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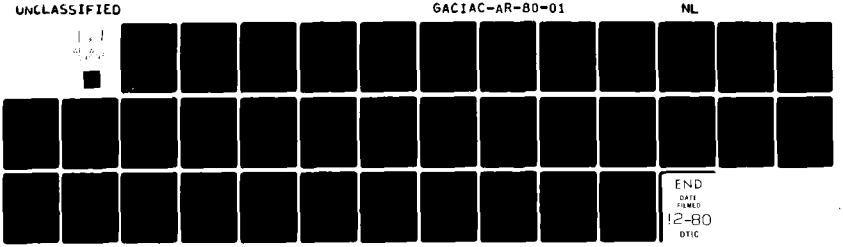

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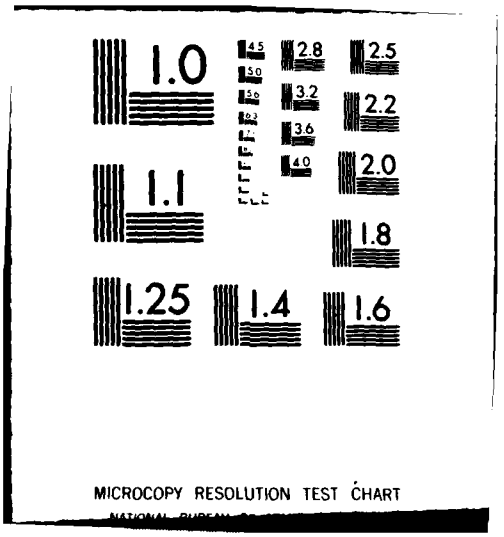
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TACTICAL WEAPON GUIDANCE & CONTROL INFORMATION ANALYSIS CENTER

ANNUAL REPORT NO. 3

TACTICAL WEAPON GUIDANCE AND CONTROL INFORMATION ANALYSIS CENTER

Report Number GACIAC-AR-80-01

LEVEL III

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IIT Research Institute
10 West 35th Street
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Contract No. DSA900-77-C-3840

U.S. Army Missile Command
Redstone Arsenal, Alabama 35898

August 1980

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Data Base
Information Retrieval

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report summarizes the activities of the Tactical Weapon Guidance and Control Information and Analysis Center (GACIAC) during its third year of operation, ~~covering the period 1 July 1979 to 30 June 1980.~~ The background and organization of the Center is reviewed and major activities consisting of internal operations, support services, and products and services are outlined. This report also serves as a contract status report covering the 12th quarter and as a final report on this three year program.

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FOREWORD

This report was prepared by the Tactical Weapon Guidance and Control Information Analysis Center (GACIAC) which is operated by IIT Research Institute (IITRI), 10 West 35th Street, Chicago, Illinois 60616, under Contract DSA900-77-C-3840. The program is administered under the direction of the Defense Logistics Agency, Cameron Station, Alexandria, Virginia, through the Defense Electronics Supply Center, Dayton, Ohio, with technical direction by the U.S. Army Missile Command, Redstone Arsenal, Alabama. Mr. Howard C. Race is the Contracting Officer's Technical Representative.

The GACIAC and IITRI management express their appreciation to the many sponsor representatives whose advice, guidance and support have contributed to the continued growth and success of the Center. Significant contributions to the program have been made by the following people:

Mr. Joseph Blue, DLA
Mr. William Leonard, MICOM
Mr. Howard Race, MICOM
Mr. James Pendergast, DTIC
Ms. Francis Burke, DESC
Ms. Sara Williams, DESC
Ms. Lorraine Pachankis, DCASMA
Mr. George Kopcsak, OUSDRE
Dr. Joseph R. Mayersak, AD/CZ
Dr. Robert J. Heaston, HQDA

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1979-1980 ANNUAL REPORT
TACTICAL WEAPON GUIDANCE & CONTROL INFORMATION ANALYSIS CENTER

1. INTRODUCTION

This is the third annual report describing the activities of the Tactical Weapon Guidance and Control Information Analysis Center (GACIAC), a DoD Information Analysis Center administered by the Defense Logistics Agency, sponsored by the U.S. Army Missile Command and operated by IIT Research Institute. This is the final report under Contract DSA900-77-C-3840 and is intended to serve as both the twelfth quarterly R&D contract status report, covering the activities and expenditures related to the operation of the Center during the period 1 April 1980 through 30 June 1980, and as an annual report summarizing the third year of operation covering the period 1 July 1979 through 30 June 1980. Cumulative totals for the complete three year contract are also provided where applicable.

In order to be compatible with previous quarterly reports distributed to cognizant government agencies for monitoring this contract, the format specified by the Defense Logistics Agency Data Item Description DI-A-4058, R&D Contract Status Report, dated 9 August 1974, will be followed with information and data specified therein provided. This is in agreement with Data Item Description DI-S-4057 specified in the contract as a guide for the final report.

2. ACCOMPLISHMENTS

During this period GACIAC has continued and expanded its full service Information Analysis Center (IAC) operations and is becoming a recognized center for technical information in the guidance and control community. The following paragraphs provide details on

the various activities and accomplishments of the Center over the twelfth quarter with a summary of the third year of operation.

2.1 JSGCC Support

Support to the Executive Committee this quarter consisted of providing secretariat services at the meeting of 30 May 1980 held at the Naval Research Laboratory, Washington, D.C., where minutes were taken, prepared, submitted for review, and distributed. As a result of the discussion at this meeting, GACIAC prepared a report, "Brief Review of High Power Millimeter Wave Tube Development," GACIAC SR 80-03 and distributed it to the Committee. In addition a proposal to conduct state-of-the-art review of high power millimeter wave vacuum tubes will be submitted to the Contract Technical Representative for consideration.

Secretariat support was provided for the following JSGCC Working Group meetings:

- Millimeter Wave Guidance Working Group meeting held at the U.S. Army Missile Command on 15 April 1980,
- Midcourse Guidance Working Group meeting held at the Air Force Armament Laboratory on 24 April 1980,
- CM/CCM Working Group meeting held at BDM Corporation, Huntsville, Alabama on 14-15 May 1980.

Support to these groups consists of contacting members, sending announcements of the meeting, attending the meeting to record the minutes, distributing the prepared minutes to the Group for review, and finally distributing the approved minutes to the entire JSGCC membership.

During the year GACIAC has provided administrative and technical support to the JSGCC Executive Committee and its Working Groups as summarized below:

JSGCC MEETINGS

Date	Place	Remarks
26 July 79	AFSC Andrews AFB, MD	Discussed PGM Handbook, Working Group Objectives and IR Measurement Standardization
31 July 79	MICOM Redstone Arsenal, AL	Initial Millimeter Wave Guidance Working Group Meeting
14 Sept 79	DARPA HQ Arlington, VA	Review of Proliferation of Symposia/Conferences/Meetings, decision that JSGCC will take lead in trying to coordinate IR/MMW signature measurement programs
18 Sept 79	AFATL Eglin AFB, FL	Initial Midcourse Guidance Working Group Meeting
27 Sept 79	MICOM Redstone Arsenal	Terminally Guided Sub-Munition Working Group Meeting
18 Oct 79	NOSC San Diego, CA	Executive Meeting was cancelled; some members attended ERASE Review being held at NOSC
7-8 Nov 79	MICOM Redstone Arsenal	MMW Guidance Working Group Meeting
15 Nov 79	HDL Adelphi, MD	Review of operations in cold weather regions, discussion of PGM Handbook, OUSDRE directive to review and coordinate IR/MMW measurement programs
27 Nov 79	AFATL Eglin AFB, FL	CM/CCM Working Group Meeting
4 Dec 79	NWC China Lake, CA	Active/Passive RF Guidance Working Group Meeting
17 Dec 79	NV&EOL Ft. Belvoir, VA	Review of Target/Background Signature Measurement Program and Working Group Chairman reports
22 Jan 80	AFATL Eglin AFB, FL	TGSM Working Group Meeting
12 Feb 80	MICOM Redstone Arsenal	Active/Passive RF Guidance Working Group Meeting
13 Feb 80	Physical Sciences Lab, Las Cruces NM	CM/CCM Working Group Meeting
14 Feb 80	AFSC HQ Andrews AFB, MD	Approved formation of IR Guidance Working Group and decided to hold Symposium on target signatures later in the year

JSGCC MEETINGS (Continued)

Date	Place	Remarks
15 Apr 80	MICOM Redstone Arsenal	MMW Guidance Working Group Meeting
24 Apr 80	AFATL Eglin AFB, FL	Midcourse Guidance Working Group Meeting
14-15 May 80	BDM Corporation Huntsville, AL	CM/CCM Working Group Meeting
30 May 80	NRL Washington, DC	Report on JSGCC briefing to Service Secretaries, Mobile Force CM Workshop to be held, review of membership and participation.

In addition to the special report on MMW tubes mentioned above, GACIAC prepared a report entitled "Millimeter Wave Guidance Frequency Allocation Requirements," GACIAC SR 79-01, November 1979, and contributed technically as well as printing a report entitled, "Millimeter Wave Hardware-in-the-Loop Simulation Survey." Both of these reports were the result of support provided to the Millimeter Wave Guidance Working Group.

2.2 Proceedings of the Second Echelon Armor Interdiction Symposium

Two volumes of the Proceedings of the Second Echelon Armor Interdiction Symposium, which was sponsored by the JSGCC, were published by GACIAC this year. Volume 1, available to both industry and government, consisted of 395 pages, and Volume 2, limited to U.S. Government only, consisted of 320 pages. The number of copies distributed by quarter is shown below:

	Volume 1	Volume 2
9th Quarter	151	34
10th Quarter	79	52
11th Quarter	8	5
12th Quarter	2	1
TOTAL	240	92

2.3 Proceedings of the Workshop on Imaging Trackers and Autonomous Acquisition Applications for Missile Guidance

This Workshop was jointly sponsored by the U.S. Army Missile Command and the JSGCC. GACIAC provided support through publishing announcements prior to the Workshop and handling the publication of the Proceedings. The Proceedings contain 516 pages. Because of the poor quality of a number of the papers submitted, GACIAC had to retype them prior to publication. Copies of these retyped papers were sent to the authors for proof reading and approval prior to publication. Copies of the Proceedings were distributed free of charge to all of the Workshop attendees and registrants. A total of 453 copies were sent out in August 1980 under this contract. Additional copies will be distributed to the JSGCC and GACIAC subscribers.

2.4 Workshop on Polarimetric Radar Technology

The major effort devoted to organizing, arranging and administering this workshop occurred during this quarterly period. GACIAC personnel visited the U.S. Army Missile Command at Redstone Arsenal on 2 May 1980 to discuss and arrange for housing, buses, luncheons, a social function, security, break refreshments, registration, program finalization, and a general review of the schedule. Both the MICOM Protocol Office and Security Office/Visitors Center were very cooperative and helpful in supporting the Workshop.

GACIAC contacted all the authors that submitted papers with acceptance or rejection letters and supplied complete instructions on preparation of camera ready copy of the accepted papers to the authors. At the Workshop a decision was made to include all the papers submitted for consideration in the Proceedings and GACIAC then notified the authors whose papers had been rejected of this decision and provided instructions on paper preparation.

The Workshop was held on 25-26 June 1980 in the Rocket Auditorium at MICOM. Preregistration was held the evening of 24 June 1980 at the Skycenter Hotel with MICOM personnel handling security check,

badges, luncheon/coffee/social hour tickets, and information packets. GACIAC personnel provided backup information regarding the Workshop to registrants. From the response of the participants (all attendees were required to submit a paper) the Workshop was judged to be very successful in terms of information exchange and informal discussion of some of the unsolved problems. Because of this, it was decided that the state-of-the-art of polarimetric radar technology has reached the stage where sufficient progress is being made to warrant another workshop next year, where more time will be allocated to questions and discussion following each session.

2.5 GACIAC Planning and Development

Being the final quarter of the 3 year program, the major effort this period was devoted to completing all of the tasks undertaken by GACIAC. No new tasks were initiated or proposed because of the uncertainty of the future of the contract.

However, a number of plans have been readied and will be carried out now that IITRI is the successful bidder for continuing GACIAC operation. Arrangements have been made for submitting white papers to the Air Force Materials Laboratory and the Night Vision and Electro-Optics Laboratory for special tasks under GACIAC to conduct a study of optical materials and to prepare a handbook of optical materials, respectively. A state-of-the-art review on high power millimeter wave vacuum tubes has been discussed by the JSGCC and some thought has been given to the preparation of a proposal for such a task.

Plans have also been made to upgrade the classified COMSEC material destruction equipment which will make that daily operation more efficient. Discussions have also been held regarding the IITRI purchase of a new microfiche reader-printer to expedite the GACIAC library and document indexing operations.

The major plans and program for continuing the development and operation of GACIAC over the next five years was submitted to the Defense Electronic Supply Center in IITRI's Proposal 79-653E dated

January 1979. These will be implemented under the new contract and discussed in the reports submitted as part of that program.

A new GACIAC *USER's GUIDE* was prepared last quarter and distributed to over 5000 people in a mailing last quarter. This user guide will be employed in the future for promotion of GACIAC within the guidance and control community through distribution at conferences and symposiums as well as through mailings.

GACIAC was represented by Mr. J. Granath, Director of the Electronics Division of IITRI, at the IAC Directors meeting held 29-30 April 1980 by the Defense Logistics Agency at Cameron Station. This meeting provided an opportunity to exchange ideas and discuss plans for continued cooperation between the Centers and DTIC. These meetings are helpful in planning future activities and policies relative to the continued development of GACIAC. Future meetings of this type are endorsed and will be supported by GACIAC.

2.6 Outputs

During this quarter a number of reports were published and activities conducted. The Workshop on Polarimetric Radar Technology was held at MICOM under GACIAC's cognizance. The Proceedings of the Workshop on Imaging Trackers and Autonomous Acquisition Applications for Missile Guidance was published and distributed to everyone attending the workshop. A Brief Review of High Power MMW Tube Developments (GACIAC Report SR 80-03) was prepared and distributed to the members of the JSGCC. A special task to survey MMW components/devices/systems related to a hardware in the loop simulation was completed and draft copies of two reports were prepared and distributed. These reports were titled "Millimeter Wave (MMW) Simulator Intermediate User/System Survey (U)," Volumes I and II, GACIAC Reports SR 80-03 and SR 80-04. Another special study of anechoic chamber fire protection systems was completed and camera ready copy of the report sent to the sponsor. This GACIAC Report SR 80-02 was titled "Evaluation of RF Anechoic Chamber Fire Protection Systems," and will be published as

Technical Publication TP 6211 by the Naval Weapons Center. A trip report based upon a one week visit to OMEW and the associated conclusions and recommendations of the resulting analysis made of the SAM simulation GACIAC has been supporting as a special task was prepared and 36 copies were mailed to the sponsor. Finally, GACIAC Bulletin Vol. 3 No. 2, June 1980 was prepared and mailed.

A summary of the major outputs for this annual period, in addition to those described above, is provided in the following paragraphs.

The GACIAC Bulletin was distributed on a quarterly basis (June, September, December, March and June) as discussed later in this report. The Bulletin has been employed to announce workshops and conferences supported by GACIAC. In these cases extra copies of the Bulletin are usually supplied to the sponsor/chairman of the event for additional distribution. Such was the case with the following issues: June 1979 - 100 copies and September 1979 - 200 copies sent to Dr. L. Minor of MICOM, Chairman of the Workshop on Imaging Trackers and Autonomous Acquisition Applications for Missile Guidance; June 1980 - 100 copies sent to Mr. C. Riley of MICOM, Chairman of the Symposium on Electronic Counter-Countermeasure Technology. A new GACIAC USERS GUIDE was prepared and 5061 copies were mailed. This same mailing contained an announcement and call for papers for the Workshop on Polarimetric Radar Technology administered by GACIAC for the U.S. Army Missile Command.

A special task to review, edit, and rewrite a number of reports dealing with the AJAX ECCM Technique was completed. The output consisted of the camera ready copy of the approved report entitled "Laboratory and Field Tests of the AJAX ECCM Technique," which was delivered to the sponsor.

The special task for the Office of Missile Electronic Warfare involving technical support for a hardware in the loop real time digital simulation of a surface to air missile was continued. Three special reports were prepared and 36 copies of each were

delivered to the sponsor. More details are provided in Section 4.3.

In support of the JSGCC and MMW Guidance Working Group, two special reports were prepared and distributed, GACIAC SR 79-01 and SR 80-03. These were described in Section 2.1.

The Guidance Law Handbook continued to be distributed this year with a total of 63 copies (47 to government and 16 to industry) mailed.

The Proceedings of the Second Echelon Armor Interdiction Symposium was published in two volumes, both classified. Volume 2 was restricted to U.S. Government only because of the proprietary nature of the contents. During the year 240 copies of Volume 1 and 92 copies of Volume 2 were distributed.

A Technology Assessment of Ring Laser Gyroscopes was completed and published in October 1979. To date 120 copies have been distributed (73 to government and 47 to industry).

2.7 Documents and Terminal Operation

Data base building and library operations continued this period with the total GACIAC data base now exceeding 24,618 bibliographic citations. The indexing has not kept pace with the volume of documents requested and received; however, effort will be devoted to increasing the number of reports indexed so as to keep abreast of the flow.

Statistics provided by DTIC on the GACIAC data base usage by on-line organizations are summarized below. The on-line service was instituted at the beginning of 1980.

Month	Number of Users	Number of Records Displayed
January	58	1,443
February	52	1,029
March	61	1,414
April	52	1,825
May	72	1,388
June	61	1,285

In April the terminal system was down due to line problems for seven days. No other interruptions occurred during the quarter.

A COMSEC inspection by Mr. J. Lamb, Air Force Cryptological Support Center, San Antonio, Texas, was conducted on 16 April 1980. He was accompanied by Lt. B. Markovitch during the inspection held 13 September 1979. The annual inspection and review of terminal operational procedures was conducted by Mr. A. Johnson, DTIC, Alexandria, Virginia, on 21 September 1979. Semi-annual security inspections of the GACIAC library and COMSEC material were conducted by DCASMA personnel from the Chicago office on 25 September 1979 and 11-12 March 1980.

GACIAC personnel attended and participated in the DTIC On-Line Users Meetings held on 24-26 October 1979 in Alexandria, Virginia and on 27-28 March in Orlando, Florida. A series of briefings were given by Mrs. V. Valaitis on the GACIAC data base, during the October meeting, to acquaint potential on-line users with its scope and general search procedures to be employed.

During this annual period, effort has been devoted toward preparation of a thesaurus to assist in document indexing and searching. More work is required to produce a really useful document and such efforts will be continued as time permits.

3. PROBLEMS

No major problems were encountered during this quarter and no continuing problems remain unsolved at the end of this annual period.

4. STATUS OF WORK IN PROGRESS

Progress on each of the special tasks undertaken or products developed this quarter and annual period will be reviewed in the following paragraphs.

4.1 Evaluation of RF Anechoic Chamber Fire Protection Systems

This special task was completed this period with the publication of GACIAC Report No. SR 80-02, "Evaluation of RF Anechoic Chamber

Fire Protection Systems," T. E. Waterman, J. A. Campbell, L. D. Paarmann, I. N. Mindel and C. W. Smoots, April 1980. One reproducible copy and three bound copies of this 174 page report were sent to Mr. E. Diede, Code 36303, Naval Weapons Center, China Lake, California, sponsor of this special study. The report has been accepted with a few minor corrections. It will be published by NWC as a Technical Publication TP 6211, using the same title. GACIAC will receive 30 copies for distribution and the report will be available from NWC and DTIC.

Total effort devoted to this task during this quarter amounted to 123 hours (70 professional and 53 non-professional) with a cost of $6,177. Total expenditures on this special task were 518 hours (432 professional and 86 non-professional) with a cost of $18,824.

4.2 Millimeter Wave Technical Support

GACIAC was requested to provide technical support to the U.S. Army Missile Command by reviewing the status of millimeter wave components and devices that may be applicable to the construction of a hardware in the loop simulator being planned. A survey of millimeter seekers/sensors/radar was also conducted to provide a basis for establishment of the simulator requirements. This effort was coordinated with the Georgia Institute of Technology (GIT), who is also providing services to MICOM on this same topic, with visits made to GIT to discuss the work on two occasions.

Two reports were compiled and published this quarter under this special task. They are entitled "Millimeter Wave (MMW) Simulator Intermediate User/System Survey (U)," edited by K. Brandt, Volume I, GACIAC SR 80-04, Unclassified, and Volume II, GACIAC SR 80-05, SECRET, July 1980. The expenditure on this task totaled 831 hours (789 professional and 42 non-professional) with costs of $32,550.

4.3 SAM Simulation Support

Continued technical support was provided to the Office of Missile Electronic Warfare, White Sands, New Mexico this period.

A one week trip was made to OMEW to assist in identifying and solving some problems that have been noted in a hardware-in-the-loop missile flight simulator. A follow up trip report was prepared after further analysis and consideration of the problems that outlined the investigation, discussed the introduction of body rotation into the simulation, discussed a seeker/body coordinate problem, questioned some aerodynamic coefficients, and suggested future efforts.

The expenditure this period amounted to 125 hours (109 professional and 16 non-professional) with costs of $6,600.

This has been an ongoing technical support task for OMEW starting during the previous annual period aimed at assisting OMEW in the development of a digital hardware-in-the-loop missile flight simulator. In addition to working directly with the engineers and equipment at OMEW, portions of the simulation were implemented on computers at IITRI and results demonstrated during visits by OMEW personnel. Three reports were prepared as part of the task as follows:

"Increasing Update Rates in Digital Computer Flight Simulation," C. E. Radgowski, GACIAC Report No. SP 79-02, August 1979.

"Mathematical Model of SADS-VI/M Seeker (U)," W. A. Davidson, GACIAC Report No. SP 79-03, August 1979, CONFIDENTIAL.

"Review of SADS-VI/M Flight Simulator (U)," W. A. Davidson, GACIAC Report No. SR 80-01, February 1980, CONFIDENTIAL.

Effort during this annual period totaled 538.5 hours (478 professional and 60.5 non-professional) with costs of $25,790. Totals since the task began amount to 752.5 hours (690 professional and 62.5 non-professional) with costs of $35,191.

4.4 Imaging Trackers and Autonomous Acquisition Applications for Missile Guidance Workshop

During this quarterly period a special task for the U.S. Army Missile Command involving the publication of the proceedings of the Workshop on Imaging Trackers and Autonomous Acquisition Applications for Missile Guidance was completed. As directed by the

Workshop Chairman, a copy of the Proceedings was sent to all attendees and registrants (454) free of charge.

GACIAC will attempt to sell additional copies of the Proceedings at $35 as a cost recovery measure. They will be advertised in the GACIAC Bulletin and used as subscription products.

Expenditure on this task during this quarter amounted to 224 hours (87 professional and 137 non-professional) with costs of $14,129 ($8,447 for printing). Total (annual) costs were $15,853 which included 274 hours of effort (141 hours professional and 133 hours non-professional).

4.5 G&C Handbook on Precision Guided Munitions

Minimal effort was devoted to this task during this quarterly period. An additional section was prepared by Dr. Heaston and sent to GACIAC for review. Forms containing technical data on the various PGM's sent to cognizant government laboratories have not been returned or have not been completed properly. Arrangements have been made by Dr. Heaston to visit the major contributors to this data compilation in order to obtain the necessary information.

During this period 4 hours of professional effort have been devoted to reviewing the material completed at a cost of $181.

During this annual period Mr. C. Smoots wrote portions of the tutorial section of the handbook including sections on: How Smart Sensors Work, Seekers, Stable Platforms, Sensors, and Autopilots. These were sent to Dr. Heaston for incorporation into the handbook as he saw fit. Total expenditures during this annual period have amounted to 124 hours (118 professional and 6 non-professional) at a cost of $4,573.

4.6 State-of-the-Art Reviews (SOARs)

The preparation of the SOAR on Characterization of RF Seekers has continued this period with the review of papers, journals, proceedings and reports. A list of seeker characteristics, important in defining seeker performance, is being generated together

with definitions of each characteristic. Examples will be provided illustrating how these characteristics are interrelated and define overall performance. Effort was also spent collecting the characteristics of operational RF seekers, i.e., Sparrow, Phoenix and Standard Missile, for possible inclusion in the review. However, these characteristics are classified, which will severely limit the use of this document, and may not be the best approach to take.

This SOAR will be completed during the following month with draft copies sent to the COTR for review.

Expenditures during this quarter on this task amounted to 406 hours of professional effort at a cost of $17,869. Total expenditure on this SOAR comes to 428 hours of professional effort at a cost of $18,933, the majority of which occurred during this annual period.

Finalization of the SOAR on Focal Plane Array (FPA) Technology has also been delayed beyond the expected completion date. During this period visits were made to discuss the overall content of the SOAR with Dr. A. Schnitzler of the Naval Research Laboratory and Drs. W. Holzer and L. Biberman of the Institute for Defense Analysis. They also agreed to review and comment on the document prior to publication. Sections covering the theory and operation of charge coupled devices (CCDs) which make up arrays have been completed. Portions of the review addressing the application of CCDs to focal plane arrays is currently being written, and the final section discussing the performance and limitations of FPA in seekers will be completed next month.

Effort expended on the review this period amounted to 1009 hours (995 professional and 14 non-professional) with costs of $33,942. Total expenditures amount to 1150 hours (1105 professional and 45 non-professional) at a cost of $39,468, most of which occurred this annual period.

4.7 Proceedings of the Workshop on Polarimetric Radar Technology

Activities related to the administration and conduct of this Workshop were reviewed in Section 2. As part of this task GACIAC will publish a proceeding containing the papers presented as well as those received from authors who did not present papers. Although the cutoff date for submission of papers has passed, many of the papers have not been received by GACIAC. This is being discussed with Mr. L. Root, Workshop Chairman, and a decision regarding the publication of the Proceedings will be made in the near future. GACIAC will publish and distribute the Proceedings to the participants and make copies available as a GACIAC product to the G&C community.

Effort devoted to the Workshop this quarter has amounted to 369 hours (335 professional and 34 non-professional) with costs of $13,548. Total effort was 440 hours (398 professional and 42 non-professional) with costs of $16,113.

4.8 GACIAC Bulletin

The GACIAC Bulletin serves as the current awareness publication for GACIAC. Its distribution has been limited to government agencies/personnel and government contractors as directed by the COTR. The DTIC Dissemination Authority List (DAL) is used as a control. Although a number of names were dropped as a result of this limitation, the mailing list continues to increase. Names have been added as a result of telephone calls and letters requesting copies of the Bulletin. Persons attending conferences and workshops administered by GACIAC are also being added to the mailing list.

Bulletin costs for the year are shown below:

Issue	Date	Copies Mailed	Hours	Costs
Vol. 2, No. 3	Sept 79	2,367	61	$3,233
Vol. 2, No. 4	Dec 79	2,317	96.2	3,067
Vol. 3, No. 1	March 80	2,347	93.4	3,217
Vol. 3, No. 2	June 80	2,370	71.3	3,373

4.9 Annual GACIAC Bibliography

Arrangements have been made to have the Annual GACIAC Bibliography reproduced on microfiche directly from tape obtained from DTIC. A sample tape was received from DTIC for a trial and discussions were held between personnel at DTIC and Micrographics (who will produce the microfiche copies) regarding the data format required to implement this approach. A final tape containing the data was received from DTIC and has been given to Micrographics for processing. The cost of reproducing 100 copies of the bibliography is estimated at $323.

The bibliography will be distributed to subscribers when it is received from Micrographics. Effort devoted to this task during this quarter consisted of meeting with the representative from Micrographics to discuss details of the bibliography reproduction, the format, and content. This amounted to 8 hours of professional effort with costs of $684, including that for reproducing the bibliography.

5. TECHNICAL AND BIBLIOGRAPHIC INQUIRIES

During this quarterly period, 19 inquiries were received from both government and industry requesting technical or bibliographic information. Two of these were both technical and bibliographic in nature, resulting in a total of 21 responses. Of these, eight were technical (four to government and four to industry) and 13 were bibliographic (four to government and nine to industry). Responses were provided as rapidly as possible, depending upon the nature of the inquiry. The telephone is used whenever possible. Where a bibliographic search is required, the request and search strategy is input to DTIC via the on-line terminal. A response is usually received at GACIAC within a week, and is immediately copied and forwarded to the GACIAC user.

For accounting purposes, expenditures in time devoted and cost incurred in responding to inquiries are shown in Tables I and II for these area titles. Income shown in based on $50 per output

unit and is assumed to be derived from industry or government subscriber funds, depending upon the source of the inquiry.

Fifty-eight responses were provided by GACIAC during this annual period; 33 were bibliographic in nature (11 for government and 22 for industry) and 25 were of a technical nature (12 for government and 13 for industry).

In addition to the inquiries specified above, a large number of telephone calls were received and made regarding GACIAC services and products, JSGCC meetings and activities, conferences/symposiums/workshops administered by GACIAC, and special tasks or studies conducted by GACIAC.

6. PROJECTED INCOME

Funds received this quarter as income beyond the baseline program totaled $1555. This was derived from industrial subscriptions and product sales. No additional income will be received under this contract. All future income from the sale of documents generated by GACIAC will be assigned to the new contract.

7. MAILING COSTS

Mailing costs this quarter totaled $1175.23. The breakdown is as follows: 350 first class letters ($52.50), 2370 Symposium call for papers ($355.50), 2370 postcards extending due dates for papers ($237.00), 153 labels for minutes, reports and bibliographies ($59.73), 2370 GACIAC Bulletins ($355.50), and 452 Proceedings ($115.00).

All mailings made use of the government indicia as authorized under this contract. No costs to the contract were incurred for these mailings.

A summary of mailings and their associated costs for this annual period and a cumulative total is given in the table below:

	Annual Period		Cumulative Total	
First class letters	748	$ 112.20	1,311	$ 196.65
Mailing labels	867	567.54	1,346	1,009.04
Bulletins	11,835	1,775.25	30,012	4,501.80
Postcards	2,370	237.00	4,602	460.20
Symposium/Workshop fliers	7,431	1,114.65	11,534	1,730.10
Proceedings	784	2,100.76	784	2,100.76
TOTALS	24,035	$5,907.40	49,589	$9,998.55

The cumulative total includes mailings made by GACIAC starting in February 1979. Final approval was authorized for use of the government indicia at that time. In the case of classified proceedings, first class registered mail was used at a cost of $5.68 each. There were 332 copies of such volumes mailed during this annual period. In other cases, book rate was used to minimize the mailing costs.

8. EXPENDITURES VERSUS INCOME

During this quarterly period expenditures were made and income derived from a number of special tasks, products and activities. Some of these resulted in income and some did not. Government block funds were employed to offset the costs of those activities where direct charges to the Government are not feasible. This includes support to the JSGCC Working Groups, distribution of handbooks, technical assessments, and proceedings to government personnel, responses to inquiries from government/military agencies, and JSGCC sponsored workshops/symposiums.

All activities showing income are included in the table. Those items completed prior to this quarter are shown at the end of the table for completeness.

The numbers shown here cannot be totaled because there are duplications among the products/tasks listed. For example, income shown in conjunction with the Guidance Law Handbook, Ring Laser

Gyro Technology Assessment, and Symposium Proceedings is also included in the income shown from Army/Navy/Air Force/DARPA and Industrial User Funds. These two items (Army/Navy/Air Force/DARPA and Industrial User Funds) are explained in more detail below.

- Army/Navy/Air Force/DARPA User Funds - Income shown is derived from block funds provided by the Services to offset the costs of products/services provided by GACIAC to government users. Expenditures this quarter include $15,018 for JSGCC Working Group Support, $720 for 12 copies of the Guidance Law Handbook, $25 for one copy of the Technology Assessment of Ring Laser Gyros, $50 for two copies of the Second Echelon Armor Interdiction Symposium proceedings, $400 for responses to technical/bibliographic inquiries, $14,129 for support to and printing of proceedings of the Workshop on Imaging Trackers and Autonomous Acquisition Applications for Missile Guidance, $13,548 for administration of the Workshop on Polarimetric Radar Technology, and $32,550 for a survey on millimeter wave systems and devices related to a hardware in the loop simulator. These expenditures are shown as income for the corresponding product/task in the table.

- Industrial User Funds - Income shown is based upon the funds accumulated in a user fee account. Subscriber fees and income from the sale of GACIAC publications are credited to this account. Expenditures shown for this quarter are based upon the distribution of two Guidance Law Handbooks ($120), 19 copies of the Technology Assessment on Ring Laser Gyros ($475), one copy of the Proceedings of the Second Echelon Armor Interdiction Symposium ($25), and responses to technical/bibliographic inquiries amounting to $650, for a total of $1,270.

9. USER COST AVOIDANCE/SAVINGS

In discussing GACIAC products/services with various users, a number of complimentary remarks have been received regarding the value of service rendered. However, during this period no quantitative numbers have been placed upon the value in terms of cost avoidance or savings. There has been widespread interest in the GACIAC Bulletin with continuing requests to be placed upon the mailing list and expression of interest in more frequent publication.

PRODUCT/TASK	EXPENDITURE			INCOME		
	Current	Annual	Total	Curr.	Annual	Total
PGM Handbook	$ 181	$ 4,573	$ 4,573	--	--	--
2nd Annual Bibliography	684	1,437	1,437	--	--	--
SOAR on Seeker Character.	17,869	18,933	18,933	--	--	--
SOAR on FPA Technology	33,942	39,468	39,468	--	--	--
Imaging Tracker Workshop	14,129	15,853	15,853	--	--	--
Polarimetric Radar Workshop	13,548	16,113	16,113	--	--	--
MMW System Survey	32,550	32,550	32,550	--	--	--
SAM Simulation	6,600	25,790	35,190	--	$19,500	$28,000
Fire Protection Study	6,177	18,824	18,824	--	18,000	18,000
KLG Tech Assessment	200	7,547	7,547	500	2,900	2,900
2nd Echelon Armor Symposium	--	11,001	42,649	75	5,802	21,787
Guidance Law Handbook	76	355	33,227	840	3,780	16,620
Army/Navy/Air Force/ DARPA User Funds	76,440	129,142	141,886	--	75,000	160,000
Industry User Funds	1,270	5,438	15,058	1555	4,755	19,835
AJAX ECCM Report	--	5,158	14,659	--	--	14,726
Image Processing Facility Support	--	2,460	2,460	--	2,500	2,500
1st Annual Bibliography	--	--	2,984	--	300	780
US Army SEMI Handbook	--	--	9,052	--	--	9,744
Long Range Art. G&C Comm.	--	--	6,986	--	--	7,200

User response forms have been included in the Guidance Law Handbook and Technology Assessment on Ring Laser Gyroscopes; however, no feedback in terms of cost savings has been obtained from any of those receiving either of these publications.

10. USER NEEDS ACTIVITY

User interests and needs are constantly monitored by GACIAC through discussions and correspondence with personnel active in the guidance and control community. GACIAC secretariat support to the JSGCC and its working groups also provides a link to topics of current interest to both the government and industry. In fact, a number of recent GACIAC activities were reviewed and endorsed by the JSGCC prior to being undertaken by GACIAC. The GACIAC Bulletin has been and will continue to be employed to determine areas of interest and to invite comments or questions from readers.

All of these techniques have been helpful in selecting the technical areas where GACIAC has concentrated its resources and they will continue to be used to permit the staff to respond to current interests through timely publications of technical assessments, SOAR's, Bulletin articles and handbooks.

11. GACIAC PROFESSIONAL STAFF ACTIVE DURING REPORTING PERIOD

The following professional staff members contributed to the GACIAC program this quarter. The listing gives their title and technical specialty.

- C. W. Smoots, Program Manager, GACIAC
  Guidance, Control and Radar
- J. A. Granath, Division Director
  Management
- T. E. Waterman, Engineering Advisor
  Fire Protection Engineering
- K. Brandt, Senior Engineer
  MM Wave Systems and Components
- W. A. Davidson, Senior Engineer
  Control Systems and Infrared

- J. J. Petrovic, Senior Engineer
  System Analysis and Electronic Warfare
- C. E. Radgowski, Senior Engineer
  Digital Systems and Infrared
- L. Valcik, Senior Engineer
  Radar, Propagation and RFI
- H. Buhay, Research Engineer
  Electro-Optics
- R. Schwab, Research Engineer
  Digital Circuit Design
- C. A. Damberger, Publications Specialist
  Technical Writing and Report Publication
- V. Valaitis, Associate Information Scientist
  Information Science
- D. Lanera, Associate Engineer
  Radar Systems
- L. Paarmann, Associate Engineer/Consultant
  Systems Analysis
- J. A. Tekiela, Associate Engineer
  Radar, Guidance and Electronic Warfare
- R. H. Joshel, Assistant Engineer
  Physics
- M. Kahn, Assistant Engineer
  Electro-Optics
- K. Lucari, Assistant Engineer
  Electronic Engineering

Other professional staff members contributing in prior quarters of this annual period are listed below.

- I. N. Mindel, Engineering Advisor
  EMP/EMC Analysis
- P. Schipma, Manager, Information Science
  Information Science
- K. Jakstas, Consultant
  Guidance and Control Simulation
- J. A. Campbell, Consultant
  Fire Protection Engineering

- R. Carlson, Senior Engineer
  Radar, Fuzes, and VLF
- P. A. Llewellen, Senior Scientist
  Information Science
- R. Gonzalez, Associate Scientist
  Information Science
- S. Kirk, Associate Scientist
  System Programming
- R. H. Kloempken, Associate Engineer
  Digital Systems
- A. Schlueter, Associate Engineer
  Electronic Systems and Reliability
- I. Horwitz, Assistant Information Scientist
  Information Science
- S. N. Thomas, Librarian
  Library Science
- C. Cokeing, Artist

Professional staff members contributing to the GACIAC program in prior years are as follows.

- H. A. Lauffenburger, Manager, Data Analysis Centers
  IAC Management and Operations
- M. M. Abromavage, Engineering Advisor
  Electronic Systems
- J. N. Faraone, Engineering Advisor
  Radar and Guidance
- C. H. Hoffman, Engineering Advisor
  Control Systems
- J. J. Krstansky, Engineering Advisor
  EMP/EMC
- J. E. Kietzer, Senior Engineer
  Radar Systems and Circuit Design
- T. A. Martin, Manager, EM Technology
  Control Systems and EMP
- T. N. Patton, Senior Engineer
  Control Systems and Systems Analysis

- K. J. Kogler, Research Engineer
  E-O Systems
- D. MacLean, Research Engineer
  Systems Analysis
- R. Kaminiecki, Associate Scientist
  Information Science
- J. Yucuis, Associate Information Scientist
  Information Science
- B. A. Hamilton, Technical Assistant
  Information Science
- V. Lenell, Technical Assistant
  Information Science

12. ERRATA

A typographical error appeared in Section 4.2 State-of-the-Art Reviews (SOAR) of the past quarter report, Quarterly R&D Contract Status Report No. 11. The breakdown of hours shown for the total effort on the SOAR on Focal Plane Array Technology should read: (110 hours of professional and 31 non-professional). An error was also made in extracting a number from the cost sheet for expenditures in support of the JSGCC working groups. The cost shown for both indirect and total costs should be increased by $908 in Quarterly R&D Contract Status Report No. 10, and in the cumulative summary (Table II) and associated attachment in Quarterly R&D Contract Status Report No. 11. This also impacts on the expenditures shown for U.S. Army/Navy/Air Force/DARPA User Funds in these two reports.

13. FINANCIAL SUMMARY

Two completed DSAH Form 1261's summarizing costs accrued during the quarter, for the annual period, and cumulatively are presented in Tables I, II, and III. Attachments giving more details and a breakdown of some of the items included under Area Titles are also provided.

APPENDIX A

CONTRACT STATUS REPORT

TABLE I SUMMARY OF CURRENT QUARTER

INFORMATION ANALYSIS CENTER CONTRACT STATUS REPORT	NAME OF INFORMATION ANALYSIS CENTER Guidance & Control Information Analysis Center			QUARTER ENDING 6/30/80			CUMULATIVE THRU
AREA TITLE	OUTPUT UNITS PRODUCED	MANHOURS EXPENDED			COSTS INCURRED			INCOME
		PROFESSIONAL	NON-PROFESSIONAL	TOTAL	DIRECT	INDIRECT	TOTAL	
1. ACQUISITION AND INPUT OF SOURCE INFORMATION		1,078	571	1,649	17,675	23,820	41,495	
a. DOCUMENTS ACQUIRED	499							
b. DOCUMENTS REVIEWED	392							
c. DOCUMENTS CATALOGED	377							
2. TECHNICAL INQUIRY RESPONSES PROVIDED	8	29	---	29	536	774	1,310	400
3. BIBLIOGRAPHIC INQUIRY RESPONSES PROVIDED	13	5	---	5	92	134	226	650
4. HANDBOOKS/DATA BOOKS COMPLETED		14	1	15	568	373	941	840
a. NEW CHAPTERS/PAGES COMPLETED	9/738							
b. REVISED CHAPTERS/PAGES COMPLETED	0/0							
c. DATA SETS COMPILED	---							
5. STATE-OF-THE-ART STUDIES COMPLETED	0	1,401	14	1,415	21,177	30,634	51,811	0
6. CRITICAL REVIEWS AND/OR TECHNOLOGY ASSESSMENTS COMPLETED	0	7	---	7	82	118	200	500
7. CURRENT AWARENESS AND PROMOTION EFFORTS		123	10	133	5,015	3,055	8,070	0
a. NUMBER NEWSLETTERS AND/OR ANNOUNCEMENTS PUBLISHED	3							
b. NUMBER MEETINGS, CONFERENCES, ETC. SUPPORTED	6							
8. OTHER (see attachment)	5	1,727	371	2,098	48,191	43,977	92,168	-835
9. MANAGEMENT AND SUPPORT		435	196	631	7,851	10,911	18,762	
10. UNASSIGNABLE INDIRECT COSTS		---	---	---	---	---	---	
11. TOTAL		4,819	1,163	5,982	101,187	113,796	214,983	1,555

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Appendix 1, EXHIBIT A

TABLE II ANNUAL SUMMARY (7/1/79-6/30/80)

INFORMATION ANALYSIS CENTER CONTRACT STATUS REPORT	NAME OF INFORMATION ANALYSIS CENTER Guidance & Control Information Analysis Center				QUARTER ENDING --		CUMULATIVE THRU --
AREA TITLE	OUTPUT UNITS PRODUCED	MANHOURS EXPENDED			COSTS INCURRED			INCOME
		PROFESSIONAL	NON-PROFESSIONAL	TOTAL	DIRECT	INDIRECT	TOTAL	
1. ACQUISITION AND INPUT OF SOURCE INFORMATION		3,086	1,403	4,489	46,040	63,042	109,082	
a. DOCUMENTS ACQUIRED	2,062							
b. DOCUMENTS REVIEWED	544							
c. DOCUMENTS CATALOGED	638							
2. TECHNICAL INQUIRY RESPONSES PROVIDED	25	63	2	65	1,212	1,744	2,956	1,250
3. BIBLIOGRAPHIC INQUIRY RESPONSES PROVIDED	33	23	23	46	560	811	1,371	1,650
4. HANDBOOKS/DATA BOOKS COMPLETED		158	8	166	2,790	3,575	6,365	4,080
a. NEW CHAPTERS/PAGES COMPLETED	9/693							
b. REVISED CHAPTERS/PAGES COMPLETED	0/0							
c. DATA SETS COMPILED	---							
5. STATE-OF-THE-ART STUDIES COMPLETED	---	1,515	45	1,560	24,041	33,517	57,558	0
6. CRITICAL REVIEWS AND/OR TECHNOLOGY ASSESSMENTS COMPLETED	1	13	9	22	1,206	365	1,571	3,000
7. CURRENT AWARENESS AND PROMOTION EFFORTS		523	71	594	12,370	11,480	23,850	0
a. NUMBER NEWSLETTERS AND/OR ANNOUNCEMENTS PUBLISHED	9							
b. NUMBER MEETINGS, CONFERENCES, ETC. SUPPORTED	19							
8. OTHER	8	3,676	984	4,660	102,079	94,617	196,696	110,350
9. MANAGEMENT AND SUPPORT		1,666	768	2,434	31,190	42,548	73,738	
10. UNASSIGNABLE INDIRECT COSTS		--	--	--	--	--	--	
11. TOTAL		10,723	3,313	14,036	221,488	251,699	473,187	120,330

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TABLE III CUMULATIVE SUMMARY

INFORMATION ANALYSIS CENTER CONTRACT STATUS REPORT	NAME OF INFORMATION ANALYSIS CENTER Guidance & Control Information Analysis Center				QUARTER ENDING ---		CUMULATIVE THRU 6/30/80
AREA TITLE	OUTPUT UNITS PRODUCED	MANHOURS EXPENDED			COSTS INCURRED			INCOME
		PROFESSIONAL	NON-PROFESSIONAL	TOTAL	DIRECT	INDIRECT	TOTAL	
1. ACQUISITION AND INPUT OF SOURCE INFORMATION		11,383	3,043	14,426	146,526	204,400	350,926	
a. DOCUMENTS ACQUIRED	4,058							
b. DOCUMENTS REVIEWED	2,139							
c. DOCUMENTS CATALOGED	2,539							
2. TECHNICAL INQUIRY RESPONSES PROVIDED	48	88	52	140	1,947	2,804	4,751	1,700
3. BIBLIOGRAPHIC INQUIRY RESPONSES PROVIDED	69	151	84	235	2,614	3,776	6,390	2,650
4. HANDBOOKS/DATA BOOKS COMPLETED		1,297	395	1,692	22,340	28,934	51,274	27,144
a. NEW CHAPTERS/PAGES COMPLETED	22/1155							
b. REVISED CHAPTERS/PAGES COMPLETED	10/282							
c. DATA SETS COMPILED	---							
5. STATE-OF-THE-ART STUDIES COMPLETED	0	1,535	45	1,580	24,386	34,016	58,402	0
6. CRITICAL REVIEWS AND/OR TECHNOLOGY ASSESSMENTS COMPLETED	3	211	68	279	4,141	4,409	8,550	3,000
7. CURRENT AWARENESS AND PROMOTION EFFORTS		1,112	154	1,266	23,959	21,644	45,603	0
a. NUMBER NEWSLETTERS AND/OR ANNOUNCEMENTS PUBLISHED	17							
b. NUMBER MEETINGS, CONFERENCES, ETC. SUPPORTED	45							
8. OTHER (see attachment)	8	6,518	1,768	8,286	162,957	166,168	329,125	242,072
9. MANAGEMENT AND SUPPORT		3,049	1,987	5,036	70,691	93,481	164,172	
10. UNASSIGNABLE INDIRECT COSTS		---	---	---	---	---	---	
11. TOTAL		25,344	7,596	32,940	459,561	559,632	1,019,193	276,566

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Appendix 1, EXHIBIT A

ATTACHMENT TO TABLES - APPENDIX 1, EXHIBIT A

Area Title 4. Handbooks/Data Books completed. The following information provides a breakdown of the products included in this category.

Current Quarter (12th)	Chapters Pages	Manhours Prof.	Manhours Non-Prof.	Manhours Total	Costs Direct	Costs Indirect	Costs Total	Income
Guidance Law Handbook	0/0	2	0.4	2.4	$ 41	$ 35	$ 76	$ 840*
PGM Handbook	0/0	4	--	4.0	74	107	181	--
GACIAC Bibliography (1978) (New)	9/738	8	--	8.0	453	231	684	--
TOTAL	9/738	14	0.4	14.4	$ 568	$ 373	$ 941	$ 840
Cumulative Through 6/30/80								
US Army SEMI Handbook (Revised)	10/279	237	120.0	357.0	$ 3,707	$ 5,346	$ 9,053	$ 9,744
Guidance Law Handbook (New) (Revised)	7/178 0/3	897	74.7	971.7	14,614	18,613	33,227	16,620†
GACIAC Bibliography (1977) (New)	6/224	16	194.4	210.4	1,385	1,599	2,984	780††
PGM Handbook (New)	0/15	118	5.5	123.5	1,879	2,694	5,233	--
GACIAC Bibliography (1978)	9/738	29	--	29.0	755	682	1,437	--
TOTAL (New) (Revised)	22/1155 10/281	1,297	394.6	1,691.6	$22,340	$28,934	$51,934	$27,144

* Of this $840, industry user fees provided $120 and government user fees provided $720.

† Of this $16,620, industry user fees provided $7,860 and government user fees provided $8,760.

†† Industry user fees account for $560 and government user fees account for $220.

ATTACHMENT TO TABLES - APPENDIX 1, EXHIBIT A

Area Title 8. Other - for the first year of the program, a broad area called Technical Development and JSGCC Support was combined under this Area Title. Now that GACIAC has its full operating capability, and the Technical Development is essentially completed, this Area Title has been broken into tasks which do not fall under any of the assigned areas. Both the current quarter and cumulative data are given.

Current Quarter 4/1/80-6/30/80	Manhours			Costs			
	Prof.	NonProf.	Total	Direct	Indirect	Total	Income
US Army/Navy/Air Force/DARPA User Funds	(Total income was 0: $400 is shown under Areas 2 and 3 for responses to inquiries, $720 is shown under Area 4 for products, $25 is shown under Area 6, $14,129 is shown below under Imaging Tracker Workshop, $13,548 is shown below under Polarimetric Radar Workshop, $32,550 is shown below under MMW System Survey, $50 is shown below under 2nd Echelon Armor Interdiction Symposium, and $15,018 is shown below under JSGCC Working Groups.)						$-76,440
Industry User Funds	(Total income was $1,555: $650 is shown under Areas 2 and 3 for responses to inquiries, $120 is shown under Area 4 for products, $475 is shown under Area 6, $25 is shown below under 2nd Echelon Armor Interdiction Symposium.)						285
JSGCC Executive Committee	87	8.2	95.2	$ 2,109	$ 2,037	$ 4,146	$ --
JSGCC Working Groups	250	81.4	331.4	7,188	7,830	15,018	15,018
Imaging Tracker Workshop	87	136.5	223.5	10,716	3,413	14,129	14,129
Anechoic Chamber Fire Prot.	70	53.0	123.0	4,141	2,036	6,177	--
Polarimetric Radar Workshop	335	34.0	369.0	6,800	6,748	13,548	13,548
MMW Survey	789	42.0	831.0	13,723	18,827	32,550	32,550
SAM Simulation Support	109	16.0	125.0	3,514	3,086	6,600	--
2nd Echelon Armor Interdiction Symposim	--	--	--	--	--	--	75
TOTAL	1,727	371.1	2,098.1	$48,191	$43,977	$92,168	$ - 835

ATTACHMENT TO TABLES - APPENDIX 1, EXHIBIT A (Cont.)

Cumulative Through 6/30/80	Manhours			Costs			
	Prof.	NonProf.	Total	Direct	Indirect	Total	Income
US Army/Navy/Air Force/DARPA User Funds	(Total $160,000: $1,700 is shown under Areas 2 and 3, $8,980 is shown under Area 4, $1,825 is shown under Area 6, $56,582 is shown below under JSGCC Working Groups, $15,853 is shown below under Imaging Tracker Workshop, $16,113 is shown below under Polarimetric Radar Workshop, $32,550 is shown below under MMW Survey, $4,675 is shown below under 2nd Echelon Armor Interdiction Symposium.)						$ 21,722
Industry User Funds	(Total $19,835: $2,650 is shown under Areas 2 and 3, $8,420 is shown under Area 4, $1,175 is shown under Area 6, and $550 is shown below under 2nd Echelon Armor Interdiction Symposium.)						7,040
Technical Development	934	180.0	1,114.0	$ 13,251	$ 22,837	$ 36,008	--
JSGCC Executive Committee	983	305.0	1,288.0	25,067	26,105	51,172	--
JSGCC Working Groups	970	303.0	1,273.0	27,256	29,326	56,582	56,582
Imaging Tracker Workshop	141	139.5	280.5	11,430	4,423	15,853	15,853
Anechoic Chamber Fire Prot.	432	86.0	518.0	10,370	8,454	18,824	18,000
Polarimetric Radar Workshop	398	41.8	439.8	7,961	8,152	16,113	16,113
MMW Survey	789	42.0	831.0	13,723	18,827	32,550	32,550
SAM Simulation Support	690	62.5	752.5	17,887	17,302	35,189	28,000
2nd Echelon Armor Interdiction	674	468.8	1,142.8	25,140	17,509	42,649	21,786
AJAX ECCM Reports	318	91.1	409.1	6,307	8,352	14,659	14,726
Long Range Artillery G&C Support	133	48.6	181.6	3,162	3,824	6,986	7,200
Image Processing Support	56	--	56.0	1,403	1,057	2,460	2,500
TOTAL	6,518	1,768.3	8,286.3	$162,957	$166,168	$329,125	$242,072

DISTRIBUTION LIST

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Redstone Arsenal, Alabama 35898

Defense Electronics Supply Center
ATTN: PAEA/Mx. S. Williams
Dayton, Ohio 45444

Headquarters (2)
Defense Logistics Agency
ATTN: DLA/SCT, Mr. J. Blue
Cameron Station
Alexandria, Virginia 22314

Defense Technical (2)
Information Center
ATTN: DTIC-AI/Mr. J. Pendergast
Cameron Station
Alexandria, Virginia 22314

Commander, DCASMA Chicago
O'Hare International Airport
ATTN: DCRI-GCCA-AL/Ms. L. Pachankis
P.O. Box 66911
Chicago, Illinois 60666

Armament Division
ATTN: Dr. J. R. Mayersak, AD/CZ
Eglin Air Force Base, Florida 32542

Office, Deputy Chief of Staff for
Research, Development & Acquisition
ATTN: Dr. R. J. Heaston, DAMA/WSZ
Department of the Army
Washington, D.C. 20310

Office, Secretary of Defense
ATTN: Mr. G. C. Kopcsak, OUSDRE(ET)
Room 3D1089, The Pentagon
Washington, D.C. 20301


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