

QUERY SCENARIOS FOR INTERDISCIPLINARY SCIENTIST
INTERFACING WITH EOSDIS, VERSION 0
SERIES II

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1. INTRODUCTION

EOSDIS (Earth Observing System's Data Information System) is obligated to provide usable scientific information and data to the geophysical, ecological, biological and interdisciplinary communities. An assessment of EOSDIS's success will be how well the data information system guides the interdisciplinary user, with their characteristic dialects, thought patterns and unique decision criteria, to quickly find, browse and order data they need to conduct their research.

NASA is funding a prototyping exercise involving 16 interdisciplinary scientists, two software engineers and one librarian from the University of Virginia. The results of this study are provided in terms of several real data query scenarios that reflects the broad perspective of the interdisciplinary user.

2. EOSDIS VERSION 0

The success of the Earth Observing System (EOS) will largely depend upon its Data and Information System (EOSDIS). EOSDIS must be able to link EOS data sets with existing data sets (satellite, aircraft, in situ, etc...) and encourage both multidisciplinary and interdisciplinary science. The development of EOSDIS will be an evolutionary process and will involve scientist inputs in it's creation. The first phase is EOSDIS Version 0, a working prototype (McDonald 1993). EOSDIS Version 0 is to provide advance services to the scientific community through improved access to existing data sets.

The EOSDIS Version 0 is a collaboration between NASA's Information Management System (IMS) and the Distributed Active Archive Center (DAAC) software development groups. In 1991, the first release of EOSDIS Version 0 was an Inventory Interoperability Proof of Concept. It demonstrated that EOSDIS Version 0 could access distributed inventories via a concurrent search and provide scientific metadata

to the user. The 1992 release of EOSDIS Version 0 demonstrated improved functionality in Inventory and Results, Directory Access, Data Representation through integrated and local FTP browse and Data product request (online and offline). EOSDIS Version 0 has been made available to a limited scientific user community for evaluation. This evaluation will help refine the functional requirements of EOSDIS Version 0 and Version 1.

3. DESCRIPTION OF THE PROTOTYPING EXERCISES

The first series of prototyping exercises were conducted in 1990 by the University of Virginia, Simpson Weather Associates and NASA/GSFC. These evaluations made significant contributions to the user interfacing for NCDS and to specifications of EOSDIS (Emmitt, Wood and Morris 1990). The Second series of prototyping exercises were designed to provide user input to the design and implementation of EOSDIS Version 0 by having a group of non-vested interdisciplinary scientist construct real science scenarios and exercise the system to search, browse and order data.

Interdisciplinary researchers were asked to develop real research science scenarios as shown in Table 1. As part of the cooperative study, the University of Virginia and Simpson Weather Associates hosted a prototyping exercise workshop with the EOSDIS Version 0 IMS staff. Each researcher made a presentation of their science scenarios to the IMS. The IMS demonstrated the 1992 release to the researchers. After the presentations, each researcher was given an EOSDIS V0 tutorial guide and was asked to go with an IMS personnel to invoked the V0 on their computer.

The primary purpose of these activities was to expose and define weaknesses in the EOSDIS architecture and functionality as related to the interdisciplinary user. Each participating researcher provided detailed answers to questions generated by the study management. The questions (taken from the 1993 Prototyping Workshop evaluations guidelines) were:

1. Where you able to determine whether the data you wanted existed in EOSDIS, and which DAAC had it?
2. Were you able to find the criteria that you needed for identifying the appropriate data for your study?
3. Were you able to use the Graphical (GUI only) search and results facility for geographic information?
4. Were you able to access the Directory Information about the data sets of interest?
5. Were you able to use the Local (FTP) and Integrated (GUI only) browse functions?
6. Did the Browse functions meet your data visualization needs for determining whether or not to order a piece of data?

7. Were you able to Request data?
8. Was the computer performance acceptable?
9. Did you find the on-line system easy to use? Intuitive?
10. Was the on-line documentation helpful?

Each prototyping participant was required to deliver an oral report every mid month and a written report at the end of each month throughout the contract. All comments were compiled into a final report. The researchers' feedback and comments were given to the EOSDIS Version 0 staff as soon as possible to insure input into the current development of the 1993 EOSDIS version 0 and future EOSDIS designs.

TABLE 1

RESEARCH TOPIC	RESEARCHER
North Atlantic Ocean Chemical Climate	Moody
Gypsy Moths in the Blue Ridge Mts.	French/Viles
Librarian	Sharretts
Toxic Algae Blooms and Shellfish	Calvin
Coastal Oceanography in the Pamlico-Albemarle Sound	Goodell/Bruce
Validate a Continential Ecophysiological Shugart/Smith Model for African Leaves	
Nocturnal Temperatures with Snow Cover Michaels/Stenger/ in Virginia	Knappenberger/ Wood
Cirrus Climatologies	Emmitt/Walker
Monthly Characteristics of Estuarary and Coastal Zone Environments	Hayden/Wood
Satellite Estimated Rainfall and Nocturnal Temperatures for Southern Africa.	Garstang/ Dieudonne

4. RESULTS

The results of the query scenario exercises are summed up in table 2 for ten groups of prototyping participants related to the criteria questionnaire. The criteria questions are defined as follows:

- Criteria 1 - Was the Interface Intuitive?
- Criteria 2 - Did you understand how to use the screens?
- Criteria 3 - Did you understand how to get to/use the menu bars?
- Criteria 4 - Did you understand the options on the menus?
- Criteria 5 - Did the menus lead you to what you expected?
- Criteria 6 - Did you understand how to use the query tool?
- Criteria 7 - Did you find the Services/Functions you expected?
- Criteria 8 - Did you find the system easy to navigate?
- Criteria 9 - Did you find the Mail services (eg. E-MAIL) to work efficiently?
- Criteria 10 - Did you find the Computer connections (eg. to/from IMS/DAACs) to work efficiently?
- Criteria 11 - Did you find the File Transfer (eg. FTP data order or Browse) to work efficiently?
- Criteria 12 - Was the overall system performance adequate?
- Criteria 13 - Did the software work efficiently?
- Criteria 14 - Was the software internally consistent?
- Criteria 15 - Was there adequate system integrity/continuity?
- Criteria 16 - Was the Directory summaries easy to find?
- Criteria 17 - Did the Directory summaries give an adequate synopsis of the data set in question?
- Criteria 18 - Were you provided inventory information needed to distinguish between different granules of data?
- Criteria 19 - Did you understand the content of the fields (attributes) that were listed for each data set/granule?
- Criteria 20 - Were you able to easily navigate through the inventory results information?
- Criteria 21 - Did you find the Local FTP Browse function helpful?
- Criteria 22 - Did you find the Local FTP Browse function intuitive to use?
- Criteria 23 - Did you find the Integrated (GUI only) Browse Function helpful?
- Criteria 24 - Did you find the Integrated (GUI only) Browse Function intuitive to use?
- Criteria 25 - Did you find the Coverage Map (GUI only) helpful?
- Criteria 26 - Did you find the Coverage Map (GUI only) intuitive to use?
- Criteria 27 - Were you able to successfully Request data?
- Criteria 28 - Was the Product Request Function Intuitive?
- Criteria 29 - Were you able to successfully receive data via FTP?
- Criteria 30 - Did you get a response from the DAAC Operations staff for request of off-line data?

Table 2. EOSDIS Version 0 Prototyping Criteria Responses

	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	AVG
CRIT01	2	2	2	2	3	2	2	3	2	2	2.20
CRIT02	2	2	2	2	3	3	2	NC	2	2	2.22
CRIT03	2	3	3	3	3	3	2	NC	3	3	2.78
CRIT04	2	2	2	2	3	2	2	NC	2	3	2.22
CRIT05	2	2	2	2	2	2	2	2	2	3	2.10
CRIT06	NC	2	3	2	3	1	2	2	1	1	1.89
CRIT07	2	NC	3	1	3	2	3	1	2	2	2.11
CRIT08	3	2	2	1	2	1	2	3	2	3	2.10
CRIT09	NC	1	2	2	3	3	3	1	2	NC	2.13
CRIT10	3	2	2	2	3	3	2	1	2	2	2.10
CRIT11	2	2	2	2	3	2	NC	1	NC	3	2.13
CRIT12	2	2	2	2	3	2	3	3	2	2	2.30
CRIT13	2	2	2	2	3	2	2	2	2	2	2.10
CRIT14	1	NC	2	1	2	NC	2	2	1	2	1.63
CRIT15	1	1	3	2	3	1	2	NC	1	1	1.89
CRIT16	3	1	3	3	3	3	3	2	3	3	2.70
CRIT17	3	2	3	1	3	3	3	3	3	3	2.70
CRIT18	2	3	2	1	3	1	3	3	3	3	2.40
CRIT19	3	2	2	1	1	1	1	3	1	3	1.80
CRIT20	2	3	3	2	3	1	2	3	1	3	2.30
CRIT21	NC	NC	3	1	3	NC	1	NC	NC	1	1.80
CRIT22	NC	NC	2	1	2	NC	1	NC	NC	1	1.20
CRIT23	3	3	3	NC	3	NC	1	3	NC	3	2.71
CRIT24	3	3	3	NC	3	NC	1	3	NC	3	2.71
CRIT25	3	3	3	NC	3	NC	3	3	NC	3	3.00
CRIT26	2	3	2	NC	3	NC	3	1	NC	3	2.43
CRIT27	3	NC	3	2	NC	3	1	3	2	NC	2.43
CRIT28	1	NC	3	1	NC	3	1	3	1	NC	1.86
CRIT29	1	NC	N2	NC	2	3	1	NC	NC	3	2.00
CRIT30	3	NC	3	1	NC	3	1	NC	2	NC	2.17

NC - NO COMMENT

1 - NO

2 - SOME

3 - YES

The responses of each researcher have been ranked from 1 (negative response) to 3 (favorable response). We can conclude from the averages under each criteria column that slow system response, inadequate browse capabilities and products (integrated and local FTP), hardware incompatibilities were the greatest difficulties. Only one scientist was able to find data, but was unable to make a successful order. From the number of no comments (NC) in the order data criteria questions, we conclude that EOSDIS version 0 needs to continue development and evaluation with an emphasis on data ordering and DAAC user services.

The following is a summary of common user comments: Many user's had hardware compatibility problems at the beginning of the exercises. Several users could not log into the system without assistance. Terminal emulation was a problem with the PCs (IBM and Apples) and one workstation had an old version of WINDOWS that was not compatible with EOSDIS V0. Many users thought the alphanumeric EOSDIS access should be possible with a modem. All user's commented on the lack of on-line help. Several users thought the terminology was too technical and confusing. All commented that they had problems with DAACs being up. The valid lists need to be refined.

5. ACKNOWLEDGEMENTS

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6. REFERENCES

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