



# **GUIDELINES FOR SUPPLIER QUALITY REQUIREMENTS**

TMT.PMO.MGT.10.009.CCR04

16 March 2016


## DOCUMENT APPROVAL

### Author Release Note:

Updated (ref. [CR197](#)) to add hyperlink to AD6, MRB Process version (TMT.PMO.MGT.15.021.CCR07) as an administrative change per CCB approved [CR179](#).

This is one of the TMT documents cited in the Contribution Agreement, Part 7, "TMT Technical Specifications and Procedures Documents".

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# 1. TMT SUPPLIER QUALITY REQUIREMENTS

## 1.1 PURPOSE

The purpose of this document is to provide guidelines for implementing quality assurance and quality control (QA/QC) program requirements and general procedures as they apply to TMT Project activities and contracted effort. It provides recommendations on the policies and phrases to be used in “Request for Proposal” (RFP) or “Request for Quote” (RFQ) solicitations to be sent to prospective suppliers and vendors for TMT Observatory components, parts, or services. This document is intended for use by the TMT Project Office (TMTPO) and TMT Partner Work Package Manager’s, and technical, science and procurement staff. During the Request for Proposal (RFP) or Request for Quote (RFQ) process, preference should be given to potential and current suppliers who are currently ISO 9001 (RD9), AS9100 (RD10), or ISO/TS 16949 (RD12) certified. TMT will contract with suppliers who are not certified, but have ISO 9001 (RD9) compliant Quality Systems. Potential TMT suppliers not having either an ISO 9001 (RD9) or AS9100 (RD10) certification and compliant Quality System, will be required to create a Quality System Description addressing the main points of ISO 9001/AS9100 with respect to the TMT work. Potential suppliers lacking certification should submit a copy of their Quality System Description with the bid package. English language (templates) are also provided in Section 7 for use by TMTPO and TMT Partner WP managers and staff when preparing RFP, RFQ, contract or Purchase Order documentation. This document is intended for use when contractor/supplier is manufacturing and/or assembling components, or engaged in observatory construction activities, or providing services, which require TMTPO or TMT Partner review of the supplier QA/QC programs and plans. TMTPO and TMT Partner engineering, science, procurement and QA teams should make determinations on the applicability of this document on a case-by-case basis.

## 1.2 THE TMT QUALITY ASSURANCE PROGRAM

The TMTPO Quality Assurance Plan (see AD1) describes procedures, processes and methods that TMTPO and TMT Partner staff will use to establish and maintain effective quality assurance programs throughout the life of the TMT Observatory. These QA programs provide requirements for prevention and detection of defects, and other quality control measures to help assure that the products and services will meet the TMT Observatory design requirements and specifications (see RD1). The specific goals and implementation of a Quality Program for the TMTPO and TMT Partners and their suppliers (vendors) should incorporate the following items:

1. All designs are to be carefully reviewed and finalized through a TMT Design Review process (see AD2).
2. The supplier has an accurate and complete set of design specifications, drawings, materials and performance characteristics that are under change control and configuration control plans (see AD3).
3. The supplier maintains a qualified and TMTPO approved quality program (see AD1) to ensure systems are fabricated, constructed, assembled, integrated, and tested to specifications provided by the TMTPO.
4. The supplier must ensure appropriate workmanship standards, including but not limited to certification, safety, handling, cleanliness and documentation of critical processes.
5. The supplier should provide appropriate (TMTPO approved) packaging and shipping methods to protect the component(s) from damage in transit.
6. The supplier should provide, maintenance procedures and schedules, if applicable, including shelf life and operating time restrictions.

7. TMTPO, TMT Partners and the supplier may, in general (depending upon the particular aspects and criticality of the effort), participate in pre-award audits, in process inspections; post-assembly and post-install inspections and acceptance testing.
8. The TMTPO and TMT Partners will work with the contractor/supplier to establish specific procedures for remedying issues which arise during fabrication, construction, assembly, integration and testing. Examples of these types of issues: component or construction work, does not meet the design, assembly or performance specifications, due to improper manufacturing, construction errors/mistakes, faulty sub-components, or improper fit or performance of critical interfaces, or improper packaging and shipping methods. An example of an appropriate remedial procedure is the use of a Material Review Board (MRB) (see AD6).

### 1.3 APPLICABLE DOCUMENTS

- AD1 [Quality Assurance Plan](#), (TMT.PMO.MGT.10.008.CCR08)
- AD2 [TMT Reviews: Definitions, Guidelines, and Procedures](#), (TMT.SEN.SPE.12.002.REL05)
- AD3 [TMT Product Data Package Definition](#), (TMT.SEN.SPE.12.001.REL06)
- AD4 [Request for Waiver](#), (TMT.PMO.ECR.15.001.REL01)
- AD5 [Calibration Laboratories and Measuring and Test Equipment – General Requirements](#), (ANSI/NCSL Z540.1) Edition 1994 (Reaffirmed 2002)
- AD6 [Material Review Board Process](#), (TMT.PMO.MGT.15.021.CCR07)

### 1.4 REFERENCE DOCUMENTS

- RD1 [Observatory Requirements Document \(ORD\)](#), (TMT.SEN.DRD.05.001)
- RD2 [Cultural and Environmental Protection Guidelines for TMT Work in Hawaii](#), (TMT.FAC.CON.12.001)
- RD3 [Environmental, Safety & Health \(ES&H\) Plan](#), (TMT.PMO.MGT.10.002)
- RD4 [Part Identification and Serial Numbering Methodology](#), (TMT.SEN.SPE.13.002)
- RD5 [Acceptance Testing Process Description](#), (TMT.SEN.SPE.14.005)
- RD6 [Verification Process Overview for TMT Requirements](#), (TMT.SEN.TEC.10.018)
- RD7 [Setup Verification Inspection Report](#), (TMT.PMO.TEC.15.001)
- RD8 [Sample Supplier In-Process Inspection Record](#), (TMT.PMO.TEC.15.002)
- RD9 [Quality Management Systems - Requirements](#), ISO 9001
- RD10 [SAE Standard - Quality Systems - Aerospace - Model for Quality Assurance in Design, Development, Production, Installation and Servicing](#), AS9100
- RD11 [SAE Standard - Aerospace First Article Inspection Requirement](#), AS9102
- RD12 [Quality management systems -- Particular requirements for the application of ISO 9001:2008 for automotive production and relevant service part organizations](#), ISO/TS 16949

## 1.5 CHANGE RECORD

Revision	Date	Section	Modifications
DRF03	28 June, 2013	All	Initial draft
DRF04	01 Dec, 2013	All	Reformat to TMT Document Template, edits and content tied to Quality Assurance Plan.
REL01	26 Feb, 2015	All	Updated Quality Assurance Information.
REL02	07 Apr, 2015	All	Added Document Approval Page. Sections 1, 2, 3, and 4: various edits. (NOTE: Never released. This version was circulated for review.)
CCR03 (DRF01)	12 Aug, 2015	All	Incorporated Changes per <a href="#">CR170</a> ; Various edits for compliance with QA Plan ( <a href="#">CR169</a> ).
CCR03 (DRF02)	24 Sep, 2015	All	Changes to reflect CCB Action Item. Document Title Change.
CCR03	20 Oct 2015	All	Initial CCR Release ( <a href="#">CR170</a> ).
CCR04	16 Mar 2016	1.3	Add a hyperlink to MRB Process version for AD6 (ref. <a href="#">CR197</a> ) as an administrative change per CCB approved <a href="#">CR179</a> .

## **2. PROCUREMENT PROCESS**

### **2.1 PRE-PROCUREMENT ACTIVITIES**

Contractor's/Supplier's Procurement Requirements should be written to use contractor's/supplier's existing QA system to the fullest extent possible consistent with the provisions of the plan after review and approval by the TMT QA Officer or their designee. Should a contractor/supplier lack an existing quality system, the contractor/supplier will be required to develop and qualify a quality system in compliance with TMT Project QA requirements (see AD1) as negotiated at contract award. Potential suppliers having neither a certified nor compliant Quality System will be required to create a Quality Assurance Program addressing the main points of ISO 9001 (RD9)/AS9100 (RD10) with respect to the TMT work.

### **2.2 PROCUREMENT DOCUMENT CONTENT**

Procurement documents (including Purchase Orders) will be coordinated as necessary with the TMTPO and TMT Partner WP technical and quality assurance personnel to ensure that appropriate and applicable technical and quality requirements are included. The procurement request should include, but not be limited to the following items:

1. Technical documents (identified by revision), including design drawings and design/functional specifications, special process requirements (see AD3), and applicable work restrictions as described in the TMT Conservation District Use Permit (CDUP) and the Final Environmental Impact Statement (FEIS) (see RD2).
2. Preservation, packaging, storage, and shipping requirements.
3. Requirements for component/assembly operating and storage longevity.
4. Specific Inspection and Acceptance Test requirements.
5. QA End Item Data Package (EIDP) requirements (see AD3 and Section 8 of this document).
6. Requirements for source inspection by TMTPO and/or TMT Partner designated representative(s).
7. Design safety and operational requirements/constraints (see RD1 and RD3).

### **2.3 CONTRACTOR SUPPLIER BID PACKAGE REQUIREMENTS**

As part of the RFP, RFQ or PO bid package, and for consideration in contract award, the contractor/supplier should confirm the intent to comply with the following TMT Quality Program requirements as applicable:

1. Provide a copy of their existing QA/QC program, with a strategy for implementing changes required for conformance to TMTPO QA requirements, if necessary.
2. Provide with contract PO deliverables, all contractor/supplier-generated technical and critical process documents, drawings, and specifications, identified by revision, with all red line items updated in electronic format (source files and .pdf file format) for the as-built system or component (see AD3).
3. Adhere to all shipping, packaging and cleanliness requirements as required in the TMTPO design and requirements documents.
4. Submit all tests and inspection reports to TMTPO Systems Engineering immediately following completion, in agreed upon electronic format.



5. Fulfill requirements for source inspection by customer (TMTPO or TMT Partner), which can include a pre-award inspection, in process audits, as well as a pre-ship inspection.

### **3. QUALITY ASSURANCE PROCESSES**

#### **3.1 DESIGN VERIFICATION**

At appropriate stages of the design process, design verification should be performed to ensure that the proposed design will meet all applicable requirements. This will normally be accomplished through the Design Review process (see AD2). However, additional design assessments may be instituted where critical elements are involved, or where a potential for errors may have significant impact to functional performance, cost or schedule. In particular, if a supplier/contractor/vendor is tasked with design effort, TMTPO Representatives and the supplier should plan to complete the design review process before authorization to fabricate will be issued.

#### **3.2 RAW MATERIAL PROCUREMENT**

Suppliers of raw materials should provide certifications and country of origin indicating that materials being provided are in compliance with requirements specified in the procurement documents. Copies of chemical and physical tests results are required for critical usage material properties (i.e., functional acceptance is dependent upon) to verify conformance to applicable specifications and drawings.

#### **3.3 TRACEABILITY OF MATERIALS**

Materials considered critical for successful operation of the TMT, or used in the segment grinding, polishing and coating systems, should require identification and country of origin by lot, batch or production run. Materials process records will be delivered to TMT by the contractor/supplier and retained in the TMT Documentation Control Center (DCC). Questions regarding traceability requirements for specific items should be directed to the TMT Quality Assurance Officer.

#### **3.4 CALIBRATION PROGRAM**

The contractor/supplier will maintain a calibration program in accordance with ISO 9001 (RD9)/AS9100 (RD10) of all instruments and tools requiring calibration (see AD5). Schedules of calibration should be in accordance with the instrument or tool manufacturers' recommendations. Labels on the instrumentation and tools should be easily read and in plain view, and have a calibration record referenced to a report on file with the contractor/supplier, as well as a date of the most recent calibration, due date for next cycle, as well as a signature and disposition of calibration (pass or fail). All instruments that have failed calibration will be required to have on file, a document showing repair, repair facility, reason for out of calibration condition, and recalibration report showing unit has passed. Out of calibration is defined as a device that is not only out of specification on measurement accuracy, but also one that may function properly but does not have an up to date (current) calibration certification.

#### **3.5 CRITICAL INTERFACES**

A Critical Interface is defined as that particular junction between systems or components that have a specific design characteristic and/or requirement, which are critical to the safety and proper function of the TMT Observatory. If these design requirements or characteristics are not met there

could be an increased likelihood of personnel hazards, improper functioning, system failure, and/or damage to itself and/or other systems or components. It is the responsibility of the TMT Work Package (WP) Manager with support of the TMTPO System Engineering Group to identify and specify all critical interfaces in the design documents and drawings, and to ensure that appropriate inspection and acceptance testing are applied to the systems at these interfaces to assure TMT acceptance.

The contractor/supplier will perform the types of inspection (as negotiated with the TMTPO Work Package Manager, TMTPO Systems Engineering and TMTPO QA) during the manufacturing and assembly process, including verification to design specifications and (if appropriate) interface tests for fit, function and/or performance. Development and performance of the test plan will be in accordance with the negotiated contract/purchase order. The final test plan will be reviewed and approved by the contractor/supplier and the TMTPO Systems Engineering Group. The supplier will provide TMTPO Systems Engineering Group with the results from all tested critical interfaces. The TMTPO WP Manager and TMTPO Systems Engineering will work with the contractor/supplier to assess the results to assure acceptance and proposed solutions for discrepancies and retesting if necessary.

### 3.6 CLEANLINESS

All components are to meet cleanliness standards as outlined in the TMTPO technical documents provided to the contractor/supplier/vendor. Cleanliness and contamination control will be particularly sensitive for systems and components used in the optics and science systems. As part of the RFP or RFQ package, all suppliers of optics and science components should provide detailed plans for achieving and maintaining cleanliness of manufactured items during the manufacturing and assembly process, through the final cleaning process, as well as processes to maintain this state during transport and storage.

### 3.7 PACKAGING

Guidelines will be developed for packaging to provide sufficient protection for TMT Observatory equipment from the point of manufacture to the delivery at the TMT Observatory site. Suppliers must ensure that all packaging will meet requirements as defined in the RFP or RFQ. Of particular note, are packaging restrictions contained in the CDUP and FEIS documents (see RD2). Any packaging issues or deficiencies are to be reported immediately to the TMTPO WP Manager. This includes packaging to protect against environmental, shock, transport noise and vibration, as well as protection from ESD and contamination as required in the negotiated contract or PO. TMTPO QA Representative will inspect all packaging upon arrival at the TMT receiving facility for damage and deficiencies and invasive species. When the component or equipment is repackaged for transport to the observatory site, it must use a minimum amount of packing material and must be inspected to verify that it is free of any invasive species. Note that components and assemblies that have been cleaned for use in the optics system also have special TMT optics shipping and handling requirements and procedures.

All packaged items should have appropriate labels attached to properly identify the following:

1. Destination Site
2. TMT/Observatory System/Subsystem cognizant group
3. Boldly identify components as clean or environmentally sensitive to prevent opening and contamination in receiving area
4. List any special handling notifications or warnings
5. Inspection for invasive species and clearance for transport to Mauna Kea TMT site

6. TMTPO contact person and contact information
7. Part ID, serial number or other identifying data (see RD4)
8. Shipping manifest with long text description of enclosed items
9. Evidence of Custom clearance/processing if required

### **3.8 STORAGE**

Supplier will protect system or components against environmental damage or unauthorized personnel access prior to shipment to the TMT site. All items should be stored with appropriate labeling to ensure removal from storage and transport of item is properly tracked and documented. Items with special storage requirements or restrictions should include appropriate warning labels and storage instructions clearly visible on the exterior of the package or container.

### **3.9 TRANSPORT**

Transport of items to the designated TMTPO receiving location/site, will be conducted in accordance with the TMTPO Shipping and Handling Requirements and will be insured as directed in the TMTPO or TMT Partner contractor/supplier's contract. All schedule critical, high cost and/or environmentally sensitive items must be shipped in a manner that will minimize damage in transit or contamination by invasive species. The contractor or supplier and shipping company will utilize protective handling support equipment including containers and handling methods and ride mechanisms (air ride or other suspension isolation techniques, etc.) to protect sensitive items, such as optics and electronics, from vibration, shock pulse, impacts and crushing. Shipping containers and the items they contain will be properly secured for transport to avoid falling and shuffling of goods internally.

### **3.10 CUSTOMS**

Customs documentation will be filled out appropriately to ensure proper handling, contamination controls and timely processing while in possession of customs agents. This includes labeling which clearly defines contents, hazards, valuation and contact information. For all customs requirements, please contact the TMTPO Customs Expediter.

## **4. MANUFACTURE, ASSEMBLY AND RECEIVING INSPECTION REQUIREMENTS**

### **4.1 PRE-AWARD INSPECTION**

Prior to contract award, TMTPO and/or TMT Partner QA representatives may perform an audit of the prospective contractor/supplier quality programs. The need to perform an audit will be determined by the responsible system/subsystem work/task leader, the TMTPO System Engineer and/or the TMTPO QA Officer. The justification for an audit, will be based on potential cost and schedule concerns and/or the functional requirements of the components or equipment. The audit scope includes but is not limited to:

1. Inspection Instrumentation Calibration program review.
2. Maintenance and calibration programs for manufacturing equipment.
3. Critical workmanship worker training and certification (i.e., optics, grinding, polishing, welding, electrical, computer numerical control (CNC), etc.).
4. Supplier QA/QC program and how it will be implemented for the TMTPO or TMT Partner contract/procurement
5. Manufacturing methodologies, especially as regards workmanship standards and certifications, cleanliness and use of approved materials and fluids.
6. Cleaning and packaging methodologies compared to RFP/RFQ requirements.

### **4.2 QA MONITORING OF CRITICAL PROCESS CONTROLS**

Critical (special) process controls are required for those activities that require strict adherence to procedures and/or process specifications and training and certification of personnel to perform the work/process. Critical processes may be a contract and/or drawing requirement. Examples of critical processes include heat treat, soldering, welding, anodizing, chemical film treatment, non-destructing testing (NDT), mirror segment polishing, segment alignment, etc.

Processes considered critical processes will be controlled using manufacturing travelers or procedures established and qualified prior to TMT Project equipment/hardware production. As an example, these manufacturing procedures will include:

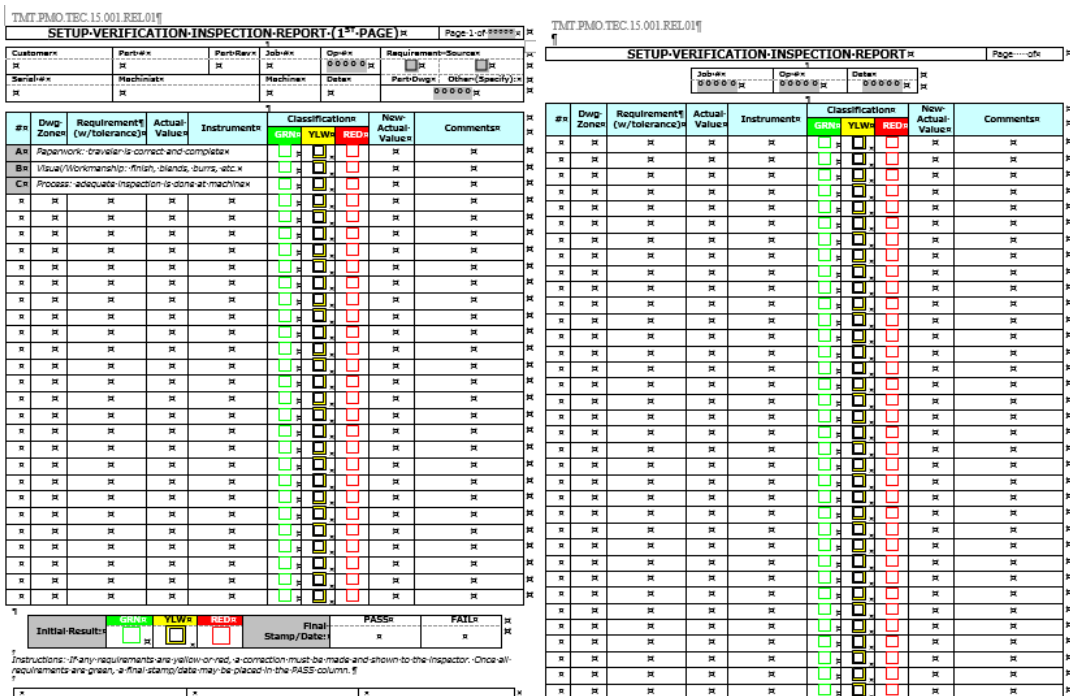
1. Processing equipment (jigs, fixtures, etc.) to be used including calibration requirements.
2. Identification of operational constraints including environmental and cleanliness requirements.
3. Workmanship standards and operator certifications.
4. First article inspection, AS9102 (see RD11).
5. Call-outs for inspections, tests, and other process verification actions.
6. Optics/segment acceptance and verification processes.
7. Final acceptance inspection criteria.

### 4.3 IN PROCESS INSPECTION

In-process inspections will be required where subsequent assembly stages will prevent inspection access, and to detect defects early in the process. In-process inspections will be identified in fabrication and assembly planning documents and/or as Mandatory Control Points (MCPs). See Figure 3.

In-process data shall be available to TMT upon request during the manufacturing process.

TMT will provide sample inspection sheets that define the preferred format for reporting data taken during the manufacturing process. Two examples of manufacturing in-process inspection data reports are shown in Figure 1 and Figure 2.



**Figure 1: TMT Sample Supplier Setup Verification Inspection Report (see RD7)**



							TMT.PMO.TEC.15.002.REL01												
Customer		Part Number		Rev	Job	Qty	Date	Page #	of										
Item	Note	D/WG Zone	Requirement & tolerance	Sample Size	Gage Type	Gage S/N	Stamp/Initials	Values / Results											
								1	2	3	4	5	6	7	8				
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2																			
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Figure 2: TMT Sample Supplier In-Process Inspection Record (see RD8)

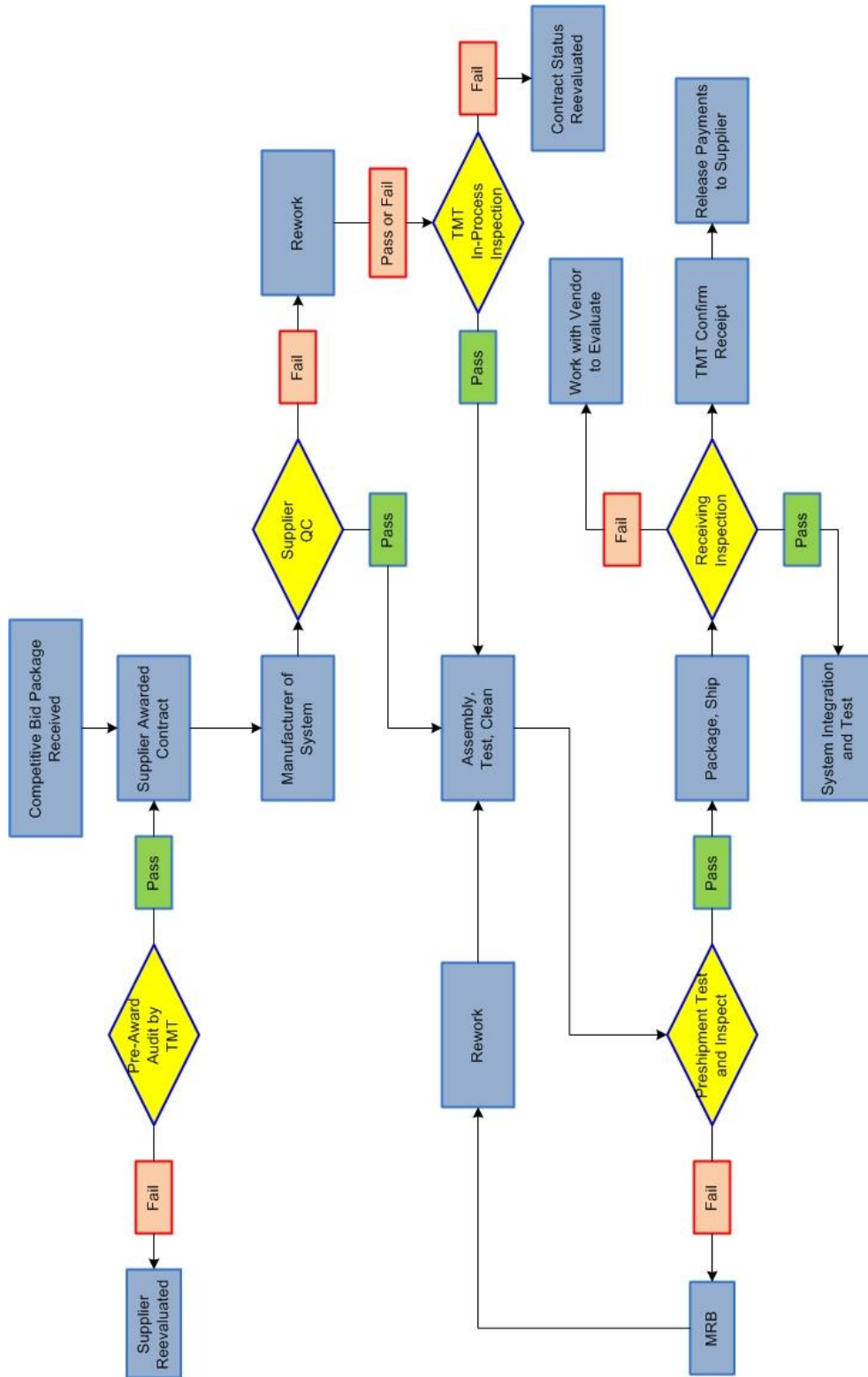


Figure 3: TMT QA Inspection Workflow Chart

#### 4.4 ACCEPTANCE TESTS QA INSPECTION

Acceptance tests will be performed after completion of all required subsystem fabrication and assembly activity (see RD5 for details). TMT Project and TMT Partner acceptance testing requirements include the following:

1. TMT Project and/or TMT Partner QA personnel or their delegates will witness acceptance testing.
2. The test will be performed in accordance with the current version of the released acceptance test procedure.
3. Instruments and gauges used in tests must include record of current calibration status (see AD5).
4. Tests will be performed in the order specified by the test procedure. A change in the test sequence will require approval by the TMT Project System Engineering representative.
5. Completed test results will be documented on TMT Project System Engineering approved forms or test data sheets.
6. Any deviations from the test procedure or discrepancies noted during the conduct of the test will be documented and reported to the TMT Work Package Manager, TMT QA and System Engineering representatives.
7. A post-test inspection will be conducted of the item under test, for the purpose of identifying and recording any changes that may have occurred as a result of the test.

#### 4.5 QA INSPECTION PROCESS

QA inspection consists of the following:

1. Verification of the product against inspection and test parameters identified as requirements in the procurement documentation.
2. Verification of part/item identification and serial number (see AD5).
3. Inspect and record physical and interface dimensions.
4. Inspect and record configuration.
5. Inspect and record quality of workmanship.
6. Verification of the QA EIDP contents in accordance with Section 8.3.

#### 4.6 PRE-SHIPMENT INSPECTION

The following pre-shipment inspection of materials, components, or equipment to be delivered to the TMT Observatory will be required:

1. Certificate of Compliance as required (EIDP).
2. Shipping documentation such as the shipping manifest, shipper, or airway bill.
3. TMT Project property control documentation, where applicable.
4. Verification of the adequacy of the shipment packaging and environmental protection.
5. Evidence of contractor/supplier Quality Assurance acceptance (EIDP).
6. Evidence of safety requirements compliance.



7. Verification that transport environmental controls and monitoring requirements have been met.
8. Evidence (certification) of invasive species inspection and clearance for shipping to the TMT Mauna Kea site as required (see RD2).

#### 4.7 RECEIVING INSPECTION

Receiving inspection will be performed to ensure that articles procured by the TMTPO, or TMT Partner contractors and suppliers, conform to contractor/supplier procurement document requirements. Receiving inspection includes the following:

1. Inspection of incoming hardware and its documentation for compliance to TMT Project procurement requirements.
2. Record of acceptance inspection by contractor/supplier (EIDP).
3. Record of source inspection acceptance as applicable.
4. Record of pre-ship review actions for deviations and waivers from requirements specified in the procurement documentation.
5. Record of pre-ship review dispositions of discrepant materials. Request for deviation completed and dispositioned and approved.
6. Verification that equipment/material is in satisfactory condition and there is no obvious handling and shipping damage.
7. Identification of hardware (piece parts) acceptance status with appropriate labels (see RD4).

#### 4.8 DISCREPANT MATERIAL

When an article does not conform to applicable engineering design documentation it will be identified as non-conforming (i.e., as discrepant material). It will be segregated from on-going work operations, and held for further action. When a discrepancy has been identified and documented it will be reported to the responsible TMTPO science or cognizant engineering person and the TMTPO or TMTPO Quality Assurance representative with the Request for Waiver (see AD4).

Only the TMTPO or TMT Partner Work Package/Task Manager are responsible for the item submitted to the discrepancy evaluation process, or their designees are authorized to issue dispositions for the discrepant item.

The disposition of discrepant material associated with TMTPO science activities will be determined by the TMTPO System Engineer.

Initial discrepant hardware dispositions include the following:

1. Rework to drawing or specification.
2. Repair: Articles that are modified to a useable state but remain nonconforming to drawing or specification requirements.
3. Return to vendor.
4. Use-as-is: Articles that are useable in the present state without further processing.

5. Suspended Action: Articles of which resolution is determined after drawing or specification change, or after hardware fit check.
6. Scrap.

TMTPO and TMT Partner Quality Assurance representative concurrence is required for all discrepant material dispositions. Any items dispositioned as rework or repair must show proof of re-inspection and approval from TMT. The Request for Waiver form (see AD4) must accompany all shipments and be included in the EIDP.

#### **4.9 MATERIAL REVIEW BOARD**

A Material Review Board (see AD6) will be convened to determine the disposition of nonconforming articles that cannot be resolved by the initial discrepant hardware review. The Material Review Board will issue a Material Review Action to the TMTPO WP Manager with the concurrence of the TMTPO System Engineer and the TMTPO Quality Assurance Officer to determine the final disposition.

#### **4.10 MATERIAL REVIEW ACTIONS AT A CONTRACTOR/SUPPLIER**

Material Review Actions conducted at a contractor/supplier are the responsibility of that contractor/supplier. TMTPO personnel will not participate as members of the contractor/supplier Material Review Board. However, Contractor/Supplier Material Review Actions will be subject to review and concurrence by TMTPO engineering/science and quality assurance personnel. Contractor/Supplier Material Review Actions will become a part of the EIDP.

#### **4.11 DISCREPANT MATERIAL STORAGE**

Discrepant Material will be identified and to the degree possible, kept in a separate bonded area from acceptable material until the disposition action has been completed.

## **5. SYSTEM INTEGRATION AND VERIFICATION INSPECTION REQUIREMENTS**

### **5.1 SYSTEM INTEGRATION INSPECTION PROCESS**

With few exceptions, system installation, integration, validation and commissioning are TMT Observatory responsibilities with no/limited supplier involvement. For additional verification requirements, see RD6. Final inspection shall consist of the following:

1. Verification of the product (subsystem or subassembly) against requirements and test parameters identified as requirements in the subsystem documentation by the TMTPO System Engineering group.
2. Verification of key physical and interface parameters.
3. Verification of Configuration.
4. Verification of quality of workmanship.
5. Verification of a complete set of as-built documentation

### **5.2 SYSTEM INTEGRATION ACCEPTANCE TEST**

System integration acceptance testing is a TMTPO System Engineering responsibility. Acceptance testing shall be performed after completion of all required installation and integration operations. TMT final acceptance testing requirements include the following:

1. Validation and commissioning acceptance test plans and test reports shall be reviewed and approved by TMTPO System Engineering.
2. The test shall be performed in accordance with the current version of the appropriate test procedure and witnessed by TMTPO System Engineering and QA representatives.
3. Instruments and gages used to determine performance characteristics must be within the range of acceptable calibration parameters, including inspection cycles and tested against known standards.
4. Tests shall be conducted in the order specified by the test procedure unless otherwise authorized by TMT System Engineering.
5. Completed test results shall be documented on authorized summary forms or test data sheets and approved by TMT System Engineering.
6. Any deviations from the test procedure or discrepancies noted during the conduct of the test shall be documented and recorded by the TMTPO QA representative.
7. If appropriate, and to the extent practical, a post-test inspection shall be conducted of the item under test, for the purpose of identifying and recording any changes that may have occurred as a result of the test.

## 6. TMT PROJECT FURNISHED PROPERTY (TMTPFP)

TMT Project Furnished Property and property purchased with TMT International Observatory Corporation funds or assigned to the TMT Corporation are under the control of the TMTPO Property Administrator, and are subject to TMTPO audit for identification, tracking, and controlled usage. TMT Project Furnished Property is subject to the following requirements:

1. TMTPFP control and tracking requirements must be included in major sub-system/system element procurements where applicable.
2. Post shipping inspection for damage that may have incurred in transit.
3. Verification that the TMTPFP equipment received is correctly identified (see RD4) and the identification is recorded on the shipping documentation.
4. Evidence of acceptance by the supplier and/or TMT Project QA or TMT Partner QA representative.
5. Protection, maintenance, periodic inspection, segregation, and controls necessary to prevent unauthorized use, damage, or deterioration during handling, in-process operations, storage, or shipment.
6. Records that include identification, dates received location, results of in-process fabrication inspections and tests, and any other significant events.
7. TMT Project Property Administrator approval must be attained prior to modifying or disposing of TMTPFP equipment.

**NOTE:** These requirements are not applicable to Japan TMT Property.

## **7. QUALITY ASSURANCE (QA) REQUIREMENTS FOR RFP'S AND RFQ'S**

### **7.1 PURPOSE**

To provide standard language to be used in all "Request for Proposal" (RFP) or "Request for Quote" (RFQ) solicitations to be sent to prospective suppliers and vendors for TMT Observatory components, parts, or services. This information is intended for the use by the TMTPO and/or TMT Partner science, technical and procurement work package/task managers.

### **7.2 INSTRUCTIONS IN USING QA LANGUAGE**

During the creation phase of an RFP or RFQ, the potential contractor/supplier must be informed of TMTPO requirements for QA/QC that will be considered for a contract or Purchase Order award. In order to streamline this process, Section 7.3 was created to simplify the writing process, as well as providing an easy way to modify and address the specific requirements for QA for a given RFP/RFQ.

To utilize standard language template, follow these simple instructions:

1. Copy and paste Section 7.3 into RFP/RFQ documents;
2. Remove numbered items that are not relevant to the procurement;
3. Add in any necessary bullet items or more specific text to meet the focused needs of the procurement document;
4. Notify the RFP/RFQ document owner, TMT QA Officer and TMT Partner QA official, of any recommended changes or additions.

### 7.3 STANDARD QA REQUIREMENTS

***Cut and Paste the following entirely:***

1. The TMT Project Office prefers to utilize the vendors existing QA/QC programs to the fullest extent possible consistent with the TMT QA and QC requirements. TMTPO requests all bidders submit a written description/plan of their existing QA/QC system with their proposal. The bidder must also submit QA/QC plans for managing subcontractor work and materials. Should a contractor/supplier lack an existing quality system, the contractor/supplier shall develop and qualify a quality assurance program in compliance with TMTPO QA requirements as negotiated at contract award. Suppliers having ISO 9001 or AS9100 Registration shall submit a copy of their current certification.
  
2. The existing supplier/vendor QA program/system shall include, but not be limited to the following critical areas of QA/QC:
  - Drawing and Specification Change Control Plan
  - Raw Material Procurement Requirements
  - Traceability of Materials Procedures and Processes
  - Instrumentation and Tooling Calibration Program
  - Critical Interface Inspection and Verification Tests
  - Cleanliness Verification/Inspection
  - Packaging Procedures and Methods
  - Storage and Preservation
  - Transport and Handling Procedures and Methods
  - Customs Information and Data
  - Inspections and Audits
  - End Item Data Package. To be provided at time of delivery to TMT (Section 8.3).
  - Certificates of Compliance and Acceptance
  - Defect Reporting and non-conforming materials data

[RFP/RFQ Author: Identify any bullet items to your corresponding section/paragraphs in your existing QA/QC system. Remove any bullet items above that are not applicable to your RFP/RFQ.

Example: You do not need the reference to Customs for domestic manufactured or supplied goods]

## **8. END ITEM DATA PACKAGE REQUIREMENTS**

### **8.1 PURPOSE**

The “End Item Data Package” (EIDP) shall be developed and retained in the TMTPO DCC for all major systems of the TMT Observatory. The EIDP shall contain, at a minimum, all critical data pertinent to each system/subsystem element (see Section 8.3).

### **8.2 INSTRUCTIONS IN USING EIDP**

To prepare an EIDP:

1. Print EIDP Checklist (Section 8.3);
2. Check all items appropriate for this system element;
3. Add in any items needed in spaces at bottom;
4. Collect required data and submit at time of delivery.





## 9. GLOSSARY

<b>AS9100</b>	Widely adopted Quality Management System standard for the aerospace industry.
<b>AS9102</b>	Aerospace standard for First Article Inspection (FAI) documentation requirements.
<b>Critical</b>	An item or activity that has a completion scheduled milestone that must be met in order to avoid adverse project cost and schedule impacts.
<b>Critical Process</b>	Activities that require the use of specialized equipment, procedures, processes, personnel training and certification to assure acceptance for installation.
<b>EIDP</b>	Collection of design, fabrication, acceptance, test and verification documents and other related data to be presented at the Preship Review.
<b>In Process Inspection</b>	Any inspection that takes place during the manufacturing process. This inspection may be performed by supplier as part of its regular quality control processes, or by TMT as a spot check of workmanship or as a result of a deficiency in the performance of the supplier or the manufactured component.
<b>ISO 9001</b>	International standard for Quality Management System certification.
<b>Pre Award Audit</b>	Audit/Inspection by TMT performed to determine the ability of a supplier to meet the system or component manufacturing requirements including QA/QC. Also includes assessment of safety, schedule and cost, cleanliness, skill and workforce stability.
<b>Quality Assurance</b>	Quality Assurance (QA) is defined as a procedure or set of procedures and quality criteria intended to ensure that a product or service under development (before work is complete, as opposed to afterwards) will meet specified requirements.
<b>Quality Control</b>	Quality Control (QC) is a procedure or set of procedures intended to ensure that a manufactured product or performed service adheres to a defined set of quality process criteria to assure satisfactory client or customer requirements.
<b>Receiving Inspection</b>	Inspection at the TMT Observatory site to verify that goods shipped arrive in good condition, without visible damage, contamination, or other problems that may have been caused during the packaging and shipping process. It is also the point at which TMT personnel look for problems related to improper packaging, as well as missing pieces or cartons. During a Receiving Inspection, TMT personnel will provide an inspection report noting any issues. If shipped item passes inspection it will be moved to the proper storage area until its intended use. TMT personnel will also submit a passed (acceptance) inspection report

	<p>which authorizes the TMT procurement agency to release payment to the supplier as specified by the contract.</p> <p>If the item does not pass receiving inspection, it will be at the discretion of the TMTPO on how to handle the issues. The issues may include returning items to vendor, requiring vendor supported testing and rework, or additional testing at a TMT site before receiving inspection is signed off (acceptance) and payments are authorized for release to the supplier.</p>
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