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5c. PROGRAM ELEMENT NUMBER
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6. AUTHORS
Robert Blake II

5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAMES AND ADDRESSES
Xavier University of Louisiana
1 Drexel Drive

New Orleans, LA 70125 -1098

8. PERFORMING ORGANIZATION REPORT NUMBER

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U.S. Army Research Office
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The views, opinions and/or findings contained in this report are those of the author(s) and should not contrued as an official Department of the Army position, policy or decision, unless so designated by other documentation.

14. ABSTRACT
We solicited and received three price quotations for a research-grade transmission electron microscope: FEI, Inc., $593,947; JOEL USA, Inc., $510,995; and Hitachi High Technologies America, Inc., $505,769. We chose to purchase the Hitachi model HT7700 Transmission Electron Microscope (TEM). Delivery and installation were completed in December, 2014. The new TEM joins and complements an existing microscopic imaging facility on the second floor of the Pharmacy Addition at Xavier University that already includes two scanning electron microscopes. The new TEM is now in use. Xavier University has formally pledged to provide funds for the

15. SUBJECT TERMS
transmission electron microscopy, bacteria

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	15. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			Robert Blake
UU	UU	UU	UU		19b. TELEPHONE NUMBER: 504-520-7489

Report Title

Final Report: Purchase of a Transmission Electron Microscope for Xavier University of Louisiana

ABSTRACT

We solicited and received three price quotations for a research-grade transmission electron microscope: FEI, Inc., $593,947; JOEL USA, Inc., $510,995; and Hitachi High Technologies America, Inc., $505,769. We chose to purchase the Hitachi model HT7700 Transmission Electron Microscope (TEM). Delivery and installation were completed in December, 2014. The new TEM joins and complements an existing microscopic imaging facility on the second floor of the Pharmacy Addition at Xavier University that already includes two scanning electron microscopes. The new TEM is now in use. Xavier University has formally pledged to provide funds for the routine maintenance of the TEM after the end of DoD support.

Enter List of papers submitted or published that acknowledge ARO support from the start of the project to the date of this printing. List the papers, including journal references, in the following categories:

(a) Papers published in peer-reviewed journals (N/A for none)

Received Paper

TOTAL:

Number of Papers published in peer-reviewed journals:

(b) Papers published in non-peer-reviewed journals (N/A for none)

Received Paper

TOTAL:

Number of Papers published in non peer-reviewed journals:

(c) Presentations

Number of Presentations: 0.00

Non Peer-Reviewed Conference Proceeding publications (other than abstracts):

Received Paper

TOTAL:

Number of Non Peer-Reviewed Conference Proceeding publications (other than abstracts):

Peer-Reviewed Conference Proceeding publications (other than abstracts):

Received Paper

TOTAL:

Number of Peer-Reviewed Conference Proceeding publications (other than abstracts):

(d) Manuscripts

Received Paper

TOTAL:

Number of Manuscripts:

Books

Received Book

TOTAL:

Received Book Chapter

TOTAL:

Patents Submitted

Patents Awarded

Awards

Graduate Students

NAME	PERCENT_SUPPORTED
FTE Equivalent:	
Total Number:	

Names of Post Doctorates

NAME	PERCENT_SUPPORTED
Tingfeng Li	0.00
Richard Painter	0.00
Bhupal Ban	0.00
FTE Equivalent:	**0.00**
Total Number:	**3**

Names of Faculty Supported

NAME	PERCENT_SUPPORTED	National Academy Member
Robert Blake II	0.00	
FTE Equivalent:	**0.00**	
Total Number:	**1**	

Names of Under Graduate students supported

NAME	PERCENT_SUPPORTED	Discipline
Michael Tran	0.00	Biosciences
FTE Equivalent:	**0.00**	
Total Number:	**1**	

Student Metrics

This section only applies to graduating undergraduates supported by this agreement in this reporting period

The number of undergraduates funded by this agreement who graduated during this period: 0.00

The number of undergraduates funded by this agreement who graduated during this period with a degree in science, mathematics, engineering, or technology fields:..... 0.00

The number of undergraduates funded by your agreement who graduated during this period and will continue to pursue a graduate or Ph.D. degree in science, mathematics, engineering, or technology fields:..... 0.00

Number of graduating undergraduates who achieved a 3.5 GPA to 4.0 (4.0 max scale):..... 0.00

Number of graduating undergraduates funded by a DoD funded Center of Excellence grant for Education, Research and Engineering:..... 0.00

The number of undergraduates funded by your agreement who graduated during this period and intend to work for the Department of Defense 0.00

The number of undergraduates funded by your agreement who graduated during this period and will receive scholarships or fellowships for further studies in science, mathematics, engineering or technology fields: 0.00

Names of Personnel receiving masters degrees

NAME
Total Number:

Names of personnel receiving PHDs

NAME
Total Number:

Names of other research staff

NAME	PERCENT_SUPPORTED

FTE Equivalent:
Total Number:

Sub Contractors (DD882)

Inventions (DD882)

Scientific Progress

See Attachment

Technology Transfer

FINAL PROGRESS REPORT

Title: Purchase of a Transmission Electron Microscope at Xavier University of Louisiana

Principal Investigator: Robert Blake II

We solicited and received the following three price quotations for a research-grade transmission electron microscope:

Company	Total price
FEI	$593,947
JOEL USA, Inc.	$510,995
Hitachi High Technologies America, Inc.	$505,769

Copies of the formal quotations are attached below. Based on the prices and our comparisons of the capabilities and the accessories offered with each instrument as outlined in the attached quotations, we chose to purchase the Hitachi model HT7700 Transmission Electron Microscope (TEM). Delivery and installation were completed in December, 2014. The new TEM joins and complements an existing microscopic imaging facility on the second floor of the Pharmacy Addition at Xavier University that already includes two scanning electron microscopes. The new TEM is now in use. Xavier University has formally pledged to provide funds for the routine maintenance of the TEM after the end of DoD support.

Quotation Number: DNEHQ1306-03

To place an order, call 800-548-9001, fax 925-218-2900, or email emdwebsite@hitachi-hta.com.

HITACHI
Inspire the Next

Quotation Prepared For:

Xavier University of Louisiana
1 Drexel Drive
New Orleans, LA 70125
USA

Contact: Robert Blake
Phone: (504) 520-7489
Fax:
E-mail: rblake@xula.edu

Issue Date: 04/16/2014
Expiration Date: 06/30/2014
Terms: Net 30 - 90% Upon Delivery/10% Upon Acceptance
FCA: HTA Shipping Point
Delivery: 120-150 Days, ARO
Hitachi Contact: Doug Griffith
Phone: 770-664-7460
Fax: 925-218-2900
E-mail: doug.griffith@hitachi-hta.com

Ln #	Qty	Part Number	Description	Unit Price	Ext. Price
1	1	821-0022	Model HT7700 Transmission Electron Microscope	$397,500.00	$397,500.00

1. 120kV maximum acceleration voltage, operation at 40, 60, 80, 100 and 120kV variable in 100v steps is preset. Lens system and deflection current interlinked in 1kV steps.
2. Lattice resolution of 0.204nm gold single-crystal specimen and graphite 0.36nm point resolution.
3. Electron Gun Assembly: Tungsten filament standard and Lab6 option available.
4. Pneumatic Gun Lift and automated venting procedure for filament exchange.
5. Optional gun valve to maintain high tension beam emission during sample exchange.
6. Microprocessor-controlled, differential turbopump evacuation system to guarantee fast pumpdown times and a clean column vacuum.
7. Eucentric "Hiper" stage 5-axis goniometer, ultra-stable for high resolution operation.
8. Hitachi's unique "dual gap" compound objective lens provides both high contrast and high resolution (HC/HR) modes exchangeable by one selection in software. No exchange of pole pieces to configure these modes is required.
9. HC/HR pole piece large gap allows up to +/-70° tilting of the standard single tilt holder.
10. Stage drift is less than 0.6nm/minute measured with the standard single tilt holder.
11. Standard single tilt holder with +/-30° tilting included, +/-70° tilting option.
12. Magnification ranges include a low magnification mode from 50X to 1,000X in 10 steps, a zoom high contrast mode from 200X to 200,000X in 30 steps, and a zoom high resolution mode from 4,000X to 600,000X in 20 steps.
13. Diffraction camera length HC mode is 0.2 to 8.0m in 10 steps, HR mode is 0.2 to 2.0m in 7 steps.
14. Independent free lens control.
15. Electronic image rotation +/-90 degrees available from 1,000X – 40,000X.
16. TEM is completely digital and does not have a film chamber.
17. Three possible positions for mounting digital cameras: a 35mm position, a mid-mount position where the detector is near or at the film plane, and a bottom-mount position.
18. Low dose system for beam-sensitive samples.
19. Cold Finger anticontamination trap option.
20. EMIP-SP software to automatically archive all saved images, provides extensive search parameters to query the database.
21. Automatic brightness, focus and astigmatism correction included depending on camera option.
22. Microtrace function indicating examined and unexamined areas of the specimen.
23. Image navigation allows storage of positions, tilt angles and orientations of up to 100 points.
24. Installation and proof of resolution in customer's laboratory.
25. On-site user training.

Quote Number: DNEHQ1306-03

Ln #	Qty	Part Number	Description	Unit Price	Ext. Price
			26. One set of operator's hardware and software manuals.		
2	1	821-0078	HT7700 - External LAN Control	$6,000.00	$6,000.00
3	1	821-0086	One Touch Single Tilt Holder for one specimen +/- 20 deg. within X translation of +/- 0.2mm without 3D Tilt Image Acquisition System +/- 60 deg within X translation of +/-0.5mm with 3D Tilt Image Acquisition System	$6,200.00	$6,200.00
4	1	817-0560NS	LaB6 filament with Wehnelt	$6,200.00	$6,200.00
5	1	821-1097	EDX kit *Includes caux lens, x-ray shutter, EDX cover and RS232 communication interface	$46,500.00	$46,500.00
6	1	821-1173	Cold Finger	$7,750.00	$7,750.00
7	1	821-0123	Gun valve	$15,500.00	$15,500.00
8	1	821-1192	Beamstop for diffraction analysis	$10,385.00	$10,385.00
9	1	821-0066	Selected Area Aperture Holder *Includes Selected Area Aperture Holder Plate	$3,200.00	$3,200.00
10	1	RFQ-AMT	AMT XR81-B-M1-BT-FXH7700 low-mount lens-coupled CCD digital camera with custom designed/engineered lens imaging system including: 1. Up to 8 megapixel scientific CCD sensor 2. 20/40 MHz high speed, low noise readout 3. Up to 120kV operation 4. Thermoelectrically cooled camera maintaining a 15°C temperature 5. Wide-angle low-mount custom designed lens 6. AMT software with unlimited desktop license 7. Includes installation and training	$51,750.00	$51,750.00
11	1	NS0-0061	Haskris Air-cooled Water Recirculator Model LX2 (LX2-A2) -208/230V-1Ø-60Hz -Cooling Capacity: 3,900 watts -Water Pump Capacity: 3.7 GPM (14.0 LPM) -Water Temp. Stability: +/-0.1 degree C -Reservoir volume: 1.3 Gallons (4.9 Liters)	$5,425.00	$5,425.00
12	1	APPSTRNG	Applications training @ customers site by Hitachi applications Engineer. This is in addition to basic training by FSE.	$5,000.00	$0.00
13		**Sub Total**			$556,410.00
14			Educational Discount		-$55,641.00
15	1	Duties	If Applicable-Not included in total	$14,891.00	$14,891.00
16	1	Taxes	City of New Orleans City Tax if applicable. Not included in total.	$27,821.00	$27,821.00
17	1	EMD-3001	3 Year Warranty Promotion - Additional 2 year system warranty coverage (total 3 years including standard one year warranty); Applies only to Hitachi components, and requires acceptance of additional Terms & Conditions.	$30,235.00	$0.00
18	1	Freight	Freight prepaid and added.	$5,000.00	$5,000.00
				Total	**$505,769.00**

This quotation and any resultant sale are subject to the attached terms and conditions, which are incorporated herein by reference.

For new and demonstration equipment the Manufacturer's one year limited warranty to repair defects in materials and workmanship commences upon Customer's acceptance. Customer's acceptance shall be deemed to occur on the earlier of the date installation is completed or Customer first uses the product. If, due to no fault or delay by HTA, installation is not completed or Customer does not use the product within sixty (60) days after delivery, Customer's acceptance shall be deemed to occur on the end of such period.

Service Agreements commensing at the end of the warranty period are available to ensure continuous peak performance from your instrument. Several programs are available. Each has multiple options to provide continuous protection and regularly scheduled preventive maintenance for your electron microscope and its accessories. Your salesperson can provide details or you may call one of our Contract Administrators at 1-800-253-3053 (Option 3).

Authorized Signature

Chad Ostrander, Director of Marketing, Life Science & Nanotechnology Divisions

PROPOSAL NOT VALID UNLESS SIGNED BY AUTHORIZED COMPANY OFFICERS.

JEOL USA, Inc.

11 Dearborn Road ● P.O. Box 6043 ● Peabody, MA 01961-6043 ● Phone: (978) 535-5900 ● Fax: (978) 536-2264 ● http://www.jeol.com

Quotation

Dr. Robert Blake II
Professor
Xavier University
College of Pharmacy
1 Drexel Drive
New Orleans, LA 70125

Quotation No.: 1999-1

Quotation Date: April 25, 2014

Price Valid 30 Days

Item	Your Inquiry No.:	Date:	
	Qty.	Description	Price
1	1	JEM-1400 TRANSMISSION ELECTRON MICROSCOPE A. 120 kV accelerating voltage; electron gun assembly with Cool Beam Illumination System - LaB6 filament standard B. PC control of all microscope operating conditions and specimen stage 1. "TEM Center" control software with customizable GUI 2. "TEM Navigation Jenie" support software to assist in routine and complex operations 3. 23" Touch Screen monitor standard 4. Mouse, trackball and GUI control of X/Y stage drives 5. Field (specimen) Position indicator with memory functions with auto specimen repositioning 6. Application programs include: a. IOS (Image Orientation System) b. MDS (Minimum Dose System) c. Optimum Under Focus 7. Multi-user login system C. High contrast objective lens - optimized for high resolution and high contrast D. Resolution guaranteed: 0.2nm line, 0.38nm point E. Five-axis Motorized Goniometer 1. Mouse and trackball control 2. ±70º rod-axis tilt 3. Specimen holder with Quick Change Specimen Cartridge tilt range is ±25º in X-Axis 4. Fully encoded X, Y, and Z and tilt axis F. Manual objective aperture with 3 positions G. Anticontamination Device (ACD12) and Cryofin H. Fully Automatic Vacuum System with penning gauge I. Automatic Sheet film camera (3¼" x 4") including (2) each light-tight loading and receiving boxes and 100 cassettes J. Complete Data Recording on negatives, including kV, magnification, film number, scale and operator code and label K. Automatic exposure control system allowing variability of either brightness or time (electron current measuring with either spot or average metering) L. Beam Stop M. Air Compressor	DF $377,000.00 DIA $7,070.00

DF = Duty Free DP = Duty Paid ND = No Duty DIA = Duty If Applicable

Item	Qty.	Description	Price
		N. Haskris Water Recirculator (specify air or water-cooled at time of order) O. Operator's chair P. Installation and proof of resolution guaranteed in customer's laboratory Q. One year all parts and labor warranty (begins with customer's first use of the instrument) R.. User Training provided S. One set of operator's manuals (356107)	
2	1	EM-16030HXA HARD X-RAY APERTURE 360198 (JU2010405)	DF $10,530.00 DIA $270.00
3	1	EM-21311HTR HIGH TILT SPECIMEN RETAINER 803043953 Specimen Retainer for the TEM. Installed on the EM-21010(SCSH) Common Specimen Holder and used for high-tilt specimen observation. Specimens/load: 1; Specimen size: 3 mm in diameter; Effective viewing field: 2 mm in diameter (when specimen tilt angle is 0°); Specimen tilt angle by pole piece: UHR: ±25° (not guaranteed when OL aperture is inserted in pole piece gap); HR: ± 80° (when OL aperture is inserted in pole piece gap, tilt = ±60°); HT: °80°; HC: ± 80°; Cryo: ±80°. Angles are achieved when all positions of X, Y and Z in the goniometer are 0. (JU2008144)	DF $2,625.00 DIA $40.00
4	1	AMT-XR81L-B 8 MPIXEL TEM COOLED CAMERA SYSTEM **AMT XR81L-B:** 8 megapixel wide-angle multi-discipline low-mount camera TEM interface, lens and camera 40% photographic field-of-view imaging. 3296 x 2472 square pixels at sensor 11µm square pixels at phosphor 26 x 36 mm phosphor Finite conjugate AMT high performance B-lens with resolution @100 line-pairs/mm across sensor Film compatible *Truesense Imaging* KAI 08050 scientific grade, CCD sensor: Multi-speed readout with 20MHz and 40MHz maximum at 12 bits to 16 bits ADC Maximum display speed at 21 fps, 4 x 4 binning at full field Anti-blooming sensor architecture Peltier-air cooled sensor to 10°C with no water required All electrical components outside the TEM vacuum and immune from contamination Electronic shutter with no blanking or mechanical shuttering required	ND $54,000.00

Item	Qty.	Description	Price
		High speed GigE digital camera interface for both data transfer and control Computer, software, and display: Dell Optiplex 7010 Computer (or better) with 4GB RAM 24 inch 1920x1080 display monitor AMT 602 Image Acquisition Engine software with unlimited desktop license A complete digital acquisition and control package dedicated to TEM image acquisition. Installation and training consisting of 2-3 days within same week One Year Warranty provided by Advanced Microscopy Techniques (JU2014876)	
5	1	JT-TRAINING/JB TEM APPLICATIONS SUPPORT FOR SERIAL EM *Installation support and training of SerialEM and IMOD through the JEOL Applications Division for a total of 1 week (5 business days including travel)* (JU2013038)	ND $10,000.00
6	1	JS-SERVICE-2 ADDITIONAL TWO YEAR JEOL SERVICE CONTRACT Standard two year JEOL Preventative Maintenance Service Contract (after warranty) for the *JEM-1400 basic unit and water chiller;* price based on payment in advance with the purchase of the new instrument Any other items contained in this quote but not listed here, are not covered by the additional contract. (JS-SERVICE1)	ND $52,340.00
		Plus Inland Transportation & Inside Delivery:	$4,500.00
		Net Grand Total:	$510,995.00
		Duty If Applicable:	$7,380.00
		FOB: Destination / Inside Delivery (freight and rigging charges have been included in the total price) Delivery: 7 Months After Receipt of Order Prices quoted do not include any applicable sales and/or use taxes. *The Buyer will need to file an application for duty free entry with the U.S. Department of Commerce in order to avoid payment of import duty on the TEM and TEM accessories. JEOL will provide the forms and assist the Buyer, where possible, in the application process.* ***NOTE REGARDING TOMOGRAPHY APPLICATION:***	

QUOTATION for

Xavier University

Quote Date : May 05, 2014
Quote Number : QUO-51573-L0K9 R0
Expires : June 27, 2014

Prepared By: **Bryan Majkrzak**
Mobile: 843 603 2202
Fax: 503 726 2570
Bryan.Majkrzak@fei.com

Proposed Solution

Line #	Part Number	Description	Qty	Amount (in USD)
Tecnai G2 Spirit BioTWIN				
1	FP 5018/41	Tecnai G2 Spirit BioTWIN The core instrument (Tecnai G^2 Spirit BioTWIN) includes: - Workstation + 19'' LCD monitor - Digital camera embedding - Automation software: AutoAdjust and AutoGun - Copper cryo shields	1	$419,686.00
Additional Warranty				
2	4022 404 45025	Additional Year(s) Warranty Labor & Parts Tecnai G2 Spirit BioTWIN NA	2	$0.00
		Sub-total		**$0.00**
Application Software				
3	FP 5458/00	Free Lens Control	1	$4,630.00
4	FP 5458/50	Magnification Calibration Package	1	$8,938.00
5	FP 5409/00	Parfocal Magnification Series	1	$1,729.00
6	FP 5451/00	TEM Scripting	1	$9,259.00
		Sub-total		**$24,556.00**
Bottom-Mount Digital Camera				
7	1058034	Gatan Orius SC200B 200 kV	1	$66,753.00
		Sub-total		**$66,753.00**
Camera Connectivity				
8	1101222	Gatan Camera Housing and Interface Flange	1	$12,952.00
		Sub-total		**$12,952.00**
Cooler / Compressor				
9	9432 909 96281	Compressor 115 V, 50 / 60 Hz	1	$1,711.00
		Sub-total		**$1,711.00**
Cryo / Low Dose				
10	FP 5407/00	Low-dose Exposure Technique	1	$13,406.00
		Sub-total		**$13,406.00**
Installation & Warranty				

11	4022 404 41025	Installation Labor Tecnai G2 Spirit BioTWIN NA	1	$0.00
12	4022 404 02025	Installation Material Tecnai G2 Spirit BioTWIN NA	1	$0.00
13	4022 404 43025	Warranty Labor Tecnai G2 Spirit BioTWIN NA	1	$0.00
14	4022 404 04025	Warranty Material Tecnai G2 Spirit BioTWIN NA	1	$0.00
		Sub-total		**$0.00**
Installation Kit				
15	9425 061 69559	NA Inst. Kit Tecnai Spirit without Plate Camera	1	$14,822.00
		Sub-total		**$14,822.00**
Miscellaneous				
16	1044450	19" Accessory Cabinet	1	$5,899.00
17	FP 6788/00	Additional Wehnelt Assembly	1	$3,620.00
18	9432 909 96101	LaB6 emitter (Denka / Mitsui)	1	$1,324.00
		Sub-total		**$10,843.00**
Power Options				
19	FP 6345/51	Mains Matching Transformer for TEM	1	$4,808.00
		Sub-total		**$4,808.00**
Specimen Holder(s) and Accessories				
20	FP 6596/05	CompuStage Single-tilt Holder	1	$4,951.00
		Sub-total		**$4,951.00**
Training				
21	9425 060 99100	On-site Training/Support (1 day, offered by Hillsboro)	2	$7,800.00
		Sub-total		**$7,800.00**
Transport Options				
22	4022 400 43831	CIP Brno / Named place of destination in North America (T-3)	1	$11,659.00
		Sub-total		**$11,659.00**
		List Price Total		**$593,947.00**

FEI Company • 5350 NE Dawson Creek Drive • Hillsboro, Oregon 97124
Tel: 503-726-7500 • Fax: 503-726-2570