatellite Dispenser







Capabilities:

- **Ability to accommodate multiple sizes and configurations of nanosatellites (1-50 kg)**
- **Capable of integration with many launch vehicles**
- **Modular, reconfigureable architecture**
- **Economy of scale**
- **Cost Efficiency**
- **Rapid Insertion Capability**

Impact:

- Addresses Access to Space Issues
- Reduces Risk to LV provider and Primary S/C

Approach:

- Build on PPOD, Cubesat Standards
- Develop and Demonstrate w Small LVs
- Define Standard, get consensus
- Show Multiple LV capability
- Gert Flight Validation early

Schedule and Major Milestones:

- 1 Year for 1st demonstration

Costs:

- Recurring costs between <$300K–$500K
- Development Costs ~$1-2M

Contact:

John W. Hines, NASA Ames
john.w.hines@nasa.gov, 650-604-5538

Collaborators:

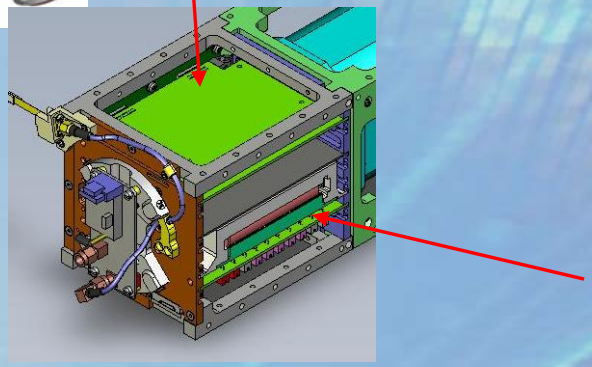
Small Spacecraft Active ADCS Systems

Objective

Develop a testbed for MEMS-based ADCS technologies to encourage collaboration on device-level development and identification of standards needs for a variety of fields.

Description

This project will leverage MEMS-based ADCS sensors and actuators which are either under development or commercially available for the purpose demonstrating capability and identifying limitations in bus technology



Relevance to CANEUS:

This project will incorporate the interests of multiple Consortia by addressing issues in reliability, standards development, and materials.

Approach:

Participating members will work together to identify sensor and actuators of an appropriate TRL and incorporate these elements into a functional subsystem. Project deliverables include data products from MEMS-device testing and recommendations for standards in small spacecraft

Project Milestones

- Sensor and actuator trade study: 2 months
- Sensor and actuator bench-top testing: 4 months
- Subsystem integration and testing: 6 months

Costs

- Recurring costs: TBD
- Development costs: TBD

Collaborators:

- NASA Ames, Aerospace Corp., UC, Davis,