

NAS-18925



National Aeronautics and
Space Administration

Langley Research Center
Hampton, Virginia 23665-5225

SOLICITATION

IFB/RFP NO.

1-109-9240.0631

REQUIREMENT: RESEARCH IN ANTENNA AND MICROWAVE TECHNOLOGY

It is NASA policy to obtain maximum practicable competition consistent with the nature of each procurement. However, to prevent unnecessary expense associated with preparation and submission of a proposal, only firms with demonstrated experience and background in the following areas are encouraged to respond to this request:

- A. EM backscatter in RF anechoic and compact ranges.
- B. Large scale antenna mesh or faceted reflector optimization; feed technology including adaptive feed compensation; and integrated controls, dynamics, and electromagnetic space system engineering experiment studies and design.
- C. Reentry RF attenuation assessment and plasma diagnostics sensor development for the Aerospace Flight Experiment orbital transfer vehicle.
- D. Radar signature and detection technology for aircraft wind shear avoidance.
- E. MIC technology and applications.

PREPROPOSAL CONFERENCE

A preproposal conference will be held at NASA Langley Research Center on October 3, 1988.

See Section L, Article L-11., for additional information.

SOLICITATION, OFFER AND AWARD		1. THIS CONTRACT IS A RATE D O R D E R UNDER DPAS (15 CFR 350)		RATING D0-A7	PAGE OF 1 78 PAGES
2. CONTRACT NO.	3. SOLICITATION NO. 1-109-9240.0631	4. TYPE OF SOLICITATION <input type="checkbox"/> SEALED BID (IFB) <input checked="" type="checkbox"/> NEGOTIATED (RFP)		5. DATE ISSUED 9/19/88	6. REQUISITION/PURCHASE NO.
7. ISSUED BY National Aeronautics and Space Administration Langley Research Center Hampton, VA 23665-5225		8. ADDRESS OFFER TO (If other than Item 7) NASA, Langley Research Center Building 1195A, Room 103 Hampton, VA 23665-5225			

NOTE: In sealed bid solicitations "offer" and "offeror" mean "bid" and "bidder".

SOLICITATION

9. Sealed offers in original and eleven (11) copies for furnishing the supplies or services in the Schedule will be received at the place specified in Item 8, or if handcarried, in the depository located in Building 1195A, Room 103 until 4:00PM local time 11/3/88
(Hour) (Date)

CAUTION - LATE Submissions, Modifications, and Withdrawals See Section L, Provision No. 52.214-7 or 52.215-10. All offers are subject to all terms and conditions contained in this solicitation.

10. FOR INFORMATION CALL:	A. NAME SEE SECTION L	B. TELEPHONE NO. (Include area code) (NO COLLECT CALLS)
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11. TABLE OF CONTENTS

(V)	SEC.	DESCRIPTION	PAGE(S)	(V)	SEC.	DESCRIPTION	PAGE(S)
PART I - THE SCHEDULE				PART II - CONTRACT CLAUSES			
<input checked="" type="checkbox"/>	A	SOLICITATION/CONTRACT FORM	1	<input checked="" type="checkbox"/>	I	CONTRACT CLAUSES	11
<input checked="" type="checkbox"/>	B	SUPPLIES OR SERVICES AND PRICES/COSTS	2	PART III - LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACH.			
<input checked="" type="checkbox"/>	C	DESCRIPTION/SPECS./WORK STATEMENT	3	<input checked="" type="checkbox"/>	J	LIST OF ATTACHMENTS	19
<input checked="" type="checkbox"/>	D	PACKAGING AND MARKING	4	PART IV - REPRESENTATIONS AND INSTRUCTIONS			
<input checked="" type="checkbox"/>	E	INSPECTION AND ACCEPTANCE	4	<input checked="" type="checkbox"/>	K	REPRESENTATIONS, CERTIFICATIONS AND OTHER STATEMENTS OF OFFERORS	48
<input checked="" type="checkbox"/>	F	DELIVERIES OR PERFORMANCE	4				
<input checked="" type="checkbox"/>	G	CONTRACT ADMINISTRATION DATA	5	<input checked="" type="checkbox"/>	L	INSTRS., CONDS., AND NOTICES TO OFFERORS	57
<input checked="" type="checkbox"/>	H	SPECIAL CONTRACT REQUIREMENTS	8	<input checked="" type="checkbox"/>	M	EVALUATION FACTORS FOR AWARD	74

OFFER (Must be fully completed by offeror)

NOTE: Item 12 does not apply if the solicitation includes the provisions at 52.214-16, Minimum Bid Acceptance Period.

12. In compliance with the above, the undersigned agrees, if this offer is accepted within _____ calendar days (60 calendar days unless a different period is inserted by the offeror) from the date for receipt of offers specified above, to furnish any or all items upon which prices are offered at the price set opposite each item, delivered at the designated point(s), within the time specified in the schedule. (See SECTION K for Negotiated RFP)

13. DISCOUNT FOR PROMPT PAYMENT (See Section I, Clause No. 52.232-8)	10 CALENDAR DAYS	20 CALENDAR DAYS	30 CALENDAR DAYS	CALENDAR DAYS
	%	%	%	%
14. ACKNOWLEDGMENT OF AMENDMENTS (The offeror acknowledges receipt of amendments to the SOLICITATION for offerors and related documents numbered and dated)	AMENDMENT NO.	DATE	AMENDMENT NO.	DATE

15A. NAME AND ADDRESS OF OFFEROR	CODE	FACILITY	16. NAME AND TITLE OF PERSON AUTHORIZED TO SIGN OFFER (Type or print)
15B. TELEPHONE NO. (Include area code)	15C. CHECK IF REMITTANCE ADDRESS IS DIFFERENT FROM ABOVE. ENTER SUCH ADDRESS IN SCHEDULE		17. SIGNATURE
AWARD (To be completed by Government)			18. OFFER DATE

19. ACCEPTED AS TO ITEMS NUMBERED	20. AMOUNT	21. ACCOUNTING AND APPROPRIATION	
22. AUTHORITY FOR USING OTHER THAN FULL AND OPEN COMPETITION <input type="checkbox"/> 10 U.S.C. 2304(c) <input type="checkbox"/> 41 U.S.C. 253(c)		23. SUBMIT INVOICES TO ADDRESS SHOWN IN ITEM 25 (4 copies unless otherwise specified)	
24. ADMINISTERED BY (If other than Item 7) CODE		25. PAYMENT WILL BE MADE BY CODE	
26. NAME OF CONTRACTING OFFICER (Type or print) Criticality Designator C		27. UNITED STATES OF AMERICA <i>(Signature of Contracting Officer)</i>	
		28. AWARD DATE	

IMPORTANT - Award will be made on this Form, or on Standard Form 26, or by other authorized official written notice

INDEX OF ARTICLES

SECTION B

- ARTICLE B-1. SCOPE OF WORK
- ARTICLE B-2. LEVEL OF EFFORT AND EQUITABLE ADJUSTMENT
- ARTICLE B-3. REPORTS AND DOCUMENTATION
- ARTICLE B-4. 18-52.216-7005 ESTIMATED COST AND FIXED FEE (APR 1984)

SECTION C

- ARTICLE C-1. STATEMENT OF WORK - RESEARCH IN ANTENNA AND MICROWAVE TECHNOLOGY

SECTION D

- ARTICLE D-1. PACKAGING AND MARKING

SECTION E

- ARTICLE E-1. FINAL INSPECTION AND ACCEPTANCE

SECTION F

- ARTICLE F-1. PERIOD OF PERFORMANCE
- ARTICLE F-2. PLACES OF PERFORMANCE
- ARTICLE F-3. TIME OF DELIVERY
- ARTICLE F-4. PLACE OF DELIVERY
- ARTICLE F-5. ORAL REVIEWS
- ARTICLE F-6. REPORTS AND DOCUMENTATION DELIVERY

SECTION G

- ARTICLE G-1. TASK ASSIGNMENTS
- ARTICLE G-2. PAYMENTS
- ARTICLE G-3. SUBMISSION OF INVOICES
- ARTICLE G-4. PAYMENT ADDRESS
- ARTICLE G-5. 18-52.227-72 DESIGNATION OF NEW TECHNOLOGY REPRESENTATIVE AND PATENT REPRESENTATIVE (APR 1984) NASA/FAR SUPPLEMENT

INDEX OF ARTICLES

ARTICLE G-6. CONTRACT CLOSEOUT

SECTION H

ARTICLE H-1. SUBCONTRACTING PLAN

ARTICLE H-2. CONTRACT FUNDING

ARTICLE H-3. IDENTIFICATION OF INSTALLATION-PROVIDED GOVERNMENT PROPERTY

ARTICLE H-4. SOFTWARE COMPATIBILITY REQUIREMENTS

ARTICLE H-5. GOVERNMENT-FURNISHED COMPUTER TIME

ARTICLE H-6. EMPLOYEE'S SECURITY CLEARANCE

ARTICLE H-7. CONTRACT SECURITY CLASSIFICATION SPECIFICATION

ARTICLE H-8. WORK SCHEDULE

ARTICLE H-9. OBSERVATION OF REGULATIONS AND IDENTIFICATION OF CONTRACTOR'S EMPLOYEES

ARTICLE H-10. INSURANCE

ARTICLE H-11. ADVANCE APPROVAL FOR RELEASE OF TECHNICAL DATA

ARTICLE H-12. 52.227-23 RIGHTS TO PROPOSAL DATA (TECHNICAL) (JUN 1987)

ARTICLE H-13. KEY PERSONNEL AND FACILITIES

ARTICLE H-14. SECURITY PROGRAM/FOREIGN NATIONAL EMPLOYEE INVESTIGATIVE REQUIREMENTS

SECTION I

ARTICLE I-1. 52.252-2 CLAUSES INCORPORATED BY REFERENCE (APR 1984)

ARTICLE I-2. CLAUSES IN FULL TEXT

INDEX OF ARTICLES

SECTION K

- ARTICLE K-1. 52.203-4 CONTINGENT FEE REPRESENTATION AND AGREEMENT (APR 1984)
- ARTICLE K-2. 52.215-6 TYPE OF BUSINESS ORGANIZATION (JUL 1987)
- ARTICLE K-3. 52.215-11 AUTHORIZED NEGOTIATORS (APR 1984)
- ARTICLE K-4. 52.215-19 PERIOD FOR ACCEPTANCE OF OFFER (APR 1984)
- ARTICLE K-5. 52.215-20 PLACE OF PERFORMANCE (APR 1984)
- ARTICLE K-6. 52.219-1 SMALL BUSINESS CONCERN REPRESENTATION (MAY 1986)
- ARTICLE K-7. 52.219-2 SMALL DISADVANTAGED BUSINESS CONCERN REPRESENTATION (APR 1984)
- ARTICLE K-8. 52.219-3 WOMEN-OWNED SMALL BUSINESS REPRESENTATION (APR 1984)
- ARTICLE K-9. 52.220-1 PREFERENCE FOR LABOR SURPLUS AREA CONCERNS (APR 1984)
- ARTICLE K-10. 52.222-19 WALSH-HEALY PUBLIC CONTRACTS ACT REPRESENTATION (APR 1984)
- ARTICLE K-11. 52.222-21 CERTIFICATION OF NONSEGREGATED FACILITIES (APR 1984)
- ARTICLE K-12. 52.222-22 PREVIOUS CONTRACTS AND COMPLIANCE REPORTS (APR 1984)
- ARTICLE K-13. 52.222-25 AFFIRMATIVE ACTION COMPLIANCE (APR 1984)
- ARTICLE K-14. 52.223-1 CLEAN AIR AND WATER CERTIFICATION (APR 1984)
- ARTICLE K-15. 52.225-1 BUY AMERICAN CERTIFICATE (APR 1984)
- ARTICLE K-16. 52.227-15 REPRESENTATION OF LIMITED RIGHTS DATA AND RESTRICTED COMPUTER SOFTWARE (JUN 1987)
- ARTICLE K-17. 52.228-6 INSURANCE - IMMUNITY FROM TORT LIABILITY (APR 1984)
- ARTICLE K-18. 52.230-1 COST ACCOUNTING STANDARDS NOTICES AND CERTIFICATION (NATIONAL DEFENSE) (SEP 1987)
- ARTICLE K-19. 18-52.203-70 CONTRACTS BETWEEN NASA AND FORMER NASA EMPLOYEES (APR 1984) (NASA/FAR SUPPLEMENT)
- ARTICLE K-20. GOVERNMENT PROPERTY

INDEX OF ARTICLES

SECTION I

- ARTICLE I-1. 52.215-5 SOLICITATION DEFINITIONS (JUL 1987)
- ARTICLE I-2. 52.216-1 TYPE OF CONTRACT (APR 1984)
- ARTICLE I-3. SMALL BUSINESS SIZE STANDARD
- ARTICLE I-4. STANDARD INDUSTRIAL CLASSIFICATION (SIC) CODE
- ARTICLE I-5. TRADE AGREEMENTS ACT OF 1979
- ARTICLE I-6. NASA'S POLICY ON FACILITIES CAPITAL COST OF MONEY
- ARTICLE I-7. REQUIREMENT FOR SPECIAL TECHNICAL CAPABILITIES
- ARTICLE I-8. SUBMISSION OF SMALL BUSINESS AND SMALL DISADVANTAGED BUSINESS
SUBCONTRACTING PLAN
- ARTICLE I-9. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS
- ARTICLE I-10. PROPOSAL PREPARATION - SPECIAL INSTRUCTIONS
- ARTICLE I-11. PREPROPOSAL CONFERENCE
- ARTICLE I-12. REJECTION, NEGOTIATION, AWARD AND EXPENDITURE OF FUNDS
- ARTICLE I-13. EXPENSES RELATED TO OFFEROR SUBMISSIONS
- ARTICLE I-14. 52.233-2 SERVICE OF PROTEST (JAN 1985)
- ARTICLE I-15. SECURITY INFORMATION
- ARTICLE I-16. 52.212-7 NOTICE OF PRIORITY RATING FOR NATIONAL DEFENSE USE
(MAY 1986)
- ARTICLE I-17. 52.215-8 ACKNOWLEDGMENT OF AMENDMENTS TO SOLICITATIONS
(APR 1984)
- ARTICLE I-18. 52.215-9 SUBMISSION OF OFFERS (APR 1984)
- ARTICLE I-19. 52.215-10 LATE SUBMISSIONS, MODIFICATIONS, AND WITHDRAWALS OF
PROPOSALS (APR 1984)
- ARTICLE I-20. 52.215-13 PREPARATION OF OFFERS (APR 1984)

INDEX OF ARTICLES

- ARTICLE L-21. 52.215-14 EXPLANATION TO PROSPECTIVE OFFERORS (APR 1984)
- ARTICLE L-22. 52.215-15 FAILURE TO SUBMIT OFFER (APR 1984)
- ARTICLE L-23. 52.215-16 CONTRACT AWARD (APR 1985)
- ARTICLE L-24. 18-52.215-70 INCREASES IN ESTIMATED COSTS (OCT 1984) NASA/FAR SUPPLEMENT
- ARTICLE L-25. 18-52.215-72 RESTRICTION ON USE AND DISCLOSURE OF PROPOSAL/ QUOTATION INFORMATION (DATA) (DEC 1984) NASA/FAR SUPPLEMENT
- ARTICLE L-26. 52.222-24 PREAWARD ON-SITE EQUAL OPPORTUNITY COMPLIANCE REVIEW (APR 1984)
- ARTICLE L-27. 52.227-6 ROYALTY INFORMATION (APR 1984)
- ARTICLE L-28. 18-52.227-71 REQUESTS FOR WAIVER OF RIGHTS TO INVENTIONS (APR 1984) NASA/FAR SUPPLEMENT
- ARTICLE L-29. 18-52.227-84 PATENT RIGHTS CLAUSES (APR 1986) NASA/FAR SUPPLEMENT
- ARTICLE L-30. INSTRUCTIONS REGARDING THE REPRESENTATION OF LIMITED-RIGHTS DATA AND RESTRICTED COMPUTER SOFTWARE
- ARTICLE L-31. 18-52.235-72 PLAN FOR NEW TECHNOLOGY REPORTING (DEC 1984) NASA/FAR SUPPLEMENT
- ARTICLE L-32. 52.252-5 AUTHORIZED DEVIATIONS IN PROVISIONS (APR 1984)
- ARTICLE L-33. FALSE STATEMENTS
- ARTICLE L-34. COMMUNICATIONS REGARDING THIS SOLICITATION
- SECTION M
- ARTICLE M-1. METHOD OF EVALUATION
- ARTICLE M-2. EVALUATION FACTORS
- ARTICLE M-3. RELATIVE IMPORTANCE OF EVALUATION FACTORS
- ARTICLE M-4. SELECTION CONSIDERATIONS

SECTION B
SUPPLIES OR SERVICES AND PRICES/COST

ARTICLE B-1. SCOPE OF WORK

In response to Government authorized task assignments, the Contractor shall provide direct productive labor hours not to exceed the total amount as specified in Article B-2., paragraph A. The type of research and development to be conducted is described in Section C, Description/Specifications/Work Statement. In the performance of this effort, the Contractor shall, except as otherwise specified herein, furnish all personnel, facilities, services, equipment, and materials necessary for the completion of the task assignments.

ARTICLE B-2. LEVEL OF EFFORT AND EQUITABLE ADJUSTMENT

A. In performing Government assigned tasks under this contract, the Contractor is obligated to provide up to 182,000 direct productive labor hours, to include subcontractor and consultant hours, as defined in paragraph C. below.

B. Government authorized tasks will be issued requiring a cumulative minimum of 36,400 direct productive labor hours.

C. Direct productive labor hours are defined as those hours expended by Contractor and subcontractor "technical personnel" and consultants in conducting the research and development effort. This does not include administrative and support personnel such as, financial, clerical, procurement, etc.; or any labor allocated as indirect. Further, direct productive labor hours shall mean hours actually worked, excluding all leave (vacation, holidays, sick, etc.) or other compensation.

D. Each task assignment shall specify a total cost and a direct labor hour limitation, neither of which shall be exceeded without the prior written consent of the Contracting Officer. Only expenditures against specific written task assignments authorized by the Contracting Officer and within the man-hour and cost limitations set forth therein shall be allocable or allowable under this contract. Notwithstanding such authorizations, in no event shall the Contractor exceed the total contract cost limitation imposed by the Section I clause entitled "Limitation of Funds."

E. Upon completion of this contract, in the event the cumulative total hours of direct labor expended is less than ninety percent (90%) of the totals specified in paragraph A. above, the Contracting Officer may equitably adjust the fixed fee downward. If the Contracting Officer elects to equitably adjust the fixed fee, the Contractor shall submit a fee adjustment proposal within sixty (60) days after receipt of such request from the Contracting Officer. Failure of the parties to agree to an adjustment shall be a dispute concerning question of fact within the meaning of the Section I clause entitled "Disputes - Alternate I."

ARTICLE B-3. REPORTS AND DOCUMENTATION

The Contractor shall provide to the Government all reports and items of documentation as required by Section I Contract Clauses, task assignments, as may be issued under the contract and Exhibit A, Contract Documentation Requirements.

ARTICLE B-4. 18-52.216-7005 ESTIMATED COST AND FIXED FEE (APR 1984)

The estimated cost of this contract is \$ _____ exclusive of the fixed fee of \$ _____. The total of estimated cost and fixed fee is \$ _____.

SECTION C
DESCRIPTION/SPECIFICATIONS/WORK STATEMENT

ARTICLE C-1. STATEMENT OF WORK - RESEARCH IN ANTENNA AND MICROWAVE TECHNOLOGYI. INTRODUCTION

The demand for technology development for microwave and higher frequencies by NASA has increased markedly. The development of communication links and high resolution remote-sensing earth observation radars and radiometers have led the development of this technology. Use of microwave and millimeter wave frequency carriers in communications systems allows higher information bandwidths and higher directivity for antennas than the previous conventional communications frequencies. The microwave frequency wavelength regime has been demonstrated to be sensitive to many earth geophysical parameters such as surface wind vector, atmospheric water vapor, ocean salinity, soil moisture, and others. These demonstrated capabilities at microwave and higher frequencies have led to more sophisticated concepts for utilization, which in turn have required development of advanced implementation technology in antenna and feed design, signal processing, and experimental sensing systems.

II. OBJECTIVE

To conduct research design, development, and measurement tasks in microwave and millimeter wave and antenna technology to:

- A. develop control, structures and electromagnetic interdisciplinary approaches to Large Space Antenna Systems and performance technology
- B. develop experimental antenna feeds and systems to demonstrate the performance of antenna systems in space
- C. develop advanced sensors suitable for applications such as reentry plasma diagnostics
- D. study advanced signal processing techniques for applications such as detection of wind shear with Doppler radars
- E. develop technology for computer-aided design methods for microwave integrated circuit (MIC) systems
- F. study advanced communications antennas and backscatter

III. CONTRACTOR'S TASKS

To accomplish the effort required by this contract, the Contractor shall perform specific tasks defined through the issuance of Task Assignments. Assignments will generally consist of a specific design trade-off study or a system development exploring some utilization of microwaves, millimeter waves, and antennas, or upgrading the state of technology developed at Langley Research Center. Examples of potential specific tasks are given at the end of this paragraph. The assignments will generally conclude with an oral and written report to be provided at periodic reviews. Contractors assigned to tasks will be expected to interact on a daily basis at LaRC and be present at biweekly LaRC staff meetings at the Antenna and Microwave Research Branch.

Examples of tasks areas anticipated are:

- A. Large Space Antenna (LSA) Systems Technology
- B. Design and Development of Advanced Multiple Beam Antennas
- C. Development of Reentry Plasma Diagnostics for the Aero-assist Flight Experiment
- D. Study of Windshear Detection Using Doppler Radars
- E. Technology Development of Computer-Aided Design Methods for Microwave Integrated Circuit (MIC) Systems
- F. Measurement of Electromagnetic Backscatter in LaRC RF Anechoic and Compact Ranges

SECTION D
PACKAGING AND MARKING

ARTICLE D-1. PACKAGING AND MARKING

All reports and other documentation required to be delivered under this contract shall be packaged/packed for mailing/shipment in such a manner as to insure safe arrival at destination. Marking of reports and other documentation shall be as set forth in Exhibit A, Contract Documentation Requirements.

SECTION E
INSPECTION AND ACCEPTANCE

ARTICLE E-1. FINAL INSPECTION AND ACCEPTANCE

Final inspection and acceptance of all items specified for delivery under this contract shall be accomplished by the Contracting Officer or his duly authorized representative at destination.

SECTION F
DELIVERIES OR PERFORMANCE

ARTICLE F-1. PERIOD OF PERFORMANCE

A. The period for issuance of task assignments is sixty (60) months from the effective date of this contract.

B. Any task assignments issued shall be completed subject to the limitations specified in the Section B article entitled "Level of Effort and Equitable Adjustment," provided that the Contractor will not be required to perform any work beyond twelve (12) months after the period for issuance of task assignments.

ARTICLE F-2. PLACES OF PERFORMANCE

The places of performance shall be at Langley Research Center, Hampton, Virginia, the Contractor's facility located in , and such other sites as may be specified in the task assignments.

ARTICLE F-3. TIME OF DELIVERY

The items called for under this contract shall be delivered in accordance with the schedule specified in the task assignments.

ARTICLE F-4. PLACE OF DELIVERY

Delivery shall be F.O.B. Langley Research Center.

ARTICLE F-5. ORAL REVIEWS

On a bi-weekly basis, on a date to be mutually selected by the Contracting Officer and the Contractor, the Contractor shall participate in an informal oral review at the Langley Research Center to present the work accomplished under the assigned tasks, and shall include a brief summary of reportable items under the Section I clause entitled "New Technology" or "Patent Rights - Retention by the Contractor (Short Form)", whichever is included.

ARTICLE F-6. REPORTS AND DOCUMENTATION DELIVERY

The reports and documentation required by Exhibit A, Contract Documentation Requirements, shall be delivered at the times and to the places specified therein.

SECTION G
CONTRACT ADMINISTRATION DATA

ARTICLE G-1. TASK ASSIGNMENTS

A. The work to be performed within the areas outlined in Section C, Description/Specifications/Work Statement, will be more specifically defined and controlled by means of written task assignments, issued solely by the Contracting Officer, containing (as applicable) the following information:

1. Task assignment number and date
2. Description of work and/or deliverable items
3. Direct labor-hour limitation and total cost limitation
4. Required completion date and/or delivery schedule

- 5. Government-furnished items
- 6. Appropriate special instructions or information

B. Two (2) copies of each task assignment shall be furnished to the Contractor, one (1) of which will be signed by the Contractor to acknowledge receipt, and returned to the Contracting Officer.

ARTICLE G-2. PAYMENTS

Payments of cost and fixed fee shall be made in monthly installments. No installment of fixed fee shall exceed the proportion of the total fixed fee determined by dividing the total direct labor hours (Article B-2., Level of Effort and Equitable Adjustment, paragraph A.) into the number of direct labor hours expended during the period. Notwithstanding, payments shall be subject to the withholding provision of the clause of this contract entitled "Fixed Fee."

ARTICLE G-3. SUBMISSION OF INVOICES

Invoices shall be addressed as shown in Block 12. on page 1 of this contract, and shall be identified by this contract number. Cost and fee invoices shall be submitted separately. Cost invoices, with the two (2) copies of the NASA Form 533 designated to be delivered to "Cost Accounting" in Exhibit A, Contract Documentation Requirements, shall be submitted through the cognizant Government Audit Agency with a copy to the Administrative Contracting Officer. Fixed fee invoices shall be submitted through the cognizant delegated Government Administrative Contracting Officer with a copy to the cognizant Government Audit Agency.

ARTICLE G-4. PAYMENT ADDRESS

Address to which payment should be addressed if different from Item 15A on Standard Form 33 or Item 7 on Standard Form 26:

ARTICLE G-5. 18-52.227-72 DESIGNATION OF NEW TECHNOLOGY REPRESENTATIVE AND PATENT REPRESENTATIVE (APR 1984) NASA/FAR SUPPLEMENT

(a) For purposes of administration of the clause of this contract entitled "New Technology" or "Patent Rights - Retention by the Contractor (Short Form)", whichever is included, the following named representatives are hereby designated by the Contracting Officer to administer such clause:

<u>Title</u>	<u>Office Code</u>	<u>Address (including zip code)</u>
New Technology Representative	139A	NASA, Langley Research Center Hampton, VA 23665-5225
Patent Representative	279	NASA, Langley Research Center Hampton, VA 23665-5225

(b) Reports of reportable items, and disclosure of subject inventions, interim reports, final reports, utilization reports, and other reports required by the clause, as well as any correspondence with respect to such matters, should be directed to the New Technology Representative unless transmitted in response to correspondence or request from the Patent Representative. Inquiries or requests regarding disposition of rights, election of rights, or related matters should be directed to the Patent Representative. This clause shall be included in any subcontract hereunder requiring a "New Technology" clause or "Patent Rights - Retention by the Contractor (Short Form)" clause, unless otherwise authorized or directed by the Contracting Officer. The respective responsibilities and authorities of the above-named representatives are set forth in 18-27.375-3 of the NASA FAR Supplement.

ARTICLE G-6. CONTRACT CLOSEOUT

A. Reassignment--After receipt, inspection, and acceptance by the Government of all required articles and/or services, and resolution of any pending issues raised during the Period of Performance, this contract will be reassigned to the NASA Langley Research Center Contracting Officer for Contract Closeout. All transactions subsequent to the physical completion of the contract should, therefore, be addressed to the said Contracting Officer at NASA Langley Research Center, Mail Stop 126, who may be reached by telephone at (804) 865-2580.

B. "Quick Closeout"--Paragraph (f) of the Allowable Cost and Payment clause of this contract addresses the "Quick Closeout Procedure" delineated by Subpart 42.7 of the Federal Acquisition Regulation (FAR). It should be understood that the said procedure applies to the settlement of indirect costs for a specific contract in advance of the determination of final indirect cost rates when the amount of unsettled indirect cost to be allocated to the contract is relatively insignificant. Therefore, the "Quick Closeout" procedure does not preclude the provisions of paragraph (d) of the Allowable Cost and Payment clause nor does it constitute a waiver of final audit of the Contractor's Completion Voucher.

C. Completion Voucher Submittal--Notwithstanding the provisions of the Allowable Cost and Payment clause, as soon as practicable after settlement of the Contractor's indirect cost rates applicable to performance of the contract, the Contractor shall submit a Completion Voucher as required by the aforesaid clause. The Completion Voucher shall be supported by a cumulative claim and reconciliation statement and executed NASA Forms 778, Contractor's Release, and 780, Contractor's Assignment of Refunds, Rebates, Credits, and Other Amounts. Unless directed otherwise by the Contracting Officer for Contract Closeout, the Contractor shall forward the said Completion Voucher directly to the cognizant Government Agency to which audit functions under the contract have been delegated.

D. Cost Concerns--The Contractor is cautioned to pay particular attention during the period of performance of this contract to the requirements of paragraphs (b), (c), (d)(1), and (e) of the Limitation of Cost clause, or, if this is an incrementally funded contract, paragraphs (c), (d), (f)(1), and (h) of the Limitation of Funds clause. Once the contract has been physically completed, the only potential source of Government funds for increasing the cost Limitation of an inactive NASA contract is derived from available (if any) unobligated prior year(s) Research and Development Appropriation(s) for the Program that authorized the obligation of funding - and limits thereto - under the contract. Moreover, the potential use of these resources is confined to making a final cost adjustment under a fully audited cost type contract when such adjustment is warranted as a result of final overhead rate determinations. Accordingly, after physical completion under this contract and during the closeout phase, modifications to increase the Estimated Cost or Limitation of Funds of the contract will not be considered in advance of receipt of the Contractor's audited Completion Voucher (reference paragraph C. above). Any claimed costs exceeding the limits set forth in this contract must be clearly and specifically identified in the Completion Voucher and fully supported by pertinent documentation such as final overhead rate determinations/agreements.

SECTION H
SPECIAL CONTRACT REQUIREMENTS

ARTICLE H-1. SUBCONTRACTING PLAN

The approved Contractor plan for subcontracting with small business and small disadvantaged business concerns is attached hereto as Exhibit B and is hereby made a part of this contract. The Contractor shall submit Standard Form 294, Subcontracting Report for Individual Contracts, and Standard Form 295, Summary Subcontract Report, in accordance with instructions provided on the back of the Forms. (This provision does not apply to small businesses.)

ARTICLE H-2. CONTRACT FUNDING

A. For purposes of payment of cost, exclusive of fee, pursuant to the Limitation of Funds clause, the total amount allotted by the Government to this contract is \$. The above allotment covers the following period of performance:

B. An additional amount of \$ is obligated under this contract for payment of fee.

C. The Contractor agrees that all future incremental funding shall be accomplished by Administrative Change Modification and that the funding procedure shall in no way change the Contractor's notification obligations as set forth in the Section I clause entitled "Limitation of Funds."

D. In addition to the requirements of the Section I clause entitled "Limitation of Funds," the Contractor shall notify the Contracting Officer in writing if at any time the Contractor has reason to believe that the total cost to the Government, exclusive of any fee, for the complete performance of this contract will be greater or substantially less than the then total estimated cost of the contract. Such notification shall give a revised estimate of the total cost for the performance of this contract.

ARTICLE H-3. IDENTIFICATION OF INSTALLATION-PROVIDED GOVERNMENT PROPERTY

Pursuant to the Section I clause entitled "Installation-Provided Government Property," the property identified below is provided for use on-site by the Contractor in performance of this contract.

office space, desks, chairs, telephone service, filing cabinets, bookcases, office supplies, and mail service

five (5) personal computers

access to laboratory, VAX 11/750 and Microvax computers, and the LaRC central computer

ARTICLE H-4. SOFTWARE COMPATIBILITY REQUIREMENTS

In performance of the effort to be accomplished off-site, the software products shall be compatible with the LaRC central computer system or a VAX 11/750, a Microvax, and IBM PC class computers.

ARTICLE H-5. GOVERNMENT-FURNISHED COMPUTER TIME

For the purpose of ascertaining computer program compatibility with Langley Research Center computers and for inspection and acceptance, the Government will provide the Contractor with computer time as deemed appropriate by the Contracting Officer. The exact date(s) and time(s) for Contractor use of the Langley Research Center computers shall be mutually agreed upon by the Contracting Officer and the Contractor.

ARTICLE H-6. EMPLOYEE'S SECURITY CLEARANCE

Certain Contractor employees, as identified by the Government, will be required to have a security clearance of SECRET issued by the Department of Defense (DoD) by virtue of their particular work assignment. Prior to the time that any Contractor employees report for work at LaRC to perform work on this contract, evidence of submittal of requests for clearance to DoD shall be presented in writing to the Contracting Officer. In the event that the SECRET clearance has not been received prior to the date the employee is to enter on duty, the Contractor shall issue a CONFIDENTIAL clearance in accordance with the Industrial Security Manual (ISM) for safeguarding Classified Information. This CONFIDENTIAL clearance will allow utilization of the employee in most contractual areas. Long term restriction of the employee's work area cannot be tolerated as it would impose restrictions on his full utilization. Because of this, it will be necessary that the Contractor remove any of his employees from the contract whose SECRET or INTERIM SECRET clearance has not been issued by DoD within 120 calendar days of the Entered-on-Duty date of the employee, unless retention of such employee is authorized by the Contracting Officer.

ARTICLE H-7. CONTRACT SECURITY CLASSIFICATION SPECIFICATION

The Contractor shall comply with the security requirements of the attached Contract Security Classification Specification, DD Form 254, as set forth in Exhibit C.

ARTICLE H-8. WORK SCHEDULE

In order that the necessary and proper inspection of the Contractor's work may be effectively accomplished, and to assure the availability of required Government interface, the Contractor shall schedule work performance hereunder so as to be compatible with the established workweek and hours of work observed by the Government organization having cognizance over the work being performed.

ARTICLE H-9. OBSERVATION OF REGULATIONS AND IDENTIFICATION OF CONTRACTOR'S EMPLOYEES

A. Observation of Regulations--In performance of that part of the contract work which may be performed at Langley Research Center or other Government installation, the Contractor shall require its employees to observe the rules and regulations as prescribed by the authorities at Langley Research Center or other installation.

B. Identification Badges--At all times while on LaRC property, the Contractor shall require its employees, subcontractors and agents to wear badges which will be issued by the NASA Contract Badge and Pass Office, located in Building No. 1228. Badges shall be issued only between the hours of 6:30 a.m. and 4:30 p.m., Monday through Friday. Contractors will be held accountable for these badges, and may be required to validate outstanding badges on an annual basis with the NASA LaRC Security Office. Immediately after employee termination or contract completion, badges shall be returned to the NASA Contract Badge and Pass Office.

ARTICLE H-10. INSURANCE

A. The Contractor shall maintain at least the following insurance coverage during the entire period of performance of this contract:

1. Workmen's compensation, as required by the laws of the State of Virginia, including employer's liability of not less than \$100,000 per incident.
2. Comprehensive general liability insurance, against bodily injury or death, with limits of not less than \$500,000 per occurrence.
3. Automobile liability insurance with minimum limits of \$200,000 per person and \$500,000 per occurrence for bodily injury liability and \$20,000 per occurrence for property damage liability. This insurance shall be in comprehensive policy form covering all owned, non-owned, hired, and Government-furnished motor vehicles which will be used in the contract operations.

B. The policies evidencing such insurance shall contain an endorsement to the effect that cancellation or material change in the policies adversely affecting the interests of the Government in such insurance for the period of the contract shall not be effective unless a 30-day written notice of cancellation or change is given the Contracting Officer.

ARTICLE H-11. ADVANCE APPROVAL FOR RELEASE OF TECHNICAL DATA

As provided by paragraph (d) of the Section I clause entitled "Rights in Data - General," the Contractor shall not release technical data first produced in the performance of this contract unless prior written approval is given by NASA. The Contractor shall submit technical data regarding the contract effort, such as journal articles, meeting papers and technical documents to the Technical Representative of the Contracting Officer for review and approval prior to publication, presentation, or release (see Exhibit A, Contract Documentation Requirements, paragraph I.E.).

ARTICLE H-12. 52.227-23 RIGHTS TO PROPOSAL DATA (TECHNICAL) (JUN 1987)

Except for data contained on pages , it is agreed that as a condition of award of this contract, and notwithstanding the conditions of any notice appearing thereon, the Government shall have unlimited rights (as defined in the "Rights in Data - General" clause contained in this contract) in and to the technical data contained in the proposal dated , upon which this contract is based.

ARTICLE H-13. KEY PERSONNEL AND FACILITIES

Pursuant to the Section I clause entitled "Key Personnel and Facilities," the following individuals are considered to be essential to the effort being performed under this contract:

ARTICLE H-14. SECURITY PROGRAM/FOREIGN NATIONAL EMPLOYEE INVESTIGATIVE REQUIREMENTS

An investigation by the Government shall be completed on each Contractor who is a Foreign National, prior to reporting to Langley Research Center (LaRC) to perform under a contract or grant. A properly executed "Name Check Request" (NF-531), shall be submitted to the LaRC Security Office, Mail Stop 182, for each Foreign National Contractor, at least forty-five (45) days prior to the estimated entry on duty date. The NF-531 may be obtained from the LaRC Security Office. If the Contracting Officer requires a Foreign National to work on LaRC prior to the completion of the investigation, a LaRC Security Officer-approved escort will be provided.

SECTION I
CONTRACT CLAUSES

ARTICLE I-1. 52.252-2 CLAUSES INCORPORATED BY REFERENCE (APR 1984)

This contract incorporates the following clauses by reference, with the same effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available.

I. FEDERAL ACQUISITION REGULATION (48 CFR CHAPTER 1) CLAUSES

<u>Clause Number</u>	<u>Title and Date</u>
52.202-1	Definitions (APR 1984)
52.203-1	Officials Not to Benefit (APR 1984)
52.203-3	Gratuities (APR 1984)
52.203-5	Covenant Against Contingent Fees (APR 1984)
52.203-7	Anti-Kickback Procedures (FEB 1987)
52.204-2	Security Requirements (APR 1984)
52.210-5	New Material (APR 1984)
52.212-8	Defense Priority and Allocation Requirements (MAY 1986)
52.212-13	Stop Work Order (APR 1984) - Alternate I (APR 1984)
52.215-1	Examination of Records by Comptroller General (APR 1984)
52.215-2	Audit - Negotiation (APR 1988)
52.215-22	Price Reduction for Defective Cost or Pricing Data (APR 1988)
52.215-24	Subcontractor Cost or Pricing Data (APR 1985)
52.215-30	Facilities Capital Cost of Money (SEP 1987)
52.215-31	Waiver of Facilities Capital Cost of Money (SEP 1987)
52.215-33	Order of Precedence (JAN 1986)
52.216-8	Fixed Fee (APR 1984)
52.219-8	Utilization of Small Business Concerns and Small Disadvantaged Business Concerns (JUN 1985)
52.219-9	Small Business and Small Disadvantaged Business Subcontracting Plan (APR 1984)
52.219-13	Utilization of Women-Owned Small Businesses (AUG 1986)
52.220-3	Utilization of Labor Surplus Area Concerns (APR 1984)
52.220-4	Labor Surplus Area Subcontracting Program (APR 1984)
52.222-1	Notice to the Government of Labor Disputes (APR 1984)
52.222-3	Convict Labor (APR 1984)
52.222-4	Contract Work Hours and Safety Standards Act - Overtime Compensation (MAR 1986)
52.222-26	Equal Opportunity (APR 1984)
52.222-28	Equal Opportunity Preaward Clearance of Subcontracts (APR 1984)
52.222-35	Affirmative Action for Special Disabled and Vietnam Era Veterans (APR 1984)
52.222-36	Affirmative Action for Handicapped Workers (APR 1984)
52.222-37	Employment Reports on Special Disabled Veterans and Veterans of the Vietnam Era (JAN 1988)
52.223-2	Clean Air and Water (APR 1984)
52.225-3	Buy American Act - Supplies (APR 1984)
52.227-1	Authorization and Consent (APR 1984) - Alternate I (APR 1984)
52.227-2	Notice and Assistance Regarding Patent and Copyright Infringement (APR 1984)
52.227-11	Patent Rights - Retention by the Contractor (Short Form) (APR 1984)--as modified by 18-52.227-11 NASA FAR Supplement (APR 1984)
52.227-14	Rights in Data - General (JUN 1987)--as modified by 18-52.227-14 NASA FAR Supplement (APR 1984)
52.227-14	Rights in Data - General (JUN 1987) - Alternate II (JUN 1987) and Alternate III (JUN 1987)--as modified by 18-52.227-14 NASA FAR Supplement (APR 1984)
52.227-16	Additional Data Requirements (JUN 1987)
52.228-7	Insurance - Liability to Third Persons (APR 1984)

52.230-3 Cost Accounting Standards (SEP 1987)
 52.230-4 Administration of Cost Accounting Standards (SEP 1987)
 52.230-5 Disclosure and Consistency of Cost Accounting Practices
 (SEP 1987)
 52.232-9 Limitation on Withholding of Payments (APR 1984)
 52.232-17 Interest (APR 1984)
 52.232-22 Limitation of Funds (APR 1984)
 52.232-23 Assignment of Claims (JAN 1986)
 52.232-25 Prompt Payment (FEB 1988) - Alternate II (FEB 1988)--as
 modified by 18-52.235-25 NASA FAR Supplement (APR 1984)
 52.233-1 Disputes (APR 1984) - Alternate I (APR 1984)
 52.233-3 Protest After Award (JUN 1985) - Alternate I (JUN 1985)
 52.242-1 Notice of Intent to Disallow Costs (APR 1984)
 52.242-2 Production Progress Reports (APR 1984)
 52.243-2 Changes - Cost-Reimbursement (AUG 1987) - Alternate V
 (APR 1984)
 52.244-2 Subcontracts (Cost-Reimbursement and Letter Contracts)
 (JUL 1985) - Alternate I (APR 1985)
 52.244-5 Competition in Subcontracting (APR 1984)
 52.245-5 Government Property (Cost-Reimbursement, Time-and-Material, or
 Labor-Hour Contracts) (JAN 1986)
 52.246-8 Inspection of Research and Development - Cost-Reimbursement
 (APR 1984)
 52.246-23 Limitation of Liability (APR 1984)
 52.249-6 Termination (Cost-Reimbursement) (MAY 1986)
 52.249-14 Excusable Delays (APR 1984)

II. NASA/FAR SUPPLEMENT (48 CFR CHAPTER 18) CLAUSES

<u>Clause Number</u>	<u>Title and Date</u>
18-52.204-70	Report on NASA Subcontracts (APR 1984)
18-52.204-71	NASA Contractor Financial Management Reporting (MAY 1987)
18-52.204-73	Observance of Legal Holidays (SEP 1987)
18-52.212-70	Notice of Delay (APR 1984)
18-52.223-70	Safety and Health (APR 1984)
18-52.227-70	New Technology (APR 1988)
18-52.227-73	Patent Rights Clause for Subcontracts (APR 1984)
18-52.227-86	Commercial Computer Software - Licensing (DEC 1987)
18-52.235-70	Scientific and Technical Information Service (SEP 1986)
18-52.244-70	Geographic Participation in the Aerospace Program (APR 1985)
18-52.245-70	Acquisition of Existing Government Equipment (APR 1988)
18-52.245-71	Installation-Provided Government Property (MAY 1987)
18-52.252-70	Compliance with NASA FAR Supplement (APR 1984)

ARTICLE I-2. CLAUSES IN FULL TEXT

I. FEDERAL ACQUISITION REGULATION (48 CFR CHAPTER 1) CLAUSES

52.215-26 INTEGRITY OF UNIT PRICES (APR 1987)

(a) Any proposal submitted for the negotiation of prices for items of supplies shall distribute costs within contracts on a basis that ensures that unit prices

are in proportion to the items' base cost (e.g., manufacturing or acquisition costs). Any method of distributing costs to line items that distorts unit prices shall not be used. For example, distributing costs equally among line items is not acceptable except when there is little or no variation in base cost. Nothing in this paragraph requires submission of cost or pricing data not otherwise required by law or regulation.

(b) The requirement in paragraph (a) of this clause does not apply to any Department of Defense (DoD) or National Aeronautics and Space Administration (NASA) contract or subcontract item of supply for which the unit price is, or is based on, an established catalog or market price for a commercial item sold in substantial quantities to the general public. A price is based on a catalog or market price only if the item being purchased is sufficiently similar to the catalog or market price commercial item to ensure that any difference in price can be identified and justified without resort to cost analysis.

(c) The Offeror/Contractor shall also identify those supplies which it will not manufacture or to which it will not contribute significant value when requested by the Contracting Officer. However, for DoD and NASA contracts, the information shall not be required for commercial items sold in substantial quantities to the general public when the price is, or is based on, established catalog or market prices.

(d) The Contractor shall insert the substance of this clause, less paragraph (c), in all subcontracts.

52.216-7

ALLOWABLE COST AND PAYMENT (APR 1984)

(a) Invoicing. The Government shall make payments to the Contractor when requested as work progresses, but (except for small business concerns) not more often than once every 2 weeks, in amounts determined to be allowable by the Contracting Officer in accordance with Subpart 31.2 of the Federal Acquisition Regulation (FAR) in effect on the date of this contract and the terms of this contract. The Contractor may submit to an authorized representative of the Contracting Officer, in such form and reasonable detail as the representative may require, an invoice or voucher supported by a statement of the claimed allowable cost for performing this contract.

(b) Reimbursing costs. (1) For the purpose of reimbursing allowable costs (except as provided in subparagraph (2) below, with respect to pension, deferred profit sharing, and employee stock ownership plan contributions), the term "costs" includes only -

(i) Those recorded costs that, at the time of the request for reimbursement, the Contractor has paid by cash, check, or other form of actual payment for items or services purchased directly for the contract;

(ii) When the Contractor is not delinquent in paying costs of contract performance in the ordinary course of business, costs incurred, but not necessarily paid, for -

(A) Materials issued from the Contractor's inventory and placed in the production process for use on the contract;

(B) Direct labor;

(C) Direct travel;

(D) Other direct in-house costs; and

(E) Properly allocable and allowable indirect costs, as shown in the records maintained by the Contractor for purposes of obtaining reimbursement under Government contracts; and

(iii) The amount of progress payments that have been paid to the Contractor's subcontractors under similar cost standards.

(2) Contractor contributions to any pension, profit-sharing, or employee stock ownership plan funds that are paid quarterly or more often may be included in indirect costs for payment purposes; provided, that the Contractor pays the contribution to the fund within 30 days after the close of the period covered. Payments made 30 days or more after the close of a period shall not be included until the Contractor actually makes the payment. Accrued costs for such contributions that are paid less often than quarterly shall be excluded from indirect costs for payment purposes until the Contractor actually makes the payment.

(3) Notwithstanding the audit and adjustment of invoices or vouchers under paragraph (g) below, allowable indirect costs under this contract shall be obtained by applying indirect cost rates established in accordance with paragraph (d) below.

(4) Any statements in specifications or other documents incorporated in this contract by reference designating performance of services or furnishing of materials at the Contractor's expense or at no cost to the Government shall be disregarded for purposes of cost-reimbursement under this clause.

(c) Small business concerns. A small business concern may be paid more often than every 2 weeks and may invoice and be paid for recorded costs for items or services purchased directly for the contract, even though the concern has not yet paid for those items or services.

(d) Final indirect cost rates. (1) Final annual indirect cost rates and the appropriate bases shall be established in accordance with Subpart 42.7 of the Federal Acquisition Regulation (FAR) in effect for the period covered by the indirect cost rate proposal.

(2) The Contractor shall, within 90 days after the expiration of each of its fiscal years, or by a later date approved by the Contracting Officer, submit to the cognizant Contracting Officer responsible for negotiating its final indirect cost rates and, if required by agency procedures, to the cognizant audit activity proposed final indirect cost rates for that period and supporting cost data specifying the contract and/or subcontract to which the rates apply. The proposed rates shall be based on the Contractor's actual cost experience for that period. The appropriate Government representative and Contractor shall establish the final indirect cost rates as promptly as practical after receipt of the Contractor's proposal.

(3) The Contractor and the appropriate Government representative shall execute a written understanding setting forth the final indirect cost rates. The understanding shall specify (i) the agreed-upon final annual indirect cost rates, (ii) the bases to which the rates apply, (iii) the periods for which the rates apply, (iv) any specific indirect cost items treated as direct costs in the settlement, and (v) the affected contract and/or subcontract, identifying any with advance agreements or special terms and the applicable rates. The understanding shall not change any monetary ceiling, contract obligation, or specific cost allowance or disallowance provided for in this contract. The understanding is incorporated into this contract upon execution.

(4) Failure by the parties to agree on a final annual indirect cost rate shall be a dispute within the meaning of the Disputes clause.

(e) Billing rates. Until final annual indirect cost rates are established for any period, the Government shall reimburse the Contractor at billing rates established by the Contracting Officer or by an authorized representative (the cognizant auditor), subject to adjustment when the final rates are established.

These billing rates -

(1) Shall be the anticipated final rates; and
 (2) May be prospectively or retroactively revised by mutual agreement, at either party's request, to prevent substantial overpayment or underpayment.

(f) Quick-closeout procedures. When the Contractor and Contracting Officer agree, the quick-closeout procedures of Subpart 42.7 of the FAR may be used.

(g) Audit. At any time or times before final payment, the Contracting Officer may have the Contractor's invoices or vouchers and statements of cost audited. Any payment may be (1) reduced by amounts found by the Contracting Officer not to constitute allowable costs or (2) adjusted for prior overpayments or underpayments.

(h) Final payment. (1) The Contractor shall submit a completion invoice or voucher, designated as such, promptly upon completion of the work, but no later than one year (or longer, as the Contracting Officer may approve in writing) from the completion date. Upon approval of that invoice or voucher, and upon the Contractor's compliance with all terms of this contract, the Government shall promptly pay any balance of allowable costs and that part of the fee (if any) not previously paid.

(2) The Contractor shall pay to the Government any refunds, rebates, credits, or other amounts (including interest, if any) accruing to or received by the Contractor or any assignee under this contract, to the extent that those amounts are properly allocable to costs for which the Contractor has been reimbursed by the Government. Reasonable expenses incurred by the Contractor for securing refunds, rebates, credits, or other amounts shall be allowable costs if approved by the Contracting Officer. Before final payment under this contract, the Contractor and each assignee whose assignment is in effect at the time of final payment shall execute and deliver -

(i) An assignment to the Government, in form and substance satisfactory to the Contracting Officer, of refunds, rebates, credits, or other amounts (including interest, if any) properly allocable to costs for which the Contractor has been reimbursed by the Government under this contract; and

(ii) A release discharging the Government, its officers, agents, and employees from all liabilities, obligations, and claims arising out of or under this contract, except -

(A) Specified claims stated in exact amounts, or in estimated amounts when the exact amounts are not known;

(B) Claims (including reasonable incidental expenses) based upon liabilities of the Contractor to third parties arising out of the performance of this contract; provided, that the claims are not known to the Contractor on the date of the execution of the release, and that the Contractor gives notice of the claims in writing to the Contracting Officer within 6 years following the release date or notice of final payment date, whichever is earlier; and

(C) Claims for reimbursement of costs, including reasonable incidental expenses, incurred by the Contractor under the patent clauses of this contract, excluding, however, any expenses arising from the Contractor's indemnification of the Government against patent liability.

52.222-2

PAYMENT FOR OVERTIME PREMIUMS (APR 1984)

(a) The use of overtime is authorized under this contract if the overtime premium cost does not exceed zero. In addition to this dollar ceiling, overtime is permitted only for work -

(1) Necessary to cope with emergencies such as those resulting from accidents, natural disasters, breakdowns of production equipment, or occasional production bottlenecks of a sporadic nature;

(2) By indirect-labor employees such as those performing duties in connection with administration, protection, transportation, maintenance, standby plant protection, operation of utilities, or accounting;

(3) To perform tests, industrial processes, laboratory procedures, loading or unloading of transportation conveyances, and operations in flight or afloat that are continuous in nature and cannot reasonably be interrupted or completed otherwise; or

(4) That will result in lower overall costs to the Government.

(b) Any request for estimated overtime premiums that exceeds the amount specified above shall include all estimated overtime for contract completion and shall -

(1) Identify the work unit; e.g., department or section in which the requested overtime will be used, together with present workload, staffing, and other data of the affected unit sufficient to permit the Contracting Officer to evaluate the necessity for the overtime;

(2) Demonstrate the effect that denial of the request will have on the contract delivery or performance schedule;

(3) Identify the extent to which approval of overtime would affect the performance or payments in connection with other Government contracts, together with identification of each affected contract; and

(4) Provide reasons why the required work cannot be performed by using multishift operations or by employing additional personnel.

52.252-6

AUTHORIZED DEVIATIONS IN CLAUSES (APR 1984)

(a) The use in this solicitation or contract of any Federal Acquisition Regulation (48 CFR Chapter 1) clause with an authorized deviation is indicated by the addition of "(DEVIATION)" after the date of the clause.

(b) The use in this solicitation or contract of any NASA/FAR Supplement (48 CFR Chapter 18) clause with an authorized deviation is indicated by the addition of "(DEVIATION)" after the name of the regulation.

II. NASA/FAR SUPPLEMENT (48 CFR CHAPTER 18) CLAUSES

18-52.235-71

KEY PERSONNEL AND FACILITIES (MAY 1987)

The personnel and/or facilities listed below (or as specified in the Schedule of this contract) are considered essential to the work being performed hereunder. Prior to removing, replacing, or diverting any of the specified individuals or facilities, the Contractor shall notify the Contracting Officer reasonably in advance and shall submit justification (including proposed substitutions) in sufficient detail to permit evaluation of the impact on this contract. No diversion shall be made by the Contractor without the written consent of the Contracting Officer; provided, that the Contracting Officer may ratify in writing the change, and such ratification shall constitute the consent of the Contracting Officer required by this clause. The personnel and/or facilities listed below (or as specified in the Schedule of this contract) may, with the consent of the contracting parties, be amended from time to time during the course of the contract to either add or delete personnel and/or facilities, as appropriate.

18-52.245-73 FINANCIAL REPORTING OF GOVERNMENT-OWNED/CONTRACTOR-HELD
PROPERTY (SEP 1987)

(a) The Contractor shall prepare and submit annually a NASA Form 1018, Report of Government-Owned/Contractor-Held Property, in accordance with the instructions on the form and Subsection 18-45-505.14 of the NASA FAR Supplement, except the reporting of space hardware shall be required only upon the written direction of the Contracting Officer identifying the specific project items to be reported.

(b) If administration of this contract has been delegated to the Department of Defense, the original and three copies of NASA Form 1018 shall be submitted through the DOD Property Administrator to the NASA office identified below. If administered by NASA, the forms shall be submitted directly to the following NASA office:

NASA, Langley Research Center
Attn: Industrial Property Office, M/S 377
Hampton, VA 23665-5225

(c) The annual reporting period shall be from July 1 of each year to June 30 of the following year. The report shall be submitted by July 31.

(d) The Contractor agrees to insert the reporting requirement in all first-tier subcontracts, except that such requirement shall provide for the submission of the subcontractor reports directly to the Contractor. The Contractor shall require the subcontractor reports to be submitted in sufficient time to meet the reporting date in paragraph (c) above.

(e) The Contractor's report(s) shall consist of a consolidation of subcontractor's reports and the Contractor's report.

SECTION J
LIST OF DOCUMENTS, EXHIBITS, AND OTHER ATTACHMENTS

- Exhibit A Contract Documentation Requirements, five (5) pages, with Appendix 1
- Exhibit B Subcontracting Plan, 198, () pages
- Exhibit C Contract Security Classification Specification
- Exhibit D Computer Programing and Documentation Specifications, four (4) pages
- Exhibit E Procedures for the Preparation and Approval of Contractor Reports for Langley Research Center, Form PROC./P-72, July 1987, four (4) pages
- Attachment 1 Representative Task Assignments, seven (7) pages
- Attachment 2 Certificate of Current Cost or Pricing Data, Form PROC./P-281, May 1986, one (1) page
- Attachment 3 Contract Pricing Proposal Cover Sheet, Standard Form 1411, October 1983 with instructions, three (3) pages

EXHIBIT A

CONTRACT DOCUMENTATION REQUIREMENTSI. DOCUMENTATION PREPARATION/SUBMISSION INSTRUCTIONS

A. Monthly Technical Letter Progress Report--The Contractor shall submit four (4) copies of monthly technical letter reports for each task assignment describing progress of the task to date, noting all technical areas in which effort is being directed and indicating the status of work within these areas. Tasks may be summarized in one letter report unless otherwise stipulated in individual task assignments. Reports shall be in narrative form, brief and informal in content. These reports shall include:

1. A narrative statement of work accomplished during the report period
2. A statement of current and potential problem areas and proposed corrective action
3. A discussion of work to be performed during the next report period
4. The direct labor-hours and total cost expended during the report period as well as the cumulative direct labor-hours and total cost expended to date for each task assignment and the projected direct labor-hours and total cost to be expended to completion of the task.

The monthly progress report for task assignments shall be submitted to the Contracting Officer within ten (10) days after the end of each calendar monthly report period. A monthly progress report shall not be required for any task assignment for the period in which the final report is due. This submittal shall be subject to the provisions of the Section I clause entitled "Production Progress Reports."

B. Monthly Financial Management Report--The Contractor shall submit a monthly financial report in accordance with the provisions of the Section I clause entitled "NASA Financial Management Reporting." Monthly financial management reports shall encompass the total contract, i.e., hours and dollars expended/projected for all task assignments. In addition to the foregoing, an individual task assignment may specify a requirement for submission of monthly financial management reports for work performed thereunder. This report shall be submitted utilizing NASA Form 533M, Monthly Contractor Financial Management Report, in accordance with submission instructions contained on the reverse side of the form. Columns 8a and 8b, 533M, shall contain estimates for the following two successive months for the reporting categories set forth in Column 6, 533M. The following categories (if applicable) shall be included in this report:

1. Direct Labor Hours
2. Direct Labor Dollars
3. Overhead(s)
4. Subcontract
5. Material
6. Other Direct Cost
7. G&A
8. Total Estimated Cost
9. Fee
10. Total Estimated Cost and Fee

C. Quarterly Financial Management Report--The Contractor shall submit a financial report at the contract level detailed by categories specified in paragraph B. above on NASA Form 533Q at times and in accordance with the instructions contained on the reverse side of the form.

D. Computer Programing Documentation and Material--Any computer program or modification of a computer program developed and delivered in performance of this contract shall be in accordance with Exhibit D, Computer Programing and Documentation Specifications dated July 1, 1988. Computer programing documentation and material shall be delivered in accordance with the schedule set forth in individual task assignments.

E. Synopsis of Proposed Publications--The Contractor shall submit a synopsis for NASA LaRC review and approval describing material proposed for publication in accordance with the format set forth in Appendix 1 to Exhibit A.

F. Final Reports--Each task assignment may require the Contractor to submit a final report, either formal or informal, which documents and summarizes the results. When a formal final Contractor report is required, it shall be submitted in accordance with the instructions contained in Exhibit E, Procedures for the Preparation and Approval of Contractor Reports for Langley Research Center, Form PROC./P-72. The specified number of approval copies shall be submitted within the time specified in the task assignments.

G. Small Business/Small Disadvantaged Business Reporting--The Contractor shall submit Standard Form 294, Subcontracting Report for Individual Contracts and Standard Form 295, Summary Subcontract Report, in accordance with instructions provided on the back of the forms. (This reporting will be incorporated to the extent a Subcontracting Plan is invoked).

H. Safety and Health Plan--Within fifteen (15) calendar days after contract award, the Contractor shall submit for the Contracting Officer's approval, a comprehensive Safety and Health Plan in accordance with the Section I clause entitled "Safety and Health" containing, as a minimum, the following:

1. Points of Contact and Responsibility--Organizational flow chart and description of responsibilities of each employee in your organization for safety.

2. Employee Safety Training, Certification and Programs--Detailed information on type of training required, parties responsible for certification, and outline of applicable regulations. Detail company programs which emphasize personal safety and what company policies are enforced to motivate employees to be safety conscious.

3. LaRC Safety Policies/Procedures--Recognition of applicable LaRC safety policy and procedures such as Langley Handbook 1710.10, LaRC Red Tag System.

4. Safety Monitoring and Area Safety--Describe areas within your facility or other work areas where protective devices (hard hats, eye protection, etc.) must be worn. Indicate who is responsible for monitoring adherence.

5. Accident Investigation and Reporting--Detail procedures for investigating and reporting accidents/incidents.

6. Hazardous Operations

a. Detail hazardous operations within your facility.

b. Plans for apprising employees of all hazards to which they may be exposed.

c. Proper conditions and precautions for safe use and exposure. Include recognition of LHB 1710.12, Potentially Hazardous Materials.

7. Equipment Inspection/Repair--Detail procedures for equipment safety inspection and repair.

8. Health--Detailed plans for insuring that baseline physicals, audiograms, or other specialized health examinations required for performance of effort under this contract are obtained and maintained.

9. Safety Related Procurement Functions--Detail plans for complying with the requirements of LMI 5000.2, specifically, plans for coordinating the acquisition of safety sensitive items or services for use at Langley Research Center, requiring the review and/or concurrence of the Head, Safety Engineering Branch. Include in your plan safety review procedures for the acquisition of pressurized components and lifting devices.

10. Other Safety Considerations--Detail any other safety considerations unique to your facility or operation.

II. DOCUMENT DISTRIBUTION REQUIREMENTS

A. Unless otherwise specified elsewhere in this contract, reports and other documentation shall be submitted F.O.B. destination as specified below, addressed as follows:

National Aeronautics and Space Administration
 Langley Research Center
 Attn: _____, Mail Stop _____
 Contract NAS1-
 Hampton, VA 23665-5225

B. The following letter codes designate the recipients of reports and other documentation which are required to be delivered to Langley Research Center by the Contractor:

- A--Contract Administrator, Mail Stop 126
- B--Technical Representative of the Contracting Officer, Mail Stop 490
- C--New Technology Representative, Mail Stop 139A
- D--Patent Counsel, Mail Stop 279
- E--Cost Accounting, Mail Stop 135 (via Mail Stop 175)
- F--Safety Officer, Mail Stop 429
- G--Programs and Resources Division, Mail Stop 104

C. The following are the distribution requirements for reports and other documentation required to be delivered F.O.B. destination. The numeral following the letter code specifies the number of copies to be provided:

<u>DOCUMENT</u>	<u>LETTER CODE AND DISTRIBUTION</u>
Monthly Progress Report	A-1, B-2, C-1
Financial Management Report	A-1, B-2, E-2, G-1
New Technology or Patent Rights Report	A-1, B-2, C-1, D-1
Safety Plan	B-2, F-1
Computer Programing Documentation	B-4 (1 reproducible)
Computer Program Material	B-1
Oral Review Materials	B-1
Synopsis of Proposed Publications	B-1
Plan for New Technology Reporting	A-1, B-1, C-2
Analysis of Government-Owned/Contractor-Held Property (NASA Form 1018) (See Section I clause entitled "Financial Reporting of Government-Owned/Contractor-Held Property")	

Informal Final Report	A-5
Final Report (Approval Copies)	A-5
Final Report (Approved)	As specified by the Contracting Officer
Standard Form 294	A-1
Standard Form 295	As specified by the Contracting Officer

D. When the Contract Administrator (A) is not designated above to receive a copy of a report or document, the Contractor shall furnish a copy of the report/document transmittal letter to the Contract Administrator. The Contractor shall also furnish a copy of the transmittal letter and a copy of each Financial Management Report to the delegated Administrative Contracting Officer of the cognizant DoD (or other agency) contract administrative services component.

INSTRUCTIONS FOR PREPARING SYNOPSIS FOR PROPOSED PUBLICATIONS

The technical highlight will be typed in a horizontal format with 5 sections, if applicable:

Research Objective

A succinct description of the objective of the specific highlight. Absolutely must be understandable with basic terminology and only fully defined acronyms can be used.

Approach

Describes the methods and techniques used in obtaining the results. This may relate to an overall plan.

Accomplishment

The specific highlight with information describing what worked (or did not work). It could show how the highlight fulfills one step along the way or the overall plan. A specific, quantified result would be especially useful.

Significance

Tells the importance of the technical highlight to the research objective and can also describe how the research objective relates to NASA Missions and/or objectives.

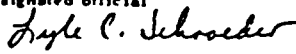
Future

This section is used to describe follow-on activities and plans. These activities do not necessarily have to be funded or programmatic, but should be the ones desired by researchers to satisfy the normal progression of technology.

The graphic should be in horizontal format. If it is detailed in nature, it should be described in the technical accomplishment. Extraneous information should be removed to promote simplicity.

EXHIBIT B
SUBCONTRACTING PLAN

NOTE: Refer to Article H-1. The Contractor's approved plan will be incorporated at the time of contract award. (This provision does not apply to those offerors that are small business as defined in Article L-3.)

DEPARTMENT OF DEFENSE CONTRACT SECURITY CLASSIFICATION SPECIFICATION		1. THE REQUIREMENTS OF THE DOD INDUSTRIAL SECURITY MANUAL APPLY TO ALL SECURITY ASPECTS OF THIS EFFORT. THE FACILITY CLEARANCE REQUIRED IS: SECRET					
2. THIS SPECIFICATION IS FOR:		3. CONTRACT NUMBER OR OTHER IDENTIFICATION NUMBER <i>(Prime contracts must be shown for all subcontracts)</i>	4. DATE TO BE COMPLETED <i>(Estimated)</i>	5. THIS SPECIFICATION IS: <i>(See "NOTE" below. If item b or c is "X", also enter date for item a)</i>			
a. PRIME CONTRACT		a. PRIME CONTRACT NUMBER	a.	a. ORIGINAL <i>(Complete date in all cases)</i> X DATE 06-10-88			
b. SUBCONTRACT <i>(Use Item 15 for subcontracting beyond second tier)</i>		b. FIRST TIER SUBCONTRACT NO.	b.	b. REVISED <i>(supercedes all previous specifications)</i> REVISION NO. DATE			
X c. REQUEST FOR BID, REQUEST FOR PROPOSAL OR REQ FOR QUOTATION		c. IDENTIFICATION NUMBER 1-109-9240.0631	c. DUE DATE	c. FINAL DATE			
6. Is this a follow-on contract? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No. If YES, complete the following:							
a. <u>NAS1-17639</u>		b. <u>7/31/89</u>	c. Accountability for classified material on preceding contract				
PRECEDING CONTRACT NUMBER DATE COMPLETED							
<input checked="" type="checkbox"/> Is <input type="checkbox"/> Is not, transferred to this follow-on contract.							
7a. Name, Address & Zip Code of Prime Contractor *		b. FSC Number	c. Name, Address & Zip Code of Cognizant Security Office				
N/A		N/A	N/A				
8a. Name, Address & Zip Code of First Tier Subcontractor *		b. FSC Number	c. Name, Address & Zip Code of Cognizant Security Office				
N/A		N/A	N/A				
9a. Name, Address & Zip Code of Second Tier Subcontractor, or facility associated with IFB, RFP OR RFQ *		b. FSC Number	c. Name, Address & Zip Code of Cognizant Security Office				
N/A		N/A	N/A				
* When actual performance is at a location other than that specified, identify such other location in Item 15.							
10a. General identification of the Procurement for which this specification applies			b. DoDAAD Number of Procuring Activity Identified in Item 16d.				
Research in Antenna and Microwave Technology			803301				
c. Are there additional security requirements established in accordance with paragraph 1-114 or 1-115, ISR? <input type="checkbox"/> Yes <input type="checkbox"/> No. If YES, identify the pertinent contractual documents in Item 15.							
d. Are any elements of this contract outside the inspection responsibility of the cognizant security office? <input type="checkbox"/> Yes <input type="checkbox"/> No. If YES, explain in Item 15 and identify specific areas or elements.							
11. ACCESS REQUIREMENTS		YES	NO	ACCESS REQUIREMENTS <i>(Continued)</i>		YES	NO
a. Access to Classified Information Only at other contractor/Government activities.		X		j. Access to SENSITIVE COMPARTMENTED INFORMATION.			X
b. Receipt of classified documents or other material for reference only (no generation)			X	k. Access to other Special Access Program Information <i>(Specify in Item 15).</i>			
c. Receipt and generation of classified documents or other material.			X	l. Access to U. S. classified information outside the U. S. Panama Canal Zone, Puerto Rico, U. S. Possessions and Trust Territories.			X
d. Fabrication/Modification/Storage of classified hardware.			X	m. Defense Documentation Center or Defense Information Analysis Center Services may be requested.			X
e. Graphic arts services only.			X	n. Classified ADP processing will be involved.			X
f. Access to IPO information.			X	o. REMARKS:			
g. Access to RESTRICTED DATA.			X				
h. Access to classified COMSEC information.			X				
i. Cryptographic Access Authorization required.			X				
12. Refer all questions pertaining to contract security classification specification to the official named below (NORMALLY, thru ACO (Item 16e); EMERGENCY, direct with written record of inquiry and response to ACO) (thru prime contractor for subcontracts).							
a. The classification guidance contained in this specification and attachments referenced herein is complete and adequate.							
b. Typed name, title and signature of program/project manager or other designated official				c. Activity name, address, Zip Code, telephone number and office symbol			
 Lyle C. Schroeder TRCO MS 490				NASA, Langley Research Center Hampton, VA 23665-5225 (804) 865-3631			
NOTE: Original Specification (Item 5a) is authority for contractors to mark classified information. Revised and Final Specifications (Items 5b and c) are authority for contractors to remark the regraded classified information. Such actions by contractors shall be taken in accordance with the provisions of the Industrial Security Manual.							

13a. Information pertaining to classified contracts or projects, even though such information is considered unclassified, shall not be released for public dissemination except as provided by the Industrial Security Manual (paragraph 5a and Appendix IX).

b. Proposed public releases shall be submitted for approval prior to release Direct Through (Specify):

N/A

to the Directorate For Freedom of Information and Security Review, Office of the Assistant Secretary of Defense (Public Affairs) * for review in accordance with paragraph 5a of the Industrial Security Manual.

* In the case of non-DoD User Agencies, see footnote, paragraph 5a, Industrial Security Manual.

14. Security Classification Specifications for this solicitation/contract are identified below ("X" applicable box(es) and supply attachments as required). Any narrative or classification guide(s) furnished shall be annotated or have information appended to clearly and precisely identify each element of information which requires a classification. When a classification guide is utilized, that portion of the guide(s) pertaining to the specific contractual effort may be extracted and furnished the contractor. When a total guide(s) is utilized, each individual portion of the guide(s) which pertains to the contractual effort shall be clearly identified in Item 14b. The following information must be provided for each item of classified information identified in an extract or guide:

(I) Category of classification. (II) Date or event for declassification or review for declassification, and (III) The date or event for downgrading (if applicable).

The official named in Item 12b, is responsible for furnishing the contractor copies of all guides and changes thereto that are made a part of this specification. Classified information may be attached or furnished under separate cover.

- a. A completed narrative is (1) ^{below} attached, or (2) transmitted under separate cover and made a part of this specification.
- b. The following classification guide(s) is made a part of this specification and is (1) attached, or (2) transmitted under separate cover. (List guides under Item 15 or in an attachment by title, reference number and date).
- c. Service-type contract/subcontract. (Specify instructions in accordance with ISR/ISM, as appropriate.).
- d. "X" only if this is a final specification and Item 6 is a "NO" answer. In response to the contractor's request dated _____ retention of the identified classified material is authorized for a period of _____.
- e. Annual review of this DD Form 254 is required. If "X'd", provide date such review is due: _____.

15. Remarks (Whenever possible, illustrate proper classification, declassification, and if applicable, downgrading instructions).

The performance of all classified work will be at the Langley Research Center. Contractor employees requiring access to classified information and material in the performance of this work will be required to have a SECRET clearance. No classified material will be stored at the contractor facility and security policy, instructions, and procedures in classifying information and material will be provided, as required, by the Technical Representative of the Contracting Officer. When it becomes necessary, appropriate program classification guides will be provided the contractor.

16a. Contract Security Classification Specifications for Subcontracts issuing from this contract will be approved by the Office named in Item 16b below, or by the prime contractor, as authorized. This Contract Security Classification Specification and attachments referenced herein are approved by the User Agency Contracting Officer or his Representative named in Item 16b below.

REQUIRED DISTRIBUTION:

- Prime Contractor (Item 7a)
- Cognizant Security Office (Item 7c)
- Administrative Contracting Office (Item 16a)
- Quality Assurance Representative
- Subcontractor (Item 8a)
- Cognizant Security Office (Item 8c)
- Program/Project Manager (Item 12b)
- U. S. Activity Responsible for Overseas Security Administration

ADDITIONAL DISTRIBUTION:

- NASA, NIS-5/Security
- Security Branch, MS 182
-

b. Typed name and title of approving official

Billy J. Smith
Security Classification Officer

c. Signature



d. Approving official's activity address and Zip Code

NASA, Langley Research Center
MS 182
Hampton, VA 23665-5225

e. Name, address and Zip Code of Administrative Contracting Office

NASA, Langley Research Center
MS 126, Hampton, VA 23665-5225
(804) 865-2854

EXHIBIT D

LANGLEY RESEARCH CENTER

COMPUTER PROGRAMING AND DOCUMENTATION SPECIFICATIONS

1. Program Compatibility

- a. Programs shall be written for use with CDC standard operating systems to run on the Langley Research Center's CDC-CYBER series computers. These computers and operating systems are described in the documents listed in Section 2.
- b. All programming shall be done using CDC FORTRAN Version 5 language (FTN5) except where machine language is absolutely essential. In which case, the CDC Compass 3 language (CYBIL for NOS/VE) shall be used. The program shall be written to run under the Network Operating System (NOS2) or Network Operating System/Virtual Environment (NOS/VE). The Technical Representative of the Contracting Office (TRCO) will be responsible for notifying the contractor regarding the installation of updated versions of the operating system. The contractor shall achieve compatibility between the programs and the current operating system at LaRC, at the time of program delivery. All I/O shall be accomplished with CDC FORTRAN Version 5 statements and shall not use, as an integral part of the operation of the program, any on-line card reader, card punch, or printer. The standard system file names of INPUT for reading and OUTPUT for printing shall be used. However, to facilitate compatibility with other computers, FORTRAN logical 5 (TAPE5) may be equated to INPUT and FORTRAN logical 6 (TAPE6) may be equated to output. The program may not output any binary data other than object programs. The disk files may be of any file organization type available with standard CDC Record Manager. All files not specifically declared as magnetic tape files, will automatically be assigned to disk.
- c. The program shall provide for adequate checkpointing within resources allocated so that the job can be recovered with a loss of no more than 1000 cpu seconds or as soon thereafter as possible.
- d. All programs shall use standard CDC-issue basic function routines such as SORT, SIN, LOG . . . , unless replacement routines are stipulated and furnished by LaRC. The LaRC library of subroutines, in specification form, will be made available upon request, as well as subsequent requests for source code and information concerning library routines.
- e. LaRC tape compatibility includes unlabelled or ANSI standard labels using 9-track, 1/2 inch tape. Nine-track tapes must be recorded at either 1600 or 6250 bpi density. Data on 9-track tapes must be recorded in ASCII, EBCDIC or integer work (compatible with LaRC computer word size) format. However, it is recommended that tapes be submitted in the following form:
 - (1) 9-track, 6250 CPI (characters per inch)
 - (2) unlabelled

July 1, 1988

- (3) internal format, binary mode for tapes generated at NOS 2 installations
 - (4) coded mode for tapes generated at all other installations
 - (5) block size of less than or equal to 5120 characters
- f. Plotting compatibilities shall interface at preprocessor level through the New Graphics System (NGS) as described in the Graphics Mini Manual for the LaRC Central Scientific Computer Complex.

The NGS consist of 4 layers:

- (1) A set of device drivers that format the graphics output for a particular graphics device and metafile system which can post-process the DI-3000 graphics metafile for permanent hard copy.
- (2) The DI-3000 kernel based on the 1979 GSPC CORE graphics standard.
- (3) The application-dependent libraries tailored to engineering/scientific, CAD, business/management, etc.
- (4) A set of menu/command driven graphics programs which interface to DI-3000.

2. Program Development

The contractor shall be fully responsible for the development of the program. She shall assign personnel who either have experience with the computers and operating systems specified herein, or are able to perform such programming using standard vendor-supplied manuals with-out significant assistance from LaRC personnel. She shall provide all computer time necessary for program development and quality analysis unless otherwise stated in the contract schedule. The contractor shall use programming techniques which enhance the modularity, readability, and efficiency of the program. Initialization of necessary variables shall be contained within the source program; operating system features shall not be used for this purpose.

a. Available from LaRC

- (1) Introduction to the use of the Central Scientific Computing Complex (A-1c)
- (2) NOS2 Version 2 Mini Manual (N2-1a)
- (3) Graphics Mini Manual (G-1)

b. Available from Control Data Corporation (obtain compatible revision)

Recommended Manuals for NOS Version 2:

- 1. Publication No. 60481300 FORTRAN Version 5 Reference Manual
- 2. Publication No. 60484000 FORTRAN Version 5 User's Guide
- 3. Publication No. 60429800 Loader
- 4. Publication No. 60450100 Modify
- 5. Publication No. 60460420 Full Screen Editor User's Guide
- 6. Publication No. 60455250 Interactive Facility Version 1 Reference Manual
- 7. Publication No. 60459680 NOS2 Reference Set Volume 3 System Commands
- 8. Publication No. 60459690 NOS2 Reference Set Volume 4 System Commands

9. Publication No. 60495700 CYBER Record Management Reference Manual
10. Publication No. 60495800 Record Manager User's Guide
11. Publication No. 60455260 Interactive Facility User's Guide

Recommended Manuals for NOS/VE:

1. Publication No. 60464018 SCL for NOS/VE Quick Reference
2. Publication No. 60464313 SCL for NOS/VE Source Code Management Usage
3. Publication No. 60464413 SCL for NOS/VE Object Code Management Usage
4. Publication No. 60464015 Full Screen Editor for NOS/VE Tutorial/Usage
5. Publication No. 60464016 Terminal Definition for NOS/VE Usage
6. Publication No. 60485913 FORTRAN for NOS/VE Language Definition Usage
7. Publication No. 60486413 SCL Advanced File Management Usage
8. Publication No. 60485916 Topics for FORTRAN Programmers/Usage
9. Publication No. 60463850 CDCNET Terminal Interface Usage

3. Computer Resources

The program shall be designed to operate within the following resource limitations. Any change to the limits shall be made only with the written approval of the Contracting Officer.

Maximum field length in memory (words) 256M
 Maximum number of magnetic tapes mounted at one time 2
 Number of local files 100
 Cumulative file size (Physical Record Units - one PRU is 64 words)
1GPRII
 Running time per case (typical) 3 hours
 Number of printed lines per case (typical) 200
 Type of graphic devices (if any) pen plotters, color hard copy
 Type of interactive devices (if any) color graphics terminals

4. Documentation

Langley Research Center will receive three copies and a reproducible copy of all documentation.

a. User Oriented Documentation

This document shall be oriented to the engineering user of the program. It shall contain the following:

- (1) A self-sufficient problem formulation with all necessary mathematical and engineering development and/or references.
- (2) The overall logical flow of the program
- (3) Detailed instructions on program usage and operation
- (4) Explanation of program use, accuracy, and limitations

b. Program Oriented Documentation

This document shall be sufficiently complete to allow for major changes to the program. It shall contain the following:

- (1) Sufficiently commented code or detailed program flow charts

- suitable for program maintenance.
- (2) Description of all contractor supplied subroutines
 - (3) A detailed description of all input/output or intermediate files used in the program. The standard input/output files and files generated by Langley-provided routines need not be given detailed descriptions.
 - (4) Test cases consisting of computer input data, operating instructions and answer listings. There shall be sufficient cases to test all major computing modules.
 - (5) CDC FORTRAN Version 5 and Compass 3 (if used) source program listing of all contractor-supplied routines.

5. Computer Program Material

All computer program material shall be provided on tape in a form compatible with NOS2, (preferably UPDATE or MODIFY). It shall contain the following:

- a. All computer programs in source language form
- b. All test case input

6. Acceptance Testing and User Training

Before delivering the program to LaRC, the contractor shall successfully compile and execute the program on a computer and operating system similar to that specified herein for test cases approved by the TRCO. Because of the lack of standards for graphic output systems, the execution and final integration of those program modules (e.g. subroutines, overlays, etc.) containing the graphic display generation code may be performed on the operating system at this Center. The selection of specific computer and operating system shall be approved by the TRCO. The contractor shall then furnish estimates of computer resources to be required for demonstration and training, if appropriate. The TRCO will contact the Computer Operations Section to schedule the time required. LaRC will provide a reasonable amount of computer time to demonstrate that the program runs properly at LaRC and to train LaRC in the use of the program.

PROCEDURES FOR THE PREPARATION AND APPROVAL OF CONTRACTOR
REPORTS FOR LANGLEY RESEARCH CENTER

GUIDELINES. - The following documents or subsequent editions in effect on date of contract shall serve as the basis for preparation of Contractor Reports:

NASA SP-7047 NASA Publications Guide
DoD 5220.22-M Industrial Security Manual for Safeguarding Classified
Information, November 1986

NOTE: Copies of NASA SP-7047 will be furnished upon request. (Call (804) 865-3248.)

FORMAT AND ORGANIZATION. - The format and organization of a Contractor Report should be consistent and follow the practices recommended in the NASA Publications Guide (NASA SP-7047). For questions concerning format, contact Langley Technical Editing Branch at (804) 865-2301. The attached Report Documentation Page (NASA Form 1626) shall be included as the last page in the report.

TRADEMARKS. - U.S. Government policy prohibits endorsing or criticizing commercial products in its publications. Use of trademarks is discouraged. If a trademark must be used, its owner must be credited and the trademark must be used as an adjective modifying the generic name.

REFERENCES. - Material that is not obtainable or available must not be listed in the references. Documents of NASA contracts published as in-house documents must be referenced as NASA CR's, not as NASA Contract Numbers.

SECURITY. - Security markings, when necessary, shall be consistent with DD Form 254, the directive issued by the Security Classification Officer, and shall conform to requirements established in the DoD Industrial Security Manual. For questions concerning security classification, contact LaRC Security Classification Officer at (804) 865-2452.

APPROVAL COPIES.

1. Upon completion of a report, the Contractor shall submit five (5) approval copies to the Contracting Officer for review and approval by NASA. These copies may be reproduced and assembled by an economical means by the Contractor.

2. The Contractor will be notified of acceptance of the approval copy of the report by the Contracting Officer within sixty (60) days. Approval will be contingent upon changes required by NASA. An original master copy in agreement with the approval copy shall be prepared and submitted by the Contractor.

ORIGINAL MANUSCRIPT. - The original manuscript of a Contractor Report shall consist of the master copy of the text, cleanly typed on opaque white paper, from which negatives and printing plates can be made, unscreened glossy prints of photographs, and original artwork of a quality suitable for reproduction by

offset printing. Suggestions for preparing acceptable copy are given in NASA SP-7047. The original manuscript should not be bound and should have consecutive page numbers added in proper sequence. Odd numbered pages are numbered at the bottom of the page on the right; even, on the left. To avoid damage in handling and shipping, the original manuscript should be carefully packaged.

DISTRIBUTION AND DUPLICATION. - From the review made at the Langley Research Center, the Contracting Officer will make a determination concerning publication and distribution, which the Contractor shall complete within thirty (30) days after receipt of approval copies.

1. If NASA Langley Research Center considers that the report should be distributed only in limited quantities, the Contractor shall be requested to prepare duplicates of the original manuscript and distribute the original manuscript and copies (not to exceed 100*) in accordance with a distribution list supplied by the Contracting Officer. In this case, the report will be assigned a number in the NASA CR high-numbered series (CR number above 50,000) by the Contracting Officer. When necessary, the Contractor will be provided with any notices to be added to the cover concerning distribution limitations.

2. If the NASA Langley Research Center considers the report of such quality or interest that it warrants wide distribution, it will be recommended to NASA Headquarters for publication in the NASA CR low-numbered series, and the Contractor will be requested to forward the original manuscript, together with up to 25* duplicate copies to Langley Research Center addresses furnished by the Contracting Officer. At the direction of the Contracting Officer, advance distribution by the Center may be made to those having a need to know. Printing from the original manuscript for final distribution will be provided by NASA. NASA will include the CR number on the cover and provide the author(s) with 10 copies each of the final printed report. (Author(s) will not receive 10 copies each of restricted distribution reports.)

PRINTING STANDARDS. - To comply with NASA printing requirements and cost considerations, reports submitted should conform to the following standards. Any questions regarding implementation of these standards should be directed to the Langley Printing Management Officer (LPMO) at (804) 865-3334.

1. Multiple-copy production shall be by the offset duplicating method, except as described in subparagraphs 1a and 1b below.

a. Production may be on office copying machines or on diazo equipment when the number of copies is so small that such production is more economical than offset duplicating. However, the images will be clearly legible and permanent.

*Not to exceed 5,000 production units of any one page and, for reports consisting of multiple pages, not to exceed 25,000 production units in the aggregate. A production unit means one sheet, size 8 1/2 x 11 inches (215 x 280 mm), one side only, one color.

b. Any image that cannot be accommodated by a foldout (as described in paragraph 2 herein) will be produced by the diazo or electrostatic method in a size dictated by legibility requirements.

2. The page image size of cover and text pages including headings will not exceed 7 1/8 x 9 1/8 inches. Page image including page number will not exceed 7 1/8 x 10 inches. Diagrams, charts, drawings, etc., shall be reduced and, if necessary, run broadside to eliminate oversized pages. If such reduction is too great for legibility, the subject will be split and run on two facing pages or run as a foldout with an image not larger than 14 x 9 1/2 inches.

3. Text and foldout pages will be on either of two paper stocks:

a. Offset book paper, white, substance 100 lbs. (basis 25 x 31/1000 sheets).

b. Chemical wood writing paper, white or colored, substance 40 lbs. (basis 17 x 22/1000 sheets).

4. Covers, if necessary, will be on either of two paper stocks:

a. Vellum finish (or antique finish) cover paper, white or colored, substance 100 lbs. (basis 20 x 26/1000 sheets).

b. Chemical wood index paper, white or colored, substance 220 lbs. (basis 25 1/2 x 30 1/2/1000 sheets).

5. Use of tabs is expensive and rarely necessary. First consideration should be given to the use of a contents page. Second choice should be bleed-edge index markers. If tabs must be used, they will be duplicated on one side only, on chemical wood index paper, white or colored, substance 220 lbs. (basis 25 1/2 x 30 1/2/1000 sheets); they will be angle cut and not die cut.


6. All duplicating will be in black ink. If other or additional color is required for a functional purpose, approval in writing must be obtained from the Langley Printing Management Officer (LPMO) through the Contracting Officer before preparation of final reproduction copy.

7. Text pages of all documents produced will be reproduced on both sides of sheet where feasible.

8. Binding will be by fastening with wire staples or stitches, either one in a corner or two in the binding margin. Documents too thick to staple or stitch will be produced in two or more volumes. Prong fasteners, binding screws, plastic combs, and spiral and similar wire fasteners add to production time and costs, and generally their use should be avoided.

9. Plastic protective sheets will not be used.

10. When hard-cover protection of a document is needed, the document will be drilled with three round 1/4 inch or 3/8 inch holes, 4 1/4 inches center-to-center, for insertion into standard 3-ring binders. Special stamped, printed or silk-screened binders shall not be used. A single corner staple or stitch or a band will be used to hold the document together until it is put into a binder.

 Report Documentation Page			
1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle Study of Advanced Composite Structural Design Concepts		5. Report Date July 1987	6. Performing Organization Code
		8. Performing Organization Report No. D6-44238-5	
7. Author(s) M. J. Turner and D. L. Grande		10. Work Unit No.	
		11. Contract or Grant No. NAS1-12234	
9. Performing Organization Name and Address Boeing Commercial Airplane Company P. O. Box 3707 Seattle, WA 98124		13. Type of Report and Period Covered Contractor Report	
		14. Sponsoring Agency Code	
12. Sponsoring Agency Name and Address National Aeronautics and Space Administration Langley Research Center Hampton, VA 23665-5225		15. Supplementary Notes Langley Technical Monitor: James C. Robinson Final Report	
16. Abstract (Provide an unclassified abstract not to exceed 150 words.)			
17. Key Words (Suggested by Author(s)) (Provide 4 or 5 key words)		18. Distribution Statement Unclassified - Unlimited <i>(If contract specifies restricted distribution, state restriction here.)</i>	
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of pages 100	22. Price



Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle		5. Report Date	
		6. Performing Organization Code	
7. Author(s)		8. Performing Organization Report No.	
		10. Work Unit No.	
9. Performing Organization Name and Address		11. Contract or Grant No.	
		13. Type of Report and Period Covered	
12. Sponsoring Agency Name and Address		14. Sponsoring Agency Code	
		15. Supplementary Notes	
16. Abstract			
17. Key Words (Suggested by Author(s))		18. Distribution Statement	
19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of pages	22. Price

ATTACHMENT 1
REPRESENTATIVE TASK ASSIGNMENTS

REPRESENTATIVE TASK 1

Task Area: Large Space Antenna (LSA) Systems Technology

Task Title: In-Space Performance Analysis using a 15-meter Antenna

Introduction: Antennas with apertures from 15 to 200 m in diameter have been proposed for use in geosynchronous orbit to solve many communications and remote sensing problems. As an example, land-mobile communications for the complete continental United States have been proposed to be provided by a single large parabolic antenna with offset feeds. Scale- or partial models of several proposed designs of such large scale antennas have been built and tested. A large-scale antenna system is expected to be launched in the 1990's to determine the experimental behavior in a space environment. Specific to this contract, the communications performance characteristics of the large scale antenna will be determined.

Task Technical Requirements: Contractor shall complete the following:

- a. Evaluate through simulations or studies the best methods of measuring the antenna performance characteristics such as gain, sidelobe level down to 60 dB, feed location, etc. at frequencies from approximately 1 to 60 Ghz. The sensitivities of these characteristics to surface roughness, feed location and measurement technique shall also be determined.
- b. Expand this analytical and conceptual design study to consider an integrated control, dynamics, and electromagnetic space system engineering experiment using a 15-meter space deployable antenna.
- c. Design a system to reliably measure the antenna performance in space and to provide error signals suitable for optimizing the antenna performance (i.e., lower sidelobe levels, proper feed location, etc.).
- d. Provide specifications and consultation for reducing the antenna performance system to a flight design.
- e. Conduct simulations and analytical studies to investigate the performance of a radiometer applied to the beam(s) generated by the antenna.
- f. Investigate problems involved in applying the 15 meter antenna to multi-beam satellite altimetry, very long baseline interferometry, space-based radar, push-broom radiometry, and other potential application experiments.

Required Completion Date and Delivery Schedule: All work shall be completed within 12 months from the start date of this task assignment. An informal final report summarizing the results of this task assignment is required to be delivered 14 months from the start date of the task assignment.

Estimate of Resources - To be proposed by offeror:

Skill Mix
Hours per Skill
Total Hours

The offeror's response to this Representative Task will be evaluated on Factors 1, 2, and 3 of the Mission Suitability Factors set forth in Section M, Article M-2.

REPRESENTATIVE TASK 2

Task Area: Development of Reentry Plasma Diagnostics for the Aeroassist Flight Experiment

Task Title: Microwave Reflectometer Ionization Sensor Design and Development and AFE Blackout Analysis.

Introduction: NASA is developing a spacecraft to enable transfer of spacecraft between low earth orbit, such as occupied by the Space Station and geosynchronous orbit. This Space Transfer Vehicle is scheduled to be operational shortly after the turn of the century. In order to design this spacecraft to withstand the extreme heat loads expected during atmospheric braking reentry from geosynchronous orbits to the low earth orbits, a flight experiment using a spacecraft launched from the Shuttle is planned in the mid 1990's to verify computational fluid dynamics (CFD) model predictions of heat loads. The program, the Aeroassist Flight Experiment, has a manifest of experiments with the purpose of providing data to help verify the CFD code. One of these experiments, the Microwave Reflectometer Ionization Sensor, proposes to measure the level and standoff distance of electron density during the reentry period. A second experiment, the Aft Flow Ionization Experiment, proposes to measure the telemetry system blackout and relate this to plasma intensity. Further information on this program is available in Ref. 1.

Task Technical Requirements: In support of this effort, contractor shall:

- a. Provide analytical and laboratory test support to establish feasibility and to develop a millimeterwave sensor that measures reflection of electron density level and standoff distance during peak reentry heating of the AFE spacecraft during reentry.
- b. Use design trade-offs to develop and improve a preliminary millimeterwave instrument design.
- c. Evaluate components and subsystems used in the preliminary system design in the laboratory.
- d. Assemble and evaluate a prototype of the millimeterwave instrument.
- e. Prepare technical specifications for the MRIS millimeterwave flight sensor procurement.
- f. Conduct link analyses associated with the AFE for definition of expected signal strength and look angles associated with the Aft Flow Ionization Experiment (AFIE). The analysis shall include the effects of Earth-related multipath.
- g. Develop a recommended approach for implementing the ground-based, Shuttle telemetry or TDRSS system as the receiver segment of the AFIE communications attenuation experiment.

Required Completion Date and Delivery Schedule: All work shall be completed within 12 months from the start date of this task assignment. A formal final report summarizing the results of this

task assignment is required to be delivered 15 months from the start date of the task assignment.

References:

1. Walberg, G. D., "A Survey of Aeroassisted Orbit Transfer", Journal of Spacecraft & Rockets, Vol. 22, No. 1, 1985.

Estimate of Resources - To be proposed by offeror:

Skill mix
Hours per skill
Total Hours

The offeror's response to this Representative Task will be evaluated on Factors 1, 2, and 3 of the Mission Suitability Factors set forth in Section M, Article M-2.

REPRESENTATIVE TASK 3

Task Area: Study of Windshear Detection Using Doppler Radars.

Task Title: Computer simulation of microburst wind fields in the presence of ground clutter and design study of airborne experimental pulse Doppler scatterometers for use in acquiring backscatter from wind shear targets.

Introduction: NASA and the FAA are conducting research on airborne Doppler radars for detecting low level wind shear in a micro-burst environment. The forward looking radar must be able to measure a set of winds and accurately predict wind shear during take-off and landing with a low false alarm rate. To accomplish this, new radar signal detection and processing designs need to be developed and evaluated to extract accurate wind velocity information from Doppler measurements of signals reflected from rain cells in a moving ground clutter environment. LARC's approach has been to develop analytical computer tools to minimize the cost and practical limitations of extensive flight test programs. These detailed computer models are being developed to accurately simulate the operation of an airborne Doppler radar sensing reflected signals from rain in micro-burst wind fields. The simulation will include models of Doppler radar characteristics, the simulated micro-burst wind field and rain models, and the clutter environment the radars may see at typical airports. This simulation program will be used to conduct detailed radar design trade-offs and performance evaluations to determine optimum parameters and methods to solve this problem. Using results from simulation studies, a set of design requirements and specifications for an experimental airborne Doppler radar with adjustable operating parameters will be developed. A flight program is being planned using an experimental radar based on this design to obtain actual reflectivity data from both ground clutter and severe weather rain cells and to evaluate possible signal processing concepts.

Task Technical Requirements: In support of this program, contractor shall:

- a. Develop and evaluate signal processing techniques and algorithms for suppressing ground clutter signals and enhancing windshear detection capability.
- b. Using the simulation program, evaluate the performance of candidate radar concepts to accurately detect windshear from various types of microbursts under landing or take-off conditions for a variety of ground clutter environments.
- c. Conduct performance and evaluation testing of the radar scatterometer being developed for experimental flights. Collect and analyze reflectivity data obtained from viewing local convective storms with the experimental radar in a ground-based setup.
- d. Develop detailed flight experimental plans -- specifying the range of radar parameters to be evaluated, number of flights to be conducted, aircraft paths to be flown, experimental

- time lines, etc. -- for flight experiments that are suitable for collecting data and evaluating performance.
- e. Conduct a study to determine real-time radar signal processing algorithms to demonstrate and evaluate windshear detection concepts which can be suitably implemented for the third set of flight experiments.

Required Completion Date and Delivery Schedule: All work shall be completed within 24 months from the start date of this task assignment. A formal final report summarizing the results of this task assignment is required to be delivered 27 months from the start date of the task assignment.

Estimate of Resources - To be proposed by offeror:

Skill mix
Hours per skill
Total Hours

The offeror's response to this Representative Task will be evaluated on Factors 1, 2, and 3 of the Mission Suitability Factors set forth in Section M, Article M-2.

REPRESENTATIVE TASK 4

Task Area: Measurement of Electromagnetic Backscatter in LaRC RF Anechoic and Compact Ranges.

Task Title: Advanced Electromagnetic Scattering Code Development and Compact Range Measurement Support.

Introduction: In order to support development of advanced design concepts, analytical codes and measurement systems are under development at LaRC. The code development is necessary for predicting the performance of antenna designs and estimating the EM scattering cross section of a variety of useful generic shapes and more complex shapes. This effort requires a strong background in advanced antenna design, EM field and wave theory, near-field and plane wave propagation and obstacle scattering theory (low and high frequency). The measurement systems will utilize the NASA LaRC compact range and a new facility, the Electromagnetics Scattering Lab. (ESL), being proposed for construction at LaRC. This task will require understanding and expertise in compact range operation and performance, utilization and development of ASYST data acquisition and analysis code, and development of software and hardware for advanced data collection and model positioner systems. Expertise in the following computer systems and associated peripherals and software are necessary; IBM PCAT, VAX, Commodore AMIGA with Turbo Expansion, and Tektronix 4129 Graphics Systems. Experience in model measurements utilizing stepped CW, pulsed CW, pulsed, and pulsed-step CW measurement systems and associated data analysis and cross section interpretation as well as the Scientific Atlanta (SA) linear FM/CW system and associated SA code for down range and cross range acquisition, analysis and plotting is required.

Task Technical Requirements: In conduct of this task, contractor shall:

- a. Develop and validate computer codes and algorithms necessary for specific test programs in analytic antenna design and EM scattering techniques research in the LaRC Compact Range Test Facility;
- b. Serve as co-principal investigator with NASA to coordinate test programs with University, DOD, Aerospace Industry and NASA participants.
- c. Operate and maintain the LaRC Compact Range Test Facility. In this task, contractor shall schedule, prioritize, conduct tests and acquire, process, display, archive, document and interpret measured data. Contractor shall be responsible for maintaining and upgrading the test facility as necessary.
- d. Assume the role identified herein for the proposed LaRC ESL facility.

Required Completion Date and Delivery Schedule: This task shall continue throughout the task contract period of performance; thus, all resources scoped shall be on a per-year basis. Informal interim

reports summarizing yearly results of this task assignment are required to be delivered within 2 months after the start date of the task assignment.

Estimate of Resources - To be proposed by offeror:

Skill mix
Hours per skill
Total Hours

The offeror's response to this Representative Task will be evaluated on Factors 1, 2, and 3 of the Mission Suitability Factors set forth in Section M, Article M-2.

ATTACHMENT 2

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
 LANGLEY RESEARCH CENTER
 HAMPTON, VIRGINIA 23665-5225

CERTIFICATE OF CURRENT COST OR PRICING DATA

This is to certify that, to the best of my knowledge and belief, the cost or pricing data (as defined in Section 15.801 of the Federal Acquisition Regulation (FAR) and required under FAR Subsection 15.804-2) submitted, either actually or by specific identification in writing, to the Contracting Officer or the Contracting Officer's representative in support of _____* are accurate, complete, and current as of _____**
 day month year

This certification includes the cost or pricing data supporting any advance agreements and forward pricing rate agreements between the offeror and the Government that are part of the proposal.

FIRM _____

NAME _____

TITLE _____

 Date of Execution ***

*Identify the proposal, quotation, request for price adjustment, or other submission involved, giving the appropriate identifying number (e.g., RFP No.).

**Insert the day, month, and year when price negotiations were concluded and the price agreement was reached.

***Insert the day, month, and year of signing, which should be as close as practicable to the date when the price negotiations were concluded and the contract price was agreed to.

CONTRACT PRICING PROPOSAL COVER SHEET	1. SOLICITATION/CONTRACT MODIFICATION NO.	FORM APPROVED OMB NO. 3090-0116
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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 (Include ZIP Code)	3A. NAME AND TITLE OF OFFEROR'S POINT OF CONTACT	3B. TELEPHONE NO.
4. TYPE OF CONTRACT ACTION (Check)		
<input type="checkbox"/> A. NEW CONTRACT <input type="checkbox"/> B. CHANGE ORDER <input type="checkbox"/> C. PRICE REVISION OR DETERMINATION		<input type="checkbox"/> D. LETTER CONTRACT <input type="checkbox"/> E. UNPRICED ORDER <input type="checkbox"/> F. OTHER (Specify)
5. TYPE OF CONTRACT (Check)		
<input type="checkbox"/> FFP <input type="checkbox"/> CPFF <input type="checkbox"/> CPFF <input type="checkbox"/> CPAF <input type="checkbox"/> FPI <input type="checkbox"/> OTHER (Specify)	6. PROPOSED COST (A+B+C)	
A. COST \$	B. PROFIT/FEE \$	C. TOTAL \$
7. PLACE(S) AND PERIOD(S) OF PERFORMANCE		

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. (Continue on reverse, and then on plain paper, if necessary. Use same headings.)

A. LINE ITEM NO.	B. IDENTIFICATION	C. QUANTITY	D. TOTAL PRICE	E. REF.

9. PROVIDE NAME, ADDRESS, AND TELEPHONE NUMBER FOR THE FOLLOWING (If available)

A. CONTRACT ADMINISTRATION OFFICE	B. AUDIT OFFICE
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10. WILL YOU REQUIRE THE USE OF ANY GOVERNMENT PROPERTY IN THE PERFORMANCE OF THIS WORK? (If "Yes," identify)	11A. DO YOU REQUIRE GOVERNMENT CONTRACT FINANCING TO PERFORM THIS PROPOSED CONTRACT? (If "Yes," complete Item 11B)	11B. TYPE OF FINANCING (If one)
<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> ADVANCE PAYMENTS <input 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? (If "Yes," identify item(s), customer(s) and contract number(s))	13. IS THIS PROPOSAL CONSISTENT WITH YOUR ESTABLISHED ESTIMATING AND ACCOUNTING PRACTICES AND PROCEDURES AND FAR PART 31 COST PRINCIPLES? (If "No," explain)
<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO

14. COST ACCOUNTING STANDARDS BOARD (CASB) DATA (Public Law 91-379 as amended and FAR PART 30)	
A. WILL THIS CONTRACT ACTION BE SUBJECT TO CASB REGULATIONS? (If "No," explain in proposal)	B. HAVE YOU SUBMITTED A CASB DISCLOSURE STATEMENT (CASB DS 1 or 2)? (If "Yes," specify in proposal the office to which submitted and if determined to be adequate)
<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO
C. HAVE YOU BEEN NOTIFIED THAT YOU ARE OR MAY BE IN NON-COMPLIANCE WITH YOUR DISCLOSURE STATEMENT OR COST ACCOUNTING STANDARDS? (If "Yes," explain in proposal)	D. IS ANY ASPECT OF THIS PROPOSAL INCONSISTENT WITH YOUR DISCLOSED PRACTICES OR APPLICABLE COST ACCOUNTING STANDARDS? (If "Yes," explain in proposal)
<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input 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 actual costs as of this date.

15. NAME AND TITLE (Type)	16. NAME OF FIRM
17. SIGNATURE	18. DATE OF SUBMISSION

TABLE 15-2 INSTRUCTIONS FOR SUBMISSION OF A CONTRACT PRICING PROPOSAL.

1. SF 1411 provides a vehicle for the offeror to submit to the Government a pricing proposal of estimated and/or incurred costs by contract line item with supporting information, adequately cross-referenced, suitable for detailed analysis. A cost element breakdown, using the applicable format prescribed in 7A, B, or C below, shall be attached for each proposed line item and must reflect any specific requirements established by the contracting officer. Supporting breakdowns must be furnished for each cost element, consistent with offeror's cost accounting system. When more than one contract line item is proposed, summary total amounts covering all line items must be furnished for each cost element. If agreement has been reached with Government representatives on use of forward pricing rates/factors, identify the agreement, include a copy, and describe its nature. Depending on offeror's system, breakdowns shall be provided for the following basic elements of cost, as applicable:
- Materials**—Provide a consolidated priced summary of individual material quantities included in the various tasks, orders, or contract line items being proposed and the basis for pricing (vendor quotes, invoice prices, etc.).
 - Subcontracted Items**—Include parts, components, assemblies, and services that are to be produced or performed by others in accordance with offeror's design, specifications, or direction and that are applicable only to the prime contract. For each subcontract over \$100,000, the support should provide a listing by source, item, quantity, price, type of subcontract, degree of competition, and basis for establishing source and reasonableness of price, as well as the results of review and evaluation of subcontract proposals when required by FAR 15.806.
 - Standard Commercial Items**—Consists of items that offeror normally fabricates, in whole or in part, and that are generally stocked in inventory. Provide an appropriate explanation of the basis for pricing. If price is based on cost, provide a cost breakdown; if priced at other than cost, provide justification for exemption from submission of cost or pricing data, as required by FAR 15.804-3(e).
 - Interorganizational Transfer (at other than cost)**—Explain pricing method used. (See FAR 31.205-26).
 - Raw Material**—Consists of material in a form or state that requires further processing. Provide priced quantities of items required for the proposal.
 - Purchased Parts**—Includes material items not covered above. Provide priced quantities of items required for the proposal.
 - Interorganizational Transfer (at cost)**—Include separate breakdown of cost by element.
 - Direct Labor**—Provide a time-phased (e.g., monthly, quarterly, etc.) breakdown of labor hours, rates, and cost by appropriate category, and furnish bases for estimates.
 - Indirect Costs**—Indicate how offeror has computed and applied offeror's indirect costs, including cost breakdowns, and showing trends and budgetary data, to provide a basis for evaluating the reasonableness of proposed rates. Indicate the rates used and provide an appropriate explanation.
 - Other Costs**—List all other costs not otherwise included in the categories described above (e.g., special tooling, travel, computer and consultant services, preservation, packaging and packing, spoilage and rework, and Federal excise tax on finished articles) and provide bases for pricing.
 - Royalties**—If more than \$250, provide the following information on a separate page for each separate royalty or license fee: name and address of licensor; date of license agreement; patent numbers, patent application serial numbers, or other basis on which the royalty is payable; brief description (including any part or model numbers of each contract item or component on which the royalty is payable); percentage or dollar rate of royalty per unit; unit price of contract item; number of units; and total dollar amount of royalties. In addition, if specifically requested by the contracting officer, provide a copy of the current license agreement and identification of applicable claims of specific patents. (See FAR 27.204 and 31.205-37).
 - Facilities Capital Cost of Money**—When the offeror elects to claim facilities capital cost of money as an allowable cost, the offeror must submit Form CASB-CMF and show the calculation of the proposed amount (see FAR 31.205-10).
2. As part of the specific information required, the offeror must submit with offeror's proposal, and clearly identify as such, cost or pricing data (that is, data that are verifiable and factual and otherwise as defined at FAR 15.801). In addition, submit with offeror's proposal any information reasonably required to explain offeror's estimating process, including—
- a. The judgmental factors applied and the mathematical or other methods used in the estimate, including those used in projecting from known data; and
 - b. The nature and amount of any contingencies included in the proposed price.
3. There is a clear distinction between submitting cost or pricing data and merely making available books, records, and other documents without identification. The requirement for submission of cost or pricing data is met when all accurate cost or pricing data reasonably available to the offeror have been submitted, either actually or by specific identification, to the contracting officer or an authorized representative. As later information comes into the offeror's possession, it should be promptly submitted to the contracting officer. The requirement for submission of cost or pricing data continues up to the time of final agreement on price.
4. In submitting offeror's proposal, offeror must include an index, appropriately referenced, of all the cost or pricing data and information accompanying or identified in the proposal. In addition, any future additions and/or revisions, up to the date of agreement on price, must be annotated on a supplemental index.
5. By submitting offeror's proposal, the offeror, if selected for negotiation, grants the contracting officer or an authorized representative the right to examine those books, records, documents, and other supporting data that will permit adequate evaluation of the proposed price. This right may be exercised at any time before award.
6. As soon as practicable after final agreement on price, but before the award resulting from the proposal, the offeror shall, under the conditions stated in FAR 15.804-4, submit a Certificate of Current Cost or Pricing Data.
7. HEADINGS FOR SUBMISSION OF LINE-ITEM SUMMARIES:
- A. New Contracts (including Letter contracts).

COST ELEMENTS	PROPOSED CONTRACT ESTIMATE—TOTAL COST	PROPOSED CONTRACT ESTIMATE—UNIT COST	REFERENCE
(1)	(2)	(3)	(4)

Under Column (1)—Enter appropriate cost elements

Under Column (2)—Enter those necessary and reasonable costs that in offeror's judgment will properly be incurred in efficient contract performance. When any of the costs in this column have already been incurred (e.g., under a letter contract or unpriced order), describe them on an attached supporting schedule. When preproduction or startup costs are significant, or when specifically requested to do so by the contracting officer, provide a full identification and explanation of them.

Under Column (3)—Optional, unless required by the contracting officer.

Under Column (4)—Identify the attachment in which the information supporting the specific cost element may be found. Attach separate pages as necessary.

B. Change Orders (modifications).

COST ELEMENTS	ESTIMATED COST OF ALL WORK DELETED	COST OF DELETED WORK ALREADY PERFORMED	NET COST TO BE DELETED	COST OF WORK ADDED	NET COST OF CHANGE	REFERENCE
(1)	(2)	(3)	(4)	(5)	(6)	(7)

Under Column (1)—Enter appropriate cost elements.

Under Column (2)—Include (1) current estimates of what the cost would have been to complete deleted work not yet performed, and (2) the cost of deleted work already performed.

Under Column (3)—Include the incurred cost of deleted work already performed, actually computed if possible, or estimated in the contractor's accounting records. Attach a detailed inventory of work, materials, parts, components, and hardware already purchased, manufactured, or performed and deleted by the change, indicating the cost and proposed disposition of each line item. Also, if offeror desires to retain these items or any portion of them, indicate the amount offered for them.

Under Column (4)—Enter the net cost to be deleted which is the estimated cost of all deleted work less the cost of deleted work already performed. Column (2) less Column (3) = Column (4).

Under Column (5)—Enter the offeror's estimate for cost of work added by the change. When nonrecurring costs are significant, or when specifically requested to do so by the contracting officer, provide a full identification and explanation of them.

Under Column (6)—Enter the net cost of change which is the cost of work added, less the net cost to be deleted. When this result is negative, place the amount in parentheses. Column (4) less Column (5) = Column (6).

Under Column (7)—Identify the attachment in which the information supporting the specific cost element may be found. Attach separate pages as necessary.

C. Price Revision/Redetermination.

CUTOFF DATE	NUMBER OF UNITS COMPLETED	NUMBER OF UNITS TO BE COMPLETED	CONTRACT AMOUNT	REDTERMINATION PROPOSAL AMOUNT	DIFFERENCE
(1)	(2)	(3)	(4)	(5)	(6)

COST ELEMENTS	INCURRED COST - PREPRODUCTION	INCURRED COST - COMPLETED UNITS	INCURRED COST - WORK IN PROCESS	TOTAL INCURRED COST	ESTIMATED COST TO COMPLETE	ESTIMATED TOTAL COST	REFERENCE
(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)

Under Column (1)—Enter the cutoff date required by the contract, if applicable.

Under Column (2)—Enter the number of units completed during the period for which experienced costs of production are being submitted.

Under Column (3)—Enter the number of units remaining to be completed under the contract.

Under Column (4)—Enter the cumulative contract amount.

Under Column (5)—Enter the offeror's redetermination proposal amount.

Under Column (6)—Enter the difference between the contract amount and the redetermination proposal amount. When this result is negative, place the amount in parentheses. Column (4) less Column (5) = Column (6).

Under Column (7)—Enter appropriate cost elements. When residual inventory exists, the final costs established under fixed price-incentive and fixed price redeterminable arrangements should be net of the fair market value of such inventory. In support of subcontract costs, submit a listing of all subcontracts subject to repricing action, annotated as to their status.

Under Column (8)—Enter all costs incurred under the contract before starting production and other nonrecurring costs (usually referred to as startup costs) from offeror's books and records as of the cutoff date. These include such costs as preproduction engineering, special plant rearrangement, training program, and any identifiable nonrecurring costs such as initial rework, spoilage, pilot runs, etc. In the event the amounts are not aggregated or otherwise available from offeror's records, enter in this column offeror's best estimates. Explain the basis for each estimate and how the costs are charged on offeror's accounting records (e.g., included in production costs as direct engineering labor, charged to manufacturing overhead, etc.) Also show how the costs would be allocated to the units at their various stages of contract completion.

Under Columns (9) and (10)—Enter in Column (9) the production costs from offeror's books and records (exclusive of preproduction costs reported in Column (8)) of the units completed as of the cutoff date. Enter in Column (10) the costs of work in process as determined from offeror's records or inventories at the cutoff date. When the amounts for work in process are not available in contractor's records but reliable estimates for them can be made, enter the estimated amounts in Column (10) and enter in Column (9) the differences between the total incurred costs (exclusive of preproduction costs) as of the cutoff date and these estimates. Explain the basis for the estimates, including identification of any provisions for experienced or anticipated allowances, such as shrinkage, rework, design changes, etc. Furnish experienced unit or lot costs (or labor hours) from portions of contract to the cutoff date, improvement curves, and any other available production cost history pertaining to the items to which offeror's proposal relates.

Under Column (11)—Enter total incurred costs (Total of Columns (8), (9), and (10)).

Under Column (12)—Enter those necessary and reasonable costs that in contractor's judgment will properly be incurred in completing the remaining work to be performed under the contract with respect to the items in which contractor's proposal relates.

Under Column (13)—Enter total estimated cost (Total of Columns (11) and (12)).

Under Column (14)—Identify the attachment in which the information supporting the specific cost element may be found. Attach separate pages as necessary.

SECTION K
REPRESENTATIONS, CERTIFICATIONS AND OTHER STATEMENTS OF OFFERORS

The representations and certifications must be filled in as appropriate. The signature of the offeror or bidder in Block 16 of the Standard Form 33 (which is the face page of this solicitation) constitutes the making of the applicable representations and certifications. Award of any contract to the offeror or bidder shall be considered to have incorporated the applicable representations and certifications by reference in accordance with FAR 14.201-1(c) or 15.406-1(b).

ARTICLE K-1. 52.203-4 CONTINGENT FEE REPRESENTATION AND AGREEMENT (APR 1984)

(a) Representation. The offeror represents that, except for full-time bona fide employees working solely for the offeror, the offeror -
(NOTE: The offeror must check the appropriate boxes. For interpretation of the representation, including the term "bona fide employee", see Subpart 3.4 or the Federal Acquisition Regulation.)

- (1) () has, () has not, employed or retained any person or company to solicit or obtain this contract; and
- (2) () has, () has not, paid or agreed to pay to any person or company employed or retained to solicit or obtain this contract any commission, percentage, brokerage, or other fee contingent upon or resulting from the award of this contract.

(b) Agreement. The offeror agrees to provide information relating to the above Representation as requested by the Contracting Officer and, when subparagraph (a)(1) or (a)(2) is answered affirmatively, to promptly submit to the Contracting Officer -

- (1) A completed Standard Form 119, Statement of Contingent or Other Fees, (SF 119); or
- (2) A signed statement indicating that the SF 119 was previously submitted to the same contracting office, including the date and applicable solicitation or contract number, and representing that the prior SF 119 applies to this offer or quotation.

ARTICLE K-2. 52.215-6 TYPE OF BUSINESS ORGANIZATION (JUL 1987)

The offeror or quoter, by checking the applicable box, represents that -
(a) It operates as () a corporation incorporated under the laws of the State of _____, () an individual, () a partnership, () a nonprofit organization, or () a joint venture; or

(b) If the offeror or quoter is a foreign entity, it operates as () an individual, () a partnership, () a nonprofit organization, () a joint venture, or () a corporation, registered for business in _____ country.

ARTICLE K-3. 52.215-11 AUTHORIZED NEGOTIATORS (APR 1984)

The offeror or quoter represents that the following persons are authorized to negotiate on its behalf with the Government in connection with

this request for proposals or quotations: (list names, titles, and telephone numbers of the authorized negotiators).

ARTICLE K-4. 52.215-19 PERIOD FOR ACCEPTANCE OF OFFER (APR 1984)

In compliance with the solicitation, the offeror agrees, if this offer is accepted within * calendar days (60 calendar days unless a different period is inserted by the offeror) from the date specified in the solicitation for receipt of offers, to furnish any or all items on which prices are offered at the price set opposite each item, delivered at the designated point(s), within the time specified in the Schedule.

*Proposals shall be valid for 120 days from offer due date.

ARTICLE K-5. 52.215-20 PLACE OF PERFORMANCE (APR 1984)

- (a) The offeror or quoter, in the performance of any contract resulting from this solicitation, () intends, () does not, intend (check applicable block), to use one or more plants or facilities located at a different address from the address of the offeror or quoter as indicated in this proposal or quotation.
 (b) If the offeror or quoter checks "intends" in paragraph (a) above, it shall insert in the spaces provided below the required information:

Place of Performance
 (Street Address, City,
 County, State, Zip Code)

Name and Address of Owner and
 Operator of the Plant or Facility
 if Other than Offeror or Quoter

ARTICLE K-6. 52.219-1 SMALL BUSINESS CONCERN REPRESENTATION (MAY 1986)

The offeror represents and certifies as part of its offer that it () is, () is not a small business concern and that () all, () not all end items to be furnished will be manufactured or produced by a small business concern in the United States, its territories or possessions, Puerto Rico, or the Trust Territory of the Pacific Islands. "Small business concern," as used in this provision, means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding on Government contracts, and qualified as a small business under the size standards in this solicitation.

ARTICLE K-7. 52.219-2 SMALL DISADVANTAGED BUSINESS CONCERN REPRESENTATION (APR 1984)

- (a) Representation. The offeror represents that it () is, () is not, a small disadvantaged business concern.
 (b) Definitions.

"Asian-Indian American," as used in this provision, means a United States citizen whose origins are in India, Pakistan, or Bangladesh.

"Asian-Pacific American," as used in this provision, means a United States citizen whose origins are in Japan, China, the Philippines, Vietnam, Korea, Samoa, Guam, the U.S. Trust Territory of the Pacific Islands, the Northern Mariana Islands, Laos, Cambodia, or Taiwan.

"Native American," as used in this provision, means American Indians, Eskimos, Aleuts, and native Hawaiians.

"Small business concern," as used in this provision, means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding on Government contracts, and qualified as a small business under the criteria and size standards in 13 CFR 121.

"Small disadvantaged business concern," as used in this provision, means a small business concern that (1) is at least 51 percent owned by one or more individuals who are both socially and economically disadvantaged, or a publicly owned business having at least 51 percent of its stock owned by one or more socially and economically disadvantaged individuals and (2) has its management and daily business controlled by one or more such individuals.

(c) Qualified groups. The offeror shall presume that socially and economically disadvantaged individuals include Black Americans, Hispanic Americans, Native Americans, Asian-Pacific Americans, Asian-Indian Americans, and other individuals found to be qualified by the SBA under 13 CFR 124.1.

ARTICLE K-8. 52.219-3 WOMEN-OWNED SMALL BUSINESS REPRESENTATION (APR 1984)

(a) Representation. The offeror represents that it () is, () is not, a women-owned small business concern.

(b) Definitions.

"Small business concern", as used in this provision, means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding on Government contracts, and qualified as a small business under the criteria and size standards in 13 CFR 121.

"Women-owned", as used in this provision, means a small business that is at least 51 percent owned by a woman or women who are U.S. citizens and who also control and operate the business.

ARTICLE K-9. 52.220-1 PREFERENCE FOR LABOR SURPLUS AREA CONCERNS (APR 1984)

(a) This acquisition is not a set aside for labor surplus area (LSA) concerns. However, the offeror's status as such a concern may affect (1) entitlement to award in case of tie offers or (2) offer evaluation in accordance with the Buy American Act clause of this solicitation. In order to determine whether the offeror is entitled to a preference under (1) or (2) above, the offeror must identify, below, the LSA in which the costs to be incurred on account of manufacturing or production (by the offeror or the first-tier subcontractors) amount to more than 50 percent of the contract price.

(b) Failure to identify the locations as specified above will preclude consideration of the offeror as an LSA concern. If the offeror is awarded a contract as an LSA concern and would not have otherwise qualified for award, the offeror shall perform the contract or cause the contract to be performed in accordance with the obligations of an LSA concern.

ARTICLE K-10. 52.222-19 WALSH-HEALY PUBLIC CONTRACTS ACT REPRESENTATION
(APR 1984)

The offeror represents as a part of this offer that the offeror () is, or () is not, a regular dealer in, or () is, or () is not, a manufacturer of the supplies offered.

ARTICLE K-11. 52.222-21 CERTIFICATION OF NONSEGREGATED FACILITIES (APR 1984)

(a) "Segregated facilities", as used in this provision, means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees, that are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, or national origin because of habit, local custom, or otherwise.

(b) By the submission of this offer, the offeror certifies that it does not and will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not and will not permit its employees to perform their services at any location under its control where segregated facilities are maintained. The offeror agrees that a breach of this certification is a violation of the Equal Opportunity clause in the contract.

(c) The offeror further agrees that (except where it has obtained identical certifications from proposed subcontractors for specific time periods) it will -

(1) Obtain identical certifications from proposed subcontractors before the award of subcontracts under which the subcontractor will be subject to the Equal Opportunity clause;

(2) Retain the certifications in the files; and

(3) Forward the following notice to the proposed subcontractors (except if the proposed subcontractors have submitted identical certifications for specific time periods):

NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENT FOR
CERTIFICATIONS OF NONSEGREGATED FACILITIES

A Certification of Nonsegregated Facilities must be submitted before the award of a subcontract under which the subcontractor will be subject to the Equal Opportunity clause. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually, or annually).

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

ARTICLE K-12. 52.222-22 PREVIOUS CONTRACTS AND COMPLIANCE REPORTS (APR 1984)

The offeror represents that -

- (a) It () has, () has not, participated in a previous contract or subcontract subject either to the Equal Opportunity clause of this solicitation, the clause originally contained in Section 310 of Executive Order No. 10925, or the clause contained in Section 201 of Executive Order No. 11114;
- (b) It () has, () has not, filed all required compliance reports; and
- (c) Representations indicating submission of required compliance reports, signed by proposed subcontractors, will be obtained before subcontract awards.

ARTICLE K-13. 52.222-25 AFFIRMATIVE ACTION COMPLIANCE (APR 1984)

The offeror represents that (a) it () has developed and has on file, () has not developed and does not have on file, at each establishment, affirmative action programs required by the rules and regulations of the Secretary of Labor (41 CFR 60-1 and 60-2), or (b) it () has not previously had contracts subject to the written affirmative action programs requirement of the rules and regulations of the Secretary of Labor.

ARTICLE K-14. 52.223-1 CLEAN AIR AND WATER CERTIFICATION (APR 1984)

The offeror certifies that -

- (a) Any facility to be used in the performance of this proposed contract () is, () is not, listed on the Environmental Protection Agency List of Violating Facilities;
- (b) The offeror will immediately notify the Contracting Officer, before award, of the receipt of any communication from the Administrator, or a designee, of the Environmental Protection Agency, indicating that any facility that the offeror proposes to use for the performance of the contract is under consideration to be listed on the EPA List of Violating Facilities; and
- (c) The offeror will include a certification substantially the same as this certification, including this paragraph (c), in every nonexempt subcontract.

ARTICLE K-15. 52.225-1 BUY AMERICAN CERTIFICATE (APR 1984)

The offeror certifies that each end product, except those listed below, is a domestic end product (as defined in the clause entitled "Buy American Act - Supplies"), and that components of unknown origin are considered to have been mined, produced, or manufactured outside the United States.

Excluded End Products

Country of Origin

(List as necessary)

Offerors may obtain from the Contracting Officer lists of articles, materials, and supplies excepted from the Buy American Act (listed at 25.108 of the Federal Acquisition Regulation).

ARTICLE K-16. 52.227-15 REPRESENTATION OF LIMITED RIGHTS DATA AND RESTRICTED COMPUTER SOFTWARE (JUN 1987)

(a) This solicitation sets forth the work to be performed if a contract award results, and the Government's known delivery requirements for data (as defined in FAR 27.401). Any resulting contract may also provide the Government the option to order additional data under the Additional Data Requirements clause at 52.227-16 of the FAR, if included in the contract. Any data delivered under the resulting contract will be subject to the Rights in Data - General clause at 52.227-14 that is to be included in this contract. Under the latter clause, a Contractor may withhold from delivery data that qualify as limited rights data or restricted computer software, and deliver form, fit, and function data in lieu thereof. The latter clause also may be used with its Alternates II and/or III to obtain delivery of limited rights data or restricted computer software, marked with limited rights or restricted rights notices, as appropriate. In addition, use of Alternate V with this latter clause provides the Government the right to inspect such data at the Contractor's facility.

(b) As an aid in determining the Government's need to include any of the aforementioned Alternates in the clause at 52.227-14, Rights in Data - General, the offeror's response to this solicitation shall, to the extent feasible, complete the representation in paragraph (b) of this clause to either state that none of the data qualify as limited rights data or restricted computer software, or identify which of the data qualifies as limited rights data or restricted computer software. Any identification of limited rights data or restricted computer software in the offeror's response is not determinative of the status of such data should a contract be awarded to the offeror.

REPRESENTATION CONCERNING DATA RIGHTS

Offeror has reviewed the requirements for the delivery of data or software and states (offeror check appropriate block) -

- None of the data proposed for fulfilling such requirements qualifies as limited rights data or restricted computer software.
- Data proposed for fulfilling such requirements qualify as limited rights data or restricted computer software and are identified as follows:

NOTE: "Limited rights data" and "Restricted computer software" are defined in the contract clause entitled "Rights in Data - General."

ARTICLE K-17. 52.228-6 INSURANCE - IMMUNITY FROM TORT LIABILITY (APR 1984)

If the offeror is partially or totally immune from tort liability to third persons as a State agency or as a charitable institution, and includes in its offer a representation to that effect, the clause at 52.228-7, Insurance - Liability to Third Persons, will be included in the contract.

(a) With its Alternate I, if the offeror represents that it is partially immune from tort liability to third persons as a State agency or as a charitable institution: or

(b) With its Alternate II, if the offeror represents that it is totally immune from tort liability to third persons as a State agency or as a charitable institution.

ARTICLE K-18. 52.230-1 COST ACCOUNTING STANDARDS NOTICES AND CERTIFICATION (NATIONAL DEFENSE) (SEP 1987)

NOTE: This notice does not apply to small businesses or foreign governments.

This notice is in four parts, identified by Roman numerals I. through IV.

Offerors shall examine each part and provide the requested information in order to determine Cost Accounting Standards (CAS) requirements applicable to any resultant contract.

I. DISCLOSURE STATEMENT - COST ACCOUNTING PRACTICES AND CERTIFICATION

(a) Any contract in excess of \$100,000 resulting from this solicitation, except contracts in which the price negotiated is based on (1) established catalog or market prices of commercial items sold in substantial quantities to the general public, or (2) prices set by law or regulation, will be subject to the requirements of Federal Acquisition Regulation (FAR) Subparts 30.3 and 30.4, except for those contracts which are exempt as specified in FAR 30.201-1.

(b) Any offeror submitting a proposal which, if accepted, will result in a contract subject to the requirements of FAR Subparts 30.3 and 30.4 must, as a condition of contracting, submit a Disclosure Statement as required by FAR 30.202. The Disclosure Statement must be submitted as a part of the offeror's proposal under this solicitation unless the offeror has already submitted a Disclosure Statement disclosing the practice used in connection with the pricing of this proposal. If an applicable Disclosure Statement has already been submitted, the offeror may satisfy the requirement for submission by providing the information requested in paragraph (c) of Part I of this provision.

CAUTION: A practice disclosed in a Disclosure Statement shall not, by virtue of such disclosure, be deemed to be a proper, approved, or agreed-to practice for pricing proposals or accumulating and reporting contract performance cost data.

(c) Check the appropriate box below:

(1) Certificate of Concurrent Submission of Disclosure Statement.

The offeror hereby certifies that, as a part of the offer, copies of the Disclosure Statement have been submitted as follows: (i) original and one copy to the cognizant Administrative Contracting Officer (ACO), and (ii) one copy to the cognizant contract auditor.

(Disclosure must be on Form Number CASB-DS-1. Forms may be obtained from the cognizant ACO.)

Date of Disclosure Statement _____
 Name and Address of Cognizant ACO where filed _____

The offeror further certifies that practices used in estimating costs in pricing this proposal are consistent with the cost accounting practices disclosed in the Disclosure Statement.

(2) Certificate of Previously Submitted Disclosure Statement.

The offeror hereby certifies that Disclosure Statement was filed as follows:

Date of Disclosure Statement _____
 Name and Address of Cognizant ACO where filed _____

The offeror further certifies that the practices used in estimating costs in pricing this proposal are consistent with the cost accounting practices disclosed in the applicable disclosure statement.

(3) Certificate of Monetary Exemption.

The offeror hereby certifies that the offeror, together with all divisions, subsidiaries, and affiliates under common control, did not receive net awards of negotiated national defense prime contracts and subcontracts subject to CAS totaling more than \$10 million in the cost accounting period immediately preceding the period in which this proposal was submitted. The offeror further certifies that if such status changes before an award resulting from this proposal, the offeror will advise the Contracting Officer immediately.

(4) Certificate of Interim Exemption.

The offeror hereby certifies that (i) the offeror first exceeded the monetary exemption for disclosure, as defined in (3) above, in the cost accounting period immediately preceding the period in which this offer was submitted and (ii) in accordance with FAR 30.202-1, the offeror is not yet required to submit a Disclosure Statement. The offeror further certifies that if an award resulting from this proposal has not been made within 90 days after the end of that period, the offeror will immediately submit a revised certificate to the Contracting Officer, in the form specified under subparagraphs (c)(1) or (c)(2) of Part I of this provision, as appropriate, to verify submission of a completed Disclosure Statement.

CAUTION: Offerors currently required to disclose because they were awarded a CAS-covered national defense prime contract or subcontract of \$10 million or more in the current cost accounting period may not claim this exemption (4). Further, the exemption applies only in connection with proposals submitted before expiration of the 90-day period following the cost accounting period in which the monetary exemption was exceeded.

II. COST ACCOUNTING STANDARDS - EXEMPTION FOR CONTRACTS OF \$500,000 OR LESS

If this proposal is expected to result in the award of a contract of \$500,000 or less, the offeror shall indicate whether the exemption below is claimed. Failure to check the box below shall mean that the resultant contract is subject to CAS requirements or that the offeror elects to comply with such requirements.

() The offeror hereby claims an exemption from the CAS requirements under the provisions of Federal Acquisition Regulation (FAR) 30.201-1(b)(7) and certifies that notification of final acceptance of all deliverable items has been received on all prime contracts or subcontracts containing the Cost Accounting Standards clause or the Disclosure and Consistency of Cost Accounting Practices clause. The offeror further certifies that the Contracting Officer will be immediately notified in writing when an award of any other contract or subcontract containing Cost Accounting Standards clauses is received by the offeror subsequent to this certificate but before the date of any award resulting from this proposal.

III. COST ACCOUNTING STANDARDS - ELIGIBILITY FOR MODIFIED CONTRACT COVERAGE

If the offeror is eligible to use the modified provisions of Federal Acquisition Regulation (FAR) 30.201-2(b) and elects to do so, the offeror shall indicate by checking the box below. Checking the box below shall mean that the resultant contract is subject to the Disclosure and Consistency of Cost Accounting Practices clause in lieu of the Cost Accounting Standards clause.

() The offeror hereby claims an exemption from the Cost Accounting Standards clause under the provisions of FAR 30.201-2(b) and certifies that the offeror is eligible for use of the Disclosure and Consistency of Cost Accounting Practices clause because (i) during the cost accounting period immediately preceding the period in which this proposal was submitted, the offeror received less than \$10 million in awards of CAS-covered national defense prime contracts and subcontracts, and (ii) the sum of such awards equaled less than 10 percent of total sales during that cost accounting period. The offeror further certifies that if such status changes before an award resulting from this proposal, the offeror will advise the Contracting Officer immediately.

CAUTION: An offeror may not claim the above eligibility for modified contract coverage if this proposal is expected to result in the award of a national defense contract of \$10 million or more or if, during its current cost accounting period, the offeror has been awarded a single CAS-covered national defense prime contract or subcontract of \$10 million or more.

IV. ADDITIONAL COST ACCOUNTING STANDARDS APPLICABLE TO EXISTING CONTRACTS

The offeror shall indicate below whether award of the contemplated contract would, in accordance with subparagraph (a)(3) of the Cost Accounting Standards clause, require a change in established cost accounting practices affecting existing contracts and subcontracts.

() YES

() NO

NOTE: If the offeror has checked "yes" above and is awarded the contemplated contract, the offeror will be required to comply with the requirements of subparagraph (a)(1) and paragraphs (b) and (c) of the Administration of Cost Accounting Standards clause.

ARTICLE K-19. 18-52.203-70 CONTRACTS BETWEEN NASA AND FORMER NASA EMPLOYEES (APR 1984) (NASA/FAR SUPPLEMENT)

The offeror represents that he or she () is, or () is not, an individual who was employed by NASA during the past two (2) years, or a firm in which such former employee is a partner, principal officer, majority shareholder, or which is otherwise controlled or predominantly staffed by such former employees.

ARTICLE K-20. GOVERNMENT PROPERTY

Use of Government property is contemplated in the contract resulting from this solicitation. Accordingly, the offeror shall furnish -

- (a) The date of the last review by the Government of its property control and accounting system and describe actions taken to correct any deficiencies found;
- (b) A statement that the offeror has reviewed, understands, and can comply with all property management and accounting procedures in the solicitation, FAR Subpart 45.5, and NASA/FAR Supplement Subparts 18-45.5, 18-45.70 and 18-45.71; and
- (c) A statement whether or not the costs associated with subparagraph (b) above are included in its cost proposal.

SECTION L
INSTRUCTIONS, CONDITIONS, AND NOTICES TO OFFERORS

ARTICLE L-1. 52.215-5 SOLICITATION DEFINITIONS (JUL 1987)

"Offer" means "proposal" in negotiation.
"Solicitation" means a request for proposals (RFP) or a request for quotations (RFQ) in negotiation.
"Government" means United States Government.

ARTICLE L-2. 52.216-1 TYPE OF CONTRACT (APR 1984)

The Government contemplates award of a cost-plus-fixed-fee contract resulting from this solicitation.

ARTICLE L-3. SMALL BUSINESS SIZE STANDARD

This procurement is not a Small Business Set-Aside; however, for Government reporting purposes, and as a definition to be used in completing Section K, Representations, Certifications, and Other Statements of Offerors, the Small Business size standard for this procurement is a concern and its affiliates having not more than 500 employees.

ARTICLE L-4. STANDARD INDUSTRIAL CLASSIFICATION (SIC) CODE

The SIC Code applicable to this procurement is 8731.

ARTICLE L-5. TRADE AGREEMENTS ACT OF 1979

Offers submitted in response to this solicitation shall be based on U.S. dollars and in the English language and shall include applicable duty charges.

ARTICLE L-6. NASA'S POLICY ON FACILITIES CAPITAL COST OF MONEY

As required by NASA FAR Supplement 18-15.970-3, when facilities capital cost of money is included as an item of cost in the Contractor's proposal, a reduction in the profit objective shall be made in an amount equal to the amount of facilities capital cost of money allowed in accordance with FAR 31.205-10(a).

ARTICLE L-7. REQUIREMENT FOR SPECIAL TECHNICAL CAPABILITIES

It is NASA policy to obtain maximum practicable competition consistent with the nature of each procurement. However, to prevent unnecessary expense associated with preparation and submission of a proposal, only firms with demonstrated experience and background in the following areas are encouraged to respond to this request:

- A. EM backscatter in RF anechoic and compact ranges.
- B. Large scale antenna mesh or faceted reflector optimization; feed technology including adaptive feed compensation; and integrated controls, dynamics, and electromagnetic space system engineering experiment studies and design.
- C. Reentry RF attenuation assessment and plasma diagnostics sensor development for the Aerospace Flight Experiment orbital transfer vehicle.
- D. Radar signature and detection technology for aircraft wind shear avoidance.
- E. MIC technology and applications.

ARTICLE L-8. SUBMISSION OF SMALL BUSINESS AND SMALL DISADVANTAGED BUSINESS SUBCONTRACTING PLAN

It is the Government's policy to provide the maximum practicable opportunity for the development of small business concerns. Accordingly, attention is invited to the Section I clause entitled "Small Business and Small Disadvantaged Business Subcontracting Plan." Pursuant to the provision of Public Law 95-507, any contract with a large business concern resulting from this solicitation shall include a subcontracting plan for small business and small disadvantaged business firms. A proposed plan shall be submitted with your offer.

NOTE: Subcontracting plans are not required from small business concerns.

ARTICLE L-9. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Number of Proposals, Time and Place of Submission--The offeror shall submit twelve (12) copies of its Technical Proposal, twelve (12) copies of its Management Proposal, and twelve (12) copies of its Business Proposal to the address shown in Block 8. of the Standard Form (SF) 33 (face page of this solicitation), or if hand carried, to the depository listed in Block 9. of the SF 33. Offers must be received at the place indicated on or before the date and hour shown in Block 9. of the SF 33.

B. 52.215-7 Unnecessarily Elaborate Proposals or Quotations (APR 1984)--Unnecessarily elaborate brochures or other presentations beyond those sufficient to present a complete and effective response to this solicitation are not desired and may be construed as an indication of the offeror's or quoter's lack of cost consciousness. Elaborate art work, expensive paper and bindings, and expensive visual and other presentation aids are neither necessary nor wanted.

ARTICLE L-10. PROPOSAL PREPARATION - SPECIAL INSTRUCTIONS

A. Proposal Clarity--The offeror is urged to examine this solicitation in its entirety and to assure that his proposal contains all the necessary information, provides all required documentation and is complete in all respects since evaluation of the proposal will be based on the actual material presented and not on the basis of what is implied. Proposals should be specific, complete, and concise. The offeror should ensure that its Cost Proposal is consistent with its Technical and Management Proposals in all respects since the business proposal may be used as an aid to determine the offeror's understanding of the technical requirements. Discrepancies may be viewed as a lack of understanding.

B. In this request for proposal, the Government has specified 182,000 direct productive labor manhours, to include subcontractor and consultant hours, as the maximum level of effort that will be required during the contract period for performance of authorized task assignments. Accordingly, the offeror must propose to 182,000 direct productive labor manhours.

C. It is noted that Section C, Statement of Work generally describes the technical mission. For proposal purposes only, Attachment 1 sets forth four (4) Representative Tasks which provide insight as to the subject matter which may be included in typical task(s) to be issued by the Government. It is not intended that the sum of the projected effort for the Representative Tasks equate to the specified RFP levels-of-effort.

D. On-Site Personnel--The Government estimates that approximately nine (9) Contractor personnel, including the Principal Investigator, will be assigned to, and located at Langley Research Center full time at the program initiation, building up to approximately eighteen (18) personnel by the fifth year of contract performance at a rate of two (2) to three (3) additional personnel each year. This assignment should be considered in the offeror's preparation of the technical, management, and business proposals. For proposal preparation purposes, the buildup of proposed personnel for the second through fifth year of performance should be extrapolated from those personnel positions proposed at program initiation.

E. For the offeror's information and better understanding of the actual type, size and extent of task assignments typically issued under the existing contract, the following information is provided. Approximately ten (10) task assignments are issued each year; the average length of a task is approximately nine (9) months, but some continue for the duration of the contract.

F. Proposals must be submitted in three (3) volumes: Volume I, Technical Proposal, Volume II, Management Proposal, and Volume III, Business Proposal. Each volume shall include the detailed information needed to evaluate the proposal in accordance with the evaluation factors set forth in Section M. No cost information shall be presented in the Technical Proposal.

G. The Technical Proposal should not exceed seventy-five (75) pages. This page limitation shall include any charts, tables, graphs, diagrams, photographs, figures and appendices. However, personnel resumes may be added as appendices and will not be counted against the seventy-five (75) page limitation. The Management Proposal should not exceed twenty-five (25) pages. All text shall be double spaced and printed black on white paper. Paper shall not exceed 8 1/2 inches x 11 inches and printing shall not exceed twelve (12) letters per inch.

H. Technical Proposal - Volume I

The Technical Proposal should set forth, in detail, the offeror's method for accomplishing the work specified in Section C, Statement of Work and the Representative Tasks (Attachment 1); the resources that will be devoted to the effort; knowledge of the elements comprising the effort; and measures that will be taken to ensure effective, efficient, timely and quality performance. The offeror shall address the factors being evaluated as set forth in Section M, Article M-2., paragraph A., in terms of proposal content and sequence of presentation.

The intent of the Representative Tasks is (1) to allow an offeror to see in greater detail the type of tasks that may be assigned, (2) to allow the offeror to demonstrate his knowledge and current involvement in antenna and microwave technology, and (3) to allow the Government to evaluate an offeror's understanding of these tasks and the approach for accomplishing them.

The offeror should provide a detailed summary of his approach to performing the Statement of Work and Representative Tasks, explaining how his knowledge and experience of the research area will be utilized. Sufficient detail should be provided so as to allow the Government to evaluate the proposal using Factor 1 - Proposed Technical Approach, Factor 2 - Understanding the Problem, and Factor 3 - Personnel Assigned of the Mission Suitability Evaluation Factors set forth in Section M. In addition, the offeror should provide the skill mix, hours per skill, and the total hours to complete each Representative Task. It should be noted that the offeror's response to the Statement of Work and Representative Tasks are not of equal importance in the evaluation of your proposal. Section M-3. sets forth the relative importance of the offeror's response to the Statement of Work and Representative Tasks.

1. The offeror should describe its approach for performing the ensuing contractual task requirements and achieving the technical objectives through discussion of proposed implementation of the Representative Tasks identified in Attachment 1 and the Statement of Work. The offeror's proposal of innovative technique could maximize the results of the technical requirements; therefore, significant differences in risk, time, equipment use, etc., should be presented. The proposal should provide a description of work performed in the past and/or work currently being performed which conveys an understanding of the purpose of the research, the technology issues, and the performance required. The proposal should demonstrate the offeror's understanding by discussion of problems likely to be encountered and proposed resolution(s) therefor. The offeror should identify those estimates of resources specified in each representative task. Key milestone schedules should be clearly established for each

task. You are reminded that the nature of the Representative Tasks included in this RFP are typical examples only. The offeror's proposal should also include the approach to an understanding of any other elements of the work statement that may not be included in discussion of the representative tasks.

2. The individuals who will perform and administer the work should be identified (including consultant and subcontractor personnel) and a resume of their experience, education, and capabilities included. Also, the amount of time that each will devote to the contract and their specific assignments should be depicted. The offeror should designate those individuals he considers to be key to this effort.

3. Proposed travel should be defined. The number of trips, the destination, their duration and the number of personnel involved should be explained, including the necessity and justification for the trips. This discussion should be integrated with the elements addressed above.

4. Any work functions which the offeror expects to retain through subcontracting and/or consulting agreements should be described and explained. Such features as the rationale for this arrangement, the qualifications/magnitude of effort, facilities/equipment and commitment of parties providing such goods and/or services should be addressed. This discussion should be integrated with the elements addressed above. Your approach for performance of the Statement of Work and the representative tasks set forth in Attachment 1 should include a discussion of what percentage of the work will be done at NASA Langley Research Center (LaRC), at the Contractor's facility, and at subcontractor facilities, and your rationale as to why this would be advantageous to the Government. Under the current contract, approximately eighty percent (80%) of the work has been conducted at NASA LaRC, approximately twelve percent (12%) at the Contractor's facility, and approximately eight percent (8%) at subcontractor facilities.

I. Management Proposal - Volume II

1. The proposal should include an overall management plan for efficiently performing individual and multiple tasks. The plan shall identify the lines of authority relative to key technical personnel. The offeror should include a description of your proposed organization for the contract and an organization chart. The management plan shall include offeror's approach for preventing organizational bottlenecks such as assignment of multiple time critical tasks to the same key technical personnel (who could be either employees or consultants).

2. Your proposal should cover such plans as proposed phase-in plans, recruiting methods, training plans (including orientation), and policies which contribute to employee recruiting, retention, and productivity, such as fringe benefits, career development, leave, salary, employee recognition, and methods of dealing with employee deficiencies in performance. You should explain your approach for accommodating personnel absences and fluctuating workloads, and for augmenting your staff, if needed, to handle anticipated growth.

3. Your proposal should detail your plans for organizing and performing within the SOW and the task assignments; plans for assigning, tracking, and executing work performed pursuant to a task assignment; and plans for recognizing, reporting, and resolving manpower problems and/or schedule slips. In addition, offeror shall include his approach for managing special urgent, high priority (possibly classified) tasks; for these tasks, offeror shall detail how he would respond including (a) prioritization and impact relative to on-going tasks, (b) implementing plan for urgent task, and (c) procedure for phasing out urgent task and returning to original task schedule. (It is recognized that offeror must know the nature of such urgent tasks, but a typical management response is what is desired.)

4. Your proposal should include your estimating and scheduling procedures. This should include how you would schedule your overall work load to respond to individual task assignments. Particular attention should be given to handling of subcontracts and estimates of manhour requirements for task assignments.

5. The management plan must include methods for reporting technical progress on a task-by-task basis to NASA management. Weekly technical highlights and accomplishments will be required for progress reviews to NASA line management.

6. It is recognized that at times, tasks will be assigned which require expertise beyond on-site personnel capabilities. Therefore, limited consultative support may be required (possibly using experts of national or international reputation) in various disciplines as defined by this Statement of Work, including the sample tasks.

J. Business Proposal - Volume III

1. Contract Pricing Proposal Cover Sheet--Standard Form 1411 shall be submitted with the proposal. In submitting the cost proposal, the offeror shall comply with the requirements set forth in Table 15-2 of FAR 15.804-6(b)(2), a copy of which is attached to the Standard Form 1411 provided with this Request for Proposal.

(NOTE: If you use Lotus 123 or Symphony microcomputer software in the preparation of your cost proposal, and have the capability to store the Lotus 123 or Symphony data on IBM PC or AT compatible 320K/360K/1.2M 5-1/4 inch diskettes, it is requested that you submit one (1) copy of the diskette(s) with your proposal.)

a. You are reminded that you must propose to 182,000 direct productive labor hours, to include consultant and subcontracting hours, as previously specified in Article L-10., paragraph B.

b. It is noted that the offeror should propose direct/indirect labor in a manner that is consistent with his established accounting practices. However, only that productive direct labor as defined in Article B-2., paragraph C., will apply for purposes of satisfying the hour levels established.

c. State and explain who is included in the labor classifications that you propose to use for conducting the work and provide the basis for and composition of the rates. Insure that the labor breakdown provides a correlation between individuals and/or skills presented in the Technical Proposal to the labor categories enumerated in the pricing proposal. If principal individuals are treated as indirect, so state. If principal individuals are treated as a mix of direct and indirect, state the mix in percentages. Also, segment those direct labor-hours that do not apply to the levels specified by the RFP.

d. Explain your treatment of cost associated with computer time and travel. Provide all factors used to estimate these cost elements.

e. For any subcontracting/consulting effort proposed, provide a detailed cost breakdown, the type of contractual arrangement, and the application of these hours to the levels specified.

f. Pursuant to the provisions of Public Law 87-653, as amended by Public Law 97-86, the Contractor will be required to certify, except where the price negotiated is based on adequate price competition, as determined by the Contracting Officer, or established catalog or market prices of commercial items sold in substantial quantities to the general public, or prices set by law or regulation, that the cost or pricing data submitted or identified on Standard Form 1411 are accurate, complete, and current. The required certificate is set forth in FAR 15.804-4, a copy of which is attached (NASA-Langley Form PROC./P-281) and which shall be properly executed after negotiation and prior to contract award.

2. Organizational Experience and Past Performance--The offeror should submit a summary (listing) of each Government and/or industry contract performed during the past three (3) years for work related to the requirements of this procurement. This summary should include the contract number, Government agency or commercial company placing the contract, name and telephone number of cognizant customer/Contracting Officer, type of contract, description of work and an explanation of the relevance of this work to the RFP. The offeror should specify the monetary amounts, state the performance period (expressed as dates) and address the extent to which the technical, cost and delivery objectives were achieved for each contract.

3. Other Factors

a. Financial Responsibility--In order for the Government to evaluate the offeror's financial responsibility, the offeror must submit a balance sheet for the last fiscal year and accompanying profit and loss statement.

b. Contract Terms and Conditions--The offeror should cite any proposed exceptions that he may have to the terms and conditions, together with an explanation of the basis therefor, and his proposed means for resolving any such exceptions should be discussed. This same information for any additive terms and conditions should be provided.

c. Security--With regard to the Contract Security Classification Specification, DD 254, Exhibit C, and the Section I clause entitled "Security Requirements," the offeror should provide a statement on his clearance status and/or a summary of his compliance implementation plans. ✓

d. Availability of Facilities and Equipment (F&E)

(1) The offeror should indicate in his proposal the availability of off-site laboratory facilities necessary for performance of the effort specified in the Statement of Work on a timely basis. The offeror should provide in his proposal an acquisition plan for the F&E which is required but not currently available.

(2) The offeror should include in his proposal a list or description of all Government production and research property that he or his subcontractors propose to use on a rent-free basis. For all proposed Government production and research property, the offeror should provide the following:

(a) Identification of the facilities contract or other instrument under which property already in his or his subcontractor's possession is held, and written permission for its use from the Contracting Officer having cognizance of the property.

(b) The dates during which the property will be available for use and, for any property that will be used concurrently in performing two or more contracts, the amounts of the respective uses in sufficient detail to support: (1) proration of the rent for determining a rental equivalent evaluation factor, and (2) a determination that there will be no interference with required use from the other contract(s).

(c) The amount of rent that would otherwise be charged, computed in accordance with FAR 45.403.

(d) Ratio of Government-owned facilities to corporate-owned facilities.

e. Subcontracting Plan for Small Business and Small Disadvantaged Business Concerns--The offeror should include a proposed subcontracting plan for small business and small disadvantaged business concerns for consideration in the source evaluation and selection process. The plan should be specific as to the work, and its dollar value, to be subcontracted with such firms, with related commitments identified, when obtainable. Accordingly, attention is invited to the Section I clause entitled "Small Business and Small Disadvantaged Business Subcontracting Plan."

f. Plan for New Technology Reporting--The offeror should include in his proposed estimates of cost and manpower requirements to perform new technology reporting in accordance with Article L-31., 18-52.235-72, Plan for New Technology Reporting (DEC 1984) NASA/FAR Supplement.

g. Equal Employment Opportunity (EEO) Compliance--The offeror should include in his proposal the following information for the Division of his firm which would perform the resultant contract:

Date of last compliance check

Name, address, and phone of cognizant Government agency

Result of review

Next scheduled compliance review

Have you ever been found in noncompliance?
If yes, explain problem(s) and resolution(s).

ARTICLE L-11. PREPROPOSAL CONFERENCE

A preproposal conference will be held on October 3, 1988, in Room 246 of NASA Building 1202, this Center, beginning at 9:00 a.m. and is expected to last approximately three (3) hours. For information in planning your itinerary, the following is a tentative agenda for the conference:

Agenda

Opening Remarks
LaRC Presentations
Break
Questions and Answers

Attendance will be limited to a maximum of three (3) representatives per offeror. The briefing will be unclassified. If you desire to attend the conference, you should so indicate by written or telephone contact with the appropriate individual specified below. After the briefing, advise this Center if you intend to submit a proposal.

In order that as many questions as possible may be answered at the NASA presentations during the briefing, written questions must be submitted to the Government representative indicated in Article L-34. so as to be received no later than close of business, two (2) working days prior to the Preproposal Conference. A limited time may be available for answering questions submitted on the day of the conference. However, as there is no assurance that adequate time to answer such questions will remain, submission of questions prior to the conference, by the date specified above, will assure their being fully answered.

Attendance at the preproposal conference is recommended; however, attendance is neither required nor a prerequisite for proposal submission and will not be considered a factor in proposal evaluation.

ARTICLE L-12. REJECTION, NEGOTIATION, AWARD AND EXPENDITURE OF FUNDS

This solicitation does not commit the Government to award a contract, since the Government reserves the right to reject any or all proposals, or to negotiate separately with any source considered qualified. The Contracting Officer is the only individual who can legally commit the Government to the expenditure of public funds in connection with the proposed procurement.

ARTICLE L-13. EXPENSES RELATED TO OFFEROR SUBMISSIONS

This solicitation does not commit the Government to pay any cost incurred in the submission of the offer/quotation or in making necessary studies or designs for the preparation thereof, nor to contract for services or supplies. Further, no costs may be incurred in anticipation of a contract with the exception that any such costs incurred at the offeror's risk may later be charged to any resulting contract to the extent that they would have been allowable if incurred after the date of the contract and to the extent authorized by the Contracting Officer.

ARTICLE L-14. 52.233-2 SERVICE OF PROTEST (JAN 1985)

Protests, as defined in Section 33.101 of the Federal Acquisition Regulation, shall be served on the Contracting Officer by obtaining written and dated acknowledgment of receipt from Head, Projects and ADP Contracts Branch.

ARTICLE L-15. SECURITY INFORMATION

During the performance of any contract resulting from this solicitation, the Contractor may require access to material classified SECRET. All Contractor's employees who will have access to classified information in the performance of work pursuant to this contract will require clearance to the maximum security level of the material which they handle. The Contractor shall comply with the requirements of the Section I clause entitled "Security Requirements."

ARTICLE L-16. 52.212-7 NOTICE OF PRIORITY RATING FOR NATIONAL DEFENSE USE (MAY 1986)

Any contract awarded as a result of this solicitation will be a () DX rated order; (X) DO rated order certified for national defense use under the Defense Priorities and Allocations System (DPAS) (15 CFR 350), and the Contractor will be required to follow all of the requirements of this regulation.

ARTICLE L-17. 52.215-8 ACKNOWLEDGMENT OF AMENDMENTS TO SOLICITATIONS (APR 1984)

Offerors shall acknowledge receipt of any amendment to this solicitation (a) by signing and returning the amendment; (b) by identifying the amendment number and date in the space provided for this purpose on the form for submitting an offer; or (c) by letter or telegram. The Government must receive the acknowledgment by the time specified for receipt of offers.

ARTICLE L-18. 52.215-9 SUBMISSION OF OFFERS (APR 1984)

(a) Offers and modifications thereof shall be submitted in sealed envelopes or packages (1) addressed to the office specified in the solicitation and (2) showing the time specified for receipt, the solicitation number, and the name and address of the offeror.

(b) Telegraphic offers will not be considered unless authorized by the solicitation; however, offers may be modified by written or telegraphic notice, if that notice is received by the time specified for receipt of offers.

(c) Item samples, if required, must be submitted within the time specified for receipt of offers. Unless otherwise specified in the solicitation, these samples shall be (1) submitted at no expense to the Government and (2) returned at the sender's request and expense, unless they are destroyed during preaward testing.

ARTICLE L-19. 52.215-10 LATE SUBMISSIONS, MODIFICATIONS, AND WITHDRAWALS OF PROPOSALS (APR 1984)

(a) Any proposal received at the office designated in the solicitation after the exact time specified for receipt will not be considered unless it is received before award is made and it -

(1) Was sent by registered or certified mail not later than the fifth calendar day before the date specified for receipt of offers (e.g., an offer submitted in response to a solicitation requiring receipt of offers by the 20th of the month must have been postmarked by the 15th);

(2) Was sent by mail (or telegram if authorized) and it is determined by the Government that the late receipt was due solely to mishandling by the Government after receipt at the Government installation; or

(3) Is the only proposal received.

(b) Any modification of a proposal or quotation, except a modification resulting from the Contracting Officer's request for "best and final" offer, is subject to the same conditions as in subparagraphs (a)(1) and (2) above.

(c) A modification resulting from the Contracting Officer's request for "best and final" offer received after the time and date specified in the request will not be considered unless received before award and the late receipt is due solely to mishandling by the Government after receipt at the Government installation.

(d) The only acceptable evidence to establish the date of mailing of a late proposal or modification sent either by registered or certified mail is the U.S. or Canadian Postal Service postmark on the wrapper or on the original receipt from the U.S. or Canadian Postal Service. If neither postmark shows a legible date, the proposal, quotation, or modification shall be processed as if mailed late. "Postmark" means a printed, stamped, or otherwise placed impression (exclusive of a postage meter machine impression) that is readily identifiable without further action as having been supplied and affixed by employees of the U.S. or Canadian Postal Service on the date of mailing. Therefore, offerors or quoters should request the postal clerks to place a hand cancellation bull's-eye postmark on both the receipt and the envelope or wrapper.

(e) The only acceptable evidence to establish the time of receipt at the Government installation is the time/date stamp of that installation on the proposal wrapper or other documentary evidence of receipt maintained by the installation.

(f) Notwithstanding paragraph (a) above, a late modification of an otherwise successful proposal that makes its terms more favorable to the Government will be considered at any time it is received and may be accepted.

(g) Proposals may be withdrawn by written notice or telegram (including mail-gram) received at any time before award. Proposals may be withdrawn in person by an offeror or an authorized representative, if the representative's identity is made known and the representative signs a receipt for the proposal before award.

ARTICLE L-20. 52.215-13 PREPARATION OF OFFERS (APR 1984)

(a) Offerors are expected to examine the drawings, specifications, Schedule, and all instructions. Failure to do so will be at the offeror's risk.

(b) Each offeror shall furnish the information required by the solicitation. The offeror shall sign the offer and print or type its name on the Schedule and each continuation sheet on which it makes an entry. Erasures or other changes must be initialed by the person signing the offer. Offers signed by an agent shall be accompanied by evidence of that agent's authority, unless that evidence has been previously furnished to the issuing office.

(c) For each item offered, offerors shall (1) show the unit price/cost, including, unless otherwise specified, packaging, packing, and preservation and (2) enter the extended price/cost for the quantity of each item offered in the "Amount" column of the Schedule. In case of discrepancy between a unit price/cost and an extended price/cost, the unit price/cost will be presumed to be correct, subject, however, to correction to the same extent and in the same manner as any other mistake.

(d) Offers for supplies or services other than those specified will not be considered unless authorized by the solicitation.

(e) Offerors must state a definite time for delivery of supplies or for performance of services, unless otherwise specified in the solicitation.

(f) Time, if stated as a number of days, will include Saturdays, Sundays, and holidays.

ARTICLE L-21. 52.215-14 EXPLANATION TO PROSPECTIVE OFFERORS (APR 1984)

Any prospective offeror desiring an explanation or interpretation of the solicitation, drawings, specifications, etc., must request it in writing soon enough to allow a reply to reach all prospective offerors before the submission of their offers. Oral explanations or instructions given before the award of the contract will not be binding. Any information given to a prospective offeror concerning a solicitation will be furnished promptly to all other prospective offerors as an amendment of the solicitation, if that information is necessary in submitting offers or if the lack of it would be prejudicial to any other prospective offerors.

ARTICLE L-22. 52.215-15 FAILURE TO SUBMIT OFFER (APR 1984)

Recipients of this solicitation not responding with an offer should not return this solicitation, unless it specifies otherwise. Instead, they should advise the issuing office by letter or postcard whether they want to

receive future solicitations for similar requirements. If a recipient does not submit an offer and does not notify the issuing office that future solicitations are desired, the recipient's name may be removed from the applicable mailing list.

(LaRC NOTE: Please use the attached NASA-Langley Form PROC./P-273 to accomplish this.)

ARTICLE L-23. 52.215-16 CONTRACT AWARD (APR 1985)

- (a) The Government will award a contract resulting from this solicitation to the responsible offeror whose offer conforming to the solicitation will be most advantageous to the Government, cost or price and other factors, specified elsewhere in this solicitation, considered.
- (b) The Government may (1) reject any or all offers if such action is in the public interest, (2) accept other than the lowest offer, and (3) waive informalities and minor irregularities in offers received.
- (c) The Government may award a contract on the basis of initial offers received, without discussions. Therefore, each initial offer should contain the offeror's best terms from a cost or price and technical standpoint.
- (d) The Government may accept any item or group of items of an offer, unless the offeror qualifies the offer by specific limitations. Unless otherwise provided in the Schedule, offers may be submitted for quantities less than those specified. The Government reserves the right to make an award on any item for a quantity less than the quantity offered, at the unit cost or prices offered, unless the offeror specifies otherwise in the offer.
- (e) A written award or acceptance of offer mailed or otherwise furnished to the successful offeror within the time for acceptance specified in the offer shall result in a binding contract without further action by either party. Before the offer's specified expiration time, the Government may accept an offer (or part of an offer, as provided in paragraph (d) above), whether or not there are negotiations after its receipt, unless a written notice of withdrawal is received before award. Negotiations conducted after receipt of an offer do not constitute a rejection or counteroffer by the Government.
- (f) Neither financial data submitted with an offer, nor representations concerning facilities or financing, will form a part of the resulting contract. However, if the resulting contract contains a clause providing for price reduction for defective cost or pricing data, the contract price will be subject to reduction if cost or pricing data furnished is incomplete, inaccurate, or not current.

ARTICLE L-24. 18-52.215-70 INCREASES IN ESTIMATED COSTS (OCT 1984) NASA/FAR SUPPLEMENT

Once the apparent successful offeror has been selected, that offeror may not unilaterally increase the estimated costs submitted with its proposal except for:

- (a) Changes resulting from updating of the certified cost or pricing data submitted with its proposal;
- (b) Costs resulting from the Government's directed correction of identified weaknesses in the offeror's proposal which must be corrected as a condition of contracting; or

(c) Minor changes in the requirements of the requests for proposals. In such cases, the Government will consider only those increases arising from those requirements that are actually affected by the changes (irrespective of whether the changes result in an increase or decrease in the requirements or are initiated by the Government or the offeror) and then only to the extent such changes are identified and justified.

ARTICLE L-25. 18-52.215-72 RESTRICTION ON USE AND DISCLOSURE OF PROPOSAL/
QUOTATION INFORMATION (DATA) (DEC 1984) NASA/FAR
SUPPLEMENT

It is NASA policy to use information contained in proposals and quotations for evaluation purposes only. While this policy does not require that the proposal or quotation bear a restrictive notice, offerors and quoter should, in order to maximize protection of trade secrets or other information that is commercial or financial and confidential or privileged, place the following notice on the title page of the proposal or quotation and specify the information subject to the notice by inserting appropriate identification, such as page numbers, in the notice. In any event, information (data) contained in proposals and quotations will be protected to the extent permitted by law, but NASA assumes no liability for use and disclosure of information not made subject to the notice.

RESTRICTION ON USE AND DISCLOSURE OF PROPOSAL AND QUOTATION
INFORMATION (DATA)

The information (data) contained in (insert page numbers or other identification) of this proposal or quotation constitutes a trade secret and/or information that is commercial or financial and confidential or privileged. It is furnished to the Government in confidence with the understanding that it will not, without permission of the offeror, be used or disclosed for other than evaluation purposes; provided, however, that in the event a contract is awarded on the basis of this proposal or quotation the Government shall have the right to use and disclose this information (data) to the extent provided in the contract. This restriction does not limit the Government's right to use or disclose this information (data) if obtained from another source without restriction.

ARTICLE L-26. 52.222-24 PREAWARD ON-SITE EQUAL OPPORTUNITY COMPLIANCE REVIEW
(APR 1984)

An award in the amount of \$1 million or more will not be made under this solicitation unless the offeror and each of its known first-tier subcontractors (to whom it intends to award a subcontract of \$1 million or more) are found, on the basis of a compliance review, to be able to comply with the provisions of the Equal Opportunity clause of this solicitation.

ARTICLE L-27. 52.227-6 ROYALTY INFORMATION (APR 1984)

(a) Cost or charges for royalties. When the response to this solicitation contains costs or charges for royalties totaling more than \$250, the following information shall be included in the response relating to each separate item of royalty or license fee:

- (1) Name and address of licensor.
- (2) Date of license agreement.
- (3) Patent numbers, patent application serial numbers, or other basis on which the royalty is payable.
- (4) Brief description, including any part or model numbers of each contract item or component on which the royalty is payable.
- (5) Percentage or dollar rate of royalty per unit.
- (6) Unit price of contract item.
- (7) Number of units.
- (8) Total dollar amount of royalties.

(b) Copies of current licenses. In addition, if specifically requested by the Contracting Officer before execution of the contract, the offeror shall furnish a copy of the current license agreement and an identification of applicable claims of specific patents.

ARTICLE L-28. 18-52.227-71 REQUESTS FOR WAIVER OF RIGHTS TO INVENTIONS (APR 1984) NASA/FAR SUPPLEMENT

(a) In accordance with the NASA Patent Waiver Regulations, 14 CFR Section 1245, Subpart 1, waiver of rights to any or all inventions made or that may be made under a NASA contract or subcontract with other than a small business firm or a domestic nonprofit organization may be requested at different time periods. Advance waiver of rights to any or all inventions that may be made under a contract or subcontract may be requested prior to the execution of the contract or subcontract, or within 30 days after execution by the selected Contractor. In addition, waiver of rights to an identified invention made and reported under a contract or subcontract may be requested, even though a request for an advance waiver was not made or, if made, was not granted.

(b) Each request for waiver of rights shall be by petition to the Administrator and shall include an identification of the petitioner; place of business and address; if petitioner is represented by counsel, the name, address and telephone number of the counsel; the signature of the petitioner or authorized representative; and the date of signature. No specific forms need be used, but the request should contain a positive statement that waiver of rights is being requested under the NASA Patent Waiver Regulations; a clear indication of whether the request is for an advance waiver or for a waiver of rights for an individual identified invention; whether foreign rights are also requested and, if so, the countries, and a citation of the specific section or sections of the regulations under which such rights are requested; and the name, address, and telephone number of the party with whom to communicate when the request is acted upon. Requests for advance waiver of rights should, preferably, be included with the proposal, but in any event in advance of negotiations.

(c) Petitions for advance waiver, prior to contract execution, must be submitted to the Contracting Officer. All other petitions will be submitted to the Patent Representative designated in the contract.

(d) Petitions submitted with proposals selected for negotiation of a contract will be forwarded by the Contracting Officer to the installation Patent Counsel for processing and then to the Inventions and Contributions Board. The Board will consider these petitions and where the Board makes the findings to support the waiver, the Board will recommend to the Administrator that waiver be granted, and will notify the petitioner and the Contracting Officer of the Administrator's determination. The Contracting Officer will be informed by the Board whenever there is insufficient time or information or other reasons to permit a decision to be made without unduly delaying the execution of the contract. In the latter event, the petitioner will be so notified by the Contracting Officer. All other petitions will be processed by installation Patent Counsel and forwarded to the Board. The Board shall notify the petitioner of its action and if waiver is granted, the conditions, reservations, and obligations thereof will be included in the Instrument of Waiver. Whenever the Board notifies a petitioner of a recommendation adverse to, or different from, the waiver requested, the petitioner may request reconsideration under procedures set forth in the Regulations.

ARTICLE L-29. 18-52.227-84 PATENT RIGHTS CLAUSES (APR 1986) NASA/FAR SUPPLEMENT

This solicitation contains the patent rights clauses of FAR 52.227-11 (as modified by the NFS), NFS 18-52.227-70, and NFS 18-52.227-73. If the contract resulting from this solicitation is awarded to a small business or nonprofit organization, the clause at NFS 18-52.227-70 shall not apply. If the award is to other than a small business or nonprofit organization, the clauses at FAR 52.227-11 and NFS 18-52.227-73 shall not apply.

ARTICLE L-30. INSTRUCTIONS REGARDING THE REPRESENTATION OF LIMITED-RIGHTS DATA AND RESTRICTED COMPUTER SOFTWARE

A. Offerors are referred to Article K-16., Representation of Limited-Rights Data and Restricted Computer Software, (hereafter referred to as "the representation"), and to Section I Contract Clause 52.227-14, Rights In Data--General--Alternate II and Alternate III--modified by 18-52.227-14 NASA FAR Supplement, (hereafter referred to as "the clause").

B. With respect to "limited-rights data" and "restricted computer software" (as defined in paragraph (a) of "the clause") identified in your proposal in accordance with paragraph (b) of "the representation," please advise whether or not:

1. You will deliver the identified limited-rights data in accordance with "the clause" and its Alternate II, Limited Rights Notice (paragraph (g)(2) of "the clause"); address Note 1. below regarding subcontractor requirements, including a statement, when appropriate, that it is not applicable.

2. You will deliver the identified restricted computer software in accordance with the data rights protection provided under "the clause" and its Alternate III, Restricted Rights Notice (paragraph (g)(3) of "the

clause"), see Note 2. below; also, address Note 1. below regarding subcontractor requirements, including a statement, when appropriate, that it is not applicable.

C. Notes:

1. The information requirements of paragraph (b) of "the representation" and paragraphs 1. and 2. above also apply to limited-rights data and restricted computer software to be obtained from a subcontractor. In this regard, your attention is directed to paragraph (h), Subcontracting, of "the clause."

2. The Government intends to use "the clause" with its Alternate III, Restricted Rights Notice in lieu of any software licensing agreement that is used by the offeror for commercial contracts. If company policy requires you to propose your standard commercial software license in lieu of "the clause" with its Alternate III, the Government intends to incorporate the applicable and allowable portions of your proposed license in conjunction with Section I Contract Clause 18-52.227-86, Commercial Computer Software--Licensing.

D. "The clause" with its Alternates II and III and the Commercial Computer Software--Licensing clause are set forth in Section I, Contract Clauses, in full text for informational purposes.

ARTICLE L-31. 18-52.235-72 PLAN FOR NEW TECHNOLOGY REPORTING (DEC 1984)
NASA/FAR SUPPLEMENT

The offeror shall, in the proposal in response to this solicitation, provide estimates of the cost and manpower requirements to perform the new technology reporting required by the clause at 18-52.227-70, New Technology, to be included in any resulting contract. In addition, if selected for negotiation, the offeror will be required to submit for approval prior to contract execution a detailed Plan for New Technology Reporting setting forth the manner in which the offeror will meet the new technology reporting requirements of the New Technology clause. Such plan shall, at a minimum -

- (a) Identify the specific areas of technical effort which are considered likely to generate new technology;
- (b) Describe the means by which project supervisory and technical personnel will be advised of the responsibilities, details and benefits of new technology reporting;
- (c) Describe the procedures to be established, maintained and followed for review of the effort to be undertaken for the purposes of identification and reporting (disclosure) of new technology within the time periods and in the manner prescribed by the New Technology clause;
- (d) Describe the procedure for timely submission of the interim and final new technology reports required by the New Technology clause;
- (e) Describe the procedures for (1) selecting which of NASA's New Technology clause or other patent rights clause is to be included in each subcontract having as a purpose the conduct of experimental, developmental, research, design, or engineering work, and (2) for providing prompt notification of either the award of such subcontracts or a subcontractor's refusal to accept the clause; and

(f) Identify the individual(s) assigned substantial and specific responsibilities for ensuring compliance with the requirements of the New Technology clause, as well as their qualifications and organizational placement to discharge these responsibilities.

ARTICLE L-32. 52.252-5 AUTHORIZED DEVIATIONS IN PROVISIONS (APR 1984)

(a) The use in this solicitation of any Federal Acquisition Regulation (48 CFR Chapter 1) provision with an authorized deviation is indicated by the addition of "(DEVIATION)" after the date of the provision.

(b) The use in this solicitation of any NASA/FAR Supplement (48 CFR Chapter 18) provision with an authorized deviation is indicated by the addition of "(DEVIATION)" after the name of the regulation.

ARTICLE L-33. FALSE STATEMENTS

Proposals must set forth full, accurate, and complete information as required by the Request for Proposal (including attachments). The penalty for making false statements in proposals is prescribed in 18 U.S.C. 1001.

ARTICLE L-34. COMMUNICATIONS REGARDING THIS SOLICITATION

Any communications in reference to this solicitation shall cite the solicitation number and be directed to the following Government representative:

Name: Betty J. Branch
Phone: (804) 865-2854 (COLLECT CALLS NOT ACCEPTED)
Telex: 823405
Address: National Aeronautics and Space Administration
Langley Research Center
Attn: Betty J. Branch, Mail Code 126
Hampton, VA 23665-5225

Any written communications must include the mail code on the envelope or on the telex.

SECTION M
EVALUATION FACTORS FOR AWARD

ARTICLE M-1. METHOD OF EVALUATION

A. Proposals received in response to this RFP will be evaluated by Technical and Business Evaluation Committees appointed by the Contracting Officer. The Technical Proposal and Management Proposal will be scored. The Business Proposal will be evaluated but not scored; however, cost, experience and past performance and other factors may be important discriminators in the final selection. The Source Selection Official will select the Contractor(s) for final negotiation which he considers can perform the contract in a manner most advantageous to the Government, all factors considered.

B. Evaluation will be on the basis of material presented and substantiated in your proposal and not on the basis of what may be implied. Vague statements will be interpreted as a lack of understanding on the part of the offeror and/or inability to demonstrate adequate qualifications. Your attention is directed to Section L which provides important instructions concerning proposal preparation.

ARTICLE M-2. EVALUATION FACTORS

A. Technical Factors - Mission Suitability--Your Technical Proposal and Management Proposal will be important in the evaluation of your company and in Contractor selection. The content of these sections of your proposal will provide the basis for evaluation of your response to the technical and management requirements of the RFP. The Mission Suitability Factors to be considered and scored in the evaluation of your Technical Proposal and Management Proposal are set forth below:

Factor 1. Proposed Technical Approach - Offerors will be evaluated on their proposed approach to perform the Statement of Work and the Representative Tasks with particular emphasis on the logical procedures, proposed activities, implementation of the proposed approach, and overall consistency that will insure an orderly, efficient procedure for achievement of the work.

Factor 2. Understanding the Problem - Offerors will be evaluated on their understanding of problems likely to be encountered as well as the proposed solutions to be investigated in performance of the Statement of Work and Representative Tasks. The offerors will be evaluated on their discussion of problems likely to occur in applying these findings to technology demonstrations in actual experimental conditions (such as flight environments), including identifying the technologies involved, defining the key problem areas, application of relevant experience, and their breadth of understanding. Previous experiences on related programs or similar programs which enhance the credibility of the offeror's knowledge of the research effort will be evaluated. ✓

Factor 3. Personnel Assigned - Offerors will be evaluated as to the availability and qualifications of their personnel, including any proposed subcontractor and consultant personnel, including documented education, experience, and significant accomplishments in antenna and microwave research in applications including compact range activities, remote sensing, microwave Doppler radar applications to wind shear detection, large space antenna applications, and on-site research task assignment contract management. Key personnel will be evaluated on their background in analytical research and experimental applications, where appropriate. This evaluation will also address skill mix, personnel assigned to the whole program, and percentages of time so allotted for both the Statement of Work and Representative Tasks.

Factor 4. Management - Offerors will be evaluated to assess the adequacy and soundness of (1) their plan for maintenance of a competent staff over the contract term to include personnel recruitment, retention, training, and productivity; (2) the proposed organization for managing and executing

contract work efficiently and effectively; (3) purchasing and subcontracting policies and procedures; and (4) estimating and scheduling procedures.

B. Business Factors--The following elements will not be scored numerically during evaluation, but will be reviewed and analyzed, for consideration in selection of a firm for negotiations:

1. Estimated Cost and Fixed Fee--For this Level-of-Effort procurement, the cost proposal will be reviewed to establish that the required direct labor manhours, representing appropriate skills, have been proposed. An analysis of the proposed cost will be conducted to determine the validity of the cost offer, and the extent to which the cost offer reflects performance addressed in the Technical Proposal. An assessment will be made with regard to the probable capability of the offeror to accomplish the contract objectives within the estimated cost proposed. In addition, the reasonableness of the fixed fee will be determined in accordance with the guidelines set forth in NASA FAR Supplement 18-15.902. The cost proposal may also be used as an aid to determine the offeror's understanding of Mission Suitability Requirements.

2. Experience and Past Performance--Your experience and past performance will be assessed to determine the extent to which contract objectives including schedule and cost, on related efforts, have been achieved. Your experience will be viewed as the demonstrated accomplishment of work which is comparable and relevant to the objectives of this procurement. This factor includes the evaluation of overall corporate or offeror experience and past performance, but not the experience and performance of individuals who are proposed to be involved in the required work.

3. Other Factors

a. Financial Responsibility--Responsibility will be determined from a review of data presented by the offeror and other independent verifications that may be considered appropriate for the circumstances.

b. Contract Terms and Conditions--The proposal will be reviewed to determine the extent to which terms and conditions as set forth in the RFP are accepted.

c. Facilities and Equipment--This area will be assessed with respect to the elements cited below:

(1) Availability of facilities and equipment for performance of the proposed effort.

(2) Degree of direct control over the required facilities exercised by the offeror and the extent of subcontracting for facilities and their availability.

(3) Extent of Government-provided facilities and equipment and determination as to possible interference with work being performed as scheduled under other Government contracts.

d. Subcontracting Plan for Small and Small Disadvantaged Business Concerns--A review of the offeror's proposal will be made to determine the extent of the offeror's compliance with NASA policy to afford maximum practicable opportunity for small and disadvantaged business concerns to participate in Government contracts.

e. Security--Offeror-provided data will be reviewed and verified to determine compliance capability with respect to security provisions. ✓

f. Plan for New Technology Reporting--The offeror's proposal will be reviewed to ensure that the proposed estimates of cost and manpower requirements to perform new technology reporting represents an adequate understanding of reporting requirements.

g. Equal Employment Opportunity (EEO) Compliance--A review of the offeror's EEO compliance record and current status will be made.

ARTICLE M-3. RELATIVE IMPORTANCE OF EVALUATION FACTORS

The following weights will apply in the scoring of Mission Suitability elements based on a scoring system of 1,000 points:

<u>Factor</u>	<u>Subfactor</u>	<u>Points</u>
1. Proposed Technical Approach	A. Response to Statement of Work	. 75
	B. Response to Representative Tasks	
	1. Task 1	25
	2. Task 2	20
	3. Task 3	40
	4. Task 4	<u>60</u>
	Total Points =	220
2. Understanding the Requirement	A. Response to Statement of Work	75
	B. Response to Representative Tasks	
	1. Task 1	25
	2. Task 2	20
	3. Task 3	40
	4. Task 4	<u>60</u>
	Total Points =	220

Solicitation No. 1-109-9240.0631

78

3. Personnel Assigned	A. Response to Statement of Work	80
	B. Response to Representative Tasks	
	1. Task 1	30
	2. Task 2	35
	3. Task 3	70
	4. Task 4	<u>105</u>
	Total Points =	320
4. Management	Total Points =	240

ARTICLE M-4. SELECTION CONSIDERATIONS

Overall, in the selection of a Contractor for negotiation leading to contract award, Mission Suitability, Cost, Experience and Past Performance, and Other Factors will be given essentially equal consideration.

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

7. AMENDMENT/MODIFICATION NO. 1		3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO. 1-109-9240.0631	5. PROJECT NO. (If applicable)
6. ISSUED BY National Aeronautics and Space Administration Langley Research Center Hampton, VA 23665-5225		CODE	7. ADMINISTERED BY (If other than Item 6)	CODE

8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code) TO ALL CONCERNED	(v)	9A. AMENDMENT OF SOLICITATION NO. 1-109-9240.0631
	X	9B. DATED (SEE ITEM 11) 9/19/88
		10A. MODIFICATION OF CONTRACT/ORDER NO.
		10B. DATED (SEE ITEM 13)

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers is extended, is not extended.

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:

(a) By completing Items 8 and 15, and returning 1 COPY of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)
N/A

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

(v) A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.

B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).

C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:

D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor is not, is required to sign this document and return _____ copies to the issuing office.

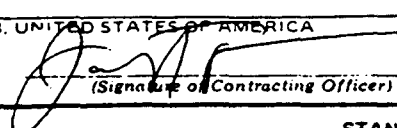
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCP section headings, including solicitation/contract subject matter where feasible.)
Subject: NASA Request for Proposal 1-109-9240.0631--Research in Antenna and Microwave Technology

AMENDMENT NO. 1

I. The purpose of this amendment is to list the questions, together with the Government responses, which were addressed at the Preproposal Conference held on October 3, 1988, regarding subject RFP. In addition, copies of the vu-graphs which were presented at the conference and the list of attendees are attached hereto.

(CONTINUED ON ATTACHED PAGE)

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)	16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) JAMES Y. TAYLOR
15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign)	15C. DATE SIGNED
16B. UNITED STATES OF AMERICA BY  (Signature of Contracting Officer)	16C. DATE SIGNED OCT 7 1988

Question 1. What guidelines should be followed or assumptions made concerning other direct costs under this effort? In particular, how should the offeror bid travel costs and equipment expenses?

Answer 1. Offerors should propose equipment and travel costs in a manner consistent with their overall proposed approach (i.e., degree of subcontracting, location of off-site facilities, etc.). If the offeror proposes a staff consistent with the approach set forth in Article L-10., approximately 5 percent of the cost of direct labor has been sufficient in the past to cover the costs of equipment and travel. However, offerors should not feel constrained to this figure. In any event, an assessment will be made by the Government during the evaluation process with regard to the probable capability of the offeror to accomplish the contract objectives within the estimated cost proposed.

Question 2. Currently, you have four tasks only. Are offerors suppose to propose to these tasks only or to propose to other tasks which offerors do not know? How do offerors estimate labor hours when they do not know what future tasks to expect?

Answer 2. As stated in the RFP, offerors must propose to the contract Statement of Work and the four (4) Representative Tasks for evaluation purposes. Also, the offeror must proposed to 182,000 direct productive labor hours including consulting and subcontracting effort. Although the hours proposed for the Representative Tasks will be evaluated, these hours are not to be included as part of the 182,000 direct productive labor hours.

II. Your attention is invited to Item 11. on the Standard Form 30 (front page) regarding acknowledgment of this Amendment No. 1.

**RESEARCH IN ANTENNA AND
MICROWAVE TECHNOLOGY**

Pre-Proposal Briefing

October 3, 1988

Bldg. 1202 Room 246

***Bruce Kendall
Antenna & Microwave Research Branch
NASA Langley Research Center***

AGENDA

- Opening remarks
 - Introduction and welcome
 - Instructions to proposers (Betty Branch / AD)
 - Introduction of evaluation committee
- Synopsis of requirements
 - Non RFP walk through
 - Research areas
 - Personnel estimates
- Overview of facilities
 - AMRB research laboratories
 - Computer Facilities
 - GFE equipment (H-3)
- Break (15 min)
 - Submit questions
- Tour of facilities
- Questions & answers

INTRODUCTION

- NASA Langley Mission & Goals
- AMRB
 - Goals
 - Organization
- Contract goal
 - Task assignment support

Langley
Research
Center

Mission and Goals

NASA
National Aeronautics and
Space Administration

MISSION STATEMENT

The mission of the NASA Langley Research Center is to increase the knowledge and capability of the United States in a full range of aeronautics disciplines and in selected space disciplines. This mission will be accomplished by:

- Performing innovative research relevant to national needs and Agency goals.
- Transferring technology to users in a timely manner.
- Providing development support to other U. S. Government agencies, U. S. industry, and other NASA centers.

Specifically, we will maintain a premier research capability in the following disciplines:

- | | |
|---------------------------|-----------------------------------|
| -Acoustics | -Hypersonic Propulsion |
| -Aerodynamics | -Information Sciences |
| -Aeroelasticity | -Materials |
| -Aerothermodynamics | -Measurement & Testing Techniques |
| -Atmospheric Sciences | -Propulsion Integration |
| -Controls & Guidance | -Remote Sensing |
| - <u>Electromagnetics</u> | - <u>Structures</u> |
| -Fluid Dynamics | |

The Center will exploit opportunities for synergistic applications of the above disciplines in the development of technology for the following vehicle classes:

- General aviation and commuter aircraft
- Long-haul commercial transports, subsonic and supersonic
- Military aircraft and missiles
- Hypersonic aircraft
- Space Transportation Systems
- Large Space Systems

Our success will be measured by the extent to which our research results and technologies are employed in the design, development and operation of future aerospace vehicles.

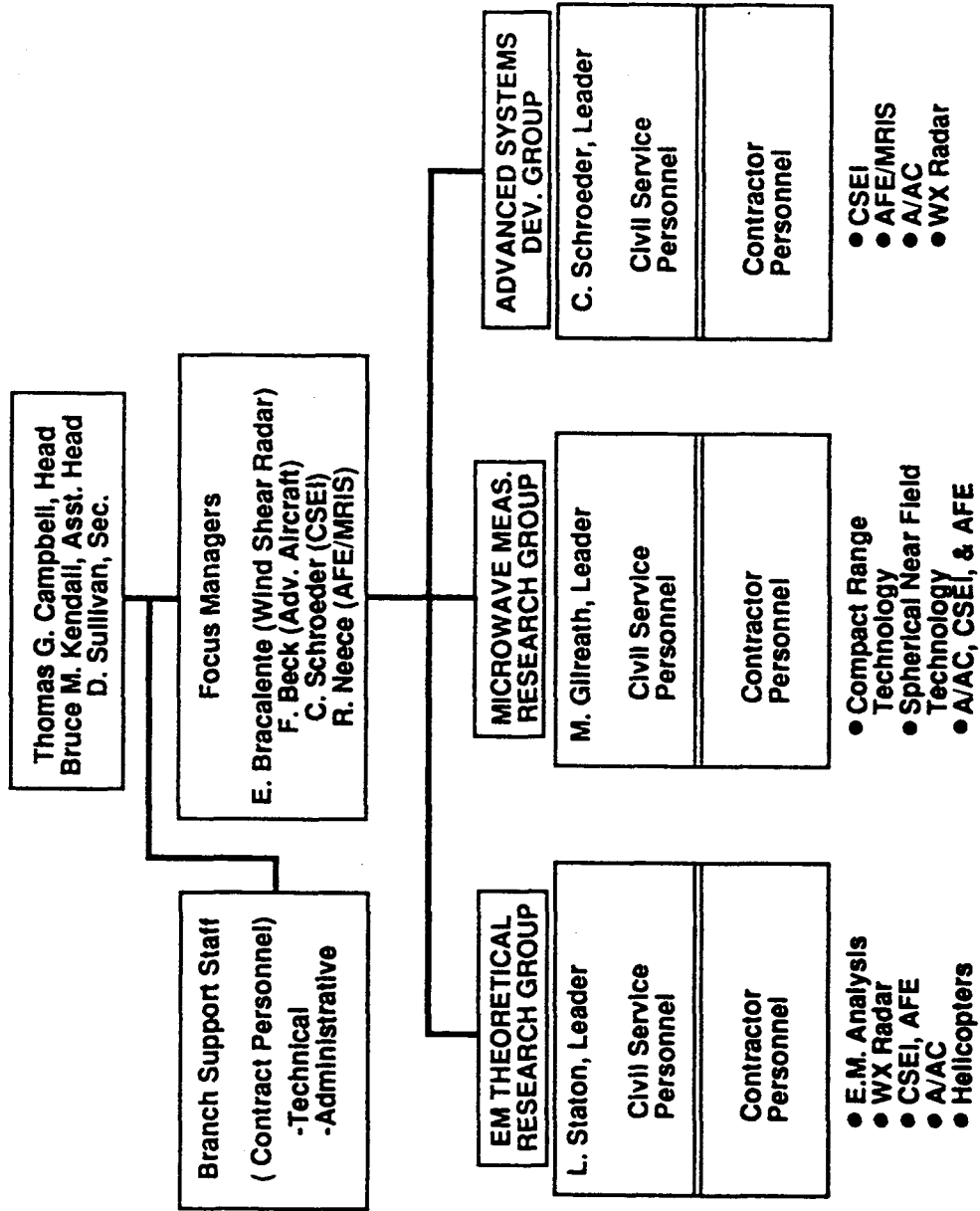
GOALS

- Conduct basic research to provide detailed understanding of fundamental physical phenomena important to the design and operation of advanced aerospace vehicles and missions.
- Conduct applied research to convert understanding of fundamental physical phenomena to practical concepts and technologies which are ready for aerospace application.
- Develop multidisciplinary integration methods to improve aerospace systems.
- Assure timely transfer of technology to aerospace customers.
- Provide development support to high priority national initiatives where the Center's expertise and unique facilities can contribute.
- Provide a research environment that fosters innovation, productivity, and professional growth.
- Ensure a highly motivated, skilled work force (civil service and support service contractor) consistent with program goals.
- Acquire, upgrade, and maintain advanced experimental, computational, and institutional facilities needed to accomplish the Center's current and future research programs.
- Maintain the level of awareness and facility integrity required to ensure a safe operating environment with the goal of eliminating accidents.
- Interact with government, industry and universities to enhance the relevance and quality of our research programs.

AMRB RESEARCH GOALS

- To develop and verify the design methodology for optimizing the radio frequency performance of large space antennas by applying controls-structures-electromagnetics interactive technology.
- To develop and verify computer-aided analysis methods for predicting the volumetric radiation characteristics of antennas mounted on metallic and nonmetallic aerospace configurations.
- To develop new and improved microwave measurement systems (for laboratory and flight systems) using microwave integrated circuit techniques for millimeter wavelength applications.
- To develop the enabling technology for an airborne Doppler radar which can measure wind shear appropriate for air hazard avoidance.
- To evaluate the feasibility for extending microwave reflectometer ionization sensing techniques to the AFE/AOTV upper atmospheric flight regime.
- To conduct research on electromagnetic aspects of advanced aircraft.

ANTENNA & MICROWAVE RESEARCH BRANCH ORGANIZATION



EVALUATION COMMITTEE
(AMRB / GCD)

B. M. Kendall - Chariman

T. G. Campbell

L. C. Schroeder

L. D. Staton

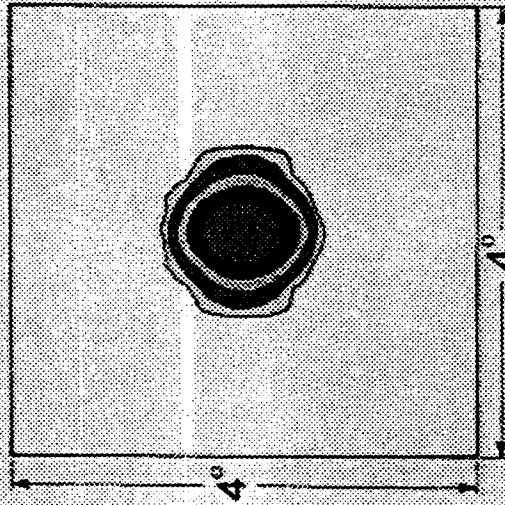
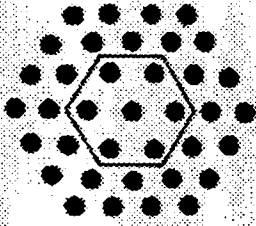
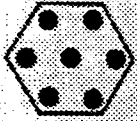
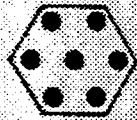
M. C. Gilreath

RESEARCH AREAS

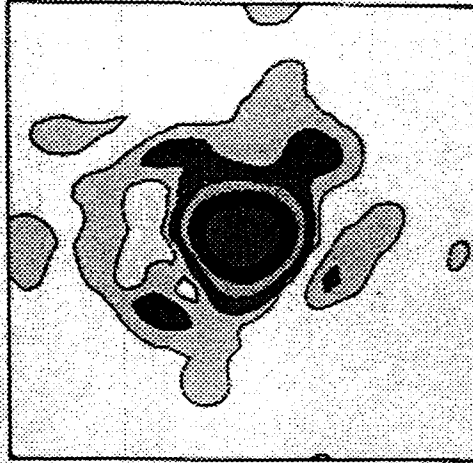
- Control-Structures-Electromagnetics-Interaction
 - Large Space Antenna systems
 - Multiple beam feeds / Microwave integrated circuit technology
- Re-entry plasma diagnostics for Aeroassist Flight Experiment
 - Microwave Reflectometer Ionization Sensor
 - Aft Flow Ionization Experiment
- Airborne doppler radar for windshear detection
- Compact range measurement of electromagnetic scattering

IMPROVED RADIATION PATTERNS OF DISTORTED-SURFACE REFLECTOR CALCULATED USING ADAPTIVE-ARRAY COMPENSATION

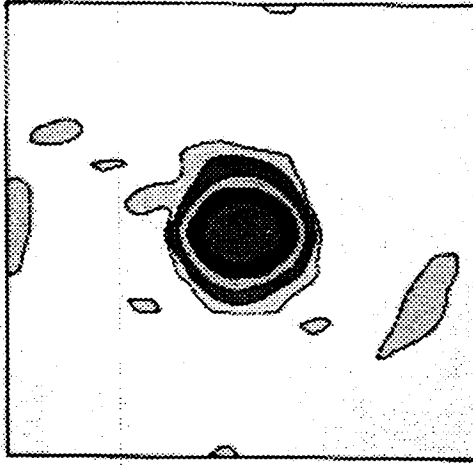
Surface Distortion = 0.061 in. RMS
Frequency = 6.4 GHz



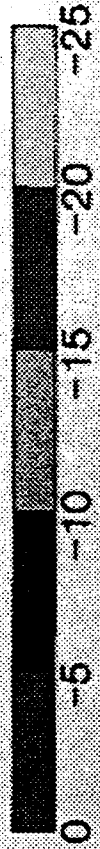
Smooth Surface



Distorted Surface



Feed-Array
Compensation

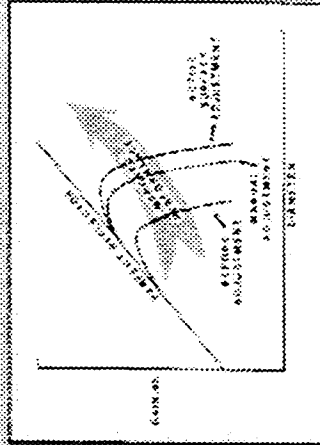
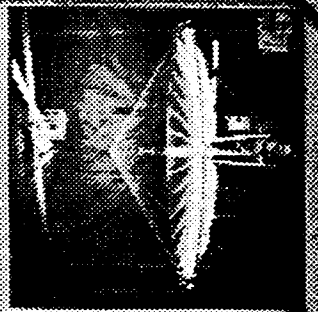
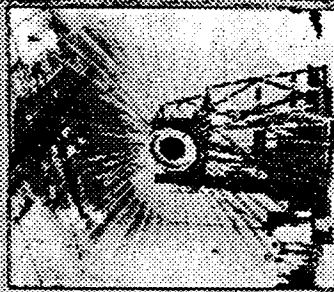
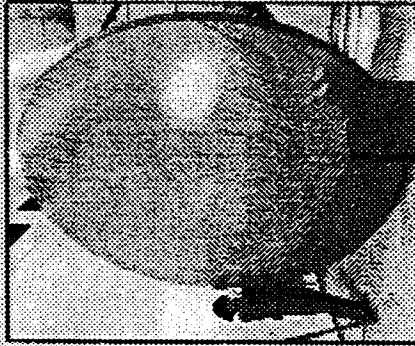
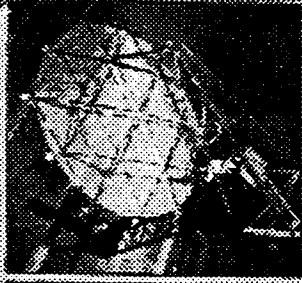
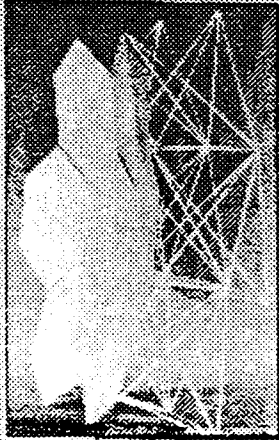


CONTROL/STRUCTURES/ELECTROMAGNETICS TECHNOLOGY FOR LARGE SPACE ANTENNA APPLICATIONS

CSEI GROUND TECHNOLOGY
CANDIDATE CONCEPTS

TECHNOLOGY DATA BASE

MISSION APPLICATIONS



SCIENCE

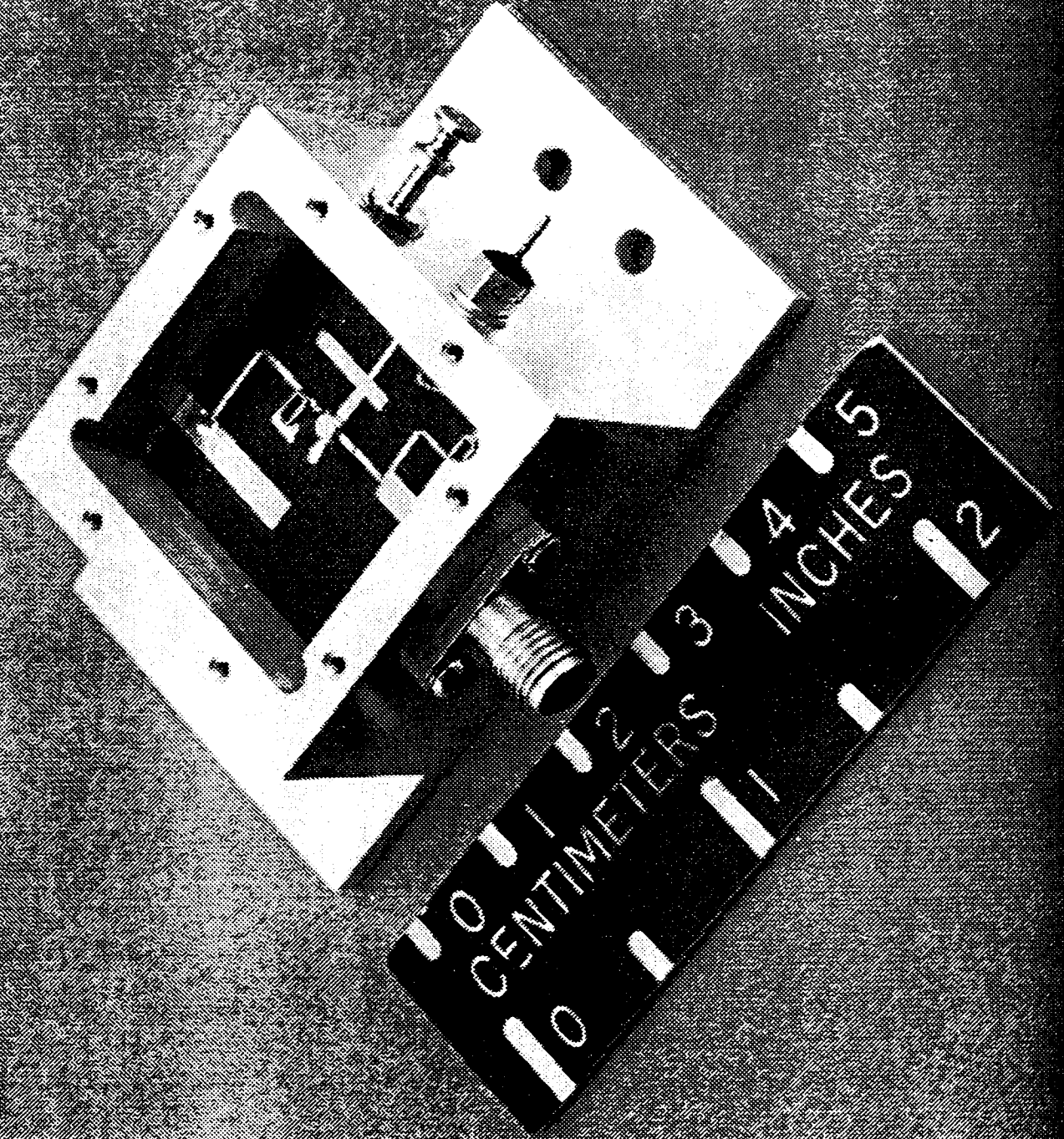
- Radio Astronomy
- Remote Sensing

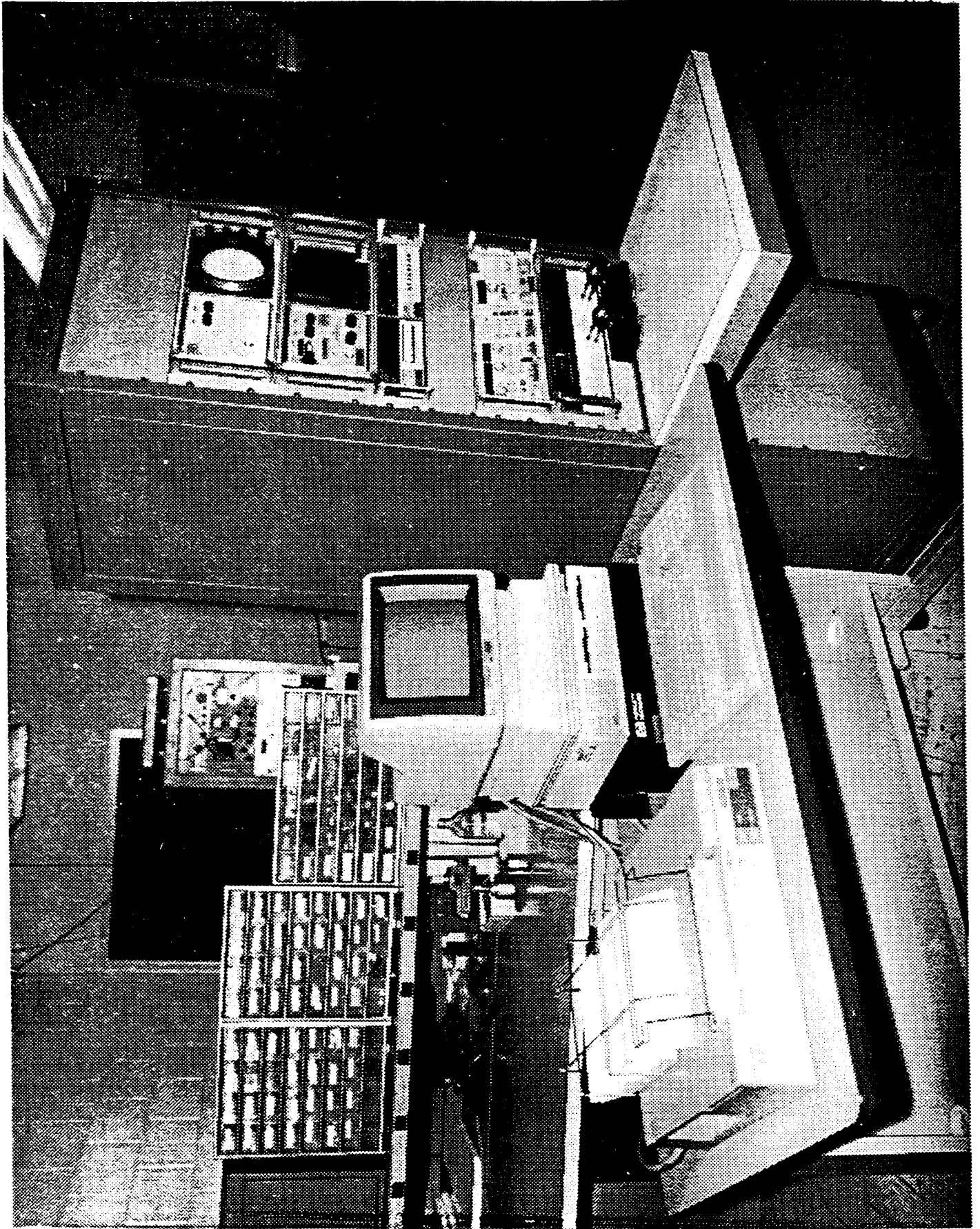
COMMUNICATIONS

- Multiple Beams
- Intermod
- System Performance Demonstration

STRATEGIC DEFENSE INITIATIVE

- Precision Reflector
- Wide Scan
- System Validation



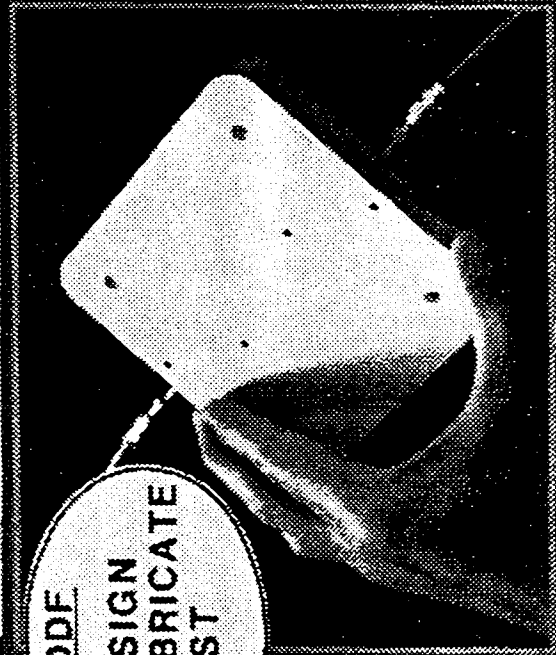


MICROWAVE INTEGRATED CIRCUIT (DDF) PROGRAM "SPIN-OFF"

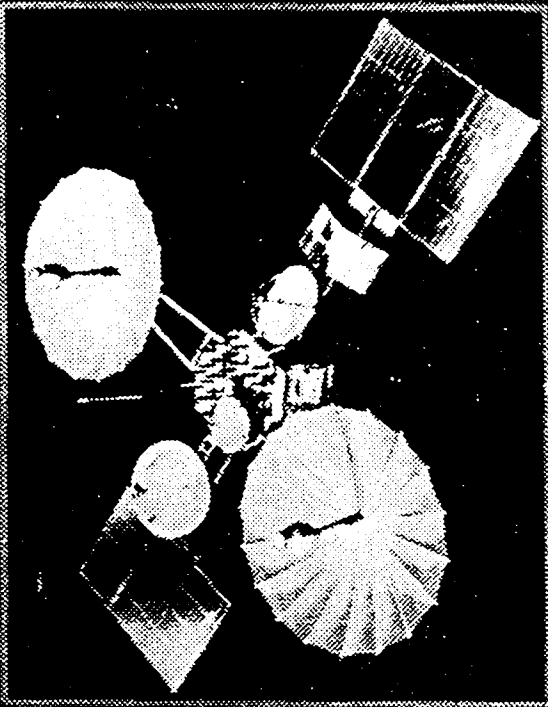
NON-OBTUSIVE TECHNIQUE DEVELOPED FOR MEASURING
SURFACE CONDUCTIVITY CHARACTERISTICS FOR
LARGE DEPLOYABLE MESH ANTENNAS

OPEN-PLATE DIELECTRIC
RESONATOR FIXTURE
APPLIED TO MESH MATERIAL
(In Situ)

- DDF
- DESIGN
- FABRICATE
- TEST



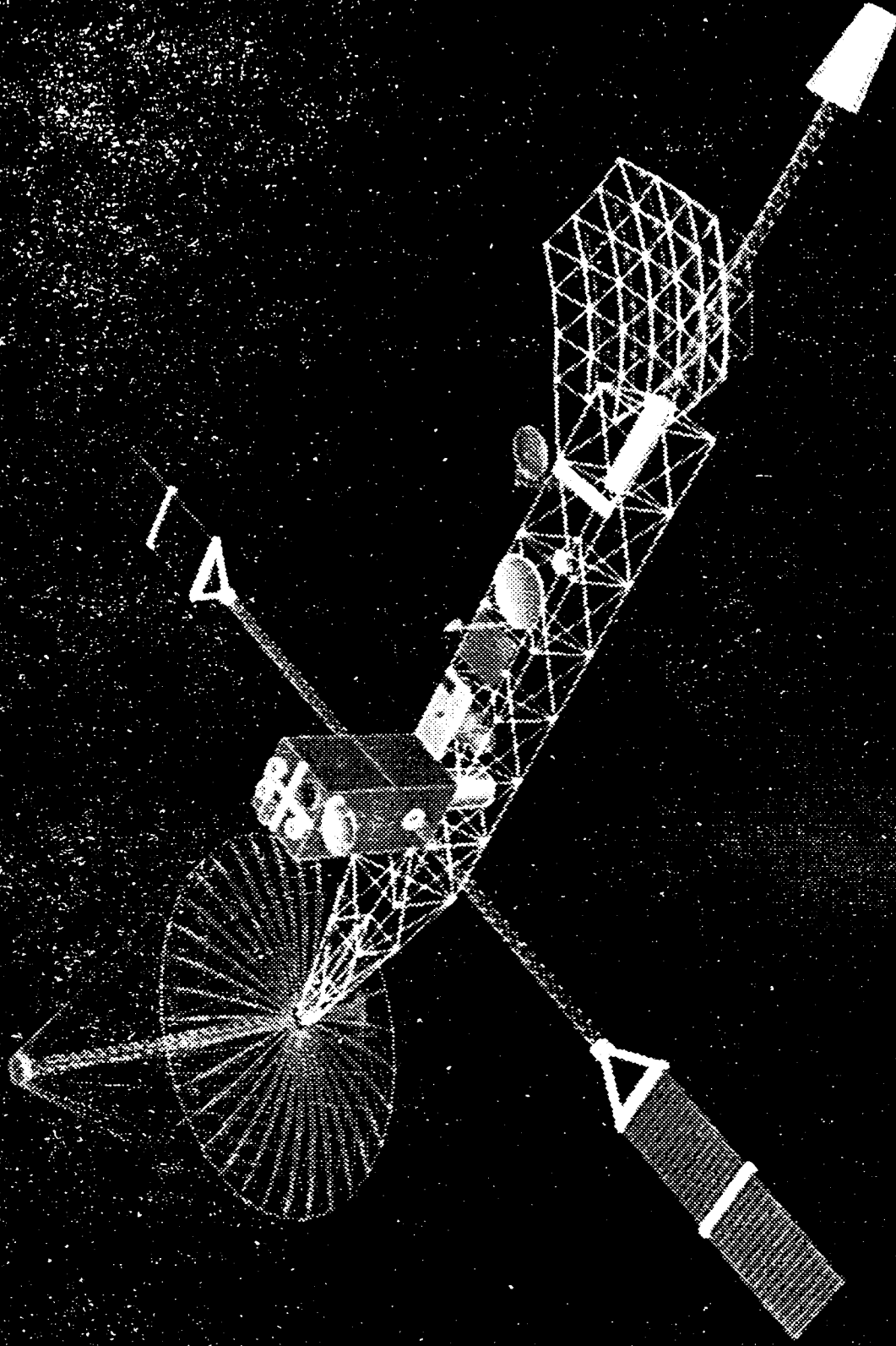
TDRS

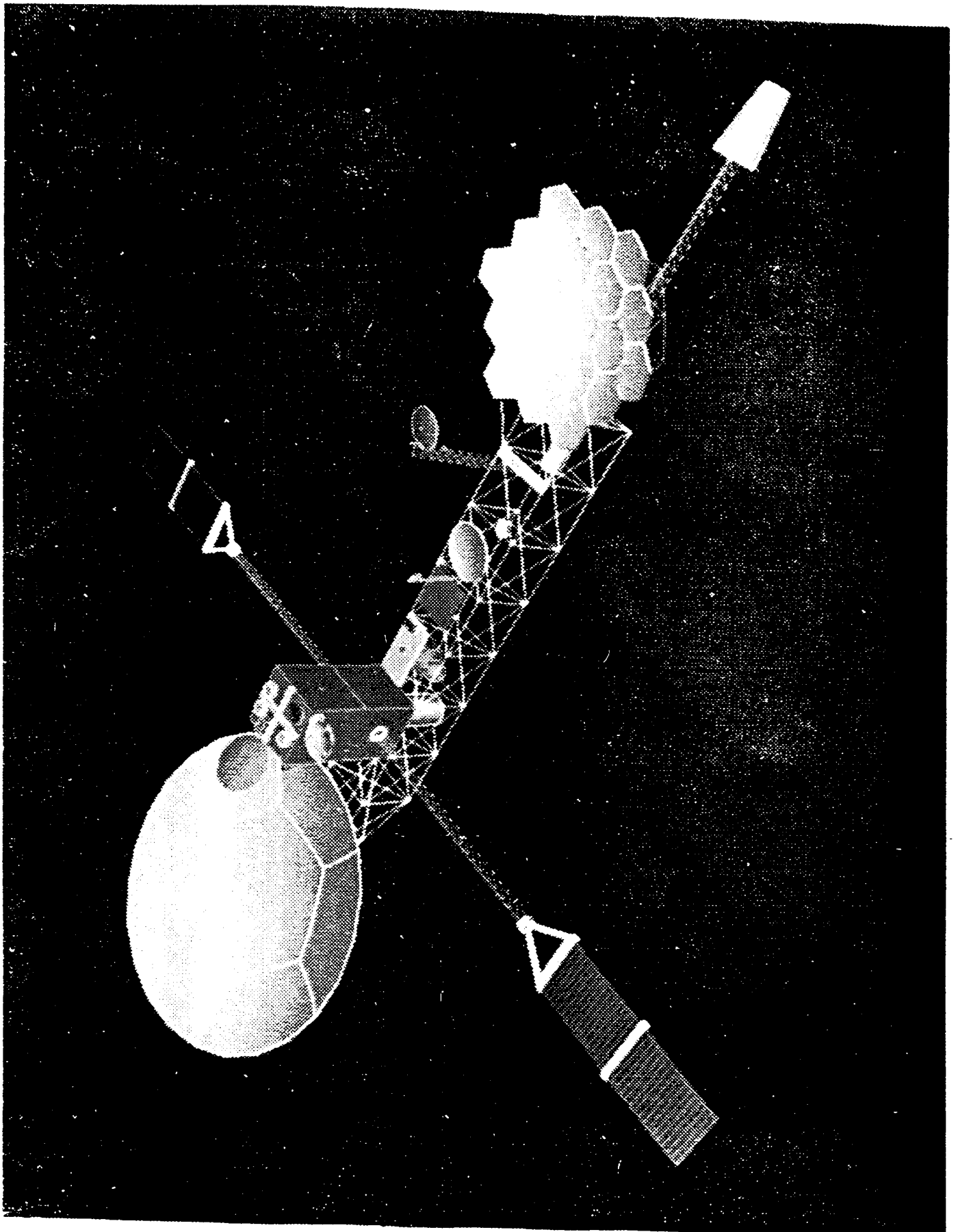


• PATENT PENDING
• TECH BRIEF

MISSION TO PLANET EARTH

GEOSTATIONARY PLATFORM





**AEROASSIST FLIGHT EXPERIMENT
(AFE)**



AEROASSIST FLIGHT EXPERIMENT MISSION

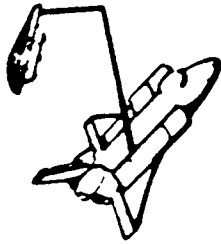
APE BURN TO CIRCULARIZE
2-53-00



SRM SEPARATION
2-00-00



STS RECOVERY OF APE
13-00-00



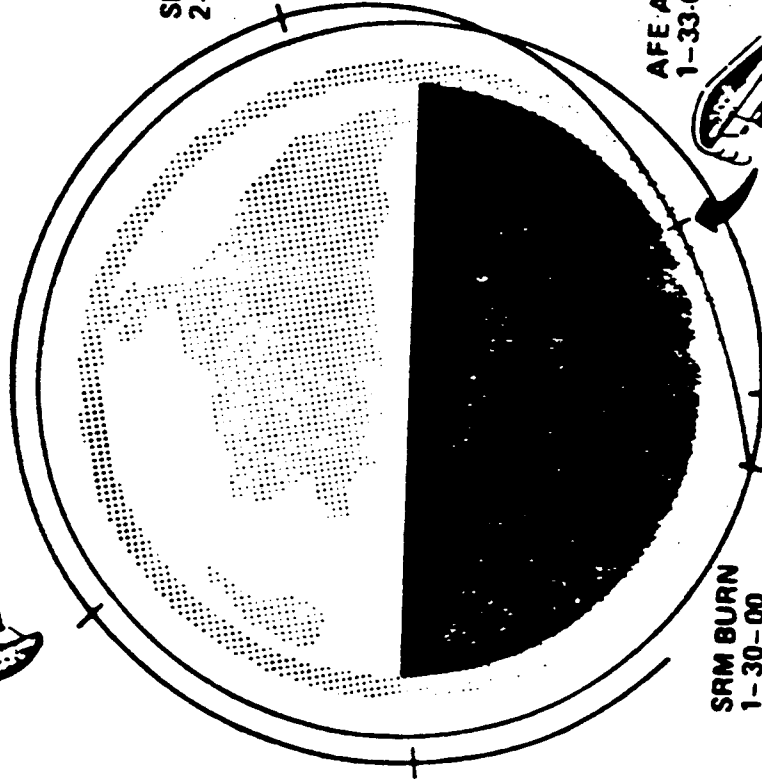
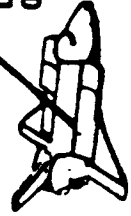
APE ATMOSPHERIC PASS
1-33-00 TO 1-41-00



SRM BURN
1-30-00

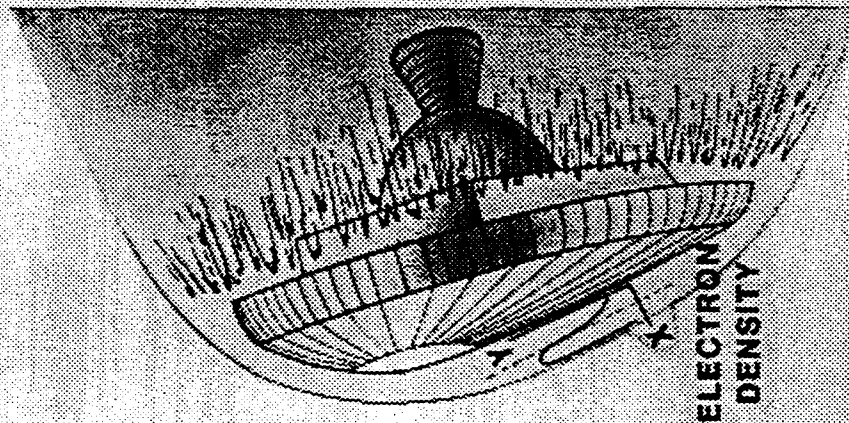


DEPLOY
0-00-00

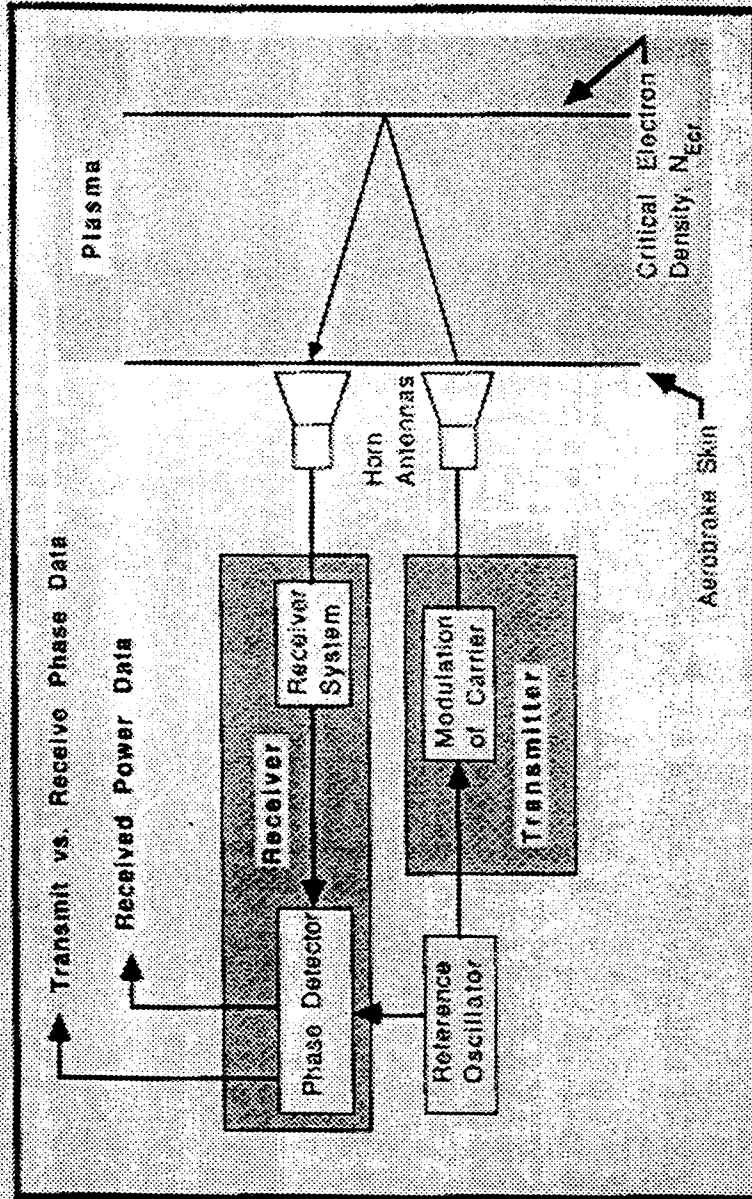


AEROASSIST FLIGHT EXPERIMENT

Microwave Reflectometer Ionization Sensor

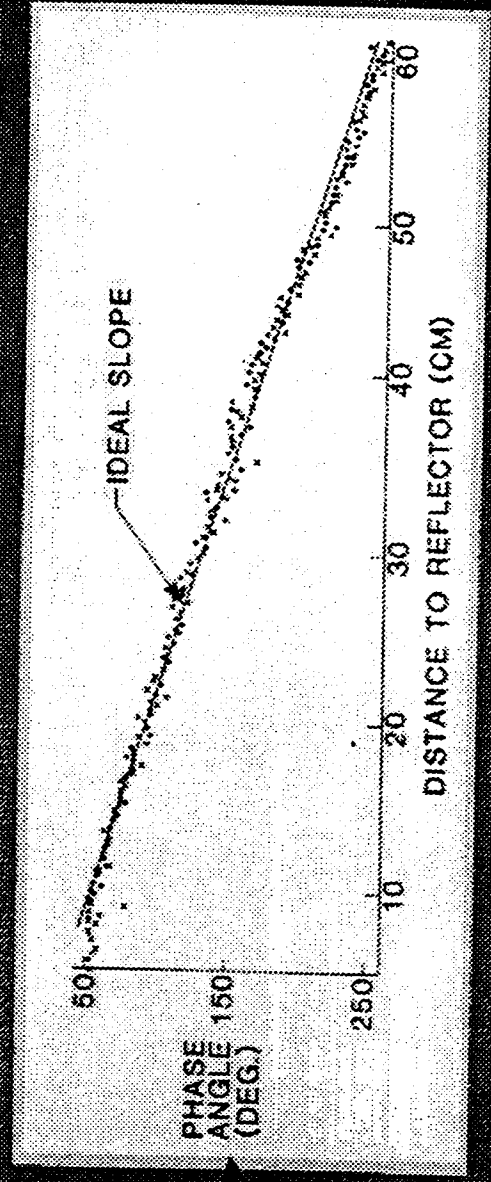
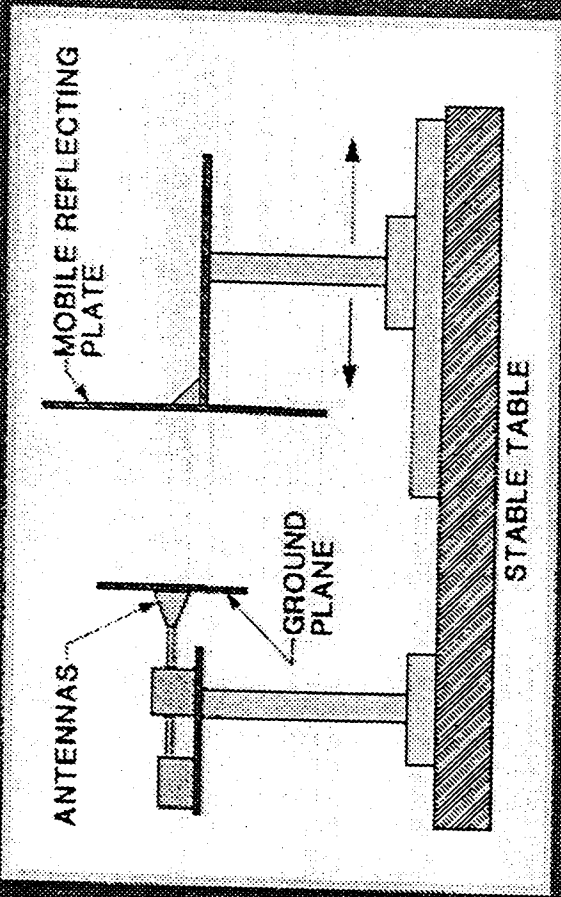


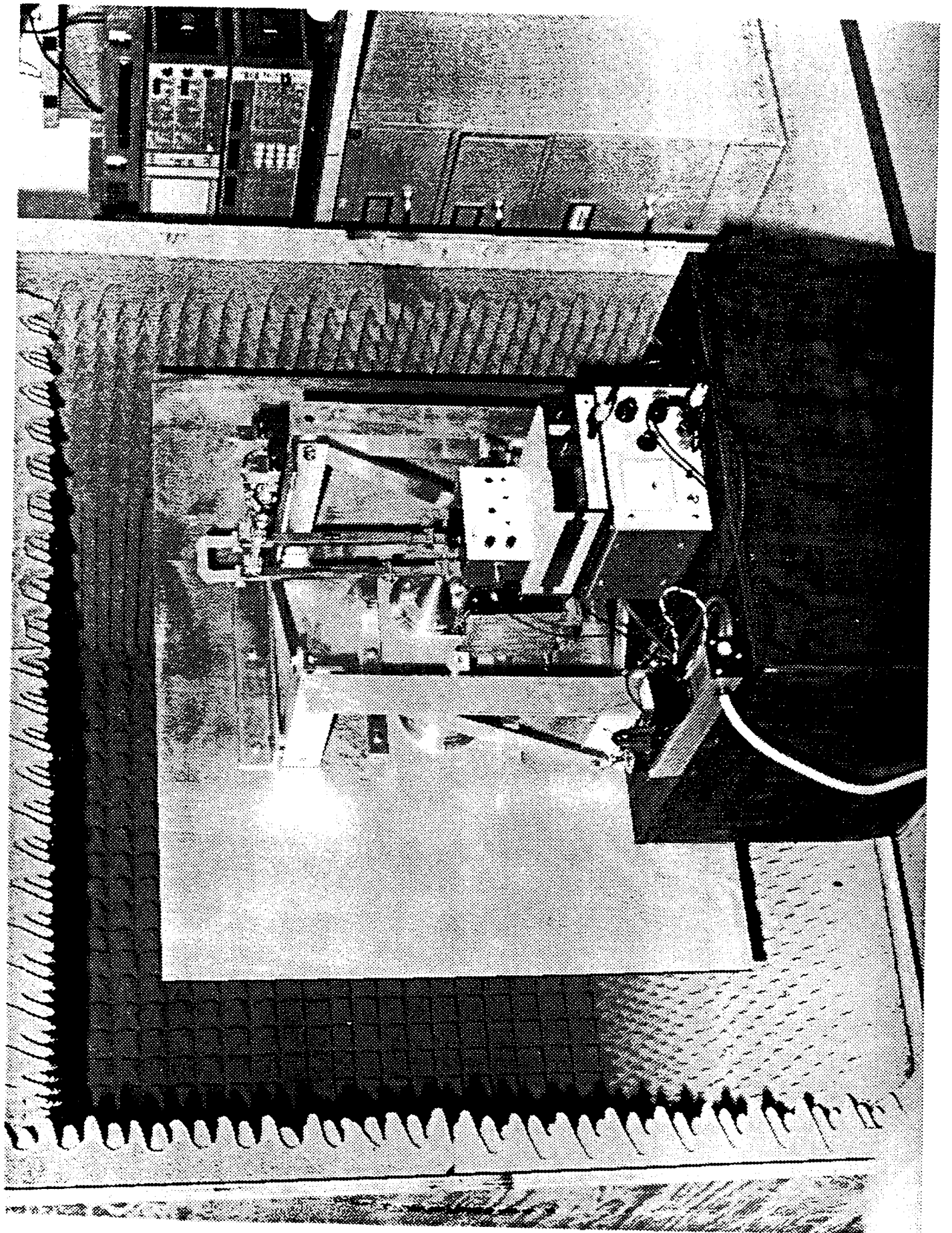
INSTRUMENT CONCEPT



MICROWAVE REFLECTOMETER IONIZATION SENSOR

Laboratory Flat-Plate Plasma Reflection Simulation







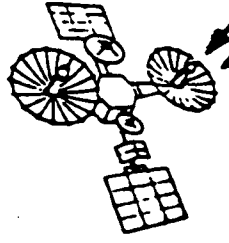
**AEROASSIST FLIGHT
EXPERIMENT**

**AFT FLOW
IONIZATION
EXPERIMENT**

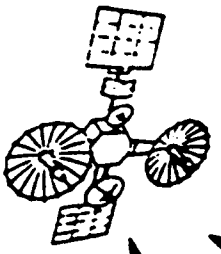
APPROACH:

- UTILIZE S-BAND TELEMETRY BLACKOUT AND VSWR MEASUREMENTS TO ESTABLISH ALTITUDE AND VELOCITY AT WHICH S-BAND CRITICAL DENSITY IS REACHED IN THE AFE BASE FLOW REGION

TDRS-West



TDRS-East

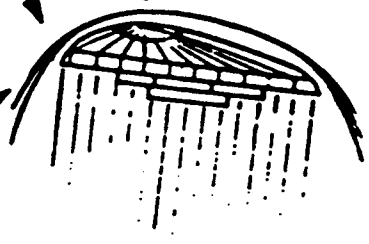


Ku-Band

S-Band

To White Sands

S-Band



AFE

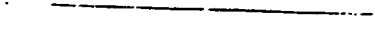
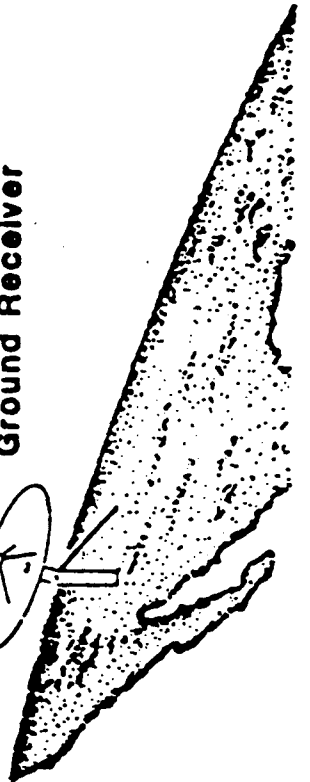
Ku-Band

To TDRS-West

White Sands
Ground Receiver



Hawaii Isl.



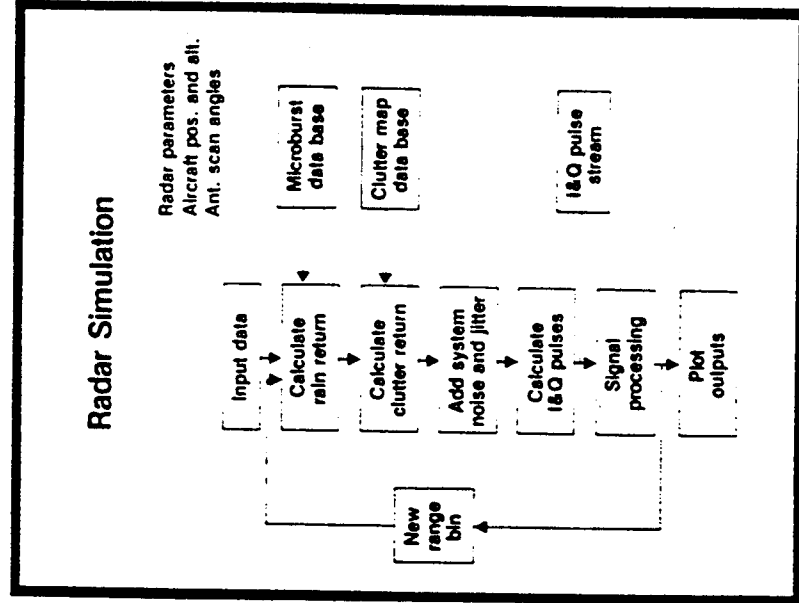
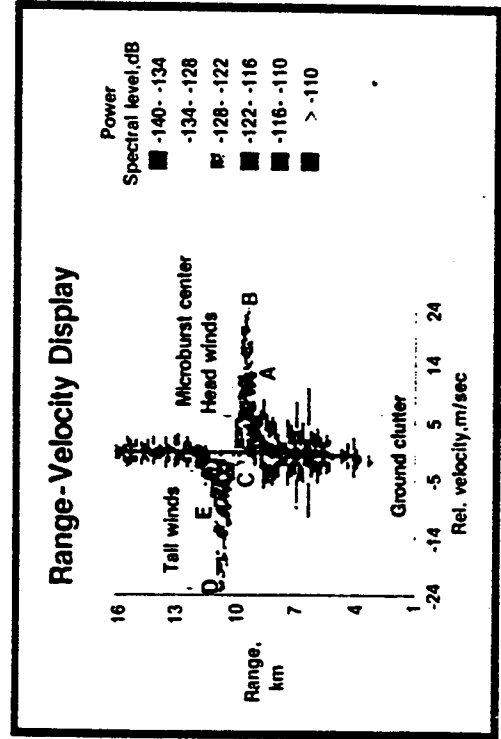
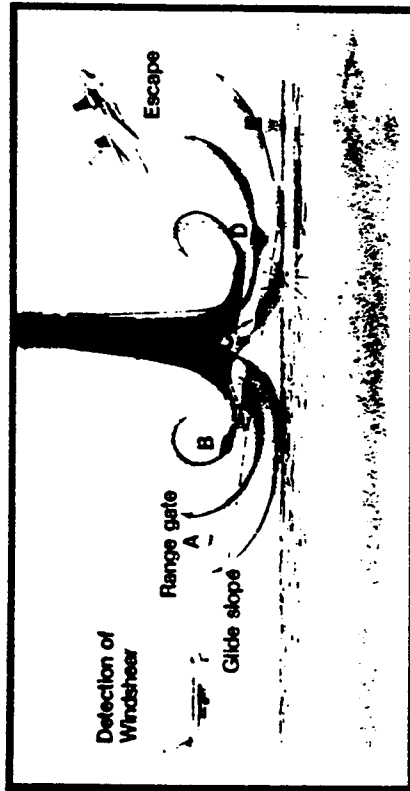
NASA
L-88-8717



WINDSHEAR RADAR TECHNOLOGY



RADAR SIMULATION & DISPLAY



L-88-7150

NASA



WINDSHEAR RADAR TECHNOLOGY

NASA
Langley Research Center

FLIGHT TEST ACTIVITIES

Phase I

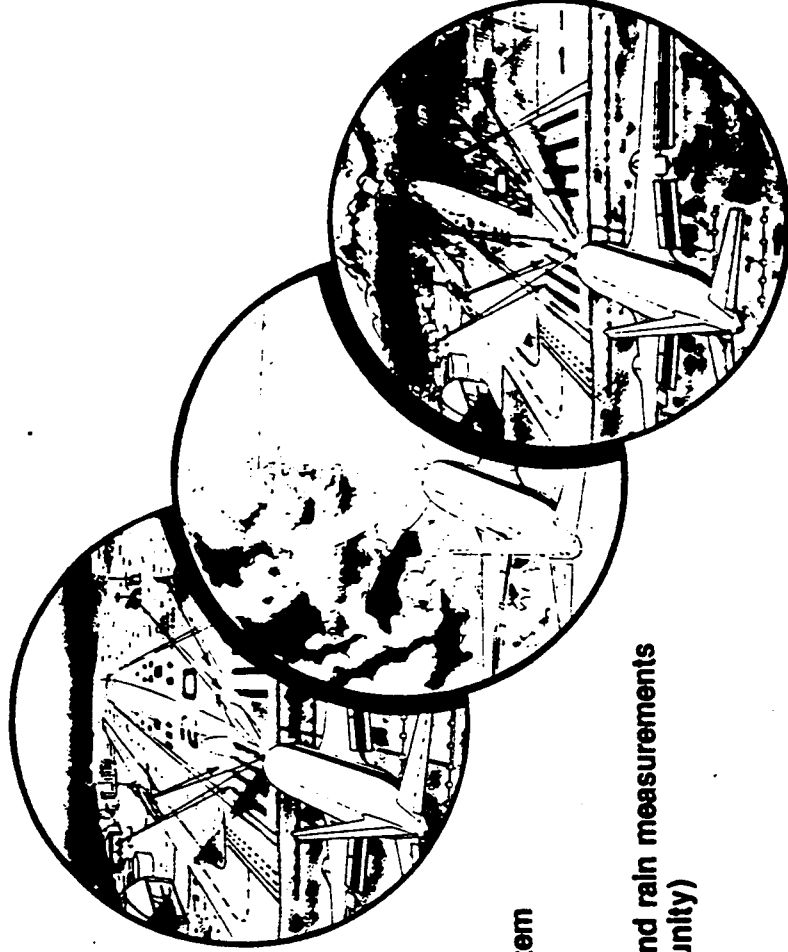
- Radar backscatter clutter measurements (during approach)
- Measurements conducted at selected airports (Dallas-Ft. Worth, San Diego, etc.)

Phase II

- Radar backscatter rain measurements
- Limited storm penetration by aircraft
- On board weather radar required
- Storm Insitu provided by ground radar system

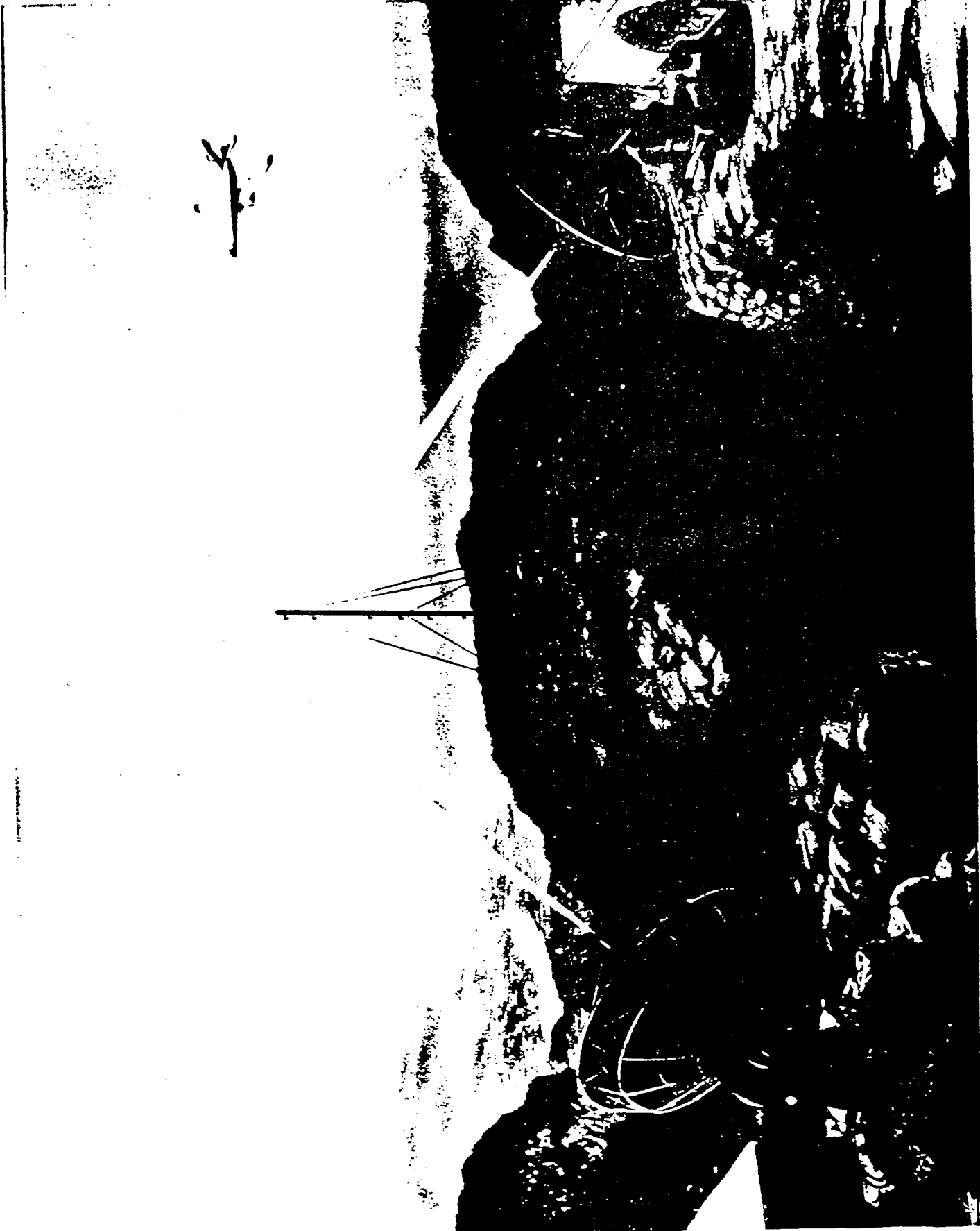
Phase III

- Combined radar backscatter clutter and rain measurements during approach (mission of opportunity)
- Aircraft storm penetration
- Ground Insitu measurements



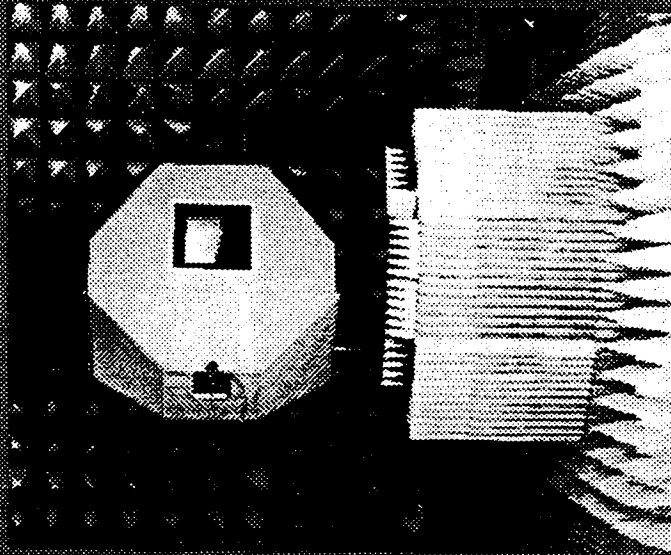
NASA

L-88-9667

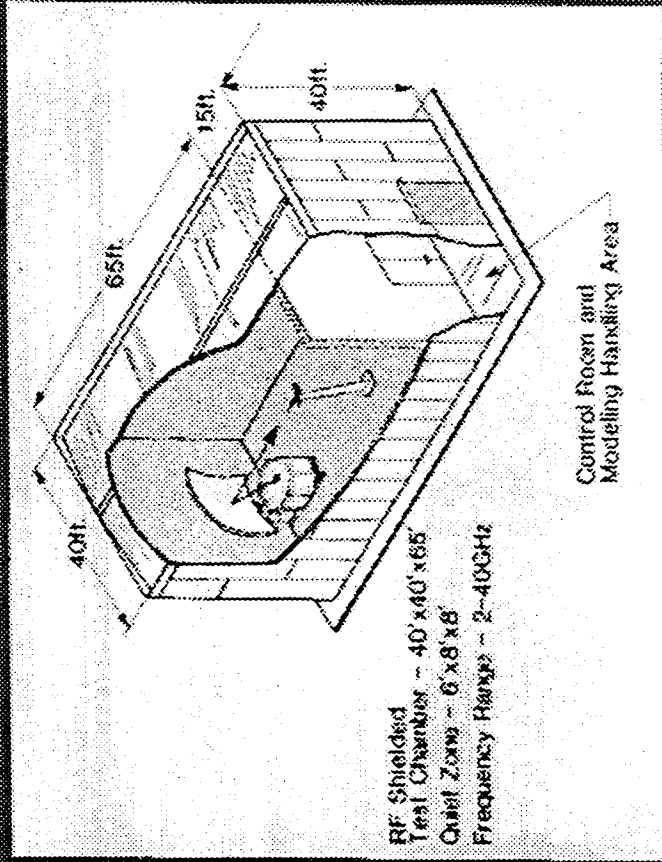


ADVANCED COMPACT RANGE TECHNOLOGY DEVELOPMENT

SUB-REFLECTOR MEASUREMENTS
IN ANTENNA CHAMBER



EXPERIMENTAL TEST RANGE (ETR)



PERSONNEL ESTIMATES

- New contract (on site personnel)
 - Start at ~ 9 people
 - Build-up rate (estimate depends on funding)
2-3 my / y
- Distribution of current work effort (L-10.H.4)
 - ~ 80% at NASA LaRC
 - ~ 12% at contractor facility
 - ~ 8% at subcontractor facilities

AMRB

Antenna Test Facilities

LOW FREQUENCY ANTENNA TEST CHAMBER

CONFIGURATION

TAPERED, 30H x 32W x 105L FT.

INSTRUMENTATION

SCIENTIFIC ATLANTA MODEL 2022 ANTENNA ANALYZER WITH HP-1000 COMPUTER
FOR SYSTEM CONTROL AND DATA PROCESSING

SCIENTIFIC ATLANTA PRECISION ANTENNA POSITIONING SYSTEM, ANTENNA
SOURCE TOWER, OPTICAL ALIGNMENT SYSTEM

SPHERICAL NEAR-FIELD SOFTWARE

MEASUREMENT CAPABILITIES

FAR-FIELD

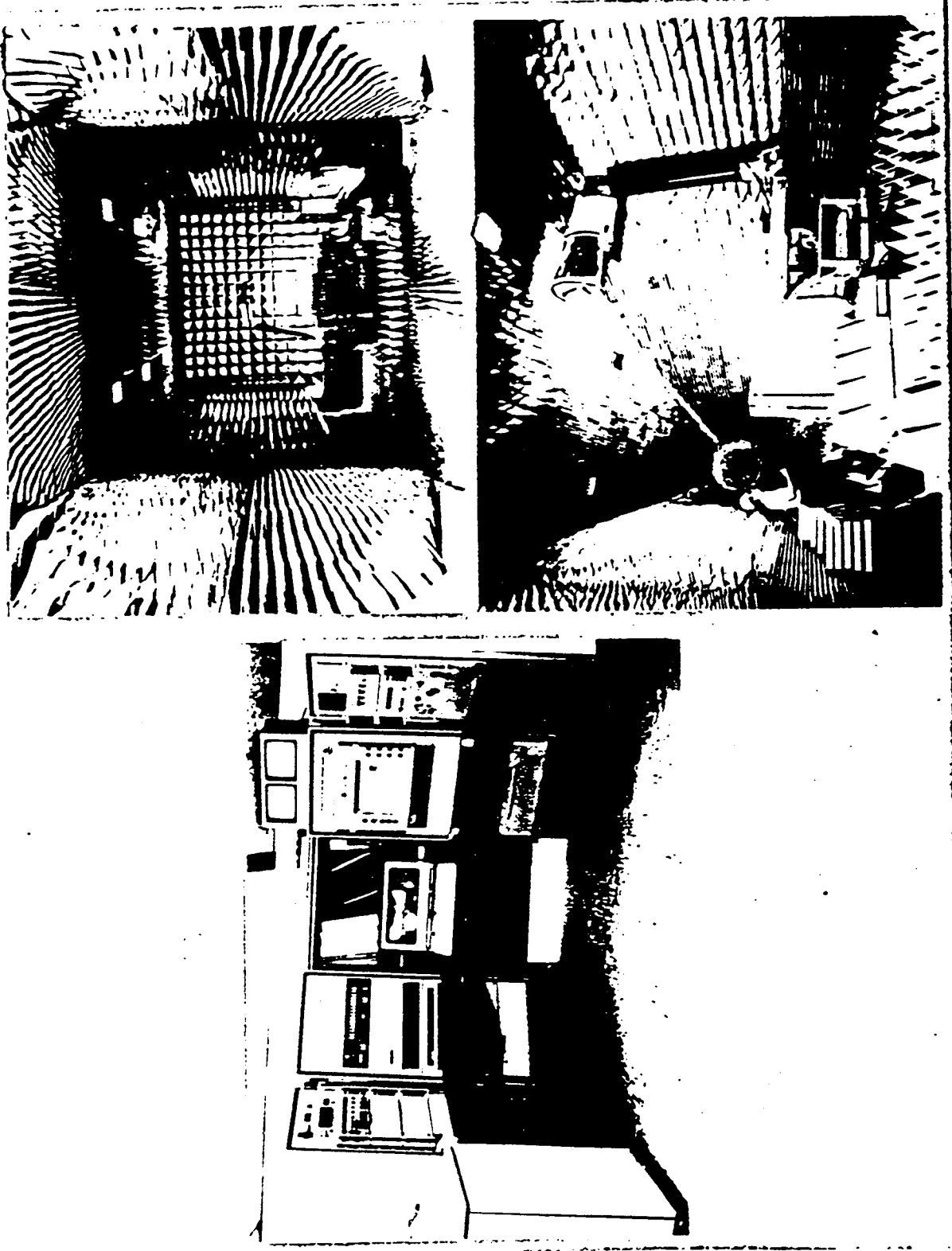
FREQUENCY RANGE (GHZ): 0.1 - 40.0
TEST MODEL/ANTENNA : 12 FT (MAX)
1,000 LBS.

SPHERICAL NEAR-FIELD

FREQUENCY RANGE (GHZ): 0.1 - 18.0
TEST ANTENNA : 12 FT DIAMETER (MAX)
D/λ ≤ 100 FOR 4 π SR COVERAGE
D/λ ≤ 150 FOR 2 π SR COVERAGE
1,000 LBS. (MAX)

NASA
L-83-2.327

LOW FREQUENCY ANTENNA TEST CHAMBER



COMPACT RANGE TEST CHAMBER

CONFIGURATION

RECTANGULAR, 30H X 28W X 65L FT.

INSIRUMENTATION

SCIENTIFIC ATLANTA MODEL 2085 ANTENNA AND EM SCATTERING MEASUREMENT SYSTEM WITH HP 9836 COMPUTER FOR SYSTEM CONTROL AND DATA PROCESSING, IBM AT FOR DATA PROCESSING

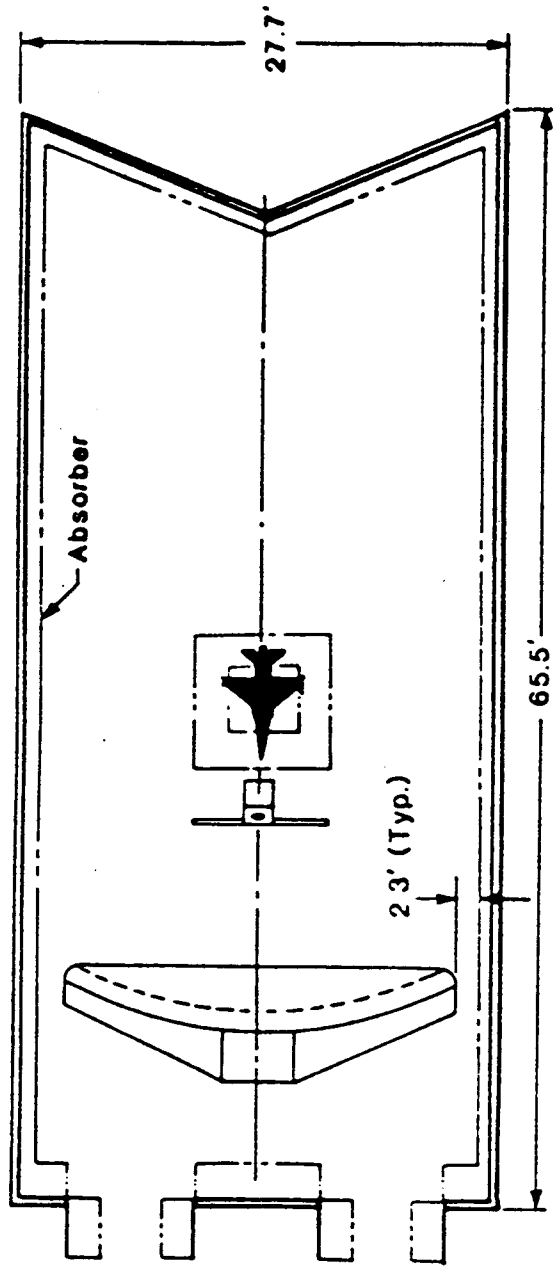
MODIFIED SCIENTIFIC ATLANTA MODEL 5752 MILLIMETER COMPACT RANGE REFLECTOR, COMPACT RANGE POSITIONER

MICROVAX WITH 3-D TEKTRONIX COLOR GRAPHICS FOR DATA PROCESSING, ANALYSIS

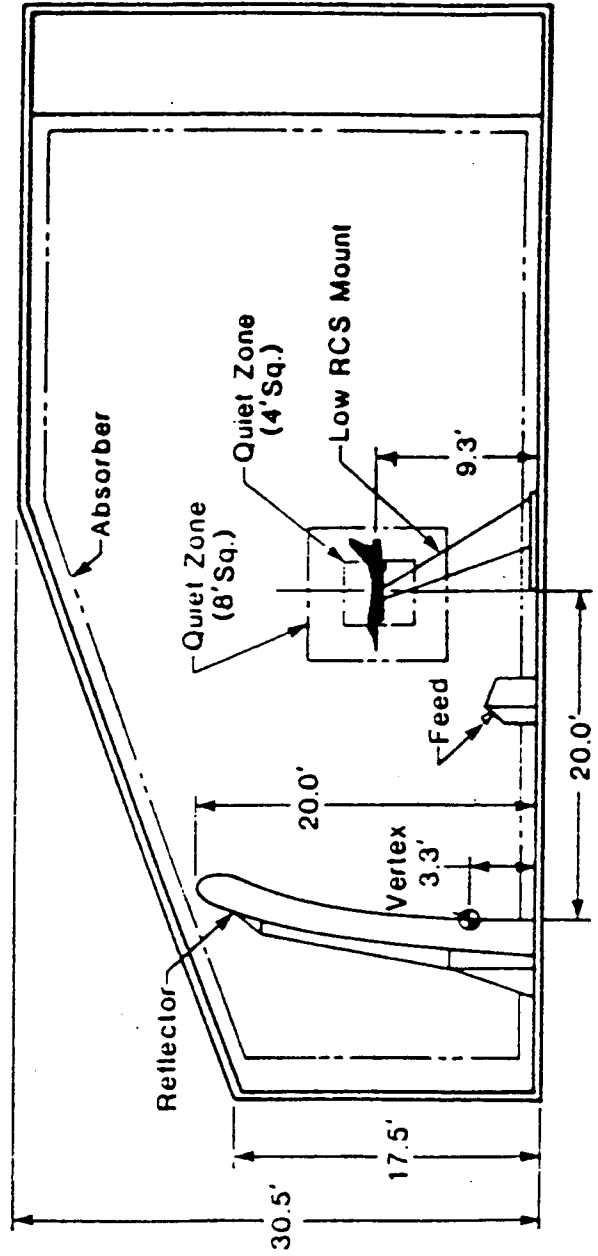
MEASUREMENT CAPABILITIES

FREQUENCY RANGE (GHZ): 2 - 40 (ANTENNA MEASUREMENTS)
8 - 18 (SCATTERING MEASUREMENTS)
TEST ANTENNA/MODEL : 8 FT. DIAMETER (MAX)
500 LBS.

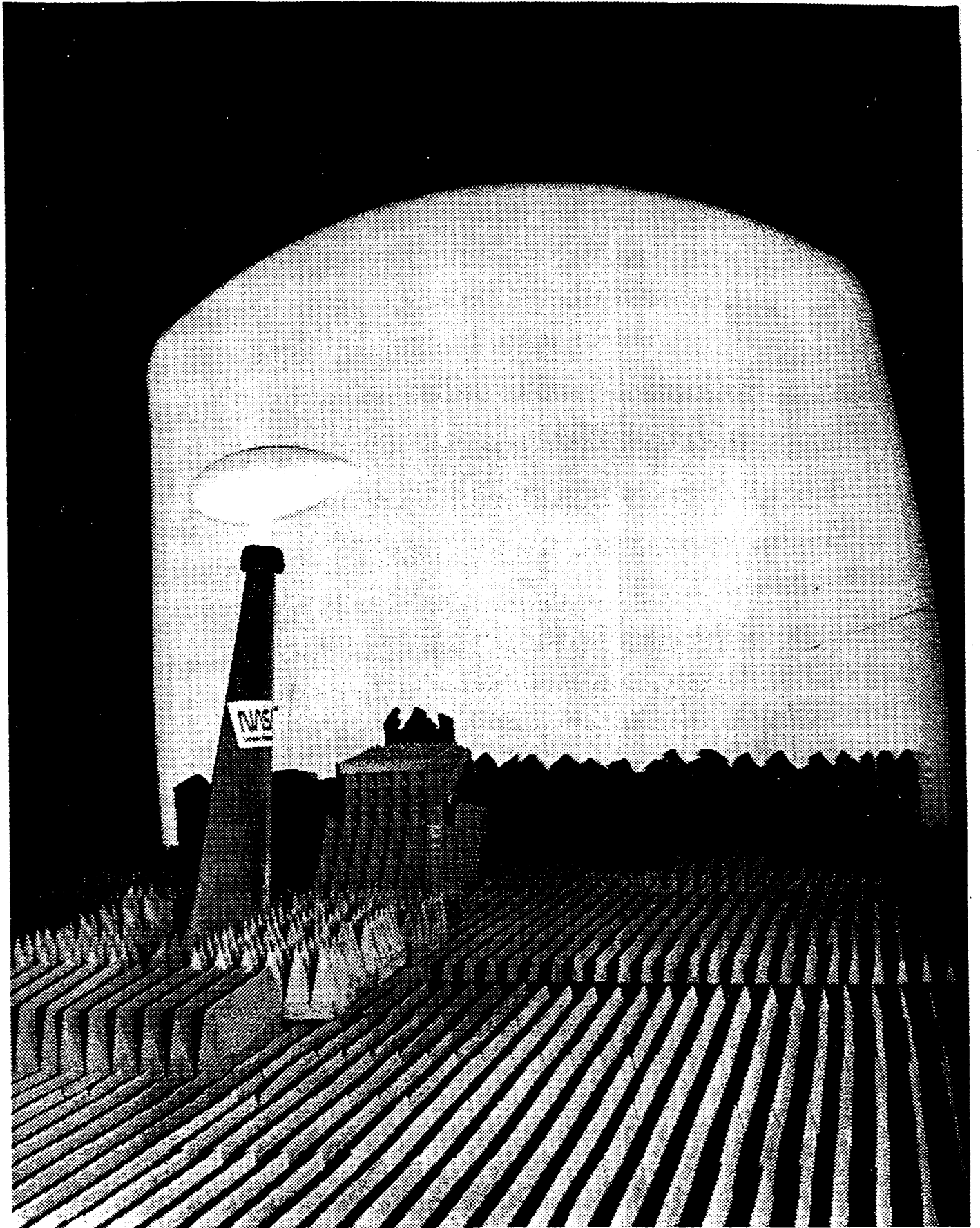
NASA-LANGLEY COMPACT RANGE CONFIGURATION

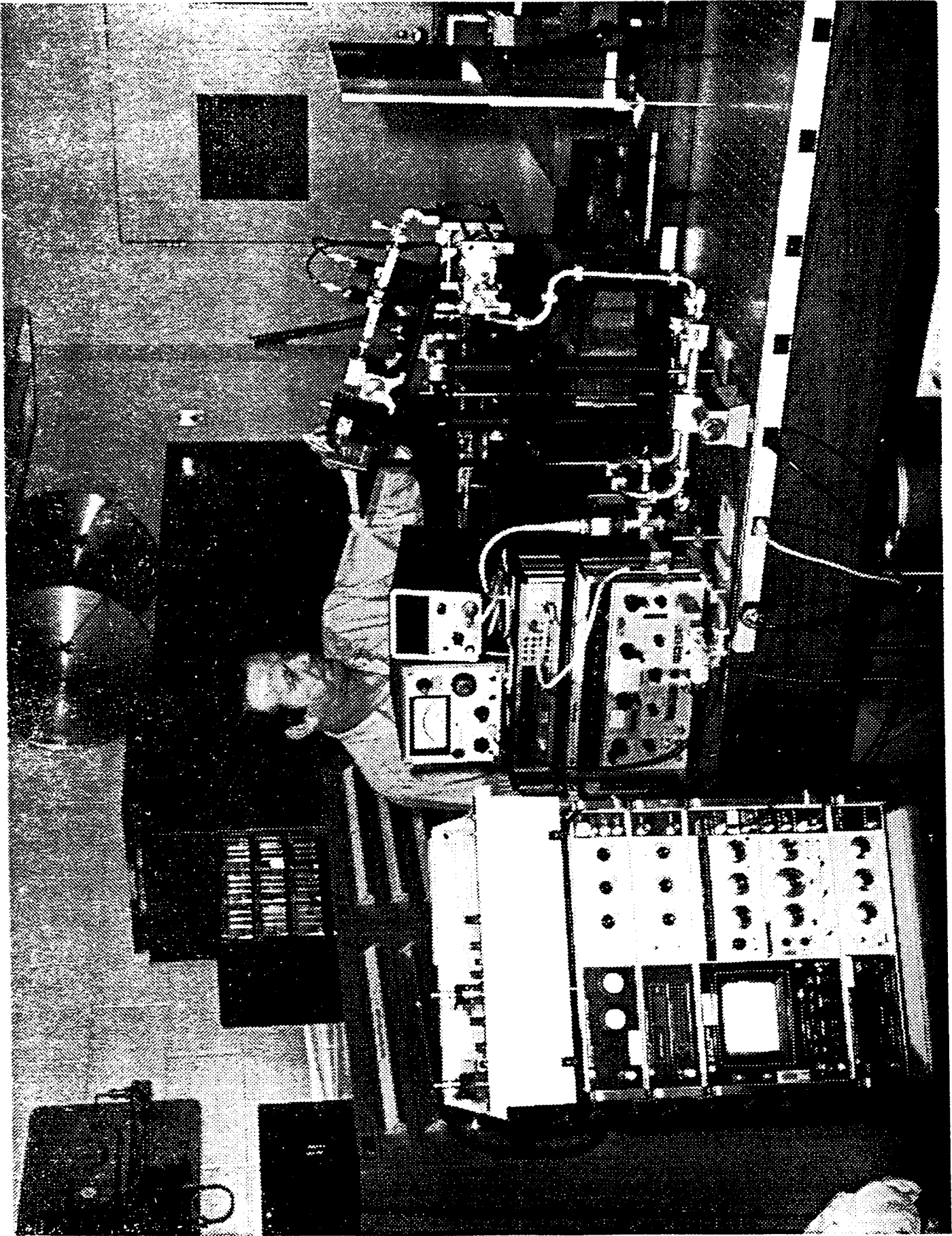


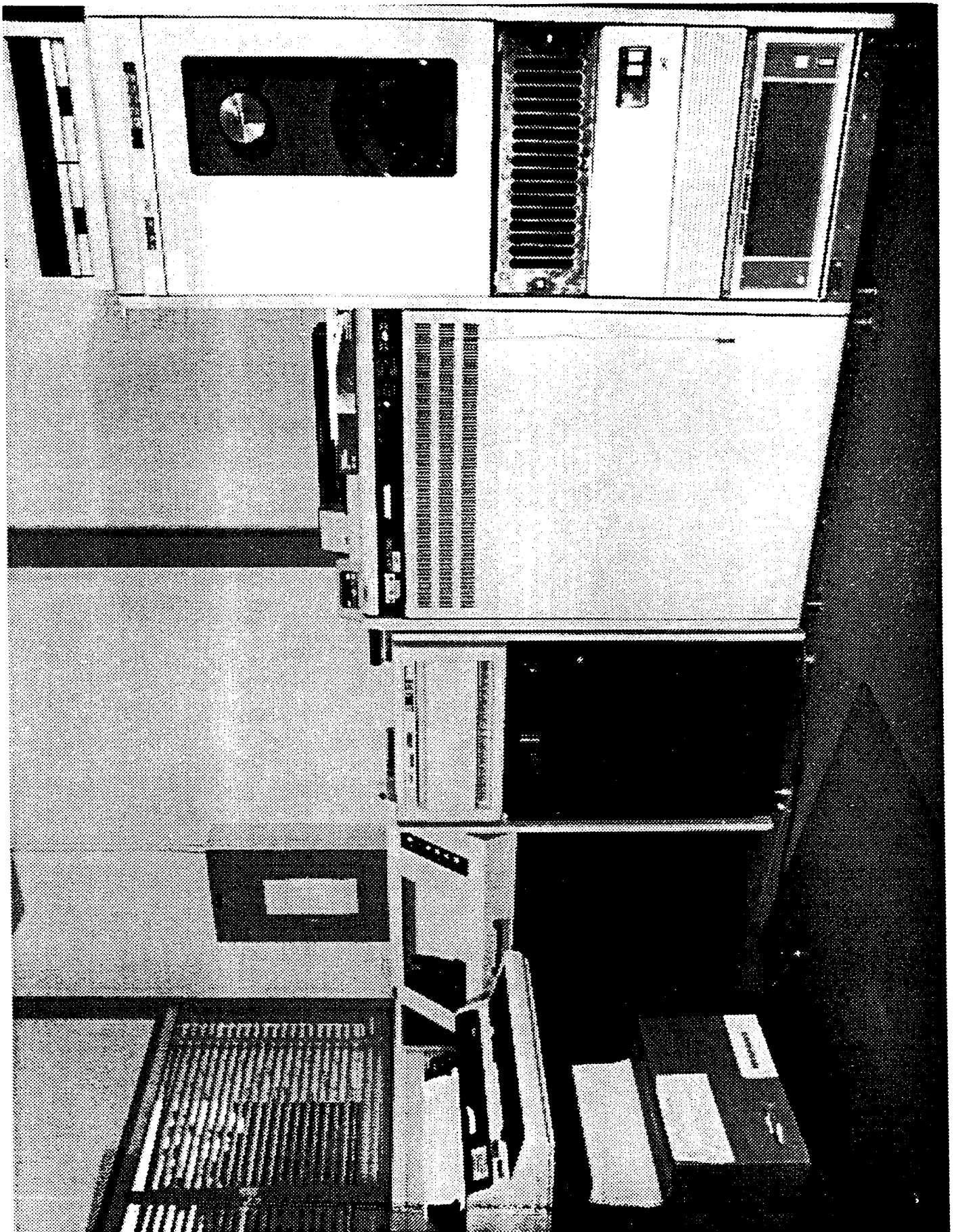
Plan



Elevation

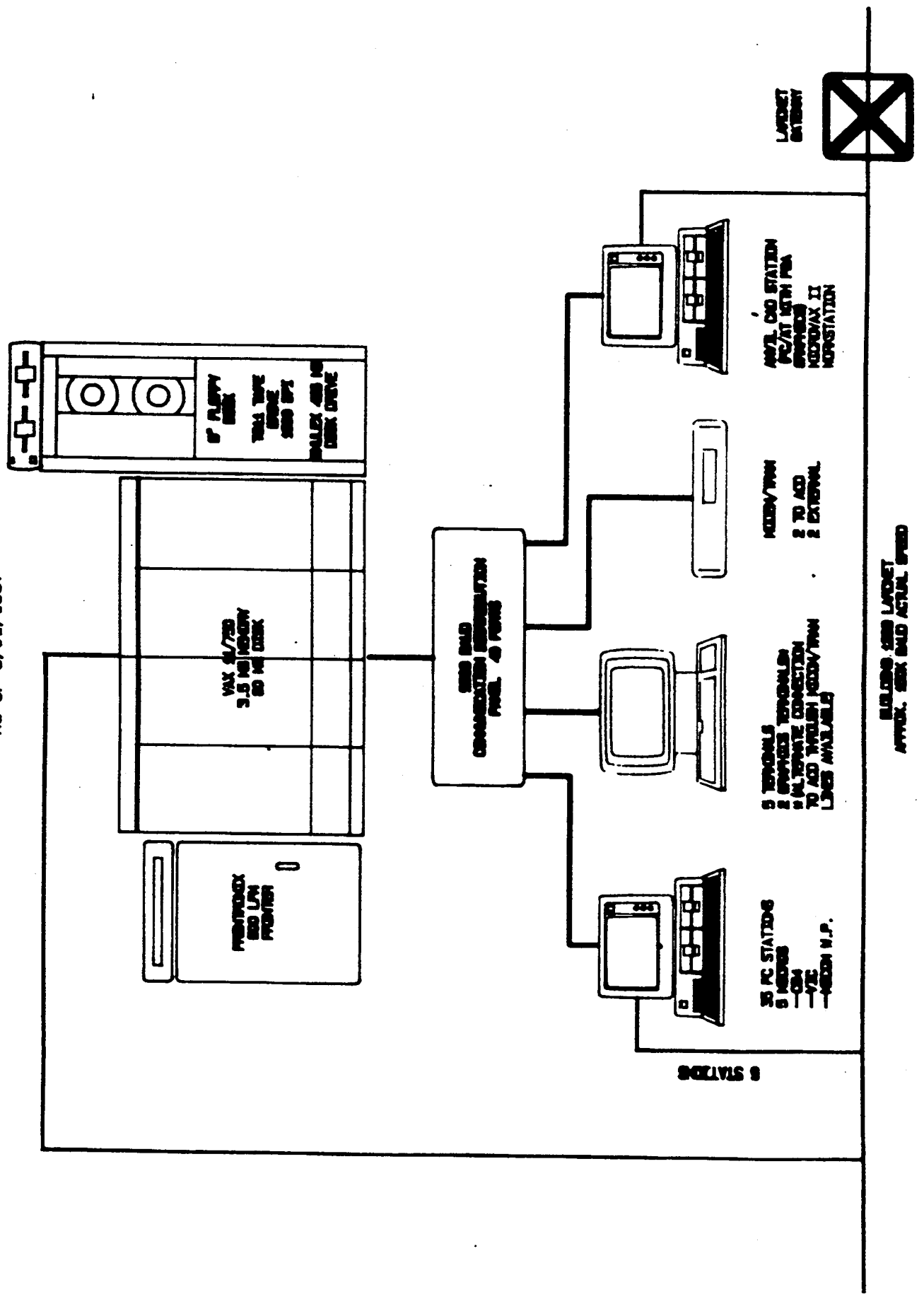




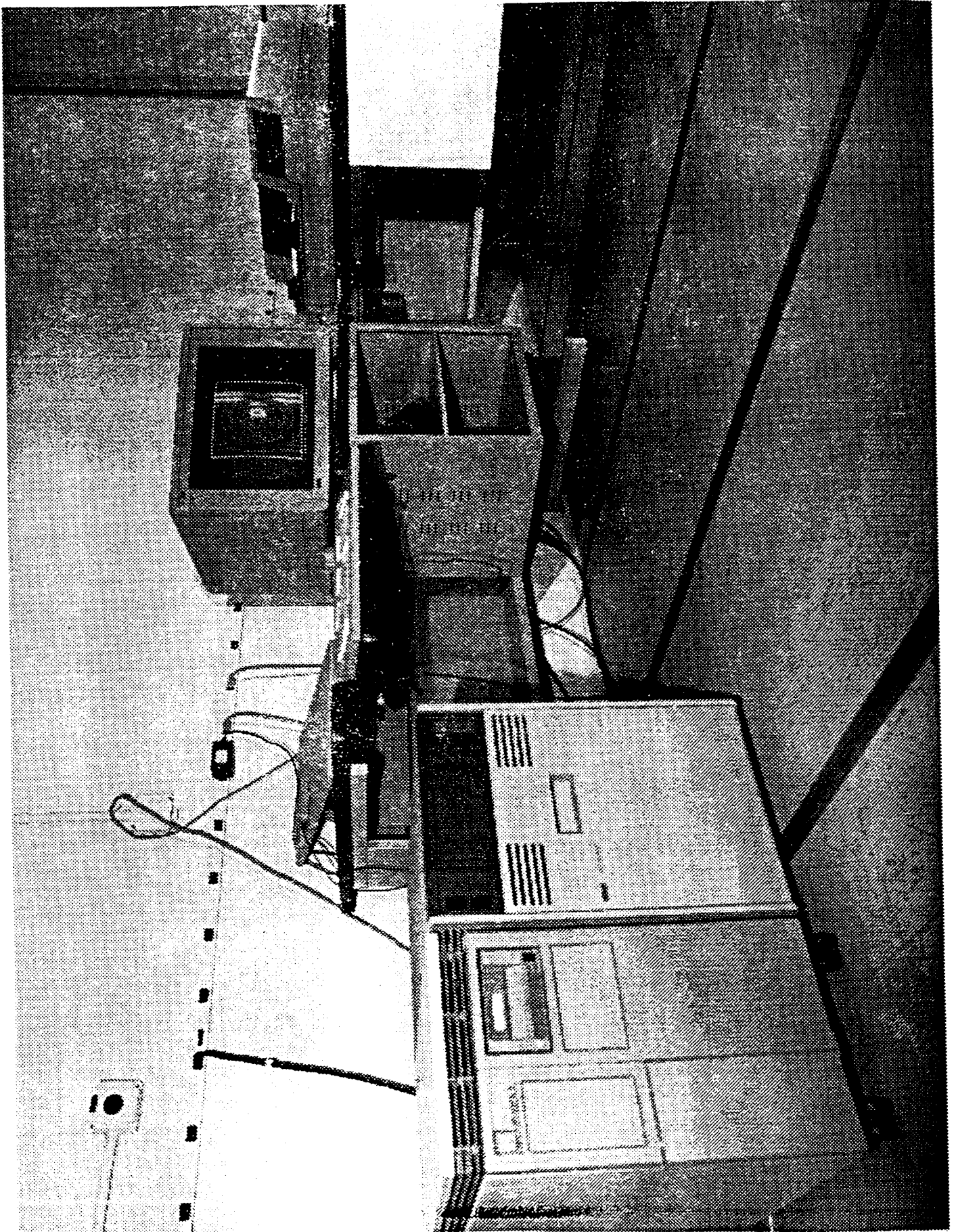


AMRB COMPUTING RESOURCES

**AMS COMPUTER RESOURCES
AS OF 5/01/1987**



**80000 BPS AND LAPNET
ATTACH. SERV BUS ACTUAL SPEED**





See Personal Learning System
for Advanced Programming

The Personal Learning System
for System Programming

NCA

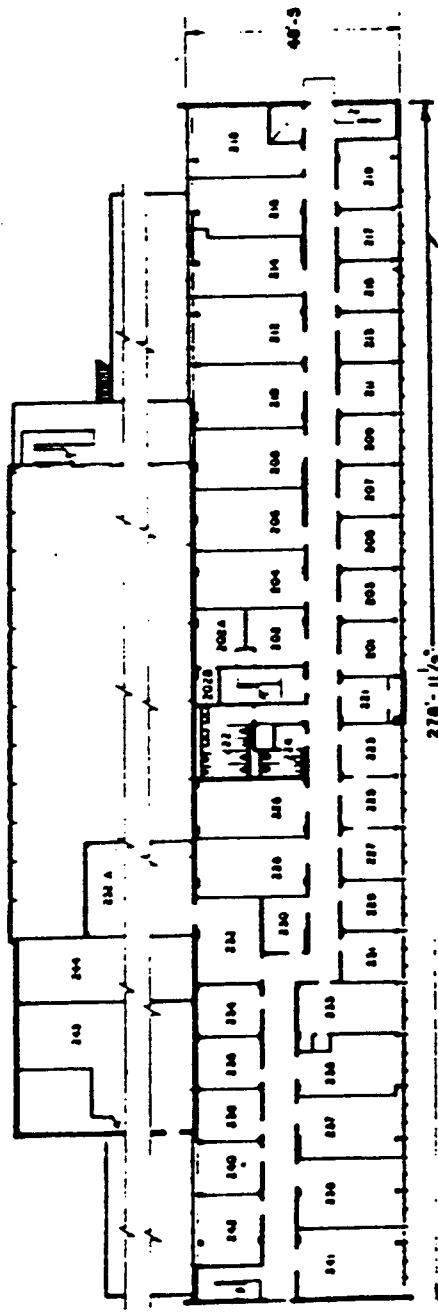
RABBIT-7

RABBIT-5

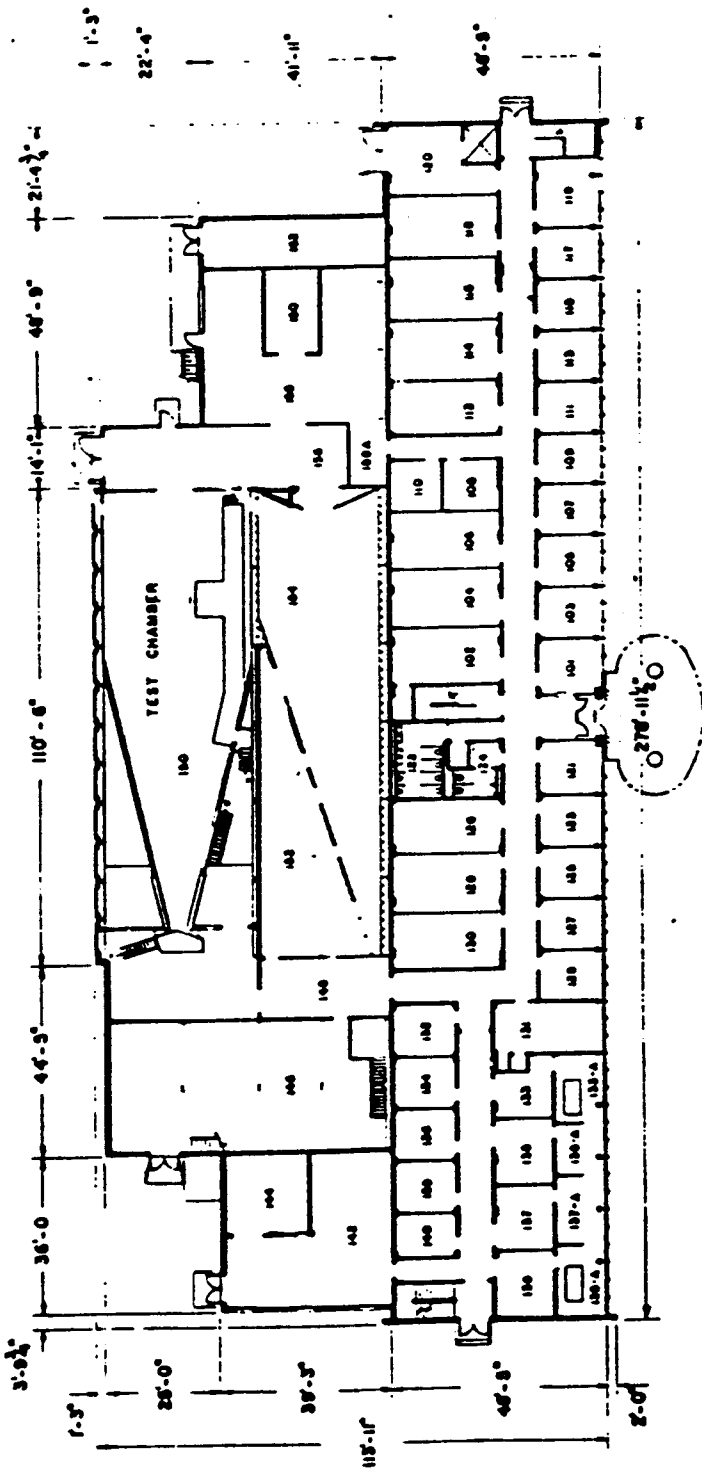
AMIB SOFTWARE

TECHNAR

LE TUTOR



278'-11 1/2"
SECOND FLOOR PLAN
 17,460 SQ. FT.



278'-11 1/2"
FIRST FLOOR PLAN
 27,033 SQ. FT.

GOVERNMENT SUPPLIED EQUIPMENT / FACILITIES

- Office space & furniture, supplies and mail service
- Five (5) personal computers
- Access to laboratory, Vax 11/750, microvax and LaRC central computer

SOLICITATION:

1-109-9240.0631

REQUIREMENT:

RESEARCH IN ANTENNA AND MICROWAVE TECHNOLOGY

CONTRACT TYPE:

- COST-PLUS-FIXED-FEE
- LEVEL OF EFFORT
- MAXIMUM: 182,000 DIRECT PRODUCTIVE LABOR HOURS, INCLUSIVE OF SUBCONTRACTING AND CONSULTANT HOURS
- MINIMUM: 36,400 DIRECT PRODUCTIVE LABOR HOURS
- HOURS TO BE AUTHORIZED THROUGH ISSUANCE OF TASK ASSIGNMENTS

PERIOD OF PERFORMANCE:

- PERIOD FOR ISSUANCE OF TASK ASSIGNMENTS IS SIXTY (60) MONTHS FROM DATE OF CONTRACT AWARD

PROPOSAL SUBMISSION:

- DUE DATE - CLOSE OF BUSINESS (4:00 P.M.) ON NOVEMBER 3, 1988
- SUBMIT TO - NASA LANGLEY RESEARCH CENTER, BUILDING 1195A, ROOM 103, HAMPTON, VIRGINIA 23665-5225
- NUMBER OF COPIES - 12 TECHNICAL
12 MANAGEMENT
12 BUSINESS

EVALUATION PROCEDURES

- PROPOSALS WILL BE EVALUATED BY A SOURCE EVALUATION COMMITTEE IN ACCORDANCE WITH PROCEDURES SIMILAR TO THOSE PRESCRIBED IN THE NASA SOURCE EVALUATION BOARD MANUAL NHB 5103.6A.

1. INITIALLY REVIEW TO IDENTIFY ANY PATENTLY UNACCEPTABLE PROPOSALS.
 - ARRIVE AT CONSENSUS RELATIVE TO ACCEPTABILITY FOR FURTHER REVIEW
 - DOCUMENT FINDINGS
 - PRESENT TO CONTRACTING OFFICER
2. INDIVIDUALLY REVIEW IN-DEPTH AND IN ALPHABETICAL ORDER REMAINING PROPOSALS.
 - DOCUMENT STRONG AND WEAK POINTS BY SUBFACTOR AND FACTOR
 - ASSIGN ADJECTIVE RATING
 - COMPARE FOR CONSISTENCY OF ADJECTIVE SELECTION
3. COLLECTIVELY DISCUSS IN-DEPTH AND IN ALPHABETICAL ORDER THOSE PROPOSALS REVIEWED IN STEP 2.
 - DOCUMENT CONSENSUS STRONG AND WEAK POINTS BY SUBFACTOR AND FACTOR
 - ASSIGN CONSENSUS ADJECTIVE RATING
 - CONVERT TO A NUMERICAL SCORE
 - REVIEW TO ENSURE ADJECTIVE RATING AND NUMERICAL SCORE REFLECTS COMMITTEE CONSENSUS
 - SUM SUBFACTOR SCORES TO FACTOR LEVEL
 - SUM FACTOR SCORES AND CONVERT TO FINAL ADJECTIVE RATING

4. INITIAL REVIEW OF BUSINESS PROPOSALS FOR IMPACT ON TECHNICAL SCORE.
5. PRESENT INITIAL FINDINGS TO CONTRACTING OFFICER FOR COMPETITIVE RANGE DETERMINATION.
6. CONDUCT WRITTEN/ORAL DISCUSSIONS WITH THOSE OFFERORS IN THE COMPETITIVE RANGE AS NEEDED FOR CLARIFICATION.
7. ESTABLISH COMMON CUTOFF DATE FOR SUBMISSION OF ANY PROPOSAL REVISIONS.
8. REVIEW PROPOSAL REVISIONS AND REVISE FINDINGS AS NECESSARY.
9. PREPARE AND PRESENT FINAL EVALUATION DATA TO SELECTION OFFICIAL FOR SELECTION OF OFFEROR(S) FOR NEGOTIATION.

<u>ADJECTIVE</u>	<u>NUMERICAL SCORE</u>	<u>DEFINITION</u>
EXCELLENT	E - 1000 E- - 950	OFFEROR'S RESPONSE SATISFIES MISSION OBJECTIVES IN ALL SIGNIFICANT ASPECTS. HOWEVER, MINOR CLARIFICATIONS, ADJUSTMENTS, ETC., MIGHT BE IN ORDER. COULD BE ACCEPTED WITHOUT CONDITION.
GOOD	G+ - 900 G - 850 G- - 800	OFFEROR'S RESPONSE SATISFIES MISSION OBJECTIVES IN MOST SIGNIFICANT ASPECTS. MAY CONTAIN WEAKNESSES WHICH, IF CORRECTED, WOULD IMPROVE PROPOSAL QUALITY; HOWEVER, THESE ARE MORE THAN OFFSET BY THE OVERALL STRENGTH OF THE PROPOSAL.
SATISFACTORY	S+ - 700 S - 600 S- - 500	OFFEROR'S RESPONSE IS CONSIDERED TO BE ACCEPTABLE. WEAKNESSES, IF ANY, ARE CONSIDERED CORRECTABLE.
MARGINAL TO UNSATISFACTORY	M - 400 M- - 200 U - 0	OFFEROR'S RESPONSE CONTAINS MAJOR WEAKNESSES. PROPOSAL MUST BE SUBSTANTIALLY CHANGED OR REWRITTEN IN ORDER TO BE CONSIDERED FOR AWARD.

EVALUATION FACTORS

TECHNICAL FACTORS - MISSION SUITABILITY

<u>FACTOR</u>	<u>SUBFACTOR</u>	<u>POINTS</u>
1. PROPOSED TECHNICAL APPROACH	A. RESPONSE TO STATEMENT OF WORK	75
	B. RESPONSE TO REPRESENTATIVE TASKS	
	1. TASK 1	25
	2. TASK 2	20
	3. TASK 3	40
	4. TASK 4	<u>60</u>
	TOTAL POINTS =	220
2. UNDERSTANDING THE REQUIREMENT	A. RESPONSE TO STATEMENT OF WORK	75
	B. RESPONSE TO REPRESENTATIVE TASKS	
	1. TASK 1	25
	2. TASK 2	20
	3. TASK 3	40
	4. TASK 4	<u>60</u>
	TOTAL POINTS =	220
3. PERSONNEL ASSIGNED	A. RESPONSE TO STATEMENT OF WORK	80
	B. RESPONSE TO REPRESENTATIVE TASKS	
	1. TASK 1	30
	2. TASK 2	35
	3. TASK 3	70
	4. TASK 4	<u>105</u>
	TOTAL POINTS =	320
4. MANAGEMENT	TOTAL POINTS =	240

EVALUATION FACTORS (CONT'D)

BUSINESS FACTORS

- ESTIMATED COST AND FIXED-FEE
- EXPERIENCE AND PAST PERFORMANCE
- OTHER FACTORS
 - FINANCIAL RESPONSIBILITY
 - CONTRACT TERMS AND CONDITIONS
 - FACILITIES AND EQUIPMENT
 - SUBCONTRACTING PLAN FOR SMALL AND SMALL DISADVANTAGED BUSINESS CONCERNS
 - SECURITY
 - PLAN FOR NEW TECHNOLOGY REPORTING
 - EQUAL EMPLOYMENT OPPORTUNITY COMPLIANCE

SIGN-IN SHEET

PREPROPOSAL CONFERENCE

OCTOBER 3, 1988

RFP 1-109-9240.0631 - RESEARCH IN ANTENNA AND MICROWAVE TECHNOLOGY

NAME	FIRM REPRESENTED
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Emmett F. Knight	Boeing
JAMES HAIDT	RTI
JOHN FINLER	RTI LARC
MILTON CRAM	GA. TECH RES. INST.
PAT BURNS	GA TECH RES INST
Phil Schaffner	RTI
Pat Napier	RTI
Jim Kurtz	Go Tech Research Institute