PRODUCT ASSURANCE

CRITICAL DESIGN REVIEW

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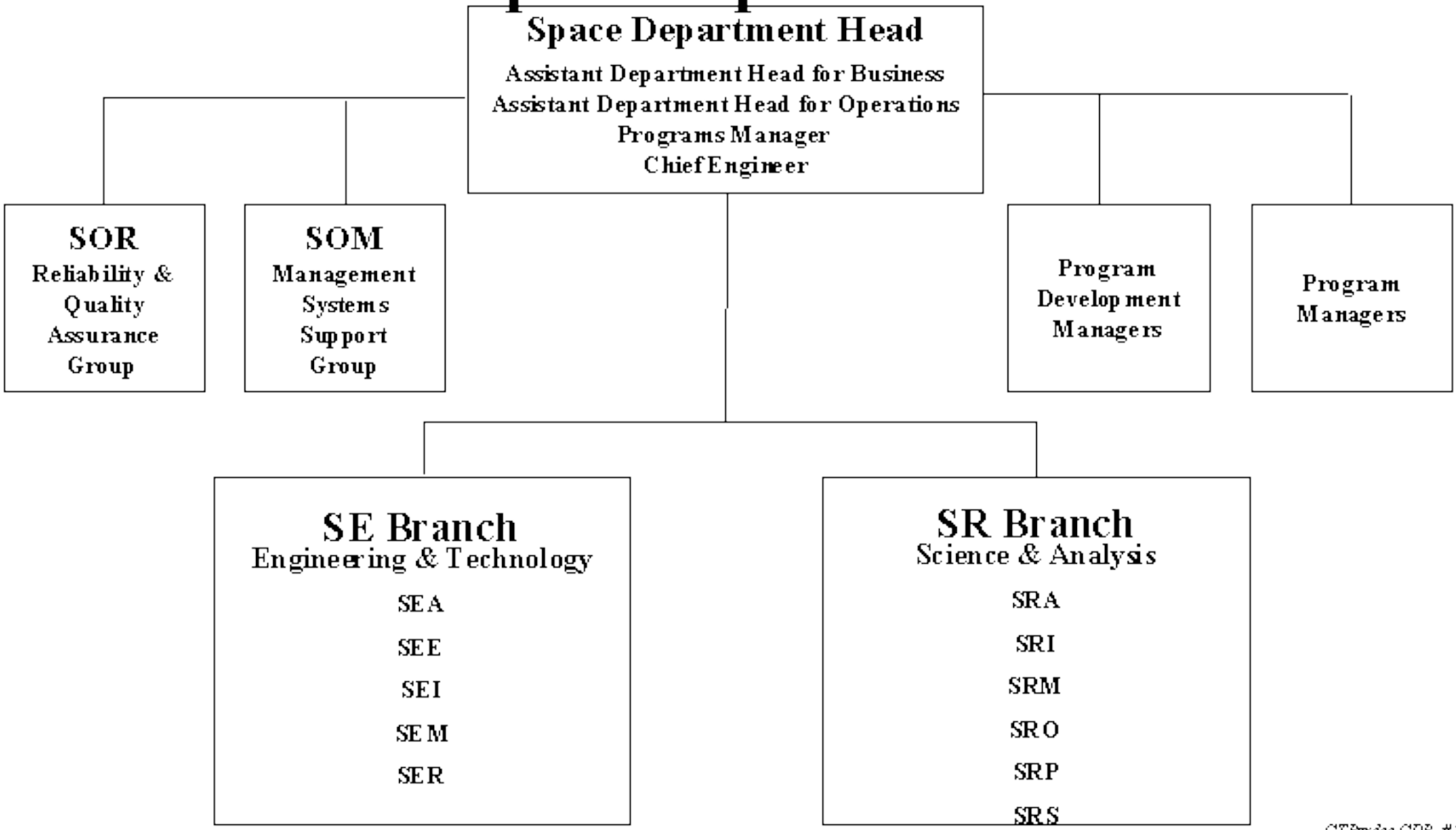
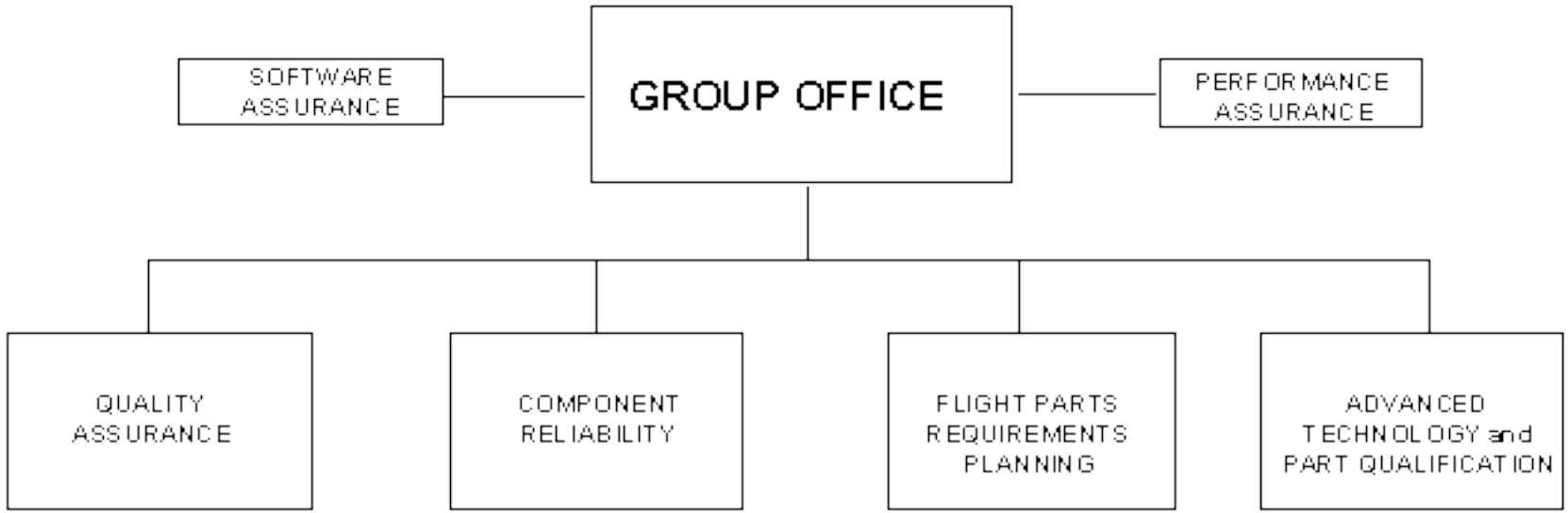
Space Department



SOR

SPACE RELIABILITY and QUALITY ASSURANCE



PRODUCT ASSURANCE

- **Scope -** The GUVI Product Assurance (PA) activities are defined in the approved GUVI Product Assurance Implementation Plan (PAIP), 7366-9190a, dated 11/14/96.
- **Overview -** This presentation shows a summary of the assurance activities that are being performed by JHU/APL and Aerospace Corp. for the GUVI experiment hardware.

SUPPLIER CONTROLS

- The applicable requirements of the PAIP are imposed upon subcontractors to assure compliance with the requirements of the GUVI program. Subcontractor PA requirements are specified in "Procurement Product Assurance Requirements (ProcPAR) for Subcontractors", 7363-9029.
- Exceptions to the ProcPAR are negotiated and documented as part of the subcontract effort.
- Suppliers of flight hardware are reviewed as part of the quality conformance program.
- Supplier PA activities are monitored and source inspection provided as required by the subcontract.

EEE PARTS SELECTION CRITERIA

- Grade 1, APPROVED: Grade 1 parts as defined in the current GSFC PPL and/or MIL-STD-975.
- Grade 2, APPROVED: Grade 2 parts as defined in the current GSFC PPL and/or MIL-STD-975.
- Grade 3, APPROVED: Parts which meet the JHU/APL Space Dept. criteria for use in high reliability, space flight applications for multi-year missions. These include parts that are screened to NASA/GSFC 311-INST-001 Grade 3 requirements.
- Grade 4, NONSTANDARD: Parts not included in Grade 1, 2 or 3 categories above.

PARTS SELECTION PROCESS

- Grade 1 or 2 parts shall be used when available with no impact on program cost or schedule.
- Grade 3 parts shall be used when Grade 1 or 2 parts are not available or the cost/schedule impact of Grade 1 or 2 parts is prohibitive.
- Grade 4 parts shall only be used when Grade 1,2 or 3 parts are not available and no known deficiency exists which would impact mission success. Screening criteria for Grade 4 parts shall be equivalent to Grade 3 parts whenever possible.
- Parts shall be derated using the GSFC PPL as a guide.

MATERIAL CONTROL

- Metallic materials shall be selected from Table 1 of MSFC-SPEC-522, "Design Criteria for Controlling Stress Corrosion Cracking".
- Nonmetallic materials shall be selected using the outgassing requirements of NASA RP-1124 as a guide, i.e.,

  1% maximum Total Mass Loss (TML).

  0.1% maximum Collected Volatile Condensable Material (CVCM).
- Lot traceability through purchase orders and C of Cs shall be maintained from procurement through assembly.
- GUVI contamination control requirements are defined in the GUVI Contamination Control Plan, 7366-9015.

CONFIGURATION MANAGEMENT

- GUVI flight hardware shall be fabricated and assembled to Drawing Level 2a (Red-line) drawings. Red-line drawing changes shall be approved by the cognizant engineer and implemented by design drafting.
- At the time of instrument delivery to the spacecraft, all red-lined changes shall be incorporated into the drawings or captured on drawing change notices (DCNs) for release as a Level 2 drawing package.
- Acceptance Test Plans, ICDs, and other documents which may affect spacecraft requirements shall be released and maintained under Level 2 formal configuration control.

CONFIGURATION MANAGEMENT

- Ground Support Equipment (GSE) shall be fabricated to Level 1 drawings under engineering control.
- The as-built configuration for the flight hardware shall be maintained throughout the fabrication operations.
- Part identification and fabrication controls shall be maintained on the flight hardware.
- The disposition of nonconforming parts and materials shall be in accordance with the GUVI Material Review Board (MRB) procedures as defined in the PAIP.

QUALITY ASSURANCE

- Flight hardware and software shall be documented and reviewed by formal design reviews in accordance with the Space Dept. Design Review Guidelines, SDO-8336 and the GUVI Software QA Plan, 7366-9003.
- Traceability
  - Purchasing and receiving records maintained for EEE parts.
  - C of C and test data reviewed for lot control.
  - Fabrication travelers with inspection stamps maintained.
  - Parts and materials identified on assembly drawings.
  - As-built flight configuration verified by inspection.

QUALITY ASSURANCE

- Controlled Stockroom
  - Maintain records of EEE parts kits as issued.
  - Limited access areas for flight parts and assemblies.
  - ESD protection provided for EEE parts and assemblies.
- Manufacturing Controls
  - Shop travelers to document fabrication operations, inspections and assembly processes.
  - QA verify configuration and workmanship.
  - Standard fabrication processes are documented.
  - All Printed Wiring Boards built to MIL-P-55110.

QUALITY ASSURANCE

- Training and Certification
  - Critical procedures such as soldering and ESD have specific training courses.
  - Trained and certified personnel shall be used for all flight hardware operations.
  - QA shall verify the training and skills of personnel working on flight hardware.

QUALITY ASSURANCE

- QA Inspections
  - Source inspection
  - Vendor inspection
  - Receiving inspection
  - In-process inspection
  - Pre-lid inspection
  - Final inspection

QUALITY ASSURANCE

- Testing
  - Acceptance testing shall be to the approved ATP.
  - Engineering level testing shall recorded in log books.
  - Formal failure reporting shall begin at acceptance level testing using existing Problem/Failure Report (PFR) procedures. The PFR uses NASA format which requires failure description, verification/analysis/cause, and corrective action and signoff.

QUALITY ASSURANCE

- Nonconformance Control
  - All nonconformances shall be documented.
  - The disposition of nonconforming parts and materials shall be in accordance with the GUVI MRB procedures as defined in the PAIP.
  - When there is a discrepancy which affects safety, performance, reliability, weight, interface, or system requirements, the JHU/APL TIMED project office shall be part of the MRB activity.