

ERIM-616371

**Proposal**

**STATE-OF-THE-ART REPORTS ON INFRARED  
TECHNOLOGY**

Submitted To:

Defense Technical Information Center (DTIC-AI)  
Cameron Station  
Alexandria, VA 22304-6145

Attention: Brian McCabe

March 1992

19990604 016



**ERIM**

P.O. Box 134001  
Ann Arbor, MI 48113-4001

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06 March 1992  
IN REPLY REFER TO:  
ERIM-616371

FAX 313-994-1575  
TELEX 4940991 ERIMARB

Defense Technical Information Center (DTIC-AI)  
Cameron Station  
Alexandria, VA 22304-6145

Attention: Brian McCabe

Subject: State-Of-The-Art Reports on Infrared Technology

The Environmental Research Institute of Michigan (ERIM) herein submits for your consideration this proposal entitled "State-Of-The-Art Reports on Infrared Technology." The proposal is being submitted as a result of recent discussions between representatives of your organization and ERIM personnel, and is for the continuation of the special studies effort being conducted currently under Contract DLA900-88-D-0392.

It is anticipated that Dr. Joseph S. Accetta, Research Manager and Director of the Infrared Information Analysis Center, will serve as Program Manager for the proposed effort under the direction of Dr. Stanley R. Robinson, Vice President and Director of the Advanced Concepts Division. However, the modification to the contract with ERIM should not specify an individual by name.

Present planning indicates the proposed 6-month program could commence as early as April 1992, if it is possible to have a modification to the contract executed by that date. Because effective planning is dependent upon prior knowledge of commitments of manpower and facilities, it is requested that ERIM be advised as to the intent of DTIC at the earliest possible date. In the event a modification is not executed within three (3) months from the date of this proposal, ERIM reserves the right to assess its current work load to determine the availability of manpower and facilities for performance of the proposed work.

The management fee included in this proposal is supported by the profit calculation procedures contained in the Department of Defense (DoD) profit policy proposal published in its final form on 3 August 1987 (Federal Register, Vol. 52, No. 148, subpart 215.9 - Profit). In calculating the management fee, the Modified Weighted Guidelines Method for Nonprofit Organizations was used.

If additional technical information is required, please communicate with Dr. Accetta, extension 2378. Correspondence and inquiries of an administrative or contractual nature should be directed to Mr. Joseph R. Welch, Contracts Administration Manager, extension 3580.

Sincerely,

Clarence E. Heerema, Director  
Customer Relations

CEH:agm

cc: D. Collins, DESC/PSC  
P. Klinefelter, DTIC-DF  
J. MacCallum, DDR&E/R&AT/ES

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## Proposal

Submitted to: Defense Technical Information Center (DTIC-AI)  
Cameron Station  
Alexandria VA 22304-6145  
Attn: Mr. Brian McCabe

### State-of-the-Art Reports on Infrared Technology

#### 1. Introduction

State-of-the-Art Reports (SOARs) are detailed treatises summarizing the current status of research, development and technology in military infrared and electro-optical systems. These systems are essential for surveillance, pilotage, target acquisition, precision guidance, night vision and a number of other applications germane to survival and success on modern air, land, sea and space battlefields. SOARs provide timely, up to date information on specific warfare technologies to system designers, planners and other executive elements within the military and aerospace communities. Of specific value is critical information relevant to the acquisition of IR/EO systems for inclusion into the operational inventory. Knowing the current state of research and development is crucial to prudent weapons procurement decisions. ERIM proposes herein to conduct state-of-the-art reviews on four IR/EO technology areas critical to military superiority in the strategic and tactical areas: Focal Plane Arrays, Infrared Search and Track Systems (IRST), Forward Looking Infrared Systems (FLIR) and Signature Simulation and Modelling.

#### 2. Approach

##### 2.1 Task 1. Focal Plane Arrays (FPAs)

Advanced focal plane array architecture is key to a number of operational infrared systems including forward looking infrared systems (FLIR), infrared search and track (IRST) and space

surveillance systems essential to the success of strategic and theater missile defense such as GPALS, Brilliant Eyes and Brilliant Pebbles. In addition, FPAs are being considered for use in certain tactical air-to-air and air-to-ground applications. Extraction of dim targets in cluttered backgrounds depends upon the availability of sophisticated, reliable, low cost and producible focal plane arrays. Producibility is a major concern in the fielding of large numbers of low cost arrays and thus, this SOAR will have a significant impact on acquisition decisions regarding major weapons systems.

Of particular interest is the current controversy between MCT FPAs operating in the long wavelength region and PtSi FPAs operating in the mid-wave region with regard to performance as well as over-all producibility and cost, which become major issues when the number of arrays procured approaches the tens of thousands.

This report, nominally 200 pages, will consist of the following major subsections.

1. Introduction
2. FPA Principles
3. Application of IR FPAs
4. FPA Technology (MCT, PtSi, InSb etc.)
5. Summary and Recommendations
6. References and Bibliography

This report will address the relative merits of competing technologies, producibility and relative cost availability of commercial arrays and recommendations for future research.

## 2.2 Task 2. Infrared Search and Track System (IRST)

Infrared Search and Track Systems have found numerous applications within the spectrum of military operations. Two of the principal advantages of the IRST over conventional radar as methods

of surveillance are its purely passive nature and its counter-stealth capabilities.IRST applications cover a range including air defense roles in tactical surveillance and warning against helicopters and approaching aircraft, naval fleet defense against attacking aircraft and sea skimming missiles, and space surveillance of ballistic or theater missiles and low-flying air vehicles. Several recent weapons system acquisitions have incorporated the IRST as a major surveillance component.

Signal processing to extract dim targets in cluttered backgrounds is the most significant problem in the implementation of long range infrared search and track systems essential to many applications including Navy fleet defense in a stealth-dominated environment. Substantial effort has been expended on this specific technology area, and to expedite prudent acquisition, operational and research decisions, a current state-of-the-art report would be invaluable.

This report, nominally 200 pages, will consist of the following major subsections.

1. Introduction
2. Principles of IRST
3. Applications of IRST
4. Implementations of IRST (F-14D, etc.)
5. Advances in IRST Signal Processing
6. Summary and Recommendations
7. References and Bibliography

### 2.3 Task 3. Forward Looking Infrared Systems (FLIR)

Forward Looking Infrared Systems (FLIR) have become standard battlefield equipment for night combat, air-to-ground surveillance, targeting and pilotage. These systems repeatedly demonstrated their value in the Persian Gulf war, often providing a significant operational advantage to allied forces. The ability to fight at

night is absolutely essential for success on the modern battlefield. The platforms that use FLIRs include the foot soldier, tanks and other ground vehicles, helicopters and close air support aircraft.

This report, nominally 200 pages, will consist of the following major subsections.

1. Introduction
2. Principles of FLIR Systems
3. Applications of FLIRs
4. Implementation of FLIRs
5. Advances in FLIR Technology and Components
  - a. detectors
  - b. coolers
  - c. signal processing and displays
6. Summary and Recommendations
7. References and Bibliography

This report will, in addition, address FLIR experience in Operation Desert Storm and recent activities on 2nd and 3rd generation common module FLIR development.

#### 2.4 Task 4. Signature Simulation and Modelling

Signature modelling has become an accurate and low cost replacement for elaborate, limited, and expensive signature measurement programs. A number of signature prediction codes exist and are applicable to the entire spectrum of military targets from re-entry vehicles to tanks. Accurate simulation is essential to affordable and rapid development of advanced infrared systems. In addition, validation is an essential element of signature code development.

This report, nominally 200 pages, will consist of the following major subsections.

1. Introduction
2. Principles of Signature Modelling
3. Current Signature Models
4. Current Research
5. Summary and Conclusions
6. References and Bibliography

### 3. Deliverables

The deliverables under this activity will consist of four reports on the aforementioned subject areas.

### 4. Schedule

The period of performance is 6 months from execution with all activity terminating 1 October 1992.

## CONTRACT AND RATE INFORMATION

The following statements are provided for your information in reviewing this proposal and/or in preparing any resultant contract or subcontract.

### FORMS USED IN PROPOSALS

Depending on Sponsor requirements, any or all of the following ERIM generated supplements are included in proposals to provide further cost detail:

COST SUMMARY: One Cost Summary is presented as a summary for the total program. Separate cost summaries are provided for each task as applicable. As cited in the "Salaries and Wages" section below, ERIM merit increases take effect on 1 July of each year. For bidding purposes, an escalation rate as described in the Salaries and Wages section, has been utilized. These rates have either been submitted to or approved by the Government. Under the Direct Labor section of the Cost Summary, a separate entry is provided for every labor category at each escalation period.

COST BREAKDOWN OF TRAVEL, SUPPLIES, EQUIPMENT, CONSULTANTS, SUBCONTRACTS: (used where applicable) These pages itemize costs associated with the proposal. Methods of arriving at these costs are explained in following sections.

MONTHLY COST SPREAD: (used where applicable) One set of monthly cost spread sheets present a summary for the total program. Separate monthly cost spread sheets are provided for individual program tasks, showing monthly amounts for each cost element and projected monthly amounts plus cumulative totals.

### CONTRACTS

Contracts are made with the Environmental Research Institute of Michigan (ERIM), a non-profit corporation organized and existing under the laws of the State of Michigan. This proposal is not to be considered binding upon ERIM unless and until its provisions are incorporated in the contract executed in the name of Environmental Research Institute of Michigan. Any proposed contractual documents should be mailed to:

ENVIRONMENTAL RESEARCH INSTITUTE OF MICHIGAN  
P.O. BOX 134001  
ANN ARBOR, MICHIGAN 48113-4001

ATTN: CONTRACTS ADMINISTRATION

## SALARIES & WAGES

Salaries and wages are charged at actual hourly rates for the individuals that performed the work and include allowances for Social Security, taxes, pension costs, medical insurance, vacation accruals, holidays and sick leave in accordance with ERIM's established policy. An escalation factor of 4.0% is applied to effort proposed between 1 July 1992 and 30 June 1993, a 4.6% escalation rate is applied to effort between 1 July 1993 and 30 June 1994, and a 5.0% escalation rate is applied to effort proposed between 1 July 1994 and 30 June 1995 and beyond. The attached Labor Rate Table contains the current rates and escalated rates for four years. ERIM's compensation system provides for merit increases effective on 1 July each year. Therefore, the escalation applied to labor bidding rates effects all rates at one time; not incrementally throughout the year. Salaried personnel and temporary personnel are paid twice each month. Salary rates and cost accounting for these personnel are determined on an annual basis. A man-month of effort consists of 152 hours.

## COMPUTER USAGE

The following bidding rates are being utilized for computer usage: (S&W Salaries & Wages, M&S Materials & Supplies).

	S&W	M&S
VAX ABC Process	1.07/min*	2.11/min**
VAX ABC Connect	.46/hr*	1.11/hr**
VAX II Process	1.04/min*	6.15/min**
VAX II Connect	1.26/hr*	10.68/hr**
VAX III Process	.15/min*	.34/min**
VAX III Connect	.75/hr*	1.69/hr**
VAX IV Process	.32/min*	.68/min*
VAX IV Connect	.74/hr*	1.79/hr**
DC VAX Process	.09/min*	2.43/min**
DC VAX Connect	.59/hr*	8.11/hr**
ARIES Process	2.56/min*	6.55/min**
ARIES Connect	2.23/hr*	6.30/hr**

\* The VAX and ARIES Systems Labor (S&W) Rates represent the average labor cost for computer maintenance for each hour of connect time and each minute of processing time. It is an average based on actual experience. Actual costs will be charged monthly.

\*\* The VAX and ARIES Systems Material & Supplies (M&S) rates represent the average material and supply costs for each hour of connect time and each minute of processing time. Included in this amount are depreciation, paper and printing supplies, replacement parts and vendor services. Like labor, actual costs will be charged monthly.

At the end of each fiscal year, the annual costs for operating both the VAX and ARIES computers is determined and all accounts that involved use of these computers are adjusted for any variance between the monthly billings and actual costs.

## TRAVEL EXPENSES

ERIM requests that actual travel expenses incurred in accordance with ERIM established policy be allowed, to the extent that the expenses are within the limitations of the Federal Travel Regulations as amended by Public Law 99-234, Title II - Travel Expenses of Government Contractors. For bidding purposes, air fares are estimated at coach rate plus \$28/trip/person for ground transportation. Other travel related costs are estimated as follows:

Subsistence	As established by Federal Travel Regulations
Destination Transportation	40.00/day/person (share when feasible)
Personal Vehicle Mileage	.275/mile

All subsistence and airfare estimates are escalated 5% per fiscal year.

The foregoing rates have been accepted by the Department of Defense for bidding purposes. Personal vehicle mileage will be billed at \$.275 per mile. When foreign travel is involved, per diem rates established by the Department of State are used.

## EQUIPMENT, MATERIALS & SUPPLIES

Equipment, materials and supplies are based on current catalog prices, recent purchase orders and/or quotations. Competition is used whenever practical.

## INDIRECT EXPENSE RATES

The contractor's provisional indirect expense rates are:

<u>ALL FISCAL YEARS</u>	
Overhead	88.4 of Direct Labor Dollars
G & A	11.7 of Total Cost, less CoM
Cost of Money (CoM)	10.4402 of Direct Labor Dollars

The indirect expense rates are the contractor's best estimate of provisional bidding rates and have been submitted to the Government. They are currently under review. Billing will be at rates approved by our Administrative Contracting Officer (ACO) which are also provisional. Final indirect expense rates are determined by the ACO after the close of each fiscal year. The contractor is claiming Cost of Money in accordance with FAR 52.215-30 and it has been included in this proposal.

Based on the current provisional indirect rates shown above, ERIM's burden (excluding cost of money) as a percent of total direct costs average 80%.

## SUBMISSION OF VOUCHERS AND INVOICES

ERIM will submit public vouchers or invoices, as applicable, in accordance with our standard practice on all Federal Government contracts and subcontracts. Each billing, with supporting detail in the form of billing tabulations, if applicable, can be provided to the sponsor through ERIM's cognizant audit agency.

## **PAYMENTS**

If the cognizant payment activity for a contract resulting from this proposal has access to the Treasury Financial Communications System, it is requested payments be made in full to ERIM by Electronic Funds Transfer. The attached form contains all of the information necessary for an Electronic Funds Transfer.

If required, additional information that may be necessary for electronic Funds Transfer will be provided after negotiations.

In the event the cognizant payment activity does not have access to the Treasury Financial Communications System, it is requested payments be made in full to:

Environmental Research Institute of Michigan  
Drawer 67-510A  
Detroit MI 48267

## **CONTRACT TYPE AND SPECIAL CLAUSES**

Unless noted elsewhere in this proposal, ERIM requests that a contract resulting from this proposal which was costed on a Cost-Plus-Fixed-Fee basis, be awarded on a Cost-Plus-Fixed-Fee basis and incorporate contractual provisions applicable to a non-profit organization. It is also requested that the following FAR clauses be included in the contract:

FAR 52.245-5, Alternate I, Government Property [see 45.106(f)(2)]  
FAR 52.251-1, Government Supply Sources

## **COGNIZANT CONTRACT ADMINISTRATION, AUDIT AND PAYMENT ACTIVITIES**

The Defense Contract Management Area Operations Detroit (DCMAO Detroit) has the responsibility for field administration of DoD contracts with ERIM. The address is:

Commander                      Activity Code: S2035A  
DCMAO Detroit  
P.V. McNamara Federal Building  
477 Michigan Avenue  
Detroit, Michigan 48226

ATTN: DCMDM GDACA-L4, Mr. Gerald A. Long  
Autovon: 346-5070/71: FTS: 226-5070/71  
Commercial: (313) 226-5070/71



The Defense Contract Audit Agency, Michigan Branch Office has audit cognizance over all Federal Government contracts with ERIM. The office address is:

Defense Contract Audit Agency, Northeastern Region  
Michigan Branch Office  
Room 420, P.V. McNamara Federal Building  
477 Michigan Avenue  
Detroit, Michigan 48226-2571

ATTN: Mr. William Schneider, Supervisory Auditor  
FTS: 226-7147; Commercial: (313) 226-7142

The Defense Finance and Accounting Service (DFAS) has payment responsibility for DoD contracts with ERIM. The address is:

Commander                      Activity Code: SC1018  
DFAS Columbus Center  
Erie Contract Accounting Division  
P.O. Box 182041  
Columbus, Ohio 43218-2041

#### **CONTRACTOR SYSTEMS REVIEWS**

The following ERIM systems are regularly reviewed by the Department of Defense and are considered acceptable;

- Contractor Purchasing System
- Contractor Employee Compensation System
- Contractor Insurance and Pension System
- Government Property Control System
- Contractor Estimating System

#### **COST ACCOUNTING STANDARDS DISCLOSURE STATEMENT**

ERIM's Disclosure Statement dated 27 February 1990 was determined adequate on 24 April 1990.

(REV. 14 FEBRUARY 1992)

## PAYMENT INFORMATION FORM ACH VENDOR PAYMENT SYSTEM

This form is used for ACH payments with an addendum record that carries payment-related information. Recipients of these payments should bring this information to the attention of their financial institution when presenting this form for completion.

### PAPERWORK REDUCTION ACT STATEMENT

The information being collected on this form is required under the provision of 31 U.S.C. 3322 and 31 CFR 210. This information will be used by the Treasury Department to transmit payment data, by electronic means, to vendor's financial institution. Failure to provide the requested information may delay or prevent the receipt of payments through the Automated Clearing House Payment System.

### COMPANY INFORMATION

NAME: <b>Environmental Research Institute of Michigan</b>	
ADDRESS: <b>P.O. Box 134001</b>	
<b>Ann Arbor, MI 48113-4001</b>	
CONTACT PERSON NAME: <b>Sue Luchs or Craig Darow</b>	TELEPHONE NUMBER: <b>( 313 )994-1200 ext 3294</b>

### AGENCY INFORMATION

NAME:	
ADDRESS:	
CONTACT PERSON NAME:	TELEPHONE NUMBER: (     )

### FINANCIAL INSTITUTION INFORMATION

NAME: <b>Manufacturers National Bank of Detroit</b>	
ADDRESS: <b>100 Renaissance Center</b>	
<b>Detroit, MI 48243</b>	
ACH COORDINATOR NAME: <b>Robert C. Klann</b>	TELEPHONE NUMBER: <b>( 313 )222-0015</b>
NINE-DIGIT ROUTING TRANSIT NUMBER: <b>0 7 2 0 0 0 3 3 9</b>	
DEPOSITOR ACCOUNT TITLE: <b>Environmental Research Institute of Michigan</b>	
DEPOSITOR ACCOUNT NUMBER: <b>Account 1076015914</b>	
TYPE OF ACCOUNT: <input checked="" type="checkbox"/> CHECKING <input type="checkbox"/> SAVINGS	
SIGNATURE AND TITLE OF REPRESENTATIVE: <i>Jane Phifer</i> <b>Jane Phifer, Second Vice President</b>	TELEPHONE NUMBER: <b>( 313 ) 930-2442</b>

**ESCALATED BID RATE TABLE**

LABOR CATEGORY	CURRENT BID RATE	RATE	RATE	RATE	RATE
		JULY 92 - JUNE 93	JULY 93 - JUNE 94	JULY 94 - JUNE 95	JULY 95 - JUNE 96
Senior Research Engineer	67.08	69.76	72.97	76.62	80.45
Research Engineer IV	54.83	57.02	59.65	62.63	65.76
Research Engineer III	41.35	43.00	44.98	47.23	49.59
Research Engineer II	31.11	32.35	33.84	35.53	37.31
Research Engineer I	24.56	25.54	26.72	28.05	29.46
Research Technicians	25.79	26.82	28.06	29.46	30.93
Technical Associate	40.96	42.60	44.56	46.79	49.13
Assistants in Research	21.09	21.93	22.94	24.09	25.29
Pilots	38.20	39.73	41.56	43.63	45.81
Aircraft Maintenance	29.10	30.26	31.66	33.24	34.90
Administrative	32.90	34.22	35.79	37.58	39.46
Photographers	20.66	21.49	22.47	23.60	24.78
Graphic Technicians	16.54	17.20	17.99	18.89	19.84
Non-Professional Res (Hrly)	11.45	11.91	12.46	13.08	13.73
Technical Typists	18.73	19.48	20.38	21.39	22.46

4.0% ESCALATION FOR EFFORTS BETWEEN 01 JULY 92 AND 30 JUNE 93  
 4.6% ESCALATION FOR EFFORTS BETWEEN 01 JULY 93 AND 30 JUNE 94  
 5.0% ESCALATION FOR EFFORTS TO EACH SUCCEEDING YEAR THEREAFTER

THESE RATES WERE APPROVED BY THE GOVERNMENT ON 09 JANUARY 1992

COST ANALYSIS

<b>ERIM-616371</b> <b>CONTRACT PRICING PROPOSAL COVER SHEET</b>	1. SOLICITATION/CONTRACT MOD NO. DLA900-88-D-0392	FORM APPROVED OMB NO. 3090-0016
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NOTE: This form is used in contract actions if submission of cost or pricing data is required. (See FAR 15.804-6(b))

2. NAME AND ADDRESS OF OFFEROR  * Environmental Research Institute of Michigan P.O. Box 134001 Ann Arbor, MI 48113-4001 ERIM Cage Code #57949	3A. NAME AND TITLE OF POINT OF CONTACT Joseph R. Welch, Manager Contracts/Purchasing	3B. TELEPHONE NO. (313) 994-1200 x 3580
	X <input type="checkbox"/> A. NEW CONTRACT <input type="checkbox"/> B. CHANGE ORDER <input type="checkbox"/> C. PRICE REVISION/REDETERMINATION	D. LETTER CONTRACT <input type="checkbox"/> E. UNPRICED ORDER <input type="checkbox"/> F. OTHER (Specify)

5. TYPE OF CONTRACT <input type="checkbox"/> FFP <input checked="" type="checkbox"/> CPFF <input type="checkbox"/> CPIF <input type="checkbox"/> CPAF <input type="checkbox"/> FPI <input type="checkbox"/> OTHER (Specify)	6. PROPOSED COST (A+B=C)	
	A. COST \$285,772	B. PROFIT/FEE \$14,239
	C. TOTAL \$300,011	

7. PLACE(S) AND PERIOD(S) OF PERFORMANCE  
Ann Arbor, MI APR 92 - SEP 92

8. List and reference the identification, quantity and total price proposed for each contract line item. A line item cost breakdown supporting this recap is required unless otherwise specified by the Contracting Officer.

A. LINE ITEM NO.	B. IDENTIFICATION	C. QUANTITY	D. TOTAL PRICE	E. REF
1	State-Of-The-Art Reports on Infrared Technology		\$300,011	

9. PROVIDE NAME, ADDRESS, AND TELEPHONE NUMBER FOR THE FOLLOWING

A. CONTRACT ADMINISTRATION OFFICE Commander, DCMAO Detroit Patrick V. McNamara Federal Building 477 Michigan Avenue, Detroit, MI 48226-2571 ATTN: DCMDM-GDACA-L4, Gerald A. Long (313) 226-5070/71	B. AUDIT OFFICE Branch Manager, Defense Contract Audit Agency Northeastern Region, Michigan Branch Office Patrick V. McNamara Building, Room 420, 477 Michigan Ave. Detroit, MI 48226-2571 ATTN: Mr. William Schnieder, Supervisory Auditor (313) 226-7142
---	---

10. WILL YOU REQUIRE THE USE OF ANY GOVERNMENT PROPERTY IN THE PERFORMANCE OF THIS WORK? (If "Yes", identify) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	11A. DO YOU REQUIRE GOVERNMENT CONTRACT FINANCING TO PERFORM THIS PROPOSED CONTRACT? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	11B. TYPE OF FINANCING <input type="checkbox"/> Advanced Payments <input checked="" type="checkbox"/> Progress Payments <input type="checkbox"/> Guaranteed Loans
--	---	--


12. HAVE YOU BEEN AWARDED ANY CONTRACTS OR SUBCONTRACTS FOR THE SAME OR SIMILAR ITEMS WITHIN THE PAST 3 YEARS? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	13. IS THIS PROPOSAL CONSISTENT WITH YOUR ESTABLISHED ESTIMATING AND ACCOUNTING PRACTICES AND PROCEDURES AND FAR PAR 31 COST PRINCIPLES? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
---	---

14. COST ACCOUNTING STANDARD BOARD (CAS) DATA (Public Law 91.379 as amended and FAR PART 30)

A. WILL THIS CONTRACT ACTION BE SUBJECT TO CASB REGULATIONS? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	B. HAVE YOU SUBMITTED A CASB DISCLOSURE STATEMENT (CASB DS-1 OR2)? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO DCASMA, Adequacy ltr. 24-APR-90
C. HAVE YOU BEEN NOTIFIED THAT YOU ARE OR MAY BE IN NON-COMPLIANCE WITH YOUR DISCLOSURE STATEMENT OR COST ACCOUNTING STANDARDS? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	D. IS ANY ASPECT OF THIS PROPOSAL INCONSISTENT WITH YOUR DISCLOSED PRACTICES OR APPLICABLE COST ACCOUNTING STANDARDS? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO

This proposal is submitted in response to the RFP contract, modification, etc, in Item 1 and reflects our best estimates and/or costs as of this date.

15. NAME AND TITLE Clarence E. Heerema, Director Customer Relations	16. NAME OF FIRM Environmental Research Institute of Michigan
---	--

17. SIGNATURE 	18. DATE OF SUBMISSION 06-MAR-92
--	-------------------------------------

\* Not-for-Profit Organization

Fri Mar 6 10:17

RES240-RPA

ENVIRONMENTAL RESEARCH INSTITUTE OF MICHIGAN  
 RESOURCE PLANNING SYSTEM II - CONTRACT PRICING PROPOSAL  
 SINGLE PROPOSAL TASK COST PLAN

Project : 616371 STATE OF THE ART REPORTS  
 Task : 616371 (v. 1) STATE OF THE ART REPORTS

(Salary Year (SY) begins on July of previous year)

Fiscal Year 1992	Period	Hours	Rate	Est. Cost	Total
1. Direct Material					
Total					0.00
2. Material Overhead					
Rate	(\$	0.00)	0.000	0.00	
Total					0.00
3. Direct Labor					
RES ENG/SCI IV	SY92	1101.0	54.830	60,367.83	
RES ENG/SCI IV	SY93	1103.0	57.023	62,896.57	
TECH. TYPIST	SY92	161.0	18.730	3,015.53	
TECH. TYPIST	SY93	159.0	19.479	3,097.17	
Total					129,377.10
4. Labor Overhead					
Rate	(\$	129,377.10)	88.400	114,369.33	
Total					114,369.33
5. Special Testing					
Total					0.00
6. Special Equipment					
Total					0.00
7. Travel Cost					
Total					0.00
8. Consultant Cost					
Total					0.00
9. Sub-Contractor Cost					
Total					0.00
10. Other Direct					
Total					0.00
11. Total Direct and Overhead					
Total					243,746.43
12. General and Administrative					
Rate	(\$	243,746.43)	11.700	28,518.31	
Total					28,518.31
13. Royalties					
Total					0.00
14. Total Estimated Cost (less Cost of Money)					
Total					272,264.74
15. Cost of Money					
Rate	(\$	129,377.10)	10.440	13,507.20	
Total					13,507.20
16. Total Estimated Cost					
Total					285,771.94
17. Management Fee					
Total					14,239.42
18. Total Estimated Amount					
Total					300,011.36

BIDDING

FACILITIES CAPITAL  
COST OF MONEY FACTORS COMPUTATION

CONTRACTOR: ENVIRONMENTAL RESEARCH INSTITUTE OF MICH.  
BUSINESS UNIT: Corporate

ADDRESS: 1975 Green Rd.  
Ann Arbor, MI 48107

COST ACCOUNTING PERIOD:	1. APPLICABLE COST OF MONEY RATE	2. ACCUMULATION & DIRECT DISTRIBUTION OF N.B.V.	3. ALLOCATION OF UNDISTRIBUTED	4. TOTAL NET BOOK VALUE	5. COST OF MONEY FOR THE COST ACCOUNTING PERIOD	6. ALLOCATION BASE FOR THE PERIOD	7. FACILITIES CAPITAL COST OF MONEY FACTORS
	%						
RECORDED	6.875%		BASIS OF ALLOCATION	COLUMNS 2 + 3	COLUMNS 1X4	IN UNIT(S) OF MEASURE	COLUMNS 5 + 6
LEASED PROPERTY							
CORPORATE OR GROUP		49,196					
TOTAL		49,196		49,196	3,382	32,396	.104402
UNDISTRIBUTED							
DISTRIBUTED							
OVERHEAD POOLS							
G&A EXPENSE POOLS							
TOTAL		49,196		49,196	3,382	32,396	.104402

\*In thousands of dollars.

**CONTRACTOR FACILITIES CAPITAL COST OF MONEY - DD1861**

1. CONTRACTOR NAME: Environmental Research Institute of Michigan  
 2. CONTRACTOR ADDRESS: P.O. Box 134001  
 Ann Arbor, MI 48113-4001  
 3. BUSINESS UNIT:  
 4. RFP/CONTRACT PIN NO: DLA900-88-D-0392  
 5. PERFORMANCE PERIOD: APR 92 THRU SEP 92

**6. DISTRIBUTION OF FACILITIES CAPITAL COST OF MONEY**

POOL	ALLOCATION BASE	FACILITIES CAPITAL COST OF MONEY	
		FACTOR	AMOUNT
Engineering Labor	\$129,377	0.104402	\$13,507

TOTAL	\$13,507
TREASURY RATE	8.3750%
FACILITIES CAPITAL EMPLOYED (TOTAL DIVIDED BY TREASURY RATE)	\$161,280

**7. DISTRIBUTION OF FACILITIES CAPITAL EMPLOYED**

	PERCENTAGE	AMOUNT
LAND	4.66%	\$7,516
BUILDINGS	34.62%	\$55,835
EQUIPMENT	60.72%	\$97,929
FACILITIES CAPITAL EMPLOYED	100%	\$161,280

**WEIGHTED GUIDELINES - DD FORM 1547 EQUIVALENT**

PROPOSAL NUMBER: ERIM-616371  
RFP NUMBER: DLA900-88-D-0392  
DATE (YY - MM): 92-03  
CONTRACTING OFFICE: DTIC-AI  
NAME OF CONTRACTOR: Environmental Research Institute of Michigan  
DUNS NUMBER: 06-918-4468  
CONTRACT TYPE: (U) CPFF  
REPORT TYPE: (2) Research and Development  
USE CODE: (5) Modified Weighted Guidelines Method for Nonprofit Organization

COST CATEGORY	OBJECTIVE
Material	
Subcontracts	
Direct Labor	\$129,377
Indirect Expenses	\$114,369
Other Direct Charges	\$0
Subtotal Costs	\$243,746
General & Administrative	\$28,518
Total Costs	\$272,265

CONTRACTOR RISK FACTORS	ASSIGNED WEIGHTING	ASSIGNED VALUE (%)	SUBTOTAL COSTS	PROFIT OBJECTIVE
Technical	40%	4		
Management	35%	4		
Cost Control	25%	4		
Performance Risk -1% for Non-Profit			3	\$243,746
Contract Type Risk			-0.5	\$243,746

CONTRACTOR FACILITIES CAPTIAL EMPLOYED	ASSIGNED VALUE (%)	AMOUNT EMPLOYED	PROFIT OBJECTIVE
Land		\$7,516	\$0
Buildings	15	\$55,835	\$8,375
Equipment	35	\$97,929	\$34,275
<b>TOTAL PROFIT OBJECTIVE</b>			<b>\$48,744</b>

TOTAL PROPOSED COSTS	\$272,265
PROPOSED FACILITIES CAPITAL COM	\$13,507
TOTAL POSSIBLE PROFIT	\$48,744
TOTAL POSSIBLE PRICE	\$334,516

MARKUP RATE (%) 22.86%