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The Next Technology Wave . . . Enterprise Document Management

by Laurel Gorman, Tri-Service CADD/GIS Technology Center

Decision makers at many military installations and Civil Works projects are looking at Document Management technology to manage engineering drawings, facilities management documents, and associated geospatial information. As with computer-aided design and drafting (CADD) and geographic information system (GIS) technologies, field users are confronted with many decisions such as hardware/software purchases, management support, implementation issues, Internet/Intranet, workflow, and training. To meet the growing demands of automation and staffing shortages throughout the Tri-Service community, the Tri-Service CADD/GIS Technology Center has undertaken a multi-year project focusing on Enterprise Document Management (EDM) solutions to meet Military Installation/Civil Works mission requirements.

Products available from previous initiatives and planned for FY 99 include:

- **Executive Overview for Engineering Document Management Systems.** This report summarizes the capabilities, features, and benefits of Electronic Document Management System (EDMS) technology as it relates to the facilities management mission of the Department of Defense (DoD). Additional discussion topics include evaluation criteria of hardware/software, methodologies for evaluation and return on investment calculations, and a partial list of currently available EDMS systems and vendors.
- **EDMS Survey.** A survey was developed to capture the user's and organizational background, hardware/software applications, degree of implementation, and user satisfaction.
- **EDMS Guidelines for Facility Management.** A draft report is being prepared to provide an overview of EDMS for engineering and facility management documents; convey lessons learned by organizations that are using EDMS; and establish guidelines for evaluating EDMS requirements and commercially available hardware and software sources.

Inside this edition . . .

The Next Technology Wave . . . Enterprise Document Management
Update of CADD Details Library CD-ROM
Release 1.7 of A/E/C CADD Standards Online
Tri-Service Spatial Data Standards (TSSDS) and Tri-Service Facility Management Standards (TSFMS)
The Modular Design System — the Optimum Tool for Designers
Survey Engineering and Monumentation Management System
CADD/GIS Project Registry Clearinghouse
IM/FCAD2 Update
Electronic Bid Solicitations
Tri-Service CADD/GIS Calendar

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Visit: http://tsc.wes.army.mil

- **Guidelines for Needs Assessment Plan.** Guidance for conducting a needs assessment plan will be written to assist a site in determining the approach, current capabilities, staff roles and responsibilities, hardware/software requirements, and document profiles. This report will provide an EDMS approach for Military Installation/Civil Works projects and will include an overall project plan, software evaluation procedures, examples of scopes of work, and EDMS functions including document creation, workflow, and viewing.

The Center maintains an EDMS Project Page located at **http://tsc.wes.army.mil/products/pages/edms**, where completed and future products are posted in Adobe Acrobat PDF format. If you are a new or experienced document management user, please assist the Center by completing the survey available on-line. The survey information will be used to assist and promote EDM adoption specifically for the Military Installation/Civil Works projects. If you need further information, please contact Laurel Gorman at **gormanl@ex1.wes.army.mil**.

Update of CADD Details Library CD-ROM

by Stephen Spangler, Tri-Service CADD/GIS Technology Center

Release 2.0 of the CADD Details Library CD-ROM will soon be ready for distribution. This release will contain updates of details in Release 1.0, as well as details in several new disciplines; namely, Structural, Civil/Site, and Telecommunications. In addition to these new disciplines, the Tri-Service Center will include metric architectural details in response to the demand for metric details. These additions will bring the total number of details on the Release 2.0 CD-ROM to approximately 1,500 (actually 3,000 since both .dwg and .dgn formats are provided). The CD-ROM will also contain an updated release of the CADD Detail Manager software. All detail reports that were released in hard-copy format along with the Release 1.0 CD-ROM will now be distributed in PDF format on the Release 2.0 CD-ROM. This format allows users to print only the reports (or pages) that they require.

Updated details from the Release 1.0 CD-ROM and the new details that will be added to Release 2.0 can be downloaded now from the Center's Web site. The CADD Details Library can be found at **http://cadlib.wes.army.mil**. If you would like to be added to a mailing list to receive the Release 2.0 CD-ROM when it becomes available, please e-mail Stephen Spangler at **spangls@ex1.wes.army. mil**.

Release 1.7 of A/E/C CADD Standards Online

During the online review period for Release 1.7 of the A/E/C CADD Standards, the Tri-Service CADD/GIS Technology Center received over 400 requests for the final CD-ROM release via the Web. The CD-ROM includes the A/E/C CADD Standards, the prototype for the nongraphic attribute data, and the updated symbols library. The MicroStation workspace that enables users to access basic drafting utilities preconfigured to meet the A/E/C Standards will also be available soon. Visit our Web site (**http://tsc.wes.army.mil**) for updates and to request your CD-ROM.

The Tri-Service Center is dedicated to fostering the application of computer-aided design and drafting (CADD) and geographic information system (GIS) technologies for facility life-cycle efforts throughout the Army, Navy, and Air Force. The CADD/GIS Bulletin *is published by the Tri-Service CADD/GIS Technology Center of the Information Technology Laboratory, U.S. Army Engineer Waterways Experiment Station, 3909 Halls Ferry Road, Vicksburg, Mississippi 39180-6199.*

Tri-Service Spatial Data Standards (TSSDS) and Tri-Service Facility Management Standards (TSFMS)

by Bobby Carpenter, Tri-Service CADD/GIS Technology Center

One of the Tri-Service Center's major initiatives has been development of the Tri-Service Spatial Data Standards (TSSDS). The TSSDS were designed to provide a nonproprietary, nonvendor-specific, graphic and nongraphic standard for geographic information system (GIS) implementations at Air Force, Army, and Navy installations and Army Civil Works projects. The TSSDS are designed to provide a consistent standard that can be used with all of the predominant commercially available off-the-shelf CADD, GIS, and relational database software used by DoD organizations. This design, in conjunction with its universal coverage, has propelled the TSSDS into being the standard for GIS implementations throughout DoD, as well as being the *de facto* standard for GIS implementations in other Federal, State, and local government organizations; public utilities; and private industry in the United States and internationally.

Release 1.75 of the TSSDS was released in January 1998. It is currently available on CD-ROM or can be downloaded from the Tri-Service Center's Web site (**http://tsc.wes.army.mil**). Release 1.75 begins the transition to the integrated TSSDS and Tri-Service Facility Management Standards (TSFMS). A few of the additions and enhancements include:

- **Facility Table.** The facility table was created to interface with the approved facility table in the Defense Information Systems Agency's (DISA) Defense Data Repository System (DDRS). It is the approved interface to facility management systems. The attribute "facil_id," formerly found in all graphic tables as an alternate key, is now the primary key to the newly created table "cmgenfac."
- **Attribute Common Names.** Attribute common names have been created by user request. They are the attribute table name and attribute name itself in a more readable syntax.
- **Unit of Measure Domain Table.** All unit of measure domain tables have been combined into one domain table called "d_uom." This change was incorporated to comply with DISA requirements. When possible, domain values have been referenced with a source, particularly units of measure domains that are being compared with ISO and ANSI standards.
- **Entity Types.** New graphic features (Entity Types/Entities) have been added to the Boundary, Common, Communications, Flora, Geodetic, Improvement, Land Status, Military Operations, Transportation, and Utilities Entity Sets. The most notable of these include the addition of saltwater systems and compressed-air systems into the Utilities Entity Set.
- **Application.** A 32-bit Windows 95/NT browser (TSSDS 32) has been introduced. The TSSDS 32 provides all of the advantages of increased speed with the increased flexibility and user friendliness that Visual Basic can provide.

Release 1.8 of the TSSDS/TSFMS is scheduled to be completed in July and will contain the first release of the Facility Management Standards (primarily focused on environmental compliance and environmental restoration), as well as incorporation of the Federal Geographic Data Committee's Soils, Vegetation, and Wetlands Standards. Additional focus is on the incorporation of Military Range and Training and Small-Scale Mapping CADD/GIS geospatial data standards and on the incorporation of features contained in the Army Corps of Engineers' Mississippi Valley Division's Regional Engineering and Environmental GIS (REEGIS). A 32-bit application (the "TSSDS Toolbox") has also been developed to assist users in updating their existing GIS databases to the most current release of the TSSDS/TSFMS. Discipline filters are being developed to provide the core set of data standards needed to construct a GIS for a specific purpose (e.g., base comprehensive planning, Civil Works, environmental compliance, environmental restoration, and small-scale mapping).

For additional information, contact Bobby Carpenter at **carpenb@ex1.wes.army.mil**.

The Modular Design System — the Optimum Tool for Designers

What is the Modular Design System?

The Modular Design System (MDS) is a unique tool that lets the user move from conceptual design to construction documents quickly and economically. Using pre-engineered and pre-designed modules, the designer is able to explore and view different configurations of a facility until determining the best one for the project. Selecting from an extensive details library, the user is able to make numerous design decisions, including foundation options, lighting, plumbing, heating and cooling equipment, and even furniture placement. As different choices are considered, the client and designer can see the effects of changes, such as room size or material, on cost. Clients and designers are able to communicate their needs in layman terms, and when the initial layout has been determined, MDS generates detailed engineering and architectural drawings and specifications, as well as cost estimates. Long before construction begins, a complete and accurate picture of the building project has been developed.

How Does MDS Work?

The key to MDS is its module-based design approach. Module-based design relies on assembling pre-designed and pre-engineered parts of a building to achieve cost savings and shorten design time. Typically, these parts are functional areas of a building, such as offices, assembly halls, and classrooms.

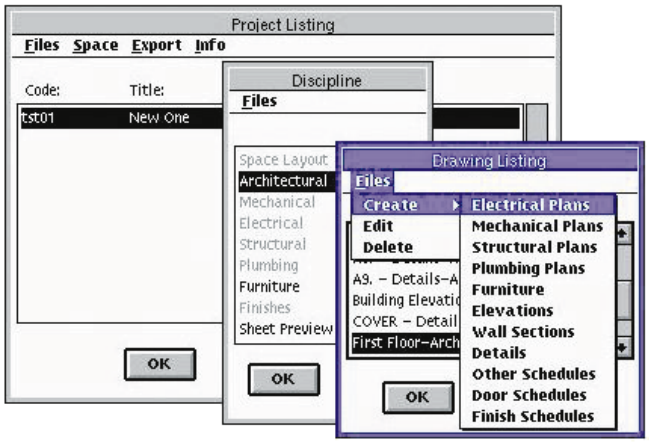
This CAD-based tool consists of two components: the programmer's package and the designer's package. The programmer's package allows both the client and the designer to provide input on the initial layout of the structure. Little knowledge of building design is needed at this stage. The user organizes color-coded modules within a user-defined structural grid. When a satisfactory layout has been determined, the designer's package automatically generates an architectural floor plan as well as mechanical, electrical, plumbing, furniture layout, and structural design plans. Based on the floor plan configuration, MDS generates wall sections, construction details, and equipment schedules from its extensive details library.

Using the designer's package, the project architect creates detailed drawings of the structure and uses MDS layering to place windows, doors, and furnishings. The package contains a number of pre-engineered structural options, such as the use of steel frame or load-bearing masonry, foundation or floor slabs. The architect uses mechanical design tools to select from three heating and cooling systems. Other options are provided for determining the placement and types of lighting fixtures and power receptacles, exterior lighting, and total building power and lighting load requirements.

How Was MDS Developed?

In 1989, the Army Corps of Engineers' Louisville District developed a CAD-based system for the U.S. Army Reserve and the U.S. National Guard to standardize the design of Army Reserve facilities. In 1996, a Cooperative Research and Development Agreement (CRDA) between Bentley Systems, Inc.; JMGR Inc.; Building Systems Design, Inc.; and the Corps' Construction Engineering Research Laboratories (CERL) was signed for further development, testing, and commercialization of this product. Also in 1996, the U.S. Army Engineer Waterways Experiment Station (WES) joined with CERL to assume responsibilities for maintenance and future development of the MDS software — WES as Program Agent with responsibility for engineering data development and day-to-day support, and CERL as the Technical Agent with responsibility for maintenance and technical enhancements of MDS.

As a collaborative project, MDS has progressed rapidly over the past few years, and upgrades to the software will continue to be made to ensure that MDS accommodates the latest building technologies. Enhancements that became available in MDS Release 2.0 released in September 1997 include metric conversion, Corps of Engineers guide specification references, multi-story



Fort Lawton, designed by JMGR, Inc., for Louisville District

capabilities, module addition capability support, multi-discipline network support, and operational capability in MicroStation 95®. MDS Release 2.1, scheduled to be released in FY 98, will include Internet design review capability, energy loads analysis, and other enhancements.

Today MDS successfully meets the planning and programming needs of the Army Reserve and National Guard and is in use on all new projects. However, the potential of MDS goes far beyond Army Reserve and National Guard facilities. With the development of more building-specific models, MDS supports a wide range of building types for both DoD and the private sector.

What Are the Benefits of MDS?

Because of its module-based, pre-engineered structural options, MDS is especially suited to the repeat design of a given building type. By providing construction details, specifications, and cost estimates, MDS reduces design times and the potential for design errors. It is estimated that for Army Reserves Centers, the use of MDS has the potential to reduce delivery time from 18 months to less than 9, with an estimated 4- to 9-percent construction cost reduction.

What Is the Availability of MDS?

MDS is commercially available through Bentley Systems, Inc. For more information, visit the MDS Web site at **http://mds.wes.army.mil** or contact Kenneth Cook at (601) 634-4483.

Survey Engineering and Monumentation Management System

by Dr. V. Danushkodi, Tri-Service CADD/GIS Technology Center

Survey Engineering and Monumentation Management System (SEMMS) is a utility software developed by the Tri-Service CADD/GIS Technology Center and the Corps' Topographic Engineering Center with the assistance of a task group consisting of Tri-Service field representatives. It uses a survey control database schema and common data fields associated with the Tri-Service Spatial Data Standards and used by other government agencies producing survey engineering geospatial data products. This software provides the means for survey control data entry, retrieval, and maintenance. SEMMS promotes consistency among various activities within the Tri-Services in the management and dissemination of survey control data. It also contains all the existing National Geodetic Survey (NGS) control data for the entire United States and territories.

A SEMMS test release was beta tested at 31 offices, and their comments were resolved during a Task Group meeting held at WES on February 2 and 3, 1998. Release 1.0 of the software and NGS survey control data are now available to download by file transfer protocol (ftp) from the Center's server **mack.wes.army.mil** with **anonymous** login and changing directory to **SEMMS\Semms\Release10**. The software is being expanded to include Web search capabilities. The SEMMS products will be available in the summer of 1998 as a new CD-ROM containing Release 1.0, an Internet release, and a User's Manual.

CADD/GIS Project Registry Clearinghouse

by Dr. V. Danushkodi, Tri-Service CADD/GIS Technology Center

The CADD/GIS Project Registry Clearinghouse is an ACCESS database developed by the Civil Works Field Working Group. This database contains information about projects using CADD/GIS applications. The registry includes contact information, data themes, descriptions of the CADD/GIS applications, study abstracts, success stories, benefits, special problems, and innovations. The registry will help users find existing projects that may help them in the development of projects and reports for other locations and will provide necessary contact information. The registry contains information about 21 projects provided by members of the Civil Works Field Working Group.

An Internet input form has been developed at the Center for the registry and can be accessed at **http://fwgcom.wes.army.mil/fwg/civil/clearinghouse/clearinghouseinput.asp**. If CADD/GIS was applied in your project, please complete the Internet input form or contact Dr. Danushkodi at **danushv@ex1.wes.army.mil**. The Civil Works Field Working Group will be collecting project data for the registry from all Corps of Engineers offices during FY98. During the next phase as proposed for FY99, the Clearinghouse will expand to include Army, Navy, and Air Force project data.

IM/FCAD2 Update

by John Hood, Tri-Service CADD/GIS Technology Center

The Installation Management/Facilities CAD2 (IM/FCAD2) program, formerly known as just CAD2, is committed to providing the best value in services for its customers, combining expertise with flexibility. The program consists of two IDIQ support contracts awarded to Tracor Enterprise Solutions (formerly Team Cordant) and Intergraph Federal Systems, each offering hundreds of products providing a vast array of automated tools for design and management of installations and facilities. Software products include CADD, GIS, facility management, Web software, networking, mapping, and database management applications, and a full suite of architectural/engineering/construction (A/E/C) applications for infrastructure and Civil Works design. Hardware products include the latest Intel Pentium II and SUN workstations and servers as well as a spectrum of support peripherals from plotters to notebooks to GPS equipment. These

contracts are easy to use and competitive with those available elsewhere to government users.

Each contract contains labor categories designed for the full range of hardware installation and operations, software integration, and the extensive skills and services needed to assist in startup and implementation of the available systems. The IM/FCAD2 program and contracts are oriented towards total solutions, comprised of software, hardware, data and services tailored to meet the customer's design, installation support, and facilities management requirements.

The contracts, open to all Federal agencies, currently have a $550 million total value with over 600 existing customers. The contracts are 4 years old with 8 years remaining. The intent is to renew and extend the current program until its expiration. The IM/FCAD2 ordering office and technical support office is located at the Information Technology Laboratory, U.S. Army Engineer Waterways Experiment Station (WES), in Vicksburg, MS, in direct support of the installation management requirements of the Navy, Army, Air Force, and Corps of Engineers.

For those customers who have used the contracts before, providing LCM documentation (your Local Information Management or Life Cycle Management for ADPE) with the order package is no longer a requirement.

A new home page is being developed to provide customers with more information about the available products and services as well as information pertaining to current order status.

New CADD/GIS products that are not currently available on the contracts may be requested to be added to the contracts via the vendors. For the latest offering and more details, we invite you to contact the IM/FCAD2 contractor's service coordinator (Tracor Enterprise Solutions 1-800-565-CAD2; Intergraph Federal Systems 1-800-565-9940) or the Contracting Officers Representative at 1-800-700-CAD2 for further information, or visit our Web site at **http://cad2.wes.army.mil**.

Electronic Bid Solicitations

by Elias Arredondo, Tri-Service CADD/GIS Technology Center

The standard process by which the government obtains contractor bids for construction projects involves many steps and much idle time. The Army, Navy, Air Force, and Corps of Engineers spend millions of dollars each year on printing, distributing, and storing contract solicitation documents. The Electronic Bid Solicitations (EBS) program implements a standard for the delivery and distribution of electronic contract solicitation documents. EBS improves and streamlines the procurement process, eliminating unnecessary reproduction and storage of printed media and allowing significant savings in resources. Prospective bidders can view, search, download, and request project solicitation documents via the Internet. The only requirements are a Windows-based PC and an Internet browser. Solicitation documents can be either requested over the Internet or delivered on CD-ROM.

The EBS project was developed by a team of subject-matter experts with backgrounds in contracting, specifications, engineering, CADD, and computer programming. The EBS Working Group consists of representatives from the Army Corps of Engineers Headquarters, Districts, and Research Laboratories, and from the Air Force and Navy. The Working Group successfully formulated, developed, and tested the EBS through pilot projects and is implementing this program throughout the Tri-Service community.

To date, eight training workshops on EBS have been presented with an enrollment of 137 attendees from 27 Corps Districts. Additional workshops will be offered through the Corps of Engineers' PROSPECT training program.

The Tri-Service Solicitation Network (**http://tsn.wes.army.mil**) established at the Tri-Service CADD/GIS Technology Center, is the hub for all EBS sites throughout the Tri-Services. Sample Web pages are available to installations for development of their own web sites. For more information, contact the EBS project manager at 1-800-522-6937 ext. 6783 or **wgebso@ex1.wes.army.mil**

EBS documents are available over the Internet or on CD-ROM

Tri-Service CADD/GIS Calendar	
Date	**Event**
Conferences of Interest	
June 2–5	A/E/C Systems ‘98, McCormick Place, Chicago, IL POC: A/E/C Systems, ***www.aecsystems.com***
July 27–31	ESRI User’s Conference, San Diego Convention Center, San Diego, CA
Publications	
Current	Tri-Service Standards, Part 2, A/E/C CADD Standards, Release 1.7 POC: Stephen Spangler, (601) 634-3104, ***spangls@ex1.wes.army.mil***
Current	Tri-Service Standards, Part 3, Spatial Data Standards, Release 1.75 POC: Bobby Carpenter, (601) 634-4572, ***carpenb@ex1.wes.army.mil***
Current	Guidelines for Electronic Document Management for Engineering Drawings, draft POC: Laurel Gorman, (601) 634-4484, ***gormanl@ex1.wes.army.mil***

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