3-D WORLD

News For The CADKEY/DataCAD User

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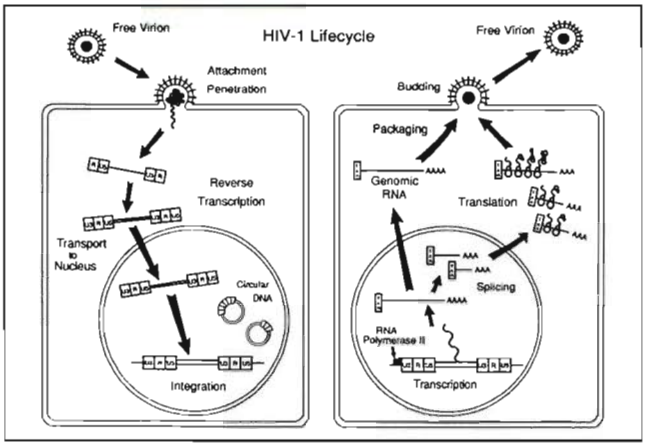
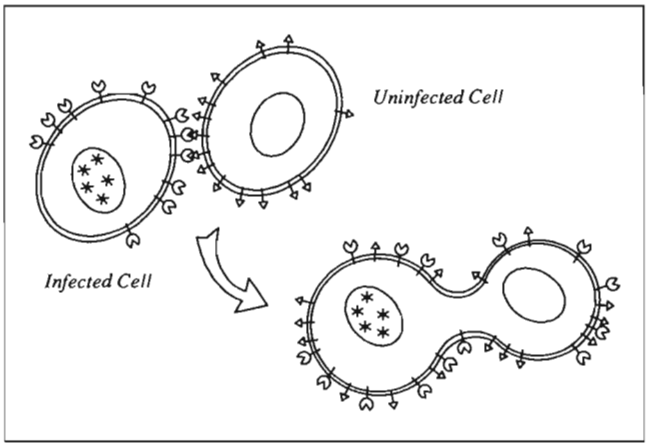
CADKEY 3 Used To Model HIV Virus

Engineering Software Helps AIDS Researchers To Visualize Results



The drawing on the left shows the early stages of the HIV -1 virus's lifecycle. The drawing on the right shows the late stages of the virus's lifecycle.



A cell infected with HIV produces envelope glycoproteins on its surface which bind with CD4 molecules on an adjacent uninfected cell, triggering a fusion of the two cells, resulting in a cell that has more than one nucleus.

by Reed Vickerman

The world-wide rush to find a treatment and cure for Acquired Immune Deficiency Syndrome (AIDS) has forced medical researchers to look for new ways to manage the tremendous explosion in research data and effectively communicate findings to an already saturated international audience. One innovative group in Boston has found a unique solution. Researchers led by Dr. William Haseltine at the Dana-Farber Cancer Institute (DFCI) are having success visualizing and communicating the results of their work using CADKEY 3™'s powerful engineering graphics.

Dr. Haseltine's Division of Human Retrovirology at Dana-Farber employs more than 50 Ph.D.'s, M.D.'s, research technicians, graduate students, and staff. A leader in research on retroviruses, the class of viruses thought to cause cancer, Dr. Haseltine's division devotes a major portion of its effort to the investigation of the Human Immunodeficiency Virus or HIV believed to be the cause of AIDS.

Researchers Follow a Genetic Trail to Find a Cure

Dr. Haseltine's group is focused on finding an AIDS vaccine and on developing anti-viral drugs. It is also seeking treatments to prevent the maternal transmission of the disease. The lab's researchers are credited with uncovering many of the molecular and genetic mechanisms involved in the replication of the virus. Their results show that HIV enters healthy cells, remains hidden from the body's immune system for long periods of time, and then slowly leaves copies of its genome in host cells as it spreads. Genomes are complete sets of chromosomes containing the genetic information

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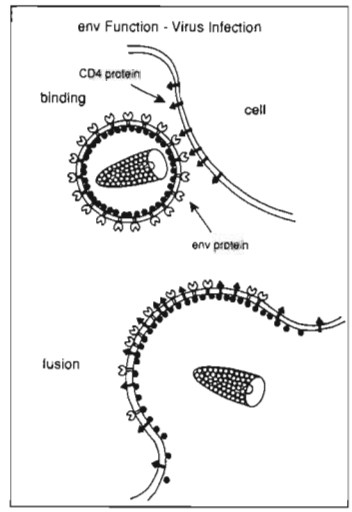
characterizing the virus. To trace the effects of viral replication and mutation, researchers rely on detecting changes in DNA and RNA sequences. They analyze these biochemical codes to develop a picture of the virus's behavior and its effect on the cells that it infects.

With the help of Administrative Associate Amy Emmert, who specializes in the presentation of results, researchers evaluate their data to determine the best way of graphically presenting their findings. These visualizations take the form of charts, graphics, genetic maps, sequence illustrations, and diagrams of molecular mechanisms. These illustrations contain many individual elements representing molecules, genes, and cells. After initial success with standard draw-and-paint software packages, the group ran into the limitations of these business-oriented presentation tools. Drawing elements were restricted to standard shapes and hand drawn curves. Common higher-order elements such as splines were not possible with these tools. The largest drawback with these programs, however, was their fixed limit on the size of files. This restricted the complexity of the drawings that could be created. Not until the adoption of a computer-aided design (CAD) package were researchers able to model their results fully. "CAD's ability to make large drawings (lots of bytes) makes it enormously valuable," Emmert said. "The option to draw on multiple levels has been an important feature".

An Unusual Choice of Tools

Selecting CADKEY 3, software usually identified with mechanical engineering, was a novel choice by Dr. Haseltine's group based on the program's broad set of drawing, drafting, and design features: methods that were fine-tuned over years of experience with professional designers. These features have helped the lab to increase the productivity of modeling results while research continues to expand in new directions and grows more complex. CADKEY's flexibility to accommodate the lab's expanding needs without additional expense was critical to the lab's decision. "There are seemingly very few programs or tailored applications for medical research and educational graphics. There are special needs in these areas quite distinct from business graphics or engineering drafting," said Emmert.



HIV infection of target cells involve binding of the envelope glycoproteins on the virus to CD4 proteins on the target cell, followed by a fusion reaction in which the viral core and nucleic acid enter the target cell.

Just as an aerospace or automotive designer re-uses common patterns and components when working with a CAD system, Emmert has built a basic set of molecular, genetic, and cellular components, and stored them in CADKEY pattern format. As discoveries are made or as subjects become better defined, existing patterns can quickly be arranged and new patterns can be added to display the information graphically. Poster-size illustrations are produced with the software using a Houston Instruments DMP-60 pen plotter. These large color plots are used inside the lab for reference and in "poster sessions" at conferences. "These are valuable for the difficult-to-read genetic sequences and associated diagrams," said Emmert.

Allowing users to design in full 3-D and available in twelve languages, CADKEY 3 features logical commands and requires no prior experience with computer-aided design. Optional use of a mouse or digitizer tablet also makes the system more intuitive for newcomers to PC's or CAD. Emmert, a trained graphic designer who had specialized in sculpture at Syracuse University, taught herself computer graphics using CADKEY 3. Within a few months she introduced computer graphics into the lab, and her work with CAD quickly became indispensable to the lab's researchers.

The software, which runs on any IBM XT/AT/386 or compatible, was sold to the lab by a local dealer, New England CAD/CAM of Waltham, Massachusetts. Emmert has loaded the program onto three Compaq 386 PC's and is using the NEC Silent Writer LC-890 PostScript Printer to keep up with the volume of work completed by the lab.

Merging Drawings with Technical Publications

When preparing papers for publication or writing grant applications, the lab's staff uses HiJaak™ and InSet™ by Inset Systems with Lotus' Freelance Plus™ and Xerox's Ventura™ desktop publishing software. After creating wire-frame models in CADKEY 3, Emmert enhances them with different fonts for text

(Continued on page 12.)

Notes From The Editor

This issue of **3-D WORLD** marks another development in our newsletter to CADKEY® and DataCAD® users. You will notice that for the first time **3-D WORLD** contains advertisements from third-party software developers whose products work with CADKEY and/or DataCAD. **3-D WORLD** is responding to repeated requests for such information from CADKEY and DataCAD users and from third-party developers. We are excited about being able to provide a new kind of support for our third-party developers. We hope that you, too, will find that these advertisements help you to make even better use of the CADKEY Advantage.

3-D WORLD mailed media kits to all of our CADKEY and DataCAD third-party software developers on October 6-9, 1989. These kits explained everything that a developer interested in advertising a product in **3-D WORLD** would need to know. Near the end of October, we discovered that a very significant number of third-party developers had not received their media kits. The U.S. Postal Service verified that the mail did leave Manchester. Why such a large and apparently random number of kits were not delivered has not been discovered. We sent a duplicate media kit to every third-party developer whom we could identify as not having received the original one. If our kit still failed to reach any third-party developer, please contact Frank Simpson at (203) 647-0220. We shall send the information to you straightaway.

3-D WORLD has received requests from people who are not CADKEY or DataCAD users, yet who are nevertheless interested in keeping informed about developments in true 3-D CAD, asking if they can subscribe to our newsletter. The answer is, of course, a resounding YES. The price of an annual subscription is $29.95, as indicated on the front page of **3-D WORLD**.

THIRD-PARTY NEWS

Correction

In the article, **WLDSYM™ Improves Productivity For CADKEY User**, that appeared in the November/December issue of **3-D WORLD**, the editor erroneously indentified WLDSYM™, welding symbols software package, as being a trademarked product of HLB Technology of Blue Ridge, Virginia. WLDSYM is a trademarked product of Specialty Services of Estill Springs, Tennessee. The editor apologizes for any confusion or inconvenience that his error may have caused.

THIRD-PARTY NEWS

CADKEY, INC. Expands DataCAD Third-party Support

Tim Dunne has joined our A/E/C Product Group working with Michael Piekarz. Tim will provide DCAL® (DataCAD Applications Language) technical support for developers of third-party software products. He will also support the internal development of DCAL. Tim's programming experience and knowledge of DCAL bolsters our A/E/C Product Group and our third-party DCAL programmers.

Computer-Based Training FIRST!

CADKEY TUTOR™ Provides Immediate Self-Help To New Users

CADKEY INC. introduced CADKEY TUTOR™ at COMDEX/FALL '89, November 13-18, in Las Vegas, Nevada. CADKEY TUTOR is the first computer-based, interactive training module ever offered by a major PC-CAD software manufacturer as an integral part of its computer-aided design system. CADKEY TUTOR uses on-line instructions to lead new users step by step through the design of simple geometry to familiarize them with CADKEY 3™. The tutorial also provides feedback to the user whenever an error occurs. CADKEY INC. will include CADKEY TUTOR with every system at no charge.

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Bell Canada Prize !

Technology Shuttle In Canada Bridges The Gap Between Small Business And Innovation (CADKEY 3 And DataCAD Involved)

Improving the ventilation system of a furniture factory in Cabano. Modernizing the shellfish industry in the Magdelan Islands. Helping a Quebec company to implement a Korean technology for using the trembling poplar tree in the manufacture of products for Asian markets. Installing a new system of tanks aboard a trawler to improve the delivery of fresh fish directly from the quay on the Gulf of Saint Lawrence to the market in Montreal. Helping to design and build a hydro-electric power plant in Blanc-Sablon. For these and at least 40 other projects in the eastern region of the Province of Quebec, Canada, Bell Canada awarded its prestigious **Innovation Prize** to the Groupe Regional du Support Technique (Regional Technical Support Group), a pilot project of the University of Quebec at Rimouski. Bell Canada presented the award during the International Small Business Council's 34th Annual World Conference at Quebec City, June 21-23, 1989. CADKEY(R) and DataCAD(R) software products are part of the pilot project.

"Small businesses frequently miss good opportunities simply because they do not have the necessary information about technology and financing," said Jean-Louis Chaumel, Director of GRST (as it is popularly called). Chaumel is the scientific director of a multi-disciplinary team of eight members whose mission is to encourage and facilitate research and development among small and medium-sized enterprises in Eastern Quebec, a region that has been underdeveloped through much of its history. Besides assisting small businesses with actual research and development, GRST helps them to obtain the financing that they require, and facilitates contact with private and public scientific resources.

Small businesses generate the vast majority of new jobs. Two independent studies in 1986, one done in the United States and the other done in Canada, have documented this phenomenon. David Birch of the Massachusetts Institute of Technology produced a working paper, *Job Generation Process*, that covered the years 1981 through 1985. Birch found that businesses with less than 20 employees generated 88.1% of the new jobs during those five years. Researchers for the Government of Quebec reported similar findings in their study, *Les Petites et Moyennes Entreprises au Quebec*. They, too, found that businesses with fewer than 20 employees were responsible for creating almost all the new jobs in the province between 1978 and 1984. There are myriad small businesses in Eastern Quebec, the area served by the University of Quebec at Rimouski.

The university established GRST as a two-year pilot project in May 1988. GRST brings together what at first would appear to be an unlikely team of specialists. Berthe A. Lambert is a board member of the National Research Council of Canada. Richard-Marc Lacasse is a research associate at the Microeconomic Research Center of the University of Nice in France. Marc Doucet is a forestry engineer. Gaston Berube is a specialist in marine biology and fisheries. Michel Coulmont is a specialist in computer-aided design and drafting. Sylvain Dionne is a mechanical engineer. And, Marc Guillemette has the difficult task of coordinating the team's activities.

The Technology Shuttle -- Awarded Bell Canada's coveted ***Innovation Prize****.*

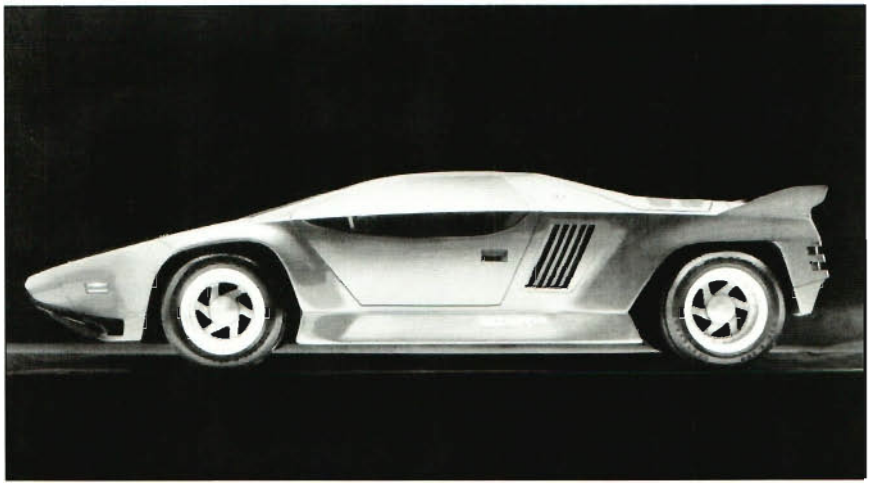
(Continued on page 14.)

CADKEY 3 Helps Start-up Car Manufacturer Get Into Production!

When the serial #001 VECTOR super-exotic sports car rolled out for delivery to its first customer, some of its high-tech features startled even aficionados of futuristic automotive design. Acceleration from 0 to 60 m.p.h. in four seconds. A 6-liter, twin turbocharged, all aluminum, 600hp V-8 engine with the highest horsepower and torque output of any automobile engine now in production, and a clutch-less hydraulic transmission. Instead of the traditional array of dials and gauges, an advanced, electroluminescent, computer-programmed, multi-function, military-jet-fighter-type panel was designed that changes function automatically. This panel also incorporates actual, aircraft circuit breakers and a heads-up windshield display. Among the first confirmed buyers were three Saudi Arabian princes. The base price of the car is $180,000 plus options, making it the most expensive automobile ever built for production in America.

The VECTOR is the first production model from this closely watched, new public company (NASDAQ Symbol: V-CAR), Vector Aeromotive Corporation of Wilmington, California. And, it has an unusual design history. As a start-up firm, Vector initially lacked the funds for a full-fledged, computer-assisted design system. Thus, although the VECTOR is technically advanced, the engineering staff drew up early plans with the most venerable of tools - pencil and paper. Only when the prototype began to draw some excited national attention (including several appearances on PM Magazine) and the car itself neared production, was Vector finally able to computerize its design process.

This raised a formidable problem. How could the company's engineers learn a CAD system, enter hand-drawn plans into it, and master it thoroughly, yet in time to meet looming production deadlines? Some of the best-known CAD systems are notoriously difficult to learn. Further, since Vector Aeromotive was designing parts with some extremely exotic and complex geometric shapes, it needed a system capable of real — not simulated — 3-D design. "Draftsmen think in two dimensions," said Gerald A. Wiegert, Vector's founder and president. "Real designers think in three dimensions." After careful consideration and a certain amount of anxiety, Wiegert and Bob Porter, the firm's computer specialist, settled on software from CADKEY, INC., the Connecticut-based developer of advanced design and engineering applications.



1990 VECTOR -- the most powerful, production, exotic sports car ever built in America.

According to David Kostka, Vector's Vice President of Engineering, CADKEY 3™ let the VECTOR's designers ease into CAD at their own pace: the learning curve was short without being steep. Designers found the transition from pen and paper into a computer environment surprisingly smooth, despite the fact that several of them had had some bad experiences in the past with other CAD software. "CADKEY is a friendly program," Kostka said. "It tends to think the same way the human mind thinks. By using human logic, you can always figure out what's next."

This proved particularly useful as the car moved closer and closer to manufacture. "For production," Kostka said, "you have to know how to make a part

(Continued on next page.)

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VECTOR Car And CADKEY

(Continued)

more efficiently; how to make it look better; how to rework it so you can rely on standard parts and manufacturing procedures." As examples, Kostka and Wiegert like to cite the VECTOR's headers, differential housing, and its unique, jet V-shaped dashboard which resembles the cockpit of a fighter aircraft. All were extremely complicated, involving some highly sophisticated geometric shapes, and all were edited and reworked repeatedly using CADKEY 3, even though Vector had been using the software for only ten weeks.

Despite their taste for cutting-edge technology in their cars, automotive engineers tend to be conservative when it comes to the process of design. They like the feel of pen and paper, and many have been reluctant to let computers into the process, as if afraid that mechanization would deprive it of its mystique. Thus, the plunge into CAD could prove traumatic. But, more advanced and more intuitive software is making it possible for designers to ease into computer-aided design at their own speed, and with a minimum of stress. And, the process can be a matter of days, not weeks. "We were producing working drawings with CADKEY 3 by the end of our second week at the computer," Kostka said.

Editor's Note: The VECTOR car will be featured in the CADKEY Booth at the National Design Engineering Show, McCormick Place, Chicago, Illinois, February 26 to March 1, 1990. Part files of the VECTOR car designed on CADKEY 3 will play an integral role in CADKEY's CAD/CAM SOLUTIONS FAIR. For a preview of this CAD/CAM SOLUTIONS FAIR, see page 20 of this issue of **3-D WORLD**.

DataCAD Helps Architect To Create
Discrete Working Drawings with Built-in Feedback

by Morris D. Verger, FAIA

Computer-generated construction documents can dramatically change housing production by reducing the time required to obtain approvals and permits They can also reduce the costs and time of construction. And, at the same time, these documents can help to make ordinary workmanship become better than usual.

Our drawings achieved this in a two-story, wood-framed condominium project in Southern California.

Housing developers generally follow this sequence:

1. Acquire land in anticipation of a market for a specific number and type of housing units.
2. Prepare drawings and obtain agency approvals.
3. Obtain bids and award contracts.
4. Construct the project.
5. Sell or rent the housing units.

The developer's thinking at the inception of the project sets its scope and character. The architect and engineers, in concert with the developer, evolve the design, the construction details, and the division of work among the subcontractors. They prepare the drawings, specifications, and other documents necessary to complete the project.

Too Much Information

The usual construction documents create problems of *too much information*. Details, dimensions, and locations on property where several trades join are referenced to each other or combined into single drawings to *coordinate* the project. The coordinating information holds several trades responsible for the same things: critical dimensions, tolerances and agencies' approvals. This is where the problem starts. Everyone is responsible, but no single individual has control.

Drawings prepared using DataCAD can be different. They hold individuals responsible and give the developer direct control.

Architects enter decisions about details related to design and construction into the computer as the decisions take place. The computer stores the data, then prints the drawings and other instructions for implementing the project.

The construction documents — the drawings, specifications, and contracts — clearly and discretely describe the quality and quantity expected from subcontractors and suppliers. They also clarify where the subcontractor or supplier has to follow specific directions, and where he/she is allowed to use personal judgement to provide an agreed-upon end result. Showing where one task stops and the next begins provides built-in feedback that helps the project go smoothly.

When we (the architects) are designing buildings and preparing working drawings, we think through the dimensions, details, and locations where dissimilar materials join. We enter this information into the computer as the thinking occurs, and it is readily available whenever needed.

We used DataCAD to prepare the floor plans and sections for a recently completed wood-frame condominium project.

Need-To-Know Data

From the information that we had entered into the drawing file, we instructed the computer to make drawings for the

Building Department. These drawings showed only what the Building Department wanted to know.

The foundation drawings showed only what the subcontractor needed to know. Computer-calculated dimensions of the formwork periphery enabled the subcontractor and the job superintendent to verify quickly and easily that the forms were square and correct. Other foundation drawings showed locations and dimensions for the items to be secured before the concrete was poured. The foundation's layout and form-verification drawings assured that the completed concrete work would be correct.

For the next trade, the framing, the drawings again showed only what the framing crew needed to know. Since the outside walls follow the foundation, those dimensions were not repeated. Framing dimensions for door and window openings were supplied, but door and window details were not.

The framer did not have to do the arithmetic (with chance of error) to determine the framing dimensions. The computer already had that information. If the dimensions were left to the framer, there would rarely be a record of those dimensions. If the framer made an error, it would not surface until there was a visible problem, such as the wrong-sized openings to receive doors, windows, plumbing fixtures, etc. As all builders painfully know, small framing errors can cause large cost and time penalties, and the quality of the finished product suffers.

We prepared similar drawings for the other trades in DataCAD. Despite the fact that we were using these drawings for the first time, they were an unqualified success. The use of these computer-generated drawings enabled us to facilitate the communication between the developer and all of the people involved in the project.

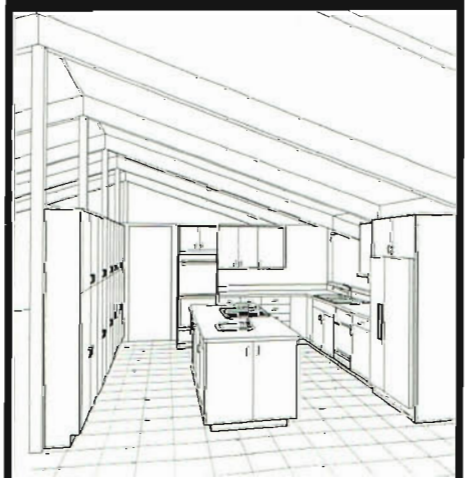
Significant Success

On this project, the results were a savings of 5 percent in construction costs, and a smoothly running job with no substantive coordination problems. In addition, because so few mistakes occurred, the workmanship in this project appeared to be of higher quality than the work in similar projects which were not so well coordinated.

I am sure that we have only scratched the surface of how computer-generated drawings will serve the construction industry.

Editor's Note: Morris Verger is principal of MORRIS D. VERGER, FAIA ARCHITECT in Los Angeles, California. Mr. Verger's article originally appeared in the June/July 1989 issue of **California Builder**, under the title: ***Architect uses computer savvy***. **California Builder** is published by Fellom Publishing Company, San Francisco, California.

3D CABINETS for DataCAD



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Opening New Doors

FORUM '89: AIAS/CADKEY Announce Design Competition!!

The American Institute of Architecture Students (AIAS) announced a national, student design competition, ***Opening New Doors***, open to any full or part-time students of architecture, engineering, and building science at the institute's annual convention, **Forum '89**, November 22-26, in New Orleans, Louisiana. Co-sponsored by CADKEY, INC., the competition's purpose is to promote the creation or evolution of better design through the use of computers. Registration for the competition began on December 1, 1989, and closes on March 24, 1990. All entries must be received at the AIAS National Office no later than 5:00 p.m. EST, March 28, 1990. A four-member panel will judge the entries. AIAS and CADKEY will ensure the anonymity of every entry during the judging.

Each student participating in the competition will receive a copy of CADKEY's new educational version of DataCAD®, DataCAD 128™, within 10 days of registering for the competition. DataCAD 128 includes all the major features of the full DataCAD program with DC Modeler for three-dimensional design and drafting, as well as a sampling of macros, templates, and a limited drawing-file size. CADKEY will also provide each registered student with access to a special AIAS Technical Support Hot Line. All entries must be generated using DataCAD in order to be eligible for judging.

Criteria and Requirements

The judges will evaluate each entry on the basis of exterior

(Continued on page 16.)

CADKEY Certified Training Center Becomes Western Massachusetts Advanced Technology Center

On January 18, 1990, Springfield Technical Community College in Springfield, Massachusetts, a certified CADKEY℠ Training Center, also officially becomes the Western Massachusetts Center for Advanced Technology. This is an historic development for the two-year technical college. A visitor with some knowledge of the history of technology could get a sense of parallels in the making.

The site of Springfield Technical Community College has seen history made for 200 years. In October 1789, George Washington, President of a newly independent United States of America, personally visited and approved the selection of the almost level bluff overlooking downtown Springfield, on the Connecticut River, as the location of the first U.S. Armory to manufacture firearms. Production began on the site in 1795. The quality of the muskets and rifles manufactured at the Springfield Armory became legendary, particularly the model 1903 Springfield and the Garand M1 rifles.

A Technology Center

Twenty-five years after the armory's founding, Roswell Lee, Superintendent of the Springfield Armory from 1815 to 1833, began to incorporate new manufacturing technology there. Lee had worked with Eli Whitney and was well acquainted with Simeon North. Both Whitney and North had begun to implement the process of making standardized, interchangeable parts for the manufacture of firearms at their respective factories in Whitneyville (now a section of Hamden) and Middletown, Connecticut. Roswell Lee was a zealous advocate of cooperative sharing of technology, especially with the Springfield Armory's counterpart, the U.S. Armory at Harpers Ferry, Virginia. Around 1817, Lee began experimenting with the use of inspection gauges to check gun components both during and after manufacture. Measurably improved quality of parts meant improved muskets in increased quantities at lower cost.

Sylvester Nash and Thomas Blanchard carried mass-production technology at the Armory forward by (at least) two major inventions. By 1818, Sylvester Nash, an Armory

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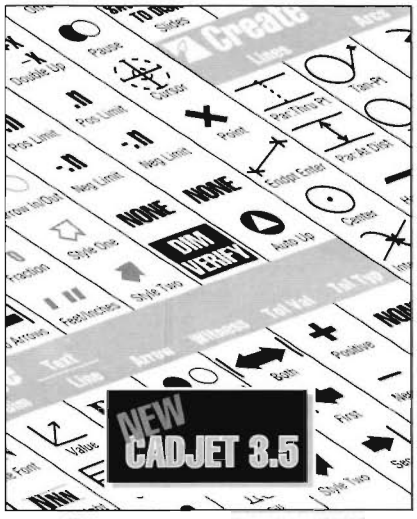

The CADJET template slips right over your digitizing pad allowing you to make all menu choices direct from the drawing surface. Once installed, CADJET loads automatically whenever you boot up CADKEY.

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Advanced Technology Center (Continued)

employee, had developed and patented a new type of lathe for turning gun barrels. In the same year, Thomas Blanchard, an independent contractor, modified an existing barrel-turning lathe. What distinguished Blanchard's modification was a cam motion for tracing a master pattern. This feature provided the key element for Blanchard's greatest invention completed in 1819: the *eccentric lathe* or *copying lathe* (also called the Blanchard Lathe) to turn irregular forms, such as gun stocks, from pre-cut patterns. The copying lathe could turn a gun stock in nine minutes, and its applications extended into a wide variety of industries not related to firearms. Roswell Lee immediately implemented Blanchard's invention at the armory.

Factory Becomes School

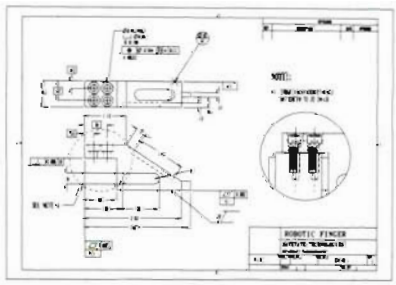
The Springfield Armory was officially closed in April, 1968. In the meantime, Springfield Technical Community College had come into existence in 1964 as the Springfield Technical Institute, a joint venture by the Springfield Public Schools, the Vocational Education Division of the Massachusetts Department of Education, and the U.S. Department of Health Education and Welfare. The new institute received more applications than the facilities at the Trade High School could handle. The plans to decommission the Springfield Armory provided a solution. During the summer of 1967, the institute moved into three buildings on the Armory grounds and opened in September, under the jurisdiction of the Massachusetts Board of Regional Community Colleges. In August, 1968, Springfield Technical Institute became Springfield Technical Community College.

With its policy of open enrollment, STCC has provided opportunities for higher education to countless students who may not have been highly motivated to learn while they were in elementary and secondary school. Its wide-spread use of computer-aided, individualized instruction, and technical specialties have equipped students with marketable industrial skills.

A Technology Center Again

Twenty-five years after the college's founding, STCC is incorporating new manufacturing technology into its curriculum. Among its programs in mechanical and engineering technologies, STCC offers training in CADKEY 3™ for 3-D design and engineering. The school has a computer-aided manufacturing center that uses

Why you should contact your CADKEY Dealer...



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If you are a mechanical designer or engineer you need DRAFT-PAK. Don't take our word for it, your CADKEY dealer can show you first hand how to become more productive with your CAD system.

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- automatic drawing of features, holes, slots, pockets, fasteners, screws, nuts and bolts
- mechanical elements such as gears, racks and springs
- geometric tolerancing and dimensioning symbols
- automatic feature labeling, surface finish symbols, and more ...

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Advanced Technology Center (Continued)

SmartCAM™ with four EMCO™ CNC machines (two lathes and two milling machines) and two AMATROL-MERCURY™ robots. STCC also provides training courses in manufacturing management in conjunction with the Western Massachusetts Chapter of the American Production and Inventory Control Society (APICS). Thomas Holland, Dean of STCC's Continuing Education Division, said that STCC's charter allows the college to provide on-going manufacturing-related programs for industries in the region, primarily small to medium-sized manufacturers, as long as they do not cost the taxpayers any money. "These industry-specific programs must be self-supporting," Tom Holland said.

In June 1989, IBM selected Springfield Technical Community College as one of 49 technical colleges nation-wide to participate in a three-year technology-grant program of hardware and software for computer-integrated manufacturing. STCC's grant as an IBM CIM Center for New England includes an IBM AS/400™, model B30, mainframe computer with 21 terminals, and an IBM/RT™ workstation that will be linked into the AS/400, plus two PS/2 model 70 engineering workstations. Through a Token Ring™ network, STCC will be able to link other computers on campus with the AS/400. Among the software included in the grant are:

- o IBM's RPG/400™,
- o CATIA™, a mainframe-based CAD system developed by Dassault Systems in France and marketed by IBM that also runs on the IBM/RT workstation,
- o AIX™ operating system for the RT workstation,
- o MAPICS DB™, IBM's manufacturing, accounting and production control system, for the AS/400.

The new equipment furnished by the IBM grant, and the impressive variety of other electronic equipment already at the school, together provide an exciting set of tools for creative research and development.

On December 7, 1989, STCC welcomed John Temple, President of Coventry Technical College in England, and Keith Jones, Head of New Technology at Coventry Technical College. Keith Jones presented to a group of STCC faculty members Coventry Technical College's low-cost, integrated manufacturing system that links CADKEY 3, MAPICS II and IBM's System 36™ into a computer-integrated enterprise. (See ***CADKEY 3 Linked To MAPICS II***, **3-D WORLD**, September/October 1989.) Coventry Technical College is developing implementations of its computer-integrated-enterprise system using IBM's System 38™ and AS/400 computers, as well.

John Temple addressed the group concerning his college's serious interest in developing a network of partnership arrangements among technical-training institutions, like Coventry Technical College and STCC, and industry. He noted the similarities in mission and in recent history between Springfield Technical Community College and his own college. The technical education/technology transfer that vitally interests John Temple is one that views training as a product tailored to industry's needs in which both student and industry are customers.

Where To Now?

With such a confluence of technology taking place now at Springfield Technical Community College, what new, historic developments will take place on the site that George Washington himself approved? We shall have to watch and see.

TRADE SHOW UPDATE

See CADKEY 3 and DataCAD at these trade shows in early 1990:

National Home Builders Association, Jan. 19-22, Georgia World Congress Center, Atlanta, GA, Booth #3850.

National Design Engineering Show '90, Feb. 26 to Mar.1, McCormick Place, Chicago, IL, Booth #218.

International Trade Shows

Constructa '90, International AEC Exhibition and Congress, Feb. 1-7, Hannover, Federal Republic of Germany, SOFT-TECH.

ICO Graphics 1990, Feb. 6-9, Milan, Italy, ALGOL SPA.

MICAD '90, Feb. 13-16, Parc des Expositions, Halls 1/2, Booth #B34, Paris, France, CADKEY, INC.

Microtex, Feb. 27 to Mar. 3, Brussels, Belgium, Maxcom.

CeBIT '90, World Center "Office-Information-Communication," Mar. 21-28, Hannover Fair, Hannover, Fed. Rep. of Germany, SOFT-TECH.

CAD/CAM '90, CAT and AEC Show, Mar. 27-29, Birmingham, U.K., ECSL-CADKEY and SPIRIT AEC Software Technology, Ltd. (Booth #129).

CAT '90, May 29 to June 1, Stuttgart, Fed. Rep. of Germany, SOFT-TECH.

Hong Kong Polytechnic University Chooses CADKEY 3™ As Standard

Six departments of Hong Kong Polytechnic University, using a variety of computer-aided design software, have decided to standardize their CAD work on CADKEY 3™. The Industrial Center, a factory-type school, the Mechanical and Marine Engineering Department, the Manufacturing Engineering Department, the Information Technology Office, the Computing Studies Department, and the Swire School of Design have all joined in choosing CADKEY 3 as their standard 3-D CAD system.

Dr. Christopher Kan, Senior Lecturer and CAD/CAM Center Manager in the university's Office of Information Technology indicated three reasons for the university's choice of CADKEY 3.

First of all, when the Industrial Center needed to find low-cost, high-performance software for training its students in computer-aided manufacturing, the faculty found that all of the CAM packages that interested them had a common link to CADKEY 3. This made them curious about CADKEY 3.

Secondly, after a demonstration of CADKEY 3, the Polytechnic's instructors realized that CADKEY 3 would allow them to train their students in true three-dimensional design and drafting rather than just two-dimensional drafting.

Thirdly, they found CADL™ (CADKEY Advanced Design Language) to be a superior language for students doing in-depth CAD research and development.

Hong Kong Polytechnic University made its initial

(Continued on page 17.)

TRAINING SCHEDULE AT CADKEY, INC.

We have Training dates scheduled through February, 1990. Please call Lisa Varvelli in the Product Support Department to register (203) 647-0220.

Course	Jan.	Feb.
Introduction to CADKEY	8-10	12-14
Advanced Geometric Modeling	11-12	15-16
Introduction to CADL	15-17	
CADKEY SOLIDS	18-19	19-20

CADKEY/DataCAD Training In U.S. & Canada

Many authorized CADKEY and DataCAD Training Centers have scheduled courses in addition to the training available at CADKEY's world headquarters here in Manchester, CT. The following is a list of who is doing what, where, and when:

State	CTC	Location/Contact	Course	Dates
Ala.	Jacksonville State University	Jacksonville, AL Dr. P.S. Yeh (205) 231-5781 (205) 231-5229	*Intro. to CADKEY*	Apr. 18-20
Ariz.	Yavapai College, S.M.E. Chapter 119	1100 E. Sheldon St. Prescott, AZ Dr. Larry Strom (602) 776-2255	*CADKEY and DataCAD Workshop*	Jan. 18-19
Calif.	Butte College	3536 Butte Campus Dr. Oroville, CA Mike Woods (916) 895-2531	*Intro. to CADKEY*	Feb. 9-11
	CAD Micro-Systems	11936 W.Jefferson Blvd. Culver City, CA Monica Hunter (213) 391-7226	*Intro. to CADKEY* *Advanced CADKEY* *CADKEY SOLIDS* *CADL*	Jan. 9-11 Feb. 6-8 Mar. 7-9 Apr. 10-12 Jan. 17-18 Mar. 14-15 Apr. 24-25 Feb. 15 Apr. 17 Feb. 13 Apr. 19
	Consulting Services International	7311 Van Nuys Blvd. Van Nuys, CA Bob Messamer (818) 994-8881	*Intro. to CADKEY* *Advanced CADKEY*	3rd wk. each mo. Scheduled on request.
	Evergreen Valley College	3095 Yerba Buena Rd. San Jose, CA Loren Fromm (408) 274-7900	*Intro. to CADKEY*	Jan. 8-10 Apr. 9-11
	Poelman's Design Service	901 Campisi Way, #360 Campbell, CA Mike Poelman (408) 377-3585	*Intro. to CADKEY* *CADKEY* *SOLIDS*	Jan. 29-31 Mar. 27-29 Feb. 26-28 Apr. 24-26

CADKEY/DataCAD Training in U.S. & Canada (continued)

State	CTC	Location/Contact	Course	Dates
Calif.	Ukiah High School	1000 Low Gap Rd. Ukiah, CA Jim Howlett (707) 463-5253, x284	*Intro. to CADKEY*	Feb. 3-4 Mar. 2-4
Colo.	University of Colorado at Denver	1200 Larimer St. Denver, CO Andreas Vlahinos (303) 556-2370	*Intro. to CADKEY* *CADL*	Mar. 19-21 Mar. 22-23
Conn.	Central Connecticut State University	1615 Stanley Street New Britain, CT Paul Resetarits (203) 827-7262	*Intro. to CADKEY* *Advanced CADKEY*	Jan. 8-10 Mar. 19-21 May 21-23 Jan. 11-12 Mar. 22-23 May 24-25
	Hartford Graduate Center	275 Windsor St. Hartford, CT Paula DiMauro (203) 548-2474	*Intro. to CADKEY*	Mar. 5-7
	University of Hartford	S.I. Ward College of Pharmacy W. Hartford, CT Don Debonne (203) 243-4763	*Intro. to CADKEY*	Mon. Wed. May 21 to July 12
D.C.	Republic Research Training Center	1911 N. Ft. Myer Dr. Arlington, VA Gregg Kendrick (703) 525-9014 (800) 476-4454	*DataCAD I* *DataCAD II* *DC Modeler* *DCAL*	Scheduled on request.
Fla.	Gateway Computers	10901 Roosevelt Blvd. St. Petersburg, FL Patricia Murphy (813) 576-0549	*Intro. to CADKEY* *Advanced CADKEY* *CADKEY SOLIDS* *CADKEY Free Demo*	Jan. 17-19 Feb. 20-22 Mar. 12-14 On request. On request. Jan 16, Feb. 14, Mar. 21
Ill.	PFB Concepts	2525 E. Oakton Av. Arlington Heights, IL Bob Konczal (708) 640-1853	*Intro. to CADKEY* *Advanced CADKEY* *CADKEY SOLIDS* *CADL* (Weekend) *PageMaker & CADKEY*	Jan. 8-10 Feb. 7-9 Mar. 7-9 Apr. 10-12 Jan. 31 to Feb.2 Feb. 21-23 Apr. 25-27 Jan. 18-19 May 17-18 Scheduled on request. Mar. 29-30 Jun. 14-15

AIDS Researchers Model HIV Virus with CADKEY 3

(Continued from page 2.)

and different colors to improve their use as illustrations in documents. In the endless process of seeking research support, Dr. Haseltine's staff can prepare sophisticated graphics for their proposals at the last minute without having to rely on an outside graphic-arts service. "Because grants are our major source of funding, it's important to use the best possible way to communicate when preparing applications," said Emmert.

The Future for CAD in Cancer and AIDS Research

The lab is continually identifying new applications for CAD in its work. One use now being developed will help new PC users map the hundreds of complicated DNA sequences, known as plasmids, produced by Dr. Haseltine's lab each year. Each of these plasmids must be documented for future reference. Documentation in the form of a graphical map is the most useful method for reference, but the process of drawing and entering the components of each map can be time consuming and error prone for the occasional CAD user. By using the CAD program's ability to define key-stroke macros and bind them to locations on a digitizer tablet (an optional device which replaces a mouse for drawing with the system) Emmert hopes to automate the production of plasmid maps. When her current customizations are completed, researchers will simply pick symbols from the lab's 12-inch Kurta tablet to combine standard genetic components into custom DNA maps. Emmert is helping other researchers in the group to explore CADKEY's unique ability to create 3-D helixes in an

effort to model DNA chains and their familiar double helix structure. The uses for CAD in this lab appear to have only just begun.

As pressure to find an AIDS cure continues to intensify, medical researchers will continue to search for better methods and tools to help them in their investigation. Part of this work inevitably includes translating their findings into terms which the rest of the world can use to better understand the complexity of their task. "There is enormous pressure to share results from the lab with researchers from divergent fields. Graphics are very effective because they can communicate esoteric information in a non-technical manner," Emmert said. It may just be this ability to apply tools from wide-ranging fields, in a creative manner, to communicate results to a widening audience that will provide the needed edge in the current struggle with AIDS.

Editor's Note: Reed Vickerman is an independent consultant in computer-aided design (CAD), computer-aided manufacturing (CAM), and computer-integrated manufacturing (CIM).

New CADKEY Users' Groups!

Colorado:	CADKEY Users' Group	Meetings:
	CADKEY-Colorado	Monthly.
	4582 Ulster Street Pkwy	
	Suite 402	Serving:
	Denver, CO	Greater Denver.
Contact:	Barbara Yonkers	(303) 770-2024
Washington:	Northwest CADKEY	Meetings:
	Users' Group	Monthly.
	Sundstrand	
	15001 NE 36th Street	Serving:
	Redmond, WA 98073	Greater Seattle.
Contact:	Joe Brouwer	(206) 842-4314
New-foundland, Canada:	CADKEY Users' Group of Eastern Newfoundland	Meetings: Quarterly.
	Memorial University	Serving:
	S.J. Carew Building	Eastern
	Prince Philip Parkway	Newfoundland.
	St. John's, Newfoundland	
	A1B 3M7 Canada	
Contact:	Steve Collins	(709) 579-1418

CADKEY/DataCAD Training in U.S. & Canada (continued)

State	CTC	Location/Contact	Course	Dates
Ill.	Triton College, Employee Development	2000 Fifth Av. River Grove, IL Peggy Hosty (312) 456-0300, x539	*Intro. to CADKEY*	Saturdays: Jan. 27 to Feb. 17; Mar. 10-31 Friday eve.: Feb. 16 to Mar. 23; Apr. 20 to May 25.
Mass.	Springfield Technical Community College	1 Armory Square Springfield, MA William White (413) 781-7822	*Intro. to CADKEY*	Jan 10-12 Mar. 19-21 Jun. 11-13
	Worcester Polytechnic Institute	100 Institute Rd. Worcester, MA Pat Scavone (508) 831-5633	*Intro. to CADKEY*	Mar. 6-7
Md.	Anne Arundel Comm. College	101 College Parkway Arnold, MD Sina Sepehri (301) 541-2435	*Intro. to CADKEY*	Feb. 2, 3-9, 10.
	Catonsville Comm. College	800 South Rolling Rd. Catonsville, MD Tom Barrett (301) 455-4298	*Intro. to CADKEY* *Advanced CADKEY*	Jan. 22-26 Feb. 19-21 Apr. 23-27 May 23-25
Me.	University of Southern Maine	37 College Avenue Gorham, ME Andrew Anderson (207) 780-5440	*Intro. to CADKEY*	(Tuesday evenings) Jan. 16 to May 1
Mich.	Future Solutions	35455 Schoolcraft Livonia, MI Paul Zwark (313) 397-2486	*Intro. to CADKEY* *Advanced CADKEY*	Jan. 9-11 Feb. 6-8 Mar. 6-8 Apr. 3-5 Jan. 16-17 Feb. 12-13 Mar. 13-14 Apr. 10-11
	Lansing Comm. College	419 N. Capital Ave. Lansing, MI Jim Perkins Steve Pohl Jerry Flore (517) 483-1356	*Intro. to DataCAD* *Advanced DataCAD*	Jan. 6 to Mar. 23 Mar. 31 to Jun. 15 Mar. 31 to Jun. 15
	Western Michigan University	Kalamazoo, MI Michael Atkins (616) 387-6522	*Intro. to CADKEY* *Advanced CADKEY*	Jan. 22-24 Mar. 12-14 Feb. 12-14 Apr. 2-4
Minn.	Albert Lea Technical Institute	2200 Tech Dr. Albert Lea, MN Larry Gilderhus (507) 373-0656	*Intro. to CADKEY* *Advanced CADKEY*	Scheduled on request.

CADKEY/DataCAD Training in U.S. & Canada (continued)

State	CTC	Location/Contact	Course	Dates
Minn.	Anderson-O'Brien	2575 N. Fairview Ave. St. Paul, MN Gail Lenzmeier (612) 636-2869	*Intro. to CADKEY*	Jan. 9-12 Feb. 6-9 Mar. 6-9 Apr. 10-13
	Anoka Ramsey Comm. College	11200 Mississippi Blvd. Coon Rapids, MN George Heron (612) 427-2600	*Intro. to CADKEY* *Advanced CADKEY*	Evening classes scheduled on request.
	Moorhead State University	Moorhead, MN Wade Swenson (218) 236-2466	*Intro. to CADKEY*	Feb. 28 to Mar. 2 Jun. 6-8
	Northeast Metro Technical College	3300 Century Av. White Bear Lake, MN Jeffrey Jahnke (612) 770-2351, x323	*Intro. to CADKEY*	Tues. eve. Jan. 9 to Mar. 13. Feb. 19-21
	St. Paul Technical Institute	235 Marshall Av. St. Paul, MN Michael Haffner (612) 221-1307	*Intro. to CADKEY*	Call for schedule.
Mo.	Country Computer	810 East Marshall St. Charleston, MO Bill McNeary (314) 683-3383	*Basic DataCAD*	Feb. 7-9
N.C.	Rockingham Comm. College	P.O. Box 38 Wentworth, NC Jim Putnam (919) 342-4261	*Intro. to CADKEY*	Feb. 7-9 Mar.21-23 May 2-4
	Wake Technical Comm. College	9101 Fayetteville Rd. Raleigh, NC Brian Matthews (919) 772-0551, x172	*Intro. to DataCAD* (11-week, eve. course)	Fall, Winter, Spring, Summer.
N.J.	Glassboro State College	Glassboro, NJ John Humbert (609) 863-6203	*Intro. to CADKEY*	Feb. 12-14 Apr. 23-25
	Entre Computer Center	400 Route 17, South Ridgewood, NJ Pat Neary (201) 445-6333	*DataCAD, the Basics*	Jan. 15-19
N.Y.	Onondaga Comm. College	Onondaga Hill Campus Syracuse, NY Paul Rice (315) 469-7741, x520	*Intro. to CADKEY*	Jan. 8-10 Apr. 16 thru May (evenings)
	State Univ. of New York, College of Technology	Farmingdale, NY Marybeth Sclafani (516) 420-2108	*Intro. to CADKEY* *Intermed. CADKEY*	Mon. eve. Jan. 8 to Feb. 12. Feb.26 to April 2
Ohio	CAD CAM, Inc.	2844 East River Rd. Dayton, OH Stephen Bishop (513) 293-3381	*Intro. to CADKEY*	Jan. 8-10 Jan. 22-24 Feb. 5-7 Feb. 26-28 Mar. 19-21

CADKEY And DataCAD Part Of Technology Shuttle In Canada

(Continued from page 4.)

GRST uses a van, thoroughly equipped with the latest in technology, as a mobile, independent, computerized consulting and engineering office. "We have a mandate to serve a vast region," Jean-Louis Chaumel said, "and it is important for us to have our presence spread as evenly as possible throughout the region, not just concentrated around the university's resources in Rimouski. The people of Gaspe, Comeau Bay, or the Magdelan Islands all have a right to our help. This is the first vehicle of its kind in North America." GRST's service area comprises the North and South coasts of the Lower Saint Lawrence River and the Gulf of Saint Lawrence and the islands in the gulf.

To equip the van, GRST obtained the collaboration of several companies and the Canadian Ministry of Employment and Immigration. The van itself is a propane-powered Dodge Ram, lengthened, heightened, and modified into an office. The van has electric heating, air conditioning, and an anti-theft system. The office includes a fax system, two cellular telephones, a color video camera, and an automatic camera for photographs. It also boasts two PC/AT compatible microcomputers (an OGIVAR System V with a color monitor and a laptop OGIVAR System IV with a plasma screen), a plotter, and a printer. For application software, the GRST van is equipped with CADKEY 3™ for mechanical design and drafting, and DataCAD® for architectural design and drafting.

Because GRST's service area encompasses the lower Saint Lawrence River and the Gulf of Saint Lawrence, 40% of the

team's projects have involved maritime and fishing industries, and 35% have related to timber and forest industries. The other 25% have been miscellaneous projects. The most ambitious project consisted in assembling a regional consortium of consulting engineers to study the feasibility of building a small, hydroelectric power plant at Blanc-Sablon for 60 million dollars.

The GRST team can respond to the need of a small business within three days. The initial evaluation of the situation is free of charge. The enterprise pays the costs of subsequent research and development which can take place at the company's site or back in Rimouski. "R&D is an area that is constantly growing and constitutes a pressing need for an enterprise," Jean-Louis Chaumel said. "Small and medium-sized businesses in the region are particularly lacking in resources, and I think that the University of Quebec at Rimouski could not remain indifferent to this situation. It is an exciting but complex area in which risk never goes away. ... There is a big future here for the university, but the path to follow is delicate and hard to identify given our very modest resources." The pilot project's total cost for two years was approximately $500,000. Its operating expenses are estimated to be $150,000 per year. The GRST van traveled more than 40,000 miles last year.

During the International Small Business Council's 34th Annual World Conference at Quebec City, many of the 500 participants took the opportunity for lengthy visits to the technology-shuttle van before its departure for Comeau Bay and another project. The van aroused considerable interest among representatives from countries in the Americas and Africa. "This concept," Jean-Louis Chaumel said, "could revolutionize the world of technology transfer."

CADKEY/DataCAD Training in U.S. & Canada (continued)

State	CTC	Location/Contact	Course	Dates
Ohio	CAD CAM Inc. (Continued)	2844 East River Rd. Dayton, OH Stephen Bishop (513) 293-3381	*Intro.*	Apr. 16-18
			Advanced CADKEY	Jan. 11-12 Jan. 25-26 Feb. 8-9 Mar. 1-2 Mar. 22-23 Apr. 19-20
	Progressive Computing Corporation	6964 Spinach Dr. Mentor, OH Mark Orzen (216) 255-0460	*Intro. to CADKEY*	Jan. 3-4 Feb. 6-7 Mar. 6-7
			Advanced CADKEY *CADL*	Jan. 17-18 Mar. 14-15 Jan. 30-31 Mar. 22, 28
			Adv. CADL *CADKEY SOLIDS*	Mar. 29 Feb. 20-21
Okla.	Oklahoma State University	301 Cordell South Stillwater, OK Gerald McClain (405) 744-5709	*Intro. to CADKEY*	Mar. 5
			Intermed. CADKEY	Mar. 6-7
Ore.	CTR Business Systems	825 SW 14th Av. Portland, OR Matthew Van Dyke (503) 293-2414	*Intro. to CADKEY*	Jan. 15 Feb. 12
			Advanced CADKEY	Jan. 29 Feb. 26
Pa.	Micro Control Inc.	390 Middletown Blvd Langhorne, PA Marion Homan (215) 752-5510	*Intro. to CADKEY*	Jan. 16-19 Feb. 13-16 Mar. 13-16
	Penn. State Univ.at Erie, Behrend College	Station Road Erie, PA. Pat Espin (814) 898-6103	*CADL* *CADKEY SOLIDS*	Mar. 1-2 May 31 to June 1
	Wilkes College	Stark Learning Center Wilkes-Barre, PA Michael Petyak (717) 824-4657	*Intro. to CADKEY*	Jan. 9-11
R.I.	Entre Computer Center	385 S. Main St. Providence, RI Carlos Kiamco (401) 831-7280	*Intro. to CADKEY* *Intro. to DataCAD*	Jan.2,4,9,11 Fb.5,8,12,15 Jn.16,18,23, Jn.25.Fb.19, Feb.22,26. Mar.1
S.D.	Northern State College	Box 705 Aberdeen, SD Jerry Sauer (605) 622-2571	*Intro. to CADKEY*	Feb. 16-17 May 28-29
Texas	MLC CAD Systems	5316 Highway 290 West Austin, TX Pat Stutz (512) 892-6311	*Intro. to CADKEY*	Jan. 24-26 Feb. 21-23 Mar. 28-30
			Advanced CADKEY	Scheduled on request.

CADKEY/DataCAD Training In U.S. & Canada (continued)

State	CTC	Location/Contact	Course	Date
Texas	Texas A&I University	Campus Box 203 Kingsville, TX Herchel Kelley (512) 595-2608	*Intro. to CADKEY*	Jan. 3-5 Mar. 14-16
	Texas Tech University	P.O. Box 4200 Lubbock, TX Mary Bentancourt (806) 742-3451	*Intro. to CADKEY*	Jan. 9-11 Mar. 20-22 May 15-17 Aug. 21-23
Utah	Salt Lake Comm. College	4600 S. Redwood Rd. Salt Lake City, UT Gary Poulsen (801) 967-4303	*Intro. to CADKEY*	Mar. 19-21 Mon., Wed. afternoons: May 2 to June 6.
Va.	Republic Research Training Center	855 West Main St. Charlottesville, VA Gregg Kendrick (804) 296-9747 (800) 476-4454	*DataCAD I* *DataCADII* *DC Modeler* *DCAL*	Feb. 26-28 May 21-23 Jan. 29-30 Jun. 18-19 Jan. 11-12 Mar. 26-27 April 23-24 On request.
	Virginia Tech	144 Smyth Hall Blacksburg, VA Allen Bame (703) 231-6480	*Advanced CADKEY*	Mar. 12-14
Wash.	Everett Community College	801 Wetmore Avenue Everett, WA Dave Utela (206) 259-7151	*Intro. to CADKEY*	Dec. 18-20
	WallaWalla College	204 S. College Av. College Place, WA Robert Noel (509) 527-2082	*Intro. to CADKEY*	Mar. 19-21
Wis.	North Central Technical College	1000 Campus Dr. Wausau, WI Michael Clark (715) 675-3331	*Intro. to CADKEY*	May 29-31 Additional courses on request.
Wyo.	University of Wyoming	3085 Engineering Bldg. P.O. Box 3295 Laramie WY Donald Polson (307) 766-6450	*Intro. to CADKEY*	Jan. 10-12 May 23-25 July 25-27 Aug. 20-22

CANADA

Prov.	CTC	Location/Contact	Course	Dates
Nova Scotia	Technical University of Nova Scotia	P.O. Box 1000 Halifax, N.S. Gary Bustin (902) 420-7764	*Intro. to CADKEY* *Advanced CADKEY*	Jan. 29-31 Mar. 26-28 Feb. 5-6 Apr. 2-3
Ontario	C.A.T.E. Ryerson Polytechnical Institute	350 Victoria St. Toronto, Ontario Brian Whelpton (416) 979-5106	*Intro. to CADKEY*	Feb. 15-16 Apr. 26-27

Design Competition

(Continued from page 7.)

image and organization, interior plan and organization, and the quality of presentation. All entries must be in the form of slides submitted in an 8.5" x 11" three-ring binder. Each entry will include an overall site plan with North clearly marked, floor plan(s), building section(s), at least one 3-D exterior perspective showing the design in context, and at least one 3-D interior perspective conveying the atmosphere and quality of the space. Participants may submit up to three additional slides to assist in the explanation of the design's intent. Each participant must also submit on diskette a copy of the computer files used to generate the competition entry, and a one-page designer's statement of not more than 350 words explaining the nature of the work submitted for judging.

Only individual entries will be judged. No team entries will be accepted. The registration fee is $10 for AIAS members, $20 for non-AIAS members. Entries should be addressed to:

AIAS/CADKEY Design Competition
The American Institute of Architecture Students
1735 New York Avenue, N.W.
Washington, D.C. 20006

Judges and Prizes

The panel of judges for this competition include Charles Sappenfield, FAIA, Dean of the School of Architecture, of Ball State University, Muncie, Indiana; Nora R. Klebow, AIA, of Skidmore, Owings & Merrill, San Francisco, California, and Eric Teicholz, AIA, of Graphic Systems, Inc., Cambridge, Massachusetts. The fourth member, an AIAS Student Juror, remains to be selected.

Prizes will be awarded to the

winners and to their local AIAS chapters. First Place: $1,000 to the winner and $250 to the local AIAS chapter. Second Place: $500 to the winner and $150 to the chapter. Third place: $250 to the winner and $150 to the chapter. Honorable mention (three to be awarded): $100 to each winner and $50 to the local chapter.

Hong Kong Polytechnic

(Continued from page 11.)

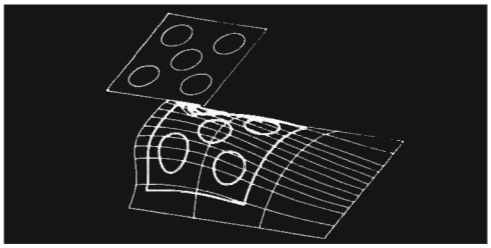
decision to use CADKEY 3 as its CAD standard in February 1989. To date they have installed more than 100 CADKEY 3 (Version 3.5) systems. They plan to install an another 100 systems through 1991.

CADKEY/DataCAD Training In U.S. & Canada (continued)

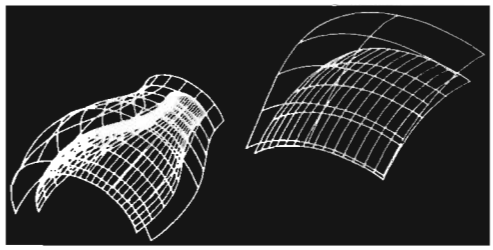
Prov.	CTC	Location/Contact	Course	Dates
Ontario	JB Marketing Associates	82 Spruceside Cresc. Fonthill, Ontario John Bradford (416) 892-8025	*DataCAD I* *DataCAD II*	Scheduled on request.
	Klear Concept Data	465 Rogers St. Peterborough, Ontario John Punshon (705) 742-3354	*Intro to CADKEY*	Jan 16-18
	Naylor-McLeod Group	1425 Bishop St. Cambridge, Ontario Brian Naylor (519) 622-4495	*Intro. to CADKEY*	Scheduled on request.

FastSURF

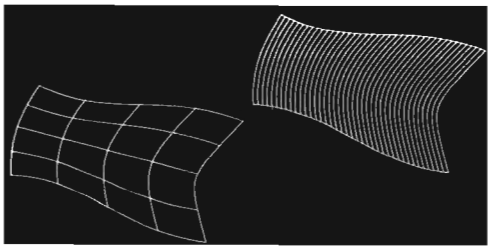
Affordable Surfacing Technology That's Easy To Use!



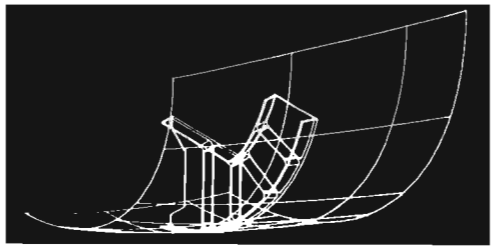
Entity projection onto a surface simplifies otherwise extremely difficult modelling procedures with precise control. No more time consuming approximations.



Constant and tapered offset surfaces are provided. Tapers can be linear or cubic blended, and may be bi-directional, Offsets simplify roughing procedures in CAM packages.



User-definable flow curve density improves accuracy of surface representation into PC-based CAM systems that are incapable of supporting true bi-cubic surface definitions. IGES and direct translators are also available.



Mold-line parts inherit surface curvature from accurate planar cross-sections. Production and inspection of these parts benefit greatly from a uniform surface database.

Complex Free-form Surfacing Power For CADKEY!

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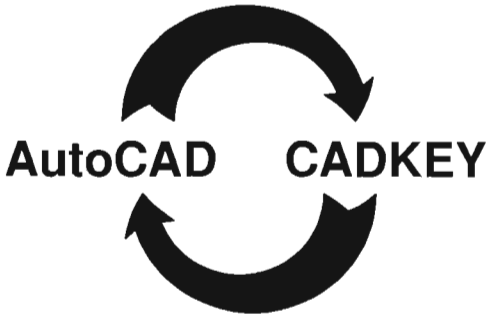
The two biggest names in micro-based CAD are finally talking to each other.



True bi-directional translation between AutoCAD® and CADKEY® is finally possible.

Two programs, **DXFtoCDL**™ and **CDLtoDXF**™, provide for the flow of data between AutoCAD and CADKEY.

To go from AutoCAD to CADKEY, **DXFtoCDL** reads an AutoCAD Release 10 DXF file and creates a CADKEY Version 3.5 CADL file. CADKEY reads the CADL file to display the AutoCAD-produced drawing on the screen.

DXFtoCDL can process almost all AutoCAD drawing entities including lines, arcs, circles, points, 3dfaces, text, and many others.

DXFtoCDL also converts each entity's color, layer, and linetype into a CADKEY-compatible format.

To go from CADKEY back to AutoCAD, **CDLtoDXF** reads a CADL file and creates an AutoCAD DXF file. AutoCAD reads the DXF file to display the CADKEY-produced drawing on the screen.

CDLtoDXF processes most CADKEY entities including lines, arcs, circles, text, polygons, polylines, and others.

CDLtoDXF also converts each entity's level, color, and linetype into an AutoCAD-compatible format.

Besides normal translations, these two conversion programs allow AutoCAD users to tap the CADKEY third party after-market, and allows CADKEY users access to the enormous AutoCAD after-market.

DXFtoCDL and **CDLtoDXF** are both stand alone utilities, requiring neither AutoCAD nor CADKEY to work.

YES, rush me more information today!

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I use CADKEY ☐ I use AutoCAD ☐ I use both ☐

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CADKEY To Feature CAD/CAM SOLUTIONS FAIR At NDES

(Continued from page 20.)

— Computers courtesy of COMPAQ CORPORATION.
— Digitizing tablets courtesy of Summagraphics.
— Mice courtesy of Logitech.
— CNC machining center courtesy of MHP.
— Cyclone CNC lathe courtesy of Denford Machine Tools.
— MicroVal Coordinate Measuring Machine courtesy of Brown & Sharpe Manufacturing Company.

CADKEY To Participate In Multi-faceted Program at NDES

In addition to the **CAD/CAM SOLUTIONS FAIR**, CADKEY and participating third parties, in association with the American Society of Mechanical Engineers and Cahners Exposition Group, will participate in four panel-discussion seminars.

On Wednesday, February 28, from 9:00 to 11:00 a.m., NDES Session 35, **CAD: Basics of Operations and Applications**, will include two seminars. One seminar, **From Decision to Drawing Board**, will discuss CAD versus conventional design, and the relative merits of the DOS and UNIX operating systems for the initial stages of computer-aided design and prototyping. A second seminar, **CAD Applications During the Design-Engineering Process**, will focus on the uses and advantages of implementing CAD for pre-production. Panelists will address low-end modeling, model analysis, rendering, and prototyping

From 2:00 to 5:00 p.m. on February 28, NDES Session 36 will present two seminars on the topic: **Integrating CAD into Corporate Operations**. One seminar, **Design to Manufacturing: the Translation**, will examine the advantages and limitations of the translation from computer-aided design to computer-aided manufacturing. The discussion will highlight the relative merits of direct translators and IGES translators between CAD and CAM, and emphasize practical applications of theory. In the second afternoon seminar, **The Corporate Decision: Converting to CAD**, the panelists will discuss how a company's selection of the most appropriate CAD system for its needs, and the use of scanning as an initia-tion into CAD, can produce an efficient conversion to CAD. The panelists will again emphasize practical applications of theory.

Making it in the '90s To Be A Special Show Attraction

Cahners Exposition Group of Stamford, Connecticut, managers of the National Design Engineering Show, have adopted **Making it in the 90s** as a ***special show attraction***. CADKEY's theme will be featured in Cahners' direct-mail campaigns, advertisements and press releases.

Discounted admission tickets to the exhibit areas of NDES '90 will be available. Contact Danielle Cote, CADKEY's Events Manager, one month before the show. Telephone: (800) 654-3413 or (203) 647-0220. Admission to the exhibit areas does not include admission to NDES '90's conferences and seminars. For admission tickets to the conferences and seminars, contact Customer Service, Cahners Exposition Group, P.O. Box 3833, 999 Summer Street, Stamford, CT 06905. Telephone: (800) 255-7798 or (203) 964-0000.

Myth #1

"Engineers don't care what the drawings look like, as long as they're accurate."

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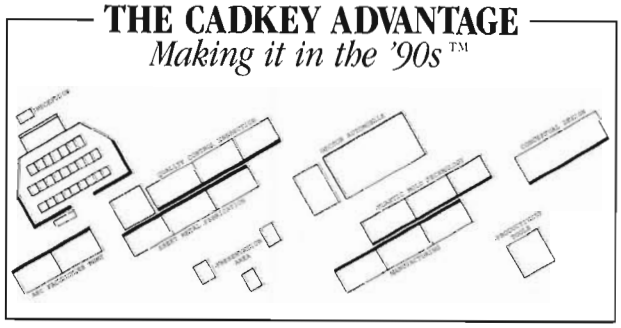
CADKEY To Feature CAD/CAM SOLUTIONS FAIR At NDES '90

Third-party design and manufacturing solutions integrated with CADKEY's products will highlight the National Design Engineering Show '90 at Booth #218, McCormick Place North, Chicago, Illinois, February 26 to March 1, 1990. The **CAD/CAM SOLUTIONS FAIR** will provide participants with hands-on experience in CAD, CAE, CAM, and CIM through step-by-step demonstrations and tutorials using CADKEY's products and 22 third-party products related to surfacing, design analysis, networking, scanning, facilities management, sheet metal unfolding, conceptual design, stereolithography, numerical-control machining, plastics, quality-control inspection, reverse engineering, design-productivity tools, and more.

Among the third-party software products to be featured in integrated applications with CADKEY 3™ are:

— SURFCAM™ - surfacing software by SURFWARE.
— VSA™ - simulation software for variation analysis by APPLIED COMPUTER SOLUTIONS.
— CADNET™ - networking software for DOS and UNIX CAD data bases and other productivity tools by CADNET, INC.
— ArborScan™ and LogoScan™ - raster-to-vector conversion software by ARBOR IMAGE CORPORATION.
— GeoPoint IV™, GEOCIM™, and GEONEST™ - sheet metal unfolding, numerical-control tool-path-generation, and fabrication software by ANDERSON-O'BRIEN, INC.
— RenderMan™ - Photorealistic conceptual-design tools by Pixar.
— HI-PRO™ and PROFOLD™ - two, sheet metal application packages by APPLIED PRODUCTIONS, INC. HI-PRO is a machine-tool-independent, numerical-control programming system. PROFOLD is a sheet metal unfolding package.
— Acu-Carv™ - computer-aided manufacturing software by OLMSTEAD ENGINEERING.
— PROTOTYPE EXPRESS™ - stereolithographic prototyping services by PROTOTYPE EXPRESS.
— DesignView™ - Conceptual-design tools by Premise.
— INERTIA™ - a finite-element-analysis package by MODERN COMPUTER-AIDED ENGINEERING.
— CADJET™ - digitizer-tablet overlay and other productivity tools by HLB TECHNOLOGY.
— CADPUNCH™ - sheet metal unfolding and punch-press programming software by N/C SYSTEMS DESIGN.
— CONCEPT™ - CNC and NC CAM software by PMX, Inc.
— TMconcept™ and faBEST™ - Plastics and injection-mold software by Plastics and Computer, Inc.
— CADView™ - Conceptual-design tools by Cubicomp.
— UNFOLD™, FabriCAM™, FabriVision™ - Quality-control, inspection, and sheet metal software by MetalSoft.
— CAM/TOOL™ - CAM software by Blue Chip Systems.
— SmartCAM™ - CNC programming system by Point Control Co., to be demonstrated by Ellison Machinery.
— FASTSURF™, PS™, CK/MOLD™, RTBOM™ . FASTSURF is surfacing software by FASTCUT NC SERVICES. PS is software by Parametric Solutions for parametrically generating CADL™ CADKEY Advanced Design Language) programs. CK/MOLD is software by Marketech Systems for parametrically creating injection-mold bases. RTBOM is real-time bill of material software by PFB Concepts, Inc. PFB Concepts will demonstrate all of these products.



*CADKEY's **CAD/CAM SOLUTIONS FAIR**, Booth #218, National Design Engineering Show.*

Several manufacturers have contributed to the **CAD/CAM SOLUTIONS FAIR** by generously loaning equipment.

Continued inside on page 19.

3-D WORLD is published bi-monthly by CADKEY, INC., 440 Oakland Street, Manchester, CT 06040-2100. TELEPHONE: (203) 647-0220. FAX: (203) 646-7120. TELEX: 510 600 7223. If you need additional copies, or if there is a change in mailing address, please contact Frank Simpson, Editor, or Mary Beth Staron, Contributing Editor. © Copyright 1990 by CADKEY, INC. All rights reserved.