ASTRONICS TEST SYSTEMS INC.
General Quality Assurance Terms and Conditions, Supplement A (10/2015)

Note: **(Standard)** conditions apply on all Purchase Orders. **(Non-Standard)** conditions apply when specified on Purchase Orders.

Purpose:

This document establishes the Quality Assurance requirements which are applicable as specified on the Order. If there is a conflict between the Astronics Test Systems Inc. Standard Purchase Order Terms and Conditions, and this Astronics Test Systems Inc. General Quality Assurance Terms and Conditions, Supplement A ("Supplement A"), this Supplement A shall prevail.

Definitions:

Capitalized terms set forth herein but not defined in this Supplement A shall have the meaning ascribed to such terms in the Order.

Additional Order Document Clauses/Notes:

Additional program or specification clauses or notes may form a part of an order as defined in the Order.

The following Quality Assurance clauses are incorporated into each Order (Standard):

Clauses 1 – 10, of this document are hereby included in the Purchase Order and are expressly made a part thereof. Failure to fully comply with all invoked requirements may result in rejection and return of the items on this order. The Seller(s) shall thoroughly check the furnished drawings and/or specifications prior to use in manufacture of the items described therein. Any anomalies must be reported and reconciled in writing before proceeding with production. Documents specified herein shall be of the issue in effect on the date of receipt of the Order, unless otherwise specified.

Any material rejected by Buyer, either at the Seller's(s) facility or at Buyer shall be fully identified as such if resubmitted. References must be made to the Buyer rejection document and satisfactory evidence given that the causes for rejection have been removed.
Buyer representatives and/or Buyer customer representatives shall be afforded the right to verify at the Seller's premises and the organization's premises that sub-contracted product conform to the specified requirements.

WORKMANSHIP: Workmanship shall conform to MIL-HDBK-454 "Standard General Requirement for Electronic Equipment" and/or IPC-A-610 "Acceptability of Electronic Assemblies" (latest revision release)

SUPPLIER QUALITY CONTROL SYSTEM REQUIREMENTS

Suppliers providing material or services not under the AS9100 classification shall maintain a quality system that is compliant to ISO9001 (latest revision) or equivalent and shall be verifiable by Astronics Test Systems Inc.

SUB-TIER SUPPLIER CONTROLS

Suppliers who subcontract work to their suppliers must flow-down all applicable quality requirements noted on the drawing, purchase order and this document.

1. Shipping Requirements (Standard)

1-A. Commercial packing is normally acceptable for shipment to Buyer. Seller is responsible for selecting packaging methods and materials, which provide adequate protection at minimum cost. Packaging methods and materials selected should consider, as a minimum, fragility, part composition, surface finish, size, and weight and transportation mode.

1-B. Each contract item must be packaged and identified separately. Markings on primary packaging must include the part number, nomenclature and quantity. If applicable, include serial number, lot number and cure date.

1-C. DO NOT combine items from different Purchase Orders in the same shipping container.

1-D. All containers are subject to material inspection and should provide a reseal able feature.

1-E. The following items are prohibited: staples used for closing bagged parts; loose fill packaging material, (i.e., plastic peanuts), unless contained in a polyethylene bag or similar method.

1-F. Seller must provide legible packing slips in a conspicuous and easily accessible place on the shipping container, unitized or palletized load. The packing slip must state the Order number, Order item number and Part number as shown on this contract.

1-G. When applicable, the packing slip must also include the appropriate control numbers, (i.e., serial, lot batch, roll, heat lot, heat treatment, etc.) and cure/manufacturing date. All associated paperwork, (i.e. certifications, test reports, MSDS etc.) must be located with the packing slip.

1-H. Bar Coded labels are to be affixed to each item and to include the following information: Order number, Line item, Part number, Unit of Measure, Quantity, and when applicable, Date code and Serial number.

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2. **Material Review Authority is not granted on this Purchase Order.** (Standard)

Seller(s) wishing to apply for authority to make disposition of Nonconforming material should forward their requests together with their procedures to Buyer. Formal approval of these procedures and written permission to implement Material Review must be received from Buyer.

2-A **NONCONFORMING MATERIAL**: Authority to ship material which does not conform to stated purchase order requirements must be obtained from Astronics purchasing in writing prior to shipment. Approval to ship nonconforming material does not release the supplier from responsibility of the defect. Material shipped and found to be discrepant shall be returned to supplier at supplier's expense

3. **Configuration Control** (Standard)

Seller will not deviate from the specifications as stated on an Order. No changes to form, fit, function, material, characteristics, firmware/software, part number, or sources of supply will be allowed without prior written approval of Buyer by submitting an Engineering Change Request (or Request for Deviation) no later than 120 days prior to the effective date of the requested change. Seller will not ship affected products prior to written approval by Buyer.

4. **Documentation & Record Retention** (Standard)

4-A. Documentation as listed herein must accompany each shipment and include company name, Astronics Test Systems Inc., Order number, Buyer specification number or Seller(s) identification number or associated drawings or specifications. Certificate of Compliance ("C of C") is required and may be furnished in any format desired by the Seller(s) provided the following information is provided:

a) Seller's name and address
b) Date certification issued
c) Buyer's purchase order number
d) Governing specification
e) Signature and title of a company authorized representative of management
f) Certification of "Special Processes" either as part of the body of the Certificate of Compliance being submitted or as an attachment thereto.
g) Part Number and Part Nomenclature

(i) The conclusions expressed in the C of C must be backed up by data. The existence of such data shall be affirmed in the C of C and the Seller(s) shall be capable of retrieving such data for inspection at any time up to 7 years after date of issuance of the C of C.

(ii) Parts, material or equipment covered by the C of C must be fully identified as to part number, revision level, and lot batch level, and lot batch serial numbers as applicable.

(iii) The C of C shall be signed by a responsible supervisory individual who has the authority to make legally binding accept/reject decisions on behalf of the Seller(s).

4-B. Seller shall maintain or have maintained by sub-suppliers all test and inspection records, including radiographs, furnace charts of heat treatment, radiographic records, all records of nonconformance, applicable to material supplied to the Buyer. These records shall include verification that all required inspections and tests have been accomplished with the satisfactory results by a qualified individual.

4-C. These records shall be kept for a period of **seven** years after completion of this purchase order and shall be made available to the buyer within 36 hours upon request.

4-D. Record retention periods also apply to electronic records. Records generated and maintained in the Seller's information systems or equipment (including mainframe, mini, and micro computer/storage systems) are to be periodically reviewed by appropriate information owners and/or custodians to ensure that record management requirements (i.e. controlled access, password protection and backup protection) are being met.

4-E. At the end of the seven year period, the Seller shall request in writing instructions from the Buyer as to whether the records shall be destroyed; forwarded to the Buyer; or retained by the Seller for a longer period (as agreed upon by the Seller and the Buyer).

5. **Shelf Life** (Standard)

For materials/products that performance is affected by shelf life and/or environmental storage conditions, each part level package shall be marked with the date of manufacture or the useful life expiration date of the Contents. When marking is impractical a certificate with this information shall be included with the shipment. If environmental control increases/decreases shelf life, identify material and paperwork with recommended storage environment. Do not ship material with less than 80% useful shelf life.

6. **Mercury Contamination** Prohibited (Standard)

Functional Mercury and Mercury contamination prohibited notwithstanding any other provisions of order, material furnished by seller shall not contain functional Mercury unless specific written approval has been obtained from Buyer.

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7. Printed Circuit Boards (Standard)

7-A. Printed Circuit Board Acceptability shall be per IPC-A-600 class 2 unless otherwise specified on the product documentation.

7-B. 100% Test Printed Circuit Boards as follows:
- i) 10 ohm Maximum Continuity Resistance
- ii) 1 megohm Maximum Resistance.

7-C. All PCB's shall be packaged in sealed bags with desiccant pouches for moisture prevention purposes. Maximum of 5 PCB's per bag. Orders of less than 5 to be individually bagged.

8. Electrostatic Sensitive Devices ("ESD") (Standard)

8-A. Seller shall mark all circuit assemblies used in the purchased hardware containing ESD sensitive components with either the military complaint symbol defined in MIL-STD-1686 or the EIA625 standard.

8-B. Seller shall utilize industry standard techniques on all relevant processes, operation and inspection areas handling ESD sensitive components, including static sensitive packaging. Systems shall be adequate to protect the most sensitive components in use.

9. First Article Approval & Qualification (Standard)

Supplier of Astronics designed parts, assemblies, and forging/ foundry supplied castings shall furnish.

9-A. A first piece inspection report is required with the first lot supplied under this purchase order. The inspection shall be performed and documented by the Seller and shall have 100% of all attributes inspected. The piece used for this inspection shall be labeled and clearly identified.

9-B. Delta first articles shall be provided if a change is made to the product affecting form, fit or function of the end item.

10. CALIBRATION: (Standard)

The supplier's system of test equipment repair and calibration shall be in accordance with;

a) ANSI/NCSL Z540, Calibration System Requirements. Seller shall furnish with each shipment a Certificate of Calibration
Or

b) ANSI/ISO/IEC 17025 "Calibration System Requirements".
Seller shall furnish with each shipment a Certificate of Calibration. Certificates of Calibration with traceability to NIST or equivalent international standard body are to be provided with each unit.

The following Quality Assurance clauses are incorporated into each Order when stipulated on the Order (Non-Standard):

Applicable additional clauses of this document when referenced in the Order are expressly made a part thereof. Failure to fully comply with all invoked requirements may result in rejection and return of the items on this order. The Seller(s) shall thoroughly check the furnished drawings and/or specifications prior to use in manufacture of the items described therein. Any anomalies must be reported and reconciled in writing before proceeding with production. Documents specified herein shall be of the issue in effect on the date of receipt of the Order, unless otherwise specified.

Any material rejected by Buyer, either at the Seller's(s) facility or at Buyer shall be fully identified as such if resubmitted. References must be made to the Buyer rejection document and satisfactory evidence given that the causes for rejection have been removed.
Buyer representatives and/or Buyer customer representatives shall be afforded the right to verify at the Seller's premises and the organization's premises that sub-contracted product conforms to the specified requirements.

11. Establish Copy Exactly! Baseline ("BCE!") (Non-Standard)

11-A. By accepting the Order, Seller is engaging in a contract to deliver the same product in terms of form, fit, function, materials, characteristics software/firmware, and/or sources of supply. To this end, Seller is required to establish a written baseline on this, the first order against the contract, so Seller can build/inspect subsequent units against the baseline.

11-B. This BCE! Contract remains in effect for all future order(s). Seller is required to notify Buyer no later than 120 days prior to the effective date of any requested change that affects BCE! compliance. The requirements stated below under CE! also apply.

12. Conform to Copy Exactly! ("CE!") (Non-Standard)

All products shipped against the identified part number(s) shall conform to the previously established Copy Exactly! Baseline. Any deviations must be requested in writing within 5 days of acceptance of the Order and/or prior to shipment, whichever, occurs first. Seller shall not ship non-CE! products prior to written approval by Buyer.

13. Special Documentation (Non-Standard)

13-A. Furnish test measurement readings covering all functional parameters identifying compliance with each of the requirements specified in the referenced drawing and/or specification. This document shall be signed by a responsible Seller(s) Quality Assurance Representative.

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13-B. Physical & chemical test data of raw materials used in the fabrication of articles on the Order, denoting the manufacturer of the materials and your order number are to be supplied with each shipment.

14. Source Inspection, Government (Non-Standard)

14-A. Government inspection is required prior to shipment from your plant. Upon receipt of this order, promptly notify the Government Representative who normally services your facility so that appropriate planning for Government inspection can be accomplished.

14-B. All work on this order is subject to inspection and/or test by the Government (FAA/DCMA) Representative. The Government Representative shall be notified a minimum of 72 hours in advance of the time articles or materials are ready for inspection or test.

14-C. The Government reserves the right to inspect any or all of the work included in this order at the Seller(s) facility.

15. Source Inspection, Buyer (Non-Standard)

15-A. All work performed under this purchase order is subject to Astronics Test Systems Inc. Source Inspection at the Seller's facility. Astronics Test Systems Inc. representative may select to witness inspection/testing either on a random basis or up to 100%. Unless specified otherwise on the purchase order the Seller shall notify Astronics Test Systems Inc. Quality Assurance Department not less than 7 working days prior to the scheduled performance of final testing and acceptance by the Seller. Times of these visits will be arranged so as to be mutually agreeable between Buyer and the Seller(s).

15-B Buyer representative and Buyer customers, when accompanied by Buyer representatives shall be granted access to the Seller(s) facility to review or monitor the Quality/Inspection system including In-process controls and final acceptance.

15-C. Release of material by Buyer Quality Representative is required prior to shipment from Seller's facility. Release of material from Seller's facility does not constitute final acceptance. Final approval and acceptance will occur by Buyer Quality Assurance at the destination.

15-D. Mandatory In-Process ("MIP") inspection of material by Buyer Quality Representative is required during specific parts of the process, as defined in attached contractual or related documents, at your plant. Notify the Buyer Quality Office at least 7 days in advance on any assembly which cannot be inspected as a result of further processing. (Pre-cap inspection is a prime example of an in-process inspection point.)

16. Design, Fabrication Methods of Process Methods (Non-Standard)

16-A. Substitution parts shall not be used for parts specified in the Order.

16-B. Seller proposed changes in design, fabrication methods or processes on Buyer or customer-designed articles (other than commercial or off-the-shelf items) shall have prior documented approval of the Buyer Procurement Representative. Such approval does not waive applicable inspection and/or acceptance requirements.

17. Reliability (Non-Standard)

The Seller(s) shall analyze returned parts/assemblies that fail. This analysis shall be of sufficient detail to pinpoint the exact failure mode and mechanism. Results of the analysis shall be documented either on the supplied Supplier Repair Report or on a Buyer (s) form, referencing the Return Material Number, or returned with the repaired assemblies. A copy of the analysis will also be forwarded to Buyer Quality Assurance.

18. T-Test Data (Non-Standard)

18-A. Test data (complete quantitative results of all final electrical and/or mechanical measurements made by/for the Seller) must be included with each shipment.

18-B. Seller to supply a "certificate of test" duly signed and authorized by a responsible Supplier Quality Assurance Representative certifying that all articles were tested and in conformance with the Order and/or drawing requirements.

19. Special Notes: (Non-Standard)

19-A. A Subcontractor Management Plan (SMP) may be established with subcontractors where deemed necessary by Buyer to assure compliance to specific programs and/or contracts. The requirements imposed by this document shall stay in effect along with any additional requirements stated in an SMP that is mutually agreed, in writing, by both parties. (An example is shown below)

19-B. All work at subcontractor facilities is overseen by Buyer Quality Assurance Personnel in accordance with established Subcontractor Management Plans (SMP) to assure Products that are in compliance with all requirements set forth by the program and is of the highest level of quality.

19-C. SUBCONTRACTOR MANAGEMENT PLAN (SMP)

i. The SMP developed with qualified subcontractors establishes an agreement to assure that all processes are continuously monitored and controlled and also establishes a direct communication link between Buyer and the subcontractor. As a minimum, the following items are covered during the establishment of the SMP.

ii. The Subcontractor shall maintain a documented Quality Management System that complies with the requirements of ISO 9001, AS9100 or equivalent.

iii. Buyer reserves the rights to perform any necessary inspections or verifications to ascertain conformance to requirements and procedures.

iv. Buyer may perform a complete Quality Management Systems Audit at the beginning of the contract and periodic Process Control Audits through the duration of the program.

v. Buyer may establish a regular conference call to address any known issues and to get updates of program status for Integrated Product Team (IPT) reporting.

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vi. Buyer may establish Mandatory Inspection Points (MIP) throughout the processes.
Vii. The Subcontractor will collect failure data and analyze it to determine the cause of each failure and to look for trends for implementation of preventive actions and/or process improvements.
viii. Buyer requires a First Article Inspection Report for all assemblies and First Article Source Inspection when necessary.
ix. Buyer may require a complete ATP with a Buyer representative prior to scheduling DCMA for required inspection and acceptance.

20. SUPPLIER'S SOFTWARE QUALITY ASSURANCE SYSTEM (Non-Standard)

Supplier shall develop and maintain a software quality assurance system that complies, as a minimum requirement, with the standard(s) designated by Astronics Test Systems Inc. and/or as specified by Customer/Government Flow down requirements. Supplier's system shall be subject to audit by the Buyer's Software Quality Assurance (SQA) Representative. Waiver to quality requirements is not valid unless obtained in writing from Buyer

21. SOFTWARE QUALITY PROGRAM PLAN (SQPP) (Non-Standard)

Supplier shall plan, develop, publish and implement an SQPP, which addresses all software quality requirements as set forth in the purchase order or prime contract. The SQPP shall be used by Supplier to evaluate the quality of the software and associated documentation, and software development activities. This document shall be reviewed and approved by Buyer's SQA Representative.

22. SOFTWARE DEVELOPMENT PLAN (SDP) (Non-Standard)

Upon contract award, Supplier shall plan, develop, publish and implement a Software Development Plan (SDP). The SDP shall provide a description of Supplier's plans for conducting the activities of the software development process in accordance with the Purchase Order. The SDP shall include the items listed below and in either case shall be subject to review, audit and approval by Buyer's SQA Representative.

a) Identification of the resources and organization required to perform software development.
b) Plans for the management of Supplier's software development effort, including identification of the software development schedules and milestones.
c) Plans for performing software configuration management, including the procedures for controlling the software and its associated documentation utilizing a Software Development library (SDL).
d) The standards, procedures, methods and tools to be used in the Supplier's software development effort.
e) Plans for formal software testing.
f) Plans for software product evaluation.

23. SOFTWARE DEVELOPMENT FILES (SDFs) (Non-Standard)

Supplier shall document the development of each Computer Software Unit (CSU), Computer Software Component (CSC), and Computer Software Configuration Item (CSCI) in Software Development Files (SDFs). Each SDF shall contain information pertinent to managing and statusing the software development effort. The SDF should contain at least the following sections/information:

a) File identification
b) Development Schedule
c) Development Status
d) Allocated Requirements
e) Design Material
f) Source Code
g) Test Information (cases, procedures, results)
h) Review Comments

SDFs shall be subject to review and audit by Buyer's SQA Representative.

24. SOFTWARE DEVELOPMENT LIBRARY (SDL) (Non-Standard)

Supplier shall establish and maintain written procedures for control and handling of source and object code, identification and documentation of different versions of software, tools and documentation, and placement of all these development products under configuration management control. These procedures are subject to audit/review by Buyer.

25. REVIEW AND CONTROL BOARDS (Non-Standard)

Supplier shall submit for approval by Buyer any significant changes in product design, composition or configuration. Supplier shall flow down this requirement to Supplier's suppliers.

Supplier shall establish a Configuration Control Board (CCB) and a Software Configuration Control Board (SCCB). Supplier shall appoint an SQA engineer as a member of these two boards to assure that corrective actions are taken on all problem/change reports. These requirements are subject to audit/review by Buyer.

26. AUTOMATED TEST EQUIPMENT (ATE) SOFTWARE CONTROL (Non-Standard)

Supplier shall control all ATE software utilizing Data Control indicators (e.g. Revision control, Library control and listing).

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27. RAW MATERIAL TEST DATA (Non-Standard)

The supplier shall submit, with each shipment, a Certified Test Report (CTR) indicating conformance to requirements of the applicable drawings/specifications. Each CTR shall contain the following minimum requirements

a) Name and address of material supplier
b) Contract #
c) Identification of material by specification, revision, amendment, and dates, together with size, grade, type, etc.
d) Quantity of material
e) Test results identified by reference to the applicable requirements
f) Date, signature, and title of supplier representative that is attesting to the accuracy of the test report (In the case of certain electronically produced documents, signature requirement may be waived, in writing, by the Buyer representative)
g) The CTR is to be traceable to the material used to produce each shipment against this contract. Supplier shall provide a copy of all raw material certifications, special processing records and certifications as recorded during the performance of this procurement order.

28. APPROVED SPECIAL PROCESS: (Non-Standard)

This order contains requirements for special processes which can only be performed by Boeing approved special processors and manufacturers as required and listed in document D1-4426 “Boeing Approved Process Sources”.

29. SERIALIZATION: (Non-Standard)

Each item furnished on this purchase order shall be identified by a unique serial number. When specific serial numbers are required, they shall be identified by the Buyer on the purchase order.

30. SPECIAL PROCESS CERTIFICATE: (Non-Standard)

The supplier shall provide one (1) legible and reproducible copy of a certificate for each special process performed per the purchase order. Special processes include but are not limited to such processes as heat treat, cleaning, x-ray, plating, painting, welding, brazing, and non-destructive test inspection. The certificate shall include Astronics purchase order number, special process description with any applicable classification, type, grade, thickness, time, temperature or any other applicable requirement noted on the purchase order, drawing or specification. The certificate shall bare the signature and title of an authorized representative from the supplier.

31. FUNCTIONAL TEST DATA (Non-Standard)

Supplier shall provide a complete set of test data certified by an authorized representative of management as recorded during the performance of this procurement order and as specified below for the purposes of quality analysis.

a) Acceptance test data
b) Qualification test data (this data may be based on previous qualification data on a similar part type)
c) Screening test data - test results for each lot or batch of material shipped.

32 RoHS Compliance Required (Non-Standard)

The product stated on this purchase order must comply with the RoHS 2002/95/EC directive. A Certificate of Compliance of declaration of conformance to this directive must accompany the shipment stating the parts comply with RoHS and any pertinent information that will provide the ability to segregate our inventory and assure compliance

33 First Article Approval & Qualification Special Requirements (Non-Standard)

33-A A first article inspection is required prior to start of the production run to demonstrate compliance with the requirements of the purchase and referenced specifications. The first article shall be identified as the first article part including the part number and purchase order number. Submit the first article to Buyer’s receiving inspection for test and/or inspection. Include Seller’s first article inspection data, indicating actual values measured for each characteristic.

33-B. First Article Inspection using FORM AS9102 is required to provide objective evidence that all engineering design and specification requirements are properly understood, accounted for, verified, and documented.

34 Item unique identification (IUID).

IUID in accordance with Mil-STD-130 required for each item delivered. **(Non-Standard)**