Earth Science Information System (ESIS)

Earth Science Information System (ESIS)

Historical Background

The Earth Science Information System (ESIS) was developed in 1981 by the U.S. Geological Survey's Office of the Data Administrator. **ESIS** serves as a comprehensive data management facility designed to support the coordination, integration, and standardization of scientific, technical, and bibliographic data of the U.S. Geological Survey (USGS). **ESIS** provides, through an online interactive computer system, referral to information about USGS data bases, data elements which are fields in the records of data bases, and systems. The data bases contain information about many subjects from several scientific disciplines such as: geology, geophysics, geochemistry, hydrology, cartography, oceanography, geography, minerals exploration and conservation, and satellite data sensing.
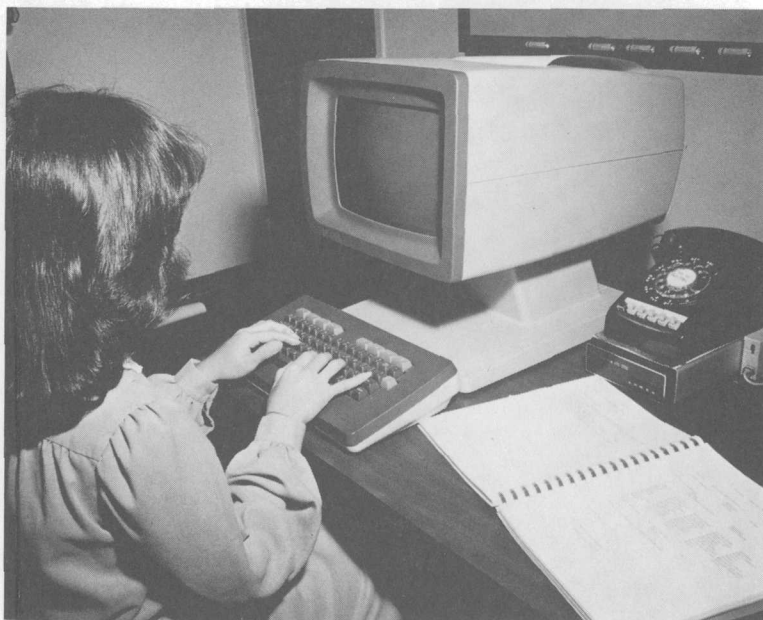
Characteristics

An important characteristic of **ESIS** is ease of use. The user is able to select functions to perform by means of menus listing selection options and is guided step-by-step by prompting, instructions, and detailed explanations. Preformated reports simplify retrieval specification. Security is assured by limitations of access and updating privileges through user registration and password assignment. Additional special features allow the creation of key words and phrases in data text as an aid to indexing and to allow for message communications via the system between the user and the Data Administrator. Most of the system's features may be used without any programming knowledge.

The system contains an inventory of data bases, a data element dictionary, and an inventory of automated systems:

Data Base Inventory (DBI), first published as USGS Circular 817, describes USGS data bases in terms of these characteristics:

Data Base Name and Acronym	Data Base Status
Data Base Type	Users
System Name and Acronym	Availability
Division	Type of Access Method
Contact Person, Address, Phone	Output Media
Subject Coverage	Storage Media
Keywords	Number of Records
Geographic Coverage	Bytes Per Record
Geographic Area	Predicted Growth Rate
Spatial Data Type	Computer Type
Coordinate System	Computer Location
Data Source	Languages
Data Structure	Data Base Management System
Begin Time Span	Data Base Description
End Time Span	Documentation
	Date Submitted
	Comments

Using the system is easy.

Data Element Dictionary (DED) describes every data element in each data base in terms of these attributes:

Data Element Name	Relationship(s) to other
Synonym(s)	Data Element(s)
Division or Office	Record(s)
Definition/Description	File(s)
Unit(s) of Measure	Data Base
Cobol Data Name(s)	System Name/Acronym
PL/1 Data Name	Major Software
Identifier(s)	Program(s)
Fortran Symbol Name(s)	Accuracy
Assembler Language/	Data Updating Period
Symbol Name(s)	Password Protection
DBMS Element Name(s)	Level
DBMS Element Number(s)	Security Classification
Length	of Data Element
Detailed Picture	Additional Security
Character Type	Provided
Acceptable Values	Comments
Data Standards Followed	Date Submitted

Inventory of Automated Systems (IAS) describes those systems which access USGS data bases in these terms:

System Name	Type of Access Method
Acronym	Frequency of Data Input
Division	Frequency of Data
Application Category	Output
Data Base Accessed by	Computer Type
System	Computer Location
Contact Person, Address,	Memory Required
Phone	(K Bytes)
Description of System	Peripheral Devices
Date Implemented	Operating System
Date of Last Major Modi-	Vendor or Commercially
fication	Developed Software or
Expected Life of Appli-	DBMS
cation	USGS Software
Other Systems Used in	Language(s)
Conjunction with this	Input Media
System	Output Media
Application Status	Input Location
Estimated Annual Operat-	System Security
ing Costs	Comments
Users	Date Submitted
Availability for Use/Access	

Functions of ESIS

ESIS offers several capabilities supported by menus for option selection and step-by-step instructions to initiate these functions:

Online Data Entry allows terminal entry of data base, data element, and system data in full screen or line-by-line teletype (TTY) mode.

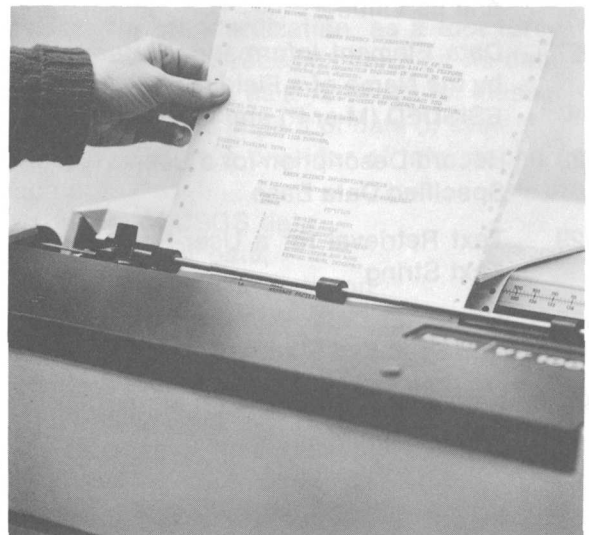**Online Data Update** allows add, modify, and delete capability by terminal.

Batch Data Entry is used for high volume data entry in batch mode.

Standard Queries have access to a series of preformated outputs initiated by prompted parameters.

Ad Hoc Queries is a capability for development of unique queries using the Model 204 Query Language which provides full Boolean capability.

Message Facility is a means of communicating between user and the Data Administrator through **ESIS**.

Keyword Reference Facility automatically indexes several text fields into key or subject words and phrases for retrieval purposes and reference.

Authorization and Move is a tool of the Data Administrator for filing data attributes which have been officially sanctioned by the standardization process of the USGS.

The Standardization Process

ESIS serves as a valuable reference for the standardization of data element names, definitions, and the particular codes or characters used to represent data.

The Data Administrator, concerned with the compatability of data and systems, directs the coordination of the standards ratification process at the USGS, which evaluates and selects names, definitions, and codes for official use by the earth-science community.

All data elements initially entering **ESIS** automatically become "proposed" candidates for standardization. After standardization, the Data Administrator uses an automated Authorization and Move function to create "master" names, descriptions, synonyms, lengths, detailed pictures, and character types.

The Hardware/Software Environment

ESIS is located on the AMDAHL V7 at the USGS National Center in Reston, Va. It can be accessed by any teletype (TTY) compatible terminal and can be updated, in a full screen mode, through a Datagraphix 132B terminal.

Software used by **ESIS** is provided by the Model 204 Data Base Management System developed by the Computer Corporation of America.

ESIS Users—Four Categories

In order to differentiate between users granted authority to change values and to perform other systems functions, a hierarchy of user types was established. The hierarchy, in ascending order, is listed below:

(1) **General User** may request a standard report or query, use the message facility and perform ad hoc queries.
(2) **Contact Person** has the privileges of a general user and may enter and update data for which this person is responsible.
(3) **Division Contact** has the privileges of a contact person but may enter and update data for all of the systems, data bases, and data elements of an entire Division or Office.
(4) **Data Administrator** possesses all system capabilities including Authorization and Move.

How To Be Registered as an ESIS User

Anyone may become an authorized ESIS user simply by contacting the Office of the Data Administrator at the address listed on the back page of this publication.

ESIS Has Many Uses

Among its many uses, **ESIS** can be used as a guide for standardization, as a tool for system design or redesign through its data dictionary aspects, as a yardstick for measuring the economic impact of data or system changes, and as a provider of information such as:
- Users of USGS data,
- Sources of data,
- Available documentation,
- Computer hardware and software resources,
- Data that needs standardization or redesign, and
- Volumes of data available.

The Following Queries Are Currently Available

Query Number	Description
Q1	Data Base Names and Descriptions for a User-Specified Division
Q2	Data Element Information for a User-Specified Data Base Name and Data Element Name or Synonym
Q3	Automated System Information Selected by the Name of a Field in the ESISIAS and its Value
Q4	Data Element Information for a User-Specified Data Element Name or Synonym
Q5	Data Base and Data Element Information for a User-Specified Data Base Name
Q6	Data Base Name and Division by the Name of a Field in the ESISDBI and its Value
Q7	Data Base Identification for a User-Specified System Name from the ESISDBI
Q8	Data Element Names and Descriptions for a User-Specified Data Base Name or Acronym
Q9	Computer Program Identification for a User-Specified Data Base Name and Data Element Name
Q10	Record Description for a User-Specified Record Name and Data Base Name or Acronym
Q11	Data Base Counts for User-Specified Data Base Type and Division
Q12	Keyword Index Search for Specific Keyword/Phrase
Q13	Keyword Index Search for Specified Alphabetic Range
Q14	Keyword Index Search for Specified String
Q15	Names of Systems, Data Bases, or Data Elements in **ESIS**

The large volumes of ESIS data are securely protected.

Q16	Data Element and DB Names for Specified Alphabetic Range
Q17	Contents of any one Field in any one File
Q18	Data Element and Data Base Names with Security Level
Q19	Standardized Data Element Information
Q20	Original Data Element Name(s) of Standard Elements
Q21	Boolean Search of Keywords/ Phrases
Q22	Names of Systems or Data Bases on Specified Computer Type
Q23	Names of Systems or Data Bases at a Specified Location
Q24	Names of Data Bases Having a Specified Data Structure
Q25	Names of Data Bases and Their Contact Persons Using a Specified DBMS
Q26	Data Base Information Selected by the Name of a Field in the ESISDBI and its Value
Q27	Data Element Information Selected by the Name of a Field in the ESISDED (M or P) and its Value
Q28	Record Description for a User-Specified Data Base
Q29	Text Retrieval for a User-Specified Text String
Q30	Names of Data Elements Adhering to a Specified Standard
Q31	Names of Data Bases on More than one Computer

Keyword Reference Facility

Much of the data in the system is in free or text form. This is automatically scanned and may be designated as *key* words or two- or three-word key phrases. The fields and records which contain these, and other closely related words, can then be easily retrieved and used as a reference to other information.

Documentation

These publications describe **ESIS** in greater detail:
- User's Guide,
- Detailed Design Specifications, and
- Systems Operations Guide.

They are available from:
Data Administrator
U.S. Geological Survey
115 National Center
Reston, VA 22092
Telephone: (703) 860-6086
FTS: 928-6086

Gathering data to be referenced by ESIS.