Invitation to Quote

Invitation to Quote (ITQ) on behalf of the Science & Technology Facilities Council (STFC)

Subject UK SBS PS17055 RAL Engineering Design & Drawing

Sourcing reference number PS17055

UK Shared Business Services Ltd (UK SBS)
www.uksbs.co.uk

Registered in England and Wales as a limited company. Company Number 6330639.
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UKSBS
Shared Business Services

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Section 1 – About UK Shared Business Services

Putting the business into shared services

UK Shared Business Services Ltd (UK SBS) brings a commercial attitude to the public sector; helping our customers improve efficiency, generate savings and modernise.

It is our vision to become the leading provider for our customers of shared business services in the UK public sector, continuously reducing cost and improving quality of business services for Government and the public sector.

Our broad range of expert services is shared by our customers. This allows our customers the freedom to focus resources on core activities; innovating and transforming their own organisations.

Core services include Procurement, Finance, Grants Admissions, Human Resources, Payroll, ISS, and Property Asset Management all underpinned by our Service Delivery and Contact Centre teams.

UK SBS is a people rather than task focused business. It's what makes us different to the traditional transactional shared services centre. What is more, being a not-for-profit organisation owned by its customers, UK SBS' goals are aligned with the public sector and delivering best value for the UK taxpayer.

UK Shared Business Services Ltd changed its name from RCUK Shared Services Centre Ltd in March 2013.

Our Customers

Growing from a foundation of supporting the Research Councils, 2012/13 saw Business, Energy and Industrial Strategy (BEIS) transition their procurement to UK SBS and Crown Commercial Services (CCS – previously Government Procurement Service) agree a Memorandum of Understanding with UK SBS to deliver two major procurement categories (construction and research) across Government.

UK SBS currently manages £700m expenditure for its Customers.

Our Customers who have access to our services and Contracts are detailed here.

Section 2 – About Our Customer

Science and Technology Facilities Council (STFC)

STFC is a world-leading multi-disciplinary science organisation, whose goal is to deliver economic, societal, scientific and international benefits to the UK and its people – and more broadly to the world.

STFC support an academic community of around 1,700 in particle physics, nuclear physics, and astronomy including space science, who work at more than 50 universities and research institutes in the UK, Europe, Japan and the United States, including a rolling cohort of more than 900 PhD students.

The organisation's large-scale scientific facilities in the UK and Europe are used by more than 3,500 users each year, carrying out more than 2,000 experiments and generating around 900 publications.

The combination of access to world-class research facilities and scientists, office and laboratory space, business support, and an environment which encourages innovation has proven a compelling combination, attracting start-ups, SMEs and large blue chips such as IBM and Unilever.

Examples of funded research

- STFC is providing the design infrastructure for the £23bn UK microelectronics sector that underpins strategically important industries worth £78bn to the UK economy
- STFC's ISIS facility and its users, working in partnership with the NHS, developed a novel material to improve the treatment of cleft lip and palate, speeding up healing times and reducing operating costs
- STFC's Synchrotron Radiation Source was used to understand how conventional anti-malarial drugs work, allowing the development of more effective treatment to reduce the devastating global impact of malaria
- STFC's ISIS facility is identifying new materials that can safely and conveniently store hydrogen, enabling the development of hydrogen-fuelled cars reducing reliance on fossil fuels and cutting carbon emissions

www.stfc.ac.uk

Section 3 - Working with UK Shared Business Services Ltd.

In this section you will find details of your Procurement contact point and the timescales relating to this opportunity.

Section 3 – Contact details		
3.1	Customer Name and address	Science & Technology Facilities Council, Polaris House, North Star Avenue, Swindon SN2 1SZ
3.2	Buyer name	Ben Oborne
3.3	Buyer contact details	Professionalservices@uksbs.co.uk
3.4	Estimated value of the Opportunity	Maximum contract value is £100,000.00 excluding VAT
3.5	Process for the submission of clarifications and Bids	**All correspondence shall be submitted within the Emptoris e-sourcing tool. Guidance Notes to support the use of Emptoris is available here. Please note submission of a Bid to any email address including the Buyer will result in the Bid not being considered.**

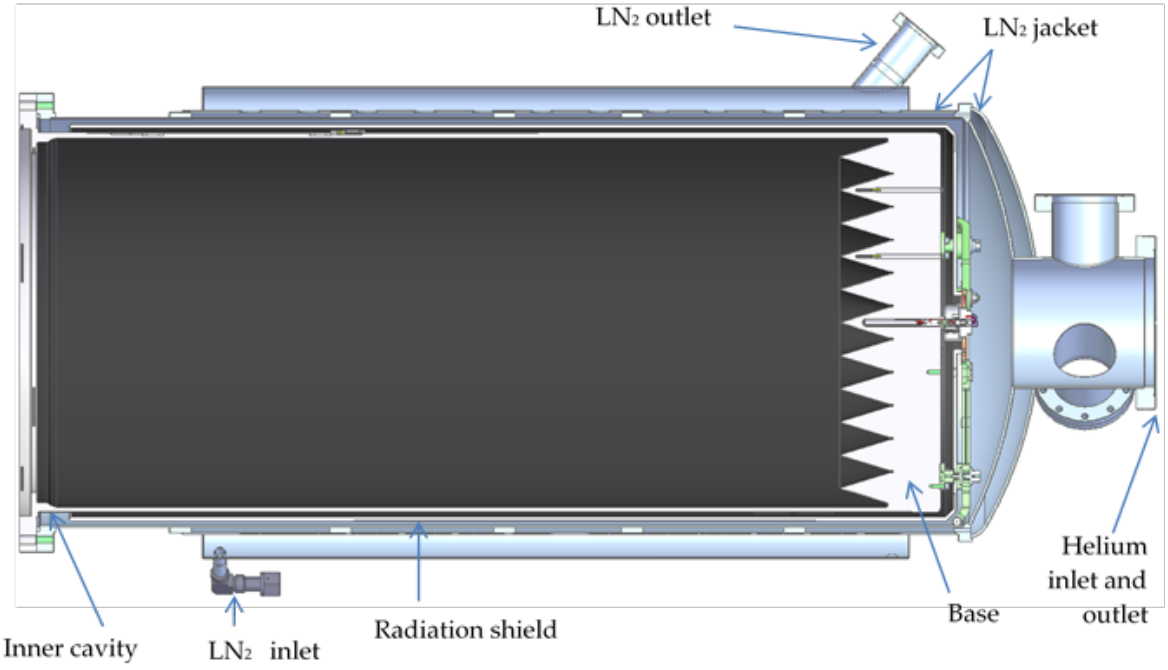
Section 3 - Timescales		
3.6	Date of Issue of Contract Advert and location of original Advert	30/03/2017 Contracts Finder
3.7	Latest date/time ITQ clarification questions should be received through Emptoris messaging system	06/03/2017 11:00am
3.8	Latest date/time ITQ clarification answers should be sent to all potential Bidders by the Buyer through Emptoris	07/03/2017 14:00pm
3.9	Latest date/time ITQ Bid shall be submitted through Emptoris	13/04/2017 14:00pm
3.10	Date/time Bidders should be available if telephone or face to face clarifications are required	20/04/2017-21/04/2017
3.11	Anticipated rejection of unsuccessful Bids date	25/04/2017
3.12	Anticipated Award date	25/04/2017
3.13	Anticipated Contract Start date	01/05/2017

3.14	Anticipated Contract End date	01/06/2018
3.15	Bid Validity Period	60 Days

Section 4 – Specification

Introduction

The Science and Technology Facilities Council (STFC) department of RAL Space is designing and building five blackbody targets for the calibration of two instruments on the European Space Agency (ESA) Meteosat Third Generation (MTG) imaging and sounding satellites. The two instruments are called 'IRS' (being developed by OHB in Germany) and 'FCI' (being developed by Thales-Alenia Space in France TAS-F). The blackbody targets (BB) require very accurate thermal control, based on a liquid nitrogen jacket, a helium gas gap (where heat conduction through the gas is controlled by adjusting its pressure), and electric heaters. These, together with associated electronics, controls, tooling, flanges, harnesses, and cryogenic supply systems and their ancillary pipework, form the Optical Ground System Equipment (OGSE).



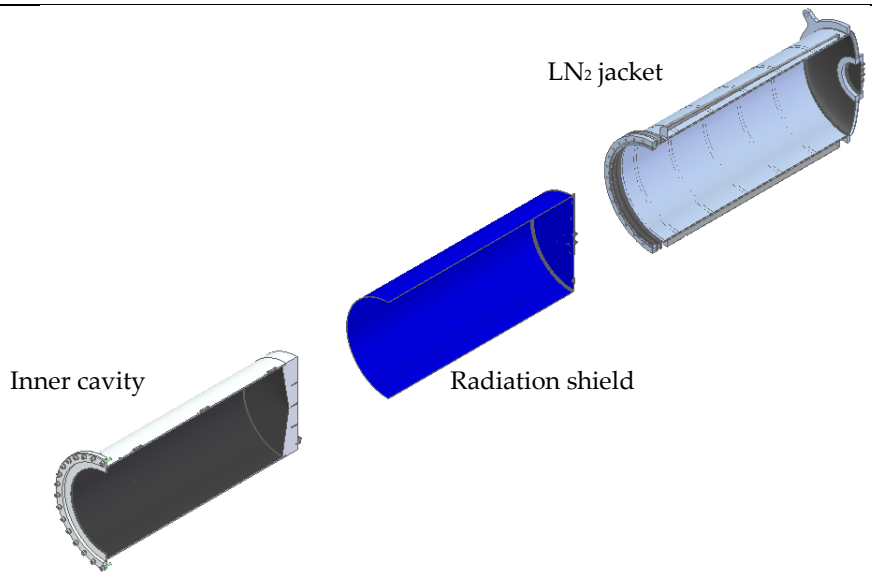


Figure 1: Basic blackbody design.

For each customer, there will be an OGSE:

- for TAS-F, this will consist of two blackbodies (Variable Blackbody (VBB) and Deep Space Blackbody (DSBB)) + one phase-separator + two Helium supply systems + associated pipework for two blackbodies + harnessing for two blackbodies + one electronics flange + one LN2 flange + one He flange + one electronics ground support system (EGSE) + two assembly frames + three mounting/alignment frameworks.
- for OHB, this will consist of three blackbodies (VBB, Cold Blackbody #1 (CBB#1) and Cold Blackbody #2 (CBB#2)) + one phase-separator + three Helium supply systems + associated pipework for three blackbodies + harnessing for three blackbodies + one electronics flange + one LN2 flange + one He flange + one EGSE + four assembly frames + three mounting/alignment frameworks + six alignment mechanisms.

Mechanically, both VBBs, DSBB and CBB#1 are identical, though they each have different frameworks/mounting features. CBB#2 is smaller than the four other blackbodies, and its mounting will not include a complicated framework.

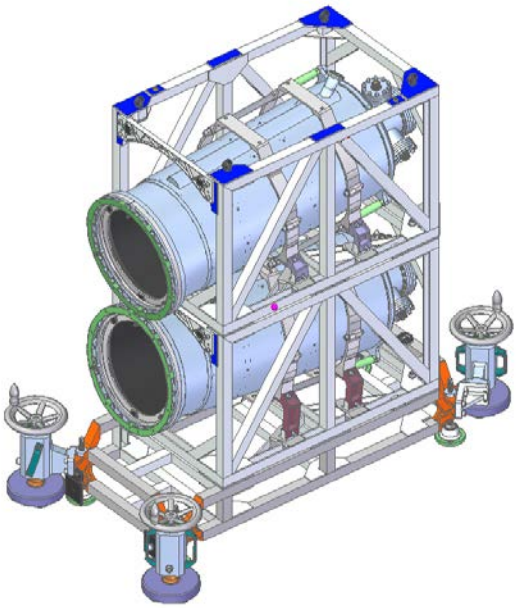


Figure 2: TAS-F blackbodies and framework.

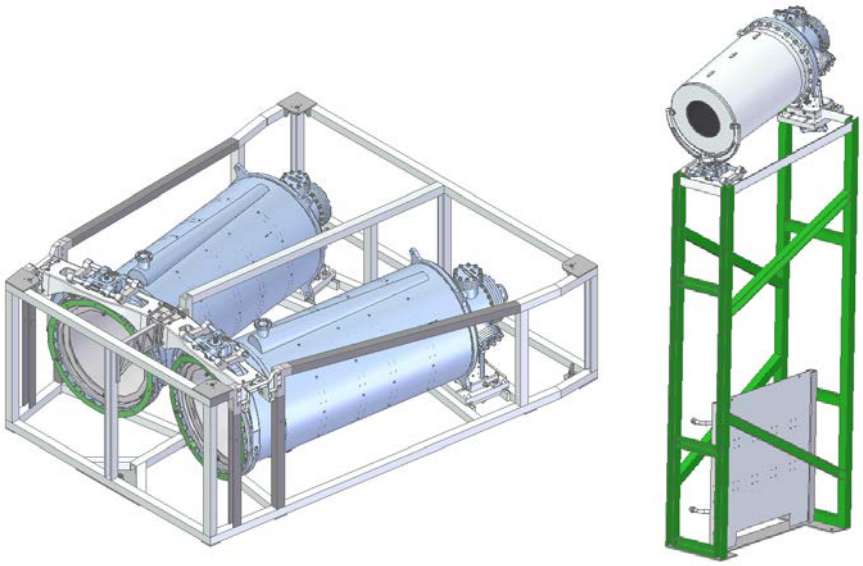


Figure 3: OHB blackbodies and framework.

Scope

This document describes the activities to be executed and the deliverables required by RAL Space in relation to mechanical support to finalise the design, analysis and support the manufacture of the blackbody targets, as well as to provide support for the assembly/integration leading to the delivery of these blackbody targets..

The winning supplier will be responsible for:

- Detailed design activities **as detailed in the Annex A - Tasks**, focusing upon updates and modifications to existing CAD models of the system, and provision of final drawings for manufacture, and of layout/interfaces in each customer's facility. This will be in collaboration with STFC internal mechanical, thermal, EGSE,

production and AIT teams.

- Contribute to project design documentation, as well as lead assembly and test procedures associated with
- Support in manufacture and procurement of the blackbodies and all associated mechanical ground support equipment (MGSE), in-line with the design activities above, in order to identify and liaise with various suppliers and manufacturers, as well as with STFC procurement procedures.
- Active support and participation in the assembly and integration of the actual blackbodies themselves, in cooperation with STFC's AIT group, as an expert in the design and assembly.

Task Number	Task Title
T1000	Cavity and Shields Out to Order
T2000	TAS-F Framework + main MGSE Accessories Out to Order
T3000	OHB Framework + main MGSE Accessories Out to Order
T4000	Remaining minor MGSE Hardware Out to Order
T5000	Assembly Preparation
T6000	OHB dCDR (delta Critical Design Review)
T7000	TAS-F Assembly
T8000	TAS-F Test prep
T9000	TAS-F TRR (Test Readiness Review)
T10000	TAS-F TRB/DRB (Test/Delivery Review Board)
T11000	TAS-F PAB (Preliminary Acceptance Board)
T12000	OHB Assembly
T13000	OHB Test prep
T14000	OHB TRR
T15000	OHB TRB/DRB
T16000	OHB FAT (Final Acceptance Test)

Management

The supplier will be expected to interface with the RAL Space project team. Formal interface points will be:

- Jane Hurley (Project Manager)
- Sandy Fok (Mechanical Lead)
- Alan Pearce (AIT Lead)

Contact details thereof shall be provided upon award of contract.

The supplier shall be responsible for the management of all activities under the Contract. They will monitor and control the managerial and technical performance of their subcontractors and shall keep under close review the interfaces between various Subcontractors and lower level Subcontractors, in order to ensure that all requirements are met. The supplier willl be well informed about the status and progress of work of his Subcontractors.

Reporting and Meetings

Face-to-face progress meetings with the supplier shall be necessary on occasion to monitor

progress, in the stead of written reporting.

Additionally, it may be requested that they participate in several key reviews with RAL Space's customers.

All such meetings shall be scheduled ad-hoc throughout the duration of the contract as needed.

Day-to-Day Work Arrangements

The supplier will be required to have all infrastructures to be able to carry out the design and documentation components of this work including computing hardware, word processing package, CAD software, internet connection and office space.

This infrastructure should be able to interface with RAL Space networks via a VPN (access and log-in details will be sorted upon award of contract), since the supplier will need constant access to shared designs on RAL shared project drives, and some large assemblies will be too large to work on remotely. RAL Space will ensure that there is a CPU workstation on-site onto which the supplier can VPN.

Deliverables and Milestones

Deliverables and Milestones are defined in detail in each Task, and each Task shall have a corresponding Milestone associated with it, for which the supplier can invoice.

Timescales

Contract award is expected by the end of April 2017 with the Kick off of the Tasks starting on 1 May 2017.

It is anticipated that the contract will end in-line with the project, as the Bidder will be expected to work in-line with the project team. Participation in weekly meetings assures that the Bidder stays aware of the overall project progress and schedule. At the time of tender, it is expected that the end of the project and contract will be June 2018.

Terms and Conditions

Bidders are to note that any requested modifications to UK SBS Terms and Conditions on the grounds of statutory and legal matters only, shall be raised as a formal clarification during the permitted clarification period.

Section 5 – Evaluation model

The evaluation model below shall be used for this ITQ, which will be determined to two decimal places.

Where a question is 'for information only' it will not be scored.

The evaluation team may comprise staff from UK SBS, the Customer and any specific external stakeholders UK SBS deem required. After evaluation the scores will be finalised by performing a calculation to identify (at question level) the mean average of all evaluators (Example – a question is scored by three evaluators and judged as scoring 5, 5 and 6. These scores will be added together and divided by the number of evaluators to produce the final score of 5.33 (5+5+6 =16÷3 = 5.33)

Pass / fail criteria

Questionnaire	Q No.	Question subject
Commercial	SEL1.2	Employment breaches/ Equality
Commercial	FOI1.1	Freedom of Information Exemptions
Commercial	AW1.1	Form of Bid
Commercial	AW1.3	Certificate of Bona Fide Bid
Commercial	AW3.1	Validation check
Commercial	AW4.1	Contract Terms
Commercial	PROJ1.1	Compliance with RAL Space rules & regulation on site
Commercial	PROJ1.2	Infrastructure interface with RAL Space network
Commercial	PROJ1.3	Attendance to period meetings on-site at RAL Space
Commercial	PROJ1.4	Ability to work on-site at RAL Space
Price	AW5.5	E Invoicing
Price	AW5.6	Implementation of E-Invoicing
Quality	AW6.1	Compliance to the Specification

Scoring criteria

Evaluation Justification Statement
In consideration of this particular requirement UK SBS has decided to evaluate Potential Providers by adopting the weightings/scoring mechanism detailed within this ITQ. UK SBS considers these weightings to be in line with existing best practice for a requirement of this type.

Questionnaire	Q No.	Question subject	Maximum Marks
Price	AW5.2	Price	25%
Quality	PROJ1.5	Methodology	35%
Quality	PROJ1.6	Project Plan and Resource	35%
Quality	PROJ1.7	Quality Monitoring	5%

Evaluation of criteria

Non-Price elements

Each question will be judged on a score from 0 to 100, which shall be subjected to a multiplier to reflect the percentage of the evaluation criteria allocated to that question.

Where an evaluation criterion is worth 20% then the 0-100 score achieved will be multiplied by 20.

Example if a Bidder scores 60 from the available 100 points this will equate to 12% by using the following calculation: Score/Total Points available multiplied by 20 (60/100 x 20 = 12)

Where an evaluation criterion is worth 10% then the 0-100 score achieved will be multiplied by 10.

Example if a Bidder scores 60 from the available 100 points this will equate to 6% by using the following calculation: Score/Total Points available multiplied by 10 (60/100 x 10 = 6)

The same logic will be applied to groups of questions which equate to a single evaluation criterion.

The 0-100 score shall be based on (unless otherwise stated within the question):

0	The Question is not answered or the response is completely unacceptable.
10	Extremely poor response – they have completely missed the point of the question.
20	Very poor response and not wholly acceptable. Requires major revision to the response to make it acceptable. Only partially answers the requirement, with major deficiencies and little relevant detail proposed.
40	Poor response only partially satisfying the selection question requirements with deficiencies apparent. Some useful evidence provided but response falls well short of expectations. Low probability of being a capable supplier.
60	Response is acceptable but remains basic and could have been expanded upon. Response is sufficient but does not inspire.
80	Good response which describes their capabilities in detail which provides high levels of assurance consistent with a quality provider. The response includes a full description of techniques and measurements currently employed.
100	Response is exceptional and clearly demonstrates they are capable of meeting the requirement. No significant weaknesses noted. The response is compelling in its description of techniques and measurements currently employed, providing full assurance consistent with a quality provider.

All questions will be scored based on the above mechanism. Please be aware that the final score returned may be different as there may be multiple evaluators and their individual scores will be averaged (mean) to determine your final score.

Example
Evaluator 1 scored your bid as 60
Evaluator 2 scored your bid as 60
Evaluator 3 scored your bid as 40
Evaluator 4 scored your bid as 40

Your final score will (60+60+40+40) ÷ 4 = 50
Price elements will be judged on the following criteria.
The lowest price for a response which meets the pass criteria shall score 100. All other bids shall be scored on a pro rata basis in relation to the lowest price. The score is then subject to a multiplier to reflect the percentage value of the price criterion. For example - Bid 1 £100,000 scores 100. Bid 2 £120,000 differential of £20,000 or 20% remove 20% from price scores 80 Bid 3 £150,000 differential £50,000 remove 50% from price scores 50. Bid 4 £175,000 differential £75,000 remove 75% from price scores 25. Bid 5 £200,000 differential £100,000 remove 100% from price scores 0. Bid 6 £300,000 differential £200,000 remove 100% from price scores 0. Where the scoring criterion is worth 50% then the 0-100 score achieved will be multiplied by 50. In the example if a supplier scores 80 from the available 100 points this will equate to 40% by using the following calculation: Score/Total Points multiplied by 50 (80/100 x 50 = 40) The lowest score possible is 0 even if the price submitted is more than 100% greater than the lowest price.

Section 6 – Evaluation questionnaire

Bidders should note that the evaluation questionnaire is located within the **e-sourcing questionnaire.**

Guidance on completion of the questionnaire is available at http://www.uksbs.co.uk/services/procure/Pages/supplier.aspx

PLEASE NOTE THE QUESTIONS ARE NOT NUMBERED SEQUENTIALLY

Section 7 – General Information

What makes a good bid – some simple do's ☺

DO:

7.1 Do comply with Procurement document instructions. Failure to do so may lead to disqualification.

7.2 Do provide the Bid on time, and in the required format. Remember that the date/time given for a response is the last date that it can be accepted; we are legally bound to disqualify late submissions.

7.3 Do ensure you have read all the training materials to utilise e-sourcing tool prior to responding to this Bid. If you send your Bid by email or post it will be rejected.

7.4 Do use Microsoft Word, PowerPoint Excel 97-03 or compatible formats, or PDF unless agreed in writing by the Buyer. If you use another file format without our written permission we may reject your Bid.

7.5 Do ensure you utilise the Emptoris messaging system to raise any clarifications to our ITQ. You should note that typically we will release the answer to the question to all bidders and where we suspect the question contains confidential information we may modify the content of the question to protect the anonymity of the Bidder or their proposed solution

7.6 Do answer the question, it is not enough simply to cross-reference to a 'policy', web page or another part of your Bid, the evaluation team have limited time to assess bids and if they can't find the answer, they can't score it.

7.7 Do consider who your customer is and what they want – a generic answer does not necessarily meet every customer's needs.

7.8 Do reference your documents correctly, specifically where supporting documentation is requested e.g. referencing the question/s they apply to.

7.9 Do provide clear and concise contact details; telephone numbers, e-mails and fax details.

7.10 Do complete all questions in the questionnaire or we may reject your Bid.

7.11 Do check and recheck your Bid before dispatch.

What makes a good bid – some simple do not's ☹

DO NOT

7.12 Do not cut and paste from a previous document and forget to change the previous details such as the previous buyer's name.

7.13 Do not attach 'glossy' brochures that have not been requested, they will not be read unless we have asked for them. Only send what has been requested and only send supplementary information if we have offered the opportunity so to do.

7.14 Do not share the Procurement documents, they are confidential and should not be shared with anyone without the Buyers written permission.

7.15 Do not seek to influence the procurement process by requesting meetings or contacting UK SBS or the Customer to discuss your Bid. If your Bid requires clarification the Buyer will contact you.

7.16 Do not contact any UK SBS staff or Customer staff without the Buyers written permission or we may reject your Bid.

7.17 Do not collude to fix or adjust the price or withdraw your Bid with another Party as we will reject your Bid.

7.18 Do not offer UK SBS or Customer staff any inducement or we will reject your Bid.

7.19 Do not seek changes to the Bid after responses have been submitted and the deadline for Bids to be submitted has passed.

7.20 Do not cross reference answers to external websites or other parts of your Bid, the cross references and website links will not be considered.

7.21 Do not exceed word counts, the additional words will not be considered.

7.22 Do not make your Bid conditional on acceptance of your own Terms of Contract, as your Bid will be rejected.

Some additional guidance notes

7.23 All enquiries with respect to access to the e-sourcing tool and problems with functionality within the tool may be submitted to Crown Commercial Service (previously Government Procurement Service), Telephone 0345 010 3503.

7.24 Bidders will be specifically advised where attachments are permissible to support a question response within the e-sourcing tool. Where they are not permissible any attachments submitted will not be considered.

7.25 Question numbering is not sequential and all questions which require submission are included in the Section 6 Evaluation Questionnaire.

7.26 Any Contract offered may not guarantee any volume of work or any exclusivity of supply.

7.27 We do not guarantee to award any Contract as a result of this procurement

7.28 All documents issued or received in relation to this procurement shall be the property of UK SBS.

7.29 We can amend any part of the procurement documents at any time prior to the latest date / time Bids shall be submitted through Emptoris.

7.30 If you are a Consortium you must provide details of the Consortiums structure.

7.31 Bidders will be expected to comply with the Freedom of Information Act 2000 or your Bid will be rejected.

7.32 Bidders should note the Government's transparency agenda requires your Bid and any Contract entered into to be published on a designated, publicly searchable web site. By submitting a response to this ITQ Bidders are agreeing that their Bid and Contract may be made public

7.33 Your bid will be valid for 60 days or your Bid will be rejected.

7.34 Bidders may only amend the Contract terms if you can demonstrate there is a legal or statutory reason why you cannot accept them. If you request changes to the Contract and UK SBS fail to accept your legal or statutory reason is reasonably justified we may reject your Bid.

7.35 We will let you know the outcome of your Bid evaluation and where requested will provide a written debrief of the relative strengths and weaknesses of your Bid.

7.36 If you fail mandatory pass / fail criteria we will reject your Bid.

7.37 Bidders are required to use IE8, IE9, Chrome or Firefox in order to access the functionality of the Emptoris e-sourcing tool.

7.38 Bidders should note that if they are successful with their proposal UK SBS reserves the right to ask additional compliancy checks prior to the award of any Contract. In

the event of a Bidder failing to meet one of the compliancy checks UK SBS may decline to proceed with the award of the Contract to the successful Bidder.

7.39 All timescales are set using a 24 hour clock and are based on British Summer Time or Greenwich Mean Time, depending on which applies at the point when Date and Time Bids shall be submitted through Emptoris.

7.40 All Central Government Departments and their Executive Agencies and Non Departmental Public Bodies are subject to control and reporting within Government. In particular, they report to the Cabinet Office and HM Treasury for all expenditure. Further, the Cabinet Office has a cross-Government role delivering overall Government policy on public procurement - including ensuring value for money and related aspects of good procurement practice.

For these purposes, UK SBS may disclose within Government any of the Bidders documentation/information (including any that the Bidder considers to be confidential and/or commercially sensitive such as specific bid information) submitted by the Bidder to UK SBS during this Procurement. The information will not be disclosed outside Government. Bidders taking part in this ITQ consent to these terms as part of the competition process.

7.41 From 2nd April 2014 the Government is introducing its new Government Security Classifications (GSC) classification scheme to replace the current Government Protective Marking System (GPMS). A key aspect of this is the reduction in the number of security classifications used. All Bidders are encouraged to make themselves aware of the changes and identify any potential impacts in their Bid, as the protective marking and applicable protection of any material passed to, or generated by, you during the procurement process or pursuant to any Contract awarded to you as a result of this tender process will be subject to the new GSC from 2nd April 2014. The link below to the Gov.uk website provides information on the new GSC:

https://www.gov.uk/government/publications/government-security-classifications

UK SBS reserves the right to amend any security related term or condition of the draft contract accompanying this ITQ to reflect any changes introduced by the GSC. In particular where this ITQ is accompanied by any instructions on safeguarding classified information (e.g. a Security Aspects Letter) as a result of any changes stemming from the new GSC, whether in respect of the applicable protective marking scheme, specific protective markings given, the aspects to which any protective marking applies or otherwise. This may relate to the instructions on safeguarding classified information (e.g. a Security Aspects Letter) as they apply to the procurement as they apply to the procurement process and/or any contracts awarded to you as a result of the procurement process.

USEFUL INFORMATION LINKS

- Emptoris Training Guide
- Emptoris e-sourcing tool
- Contracts Finder
- Tenders Electronic Daily
- Equalities Act introduction
- Bribery Act introduction
- Freedom of information Act

Annex A – Tasks

Activity Descriptions as a function of timeline, along with their corresponding deliverables are given in Table 1. Overall MTG Blackbodies project key events are interspersed with these activities for clarity of dependencies and scope of work within the project. Table 2 then collates these activities into distinct Tasks

Table 1: Activity and deliverable description timeline. Full-width light-grey rows indicate project status or major activities that take place to give structure and context to the particular activities (A*) and deliverables (D*); they are not meant as summaries of the activities following them.

Month	Activity Description	Monthly Deliverables
Prior to the beginning of this statement of work, it is expected that: 1) Changes to TAS-F LN2 jackets will be completed, and the RFS will be out through OM for manufacture 2) Framework for TAS-F will be done, and the RFS will be out through OM for manufacture 3) TAS-F BB rear flanges + TVAC flanges out through OM for manufacture 4) EB welding cavity & shield test pieces and shield deliverables will be completed		
01/04/2017 – 15/04/2017	A1: Complete **EB welding cavity and shield test pieces** and associated MGSE. A2: Complete **TAS-F frames** including CAD model update and alignment plan. A3: Finalise **VBB/CBB#1/VBB/DSBB cavity + shield CAD model with EB welding** updated, and converted to drawings for manufacture. A4: Find **material/manufacturer** capable to manufacture cavity. A5: Find **material/manufacturer** capable to manufacture shield. A6: Get **quotes for VBB/CBB#1/VBB/DSBB shield** manufacture.	D1: Manufactured, assembled and tested cavity and shield test pieces D2: RFS for TAS-F box and base frames, alignment procedure document D3: VBB/CBB#1/VBB/DSBB cavity + shield manufacturing drawings D4: Tender document for VBB/CBB#1/VBB/DSBB manufacture out D5: RFS (Request for Supply) for VBB/CBB#1/VBB/DSBB shields to OM (Outside Manufacturing group at RAL Space)

01/04/2017- 30/04/2017	A7: Finalise design/drawings for **shield stabiliser** assembly for VBB/CBB#1/VBB/DSBB. A8: Finalise design/drawings for **harness guard** for VBB/CBB#1/VBB/DSBB, following thermal cycle results completed by STFC AIT. A9: Finalise **cradle assembly** for VBB/CBB#1/VBB/DSBB. A10: Finalise **SPRT holder + insertion tool** design/drawings.	D6: RFS for VBB/CBB#1/VBB/DSBB shield stabilisers out to OM D7: RFS for VBB/CBB#1/VBB/DSBB harness guards out to OM D8: RFS for VBB/CBB#1/VBB/DSBB cradle assemblies out to OM D9: RFS for VBB/CBB#1/VBB/DSBB SPRT holders + insertion tools out to OM
01/05/2017 – 30/05/2017	A11: Update **OHB mounting and alignment features** in CAD VBB/CBB#1/CBB#2 models. A12: Update **framework** for VBB/CBB#1. A13: Finalise **alignment strategy** (wrt laser tracker targets/cubes). A14: Finalise **location of laser-tracker targets** and cubes in CAD model. A15: Issue all **framework and mounting interface drawings**. A16: Get **quotes for all framework and mounting interface** manufacture.	D10: RFS for OHB framework/mounting interfaces for VBB/CBB#1/CBB#2, including alignment (laser + cube) features out to OM.
01/06/2017 – 30/06/2017	A17: Get quotes for **LN2 and He pipes/hoses**. A18: Finalise **VBB/CBB#1 LN2 jacket** designs and issue manufacturing drawings. A19: Finalise **OHB TVAC feedthrough flange** CAD models and issue manufacturing drawings. Get quotes for OHB TVAC	D11: Provide quotes to project team for LN2 and He pipes/hoses D12: RFS for VBB/CBB#1 LN2 jacket out to OM. D13: RFS for OHB TVAC feedthroughs out to OM

	feedthrough. A20: Compile **OHB dCDR datapack** (ICDs, Design documents, assembly procedures) A21: Finalise all **assembly and operating procedures** needed for TAS-F BBs assembly. This includes drawings for masking for painting, and for cavity/shield sensors and heaters, and cavity/shield harnessing.	D14: Delivery of dCDR datapack as part of project team D15: Delivery of assembly and operating procedures required for assembly of TAS-F blackbodies.
01/07/2017 – 31/07/2017	A22: **Dry assembly** & metrology of VBB/CBB#1/VBB/DSBB A23: **Assembly of TAS-F**: • Assembly frames • minor mechanical components • VBB cavity onto assembly frame and temperature sensors insertion • VBB shield onto shield assembly and temperature sensors on • DSBB cavity onto assembly frame and temperature sensors insertion • DSBB shield onto shield assembly and temperature sensors on	D16: Successful dry assembly or distinct list of changes to manufacture D17: VBB/DSBB cavity/shield assembly complete up to temperature sensor insertion and ready for wiring up
OHB dCDR		
01/08/2017 – 31/08/2017	A24: Help prepare mechanical portion of **TAS-F TRR datapack** A25: **Assembly of TAS-F**: • VBB LN2 jacket assembly to cavity/shield assembly + insertion of Helicoflex seal • DSBB LN2 jacket assembly to cavity/shield assembly + insertion of Helicoflex seal A26: **OHB dCDR**: participate in RID (Reivew Item Discrepancy) review/response and in review	D18: Submission of TAS-F TRR datapack D19: VBB/DSBB cavity/shield/LN2 jacket/seal assembly complete and ready for final wiring up D20: Closeout of dCDR
TAS-F TRR		
01/09/2017	A27: **TAS-F TRR**: participate in RID review/response and in	D21: Closeout of TAS-F TRR

– 30/09/2017	review A28: **Assemble VBB/DSBB** into framework A29: Complete **in-air tests** on assembled VBB/DSBB, including mechanical acceptance testing A30: Assemble **target plates**	 D22: VBB/DSBB assembled and ready for installation into TVAC (Thermal vacuum) chamber. D23: Target plates (2 of them) assembled and ready for installation into TVAC chamber.
01/10/2017 – 31/10/2017	A31: **Dry assembly** & metrology of CBB#2 A32: Help prepare mechanical portion of **TAS-F TRB/DRB datapack**	D24: Successful dry assembly of CBB#2 distinct list of changes to manufacturer D25: Submission of TAS-F TRB/DRB datapack
TAS-F TRB/DRB		
01/11/2017 – 30/11/2017	A33: **TAS-F TRB/DRB**: participate in RID review/response and in review A34: Help **pack TAS-F OGSE** into transport and storage boxes and ensure all paperwork is in order. A35: **Assembly of OHB**: • Assembly frames • minor mechanical components A36: Help prepare mechanical portion of **TAS-F PAB datapack**	D26: TAS-F TRB/DRB closeout D27: TAS-F OGSE delivered D28: OHB assembly frames and minor mechanical components assembled. D29: Submission of TAS-F PAB datapack
TAS-F PAB		
01/12/2017 – 31/12/2017	A37: **TAS-F PAB**: participate in RID review/response and in review A38: **Assembly of OHB**: • VBB cavity onto assembly frame and temperature sensors insertion • VBB shield onto shield assembly and temperature sensors	D30: TAS-F PAB closeout D31: OHB VBB cavity/shield assembly complete up to temperature sensor insertion and ready for wiring up D32: OHB CBB#1 cavity/shield assembly complete up to temperature

	on • CBB#1 cavity onto assembly frame and temperature sensors insertion • CBB#1 shield onto shield assembly and temperature sensors on	sensor insertion and ready for wiring up
01/01/2018 – 31/01/2018	A39: **Assembly of OHB**: • VBB LN2 jacket assembly to cavity/shield assembly + insertion of Helicoflex seal • CBB#1 LN2 jacket assembly to cavity/shield assembly + insertion of Helicoflex seal • CBB#2 cavity onto assembly frame and temperature sensors insertion • CBB#2 shield onto shield assembly and temperature sensors on • CBB#2 LN2 jacket assembly to cavity/shield assembly + insertion of Helicoflex seal	D33: VBB/CBB#1/CBB#2 cavity/shield/LN2 jacket/seal assembly complete and ready for final wiring up
01/02/2018 – 28/02/2018	A40: Help prepare mechanical portion of **OHB TRR datapack**	D34: Successful delivery of OHB TRR datapack
OHB TRR		
01/03/2018 – 31/03/2018	A41: **OHB TRR**: participate in RID review/response and in review A42: **Assemble VBB/CBB#1** into framework and CBB#2 onto representative mounting A43: Complete **in-air tests** on assembled VBB/CBB#1/CBB#2, including mechanical acceptance testing	D35: OHB TRR closeout D36: VBB/CBB#1/CBB#2 assembled and ready for installation into TVAC chamber.
01/04/2018 – 30/04/2018	A44: Help prepare mechanical portion of **OHB TRB/DRB datapack**	D37: Submission of OHB TRB/DRB datapack
OHB TRB/DRB & FAT		

01/05/2018 – 30/05/2018	A45: **OHB TRB/DRB**: participate in RID review/response and in review A46: Help **pack OHB OGSE** into transport and storage boxes and ensure all paperwork is in order. A47: Help prepare mechanical portion of **OHB FAT datapack** A48: **OHB FAT**: participate in RID review/response and in review	D38: OHB TRB/DRB closeout D39: OHB OGSE delivered D40: Submission of OHB FAT datapack D41: OHB FAT closeout

Table 2: Task Descriptions

Task Number	Task Title	Activities within Task	Deliverables for Task Completion	Milestone Number	Start/Stop Dates
T1000	Cavity and Shields Out to Order	A1, A2, A3, A4, A5, A6	D1, D2, D3, D4, D5	M1	01/04/2017 – 15/04/2017
T2000	TAS-F and OHB BB Components Out to Order	A7, A8, A9, A10	D6, D7, D8, D9	M2	01/04/2017 - 30/04/2017
T3000	OHB Framework + main MGSE Accessories Out to Order	A11, A12, A13, A14, A15, A16	D10	M3	01/05/2017 – 15/06/2017
T4000	Remaining minor MGSE Hardware Out to Order	A17, A18, A19	D11, D12, D13	M4	15/06/2017 – 30/06/2017
T5000	Assembly Preparation	A21	D15	M5	01/06/2017 – 30/06/2017
T6000	OHB dCDR	A20, A26	D14, D20	M6	15/06/2017 – 30/08/2017
T7000	TAS-F Assembly	A22, A23, A25	D16, D17, D19	M7	01/07/2017 – 15/08/2017
T8000	TAS-F Test prep	A28, A29, A30	D22, D23	M8	15/09/2017 – 30/09/2017
T9000	TAS-F TRR	A24, A27	D18, D21	M9	01/08/2017 – 15/09/2017
T10000	TAS-F TRB/DRB	A32, A33, A34	D25, D26, D27	M10	15/10/2017 – 30/11/2017

T11000	TAS-F PAB	A36, A37	D29, D30	M11	25/11/2017 – 05/12/2017
T12000	OHB Assembly	A31, A35, A38, A39	D24, D28, D31, D32, D33	M12	01/10/2017 – 31/01/2018
T13000	OHB Test prep	A42, A43	D36	M13	15/03/2018 – 31/03/2018
T14000	OHB TRR	A40, A41	D34, D35	M14	01/02/2018 – 15/03/2018
T15000	OHB TRB/DRB	A44, A45, A46	D37, D38, D39	M15	01/04/2018 – 15/05/2018
T16000	OHB FAT	A47,A48	D40, D41	M16	15/05/2018 – 30/05/2018