

**SOLICITATION/CONTRACT/ORDER FOR COMMERCIAL ITEMS  
OFFEROR TO COMPLETE BLOCKS 12, 17, 23, 24, & 30**

2. CONTRACT NO.		3. AWARD/EFFECTIVE DATE	4. ORDER NUMBER	1. REQUISITION NUMBER 61-0839-00	PAGE 1 OF 8	
7. FOR SOLICITATION INFORMATION CALL:			a. NAME John Booros	5. SOLICITATION NUMBER N00173-00-R-TB01	6. SOLICITATION ISSUE DATE 6/29/00	
9. ISSUED BY CONTRACTING OFFICER NAVAL RESEARCH LABORATORY ATTN: CODE 3220.TB WASHINGTON DC 20375-5326			CODE N00173	10. THIS ACQUISITION IS <input checked="" type="checkbox"/> UNRESTRICTED <input type="checkbox"/> SET ASIDE: % FOR <input type="checkbox"/> SMALL BUSINESS <input type="checkbox"/> SMALL DISAV. BUSINESS <input type="checkbox"/> 8(A) SIC: 3826 SIZE STANDARD: 500 empl.	11. DELIVERY FOR FOB DESTINATION UNLESS BLOCK IS MARKED <input type="checkbox"/> SEE SCHEDULE 13a. THIS CONTRACT IS A RATED ORDER UNDER DPAS (15 CFR 900) 13b. RATING DOC9 14. METHOD OF SOLICITATION <input type="checkbox"/> RFQ <input type="checkbox"/> IFB <input checked="" type="checkbox"/> RFP	
15. DELIVER TO Receiving Officer, Naval Research Laboratory 4555 Overlook Ave., Bldg. 49, Washington, DC 20375			CODE N00173	16. ADMINISTERED BY To be completed at time of award.		
17a. CONTRACTOR/OFFEROR CODE			FACILITY CODE	18a. PAYMENT WILL BE MADE BY To be completed at time of award.		
TELEPHONE NO.			18b. SUBMIT INVOICES TO ADDRESS SHOWN IN BLOCK 18a UNLESS BLOCK BELOW IS CHECKED <input type="checkbox"/> SEE ADDENDUM			
<input type="checkbox"/> 17b. CHECK IF REMITTANCE IS DIFFERENT AND PUT SUCH ADDRESS IN OFFER						
19. ITEM NO.	20. SCHEDULE OF SUPPLIES/SERVICES		21. QUANTITY	22. UNIT	23. UNIT PRICE	24. AMOUNT
	SEE PAGE 2					
	TOTAL					
<i>(Attach Additional Sheets as Necessary)</i>						
25. ACCOUNTING AND APPROPRIATION DATA				26. TOTAL AWARD AMOUNT (For Govt. Use Only)		
<input checked="" type="checkbox"/> 27a. SOLICITATION INCORPORATES BY REFERENCE FAR 52.212-1, FAR 52.212-4. FAR 52.212-3 AND 52.212-5 ARE ATTACHED. ADDENDA			<input checked="" type="checkbox"/> ARE <input type="checkbox"/> ARE NOT ATTACHED			
<input type="checkbox"/> 27b. CONTRACT/PURCHASE ORDER INCORPORATES BY REFERENCE FAR 52.212-4. FAR 52.212-5 IS ATTACHED. ADDENDA			<input type="checkbox"/> ARE <input type="checkbox"/> ARE NOT ATTACHED			
28. CONTRACTOR IS REQUIRED TO SIGN THIS DOCUMENT AND RETURN <u>2</u> COPIES TO ISSUING OFFICE. CONTRACTOR AGREES TO FURNISH AND DELIVER ALL ITEMS SET FORTH OR OTHERWISE IDENTIFIED ABOVE AND ON ANY ADDITIONAL SHEETS SUBJECT TO THE TERMS AND CONDITIONS SPECIFIED HEREIN.			29. AWARD OF CONTRACT: REFERENCE _____ OFFER <input type="checkbox"/> DATED _____ YOUR OFFER ON SOLICITATION (BLOCK 5), INCLUDING ANY ADDITIONS OR CHANGES WHICH ARE SET FORTH			
30a. SIGNATURE OF OFFEROR/CONTRACTOR			31a. UNITED STATES OF AMERICA (SIGNATURE OF CONTRACTING OFFICER)			
30b. NAME AND TITLE OF SIGNER		30c. DATE SIGNED	31b. NAME OF CONTRACTING OFFICER		31c. DATE SIGNED	
32a. QUANTITY IN COLUMN 21 HAS BEEN <input type="checkbox"/> RECEIVED <input type="checkbox"/> INSPECTED <input type="checkbox"/> ACCEPTED, AND CONFORMS TO THE CONTRACT, EXCEPT AS NOTED			33. SHIP NUMBER PARTIAL FINAL		34. VOUCHER NUMBER	
32b. SIGNATURE OF AUTHORIZED GOVT. REPRESENTATIVE		32c. DATE	36. PAYMENT <input type="checkbox"/> COMPLETE <input type="checkbox"/> PARTIAL <input type="checkbox"/> FINAL		35. AMOUNT VERIFIED CORRECT FOR	
41a. I CERTIFY THIS ACCOUNT IS CORRECT AND PROPER FOR PAYMENT		38. S/R ACCOUNT NUMBER		39. S/R VOUCHER NUMBER		37. CHECK NUMBER
41b. SIGNATURE AND TITLE OF CERTIFYING OFFICER		41c. DATE	42a. RECEIVED BY (Print)		40. PAID BY	
		42b. RECEIVED AT (Location)				
		42c. DATE REC'D (YY/MM/DD)		42b. TOTAL CONTAINERS		

**1. CONTINUATION OF THE SF 1449 - SOLICITATION/CONTRACT/ORDER FOR COMMERCIAL ITEMS**

A. Blocks 19 - 24 are completed as follows:

Item No.	Schedule of Supplies/Services	Quantity	Unit	Unit Price	Amount
0001	Scanning Electron Microscope System in accordance with Attachment No.1, Specifications (7 pages).	1	EA	\$	\$
0002	Shipping to NRL- DC	1	LO	\$	\$
0003	Installation onsite at NRL – DC	1	LO	\$	\$
0004	Training onsite at NRL - DC for two (2) persons	1	LO	\$	\$
0005	Data in accordance with Enclosure 1, DD 1423, 1 page.	1	LO	\$ NSP	\$ NSP
Total				\$	\$

B. Block 25 is completed as shown on Page (to be completed at time of award)

**2. ADDENDA TO FAR 52.212-4 CONTRACT TERMS AND CONDITIONS--COMMERCIAL ITEMS (MAY 1999)**

**A. REQUIRED DELIVERY OR PERIOD OF PERFORMANCE**

The required delivery is as follows:

ITEM NO.	QUANTITY	WITHIN DAYS AFTER DATE OF CONTRACT AWARD
<b>0001</b>	1 LO	<b>90 DAYS</b>
<b>0003</b>	1 LO	90 Days
<b>0004</b>	1 LO	90 Days
<b>0005</b>	1 LO	90 Days

**C. AUTHORIZED GOVERNMENT REPRESENTATIVE**

\*,Code \*,Telephone number \*, is hereby designated the Authorized Government Representative for inspection and acceptance purposes.

\*(To be filled in at time of award)

D. YEAR 2000 COMPLIANT INFORMATION TECHNOLOGY

This requirement applies to information technology (IT) that processes date-related information. All such IT delivered under this contract shall be Year 2000 compliant as defined at FAR 39.002.

F. Remittance Address:

3. FAR 52.212-5 CONTRACT TERMS AND CONDITIONS REQUIRED TO IMPLEMENT STATUTES OR EXECUTIVE ORDERS--COMMERCIAL ITEMS (FEB 2000)

(a) The Contractor agrees to comply with the following FAR clauses, which are incorporated in this contract by reference, to implement provisions of law or executive orders applicable to acquisitions of commercial items:

- (1) 52.222-3, Convict Labor (E.O.11755).
- (2) 52.225-13, Restrictions on Certain Foreign Purchases (E.O.'s 12722, 12724, 13059, and 13067).
- (3) 52.233-3, Protest after Award (31 U.S.C 3553).

(b) The Contractor agrees to comply with the FAR clauses in this paragraph (b) which the contracting officer has indicated as being incorporated in this contract by reference to implement provisions of law or executive orders applicable to acquisitions of commercial items or components:

*(Contracting Officer shall check as appropriate.)*

- (1) 52.203-6, Restrictions on Subcontractor Sales to the Government, with Alternate I (41 U.S.C.253g and 10 U.S.C.2402).
- (2) 52.219-3, Notice of HUBZone Small Business Set-Aside (Jan 1999)
- (3) 52.219-4, Notice of Price Evaluation Preference for HUBZone Small Business Concerns (Jan 1999) *(if the offeror elects to waive the preference, it shall so indicate in its offer)*
- (4) (i) 52.219-5, Very Small Business Set-Aside (Pub. L. 103-403, section 304, Small Business Reauthorization and Amendments Act of 1994)

- (ii) Alternate I to 52.219-5
- (iii) Alternate II to 52.219-5
- (5) 52.219-8, Utilization of Small Business Concerns (15 U.S.C.637 (d)(2) and (3)).
- (6) 52.219-9, Small Business Subcontracting Plan (15 U.S.C.637 (d)(4)).
- (7) 52.219-14, Limitations on Subcontracting (15 U.S.C.637(a)(14)).
- (8) (i) 52.219-23, Notice of Price Evaluation Adjustment for Small Disadvantaged Business Concerns (Pub. L. 103-355, section 7102, and 10 U.S.C. 2323) (if the offeror elects to waive the adjustment, it shall so indicate in its offer)
- (ii) Alternate I of 52.219-23.
- (9) 52.219-25, Small Disadvantaged Business Participation Program - Disadvantaged Status and Reporting (Pub L. 103-355, section 7102, and 10 U.S.C. 2323).
- (10) 52.219-26, Small Disadvantaged Business Participation Program - Incentive Subcontracting (Pub. L. 103-355, section 7102, and 10 U.S.C. 2323).
- (11) 52.222-21, Prohibition of Segregated Facilities (Feb 1999)
- (12) 52.222-26, Equal Opportunity (E.O.11246).
- (13) 52.222-35, Affirmative Action for Disabled Veterans and Veterans of the Vietnam Era (38 U.S.C.4212).
- (14) 52.222-36, Affirmative Action for Workers with Disabilities (29 U.S.C.793).
- (15) 52.222-37, Employment Reports on Disabled Veterans and Veterans of the Vietnam Era (38 U.S.C.4212).
- (16) 52.225-1, Buy American Act – Balance of Payments Program--Supplies (41 U.S.C.10a – 10d).
- (17) 52.225-3, Buy American Act –North American Free Trade Agreement—Israeli Trade Act -- Balance of Payments Program (41 U.S.C.10a –10d, 19 U.S.C.3301 note, 19 U.S.C. 2112 note).
- (ii) Alternate I to 52.225-3.
- (iii) Alternate II to 52.225-3.
- (18) 52.225-5, Trade Agreements (19 U.S.C. 2501, *et seq.*, 19 U.S.C. 3301 note).
- (19) 52.225-15, Sanctioned European Union Country End Products (E.O.12849).
- (20) 52.225-16, Sanctioned European Union Country Services (E.O.12849).
- (21) Reserved

- (22) 52.232-33, Payment by Electronic Funds Transfer -- Central Contractor Registration (31 U.S.C. 3332).
- (23) 52.232-34, Payment by Electronic Funds Transfer --Other than Central Contractor Registration (31 U.S.C. 3332).
- (24) 52.232-36, Payment by Third Party (31 U.S.C. 3332).
- (25) 52.239-1, Privacy or Security Safeguards (5 U.S.C.552a).
- (26) 52.247-64, Preference for Privately Owned U.S.-Flag Commercial Vessels (46 U.S.C.1241).

(c) The Contractor agrees to comply with the FAR clauses in this paragraph (c), applicable to commercial services, which the Contracting Officer has indicated as being incorporated in this contract by reference to implement provisions of law or executive orders applicable to acquisitions of commercial items or components:

*(Contracting Officer check as appropriate.)*

- (1) 52.222-41, Service Contract Act of 1965, As Amended (41 U.S.C.351, *et seq.*).
- (2) 52.222-42, Statement of Equivalent Rates for Federal Hires (29 U.S.C.206 and 41 U.S.C.351, *et seq.*).
- (3) 52.222-43, Fair Labor Standards Act and Service Contract Act -- Price Adjustment (Multiple Year and Option Contracts) (29 U.S.C.206 and 41 U.S.C.351, *et seq.*).
- (4) 52.222-44, Fair Labor Standards Act and Service Contract Act - Price Adjustment (29 U.S.C.206 and 41 U.S.C.351, *et seq.*).
- (5) 52.222-47, SCA Minimum Wages and Fringe Benefits Applicable to Successor Contract Pursuant to Predecessor Contractor Collective Bargaining Agreement (CBA) (41 U.S.C.351, *et seq.*).
- (6) 52.222-50, Nondisplacement of Qualified Workers (Executive Order 12933).

(d) *Comptroller General Examination of Record.* The Contractor agrees to comply with the provisions of this paragraph (d) if this contract was awarded using other than sealed bid, is in excess of the simplified acquisition threshold, and does not contain the clause at 52.215-2, Audit and Records -- Negotiation.

(1) The Comptroller General of the United States, or an authorized representative of the Comptroller General, shall have access to and right to examine any of the Contractor's directly pertinent records involving transactions related to this contract.

(2) The Contractor shall make available at its offices at all reasonable times the records, materials, and other evidence for examination, audit, or reproduction, until 3 years after final payment under this contract or for any shorter period specified in FAR Subpart 4.7, Contractor Records Retention, of the other clauses of this contract. If this contract is completely or partially terminated, the records relating to the work terminated shall be made available for 3 years after any resulting final termination settlement. Records relating to appeals under the disputes clause or to litigation or the settlement of claims arising under or relating to this contract shall be made available until such appeals, litigation, or claims are finally resolved.

(3) As used in this clause, records include books, documents, accounting procedures and practices, and other data, regardless of type and regardless of form. This does not require the Contractor to create or maintain any record that the Contractor does not maintain in the ordinary course of business or pursuant to a provision of law.

(e) Notwithstanding the requirements of the clauses in paragraphs (a), (b), (c) or (d) of this clause, the Contractor is not required to include any FAR clause, other than those listed below (and as may be required by an addenda to this paragraph to establish the reasonableness of prices under Part 15), in a subcontract for commercial items or commercial components --

- (1) 52.222-26, Equal Opportunity (E.O.11246);
- (2) 52.222-35, Affirmative Action for Special Disabled and Vietnam Era Veterans (38 U.S.C.2012(a));
- (3) 52.222-36, Affirmative Action for Workers with Disabilities (29 U.S.C.793); and
- (4) 52.247-64, Preference for Privately-Owned U.S.- Flag Commercial Vessels (46 U.S.C.1241) (flow down not required for subcontracts awarded beginning May 1, 1996).

**4. 252.212-7001 -- CONTRACT TERMS AND CONDITIONS REQUIRED TO IMPLEMENT STATUTES OR EXECUTIVE ORDERS APPLICABLE TO DEFENSE ACQUISITIONS OF COMMERCIAL ITEMS. (MAR 2000)**

(a) The Contractor agrees to comply with any clause that is checked on the following list of DFARS clauses which, if checked, is included in this contract by reference to implement provisions of law or Executive orders applicable to acquisitions of commercial items or components.

- |                          |              |   |
|--------------------------|--------------|---|
| <input type="checkbox"/> | 252.205-7000 | Provision of Information to Cooperative Agreement Holders (10 U.S.C.2416).                                    |
| <input type="checkbox"/> | 252.206-7000 | Domestic Source Restriction (10 U.S.C.2304).  |
| <input type="checkbox"/> | 252.219-7003 | Small, Small Disadvantaged and Women-Owned Small Business Subcontracting Plan (DOD Contracts) (15 U.S.C.637). |

- 252.225-7001 Buy American Act and Balance of Payment Program (41 U.S.C. 10 a-10d, E.O. 10582).
- 252.225-7007 Buy American Act -Trade Agreements - Balance of Payments Program (41 U.S.C. 10a-10d, 19 U.S.C.2501-2518, and 19 U.S.C. 3301 note).
- 252.225-7012 Preference for Certain Domestic Commodities.
- 252.225-7014 Preference for Domestic Specialty Metals (10 U.S.C.2241 note).
- 252.225-7015 Preference for Domestic Hand or Measuring Tools (10 U.S.C.2241 note).
- 252.225-7021 Trade Agreements (19 U.S.C. 2501-2518 and 19 U.S.C. 3301 note).
- 252.225-7027 Restriction on Contingent Fees for Foreign Military Sales (22 U.S.C.2779).
- 252.225-7028 Exclusionary Policies and Practices of Foreign Governments (22 U.S.C.2755).
- 252.225-7029 Preference for United States or Canadian Air Circuit Breakers (10 U.S.C.2534(a)(3)).
- 252.225-7036 Buy American Act -- North American Free Trade Agreement Implementation Act.-- Balance of Payment Program (Alternate I) (41 U.S.C. 10a-10d and 19 U.S.C. 3301 note).
- 252.227-7015 Technical Data -- Commercial Items (10 U.S.C.2320).
- 252.227-7037 Validation of Restrictive Markings on Technical Data (10 U.S.C.2321).
- 252.243-7002 Requests for Equitable Adjustment (10 U.S.C. 2410).
- 252.247-7023 Transportation of Supplies by Sea (Alternate I) (Alternate II) (10 U.S.C. 2631).
- 252.247-7024 Notification of Transportation of Supplies by Sea (10 U.S.C.2631).

(b) In addition to the clauses listed in paragraph (e) of the Contract Terms and Conditions Required to Implement Statutes or Executive Orders-Commercial Items clause of this contract (Federal Acquisition Regulation 52.212-5), the Contractor shall include the terms of the following clause, if applicable, in subcontracts for commercial items or commercial components, awarded at any tier under this contract:

- 252.225-7014 Preference for Domestic Specialty Metals, Alternate I (10 U.S.C.2241 note).
- 252.247-7023 Transportation of Supplies by Sea (10 U.S.C. 2631).
- 252.247-7024 Notification of Transportation of Supplies by Sea (10 U.S.C. 2631).

**DFARS:**

252.204-7004 Required Central Contractor Registration (MAR 2000)

**5. CONTRACT DOCUMENTS, EXHIBITS OR ATTACHMENTS:**

1. Statement of Work/Specifications 7 pages
2. Accounting and Appropriation Data – 1 Page\*  
(\* To be included at time of award)

**2. ADDENDUM TO FAR 52.212-1 INSTRUCTIONS TO OFFERORS- COMMERCIAL ITEMS (MAR 2000)**

The Government intends to award a contract resulting from this solicitation to that responsible offeror proposing the lowest price for the Supplies or Services that has been determined to comply with the requirements of the solicitation.

**8. OFFEROR REPRESENTATIONS AND CERTIFICATIONS**

Offeror must complete and submit with its proposal, FAR 52.212-3 (FEB 2000) *Offeror Representations and Certifications--Commercial Items* and DFARS 252.212-7000 *Offeror Representations and Certifications--Commercial Items.*, which are available electronically in full text at : <http://heron.nrl.navy.mil/contracts/rep&certs.htm>

**The Naval Research Laboratory (NRL) requires a Scanning Electron Microscope System. This system must meet or exceed the following specifications.**

**Spatial Resolution**      with Tungsten electron source: 3.5nM

Variable Pressure mode: 5.5nM.

**Acceleration Voltage**      Range: 200V to 30kV.

**Probe Current**      Range: 1pA to 1 $\mu$ A.

**Magnification**      Range: 15x to 300kx.

**Adjustment:** Continuously variable in either coarse or fine modes

**Pre-sets:** Selectable from a user definable table of eight entries, plus a low-Mag facility which automatically selects the lowest available Mag for the operating conditions.

**Auto-Compensation:** Magnification is corrected automatically for changes in working distance or acceleration voltage.

## **Electron Optics**

### **Electron Source**

**Filament:** pre-set tungsten hairpin filament .

**EHT Bias:** Automatically adjusted, with acceleration voltage compensation.

**Alignment:** Electronic gun alignment.

**Automatic Gun Run-Up:** Sets the gun conditions automatically to last used conditions or default settings.

**Indicators:** On-screen information to indicate filament replacement required and Help instructions for filament replacement.

### **Lens Control**

**Control:** The lenses are electronically controlled. The SEM must have a computer control system for its electron optics, ensuring the optimal resolution and signal-to-noise ratio for a wide range of probe currents, accelerating voltages, and working distances. It must control the current supplied to the three electromagnetic lenses in such a way as to give optimum performance for the conditions chosen by the operator.

**Enhanced Depth of Field:** The electronic lens control system will specifically enhance the depth of field. This is especially useful at working magnifications less than 1500x.

**Probe Current Adjustment:** Both manual and automatic control provided. Under manual control, the probe current is freely adjustable over the entire range 1pA to 1 $\mu$ A. If auto-probe is selected, the probe current is automatically optimised for resolution for the chosen magnification.

**Hysteresis Correction:** Built-in, for the removal of lens hysteresis.

**Focus**

**Objective:** Conical (35°) for focusing.

**Working Distance:** Focal range from 1mm to 125mm.

**Manual Focus Control:** Coarse and fine with control sensitivity related to magnification.

**Automatic Focus Control:** Coarse and fine.

**Focus Compensation:** Automatic compensation to minimise focus changes over the entire acceleration voltage and probe current range.

**Dynamic Focus:** For correction of focus on specimens tilted from -80° to +80° with automatic compensation for changes in magnification.

**Rotation Compensation:** Automatic correction of apparent image rotation with changes in working distance.

**Stigmator**

**Type:** Eight pole electromagnetic.

**Manual Control:** X and Y adjusted either separately using the mouse or simultaneously using a 2D 'Navigation Box'.

**Automatic Stigmation Control:** Standard.

**Apertures**

**Number:** Two Apertures with micrometer controls for precise alignment.

**Focus Wobble:** For operator assistance in aperture alignment, with adjustable amplitude and speed.

**Beam Shift**

**Control:** Adjustment either using the mouse or within a 2D 'Navigation Box', for precise adjustment of image position at high magnifications.

**Range:** +/- 20µm.

**Specimen Chamber and Stage****Specimen Chamber**

**Dimensions:** 300mm (Length) x 265mm (Wide) x 216mm (Deep).

**Accessory Ports:** Seven accessory ports are provided on the large chamber and stage door.

**Specimen Stage**

**Standard Type:** High precision 5-axis motorised.

**Mounting:** Drawer Type.

<b>Movements:</b>	X	100mm (+ 50mm)
	Y	125mm (+ 75mm, -50mm)
	Z	35mm motorised (26mm spacer supplied)
	Tilt	0° to 90°
	Rotation	360° continuous

**Maximum Specimen Weight:** Up to 0.5kg

**Touch Alarm:** Audible warning with on-screen message.

**Specimen Mounts:** Single and eight position quick fit holders for 13mm diameter stubs.  
Single holder for 32mm diameter stubs.

## **Variable Pressure Detector**

**Detector** 4 Quadrant solid state diode BSD.

**Controls** **Automatic Contrast/Brightness:** Built-in, to compensate for changes in signal.

**Diode Control:** Independent control of all 4 diodes enables full compositional (COMPO), and user defined topographical (TOPO) modes to be implemented on the 4QBSD.

**Manual Contrast/Brightness:** Built-in.

## **Secondary Electron Detector**

**Detector** **Type:** Phosphor scintillator with optically coupled photomultiplier.

**Collector Bias:** Adjustable from -250V to +400V continuously.

**Controls** **Automatic Contrast/Brightness:** Built-in, to compensate for changes in signal.

**Manual Contrast/Brightness:** Built-in

## **Signal Handling**

**Signal Inputs** **Number:** Four as standard.

**Mixing:** Any two inputs can be mixed for enhanced image information.

**Selection:** From a menu of available detectors.

**Control:** Both manual and automatic contrast and brightness built-in, compatible with all video-type input detector signals. Signals may also be selectively inverted.

## **Scanning**

**Raster Scanning** **Scanning Rates:** Fifteen non-interlaced electron beam scan speeds are provided as standard from 0.09 sec/frame to 42 min/frame.

**Scan Modes** **Small Raster:** Adjustable reduced area scanning for fine adjustment of stigmatism, focus, etc.

**Spot Mode:** Allows the electron beam spot location to be defined freely in X and Y. The position of the beam on the specimen is indicated by a cursor superimposed upon a frozen image of the specimen.

**Line Scan:** Allows repeated scanning of a single line on the specimen. The position of the line is freely adjustable.

**Line Profile:** Shows the variation of signal level along the chosen line scan, allowing precise adjustment of contrast and brightness.

**Scan Rotation:** 360° scan rotation, at all scan rates.

**Tilt Correction:** Correction of image compression on tilted samples.

## **Image Processor**

### **Image Store**

**Resolution:** 3072 x 2304 pixels, each 8 bits deep.

**Display:** Non interlaced display of stored contents at 1024 x 768 resolution, with annotation and Windows™ overlays.

### **Image Processing**

**Pixel Averaging:** Multiple averaging on each single pixel to display the specimen image.

**Continuous Averaging:** Averages up to 256 scans to display the specimen image.

**Frame Integration:** Up to 256 frames integrated with freeze at end.

## **Image Display Functions**

### **Monitor**

**Type:** High contrast colour XVGA. Displays both image and Windows menus.

**Size:** 430mm (17") standard.

### **Display Modes**

**Split Screen:** Side by side live display of the same image using the input from any combination of installed detectors. Image halves may be selectively processed and frozen.

**Histogram:** Displays of grey level histogram of stored images. Cursor control allows the amplitude of any individual grey level to be displayed.

**Profile Mode:** Display of grey level intensity along a selected line. For stored images, line orientation is freely adjustable.

**Pseudo-Colour:** Images may be pseudo coloured using the colour look-up table editing facility from a palette of up to 16 million colours. Individual or user-defined bands of grey levels may be coloured, with the aid of image-to-LUT correlation and flexible grey band selection.

## Image Overlays

### Data Zones

**Standard Data Zone:** A standard data zone is supplied, displaying the following information: magnification, acceleration voltage, working distance and a scale bar. The data zone information appears on the hard copy output, but may also be disabled. Text and background colours, including transparent, are freely selectable.

**Custom Data Zone:** A customised data zone may be assembled using any of the available system parameters, e.g. aperture, detector, etc. Text and background colours, including transparent, are freely selectable.

### Status Menu

**System Status:** Operating parameters may be monitored using a system status display. Any available system parameter, e.g. brightness, contrast may be chosen for display. Status display choice lists may be stored and recalled freely.

### Image Annotation

**Annotation:** User text may be entered from the keyboard to any position on the image. Windows<sup>TM</sup> fonts and sizes are available, plus micron markers both fixed and adjustable. Text colour, style and background are freely selectable. Overlay text may be stored either separately or merged with the image as required.

### Measurement Functions

**Linewidth:** Both horizontal and vertical measurements can be made.

**Point to Point:** A pair of cross-hair cursors may be placed independently anywhere on the image display. The shortest in-line distance between the cursor centres and their bearing is displayed. Two pairs of point to point cursors may be displayed simultaneously.

**Angular:** Two lines with an included angle may be placed on the screen and freely adjusted, to show the angle between features.

**Radial:** A circle, with associated diameter measurement, may be placed on the screen and freely adjusted in size and position.

## Image Input/Output

### Hardcopy

Capability to add the following printers:

**Dye Sublimation printer:** Images may be transferred to a Dye Sublimation printer for high quality hard copy. Any image and associated overlays may be recorded.

**Video printer:** Images may be transferred to a video or LaserJet printer for low cost hard copy. Any image and associated overlays may be recorded.

**Archiving**

**Hard Disk:** Images, or part images, may be stored on the standard hard disk. These can be imported into DTP or image processing applications. The maximum number depends on the available space. All images are stored in the industry standard TIFF format, bitmap (BMP) or JPG.

**Floppy Disk:** Images, or part images may be stored on the standard 3.5 inch 1.44Mbyte floppy disk drive for off-line storage or importing into DTP or image processing applications.

**Colour Images:** Images that have been pseudo-coloured can be stored on the larger archive media as an industry standard colour TIFF file.

**TIFF Files:** All relevant image and instrument set-up data and an 80 character descriptive text string is stored with the image for future reference.

**BMP & JPEG Files:** Industry compliant versions.

**Image Gallery Recall:** Viewing of all images in a subdirectory.

**Integrated Computer Environment****Central Processor**

**Type:** Minimum Intel Pentium II 350 Megahertz.

**RAM:** 64 Megabytes.

**Operating System**

Microsoft® Windows® 98 or better

**SEM System**

Scanning control, Image Storage, Image Processing, detector control.

**External Comms.**

Serial Parallel, SCSI and USB.

**Network**

10base2 and 10 baseT. 100baseT available.

**Disk Drives**

**Hard Disk:** Minimum 4.3 Gigabyte EIDE standard.

**Floppy Disk:** 1.44Mbyte drive.

**CD-ROM:** 40 speed EIDE standard.

**User Interface**

**Keyboard:** Windows enhanced type.

**Mouse:** three button serial mouse pointing device for instrument control.

## **Vacuum System**

**Control:** Fully automatic.

**VP Control:** Automatic pressure regulation 1PA - 400PA.

**Rotary Pump:** Two stage 10 cubic metre/hr.

**Turbomolecular Pump:** 280 litre/sec water cooled.

**Gauging:** Penning gauge for high vacuum measurement. Pirani gauge for VP measurement.

**Indication:** Vacuum readings, vacuum ready and valve status, are shown in the vacuum menu .

**Ultimate High Vacuum:** The ultimate vacuum in the specimen chamber is better than  $2.0 \times 10^{-6}$  torr.

**High Vacuum Evacuation Time:** Normally better than 3 minutes, dependent upon specimen outgassing and atmospheric humidity.

**Variable Pressure Evacuation Time:** Normally better than 2 minutes.

**A LIQUID NITROGEN COOLED STAGE AND AIRLOCK SYSTEM MUST BE INCLUDED.**

**INTERFACE FOR ADAPTATION OF EXTERNAL CONTROLLING SCAN SYSTEM MUST BE INCLUDED.**

**A MULTI-FUNCTION CONTROL PANEL WITH JOYSTICK AND ROTARY CONTROLS MUST BE INCLUDED.**

**SHIPPING TO NRL, INSTALLATION AT NRL, ONE YEAR WARRANTY AND ON SITE TRAINING FOR TWO PERSONS MUST BE INCLUDED.**

# CONTRACT DATA REQUIREMENTS LIST

(1 Data Item)

Form Approved  
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 110 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503. Please DO NOT RETURN your form to either of these addresses. Send completed form to the Government Issuing Contracting Officer for the Contract/PR No. listed in Block E.

<b>A. CONTRACT LINE ITEM NO.</b> 0005	<b>B. EXHIBIT</b> A	<b>C. CATEGORY:</b> TDP _____ TM _____ X OTHER _____
--	------------------------	---

<b>D. SYSTEM / ITEM</b> Scanning Electron Microscope System	<b>E. CONTRACT / PR NO.</b> 61-0839-00	<b>F. CONTRACTOR</b>
--	---	----------------------

<b>1. DATA ITEM NO.</b> A001	<b>2. TITLE OF DATA ITEM</b> Users Manual	<b>3. SUBTITLE</b>
---------------------------------	--	--------------------

<b>4. AUTHORITY (Data Acquisition Document No.)</b>	<b>5. CONTRACT REFERENCE</b> Specifications	<b>6. REQUIRING OFFICE</b> 6174
---	--	------------------------------------

<b>7. DD 250 REQ</b> No	<b>9. DIST STATEMENT REQUIRED</b>	<b>10. FREQUENCY</b> 1 time	<b>12. DATE OF FIRST SUBMISSION</b> 90 days after award	<b>14. DISTRIBUTION</b>		
<b>8. APP CODE</b> n/a	n/a	<b>11. AS OF DATE</b> n/a	<b>13. DATE OF SUBSEQUENT SUBMISSION</b> n/a	<b>a. ADDRESSEE</b> NRL Code 6174	<b>b. COPIES</b>	
					Draft	Final
					Reg	Repro

<b>16. REMARKS</b>	<b>15. TOTAL</b>					
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;"></td> <td style="width: 10%; text-align: center;">0</td> <td style="width: 10%; text-align: center;">1</td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> </tr> </table>		0	1		
	0	1				

<b>G. PREPARED BY</b> John Booros	<b>H. DATE</b> 24 May 2000	<b>I. APPROVED BY</b>	<b>J. DATE</b>
--------------------------------------	-------------------------------	-----------------------	----------------

<b>17. PRICE GROUP</b>
<b>18. ESTIMATED TOTAL PRICE</b>