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

ncits National Committee for Information Technology Standards

American National Standards

Spatial Data Standard for facilities, infrastructure, & environment (NCITS 353)

The CADD/GIS Technology Center

for Facilities, Infrastructure, and Environment

Army Engineer R&D Center

Vicksburg, Mississippi

CADD/GIS Technology Center Internet URL :

http://tsc.wes.army.mil

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

Bobby G. Carpenter, P.E.

Environmental Engineer

CADD / GIS Technology Center
for facilities, infrastructure, and environment
CEERD-ID-C
Army Engineer Research and Development Center
at Waterways Experiment Station
3909 Halls Ferry Road
Vicksburg, MS 39180-6199

phone: 601-634-4572
fax: 601-634-4584
E-mail: carpenb@wes.army.mil

CADD / GIS Technology Center Internet URL : http://tsc.wes.army.mil

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.

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

About the CADD/GIS 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 CADD/GIS TECHNOLOGY CENTER
for Facilities, Infrastructure, and Environment

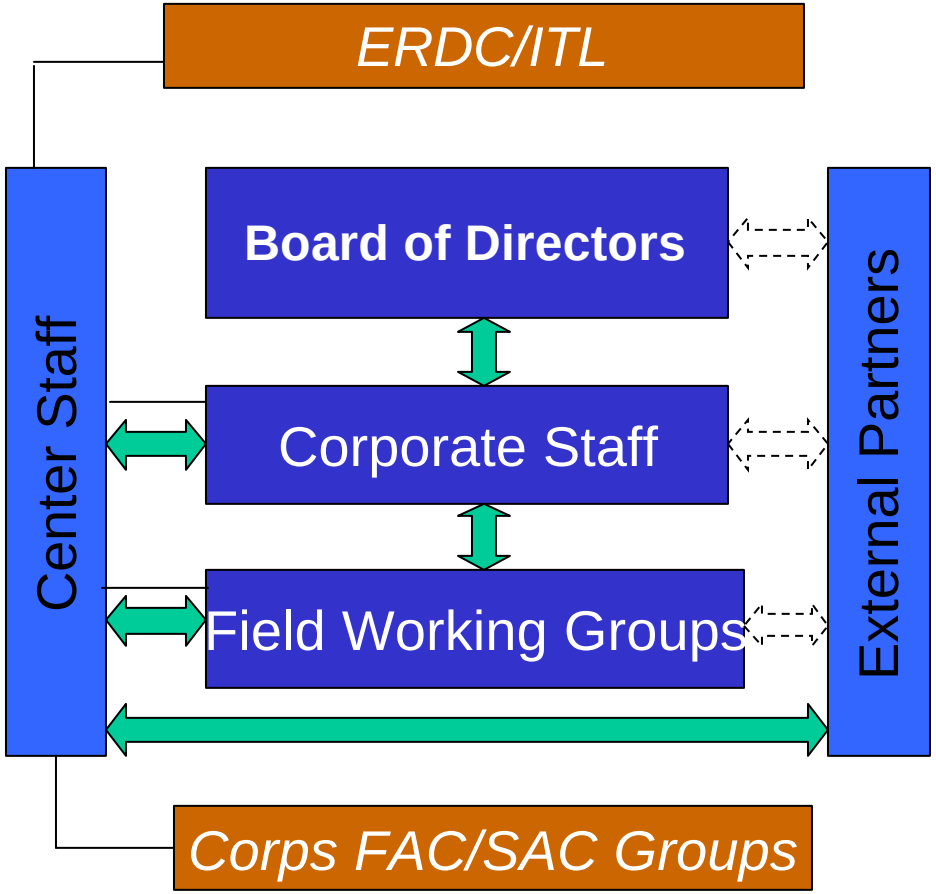
The *New* CADD/GIS Technology Center

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:

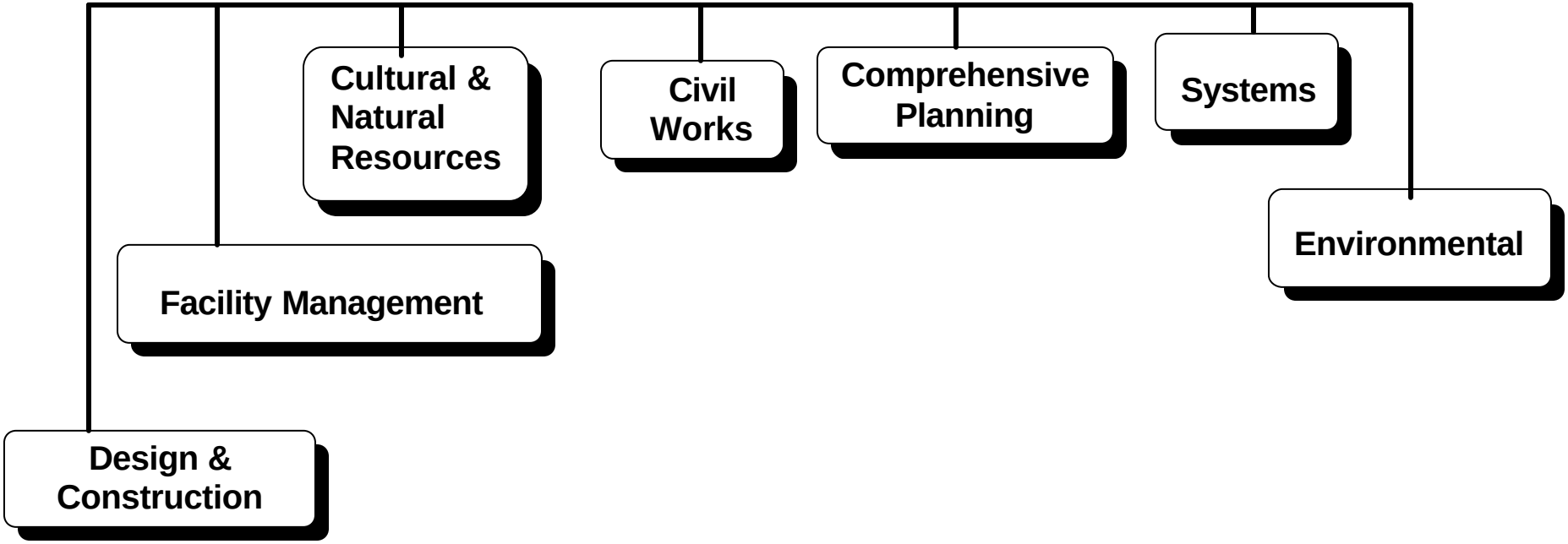
- ESRI
- Autodesk
- Bentley
- Intergraph

Societies/Organizatio

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

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

Center Field Working Groups



FGDC Facilities Working Group –

- Since installation/civil works facility management can involve processing and integrating high- and low-resolution data and large- and small-scale data, the facility management and civil works organizations require a very detailed, standardized database structure. These needs are being met on a national level through the Facilities Working Group (FWG) of the Federal Geographic Data Committee (FGDC).

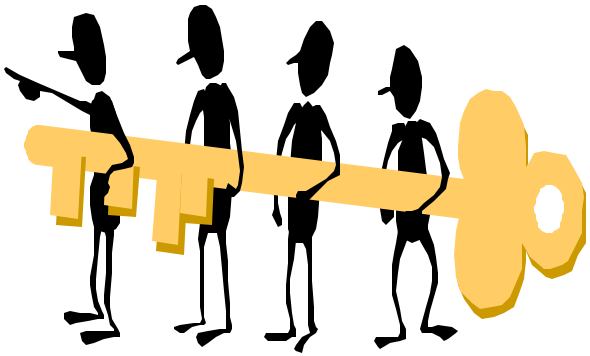
- The Facilities FWG was established in January 1995 to develop standards for facility management and civil engineering.

- In October 1999, the FGDC Coordination Group approved a plan to merge the Facilities FWG with the CADD/GIS Technology Center for Facilities, Infrastructure and Environment.

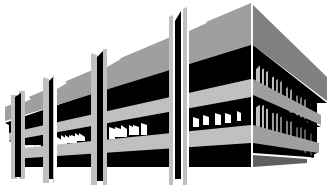
The Center's Approach to Standards

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

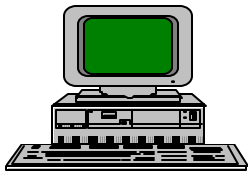


LIFE-CYCLE PROJECT DATA MODEL



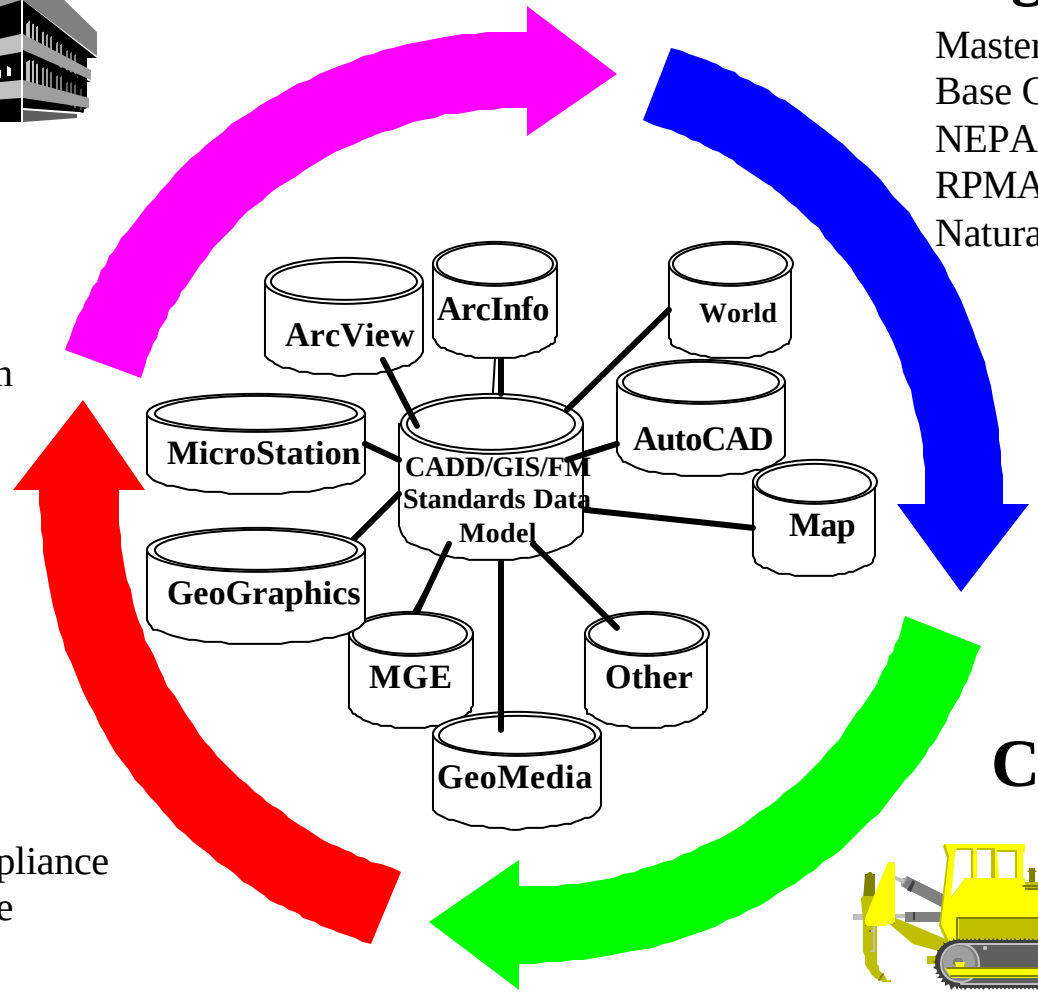
Maintenance

AIS
Work Orders
Installation Restoration



Planning

Master Plans
Base Closure
NEPA Reports
RPMA
Natural/Cultural Resources



Design

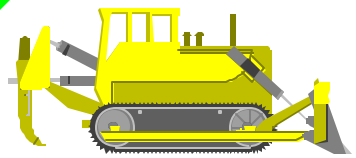
Plans &
Specifications

Operations (Base/Mil)

ISR
Mobilization Plans
Environmental Compliance
Emergency Response
Range Management

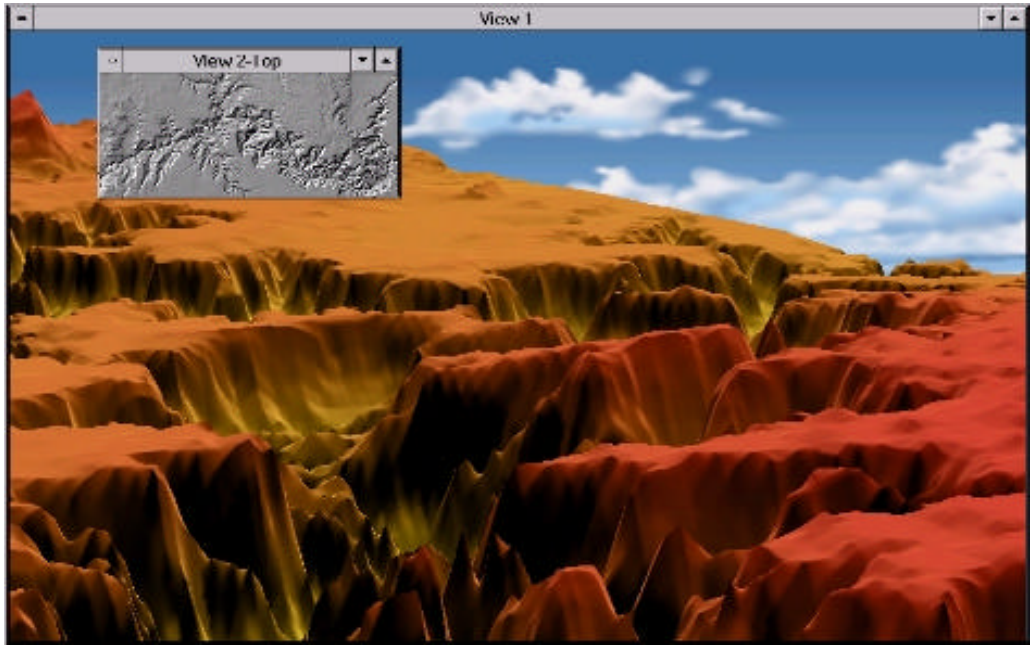
Construction

As-Builts
Shop Dwgs



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

What is *GIS* ?!?!?

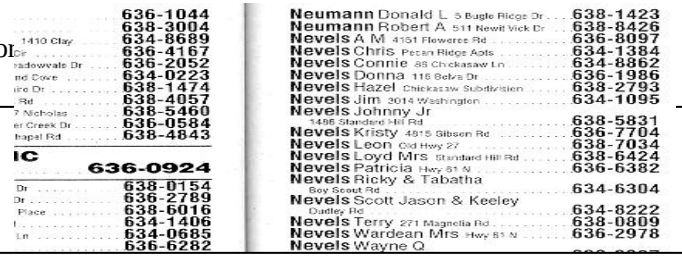


Spatial_Reference_Information:
Horizontal_Coordinate_System_Definition:
Planar:

Grid_Coordinate_System:
Grid_Coordinate_System: State Plane Coordinate System 1927
State_Plane_Coordinate_System:
SPCS_Zone_Identifier: 1001
Transverse_Mercator:
Longitude_of_Central_Meridian: -082.166666
Latitude_of_Projection_Origin: +30.000000
False_Easting: 500000
False_Northing: 0.0

Planar_Coordinate_Information:

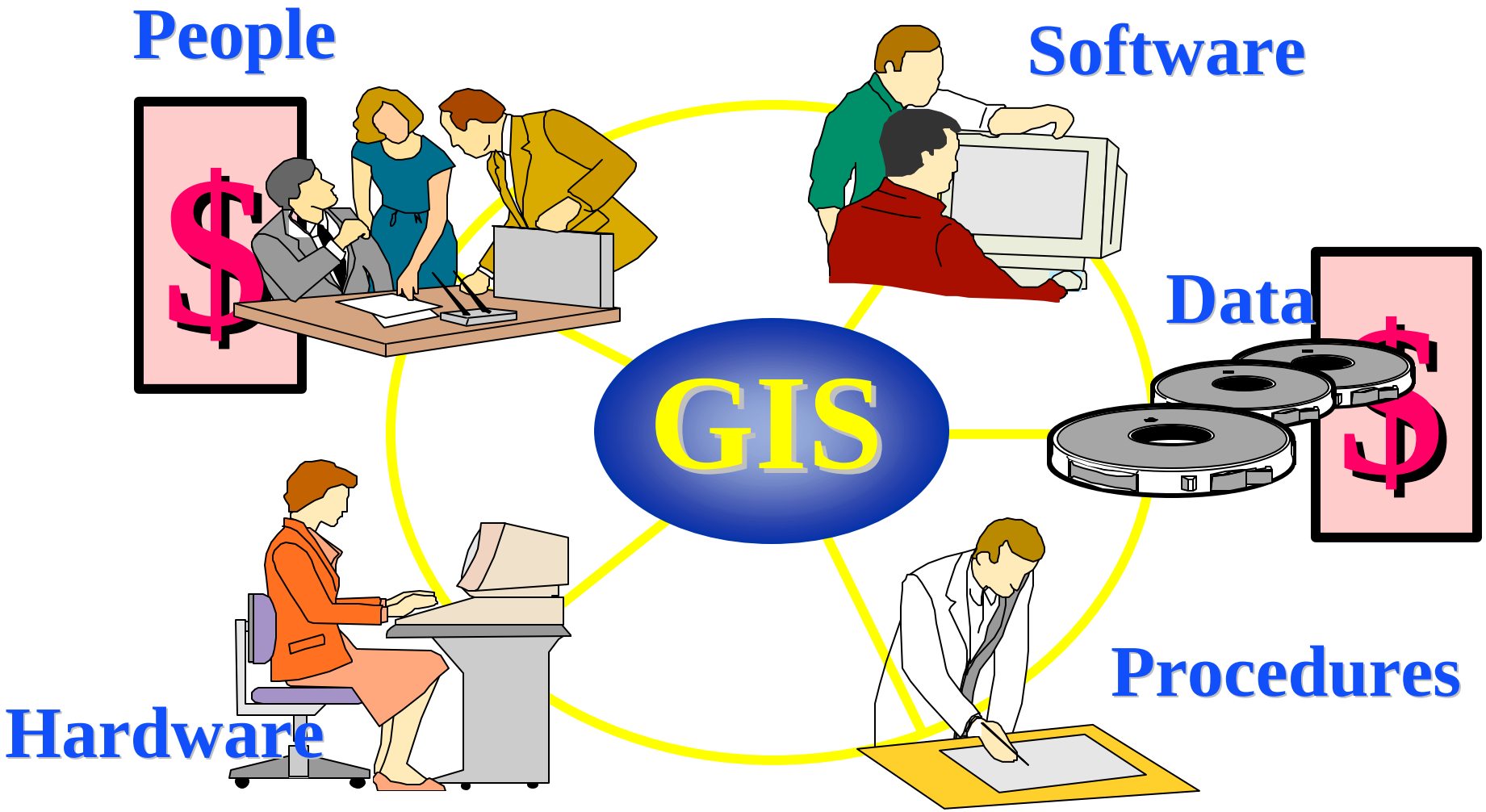
Coor



A system for capturing, storing, retrieving, analyzing, and displaying geographically referenced information, i.e. data identified according to its location on the earth.

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

Geographic Information System



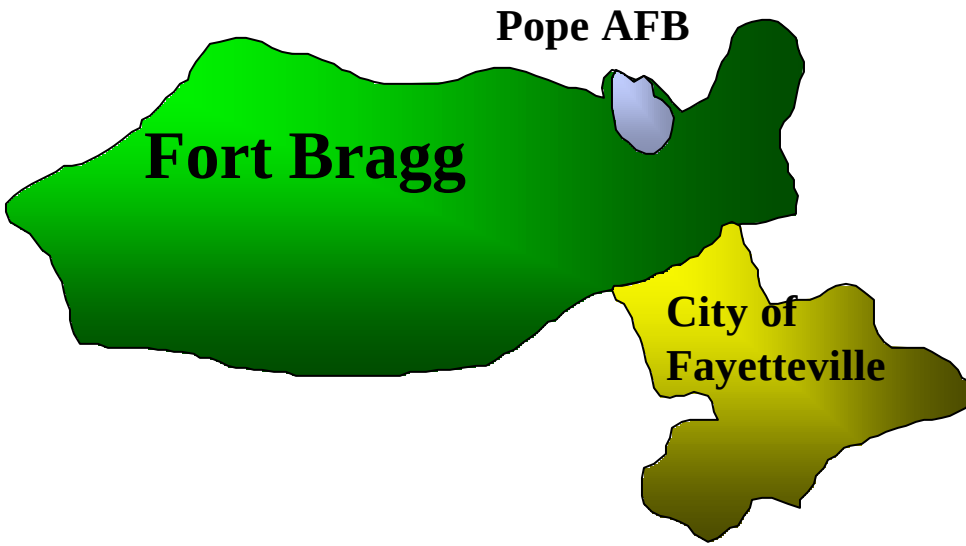
THE CADD/GIS TECHNOLOGY CENTER for Facilities, Infrastructure, and Environment

Benefits of Using a GIS Data Standard

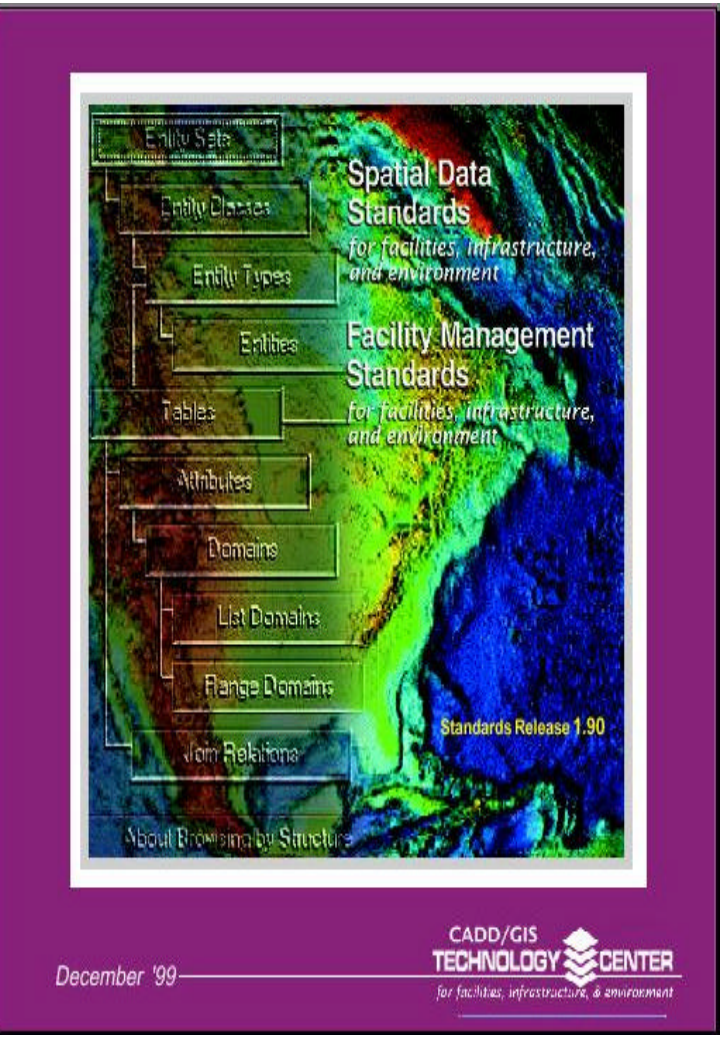
- Standard GIS and FM Data Collection Requirements
- One Training Program
- Common GIS and FM Software Applications
- Standard Implementation Procedures and Requirements
- Common Data Model which Permits the Sharing of Data
- Nonproprietary Data Model (SDSFIE & NCITS 353)

Benefits of Using a GIS Data Standard

- **Common Data Model which Permits the Sharing of Data**
  - **Fort Bragg**
    - Pope AFB Assets
    - BRAC and Mobilization Plans
    - Utilities and Drainage Interface
  - **Pope Air Force Base**
    - Site Drawings and As-Builts
  - **City of Fayetteville**
    - Hurricane Evacuation Plan
    - Cadastral Data and Demography
    - Utilities and Drainage Interface



Benefits of Using a GIS Data Standard



One Training Program

- Total of 7 SDSFIE Implementation Workshops provided in FY99 - FY2001.
- Total of 222 students.
- Next Workshop scheduled for February 5 – 7, 2002

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

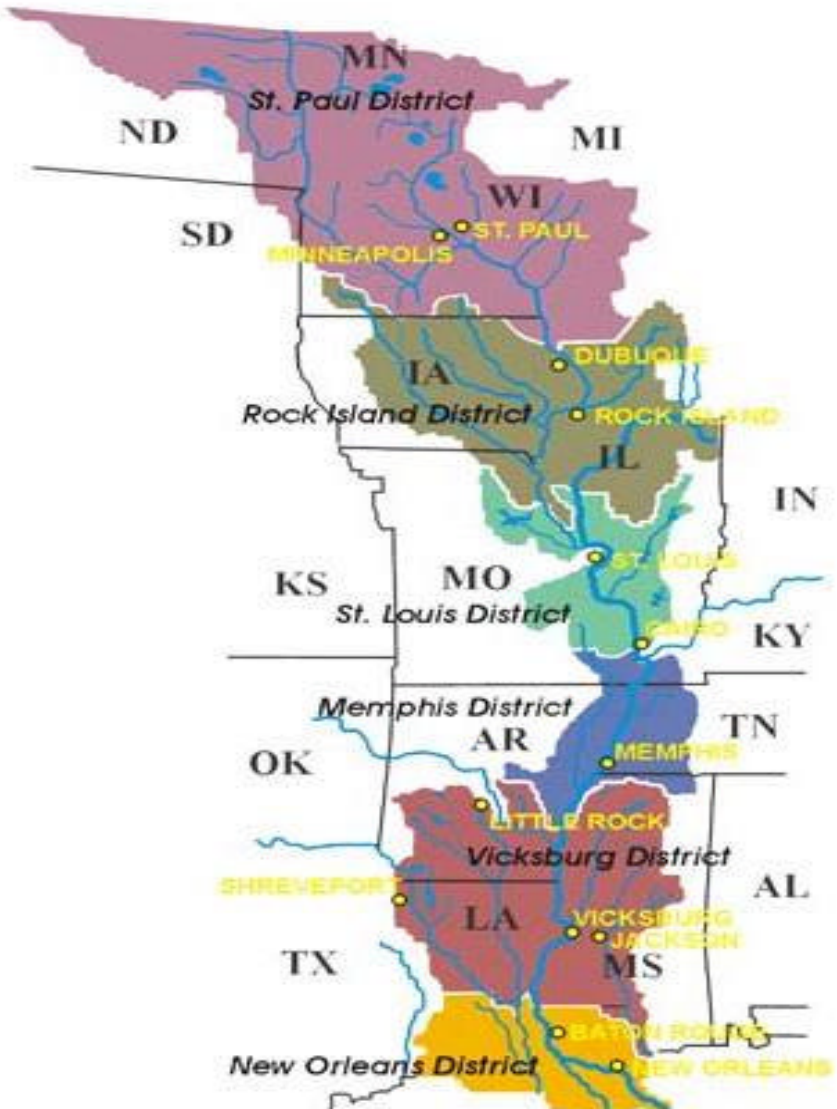
Benefits of Using a GIS Data Standard

U.S. Army Corps of Engineers Mississippi Valley Division (CEMVD) adopted SDSFIE as GIS Standard for their GIS (called Regional Engineering & Environmental GIS (REEGIS)).

REEGIS is used by all Six Districts within their Division. Each District maintains their part of REEGIS.

Some Districts use Intergraph MGE & GeoMedia, whereas other Districts use ESRI ArcView, ARCINFO, & ArcGIS.

Geospatial data can be shared between Districts & MVD, even though they use different GIS software programs.



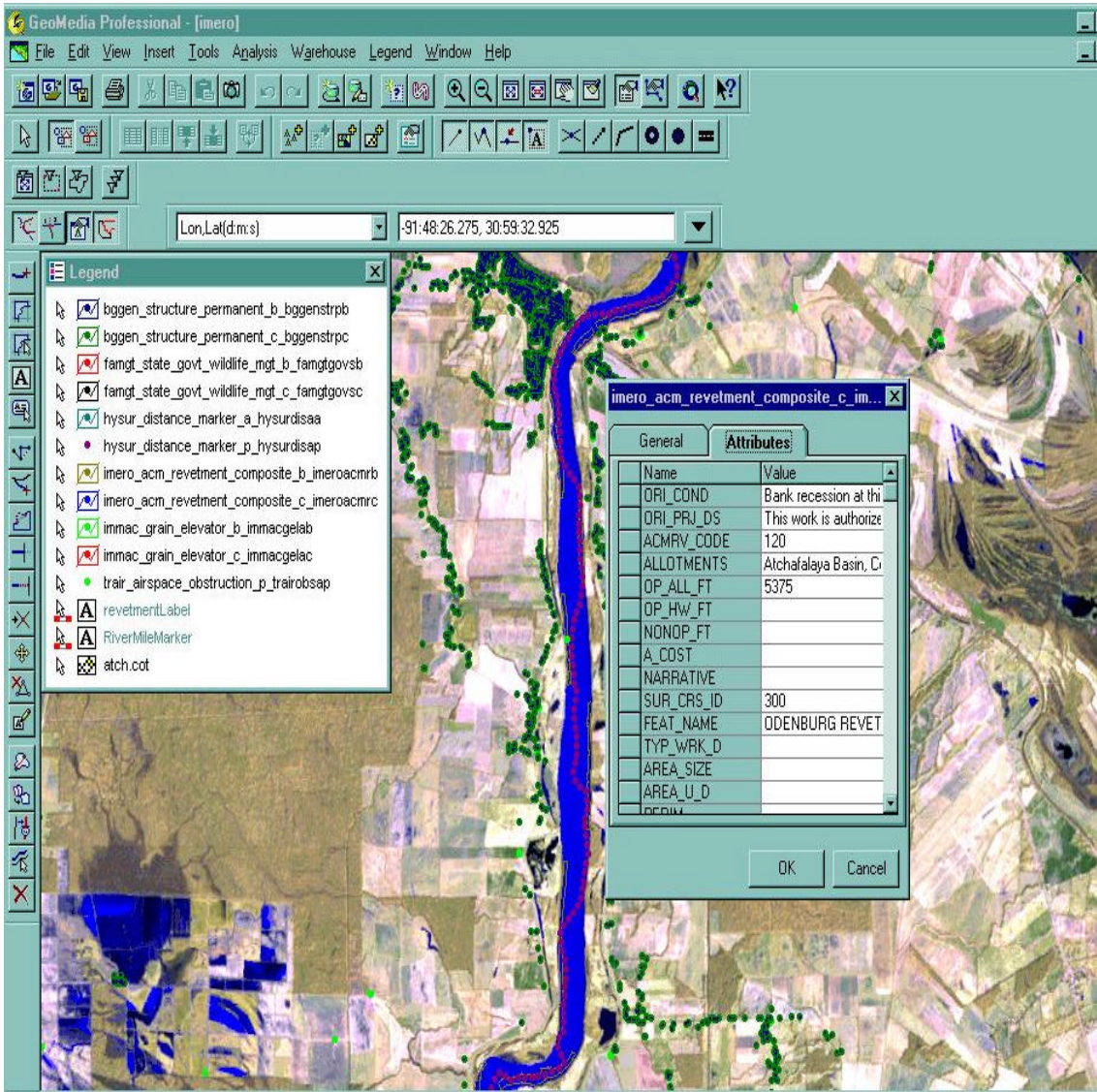
THE CADD/GIS TECHNOLOGY CENTER
for Facilities, Infrastructure, and Environment

Benefits of Using a GIS Data Standard

Atchafalaya Basin GIS is SDSFIE compliant.

New Orleans District (CEMVN) currently uses Intergraph MGE & GeoMedia.

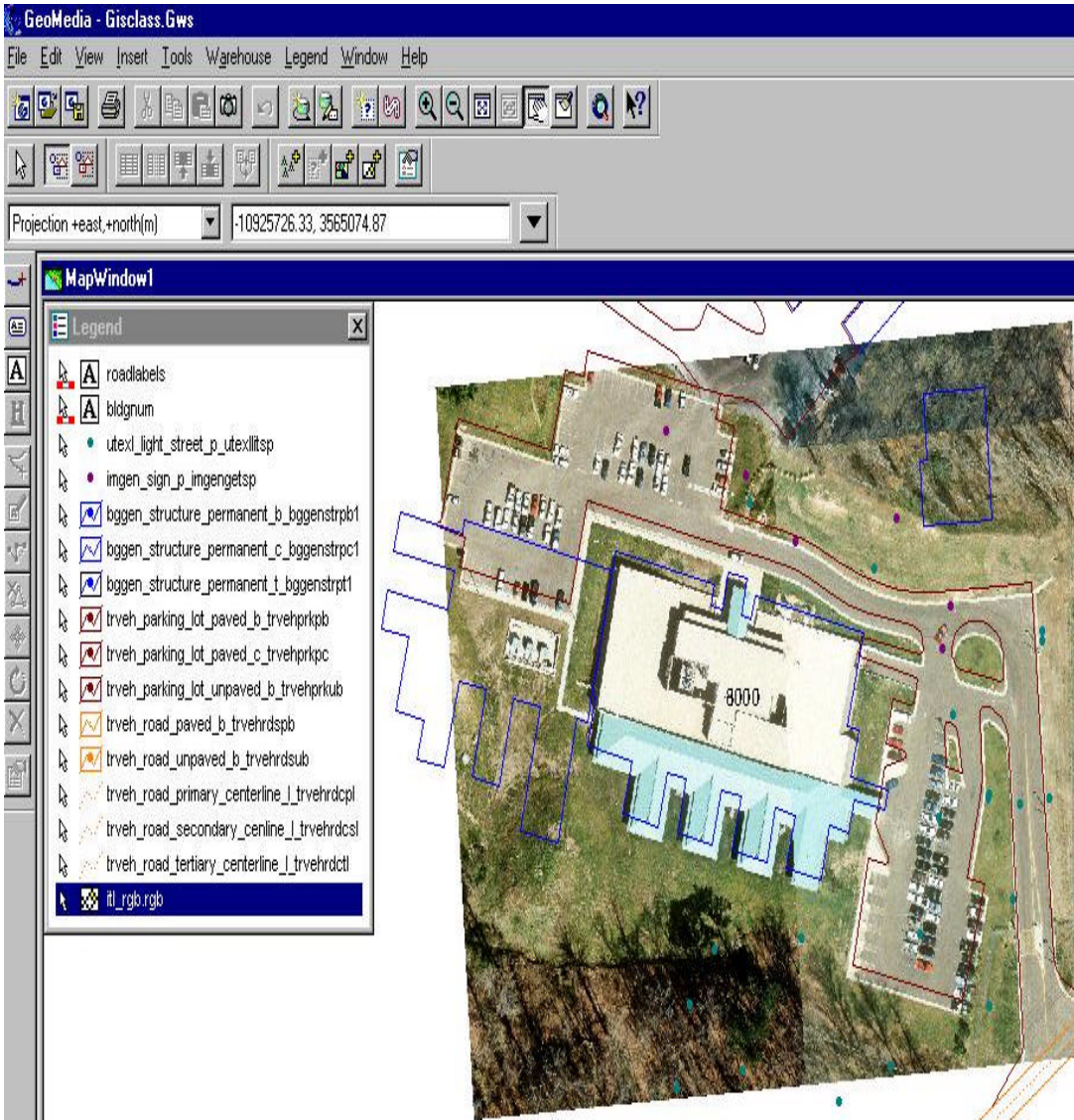
CEMVN will not lose data investment if they migrate to ESRI ArcGIS (or other GIS software vendor) in future.



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

Benefits of Using a GIS Data Standard

- GIS for Waterways Experiment Station, Vicksburg, MS based upon SDSFIE.
- Both ESRI ArcView & Intergraph GeoMedia GIS uses data from same SDSFIE compliant Oracle database.



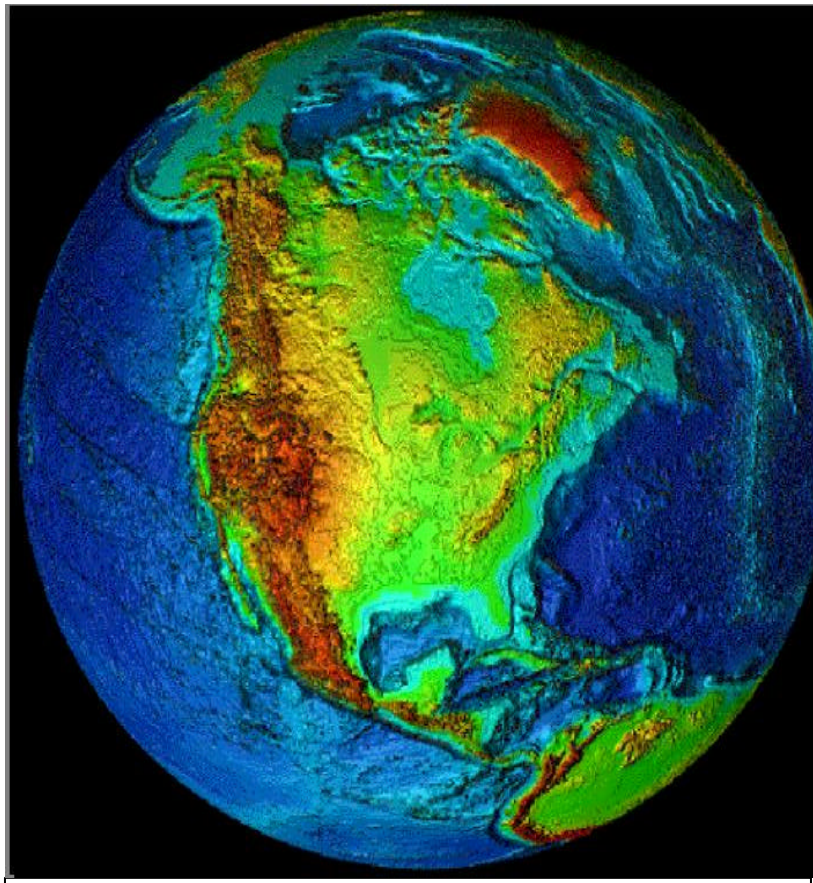
THE CADD/GIS TECHNOLOGY CENTER for Facilities, Infrastructure, and Environment

96.013 – Spatial Data Standard (SDSFIE)

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

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

roducts: (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) Customer assistance



PI – Bobby Carpenter

Spatial Data Standard (SDSFIE) - Coordination

Coordination Efforts With DoD & Federal Standards Development Initiatives Include:

- Federal Geographic Data Committee (FGDC)
  - *Center* Participation
  - Adoption of Subcommittee Products
  - Adoption of Metadata Standards
- Defense Information Systems Agency (DISA)
- Corporate Information Management (CIM) Initiatives
- Defense Environmental Security Corporate Information Management (DESCIM) Initiatives
- National Imagery and Mapping Agency (NIMA) (formerly Defense Mapping Agency (DMA)) Initiatives

Spatial Data Standard (SDSFIE) - Coordination

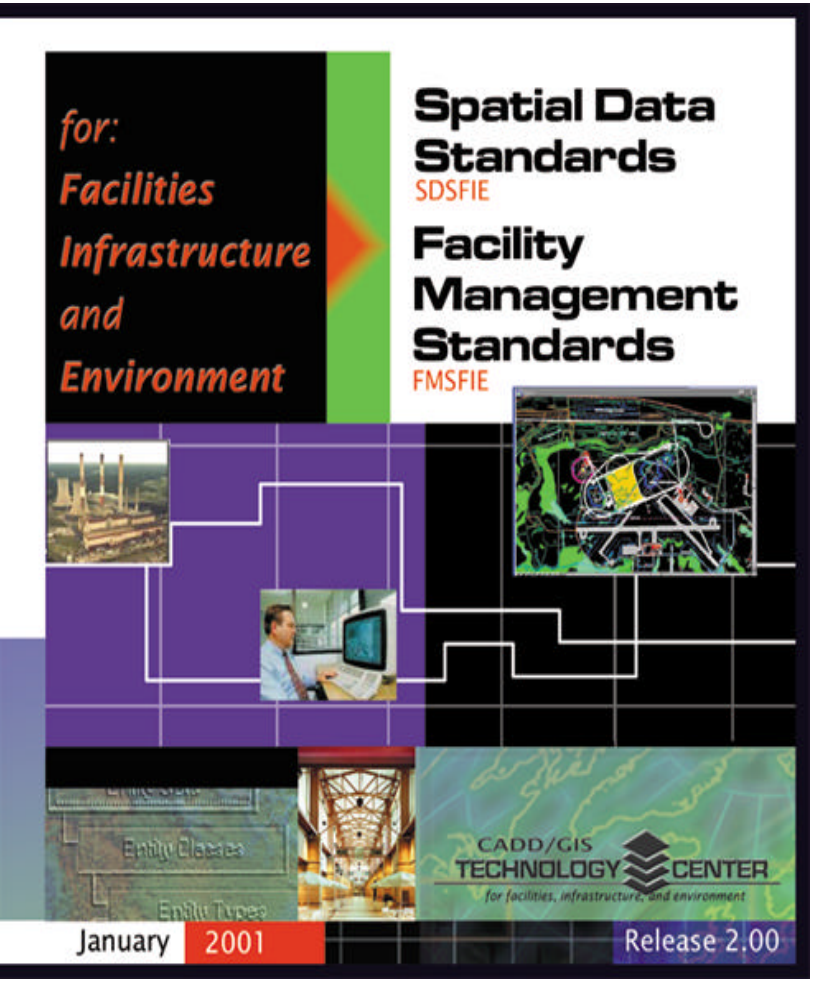
All DoD Organizations

Other Federal Agencies

- US Coast Guard
- Veteran's Administration
- Indian Affairs
- GSA
- EPA
- FAA
- Census Bureau
- NASA
- CIA
- DOE
- USGS
- U.S. Forest Service
- Housing and Urban Development
- Panama Canal Commission
- Tennessee Valley Authority
- Department of Transportation

- CADD/GIS/Database Software Vendors
  - Intergraph
  - Bentley
  - Autodesk
  - ESRI
  - FIS
  - Maximo
  - Oracle
  - Microsoft
- Numerous State & Local Government Organizations, Universities, etc.
- Numerous Architect-Engineer Firms & Contractors

Spatial Data Standard (SDSFIE) - Development History



- 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

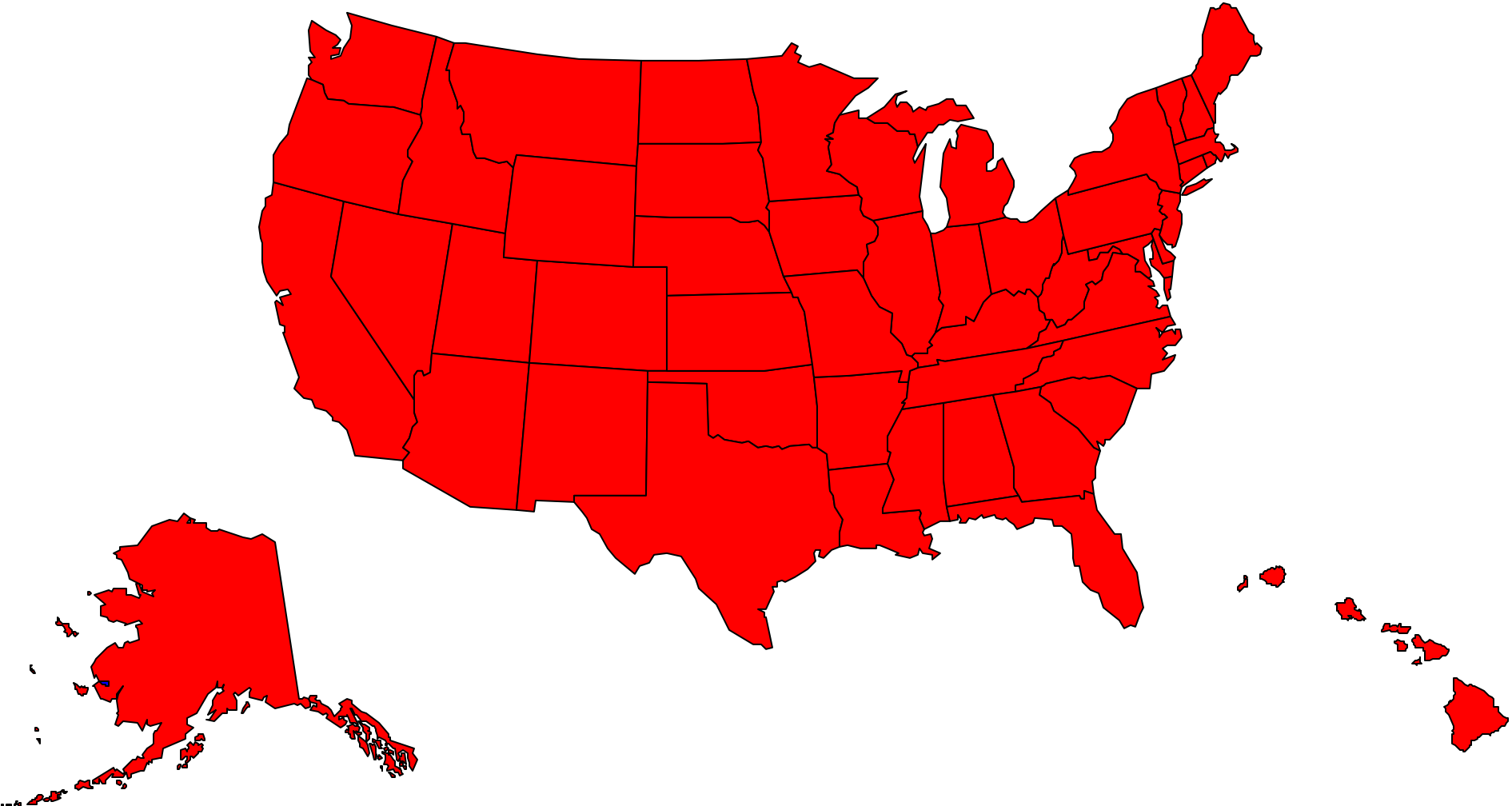
THE CADD/GIS TECHNOLOGY CENTER for Facilities, Infrastructure, and Environment

Organizations Around the World have Requested or Downloaded the SDSFIE/FMSFIE

Australia
Bahrain
CanadaChina
Chile
Columbia
India
Italy
England
Sweden
Japan
United States
Malaysia
Poland
South Africa

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

DoD Organizations in all 50 States Use the SDSFIE/FMSFIE



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

State Agencies in 20 States Have Requested the SDSFIE/FMSFIE

Alaska
Arkansas
Arizona
California
Conneticut
District of Columbia
Florida
Georgia
Hawaii
Indiana
Kansas
Massachusets
Maryland
Mississippi
Montana
North Carolina
North Dakota
Ohio
Texas
Wisconsin

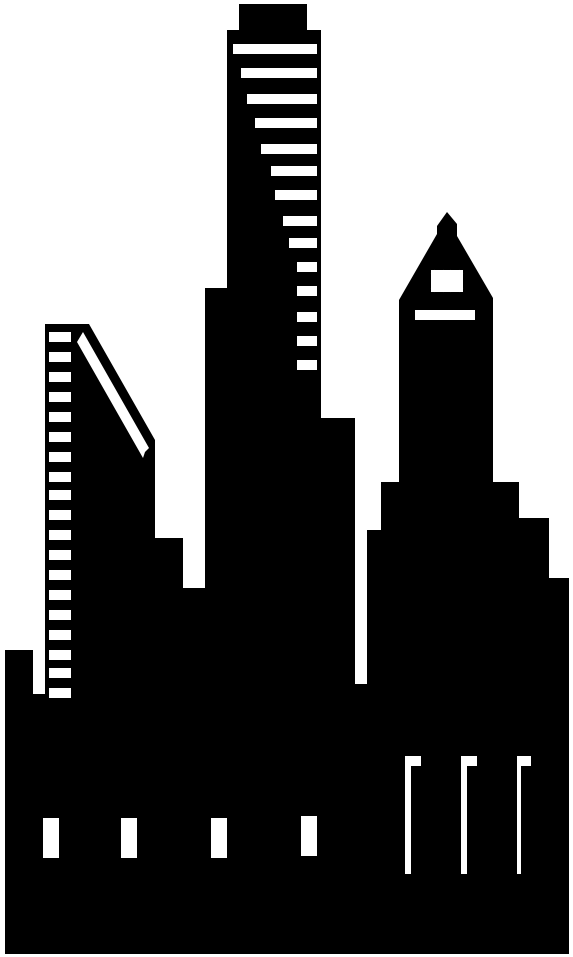
THE CADD/GIS TECHNOLOGY CENTER for Facilities, Infrastructure, and Environment

Universities in 22 States Have Requested the SDSFIE/FMSFIE

Arkansas	North Dakota
Colorado	New Jersey
Florida	New Mexico
Illinois	New York
Indiana	Oklahoma
Louisiana	Pennsylvania
Massachusetts	Texas
Minnesota	Utah
Missouri	Virginia
Mississippi	Washington
North Carolina	West Virginia

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

Local Governments in 30 States Have Requested the SDSFIE/FMSFIE



Arizona
California
Colorado
Connecticut
Florida
Georgia
Hawaii
Idaho
Illinois
Indiana
Kansas
Kentucky
Maryland
Maine
Michigan
Minnesota
Missouri
North Carolina
New York
Ohio
Oklahoma
Oregon
Pennsylvania
South Carolina
Tennessee
Texas
Utah
Virginia
Washington
Wisconsin

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

96.013 – Spatial Data Standard (SDSFIE)

Release 2.00:

- Completed Final in January 2001.
- Distributed 3,000 CD-ROMs.
- Over 1,000 downloads from Internet web site.
- 319 Registration Cards returned in FY01
- Expanded electronic tools (applications) to seven (Browser, SQL Generator, Filter Builder, Filter Eraser, Access Builder, Geomedia Builder, & Access Data Creator)
- Incorporated numerous customer comments and requests

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

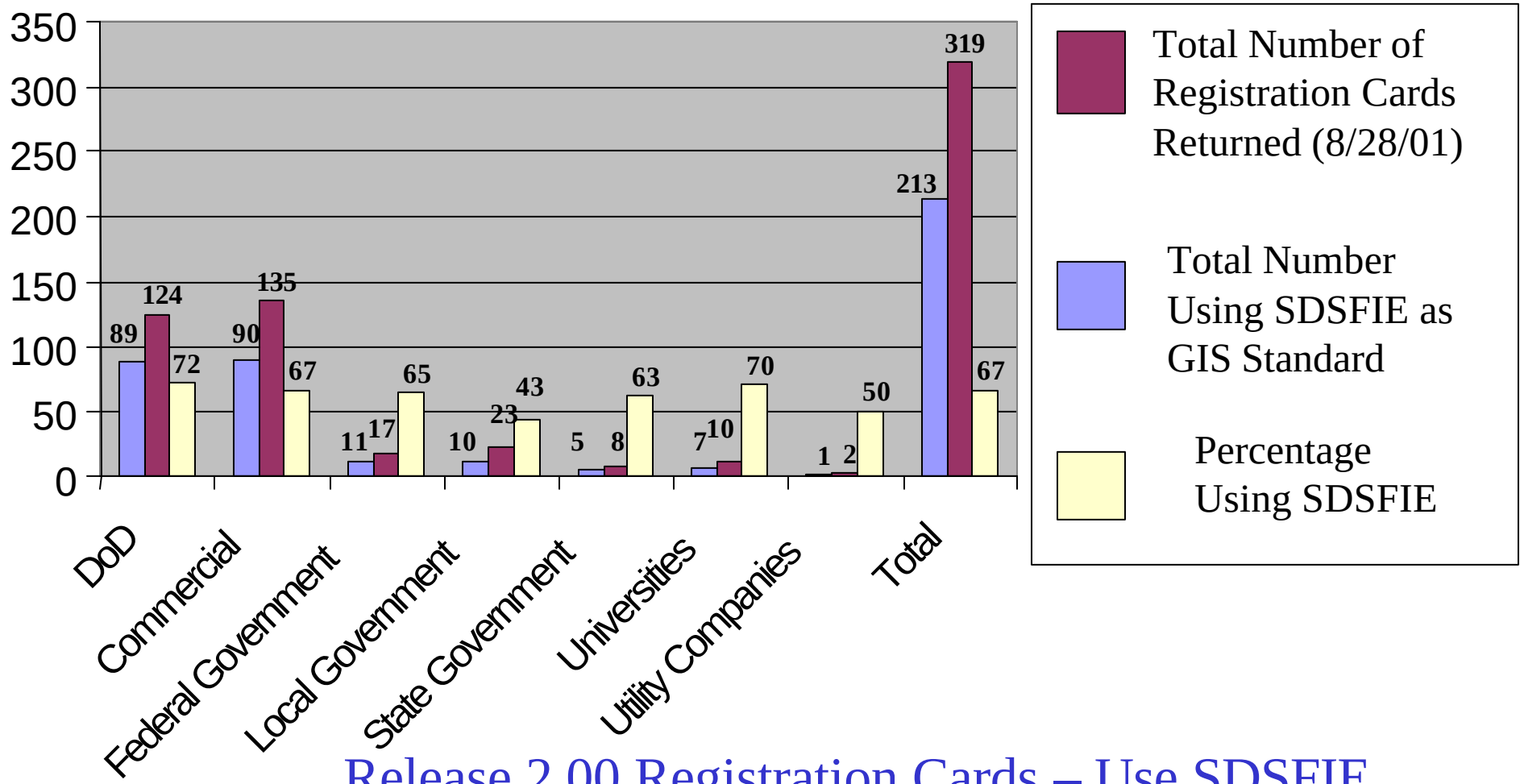
Important contributions have been made by many past and present Department of Defense, other Federal government, State government, local government (city/county), and contractor personnel. All deserve our thanks and appreciation for their contributions to the SDSFIE and FMSFIE development effort. Of 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

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

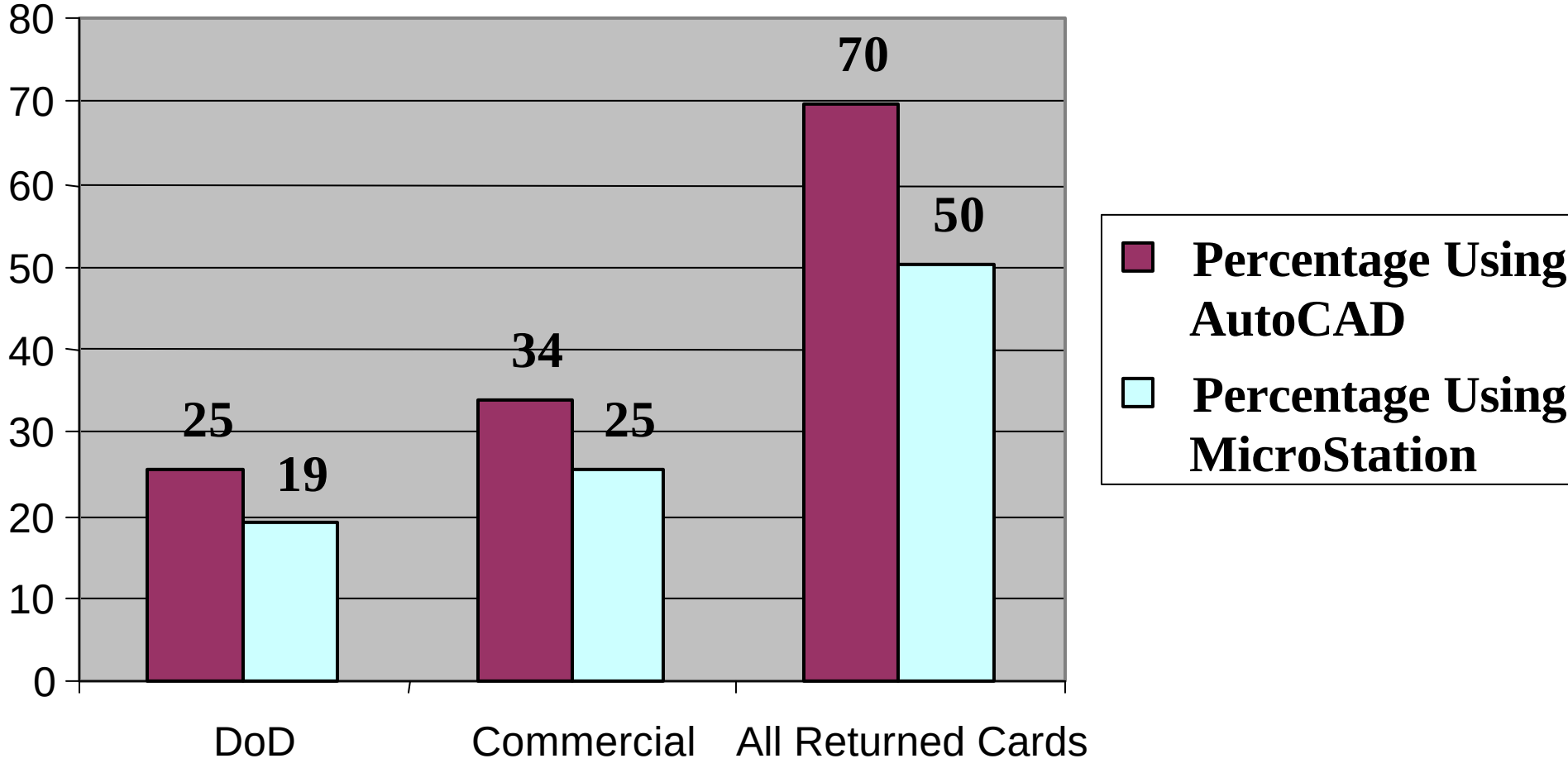
96.013 – Spatial Data Standard (SDSFIE)



Release 2.00 Registration Cards – Use SDSFIE

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

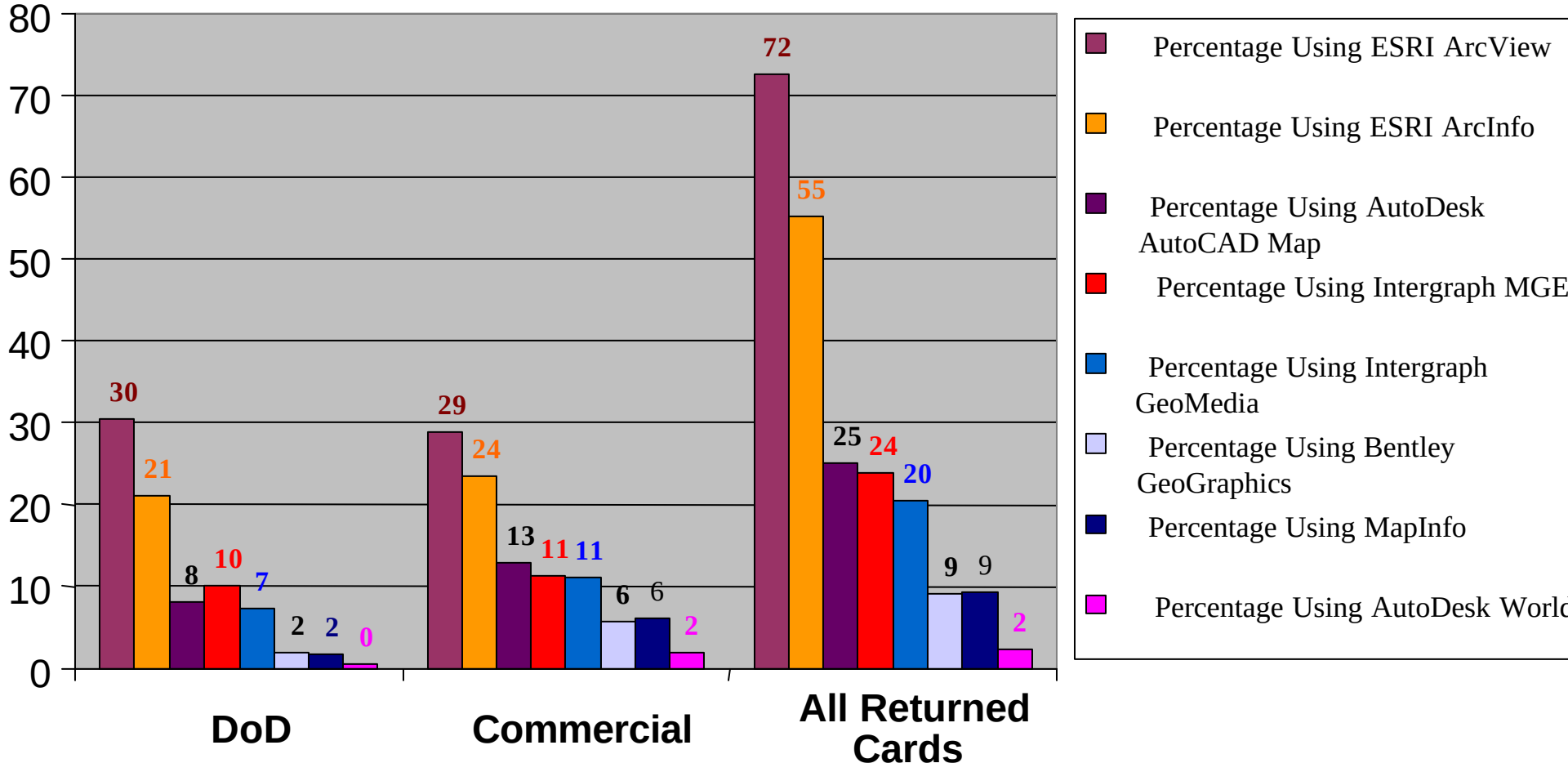
96.013 – Spatial Data Standard (SDSFIE)



Release 2.00 Registration Cards – CADD Software Used

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

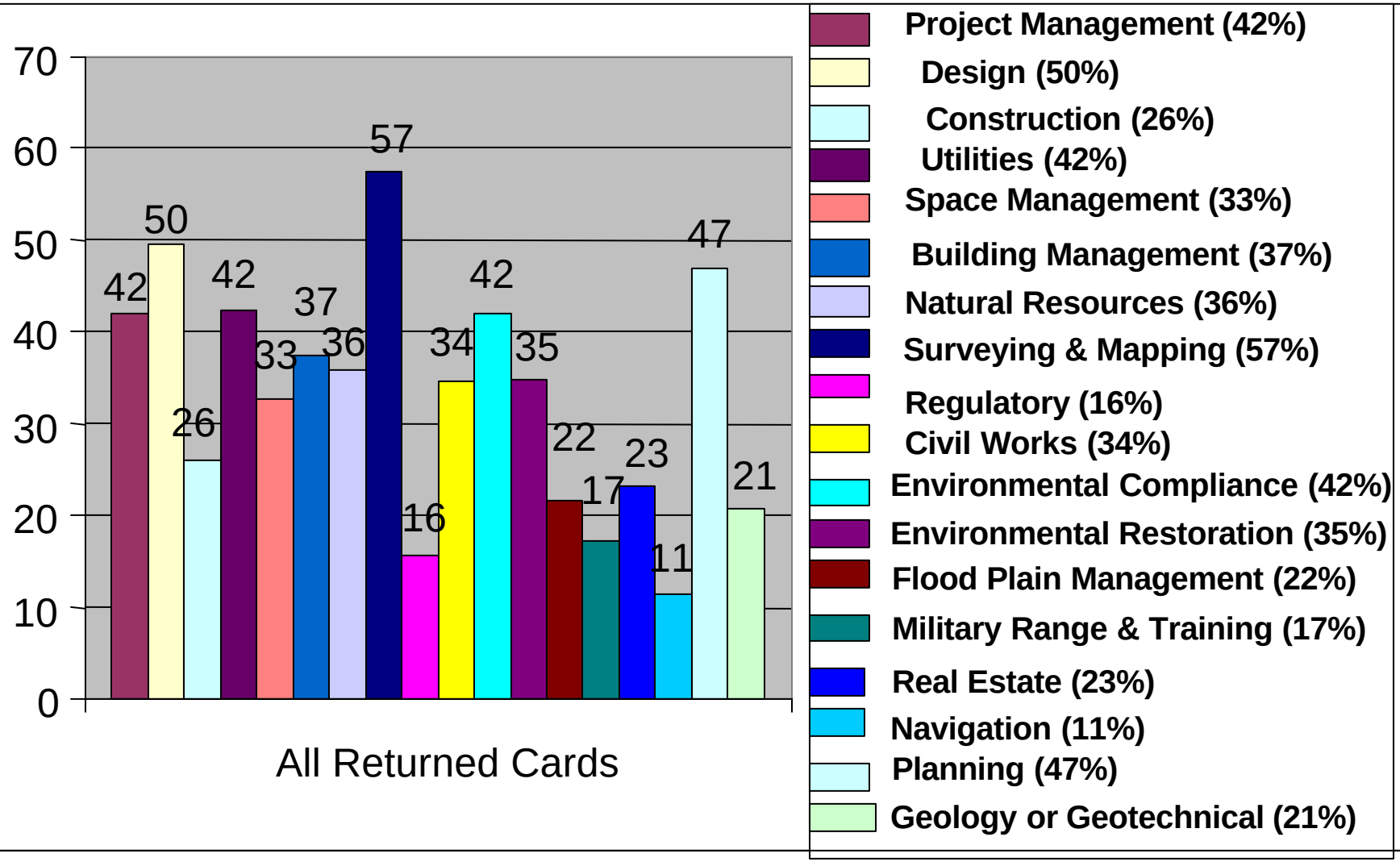
96.013 – Spatial Data Standard (SDSFIE)



Release 2.00 Registration Cards – GIS Software Used

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

96.013 – Spatial Data Standard (SDSFIE)



Release 2.00 Registration Cards – Use of CADD or GIS

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

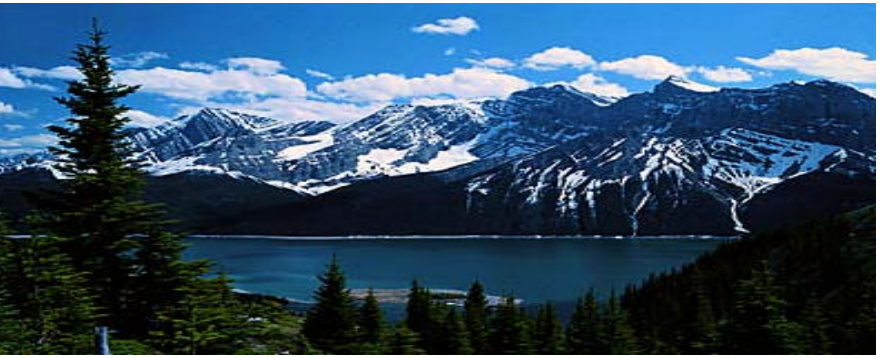
96.013 – Spatial Data Standard (SDSFIE)

Workshops –

Provided 2 Implementation Workshops at Vicksburg – Total of 73 students.

Provided 3 abbreviated workshops (Fresno, CA; USACE Louisville District, KY; & ITAM Conference, Nashville, TN).

Provided 2 GIS-GPS Classes at Vicksburg.



Customer Service –

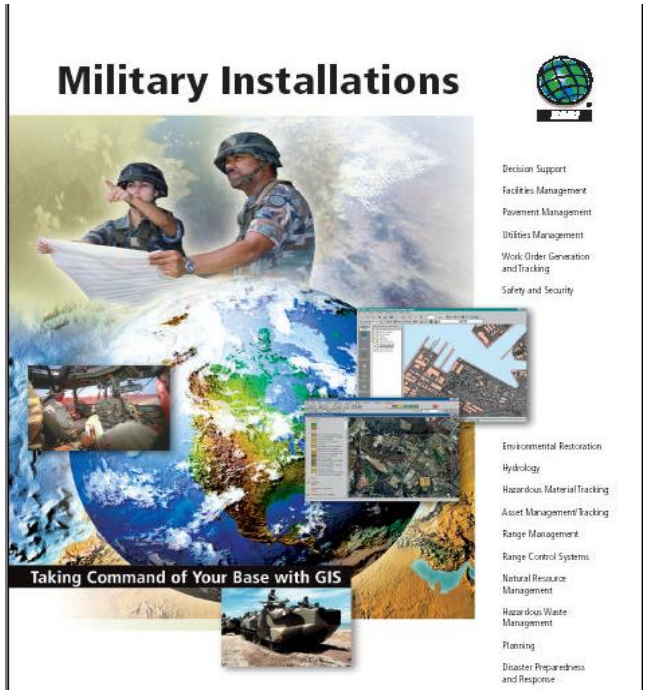
- **Provided assistance/responses to more than 321 customer questions/comments in FY01.**
- **Completed Implementation Guides for ArcView 3.2 & AutoCAD Map.**
- **Provided numerous briefings & presentations concerning SDSFIE at meetings & conferences.**
- **Expanded and updated SDSFIE website** http://tsc.wes.army.mil/products/TSSDS-TSFMS/tssds/html/
- **Developed website for SDSFIE Geodatabase News** http://tsc.wes.army.mil/News/Geodatabase/Geodatabase.asp

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

96.013 – Spatial Data Standard (SDSFIE)

SDSFIE Featured in ESRI Brochure -

• SDSFIE was recommended by ESRI as the preferred standard for GIS implementations, and featured in their brochure entitled “ESRI Military Installation Management GIS”.



Spatial Data Standards for Facilities, Infrastructure, and Environment

The Computer-Aided Design and Drafting (CADD)/GIS Technology Center for Facilities, Infrastructure, and Environment was established at the Information Technology Laboratory (ITL), U.S. Army Engineer Research & Development Center (Waterways Experiment Station [WES]), Vicksburg, Mississippi, in October 1992 to support the Army, Navy, Air Force, and Corps of Engineers. Since its creation it has expanded its role to support other federal, state, and local government organizations.

One of the major initiatives assigned to the CADD/GIS Technology Center is the development of the Spatial Data Standard for Facilities, Infrastructure, and Environment (SDSFIE). The SDSFIE is the only nonproprietary GIS data content standard designed for use with predominant commercial GIS and relational database software. The SDSFIE focuses on development of data content standards to facilitate shareability and interoperability with the enterprise GIS at Air Force, Army, Navy, and Marine Corps installations; U.S. Army Corps of Engineers Civil Works activities and other federal government organizations.

This nonproprietary design, in conjunction with its universal coverage, has propelled the SDSFIE into a de facto standard throughout the Department of Defense; other federal, state, and local government organizations; public utilities; and private industries throughout the United States and the world.

The CADD/GIS Technology Center annually updates and expands the SDSFIE. The SDSFIE (along with the Facility Management Standards for Facilities, Infrastructure, and Environment (FMSFIE)) is distributed via CD-ROM and the Internet (http://tsc.wes.army.mil). A user-friendly interactive Microsoft® Windows®-based software application installs the SDSFIE/FMSFIE toolbox of software applications that facilitates the use of the standards and the development of an implementation schema.

The Center recently began an effort to develop a consolidated geospatial data model using object-oriented technology. In conjunction with ESRI, the Center is working to define an SDSFIE geodatabase implementation. In so doing, the Center will be able to move with and help lead the industry in developing a standard object-oriented data model for GIS.

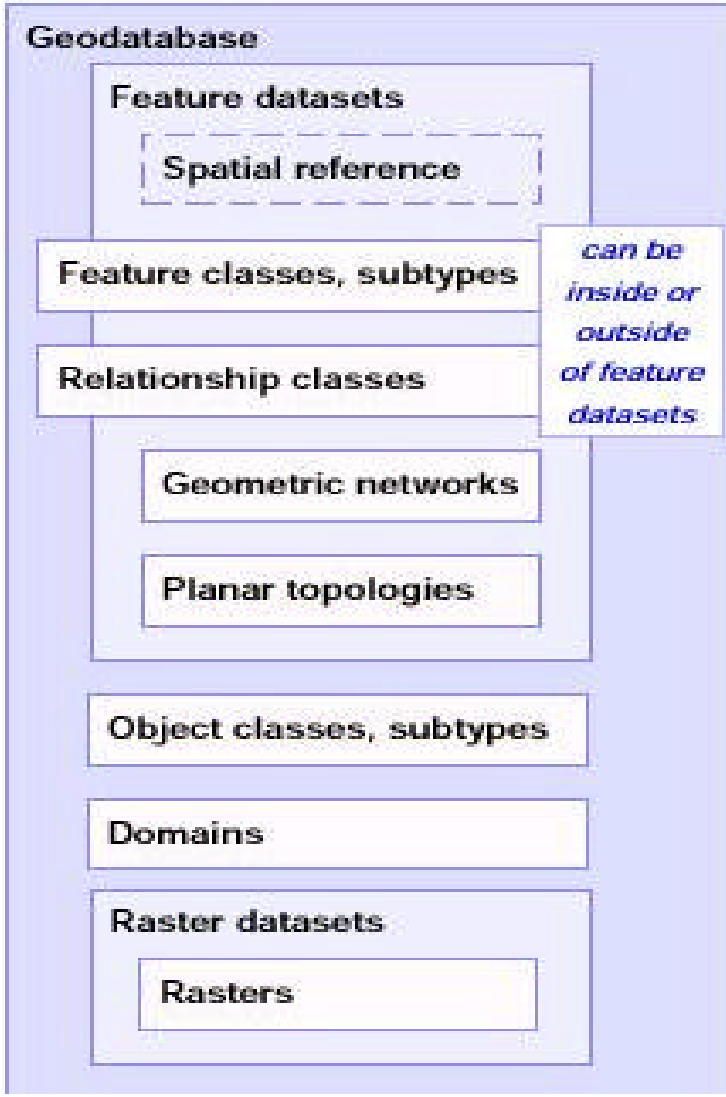
For additional information, contact Bobby G. Carpenter, P.E., CADD/GIS Technology Center, e-mail: carpenb@wes.army.mil.

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

96.013 – Spatial Data Standard (SDSFIE)

Release 2.10:

- Completed Beta in September 2001.
- Quality Control review and testing currently underway.
- Final scheduled to be completed in January 2002.
- Partnered with ESRI, Army National Guard Bureau, & Numerous GIS Users to develop SDSFIE compliant ESRI Geodatabase Template & ARC Builder tool.
- Incorporated numerous customer comments and requests



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

Spatial Data Standard (SDSFIE) Design Considerations

- Must be compatible with Commercially Available CADD, GIS, & Relational Database Software.
- GIS and CADD Software include:
  - ARC/INFO - MicroStation - ArcView - Map
  - MGE - AutoCAD - GeoMedia - GeoGraphics
- Relational Database Application Software includes:
  - ANSI Standard Structured Query Language (SQL)
  - Informix SQL - Access
  - Oracle SQL
- Operating Systems include:
  - UNIX
  - Windows 95, 98, NT, 2000, ME, XP

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

Spatial Data Standard (SDSFIE) Applications

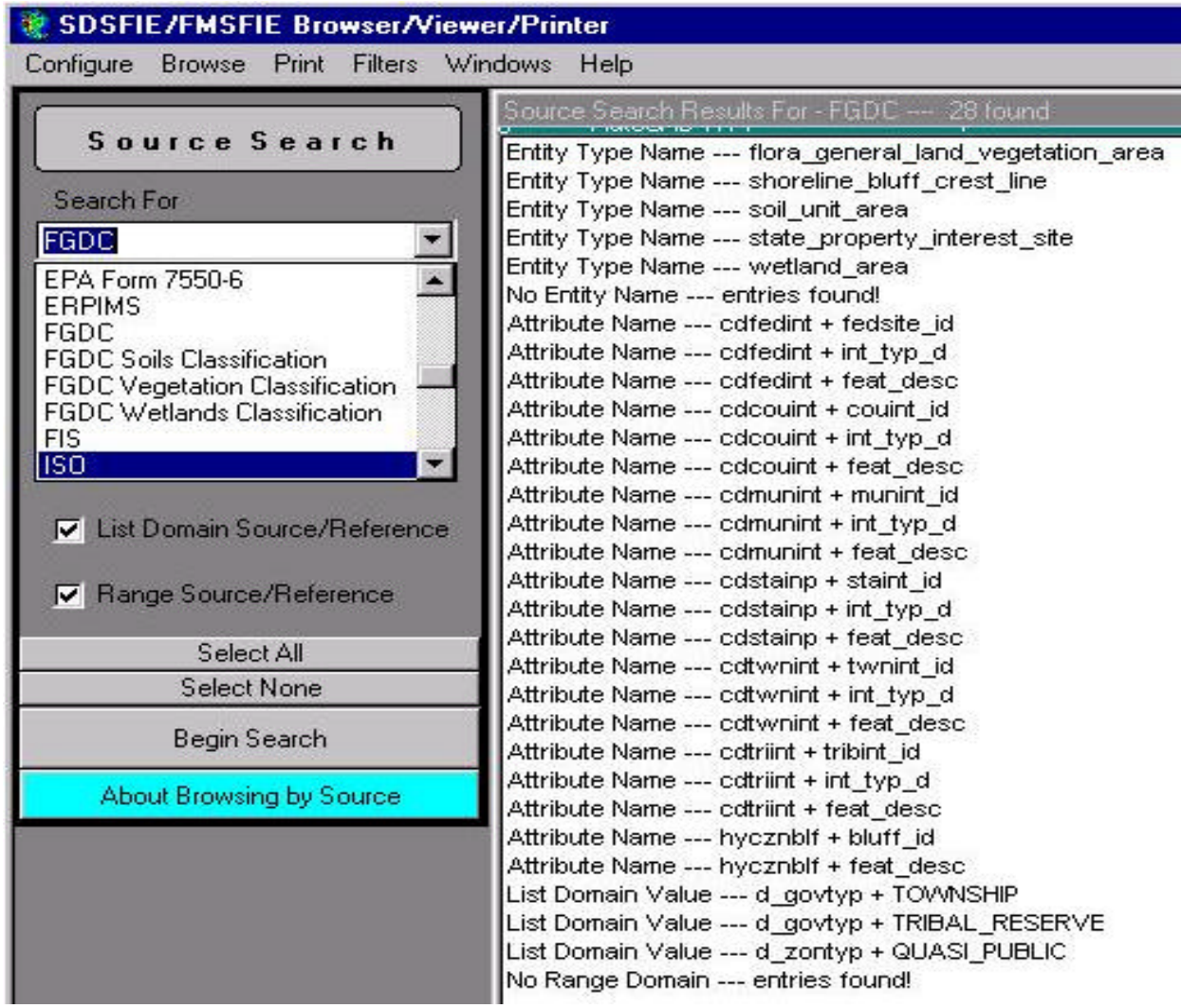
Self-contained Microsoft Visual Basic (32 bit) Applications for Windows Operating Systems:

- Runs 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
- Seven Applications provided with Release 2.00 (Browser, SQL Generator, Filter Builder, Filter Eraser, Access Builder, Geomedia Builder, & Access Data Creator).

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

Incorporation of Approved FGDC Data Standards

- The SDSFIE provides a GIS Implementation Schema for Approved Federal Geographic Data Committee (FGDC) Data Standards.
- Approved FGDC Soils, Vegetation, Wetlands, & Cadastral Classification Standards were incorporated in the SDSFIE.



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

NCITS 353

Spatial Data Standard for facilities, infrastructure, & environment (NCITS 353) –

- Approved by NCITS Executive Committee on November 15, 2001.
- Provides catalog of geographic features (a geographic feature is a representation of a real world phenomenon associated with a location relative to the earth), as well as a list of information commonly collected for each feature.
- NCITS 353 provides a common standard for the collection and storage of geographic data using GIS technology.
- GIS users will profit from increased compatibility through cost and time savings as well as greater accuracy and consistency and the ability to easily share geographic data between different organizations

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

NCITS 353

Spatial Data Standard for facilities, infrastructure, & environment (NCITS 353) -

- Based upon the Spatial Data Standard (SDSFIE) developed and maintained at CADD/GIS Technology Center.
- Provides different application and view of the SDSFIE than provided by CADD/GIS Technology Center applications.
- Will be updated and maintained by CADD/GIS Technology Center.
- Will be distributed by ANSI (NCITS) via CD-ROM.

American National Standard Institute (ANSI)

American National Standard Institute (ANSI) –

http://www.ansi.org/

Private, non-profit organization (founded in 1918) that administers and coordinates the U.S. voluntary standardization and conformity assessment system.

Mission is to enhance both the global competitiveness of U.S. business and the U.S. quality of life by promoting and facilitating voluntary consensus standards and conformity assessment systems, and safeguarding their integrity.

- Represents the interests of its nearly 1,000 company, organization, government agency, institutional and international members through its office in New York City, and headquarters in Washington, D.C.

National Committee for Information Technology Standards (NCITS)

National Committee for Information Technology Standards (NCITS) –

- http://www.ncits.org/index.html
- NCITS's mission is to produce market-driven, voluntary consensus standards in the area of Information Technology (IT).
- Most of the standardization activities result in national (ANSI) standards and international (ISO/IEC) standards.
- NCITS is the forum of choice for information technology (IT) developers, producers and users for the creation and maintenance of formal IT standards.
- NCITS is accredited by, and operates under rules approved by, the American National Standards Institute (ANSI).
- NCITS currently has 612 published standards.
- NCITS's L1 Committee (Geographic Information Systems (GIS)) adopts, adapts, and/or develops digital GIS data standards. This technical committee is the U.S. TAG to ISO/TC 211.(http://www.ncits.org/tcs.html)

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

NCITS 353

NCITS 353 (Spatial Data Standard for Facilities, Infrastructure, & Environment) –

- **November 1999 -** NCITS L1 (GIS Technical Committee) approved concept of pursuing adoption of the SDSFIE as a national GIS standard (to be called NCITS 353).
- **April 26, 2000 -** NCITS L1 Committee approved development o draft NCITS 353 for public review and comment.
- **October 19, 2000** – Draft NCITS 353 electronic template completed.
- **July 3, 2001** – Public review and comment period completed.
- **November 15, 2001** – NCITS 353 received final approval from NCITS Executive Committee.

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

NCITS 353

- "*Now there will be a national standard for enabling the common collection and interoperability of spatial data by DoD facilities, state and local governments. Because these operations include our military facilities, civilian airports and other public facilities, infrastructure, and environment, this standard is fundamental for our homeland defense*." - Henry Tom, Chairman of NCITS L1, GIS Technical Committee.

- "*This truly is an awesome achievement*." - Ed Riegelmann, Vice President, CH2M HILL, Inc., Colorado Springs, Colorado

- "*Whether you realize it or not, you convinced Ron and I that the SDSFIE (way back in the TSSDS days) was going to be the way to go for COMMERCIAL AIRPORTS. We've been promoting that ever since... Now to see this news; for once I can tell some others, "I told you so*!" – Joe Zumwald, Woolpert, Inc.

ncits National Committee for Information Technology Standards

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

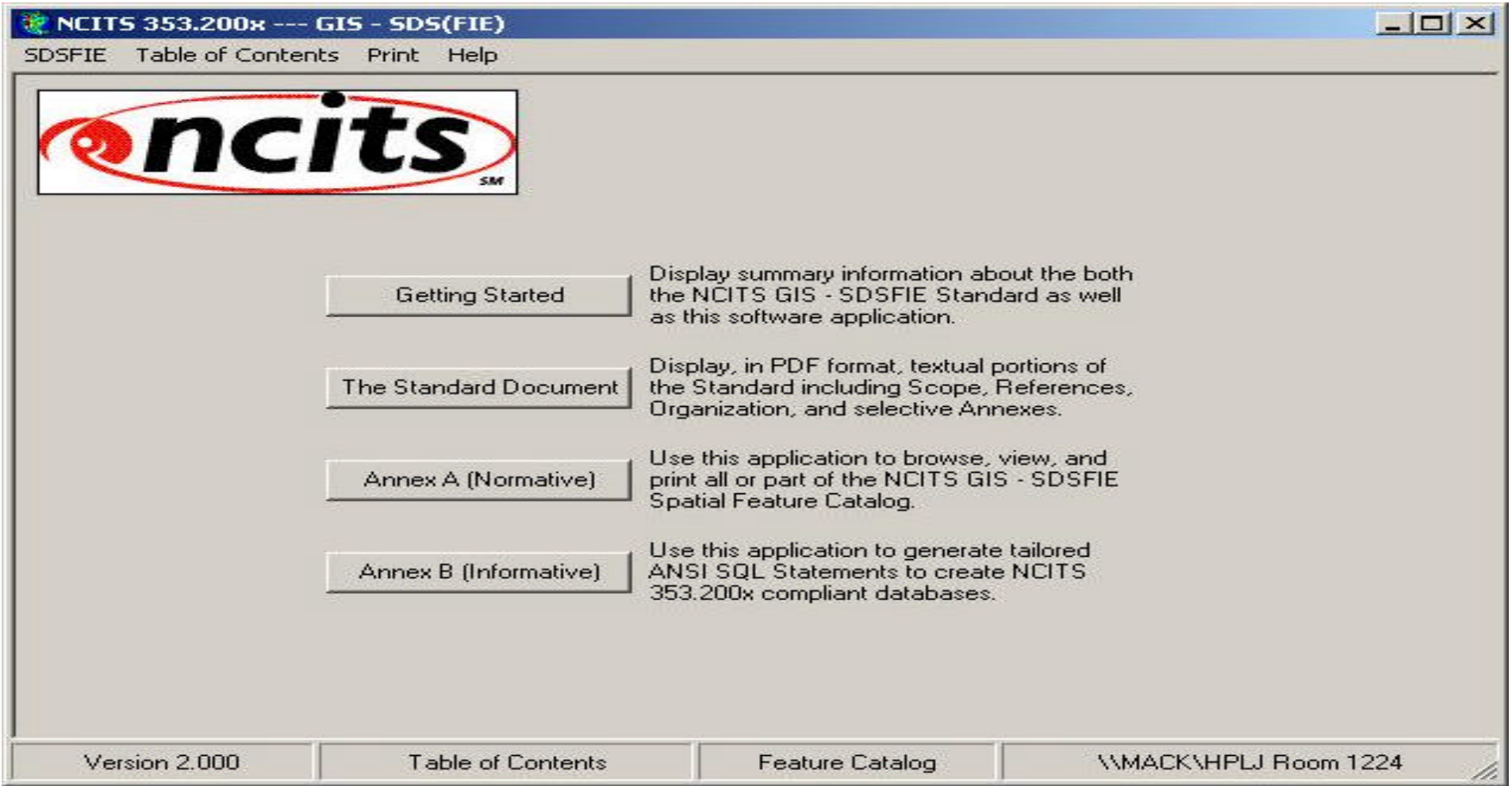
NCITS 353

- *"Congratulations to the Center and others who have invested time and energy. Our implementation of the standards many years ago has proven beneficial many times over. Times here, even with SDS implementation, have held their share of challenges. In retrospect, they seem to have been some of our greatest challenges. The hurdles were presented when we worked with data formats and application solutions using proprietary data formats/structures. Yes - there is always a work around, a band aid of sorts, for those things that do not exactly quite fit out of the developers box - But if not for these experiences, then our appreciation of SDS would be light. Funny how there seems to be a greater appreciation when labor, sweat and brow are involved. As with most things in life - time, persistence, patience, vision and the sharing of knowledge have proven to be consistent factors in evolving an agent of value (SDSFIE-NCITS 353). Again - my congratulations and appreciation*." - Karen Jones, Naval Surface Warfare Center Dahlgren, Public Works Department, Dahlgren, VA

ncits National Committee for Information Technology Standards

NCITS 353 CD-ROM Installation Options -

NCITS 353 Program After Installation on Computer



NCITS 353 Program – Getting Started

ANSI Spatial Data Application

File Edit Bookmark Options Help

Contents Index Back Print

Introduction

This section contains information about both the NCITS 353 Spatial Data Standard for FIE and the NCITS 353 Interpreter. The Introduction is a continuation of the Overview and is organized into:

NCITS 353 Standard for FIE Spatial Data

- Definition - defining the Standard and it's major elements
- Data Organization and Hierarchy - how the major elements of the Standard are organized
- Logical versus Physical - the differences between a logical representation and a physical implementation
- List of Feature Themes - a complete list of the 26 Themes (Entity Sets) defined in the Standard

NCITS 353 Interpreter

- Getting Started - Installing and configuring the NCITS 353 Interpreter
- Introduction - general information about the Application
- Screens and Forms - the appearance and use of various screens.
- Menu and Operation - how the menu it used to make the application work
- Browsing for Spatial Data - how to browse and find features in the Standard
- Generating SQL - how to use the SQL Generator with the Standard

NCITS 353 Program – Getting Started

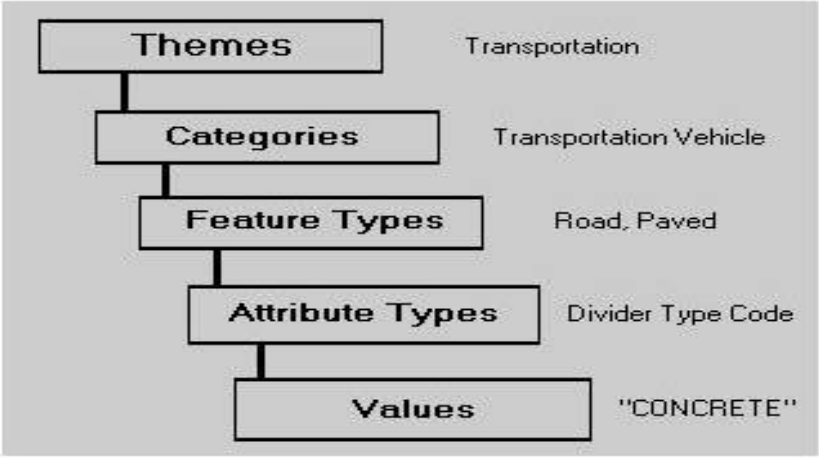
ANSI Spatial Data Application

File Edit Bookmark Options Help

Contents Index Back Print

Spatial Data Standard FIE Hierarchy

The NCITS 353 Spatial Data Standard for FIE is organized as shown:



Themes - (Entity Sets) are broad thematic groupings of features with a like purpose or function

Feature Categories - (Entity Classes) are related features likely to appear on the same "map" or spatial product

Features/Feature Types - are individual objects appearing on a "map" or spatial product

Attributes/Attribute Types - are characteristics of feature types

Values - are permissible values for attribute types

NCITS 353 Data Organization & Hierarchy

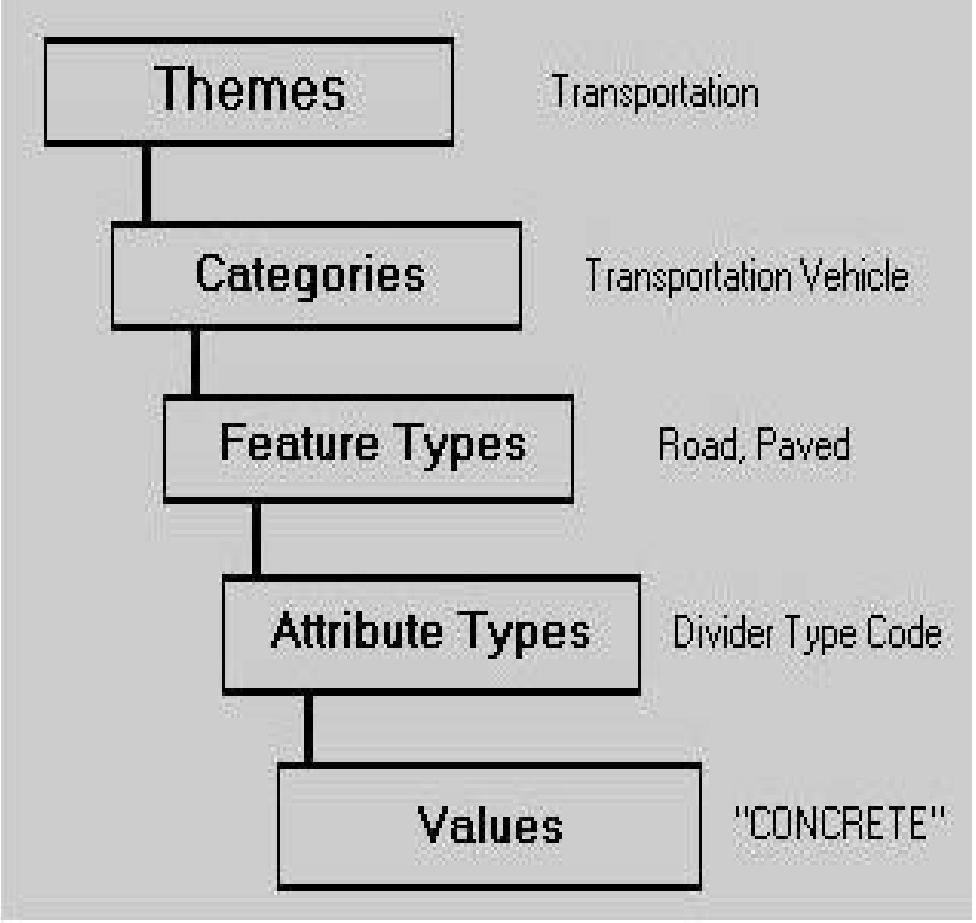
Themes (NCITS 353) = Entity Sets (SDSFIE)

Categories (NCITS 353) = Entity Classes (SDSFIE)

Feature Types (NCITS 353) = Entity Types (SDSFIE)

Attribute Types (NCITS 353) = Attribute Tables & Attributes (SDSFIE)

Values (NCITS 353) = Domain Tables & Domain Values (SDSFIE)



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

NCITS 353

NCITS 353 - 26 Themes (Entity Sets)

NCITS 353 Standard for FIE Spatial Data Master Themes List

Name	Definition
auditory	The generation and detection of sounds or noise in the environment.
boundary	The borders or boundaries that define logical or political divisions or subdivisions.
buildings	The structures located on the face of the earth that were created, by man, to protect man and his possessions from the environment; or to enhance man's activities.
cadastre	The man-made division of land into areas of ownership and control.
climate	The movement and effects associated with the earth's atmosphere.
common	The information that describes the overall data set or components of data that are common to all entity sets.
communications	The means available to relay data and translate data.
cultural	The activities of man that are historically significant.
demographics	The information pertaining to man's trends or traits.
ecology	The information pertaining to the interrelationship between organisms and their environments.
environmental_hazards	The identification and management of natural and manmade substances, materials, and conditions which are, or have the potential to be, detrimental to life and ecosystems on the earth.
fauna	The study of the animals in a region or environment.
flora	The study of the plant life in a region or environment.
future_projects	The information that describes planned projects for future development.
geodetic	The information pertaining to the size and shape of the earth.
geology	The geologic features and processes occurring in a given region on the earth.
hydrography	The physical conditions, boundaries, flow, and related characteristics of earth's waters.
improvement	The miscellaneous man-made minor structures and facilities which improve appearance, provide security, or facilitate man's activities.
land_status	The current use by man of the surface of the earth.
landform	The distribution of features that make up the visible surface of the earth's crust.
military_operations	The information relevant to military presence, operations, training, and security.
olfactory	The detection of odors in the earth's atmosphere.
soil	The unconsolidated materials above bedrock.
transportation	The methods and means of spatial movement in a large scale.
utilities	The man-made components of a system that provides a service to the public. The components of each utility system in this entity set are located outside the foundation of a structure.
visual	The observation of man-made or natural components in and through the atmosphere.

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

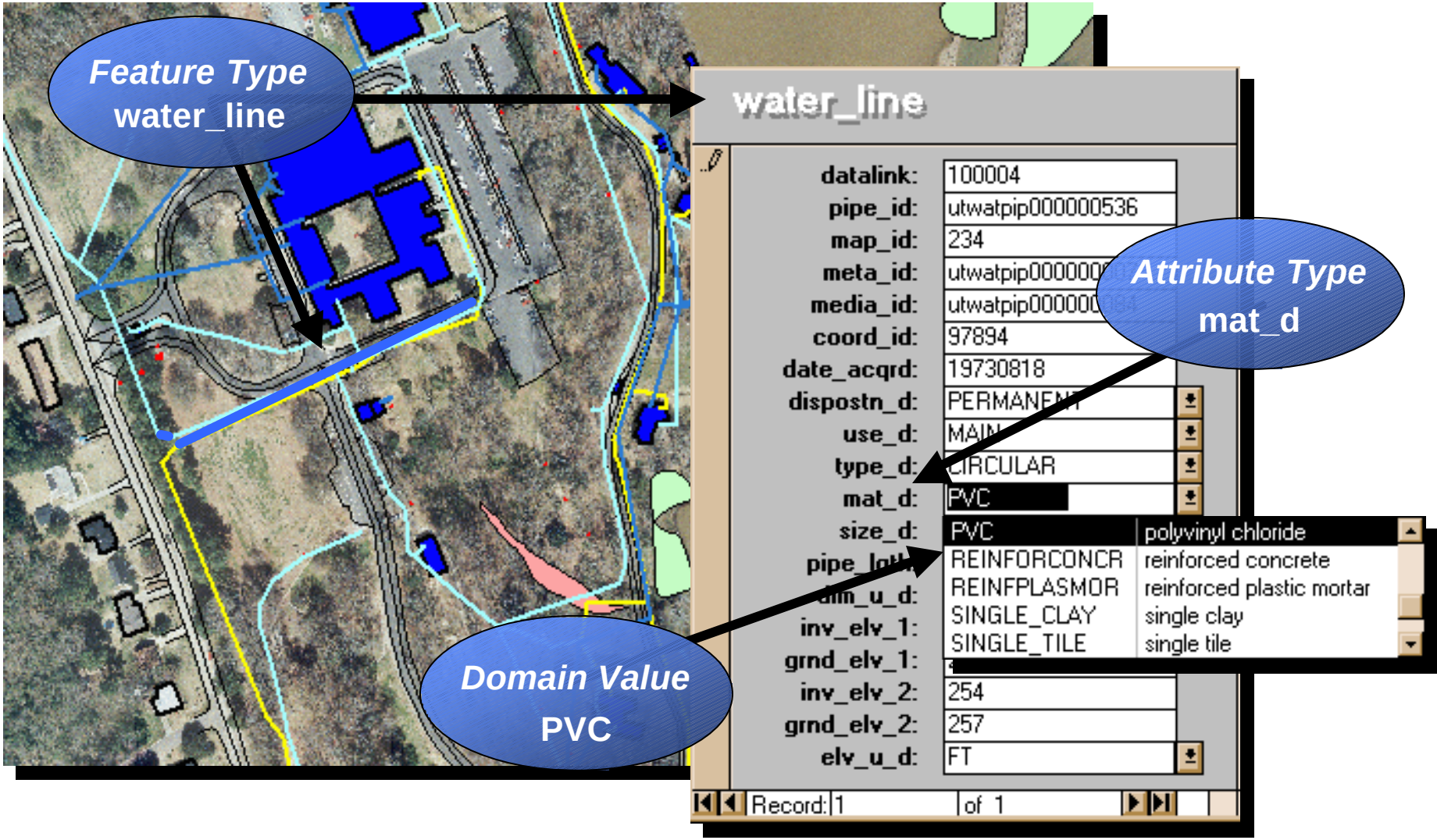
NCITS 353

- **NCITS 353 Themes (SDSFIE Entity Sets) – Currently 26**

Auditory
Boundary
Buildings
Cadastre
Climate
Common
Communications
Cultural
Demographics
Environmental Hazards
Ecology
Fauna
Flora
Future Projects
Geodesy
Geology
Hydrography
Improvements
Landform
Land Status
Military Operations
Olfactory
Soil
Transportation
Utilities
Visual

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

NCITS 353 & SDSFIE Data Model



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

NCITS 353
Incorporation of FGDC Wetlands Classification Standard

Entity Set	Entity Class	Entity Type	Attribute	Domain Value
Theme	Category	Feature Type	Attribute Type	Value
Hydrography	Wetland	Wetland	NWI Classification Code	
			NWI pH Modifier Code	
			NWI Soil Modifier Code	
			NWI Special Modifier Code	
			NWI Subclass Code	
			NWI Subsystem Code	
			NWI System Code	
			NWI Regime Non-Tidal Code	
			NWI Inland Salinity Code	
			NWI Regime Tidal Modifier Code	
			NWI Chemistry Coastal Salinity Modifier Code	

NCITS 353 – Annex A (Normative)

NCITS 353.200x --- GIS - SDS(FIE)

SDSFIE Table of Contents Find Print Help

Theme (Entity Set)

All Themes

Feature Catagory

All Feature Categories

Feature Type

Access Channel
Access Location, Controlled Military
Access Location, Uncontrolled
Accident Zone Air
Accident, Marine
Acid Concentration Area
Acid Concentration Contour
Acquisition Boundary Area
Agency Owned Area
Agricultural Tract
Air Eliminator, Fuel
Air Pressure Area
Air Pressure Contour

Geometry: G/GT Polygon

Paragraph: A-24.7.4

Definition

A manmade channel that provides access from one body of water to another; e.g. form the navigation channel to a harbor.

Channel Attributes

Primary Key Identifier
Width Dimension
Width Unit Measure Code
Mean Water Depth Dimension
Depth Unit Measure Code
Depth Datum Name
Restrictions Descriptive Text
Mean Cross Section Dimension
Cross Section Unit Measure Code
Area
Area Size Unit Measure Code
Perimeter Dimension
Perimeter Unit Measure Code

Data Type | Length

Definition

Relates to

Analog and Digital Map
Metadata
Common Media
Positional Location
Water Course

Domain Values

Version 2.000 | Table of Contents | Feature Catalog | \\MACK\HPLJ Room 1224

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

Bobby G. Carpenter, P.E.

Environmental Engineer

CADD / GIS Technology Center
for facilities, infrastructure, and environment
CEERD-ID-C
Army Engineer Research and Development Center
at Waterways Experiment Station
3909 Halls Ferry Road
Vicksburg, MS 39180-6199

phone: 601-634-4572
fax: 601-634-4584
E-mail: carpenb@wes.army.mil

CADD / GIS Technology Center Internet URL : http://tsc.wes.army.mil