

# 3-D WORLD



Replica of Mount Shasta in California makes a dramatic product package for the Avocet Altimeter 50™.

## New Product Package Features 3-D Model of Mount Shasta

When a serious bicyclist buys an Avocet Altimeter 50™, he or she purchases a miniaturized computer, designed for bicycle use, that calculates altitude, trip climb and descent, total climb and descent, current speed, average speed, maximum speed, trip distance, and total distance. The Altimeter 50 also serves as a clock and a stopwatch. However, the buyer is buying not only a high-tech product, but also high-tech packaging. When Avocet, Newark, California's well-known manufacturer of equipment for bicycling enthusiasts, planned to introduce its Altimeter 50, the company wanted a distinctive sales package that would reflect the distinctiveness of the product, as well as provide concerned users with a convenient place to store the manual and the hardware for attaching the Altimeter 50 to a bicycle.

Avocet chose Mount Shasta in Northern California, near the border with Oregon, as the theme, and Geri Engineering, Inc. of San Carlos, California, as the designer of the Altimeter 50's package. Don Geri, P.E., President of Geri Engineering, obtained computerized topographical data of the Mount Shasta area from the United States Coastal and Geodetic Survey (C&GS), through Geographic Information Systems of Houston, Texas, who converted the C&GS data from their format on magnetic tape into ASCII format on disk.

### A Curious Anomaly

Don discovered an anomaly in the C&GS data: the x and y data were in metric measurements; the z data were in English measurements. He

*(Continued on page 2)*

## What a Month!!!

### CADKEY, INC. Expands Its Corporate Direction in M/E/C and A/E/C

Five dates: April 8, April 22, April 23, April 30, and May 8, 1991, although very recent, are already significant milestones in the history of CADKEY, INC. On each of these dates, CADKEY, INC. did something that the company has never done before. We gave our customers, dealers, third-party-solution partners, and the industries that our products serve, a peek at product developments on which CADKEY is currently working. CADKEY, INC. had never before done this. CADKEY, INC. anticipates that all of these products-in-development will be shipped by the end of 1992.

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## Mount Shasta

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wrote a CADL program to convert the metric measurements into English measurements, and to read the data into CADKEY. The reason for choosing English measurements (rather than metric) for entering the data into CADKEY was that the model of Mount Shasta which Avocet wanted for the Altimeter 50's package was going to be a three-dimensional topographical model, in which each contour line would represent 100 feet in height.

The C&GS data, now in CADKEY, consisted of a three-dimensional array of points in space. Don wrote another CADL program to mesh the data points in the array. From this mesh of data points Don created two-dimensional cubic splines in CADKEY to represent the contours of the topography, using linear interpolation between the data points.

### Modeling a Mountain

Don defined the elevation planes in CADKEY as 100-foot-high topographical steps. Using CADKEY's sectioning and level-defining capabilities, he marked all of the points at which the elevation planes intersected the linear meshing. He then sorted the topographical data to levels by elevation step, and joined the data points on each elevation by 2-D cubic splines to form the continuous topography for the model. Mindful that the purpose of this model was to serve as a display package for the Altimeter 50, Don completed the model by constructing four elevated walls, supporting the model mountain, and a mounting fixture for the product. Creating this mounting fixture and scaling it to the packaging size, required some minor modifications to the sloping contours of the mountain. Designing the corners of the package to snap-fit into a clear-plastic, calibrated cover also required some other minor

modifications to the topography. In most respects, the topography of Mount Shasta in the Avocet model is accurate to scale.

### Making a Mold

Don's 3-D model of the mountain went to Kattenhorn Tool and Die Company in San Lorenzo, California. Don Kattenhorn used CADKEY and a third-party CAM product to generate the numerical-control tool path to manufacture the mold components directly from the CADKEY part file of the mountain. Don Kattenhorn used drawings only to determine the outline and orientation of the mold. In manufacturing the mold, he did not use detailed drawings for any topography.

Don Kattenhorn manufactured five graphite electric-discharge-machine (EDM) electrodes to produce the mold's cavity in steel. An electrode is a positive model made of electrically conductive material, most often graphite, used to create a negative cavity in a mold. The electric arc erodes the steel from which the mold is being made, so that the electrode quite literally creates the cavity by sinking into the steel. Consequently, the electrode is called a *sinker*. Four of the graphite sinkers served for rough-cutting the steel. The fifth electrode provided the final finish on the cavity.

Don Kattenhorn used multiple graphite sinkers to produce the mold's cavity because, as the electrical arcs are formed and broken, the electrode not only erodes the material from which the mold is being made, it also consumes a little of itself. Thus, sharp edges become rounded. The mountain-topography design required some distinctly sharp edges. Using more than one CNC-generated, identical graphite electrode was an economical way to produce the mold's cavity with sharp edges.

Henry Plastics of Fremont, California, manufactures the injection-molded plastic packaging for Avocet's Altimeter 50.

## Notes from the Editor

### Reference Point

With great regret, we note that **WindowIn on DataCAD** has ceased publication with its May 1991 issue. **WindowIn** has served DataCAD users well for almost four years. Its disappearance is a genuine loss. However, we are pleased to announce that **Reference Point**, a new, bi-monthly DataCAD-related publication will make its debut with its July/August 1991 issue.

**Reference Point** will go free of charge to DataCAD users who have maintenance agreements.

### CADKEY, INC. to Move

Effective August 19, 1991, CADKEY, INC. will be installed in our new, international corporate headquarters at 4 Griffin Road North, Windsor, CT 06095. Our new telephone number will be (203) 298-8888.

### Names at CADKEY Cause Some Confusion

The names of four members of CADKEY, INC. appear to be causing confusion among dealers and customers. All four of them work in Marketing or Customer Service positions that involve considerable contact with the public.

Danielle Cote is Marketing Events Manager, and Danielle Coviello is a Customer Service Agent

Maribeth Schneider is Marketing Production Manager, and Mary Beth Staron is Marketing Communications Manager. Contrary to rumors, Mary Beth Staron is single (but still looking) with two children, and Maribeth Schneider is married with four children.

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## What a Month!!!

(Continued from page 1)

### Redefining Low-Cost, High-Performance Concurrent Engineering and Computer-Integrated Manufacturing

Four major events took place during the month of April 1991, that contribute to CADKEY's expanded mission in the realm of mechanical engineering and manufacturing.

#### April 8, NDES '91

On April 8, at the **National Design Engineering Show, NDES'91**, in Chicago, Illinois, Livingston Davies, President, and Peter Smith, Chairman of the Board of CADKEY, INC., introduced the company's new directions in mechanical product development: concurrent engineering through integrated CAD, engineering analysis, and CAM, built upon a single, three-dimensional database. "At NDES, we demonstrated that our core technology can be applied to solve a host of manufacturing problems through specialized, but integrated products," said Livingston Davies.

Although not formally announced as products, two of CADKEY's new products-in-development were demonstrated at NDES '91: Cutting Edge™ (CAM), and CADKEY™ ANALYSIS. CADKEY ANALYSIS incorporates a new Boundary Element Method system which applies the theory of integral equations to the surfaces of a design's geometry to determine the effects of heat transfer, stress and strain on the design. The Boundary Element Method of analysis represents a significant advance over the Finite Element Method of analysis because of its ease of use, speed, and accuracy. "CADKEY is moving beyond its traditional role as a developer of

CAD software," Peter Smith said. "We are now focusing on products that begin with core CAD technologies, and then systematically integrate the most powerful analytical and manufacturing tools available into a complete solution for broad aspects of the product-development and manufacturing cycle."

"CADKEY's Cutting Edge is the first truly open-architecture CAM product on the market," Livingston added. "Because it incorporates knowledge of the fundamental manufacturing concepts, such as tool paths, feeds, speeds, and post processors which are not inherent in CAD products, it provides a significantly improved basis for CAM-application developments by CADKEY's strategic applications partners. CAM-oriented application partners present at NDES expressed strong interest in this new opportunity. Benefits to the application developer include automatic multi-platform support and tighter integration

in the design, analysis, and manufacturing process."

#### April 22, NCGA '91

On April 22, at the National Computer Graphics Association's **NCGA '91**, also in Chicago, Gary Magoon, Director of the Manufacturing Systems Group demonstrated CADKEY working with the Polhemus 3 Space™ Isotrak™ three-dimensional digitizer and motion tracker. The interface between CADKEY and the 3 Space Isotrak incorporates new features found in CADKEY Version 4. The interface allows the operator to use the 3 Space Isotrak as both a primary pointing device for menu selections and screen interaction, and as a secondary, CADL-integrated three-dimensional digitizer capable of tracing 3-D geometry from an existing, free-standing part and also capable of drawing in open 3-D space. The CADKEY-Isotrak interface had previously been used to assist in the ergonomic design of the 1992

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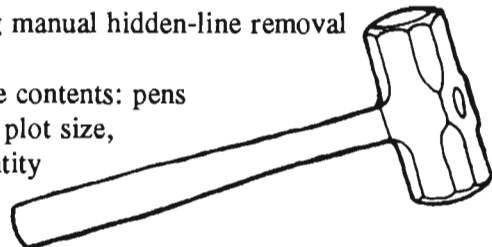
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TECHNOLOGY

## What a Month!!!

(Continued from page 3)

Olympic speed skiing helmet (See **High-Tech Speed Ski Helmet, 3-D WORLD**, May/June 1990, page 1.) The new interface is expected to be used for several applications ranging from biomechanical and biomedical design and ergonomic engineering to head-position tracking, clothing design, stereotaxic localization, and archeological study.

### April 23, Quality Expo '91

On April 23, at the **Quality Expo '91**, in Chicago, Ujjwll Trivedi, a software engineer in CADKEY's Manufacturing Systems Group, demonstrated CADDInspector™ working with Sheffield Measurement Company's Cordax 1808M™ coordinate measurement machine (CMM). This expands significantly the number of CMM platforms which CADDInspector supports. The primary

application for this new interface currently is reverse engineering. Reverse engineering is a technique of using a CMM to create a CAD database of a damaged or worn part or product, when it is necessary to re-manufacture the part or product, but its original drawings on paper are no longer available or no longer usable.

### April 30, UTECA '91

On April 30, at the **1991 UTECA Conference and Trade Show**, in Springfield, Massachusetts, sponsored by United Technologies Corporation, Peter Smith publicly discussed another CADKEY product-in-development: a Navier-Stokes Fluid Solver. The Navier-Stokes equation describes the complete motion of a fluid, whether it is a liquid or a gas. Initially, the CADKEY Navier-Stokes Fluid Solver will be capable of solving wing-body interaction on aircraft, or the flow of a river

past pylons of a bridge. CADKEY's Navier-Stokes Fluid Solver will ultimately be capable of handling 2-D or 3-D, subsonic or supersonic flow, with or without viscosity and/or turbulence effects.

## Building a New Foundation for the A/E/C Market

### May 8, A/E/C Systems '91

On May 8, at **A/E/C Systems '91** in Washington, D.C., Livingston Davies unveiled new technology directions for CADKEY's A/E/C family of software products. In addition to DataCAD Version 4.0 on DOS, CADKEY is developing a new product for architectural and construction engineering, code-named "Parthenon," which incorporates object-oriented programming using C++ and Microsoft Windows®.

Parthenon features full support

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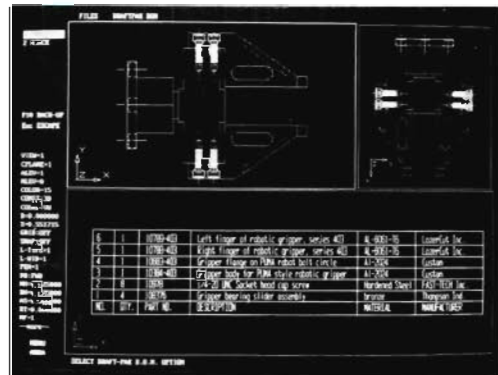
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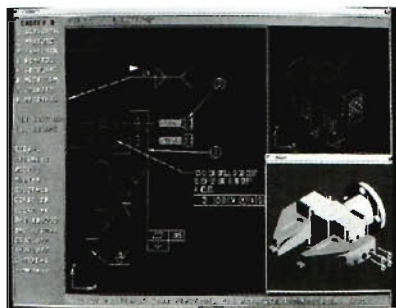
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## What a Month!!!

(Continued from page 5)

for multiple windows to display multiple files simultaneously, with an unlimited number of viewports. It also features multi-tasking operations for increased productivity. Parthenon will appear in a protected-mode 386/486 version for increased speed and access to virtual memory for larger drawing files. It will also highlight tighter integration of rendering and drafting that will make both functions easier to use together.

Parthenon offers full support for Dynamic Data Exchange (DDE) so that other programs can concurrently update data in a seamless manner. DDE will also provide a vehicle for easy porting of third-party products that support DDE. Parthenon also includes full support for Dynamic Link libraries to provide increased opportunities for sophisticated third-party products.

Being written in the C++ language allows Parthenon to take advantage of modular, object-oriented programming, and optimal integration of third-party products, as well as easier addition of specialized features. The modularity of C++ assures consistent operation across multiple hardware platforms.

## NCGA Honors High-Tech Headache Researcher

The National Computer Graphics Association presented its second annual award for innovative use of microcomputer-based CAD technology to Ruth Ann Fraser for her unique application of CAD software, designed for mechanical and reverse engineering, in the study of cluster headaches. The NCGA made the presentation on April 23, 1991, during the **NCGA '91 Conference and Exposition** in Chicago, Illinois.

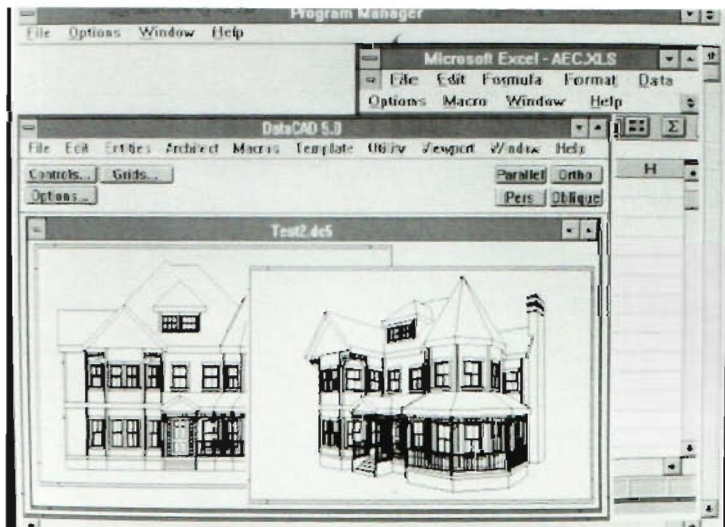
Ruth Ann, a registered nurse and graduate student at Carleton University, Ottawa, Ontario, Canada, had been doing research into the dimensions of headache pain at Ottawa Civic Hospital in 1988, and at the Headache Research Foundation of Faulkner Hospital, Boston, Massachusetts in 1989-1990. During her research, Ruth Ann obtained the collaboration of Wence Daks of CAD WIRE, a CADKEY dealer in Markham, Ontario, and of Gary Magoon and Ujjwll Trivedi of CADKEY, INC. She used a combination of CADKEY's products, CADDInspector™/CopyCAD™, CADKEY™, CADKEY SOLIDS™, and Perceptor™ to create a reliable technique by which sufferers of cluster headaches

can report the locations of their head pain in three dimensions. Pain has not only height and width (area), but also depth (volume). (See **High-Tech Headache Research, 3-D WORLD**, May/June 1990, page 1.)

Ruth Ann created an anatomically correct, three-dimensional CAD model of the human head which Santin Engineering of Beverly, Massachusetts, manufactured into a physical model, assembled from precisely machined slices of 3/8-inch-thick, transparent acrylic. The slices are assembled as a physical model of the head by sliding each slice down two dowels mounted into a base, through precisely drilled holes, one slice at a time, from the neck to the top of the head, similar to a child's ring-stacking toy.

A cluster headache patient can help medical personnel to study his/her pain by drawing its location(s), level by level on the acrylic slices, in erasable marker. Using the Perceptor's stylus, a technician creates a digital tracing of the patient's 2-D drawings on each respective level. The accumulated headache data from all the levels, provided through the Perceptor, creates a three-dimensional representation of the pain as a part file in CADKEY. Using CADKEY SOLIDS on this part file allows the medical personnel to calculate the mass properties of the pain, specifically its volume and its centroid. The centroid serves as the focal point of each pain region that the patient has described.

Ruth Ann's research into headache pain is the foundation of her thesis for a Master of Arts degree in Psychology at Carleton University.



*Parthenon incorporates the latest in 3-D CAD technology with the highest level of Windows functionality. Modular programming, object-oriented tools, and complete integration will be only a few of the features available through an easy-to-use graphical interface.*

**Editor's Note:** 3-D WORLD is delighted to have played a role in publicizing Ruth Ann Fraser's unique research.

## CADKEY Products Now Available to U.S Government Customers on GSA Schedule!

Effective May 3, 1991, until March 31, 1992, U.S. government customers can purchase CADKEY and DataCAD products directly from CADKEY, INC., using the schedule authorized by the General Services Administration in contract number GS00K91AGS5124.

This GSA schedule applies to CADKEY<sup>®</sup> Version 4 (DOS), CADKEY Version 4/386, CADKEY IGES Translator<sup>™</sup>,

CADKEY Light<sup>™</sup>, CADKEY Maintenance Program, DataCAD<sup>™</sup>, DataCAD Velocity<sup>™</sup>, DataCAD 128<sup>™</sup>, and DataCAD Maintenance Program. CADKEY upgrades are also included in the schedule of GS00K91AGS5124.

At the present time, government customers can take advantage of the favorable prices in CADKEY INC.'s new GSA schedule only by purchasing products directly from CADKEY, INC. For additional information, contact Larry Boardman, Director of Government Accounts, extension 7171, or Karen Miller, Coordinator of Government Accounts, ext. 7157.

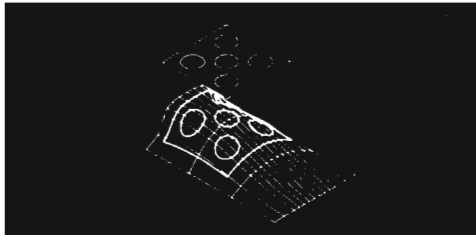
## CADL Consulting

In the May/June issue of **3-D WORLD**, CADKEY, INC. announced the formation of an Application Consulting Group, as part of our Technical Services Department, to provide enhancement utilities, written in CADL<sup>®</sup>, based on the specialized needs and specifications of CADKEY users. Pricing and work schedules depend upon a customer's specific needs.

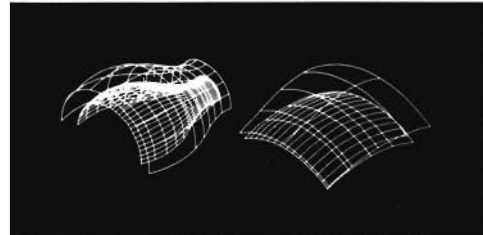
For additional information about the Application Consulting Group, and/or to explore the feasibility of potential utilities in which you are interested, contact the Sales Dept., CADKEY, INC., 440 Oakland Street, Manchester, CT 06060-2100. Tel.: (203) 647-0220. Fax: (203) 646-7120.

# FastSURE

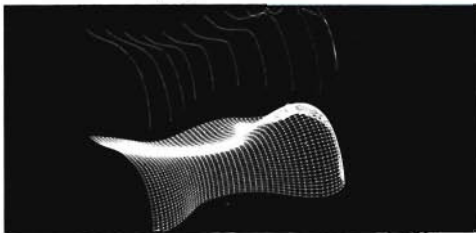
## Complex Free-Form Surfacing Power for CADKEY



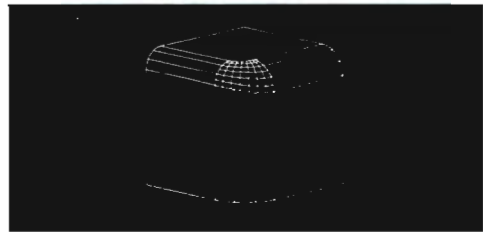
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## **X-FORM Function Expanded in CADKEY Version 4**

by Steve Falusi

CADKEY Version 4 offers users dramatically changed options in the X-FORM function. As with CADKEY's earlier versions, the MOVE, COPY and JOIN options all appear in the X-FORM menu. There are only two X-FORM options that did not change in Version 4: TRANS-R and PROJECT. However, TRANS-R did receive a new name: DELTA.

The TRANS-A option has been replaced with OLD-NEW. OLD-NEW uses base positions as TRANS-A used to do, but you can now also specify either one or two director points. These director points can change the object's orientation.

2-D ROTATE is now simply ROTATE. The difference in ROTATE's functionality is that now you can rotate about any axis. You can even rotate entities about an axis that does not lie normal to the screen. There is also a new submenu under ROTATE-JOIN. You now have the choice of joining entities using either lines or arcs.

CIRCULAR ARRAY is a brand new X-FORM option in Version 4. CIRCULAR ARRAY allows you to rotate entities about an axis, and still have the entities maintain their original orientation. ROTATE is different from CIRCULAR ARRAY because when you use the ROTATE option, the entities in the array are rotated, that is, they lose their original orientation.

Although the SCALING function has retained its name, it now has a submenu with the options: UNI-DIRECTIONAL, AXES, and FULL. UNI-DIRECTIONAL and AXES allow you to specify independent or combined scaling along the x, y, or z axis.

In addition to its familiar two-point option, MIRROR now has three new options: 1 POINT VERTICAL, 1 POINT

HORIZONTAL, and PLANE. The options 1 POINT VERTICAL and 1 POINT HORIZONTAL form a vertical or horizontal plane about which you can mirror objects. The PLANE option allows you to define a plane about which the mirroring is going to take place. Moreover, you can still use the MIRROR function about a two-point axis, as you are accustomed using it.

HELICAL ROTATION is the second brand-new X-FORM option in Version 4. It is also the most powerful new option in X-FORM. HELICAL ROTATION allows you to rotate entities along a helical path. These entities can be joined either by lines or by splines. The rotation of these entities can be in a clockwise direction or in a counterclockwise direction, depending upon whether you specify a positive or negative rotation angle.

### **Some Applications for these New Capabilities in X-FORM**

1. One good application for the OLD-NEW option in X-FORM occurs when you have existing geometry that you want either to copy or to move to another part of your model. Your first step is to define the entity or entities that you want to transform. Then, you define a base position and one or two director points. These director points allow you to define the correct orientation for the new placement of the entity. You can even choose the plane on which to place the entity. The option ALONG in OLD-NEW is very useful when you want to define a new director point.

2. If you need to re-size or stretch a model in one or more directions, the new SCALE option in X-FORM will prove to be handy. You must first define a point about which you want to scale the model (Scaling Origin). Next, you use the Universal Selection Menu to

identify the entities that you want to scale. Then, you use the options Axes or Uni-Directional to define the direction in which you want to scale these entities. Using the Axes option to define the direction of the scaling allows you to scale in more than one direction at the same time, and it is easy to do. The Axes option prompts you to enter the amount that you want to scale your model in x, y, or z. Enter the amounts that you want for x, y, or z, and CADKEY will scale your model that way about the scaling origin. The Uni-Directional option prompts you to define the part of your model that you want to scale. Then, it prompts you to define the scale factor to apply to that part of the model.

3. The new options in MIRROR, 1 POINT VERTICAL, 1 POINT HORIZONTAL, and PLANE, are also easy to use. If you create the left half of a model, all you need to do to create the right half is: (a) select the right-most end point of the model; and (b) select the 1 POINT VERTICAL option. The 1 POINT VERTICAL option defines a vertical plane at that right-most end point and creates the right half of the model automatically. This procedure also works to mirror the top or bottom half of a model, but in this case you select the topmost or bottommost end point of the model and the 1 POINT HORIZONTAL option, to create the other half.

The PLANE option allows you to mirror entities about any definable plane. The choices that you have for defining a plane about which to mirror the geometry are almost the same as the options for defining a construction plane.

**Editor's Note:** Steve Falusi is an Applications Trainer in CADKEY's Learning Systems Group.

**Postponement:** The article, *What A Month!*, caused the article on CADKEY SOLIDS' new interface to be re-scheduled to the September/October issue.

# DataCAD Users' Groups

DataCAD users frequently request information about where and when a local Users' Group meets. Here is a listing of DataCAD Users' Groups for your convenience. Some users' groups have formal names; others do not. Members frequently host meetings at different locations. The address listed with the contact person's name is not necessarily the meeting place. If your DataCAD Users' Group is not included in this listing, please let us know.

State	Location/Contact	Meetings/ Serving	State	Location/Contact	Meetings/ Serving
<b>Calif.</b>	<b>BAD</b> Bay Area DataCAD c/o Design For Health 250 Dufour St. Santa Cruz, CA Mitchell Goldstein (408) 425-1869	Monthly.	<b>Fla.</b>	<b>BACUP DATACAD</b> Bay Area CAD Users' Party Peter Augustyniak Gorilla Systems Corp. 4025 Tampa Road, Oldsmar, FL 34677 (813) 855-7294	Monthly. West Central Florida
	<b>Orange County Area</b> Karl Buehrens Desktop Productions 18200 Yorba Linda Blvd. Yorba Linda, CA 92686 (714) 579-3066	Monthly.	<b>Ga.</b>	<b>Greater Atlanta Area</b> David Easterwood Koets Corporation 3195 Paces Ferry Place, Atlanta, GA 30305 (404) 231-4554 or Greg O'Neal (404) 986-9556	Monthly. Central Georgia.
	<b>San Diego Area</b> Dae Kim Mostrè Design, Inc., 7968 Arjons Dr., A103 San Diego, CA 92126 (619) 693-3030 Fax: (619) 693-3032	Monthly.	<b>Ind.</b>	<b>Northern Indiana Area</b> Dennis Jeffrey Tekni 4011 South Wayne Av. Fort Wayne, IN 46807 (219) 744-3575	Monthly. Northern Indiana area.
	<b>San Fernando Chapter/ A.I.A.</b> Los Angeles Area DataCAD Users' Group Bert Levine Ronnins & Brown 14955 Califa St. Van Nuys, CA 91411 (818) 781-7100	Monthly.	<b>Mass. N.H. Me.</b>	<b>DBUG</b> DataCAD Boston Users' Group Evan Shu, A.I.A. Evan Shu Architects 10 Thacher St., #114 Boston, MA 02113 (617) 367-9622, or Rick Gleason The Gleason Partnership 114 Commonwealth Av. Boston, MA 02116 (617) 267-7754	Monthly. North- eastern New England
<b>Conn.</b>	<b>Stamford Area</b> David Chilenskas Entré Computer Center 777 Summer St. Stamford, CT 06901 (203) 967-2233	Monthly.	<b>Mich.</b>	<b>MUD</b> Michigan Users of DataCAD James A. Remus Granger Construction P.O. Box 22187 Lansing, MI (517) 393-1670, or Randy Leak Freeman-Smith/Assoc. 3850 Capital City Blvd. Lansing, MI (517) 323-3700	Monthly, except July and September. Lansing & Central Tri-county area.
<b>D.C. Va. Md.</b>	<b>Capital Area Users' Group</b> Bruce A. Kaplan Kaplan & Associates 7003 Ballast Court Burke, VA 22015 (202) 267-9596 (703) 644-2816	Monthly.	<b>Minn.</b>	<b>Minnesota Area</b> Jeff Pflipsen HTG Architects, Inc. 6950 France Av. South Suite #205 Minneapolis, MN 55435 (612) 920-1881	Bi-monthly Minnesota, parts of Iowa and Wisconsin.
<b>Fla.</b>	<b>Tallahassee Area</b> Richard Crowe R. Crowe & Associates 1933 Commonwealth Ln. Tallahassee, FL 32301 (904) 575-3122 Fax: (904) 574-1641	Monthly.	<b>Mo.</b>	<b>Central States</b> Nicholas Peckham or Mike Goldschmidt Peckham & Wright Architects 18 North Eighth St. Columbia, MO 65201 (314) 449-2683	Monthly. Missouri; Eastern Kansas; Southern Illinois.
			<b>N.C.</b>	<b>Charlotte Area</b> John Murphy Entré Business Systems 110 Charlotte Plaza Charlotte, NC 28244 (704) 332-1555	Greater Charlotte area.
			<b>N.J.</b>	<b>RADIUS</b> Raleigh Area DataCAD Information & User Support James Esquivel P.O. Box 12253 Raleigh, NC 27605 (919) 556-1401 BBS: (919) 556-6173	Quarterly. Greater Raleigh area.
			<b>N.J.</b>	<b>DUNE</b> DataCAD Users of the Northeast Allen Weitzman The Ives Group 14-25 Plaza Rd. Fair Lawn, NJ 07410 (201) 791-7444	Monthly. Bergen City., NJ; Manhat- tan, Brook- lyn, Rock- land City., NY.
			<b>N.Y. N.J.</b>	<b>New York-New Jersey</b> Arkady Kleyner American Training Center, Inc. 118-21 Queens Blvd. Suite 310 Forest Hills, NY (718) 544-8100 (800) 273-ACTI (N.Y. only)	Monthly. New York State and New Jersey.
			<b>N.Y.</b>	<b>Upstate New York</b> Tom Cisek, R.A. 999 Design Group 25 McCleary Av. Amsterdam, NY 12010 (518) 842-3977 or Vito Mazzariello, R.A. 999 Design Group 2 Skyview Lane Valatie, NY 12184	Upper New York state.
			<b>Okla.</b>	<b>State of Oklahoma</b> Steve McGinley Dept. of Human Services Architectural Engineering Unit 940 NE 13th St. Room 5N 400 Oklahoma City, OK (405) 271-6766	Monthly. Central Okla- homa.
			<b>Pa.</b>	<b>DETAIL</b> DataCAD Enthusiasts Trading Advice In Lancaster Terry Bergen ComputerLand of Lancaster 1360 Harrisburg Pike Lancaster, PA (717) 291-2111	Bimonthly. South Central Pennsyl- vania.
			<b>R.I.</b>	<b>Southeastern New England</b> Carlos Kiamco Peter Ashton Diane Carlino Entré Computer Center 385 South Main Street Providence, RI (401) 831-7280	Monthly. Rhode Island, SE Massa- chusetts, E. Con- necticut.

State	Location/Contact	Meetings/ Serving
Tenn.	<b>MAD</b> Memphis Area DataCAD Users Dennis Agren Mahan & Shappley Architects, Inc. 5575 Poplar Av., #603 Memphis, TN 38119 (901) 767-9170	Monthly.  Western Tennes- see.
	<b>Texas</b> <b>Dallas-Fort Worth Area</b> Rick Ferrara Richard Ferrara Architects, Inc. 445 E. Walnut St., #131 Richardson, TX 75081 (214) 470-0171 or Jim Fay Urban Architecture 7001 Preston Rd., #210 Dallas, TX 75205 (214) 522-8494	Monthly.  Greater Dallas & Fort Worth area.
Va.	<b>Central Virginia Area</b> Roger O'Dell Roger W. O'Dell, P.E. 100 Troost Court Charlottesville, VA (804) 295-7246 Fax: (804) 971-1582	Monthly.  Greater Char- lottesville area.
	<b>Tidewater Area</b> Tim Pruitt I.V. Harris & Associates 329 Office Square Lane Virginia Beach, VA (804) 499-8628	Monthly.  South- eastern Virginia.
Vt.	<b>Northern New</b>	
N.H.	<b>England</b>	Monthly.
N.Y.	Ed Wolfstein Ed Wolfstein, Architect 117 St. Paul St. Burlington, VT (802) 864-8334	Vermont, New Hamp- shire, and New York.

If your DataCAD Users' Group is not included in this list, please inform Danielle Cote at CADKEY, (203) 647-0220, so that we may publicize your meeting schedule. If you would like to start a new DataCAD Users' Group in your area, a **FREE** DataCAD Users' Group Start-Up Kit is available to help you.

## DataCAD Tech Tip Hints for Using DataCAD Velocity

by Steve Falusi

DataCAD Velocity is a photorealistic, high-end rendering package developed by Circuit Studios of Bethesda, Maryland, to work with DataCAD. It offers advanced rendering with texture mapping and 18 individual, simultaneous light sources.

The first steps before you can use Velocity are to develop a model in DataCAD and define a number of different views that you wish to render. Then, output a .drn file using the Velocity macro file. To make things easier, set a new path for the output of this file to the DRN subdirectory under the main Velocity directory (i.e., c:\velocity\drn).

The next step is what gives people some trouble. Before you can use Velocity, you must set an environment variable and load the appropriate graphics driver. (You might want to check the article *Errors in the Velocity User Guide, 3-D WORLD* November/December 1990, page 7, before beginning this procedure.)

There are a number of ways to set the environment variable and to load the graphics driver. One method is to add a number of lines into your AUTOEXEC.BAT file. This will, however, set the variable and load the Velocity driver every time you turn on your computer, taking up valuable memory that

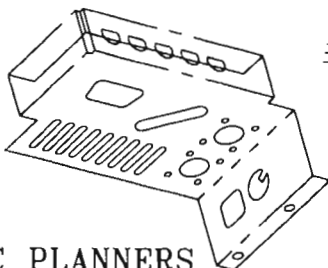
may be needed to run other applications. A second method is to type manually the necessary commands every time you wish to run Velocity. This method is a time consuming process and relies upon good typing and memory skills.

A much more useful and convenient method is to make a batch file that sets up the environment variable and loads the appropriate graphics driver. A batch file is a file that executes a group or string of DOS commands, completing a number of tasks in a one-step process. You can create batch files using any text editor, such as EDLIN which is included with all versions of DOS.

There are two essential tasks that need to be accomplished with this particular batch file. The first is to load the graphics driver from the DRV subdirectory of Velocity, and the second is to set the environment variable. (The command line for setting the environment variable is found in Volume 4, Appendix 3 of the *DataCAD Rendering and Customization Guide*.) To work more efficiently, you could also have your batch file enter Velocity after loading the driver and setting the environment variable, and then remove the driver from memory when you exit from Velocity. (In previous versions of DataCAD, a batch file called VELSET.BAT performed a similar function.)

(Continued on page 12)

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## TRAINING SCHEDULE AT CADKEY, INC.

We have Training dates scheduled through August, 1991. Please call Customer Service to register: (203) 647-0220, ext. 8030.

Course	Jul.	Aug.
Introduction to CADKEY		12-14
Introduction to DataCAD	29-31	26-28
Advanced Geometric Modeling	18-19	

### 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	Dept. of Engineering Jacksonville, AL Dr. P.S. Yeh (205) 782-5229	<i>Intro. to CADKEY</i>	Jul. 10-12 Jul. 29-31 Aug. 28-30	
	Ariz.	Motorola University at Mesa 145 N. Centennial Way Mesa, AZ David Zamora (602) 461-4965	<i>Intro. to CADKEY</i>	Jul. 8-10 Jul. 29-31 Aug. 19-21	
			<i>Advanced CADKEY</i>	Jul. 18-19 Aug. 5-7	
Ark.	Crowley's Ridge Vo-Tech School	I-40 and Crowley's Ridge Rd. Forrest City, AR Charles Coleman (501) 633-5411	<i>Intro. to CADKEY</i>	Jul. 6 & 13 Jul. 20 & 27 Aug. 10 & 24 Sept. 7 & 14 Sept. 21 & 28	
	Calif.	CAD MicroSystems 5120 W. Goldleaf Cir. Suite 100 Los Angeles, CA Monica Hunter (213) 291-2000	<i>Intro. to CADKEY</i>	Call for schedule.	
California Polytechnic State University			Eng. Tech. Dept. San Luis Obispo, CA Karl Lilje (805) 756-6789	<i>Descriptive &amp; Applied Geometry using CADKEY</i>	Aug. 7-9 (For instructors in colleges.)
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.) <i>DC Modeler</i>	Jul. 9-18 Jul. 28-Aug. 2 Aug. 6-15 Aug. 21-30 Sept. 10-19 Sept. 23-Oct. 2 Jul. 10, 23 Aug. 9, 27 Sept. 13 Oct. 1, 31
<b>Third-Party News</b>			<i>Advanced DataCAD &amp; Velocity</i>	Scheduled on request.	
<b>ACU•TOOLS+™ Works Inside CADKEY®</b>			<i>DataCAD</i>	Jul. 19, Aug. 20	
ACU•TOOLS+™ from Olmsted Engineering Co., is general-purpose machining software that runs directly from within CADKEY™. ACU•TOOLS+'s capabilities include pocketing, 2-axis and 4-axis wire EDM, drilling, center drilling, boring, reaming, and tapping. ACU•TOOLS+ also includes Olmsted Engineering's DNC software and standard post processor. For additional information contact Kevin Graves, Olmsted Engineering Co, 2320 Aero Park Court, Traverse City, MI 49684. Tel.: (616) 946-3174. Fax: (616) 946-7080.			<i>Keybd Macros</i>	Sept. 20, Oct. 15	

## Hints

(Continued from page 11)

An example batch file for an IBM compatible running a graphics card that emulates an IBM VGA 256-color adaptor at a screen resolution of 320 x 200, with Velocity residing on the C: drive would look like this:

```
C:
CD\VELOCITY
DRV\IBMV256
SET DC_GDT=IBMV256,60,0,0,0,1
VELOCITY
DRV\IBMV256 -R
```

The first line of this batch file brings you to the drive where Velocity is located. The following line brings you to the directory where Velocity is loaded on the drive. The third and fourth lines load the IBM VGA 256-color graphics driver and sets the environment variable. The fifth line executes the program, and the final line removes the Terminate-and-Stay-Resident (TSR) graphics driver from memory when you exit Velocity.

To run this batch file, simply type the name of the file at the DOS prompt. Your computer will execute the set of commands.

**Editor's Note:** Steve Falusi is an Applications Trainer in CADKEY's Learning Systems Group.

## Unusual Training Opportunity for College Instructors

The Engineering Technology Department of California Polytechnic State University, San Luis Obispo, CA, will offer a three-day intensive course: **Descriptive and Applied Geometry Using CADKEY**, Aug. 7-9, 1991. The purpose of this course is to teach how to generate 3-D mechanical devices and structural models with a view to subsequent FEM or BEM analysis. Information about this course arrived too late to be included in the May/June issue of **3-D WORLD**. Anyone who uses CADKEY as part of teaching aerospace, civil, or mechanical engineering in college-level educational institutions, is invited to participate in this course. To register for **Descriptive and Applied Geometry Using CADKEY**, contact Karl Lilje by telephone at (805) 756-6789, or by fax at (805) 756-6503.

## Educational Materials

### DataCAD<sup>(R)</sup> and CADKEY<sup>(R)</sup> Featured in Textbooks, Videos, and On-line Help Software

DataCAD<sup>(R)</sup> and CADKEY<sup>(R)</sup> users can now select from among 22 books, videos, and on-line help software for self-paced learning, plus four general-interest textbooks on drafting and three management-level overviews of computer-aided design or engineering with specific references to DataCAD and CADKEY. **3-D WORLD** is proud to list them all alphabetically by title and author, with information about the publisher so that you can investigate these materials based on your own interests and needs.

#### Book about DataCAD

**DataCAD for the Architect**, Second Edition, Carol Buehrens; TAB Books, Blue Ridge Summit, Pennsylvania 17294-1128. Telephone: (800) 233-1128. Telephone in Pennsylvania and from Alaska: (717) 794-21-91. (You can also check with your DataCAD dealer or local bookstore.)

#### Books Referring to DataCAD

**CADD and the Small Firm, a Resourcebook**, Third Edition, Evan H. Shu, Ruth Neeman, Geoffrey Moore Langdon; The Boston Society of Architects, contact Shu Associates, 10 Thacher Street, Suite 114, Boston, Massachusetts 02113. Telephone: (617) 367-9622.

**CAD Implementation**, Associate Professor David L. Mackey, Ball State University, College of Architecture and Planning, Muncie, Indiana 47306-0305, Telephone: (317) 285-1900.

#### Books about CADKEY

**An Introduction to CAD Using CADKEY**, Second Edition (for CADKEY Version 3.5 and CAKEY Light), Hugh F. Keedy, Ph.D.; PWS-KENT Publishing Company, 20 Park Plaza, Boston, Mass. 02116. Telephone: (800) 343-2204, (617) 542-3377. ISBN 0-534-92564-2.

(Continued on page 14)

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

State	CTC	Location/Contact	Course	Dates	
Calif.	Evergreen Valley College	3095 Yerba Buena Rd.	<i>Intro. to CADKEY</i>	Aug. 12-14	
		San Jose, CA			
		Loren Fromm (408) 274-7900, x6664	<i>3-D Design w/ CADKEY</i>	Aug. 15-16	
			Customized courses available.		
	Golden West College	15744 Golden West St.	<i>Intro. to CADKEY</i>	Jul. 12-14	
		Huntington Beach, CA Jack North (714) 895-8209			
	Nikken Design Systems	2116 Arlington Av. #209	<i>Intro. to DataCAD</i>	Scheduled on request.	
		Los Angeles, CA	<i>Advanced DataCAD</i>		
		Roy Yoshino (213) 734-9433	<i>DC Modeler</i>		
	Poelman's Design Service	901 Campisi Way, #360	<i>Intro. to CADKEY</i>	Aug. 26-28	
Campbell, CA		<i>CADKEY</i>			
Mike Poelman (408) 377-3585		<i>CADL CADKEY SOLIDS</i>	Jul. 22-26 Sept. 23-25		
Ukiah High School	1000 Low Gap Rd.	<i>Intro. to CADKEY</i>	1st weekend of every month.		
	Ukiah, CA Jim Howlett (707) 463-5253, x284				
Colo.	University of Colorado at Denver	1200 Larimer St.	<i>Intro. to CADKEY</i>	Call for schedule.	
		Denver, CO Andreas Vlahinos (303) 556-2370	<i>Advanced CADKEY</i>		
Conn.	DATAMAT Programming Systems	9 Mott Avenue	<i>Intro. to CADKEY</i>	Jul. 15-19 CT Aug. 19-23 NJ Sept. 9-13 CT Oct. 28-Nov. 1	
		Norwalk, CT Matt Reuben (203) 855-8102			
	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>	Sept. 5 to Dec. 12, 8:30-9:45 a.m.	
Fla.	Gateway Computer Learning Center	10901B Roosevelt Blvd.	<i>Advanced CADKEY</i>	Scheduled on request.	
		St. Petersburg, FL Terri Long (813) 576-0549	<i>CADKEY SOLIDS</i>	Scheduled on request.	
	Indian River Community College	3209 Virginia Av. Fort Pierce, FL Bill Sigurdson Dean Zirwas (407) 468-4700, x4269	<i>Intro. to CADKEY</i>	(weekend) Individualized audit courses available.	
Ill.	PFB Concepts a.k.a. CADPRO	2525 E. Oakton Av.	<i>Intro. to CADKEY</i>	Jul. 10-12 Jul. 24-26 Aug. 7-9 Sept. 4-6	
		Arlington Heights, IL Bob Konczal (708) 640-1853			
	Chicago		<i>Advanced CADKEY</i>	Jul. 17-19 Aug. 21-23 Sept. 18-20	
			<i>CADKEY SOLIDS CADL</i>	Aug. 1-2 Sept. 26-27 Aug. 17-18	

#### New CADKEY Users' Group

CADKEY users in Arizona have organized the Arizona CADKEY Users' Group. The contact person is Dwayne Quatier of Acoustic Imaging, 10027 South 51st Street, Phoenix, AZ 85044. Telephone: (602) 496-6681.

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

State	CTC	Location/Contact	Course	Dates
Ill.	PFB	2525 E. Oakton Av.	CADKEY	Sept. 13
	Concepts/ CADPRO (continued)	Arlington Heights, IL Bob Konczal (708) 640-1853	Light PageMaker for CADKEY	Aug. 28-29
Ind.	Tekni	4011 South Wayne Av.	Intro. to	Scheduled
		Fort Wayne, IN Dennis Jeffrey (219) 744-3575	DataCAD DCAL Intro. to CADKEY CADL	on request. On-site courses available.
Iowa	Iowa Lakes Community College	300 South 18th St. Estherville, IA Roger Patocka (712) 362-2604	Intro. to CADKEY	Special schedules by request.
Md.	Anne Arundel Community College	101 College Parkway	Intro. to	Oct. 18-19
		Arnold, MD Sina Sepehri (301) 541-2435	CADKEY	Oct. 25-26
Mich.	Future Solutions	5900 N. Lilley Rd. #101	Intro. to	Jul. 10-12
		Canton, MI Paul Zwarka (313) 981-7455 FAX: (313) 981-7473	CADKEY Adv. Geo. Modeling	Aug. 6-8 Sept. 10-12 Jul. 15-16 Aug. 26-27 Sept. 23-24
	Washtenaw Community College	Occupational Ed. Bldg.	Intro. to	May 13-15
		4800 E. Huron River Dr. Ann Arbor, MI Belinda McGuire (313) 973-3300	CADKEY Advanced CADKEY CADKEY SOLIDS	Jun. 3-5 May 16-17 Jun. 6-7 May 21-22 Jun. 11-12
Minn.	Albert Lea Technical Institute	2200 Tech Dr.	Intro. to	Scheduled
		Albert Lea, MN Larry Gilderhus (507) 373-0656	CADKEY Advanced CADKEY	on request.
	Anoka Ramsey Community College	11200 Mississippi Blvd.	Intro. to	Jul. 1, 8, 10, 15,
		Coon Rapids, MN Tom Loftus (612) 427-2600 (Customized classes at CTC or on site scheduled on request.)	CADKEY CADKEY Intermed. CADKEY & DRAFT-PAK Adv. Geo. Modeling	17, 22, 24 (eve.) Jul. 15-17 (day) Sept. 9-11 Jul. 22-24 Jul. 25-26
	Moorhead State University	Industrial Studies Dept.	Intro. to	Aug. 28-30
		Moorhead, MN Wade Swenson (218) 236-2466	CADKEY	Oct. 5, 12, 19 Nov. 18-20 On-site courses on request.
	Northwest Metro Technical College	3300 Century Av. North	Professional	Jul. 1-3
		White Bear Lake, MN Jeff Jahnke (612) 770-2351, x323	CADKEY Advanced CADKEY	Jul. 16-12
	St. Paul Technical Institute	235 Marshall Ave. St. Paul, MN Michael Haffner (612) 221-1307	Intro. to CADKEY	Call for schedule.

## Educational Materials

(Continued from page 13)

**CADKEY Light: Computer-Aided Design and Drafting for Engineers and Technologists**, Jon M. Duff; Prentice Hall, 200 Old Tappan Road, Old Tappan, New Jersey 07675. Telephone: (800) 233-1360. Fax: (800) 445-6991. College Edition: ISBN 0-13-117383-9. Professional Edition: ISBN 0-13-117748-6.

**CADKEY Training Manual**, CADKEY, INC., 440 Oakland Street, Manchester, Connecticut 06040-2100. Telephone: (203) 647-0220. Fax: (203) 646-7120. Telex: 510 600 7223.

**Discovering CADL** (for Version 3.5), CADKEY, INC., 440 Oakland Street, Manchester, Connecticut 06040-2100. Telephone: (203) 647-0220. Fax: (203) 646-7120. Telex: 510 600 7223.

**Engineering Graphics on the PC with CADKEY**, Dr. Edward V. Mochel; McGraw-Hill Publishing Company, College Division, 1221 Avenue of the Americas, New York, NY 10020. Telephone: (212) 512-2012. Exercises on disk also available. ISBN 0-07-042642-2.

**Exploring CADKEY** (for CADKEY 1), David C. Reichard; Prentice Hall, 200 Old Tappan Road, Old Tappan, New Jersey 07675. Telephone: (800) 223-1360. Fax: (800) 445-6991. *Exploring CADKEY*: ISBN 0-13-296377-9. *Exploring CADKEY* Book/Disk Package: ISBN 0-13-296195-4.

**Exploring CADKEY 3**, David C. Reichard; Prentice Hall, 200 Old Tappan Road, Old Tappan, New Jersey 07675. Telephone: (800) 223-1360. Fax: (800) 445-6991. *Exploring CADKEY 3* Book/Disk Package: ISBN 0-13-296112-1.

**Fundamentals of CAD with CADKEY for Engineering Graphics** (for CADKEY Version 3), Larry D. Goss; Macmillan Publishing Company, College Division, 866 Third Avenue, New York, New York 10022. Telephone: (800) 257-5755 or (212) 702-2000. ISBN 0-02-345291-9.

**Graphics for Engineers with CADKEY**, Second Edition (for CADKEY Version 3.5), James H. Earle; Addison-Wesley Publishing Company, Jacob Way, Reading, Massachusetts 01867. Telephone: (800) 447-2226, (617) 944-3700. ISBN 0-201-53059-9.

**Learning CADKEY** (CADKEY Version 4 and CADKEY Light), Richard G. McGinnis, P.E., Ph.D., and Richard G. McGinnis, Jr.; McGraw-Hill Publishing Company, College Division, 1221 Avenue of the Americas, New York, NY 10020. Telephone: (800) 338-3987 (colleges); (800) 722-4726 (individuals), or (609) 426-5000. ISBN 0-07-044791-8.

**Problems in Engineering Drawing and Descriptive Geometry Using CADKEY**, Robert L. Ritter; Kern International, Inc., 190 Duck Hill Road, Duxbury, Massachusetts 02332. Telephone: (617) 934-2452. ISBN 1-55948-002-5.

**Using CADKEY**, Second Edition (Version 3.5), Dr. Paul J. Resetarits and Dr. Gary R. Bertoline, Delmar Publishers, Inc., 2 Computer Drive, West, P.O. Box 15015, Albany, New York 12212-5015. Telephone: (800) 347-7707, (518) 459-1150.

**Books about CADKEY to Appear in the Near Future**  
**An Introduction to CAD Using CADKEY**, Second Edition (for CADKEY Version 3.5 and CAKEY Light, including supplement about CADKEY Version 4), Hugh F. Keedy, Ph.D.; PWS-KENT Publishing Company, 20 Park Plaza, Boston, Massachusetts 02116. Telephone: (800) 343-2204, (617) 542-3377. ISBN 0-534-92564-2.

**CADKEY Light: A Handbook**, Clifford E Horton; Macmillan Publishing Company, College Division, 866 Third Avenue, New York, New York 10022. Telephone: (800) 257-5755 or (212) 702-2000. ISBN 002-357195-0. Available in Fall 1991.

**Introduction to CADKEY Curriculum** (Instructor's Guide or Instructor's Kit), CADKEY, INC., 440 Oakland Street, Manchester, Connecticut 06040-2100. Telephone: (203) 647-0220. Fax: (203) 646-7120.

(Continued on page 16)

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

State	CTC	Location	Course	Dates	
Miss.	Mississippi	Highway 3, Box 668	<i>Intro. to</i>	Aug. 12-14	
	Delta	Moorhead, MS	<i>CADKEY</i>	Oct. 28-30	
	Community College	Tony Honeycutt (601)246-5631, ext.103			
Mont.	Montana	West Park St.	<i>Intro. to</i>	May 15-17	
	School of	Butte, MT	<i>CADKEY</i>		
	Min. Sci. & Technology	Dick Johnson (406)496-4452	<i>Advanced CADKEY</i>	Scheduled on request.	
N.C.	Entré	110 Charlotte Plaza	<i>DataCAD I</i>	Scheduled	
	Computer Center	Charlotte, NC John Murphy (704)332-1557	<i>DataCAD II</i> <i>DC Modeler</i>	on request.	
N.H.	Portsmouth	Alumni Drive	<i>Intro. to</i>	Call for	
	Senior High School	Portsmouth, NH Kenneth Webber (603)436-7100	<i>CADKEY</i>	schedule.	
N.J.	Advanced Micro Systems	511 River Drive Elmwood Park, NJ Pat Neary (201)703-0404 Fax: (201)703-0546	<i>Intro. to DataCAD</i>	Jul. 24-26 Aug. 7-9 Sept. 11-13	
	Collingswood High School	Collings Avenue Collingswood, NJ Gary Krause (609)962-5701	<i>Advanced DataCAD</i> <i>Intro. to CADKEY</i>	Jul. 15-Aug. 19 (Mon. 7-11 p.m.) Sept. 9-Oct 21 (Mon. 7-11 p.m.)	
	Glassboro State College	Dept. of Technology Glassboro, NJ Michael Guerard (609)863-6203 (work) (609)468-3087 (home)	<i>Using CADKEY to Solve Special Problems</i>	Call for schedule.	
N.M.	New Mexico State University	P.O. Box 30001 Dept. 3450 Las Cruces, NM Maurice Hamilton (505)646-3501	<i>Intro. to CADKEY</i> <i>Advanced CADKEY</i>	Jul. 8-10 Jul. 11-12	
N.Y.	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 CADKEY</i> <i>Advanced CADKEY</i> <i>Intro. to DataCAD</i> <i>Advanced DataCAD</i>	Jul. 8-10 Aug. 5-7 Jul. 11-12 Aug. 8-9 Jul. 15-17 Aug. 12-14 Jul. 18-19 Aug. 15-16	
	Rochester Institute of Technology	1 Lomb Memorial Dr. Rochester, NY Dr. Robert Hefner (716)475-2205	<i>Intro. to CADKEY</i> <i>Advanced CADKEY</i>	Jul. 22-24 Aug. 8-10 Jul. 10-12 Aug. 22-24	
	Ohio	Owens Technical College	P.O. Box 1000 Oregon Road Toledo, OH Marty Weislak (419)666-0580, x454	<i>Intro. to CADKEY</i>	Aug. 16-17 Aug. 23-24
	Progressive Computing Corp., Inc.	6964 Spinach Dr. Mentor, OH Jean Kempton (216)255-0460	<i>Intro. to CADKEY</i> <i>Advanced CADKEY</i>	Jul. 9-10 Aug. 14-15 Jul. 16-17 Aug. 20-21	

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

State	CTC	Location/Contact	Course	Dates
Ohio	Progressive Computing Corp. (continued)	Mentor, OH	CADKEY	Jul. 23-24
		Jean Kempton (216) 2550460	SOLIDS	Aug. 28-29
		(800) 473-0460	CADL and Macros	Jul. 25-26
Okla.	Oklahoma State University	301 Cordell South Stillwater, OK Gerald McClain (405) 744-5709	Advanced CADKEY	Jul. 24-26
Ore.	CTR Business Systems	6420 SW Macadam Av. Portland, OR	Intro. to CADKEY	Courses offered every month. Call for schedule.
		Sandi McNeil (503) 293-8627	Advanced CADKEY	
		Oregon Advanced Technology Center	Clackmas Comm. Coll. 9720 SW Hillman Ct. Wilsonville, OR Nicole Skinner (503) 657-6958, x668	
	Portland Community College	12000 S.W. 49th Av. Portland, OR	Intro. to CADKEY	Aug. 12-14
		Thomas Macready (503) 244-6111, x4160	Intermed. CADKEY	Aug. 15-16
Pa.	Computer-Land	1360 Harrisburg Pike Lancaster, PA	Intro. to DataCAD	Scheduled on request, on site or in house.
		Lori Fraser (717) 291-2111	Advanced DataCAD	
	Micro Control Inc.	390 Middletown Blvd. Langhorne, PA. Marion Homan (215) 752-5510	Intro. to CADKEY Intro. to DataCAD	Jul. 16-19 Aug. 13-16 Sept. 10-13 Jul. 10-12 Aug. 21-23 Sept. 18-20
S. D.	Northern State University	Industrial Technology Box 705 Aberdeen, SD Jerry Sauer (605) 622-2571	Intro. to CADKEY Intro. to DataCAD	Continuous courses: 2-wk/M-F/day 4-wk/M,W,Th./evening
Texas	AEC Software	2200 North Lamar Dallas, TX	Intro. to DataCAD	Scheduled on request.
		David Demarest (214) 720-0270	Advanced DataCAD	
	MLC CAD Systems	5316 Highway 290 West Austin, TX	Intro. to CADKEY	Jul. 9-11 H Jul. 16-18 A Aug. 6-8 D Aug. 13-15 A
		Barbara Leesley (512) 892-6311		
		A = Austin D = Dallas H = Houston	Advanced CADKEY CADL	Jul. 23-24 A Aug. 20-21 A On request.
		Texas A&I University	Industrial Technology Campus Box 203 Kingsville, TX Herschel Kelley (512) 595-2608	Intro. to CADKEY
Texas Tech University	P.O. Box 4200 Lubbock, TX Mary Bentancourt (806) 742-3451	Intro. to CADKEY	Aug. 20-22	

## Educational Materials

(Continued from page 15)

**Mastering CADKEY**, Al Torrizzo and Gregg Garguilo; Glencoe, 809 West Detweiler Drive, Peoria, IL 61615. Telephone: (309) 691-4454. Fax: (309) 691-7856. ISBN 0-02-677117-9. Available in December 1991.

**Mastering CADKEY Instructor's Resource Guide**, Al Torrizzo and Gregg Garguilo; Glencoe, 809 West Detweiler Drive, Peoria, IL 61615. Telephone: (309) 691-4454. Fax: (309) 691-7856. ISBN 0-02-677118-7. Available by March 1992.

**Using CADKEY**, Third Edition (Version 4), Dr. Paul J. Resetarits and Dr. Gary R. Bertoline, Delmar Publishers, Inc., 2 Computer Drive, West, P.O. Box 15015, Albany, New York 12212-5015. Telephone: (800) 347-7707, (518) 459-1150.

**Using CADKEY Light**, Dr. Paul J. Resetarits and Dr. Gary R. Bertoline, Delmar Publishers, Inc., 2 Computer Drive, West, P.O. Box 15015, Albany, New York 12212-5015. Telephone: (800) 347-7707, (518) 459-1150.

### Books Referring to CADKEY

**Computer-Aided Drafting, Applications Workbook**, Brian L. Duelm; Goodheart-Willcox, Company, Inc., South Holland, Illinois. Telephone: (708) 333-7200. ISBN 0-87006-705-2.

**Computer-Aided Drafting, Fundamentals and Applications**, Brian L. Duelm; Goodheart-Willcox, Company, Inc., South Holland, Illinois. Telephone: (708) 333-7200. ISBN 0-87006-704-4.

**Computer-Aided Engineering Design Graphics**, Second Edition, Walter E. Rodriguez; McGraw-Hill Book Company, College Division, 1221 Avenue of the Americas, New York, NY 10020. Telephone: (212) 512-2012. ISBN 0-07-053396-2.

**Manager's Guide to MCAE**, John Krouse, Krouse Associates, 7310 Holly Park Drive, Concord, OH 44060. Telephone: (216) 354-8459.



## Mechanical Drawing: CAD

**Communications**, Eleventh Edition, French, Svenson, Helsel, and Urbanick, McGraw-Hill Book Company, College Division, 1221 Avenue of the Americas, New York, NY 10020. Telephone: (212) 512-2012. ISBN 0-07-022337-8.

## Videos about CADKEY

**CADKEY FUNDAMENTALS**, Visual Education Associates, 2218 North Canyon Road, Provo, Utah 84604. Telephone: (801) 373-4616.

**CADKEY VIDEO**, CADKEY, INC., 440 Oakland Street, Manchester, Connecticut, 06040-2100. Telephone: (203) 647-0220. Fax: (203) 646-7120. Telex: 510 600 7223.

**CADKEY VIDEOS** (CADKEY Videos 1.4, CADKEY Videos 3.5, CADKEY Light Videos), Microcomputer Education Systems, Inc., 4900 Blazer Parkway, Dublin, Ohio 43017. Telephone: (614) 793-3069.

## On-line Help Software

**The KAD Partner**, Engineering Technology, 6259 Plaited Reed, Columbia, Maryland 21044. Telephone: (301) 730-1318.

## Bulletin from Technical Services

### You asked for a new capability in CADUTIL, and now you have it!

Some users have complained about not being able to use CADUTIL to update large quantities of part files or pattern files to the latest version of CADKEY. In some cases, these users mean quantities of 25,000 files! Yes, you read that correctly, 25,000 files!

With the help of R&D wizards, we have found a way to handle this need that will also help you to do many other batch operations. The procedure involves using the FOR command in DOS. The following paragraphs provide an example and an explanation of how to use this procedure with CADUTIL on a large number of files.

Create two batch files. Call the first batch file **UPDATE.BAT**, and call the second batch file **DOIT.BAT**.

#### UPDATE.BAT

```
@echo off
del jnk
for %%x in (*.prt) do call doit %%x
```

(Continued on page 18)

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

State	CTC	Location/Contact	Course	Dates
Va.	Republic Research Training Center	855 West Main St. Charlottesville, VA Gregg Kendrick (804) 296-9747 (800) 476-4454	<i>DataCAD I</i> <i>DataCAD II</i> <i>DataCAD 3-D</i>	Scheduled on request. Minimum of 4 people required.
	Wash. Community College	801 Wetmore Av. Everett, WA Stu Barger Kathy Ardmore (206) 388-9429	<i>Intro. to CADKEY</i>	Aug. 21-23
		Walla Walla College	School of Engineering College Place, WA Dale Visger (509) 527-2712	<i>Intro. to CADKEY</i>
Wis.	CAD PROfessionals Inc.	120 Bishops Way, #136 Brookfield, WI Dan Warsh (414) 782-9199	<i>Intro. to CADKEY</i> <i>Intro. to DataCAD</i> <i>CADKEY SOLIDS</i>	2nd & 4th Tues. every month. <i>CADKEY SURFACES</i> <i>CADKEY RENDER</i>
		Lakeshore Technical College	1290 North Avenue Cleveland, WI Robert Moore (414) 458-4183	<i>Adv. Geo. Modeling</i>
	North Central Technical College	1000 Campus Dr. Wausau, WI Michael Clark (715) 675-3331	<i>Intro. to CADKEY</i>	Courses scheduled on request.
Wyo.	University of Wyoming	3085 Engineering Bldg. Laramie, WY Donald Polson Jean Richardson (307) 766-5255	<i>Intro. to CADKEY</i>	Jul. 24-26 Aug. 26-28

## CANADA

Prov.	CTC	Location/Contact	Course	Dates
British Columbia	Pacific Marine Training Institute	265 West Esplanade North Vancouver, B.C. Mike Davison (604) 985-0622	<i>Intro. to CADKEY</i>	Courses scheduled on request.
	New Brunswick Community College	P.O. Box 2100, Sta. A CAD/CAM Dept. 1234 Mountain Rd. Moncton, N.B. Wayne Ritchie (506) 856-2169	<i>Intro. to CADKEY</i>	Scheduled on request. On-site courses available.
Ontario	Algonquin College	200 Lees Av. Ottawa, Ontario Peter Casey (613) 594-3888, x5904	<i>Intro. to CADKEY</i> <i>Intermed. CADKEY</i> <i>Advanced CADKEY</i>	Sept. 9-Oct. 2 M&W, 5-7 p.m. Oct. 7-30 M&W, 5-7 p.m. Nov. 7-27 M&W, 5-7 p.m.
		JB Marketing Associates	82 Spruceside Cresc. Fonthill, Ontario John Bradford (416) 892-8025	<i>DataCAD I</i> <i>DataCAD II</i>

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

Prov.	CTC	Location/Contact	Course	Dates
	Klear	465 Rogers St.	<i>Intro to</i>	Customized
	Concept	Peterborough, Ontario	<i>CADKEY</i>	training
	Data	John Punshon (705) 742-3354		scheduled on request.
	Naylor- McLeod Group	1425 Bishop St. Unit 8 and 9 Cambridge, Ontario Brian Naylor (519) 622-4495	<i>Intro. to</i> <i>CADKEY</i> <i>Advanced</i> <i>CADKEY</i> <i>CADL</i>	Customized training scheduled on request.
	Ryerson Polytechnical Institute, C.A.T.E.	350 Victoria Street Toronto, Ontario K. Doddridge (416) 979-5106	<i>Intro. to</i> <i>CADKEY</i>	Scheduled on request.
Québec	APPLICAD	11956 Blvd. Laurentien Montréal, Québec Walid Hadid (514) 336-5959 (514) 335-4145	<i>Intro. to</i> <i>CADKEY</i> <i>Advanced</i> <i>CADKEY</i> <i>Intro. to</i> <i>DataCAD</i>	Aug. 6-7 Sept. 10-11 Aug. 13-14 Sept. 17-18 Aug. 20-21 Sept. 29-30

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., 440 Oakland Street, Manchester, CT 06040-2100. Telephone: (203) 647-0220. FAX: (203) 646-7120.

**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.

**New Capability in CADUTIL**

(Continued from page 17)

```
DOIT.BAT
@echo off
CADUTIL -b %1
echo CADUTILing %1 >>jnk
del *.brt >NUL
```

UPDATE.BAT creates a variable for each part file, and then it calls DOIT.BAT. DOIT.BAT runs CADUTIL with the -b option. This -b option eliminates the question about backing up the files. DOIT.BAT then deletes the .brt files, and it outputs the status of the CADUTIL to a file called jnk. DOIT.BAT then goes back to UPDATE.BAT and calls the next file to repeat the process. They work very well together.

You can also use the FOR loop with RPLOTT when you want to run a large quantity of .plt files to your printer unattended. The example below shows how to enter the command on the DOS command line.

Example: for %x in (\*.plt) do rplot %x

**NOTE:** When the FOR loop command is running in a batch file, it requires two percent symbols before the variable is declared. See UPDATE.BAT above. In UPDATE.BAT the variable is x. When the FOR loop command is entered on the DOS command line, it only requires one percent symbol before the variable is declared.

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## CADKEY Overlay and Draftsman Available Now!

CADKEY Overlay™, the original, on-screen tool for tracing scanned images of paper drawings into 3-D CAD models, and Draftsman™, the automatic raster-to-vector conversion software, are now both available for CADKEY. Working in conjunction with Image Systems Technology, Inc. and Arbor Image, Inc., Software Ventures, Inc. developed a graphical interface linking CAD Overlay™, and Draftsman, with CADKEY.

CADKEY Overlay saves engineers time and money by eliminating most of the problems associated with CAD-data entry using large digitizing tablets or tables. Scanning a paper drawing creates a raster image. Draftsman automatically converts the raster image into a vector image that can be edited. This saves hours of time.

### A Raster-CADKEY Hybrid

The process of conversion begins with the scanning of an existing paper drawing, using any commercially available scanner or scanning service bureau. CADKEY Overlay displays the scanned image, using CADKEY's video-display capability, as a background on the screen, creating a hybrid image. The background image is not a layer in a CADKEY part file. (In fact, the background image is virtually hidden from CADKEY for faster display processing.)

Although the background image is not a CADKEY file, you can turn the image on and off; you can move around in the image, pan and zoom, all in perfect synchronization with an overlaying CADKEY file. With the CADKEY Overlay image displayed, you can very rapidly trace over the image because both the scanned image and the CADKEY part file are on the same screen. It is important to note that, while you *appear* to be tracing over the scanned image, in fact, you are *really constructing* the part in CADKEY that the image represents. You are creating a two-dimensional part file because the

entities in the flat image represent only x and y coordinates. To make the part file three dimensional, add the appropriate height or depth (the z coordinate) wherever needed.

For example, if you have scanned a multi-view drawing into CADKEY Overlay, you can trace/construct the part in any view in CADKEY. Then, using CADKEY's X-FORM function you can join the geometries of all of the views together into a single three-dimensional model.

### Human and Economic Advantages

CADKEY Overlay offers human and economic advantages. Unlike converting a drawing by using a digitizer tablet, you no longer have to shift your attention back and forth between the screen and the digitizer. This significantly reduces operator fatigue. Quality control can take place constantly as you are tracing, because the original image is available on-screen for immediate checking. Draftsman creates small vectors files because the vectors it creates are long. The length of the vectors makes them useful for computer-aided design, and a user can modify them in CADKEY according to the needs of the design.

CADKEY Overlay and Draftsman are available now for DOS-based CADKEY/386 Version 3.5 or higher. CADKEY Overlay and Draftsman support both large format scanners, such as VIDAR™ and Skantek™, and low-cost units, such as Houston Instrument's SCAN-CAD™, DataCopy™, Contex™, and scanners used for desktop publishing.

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

**Editor's Note:** CAD Overlay™ is a trademarked product of Image Systems Technology, Inc., Troy, New York. Draftsman™ is a trademarked product of Arbor Images, Inc., Ann Arbor, Michigan.

## Roland Digital Group Announces 30% Discount for Schools That Are Authorized CADKEY or DataCAD Training Centers

A letter to all educational institutions that are also Authorized CADKEY and/or DataCAD Training Centers, dated April 15, 1991, offers a one-time opportunity to purchase any of Roland Digital Group's products at a 30% discount from list price. Paul Mailhot, Director of CADKEY Training Centers, and Amy Curtis, Educational Representative of Roland Digital Group, jointly signed this letter to schools that teach CADKEY and DataCAD. The offer extends through December 31, 1991. Roland Digital Group reserves the right to determine a training center's eligibility to participate in the offer.

Roland Digital Group's line of HPGL-compatible computer peripherals includes a broad range of high resolution plotters, available in flatbed, thermal, rollerbed, and desktop models, as well as the CAMM-3 mechanical modeling machine for manufacturing three-dimensional physical prototypes, and computer-based solutions for engraving and signmaking.

For more details and pricing information, interested Authorized CADKEY and DataCAD Training Centers should contact Amy Curtis at Roland Digital Group, 77 Accord Park Drive, Building C, Norwell, MA 02061. Telephone: (617) 878-0064. Fax: (617) 871-9812.

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## Some of CADKEY's software products and services:

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CADKEY/UX<sup>TM</sup>  
CADKEY IGES Translator<sup>TM</sup>  
CADKEY SURFACES<sup>TM</sup>  
CADKEY SOLIDS<sup>TM</sup>  
CADKEY RENDER<sup>TM</sup>

### Reverse Engineering

CADDInspector<sup>TM</sup>  
CopyCAD<sup>TM</sup>

### Inspection/Quality Control

CADDInspector<sup>TM</sup>  
VIEWSTATION<sup>TM</sup>

### A/E/C

DataCAD<sup>(R)</sup>  
DC Modeler<sup>TM</sup>  
DataCAD Velocity<sup>TM</sup>  
DataMERGE<sup>(R)</sup>

### Services

Training  
Technical Support  
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For information about CADKEY's products and services, contact CADKEY, INC., 440 Oakland Street, Manchester, Connecticut 06040-2100. Telephone: (203) 647-0220. FAX: (203) 646-7120.

### Marathon-IBM Tower

## DataCAD User Delivers 50-Story Skyscraper On Time!

Rising dramatically 50 stories to within one meter (39 inches) of the height of the summit of Mount Royal, the Marathon-IBM Tower at 1250 Boulevard René-Lévesque in Montréal, Québec, Canada, has already become a famous landmark in the city. Construction of this joint venture between Marathon Realty Company, Ltd. (a subsidiary of Canadian Pacific Limited) and IBM Canada began in October 1988. Now the Marathon-IBM Tower has another significant claim to fame: the building was completed on schedule! And, the architectural firm responsible for coordinating this entire project, Larose, Petrucci & Associés of Montréal, used DataCAD<sup>SM</sup> to produce all of the detailed plans required for the project.

"A lot of work by a lot of people made it happen with a very tight schedule," said Charles Lamy, Project Manager at Larose, Petrucci. Charles served as the liaison coordinating the work by Kohn Pedersen Fox PC of New York (the architectural-design firm), Marathon Realty, Magil Construction, Ltd. (the general contractor) and the various subcontractors. (See **DataCAD Plays Key Role in Major Construction Project in Montréal, 3-D WORLD**, November/December 1989, page 9.)



*The Marathon-IBM Tower, Montréal, Québec, Canada. Photograph by Jean Lemieux.*

### One Week's Lead Time

"Until we reached the fifth story, we only had approximately one week's time to prepare each section's construction plans for the builders," Charles added. "We laid out the floor and ceiling plans in square, 1.5 x 1.5-meter modules. It took between a week and a half and two weeks (eight to ten working days) to construct each story, depending on the weather."

From the fifth story up, construction proceeded rather rapidly because the plans for groups of floors (5-11, 12-15, 16-17, 18-35, 36-42, and 43-45) were basically the same. Floors 46, 47, 48, 49, and 50 each required individual plans. "DataCAD made individual modifications

for specific floors easy to do," Charles continued. "On the average, there were major changes in the floor plans every five or ten floors.

### Ahead of Schedule

IBM Canada took occupancy of floors 4 through 12, in stages, beginning on May 15, 1990, one year before the building's scheduled date of occupancy. The company did this in order to give themselves the lead time needed to add customized touches for their specific needs. By November 15, 1990, the staff of IBM Canada began to move their operations into their new facilities. "Getting IBM into its new quarters, on time, was the key goal," Charles added. IBM Canada was not the only tenant to begin occupancy in the Marathon-IBM Tower before the scheduled completion date. By the building's official opening date, it will already be 50%-60% occupied.

The municipal ordinances of Montréal do not allow any building to be built taller than the summit of Mount Royal, the most prominent natural landmark on the Island of Montréal. With its roof reaching within three feet of the height of the summit of Mount Royal, the Marathon-IBM Tower is probably destined to remain one of the tallest skyscrapers, if not the tallest one, in Montréal.