Unmanned Systems

SUPPLIER QUALITY ASSURANCE REQUIREMENTS (SQAR) DOCUMENT

NOTE: The change history of this process guide can be found at the end of this document.

INTRODUCTION AND SCOPE

This Supplier Quality Assurance Requirements document defines supplier restrictions and quality system requirements applicable when goods and services are procured to L-3 Unmanned Systems part numbers or Military, Federal or Industry specifications or standards. It describes the minimum requirements and processes that L-3 Unmanned Systems expects suppliers to implement.

L-3 Unmanned Systems is committed to working with suppliers to ensure customer satisfaction through conformance to Quality requirements, competitive costs, improved communication, reduction of variation, elimination of non-value added work and meeting delivery expectations. We intend to establish and maintain long-term relationships with suppliers who are committed to continuous improvement in quality, delivery, cost and service. This commitment is an expectation of all suppliers. Those suppliers who embrace this philosophy will have the opportunity to enter into long-term relationships with L-3 Unmanned Systems. As we explore new markets, we need support from our entire supply base and commitment in meeting or exceeding our customer's needs. We look forward to continuing our proactive relationship with suppliers that is mutually beneficial and long term.

This SQAR document is the suppliers' guide to understanding L-3 Unmanned Systems quality requirements and expectations. This document forms a part of the L-3 Unmanned Systems purchase order, unless otherwise specified herein. It contains helpful general information and specific L-3 Unmanned Systems quality requirements that must be met by our suppliers.

We believe that evidence of this commitment to a continuous improvement philosophy includes ISO9000, ISO14000, AS9100, QS9000 (TS16949) certification, proactive supply chain management, productivity improvements and frequent cost-saving proposals. In turn, L-3 Unmanned Systems will deal honestly with our Suppliers, strive to listen to our Suppliers concerns, communicate our requirements and provide our Suppliers with the appropriate tools to perform at world-class levels.

DEFINITIONS

2.1 **"BUYER"** shall mean a duly authorized Subcontract Manager/Buyer representative of L-3 Unmanned Systems Corporation as stated in the Purchase Order.

2.2 **"SELLER"** means the vendor/Supplier and/or distributor performing the work/supplying the materials, parts, assemblies, subassemblies, and systems, subsystems, or services pursuant to the Purchase Order.

2.3 The words “shall” and “must” express mandatory requirements. The word “should” expresses a recommendation or advice on implementing such a requirement. L-3 Unmanned Systems encourages such recommendations or best practices to be followed. The word “may” expresses a permissible practice or action. The word “will” expresses a provision or intention in connection with a requirement.

GENERAL REQUIREMENTS

3.0 APPLICABILITY

3.1 These general requirements shall apply to Sellers whenever this SQAR is invoked on the Purchase Order (QA Purchase Order Requirement **QAPOR 5**). Other variable requirements specific to the Purchase Order shall be identified as additional quality requirements with the applicable Quality Code.

Applicable revision status of such specifications shall be the revision in affect on the date of the Purchase Order, unless specified in the Purchase Order or related documents. Revision status of procured/deliverable items shall always be as specified in the Purchase Order.

3.2 Where there is a conflict between the SQAR and the purchase order, engineering drawings, specifications, and/or Statement of Work, the documents previously mentioned shall have precedence over this SQAR.

3.3 Supplier performance will be monitored on a monthly basis using a six month rolling period. The Scorecard measures the supplier performance in the areas of delivery and quality. Suppliers will receive regular documentation concerning their performance. Poor performing Suppliers may be placed on restriction for placement of new purchase orders or may be removed from the Approved Supplier List (ASL). Suppliers who have not supplied product to L-3 Unmanned Systems for a period of three years will be removed from the ASL. Any supplier removed from the ASL will be required to be revaluated and approved in order to be placed back on the ASL.

4.0 SUPPLIER’S QUALITY SYSTEM REQUIREMENTS

4.1 It is L-3 Unmanned Systems expectation that suppliers implement a quality management/inspection system which complies with ISO 9001:2000, AS9100 or an equivalent system approved by L-3 Unmanned Systems. The Seller should employ advanced quality techniques and tools which foster continuous improvement of fabrication and assembly processes.

4.2 The Seller shall immediately notify the Buyer in writing of any change to ownership, facility location or the quality management system that may affect the inspection, conformity, or safety of the product or quality system status. (e.g., Seller converts to an ISO900-based system; or Seller is no longer registered to AS9100)

4.3 L-3 Unmanned Systems approval of the supplier's program does not constitute acceptance of product/services or relief of purchase order requirements.

5.0 CORRECTIVE ACTION SYSTEM

5.1 The Supplier shall have a functioning system for closed loop corrective action. Seller agrees to provide to the Buyer corrective action using Buyer's Form L3US-QAP-001 (Supplier Corrective Action Request) within 30 days from issuance of a SCAR. Seller further agrees to:

a) Conduct a thorough failure/root cause analysis identifying the cause(s) for the discrepancy (ies) noted.
b) Determine and take the necessary corrective action(s) to prevent recurrence.
c) Identify whether any previous shipments for the subject or similar parts contain the noted discrepancy.
d) Identify the effectivity of the corrective action(s).

The failure/root cause analysis should be conducted using proven techniques such as 5-Why's, Cause and Effect/Fishbone diagrams, Fault Tree diagrams, etc.

6.0 RECORDS OF OBJECTIVE EVIDENCE/RECORD RETENTION

6.1 Suppliers shall maintain Quality records in accordance with ISO 9001:2000 or an equivalent L-3 Unmanned Systems approved system. The records shall be retained for a period of not less than 7 years from the completion of the Purchase Order. The records shall include but not limited to:

a. Verifiable objective evidence of inspection and tests performed during execution of this Purchase Order, including nonconformance documentation.
b. Test data records of all qualification and acceptance tests performed.
c. Raw material and Process certifications.
d. Material Review Reports. (MRB)
e. Certification of personnel as required by specification and/or contract.
f. First Article Inspection reports.

These records shall be provided to the Buyer upon request.

7.0 CALIBRATION SYSTEM

7.1 Seller test and measurement equipment services shall have a calibration system in compliance with the requirements of MIL-STD-45662A, ISO 10012 or ANSI/NCSL Z540. Calibration procedures must be maintained which provide sufficient information for periodic calibration of inspection, measuring, and test equipment (IM&TE).

8.0 PREVENTATIVE MAINTENANCE SYSTEM

8.2 Seller shall establish and implement a preventative maintenance program This program shall include proper scheduling of maintenance requirements, documentation for completion or inability to complete the maintenance requirement, a quality control process that ensures the proper procedure is followed and maintenance inspections are being completed properly, and material and parts support to ensure that maintenance requirements can be completed in the frequency assigned.

9.0 SHELF LIFE MATERIAL CONTROL PROGRAM

9.1 Supplier shall establish a shelf life and storage control program to ensure that no material that has exceeded its shelf life can be used in the assembly of L-3 Unmanned Systems product. Such a program shall include policies and procedures for:

a. Identifying and maintaining a database (a list) of all items that have shelf life limitations and/or special storage requirements.
b. A receiving inspection process that can ensure that all incoming products are still within their shelf life limitation period.
c. A process for physically identifying, labeling, or coding each item so that its shelf life can be readily determined and stating that the item is under shelf life control.
d. A procedure(s) for reviewing (auditing) the status of all items under shelf life controls both in stock and previously issued items/products.
e. Identifying and tracking repackaged consumables. This should include all appropriate information, such as part number, batch number, receiving information (for tracking), date opened, and expiration date. Note: Repackaged consumables with shelf life/storage condition requirements, on which the status cannot be verified, should be properly disposed of.

10.0 ELECTROSTATIC DISCHARGE (ESD) PROTECTION

10.1 Components and assemblies, which are susceptible to electrostatic discharge damage, shall be handled and packaged to prevent ESD damage utilizing MIL-STD-1686, ANSI/ESD S20.20, or EIA/JEDEC JESD625 as a guideline or equivalent system approved by L-3 Unmanned Systems.

11.0 WORK INSTRUCTIONS

11.1 Suppliers shall maintain work instructions or equivalent control mechanism that directs procedures and processes appropriate for the control of quality and configuration through all stages of production.

12.0 NONCONFORMING MATERIAL CONTROL

12.1 Nonconforming material shall be identified, documented, evaluated, segregated and dispositioned to prevent its unintended use. Unless otherwise stated in the Purchase Order, the Seller is authorized to conduct limited Material Review and disposition of nonconforming products identified by the Seller using the following disposition alternatives:

a. rework to applicable requirements,
b. scrap, or
c. RTV – return to (the Supplier's) sub-tier source for rework or replacement.

12.2 Nonconforming products are defined as any products that fail to meet the requirements of the L-3 Unmanned Systems engineering drawing, specification, Purchase Order or other approved product description, including products (such as products under the Supplier's proprietary design control) which fail to meet requirements established and controlled by the Seller or the Seller's sub-tier sources.

12.3 The Seller may propose and formally request a "use-as-is" or repair (salvage) disposition from L-3 Unmanned Systems by submitting Form L3US-QAP-002, "Suppler Information Request", to the L-3 Unmanned Systems Buyer. The Seller's Material Review and nonconforming product disposition records, as well as the Material Review records at the Supplier's sub-tier sources are subject to on-site verification by L-3 Unmanned Systems to ensure that the Seller is in compliance with these requirements.

12.4 The Seller shall not ship to L-3 Unmanned Systems any nonconforming products that have not been dispositioned by L-3 Unmanned Systems MRB unless authorized by L-3 Unmanned Systems in writing. When L-3 Unmanned Systems MRB dispositioned products are delivered to L-3 Unmanned Systems, the Seller shall reference on the packing list/shipper the MRB document which describes the L-3 Unmanned Systems MRB disposition. When the Supplier's shipment includes products dispositioned by L-3 Unmanned Systems MRB along with conforming products, the products dispositioned by L-3 Unmanned Systems MRB shall be segregated and marked or tagged so as to permit easy identification upon receipt at L-3 Unmanned Systems.

13.0 PRODUCT CHANGES

13.1 Seller shall not make any changes in material(s), software, design, manufacturing source(s), process (es) and tooling, which potentially affects the fit, form, or function of the item for items on this PO without the prior notification and approval of the Buyer. Production parts fabricated in advance of Buyer approval shall be at the Seller's risk.

13.2 The Seller's change control system shall assure that the latest applicable drawings, specifications, technical requirements, Purchase Order information and changes thereto will be available at the time and place of acceptance of material and/or services.

Buyer reserves the right to test the changed hardware in its system or by using simulators to verify the compatibility of changed hardware prior to accepting said hardware or changes. This includes full re-qualification if necessary.

13.4 In the event that a component becomes obsolete or otherwise unprocurable, the Supplier shall formally notify L-3 Unmanned Systems as soon as a last time buy notification is received.

13.5 All requests to deviate or request clarifications from the requirements of this document shall be submitted to L-3 Unmanned Systems for approval using Form L3US-QAP-002, “Suppler Information Request”.

15.0 STATISTICAL TECHNIQUES

15.1 Suppliers are responsible for understanding and reducing variation within processes, and are encouraged to use control-charting techniques.

16.0 SUPPLIER CONTROL

16.1 The Seller, as the recipient of the Purchase Order, is responsible for meeting all Purchase Order specified technical and quality requirements, whether the Seller performs the work, or the work is performed by the Sellers's sub-tier sources. When the Seller uses sub-tier sources for components or to perform work on products and/or services scheduled for delivery to L-3 Unmanned Systems, the Seller shall flow-down all on Purchase Orders or Contracts, to his sub-tier sources, all of the applicable technical and quality requirements of the L-3 Unmanned Systems Purchase Order, this SQAR document and, when applicable, the requirement to document and control 'key characteristics' and/or 'key processes', and to furnish certifications and test reports required by the applicable Purchase Order requirements.

17.0 INDUSTRY SPECIFICATIONS AND STANDARDS

17.1 For all Military, Federal, and Industry specifications and standards, the Supplier shall comply with the revision in affect at the time the L-3 Unmanned Systems Purchase Order is issued.

18.0 ALTERING DATA ON DOCUMENTS

17.1 The use of any method that causes the original data on documents to be obliterated and unreadable (i.e. the use of correction fluids, correction tape, write-over, or other methods) to correct, modify or otherwise alter the data and/or entries on any certifications, test reports or other documents required by the Contract, is strictly prohibited. Corrections may be made on inspection a report providing it is clearly obvious that a correction was made and it is signed (initialed) or stamped by an authorized individual. Upon receipt at L-3 Unmanned Systems, products or services represented by documents that show evidence that they have been corrected or altered in an unauthorized manner are subject to return to the Supplier.

19.0 FOREIGN OBJECT DEBRIS/DAMAGE (FOD) CONTROL PROGRAM

Definitions.

19.1 Foreign Object Debris (FOD): A substance, debris, or article alien to a vehicle or system which could potentially cause damage which downgrades or renders the system unusable or unsafe for operation. Other contaminants having the same potential as foreign objects include, improper or incomplete cleaning and deburing of machine parts, high concentration of oil and/or water vapor in pneumatic test facilities, food and beverage residue, grease, etc.

19.2 Foreign Object Damage (FOD): Any damage attributed to a foreign object that can be expressed in physical or economic terms which may or may not degrade the product's required safety and/or performance characteristics.

19.3 Foreign Objects: Any loose objects such as solder balls, electrical wire clippings, safety wire clippings, screws, washers, metal filings, RTV clods, machine shavings, detached burrs, staples, tools, etc.

19.4 The Supplier shall establish and maintain a program to control and eliminate FOD and/or contamination during the Supplier's manufacturing, assembly, test and inspection operations. When applicable, the Supplier's FOD control program shall include controls to preclude FOD or contamination at the Supplier's sub-tier sources.

19.5 The Supplier's FOD prevention program shall include the review of design and manufacturing processes to identify and eliminate foreign object entrapment areas and paths through which foreign objects can migrate. Supplier shall ensure work is accomplished in a manner preventing foreign objects or material in deliverable items.

19.6 The Supplier shall maintain clean and orderly Inspection, Assembly and Test area work tables to prevent contamination and foreign objects from entering the product.

Operators should practice a "Clean As You Go" approach to every product being assembled. Only the parts, tools and/or equipment necessary for performing the work shall be allowed on the work tables. All tools used during the product assembly, shall be accounted for upon completion of each assembled unit or groups of units.

19.7 All hardware items shall be accounted for upon completion of each assembled unit or groups of units. Assembly/Inspection personnel shall ensure all assemblies are visually inspected for FOD prior to closing.

19.8 Supplier shall document and investigate each FOD incident and ensure elimination of the root cause, and implement corrective action of each such incident.

19.9 The Supplier's FOD program is subject to on-site review and approval by L-3 Unmanned Systems.

19.10 Delivery of product shall be deemed as certification that items delivered are FOD free.

20.0 NOTIFICATIONS/ DISCLOSURES

20.1 The Supplier's system shall provide for timely reporting of nonconformities that may affect product already delivered, including any continuing air-worthiness actions. Notification to the buyer shall include a clear description of the discrepancy, identification of all suspect parts (to include mfg. dates, serial numbers, quantities, etc.) and material affected by the deficiency, date(s) delivered, any information relating to the Root Cause/Corrective Action steps initiated to address the defective condition, and preventive measures taken to preclude recurrence of the process failure. Modifications of a disclosure (additions or deletions of data) requiring subsequent issuances shall be revision controlled to provide definitive sequencing (i.e. Rev 'A', 'B' etc.).

21.0 SOFTWARE CONFIGURATION MANAGEMENT

21.1 The Seller shall implement a Software Configuration Management (SCM) system which includes CM planning, identification, change control, status accounting and CM audits.

21.2 The Seller shall implement a Corrective Action / Problem Tracking System to track software problems/corrective actions to closure.

22.0 COUNTERFEIT PARTS PREVENTION - Subcontractors and Contract Manufacturers

22.1.1 Only new and authentic materials are to be used in products delivered to Buyer. No counterfeit or suspect counterfeit parts are to be contained within the delivered product. Parts shall be purchased directly from the OCMs/OEMs, or through the OCM/OEMs Franchised Distributor. Documentation must be available that authenticates traceability to the applicable OCM/OEM. Independent Distributors (Brokers) shall not be used without written consent from Buyer (L-3).

Definitions

Counterfeit – a part that is an illegal or unauthorized copy or substitute of an OEM item; an item that does not contain the proper external or internal materials or components required by the OEM or that is not constructed in accordance with OEM specification; an item or component thereof that is used, refurbished or reclaimed but the Seller represents as being a new item; an item that has not successfully passed all OEM required testing, verification, screening and quality control but that Seller represents as having met or passed such requirements; or an item with a label or other marking intended, or reasonably likely, to mislead a reasonable person into believing a non-OEM item is a genuine OEM item when it is not. Parts that have been modified pursuant to a specific L-3 purchase order requirement, such as refinished, up-screened, or up-rated parts that are properly identified as such are not considered suspect or counterfeit.

Suspect Counterfeit – A part in which there is an indication by visual inspection, testing, or other information that it may have been misrepresented by the supplier or manufacturer and may meet the definition of a counterfeit part.

OCM – Original component manufacturer

OEM – Original equipment manufacturer

Franchise Distributor – A distributor with whom the OCM has a contractual agreement to buy, stock, re-package, sell and distribute its product lines. Franchised distributors normally offer the product for sale with full manufacturer's warranty. Franchising contracts may include clauses that provide for the OCM's marketing and technical support, failure analysis and corrective action, and exclusivity of inventory.

Independent Distributor (Broker) – A distributor that purchases parts with the intention to resell them. Independent Distributors may be franchised for selected, but not all, product lines. For purposes of counterfeit risk mitigation, a distributor is considered independent when not franchised for the item to be procured.

23.0 COUNTERFEIT PARTS PREVENTION - Independent Distributor - Passive Components and Connectors

Independent Distributor's procedures shall meet the requirements of IDEA-STD-1010 & SAE AS5553 and have a Quality Management System certified to AS9120:2002. The requirements of AS6081 shall be in effect upon industry release of this standard.
The original manufacturers Certificate of Conformance (C of C) and all traceability documentation shall be included with each shipment of parts. It shall include the manufacturer's name, part number, date codes, lot codes, serializations, and / or any other batch identifications. Seller is to contact Buyer in the event that the original OEM/OCM C of C and traceability documentation is not available. All inspecting
and testing shall be performed to the original manufacturer's specifications and parameters. Recorded evidence of all testing performed shall be included with each shipment. The following inspections and tests are required:

- Applicable electrical testing (resistance, capacitance, continuity) for the devices procured (1% AQL Level II)
- Visual Microscopy Inspection of all parts in the order under 10X minimum magnification (100% of the lot)
- X-Ray inspection for non-glass diodes and tantalum capacitors (100% of the lot)
- XRF/RoHS (2 parts per lot date code)
- Resistance to Solvents testing (2 parts per lot date code)
- Heated Solvent testing (Dynasolve Immersion) (2 parts per lot date code)
- Scrape testing (2 parts per lot date code)
- Solderability testing per IPC/EIA J-STD-002 (2 parts per lot date code)

- Scanning Electron Microscopy for metal packaged parts only (1 part per lot date code)

If suspect/counterfeit parts are furnished under this subcontract and are found in any of the goods delivered hereunder, such items will be impounded by Buyer. The Seller shall promptly replace such suspect/counterfeit parts with parts acceptable to the Buyer and the Seller shall be liable for all costs relating to the removal and replacement of said parts as specified in the subcontract requirements or Distributor's insurance policies. Buyer reserves all contractual rights and remedies to address grievances and detrimental impacts caused by suspect/counterfeit parts. All occurrences of Suspect Counterfeit and/or Counterfeit parts will be immediately reported to ERAI.

24.0 COUNTERFEIT PARTS PREVENTION - Independent Distributors – Active Components

Independent Distributor's procedures shall meet the requirements of IDEA-STD-1010 & SAE AS5553 and have a Quality Management System certified to AS9120:2002. The requirements of AS6081 shall be in effect upon industry release of this standard. The original manufacturers Certificate of Conformance (C of C) and all traceability documentation shall be included with each shipment of parts. It shall include the manufacturer's name, part number, date codes, lot codes, serializations, and / or any other batch identifications. Seller is to contact Buyer in the event that the original OEM/OCM C of C and traceability documentation is not available. All inspecting
and testing shall be performed to the original manufacturer's specifications and parameters. Record evidence of all testing performed shall be included with each shipment. The following inspections and tests are required:

- Visual Microscopy Inspection of all parts in the order under 10X minimum magnification (100% of the lot)
- X-Ray inspection (100% of the lot)
- XRF/RoHS (2 parts per lot date code)
- Resistance to Solvents testing (2 parts per lot date code)
- Heated Solvent testing (Dynasolve Immersion) (2 parts per lot date code)
- Scrape testing (2 parts per lot date code)
- Solderability testing per IPC/EIA J-STD-002 (2 parts per lot date code)
- De-lid, Die Penetrate, Die Verification (2 parts per lot date code)
- Scanning Electron Microscopy (1 part per lot date code)

If suspect/counterfeit parts are furnished under this subcontract and are found in any of the goods delivered hereunder, such items will be impounded by Buyer. The Seller shall promptly replace such suspect/counterfeit parts with parts acceptable to the Buyer and the Seller shall be liable for all costs relating to the removal and replacement of said parts as specified in the subcontract requirements or Distributor's insurance policies. Buyer reserves all contractual rights and remedies to address grievances and detrimental impacts caused by suspect/counterfeit parts. All occurrences of Suspect Counterfeit and/or Counterfeit parts will be immediately reported to ERAI.

Revision	Date	Primary Change Summary
New	15 Oct 2012	Initial Release