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NASA Technical Memorandum 104630, Part II

NASAwide Electronic Publishing System—Prototype STI Electronic Document Distribution, Stage-4 Evaluation Report

Richard C. Tuey et al.

May 1996

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National Aeronautics and Space Administration
Washington, D.C.

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Space Administration

Goddard Space Flight Center
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1996

This publication is available from the NASA Center for AeroSpace Information,
800 Elkridge Landing Road, Linthicum Heights, MD 21090-2934, (301) 621-0390.

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Executive Summary

Overview

Stage 4 of the NASAwide Electronic Publishing System is the final phase of its implementation through the prototyping and gradual integration of each NASA center's electronic printing systems, desktop publishing systems, and technical report servers to be able to provide to NASA's engineers, researchers, scientists, and external users the widest practicable and appropriate dissemination of information concerning its activities and the result thereof to their work stations. The inclusion of NASA Headquarters as a node essentially completes a totally distributed set of report servers for formal and nonformal publications as identified by Figure 1[1]. Currently, no standard software package (single) exists across all NASA centers for either word processing or graphics, and manually pasting figures into documents is still prevalent. In addition to differences in software utilization, no standard platform across all NASA centers exists for producing the documents. Common sense dictates that it is neither appropriate nor cost-effective to define a standard set of software and compel all NASA's engineers, researchers, and scientists to conform. Rather, a common output format, such as Adobe PostScript, will be sought from among the set of software; the electronic document distribution system would only need to handle the single common output format.

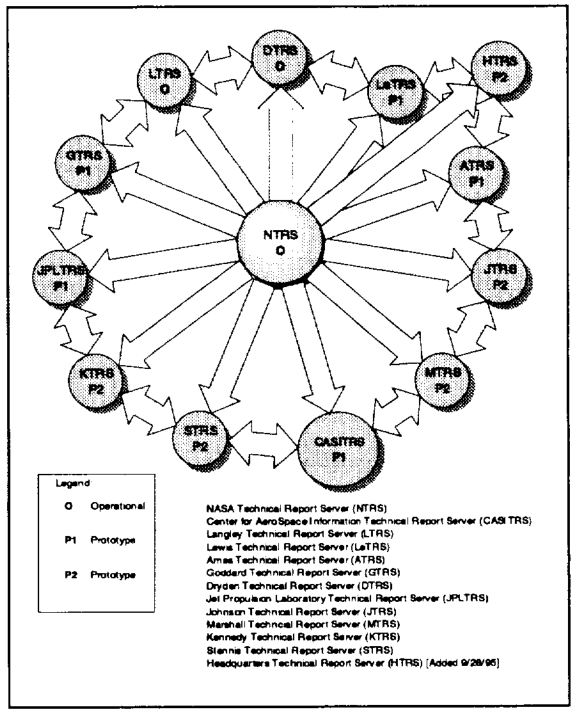

Figure 1. NASAwide Technical Report Servers.

The report is presented by an introduction, seven chapters, and six appendices; the Introduction describes the purpose, conceptual framework, functional description, and technical report server (TRS) of the Scientific and Technical Information (STI) Electronic Document Distribution (EDD) project. Chapter 1 documents the results of the prototype STI EDD in actual operation, e.g., the electronic distribution of the source document to its printed output and the distributed on-line access to technical reports available at each NASA center. Metrics identifying the number of accesses on the NASA Technical Report Server (NTRS) and on the NASA Public Affairs Information Server (NPAIS) from the period July through December 1995 are displayed by Table 1 - 13 and Table 1 - 14, respectively. A number of abstracts, reports, and fact sheets are displayed by Table 1 - 15. A profile by subject division for abstracts available from the Center for AeroSpace Information Technical Report Server (CASITRS) are displayed by Table 1 - 16.

Although in a prototype stage, the actual demonstration of print on demand, which was achieved through the distributed production of the NASA Headquarters phone directory at each center, is documented. In the past, printing was accomplished by the NASA centers as shown by

[1]Decision to exclude Headquarters as a node was made in December 1995.

the top band of Figure 2. The lower band of Figure 2 shows a fully operational electronic publishing process. The middle band of Figure 2 describes the current process. A second application included a file server that was designated the Public Affairs Information Series Server for the storage and retrieval of Public Affairs fact sheets and information summaries. Finally, a third application was added to document the pre- and post-processing steps involved during the preparation of a technical report to be published by a typical NASA researcher or engineer at a center.

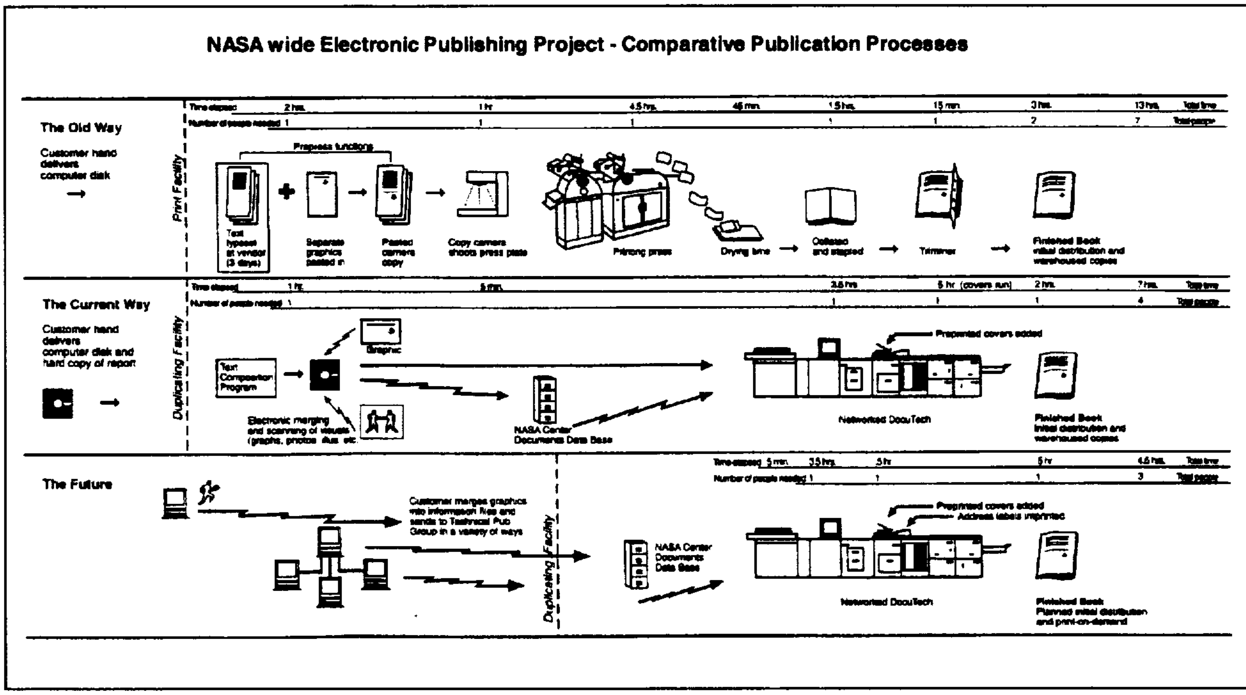

Figure 2. Comparative printing processes.

Figure 3 displays a conceptual macro view of the publication process from its conception to its storage, printing and on-line retrieval. Details are covered by Chapters 2, 3, and 4. Chapter 2 documents each NASA center's post processing publication process. Chapter 3 documents each NASA center's STI hardware, software, and communication configurations. Chapter 4 documents each NASA center's network topology. Chapter 5 documents lessons learned. Chapter 6 documents the STI standards and guidelines, and Chapter 7 documents STI EDD policy, practices, and procedures.

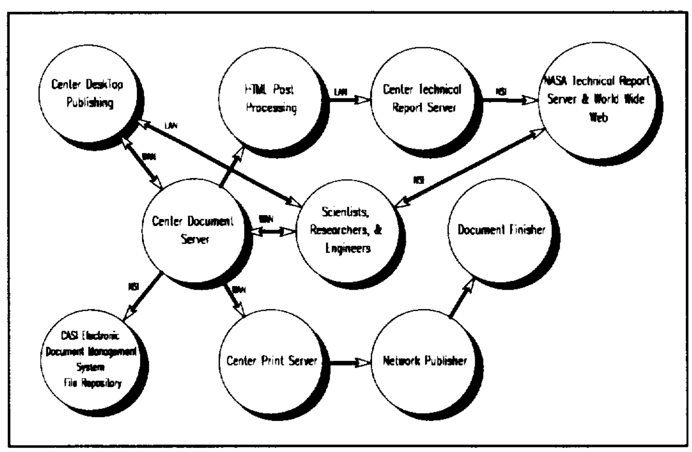

Figure 3. End-to-end functionality.

The appendices contain supporting information. Appendix A documents the STI EDD Project Plan jointly agreed to by all the participating NASA centers (Project Plan reflects status as of November 1994; deliverables are reflected in Appendix C). Appendix B lists all the team members for the STI EDD project. Appendix C displays the progress of the STI EDD project from its start to its completion with its final delivery identified as this joint technical memorandum. Appendix D documents how a user accesses the on-line reports. Appendix E describes the creation of an hypertext markup language (HTML) file for a typical NASA fact sheet.

Recommendations

Conceptually, the prototype STI EDD project has demonstrated its potential value for the dissemination of scientific and technical work accomplished by NASA's engineers, scientists, and researchers. The statistical profiles, Tables 1 - 13 through 1 - 16 show the World Wide Web activity for the period July through December 1995. As of December 31, 1995, the prototype STI EDD was not fully integrated as a NASA Technical Report Server or a NASA Public Affairs Information Server; however, the prototype system has achieved its goal of devising a concept that is sound and feasible for the provision of scientific and technical information to the Agency, as well as to the public. In achieving a fully operational STI EDD, it is recommended that:

1. Headquarters Scientific and Technical Information Office continue to support the STI EDD full implementation across the Agency through the use of an Executive Notice or Policy Directive.

2. The STI EDD Committee be formally established with members from each NASA center, including the Center for AeroSpace Information, to coordinate and resolve Agencywide STI policy issues and interoperability for the exchange of scientific and technical information within the Agency and between agencies, as well as with commercial organizations and foreign countries.

3. Langley Research Center, who has been designated as the operations manager of the Center for AeroSpace Information, also lead the implementation of the STI EDD project, taking into consideration the initial creation of the technical publication to its availability on each center's technical report server or the availability for printed copies on designated networked high-speed production duplicators.

4. Langley Research Center continue its role as the system administrator for the NASA Technical Report Server.

5. Dryden Flight Research Center continue its role as the system administrator for the NASA Public Affairs Information Server.

6. Each NASA center take on the role of continual maintenance of the center's technical report server and public affairs information server, as well as its integration to the Agency's networked high-speed production duplicators.

7. Each NASA center participate in the integration of electronic document availability authorization (DAA) and report documentation page (RDP) as part of the publishing processes, i.e., creation to its archival and dissemination.

Strategic Enabling Technology

The NASAwide Electronic Publishing System consists of an enabling capability for each of the five Strategic Enterprises (Aeronautics, Mission to Planet Earth, Space Technology, Scientific Research, and Human Exploration/Development) to access, via the World Wide Web, its scientific and technical works and/or print-on-demand information (text, graphics, and images) within and across the five enterprises.

When fully implemented, this enabling capability will allow the NASA centers and Headquarters to perform wide-area, networked print-on-demand environments, as well as to provide a central source for retrieving NASAwide STI on line at each user's workstation. The prototype STI EDD project has established technical report servers at each NASA center. Additionally, with the exception of Dryden Flight Research Center, each NASA center will have a networked print-on-demand, high-speed production duplicator capable of printing quality print products.

TABLE OF CONTENTS

Acronyms and Abbreviations

APAIS	ARC Public Affairs Information Server
ARC	Ames Research Center
ATRS	Ames Technical Report Server
BOC	Base Operations Contractor
CASI	Center for AeroSpace Information
CASITRS	CASI Technical Report Server (RECON Select)
DFRC	Dryden Flight Research Center
DPAIS	DFRC Public Affairs Information Server
DTRS	Dryden Technical Report Server
EDD	electronic document distribution
EDMS	electronic document management system
FTP	file transfer protocol
GIF	graphics interchange format
GPAIS	GSFC Public Affairs Information Server
GSFC	Goddard Space Flight Center
GTRS	Goddard Technical Report Server
HQTS	NASA Headquarters
HPAIS	Headquarters Public Affairs Information Server
HTML	hypertext markup language
HTTP	hypertext transfer protocol
IEEE	Institute of Electrical and Electronic Engineers
JPAIS	JPL Public Affairs Information Server
JPEG	Joint Photographic Experts Group (Standard for still image compression)
JPL	Jet Propulsion Laboratory
JPLTRS	JPL Technical Report Server
JPAIS	JSC Public Affairs Information Server
JSC	Johnson Space Center
JTRS	Johnson Technical Report Server
KDN	Kennedy Data Network
KMAN	KSC Metropolitan Area Network
KPAIS	KSC Public Affairs Information Server
KSC	Kennedy Space Center
KWAN	KSC Wide Area Network
KTRS	Kennedy Technical Report Server
LAN	local area network
LaRC	Langley Research Center
LTRS	Langley Technical Report Server
LePAIS	LeRC Public Affairs Information Server
LeRC	Lewis Research Center
LeTRS	Lewis Technical Report Server
LPAIS	LaRC Public Affairs Information Server
MPAIS	MSFC Public Affairs Information Server
MSFC	Marshall Space Flight Center
MTRS	Marshall Technical Report Server
NPAIS	NASA Public Affairs Information Server
NSI	NASA Science Internet
NTRS	NASA Technical Report Server
OLE	object link entry

PAIS	Public Affairs Information Server
PDF	Portable Data File
PON	Payload Operations Network
PSCNI	Program Support Communications Network Interface
RECON	Research Connection
RDP	report document page
SCAN	selected current aerospace notices
SODN	Shuttle Operations Data Network
SPAIS	SSC Public Affairs Information Server
SPC	Shuttle Processing Contractor
SSC	Stennis Space Center
STRS	Stennis Technical Report Server
STI	Scientific and Technical Information
TCP/IP	Transmission Control Protocol/Internet Protocol
THB	thumbnail file
TIFF	tagged image file format
URL	universal resource locator
TRS	Technical Report Server
WAIS	Wide Area Information Server
WAN	wide area network
WWW	World Wide Web
XDOD	Xerox Document On Demand

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In addition to the prototype team members, the inclusion of the following centers are being phased into the NASAwide STI Electronic Document Distribution project without any major interruption to the current prototype implementation schedule. This decision was made in early February 1995.

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FTP Sites:

ARC	128.102.194.143	
LeRC	139.88.70.110	
LaRC	tebtre.larc.nasa.gov	
DFRC	ftp.dfrc.nasa.gov	
GSFC	xdod.gsfc.nasa.gov	128.183.32.184
JPL	jpl-64-mosaic	
JSC	139.169.18.100	
MSFC	eagle.msfc.nasa.gov	
KSC	128.217.62.1	
CASI	casi1.casi.sti.nasa.gov	

Appendix B—Phasing Schedules

Each center participating in the prototype STI EDD project has a specific set of schedules for its implementation of the technical report server. A composite schedule reflecting the integration of each center's tasks are displayed by Figure B - 1 with supporting schedules displayed by Figures B - 2 to B - 9.

Figure B - 1	Prototype STI EDD Composite
Figure B - 2	Goddard Space Flight Center
Figure B - 3	Lewis Research Center
Figure B - 4	Ames Research Center
Figure B - 5	Langley Research Center
Figure B - 6	Center for AeroSpace Information
Figure B - 7	Jet Propulsion Laboratory
Figure B - 8	Dryden Flight Research Center
Figure B - 9	JSC/MSFC/KSC/SSC Centers and Hqts

Significant events leading up to each of the major deliverables are highlighted below:

1.	FAX to team, request for network topology at each participating center	12/16/94
2.	Coordination with JPL regarding inclusion in NTRS as JPLTRS	1/5 - 6/95
3.	Tech Focus Group VITS, presentation by Joint STI EDD Team - status	1/23/95
4.	FAX to team, request for input to joint TM	1/30/95
	a. Draft 1 - Chapters 2, 3, and 4	2/28/95
	b. Draft 2 - Chapters 2, 3, 4, and 5	3/17/95
	c. Draft 3 - Chapters 2, 3, 4, 5, and 6	4/7/95
	d. Final Working Draft - Introduction plus all chapters	5/1/95
	e. Joint Working Session at LeRC plus use of VITS	5/15/95
5.	Coordination with DFRC regarding inclusion in prototype STI EDD project	1/30/95
6.	Coordination with JSC regarding inclusion in prototype STI EDD project	2/3/95
7.	Coordination with KSC regarding inclusion in prototype STI EDD project	2/3/95
8.	Coordination with MSFC regarding inclusion in prototype STI EDD project	2/6/95
9.	Coordination with SSC regarding inclusion in prototype STI EDD project	2/6/95
10.	Budget memo sent to Budget Office for Code M STI EDD participation	2/13/95
11.	Initiate file transfer testing between STI EDD file server sites	2/8/95
12.	Fax joint plan addendum to Code M centers for their review	2/14/95
13.	Initiate EDD application - Headquarters Telephone Directory	2/28/95
14	Initiate EDD application - Public Affairs Fact Sheets	3/17/95
15.	Coordinate Implementation Hqtr's Telephone Directory - Code JOB-1 & JT	5/9/95
16.	Presentation to ITMSC Standards and Architecture Sub-Board	6/14/95
17.	STI EDD VITS - Center status	6/19/95
18.	Coordination with LeRC/MSFC/JSC - NPAIS	6/27-29/95
19.	Presentation to Code U, Life & Microgravity Sciences & Applications	7/12/95
20.	Coordination with Code JOB-1 & JT - GPO/Covers/Elec Interface Issues	8/21/95
21.	STI EDD Workshop at LeRC	8/22-8/23/95
22.	Headquarters to be included as a node in the STI EDD Project	9/28/95
23.	Headquarters excluded as a node in the STI EDD Project	12/95

Prototype STI EDD Composite Schedule

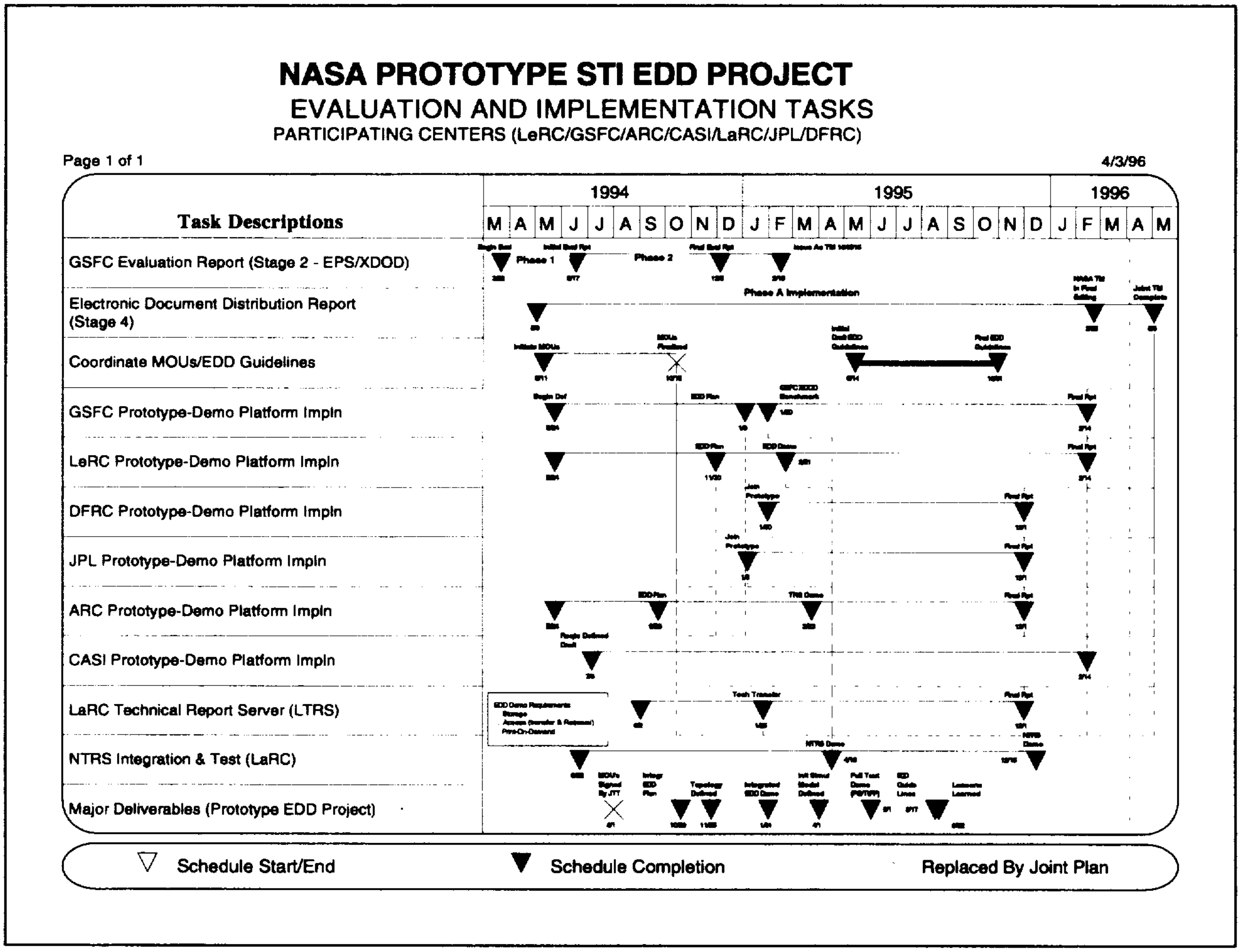

Figure B - 1. Prototype STI EDD Composite.

Headquarters was included as a node in the STI EDD project on September 28, 1995. Integration into the scheduling of input to the Joint TM is shown by Figure B - 9.

Goddard Space Flight Center Schedule

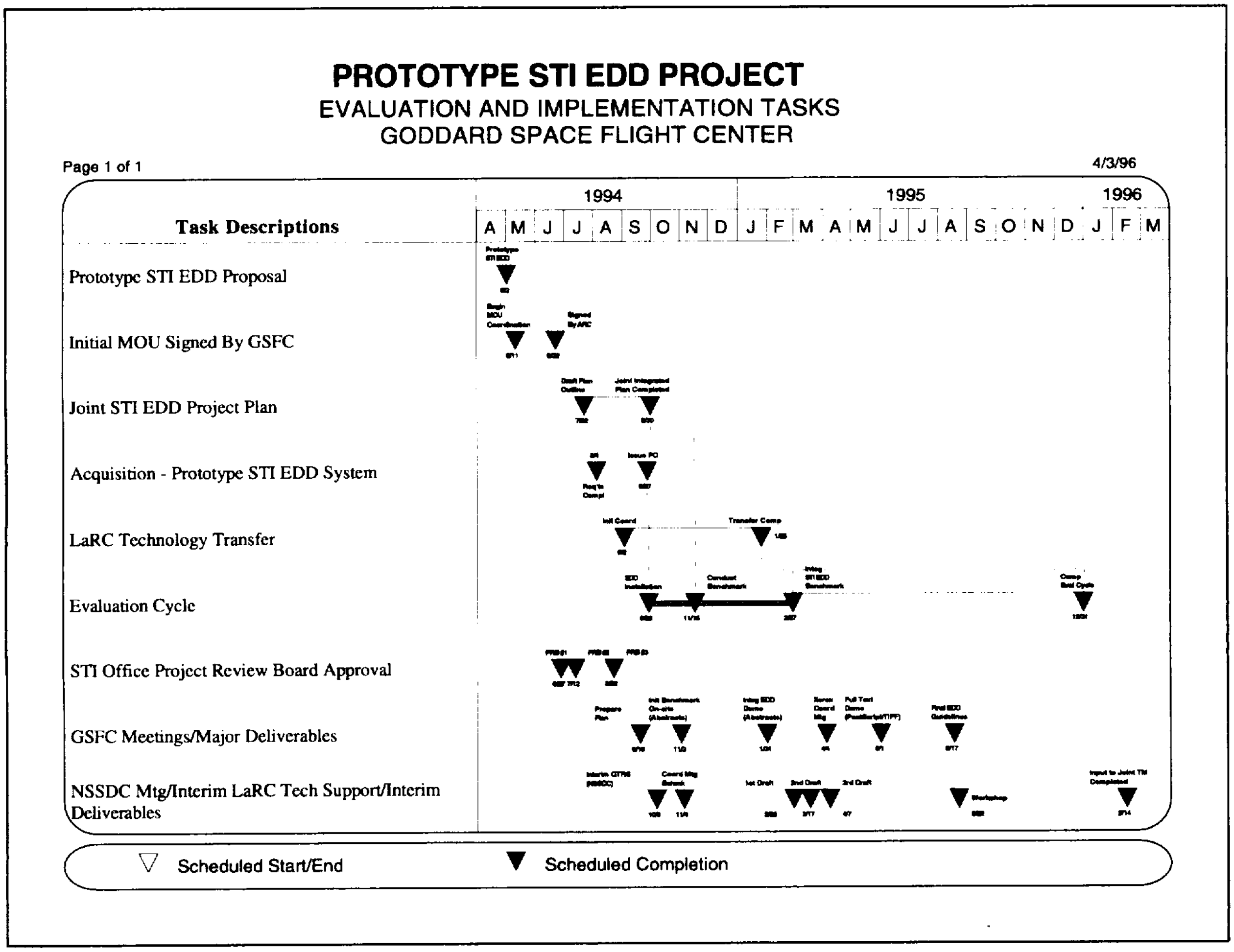

Figure B - 2. Goddard Space Flight Center.

Lewis Research Center Schedule

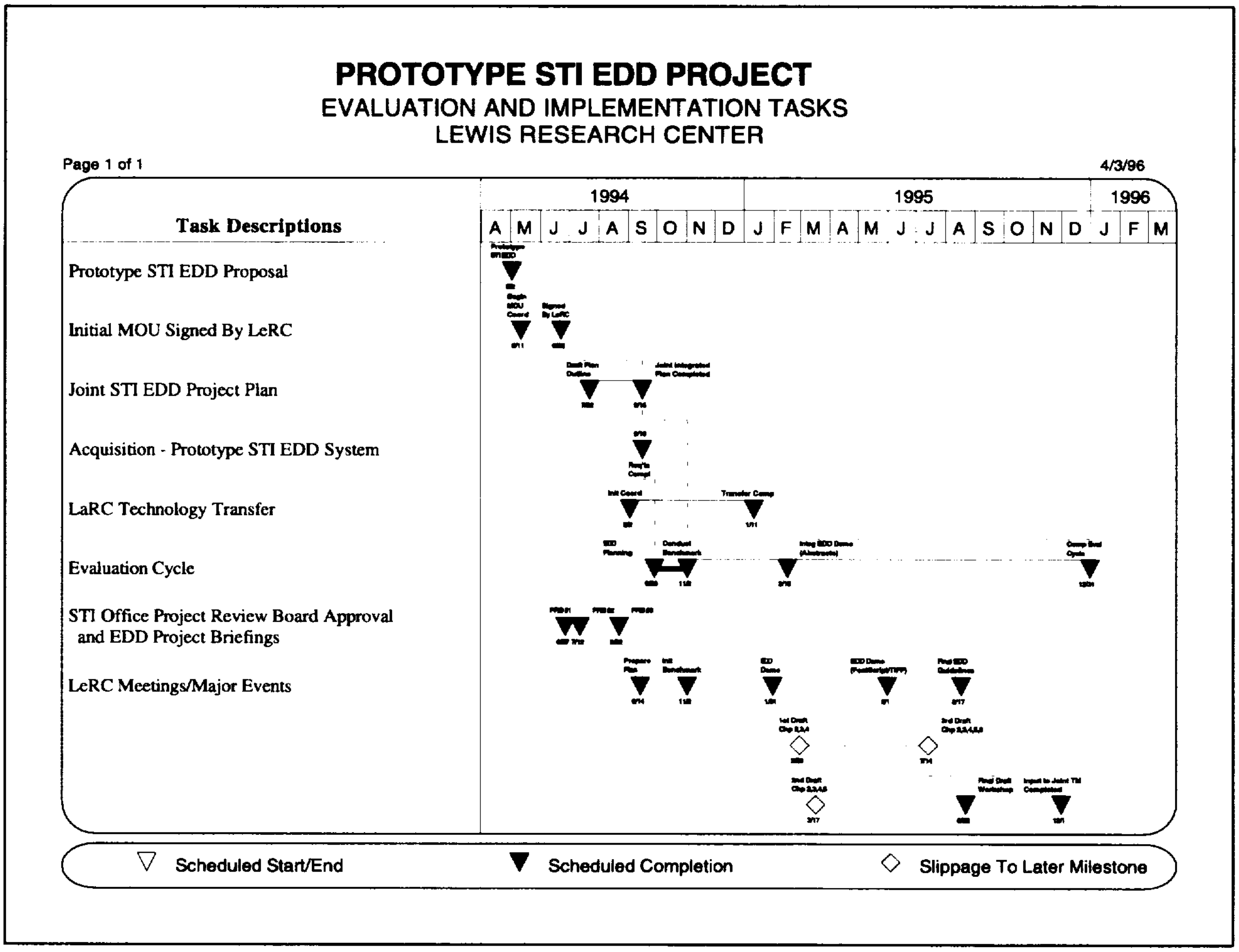

Figure B - 3. Lewis Research Center.

Ames Research Center Schedule

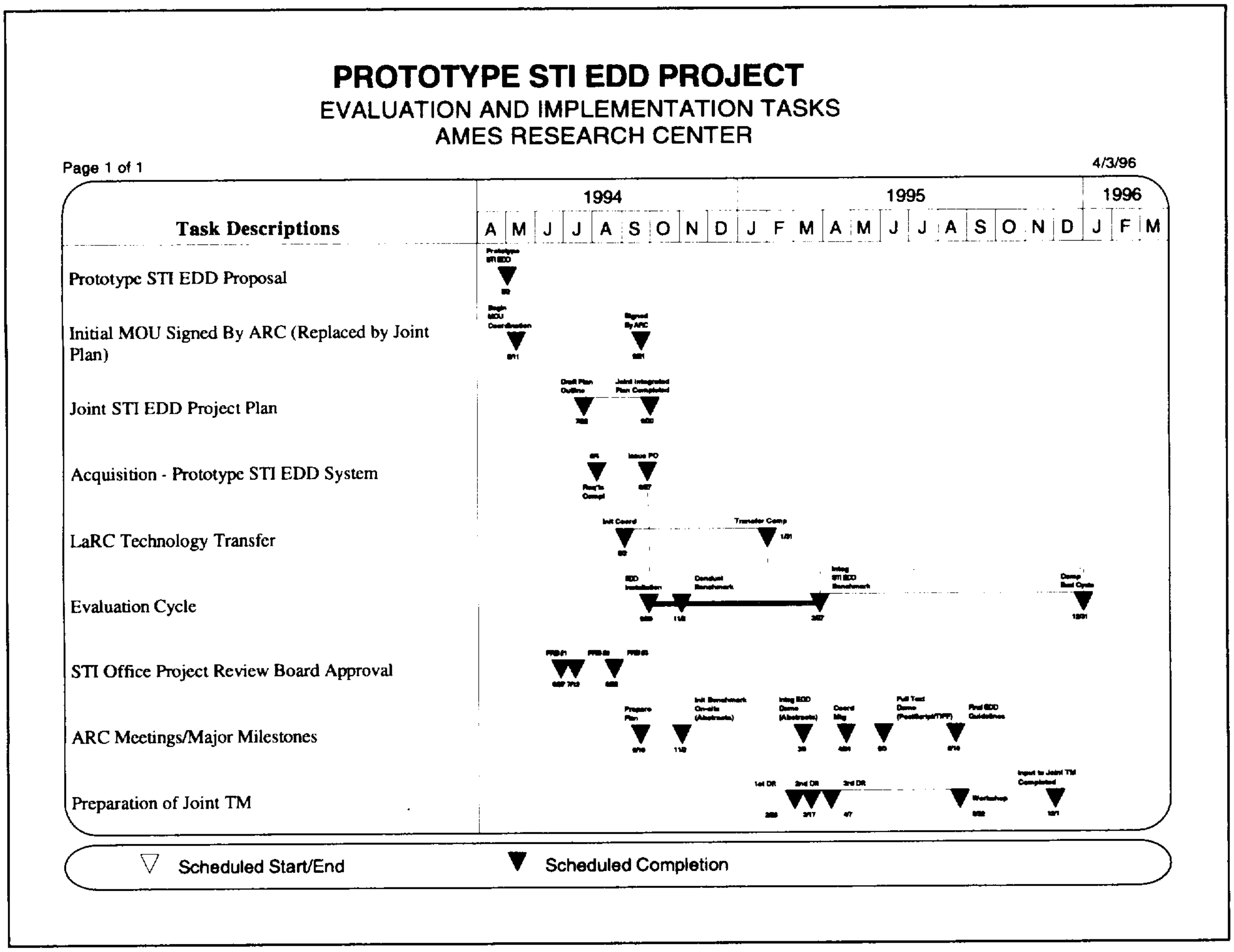

Figure B - 4. Ames Research Center.

Langley Research Center Schedule

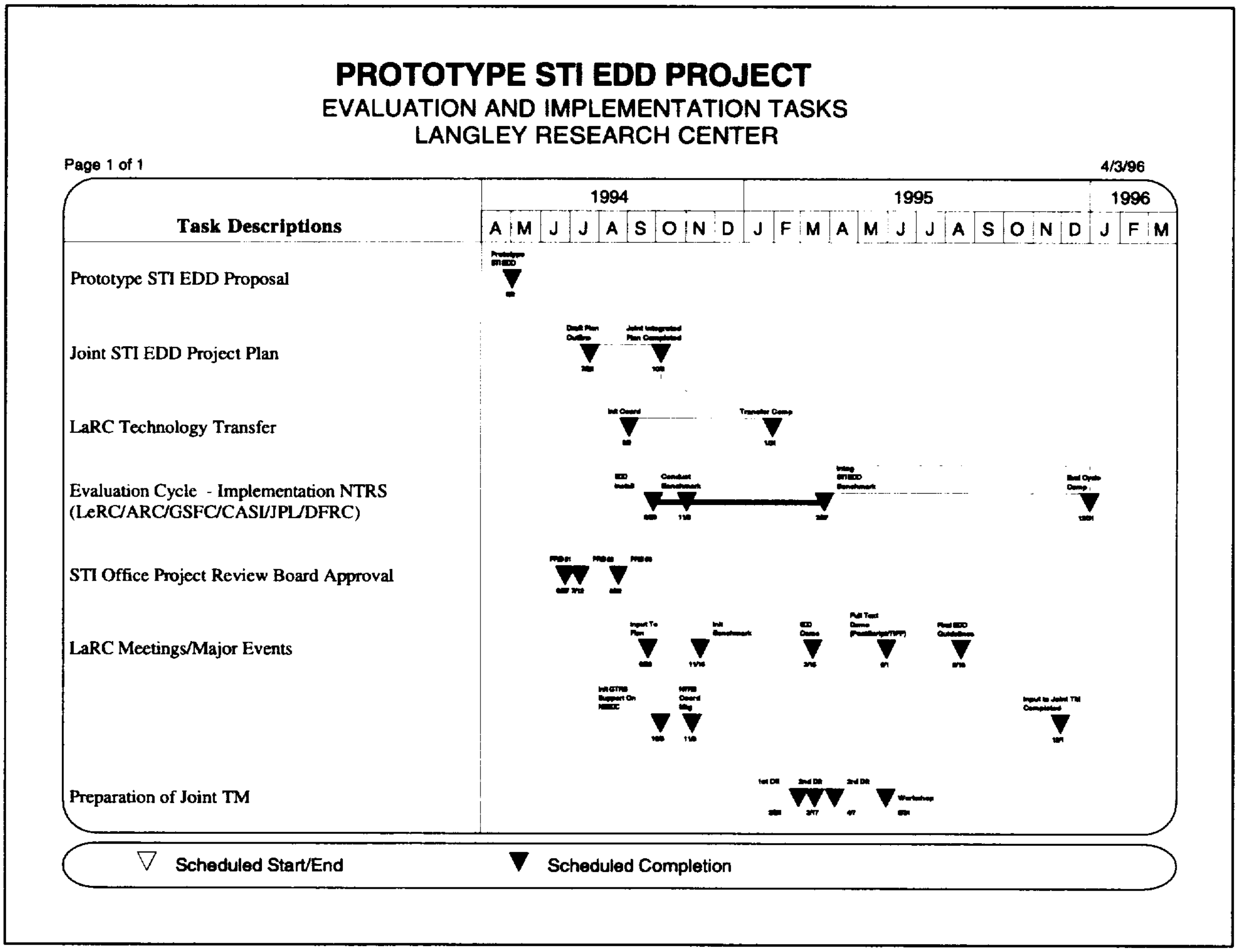

Figure B - 5. Langley Research Center.

Center for AeroSpace Information Schedule

PROTOTYPE STI EDD PROJECT

EVALUATION AND IMPLEMENTATION TASKS
CENTER FOR AEROSPACE INFORMATION

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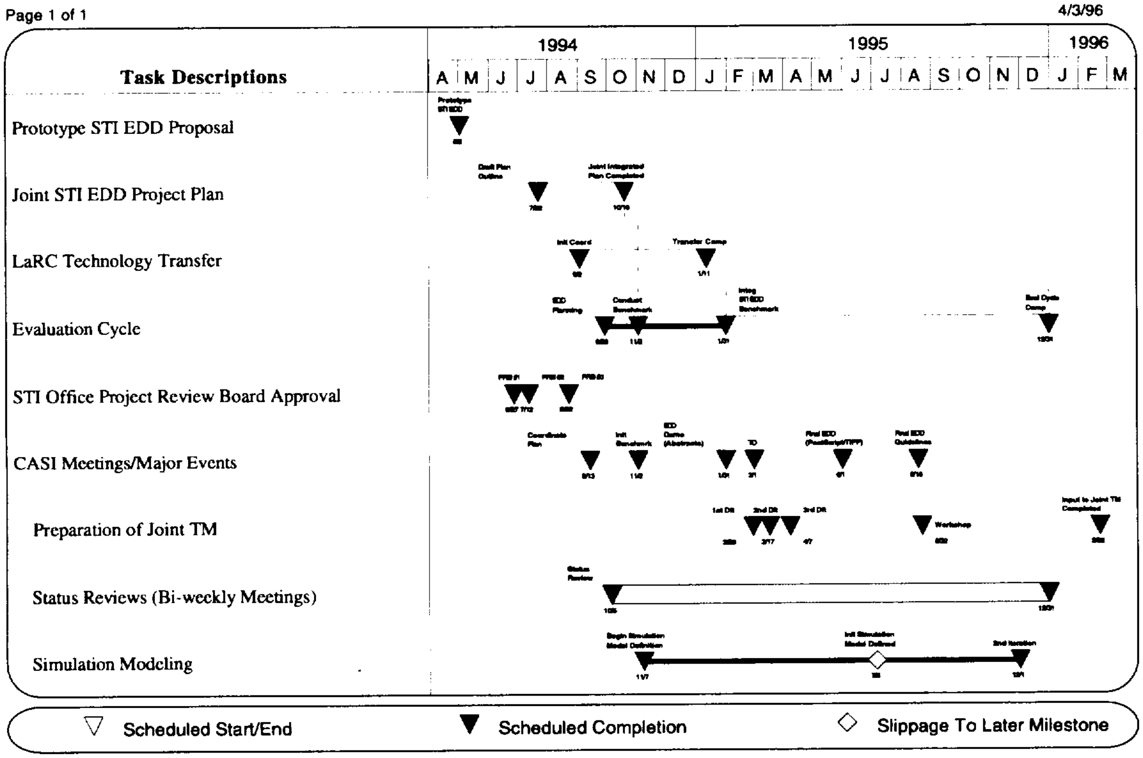


Figure B - 6. Center for AeroSpace Information.

Jet Propulsion Laboratory Schedule

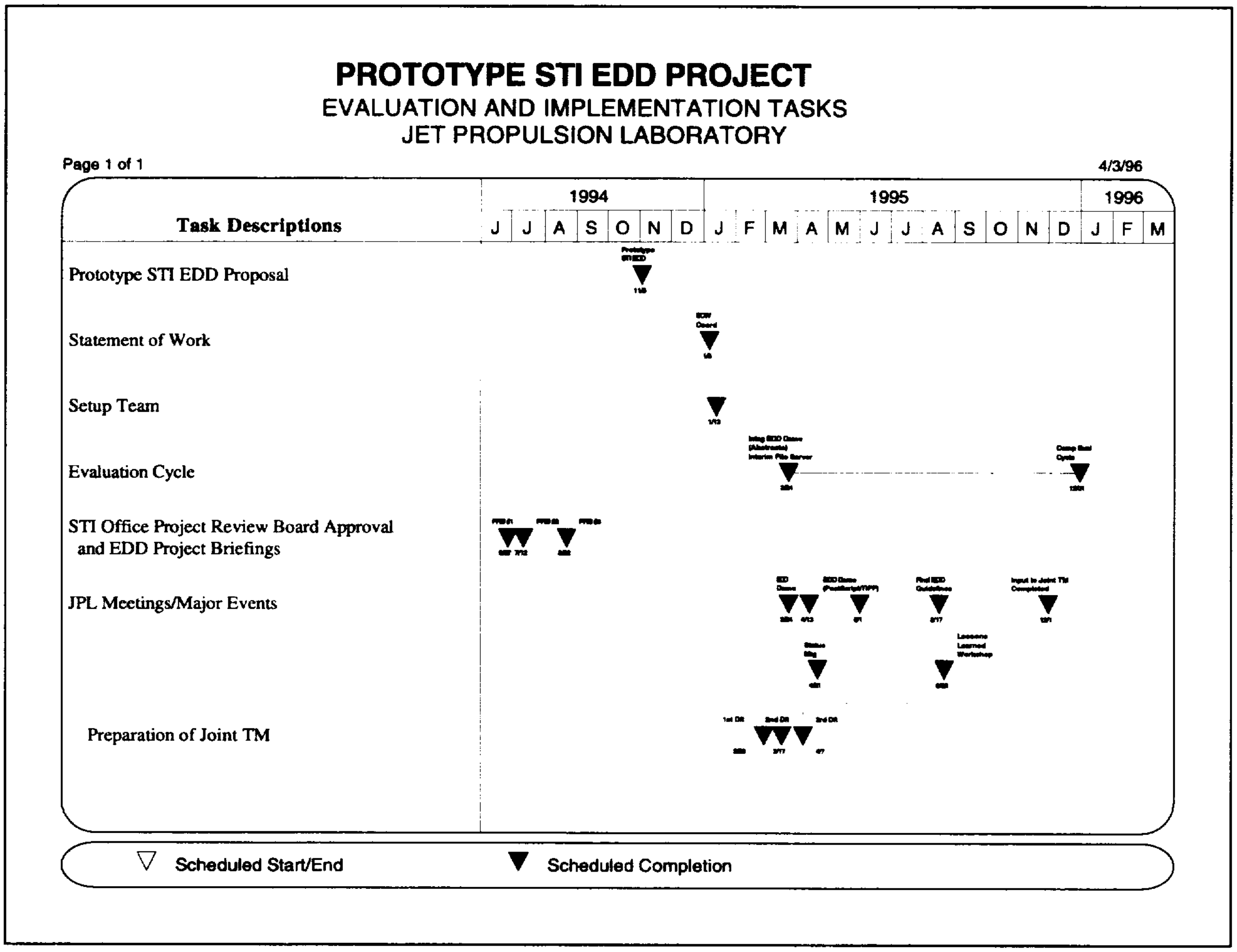


Figure B - 7. Jet Propulsion Laboratory.

Dryden Flight Research Center

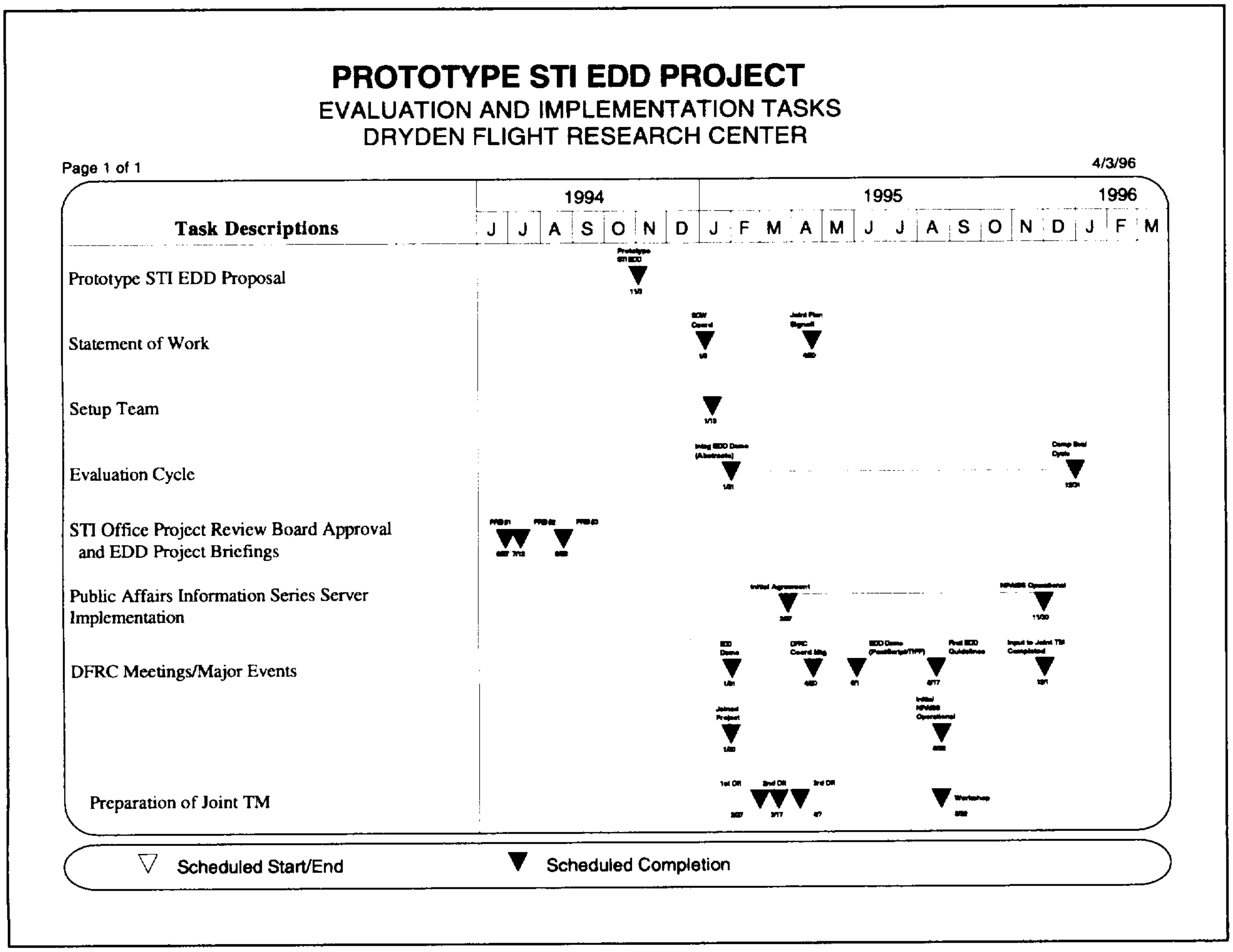


Figure B - 8. Dryden Flight Research Center.

JSC/MSFC/KSC/SSC Centers and Hqts Schedule

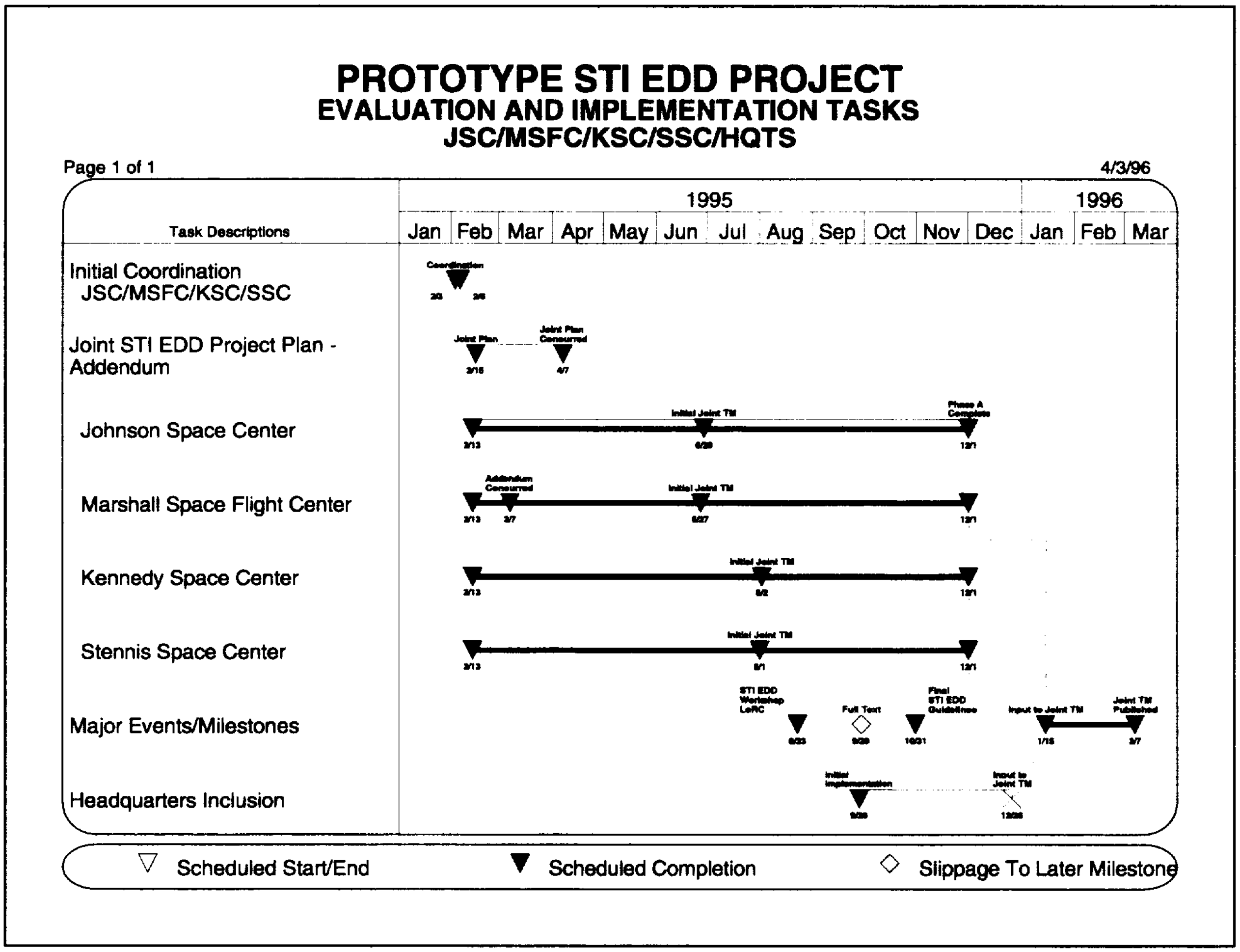
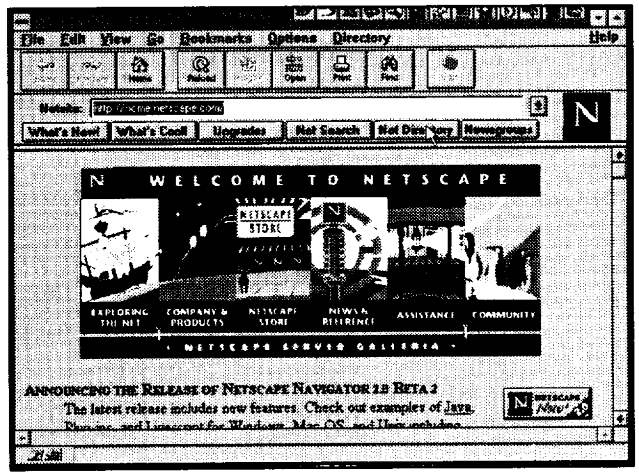


Figure B - 9. JSC/MSFC/KSC/SSC/HQTS.

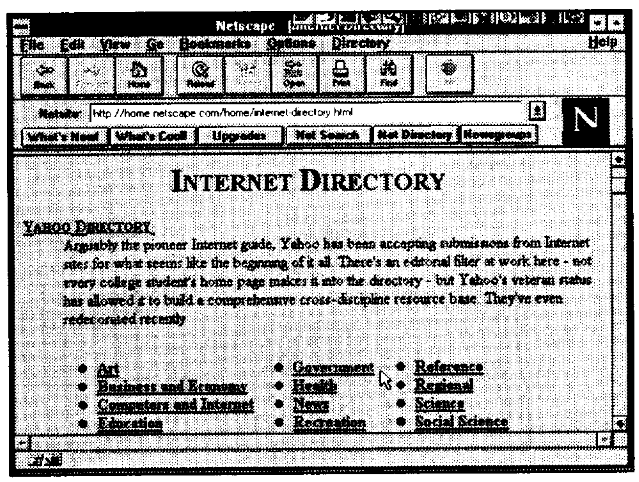
Appendix C—Accessing NASA Public Affairs Information Server (NPAIS)

Using Netscape for Windows

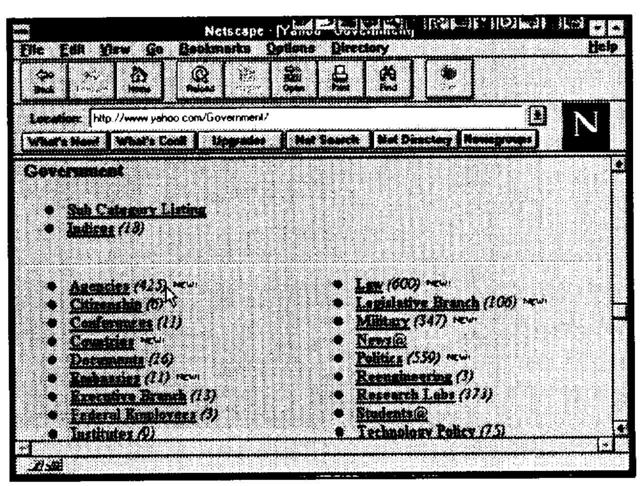
Instructions for using Netscape for Windows are provided below. The same-step by-step instructions can be used for using Netscape for the Macintosh.



Step 1 Double click on the Netscape icon in Program Manager. If you have the Netscape Home Page as your default, double click on **Net Directory**; this will give you a Home Page listing for Step 2.

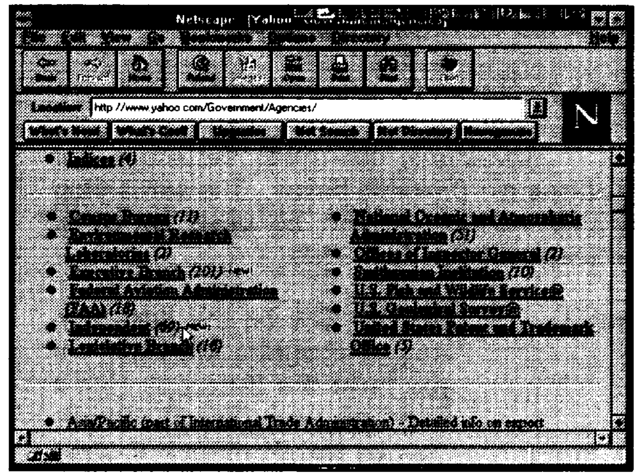


Step 2 Double click on **Government**; this will give you the next Home Page listing for Step 3.

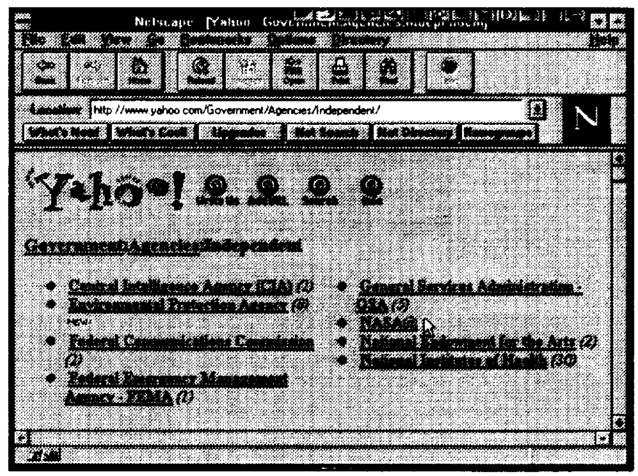


Step 3 Double click on **Agencies**; this will give you the next Home Page listing for Step 4.

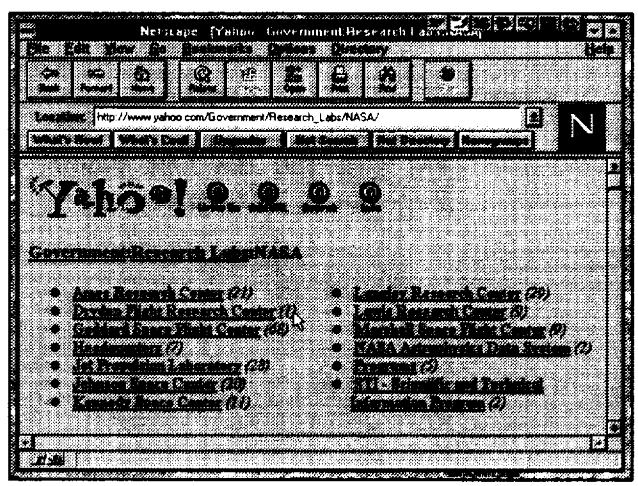
Step 4 — Scroll down the Home Page and double click on **Independent**; this will give you the next Home Page listing for Step 5.



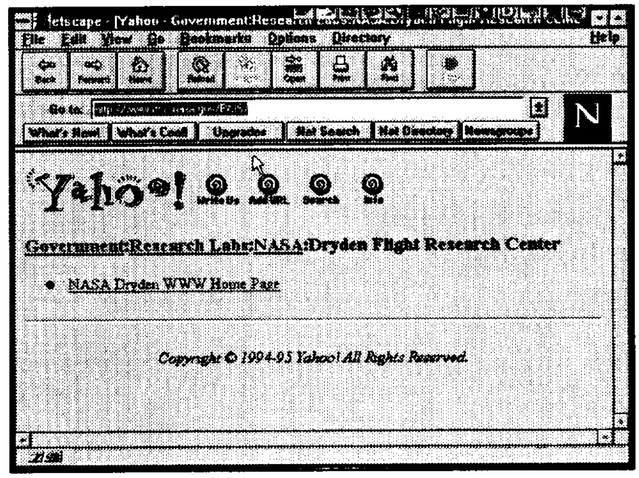
Step 5 — Double click on **NASA**; this will give you the next Home Page listing for Step 6.



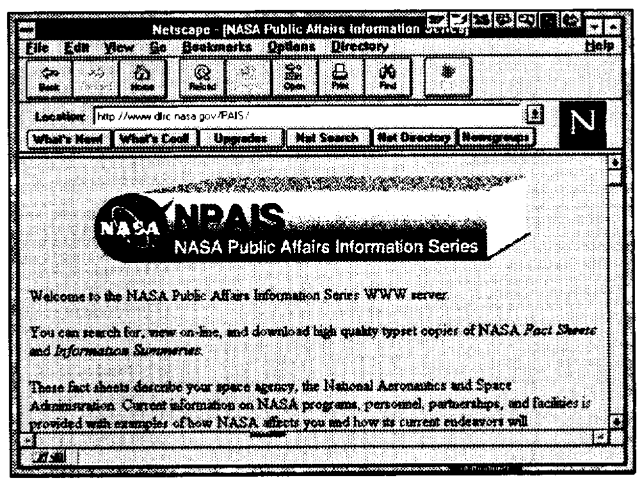
Step 6 — Double click on **Dryden Flight Research Center**; this will give you the next Home Page for Step 7.



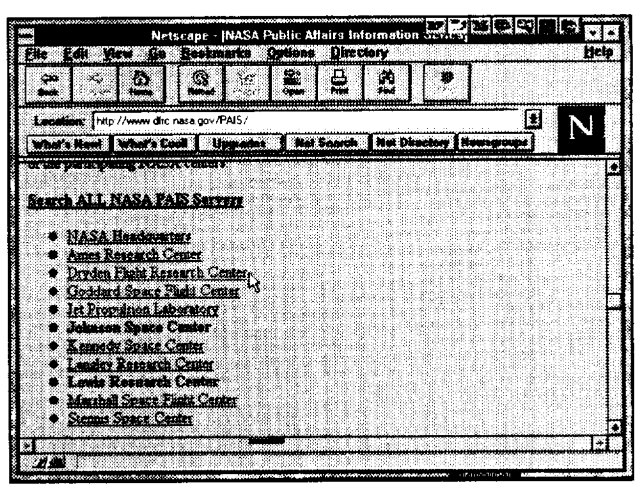
Step 7 To access the **NPAIS** Home Page, use the following URL: **http://www.dfrc.nasa.gov/PAIS**; this will give the next Home Page, go to Step 8.



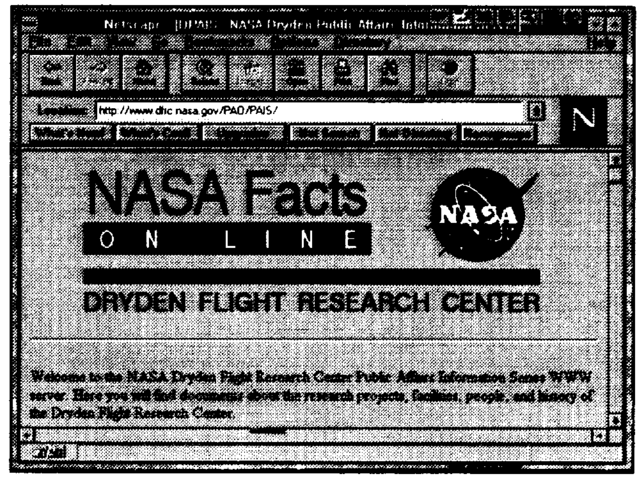
Step 8 Scroll down the Home Page till you can access the **Dryden Flight Research Center**; go to Step 9.



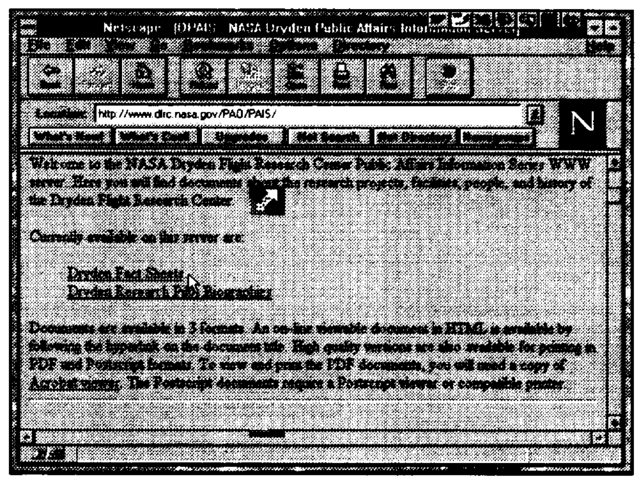
Step 9 Double click on **Dryden Flight Research Center** to access Home Page for DPAIS On Line Fact Sheets; go to Step 10.



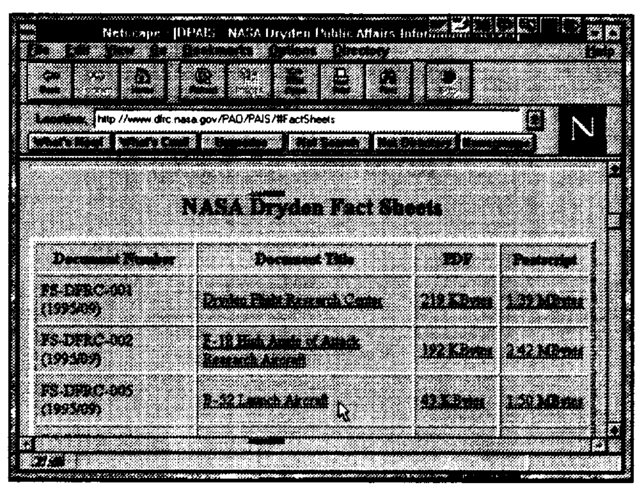
Step 10 Scroll down the Home Page listing until you reach **Dryden Fact Sheets**; go to Step 11.



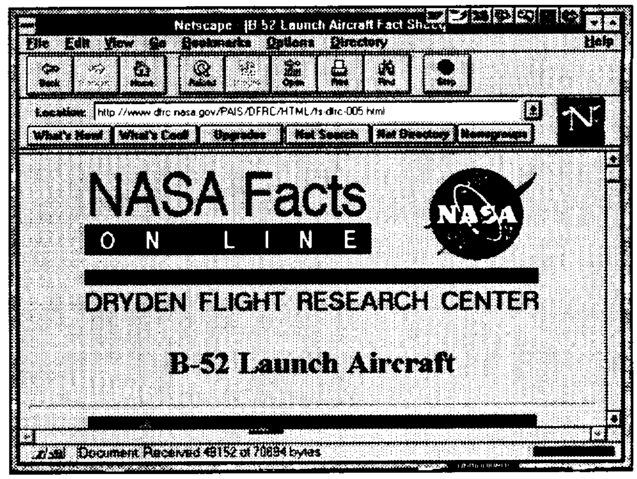
Step 11 Double click on **Dryden Fact Sheets** and go to Step 12.



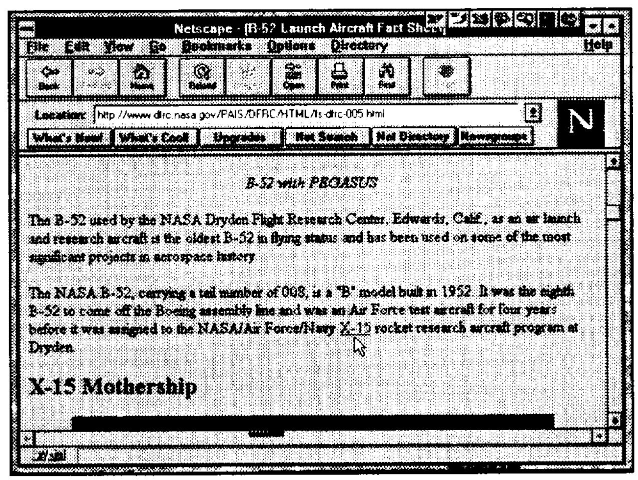
Step 12 Select the fact sheet you want by double clicking on **B-52 Launch Aircraft**; go to Step 13.



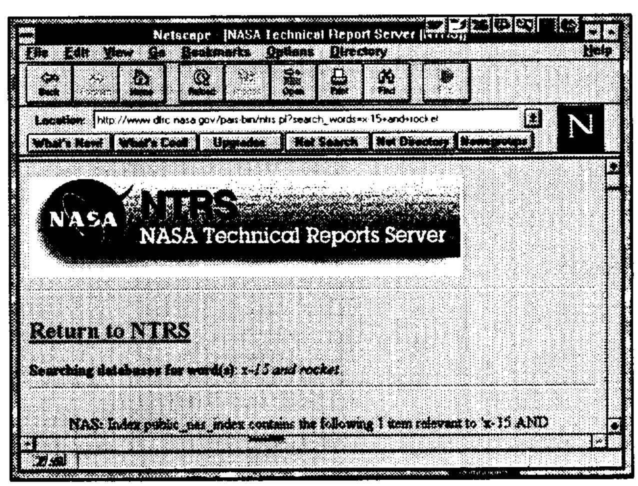
Step 13 Scroll down the Home Page until you see the specific key word you desire to do further research on; go to Step 14.



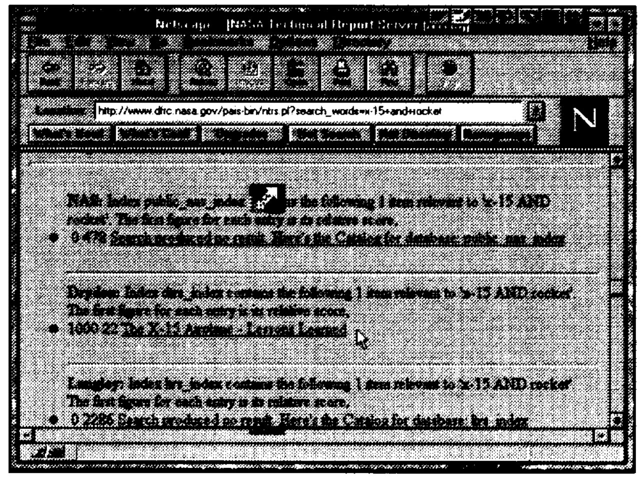
Step 14 Double click on the key word **X-15** to enable the execution of keyword searching against the NASA Technical Report Server; go to Step 14.



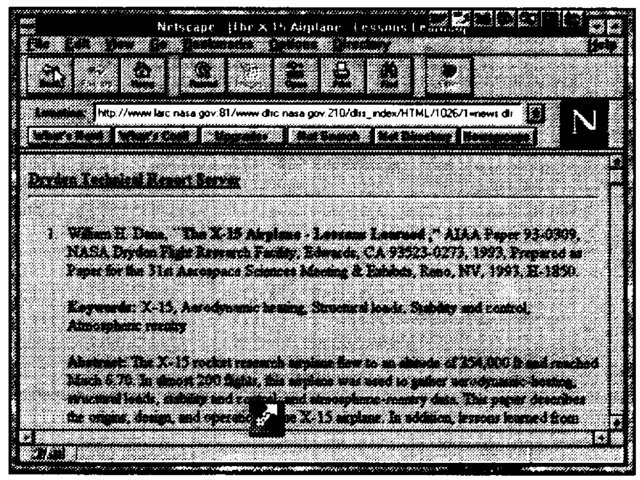
Step 15 Scroll down the Home Page to view the specific title pages that the key word found. The NTRS will list all hits by xTRSs currently available; go to Step 16.



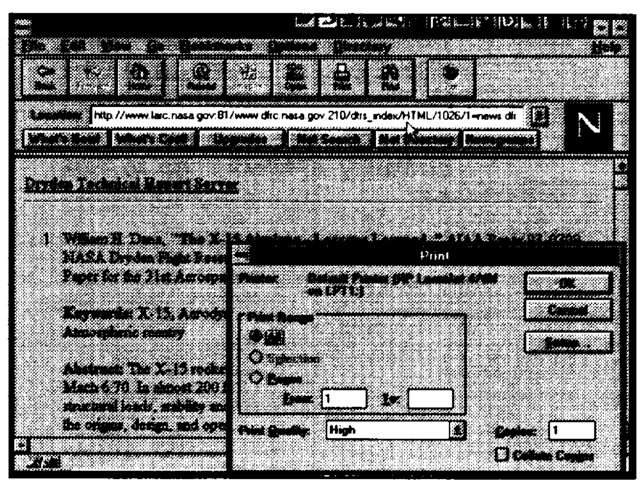
Step 16 To obtain the abstract of the list of titles available, double click on **The X-15 Airplane - Lessons Learned**; go to Step 17.



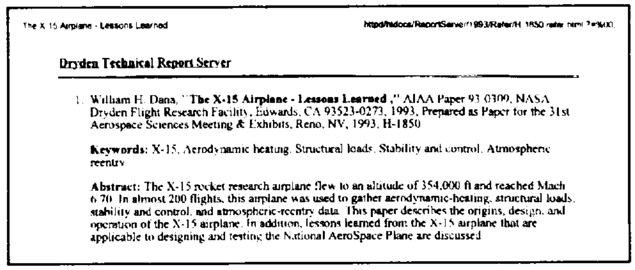
Step 17 At this step, you will have the abstract which you can now print out on your local printer by double clicking on the Netscape Print Button; go to Step 18.



Step 18 Double click **ok** to print the abstract on your local printer. Results of the printed abstract are shown by Step 19.



Step 19 Printed abstract from the Dryden Technical Report Server (DTRS).



The X 15 Airplane - Lessons Learned http://hdocs/ReportServer/1993/Refer/H 1850 refer html 7#9600

Dryden Technical Report Server

1. William H. Dana, "**The X-15 Airplane - Lessons Learned**," AIAA Paper 93 0309, NASA Dryden Flight Research Facility, Edwards, CA 93523-0273, 1993, Prepared as Paper for the 31st Aerospace Sciences Meeting & Exhibits, Reno, NV, 1993, H-1850

Keywords: X-15, Aerodynamic heating, Structural loads, Stability and control, Atmospheric reentry

Abstract: The X-15 rocket research airplane flew to an altitude of 354,000 ft and reached Mach 6.70. In almost 200 flights, this airplane was used to gather aerodynamic-heating, structural loads, stability and control, and atmospheric-reentry data. This paper describes the origins, design, and operation of the X-15 airplane. In addition, lessons learned from the X-15 airplane that are applicable to designing and testing the National AeroSpace Plane are discussed

At step 12, you have the functionality to print the Document Title as shown by Step 19, or to print the file in PDF or PostScript, if you have available on your PC the necessary software. Note that the size of the PDF and PostScript files are shown.

Appendix D—Creating an HTML File and Setting up an xTRS

Introduction

This appendix was created from exerpts taken from an instruction course on the "Authoring HTML Documents/Home Page," taught by Ms. Robin Dumas, Information Systems Services, Section 392, Jet Propulsion Laboratory. Requests for her instruction manual may be directed to her on e-mail at Robin.C.Dumas@jpl.nasa.gov. The following text will provide the process used in creating an html file using a Public Affairs Office Fact Sheet prepared by DFRC as an example. Before an html file can be created, it must first be converted from the word processing file format to a text file format and then html tagged. Graphics are converted to gif format. In the Public Affairs Office environment, the word processors used are Personal Computers and MacIntosh machines. Conversions are displayed by Table D - 1. Table D - 2 provides a list of HTML tags and their definition. Following Figure D - 4 are instructions on setting up an xTRS.

Table D - 1. Conversion to Text

Software	Personal Computer	MacIntosh
PageMaker		Export text only, e.g., abc.txt
Microsoft Word		Save as text only, e.g., abc.txt
WordPerfect	Save as ASCI (DOS) text only, e.g., abc.txt	
Graphics	Save as abc.gif file	Save as abc.gif file

Table D - 2 HTML Tags

HTML Tag	What it means
<html> & </html>	Indicates that file is an html file, where / represents ending point
<title> & </title>	Indicates text that will be in browser window box
<body> & </body>	Indicates main body of file
<h#> & </h#>	Indicates level of heading where # represents levels 1, 2, 3, 4, 5, or 6
<p>	Indicates paragraph break
 	Indicates line break (no extra space)
<hr>	Indicates horizontal rule
 & 	Indicates bold text
<i> & </i>	Indicates italic text
<tt> & </tt>	Indicates fixed width text
<pre> & </pre>	Indicates fixed width text in which tabs and line breaks are displayed in the same locations as in the source html file
<blockquote> & </blockquote>	Indicates indented text separated from surrounding text
<address> & </address>	Indicates address text at end of file

HTML Tag	What it means
&	Ordered (numbered) list
&	Unnumbered list
	Indicates line item of list
<dl> & </dl>	Indicates definition list
<dt>	Indicates word being defined
<dd>	Indicates text of definition
<img src = "filename">	Indicates in-line image file where filename is name of file Must be a .gif or .xbm file format Keep under 30Kb, since larger files take longer to display
link anchor	Indicates link to another file (.html, .tiff, .jpeg, .au, etc) Where filename = name of file being linked, and Link anchor = text indicating hypertext link Filename must include pathname Use for larger image files
Relative pathname	Used when linking related documents which will remain in one directory or on one file server, e.g., "contents.htm"
Absolute pathname	Used when linking unrelated files, or linking to another Home Page or server Must include entire pathname - scheme://host.domain/path/filename where scheme = type of link, host = server, domain = where the server is known, path = directories, and filename = name of file e.g., "http://techinfo.jpl.nasa.gov/sec644/authoring_html/toc.html"

Source Document

The first couple of paragraphs of a Fact Sheet have been extracted and are displayed below: HTML tagging is shown by the next section.

F-8 Digital Fly-By-Wire Fact Sheet

The Digital Fly-By-Wire (DFBW) concept utilizes an electronic flight control system coupled with a digital computer to replace conventional mechanical flight controls.

The first test of a DFBW system in an aircraft was in l972 on a modified F-8 Crusader at the Dryden Flight Research Facility, Edwards, Calif. It was the forerunner of the fly-by-wire flight control systems now used on the space shuttles and on today's military and civil aircraft to make them safer, more maneuverable, and more efficient.

Background

In the first few decades of flight, pilots controlled aircraft through direct force -- moving control sticks and rudder pedals linked to cables and pushrods that pivoted control surfaces on the wings and tails.

HTML Tagged Document and MOSAIC Display

Figures D - 1 to D - 3 displays a fully tagged html file which includes the hyperlink to a gif file.

Removal of all tags would represent the source document in ASCI format. The ASCI format is created by saving the source document as an ASCI file from whatever DeskTop word processing

```
DFRC-FS-.HTM

<HTML>
<HEAD>
<TITLE>F 8 Digital Fly By-Wire Fact Sheet</TITLE>
</HEAD>

<BODY>
<CENTER><IMG SRC="http://www.dfrc.nasa.gov/PAIS/DFRC/HTML/DFRCMasthead.gif" ALT
="[Image: Fact Sheet Masthead]"></CENTER>
<CENTER><H1>F-8 Digital Fly By-Wire</H1></CENTER>
<HR SIZE "5">

<CENTER><img src="http://www.dfrc.nasa.gov/PAIS/DFRC/HTML/Photos/ECN-3312.gif">
</CENTER>

<P>
The Digital Fly-By-Wire (DFBW) concept utilizes an electronic
flight control system coupled with a digital computer to replace
conventional mechanical flight controls.
<P>
The first test of a DFBW system in an aircraft was in 1972 on
a modified F-8 Crusader at the Dryden Flight Research Facility,
Edwards, Calif. It was the forerunner of the fly-by-wire flight
control systems now used on the space shuttles and on today's
military and civil aircraft to make them safer, more maneuverable,
and more efficient.
<H2>Background</H2>

<P>
In the first few decades of flight, pilots controlled aircraft
through direct force    moving control sticks and rudder pedals
linked to cables and pushrods that pivoted control surfaces on
the wings and tails
<P>
As engine power and speeds increased, more force was needed and
hydraulically boosted controls emerged. Soon, all high performance
and large aircraft had hydraulic-mechanical flight control systems.
These conventional flight control systems restricted designers
in the configuration and design of aircraft because of the need
for flight stability.
<P>
As the electronic era grew in the 1960s, so did the idea of aircraft
with electronic flight control systems. Wires replacing cables
and pushrods would give designers greater flexibility in configuration
and in the size and placement of components such as tail surfaces
and wings. A fly-by-wire system would be smaller, more reliable,
and in military aircraft the systems would be much less vulnerable
to battle damage. A fly by wire aircraft would also be much more
responsive to pilot control inputs. The result would be more efficient,
safer aircraft with improved performance and design.
<H2>The Aircraft</H2>

<P>
By the late 1960s, engineers at Dryden began discussing how to
modify an aircraft and create a digital fly by-wire testbed.
<P>
Support for the concept at NASA headquarters came from Neil Armstrong,
former research pilot at Dryden. He served in the Office of Advanced
Research and Technology following his historic Apollo 11 lunar
landing and knew electronic control systems from his days training
in and operating the lunar module. Armstrong supported the proposed
Dryden project and backed the transfer of an F-8C Crusader from

Page 1
```

Figure D - 1. HTML coded file.

```
DFRC-FS  HTM

the Navy to NASA to become the Digital Fly-By-Wire (DFBW) research
aircraft. It was given the tail number &quot;NASA 802&quot;.
<P>
The entire mechanical flight control system in the F-8, including
all cables, pushrods, and bell cranks, was replaced by wires
from the control stick in the cockpit to the control surfaces
on the wings and tail surfaces. The heart of the system was an
off-the-shelf backup Apollo digital flight control computer and
inertial sensing unit which transmitted pilot inputs to the actuators
on the control surfaces.
<P>
On May 25, 1972, the highly modified F-8 became the first aircraft
to fly completely dependent upon an electronic flight control
system. The pilot was Gary Krier.
<P>
The first phase of the DFBW program validated the fly-by-wire
concept and quickly showed that a refined system    especially
in large aircraft -- would greatly enhance flying qualities by
sensing motion changes and applying pilot inputs instantaneously.
<P>
The Phase 1 system had a backup fly-by-wire system in the event
of a failure in the Apollo computer unit, but it was never necessary
to use the system in flight.
<P>
In a joint program carried out with the Langley Research Center
in the second phase of research, the original Apollo system was
replaced with a triple redundant digital system. It would provide
backup computer capabilities if a failure occurred.
<P>
The DFBW program lasted 13 years. The final flight    the 210th
of the program    was made April 2, 1985, with Dryden research
pilot Ed Schneider at the controls
<H2>Research Benefits</H2>

<P>
The DFBW F-8 validated the principal concepts of the all electric
flight control systems now used on nearly all modern high performance
aircraft and on military and civilian transports. A DFBW flight
control system is also used on the space shuttles.
<P>
NASA 802 was the testbed for the sidestick controller used in
the F 16 fighter, the first U.S. high performance aircraft with
a DFBW system.
<P>
Among other electronic milestones first flown on the DFBW F-8
were an angle-of-attack limiter and maneuver driven flaps, features
commonly used on today's new generation of aircraft.
<P>
In addition to pioneering the space shuttle's fly by wire flight
control system, NASA 802 was the testbed that explored Pilot Induced
Oscillations (PIO) and validated methods to suppress them. PIOs
occur when a pilot overcontrols an aircraft and a sustained oscillation
results. On the last of five free flights of the prototype space
shuttle Enterprise during approach and landing tests in 1977,
a PIO developed as the vehicle settled onto the runway. The problem
was duplicated with the DFBW F-8 and a series of PIO suppression
filters were developed and tested on the aircraft for the shuttle
program office
<P>
The aircraft was used to develop a concept called Analytic Redundancy
Management, in which dynamic and kinematic relations between various

Page 2
```

Figure D - 2. HTML coded file.

software was used to create the fact sheet. Explanation and use of the tags are contained in Table D - 2. Figure D - 4 displays the first page of the Fact Sheet by MOSAIC on a PC. By comparing the source document with Figure D - 1, the creation of Figure D - 4 can be accomplished. Specifically, the steps are as follows:

F-8 Digital Fly-By-Wire Fact Sheet gives:

<HTML>	Indicates start of html file
<HEAD>	Indicates start point of header
<TITLE>F-8 Digital Fly-By-Wire</TITLE>	Indicates title
</HEAD>	Indicates end point of header
<BODY>	Indicates start point of main body of file

The masthead is inserted next:

<*Center*><IMG SRC="http://www.dfrc.nasa.gov/PAIS/DFRC/HTML/DFRCMasthead.gif" ALT="[Image: Fact Sheet Masthead]"></CENTER>   Masthead image is linked to file

```
DFRC-FS-.HTM

dissimilar sensors and measurements are used to detect and isolate
sensor failures.
<P>
In another series of successful tests, a software back-up system
(Resident Backup System) was demonstrated as a means to survive
common software faults which could cause all three channels to
fail. This system has been subsequently used on many experimental
and production aircraft systems.
<P>
The Dryden project also worked with the British Royal Aircraft
Establishment using the DFBW F-8 to produce ground-based software
to use when researchers are investigating flight controls in high
-risk flight environments. During contingencies, pilots can disengage
the ground control software and switch to backup on-board controls.
<P>
DFBW research carried out with NASA 802 at Dryden is now considered
one of the most significant and successful aeronautical programs
in NASA history.
<H2>Specifications</H2>

<P>
The F-8 aircraft was originally built by LTV Aerospace, Dallas.
Tex., for the U.S. Navy which made it available to Dryden as a
test vehicle
<P>
NASA 802  NAVY BUREAU #145546
<P>
Powerplant was a Pratt and Whitney J57 turbojet
<P>
Wingspan is 35 feet 2 inches (350 square feet)
<P>
Overall length is 54 feet 6 inches, and height is 15 feet 9 inches
<P>
Flown as the DFBW testbed by NASA from 1972 to 1985
<P>
Fleet F-8s were the first carried based plane with speeds in excess
of 1000 mph. LTV won the Collier Trophy for its design and development
Total production was 1,261
<P>
<CENTER><IMG SRC="http://www.dfrc.nasa.gov/PAIS/DFRC/HTML/nasa.gif" ALT="-- NAS
A  "></CENTER>
<P>
<HR>
NASA Dryden Flight Research Center<BR>
Public Affairs Office<BR>
Edwards, Calif. 93523<BR>
(805) 258-3449<BR>
<A HREF="mailto:pao@news.dfrc.nasa.gov">pao@news.dfrc.nasa.gov</A><BR>
<P>
<B>Document</B>: DFRC FS-011-9205<BR>
<B>Modified</B>: May 1992
</BODY>
</HTML>

Page 2
```

Figure D - 3. HTML coded file.

Title is inserted next:

<CENTER><H1>F-8 Digital Fly-By-Wire</H1>
</CENTER>

<HR SIZE="5">   Image is sized

Image of F-8 is linked and inserted next:

<CENTER><img src="http://www.dfrc.nasa.gov/PAIS/DFRC/HTML/Photos/ECN-3312.gif">
</CENTER>

<P>   Start point of paragraph

The Digital Fly-By-Wire (DFBW) concept utilizes an electronic flight control system coupled with a digital computer to replace conventional mechanical flight controls.

<P>   Start point of next paragraph

The first test of a DFBW system in an aircraft was in l972 on a modified F-8 Crusader at the Dryden Flight Research Facility, Edwards, Calif. It was the forerunner of the fly-by-wire flight control systems now used on the space shuttles and on today's military and civil aircraft to make them safer, more maneuverable,
and more efficient.

Header number 2:

<H2>Background</H2>   Next header

<P>   Next paragraph

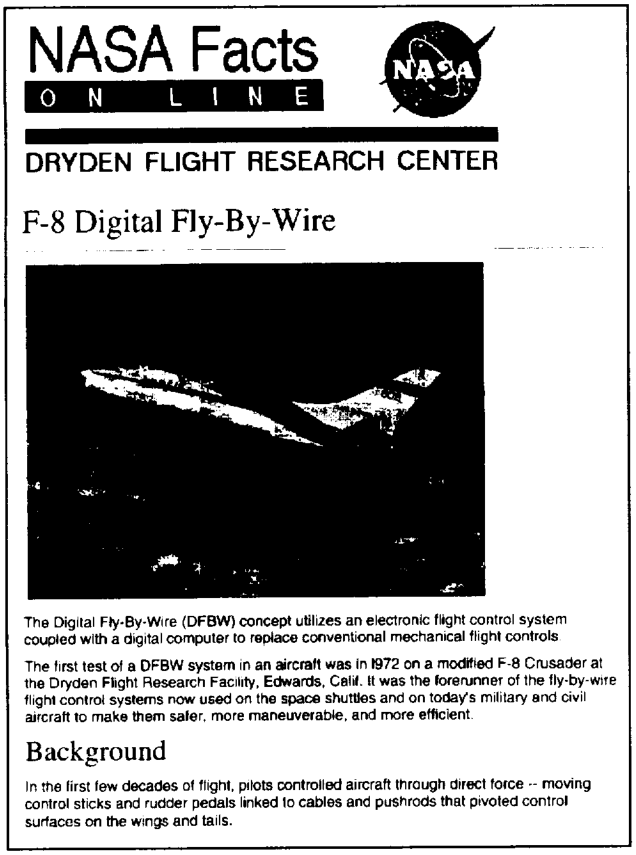
In the first few decades of flight, pilots controlled aircraft through direct force -- moving control sticks and rudder pedals linked to cables and pushrods that pivoted control surfaces on the wings and tails.

<P>   Next paragraph

Fleet F-8s were the first carried based plane with speeds in excess of 1000 mph. LTV won the Collier Trophy for its design and development. Total production was 1,261

<P>
<CENTER><IMG SRC="http://www.dfrc.nasa.gov/PAIS/DFRC/HTML/nasa.gif" ALT="-- NASA --"></CENTER>\

<P>
<HR>
NASA Dryden Flight Research Center
Public Affairs Office
Edwards, Calif. 93523
(805) 258-3449
<A HREF="mailto:pao@news.dfrc.nasa.gov">pao@news.dfrc.nasa.gov</A>



NASA Facts

ON LINE

DRYDEN FLIGHT RESEARCH CENTER

F-8 Digital Fly-By-Wire

The Digital Fly-By-Wire (DFBW) concept utilizes an electronic flight control system coupled with a digital computer to replace conventional mechanical flight controls.

The first test of a DFBW system in an aircraft was in 1972 on a modified F-8 Crusader at the Dryden Flight Research Facility, Edwards, Calif. It was the forerunner of the fly-by-wire flight control systems now used on the space shuttles and on today's military and civil aircraft to make them safer, more maneuverable, and more efficient.

Background

In the first few decades of flight, pilots controlled aircraft through direct force -- moving control sticks and rudder pedals linked to cables and pushrods that pivoted control surfaces on the wings and tails.

Figure D - 4. MOSAIC display.

<P>
<B>Document</B>: DFRC-FS-011-9205
<B>Modified</B>: May 1992

</BODY> Indicates end point - BODY

</HTML> Indicates end point - HTML

Setting Up xTRS (Technical Report Server)

This section of the Joint Technical Memorandum was written by Mr. Michael Nelson, LaRC, and can be retrieved at "http://techreports.larc.nasa.gov/ntrs/xtrs.html. The HTML ASCII file follows:

<html>
<head>
<title>How Do I Set Up My Own Technical Report Server?</title>
</head>
<body>
<h1>
How Do I Set Up My Own Technical Report Server?
</h1>
<hr>

<h2>Two Things are needed:</h2>
<p>

<dd> 1. a WAIS URL that points to your abstract database
<dd> 2. a URL that points to your xTRS home page

<p>

<hr>
Notes:
<hr>
<p>

<LI> You will need to install some version of WAIS on your machine. The best version of WAIS is freeWAIS-sf:
<p>

 <A
href="http://ls6-www.informatik.uni-dortmund.de/freeWAIS-sf/">http://ls6-www.informatik.uni-dortmund.de/freeWAIS-sf/
</A>
<LI> Pfeifer, Ulrich; Fuhr, Norbert; Huynh, Tung: "Searching Structured Documents with the Enhanced Retrieval Functionality of freeWAIS-sf and SFgate", Proceedings of the Third International World Wide Web Conference, Darmstadt, Germany, April 10-14, 1995, pp. 1027-1036. (
<a
href="http://www.igd.fhg.de/www/www95/papers/47/fwsf/fwsf.html">http://www.igd.fhg.de/www/www95/papers/47/fwsf/fwsf.html</A>)
 freeWAIS-sf has a very powerful and flexible indexing mechanism. Its use is covered in <A href="#appa">Appendix A.

<p>

```
<li> If you do not wish to install freeWAIS-sf, and already have another version of WAIS installed at your site, I can offer the following SunOS binaries: (the source has been lost ;-)
<p>
<ul>
<LI>
<href="http://www.larc.nasa.gov/ntrs/waisserver">http://www.larc.nasa.gov/ntrs/waisserver</A>
<LI> <A
href="http://www.larc.nasa.gov/ntrs/waisindex">http://www.larc.nasa.gov/ntrs/waisindex</A>
<li> If you use this version of <tt>waisindex</tt>, use:

<p>
<img src="http://www.larc.nasa.gov/images/top_divider.xbm"><p>
<code>
     waisindex -pos -export -t html -d xtrs_index $YEARS/*.html
</code>
<p>
<img src="http://www.larc.nasa.gov/images/bottom_divider.xbm">
<p>

</ul>
<p>

<li> Put your "citations + abstracts" in <b>refer</b> format.

<p>
<ul>
<li> refer format has been around for a while.  On SunOS systems, you can <tt>man addbib</tt> for more information.
<li> An HTML version of the tag explanations is available at: <a
href="http://www.cs.indiana.edu/ucstri/bib.format">http://www.cs.indiana.edu/ucstri/bib.format</a>
<li> Sample refer citations can be viewed at: <a
href="http://techreports.larc.nasa.gov/ltrs/examples.html">http://techreports.larc.nasa.gov/ltrs/examples.html</a>
<li> A compressed tar file of all LTRS contents in refer format can be viewed at: <a
href="ftp://techreports.larc.nasa.gov/.waters/waters.tar.Z">ftp://techreports.larc.nasa.gov/.waters/waters.tar.Z</a>.  This is provided for reference only -- you do not have to do anything with these contents.
<li> There is nothing magic about refer; you can use some other format if you wish.  You'll be on your own though for adapting / creating filters to process other formats.
</ul>

<p>

<LI> There is a Perl program to process the refer citations.  This program (and its library) have binary characters in them and they must saved to disk prior to viewing them.  In other words, you must save the links without actually viewing them. A copy-n-paste will not work!!!

<p>
<ul>
<li> <a href="http://www.larc.nasa.gov/ntrs/bib">http://www.larc.nasa.gov/ntrs/bib</a>
<li> <a href="http://www.larc.nasa.gov/ntrs/accent.pl">http://www.larc.nasa.gov/ntrs/accent.pl</a>
<li> <tt>accent.pl</tt> is a library file for <tt>bib</tt> -- it must be visible to <tt>bib</tt>.  Edit the following lines of <tt>bib</tt> appropriately:
<p>
<img src="http://www.larc.nasa.gov/images/top_divider.xbm"><p>
<code>
unshift(@INC,"/ump/csb/home/mln/ltrs/bin"); <br>
require("accent.pl"); <p>
</code>
<img src="http://www.larc.nasa.gov/images/bottom_divider.xbm">
<p>

</ul>
```

```
<p>

<li> <tt>bib</tt> is very easy to use.  Here are some sample invocations:

<p>
<ul>

<LI> To take <b>many</b> refer files, and convert them to <b>many</b> .refer.html files to be used for
<tt>waisindex</tt><p>
<p>
<img src="http://www.larc.nasa.gov/images/top_divider.xbm"><p>
<code>
        bib -ha -hk *.refer
</code>
<p>
<img src="http://www.larc.nasa.gov/images/bottom_divider.xbm">
<p>

<li> To take <b>many</b> refer files and convert them to a <b>single</b> .html file <i>with abstracts</i> for browsing

<p>
<img src="http://www.larc.nasa.gov/images/top_divider.xbm"><p>
<code>
    bib -ha *.refer >> all-years-abs.html
</code>
<p>
<img src="http://www.larc.nasa.gov/images/bottom_divider.xbm">
<p>

<li> To take <b>many</b> refer files and convert them to a <b>single</b> .html file <i>without abstracts (i.e. just
citations) </i> for browsing

<p>
<img src="http://www.larc.nasa.gov/images/top_divider.xbm"><p>
<code>
    bib -h *.refer >> all-years-cit.html
</code>
<p>
<img src="http://www.larc.nasa.gov/images/bottom_divider.xbm">
<p>

</ul>

<p>

<li> The source code for NTRS is available at: <a
href="http://www.larc.nasa.gov/ntrs/ntrs.pl">http://www.larc.nasa.gov/ntrs/ntrs.pl</a>  <b>This is for your knowledge
only</b>; you do not have to install NTRS or use anything from this script to set up your technical report server.

<p>

<li> A csh script that I used to maintain LTRS is in <A href="#appb">Appendix B</a>.  It should help you automate
maintainance for your site.

<p>

<li> Your technical report server should support, at a minimum, 2 functionalities:
<dd> 1. Searching
<dd> 2. Browsing
<p>
```

```
Searching is the trickiest to implement, but is the part used most significantly in NTRS.

<li> The following may be of use to your site as well:
<p>
<ul>
<li> user feedback form: <A
href="http://techreports.larc.nasa.gov/ntrs/feedback.pl">http://techreports.larc.nasa.gov/ntrs/feedback.pl</a>
<li> abstract entry form: <a
herf="http://techreports.larc.nasa.gov/ntrs/conrtrib.pl">http://techreports.larc.nasa.gov/ntrs/conrtrib.pl</A>
<li> No promise is made about their quality, code aesthetics, or anything else. ;-)
</ul>

<p>
<LI> The e-mail list for NTRS feedback and notices is:<p>
<tt>ntrs-admin@techreports.larc.nasa.gov</tt><p>
Please e-mail <tt>m.l.nelson@larc.nasa.gov</tt> if you want on or off this list.
The current members of the list are at: <a
href="http://techreports.larc.nasa.gov/ntrs/ntrs-admin.txt">http://techreports.larc.nasa.gov/ntrs/ntrs-admin.txt</a>
<p>

<li> The following services are being worked on:
<p>
<ul>
<LI> Parallel searching in NTRS (Ming Maa, Michael Nelson)
<li> Gateways with non-WAIS databases (Ming Maa, Michael Nelson, Jeff Robinson, Alberto Accomazzi)
<li> Fielded searches (not too much interest in this of late)
<li> NTRS acting as a proxy to resolve the long URL / firewall problem (Ming Maa, Michael Nelson)
</ul>
<p>
</ul>

<p>
</ol>

<hr>

<p>
<a name="appa"></a>
<h2>Appendix A: Using freeWAIS-sf</h2>
<hr>

freeWAIS-sf does not support the <tt>waisindex ... -t html ... </tt> construct.  Instead, it has the concept of a "format" file,
where the user builds the description of how the files should be indexed.  It is useful for all types of files, not just HTML
files.  This format file is also how fielded searches would be added if you are ready to take that step.

<p>

For the example given below, it assumes that your HTML files are following the correct HTML 2.0 specifications and
have the following tags (white space and case are not important):

<p>
<hr>

<pre>
&ltHTML&gt
&ltHEAD&gt
&ltTITLE&gt  ...   &ltTITLE&gt
&lt/HEAD&gt

&ltBODY&gt
```

```
stuff....

&lt/BODY&gt
&lt/HTML&gt
</pre>
<hr>
<p>

<tt>waisindex</tt> would then be invoked like:

<p>
<img src="http://www.larc.nasa.gov/images/top_divider.xbm"><p>
<code>
    waisindex -pos -export -T HTML -t fields -d xtrs_index $YEARS/*.html
</code>
<p>
<img src="http://www.larc.nasa.gov/images/bottom_divider.xbm">
<p>

This assumes the existance of a file <tt>xtrs_index.fmt</tt>.  This format file would look something like:

<p>
<hr>
<pre>

    &ltrecord-end&gt /(&lt.BODY&gt|&lt.HTML&gt)/

    &ltlayout&gt
    &ltheadline&gt /&ltTITLE&gt/ /&ltVTITLE&gt/ 80 /&ltTITLE&gt *./
    &ltend&gt

    &ltfield&gt /&ltHTML&gt/
    stemming TEXT GLOBAL
    &ltend&gt /&lt.BODY&gt/

</pre>
<hr>

<p>

You will need a separate format (.fmt) file for each database you index.
This file tells <tt>waisindex</tt> to use the string between the &ltTITLE&gt tags as the string for the headline.  The
headline is the list of "titles" that one sees immediately upon doing a WAIS search.  The "80" in this line indicates
to only use the first 80 characters. The format file also tells <tt> waisindex</tt> to index everything between the
&ltHTML&gt tag and either one of the tags: &lt/HTML&gt or &lt/BODY&gt.

<p>
<hr>
<hr>
<hr>

<p>
<a name="appb"></a>
<h2>Appendix B: A Sample Script for xTRS Maintainenance</h2>
<hr>

<pre>
#!/bin/csh -x
#  Update abstract lists, WAIS indexes
#
```

```
#  Michael Nelson                          m.l.nelson@larc.nasa.gov
#
#
# usage: ltrs-update year [years...]
#
set REFER_ROOT=/ump/csb/home/mln/reports/refer
set WAIS_ROOT=/usr/local/wais/wais-sources
set WAIS_TMP=$WAIS_ROOT/wais_tmp
set LTRS_HTML_ROOT=/ump/csb/home/mln/http/ltrs

#
# update each year
#

foreach year ($argv[*])
     cd $REFER_ROOT/$year
     bib -ha -hk *.refer
     cd $LTRS_HTML_ROOT
     bib -ha ~/reports/refer/$year/*.refer > new.19$year.html && mv new.19$year.html 19$year.html
     bib -h ~/reports/refer/$year/*.refer > new.19$year-cit.html && mv new.19$year-cit.html 19$year-cit.html
end

#
# update total lists
#

cd $LTRS_HTML_ROOT

bib -ha ~/reports/refer/??/*.refer > new.abs.html && mv new.abs.html abs.html
bib -h ~/reports/refer/??/*.refer > new.cit.html && mv new.cit.html cit.html

#
# update WAIS indexes
#
# builds the indexes in a temporary directory, then copies them overtop of
# the existing indexes to minimize service interruption
#
# does not try to do incremental builds

cd $WAIS_TMP
/ump/csb/home/mln//ltrs/bin/waisindex -pos -export -t html -d ltrs_index ~/reports/refer/??/*.html
mv ltrs_index.* ..

#
# final updates
#
# (generates the waters tar file)

cd
(cd ~/reports/refer ; make-waters )

</pre>

<hr>
<p>
<hr>
<p>
<A HREF = "http://www.larc.nasa.gov/larc.html"> <IMG SRC="http://www.larc.nasa.gov/images/75small.gif">LaRC
Home Page </A>
<A HREF = "http://www.nasa.gov/"> <IMG SRC = "http://www.larc.nasa.gov/images/NASAlogosmall.gif">NASA Home
```

```
Page </A>
<p>
<hr>
<address>Last Updated
Mon Jul 17 16:35:47 EDT 1995
</address>
<address><A HREF="http://www.larc.nasa.gov/~mln/">Michael Nelson (m.l.nelson@larc.nasa.gov)</address></A>

</body>
</html>
```

REPORT DOCUMENTATION PAGE

Form Approved OMB No 0704-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	May 1996	Technical Memorandum

4. TITLE AND SUBTITLE
NASAwide Electronic Publishing System -- Prototype STI Electronic Document Distribution, Stage 4 Evaluation Report
Part II - Appendices

5. FUNDING NUMBERS
Code JT

6. AUTHOR(S)
Richard C. Tuey et al.

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS (ES)
National Aeronautics and Space Administration
Washington, DC 20546-0001

With Field Installations and Jet Propulsion Laboratory

8. PEFORMING ORGANIZATION REPORT NUMBER
96B00019

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS (ES)
National Aeronautics and Space Administration
Washington, DC 20546-0001

10. SPONSORING / MONITORING AGENCY REPORT NUMBER
NASA TM-104630, Part II

11. SUPPLEMENTARY NOTES
Tuey: Ames Research Center, Information Services Division, Code IS, Moffett Field, California.

12a. DISTRIBUTION / AVAILABILITY STATEMENT
Unclassified - Unlimited
Subject Category 82

Availability: NASA CASI (301) 621-0390.

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

This evaluation report contains an introduction, seven chapters, and five appendices. The Introduction describes the purpose, conceptual frame3work, functional description, and technical report server of the STI Electronic Document Distribution (EDD) project. Chapter 1 documents the results of the prototype STI EDD in actual operation. Chapter 2 documents each NASA center's post processing publication processes. Chapter 3 documents each center's STI software, hardware, and communications configurations. Chapter 7 documents STI EDD policy, practices, and procedures. The appendices, which are contained in Part II of this document, consist of A) STI EDD Project Plan, B) Team members, C) Phasing Schedules, D) Accessing On-line Reports, and E) Creating an HTML File and Setting Up an xTRS. In summary, Stage 4 of the NASAwide Electronic Publishing System is the final phase of its implementation through the prototyping and gradual integration of each NASA center's electronic printing systems, desktop publishing systems, and technical report servers to be able to provide to NASA's engineers, researchers, scientists, and external users the widest practicable and appropriate dissemination of information concerning its activities and the result thereof to their work stations.

14. SUBJECT TERMS
Electronic publishing; Duplicating; Cost analysis; FTP; Network duplicating; Cost benefit analysis; Return on investment; Justification

15. NUMBER OF PAGES
52

16. PRICE CODE
A04

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	UL