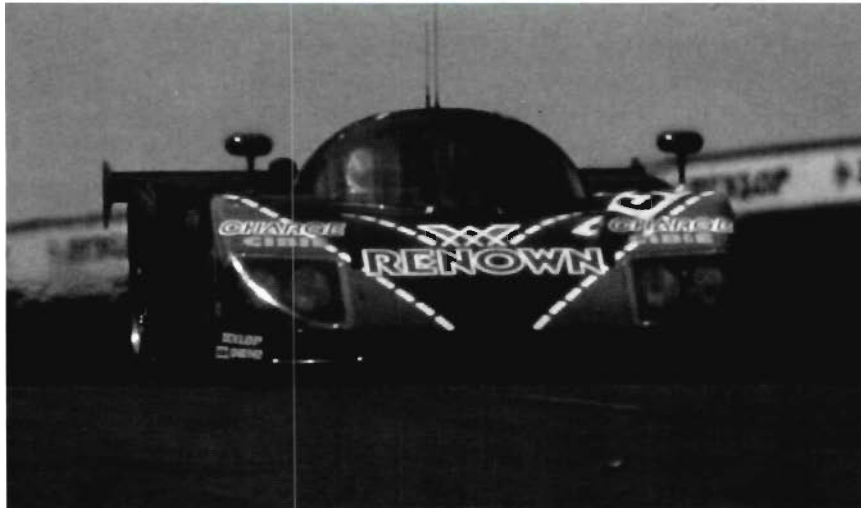


3-D WORLD

News For The
CADKEY/DataCAD
User

Winter 1992
Volume 6, Number 1
Annual Subscription: \$29.95



Mazda racer with Dunlop tires designed with CADKEY for Le Mans 1991.

Dunlop Motorsport Wins with CADKEY

Dunlop Motorsport helped make another piece of racing history in June 1991 when the company joined with Mazda to produce the first-ever Japanese victory in the world's most famous race: the Le Mans 24 Hours. The win creates a record which cannot be equalled by any other tire manufacturer well into the 21st century. It was Dunlop Motorsport's second 24-hour race in a week, following its Group N victory in partnership with Nissan at Nurburgring, Germany. The winning Mazda 787B used Dunlop radial tires in its sensational defeat of the Mercedes, Jaguar, and Peugeot factory teams, as well as 19 private Porsches.

SP Tyres UK Limited of Fort Dunlop, Birmingham, England, designs, develops and builds Dunlop competition tires. SP Tyres' Motorsport Development Department relocated and combined its design operations

with SP Tyres' UK Motorsport Division in January 1990. The move prompted a need for a self-contained design tool to be located in the center of the development office, which is some distance away from the company's existing large computer facility.

Ease of Use — Key Feature

SP Tyres chose CADKEY for their design and drafting requirements, and the system now sees regularly increasing use by more and more members of the design staff. Matthew Simpson, a Senior Tire Engineer at Fort Dunlop, explained how CADKEY helped Dunlop to help Mazda make it in the '90's. "Most people were self-trained on the system, acquiring skills through work-related exercises," Matthew Simpson said. "There was never the need to provide a formal training program as the

(Continued on page 2)

CADKEY ANALYSIS and CUTTING EDGE Join Cadkey's Family of Products

Cadkey Inc. announced CADKEY ANALYSIS™, our new analysis software which uses the Boundary Element Method, and CUTTING EDGE™, our new 3-axis CNC machining software, on November 12, 1991 at AUTOFACT '91 in Chicago, Illinois. We also announced CADKEY™ on Digital Equipment Corporation's Personal DECstation 5000™.

CADKEY ANALYSIS features individual modules for steady-state heat transfer, elastic stress/strain, and thermo-elastic stress/strain for 2-D and axisymmetric geometries. Additional modules, including analysis for 3-D geometries, are scheduled to be released in 1992.

(Continued on page 2)

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Dunlop Motorsport

(Continued from page 1)

package is so user friendly."

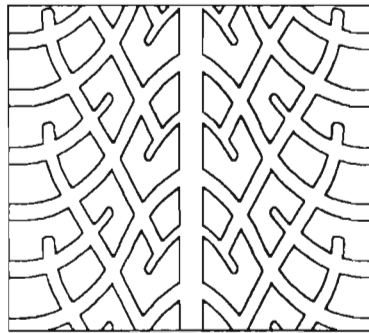
"Soon after our dealer installed the system," Matthew continued, "I became engrossed in finding out just what was possible. It was not uncommon for me to spend hours on my own, in a darkened office, evenings and weekends, exploring its extremely powerful capabilities. I am now able to produce all my own drawings, which is an infinitely preferable process to conveying ideas, thoughts, and all the background information to someone else."

"CADKEY enables me to alter things on the run, sit and sketch concepts on mold shapes, tire constructions, tread patterns, and all the associated aspects of the design process for Group C racing tires, before committing myself to final drawings," Matthew added. "I do not pretend to know the full capabilities of the system, yet I keep discovering powerful new features and simpler methods of design. Personally, I don't think that our use of the system does CADKEY real justice. For example, in the normal process of tire design, we do not make use of all of CADKEY's 3-D capabilities, or of the specialized engineering tools for which the system is really designed. However, it is ideal for my purposes."

Tread Patterns — Critical for Racing

Late in 1990, the size parameters and wheel widths for the tires to be used on the Mazda racing car were defined. Initial work involved the design of the mold profile for the front tires. Working within the dimensional

constraints of the vehicle, and using knowledge acquired from previous years of developing radial tires with Jaguar and Nissan sports prototypes, the design group finalized the profile in January 1991. "During our development period, work progressed on new tread patterns using CADKEY, both for light and for heavy rain conditions. Tread-pattern development is an amalgamation of style, and performance," Matthew said. "We produce a lot of preliminary sketches with the CAD system to assess how the various elements of the pattern



Detail of tire-groove pattern.

relate to one another, and to achieve the requisite relationship of *land to sea* (rubber-to-groove ratios). It is possible to assess new concepts of pattern theory and style by producing templates directly from CADKEY at full size, cutting the grooves out with a scalpel, and spraying paint through onto a plain-treaded tire. The pattern is then *hand-cut* to provide a model for visual appraisal. We produce full sets of test tires in the same way. This method is fairly common within the tire industry. Ultimately, however, we will

look toward a solid-modeling system, like CADKEY[™] SOLIDS, to save time and effort in producing these visual appraisals. CADKEY Version 4 includes such a package, and an upgrade to the new system seems viable in the near future."

SP Tyres provides tires for each race in a variety of tread-compound types to suit prevailing conditions of temperature, track surface, vehicle-handling characteristics, driver preference, etc. Typically, each car will have as many as 20 sets of dry *slick* tires available per race. In sprint races, cars will use only three sets under normal circumstances. At Le Mans 1991, the winning Mazda car used 18 sets of tires during the 24 hours of the race.

CADKEY ANALYSIS and CUTTING EDGE

(Continued from page 1)

CUTTING EDGE provides an ideal environment for third-party manufacturing-product developers. Some CAM vendors have already begun working to take advantage of its versatility using CADKEY[™] Dynamic Extensions[™] (CDE). The first CDE developers' conference took place December 2-4, 1991. (See story, **Cadkey, Inc. Hosts CDE Developers' Conferences**, on page 7.)

CADKEY ANALYSIS and CUTTING EDGE represent major steps in Cadkey's ongoing effort to foster desktop concurrent engineering. Both CADKEY ANALYSIS and CUTTING EDGE run on 386 and 486 personal computers. They support all popular graphics cards, input devices, plotters, and printers.

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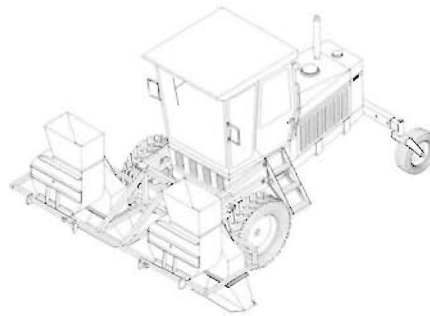
Note from the Editor

The arrival on the market of eight, new, CADKEY-related third-party products, in January 1992, developed by five different third parties independently of one another, has affected the contents published in this issue of **3-D WORLD**. Some other time-sensitive articles also played a role in what got into print in this issue, and in what size type.

Introducing these new products: CADView™, KeyView™, DMSPro™, EuroBOM™, dPACE™, FindWare™, LookWare™, and ViewWare™, posed an interesting challenge to the editor. On the one hand, it would not be possible to include in **3-D WORLD** some articles planned long before, and still be able to introduce all of these new products in the same issue. On the other hand, to introduce one or two of these new third-party products, without introducing all of them in the same issue, would mean that **3-D WORLD**, was not treating our third-party developers evenhandedly. Readers have applauded **3-D WORLD**'s efforts to be fair to all of the third parties who develop products related to CADKEY™ and DataCAD™. The fact that these eight products have been developed independently, in different parts of the world, yet during the same period of time, indicates the dynamic interest that surrounds Cadkey's software products.

Fairness and evenhandedness determined the final decision. At the risk of redundancy, because these products compete among themselves in many ways, you will find five third-party news stories introducing these eight new products. They are: (1) **CADView Opens New Windows for CADKEY Users** (on page 15), (2) **KeyView and DMSPro — New Viewing and Drawing Management Utilities for CADKEY Users** (page 16), (3) **EuroBOM Makes**

Integrated Parts List and Drawing Management System Available for CADKEY 4 (on page 18), (4) **Process-Planning and Cost-Estimating Program Outputs CUTTING EDGE Tool List** (on page 20), and (5) **FindWare, LookWare, ViewWare: Utilities for Drawing Management** (on page 22). The articles attempt to be purely objective, and they do not make any comparisons among these products. The comparisons are for you to make. Enjoy your reading.



BUG-BUSTER™ crop-vacuum machine.

Farm Tractor Wins CADKEY Part File Contest

The BUG-BUSTER™ crop-vacuum machine, manufactured by IAP, Inc. of Phillips, Wisconsin, and designed with CADKEY™ by Ronald Kulas, proved to be the winning entry in the recent CADKEY Part File Contest. The contest was announced in a flyer that accompanied the November/December 1991 issue of **3-D WORLD**. Ron designed the tractor as part of a project done while he was employed by IAP, Inc. The prize awarded to Ron Kulas is a brand new D28 Martin™ guitar. Like all the guitars manufactured by the more-than-150-year-old Martin Guitar Company of Nazareth, Pennsylvania, the D28 *Dreadnought* model is entirely hand-made of rosewood. An interesting side note is that Martin Guitar used CADKEY to redesign the guitar bridge for their *Dreadnought* model to improve the manufacturing process. We hope that Ron has as many hours of enjoyment with his new Martin guitar as he has had with CADKEY.

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The Sun Shines Bright in North Carolina...

Wrangler Builds Its Own Machines to Make Jeans !

"We build our own machinery to give ourselves a competitive edge in manufacturing. Now CADKEY™ and Sun Sparcstations™ are part of that competitive edge," said Jay Craft, Director of Equipment Engineering and R & D, at Wrangler Equipment Center in Greensboro, North Carolina. Wrangler Equipment Center makes new machines and modifies existing, commercially available machines to manufacture Wrangler™ jeans. Wrangler belongs to the Blue Bell Division of VF Corporation, Wyomissing, Pennsylvania, the largest apparel manufacturer in the world.

"We did everything manually until 1982, when we invested in Vector Automation's CADMAX II system on a Hewlett Packard minicomputer with four

stations," Jay continued. "Everything was proprietary, software and hardware. We got our money's worth from the system, but it is too slow and presents too many hardware problems to continue to use in the 1990's."

Thorough Research of CAD Technology

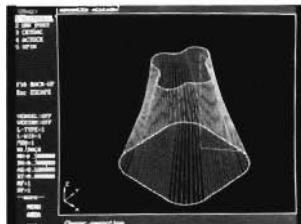
In June-July 1990, Jay organized a CAD committee that included a design engineer, Tom Hardy, and three draftspeople, Barbara Jensen, Jennifer Gunning, and Randy Greeson along with the Operations Manager of the Machine Shop and Assembly Floor, Alton Ward, and the Parts Purchasing Manager, Eric Knoerr. These six people, under Tom Hardy's chairmanship, were charged

with the responsibility to conduct a complete review of all PC-based, workstation-based, and minicomputer-based CAD products. The purpose was to establish a five-year plan for upgrading Wrangler's design and manufacturing technology. "Technology is moving so fast now that a company must look into upgrading its technology approximately every five years," Jay said. "We put together a team that could fit into a van, or into two cars, and go visit sites where CAD systems were in actual use. Even after they had recommended a specific product for purchase, this team has continued to meet on a quarterly basis."

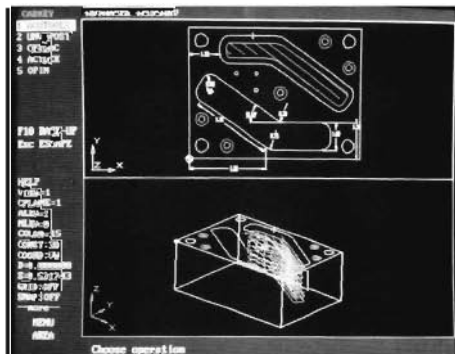
"It finally came down to a choice of CADKEY or AutoCAD," Jay continued. "The CAD evaluation team recommended

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CADKEY because it was by far the most user friendly package, especially in managing a database without involving a lot of customization by each operator. They recommended the Sun Sparcstation and UNIX because of CADKEY's speed on that configuration. The speed of operation was the key. For example, to refresh and redraw a complicated part file on their Vector CADMAX II™ system took 10 to 15 minutes. "With CADKEY on the Sparcstation, redrawing the same file takes 2 to 5 seconds," Jay said. "Using CADKEY SOLIDS, it may take a little longer. We are looking for tremendous gains in productivity by removing the drafting bottleneck. A strong second reason for selecting CADKEY and the Sun Sparcstation is the ability to run a DOS shell on the UNIX system as a fall back, if necessary," he added.

Piedmont Automated Technologies (PAT) of Greenville, South Carolina installed CADKEY and four Sun Sparc workstations at the Wrangler Equipment Center, on a network with two IBM 386 personal computers. An optical laser disk is attached to one Sparc workstation to provide storage for many thousands of part files. One PC is on the shop floor some three hundred feet away. The PC has DOS-based CADKEY™ VIEWSTATION installed, as well as SmartCAM™ for computer numerical-control (CNC) machining work. Wrangler also bought a DOS-based CADMAX II system on an

Everex 386 PC in order to be able to translate the CADMAX files into DXF format for transfer into CADKEY. "Our original Vector CADMAX II system did not support DXF translation," Jay explained. "DXF was the only way to bring our files into CADKEY. So the PC-based CADMAX II system was a worthwhile temporary investment."

No Production Time Lost

"Immediately after installation, PAT conducted in-house training for us, which was followed by a six-week training program at Rockingham Technical Institute. Then we were ready to make the transition," Jay said. "One weekend last May (1991), we powered our CNC systems down on Friday afternoon as usual, and transferred our most immediately critical files through DXF into CADKEY on Saturday and Sunday. On Monday morning we began drawing and cutting metal again. We did not lose any CNC time." By August 1991, Wrangler's design team had translated some 9,000 part files into CADKEY. "These files are 80% of the part files that we use for production work, but they represent only about 20% of the total number of our drawings," Jay added.

"We are very impressed with the way PAT approached our needs," Jay said. "They have gone above and beyond what we had hoped for. They even discovered a power problem in our conference room. Of course,

it happened the first time that they demonstrated CADKEY to us. What a disaster! But, they discovered our power problem for us."

Now for Steps Two and Three

Wrangler Equipment Center now has the first phase of its five-year technology upgrade operational. "We plan to put into place an entirely new set of manufacturing and management tools," Jay said. The plans for 1992 focus on linking Wrangler's networked CADKEY system, incorporating a UNIX-based version of DRAFT-PAK™, a CADKEY-related third-party product developed by Baystate Technologies, with MAPICS II™. MAPICS II is a manufacturing, accounting and production-information control system developed by IBM. Jay plans to use a UNIX-based version of GLUE™, a CADKEY-related third-party product developed at Coventry Technical College in England, to integrate CADKEY on the Sun Sparc workstations with MAPICS II on an IBM 3600 minicomputer.

1993's goal is equally ambitious: to eliminate paper in the design and manufacturing process altogether. This will require the use of digital-display systems, distributed in networks throughout the engineering and production departments, so that all the appropriate people involved in reviewing a project can comment on designs and suggest changes by typing at the terminal. Each person's comments will appear on a different level and yet not be part of the actual design file. "Managers will be able to approve manufacturing based on the marked-up screen display," Jay said. "Our management, engineering, and manufacturing groups think that this is the correct direction in which to proceed. **Editor's Note:** SmartCAM is a trademark of Point Control Company, Eugene, Oregon.

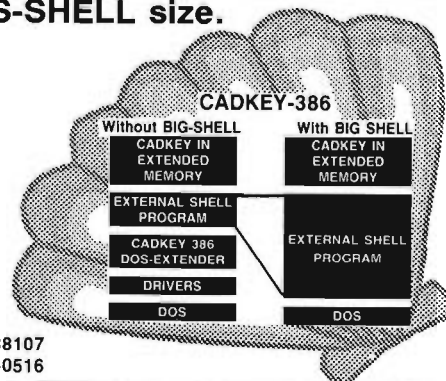
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Cadkey, Inc. Hosts CDE Developers' Conferences

Fifty-three third-party developers from the United States and around the world participated in Cadkey, Inc.'s first and second Developers' Conferences for CADKEY^(R) Dynamic Extensions^(TM) (CDE). The first conference took place at Cadkey's world headquarters in Windsor, Connecticut, December 2-5, 1991. The second conference took place in Mesa, Arizona, January 20-21, 1992. Both conferences were *sold out*. CADKEY Dynamic Extensions are a mechanism that allows third-party developers to run-time link standard C-language programs to CADKEY^(R) Version 5 and to future versions of CUTTING EDGE^(TM).

CADKEY Dynamic Extensions provide a uniform, device-independent environment for managing and sharing functions between and among user applications that work with and within CADKEY. CDE functions can be memory resident, disk-based, or network based. Some immediate benefits of CDE include:

- Reading and writing directly to the CADKEY database.
- Using CADKEY or CUTTING EDGE as a front end or back end to third-party applications.
- Customizing and enhancing CADKEY or CUTTING EDGE functions.
- Linking external databases to CADKEY to perform on-line, bill-of-material or part-classification functions.
- Linking CADKEY to 3-D digitizer and coordinate-measurement devices to perform on-line part inspection or reverse engineering.
- Performing on-line data translation to and from other CAD or CAM databases.
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Participants at both conferences expressed enthusiasm for what CADKEY Dynamic Extensions will allow them to do.

Cadkey will host its next Developers' Conference for CADKEY Dynamic Extensions in Ypsilanti, Michigan, March 16-17, 1992. Interested third-parties should contact Johan Lavery or Jeff Hall at Cadkey, Inc.: (203) 298-6463.

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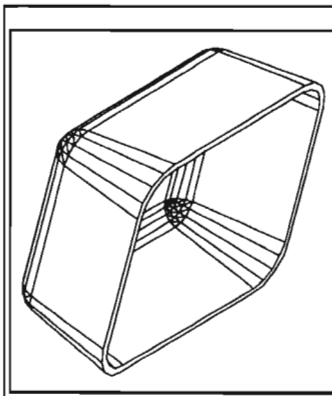
The CADKEY Videos 4.0 Update Tape, a 46 minute VHS tape which demonstrates the features found in the newest version of the CADKEY software is now available. This tape, together with the earlier set of 12 CADKEY video tapes and an accompanying Study Guide, provides a complete instructional package for introducing new users to the CADKEY software. A similar set of video tapes is available for CADKEY Light.

New DataCAD users will benefit from The DataCAD Videos, a series of 10 instructional video tapes which provide an introduction to the most frequently used DataCAD features. The tapes are correlated with the projects found in the book "Beginning DataCAD".

"Beginning DataCAD" by Dr. Leonard O. Nasman, is a 165 page book which introduces new users to DataCAD through a series of carefully crafted drawing projects. These are designed to help beginners make useful drawings as quickly as possible by introducing concepts in the context of completing architectural drawing exercises.

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U.S. Speed Skiers Use Aerodynamic Helmets Designed with CADKEY and CADKEY-related Third-party Products !

When the members of the U.S. Speed-Skiing Team hurtle down the mountainous terrain of Albertville, France, during the 1992 Winter Olympic Games, their aerodynamic safety helmets provide dramatic proof that concurrent engineering works successfully. The United States Performance Engineering Program (U.S.P.E.P.), a non-profit corporation in Carlsbad, California, dedicated to the application of technology to improve safety and competitiveness in sports, designed and manufactured these speed-skiing helmets in collaboration with Cadkey, Inc., several CADKEY®-related third-party developers, and Bell Sports of Norwalk, California. Beginning on December 4, 1989, the design and manufacture of U.S.P.E.P.'s original aerodynamic helmet took 67

days, from a hand-drawn outline on a napkin to a finished product. On February 20, 1990, the helmet was delivered to Steve McKinney, the late Captain of the U.S. Speed-Skiing Team, to test at an international speed-skiing event at Kirkwood, California. (See "High-Tech Speed Ski Helmet," *3-D WORLD*, May/June 1990.)

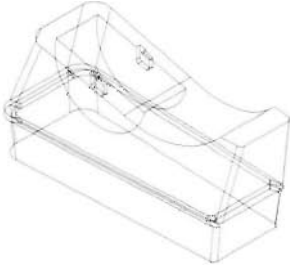
"We have built our research and development capabilities around CADKEY's open data architecture," said Stephen Gubelmann, co-founder of U.S.P.E.P. with Braxton Carter and Steve McKinney. "When we started doing this stuff, everybody thought that we were crazy. We did not know that we were not supposed to be able to do what we did; we just did it. CADKEY and CADKEY-related third-party products made it possible for us to design and

manufacture quickly custom helmets for the athletes, and to refine these helmets for superior structural and aerodynamic performance."

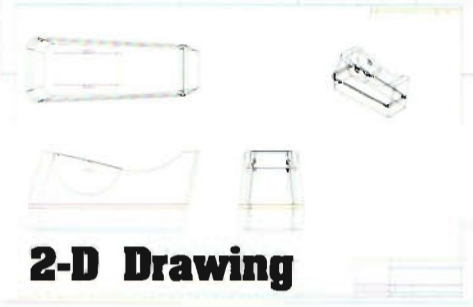
Reverse Engineering: Old Helmets — New Designs

The first step in the development process involved creating three-dimensional computer models of existing helmet designs. U.S.P.E.P. used Cadkey's CADDInspector™ with Brown & Sharpe's MicroVal™ coordinate measurement machine, to create digital files of coordinate data from existing helmet models, supplied by the athletes and by Bell Sports, into a Zenith Data Systems Z-386/25 microcomputer. These files were then transferred into CADKEY for the development of new prototype designs. U.S.P.E.P.

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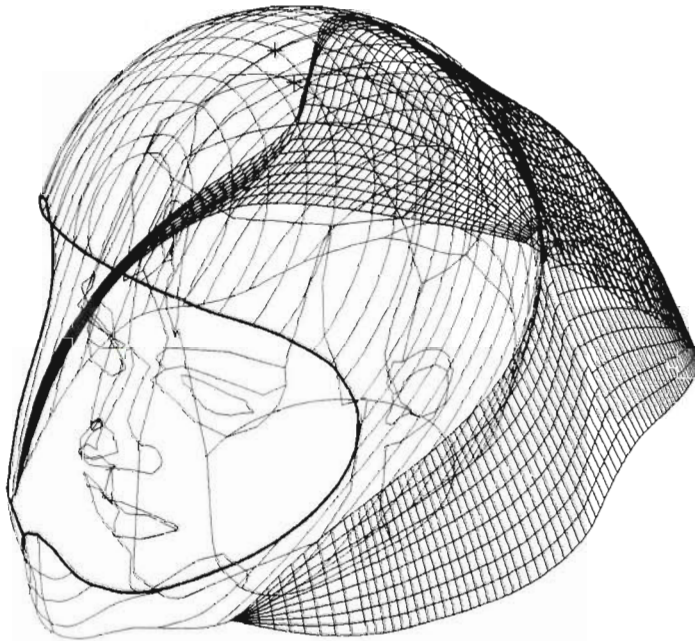
followed essentially the same process for the speed skiers' leg fairings.

Concurrent Engineering and Manufacturing

After the helmet and leg-fairing models had become three-dimensional part files in CADKEY, U.S.P.E.P. divided the project into multiple efforts taking place simultaneously:

(1) design of new prototype models for the helmets and fairings, (2) comparing different models to determine which design's aerodynamic properties are most efficient (fluid-flow

In addition to Cadkey, Inc., Brown & Sharpe, Zenith Data Systems, and Bell Sports, other companies which are collaborating in U.S.P.E.P.'s research and development of high-technology sporting equipment are: Alias Research, Ampex, Broadcast Equipment Rental Corporation, CNC Software, FastSurf, GRiD, Hayes, Hewlett Packard, Intel, International Visual Communications, Microsoft, Motorola, Siemens Solar, Silicon Graphics, Structural Research and Analysis Corporation, 3-D Systems, Trace, and Wind Baron.



Wire-frame model of the speed-skiing helmet.

analysis, i.e., computer simulated wind tunnel), (3) design detailing, (4) photorealistic renderings, (5) surfacing, (6) refinements to the helmet and fairing models, and (7) manufacturing of the molds from which Bell Sports would make the helmets and fairings. CADKEY and CADKEY-related third-party CAD and CAM products played pivotal roles in accomplishing these phases of the project. The National Institute of Standards and Technology also assisted U.S.P.E.P.'s efforts.

Performance Proven by Competition

Speed skiers tested the original helmet at Kirkwood, California, in February 1990. Their suggestions led to improvements in the helmet's design. The skiers used these improved helmets at the World Cup Speed-Skiing Race at Bend, Oregon, in February 1991. Additional tests in the heat of competition took place in May 1991, in Colorado and in Italy.

The aerodynamic helmets and leg fairings contributed to the remarkable performance of

another American skiing team in the 24-Hour Ski Marathon, at Aspen, Colorado, December 2-3, 1991. The Ski Marathon was both a competition and a charity fund-raising event to combat Multiple Sclerosis. In spite of bouts with the flu, the U.S. Endurance Skiing Team streaked down Aspen Mountain continuously, day and night, completing 82 runs in those 24 hours. The Canadian team won the event by one lap. When asked how their helmets performed, U.S. athletes, Ed McCaffrey and Scott Nichols, responded with an enthusiastic *thumbs-up* and a hearty "Right On!"

The *acid tests* of actual speed-skiing competition in 1990 and 1991 led to additional refinements to the helmets and fairings in preparation for the 1992 Winter Olympics. The U.S. Speed-Skiing Team began testing the newly refined models in Oregon in January 1992. The new helmets feature a double-paned wind screen and a battery-powered venting system to eliminate the fogging problems that speed skiers commonly experience traveling at such high speeds downhill (up to 140 miles per hour). The speed-skiing competitions at the 1992 Winter Olympics are scheduled to take place February 16-22, 1992.

Speed-Skiing Research

Benefits Cycling Teams

U.S.P.E.P.'s work for safety in speed-skiing will also pay dividends for the U.S. Road and Track Cycling Teams in the 1992 Summer Olympics at Barcelona, Spain. They are now developing aerodynamic helmets for cycling. U.S.P.E.P. will use 3-D Systems' Stereolithography system and Cadkey Inc.'s new CAM product, CUTTING EDGE™, to manufacture the molds for these helmets.

Editor's Note: The U.S. Performance Engineering Program is a non-profit corporation. Anyone interested in participating in their work can contact U.S.P.E.P. at 4202 Sierra Morena Av., Carlsbad, CA 92008. Tel.: (619) 729-1683. Fax: (619) 729-9098.

Schedule of Seminars about CADKEY, CADKEY ANALYSIS, CUTTING EDGE, and DataCAD

March

Milwaukee, WI Mar. 10-11
St. Louis, MO Mar. 18
San Jose, CA Mar. 18-19

Chicago, IL May 12-13
San Diego, CA May 19-20
Des Moines, IA May 26
Cedar Rapids, IA May 28

September

Phoenix, AZ Sept. 8-9
Montreal, Canada Sept. 8
Chicago, IL Sept. 16-17
Los Angeles, CA Sept. 29-30

April

Baltimore, MD Apr. 9
S. Francisco, CA Apr. 15-16
Windsor, Canada Apr. 24
Washington, DC Apr. 30

June

Erie, PA Jun. 4

November

Ottawa, Canada Nov. 6

May

Seattle, WA May 5-6
Dallas, TX May 12

August

Kansas City, MO Aug. 12

Seminar dates and locations are subject to change. Reservations will be accepted only within 30 days of the scheduled seminar. To register, call (800) 654-3413 or (203) 298-8888, and press #4.

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| Inset Systems | PIX |
| MacPaint | MAC |
| MS Paint | MSP |
| PC Paintbrush | PCX |
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"Apalachee's CADD work for us was of exceptional quality!"

Tim Ashmore

"Their work is very good. Most of these students have no background or experience in architecture or engineering. The instructors are doing a great job."

Andres Santana

"Their work has been so good that we have used them for two successive years. And, we shall continue to use their services."

Paul Kelley

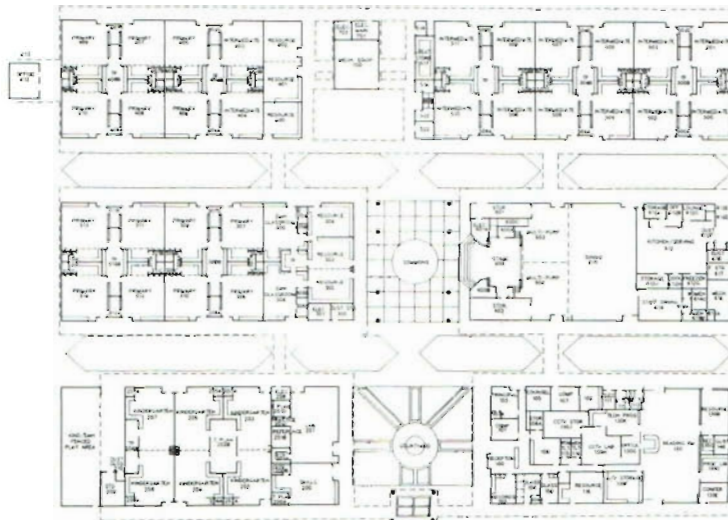
The praise goes on, but these quotations are enough to start. Of whom or what are these people speaking in such glowing terms? Andres Santana's comments clearly indicate that he is talking about a training program somewhere. And, what a program! Unique in the United States! Who knows? Perhaps unique in the world!

Tim Ashmore is an engineer with the Department of Public Works in the city of Fort Lauderdale, Florida. Andres Santana is the Engineer Supervisor with the Bureau of Facilities Services for the State of Florida's Department of Corrections. Paul Kelley is the architect responsible for facilities management in the Department of Education for the State of Florida. Andres Santana and Paul Kelley work in Tallahassee, Florida, but they both have statewide responsibilities.

The program that Tim Ashmore, Andres Santana, and Paul Kelley are describing is PRIDE located within the compound of Apalachee Correctional Institution in the Florida Panhandle between Chattahoochee and Sneads. Apalachee is a state prison, and PRIDE is Prison Rehabilitative Industries & Diversified Enterprises, Inc. The students

whose work is so good are inmates participating in a unique training program to provide them with marketable job skills when they graduate (get out). PRIDE APALACHEE CADD is on the road to becoming well known for the quality of its work.

different goods and services. "PRIDE's program is unique, and our CADD program at Apalachee is unique within PRIDE." said Jeffrey Will, Industry Manager at PRIDE APALACHEE CADD. "Although our work currently focuses on Florida, our customers are not limited to Florida."



Riviera Elementary School, Brevard County, Florida. Plan view drawn at PRIDE APALACHEE CADD, published in *Florida Educational Facilities 1990*, page 11.

Training and Production Tools

PRIDE APALACHEE CADD uses DataCAD™ and other CAD software as teaching and production tools because the facility is both an on-the-job training program and a business. PRIDE is a non-profit corporation formed in 1981 by the Florida State Legislature. PRIDE's mission is to make, produce, and sell goods and services with the end purpose of educating prison inmates and returning them to society as useful citizens. PRIDE is the first state-prison-industry program in the United States managed and operated by the private sector as a self-funded non-profit corporation. PRIDE APALACHEE CADD is one of 56 PRIDE facilities in 22 correctional institutions scattered throughout Florida, producing approximately 3,000

Meaningful Job Skills and Social Responsibility

"Our business is restricted to tax-supported entities only," Jeff said. "PRIDE participates in the state bidding process for the CADD conversion work. Our objective is to complement the private sector, not to compete with it." PRIDE runs its industries with a *free world* environment in which the inmates not only learn meaningful job skills; they also receive comprehensive post-release job-placement support through a program called TIES (Training, Industry, Education and Support), and they earn wages for their work. However, even the wage-earning side of PRIDE's program for inmates, has an educative and rehabilitative purpose: developing a sense of social responsibility as citizens. Any profits that PRIDE's businesses

make are reinvested into the program to improve it, and to reduce costs to the taxpayers of Florida. PRIDE contributes 1.5% of its annual sales to the State of Florida toward the costs of incarceration. PRIDE also pays 15% of total annual inmate compensation to victim restitution and court costs.

PRIDE began its CADD program in 1988. The CADD program deliberately trains and cross-trains the participants in three CAD software systems: DataCAD, AutoCAD™, and MicroStation™. DXF transfer of files among the systems plays a significant role in the training. The participants in the CADD program convert manual drawings to electronic files. Typically, they work with two-dimensional types of hand-drawn data: architectural floor plans, street maps, aerial site plans or photographs, engineering, mechanical, and structural drawings.

Silver Certificate

PRIDE's program at Apalachee involves five steps leading to a Silver Certificate for on-the-job training issued by the State of Florida's Department of Education. The CADD program averages 21 or 22 participants at any one time. The length of training and the amount of cross-training depend upon the length of the participating inmates' sentences. "We try to give people at least a year of training and experience," said Michael Oberlin, Training and Production Supervisor at Apalachee. "So far, nine inmate-workers have graduated from our program."

"PRIDE is both a training program and an ongoing business effort," Mike continued. "Participants get into PRIDE very much as they would get any normal job. The inmate must request to participate in one of PRIDE's industries, and he or she is screened for ability. The key elements are the applicant's

expression of serious interest, enthusiasm, and willingness to learn. We have three other minimum requirements. The applicant must have at least a tenth-grade education. He or she must have a GED (General Equivalency Diploma), or at least must be working toward a GED. And, the applicant must have gone at least six months without any disciplinary problems."

Real Work

PRIDE APALACHEE CADD did several jobs converting manually drawn blueprints into electronic drawings for Florida's Bureau of Facilities Services in the Department of Corrections. A prototype gate house required 10 drawings: eight architectural drawings, one drawing of plumbing and HVAC (heating, ventilation, and air conditioning), and one drawing of electrical layout. A food-services building needed 18 drawings: ten architectural drawings, plus two drawings of kitchen equipment, four plumbing drawings and two electrical drawings. A multi-purpose building required sixteen drawings. "Each job was a prototype building, and each one involved a complete set of working drawings," said Andres Santana. "They did very good work."

Two years in a row, electronic drawings by PRIDE APALACHEE CADD have illustrated the publication, **Florida Educational Facilities**. "And," Paul Kelley said, "we shall continue to use their services."

Editor's Notes: AutoCAD is a trademark of Autodesk, Inc., Sausalito, California. MicroStation is a trademark of Intergraph Corporation, Huntsville, Alabama.

For additional information about PRIDE APALACHEE CADD or about any of PRIDE's programs, contact Patricia Foote, Director of Public Affairs, PRIDE of Florida, 5540 Rio Vista Drive, Clearwater, FL 34620. Telephone: (813) 535-4900. Fax: (813) 535-2731.

Using DataCAD with the Hewlett Packard DesignJet Plotter

Many DataCAD users have been calling Technical Support with questions about using DataCAD with the Hewlett Packard DesignJet™ plotter. This plotter uses ink-jet technology to produce large (up to E size), black-and-white drawings at 300 dots per inch. It uses the HPGL II command language, and it plots at a much faster rate than pen plotters.

Hewlett Packard has informed people that the DesignJet runs only with HPGL II, and DataCAD users want to know if the DesignJet will work with DataCAD. DataCAD has several HPGL device drivers, but it does not currently support HPGL II. Since HPGL commands are a subset of HPGL II, a device that runs with HPGL II should also accept HPGL commands. However, to get the DesignJet to plot using a DataCAD HPGL driver, there are a few peculiarities that must be addressed.

We have prepared an HPGL driver for the DesignJet that addresses these special issues. It is posted in the DataCAD area of the Cadkey Bulletin Board, (203) 298-6405. The driver's file name is HPGLS2.DVP. To use the driver, simply copy it into the \MTEC\DRV\ directory, and configure DataCAD for the Hewlett Packard DesignJet.

We have received reports that users can also get the Hewlett Packard DesignJet to work with DataCAD by configuring DataCAD to plot to a Hewlett Packard LaserJet Series III.

Time to Renew Your CADKEY or DataCAD Maintenance?

Call Cadkey's Sales Dept. at (800) 654-3413 or (203) 298-8888.

Error in MCN MicroCAD News

The International Section of the November 1991 issue of **MCN MicroCAD News** stated that Soft-Tech, the German distributor of DataCAD, will be responsible for the development of the DataCAD^(R) and 'Parthenon' products. This information is incorrect.

Soft-Tech is an additional development site for DataCAD, and currently develops application macros for the German version of DataCAD, DataCAD Spirit™. Soft-Tech is not jointly developing Parthenon with Cadkey., but may elect to develop applications for Parthenon at a future date. All development of the current U.S. version of DataCAD and the new Parthenon product is being done in the United States at Cadkey, Inc. **Editor's Note:** *MCN MicroCAD News* now has a new name: *DESIGNNET*.

Another DataCAD Newsletter?

Welcome *D/PA News* !

3-D WORLD is pleased to announce that *D/PA News*, a new newsletter dedicated to DataCAD^(R), joins *Reference Point* and *Cheap Tricks*. "*D/PA News* addresses advanced DataCAD users," said John Fornaro of DESIGN/PROGRAM Associates, publisher of *D/PA News*. "We're here for experienced DataCAD users who want to go even further. However, *D/PA News* will not substitute for *Reference Point* or for *Cheap Tricks*."

For information about subscribing to *D/PA News*, contact John Fornaro, DESIGN/PROGRAM Associates, Route 1, Box 114-C, Afton, VA 22920. Telephone: (703) 456-8686.

Cadkey, Inc. distributes *Reference Point* to all DataCAD customers who have up-to-date maintenance agreements. For information about DataCAD Maintenance, contact Dawn Wynkoop at Cadkey, Inc. Tel.: (203)

298-6413. Fax: (203) 298-6401.

Cheap Tricks, published by Shu Associates is available by subscription. For information about subscribing to *Cheap Tricks*, or about *Cheapware* (an associated shareware service), contact Evan Shu, Shu Associates, 10 Thacher Street, Suite 114, Boston, MA 02113. Telephone and Fax: (617) 367-9622.

Structural Sections

(Continued from page 25)

new view; (3) new sizes on a parallel plane or normal to the existing plane, and (4) new sizes using a new view, and (5) rotations, if required, about the defined line-of-sight view.

For additional information about STRUCTURAL SECTIONS for CADKEY, and for information about customized versions for proprietary or non-standard extrusions, contact Imagineering CADD Services, 28 Augusta Court, Thornhill, Ontario L3T 7K7 Canada. Telephone: (416) 347-5530. Fax: (416) 771-9238.







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



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For more information, contact your authorized CADKEY/ DRAFT-PAK dealer.

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THIRD-PARTY NEWS

CADView Opens New Windows for CADKEY Users

CADView™ offers a modular set of application programs for viewing, printing, and plotting CADKEY™ part and pattern files in the Microsoft® Windows™ environment. Developed by Unitec, Inc. of Rocky Hill, Connecticut, CADView also provides utilities for exchanging CAD vector data with other Windows-based word-processing, desktop-publishing, spread-sheet, and paint applications. "Previously, CAD data could only be used by trained operators of CAD systems," said Martin Loschiavo, President of Unitec. "Now anyone can use CAD data ... engineering supervisors, technical writers and illustrators, quality engineers, shop-floor supervisors, machinists, maintenance technicians, field-service agents, manufacturers reps and sales people ... anyone."

CADView provides true three-dimensional viewing of CADKEY part files and pattern files, with panning, zooming and view-changing features. In addition to the standard orthographic and axonometric views, the user can select other views from a scrolling list. The user also has full control over the data that is displayed on each level of the drawing. He/she can remove geometric data from the display without modifying any of the data in the file itself. This feature is especially useful for focusing attention on particular aspects of a drawing. CADView's query feature allows users to check the dimensions and properties of every element in the CAD design.

CADView features Hyperlinks™-based on-line help, to reduce the need to use the printed manual, and *hot-key interaction* (combinations of the CTRL and ALT keys with other keys) to increase CADView's performance. "These features make CADView ideal for the shop floor or for traveling with a laptop," Marty Loschiavo said, "because a manual is frequently inconvenient in these situations."

CADView supports printing and plotting on any Epson™, Postscript™, HPCL, and HPGL 100%-compatible printers and plotters. CADView exports

(Continued on page 16)

Training Schedule at Cadkey, Inc.

We have Training dates scheduled through May 1992. Please call (203) 298-6453 for information and registration.

| Course | Feb. | Mar. | Apr. | May |
|-----------------------------|-------|-------|----------|-------|
| Introduction to CADKEY | 17-19 | | 13-15 | 4-6 |
| Introduction to DataCAD | | 23-25 | | 11-13 |
| Advanced Geometric Modeling | 20-21 | 5-6 | 16-17 | |
| CADKEY SOLIDS | 24-25 | | 30-May 1 | |
| Introduction to CADL | | | 27-28 | |
| CUTTING EDGE | | | 8-10 | 18-20 |

Note About CADKEY/DataCAD Training Centers

The number of CADKEY and DataCAD Authorized Training Centers has increased so significantly that the format which 3-D WORLD has used for the last three years to report about ATC programs no longer appears to be adequate to provide the information needed by our customers. We shall continue to provide information about training centers, but the format will probably be different.

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 Windsor, CT. The following is a list of who is doing what, where, and when:

| State | CTC | Location/Contact | Course | Dates |
|--------|-----------------------------------|---|---|---|
| Ark. | Arkansas State University | State University, AR Charles Coleman office: (501) 972-2088 | <i>Intro. to CADKEY</i> | Feb., Mar. every Fri. and Sat. 8 a.m. to 3 p.m. |
| Calif. | Consulting Services International | 14621 Titus St. Van Nuys, CA Bob Messamer (818) 994-8881 | <i>Intro. to CADKEY</i> <i>Advanced CADKEY</i> | 3rd full week of each month. Scheduled on request. |
| | Desktop Productions | 18200 Yorba Linda Bd. Yorba Linda, CA Carol Buehrens (714) 579-3066 | <i>DataCAD for the Architect</i> (Mon./Wed., Tues./Thur., & Wed./Fri.) | Mar. 2-11 Mar. 10-19 Mar. 24-Apr. 9 Apr. 14-23 Apr. 15-24 Apr. 28-May 7 May 12-21 |
| | | | <i>DC Modeler</i> | Mar. 18, 30 Apr. 13, May 6 May 29 |
| | | | <i>Advanced DataCAD</i> <i>PageMaker & DataCAD</i> | Mar. 3, Apr. 6 May 15, Jun. 1 Mar. 20, Apr. 20 May 22 |
| | Evergreen Valley College | 3095 Yorba Buena Rd. San Jose, CA Loren Fromm (408) 274-7900 | <i>Intro. to CADKEY</i> <i>3-D Design w/ CADKEY</i> | Apr. 13-15 Jun. 15-17 Apr. 16-17 Jun. 18-19 |
| | Golden West College | 15744 Golden West St. Huntington Beach, CA Jack North (714) 895-8209 | <i>Intro. to CADKEY</i> | Mar. 6-8 |
| | Nikken Design Systems | 2116 Arlington Av. #209 Los Angeles, CA Roy Yoshino (213) 734-9433 | <i>Intro. to DataCAD</i> <i>Advanced DataCAD</i> <i>DC Modeler</i> | Scheduled on request. |

Third-Party News: Graphic Driver

Vibrant Graphics, Ltd. now offers a protected-mode, anti-aliasing, graphic driver to use with CADKEY™ 386 Version 4. It supports 8514, S3, TIGA 1.0/2.0 and VGA/ SuperVGA graphic boards. For more information contact Vibrant Graphics, Ltd., 12741 Research Blvd., Austin, TX 78759. Tel.: (512) 250-1711. Fax: (512) 250-5811.

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

CADView

(Continued from page 15)

| State | CTC | Location | Course | Dates | | |
|--------|------------------------------------|--|-------------------------------|---|-----------------------------------|---|
| Calif. | Poelman's Design Service | 42 W. Campbell Av. Suite 201 Campbell, CA Mike Poelman (408) 378-9980 | <i>Using CADKEY in Design</i> | Feb. 18-20 May 25-27 Aug. 24-26 | | |
| | | | <i>CADKEY Basics</i> | Mar. 23-25 Jun. 22-24 | | |
| | | | <i>Basic 3-D Geometry</i> | Apr. 27-29 Jul. 27-29 | | |
| | Ukiah High School | 1000 Low Gap Rd. Ukiah, CA Jim Howlett (707) 463-5253, x284 | <i>Intro. to CADKEY</i> | 1st weekend of every month. | | |
| Colo. | University of Colorado at Denver | 1200 Larimer St. Denver, CO Andreas Vlahinos (303) 556-2370 | <i>Intro. to CADKEY</i> | Call for schedule. | | |
| | | | <i>Advanced CADKEY</i> | <i>CADKEY SURFACES</i> | | |
| | | | <i>CADKEY</i> | <i>CADKEY</i> | | |
| | | | <i>SOLIDS</i> | <i>and FEA</i> | | |
| Conn. | DATAMAT Programming Systems | 9 Mott Avenue Norwalk, CT Matt Reuben (203) 855-8102 | <i>Intro. to CADKEY</i> | Feb. 24-28 Apr. 20-24 Jun. 1-5 | | |
| | | | University of Hartford | S.I. Ward Coll. of Tech. 200 Bloomfield Av. W. Hartford, CT Don De Bonee (203) 243-4763 | <i>Intro. to CADKEY</i> | May 19 - Jul. 2 Tues. & Thurs. 5:00-8:15 p.m. |
| | | | | | Waterbury State Technical College | 750 Chase Parkway Waterbury, CT Stephen M. Colwell (203) 575-8220 |
| Fla. | Indian River Community College | 3209 Virginia Av. Fort Pierce, FL Bill Sigurdson Dean Zirwas (407) 468-4700, x4269 | <i>Intro. to CADKEY</i> | Mar. 5 - Apr. 29 Thurs. eve. 5:30-10:30 p.m. | | |
| | | | <i>Intro. to DataCAD</i> | Jan. 7 - Apr. 29 Tues. & Thurs. 2:30-4:30 p.m. | | |
| Idaho | Ricks College | Revburg, ID Melvin F. Eckman (208) 356-1874 | <i>Intro. to CADKEY</i> | Call for schedule. | | |
| | | | <i>Advanced CADKEY</i> | Call for schedule. | | |
| Ill. | PFB Concepts a.k.a. CADPRO Chicago | 2525 E. Oakton Av. Arlington Heights, IL Bob Konczal (708) 640-1853 | <i>Intro. to CADKEY</i> | Mar. 11-13 | | |
| | | | <i>Advanced CADKEY</i> | Apr. 8-10, 22-24 | | |
| | | | <i>CADKEY</i> | Mar. 25-27 | | |
| | | | <i>CADKEY</i> | Apr. 15-17 | | |
| | | | <i>SOLIDS</i> | Mar. 5-6 | | |
| | | | <i>CADKEY</i> | Apr. 30-May 1 | | |
| | | | <i>Light CADL</i> | Feb. 11 Apr. 29 | | |
| | | | <i>(Weekends)</i> | Mar. 21-22 | | |
| | | | <i>PageMaker & CADKEY</i> | May 23-24 Apr. 2-3 Jun. 11-12 | | |

graphical data through Microsoft Windows' Meta-file format and Clipboard for *cutting and pasting* into files in word-processing, desktop-publishing, spread-sheet and paint programs.

CADView currently operates in the Microsoft® Windows™ environment. DOS and UNIX versions will be available later in the first quarter of 1992.

A working model of CADView, free of charge, is available upon request.

For additional information about CADView, contact Unitec, Inc., 30 Inwood Drive, Rocky Hill, CT 06067. Telephone: (203) 529-2443. Fax: (203) 563-9220.

THIRD-PARTY NEWS

KeyView and DMS Pro — New Viewing and Drawing Management Utilities for CADKEY Users

KeyView™ provides a quick viewing utility for CADKEY™ part files, and DMS Pro™ offers a complete drawing management system for CADKEY users. Both products, developed by THE van der ROEST GROUP, Inc. of Santa Ana, California, operate in stand-alone or in networked environments.

KeyView

KeyView allows users to view, analyze, and print CADKEY part files either from within CADKEY, or without having to load CADKEY. According to Martin van der Roest, President of THE van der ROEST GROUP, KeyView's user interface has been designed for all kinds of users. "CADKEY users will find the keystrokes and graphics similar to CADKEY," Martin said. "Novices and non-CAD users will find KeyView's graphical user interface easy to use in accessing, viewing, or printing a drawing." KeyView loads and displays a typical 300KB part file within 3 to 5 seconds operating on a 386/33 computer.

KeyView works either from within CADKEY or as a stand-alone product. A designer working in CADKEY can

quickly view another part file with KeyView, without having to exit the design session in which he/she is working. KeyView as a stand-alone product allows other design and manufacturing professionals, for example, people on the shop floor, to view a drawing without any danger of accidentally modifying the part file.

Multiple viewports allow users to choose among eight standard views, while pan and zoom functions allow them to control the angle best suited for viewing the drawing. The ability to switch on and off the displayed levels of the part file and the groups of entities in the file displayed on each level, enables users to review complex drawings and focus their attention on particular aspects of a drawing. KeyView's *quick print* feature provides output to most laser or dot-matrix printers.

KeyView also includes several utilities, such as copy, move, and rename, to assist in managing files. If more extensive file management capabilities are needed, KeyView integrates fully with DMS Pro.

KeyView currently operates in the DOS environment, in single-user or networked configurations. A UNIX version of KeyView will be available later this year.

DMS Pro

DMS Pro is a complete drawing and document management system which supports the access, management and control of CADKEY drawings and their related documents. DMS Pro automatically tracks all activities involving CAD and non-CAD files. This includes such things as time spent on drawings, revision and completion status, project association, reference files, and title block updates. Users can customize DMS Pro to suit their own needs. For example, file names and description fields can be of unlimited length. DMS Pro accepts input files from other software applications, such as word processing, spread sheets, and databases. DMS Pro also includes utilities to generate standard or customized reports.

DMS Pro provides capabilities for multiple levels of security in project planning and work-flow planning. "DMS Pro instills the idea of a *work*

(Continued on page 18)

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

| State | CTC | Location | Course | Dates |
|-----------------------------------|--|---|--|--|
| Ill. | Triton College | 2000 Fifth Av. River Gorge, IL | <i>Intro. to CADKEY</i> | Feb. 20-Mar. 26 (Thu. 1-5 p.m.) |
| | Employee Dev. Inst. | Peggy Hosty (708) 456-0300, x539 | | |
| Ind. | Tekni | 4011 South Wayne Av. Fort Wayne, IN | <i>Intro. to DataCAD</i> | Scheduled on request. |
| | | Dennis Jeffrey (219) 744-3575 | <i>DCAL</i> | |
| | | | <i>Intro. to CADKEY</i> <i>CADL</i> | On-site courses available. |
| Iowa | Iowa Lakes Community College | 300 South 18th St. Estherville, IA Roger Patocka (712) 362-2604 | <i>Intro. to CADKEY</i> | Special schedules by request. |
| Mass. | Computer-Aided Products | 3 Sewall St. Marblehead, MA | <i>Intro. to CADKEY</i> | Feb. 12-14 Mar. 4-6 |
| | | Julie Carignan (617) 631-9662 | <i>Adv. Geo. Modeling</i> | Feb. 20-21 Mar. 19-20 |
| | | | | |
| Mich. | Future Solutions | 2200 N. Canton Center Canton, MI Paul Zwarka (313) 981-7455 FAX: (313) 981-7473 | <i>Intro. to CADKEY</i> | Mar. 17-19 Apr. 14-16 May 12-14 |
| | | | <i>Adv. Geo. Modeling</i> | Mar. 2-3, 30-31 Apr. 27-28 |
| | | | | |
| Minn. | Albert Lea Technical College | 2200 Tech Dr. Albert Lea, MN Larry Gilderhus (507) 373-0656 | <i>Intro. to CADKEY</i> <i>Advanced CADKEY</i> | Scheduled on request. |
| | | | | |
| | Anoka Ramsey Community College | 11 200 Mississippi Blvd. Coon Rapids, MN Tom Loftus (612) 427-2600 | <i>Intro. to CADKEY</i> <i>Intermed. CADKEY & DRAFT-PAK</i> | Call for schedule. Mar. 23-25 |
| | | (Customized classes at ATC or on site scheduled on request.) | <i>Adv. Geo. Modeling</i> | Feb. 27, Mar. 3, 5 |
| | | | | |
| | Moorhead State University | Industrial Studies Dept. Moorhead, MN Wade Swenson (218) 236-2466 | <i>Intro. to CADKEY</i> | On-site courses available. |
| | | | | |
| Northwest Metro Technical College | 3300 Century Av. North White Bear Lake, MN Jeff Jahnke (612) 770-2351, x323 | <i>Professional CADKEY</i> | Call for schedule. | |
| | | <i>Advanced CADKEY</i> | | |
| St. Paul Technical Institute | 235 Marshall Ave. St. Paul, MN Michael Haffner (612) 221-1307 | <i>Intro. to CADKEY</i> | Call for schedule. | |
| | | | | |
| Miss. | Mississippi Delta Community College | Highway 3, Box 668 Moorhead, MS Tony Honeycutt (601) 246-5631, ext.103 | <i>Intro. to CADKEY</i> | Call for dates in May. |
| Mont. | Montana School of Min. Sci. & Technology | West Park St. Butte, MT Dick Johnson (406) 496-4452 | <i>Intro. to CADKEY</i> <i>Advanced CADKEY</i> | Mar. 16-18 May 18-20 Scheduled on request. |
| | | | | |
| | | | | |

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

| State | CTC | Location | Course | Dates |
|-------|--|--|---|---|
| N.C. | Entré Computer Center | 110 Charlotte Plaza Charlotte, NC John Murphy (704)332-1557 | <i>DataCAD I</i> <i>DataCAD II</i> <i>DC Modeler</i> | Scheduled on request. |
| N.H. | Portsmouth Senior High School | Alumni Drive Portsmouth, NH Kenneth Webber (603)436-7100 | <i>Intro. to</i> <i>CADKEY</i> | Call for schedule. |
| N.J. | Advanced Micro Systems | 511 River Drive Elmwood Park, NJ Pat Neary (201)703-0404 | <i>Intro. to</i> <i>DataCAD</i> | Call for schedule. |
| | Glassboro State College | Dept. of Technology Glassboro, NJ Michael Guerard (609)863-6203 (work) (609)468-3087 (home) | <i>Using</i> <i>CADKEY</i> <i>to Solve</i> <i>Special</i> <i>Problems</i> | Call for schedule. |
| N.M. | New Mexico State University | Department 3450 P.O. Box 30001 Las Cruces, NM Maurice Hamilton (505)646-3501 | <i>Intro. to</i> <i>CADKEY</i> | Mar. 9-13 May 11-15 May 18-22 |
| | American Training Center, Inc. | 118-21 Queens Blvd. Forest Hills, NY Arkady Kleyner (718)544-8100 (800)273-ATCI (N.Y. only) | <i>Intro. to</i> <i>CADKEY</i> <i>Advanced</i> <i>CADKEY</i> <i>Intro. to</i> <i>DataCAD</i> <i>Advanced</i> <i>DataCAD</i> <i>CADKEY</i> <i>ANALYSIS</i> <i>CUTTING</i> <i>EDGE</i> | Mar. 2-4 Apr. 6-8 May 4-6 Mar. 5-6 Apr. 9-10 May 7-8 Mar. 9-11 Apr. 13-15 May 11-13 Mar. 12-13 Apr. 16-17 May 14-15 Mar. 20 Apr. 22 May 22 Mar. 16-17 Apr. 20-21 May 18-19 |
| | Broome Community College | Upper Front St. Binghamton, NY Karen K. Madsen (607)771-5000, x5012 | <i>Intro. to</i> <i>CADKEY</i> | Mar. 13, 20, 27 (8 a.m.-5 p.m.) Mar. 17, 18, 24, 25, 30, Apr. 1 (6-10 p.m.) May 1-3 (Wknd) (8 a.m.-5 p.m.) |
| | Central Technical Vocational Center | 258 East Adams St. Syracuse, NY Dick Harroun (315)435-4150 | <i>Intro. to</i> <i>CADKEY</i> <i>Intermed.</i> <i>CADKEY</i> | Call for schedule. Feb. 3-Mar. 16 (M.,W. 3:30-6:30) |
| | Rochester Institute of Technology | 1 Lomb Memorial Dr. Rochester, NY Dr. Robert Hefner (716)475-2205 | <i>Intro. to</i> <i>CADKEY</i> <i>Advanced</i> <i>CADKEY</i> | Call for schedule. |

Variety of College Entrants Sparks Irwin Drawing Contest ! The response to this contest was so enthusiastic that Irwin Publishing will sponsor a second contest in Spring 1992. College instructors can contact Kelley Butcher for detailed information. Telephone: (800) 522-2661 or (617) 451-1090. Fax: (617) 451-2437. Look for the story in the next issue of **3-D WORLD**.

KEYView and DMSPro

(Continued from page 17)

group in your CAD environment," said Martin van der Roest.

DMS Pro currently operates in the DOS, OS/2 and Microsoft[®] Windows[™] environments. DMS Pro also operates on all major networks, and it provides linkages into database servers.

For additional information about KeyView or DMS Pro, contact THE van der ROEST GROUP, Inc., 1535 East 17th Street, Suite N, Santa Ana, CA 92701. Telephone: (714) 542-2201. Fax: (714) 543-4931.

THIRD-PARTY NEWS

EuroBOM Makes Integrated Parts List and Drawing Management System Available for CADKEY 4

"Today, medium-sized mechanical-engineering companies produce 1,000 to 2,000 drawings every year," said Thomas Berkmann, President of AGS Advanced Graphics Software GmbH, Leonberg, Germany. "The range of drawings extends from a simple metal part, such as a workshop drawing, through machine parts, to complete systems. The management of this mass of data creates a whole series of problems, but it also opens up opportunities for rationalization and reducing costs. Furthermore, the increased use of CAD systems, both stand-alone and especially in networks with central data storage, has made management of the drawing data more critical. EuroBOM[™], developed by INTESO AG of Flamatt, Switzerland, and distributed by AGS Advanced Graphics Software, is a data management system developed by CADKEY[™] users for CADKEY users, and it is available in stand-alone and network versions, in German, English, and French."

"The use of CAD is only effective and viable if designers can use existing drawings and their associated data in different ways," said Martin Trostel, Co-President of Advanced Graphic Software. "Instead of making the same drawing twice, use the drawings of

existing parts and constructions repeatedly. Similar parts can be redesigned, while exact copies can be reused."

With EuroBOM the user can quickly, and without difficulty, locate the correct drawing of a particular part or assembly from a large number of drawings, by using text-oriented drawing-specific data, such as:

- drawing number, designation, file name, modification index,
 - draftsman, date, job/project, source, replacement, modification index,
 - date/time, CAD/PPS transfer (the transfer of bill-of-materials and manufacturing-requirements data from CAD drawings into computerized product planning systems),
- or by using the basic parts list information, for instance, article, quantity, article numbers, item numbers.

EuroBOM also provides the user with a special DIA function for storing CADKEY drawings in a reduced-image format that allows designers to scroll through the drawing database graphically, without loading any part files. The designer identifies the part file by its drawing image. At the same time, EuroBOM features a self-updating library which automatically includes all entries made into any files. EuroBOM also maintains and safeguards the design data automatically.

A fully functional demonstration model of EuroBOM is available.

For additional information, contact AGS Advanced Graphics Software GmbH, Mollenbachstrasse 37, D-7250 Leonberg, Germany. Telephone: (inside Germany) 07152-42081; (from outside of Germany) 49-7152-42081. Fax: (inside Germany) 07152-74166; (from outside of Germany) 49-7152-74166.

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

| State | CTC | Location | Course | Dates |
|----------------------|---|--|---------------------------------------|---|
| Ohio | Owens Technical College | P.O. Box 1000 Oregon Road Toledo, OH Marty Weislak (419)666-0580, x454 | <i>Intro. to CADKEY</i> | Apr. 17-18 Apr. 24-25 (Fri. eve. and Sat. all day.) |
| | Progressive Computing Corp., Inc. | 6964 Spinach Dr. Mentor, OH Jean Kempton (216)255-0460 (800)473-0460 | <i>Intro. to CADKEY</i> | Mar. 3-4 Apr. 7-8 May 5-6 |
| | | | <i>Advanced CADKEY</i> | Mar. 10-11 Apr. 14-15 May 12-13 |
| <i>CADKEY SOLIDS</i> | | | Mar. 17-18 Apr. 21-22 May 19-20 | |
| Okla. | Oklahoma State University | 301 Cordell South Stillwater, OK Gerald McClain (405)744-5709 | <i>Intro. to CADKEY</i> | Jun. 17 |
| | | | <i>Intermed. CADKEY</i> | Mar. 9-10 Jun. 18-19 |
| | | | <i>Advanced CADKEY</i> | Mar. 11-13 Jul. 15-17 |
| Ore. | CTR Business Systems | 6420 SW Macadam Av. Portland, OR Sandi McNeil (503)293-8627 | <i>Intro. to CADKEY</i> | Courses offered every month. Call for schedule. |
| | | | <i>Advanced CADKEY</i> | |
| | Mount Hood Community College | 26000 SE Stark Gresham, OR Michael Durrer (503)667-7294 (503)667-7470 | <i>Intro. to CADKEY</i> | Call for schedule. Feb. 17-Mar. 18 (M. & W. eve.) |
| | | | <i>Advanced CADKEY</i> | |
| | Rogue Community College | 3345 Redwood Highway Grants Pass OR Del Harris (503)479-5541 | <i>Advanced CADKEY</i> | Mar. 30-Jun 8 (semester) Mar. 30-Jun. 8 (semester) |
| | | | <i>DataCAD</i> | |
| Pa. | Butler County Community College | College Drive/Oak Hill Butler, PA Mike Aikens (412)287-8711 | <i>Intro. to DataCAD</i> | Mar. 25-27 |
| | | | <i>Intro. to CADKEY</i> | May 20-22 |
| | | | <i>Adv. Geo. Modeling</i> | Jul. 30-31 |
| Computer-Land | Edinboro University of Pennsylvania | 1360 Harrisburg Pike Lancaster, PA Lori Fraser (717)291-2111 (814)732-2000 | <i>Intro. to DataCAD</i> | Scheduled on request, on site or in house. |
| | | | <i>Advanced DataCAD</i> | |
| | | | <i>Intro. to CADKEY</i> | |
| Lafayette College | Easton, PA Rebecca Rosenbauer (215)250-5000 | <i>Intro. to CADKEY</i> | Call for dates in Spring. | |

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

| State | CTC | Location/Contact | Course | Dates |
|-------|--|---|---|--|
| Pa. | Micro Control Inc. | 390 Middletown Blvd. Langhorne, PA. Marion Homan (215) 752-5510 | <i>Intro. to CADKEY</i> | Feb. 18-21 Mar. 17-30 Apr. 13-16 |
| | | | <i>Advanced CADKEY</i> | Feb. 26-28 Apr. 22-24 Mar. 11-13 |
| | Wilkes University | 150-180 S. River St. Wilkes-Barre, PA Dr. Cliff Mirman (717) 824-4651, x4810 | <i>Intro. to CADKEY</i> | Mar. 19-21 |
| S. D. | Northern State University | Industrial Technology Box 705 Aberdeen, SD Jerry Sauer (605) 622-2571 | <i>Intro. to CADKEY</i> <i>Intro. to DataCAD</i> | Continuous courses: 2-wk/M.-F./day 4-wk/M.,W.,Th./evening. |
| Tenn. | Southern College of Seventh Day Adventists | Computer Sci. & Tech. Box 370 Collegedale, TN John Durichel (615) 238-2862 | <i>Intro. to CADKEY</i> <i>Intermed. CADKEY</i> <i>Intro. to DataCAD</i> | Call for schedule. |
| Texas | AEC Software | 2200 North Lamar Dallas, TX David Demarest (214) 720-0270 | <i>Intro. to DataCAD</i> <i>Advanced DataCAD</i> | Scheduled on request. |
| | | | <i>Intro. to CADKEY</i> | Mar. 10-12 D Mar. 17-19 A Apr. 7-9 D Apr. 14-16 A May 5-7 H May 12-14 A Mar. 17-18 A Apr. 21-22 A May 19-20 A On request. |
| | MLC CAD Systems | 5316 Highway 290 West Austin, TX Barbara Leesley (512) 892-6311 A = Austin D = Dallas H = Houston | <i>Intro. to CADKEY</i> <i>Advanced CADKEY</i> <i>CADL</i> | |
| | | | | |
| Utah | Utah Valley Community College | 800 West 1200 South Orem, UT Rux Plott (801) 226-5000 | <i>Intro. to CADKEY</i> <i>Advanced CADKEY</i> | Call for schedule. |
| Wash. | Everett Community College | 801 Wetmore Av. Everett, WA Stu Barger Flo McIntyre (206) 388-9429 | <i>Intro. to CADKEY</i> <i>Advanced CADKEY</i> | Apr. 21-23 May 19-20 |
| | | Walla Walla College | School of Engineering College Place, WA Robert Noel (509) 527-2766 (Engr.) (509) 527-2712 (Tech.) | <i>Intro. to CADKEY</i> |
| Wis. | Apple River CAD/CAM Academy | 206 West Fourth St. Star Prairie, WI Bruce Nelson (715) 248-3222 | <i>Intro. to CADKEY</i> <i>Advanced CADKEY</i> <i>CADKEY SOLIDS</i> | Scheduled on request. |

Continued on page 22)

THIRD-PARTY NEWS

Process-Planning and Cost-Estimating Program Outputs CUTTING EDGE Tool List

MSR, Inc.'s *dPACE*™ Version 3.1 combines operator input with information previously defined by the user in Material, Workcenter, Labor Standard, and Tooling databases to produce standard or customized data files and reports, such as Process Plans, Cost Estimates, Shop Work Orders, CUTTING EDGE™ Tool Lists, and Quote Letters. MSR is an acronym for Manufacturing Research Systems, located in Ottawa, Ontario, Canada.

"One strength of our system," said Alice Bunt, Managing Director/C.E.O. of MSR Inc., "is that we provide a CAM interface to transfer data from the Process Plan and Cost Estimate to the CAM programmer. We specifically support Cadkey's CUTTING EDGE."

"We intend to integrate *dPACE* into CADKEY® and CUTTING EDGE through the CADKEY™ Dynamic Extensions™," Alice added. "We have already begun the first phase of CDE development for *dPACE*. *dPACE* will get part dimensions directly from the CAD/CAM database. This will be a major step toward true computer-integrated manufacturing (CIM) because the CAD database will be the central database for Sales, Estimating, Purchasing, Manufacturing, Shipping, and Accounting functions."

dPACE automatically transforms pocket, contour, drill-depth, and pattern information into tool-path distances and time requirements. *dPACE* uses workcenter cost information to generate the cost estimate. The tooling list, created in the process-planning and estimating functions, can also be transferred as a CUTTING EDGE tool list. "This reduces duplication of effort," said Stewart Melvin, Systems Engineer at MSR. "It also makes sure that manufacturing people knows the methods used for estimating costs."

dPACE features an open-system architecture, and allows access to its database through dBASE III™, dBASE IV™, and R&R Relational Report Writer™. *dPACE* comes fully docu-

(Continued on page 22)

DRIVING PROGRAMS HAS NEVER BEEN EASIER!

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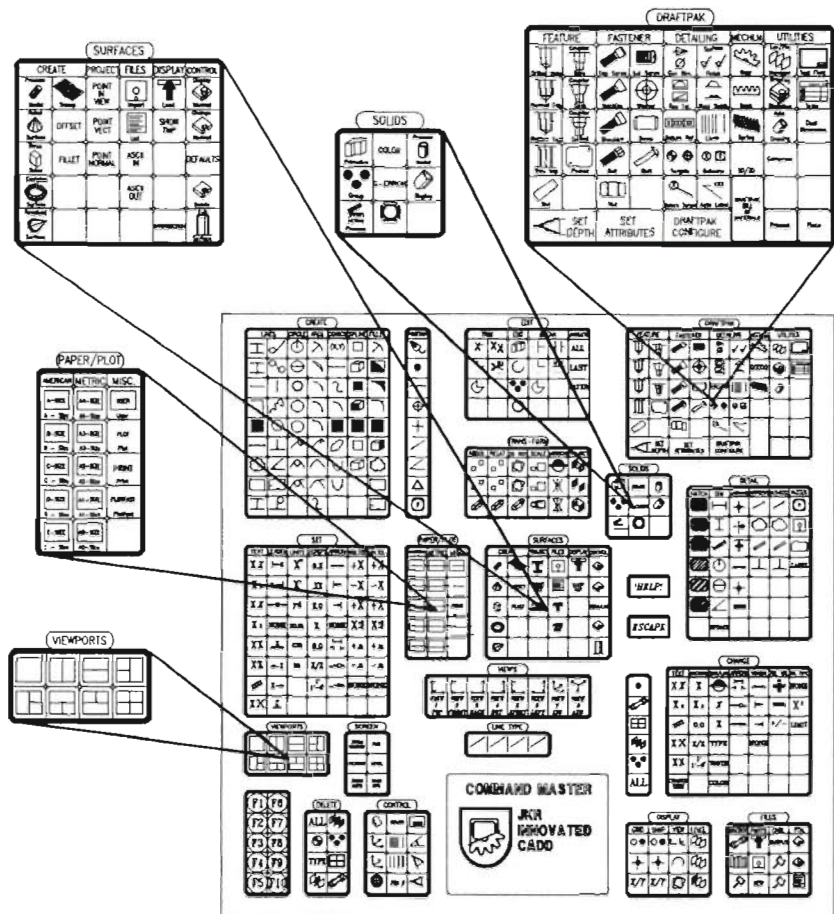
- Tablet technology has entered the era of efficient drawing production. Memorizing keyboard commands and complex menu structures is no longer the preferred means for operating today's software.
- With COMMAND MASTER™, access to CADKEY®, SOLIDS™, SURFACES™, and Baystate Technologies' DRAFT-PAK™ and BOM is as easy as PICK, CLICK, DONE.
- COMMAND MASTER™ tablet overlays are ergonomically designed to maximize design and drafting productivity.
- All commands are color coded and grouped by function for ease of use.
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CANADA P0M 1N0



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

| State | CTC | Location/Contact | Course | Dates |
|----------------------------|---|---|--|---|
| Wis. | CAD PROfessionals Inc. | 120 Bishops Way, #136 Brookfield, WI | <i>Intro. to CADKEY</i> | 2nd & 4th Tue. every month. |
| | | Dan Warsh (414) 782-9199 | <i>Intro. to DataCAD CADKEY SOLIDS</i> | <i>CADKEY SURFACES CADKEY RENDER</i> |
| | Milwaukee School of Engineering | 1025 N. Milwaukee St. Milwaukee, WI | <i>Intro. to CADKEY</i> | Mar. 4-6 May 27-29 |
| | | Marvin Bollman (414) 277-7357 | Additional classes available on request. | |
| Wyo. | North Central Technical College | 1000 Campus Dr. Wausau, WI | <i>Intro. to CADKEY</i> | Courses scheduled on request. |
| | | Michael Clark (715) 675-3331 | | |
| | University of Wyoming | Dept. of Civil Engr. 3085 Engineering Bldg. Laramie, WY | <i>Intro. to CADKEY</i> | May 13-15 Jul. 29-31 Aug. 26-28 |
| | | Donald Polson (307) 766-6450 | | |
| CANADA | | | | |
| Prov. | CTC | Location/Contact | Course | Dates |
| British Colum- bia | Pacific Marine Training Institute | 265 West Esplanade North Vancouver, B.C. | <i>Intro. to CADKEY</i> | Courses scheduled on request. |
| | | Mike Davison (604) 985-0622 | | |
| New Brun- swick | New Brunswick Community College | P.O. Box 2100, Sta. A CAD/CAM Dept. 1234 Mountain Rd. Moncton, N.B. | <i>Intro. to CADKEY</i> | Scheduled on request. On-site courses available. |
| | | Wayne Ritchie (506) 856-2169 | | |
| New- found- land | Memorial University | St. John's, NFLD David Press (709) 737-7925 Yvonne Raymond (709) 737-7467 | <i>Advanced CADKEY</i> | Course scheduled for late April or May. Call for specific dates. |
| | | | | |
| Ontario | Algonquin College | 200 Lees Av. Ottawa, Ontario | <i>Intro. to CADKEY</i> | Call for schedule of Spring courses. |
| | | Peter Casey (613) 594-3888, x5904 | <i>Advanced CADKEY CADL & Sys. Customizing</i> | |
| | JB Marketing Associates | 82 Spruceside Cresc. Fonthill, Ontario | <i>DataCAD I DataCAD II</i> | Scheduled on request. |
| | | John Bradford (416) 892-8025 | | |
| | Klear Concept Data | 465 Rogers St. Peterborough, Ontario | <i>Intro to CADKEY</i> | Customized training scheduled on request. |
| Naylor- McLeod Group | 1425 Bishop St. Unit 8 and 9 Cambridge, Ontario | <i>Intro. to CADKEY</i> | Customized training scheduled on request. | |
| | | Brian Naylor (519) 622-4495 | <i>CADKEY CADL</i> | |

(Continued on page 24)

Process-Planning Program

(Continued from page 20)

mented, with a step-by-step tutorial for easy learning. On-line help, which follows the content of the 200-page manual, is available with a single keystroke. *dPACE* Version 3.1 runs on IBM PC/XT/AT/PS2 and compatible computers which have at least 640 kilobytes of random-access memory. DOS version 3.1 or later, and 5 megabytes of hard disk space available.

For additional information about *dPACE*, contact Manufacturing Systems Research (MSR), Inc., 1386 Manotick Station Road, Ottawa, Ontario K4M 1B2, Canada. Telephone: (613) 821-3632. Fax: (613) 821-3054.

Editor's Note: dBASE III and dBASE IV are trademarks of Borland International, Scotts Valley, California. R&R Relational Report Writer is a trademark of Concentric Data Systems, Inc., Westborough, Massachusetts.

THIRD-PARTY NEWS

FindWare, LookWare, ViewWare: Utilities for Drawing Management!

Software Ventures, Inc. of Kalamazoo, Michigan, presents three, related, third-party software products for managing drawing files: FindWare™, LookWare™, and ViewWare™. FindWare, LookWare, and ViewWare work as individual programs, and they also work with CADKEY Overlay™. (See **CADKEY Overlay and Draftsman Available Now!, 3-D WORLD**, July/August 1991, page 19.) "View Ware, LookWare and ViewWare, as products, are similar to a set of Russian dolls, one completely enclosing the other," said Frank Lucatelli, President of Software Ventures. "View Ware is the complete product. It includes LookWare and FindWare. LookWare is a CADKEY-specific product which includes FindWare. FindWare is the database."

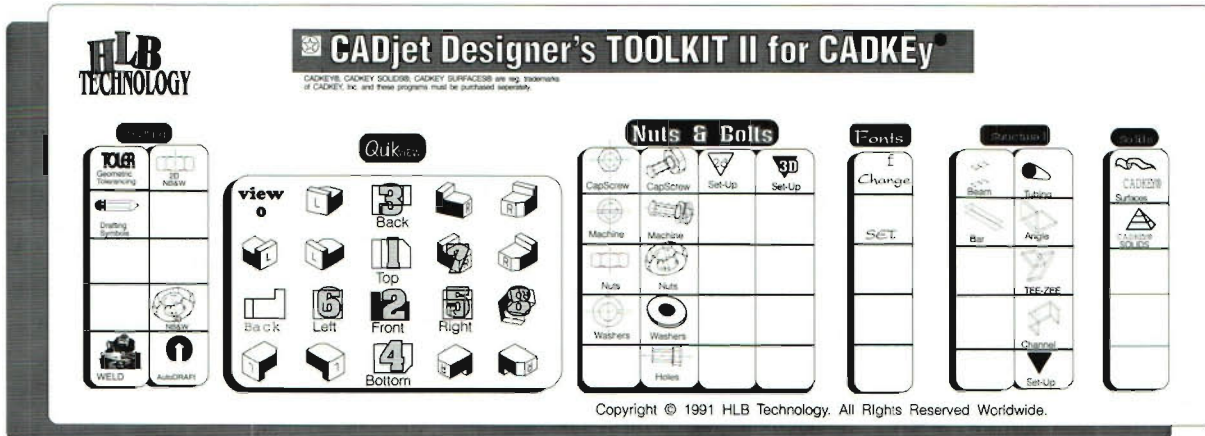
FindWare

FindWare is generic software for locating CADD files and raster images of paper drawings. It works with CADKEY and DataCAD files, as well as

(Continued on page 24)

Trade In Your and, get a

Now, a complete drafting packakage for CADKEY® that's as fast and efficient as you are!



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- Gives 12 more views than CADKEY
- Pop-up View Selection
- Easy, intuitive
- Saves time and effort



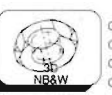
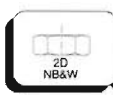
- Datums, Slope, Depth, Countersink, more
- Includes ANSI Surface Finish Symbols
- Full ANSI and IGES compatibility
- Easy to use graphical 'pop-up' interface



- 2 High Quality Plotter Fonts
- CADKEY Font Manager Program
- Symbol Library with each Font
- Loads directly into CADKEY



- Convert 3D Wireframes into 2D Drawing Layouts
- Select your Borders and Views
- Saves time and effort
- Incredibly easy to use - drag boxes, on-the-fly scaling



- Full 2D & 3D capabilities
- Fully Parametric
- Full IGES compatibility
- Saves time and effort



- Architectural and Structural Shapes
- Fully Parametric
- Channels, Beams, TEEs, ZEEs and more
- Saves time and effort



- Full ANSI/AWS A2.4-86 compliance
- Graphical 'Pop-Up' Menus
- IGES Compatible
- Fully Parametric



- Full ANSI Compliance
- Fully Parametric
- Easy to use, pop-up interface
- 'Can't draw a symbol wrong'

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

| Prov. | CTC | Location/Contact | Course | Dates |
|------------------------|---|--|---|--------------------------|
| Ontario | Ryerson Polytechnical Institute, C.A.T.E. | 350 Victoria Street Toronto, Ontario K. Doddridge (416)979-5106 | <i>Intro. to CADKEY</i> | Scheduled on request. |
| | Québec | APPLICAD | 11956 Blvd. Laurentien Montréal, Québec Walid Hadid (514)336-5959 (514)335-4145 | <i>Intro. to CADKEY</i> |
| | | | | Apr. 1-2 |
| | | | | Apr. 14-15 |
| | | | | Apr. 29-30 |
| | | | | May 20-21 |
| <i>Advanced CADKEY</i> | | | | Mar. 18-19 |
| | | | | Apr. 8-9 |
| | Apr. 22-23 | | | |
| | May 6-7 | | | |
| | May 27-28 | | | |
| | <i>Intro. to DataCAD</i> | Mar. 12-13 | | |
| | | May 12-13 | | |
| | | Jul. 14-15 | | |

CADKEY and DataCAD Training Centers that would like dates of scheduled training courses to appear in 3-D WORLD, contact Paul Mailhot, Educational Programs, Cadkey, Inc., 4 Griffin Road North, Windsor, CT 06095-1511. Telephone: (203) 298-6442. FAX: (203) 298-6401.

Colorado State University Correspondence Course in CADKEY Fundamentals

(Versions 1, 1.4, 2.06M, 2.11, and 3.5), Self-paced introduction to CAD. Developed by Terry T. Wohlers and Dr. Paul J. Resetarits. Contact: Division of Continuing Education, Colorado State University, Spruce Hall, Fort Collins, CO 80523. Tel.: (800) 525-4950.

FindWare, LookWare, ViewWare

(Continued from page 22)

files created using other CADD systems. FindWare allows users to select from a database of files and raster images of drawings, to load them rapidly into the appropriate CADD system, and to record key information about CADD files or paper drawings in its database. "We regard FindWare as the first step in the data management of engineering graphics," Frank continued.

FindWare maintains a database of CADD drawings and of raster images of paper drawings by verifying the contents of any directory, adding new drawings from any directory into the database, recording the location of drawings that have been archived (saved and stored off-line).

LookWare

"LookWare is CADKEY-specific software that gives you the ability to forget where you have filed a part file and still retrieve it quickly when you need it," Frank added. LookWare is a superset of FindWare that provides CADKEY users all of the functions of FindWare plus the ability to create a VGA-compatible raster slide file of any CADKEY part file, inside CADKEY, and store it in the associated LookWare database.

FindWare and LookWare work with IBM-compatible XT, AT, 386, and 486 personal computers, using monochrome, Hercules, EGA, and VGA graphic cards.

ViewWare

ViewWare provides viewing and printing capabilities to

anyone who needs graphical information of engineering drawings. This drawing data can be available anywhere in a company's facilities. "It allows you to choose from a select database of CADD files and scanned raster images of archived paper drawings," Frank said.

ViewWare is a superset of both FindWare and LookWare. It includes all of their functions plus the ability to pan and zoom in CADD files and in raster images, to view scanned images, and to view rasterized plot files from a variety of CADD systems. ViewWare accepts the following formats for vector files: PRT, PTN, HPGL, DXF, and DWG. ViewWare also accepts these formats for raster files: TIFF, RLC, PCX, IMG, GP4, and GIF. Red-lining is also available as an option.

ViewWare works with EGA and VGA graphics on the DOS platform.

For additional information about FindWare, LookWare, ViewWare, or CADKEY Overlay, contact Software Ventures, Inc., The Atriums, Suite 1100, 4341 South Westnedge Avenue, Kalamazoo, MI 49008. Telephone: (616) 344-0708. Fax: (616) 381-2965.

Hip-Replacement Surgery

(Continued from page 27)

the .STL file be processed by a *slicing* program that creates contours of the file's triangular polygons on constant Z planes. The slicing program requires that the user define the thickness of the planes or slices that it will produce in its .SLI output file. For this model, the thickness was set at .010 inch. It is the .SLI file that actually controls the laser beam which solidifies the liquid polymer in the StereoLithography Apparatus to manufacture the physical model. Six physical models were produced in 23 hours time.

The client who requested this experiment was very impressed with the physical model's high degree of accuracy. Traditional manufacturing techniques had never been successful in producing such an accurate model of a bone, especially with respect to the interior bone-marrow canal.

The successful merging of CT Scan data of a patient's femur with CADKEY and stereolithography to manufacture the physical model of the bone left the participants in this experiment encouraged about where pioneering applications such as this will lead.

THIRD-PARTY NEWS

STRUCTURAL SECTIONS for CADKEY Offers Specialized Parametric Design Functionality

Imagineering CADD Services of Thornhill, Ontario, Canada, introduces STRUCTURAL SECTIONS for CADKEY™, a 3-D parametric-design program written in CADL™ (CADKEY™ Advanced Design Language), that provides a quick and easy way for engineers, designers and draftspeople to build frames and structures of all descriptions. STRUCTURAL SECTIONS constructs a structural member based on two user-defined points and user input for sizes. The two points (line-of-sight view) determine the length and position of the structural member with respect to a user-specified construction plane in order to maintain associativity with any component in terms of the component's coordinate system.

Jack Allen, President of Imagineering CADD Services, described how he managed in his spare time, while working as a consultant with a large aerospace company, to modify the CADL utility, 2PTSVW.CDL, to establish SECTIONS™ geometry relative to any user-specified construction plane.

"Thanks to the ease of the CADL program structure and powerful system commands, I was able to write enough code in a relatively short period of time to demonstrate a portion of the program to my colleagues at the office," Jack said. "I purposely chose to model the acceptance gauge that I was working on with CADKEY, as its structure was quite

involved. Like designers on the board everywhere, my colleagues were skeptical that a CAD program could outperform them, as this particular job had taken a full day just to model the frame weldment."

"After establishing the construction view in CADKEY, I proceeded to lay in just the center lines of all of the members required. A task that took only 20 minutes at the most. I then executed the SECTIONS program, and in a matter of 8 minutes, all of the frame members, machined pads, and closing plates were modeled. Boy, were they surprised!"

"Needless to say, they confirmed for me the fact that this program has a lot of potential, not only in the aerospace disciplines, but in any discipline that involves modeling structures in 3-D," Jack concluded.

STRUCTURAL SECTIONS for CADKEY currently allows the parametric design of structures that have square, rectangular, and round tubing; equal leg angle and unequal leg angle; center tee and zee; structural channel and architectural channel, wide-flange beam and American-standard beam, as well as square, flat, and round bars. The flat bar can also be used as a plate. All of STRUCTURAL SECTIONS' programs include these functionalities: (1) repeat sizes on a parallel plane or normal to the existing plane; (2) repeat sizes using a

(Continued on page 14)

THIRD-PARTY NEWS

Component Library to Mold Designers

How does one mold component distributor differentiate itself from another during highly competitive times? D&L Progressive Components of Wauconda, Illinois, has gained an advantage by providing CADKEY™ geometry, free of charge, to mold designers.

PC/MOLD™ CAD Database is a pattern library of pre-drawn mold-component and mold-base files. PC/MOLD is available, at no charge to mold-design person-nel. All the pattern files insert easily into the mold design. This saves the designer tedious re-copying of standard components, such as mold bases, pins, brass fittings, locks, unilifters, etc.

"Other component suppliers charge hundreds of dollars for the CAD geometry of the components that they sell," said Glenn Starkey, President of D&L Progressive Components. "We distribute it at no charge to assist mold designers throughout the country. Because of the 3-D demands for mold-cavity definition, CADKEY is a very popular software with our customers." Glenn wrote CK/MOLD Design™, a parametric CADL™ (Cadkey Advanced Design language) program that generates the geometries in PC/MOLD's database.

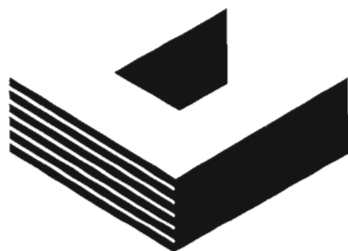
For more information about PC/MOLD, contact D&L Progressive Components, 1000 Rand Road, Wauconda, IL 60084. Tel.: (708) 487-1000. Fax: (708) 487-1003.

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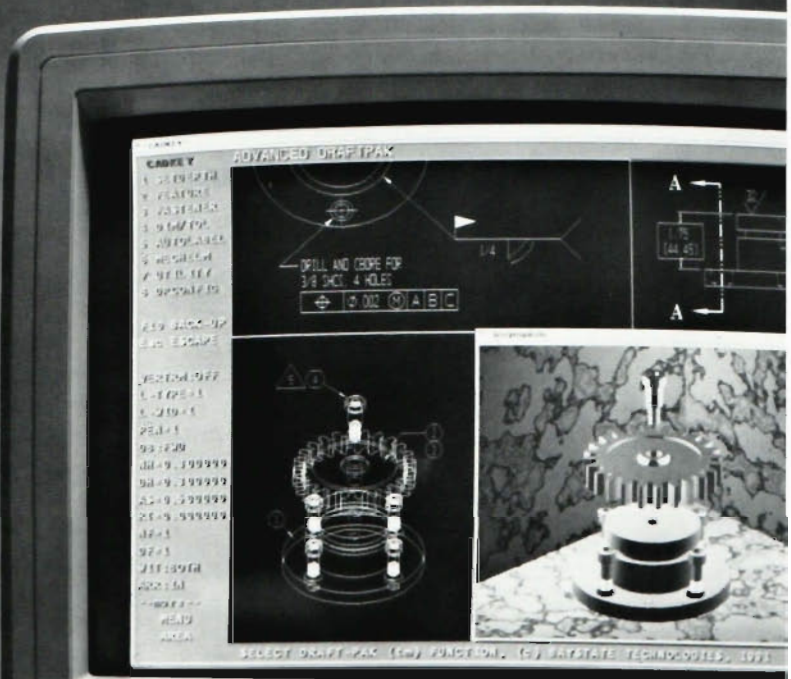
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Three-Company Joint Effort

CT Scan, CADKEY and Stereolithography Team-Up for Hip-Replacement Surgery!



CADKEY 3-D model of hip bone.

An accurate physical model of the femur, created from CAD data based on Computer Tomography scans (CT scans), offers new opportunities to surgeons preparing for hip-replacement surgery. Recent collaboration among three companies: 3D Systems, Inc. of Valencia, California, developer of the StereoLithography Apparatus™, Dimensional Medicine, Inc. of Minnetonka, Minnesota, pioneers in Medical Imaging, and Cadkey, Inc., produced a physical model of a section of the human femur for a mutual client who manufactures hip prostheses.

A prosthesis is an artificial device used to replace a missing or damaged part of the body. An accurate model of the femur helps surgeons in their pre-surgical planning to choose and prepare ahead of time the prosthesis to be implanted during the hip-replacement operation. If successful, such a model would fill a need for improved results and patient comfort. Up to and including the present time, a hip-replacement operation must be interrupted while the surgeon selects a prosthesis and fits it to the patient.

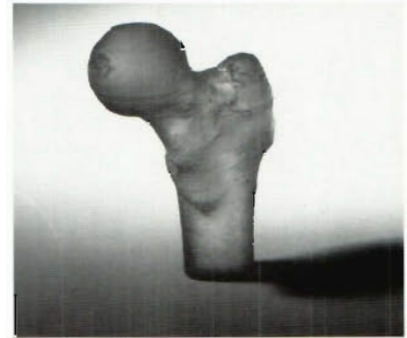
CT Scan Data to CADKEY

The process of creating this model of the human femur began with data obtained from a real patient's CT Scan. The data consisted of 75 CT slices, or images, of the patient's femur taken 1.5 millimeters apart. An operator input the data into Dimensional Medicine's Maxview™ workstation.

The Maxview generated contours representing the anatomy at each slice position. The contour points were then translated into a two-dimensional CADKEY[®] spline for each slice. The output was a CADL™ (CADKEY Advanced Design Language) file consisting of closed splines with a constant Z value, which was transferred to a CADKEY system.

Wire-frame to Solid Model

The next step converted this wire-frame model to a solid model using CADKEY[®] SOLIDS. The only modification needed in the wire-frame model was the insertion of line segments between the starting points of each closed spline. Proceeding from top to bottom, closed splines with a specific Z value were joined to closed splines with the same Z value below. To run CADKEY SOLIDS, the user defines the type of solid rendering desired, and creates an output geometry file. Because 3D Systems' stereolithography software accepts



Stereolithographic model of hip bone.

only triangular polygons, it was necessary to edit the output geometry file to include this constraint as its first command. The file ran successfully through CADKEY SOLIDS.

CAD Model to Physical Prototype

The solid model was translated by the CADKEY/3D Systems Translator. This converted the solid-model file from CADKEY's .CDL format into 3D Systems' .STL format.

Manufacturing a physical model by stereolithography requires that

(Continued on page 24)



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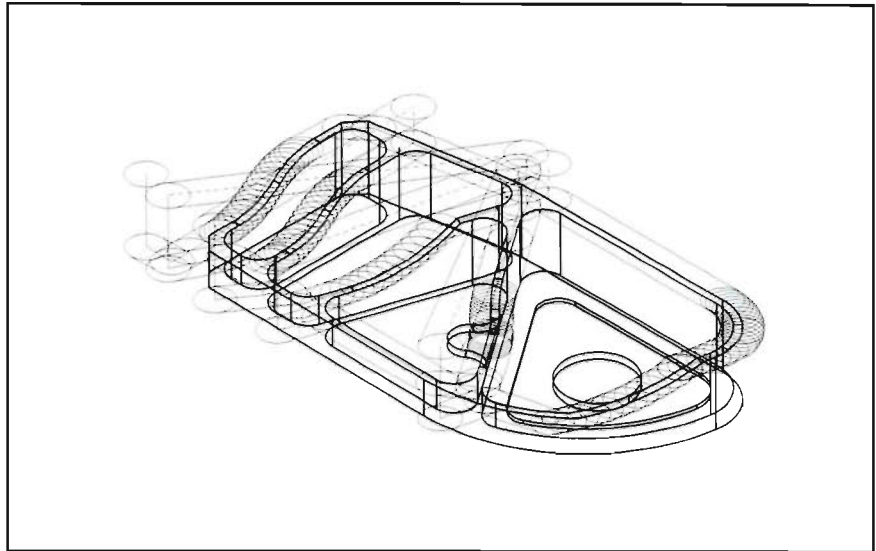
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