Canadian Satellite Design Challenge

Kick-Off Meeting
&
Requirements Review

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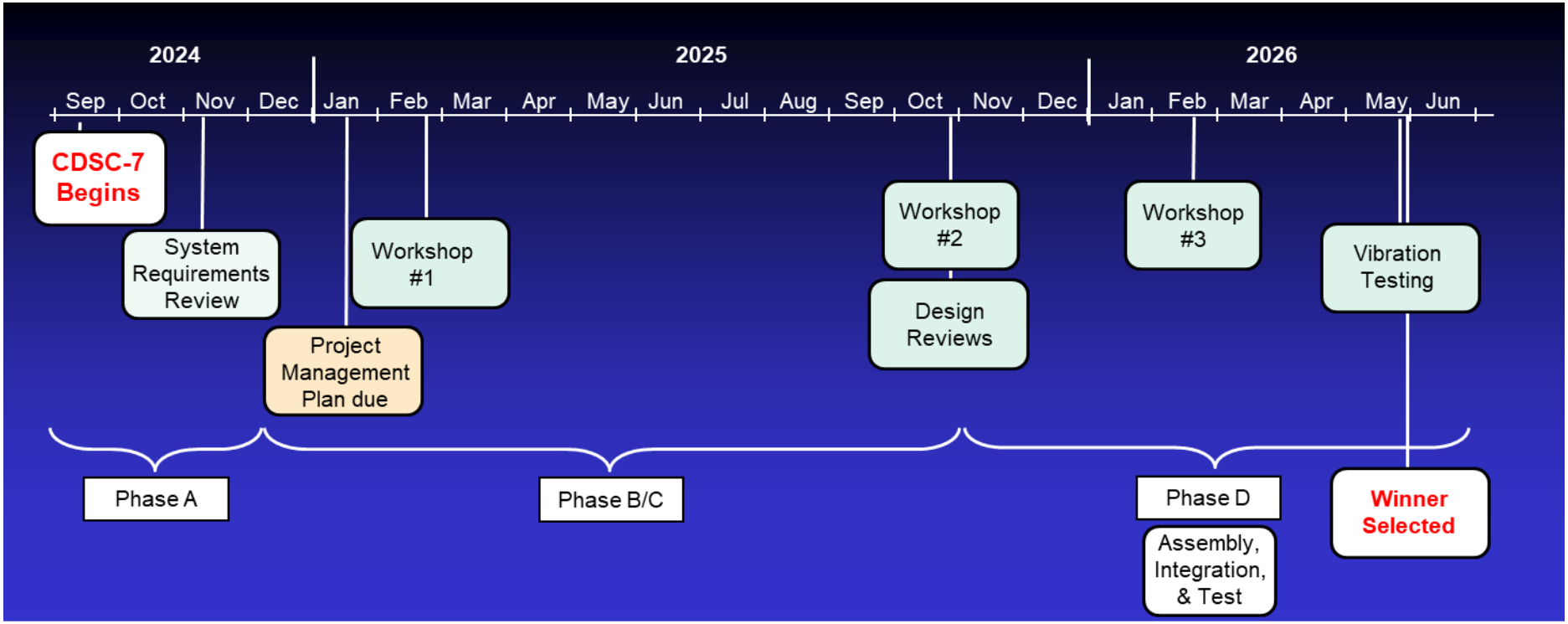
With generous support from:

CSDC System Requirements Review - Agenda

- CSDC-7 Schedule
- Requirements Overview
- Options for the workshops
- Design Review
- Evaluation process
- Documentation (CDRLs)
- Lessons learned from previous CSDCs
- Other resources

CSDC-7 Schedule



Requirements

Requirements (1/5)

There are two main Requirements documents:

- General Rules & Requirements
  - A combination of a Mission Requirements Document (MRD) and a System Requirements Document (SRD)

- Design, Interface, and Environmental Test Requirements (DIETR)
  - A combination of the General Design and Interface Requirements (GDIR), and the Environmental Design and Interface Specification (EDTS)

Requirements (2/5)

Mission:

- The mission must have a de-orbiting capability
- Otherwise, it's up to you (SelfieSat is optional)

Orbit:

- Between 300km & 600km; between 51° & sun-synchronous (not dawn-dusk)
- Orbit knowledge: whatever you need
- Orbit control: optional (and probably best to avoid)

Requirements (3/5)

Spacecraft:

- Must comply to DIETR
- Design for End-Of-Life (EOL)

Power Subsystem

- Note launch-related safety requirements

Communications Subsystem

- Note launch-related safety requirements
- Amateur band: 430 to 450 MHz UHF recommended

Requirements (4/5)

Telemetry, Command, & Control (TC&C)

- Encrypt your uplink! (with safety measures)
- Gather telemetry (it helps to diagnose anomalies)

Attitude Determination & Control Subsystem (ADCS)

- Whatever you need for your mission
- BUT: have some redundancy

Ground Segment

- That's your responsibility

Requirements (5/5)

Programmatic requirements

- Exportable technology
- Documentation requirements
- Intellectual property
- Data sharing after one year

Educational Outreach Requirements

- At least five specific presentations required each year
- Educational Outreach Award

Workshops
Design Review
Evaluation
Other

Workshop Plans & Options

- Workshop dates:
  - Feb. 2025 (Reading Break)
  - Sept/Oct 2025 (with Design Reviews)
  - Feb. 2026?

- Potential Workshops:
  - Structural/Thermal modelling & analysis
  - Radiation testing at TRIUMF
  - Company visit(s) & presentations
  - TVac testing

- Final Testing: May/June 2026

Design Review

- To be held September/October 2026
- 2.5-hour review of your mission and spacecraft design
- Judged by an intimidating panel of experts
- Presentation template will be provided

The Design Review is held in conjunction with a workshop or professional visits.

Design Review Evaluation

Mission Overview	5
Spacecraft Overview	
Payload	10
Structure	10
Power	10
ADCS	10
Comms	10
C&DH	10
Orbit Determination	5
AI&T	5
Programme Management	10
Operations	10
Educational Outreach	5
Total	100

Final Selection Criteria

- Mandatory Criteria:
  - All required deliverable documents
  - Meet minimum Educational Outreach requirement

- Graded Criteria:
  - Design Review Presentation
  - Final Testing

- Additional Evaluation:
  - Educational Outreach Award

Documentation provided by CSDCMS

- Rules and Requirements document
- DIETR
- Test POD drawings and User Manual
- Random Vibration Test Plan

- Templates (DIDs) for all documents required from teams

Required Documentation from Teams (CDRLs)

- Programme Management Plan (PMP)
- Design Review presentation
- Any required test documentation
- Verification & Test Plans
- RFD / RFW

Programme Management Plan

- Describes how your team will be structured and managed throughout the competition.
  - Team members, team structure
  - Advisors and/or “stakeholders”
  - Resources for the team:
    - Office/lab space
    - Computers & software
  - Operations facility and plan
  - Communications
  - Risk Management
    - Technical, management, personnel, financial, political

Others…

- Declared Material List (DML) or Bill of Materials (BoM)
  - a detailed record of all the materials used to produce the CubeSat.
  - Verifies that the CubeSat meets off-gassing/out-gassing requirements, or other material requirements.
- Verification Plan
  - A detailed description of how you will prove you have met every requirement.
- Request for Deviation (RFD)
- Request for Waiver (RFW)

Resources

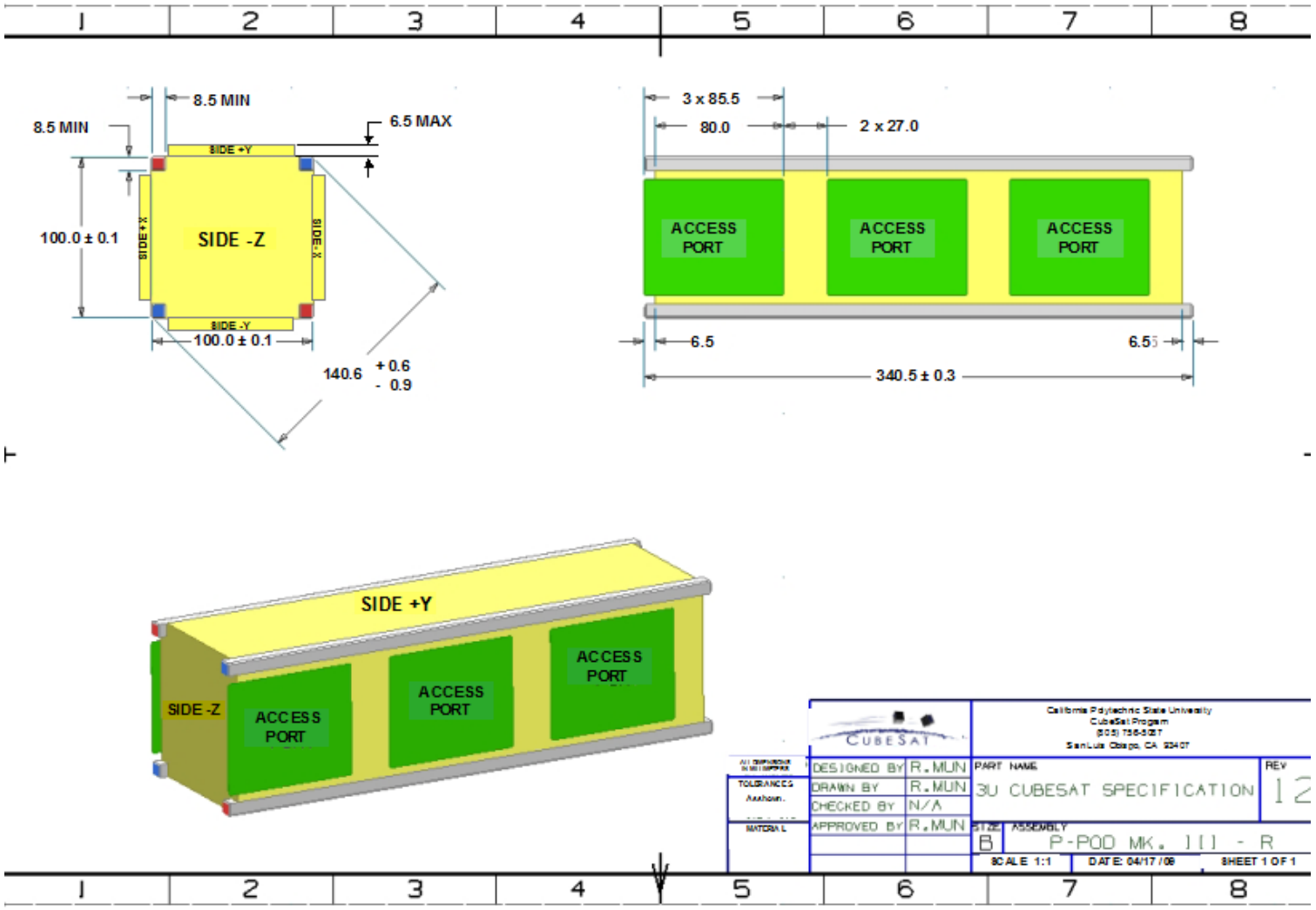
- STK
- Other software?
  - CAD software (Solidworks)
  - Structural/thermal analysis software (Maya/Siemens)
- Industry Advisors

Some words of advice…

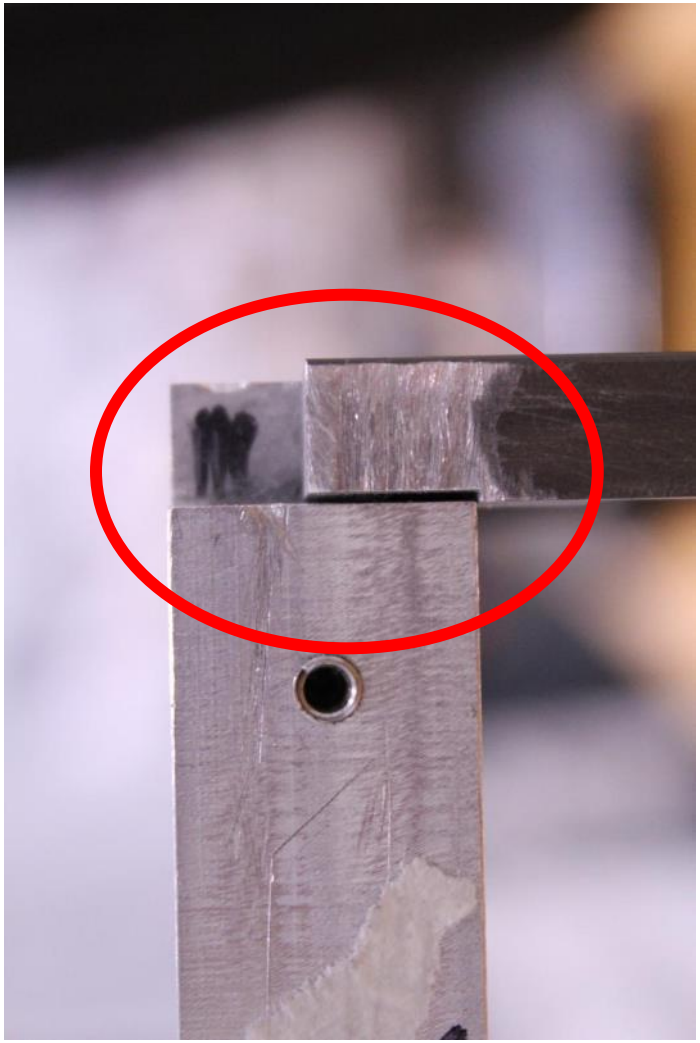
Lessons Learned

1. Dimensions & Tolerances matter!!!
2. Design & Workmanship matter!!
3. Read the Requirements documents!!!
4. Use mentors & resources.

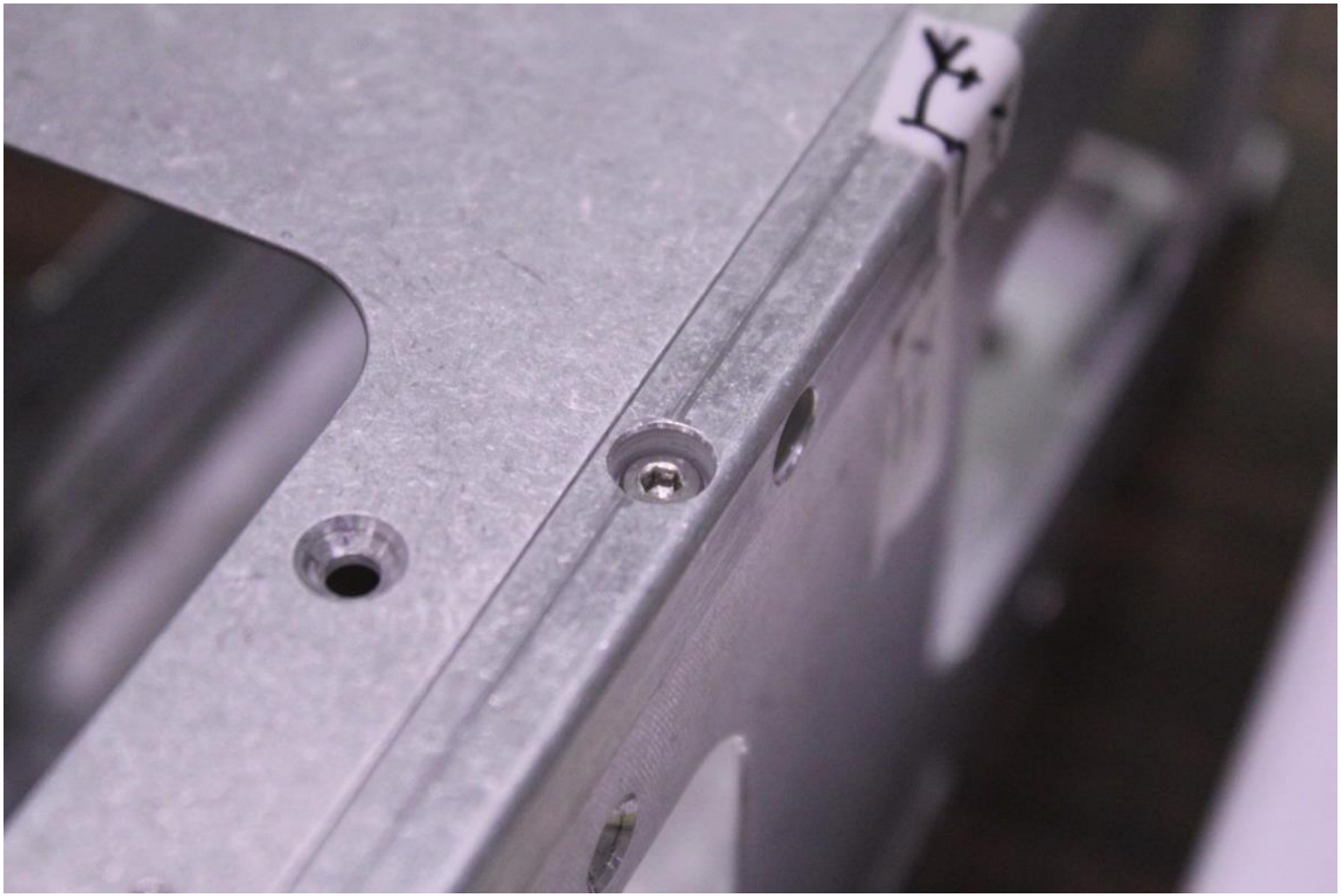
Dimensions & Tolerances



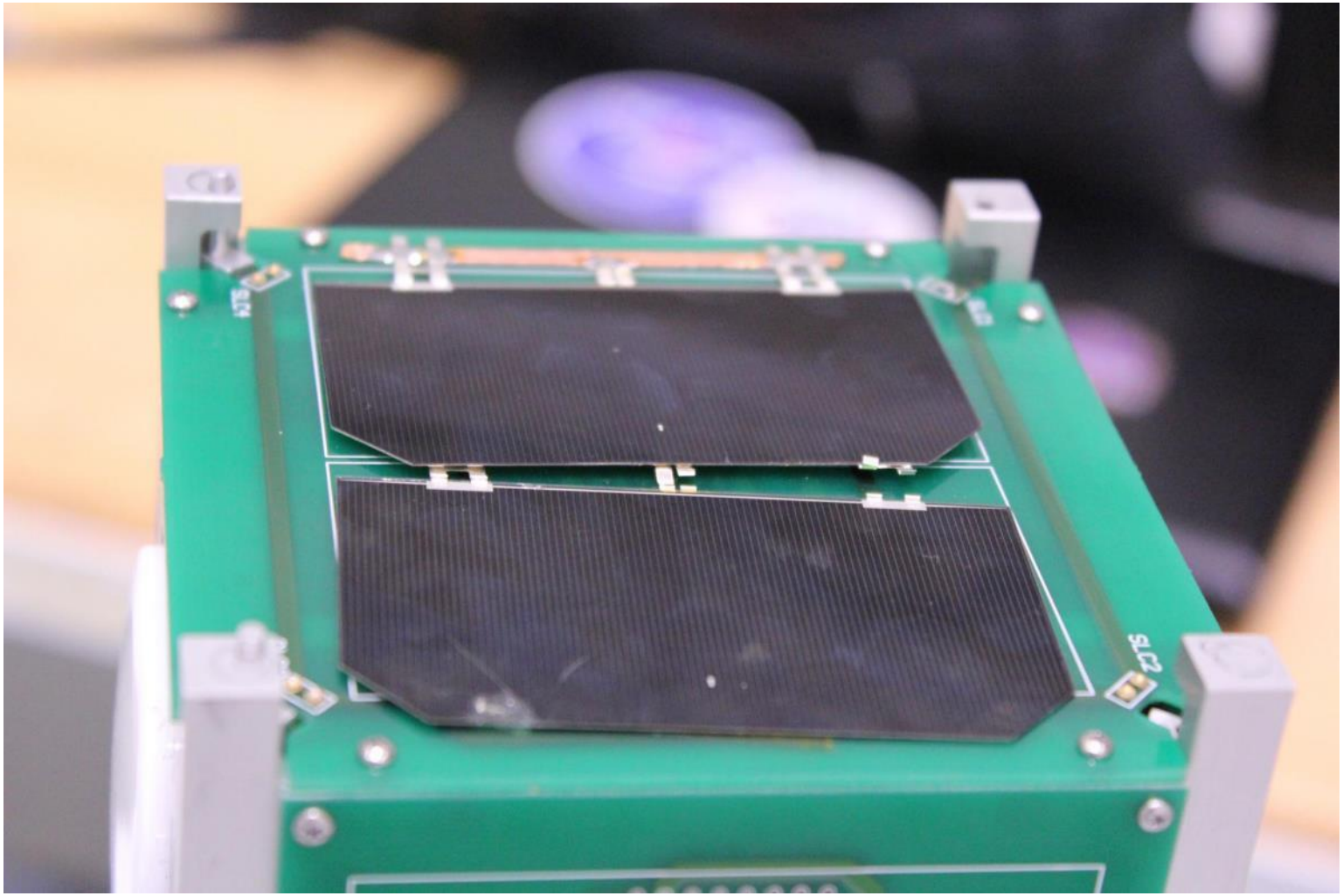
Tolerances & Design Considerations



Design Considerations (1/2)



Random Vibration Outcomes



Random Vibration Outcomes