**QUALITY OPERATIONS STANDARD**

**TITLE:** AEROSPACE SYSTEMS – SUPPLIER INDEPENDENT MATERIAL REVIEW BOARD REQUIREMENTS

Standard Number: QOS 0043  Revision Letter: F  Effective Date: 2/4/2013

**PREPARED BY:** *Bill Desmond / Russ Griesmer
QS&MA Quality Engineering, Bethpage

**APPROVED BY:**
- **APPROVED BY:** *A. Mule
Manager, AS Quality Systems
- **APPROVED BY:** *A. Gelderman
Manager, Quality Engineering - Bethpage
- **APPROVED BY:** *P. Morris
Manager, Product Quality - Melbourne
- **APPROVED BY:** *M. Meloro
Manager, Quality Systems
- **APPROVED BY:** *S. Grisafi
Manager, Mechanical Engineering - Bethpage

* Approvals on file

**REVISIONS**

<table>
<thead>
<tr>
<th>DATE</th>
<th>REV</th>
<th>REV. BY</th>
<th>DESCRIPTION</th>
<th>RATIONALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>05/15/06</td>
<td>A</td>
<td>B.D.</td>
<td>Revise Scope, General Requirements, MRB Redelegation</td>
<td>Clarify Requirements</td>
</tr>
<tr>
<td>06/14/06</td>
<td>B</td>
<td>B.D.</td>
<td>Add re-delegation statement Section VI, para J.1,I.f</td>
<td>Clarify Requirements</td>
</tr>
<tr>
<td>09/03/08</td>
<td>C</td>
<td>R.G.</td>
<td>Revised to replace AEW &amp; EW call outs with ISER</td>
<td>Consolidate into an ISER document</td>
</tr>
<tr>
<td>07/21/09</td>
<td>D</td>
<td>R.G.</td>
<td>Revised to update IWO requirements and ISER to AS</td>
<td>Clarify Requirements</td>
</tr>
<tr>
<td>08/02/12</td>
<td>E</td>
<td>R.G.</td>
<td>Revised to clarify BAMS and MRB membership requirements. Remove MLB -</td>
<td>Clarify Requirements</td>
</tr>
<tr>
<td>02/04/13</td>
<td>F</td>
<td>R.G.</td>
<td>Revised to change the call out for BAMS to Triton - administrative change only</td>
<td>Program name change</td>
</tr>
</tbody>
</table>
I. CONTENTS:

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>II. Scope:</td>
<td>3</td>
</tr>
<tr>
<td>III. Purpose:</td>
<td>3</td>
</tr>
<tr>
<td>IV. Associated Documents:</td>
<td>3</td>
</tr>
<tr>
<td>V. Definitions:</td>
<td>4 - 5</td>
</tr>
<tr>
<td>VI. Specific Requirements:</td>
<td>5 - 16</td>
</tr>
<tr>
<td>A. Design Cognizance:</td>
<td>5</td>
</tr>
<tr>
<td>B. Supplier Authority:</td>
<td>5 - 6</td>
</tr>
<tr>
<td>C. MRB Members:</td>
<td>6</td>
</tr>
<tr>
<td>D. MRB Membership Requirements:</td>
<td>7</td>
</tr>
<tr>
<td>E. NG AS Approval:</td>
<td>8</td>
</tr>
<tr>
<td>F. Preliminary Review Personnel:</td>
<td>8</td>
</tr>
<tr>
<td>G. NG AS Audits:</td>
<td>8</td>
</tr>
<tr>
<td>H. General Requirements:</td>
<td>9</td>
</tr>
<tr>
<td>I. Supplier Sub-tier Nonconforming Material:</td>
<td>9</td>
</tr>
<tr>
<td>J. MRB Redelegation:</td>
<td>10</td>
</tr>
<tr>
<td>K. Detailed Requirements for Preliminary /</td>
<td></td>
</tr>
<tr>
<td>Material Review:</td>
<td>11 - 12</td>
</tr>
<tr>
<td>L. Disposition Requirements:</td>
<td>12 - 13</td>
</tr>
<tr>
<td>M. Nonconforming Material Documentation:</td>
<td>13</td>
</tr>
<tr>
<td>N. Material Review Forms:</td>
<td>14</td>
</tr>
<tr>
<td>O. Precedence:</td>
<td>14</td>
</tr>
<tr>
<td>P. Corrective Action :</td>
<td>14</td>
</tr>
<tr>
<td>Q. Additional Requirements for Build to</td>
<td></td>
</tr>
<tr>
<td>Print Suppliers:</td>
<td>15</td>
</tr>
<tr>
<td>R. Independent Supplier MRB Request Data</td>
<td></td>
</tr>
<tr>
<td>Package:</td>
<td>16</td>
</tr>
</tbody>
</table>
II. SCOPE:

This document delineates the supplier Material Review Board (MRB) system requirements for the control and disposition of nonconforming material at a supplier’s facility. This standard is applicable to the production of contract deliverables, including Development contracts unless stated otherwise in the Purchase Order or Intra-company Work Order (IWO) contract.

The requirements specified herein are minimum requirements in order to be approved for Northrop Grumman Aerospace Systems (NGAS) Supplier Independent MRB for the following programs: A-10, ASO Spares, Triton, C-2 Spares, EA-6B/EA-18G, EA-6B Spares, E-2C/D, E-2T, Littoral Combat Ship and LEMV.

All references to NGAS throughout this document shall only be specific to the programs defined above.

Specific Program applications and requirements will be delineated in the individual Letters of Delegation.

Note: The term “Supplier” used herein shall be inclusive of all work performed under a Purchase Order or IWO contract.

III. PURPOSE:

To provide one comprehensive document that specifies the requirements and submittal process for Independent Material Review Authority.

This document shall be applicable when:

a. The supplier’s Quality Management System is AS9100 registered.

b. The supplier’s management with executive responsibility has defined, documented, and approved the procedures for the control and disposition of nonconforming material (that is in conformance with this document), and

c. Government Source Inspection (GSI) is specified in the Purchase Order/Contract (excludes Triton Program).

IV. ASSOCIATED DOCUMENTS:

- **QOS 0035** Guidelines for Supplier Preparation and Processing of Supplier Material Review Reports (SMRR/WT)
- **SQAR** Supplier Quality Assurance Requirements
- **SQ 0100** Supplier Material Review Board Guidelines
- **AS9100** Quality Management Systems – Aerospace Requirements
V. DEFINITIONS:

**Material Review Board (MRB)** - A board consisting of authorized Supplier Quality and Engineering members necessary to review, evaluate and determine the proper disposition of nonconforming material referred to it.

**Nonconformance** - The failure of a characteristic to conform to the requirements specified in the contract, drawing, specification, purchase order or other approved product description.

**Major/Critical Nonconformance** - A nonconformance other than minor that cannot be completely eliminated by rework or reduced to a minor nonconformance by repair.

**Minor Nonconformance** - A nonconformance which does not adversely affect any of the following: health or safety, performance, interchangeability, reliability, maintainability, effective use or operation, weight or appearance when a factor. Note: Multiple minor nonconformances, when considered collectively, may raise the category to a major/critical nonconformance.

**Nonconforming Material** - Any item, part or product containing one or more nonconformances.

**Preliminary Review (PR)** – The action taken by supplier’s authorized personnel when nonconforming material is initially discovered and prior to referral to the supplier’s approved MRB.

**Repair** - Action which subjects nonconforming material to a planned manufacturing process designed to reduce but not completely eliminate the nonconformance. Except for Standard Repair Procedures (SRP), proposed repairs approved by the customer are for use on a one-time basis.

**Rework** - Action which subjects nonconforming material to a planned manufacturing process that restores all nonconforming characteristics to the requirements in the contract, drawing, specification, purchase order or other approved product description.
Scrap - Nonconforming material that is not useable for its intended purpose or cannot be economically reworked or repaired.

V. DEFINITIONS (continued)

Standard Repair Procedure (SRP) - A documented repair technique which, when properly applied, has been demonstrated to be an adequate and cost effective method for repair of a nonconformance. Standard Repairs are developed by the supplier and approved by the organization’s MRB.

Note: Specific to the Triton Program only, in order for a supplier to be permitted to use Standard Repair Procedures on the Program; the Supplier must submit their Standard Repair Manual/Procedures to NGAS MRB and DCMA – Bethpage for review and approval.

Use-as-is – A disposition of material with one or more minor nonconformances determined to be usable for its intended purpose in its existing condition.

VI. SPECIFIC REQUIREMENTS:

A. Design Cognizance

1. Supplier Designed Material review authorization is intended for Northrop Grumman AS supplier contracts wherein the products being procured are of supplier design. This does not apply to off-the-shelf products.

2. Build To Print Suppliers- Northrop Grumman AS (the design authority) may authorize Material Review for build to print suppliers (e.g. major assemblies/structures) of Northrop Grumman AS designed products. See section Q for additional Material Review requirements for suppliers with build to print contracts. All requirements of this document apply; should there be a conflict between the requirements of this document and the additional requirements specified in section Q, Section Q shall take precedence.

B. Supplier Authority

1. The supplier, after approval, will be authorized to process Minor nonconformances. All nonconformances that are considered to be Major shall be submitted to Northrop Grumman in accordance with QOS 0035 and accompanied by a recommended disposition.
VI. SPECIFIC REQUIREMENTS (continued):

B. Supplier Authority (continued)

2. The following items are also considered to be Major nonconformances and as such, cannot be dispositioned by the supplier’s MRB:

   Interface – those mating points and surfaces whose configuration and dimensions affect the next higher level of assembly/installation over which the supplier has no design cognizance.

   Fatigue Critical - those details, assemblies, and areas designated by Northrop Grumman AS or identified as such on supplier engineering drawings.

   Aerodynamic Nonconformances – Aerodynamic smoothness nonconformances that affect appearance or performance after repair.

   Critical Safety Items – Any nonconformances associated with parts identified by Engineering as Critical Safety Items in accordance with DFARS 209.270 “Aviation Critical Safety Items”

C. MRB Members

1. The supplier’s procedures shall require approval of each MRB member by Quality Assurance and/or Engineering management. Objective evidence of this approval including the resume or equivalent documented MRB experience/MRB training shall be maintained.

2. MRB members shall be selected on the basis of their technical competence and supplier experience. MRB members may call upon other supplier personnel/groups for technical assistance.

3. The supplier’s Material Review Board shall consist of Quality Engineering and Engineering responsible for product design.

4. Normally, Northrop Grumman will only authorize a maximum of three (3) members from each of the Engineering and Quality disciplines to serve on the MRB. If warranted by the diversity of work operations, additional members will be considered.

5. Northrop Grumman AS shall be apprised of all changes to the roster of authorized MRB personnel. Resumes or equivalent documented MRB
experience of proposed MRB members shall be submitted for Northrop Grumman AS approval.

VI. SPECIFIC REQUIREMENTS (continued):

C. MRB Members (continued)

6. The Government representative shall approve all dispositions of use as is and repair when required by contract. The use of “Government Post Audit” review is not permitted without the express written approval of Northrop Grumman AS and the Government representative, (DCMA-Bethpage Contracting Office).

D. MRB Membership Requirements

Minimum criteria for selecting and approving MRB personnel:

1. MRB Quality Membership

a. Education:

   1. Bachelor’s degree in Engineering or related technical discipline.

   2. In the absence of a degree as described above, at least five years of Quality Assurance experience.

b. Training:

   1. Minimum one (1) year on-the-job training with an approved Quality member of the MRB.

   2. Ability to read engineering drawings.

   3. Familiarity with AS9100 (Quality Management Systems) and this document.

2. MRB Engineering Membership- Mechanical/ Electrical

   The selection of engineers for MRB Engineering membership shall be based upon education, experience, technical competence, and engineering skills.

   a. Education:

      1. Bachelors Degree in Engineering or related technical discipline.
VI. SPECIFIC REQUIREMENTS (continued):

b. Training:

1. Applicants should have a minimum of two years technical work experience in a professional engineering capacity.

2. Applicants should have a minimum of one year’s work experience, in an aerospace environment (may be concurrent with the above). This experience shall have been under the mentorship of an authorized MRB Engineer.

E. NG AS Approval

1. A proposed MRB member meeting the noted minimum requirements does not negate Northrop Grumman’s AS sole right of approval.

F. Preliminary Review Personnel

1. The Supplier’s procedures shall require that personnel appointed to conduct preliminary review shall have experience and/or training consistent with the requirements of the duties to be performed by this function. (See Section K, paragraph 3)

   a. Preliminary review personnel must be able to discern the difference between rework and repair.

G. Northrop Grumman AS MRB Audits

1. The supplier’s Material Review system will be audited on a periodic basis. Audit time period will be based on the nature of the product, recommendation from the initial review and the Supplier Scorecard performance rating. Additional audits may be scheduled as required. Note: MRB audits may be conducted as both an onsite and offsite review and require audit documentation to be submitted to NGC for review.

   The Supplier’s MRB procedures, records, and processes shall be made available and submitted upon request to the Northrop Grumman AS representative.

   The supplier shall provide sufficient support to allow an efficient and effective review.
VI. SPECIFIC REQUIREMENTS (continued):

2. Upon receiving initial MRB Authority the supplier may be required to submit completed MRB documentation to Northrop Grumman AS Quality for post audit review.

H. General Requirements

1. Changes to procedures for the identification, control and disposition of nonconforming material and concurred within the Letter of Delegation shall be submitted to Northrop Grumman AS for concurrence.

2. Northrop Grumman AS reserves the right to review the decisions of the Supplier’s Material Review Board.

3. Northrop Grumman AS reserves the right to revoke the Supplier’s MRB delegation at any time.

4. A change in supplier name, ownership, or facility location may subject supplier’s Independent Material Review System to be reevaluated by Northrop Grumman. The supplier shall notify Northrop Grumman AS of any of the aforementioned changes.

I. Supplier Sub-tier Nonconforming Material

1. The Supplier’s procedure shall address sub-tier supplier nonconformances found by the supplier. These nonconformances should be included in the supplier rating of the sub-tier supplier.

2. Sub-tier suppliers shall be notified of material nonconformances discovered by the supplier (exceptions may be included in the Supplier’s procedures).

3. Supplier may disposition nonconforming conditions associated with the Supplier’s parts and assemblies within the limitations and requirements of this document.
VI. SPECIFIC REQUIREMENTS (continued):

J. MRB Redelegation

1. The redelegation of MRB authority is not permissible without prior Northrop Grumman AS approval.

   a. If Northrop Grumman AS and the Supplier elect to delegate such authority, the requirements of this document shall be flowed down either in full or as appropriately tailored. Note: Tailoring shall be reviewed/evaluated by Northrop Grumman AS Quality.

   b. Supplier reviews – The Supplier’s procedures shall require that the Supplier’s sub-tier MRB process be reviewed and results documented annually as a minimum.

   c. Provisions shall be included in the delegation allowing Northrop Grumman AS to review the sub-tier’s MRB system and/or documents upon request.

   d. Northrop Grumman AS reserves the right to revoke the Supplier’s sub-tier MRB delegation.

   e. Prior to requesting Northrop Grumman AS re-delegation approval, the Supplier shall review and approve all sub-tier:

      1. Procedures for corrective action, MRB, control and disposition of non-conforming materials that establish compliance with this document and AS9100

      2. Resumes of proposed Quality and Engineering members. The same requirements shall apply to sub-tier MRB membership as apply to Supplier’s membership.

   f. Re-delegation shall have the formal endorsement of the Supplier’s cognizant Government Representative.
VI. SPECIFIC REQUIREMENTS (continued):

K. Detailed Requirements for Preliminary / Material Review

1. Control of Nonconforming Material- the Supplier shall establish and maintain a system which will identify, segregate (or control if segregation is not practical) and disposition nonconforming material (including scrap).

2. Identification and segregation of nonconforming material- When material is found to be nonconforming:
   
a. The nonconforming items shall be conspicuously marked or tagged (or otherwise identified if marking or tagging is not practical) and controlled to preclude their unauthorized use in production.

b. The material shall be moved to a controlled area designated for the storage of nonconforming material unless it is not practical due to size, configuration, or environmental requirements.

c. The designated area shall be protected to preclude unauthorized removal.

3. Preliminary Review Process

   a. Preliminary Review- When material is initially found to be nonconforming, the supplier’s procedures may provide that it can be examined by Supplier appointed “preliminary review” personnel, who may be separate from MRB personnel, to determine if the nonconforming condition:

      1. Requires scrapping of the material because it is obviously unfit for use and cannot be economically reworked or repaired.

      2. Can be eliminated by rework to drawing or completion to drawing

      3. Requires return of the material to a supplier

      4. Can be repaired by approved Standard Repair Procedure (SRP) and must be forwarded to the MRB for concurrence.
5. Meets none of the above and must be referred to the supplier’s MRB.

VI. SPECIFIC REQUIREMENTS (continued):

K. Detailed Requirements for Preliminary / Material Review (continued)

b. The use of previous MRB decisions by Preliminary Review to process identical or similar articles is not permissible except where an SRP exists.

4. Material review process

a. Supplier’s MRB system- The supplier shall establish and maintain written procedures that ensure at a minimum, the MRB:

1. Investigates all nonconforming material (except material previously disposed of in the Preliminary Review) in sufficient depth to determine proper disposition.

2. Reviews and concurs in all proposed use-as-is and repair dispositions.

3. Approves all SRPs for recurrent use and establishes thresholds for re-evaluation.

4. Only dispositions nonconforming material as scrap, rework, return to supplier, repair, repair by an approved SRP, use-as-is or submit as a waiver to the Northrop Grumman AS Subcontracts Administrator.

L. Disposition Requirements

1. The supplier’s MRB procedures shall assure that:

a. Use-as-is dispositions (UAI):

1. Are submitted to the cognizant Government Representative for review and approval.

2. Are supported by rationale for accepting the nonconforming condition. Rationale must be specific to the nonconformance and end item usage.
3. Include a determination of the appropriateness of a document change is annotated on the MRB document.

### VI. SPECIFIC REQUIREMENTS (continued):

#### L. Disposition Requirements (continued)

- **b. Repair dispositions:**
  
  1. Are submitted to the Supplier’s cognizant Government Representative for review and approval prior to accomplishing the repair.

- **2. Standard Repair dispositions**
  
  a. Are approved by the Supplier’s Northrop Grumman AS approved Material Review Board for recurrent use.
  
  b. Are approved by the Supplier’s cognizant Government Representative for recurrent use.
  
  c. Are reviewed periodically to ensure that they are complete and up-to-date relative to current process capability and state-of-the-art.

- **3. Scrapped material**
  
  a. The supplier’s procedures shall provide that scrapped material be conspicuously identified and controlled to preclude its subsequent use or inadvertent shipment.

- **4. Reprocessing Instructions**
  
  a. Supplier’s procedures shall include provisions for reprocessing material (including reinspection and test) after repair. This applies to both standard and non standard repairs.
M. Nonconforming Material Documentation

1. The supplier shall maintain records of nonconforming material and dispositions. The supplier’s procedures shall assure these records are organized to permit efficient retrieval and provide sufficient detail for performing investigations.

VI. SPECIFIC REQUIREMENTS (continued):

N. Material Review Forms

1. The supplier shall identify the standard form(s) for documenting and dispositioning nonconforming material. The procedures shall address the minimum requirements or data fields to be on the form, including signatures/approvals. Detailed instruction shall be established, when necessary for documenting nonconforming material, dispositions, approvals, etc., in accordance with the Supplier’s defined system.

O. Precedence

1. The foregoing conditions shall take precedence over any provisions contained in the procedures and practices comprising the Supplier’s system for control and disposition of nonconforming materials.

P. Corrective Action

1. The Supplier’s procedures shall ensure that an effective corrective action system is established and functioning throughout the supplier’s organization. If cumulative methods of corrective action are employed, the procedures shall require establishment of limits beyond which specific corrective action shall be taken to bring the process back to acceptable limits.

2. Supplier’s procedures shall require flow down of corrective action requirements to a sub-tier supplier when it is determined that the sub-tier supplier is responsible for the root cause.
3. The supplier’s procedures shall require that records of corrective action, both individual and cumulative, be maintained.

VI. SPECIFIC REQUIREMENTS (continued):

Q. Additional Requirements for Build to Print Suppliers

1. Standard Repair Procedures (SRP)
   a. The use of SRPs is not permitted for Build to Print Suppliers. All nonconforming conditions shall be dispositioned by the MRB.

2. MRB Engineering Members
   a. Northrop Grumman shall conduct an interview of proposed MRB Engineering members prior to approval. The interview will cover Northrop Grumman AS Engineering repair philosophy as related to the end item supplied. For example: Structural Issues, (shear-moment diagrams, beam loading, truss loading, etc.), static strength, fatigue considerations, stress concentration, bearing and shear capability, equivalent strength, tear out, and examples of relevant nonconforming conditions to be dispositioned.

3. Nonconformance’s in Fatigue Critical areas
   a. Fatigue Critical details, assemblies and areas are those designated on Northrop Grumman AS blueprints, specifications or contract.
   b. When dispositioning nonconforming parts/assemblies, it shall be determined whether such parts are fatigue critical. Applicability (yes or no) accompanied by the initials of the Engineering MRB member must be indicated on the MRB nonconforming document.
   c. Those conditions determined to be “applicability yes” shall be submitted to Northrop Grumman AS in accordance with QOS 0035, accompanied by a recommended disposition.
VI. SPECIFIC REQUIREMENTS (continued):

R. Independent Supplier MRB Request Data Package

1. Supplier shall prepare the data package with the following minimum items that establish compliance with this document and AS9100.

   a. Procedure(s) for:
      1. Identification, control and disposition of non-conforming material.
      2. Material Review.
      3. Standard Repair Process. (Triton Program only: all SRPs must be approved for use by NGAS MRB and DCMA – Bethpage.)
      4. Implementation of corrective action to preclude recurrence of nonconformances.

   b. Roster of Quality and Engineering personnel proposed for MRB membership accompanied by resumes or equivalent documented experience. Documented experience shall include the candidate’s education, work history and relevant MRB experience. See section D for requirements.

   c. Evidence of the cognizant Government Representatives concurrence with the above items.

   d. Copies of Quality Management System (AS9100) registration.

   e. A matrix shall be provided that cross references the requirements of this document to the Supplier’s procedures by Procedure number, section and paragraph.

2. The request data package shall be submitted to the appropriate Northrop Grumman AS Subcontracts Administrator for processing.