QUALITY ASSURANCE PROVISIONS FOR PURCHASE ORDERS ON THE ARRW PROGRAM

**Scope.** The purpose of this document is to provide the needed descriptions of quality flow-down requirements for the ARRW program from LMMFC to Northrop Grumman Innovation Systems (NGIS) Elkton to NGIS sub-tier suppliers. The NGIS quality assurance requirements listed below with the sub-listed items are required to meet the requirements flowed down by LMMFC and NGIS. This document is a part of every Purchase Order from NGIS Elkton. Additional Quality Assurance Provisions may be called out on the purchase order on a case by case basis. Articles defined in the purchase order will not be accepted if certifications, documentation, test data, or reports specified herein are not submitted.
01Q000, No Process Change Policy
This clause supplements the Product Changes/ Part Obsolescence clause of the Purchase Order Terms and Conditions:
Upon notification of product changes as required by the Product Changes/ Part Obsolescence clause of the Purchase Order Terms and Conditions, NGIS will provide written acknowledgement of the notification, and when processes are approved by NGIS (e.g. by incorporation of 01Q005 or 01Q005A in the purchase order), approval of the change.
Notwithstanding NGIS approval of changes to processing or inspection parameters, the supplier remains responsible for meeting all purchase order requirements.
This clause does not apply to "Commercially available off-the -shelf (COTS) items" as defined in FAR 2.101, Definitions.

01Q000A, General Quality Assurance Provisions
This document establishes general requirements for product assurance that are applicable to items ordered under the purchase order of which these provisions form a part. These provisions are intended to assure that the procured items meet the quality and reliability requirements of NGIS and our customer, and apply unless expressly excluded or superseded in the purchase order. Additional Quality Assurance Provisions (QAPs) may also apply as designated in the purchase order.

Foreign Object Damage Prevention (FOD)
The supplier shall ensure that Foreign Object Damage (FOD) is controlled with the aim of preventing damage or degradation of the deliverable item, or of creating a hazardous condition to users of the deliverable item. Techniques that have been proven effective for control of FOD include: proper housekeeping; control of tools, personal items, and facilities; control of in-process hardware and consumables, including in-process scrap; kitting; and use of parts protective equipment.

Correspondence
All correspondence relating to particular articles shall reference the specification(s) and/or drawings(s) (including number and revision) and the purchase order number. All correspondence shall be directed to the procurement division of NGIS.

Conflict in Instructions
In the event of apparent conflict among the purchase order provisions, the supplier shall obtain clarification from the procurement division of NGIS as to the exact interpretation of requirements. Failure to obtain clarification may subject the procured articles to rejection.

Responsibility for Compliance
The inspections set forth in the drawings and specifications shall become part of the supplier's overall inspection system or quality program. The absence of any inspection requirements in the drawings or specifications shall not relieve the supplier of the responsibility of assuring that all products or supplies submitted to NGIS for acceptance comply with all requirements of the purchase order. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit NGIS to acceptance of such defective material.
Supplier Qualification
Upon NGIS acceptance of first article inspection or first piece(s) inspection (as required), supplier is restricted to use only those suppliers of materials, components and services (i.e., sublet machining, molding, forming, etc.) that participated in the initial contract qualification. Supplier's quality program shall maintain a listing of these suppliers, corresponding to the product or service they provide, including the associated drawing or specification by which the material or service is controlled. At time of purchase, the supplier's quality program shall assure that only those suppliers who are qualified and contained in the listing are used for follow-on purchase. Any change in supplier participation that deviates from these qualified suppliers shall be requested in writing from NGIS.

Special Tooling and Special Gages and Equipment
Special tools and special gages and equipment which are used for dimensional control and acceptance in lieu of inspection by standard methods or standard gages and equipment shall be designed and maintained to assure repetitive compliance to governing drawings within the specified tolerance zone(s) of the dimension(s) being controlled or accepted.

Discrepant and Nonconforming Articles
The supplier is not granted material review board (MRB) privileges on this purchase order/subcontract. Nonconforming articles shall be withheld from subsequent manufacturing operations until written authorization for use or shipment is received from NGIS. Unless authorized in writing by NGIS, repairs utilizing any process or equipment not used in the normal manufacturing process for the item/material are strictly prohibited. Examples include
but are not limited to:

1. Weld repairs where welding is not part of the normal process;
2. Using plating or chemical etching to modify component dimensions if not part of the normal process;
3. Installing plugs, bushings, thread inserts, etc. when not specified on the drawing.

Requests to use or deliver nonconforming materiel will be made to the buyer. The request shall include complete details of the discrepancy. An explanation of the root cause, and a statement of the corrective action proposed to prevent recurrence will be submitted with the request or within a reasonable time thereafter. If a Quality Assurance Representative (QAR) is servicing the supplier's facility, the QAR will review the request prior to submittal for clarity of discrepancy. The QAR should review root cause and corrective action proposals prior to submittal, Upon completion of material review board consideration, Buyer will forward the disposition to the supplier. If the buyer authorizes further processing of the discrepant materiel, the supplier's records and the certification package will reference and include a copy of such authorization. No discrepant material will be shipped by the supplier, except with the buyer's written authorization.

Resubmission of Rejected Articles
All articles, including associated documentation, rejected by NGIS and subsequently reworked to drawings, specifications, etc., shall bear indication of each resubmission. The
accompanying documentation (discrepancy report, corrective action report, re-inspection data, etc.), as required, shall be identified in the same manner as the article. The supplier shall contact the NGIS procurement division for identification of articles submitted as replacement(s) for NGIS rejected and supplier scrapped articles.

Packaging
When the drawing, specification, or purchase order lacks specific packaging instructions, the supplier shall use best commercial practices to ensure that the quality of the delivered part(s) is maintained and that damage, deterioration, and loss in transit are prevented. Any packaging supplied by NGIS shall be reused to the maximum extent possible. If supplied packaging is degraded or cannot be re-used, the material supplied on this order shall be packaged as specified elsewhere in this order. Damage to specially-fabricated shipping containers shall be reported to the buyer before any repair is attempted. Packaged items shall be free of dirt and other contaminants that would contribute to deterioration of the item or which would require cleaning by NGIS prior to use. Items susceptible to corrosion or deterioration shall be provided protection such as preservative coatings, volatile corrosion inhibitors, or a desiccated environment. Items requiring protection from physical and mechanical damage, or which are fragile, will be protected by wrapping, cushioning, or other means to mitigate shock and vibration, and to prevent damage during handling and storage. Cushioning or wrap can be any suitable, appropriate material; except newspapers may not be used when painted surfaces are involved. Partitions or divisions must be used when necessary. Items susceptible to damage by Electrostatic Discharge (ESD) shall be packaged in antistatic bags of conductive carbon ("black poly") or antistatic bags per MIL-PRF-81705 Type III. All external and internal packaging shall be properly identified with “ESD Sensitive Item” labels. Pink Poly material shall not be used as a primary packaging material or as an insert in waffle packs or trays.

Failure Report
NGIS will be notified within 24 hours of any material, component, tooling, or motor case failure during manufacturing or testing. In addition, the supplier will submit to NGIS written failure reports within 72 hours of any failure. Failure reports will identify the failed item by serial number, part number and applicable revision letter. The supplier will submit a failure analysis and corrective action report to NGIS within 15 days of any failure. The report will include, as a minimum, the mode of failure, cause of failure, corrective action to be initiated, and a list of other parts affected.

Documentation Retention
The supplier will maintain records necessary to show conformance with all requirements of the purchase order/subcontract. These records include dimensional inspection records, process control charts, temperature recorder charts, x-ray film, nondestructive testing records, personnel certification documentation, nonconformance reports, process qualification data, hydrostatic test records, and certifications of materials and special processes. These records will be maintained for a minimum of 10 years after the date of completion of this purchase order.
01Q001, AS9100 Quality Management System
The material supplied on this contract shall be controlled under a Quality Management System that conforms to all requirements of SAE AS9100 (Quality Management Systems - Requirements for Aviation, Space and Defense Organizations).

01Q002, Source Surveillance
NGIS reserves the right to place Quality Assurance Representatives (QARs) in the supplier’s facilities, as deemed necessary, to ensure conformance with contractual requirements in any phase of design, processing, fabrication, testing, and inspection of the article(s) being produced. The supplier shall provide all reasonable facilities and assistance for the safety and convenience of such personnel in the performance of their duties. Such representatives shall be allowed full access to witness all operations involved in the fulfillment of this contract.
The supplier shall grant the same access to representatives of the buyer’s customer, when accompanied by NGIS personnel.
The supplier shall secure the same privileges from lower-tier subcontractors.

01Q002A, Source Inspection
Products or services furnished under this purchase order shall be inspected for compliance with quality and technical requirements of the purchase order at the supplier’s facility prior to shipment. Notwithstanding the results of source inspection, final acceptance will occur at destination. The buyer’s procurement representative shall be notified 12 working days in advance of the shipment. If an NGIS Quality Assurance Representative (QAR) is in residence at the facility, notification through procurement is not required.

01Q002D, Right to Access
NGIS, NGIS customer and/or regulatory agencies shall have the right to access the supplier’s facility and Quality records during the course of contract or purchase order.

01Q002E, Government Right of Access
During performance of this order, your Quality Control or Inspection system and manufacturing processes are subject to review, verification and analysis by authorized government representative. Government inspection or release of product prior to shipment is not required unless you are otherwise noted.

01Q004, Subcontracted Special Processes
NGIS approval of all special process suppliers used in the performance of this purchase order is required. The supplier should submit the F11021 form with the intended special process suppliers to the buyer for consideration at the earliest possible time. The supplier shall have required approval(s) in place at the time of hardware processing.
The Basis for the special process supplier approval is by a NGIS special process audit or nationally recognized third-party audit and certification by organizations with expertise in the specific special process of interest (e.g., NADCAP, A2LA). Third party Quality Management System (QMS) certification (e.g., ISO 9001/AS9100) alone does not satisfy the requirement for a third party special process audit. Special processes include but are not limited to:

- Heat-treating (except suppliers who only perform stress relief or hydrogen embrittlement relief)
- Plating
- Passivation
- Chemical Processes (except in-process cleaning, application of paint to composite parts, and touch up of damaged coatings and paint)
- Nondestructive Test (NDT) (radiographic, magnetic particle, penetrant, ultrasonic inspection and eddy current)
- Welding
- Soldering
- Brazing
- Mechanical/Electrical/Chemical Testing
- Non-conventional Machining (ex. using electrical, chemical, optical sources) & Surface Enhancements (ex. shot peening)
- Composites (ex. compression molding, core processing, liquid resin processing, metal bonding, prepreg/adhesive bonding/resin film infusion)

**Notes:**


2. The certification package shall include the approved F11021 form.

**01Q004A, Flowdown Requirements**

The supplier is responsible for compliance with all quality and technical requirements imposed by NGIS even when the supplier subcontracts part of the work. The supplier’s responsibilities with respect to subcontracted work include:

- Transmission (flow down) of applicable quality and technical requirements to subtier suppliers
- Flow down of this provision to their subtier suppliers and verification that this provision has been properly implemented.
- Selection and control of subtier suppliers, unless otherwise specified in the purchase document.
- Assuring traceability of items processed through subtier suppliers

It is the supplier's responsibility to assure that the purchase order to the subtier supplier requires sufficient acceptance data to clearly fulfill the requirements imposed by the NGIS purchase order to the supplier.
**01Q005, Approval of Planning including Non Destructive Testing (NDT)**

Prior to fabrication of any deliverable item, the supplier shall provide, for NGIS approval, the planned manufacturing, testing, and inspection procedures to be used in the fulfillment of this purchase order/subcontract. These procedures shall include, but not be limited to, drawings of special tooling used for dimensional acceptance, plans for performing tests on raw, semi-finished, and/or finished materials, dimensional inspection reports, and special process technique sheets. **Special process technique sheets must be submitted to NGIS and approved by an NDT Level III at NGIS.**

NGIS approval of plans referenced above shall not be required if the plans have been approved on a previous contract. **A list of the previously approved documents that will be used, including the document title, name, revision, and approval reference, shall be submitted to the buyer prior to use.**

Any changes to the approved planning must be submitted to NGIS for approval. Changes that affect the stated requirements of the part (Class I changes) shall be approved by NGIS prior to implementation. All other changes (Class II changes) shall be submitted for concurrence in classification, and may be implemented immediately at the supplier's risk.

**01Q006, Supplier Shelf Life Control**

Inspection acceptance records and environmental control limitations of materials employed in the manufacture of the end item designated must indicate as a minimum: material, specification (s), lot number, purchase order number, inspection acceptance markings, shelf-life limitations, and storage conditions as recommended by manufacturer or required by specification. Supplier shall systematically control materials to ensure acceptability for use and to prevent nonconforming materials from being incorporated into the end item.

**01Q007, First Article Inspection (FAI)**

A first article inspection, meeting the requirements of AS9102, is required. The supplier shall notify NGIS, through the procurement division, twelve (12) days prior to first article inspection. At this time, NGIS may elect to send a representative to visit the supplier's facilities to evaluate the quality program and perform or witness first article inspection. If NGIS decides to waive this right, the supplier shall, upon request, forward the first article(s) along with inspection results (by variables data) and any additional substantiating documentation to NGIS. Shipment of production articles will not be received by NGIS pending the acceptance of the first article. Any production effort prior to NGIS authorization will be at supplier's risk.

The FAI and any other required documentation should be included with the initial shipment. After the initial shipment the FAI shall be kept on file and be available for review by NGIS personnel. Subsequent shipments should include a copy of the FAI or the C of C should include a reference to the applicable FAI (part number, revision, date and original P.O.) **A new first article inspection shall be required when the conditions in AS9102 section 4.6 are met. The exception to this would be a new FAI is required for a lapse in production of one year or more.**
01Q007B, Inspection
The supplier is to perform 100% dimensional inspection and record the results. Actual dimensions are to be recorded and reported for each piece inspected. A range of dimensions representing all units delivered is not acceptable. The use of check marks or “OK” is not acceptable except in the case of tool-controlled dimensions. If used, tooling used to control or accept dimensions must be validated prior to use and a First Article Inspection report prepared for the tool-controlled dimensions. The resulting FAI report shall be included with the certification package.

01Q008, Contamination Control (Titanium)
Control measures shall be taken to preclude any type of titanium corrosion. Specific actions to be taken include but are not limited to:
- Avoiding contamination by sulfur- or chloride-containing solvents, cadmium-plated components, and mercury.
- Immediate degreasing when fabrication is complete, or when additional work will not be performed for eight (8) or more hours.

01Q008A, Foreign Object Damage (FOD) Prevention
The subcontractor shall establish procedures to implement a Foreign Object Damage (FOD) Prevention program using NAS412 as a guideline. The program shall be proportional to the sensitivity of the product(s) design to FOD, as well as, to the FOD generating potential of the manufacturing methods. Existing subcontractor practices and procedures that meet specific requirements shall be documented and submitted to the buyer for review and concurrence. The procedures shall include the following elements as a minimum:
- Guidance on practices that, when followed, will eliminate damage caused by foreign objects during manufacturing, rework, and assembly and test, including but not limited to:
  - Inspection of materials and components on receipt at the work station for cleanliness and damage, and ensuring that they are clearly and properly identified;
  - Continual cleaning of finished and in-process materials and the surrounding work area as part of the normal in-process work effort;
  - Steps in shop documentation to check for the presence of FOD.
- Wearing attire that is appropriate for the specific work area – by both operators and transients – including removal of all personal items, including jewelry (e.g., rings, watches, necklaces, earrings, badges), and restraining of all eyewear and ear protection;
  - Elimination or limiting FOD-causing processes;
  - A program to prevent tools, accompanying documents, and other items necessary to the manufacture of the item from becoming foreign objects; and
- Ensuring that items not necessary to the manufacture of the item are not introduced into the work area
• Establishment and maintenance of a training program for the FOD program.
• Identification of those categories of employees who require FOD training.

01Q009, Serialization
The supplier is responsible for assigning serial numbers as specified on the drawing. Serial numbers shall be unique across all purchase orders. Serialization requirements on the drawing take precedence over the requirements of this Quality Assurance Provision. In the event conflict between the purchase order and the drawing cannot be resolved, contact the buyer.
Serial numbers shall be in the following format: Supplier’s Cage code, followed by a dash, followed by the supplier-assigned number. Example: 3BJA0-00001. The total length of the serial number shall not exceed 20 characters. In the event a supplier does not have a cage code they can use their vendor code. Example: V506771-00001.

01Q010, Certification of Conformance
A Certification of Conformance is required with shipment. The certification shall include, for each item covered by the certification, the following minimum information:
• Purchase order number
• Part number and revision of the item supplied, as specified on the purchase order
• Serial or lot numbers covered by the certification (as applicable)
• A statement that the certified item meets all drawing, specification, and/or purchase order requirements
• Signature of the Quality Assurance Manager or other responsible member of the supplier’s company (a typed name with title on a computer generated document is an acceptable substitute for signature).
• The title of the person signing.
• The suppliers name and address
• Manufacturers name and address if different from seller

Material received without certification is subject to rejection and return to the supplier at the supplier's expense.
Note: Test reports or other supporting documents generated from a computer system with a statement of validity without additional signatures will be accepted providing the certificate portion of the data packet is signed or stamped as outlined above.

01Q010E, Process Documentation Revision Statement
A listing of applicable Process Documents and their respective revision levels shall be included with the Certificate of Conformance in addition to the standard requirements specified in Quality Assurance Provision 01Q010. The listing shall include reference to the NGIS document approving each listed Process Document. The term Process Document includes Work Instructions, Travelers, Planning Documents, Routings, and Test Procedures.
When the Supplier utilizes NGIS approved subcontracted special process suppliers in the performance of this purchase order, a listing of those Process Documents with revision level
along with the NGIS approval reference shall be included with that Certificate of Conformance.

01Q014, Process Control
The supplier shall utilize statistical methods such as statistical process control or other recognized graphical and statistical techniques to establish, control, and verify process capability and product characteristics on key processes directly or indirectly affecting product to be delivered to the buyer. Supplier shall determine the key processes, supplier shall establish and maintain documented procedures to implement and control the application for statistical methods. Supplier shall provide documentation of the functioning and effective use of the process control upon request.

01Q024, Supplier’s Calibration System
The supplier shall control all inspection and test equipment used for acceptance of deliverable items covered by this PO in accordance with ANSI-Z540-1, ANSI-Z540-3 or ANSI/ISO/IEC 17025. Test reports and or certificates shall be submitted with the shipment and shall be in compliance with the associated calibration system requirement. A supplier that manufactures and/or calibrates specialized inspection equipment and is not accredited to one of the above calibration standards may, upon approval by the NGIS buyer, calibrate such equipment if (1) the standards used are NIST traceable, (2) the calibration process is defined and standardized, and (3) the resulting certifications or reports are essentially comparable to one of the above standards. The supplier’s calibration system is subject to review and approval by NGIS Quality Assurance at all times during the performance of the PO.

001, Counterfeit Part Prevention
Seller shall only purchase products to be delivered or incorporated as work to the Buyer directly from the Original Component Manufacturer (OCM)/Original Equipment Manufacturer (OEM), or through an OCM/OEM authorized distributor. Seller may use another source only if:

(i) the foregoing sources are unavailable,

(ii) Seller’s inspection and other counterfeit risk mitigation processes will be employed to ensure the authenticity of the work,

(iii) the suppliers meet applicable DOD-adopted counterfeit prevention industry standards and processes (including tests) and;

(iv) Seller obtains the advance written approval of Buyer.

Approval to use another source other than defined above requires the submittal of a comprehensive risk mitigation test and inspection plan to the Buyer’s Procurement
Representative. The risk mitigation plan shall define appropriate tests and inspections, as well as acceptance criteria, to validate the products authenticity. Test results shall be reviewed and approved by the Buyer’s Quality Engineering prior to shipping or incorporating into deliverable hardware.

Seller shall develop and implement a counterfeit product control plan using AS5553 for electronic parts and AS6174 for all other material. The plan shall be available for the Buyer review upon request.

The Seller’s counterfeit avoidance and detection systems are subject to Buyer and/or Buyer’s customer audit and approval.

Seller shall implement systems that assure traceability of all material from the original manufacturer to product acceptance by the Buyer. For electronic parts, Seller shall have processes that enable tracking from the OCM, OEM or the OCM/OEM authorized suppliers, whether the electronic part is supplied as a discrete electronic part or is contained in an assembly. This requirement applies to all work delivered to the Buyer either directly or indirectly as components or included in assemblies. This entire note, or requirements that meet the intent of this note, shall be flowed down to all sub-tier suppliers under this contract and the Seller shall provide evidence of compliance to this note upon request.

002, In-Process and Close-Out Photographs
The Seller shall incorporate in-process and close-out photograph operations into manufacturing plans, work instructions, inspection plans, shop orders, travelers, and logbooks to capture the following items:
  • Box / enclosure cavities prior to closing (shipping container)
  • Both sides of Printed Wiring Assemblies (PWAs) at sufficient resolution to show component polarities
  • Cables / connectors at sufficient resolution to exhibit connector pin conditions at each connector face
The format and quality of captured photographs shall adhere to the following requirements:
  • Photographs shall be taken using 10 megapixels or greater resolution.
  • Photographs shall focus on the required object being photographed with the object fully in field of view.
  • Photographs shall be annotated with part number, serial number and the date taken of the photograph.
  • Photographs shall not be downscaled/resized for archiving.

003, Traceability
Parts, components and materials included in the deliverable product will be traceable to their source and to all available objective evidence of acceptability. Parts will be identified with the part number (including dash number), revision, and serial number and/or lot number.
004, **Software and Firmware Quality Control Program**
The subcontractor shall have a process to control the quality of software and/or firmware to produce and/or test delivered products. The subcontractor shall be able to show that the software and/or firmware process provides mechanisms for correctness verification of the software and/or firmware, as well as providing configuration control of the software and/or firmware. The subcontractor shall insure that only properly approved versions of the software and/or firmware are available for testing delivered products.

005, **Pure Tin Finishes**
Electronic, electrical, electromechanical and mechanical piece parts and assemblies, including the internal fabrication of hardware, delivered under the provisions of this purchase order **shall not have pure tin finishes**. Any tin-lead plating or solder process/processing shall result in a finish of **no less than 3% lead** composition. This applies to component leads and terminations, carriers, bodies, cages, brackets, housings, mechanical items hardware (nuts, screws, bolts), etc. **The supplier shall provide a statement of compliance to this provision via the Certificate of Conformance (C of C) with each shipment.** The supplier shall be responsible for managing compliance with this requirement with sub-tier suppliers, and provide evidence of the appropriate flow-down and management of this requirement to the satisfaction of the buyer.

006, **Alerts and Advisories**
The supplier shall participate in GIDEP in accordance with MIL-STD-1556, GIDEP Contractor Participation Requirements. The supplier shall assure that substandard products are not used in hardware provided to NGIS, by taking corrective action in response to Alerts, Safe-Alerts, Problem Advisories and Product Change Notices in all instances where there is an impact on this purchase order. The supplier shall respond to NGIS requests for information regarding MDA or other customer advisories as required.

007, **Training and Certification**
The supplier shall implement and maintain training and certification programs, as required, based on the type of hardware manufactured and operations performed to ensure that personnel have the necessary skill and knowledge to perform their assigned duties.

008, **Risk Management and Metrics**
Supplier shall establish and maintain a risk management program to continuously identify, analyze, mitigate, monitor, and report systems engineering process, product, technology, cost, schedule and other program risks as deemed necessary by the product manufactured. Supplier shall notify NGIS of any known risks and the mitigation taken for tracking purposes by NGIS. Results of the risk management process shall be used for continuous improvement and risk reduction.
009, Government Source Inspection
If QAP 01Q003 is imposed on the purchase order, these requirements will be issued by the NGIS Elkton DCMA office to the Government inspection office servicing the supplier's facility.

010, Supplier Assessment
The deliverable output is a Supplier generated Supplier Requirements Compliance Matrix (SRCM) (supplier format acceptable). The SRCM is intended to provide objective evidence that the supplier will comply with all purchase order requirements, including but not limited to: Technical Data Package requirements, Quality Assurance Provisions, delivery and schedule expectations, and terms and conditions.