

Manufacturing Management External Provider Requirements

The latest issue to this document is the version that is available on the Lockheed Martin Logistics Services External Provider Quality Management website:
<https://www.lockheedmartin.com/en-us/who-we-are/business-areas/aeronautics/mmro/greenville-operations.html>

Summary of Changes: Updated hyperlinks; Revised Sections 3, 6, 8, 9, and 24.

TABLE OF CONTENTS

SECTION	TITLE PAGE	PAGE
1.	Quality Requirements	2
2.	Supplemental Quality Requirements	2
3.	Quality Management System Requirements	2
4.	Quality System Changes & Customer Findings	3
5.	Sale, Relocation, Closure or Transfer of Manufacturing Operations	4
6.	Language	4
7.	Competence, Awareness & Communication	4
8.	Foreign Object Damage (FOD) Prevention	4
9.	Prevention of Counterfeit Parts	5
10.	Government-Industry Data Exchange Program (GIDEP) Membership	6
11.	Documented information	6
12.	Buyer-Certified Materials	7
13.	Monitoring & Measurement Resources-Measurement Traceability	7
14.	Buyer-Furnished, External Provider-Manufactured, or External Provider-Owned Tooling	7
15.	Point of Acceptance	7
16.	Facility Access	8
17.	Corrective Action, Preventive Action, Request and Reporting	8
18.	Control of Nonconforming Outputs and Material Review Process	9
19.	QCS-001 Requirements for Buyer-Designed Items	10
20.	QCS-001 Requirements for External Provider-Designed Items	11
21.	Determining the Requirements for Products and Services	11
22.	Manufacturing Management Program Requirements	11
23.	Improvement	13
24.	First Article Inspection Requirement	13

The terms “Item(s)”, “PO”, “External Provider”, and “Buyer” as used herein, have the same meaning as the terms “Work”, “Contract”, “External Provider”, and “Lockheed Martin”, respectively.

Manufacturing Management External Provider Requirements

Questions regarding QA022-03 or the applicability of QA022-03 shall be addressed to Lockheed Martin's Supply Chain Management Representative (Buyer) who administers this PO.

Copies of Aerospace Standards (AS/EN documents) from the Society of Automotive Engineers may be obtained at www.sae.org.

1. Quality Requirements

External Provider shall meet the requirements of the latest revision of QA022-03 and all applicable requirements therein in effect as of the date of this PO. External Provider shall:

- a. Ensure all applicable QA022-03 requirements herein and other quality requirements in this PO are imposed upon External Providers and manufacturing facilities at all tiers working on Buyer's product.
- b. Maintain Internet access for obtaining requirements of this PO.
- c. Ensure compliance to all quality requirements identified elsewhere in this PO.

2. Supplemental Quality Requirements

- a. Quality requirements regarding this PO define unique and specific requirements relevant to the item(s) being procured.
- b. External Provider may obtain supplemental quality requirements referenced in this PO from Buyer's website at:
<https://www.lockheedmartin.com/en-us/who-we-are/business-areas/aeronautics/mmro/greenville-operations.html>
- c. External Provider shall ensure all quality notes on Buyers PO are flowed to their sub-tier supplier as their PO requirement.
- d. External Provider shall ensure the effectiveness of controls applied by their sub-tier supplier.
- e. External Provider shall ensure that its sub-tier supplier's personnel have the required training and experience appropriate with the requirements necessary for the performance of this PO.
- f. Sampling: Unless specific requirements relevant to sampling plans are denoted in this PO, External Provider shall have the right to use sampling plans, provided the sampling plans are in accordance with existing industry, military or Government standards, or have been prior approved in writing by Buyer.

3. Quality Management System Requirements

External Provider shall establish and maintain an Aerospace Standard (AS), International Organization for Standardization (ISO), or Quality Management System (QMS) approved by Lockheed Martin.

Manufacturing Management External Provider Requirements

- a. External Provider should have a current third party certification from an accredited registrar listed in the "On line Aerospace Supplier Information System" (**OASIS**) per the following criteria. For all products, except as defined below:
 1. AS9100 is required for external providers performing design, develop, or provide products and services manufacturing.
 2. AS9110 is required for external providers performing maintenance or continuing airworthiness management services on articles and products. External Providers with AS9100 certification must have a Scope of Approval that includes Maintenance Repair Organization (MRO) activity if AS9110 certification is not held.
 3. AS9120 is required for external providers performing as distributors that procure parts, materials, and assemblies and resells these products. External Providers acting as nonvalue added distributor with AS9100 certification must have a Scope of Approval that includes Distribution if AS9120 certification is not held.
 4. ISO 9001, as a minimum, is required for supplier providing ground support or manufacturing support equipment.
 5. NADCAP approval is required prior to performing special processes as required by engineering documents when Lockheed Martin does list the process in Specification QCS-001.
 6. Approved Quality System and /or Special Process Survey performed by LM Corporate approved Surveyor.

4. Quality System Changes & Customer Findings

External Provider shall notify Buyer's External Provider Quality Engineer, in writing, within 10 days of any of the following:

- a. Change in its quality system status.
- b. Loss of third party registrar's certification status.
- c. Change in External Provider's quality External Provider, process or procedures that affects conformity of any Item.
- d. Adverse action taken by External Providers customer, the Government entity (e.g. FAA, CAA, OSHA, DoD, EPA, etc.), Third Party Registrar, International Government Agencies, or NADCAP to include, but is not limited to, any of the following:
 1. Issuance of a Level II Corrective Action Request (CAR) associated with Buyer Items.
 2. Issuance of a major finding by a third-party registrar
 3. Suspension of Government Source Inspection (GSI).
- e. External Provider shall provide actions taken or planned actions related to any events listed in a through d above with the written notification.

Manufacturing Management External Provider Requirements

- f. External Provider shall provide within 30 days written notification the approved corrective actions taken in response to any adverse action reported in d above.

5. Sale, Relocation, Closure or Transfer of Manufacturing Operations

External Provider shall notify External Provider Quality Engineer and Buyer, in writing, at least 90 days in advance of any sale, relocation, or transfer of External Provider's manufacturing operations. External Provider shall include the following, as a minimum, in the written notification:

- a. Purpose of the relocation.
- b. Address of the new location(s).
- c. Assessment of actual or potential impact to current PO's.
- d. Risk mitigation plan to ensure compliance to existing requirements.
- e. Plan defining the identification, storage, protection, retrieval and retention of records.
- f. Master schedule and timeline of relocation activities.
- g. Relocation Coordinator/Point of Contact.

6. Language

External Provider documents and records submitted to Buyer shall be in English.

7. Competence, Awareness & Communication

External Provider shall ensure that its personnel have the required training and experience appropriate with the requirements necessary for the performance of this PO.

- a. Their contribution to product or service conformity.
- b. Their contribution to product safety.
- c. The importance of ethical behavior.

8. Foreign Object Damage (FOD) Prevention

- a. External Provider shall maintain a FOD prevention program in accordance with National Aerospace Standard AS9146, Foreign Object Damage (FOD) Prevention Program - Requirements for Aviation, Space, and Defense Organizations.
- b. Whenever or wherever Foreign Object Debris (FOD) can be entrapped or Foreign Objects (FO) can migrate, External Provider shall ensure that applicable requirements are flowed down to External Provider's subcontractors at every tier.
- c. Prior to closing inaccessible or obscured areas and compartments during assembly, External Provider shall inspect for foreign objects/materials and ensure no FOD barriers remain embedded, e.g. embedded protective plugs. External Provider shall ensure tooling, jigs, fixtures, and test or handling equipment are maintained in a state of cleanliness and repair sufficient to prevent FOD.

Manufacturing Management External Provider Requirements

- d. By delivering Items to Buyer, External Provider shall be deemed to have certified to Buyer that such Items and packaging are free from any FO / FOD.

9. Prevention of Counterfeit Parts

- a. For purposes of this clause:
 - 1. Work - consists of those product delivered under this Contract that are the lowest level of separately identifiable items (e.g., articles, components, Commercial Off-the-Shelf items, standard hardware, goods, raw materials and assemblies).
 - 2. Commercial Off-the-Shelf - (COTS) describes the purchase of packaged solutions available in the commercial marketplace that can be bought and used either out of the box or adapted to satisfy the needs of the purchasing organization.
 - 3. Counterfeit Work - means Work that is or contains unlawful or unauthorized reproductions, substitutions, or alterations that have been knowingly mismarked, misidentified, or otherwise misrepresented to be an authentic, unmodified part/material from the original manufacturer, or a source with the express written authority of the original manufacturer or current design activity, including an authorized aftermarket manufacturer. Unlawful or unauthorized substitution includes used Work represented as new, or the false identification of grade, serial number, lot number, date code, or performance characteristics.
 - 4. Suspect Counterfeit Work - means Work for which credible evidence (including, but not limited to, visual inspection or testing) provides reasonable doubt that the Work part/material is authentic.
 - 5. Authorized Aftermarket Manufacturer - means an organization that fabricates a part under a contract with, or with the express written authority of, the original component manufacturer based on the original component manufacturer's designs, formulas, and/or specifications.
 - 6. Authorized Supplier - means a supplier, distributor, or an aftermarket manufacturer with a contractual arrangement with, or the express written authority of, the original manufacturer or current design activity to buy, stock, repackage, sell, or distribute the part.
 - 7. Original Manufacturer - means the original component manufacturer, the original equipment manufacturer, or the contract manufacturer.
- b. External Provider shall not deliver Counterfeit Work or Suspect Counterfeit Work to Buyer under this Contract. External Provider's counterfeit prevention process shall include training of appropriate personnel to ensure awareness, prevention and mitigation of Counterfeit Work and implementation of the counterfeit prevention processes. External Provider shall maintain counterfeit risk mitigation processes in accordance with industry recognized standards and with any other specific requirements identified in this Contract.
- c. External Provider shall only purchase product to be delivered to Buyer as Work directly from Authorized Sources of Supply. Authorized Sources of Supply include: The Original

Manufacturing Management External Provider Requirements

Manufacturer (OM) of the product, including mills and foundries, and Authorized Aftermarket Manufacturer (AAM) of the product, their Authorized Suppliers (AS), or suppliers that obtain such product exclusively from the OM/AAM/AS. If External Provider is unable to acquire product from the OM/AAM/AS because of non-availability from such sources, External Provider may obtain product from another source only if External Provider's inspection and other counterfeit risk mitigation processes are employed to ensure the authenticity of the Work, and External Provider has received advanced written approval from the Buyer. External Provider is responsible for the authenticity of all product provided to Buyer and evidence of authenticity is subject to review by the Buyer and its customer upon request.

- d. External Provider's processes shall include the means to provide to the SQE and Buyer, upon request, the supply chain traceability from the OM/AAM, including mills and foundries, to product acceptance by Buyer, including the name and location of all the supply chain intermediaries. If traceability is not obtainable External Provider shall provide written notice to the SQE and Buyer prior to delivery that includes records of evidentiary tests and inspections of authenticity in accordance with existing applicable industry standards. External Provider shall maintain documentation of traceability or the inspection and testing authentication required and make such documentation available to Buyer and its customer upon request
- e. External Provider shall notify the SQE and buyer of the pertinent facts of a nonconformance in accordance with Section 17, if External Provider becomes aware or suspects that it has furnished Counterfeit Work. Suspect counterfeit product shall be treated as Nonconforming Items as they relate to the External Provider notification process in accordance with Section 17, including the quarantining and reporting of suspect product.
- f. External Provider shall include this clause or equivalent provisions in lower tier subcontracts for the delivery of product that will be included in or furnished as Work to Buyer.

10. Government - Industry Data Exchange Program (GIDEP) Membership

External Providers eligible for utilization of the Government-Industry Data Exchange Program (GIDEP) shall utilize the GIDEP process to alert the industry of encountered counterfeit parts

11. Documented Information

- a. Maintain complete records of the following:
 - 1. All manufacturing, inspection, test, CoC, and shipping.
 - 2. Process capability or tooling controlled per TMS-MC-015, if applicable.
 - 3. All nonconforming material, dispositions, assignable causes, corrective and preventive actions, and effectiveness of corrective actions.
- b. Make records available for at least six (6) years after completion of this PO or for longer periods if specified elsewhere in this PO.

Manufacturing Management External Provider Requirements

- c. Upon Buyer's request, forward copy of Quality Records to Buyer.
- d. If External Provider ceases operations, External Provider shall notify Buyer in writing within ten (10) business days of decision to cease operations and transfer records to Buyer.

12. Buyer-Certified Materials

External Provider shall establish and maintain controls to prevent the use of noncertified materials when Buyer-certified materials (e.g. Engineering Materials and Approved Products (EMAPs) are required.

13. Monitoring & Measurement Resources - Measurement Traceability

- a. External Provider shall maintain a documented calibration system for the calibration and maintenance of tools, jigs, inspection and test equipment. External Provider shall have and maintain a calibration system compliant to ISO 17025, ISO10012-1.
- b. External Provider performing equipment Calibration must have second or third party Quality System accreditations referencing compliance to ISO 17025 and/or National Institute of Standards & Technology (NIST) or are approved by another Lockheed Martin business unit.

14. Buyer-Furnished, External Provider - Manufactured or External Provider - Owned Tooling

- a. External Provider shall include in its documented quality system written procedures for the control, maintenance, and calibration of special tooling, jigs, inspection and test equipment, and other devices used in manufacturing processes.
- b. External Provider shall comply with the requirements of Buyer's tooling manual (TMS-MC-015). Access to this manual can be found on the Supply Chain Management Home Page at <http://www.lockheedmartin.com/us/aeronautics/materialmanagement.html> External Provider shall: under Quality Requirements, Control Specs.

15. Point of Acceptance

- a. Unless otherwise specified (reference Quality Notes identified in PO Item Text) Buyer point of acceptance is destination.
- b. The point of acceptance is indicated on each PO issued. When this PO requires Buyer Accept at Source, Buyer acceptance can involve periodic surveillance by Buyer of External Providers quality system, manufacturing processes or physical Item, including work at External Providers sub-tiers. Based on External Providers performance, Buyer acceptance activities may result in the requirement for full-time oversight of External Providers and/or External Providers sub-tier suppliers. The location of performance of Buyer acceptance, prior to shipment, shall be the External Providers facility address referenced on Buyer's PO.

Manufacturing Management External Provider Requirements

16. Facility Access

- a. External Provider shall provide or obtain for Buyer, Buyer's customers and regulatory agency personnel, access to all facilities where work is being performed or is scheduled to be performed, including those facilities of External Providers subcontractors, in order to perform Item inspections, surveys or system/process surveillance as part of verification of conformance to the requirements of this PO. External Providers denial of any such access may result in inactivation of External Providers approval. External Provider shall include the provisions of this facility access requirement in its POs with its subcontractors, for this PO.
- b. External Provider shall provide the following, at no increase in price, cost or fee to Buyer, Buyer's customers or regulatory agencies:
 1. Suitable facilities at External Provider and External Providers subcontractors' manufacturing locations for Buyer, Buyer's Supplier Quality Engineer, Buyer's customer and regulatory agency representatives to perform Item inspections, surveys or system/process surveillance.
 2. Buyer's Supplier Quality Engineer with high speed internet access (DSL or wireless).

17. Corrective Action, Preventive Action, Request and Reporting

- a. External Provider shall:
 1. Ensure effective corrective and preventive action is taken (including repetitive nonconformance's dispositioned "Use-As-Is" or "Repair" by Buyer's or External Providers Material Review Board (MRB) actions to prevent, minimize, or eliminate non-conformances.
 2. QMS shall ensure that non-conforming material is not used for production purposes.
 3. Records of all nonconforming material, dispositions, assignable causes, corrective actions, and effectiveness of corrective actions for the period specified in this PO.
 4. Evaluate each nonconformance for its potential to exist in previously produced Items and notify Buyer, in writing, within 24 hours of potential or verified non-conformances impacting flight safety on Items in transit or delivered to Buyer.
 5. Notify Buyer in writing within 5 working days of all other potential or verified non-conformance.
 6. Provide effective corrective and preventive action upon request by Buyer and, when requested by Buyer, provide trend data.
 7. Perform the following actions when External Provider has tested any returned Item and External Provider cannot verify a Buyer reported non-conformance:
 - i. Contact Buyer for additional verification testing and disposition.
 - ii. Do not return non-verified failure Items unless authorized by Buyer.

Manufacturing Management External Provider Requirements

18. Control of Nonconforming Outputs / Material Review Process

- a. Buyer and Buyer's customers have the right to refuse to accept any and all External Provider non-conformance.
- b. External Provider shall ensure External Providers quality system has capability to report nonconformance(s) on Critical Safety Item (CSI) in full compliance with Defense Federal Acquisition Regulation Supplement (DFARS) 252.246-7003.
- c. When Buyer's customer has delegated oversight/surveillance of Buyer's work to a cognizant Government representative at External Providers facility, External Provider shall submit all material review dispositions for Buyer-related work to the cognizant Government representative, for concurrence when requested by the Government representative.
- d. Buyer has the right to limit or eliminate Material Review (MR) processing on work defined by this PO.
- e. External Provider MR for External Provider designed or Buyer-designed Items is not applicable to Buyer - Furnished Equipment (BFE). BFE is equipment or Items provided to External Provider from Buyer; therefore not procured or built by External Provider.

External Providers continued processing, prior to obtaining Buyer's MR disposition, of any nonconforming BFE shall be at External Providers risk. External Provider shall request Buyer MR Disposition of BFE.
- f. For External Provider - designed Items, MR Dispositions are limited to non-conformances that do not affect a parameter controlled by Buyer drawing or specification, where form, fit or function, interchangeability, Critical Safety Characteristic (CSC) related to CSI service life or reliability is affected. External Provider shall submit requests for recommended disposition of non-conformances, if any, affecting any such parameter(s) to Buyer for Major Variance approval as defined in this PO.
- g. For Buyer-designed Items, External Provider MR Process is limited to scrapping of Items, eliminating the nonconformance by rework to engineering, or returning to vendor. External Provider shall request repair or Use-as-Is disposition from Buyer's MRB. External Providers continued processing shall be limited to subsequent operations that do not hide, alter or limit the ability to inspect, disposition or repair Item unless External Provider has received written approval from Buyer.
 1. When Buyer has delegated MR to External Provider for Buyer-designed Items, External Providers process shall be limited to the scope provided in the MR delegation.
 2. External Providers request for Buyer MR Disposition of External Provider or Buyer-designed Items shall be submitted to the Buyer.
- h. When requested by Buyer, External Provider shall provide Buyer's Supplier Quality Engineer with External Providers MRB disposition information related to Buyer's Item(s).

Manufacturing Management External Provider Requirements

19. QCS-001 Requirements for Buyer-Designed Items

- a. QCS-001 sets forth both the process sources and the processes that require Buyer approval, prior to use for Items delivered to Buyer.
- b. A controlled process is an operation performed on an Item where the operation cannot be readily verified subsequent to its conclusion. Controlled processes have verifiable controls inherent to the process, e.g. heat treat, plating, nondestructive testing, etc.
- c. External Provider and External Providers sub-tiers shall meet all requirements of the latest version of QA022-02 in effect as of the date of this PO when External Provider or External Providers sub-tiers are performing any Buyer controlled process identified in QCS-001. The latest version of QA022-02 referenced in this PO from Buyer's website at: <https://www.lockheedmartin.com/en-us/who-we-are/business-areas/aeronautics/mmro/greenville-operations.html>
 1. Select the hyperlink titled QA022-02 Seller Quality Requirements - EPQR QCS-001 Processing Sources.
- d. The controlled processes listed in QCS-001 are not applicable to standard hardware (nuts, bolts, washers, etc.) that is ordered to military, federal or industry specifications or standards (e.g., MS, AN, NAS, etc.) or to metallic raw material (plate, sheet, bar, extrusion, etc.) that is purchased from a mill.
- e. External Providers providing perishable tooling and Tool Service Requirements List (TSRL) Items are not required to use QCS-001 approved process sources.
- f. External Providers utilization of Buyer-approved sources does not relieve External Provider from the obligations to ensure subcontracted sources are in full compliance with applicable process specifications and to deliver conforming Items.
- g. External Providers utilization of Buyer-approved or Nadcap accredited sources does not relieve External Provider from the obligations to ensure subcontracted sources are in full compliance with applicable process specifications and to deliver conforming Items. Upon request by Buyer, External Provider shall provide objective evidence that such compliance was attained and that such conforming Items were delivered.
- h. Buyer authorizes External Provider to use Nadcap accredited sources for Industry Standard processes controlled by QCS-001. External Provider may access Nadcap approved sources at <http://www.pri.sae.org> or <http://www.eauditnet.pri.sae.org>. Buyer shall have the right to validate any Nadcap approved source or process using normal survey practices, and shall have the right to disapprove External Provider's use of any such source relating to this PO.
- i. External Provider shall be responsible for providing special process source with the appropriate revision level of the process standards/specifications prior to performing processing.

Manufacturing Management External Provider Requirements

20. QCS-001 Requirements for External Provider-Designed Items

External Provider has the authority and responsibility to approve and control its special processing sources including in-house processes. External Provider is not required to use those sources or specifications listed in QCS-001.

21. Determining the Requirements for Products and Services

The External Provider shall ensure that it has the ability to meet the requirements for products and services to be offered to customers. The External Provider shall conduct a review before committing to supply products and services to the customer, to include:

- a. Requirements specified by the customer, including the requirements for delivery and post-delivery activities.
- b. Requirements not stated by the customer, but necessary for the specified or intended use, when known.
- c. Requirements specified by the External Provider.
- d. Statutory and regulatory requirements applicable to the products and services.
- e. Contract or order requirements differing from those previously expressed.
- f. This review shall be coordinated with applicable functions of the External Provider.
- g. If upon review the External Provider determines that some customer requirements cannot be met or can only partially be met, the External Provider shall negotiate a mutually acceptable requirement with the customer.
- h. The External Provider shall ensure that contract or order requirements differing from those previously defined are resolved.
- i. The customer requirements shall be confirmed by the External Provider before acceptance, when the customer does not provide.

22. Manufacturing Management Program Requirements

For External Provider designed Items the External Provider shall ensure current revision of SAE AS6500 manufacturing management program requirements are incorporated into process as applicable. Objective evidence of compliance validation shall be available to Buyer upon request.

For Buyer designed Items the External Provider shall comply with the following processes.

- a. Process Control Plans
 1. The External Provider shall implement Variability Reduction (VR) techniques to reduce part to part variation of key and critical characteristics. The External Provider shall focus VR on achieving stable and capable critical manufacturing processes. For reference only; additional information on this topic can be found in AS9103.

Manufacturing Management External Provider Requirements

2. The External Provider shall develop, document, and implement process control plans for all critical manufacturing processes. Process control plans shall be kept current based on design and process changes. Plans shall include:
 - i. How key sources of variation in the manufacturing processes will be controlled (statistical process control, control of key process input variables, or other techniques).
 - ii. How data will be collected, analyzed, and used.
- b. Design and Development Outputs
 1. The organization shall ensure that design and development outputs:
 - i. Meet the input requirements.
 - ii. Are adequate for the subsequent processes for the provision of products and services.
 - iii. Include or reference monitoring and measuring requirements, as appropriate, and acceptance criteria.
 - iv. Specify the characteristics of products and services that are essential for their intended purpose and their safe and proper provision.
 - v. Specify, as applicable, any critical items, including any key characteristics, and specific actions to be taken for these items.
 - vi. Are approved by authorized person(s) prior to release.
 2. The organization shall define the data required to allow the product to be identified, manufactured, verified, used, and maintained.
- c. Process Capability
 1. The External Provider shall analyze process capabilities for each critical manufacturing process. The External Provider should use statistical tools to minimize variability and calculate the process capability index (Cpk), if applicable
 - i. Cpk goals shall be identified for each critical manufacturing process.
 - ii. Process capability data shall be utilized in developing manufacturing instructions for the product.
 - iii. The capability indices of all critical manufacturing processes shall be tracked and improvement actions instituted for processes with low yields or unacceptable variation and targets shall be established for process yields
 - iv. Acceptability of Cpk shall be based on statistically sound data, considering impacts on producibility, cost, and quality.

Manufacturing Management External Provider Requirements

- d. Production Process Verification (PPV)
 - 1. The External Provider shall conduct PPVs to verify that manufacturing processes, documentation, and tooling are statistically capable of producing parts and assemblies that meet requirements.
 - 2. External Provider shall document the Production Process Verification on LM Form QA022-03-1 (or equivalent). LM Form QA022-03-1 can be obtained at the following Supplier Quality Management website:
<https://www.lockheedmartin.com/en-us/who-we-are/business-areas/aeronautics/mmro/greenville-operations.html>

23. Improvement

- a. The External Provider shall determine and select opportunities for improvement and implement any necessary actions to meet customer requirements and enhance customer satisfaction. These shall include:
 - 1. Improving products and services to meet requirements as well as to address future needs and expectations.
 - 2. Correcting, preventing, or reducing undesired effects.
 - 3. Improving the performance and effectiveness of the quality management system.
 - 4. When a nonconformity occurs, including any arising from complaints, the External Provider shall:
 - i. React to the nonconformity and, as applicable.
 - ii. Take action to control and correct it.
 - iii. Deal with the consequences.
 - iv. Evaluate the need for action to eliminate the cause(s) of the nonconformity, in order that it does not recur or occur elsewhere, by: reviewing and analyzing the nonconformity; determining the causes of the nonconformity, including, as applicable, those related to human factors and determining if similar nonconformities exist, or could potentially occur.
 - v. Examples of improvement can include correction, corrective action, continual improvement, breakthrough change, innovation, and re-External Provider.

24. First Article Inspection (FAI) Requirement

- a. Purpose:

The purpose of First Article Inspection (FAI) is to validate:

 - 1. External Provider's product realization processes are capable of producing parts and assemblies that meet all engineering and design requirements

Manufacturing Management External Provider Requirements

2. Those processes are stable and repeatable. A well planned and well executed FAI will provide objective evidence that External Provider's processes can produce compliant product and External Provider understands and has incorporated all product requirements.
- b. Scope:
1. The requirements of this Quality Clause and AS9102 are applicable in full to the PO. The requirements of AS9102 are also applicable to all lower-level detail parts which comprise the part on the PO. This includes parts manufactured, processed, assembled, tested or inspected at sub-tier External Providers.
 2. Copies of AS9102 and the FAI forms may be obtained from the Society of Automotive Engineers at www.sae.org/aaqg/publications.
 3. References to AS9102 in this document refer to the revision in effect at the time of the PO. External Provider may work to the latest version of AS9102, if desired, at no additional cost, price or fee to the PO.
- c. Definitions:
1. Critical Items – For the purposes of this Quality Clause, Critical Items shall mean parts identified on the drawing or specification as Critical Safety Items (CSI), Fatigue Fracture Critical (FFC), Fracture Critical (FC), Durability Critical (DC), Maintenance Critical (MC), Mission Abort Critical (MAC), Safety Critical (SC) and Flight Science Critical (FSC). Critical Items will also include Items that have Interchangeable-Replaceable (I-R) features identified on the drawing.
 2. Digital Production Definition (DPD) – Requirements in any digital data files that disclose, directly or indirectly, the physical or functional product requirements. This includes both the design and acceptance criteria (e.g., 3D solid models, CATIA, etc.).
 3. External Provider – Supplier that Provides Processes, Products, and/or Services per purchase order requirements.
 4. FAI Planning – Those activities that are performed prior to the first production run of parts.
 5. FAI Report Package – The collective evidence of an FAI as required by this Quality Clause and AS9102, including but not limited to the following: FAI Reports of sub-indentured parts; Certificates of Conformance (CoC); CMM or other metrology system reports; and Acceptance Test Procedure (ATP) reports.
 6. First Production Run Parts – The first group of one or more parts that are the result of a planned process designed to be used for future production of these same parts.
 7. Production Process Verification - A planned, complete, independent, and documented inspection and verification process to ensure that prescribed production processes have produced an item conforming to engineering drawings, DPD, planning, purchase order, engineering specifications, and/or other applicable design documents.

Manufacturing Management External Provider Requirements

8. Sub-Tier External Provider – For the purposes of this document, sub-tier External Provider shall include all entities that perform manufacturing, assembly, testing and inspection work for External Provider, including, but not limited to, sub-tier External Providers at all levels, subcontractors, special processors, feeder plants, other External Provider manufacturing sites, partners, etc.
 9. Technical Data Package (TDP) – The complete set of technical requirements necessary to communicate design intent. A TDP may include but is not limited to only: drawings, performance-based specifications, Digital Production Definition (DPD) media and process specifications.
- d. General Requirements:
1. External Provider shall notify Buyer's assigned Supplier Quality Engineer (SQE), in writing, a minimum of five (5) business days prior to:
 - i. External Provider's intended date to complete inspection of the first production run parts for this PO.
 - ii. Creating or starting any changes that affect items to be delivered under this PO as identified in paragraph d.6.
 2. Buyer's assigned SQE may elect to review or participate in External Provider's FAI process at any time throughout the FAI process.
 3. External Provider shall create a documented procedure or plan that satisfies all the requirements of this Quality Clause and AS9102. This procedure or plan will detail how External Provider will validate FAIs completed by sub-tier suppliers.
 4. External Provider shall document completion of External Provider's FAI in the English language. External Provider shall record the requirements and results in the units specified within the TDP.
 5. External Provider shall flow down the requirements of this Quality Clause and AS9102 to all sub-tier suppliers as necessary to ensure External Provider is in full compliance with this Quality Clause. External Provider shall flow the requirements of this Quality Clause to any sub-tier supplier where Buyer design characteristics will be part of the sub-tier supplier build responsibility. Sub-tier supplier FAI reports become an integral part of External Provider's FAI documentation records and shall be made available upon request.
 6. External Provider is required to perform a partial or full FAI, as required by AS9102, when:
 - i. Any change to programming that is used in numerical controlled machines, test stations, coordinated measuring equipment, etc.
 - ii. A lapse in production for over two (2) years has occurred.
 - iii. Any physical location changes of manufacturing or inspection equipment or relocation of tooling.

Manufacturing Management External Provider Requirements

- iv. Nonconformances to Buyer requirements discovered after completion of an FAI.
7. The following items do not require FAI, unless otherwise directed by Buyer:
- i. Standard hardware and electronic piece parts (e.g., AN, MS and NAS standards; C, M & P standards; 2GNA00001 standard parts; etc.).
 - ii. Commercial off-the-shelf (COTS) items.
 - iii. Metallic raw material (e.g., plate, bar, rod, etc.) and non-metallic raw material (e.g., paints, sealants, adhesives, etc.).
 - iv. Engineering models, design/concept prototypes, etc.
 - v. Items that have been manufactured and delivered to the U.S. Government where External Provider has objective evidence of an FAI performed in accordance with AS9102, unless otherwise approved in writing by Buyer, within the last two (2) years from the date of the PO to the same configuration as required by the PO. If External Provider or the U.S. Government are experiencing a delivered nonconformance, Buyer may require External Provider to complete a partial or full FAI in accordance with this Quality Clause.
 - vi. Items returned to External Provider for repair or rework.
 - vii. Items bought as spares.
 - viii. Items procured to Buyer's part number where Buyer has not developed drawings or specifications controlling the item's physical and functional requirements.
 - ix. Special Tooling and Perishable Tooling.
8. For major aircraft assemblies (i.e., wings, fuselages, empennages, tails, etc.) External Provider is only required to complete the FAI Planning section of the FAI in Detailed Requirements section below (section e.1), unless otherwise directed in the PO. All constituent detail components and sub-assemblies within the above major aircraft assemblies that are manufactured, processed, tested or inspected by sub-tier External Providers will require full compliance to AS9102.
9. FAI by similarity will be accomplished per AS9102. An FAI by similarity requires a previously completed FAI on parts with identical characteristics of similar parts produced by identical means with no history of nonconformances. FAI by similarity shall be approved in advance in writing by Buyer's assigned SQE. FAI by similarity is not allowed for critical items.
10. Any discrepancies or nonconformances to Buyer's requirements discovered during the FAI shall result in the failure of the FAI or "not complete" as defined in AS9102. This shall extend to any parts found nonconforming if the FAI part was selected from a batch or production run. External Provider shall determine root cause and take corrective action for any nonconformance to Buyer requirements discovered during the FAI. A partial FAI for all characteristics affected by the nonconformance shall be performed on the first production run after implementation of the corrective actions. If the partial FAI does not clear all identified nonconformances, the FAI shall be

Manufacturing Management External Provider Requirements

considered “not complete” and the requirements to complete the FAI shall remain in effect. External Provider shall notify Buyer’s assigned SQE, in writing, within 5 days of any nonconformance discovered during the FAI.

11. External Provider shall comply with the forms usage and completion requirements of AS9102. Customer approval block Date block shall be signed and completed by the buyer External Provider quality representative prior to release for shipment.
12. External Provider shall maintain documentation of FAI results on each deliverable end item for the period specified by the PO. External Provider shall provide a complete copy of FAI reports, including those of sub-tier suppliers, to Buyer upon request.
 - i. FAI for follow on POs need not be re-accomplished if there has been no lapse in production (reference d.7.v) and the FAI record is still available for Buyer review when requested. Lost or destroyed FAI records will require a new FAI.
13. Buyer reserves the right to require External Provider to perform a partial or full FAI for causes defined in AS9102.

e. Detailed Requirements Of External Provider:

1. FAI Planning:

External Provider shall take the following actions prior to the start of manufacturing or subcontracting of the item on Buyer’s PO:

- i. All applicable characteristics from the engineering (e.g., drawings, specifications, DPD, Production Outsource Instruction Sheet (POIS), Procurement Data Sheets (PDS), etc.) and PO shall be accounted for during the FAI planning. The method of documentation for this reconciliation shall follow the best practice of “ballooning” the drawings, specifications and other requirements and providing traceability of each characteristic to the FAI report. The “ballooned” documents shall become part of the FAI documentation package. External Provider may propose and use alternate “ballooning” type methods that meet the intent of this Quality Clause only after receiving Buyer SQE approval in writing.
- ii. All specifications, including referenced specifications within parent specifications, shall be reviewed, ballooned and reconciled to each applicable work instruction / operation planning card to ensure no product requirements have been overlooked.
- iii. Reconcile the engineering bill of material against the released configuration effective at the time of PO acceptance.
- iv. Determine the method for validating all TDP requirements and the resulting objective evidence of that validation. All geometric design features in the TDP, including but not limited to fillets, seal grooves, etc., must validated. Computer Numerical Control (CNC) programs must but validated using simulation and

Manufacturing Management External Provider Requirements

- optimization software or using other methods that validate the CNC program prior to production manufacturing.
- v. Review routing sheets, manufacturing / quality plans, manufacturing work instructions, engineering, etc., to ensure operations are planned with the appropriate level of detail and clarity. The review shall include production and inspection steps. Ensure inspection steps have appropriate measurement or sampling plans.
 - vi. Verify employee certifications required to perform all tasks listed in operation cards / work instructions are identified and current. Employee certifications are not required to be included in the FAI package.
 - vii. Determine how subcontracted components, sub-assemblies and special processing will be validated as part of the FAI process. As applicable, ensure only approved components, special processes and material sources have been or will be used (e.g., Engineering Material & Approved Products (EMAP), Qualified Material List (QML), Qualified Product List (QPL), QCS-001, 2GNA00001, etc.).
 - viii. Identify Key Characteristics and Critical Item requirements and ensure these requirements are validated during the FAI. This shall include planning for the completion of an Engineering First Article Evaluation (EFAE) when required.
 - ix. Ensure all gages and tooling used for the manufacture, processing, testing and inspection of product, including airframe tooling controlled by TMS-MC-015 (Buyer-furnished and External Provider owned) are qualified, calibrated and validated, as applicable. Tooling used as a media of acceptance shall be verified against the applicable requirements of engineering, master tooling, etc., in accordance with the plan defining periodic inspection requirements and methods.
 - x. For all major aircraft assemblies (wings, forward fuselage, center fuselage, tails, aft fuselage, mid-fuselage panels, forward/aft plug panels, center wing assemblies and empennage), or when otherwise required by Buyer, create planning for completing Fit check at the appropriate aircraft assembly level.
 - xi. If machine-readable part marking is required, External Provider shall validate that the machine-readable information (MRI) in the 2D marking is correct per validation requirements specified in LMA-PN015 (both the quality (grading) of the 2D mark and the data content encoded in the marking). External Provider shall generate an image of the nameplate showing the human-readable information (HRI) and the 2D mark. Both are required to ensure the relationship between MRI and HRI is maintained and shall become part of the FAI data package.

Manufacturing Management External Provider Requirements

2. FAI Entrance Criteria:

FAI documentation requirements begin when FAI planning begins. Once the following are met, External Provider shall begin the FAI:

- i. TDP (e.g., drawing, specifications, DPD, etc.) is released by Buyer.
- ii. External Provider Acceptance Test Procedures (ATP) have been approved by Buyer, as required.
- iii. External Provider Manufacturing Plans for Critical Items have been approved by Buyer, as required.
- iv. Buyer's assigned SQE has been notified in writing of the beginning of the FAI process.
- v. External Provider may begin the FAI process prior to the completion of 1 through 4 above but will be required to re-accomplish any FAI process steps if changes are made.

3. FAI Process:

- i. Complete production, processing, assembly and verification activities for all detail parts, sub-assemblies, subcontracted components and special processes. Document the FAI in accordance with AS9102.
- ii. Complete the EFAE, as applicable. Evidence of EFAE completion and acceptance by Buyer shall become part of the FAI report.

4. FAI Exit Criteria:

An FAI will be considered complete when the following are met:

- i. Completion of all the FAI requirements contained in this Quality Clause and AS9102, including the completion of the FAI documentation package with supporting objective evidence.
- ii. Completion and validation of all sub-tier External Provider FAIs on sub-components, sub-assemblies and processing, as applicable. This includes documented objective evidence of utilization of approved Special Processors identified in Lockheed Martin Specification QCS-001.
- iii. Successful manufacture, process, test and inspection of the FAI item, with no defects or nonconformance to Buyer's requirements.

5. Post FAI Sustainability:

- i. After FAI is complete, Buyer expects all subsequent production parts will be defect free. If nonconformance's to Buyer's requirements affecting form, fit, function, safety or reliability are discovered after FAI, External Provider shall conduct RCCA analysis to determine root causes for each nonconformance.

Manufacturing Management External Provider Requirements

- ii. External Provider shall provide documented evidence for the RCCA analysis and the actions External Provider is taking for any failure following FAI completion, upon written request by Buyer.
- iii. After RCCA has been implemented, External Provider perform partial FAI for all characteristics affected by the nonconformance.
- iv. A Nonconformance caused by uncontrollable special causes (e.g., power outage, weather events, etc.) do not require full or partial FAI. Documentation on uncontrollable special cause determination shall be made available upon request.