



FUV Detector System
Materials and Processes,
Stress/Dynamic Analysis,
Fracture Control

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Materials and Processes



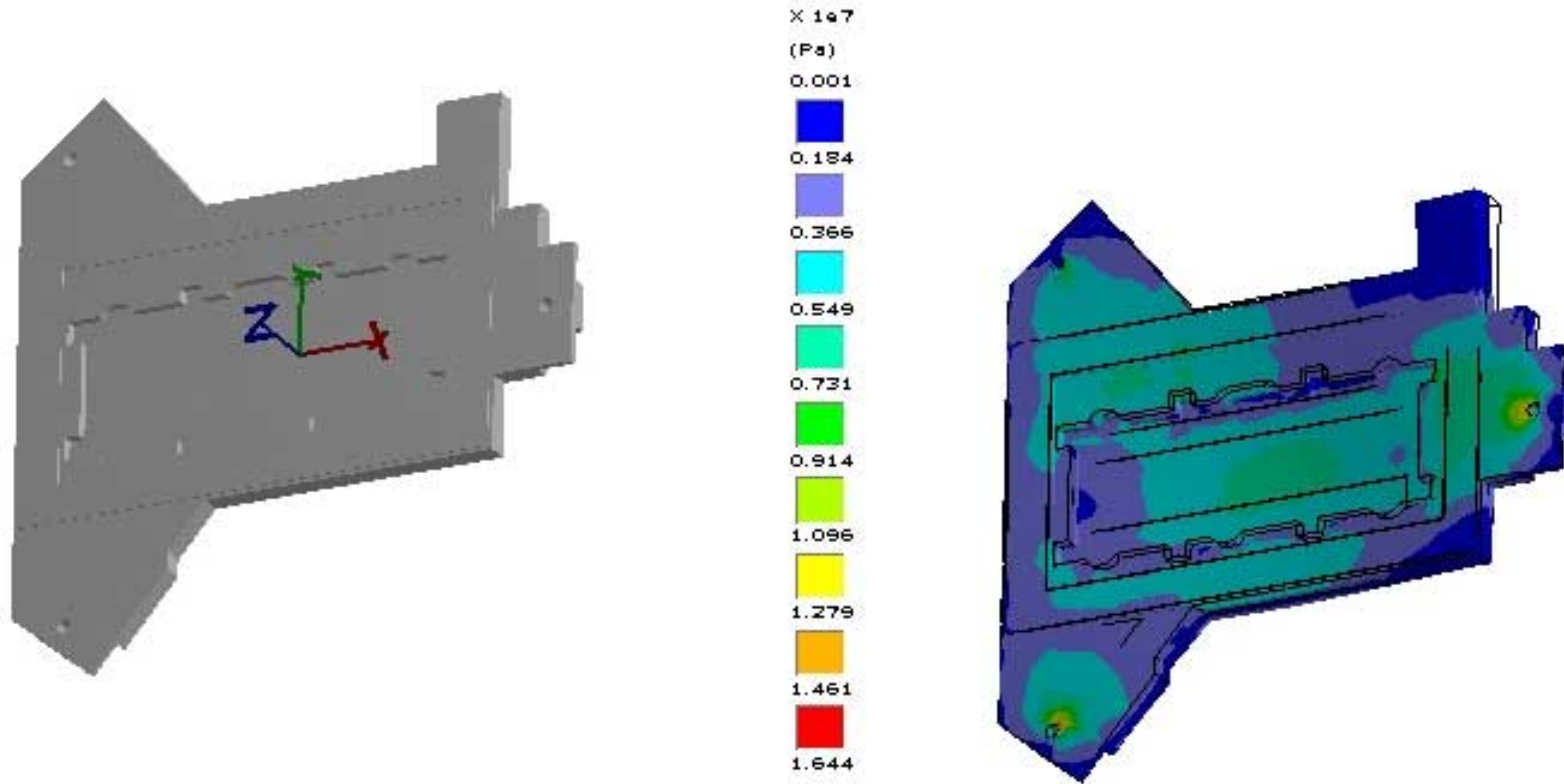
- Materials and Processes List contained in UCB-COS-LST-1003 Rev A
- Requirements
 - Outgassing
 - $\leq 1.0\%$ & $\leq 10\%$ CVCM per STR-29
 - Stress Corrosion Cracking
 - Structural Materials High Resistance to SCC (Table I per MSFC-SPEC-522B)
 - Toxicity, Flammability, and Corrosion per NSTS 1700.7B
 - Instrument Not in Crew Compartment
 - Instrument Unpowered in Payload Bay
 - Purged N₂ Environment Precludes Ignition Sources
 - Material Certifications required for all raw materials
 - Shelf Life (Polymeric) materials date controlled by QA
- Designs based on Heritage of FUSE/ORFEUS Flight Systems



Materials and Processes



- Baseline Release Reviewed by BATC, GSFC
- All Materials in Compliance with Two Exceptions
- MUA's in-work
 - UCB-COS- MUA-1138
 - Acme E-Solder 3022
 - Outgassing 1.25% TML exceeds requirement
 - Small portions used in vacuum chamber (<1 gram)
 - UCB-COS-MUA-1139
 - Globe DC Gearmotor
 - COTS Unit Procured to UCB modification (plating, lubricants)
 - Unit stripped and rebuilt to UCB specs (proper lubricants, brushes, cleaning)
 - Heritage design flown on ORFEUS, CLUSTER, FUSE
 - Contamination Certified by BATC



- Flight Hardware Design Components Heritage from FUSE
- Analysis, Testing Data, Manufacturing well understood



Stress/Dynamic Analysis



- FEM Modeling performed on two Components altered from FUSE
 - Detector Backplate
 - Safety Margin >2
 - First Natural Frequency 530 Hz
 - Detector Vacuum Chamber
 - Safety Margin >3
 - Deflection minimal following vacuum pump down
- All Structure Robust, Test History, and High Natural Frequency
- All Safety margins positive



Fracture Control



- Documentation and Control
 - Fracture Control Plan Implemented for Shuttle Launch Vehicle
 - UCB has Fracture Control Experience on ORFEUS Mission
 - All Fracture Control (and other STS safety issues) input to BATC for Safety Presentation at Instrument Level to JSC
 - UCB Implementation Plan UCB-COS-PLN-1014
 - Consistent with NASA-STD-5003
 - Document Completed
 - Implementation Completed



Fracture Control



- Fracture Control Summary
 - Necessary Hardware Design Changes Implemented
 - Ion Pump Assy Bracket Redesigned
 - Secondary Load Path added to Vacuum Pumping Port
- All Parts either Exempt, Fail-Safe, Contained, or Low Released Mass
- No Low-Risk Fracture Parts
- No Fracture Critical Parts
- Fracture Control Summary Report (UCB-COS-RPT-1134) in-work
- Input to COS Instrument Safety Reviews A/R