CADD/GIS Bulletin

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Waterways Experiment Station Automated Master Plan/Design/Facility Management System Compliant with Tri-Service Data Standards

(Submitted by David H. Horner, Tri-Service CADD/GIS Technology Center)

An initiative under way at the U.S. Army Engineer Waterways Experiment Station (WES) is integrating master planning, engineering design, and facility management using CADD/GIS technology in a system that is fully compliant with the Tri-Service data standards. This article presents an overview of WES's Integrated Automated Master Plan (IAMP) and describes how it can be effectively applied by the installation planner/engineer and civil works personnel.

The WES system represents the next generation of tools for master planning, engineering design, and facility management for military and civil works projects. It is designed for accessibility by personnel ranging from the installation commander to the installation/base planner, civil engineer, environmental specialist, and support staff. The concept is to place planning, design, construction, operations, and maintenance information on the desktop of the personnel who require and need the information.

The components of the traditional master plan (MP) can be assembled using the IAMP system within a few weeks instead of months or even years. What is of greatest benefit, however, is that it provides users a tool which is not put away on a shelf and referred to only three or four times every five years, but which is a viable system that provides critical data on a regular basis and becomes an effective planning and operations tool for the installation. The WES IAMP is being developed in four phases, the first two of which are completed. These are phased to allow for a prototype that is currently being utilized on station by the Department of Public Works.

Phase I involves *site mapping* of the installation and is essentially broken down into three parts. The first part, the installation general plan, is a synopsis of the overall plan for the installation and describes the interaction of the component plans. Among the component plans are: natural resources; environmental quality protection; land use; airfield, air, and range operations; air installation compatibility use zones (AICUZ); utility systems; communications; transportation; energy; architectural compatibility; landscape development; and long-range facility development and capital improvements program. Each of the plans is developed with the quality-of-life concept, which includes recommendations affecting economic, social, and educational opportunities; health care; housing and neighborhood environment; environmental quality and recreation opportunities; community support services; and aesthetics.

The second part consists of the actual maps or plan development shortened from the original program requirements to include a "core" set of approximately 50 maps. Installations/projects can then update the maps and provide any comments that may be needed each year.

The third part of site mapping is the integration of the maps with the component plans using current CADD/GIS software programs such as AutoCAD, MicroStation, ArcView, Arc/Info, and

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Intergraph MGE/MGA. This integration allows the installation to generate operational/real world and time scenarios for installation readiness and provides the capability for continuously updating the IAMP data base.

Phase II, *infrastructure integration*, which is the MP integrated with the facility management model, provides the needed data bases used daily for facilities real property planning, programming, and maintenance and repair. The maps and the plan concept are integrated using commercially available programs.

Design management will be developed in **Phase III**, *engineering analysis phase*. Automated design tools will provide the designer immediate access to as-built information such as two- and three-dimensional images of land utilization maps, geographic features, land zoning, floor plans, utility systems, installation design guidance, and current design criteria.

Phase IV provides for the total facility management and operations, which is the *micro facility management phase*, integrated into a functional management system that provides environmental, civil, and structural engineers, architects, and other base engineering personnel the total management and operational schematic.

The total integration package will be compatible with Tri-Service data bases such as the Army's Integrated Facility System (Mini/Micro), Navy's Activity Planning and Management Model, and Air Force's Work Information Management System. In this way, the Army, Navy, and Air Force save dollars through the procurement, and the requirements tend to be more user friendly. Also, once the information management team completes current efforts under way to incorporate GIS technology to produce up-to-date images of the entire installation/project as a backdrop for the computer-generated installation/base infrastructure, all the ingredients will be in place for a detailed map that is up-to-the-minute current and accurate. Integration will be very important at military and civil works projects so that comprehensive digitized data systems will not be out-of-date. The integration package uses software that is currently off-the-shelf.

There are other ways to accomplish the MP, but all are time-consuming and labor-intensive and require additional funding from DoD sources that will increasingly be strapped for money. New software and technology make the IAMP approach being developed at WES not only possible, but desirable.

Sandy Stephens Accepts Position at Fort Carson; John Hood Named Acting Chief

Sandy Stephens

Sandy Stephens has accepted a new position at Fort Carson's Directorate of Public Works in Colorado Springs, Colorado. Sandy reported to his new position as Chief of Project Management Division on December 10, 1995.

Sandy had served as Chief of the Center since its inception in 1992. During his tenure, Sandy was instrumental in establishing the Center's working relationships with the three services and championing the benefits of CADD and GIS technology throughout DoD. Sandy's work at the Center garnered him numerous awards including the Department of the Army's Commander's Award for Civilian Service. Sandy's dedication and contributions to the Center will be greatly missed by both the Center staff and the CADD/GIS community.

John Hood

With Sandy's departure, John Hood has been named Acting Chief of the Center. John has been with the Center since 1992, most recently serving as the Technical Contracting Officer's Representative for the Naval Facilities Engineering Command CAD2 contract. He may be contacted by calling the Center at (601) 634-3138, or by e-mail at hoodj@ex1.wes.army.mil.

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*

Welcome to *The Data Window*. *The Data Window* is a regular column in the *CADD/GIS Bulletin* dedicated to discussion of the issues surrounding *data* that are input, stored, manipulated, linked, accessed, analyzed, archived, and output using CADD and GIS software. We encourage submissions of articles on data issues from anyone in the Tri-Service CADD/GIS user community. Since the user community employs a variety of GIS and CADD software and hardware platforms, feel free to submit any discussion, regardless of software or hardware. Our objective is to provide an open forum for issues concerning CADD and GIS data in the Tri-Service user community.

The article in this issue of *The Data Window* was submitted by Mr. Will Martin, a civil engineer at the U.S. Army Corps of Engineers (USACE) Savannah District. Will has worked with CADD technology for 18 years. His early work involved creation of a CADD application in support of dredging-related projects, notably in support of Naval Submarine Base Kings Bay, Georgia, for production of hydrographic survey maps and volume calculations.

Since 1985, Will has been involved with GIS/automated mapping/facilities management systems and has worked extensively in data translation between systems and platforms. He is currently involved in GIS projects at the U.S. Army's Fort Bragg, NC, Fort Stewart, GA, and Fort Benning, GA. In addition, Will is Savannah District's support advisor for construction efforts at the Fort Bragg Replacement Hospital.

If you have any comments on this or any other article in this column or if you would like to submit an article, please contact: Ed Riegelmann, CEWES-ID-C, USAE Waterways Experiment Station, 3909 Halls Ferry Road, Vicksburg, MS 39180-6199, phone (601) 634-4604, fax (601) 634-4584, or email: riegele@ex1.wes.army.mil.

As-Built Drawing Production Evolution at Savannah District: An Entirely New Concept

(Submitted by William A. Martin USACE Savannah District)

Historically, as-built drawing production has been less than satisfactory because of a lack of quality control (QC) on the as-built drawings. The drawings supplied are marked-up construction drawings created at a scale less than usable by the customer. For instance, site drawing data at 1" = 30' is ill-structured to fit into basic planimetric maps. Additionally, there is sometimes a considerable lapse of time between construction completion and the delivery of as-built drawings.

Other problems associated with as-built drawings involve drawing content. The content is reflective of the construction process and is encumbered by details that are insignificant to the facility maintainer. Pre-construction erosion control plans and similar products are of no use once the facility is complete. Additionally, as-built drawings are "marked-up" to reflect deviations from the original contract drawings. These deviations reflect the "as-built" condition of the facility. The facilities maintainer does not need to know where an object *may* have been constructed — only the final result. That is why the drawings are called "as-built."

Savannah District is engaged in a prototype project to deliver facility maintenance-ready, as-built site drawings of the Fort Bragg Replacement Hospital. These drawings will be consolidated into single-discipline utilities encompassing the entire site instead of three volumes, primarily at 1" = 30', encumbered with many sheets of details, notes, and other construction-related data. The resident construction office will update the electronic drawing files onsite in cooperation with the construction contractor. The as-built drawings will be provided in Intergraph design file (DGN) format ready to be incorporated by the Directorate of Public Works and Environment into the Bragg Basic Information Maps.

The site-work as-built drawings will serve as a beginning point for the preparation of as-built drawings for the remainder of the 1.3-million-square-foot hospital construction (the steel and concrete portion of the facility). Additionally, Fort Bragg will receive the completed site drawings 4 years before the remainder of the facility is completed instead of 2 years after construction.

Attention Electrical Engineers

(Submitted by Gregory A. Covington, Tri-Service CADD/GIS Technology Center)

Intergraph Corporation and EDSA Micro Corporation have entered into a new agreement concerning the future of EE Power. Under this new agreement, EDSA Micro will be in charge of the sale and support of EE Power. EDSA is offering to upgrade current EE Power users to the EDSA 2000 Super package version 2.0 at no cost. The EDSA 2000 Super package is expected to be released in the first quarter of 1996. Through this offer, EDSA will provide users with:

- EDSA for Windows - 2000 Super package, Release 2.0
- EDSA for DOS - 2000 Super package
- EDSA Manuals CD-ROM
- EDSA "Playing with Power" multimedia training CD-ROM.

EDSA will provide both the DOS and Windows versions of their software because all modules have not been ported from DOS to Windows.
Users who purchase and maintain an active software maintenance agreement will receive updates on a regular basis until the DOS system is phased out. Questions concerning this offer should be directed to:

Mr. Adib M. Nasle
Marketing Manager,
EDSA Micro Corporation
200 East Long Lake Road, Suite 177
Bloomfield Hills, Michigan 48304
Phone: 1-800-362-0603 / (810) 647-3791
Fax: (810) 647-3792

Results of the 1995 Tri-Service CADD/GIS/FM Symposium and Exposition

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

With over 700 attendees representing vendors, private industry, architect-engineer (A-E) firms, local government, and DoD, the 1995 Tri-Service Computer-Aided Design and Drafting/Geographic Information System/Facilities Management (CADD/GIS/FM) Symposium and Exposition was a great success. The Symposium, held during the week 28 Aug-1 Sep 1995, offered 114 presentations throughout the week scheduled into 7 General Plenary Sessions, 26 Concurrent Sessions, and 3 Panel Discussions. Other events included 4 workshops and an exhibition hall offering booths at which Symposium attendees saw demonstrations of the latest developments in CADD/GIS/FM technology. The Symposium was coordinated by the Tri-Service CADD/GIS Technology Center and sponsored by the Naval Facilities Engineering Command.

The first day of the Symposium was for exhibitor setup, early registration, and Field Working Group (FWG) meetings. With 87 exhibitor booths, an empty conference hall was soon bustling with activity as DoD personnel, vendors, and A-E firms assembled their booths in preparation for exhibition hours the next day. As attendees arrived at the hotel, registration lines quickly grew long. The Center's registration staff (Joy Wells, Kathy McMichael, and Mary Stewart) kept the lines moving rapidly and efficiently. The Center's eight FWGs spent the day developing goals and work plans for FY96 projects sponsored by each FWG. Because of the high interest and dedication of the FWG members, many additional meetings were scheduled by the groups throughout the week. An icebreaker was held that evening to intermingle in an informal atmosphere.

The remaining three and a half days of the Symposium were dedicated to presentations and exhibitions. The Center was fortunate to have many diverse and informative presentations. The opening session, "Managing the Technology Successfully," set the mood for the week. Speakers included Dr. Robert Whalin and Dr. N. Radhakrishnan, U.S. Army Engineer Waterways Experiment Station; Dr. Robert Wolff, Headquarters, U.S. Air Force; Major Michael Costigan, Headquarters, Department of the Army; Mr. Harry Zimmerman, Naval Facilities Engineering Command Headquarters; and Mr. Ed East and Mr. M. K. Miles, Headquarters, U.S. Army Corps of Engineers. This year the Symposium had two keynote speakers. Mr. Frank J. Conkling, The MacArthur Foundation, discussed the successful management of GIS technology, and Mr. A. B. (Buddy) Cleveland, Jacobus Technology, Inc., provided an insightful look at managing CADD technology in the 1990s and beyond. As part of the opening session, Mr. Terry Coomes, Fort Worth District, was presented with a plaque in recognition of his outstanding service as Chair of the Field Technical Advisory Group.

After the opening session on Tuesday, managers and executives were offered the chance to attend special Manager's Track sessions as well as an Executive Luncheon. Topics presented during the Manager's Track were: "Education," which provided an overview of CADD/GIS technology; "Facilities CAD2 Vendor Presentations," which allowed the Facilities CAD2 vendors to present how their products can result in time savings, cost savings, and increased performance; and "Success Stories," at which executives presented how CADD/GIS technology helped their installations. During the Executive Luncheon, Mr. Wes Holsapple from Dale Carnegie gave a presentation on managerial skills.

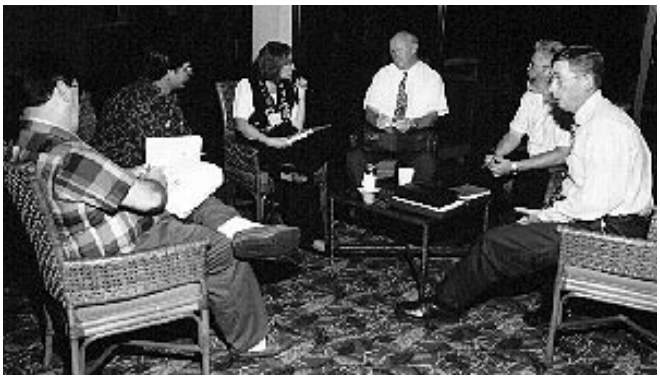
For the other attendees, the remainder of Tuesday's agenda provided a general session on "Data Standards and CADD Criteria," and concurrent discipline-specific sessions such as "Environmental Management," "Emergency Management," and "Facility Management." The Symposium also offered five afternoon "Technical and System Track" sessions hosted by Mr. John Kincaid, Rock Island District, during the week. The Exhibition Hall also was open from 1200 to 1700 on Tuesday, Wednesday, and Thursday (on Wednesday the hours were extended to 1900 due to the high attendance).

A new feature to the Symposium this year was the offering of workshops. These workshops presented more detailed information on topics such as: "Implementing GIS Technology on Defense Installations: Critical Issues for Organizational Managers," presented by Major Brian Cullis, U.S. Air Force Academy, and Mr. Ed Riegelmann, Tri-Service Center; "Implementation of the Tri-Service Spatial Data Standards," presented by Mr. Harold Smith and Mr. Ed Riegelmann, Tri-Service Center; "Maximizing Your Profits with Satellite Imagery and GIS," presented by Ms. Cheryl Collier, Spot

Imaging Corporation; and "Building a Productive CADD Environment," presented by Mr. John Leavy, Computer Graphic Solutions, Inc.

On Wednesday morning, each service (Air Force, Army, and Navy) met separately to discuss CADD/GIS issues affecting their organizations. The U.S. Coast Guard took advantage of the scheduled time to conduct a meeting of their Coast Guard Technology Working Group. The remainder of the morning was spent in a "New Technologies and Beyond" session where vendors promoted current and future technologies. The afternoon was broken out into discipline-specific sessions, such as "Civil Planning (Parts 1 and 2)," "Design," "Information Management," "Military Planning," and "Natural and Cultural Resources."

On Thursday, the following General Plenary sessions were held: "Federal Data Standards Activities," "Construction Management," and "Life-Cycle Management: A Tri-Service Perspective." Afternoon discipline-specific sessions included "GPS and Photogrammetry," "Facilities CAD2," and "Data and Information Management." Friday's agenda was composed of two General Plenary sessions: "Partnering and Cooperation in the New Environment" and "CADD, GIS, and FM Successes in Managing the Technology." The Symposium then concluded with closing remarks from Dr. Radhakrishnan.



The staff of the Tri-Service CADD/GIS Technology Center would like to express their appreciation to all attendees for their support in helping make the 1995 Tri-Service CADD/GIS/FM Symposium and Exposition a great success. A special thank you goes out to the members of the Symposium Organization Committee. The Center would also like to recognize the hard work and devotion involved in the coordination of all aspects of the symposium made by Mr. Toby Wilson, a Center staff member.

Symposium Organization Committee

Captain Russ Odum	Tyndall Air Force Base
SMSgt Donald Brannam	Scott Air Force Base
Mr. Andy Bruzewicz	U.S. Army Cold Regions Research and Engineering Laboratory
Mr. John Kincaid	U.S. Army Engineer District, Rock Island
Mr. Mark Kleinwichs	Naval Facilities Engineering Command Headquarters

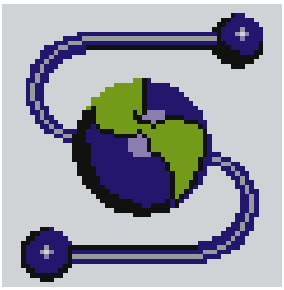
Tri-Service CADD/GIS Calendar	
Date	**Event**
Organizational Meetings	
May 14 June 11 July 9	FGDC Standards (0900-1200) and Coordination (1300-1600) Group Meeting. Washington, DC. POC: Harold Smith, (601) 634-3181, Smithh2@ex1.wes.army.mil
May 21-23	Concurrent FTAG & FWGs Coordination Meeting. Fort Worth, TX. POC: Andy Covington, (601) 634-4484, covingg@ex1.wes.army.mil
Training	
July 16-18 July 23-25	Remedial Investigation and Design for HTRW Restoration Using AutoCAD Applications. Vicksburg MS. Remedial Investigation and Design for HTRW Restoration Using MicroStation Applications. Vicksburg MS. POCs: Bobby Carpenter, (601) 634-4572, carpenb@ex1.wes.army.mil, and Terry Pace, (601) 634-4452, pacet@ex1.wes.army.mil, fax: (601) 634-4584
August 5-9	Structural Engineer and CADD Details. Vicksburg, MS. POCs: Elias Arredondo, (601) 634-4190, arredoe@ex1.wes.army.mil, and Terry Pace, (601) 634-4452, pacet@ex1.wes.army.mil, fax: (601) 634-4584
Conferences of Interest	
May 20-24	ESRI 16th Annual User Conference. Wyndham Hotel and Palm Springs Convention Center, Palm Springs, CA. POC: Environmental Systems Research Institute (ESRI), User Conference Registration, 380 New York Street, Redlands, CA 92373, (909) 793-2853, fax: (909) 793-5953, uc96@esri.com
June 17-20	A/E/C Systems '96. Anaheim, California, Convention Center. POC: Sharon Price, 365 Willard Ave, 2K, Newington, CT 06111, 1-800-451-1196, fax: (714) 776-2688, http://www.aecsystems.com
Publications	
August	Tri-Service Standards, Part 3, Spatial Data Standards, Release 1.6. POC: Ed Riegelmann, (601) 634-4604, riegele@ex1.wes.army.mil
Current	Tri-Service Standards, Part 1.2, A-E GIS Deliverables Standards, Draft. POC: Bobby Carpenter, (601) 634-4572, carpenb@ex1.wes.army.mil
June 1	Tri-Service Standards, Part 1.1, A-E CADD Deliverables Standards. Final Draft. POC: Bobby Carpenter, (601) 634-4572, carpenb@ex1.wes.army.mil
Current	Tri-Service Standards, Part 2, A/E/C CADD Standards, Release 1.4. POC: Stephen Spangler, (601) 634-3106, spangls@ex1.wes.army.mil
Current	Tri-Service CADD Details, Release 1.0. POC: Stephen Spangler, (601) 634-3106, spangls@ex1.wes.army.mil
Current	An Exploratory Analysis of Responses to GIS Adoption on Tri-Service Military Installations, by Maj Brian Cullis. POC: Laurel Gorman (601) 634-4484, gorman1@ex1.wes.army.mil

Attend A/E/C Systems '96

The Tri-Service CADD/GIS Technology Center will have an exhibit booth (June 18-20) and will be participating in a government session — "Information Technology in the Federal Government," June 19th, 8:00-11:00 a.m.

Upcoming *Special Edition* Bulletin

The next newsletter will focus on the reorganized FWGs and FTAG. Highlights from FY95/96 activities will be summarized including major accomplishments on sponsored FWG/FTAG projects and promotion of Tri-Service CADD/GIS products. The Center staff will be coordinating with officers and members regarding the featured articles.



Access and Reload the Center's WWW Home Page frequently at

http://mr2.wes.army.mil

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