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INFORMATION ANALYSIS CENTERS IN THE DEPARTMENT OF DEFENSE

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The Department of Defense(DoD) Information Analysis Centers(IACs) have been assisting the research, development, and engineering efforts of the defense community for over forty years by analyzing, repackaging, and disseminating highly technical information in specialized subject areas to a select community. An overview of the IACs is presented, including an analysis of the IAC concept, followed by a brief history of the DoD IACs and an examination of some of the issues of concern to DoD IACs. IACs are not without their problems; nevertheless, they continue to have a significant role in the transfer of scientific and technical information.

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PREFACE

This publication is an updated version of the April 1986 edition of Information Analysis Centers in the Department of Defense, AD-A167 001. It gives a brief history of the Department of Defense (DoD) Information Analysis Centers (IACs), explores the IAC concept, the role of IACs in the transfer of scientific and technical information, and some of the problems of concern to IACs.

The paper is divided into two major sections. The first section contains the materials described in the preceding paragraph; the second section, the appendix, consists of 21 separate IAC description summaries written by the individual IACs.

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EXECUTIVE SUMMARY

Scientists and engineers have a need for accurate, complete, up-to-date information. Traditionally they have turned to colleagues, journal literature, conferences and meetings, and libraries to meet these information needs. Libraries acquire, catalog, and circulate many of the standard sources of information such as books, conference proceedings, and journals, providing bibliographic citations to access these sources.

The twenty-one Department of Defense (DoD) Information Analysis Centers (IACs) are unique as information centers. Each one, staffed by scientists and engineers who are experts in their fields, focuses on a well-defined scientific or technical subject area. Among the specialized activities IACs carry out are:

1. acquisition and selection of scientific and technical information through conventional and unconventional means
2. analysis, evaluation, and repackaging of the acquired materials
3. creation of new information
4. bibliographic control of this information
5. setting of standards in their areas of expertise
6. peer review process for the technical report literature
7. monitoring of their individual scientific and technical fields

Since their inception in the 1940s the DoD IACs have attempted to be be responsive to the user community. Some of the issues raised in accomplishing their mission revolve around the larger concerns of secrecy versus the free flow of information, the obstacles presented by proprietary information, the labor intensiveness of IAC work and the resulting high costs of operation, and the marketing of these very specialized information centers.

Despite these problems the success of the DoD IACs has been such that new ones continue to be established and their role in the transfer of scientific and technical information continues to grow in importance.

INTRODUCTION

"Among the numerous scientific and technical information services existing in our contemporary society, none is so sophisticated, or so little known as the Information Analysis Center." [1] This cogent statement was made over fifteen years ago at the opening remarks of the 1970 Advisory Group For Aerospace Research And Development (AGARD) Meeting on Information Analysis Centres. It remains true today.

What are information analysis centers (IACs)? What purpose do they serve? How do they differ from technical and special libraries and other kinds of information centers? Where are they found? How are they staffed? What is their role in the transfer of scientific and technical information? When and why did they begin? These are some of the questions the following paper will address through an analysis of the periodical literature, the technical report literature, and written and oral communication supplied by the twenty-one Department of Defense(DoD) IACs. Several definitions of an IAC are presented and compared, including an analysis of the IAC concept; an historical overview of the DoD IACs is given; and some of the issues of concern to DoD IACs are discussed.

AN IAC DEFINED

An agreed upon definition of an IAC is problematical; one that seems to to have attained general acceptability is the definition advanced by the Committee on Scientific and Technical Information(COSATI) at their meeting on federally supported IACs held in 1967:

> An Information Center is a formally structured organizational unit specifically (but not necessarily exclusively) established for the purpose of acquiring, selecting, storing, retrieving, evaluating, analyzing, and synthesizing a body of information in a clearly defined specialized field or pertaining to a specified mission with the intent of compiling, digesting, repackaging, or otherwise organizing and presenting pertinent information in a form most authoritative, timely, and useful to a society of peers and management. [2]

Several additional definitions are found throughout the literature and are worthy of examination because they emphasize different aspects of IACs and thus provide the reader with an opportunity to gain a more inclusive view of information analysis centers.

At the same 1967 COSATI meeting the following definition was also given:

> An information analysis center is a person or group of persons who have a responsibility to gather together everything known that is relevant to a particular well-defined field, to organize the informatiom is some systematic fashion so that they and others will know what information exists, to analyze and synthesize the contents in such a fashion that they create new knowledge, and to maintain these activities as a long-term commitment for a substantial portion of their professional career. [3]

Still another definition specifically states that IACs should be, "... staffed mainly with scientists and engineers, who first index and then compile, analyze, evaluate, condense, extrapolate, and/or synthesize information in a given area as integral steps in a comprehensive information acquisition, storage, retrieval, and dissemination process for the benefit of the scientific community to which they belong." [4]

The technical report proposing the establishment of a Survivability/Vulnerability Information Analysis Center (SURVIAC) within DoD poses the question, "What is an IAC?" The response separates the information analysis center into its component parts, looking initially at what it means to be a center, next at how a center changes when information is added, and finally at what analysis brings to the information center:

> As a center, it is a focal point for an assigned specialized technology.... As an Information Center, it is responsible for the accumulation of published and unpublished scientific information and timely responsive retrieval of such, for technically trained managers, scientists and engineers who need the information. As an Information Analysis Center, it is further responsible for "filtering and reduction of such information to insure that those who need it are provided with the best, the most pertinent and the most succinct information...with special emphasis on the evaluation of the concept." [5]

The DoD, for most part, describes the DoD IACs in terms similar to those outlined above. The major distinguishing characteristic is that DoD IACs must concern themselves with specialized subjects of "significant" interest to the DoD and its research and development programs. Department of Defense Regulation, 3200.12-R-2, Centers For Analysis of Scientific and Technical Information states, "This regulation applies to only those centers whose primary purpose is to provide analytical and evaluative support to defense research, development, and acquistion programs and whose basic operating funds are appropriated for research, development, test, and evaluation." [6] The definition reads:

> A formal organization with a primary mission to acquire, digest, analyze, evaluate, synthesize, store, publish, and provide advisory and other user services concerning available worldwide scientific and technical information and engineering data in a clearly defined, specialized field or subject area of significant DoD interest or concern. [7]

What is the extent and diversity of IAC collections? Some advocate selectivity in the acquisition of information, while others would broaden the responsibility to gather everything that is relevant to a particular field so that any center, "...should achieve 99.5% retrieval of the literature in the special field in which it operates." [8] The SURVIAC proposal sees the IAC's responsibility as the accumulation of published and unpublished information. The DoD wants their IACs to concern themselves with available worldwide scientific and technical information and engineering data. In light of DoD's regulation, for example, 37 percent of the items entered into the Metals and Ceramics Information Center (MCIC) database for fiscal year 1985 were of foreign origin. [9]

Who is the IAC user community? All definitions agree that the centers should serve the scientific community. COSATI widens this to a society of peers and management, and the SURVIAC proposal specifies technically trained managers, scientists and engineers. Since the IACs managed by the DoD must support defense programs the implication is transparent, that the user group is limited to the DoD and its contractors.

What services and products should the IACs provide? In addition to acquiring, selecting, evaluating, and analyzing information some believe that the IAC's primary purpose is to prepare reports and create new knowledge. The DoD Regulation includes publishing as an IAC activity.

The one activity which appears to be exclusive to the DoD IACs is that they assist the DoD Research, Development, Tests, and Engineering (RDT&E) efforts by providing administrative and technical support to joint or interservice committees in the DoD, for example, the Joint Army-Navy-NASA-Air Force Propulsion Committee (JANNAF).

> These committees, made up of highly competent technical specialists, review and coordinate the R&D efforts undertaken by the military services and associated government agencies, and ensure that weapons requirements provide maximum interservice compatability. The committees also provide a forum for the discussion of important issues and, through analysis, upgrade and support the reliability of defense systems. Additionally, the committees ensure maximum transfer of related technology between services. [10]

What is the relationship of IACs to other information centers? Some believe that libraries and IACs have complementary and mutually supporting functions: the libraries provide the documents; the IACs analyze and repackage them, and can, in turn, supply libraries with this new information. These people contend that libraries are better prepared to select, acquire, process and control the physical materials, leaving IACs the time to successfully carry out their mission. Others would take issue with this separation of responsibilities, stating unequivocably that IACs must be involved in the acquisition of materials and related processes because they are the experts in the field and are the only ones with sufficient knowledge to properly carry out these activities.

At the same time there seems to be a general consensus on the distinctions between the IAC and the library:

1. IACs produce specialized products: handbooks, manuals, abstracts, symposium proceedings, technical journals; libraries, even highly technical specialized libraries, do not.

2. IACs work with information and, in fact, are retailers of information; libraries work with the materials which contain the information. In other words, IACs process and transfer information; libraries process and transfer books, journals, and other kinds of documents in which the information is found.

3. IACs directly help solve real problems with their critical state-of-the-art reviews and compilations and inquiry services; libraries may indirectly help with problem solving by supplying a user with the materials from which (s)he extracts the critical information.

4. IACs create new knowledge; libraries do not.

The DoD differentiates the library and the IAC in this way:

> DoD libraries circulate materials, do bibliographic searches, and provide reference and other services. The IACs of DoD produce authoritative technical information in their specialized fields. [11]

Discussion of two interrelated topics, the IAC's staffing and its location, complete the picture of the IAC. The seminal report on the transfer of information written in 1963, Science, Government, and Information, commonly referred to as the Weinberg Report, states explicitly that because of the interactive nature of science and technology, the transfer of information is an inseparable part of research and development, i.e. the work of the IAC is in every sense a part of science. Therefore, the work of the IAC must be carried out by scientists and engineers working in the field. This idea, that subject expertise is crucial to the functioning of the IAC, is reiterated throughout the literature. However the evaluator/operator must be more than a subject expert; (s)he must have an established reputation for competence and vigor. [12]

Furthermore, due to the criticality of this relationship between science and technology and specialized, timely information, the Weinberg Report states that IACs should be located in areas where science and technology are flourishing. Placing the information analysis center within a laboratory setting is essential because:

1) No one person is a complete expert.

2) Successful feedback from evaluation to research and vice versa provides symbiotic and synergistic benefits to each activity.

3) Time sharing of competent individuals and specialists for information related tasks is made possible at reduced investment and increased efficiency.

4) IAC staff members are better received by their peer groups, especially in obtaining unpublished information.

5) Products of IACs are better received by the user community if that community knows and respects the producers of the products. [13]

The DoD IACs have followed the recommendations of the Weinberg Report, and are, in fact, located in centers of science and staffed by qualified scientists and engineers. For example, five are situated at the US Army Engineer Waterways Experiment Station, Vicksburg, Mississippi; several more at Battelle's Columbus Laboratories in Ohio; one at the Applied Physics Laboratory of John Hopkins University, Laurel, Maryland; and one at the IIT Research Institute, Chicago. The staff is first and foremost engineers and scientists, specialists in their field, supplemented by information specialists and clerical staff. It is, however, common practice for the IACs to directly employ experts to augment their in-house staff. Often, in answer to specific information requests or for special projects, the IACs use staff from the science centers where they are housed or they contract for outside consultants, nationally recognized authorities from the larger scientific and technical community.

THE ROLE OF IACs IN THE TRANSFER OF SCIENTIFIC AND TECHNICAL INFORMATION

The IACs, through their activities, have a unique and significant role in the transfer of scientific and technical information. The data they acquire and select is in the forefront of science and technology. Moreover, by virtue of their position as centers for specialized knowledge, they have access to information through unconventional means, such as unpublished, interim reports of colleagues or trip reports from staff members.

It is as important to sift out useless information as it is to gather all relevant materials. The IACs achieve this end through their analytical and evaluative activities, thereby not only increasing the density of useful information, but also improving the quality and reliability of the information held. It has been documented that this quality control function has a definite impact on fundamental science. [14]

IACs are also known to set the standards in their individual areas of expertise; the handbooks they produce, for example, are looked upon as definitive works in their fields.

Bibliographic control of this kind of information which appears in such varied formats, has been troublesome to accomplish. IACs, by gathering all of the relevant, difficult to find, not readily available data of a particular field in one place, perform a useful and necessary service for the world's literature.

Then, too, scientists and engineers find it expedient to go to one main source for their information. They have learned to rely on the IACs because they know they can turn to them for the best possible, most up-to-date, individually tailored information, saving both time and money.

The peer review process has been the established method for determining the credibility of new scientific information. Scientists publish their findings in professional journals where they are subjected to critical examination by their colleagues. The results of scientific work published in government technical reports do not receive this kind of peer review. "Consequent [sic] such products are often not perceived by the scientific and technical community as prestigious sources of information." [15] The IACs moderate the effects of this deficiency through their evaluative and analytical functions, performing in a very real sense a type of peer review.

There are also the stimulating and monitoring functions of IACs. The first is accomplished when IACs, in focusing on particular problems, facilitate solutions by mobilizing available resources. Users can turn to IACs for guidance, stimulation, and the latest knowledge. Monitoring is achieved when IACs serve as a sounding board or central exchange to which concerned users take their problems. As an informed monitor of its specialized subject field, IACs are in a position to both recognize the emergence of new topical matters and to mobilize the community for necessary action. [16]

The DoD IACs have a broad mission of increasing the productivity of scientists, engineers and technicians engaged in scientific and engineering programs for the Department of Defense. "The aim of these services is to improve weapons reliability, engineering decisions, and development lead-time and provide a means for increasing the productivity of defense scientists and engineers through the reduction of duplication and evaluation programs." [17] They are, in other words, in the business of solving military and defense problems, and it is their role to assist the DoD in carrying out its mission quickly and effectively.

There are several direct benefits which accrue to the DoD from the work of its IACs:

1. Greater use of project results increases cost effectiveness
2. Costs are reduced by keeping duplication of efforts to a minimum
3. The productivity and the quality of research and development are maximized
4. The capability and the competitive posture of the industrial base of the United States are expanded. [18]

HISTORY OF THE DoD IACs

It is generally acknowleged that after World War II the world began to experience an information explosion. The unprecedented growth of journals and the numbers of papers presented at conferences and meetings made it impossible for scientists and engineers to read all the relevant published literature or to even be aware of the existence of this material. The volume of information was not the only problem. "The information crisis owes its criticality to the paralyzing inability to isolate useful information from the totality of information resources." [19] Then, too, much of this new information was never published in traditional books or journals, appearing in the form of technical reports or unpublished communications.

The IAC concept was a specific response to an urgent need. Specifically, there were three major obstacles in the transfer of scientific and technological information which IACs were created to overcome:

> 1. the variety of ways in which information can be originated, whether through primary journals, secondary journals, letters, trip reports, person-to-person, proceedings, or phone messages, each with its attendant different time lapses
>
> 2. scientists' and engineers' impatience with great masses of paper... and
>
> 3. management's critical need to know what the state of the art is now. [20]

The beginning of the IAC as a unique entity is not simple to pinpoint. Battelle Laboratories in Columbus, Ohio, claims to be the originator of the IAC concept, establishing its first technical information center in 1951. [21] Battelle's assertion is challenged by two other organizations, the Chemical Propulsion Information Agency (CPIA), located at the Applied Physics Laboratory (APL), John Hopkins University, and the Shock and Vibration Center (SVIC),

located at the Naval Research Laboratory in Washington, D.C. Both name 1946 as the year of their inception. CPIA went through several name changes, broadened its scope, and finally merged with the Liquid Propellant Information Agency in 1962 to become the IAC it is today. [22]

Another center traces its beginning to 1951 when the Metcalf Project was undertaken to evaluate the utility of infrared techniques in solving military problems. One of the conclusions of this study was that the overall infrared program was seriously hampered by the inadequate facilities for the exchange of information. The eventual outcome was the creation of the Infrared Information and Analysis Center (IRIA) in the early fifties, with high level conferences and published proceedings on the subject as their first activity.

Battelle enters the picture once more in 1955 with the initiation of the MCIC. The Office of Defense Research and Engineering was concerned about the delays in the development of titanium for military systems and directed the establishment of the Titanium Metallurgical Laboratory (TML). The scope was expanded to eventually include most advanced metals under the name Defense Metals Information Center (DMIC). The Defense Ceramic Information Center (DCIC), first chartered in 1967, merged in 1971 with DMIC into what is now the MCIC. [23]

The Advanced Projects Research Agency (ARPA) of the DoD was given the responsibility for establishing several DoD IACs. Their first sizable IAC came into being at Willow Run Laboratories at the University of Michigan around 1959. [24]

Still, it was not until the early sixties when scientists, scientific managers, and engineers, under the weight of the information explosion, turned to the IACs to assist with the control of technical information, and the "information analysis center" as a clearly defined entity began.

Two documents are noteworthy for their role in this process: first, the previously discussed Weinberg Report gave needed impetus to the scientific and technical information program, acknowledging the impact of modern science and technology on national defense and naming the IAC as a means to solve some of the information transfer problems; second, the DoD Instruction, 5100.45, Centers for Analysis of Scientific and Technical Information dated July 28, 1964, added emphasis to the IACs importance in the information transfer process. [25] This instruction was updated on January 17, 1985, with the issuance of DoD Regulation, 3200.12-R-2. This Regulation continued the earlier recognition and strong endorsement of the IACs.

> The growth of published and unpublished scientific technical information that must be assimilated by technically-trained managers, scientists, and engineers has resulted in ever-expanding requirements for organized screening, filtering and reduction of such information to insure that those who need it are provided with the best, the most pertinent, and the most succinct information. The Department of Defense, after considering the advantages and disadvantages of central review of pertinent information, endorses further development of the information analsysis center concept, with special emphasis on the evaluation aspects of the concept. [26]

The IACs began to proliferate. A memorandum of April 19, 1966, from the Director of Defense Research and Engineering to the Assistant Secretary of the Army, Research and Development, directed the establishment of eight Department of Defense (DoD) Information Analysis Centers. [27] Some focused on nondestructive testing and tactical warfare, both critical and specific to DoD functioning. Others dealt with technologies that were highly useful for DoD work, but could be applied more generally, such as concrete technology and soil mechanics.

Several more have emerged in the seventies and the eighties. Often they have come about through either the formalization of an existing function into

an IAC - the DoD Manufacturing Technology Advisory Group which had been in operation for seventeen years corresponds in technical scope to the Manufacturing Technology Information Analysis Center (MTIAC) - or the merger of two previous centers or functions - the merger of the Combat Data Information Center (CDIC) and the Aircraft Survivability Model Repository (ASMR) into the Survivability/Vulnerability Information Analysis Center (SURVIAC). In addition, when a need is recognized a totally new center is created - the Data and Analysis Center for Software(DACS) was designated a DoD IAC in 1981 while it was still a pilot program. [28]

Effective July 1, 1971, the funding and administrative responsibility for nine contractor-operated IACs was assigned by the Office of the Undersecretary of Defense for Research and Engineering(OUSDR&E) to the The Defense Supply Agency(DSA), now called the Defense Logistics Agency(DLA). Prior to this time DoD IACs were both administratively and technically managed by the Navy and Air Force. These Centers continue to receive technical management from DoD laboratories and agencies with leading competence in the field of science and technology. Technical expertise is also provided by practicing scientists and engineers associated with the research and development facility. [29]

In 1980 the DLA assigned the management responsibility of their nine contractor-operator IACs to the Defense Technical Information Center (DTIC). At present there are twenty-one IACs in the Department of Defense. Eleven are administratively managed by DTIC and funded by DLA; ten are managed by other DoD activities. (See Appendix for detailed information on the individual IACs.)

Today the DoD IACs are making multiple use of the DTIC Defense RDT&E On-Line System(DROLS). Many of the IACs, for example, are adding bibliographic citations of their referenced documents to DTIC's Technical Report database,

enabling qualified users registered with DTIC to easily and quickly learn about the more specialized IAC materials. Also, the IACs use DROLS as a means of alerting themselves to new materials in their fields which they subsequently add to their own databases; and specialists at the IACs use the DTIC databases to help answer technical inquiries as a supplement to their own library resources.

ISSUES

The DoD IACs are not without their problems and concerns. Most of these issues center around the question, "How well are the IACs accomplishing their mission?" Over twenty years ago the Weinberg Report recognized there could be problems in establishing and maintaining IACs. One potential area for concern was the securing of enough qualified scientists and engineers to serve on the staffs of the IACs. This does not seem to be a problem, and DoD IACs are well-staffed.

A second issue acknowledged by Weinberg, one which continues, is the conflicting demands of secrecy and the free exchange of information. Much of the U.S. scientific research and development is aimed at maintaining our military strength, and the results of these efforts can be transmitted as freely as non-military efforts. Yet the problem is complicated because within the military research establishment, rapid and open communication is vital. Many believe this "need-to-know" required by the DoD for access to DoD information is a major deterrent to the fundamental capability for knowledge transfer.

It is contractually required that each IAC, consistent with security and other limitations on the Center's information, serve the public. In addition to having a need-to-know, organizations must, in some cases, be registered with the DoD to receive export-controlled information. Requirements vary from Center to Center and seem to depend largely upon the sensitivity of the subject focus of the particular IAC. The Tactical Weapon Guidance & Control Information Analysis Center (GACIAC) is an example of an IAC with severely restricted access. Users must be registered with DTIC at the confidential or higher security level, with fields of interest specified, and their facility cleared to receive this kind of information. [30] In contrast, the "[Manufacturing Technology Information

Analysis Center] MTIAC provides services to government agencies, contractors, or subcontractors and, to the extent that funds permit, to firms in the general industrial community as well as universities and research institutes. U.S. firms are not required to have contracts with the government in order to use the services of the Center." [31] The majority of the IACs do circulate, free of charge and to a wide audience, an unclassified newsletter on current awareness information.

Proprietary information presents another obstacle in the information transfer process. Industry justifiably refuses to share such information which they have acquired at great expense and effort. "Whenever an industrial organization develops scientific or technical information which would provide that organization with a competitive advantage, a technological advance, or a completely new piece of hardware, the organization will not release this information until it either has obtained patent protection or a copyright." [32]

All IACs are expensive to operate if only the dollars and cents outlay is considered. The work of an IAC is labor intensive, and the scientists and engineers performing the work command high salaries. Therefore the broader the IAC's scope, the more technical people required, and the higher the salary budget. However, a strong case for the end-savings that result from the work of the IAC can be made. The prevention of duplication of efforts is cited as one of the major ways IACs save real monies. Not knowing about a piece of relevant information because of an inadequate information transfer process can increase costs of scientific and technical work. Yet it has not been easy for IACs to quantify their cost-benefit value to the science and engineering community. There is no simple way to measure actual savings, and at best only estimates are made.

In the early seventies, the DoD made a decision that by 1973 all DoD IACs would have to recover 50 percent of their operating budgets through user charges. MCIC for example, began a phased transition to service charges in August, 1971, seeking to derive monies from three principal sources: publications, inquiry services, and special studies. The stated objective of the service charge program was twofold: to allow each IAC a means to recover part or all of the costs associated with the output of the IAC, in order to provide an income to offset rising costs, and to allow for expansion of services to the technical community. It was believed by the DoD that users would pay for those services and products they wanted and the IACs, in turn, would become more responsive to the needs of their user community.

Charges are assessed in two main ways:

1. on the basis of costs incurred; for example, on the number of files searched, the number of references supplied, or how much staff time was used, and

2. according to a preestablished fee structure for specific products and services.

Certain services remain free to the user and vary from IAC to IAC. These might include general information queries, certain kinds of bibliographic searches, or minor technical inquiries. There are several payment options: subscription plans, pre-paid accounts, standing order plans, deposit accounts with the National Technical Information Service(NTIS), blanket purchase agreements, military deposit accounts, and Military Interdepartmental Purchase Requests.

Once the cost recoupment policy was put into effect and the procedures for assessing charges were in place, the IACs found themselves in the business of marketing their products and services. Initially, marketing of products and

billing for inquiry services were handled by NTIS. According to Clara Gannon of NTIS, however, the relationship is limited today, with most of the IACs selling documents on their own. The reasons for this are twofold: first, much of the material the IAC produces is sensitive and cannot, by law, be distributed through NTIS, and secondly, the financial rewards are greater to the IAC if they handle the marketing and distribution of their own products. [33]

Despite the DoD's intention to improve responsiveness to the user community, a serious concern has been the underutilization of IACs. A 1976 study on the needs of users or potential users was undertaken by Michael C. Corridore for the DSA. Among his findings was that DoD scientists and engineers meet only 2.6 percent of their Scientific and Technical Information(STINFO) needs directly from the DoD IACs. A second part of this study, on user satisfaction, showed that 25 percent of the respondents said they had never heard of the IACs; another 44 percent, while they had heard of the IACs, said they really didn't know what they did. On the other hand, those who were fully aware of the IACs and their products and services, were satisfied with their performance. [34] No actual study has been done since Corridore, but the continued growth of the IACs, both in numbers and in fiscal soundness, along with a genuine effort by the IACs to actively promote their services to the users, indicate a more positive picture is likely today.

CONCLUSION

The problems and concerns facing the IACs do not exist in isolation. They are part of the more basic issues which trouble all institutions and individuals involved with the transfer of scientific and technical information in this country, and can only be understood in light of our nation's federal information policies. Unfortunately the history of these policies exhibits a variety of disparate positions and seems to depend upon the current attitudes about science, technology, or information. The IACs, however, over a forty year period have been making a very real, positive contribution to the flow of scientific and technical information. Their position remains secure.

ENDNOTES

1 Anton J. Marx, "Opening Address," in Information Analysis Centres, Conference Proceedings, No. 78., AD-719716 (Sur Seine, France: North Atlantic Treaty Organization, Advisory Group for Aerospace Research and Development(AGARD), 1971), p. vi.

2 Information Analysis and Data Centers, Proceedings of the Forum of Federally Suported Information Analysis Centers, November 7-8, 1967 ([n. p.]: Federal Council for Science and Technology, Committee on Scientific and Technical Information, Panel #6, [1967], p. iii.

3 Donald F. Hornig, "Role and Importance of Information Analysis Centers," in Ibid., p. 10.

4 Bonnie (Talmi) Carroll and Betty F. Maskewitz, "Information Analysis Centers," Annual Reveiw of Information Science and Technology, 15 (1980): 152.

5 Proposal and Justification for the Establishment of an Aeronautical Systems/Target Nonnuclear Survivability/Vulnerability Information Analysis Center-SURVIAC, AD-A130414 (Washington, D.C.: Joint Technical Coordinating Groups on Aircraft Survivability and Munitions Effectiveness, 1982), p. 19.

6 United States, Department of Defense, DoD Regulation 3200.12-R-2, Centers for Analysis of Scientific and Technical Information, 17 January 1985, Foreward.

7 Ibid, Definitions, No.2.

8 Alan M. Rees, "Functional Integration of Technical Libraries, Information Centers and Information Analysis Centers," in Contemporary Problems in Technical Library and Information Center Management: A State-of-the-Art, ed. Alan Rees (Washington, D.C.: American Society for Information Science, 1974), p. 122.

9 "Metals and Ceramics Information Center (MCIC)," Battelle Columbus Division, Columbus, OH, [1985], p. 3. (Typewritten.)

10 "DTIC Assumes Responsibility for Nine IACs, Names James Pendergast Program Manager," Defense Technical Information Center Digest, no. 85, 26 January 1981, p. 4.

11 Carroll and Maskewitz, p. 156.

12 Herman M. Weisman, Information Systems, Services, and Centers (New York: Becker and Hayes, John Wiley & Sons, 1972), p. 150.

13 Ibid, p. 152.

14 Ibid, pp. 156-7.

15 Tora K. Bison, Barbara E. Quint, and Leland L. Johnson, Scientific and Technical Information Transfer: Issues and Options (Santa Monica, CA: Rand, 1984), p. 62.

16 Weisman, pp. 157-8.

17 FY 1986 Descriptive Summary, AD-B090222 (Alexandria, VA: Defense Technical Information Center, 1985). Program Element: 65B02S, Title: Information Analysis Centers.

18 "DTIC Assumes Responsibility for Nine IACs, Names James Pendergast Program Manager," p. 1.

19 Rees, p. 117.

20 J. W. Murdock, "Concept, Mission, and Operation of Scientific and Technical Information Analysis Centers," in Information Analysis Centers, Conference Proceedings, No. 78, p. 1-5.

21 Proposed Program for Operation of the Metals and Ceramics Information Center (MCIC), RFP No. DLA900-83-R-0290 (Columbus, OH: Battelle Columbus Laboratories, 1983), p. 65.

22 "Chemical Propulsion Information Agency (CPIA)," The Johns Hopkins University Applied Physics Laboratory, Laurel, MD, [1985], p. 1. (Typewritten.); "The Shock and Vibration Information Center (SVIC)," Naval Research Laboratory, Washington, D.C., [1985], p. 1. (Typewritten.)

23 "Metals and Ceramics Information Center (MCIC)," p. 1.

24 Fred A. Koether, "The ARPA Information Analysis Center Program," in Proceedings of the Meeting of Managers and Users of the Department of Defense Information Analysis Centers, AD-A008289, ed. Joseph L. Blue (Alexandria, VA: Defense Supply Agency, 1973), p. 60.

25 Ibid.

26 Proposal and Justification for the Establishment of an Aeronautical Systems/Target Nonnuclear Survivability/Vulnerability Information Analysis Center-SURVIAC, AD-A130414 (Washington, D.C.: Joint Technical Coordinating Groups on Aircraft Survivability and Munitions Effectiveness, 1982), p. 11

27 "Soil Mechanics Information Analysis Center(SMIAC)," US Army Engineer Waterways Experiment Station, Vicksburg, MS, [1985], p. 1.

28 "Manufacturing Technology Information Analysis Center(MTIAC),"Case and Company, Inc., Chicago, IL, [1985], p. 1.; "Survivability/Vulnerability Information Analysis Center(SURVIAC)," Wright-Patterson AFB, OH, [1985], p. 1; "Data & Analysis Center for Software(DACS), Griffiss AFB, NY, [1985], p. 1.

29 Information Analysis Centers Directory (Alexandria, VA: Defense Technical Information Center, 1985), p. 1.

30 "Tactical Weapson Guidance & Control Information Analysis Center (GACIAC)," IIT Research Institute, Chicago, IL, [1985], p. 4.

31 "Manufacturing Technology Information Analysis Center (MTIAC)," p. 5.

32 Murdock, p. 1-2.

33 Telephone Interview with Clara Gannon, National Technical Information Service, Springfield, VA, 19 December 1985.

34 Michael C. Corridore, Scientific and Technical Information Needs of Users or Potential Users of the DSA-Administered, DoD Information Analysis Centers, AD-A0249937 (Alexandria, VA: Defense Supply Agency, 1976), pp. 18, 3-5.

SOURCES CONSULTED

Bikson, Tora K., Quint, Barbara E., and Johnson, Leland L. Scientific and Technical Information Transfer: Issues and Options. Santa Monica, CA: Rand, 1984.

Blue, Joseph L., ed. Proceedings of the Meeting of Managers and Users of the Department of Defense Information Analysis Centers. AD-A008289. Alexandria, VA: Defense Supply Agency, 1973.

Carroll (Talmi), Bonnie and Maskewitz, Betty F. "Information Analysis Centers." Annual Review of Information Science and Technology, 15 (1980): 147 - 89.

"Chemical Propulsion Information Agency (CPIA)." The Johns Hopkins University, Applied Physics Laboratory, Laurel, MD, [1985]. (Typewritten.)

Christian, Thomas W., Strange, Karen and other staff members. Chemical Propulsion Information Agency, Laurel, MD. Interview, 26 November 1985.

"Coastal Engineering Information Analysis Center (CEIAC)." US Army Engineer Waterways Experiment Station, Vicksburg, MS, [1985]. (Typewritten.)

"Cold Regions Science and Technology Information Analysis Center (CRSTIAC)." US Army Cold Regions Research and Engineering Laboratory, Hanover, NH, [1985]. (Typewritten.)

"Concrete Technology Information Analysis Center (CTIAC)." US Army Engineer Waterways Experiment Station, Vicksburg, MS, [1985]. (Typewritten.)

Corridore, Michael C. Scientific and Technical Information Needs of Users or Potential Users of the DSA-Administered, DoD Information Analysis Centers. AD-A024937. Alexandria, VA: Defense Supply Agency, 1976.

"Data & Analysis Center for Software (DACS)." Griffiss AFB, NY, [1985]. (Typewritten.)

"DoD Nuclear Information and Analysis Center (DASIAC)." DASIAC/Kaman Tempo, Santa Barbara, CA, [1985]. (Typewritten.)

"DTIC Assumes Responsibility for Nine IACs, Names James Pendergast Program Manager." Defense Technical Information Center Digest. no. 85, 26 January 1981, pp. 1, 4.

FY 1986 Descriptive Summary. AD-B090222. Alexandria, VA: Defense Technical Information Center, 1985.

Gannon, Clara, National Technical Information Service, Springfield, VA. Telephone Interview, 19 December 1985.

Gardner, C.G. Nondestructive Testing Information Analysis Center: 1975 - Year of Transition. AD-A024848. Alexandria, VA: Defense Supply Agency, 1975.

Garvin, David. "The Information Analysis Center and the Library." Special Libraries 62 (January 1971): 17-23.

Gubiotti, R., Pestel, H. and Kovacs, G. "Numeric Data Information Analysis Centers at Battelle." Drexel Library Quarterly 18 (Summer-Fall 1982): 67-106.

"High Temperature Materials-Mechanical, Electronic and Thermophysical Properties Information Analysis Center (HTMIAC)." Purdue University, West Lafayette, IN, [1986]. (Typewritten.)

"Hydraulic Engineering Information Analysis Center (HEIAC)." US Army Engineer Waterways Experiment Station, Vicksburg, MS, [1985]. (Typewritten.)

Information Analysis and Data Centers. Proceedings of the Forum of Federally Supported Information Analysis Centers, November 7-8, 1967. [n.p.]: Federal Council for Science and Technology. Committee on Scientific and Technical Information. Panel #6, [1967].

Information Analysis Centers Directory. Alexandria, VA: Defense Technical Information Center, 1985.

Information Analysis Centres. Conference Proceedings. No. 78. AD-719716. Sur-Seine, France: North Atlantic Treaty Organization. Advisory Group for Aerospace Research and Development (AGARD), 1971.

"Infrared Information and Analysis Center (IRIA)." Environmental Research Institute of Michigan, Ann Arbor, MI, [1985]. (Typewritten.)

Keces, Shanya H. An Information Analysis Centre for Low Intensity Conflict, Part II, Technical Design of the Information Service. AD-B001193. Ottowa, Canada: Department of National Defence. Research and Development Branch. Defence Scientific Information Service, 1974.

The Management of Information Analysis Centers. Edited by William A. Smith. Washington, D.C.: ERIC Clearinghouse on Library and Information Sciences; Federal Council for Science and Technology. Panel on Information Analysis Centers of the Committee on Scientific and Technical Information (COSATI), 1972.

"Manufacturing Technology Information Analysis Center (MTIAC)." Case and Company, Inc., Chicago, IL, [1985]. (Typewritten.)

Mason, Robert M. A Study of the Perceived Benefits of Information Analysis Center Services. Executive Summary. Final Report on NSF Contract No. DSI-7718035. Atlanta, GA: Metrics, 1979.

Mason, Robert M. "The Marketing Ideal Vs. Actual Cases: A Synthesis." In The Information Age in Perspective: Proceedings of the 41st ASIS Annual Meeting, November 13-17, 1978. pp. 209-212. Compiled by Everett H. Brenner, White Plains, NY: Knowledge Industry Publications for the American Society for Information Science, 1978.

"Metal Matrix Composites Information Analysis Center (MTIAC)." Kaman Tempo, Santa Barbara, CA, [1985). (Typewritten.)

"Metals and Ceramics Information Center (MCIC)." Battelle Columbus Division, Columbus, OH, [1985]. (Typewritten.)

"Nondestructive Testing Information Analysis Center (NTIAC)." Southwest Research Institute, San Antonio, TX, [1985]. (Typewritten.)

"Pavements and Soil Trafficability Information Analysis Center (PSTIAC)." US Army Engineer Waterways Experiment Station, Vicksburg, MS, [1985]. (Typewritten.)

Planning Study to Establish DoD Manufacturing Technology Information Analysis Center. Final Report. AD-A108925. Watertown, MA: Army Materials and and Mechanics Research Center, 1981.

"The Plastics Technical Evaluation Center (PLASTEC)." US Army Armament, Materials and Chemicals Command, Dover, NJ, [1985]. (Typewritten.)

Problems in Mechanization of Small Information Centers. Conference Proceedings. No. 57. AD-702660. Sur-Seine, France: North Atlantic Treaty Organization. Advisory Group for Aerospace Research and Development (AGARD), 1970.

Proposal and Justification for Establishing Strategic Technology Information Analysis Center. AD-A111058. Huntsville, AL: Optics Directorate, Ballistic Missile Defense Advanced Technology Center, 1981.

Proposal and Justification for the Establishment of an Aeronautical Systems/Target Nonnuclear Survivability/Vulnerability Information Analysis Center - SURVIAC. AD-A130414. Washington, D.C.: Joint Technical Coordinating Groups on Aircraft Survivability and Munitions Effectiveness, 1982.

Proposed Program for Operation of the Metals and Ceramics Information Center (MCIC). Volume I-Technical Proposal. RFP No. DLA900-83-0290. Columbus, OH: Battelle Columbus Laboratories, 1983.

Rees, Alan M. "Functional Integration of Technical Libraries, Information Centers and Information Analysis Centers." In Contemporary Problems in Technical Library and Information Center Management: A State of-the-Art. pp. 117-138. Edited by Alan Rees, Washington, D.C.: American Society for Information Science, 1974.

"Reliability Analysis Center (RAC)." IIT Research Institute, Griffiss AFB, NY, [1985]. (Typewritten.)

"The Shock and Vibration Information Center (SVIC)." Naval Research Laboratory, Washington, D.C., [1985]. (Typewritten.)

"Soil Mechanics Information and Analysis Center (SMIAC)." US Army Engineer Waterways Experiment Station, Vicksburg, MS, [1985]. (Typewritten.)

"Survivability/Vulnerability Information Analysis Center (SURVIAC)." Wright-Patterson AFB, OH, [1985]. (Typewritten.)

Tactical Technology Center (TACTEC)." Battelle Memorial Institute, Columbus, OH, [1985]. (Typewritten.)

"Tactical Weapon Guidance & Control Information Analysis Center (GACIAC)." IIT Research Institute, Chicago, IL, [1985]. (Typewritten.)

United States. Department of Defense. Centers for Analysis of Scientific and Technical Information. DoD Regulation 3200.12-R-2. 17 January 1985.

United States. Department of Defense. DoD Scientific and Technical Information Program. DoD Directive 3200.12. 15 February 1983.

United States. Library of Congress. National Referral Center. Directory of Federally Supported Information Analysis Centers. 4th ed. Washington, D.C.: Government Printing Office, 1979.

United States. The President's Science Advisory Committee. Science, Government, and Information: The Responsibilities of the Technical Community and the Government in the Transfer of Information. Washington, D.C.: Government Printing Office, 1963.

Weisman, Herman M. Information Systems, Services, and Centers. New York: Becker and Hayes, John Wiley & Sons, 1972.

Wooster, Harold. "An Information Analysis Center Effectiveness Chrestomathy." Journal of the American Society for Information Science 21 (March - April, 1970): 149 - 59.

APPENDIX

IAC Description Summaries

CHEMICAL WARFARE/CHEMICAL AND BIOLOGICAL DEFENSE INFORMATION ANALYSIS CENTER (CBIAC)

Francis T. Crimmins, Director
Battelle Edgewood Operation, CBIAC
2113 Emmorton Park Road, Suite 200
Edgewood, MD 21040

ORIGIN

The Chemical Warfare/Chemical and Biological Defense Information Analysis Center (CBIAC) began operations on August 18, 1986. The formation of the CBIAC was a culmination of over seven years effort by DoD organizations concerned with Chemical Warfare/Chemical and Biologial Defense (CW/CBD) to create a centralized location and center of expertise for Chemical and Biological Information.

MISSION AND SCOPE

The mission of the CBIAC is to support DoD's CW/CBD research and development program by:

- Collecting, reviewing, analyzing, appraising and summarizing available information and data
- Establishing and maintaining appropriate databases
- Serving as the focal point and, thus, facilitate integration and coordination of activities, programs, etc. throughout the community
- Providing rapid access to existing information and data
- Maintaining a historical perspective of programs, events, types of data collected, etc. to help in the structuring of future efforts

Services are also provided to non-DoD Government agencies, contractors and agents consistent with security and data limitations.

The CBIAC is concerned with all areas of CW/CBD technology applicable to DoD needs. These areas include:

- Physical and chemical properties of agents and simulants
- Agent/simulant persistence on vegetation, terrain, material and equipment
- Agent/simulant effects on personnel, material, and equipment
- Environmental transport and fate of agents and simulants

- Combined/synergistic effects on personnel, targets, and equipment
- Medical effects, prevention, diagnosis, and treatment of casualties
- Toxicology of agents and simulants
- Performance degradation of individuals in CW environment
- Detection, warning, identification, and monitoring
- Individual and collective protection
- Decontamination
- Munitions capabilities
- Combat effectiveness
- Materials properties
- Munitions status
- Queries from the intelligence community
- Modeling
- Threat and retaliatory capabilites
- Chemistry and biology of agents
- Aerosol and operational sciences

Information from both U.S. and Foreign sources are included in CBIAC's scope.

ORGANIZATION

Presently, the CBIAC consists of five full-time staff on site at the Edgewood area of Aberdeen Proving Ground. Support, as required, is provided by Battelle's Edgewood Office and by the over 5,000 scientists and engineers at Battelle's Columbus Division. Other subcontractors and consultants may be hired for specific projects requiring specialized expertise.

INFORMATION OPERATIONS

The main reason for the CBIAC is to provide its users with readily accessible, comprehensive information and data on CW/CBD technology. Currently, we have direct access to information contained in the Defense Technical Information Center, CRDEC and Dugway Libraries, and such datatbases as those at Armstrong Aerospace Medical Research Laboratory, PLASTEC, TACTEC, the Army Medical Research Institute of Chemical Defense, and the Air Force's Flight Dynamics Laboratory. We also have access to DIALOG and its many databases. We are presently establishing an online capability with as many of the above mentioned databases as possible. Additionally, we are designing a CBIAC "Users Database" which will allow online access, with appropriate security and data limitations, to much of the information contained in these databases as well as other items of interest to the CB community including points of contact, upcoming meetings, and other information sources, such as the location of small, specialized databases, etc. Also, as part of our special studies efforts, we will be developing and making available to our users, databases in such areas as Allied Equipment, affects of agents on materials, heat stress and studies and analysis.

To date we have had over forty technical and bibliographical inquiries. We have aggressively investigated and replied to each of these, often within two or three days. Our knowledge of where information is located, our ability to carefully analyze it and provide the user with pertinent information directly applicable to his problems has saved our customers numerous hours.

SERVICES AND PRODUCTS

CBIAC will provide all the services and products of a full service Information Analysis Center including: technical and bibliographical inquiries, state-of-the-art reports, hand and data books, critical reviews and technology assessments, abstracts and indices, and special studies and tasks. We have published two editions of our quarterly newsletter and we are presently preparing a user's guide.

SPECIAL SERVICES

The resources of the CBIAC have already been employed by numerous DoD agencies for a variety of special analyses, database generation and technical support. These are all conducted by supplemental funding provided by the requesting organization. Some of the over 12 efforts underway are:

- Technical and Logistical support for the 1987 Air Force Conference on Maintenance of Air Base Operations in a CW Environment
- Identification and Analysis of CD Equipment developed by Allied Nations for USAF use
- Development of a Material Degradation Database
- Provide Technical Support and Analysis for the USAF Wartime Hospital Integration Office
- Compile a listing of planned, on-going and completed studies and analysis involving CD
- Assess the Utility of the M43A1 Chemical Agent Detector for Fixed Site Detection and Warning

The resources of Battelle Columbus Division, other Battelle technical experts located throughout the world, subcontractors, consultants, etc. are available to DoD, government agencies, or industry to perform a special study in any area within the scope of the CBIAC. Arrangements for accomplishing requests will be worked out with each requestor. Normally, funds are provided through a Military Interdepartmental Purchase Request or Purchase Order.

AVAILABILITY OF SERVICES AND PRODUCTS

CBIAC services and products are available to all "qualified" users. A qualified user is a member of DoD or other Government organization as well as U.S.

Government contractors who have valid needs for CBIAC information. Also, since much of the information in CBIAC's technical area is classified, or limited, requirements such as security clearances and need-to-know must also be met. At present, CBIAC does not have a user charge system in place; a system is being devised consistent with Dod instructions for information analysis centers and will be implemented upon approval. A quarterly unclassified newsletter providing CBIAC awareness information is available at no charge and is circulated to more than 300 individuals and organizations. A comprehensive 30 to 60 minute briefing on the CBIAC is available upon request.

Requests for service may be directed to the CBIAC by letter, teletype, or simply, by telephone.

CHARGES/PAYMENT OPTIONS

Payment can be handled by purchase order or, for Department of Defense agencies, via Military Interdepartmental Purchase Request (MIPR) through the basic CBIAC contract. Specific procedures may be obtained by contacting the CBIAC.

CONTACT POINT

For additional information, please write or call the CBIAC at:

Battelle Edgewood Operations
ATTN: CBIAC
2113 Emmorton Park Road, Suite 200
Edgewood, MD 21040
Phone: (301) 676-9030

COASTAL ENGINEERING INFORMATION ANALYSIS CENTER (CEIAC)

Dr. Fred E. Camfield, Director
U.S. Army Engineer Waterways Experiment Station
Coastal Engineering Research Center
ATTN: Director, CEIAC
P.O. Box 631
Vicksburg, MS 39180-0631

ORIGIN

A memorandum of 18 April 1968 from the Director of Defense Research and Engineering to the Assistant Secretary of the Army, Research and Development directed the establishment of six Department of Defense (DoD) Information Analysis Centers. The Coastal Engineering Information Analysis (CEIAC) was one of the six and is located at the Coastal Engineering Research Center at the U.S. Army Engineer Waterways Experiment Station (WES). It was established to acquire, analyze, evaluate, condense, and disseminate the World's literature and data in the area of coastal engineering. The Center was established in accordance with the provisions of DoD Instruction 5100.45, "Centers for Analysis of Scientific and Technical Information," July 28, 1964 which since has been replaced by DoD Regulation 3200.12-R-2, of the same named, dated January 17, 1985. Although established in 1968 the CEIAC was not funded or staffed until November 1976. However prior to being funded and staffed its functions as required by DoD Instruction 5100.45 were carried out by the staff of the Coastal Engineering Research Center.

MISSION AND SCOPE

The mission of the Coastal Engineering Research Center (CERC) is to develop and update design criteria for coastal works and to disseminate these criteria to the field as rapidly as possible. CERC performs this mission in several ways: (a) by conducting basic and applied research into particular aspects of coastal design; (b) by monitoring recently completed coastal works and assessing their performance and interactions with the local environment; (c) by serving as a Corps clearinghouse for developments in other agencies, universities, the private sector, and other countries; and (d) by synthesizing experiences of individual Corps districts into guidelines for general use.

The mission of the CEIAC is to collect, analyze, and disseminate information in the field of coastal engineering. The Center deals primarily with the following coastal engineering subjects; wave action in coastal waters; coastal processes; tides, surges, and long period waves; inlet and estuary dynamics; coastal works evaluation; functional and structural design of coastal works; coastal construction techniques; coastal environmental data collection; and harbors and channels.

ORGANIZATION

The Center has two employees: a Director, an administrative clerk and receives additional personnel support from the technical divisions of the Coastal Engineering Research Center. The Director is responsible for planning, directing and executing the work of the Center. Technical assistance in answering specific inquiries is provided as needed by a number of experienced engineers and scientists on the staff of the CERC. The CEIAC is also supported by the Library Branch, Technical Information Division of WES, which contains approximately 250,000 items including books, periodicals, reports, pamphlets, standards, microforms, unpublished matter, and other data. The Library is a bibliographic center containing catalogs of other libraries in related fields of interest, capable of supporting research on a doctoral level. Library resources are supplemented by services of the Defense Technical Information Center. An on-line computer terminal is also available providing access to Dialog and Systems Development Corporation's Orbit bibliographic databases. Access is also available to the OCLC bibliographic network.

INFORMATION OPERATIONS

The CEIAC has the technical capability (but not the fiscal resources) to provide the user community with a comprehensive, readily accessible source of current information within the scope of the Center's activities. The Center has access to three principal sources of information: data files developed and maintained at the Center; information in the Library of the Technical Information Technology Laboratory at WES; and the knowledge and experience of the professional staff of the CERC, the majority of whom have advanced degrees and some of whom are considered as international experts in their respective subdisciplines.

Databases

The following are databases maintained by the CEIAC:

Littoral Environment Observation (LEO) Database.

The LEO database contains environmental data such as wave height, period, and direction, wind speed and direction, and longshore current and direction collected visually by volunteer observers at over 200 locations along the coasts of the United States. The LEO collection effort has been ongoing since 1968 and the data has been placed in a database residing on Control Data Corporation's Cyber Corps of Engineers dedicated computer in Rockville, Maryland.

Photographic Database

The photographic database consists of over 50,000 slides and photographs of coastal scenes and projects including waves, beaches, revetments, breakwaters, jetties, seawalls, harbors, and damage to coastal structures resulting from storms.

SERVICES and PRODUCTS

Requests for assistance are given high priority and quick response. Requests for general technical information or data, bibliographies or abstracts, and sources of specific information are handled by the Center. Highly technical questions that cannot be answered by the Center are referred to engineering or scientific specialists at the CERC, or others in the scientific community. Requests for publications for loan are referred to the Library. Requests for publications for retention are referred to the Publications Distribution Section at WES. Requests for publications which are not available at WES are referred to the Defense Technical Information Center or to the National Technical Information Service.

Publications

Reports published by CERC related to the CEIAC mission: GITI 4, "Annotated Bibliography of the Geologic, Hydraulic, and Engineering Aspects of Tidal Inlets," by J.H. Barwis, Jan 1976 (A020 355).

MP 1-72, "Groins: An Annotated Bibliography," by R.O. Bruno and J.H. Basillie, Apr 1972 (743 942).

MP 2-73, "An Annotated Bibliography of Aerial Remote Sensing in Coastal Engineering," by R.O. Bruno, H.M. Goldstein, and D.B. Stafford, May 1973 (766 720).

MP 3-75, "Features of Various Offshore Structures," by L. Amy, B.L. Chase, J. Peraino, and T. Plodowski, Apr 1974 (A012 843).

MP 5-75, "A Selected Bibliography of the Nearshore Environment: Florida West Coast," by C.H. Saloman, Apr 1975 (A012 854).

MR 77-2, "Marine Pipelines: An Annotated Bibliography," by G.L. Bowie and R.L. Wiegel, Mar 1977 (A038 593).

MR 78-2, "An Annotated Bibliography of CERC Coastal Ecology Research," by A.K. Hurme, P.L. Knutson, E.J. Pullen, and R.M. Yancey, May 1978 (A058 712).

MR 79-1, "An Annotated Bibliography on Detached Breakwaters and Artificial Headlands," by J.R. Lesnik, Feb 1979 (A068 981).

MR 79-6, "An Annotated Bibliography of Patents Related to Coastal Engineering," by R.E. Ray, M.D. Dickey, and A.M. Lyles, Nov 1979 (A080 914).

MR 80-5, "An Annotated Bibliography of CERC Coastal Ecology Research," by A.K. Hurme, P.L. Knutson, E.J. Pullen, and R.M. Yancey, Jun 1980 (A088 585).

MR 80-7, "An Annotated Bibliography of Seagrasses with Emphasis on Planting and Propagation Techniques," by D.B. Knight, P.L. Knutson, and E.J. Pullen, Sep 1980 (A092 584).

MR 82-7, "Annotated Bibliography of Surf Zone Currents," by D.R. Basco, and R.A. Coleman, Sep 1982 (A121 585).

MR 83-2, "An Annotated Bibliography on the Biological Effects of Constructing Channels, Jetties, and Other Coastal Structures," by J.C. Ford, A.K. Hurme, and E.J. Pullen, Jan 1983 (A128 080).

MR 83-7, "Annotated Bibliography on Wave-Current Interaction," by D.H. Peregrine, I.G. Jonsson, and C.J. Galvin, Mar 1983 (A127 225).

"Bibliography of Publications Prior to July 1983 of the Coastal Engineering Research Center and the Beach Erosion Board," by A. Szuwalski, and S. Wagner, Mar 1984 (A145 404).

CETA 81-5, "The Littoral Environment Observation (LEO) Data Collection Program," by C. Schneider, Mar 1981 (A101 855).

MP 2-70, "Littoral Environment Observation Program in California, Preliminary Report, Feb-Dec 1968," by A. Szuwalski, Feb 1970 (704 720).

MR 82-6, "Littoral Environment Observation (LEO) Data Summaries, Northern California, 1968-78," by C. Schneider and J.R. Weggel, Aug 1982 (A128 551).

R 4-69, "Systematic Collection of Beach Data," by D.W. Berg, Sep 1969 (697 533).

R 4-74, "Littoral Environment Observation Program in the State of Michigan," by R.O. Bruno and L.W. Hiipakka, 1973 (777 706).

"Littoral Environment Observation Program,: by A. Szuwaiski and A. Sherlock, Conference Proceedings of Hydraulics and Hydrology In the Small Computer Age, American Society of Civil Engineers, Aug 1985.

MR 82-16, "CERC Field Research Facility Environmental Data Summary, 1977-79," by H.C. Miller, Dec 1982 (A127 066).

TR CERC-84-1, "Annual Data Summary for 1980, CERC Field Research Facility," by H.C. Miller, Feb 1984 (A142 587).

TR CERC-85-3, "Annual Data Summary for 1981, CERC Field Research Facility," by H.C. Miller, W.E. Grogg Jr., J.R. Rottier, M.W. Leffler, and C.R. Townsend III, Jun 1985.

MP CERC-85-11, "Annotated Bibliography of Sediment Transport Occurring Over Ebb-Tidal Deltas," by L.L. Weishar and M.L. Fields, Sep 1985 (A161 548).

SPECIAL STUDIES AND ACTIVITIES

In addition to its other activities, the CEIAC participates in planning national meetings of professional societies and WES laboratory symposia, workshops, and courses related to coastal engineering. The CEIAC also publishes a quarterly information bulletin summarizing research conducted by CERC.

CHARGES/PAYMENT OPTIONS

No charge is made for answering technical inquiries unless the request requires extensive work. In that case the Center will negotiate payment.

CONTACT POINT

Names, addresses, and telephone numbers or organizations or individuals directly relating to or assisting in CEIAC activities are as follows:

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Telephone No: 601/634-3111 or FTS 542-3111

Director, CEIAC
Dr. Fred E. Camfield
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Chief, Technical Information Division, Information Technology Laboratory
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Telephone No: 601/634-2533 or FTS 542-2533

Chief, Library Branch, Technical Information Center
Ms. Bernice Black Address as above, ATTN: WESTL
Telephone No: 601/634-2542 or FTS 542-2542

Technical reports
Defense Technical Information Center
Building 5, Cameron Station
Alexandria, VA 22314
Telephone No: 202/274-7633

National Technical Information Service
5825 Port Royal Road
Springfield, VA 22161
Telephone No: 703/487-4650

CHEMICAL PROPULSION INFORMATION AGENCY (CPIA)

Thomas W. Christian, Director
The Johns Hopkins University
Applied Physics Laboratory
Chemical Propulsion Information Agency
Johns Hopkins Road
Laurel, Maryland 20707-6099

ORIGIN

The Chemical Propulsion Information Agency (CPIA), with some changes in scope and title, has been in continuous operation for 40 years. The Rocket Propellant Information Agency (RPIA) was created in 1946 at The Johns Hopkins University, Applied Physics Laboratory (APL) to provide technical and administrative support to the U.S. military services in the field of solid rocket propulsion technology. The title was later changed to the Solid Propellant Information Agency. A Liquid Propellant Information Agency was established at APL in 1956 and two agencies were then merged to form the CPIA in 1962. The DoD military services and the National Aeronautics and Space Administration (NASA) that year established what is now the Joint Army-Navy-NASA-Air Force (JANNAF) Interagency Propulsion Committee. Their charter tasked CPIA with the provision of technical and administrative support for their information exchange activities.

In 1964, the CPIA was designated as a DoD Information Analysis Center. The scope was broadened in 1972 to formally cover ramjet propulsion; gun propulsion was included in 1973; and electric propulsion was added in 1976. An annual service charge system was implemented in FY 1970 in compliance with DoD directives. Government technical program management is provided by the Naval Sea Systems Command (NAVSEA) and administrative management is provided by the Defense Technical Information Center (DTIC).

MISSION AND SCOPE

The mission of CPIA is to systematically acquire, compile, analyze and disseminate pertinent information and data in the areas of rocket, ramjet, space, and gun propulsion technology based on chemical and electrical energy release.

Included in the scope are information and data on the research, development, test, and evaluation of solid, liquid, hybrid, and electric rockets, ramjets, space vehicles and gun propulsion systems. This includes chemical synthesis; thermochemistry; combustion phenomena; physical, chemical and mechanical

properties and manufacturing processes of propellants and fuels; special test equipment and techniques; theoretical and experimental performance; analytical test techniques; component and propulsion unit design; operational serviceability; life-cycle costs; reliability; environmental protection; exhaust plume technology; interior ballistics; materials areas specifically related to missile, space and gun propulsion; and the evaluation of hazards and safety measures related to these areas.

To accomplish this mission, the CPIA program includes the following basic tasks:

1. Acquisition and maintenance of a comprehensive, up-to-date, authoritative technical information base.

2. Response to requests for technical information from government agencies, contractor facilities, and educational institutions.

3. Issuance of timely reviews in various areas of propulsion technology.

4. Publication of propulsion abstracts, manuals, newsletters, meeting bulletins, and special publications.

5. Provision of technical and administrative support to the JANNAF Executive Committee and nine JANNAF Subcommittees.

6. Maintenance of up-to-date computer data tapes on hazardous materials for the Department of Transportation (DoT).

7. Maintenance of a Chemical Propulsion Mailing List (CPML) for the direct exchange of information among selected government facilities and contractors.

In addition, special projects such as support of the U.S. Department of Transportation in work associated with preparation of an air transport version of the Emergency Response Guidebook (ERG), and with updating the 1984 published edition of the land transport version of the ERG, are undertaken.

ORGANIZATION

A full time staff of ten professional scientists, engineers, and information specialists and nine supporting members is employed. The CPIA also receives technical support through its collaboration with the JANNAF Interagency Propulsion Committee and Subcommittees. The staff of APL can also be used for assistance and outside consultants are sometimes hired to author Chemical Propulsion Technology Reviews.

INFORMATION OPERATIONS

The technical information base provides the CPIA staff and its users with a comprehensive, readily-accessible source of current information on propulsion information. There is a unique library containing approximately 56,000 hard copy and microfiche reports on hand which document U.S. efforts in propulsion technology since 1946. Additions to the file are made at the rate of about 1,100 per year.

Sources of information and data are contractor and government laboratory technical progress reports, bulletins of the proceedings of technical meetings coordinated and attended by staff members, questionnaires submitted to CPIA by participants in the information exchange effort, trip reports of visits by the staff members, consultations with visitors and those making technical inquiries to CPIA, and information gained through technical support of JANNAF activities. Included in the files are the applicable reports available through DTIC and the National Technical Information Service (NTIS), reports announced in NASA STAR, and reports received directly through the CPML.

All accessions are reviewed for pertinency before being entered into the system. Professional staff specialists index reports using a computer-compatible hierarchical structured indexing system.

A thesaurus for in-house use by the indexers and for retrieval of information is published periodically. The current edition contains over 25,000 subject index terms, over 5,000 cross-references and over 3,000 words extracted from multi-word subject index terms. The complete facilities of the NAS AS/9160 computer system and onsite terminal connections are available for searches as well as for the solution of propulsion-related problems. Although computer files are designed primarily for searches by the CPIA staff, the current year accession data is being added to Defense RDT&E On-Line System (DROLS) and is accessible to qualifed DTIC users. The abstracts that accompany the citations appearing in the Chemical Propulsion Abstracts (CPA) are extracted primarily from the DTIC technical reports file for all documents accessible through the DROLS system; those not accessible from DTIC are processed by CPIA and entered into DROLS.

SERVICES AND PRODUCTS

The CPIA serves its users in the propulsion community through personal technical advisory service, by publication of a variety of technical publications and bulletins and by technical and administrative support to the JANNAF Executive Committee and Subcommittees. Services are available to qualified users who have registered with the DTIC at the confidential or higher security level, have the necessary need-to-know for propulsion, and subscribe to CPIA services. All non-government agencies are also required to register with the Defense Logistics Services Center (DLSC) as a "qualified U.S. contractor". The publications and services available are described in the following paragraphs.

The Chemical Propulsion Abstracts (CPA) is a Confidential publication treating the research, development, test, and evaluation (RDT&E) of chemical propellants and propulsion units used in missile, rocket, space and gun systems. About 1100 technical documents and conference papers reporting progress on U.S. Government-sponsored programs in chemical propulsion are analyzed and indexed each year and added to CPIA's propulsion technology data base, which now consists of more than 56,000 records dating back to the mid-1940s. Subject indexing is done by CPIA professional staff specialists using a computer-compatible, structured system; this permits updating of the on-line computer-searchable subject files that begin with the year 1969, as well as publication and updating of hierarchical subject indexes for ease of use at the subscriber's desk. Loose-leaf interim issues of the bibliographic citations, abstracts, and indexes are distributed about six times per year to provide current information. A bound volume is issued annually to include all the citations and abstracts and cumulative indexes for the year. Cumulative twelve-year (1969-1980 inclusive) citations and bibliographic and subject indexes have been distributed to all CPA subscribers. Additional copies of the four-volume set are available upon request. The CPA is an indispensible reference tool for any organization engaged in the advancement of the nation's propulsion technology base, and it is the cornerstone of CPIA's technical information products.

In 1984, CPIA started a program to submit documents and insert subject index files into the Defense Technical Information Center's (DTIC's) Defense RDT&E On-Line System (DROLS). The DROLS covers all scientific and technical areas of interest to the Department of Defense (DoD). Several other DoD Information Analysis Centers have portions of their databases in the DROLS, making bibliographic data accessible on-line for all DTIC users. Our transfer of CPA data into DROLS is intended to broaden and improve the accessibility of propulsion information and thereby enhance its utility and application to propulsion problems.

The Chemical Propulsion Technology Reviews (CPTR) are summaries and status reports on topics pertaining to rocket, ramjet and gun propulsion. The general objective is to collect, analyze, and condense the literature, then present the technology advances in a language understood by a broad range of propulsion technologists. Although most articles are authored by the CPIA professional staff, several articles from outside sources have been included in past issues. User response regarding subject matter, technical content and format, and suggestions for future subjects and improvements in presentation are continuously solicited. Five to eight articles are prepared per year, depending on availability of staff specialists and complexity of the topics.

Seven CPIA Propulsion Manuals are maintained and updated. Data sheets for (or "units") these loose-leaf books are prepared via questionnaires and/or extractions from the published literature with CPIA professional staff members responsible for gathering, organizing and verifying the data and checking for consistency. Recently published data are expressed in SI units with English equivalents.

The CPIA/M1 Rocket Motor Manual is classified Confidential and contains general descriptions of solid propellant rocket motors used for tactical, strategic, space, JATO and sounding-rocket applications. Principal weights and dimensions, ballistic performance, component details, and drawing of the motors are included. Indexes are compiled by name and certain performance parameters, as are special indexes of rocket motors referenced in JANNAF meeting bulletins and rocket motors cited in the CPA. The manual contains about 252 current data sheets.

The CPIA/M2 Solid Propellant Manual is classified Confidential and includes data on the composition and physical, chemical, ballistic and safety properties of both service-accepted and experimental solid propellant formulations, including some gun propellants. Full indexes are provided, as well as a summary of some data not published as full data sheets in the CPIA/M2. A special index of propellants cited in the CPA is included. The manual comprises about 187 current data sheets.

The CPIA/M3 Solid Propellant Ingredients Manual is Unclassified and contains data on the chemical, physical, thermodynamic and safety properties of ingredients used in solid rocket and gun propellants. The manual contains 66 CPIA-prepared data sheets and 64 vendor data sheets for a total of 130 data sheets. Indexes include unit order, chemical names, and empirical formulas.

The CPIA/M4 Liquid Propellant Manual is an Unclassified compilation of the properties of liquid propellants in use as well as of promising propellant candidates. The manual contains 29 current data sheets.

The CPIA/M5 Liquid Propellant Engine Manual is Unclassified and consists of descriptions of engines that are now in use or have been operated in a flightweight configuration. Performance values, design inovations, and engine parameters are tabulated and indexes are provided. The manual contains 106 current data sheets.

The CPIA/M6 Airbreathing Propulsion Manual is classified Confidential and contains descriptions of the propulsion units and fuels used or designed for use in airbreathing missile systems. Propulsion unit information includes inlet performance, combustor performance, and booster motor characteristics. Chemical and physical properties data are provided on fuels. The manual presently contains four engine data sheets and seven fuel data sheets.

The CPIA/M7 Liquid Engine Static Test Facilities Manual is Unclassified and contains information on the nation's liquid propulsion test facilities and their adequacy to support current, near-term, and long range national program requirements. The manual contains 184 Facility Inventory Sheets (FIS) and 197 data sheets with specific information Propulsion Test Stands (PTS).

JANNAF Propulsion Meetings (JPM) are held on an approximately annual basis; CPIA provides administrative and technical assistance in the conduct of the meeting

and compiles and publishes the technical papers presented. The JPM and published proceedings provide a rich source of current information and data not as readily available and digestible from other sources.

JANNAF Subcommittee Meeting Proceedings are compiled and published by CPIA representatives to the nine JANNAF Subcommittees, at the request of the Subcommittee Chairmen and with the approval of the JANNAF Executive Committee. CPIA provides assistance in the conduct of the subcommittee information exchange meetings and is the focal point for gathering, organizing, formatting, publishing, and disseminating the information in a timely and consistent manner. During FY 1986, 12 JANNAF-associated documents in this category were issued. Notices of JANNAF events appear in the bimonthly CPIA Bulletin. Support of JANNAF activities involves professional CPIA staff members as named representatives to the subcommittees. The nine subcommittees and their areas of interest are described below.

Combustion. The technical areas of coverage include the chemical combustion phenomena occurring within the interior of guns and combustors of solid, liquid and airbreathing missile and space propulsion systems. The combustion phenomena encompass steady-state, transient and nonsteady proceses. Airbreathing propulsion systems include ramjets and air-augmented systems. Work areas covered include analytical modeling and experimental research on fundamental combustion and fluid dynamic processes and their relation to the development and performance of solid, liquid, and airbreathing rocket, missile, space, and gun propulsion systems. The dependance of the combustion and flow phenomena on parameters such as propellant systems, combustor configurations, environment, inlets, and nozzles included in these work areas.

Composite Motor Case. The subcommittee is concerned with the application of composite materials in the construction of rocket motor cases for strategic and tactical missiles and space propulsion systems and cartridge cases for gun propulsion systems. The following technology areas are encompassed: evaluation of fibers, resins, and composite materials used in the manufacture of motor cases; motor case structural analysis and design methods; fabrication and processing technology, covering such process variables as environmental controls; and testing and inspection of composite cases, including material property characterization, materials acceptance criteria, life-cycle testing, and damage classification.

Exhaust Plume Technology. The technical areas of concern to this subcommittee involve phenomena associated with the exhausts from rocket, ramjet, space and gun propulsion systems. These phenomena can be divided into three technical areas: plume flow fields; plume radiation; and a broad area incorporating other plume effects. The plume flow field encompasses the physical phenomenology required to describe the thermodynamic, gas dynamic, chemical and physical state of the plume. Plume radiation addresses the physical processes associated with the emission, scattering, absorption, and reflection of electromagnetic radiation from exhaust plumes ranging over the spectrum from the ultraviolet and visible through the infrared and microwave regions. Plume effects include the interaction of plumes with external structures, leading to the imposition of loads of thermal, chemical and mechanical stresses, and the electromagnetic interference effects which degrade guidance and sensor systems.

Propellant Characterization. The subcommittee is concerned with the technology areas required to develop, manufacture, and characterize propellants and ingredients. The manufacturing technologies of interest include mixing procedures, sampling and quality control, safety and handling practices, and the design and operation of mixing equipment. The characterization tests involve classical wet chemistry, instrumental analysis, chemical stability, compatibility, and calorimetric measurements. Propellant ballistic and mechanical properties and hazard evaluation tests are excluded from the scope of interest because thse subjects are covered by other subcommittees.

Propulsion Systems Hazards. The subcommittee is concerned with the potential hazards associated with missile, space and gun propulsion systems. Included are hazard analyses for both tactical and strategic missiles, small-and large-caliber gun systems, solid and liquid propellant systems, hazards encountered in loading and firing operations, and hazard technology areas identified from hazard analyses.

Ramjet. The scope of the Ramjet Subcommittee includes the technology areas of ram-compression airbreathing propulsion systems such as liquid- and solid- fuel ramjets, ducted rockets, and other mixed-cycle engines oriented towards missile applications. The scope excludes fundamental combustion studies and engine systems of the turbojet family. The objectives include characterization of advanced airbreathing fuels and ramburner thermal protection systems.

Rocket Nozzle Technology. The scope of this group is limited to the problems associated with the application of carbon-carbon composite materials to solid rocket nozzles. Three general technology areas are of interest: structures, including thermostructural analysis, instrumentation, and failure modes; heat transfer/recession, including material roughness, kinetics, and analysis; and materials, including nondestructive evaluation, processing, acceptance/rejection criteria, characterization, and establishment of a carbon-carbon data base. Material behavior and analyses for other application environments (e.g., reentry vehicle nosetips) are included when it is clear that such information can enhance the understanding of the nozzle problem.

Safety and Environmental Protection. The scope includes collecting, evaluating, disseminating and exchanging information relative to safety and environmental hazards criteria and operational procedures for manufacturing, handling, transporting, transferring, storing, and testing propellants, ingredients, and propulsion systems. Research programs which are deemed to be necessary are recommended. The nature and extent of hazards are defined, and guidelines are provided for the development of controls for hazardous operations, including the enfironmental dispersion of combustion products, disposal of wastes, and management of reultant secondary effects. Guidelines for coping with catastrophic incidents involving these materials are also developed.

Structures and Mechanical Behavior. This subcommittee is concerned with the experimental, analytical, and statistical techniques required in the preliminary or detailed structural design of solid propellant rocket motors and gun ammunition, and in the prediction and assessment of their structural integrity and structural service life. Specific technical areas of activity include

thermomechanical characterization of response and failure behavior in propellants, liners, insulation, case materials, and gun ammunition; structural analysis methods for solid rocket motors and various test specimens; experimental structural analysis methods: environmental load definitions; determination of failure mechanisms for rocket motors and components; aging characterization and predictive modeling for motor materials and components; and motor service life prediction and surveillance methods.

The JANNAF Compilation of Propulsion Technology Programs is published annually. It lists the research and development programs of the JANNAF agencies in the areas of solid liquid, airbreathing and gun propulsion technology and includes the level of funding, contractor, contract manager, and a brief unclassified description of the program. It is published in two forms, a "for official use only" volume and a "contractor edition"; the only difference is that the future year funding has been deleted from the latter edition.

The Chemical Propulsion Mailing List (CPML) provides a means for the efficient and timely automatic exchange of chemical propulsion technical reports in accordance with the needs of the recipients and is normally used as a distribution guide in propulsion contracts. It is a listing of those government and contractor organizations who have agreed to a direct primary distribution exchange of their technical reports. The addresses in the CPML are routinely checked against new issues of the Defense Technical Information Center's Dissemination Authority List (DAL) for verification of need-to-know and facility security clearance. Revisions are issued semi-annually.

Automatic Distribution of Published Literature Searches ("LS"Documents) ensures the immediate mailing to subscribers of CPIA LSs in the categories of solid, liquid, airbreathing and gun propulsion. These LSs are prepared by professional staff specialists in response to outside inquiries or are initiated internally on topics known to be of current broad interest to the propulsion community. Most of the LSs are Unclassified and contain "title block" bibliographic citations of pertinent reports along with subject, corporate source and personal author indexes. About 25-30 LSs are published annually, with solid propulsion the predominant category.

Technical and Bibliographic Inquiry (TBI) Services consist of user visits to CPIA and use of an extensive technical report library, access to bibliographic files, consultation with the staff, and responses to technical inquiries. The CPIA professional staff includes scientits and engineers with extensive educational and experiential backgrounds in propulsion. Technical inquiries are answered by those staff members who specialize in the problem area under investigation. Responses are usually given within 2-3 work days and may take the form of telephone discussions of findings, identification of pertinent literature (perhaps leading to a formal bibliography to be published as a Literature Search), and provision of excerpts from reports, computer library tapes and instructions, or results of CPIA calculations of propellant theoretical performance. A computerized subject-term search of the Chemical Propulsion Abstracts files from 1969 to the present forms the basis for most bibliographies, but manual searches of the pre-1969 bound volumes are performed as required to satisfy the requester. CPIA does not operate a library loan

service; requests for documents not of CPIA origin are referred to DTIC, NTIS, NASA, AIAA, or other sources.

Other special documents published by CPIA include the "Chemical Propulsion Acronyms and Trade Names" list and the "Chemical Propulsion Publications List".

Certain Current Awareness and Promotion products are available free of charge to existing or prospective CPIA subscribers.

The CPIA Bulletin is a bimonthly unclassified newsletter which contains information on CPIA services and products, JANNAF activities, and items of general interest to the propulsion community. Included are reports on meetings and a calendar of future meetings, spotlights on people in propulsion, announcements of recent CPIA publications and literature searches, and news releases from companies and agencies. The circulation is over 6000 copies.

An unclassified pamphlet listing Selected Bibliographies, Handbooks, Manuals and Reviews is published at least once a year to provide a ready means of rapid identification and retrieval of popular reports of a generally broad scope. All aspects of chemical rocket and gun propulsion are covered in a three-column subject/source/reference listing, some of the references dating back more than 12 years. New and updated citations are added from such sources as CPA, CPIA Literature Searches, and the CPTRs.

CPIA Annual Reports are written to summarize activities on a government fiscal year basis. A CPIA Brochure is available (as well as a DTIC Brochure on all DoD Information Analysis Centers) that gives a pocket-size description of CPIA. A 12-minute cassette-narrated, 35-mm CPIA Slide Show is available on loan to interested technologists to assist in better understanding and use of the available CPIA technical information resources. Also available is a flier that describes the Technical Inquiries and Literature Searches in detail, a JANNAF Brochure that describes the purpose, organization, and functions of the JANNAF Interagency Propulsion Committee, including the Executive Committee and the nine Subcommittees, and a JANNAF Annual Report that describes all activities carried out during the year. All of these are available free of charge to existing or prospective CPIA subscribers.

CONTACT POINT

Additional information on the services available and how CPIA can benefit organizations in the U.S. propulsion community may be obtained by writing or calling the following address or telephone number.

The JHU Applied Physics Laboratory
Chemical Propulsion Information Agency
Johns Hopkins Road
Laurel, Maryland 20707-6099
(301) 953-5850 or 5851

COLD REGIONS SCIENCE AND TECHNOLOGY INFORMATION ANALYSIS CENTER (CRSTIAC)

Nancy Liston - Librarian
U.S. Army Cold Regions Research and Engineering Laboratory (CRREL)
72 Lyme Road
Hanover, NH 03755-1290
(603) 646-4221 (AUTOVON 836-4221)

ORIGIN/ MISSION AND SCOPE

CRREL

In nearly half the land of the Northern Hemisphere, the cold of winter freezes the earth and covers it with ice and snow. Low temperatures continue challenging the men and women who live and work there.

To adapt to the environmental conditions of these cold regions, we must fully understand their special characteristics. We must determine how the cold affects our activities and how our civilization in turn affects the cold regions. We must also learn how to adjust to the extreme changes that take place between summer and winter seasons.

Gaining the knowledge through scientific and engineering research, and making the results available to governmental, military and other public organizations, is the job of CRREL - the Cold Regions Research and Engineering Laboratory of the U.S. Army Corps of Engineers.

CRREL is a federal laboratory with a special mission - to understand the characteristics of the cold regions of the world and to apply this knowledge to make it easier for people to live and work there.

CRREL was created in 1961 by combining two existing Corps of Engineers organizations: the Arctic Construction and Frost Effects Laboratory and the Snow, Ice, and Permafrost Research Establishment. Between them, the two labs brought together at CRREL, a group of research personnel with expertise in virtually all aspects of cold regions science and technology.

As a Corps of Engineers lab, CRREL has the advantage of the Corps' long-held tradition of service to the nation. CRREL research facilities and expertise are available to any federal agency which has need of them, and work has occasionally been done for private organizations as well. This approach helps to account for the diversity of research activities at CRREL and the overall character of the laboratory. Each research or study project, whether funded by the Corps of Engineers or other agencies, has a well-defined scope and objective chosen by its sponsor.

ORGANIZATION

Cold regions science and technology is a specialty that cuts across traditional disciplinary lines. As a result, the CRREL staff is quite diverse, with specialists from many different backgrounds. The total staff numbers about 300, including more than 100 research scientists and engineers. These researchers include civil, hydraulic, electrical, chemical and mechanical engineers, and agronomists, biologists, chemists, geographers, geologists, geophysicists, glaciologists, meteorologists, physicists, and soil scientists. In addition, scientists and engineers from other institutions often pursue long-term research projects at the laboratory.

The support staff at CRREL also comprises a variety of professionals. Administrators, support engineers, technicians, computer specialists, photographers, illustrators, editors, typesetters, secretaries and dozens of other help to keep the laboratory running smoothly. These personnel often bring their expertise outside CRREL when needed for the research projects of other organizations.

The physical facilities which support the CRREL research effort really merit the description "unique." The main laboratory building contains 24 cold-room laboratories, many capable of achieving temperatures of -30 C or below. Along with the cold laboratories are chemistry, physics, soils, and electronics labs with highly specialized equipment for research at below-freezing temperatures.

In 1978, an Ice Engineering Facility was completed which is devoted to the study of problems caused by ice in waterways. This lab, acclaimed as the finest in the world, permits research that will lessen the affects of winter on the nation's waterways. In the Ice Engineering Facility, there is a refrigerated modeling area where scaled-down rivers, harbors, and lakes can be studied; a tilting refrigerated flume for river ice research; and a large test basin in which ice force problems can be studied at nearly full-scale dimensions.

A Frost Effects Research Facility, completed in 1983, is devoted to the study of frost action in soils. This laboratory contains refrigerated research areas for below-freezing testing of pavements, foundations, and underground utilities, and permits the study of destructive freeze-thaw cycles in a controlled setting.

CRREL also has an Alaskan Projects Office at Fairbanks with a research and supporting staff to aid in conducting CRREL's many projects in Alaska. In Fox, Alaska, CRREL excavated and helps to maintain a research tunnel in permafrost, the only facility of its type in the western world.

CRSTIAC

In 1974, CRSTIAC was designated as a DoD Information Analysis Center. As such, CRSTIAC does not have its own staff, but rather, is an integral part of the scientific and technical laboratory organization.

INFORMATION OPERATIONS

Size of Collection

There are approximately 15,000 books, 140,000 technical reports, 550 journals, 125,000 microforms. Each year, approximately 6,000 reports are added.

SERVICES AND PRODUCTS

A. Maintain a comphehensive, up-to-date and authoritative database. This database is available on-line commercially via Orbit Search Services, McLean, VA (File COLD). An annual Bibliography of approximately 5000 citations (Bibliography on Cold Regions Science and Technlogy) is available by subscription, as is a monthly
current awareness bulletin.

B. Provide rapid responses to requests for technical advice and assistance. This service is available to DoD agencies and other federal agencies on a negotiated basis.

C. Develop state-of-the-art reviews and bibliographies. A monograph series is published and is available upon request or via NTIS. Each year approximately 200 technical reports are published. Publications lists are available upon request.

D. Publish a quarterly newsletter. This newsletter (Benchnotes) is available upon request.

AVAILABILITY OF SERVICES AND PRODUCTS

The Cold Regions database is available commercially via Orbit Search Services. Most other reports and bibliographies are available from NTIS. Special assistance is available.

DOD CONCRETE TECHNOLOGY INFORMATION ANALYSIS CENTER (CTIAC)

Bryant Mather, Director
U.S. Army Engineer Waterways Experiment Station
Box 631
Vicksburg, Mississippi 39180-0631
(601) 634-3264

ORIGIN

The U.S. Army Corps of Engineers has been deeply involved in concrete technology--the intelligent use of concrete as a construction material--for nearly two centuries. Such involvement in concrete technology inevitably includes analysis of information on concrete technology. Since concrete technology is an important element of the technological base of the civilian economy as well as of military technology, there has necessarily been an interchange of information between the military and civilian sectors and the public and private sectors. The research and development center for concrete technology of the Corps of Engineers, the U.S. Army Engineer Waterways Experiment Station (WES), has been and is the principal point of contact for information exchange within the Federal establishment, the Defense establishment, and between these and the civilian and private sectors of the enonomy. It was, therefore, highly appropriate that when a Department of Defense (DOD) Concrete Technology Information Analysis Center (CTIAC) was established on 18 April 1968, it was established at the WES and that its Director be the Chief, Concrete Laboratory* (CL), WES.
Under date of 17 March 1965, the Office, Chief of Engineers (OCE), requested the Director, WES to review AR 70-22 "Centers for Analysis of Scientific and Technical Information" and comment on the extent to which WES was already engaged in work of this sort, areas for whch establishment of centers at WES should be considered, and related topics. In reply, it was stated that WES was rather deeply engaged in this sort of activity and recommended consideration of the establishment of several centers, one of which was in the area of concrete technology which would deal specifically with (a) mass concrete materials and construction methods, (b) analytical procedures and test methods, and (c) portland cement grout mixtures; with initial service responsibility to the DOD. It was noted that the WES Concrete Laboratory had gathered, analyzed, evaluated, condensed, and published reports on the state-of-knowledge or state-of-the-art in a number of areas, and that the capability of its staff is superior to that found elsewhere in the world for treating some of these areas. Estimates of needed funds and spaces were made.

*At the time the CTIAC was created, the "Concrete Laboratory" was called "Concrete Division," later it was called "Concrete Laboratory," now it is part of the "Structures Laboratory."

In August 1965, in accordance with AR 70-22, a proposal for establishment of the center was sent from WES to OCE. It was proposed that the CTIAC draw upon the work of other groups such as the Centre Internationale du Batiment (CIB), CEMBUREAU, Portland Cement Association (PCA), American Concrete Institute (ACI), Highway Research Board (HRB), American Society for Testing and Materials (ASTM), RILEM, National Bureau of Standards (NBS), etc.

In April 1966, OCE submitted proposals to the Office, Chief of Research and Development (OCRD), for approval of the establishment of eight centers to serve the DOD. The CTIAC was established by memorandum dated 18 April 1968 from the Director, Defense Research and Engineering (DDRE), to the Assistant Secretary of the Army, R&D.

On 29 April 1970, TISA Project 02/07, "Cost Analysis of Information Centers," was begun to develop information relative to the level of effort being expended by the Waterways Experiment Station Technical Library and the staff of the Concrete Division in the operation of the Concrete Technology Information Analysis Center. Information collected included the activity that was conducted and its nature, the clientele served, and the cost. A member of the technical staff of the CL was assigned as project leader. The CL staff and the WES Library kept records of requests for services from CTIAC, action taken, response made, difficulties encountered, time expended, and elapsed time required to complete the necessary action. The report on this project was publshed in December 1972, entitled "Concrete Technology Information Analysis Center, Evaluation of Pilot Study," WES Miscellaneous Paper C-72-24, TISA Project Report No. 41 (Project 02-07), and CTIAC Report No. 11.

International Exchange of Information

During the period 2-6 March 1970, the Director, CTIAC, was a member of a delegation of six individuals from the United States, and the only representative of the U.S. Government, at the Conference on International Exchange of Information on Cement and Concrete Research, held at the Institution of Civil Engineers, London, England. There were 30 registrants from 18 organizations in 10 countries. The host was the Cement and Concrete Association (C&CA) in conjunction with the Concrete Society. U.S. participation was coordinated by the ACI. A full report was distributed by the ACI in April 1971.* As a result of an agreement at this conference, the CTIAC continues to receive a very substantial amount of useful information from the other organizations in many countries that participated

MISSION AND SCOPE

The technical objective of the CTIAC is: "To collect, analyze, evaluate, and disseminate information in the broad field of concrete technology and perform all functions of a DOD Information Analysis Center as prescribed in AR 70-22."

*American Concrete Institute, Conference on International Exchange of Information on Cement and Concrete Research, London, England, March 2-6, 1970, Detroit, Michigan.

The approach is stated to be: "Information is collected; the 'International Exchange of Information Scheme' in concrete technology is participated in; queries are responded to; reports covering the state-of-the-art and annotated bibliographies are prepared and distributed; reference searches and loans are provided."

Relation of CTIAC to the Civil Works Mission of the Corps of Engineers

The justification for the operation of a CTIAC in terms of the Civil Works mission of the Corps of Engineers was stated in 1971, in part as follows:

Statement of the Problem: The CW mission in managing the nation's water and related resources involves the design, and operation and maintenance construction, of a variety of concrete structures, the use of portland-cement-based grouts in foundation work, and other technological and engineering activity based on concrete and cement technology. Related to this mission is the need to accomplish the necessary R&D so these activities will be conducted efficiently, reliably, and economically--in accordance with the current standards of good practice, and to know and set forth these standards in specifications and manuals. There needs to be a Corps facility charged with responsibility to keep aware of the state-of-knowledge in the several aspects of concrete technology to which designers, planners, specifiers, researchers, constructors, and contract administrators can turn to learn what the state-of-the-art is in this area. This facility will also provide output needed in the planning of R&D and in the preparation of specifications and manuals.

Present Procedure and Possible Improvements: The sort of need mentioned above is not fully met because no such facility is functioning effectively. When a question arises as to the state-of-the-art or the state-of-knowledge it may be and often is addressed to a variety of agencies in the hope that among those addressed an answer may be found. Depending on the nature of the problem one seeks assistance of technical societies, other federal or state agencies, universities, corporations, research organizations in other countries, individual experts, etc. Often the information is not located. The most complete collection of data in concrete technology in the Department of Defense is at the WES.

Urgency: It is believed especially urgent that this activity be upgraded promptly. One previous source of much valuable assistance of this nature, the Portland Cement Association, has drastically reduced its activity in this area. The volume of requests for such service is increasing as the concrete technology community both within and outside the DOD becomes increasingly aware of the existence of the CTIAC.

Sequential Phasing of Tasks: The implementation of the activity is being undertaken in steps. First there was the establishment of priorities. This was followed by planning for expansion as required by demand for services and available funding. The functions include:

(1) Bibliography compilation
(2) Consulting service.
(3) Data compilation.
(4) Identification service.
(5) Indexing.
(6) Literature surveys.
(7) Loans.
(8) Referral.
(9) State-of-the-art studies.
(10) Technical analysis and evaluation.
(11) Technical ansawers.

Estimated Magnitude of Payoff: Analyses of information in the field of concrete technology that have been made previously, using funding available for such analyses as a preliminary phase of an R&D investigation, have in many cases revealed that the proposed investigation was not needed, that the sought-for results were available. When such is the case, there is a tendency to do the work anyhow if funds have been made available. This can be avoided by obtaining the information on the state-of-knowledge before authorizing the investigation. It often occurs that CE specifications and engineer manuals, as they are revised, are updated to a state-of-the-art that represents only the personal expertise of the revisers and are obsolete before being promulgated with regard to matters not brought to the attention of the revisers. It is estimated that the savings to the Corps of Engineers from avoiding unneeded investigations and from having its specifications and manuals reflect the current state-of-the-art would be of the order of $1,000,000 annually, in the field of concrete technology.

Coordination within the Concrete Technology Community: The CTIAC will not generate new knowledge based on experiments or construction experience. It will assemble, analyze, and provide such knowledge to others as needed. It will therefore maintain contacts with and coordinate with the entire concrete technology community in the United States and in other countries.

Duplication: This project does not overlap or duplicate work accomplished or under way by others within or outside the Corps. Others are accumulatng and analyzing concrete technologcal data but no one is doing this for the scope of the needs of the CE and the DOD.

Remarks: The operation of the CTIAC as here proposed will enable the reservior of concrete technological information available and increasingly collected at WES to be put to use efficiently in assisting the CE to effectively and economically accomplish its mission. It is not intended that the professional man-years of effort per annum contemplated be individuals who work full-time conducting the professional part of this project, but rather that all the available professionals at WES, who jointly constitute the largest and most expert available pool of talent in the field of concrete technology available to the CE, in-house, would contribute as required to the accomplishment of this work assisted by the library and information specialists also available at WES.

INFORMATION OERATIONS

The CCTIAC is supported by the WES Library, Information Technology Laboratory (ITL), WES, which contains more than 200,000 items including books, periodicals, reports, pamphlets, standards, microforms, unpublished matter, and other data. The Library is a bibliographic center, containing a dozen catalogs of other libraries in related fields of interest, capable of supporting research on the doctoral level. Library resources are supplemented by services of the Defense Technical Information Center (DTIC); and a Defense RDT&E On-Line computer terminal.

SERVICES AND PRODUCTS

Despite a deliberate decision not to publicize widely the existence of the CTIAC, the volume of inquiries and requests for service continues to increase. A major element in CTIAC plans must therefore be to prepare to provide answers to inquiries and services to users as requested. In providing services it is often necessary to provide to the inquirer, directly from the CTIAC, copies of one or more relevant bibliographies or summaries of the state-of-the-art. To date, with very few exceptions, these documents have been produced and published using other funds. As a method of increasing the efficiency of response of the CTIAC, it provides limited funding to produce, publish, and reprint such reports as may be necessary to meet user requirements, as resources permit. Many users will still need to be referred to DTIC or NTIS because of unavailability elsewhere of copies of relevant documents in print, a condition that often precludes providing the required information in a timely manner. In some cases this situation is mitigated by the use of WES library loan copies of relevant documents. The data base is periodically reviewed and steps taken to enhance its capabilities by recommending additional purchases, subscriptions, and exchanges. Reference searches are provided in cooperation with the WES Library. Automated search and retrieval systems are being developed jointly with other WES TIAC's in cooperation with the WES ITL. It is estimated that about 500 technical queries will be responded to and that five state-of-the-art reports will be published in any given year.

AVAILABILITY OF SERVICE

The WES, as the DOD concrete technology R&D Center, distributes the product of its R&D activity to interested users as widely as permissible under security requirements and seeks to receive the product of similar activity by others throughout the world. Analyzed information on the state-of-knowledge or the state-of-the-art is a necessary prerequisite to justifiable and economical initiation of additional R&D effort.

Since the concrete technology community of the world is generally aware of the WES contributions to the advancement of that technology, that community approaches WES when it needs information and information analysis.

CHARGES/PAYMENT OPTIONS

It is believed proper for the information gathering, storing, retrieval, analysis, and dissemination activities of WES that are conducted as integral features of its funded concrete technology R&D projects to be funded by the sponsors of these projects, as they have in the past.

It is further believed proper for those similar activities, unrelated to any currently funded R&D projects, but which relate to areas of concrete technology covered by specifications and manuals issued by the Office, Chief of Engineers to be funded by OCE.

The remaining functions that WES is called upon to perform that do not represent reimbursable work for a sponsor of R&D not direct support of the mission of the Corps of Engineers should be supported by other funding.

DATA & ANALYSIS CENTER FOR SOFTWARE (DACS)

Thomas R. Robbins, Program Manager
RADC/COED
Griffiss AFB, NY 13441-5700

ORIGIN

In the early 1970's, the Air Force recognized the need for an information center to serve government, industrial, and university communities as a focal point for software development and experience data.

In 1976, Rome Air Development Center (RADC) contracted with IIT Research Institute (IITRI) to design a center that would acquire, analyze, synthesize, and disseminate information on software engineering technology. Subsequently, in August 1978, RADC again contracted with IITRI to develop such a center, named the Data & Analysis Center for Software (DACS), and to operate this center during a 36-month pilot period.

The DACS was designated a Department of Defense (DoD) Information Analysis Center (IAC) in January 1981, while still in its pilot period. Following the pilot period, IITRI was awarded an additional 14-month contract to accomplish two objectives: (1) to provide an orderly transition from a pilot information center to a full-scale IAC, and (2) to convert from a center completely supported by government funds to an IAC whose users partially fund the services they use. With these goals accomplished and the DACS operating as a full-service IAC, IITRI was awarded a third contract of 36 months in December 1982 and a fourth contract of 36 months in April 1986.

MISSION AND SCOPE

The DACS was established to provide a focal point for software development and experience data and information within the field of software engineering.

Functions of the DACS include acquiring, reviewing, evaluating, storing, analyzing, and disseminating data and Scientific and Technical Information (STINFO) concerning developing and maintaining computer software, software engineering, and software technology. DACS responsibilities include: developing, maintaining, and expanding computer databases of empirical data collected on software development and maintenance projects; producing and distributing subsets of these databases in support of software technology research; maintaining a software technology information base consisting of current reports, articles, and technical papers; analyzing data and producing reports of interest to the DACS user community; producing and distributing

software technology assessments and state-of-the-art reports; servicing bibliographic and technical inquiries; and maintaining an active user awareness program.

The DACS exists for the purpose of supporting software technology research, assisting in the transition and application of new software technologies, serving as an authoritative source of information concerning the state-of-the-art in software engineering, and serving as a repository of information on the development and maintenance of computer software. The DACS does not store computer programs, as in the case of a program library; does not develop computer software; except for its own use, and does not distribute or sell computer programs.

The DACS provides a centralized authoritative source for current, readily usable data and information concerning software technology. The objectives of this software information analysis center are to:

- o Encourage the exchange of software technology information among DoD and civil government agencies, government contractors, the private sector, and academia
- o Support software technology research by providing a centralized source of software life cycle data
- o Facilitate higher levels of utilization of research project results in a cost-effective manner
- o Increase the productivity of software producers and the quality of their products by improving the transfer of software engineering technology
- o Assist in distributing new technology throughout the U.S. industrial base, thereby expanding its capability and competitive posture
- o Provide scientific and technical information analysis services to DoD, civil agencies, government contractors, and the private sector in areas relating to software technology needs, developments, and trends
- o Minimize duplication of software technology research.

ORGANIZATION

The DACS is staffed with six on-site personnel in the operations headquarters at Rome Air Development Center on Griffiss Air Force Base. On-site personnel include:

- o Program Manager, experienced in the operation of an information analysis center

- o Two scientific and engineering personnel, experienced in the computer software field
- o One full-time Data Analyst, experienced in statistical analysis techniques and mathematical modeling
- o Clerical personnel required to operate the DACS.

In addition, the DACS draws on the software engineering and support staff of IITRI/Rome, NY for the performing DACS special studies. Together, this constitutes a staff of over 35 professionals supporting the DACS on either a part-time or full-time basis.

INFORMATION OPERATIONS

The DACS gathers software engineering software experience data, as well as documented scientific and technical information. This information is stored in three computerized databases for easy retrieval.

Acquisition of Software Experience Data

There is a real need to collect productivity and failure data on the development, operation, and maintenance of software to support research in the software field. Data is needed which will allow researchers to isolate factors that contribute significantly to the costs, reliability, and quality of the software; to measure achieved reliability; to predict development and maintenance costs; and to track the progress of a software development project.

The DACS reviews data sources, contacts the potential data source, and negotiates with the source to secure datasets for inclusion in the DACS Software Life Cycle Empirical Database (SLED). When possible, the DACS coordinates the automatic submission of updated data to the DACS by the source. Nine datasets are currently contained in the SLED.

Scientific and Technical Information (STINFO)

Scientific and technical information (STINFO) consists of documented information concerning the state-of-the-art and technology aspects of the computer software field. STINFO usually includes technical reports, trade journal publications, proceedings of conference and symposia proceedings, theses, texts, and product descriptions and specifications. STINFO serves as input to two DACS databases, the Software Engineering Bibliographic (SEB) Database and the Software Tool Information (STI) Database.

The Software Engineering Bibliographic (SEB) Database

The DACS SEB Database was established to provide a readily accessible source of comprehensive information on the state-of-the-art in software engineering and to channel that information to those able to use it in developing, maintaining, and managing software. The bibliographic collection is composed of texts, technical

reports, theses, journal articles, proceedings, and other documents relating to software engineering, reliability, costs, and quality factors, maintainability and other appropriate topics. These documents are ordered from the Defense Technical Information Center (DTIC), from the National Technical Information Service (NTIS), and from publishers. The computerized database facilitates document retrieval by using keywords or any portion of a document's citation.

The "DACS User's Guide to Bibliographic Services (BIBGUIDE)" is a guide for ordering a custom search of the SEBD. The BIBGUIDE contains the "DACS Software Engineering Thesaurus of Keywords" used for idexing and retrieving documents from the SEBD. The BIBGUIDE is distributed free of charge to DACS users upon request.

The Software Tool Information (STI) Database

The National Bureau of Standards (NBS) developed a database which contained information on 250 software tools. The NBS sought a facility to assume maintenance of the database when it could no longer support the database. Recognizing the need for a central source of software development tool information, the DACS acquired the NBS database and established the STI Database.

DACS users can order a custom search of the STI Database or purchase the "Software Life Cycle Tools Directory," a directory of the over 400 software tools currently contained in the STI Database.

SERVICES AND PRODUCTS

The DACS offers a variety of software engineering products. These products include:

- o Subsets of the Software Life Cycle Empirical Database (SLED)
- o Data Compendiums
- o Analysis Reports
- o Bibliographies from the Software Engineering Bibliographic (SEB) Database
- o Newsletters and Bulletins
- o Technical Monographs.

The DACS offers many software engineering and software technology services. These services include:

- o Accumulating, maintaining, and tailoring data subsets for software technology research
- o Bibliographic searches that provide rapid access to documents, reports, and papers

- o Special technical studies which include technical assessments, critical reviews, and papers
- o Technical Inquiry Service.

The DACS produces the following publications:

- o State-of-the-Art Reports (two per year)
- o Technology Assessments (two per year)
- o DACS Newsletter (four per year in March, June, September, and December)
- o DACS Bulletin (eight per year in January, February, April, May, July, August, October, and November)

SPECIAL SERVICES

In addition to the products and services outlined above, the DACS performs other special programs: current awareness, data analysis, and special studies.

Current Awareness

The DACS current awareness program has two purposes: (1) to keep the DACS user community informed of the latest and most significant developments in software technology and software engineering, and (2) to inform its current user community, as well as potential users, of products and services offered by the DACS and the benefits to be realized by using the DACS. The DACS uses several methods to implement the current awareness program:

- o Publishing the DACS Newletter
- o Publishing the DACS Bulletin
- o Establishing contacts throughout the software engineering community and by actively participating in professional organizations

Data Analysis Program

The DACS contributes to software technology research through data analysis. The research and development objectives of this program include:

- o Providing a better understanding of the processes involved in producing and managing software
- o Identifying those factors that influence the cost, reliability, quality, and complexity of software

- o Developing and improving methods and tools for use in producing and maintaining software
- o Applying or developing new tools for the data analysis effort
- o Developing techniques for estimating costs, resource requirements, and schedules of future software products
- o Developing techniques to assist managers in planning, measuring, and tracking the development and maintenance of software projects.

Special Studies

There are many software technology problems that can be solved through the full-service capabilities provided by the DACS. Many of these problems are sizable, requiring a substantial expenditure of engineering resources to accomplish. The DACS can contribute to this area of software technology by increasing the productivity of software engineers and researchers while making efficient use of DACS information and resources.

The DACS can best serve its user community by identifying the areas for which there is a strong need for the technological expertise and other resources of the DACS, and by performing special studies tailored to the individual needs of a particular organization. The DACS has initiated 24 special study efforts since it began operation.

AVAILABILITY OF SERVICES AND PRODUCTS

All DACS products and services are available from the DACS. Several DACS products are available from the National Technical Information Service (NTIS) at the current DACS price. The nominal charge for selected DACS products is intended to cover reproduction and shipping costs. The "DACS Products and Services Information" flier contains a complete listing of all DACS products and services and their associated costs, as applicable. The flier is free of charge to DACS users upon request.

CHARGES/PAYMENT OPTIONS

DACS users can select from three methods of payment for their orders: (1) DACS Full Service Participation Plan, (2) Blanket Purchase Agreement, DD Form 1155 for military orders, or (3) check.

The DACS Full Service Participation Plan option enables an organization to either predeposit a minimum of $500 or write a single Purchase Order for a stipulated maximum dollar amount and active time duration. The DACS will bill for services and publications on a quarterly basis.

The Plan allows full access to DACS resources. The Plan is open to all U.S. Government agencies, government contractors, commercial users, laboratories, and educationsl institutions within the United States. The Plan allows participants to request consulations, custom software tool searches, custom bibiligraphic searches, and DACS publications. Participants receive one copy of each publication when issued, discount privileges, access to DACS resources, and account maintenance.

The User's Guide to DACS Products & Services (DACSGUIDE)

The "User's Guide to DACS Products & Services (DACSGUIDE)" provides an introduction to the DACS, an overview of the DACS specialty databases, a description of DACS products and services, a description of DACS special studies and Full Service Participation Plan, and information on ordering DACS products and services. The DACSGUIDE is free of charge to DACS users upon request.

CONTACT POINT

The contact point for the Data & Analysis Center for Software (DACS) is:

Thomas R. Robbins, Program Manager
Data & Analysis Center for Software
RADC/COED
Griffiss AFB, NY 13441-5700
(315) 336-0937 or AV 587-3395

DOD NUCLEAR INFORMATION AND ANALYSIS CENTER (DASIAC)

Richard H. Rowland, Director, DASIAC
Operated by
Kaman Sciences Corporation
Tempo Division
816 State Street
P.O. Drawer QQ
Santa Barbara, CA 93102-1479

DASIAC (Washington Area DASIAC Office)
Kaman Sciences Corporation
Tempo Division
2560 Huntington Avenue, Suite 500
Alexandria, VA 22304-1490

ORIGIN

The concept for a central agency for the collection, analysis, and dissemination of nuclear weapons effects information was the result of Project QUICK KEY organized by DOD in 1960 to study the experimental data gathered during Operation HARDTACK, the U.S. high altitude tests conducted in 1958. There was wide spread agreement within the scientific community that a permanent information agency should be established to continue the QUICK KEY endeavors, and the activity designated DASA Data Center and began operations in June 1961. In 1967, the Center was renamed DASIAC (DASA Information and Analysis Center). DASIAC is sponsored by the Defense Nuclear Agency.

MISSION AND SCOPE

DASIAC is the key DoD information resource on nuclear explosion phenomena and effects, and advanced non-nuclear weaponry. It has major reference collections of documents and photographic data, operates the Electronic Radiation Response Information Center (ERRIC), that contains an extensive numerical data base for semiconductor devices, and manages the Defensive Technology Information Repository (DETIR) that covers directed and kinetic energy weapons and hardening technolgies.

PRODUCTS AND SERVICES

DASIAC provides to the entire defense community quick-response studies, detailed analyses, state-of-the-art reviews and technology assessments, data compilations

and summaries, technical handbooks and sourcebooks, current awareness bulletins and publications lists, training aids, and special literature surveys and reviews. The staff provides consultation, assists in conference planning and documentation, organizes and hosts technical meetings, and presents on-site briefings on DASIAC resources available to the nuclear and directed energy communities. DASIAC also offers an archiving service for nuclear and directed energy test data and documentation.

ORGANIZATION

DASIAC has a technical staff of 16 full-time nuclear and information science specialists, augmented by other staff professinals and consultants as needed. The Center staff maintains liaison with DOE and NATO, and participates in numerous technical meetings in an ongoing basis. DASIAC staff members are on a number of technical steering committees and working groups.

AVAILABILITY OF SERVICES AND PRODUCTS

DASIAC services are available to all organizations with a certified need-to-know who have registered with DLSC to receive export-controlled critical military technology data. Normal DASIAC services are available to the community without charge.

CONTACT POINT

General Information

Richard H. Rowland, Santa Barbara	(805) 963-6453
William A. Alfonte, Jr., Alexandria	(703) 960-4774

Reference Assistance

Connie Salus	(805) 963-6441
Ed Martin	(805) 963-6400

Photographic Data

Diane Holland	(805) 963-6440

Radiation Effects (ERRIC)

Manny Espig	(805) 963-6484
Dave Bradbury	(805) 963-6427

Directed Energy (DETIR)

Linda Berkhouse	(703) 960-4774
Dave Reitz	(805) 963-6485

Current Awareness

Ed Martin	(805) 963-6400

Computer Codes

Chuck Anderson	(805) 963-6437
Bruce Carlson	(805) 963-6428

TACTICAL WEAPON GUIDANCE & CONTROL INFORMATION ANALYSIS CENTER (GACIAC)

Joseph J. Petrovic, Director
IIT Research Institute
10 West 35th Street
Chicago, IL 60616

ORIGIN

The Tactical Weapon Guidance and Control Information Analysis Center (GACIAC) was initiated on 1 July 1977 through a contract with the Defense Electronics Supply Center, Dayton, Ohio, which acted as the contracting office for the Defense Logistics Agency. The Center is chartered under Department of Defense Instruction 5154.26, dated July 26, 1985, which also charters the Joint Service Guidance and Control Committee (JSGCC). Both the Committee and the Center were created to promote and facilitate the exchange of technical information between the Military Services and Defense Agencies, establish standards, and effect coordination of research, exploratory development, and advanced technology demonstration programs in the area of tactical weapon guidance and control.

The Defense Technical Information Center acts as the administrative manager of GACIAC, the Defense Electronics Supply Center acts as the contracting office, and the U.S. Army Missile Command provides technical management. IIT Research Institute has served as the contractor to operate GACIAC since its inception and is currently under contract to operate GACIAC through 1988 with option to continue the operation through 1990.

MISSION AND SCOPE

GACIAC'S mission is to assist the tactical weapon guidance and control community, both government and industry, by encouraging and facilitating the exchange and dissemination of technical data and information as a means for coordinating research, exploratory development, and advanced technology demonstrations. An Information Analysis Center is a center that provides scientific and technical information and support services to both government and industry in a vital technical area.

GACIAC's fields of interest are in the technology of tactical weapon guidance and control and related analyses, hardware, subsystems, and systems. Tactical weapons of interest include missiles, rockets, bombs, submunitions, and projectiles having nonnuclear warheads and/or those pertinent weapons with nuclear warheads whose primary application is designated as tactical by the intended user. The guidance and control of munition dispensing cannisters is also included. Technical areas of interest include instrument and seeker

development and test; subsystem or system simulation; development of computational techniques and hardware; theoretical performance calculations; inertial component and system development; control actuators and power sources; aerodynamics and reaction jet control devices; special design test equipment and techniques; component design criteria; analytic test techniques; manufacturing process development; operational serviceability; environmental protection; and materials areas specifically related to weapon guidance and control.

Functions

The functions of GACIAC are as follows:

- o Develop and maintain a bibliographic data base in its fields of interest using the Defense Technical Information Center's computer via a classified terminal at GACIAC.
- o Collect, review, and store reports/papers/journals in its fields of interest.
- o Analyze, appraise, and summarize information and data on selected subjects of interest.
- o Disseminate information to the G&C community and GACIAC users through periodic bulletins, bibliographies, state-of-the-art summaries, handbooks, technical assessments, and special reports.
- o Administer an annual national conference/symposium addressing a topic of current interest.
- o Provide technical and administrative support to the Joint Service Guidance and Control Committee (JSGCC).
- o Conduct special tasks for both government and industry in areas related to GACIAC's field of interest.

Secretariat to the JSGCC

GACIAC provides technical and administrative support to the Joint Service to Guidance and Control Committee (JSGCC). The JSGCC is a DoD Committee chartered by the Assistant Secretaries of the Services, in November of 1976, to review guidance and control programs, effect coordination of all such DoD technology programs, and promote the exchange of technical information. The JSGCC is composed of a voting membership of six Executive Committee members from the Army, Navy, and Air Force, and participating members from the Marine Corps, Office of the Under Secretary for Defense Research and Engineering, Defense Mapping Agency, Defense Nuclear Agency, Defense Logistics Agency, Defense Advanced Research Projects Agency and the Joint Technology Coordinating Group/Munitions Development. The Committee also invites technical advisors to participate in meetings where their expertise is needed to help resolve technical issues.

Besides the Executive Committee, the JSGCC also has had several Working Groups involved in specific aspects of G&C technology; i.e., MMW Guidance, IR Guidance, Active/Passive RF Guidance, Midcourse Guidance, CM/CCM, and Enroute Guidance. These are not permanent groups, but are formed and disbanded as technological interest change, as determined by the Executive Committee. Members of the GACIAC/IITRI staff fulfill the secretariat functions for the Executive Committee and all of its Working Groups. This function involves a broad range of activities--from arranging the meetings and preparing formal minutes to preparation of summaries of the state-of-the-art in specialized areas and administering conferences and symposia.

ORGANIZATION

GACIAC has a full-time core staff of engineers, information scientists, and secretarial assistants dedicated to the basic on going operation of the center. In order to respond to technical inquiries, prepare handbooks, state-of-the-art summaries, technical assessments, index documents, support the JSGCC and conduct special tasks, the technical staff of IIT Research Institute is called upon as required. The staff of the Microwave and Electro-Optics Department provides most of the support required, however, special tasks have employed personnel from the Chemistry and Chemical Engineering, Electromagnetics, Materials, and Explosion Science and Engineering Departments. IITRI has approximately 300 professional personnel in the Chicago offices that are available for participation in GACIAC, should the need arise. IITRI also maintains offices in Washington, D.C.; Annapolis, Maryland; Lanham, Maryland; Bartlesville, Oklahoma; Dayton, Ohio, Rome, New York; White Sands, New Mexico, and Valparaiso, Florida. In cases where the required expertise is not available at IITRI, GACIAC will bring in consultants or subcontract to other firms.

The GACIAC core staff is located in adjacent offices together with the library and computer terminal that interfaces with the DTIC computer, located at Cameron Station, Virginia. This insures close cooperation among the staff members and permits rapid response to inquiries.

INFORMATION OPERATIONS

GACIAC's data base consists of computerized bibliographic information on thousands of documents dealing with various aspects of quidance and control and related technologies. The data base is constantly being expanded to incorporate the results of relevant research and development projects. Information sources include: technical reports from DoD, other government agencies, industry, and academic institutions; open literature, including foreign sources; unpublished papers; and proceedings from conferences, symposia, and conventions. Because of the areas of interest, much of the collection is classified.

Shortly after GACIAC was initiated, the Terminal Homing Data Bank (THDB), a bibliographic data base generated at the U.S. Army Missile Laboratory, Redstone Arsenal, Alabama, was transferred to the Center. The scope of the THDB was very similar to that of GACIAC, and thus it provided an excellent base upon which to build. Currently the data base has approximately 33,500 entries, with about 2,000 added each year. The GACIAC data base is available on-line to anyone having access to the Defense RDT&E On-Line System (DROLS).

Materials received for potential entry into the data base are first reviewed for relevance, then indexed using key words by the GACIAC/IITRI staff. An indexing vocabulary has been generated with an attempt made to be consistent with that used by both DTIC and THDB. New terms are added as technology expands, but this is intentionally minimized to maintain a controlled work list.

Most of the library holdings are in the form of microfiche. This decision was made early in the program, as the storage problem created by the receipt of documents in hard copy quickly became apparent. The Center's library is available on a very limited basis to subscribers that have the required clearance and need-to-know. Because of the limited distribution of many of the reports in the library, access is severely restricted.

SERVICES AND PRODUCTS

GACIAC's services and products are available to DTIC users. User organizations must also be authorized to receive export controlled technical data. GACIAC users must be registered with DTIC at the confidential or higher security level and have an established need-to-know. Such registration results in a DTIC user code number and inclusion in the DoD Dissemination Authority List (DAL), where user's facility clearances and fields of interest are specified. Service and products are available to government/military personnel at no direct cost, being funded by block funds supplied by user Services/Agencies. Industrial subscriptions are available to cover the cost of products/services supplied to government contractors or products can be purchased on an individual basis.

Bibliographic Inquiries

Bibliographic searches of the GACIAC data base are made to provide users with references to relevant authoritative sources covering the areas of interest required. GACIAC's professional staff generates the search strategies to retrieve this information, and then reviews the output to assure that it is pertinent and that excess extraneous material is not sent to the user. As stated elsewhere, the data base is available on-line to anyone having access to the DROLS. A GACIAC Data Base Users Guide is available to assist in accessing the GACIAC data base.

Technical Inquiries

GACIAC responds to technical inquiries in its fields of interest by assigning

qualified engineers to each inquiry received. Inquiries requiring more than a couple of days to resolve fall under the category of special tasks.

Information Referrals

Although GACIAC does not function as a distributing or lending library for any other than its own products, user requests for documents are handled on a referral basis. GACIAC can often provide or complete a citation so that the requesting user can locate the desired document. The referral service also applies to other types of information, e.g., forthcoming conferences, identification of principal investigators of work in progress, identification of knowledgeable personnel in specific areas, or organizational information. Such referrals are possible because of the large number of contacts made by the GACIAC staff through its support of the JSGCC, interchange with government and industrial subscribers, and current awareness activities.

Publications

A number of publications have been produced and are available from GACIAC. IAC's are required to publish handbooks/databooks, state-of-the-art summaries, technical assessments, conference proceedings, special reports and a current awareness letter. Through these publications, information relevant to the guidance and control of tactical weapons is made available to the technical/engineering community. Titles of GACIAC publication currently available can be obtained by contacting the Center.

GACIAC Bulletin

The GACIAC Bulletin serves as the current awareness publications for the Center. The Bulletin is distributed free of charge to personnel/organizations having an interest in guidance and control that are registered with DTIC. The Bulletin is published bimonthly with approximately 4,000 copies mailed. It provides information on JSGCC activities of interest, reviews papers/reports believed to be of special interest to the G&C community, announces meetings/courses relevant to G&C, and provides other information that has come to the attention of the GACIAC staff.

SPECIAL SERVICES

By special arrangement, GACIAC performs customized studies/tasks that are relevant to its fields of interest. These require financial support by the sponsoring organization and approval by the Contracting Officers Technical Representative. Such tasks/studies are usually performed by members of the IITRI staff, however, consultants or subcontracts to outside organizations are sometimes employed to complete the program. Funding for such tasks range from $10,000 to $150,000, and include administrative, analytical, and experimental work, as well as prototype development.

CHARGES/PAYMENT OPTIONS

Under the GACIAC contract, user service charges are required to offset the costs incurred. To ease the administration of such arrangements, industrial user participation plans have been developed to offer GACIAC products and services on a package basis. These plans, together with methods of payment, are described in the paragraphs following.

The services and products of GACIAC are available to government/military users through block funding arrangements made with various Services/Agencies. These funds are used to offset the costs of services and products provided to such users. Application for Government/Military participation as a subscriber or requests for individual services or publications should be submitted on official stationery to: GACIAC, IIT Research Institute, 10 West 35th Street, Chicago, Illinois 60616, telephone (312) 567-4526.

Industrial participation to GACIAC is encouraged through two subscription plans at the $300 level and $500 level. The minimum service charge category is $300 per year. This includes four man-hours of GACIAC professional staff time for the three types of services described previously, i.e., bibliographic inquiries, technical inquiries, and information referrals. Products included with this package are unclassified Critical Reviews and Technology Assessments, Handbooks and Data Books, State-of-the-Art Reviews, Proceedings, and Special Reports.

The $500 subscription includes the same level of professional man-hour effort in the performance of GACIAC services. However, it includes one copy of all of the products produced by the Center, including classified documents (providing they are not restricted to government only, and that proper need-to-know and facility clearances are verified).

CONTACT POINT

For additional information on GACIAC's products, services, or participation plans, write or call the Center at the address given below:

GACIAC, IIT Research Institute
10 West 35th Street
Chicaago, Illinois 60616

Telephone: (312) 567-4526/4519

HYDRAULIC ENGINEERING INFORMATION ANALYSIS CENTER (HEIAC)

B. J. Brown, Director
Hydraulics Laboratory
U.S. Army Engineer Waterways Experiment Station (WES)
P.O. Box 631
Vicksburg, MS 39180-0631

ORIGIN

Hydraulic engineering information analysis has been a continuous component of the hydraulic research program at the Waterways Experiment Station as part of studies performed for design application for nearly 60 years. Broad-area reviews required for research studies, technical reports, engineer manuals, and hydraulic engineering training programs continue to provide a data base for current awareness, referral, and information transfer of the HEIAC. The HEIAC was established and assigned to DA by ODDR&E, 18 April 1968, in accordance with DOD instruction 5100.45, 28 July 1964. The sponsoring agencies are USA DARCOM and DAEN-CWE-DC.

MISSION and SCOPE

The purpose of HEIAC is to collect, analyze, evaluate and condense the world's literature concerned with hydraulic engineering and to otherwise perform the functions of an Information Analysis Center of the Department of Defense as prescribed in AR 70-22. The coverage consists of the following hydraulic engineering subject areas:

a. River, harbor, and tidal hydraulics;

b. Flow through pipes, conduits, channels and spillways as related to flood control and navigation;

c. Hydraulic design and performance of dams, locks, channels, and other structures; and

d. Transient flow effects (such as underwater shock pressures) in civil engineering applications.

To accomplish this mission, the HEIAC requires direct technical support from:

Hydraulics Laboratory

The WES Hydraulics Laboratory conducts hydraulic engineering applied research studies of estuarine, riverine, and structural concerns relating primarily to the Corps of Engineers missions. Within the Hydraulics Laboratory, the Hydraulic Analysis Division (WESHP) collects hydraulic data from all sources, domestic and foreign, and these data are reviewed, analyzed, correlated and published as guidance in the form of Hydraulic Design Criteria Charts, Miscellaneous Papers, Engineer Technical Letters and Engineer Manuals. Computer programs are developed from these criteria, documented and distributed as supplements to the basic information. To date about 3,000 copies of Hydraulic Design Criteria have been distributed (to all Corps of Engineers Division and District Offices as well as being sold to other private and governmental agencies).

Technical Information Center

The Library Branch, Technical Information Center, WES, is the chief support element for the HEIAC. This Library, which serves as a central reference source for the entire Corps of Engineers in the subject fields of WES interest, is a bibliographic center containing a dozen catalogs of other libraries in similar fields and capable of supporting research on the doctoral level. The Library collection of over 200,000 items is made up of the following:

a. DOD reports - 35 percent.

b. Other document reports - 30 percent.

c. Open literature - 35 percent.

Included in the above is about 5 percent foreign literature. The Library has extensive holdings in microforms and the necessary reader-printers and portable readers for their use. The TIC is on-line with automated (computer-based) data bases as well as managing automated data bases directly relating to WES missions.

ORGANIZATION

The staffing and management of HEIAC is in conjunction with laboratory-based activities. One full-time professional research engineer is available for normal inquiry responses. Referral to Hydraulics Laboratory or TIC professional staff is required for more extensive information needs.

INFORMATION OPERATIONS

Inquiries are received and acted upon; many such actions are by telephone and result in referral to individuals having expertise or to recent documents having guidance on the queried topic.

Narrow-term queries requiring bibliographic information are often managaed by means of an in-house non-automated data base (about 15,000 items) that was established and is maintained during preparation of hydraulic engineering design guidance documents. Queries not manageable in this manner are referred to the large TIC data base and to on-line computer based systems.

Support is given the WES Technical Information Center Library for acquisition, retrieval, processing, and maintenance of the comprehensive collection of hydraulic reference material used by HEIAC. The Library's abstracting and bibliographic services, technical material, and published abstracts are used extensively in developing the capability of HEIAC.

Support is also given to the Hydraulic Analysis Division in regard to the preparation of hydraulic design guidance documents and to the Hydraulics Laboratory in regard to training courses and technical studies when required.

SERVICES AND PRODUCTS

Corps of Engineers manuals address the following hydraulic engineering subject areas: outlet works, spillways, navigation dams, navigation locks, surges, lock valves, etc. The Hydraulic Design Criteria Charts address complementary very-narrow-term subject areas. To the extent possible, these documents and revisions thereto are used for query technical response. Bibliographic or other survey type studies are retained but only rarely published as a stand-alone formal report.

SPECIAL SERVICES

Complementary to the effort invested in the preparation of design guidance documents, the in-depth (very-narrow-term) referencing of individual hydraulic engineering technical papers for the WESHP-HEIAC card file is at a rate of several items per day. The total accumulation from nearly 20 years' effort is over 15,000 references.

AVAILABILITY OF SERVICES AND PRODUCTS

All DOD offices and personnel are authorized users; service is also available to other agencies (Federal, state, local, nongovernmental) subject to time and manpower limitations.

CONTACT POINT

Mailing Address

U.S. Army Engineer Waterways Experiment Station
Hydraulics Laboratory
ATTN: HEIAC
P.O. Box 631
Vicksburg, MS 39180-0631

Telephones (December 1985)

Commercial:	601-634-2608 or	601-634-2615
FTS:	542-2608	542-2615

HIGH TEMPERATURE MATERIALS - MECHANICAL, ELECTRONIC AND THERMOPHYSICAL PROPERTIES INFORMATION ANALYSIS CENTER (HTMIAC)

Cho-Yen Ho, Director
HTMIAC/CINDAS
Purdue University
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West Lafayette, Indiana 47906
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ORIGIN

The High Temperature Materials - Mechanical, Electronic and Thermophysical Properties Information Analysis Center (HTMIAC) is a Department of Defense (DoD) Information Analysis Center operated by the Center for Information and Numerical Data Analysis and Synthesis (CINDAS) of Purdue University beginning on 1 January 1986. HTMIAC is under the management of the Defense Technical Information Center (DTIC) of the Defense Logistics Agency (DLA), and under the sponsorship of the Office of the Undersecretary of Defense Research and Engineering.

HTMIAC evolves from the Thermophysical and Electronic Properites Information Analysis Center (TEPIAC), which was one of the oldest DoD Information Analysis Centers, pioneering in the material properties information analysis services. TEPIAC's operation was initiated in 1960 when the DoD Thermophysical Properties Information Center (TPIC) was established at the Thermophysical Properties Research Center (TPRC) of Purdue University under the sponsorship of the Air Force and under the technical direction of the Air Force Materials Laboratory (AFML).

In 1971 the sponsorship of TPIC and related contract responsibility was transferred from the Air Force to the Defense Logistics Agency, and concurrent with this change of sponsorship the name of TPIC was changed to Thermophysical Properties Information Analysis Center (TPIAC). At the same time the technical monitorship was transferred from AFML to the Army Materials and Mechanics Research Center (AMMRC).

In 1973 the Electronic Properties Information Center (EPIC) was moved from Hughes Aircraft Company to Purdue University for continuing its operation by TPRC, and, as a result, TPIAC changed its name to TEPIAC.

TPRC was founded on 1 January 1957 at Purdue University. Due to the expansion of its coverage and the enlargement of the scope of its operation in 1972 (establishing and operating the Undergraduate Excavation and Rock Properties Information Center) and in 1973 (as mentioned above), TPRC and its affiliated Centers were restructured effective 1 July 1973 to have an umbrella organization, known as CINDAS, to comprise all the Centers.

Starting January 1981 TEPIAC was administratively managed by DTIC, a primary level field activity of DLA. TEPIAC was operated by CINDAS till 31 December 1985 and was transformed to become HTMIAC on 1 January 1986.

MISSION AND SCOPE

HTMIAC's mission is to support the Department of Defense in the specialized area of high temperature materials properties. HTMIAC searches, identifies, acquires, reviews, digests, compiles, evaluates, analyzes, synthesizes, computerizes, stores, publishes, and provides timely information and data, and advisory, analysis, and other user support services concerning the available worldwide scientific and technical information and engineering data on the high temperature materials-mechanical, electronic and thermophysical properties that are important to the Department of Defense.

The objectives of HTMIAC operations are as follows:

(1) Support the DoD Tri-Service Laser Hardened Materials and Structures Group (LHMSG) to meet the material property data requirements for high energy laser (HEL) structural and detector vulnerability, survivability and hardening assessments; also provide similar support to the DoD high energy laser community associated with the Strategic Defense Initiative (SDI) programs.

(2) Serve as the DoD's central source of data and information on high temperature materials properties for the DoD research, development, engineering, and studies programs, weapons systems, and military hardware in general.

(3) Increase the knowledge and productivity of scientists, engineers, and technicians engaged in scientific and engineering programs for the Department of Defense.

HTMIAC covers aerospace structural composites and metals and infrared detector/sensor materials and their thermophysical, mechanical, thermoradiative, optical, and electrical properties, which are listed below.

(A) Aerospace Structural Materials and Properties

a. Aerospace Structural Materials

1. Composites:

(1) Graphite/epoxy (0, 90, 0/90, and 0/90/±45 orientations)
(2) Graphite/polyimide (0, 90, 0/90, and 0/90/±45 orientations)
(3) Kevlar/epoxy
(4) Carbon/carbon
(5) Carbon/phenolic
(6) Fiberglass/epoxy

(7) Graphite/bis-maleimide
(8) Silica/phenolic

2. Metals:

(1) Aluminum alloy 2024
(2) Aluminum alloy 7075
(3) AISI stainless steel 304
(4) Titanium alloy Ti-6A1-4V

b. Properties of Aerospace Structural Materials

1. Thermophysical, Thermoradiative, and Electrical Properties:

(1) Thermal conductivity
(2) Thermal diffusivity
(3) Heat capacity
(4) Thermal expansion
(5) Density
(6) Ablation energy (of each constituent material)
(7) Ablation temperature (of each constituent material)
(8) Absorptance
(9) Emittance
(10) Reflectance
(11) Transmittance
(12) Electrical resistivity (of metallic materials)

2. Mechanical Properties:

(1) Tensile modulus (E_{11}, E_{22}, and E_{33})
(2) Compressive modulus
(3) Shear modulus (G_{12})
(4) Flexural modulus (of composites)
(5) Poisson's ratio (V_{12})
(6) Tensile strength
(7) Compressive strength
(8) Shear strength
(9) Flexural strength (of composites)
(10) Yield strength (of metallic materials)
(11) Stress-strain curve (tension)
(12) Stress-strain curve (shear)
(13) Ultimate strain
(14) Fracture toughness (K_{IC}, K_{IIC}, K_{IIIC})

(B) Infrared Detector/Sensor Materials and Properties

a. Infrared Detector/Sensor Materials

(1) HgCdTe
(2) Si: X (X = In, Ga, As, Bi)
(3) Ge (e-m transparent)

(4) ZnSe (e-m transparent)
(5) ZnS (e-m transparent)
(6) Ge: Hg
(7) InSb
(8) Al (thin film)
(9) Ag (thin film)
(10) MgF_2

b. Properties of Infrared Detector/Sensor Materials

1. Thermophysical, Thermoradiative, and Optical Properties:
(1) Absorption coefficient
(2) Absorptance
(3) Thermal conductivity
(4) Thermal diffusivity
(5) Heat capacity
(6) Thermal expansion
(7) Density
(8) Emittance
(9) Reflectance
(10) Transmittance
(11) Refractive index
(12) Heat of fusion
(13) Heat of vaporization
(14) Melting point
(15) Boiling point

2. Mechanical Properties:

(1) Tensile modulus
(2) Shear modulus
(3) Ultimate tensile strength
(4) Ultimate compressive strength
(5) Ultimate shear strength

ORGANIZATION

HTMIAC personnel include seven staff members having a doctoral degree (Ph.D), three staff members having a master degree (M.S.), three staff members having a bachelor degree (B.S.), and a number of highly-trained and experienced supporting staff. Most of the staff members work part-time for HTMIAC.

Due to the fact that HTMIAC directly employs experts (some are nationally recognized authorities and experts in hgh temperature materials properties), it has immediate and direct access to the required expertise by the use of its own employees. Consequently, HTMIAC benefits from having the full capabilities in-house to prepare authoritative technical products, to develop highest-quality data bases, and to respond to a variety of technical inquiries in a timely authoritative, superior manner.

INFORMATION OPERATIONS

Literature Search, Acquisition, and Input of Source Information into the Information Support System

To establish and maintain a comprehensive, authoritative, and up-to-date High Temperature Materials Properties Data Base for the Department of Defense to support the DoD Tri-Service Laser Hardened Materials and Structures Group (LHMSG) in meeting the material property data requirements for high energy laser structural and detector vulnerability, survivability, and hardening assessments, a systematic program of literature search, identification, acquisition, review, evaluation, cataloging, codification, computerization, microfiching, and storing for retrieval and processing is conducted and maintained by HTMIAC in the most efficient and economical manner.

HTMIAC covers the worldwide scientific and technical information and data within its subject area. To find out and identify all the available U.S. and foreign scientific and technical documents in the area of high temperature materials properties, HTMIAC searches and screens systematically the following abstracting publications:

(1) Chemical Abstracts
(2) Physics Abstracts
(3) Electrical and Electronics Abstracts
(4) Engineering Index
(5) Dissertation Abstracts International
(6) Scientific and Technical Aerospace Reports
(7) Technical Abstracts Bulletin
(8) Government Reports Announcements.

Since computerized bibliographic tapes services are available for most of the above-listed abstracting publications in recent years, we subscribe to the following bibliographic tapes services for efficient and cost-effective computer searching and screening using carefully chosen search terms and carefully designed search logic:

(1) CA Condensates (Chemical Abstracts Condensates): - Covering Chemical Abstracts published after 1966 and Dissertation Abstracts International.

(2) INSPEC (International Information Services for the Physics and Engineering Communities): - Covering Physics Abstracts, Electrical and Electronics Abstracts, and Computer and Control Abstracts.

(3) COMPENDEX (Computerized Engineering Index): - Covering Engineering Index.

(4) DROLS (Defense RDT&E On-Line System): - Covering DTIC bibliographic files.

(5) NTIS (National Technical Information Service Bibliographic Data File): - Covering Scientific and Technical Aerospace Reports, Government Reports Announcements, and the unclassified part of Technical Reports Awareness Circular.

In addition, we take full advantage of the Central Information Reference and Control Version II (CIRC II) computerized information retrieval system operated by the Air Force Foreign Technology Division (FTD) located at Wright-Patterson Air Force Base, Ohio. This DoD system for the processing, storing, retrieval, and dissemination of foreign scientific and technical written word intelligence information helps to insure our broadest possible coverage of foreign literature within HTMIAC scope of coverage.

The results yielded from current awareness searches and/or retrospective searches of the above listed computerized bibliographic data tapes are carefully scrutinized manually to weed out false drops and to positively identify pertinent source documents. The actual documents are acquired from the following sources:

(1) Purdue University Libraries: - Purdue University's 16 libraries subscribe to more than 18,000 periodicals, most of which are scientific and technical journals coming from all parts of the world as well as the U.S.A.

(2) Defense Technical Information Center.

(3) Journal articles requested directly from authors.

(4) Library of Congress and other special libraries.

(5) National Technical Information Service.

(6) High-yield journals subscribed to by HTMIAC.

(7) Interlibrary loan and miscellaneous other resources.

Establishment, Maintenance, and Continuous Updating of the High Temperature Materials Properties Numerical/Technical Data Base

The establishment, maintenance, and continuous updating of the high temperature materials properties numerical/technical data base for the DoD is the primary thrust of the HTMIAC operations. To accomplish this, we perform the following five major tasks:

Task A. Extraction, compilation, organization, and computerization of the existing material property data from the worldwide literature to develop and establish a computerized high temperature materials properties data base.

Task B. Evaluation and analysis of the existing data and determination and documentation of the deficiencies, gaps, and voids in the current high temperature materials properties data base.

Task C. Supplementation of the data base by recommending appropriate experimental techniques required to augment the current data and/or by conducting analytical studies to estimate significant data base deficiencies.

Task D. Continuous update and expansion of the data base by adding available new data at the earliest possible time.

Task E. Publication and distribution of the data and information in the high temperature materials properties data base to users.

It is important to note that property data are meaningful and useful only if adequate information on the specification and characterization of the test material and on the method and conditions of the property measurement is also provided. For example, since composite materials are nonhomogeneous and anisotropic, their properties must be expressed in terms of construction configuration (such as lay-up sequence and fiber orientation) and specimen geometry; otherwise the property data are not useful. Similarly, the history of the material and the method and conditions of the measurement (such as heating rate, heat-up temperature, holding time at temperature, type of heat source, and loading rate) must also be documented.

Consequently, in extracting and compiling data and information for the high temperature materials properties numerical/technical data base, we pay special attention to extract such information from the scientific and technical document together with the numerical data. Thus, each set of data extracted by us consists of numerical data points (as a function of temperature and/or other independent variable) and pertinent information on the specification and characterization of the test material and on the method and conditions of the property measurement, such as composition, purity, material construction configuration, material processing, sample preparation, specimen geometry and dimensions, density, porosity, surface condition, material history, heat treatment, manufacturer, method of measurement, test environment, heat flow direction, heating rate, heat-up time, heat-up temperature, holding time at temperature, type of heat source, loading rate, etc., insofar as these are contained in the original document.

In order to accommodate so many different kinds of information in each set of data such that the information is well organized and uniformly presented, and in order that all information and data are computer readable and retrievable so that magnetic tape listing is possible as required, we have designed a most appropriate computer-file data structure and the corresponding detailed "Instructions for Data Extraction and Processing" for the high temperature materials properties numerical/technical data base.

Establishment, Maintenance, and Continuous Updating of the High Temperature Materials Properties Bibliographic/Literature Data Base

The bibliographic information on each of the technical documents acquired is computerized and input into the high temperature materials properties bibliographic/literature data base. The computerized bibliographic data base

is stored in a computer located at DTIC for on-line search and retrieval utilizing the Defense RDT&E On-Line System (DROLS) and the Information Analysis Center Support Package developed by DTIC.

SERVICES and PRODUCTS

HTMIAC provides the following two main categories of services to the DoD user community:

(1) Technical Inquiry Service.
(2) Bibliographic Inquiry Service.

Technical inquiry service includes providing the users with data and information from the High Temperature Materials Properties Numerical/Technical Data Base developed since January 1984 and/or from the Thermophysical and Electronic Properties Numerical/Technical Data Base developed earlier, and includes also technical advice, consultation, and assistance; quick responses to urgent requests for specific technical informtion; analysis and synthesis of fragmentary conflicting data to generate recommended reliable values for specific applications; critical review and assessment of current technolgical advances in selected areas; establishment and operation of computerized on-line numberical/technical data bases; targeting services for material property measurements; mesurements on the mechanical, thermophysical, and electrical properties of materials; and other user support services.

The High Temperature Materials Properties Numerical/Technical Data Base contains about 11 600 sets of data as of March, 1987. These 11,600 sets of data cover 555 materials, 172 properties, 445 parameters, and 12 independent variables.

The Thermophysical and Electronic Properties Numerical/Technical Data Base contains 100,000 sets of data, which was developed through the multiple supports of DLA and other DoD agencies, other Government agencies, industrial organizations, academic institutions, and Purdue University.

Bibliographic inquiry service consists of providing the inquirers with bibliographic information from the High Temperature Materials Properties Bibliographic/Literature Data Base developed since January 1984 and/or from the Thermophysical and Electronic Properties Bibliographic/Literature Data Base developed earlier.

The High Temperature Materials Properties Bibliographic/Literature Data Base contains about 15,500 pertinent technical documents as of March, 1987, of which about 62% are U.S. documents and 38% are foreign documents (including about 12% Soviet documents).

The Thermophysical and Electronic Properties Bibliographic/Literature Data Base developed through multiple supports contains 225,520 pertinent technical documents, of which about 72% are in English and 28% are in foreign languages (including 18% in Russian).

In HTMIAC's mission to support the Department of Defense, especially the DoD Tri-Service, Laser Hardened Materials and Structures Group and the DoD HEL community, HTMIAC's principal products are the following:

(1) High Temperature Materials Properties Numerical/Technical Data Base.

(2) High Temperature Materials Properties Bibliographic/Literature Data Base.

(3) Technical Reports on Data and Information on High Temperature Materials Properties.

(4) Critical Reviews and Technology Assessments.

(5) Technical Reports on Special Studies and Tasks.

(6) Newsletters and Users Guides.

Before January 1986, TEPIAC and CINDAS had published 34 volumes of data books, 26 volumes of materials properties research literature retrieval guides, and 87 technical reports. We have submitted 124 TEPIAC and CINDAS major publications (with a total of 53,659 pages) to DTIC to become part of DTIC's literature holdings, which are listed in the DTIC Bibliographic Data Base (Source Code is 413571). Most of these 124 TEPIAC and CINDAS publications are now available on microfiche from DTIC to serve the DoD user community.

SPECIAL SERVICES

HTMIAC is specifically assigned the responsibility to support the DoD Tri-Service Laser Hardened Materials and Structures Group (LHMSG) to meet the material property data requirements for high energy laser (HEL) structural and detector vulnerability, survivability, and hardening assessments. It also provides similar support to the DoD high energy laser community associated with the Strategic Defense Initiative (SDI) programs.

HTMIAC also provides support to the Defense Nuclear Agency's project on the effect of rapid heating rates on material properties support to the Air Force Materials Laboratory's space-based laser data base program, support to the Air Force Weapons Laboratory's study on the effect of high energy laser shots on military hardware, support to Naval Research Laboratory for their modelers' theoretical modeling and computer simulation of laser damage to and thermal response of aerospace structural materials, and many others.

AVAILABILITY of SERVICES and PRODUCTS

HTMIAC's services and products are availablele to users in the following communities:

(1) DoD and other Government agencies.

(2) U.S. Government contractors and grantees.

(3) Private sector to the extent practicable without impairment of service to DoD and consistent with security and other limitations on release of such data.

CHARGES/PAYMENT OPTIONS

In order that the users can obtain and pay for the services and products most easily and simply, HTMIAC's Service Charge System includes an established service charge structure, flexible payment options, and auditable detailed file of users and charges, and Purdue-subsidized billing, collecting, and accounting.

The nominal charges in HTMIAC's service charge structure are as follows:

(1) Evaluation and analysis of information and data, data synthesis and prediction, advice and consultation, and other technical assistance and services. Minor technical assistance is provided at the rate of $40 per hour. Price quotations are given for extended services.

(2) Bibliographic search. The nominal charge for a single bibliographic search is $40. A single bibliographic search is defined as a search for a maximum of five properties of one material. In the cases of special search requrements, price quotations are given.

(3) Technical products. HTMIAC's technical reports and other publications are sold directly from the Center at reasonable prices.

Flexible payment options for HTMIAC services and products are the following:

(1) Pre-paid account. This payment option allows an organization to deposit funds with HTMIAC/Purdue University. When HTMIAC delivers products or services in response to orders placed by the organization's authorized employees, it will deduct the costs from the deposit account. The requester will be informed of the remaining dollar balance each time technical service is provided.

(2) Telephone/letter authorization, pay later. A user may grant approval by telephone or letter for the performance of services for a specified dollar value. HTMIAC will provide the technical services to the requester, and Purdue University will issue an invoice soon after making reference to the purchase order number, if availabale, or to the authorization call or letter and the name of authorizing individual.

(3) Standing order. This plan authorizes an organization to expend a specified amount of funds by anyone from the organization or by

specified personnel only over a specified period. As products and/or services are rendered, HTMIAC will invoice the organization through Purdue University against this established standing order.

(4) Blanket purchase agreement(BPA) or military deposit account. DoD agencies may use this arrangement with a DD Form 1155 (order for supplies and services). A BPA according to the Armed Services Procurement Regulations (ASPR) is a "simplified method of filling anticipated repetitive needs for small quantities of supplies or services by establishing 'charge accounts' with qualified sources of supply. Blanket purchase agreements are designed to reduce administrative costs in accomplishing small purchases documents." In addition, BPA's allow for timely fulfillment of order.

CONTACT POINT

For further technical and biliographic inquiry services and for further information on HTMIAC and on the benefits that one may realize through the use of HTMIAC, please contact:

HTMIAC/CINDAS
Attn: James F. Chaney
Purdue University
2595 Yeager Road
West Lafayette, Indiana 47906

Telephone: (317)494-9393

INFRARED INFORMATION AND ANALYSIS CENTER (IRIA)

George J. Zissis, Director
Environmental Research Institute of Michigan
P.O. Box 8618
Ann Arbor, MI 48107

ORIGIN

The IRIA Center traces its beginnings to 1951 when the Navy assembled a group of distinguished scientists to make an objective evaluation of the utility of infrared techniques in solving military problems*. Although the study, Project Metcalf, was concerned chiefly with the program of the Navy Department, it also included the work and problems of the Air Force and to a lesser extent the ground forces. In surveying the projects current at the time, the Metcalf Committee found that the overall infrared program "was severely handicapped at present because of inadequate facilities for the exchange of information". It concluded that the need-to-know criterion should not be drastically interpreted as to prevent information from being disseminated among investigators in closely allied fields in infrared. It lauded the conferences of infrared workers that had been taking place on the Pacific Coast and recommended that a central information center and library for infrared be established which would be active in "evangelically diffusing information among IR workers" rather than merely supplying information upon request.

The meetings on the Pacific Coast to which the Committee alluded began 11 August 1949 under the sponsorship of the Office of Naval Research (ONR), Pasadena, and were known as the "Conference on IR Instrumentation". Six meetings were held in this initial series. With the recognition and impetus given by the Metcalf Committee there was an increase in coordination among the services, and in 1952 a new series was established with the backing of ONR Washington and the Wright Air Development Center. This series was known as the "Conference on Guided Missile Infrared Applications" which was soon abbreviated to "GMIR Conference". Up to 1954 attendance at these conferences was only by invitation. However, the planning committee of the GMIR, recognizing the growth of the field and the need to open the conferences to a wider audience, changed the requirements for attendance and introduced more talks of the informative type. To emphasize the new policy it was decided to change the name of the group and their meetings to the "Infrared Information Symposia (IRIS)".

Although the name has remained the same for the past 30 years, many other changes have taken place. The introduction of formal talks led to the appearance in June 1956 of Volume I, No. 1 of the Proceedings of the Infrared Information Symposia (Proc. IRIS). What had been separate East Coast and West Coast IRIS meetings

*"The Military Role of Infrared Detection, Vol. I", Project METCALF, Brown University, Final Report, 6 October 1952, AD 004 716

eventually merged, as the jet age approached, into the National IRIS (October 1957), and the quarterly meetings gave way to a single annual meeting as the size of the symposia grew. To counteract the inevitable loss of informal information exchange brought about by the ever increasing size and consequent formality of the National IRIS, small special interest groups, now known as the Specialty Groups of IRIS, appeared. These groups are highly flexible in their organization, degree of formality and programs. There are currently seven active Specialty Groups within IRIS. Atmospheric Physics; Infrared Materials; Infrared Detectors; Infrared Imaging; Infrared Countermeasures; Targets, Backgrounds and Discrimination; and Active Systems.

The National Executive Committee of IRIS was also established in 1954. Today, this Committee has representation from the three services, DARPA, OUSD(R&E) and the private sector. Although the Committee assists in setting policy, the overall responsibility for IRIS still lies with ONR.
In accordance with the recommendations of the Metcalf Committee, the Navy, with the support of the other services, established the Infrared Information and Analysis (IRIA) Center at the Willow Run Laboratories of The University of Michigan because of the size and expertise of the Infrared Laboratory's staff and the concomitant, strong, on-going, military infrared research programs. The Center was operated by the Willow Run Laboratories of the University under ONR contract for nearly 20 years. When, on 1 January 1973, the Willow Run Laboratories separated from the University to become the not-for-profit Environmental Research Institute of Michigan (ERIM), the contract was changed to the new Institute.

The basic mission of the IRIA Center was and is to "collect, analyze, and disseminate information on research and development in infrared physics and technology with special emphasis on the military applications". In the course of time the subject area was expanded to include more of the general field of electro-optics and laser technology. The functions and activities of the IRIA Center and the IRIS began to merge as the Center's obligations with respect to IRIS increased. In late 1960 the Center was assigned the task of editing and publishing Proc. IRIS with the Chairman of IRIS (then Mr. T. B. Dowd, ONR Boston, and later until his retirement in 1981, Dr. John E. Ivory of ONR Chicago) as Editor-in-Chief, and the Director of IRIA as Editor. Late in the summer of 1981 Dr. Lewis Larmore, ONR Pasadena, was appointed Editor-in-Chief of Proc. IRIS and Chairman of IRIS. Dr. Richard Brandt of ONR Pasadena succeeded Dr. Larmore following his retirement in September, 1986. Since the late 1960's the Center has been involved in the administration of the IRIS and some other ONR-sponsored meetings and the publication of the resulting proceedings and/or minutes. These include: starting from 1969, the DoD Conference on Laser Technology, and the National IRIS; from 1971, the IRIS Specialty Group meetings (the Director of IRIA acts as Executive Secretary of the Specialty Groups); in 1974, the DoD High Energy Laser Conference; and, in 1977 and 1980, the DoD Conference on Laser Effects, Vulnerability and Hardening. In 1984, at the request and sponsorship of the Army Electronic Warfare Laboratory, the Center supported a special one-day meeting with attendance by invitation only on the subject of Electro-Optical Countermeasures. The meeting was held in conjunction with the regular IRIS Countermeasures Symposium.

The operations of the Center have been influenced by a series of decisions at the OUSD (R&E) level. Under DoD Instruction 5100.45, dated 28 July 1964, the IRIA Center became a DoD Information Analysis Center (IAC) with ONR designated as the DoD component responsible for programming, budgets, financing and otherwise administering the IRIA Center. DoD Instruction 5100.45 was superseded by DoD Regulation 3200.12-R-2 in July 1984.

In a memorandum dated 25 July 1968 addressed to the Assistant Secretaries (R&D) for the three services, the Director of Defense Research and Engineering requested that plans be submitted for an orderly transition from 100% direct funding by DoD to the partial support of all DoD IAC's through service charges to the users. The IRIA Center responded by adopting an annual subscription plan for IRIA-IRIS services. The military infrared (IRIS) community which the Center serves, although limited in size because of security requirements and need-to-know, is a well defined and cohesive user group with a long history of participation in the activities of IRIS and a dependence upon the Center's publications. Thus, when the user charge plan went into effect in 1971, over $80,000 in subscription monies were received from industry alone. The number of subscribers (about 200 industrial and non-DoD government agencies) has been relative constant (within 10%) since then. Although subscription rates have been increased as a result of inflation, this source of funding constitutes essentially a constant level of support.

The collection agency for the subscription funds for the first year (1971) was the Navy Publications and Printing Service (NPPS), and from 1972 through 1976 it was the National Technical Information Service (NTIS) of the Department of Commerce. The funds collected by NTIS, less a collection fee, were transferred quarterly to the Defense Logistics Agency (DLA) which transferred them to ONR, which finally transferred them to IRIA via the ONR contract. Sometimes this transfer process took over a year. To avoid the delays and extra charges and since IRIA, unlike other DoD IAC's, cannot market its products (mostly classified or limited distribution) through NTIS, both document sales and industrial subscription funds have been collected directly by ERIM since 1979.
In FY'72 the Defense Logistics Agency was assigned by OUSD (R&E) the funding and administrative responsibility for nine contractor-operated DoD IACs. In 1980 this responsibility was placed with the Defense Technical Information Center (DTIC), a field activity of DLA. ONR continues as contracting agency and technical monitor through an agreement with DTIC since it has the unique technical capabilities and background to monitor this contract.

MISSION AND SCOPE

The basic mission of the IRIA Center is to collect, analyze, and disseminate information on research and development in electro-optics, including infrared and laser technology, and to assist the Office of Naval Research in the administration of the Infrared Information Symposia (IRIS).

The subject areas covered by IRIA include: radiation sources emitting in the

ultraviolet through infrared regions; radiation characteristics of natural and man-made targets; optical properties of materials; detection materials, elements and arrays; lasers; image tubes and sensors; optical systems and components; detector coolers and electronics; atmospheric propagation including absorption, emission, scattering and turbulence effects; and search, homing, tracking, ranging, countermeasures, reconnaissance, and other military infrared and laser systems.

To fulfill its mission, IRIA maintains a comprehensive library of technical information, responds to technical and bibliographic inquiries, publishes special documents (such as handbooks, data books, and state-of-the-art reports), arranges and conducts the Infrared Information Symposia and publishes the proceedings of these Symposia.

ORGANIZATION

The IRIA Center operates as a part of the Information and Processing Division of ERIM, and has an assigned staff of approximately 10 persons, including engineers, physicists, information specialists, and secretaries. This regular staff provides most of the basic services of IRIA. In addition, IRIA calls upon the professional staff of ERIM and its computer staff and facilities for additional technical support. Because the ERIM technical staff is heavily engaged in research and development activities for a variety of government and industrial sponsors on many advanced projects involving infrared and electro-optical technology, members of this staff are frequently employed by IRIA to perform the technical reviewing of documents, create responses to technical inquiries, and help prepare special data books and surveys.

The following individuals are responsible for managing the day-to-day activities of the IRIA Center:

Dr. George J. Zissis, Director
Miss Mildred F. Denecke, Manager

IRIA is currently operating under Contract N00014-84-C-0493 with the Office of Naval Research. The Center comes under the Electronics Division, Code 114 ONR. The scientific officer for the contract is:

Dr. Richard G. Brandt
Office of Naval Research Detachment
Pasadena, California

INFORMATION OPERATIONS

IRIA's information collection operations are performed for two major purposes: maintenance of a current knowledge of what is going on in infrared and

electro-optics both within and outside DoD; and acquisition and cataloging of documents for inclusion in the IRIA library and in the IRIA bibliographic data base.

To maintain a current knowledge of the field, the IRIA staff reads not only technical reports but also newsletters, trade magazines, and scientific journals. They review Work Unit Summaries from the DTIC Data Base. IRIA staff members also make contacts with government and industrial organizations, by telephone and by visits. They regularly monitor the activities of the Optical Society of America (OSA), SPIE-The International Society of Optical Engineering, DARPA Strategic Space Symposia (S^3), and OUSD (R&E)'s Advisory Group on Electron Devices (AGED Working Group C).

The acquisition and cataloging of documents is a major information processing activity. Documents are received on initial distribution, ordered directly from the originating agency, or ordered through Centers such as DTIC. They are screened by the scientific staff for technical content and pertinence to the IRIA Center's area of interest before being accessioned for the document library. The reviewing, annotating and subject cataloging of each document is done by technical experts within ERIM. The bibliographic information along with the subject cataloging and brief annotation are entered and stored in computerized form for later searching and retrieval.

The size of the library collection is currently over 48,000 items. The library includes government R&D reports, journal articles, proceedings papers and informal reports. The collection has been growing at a rate of about 1500-2000 documents or items per year. A large number of the documents are classified; actually, IRIA specializes in limited distribution and classified report literature. Since the collection also serves as a national reference library for the DoD community, strict attention is paid to need-to-know requirements and distribution limitations.

The IRIA bibliographic data base is currently on a DEC VAX computer in the ORACLE relational database management system. To facilitate subject searching of the data base, the dictionaries of category numbers and code words are continually reviewed and modified when necessary to better describe the reports in this rapidly expanding field.

The IRIA Center, especially in responding to inquiries, makes use of its extensive library and the associated classified bibliographic data base. It can search other on-line systems such as DIALOG, DTIC's DROLS and CIRC II. It also maintains large files of names and addresses of people active in the field.

In addition to the inquiries which concern technical subject matter, the Center responds to many questions from engineers, their secretaries, and librarians about particular documents or individual papers, concerning their availability, security downgrading, order numbers, or author's addresses. An even larger volume of questions are answered concerning the dates, deadlines or eligibility-to-attend for the IRIS meetings.

SERVICES and PRODUCTS

The IRIA Center provides the following:

- o Services
  - * References to scientific and technical documents
  - * Use of Center's collection of over 46,000 documents
  - * Substantive answers to specific technical questions
  - * Information on current R&D Projects
  - * Consulting services
- o Products
  - * The Infrared Newsletter
  - * Proceedings of the Infrared Information Symposia (Proc. IRIS) - annual
  - * Proceedings and/or Minutes of the seven Specialty Groups of IRIS
  - * Meeting Announcements and General Arrangements information for all IRIS meetings

SPECIAL SERVICES

- * Handbooks - (example) The Infrared Handbook (1978/1986)
- * State-of-the-Art Studies - (example) Atmospheric Transmittance and Radiance: Methods of Calculation (U) (1975), Optical - Mechanical, Active/Passive Imaging Systems (U), Vol.I (1982)
- * Proceedings of Special Meetings - (example) Proceedings of the Special Meeting of Unconventional Detectors (1972)

AVAILABILITY OF SERVICES and PRODUCTS/CHARGES/PAYMENT OPTIONS

IRIA's services and products, as described above, are available to qualified organizations either singly or through an annual subscription plan. A qualified organization is one with a facility and storage clearance through SECRET and the appropriate need-to-know. Subscriptions cover admission to meetings, receipt of publications, and bibliographic and other services of the IRIA Center. The level of services depends on the class of subscription purchased. The annual cost currently ranges from a minimum of $425 to a maximum of $6,300 (for unlimited use).

About 200 industrial and non-DoD organizations currently subscribe to IRIA's services annually. In addition, both military and civilian employees of DoD agencies and the three services are covered by blanket subscriptions.

IRIA-IRIS documents are announced to the DoD community through DTIC and/or the National Technical Information Service(NTIS). Most requests are referred to the IRIA Center. The general public can purchase IRIA unclassified-unlimited documents and searches of the unclassified-unlimited holdings on an individual basis.

Special studies by the Center can be supported by means of purchase orders, or in the case of DoD agencies, by MIPR of funds to ONR.

CONTACT POINT

For additional information on IRIA services, call (313) 994-1200 Ext. 2214 or write to:

The IRIA Center
ERIM
P.O. Box 8618
Ann Arbor, MI 48107

METALS AND CERAMICS INFORMATION CENTER (MCIC)

Harold Mindlin, Director
Battelle Columbus Division
505 King Avenue
Columbus, Ohio 43201-2693

ORIGIN

One of the oldest - and largest - of the DoD Information Analysis Centers, the Metals and Ceramics Information Center (MCIC) has been in continuous service to the materials community since its initiation in 1955. At that time the Office of the Director of Defense Research and Engineering, concerned with technical delays in the development of titanium for military systems, instituted the Titanium Metallaurgical Laboratory (TML) at Battelle's Columbus Laboratories. TML was instrumental in the intensive efforts of the 1950s that brought titanium from status of a relatively unknown engineering material to its current wide use in aerospace and commercial applications.

In 1958, the scope of the Center was expanded to include most of the advanced metals, and the program retitled "Defense Metals Information Center (DMIC)". Its services to government and industry included preparation of a large variety of engineering reports, handbooks, technical bulletins, and advisory services. DMIC served as the prototype for a number of other information analysis centers including the Ceramics and Graphite Technical Evaluation Center, established at the Air Force Materials Laboratory in the mid 1960s. Later chartered as a DoD IAC, this program was assigned to Battelle in 1967 as the Defense Ceramic Information Center (DCIC).

In August 1971, DMIC and DCIC were merged to form the Metals and Ceramics Information Center. The scope was further broadened to include metal and ceramic based composite materials, and the current policy of fees for publications and services was implemented. At the same time, contract responsibility was transferred from the Air Force to DLA and now to the Defense Technical Information Center, a field activity of DLA. Technical monitorship was transferred from the Air Force Materials Laboratory (which had monitored the program since 1955) to the Army Materials and Mechanics Research Center.

With the close of the Mechanical Properties Data Center (another center operated by Battelle) in April 1982, MCIC acquired the maintenance responsibility for the widely used Aerospace Structural Metals Handbook (ASMH) and the companion Structural Alloys Handbook (SAH). Also, in 1983, the technical monitorship was transferred to the Office of the Under secretary of Defense for Research and Engineering. In 1980 the technical scope of MCIC was further changed to reflect the establishment of another Center devoted to metal-matrix composites.

MISSION and SCOPE

MCIC's primary function is to provide timely, authoritative technical information on the characteristics and utilization of the advanced metals and ceramics. Although its first obligation is to serve Department of Defense components, contractors, and grantees, MCIC's resources also are available to the private sector and industry at large. Materials in the Center's scope include:

Metals: titanium and titanium-base alloys, beryllium and beryllium- base alloys, high-strength aluminum alloys, magnesium, high-strength steels and superalloys, refractory metals, coatings for these metals, and other metals and alloys used in critical structural applications.

Ceramics: single-crystal and polycrystalline metal oxides, sulfides, carbides, borides, nitrides, silicides, intermetallics, metalloid elements, glasses, and coatings for these materials.

To accomplish these purposes, the MCIC program consists of the following four basic functions:

1. Maintenance of a comprehensive, up-to-date, authoritative technical information base.

2. Response to requests for technical advice and assistance from government agencies, contractors, suppliers and the public sector.

3. Issuance of a monthly Current Awareness Bulletin to inform users of new technical developments and related activities within the scope of the Center.

4. Publication of technical reports, handbooks, and related documents apprising the state of the art of metal, ceramics, and processes within the MCIC scope.

In addition, MCIC provides capabilities for special assignments, such as preparation, publication and maintenance of engineering handbooks, conduct of critical surveys, materials technology assessments, etc.

ORGANIZATION

The Center employs a full-time staff of approximately eight engineers, information specialists and secretarial assistants. These provide the basic day-to-day functional operations, including maintenance of the information files

and administration of the Center services. But the technical substance of the program depends on the utilization of more than 100 engineers and scientists on the Battelle staff who contribute on a part-time basis as required. It is the select coterie of qualified authorities in the metals and ceramic technologies that constitutes the principal strength of MCIC as an Information Analysis Center. Their experience and daily participation in advanced materials research provide the Center's users with expert advice and authoritative state-of-the-art information.

INFORMATION OPERATIONS

The principal purpose of the MCIC technical information base is to provide its staff and the audience with a comprehensive, readily accessible source of current information and data on the materials within the Center's scope. With coverage dating back to 1955, the current MCIC files include more than 130,000 accessions-- all technically reviewed, evaluated, and indexed. Additions to the files are being made at the rate of about 3,000 accessions per year.

The Center's current files are maintained in two separate retrieval systems. The items collected prior to 1971 are maintained in a manual retrieval system utilizing extracts or documents which are filed in multiple locations by key words (index terms). The MCIC computerized file began in 1971 on the Battelle BASIS System and was moved to the Defense Technical Information Center's Defense RDT&E On-Line Systems (DROLS) in March 1975. As of 31 December 1986, MCIC's computerized file contained approximately 58,000 references.

Identification and acquistion of pertinent technical literature are agressively pursued by MCIC. Primary attention in the selection of input is given to government contract R&D reports; but open U.S. and foreign literature is also reviewed for pertinent data. For FY85, approximatey 64 percent of MCIC input consisted of journal articles, 22 percent technical reports, 13 percent technical papers and 1 percent miscellaneous (industry sources, manufacturers' literature, etc.). Of the 2,856 items entered into the database in FY85, approximately 37 percent were of foreign origin.

Each MCIC accession is reviewed and evaluated for applicability to the scope, for quality of information, for completeness and for usefulness to the mission of the Center. Indexing uses a controlled but open-ended thesaurus which at present employs about 35,000 terms. Generic up-posting of the alloys contained in the system is possible to permit entry of new alloys.

MCIC's own information files are supplemented by the extensive collections of the several technical libraries in Battelle's facilities and access to several commercially available materials databases. These provide broad coverage of the open and US and foreign literature. Two direct, on-line connections to the automated information of the Defense Technical Information Center are maintained by MCIC for entering of new data and access to the DTIC files.

Although MCIC's files were originally designed primarily to serve as a tool for its own staff and advisory engineers, direct on-line access is possible from any site having either a dedicated DROLS terminal, or a user password for use with a wide variety of dial-up terminals. This development has led to wider use of the MCIC database by industrial and government agencies on a personal, real-time basis.

SERVICES AND PRODUCTS

MCIC serves its user community both through personal technical advisory services and with a variety of authoritative publications in metals and ceramics technology. Excepting only sensitive information (such as export-controlled or limited distribution), the Center's services and publications are available without restriction to industry and individuals, as well as to all government agencies. As with most similar information programs, MCIC has found it necessary to charge agencies for its services.

Technical Inquiries

The philosophy of MCIC management is that the most important service that can be provided is assistance in the solution of urgent, immediate technical problems. Thus, quick response to technical inquiries has always been given high priority. The approach is to put the inquiring engineer or scientist directly in touch with a contemporary, professionally qualified engineer in the particular technology of concern. Most often, assistance can be given by telephone or informal letter report. Inquiries handled by MCIC range from those requiring only a few minutes for response to studies calling for several months of professional time. For example, the question may be simply, "What are the preferred titanium alloys for die forging?" or, on the other hand, the inquiry may call for the analysis of the source of material failures or the writing of a series of process specifications.

Current Awareness Services

The Center issues a monthly current awareness bulletin to its users and members of the materials community. It includes reports of significant developments in materials technology (with emphasis on DoD sponsored activities), announcements of new MCIC products and services, reviews of pending government R&D contract programs, and notices of technical meetings. The bulletin is available without charge to any interested individual or company engaged in materials research, development, and/or utilization. (The bulletin is not distributed outside the United States.)

Publications

These comprise state-of-the-art reports and the maintenance of several materials data handbooks in metals and ceramics technologies. MCIC's publications are intended to provide timely, reliable technical information to the engineering community.

The Center regularly issues comprehensive reports on topics of current concern: titles of recent state-of-the-art publications include:

- o Rapid Solidification of Ceramics - A Technology Assessment
- o Laser Processing of Materials
- o Isothermal and Hot Die Forging
- o Hot Isostatic Processing
- o Rapidly Solidified Materials
- o Ceramic/Ceramic Matrix Materials
- o Corrosion of Metals in Marine Environments

In addition, approximately 40 other state-of-the-art reports generated since 1971 are available. Almost all publications of the DMIC or DCIC are also available.

Under the current contract, MCIC publishes and maintains the:

- o Aerospace Structural Metals Handbook (supplements covering new or revised chapters are issued quarterly)
- o Structural Alloys Handbook (semi-annual supplements of new or revised sections)
- o Damage Tolerant Design Handbook (supplements will be issued as new data are accumulated)

Several Handbooks produced under previous contracts are still available.

SPECIAL SERVICES

The resources of MCIC have been employed by DoD, other government agencies, and industry for a variety of special analyses, updating compilations and standards, and state-of-the-art reports. Such special tasks generally are supported through supplemental funding. The following titles indicate some of the special tasks that have been conducted by MCIC.

- o Comparison of Soviet versus US Materials Technologies
- o Ceramic Materials for Severe Environments
- o Technical and Secretariat Support of the Preparation and Maintenance of MIL-STD-1515
- o Preparation and Publication of the US Army ManTech Journal

- Technical and Logistic Support for the Structural Design Applications Panel
- Support Function for MIL-HDBK-17
- Corrosion Information and Analysis
- Workshop for Space Experimentation
- Conversion of Handbooks to Computer Readable Formats
- Sagamore Materials Conferences
- Effects of Bead Blasting on Fatigue of Aircraft Materials

In addition, MCIC can provide technical support to conferences, seminars, and meetings. This support includes all aspects from technical input and program planning and physical arrangements to publication of the proceedings. Utilizing appropriate staff from the Battelle Seminar and Conference Coordination Group hotel arrangements, menus, conference costs and fees can be arranged; the Battelle technical staff can be made available for the handling of the technical subject area, collection and editing of papers, and publication of proceedings.

If requested, MCIC will submit a technical proposal with related time and cost estimates necessary to undertake a special task. Government agencies can authorize initiation of the task through an Interdepartmental Funding Authorization; Department of Defense agencies can utilize the Military Interdepartmental Purchase Requisition. Industrial concerns can use a Purchase Order of contract separately with Battelle.

AVAILABILITY of SERVICES and PRODUCTS

A list of available publication titles, costs, and ordering information can be obtained by contacting MCIC.

CHARGES/PAYMENT OPTIONS

Charges for MCIC's technical inquiry services are made on the basis of costs incurred. Payment can be made through either MCIC or the National Technical Information Service (NTIS). Also, technical service agreements can be established with MCIC.

CONTACT POINT

For additional information on how you may benefit from use of MCIC's technical resources, write or call the Center at the address given below:

Metals and Ceramics Information Center
Battelle Columbus Division
505 King Avenue
Columbus, Ohio 43201-2693
Telephone: (614) 424-5000

METAL MATRIX COMPOSITES INFORMATION ANALYSIS CENTER (MMCIAC)

L. A. Gonzalez, Director
Kaman Tempo
816 State Street
Santa Barbara, CA 93102

ORIGIN

Interest in metal matrix composites (MMC) dates back to the late 1950s. Since then, Department of Defense (DoD) interest in developing MMC materials has increased significantly, resulting in an investment of over $160 million in this technology during the past 7 years. In 1978, an MMC technology thrust was established by DoD to further accelerate development.

In a February 1979 memorandum to the Director, Defense Logistics Agency (DLA), the Deputy Undersecretary of Defense for Research and Engineering (USDR&E) expressed the need for a formal means of fostering the rapid transfer of MMC technology and approved the creation of a Metal Matrix Composites Information Analysis Center. It was also requested that DLA assume responsibility for establishment and administration of this new Center.

On 1 October 1980, the original Contract DLA 900-80-C-4095 to establish, operate, and manage the Metal Matrix Composites Information Analysis Center (MMCIAC) was awarded to General Electric-TEMPO (GE-TEMPO), a component of the General Electric Company. On 23 January 1981, the assets of GE-TEMPO were acquired by Kama Sciences Corporation (KSC) of Colorado Springs, Colorado. This acquisition included responsibility for conduct of the MMCIAC program as originally specified in the contract. All GE-TEMPO personnel assigned to the MMCIAC program were transferred to the payroll of the acquiring company and, as of 26 January 1981, assumed similar positions and duties in the program. KSC renamed the acquired company "Kaman Tempo" and its location remains in Santa Barbara, California.

In late October, 1985, Kaman Tempo was re-awarded the competitively bid contract by the DoD to continue the operation of the MMCIAC for a period of three years with an additional two-year option. On November 6, Tempo received the newly-awarded contract DLA 900-85-C-4100 with the first increment of allocted funding.

Over the years, MMC have come to be recognized for their tremendous advantages to system designers for use in many high performance land-based applications. MMC components developed in high-priority DoD programs are moving rapidly from development to the strucutral test and demonstration and validation phase.

For example, a major requirement of the Strategic Defense Initiative (SDI) is to establish a broad materials and structures technology base to assist in the assessment of design options. MMC materials are a critical part of this technology base.

In establishing MMC as a major thrust area, DoD also urged that the results of composite materials R&D programs conducted over the past 10 years be used as a foundation to support the data needs for the future, more intensified efforts to be funded by DoD. Limited to aerospace applications in the initial years of their development, certain MMCs are currently being considered for a wide range of commercial applications. These include sports equipment, automotive components, high-speed machine components such as bearings and gears, batteries, prosthetic devices, and superconductors. This experience and increased confidence in using MMC combined with the potential for commercial applications will result in an exponential increase in MMC usage and a significant increase in MMC data.

There are many problems attendant to management of scientific and technical information in any area of technology. On a national scale, the significant investment in MMC research and development demands a reasonable coordination of effort to service the R&D information needs, a systematic handling of research results, and an aggressive program to inform industry and other government agencies of successful projects so as to foster wider application of technological advances in MMC. The MMCIAC is considered to be one of the most effective means to satisy such demands.

MISSION AND SCOPE

The broad mission of the MMCIAC is to provide scientific and technical information analysis service to the DoD, other government agencies, government contractors, and the private sector in the area of metal matrix composite materials.

To fulfill this mission, the MMCIAC provides the facilities and capabilities to: (1) identify, collect, process, store, and disseminate authoritative MMC information; (2) prepare or sponsor the preparation of the necessary products and services to communicate this information to researchers, practicing specialists, manufacturers, and other users with interests and concerns in metal matrix composites; and (3) coordinate and augment existing information activities to improve the transmittal of this information to interested organizations and individuals in the government, military, and private sector.

Objectives

Objectives that guide the Center's activities include:

- Increasing the productivity of scientists, engineers, and technicians engaged in DoD MMC programs by providing authoritative information on on MMC materials and related subjects.

- o Providing technical information analysis services relating to MMC technology needs, development, and trends to the DoD and its contractors.

- o Increasing the manufacturing productivity of the defense industrial base through diffusion of MMC materials technology.

- o Promoting diffusion of DoD MMC program results to non-defense manufacturers through active dissemination of information, technical conferences and workshops.

These objectives stem from the recognized need to improve information transfer so that current knowledge closely approximates the state-of-the-art in metal matrix compsites development technology. If properly exploited, metal matrix composites technology has the potential to revolutionize engineering designs and the structural use of isotropic metals in a number of DoD applications, with significant weight savings and increases in strength.

Technical Scope

The subject matter coverage of the MMCIAC is the technology related to metal matrix composite materials. The materials are understood to be those composites that perform acceptably under severe conditions, both environmental and operational. The materials are those characterized as having high specific properties, proven environmental fatigue capability, reduced requirement for critical metals, improved creep and wear resistance, high design flexibility, high damagae tolerance, and unique combinations of materials properties including mechanical, electrical, and thermal. Metal matrix composite materials and technology include:

- o Matrix materials (e.g., aluminum, magnesium, copper, beryllium, titanium, lead).

- o Continuous and discontinuous reinforcements (e.g., whiskers, filaments, fibers, particulates, wires).

- o Reinforcement or fiber materials (e.g., silicon carbide, graphite, alumina, boron, silicon nitride, borsic).

- o Metal matrix composites properties (e.g., mechanical, physical, chemical, wear, corrosional, dynamical).

- o MMC Systems - alumina/magnesium, beryllium/titanium, boron/aluminum, aluminum, boron/stainless steel, boron/titanium/aluminum, borsic/ aluminum, borsic/titanium, graphite/copper, graphite/aluminum, graphite/ lead, tungsten/nickel, silicon carbide/aluminum, graphite/magnesium

Technical areas: Fabrication and manufacturing processes, defense and industrial applications, test and evaluation techniques and methods,

properties data, operational serviceability and repair, environmental protection, performance computations, and other MMC-related areas.

The MMCIAC also supports the DoD Metal Matrix Composites Steering Committee.

ORGANIZATION

The program plan calls for the MMCIAC to be supported by the resources of its host organization, Kaman Tempo, and augmented by subcontractors such as NETCO and ROI located in Long Beach and Palos Verdes, California, respectively.

The principal Tempo personnel, as well as key supporting technical staff, are listed below.

Name	Title and Function
Louis A. Gonzalez	Director; planning, management, technical reviews, information services
Jacques E. Schoutens	Manager; data analysis and special studies
Christine Gallery	Research Associate; bibliographic inquiries and literature searches
David I. Higa	Data tagging and analysis
William E. Rogers	Manager-publications; editor-newsletter
Sara B. Ellinwood	Acquisitions and sources management
Charles D. Anderson	Manager, Tempo computer services; data base management
D. Bruce Carlson	Systems analyst and programmer
William McNamara	Computer models and codes
Jo Ann Cherry	MMCIAC Secretary, conference coordinator, DROLS inputting

INFORMATION OPERATIONS

Ongoing Center activities include the collection, review, evaluation, analysis, and dissemination of the literature related to MMC materials, and assisting visitors in using data files. Emphasis is placed on screening, filtering, and selective reduction to maintain a data base that truly reflects the current state-of-knowledge. MMCIAC personnel continuously review, analyze, refine, and pool worldwide published and unpublished scientific and technical information

acquired from the DoD and NTIS and recognized professionals in Government and contractor organizations. They also monitor publications of other IACs and data centers and actively participate in MMC technical conferences and symposia such as the MMC Technology Conference.

The Center's information sources include: Technical reports from DoD, other Government agencies, industry, and academic institutions, etc.; open literature including foreign sources; unpublished papers; meetings; technical journals; conferences, workshops, etc. The MMCIAC provides a central, authoritative, well-organized, and easily accessible body of information consistent with MMC materials development and applications.

The MMCIAC information resources program is concerned with acquiring, reviewing, and evaluating information and data on MMC materials and technology. The program basically consists of developing and maintaining:

- o A DoD documents collection (information base)
- o Computerized bibliographic data files of all MMC holdings on the DTIC Defense RDT&E On-Line (DROLS) system
- o An open literature collection of serials, books, technical papers, conference proceedings, journal extracts, etc.
- o An index of types of MMC data contained in acquired documents
- o A (future) computer-based MMC properties data file
- o An MMC projects data file via the DTIC DROL system
- o A directory of the Center's users, a computerized user mailing list for publication mailings, and user surveys and analyses for determining information needs and interest profiles
- o A comprehensive MMC sources directory to support the Center's referral and consulting services
- o An MMC foreign technology review and acquisition program.

The MMCIAC information base and bibliographic files are maintained to provide technical documentation needed by staff scientists and engineers who produce the various products of the Center and to provide a rapid, inexpensive retrieval mechanism to support the Center's technical inquiry services, special studies, and DoD contractor visits to the Center.

Open literature is surveyed and reviewed in two basic modes. The most important serial literature, books, conference proceedings, etc., are directly scanned. The "core" literature comprises those serials of which a significant fraction of the contents is ordinarily accessioned as relevant to MMC technology. The

secondary literature comprises those serials that are also directly reviewed, cover to cover, but from which only selected pertinent articles are accessioned. As an added check on surveillance effectiveness, MMCIAC staff also scan "Current Contents," NASA/SCAN, and the monthly "Engineering Index and Science Abstracts." New books, conference proceedings, etc. are surveyed through informal channels, publishers' advertisements and catalogs, and reveiws published elsewhere. Some of the serial publications, books, proceedings, and other documents are furnished to MMCIAC by its host institution, Kaman Tempo, through the Tempo Library without direct charge. (Exceptions are specific purchases of the books and documents made especially for MMCIAC; such items become the property of MMCIAC, i.e., of the U.S. Government).

DoD technical reports are surveyed and reviewed upon direct receipt of reports from DTIC and other sources. MMCIAC is on the primary DTIC distribution list and subscribes to the current awareness service provided by DTIC. After review and cataloging, a hard copy (or microfiche) of each accessioned report is added to the MMCIAC document collection.

Other U.S. Government reports and unpublished private sector reports (when available) are surveyed mainly by requesting copies through informal contacts with agencies and individuals engaged in MMC research programs. Additionally, commercially available "dial-up" bibliographic data files (mainly through the DIALOG system) are periodically searched for MMC-related citations. This gives good coverage of publicly released U.S. Government reports, including those of NASA.

In keeping with DoD's concerns relevant to "reverse technology transfer," the MMCIAC also performs a task of monitoring, acquiring, reviewing, and, when necessary within budgetary constraints, translating foreign literature on MMC foreign technology.

SERVICES AND PRODUCTS

The MMCIAC generally offers the following categories of services and products;

- o Technical Inquiry Service--Provide authoritative advice in response to technical questions posed by users, either by letter or telephone.

- o Bibliographic Inquiry Service--Provide references to the latest and most relevant information covering the user's inquiry.

- o Scientific and Engineering Reference Works--Design, develop, publish, and update authoritative handbooks, databooks, and materials properties "data summaries" that will directly contribute to improved productivity in design and investigative work at the "bench level."

- o State-of-the-Art Reports--Prepare summaries of MMC technology that is pertinent to current RDT&E decision- making with usefulness extending from the bench level to all levels of RDT&E mangement. An important part of this service is to review existing and suggest new applications of MMC materials.

- o Critical Reviews and Technology Assessment--Critically review, synthesize, and report the latest scientific or engineering information in the most useful format on subjects of significant interest to the Defense RDT&E community. These reviews and assessments may provide comparative analysis of MMC technologies based on technical, national, and/or geographic considerations.

- o Quarterly Newsletter--Issuance of a quarterly newsletter. "Current Highlights," to its users and other members of the MMC community. The newsletter is available without charge to any interested U.S. citizen, DoD contractor, or U.S. company engaged in materials research, development, testing, fabrication, and/or applications.

- o MMC Properties Data Program--Establish and maintain an MMC properties data bank from which to develop databooks, data reviews, and other information useful to designers concerned with materials selection and MMC applications. Documents acquired by the Center may contain reference MMC test data that substantiate both derived conclusions and analytical results. In these instances, supporting test data are examined and screened for potential incorporation into the MMCIAC data base.

Publications

The transfer of technical information on advances in MMC materials and technology within MMCIAC's scope and related to applications in defense systems and hardware is an important activity of the Publications Program. In response to needs of the Government, particularly DoD, as well as industrial and academic communities, the Center continuously prepares a variety of publications, including data books, technical reports, state-of-the-art reports, proceedings of conferences and critical reviews or technology assessments, as well as comprehensive bibliographies of available literature on identifiable areas of interest.

The Center structures its Publications Program into 11 "series" of publications. The complete series and examples of publications in each series are listed below:

CONFERENCE PAPERS SERIES

Future Trends in Metal Matrix Composites, by William C. Riley, presented at Fifth MMC Technology Conference, MMCIAC 436, June, 1983.

Survey of Conventional MMC Testing Methods, by Jacques E. Schoutens, presented at Fifth MMC Technology Conference, MMCIAC 437, June 1983.

CONFERENCE PROCEEDINGS

Proceedings, Sixth MMC Technology Conference, NPS, Monterey, CA, MMCIAC 673, May, 1985.

Proceedings, MMC Potential Industrial Applications Workshop, La Jolla, CA, MMCIAC 462, February, 1984.

STATE-OF-THE-ART REVIEWS

State-of-the-Art Review of Metal Matrix Composites Technology, by Jacques E. Schoutens and Louis A. Gonzalez, MMCIAC 681, June 1986.

TECHNOLOGY ASSESSMENTS

Introduction to Metal Matrix Composite Materials, Jacques E. Schoutens, MMCIAC No. 272, June 1982.

SPECIAL BULLETINS

Metal Matrix Composites Overview, by Carl Zweben, MMCIAC 253, February, 1985.

The Metal Matrix Composites Information Analysis Center, by Louis A. Gonzalez, MMCIAC 254, March, 1982.

DIRECTORIES/GUIDES

Guide to Metal Matrix Composites Material Suppliers and Fabricators and Their Products, by Jacques E. Schoutens and Joseph F. Dolowy, Jr., MMCIAC 666, September, 1985.

Metal Matrix Composites Patents Catalog and Review, by David Higa, Sara Ellinwood, and Linda Berkhouse, MMCIAC 662, September, 1985.

DATABOOKS/HANDBOOKS

Bibliography on Silicon Carbide/Aluminum Metal Matrix Composites, by Christine Gallery, MMCIAC 590, December 1984.

Bibliography and Data Index on Graphite/Aluminum Metal Matrix Composites, by Ghristine Gallery and David Higa, MMCIAC 680, May 1986.

LITERATURE REVIEWS

A Review of the Open Literature on Soviet Advanced Composites Technology, by Jacques E. Schoutens, MMCIAC 685, January 1987.

SPECIAL SERVICES

An important function is to find solutions to problems brought to the Center's attention by DoD and military and other government agencies. Such activities are treated as special studies and tasks with limited scope. Approval by the Center's COTR is obtained before work on such studies or any additional tasks are undertaken. Funding for such special studies and tasks is normally the responsibility of the requesting agaency, since they generally require a substantial technical effort extending over a period of time. Some studies may involve several tasks that are assigned to technical staff members within the Center, elsewhere in Tempo, or to consultants or subcontractors. These tasks are coordinated by the MMCIAC to maintain professional quality of response and cost effectiveness.

As the MMCIAC has matured, its staff has achieved technical and analytical credibility and an increasing number of users recognize the Center as a valuable resource for conducting research on MMC materials and technology. This has resulted in a number of studies being conducted whose results have been, or will be, presented in final reports and papers at conferences. Significant completed special studies include:

1. "Satellite System Requirements for Advanced Composite Materials," MMCIAC 647, December 1984

2. "MMC as Substitutes for Critical and Strategic Materials - Annual Report for 1984," MMCIAC 648, January 1985

3. "Use of P-100 Fiber in Future Navy Systems," MMCIAC 649, December 1984

4. "Materials Implications in Spacecraft Maneuvering," MMCIAC 650, December 1984

5. "Survivable Space Structure," MMCIAC 651, December 1984

6. "Materials for Satellites," MMCIAC 652, December 1984

7. "Use of High Modulus Fibers in MMC," December 1984

8. "The Role of MMC in Spacecraft Survivability," MMCIAC 439, September 1983

9. "The Need for Improved Transverse Strength in C/Al Composites," MMCIAC 579, May 1984

10. "Comparison of Astro-Quarts and Metal Matrix Composites for Laser Hardening of Satellites," MMCIAC 580, May 1984

11. "MMC Substitutes for Titanium and Super Alloys," MMCIAC 481, January 1984

12. "Substitutes for Beryllium in Navy Systems," MMCIAC 309. July 1982

13. "MMC as Substitutes for Critical Strategic Materials: Methodology for Selection and Development of Specific System Components," MMCIAC 328, August 1982

14. "Satellite Survivability Options, Selected Visuals of a Technical Briefing," MMCIAC 583, July 1984

CHARGES/PAYMENT OPTIONS

During the first year (FY81) of the MMCIAC program, DoD became concerned with the complex problem of technology leakage via unclassified information sent to foreign countries, particularly the Warsaw Pact nations. In August 1981, USDR&E/R&AT recognized the special military significance of MMC technology and directed DLA to fully fund the MMCIAC and waive its requirement for recovery of 50 percent of its operating costs. MMC technology was specifically cited in the State Department Munitions Control List and the DoD Military Critical Technologies List and, therefore, the MMCIAC would be unable to develop the revenues from the broad user community originally anticipated.

Despite these limitations, the MMCIAC has operated a service charge system that has been able to generate modest revenues through (1) the preparation and sale of some basic MMC technology publications such as special data compilations, state-of-the-art reviews, tutorials, special bibliographies, a fabricators directory, and technology reviews, and (2) the conduct of MMC short training courses, the biennial MMC Technology Conferences, and workshops, some of which are jointly sponsored with other DoD IAC activities such as MCIC. Separate funding provided by other DoD components such as Naval Sea Systems Command and the Naval Civil Engineering Laboratory for technology assessments are also considered part of the sales revenue that supplement the basic contract funding provided by DLA/DTIC.

At the present time, bibliographic searches by the Center are performed, without charge, on the DTIC DROLS technical reports file (and occasionally on the DD 1498 Work Unit file). A typical search is completed within 3 days of the request. Some or all of the retrieved citations are printed out on-line and mailed to the user with a transmittal letter the following day. When more than a dozen relevant citations are found, an off-line printed bibliography (easier to read and refer to) is ordered from DTIC and also forwarded to the requestor upon receipt, usually within 10 days. Urgent searches are performed immediately and, if the user has the equipment, the bibliography is telefaxed.

In the course of daily operations, effort is also expended answering, at no charge, a variety of general information queries. These, which are answered within 3 days are related to: (1) products and services, (2) quotations for products and services, (3) orders for publications, (4) newsletter availability, (5) information concerning technology conferences and workshops, (6) identification and sources of government reports, (7) requests for

references cited in publications, (8) sources for acquisition of MMC journal articles, and (9) sources of technical information outside the Center's scope.

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MANUFACTURING TECHNOLOGY INFORMATION ANALYSIS CENTER (MTIAC)

Robert A. Walk, Director
Cresap, McCormick & Paget, div. of T P F & C Inc.

Principal Subcontractor:
IIT Research Institute
10 West 35th Street
Chicago, Illinois 60616

ORIGIN

The Manufacturing Technology Information Analysis Center (MTIAC) has been in operation since June, 1984. Government technical program management is provided by the Army Materials and Mechanics Research Center and administrative management by the Defense Technical Information Center.

The mission and scope of the Center corresponds in technical scope with that of the DoD Manufacturing Technology Advisory Group, which has been in operation for seventeen years. The contract enables MTIAC to provide support to MTAG as required.

MISSION AND SCOPE

The mission of the Center is to collect, analyze and disseminate manufacturing technology information and data. MTIAC is concerned with areas of manufacturing technology applicable to defense systems. The term "manufacturing technology" includes but is not limited to areas used in the organization of the DoD Manufacturing Technology Advisory Group: Metals, Non-metals, Computer Aided Design/Computer Aided Manufacturing (CAD/CAM), Inspection and Test, Electronics and Munitions.

Manufacturing technology can cover the entire product life cycle, i.e. design, production and operation support. It also includes design for production and the design/production interface, production technologies, methods and processes, repair and rework and remanufacture aspects of operational support.

The general manufacturing equipment and methods include but are not limited to defense related fields of: machine tools and related equipment, robots and special machines, material handling equipment, controls, software and data bases, communication lines and networks, sensors and inspection or checkout procedures, materials and materials treatment, production processes, specific defense related products being produced and management aspects of manufacturing technology.

INFORMATION OPERATIONS

From its inception, the Center has planned to have direct input of citations and abstracts by the Center staff via a government-furnished terminal and dedicated line to the computer system at DTIC. The inputting process has been initiated.

Other sources of information are proceedings of technical meetings conducted by the government or technical societies, trip reports by staff members, consultations with visitors and those making technical inquiry to MTIAC and information obtained from MTAG.

An internal control system has been developed, using the IITRI VAX 11/780 computer for control of documents as they are circulated through the Center's staff for review.

All assessions are reviewed for substance and content before being entered into the DTIC data base via the dedicated terminal and line.

In order to provide a basis for classification and coding, and to facilitate searching, it was found desirable to employ a thesaurus of manufacturing terms. Since no such thesaurus was found to be readily available, a thesaurus of manufacturing terms was developed for the use of Center staff and users. It currently has approximately 4000 terms and it is updated frequently. Subscribers to the Center's services receive an updated thesaurus approximately every six months, presented in the User's Guide to Bibliographic Searching.

The Manufacturing Technology Projects Data Base is resident on IITRI's VAX 11/780 computer system and is available to users at remote distances using appropriate private codes and passwords.

The system makes use of a data base system developed by IITRI which makes possible search of records by keyword. The project records are made available by the Army and Navy. It is planned to have Air Force data on the system by the end of January, 1986. There are approximately 700 project records on the data base at the present time. This number will increase substantially with the acquisition of the Air Force data.

Man Tech Project information for the MTP data base is obtained from each of the three services by computer tape and entered directly into the system and provides only appropriately limited and technical information. The data base system makes provision for users to communicate with MTIAC by computer.

The MTIAC technical and information specialist staff make extensive use of other commercial data bases such as DIALOG, which includes COMPENDEX and INSPEC. Since much of the technical literature in the commercial world is available through such sources, MTIAC staff makes productive use of the data which is already available. In addition, users can be assisted by enlisting the aid of organizations such as the Society of Manufacturing Engineers who also maintain extensive collections of papers and articles and publish journals.

AVAILABILITY OF SERVICES AND PRODUCTS

MTIAC provides services to government agencies, contractors to the government or subcontractors and, to the extend that funds permit, to firms in the general industrial community as well as universities and research institutes. U.S. firms are not required to have contracts with the government in order to use the services of the Center.

If an organization or firm requests data or services and is known to be foreign owned, the inquirer is requested to file a DoD Form 2345 "Export Controlled DoD Technical Data Agreement". In addition, the request is discussed with the Contracting Officer's Technical Representative (COTR) prior to accommodation. However, the distribution of the Current Awareness Bulleting (CAB) is not restricted to the United States.

Technology assessments written to date have been unclassified and are not limited in distribution. These are available in hard copy from the Center for purchase and are made available to Government agencies through DTIC in microfiche or printed copy. The first four publications have been priced at $20.00 each.

CHARGES/PAYMENT OPTIONS

The Center staff negotiates a fee and estimated cost for its technical services and bibliographic search capability based on a pricing schedule approved by the COTR. Fees are currently set at a rate to encourage utilization of the Center. As such, the current schedule represents only a partial recovery of costs.

When a user pays for a search, the cost of computer time and telephone charges is charged to the user at full recovery and is not discounted.

MTIAC has a deposit or subscription account system. The Class B user is asked to pay $400.00 in advance for services and publications to be acquired over a two year period. The Class B user receives a 10% discount on publications.

The Class A subscription account is $800.00 for a two year period. Discounts for quantity purchases of MTIAC publications can run as high as 30% depending on quantities ordered. This subscription account is designed for the large multiple division corporation. It is not necessary to have a deposit account to be a user.

CONTACT POINT

Additional information on the services available from the Center can be obtained by calling or writing the Center staff at the following address:

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Technology Coordinator
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(312) 567-4733

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(312) 567-4731

NONDESTRUCTIVE TESTING INFORMATION ANALYSIS CENTER (NTIAC)

George A. Matzkanin, Director
Southwest Research Institute
P.O. Drawer 28510
San Antonio, Texas 78284

ORIGIN

From its establishment in 1961, through 1975, the Nondestructive Testing Information Analysis Center (NTIAC) was operated by the U.S. Army Materials and Mechanics Research Center, Watertown, Massachusetts. In February 1974, the Department of Defense supplemented the capabilities of NTIAC through a contractor operated support function designated as the Nondestructive Testing Data Support Center (NTDSC). AMMRC continued, however, to bear responsibility as the officially designated DoD information analysis center in the field of nondestructive testing. Accordingly, AMMRC was charged to provide the interface with the NDT community for services of both NTIAC and NTDSC. During the period from February 1974 to January 1976, AMMRC worked closely with NTDSC to develop the latter's capability to function independently as a full-service information analysis center of technical excellence. On January 6, 1976, the Department of Defense transferred to Southwest Research Institute full responsibility for operation of NTIAC and discontinued the Nondestructive Testing Data Support Center as a separate function. Although technical monitorship was initially provided by AMMRC to the fully contractor operated NTIAC, the contracting officer's technical representative responsible for technically monitoring NTIAC activities is now the Office of the Undersecretary of Defense, Research and Engineering. Additional technical guidance is provided by a Tri-Service Steering Committee comprising NDE representatives from the Army, Navy and Air Force.

MISSION and SCOPE

The broad mission of NTIAC is to increase the productivity of scientists, engineers and technicans engaged in scientific and engineering programs for the Department of Defense. The NTIAC also renders service to other U.S. Government agencies and their contractors, and to the extent practical, without impairment of services to the foregoing users, to the private sector (consistent with security and other limitations on NTIAC information). NTIAC functions to collect, review, analyze, appraise, summarize and disseminate pertinent and timely literature on the processes, techniques, and associated technologies within the scope of NTIAC's competence and concern. The objectives of NTIAC are achieved by:

1. Establishing and continuously maintaining a comprehensive, up-to-date, authoritative technical information base in the field of nondestructive testing.

2. Responding to inquiries for technical or bibliographic advice and assistance from government agencies, contractors, suppliers, and the public sector.

3. Publishing a current awareness periodical (the NTIAC Newsletter) covering nondestructive testing and evaluation technology on a variety of subjects.

4. Responding to the needs of the user community by preparing, publishing and marketing timely and authoritative state-of-the-art reports, critical reviews, technology assessments, databooks and handbooks.

5. Conducting special tasks and studies for DoD agencies and other departments of the Federal Government.

The technical scope of NTIAC is that of the entire field of nondestructive testing (NDT), nondestructive evaluation (NDE), and nondestructive inspection (NDI) - the full range of methods and techniques whereby a material, component or entire system can be so characterized as to reliably predict its performance under a prescribed service regime. NTIAC is also concerned with the economic aspects of the NDT/NDE/NDI industry, economic considerations with respect to selection of techniques and processes, and industry trends in applying current NDT/NDE/NDI technologies to research and development, production, maintenance, safety monitoring, and failure prevention of in-service material.

ORGANIZATION

NTIAC is formally assigned to the Division of Nondestructive Evaluation Science and Technology at Southwest Research Institute (SwRI). Direct management of NTIAC is vested in an NTIAC Director who is responsible for operating NTIAC in accordance with the terms of the contract, for leading the development of NTIAC, for direct supervision of the NTIAC staff, for overall coordination of NTIAC products and services, and for interaction with COTR, the Tri-Service Steering Committee, and the IAC program manager.

In addition to the NTIAC Director, three full-time and one part-time staff persons are employed to provide the continuing functional operations of NTIAC. Other resources include the on-call, broad expertise of over 200 professional

and support NDT personnel at SwRI who are available to directly support NTIAC in responding to inquiries, preparing technical publications, maintaining the literature base and performing special tasks.

INFORMATION OPERATIONS

The basic information resource of NTIAC is its Information Support System (ISS) comprising unclassified computerized bibliographic date and index files residing at the Defense Technical Information Center (DTIC) in Alexandria, VA, together with a corresponding document collection. The ISS is maintained by NTIAC through continuous surveillance and review of the worldwide open literature, U.S. government reports, and other accessible documentation. Citations of significant interest are evaluated and analyzed by NTIAC specialists before addition to the DTIC data base. The ISS includes approximately 34,000 NDT related bibliographic items with approximately 200 additional items added to the data base each month. The NTIAC ISS is directly available to established users of the Defense Research On-Line System (DROLS). NTIAC information specialists familiar with DTIC/DROLS, as well as with other information systems, are available to assist users with bibliographic inquiries. In addition to the NTIAC bibliographic data base, other literature files available at NTIAC for exhaustive searches include the DTIC Technical Report file and the DIALOG system.

The source material for the NTIAC information systems operation consists of the open literature, government agency reports other than DoD agencies, and DoD agency reports. The open literature refers to scientific journals, magazines, and other periodical literature such as textbooks, treatises, monographs, and so forth; proceedings of conferences and symposia; and unpublished reports and technical specifications and data available from commercial companies. The primary resource of open literature is Southwest Research Institute Slick Memorial Library which presently subscribes to virtually all domestic and foreign periodical literature in the field of nondestructive testing, as well as all standard abstract services which include the field of nondestructive testing. Textbooks, treatises, monographs, and other books, as well as Proceedings of conferences and symposia, in the field of nondestructive testing, are procured by the library upon request of NTIAC, and are promptly made available for review by NTIAC. In certain instances, where retention of a copy of a publication is judged warranted by NTIAC, such copy is purchased at the expense of the program.

Commercial firms engaged in the manufacture and sale of equipment or materials for nondestructive testing are solicited to furnish nonproprietary publicity and available substantive documentation on their products and their applications. Each item furnished from these sources is appraised, and if found to be of substantive value to the NDE community the item is accessioned and treated as any other open literature item.

In general, surveillance and review is carried out by routinely scanning pertinent serial publications as they are accessioned by the SwRI library, and identifying those articles or items to be reviewed; reading of the article or item by a technically qualified reviewer who assesses the adequacy of the author's abstract, and prepares an adequate abstract if neccessary, and also assesses significance of the item ranking it as being of archival interest only, of sufficient interest to warrant a brief interest in the NTIAC Newsletter, or of major significance and meriting substantive review in the NTIAC Newsletter.

On the basis of an items-review, appropriate descriptors are assigned to the item and the total information inputted to the computerized data bank through the Department of Defense interactive computerized terminal.

Surveillance of non-DoD U.S. Government agency reports is accomplished by monitoring work in progress and by regular searching of commercially available bibliograpic data computer files. Work in progress is monitored through notices published in the Commerce Business Daily, and through informal channels. An effort is made to have NTIAC placed on the primary distribution list for reports issued from all relevant work in progress.

SERVICES and PRODUCTS

NTIAC provides four basic types of services to its user community:

- A current awareness service available through the NTIAC Newsletter
- Literature searches and customized bibliographies tailored to the user's requirements
- Responses to technical inquiries where the information sought goes beyond bibliographic citations
- Special services such as support of technical conferences and commissioned special tasks or studies

NTIAC publication products available to the NDT community include:

- State-of-the-Art Reports on topics of current interest in the field of NDT
- Handbooks and Data Books in response to the need of the user community
- Critical Reviews and Technology Assessments on timely NDT subjects
- Proceedings of NDT related conferences, symposia and workshops

Current Awareness

As a Department of Defense Information Analysis Center, NTIAC is responsible for keeping users aware of the latest and most significant technological developments in nondestructive testing. Awareness of ongoing research and development is particularly important if critical nondestructive testing problems are to be solved. Problems resulting from use of materials to their physical limits; consumer product safety; nuclear power generation; aerospace technology; limited availability of energy and materials; and literally thousands of other engineering, production and maintenance activities demand a vigorous and knowledgeable nondestructive testing community having a heightened sensitivity to its collective responsibility.

If there is to be increased sensitivity to collective responsibility there also needs to be an awareness of the means for information exchange so that the responses of the members of the community may be shared. NTIAC is responsible for increasing the awareness of the user to these means. This applies not only to the use of NTIAC itself as an information exchange system but also to the availability of means for information exchange offered by professional societies, government organizations, publishing media, technical meetings, special activities such as commissions and committees, and special publications.

To meet these current awareness responsibilities NTIAC participates in nondestructive testing meetings, makes special announcements about the activities of NTIAC, disseminates information by special publications and in response to requests, and publishes a quarterly newsletter.

The NTIAC Newsletter is oriented to the technical requirements of the user community. Generally it contains:

- A substantial digest of one or more meritorious technical articles on or related to nondestructive testing
- Summaries of recent technical conferences and meetings
- Announcements and an extensive calendar listing of upcoming conferences and symposia
- Descriptions of new NDT products and publications
- Abstracts of recent government reports concerned with nondestructive testing
- A list of new government contracts involving, or related to, nondestructive testing
- Special announcements considered to be especially important to the user community

The Newsletter is free to members of the NDT community who register with NTIAC. This includes DoD and other Government personnel engaged in or responsible for nondestructive testing. Also those members of the NDT community in the private sector, including equipment makers and suppliers, nondestructive inspection services, and others engaged in NDT or NDT-related activities are eligible for a free subscription to the NTIAC Newsletter.

Bibliographic Services

NTIAC is available to provide on-call, specialized user services for bibliographic inquiries and literature searches. These services provide the user with references to the latest available information relating to his specific NDT problem. Based upon a statement of specific user needs, NTIAC conducts a computerized search of its data base to identify applicable reports, project summaries, and journal articles. The search is conducted by an information specialist broadly knowledgeable in NDT technology and the mechanics of computerized data base searching. The search strategy is structured from subject terms or descriptors contained in the NTIAC Thesaurus, along with searchable nonsubject catagories which include dates, personal authors, corporate authors, sponsoring agencies, report numbers, and contract numbers, if known. The search output provides references including abstract and sources; title, author and subject indexes are also included. Bibliographic printout is usually ordered offline and forwarded to the requester, typically within one week.

Technical Inquiry Service

The objective of NTIAC's technical inquiry service is to provide prompt, personal and authoritative assistance on problems submitted by the nondestructive testing user community. All the resources of NTIAC are employed in furnishing this assistance including personnel experienced in the practice of NDT methods as well as NTIAC's massive nondestructive testing data bank. Assistance may range from a telephone response from one of our staff members to a fully developed research and development program.

In order to offer technical excellence in its broad subject coverage, NTIAC must rely upon a number of resources. First, NTIAC depends on its staff of experienced NDT practitioners. Secondly, NTIAC utilizes the on-call expertise of the technical staff of Southwest Research Institute where over 200 professional and support personnel are engaged in nondestructive testing research, development and service activities. Thirdly, NTIAC may call upon recognized experts in the many fields of NDT regardless of their professional affiliations.

Publications

NTIAC publishes in response to needs of the user community such publications as Technology Assessments, Critical Reviews, State-of-the-Art Surveys, Handbooks, and Data Books. Also, NTIAC may publish and market the Proceedings of Workshops, Symposia, and Conferences in which it has been involved and where appropriate arrangements are made with the sponsor of the meetings.

Handbooks and data books are engineering reference works containing authoritative scientific information or data. The scope comprises: (1) extraction of data and information for inclusion in the reference work (including related data searches and/or literature review); (2) assimilation, organization, and critical analysis of reference data; (3) development of the reference work; and (4) all activity incident to the handbook/data book publication.

The key steps necessary to initiate the production of the handbook or data book are: (1) determination that there exists in the NDT community a need for the prospective book; (2) a determination that there exists an adequate information and data base to permit the preparation of the prospective book; and (3) an identification and recruitment of a qualified authority to undertake the preparation of the book.

A state-of-the-art report provides a reasonably comprehensive summary of current knowledge and practice in a specific technical area. The scope comprises: (1) determination of the need, subject, scope, and user audience; (2) selection of personnel to prepare the summary; (3) development of outline of summary; (4) review of available information and data; (5) literature search and document procurement; (6) analysis and drafting of the summary; (7) reviews and approvals; and (8) summary reproduction, distribution, and follow up.

To be practical as an NTIAC state-of-the-art report, a candidate subject area in addition to being needed by the user community must also have an adequate basis in technical literature. It is not, in general, feasible to develop a state-of-the-art report at reasonable cost if crucial information must be obtained from sources other than the published literature. Thus, many otherwise attractive candidate areas for state-of-the-art reports must be foregone pending a richer development of the primary literature. The adequacy of the literature can generally be judged from a review of the NTIAC file holdings in the subject area.

Critical reviews and technology assessments are technical reports of critically reviewed scientific and technical information on subjects of significant interest through the nondestructive testing community. Their scope, however, is smaller than that of a state-of-the-art report. These reports include bibliographies containing substantive extracted or annotated technical information. A critical review would survey and summarize recent progress, highlighting developments over the immediately preceding year in many cases. In addition, a review should contain a comprehensive annotated bibliography of the important publications in the area covered by the review. Publications available from NTIAC are listed in Table 1.

SPECIAL SERVICES

Special services are those of scope considerably beyond ordinary bibliographic or technical inquiries; they may be thought of as "super inquiries". They include major assignments which (1) basically involve gathering, analyzing, and (possibly) disseminating technical information; and (2) primarily relate to nondestructive testing. Representative assignments include:

- Technical and administrative support of workshops, conferences, etc., including publication of proceedings
- In-depth review and analysis of technical literature in specific areas
- Major state-of-the-art surveys
- Technical assistance in identification and application of NDT technology
- Review of NDT standards or specifications
- Development of computer-based information systems and databanks in specific areas
- Special technology assessments, "paper" feasibility studies, major handbooks and data books

Such special service assignments are performed in accordance with a statement of work and cost schedule negotiated in advance with the client. Proposals are prepared and submitted without direct cost. In carrying out special service assignments, NTIAC generally utilizes personnel of the SwRI professional staff who have appropriate expertise. Special studies and tasks may be funded by a DoD user through a Military Interdepartmental Purchase Requisition (MIPR).

A very important service of NTIAC is the planning, organizing, management, and conducting of workshops and symposia on NDE. Past activities have included a workshop on residual stress and a conference on educational needs for NDE. Every other year, NTIAC organizes and conducts a symposium on NDE which brings together technical and managerial personnel engaged in and concerned with, fundamental and applied aspects of NDE for the exchange of new ideas, methods, and research and development results. Proceedings of these biennial symposia are published and distributed by NTIAC.

AVAILABILITY OF SERVICES AND PRODUCTS

Inquiries, requests for literature searches, special technical services or other information on utilizing NTIAC can be obtained through the address and telephone numbers listed in the Points of Contact Section. All inquiries and requests for technical assistance are handled in confidence.

Requests for NTIAC's services and products are accepted by telephone, letter or purchase order. Invoices are submitted along with the product, and payment may be made by check or money order. Excepted are mailings outside the United States, which must be prepaid.

Copies of articles and documents cited in resulting literature searches are not available from NTIAC. Availability of journal articles and conference proceedings is included in the bibliographic printout; most unclassified reports are available from the National Technical Information Service (NTIS). Requests for other documents must be referred to DTIC or the publisher Although NTIAC does not distribute documents cited in literature searches, assistance is provided, when needed, to locate items not readily available to the requestor.

As a help in obtaining the NTIAC's products and services, a User's Guide is available at no charge from NTIAC. Included in the User's Guide are points of contact, the objective and scope of NTIAC, descriptions of bibliographic and technical inquiry services, special services available, a complete price list of NTIAC publications, information on how to obtain NTIAC's products and services, and forms for ordering publications.

CHARGES/PAYMENT OPTIONS

NTIAC is contractually required to charge for its services and products on the basis of partial recovery of costs. Income so derived is used to fund the NTIAC program. Exceptions to the change policy are subscriptions to the NTIAC Newsletter and inquiries requiring nominal effort. Fees are quoted in advance, and although NTIAC is obligated to charge for its products and services, these charges do not recover the total operating cost of the Center.

The cost for bibliographic services depends upon a number of factors including the number of files searched, the number of references supplied, and whether or not the bibliography is printed locally at NTIAC for faster services. Minor bibliographic inquiry assistance and technical inquiry service requiring only a nominal amount of NTIAC staff time are provided free of charge. However, for more extensive assistance, an estimate is provided of the effort and costs required to satisfy the inquiry, or a "not-to-exceed" amount may be specified by the requestor.

Payment methods available for NTIAC's services and products include: Blanket Purchase Agreement, Military Deposit Account, Military Interdepartmental Purchase Request, Subscription Plan, Pre-Paid Account, Standing Order, and check or money order made payable to NTIAC, Southwest Research Institute.

CONTACT POINT

Mailing Address	NTIAC Southwest Research Institute P.O. Drawer 28510 San Antonio, TX 78284
Director	Dr. George A. Matzkanin (512) 522-2737
General Information	Mrs. Maureen Ahr (512) 522-2369
Technical Inquiries and Bibliographic Services	Mrs. Fran Hicks (512) 522-2362
NTIAC Newsletter	Mrs. Maureen Ahr (512) 522-2369
NTIAC Publications	Mrs. Fran Hicks (512) 522-2362
Special Services (Studies, Tasks, Conferences)	Dr. George A. Matzkanin (512) 522-2737

Table 1: List of Publications

PUBLICATION	PUBLICATION NUMBER
STATE-OF-THE-ART SURVEYS	
Electromagnetic Acoustic Transducers (A Survey of the State of the Art)	NTIAC-76-1
Advanced Ultrasonic Testing Systems (A State-of-the-Art Survey)	NTIAC-77-1
Automated Radiograpy (A State-of-the-Art Survey)	NTIAC-78-1
Liquid Crystals for Nondestructive Evaluation	NTIAC-78-2
The Barkhausen Effect and Its Application to NDE	NTIAC-79-2
NDE Applications of Magnetic Leakage Field Effects (A State-of-the-Art Survey)	NTIAC-80-1
Technology Assessment of Optical Methods for Nondestructive Evaluation (Part I)	NTIAC-80-2
Technology Assessment of Optical Methods for Nondestructive Evaluation (Part II)	NTIAC-81-1
Nondestructive Evaluation of Fiber Reinforced Composites, Vol. 1	NTIAC-82-1
Ultrasonic Transducers - Performance Variability, Design, and Manufacturing Procedures	NTIAC-84-1
Automated Radiography, 2nd Edition	NTIAC-84-2
BIBLIOGRAPHIES	
Economics of NDE, A Bibliography	NTIAC-80-3
Life Predictions/Failure Probability Utilizing NDE and Fracture Mechanics, A Bibliography	NTIAC-81-2
Acoustic Emission, A Bibliography	NTIAC-82-2
Electromagnetic-Acoustic Transducers, A Bibliography	NTIAC-83-1
HANDBOOKS	
NTIAC Handbooks	NTIAC-79-1
Handbook Revision/Supplement No. 1	NTIAC-82-3
Depot Maintenance Handbook	NTIAC-85-1
ACE/AACE Inspection and Analysis Handbook	NTIAC-85-2
CONFERENCE PROCEEDINGS	
Proceedings of a Workshop on NDE of Residual Stress (microfiche copies only)	NTIAC-76-2
12th Symposium on NDE, Proceedings	
13th Symposium on NDE, Proceedings	
14th Symposium on NDE, Proceedings	
15th Symposium on NDE, Proceedings	
Proceedings of Conference on Nondestructive Testing and Evaluation of Advanced Materials and Composites, August 19-21, 1986	

PLASTICS TECHNICAL EVALUATION CENTER (PLASTEC)

Charles Yearwood , Director
Plastics Technical Evaluation Center
Armament Research Development and Engineering Center (ARDEC)
US Army Armament, Materials and Chemicals Command
Picatinny Arsenal, NJ 07806-5000

MISSION AND SCOPE

PLASTEC is one of 21 information analysis centers sponsored by the Department of Defense to provide the defense community with a variety of technical information services applicable to plastics, adhesives, and organic-matrix composites. Since 1960 PLASTEC has been supplying this community with authoritative information and advice in such forms as engineering assistance, responses to technical inquiries, special investigations, field troubleshooting, failure analysis, literature searches, state-of-the-art reports, data compilations, and handbooks. PLASTEC is also a good source of information on standardization activities in plastics.

ORGANIZATION

The staff includes chemical engineers, and chemists, all of whom have worked for or with material suppliers, manufacturers, the Department of Defense, and other agencies and departments of the Government. They have had extensive personal experience in research, component design and development, as well as in testing and evaluation.

It should also be mentioned that PLASTEC is backed up by staff resources of ARDEC's Organic Materials Branch. Plastic design, development, fabrication, and testing area carried on in one major area of the branch, and adhesives engineering and development in the other. The branch's capabilities are being strengthened in elastomers, fluids, and lubricants technology. Well equipped laboratories complement the diverse technical skill of the staff.

INFORMATION OPERATIONS

Evaluation and Analysis

The significant difference between a Library and a Technical Evaluation Center is the quality of the information provided the user. PLASTEC uses its data base "library" as a means to an end--to provide succinct and timely information which has been carefuly evaluated and analyzed. Examples of this activity

include recommendation of materials, counseling on designs, and performing trade-off studies between various materials, performance requirements, and costs. Applications are examined consistent with current manufacturing capabilities; market availability of new and old materials alike is considered. PLASTEC specialists can reduce raw data to the user's specifications and supplement them with unpublished information which updates and refines published data. PLASTEC works to spin-off the results of government sponsored R&D to industry and similarly to utilize commercial advancements to the government's benefit; a realization of the technology transfer goals.

The Data Base

PLASTEC has a highly specialized library to serve the varied needs of both its own staff and its customers. Undoubtedly the most useful part of this library is the file of more than 45,000 documents. This file is made up primarily of significant government-sponsored work and conference papers. Each document, whether it has been received on automatic distribution or as the result of a request, is first evaluated by a staff specialist to determine whether it should be retained. Those that are retained are then indexed, abstracted, and processed into a data base. This data base is machine searchable on-line by subject, author, contractor, document number, etc. About 2,000 new documents are added to the collection each year.

PLASTEC's library also includes about 1,000 hard-cover books, 200 of the most significant journals, trade literature, a complete microfilm file of government and industrial specifications and standards, and selected bibliographies.

In addition to its own document file, PLASTEC has on-line access to the records of the Defense Technical Information Center (DTIC) and to NASA's RECON to supplement the resources of government-operated data bases, for access to the open literature. PLASTEC subscribes to several major commercial retrieval systems.

COMPAT

COMPAT, a computerized retrieval program operated by PLASTEC, provides rapid access to a unique body of compatibility data covering the effects of energetic materials (explosives, propellants, pyrotechnics, etc.) on inert materials (polymer, metals, adhesives, coatings, sealants, etc.) and vice versa. The information available in the system is both extensive, covering more than 7,000 items, and comprehensive.

COMPAT, which uses the computer facility at Picatinny Arsenal , can be used by all government agencies and by private industry on a service fee basis. Subscribers who have the necessary equipment may choose to access the computer directly through a conventional telephone/teletype link, with answers being printed out immediately. Subscribers without such means of direct access may request data by either mail or phone. A descriptive brochure is available on request.

SERVICES AND PRODUCTS

Publications

From time to time PLASTEC specialists publish technical reports or notes on information felt to be of general interest to the technical community. These documents are distributed by the National Technical Information Service of the Department of Commerce (NTIS) located at 5285 Port Royal Road, Springfield, Virginia 22161 at a price commensurate with their handling and printing costs. A complete list of PLASTEC reports and notes is available upon request.

SPECIAL SERVICES

As an offshoot of its in-house information activities, PLASTEC has developed the capability to design and develop computerized information files to meet special needs. Two such systems have already been completed, one for information on the effects of chemical and biological agents and decontaminants on materials and the other on hazard assessments of various explosive and propellant manufacturing operations. Access to these two files is on a need-to-know basis.

AVAILABILITY of SERVICES and PRODUCTS/CHARGES/PAYMENT OPTIONS

At the direction of DoD, PLASTEC's services are made available to the entire U.S. scientific and technical community upon payment of a fee. This fee, whose amount is determined by the kind of service requested, is paid directly to PLASTEC. Minor requests for information by government agencies and contractors are responded to without charge. Payments made to PLASTEC enable this center to recover some of its operating expenses and thereby make funds available to improve and expand its information activities.

How Plastec Works

Here is an actual example of how PLASTEC used its resources to respond to a request for assistance from a customer with a problem. The customer had asked for information on the permeablity of hydrogen gas through polyurethane foam.

The original request, made by phone, was followed by a letter further defining the problem, and including additional information about materials, properties, and the application involved. A PLASTEC subject specialist and information specialist both participated in the preliminary discussions, during which it was decided what time period should be covered by the investigation and which data banks would be used. PLASTEC estimated the cost for this service. The customer estimate was based on the hours of effort involved by the PLASTEC staff, multiplied by the current hourly rate. Five machine searches were then made which included searches of the PLASTEC file, DTIC, NTIS, Lockheed's DIALOG, and

Engineering Information data base. The results of each search were reviewed and pertinent references were ordered off-line. The results of the searchers, accompanied by an explanatory cover letter and an invoice, were forwareded to the customer. The fee for this sercice was $250.00.

CONTACT POINT

PLASTEC can be reached by writing to the following address:

Mr. Charles Yearwood, Director
PLASTEC
Armament Research, Development and Engineering Center
Picatinny Arsenal, NJ 07806-5000
Telephone: (201) 724-4222
Autovon: 880-4222.

PLASTEC is located at Picatinny Arsenal, near Dover in northern New Jersey, off Interstate 80, an hour from New York City and Newark Airport.

PAVEMENTS AND SOIL TRAFFICABILITY INFORMATION ANALYSIS CENTER (PSTIAC)

Gerald W. Turnage, Director
US Army Engineer Waterways Experiment Station
P.O. Box 631
Vicksburg, Mississippi 39180

ORIGIN

A memorandum of 19 April 1966 from the Director of Defense Research and Engineering to the Assistant Secretary of the Army, Research and Development, directed the establishment of eight Department of Defense (DoD) Information Analysis Centers. The PSTIAC was one of four Centers located at the Waterways Experiment Station (WES). It was established to acquire, analyze, evaluate, condense, and disseminate the world's literature in subject areas of concern.

MISSION AND SCOPE

The PSTIAC provides information in a clearly defined mission-oriented subject area which is of special interest to the Department of the Army and other elements of the DoD. Subjects covered by the Center include flexible and rigid pavements, expedient surfacing, ground flotation, and research in surface vehicle mobility, trafficability, and terrain analysis. This work is directed primarily toward military needs and priority is given to agencies of the DoD and their contractors. An appreciable amount of assistance is provided to mission-oriented work at WES. Services are also available to others in the scientific community, private sector, and industry at large subject to facility and manpower limitations.

ORGANIZATION

The director of PSTIAC is the only full-time employee of the Center. He is responsible for planning, directing, and executing the work of the Center. Technical assistance in answering specific inquiries is provided as needed by a number of experienced engineers and scientists on the staff of the Mobility Systems Division (MSD) and the Pavement Systems Division (PSD) of the Geotechnical Laboratory (GL), and the Environmental Systems Division (ESD) of the Environmental Laboratory (EL), WES. Secretarial assistants provide help on a part-time basis as needed. The Technical Information Center (TIC) at WES supports PSTIAC activities in its capacity as a central source of technical information. It consists of a Library Branch and Special Projects Branch.

Most of the funds for operation of the Center are provided by the US Army Materiel and Readiness Command (DARCOM). Some additional monie are obtained by reimbursement of costs for services.

INFORMATION OPERATIONS

The principal purpose of the PSTIAC is to provide the user community with a comprehensive, readily accessible source of current information within the scope of the Center's activities. The Center has access to two principal direct sources of information: index files and bibliographies developed and located at the Center, and information in the library of the TIC at WES.

PSTIAC Microthesaurus

One of the first tasks of the Center was the development and publication of a microthesaurus of vehicle mobility, environment, and pavement terms (see "Publications"). This was an important undertaking because the key word terms in the thesaurus are not only basic to the systematic storage and retrieval of literature compiled by PSTIAC and the TIC library, but by other organizations and information centers working in the field. The thesaurus has been integrated into a WES microthesaurus covering a larger number of engineering and scientific terms. The PSTIAC microthesaurus follows COSATI guidelines. Each main term is referenced with respect to "use," "use for," "broad," "narrow," and "related" to assist the user in selecting proper key words for indexing and searching literature. Also, each term is coded with the letters M, E, and P, individually or in combination, to designate usage of the term in subject fields of mobility, environment, and pavements, respectively.

Indexes

Published indexes from various scientific organizations and indexes compiled from technical periodicals relating to vehicle mobility and terrain provide an important source of information. Some of the more important indexes on file in the Center and the period of record of each are:

a. Samarbetsorganisationen for Fordon-Markforskning (SFM) Literature Index, 1968-1978 (includes abstracts of articles on mobility and terrain).
b. The Motor Industry Research Association (MIRA) Automobile Abstracts, 1955-1981.
c. Society of Automotive Engineers (SAE) Transactions, Index Abstracts, 1966-1978.
d. Cumulative Index of SAE Technical Papers, 1965-1978.
e. Author and Subject Index to the Soil Science Society of America Proceedings, 1947-1971.
f. Author and Subject Index to the Soil Science Society of America Journal, 1945, 1972-1981.
g. Comprehensive Index of American Society of Agricultural Engineers (ASCE) Publications, 1971-1980.

h. Author and Subject Index of the Shock and Vibration Digest, 1975-1981.
i. Author and Subject Index of Tire Science and Technology, 1973-1978.
j. Index of Material Published in Soviet Soil Science, 1972-1979.
k. Index of Authors, Titles, and Keywords of the Military Engineer, 1968-1979,
l. Author and Subject Index of GEO Abstracts, Landforms and the Quaternary, 1972-1981.
m. Armor Magazine Title and Author Index, 1974, 1980.
n. Vehicle System Dynamics Subject Index, 1972-1973, 1976-1977.

TIC Library

PSTIAC draws heavily on the TIC Library at WES for its information. About 50,000 items relating to subjects of interest to PSTIAC including books, technical reports, periodicals, reprints, and three types of microforms are on file. Indexes in the library of some relevance to PSTIAC include Engineering Index, Monthly Catalog of US Government Publications, and Government Reports Index. The Center has ready access to the library catalog, which is the primary tool for the retrieval and dissemination of information for WES and the Corps of Engineers. In addition, it has catalogs from several other libraries and information centers in either card or book form. Items of relevance include US Geological Survey Library, Engineering Societies Library, John Crerar Library in Chicago, American Geophysical Society, and the Library of Congress (including Library of Congress Catalog of Printed Cards, National Union Catalog of the Library of Congress, Library of Congress Author Catalog, and Library of Congress Catalog, Books (Subjects)).

A remote on-line terminal in the WES library links the Center to the Defense Research and Development Test and Evaluation On-Line System at DTIC. Information from the Technical Report Data Bank, the Work Unit Data Bank, and Research and Development Program Planning Data Bank can be displayed on the terminal screen and a printout of the information on the screen can be obtained through the console. Operators can acquire on-the-spot information while the requester observes the structuring of the search. An additional terminal in the library is available for searches on-line, from Lockheed Information Systems DIALOG, which provides access to more than 50 machine computer-readable databases.

SERVICES AND PRODUCTS

PSTIAC serves its user community through personal technical advisory service working in close coordination with the staff of the WES TIC. Information is provided by mail, telephone, interoffice communication, or in person.

Technical inquiries and requests for publications

Requests for assistance are given high priority and quick response. Requests for general technical information or data, bibliographies or abstracts, information on vehicles and test equipment, and sources of specific information

are handled by the Center. Highly technical questions that cannot be answered by the Center are referred to engineering or scientific specialists at WES (see Contact Point) or others in the scientific community. Requsts for publications for loan are referred to the library. Requests for publications for retention are referred to the Publications Distribution Section at WES or to private or other governmental agencies that distribute publications. For example, requests from DoD users for technical publications (with an AD number) not available at WES are referred to the Defense Technical Information Center(DTIC); other requests are referred to the National TechnicalInformation Center(NTIS).

Current awareness program

The Center, working in close coordination with the library, circulates current bibliographic citations, abstracts, and occasionally copies of pertinent papers. Information is obtained from technical journals, proceedings of professional societies, technical abstract services, scientific periodicals, and DTIC profile listings. Recipients are in-house engineers and scientists and some outside specialists who have specific needs for this information.

Report biblioigraphies

Another important undertaking of the Center has been the compilation and publication of bibliographies of WES reports on vehicle mobility, terrain, and pavements, respectively (see Publications for listing of reports). The bibliographies include listings of report titles, indexes for subject, personal author, corporate author, geographical region and miltary base, and report documentation page data including abstracts of the reports. These bibliographies provide an important source of information in quick-response replies to inquiries by customers of the Center.

Standards for off-road mobility

The Center, in conjunction with the International Society of Terrain-Vehicle Systems (ISTVS), has prepared a set of Standards relevant to off-road mobility. Three sections have been completed to date:

Section A: Glossary of Terrain-Vehicle Terms
Section B: Soil-Test Devices Associated with Soil-Vehicle Tests
Section C: Abbreviations and Symbols

The Standards have been published in the Journal of Terramechanics, 1977, Volume 14, No. 3, pages 153-182, Pergamon Press. The Standards were adapted by ISTVS in 1978 and are used by all researchers in the field of vehicle mobility.

Publications

Reports published by the Center include:

a. PSTIAC-1, "Microthesaurus of Vehicle Mobility, Environment, and Pavement Terms," April 1975 (AD A011 269).

b. PSTIAC-2, "Bibliography of Papers Presented at Meetings or in Technical Journals on Studies of the Mobility of Envirnomental Systems Laboratory," by Marvin P. Meyer, November 1975 (AD A018 290).
c. PSTIAC-3, "A Bibliography with Abstracts of U.S. Army Engineer Waterways Experiment Station Publications Related to Vehicle Mobility," by Marvin P. Meyer, August 1976 (AD 031 524).
d. PSTIAC-4, "A Bibliography with Abstracts of U.S. Army Engineer Waterways Experiment Station Publications Related to Terrain," by Marvin P. Meyer, June 1977 (AD A043 789).
e. PSTIAC-5, "A Bibliography with Abstracts of U.S. Army Engineer Waterways Experiment Station Publications Related to Pavements:"
   (1) "Volume I: List of Reports and Indexes," by M. P. Meyer and Virginia Dale, August 1977 (AD A045 024).
   (2) "Volume II: Report Documentation Page Data, Part 1: Bulletins, Instruction Reports, Miscellaneous Papers," by M. P. Meyer and Virginia Dale, August 1977 (AD A045 025).
   (3) "Volume II: Report Documentation Page Data, Part 2: Technical Memoranda, Technical Reports, Pavements and Soil Trafficability Information Analysis Center Reports, Contract Reports," by M. P. Meyer and Virginia Dale, August 1977 (AD A045 026).

SPECIAL SERVICES

In addition to its other activities, the Center participates in planning national and international meetings of professional societies and WES laboratory symposia and workshops in pavements and mobility. Financial assistance is given when available and appropriate. Facilities and personnel are also available for conducting state-of-the-art surveys. Technical assistance is provided to foreign military personnel on tours of duty in this country.

CHARGES/PAYMENT OPTIONS

No charges are made for letter, telephone, or in-person inquiries that normally require less than one-half day to answer. Jobs requiring more time are charged on a cost-reimbursable basis.

CONTACT POINT

Names, addresses, and telephone numbers of organizations or individuals directly related to or assisting in PSTIAC activities are as follows:

Location of PSTIAC
US Army Engineer Waterways Experiment Station
P. O. Box 631
Vicksburg, MS 39180
Telephone No.(601) 634-3111 or FTS 542-3111

Director, PSTIAC
Mr. Gerald W. Turnage
Address as above, ATTN: PSTIAC
Telephone No. (601) 634-2734 or FTS 542-2734

Chief, Technical Information Center
Mr. James A. Sherlock
Address as above, ATTN: WESTV
Telephone No.(601) 634-2533 or FTS 542-2533

Chief, Library Branch, Technical Information Center
Mrs. Bernice Black
Address as above, ATTN: WESTL
Telephone No.(601) 634-2542 or FTS 542-2542

Chief, Mobility Systems Division, Geotechnical Laboratory
Mr. Clifford J. Nuttall, Jr.
Address as above, ATTN: WESGM
Telephone No.(601) 634-2447 or FTS 542-2447

Chief, Pavement Systems Division, Geotechnical Laboratory
Mr. Harry H. Ulery, Jr.
Address as above, ATTN: WESGP
Telephone No.(601) 634-3304 or FTS 542-3304

Chief, Environmental Systems Division, Environmental Laboratory
Dr. Lewis E. Link, Jr.
Address as above, ATTN: WESEN
Telephone No.(601) 634-2683 or FTS 542-2683

Technical reports for DoD personnel:
Defense Technical Information Center
Building 5, Cameron Station
Alexandria, VA 22304
Telephone No.(202) 274-7633

Technical reports for non-DoD personel:
National Technical Information Service
5825 Port Royal Road
Springfield, VA 22161
Telephone No.(703) 487-4650 (rush handling 1-800-336-4700)

RELIABILITY ANALYSIS CENTER
(RAC)

Mr. Steven J. Flint, Technical Director
IIT Research Institute
RADC/RAC
Griffiss AFB, NY 13441-5700

ORIGIN

The Reliability Analysis Center (RAC) is a Department of Defense Information Analysis Center which functions as a focal point for reliability technology, information, techniques and data. The RAC has been operated by IIT Research Institute under contract to the U.S. Air Force since its inception in 1968, first at its Chicago headquarters and since 1972 at the Rome Air Development Center, Griffiss Air Force Base, New York.

Beginning with a small core staff, the RAC has grown in response to the rapid growth in reliability technology and user needs. It is currently staffed by about 35 engineers, analysts, computer scientists and support staff to fulfil the RAC mission and associated user funded special tasks.

During the Center's nineteen years of operation, numerous modifications and changes have been implemented to build RAC into a prime motivating force for the achievement of reliable, cost-effective military systems. RAC products and services are continually enhanced and refined, its scope extended and its engineering staff expanded in direct response to changing reliability technology and user needs. A computer-based information system has been developed to support the RAC mission, and includes an extensive database system. The RAC engineering services are made available, under service charge arrangements, directly to government agencies and contractors.

During its 19 year history, RAC has expanded from an initial concentration in component reliability, to now include system reliability, reliability statistics, maintenance, mechanical structures reliability, packaging reliability, and reliability software. The growth in engineering services supplied have also extended RAC knowledge into an extensive array of tools and techniques. Since 1976, RAC has also developed courses in reliability technology, statistics, quality-productivity improvement, electrostatic discharge damage control, electronic equipment testability, and worst case analysis and currently teaches over 1000 government/industry personnel each year.

RAC is recognized as a leading resource in reliability technology and RAC staff members serve on industry standardization committees, in professional societies and technical symposium management committees and also participate in technical conference and symposia programs. From time to time, RAC also

augments its in-house expertise by engaging consultants recognized as reliability experts in specific fields.

Since RAC is co-located with the Systems Reliability and Engineering Division and the Microelectronics Reliability Division Rome Air Development Center, there is an opportunity for frequent dialogue with Air Force R&M specialists, particularly in the areas of rapidly advancing technologies such as microprocessors, VLSI and VHSIC integrated circuits, and equipment R&M prediction and demonstration methods.

INFORMATION OPERATIONS

The Reliability Analysis Center has continuously and effectively performed the function of providing valuable reliability information services to DoD agencies, their contractors and industrial organizations. RAC data files have been automated and expanded through the recent acquisition of an HP 9000 series computer in the Unix environment, with the Informix dbms. The data collection effort encompasses R&D activities, device design and manufacturing processes, system application and testing and field operations covering a broad spectrum of source organizations. Services have been periodically modified, redesigned and expanded to remain responsive to the changing needs of its users.

The RAC carries on an aggressive data collection effort in government and private sectors of the electronics community involved with research, development, production, quality assurance, reliability and deployment of electronic components and systems. Both published and unpublished data are sought. Published data appear in readily available forms such as government-funded R&D reports (Defense Technical Information Center: DTIC and National Technical Information Service: NTIS), technical society and trade journals, conference and symposia proceedings, etc., and thus relevant items are easily identified. Because it represents the key RAC data resource, the major thrust of RAC's data solicitation effort is directed toward unpublished sources, particularly equipment and systems development and procurement programs as well as field operating experience. Methods have been devised for recovering significant volumes of this data.

In addition to the HP 9000 system, RAC also utilizes a range of mainframe and personal computers.

SERVICES AND PRODUCTS

- o Data searches for reliability of specific parts/systems.
- o Engineering/analytical services in the prime areas of:
  - Reliability Engineering (Electronic and Mechanical)
  - Reliability Statistics
  - Reliability Management

- o Training Courses/Seminars in:
  - Design for Reliability
  - Practical Reliability Statistics
  - Testabilty
  - Worst Case Analysis
  - Electro-static Discharge
- o Reliability Newsletter
- o Publications in the prime areas of databooks, state-of-the-art reviews, technical study reports, handbooks. Selected publications are also available on IBM-PC compatible floppy disks.

An quarterly newsletters is also provided free of change to over 22,000 persons on the RAC mailing list. Contents include notification of new reliability products, technical meetings, reliability research, and other items of interest to RAC users.

AVAILABILITY of SERVICES and PRODUCTS

The Reliability Analysis Center offers a Full Service Participation Plan which affords full access at all times to the vast RAC reliability data resources by payment of a single annual participation fee.

The RAC Full Service Participation Plan is open to all U.S. Government agencies, government contractors, commercial producers and users, device vendors, laboratories, educational institutions and qualified foreign organizations.

CHARGES/PAYMENT OPTIONS

A RAC Full Service Participation Plan can be opened in two ways:

- o Pre-deposit of a minimum amount of $500.00 U.S. ($575.00 non U.S.).
- o A purchase order (not less than $500.00 ($575.00 non U.S.) with a "not-to-exceed" amount indicated. RAC will bill for services and publications quarterly.

CONTACT POINT

To place an order or for general information:

Gina Nash	315/330-4151 AV: 587-4151

Technical inquiries:

Gregory Chandler	315/337-9933

SOIL MECHANICS INFORMATION AND ANALYSIS CENTER (SMIAC)

Paul F. Hadala, Director
US Army Engineer Waterways Experiment Station
P.O. Box 631
Vicksburg, Mississippi 39180-0631

ORIGIN

A memorandum of 19 April 1966 from the Director of Defense Research and Engineering to the Assistant Secretary of the Army, Research and Development, directed the establishment of eight Department of Defense (DoD) Information Analysis Centers. The Soil Mechanics Information and Analysis Center (SMIAC) was one of four Centers located at the Waterways Experiment Station (WES). It was established to acquire, analyze, evaluate, condense, and disseminate the world's literature in subject areas of concern.

MISSION and SCOPE

The SMIAC provides information in a clearly defined mission-oriented subject area, which is of special interest to the Department of the Army and other elements of the DoD. Subjects covered by the Center include soil mechanics, engineering geology, rock mechanics, seismology, geophysics, and earthquake engineering. This work is directed primarily toward military needs and Corps of Engineers Civil Works missions and priority service is given to agencies of the DoD and its contractors. An appreciable amount of assistance is provided to mission-oriented work at WES. Services are also available to others in the scientific community, private sector, and industry at large; subject to facility and manpower limitations.

ORGANIZATION

The Center normally has three employees: A part-time Director, another engineer, and a part-time secretary. The Director is responsible for planning, directing, and executing the work of the Center. Technical assistance in answering specific inquiries is provided as needed by a number of experienced engineers and scientists on the staff of the Geotechnical Laboratory (GL) at WES. The Technical Information Division (TID) of the Information Technology Laboratory at WES supports the SMIAC activities in its capacity as a central source of technical information. It consists of a Library Branch, Special Projects Branch, and a Reports Distribution Section. The Office, Chief of Engineers provides limited Civil Works funding for the SMIAC. The Center has no military funds, consequently priority is given to Civil Works requests.

INFORMATION OPERATIONS

The SMIAC has the technical capability to provide the user community with a comprehensive, readily accessible source of current information within the scope of the Center's activities. The Center has access to three principal sources of information: data files developed and located at the Center; information in the Library in the TID at WES; and the knowledge and experience of the professional staff of the GL, which consists of professionals, many of whom have advanced degrees and some of whom are considered as international experts in their respective subdisciplines.

The day-to-day operation of the Center involves responses to requests for information. These responses take two forms: (1) oral or written advice from a technical expert on the WES staff and/or, (2) a literature search which results in a bibliography and a set of abstracts which are furnished to the requester.

In addition to the card catalog in the TID Library, other primary sources used in the searches are Geodex, Geotechnical Abstracts, Rock Mechanics Abstracts, and the indexes of all major journals in the field. A current awareness service is also provided to WES geotechnical engineers on a routine basis.

The TID Library contains 75,000 items relating to subjects of interest to SMIAC including books, technical reports, periodicals, reprints, and three types of microfilms are on file. Indexes in the TID library of some relevance to SMIAC include Engineering Index, Applied Science and Technology Index, British Technology Index, the Monthly Catalog of U.S. Government Publications, Government Reports Index, and Geodex. The Center has ready access to the TID Library catalog, which is the primary tool for the retrieval and dissemination of information for WES and the Corps of Engineers. In addition, it has several other catalogs from libraries and information centers in either card or book form. Items of relevance include U.S. Geological Survey Library, Engineering Societies Library, John Crerar Library in Chicago, American Geophysical Society, and the Library of Congress (including Library of Congress Catalog of Printed Cards, National Union Catalog of the Library of Congress Author Catalog, and Library of Congress Catalog, Books (Subjects)).

A remote on-line terminal links the SMIAC through the TID Library to the Defense Research and Development Test and Evaluation On-Line System. Information from the Technical Report Data Bank, the Work Unit Data Bank, and Research and Development Program Planning Data Bank can be displayed on the terminal screen and a printout of the information on the screen can be obtained through the console. Operators can acquire on-the-spot information while the requester observes the structuring of the search. An additional terminal in the TID Library is available for searches on-line and from Lockheed Information Systems DIALOG, which provides access to more than 50 computer-readable data bases.

SERVICES and PRODUCTS

The SMIAC serves its user community through personal technical advisory service working in close coordination with the staff of the WES TID. Information is provided by mail, telephone, interoffice communication, or in person.

Technical Inquiries and Requests for Publications

Requests for assistance are given high priority and quick response. Requests for general technical information or data, bibliographies or abstracts, and sources of specific information are handled by the Center. Highly technical questions that cannot be answered by the Center are referred to engineering or scientific specialists at WES (see Contact Point), or others in the scientific community. Requests for publications for loan are referred to the Library. Requests for publications for retention are referred to the Publications Distribution Section at WES. Other private or Government agencies that distribute publications not available at WES are referred to the Defense Technical Information Center; other users are referred to the National Technical Information Service.

Publications

Reports published by the Center include:

a. Periodic Lists of Recently Acquired Publications on Soil Mechanics and Related Subjects (prepared in cooperation with the TID Library).

b. Proceedings of the Symposium on Application of the Finite Element Method in Geotechnical Engineering, edited by C. S. Desai, Volume 1-11, May 1972, US Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.

c. Microthesaurus of Soil Mechanics Terms, April 1974, US Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.

CHARGES/PAYMENT OPTIONS

No charges are made for letter or telephone inquiries that normally require less than one-half day to answer. Jobs requiring more time are charged on a cost-reimbursable basis.

CONTACT POINT

Names, addresses amd telephone numbers of organizations or individuals directly relating to or assisting in SMIAC activities are as follows:

Location of SMIAC

U.S. Army Engineer Waterways Experiment Station
P.O. Box 631
Vicksburg, Mississippi 39180-0631
Telephone No: 601/634-3111 or FTS 542-3111

Director, SMIAC

Dr. Paul F. Hadala
Address as above, ATTN: WESGV-IC
Telephone No: 601/634-3475 or FTS 542-3475

Chief, Technical Information Center

Mr. James A. Sherlock
Address as above, ATTN: WESIM-T
Telephone No: 601/634-2533 or FTS 542-2533

Chief, Library Branch, Technical Information Center

Ms. Bernice Black
Address as above, ATTN: WESIM-TL
Telephone No: 601/634-2542 or FTS 542-2542

SURVIVABILITY/VULNERABILITY INFORMATION ANALYSIS CENTER (SURVIAC)

John M. Vice, Director
AFWAL/FIES/SURVIAC
Wright-Patterson AFB, Ohio 45433-6553

ORIGIN

The Survivability/Vulnerability Information Analysis Center (SURVIAC) began operations on 21 December 1984. SURVIAC was formed from the merger of two pre-existing functions--the Combat Data Information Center (CDIC) and the Aircraft Survivability Model Respository (ASMR). The CDIC was a central repository for combat and test data related to weapon system survivability and vulnerability. It was sponsored by the Joint Technical Coordinating Groups for Aircraft Survivability and Munitions Effectiveness and had been in continuous operation since 1970. The Aircraft Survivability Model Respository was established in 1981 to serve as a focal point for models related to aircraft survivability. It was sponsored by the Joint Technical Coordinating Group on Aircraft Survivability. Both the CDIC and ASMR were operated under the technical monitorship of the Flight Dynamics Laboratory at Wright-Patterson AFB, Ohio and were located in Flight Dynamics Laboratory facilities.

MISSION and SCOPE

The purpose of the SURVIAC is to increase the knowledge and productivity of scientists, engineers and analysts engaged in nonnuclear survivability/vulnerability and lethality scientific and engineering programs for the DoD.

The SURVIAC's mission is to perform the functions of a full-service DoD IAC (as described in DoD 3200.12-E-2, "Centers for Analysis of Scientific and Technical Information") in the vital technical areas of nonnuclear survivability/vulnerability and lethality. SURVIAC's specific mission is to maintain a technology base of its technical area, provide authoritative responses to user inquiries, provide technical assistance and support to its user community, prepare authoritative technical reference works (i.e., handbooks, data books, state-of-the-art reports, etc.) and perform special tasks and studies. The SURVIAC's technical area is nonnuclear survivability/vulnerability and lethality as they relate to U.S. and foreign aeronautical and surface targets. Nuclear survivability information is provided by the DoD Nuclear Information and Analysis Center (DASAIC).

The nonnuclear threats included within SURVIAC's scope are: (1) conventional weapons (i.e., small arms/automatic weapons (SA/AW), anti-aircraft artillery

(AAA), surface-to-air missiles (SAMs), air-to-air guns, air-to-air missiles (AAM), field artillery and direct fire weapons (i.e., tanks, TOWs, etc.)), (2) directed energy weapons including laser, millimeter wave and particle beams and (3) chemical/biological weapons. Data requirements in the threat area include, as applicable, acquisition, detection, tracking, launch, fly-out and fuzing characteristics, the countermeasures and counter-countermeasures employed, and terminal effect.

Both U.S. and foreign aeronautical and surface targets are included within SURVIAC's scope. The aeronautical targets include fixed and rotary-winged aircraft (manned and unmanned), and missiles. Surface targets include tanks, trucks, armored personnel carriers, artillery, radar vans, shelters and other similar items. Data requirements in these areas include, as applicable, physical and functional characteristics; design, performance and operational information: acoustic, infrared, optical, electro optical and radar signatures; combat damage and repair; and system, subsystem and component probability of kill given a hit (Pk/h) functions. Initial holdings are concentrated on aeronautical targets with an expanding scope to surface targets.

ORGANIZATION

A full-time staff of Booz, Allen & Hamilton Inc professional engineers, computer scientists, information specialists and support members operate the SURVIAC. Assistance to SURVIAC is provided by the SURVICE Engineering Company and Battelle Memorial Institute for system vulnerability and susceptibility matters, respectively. The extensive staff of Booz, Allen employees located in offices around the world is also available to SURVIAC as required. Other subcontractors and consultants may be hired for specific projects requiring specialized expertise. To address the survivability concerns of organizations located in the Washington, DC area, a SURVIAC Satellite Office is maintained at the Booz, Allen facility in Arlington, Virginia .

INFORMATION OPERATIONS

The capabilities of the SURVIAC include the technology base of information and data held by and available to the SURVIAC, the physical facilities and equipment used to store, retrieve and process this information and data, and the skilled personnel required to use and analyze them. The technology base consists of data, reports, data bases, models, methodologies, libraries, etc. These are availaable as computer-resident and computer-retrievable files as well as hard copy libraries from which information is manually retrievable. Much of the information and data are classified and, therefore, stored in secure computer facilities and large, secure vaults. These libraries and equipment are physically located at Wright-Patterson AFB, Ohio, Area B, Building 45. The computer capabilities of the Aeronautical Systems Division Information Systems and Technology Center are used for the computerized technology base. SURVIAC maintains four reference libraries with copies of the document available on

site and retrievable through computerized operations with key word searches. Also, arrangements have been made with seven other library-type data bases for on-line access to additional specialized information resources related to SURVIAC's technical area. The SURVIAC libraries currently total approximately 11,000 separately retrievable items. SURVIAC also maintains five major additional numerical data bases focusing on combat damage and survivability testing of systems, subsystems and components. A "single-incident" philosophy has been adopted for these data bases where each individual data record is backed by a folder which contains all known information relevant to that incident. SURVIAC currently maintains and disseminates to qualified requesters copies of selected survivability models and their documentation. SURVIAC provides configuration control and limited technical support to the survivability and lethality communities for these models.

SERVICES and PRODUCTS

SURVIAC provides the full range of services inherent to DoD information analysis center (IAC) operations including response to bibliographic and technical inquiries and referrals to other centers or organizations when appropriate. SURVIAC has also hosted several workshops and offers training on the SURVIAC models. Special tasks, funded by the requesting organization, are conducted consistent with the SURVIAC charter and technical area. The full range of IAC products such as handbooks, data books, state-of-the-art reports, critical reviews and technology assessments, etc., will be provided. A critical review has been produced and the first data book is in publication. Another data book, a handbook and SOAR are also being prepared for publication.

SPECIAL SERVICES

Requests for detailed or extensive analytical efforts will be handled as special studies and tasks and require funding. Again, specific arrangements to accomplish the work will be worked out with the requester. A qualified SURVIAC monitor will be assigned to every special study and task. Skills may be obtained from the SURVIAC, other Booz, Allen technical experts, subcontractors, consultants or other highly qualified individuals or corporations.

AVAILABILITY of SERVICES and PRODUCTS

SURVIAC services and products are available currently to all "qualified" users. A qualfied user is a member of a DoD or other Government organization as well as U.S. Government contractors who have valid needs for SURVIAC information. Contractors who require SURVIAC products and services must have current, valid Government contracts for which the information is needed. Also, since much of the information in SURVIAC's technical area is classified, normal security requirements such as security clearances and need-to-know requirements must

also be met. SURVIAC does have a user charge system in place consistent with DoD instrutions for information analysis centers. A quarterly unclassified newsletter providing SURVIAC Current Awareness Bulletin is available at no charge and is circulated to more than 8000 individuals and organizations. A comprehensive 30 to 60 minute briefing on the SURVIAC is also available upon request.

Requests for service may be directed to the SURVIAC by letter, teletype, or simply by telephone. Specific arrangements to accomplish the work will be made with the requester.

CHARGES/PAYMENT OPTIONS

Payment can be handled by purchase order or, for Department of Defense agencies, via Military Interdepartmental Purchase Request (MIPR) through the basic SURVIAC contract. Specific procedures may be obtained by contacting SURVIAC.

CONTACT POINT

The SURVIAC may be contacted by writing to the SURVIAC at:

AFWAL/FIES/SURVIAC
Wright-Patterson AFB, OH 45433-6553

By calling :

AUTOVON 785-4840
Commercial (513) 255-4840

By visiting the SURVIAC at:

Building 45, Area B
Wright-Patterson AFB, Ohio.

The SURVIAC Satellite Office may be contacted by writing to:

SURVIAC
Booz, Allen & Hamilton, Inc.
Crystal Square 2, Suite 1100
1725 South Jefferson Davis Highway
Arlington, VA 22202

By calling: Commercial (703) 769-7720

TACTICAL TECHNOLOGY CENTER (TACTEC)

Larry W. Williams, Director
Battelle Columbus Division
505 King Avenue
Columbus, Ohio 43201-2693

ORIGIN

In 1963, the Defense Advanced Researach Projects Agency (DARPA) contracted with Battelle Columbus Division for the establishment of the Remote Area Conflict Information Center (RACIC). RACIC was directed by DARPA to respond to the information needs of all DoD components where these needs were within its scope. As part of this primary responsibility, RACIC was to maintain holdings of technical reports and other information pertaining to counterinsurgency and overseas defense research.

During its lifetime, RACIC acquired over 30,000 documents, answered approximately 4500 inquiries and responded to the needs of over 1200 visitors.

In November 1971, DARPA announced its reorientation of RACIC to include the broader scope of tactical warfare and renamed the Center the Tactical Technology Center (TACTEC). Since then, TACTEC has provided support to the DoD's tactical warfare and technology activities. Organized as it is within Battelle, the Center enjoys a particular advantage in that it can draw upon the capabilities of Battelle's more than 1600 engineers and scientists. Thus, while TACTEC maintains a core staff of specialists who analyze, evaluate, and extract the current DoD scientific and engineering literature and incorporate this information in responses tailored to meet a specific user's needs, the entire technical staff of Battelle's Columbus Division is available to TACTEC to address the research and analytical problems directed to the Center.

MISSION AND SCOPE

The scope of the Tactical Technology Program (TACTEC) covers the full range of tactical warfare, including low-intensity conflict, large-scale conventional warfare, desert warfare, and warfare in built-up areas. This charter allows Battelle to provide support to the DoD with the following:

- o R&D tasks to develop or evaluate new or existing systems for specific tactical warfare missions; to perform research on devices or phenomena of potential value in tactical warfare; or to perform feasibility demonstrations for specific systems or devices.

- o Quick-response inquiries (QRI's) to determine what information is available on particular topics, to evaluate novel ideas and new applications of existing technologies or systems, or to answer specific technical questions.

- o Scientific and other technical assistance to meet the R&D requirements of the DoD either within Battelle's Columbus Division, on-site at the requesting agency's facility, or, by special arrangements, off-site within CONUS or overseas.

- o Maintenance of an Information Analysis Center (IAC) covering the full spectrum of tactical warfare.

INFORMATION OPERATIONS

- o The IAC collects, stores, retrieves, and analyzes information and data pertaining to tactical warfare.

- o The IAC staff includes a number of specialists who analyze, evaluate, and extract the information acquisitioned from the DoD and its major contractors. This information is retrieved when needed, analyzed, supplemented by additional data, and incorporated into answers responsive to specific user needs.

- o The IAC contains in excess of 55,000 documents and is available for use to the qualified visitor.

- o The holdings of the IAC are currently being converted to a computerized system which will be available to qualified users over ARPANET.

SERVICES AND PRODUCTS

Quick-Response Inquiry (QRI)

Battelle has responded to more than 6000 QRI's from members of the defense community representing more than 500 different organizations. A quick-response inquiry (QRI) comprises technical assistance to the DoD user. This assistance can take the form of an answer to a specific technical question, a short-term study, a review of the literature, or a similar effort.

Once a QRI has been received, a Battelle scientist or engineer is assigned prime responsibility for the task. Depending upon the complexity of the question and his personal capabilities, the individual may choose to answer the question on his own or seek the assistance of other Battelle personnel. This flexible interdisciplinary team approach allows the highest level of technical competency to be brought to bear on a problem for only that portion of the staff member's time required by the task; this results in a direct savings to the client.

Additionally, Battelle conducts numerous literature surveys for its users. The resultant bibliographies represent the more significant publications dealing with a specific subject. A listing of these bibliographies is made available periodically to interested personnel in the defense community.

Scientific and Other Technical Assistance

One of the keys to the successful accomplishment of the DoD's tactical warfare mission is the effective utilization of science and technology. This requires a comprehensive RDT&E effort which involves

- o The translation of practical problems of tactical warfare into technical requirements to guide technical personnel
- o The knowledgeable response to ideas generated by technical personnel as potential solutions to the practical problems of tactical warfare.

In most instances, Battelle can most effectively contribute to the accomplishment of these objectives in the Columbus Division of Battelle. Occasionally, however, the achievement of these R&D objectives can best be accomplished in the field or on-site at the sponsoring agency's facility. Representative tactical warfare technologies now available through the staff and facilities of Battelle-Columbus as follows:

- o Advanced Materials Development and Fabrication Technologies
  - Armor plate development
  - Electronic, magnetic optical materials
  - Composite materials
  - Ceramic materials
- o Advanced Sensor Technology
  - Radar, IR and optical devices
  - Radiation detectors
  - Laser technology
  - Acoustics
- o Advanced Weapons Technology and Design
  - Nonnuclear warheads and explosives
  - Hypervelocity impact and terminal ballistics
  - Laser and particle beam weapons
- o Resources Analysis
  - Force planning analyses
  - Cost-effective/cost-benefit analyses
- o Systems and Design
  - Structural engineering and mechanics
  - Engineering design
  - Computer-aided systems synthesis, simulation and optimization
- o Advanced Energy Systems
  - Energy conversion
  - Propulsion and Power
- o Advanced Offensive/Defensive Systems Studies
  - Vulnerability/survivability of land, sea and air systems in tactical warfare
  - Threat and Nth country studies
- o Information Systems
  - Design, development and operation
- o Cover and deception

An example of scientific and technical assistance through the Tactical Technology Program might involve a Battelle scientist or engineer visiting the sponsoring agency's facility to participate as a member of a study team or to provide a technical capability not available at the facility. In addition to the direct cost savings to the sponsoring agency effected by the utilization of the technical skills of the Battelle expert, this advisory assistance offers a fresh perspective to the research program plus possible new insight into means of its accomplishment. Similarly, Battelle offers scientific and technical assistance to the sponsoring agencies' in-field studies whether within CONUS or overseas.

Publications

In general, publications which have been released by TACTEC's clients are available through the Defense Technical Information Center to its qualified users.

AVAILABILITY OF SERVICES AND PRODUCTS/CHARGES/PAYMENT OPTIONS

TACTEC services are available to those Department of Defense agencies which have transferred funds into TACTEC's prime contract. Services of the program are also availabale to contractors whose clients have authorized funding on their behalf or to DARPA contractors for whom use of the Center has been approved by DARPA. Work may also be done for DoD contractors through purchase orders or separate contracts with DARPA approval.

CONTACT POINT

For additional information write or call the Center:

Battelle Columbus Division
Tactical Technology Center
505 King Avenue
Columbus, Ohio 43201-2693

Telephone: (614) 424-5047