

Title: **EarthCARE Specific Statement of Work for the X-Band SCOE**

CI - No: 411220

DRL Refs : D-AV22

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1. INTRODUCTION

1.1 Scope

This Statement of Work (SoW) describes the tasks to be performed and the deliverables to be provided by the Contractor in the frame of an EarthCARE equipment supply contract with Astrium GmbH. The equipment to be developed and delivered in the frame of the contract and addressed by this SoW are:

- X-Band SCOE
- X-Band digital SCOE only

In the context of this document, the term "equipment" shall be interpreted as the product in subject either being

- hardware or
- software or
- a hardware with embedded software or services.

The SoW defines the activities from beginning of the contract until equipment contract close-out, i.e.:

- The design, development, production, test and delivery of the equipment hardware and software
- The provision of equipment related support activities and services as required by Astrium GmbH for conduction of the higher level tasks

The contractor shall be responsible for the provision of all materials, manpower, facilities, supplies, tools, equipment, documentation and support services as may be required to design, manufacture, assemble, test and deliver to Astrium GmbH the end products and services as specified in the SoW and referred to as the "equipment".

The contractor shall respond to this issue of the Statement of Work with a proposal which expands and details the requirements contained herein. Tasks and deliverables specified herein are considered mandatory but not necessarily exhaustive.

The tasks given in this SoW are categorized into

- fixed baseline tasks
- optional tasks

Both kinds of tasks may be subject of this SoW and its applicable requirement specifications. Unless specifically identified, the task shall belong to the baseline tasks.

This Statement of Work with all its attachments and applicable documents and standards will become part of the contract between the Astrium GmbH and the contractor and all the requirements therein are applicable to the work to be performed by the contractor.

The requirements of this SoW shall also be made applicable to the contractually specified lower level contractors, as pertinent to their work shares. Therefore the word "Contractor" shall be interpreted as "Contractor and Lower Level Contractors", if not specifically restricted by appropriate formulations. Hardware and software from other sources shall be procured according to the relevant technical, quality and safety related requirements being applicable to EarthCARE.

1.2 Definition of the Equipment

The equipment forms part of the ground test environment being used for assembly, integration and test on bench level and on satellite level. The equipment is subdivided into the following purpose made elements:

- X-Band SCOE
- X-Band digital SCOE only

The X-Band and X-Band digital SCOE are interfacing on-board hardware and other EGSE elements. As depicted in the figure below, they interface to other EGSE elements (e.g. CCS, TM/TC FE), as well as the NDIU provided by ESOC.

The X-Band digital SCOE only is used to support the EFM setup and is interfacing the mass memory.

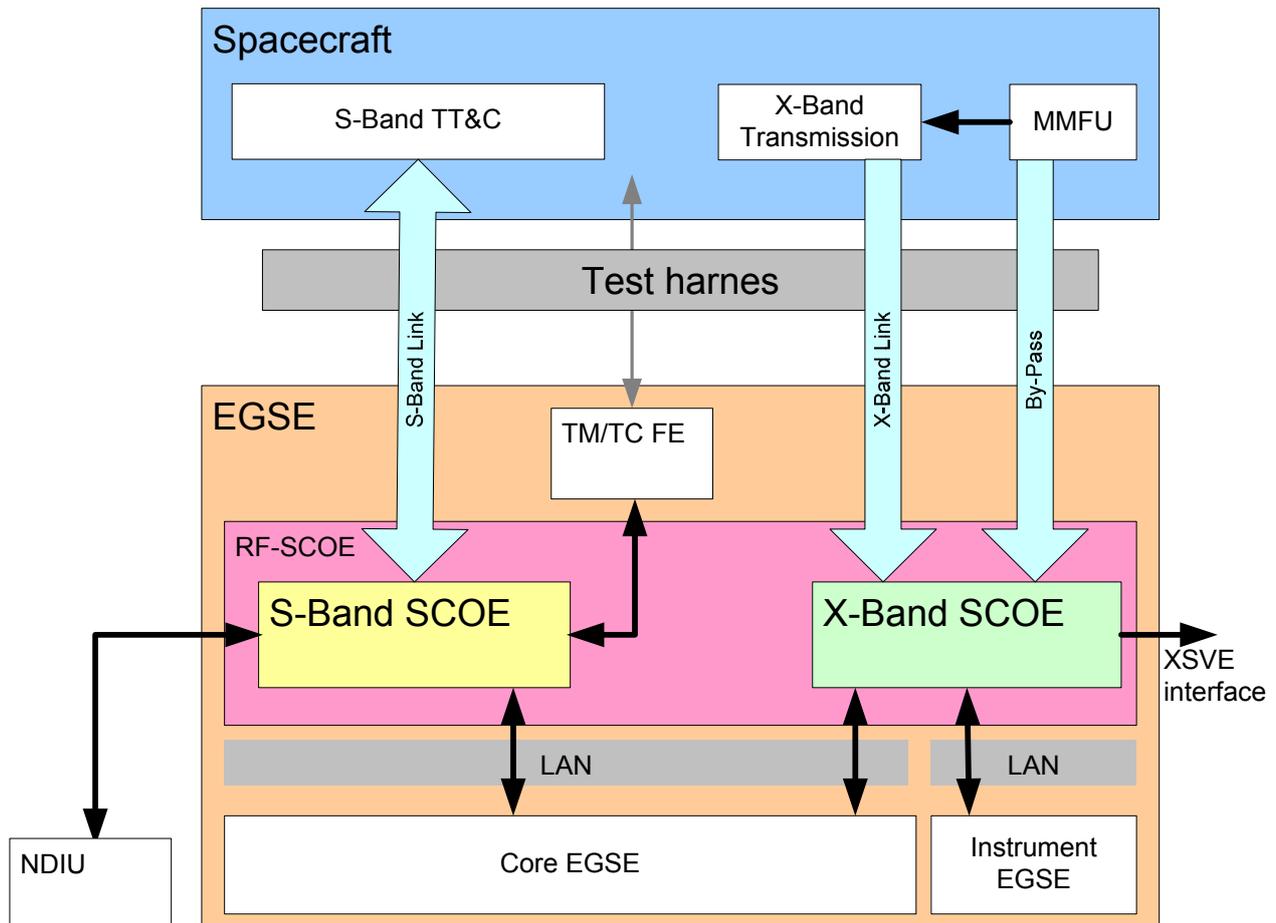


Figure 1.2-1 S-Band and X-Band SCOE overview

2. REFERENCES

2.1 Requirements Tree

The requirements tree and the order of precedence is shown in the figure below.

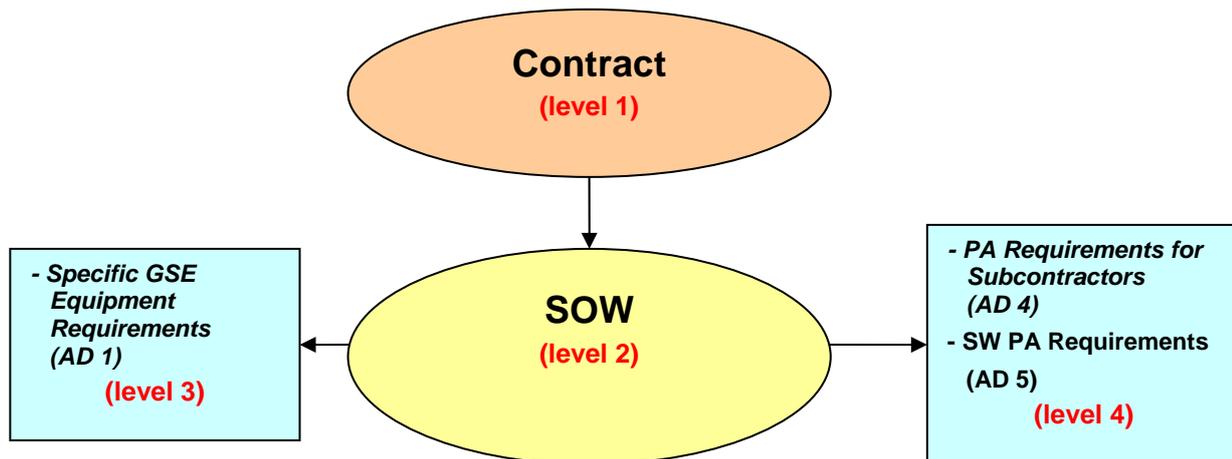


Figure 2.1-1: Requirements Tree with Level of Precedence

2.2 Document Order of Precedence

In the event of conflict between documents referenced within this activity, the following order of precedence shall apply until the conflict is removed:

- contract
- the SOW (this document)
- Specific GSE Equipment Requirements
- Equipment PA Requirements (General & Software)
- Documents listed in section 2.4.1
- Contractor produced approval documents

2.3 Definitions

In the following the prime Contractor is named “customer” or “ASTRIUM” for ASTRIUM GmbH. The final customer is ESA, who is also called “end customer”.

The name “Contractor” in this document is referring to the selected equipment provider in the frame of this activity.

The name subcontractor refers to any lower level subcontractors

The wording “project” is referring to the EarthCARE project.

2.4 Documents

2.4.1 Applicable Documents

The work defined in this SOW shall be performed in accordance with the requirements contained in the following applicable documents, in their latest issue and revision as agreed with Astrium GmbH. Cases of conflict between the requirements defined in the Applicable Documents of the SOW shall be brought to the attention of Astrium GmbH for resolution. The order of precedence defined by the contract shall apply.

The following documents are applicable:

	Title	Doc. No.
AD 1	RF-SCOE X-Band Requirement Specification	EC.RS.ASD.SY.00017
AD 3	Management Requirements Document for Sub-Contractors	EC.RS.ASD.SY.00013
AD 4	Product Assurance Requirements for Sub-Contractors	EC.RS.ASD.SY.00002
AD 5	Software PA Requirements for Sub-Contractors	EC.RS.ASD.SY.00004
AD 6	EGSE ICD for EC	EC.ICD.ASD.SY.00002
AD 7	Population Requirements for Equipment TM/TC (Excel SIS Format)	EC.IRD.ASD.SY.00016
AD 8	EC Packet Utilization Standard	EC.STD.ASD.SY.00001
AD 9	Document Content Guidelines	EC-RS-ESA-SY-0006

ECSS standards shall be considered in their latest issues as defined in the Equipment Specifications [AD1].

A number of "TBD" and "TBC" are included across the applicable documents, in particular regarding the interfaces between the EGSE equipment and the EarthCARE on-board equipments. The contractor shall include appropriate provisions such that these "TBD" and "TBC" can be frozen at the latest possible date.

2.4.2 Normative Documents

The following documents are referred in the SOW:

	Title	Doc. No.
ND 124	Verification	ECSS-E-10-02A
ND 171	Non-Conformance Control System	ECSS-Q-20-09B
ND 3	Low Voltage Directive	2006/95/EC
ND 4	EU EMC Directives	2004/108/EC
ND 5	European Union CE Marking Directive	93/68/EEC
ND 6	Product Liability Directive	1999/34/EG
ND 7	WEEE directive	2002/96/EC
ND 8	RoHS directive	2002/95/EC
ND 9	REACH EC Regulation	1907/2006
ND 10	General Product Safety Directive	2001/95/EEC
ND 11	Space Product Assurance -Safety	ECSS-Q-ST-40C
ND 12	EMC requirements for electrical equipment for measurement control and laboratory use. General requirements	EN 61326-1:2006

2.4.3 Reference Documents

The following documents are referred in the SOW:

	Title	Doc. No.
RD 1	Acronyms and Abbreviations	EC.LI.ASD.SY.00001
RD 2	SRDB Data Population Requirements Document	EC.IRD.ASD.SY.00003

2.5 Abbreviation List

For further abbreviations and terms used refer to [RD 1].

3. DELIVERABLE ITEMS

The following **Configuration Identification** (CI) numbers are defined and shall be used by the Contractor:

CI-No.	Product Tree Item
411220	X-Band SCOE

The CI number may be extended by the contractor adding digits at the right hand side as needed to identify (sub-)components within a given group (e.g. 416000 0001 == item x; 416000 0002 == item y).

3.1 Hardware

In the sense of this SoW, the "Delivery Date" given in the tables below shall be the date at which the deliverable item shall be available at the Place of Delivery.

The contractor shall demonstrate that the X-Band SCOE meets, or exceeds, the requirements as specified in AD 1 and all applicable documents addressed in it.

3.1.1 Deliverables – Baseline

The list of all hardware deliverables forming the contractual baseline is presented in Table 3.1-1.

Pos.	Item	Model	Delivery Date	Place of Delivery
1	X-Band SCOE including all functional blocks and RF harnesses, as required in AD 1	PFM	06 July 2011	Astrium GmbH, Immenstaad
2	Spare Kit	PFM	06 July 2011	Astrium GmbH, Immenstaad
3	re-usable container as required in AD 1		Together with items under pos 1	Astrium GmbH, Immenstaad
4	X-Band SCOE including all functional blocks as defined for Digital SCOE without RF and bypass harnesses, as required in RF-SCOE X-Band Requirement Specification (AD1)	EFM	15 Dec 2010	Astrium GmbH, Immenstaad
5	re-usable container as required in AD 1		Together with items under pos 4	Astrium GmbH, Immenstaad

Table 3.1-1: Baseline Deliveries

For the item 4 the following Requirements / sections in X-Band Requirement Specification (AD1) are applicable:

- As an overview see Figure 1.2-3: X-Band SCOE Block Diagram (Digital SCOE without RF)
- §2.1.1 **not** required is: RF-Harnes, RF IF Unit, X-Band Receivers, RF test equipment
- §2.1.2 only RFSX-1346 is applicable
- §2.1.3; §2.1.4; §2.1.5, all **not** applicable
- §2.1.6 fully applicable
- §2.1.7 applicable for the by-pass interface

- §2.1.8; §2.1.9; §2.1.10; §2.1.11; fully applicable
- §2.2.1 only RFSX-300 is applicable
- §2.2.2 only applicable for by-pass interface
- §2.2.3 fully applicable
- §3 applicable for the remaining components for Digital SCOE without RF
- §4 fully applicable
- §5 fully applicable

3.2 Software

The software of the X-Band SCOE equipment shall be delivered integrated with the H/W and in addition as a separate file on a computer readable medium.

All necessary S/W licenses for operating systems, database tools, development licenses, etc. required to operate and maintain the X-Band SCOE items shall be provided. The licenses shall be valid until the end of 2015.

3.3 Spares

The Contractor shall suggest a spares concept that shall enable the X-Band SCOE items to be repaired or replaced to achieve operationally again in <48 hours from any credible failure. The first line repairs will be carried out by Astrium GmbH personnel at the various EarthCARE test and launch campaign locations.

The contractor shall assess the proposed and at KO agreed utilised spare approach under constraints of availability for the different scenarios on test/integration as well as for the launch campaign. He shall achieve a suitable spare availability addressing the specific needs to ensure compliance to the above requirements.

This concept may involve the delivery of a full suite of spares to Astrium GmbH, or the holding of a full suite of spares at the Contractor premises or a combination of both ("spares pool").

The costs shall be considered by the Contractor when presenting the most suitable regime with the objective of providing a cost effective solution.

3.4 Repairs

Any X-Band SCOE equipment which is found not to conform to the relevant requirements as specified in, AD 1 and any other AD after delivery to Astrium GmbH and before the expiry of the warranty period, shall be investigated, repaired and tested by the Contractor, and returned to the point of despatch in the shortest possible time.

The repair time shall be 1 week maximum.

Faulty items removed from the RF SCOE following a failure shall be returned to the Contractor for repair or replacement. The faulty item(s) shall be repaired and returned to the spares pool within 15 working days (including any re-testing) of receipt by the Contractor.

For COTS items forming part of the manufactured items, full details of the repair / maintenance procedures shall be provided in the RF SCOE items user manuals.

3.5 Long Lead Items (LLI)

The contractor shall identify any long lead items which may impact the scheduled delivery of the X-Band SCOE items. Once identified, the procurement status of the long lead items shall be reported in the regular progress reports, together with any corrective actions to overcome procurement delays.

3.6 Documents

The list of documents to be delivered is attached in chapter 12 DOCUMENTATION REQUIREMENTS LIST, (DRL), of this SoW.

The contents of the listed documents are defined in the Annex A "Document Requirement Description". The definitions of the document description given therein shall be considered as requirements. Improvements to these content descriptions or efficient and reasonable combination of several documents may be proposed by the contractor. Such deviations require agreement by Astrium GmbH.

The documentation delivered by the contractor can be classified into three categories as follows:

1. Where Astrium GmbH action is "approval" – Status of documents "A"

This category includes documentation that requires formal approval in writing from Astrium GmbH before its acceptance or intended use. Provisions shall be made for Astrium GmbH signature on the cover of documents for approval. It should be noted, however, that approval of the document by Astrium GmbH does not in any way absolve the contractor of their liabilities under the contract, but confirms that the document is in compliance with higher level system documentation, not referred to under this contract.

The use by the contractor of a document in the "For approval" category before written approval is granted by Astrium GmbH is at the contractor own risk.

2. Where Astrium GmbH action is "review"- status of documents "R"

Astrium GmbH will review the document within 10 working days after receipt. Unless otherwise notified by Astrium GmbH within this same period, the contractor shall proceed to implement the document as planned. Review of the document by Astrium GmbH shall not imply any acceptance of liability by Astrium GmbH for its correctness.

3. Where Astrium GmbH action is "information"- status of documents "I".

This category includes routine documentation whereby Astrium GmbH determines current programme status, progress and future planning requirements. A formal response is not required but Astrium GmbH may elect to provide comments.

All documents shall be provided as PDF-Files in an electronically searchable format (NOT scanned from paper) and shall be delivered to Astrium GmbH in electronic form (e.g. ftp).

Each Data Package shall be delivered on electronic media (CD). Three CDs shall be provided with each data pack. Paper copies are NOT required for review data packages.

Two paper copies of the End-Item Data Package are required to be delivered together with each equipment delivery.

On request by Astrium GmbH, the contractor shall deliver data packages to ESA in addition and without extra charge.

4. CUSTOMER FURNISHED ITEMS AND UNDERTAKINGS

Not applicable

5. MANAGEMENT AND CONTROL REQUIREMENTS

The Contractor shall perform the work in line with management requirements specified in the Management Requirements Specification AD 3.

5.1 Reviews

There are several types of review to which the X-Band SCOE items shall be subjected; these reviews shall be held by the contractor and defined in the contractor's schedule.

The specific review boards applicable to the X-Band SCOE items shall be a design review, acceptance, TRR and TRB/DRB – refer to AD 4. The applicable review process applied to the X-Band SCOE items, subject to this Statement of Work, shall be agreed with the Astrium GmbH.

The objectives of the reviews are stated in the PA requirements, AD 4.

Astrium GmbH and the Agency shall have the right to perform or participate in audits, surveys, source inspections, test reviews, mandatory and key inspections, test reviews, delivery review boards, non-conformance review board etc. at the contractor's facilities and the lower tier contractors and suppliers. However, the Astrium GmbH and the Agency's participation shall not in any way replace or relieve the contractor of its responsibilities in meeting its contractual terms; rather, the Astrium GmbH and Agency participation shall aim to contribute to the identification of problem areas and assessing satisfactory progress.

The contractor shall hold all necessary reviews to ensure successful delivery of the X-Band SCOE. Deliverable documents for the reviews are defined in chapter 12 and in the Document Requirement Descriptions of Annex A.

6. PRODUCT ASSURANCE REQUIREMENTS

The contractor shall perform all PA and safety tasks covering the supply of the equipment and services defined in this SOW according to the project PA requirements specified in AD 4 and AD 5. These tasks shall be reflected in a PA plan, based on the requirements above, prepared in line with the execution of this contract and shall be approved by the Astrium GmbH.

All flight hardware test and handling support equipment shall comply with national and european legal product liability requirements.

Software PA requirements will apply to the Front End items software to the extent specified within AD 5.

Beyond the documents made applicable the regulations as listed below shall apply.

7. ENGINEERING REQUIREMENTS

7.1 General

The contractor shall co-ordinate all technical activities and the interfaces between the different disciplines involved and shall manage the technical and commercial interfaces to Astrium GmbH and to the lower tier contractors and suppliers.

He shall analyse all requirements imposed by the applicable documents and shall derive/analyse respective means to maintain compliance to the specification or propose a well founded other alternative with minor impact on the compliance status to Astrium GmbH.

If necessary the Equipment Contractor shall establish and maintain requirement specifications for the lower level configuration items.

7.2 Equipment Design

The contractor shall perform all design activities necessary to define the equipment under his responsibility such that it meets all applicable requirements.

In case the equipment includes a controller with software, the software development shall ensure that the development process is performed in accordance with the PA Requirements (AD 5) and the relevant ECSS referred to therein.

7.3 Interfaces

The contractor shall perform interface engineering, design and manufacturing to assure the compatibility and coherence of all physical and operational interfaces of the Contractor's equipment.

The interface engineering between spacecraft system and contractor equipment will be performed by Astrium GmbH. The contractor shall review, complement and comment on the spacecraft ICDs relevant interfaces. For this purpose, the contractor shall issue an Interface Control Document for his equipment.

7.4 Operations

The contractor shall generate and maintain a User Manual for his equipment.

7.5 Verification Task

The contractor shall demonstrate that:

- the design conforms to the requirements (qualification).
- the hardware and software complies to the design, is free of workmanship errors and is fully functional (acceptance)
- The requirements to be verified are identified in the applicable specifications by a unique requirements numbers.

The verification of the requirements shall be performed on equipment level, wherever possible. Verification on lower level is permitted. Higher level verification needs approval by Astrium GmbH.

The contractor shall maintain a Verification Control Document (VCD) which lists all applicable requirements and the correlated verification activities.

7.6 Specific Tasks

The design, development and verification of the equipment to be manufactured and delivered by the contractor shall as a minimum include the tasks as presented in the following not exhaustive list. The contractor shall:

- prepare, contribute and participate in meetings and reviews. the Kick-off meeting, the design review, the acceptance testing and progress meeting(s)
- analyse the requirements defined in the applicable specifications and the referenced standards
- prepare and maintain a master schedule
- perform the architectural design, thereby taking into account the optimal assignment of implementation to the soft- and hardware products
- establish the equipment design specifications and Interface Control Documents (ICD)
- perform and document the equipments design and check the design for compliance with equipment requirements
- define the hardware configurations
- procure hardware, software and material necessary to set-up the required equipment configurations
- establish and maintain a coherent set of configuration documents and drawings
- organise the meetings as required in this SoW and deliver such agendas, minutes and reports as are required
- monitor, control and report equipment properties (power, dimensions, electrical properties..)
- provide technical notes as necessary
- show calculations for the total power consumption of the Front End items in their worst case mode of operation, whenever possible, the measured values shall also be given
- prepare the equipments User & Operations Manuals defining the user interfaces, the equipment set-up and operations, its conditions and constraints as well as packaging and transportation procedures, covering all information to operate the Front End items and to perform first line maintenance
- prepare a verification programme including an assignment of verification tasks to functions and requirements
- define test cases and test data according to the agreed verification program and prepare the corresponding test procedures
- carry out the acceptance tests and prepare the verification close out documentation
- deliver the software and hardware to Astrium GmbH

- support the integration with the EarthCARE CCS and instrument EGSEs.
- support the operation commissioning

Additional tasks shall also be included if deemed necessary by the contractor to ensure that the deliverables fully satisfy all contractual requirements.

The contractor shall perform studies, analyses, simulations and testing as necessary to demonstrate the capability of the end products to fulfil the specified requirements, with the objective of delivering an optimised design. The optimised design shall reflect full consideration of available knowledge, hardware and technology commensurate with the EarthCARE schedule and key project events and milestones.

In the execution of the above tasks the contractor is expected:

- to co-ordinate in his team an orderly progress of the different tasks (managerial, technical and programmatic)
- to maintain an active and close contact with the Customer to ensure proper co-ordination and feedback;
- to provide evidence that the cost and schedule have been properly integrated with the engineering tasks
- to maintain a coherent set of configuration documents
- to carry out all development under control and supervision of product assurance to ensure compliance with applicable in-house software QA standards
- to manufacture and integrate the equipment in accordance with the requirements documentation and to update the documentation after agreement where necessary
- to fully verify the requirements and provide evidence in the relevant documentation

As part of the technical and cost monitoring process, the customer requires that reviews be performed at key stages of the work as is outlined in the following section. Each review shall demonstrate the compatibility of the existing technical status with the applicable requirements, and will also examine plans, specifications and procedures for future work in order to provide confidence that the specified requirements will be met within the defined cost envelope and in the schedule.

Regular progress reports are requested by the customer at 6 weeks interval. Intermediate abridged progress reports may be requested by the customer in critical project situations.

8. MANUFACTURE AND TEST REQUIREMENTS

8.1 Manufacture Requirements

The contractor shall maintain adequate facilities and personnel resources to sustain manufacturing, assembly, testing, handling and transportation of hardware at all levels during the programme in compliance with programme schedules. The contractor shall ensure that the standards of in-house and subcontracted manufacture are compatible with the requirements defined in the PA requirements (AD 4) and software PA requirements (AD 5). The contractor shall ensure that adequate documentation is available prior to start of any hardware manufacture to define all manufacturing processes, flow diagrams, planning, process control, material application data and personnel and facility certification. Manufacturing flow diagrams shall show all activities in their proper sequence and shall identify critical operations and mandatory inspection points at which the Astrium GmbH reserves the right to participate in accordance with AD 4 and AD 5.

8.2 Test Requirements

8.2.1 General

The contractor shall carry out all development, qualification and acceptance tests in accordance with AD 1 and any additional testing necessary to demonstrate the performance requirements are met.

8.2.2 Test Plan

The contractor shall prepare a test plan, describing the proposed programme of test activities in accordance with AD 1. The test plan shall be supplied to the Astrium GmbH in accordance with the submission requirements of the documentation requirements list (chapter 12). The test plans shall be in such detail that, in conjunction with the test reports and requirement specifications, it clearly allows traceability from requirements to measured value.

8.2.3 Test Procedures

The contractor shall provide test procedures for the Astrium GmbH approval two weeks prior to the test. In addition, the contractor shall provide all complete test report within 1 week of the completion of the test.

8.2.4 Test Results and Reports

Test results and test result summary sheets shall be available and delivered:

- in hard copy,
- and in electronic form in Excel compatible text files on CD-ROM format

inline with requirements of section 3.6 Documents above.

Where appropriate, all test results that are presented graphically shall include the relevant requirement mask; any 'out of specification' results shall be clearly identified and shall be subject to non-conformance control defined in AD 4. Test reports shall also list the test equipment used as defined in section 8.3.

8.2.5 Notification requirements

The contractor shall notify the Astrium GmbH of the start of a (group of) equipment acceptance tests by e-mail or by fax at least 5 working days before the commencement of the test sequence. Astrium GmbH will notify the contractor whether or not representatives will attend, and provide their names. In all instances, the contractor shall keep the Astrium GmbH informed of any change which may occur to the planned test date.

8.2.6 Test Readiness Review & Board (TRR / TRB's)

These shall be convened by the contractor, who shall invite Astrium GmbH and the Agency, to ensure the review meets the objectives defined in AD 4.

8.2.7 Acceptance Testing and Final Acceptance

The contractor shall perform acceptance testing on the Front End items to demonstrate compliance with the requirements defined in the equipment specification and relevant applicable documents.

The final acceptance shall be stated once:

- the deliverable items are received at the delivery site,
- the incoming inspection and the commissioning tests are performed successfully,
- all open action items are closed.

8.3 Test Equipment

All test equipment, including commercial test equipment, used during formal acceptance tests shall be calibrated and validated prior to use, and shall remain in calibration during the applicable test; the configuration of the test equipment, including software release, shall be defined during the TRR, and described in the Test Procedure. All calibration standards shall be traceable to national/international standards. In addition, the test report shall list the test equipment used, together with their serial numbers and calibration expiry date.

8.4 Ground Support Equipment

General

The Contractor shall ensure that the product under his responsibility is safe and comply with all applicable legal European Union (EU) requirements related to the product liability.

During design and manufacturing phases the Contractor shall implement specific safety operations where appropriate and all the associated activities, analyses and results shall be reported in a specific liability file, which shall be part of the EIDP.

The tasks for liability certification shall include:

- Identification of the EU directives applicable to the product.
- Derivation of the design and manufacturing liability matters where appropriate.
- Assessment of compliance with the applicable EU directives and the associated derived requirements (referring to analysis, tests, ...):
- Labelling the product with a CE mark (including the name of the company),
- Issuing a formal liability Declaration of Conformity.
- Addressing product liability in the product user's manual.

The Contractor shall be legally responsible for the supplied product.

Product Safety

All product(s) supplied against this order shall be as safe as reasonably possible and a safety assessment carried out in accordance with ECSS-Q-ST-40 (latest version) or equivalent.

The Design Authority is fully responsible for the identification and for the demonstration of compliance to applicable EU legislation. The following is given for guidance and is not necessarily complete

New Approach ('CE') - All product(s)/equipments supplied against this order, that fall into the scope of any applicable 'New Approach' directive(s), shall be

- Labelled with the 'CE' marked in accordance with European Legislation [ND 5]
- Supplied with a 'Declaration of Conformity' showing compliance to all applicable directives
- Supplied with a 'User Manual' detailing any safety warnings

In particular, consideration should be given to Low Voltage directive (2006/95/EC), EMC directive (2004/108/EC) for EGSE and the machinery directive (98/37/EC) for MGSE.

Legacy Equipment Returned for Re-use, Repair or Modification

Legacy Equipment that is currently 'in-service' and returned for re-use, repair or modification, should be assessed for 'CE' applicability using the following rules, taken from the 'European Commission Guide' to the implementation of New Approach Directives:

- a. Products that have been re-used/repared without changing the original performance, purpose or type, are not normally subject to conformity assessment according to the New Approach Directives.
- b. Products that have been subject to important changes that aim to modify its original performance, purpose or type, (i.e. changes to form-fit and/or function) are considered to be new products and have to comply with the provisions of all current applicable Directives.

The manufacturer carrying out the repair or modification shall supply a statement in respect of their decision (above) in respect of the application of all current directives

Waste Electrical Electronic Equipment (WEEE) (EU directive 2002/96/EC) and Battery and Accumulator directive (EU directive 2006/66/EC) -- All **electrical** product(s)/equipments/systems supplied against this order, that fall into the scope of the WEEE directive and/or the Battery & Accumulator directive, shall be

- Labelled with the 'crossed out wheelie bin', and WEEE registration number
- Supplied with a 'User Manual' detailing information on recycling and re-use. Plus information on dismantling/replacement and disposal/return of product at end of life

Restriction of Certain Hazardous Substances (RoHS) (EU directive 2002/95/EC)

All **electrical** product(s)/equipments supplied against this order, that fall into the scope of the WEEE and RoHS directives, shall be

- Supplied with a statement of compliance to RoHS where applicable

Registration, Evaluation, Authorization of Chemicals (REACH) EC Regulation 1907/2006

Astrium realizes that some manufacturers may be forced to make changes to product design and/or processes as a consequence of REACH.

Suppliers must therefore make early consideration of REACH to identify substances, and/or preparations or processes used in-house or involved in a sub-tier process where there is a risk of change due to the impact of REACH. Suppliers, sub-contractors and sub tier suppliers are reminded that they are required to provide

- A statement to confirm that the obligations outlined in REACH have been met
- For all Substances of Very High Concern (SVHC) listed in Annex 14 of the regulation, where each item delivered contains a concentration above 0.1% of the total weight, suppliers must provide for each SVHC
 - SVHC name and registration number
 - Instructions for safe use of the product
 - Safety instructions with respect to servicing, disposal and recycling.
 - A Material Safety Data Sheet (MSDS).

The contractor is requested to fill out the "REACH QUESTIONNAIRE" form, provided by Astrium GmbH.

9. DELIVERY

9.1 Delivery Review Board (DRB)

The contractor shall convene a DRB, chaired by Astrium GmbH, in accordance with AD 4.

9.2 Customs

EarthCARE is an ESA project that enables companies from ESA member states to be relieved from customs and excise between the member states.

It is the responsibility of the contractor to request relief from customs.

For items acquired outside the ESA member states it is the responsibility of the contractor to ensure that the customs paperwork and procedures are properly considered in the planned time for shipment.

9.3 Packing

The EGSE packing containers shall be reusable and comply with the requirements of AD 1. Details of the packing containers shall be identified in the ITT response.

Unless otherwise specified, deliverable hardware/software shall be inspected and packed in accordance with PA requirements AD 4, and addressed as follows:

Astrium GmbH
Claude-Dornier-Straße
88090 Immenstaad
Deutschland

followed by the name of Uwe Slansky, EarthCARE Project Manager, or his representative, as defined at the time of the DRB or Shipment Delivery Review.

Each container shall bear markings in accordance with AD 1. Any hazards associated with the proximity of the container (e.g. magnetics) or the opening of the container shall be clearly labelled and observable on the outside of the container.

9.4 Preparation for Shipment

The Contractor shall be responsible for compliance with all required custom formalities and for insuring the deliverable items as defined in the contract. All consignments shall be made Delivery Duty Paid (DDP-Incoterms 2000) by the Contractor to the delivery places stated in this SOW.

The term "delivered" shall be construed in accordance with "Incoterms 2000", such document being published by the International Chamber of Commerce.

The Contractor shall notify the Customer by fax the "Advice of Despatch" of all the coming items at least 3 working days prior to the effective date of shipment. The advice of despatch shall give at least the following information:

- . Purchase Contract Number,
- . Quantity of goods consigned,

- Description of goods consigned,
- Package number, weight and size,
- Number of air-freight bills,
- Pro-forma Invoice INTRASTAT purposes
- The insurance value of the goods

Every shipment shall be accompanied by relevant shipping documents, accessible outside the item that shall include as a minimum:

- despatch note,
- release note (or Contractor approved equivalent),
- procedures covering handling, safety, cleanliness, cleaning of containers and storage conditions;
- copies of the pro-forma invoice

The invoice shall contain the following information:

- full address information,
- Contract number,
- description of goods consigned,
- quantity of goods consigned,
- net value of goods consigned (for customs purpose where applicable),
- relevant certificate of conformance number,
- package number, weight and size.

This copy shall be anticipated via fax to the Customer Subcontractor Manager appointed in the Contract.

The shipment shall include one complete copy of the End Item Data Package (EIDP) for each item of hardware delivered.

A delivery will not be deemed completed until the above documentation requirements have been fulfilled.

9.5 Transport

Transport shall be arranged by the most consistent and cost effective expedition method with the equipment being delivered, safely and in good order.

The Contractor must insure the deliverable items at least for the amount of their replacement value including insurance against "special transport risks", in particular theft, pilferage, breakage, shipping and contact with other cargoes.

In the event of damage in transit, the Customer will provide the Contractor with all the information and evidence available regarding such damage within seven days of the damage discovery. It is understood and agreed that, in principle, the cost of the insurance and freight of any shipment to be made hereunder, shall be borne by the forwarding party with the exception of items which are subject to rejection, which shall be borne by the party responsible for the cause of the rejection.

Upon written request of the Customer, the Contractor shall in any case and any time be obliged to deliver and/or transfer to the Customer the products manufactured under this contract in their respective state, as well as any materials (e.g. in the case of contract termination or suspension). This shall - without any restriction - also apply to products and material of the Contractor's Suppliers.

10. SERVICES AND SUPPORT

10.1 Commissioning

The Contractor shall support the installation and commissioning of the X-Band SCOE at Astrium GmbH in the frame of the equipment incoming inspection at Astrium.

Delivery shall not be deemed to have been completed until the receipt inspection and the commissioning tests performed by Astrium GmbH with or without the support of the Contractor have been successfully completed at destination for each delivered system.

10.2 Post Delivery Services

In order to ensure technical support to Astrium GmbH after delivery of the end products, the contractor shall make sure that technically qualified and project experienced personnel can be made available to Astrium GmbH, within one week, after delivery of the products and up to the end of the warranty period as defined by the contract. After this time period, the contractor shall be able to provide, upon Astrium GmbH request, a technically qualified personnel support on time and material basis.

For each of the delivered equipment, the contractor shall provide support during normal working time in Europe like a helpdesk.

Fast maintenance/repair service shall be provided on a time and material basis (if not covered by warranty), including:

- 24 hour response time for remote failure diagnostics/repair and helpdesk like advice to the X-Band SCOE user team while the X-Band SCOE is located at user premises
- Replacement/repair service shall be based on the available spares.

All means and tools shall be kept operational and maintained throughout the warranty period in order to minimise potential repair and re-verification time. That shall be no more than typically three weeks. These activities do not impact the contractor's warranty obligations.

11. EXPORT CONTROL REQUIREMENTS

11.1 General

The Contractor is obliged to perform his activities and deliveries under the existing export license regulations (national and US). He is further obliged to avoid or at least to minimize the license effort (especially US ITAR) wherever possible. In any case this shall be done in consultation with Customers Export Control Department and requires its prior formal approval.

The Contractor shall be responsible for ensuring compliance with the requirements of the Government of the United States of America regarding exportation or re-exportation of the goods and/or materials which are the subject of the present Subcontract from ASTRIUM. In order to achieve this, the Contractor shall be responsible for obtaining any necessary export licence or approval from the U.S. Authorities and for making the controlling provisions thereof known to ASTRIUM in accordance with the requirements presented hereafter.

11.2 Regulations

Components and materials shall be selected such that they are not affected by trading barriers (e.g. ITAR regulations). Where this requirement cannot be met, the justification for use of such components and materials shall be supplemented with:

- Information of the subject item (Description, part/unit nr., manufacturer, origin, export restriction type, lead time) (this info may already be in the PAD).
- Details of design requirements, which drive the need of that particular item.
- List of alternative (European) items and discussion of how those alternatives do not fulfil the technical requirements.
- For each alternative (European) identified above discussion of possible use while not fully meeting the technical/performance requirements.
- Discussion of possible associated programmatic impacts introduced by the use of alternative (European) items and identification of schedule mitigation measures.
- Risk assessment detailing potential impacts for the project.

11.3 Direct “US Contractor”

When the Contractor to ASTRIUM is a “Direct US Contractor” to ASTRIUM, the following provisions shall apply between ASTRIUM and the Contractor:

11.3.1 Inputs from ASTRIUM to Support Contractor's Application

- ASTRIUM cover letter
- DSP-83 (for agreements or an export licence for classified 'defence articles')
- ASTRIUM control plan, if available
- ASTRIUM accountability plan (for DSP-5 export licence only)
- Minutes of meetings, if any to the subject
- ASTRIUM information and requirements related to the agreement

11.3.2 Description of Contractor's Responsibilities

To draft the documentation that has to be prepared to make the application to the DOS;

To take into account in the documentation the information that ASTRIUM has transmitted via the cover letter, the DSP-83 (for agreements or an export of classified 'defence articles) and associated documents;

To inform ASTRIUM about any omission in the submitted cover letter and / or missing document and not to venture any input as a replacement for a missing information;

To send the drafted relevant documentation to ASTRIUM for ASTRIUM internal review before submission to the DOS;

To inform ASTRIUM about the status of the application (preparation, submission, staffing, authorisation, provisos...)

To pass on to ASTRIUM the DOS authorisation (i.e. the DTC original case number (for agreements) or the licence number (for DSP-5 licence) , the text of the authorisation and provisos);

According to the ITAR regulation, to do the identification of the hardware, technical data and information that are exported in the frame of the authorised agreement or export licence.

11.3.3 Outputs from Contractor

- Drafted documentation including final issue that is submitted to the DOS;
- TAA or Distribution Agreement as agreed with ASTRIUM, submitted to the DOS authorisation and countersigned by both parties after DOS approval when applicable;
- DSP-5 submitted to the DOS authorisation when applicable;
- DTC original case number and licence number;
- Copy of the DOS authorisation, including provisos;
- Technical data and information identified as 'defence articles' as required by the ITAR rules;
- Hardware and relevant documentation (EIDP, etc) identified as 'ITAR controlled' as required by DOS.

11.4 Requirements for Lower Tiers "US Subcontractors/Suppliers"

When the Subcontractor to ASTRIUM is not a "Direct US Contractor" but has US subcontractors/suppliers in its Lower Tiers, the requirements of paragraph 11.2 shall be applied between the contractor and its "Direct US subcontractors/suppliers" and at any level between a Lower Tiers subcontractor/supplier and its "Direct US Supplier", with all references to "ASTRIUM" changed to refer to the Contractor.

In addition, the supplier to ASTRIUM shall:

- Advise the DTC original case number(s) and licence number(s) to ASTRIUM;
- Provide copy(ies) of the DOS authorisation(s), including provisos, to ASTRIUM;
- Provide a copy of his own control plan, to ASTRIUM;

- Ensure that all 'technical data and information' passed on to ASTRIUM or that all data and information supplied to ASTRIUM which incorporates such 'technical data and information' are identified as 'defence articles' as required by the ITAR rules;
- Ensure that all 'H/W and relevant documentation (EIDP, etc)' passed on to ASTRIUM or that all hardware and documentation incorporating any items subject to such ITAR control, are identified as 'ITAR controlled' as required by DOS.

Flow down all the provisions at Paragraph 11.2 above mutatis mutandis to all lower tier subcontractors/suppliers to the lowest tier of subcontractor/supplier, unless otherwise agreed with ASTRIUM, and ensure that the relevant data is provided to the contractor by those lower tier subcontractors/suppliers and passed up to ASTRIUM or incorporated into lower levels of documentation as necessary and appropriate.

12. DOCUMENTATION REQUIREMENTS LIST

Legend: The document classes are:

- Class A - documents for approval
- Class R - documents for review
- Class I - all other documents

DRL-Code	DRL	Class	Proposal	Kick-Off	PDR	CDR	TRR	TRB	DRB	As required
	Statement of Compliance									
	SoC to Contract, SOW, Requirements and Specifications (generic and specific)	R	x	x	x	x				
	Management Documents									
PM-01	Management Plan	A	x		x					
PM-02	Progress Report	R								x
PM-04	Minutes of Meeting	I								x
PM-05	Project Directory	R	x		x	x				
PM-07	Inventory Control List	I						x		
PM-08	Schedule	R	x							x
PM-09	Contract Change Notice	A								
PM-12	Product Tree	R	x		x	x				
PM-13	Work Breakdown Structure	A	x							
PM-14	Work Package Description	A	x							
PM-19	Risk Assessment and Management Plan	A	x							
PM-22.1	Document Change Note (DCN)	R								x
PM-22.2	Document Change Request (DCR)	A								x
PM-23	Contract Close-out data Package	A								
PM-23.1	End of Project Assessment Report	A								x
PM-24	Request for Waiver / Request for deviation	A								x
PM-25	Request for Waiver / Request for deviation Status List	R								x
PM-30	Project Organisation Breakdown Structure	R	x							
PM-33	Configured Item Data List (CIDL)	R					x			
PM-35	Risk Assessment Report	A								
PM-40	Cost Breakdown Structure (CBS)	R	x							
PM-41	Export control list	R	x						x	
PM-42	Export licenses	R							x	
PM-43	Configuration Status List (CSL)	R							x	

DRL-Code	DRL	Class	Proposal	Kick-Off	PDR	CDR	TRR	TRB	DRB	As required
	Engineering Documents									
SA-01	Equipment Design Description	R	x		x	x				
SA-04	Budget Report (mass, power, dimensions, TM/TC etc.)	R				x	x			
SA-07	EMC Control Plan	A								
SA-08	Design and Development Plan	A	x		x					
SA-12	Review Data Packages	R			x	x	x			
SA-15.2	Technical Notes	R								x
SA-15.3	EMC Analysis	R								
SA-30	Verification Plan (incl. Verification Matrices)	A	x			x				
SA-34	ICDs (Mechanical, Thermal, Electrical, HW/SW, Calibration, etc)	A	x		x	x	x		x	
SA-35	TM / TC Data Base	R				x	x		x	
SA-36	Drawings (Overall Assembly; Mechanical & Thermal, Electrical incl. Circuit diagrams, switching diagrams & synoptics, Grounding & Bonding)	R				x	x		x	
SA-37	Equipment User's Manual	R				x	x		x	
	AIV Documents									
AV-01	Verification Control Document (VCD)	A	x			x			x	
AV-02.1	AIV Plan	A	x							
AV-02.2	MAIT Flow Charts including MIPs and KIPs (may be part of the AIV plan)	A	x							
AV-07.1	Test Specification	A								
AV-07.2	Test Plan	A	x			x	x			
AV-08	Test Procedures	R				x	x			
AV-15.1	Test Reports	R						x	x	
	Product Assurance									
PA-1.1	Product Assurance & Safety Plan	A	x		x					
PA-5	Critical Item List (CIL)	R								
PA-6	Non Conformance Report	R					x	x	x	
PA-7	Non Conformance Status Report	R								x
PA-10	Alert Status Report	R								x
PA-11.1	EIDP	A							x	
PA-11.2	Packaging, Transport, Handling and Storage Procedure (PHTS)	R				x			x	
PA-16	FMEA	R			x	x				
PA-17	Safety Analysis	R			x	x				
PA-31	Certificate of Conformity	A							x	
PA-35	As Built Configuration List (ABCL)	R					x		x	

