

PRODUCT ASSURANCE

GUVI INSTRUMENT
PRELIMINARY DESIGN REVIEW

TIMED PROGRAM

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PRODUCT ASSURANCE

* Scope

The JHU/APL and Aerospace Corporation product assurance activities are defined in the approved GUVI Product Assurance Implementation Plan (PAIP), (7366-9190a), dated November 14, 1996.

* Overview

This presentation will show a summary and status of the assurance activities that will be performed by JHU/ APL and Aerospace.

SUPPLIER CONTROLS

* The applicable requirements of the PAIP shall be imposed upon the JHU/APL and Aerospace GUVI hardware suppliers to assure compliance with the requirements of the GUVI product assurance (PA) program.

* Exceptions to the approved PAIP shall be documented as waivers and shall be negotiated between the supplier, JHU/APL and Aerospace as appropriate.

* Suppliers of deliverable and/or flight hardware shall be reviewed as part of the quality conformance program.

* Supplier Product Assurance activities shall be monitored and source inspection provided as required by the cognizant Performance Assurance Engineer (PAE).

* EEE flight parts purchased for GUVI shall be stored in controlled access areas.

* EEE part identification and controls shall be maintained on the flight

EEE PARTS SELECTION CRITERIA

* APPROVED, Grade 1: Grade 1 parts as defined in the current MIL STD-975. GSFC PPL and/or

* APPROVED, Grade 2: Grade 2 parts as defined in the current MIL STD-975. GSFC PPL and/or

* APPROVED, Grade 3: Grade 3 are parts defined as parts which meet the Space Department criteria for use in high reliability, space flight applications for multi year missions. These include parts that fall into the following categories and are screened to NASA/GSFC 311-INST-001 Grade 3 requirements:

Microcircuits:

- Microcircuits which are fully compliant to MIL-STD-883, par. 1.2.1, and are supplied with a Certificate of Compliance to same. Defense Electronic Supply (DSCC) Standard Military Drawings (SMDs) are in this category.

- Microcircuits procured to Purchase Instruction (PI) documents that contain screening which meets MIL-M-38501, Class B screening levels as a minimum, and supplied with data and a Certificate of Compliance to same.

- Microcircuits procured to a manufacturer's in-house high reliability "flex" which meets MIL-M-38510, Class B screening levels as a

EEE PARTS SELECTION CRITERIA (CONTD)

Semiconductors:

- All QPL, JANS, JANTXV, JANTX, MIL-S-19500 semiconductors not listed in MIL STD-975 or the GSFC PPL.
- Semiconductors procured to Purchase Instruction (PI) documents that screening which meets MIL-S-19500, JANTX screening levels as with a Certificate of Compliance to same. contain a minimum, and supplied
- Semiconductors procured to a manufacturer's in-house high reliability "flow" which meets MIL-S-19500, JANTX screening levels as a minimum, and is supplied with data and a Certificate of Compliance to same.

Passive Parts:

- All QPL, Established Reliability parts not listed in MIL-STD-975 or the GSFC PPL, which have as a minimum, an "ER" failure rate level of "P", as defined by the applicable Military Specification.

Electro-Mechanical and Electro-Optical Parts:

- All QPL, Established Reliability parts not listed in MIL-STD-975 or the GSFC PPL, which have as a minimum, an "ER" failure rate level of "P", as defined by the applicable Military Specification.

Miscellaneous Parts:

- All parts procured to Purchase Instruction (PI) documents that contain screening to the maximum possible subset of NASA Grade 3 requirements with data and a Certificate

PARTS SELECTION PROCESS

- * **Grade 1 or 2 parts will be used when:**
 - Available with no impact on program schedule.

- * **Grade 3 parts will be used when:**
 - Grade 1 and 2 parts are not available.
 - Cost and/or schedule impact of Grade 1 and 2 parts are prohibitive.

- * **Grade 4 parts (NONSTANDARD) will be used when:**
 - Grade 1, 2, and 3 parts are not available.
 - Required circuit function can be achieved using NONSTANDARD parts.
 - No known deficiency exists which would adversely impact mission requirements.
 - Screening criteria is acceptable to JHU/APL Component Engineering.

- * **Printed Wiring Boards:**
 - All printed wiring boards shall be certified to MIL-P-55110.

MATERIAL CONTROL

* Metallic materials shall be selected from Table 1 of MSFC- SPEC-522, Design Criteria for Controlling Stress Corrosion Cracking. Use of other materials shall require justification and approval.

* Nonmetallic materials shall meet the following outgassing requirements in accordance with NASA Publication 1124;

- 1.0% maximum Total Mass Loss (TML).
- 0.1% maximum Collected Volatile Condensable Material (CVCM).

* Lot traceability through purchase orders and certificates of compliance shall be maintained from procurement through all phases of assembly.

CONFIGURATION MANAGEMENT AND CONTROL

* Flight hardware shall be fabricated and assembled to Drawing Level 2a (Prototype) requirements as defined in TSD-STD-400.1. These drawings are changed by red-lined engineering change control.

* By instrument delivery to the spacecraft, all red-lined changes shall be transferred to the drawings or captured on drawing change notices (DCNs), for release as a Level 2 drawing package as defined in TSD-STD-400.1.

* Red-line drawing changes shall be reviewed and approved by:
- Cognizant Design Engineer
- Design Drafting

* System requirements, ICDs, Acceptance Test Plans, and other documents which affect spacecraft performance shall be released and maintained under Level 2 configuration control.

* Configuration changes to Level 2 documents shall be by DCN with approval by those signatures as defined by GUVI program office memo.

QUALITY ASSURANCE

* Traceability

- Purchasing and receiving records maintained for all EEE parts.
- Certificate of Compliance and test data reviewed for lot control.
- Fabrication travelers with inspection stamps for all as-built

hardware will be maintained.

- Parts and materials identified for each detail part and assembly.
- The as-built configuration for the flight hardware shall be

maintained and verified by QA during fabrication.

* Controlled Stockroom

- Computer records of EEE parts kits as issued will be

maintained.

- Limited access areas for EEE parts and assemblies in storage.
- ESD protection provided for all electronic assemblies and parts.

* Manufacturing Control

- Shop travellers used to document history of work operations, inspections, and assembly processes.

- Quality assurance will verify configuration, compliance, traceability, and workmanship of flight hardware.

- Standard fabrication processes documented and controlled.

* Training and Certification

QUALITY ASSURANCE (cont.)

* QA Inspections

- Receiving inspections
- In-process inspections
- Pre-lid inspections
- Final inspections

* Testing

- Acceptance testing will be performed to the approved Acceptance Test Procedure under configuration control.
- Engineering level testing will be recorded in engineering log books.
- Formal failure reporting will begin at acceptance level testing using the Problem/Failure Reporting (P/FR) system which requires closure and sign-off.

* Nonconformance Control

- All nonconformances shall be documented.
- The disposition of nonconforming parts and materials shall be in accordance with the GUVI Program Material

system

Review

SAFETY

*** Safety Assurance**

- The GUVI System Engineer is responsible for generating the safety plans and implementing the necessary safety GUVI program. appropriate procedures in the

*** Precautions shall be taken for protection of personnel safety**

- Review of potentially hazardous or dangerous materials and processes.
- Develop required safety plans.

*** Provisions shall be taken for protection of deliverable hardware**

- Review of potential electrical and mechanical interface hazards.
- Protection against uncontrolled environments.
- Protection against electrostatic overstress (ESD).
- Provide for appropriate handling procedures and fixtures, including proof testing of fixtures.