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NASA STI Conference and Workshops '91

Marshall Space Flight Center

Shaping the Future: NASA STI in the 1990s

Conference Summary

April 9-11, 1991

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NASA STI Conference and Workshops '91
Marshall Space Flight Center

Shaping the Future: NASA STI in the 1990s

April 9-11, 1991

Agenda

Tuesday, April 9

FOCUS: STI Purpose, Product, and Customers
SITE: Holiday Inn-Research Park

MORNING–Joint Sessions, All Participants

8:00 Registration		
8:30 Conference Orientation		Annette Tingle
8:45 Welcome		T.J. Lee, MSFC Director
9:00 STI Mission & Conference Objectives		Gladys A. Cotter
9:15 Panel: Creation and Use of STI	Moderator:	Thomas E. Pinelli
	Members:	Charles Telesco
		Paul J. Bennett
		David J. Weeks
		Robert J. Naumann
10:15 Break		
10:30 Federal Transfer of STI		John Eveland
11:15 NASA R&T via FEDIX		Steve Robbins
11:40 International Exchange Project: Status and Future Options		Thomas F. Lahr
11:55 STI User Queries		Patricia A. Sullivan
12:00 Lunch		

Afternoon– Function-Based Workshops (Concurrent)

Library Workshop 1 –Center Concerns I	Moderator:	Mary Walsh
1:00 Preconference Survey Results –Revisited		Mary Walsh
1:15 ARIN: ARIN Subcommittee Activities		
Recognition of Subcommittee Chairs		
MIS Subcommittee-Discussion		Janet Ormes
1:45 Brief Status Report/Open Discussion		Irma Dillon
2:15 Break		

Library Workshop 2 –Center Concerns II Moderator: Janet Ormes

2:30	RECON II Brief Status Report/Open Discussion	Judy Hunter
3:00	NACA Document Collection	Thomas Lahr
3:10	Other Library Concerns	Janet Ormes

Technical Publications Workshop 1

1:00	Video as Publication Medium: Guidelines, Costs, Other Centers' Experiences	Barbara Pasternak
1:20	Experience in Writing Style Manuals and Role of Headquarters in Directing Styles	Mary McCaskill
1:50	NASA Special Publications and Guidelines for Publications (Revision of SP-7047)	Kay Voglewede
2:00	Break	

Technical Publication Workshop 2

2:15	Center Concerns	Moderator:	Harriet Brown
2:45	Totally Integrated Electronic Publishing – Langley		Cheryl Winstead
3:15	Use of Color and STIF Output and OMB Productivity Reporting		Kay Voglewede

Graphics Workshop 1

1:00	NASA Graphics Standards Manual– Round-Table Discussion	Moderator:	Dennis Sender
2:30	Break		

Graphics Workshop 2

2:45	Creativity in Graphics	Moderator:	Becky Caneer

Summary Session

3:30 Summary/Wrap-up of Day & Conference Logistics/Announcements

4:00 Bus departs for Alabama Space & Rocket Center (ASRC)

4:45 Movie, museum tour, and reception at ASRC

7:15 Optional Dutch treat dinner

Wednesday, April 10

FOCUS: Current STI Developments, Issues, and Technology Trends
SITE: Marshall Space Flight Center

Morning – Joint Sessions, All Participants

8:00 Travel to MSFC	
8:30 Center Overview	J.A. Bethay (MSFC Associate Director)
9:00 NASA Communications Networks and Gateways	Rick A. Helmick
9:20 NASA STI User Requirements Analysis and Gateway Project	Judy Hunter Curtis Generous
9:45 Break	
10:00 NASA Printing Function	Wallace O. Keene
10:10 Update on JCP Activities –LaRC Perspective	Andrew J. Hansbrough
10:35 Group Photograph, Building 4200	
10:50 Brief MSFC Historical Tour	
12:00 Lunch–Radisson Suite Hotel Education Initiatives and NASA STI	J.D. Horne
1:00 Return travel to MSFC	

Afternoon–Function-Based Workshops & Tours at MSFC (Concurrent)

Library Workshops

1:15 Identification of Library User Needs	
Library User Committees: How and Why?	George Roncaglia Mary Walsh
Library User Surveys: GSFC User Survey RSIC User Survey	 Janet Ormes Sybil Bullock
2:15 Selling Value of Information to Users & Management in Era of Budget Constraints	Sybil Bullock

2:45	Break	
3:00	Scientific & Technical Information Library Automation System (STILAS) Overview	Sybil Bullock
3:15	Tours: Redstone Scientific and Information Center (RSIC)	

Technical Publications Workshops

1:15	SSL Document Processing–Equipment Demonstration & Briefing	Dennis Gallagher
2:00	Developing & Implementing STEPS (Scientific and Technical Electronic Publishing System)–Dryden/Ames	Linda Quinby Gene Waltman
3:00	Demonstration of the STEPS Tracking and Retrieval System	Anthony Templer
3:45	Tour: Publications and Central Graphics Facilities	Wendell Smith

Graphics Workshops

1:15	Tour of Conceptual Art Function and Central Graphics Facilities	Jack Hood Wendell Smith
2:15	Graphics by Non-graphics people–Round-table discussion — Moderators:	Dennis Sender Loren Gifford
3:15	New Graphics Technology	Jack Hood

Automated Information Management Workshops

1:15	Space Station TMIS–Concept, Status, and Demonstration	John Kearney Kenneth Mitchell
2:10	Toward the Electronic Delivery of NASA Technical Reports	Jean Tolzman
2:30	CD-ROM Prototype	Richard C. Tuey
2:45	Repository Automated Optical Imaging System (RAOIS)	Rod Hyde Mickey Hunter Robert Stewart Manuel Santos
3:00	Tour: MSFC Documentation Repository and Equipment Demonstrations	

Return to Holiday Inn

4:15 Depart MSFC

Evening- Banquet at Holiday Inn

6:00	Social Hour	
7:00	Dinner And Keynote Speaker	J.R. Thompson, Jr. NASA Deputy Administrator

Thursday, April 11

FOCUS: Strategy and Plan for 1990's
SITE: Holiday Inn-Research Park

Morning – Joint Sessions, All Participants

8:15	Coffee	
8:30	STI Outlook: STI Coordination Efforts Within Headquarters Program Offices	Wallace O. Keene
8:45	Department of Energy STI Program	Mark Fornwall
9:45	Break	
10:00	STI Function Status and Conference Summaries	
	Library	Mary Walsh
	Publications	Kay Voglewede
	Graphics	Jack Hood
	ADP Technology & STI Global Network	Judy Hunter
10:45	CD-ROM User Survey	Dian Marincola
11:00	STI Strategic Plan Status/Open Discussion	Gladys A. Cotter
12:00	Lunch	

Afternoon

1:00	Conference Actions/Directions	Wallace O. Keene
1:30	STI Managers	Gladys A. Cotter
2:30	Conference Summary and Conclusion	

NASA STI CONFERENCE AND WORKSHOPS '91

Marshall Space Flight Center, Alabama
April 9-11, 1991

List of Attendees

NASA Headquarters
- Catherine Bajis (RMS)
- Gladys A. Cotter
- Irma F. Dillon (RMS)
- Carl H. Eberline (RMS)
- James M. Erwin
- Curtis C. Generous (CDC)
- Thomas A. Hermann (RMS)
- Judy Hunter
- Kate Kase (RMS)
- Karen Kaye (CDC)
- Wallace Keene
- Allan D. Kuhn (CDC)
- Thomas Lahr
- Joseph Langdon
- Dian A. Marincola (RMS)
- Ann E. Normyle (CDC)
- Roland M. Ridgeway
- Lou Ann Scanlan (RMS)
- Michael J. Streeks (RMS)
- Patricia A. Sullivan
- Ardeth J. Taber (CDC)
- Jean Tolzman (RMS)
- Richard C. Tuey
- Kay Voglewede
- John Wilson

Ames Research Center
- Charlotte Barton (Quad S)
- Paul J. Bennett
- Doreen Cohen (Bendix)
- David Faust (Quad S)
- Loren Gifford
- Sheila H. Keegan (Quad S)
- Susan D. Parkhurst
- Anthony Templer (A.T. & Assoc.)
- Robert E. Haynes
- Mary Walsh

Ames/Dryden
- Justine Klipfel (Quad S)
- Steven L. Lighthill
- Marilee S. Morgan
- Linda Quinby
- Gene Waltman

Langley Research Center
- Elizabeth G. Fedors
- Andrew J. Hansbrough
- Linn Landis (Mason & Hanger)
- Mary McCaskill
- Harold Orr
- Barbara A. Pasternak
- Thomas E. Pinelli
- George J. Roncaglia
- Cheryl Winstead

Lewis Research Center
- Joyce Cieszewski
- Donna Clements (Cortez III)
- Joan Connors (Cortez III)
- Leona T. Jarabek
- Melanie C. Long
- Dennis M. Sender
- Richard E. Texler

Kennedy Space Center
- Harriet M. Brown
- William G. Cooper (New World Services)
- Ann Gary

Johnson Space Center
- Carol Homan
- Donna McAllister

Stennis Space Center
- Hannah Cake
- Herman Watts

Goddard Space Flight Center
- Mary C. Collins
- Luann Giese
- Jerry Hodge
- Carol Ladd
- Janet D. Ormes
- Sue Prevost

Marshall Space Flight Center

Becky Caneer
Carl J. Dow
Jacqueline Fletcher
Betty Fowler
Jack B. Hood
Judy Maples (DPTI)
Tauna Moorehead
Shelby Morris (DPTI)
Jane G. Posey
Janice C. Robinson (MSI)
Wendell J. Smith (MSI)
Diane Stephanouk (MSI)
Annette K. Tingle
Joyce Turner
Oma Lou White
Deborah R. Wills

Redstone Scientific Information Center

Sybil Bullock
Jean Bannister
Martha Knott
Nancy Stilson

Jet Propusion Laboratory

E. S. Jollie, Jr.
Robert Van Buren

AIAA

Irene Bogolubsky
Patricia Marshall
Geoff Worton

GISS

David Purdy

Information International

Bonnie Carroll

Other

John Eveland, Consultant
Mark Fornwall, DOE

FOCUS: STI Purpose, Product, and Customers

STI Mission & Conference Objectives

Gladys A. Cotter
April 9, 1991 9:00 am

The objective of this conference is to generate three or four projects to use as building blocks for shaping the future. These projects should be important and also doable; they should take no more than 4 months, 12 months, or 20 months to complete. In addition to furthering the STI mission, these projects will help to establish a track record and thus make it easier to obtain additional resources, staff, and users of STI products and services. The goal is to have people using the system and happy with it.

To further these objectives, Headquarters staff has been reorganized. In charge of User Services and Marketing is Kay Voglewede; helping her are Lou Ann Scanlan, Center Coordinator; Tom Hermann, Marketing and Exhibits; Ardeth Taber; and Ann Normyle. Responsible for CASI, AIAA, ESA, and publications is Jim Erwin. Tom Lahr is heading up the International Exchange program.

Panel: Creation and Use of STI

Thomas E. Pinelli, Moderator
Charles Telesco, Paul J. Bennett, David J. Weeks, Robert J. Naumann
April 9, 1991 9:15 am

Panelists for this session were users and producers of STI.

Producing STI is part of the continuing cycle of creation and use of STI, the alpha and omega of research and development. Information intermediaries can help in the creation of STI by packaging it for ease of use by others: editing, creating graphics, page formatting, publishing, and disseminating the information.

Existing STI is essential for the research and development of new science and new STI. Scientists on the panel estimated that they spent between 5 and 50 percent of their time looking for and using scientific and technical information, usually in the form of journal articles. A scientist going into a new area of research needs to find information in that area, and looks for the background information in a series of predictable steps. First he looks through the journals he subscribes to and knows for the relevant articles; then he proceeds through the reference tree, looking up references in the first article, then references in subsequent articles. Sometimes he goes to the information center, but not always. He does not have time to spend 3 or

4 hours there. He also networks: talks with colleagues down the hall, and at conferences. Marshall's Technology Directory, listing specialties of the Marshall staff, is helpful here.

Scientists do not have time to go to the information center, and do not have time to invest in training programs for the new information technology. They tend not to use SCAN, STAR, and RECON, because they do not know how to use them and they do not know what these tools can do. They are happy to have information intermediaries find and package the information for them, although generally they would prefer to do it themselves. They would like a system they can learn quickly and easily, with instructions on one sheet of paper or a floppy disk, and perhaps a manual to refer to. They would like to be able to search for information the way they are used to using a library: to look in an annual index to a journal, find the articles pertaining to the subject, read the abstracts, and read the articles. This is analogous to searching on subject terms (perhaps with authors or journal titles), selecting and reading the appropriate abstracts, and ordering the documents on RECON. However, most scientists are unaware of RECON's capabilities, do not know how to use it, and are unwilling to invest the time to learn it. The capabilities they are asking for are already available; the STI Program needs to market its' products more aggressively.

Other features the scientists would like to have online at their desks are translation of at least key words of an article title from languages like Russian or Japanese so that they can tell if they want a full translation of the article. They would also like visual, graphic, and video representation of data, including full text of journal articles as presented in the journals with graphics in place.

Libraries (information centers) are evolving rapidly to meet these needs, from places where documents are stored to distributed systems for information delivery. The research scientists need to be made aware of the services that the information centers can offer.

Federal Transfer of STI

John Eveland
April 9, 1991 10:30 am

Mr. Eveland presented a paper entitled "NASA/DoD Aerospace Knowledge Diffusion Research Project." The fifteen-page paper is included here.

NASA/DoD Aerospace Knowledge Diffusion Research Project

Paper Nine

Information Intermediaries and the Transfer of Aerospace Scientific and Technical Information (STI): A Report from the Field

Paper Commissioned for Presentation at the 1991 NASA STI Annual Conference held at the Marshall Space Flight Center, Huntsville, AL

April 9, 1991

J.D. Eveland
Department of Psychology
Claremont Graduate School
Claremont, California

Thomas E. Pinelli
NASA Langley Research Center
Hampton, Virginia

NASA
National Aeronautics and Space Administration

Department of Defense

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INFORMATION INTERMEDIARIES AND THE TRANSFER OF SCIENCE AND TECHNOLOGY: A REPORT FROM THE FIELD

In recent years there has been an increasing degree of attention given to issues of the generation, management, and use of scientific and technical information. In part this attention can be attributed simply to the ever-increasing volume of data emerging from the nation's laboratories, libraries, and field sites, and to the amount of public and private resources going in to these facilities. In part, it results from a simultaneously growing uneasy feeling that we are failing to make the best use of this rapidly developing and changing resource. As we contemplate the increasing disadvantages experienced by American manufacturers in field after field of both low and high technology development, we are forced to ask ourselves why we seem to be unable to leverage our scientific expertise into equally significant economic payoffs.

There is no shortage of explanations -- or prescriptions -- to be offered. Those of an economic bent tend to stress the role of tax incentives, of regulatory influence and uncertainty, and problems associated with capital formation and deployment (e.g., Mansfield, 1968). Those of a managerial turn of mind criticize the emphasis in American companies on short-term performance and limited financial planning criteria (e.g., Hayes and Abernathy, 1980). Some look to political solutions, such as the creation of "enterprise zones" or subsidies for small high-technology businesses (e.g., Watkins and Wills, 1986). Others look to the development and expansion of industry/university consortia, either with or without public participation (e.g., Gray et al., 1986).

One common denominator in most analyses of the relationship of science and technology to economic performance and competitiveness is a perception that the mechanisms for moving information from place to place in the overall system of knowledge generation and application are functioning at something less than an optimal level of efficiency and effectiveness (Bikson et al., 1984; Tornatzky and Fleischer, 1990). This concern tends to be expressed as a problem of "technology transfer" -- that is, "Why can't we get all that technology out of the universities and research labs and into industry?" While there are a number of other terms applied to the problem -- "knowledge utilization" and "information dissemination" are probably the best known -- "technology transfer" remains the predominant metaphor by which the issue is understood in the U.S. today.

For a variety of reasons, "technology transfer" as a metaphor can be significantly misleading (Eveland, 1985). "Technology" in this context often implies products -- at the least, physical objects -- that can somehow be put into a vehicle and moved or "transferred" to some other point in physical space. In reality, the vast majority of interesting technology consists not of objects but information. And even that information is often not even *about* physical objects as such, but rather about the social environment within which the objects are deployed and the processes by which they are to be used. "Transfer" in this sense thus means much less actual movement than *learning* new information. In short, to speak of the problem as one of "technology transfer" can systematically represent what is, in fact, a complex problem of

linking the *information environments* within which participants in the science and technology process must function.

This concept of the "information environment" can be particularly helpful. All of us are surrounded by enormously complex -- and increasingly complex -- webs of information, some of which is immediately germane to our lives, some of which is not. The mechanisms by which we sort and attend selectively to that information we need at particular points in time are beyond our scope here. The key point for our purposes is to recognize that the information environment is dynamic and continually being reshaped in response to perceptions of need and value.

Information Environments and Boundaries

The purpose of any transfer mechanism or strategy is to increase the interaction of two or more information environments. Essentially, we learn new things when our information space connects with that of another individual (or institution) which has access to information we do not have.[1] Sometimes this interaction is deliberate search, sometimes it is an accidental encounter. Sometimes we know what we are looking for; often we do not, although we usually have some criteria in mind for determining when we have found it. Sometimes we have immediate access to the new information; often we simply store it away against the possibility of needing it at some future point.

The key element in this transactional view is the idea of a *boundary* between the information environment of the holder of the information and that of the potential user. By definition, if there is no information to flow between the two systems, there is no boundary. Boundaries form when two information-managing systems interpenetrate each other. The process may be by mutual consent, or it may be by force.[2] This interpenetration may take a variety of forms; usually one organization moves farther into the other than the other moves into the first. A salesman who expects to sell his products to a particular customer must know considerably more about that customer's context than the customer can be expected to know about his. On the other hand, a customer who knows reasonably well what he wants may wind up knowing considerably more about the potential products available and those who sell them than any of the potential suppliers know about the client.

In a technology transfer boundary situation, the information involved is generally information about the technology, both its technical and behavioral dimensions (note that the information may be either questions or answers). This information, once received, must of course be interpreted in terms of the receiving context. Both sides tend to hear what they want to hear. Since developers are generally more comfortable with the technical context of their

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[1] We also learn, clearly, when we rearrange existing information in new patterns that give us new insights into things we already know. This creative process is at this point beyond our attention here.

[2] Being sued is an excellent example of forcible creation of an interorganizational interaction.

innovations than the behavioral component, they usually tend to hear most questions as technical issues and respond with technical answers. Users, by contrast, tend to be more preoccupied with what they are going to do with the innovation than what it looks like or what its structure is, and frequently fail to get satisfactory answers.

The nature of the processes of organizational management of information creates some predictable barriers to effective interpenetration. These barriers are of several types:

Structural: Those barriers posed by organizational arrangements and the need to achieve internal organizational maintenance criteria.

Cultural: Those barriers posed by the basic frame of reference of the parties involved. They may involve general cultures (e.g., American firms trying to do business in Japan and encountering unfamiliar practices), or the professional and technical cultures either within or across organizational lines (e.g., manufacturing trying to talk to R&D; university professor talking to industrial researcher; economist talking to anyone else).

Geographical: Those barriers posed by separation in space or time; despite the advances of information technology in helping achieve asynchronous communication, the fact remains that it is still a lot easier to share a lot of information with those close by than those farther away.

Procedural: Those barriers posed by different ways of defining and conducting operations. Frequently what this amounts to is a failure to appreciate that words have different meanings in different contexts, and what seems normal and logical to one organization in terms of procedures may not seem equally logical to everyone else.

The key point here is that all these "barriers" are in fact not physical or even organizational, but cognitive. That is, they are created by people operating within their own contexts for reasons that make sense within that context. By the same token, they can by modified or removed by the same cognitive processes that brought them into being. The critical dimension is not who people are, or even where they are -- it is how they think and feel. At bottom, creating effective technology transfer systems that take full advantage of the capabilities of parties on both sides is as much a process of reeducating people as it is of doing anything at the organizational level.

In sum, the ability of a boundary between two organizational contexts to be permeated effectively with technology transfer information depends on where it lies and who is available to preside over the information transfer activity. The further the boundary lies within the user context -- the more the developer context has penetrated into the user -- the easier the process is likely to be. But any boundary-spanning activity is of course mediated by inter-institutional mechanisms, and it is now appropriate to consider some key dimensions of such mediating points in the system.

Intermediaries and Transaction Mechanisms

While much information exchange is carried out through direct person-to-person interaction, the set of information transactions that involve *intermediary* individuals or institutions are of increasing importance. Our society has evolved a vast range of information intermediaries of varying degrees of formality, generality, and effectiveness -- television, libraries, conferences, on-line databases, just to name a few. In fact, probably the vast bulk of information transactions among individuals in our society are mediated in some way and to some degree. Moreover, the capacities of information intermediaries have been augmented in recent years through a vast array of new electronic tools. Yet we still know very little overall about how intermediaries function -- and still less about how their new capacities have changed what little we think we know.

Intermediaries are effective to the degree that they are able to translate information from the frame of reference of one individual to that of another (Bishop and Boissey, 1989). Sometimes little translation is required, if for example the two individuals concerned happen to be much alike; sometimes rather extensive translation may be required. The intermediary process is not just translation but creative editing and reinterpretation.

Eveland (1987) has outlined a three-dimensional framework for characterizing intermediary mechanisms in STI exchange:

Active/Passive: This dimension refers to the modes of communication involved. *Active* systems have some kind of "transfer agents" whose job it is to take information from one place and move it to another; the classic example is agricultural extension. *Passive* systems simply array information for the taking, relying on the initiative of the user to search out that part of the information s/he may need. On-line data bases such as NTIS are good examples.

Formal/Informal: This dimension reflects the channels of communication. *Formal* systems are those established explicitly to transfer information; *informal* systems are those that transfer information while serving some other formal purpose. This distinction is often mirrored in the roles of the individuals involved. In formal systems (such as extension) the roles of the transferror and recipient are specified and understood; in informal systems (for example, a cocktail party at a professional society meeting) roles are not defined clearly, and often shift.

Direct/Indirect: This dimension reflects the relationships of the participants and the distance between them. *Direct* systems put producer and user in relatively immediate contact (for example, a journal article written by a researcher); *indirect* systems generally transfer the information to some intermediate point, often with intervening analytical stages (for example, a journal article summarizing and commenting on a body of others' research).

It is important to remember that these *functional* differences are not necessarily mirrored directly in *institutional* differences. Most information-transferring institutions do play both active and passive, formal and informal, roles at various times and through various individuals. Some

structures are inherently less flexible; it is hard, for example, to make a traditional on-line database behave like an active or an informal medium. In general, institutions that can behave flexibly have a definite advantage over those that have only one mode of operation.

Obviously, the relative effectiveness of any intermediary mechanism in facilitating information interpenetration will depend on the nature of the boundary to be crossed and the resources available to cross it. It is also critically influenced by the guiding assumptions and underlying ideological predispositions of those who operate within it. At this point, let us turn attention to some of the mechanisms that the Federal government has been involved with, and to a framework for looking at how guiding principles influence institutional evolution of transfer mechanisms.

Technology Transfer Strategies and Institutions

The Federal government has in recent years become increasingly involved with arrangements intended to promote the more effective utilization of technology through exchange of scientific and technical information. A wide range of programs, policies, and systems have been experimented with to varying degrees of thoroughness. In general, it is useful to distinguish between the government's *market-oriented* approaches and those that do *not* involve market mechanisms.

Market mechanisms are all those that involve reciprocal transactions of value exchange. These include direct **sales**, technology **licensing**, **partnership** and cooperative arrangements of various types, and similar exchange processes. They are appropriate when both parties operate in a market environment, where the balance of value given and received is close enough to even that the relationship is sustainable, and where the parties both command sufficient resources to carry the relationship long enough to make it work without outside help.

Non-market arrangements primarily involve units of government as one of the parties, and include **commercialization** programs (for technologies with potential market value); **dissemination** programs (for technologies either without market value or intended for use by other government units), either with or without associated **demonstration** projects; **technology mandating** (where the government requires the use of particular technologies); and **economic levers** (regulation, tax and patent policies, and direct subsidy). There is considerable debate in the literature over when particular non-market arrangements are and are not helpful, and how they interact with market mechanisms. In general, the consensus seems to be that non- market interventions are appropriate where "market failures" exist either because the government is the only buyer (or seller) or because the market is structurally imbalanced in some critical way.

There are also some mechanisms that can operate in either a market or non-market context. These include **library-type** systems (e.g., NTIS, DIALOG), **research consortia** (particularly those involving universities and industrial firms), **publication** in the open or not-so-open literature, and **personnel exchange**, either among developers, among users, or between developers and users. These arrangements are frequently part of other, more structured mechanisms.

The degree of enthusiasm of the government for each of these approaches has waxed and waned as political fashions have changed. In general, however, there has been a trend over the years to move toward more specific focus of involvement, and more specific focus on information management. Williams and Gibson (1990) have outlined an interesting framework that categorizes technology transfer in terms of three models of increasing interactivity:

> *Appropriability* models: Under this approach, research knowledge is generally treated as a commodity, to be procured/purchased by a user in accordance with his/her judgments of its utility. Good research will sell itself; the "better mousetrap" will find utilization. Transfer mechanisms emphasize publication in the research literature and, to a lesser extent, direct interpersonal interaction initiated by the user. The user bears the primary responsibility for utilization.
>
> *Dissemination* models: Under this approach, technical experts have a responsibility to identify good ideas and bring them to the attention of potential users. The experts, who may be either the producers of the knowledge or third parties, establish linkages that presumably ensure a continuous flow of ideas. Responsibility for use is thus shared between producer and user.
>
> *Knowledge utilization* models: Under this approach, the flow of ideas moves toward bidirectionality. That is, the user accepts a responsibility to interact creatively with the producer to ensure a more precise targeting of the knowledge to real problems. Information exchange becomes more of a transaction and less a linear flow.

Clearly there is an intersection between these models and the typology of mechanisms outlined earlier. Appropriability models tend to emphasize passive and indirect strategies, while dissemination models tend to center on more active and direct strategies. Knowledge utilization models more or less require active approaches, but can be either direct or indirect in operation. Each model employs a mix of formal and informal approaches.

The bulk of the Federal government's attention to technology transfer has been divided between appropriability and dissemination strategies. As we noted earlier, there has been a heavy emphasis on market mechanisms, which are largely based on appropriability models, and some limited attention to dissemination in fields such as agriculture and education.[3] Certainly virtually all of what currently exists in the aerospace science and technology area would fall into one or another of these two models.

At this point the question logically arises: "What's best? What works? And shouldn't the Federal government be doing more of it?" The answer, unfortunately, tends to be contingent -- "It depends...on the contexts, on the information, on the participants, on the criteria for success of the

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[3] There have also been quite limited and sporadic efforts in the areas of manufacturing technology and energy technology that have occasionally contemplated a knowledge utilization framework, although with very limited success.

encounter." Moreover, the evidence on which even such contingent conclusions are based tends to be anecdotal and impressionistic (Bikson et al., 1974; Eveland, 1987). There is a significant need for well- structured empirical research to begin to disentangle the issues involved in the relative advantages and disadvantages of different approaches to technology transfer.

Investigating Knowledge Use: Going to the Sources

Recognizing the general shortage of empirical knowledge in this area -- particularly with reference to the aerospace community -- NASA and DOD launched in 1987 the *NASA/DOD Aerospace Knowledge Diffusion Research Project*, aimed at systematically investigating how the results of NASA and DOD research find homes in the wider aerospace R&D process (Kennedy and Pinelli, 1990). As an early part of its research, this project surveyed in 1989 three samples of aerospace scientists and engineers and a parallel sample of technical librarians and other formal information intermediaries. These surveys were aimed at gathering some basic data on how scientific and technical information (particularly that generated by the government) is being used, how its use fits into broader issues of R&D, and how the information infrastructure supports (or fails to support) this process. In this section of the paper, we present some findings from these surveys as they relate to the issues posed earlier of how an effective knowledge diffusion system might work.

The sample for the survey of scientists and engineers was drawn from the membership lists of the American Institute of Aeronautics and Astronautics (AIAA). Overall, 3946 responses were received to the three different questionnaires, with 2016 of those being to the first and longest questionnaire. 51% of the respondents worked in industry, 22% for the government, and 12% in academia. 84% classified themselves as engineers by training, 12% as scientists.[4]

The survey of information intermediaries gathered data from 156 technical librarians and related personnel. The list of U.S. and Canadian government and industrial libraries was compiled from several sources. One source was the Directory of Special Libraries and Information Centers. Additional libraries were compiled from the members of the Aerospace Division of the Special Libraries Association. All libraries held aerospace, aeronautical or related collections. In addition to the industry libraries, government libraries, including both regional depositories and armed services libraries, were included on the list.

In the remainder of this paper we present some findings from these surveys that shed light on how scientists and engineers actually use scientific and technical information to carry out research and solve problems. We then return to some implications of these findings for the design of effective knowledge transfer systems, and some ideas for further research that should help flesh out the picture in more detail.

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[4] Full reports on the data from these studies can be found in Kennedy, Pinelli, and White (1990). In our discussion, we draw data from the first scientist/engineer survey and from the library survey.

What the Data Show

One of the most intriguing sets of questions in the scientist/engineer survey addressed directly the issue of their information gathering behavior. Respondents were asked to think back on their most important recent technical project or task in the last six months, and to rank in order the steps they went through to gather information relative to it. The nine possible information gathering modes fell into three general classes:

Formal data sources: Searching databases, consulting library sources, etc.

Information intermediary sources: Consulting with librarians and technical information specialists

Informal network sources: Consultation with colleagues, supervisors, "gatekeepers", etc.

Ranking nine steps is inherently a rather difficult task, and it is hard to be fully confident in the rankings at later stages. However, it is probably that at least the first couple of steps would be recalled with some precision. Accordingly, respondents were grouped in terms of whether they employed data, information specialist, or network sources at the first and second steps of the process.[5] Table 1 gives the frequencies for these usage patterns. In the analyses that follow, these groups

TABLE 1
SOURCES OF PROJECT INFORMATION

		SECOND STAGE	
		DATA SOURCES	NETWORK SOURCES
FIRST STAGE	DATA SOURCES	416	519
	NETWORK SOURCES	281	430

will be referred to as "Data-to-Data" (D/D), "Data-to-Network" (D/N), "Network-to-data" (N/D), and "Network-to-Network" (N/N) depending on which source

[5] Since there was relatively little reported use of information intermediary sources at these stages, they were combined with "data" sources for the rest of this analysis. Thus, references to "data people" should be interpreted as referring to both those who chose formal data sources and those who relied on information intermediaries.

they took first and which they subsequently resorted to.[6]

There are some interesting differences between the four groups in terms of composition. The scientists in the sample are disproportionally D/D's (33% vs 24% across the sample) and low in N/N's; however, the engineers distribute themselves across all four groups more or less in proportion. Perhaps as a consequence of this concentration, the D/D's tend to be better educated (an average of one more degree than the other groups), and to be employed in education and research; the N/N group is disproportionately higher among the administrators. D/D's are somewhat more likely to use basic science and technical information than are N/N's (95% vs 85%), but N/N's use more in- house technical data. D/D's get a higher percent of their information from conference papers and journal articles than do the other groups.[7]

A series of questions was asked relating to use of libraries and technical information sources. There were no differences among the groups in terms of the availability of library resources (over 90% across the board). However, D/D's were, not surprisingly, more likely to have visited the library in the past six months (95% vs. 80% for N/N's), and to have sought help from a specialist (85% vs 67%). On average, D/D's rated the library one full point higher on a 5-point scale of importance than did N/N's; 63% rated it as "very important", as opposed to only 25% of N/N's.

Another series of questions asked for opinions about the severity of a series of potential barriers to library use. The eleven specific barriers broke down into four general classes of factors: lack of help, lack of information needs, administrative barriers, and availability of other sources of information.[8] D/D's tended to react most strongly to administrative barriers, while N/N's tended simply to have no information needs or to have other sources of information.

The barrier questions offer an interesting opportunity to compare the opinions of information users with those of the information specialists, since parallel questions were asked in both surveys. Table 2 shows the similarities and differences. A significantly large proportion of librarians felt that users were

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[6] Of the 416 D/D's, 210 were what might be called "hardcore D/D's", in that they remained with data sources even to the third iteration. The behavior of this hardcore group seldom differs from that of the rest of the D/D group significantly, though they do tend to exhibit the D/D properties with a bit more strength than do the "softcore" D/D's.

[7] In general, the D/N's and the N/D's are remarkably like each other, and usually about halfway between the D/D's and the N/N's. When there are exceptions to this pattern, they will be noted; otherwise, it can be assumed to hold.

[8] This grouping, and that reported subsequently for information technologies, was accomplished through principal components factor analysis with varimax rotation. In both cases, the four-factor solution accounted for about 80% of the variance of the original variables.

TABLE 2
BARRIERS TO LIBRARY USE
(PROPORTION OF EACH GROUP ANSWERING "YES")

	SCIENTISTS/ENGINEERS	LIBRARIANS
DISCOURAGED FROM USING	1.2%	11.1%
HAVE TO PAY	4.8	5.6
OWN PERSONAL COLLECTION	30.3	71.5
LIBRARY TOO SLOW	15.8	31.3
LIBRARY NOT HAVE INFO	23.6	42.8
LIBRARY TOO FAR AWAY	23.6	49.6
INFO NEEDS MET MORE EASILY ELSEWHERE	38.2	37.6

"discouraged from using the library"; by contrast, this was identified by an extremely small number of users. Almost twice as many librarians as users saw "personal information sources" as a barrier. In general, the librarians tended to see a much higher incidence of barriers to use than did the users themselves.

Both groups were also asked about seven factors that might influence use of NASA technical reports (Table 3). Here, there was a generally high degree of agreement between the two groups. The only major differences resulted from the librarians' underestimating the importance of accessibility to technical managers, and relevance to engineers. In general, the information specialists seem to have a good understanding of this aspect of their clientele.

TABLE 3
AVERAGE RANK OF IMPORTANCE OF FACTORS INFLUENCING USE OF TECHNICAL REPORTS
("1" = "MOST IMPORTANT")

	JUDGMENTS OF:		JUDGMENTS BY LIBRARIANS ABOUT OPINIONS OF:	
	TECH.MGT.	ENGR.	TECH MGT.	ENGR.
ACCESSIBILITY	3	3	5	2
EASE OF USE	7	6	6	6
EXPENSE	6	7	7	7
FAMILIARITY	5	5	3	4
QUALITY	2	2	2	1
COMPREHEN-SIVENESS	4	4	4	5
RELEVANCE	1	1	1	3

One other area where parallel items were asked related to the use of a series of fourteen specific information technologies (Table 4). Some interesting differences emerged here. Librarians tended to report higher involvement with electronic databases, CD/ROM, and fiche. By contrast, the users tended to report higher involvement with desktop publishing, film, audio, and teleconferencing. These distinctions make sense; the librarians' preferred technologies are all archival media, while the users' technologies tend to be more interactive. Oddly, there were no notable differences between the groups in terms of use of electronic networks, fax, electronic BBS's, or videotape.

TABLE 4
USE OF INFORMATION TECHNOLOGIES
[PROPORTION ANSWERING 'I CURRENTLY USE IT']

	USERS	LIBRARIANS
ELECTRONIC DATABASES	57	92
ELECTRONIC NETWORKS	43	55
CD/ROM ETC.	8	53
FICHE, MICROGRAPHICS	63	91
TELECONFERENCING	50	29
VIDEO TELECONFERENCING	20	15
FAX	88	90
ELECTRONIC BBS'S	29	39
ELECTRONIC MAIL	53	65
CARTRIDGE TAPE	40	34
DESKTOP PUBLISHING	54	31
VIDEOTAPE	60	65
FILM	28	23
AUDIOTAPE	37	61

Among the user group, the D/D's tended to report higher use of electronic databases, fiche, video and audio tape, and film than did the other groups. N/N's were disproportionately higher users of video and audio teleconferencing. This is consistent with an overall pattern in which the D/D group tends to prefer more archival media, while the N/N group prefers technologies that enhance networking.

In general, then, the data support a picture of a rather diverse user community, one generally in touch with its information needs, but ready to meet those needs in a variety of divergent ways. Those who prefer specific information gathering strategies tend to be different in other ways as well. While there is clearly structure to information acquisition and use in this sample of information users, it is a structure of diversity rather than uniformity.

Conclusions and Future Research

We have suggested earlier in this paper that there is potentially an enormous range of arrangements that might be considered for knowledge transfer systems, varying along several different dimensions. Some are susceptible to formal creation and management; others are simply a matter of not getting in the way of something that is working. All have met some needs at some places and some times, for some people.

From the NASA/DOD survey data, there can be no way of inferring what strategy is "best"; indeed, given the fact that the respondents were all presumably well qualified professionals, the data tend to call into serious question the idea that any one model might meet the needs of more than a distinct minority of possible users. Thus, we have empirical reinforcement for the idea of the value of diversity in knowledge transfer strategies.

One point that does emerge loud and clear from these data is that the traditional strategy of essentially passive information distribution through formal channels -- under an appropriability or even a dissemination model -- appears to be the preferred approach of only about one-quarter of this large and diverse population of users. That is, over three-quarters of the respondents preferred to use a networking approach early in their information gathering process, rather than relying on the data and information intermediary systems to produce what they needed.

Surely this constitutes an argument for a movement toward a more comprehensive information utilization model, in which formal sources of data can be used in creative combination with interpersonal and interactive media to produce a more situation- and person-responsive operation. Such an approach, which one might call an "interactive information intermediary" system, would lend itself to effective use by a significantly higher number of individuals than are now comfortable with any one component of our present highly disaggregated and generally reactive arrangements for knowledge transfer.

It is clear that the technological infrastructure to support such a system, if not wholly developed, is at least feasible. The data indicate quite high overall levels of use of a significant number of the interactive information technologies that would be required by this approach. With some additional augmentation -- for example, expert system tools to assist in literature search, or object-oriented databases that link text, graphics, and audio in searchable patterns -- existing knowledge transfer systems would find themselves reaching vastly more individuals, and vastly better.

Attention to the technology *of* transfer should not lead us to forget, however, that the underlying issues of quality and utility of data are paramount. On-line data retrieval is paced by the ability of the searcher to bound the problem; computer or video conferencing is no better than the quality of the participants and the time they can afford to devote to the exchange. The "new media" (Rice et al., 1984) can best be seen as "multipliers", affecting the power and magnitude of the exchanges they facilitate rather than their basic nature.

We have by no means exhausted the research needed to understand this problem, even within the limited compass of NASA/DOD research publications and the aerospace

community. For one thing, it would be particularly interesting to have follow-up data that reflect more directly the *networks* of relationships among information providers, intermediaries, and users. The present data, while extremely informative, do not allow us to link, for example, the opinions of users and those of the intermediaries that serve them. More systematic attention to the patterns of interaction that characterize this extremely diverse and heterogenous community of participants in the research process would be extremely helpful in estimating the need that remain to be met by such an interactive strategy.

In sum, the evidence to date appears to reinforce the concept that individuals' "information environments" take many different shapes, and interact with each other and with formal data transmisssion sources in many different and equally valuable ways. Any overall strategy for improving the effectiveness and efficiency of scientific and technical information sharing must take this divergence into account, and work toward the creation of systems that reinforce true interactive knowledge *utilization* rather than simply "disseminating" data. We have a long way to go before we can specify what such a strategy would look like, but studies such as this can help point the way.

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NASA R&T via FEDIX

Steve Robbins
April 9, 1991 11:15 am

FEDIX is yet another online information service. Its key features differentiate it from other systems. The information on FEDIX serves colleges and universities and other research organizations. This information is in the form of actual articles, rather than abstracts, and includes key words, an overview of agency information, titles, and authors or principal investigators. Figures and references to figures have been deleted. A main advantage is that the online system includes DoD, DOE, FAA, NASA, and Office of Naval Research information. Other features include text searching, key word searching, and download capability to WordPerfect and ASCII.

A pilot project received support from the Office of Space Science and Applications (OSSA), and was initiated by Marshall Space Flight Center for smaller schools with no previous contact with NASA research scientists. These included minority schools, teachers colleges, and liberal arts schools not involved in space research.

Marshall Space Flight Center (MSFC) is the first center to pilot the program and include centerwide information. It got involved trying to achieve pilot program goals working with the universities. An annual MSFC research and technology report which serves as an update to management is now available on FEDIX. The input comes from different labs and the researchers themselves and includes authors, titles, and textual description of what is being done. It describes current research and is updated yearly. The online information also includes principal investigators, telephone numbers, organization, agency, office, etc. Funding for other centers to do the same may be available in the future from Headquarters.

A menu-driven system allows search by topic as well as location of research. For example, if a user were interested in nuclear propulsion, he might find references to research on that topic at MSFC, Oakridge National Laboratory, and Sandia National Laboratory. The key words were compiled by the FEDIX people; although they are not from the NASA Thesaurus, they are space related.

International Exchange Project: Status and Future Options

Thomas Lahr
April 9, 1991 11:40 am

The STI Program initiated a review of its' international program. The historical development of the international program has had a number of features. The American Institute of Aeronautics and Astronautics collects worldwide journal literature–proceedings and other published literature. NASA collects international information through bilateral agreements with institutions; i.e., NASA to research

centers or NASA to a library, and a 25-year relationship with the European Space Agency (ESA) in which ESA takes a coordinating role for its member countries. This relationship has developed from being exclusively an exchange of documents, to data media, to online systems, and finally to a tripartite exchange program. A recent development is a national-level program called Country to Country. Currently, we have agreements with Canada, Australia, and Israel. There is also a draft program with Japan and negotiations are under way with Hungary, Brazil, and India.

The review focused on the NASA/ESA tripartite exchange program which provides approximately 5,000 technical documents a year. Concerns from the major participants surfaced in conjunction with the development of the European Aerospace Database and national databases and indicated a reconditioning of changing technology and market placement, which impacts the basis of the exchange. Also, the maturity of the information program and the partners and experiences of other government exchange programs have changed the direction of the ESA.

To increase the awareness, within and outside of NASA, of the available international STI resources, and the International Exchange Program and its benefits, the STI Program is developing an information brochure, outlining the International Exchange Program and what is exchanged, from where, and how.

The goals of the program are to increase access to foreign material for U.S. and NASA scientists and engineers, and to improve the quality of the program in areas such as timeliness, quality of items, and scope and coverage. These are areas NASA's national partners have said don't meet their expectations of the program. Finally, NASA must be responsive to changing international conditions, especially individual national interests and the United Bureau.

Traditionally, items exchanged have included documents, microfiche, standardized citations, or records in magnetic format, as well as search time, abstracts, access rights to the database, and money in form of royalties.

Who has responsibility for what? Who does what? Who does initial documents and translations, whether technical reports or the open literature? Who does cataloging, accessing, and indexing? Who develops and manages standards such as 'Scope and Coverage'? Who is responsible for quality control of the database, policy development, training, and marketing of the database?

Who maintains control over what? Who makes policy decisions as part of a bilateral or ESA-sponsored agreement? Who owns the data? Who has authority to allow access to the data? Who makes decisions on standards, such as scope and timeliness? Financial decisions? Contract decisions?

The economics includes cost of acquisitions or processing, computer maintenance, abstract journal production, maintenance and tracking of standards, and management resources, as well as actual revenues such as sales of program products.

In the analysis of the international program, various options exist. NASA staff have developed a questionnaire for the participants who are the foreign contributors through the ESA program, and plans to hold discussions with key users and to go back to ESA and discuss the implementation and formalization of the questionnaire in April and in May. They plan to develop participant meetings to gather feedback and information. In June, they hope to send out the questionnaire. In July, they hope to complete the international program brochure, and, in August, they will begin to develop program plans for 1992.

Using the questionnaire, they plan to query the 500-plus participants in the tripartite program. They want information about the strengths and weaknesses, and the costs and benefits of the current information exchange program. They want suggestions on how to improve the program. They are interested in five program areas: the demographics and general information, the contributor organization experience, the national center program, the development of the European Aerospace Database and other national databases, and opportunities to share information. All who are users of the NASA system and providers to a user community, should take the opportunity to discuss your expectations with Lahr and his staff, and tell them your requirements for your users of foreign scientific and technical information during the conference. They are interested in your opinions, your requirements for things such as expanded subject coverage, expanded country coverage, the timeliness and quality of the data, expanded literature type, and ways to improve the existing program to meet your needs.

STI User Queries

Patricia A. Sullivan
April 11, 1991 11:55 am

Center representatives were queried for their formatting preferences for RECON citations. The author name field has been the complete name, and representatives were asked their opinions on using only the first two initials. The consensus was that they prefer the complete name. Centers were also asked to submit items for the STI Bulletin.

FOCUS: Current STI Developments, Issues, and Technology Trends

NASA Communications Networks and Gateways

Rick A. Helmick
April 10, 1991 9:00 am

The Office of Space Operations (Code O) has the overall network responsibility for the agency. They are the networking focal point for Congress within NASA. Code O delegates the local network responsibility to each of the Center Directors. However, within the organization they do manage and fund a variety of activities, such as: The Deep Space Network, Near Space and Program Support Communications Network (PSCN). Code O also has the responsibility for the network addressing for the agency, including OSI, X.25 Network, and DECNET Phase 5.

The Office of Space Science Applications (Code S) is responsible for consolidating all the science networking requirements. The requirements were so diverse and unique that they formed the NASA Science Internet (NSI). NSI is responsible for pulling together all the other agency science requirements and consolidating them. Code S is also the focal point in NASA for the Internet community and the National Science Foundation (NSF) network. They also take part in the Internet Engineering Task Force. NSI is working to bring together the Transmission Control Protocol/Internet Protocol (TCP/IP) community and the DECNET community into one large science network..

The Office of Aeronautics, Exploration and Technology (Code R) has a pathfinding role in high-speed computing and networking. One of their major initiatives is the Numerical Aerodynamic Simulator Program. A high speed network called ASNET or Aerodynamic Simulator Network was built to support the users of that system. It is a bridge base network that extends to various locations, mostly aerospace contractor locations, and NASA sites. Code R manages and funds this network.

NASA Centers used to be separate entities and were able to make their own decisions on these kinds of issues. But now within the agency they are having to work closer and closer together. There has to be coordination in tying these networks together. This led to the formation of the Intercenter Committee on Computer Networking, which consists of representatives from Headquarters and every NASA Center. It is sponsored by Code O as a forum for people to get together and exchange information about the networking plans for their sites. It provides an opportunity to share information on appropriate contacts at the centers for trouble calls, problem reporting, protocol coordination, and other issues.

Recent technology trends in networking include Fiber Distributed Data Interface (FDDI) and Broad Band FDDI. Many of the centers are implementing Ethernet LANs to connect to the outside world.

NASA STI User Requirements Analysis and Gateway Project

Judy Hunter and Curtis Generous
April 10, 1991 9:20 am

Judy Hunter explained that the NASA Access Mechanism (NAM) project is a prototype system being developed to help the scientific user community in locating and accessing sources of Scientific and Technical Information (STI). The prototype system is an integration of communications, graphical user interface, electronic mail, and data locator software that will provide an intuitive approach to data access procedures. The user requirements analysis will provide a base for building the prototype by defining the areas of greatest concern to the researchers. The requirements analysis was focused specifically towards the existing user base and what was needed to put the prototype together. A sample of the total user community was used to get some idea of the broad range of requirements necessary. In this limited analysis it was discovered that the users want broader and deeper coverage of relevant disciplines. They need help locating the sources of data. With this information, the prototype will be built and then taken out into the field so that users can provide feedback. Feedback is important for improving the capabilities of the NAM project, especially in the areas of user interface and data representation for the final version. In addition, it will be important to look at what the next generation of online information systems might be.

Curtis Generous explained that NAM will attempt to simplify the issues of communications and networking which have made the task of search and retrieval far too complicated for the average researcher. There are plans for the development of a global STI Network, which will provide users with a virtual, transparent connectivity to many of the different networks available within NASA and the Internet community at large, such as NASA Science Internet (NSI), Program Support Communications Network (PSCN), Space Physics Analysis Network (SPAN), National Science Foundation (NSF), and many others.

A decade ago, scientists in their laboratories only needed access to a single machine to access their scientific data. This scenario was a simple one. Then an explosion of new computer manufacturers occurred in the late 1970s, and scientists found themselves needing to access several machines at once. Then in the 1980s, local and wide area networks appeared and started a whole new revolution. Scientists needed to learn about network access methods, while also resorting to use several different computers to access data spanning dissimilar networks which were incompatible with one another. This is best exemplified by the explosion of network protocols

and networking operating systems that came into existence. And to make things worse, once the data were located and retrieved, the user was faced with the problem that the data was not represented in any standard format, making the task of merging and manipulating different data sets a very difficult task. The NAM project will try to address every one of these issues, giving the scientist a unified view access of all these network resources, effectively creating a virtual STI Network.

To address the biggest complaint that users have expressed, "knowing where to find the data," NAM will be equipped with an intelligent resource locator which allows queries on metadata descriptions to be made, and provides a database of information storage locations. Eventually, NAM will even allow users to communicate with each other through an electronic mail directory service coupled with an easy to use electronic mail interface.

The power of NAM is in its' ability to access more than one remote system at the same time. If the user is searching for a certain data set spread across multiple hosts, NAM will access all those machines simultaneously and bring them back to the user.

The NAM prototype is expected to be completed by the first quarter of FY 92, and will be running on a Sun machine under the UNIX operating system, using the X windowing system for the graphical user interface.

NASA Printing Function

Wallace O. Keene
April 10, 1991 10:00 am

The issue of forwarding requests for printing equipment to the Joint Committee on Printing (JCP) for approval was raised by the Inspector General's (IG's) Report and a letter received from a U.S. Senator instructing NASA to cease acquisition of a laser printer for the Marshall Space Flight Center. Also, during discussions of the IG Report, staff in the IG Office had made the same recommendation. Based on these documents and recommendations, it was decided to reevaluate whether or not NASA would, in the future, seek JCP approval of printing equipment acquisitions.

This decision led to several activities. First, the situation in other agencies was surveyed along with the decisions of their General Counsels in relation to earlier guidance received from the Justice Department. It was found that several agencies had agreed to send printing equipment requests to the JCP for approval but there was no consistency across government agencies. In some cases, internal organizations have passively concurred with JCP as a means to survival. On the other hand, the Office of Management and Budget (OMB) had no policy on the issue and was not interested in getting involved. Concurrently, the NASA General

Counsel queried his counterparts on their policy in this matter. This group replied that they have acted on the Justice Department decision and were not going forward to the JCP for approval of printing equipment acquisitions.

At this point, Admiral Truly, the NASA General Counsel, and Inspector General reviewed the situation and found that the General Counsel's decision to go forward to JCP for approval violated the guidance given by the Justice Department. After this review of the issue at the highest levels of NASA Headquarters, it was decided that NASA would not go forward to JCP for approval of printing equipment acquisitions.

The decision to move the printing function out of the regulatory division and ally it with the STI function has affected internal operations, but due to STI's interest in printing, it is a better alliance. Issues of interest to STI include desktop publishing, as well as printing, and a more coherent use of the printing function.

Update on JCP Activities–Langley Perspective

Andrew J. Hansbrough
April 10, 1991 10:10 am

The focus of the Langley printing operation is to print and distribute NASA formal reports for other centers. This includes creating covers. Approximately 60% of the printing handled at Langley is contracted through GPO, and the other 40% is printed in-house. Although the Inspector General has said not to print in-house at all, the 60/40 ratio is pretty good. Langley also prints the technical reports for Air Force conferences; this material is security classified and turnaround time is about 10 working days. The Air Force reimburses Langley about 30% of the cost. Research reports comprise the greatest part of what is printed at Langley. They are the basis on which having an in-house printing operation is justified.

Langley's equipment acquisition process and JCP's involvement in that process includes announcing acquisition plans and purchasing the equipment; and then JCP shows up to review the equipment and overall operation. Past efforts to upgrade two presses drew a lot of comments from both GPO and JCP. Currently, Langley is re-examining emerging technology in the print arena before making a large investment. A factor to be considered is the increase in per unit cost realized with each new purchase.

To restructure just the in-house operation from a printing plant to a duplicating center would involve changing the skill mix as well as buying duplicating equipment. The recurring cost is estimated at about $240,000. Such a change would

affect quality and turnaround time. A case in which some classified work was contracted on GPO's direction resulted in a turnaround time of about three months vs. the 10-day turnaround time for in-house printing.

The political philosophy and role of the JCP change as the Congress and the committee are restructured. A bill proposed to Congress last year would have changed the definition of printing and publication. It defined publications as any information, no matter what format it takes, or what equipment is used to generate it–photography, video, computer imagery, etc. This would change the role of JCP from pure printing to any information systems sources.

The Inspector General audit made Langley re-examine how things get done, how records are kept, etc. It is likely that a control system to help track jobs, etc. will be developed, increasing reporting overhead.

Education Initiatives and NASA STI

J.D. Horne

April 10, 1991 12:00 pm

Transcripts for this presentation are not available.

FOCUS: Strategy and Plan for 1990s

STI Outlook: STI Coordination Efforts within Headquarters Program Offices

Wallace O. Keene
April 11, 1991 8:30 am

The first meeting of the STI Council will be held at Marshall during the conference. Participants will include chief engineers, chief scientists, program office representatives and centers.

The STI Program has drifted away from the users, and the STI Council was formed to allow a high level advocacy group to discuss the problems and formulate some conclusions. The Council was set up to put some definitions on the requirements. Several issues to be discussed include: What should the STI Program do for the NASA community? What are NASA's responsibilities to the research community? Is the STI Program currently prepared to respond to these requirements? What solutions can or should be implemented? The Council will be tasked with formulating a work plan based on recommendations from the group.

Department of Energy STI Program

Mark Fornwall
April 11, 1991 8:45 am

OSTI (Office of Scientific and Technical Information) is in the Office of Administration, Human Resources Management. The office works in cooperation with program offices: nuclear energy, fossil energy, energy conservation, environment, safety, health, energy research, etc. These are the Department of Energy's (DOE's) research and development offices.

The DOE R&D budget is approximately $6 billion per year. The OSTI budget is $15 million. Contractor operations cost about $250 million. Headquarters funds R&D. The funds are administered by the operations office, which oversees several contractors. There are about 500 direct procurements per year. There are three national laboratories, with large research budgets.

STI issues are handled by technical information officers, responsible for planning and policy development. OSTI meets with them periodically. The technical information officers ensure that the required deliverables meet the needs of DOE.

A very large national laboratory will spend from $5 million, with a staff of 70, to as much as $23 million, with a staff of 280, on STI. They report research in progress and research results.

OSTI provides leadership and direction for the DOE in the area of STI. Also, it provides information management support. OSTI enjoys fairly high-level support within DOE. OSTI's program objectives are program direction, information management, representation, and consultation. The policy program development function includes interpretation of laws and regulations affecting information management. OSTI works closely with the IRM office. The representation function includes standards and practices pertaining to globalization, electronic publishing, implementing user exchanges, and research sharing. Several bilateral agreements are in place in addition to agreements with the International Energy Agency and the International Atomic Energy Agency. Information management includes the R&D deliverable monitoring program (the OSTI signs off on a contract only after a report is delivered; payment will not be made without an OSTI signature), the research in progress program, the STI software program. OSTI has a database, a reproduction activity; it is the DOE archive. Reports are announced in the database and in publications.

One of the department's priorities is to improve attention to safety and health, including the environment. The department is thinking about STI in this regard. Documents contain valuable information that can be applied to current studies. In terms of setting up reactors, there's quite a paper trail for licensing, etc. Production documents are also useful in the development of waste management plants. The department is also involved in modernizing defense facilities, and documents are useful in this area.

The department is also involved in promoting math and science education, and OSTI assists in that area. We are involved with pamphlets, and other educational materials. DOE is also providing old epidemiology research data to the Centers for Disease Control in Atlanta, Georgia.

The most important area right now is technology transfer, which brings up information flow in government. There is competition. The Freedom of Information Act has affected this. However, the department also classifies and restricts information. There needs to be a balance.

In the 1990s, STI will be global. There are some dichotomies, such as the open flow of information versus access restrictions. In the future, government resources will be limited, so we have to be able to do more with less. We must have interagency cooperation and international cooperation.

Another dichotomy is technology development versus user expectation. Scientists want simply to press a button and have information come up on a screen. This is an unrealistic expectation. On the other hand, we have a responsibility to the public. Federal agencies are going to have to be able to use a broader range of technologies.

In the past, the fashion was to have a decentralized STI function. Now the trend is toward moving STI back into the center. In some areas, centralization makes sense.

In order to market the office liaison program, we assigned the three divisions responsibility for different programs and then talked to program managers in those divisions and told them what we were trying to accomplish. The managers of defense programs were open to our assistance. The fossil energy department was not cooperative. The office responsible for world climate change welcomed our help.

STI Function Status and Conference Summaries

April 11, 1991 10:00 am

Library –Mary Walsh

Users want their information, they want it now, and they want it in a form they can use. The current opinion by users is that the librarians are doing a lousy marketing job for the services that are available.

In the library program, they are setting up working groups to make sure that their current databases are taken care of better and to improve and upgrade their equipment. There is a perceived need to improve communications between centers and libraries. They are trying to find a standardized ADP method.

The library programmers devoted the afternoon of the second day entirely to marketing. Specific marketing tools were discussed. The libraries could have the library user committee present how these committees are set up, how they are used to improve the dialogue between researchers and the STI group, and how they are used to leverage money out of NASA. Two of the libraries have put out user surveys and will let us know the results.The group discussed concerns of end users. It appears that speed of delivery is more important than accuracy.

Publications–Kay Voglewede

There were several presentations on publishing, including desktop publishing. The group discussed the need for network standards and the electronic transfer of information. There is a need for visibility for our program in the program offices and centers. The group discussed timeliness, the time it takes to produce and print publications, the time and effort it takes to retrieve and track DAAs from Headquarters, and the time it takes between the publication of a report and when it is entered into the database. A concern that was new to Ms. Voglewede was a requirement about the metric system.

There is a pilot project between Headquarters and Ames to deal electronically with DAAs. Everyone will be able to share that. They are working hard on networks, standards, marketing, and discovering what users need.

Graphics–Jack Hood

This was the first time that NASA graphics personnel got together to discuss common concerns. In the future, they may be able to take advantage of videoconferencing equipment to continue our discussions.

NASA's image is created by the press, not by NASA. The creative people in NASA must find a way to present NASA's image in the best light.

ADP Technology & STI Global Network–Judy Hunter

A picture is worth a thousand words. The STI Program is using new technology to help present data, provide access to data, and gather knowledge to help make tasks easier. They are exploring new technology and, in the future, will use it more and more. We will all be able to communicate electronically and use networks for text, graphics, and complex equations.

They discussed a project that involves tracking a document from creation all the way through the publishing process, to the database and distribution. Electronic networks make their jobs easier and the process more efficient. They are exploring the area of video, how to present data and provide access to the data.

Email is a big issue. In the user requirements analysis for the gateway project, one of the major requests was, can you help me talk to my peers? We won't have universal email for another 5 or 6 years, but there are things we can do in the interim to improve existing systems.

There are a lot of opportunities for sharing in the cost of developing systems like STYLUS and ARIN. Eventually, we'll have a global network.

CD-ROM User Survey

Dian Marincola
April 11, 1991 10:45 am

At the Center for AeroSpace Information (CASI), they are now trying to develop a prototype system to distribute to NASA users. First CASI staff asked for information from Centers. They wanted to know whether everyone had CD-ROM technology and, if not, whether they were planning to get it. They wanted to know what host interface software (retrieval software) users liked. They also wanted to know about technical support, how users were using CD-ROM technology, and whether user's patrons were using it.

Dian Marincola reported on the preliminary analysis of the the CD-ROM survey. The results are only preliminary, and the sample was small, at 13. Eleven sites are using DOS platform, although one site does have UNIX attached to a CD-ROM unit as a standalone device. Four sites have multiple CD-ROM drives; one site has 14 drives, one site has 4 drives, and one site has 2 drives. All 11 sites use global printers. According to research, CD-ROM systems should have a local printer, because the user will want to print screens. Nine sites are planning to order additional CD-ROM equipment. Two sites already have it on order, and three sites are planning to order within the next 12 months. Fourteen software packages are in use among the 13 sites. The favorites were Dialog, Silver Platter, and online computer systems. The least liked were ISI, UNCD-ROM, CD Plus, and Wilson disk. In answer to the survey question about effective user documentation, the written manual scored highest. Laminated card and keyboard template were next. The preferred format for tutorials was interactive text from floppy disk and interactive text from CD-ROM. All respondents would like to see the NACA document collection put on CD-ROM.

Where to go from here? NTT will take this information and give it to the people who are working on the prototype. They would like to develop a product that will be used.

STI Strategic Plan Status/Open Discussion

Gladys A. Cotter
April 11, 1991 11:00 am

The STI Strategic Plan was presented at a recent videoconference in order to get some feedback from the Centers. It was suggested that the STI Program focus more on operations by maintaining and enhancing ongoing operations. So in addition to

outreach efforts and modernization efforts, they will put a focus on maintaining and enhancing the current services. They will look at what our requirements are in the contract for these services to determine what they have to do to the existing structure to make improvements possible. The priority will be to analyze the costs associated with improvements or changes to the structure.

They would like to put the money where it will make the most difference to users who are getting the services. They have to look at the standards defined in the contract, decide what standard they want to establish, and how much it would cost to make the change.

They are currently going through the contracts in detail to establish a list of products and services, along with the requirements established for each service. Then they can look at each service and decide if the current standards are acceptable. If they are not, they need to go back to the contract and make changes. But they want everyone to know the costs involved. They have to consider the trade-offs, and determine where they really want to invest the money.

Lou Ann Scanlan, Program Liaison, is currently collecting input from the Centers and analyzing it. She will be providing evaluation summaries for each Center and comparing the issues to determine where the problems are and how to solve them.

Jim Erwin, Program Operations Manager, will be responsible for providing the current list of products and services to use as evaluation criteria. It will be important to ensure that the contractor has quality control mechanisms in place. He will have to get feedback from the users so that he knows when there is a problem, and he can take the appropriate action. They want users to be able to call the technical staff directly with their problems, and they must have quality control to ensure that this happens successfully.

Carl Eberline, General Manager, Center for AeroSpace Information (CASI), explained that the recent reorganization was made as an emphasis on quality and customer service. Dian Marincola will be in charge of the User Services Division at CASI, which will include online services, such as ARIN and RECON, as well as document processing, classified document control, request processing, registration, and videographics. A new directory for CASI will be available soon.

The STI Strategic Plan was developed by a working group of STI Program professionals. It includes a mission statement to "advance aerospace knowledge." The whole reason the STI Program exists is to provide information support to the researchers who are advancing knowledge. To provide the necessary information resources, there must be an analysis of the cost to provide these services. The Strategic Plan details a goal, objectives, and an actual plan. The STI Program wants to be an integral part of the R&D effort: a line item in the R&D budget, fifty percent increase in staff, direct association with R&D staff to distribute data. Also outlined is

the implementation of an effective management strategy and ways to assert a NASA leadership role for STI policy. To accomplish these goals, there must be 100 percent commitment from everyone involved to work together.

Conference Actions/Directions

Wallace O. Keene
April 11, 1991 1:00 pm

STI Program participants should ask themselves these questions:
Do we think we are the experts in the information that needs to be delivered? Or are we barriers to people getting their information? What do we want our role to be? Where do we go from here?

They are facilitators, and at times also barriers. They should be intermediaries–listening to users' needs and then advising them how to best get to the available resources. They have to be more attuned to what is happening in the user community, what kinds of information users are looking for, how they want to access it, and how they are going to use it. That way staff can retool their support organizations–retrain themselves and better accommodate the users.

Does this prove that STI is a part of the R&D function? The researchers do not perceive themselves as having a budget problem. They use R&D funding to buy the equipment they need to produce their documents. But from an STI viewpoint, are they producing a product that truly represents the quality and timeliness of the material STI Staff wants to have available for distribution? There is a risk that some information is going underground as researchers expand their electronic capabilities and are able to finalize the products themselves. This is now and will continue to be a problem. They must find a way to put some accountability on this and encourage researchers to provide them with all the information.

One action from this conference will be for all Centers to come up with a definition of STI at their site and how it functions. The STI Program needs to come up with a consolidated position and know how things run differently at each site.

Library Workshops

Preconference Survey Results

Moderator: Mary Walsh

Prior to the STI conference scheduled for October 1990, a suggestion was made to take an informal, preconference survey among the NASA Libraries on Center concerns for use during conference discussions. Survey questions were submitted from NASA libraries and STI personnel. The surveys were mailed and responses were received before the October conference was cancelled. A video-teleconference was held on December 18, 1990 to discuss the survey results. Mary Walsh (Ames) presented the results and later mailed a copy of the compiled responses to each center.

During this workshop, Mary Walsh reviewed the preconference survey results. Copies of the combined results were available as handouts. Two areas of concern received unanimous votes: 1) ARIN should be supported; and 2) RECON II should not go forward until fully tested and approved by the Centers. Mary grouped the survey results into the following four basic areas of concern:

1. Agency Now	Clean-up of the RECON database; RECON II
2. Center Sharing	Joint collection efforts; Union lists; Newsletter
3. Center Planning	Strategic planning decentralized
4. Comparison of Center procurement methods	

Center representatives volunteered to address some of these areas of concern and brain-storm on possible solutions to them. The four main areas identified and volunteers were:

1. RECON	Dian Marincola (CASI), Joyce Stipe (HQ), Dan Pappas (ARC), Debra Wills (MSFC), Sylvia Hu (JSC), and Melanie Long (LeRC)
2. Joint collection	Pete Banholzer (GSFC), Joe Langdon (HQ), Doreen Cohen (ARC), Donna McAllister (JSC), Dave Purdy, Chairman (GISS), Bill Cooper (KSC)
3. Newsletter	Dian Marincola (CASI), Debra Wills (MSFC), Craig Wright (JSC), Linn Landis (LaRC), Lee Jarabek (LeRC)

4. Equipment Upgrade–Dian Marincola (CASI)

ARIN Subcommittee Activities

Each ARIN Subcommittee chair was asked to submit a report prior to the conference on the activities of their subcommittee. These reports were compiled and made available during this workshop session. Each ARIN Subcommittee chair was briefly recognized. The ARIN Subcommittees and chairs are as follows:

a. Acquisitions–Jaclyn Facinelli (Lewis)
b. Cataloging–John Vogel (Headquarters)
c. Circulation–Joe Langdon (Headquarters)
d. Management Information System (MIS)–Janet Ormes (GSFC)
e. Serials–Barbara Amago (JPL)
f. Users –Mary Walsh (Ames)

After the subcommittee chairs were recognized, Janet Ormes, MIS Subcommittee chair, gave a presentation on management information and the need for a management information system. Janet discussed output measures and compared some output measures for academic and public libraries with the ARIN/MIS reports available.

Acquisitions Subcommittee Report

The Acquisitions Subcommittee's inception occurred in July of 1986. The first priority of the committee was to draft a memorandum of understanding stating purposes and goals and forward these to the ARIN Steering Committee and NASA Headquarters to aid in design of a time table. Four significant issues with respect to the memorandum arose:

1. Technical: How is the system operated? What capabilities does it have and who is responsible for its operation and maintenance.
2. Organizational: What are the responsibilities of the subcommittee? How do we obtain travel or visitation rights and money to see an operational acquisition module.
3. Data elements: What is the best way to obtain elements needed for operation from each Center?
4. Functional review: What are the functions, capabilities, and requirements of NOTIS?

After careful consideration members decided that "the purpose of the Acquisitions Subcommittee is to advise on matters of policy, standards, and procedures in the implementation and operation of the acquisition module."

In May of 1988 the committee decided to design a new requirements survey. All members agreed that many needs had changed since 1984 when the first survey was completed. Headquarters assigned the actual preparation to Booz-Allen Hamilton Inc. (BAH), and a cumulative of the survey results was presented at the Installation Project User Committee (IPUC) meeting held August 23-24, 1988. After clarification of the responses the committee resubmitted their revised answers to BAH. In each revision responses were sent to all members, to ensure understanding.

As a better way to distribute the workload, in September the Acquisition Subcommittee divided responsibilities into books, standing orders, foreign titles, non-fax on journals, journals, deposit accounts, and reports. They decided to begin further work evaluating the book area first. The survey was completed, evaluated and prioritized for mandatory, nice to have, level of difficulty of implementation and features for future development. In addition, each Center was personally contacted by the chairpersons or the NASA Administrative Librarian to clarify any questions and verify any interpretive information. Two large concerns surfaced; how will ARIN interface with existing procurement systems, and can it provide customized reports. To augment the committee's finding, data elements as defined by others were examined. Rush Associates produced a list and the AIM Council methodology was evaluated. Site visits to Arlington Public Library and Kent State University also enhanced their understanding of the system.

A final agenda item for the committee was the Data Item Description Functional Requirements Document. This document provided a basis for the establishment of the systems requirements, such as capabilities, features, operational requirements, security and others. IPUC was required to approve the completed document.

After much discussion concerning the absence of a NOTIS acquisitions system to preview and evaluate, CASI agreed to make available a "bare bones" system. In March of 1989 three centers volunteered as the beta testing sites; Headquarters, Goddard and Wallops (who use contractors for acquisitions), and Lewis (who follows the traditional government procurement path). Training by NOTIS personnel was provided, and their instructions were to run a verifiable parallel systems test for one month. Because testing was not conclusive, all agreed to continue for another month. Results of the testing were presented to all members of the NASA Library Community on January 23, 1990 in a videoconference.

The acquisitions subcommittee concluded its work responsibility with participation from the ARIN Review Project designed by Hershel Porter of BAH and Ira Jekowsky. The subcommittee was asked to review the requirements packages provided and to validate system requirements. As a second phase of the project, the requirements were arranged by level of importance and an indication was made of whether the needs were being met through a local system or by other means. The committee concluded all tasks in early May 1990 and has not met since that time.

Cataloging Committee Report

Cataloging Committee activities in the past 12 months have largely centered on the requirements for a MARC formatted export tape. The committee members at the centers critiqued the proposal for this export circulated by CASI and reported that it did not meet the needs of the centers. The bibliographic and holdings data to be included was acceptable, but two areas were found to be faulty.

First the tape was to be formatted on USMARC rather than the de-facto standard, OCLC MARC. The survey of vendors failed to find any who had ever processed a USMARC formatted tape, and several who explained that their normal process was to convert whatever format the customer had to OCLC MARC prior to processing. As a result, the committee recommended using OCLC MARC as the export tape's format.

Second, no attempt was made to code item level data. Thus, any library that attempted to make use of the tape would have no piece level barcode information. This was unacceptable. A proposed standard was circulated by the chair. The members at each Center took this to the appropriate people at their library and a modified form was agreed to by the committee.

This proposed standard was forwarded to ARIN management. The committee has received no technical comment on its proposal. As far as is known to the committee, no action was taken on its proposal. The committee is most anxious to be involved in the planning and implementation of the ARIN/NOTIS authority module this fiscal year.

Circulation Subcommittee Report

The circulation module of ARIN has been in the production mode since early 1988. A flurry of activity occurred during the initial planning of the module, primarily due to the AIM requirement that the tables utilize standardized data elements. The Center libraries submitted their requirements, which were compiled into standardized elements, agreed upon by the committee members, and forwarded to the STI Program for implementation. Since that time (mid to late FY 1988) the committee members have only met (via telecon) when there has been a problem with the NOTIS module. Most libraries surveyed are using the circulation module. With the implementation of the MIS reports produced by NOTIS, the committee needs to take up the task of developing a series of reports detailing circulation activity within each library.

MIS Subcommittee Report

Throughout the past year, the subcommittee has addressed reports currently being generated by CASI and issues concerning ARIN such as the ARIN consultant's report. The majority of its time has been devoted to the development of various management reports. The goal of these reports is to give managers meaningful information about their operation in a concise format. They have been distilled from literature on the emerging concensus for standardization of library output measures, sample reports CASI acquired from other NOTIS users, and longitudinal data the libraries have been tracking internally.

Working via teleconferences, the subcommittee has reviewed, revised, and proposed nine core reports for production. Two reports have been completed by CASI, two are near completion, and five remain to be produced. The data is being generated by CASI using a mainframe version of SAS. Where appropriate, center specific classifications and groupings will be provided.

The idea of core reports seems to be a workable approach to an MIS program. Using these reports as a starting point, additional uses or needs for such information may become evident. For example, GSFC has begun experimentation with manipulation of the data using PC-SAS to provide additional MIS reports that address management concerns at Goddard. Other Centers may have center specific reports that they would like to address.

The subcommittee's efforts thus far have focused on what reports managers need to assess their operations. There are various other reports, relating to the functionality of specific modules, that have not been addressed. These could more logically be handled by the other subcommittees dealing with cataloging, OPAC, and circulation. However, the MIS subcommittee is interested in working with other subcommittees on a methodology or procedure for moving forward with this approach.

A draft procedure has been discussed within the committee that would involve the MIS subcommittee acting as a clearinghouse. Members of other subcomittees could 1) circulate an idea or need among their subcommittee membership to determine the level of interest among the centers; 2) if there is an indication of interest, the report request is passed through the MIS Subcommittee to Roland Ridgeway (HQ); 3) he will submit it to CASI for an assessment of its feasibility; and 4) the assessment is then forwarded back to the MIS Subcommittee for review and prioritization. Perhaps this conference can be used to generate feedback about this approach or suggestions from the other subcommittees.

Serials Subcommittee Report

This subcommittee has been relatively inactive this year. The NASA libraries have been finishing up the conversion of their serials records and verifying them so as to be ready for the anxiously awaited serials union list. The only additional activity planned for this fiscal year is the union list of serials. CASI has prepared a product specification for the union list of serials to be produced this fiscal year from the ARIN production data.

User Subcommittee Report

Members met in 1989 teleconference to discuss review of User Module. Committee is currently not active.

RECON II

Judy Hunter gave a status report on the RECON II project. She stated that RECON II has been suspended for re-evaluation because of budget constraints. Judy discussed the evolution of RECON II and how RECON II's modular design would allow for future enhancements. Since the focus will be on the customer, users will be asked to evaluate the functional baseline for RECON II. RECON I will continue for the interim, and alternative user interfaces will be explored.

NACA Document Collection

Tom Lahr gave a presentation on the NACA document project. He provided working definitions of NACA documents (any document produced by and/or for NACA), non-NACA documents (any document held by NACA libraries), and the 'NACA Collection' (both of the above types of documents). The Centers had been surveyed and a meeting was held in Washington to discuss the NACA collection and what should be done to preserve it. Tom re-emphasized the value of the collection and listed the project working groups and chairs that were formed during the Washington meeting.

Other Library Concerns

Other library concerns included:

1. The <u>need to preserve an understanding of the old systems</u> as they move to new ones. People working to enhance or redesign older systems need to have a thorough understanding and experience on the older system before any new

plans or enhancements, etc., are made. For example: the Artificial Intelligence (AI) front-end for RECON. We've had a videoconference speaker make a lengthy presentation on AI and possible applications of AI to RECON. Towards the end of his presentation, he said that he didn't know much about RECON and had not worked with it.

2. Planning and governance of ARIN. Janet Ormes summarized this concern as follows:

   "The NASA Centers need to play an official role in planning and prioritizing ARIN enhancements. Formerly, we had an ARIN Steering committee, then an IPUC and Configuration Control Board (CCB). Currently, there is no formal way for the Centers to participate in ARIN planning and governance. ARIN Subcommittees, which were originally established to advise the ARIN Steering Committee, can only suggest enhancements for individual modules and do not substitute for an authoritative council with an overview of the entire system. (I am on a Configuration Control Board for the GSFC personnel locator system, and that process seems to work as a mechanism to bring together users, providers and implementers.)"

3. Budget–there is a need to share information on how it is done at the Center level.

4. Need to speed up document delivery and interlibrary loans.

5. Multiple database access system for journal literature.

6. Standardization of conference entries on ARIN.

7. The need to take care of the resource/tools in hand before going too far ahead.

8. Need for better coordination and communication of decisions between Headquarters and the Centers on both short- and long-term decisions.

Library User Committees

Mary Walsh discussed how the Ames Library User Committee was established. The library staff identified heavy users of library services, and the list was submitted to management for selection of members. Committee members serve a two-year term, and an attempt is made to recruit people from different subject areas. Committee meetings are bimonthly for one hour.

Mary mentioned that the best part of having a committee is that she is now able to approach management and say, "The Library Committee recommends..." This is a

good leverage point with budget people. Also, by having a committee, top management gets the 'message' from committee members as well as directly from library management.

George Roncaglia discussed the Langley Library Committee which was established in the late 60's or early 70's and handed out a copy of the Langley Management Issuance (LMI 1100.31) which "sets forth the functions, organizations, and membership of the Library Committee." The chairman is head of a research area. George is an ex-officio member of the committee.

George brought out that you need people who are in the upper- to middle-management range on your committee. They must be high enough to influence decisions (get your input through), yet low enough to still be useful and open to ideas from the library staff. Also, you must be prepared to follow the committee's advice. Sometimes library management will have to make concessions.

The Library Committee is used for directional and technical advice, and to advocate ideas to management and the user community. The meetings are scheduled and follow a formal agenda. Minutes of the meeting are distributed for review.

A comment was made that library personnel need to observe what people are doing and not just take what they say at face value. Sometimes people say that they do not use library services, or that they do not ask for assistance, etc., when in actual fact they do. The patron is often not aware of how they are interfacing with the library. It is up to library staff to observe that interface and, if necessary, make the patron aware of it.

GSFC User Survey

Janet Ormes presented the results of the Goddard Library User Survey. This survey was taken to determine user needs so that the library could outline where it was going in 10 years. The Library Survey was a Library Council initiative and its structure was based on the 1972 survey. Some of the highlighted results include:

- Heaviest users (88% scientists)
- Reasons for using the library (look up reference, or information on a new topic, new books/journals)
- Reasons for non-use
- Evaluation of various services
- Additional services or improvements they would like to see (better photocopy machines, faster Ills, SCAN dissemination electronically, remote access and submission of requests, optical scanner, and tutorials on how to use the library's database)

RSIC User Survey

Sybil Bullock presented the results of the Redstone Scientific Information Center (RSIC) User Survey. This survey was taken to assess patron needs and to assist in designing the plans for the new library building. Most users were satisfied with the library and some gave concrete examples of library support to their projects.

Some of the items on the 'wish list' were: a new building; full text databases; better collection maintenance; a copy service; remote access; and no compact shelving.

These surveys were valuable tools in gathering information on patron-perceived assets and problems with existing resources as well as being helpful in identifying some future trends and needs.

Selling Value of Information to Users & Management in Era of Budget Constraints

Sybil Bullock discussed the need to sell, or market, the value of information to whomever will listen. She stated that we need to know our environment and identify all the players and processes (i.e., management, users, media, budget, User Committee). We need to analyze the market, identify needs, identify our strengths, and solicit positive testimonials in writing.

Four keys to marketing were presented: 1. Confidence in our abilities; 2. Commitment; 3. Capability (the ability to 'sell'); and, 4. Quality of product. There was concern that 'quality of product' should be given first priority which would increase our confidence in our abilities to meet patron information needs. This in turn would generate more commitment which would increase our ability to 'sell' our product and services. It's much easier to sell something you have confidence in and are committed to.

Scientific & Technical Information Library Automation System (STILAS)

Sybil Bullock from Redstone Library presented information on the STILAS, which is an online product for integrated library systems that will help circulate catalogs acquired and disseminate information. This product allows you to go into different commercial and government vendor databases at the same time, with the same search strategy, and get a clean package in one step search. There was also a tour of the Redstone Library, with demonstrations of STILAS and the CD ROM products.

Technical Publications Workshops

Video as Publication Medium: Guidelines, Costs, Other Centers' Experiences

Barbara Pasternak

Transcripts for this presentation were not available.

Experience in Writing Style Manuals and Role of Headquarters in Directing Styles

Mary McCaskill

This presentation discussed style manuals. What are style manuals? What do they contain? Why do we have them? How do we write or maintain them? What is NASA Headquarters' role in setting style? Why do we use them?

A style manual provides a set of rules to follow for producing a document. It is apparent that there should be more interaction between the Centers on formulating guidelines on the subject of style manuals. Who should actually undertake this task was not determined. Mary confessed that it had taken her the most part of 10 years to accomplish her task of writing a style manual for use at Langley, due to the fact that it had to be done just whenever she could spare the time.

Some basic rules were outlined for formulating your own "style guide"–"The rules of good writing, fidelity, completeness, conciseness, believability"–believability getting top billing. Recent technology in desktop publishing has changed the way documents are produced and they must still look professional. Some micro rules were also brought up–minor points of usage and practice that do not involve the believability rule. House rules were mentioned as those rules set by particular organizations.

Authority for enforcement of standards was discussed and agreement made that "if you mark on it, you should be able to stand by it." A style manual would alleviate one of the greatest dangers, making authors look stupid by not understanding rules. Also it could be used as a training tool for basic understanding among experienced people, or to get new employees up to speed–relieve the staff of a lot of trivial decisions. There is a definite need for this most basic of tools at NASA.

NASA Special Publications and Guidelines for Publications

Kay Voglewede

There is apparently some confusion about the types of documents that are appropriate to publish in the special publication series. Specifically, special publications (SPs) contain scientific and technical information particular to NASA programs, projects, and missions for presentation to audiences of diverse technical backgrounds. SPs are often concerned with subjects of substantial public interest produced as books containing summaries of mission results, atlases, studies, program descriptions, retrospective assessments, histories, chronologies, bibliographies, and information guides and thesauri.

Most of the SPs that are received from headquarters program offices fall into two general categories: history and planetary science; there is also a smattering of astrophysics and astronomy. Most documents proposed as SPs come from the NASA History Office and from the Office of Space Science and Applications. These two offices are aware of the role of the STI Division in publication services; other Headquarters offices may have ideas or even manuscripts, but do not seem to be informed about how to go about having documents produced and published.

Since most of NASA's research and development takes place at the Centers or is done by Center contractors, we expect that documents proposed by the Centers for publication as SPs will be of a generally more technical nature than those from Headquarters offices.

The SPs now in production at Headquarters (in addition to the three new publications guides) fall into two general categories; planetary studies and history. *Voyage to Uranus* and *Voyage to Neptune* (SP-499 and SP-505) contain mission results. Previously published documents in the series (*Voyage to Jupiter* and *Voyage to Saturn*) were very popular. These books contain technical information but are written in such a way that they have great appeal to that segment of the public sometimes referred to as "space buffs."

Two books for the Office of Space Science and Applications are now in production; a third is expected shortly. One is a summary of new findings in the field of planetary geosciences in the last two years, and one is an atlas of Mars. Another, more ambitious atlas is planned.

There are two books for the History Office in production (*NASA Engineers and the Age of Apollo* and *First Among Equals: the Selection of NASA Space Science Experiments*); we have recently published a history of Lewis Research Center (*Engines and Innovation*). In addition, the final volume in the monograph series on nonthermal phenomena in stellar atmospheres, entitled *Cataclysmic Variables and Related Stars*, is being produced in collaboration with GSFC, which originated the document.

We are expecting (and have approved special publication plans for): from GSFC, *Artic and Antartic Sea Ice: 1978-1987*: from JSC Space Resources, *Satellite Passive Microwave Observations and Analysis*; a 5 volume report of a study. We are also expecting: from Ames, *Symposium on Exobiology in Solar System Exploration*.

Now in preparation in the Headquarters Technical Publications Office are three new publications guides: NASA SP-7086, *NASA Publications Guide*; NASA SP-7087, *Guide for Preparing Contractor Reports*; and NASA SP 7088, *Reporting Research and Development: Guidelines for Contracting Officer's Technical Representatives*.

NASA SP-7086, NASA Publications Guide replaces and updates NASA SP-7047, *NASA Publications Guide*, and NASA SP-7013, *NASA Publications Manual* (1974). It is a style guide for use in preparing scientific and technical reports in science, engineering, and technology. Although it is intended for use primarily by publications specialists, it will be useful to authors and managers. The content reflects an attempt to set forth standards that are easy to apply and will provide a uniform reference in matters of report makeup and handling. In addition to suggestions about style, it includes elements that should (or must) be incorporated into a numbered-series NASA report. Section I, General Information and Requirements, outlines the NASA publication program and management policies and should be useful for authors as well as publishers. Section II, Editorial and Page Makeup Considerations, discusses elements that may be primarily of use to publishers, but will also be helpful to authors. Detailed examples are given in Appendix A; Appendix B is included to help define the series in which a report belongs. A bibliography is included as Appendix C.

NASA SP-7087, Guide for Preparing Contractor Reports encourages NASA contractors to report on their research using a standard format based on ANSI standards for scientific and technical reporting. It will help all scientific and technical researchers for NASA contractors with the organization, preparation, and production of their reports. The Guide is based in part on a guide prepared at Lewis Research Center and issued in 1987. The information has been updated and generalized so that it can be used throughout NASA.

A basic responsibility of NASA and its contractors is to report the results of their work to the scientific community. This guide provides both mandatory and optional standards for use in preparing NASA Contractor Reports. Information is included on types of contractor reports, authorship, reporting requirements, distribution, numbering system, announcement, and availability. The guide treats the report format, including general discussions of the purpose and general content of each section of a contractor report. It describes miscellaneous style and quality requirements that are generally applicable to all NASA publications.

NASA SP-7088, Reporting Research and Development: Guidelines for Contracting Officer's Technical Representatives is a short guide written to answer questions often asked by new COTRs. It addresses reporting requirements for

contracts, explaining options available to COTRs in directing the research reports within the NASA scientific and technical information system and enumerating the informational resources available to them and to their contractors.

All three new special publications contain some of the information already available in the NASA Scientific and Technical Information Handbook (NHB 2200.2) as it applies to the subject of the respective special publication. The Handbook remains in force and is currently the best source of information concerning the preparation and publication of the results of NASA and NASA contractor research and development.

Two of the three new special publications have been edited and prepared in draft form. The third (SP-7087) is being edited and formatted and will be ready in draft form in approximately one week. All three drafts will be sent to the Center publications offices for review and comment. We hope that one month will be sufficient for this review. When all comments have been received from the Centers, the documents will be edited once more, incorporating relevant suggestions. The camera copy will be prepared and sent to Langley for printing. We plan on publication and distribution by September 1991.

Totally Integrated Electronic Publishing–Langley

Cheryl Winstead

"Totally Integrated Electronic Publishing" is the wave of the future at Marshall. The computerized world will provide publications that can be received electronically via Mac disk, PC disk, file transfer protocol (FTP), or electronic mail (e-mail). Also available will be shared networking for speed and convenience, multitasking operating systems, automatic backup for all tasks, electronically integrated figures and math equations (using TEX), and output to laser printers for a perfect final product–plus superb memory.

The learning curve for the TEX software and the Sun computers is high but it is worth it in the end. There is no limit on storage, and having an automatic backup system is priceless.

Use of Color and STIF Output and OMB Productivity Reporting

Kay Voglewede

Transcripts of this presentation are not available.

SSL Document Processing–Equipment Demonstration & Briefing
Linda Porter

An overview was given of some of the projects that are now going on within the Space Science Laboratory (SSL). The description of SSL was very concise. "They do research for the purpose of producing papers." Linda Porter then went on to describe how the computer system network ties all of Space Science Lab into the rest of Marshall and the other NASA Centers throughout the country and the world. Space Science Lab is unique within the Center in that it has its own Technical Typist contract; it has a setup with an NBI 5000 system that is compatible with all the various computers, through Ethernet, throughout the lab. Their system allows the scientists to send their material straight to the technical typists in whatever form is convenient to them, be it electronic or handwritten, because they are right there in the lab. A Technical Editor is tied into the system via an NBI OASys 64. This setup is the most efficient way for this laboratory to handle the staggering amount of publications and papers that is generated by the scientist yearly. After giving an overall view of the system via Vu-Graphs, there was a tour, and the resident Technical Typists gave a demonstration on their NBI 5000 computer and a little talk about the unique area they operate in. It is a totally "customer-oriented" operation with a turnaround time that is unbelievably fast due to their being able to utilize previously generated material. Theirs is a partnership with the scientists that gets quality publications out quickly.

Developing & Implementing Scientific & Technical Electronic Publishing System (STEPS)
Linda Quinby and Gene Waltman

Linda Quinby and Gene Waltman (Scientific and Technical Electronic Publishing Systems) gave us their story of a 5-year quest for the perfect publication system that would take practically no money to buy. They found it! Of course the search was not entirely cheap. Dedicated employees were willing to take a chance on a thoroughly innovative approach–something no one had thought possible for so little money–to go out on a limb with Linda and Gene and sell it to management. Linda and Gene and their staff, through dedication and hard work, were able to do just that. Gene, with his genius for computer systems analysis, could visualize a way to achieve a sleek publication with the least expensive computer ever built–with all the capabilities they needed plus networking and memory capacity. And Linda accomplished the "Super Sell" with her ability to transcend management's doubts that all this could be accomplished so inexpensively.

Demonstration of the STEPS Tracking and Reporting System (STAR)

Anthony Templer

Anthony Templer gave an overview and demonstration of the STAR System. It has a menu that can be customized to fit user needs. A publication record is entered into the computer, the system automatically brings up new forms or attaches a document brought through a file server from an author. The editor (as project manager) will then have control of the latest version of the document. The STAR system has capabilities for creating individual systems.

Graphics Workshops

NASA Graphics Standards Manual–Round-Table Discussion
Dennis Sender, Moderator

In the workshop on the NASA Graphics Standards Manual, some of the good and important aspects of the manual, as well as many of the problems, centered on the proper application of sharing of mutual problems and concerns as well as discussion of creativity in graphics.

It was generally agreed that this STI conference had given the NASA Graphics Program a unique opportunity to open the doors of more meaningful and more frequent communications among graphics personnel at the NASA Centers. They concluded that in the future they would use the possibility of a Graphics Video Teleconference to continue the communication efforts started at the 1991 STI Conference.

Creativity in Graphics
Becky Caneer, Moderator

This workshop was successful in stressing the importance of creativity. Creative thinking and creative problem solving in the NASA Graphics effort, and in all other Scientific and Technical Information collection and distribution, are very important factors in the performance of the U.S. space effort. It was agreed that our common goals demand that we maintain a sense of professional integrity and be creative in our pursuit of excellence.

Graphics by Non-Graphics People–Round-Table Discussion
Moderators: Dennis Sender and Loren Gifford

Transcripts for this presentation are not available.

New Graphics Technology
Jack Hood

Transcripts for this presentation are not available.

Automated Information Management Workshops

Space TMIS–Concept, Status, and Demonstration
John Kearney and Ken Mitchell

The session opened with a brief explanation of the concept and organization of the Technical Management Information System (TMIS) electronic library used by the Space Station Project, given by John Kearney of the Data Systems Branch, MSFC Information Systems Office. He then introduced Kenneth Mitchell of MSFC/Boeing CMS, who provided a briefing on the TMIS electronic library, or Program Automated Library System (PALS), and answered participants' questions. Mr. Harold Tuten (MSFC/Boeing SS Level II) then gave an online demonstration of selected aspects of the PALS system.

Toward the Electronic Delivery of NASA Technical Reports
Jean Tolzman

Jean Tolzman (CASI/RMS Associates) reported on the preliminary research on electronic delivery of technical reports. Two concerns that emerged during the presentation and discussion were the issue of format in publications designed for paper distribution and the necessity for ensuring the integrity of an author's work once it enters an electronic environment.

CD-ROM Prototype
Richard Tuey

Richard Tuey briefed attendees on the developments of a plan to issue portions of the NASA STI bibliographic database in CD-ROM format. A scheduled comparative demonstration of a selected sample of data was announced for the next day's session.

Repository Automated Optical Imaging System (RAOIS)
Rod Hyde, Mickey Hunter, Bobby Stewart, and Manuel Santos

The remainder of the workshop was devoted to a description by Rod Hyde (MSFC) and Bobby Stewart (MSFC/MSI) of the mission and background of the MSFC Documentation Repository. Mickey Hunter (MSFC/MSI) described the existing and planned phased upgrades to the Repository Automated Optical Imaging System (RAOIS). This was followed by a tour and demonstration of RAOIS capabilities by

Mr. Hunter and Manuel Santos (MSFC/MSI). Attendees had an opportunity individually to observe various RAOIS operations and ask questions about the equipment and some of the experiences during the system prototype phase.

DOC NUMBER: 22374 INDEXING: SUBJECT/TERMS SCREEN CIN: SAF
TITLE: Shaping the Future: NASA STI in the 1990s KIN: EJS
AIN:

MAJOR TERMS:	SWITCH
1: NASA PROGRAMS	_
2: LIBRARIES	_
3: CONFERENCES	_
4: INFORMATION MANAGEMENT	_
5: INFORMATION DISSEMINATION	_
6:	_
7:	_
8:	_
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12:	_
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15:	_

MINOR TERMS:	
1: ON-LINE SYSTEMS	_
2: TECHNOLOGY TRANSFER	_
3: DOCUMENTS	_
4: SCIENTISTS	_
5: RESEARCH FACILITIES	_
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PROPOSED TERMS:

PF2=RESET; PF3=SIGNON; PF4=RELEASE; PF5=SELECTION; PF6=SUBQ
PF10=ALPHA; PF11=HIERARCHY; PF12=STORE; PF13=CENTRAL SCREEN; PF20=TITLE/WNF
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Shaping the Future: NASA STI in the 1990s STI

ABQ: NC
ABA: CASI

CIN: SAF
KIN: EJS
AIN:

The purpose, product and clientele for scientific and technical information (STI) within NASA were discussed by personnel from NASA headquarters, the NASA centers, and NASA contractors. STI is essential for research and development of new science. A scientist going into new areas of research need to find background information in those areas. Several Federal on-line information systems are described along with various information center/library activities at the individual NASA centers. NASA-wide STI programs and projects are also discussed.

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