Submit 5-8 objective selection criteria for your system-level concepts, along with the rationale for each criterion. Submissions should be in pdf format.

Eva Czukkermann

Selection Criteria:

1. Can withstand vibration from satellite during time above the ground - vibration can cause system to fall apart physically or malfunction electronically
    a. Withstand random vibration testing IAW MIL-STD-1540
2. System temperature range is within temperature range allowable for system components - will keep components from freezing or melting
3. Pressure within module is controlled - allow components within to properly operate
4. Can withstand shock loads IAW MIL-STD-1540 - components can withstand loads it might experience through time above the ground
5. Effective temperature regulating system - keep overall system from overheating or freezing due to environment or power produced by components inside module

Tanner Smith

Selection Criteria:

1.) Must be able to communicate with GNSS Antenna SMA input. 1PPS / 10MHz SMA output and input.
2.) Provides a traceable time-of-day for systems directly connected, and networked systems. This is / can be achieved using precision time protocol (PTP) or (NTP).
3.) Requires logical interfaces that are compatible with the Portable Operating System interface for UNIX (interface to share physical hardware clock (PHC)).
4.) Provide a resilient timing engine, 1pps/10MHz reference. Along with a multi-frequency GNSS receiver.
5.) Should allow for external / internal battery backup to ensure uninterrupted operation, maintain synchronization and prevent clock drift during outages, surges, or fluctuations.

https://github.com/opencomputeproject/Time-Appliance-Project/tree/master/Time-Card#Precision

https://development.standards.ieee.org/myproject-web/public/view.html#pardetail/10369

https://safran-navigation-timing.com/product/art-card?model_interest__c=ART+Card&product_interest___single_select=Resilient+Timing

Nsadhu Muyinda

Selection Criteria:
Specifications supplied by the Air Force SPACE SYSTEMS COMMAND MANUAL 91-710, VOLUME 3

[1]
J. Orpen, *SPACE SYSTEMS COMMAND MANUAL* . Department of Air Force: SPACE SYSTEMS COMMAND. Accessed: Sept. 17, 2024. [Online]. Available: https://www.e-publishing.af.mil/

1. 16.3.1.2. Under maximum system loads, CPU throughput shall not exceed 80% of its design value. Note: Although CPU throughput of 80% is acceptable, experience has shown that a value of 70% is desirable.

2. 16.3.1.3. Computer system architecture shall be single failure fault tolerant.

3. 16.3.1.3.2. No single software fault/output shall cause a critical accident.

4. 16.3.1.3.3. No single or double software fault/output shall cause a catastrophic accident.

5. 16.3.2.1. Computer systems shall be powered up and/or restarted in a safe state.

6. 16.3.2.2. A computer system shall not enter a hazardous state as a result of an intermittent power transient or fluctuation.

7. 16.3.2.3. In the event of the single failure of primary power to a computer system or computer system component, that system or some cooperating system shall take action automatically to transition to a stable state. Note: In the context of response to failure or retreat from some unsafe state, a stable state is the safest possible state that can be achieved without causing a more hazardous state to occur during that transition.

Luke Schrom
Selection Criteria
Specifications supplied by the Air Force SPACE SYSTEMS COMMAND MANUAL
91-710, VOLUME 3

[1]
J. Orpen, *SPACE SYSTEMS COMMAND MANUAL* . Department of Air Force: SPACE SYSTEMS COMMAND. Accessed: Dec. 27, 2022. [Online]. Available: https://www.e-publishing.af.mil/

1. 14.1.6.2.1. Power and signal leads shall not be terminated on adjacent pins of a connector.
    a. Close connections of high voltage and signals could lead to possible coupling
2. 14.1.6.2.2. Wiring shall be isolated so that a single short circuit occurring in a connector cannot affect other components.
    a. If a short were to occur, having it cause faults to other components can cause the entire system to fail. Leading to a waste of space on a spacecraft.
3. 14.1.6.2.3. Pin locations shall be assigned to prevent inadvertent pin-to-pin and pin-to-case shorts.
    a. Another way to prevent a short from occurring. Easiest way to do this is with keyed connectors. Swapping power and ground is never a good thing.
4. 14.1.6.2.4. Spare pins shall not be used in connectors controlling hazardous operations or safety critical functions.
    a. Spare pins on a connector could cause crosstalk from possible emf interference produced from a part on the board. This can cause noise in the signal or errors in digital signals
5. 14.1.2. All wiring shall be copper and contact with dissimilar metals shall be avoided. Aluminum wire shall not be used.
    a. Dissimilar metals can cause electron migration. This can lead to the metal degrading.

Drew Schacke
Selection Criteria
Specifications supplied by the Air Force SPACE SYSTEMS COMMAND MANUAL
91-710, VOLUME 3

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1. 16.4.1.1.10. Test coverage for all execution paths; with all statements executed at least once and every branch tested at least once.
2. 16.4.3.2. The system shall be designed such that the operator may exit current processing to a known stable state with a single action.
3. 16.4.3.3. Computer systems shall minimize the potential for inadvertent actuation of hazardous operations.
4. 16.4.3.6. Software shall provide confirmation of valid command and/or data entry to the operator.
5. 16.4.3.8. Software shall provide the operator with real-time status reports of operations.
6. 16.4.5.2. Software and firmware shall be put under formal configuration control as soon as a software baseline is established.