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IDA DOCUMENT D-1108

THE BENEFITS OF SCIENTIFIC AND TECHNICAL INFORMATION FOR THE DEPARTMENT OF DEFENSE

Forrest R. Frank

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MAR 0 9 1992
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December 1991

Prepared for
Defense Technical Information Center

92-06017

(barcode)

IDA INSTITUTE FOR DEFENSE ANALYSES
1801 N. Beauregard Street, Alexandria, Virginia 22311-1772

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY *(Leave blank)*	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	December 1991	Final--October-December 1991

4. TITLE AND SUBTITLE

The Benefits of Scientific and Technical Information for the Department of Defense

5. FUNDING NUMBERS

C - MDA 903 89 C 0003

T - T-AI2-941

6. AUTHOR(S)

Forrest R. Frank

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

Institute for Defense Analyses
1801 N. Beauregard St.
Alexandria, VA 22311-1772

8. PERFORMING ORGANIZATION REPORT NUMBER

IDA Document D-1108

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

Defense Technical Information Center
Cameron Station
Alexandria, VA 22314

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT

Distribution authorized to U. S. Government organizations only; Administrative/Operational Use, February 26, 1992. Other requests for this document must be referred to Defense Technical Information Center, DTIC/R, Cameron Station, Alexandria, VA 22314

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

The purpose of this document is to describe recent changes in the institutional enviornment affecting plans, programs and operations of the Defense Technical Information Center. The potential impact of these changes on users, information requirements, and information collection, analysis, and dissemination activities is described. The need to focus on user-oriented products and services provided by DTIC is explored. This document is intended to assist DTIC staff and DTIC users in better identifying information requirements, information products, and information services. The future role of DTIC is likely to expand as all DoD components seek to accomplish their institutional missions with fewer budgetary resources.

14. SUBJECT TERMS

Defense Technical Information Center, Information Analysis Centers, Information, Research and Development, Libraries, Defense Business Operations Fund

15. NUMBER OF PAGES

43

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	SAR

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Accession For		
NTIS GRA&I	☐	✓
DTIC TAB	☑	
Unannounced	☐	
Justification		
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Distribution/		
Availability Codes		
Dist	Avail and/or Special	

CONTENTS

ABBREVIATIONS

CBIAC   Chemical Warfare/Biological Defense Information Analysis Center
CENTCOM   U.S. Central Command
CINC   Commander-in-Chief (of a Unified or Specified Command)
CINCENT   Commander-in-Chief, U.S. Central Command

DBOF   Defense Business Operations Fund
DD   Department of Defense
DDDR&E   Deputy Director of Defense Research and Engineering
DLA   Defense Logistics Agency
DTIC   Defense Technical Information Center
DRB   Defense Resources Board

IAC   Information Analysis Center
IR&D   Independent Research and Development

LSD   "Large Steel Desk"

NTIAC   Nondestructive Testing Information Analysis Center

OUSD(A)   Office of the Under Secretary of Defense for Acquisition

PEO   Program Executive Officer

RDT&E   Research, Development, Testing, and Engineering

STINFO   Scientific and Technical Information

WUIS   Work Unit Information System

THE BENEFITS OF SCIENTIFIC AND TECHNICAL INFORMATION FOR THE DEPARTMENT OF DEFENSE

A. SUMMARY

This document is based on presentations to the Defense Technical Information Center's (DTIC) Annual Users' Meeting, November 1991, and the DTIC staff on December 10, 1991. These presentations put before DTIC users and the DTIC staff one perspective on the future use of scientific and technical information within the Department of Defense.

Figure A summarizes the fundamental thesis of the presentations. The author believes that DTIC will play an important and growing role in the Defense Department's acquisition programs and operations in the future provided that four preconditions for success can be met.

BENEFITS OF INFORMATION

DTIC'S FUTURE

- **MEETING THE NEEDS OF ITS CUSTOMERS**

- **DEMONSTRATING BENEFITS TO OSD STAFF**

- **MEETING FISCAL GOALS ESTABLISHED BY OSD COMPTROLLER**
  OR
  PERSUADING COMPTROLLER TO SET MORE REALISTIC GOALS

- **FINDING CUSTOMERS WHO WILL SUPPORT DTIC**
  -- DOCUMENTED BENEFITS TO DOD
  -- DEMONSTRATE WILLINGNESS TO PAY FOR SERVICES

Figure A

1

In order for DTIC to thrive in the future, it will have to develop measures of institutional performance and document customer satisfaction. It will have to be responsive to the information needs of the Office of the Secretary of Defense (OSD) staff. It will have to demonstrate to the OSD staff that it has been helpful to its information consumers. DTIC will have to meet fiscal goals established by the OSD Comptroller or alternatively build a convincing case for new fiscal goals which can be met.

Finally, DTIC will have to cultivate information consumers who will in turn support DTIC. Such support can take many forms. It certainly includes providing DTIC with scientific and technical information in all media. It also includes providing DTIC technical direction, funding support, and even technology to facilitate the collection, analysis, storage, retrieval, and dissemination of scientific and technical information. It may even go so far as to include additional tasking and provision of supplemental funds to pay for DTIC information products and services.

The balance of this document is devoted to the development of the argument leading for this generally favorable although qualified assessment of DTIC's future.

B. INTRODUCTION

My name is Forrest Frank and I'm a DTIC user.

I say that because I want to thank all of you for the support you've given me over the last twenty years as one of your users. Obviously things have changed in twenty years and I think they're going to change even more.

Many of the changes that lie ahead are already visible, as suggested by Figure 1.

BENEFITS OF INFORMATION

DTIC'S FUTURE

- **25% REDUCTION IN REAL DEFENSE SPENDING OVER THE NEXT FEW YEARS**
  - **-- CONSOLIDATION OF SERVICE RDT&E ACTIVITIES**
  - **-- FOCUS ON COST-EFFECTIVE ACQUISITION SYSTEM**
  - **-- BUSINESS-LIKE APPROACH TO DECISIONMAKING**

- **ONLY ONE WAY TO DO MORE WITH LESS — MANAGE INFORMATION**

Figure 1

As noted in the first bullet, DoD is now anticipating at least a 25 percent reduction in spending in real terms over the next five years. Some believe that DoD's budget will shrink by substantially more than this amount. Such reductions will not spare any budget categories, although the research and development accounts may shrink more slowly than other parts of the DoD budget. There will be consolidation of DoD research, development, testing, and engineering (RDT&E) activities at the contractor and Service levels; management of scarce resources is going to become much more important than it was in the past. More and more, I think we will hear discussion about the need to operate DoD in a "businesslike" manner.

In some organizations being told, "you're going to take a 25 percent reduction in your budget" is perceived by the staff as an opportunity for everyone to get their resumes out and head to the door. I do not believe that this is going to be the fate of DTIC at all. The reason that I don't think that lies ahead for you is the very bottom line in Figure 1.

DTIC is probably one of a handful of organizations in the Department of Defense that in fact is going to see growth, notwithstanding that big 25 percent reduction. Why? Because the only way everyone else can do their job with fewer resources is to take advantage of the one resource DTIC has. There is only one resource in the world which increases in value every time it is consumed--information. The more it's used, the greater it becomes in value. As the keeper of DoD's scientific and technical information base, it is my view that DTIC's future, unlike almost all other components in the Department of Defense, is very encouraging.

We will return to this theme at the conclusion of the presentation. Let us turn to DTIC's present situation.

C. CHANGES IN DTIC'S ENVIRONMENT

The 1990s have been years of marked change for DTIC. As summarized in Figure 2, three major changes of special importance have occurred.

First, there have been structural changes, changes that I regard as highly significant for DTIC and the rest of DoD. DTIC is no longer the "spare parts depot" for DoD scientists and engineers. It is now an integral part of the whole RDT&E planning and programming process. DTIC reports directly to OSD. This is a very significant change.

BENEFITS OF INFORMATION

CHANGES IN THE DTIC ENVIRONMENT

- **STRUCTURAL CHANGES**

  DTIC NOW REPORTS TO OUSD(A)

- **DOD MANAGEMENT PERSPECTIVE**

  THE MOST CHALLENGING PROBLEM FACING DOD IS THE MANAGEMENT OF RDT&E

- **DTIC FUNDING NO LONGER PART OF THE CONGRESSIONAL APPROPRIATION PROCESS**

  DTIC IS PART OF THE DEFENSE BUSINESS OPERATIONS FUND — DBOF

Figure 2

Secondly, attitudes within the Pentagon are radically different today than they were several years ago. The senior acquisition managers in DoD publishing in the *Defense Management Review* in July 1989 have asserted that the biggest challenge facing DoD is not how to build a better bomb, or a better tank, but how to better manage our R&D efforts. It seems to me as an outsider that DTIC's importance will grow in the management of RDT&E because it controls the vast storehouse of scientific and technical information that is the foundation upon which technological advances in the cause of national security are based.

A December 10, 1991, article in the *Washington Post* describes the importance of R&D to the future of the Department of Defense. The author concludes that R&D is going to grow, notwithstanding the drawdown in the Department of Defense budget and other resources. Why? Because DoD will have to do more with less resources. The only way to do more with less in the military world is with technology.

The third change in DTIC's environment is a change that has affected DTIC in ways difficult to foresee. DTIC no longer receives a Congressional appropriation. It is now one of the agencies included in Defense Business Operations Fund (DBOF). This imposes on all of us, those of us who use DTIC, those of us who work with DTIC, or those of us who work for DTIC, a very special set of challenges.

Figure 3 identifies some of the implications of the changes in DTIC's institutional environment outlined above.

BENEFITS OF INFORMATION

IMPLICATIONS OF CHANGES IN THE DTIC INFORMATION

- **NEW PRIORITY USERS**

- **NEW INFORMATION REQUIREMENTS**

- **NEW PRODUCTS**

- **BALANCING THE TRADITIONAL NEEDS OF DTIC USERS WITH REQUIREMENTS OF NEW USERS**

Figure 3

With the changes in DTIC's institutional environment, things are going to be different. With new corporate "owners" (OUSD(A)), DTIC will have new users. During the course of IDA's study, *Evaluation of DoD Information Analysis Centers (IAC) Program,* I had an opportunity to talk with several hundred DTIC users at all levels within the Department of Defense, its components, and among DoD contractors. One of the concerns voiced by DTIC users was the problem of communicating directly to and from DTIC. DTIC and its users found reliance upon the DLA chain of command awkward and cumbersome at best.

Interviews with DLA headquarters staff revealed strong support for direct DTIC/OSD contacts, just as long as DTIC staff go through chain of command. Chain of command does a number of very good things. It filters out bad information; it keeps people from making mistakes; it avoids embarrassing situations; and it also can delay DTIC users from getting the information they need.

DTIC no longer has that problem. If OSD staff need information, they are free to pick up the phone and speak directly to DTIC; if DTIC staff think the OSD staff need some information, there is no DLA chain of command superimposing its values or sense of propriety on the DTIC staff. Information can flow without hierarchical impediments. No questions about chain of command are asked. DTIC works for the OSD staff. This should improve the flow of information from DTIC to OSD staff and from the OSD staff to DTIC.

The second bullet suggests that OSD staff and other senior Service staff may have information needs that are substantially different from other DTIC users. As will be suggested later in this presentation, these users need information in many cases that differs from the kinds of information bench level scientists and other traditional DTIC users require.

OSD and senior Service staff look at a variety of issues which go to the heart of large programs. For example, Mr. Jerome Persh, the senior materials scientist in DDDR&E (R&AT) asks very broad questions:

- What is the future of carbon-carbon composites?

- Can we manufacture large structures from carbon-carbon composite materials?

- How survivable are structures made from carbon-carbon composite materials and what can be done to improve their survivability?

These are different kinds of questions than questions coming from bench level scientists and engineers at DoD RDT&E laboratories. Answering these questions requires an ability to synthesize great quantities of information across a wide spectrum of issues to arrive at an aggregate assessment of the state of the art in carbon-carbon composite manufacturing technology.

The kinds of information DTIC collects, analyzes, and furnishes to its users may change radically as the nature of DTIC's users changes.

I suggest in Figure 3 that the OSD staff and senior Service staffs are "priority" users, meaning that their information needs should be met before other users' needs are addressed. I come to this conclusion because OSD, senior Service, and even CINC or Defense Agency staffs share several interesting characteristics: (1) they directly control large programs; (2) they are in a position to encourage others to use DTIC, and (3) they are also in a position to discourage others from providing information to DTIC and not using DTIC in the future. If DTIC can meet the information needs of these priority users, they in turn can assist DTIC in the collection, analysis, and dissemination of scientific and technical information.

In the Defense Business Operating Fund environment this assistance is going to be important. Customer service ultimately will translate into better information coming into DTIC and better information going out from DTIC. This also translates into dollar savings for you and me as taxpayers. And it helps the Department of Defense do more with less.

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In addition to meeting new information requirements posed by new users, it may also be necessary to develop new products and services to respond to existing, established users. Some DTIC staff have already been involved in the development of improvements and changes to the Work Unit Information System (WUIS); some DTIC staff are developing new current awareness products. There is virtually no limit to the form, the format, the media, the method of dissemination, even the information content in those new products, all of which will be driven by the market for information.

DTIC has a difficult set of choices to make. Mr. Mulholm and all members of his staff have to strike a very careful balance, meeting new customer needs but not sacrificing the old. There's no magic formula. I can't give DTIC a formula that makes it easy to calculate which user is more important than another. But clearly just as every other defense agency has to make choices--which Army unit remains active and which division's flag is furled for the last time--so too will DTIC face some difficult choices.

D. INFORMATION FUNCTIONS

Traditional DTIC users have sought information to help them address a specific problem within the domain of science or technology. OSD, Service, Defense Agency staffs as well as those of Commanders-in-Chiefs of Unified and Specified Commands (CINCs) typically seek out information to address a wide range of problems. These are highlighted in Figure 4.

BENEFITS OF INFORMATION

DOD MANAGEMENT PERSPECTIVE

- **PURPOSES OF INFORMATION**
    - -- **MANAGEMENT SUPPORT**
    - -- **RESOURCE CONSERVATION**
    - -- **PRODUCTIVITY**
- **ACQUISITION PROCESS SUPPORT**
    - -- **DRB MILESTONES**

Figure 4

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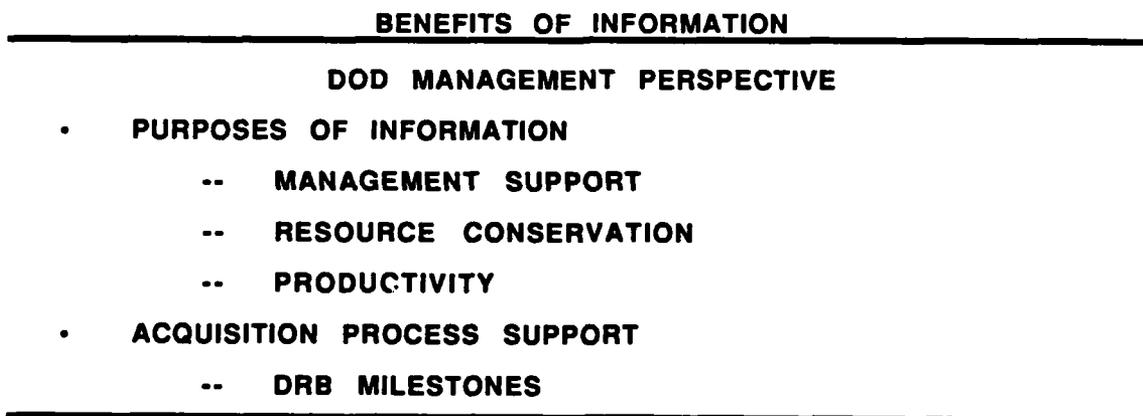
In a recent IDA study, interviews with OSD, Service, Defense Agency, and CINC staff were conducted to try to understand the information needs of these users. The results of this study were quite interesting. We found that although these users were interested in substantive information on an occasional basis, they were most interested in information bearing on management of RDT&E programs. We were told that DTIC could be most helpful in providing information to be used in identifying resources and allocating them.

In the current environment, these interviewees told us that they needed assistance in conserving resources. DTIC's charter, DoD Directive 3200.12, Scientific and Technical Information Program, has mandated the establishment of a centralized data base to support RDT&E planning. This Directive instructs the RDT&E establishment to check with DTIC before initiating RDT&E activities to avoid unnecessary duplication of work.

The definition of unnecessary duplication of work has always been subject to challenge. One scientist's efforts to replicate work reported in the literature--the hallmark of the scientific method--is often identified by "bureaucrats" as unnecessary duplication of work. The nation can no longer afford repeating over and over again experiments and projects successfully accomplished in the past. Replication of past experiments may be important and worthwhile. We can do them again as learning exercises. But as scientists, engineers, and taxpayers, we have to know why DoD is repeating previously accomplished work.

The other problem OSD staff are trying to deal with is RDT&E productivity. Many of the initiatives taken in recent years in the acquisition process have been aimed at accelerating the pace by which DoD get new systems into the hands of soldiers, sailors, airmen. Efforts have also targeted the speed and manner by which new analytic tools are furnished to scientists and engineers.

Dr. Kimmel, the Deputy Under Secretary of Defense for Acquisition Planning and Program Integration, the senior official in the department to whom DTIC reports, frequently speaks on the role of information in the acquisition process. Dr. Kimmel points out that the DoD will spend on order $100 billion a year in acquisition. He stresses his belief that DTIC should be playing a major role in helping the Department of Defense make wise purchases.

Some have suggested that DTIC could play a significant role in providing technical assistance to the Defense Resources Board (DRB) during its consideration of Milestones in major systems acquisition decisions. At least two possible approaches come to mind.

Advocates of one approach sometimes suggest that DTIC should act as an alternative source of information about experiments, program problems, and deficiencies in DoD's RDT&E or acquisitions programs for OSD staff. DTIC should be able to help the OSD staff learn that Program Executive Officers and project leaders have not told the OSD staff and DRB principles the entire story about their programs.

Such an approach would work once. If one program manager were to be "blindsided" at the DRB where DTIC is identified as a source of technical information which results in a complete restructuring or cancellation of a program, then all the other program managers would say "we're not sending a single negative test report, project report, or any technical data to DTIC, ever."

I believe that efforts to use DTIC as a "watchdog" on behalf of DRB considerations will ultimately hurt both DTIC and the acquisition process. I believe it would be too easy for DTIC to be "shot" by the RDT&E community as the messenger of bad news rather than to be supported by the same community as the storehouse of knowledge and the information base on which program analysis can be built.

An alternative perspective is to rely on DTIC generally, and the DoD IACs it sponsors specifically, to assist the DRB process by tracking the development of technology. The deeply divisive debates on the degree to which DoD is or is not dependent on foreign sources of raw materials, components, and even manufacturing technology illustrate the ignorance of DoD on technologies which cut across multiple military systems and subsystems. While DoD is often able to identify specific parts or specific technologies on a system by system basis, it is very much at a loss to go from a national stock number part or even a manufacturing technology to the specific military systems which rely upon such items or technologies.

The DoD scientific and technical information (STINFO) program might be very helpful to the acquisition process if it could undertake periodic reviews of the state of the art in major technology areas so that DRB members can judge for themselves whether or not program executive officers have built program acquisition schedules that are too ambitious, too conservative, or are reasonable from the standpoint of technological risk.

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E. DEFENSE BUSINESS OPERATIONS FUND CONCERNS

Inclusion of DTIC in the Defense Business Operations Fund as opposed to continuation of DTIC's Congressional appropriation for purposes of funding the organization raises some very interesting challenges for all DTIC staff and DTIC users.

BENEFITS OF INFORMATION

DTIC BUDGETING — DBOF

- DEFENSE BUSINESS OPERATIONS FUND
    - OMNIBUS DOD INDUSTRIAL FUND
    - FULL COST VISIBILITY
        - OVERHEAD
    - GIVING USERS CHOICES
        - NO CAPTIVE CONSUMERS

Figure 5

Let us talk a little bit about a subject near and dear to all of us--money. The Defense Business Operating Fund--what does it mean for you?

The Defense Business Operating Fund (DBOF) is an omnibus business fund. It is an industrial fund. DTIC will join other DoD organizations such as the Navy Department's laboratories, aircraft rework facilities, shipyards, ammunition plants, etc., in having to compete for business from the military services and DoD agencies.

Who are DTIC's competitors? In some cases the competition is represented by commercial firms like Dialog and BRS. In other cases.the competition may be represented by professional societies or trade organizations. In still other cases DTIC may have no organized competitors. It competes with librarians, information specialists, and scholars who plow through files, talk to colleagues, and network around the country to collect scientific and technical information.

DTIC's management has gone through a detailed exercise in the last several months to start to dissect the costs of all DTIC operations. Knowing what efforts are required to put together an awareness product, a bibliography, maintain the technical reports data base, etc., is mandatory. In so doing, DTIC management will make it possible to evaluate the

cost of DTIC products against the cost of similar products offered by other information vendors within the government or in the private sector. Even if such products are provided to users free of charge, users will still be able to ask, "did I, as a consumer, get my money's worth?"

The purpose of establishing the DBOF is to give consumers of DBOF-supported products and and services--technical information (DTIC), shipbuilding services (Navy shipyards), research and development services (Service laboratories)--an opportunity to measure the costs and benefits of government-supplied products and services against the costs and benefits of products and services supplied by alternative sources in the private sector or competing government activities. The goal of DBOF is to give consumers a choice between the government activity and comparable commercial sources of products and services.

DTIC is going to have to focus its activities on those products and services for which it has a comparative advantage. DTIC has unique access to government information. Dialog and all the other commercial vendors don't have access to much of the information available within DTIC. I believe DTIC is going to have to work from a position of comparative advantage based on its access to U.S. Government information. It is going to have to develop products and services based on this comparative advantage so that, in fact, scientists and engineers say, "I get better service from DTIC than I do from other information vendors." DTIC will also have to develop products and services tailored to OSD, Service, Defense Agency, and CINC staffs so that they too say "I get better answers from DTIC than I do from other information sources."

Why is this focus on users so important? Because in the DBOF environment, DTIC is going to have to compete with many other activities for funding. The metric for funding is very likely to be customer satisfaction measured in part by how many dollars customers are willing to put up directly. When the times comes to provide additional funds for DTIC's operation, DTIC wants its users go to the OSD Comptroller and say collectively, "we want to be sure there's money in the DBOF to pay for all of DTIC."

With apologies to the artist, E.M. Escher, Figure 6 attempts to illustrate graphically some of the functions DTIC provides to the Department of Defense.

BENEFITS OF INFORMATION

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information **Information** information information **Information** information

INFORMATION AND DATA

Figure 6

DTIC is supposed to collect, organize and disseminate data so that others can convert the data into additional data and information. The DBOF environment poses new challenges as illustrated in part in Figure 7.

BENEFITS OF INFORMATION

CHALLENGE OF DBOF

- WHAT IS THE COST OF DATA?
- WHAT IS THE COST OF CONVERTING DATA INTO INFORMATION?
- HOW ARE COSTS TO BE ALLOCATED AMONG
  -- DATA GENERATORS
  -- INFORMATION GENERATORS
  -- DATA SUPPLIERS
  -- INFORMATION GENERATORS
- WHO BENEFITS?
- WHO PAYS, HOW MUCH, AND FOR WHAT?

Figure 7

In the new environment created by the Defense Business Operations Fund all of DTIC's users ultimately are going to have to satisfy themselves that the cost of getting data to DTIC and getting data and information from DTIC are, in some sense, justifiable. This puts a very heavy obligation on DTIC.

Who pays? How much do they pay? And for what?

These are open questions. The DTIC staff has met frequently with OSD technical staff on the one hand and OSD Comptroller staff on the other in an effort to answer these questions. While there has been some resolution for purposes of planning FY 93 and FY 94 DTIC funding, the questions remain far from resolved.

F. PURPOSES SERVED BY SCIENTIFIC AND TECHNICAL INFORMATION

Since the future of DTIC depends, in my view, on its ability to meet user needs, it is worthwhile to consider the purposes underlying requests for information from DTIC for different types of users. Figure 8 addresses some of the underlying questions that often times are not articulated clearly even though a request for information has been made.

BENEFITS OF INFORMATION

QUESTIONS UNDERLYING USER NEEDS

- **WHO IS ACTIVE IN THE FIELD?**
- **WHAT IS THE STATE OF THE ART?**
- **WHAT TECHNICAL APPROACHES ARE OTHERS TAKING?**
- **WHAT RELEVANT DATA IS AVAILABLE?**
- **HOW CAN I AVOID REPEATING EXPERIMENTS RUN BY OTHERS?**
- **HOW NECESSARY IS THE PROPOSED RDT&E?**

Figure 8

In order to provide the best possible service, in order to have DTIC users come back time and time again, and in order to encourage users to pay willingly for products and services DTIC provides, it is useful to understand one perspective on what information users really need. As someone who requests frequent assistance from DTIC on a variety of matters, I feel qualified to address this particular issue.

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Let me give you an example. I have requested a standing bi-weekly bibliography on the subject of terrorism in many of its forms. Generally, I receive a printout of recent acquisitions by DTIC consisting of the following information: AD numbers, author, corporate author, title, classification, and abstract. Although DTIC has answered my specific question it has not gone the the next step. What is the user (me) really after? If I ask for a bibliography on terrorism, that is really a meta question. What are the real questions on which the user is seeking answers?

Figure 8 addresses these. Who's active in the field? What is the state of the art? What approaches are others taking? I might want to follow those leads or I might want to avoid their mistakes. What is and where is the relevant data? How can I avoid making mistakes others have made? In some cases if the user is managing tasks, how necessary is the work being proposed?

Using the biweekly bibliography on terrorism prepared for me as an example, I would benefit from more information on corporate author. It would be very helpful if corporate author addresses and telephone numbers could be included in the bibliography so that I could attempt to contact authors of documents referenced in the bibliography.

Improving the indexing of DD Form 1498 information to permit aggregation of project by technology or mission area would make the WUIS more helpful to OSD managers who need to understand complex interactions among subcomponents, components, and manufacturing technology associated with a variety of weapon systems to successfully manage large programs.

Figure 9 suggests several benefits that can be derived as the result of using scientific and technical information available from DTIC.

Contacts

One of the benefits of obtaining information from DTIC specifically and other information sources generally is identifying significant individuals and institutions in each field of science or technology of interest. One of the joys of science and engineering, is the discovery of new ways to define and analyze a problem. It is highly unusual where there can be one and only one solution to any problem and one and only one definition of the problem. Knowing who is active in a field and how others have defined and solved a problem is a very important benefit of scientific and technical information.

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BENEFITS OF INFORMATION

- **CONTACTS**
- **TECHNIQUES**
- **DATA**
- **ANALYSIS**
- **SAVINGS**
  - -- **TIME**
  - -- **MONEY**
- **NEUTRAL OPINIONS & ADVICE**
- **MANAGEMENT OVERSIGHT & CONTROL**

Figure 9

Data

The single most expensive part of science and engineering is the collection of data. It takes time. It takes energy. It takes facilities. It takes experiments. Anything a scientist or engineer can do to collect data without having to run off to a laboratory saves time, saves money, saves effort. The ability to mine the storehouse of knowledge for data really is very important. It is very important to the taxpayers as well. As taxpayers, we don't want to encourage experimentation solely for the purpose of experimentation. We want to encourage experimentation for the generation of new scientific and technical information. We want scientists and engineers working on problems of interest to DoD to first check with DTIC to gain whatever data is appropriate, thereby minimizing the amount of new data that must be collected.

Analysis

It has been said that those who do not know history are condemned to repeat it. The corollary applied to science and technology is also true: those who don't know how to think about a problem are condemned to make the same mistakes as well. Knowing how others have analyzed a given problem is critical to the progress of scientific knowledge.

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Savings

Oftentimes it is possible to calculate the dollar value of scientific and technical information. Some of these savings can be calculated directly.

Savings can be characterized as either direct or indirect. In some instances, it costs users less to come to DTIC for help than it costs to seek answers to questions themselves or from alternative information sources. For example, the costs of a computerized search of the DTIC technical reports data base is substantially less than the cost of having a scholar spend his or her time physically inspecting the DTIC holdings looking for reports on a particular topic. Use of DTIC-sponsored IACs was found in IDA's study, *Evaluation of DoD Information Analysis Centers (IAC) Program*, to cost government sponsors less than other performers of information analysis. These are examples of direct savings.

In other instances, use of scientific and technical information obviates the need to conduct expensive, time-consuming experiments. The costs of extracting data in an appropriate manner from existing reports are almost always far less expensive than re-creating a set of experiments to obtain the same information from experimental results.

Neutral Opinions and Advice

In IDA's study of DoD Information Analysis Centers, we found a very important qualitative benefit to DoD resulting from the analysis of scientific and technical information. This benefit is especially important to public policy and is one of the distinctions between public administration and business administration. Let me give you an example.

Several years ago the Army sought to erect a new pilot production facility for chemical agents at the Edgewood, Maryland, Arsenal. This facility has a history of management which has been insensitive to the adverse environmental impact that chemical warfare and chemical defense activities may have had on the region. In the late 1980s and early 1990s, three senior civilian employees of Edgewood Arsenal were convicted in Federal court of willfully disobeying Federal and state environmental protection laws.

Residents of the Edgewood area, learning of the Army's plans to build a new pilot production facility for chemical warfare agents, prevailed upon their Congressional Representative to intervene in the Army's plans and to secure a commitment from the Army that it would comply fully with all environmental laws and regulations

The Chemical Warfare/Biological Defense Information Analysis Center (CBIAC), one of DTIC's Information Analysis Centers, was tasked by the Chemical Research and Development Center to undertake a review of the plans for the pilot production facility. The purpose of the review was to obtain an outside opinion from qualified experts who had no stake in the outcome of the analysis of the adequacy of industrial hygiene and environmental safety plans for the new facility. Since CBIAC was not involved in the design or implementation of the facility, but was very knowledgeable with respect to health, safety, and environmental issues associated with chemical weapons, it was viewed as a neutral-competent authority.

The staff of the Chemical Warfare/Biological Defense Information Analysis Center (CBIAC) proposed a few changes in the design to improve ease of access to certain waste lines and improve containment of agent in the event of an accident. However, in general, the CBIAC staff thought the plans proposed by the Army were consistent with good industrial hygiene and in compliance with environmental laws and regulations.

As a result of this independent review by a neutral, competent organization, the Army was able to satisfy the Congressional Representative and authorization to go forward with construction of the facility was obtained.

DTIC's ability to furnish to DoD sources of independent scientific and technical analysis and advice is a highly valued benefit of the DoD STINFO program. The DoD IACs have played major roles as neutral-competent authorities in arbitrating technical disputes among various DoD components and DoD contractors; studies and analyses completed by the DoD IACs have figured prominently in the design, development, and fielding of military systems which have improved the capability of U.S. forces while also improving reliability, maintainability, standardization, and reducing life-cycle costs.

Management Oversight and Control

The other important benefit of information deals with management. DTIC continues to play an important role through the Work Unit Information System (WUIS) and its evolving successor system and the Independent Research and Development System (IR&D) in providing useful information on DoD's RDT&E plans and programs. Information in these systems has a variety of uses, as will be discussed below in greater detail. It is clear, however, as resources available for RDT&E shrink, knowing more about

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the successes and failures of past efforts will be important in planning, programming, and budgeting for the future.

G. USER PERSPECTIVES ON SCIENTIFIC AND TECHNICAL INFORMATION

Earlier discussion has suggested that DTIC now has a wider array of users than it did in the past. It has been suggested that DTIC may have to develop new information products and services to meet the needs of its users. In the following discussion I hope to convey a sense of how information gets used by different kinds of users.

There's an old aphorism that comes out of bureaucratic politics that "where you stand on an issue often depends on where you sit." If a user sits at a laboratory bench, one kind of information product or service may be very important; if a user sits behind an LSD (a large steel desk) in the Pentagon, other information products or services may be at a premium. Understanding the different information requirements of various categories of users may help DTIC better gauge the variety of information that should continue to be collected, analyzed, and disseminated.

We begin with the information needs of bench level scientists and engineers.

As a bench level scientist, I can speak to Figure 10 from personal experience. Current awareness products are very important to me. They help me save time and money because it is far less expensive use of my time to read a DTIC product than it is to attempt to search DTIC and other data bases myself. They help me avoid costs I would otherwise incur if I attempted to use other information sources to keep track of what research DoD is reporting in fields of interest to me. Some of the current awareness products I receive tell me a good deal about the approach others have taken, thereby saving me from unnecessary duplication of effort.

The use of DTIC report bibliographies is similarly helpful.

I often benefit directly from using technical reports furnished by DTIC. It is clearly less expensive to order documents containing experimental and historical data than it is to go out and re-create experiments or try to gather original source historical records. Working with data books and handbooks produced by DTIC-sponsored IACs is especially helpful since such data has been standardized or screened against specific criteria so that as a researcher I understand the purposes for which such data can and cannot be used.

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BENCH LEVEL SCIENTISTS/ENGINEERS

DTIC PRODUCTS

BENEFIT	CURRENT AWARENESS	REPORTS BIBS	TECH REPORTS	WUIS REPORTS	IR&D REPORTS
COST AVOIDANCE	What would be spent to track the field	What would be spent to identify literature	Generation of comparable data	Avoid unnecessary duplication	Avoid unnecessary duplication
DIRECT SAVINGS	DTIC/IAC costs less than researchers	DTIC/IAC costs less than researcher	Collection of original rpts	Obtaining data in reports, not experiments	Access to new products not previously developed by DoD
TIME & EFFORT	How much time spent to track discipline	Broader coverage of DoD RDT&E	Search for and acquisition of documents	Reading time less than experiment time	Shorten development time
TECHNICAL DIRECTION	What approach are others taking	What approach are others taking		Complementary efforts, not unnecessary duplication	
OTHER BENEFITS					

Figure 10

Finally, it is easier, quicker, and less expensive to contact DTIC to obtain copies of technical reports than it is to go to multiple corporate author, government agency, or technical monitor sources.

As a staff member of a Federally Funded Research and Development Center (FFRDC), I have access to WUIS information. I find this very helpful in planning my research program. I have an opportunity to identify topics of concern to the R&D community. I also have an opportunity to track the results of R&D efforts. I have been particularly gratified to see connections between some of IDA's work and RDT&E programs undertaken by OSD and the Services.

I can also imagine how others might use WUIS information. It appears to be a rich source of information with respect to DoD RDT&E capabilities and interests; it would allow bench level scientists and engineers to build networks among colleagues and facilities exploring related scientific and engineering problems.

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I do not have access to reports from the Independent Research and Development data base. However, in talking with government scientists and engineers who do, it appears that this data base offers excellent opportunities to DoD scientists who are trying to identify solutions to problems which may not have been proposed directly by contractors or DoD laboratories. The Independent Research and Development (IR&D) data base is also a rich source of information on the capabilities of various DoD contractors. It can be of great assistance in assuring the government that competition for an R&D procurement is feasible. If a contractor reports IR&D activities in a discipline or problem area, it is a potential offeror of R&D services for competitive procurements to be made in that discipline or problem area.

It is clear that use of DTIC as a source of scientific and technical information can be of great benefit to bench level scientists and engineers. How do such benefits accrue to managers of scientists and engineers? Figure 11 addresses this question.

BENEFITS OF INFORMATION

FIRST LEVEL TECHNICAL MANAGERS

DTIC PRODUCTS

- **DIRECT USE**

- **INDIRECT USE**

BENEFIT	CURRENT AWARENESS	REPORTS BIBS	TECH REPORTS	WUIS REPORTS	IR&D REPORTS
COST AVOIDANCE	Better staff knowledge of activity in discipline		Avoid duplica- tion of work	Avoid duplica- tion of work	
DIRECT SAVINGS	Don't have staff duplicating others' work	DTIC/IACs cost less than research staff	Data extracts cost less than new experiments	Utilize existing research resources first	
TIME & EFFORT	Better focus on DoD needs	Research staff works multiple problems	Focused efforts- what is new?		
TECHNICAL DIRECTION	Coordination of efforts with other programs		Don't repeat mistakes	Program coordination	Program coordination
OTHER BENEFITS					

Figure 11

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To the extent that managers of technical staffs use DTIC products directly, they often obtain the same benefits that their bench level scientists and engineers obtain as noted above. The more challenging question is how do managers benefit because their staffs use DTIC?

Current awareness products help managers by allowing their staffs to track developments in a field at relatively low cost. Multiple current awareness products consumed by an organization facilitate and support staff specialization, helping to ensure that staff members don't duplicate each others work. Current awareness products help managers retain their focus on issues of importance to DoD. Current awareness products allow staff and managers an opportunity to coordinate their research activities with those of others publishing or reporting in the field or disciplines of interest.

Report bibliographies are of benefit to managers because it costs substantially less in both dollars and time to have DTIC prepare such documents than it does to assign research staff to prepare bibliographies. Furthermore, use of DTIC to prepare bibliographies allows research staff to spend time on multiple tasks.

Managers benefit from their staffs' use of existing reports in several ways. Review of existing reports by research staff helps to assure managers that experiments will not be repeated unnecessarily. Even if it is necessary to repeat an experiment described in scientific literature, managers and researchers can better understand the gap in knowledge the data generated by an experiment and its analysis should seek to fill. To the extent that existing reports obviate the need to conduct experiments to generate data, managers have more resources that can be applied to new problems for which experimentation is the only manner by which data can be generated. Use of existing reports helps focus efforts on those problems or parts of problems that are new, relevant, and not yet addressed in the literature. Finally, use of existing reports helps keep researchers and their managers from avoiding mistakes made in the past. Some of those mistakes may be procedural, others may have been analytical. In either event, knowledge of the past can be most beneficial in avoiding scientific errors in future work.

The WUIS and the IR&D data bases are of substantial potential benefit to R&D managers. These two data bases help map out areas of importance to both the government and industry. To the extent that the priorities of industry as reflected in the IR&D data base differ from the priorities of government reflected in the WUIS, managers gain insight into possible alternative solutions to technical problems that may escape their subordinates who

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are focused more narrowly on specific research problems or topics. As noted earlier, the WUIS and the IR&D data bases provide considerable information about the research agenda and capabilities of DoD activities and commercial organizations receiving IR&D support.

Some R&D managers may view the WUIS as a source of "competitor intelligence". Research organizations in the military services and Defense Agencies can gain insights into the plans and programs of other similar activities. Such "competitor intelligence" when applied wisely can reduce the likelihood of unnecessary duplication of R&D effort, and increase the effective utilization of scarce, expensive R&D facilities.

There are other managers of DoD programs beyond R&D who might also benefit from use of DTIC. These are identified in Figure 12.

BENEFITS OF INFORMATION

PROGRAM EXECUTIVE OFFICER/STAFF

DTIC PRODUCTS

- DIRECT USE

- INDIRECT USE

BENEFIT	CURRENT AWARENESS	REPORTS BIBS	TECH REPORTS	WUIS REPORTS	IR&D REPORTS
COST AVOIDANCE	Detection & warning of program problems		Detection & warning of program problems		
DIRECT SAVINGS			Problem fixes		Problem fixes
TIME & EFFORT			Test & evaluation plans		
TECHNICAL DIRECTION			Future product improvements & requirements		Future product improvements
OTHER BENEFITS	Specifications & standards competition	Industrial base capability competition	Industrial base capability	Requirements	Industrial base capability competition

Figure 12

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Several years ago the Defense Department instituted a major restructuring of its major systems acquisition processes. In an effort to shorten chains of command, strengthen lines of authority, and simplify the acquisition process, each major weapon system was assigned to a military service for acquisition. Within each Service, a Program Executive Officer (PEO) was designated for each major acquisition. These officials have significant information needs, some of which may not be recognized by DTIC. In discussions with several PEOs it has become clear that the PEOs do not perceive DTIC as a source of program relevant information.

PEOs are responsible for keeping their programs on schedule and on budget. DTIC produces a range of products that could be of significant help to PEOs. For example, current awareness products can help PEOs identify problems in technologies or components that are integral to their programs. Current awareness products produced by the DoD IACs might have helped the Navy's A-X Program Executive Officer identify problems in the produceability of radar absorbing materials and structures early enough so that he could revise the program schedule and budget without causing its cancellation and significant embarrassment to the Secretary of Defense. Current awareness products can also help PEOs identify standards and specifications which can be used to promote reliability and maintainability in their systems. Current awareness products can also highlight capabilities of the industrial base, promoting competition for contracts and subcontracts.

Similarly, bibliographies of technical reports produced by DTIC can aid in the identification of industrial base capabilities and assist PEOs in identifying potential sources for competitive procurements. Technical reports can assist program managers by identifying problems and solutions thereto. In some cases, the lessons learned from one program can be transferred *en bloc* to another program, saving time and money. Technical reports can also play a major role in helping to shape preparation of test and evaluation plans, one of the most important planning and programming functions performed by PEOs.

WUIS reports can also be used by PEOs to spot capabilities in DoD laboratories that should be tapped to keep programs on schedule and on budget. Such reports can also be used to help identify requirements which in some cases can be used to bolster an argument for a particular program.

The IR&D data base can also be used by PEOs as a source of information. IR&D efforts may be helpful in solving problems which crop up from time to time in an

acquisition program. IR&D reports can also be used to identify potential improvements in a program, even if such improvements are to be incorporated in systems several years into production. The IR&D data base can also be used to identify sources of products and services to promote competition in procurement.

PEOs work with Service staffs to coordinate their activities with requirements levied by the commanders of the Unified and Specified Commands on the Services for resources. The Service staffs, too, might benefit from use of DTIC information as illustrated by Figure 13.

BENEFITS OF INFORMATION

MILITARY SERVICE STAFF

DTIC PRODUCTS

- **DIRECT USE**

- **INDIRECT USE**

BENEFIT	CURRENT AWARENESS	REPORTS BIBS	TECH REPORTS	WUIS REPORTS	IR&D REPORTS
COST AVOIDANCE					
DIRECT SAVINGS			Problem Identification	Product Improvements	
TIME & EFFORT			Test & evaluation planning	Program coordination	
TECHNICAL DIRECTION					Technology opportunities
OTHER BENEFITS	Industrial base activities		Mission requirements	Program planning Integration	

Figure 13

Military service staffs are primarily in the business of program planning and budgeting. These staffs are anxious to avoid problems which will delay incorporation of systems in procurement into forces in the field. They are also looking for improvements to existing systems which will increase the military effectiveness of existing forces.

Service staffs can benefit from DTIC information much like bench level scientists and engineers. In addition, they can benefit to the extent that they, too, worry about the

health of the defense industrial base and the need to identify RDT&E and production capabilities. Current awareness products, technical reports bibliographies, and technical reports can be of significant help. IR&D data base reports can also be helpful.

Service staffs also become deeply involved in the development of new mission requirements. Technical reports can be particularly helpful here. As the results of operational test and evaluation of systems become clearer, it is possible to devise new and more effective ways of using equipment; it is also possible to identify the need for new equipment, either to counter threats identified or to overcome shortcomings in systems completing test and evaluation.

Service staffs may also benefit from careful use of WUIS reports. As resources become more and more difficult to acquire, the Services will have to work more closely together to meet their operational requirements. WUIS reports could be very helpful in allowing Service staffs to coordinate their RDT&E activities. Such reports could also be helpful in coordinating and scheduling test and evaluation activities.

The IR&D data base might also be of use to Service staffs as they look for new technologies that can be applied to current or emerging military requirements.

As a result of the Goldwater-Nichols Defense Department Reorganization Act of 1986, the Services are responsible for meeting requirements established by the Commanders of the Unified and Specified Commands (known collectively as the CINCs). The Chairman and Vice Chairman of the Joint Chiefs of Staff as well as the Joint Staff work with the Service staffs to establish plans and programs to meet operational requirements. The CINCs and their staffs exercise command and control over forces deployed in the field.

Figure 14 identifies some of the roles DTIC information might play for these operational commanders and their staffs.

Several problems arose during OPERATION DESERT SHIELD/DESERT STORM for which DTIC might have been a reasonable place for the Commander-in Chief, Central Command (CINCENT)--General Norman Schwartzkopf--or his staff to turn for assistance. In once instance, the Army had to replace wooden handles for sledge hammers because the extreme heat and low humidity of the Saudi Desert caused the handles to shrink and the sledgehammer heads to fly off. As these tools were vital to the proper emplacement of artillery, it was necessary to substitute fiberglass handles for wooden handles.

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CINC/JCS

DTIC PRODUCTS

- DIRECT USE

- INDIRECT USE

BENEFIT	CURRENT AWARENESS	REPORTS BIBS	TECH REPORTS	WUIS REPORTS	IR&D REPORTS
COST AVOIDANCE					
DIRECT SAVINGS					
TIME & EFFORT					
TECHNICAL DIRECTION			Quick response technical fixes		Quick response technical fixes
OTHER BENEFITS			Requirements definition & validation	Requirements definition & validation	

Figure 14

This problem could have been predicted and a solution identified before the forces deployed had DTIC and one or more of its IACs been consulted. There is a substantial body of literature dealing with maintenance and logistics in a desert environment available through DTIC.

This example drawn from DoD's experience in DESERT SHIELD/DESERT STORM highlights some of the potential uses of scientific and technical information by CINC and Joint staff. Such information can be used to identify potential problems to be confronted by combatant forces before such problems are encountered in the field. Scientific and technical information can be used to refine problems and arrive at quick remedies.

Some of this information can come from technical reports; other information can come from the IR&D data base.

Scientific and technical information can also be helpful to CINC and the Joint Staffs by helping to address issues of future force requirements. Technical reports, WUIS

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output, and IR&D data base reports can help formulate questions and answers along the following lines:

- What are U.S. forces going to have to do in the future?

- What kinds of missions are U.S. forces going to have to perform?

- How should various kinds of military functions such as surveillance, reconnaissance, target acquisition, target destruction, logistic support, mobility, etc., be performed in the future?

- What kinds of training are most likely to be effective?

- What kinds of capabilities are potential adversaries likely to field in the future?

The kinds of information DTIC collects, stores and analyzes can be very helpful to the CINC and Joint Staffs. The challenge facing DTIC is to make its products and services known to the CINCs, the JCS, and their staffs.

Another set of senior level users whose information needs can be met at least in part by DTIC and its Information Analysis Centers are the technical staffs of the Office of the Secretary of Defense and the Defense Agencies such as Defense Communications Agency, Defense Logistics Agency, Defense Mapping Agency, and the Defense Intelligence Agency. Figure 15 highlights some of the potential uses of DTIC information by these staffs.

In a recent IDA study undertaken for DTIC, we discovered that OSD staff really focus their efforts to acquire information related to DoD program management issues. The OSD staff are trying to answer questions like the following:

- How does DoD buy more capability with less budget resources?

- How does DoD acquire this capability more quickly?

- How can DoD avoid unnecessary duplication of RDT&E efforts?

There is strong evidence that the OSD staff in conjunction with their colleagues in Defense Agencies, in the Services, and at the headquarters of the CINCs, are obtaining answers to these questions. Some of the answers involve base closures. Consolidation of R&D activities is also in part an answer to these questions. Moving DTIC and DLA to Ft. Belvoir is all part of this management perspective--managing our resources.

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DEFENSE AGENCY/OSD STAFF

DTIC PRODUCTS

- DIRECT USE

- INDIRECT USE

BENEFIT	CURRENT AWARENESS	REPORTS BIBS	TECH REPORTS	WUIS REPORTS	IR&D REPORTS
COST AVOIDANCE			Problem detection & warning	Unnecessary duplication of technical effort	Unnecessary duplication of technical effort
DIRECT SAVINGS			Problem fixes	Unnecessary acquisition & Improved use of RDT&E resources	
TIME & EFFORT			Test & evaluation planning		
TECHNICAL DIRECTION			Test & evaluation planning		
OTHER BENEFITS			Standardization	Program planning	Quick response technical fixes

Figure 15

DTIC information can be of great value to the OSD and Defense Agency staffs in three broad areas. Current awareness products and technical reports can be quite valuable in providing early warning with respect to problems that may be encountered in specific programs. While specific problems might be detected by reading technical reports obtained from DTIC, it is more likely that state-of-the-art reports prepared by DTIC-sponsored IACs as well as OSD staff synthesis of technical reports will identify problems in technology areas which underlie or are incorporated in specific weapon systems. As noted earlier, it is important to separate DTIC as a knowledge base from a technology audit or inspector general/program monitor function. If the Program Executive Officers and Service staffs perceive DTIC as an adversary organization, they will take actions which will effectively constrict the flow of scientific and technical information. In so doing, the second area in which DTIC can help OSD and Defense Agency staffs will be adversely affected.

DTIC information can be especially helpful in program planning and program coordination. The WUIS in its current or its enhanced mode can play a vital role in helping DoD better manage its limited RDT&E resources. It can facilitate the sharing of information, of scarce R&D facilities, and improving the utilization of RDT&E resources. DTIC information can be used to develop and implement test and evaluation plans that are more effective in identifying the strengths and weaknesses of system performance.

Finally, DTIC information can be used to facilitate improvements in standardization of DoD systems, subsystems, and components. Use of the IR&D data base as well as other DTIC information can also be used to identify urgent solutions to technical problems related to system performance, maintenance, or operational use.

DTIC can provide information helpful to other non-technical offices in the Pentagon as well. One of the most important offices DTIC might seek to serve is the OSD Comptroller and his staff. Figure 16 addresses some of the possible uses DTIC information might serve in the fiscal arena.

BENEFITS OF INFORMATION

OSD COMPTROLLER

- **DIRECT USE OF DTIC PRODUCTS**

- **DOD USE OF DTIC PRODUCTS**
  - -- **ACQUISITION (PROCUREMENT)**
  - -- **RDT&E**
  - -- **STUDIES**
  - -- **LOGISTICS AND MAINTENANCE**
  - -- **PERSONNEL**

- **DOD CONTRACTOR USE/BENEFITS**
  - -- **SAVINGS FOR DOD?**
  - -- **OTHER BENEFITS TO DOD?**

Figure 16

The OSD Comptroller and his staff have a very difficult function to perform. Their institutional role is, like a personnel office, to say "No," regardless of the question asked. DTIC's function in this context is to provide information to the Comptroller's staff intended to change the "No" to "Maybe." The following is an example of the potential use of DTIC information by the Comptroller's staff that might benefit all of DoD.

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The Comptroller decided about a year and a half ago that the Army, Navy, and Air Force had far too many test ranges for testing air-to-air, air-to-ground ordnance. Among the facilities included in the Comptroller's survey were test ranges in wet and dry tropical regions in Hawaii; temperate ocean areas off the California coast, low desert ranges in California; high desert ranges in California, Nevada, and New Mexico; wet tropical areas in Florida and the Caribbean, and Arctic test areas in Alaska.

The Comptroller concluded that there was a surplus of test ranges and that DoD could not afford all of them. It was concluded that several would be closed.

The critical point missed by the Comptroller and his staff was the nature of the test areas. If DoD could be assured that it would never have to drop air-to-ground ordnance or engage in air-to-air combat in very cold climates, then, of course, the facilities in Alaska could be closed. Similarly, if the Comptroller could assure the Navy that it would never have to engage adversary forces in tropical waters, the ranges in the Caribbean and in Hawaii could be closed. Similarly, if the Air Force could be assured it would never have to fly close air support for the Army in low or high desert conditions, it could easily dispense with the Nellis and White Sands ranges.

When the Services pointed out that the ranges were needed to ensure the Services that ordnance developed and deployed would continue to work in all of the environments into which DoD forces might have to operate, the Comptroller relented and suggested improvements and consolidation in the management and oversight of the ranges. The ranges themselves remained open and funded. Much of the effort expended by all parties to this debate could have been saved had the Comptroller's staff asked DTIC for a bibliography of reports or an assessment of the work going on at each of these test ranges. Had the question been asked, it would have been apparent that each test range offered DoD a unique environment in which to test ordnance. Each of the environments mimics an environment in which DoD has previously fought and/or an environment in which DoD may one day have to fight.

H. DTIC'S FUTURE

There isn't a single question or problem or issue anywhere in the DoD for which relevant information cannot be obtained from DTIC. The tools that DTIC has, the information sources DTIC can tap, and information resources DTIC stores directly, through its Information Analysis Centers, or through other collaborative information

sharing activities with Federal agencies, form an impressive array of knowledge, information, and data. The problem DTIC faces is communicating its capability to potential users so that they come to DTIC for help.

The prospective budget climate should make DTIC a much more attractive source of assistance for DoD organizations in the future. As illustrated by the graphs extracted from the *Washington Post* on Sunday, December 8, 1991, the downward slope of DoD budgets in both absolute terms and in terms of percent of GNP show that resources are going to shrink.

Some have argued that if one draws a line linking the mid-points of the bars showing projected outlays in defense spending for FY 89 through FY 95, the resulting line is an optimistic projection of future defense spending. The actual line is likely to have a steeper slope as the Soviet threat diminishes and as pressures mount on the Congress and the Executive Branch to address domestic U.S. economic problems.
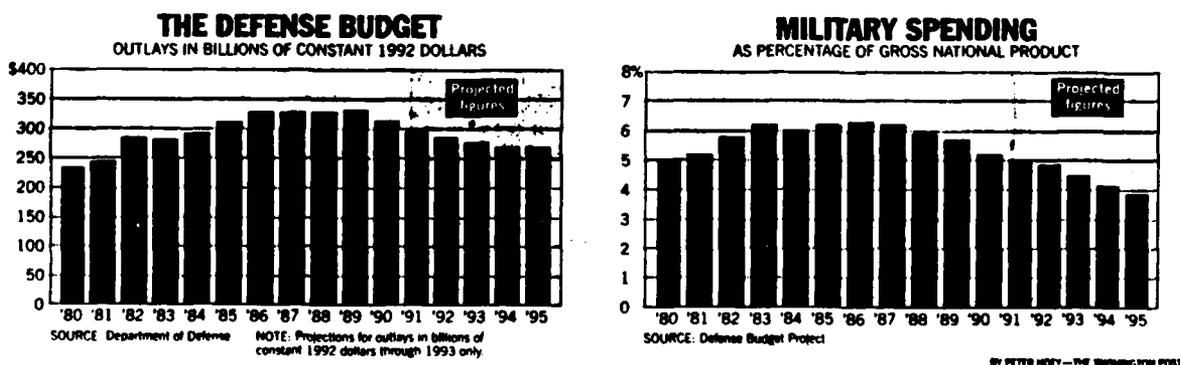
BENEFITS OF INFORMATION

DTIC'S FUTURE (1)

Figure 17

It is in this context that we return to the figure which opened this presentation.

BENEFITS OF INFORMATION

DTIC'S FUTURE (2)

- 25% REDUCTION IN REAL DEFENSE SPENDING OVER THE NEXT FEW YEARS
  - -- CONSOLIDATION OF SERVICE RDT&E ACTIVITIES
  - -- FOCUS ON COST-EFFECTIVE ACQUISITION SYSTEM
  - -- BUSINESS-LIKE APPROACH TO DECISIONMAKING

- ONLY ONE WAY TO DO MORE WITH LESS — MANAGE INFORMATION

Figure 18

It is now clear that DoD's budget will shrink by at least 25 percent in real terms over the next five years. The absence of a compelling Soviet threat on the one hand, and the mounting pressures on the President and Congress to do something about the persistent economic recession on the other make the DoD budget a major target for changes in Federal spending. After all, the DoD budget is still one of the few areas where Federal spending is entirely controllable by action of the Congress and the President. This differentiates DoD's budget from many other Federal agencies whose budgets are determined by various entitlement programs.

Figure 19 outlines my perception of DTIC's future.

BENEFITS OF INFORMATION

DTIC'S FUTURE

- MEETING THE NEEDS OF ITS CUSTOMERS

- DEMONSTRATING BENEFITS TO OSD STAFF

- MEETING FISCAL GOALS ESTABLISHED BY OSD COMPTROLLER
  OR
  PERSUADING COMPTROLLER TO SET MORE REALISTIC GOALS

- FINDING CUSTOMERS WHO WILL SUPPORT DTIC
  - -- DOCUMENTED BENEFITS TO DOD
  - -- DEMONSTRATE WILLINGNESS TO PAY FOR SERVICES

Figure 19

On balance, I believe DTIC has more reasons to be optimistic about its future roles and missions than most DoD components. While I believe DTIC faces some very difficult challenges, I also believe it will become an increasingly important player in the Department of Defense and in the rest of the federal information community. I think, in fact, DTIC's role is very likely to grow *if* some of these conditions can be met.

First, DTIC is going to have to strive, even harder than ever before, to meet the real needs of its customers. Note, I did not say users, I said customers. It is very clear DTIC information consumers are going to be told to pay, in one form or another, for DTIC services. DTIC is therefore going to have to develop an enhanced sense of service. DTIC staff have come a long way in developing a sense of service in recent years, but in my view, the commitment to customer service is going to have to extend from the very top to

the very bottom of the organization. Everyone--from the Administrator to camera operators, mail clerks, computer operators, catalogers, indexers, abstracters, users' services staff--is going to have to face each task from the perspective, how will this function help DTIC's users get more information more quickly, with greater accuracy, and at lower cost? If there is no answer to this question, then that function needs to be examined to see whether or not it is necessary.

Some months ago I talked to a very senior OSD staff member who said, "you know I'm sure DTIC really helps a lot of people. They've never really helped me, but I'm sure they have helped a lot of other people. I'll work with them and I'll make sure they get funded."

That individual is going to retire, and when he does, he may be succeeded by someone who is a Missourian--that is to say, some one who says "show me." One of the challenges that lies ahead is developing tools, measures, and tests that can measure DTIC's impact. When the question is posed, how does DoD benefit from having a Defense Technical Information Center, there should be an answer. Part of the answer might be found in a statement to the effect that DoD got X faster and DoD did Y quicker. Another part of the answer might be that DoD got more work out of its scientists and engineers. Another part of the answer could be that Department of Defense saved hundreds of millions of dollars because DoD did not repeat experiments that had already been done, etc.

Being able to demonstrate to the OSD staff that DTIC makes a tangible difference to the conduct of DoD RDT&E and acquisition activities is going to become even more important in the future than it has been in the past.

DTIC is now in the Defense Business Operating Fund environment. There is a significant disagreement about how much of DTIC's costs DTIC should be expected to recover from its users. The issue, however, is *how much* cost should be recovered, not if costs should be recovered.

DTIC and the OSD Comptroller have struck a bargain. Over a period of years it is expected that DTIC will generate a substantial portion of its own funds by providing products and services for fees. There are some numbers that have been negotiated as to how much of DTIC's resources the sales of products and services are expected to generate.

DTIC and its users face a couple of choices: (1) DTIC will have to meet the financial goals set by the Comptroller or alternatively, (2) DTIC will have to document to the satisfaction of its users and the OSD Comptroller that those financial goals are not realistic. There are good reasons to believe that some of these goals are not reasonable.

One of the things that differentiates DTIC from Dialog or other commercial information vendors is the fact that DTIC works with a very interesting set of data. It is data that not just anybody can have. It's restricted, controlled, or classified. Many times the data is restricted *and* controlled *and* classified. The limitations on the distribution (and sales) of DTIC information imposed by the information security regime in which DoD operates may be one of the reasons why DTIC proves unable to meet cost-recovery goals set by the Comptroller.

Another facet of DTIC operations that differentiates it from commercial information vendors is the nature of its customer base. There are many DTIC users who quite literally have no access to funds by which they could pay for information products and services. In IDA's study of DoD Information Analysis Centers, we found many examples of IAC users who relied heavily upon core IAC services such as current awareness products, handbooks, and technical inquiry services who simply could not pay for such services. Some of these users were very important users from the standpoint of preserving DoD capability.

The senior enlisted nondestructive testing inspector at the Air Logistics Center at Kelly Air Force Base called the Nondestructive Testing Information Analysis Center

(NTIAC) for help in identifying an appropriate test to inspect C-141 cargo aircraft wings for fatigue cracks. On the basis of NTIAC advice, the Air Force maintenance people changed their inspection practices and were able to keep C-141s in the air. The C-141 proved to be the workhorse aircraft during OPERATION DESERT SHIELD/DESERT STORM. What might have happened if NTIAC had told the Air Force Chief Master Sergeant he had to cut a purchase order before an answer to his inquiry could have been provided?

Some users of scientific and technical information have questions so urgent and so important to the business of defense that holding information until payment is made defeats the purpose of having the information in the first place. DTIC may in fact have thousands of users whose questions are so important or whose resources are so limited that it makes no sense to try to charge on a per service basis.

The problem facing DTIC, however, is the absence of information about its users, their information needs, and their ability and willingness to pay for information products and services. DTIC will have to collect real information on its users. It needs to know why users come to DTIC, why they go to other information sources, and the circumstances under which they would come to DTIC and pay for information products and services.

DTIC is going to have to make sure that its products and services respond to customer needs before it can go back to the OSD Comptroller and renegotiate its cost recovery goals.

Figure 20 presents my final thoughts on the "bottom line" of DTIC's future.

BENEFITS OF INFORMATION

**THE MOST
IMPORTANT PART OF
YOUR NEW
INFORMATION
SYSTEM**

SERVICE

Ouodata Advertisement

Figure 20

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Ultimately the quality of data DTIC collects, the quality of analysis, the quality of products and services furnished by DTIC does not do any good for the Department of Defense or DTIC unless it meets the needs of DTIC's customers.

DTIC finds itself in a new, highly competitive environment. The only way it will be successful is to make itself indispensable to customers. The tremendous pressure on DoD to do more with fewer budget resources will help DTIC because the only way the Services and OSD can do more with less is to better manage their resources. Doing so requires information, the products and services DTIC provides. I am confident that if DTIC successfully attacks the problems of defining the needs of its customers, and developing products and services to match these needs, then DTIC's future will be quite bright.