Schedule 1 – Additional Definitions of Contract

Not Applicable

Schedule 2 (Schedule Of Requirements) for Contract No: FLEET/00566

For the Purchase of Scanning Electron Microscope with upgraded EDX analysis software and ongoing support

Deliverables									
Item Number	**MOD Stock Reference No.**	**Part No. (where applicable)**	**Specification**	**Consignee Address Code** (full address is detailed in DEFFORM 96)	**Packaging Requirements inc. PPQ and DofQ** (as detailed in DEFFORM 96)	**Delivery Date**	**Total Qty**	**Firm Price (£) Ex VAT**	
								Per Item	**Total inc. packaging (and delivery if specified in the Purchase Order)**
1			Scanning Electron Microscope and on-going support		00		1		
2			Preventative Maintenance, Calibration and support for EDX Year 2-5		00		1		
								Total Firm Price	£184,440.00

Schedule 3 - Contract Data Sheet for Contract No: FLEET/00566

Contract Period	Effective date of Contract: Date of contract signature (both parties) The Contract expiry date shall be: 22 October 2022
Clause 6 - Notices	Notices served under the Contract can be transmitted by electronic mail Yes ☒ No ☐ Notices served under the Contract shall be sent to the following address: Authority: Def Comrcl CC-Navy 18 Contractor:
Clause 8 – Supply of Contractor Deliverables and Quality Assurance	Is a Deliverable Quality Plan required for this Contract? Yes ☐ No ☒ If Yes the Deliverable Quality Plan must be set out as defined in AQAP 2105 and delivered to the Authority (Quality) within Business Days of Contract Award. Once agreed by the Authority the Quality Plan shall be incorporated into the Contract. The Contractor shall remain at all times, solely responsible for the accuracy, suitability and applicability of the Deliverable Quality Plan. **Other Quality Assurance Requirements:**
Clause 9 – Supply of Data for Hazardous Contractor Deliverables, Materials and Substances	A completed DEFFORM 68 (Hazardous Articles, Materials or Substance Statement), and if applicable, Safety Data Sheet(s) are to be provided by e-mail with attachments in Adobe PDF or MS WORD format to: a) The Authority's Representative (Commercial) b) DSALand-MovTpt-DGHSIS@mod.uk or: if only a hardcopy is available to: a) The Authority's Representative (Commercial) b) Hazardous Stores Information System (HSIS) Defence Safety Authority (DSA) Movement Transport Safety Regulator (MTSR) Hazel Building Level 1, #H019 MOD Abbey Wood (North) Bristol, BS34 8QW DSA-DLSR-MovTpt-DG HSIS (MULTIUSER) to be Delivered no later than one (1) month prior to the Delivery Date for the Contract Deliverable or by the following date:

Clause 10 – Delivery/Collection	Contract Deliverables are to be: Delivered by the Contractor ☒ Special Instructions: Collected by the Authority ☐ Special Instructions (including consignor address if different from Contractor's registered address):
Clause 12 – Packaging and Labelling of Contractor Deliverables	Additional packaging requirements: Not Applicable
Clause 13 – Progress Meetings	The Contractor shall be required to attend the following meetings: Type: N/A Frequency: N/A Location:, N/A
Clause 13 – Progress Reports	The Contractor is required to submit the following Reports: Type: N/A Frequency: N/A Method of Delivery: N/A Delivery Address: N/A

DEFFORM 111
(Edn 11/16)

Appendix - Addresses and Other Information

1. Commercial Officer:

Name: Hannah Streatfield

Address:
Room 303, 3rd Floor, Bldg 1/080, PP73A, Jago road, HMNB Portsmouth, Hants, PO1 3LU

Email: DefComrclCC-Navy18@mod.uk

☎ 02392 727632

2. Project Manager, Equipment Support Manager or PT Leader (from whom technical information is available):

Name:

3. Packaging Design Authority:

Organisation and point of contact:

(where no address is shown please contact the Project Team in Box 2)

☎

4. (a) Supply/Support Management Branch or Order Manager Branch/Name:

☎

(b) U.I.N.

5. Drawings/Specifications are available from:

6. Intentionally Left Blank

7. Quality Assurance Representative:

Commercial staff are reminded that all Quality Assurance requirements should be listed under the General Contract Conditions.

AQAPS and **DEF STANs** are available from UK Defence Standardization, for access to the documents and details of the helpdesk visit http://dstan.uwh.diif.r.mil.uk/ [intranet] or https://www.dstan.mod.uk/ [extranet, registration needed]

8. Public Accounting Authority:

1. Returns under DEFCON 694 (or SC equivalent) should be sent to DBS Finance ADMT – Assets In Industry 1, Level 4 Piccadilly Gate, Store Street, Manchester, M1 2WD
   ☎ 44 (0) 161 233 5397

2. For all other enquiries contact DES Fin FA-AMET Policy, Level 4 Piccadilly Gate, Store Street, Manchester, M1 2WD
   ☎ 44 (0) 161 233 5394

9. Consignment Instructions:

The items are to be consigned as follows:

See Schedule of Requirement

10. Transport. The appropriate Ministry of Defence Transport Offices are:

A. **DSCOM**, DE&S, DSCOM, MoD Abbey Wood, Cedar 3c, Mail Point 3351, BRISTOL BS34 8JH

Air Freight Centre
IMPORTS ☎ 030 679 81113 / 81114 Fax 0117 913 8943
EXPORTS ☎ 030 679 81113 / 81114 Fax 0117 913 8943

Surface Freight Centre
IMPORTS ☎ 030 679 81129 / 81133 / 81138 Fax 0117 913 8946
EXPORTS ☎030 679 81129 / 81133 / 81138 Fax 0117 913 8946

B. **JSCS**

JSCS Helpdesk ☎ 01869 256052 (option 2, then option 3); JSCS Fax No 01869 256837 www.freightcollection.com

11. The Invoice Paying Authority:
Ministry of Defence ☎ 0151-242-2000
DBS Finance
Walker House, Exchange Flags Fax: 0151-242-2809
Liverpool, L2 3YL **Website is:**
https://www.gov.uk/government/organisations/ministry-of-defence/about/procurement#invoice-processing

12. Forms and Documentation are available through *:
Ministry of Defence, Forms and Pubs Commodity Management
PO Box 2, Building C16, C Site
Lower Arncott
Bicester, OX25 1LP (Tel. 01869 256197 Fax: 01869 256824)
Applications via fax or email: DESLCSLS-OpsFormsandPubs@mod.uk.

NOTES
***** Many **DEFCONs and DEFFORMs** can be obtained from the MOD Internet Website [extranet, registration needed]: https://www.aof.mod.uk/aofcontent/tactical/toolkit/index.htm

Schedule 4 - Contractor's Commercially Sensitive Information Form (i.a.w. Clause 5) for Contract No: FLEET/00566

Contract No: FLEET/00566
Description of Contractor's Commercially Sensitive Information: 1. Information Identifying, or tending to identify, individual employees of Carl Zeiss 2. Pricing breakdown information.
Cross Reference(s) to location of sensitive information: 1. Throughout documentation
Explanation of Sensitivity: 1. The information is required to be kept confidential in the interests of personal privacy, security and industry competitiveness.
Details of potential harm resulting from disclosure: 1. Personal privacy and industry competitiveness
Period of Confidence (if applicable): Permanently

Schedule 5
Statement of Requirement for Contract No: FLEET/00566

Specimen chamber and stage:
1. The Scanning Electron Microscope (SEM) shall have a specimen chamber of at least 420 mm diameter and 330 mm in height.

2. The stage and chamber combination shall allow the viewing of all of the extremities of a specimen in movements of X=130mm Y=130 and Z= 50mm and tilt of -10° to 90° to the rear without touching any other part of the instrument. The stage shall be equipped with an alarm to warn if any part of the stage or specimen touches any other part of the instrument.

3. The chamber shall contain sufficient ports to accommodate a range of different detectors and a chamberscope which shall enable inspection of the specimen stage. Tenders shall state the number of ports available and position of the chamberscope relative to the sample and pole piece.

4. The microscope shall have the ability to navigate around the sample using a digital optical image.

5. The specimen stage shall be a Cartesian type capable of being controlled by console controls, and will enable movement of X: 130 mm Y: 130 mm Z: 50 mm T 0-90 degrees R 360 degrees continuous.

6. The stage shall be capable of supporting a load of 2kg in the un-tilted position.

7. The stage shall have 5 axis motorised control which shall be rate compensated to allow for the magnification being used and that is capable of being automated. Control of the stage position shall be accurate to 1 micron and a display of stage position information will be available.

8. The stage shall be supplied with adapters to take multiple specimens on 32mm diameter stubs.

Electron optics:
1. The system shall have an electron gun using a tungsten filament electron source and also a LaB_6 electron source.

2. The filament assembly shall allow quick changing and alignment of the filament by the user. Tenders will state the system capability.

3. Filament condition indicators shall be provided.

4. The electron gun shall have optional automatic and manual alignment.

5. The accelerating voltage shall be in the range 0.2 – 30 kV, continuously variable.

6. The probe current shall be adjustable within a minimum range of 0.5 pA to 5µA continuously variable. Tenders will state the system capability.

7. The stability of the probe current shall be a minimum of 0.2%/hr.
8. Electromagnetic apertures shall be provided to control the probe current.

9. The resolution shall be a maximum of 2 nm at 30kV, 10nm at 3kV and 15nm at 1kV.

10. The final aperture position adjustment shall be easily adjustable by the user. Tenders will state which methods and aids for adjustment are included.

11. The magnification shall be adjustable within a minimum range of 5x to 1000,000x. Compensation for changes in working distance or accelerating voltage shall be automatic. Tenders will state the system capability.

12. Working distance shall be adjustable within a minimum range of 1mm to 45mm.

13. Automatic beam control shall be provided to give optimum probe diameter and maximum depth of field. Tenders will state the system capability.

14. The focus control shall be user controlled for both coarse and fine focus and dynamic focus shall also be available.

15. The raster scan speed shall be in the range 10 frames second to 1 frame in 20 minutes.

Vacuum system and detectors:
1. The vacuum system shall incorporate the ability to operate at variable pressure/low vacuum of up to 100 Pa.

2. The system shall achieve the required operational vacuum in less than 4 minutes. Tenders will state capability of equipment offered.

3. A display of chamber and column vacuum readings shall be available.

4. The microscope should be air cooled

5. All vacuum pump switching shall be automatic.

6. Chamber venting shall be automatic and use air with nitrogen as an option.

7. A secondary electron detector and a low vacuum secondary electron detector shall be fitted.

8. The secondary electron detector bias shall be adjustable within a minimum range of –250V to +400V.

9. The instrument shall be provided with a quadrant type solid state back scattered electron detector that allows independent control of each quadrant for both composition and topographic modes shall be fitted.

10. A detector for X-ray spectroscopy and compatible software shall be fitted. The tender shall include details of the type of software to be supplied-see below.

11. All detectors shall be of a type capable of withstanding sudden vacuum failure.

12. All detectors shall be available for use simultaneously when operated in appropriate working conditions.

13. The instrument shall be fitted with a column burnout/contamination removal system.

Imaging:
1. The image brightness and contrast shall be set by the user or automatically.

2. There shall be two 24 inch monitors such that separate detector signals may be displayed on each monitor, live and simultaneously.

3. The scan modes shall consist of reduced raster, spot and line scanning.

4. The image resolution shall be 3024x2304 pixels, 16 bit deep.

5. The image processing software shall encompass frame averaging (2-256 frames), frame integration (2-256 frames).

6. The image display system shall include functions for image feature analysis such as size measurement. The tender shall state which functions are included.

7. The image display system shall be capable of printing, saving and retrieving images to and from a network location in an industry recognised format and at a minimum resolution of 1024x768 pixels. Windows 7 is the current in use operating system. It is acceptable for any control software to operate in this environment. However, a Windows 10 based system is preferable. Tenders shall state the formats and resolutions supported.

8. The image shall have the magnification, micron bar, accelerating voltage, detector type, image number, measurement tools and results displayed on the screen if user desires.

Energy Dispersive X-ray (EDX) analysis system:

Overview:
The existing Oxford Instrument's 80 mm^2 Inca Energy X-ray Detector (X-Max80) shall be fitted to the SEM.
The EDX software shall be upgraded to that currently available that will run within the preferable Windows 10 environment (Windows 7 acceptable). It shall be compatible with and capable of enabling the existing X-Max80 to perform PC controlled multi elemental analysis simultaneously over: an area (mapping), a reduced area, spot, line. The software shall enable automatic quantitative analysis to be carried out at a number of sequential sample locations chosen by the user. The analysis shall be displayed on a 24 inch monitor.

Specifics:
1. The EDX system shall be integrated to allow control of the SEM.

2. The EDX system shall achieve a resolution of 138eV or better and include automatic functions for the conditioning of the detector in event of ice formation.

3. The analysis system shall include manual and automatic element identification for all elements of atomic number 6 (Carbon) and higher.

4. The analysis system shall be capable of standardless composition analysis and be accurate to 0.1% by weight of samples of minimum size 20 micron.

5. Composition analyses shall include corrections for matrix, peak overlap and electron beam settings as a minimum. Tenders shall state which correction algorithms are included.

6. The analysis system shall be capable of automatically analysing a user-defined queue of points and areas.

7. The analysis system shall be capable of generating multiple element X-ray maps of a specimen. Tenders shall state any limitations on the number of elements that can be mapped simultaneously.

8. The analysis system shall be capable of producing high magnification images of large areas automatically.

9. The analysis system shall be capable of comparing and matching spectra from a user definable library.

10. The analysis system shall be capable of stripping unwanted peaks from collected spectra. The capability to synthesise spectra from a known composition should be included as a costed option.

11. The analysis system shall include on screen help and a user guide to the analytical process.

12. The analysis system shall include a user configurable report generator capable of including images, quantified analyses and X-ray spectra as a minimum.

13. The software and associated hardware shall be able to conduct automated particle detection, analysis and classification based on user defined parameters, over multiple fields and samples. The analysis data shall include multi elemental analysis, size and size ratios. The software shall record the position of the particle and allow recall of the stage position post analysis.

14. The capability to access analysis results from a remote workstation should be included as a costed option.

Microscope footprint and other requirements:
1. The microscope shall be fitted with a robust control panel with rotary controls.

2. The footprint of the microscope shall be a maximum of length 2m, width 2m, height 2m.

3. Vibration control based on a solid state feedback system shall be supplied.

4. The microscope shall run on 240 volts single phase at 50-60 HZ.

5. All equipment supplied will comply with the relevant health and safety legislation.

6. The equipment shall be supplied with all manuals, tools and spares required for normal use and user maintenance tasks.

7. Installation and commissioning of the equipment will be the responsibility of the supplier or their representatives. Tenders shall be inclusive of costs for the delivery, installation and commissioning of the equipment.

8. The tender shall include on-site familiarisation training for a minimum of 4 operators.

The tender shall include for an additional 4 (four) years maintenance/support contract – total 5 (five) years support – first year is manufacturer's warranty. This is to include annual preventative maintenance (PM) visit(s), as appropriate; travel and spare parts for PM;

support response of 48 hours; breakdown costs; and software/firmware updates as they become available.

10. If applicable, the tender shall explain to what extent the Prime Contractor will check the environmental and health and safety performance of any sub-contractors involved in the delivery of this Contract.