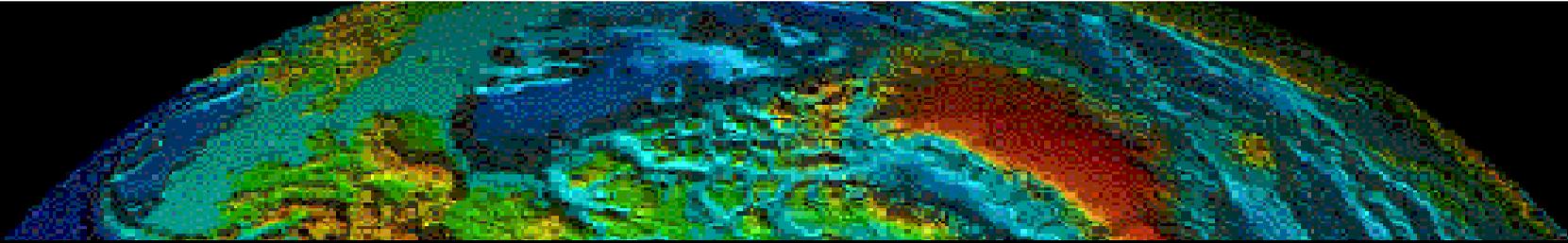
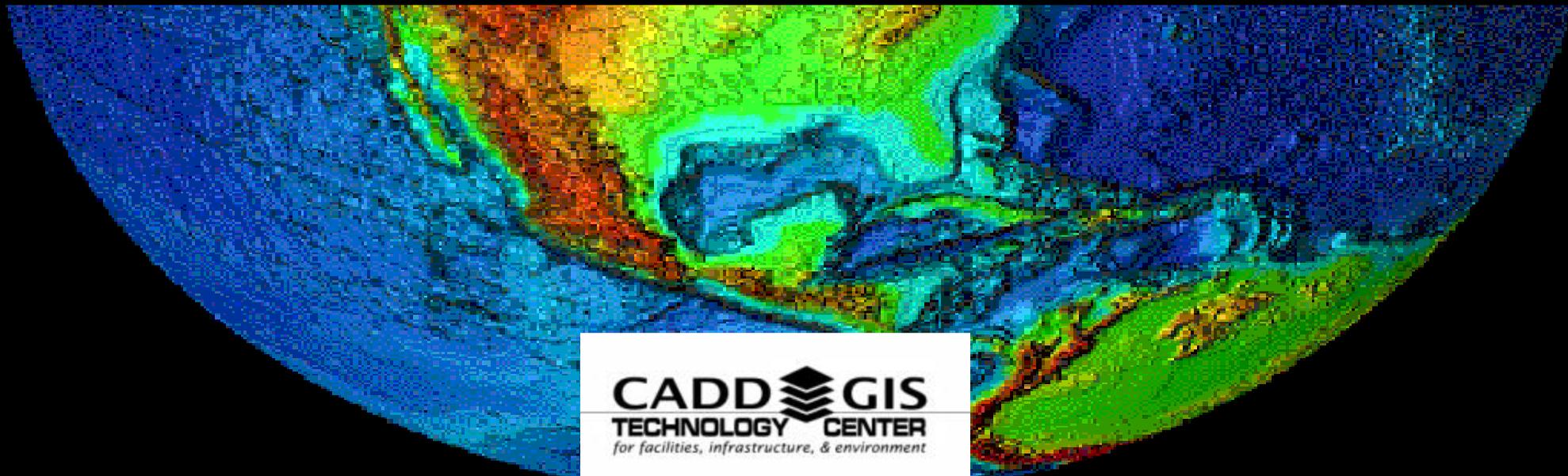


Center's Internet Web Page URL Address: <http://tsc.wes.army.mil>



**Spatial Data Standards (SDSFIE)
for facilities, infrastructure, and environment
and
Facility Management Standards (FMSFIE)
for facilities, infrastructure, and environment**

TOOLBOX



CADD GIS
TECHNOLOGY CENTER
for facilities, infrastructure, & environment

CADD/GIS Technology

Center

for facilities, infrastructure, and environment



- Originally established as the “Tri-Service CADD/GIS Technology Center” in 1992 at the Army Waterways Experiment Station, Information Technology Laboratory, Vicksburg, Mississippi .
- Established by the Army (including Army Corps of Engineers), Navy, and Air Force (i.e, Tri-Services).
- Center’s name changed to “CADD/GIS Technology Center for facilities, infrastructure, and environment” in July, 1999 to reflect a broader mission.
- CADD – Computer Aided Design & Drafting
- GIS – Geographic Information System

About the Center

- **Mission Statement**

CADD

Establish a multi-agency vehicle to coordinate facilities, infrastructure and environmental use of Computer Aided Design and Drafting and Geographic Information Systems (CADD/GIS) activities within the Department of Defense (DOD) and with other participating governmental (federal, state and local) agencies, and the private sector. This includes setting standards, promoting system integration, supporting centralized acquisition, and providing assistance for the installation, training, operation, and maintenance of CADD/GIS and facilities management (FM) systems.

GIS

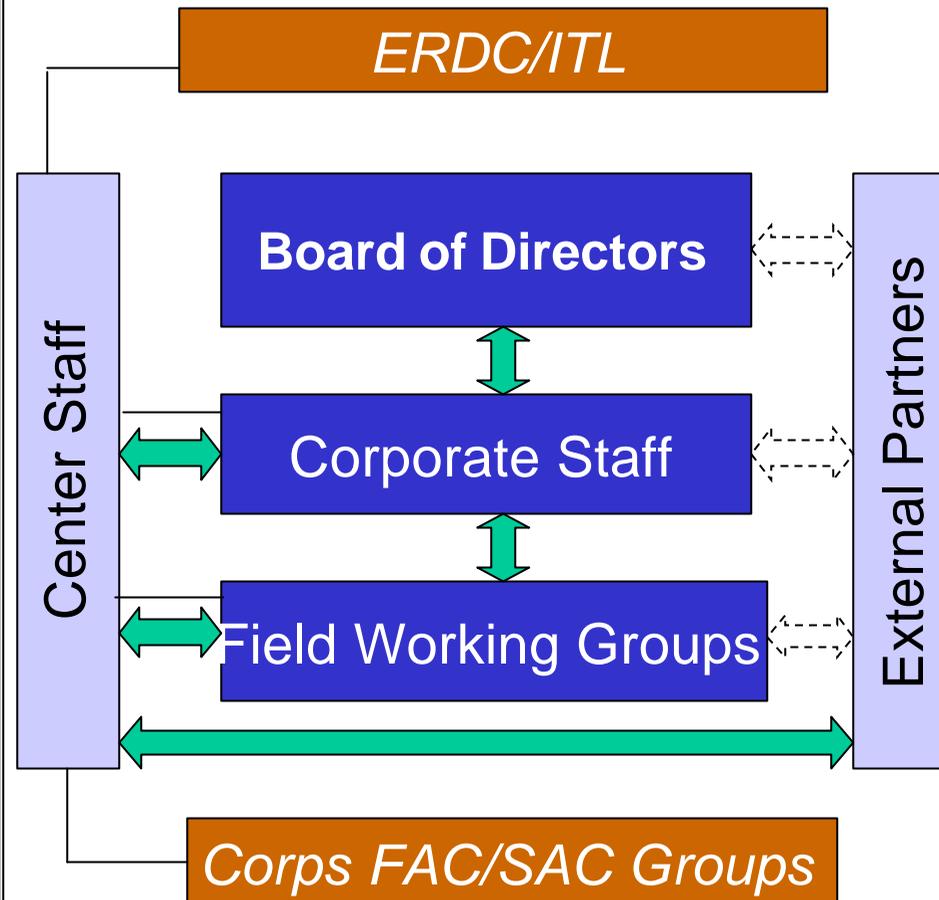
The *New* CADD/GIS Technology Center

Federal Partners:

- USACE
 (Military Programs)
 (Civil Works)
 (Research and Development)
- Naval Facilities Command
- Air Force Civil Engineer
- Marine Corps
- General Services Admin.
- NASA
- Coast Guard
- Department of State
- Defense Logistics Command
- FAA

Federal Associates:

- Architect of the Capitol
- Army Reserve
- National Guard
- Veteran;s Affairs
- EPA
- Department of Interior
- DOE



Industry Associates:

- ESRI
- Autodesk
- Bentley
- Intergaph

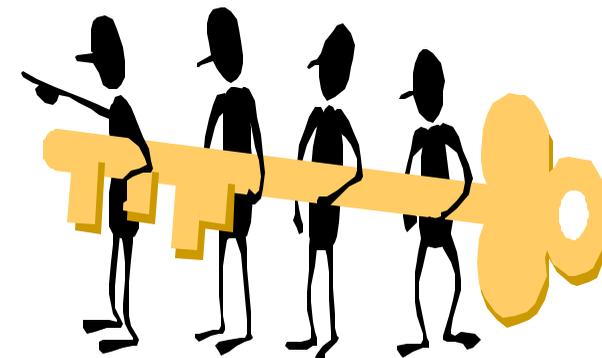
Societies/Organizations

- NIBS
- CSI
- AIA
- IFMA
- ISO
- ANSI
- ASTM
- ACS
- Nature Conservancy
- OGRIP
- PaMAGIC
- National Assoc.. of Counties

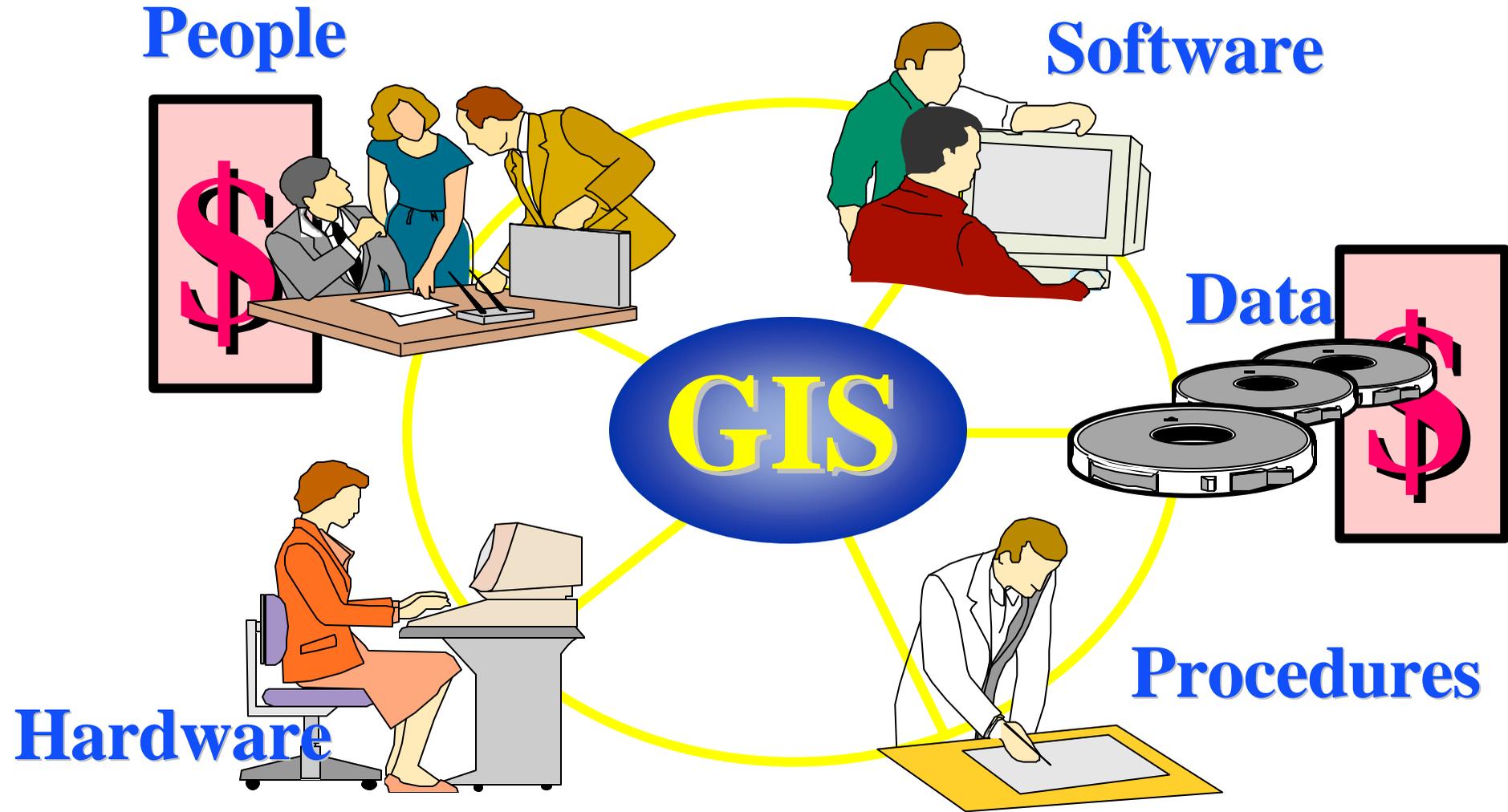
The Center's Approach to Standards

- **Current Efforts**

- Architect-Engineer (A-E) Deliverables Guidelines
 - A/E/C Guidelines
 - GIS/Spatial Data Guidelines
- Architectural/Engineering/Construction (A/E/C) CADD Standard
- Spatial Data Standard (SDSFIE) (GIS)
- Facility Management Standard (FMSFIE) (GIS & CADD)
- Electronic Bid Solicitations (EBS)
- CADD & GIS Object Standards



Geographic Information System



Spatial Data Standard for facilities, infrastructure, & environment (SDSFIE)

-
- CADD/GIS Technology Center Project No. 96.013.
- Website - <http://tsc.wes.army.mil/products/TSSDS-TSFMS/tssds/html/>
- Called Tri-Service Spatial Data Standards (TSSDS) prior to July 1999. Acronym SDS was used from July 1999 until January 2001. Acronym changed to SDSFIE in January 2001.

Facility Management Standard for facilities, infrastructure, & environment (FMSFIE) -

- CADD/GIS Technology Center Project No. 96.015.
- Website - <http://tsc.wes.army.mil/products/tssds-tsfmts/fms/fmsprods.asp>
- Called Tri-Service Facility Management Standards (TSFMS) prior to July 1999. Acronym FMS was used from July 1999 until January 2001. Acronym changed to FMSFIE in January 2001.

96.013 – Spatial Data Standard (SDSFIE)

Scope: Development, improvement, and testing of Geographic Information System (GIS) Standard, called Spatial Data Standard for facilities, infrastructure, & environment (SDSFIE).

Objective: Provide a common non-proprietary data format for GIS development, thereby reducing costs and providing a vehicle for sharing GIS data sets among federal partners, commercial/private concerns, and government installations.

Products: (1) GIS data standard, (2) Interactive software tools, (3) Implementation guidance and technical reports, (4) Digital symbol sets, (5) Distribution via CD-ROM and Internet download, (6) Internet web site, (7) Workshops, and (8) Limited Customer assistance.



Spatial Data Standard (SDSFIE)

for facilities, infrastructure, & environment

- Provides a standard graphic and nongraphic (database) format and structure for GIS implementations.
- Provides a “nonproprietary” standard designed for use with commercially available “off-the-shelf” GIS and relational database software.
- Provides a GIS implementation schema for approved FGDC geospatial related data standards, and appropriate approved DISA data elements.
- Provides a grouping of geographically referenced (geospatial) features (i.e., features which can be depicted graphically on a map at their geographic location (coordinate). Each geospatial feature has an “attached” Attribute Table containing pertinent data about the geospatial feature.

96.015 – Facility Management Standard (FMSFIE)

Scope: Development and testing of a standard for life cycle Facility Management (FM) implementations, called Facility Management Standard for facilities, infrastructure, & environment (FMSFIE).

Objective: Provide a common nonproprietary format for the collection and management of FM data thereby reducing costs and allowing for the sharing of data sets among federal partners, commercial/private concerns, and government installations.

Products: (1) FM data standard, (2) Interactive software tools, (3) Implementation guidance and technical reports, (4) distribution via CD-ROM and Internet download, (5) Internet web site, and (6) Customer assistance.



Facility Management Standard (FMSFIE)



for facilities, infrastructure, & environment

- Provides a standard database format and structure for “business” and event data (e.g., inspections, repairs) related to SDSFIE geospatial features and/or A/E/C CADD objects, specifically for CADD/GIS Based implementations at Air Force, Army, Navy, & Marine Corps installations and Army Corps of Engineers Civil Works activities. Also provides a CADD/GIS Based FM standard for use by other Federal, State, and Local Government organizations, public utilities; and private industry.
- Provides a “nonproprietary” standard designed for use with commercially available “off-the-shelf” CADD, GIS, FM, and relational database software.
- Provides a grouping of related attribute tables containing “business and event data.
- The first FMSFIE release was included with the TSSDS/TSFMS Release 1.80, which was published on CD-ROM in February 1999.
- The FMSFIE will migrate to a Transactional Data Model in the Future. Development of the Transactional FMSFIE Data Model began in FY 2001.

Spatial Data Standards (SDSFIE) & Facility Management Standards (FMSFIE) - Development History

Spatial Data Standards / Facility Management Standards

Spatial Data Standards for facilities, infrastructure, and environment (SDSFIE) (formerly called Tri-Service Spatial Data Standards (TSSDS) and Spatial Data Standards (SDS)) and Facility Management Standards for facilities, infrastructure, and environment (FMSFIE) (formerly called Tri-Service Facility Management Standards (TSFMS) and Facility Management Standards (FMS)).

PURPOSE

- ◆ Provide a standard for GIS and facility management (CADD and GIS) implementations at Department of Defense installations, Army Corps of Engineers Civil Works activities, and other Government organizations.
- ◆ Provide a nonproprietary standard designed for use with commercially available, off-the-shelf CADD, GIS, and relational database software.
- ◆ Provide a GIS implementation schema for approved Federal Geographic Data Committee Data Standards.

CD-ROM CONTENTS

- ◆ Windows-based SDSFIE/FMSFIE Applications (95, 98, NT, and 2000) Release 2.00 and Tutorial (Installs with SDS/FMS Release 2.00 Installation Program). Applications include the Browser, SQL Generator, Filter Maker, Filter Eraser, Geomedia Builder, Access Builder, and Access Data Creator.
- ◆ SDSFIE Symbol Sets for MicroStation, AutoCad, ArcInfo, and ArcView. (See ArcInfoSym.200, AutoCadSym.200, ArcViewSym.200, and MicroStaSym.200 directories).
- ◆ SDSFIE/FMSFIE Release 2.00 IDEF Models (.pdf and .er1 digital format). (See Models.200 directory.)
- ◆ Technical guidance and documentation. See Guidance and Instructions Directories.
- ◆ GPS Tutorial (Compliments of Patuxent River Naval Air Station, Maryland). See GPS Tutorial directory.

Facilities • Infrastructure • Environment

Important contributions have been made by many past and present Department of Defense, other Federal government, State government, local government (city/county), and contractor personnel. All deserve our thanks and appreciation for their contributions to the SDSFIE and FMSFIE development effort. Of special note were the dedication and support of all past and present CADD/GIS Technology Center organizations, including Board of Directors (formerly Executive Steering Group), Corporate Staff (formerly Executive Working Group and Field Technical Advisory Group), Field User Groups (formerly Field Working Groups), and contributing subject matter experts. Special appreciation goes to all reviewers and GIS technical experts who provided invaluable comments and recommendations on this and past releases.

U.S. Army Corps of Engineers • U.S. Army • U.S. Air Force • U.S. Navy • U.S. Marines
 U.S. Coast Guard • Defense Logistics Agency • Environmental Protection Agency
 National Aeronautics & Space Administration • General Services Administration
 State Department • National Institute of Building Sciences

Jan 2001

Spatial Data Standards / Facility Management Standards

- TSSDS Release 1.20 - November 1993.
- TSSDS Release 1.40 - August 1995.
- TSSDS Release 1.60 - November 1996.
- TSSDS Release 1.70 - August 1997.
- TSSDS Release 1.75 - January 1998.
- TSSDS/TSFMS Release 1.80 – February 1999.
- SDS/FMS Release 1.90 – December 1999
- SDS/FMS Release 1.95 - April 2000
- SDSFIE/FMSFIE Release 2.00 – January 2001
- SDSFIE/FMSFIE Release 2.10 – January 2002
- SDSFIE/FMSFIE Release 2.20 –August 2002

SDSFIE Design Considerations

- **Must be compatible with the predominant Commercially Available CADD, GIS, & Relational Database Software.**
- GIS and CADD Software include:
 - ESRI Arc/Info
 - Bentley MicroStation
 - ESRI ArcView
 - Autodesk Map
 - Intergraph MGE
 - Autodesk AutoCAD
 - Intergraph GeoMedia
 - Bentley GeoGraphics
 - ESRI ArcGIS
- Relational Database Management System (RDBMS) Software includes:
 - ANSI Standard Structured Query Language (SQL)
 - Informix SQL
 - Microsoft Access
 - ESRI SDE
 - Oracle SQL
 - Microsoft SQL Server
- Operating Systems include:
 - Windows 98, 2000, NT, & XL

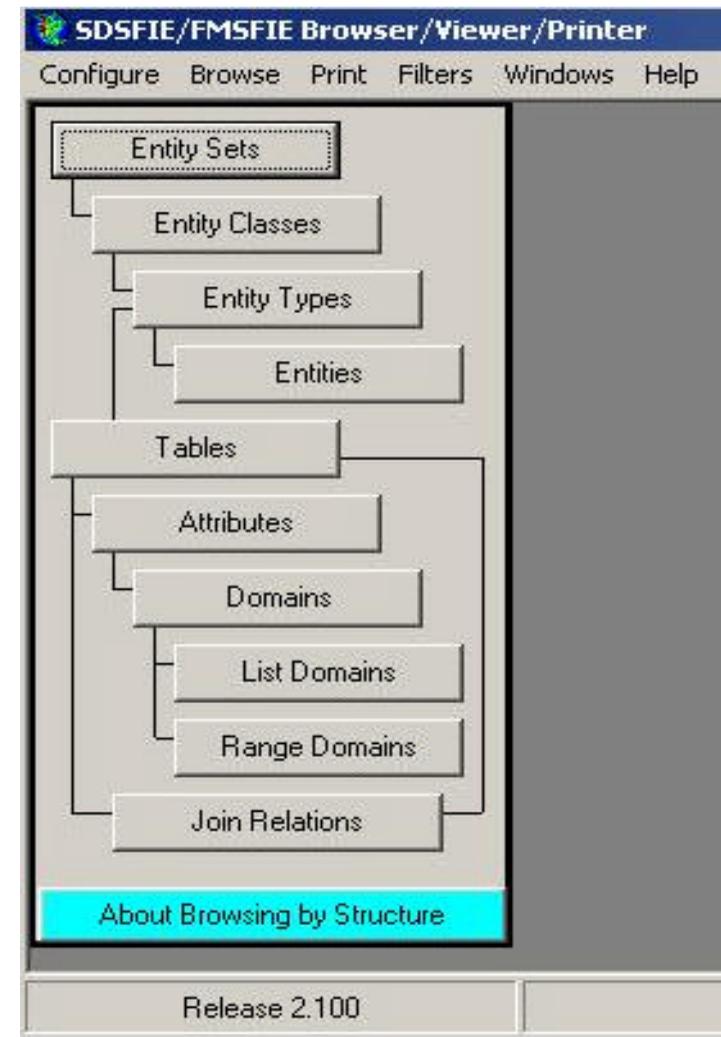
What is the Toolbox?

Collection of Self-contained Microsoft Visual Basic (32 bit)
Applications for Windows Operating Systems:

- Run on Personal Computer with Windows Operating Systems.
- No Additional Software Required.
- Distributed on CD-ROM.
- Updated each Year.
- Most current Release is available for download from
CADD/GIS Technology Center Internet Web Site
<http://tsc.wes.army.mil>
- Eight Applications provided with Release 2.10 (Browser, SQL
Generator, Filter Builder, Filter Eraser, Access Builder,
Geomedia Builder, Access Data Creator, & Geodatabase
Builder).

What is the Toolbox?

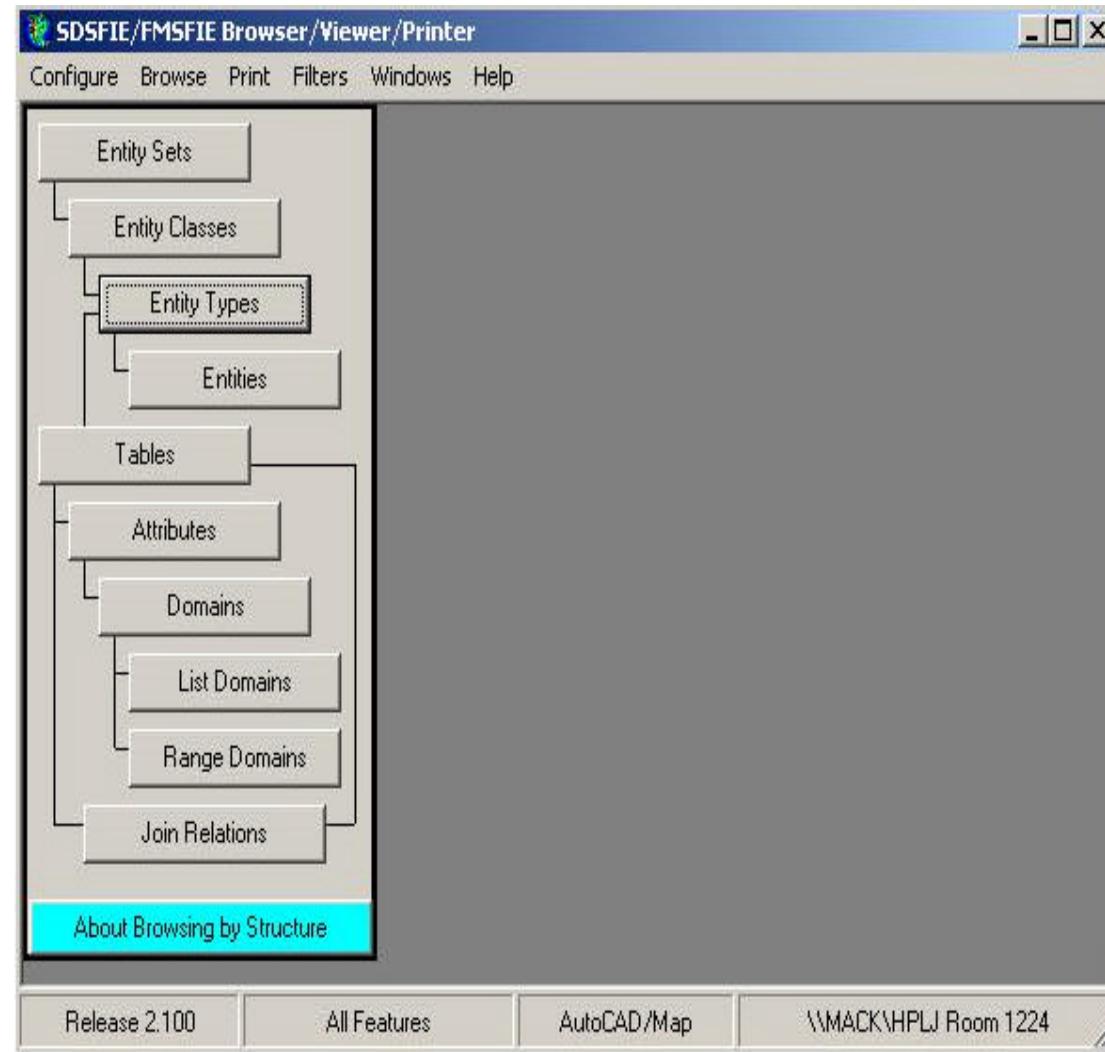
- **Release 2.10 Software Toolbox Includes:**
 - Browser – Permits viewing & printing of SDSFIE.
 - Filter Maker – Permits customer selection of SDSFIE Subset for specific project or organization.
 - Filter Eraser – Permits deletion of customer developed Filters no longer needed.
 - Access Builder – Permits construction of SDSFIE compliant Access 97 or 2000 databases.
 - SQL Generator – Permits construction of script for Oracle, Informix, SQL Server, ANSI SQL.
 - Geomedia Builder – Permits construction of SDSFIE compliant Intergraph GeoMedia databases.
 - Geodatabase Builder – Permits construction of SDSFIE compliant ESRI Arc 8.x Personal Geodatabase (Access 2000)
 - Access Data Creator – Data Entry



SDSFIE/FMSFIE Toolbox - Browser

SDSFIE/FMSFIE Browser Software Application:

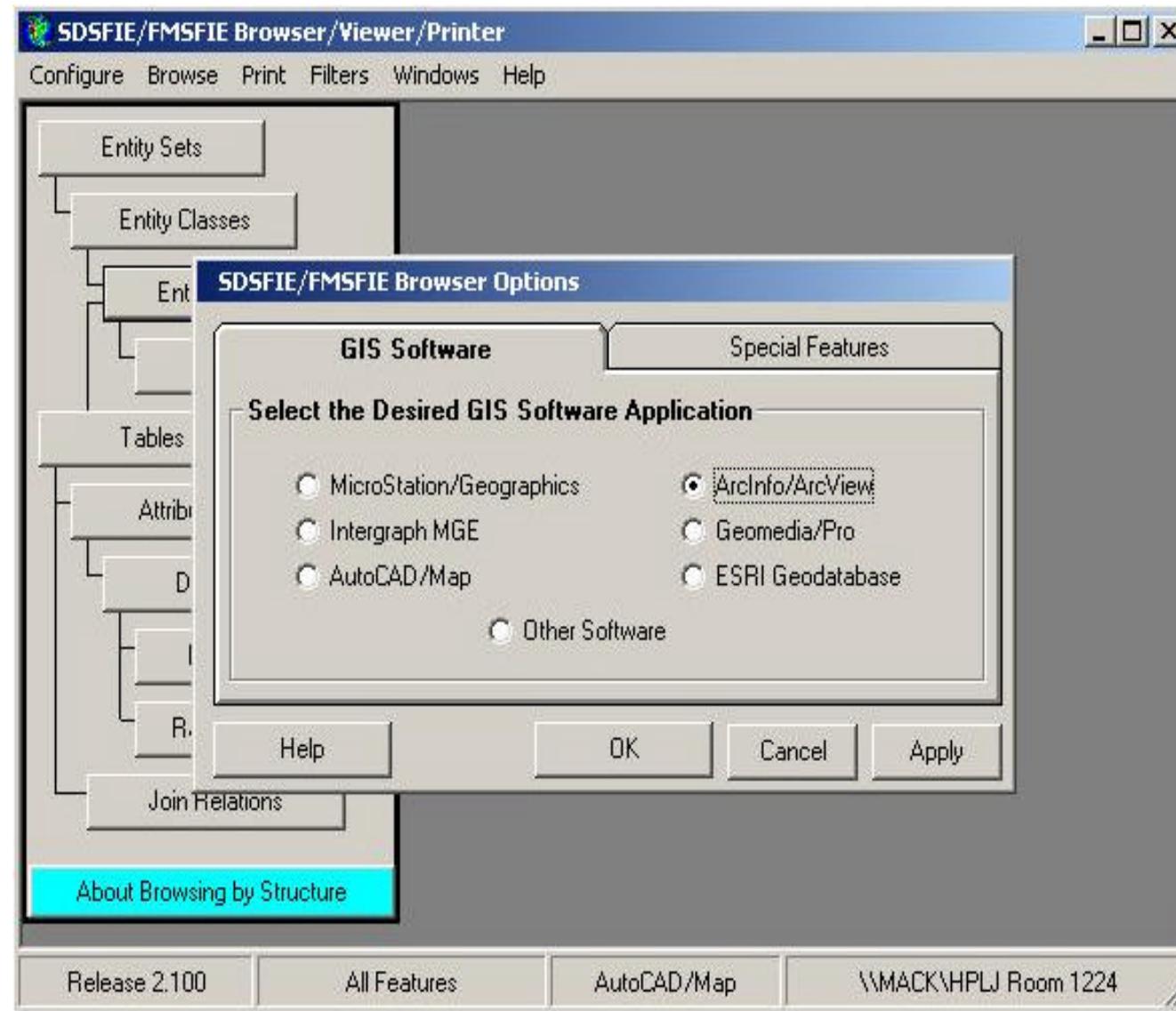
- Provides a tool for viewing & printing the various components of the Standards.
- Permits the User to view/print Standard based upon their specific CADD/GIS software.
- Permits the User to view/print either: (1) entire Standard, (2) pre-defined “filter”, or (3) User’s custom filter.



SDSFIE/FMSFIE Toolbox - Browser

SDSFIE/FMSFIE Browser Software Application:

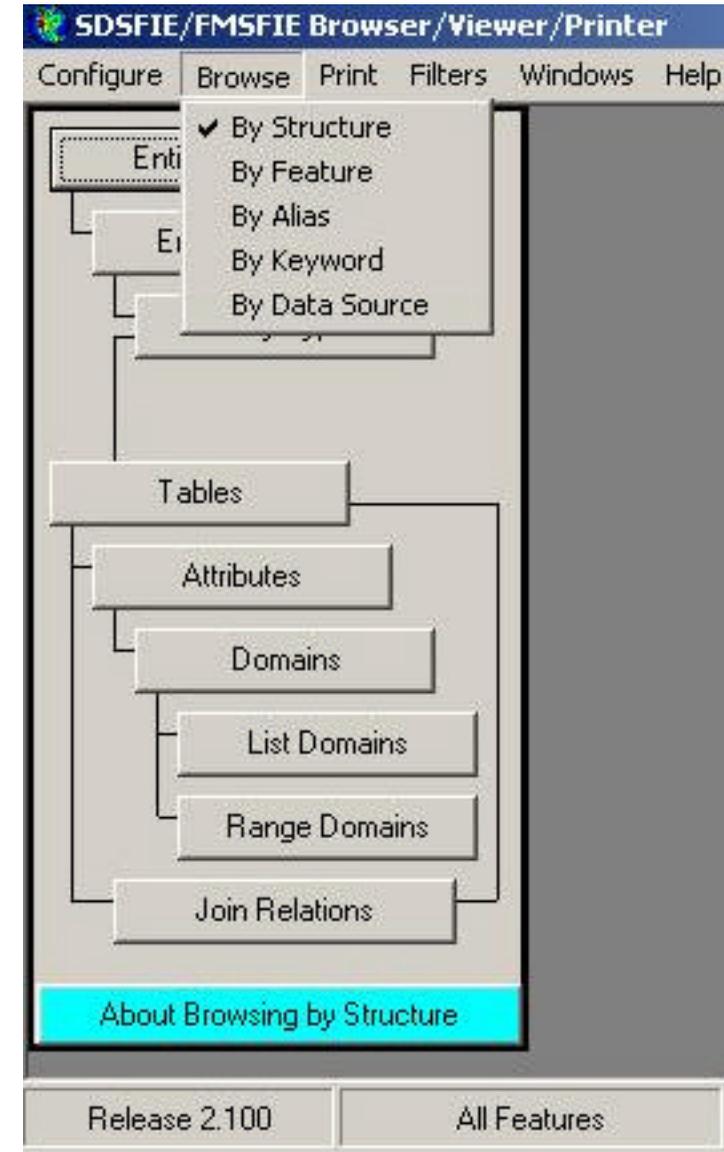
- Permits the User to view/print Standard based upon their specific CADD/GIS software.



SDSFIE/FMSFIE Toolbox - Browser

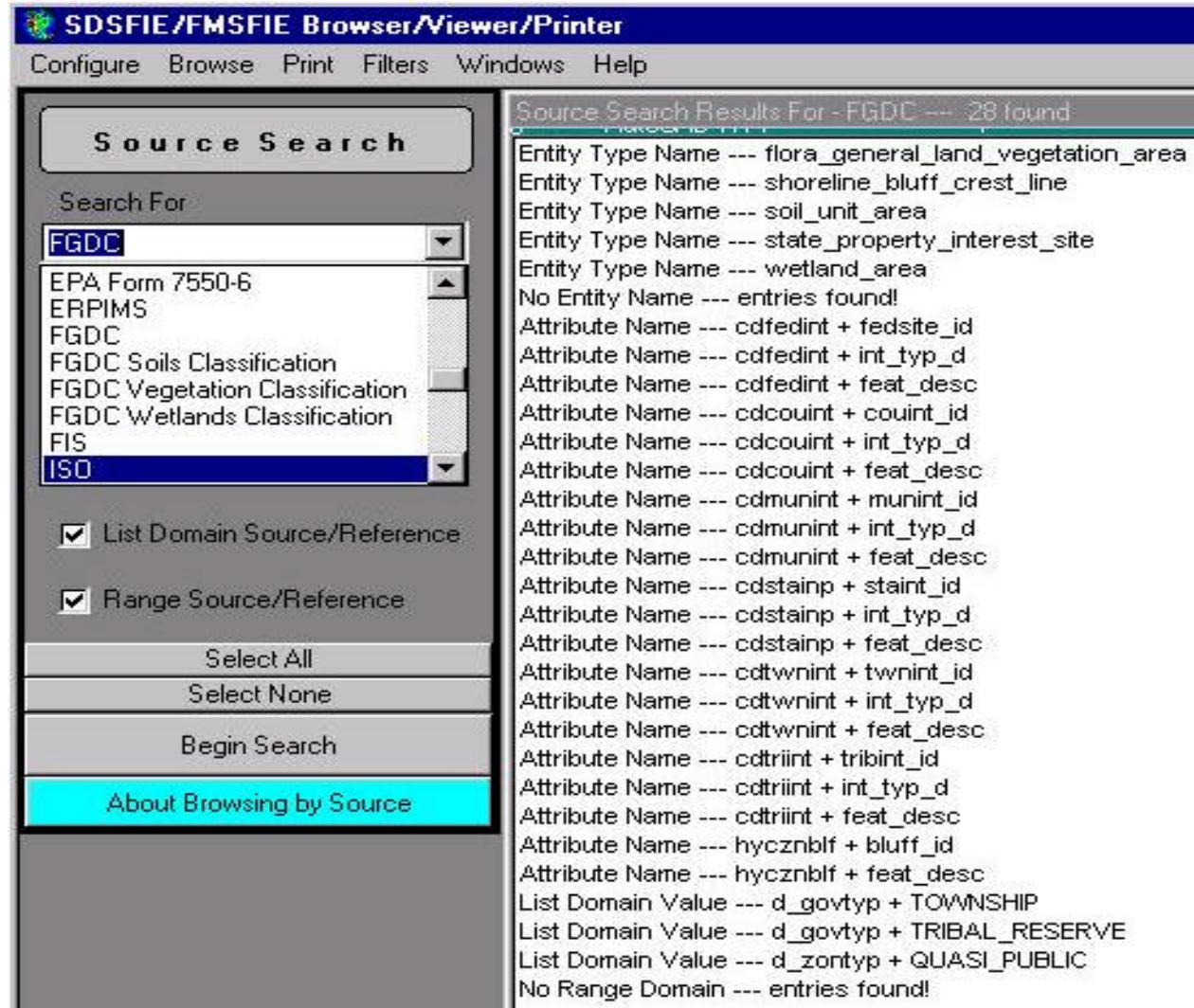
SDSFIE/FMSFIE Browser Software Application:

- Provides Several Options for Viewing the Standard:
 - Structure – View Standard by selecting Entity Set, Entity Class, Entity Type, Tables, Attributes, Domain Tables, & Domain Values.
 - Feature – View standard by selecting Features of Interest.
 - Alias – View standard by selecting Alias Feature Names.
 - Keyword – View standard by a Keyword (e.g., tree).
 - Data Source – View standard by Source (e.g., FGDC, EPA).



Incorporation of Approved FGDC Data Standards

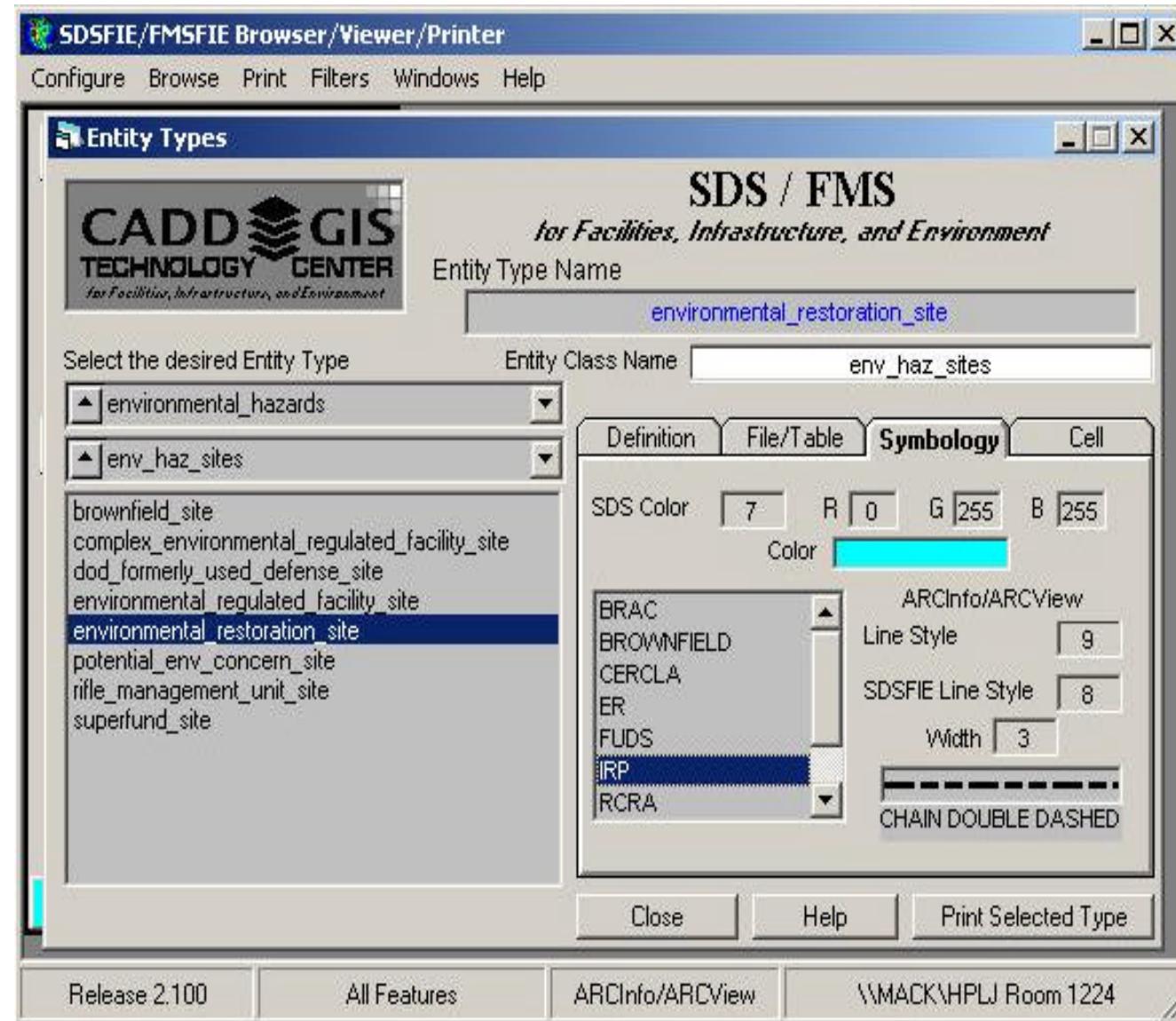
- The SDSFIE/FMSFIE provides a GIS Implementation Schema for Approved Federal Geographic Data Committee (FGDC) Data Standards.
- Approved FGDC Cadastral, Soils, Vegetation, Wetlands Classification, & Utilities Data Content Standards have been incorporated.



SDSFIE/FMSFIE Toolbox - Browser

SDSFIE/FMSFIE Browser Software Application:

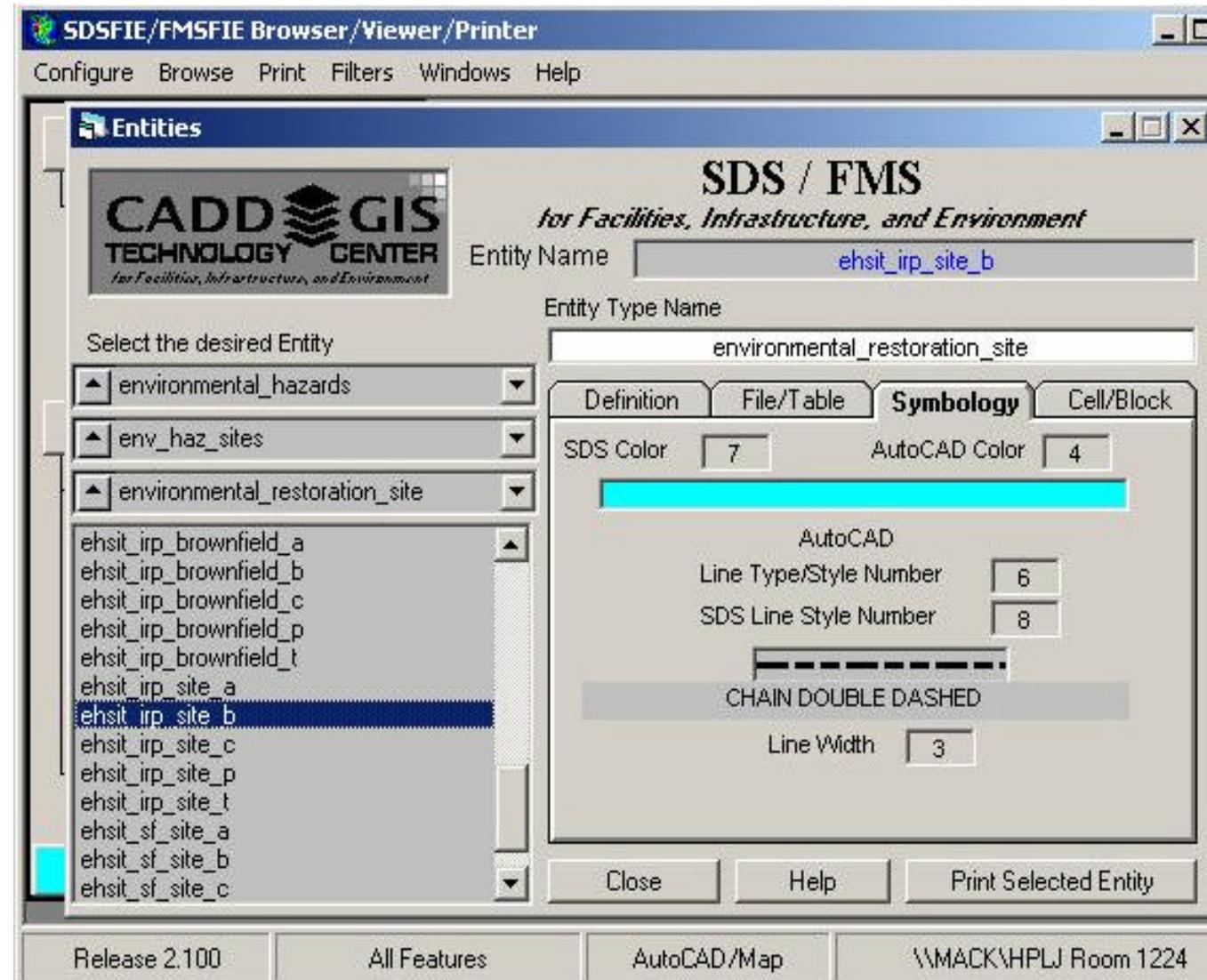
- Permits the User to view Standard color, linestyles, & symbols.



SDSFIE/FMSFIE Toolbox - Browser

SDSFIE/FMSFIE Browser Software Application:

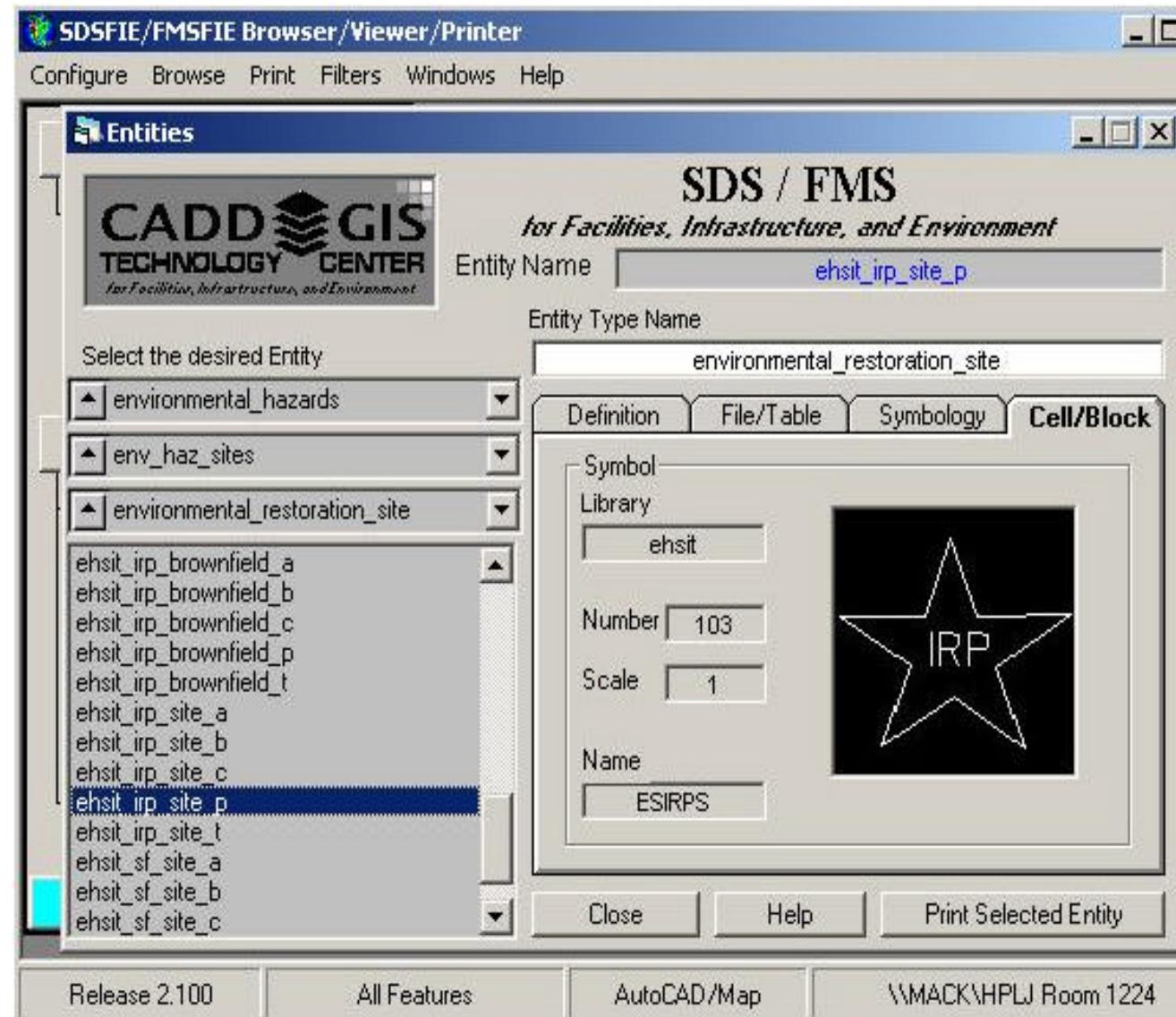
- Permits the User to view Standard color, linestyles, & symbols.
- AutoCAD Map is a CADD Based GIS with Layer assignments for placement of features, text, & linestyles (called Entities).

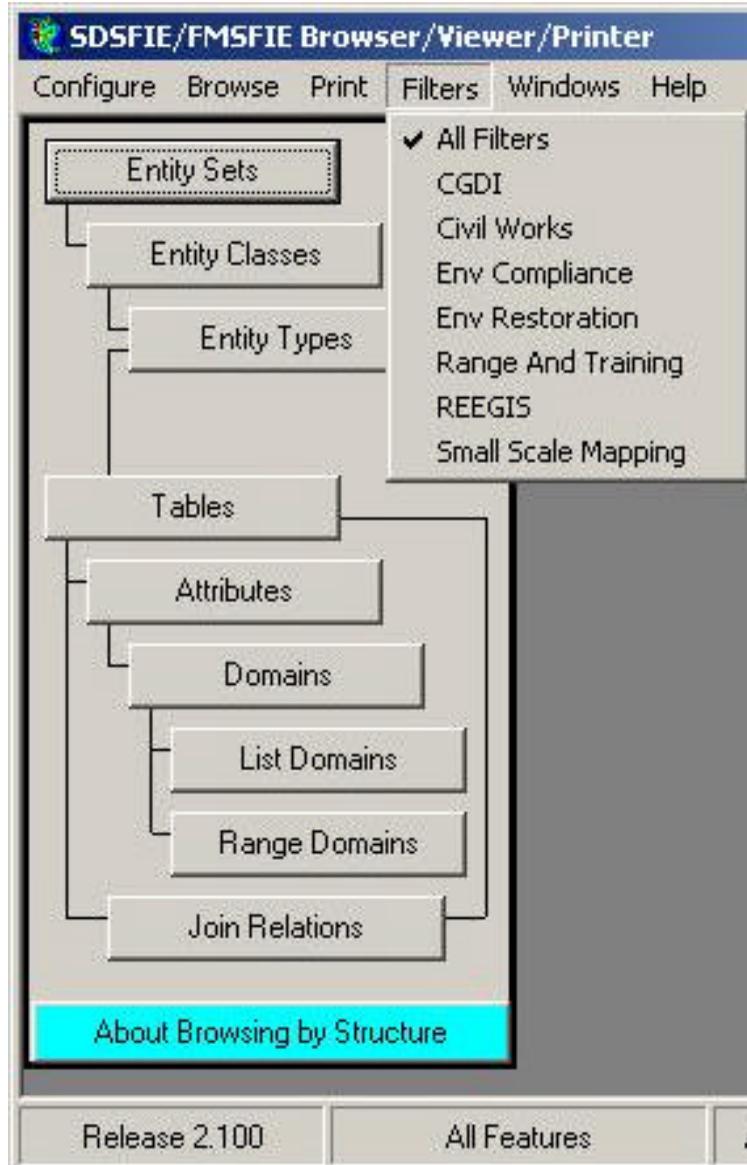


SDSFIE/FMSFIE Toolbox - Browser

SDSFIE/FMSFIE Browser Software Application:

- Permits the User to view Standard color, linestyles, & symbols.
- Images of Point Symbols can also be viewed.
- Symbol Sets are available for use with MicroStation, AutoCAD, ArcInfo, & ArcView.





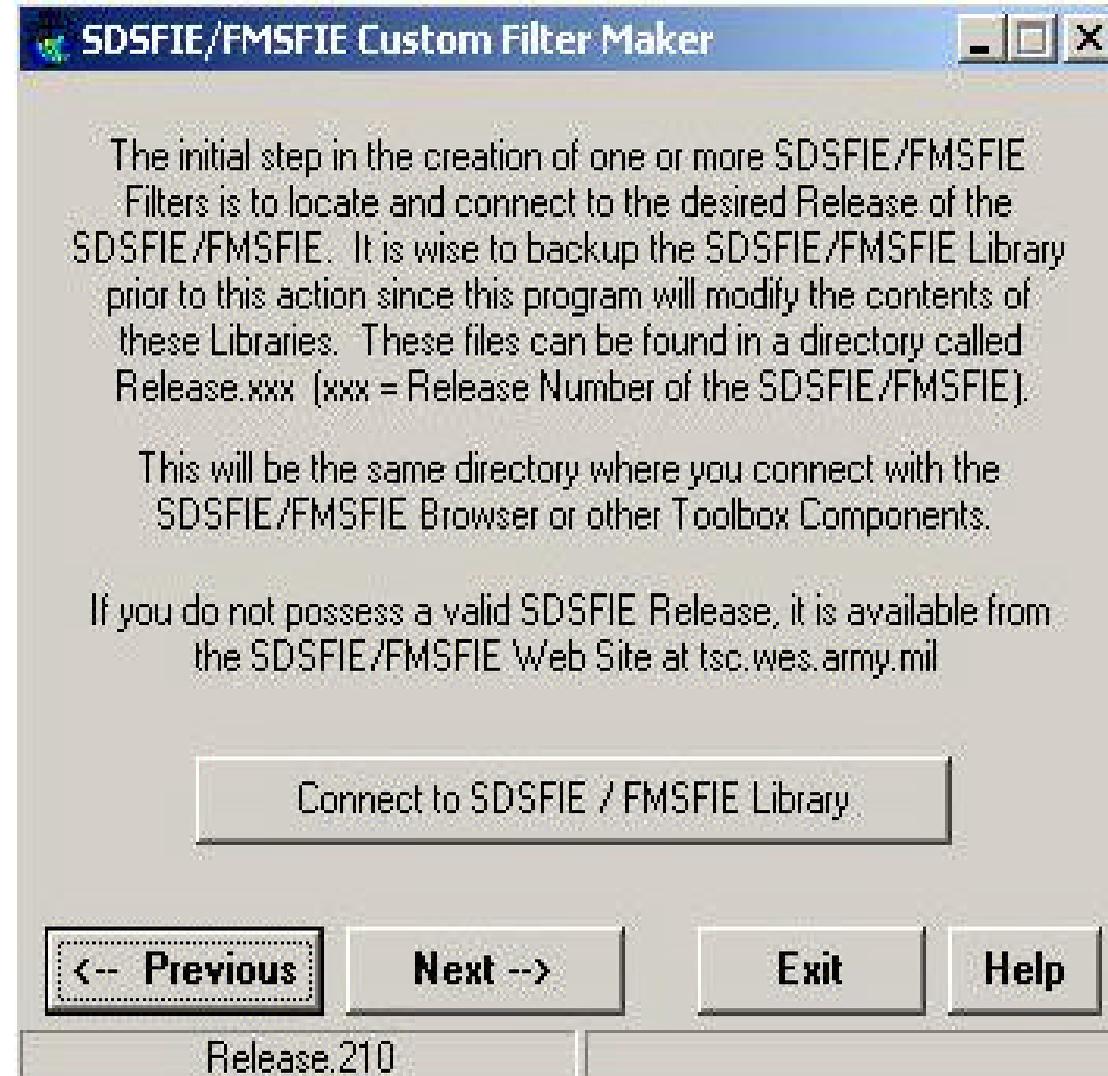
SDSFIE/FMSFIE Toolbox - Filters

- “Filters” are a subset of the SDSFIE/FMSFIE.
- “Filters” can be “Pre-Defined” (i.e., defined by a User Group and provided by the Center with the SDSFIE/FMSFIE Release) or “User-Defined” (i.e., defined by a User through use of the “Filter Maker” Software Application).
- SDSFIE/FMSFIE contains an enormous amount of detail and information. Most GIS implementations use a subset of the SDSFIE/FMSFIE. “Filters” simplify development of a SDSFIE/FMSFIE compliant GIS through the identification and use of a defined SDSFIE/FMSFIE subset.

SDSFIE/FMSFIE Toolbox – Filter Maker

SDSFIE/FMSFIE Filter Maker Software Application:

- Provides a tool which permits the User to define their own subset of the SDSFIE/FMSFIE for use in GIS development.

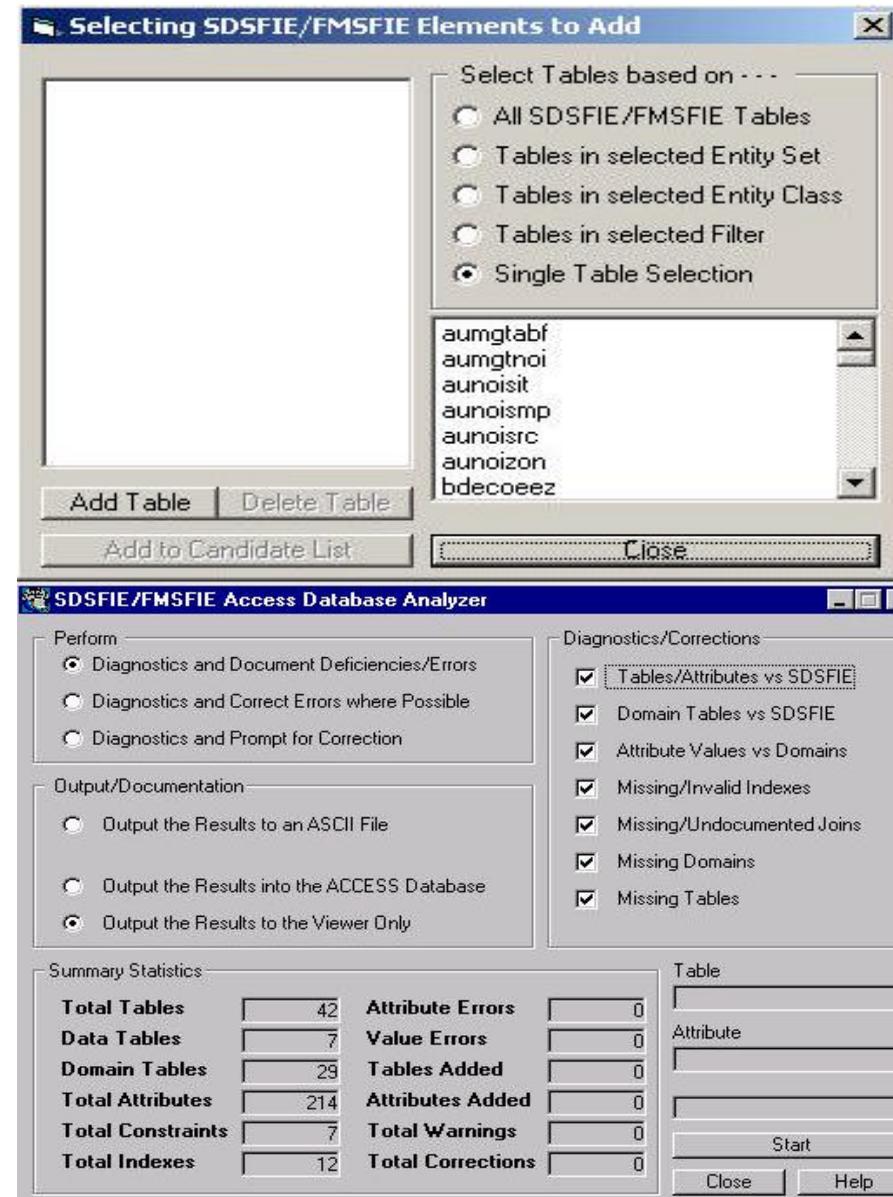


SDSFIE/FMSFIE Toolbox – Access Builder



SDSFIE/FMSFIE Access Builder Software Application:

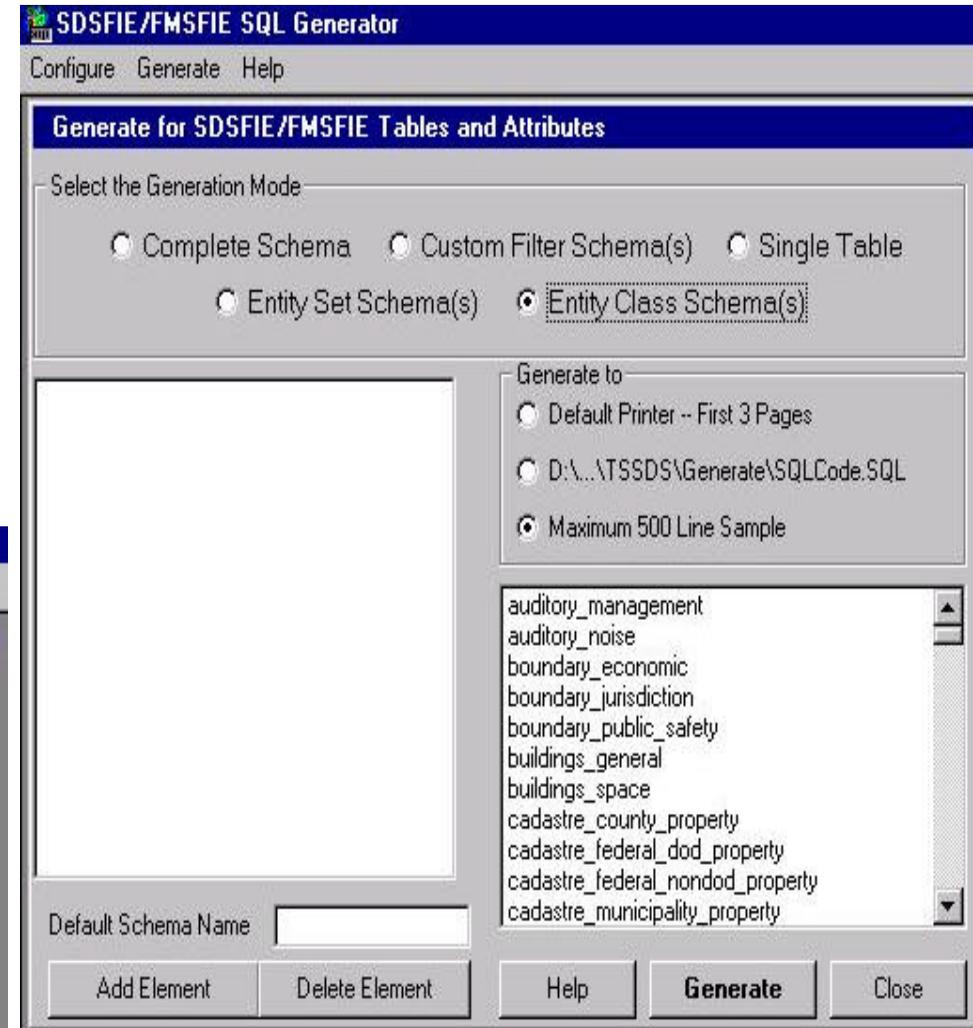
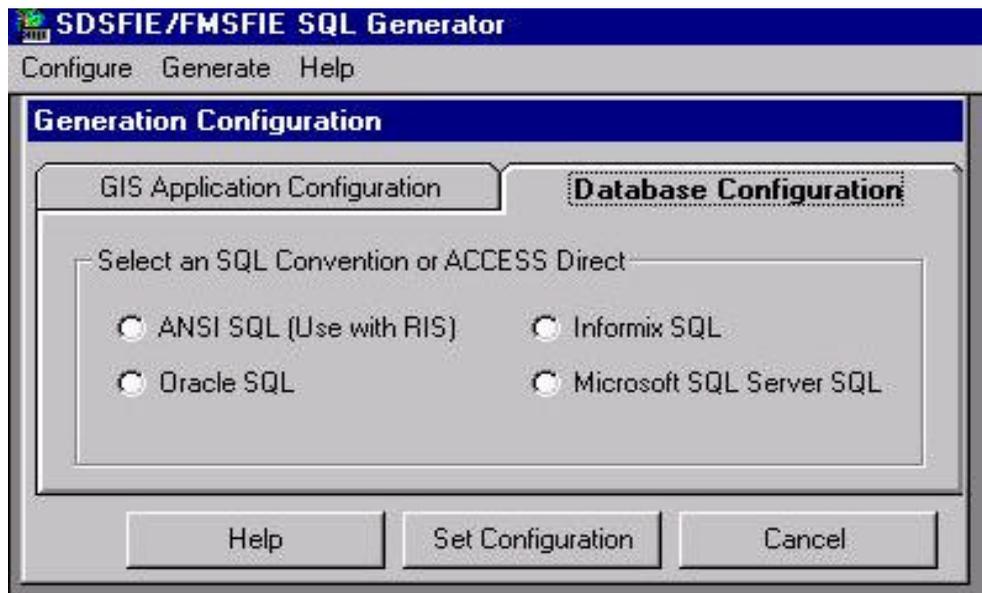
- Provides a tool which permits the User to build SDSFIE/FMSFIE compliant Microsoft Access 97 or 2000 attribute & domain tables, complete with the relational joins between tables.
- Also Provides a tool which permits the User to check and run diagnostics on SDSFIE/FMSFIE compliant Microsoft Access 97 or 2000 database tables.



SDSFIE/FMSFIE Toolbox – SQL Generator

SDSFIE/FMSFIE SQL Generator Software Application:

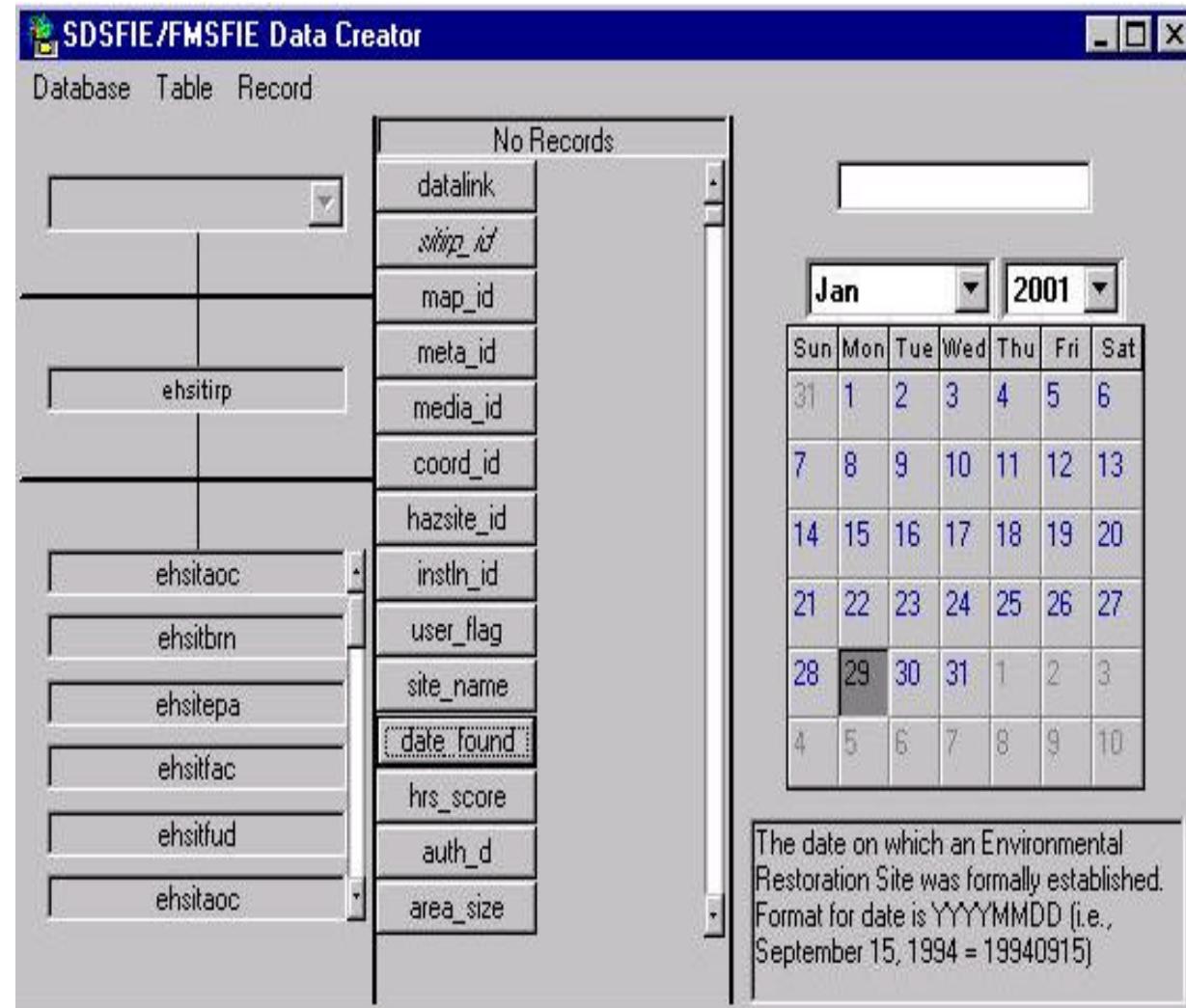
- Provides a tool which permits the User to build SDSFIE/FMSFIE compliant ANSI SQL, Oracle SQL, Informix SQL, and SQL Server databases.



SDSFIE/FMSFIE Toolbox – Access Data Creator

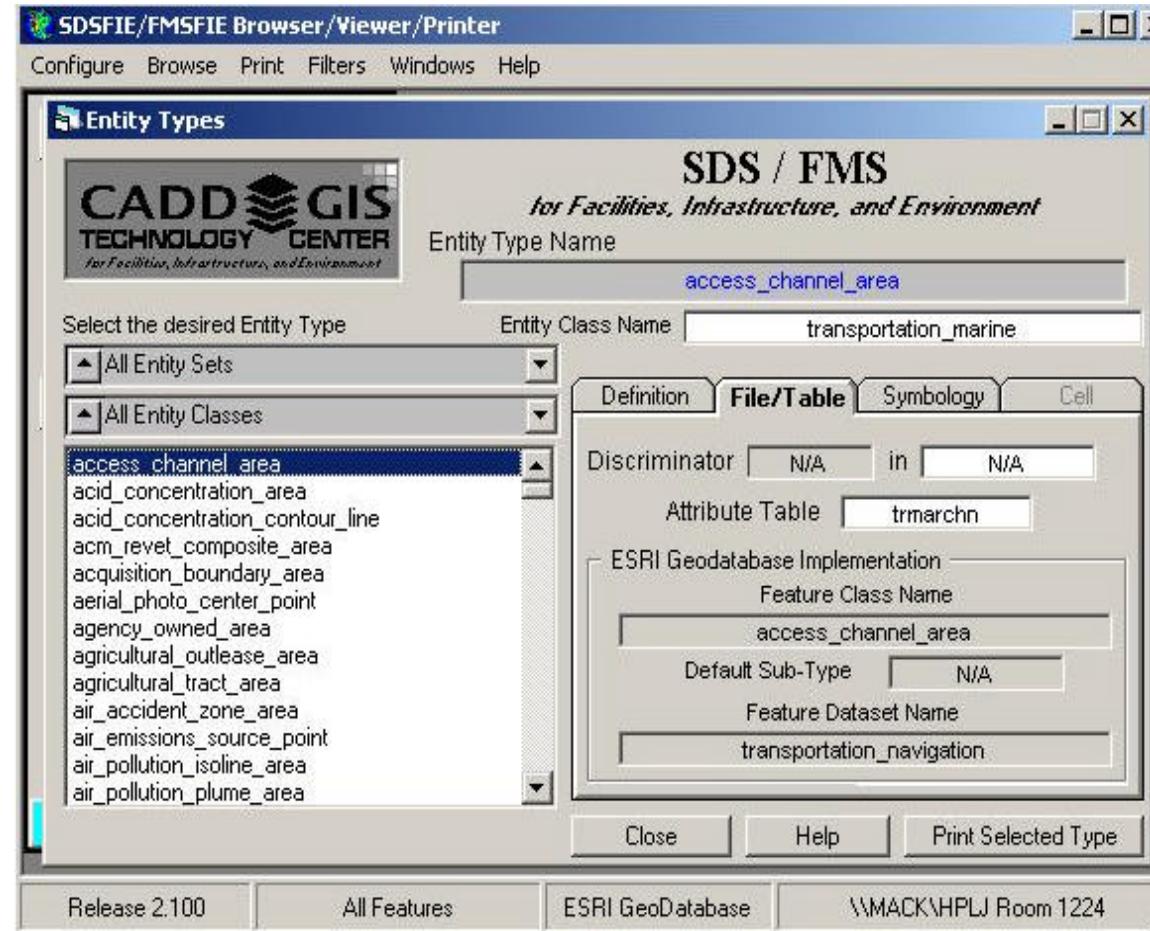
SDSFIE/FMSFIE Access Data Creator Software Application:

- Provides a tool which permits the User to manually input data into SDSFIE/FMSFIE compliant Microsoft Access 97 or 2000 database tables.



SDSFIE/FMSFIE Toolbox – Geodatabase Builder

- **Incorporation of ESRI ArcGIS Personal Geodatabase Data Model – Part 1 (Release 2.10 -January 2002).**
- **Feature Dataset –**
 - Entity Set/Class
- **Feature Class –**
 - Entity Type
- **Default Sub-Type**
 - Discriminator Domain Value
- **Release 2.10 Geodatabase –**
 - Based upon Access 2000, but did not yet implement relational SDSFIE/FMSFIE database.



SDSFIE/FMSFIE Toolbox – Geodatabase Builder

- Incorporation of ESRI ArcGIS Personal Geodatabase Data Model – Part 2 (Release 2.20 –August 2002).
- Object Class –
 - Database Table
 - Object Class Name cannot exceed 30 characters in length
- Release 2.20 Geodatabase –
 - Based upon Access 2000 and does implement relational SDSFIE/FMSFIE database.

