



Adapting Mission Assurance for Small Satellites

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Adapting Mission Assurance: Key Takeaways



- 1 Adaptive mission assurance is harder than full mission assurance, not easier

 - *“Not for beginners” - requires good judgement and good mentoring – no safety net*
 - *Need workforce training that is open to all*
- 2 There is a systemic mismatch of expectations

 - *Customers say they want Class D when they really want Class A at Class D cost and schedule*
 - *Asking for alternative grade parts but requiring upscreening – which can induce failure*
- 3 Information firewalls do not contribute to mission success

 - *Data sharing is necessary but needs to be coupled with protection of reputation*
 - *Philosophy is fine, but tools and techniques should be more widely circulated*
- 4 Culture change is happening... slowly

 - *Tendency to miscommunicate risk and confuse decisions and outcomes*
 - *Need a forward-looking (not retrospective) “just culture” – no one wants to make a mission fail*
 - *Seeds of enterprise thinking are starting to grow*

Mission Assurance Baseline Matrix



Mission Assurance Baseline v2.10

Filter by Phase ▾

show sub-folders hide sub-folders

4. Space Segment	5. Ground Segment
4.1. Reserved for Future	5.1. Ground Segment Program Planning & Management
4.2. Space Segment Systems Engineering	5.2. Ground Segment System Engineering, Integration & Test (SEIT)
4.3. Reserved for Future	5.4. Ground Segment Software
4.4. Spacecraft Bus Element	5.5. Ground Segment Hardware
4.5. Payload Element	5.6. Ground Segment Facilities
4.6. Space Vehicle Ground Support Equipment	
4.7. Space Operations	
4.8. Launch System Integration	
4.9. Space Vehicle Storage	

- 4.4.2. Bus Element Systems Engineering
 - 4.4.4. Structures & Mechanisms Subsystem (SMS)
 - 4.4.5. Electrical Power & Distribution Subsystem (EPDS)
 - 4.4.6. Thermal Control Subsystem (TCS)
 - 4.4.7. Attitude Control Subsystem (ACS)
 - 4.4.8. Propulsion Subsystem (PS)
 - 4.4.9. Telemetry Tracking & Command Subsystem (TT&C)
 - 4.4.10. Command & Data Handling Subsystem (CS&DH)
 - 4.4.11. Fault Management Subsystem (FMS)
 - 4.4.12. Software Subsystem (SS)

Home Framework Level 1 Tasks Resources ▾ Customize

Mission Assurance Baseline v2.10 ▾

MAB > Space Segment > Spacecraft Bus Element > Bus Element Systems Engineering

4.4.2 - Bus Element Systems Engineering

Tasks

Tasks	Sub-Tasks	Description	References
4.4.2-1 Assess Bus System Program Assurance Elements	Level 2 Tasks	Ensure a set of mission assurance activities exists that is systematically executed through technical assessment of the programmatic practices (cost, schedule, performance, and risk) to ensure the program delivers the required capability within current budget, schedule and political constraints for overall assured mission success.	Mission Assurance Guide, TOR-2007(8546)-6018, Rev B, Program Assurance chapter
4.4.2-2 Assess Bus System Risk Identification and Management	Level 2 Tasks	Ensure that structured process exists to identify and evaluate program or mission risk, including the identification and evaluation of specific risk reduction and risk control measures.	Mission Assurance Guide, TOR-2007(8546)-6018, Rev B, Risk Management Chapter

- What can we use it for?
 - Tailoring Mission Assurance
 - Crowdsourcing Mission Assurance
 - Tracking anomalies?
 - Gathering lessons learned?

Adapting Mission Assurance Workshop

Next Workshop
November 13-14, 2024
NASA Ames Research Center
<https://cvent.me/0Q973B>

In the meantime,
<https://www.nasa.gov/smallsat-institute/>



Small Spacecraft Virtual Institute