PREPARED BY:	***Multiband Imaging Photometer for SIRTF***	NUMBER M43P20	
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APPROVALS		PROCESS	
ENGINEERING	University of Arizona Steward Observatory, IR Group	DATE 97/06/19	
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PI/DEPUTY PI		REV. NEW	PAGE 1 OF 7

TITLE

PRODUCT AND INVENTORY CONTROL PROCEDURE

1.0 PURPOSE

This document defines and establishes the requirements and processes for control of inventory product throughout all phases of contract performance for the development and manufacture of flight focal plane arrays for the Multiband Imaging Photometer for the Space Infrared Telescope Facility (MIPS) program.

2.0 SCOPE

This Control Plan describes the requirements, controls, procedures and documentation which will be in effect during development, manufacture, test, storage and delivery of the MIPS flight hardware to ensure compliance with provisions described in the Ge:Ga Focal Plane Array Quality Assurance Plan, MIPS-0033B.

3.0 APPLICABLE DOCUMENTS

The following documents, in the most current revision, form a part of this specification to the extent specified herein. In the event of conflict between this document and those referenced, the requirements of this specification shall prevail.

Specifications

- MIPS-0033 Ge:Ga Focal Plane Array Quality Assurance Plan
- MIPS-0034 Critical Item Development Specification for the Flight Unstressed Ge:Ga Focal Plane Array
- MIPS-0037 Critical Item Development Specification for the Flight Stressed Ge:Ga Focal Plane Array
- M43P30 MIPS Equipment Calibration and Control
- M43P40 MIPS Contamination Control Procedures
- M43P60 MIPS Electrostatic Discharge Control Procedures

Incoming Receiving

- M11I10 Ge:Ga Detector Wafer
- M11I21 Sapphire Fanout Die
- M11I30 4x32 Frame Clamp
- M11I31 Sapphire Reflector Bar
- M11I40 4x32 Module Frame
- M11I51 Germanium Concentrator
- M11I60 Ceramic Multilayer Board
- M12I10 Flex Cable Assembly
- M43I10 Adhesives

4.0 Control Plan Responsibility

While ultimate responsibility for the control of inventory is vested with the Program Manager, implementation of the provisions of the plan will be the responsibility of the engineering staff. The MIPS Process Engineer will be responsible for the overall implementation of inventory and product control for flight hardware, will bear primary cognizance for the achievement of the requirements described in this procedure, and will be accountable for ensuring that the requirements contained herein are achieved during the development, manufacture and testing effort. In addition, it will be the responsibility of the MIPS Process Engineer to control and maintain this document to reflect current contractual requirements, and to maintain and control all necessary process documents and work instructions to reflect the requirements and procedures contained herein. The cognizant Quality Control representative, in partnership with engineering and manufacturing personnel, will be responsible for the monitoring of written records, conducting conformance audits, and performing surveillance to ensure compliance with these provisions.

5.0 INVENTORY CONTROL PROVISIONS

5.1 Incoming / Receiving Requirements

5.1.1 Incoming parts and materials shall be handled according to the MIPS Electrostatic Discharge Protection Procedure, M43P60, if applicable.

5.1.2 Each individual detail part or material utilized in and becoming integral to the final flight assembly shall be included in the respective parts lists of the engineering drawings. Each part and material shall have a unique part number assigned.

5.1.3 The parts and materials shall be described in enough detail on the engineering drawing and/or in another part specification document to facilitate procurement of identical materials or parts. Information to be specified should include, but not be limited to,:

- approved vendor name and address
- critical dimensions
- level of workmanship required (i.e.; defects)
- mix ratios and cure conditions
- key attributes (i.e.; conductivity, insulation, adhesive strength)

5.1.4 Each incoming part and material shall be inspected for compliance with requirements, and shall undergo the tests and inspections described in the applicable Incoming Inspection Procedure (MXXIXX). Parts and materials meeting specification and drawing requirements, and complying with all requirements described in the Incoming Inspection Procedure are deemed suitable for use on flight hardware, shall be identified as such, and entered into inventory. A record shall be kept of the inspection as part of the permanent document file for the program. Parts characterized as compliant and suitable for flight shall be visually identified with a green tag detailing the part number and date, along with the lot number and other pertinent data allowing traceability to the incoming inspection data.

5.1.5 **Noncompliance** Parts and materials that do not meet incoming/receiving requirements will be segregated and identified as unsuitable for use on flight hardware. Non-compliant parts and materials will be visually identified with a red tag or sticker. Such non-compliance will be documented on the MIPS failure/discrepancy form, which shall accompany the parts or materials. Disposition and/or corrective action will be required for non-compliant parts and materials. Materials and parts designated as non-compliant shall not be used in the manufacture of flight hardware, though may be used at the discretion of the MIPS Principle Investigator, the Deputy PI or the Development/Test Lead Engineer in development and non-flight applications.

5.1.6 For each purchased part or material, a permanent file shall be maintained until the end of the program containing the original receiving documents, incoming inspection report, all pertinent failure/discrepancy reports, part dispositions, and other significant information to provide for traceability to the flight hardware.

5.1.7 Certain parts, after being determined to be compliant with the incoming inspection requirements, will require in-house processing before being suitable for flight hardware assembly operations. These parts will be identified with a blank green sticker, and held separate from inventory until that processing is complete. After in-house processing, the parts shall be inspected according to the requirements of the applicable process specification, and if determined to be acceptable, handled as compliant parts described above. If, after in-house processing, parts are determined to be unacceptable for use on flight hardware, they shall be handled as non-compliant parts described above.

5.2 Inventory Requirements

5.2.1 Parts and materials shall not be entered into inventory or utilized in the fabrication of flight hardware prior to acceptance inspection and appropriate identification.

5.2.2 Materials entered into inventory as acceptable for use on flight hardware that are subject to shelf-life control shall be kept segregated from items not subject to shelf-life requirements. These items shall have the expiration date clearly and legibly written on the label. Any item from inventory with an expired shelf-life shall be identified as non-compliant and handled as described above.

5.2.3 Materials entered into inventory requiring special storage conditions, as in cold storage or dark room storage, shall have these requirements clearly and legibly written on the label, and shall be maintained as required. Any item from inventory requiring special storage conditions, but not stored correctly, shall be identified as non-compliant and handled as described above.

5.2.4 Parts and materials may be removed from inventory only by designated MIPS personnel. Unless otherwise directed by the PI, deputy PI or lead engineer, parts and materials shall be removed from inventory only as part of a “kitting” operation, in which all parts and materials required for a particular assembly are defined and brought together immediately prior to the effort. Unless otherwise directed by the PI, deputy PI or lead engineer, assembly operations for flight hardware shall not occur unless a complete kit exists. A kit shall be designated as complete if it contains all the parts and materials described in the parts lists of the applicable engineering drawing, all the parts and materials have come out of flight hardware inventory having a green sticker and a traceable incoming inspection report, all special shelf-life and storage requirements can be verified as compliant, and all applicable MIPS Failure/Discrepancy forms have been satisfactorily dispositioned.

5.3 Manufacturing Requirements

5.3.1 Upon the initiation of any manufacturing operation involving flight hardware, the MIPS personnel involved shall verify that the “kit” is complete, containing all parts and materials required by engineering drawing for the fabrication of the assembly. The cognizant personnel shall verify that all parts and materials have been accepted into inventory, as evidenced by the presence of a copy of the incoming inspection reports attached to the manufacturing traveler, and the presence of a green tag or sticker.

5.3.2 The cognizant personnel shall match the lot number, serial number, part number and/or date of each part and material in the kit against the applicable incoming inspection report, to ensure that the documents contained in the traveler are representative of the assembly.

5.3.3 Parts and materials not exhibiting a green sticker, or not traceable to the incoming inspection reports contained in the applicable traveler, shall not be used in the assembly of flight hardware.

5.3.4 Upon completion of any assembly operation, the assembly shall be verified against engineering and specification requirements, and any applicable test procedures shall be conducted. Non-compliance to requirements at this point shall result in the assembly being identified as non-compliant, documented on the MIPS Failure/Discrepancy Report form, and handled in the same manner as non-compliant parts described above. Acceptable performance of the assembly shall be documented on the traveler and any applicable test reports. Compliant assemblies shall be identified with the applicable assembly number, and handled in the same manner as compliant parts described above. Completed assemblies deemed compliant shall have a green sticker describing the assembly number and date of manufacture. Compliant assemblies shall be entered into inventory only if accompanied by the applicable traveler package representing the assembly to date.

5.4 Documentation Requirements

5.4.1 From incoming inspection of purchased parts and materials through manufacturing operations and final assembly, the engineering traveler shall accompany the flight hardware. All inspection documents, discrepancy reports, test reports, performance data , and any other information representative of the flight hardware being fabricated shall form a part of the traveler document and accompany that assembly into final inventory prior to shipment.

5.4.2 Immediately prior to shipping, a final review of the traveler document shall be conducted by the lead engineer and/or other cognizant MIPS personnel to ensure all pertinent documentation is contained within the traveler, that there are no undispositioned discrepancy reports, that the traveler document is completely representative of the flight hardware, and that no other unresolved issues exist. The traveler document will then become part of the final assembly permanent record file, and the assembly may be removed from inventory and packaged for shipment to the customer.

Appendix A

This appendix describes the procedure for incoming inspection and acceptance of hardware specified for the fabrication of the 70μ unstressed Ge:Ga focal plane array. In the event of conflict between the requirements documented herein, and any other referenced documents, these procedures shall take precedence.

Part / Assembly / Material	P/N	Procedure
Detector Wafer	MIPSD-065	M11I10
Fanout Board	MIPSD-060	M11I21
Concentrator	MIPSD-066	M11I51
Side Bar	MIPSD-068	P.O. & Engineering Drawing review(1)
Reflector Bar	MIPSD-069	M11I31
Flex Cable Assembly	MIPSD-040	M12I10
Frame Clamp	MIPSD-048	M11I30
Module Frame	MIPSD-049	M11I40
Ceramic Multilayer Board	MIPSD-029	M11I60
Readout Die	MIPSD-027	P.O. & Engineering Drawing review
Adhesives	EPO-TEK 301, H20E 3M Scotchweld 2216	M43I10
Temperature Sensor	DT-414-NU	P.O. review(2)
Resistor, 20 Kohm	MSTF-35AN-20K-01-E	P.O. review
Capacitor, 1000 pf	700A102MCA	P.O. review
Aluminum Wire	42985-1, DN305-1	P.O. review

Notes:

(1) P.O. and Engineering Drawing review: Acceptance and green-tag of this part is accomplished by comparing engineering drawing and purchase order requirements to the incoming shipping documents from the supplier for compliance, and by conducting such visual and dimensional inspections as are necessary to verify that compliance.

(2) P.O. review: Acceptance and green-tag of this part is accomplished by verification that the shipping documents from the supplier are complete and representative of the shipment, and that all provisions of the purchase order have been accomplished.