THE CADD/GIS TECHNOLOGY CENTER
for Facilities, Infrastructure, and Environment

SDSFIE Toolbox

August 20, 2002

2002 Geospatial Technologies Symposium & Exposition

San Antonio, Texas

CADD/GIS Technology Center

Internet URL : http://tsc.wes.army.mil

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SDSFIE & FMSFIE

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-tsfms/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.

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What is the Toolbox?

Collection of Self-contained Microsoft Visual Basic Software Applications:

- Run on Personal Computer with Windows Operating System.
- 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 2.20

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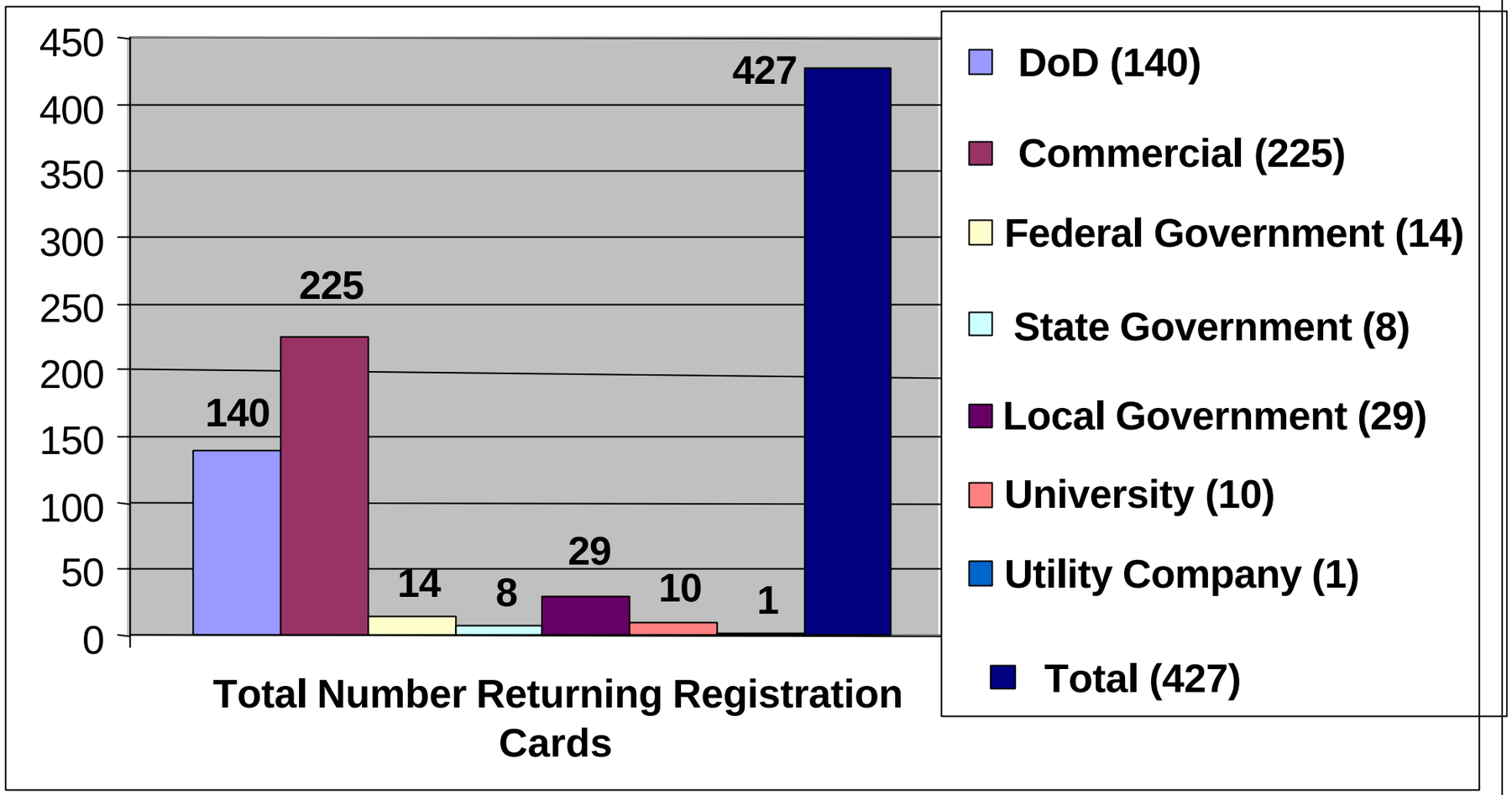
SDSFIE Design Considerations

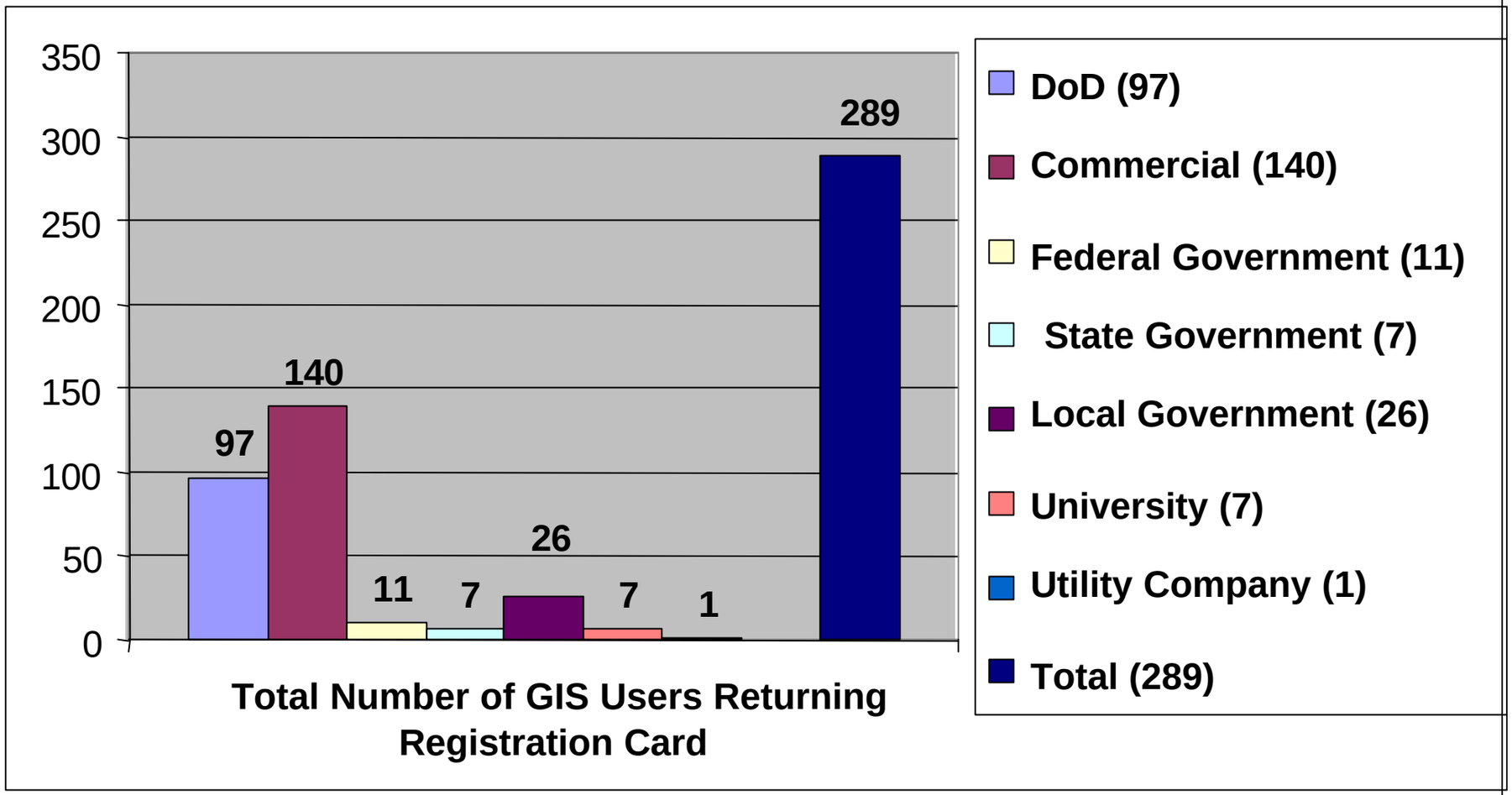
- **Must be compatible with the predominant Commercially Available CADD, GIS, & Relational Database Software.**
- GIS and CADD Software include:
  - ESRI Arc/Info - Bentley MicroStation - ESRI ArcView
  - Autodesk Map - Intergraph MGE - Autodesk AutoCAD
  - Intergraph GeoMedia - Bentley GeoGraphics - 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 ME, 2000, NT, & XL

Registration Cards – Total Number Returned



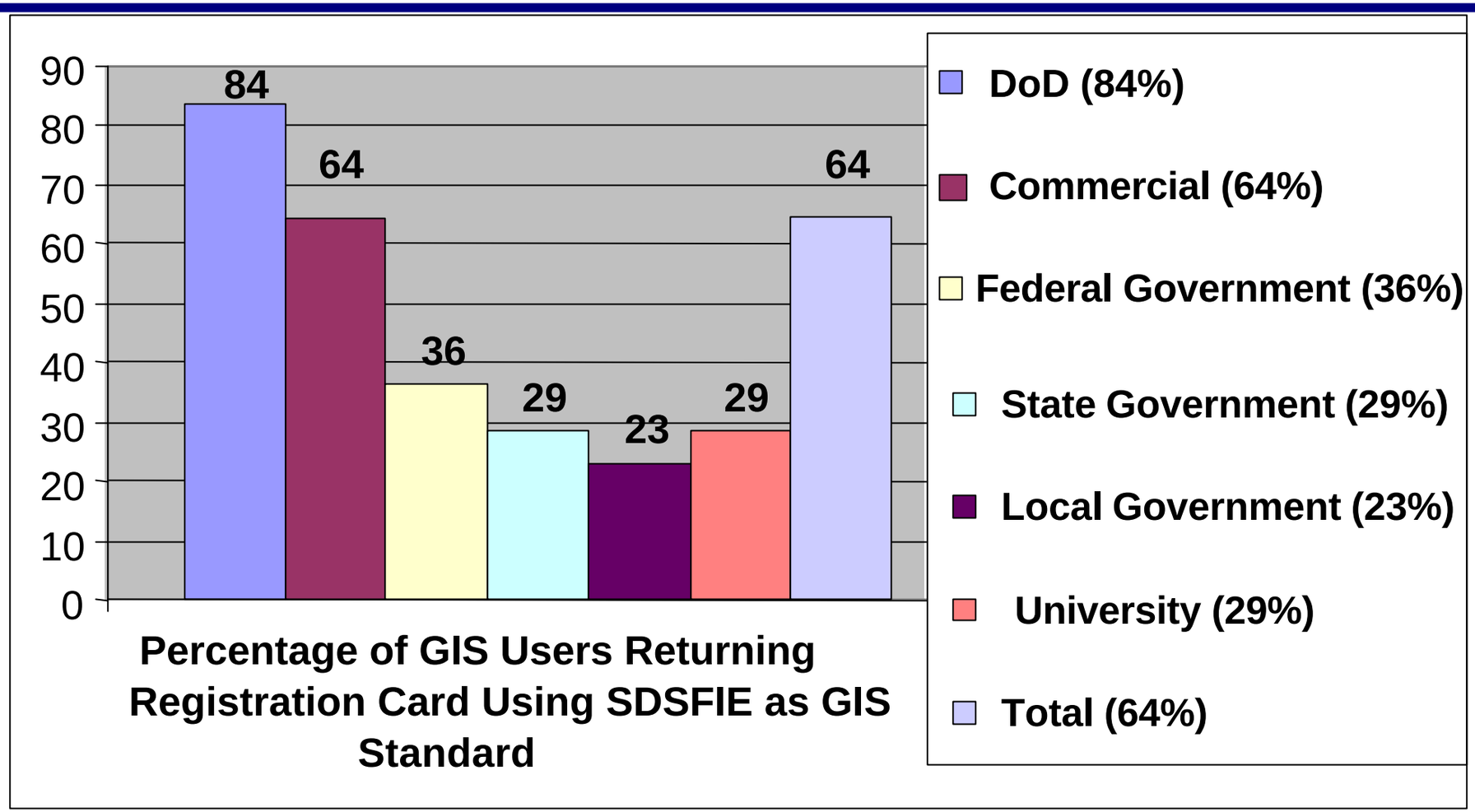
October 1, 2001 – August 12, 2002

Registration Cards – GIS Users



October 1, 2001 – August 12, 2002

Registration Cards – Use SDSFIE



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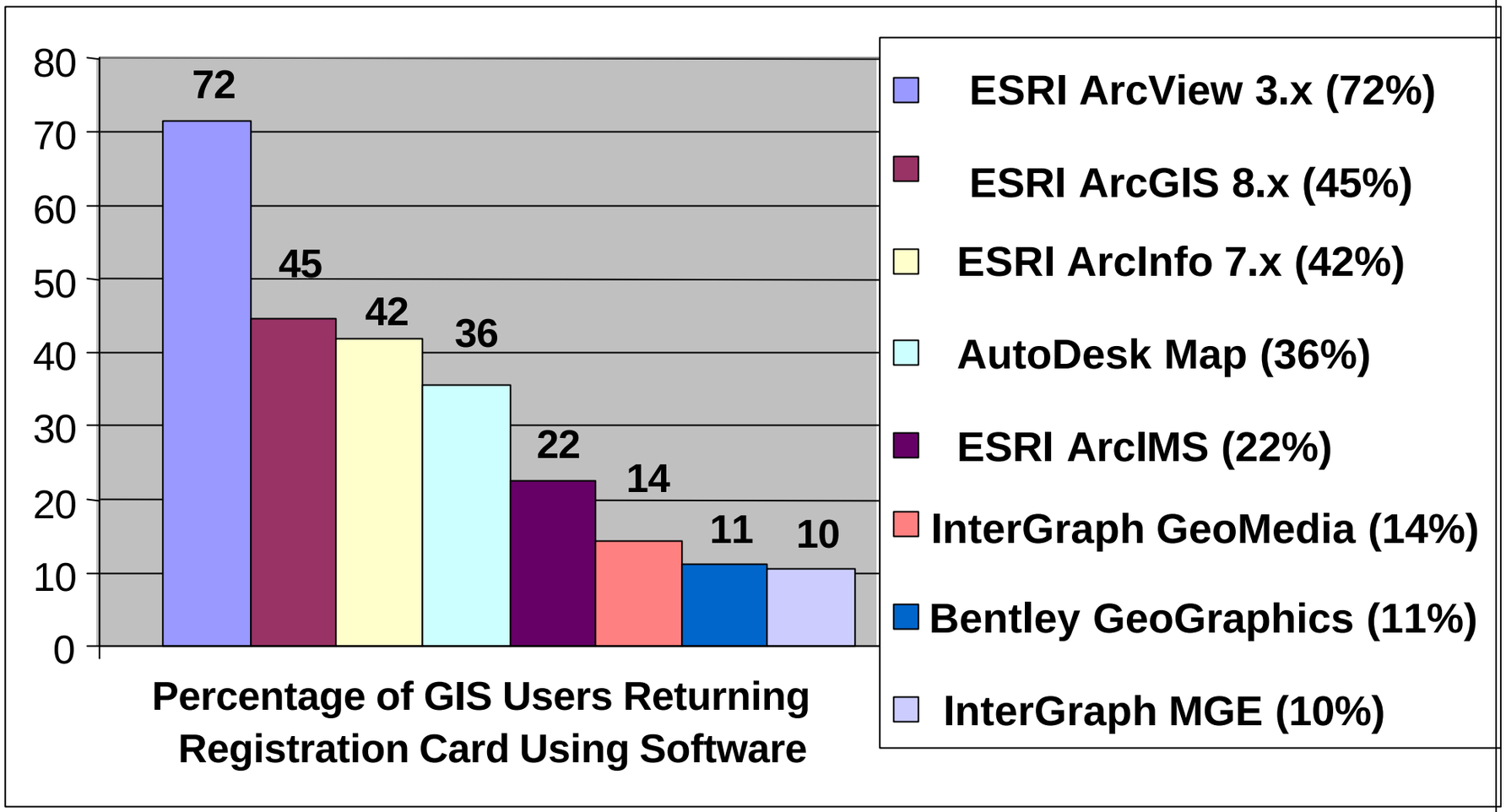
Registration Cards – GIS Software



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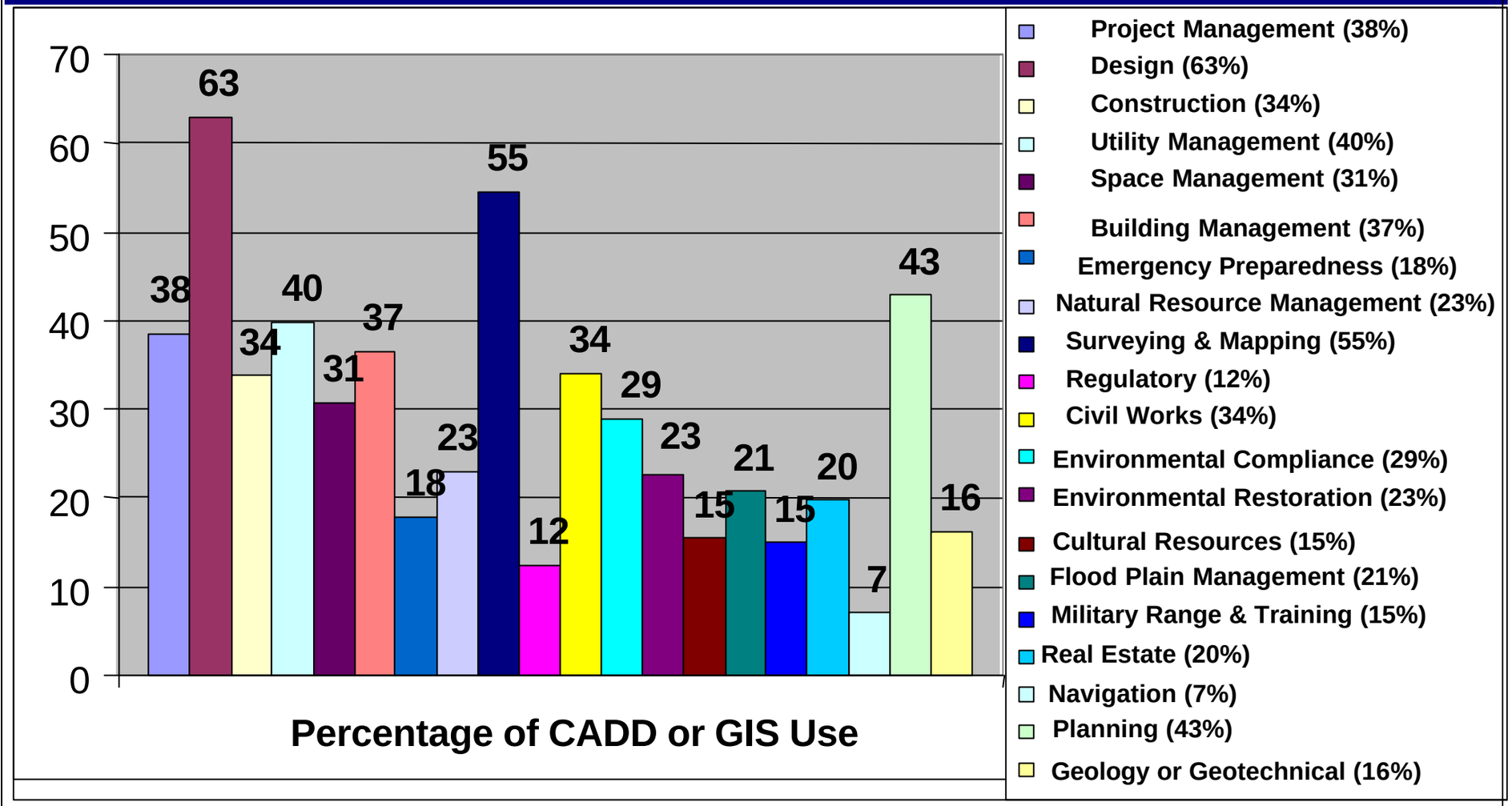
Registration Cards – Use of CADD or GIS



October 1, 2001 – August 12, 2002

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SDSFIE Compliancy

There are 2 levels of compliancy:

- Basic (supported by Toolbox)
- Experienced (not supported by Toolbox)

Each level has 5 elements of compliancy:

1. Entity Types and Entities
2. Attribute Tables
3. Attributes
4. Domain Tables
5. Domain Values

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SDSFIE Basic and Experienced Compliancy

1. Entity Types and Entities - Use SDSFIE Entity Type and Entity naming conventions
2. Attribute Tables - Use SDSFIE attribute table naming conventions and definitions
3. Attributes (see following slides)
4. Domain Tables - Use SDSFIE domain table naming conventions and definitions
5. Domain Values (see following slides)

SDSFIE Basic vs. Experienced Compliancy

Basic	3. Attributes - All SDSFIE defined attributes must be stored in the selected tables. No user-defined attributes may be added to the tables – they may be stored in user-defined local tables and linked to the SDSFIE table.
Experienced	3. Attributes – User-defined attributes may be added to the SDSFIE tables and SDSFIE attributes not needed may be deleted.

SDSFIE Basic vs. Experienced Compliancy

Basic	5. Domain Values - All SDSFIE defined list and range domain values must be kept for the selected domain tables. No user-defined values may be added to the tables – they may be stored in user-defined local tables and linked to the SDSFIE table
Experienced	5. Domain Values - User-defined domain values may be added to the SDSFIE domain tables and SDSFIE domain values not needed may be deleted.

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What is the Toolbox?

- **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 database Tables.
- **SQL Generator** – Permits construction of script for construction of SDSFIE compliant Oracle, Informix, SQL Server, ANSI SQL database tables.
- **Geomedia Builder** – Permits construction of SDSFIE compliant Intergraph GeoMedia database.
- **Geodatabase Builder** – Permits construction of SDSFIE compliant ESRI Arc 8.x Personal Geodatabase (Access 2000)
- **Access Data Creator** – Provides Data Entry Tool for SDSFIE Compliant Access Tables

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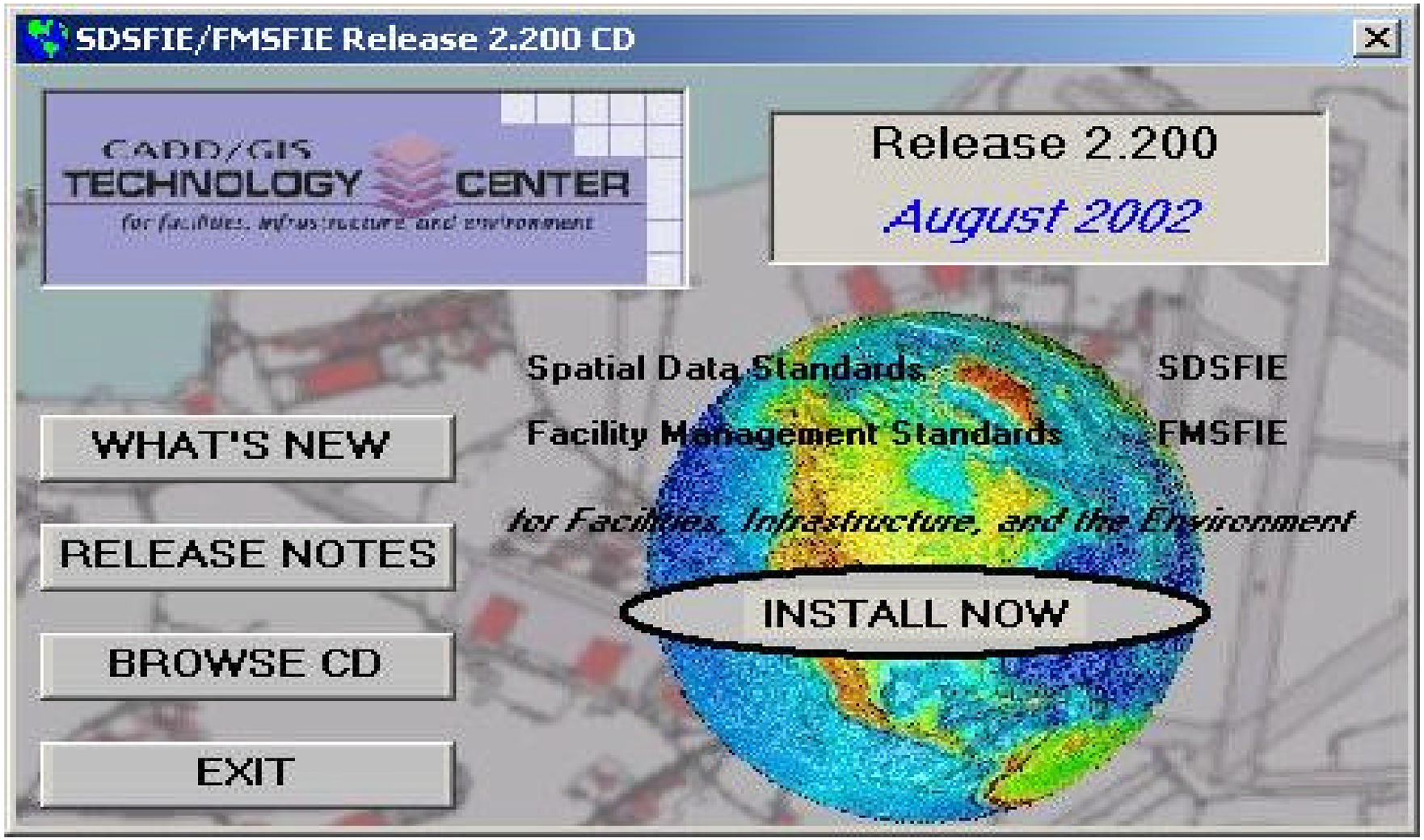
Toolbox Installation

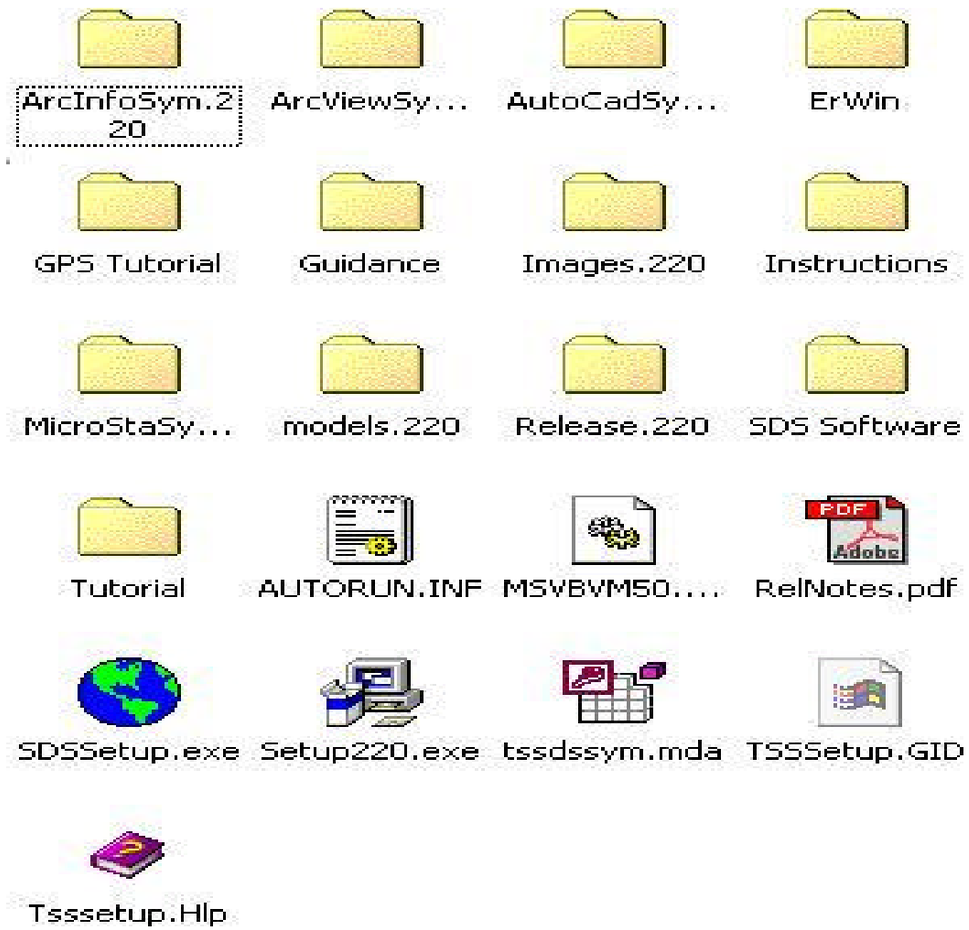


Toolbox Installation – Browse CD

SDSFIE/FMSFIE Library & Tools – Installed with Toolbox Installation.

Other Items Available on CD Include:

- **Symbol Sets** – Symbol sets for use with ArcInfo, ArcView, AutoCAD, & MicroStation.
- **Instructions** – Instructions concerning use of Tools.
- **Guidance** – Papers, PowerPoint Slides, Technical Implementation Guides, etc.



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Toolbox – Installation

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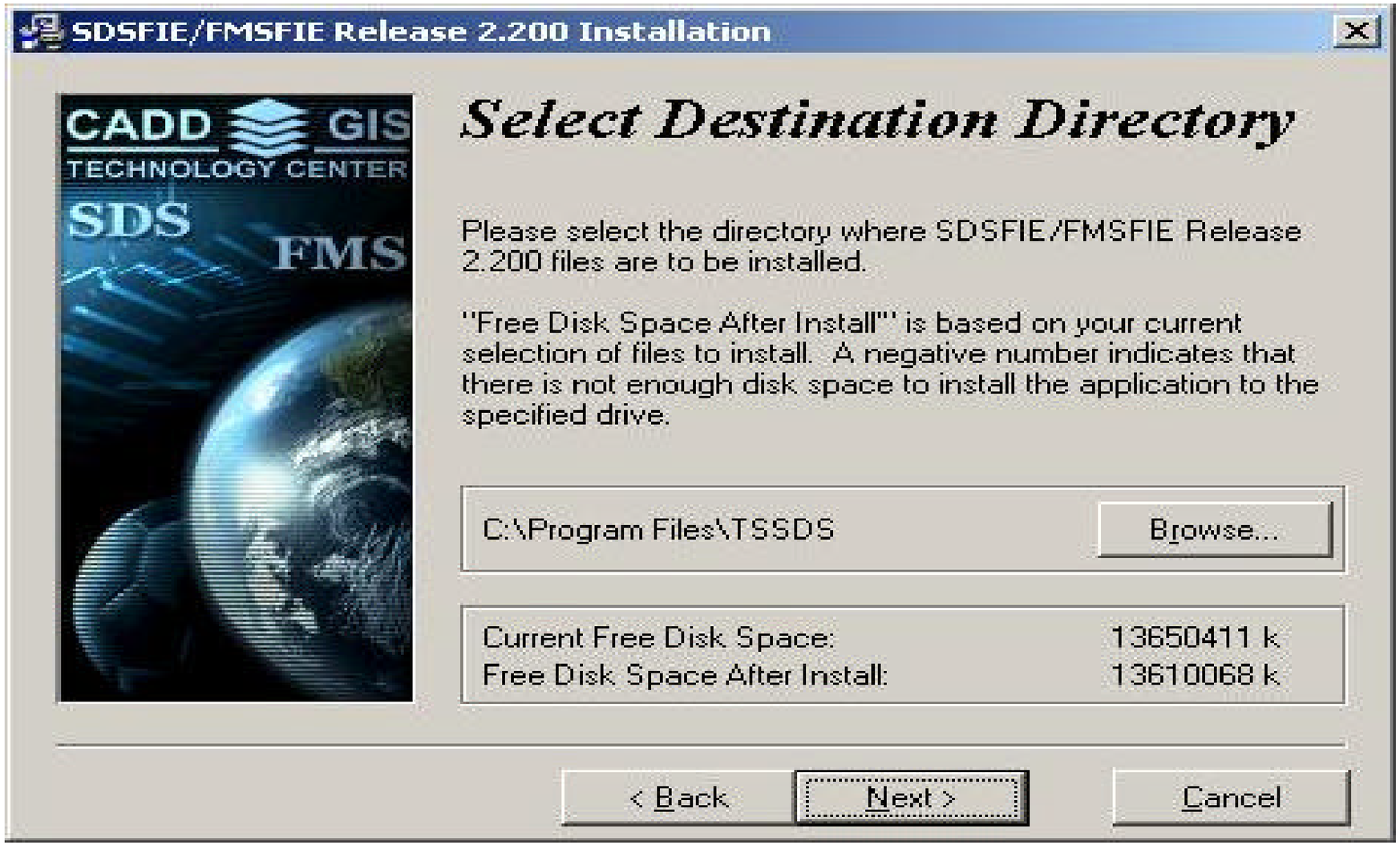
Toolbox Installation



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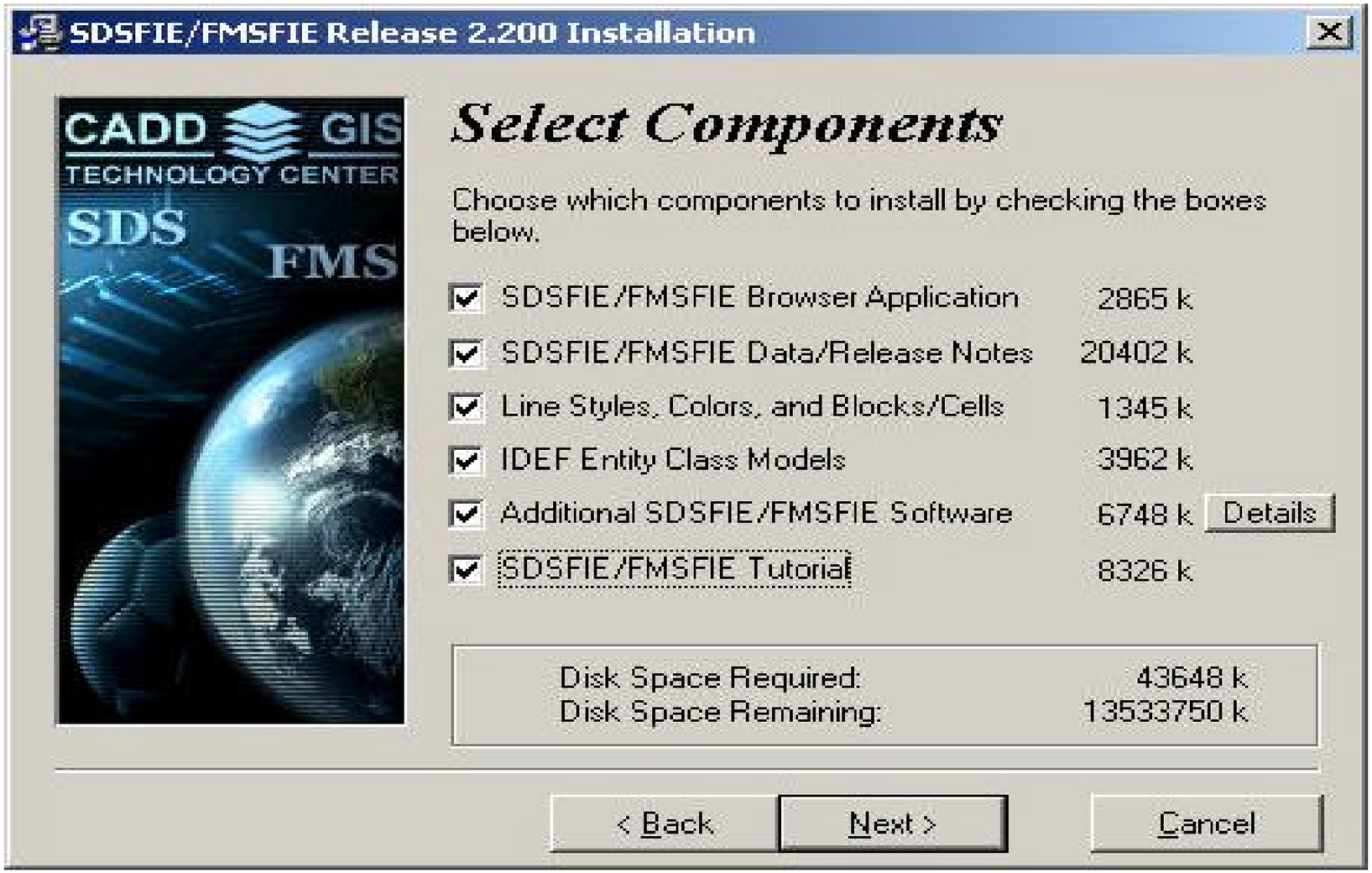
Toolbox Installation



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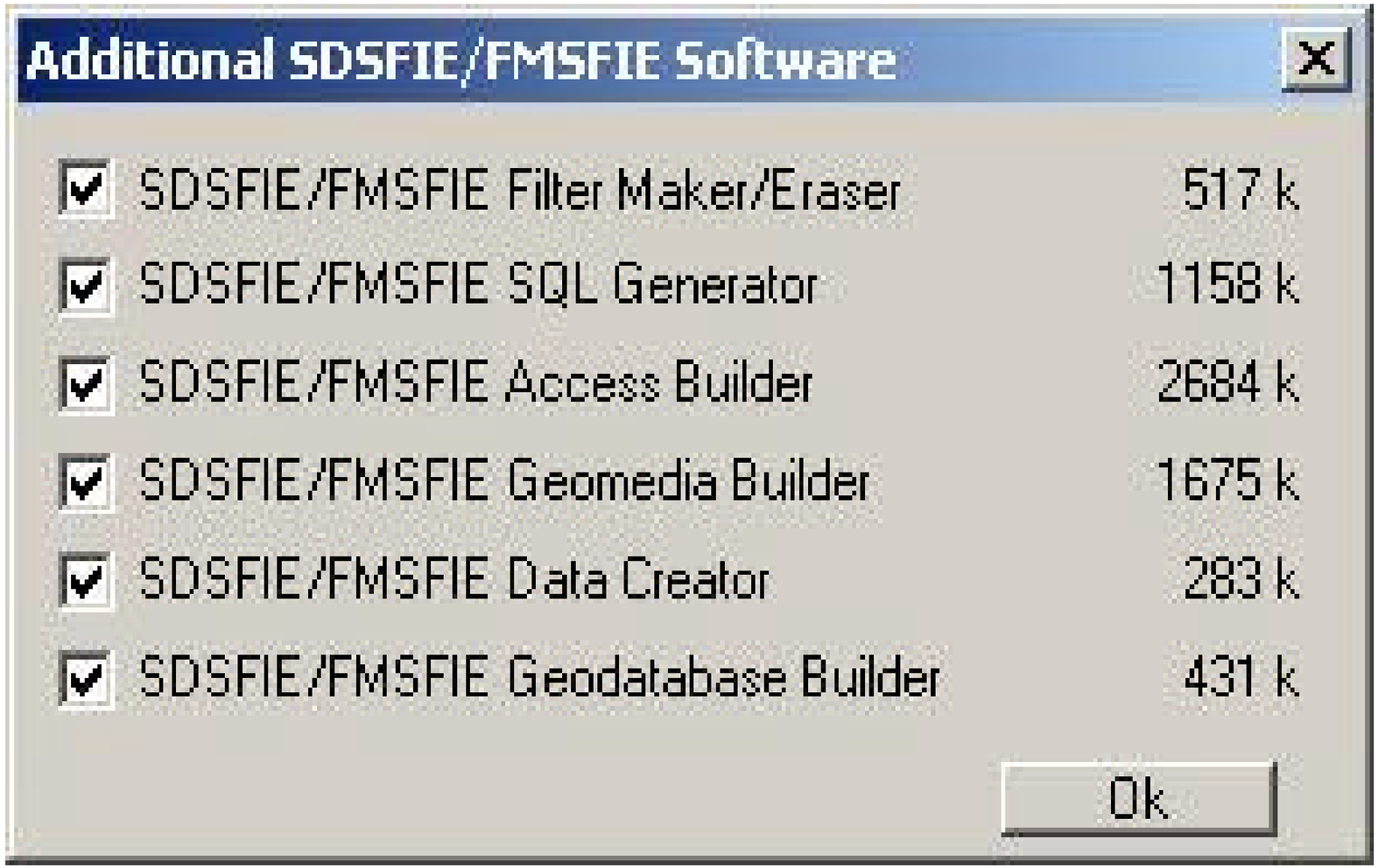
Toolbox Installation



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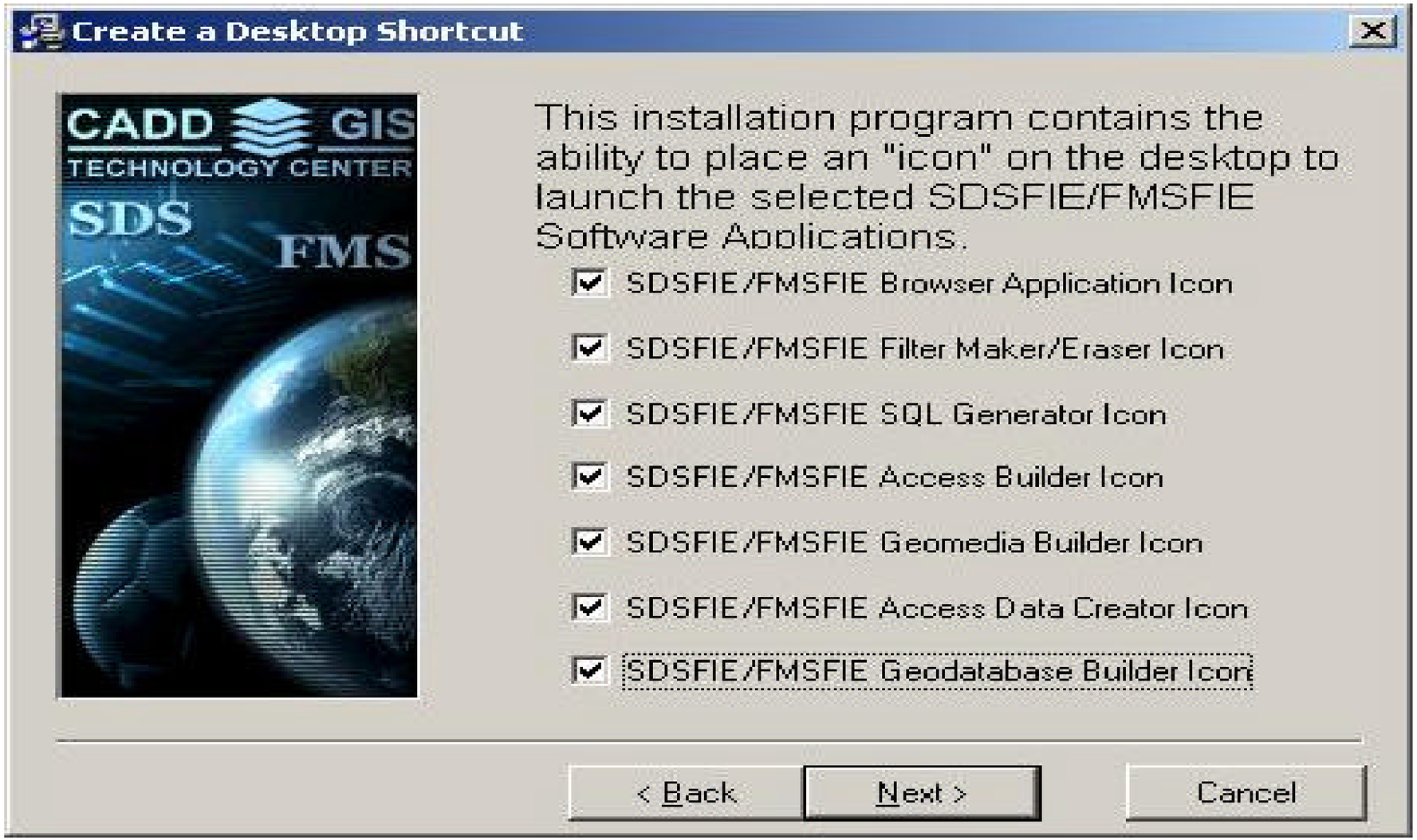
Toolbox Installation



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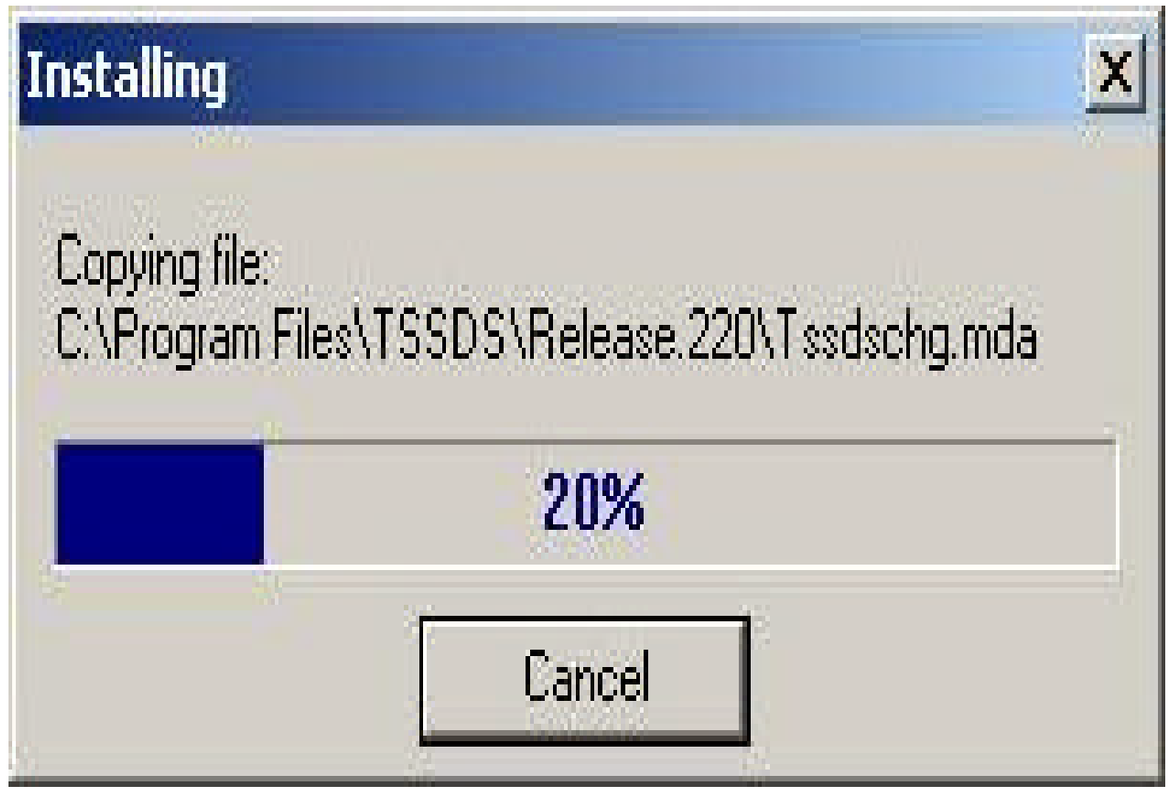
Toolbox Installation



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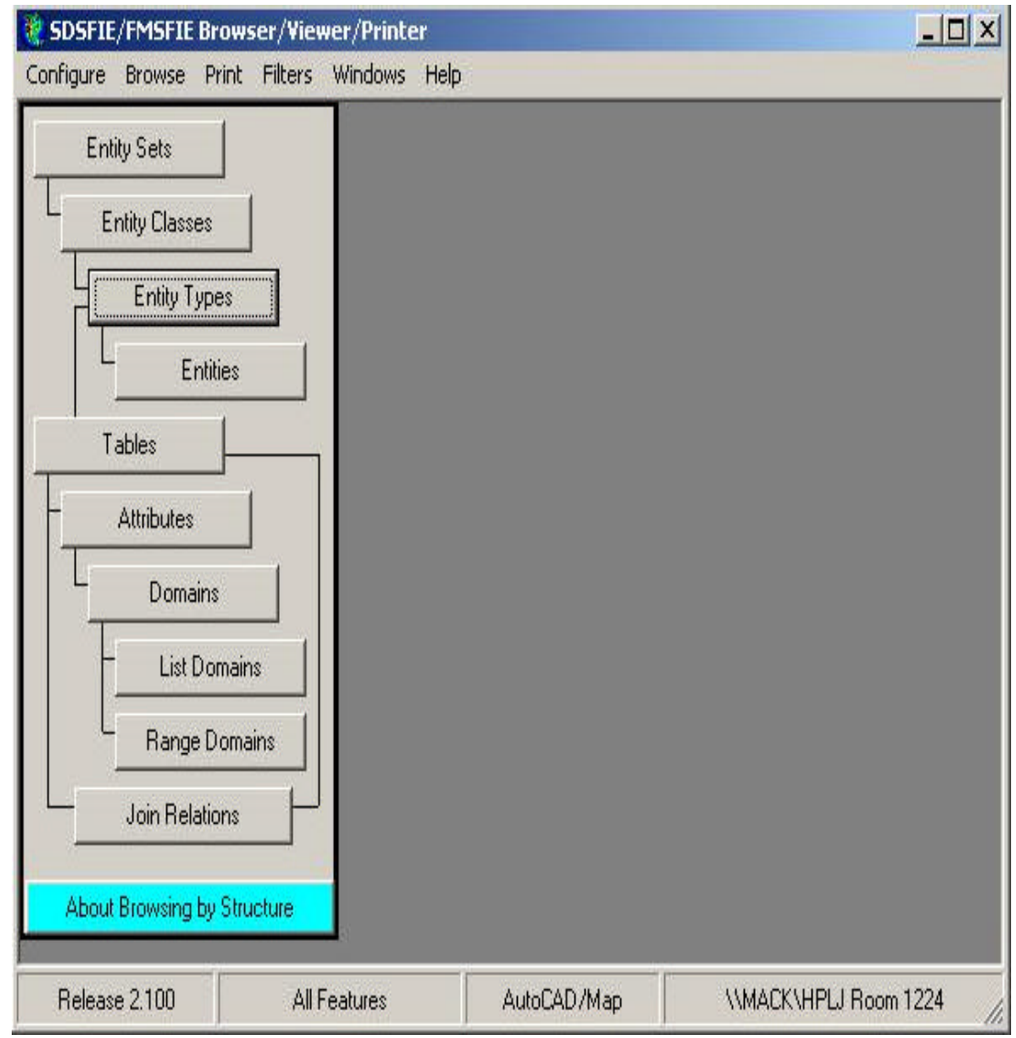
Toolbox - Browser

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.

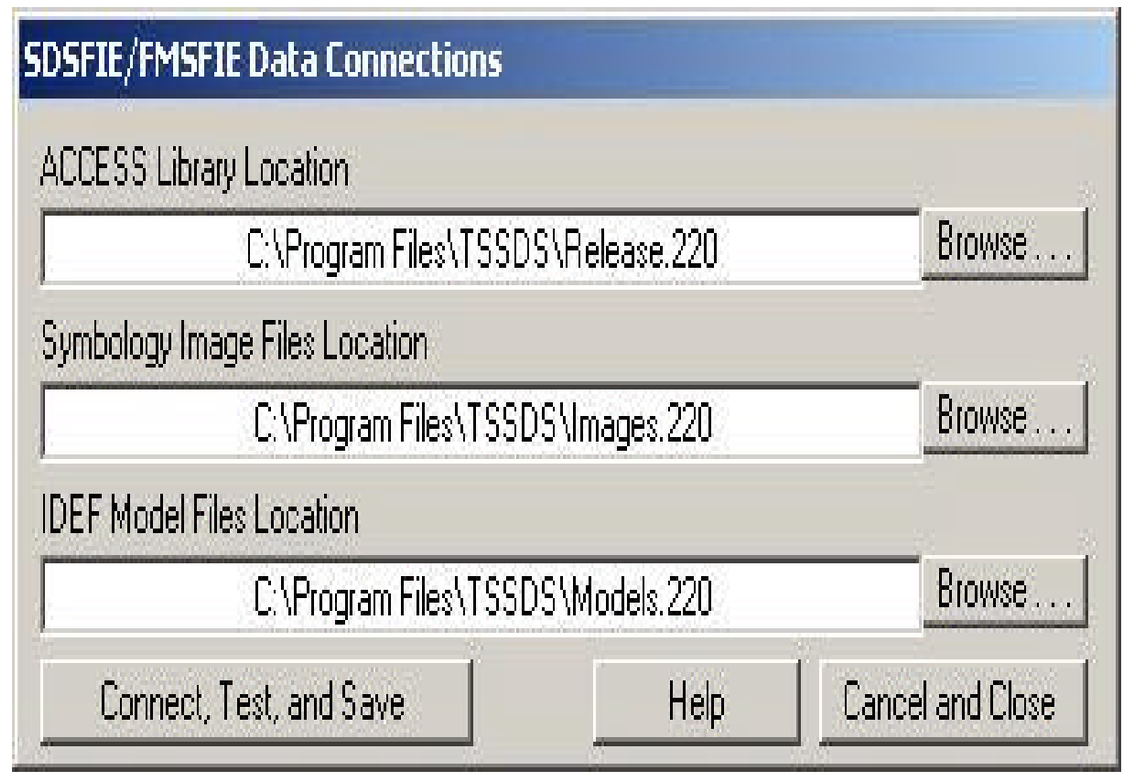
• Permits the User to view/print either: (1) entire Standard, (2) pre-defined “filter”, or (3) User’s custom filter.



Toolbox – Browser Setup

Step 1 –

- Go to Browser Menu entitled “Configure”.
- Make sure you are connected to the most current Release. Select “Browse”, then identify directory containing current Release.
- Select “Connect, Test, and Save”.



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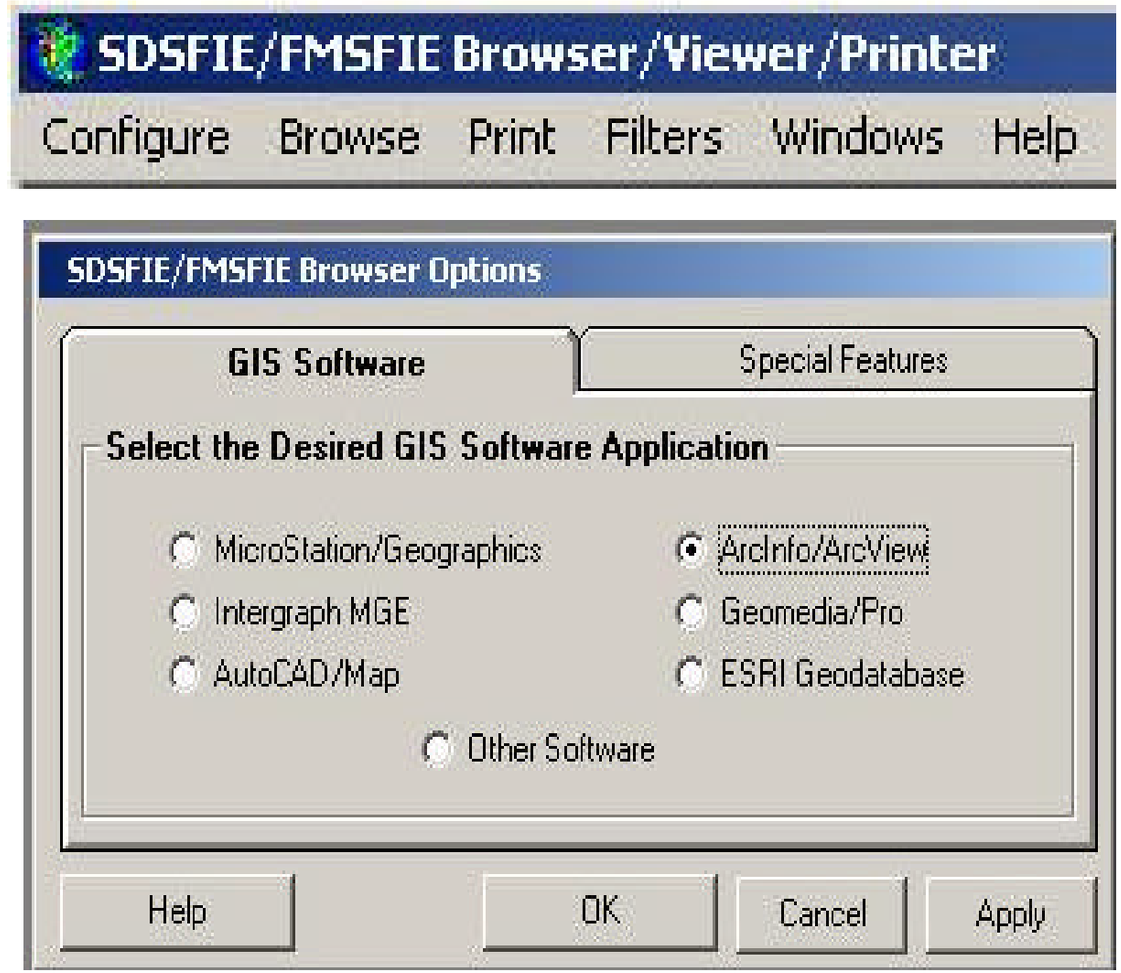
Toolbox – Browser Setup

Step 2 –

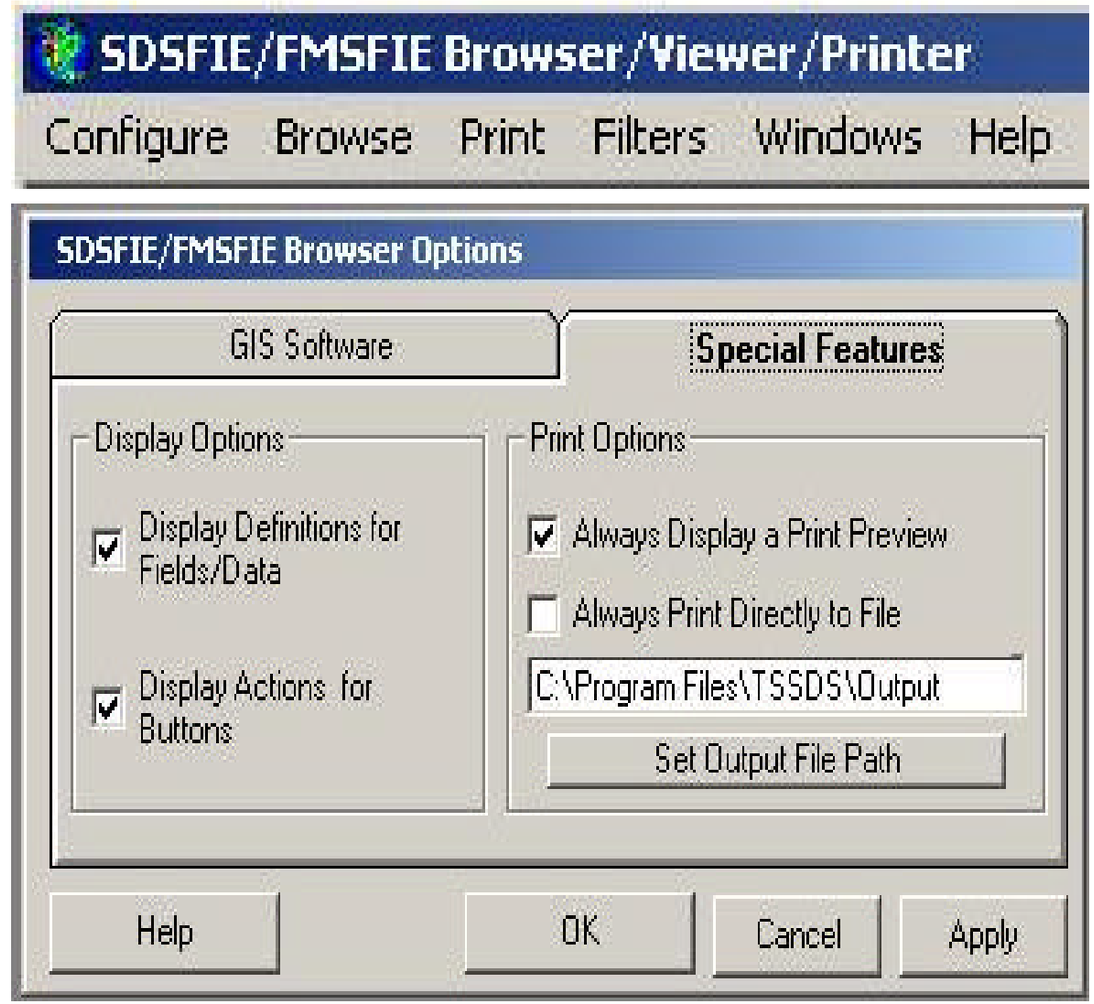
- Go to Browser Menu entitled “Configure”.
- Select “Options”.
- Under “GIS Software” Tab, Select GIS software you are using.
- Press “Apply” button, then Press “OK” button.



Toolbox – Browser Setup

Step 3 (Optional) –

- Go to Browser Menu entitled “Configure”.
- Select “Options”.
- Under “Special Features” tab, Select your preferences.
- Press “Apply” button
- Press “OK” button.



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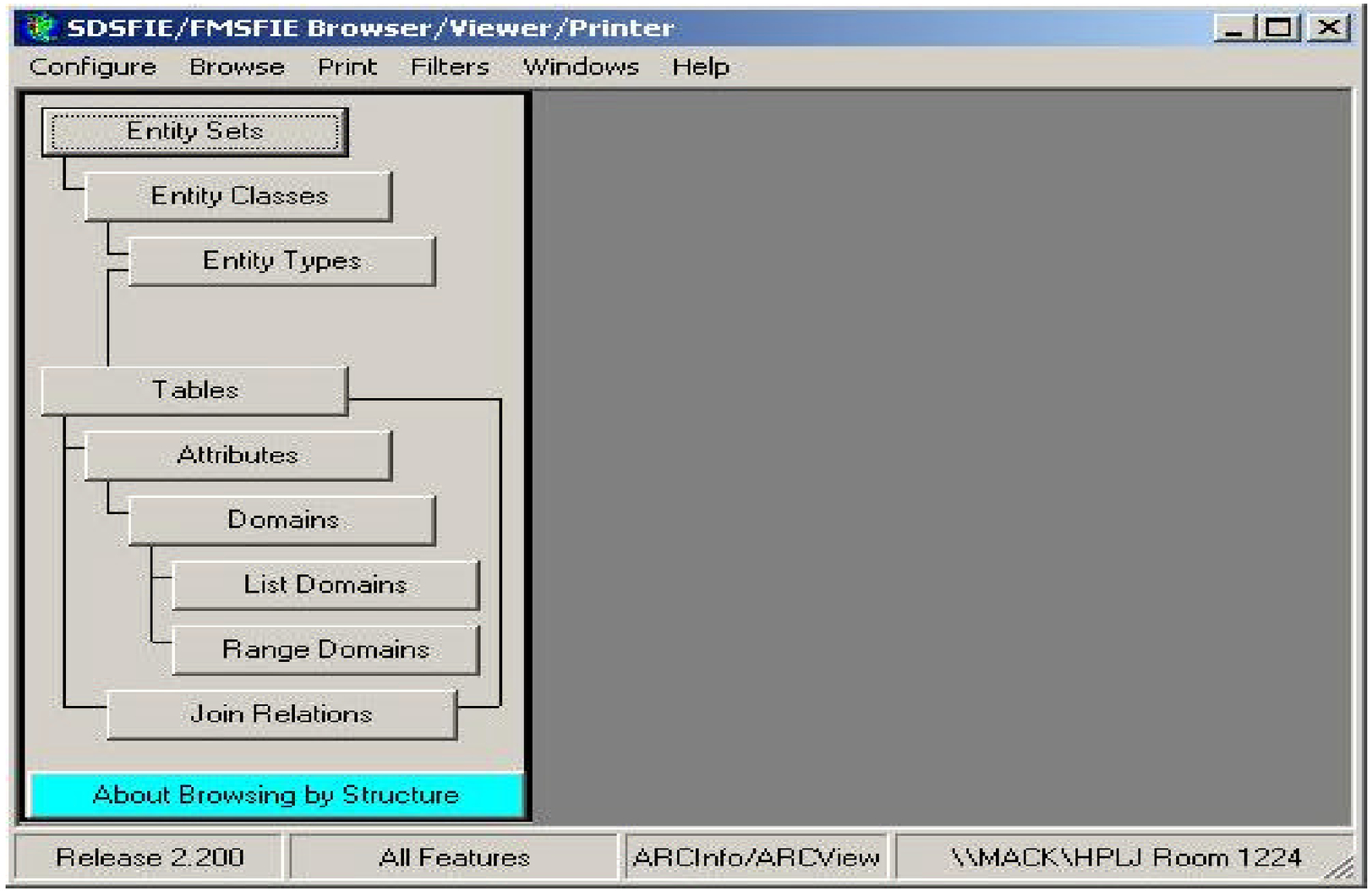
Toolbox - Browser



Toolbox - Browser

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Menu entitled "Browse"provides Viewing and Identification Options:

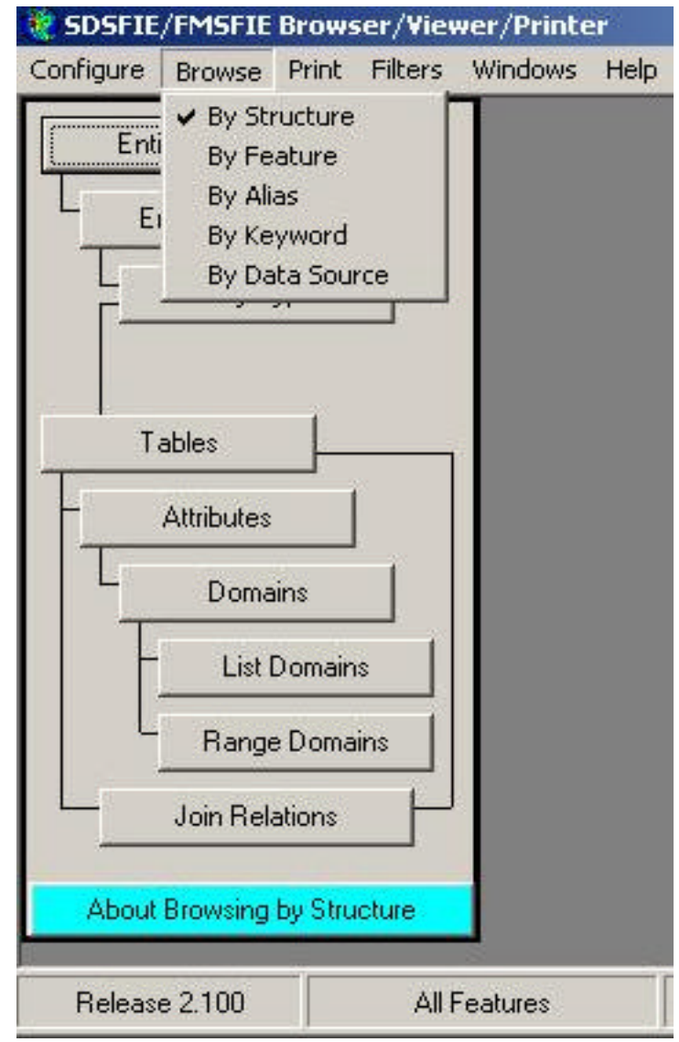
• **Structure** – View Standard by selecting Entity Set, Entity Class, Entity Type, Tables, Attributes, Domain Tables, & Domain Values.

• **Feature** – View standard by selecting Features of Interest.

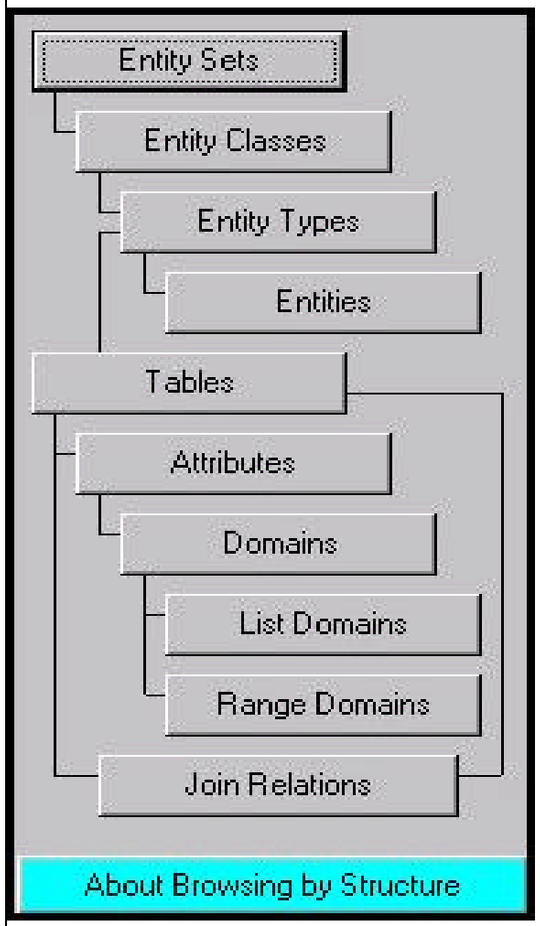
• **Alias** – View standard by selecting Alias Feature Names.

• **Keyword** – View standard by a Keyword (e.g., tree).

• **Data Source** – View standard by Source (e.g., FGDC, EPA).



oolbox – Browser – Browse by Structure



26	Entity Sets
169	Entity Classes
967	Entity Types
6,811	Entities (CADD & CADD Based GIS)
1,055	Attribute Tables (Database Tables)
27,239	Attributes (Fields in Tables)
1,022	Domain Tables (List & Range)
22,749	List Domain Values
17	Range Domains
8,503	Relational Database Join Relationships

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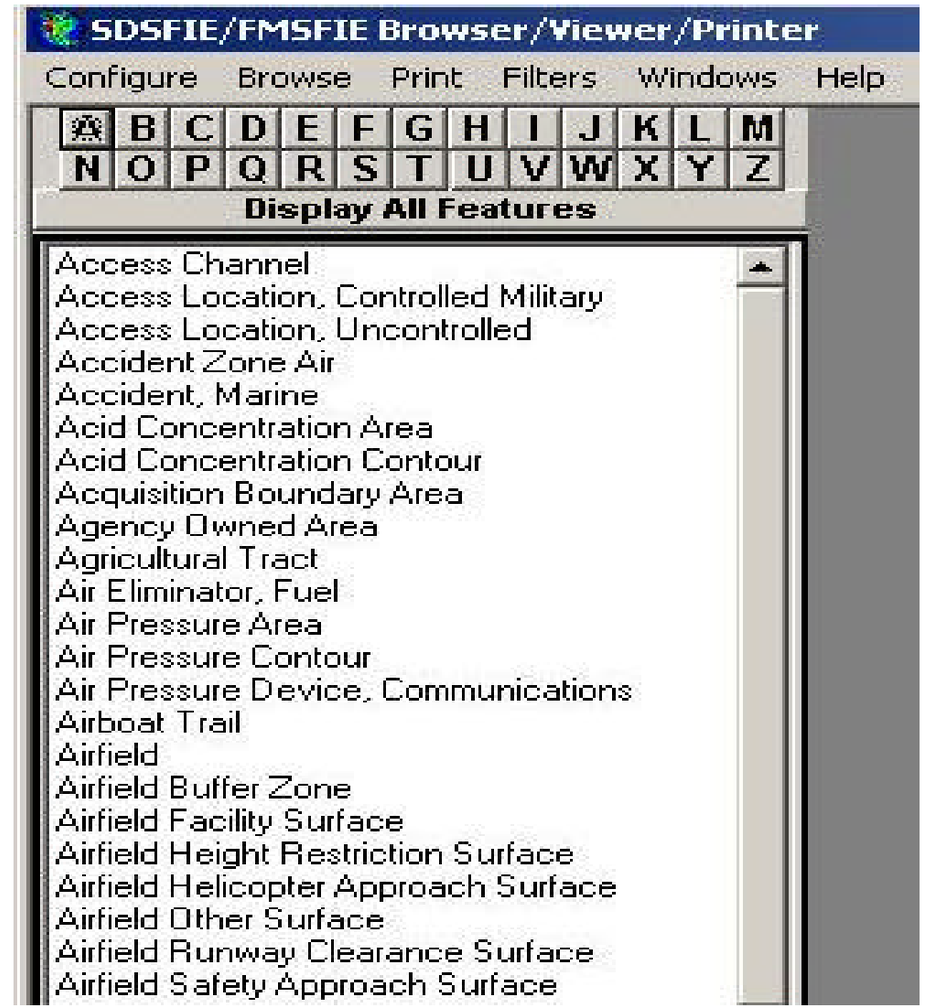
Toolbox - Browser

Menu entitled "Browse"provides Viewing and Identification Options:

• **Feature** – View standard by selecting Features of Interest.

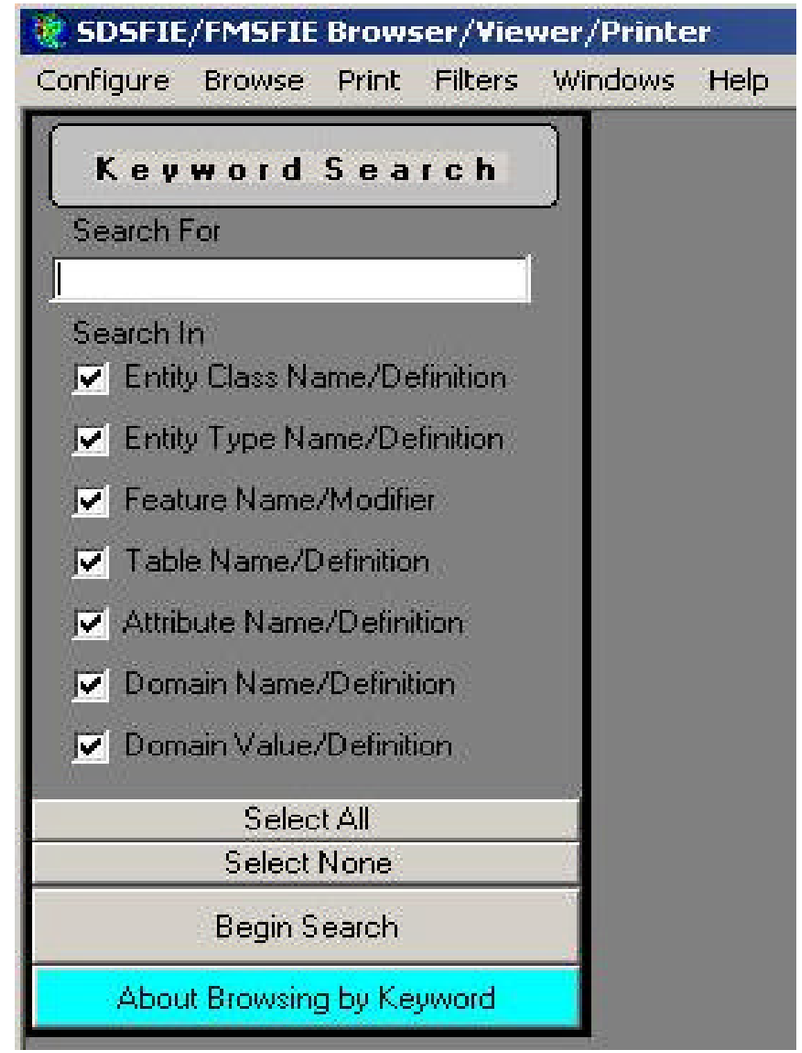
• **Alias** – View standard by selecting Alias Feature Names.



Toolbox - Browser

Menu entitled "Browse" provides Viewing and Identification Options:

• **Keyword** – View standard by a Keyword (e.g., tree).



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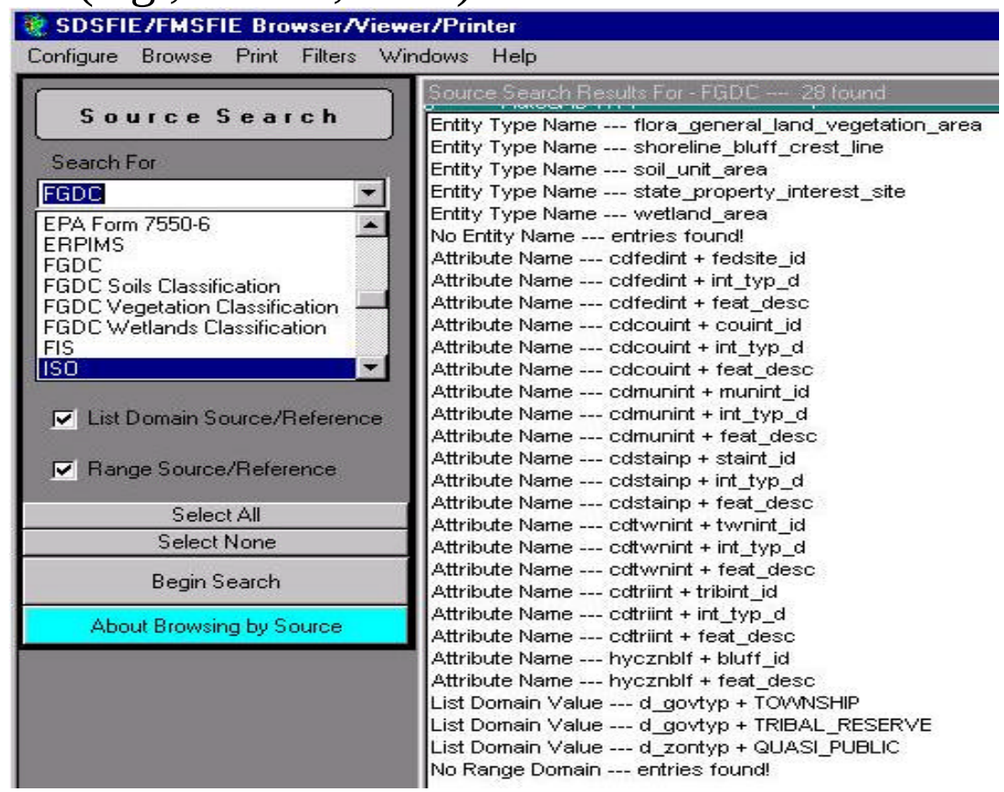
Toolbox - Browser

Menu entitled "Browse"provides Viewing and Identification Options:

Data Source – View standard by Source (e.g., FGDC, EPA).

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.



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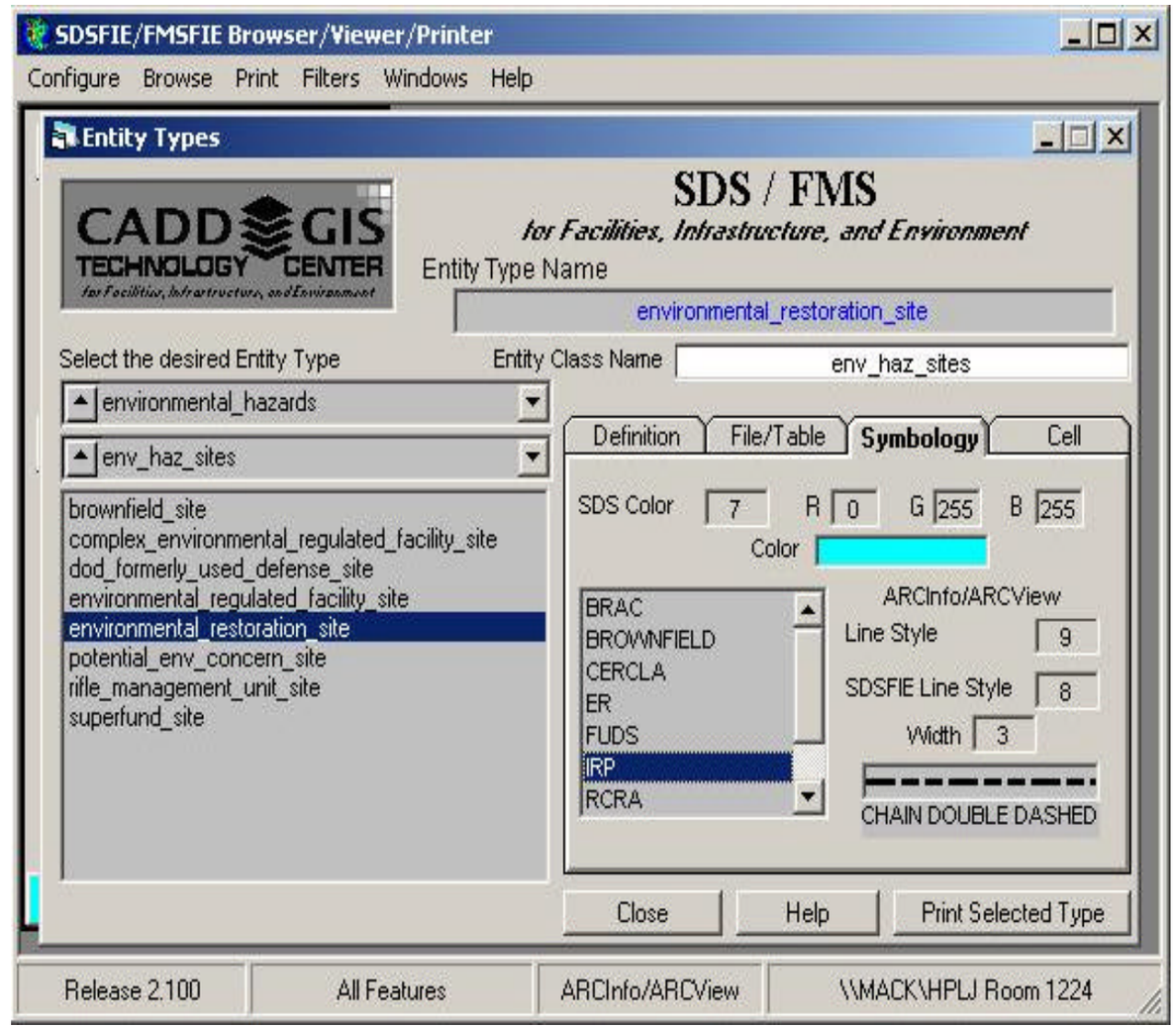
Toolbox - Browser

SDSFIE Browser Software Application:

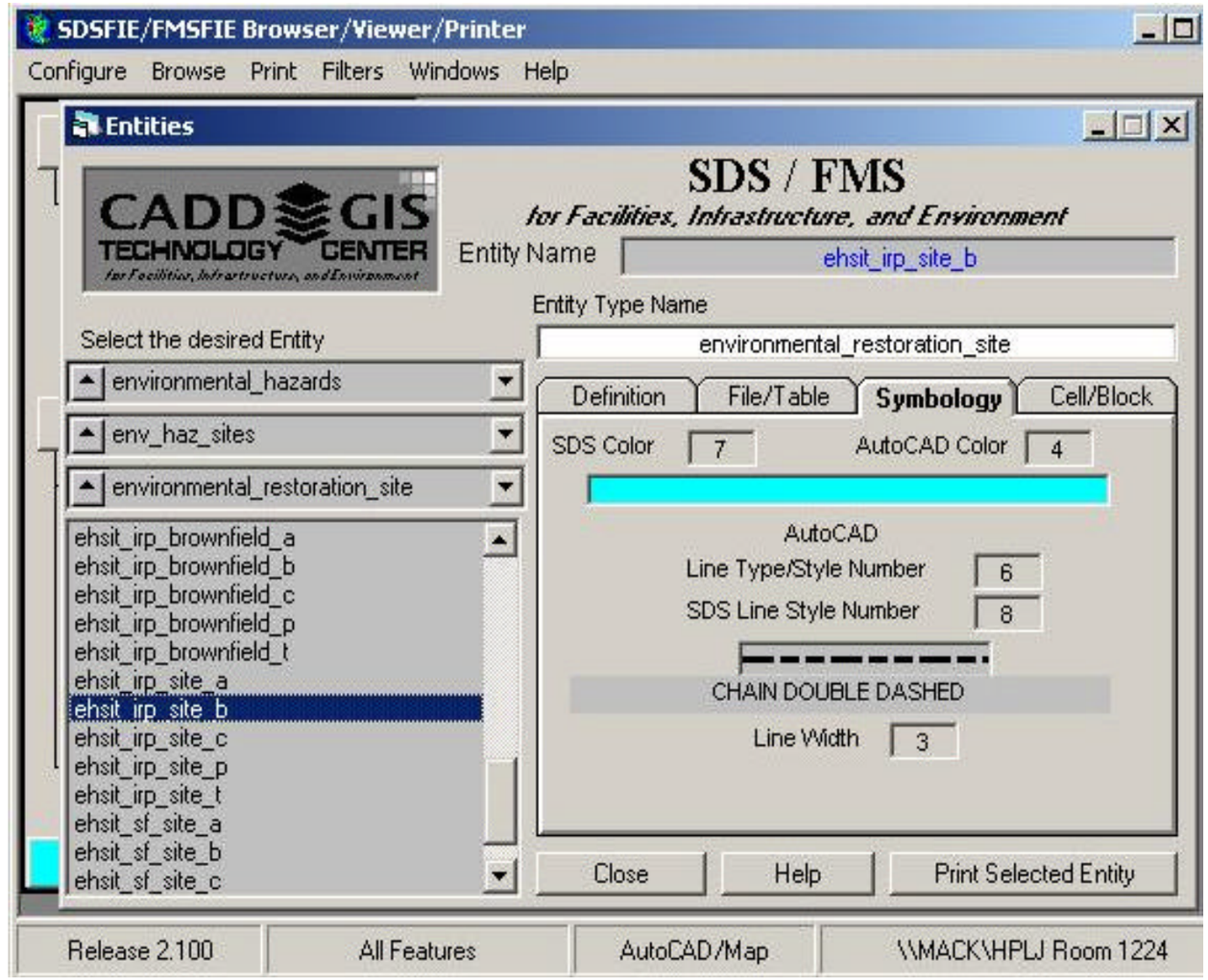
- Permits the User to view Standard color, linestyles, & symbols.



Toolbox - Browser

SDSFIE Browser Software Application:

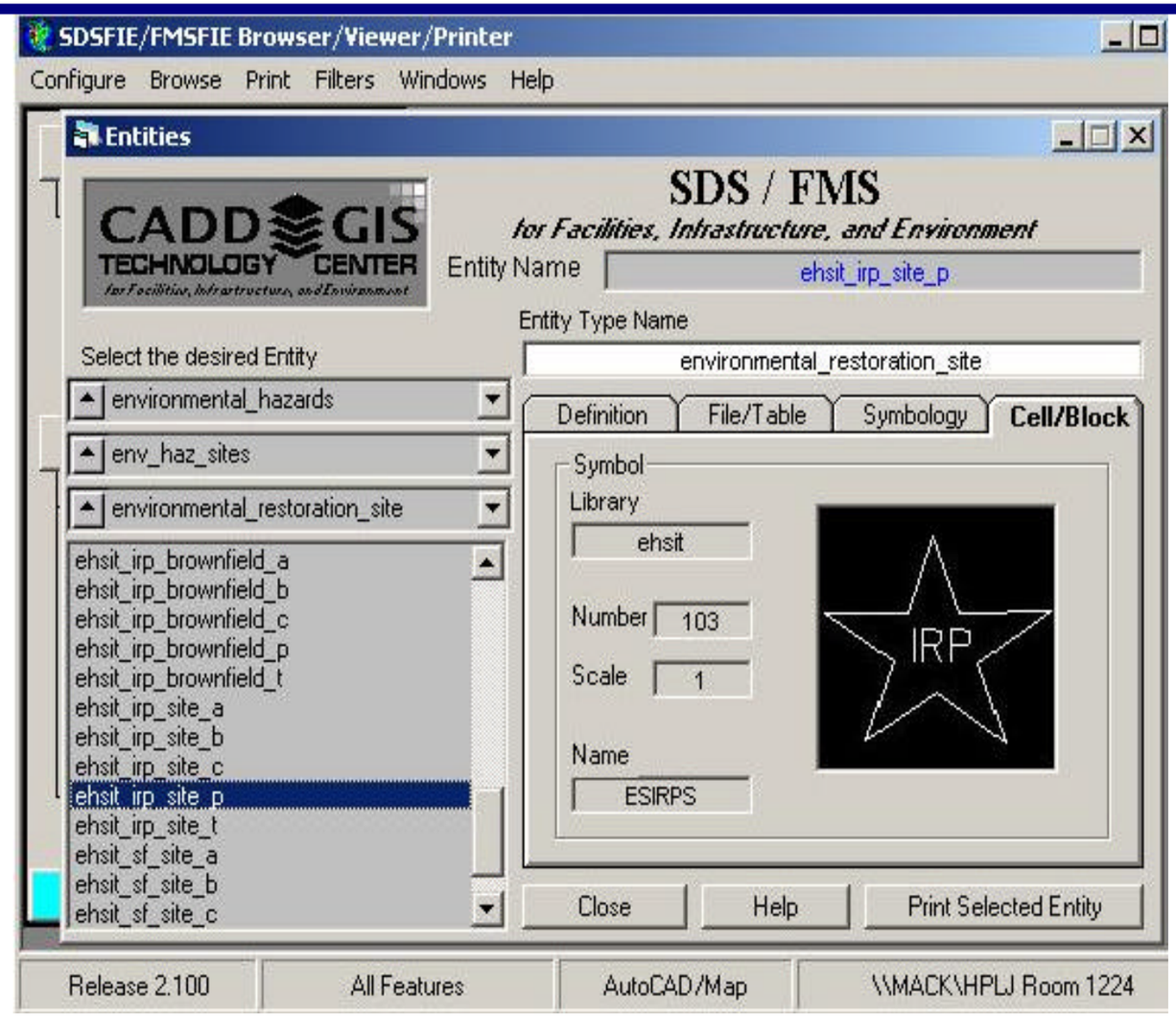
- Permits the User to view Standard color, linestyles, & symbols.
- AutoCAD Map is a CADD Based GIS with Layer assignments for placement of features, text, & linestyles (called Entities).



Toolbox - Browser

SDSFIE 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.



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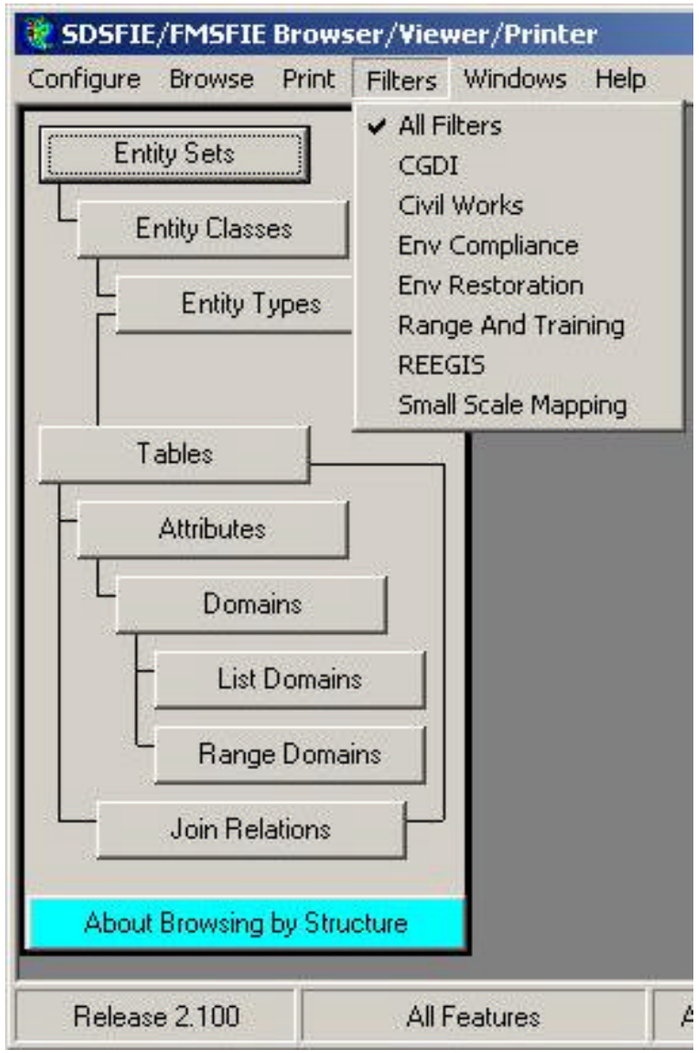
Toolbox - Filters



- "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.

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Toolbox – Filter Maker

SDSFIE 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.

Toolbox – Access Builder

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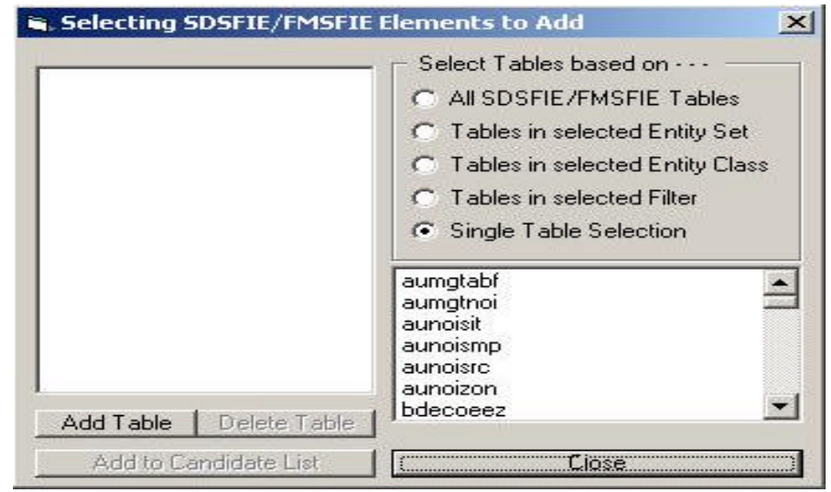
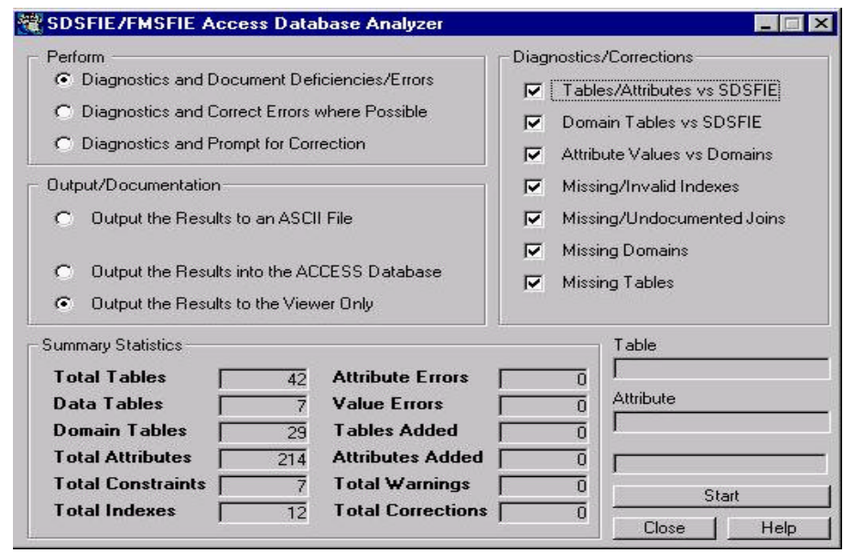
SDSFIE Access Builder Software Application:

- 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.





Toolbox – SQL Generator

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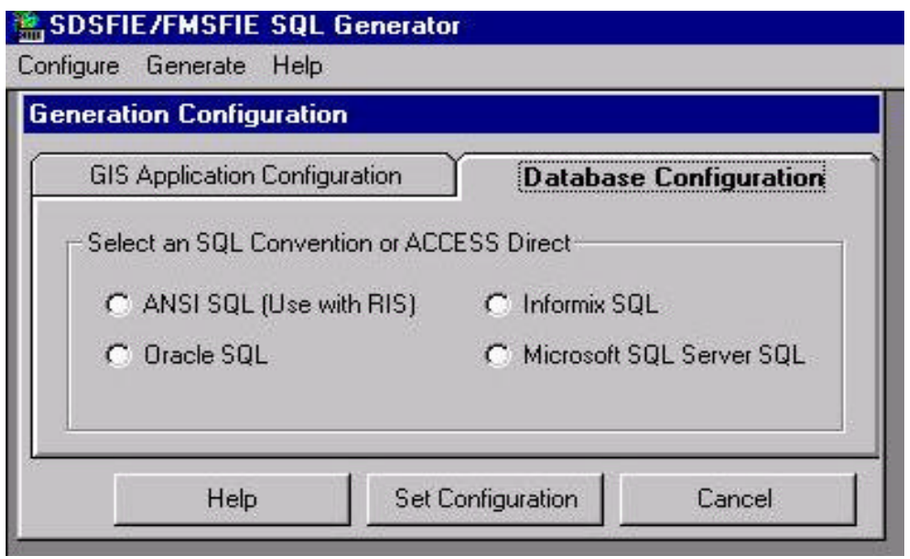
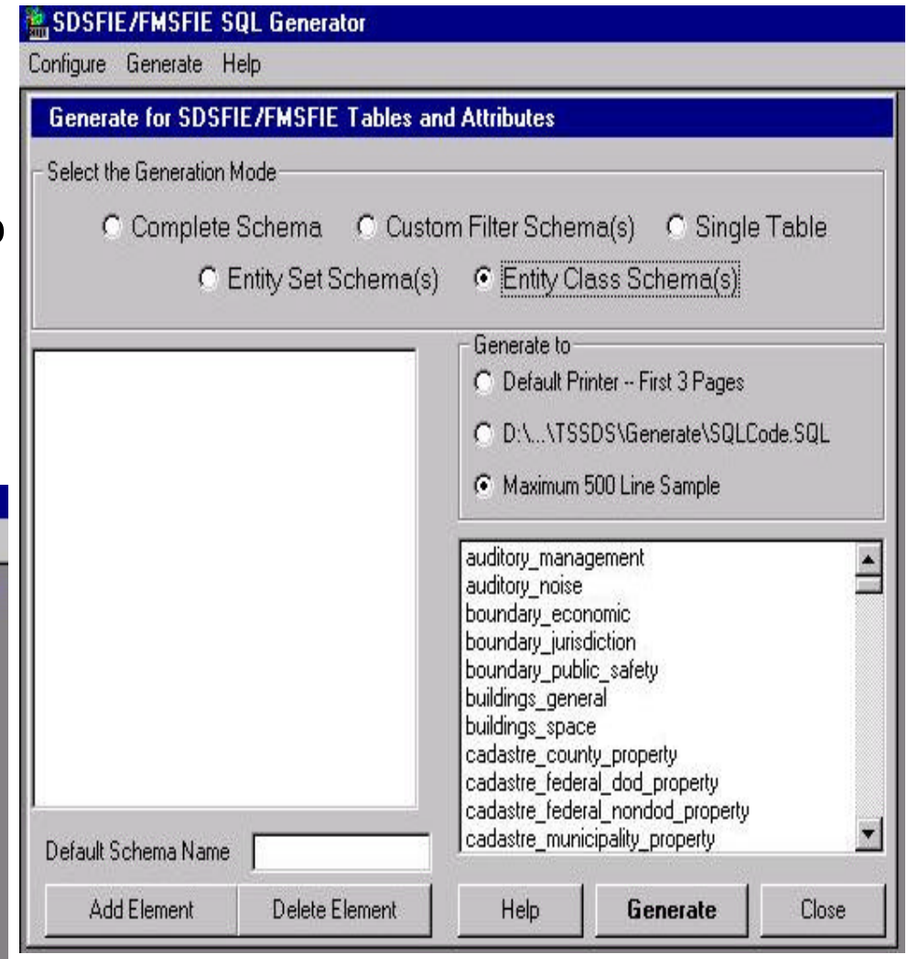
SDSFIE SQL Generator Software Application:

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





Toolbox – Access Data Creator

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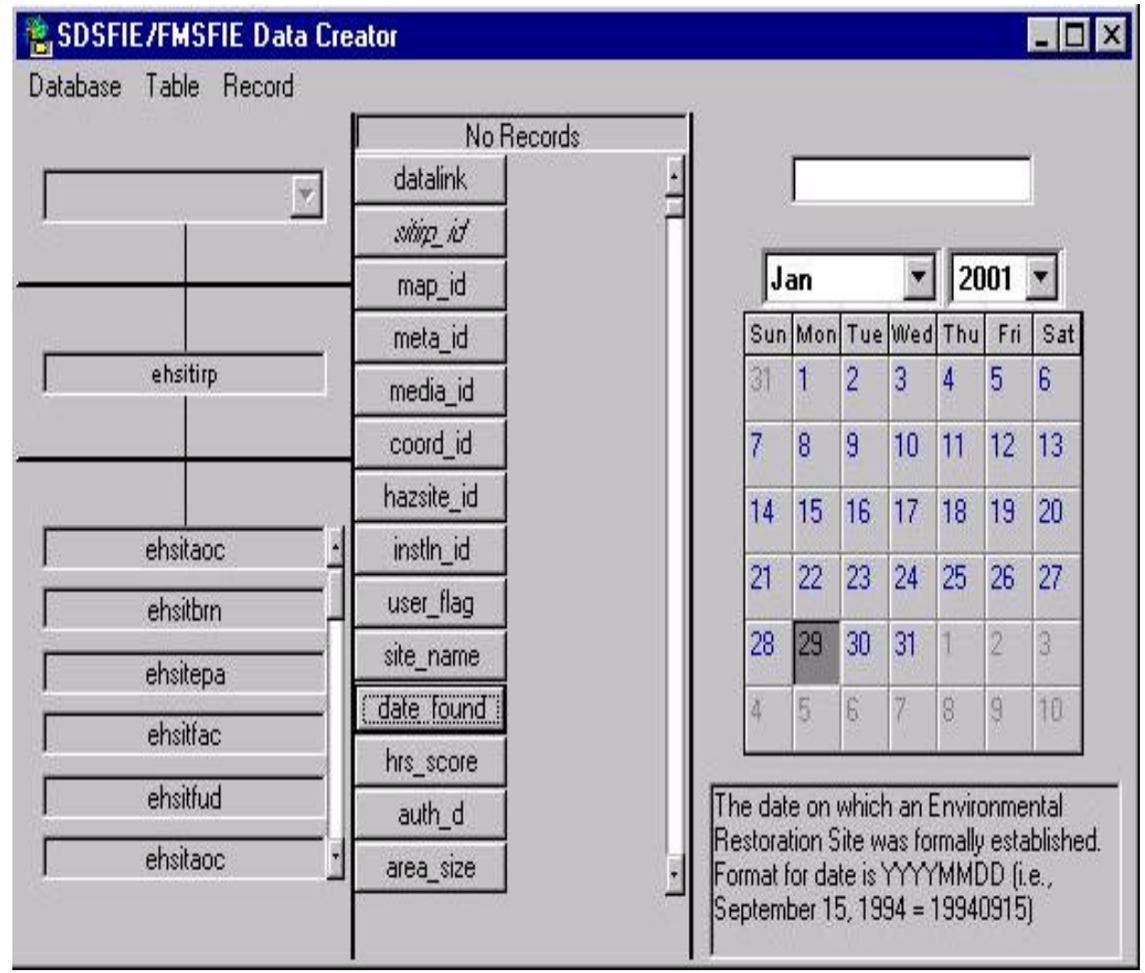
SDSFIE Access Data Creator Software Application:

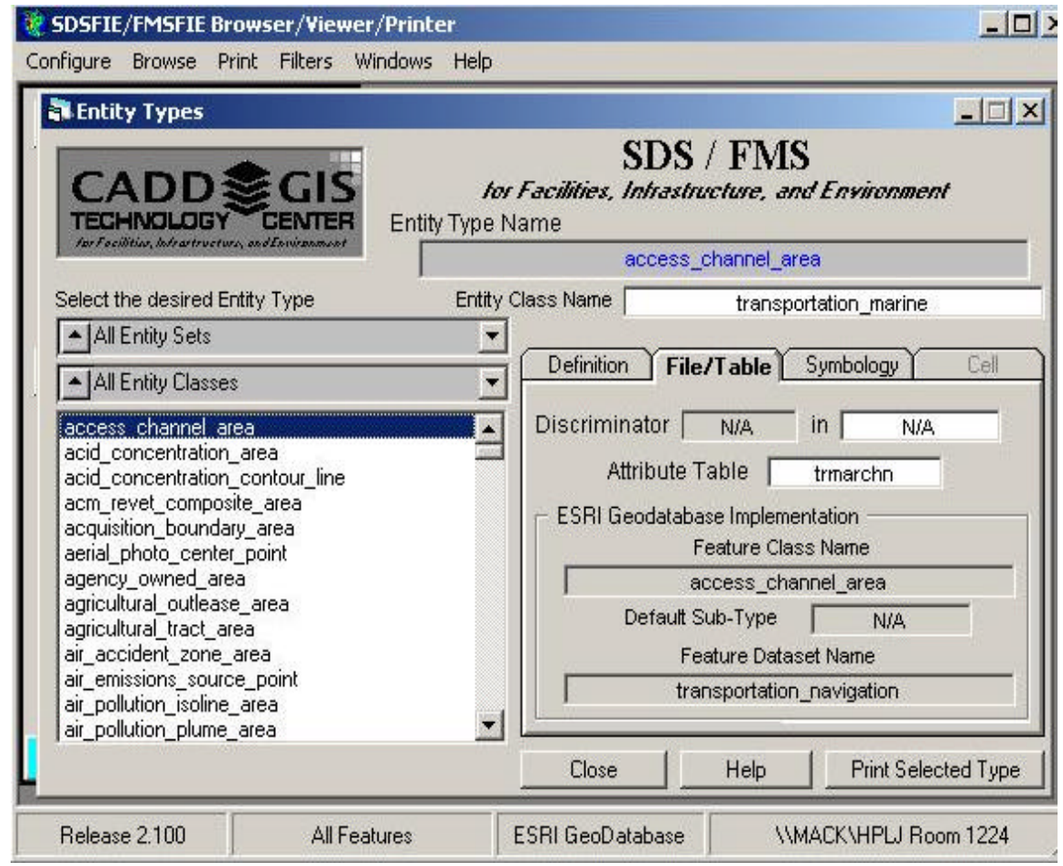
• Provides a tool which permits the User to manually input data into SDSFIE/FMSFIE compliant Microsoft Access 97 or 2000 database tables.



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



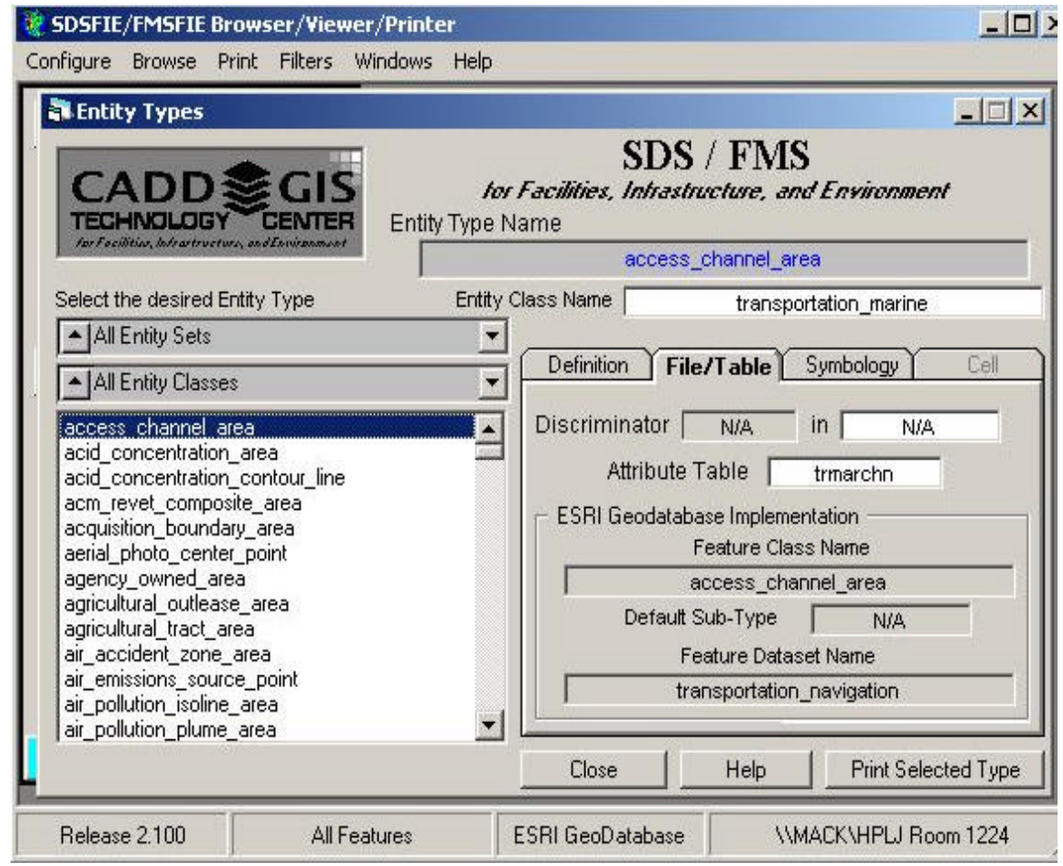
- **Release 2.10 Geodatabase –**

- Based upon Access 2000, but did not yet implement relational SDSFIE/FMSFIE database.

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.

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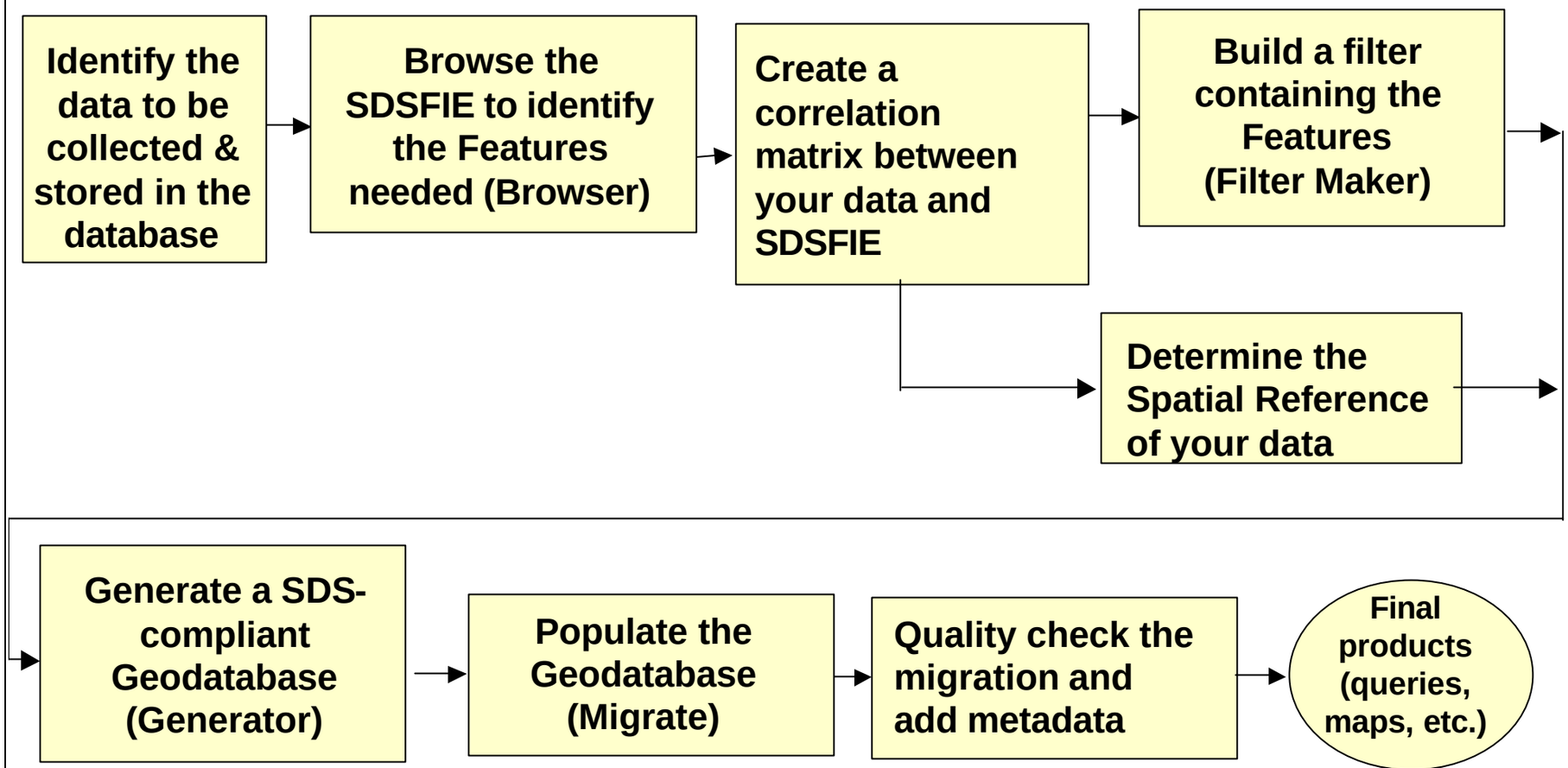
Steps for Implementing the SDSFIE



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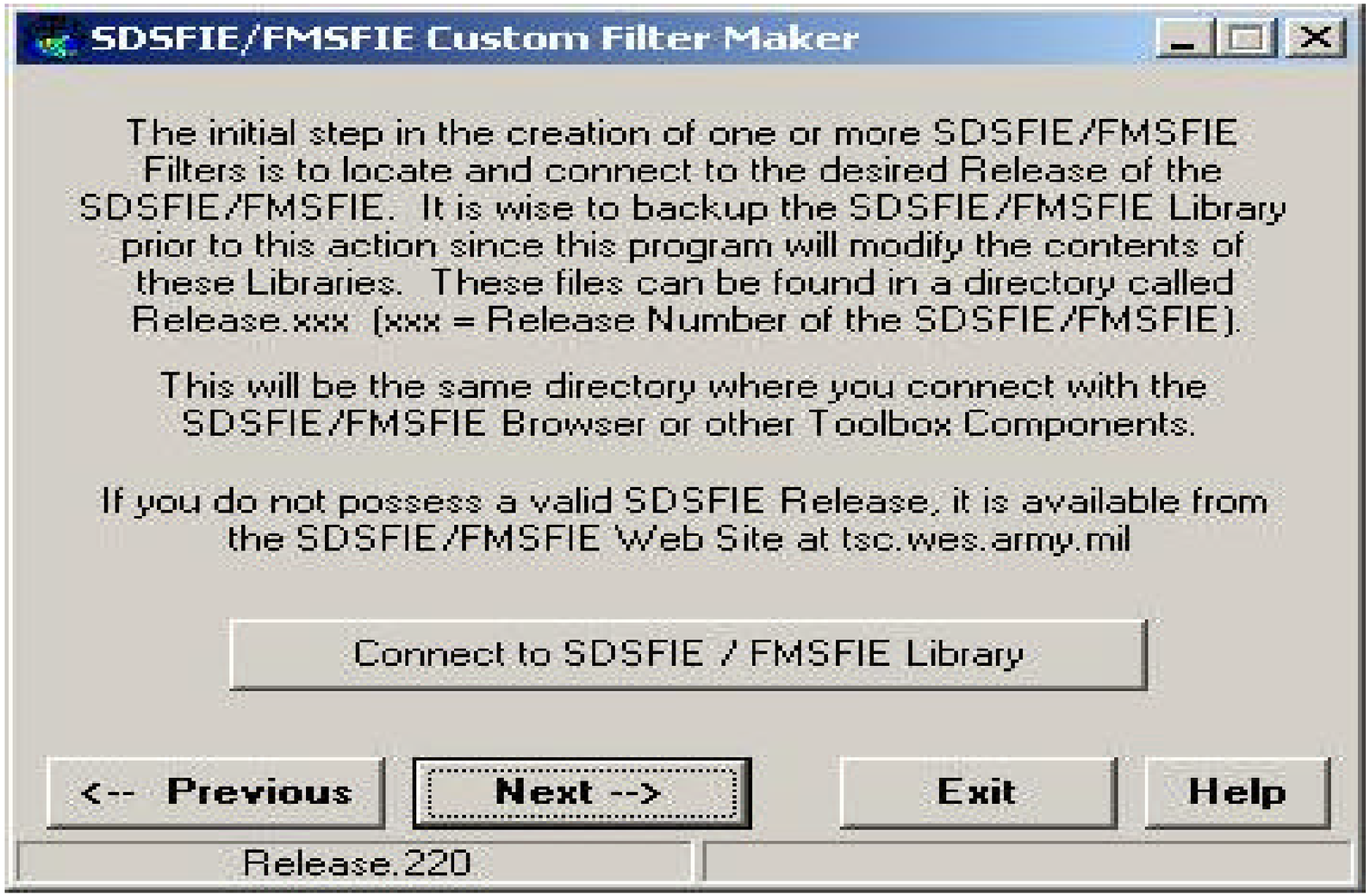
Toolbox – Filter Maker



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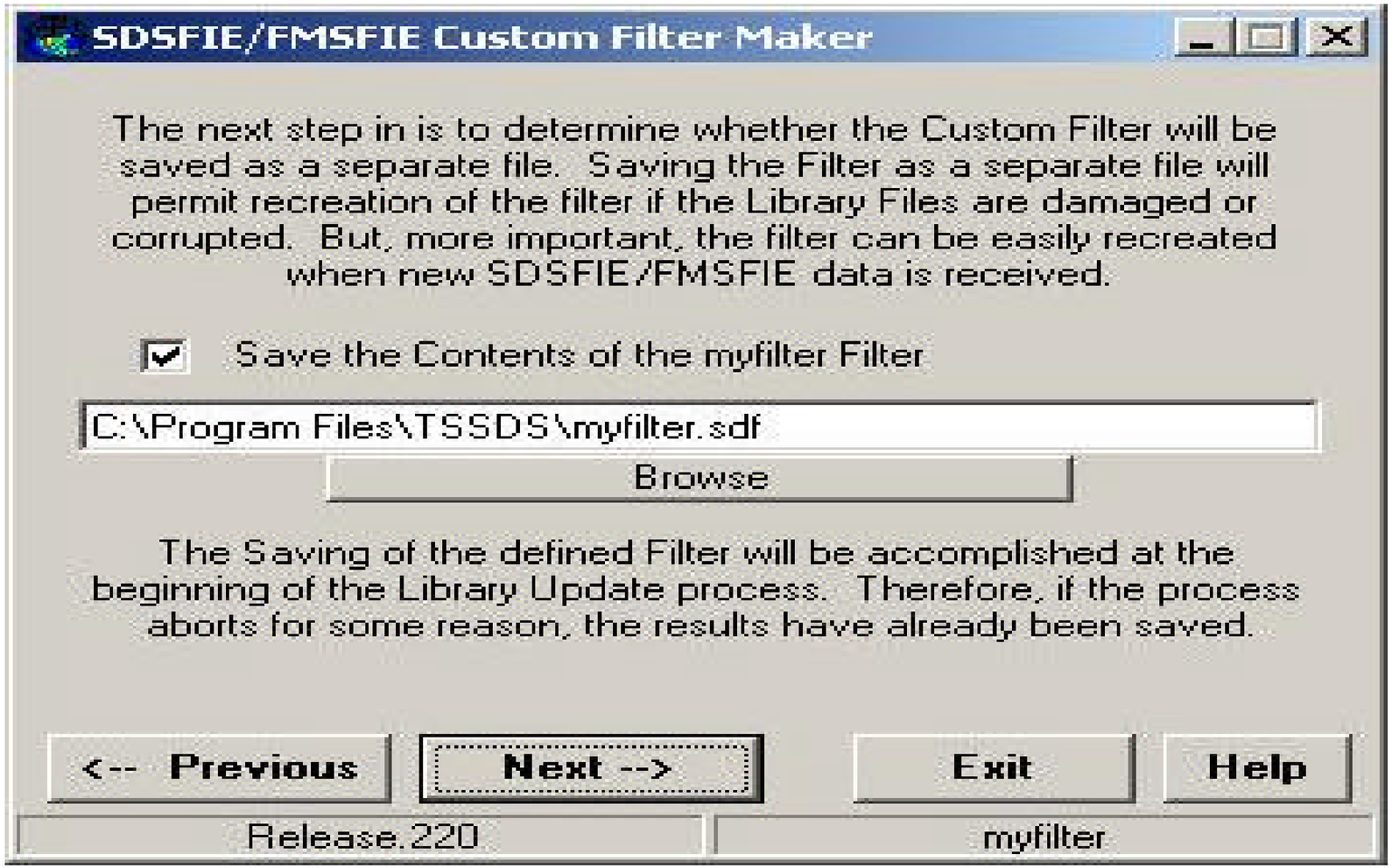

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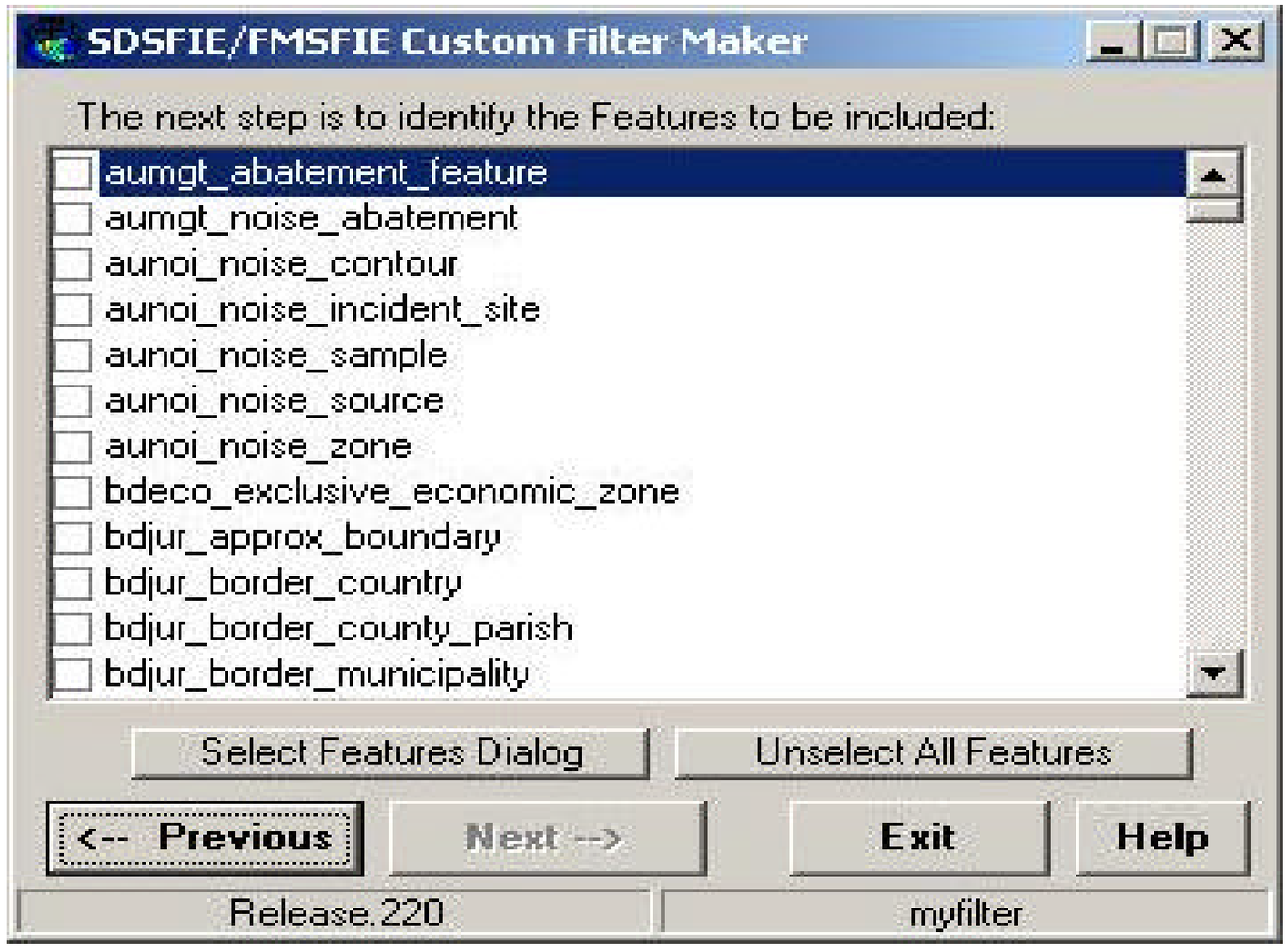

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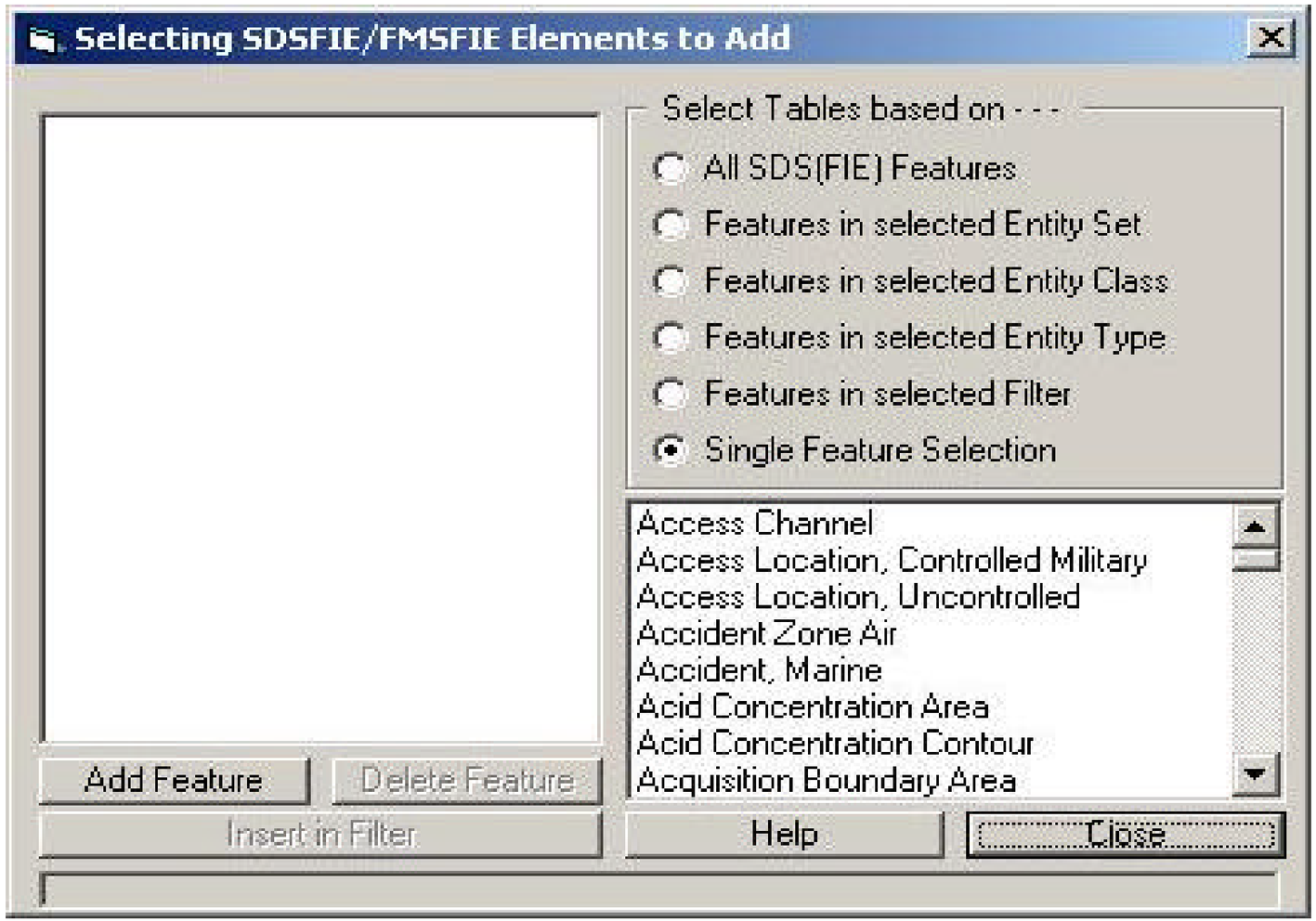

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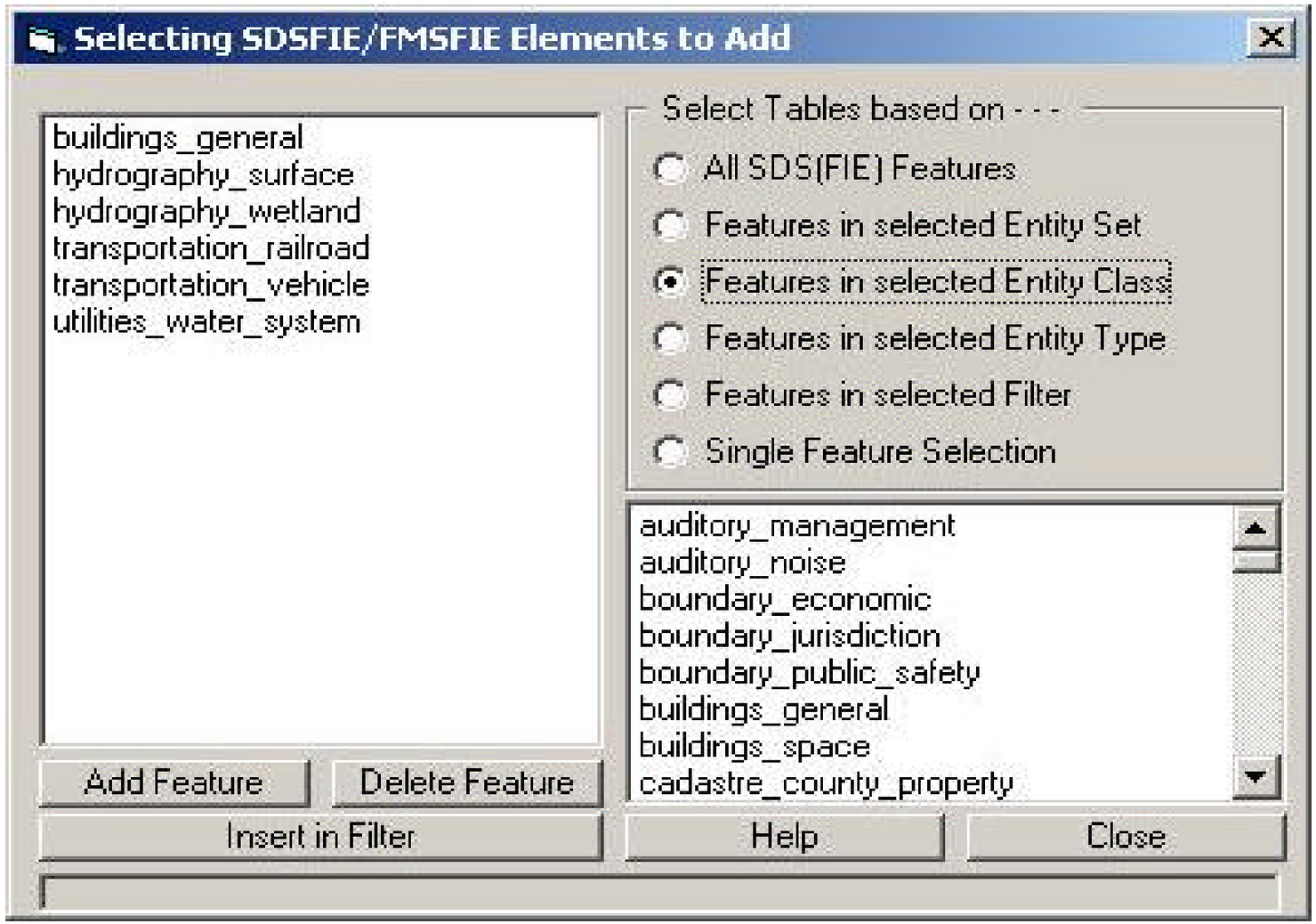

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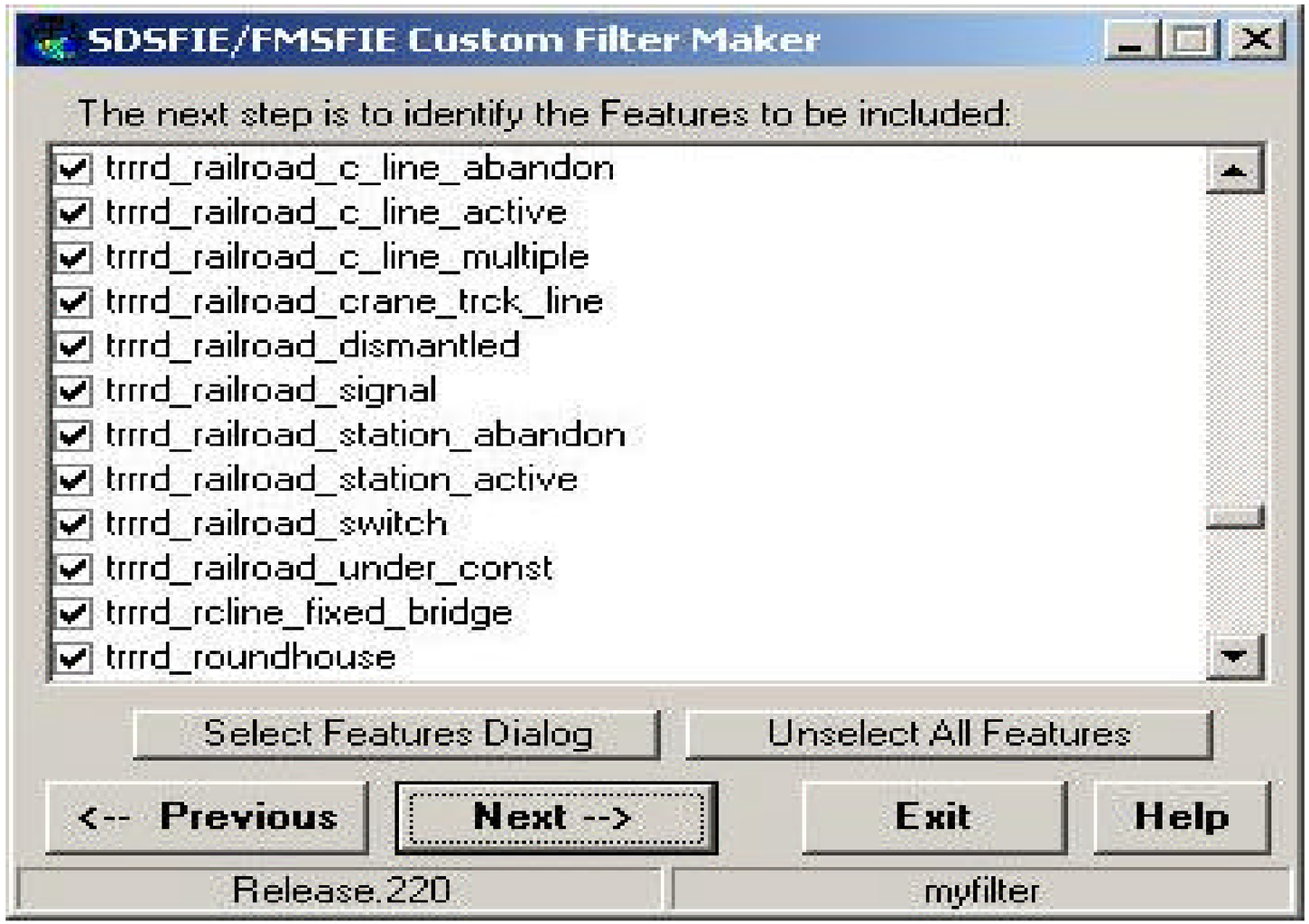

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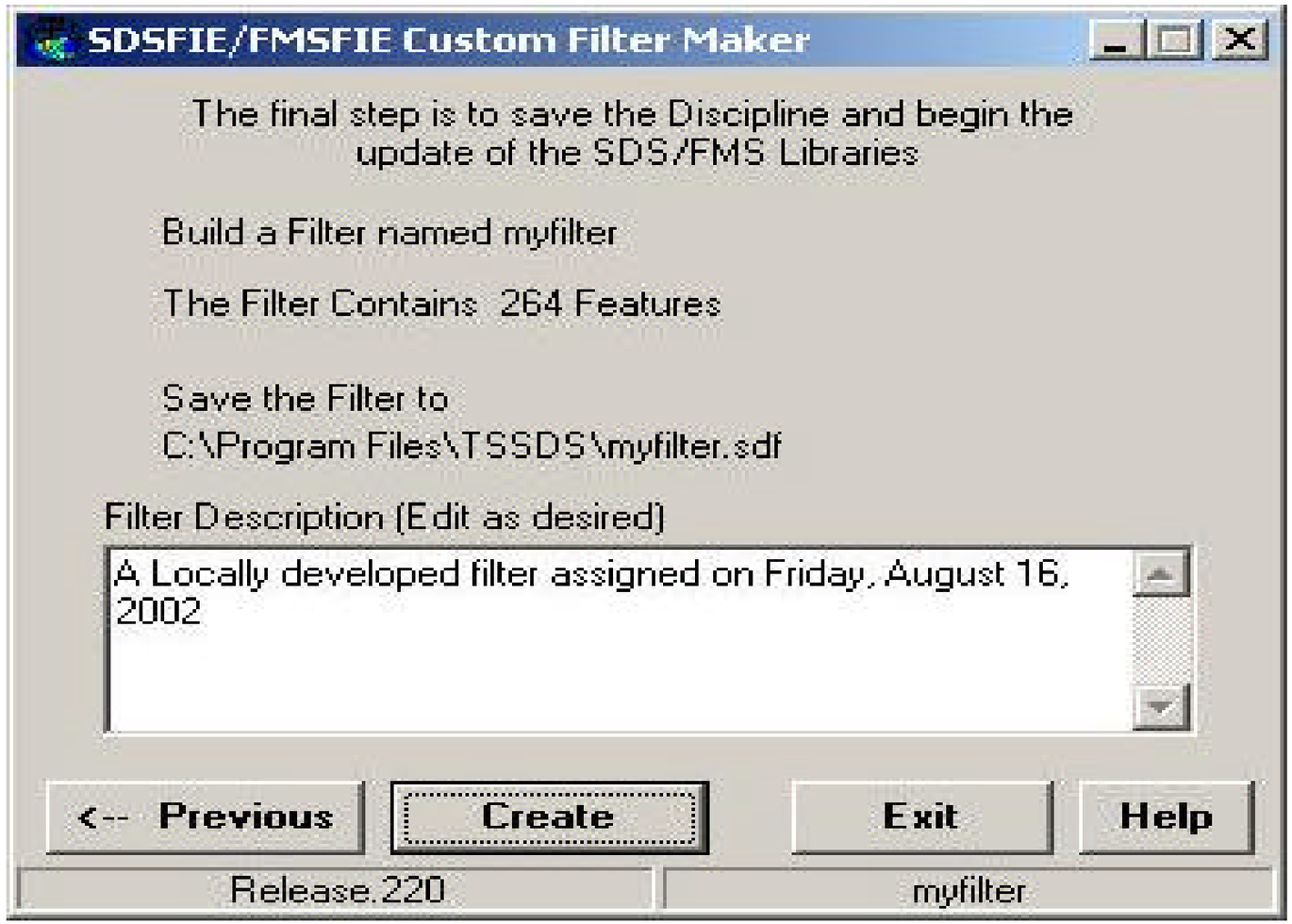
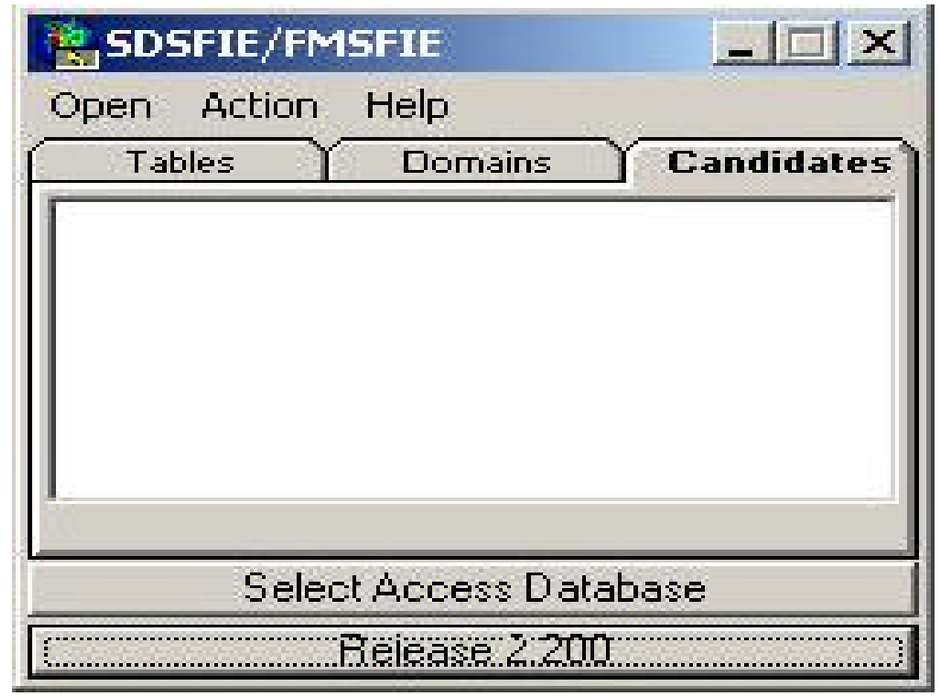
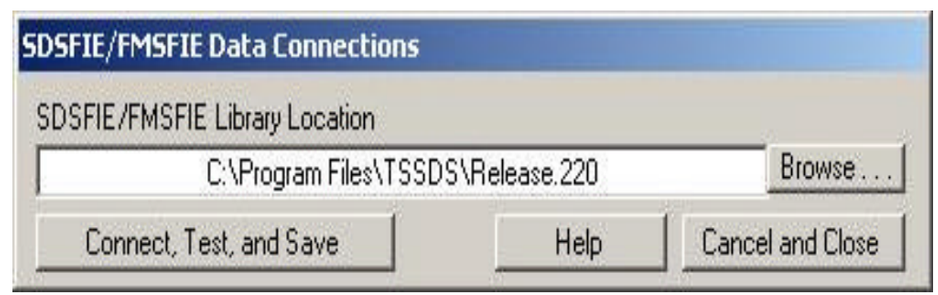


Toolbox – Access Builder

Step 1 –

- Go to drop down Menu entitled “Open”.
- Select “Library Connection”
- Make sure you are connected to the most current Release. Select “Browse”, then identify directory containing current Release.
- Select “Connect, Test, and Save”.

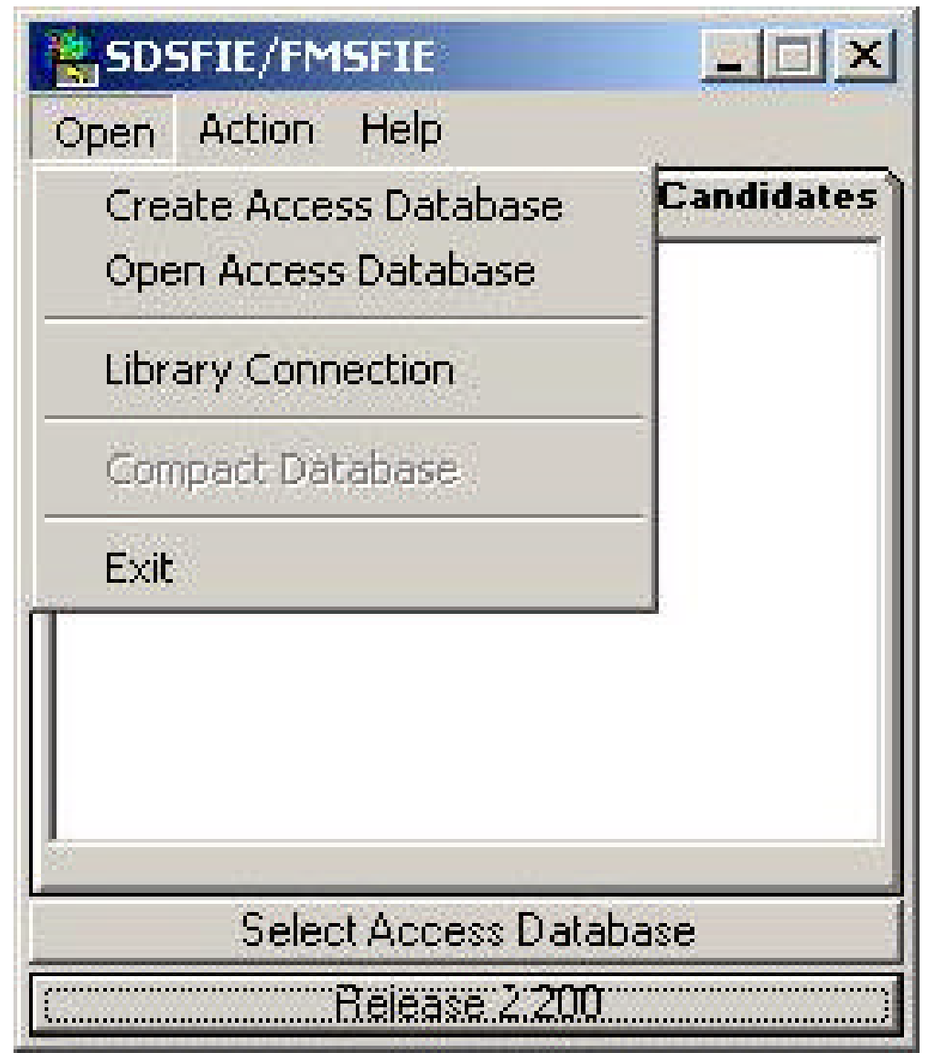




Toolbox – Access Builder

Step 2 –

- Go to drop down Menu entitled “Open”.
- Select “Create Access Database” to build new Access Database.
- Select “Open Access Database” to use an existing Access Database.



Toolbox – Access Builder

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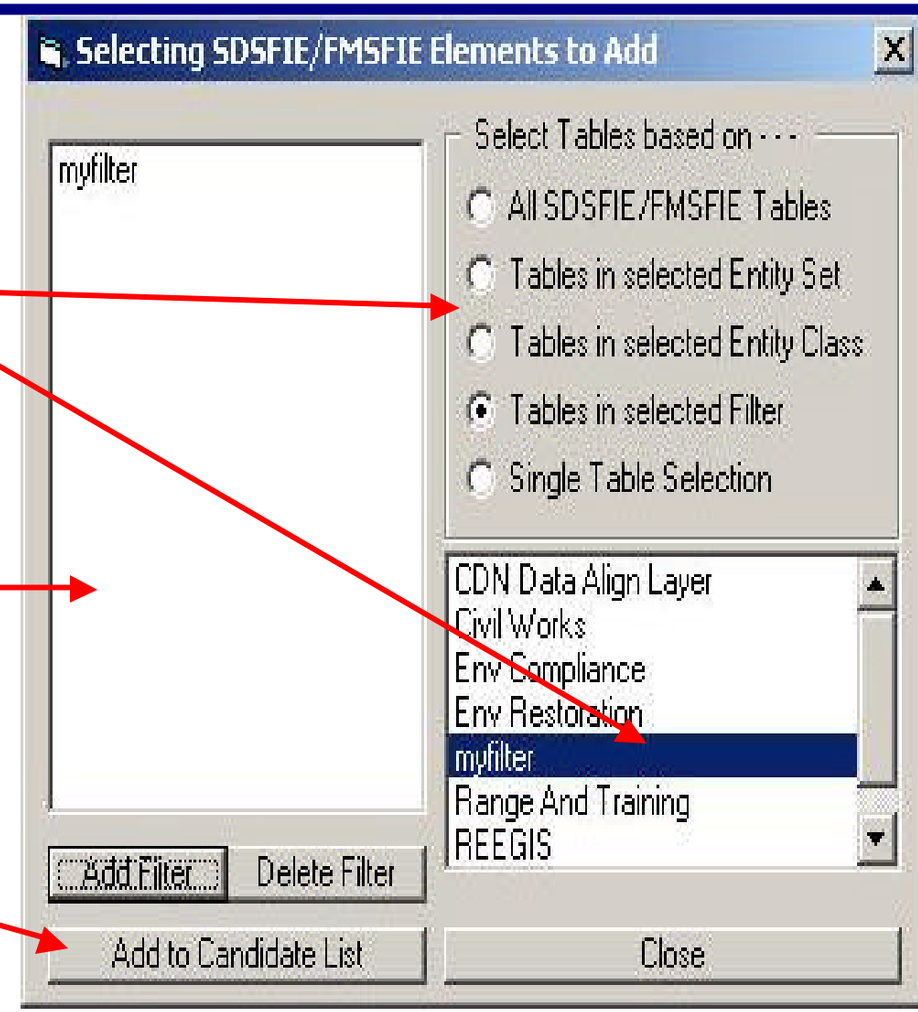
Step 4 –

- Use one or all of the five available options to select Tables from Source List.
- Select the "Add" button until all tables are included in Destination List.
- Select "Add to Candidate List" button.



Toolbox – Access Builder

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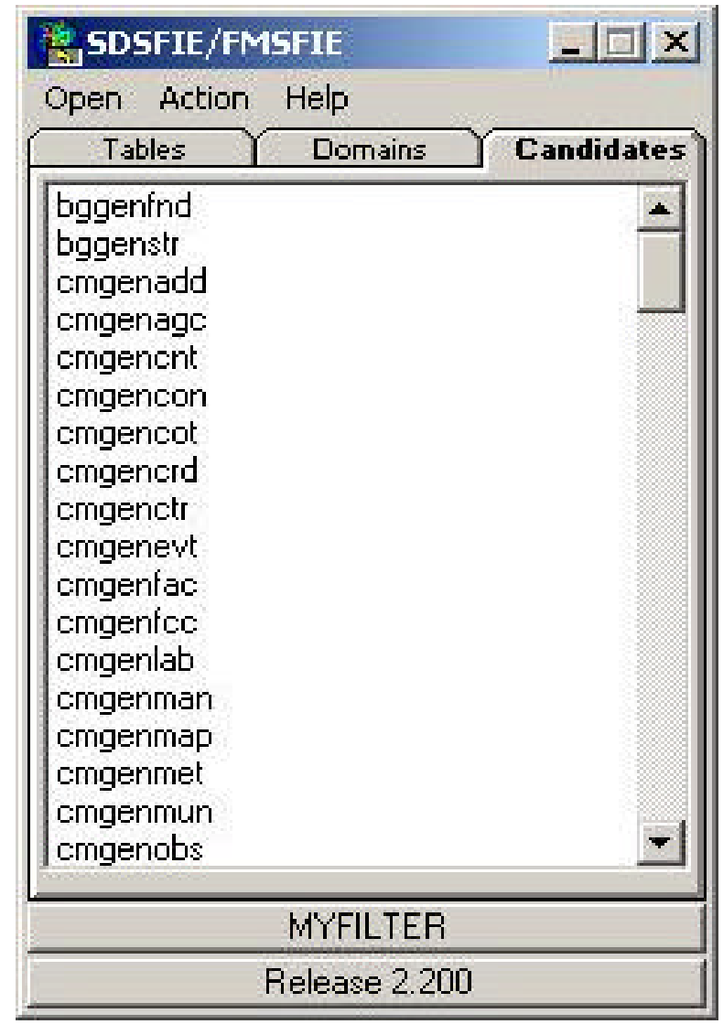
- Tables from Destination List have been included in Candidates List.

A **CANDIDATE** is a SDSFIE feature class which is proposed to be added to the user Geodatabase. Candidates may be added one at a time or based on combinations of either Entity Sets, Entity Classes, Filters, or Single Features.

They are considered **CANDIDATES** because the Builder looks to determine whether the Candidate feature class already exists before attempting to build the feature class, its attributes, its domains, and its joins.



Toolbox – Access Builder

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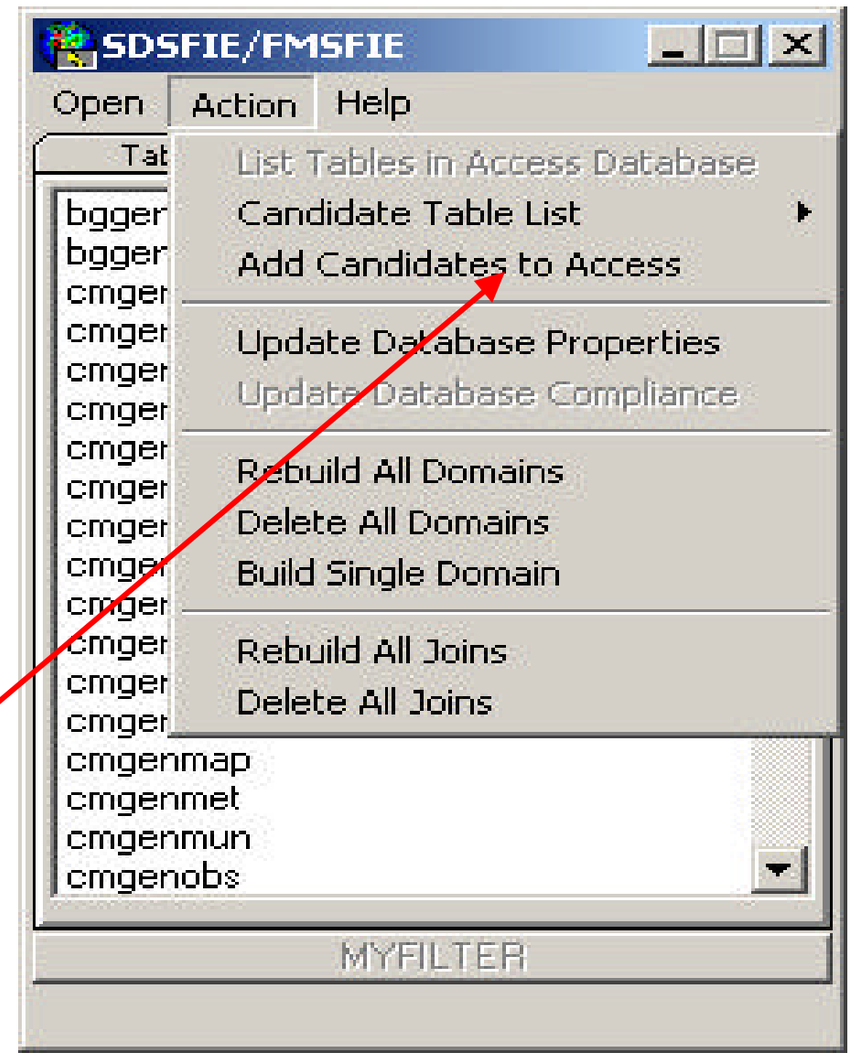
Step 5 –

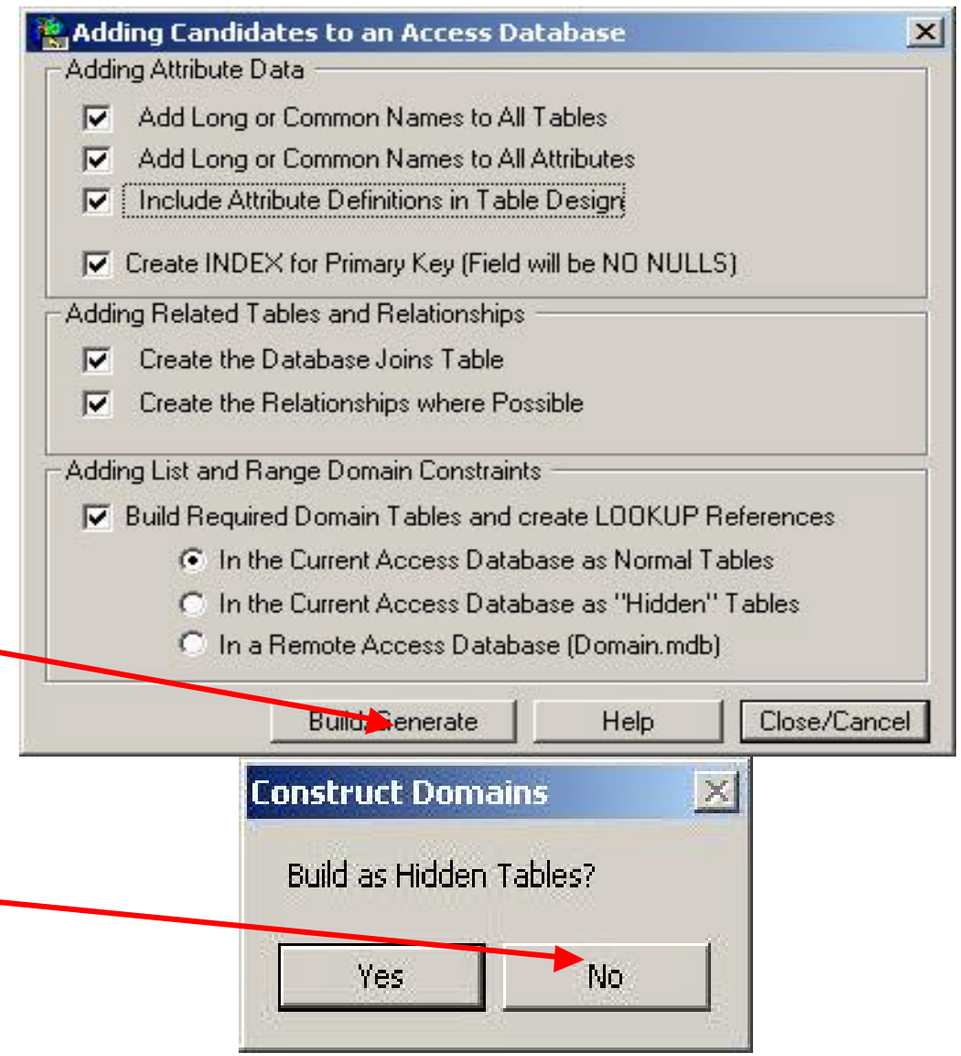
- **"Candidate Table List" -**
  - **Build** – Use to add additional tables to Candidate List.
  - **Clear** – Use to clear all tables from Candidate List.

- When complete, select **"Add Candidates to Access".**



Toolbox – Access Builder

- **Adding Candidates to Access Database –**
- Several options available. Default options are recommended.
- Select “Build/Generate” button.
- When “Build as Hidden Tables?” option appears, “No” is recommended option.



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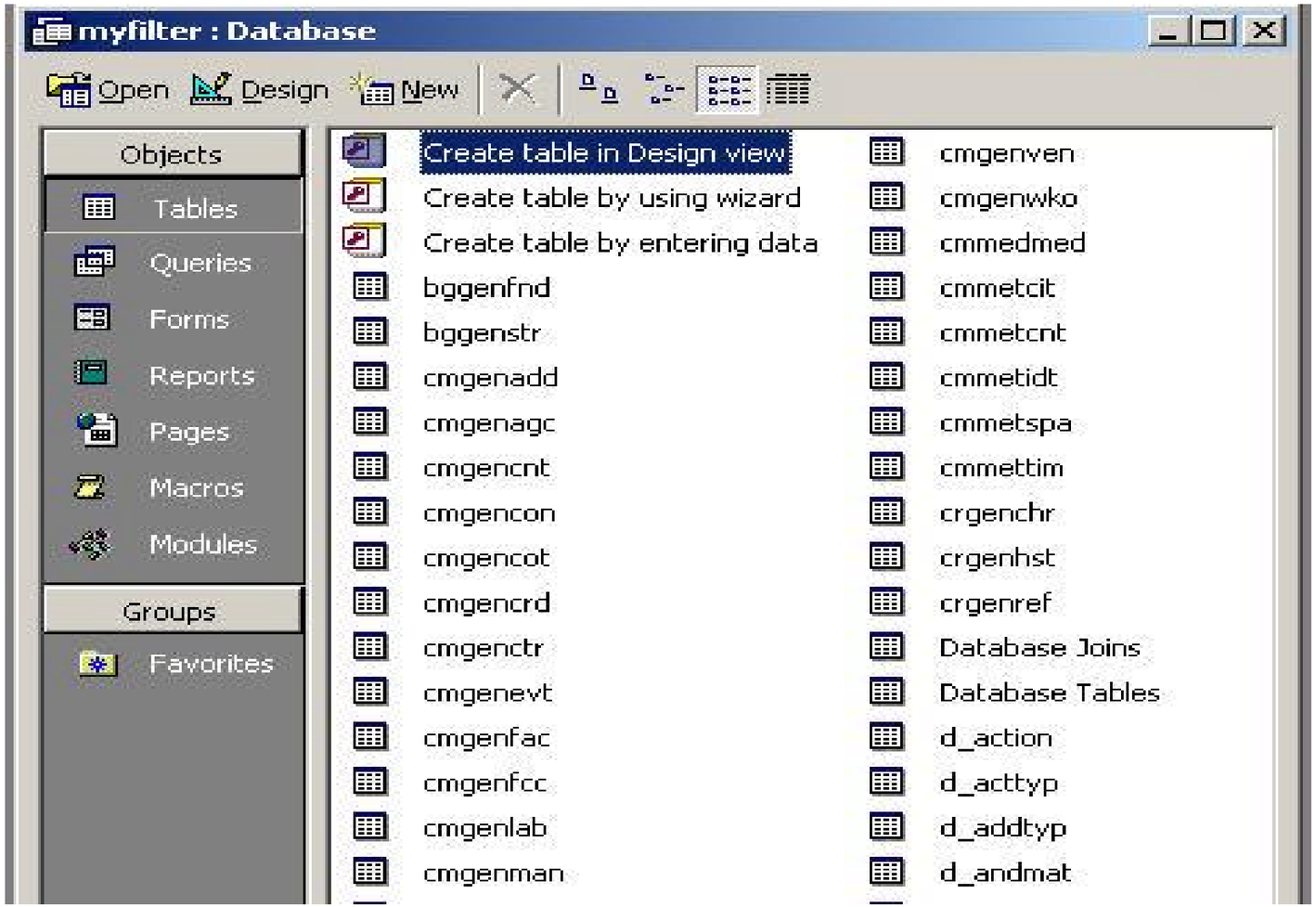
Toolbox – Access Builder



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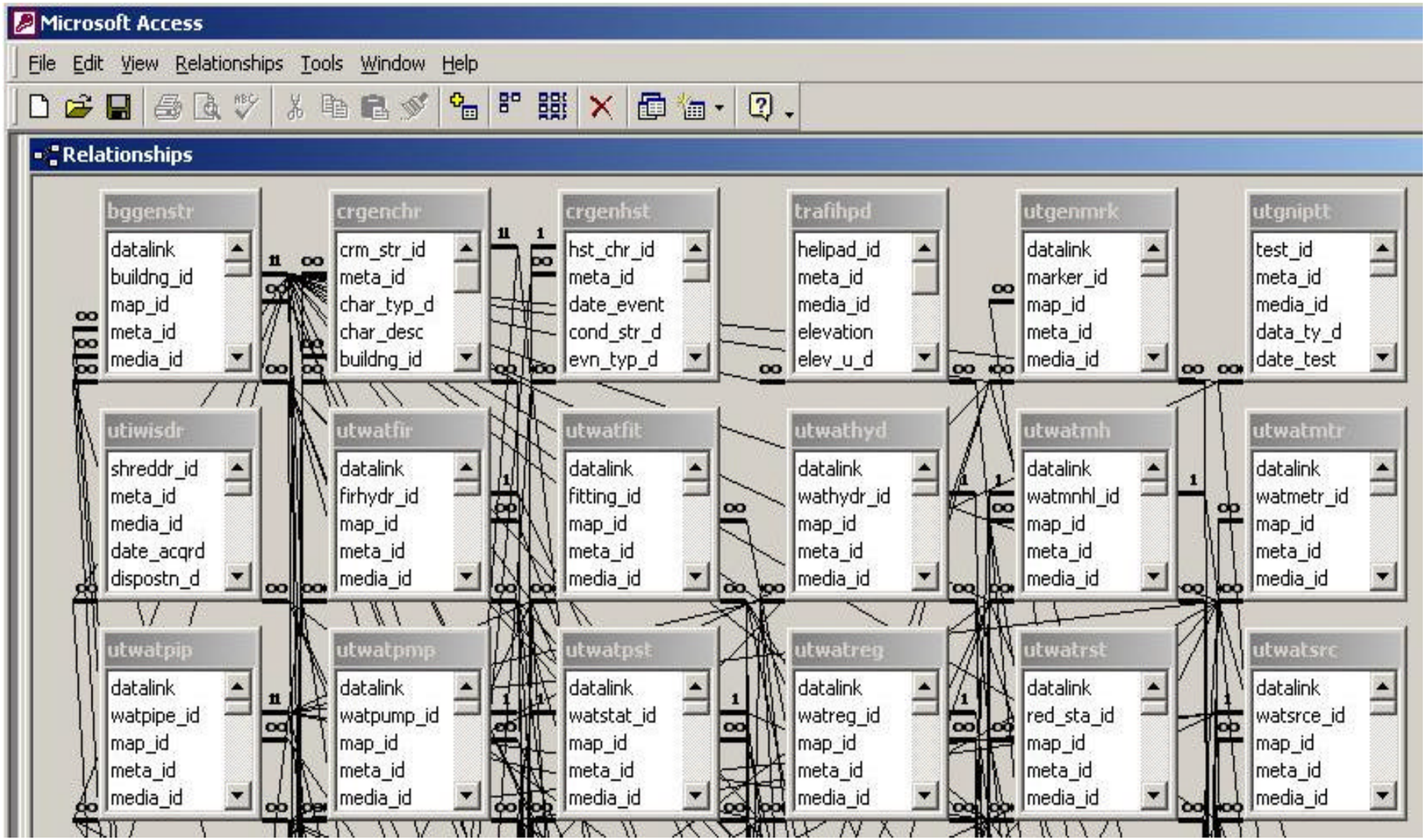

Workshops

SDSFIE and Geodatabases Workshop -

Where - Symposium

Instructor - Nancy Towne

- Thursday, 10:30 – 12:00
- Thursday, 3:30 – 5:00 pm

Basic and Advanced SDSFIE Implementation Workshops –

Where - CADD/GIS Technology Center, Vicksburg, MS –

- February 2003

CADD/GIS Technology Center Internet URL :

http://tsc.wes.army.mil

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QUESTIONS?

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