

Supplier Quality Assurance Requirements (SQAR)

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Approved

(Signature on file)

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REVISION RECORD

The latest issue to this manual may be confirmed by viewing the OASIS web site: https://oasis.northgrum.com).

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Note – All revisions are in Blue font

SQAR Rev. J Primary Change Summary

- Stated intent to migrate to ISO 9001: 2000 and AS/EN9100: 2001 Third Party Certification by December 2004

 Section 2.1, page 5
- Added a reference to the "Supplier Product Acceptance and Delivery Guide" section 2.3, page 8
- Replaced Key Plan with Platinum Source section 2.3, f, page 9
- Revised Record Retention Requirement to 10 years section 2.4, page 9
- Added requirement to perform 100% Conductivity Testing of all Aluminum fabricated parts section 2.5, page
 10
- Clarified engineering revision level call outs section 2.5, b, page 11
- Modified metallic raw material mill certification requirement section 2.5, I, page 13
- Re-instated the Quality Assurance Test Procedure for Standard Hardware section 2.5, j, page 13
- Revised the Corrective and Preventative Action requirements section 2.9, page 14
- Added a Control and Use of Digital Datasets requirement section 2.11, page 15
- Added a Foreign Object Debris/ Damage (FOD) requirement section 2.12, page 15
- Added a Supplier Sub-tier Control requirement section 2.13, page 15
- Mandate the use of AS9102, "Aerospace First Article Inspection Requirement" section 3.1, page 16
- Stated intent to use Nadcap accredited laboratories as of June 2004 section 3.3, page 17
- Added Research and Development/ Advanced Programs Requirements section 3.12, page 21



DOCUMENT OVERVIEW

Supplier Quality Assurance Requirements (SQAR) is the Suppliers' guide to understanding Northrop Grumman's Integrated Systems sector (hereafter referred to as Northrop Grumman) quality requirements and expectations. This document forms a part of Northrop Grumman purchase order, unless otherwise specified herein. It contains helpful general information and specific quality requirements of the Air Combat Systems (ACS), the Airborne Early Warning and Electronic Warfare Systems (AEW/EW) and the Airborne Ground Surveillance and Battle Management Systems (AGS/BMS) business areas of Integrated Systems.

SQAR is broken into four major sections as described below:

Section 1 - This section identifies key information, shown on all Northrop Grumman purchase orders or change orders, that must be used by the Supplier to determine which requirements in Sections 2 and 3 of this manual apply to Suppliers deliverable product. Also, included in this section is an "easy-to-read" matrix, which guides Supplier's to their product(s) specific quality requirements, based on the type of commodity being delivered.

Section 2 - This section includes **minimum quality requirements** required for all deliverable products and services procured by Northrop Grumman.

Section 3 - This section includes **commodity-unique quality requirements** that may be applicable to the Supplier's deliverable product. Supplier is guided to these requirements using the commodity-based matrix shown in Section 1.

Section 4 - This section provides useful **general information** associated with the purchase order and related quality subjects.

Questions regarding this document should be directed to Northrop Grumman Integrated Systems sector, Supplier Quality and Technical Performance, Tel. (321) 752-8371, or to your buyer.



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1.0 OVERVIEW

This document is applicable to all Northrop Grumman Integrated Systems sector (Northrop Grumman) purchase orders for the production, overhaul, and modification of contract deliverables including tooling, ground support equipment and repair stations. Tables 1 & 2 contain matrices that are the key to determining the applicability of Northrop Grumman quality requirements and shall be used by the supplier as part of their quality planning function to ensure compliance with the Northrop Grumman requirements. The requirements in Section 2 apply to all procurements. The requirements in Section 3 apply as indicated in Table 2. Each item in the purchasing document specifies the SQAR code, the applicable inspection location requirement (See Section 2.3), and Project Code (see Table 3). This information is a road map to the requirements for production and delivery of product. Suppliers who receive electronic purchase orders may see a different format than that shown below. Please consult your buyer if you have difficulty in locating this key information.

Note: Tables 1, 2 and 3 may be found in Attachment 1.

2.0 GENERAL AND PROGRAM SPECIFIC REQUIREMENTS

Note: The requirements in this section apply to all procurements

2.1 Quality System Requirements

Supplier shall implement and maintain a quality management system, which complies with the applicable Quality System Standard or Specification listed in Table 1, Quality System Requirements. The supplier's approval level must be appropriate for the type of product being delivered to Northrop Grumman.

Initial and subsequent periodic review of supplier's quality system may be performed at the option of Northrop Grumman. Objective evidence of supplier's compliance, either by submittal of requested evidence, or evidence of a third party accreditation, may be acceptable for the purpose of re-survey, but will not preclude the use of on-site evaluations or other review methods.

Northrop Grumman at its discretion may honor qualified second and third party audits, provided that the scope of the audit performed by the second or third party correlates with the type of product/service being provided to Northrop Grumman (see Table 1). Northrop Grumman reserves the right to perform additional assessments if deemed necessary.

Currently and up thru December 31, 2003, a supplier may utilize an ISO 9001:1994, AS/EN9000: 1997, AS/EN9100A, or military equivalent quality system standard. As of January 1, 2004 suppliers shall be compliant to ISO 9001:2000, AS/EN9100A. Calibration suppliers will be required to be compliant to ISO17025 or ANSI Z540-1. A third-party quality system certification shall be required by December 2004. Northrop Grumman will recognize all third-party certifications issued by an accredited Certification/ Registration Body (CRB). The accredited CRB's can be found on the SAE web page: www.sae.org/oasis.



Suppliers shall forward a copy of their certifications to Northrop Grumman. Any changes to the certification such as a change of the CRB, update, withdrawal or disapproval must also be forwarded to Northrop Grumman immediately.

A change in supplier name, ownership, or facility location will subject the supplier's quality system to reevaluation by Northrop Grumman. The supplier shall notify their buyer of any of these aforementioned changes in writing. The buyer will instruct the supplier on formal notification actions and specific forms to submit, if necessary.

JSTARS Repair Station Suppliers Only

Suppliers shall comply with the following Quality System standards for the JSTARS program as follows:

- 1) FAA FAR Part 145 (Repair Stations) Suppliers of overhauled or repaired FAA parts shall be a FAA FAR 145 approved repair station and shall maintain a Quality System which complies with Federal Aviation Regulation FAR 145.
- 2) JSTAR Modification Phase Parts Suppliers manufacturing JSTAR Modification Phase Parts (MODS) shall be an approved Level 1 or 2 per Table 1.

2.2 Nonconforming Material Control

Nonconforming material must be identified, documented, evaluated, segregated (where practical), and dispositioned to prevent its unintended release or use.

a) Disposition Authority

The supplier's disposition authority of nonconformances is limited to rework to specification, return to supplier and scrap. These terms are defined as follows:

- 1) **Rework** Restore material to specification compliance in accordance with required process(s) and addressed by governing process specification(s). Parts subject to subsequent processing not authorized by specification shall be submitted to Northrop Grumman Material Review Board (MRB) for disposition per Table 4. Specific rework instructions shall be provided with Rework dispositions.
- **2**) **Return To Supplier** Return of subcontractor product found to be discrepant for subsequent rework or replacement.
- 3) **Scrap** Permanent removal from production and destruction of product found to be unfit for use. Scrapped product shall be controlled until destroyed.
- **4**) All other dispositions of nonconforming material shall be submitted to the Northrop Grumman MRB in accordance with Table 4.

Suppliers may access copies of the instructional guides on OASIS or may request a copy from their buyer.



Applicable Project ID's	Document Description(s)
ACS Programs	Supplier Instruction - Nonconformance Documentation and
AA, AT, BS, CC, DD, GH,	Form Facsimile for Form MSF-257
HA, HH, KK, MA, NN, QQ,	
QX, RD, SE, SS, TF, VC	Supplier Instruction – Functional Nonconformance Report NOR
	86-240 and Form 27-911
AEW/EW Programs	
AE, AB, AO, AS, CP, EA,	QOS-0035 Guidelines for the Preparation of Seller Material
EB, EC, ET, FD, FE, FF, PM	Review Reports
AGS/BMS Programs	QES-MLB-106 Supplier Material Review Report
AL, AM, BO, DM, JS, TR,	
WR	

Table 4 - Nonconformance Control Documents by Project ID

b) MRB Dispositions for Supplier Designed Hardware

Suppliers do not have MRB authority for Northrop Grumman or any of its customer's (i.e. – Boeing, Lockheed) designed items unless specifically authorized in writing by the buyer. Suppliers of product that retain design authority to a Source/Specification Control Drawing (SCD) may use dispositions of use-as-is or repair, as long as the nonconformity does not result in a departure from the requirements of the SCD/Customer Specification. This includes those suppliers that produce products of proprietary design, and products to military and industry standards.

The supplier MRB shall not perform any disposition on any nonconformance to customer requirements that affect form, fit, function, weight, interchangeability, maintainability, reliability, unique key characteristics or safety. These nonconformances shall be submitted to the Northrop Grumman MRB on the specified nonconforming material control document (see Table 4).

Suppliers may request independent MRB authority by following the procedural steps that are addressed in the Supplier Material Review Board Authority Guideline document that is posted in OASIS.

c) Notification/ Disclosures

The suppliers system shall provide for timely reporting of nonconformities that may affect already delivered product, including any continuing airworthiness actions. Notification to the buyer shall include a clear description of the discrepancy, which includes as necessary; parts affected, customer and/or supplier part numbers, quantities and date(s) delivered.

d) Exception to Rejections



In the event a supplier does not accept the responsibility for a discrepant condition, the supplier shall initiate a letter of exception to their buyer. The letter shall make full reference to applicable documents and be specific in defining the area of exception.

2.3 Product Release

Northrop Grumman, its customer, and/or their authorized Inspection Agency, shall have the right to send representatives to the supplier's facilities to determine contract compliance by either monitoring, witnessing, and/or performing such activities as inspections, test witness or other system, process and/or product evaluations and verifications as necessary to determine product acceptability to contractual requirements. The type, necessity and degree of demonstration of conformance will be at the sole discretion of Northrop Grumman taking into consideration such factors as product complexity, the environment where the product is used, the ability to determine product quality after receipt and past supplier performance. Without additional charges, the supplier and/or their subcontractor shall make their facility available for these activities and provide all reasonable support for the safety and convenience of these representatives during their stay at the supplier's and/or their subcontractor's plants and facilities. A "Supplier Product Acceptance and Delivery Guide" is posted on OASIS to assist suppliers in preparation of product and associated documentation for source surveillance activities.

Northrop Grumman inspection requirements are stated in the Purchase Order Header Text under the field identified Inspection Location/Type.

Northrop Grumman Inspection Types

a) Receiving Inspection Buyer Plant

Deliverable product(s) are subject to Northrop Grumman inspection upon receipt at Northrop Grumman' facility.

b) Government Source Inspection

Deliverable products are subject to Government oversight during the performance of this Purchase Order prior to shipment.

c) Government Surveillance

Government reserves the right to perform surveillance of a supplier's quality and/or manufacturing operation during the performance of this Purchase Order.

Note: For unclassified programs, see Sect. 2.7. For classified programs, see Sect. 2.8.

d) Northrop Grumman Source Inspection

Deliverable product(s) are subject to Northrop Grumman Source Surveillance. Supplier shall notify Northrop Grumman Field Representative, at least forty-eight (48) hours in advance of need, to schedule "in process" or "final" source surveillance. If contact cannot be made, call your buyer.

e) No Customer Inspection Required



Suppliers Quality System certifies to requirements of deliverable items/products in this purchase order. No Northrop Grumman inspection is required.

f) Platinum Source

1) General

Platinum Source suppliers are authorized to perform inspection functions and acceptance of product and associated paperwork in lieu of Northrop Grumman final inspection and acceptance of product as defined in the purchase order.

Northrop Grumman's customers retain the right to impose inspection requirements independent of the supplier's Platinum Source authority.

Platinum Source suppliers shall perform inspection and acceptance of product in accordance with Platinum Source Program Supplier Instructions. These documents can be found on OASIS.

2) Platinum Source Exclusions

Platinum Source suppliers <u>do not</u> have inspection authority for items listed below. These items require <u>mandatory</u> Northrop Grumman Source Inspection.

- Safety of Flight
- Items requiring Northrop Grumman First Article verification as identified in section 3.4, Northrop Grumman First Article Review
- Fatigue Critical
- Fracture Critical/ Fracture Critical Traceable
- E-2C and EA-6B Prime Mission Equipment (ref: QOS-0040)
- F-35 Critical Parts requiring Traceability
- Functional Equipment that has not yet completed formal qualification testing (Ref: Supplier Data Requirements Listing-SDRL)
- Air Vehicle Software
- Purchase Order Line Item Deliverable Supplier Manufactured Tooling
- Customer Furnished Equipment
- F/A-18 Product drop shipped from the supplier to Boeing, St. Louis (Northrop Grumman customer)
- F/A-18 I & R Tool Prove First Article

Note: Refer to Supplier Requirements Interchangeability and Replaceability (I&R) Program document located on OASIS or supplier may request a copy from their buyer.

2.4 Quality Record Retention

The supplier shall maintain Quality records in accordance with the applicable Quality System standard (i.e. – ISO 9001, AS/EN9100). The records shall be retained for a period of not less than ten (10) years from completion of purchase order. The supplier must impose this requirement on their sub tiers.



Records shall include, but not be limited to:

- Evidence of inspection to assure adherence to applicable drawings or specifications and revisions
- First Article Inspection Report see section 3.1 for retention requirement
- Test Reports
- Periodic inspection and control of inspection media
- Records to indicate control of Special Tooling and Special Test Equipment
 - Test data records of all qualification and acceptance test performed
 - Certification of personnel as required by specification and/or contract
 - Raw Material and Process certifications
 - Material Review Reports

2.5 Shipping Documentation Requirements

a) Packing Slips

Supplier shall provide a packing sheet or attachments for each separate shipment with the following minimum requirements:

- 1) Supplier's company name and address
- 2) Purchase order number, line item(s) and part numbers.
- 3) Northrop Grumman dispositioned nonconformance document number(s), as applicable.
- 4) Interchangeable and Replaceable (I&R) designated control numbers.
- 5) Required parts traceability forms associated with Section 3.5.
- 6) Evidence of Northrop Grumman source acceptance if purchase order required Northrop Grumman Source surveillance

b) Certificate of Conformance

Suppliers of SQAR codes - C, E, K, and L (noted in Table 2) shall complete form P0-F165, Supplier Certificate of Compliance in accordance with attached instructions. This form shall be included with every shipment.

All aluminum fabricated parts (SQAR Code E) require 100% Conductivity Inspection. Use Table 5 to determine the required conductivity range. The AMS2658 document is available from the SAE International (http://www.sae.org). The QOS-0021A document is available on OASIS.

Business Area	"As Ordered" Material	Heat Treated Material
ACS	AMS2658	Heat Treat Specification
AEW	AMS2658	QOS-0021A
AGS	AMS2658	Heat Treat Specification

Table 5 - Conductivity Standards



Suppliers of the balance of the SQAR Codes will provide a Certificate of Conformance (C of C) assuring that all work performed in connection with the purchase order conforms to requirements therein. The C of C may be a separate document or included on the packing sheet. The supplier's Quality management or designee must sign and/or stamp this document.

When a supplier is contracted to build and deliver a given part number to a specific engineering revision level, an engineering document that is either equal to or later in revision level is an acceptable means of performing product acceptance. A later revision of an engineering drawing includes incorporation of revisions that would have been issued as addendums (Engineering Orders, Engineering Change Notices, etc) to the prior level change and are thereby incorporated in the later revision.

Unless otherwise specified, the supplier shall work to the latest revision military process specifications referenced in the purchase order or the engineering documents.

c) Suppliers of Age-Sensitive Materials

Provide original manufacturing/cure date, lot number(s), expiration date or length of shelf life (if indefinite, so state). In addition, forward any special storage/handling instructions. Supplier is responsible to determine if acceptance test report submittal is required in accordance with applicable material specification.

The supplier shall physically identify the shelf life expiration date on the deliverable product or the unit packaging according to the applicable standard.

Elastomeric material with "No Shelf Life" requirement or "Unlimited Shelf Life" shall be marked as such

Note: For Project ID's AE, AL, AO, AS, BO, CP, DM, EA, EB, EC, ET, FD, FE, FF, JS, PM, TR, WR material must have no more than 25% of its shelf life expired when delivered.

d) Overhaul/Repair/Modified Items – FAA Repair Stations

Supplier shall provide a completed serviceable tag with Maintenance Release Statement, FAA Form/Tag 8130-3 in accordance with Federal Aviation Regulations (FAR), Part 43. Any Airworthiness Directives (AD's) or Service Bulletins (SB's) required by contract or the FAA shall be documented on the 8130-3, including level of compliance.

When applicable, the supplier shall provide FAA Form 337, "Major Repairs and Alteration Statement", and or FAA Form 8110-3, "Statement of Compliance with Federal Aviation regulations, and Alternate Method of Compliance".

A FAA FAR 145 approved repair station must perform work. All FAR 145 Repair Station Certificates will be validated utilizing the FAA website,

(http://av-info.faa.gov/oshkosh/RepairStation.asp). When requested by the Northrop Grumman, supplier shall provide a completed copy of the final inspection work order, which details the entire scope of work performed.



e) FAA FAR, Part 21 (Certification Procedure for Products and Parts)

Suppliers of new FAA parts shall provide documented evidence of traceability to FAR Part 21, Quality System Requirements, with each shipment. Suppliers of approved serviceable replacement parts shall provide, with each shipment, documented objective evidence of traceability to FAA FAR 21 as outlined by Advisory Circular No. 20-62, latest revision. Supplied parts shall be airworthy and acceptable for aircraft/aeronautical installations to all specifications called out contractually.

f) Tooling – Suppliers of Special Tooling or Special Test Equipment

In addition to sections "a & b" above, record the tool number, tool symbol, tool serial number (including the multiple number, as applicable), and assure a Northrop Grumman source surveillance stamp has been applied (see Section 3.6 for additional tooling-related requirements).

g) Rework/Repair/Replacement/Modified Items

Supplier's Certification of Conformance and/or packing sheet document shall reflect the following requirements for rework, replacement, repair or modification items returned to supplier or including work performed by supplier at Northrop Grumman' facility.

- 1) The item(s) have been reworked, repaired, replaced, or modified (as applicable), inaccordance with respective nonconformance documents or Purchase Order.
- 2) The item(s) meet the requirements of the engineering document(s).
- 3) The original configuration and qualification status of the item(s) remains in effect (as applicable).
- 4) All applicable nonconformance document numbers or other references to insure traceability.

Note: Discrepant material **shall not** be shipped to Northrop Grumman without prior approval from Northrop Grumman Materiel Review Board (MRB). (ref: section 2.2 and Table 4)

h) Qualification Certification

When Northrop Grumman' drawing, procurement specification and/or purchase order requires deliverable items to be "Qualified", suppliers shall certify that materials, parts, assemblies and/or related contract "Data Items" have been approved and all components of a deliverable item have been inspected and/or tested to applicable Acceptance Test Procedures (ATP) and/or specification/control drawings (both Northrop Grumman and supplier originated). In addition, to sections "a and b" above, certification shall indicate revision level of engineering drawings, specifications, and applicable design/specification changes as stated in purchase order.

Only authorized Northrop Grumman Engineering and Procurement written consent shall allow end items to be delivered prior to completion of qualification testing.



i) Material/ Process Certifications

Supplier shall maintain a copy of all supplier procured raw material certifications, which must be readily retrievable and shall include material specification, description, alloy and condition. The supplier shall maintain the mill certification for procured metallic material that shall include physical properties, chemical analysis and lot number(s).

Metallic Raw Material Distributors (ref: SQAR Code "A") shall include a copy of the original mill's certification with the shipment of deliverable material.

Supplier shall maintain copies of all subcontracted special processes. Supplier shall also obtain and maintain sub-tier supplier process certifications. No submittal is required unless specifically required per purchase order or other requirement herein. Supplier's material/special process and sub-tier supplier/processor certifications and test results shall be made available upon request.

j) Distributors of Standard Parts/Hardware

Project ID's – BS, NN, JF and AB

Standard and Purchase parts Distributors shall comply with the requirements of Northrop Grumman's Quality Assurance Test Procedure (QATP). Copies of this document are available on OASIS.

2.6 Nondestructive Test (NDT) Submittal Requirements

Project ID's – BS, NN, GH, JF and AB

Supplier shall review the purchase order and associated drawings/drawing notes and related documents to determine if NDT is required. Submittal of NDT general procedures and part-specific techniques to Northrop Grumman is required prior to production testing. Guidelines for the minimum content of general procedures/techniques are provided in the respective NDT process specification. After initial approval, any changes to subject documents must be resubmitted to Northrop Grumman for approval. An EO change to a specification does not require resubmittal. A specification revision change does require submittal of a revised procedure/technique or letter of compliance.

Suppliers using outside sources for NDT shall ensure that the selected NDT sub-tier has Northrop Grumman approval for the NDT procedure/technique used. An Approved Nondestructive Testing procedure/technique list is available on OASIS under Approved Processors.

NDT technique shall be submitted in accordance with applicable specifications.

2.7 Government QA Requirements (Unclassified Programs)

Supplier shall determine applicability of this requirement via the "Government Source" requirement shown on the purchase order header or the notes section. If applicable, supplier shall notify, at least forty-eight (48) hours in advance of need, the local government representative normally servicing supplier's facility. Supplier shall furnish a copy of this purchase order to the respective government office.



If the government representative/agency cannot be identified, notify the buyer immediately.

2.8 Government QA Requirements (Classified Programs)

Supplier shall determine applicability of this requirement via the "Government Source" requirement shown on the purchase order header or the notes section. When applicable, supplier is specifically instructed <u>not</u> to contact the Government representative normally servicing supplier's plant. Supplier will be advised through security channels of the Government representative accessed and designated for this contract. The designated representative shall be provided a copy of this order so that the Government representative can determine the appropriate level of service required, and to schedule associated activities.

2.9 Corrective and Preventive Action

a) General

The supplier shall respond to all buyer requests for corrective action on or before the requested response due date. Supplier shall maintain a documented system for determining root causes of documented defects and obtaining corrective action both internally and from its suppliers. The supplier is accountable for effectiveness of corrective and preventive actions taken.

Buyer requests for corrective and preventative action will be issued to the supplier's representative in the form of, but not limited to,

- Supplier Corrective Action Request (SCAR)
- Quality Assurance Deficiency Review Report (QADRR)
- Failure analysis reporting as required by engineering specification or contract data item requirements.

b) Guidelines for conducting Cause Analysis and Preventive Corrective Action

Suppliers shall utilize the Northrop Grumman "Corrective and Preventative Action Guidelines" available on OASIS. The Guide is intended to communicate Northrop Grumman's expectations for effective supplier corrective actions to prevent defect recurrence. Onsite training assistance from Northrop Grumman is available by contacting your assigned Supplier Quality & Technical Performance Process Manager.

c) Corrective Action Response Extensions

Northrop Grumman may grant the supplier an extension for their corrective action response on a case-by-case basis. Suppliers may formally request a time extension at least forty-eight (48) hours prior to the assigned corrective action response due date. Request must be in writing with adequate justification including a milestone plan documenting the actions, implementation dates and personnel responsible for root cause analysis and corrective action implementation.



d) Verification of Corrective Action (VCA)

Northrop Grumman retains the right to conduct corrective action verification at the supplier and/suppliers sub-tier supplier's facility to assess effectiveness of implemented corrective action.

Note: Material currently undergoing corrective action investigation processing up to and including verification of corrective action shall not be shipped without the authorization of Northrop Grumman Supplier Quality and Technical Performance.

2.10 Key Characteristics

When Northrop Grumman drawing, specification, and/or purchase order, includes "key characteristic" requirements, the supplier shall employ a Process Variability Reduction/Statistical Process Control (VR/SPC) program compliant with AS9103, Variation Management of Key Characteristics. VR/SPC related records shall be retained at supplier's facility and provided to Northrop Grumman' representative, upon request, for compliance review.

2.11 Control and Use of Digital Datasets

When digital datasets are required to manufacture product, the supplier shall comply with the "SQAR Supplement for the Use and Control of Digital Datasets" located in the Quality Requirements section of OASIS.

2.12 Foreign Object Debris/ Damage (FOD)

Supplier shall maintain good housekeeping and where applicable a Foreign Object Debris/Damage (FOD) prevention program, to preclude introduction of foreign objects into any deliverable item. Supplier shall employ appropriate housekeeping practices to assure timely removal of residue/debris generated during manufacturing operations or tasks. Supplier shall determine if sensitive areas that have a high probability for introduction of foreign objects should have special emphasis controls in place for the manufacturing environment.

2.13 Supplier Sub-tier Control

Supplier is responsible for ensuring all items procured from its subcontractors conform to all requirements of the Northrop Grumman purchase order. Supplier shall ensure all applicable provisions of this document are flowed down to its subcontractors. Sub-tier Supplier Quality system shall be compliant to either ISO9001: 2000 or AS/EN9100A, except FAA Repair Stations. All subtier suppliers are also required to utilize AS9102 for their first article inspection.

2.14 Program Specific Requirements

In addition to the requirements identified in Table 1, Quality System Requirements, the following additional documents are applicable to the following Project ID's (Ref. Table 3, Project ID).

a) Project ID's AE, AO, AS, EA, EB, EC, ET, FD, FE, FF, PM

• QES-0021 - Seller Requirements for Temper Inspection by Electrical Conductivity Measurement and/or Hardness Testing.



b) Project ID's AL, BO, DM, JS, TR, WR

- QES-MLB-100 J-STARS Quality Requirements for Refurbishment and Repair of Aircraft Component Parts and Assemblies
- QES-MLB-102 Northrop Grumman Joint Stars Quality Requirements for the Refurbishment Inspection of Boeing 707 Aircraft

Note: If the requirements in SQAR and the requirements in the documents referenced in SQAR conflict, the requirements in the referenced documents shall take precedence.

3.0 COMMODITY SPECIFIC REQUIREMENTS

The Requirements in this Section apply as indicated in Table 2, Standard Quality Requirements Matrix by SQAR Code.

3.1 Supplier First Article Inspection (FAI)

First Article Inspection (FAI) shall be performed per the requirements of AS9102, "Aerospace First Article Inspection Requirement" **prior** to product acceptance and shipment to Northrop Grumman. A copy of the First Article Inspection Report shall be submitted to Northrop Grumman as part of the shipping documentation.

If the supplier already has FAI documentation on file that meets the intent of AS9102 paragraph 5.2, a new FAI is not required.

The FAI shall be retained as a Quality Record for a minimum of three (3) years from completion of the <u>last purchase order</u> for that part number with the same revision level.

Suppliers may obtain copies of the AS9102 Forms and the AS9102 Frequently Asked Questions information from http://www.sae.org/iaqg/publications/faq9102.htm.

Note: This section does not apply to JSTARS Overhaul Items, Project ID BO and JS. However, JSTAR Modification parts that are manufactured by the supplier as part of a JSTAR overhaul require a documented FAI.

3.2 Part Marking Requirements

Supplier shall mark all deliverable products as required by the purchase order, engineering drawing and manufacturing planning. In addition, products with SQAR codes C, E, H, I, J, K, L, N, and R, shall also be identified with the six (6) digit Northrop Grumman supplier code or equivalent identifier traceable to the supplier.

Supplier shall apply the date of manufacture, date code(s) or other control identifier number (see examples below) to all deliverable hardware. Information must be applied adjacent to the hardware's identification markings and must be traceable to supplier's build documentation. Hardware produced



in lots, batches, groups, etc., shall have traceable control information applied. When size of hardware, or supplier's automated stamping process, does not permit data application to individual hardware (such as standard parts), the information shall be similarly placed on bags, tags, or labels as applicable.

Examples of traceable information may include, but are not limited to:

0)	Data	of Mo	nufactur	_
a)	Date	OL IVIA	пшасшт	e

f) Final Inspection Date

b) Serial Number

g) Batch Number

c) Lot Number

h) Casting Number

d) Control Number

i) Work Order Number

e) Heat Lot Number

Note: For Project ID's BO and JS, the revision level is not to be marked on the parts.

3.3 Special Process Requirements

a) General Requirements

When special processes listed in the Northrop Grumman "Approved Special Processors List" (ASPL), are required by drawing, specification, or purchase order, the supplier shall ensure that the processing source performing the work, including the supplier, is listed on the ASPL for that process prior to processing each batch of hardware.

Special Processors are required to be accredited by the National Aerospace and Defense Contractors Accreditation Program (Nadcap). A processor's approval will be determined based on the Northrop Grumman review of the latest Nadcap audit report for those processors with valid Nadcap approvals. For processors without a valid Nadcap approval, the affected processors are encouraged to get the Nadcap accreditation as soon as possible. Northrop Grumman has subscribed to Nadcap for the following process categories with a full transition to Nadcap by August 2003:

Nondestructive Testing

Chemical Processes

• Heat Treating

Coatings

• Material Testing Laboratories

Welding

When the Processor requires the use of outside sources for salt spray, tensile testing and solution analysis, Nadcap accredited laboratories shall be used as of June 2004. The Nadcap approved Materials Test Laboratory list can be found on the PRI web site: http://www.pri.sae.org under Qualified Manufacturer List (QML) or eAuditnet.

Northrop Grumman reserves the right to validate Nadcap compliances to any processes that are unique to Northrop Grumman or outside the scope of normal industry practice and/or Nadcap general audit practice.

This requirement also applies to the first-tier suppliers with internal process capabilities. In addition, if the supplier utilizes any external special process sources, this requirement must be



flowed down to the processing sources as soon as possible so as to avoid any problem during the transition in September 2003. All costs associated with Nadcap accreditation are to be borne by the processor.

The Performance Review Institute (PRI), a nonprofit affiliate of the Society of Automotive Engineers (SAE), must perform Nadcap accreditation audits. Any detail information regarding Nadcap accreditation process including the audit schedule can be obtained from PRI at (724) 772-1616 or from the PRI Website: http://www.pri.sae.org.

When processes listed in another prime aerospace company's Approved Processor List, (i.e., Boeing D1-4426, Lockheed Martin QCS-001, etc.), are required by drawing, another specification, or purchase order, the supplier shall ensure that the processing source for these processes, including those performed in house by the supplier, are approved prior to any processing of hardware.

The ASPL, D1-4426 and QCS-001 are available on OASIS. The processor may use a later revision of a process specification shown on OASIS, provided the following requirements are met:

- 1) There is no Northrop Grumman-initiated engineering orders associated with the process specification that the author of the specification has not incorporated in the latest revision.
- 2) There is no cost or schedule impact to deliverable hardware under contract. If an impact does exist as a result of using a later process specification revision than that shown on OASIS, the supplier shall contact the buyer for disposition instructions.

Note: Suppliers with Design authority may approve their own sub tier process source(s) to their process specifications. This authority does not extend to other Prime's process specifications, such as Boeing or Lockheed Martin. However, they are encouraged to subscribe to Nadcap by August 2003. Subcontracted processes of components of Supplier design must be performed by supplier-approved facilities whose capabilities and performance are supported by objective evidence of control such as: surveys and/or test results. A listing of all facilities being used must be available for review by Northrop Grumman which reserves the right of disapproval of those facilities not considered satisfactory. The suppliers shall not substitute their own process specification for the Northrop Grumman or customer process specification without prior written approval from Northrop Grumman Engineering.

The ASPL is organized by process type rather than by process specification. This listing of the ASPL indicates a Northrop Grumman approval of processor's capability to perform the process as required by the process specification.

Listing in the ASPL does not assure or imply that the work performed by the ASPL processor is acceptable, nor does it compel the listed processor to accept the work. It is the responsibility of the Supplier and/or the processor to review, perform, inspect and certify the processes specification as required by the purchase order. Since many specifications call out multiple alloys, grades, types, classifications and conditions for materials, it is also the supplier and/or the processor's responsibility to assure that you are approved for and capable of performing requested processing prior to any actual processing. Any departure from specification



requirement requires the prior written approval of the Northrop Grumman engineering group responsible for the specification.

The ASPL processors tier shall also comply with the Northrop Grumman Program unique requirements such as submission of test coupon, written approval of the processor's detail procedure, use of specific chemicals and/or concentration, and witnessing of first part processing and etc., when required by the process specification.

b) JSTAR Requirements (Project ID's BO and JS)

When special processes are performed in conjunction with a JSTAR's overhaul, the Repair Station shall ensure that processes are performed by a source approved under their FAA license, or a Northrop Grumman approved source (ASPL) or by the Original Equipment Manufacturer (OEM) approved source for that process.

c) Product Associated with Classified Programs Only

For Special Access Required "SAR" Items, supplier must contact the buyer for process approval status.

3.4 Northrop Grumman First Article Inspection Review

Non-Platinum Source suppliers shall request Northrop Grumman first article inspection review, as mandated in Section 1, Table 2, Standard Quality Requirements Matrix by SQAR Code. No shipment will occur until the Northrop Grumman first article review is complete.

Platinum Source suppliers shall request Northrop Grumman first article inspection review on the following items:

- a) Major Components and Assemblies (SQAR Code N)
- b) Structural Assemblies (SQAR Code H)
- c) Castings and Forgings (SQAR Code C)
- d) Maintenance/ Durability Critical Items
- e) Items with Interchangeable & Replaceable (I&R) features
- f) When specifically requested in the purchase order.

Supplier shall notify Northrop Grumman at least three (3) business days in advance of the need for first article inspection review. Configuration changes which affect the deliverable item's form, fit or function, or major changes in supplier's manufacturing process, shall require a new first article inspection to the extent necessitated by the change.

It is the responsibility of the supplier to coordinate and schedule Northrop Grumman first article inspection review as early during purchase order execution as practical. Production of deliverable items prior to Northrop Grumman acceptance of first article will be at supplier's own risk.

In addition to Northrop Grumman first article inspection review:

• The engineering drawing or Northrop Grumman's written instruction may require an <u>Engineering</u> first article evaluation. When required, supplier shall schedule and support this requirement similar to first article inspection review.



• Any Special Tooling used in the manufacture and/or as a media of inspection must be presented at this time for tool prove acceptance.

Note: This section does not apply to JSTARS Overhaul Items, Project ID's BO and JS.

3.5 Manufacturing Plan Submittals for Critical and Designated Parts

Project ID's – BS, NN, GH, JF and AB

Parts designated or described as Fracture Critical, Fracture Critical Traceable, Fatigue Critical, Durability Critical, Maintenance Critical, or F-35 Critical Parts requiring traceability by engineering drawings, specifications or purchase order configuration, require submittal of the manufacturing plan to Northrop Grumman at least thirty (30) days prior to start of production. The manufacturing plan shall contain sequential fabrication, processing, processor name and inspection steps, in the order required by the applicable process specification(s) and/or engineering drawing(s).

Upon approval of supplier's manufacturing plan, the supplier shall control all manufacturing, processing, testing and inspections as stated in the approved plan. No deviations, including the selection of supplier's sub-tier suppliers/processors, is permitted without Northrop Grumman prior knowledge and written authorization.

Manufacturing of product is not permitted until supplier has received Northrop Grumman approvals.

3.6 Tooling Requirements

The Northrop Grumman Supplier Tooling Manual delineates requirements for suppliers who have purchase orders that require manufacture, rework or use of Special Tooling (ST) and Special Test Equipment (STE). These requirements are applicable to all Northrop Grumman ST and STE fabricated and/or used in the manufacture of deliverable end items, unless specifically stated otherwise on the purchase order. Suppliers shall flow down requirements identified in these manuals to their sub-tier suppliers that fabricate or design tooling on their behalf.

The Northrop Grumman Supplier Tooling Manual can be accessed on OASIS. Copies of other manuals/documents can be obtained by contacting the buyer.

At a minimum, Special Tooling (supplier manufactured or Northrop Grumman furnished) used as a media of inspection must be delineated in the supplier's manufacturing plan at the applicable operation/sequence where the inspection occurs. Inspection media tooling must be controlled as part of the supplier's "Periodic or Calibration" system prior to use in production. Periodic tool inspection detailed requirements are covered in the Northrop Grumman Supplier Tooling Manual.

3.7 Commercial Product Requirements

Supplier shall comply with the quality requirements noted in the Contract Terms & Conditions (T&C) section of the purchase order.

3.8 Best Commercial Practices

Northrop Grumman reserves the right to visit the supplier's facilities to determine purchase order compliance. The type, necessity and degree of demonstration of conformance will be based on the confidence in the supplier's quality system and other factors such as product complexity, the



environment where the product is used, the ability to determine product quality after receipt, degree of "non-developmental design", and past supplier performance. Northrop Grumman reserves the right to reject non-conforming products. The supplier shall provide a Certificate of Conformance with each shipment.

3.9 Qualified Die for Castings & Forgings

Project ID's AO, AS, CP, EA, EB, EC, ET, FD, FE, FF only.

Prior to initial production, the die or pattern must be qualified per the requirements and procedures established in SP-G-012. The supplier of the casting or forging shall perform first piece inspection. Actual dimensions are to be recorded per SP-G-012 and the casting and forging sample report submitted for AEW/EW approval via the Request for Change/Information process. Shipment is to be withheld pending die or pattern dimensional approval by AEW/EW.

3.10 QOS-0033 Inspection Guidelines

Project ID's - AL, AM, AO, AS, BO, CP, DM, EA, EB, EC, ET, FD, FE, FF, JS, TR, WR

The supplier shall comply with the inspection requirements delineated in the Quality Operations Standard QOS-0033 "Inspection Guidelines for Sheet Metal Parts, Extrusions, and Tubing".

3.11 Software Control

Supplier shall establish and maintain a Software Quality Assurance (SQA) program in accordance with contractual requirements.

3.12 Research and Development/Advanced Programs Requirements

Note: Section 2 - General and Program Specific Requirements are <u>excluded</u>. The following is imposed on the Purchase Order contract invoking this document and SQAR code "V".

a) General

Northrop Grumman reserves the right to visit the supplier's facilities to determine purchase order compliance. The type, necessity and degree of demonstration of conformance will be based on the confidence in the supplier's quality system and other factors such as product complexity, the environment where the product is used, the ability to determine product quality after receipt, degree of "non-developmental design", and past supplier performance. Northrop Grumman reserves the right to reject non-conforming products.

b) Quality System Requirements

Supplier shall implement and maintain a quality management system in accordance with a recognized industry standard, such as; ISO 9001, AS/EN9100, AS 9003, etc. or a Program specific plan approved by Northrop Grumman Program Quality.

c) Product Release

No Customer Inspection is required.



d) Notification/ Disclosures

The suppliers system shall provide for timely reporting of nonconformities that may affect already delivered product, including any continuing airworthiness actions. Notification to the buyer shall include a clear description of the discrepancy, which includes as necessary; parts affected, customer and/or supplier part numbers, quantities and date(s) delivered.

e) Certificate of Conformance

Suppliers shall provide a Certificate of Conformance (C of C) assuring that all work performed in connection with the purchase order and this document conforms to requirements therein. The C of C may be a separate document or included on the packing sheet. The supplier's Quality management or designee must sign and/or stamp this document.

f) Qualification Certification

When Northrop Grumman' drawing, procurement specification and/or purchase order requires deliverable items to be "Qualified", suppliers shall certify that materials, parts, assemblies and/or related contract "Data Items" have been approved and all components of a deliverable item have been inspected and/or tested to applicable Acceptance Test Procedures (ATP) and/or specification/control drawings (both Northrop Grumman and supplier originated).

g) Part Marking Requirements

Supplier shall mark all deliverable products as required in the purchase order, engineering drawing and/or manufacturing planning.

4.0 GENERAL INFORMATION

4.1 Purchase Order Terms and Conditions

Northrop Grumman Contract Terms and Conditions information, which document purchase order requirements, are available on OASIS.

4.2 Internet Access

Northrop Grumman has established a web page on the Internet to provide suppliers a quick on-line link to this SQAR document. The web site is called the Online Automated Supplier Information System (OASIS) and can be accessed at: https://oasis.northgrum.com.

SQAR is found within the "Contracts Data" section of OASIS.

Note: Suppliers do not need an OASIS password to access the SQAR document, however, a password <u>is</u> required to access certain "Technical Data". Passwords may be obtained by contacting Internet Supplier Programs at (310) 332-2759 or (310) 331-1055.

In addition to SQAR, OASIS has links to other information resources. OASIS provides quick access to Purchase Order Terms & Conditions, Standard Notes, Web EDI (Electronic Data Interchange), Process Specifications, and Approved Supplier Sources for Process Specifications (including those requiring Customer approval).



4.3 SQAR Code (Commodity-Type Definitions)

- **A Metallic Raw Materials** Associated with metallic (ferrous and non-ferrous) materials that are controlled by a material specification, i.e., sheet, bar/plate/round stock, ingots, extrusions, tubing, etc.
- **B Non Metallic Raw Materials** Associated with non-metallic materials that are controlled by a material specification, i.e., fiberglass, graphite, kevlar, plastics, etc. Materials may be provided by the original mill or manufacturer, or furnished by distributors.
- C Castings & Forgings "As cast" castings and forgings
- \mathbf{D} Not in use

E – Fabricated Parts

Sheet Metal Parts - Parts that are fabricated from sheet metal through metal forming/blanking/chemical milling operations, i.e. stretch form, brake form, routing, punch press, drop hammer, joggling, hand forming, hydro forming, welding, etc.

Machined Parts - Simple to complex metallic parts that are machined from plate/ bar/round stock, extrusion, castings, or forgings, including those that have minor assembly work such as installation of bushings or bearings.

- **F Mechanical Standard Parts/Hardware** Hoses, fittings, couplings, springs, fasteners, inserts, pins, shims, and miscellaneous small parts controlled by design standard drawings. Hardware may be provided by the original manufacturer or distributor (includes just-in-time suppliers).
- **G Electrical Components/Hardware** Cables, wires, resistors, capacitors, diodes, blank circuit boards connectors, switches, etc. Hardware may be provided by the original manufacturer or distributors (includes just-in-time suppliers).
- **H Structural Assemblies** Simple/minor aircraft structures and sub-assemblies (metallic or composite) i.e., doors, flaps, canopies, radomes, nacelles, etc.
- **I Functional Assemblies** Mechanical, hydraulic, electromechanical, fuel, oxygen, pyrotechnics, parachutes, life rafts, pneumatics, landing gears, actuators, hydraulic pumps/motors, electrical motors, and aircraft assemblies that usually require acceptance/functional testing (ATP).
- **J Electronics** Electronic assemblies/sub-assemblies that usually require acceptance/ functional testing (ATP), i.e., stuffed circuit boards, "black boxes", flight control computers and recorders, radios, wiring harnesses, etc.
- **K** Composite Detail Parts Parts that are fabricated from graphite, fiberglass, kevlar, or other composite materials, i.e., ducts, skin panels, fairings, etc.
- L **Non-Metallic Details** These parts typically include items such as phenolic, rubber seals, gaskets, o-rings, etc. These parts cab be either fabricated to an engineering drawing or procured to a material specification.
- M Paints, Sealants, & Chemicals Airborne paints, sealants, adhesives, chemicals and consumables procured to a material specification for use on contract deliverable items.



- N Major Components/Assemblies Major aircraft assemblies (metallic or composite), components, mechanical and avionic systems or subsystems. Also included are high-value hardware items, hardware considered to be critical to flight performance and/or safety, high-value and/or complex Ground Support Equipment (GSE) and Strategic alliances with critical /key suppliers.
- O Special Processing Outside or in-house processing performed to a process specification in support of material/parts finish/testing requirements, i.e., anodize, paint, plating, welding, chemical milling, heat treat, non-destructive test (NDT), etc. that requires customer process approval.
- **P Technical Services -** Services provided in support of assuring product compliance, i.e., calibration, CMM inspection, NDT technical support, etc.
- **Q Tooling** Usually associated with tooling purchased by Northrop Grumman for use by Northrop Grumman or the supplier in producing/validating parts/assemblies. Tools usually are fabricated in accordance with Northrop Grumman/ Northrop Grumman' Customer tooling specifications.
- **R Repairs** Related to repair of items that have been in service or are no longer under warrantee.
- **S Software** Contract deliverable software typically procured in support of airborne or ground support equipment.
- **T No SQAR** No quality system requirements are applicable. Normally for non-deliverable material and Government and/or Customer furnished equipment.

U – Commercial Items –

- (1) Any item, other than real property, that is of a type customarily used by the general public or by non-governmental entities for purposes other than governmental purposes, and
 - (a) Has been sold, leased, or licensed to the general public; or,
 - (b) Has been offered for sale, lease, or license to the general public;
- (2) Any item that evolved from an item described in paragraph (1) of this definition through advances in technology or performance and that is not yet available in the commercial marketplace, but will be available in the commercial marketplace in time to satisfy the delivery requirements under a Government solicitation.

V – Research & Development (R&D)/Advanced Programs –

Material that is procured for an experimental proof of concept vehicle that will be part of "flight" hardware.



Attachment 1

Quality System Level	Applicable Quality System Document*	Supplier Description
Level 1	ISO 9001, AS/EN9100, AS/EN9000	Manufacturer with Design Authority
Level 2	ISO 9002, FAR Part 145	Manufacturer (Build-to-Print) Value Added Distributor
Level 3	ISO 9003, AS9120, ASA 100	Pass-thru Distributor
Level 4	ISO 9002, ISO 10012-1, ISO 17025, AS9003, Nadcap AC7004, ANSI-Z540-1	Processor/ Services
Level 5	Per Applicable Statement of Work	Commercial Items

Table 1- Quality System Requirements

Applicable SQAR Section (✓ **indicates Section is applicable) SQAR Code & Commodity Description** 3.2 3.4 3.5 3.6 3.7 3.8 3.9 3.10 3.11 3.12 3.3 **Metallic Raw Materials** В **Non-Metallic Raw Materials** _ _ **Castings & Forgings √** ✓ ✓ Open - Not in Use* D E **Fabricated Parts Mechanical Standard Parts/ Hardware** _ _ G **Electrical Components/ Hardware** -_ ----**Structural Assemblies √** H Ι **Functional Assemblies √** ✓ -**√** -J **Electronics √** K **Composite Detail Parts** L **Non-Metallic Detail Parts** ✓ ✓ Paints, Sealants and Chemicals ---N **Major Components and Assemblies √ √** 0 **Special Processing** _ ✓ **Technical Services** Q **Tooling** ✓ **√** _ _ R Repairs -✓ ✓ ----S Software No SQAR Requirements U **Commercial Items Research & Development/ Advanced Programs**

Table 2 - Standard Quality Requirements Matrix by SQAR Code – Commodity Type

^{*}Note – Previous Quality System approvals will continue to be recognized unless there is a change to Supplier status or contract.



Project	Project Description	Business	Project	Project Description	Business
ID*		Area	ID*		Area
AA	T-38	ACS	GH	Global Hawk	ACS
AB	T-38/F5 Common	AEW	HH	B-2 Program	ACS
AE	A-10	AEW	JF	F-35 (Joint Strike Fighter)	ACS
AL	ALMDS (Air Laser)	AGS	JS	E-8A/E-8C (JSTARS)	AGS
AM	AMSTE	AGS	KK	Kistler	ACS
AO	ASO Spares	AEW	MA	MALDS	ACS
AS	A-6	AEW	NN	F-18 Production	ACS
AT	AS & T	ACS	PM	Point Mugu	AEW
BO	JSTARS (Boeing Unpriced Items)	AGS	QQ	BQM 74 (Targets)	ACS
BS	B-2 Spares	ACS	QX	BQM 34 (Targets)	ACS
CC	Chukar (Targets)	ACS	RD	RDT&E	ACS
CP	C-2 Spares	AEW	SE	Advanced Program	ACS
DD	NASA	ACS	SS	Special Project	ACS
DM	Depot Maintenance	AGS	TF	F-18E/F	ACS
EA	EA-6B	AEW	TR	TSSR	AGS
EB	EA-6AB Spares	AEW	UU	Non-Contract Allocated	Other
EC	E-2C	AEW	VC	VTUAV	ACS
ET	E-2T	AEW	VV	Non-Contract Burden	Other
FD	F-14D Spares	AEW	WR	Warner Robbins	AGS
FE	F-14A Spares	AEW			
FF	F-14	AEW			

Table 3 - Project ID

^{*}Note – All Project ID's will be prefaced on purchase orders with "PID"