Precision Air & Land Systems

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Title:	Requirements for Suppliers to Ultra Electronics Precision Air & Land Systems ***(Airbus Products Related Suppliers)***
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AMENDMENT RECORD

Issue	Reason for change	Date
1	Initial Issue	08 Sep 2014
2	Procedure updated and in new format which include:- 1. Sections 3.0 to 17.0 inclusive removed because contents are incorporated within procedure PUR-SOPS-003. 2. Paragraphs 18.0 to 46.0 renumbered. Change Request BMS028-15 refers.	23 March 2015

Security

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1.0 INTRODUCTION

1.1 Scope

This document defines the methodology, policies, objectives, quality assurance (QA) requirements and approval process employed at Ultra for the selection and control of suppliers for programmes delivered to Customer Airbus.

This document should be read in conjunction with PUR-SOPS 003 – requirements for Suppliers. Where conflict arises between this document and PUR-SOPS 003, this document will take precedence. Where conflict arises between this document and the purchase order; the Purchase Order will take precedence.

1.2 Purpose

The purpose of this document is to specify the additional Airbus GRESS specific requirements for Suppliers of products or services against an Ultra purchase order furnished for used on the Airbus programmes.

1.4 Application

Compliance with the requirements of this document is mandatory when invoked by purchase order. In the event of conflict arising between the requirements of this document and the purchase order, the requirements of the purchase order shall take precedence.

1.4.1 Supplier Responsibility

It is the responsibility of the supplier to ensure that they are working to the latest version of specifications referenced within this document as well as purchase order requirements. Requests for Specific specifications that are needed shall be requested from the Ultra Procurement Team

1.4.2 Compliance Matrix

The supplier shall complete Compliance Matrix PUR-FORM-010 then return to UEPALS purchasing Department. UEPALS Purchasing will then use the supplier response to populate the supplier compliance log.

1.4.3 Verbal Agreements

Verbal agreements or instructions shall under no circumstances be construed as approval or authorization to proceed. Clarification must be confirmed in writing. Written PO Amendment or Concession must be issued when the contract/PO cannot be met in full.

1.4.4 Changes

Changes that may affect quality must be documented and communicated to the Ultra Quality Assurance Dept and/or Procurement Representative prior to effectivity of the change. Examples of changes include, change in ownership, manufacturing location, Manufacturing Process, Inspection Techniques etc.

2.0 APPROVAL PROCESS

2.1 In accordance with the requirements of procedure PUR-SOPS-003 Section 2.0.

3.0 COMPETENCE TRAINING & AWARNESS

3.1 Procedures shall be implemented to ensure that eye examinations, including visual acuity and colour vision are administered by a medically qualified/trained person to all personnel performing visual inspection and/or product acceptance activities that require visual acuity as follows:

- Intervals should not exceed 1 year
- Individuals shall be tested in at least one eye either corrected or uncorrected
- Colour perception testing is required one time only. Individuals shall be capable of adequately distinguishing and differentiating colours used in the method for which certification is required, the process being performed or the inspection activity
- Records shall be retained for each individual

Individual performing …	**Individual performing …**
Visual inspection (i.e. calibration, non-weld, in-process, layout, dimensional)	Near vision requirements of • Snellen 14/18, (20/25), • Jaeger 2 at not less than 12 inches
Visual Inspections on Welds	American Welding Society Standard (AWS) D17.1
Non-destructive Testing (NDT)	Aerospace Industries Association National Aerospace Standard (AIA/NAS) 410
Note!: Vision tests may be substituted for the options listed above providing the equivalence is verified and documented by a licensed optometrist.	

4.0 VERIFICATION OF PURCHASED PRODUCT

4.1 Suppliers must provide raw materials test reports / certification results / laboratory analysis requirements (e.g., tensile strength, stress rupture, hardness, chemical composition, etc.), as defined by the drawing and/or the purchase order.

4.2 Where the supplier utilizes test reports to verify purchased product, the data in those reports shall be acceptable per applicable specifications. The supplier shall periodically validate test reports for raw material.

Suppliers and all members of their supply chain shall use approved suppliers when a specific material or manufacturing special process is identified by Drawing or Purchase Order. Suppliers and all members of their supply chain that only provide special processes (not part manufacturing suppliers) must be Nadcap accredited for the following special processes:

- Brazing
- Chemical Processing
- Coatings
- Heat Treating
- Materials Testing
- Nonconventional Machining
- Nondestructive Testing
- Shot Peening
- Welding

Nadcap requirements may be further defined by Ultra or their customer.

Note: *Nadcap accreditation is not required for materials testing laboratories with American Association for Laboratory Accreditation (A2LA).*

5.0 MEASUREMENT & TEST EQUIPMENT (M & T E)

5.1 The supplier shall generally select M&TE with an accuracy ratio of 10 to1 (product tolerance to M&TE tolerance) however, accuracy ratios as low as 4 to 1 are acceptable, unless otherwise specified.

Use of M&TE with accuracy ratios less than 4 to 1 are not permitted unless a detailed measurement uncertainty analysis in accordance with ANSI/NCSL Z540.3 indicates an uncertainty ratio of 1.5 to 1, or better, and the measurement process is maintained under statistical quality control.

5.2 When functional performance / test data is required, include the following minimum requirements:

- Test specification number, revision status, amendment number and addendum.
- Part number / serial number and revision letter of material / component being tested.
- Test paragraph, required reading, actual reading (use positive statement, e.g., "No Leakage" if actual reading is not quantifiable).
- Date test was performed.
- Operator identification.
- Inspection approval signature / stamp.
- Blank entries that are not applicable shall be noted "N/A".

6.0 FOD PREVENTION

6.1 The requirements for Foreign Object Damage/Foreign Object Debris (FOD) prevention are based on the National Aerospace Standard (NAS) 412, Foreign Object Damage/Foreign Object Debris Prevention, which establishes a baseline FOD prevention policy/procedure. NAS 412 supports the quality management system standard, AS/EN/JISQ 9100/9110/9120 which requires suppliers carry out a program for the prevention, detection, and removal of foreign objects from its products.

6.2 The minimum requirements of a FOD Prevention Program for all product/service suppliers shall include:

a. A FOD training program shall be in place to increase employee awareness on causes and effects of FOD, promote active involvement through specific techniques and emphasize good work habits through work discipline. FOD training is required for all employees and contractors (internal and external) as applicable and shall be on going, (i.e., initial and periodic) to maintain employee awareness.

Training shall include (but is not limited to) the following topics:

- Causes and effects of FOD
- Protection of product
- General housekeeping program and formal 5-S practices
- Clean as you go principles
- Tool control/accountability
- Unrestricted hardware control/accountability
- Consumable control/accountability

b. A documented procedure for material handling and part protection to eliminate potential FO/FOD and handling hazards that includes:

- Risk identification for sensitive parts, assemblies, surfaces, areas, etc.
- Risk identification related to packaging, handling, shipping and storage processes.
- Evaluation and controls for risk mitigation specific to cleaning, protection, and care processes.
- Defined process sequencing that allows for proper contamination prevention, cleaning, and detection on parts and containers at appropriate process points.
- Defined methods to protect parts where contact with other elements may be detrimental to the part (e.g., columbium, titanium, magnesium, etc.).

c. A general housekeeping program and formal 5-S practices that includes:

- Area cleaning in accordance with 5-S principals (i.e., assembly, test, manufacturing, warehouse, and operational support areas).
- Periodic cleaning/sweeping floors, work-surfaces and any other pertinent surfaces.
- Maintaining critical process areas free of open food and beverages.
- Areas having clear signage indicating requirements.

d. A FOD reporting and investigation process shall be in place and define how to:
- Report and investigate FOD occurrences and include the use of common root-cause analysis tools as part of the record.
- Advise personnel of how to react in the event of a FOD incident, (e.g. do not disturb evidence, cease operation, immediately notify supervision, begin investigation, etc.).
- Ensure effectiveness of corrective/preventive actions taken to preclude recurrence.

e. Storage controls shall include:

- Facilities, as necessary, provide isolation/protection to material pending use or shipment.
- Periodic assessment of the condition of material in stock.
- "First in - First out" issuance of materials subject to degradation.
- Shelf life control applied to processing material, as required.

f. Preservation and Packaging controls shall include:

- Preservation of material during processing, fabricating, assembly and testing, through shipment of end items.
- Regular preservation fluid checks for contamination and maintained free from FO via filtering or replacement of preservatives.
- Visual inspections prior to final preservation to ensure parts are free from contaminants, debris, foreign material, finger marks and stains. When required, a bore scope examination shall be carried out to ensure freedom from machining chips and debris for internal passages that cannot be inspected visually.
- Prevention of oil system contamination from silicone-based lubricants.
- External cleaning when there is evidence of external contamination.
- Packing material does not induce contamination to parts and assemblies.

g. Prohibited packing material is not used. This includes, but is not limited to:

- Newsprint
- Loose packing material small enough to block internal passages, holes and crevices or parts
- Glue bearing material

h. Packing methods consider weight, physical configuration, and method of shipment to preclude damage to parts.

i. For UTC Member drawings that do not include special preservation instructions:

- Castings made of low alloy steel, plain carbon steel, ductile iron or martensic stainless steel shall be preserved prior to shipping using oil per MIL-L-2104 or equivalent.
- Magnesium alloy castings may be preserved prior to shipping using UTC member approved preservation oil instead of AMS 2475 pickle when called for. Contact the appropriate UTC member, if necessary.
- Overhaul and repair material shall be preserved in accordance with the applicable approved technical data.

j. Optical systems, electrical components or assemblies containing cadmium, lead, zinc or magnesium are not protected with Vapor Corrosion Inhibitor (VCI) treated materials.

k. Protection against corrosion and damage during transit or storage and state the duration of effectiveness of such preservation and packaging, as required by applicable regulatory agency.

7.0 ELECTROSTATIC DISCHARGE (ESD) CONTROL

7.1 Where applicable, institute adequate procedures and controls to prevent damage to electronic equipment and components which are sensitive to ESD.

7.2 Provisions shall be made for protection of electronic and electrical material which is sensitive to electronic discharge (ESD), per MIL-STD-1686 or for overhaul and repair applicable approved technical data.

7.3 ESD control requirements apply where equipment containing ESD sensitive parts are used during the process of fabrication, calibration, testing or packaging of the end item, whether or not the end item is ESD sensitive.

8.0 ORGANISATION SPECIFIC TO THE CONTRACT

8.1 The supplier shall nominate a Technical Manager to support product and product/process development functions, aligned to the defined project scope.

9.0 INDUSTRIAL RISK ANALYSIS METHOD

9.1 The Supplier shall define its industrial risk analysis method. This method shall cover:

- product risks (with respect to industrialisation)
- industrial process/sub-process risks, including processes related to safety critical Products
- procurement and suppliers risks including all Supply Chain failure modes

9.2 The method shall ensure the identification of all risks liable to disrupt the industrial process and shall take into account lessons learnt.

The method shall define as a minimum how:

- cross functions are involved
- risks are identified and quantified
- associated causes are identified
- risk mitigation actions are implemented and followed up
- residual risk levels are assessed
- risk analysis is kept up to date
- effectiveness and risk status are monitored
- the industrial Process Flow Charts are used to perform the process risk analysis

9.3 The Supplier shall define the re-visit criteria of the industrial risk analyses throughout the Product life. In particular, the Supplier shall update the analyses whenever a new component or part or a new or changed process/sub-process or a new or changed supplier is introduced.

10.0 INDUSTRIAL RISK REGISTER

10.1 In application of the industrial risk analysis method (**24.0**), the Supplier shall formalise the risk analysis in an Industrial Risk Register (IRR).

The IRR shall contain all risks addressing Product, industrial process/sub-process, procurement and suppliers.

The IRR shall contain as a minimum the requirements from **24.0** (risks identification, quantification) and need to be kept updated.

10.2 The Supplier shall enclose in the Risk Identification and Mitigation Status all major risks of the Industrial Risk Register that may affect the project.

11.0 PRODUCTION OF THE PRODUCTS BY A SERIES PRODUCTION PROCESS

11.1 The Supplier shall plan all changes or additional dispositions needed in manufacturing prior to producing the Product in series (component or part changes, tools, means, process, operators' qualification, 3nd source qualification).

11.2 The Supplier shall produce the Products for qualification (at the CDR and subsequently) and all subsequent Products delivered to the Purchaser using series production processes and means.

11.3 The Supplier shall record and justify any deviation related to series production (processes, means, and key contributing parties) with risk identification and mitigation actions.

11.4 The Supplier shall perform a First Article Inspection (FAI) at end items and each major sub assembly for each standard. The Purchaser reserves the right to have a representative attending FAI as an observer.

12.0 INDUSTRIAL PROCESS FLOW CHART – MANUFACTURING

12.1 The Supplier shall establish, for the Product, the Industrial Process Flow Chart of the industrial production process (internal and external) up to shipment and delivery of the Product including:

- main manufacturing, inspection and test phases of subassemblies and Product procurement (related to Key contributing parties)
- identification of external activities
- which and where quality metrics & key characteristics are recorded
- the processes requiring a qualified operator
- configuration management (reference, issue)

12.2 The Supplier shall complete or otherwise to justify the Industrial Process Flow Chart by the following information:

- the means & tools used
- associated documentation used at each key phase
- bottleneck identification

12.3 The Supplier shall use this Industrial Process Flow Chart to perform the process risk analysis.

13.0 QUALITY METRICS

13.1 The Supplier shall define the Quality metrics which will be implemented in the manufacturing process and give their visibility in the Industrial Process Flow Chart - Manufacturing.

For the whole Process (from end to end), Quality metrics such as:

- Failures rates
- % of scrap
- % of internal rework

For each SPC Key Characteristic:

- Cp min
- Cpk min
- DPM: Defects per Millions (number of defects/total number of potentialities of defects)
- Pre-test First Pass Yield (% FPY)
- Environmental Stress Screening (ESS)/ageing/Non Destructive Testing First Pass Yield (% FPY)
- Final Test i.e. Acceptance Test Procedure First Pass Yield (% FPY)
- Roll Throughput Yield (RTY = pre test FPY x ESS FPY x Final Test FPY %)
- Product in service returns

Note: The Supplier shall provide any additional relevant metric as requested by the Purchaser depending on any specific situation that may occur.

All data related to Quality metrics defined above shall be provided by the Supplier on request.

14.0 PRODUCT, PROCESS AND SUB-PROCESS MAJOR/KEY CHARACTERISTICS

14.1 The Supplier shall:

- define a mode of determination of Product, Process and sub-process major/key characteristics
- identify the Product, Process and sub-process major/key characteristics for production
- define the monitoring measures of the Product, Process and sub-process major/key characteristics and associated objectives

14.2 The Supplier shall define specific action plans to maintain the objectives, (e.g. Cp / Cpk, etc).

14.3 The Supplier shall describe the major/key characteristics assigned to their key contributing parties.

15.0 CONTROL OF THE MANUFACTURING/INSPECTION PROCESS AND MEANS

15.1 The Supplier shall:

- set up operator qualifications (specific to the Product)
- demonstrate that the manufacturing processes and means implemented for the Product are qualified
- set up suitable maintenance for the manufacturing and inspection means

16.0 CONTROL OF A MAJOR INDUSTRIAL CHANGE

16.1 The Supplier shall inform the Purchaser **prior** to any major **industrial change** such as:

- plant location or layout
- transportation method
- major Enterprise Resources Planning (ERP) change
- top level organisation and personnel in key positions
- major process (including main tools) changes
- major suppliers (including subcontractors) change

These requirements are also applicable for any change at suppliers – tier 3, 4, etc.

16.2 The Supplier shall describe how it intends to inform the Purchaser prior to any major industrial change.

For serial production, the Supplier shall use CMES (Communication of manufacturing evolution sheet) to provide at least:

- Product identification
- change description
- reason for change
- Product change implementation start (e.g. P/N, S/N, etc.)
- risk identification and mitigation status
- associated schedule

16.3 The Supplier shall validate this transfer via the results obtained (in particular the Supplier shall perform an article review before transfer (Current Article Review) versus the article review after transfer (First Article Review), deviations, management of deviations.

The Supplier shall provide any complementary information when requested by the Purchaser.

Note: Any change impacting Product (e.g. qualification) shall be notified in writing to the Purchaser.

17.0 LABELLING, HANDLING, STORAGE, PACKAGING, PRESERVATION AND DELIVERY: SPECIFICITY CONCERNING THE PRODUCT

17.1 The Supplier shall define the handling, storage, preservation and delivery specificities concerning the Product - subassemblies, components and parts.

For components and parts, the Supplier shall define:

- end of life and appropriate rules of "re-life"
- for long-term storage, the Supplier shall define storage/preservation method and how component quality control/verification is ensured before and during storage

17.2 For Package Bar Code label, the Supplier shall respect Purchaser requirements as defined on the Purchase Order, if applicable.

18.0 PRODUCTION DOCUMENTATION RETENTION TIME

18.1 The Supplier shall control the configuration and store all the documents/data prepared and issued the Engineering for Manufacturing and Production phases (routing sheets, final acceptance reports, etc.)

It shall retain them throughout the Product (Equipment or System) life as defined on the Purchase Order.

19.0 NON-CONFORMANCES AND ROOT CAUSES

19.1 The supplier shall provide a detailed description of its method applicable to the Product, for processing non-conformities root causes (i.e. 5 WHY, 8D methods, etc.).

The Supplier shall:

- collect, in an integrated or linked database, non-conformities in-house
- establish correlation between the non-conformities found during the industrialisation production (tests included) and after delivery
- analyse the non-conformities and search for their root causes (i.e. 5 WHY, 8D methods parts expertise)
- record and correlate the root causes
- set up & follow up corrective and preventive actions
- measure their effectiveness.

20.0 CONTINUOUS IMPROVEMENT

20.1 The Supplier shall define its continuous improvement policy. The Supplier shall illustrate this policy based on existing results already achieved.

The Supplier shall detail at least the following:

- company's objectives (target setting)
- continuous improvement organisation and structure (for Lean management
- tools: e.g. JIT, TPM, Visual Management, VSM, 5S/5C, TQM, etc.)
- current status (KPI's)

21.0 PRODUCTION MAMAGEMENT SYSTEM

21.1 The Supplier shall demonstrate its policy and processes to manage the Product 2 Production Planning activities including the following steps:

- Sales and Operation Planning (SOP)
- Master Production Schedule (MPS)
- Material Requirements Planning (MRP)
- Purchasing and Production Activity Control (PAC)

21.2 For each step, the Supplier shall define the purpose of the plan, the owner of the process, the input/output in terms of data (level of detail), the planning horizon, the time bucket, the frequency with which the plan is reviewed.

21.3 The Supplier shall describe how the data accuracy (Bill of Material, inventory) is ensured throughout the process.

22.0 CAPACITY MANAGEMENT

22.1 The Supplier shall demonstrate its policy and processes defined to manage its capacity, including the following steps:

- Resource Plan,
- Rough Cut Capacity planning
- Capacity Requirement Plan

22.2 For each step, the Supplier shall define the purpose of the plan, the owner of the process, the input/output in terms of data (level of detail), the planning horizon, the time bucket, the frequency with which the plan is reviewed.

22.3 The Supplier shall describe how the Capacity data accuracy (available capacity, load profile) is ensured throughout the process.

22.4 The Supplier shall detail its policy and process to resolve differences between available capacity and required capacity over short, medium and long terms.

22.5 The Supplier shall detail for the Product their policy and process for bottleneck detection and management. The Supplier shall explain all Key Performance Indicators that are Product and bottleneck specific.

23.0 FORMAL NOTIFICATION OF DELIVERY SCHEDULE

23.1 The Supplier shall commit to meet the delivery schedule as per Purchaser requirements.

23.2 In case of delays in delivery; the Supplier shall inform the Purchaser, present a recovery plan (e.g. line of balance) if requested, perform a root cause analysis (e.g. 8D) and establish an action plan.

24.0 BACK ORDER MANAGEMENT

24.1 The Supplier shall define its backorder management methodology.

24.2 The Supplier shall demonstrate how delays and shortages are monitored and managed (Line of Balance or similar tools).

25.0 LOGISTICS SOLUTIONS

25.1 The Supplier shall put in place relevant logistics solutions (e.g.: kit, Kanban, direct flow, Vendor Managed Inventory, etc.) to reduce costs and risks over the whole supply chain.

26.0 SELECTION OF SUPPLIERS AND ACHIEVEMENTS

26.1 The Supplier shall not procure components or parts from brokers.

26.2 The Supplier shall provide the Purchaser with their procedures related to the Purchasing / Procurement processes.

26.3 Those procedures shall cover its supplier selection process and formalisation by Contract if any.

26.4 The Supplier shall provide the Purchaser with records of the results of pre-selection assessments, audit and any requested actions arising from these assessment or audit.

26.5 The Supplier shall give a status on its supplier selection achievement.

27.0 PROCUREMENT/SUPPLIERS RISK ANALYSIS

27.1 In application of the industrial risk analysis method, the Supplier shall formalize the Procurement and suppliers risk analysis in an Industrial Risk Register (IRR).

27.2 The Supplier shall include in its Procurement and suppliers Risk analysis all Supply Chain failures modes (resources, lead time, location, lot size, etc).

28.0 VERIFICATION OF THE REQUIREMENTS ASSIGNED TO THE SUPPLIERS

28.1 The Supplier shall:

- ensure that the Purchaser's requirements, assigned to their suppliers, are fulfilled
- demonstrate the appropriate management of suppliers related to the Product
- establish the associated verification measures (design reviews, industrialisation reviews, Product evaluations, evaluation/qualification of special processes, etc.) throughout the Product life cycle

29.0 SUPPLIER MONITORING

29.1 The Supplier shall describe its policy and processes in terms of supplier monitoring for Quality and Supply Chain. The Supplier shall provide their supplier's KPIs (quality, delivery), with associated objectives.

30.0 RECOVERY AND IMPROVEMENT ACTIONS

30.1 The Supplier shall demonstrate that its supplier monitoring includes:

- recovery plan when needed
- continuous improvement policy

31.0 PROCUREMENT TRIGGERING MODE

31.1 Based on its customers' forecast and through MPS and MRP calculation, the Supplier shall flow down their needs to their suppliers using purchase orders and Procurement Plan.