CAD/CAM NEWSLETTER

July-August 1987

Information Compiled by the Canadian CAD/CAM Council

for the Advancement of Computer Integrated Manufacturing *

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1. CAN-MATE To Be Established

Arrangements for the establishment of the Canadian Manufacturing Advanced Technology Exchange (CAN-MATE) were described by the Honourable Frank Oberle, Minister of State for Science and Technology, and Laurent Thibault, President of the Candian Manufacturer's Association (CMA) at a press conference held in Toronto, July 15, 1987.

CAN-MATE is a national centre operated by the CMA which will help Canadian manufacturers apply advanced technologies to production and processing in all industries, thereby improving their competitiveness in domestic and foreign markets. These advanced technologies include automated materials handling, testing and inspection, computer-aided design, robotics and artificial intelligence.

Under an agreement between the National Research Council (NRC) and the Canadian Manufacturer's Association, the NRC will provide the CMA with $3.5 million over seven years to assist in the operation of CAN-MATE.

"Adopting advanced manufacturing technologies is essential to strengthening competitiveness and Canada needs new approaches to meet the challenge. I commend the CMA for showing leadership in establishing CAN-MATE. Their initiative will enhance the existing technology diffusion activities across the country for the benefit of all manufacturers," Mr. Oberle said.

CAN-MATE will operate as a separate entity out of the CMA headquarters in Toronto. This will allow it to use CMA equipment and services and to benefit from, and build upon, the expertise and experience which the CMA has accumulated over the past few years in this field.

Over the past few years, the Candian Manufacturer's Association has taken initiatives, such as the Manufacturing Advanced Technology Forum, to increase senior management's awareness of the benefits from exploiting manufacturing and materials technologies. Their position paper on advanced manufacturing technology, entitled "Canadian Manufacturing at the Crossroads" (1986), discusses in detail the challenges facing industry. The establishment of CAN-MATE will allow the CMA to expand its programs in manufacturing technologies, for the benefit of all companies.

CAN-MATE is designed to:

- foster greater cooperation and sharing of information, expertise and resources betweeen the private sector, the more than 70 CAD/CAM centres and appropriate provincial and federal facilities;

- monitor developments and exchange information with national facilities in other countries, for the benefit of Canadian industry;

- define and coordinate technology development, diffusion and demonstration projects at the request of industry; and

- act as a source of advice to governments in Canada on how to encourage the development and application of advanced manufacturing technologies nationally and regionally.

Information and Advice to Industry

In collaboration with technology centres, CAN-MATE will inform industry on investment planning, and the sources, management and application of new technologies. This will be done through, among other things, an inquiry system for manufacturers, linked electronically to foreign and domestic technology bases, such as the Canadian Institute for Scientific and Technical Information (CISTI). CAN-MATE will also: prepare and distribute bulletins on up-to-date developments in advanced manufacturing technologies; facilitate the exchange of video tapes; and arrange seminars, workshops, and training programs in cooperation with other organizations or groups.

Multi-Firm Development Projects

On the request of clients, CAN-MATE will help define and coordinate technology development, diffusion and demonstration projects of common interest to firms on a cost-shared basis. This activity could include technology reviews, hardware and software directories and user evaluation guides on the development of new hardware, software or systems.

Coordination of Activities

CAN-MATE will work closely with existing CAD/CAM and robotics centres in Canada to coordinate and share information, strengthen their capabilities and minimize duplication. The Exchange will supply manufacturers with information on the activities of the various technology centres, including their functions, facilities and areas of specialization. In addition, the Exchange will help bring the needs of manufacturers to the attention of the centres. CAN-MATE will also work closely with industry trade associations.

National and International Role

CAN-MATE will monitor international developments in advanced manufacturing technologies and develop contacts and exchange information with organizations in other countries. It will provide a national and international perspective to Canadian industry, community colleges, universities and other centres on technological developments and identify issues of strategic importance to Canada.

CAN-MATE Advisory Board

An Advisory Board will be established to provide policy and program advice to the CMA on the operation of CAN-MATE. It will include representatives from industry associations, provincial research organizations, technology centres, the clients served by CAN-MATE and the National Research Council. The Department of Regional Industrial Expansion will participate as an observer. The Board will also advise governments on industry needs and on ways to develop and apply advanced manufacturing technologies nationally and regionally. CAN-MATE will have its own director and staff. Persons interested in applying for these positions are advised to contact the CMA who are currently seeking to fill the position of director.

Summary

In summary, the four main objectives of CAN-MATE are:

1. Providing information and advice to industry

2. Coordinating multi-firm development projects

3. Coordinating activities and sharing information between regional and national centres and organizations

4. Providing a national and international perspective

The CAD/CAM Council fully supports the establishment of CAN-MATE and in fact has worked closely with the CMA for several years in encouraging their participation in this development.

With approximately 6000 member companies, most of whom are current or potential users of CIM, the CMA connection to CAN-MATE will provide a strong "user-pull" to the development and application of advanced manufacturing technologies. This will strongly augment the "technology-push" of the more than 70 CAD/CAM technology centres in Canada. It also represents the commencement of a new level of partnership and collaboration towards mutual goals between government and the CMA.

The need for such a facility was first identified in the CAD/CAM Councils 1980 report "Strategy for Survival". Of the four objectives of CAN-MATE, the first two above are derived directly from the council's 1980 report "Strategy for Survival", and the second two from the council's 1983 report "Closing the Gap".

The CAD/CAM Council therefore commends both the CMA and the federal government for this accomplishment and support.

For additional information, please contact:

Greg MacDonald
Director, Public Affairs
Canadian Manufacturer's Association
(416) 363-7261

Patricia Montreuil
Public Affairs
National Research Council
(613) 993-4848

Ozzie Silverman
Director, Strategic Technology Planning
Ministry of State for Science and Technology
(613) 993-7599

For additional copies of the CAN-MATE Backgrounder, contained in the press information kit, please contact:

Communications Branch
Ministry of State for Science and Technology
(613) 990-6142

2. CAD/CAM Council Holds Final Meeting

Members of the steering committee held a meeting of the CAD/CAM Council in the offices of the Department of Regional Industrial Expansion (DRIE) on July 30, 1987, and were advised that this would be the final meeting as funds for continued support had been exhausted by this meeting.

The attention of the seven council members and three government persons attending as observers was devoted primarily to two items:

a) Achieving continuity between the council's activities and those of CAN-MATE when operational status is achieved, and

b) Stimulating action, where possible, on the projects on CIM recommended by the council to DRIE for implementation. These are described fully in an information report entitled "New Government Initiatives for Ensuring Manufacturing Competitiveness" (see CAD/CAM Newsletter Feb. 1987, also CAD/CAM & Robotics magazine, August 1987).

The Chairman of the CAD/CAM Council, Mr. E. Cinits, has therefore written to Mr. L. Thibault President of the CMA to convey the council's congratulations on the launching of CAN-MATE and offering to provide assistance in its establishment. For example, individual current or past members of the council are available to serve as members of the CAN-MATE advisory board, and the need for a long-range planning committee is identified.

The Canadian CAD/CAM Council (originally called the CAD/CAM Technology Advancement Council) was established in 1978 by the then Department of Industry, Trade and Commerce in recognition of the contribution that CAD/CAM can make to improving the productivity and efficiency of the Canadian manufacturing industry.

The most active areas in CAD/CAM technology development and application are:

- computer-aided drafting and design;
- numerical control of machine tools and other equipment;
- industrial robotics;
- flexible manufacturing systems.

The mandate of the Council, comprised of approximately eighteen representatives from industry, educational institutions and the government, is to examine the potential of CAD/CAM, to recommend actions on the part of industry, educational institutions and government to promote its widespread adoption and to disseminate information on the subject.

Since the majority of its members are from outside government, the council is responsive to the needs of the private sector. Council chairmen, since its formation and their positions held at time of office are;

1978-79 J. Nassr, President, ICAM Technologies Corporation, St. Laurent, Quebec.

1979-80 J.E. Crozier, Vice President and General Manager, Canadian Institute of Metalworking, Hamilton, Ontario.

1980-81 Dr. D. Bonham, Chairman, Department of Mechanical Engineering, University of New Brunswick, Fredericton, New Brunswick.

1981-82 R. Fielding, Technical Director, Alcan Canada Products Limited, Kingston, Ontario.

1982-83 J.R. Dickinson, Faculty of Engineering Science, University of Western Ontario, London, Ontario.

1983-84 C.A. Archibald, Director of Manufacturing, NCR Canada Ltd., Waterloo, Ontario.

1984-85 M. Lishnak, Vice President Sales, Gross Machinery Group, Toronto, Ontario.

1985-87 E. Cinits, Managing Director, Centre for Advanced Technologies (CART), Prince George, B.C.

Secretariat services for the council have been the responsibility of J. Scrimgeour from 1978-1983, and L. Giroux 1983-1986. The Editor for the monthly CAD/CAM Newsletter from Aug. 1979 to Aug. 1987 has been J. Scrimgeour.

The Council is perhaps best known for its three major reports, in addition to the CAD/CAM Newsletter.

- "Strategy for Survival" - 1980

- "Closing the Gap" - 1983

- "Management in Crisis" - 1986

The council members from the private sectors serve without remuneration other than travel expenses incurred in attending the council meetings, held four times per year. Council meetings have been held in virtually all provinces of Canada. In addition, as early as 1983, council members had given approximately 80 talks or presentations at 61 conferences and seminars in Canada, with a collective attendance of approximately 4 400 persons, thus giving an early and guided initial thrust to CAD/CAM in Canada.

The council has assisted in the sponsorship of many CAD/CAM conferences in addition to holding an annual coordination meeting for representatives of the CAD/CAM technology centres in Canada. These have been well attended and supported by the centres.

Travel costs for attendance at the council meetings, born by the Department of Industry Trade and Commerce, and later by the Department of Regional Industrial Expansion, have gradually increased from a low of $8,000 to approximately $50,000 per year in total, due largely to increases in rates for travel associated with the four council and four steering committee meetings held per year.

3. Newsletter Continuity

It is expected that CAN-MATE will issue a regular newsletter or publication. Arrangements are being made by the CAD/CAM Council whereby readers of the CAD/CAM Newsletter may automatically receive this new publication.

4. Statscan Canada Data on Capital Expenditures for Machinery Equipment

Based on data gathered for the first time in 1985, Statscan now have available some unpublished data on capital expenditures by type of machinery and equipment.

On the basis of the new survey, 30 different types of equipment have been reported and classified according to 45 industries that buy the equipment. Previously, this detail has not been available. Analysis will now yield not only how much an industry invests but also the kind of machinery being purchased and the technological and structural change taking place. The price for this unpublished data is $25, and maybe obtained as noted below.

The source of these data is the survey of capital and repair expenditures "Actual 1985". Industries included in the 1st phase represent 75% of the all-industry total of $32.4 billion published in "Private and Public Investment in Canada Outlook 1987". In order to complete the coverage further industries will be added in succeeding years.

Since this is the first time the data has been collected, it is only possible at this time to high-light the structure of the data series. Trend analysis will follow in future years as the data becomes available.

Highlights

For those industries surveyed:

- For every $1 spent on robotized/computerized machinery and equipment, $7 was spent on conventional machinery and equipment. (Editor's Note: In other words, of every $8 now spent on machinery and equipment, $1 now, is for machinery with robotized/computerized operation)

- Within robotized/computerized machinery and equipment the spending pattern was as follows: $41 million for material handling, $820 million for the production process and $244 million for communications.

- Within conventional machinery and equipment the spending pattern was as follows: $272 million for material handling, $5,754 million for the production process and $1, 810 million for communications.

- In the manufacturing industries, electrical products led with 30.1% of its spending on robotized/computerized machinery and equipment.

- The paper and allied industries spent the most on robotized/ computerized equipment - $341 million.

- Expenditures on computer hardware and word processors amounted to $2,264 million.

- Capitalized overhaul represented 3% of total capital machinery and equipment.

For further information, contact:

Science, Technology and Capital Stock Division
Statistics Canada,
Ottawa, Ontario
K1A 0T6
Telephone: (613) 991-2209, 991-2590, 991-2591

5- ESPRIT and Eureka Projects in Europe

Recent information in U.K. publications relating to the May 1987 Conference on CIM Europe expresses concern at the freeze on funding of the second phase of ESPRIT which is Europe's advanced information technologies collaborative R & D programme. Under the proposed ESPRIT II, running from 1988-1992, total funding would double to £2.2 billion, and the CIM portion would increase for £ 125 million to over £ 380 million. However, a delay may occur unless U.K. agreement is obtained for the new five year plan.

Concern is also being expressed on data indicating that new robot installations in the U.K. in 1986 decreased to 475, which is a decrease of 20% from 1985 installations (and 1985 was a 27% decrease from 1984) while the total robot population in West Germany increased from 8,800 units in 1985 to a new high of 12,400 units.

Meanwhile, as reported in the CAD/CAM Newsletter June 1987, and now elsewhere, the Eureka program is gaining great momentum. Unlike ESPRIT, which has central funding and direction, Eureka relies on industry initiative. To date 19 countries have endorsed 109 Eureka projects totalling approximately $ 3.7 billion in R & D.

6- "Standard Glossary of Industrial Automation Terms"

Work is proceding to develop a standard glossary of industrial automation terms as described in the CAD/CAM Newsletter, October 1986. This is being undertaken as a project under Technical Committee 184 of the International Standards Organization and a first draft for committee review is expected by October 1987.

Readers of the CAD/CAM Newsletter have responded by drawing existing source material to the attention of the editor, who is also a co-convenor for this undertaking.

Readers who have, or who know of, existing glossaries which should be considered for input material are requested to contact the newsletter editor. Hard copy of the existing glossaries would be appreciated in instances where these are reasonably short, out of print or difficult to obtain.

Contact: J. Scrimgeour
ISO Industrial Automation Glossary
Room 205, Bldg, M-50
Division of Electrical Engineering
National Research Council
Ottawa, Ontario, Canada
K1A OR6

7. General Motors Briefing on MAP Implementation Progress

General Motors held a media briefing at its Truck and Bus Group Pontiac East assembly plant, July 30/1987, to highlight the implementation of the Manufacturing Automation Protocol (MAP) plant communication system at that location. As newsletter readers are aware, GM has been the driving force behind the adoption of MAP worldwide in order to reduce the cost of plant-floor data communications.

A few statistics on the Pontiac, East plant indicate the extent of the implementation at this location. Automated systems operating include:

- 143 robots
- Nine modular paint booths
- 350 programmable logic controllers
- 25 cell controllers
- 20 miles of broadband cable.

More than 1.6 million hours of employee training preceded the start of production, including 760,000 hours of training in classrooms and elsewhere for skilled trades employees, and two weeks of classroom training for a majority of the plant's 2,200 employees.

The plant contains more than 39 hardware systems driving eight major software sysems. The major hardware devices are (2) IBM 4381 mainframes; (4) digital VAX 8600s; (24) HP cell controllers; and (9) Digital micro VAXs. The software systems include flexible scheduling; statistical process control; various test systems; vehicle processing system; inspection feedback system; facilities monitoring control system; maintenance management; and shipping control system.

Condensed from information supplied by:

Public Relations Staff
General Motors Truck and Bus Group
31 Judson Street
Pontiac, Michigan 48058
Telephone: (313) 456-2911

8. CAD/CAM Information Available

- "M*: A Methodology for Information System Analysis and Database Design in Production Environments" A. DiLeva, F. Vernadat, D. Bizier, National Research Council Report #26204 (Div. of Electrical Engineering ERB-1000).

  In this report, a methodology, called M*, for information system analysis and database design of production environments is presented in detail. The M* methodology is based on the Italian DATAID methodology. Preparation of the report has been motivated by the realization that database technology, and logical database design in particular, are central to the CIM concept and require significant user involvement because CIM is not a technology that can be purchased.

  The methodology M* is a manual methodology dealing with centralized databases. Beginning from fundamental concepts in information science, a case study application to a flexible manufacturing system is presented in the report for a hypothetical company manufacturing turbine blades.

  Advantages of M* include:

  - It is a pragmatic, step by step methodology
  - It is complete, i.e., it covers all database design phases
  - It is based on good modelling tools (functional models, EER model, Petri nets)
  - It deals with static and dynamic properties of data
  - It involves a detailed system analysis and modelling phase

  However, M* has some disadvantages which are:

  - It is a complex manual methodology involving numerous modelling techniques
  - It is time-consuming since it is manual and involves a lot of clerical work
  - It is prone to human subjectivity for the definition of entities and links among these entities, and during the view integration process

  For report copies, available free of charge contact:

  Editorial Office, Room 301
  Div. of Electrical Engineering
  National Research Council of Canada
  Ottawa, Ontario, K1A 0R8

- "Benchmark Procedure to Evaluate Computer-Aided Design and Drafting Systems for Building Industry Application" D. Vanier Building Practise Note BPN 58, Division of Building Research, National Research Council Canada.

  A formalized Benchmark procedure, described in this report, has been developed to assist purchasers in their evaluation of the myriad of CADD systems now available. The procedure is thorough and time-consuming and should be used only at the final stage of the selection of a CADD system. The CADD Benchmark is designed to test most drafting features, as well as a number of more complex CADD operations, such as: area calculation, bills of material, and data base manipulation. It is directed at facilities management or space planning, but the software features tested cover a wide variety of drafting requirements for most building disciplines: plotting, zooming, dimensioning, scaling, rotation, filing, and symbol creation.

  Contact: Publications Section
  Division of Building Research
  National Research Council of Canada
  Ottawa, Ontario, K1A 0R6

- "The First Micro CAD Ratings Guide"

  This 182 page report presents an in-depth and scientific comparison of the main features of the best known and most promising CAD software packages: AUTOCAD, AUTOCAD AEC, C-CADD, CADKEY, CAD-SOLUTIONS, CADVANCE, DATACAD, DESIGN BOARD PROFESSIONAL, DRAWBASE, PERSONAL DESIGNER, VERSACAD, VERSACAD 3D. The research was conducted by a team of CAD specialist from various fields (architects, engineers, software analysts).

  A comparison matrix presents the twelve systems side by side in terms of their commands grouped under major themes. Also included are graphs of the response time for each system for a number of typical operations. A cost comparison of each system tested is included.

  The guide, prepared by a group of professionals under the direction of SIRICON, is distributed in Canada by SIRICON and in the USA by Design and Systems Research Publishing, Boston. SIRICON, Research and Computer Application for the Construction Industry, is affiliated with the Centre for Building Studies of Concordia University in Montreal.

  The Micro CAD ratings guide is available for $65 under the title noted above, or in French under the title "Le guide d'évaluation des logiciels de CAO".

  Contact: SIRICON
  1257 Guy Street, Suite 341
  Montreal, Quebec, H3H 2K5
  Telephone: (514) 848-8770

- "Making Technology Work"

A statement by the Economic Council of Canada, published in June 1987, this report examines the impact of technological change on the labour market: The report considers how technological change affects employment and income and its impact on various groups such as women, young people, older workers and the disabled.

Related reports, published in 1986 include "Workable Futures: Notes on Emerging Technologies" and "Working with Technology: a Survey of Automation in Canada".

"Making Technology Work" Cat. No. EC 22-142/1987E is available in English or French from booksellers or the government publishing centre for $4.95 each in Canada ($5.95 in other countries) as noted below.

Contact: Canadian Government Publishing Centre
Supply and Services Canada
Ottawa, Ontario
Canada K1A 0S9

- "Innovation and Jobs in Canada"

This research report provides the detailed analytical findings that support the Economic Council of Canada's recently published statement "Making Technology Work", as noted above. The report identifies technologies that have been introduced, the management of innovation within firms and recommends a strategy to encourage both rapid technological advance and minimum cost of labour market adjustment.

Publication Cat. No. EC 22-141/1987E. Available in Canada for $10.95 as noted above, $13,95 elsewhere.

- IIASA Reports on Computer Integrated Manufacturing

The International Institute for Applied Systems Analysis (IIASA) is a systems analyses institute with headquarters in Laxenburg Austria. IIASA is supported by member countries from around the world.

Under the leadership of Prof. R. Ayres of Carnegie Mellon University, IIASA is in the process of initiating a cooperative project involving many countries, with both free market and centrally planned economies, to model the economic impact of computer integrated manufacturing. The principle approach to the project appears to be to develop the numerical coefficients for new input-output matrices, which model the economy in each nation. The new coefficients would represent values for a post CIM world, rather than a pre-CIM world, thus reflecting the wide scale impacts of computer integrated manufacturing.

In preparation for this project, which held its first major planning meeting in July 1987, a number of working papers on CIM have been prepared as interim reports. One report plots data from a database describing worldwide installations of flexible manufacturing systems. A second discusses methodology for estimating the employment effects of CIM at the macro-economic level, while a third discusses future trends in factory automation.

For further information, contact:

International Institute for Applied Systems Analysis
A-2361 Laxenburg
Austria

- "The Introduction of a Group Technology System and the Allocation of Resources Within that System" P. Bunce

Due to a recent resurgence of interest in Group Technology the author has donated the above Ph.D. thesis to the CAM-I library who therefore have it as one of their reports available to the public. CAM-I advises that the report demonstrates how a Group Technology System in a small company with limited resources and product range needs to differ practise from theory in order to be succesful. CAM-I document DR-87-GT01, price $50.00 (U.S.).

Contact: Computer Aided Manufacturing, Inc. (CAM-I)
Suite 1107
611 Ryan Plaza Drive
Arlington, Texas, 76011, U.S.A.
Telephone: (817) 860-1654
Telex: 890-5127
Fax: (817) 275-6450

- "Teaming Lasers and Robots"
American Machinist and Automated Manufacturing, May 1987, pp 85-96

This Special Report No. 794 describes the natural marriage between the guidance and manipulation capability of industrial robots with laser devices whose beam can cut, make holes, weld, surface-harden, alloy, clad, coat, strip or mark virtually any material. Cutting of prototype auto stampings has become a major application. Reprint copies available $4.00 (U.S.) but minimum billing, pre-paid is $16.00. For details,

Contact: Resource Center
American Machinist and Automated Manufacturing
P.O. Box 1130
Times Square Station
New York, N.Y. 10036, U.S.A.

- "The Personal Computer in Manufacturing"
American Machinist and Automated Manufacturing, June 1987, pp 57-96

The June 1987 issue of American Machinist and Automated Manufacturing contains a 40 page special report No. 795 on the use of PC level computers for CAD, cost estimating, process planning, manufacturing control and quality assurance. Includes a 20 page software directory.

Contact: American Machinist, (as above)

- "Computer Integrated Manufacturing Handbook". E. Teicholz, J.N. Orr/editor, McGraw Hill Book Company

The twenty chapters by many authors include chapters devoted to most of the component technologies of CIM plus an emphasis on management issues. Includes a special chapter on the financial accounting aspects of CIM.

Contact: McGraw Hill Ryerson Limited
330 Progress Avenue
Scarborough, Ontario, M1P 2Z5
Telephone: (416) 293-1911

- Video Course on "Computer Integrated Manufacturing Systems: Theory and Application"

The American Society of Mechanical Engineers (ASME) has a new video course available on CIM which includes three videotapes and more than 200 pages of course notes. Video presenters to the presentation include persons from General Electric, Harvard University, IBM and others. Available in VHS or Beta format. Price $ 299.95 (U.S.) prepaid including shipping.

Contact: Professional Development Dept./CIM
American Society of Mechanical Engineers
345 East 47th Street
New York, N.Y., 10017, U.S.A.

- "Manufacturing Insight" Video Series from SME

The Manufacturing Insight Series of videotapes produced by the Society of Manufacturing Engineers (SME), as described in previous issues of the CAD/CAM Newsletter, is continuing to issue videotapes on new subject material.

Recent issues in the series include:

"Simulation" - Number 12 in the series describes three case studies using simulation as a design-analyses tool (1) A study of autoclave curing times at Rohr Inustries, Los Angeles, (2) The elimination of bottlenecks in AGV guide paths at General Electric, Cincinnati and (3) the design of production facilities at Intel in Phoenix, Arizona.

For 1987 tapes to be released in the series are on "CAD/CAM (released Feb./87), "Programmable Controllers", "Automated Assembly", "Flexible Manufacturing Cells" and "Sensors"

For further information contact SME at the address given elsewhere in this issue, or by telephone at (313) 271-1500, ext. 429.

- Information on MAP, the Manufacturing Automation Protocol

Several new references and publications on MAP are listed below. Readers are also reminded of further information, including a description of the MAP users group and the Canadian MAP interest group (CMIG) contained in the Oct. 1986 CAD/CAM Newsletter.

- "The MAP Book: An Introduction to Industrial Networking" is a book published by Industrial Networking Inc. (INI) as an aid to managers responsible for implementing CIM strategies. Price $ 14.95 (U.S.).

  Contact: INI, 3900 Freedom Circle
  Santa Clara, California, 95052-8030, U.S.A.
  Telephone: (408) 496-0969

- "MAP 3.0 Implementation Release" and "TOP 3.0 Implementation Release". Copies of the draft implementation specifications for factory data communications (MAP) and multi vendor office communications (TOP) are now available. Price is $120 for MAP (1500 pages) and $60 (281) pages for TOP.

  Contact: Canadian MAP Interest Group
  c/o Canadian Standards Association
  178 Rexdale Blvd.
  Rexdale, Ontario
  M9W 1R3
  Telephone: (416) 747-4017

- "MAP/TOP Product Directory" - lists 179 products (69 of them new in this updated edition) with one page descriptions of each. Subscribers will receive both the spring 1987 edition, and a further updated fall 1987 edition: Subscription price $115 (U.S. - SME members) and $135 (U.S. - non-members).

  Contact: Publication Sales, SME
  One SME Drive
  P.O. Box 930
  Dearborn, Michigan, 48121
  Telephone: (313) 271-1500 ext. 418 or 419

- **"Strategic Planning for Computer Integrated Manufacturing"**

  A 459 page report with chapters on CIM, its challenge and integration as a strategic weapon, MAP and factory data communications, assessments of CIM technologies such as MRP, CAPP, JIT, GT, CNC, robotics, FMS, corporate strategies, case histories, planning for CIM and sources of assistance. Price $ 495 (U.S.).

  Contact: CAD/CIM Management Roundtable, Inc.
  824 Boylston Street
  Chestnut Hill, MA, 02167, U.S.A.
  Telephone: (617) 232-8080

9. CAD/CAM Conferences, Seminars, Workshops and Exhibitions

- **"Industrial Automation Standards"**
  Sept 15-18, 1987 Ramada Hotel O'Hare, Rosemount (Chicago)

  A conference and workshop on industrial automation standards, sponsored by CAM-I dealing with the need for standards in computer integrated manufacturing (CIM) and the computer integrated enterprise (CIE). Fee $275 (U.S.). No charge for CAM-I Executive Standards Committee meeting which is open to all interested parties.

  Contact: CAM-I
  Standards Committee Conference
  Attention Annette Van Haven
  611 Ryan Plaza Drive, Suite 1107
  Arlington, Texas, 76011
  Telephone: (817) 860-1654

- **"Group Technology - Concepts and Applications"**
  Sept. 15-18, 1987 Hyatt Hotel at Los Angeles Airport

  A user's forum with many case histories including live demonstration of DCLASS, Multiclass and others. Organized by the SME. Fee $425 (U.S. - SME members), $525 (U.S. - non members).

  Contact: Special Programs Division
  Society of Manufacturing Engineers
  One SME Drive, P.O. Box 930
  Dearborn, Michigan, 48121, U.S.A.
  Telephone: (313) 271-1500 ext. 386

- **"AGV'S at Work"**
  Sept 22-24, 1987 The Prince Hotel Toronto, Ontario

  An introductory course to automated guided vehicles (AGV'S) organized the SME and G. Hammond, professor of mechanical engineering at GMI Engineering and Management Institute, Flint Michigan. Course material includes book "AGV'S at Work" by Prof. Hammond. Fee $525 (U.S. - SME members), $625 (U.S. - non members).

  Contact: SME (as above)
  Telephone: (313) 271-0039

- "MAP/TOP Users Group Meeting"
  Sept. 22-23, 1987 Loews Anatole Hotel, Dallas, Texas.

  A special emphasis will be given at this users group meeting on recent developments, user implementation of MAP and TOP, and the new MAP specification 3.0. Includes vendor's table top exhibits. Registration fee $250 (U.S. - SME members), $325 (U.S. - non members). Meeting is preceded by an optional in depth workshop on MAP Application Technologies, Sept. 21. Fee $195 (U.S. - SME members), $245 (U.S. - non members).

  Contact: MAP/TOP Users Group
  Technical Activities Division
  Society of Manufacturing Engineers
  P.O. Box 930, One SME Drive
  Dearborn, Michigan, 48121, U.S.A.
  Telephone: (313) 271-1080

- "Mechanical Design and Sensor Integration for Robot and Automation Tooling"
  Sept. 22-23, 1987 Radisson Inn (Airport), Cincinnati, Ohio

  A clinic with multiple instructors organized by R. Hinson. Includes table top exhibit by suppliers. Fee $395 (U.S. - SME members), $495 (U.S. - non members).

  Contact: Special Programs Division
  Society of Manufacturing Engineers
  One SME Drive, P.O. Box 930
  Dearborn, Michigan, 48121, U.S.A.
  Telephone: (313) 271-0039

- "Succesful Automatic Assembly Systems"
  Sept. 23-24, 1987 The Prince Hotel, Toronto, Ontario

  A course organized by SME, with F.J. Riley of Bodine Corporation, Bridgeport, Connecticut as instructor. Course covers mechanical assembly plus special problems for electronic assembly with discrete component insertion, surface-mounted assembly, or hybrids. Course fee includes 352 page book "Assembly Automation: A Management Handbook" by F.J. Riley. Course fee $395 (U.S. - SME members), $495 (U.S. - non members)

  Contact: Special Programs Division of SME (as above)

- "Flexible Welding and Cutting '87"
  Oct. 6-8, 1987 Clarion Hotel, Cincinnati, Ohio

  A conference with presentations on plasma arc cutting, flexible automated welding, expert systems for robotic welding, laser welding, abrasive water jet cutting plus a full day workstop on MAP and TOP.

  Contact: Technical Activities Dept., SME (as above)

- "Developing Practical Artificial Intelligence Strategies for Manufacturing"
Oct. 7-8, 1987 Hyatt Lincolnwood, Lincolnwood (Chicago), Illinois

A comprehensive two day seminar designed to aid in understanding artificial intelligence and its potential use in manufacturing, organized by the SME and conducted by Dr. H. Firdman as program instructor. Registration fee $595 (U.S. - SME members) $695 (U.S. - non-members)

Contact: Special Programs Div. of SME (as above)

- "FMS' 87"
Oct. 12-15, 1987 Ramada Renaissance Hotel, Long Beach, California

An annual SME conference with up to date FMS application case studies and FMS design information. Registration includes conference proceedings. Fee $485 (U.S. - SME members) $585 (U.S. - non-members)

Contact: Special Programs Div. of SME (as above)

- "Design for Manufacturability: Getting it Right the First Time"
Oct. 18-20, 1987 McCormick Center Hotel, Chicago

An international conference organized by "CAD/CAM Alert" emphasizing the gap to be bridged between CAD and other functions including engineering analysis, costing, materials requirements and production processes. Program fee $745 (U.S. - for CAD/CAM Alert subscribers) $845 (U.S. - for others)

Contact: Kim Takita
Program Manager
Management Roundtable, Inc.
824 Boylston Street
Chestnut Hill, MA 02167
Telephone: (800) 338-2223
(617) 232-8080

- "APICS 30th Annual International Conference and Technical Exhibit"
Oct. 19-23, 1987 Cervantes Convention Center, St.Louis, Missouri

An annual conference, this year with approximately 200 experts presenting papers on advanced manufacturing systems technologies including production control, statistical quality control, project management, material requirements planning (MRP), Just In Time (JIT) strategies, inventory management, computer integrated manufacturing (CIM) and others. Includes 80,000 square feet of exhibits. Fee $550

(U.S. - members), $615 (U.S. - non-members) or $150 - 215 (U.S.) respectively for academics.

Contact: APICS Registration Dept.
500 W. Annandale Rd.
Falls Church, Virginia 22046
Telephone: (800) 368-3402
(703) 237-8344

- "CAM-I's 16th Annual Technical Conference"
Oct. 26-28, 1987 Innisbrook, Tarpon Springs, Florida

An annual technical conference open to non-members of CAM-I, and members meeting, this year emphasizing the Computer Integrated Enterprise (CIE) with integration of all major functions necessary for world class manufacturing. Conference includes both technical issues and management issues such as justifying, planning, organizing and managing CIE.

Contact: CAM-I (as above)

- "Canadian MAP Interest Group Annual General Meeting"
Sept. 30, 1987 Toronto, Ontario

Contact: Canadian MAP Interest Group (CMIG)
c/o Canadian Standards Association
178 Rexdale Blvd.
Rexdale, Ontario, M9W 1R3
Telephone: (416) 747-4017

- "AUTOFACT '87 Conference and Exhibition"
Nov. 9-12, 1987 Cobo Hall Detroit, Michigan

The theme for AUTOFACT '87 is "Implementing CIM: Gaining the Competitive Advantage." Experts will address topics such as solid modelling, MAP/TOP, CIM management, socio technical engineering, FMS, AI/expert systems and other CIM issues. The November 1986 AUTOFACT exhibit covered 177,480 square feet with 250 exhibits under 90 categories and was attended by 23,995 persons. For 1987 the product category index now contains 124 categories as new products and services enter CIM.

Contact: Public Relations Dept., SME (as above)
Telephone: (313) 271-0777

**** 1988 CONFERENCES ****

- "Ninth Symposium on Engineering Applications of Mechanics"
May 29-31, 1988 University of Western Ontario, London, Ont.

Call for papers has been issued for the above symposium on current and emerging technologies in mechanics including solids, fluids, computer methods, structural dynamics, robotics, artificial intelligence, expert systems and others. Abstracts of 30 words in French or English required Sept. 30, 1987 for review and selection. Full papers Jan. 29, 1988.

Contact: Secretary to the Ninth EAM Symposium
Dept. of Mechanical Engineering
The University of Western Ontario
London, Ontario, Canada, N6A 5B9
Telephone: (519) 679-2111 ext. 8314

- "18th International Symposium on Automotive Technology and Automation - ISATA"
May 30 - June 3, 1988 Florence, Italy

First announcement and call for papers for ISATA '88 has been issued with the theme "Mechatronics - the use of electronics for product design, testing, engineering and reliability. ISATA typically attracts 400 delegates from 24 countries. All papers are selected and reviewd by a coordinating committee whose members include senior representatives from most European automobile manufacturers and the ISATA proceedings are widely recognized.

Prospective authors should submit 100-150 word abstracts by Oct. 15, 1987.

Contact: ISATA Secretariat
42 Lloyd Park Avenue
Croydon, CRO 5SB
England
Telephone: 01-680 8659
01-686 7026
Telefax: 01-680 3268

- "Robots 12 / Vision 88"
June 7-9, 1988 Detroit, Michigan

In 1988 the Robots 12 and Vision 88 expositions sponsored by the Robotics Industries Association (RIA) will be organized and managed by the National Machine Tool Builders' Association (NMTBA) who are experienced at handling very large technology shows and exhibitions.

The technical conference portions of the concurrent Robots 12 and Vision 88 will be sponsored by the SME as usual.

Contact: SME (as above) or
R.E. McCreary
Show operations Manager
Robots 12 / Vision 88
7901 Westpark Drive
McLean, Virginia 22102
Telephone: (703) 827-5277

- "7'th Canadian CAD/CAM, Robotics and Automation Conference and Exposition"

  Dates of June 14-16, 1988 have been announced for the exposition portion of this event, and it is assumed that the conference portion will be similar as in previous years.

- "Symposium on Manufacturing Application Languages"
  June 20-21, 1988 National Research Council, Winnipeg, Manitoba

  Call for papers has been issued for the above symposium organized in cooperation with the International Organization for Standardization's ISO/TC184/SC3 to enhance the standardization activities of Technical Committee 184 on Industrial Automation Systems, in particular, the work carried out by subcommittee 3 on manufacturing application languages.

  Topics of interest include languages for the orchestration of production plans, material handling, programable controllers, initiation of operations, robots, inspection and others.

  Abstracts of 200-300 words for review by the selection committee should be submitted by November 5, 1987 as follows, or to receive the preliminary program, hotel and registration material.

  Contact: MAPL '88
  c/o Mrs. H. Lacoste
  Conference Services Office, Bldg, M-58
  National Research Council Canada
  Montreal Road
  Ottawa, Ontario, K1A 0R6
  Telephone: (613) 993-9009
  Telex: 053-3145
  Fax: (613) 993-0603

- "First International Workshop on Robotic Application in Medical and Health Care
  June 23-24, 1988 National Research Council, Ottawa, Ontario

  Call for papers has been issued for the above workshop which is one in a series under the International Advanced Robotics Programme (IARP), sponsored by a group of eleven countries, including Canada. Attendance at the workshop is by invitation, based on the papers submitted for review by an international programme committee.

  Paper summaries of two pages should be submitted prior to Jan. 15, 1988.

  Contact: Mrs. H. Lacoste (as above)

- AUTOFACT '88
October 31 - Nov. 2, 1988 McCormick Center, Chicago, Illinois

Because of sell out and space limitations, the SME has announced plans to hold AUTOFACT '88 in Chicago and has booked dates, through to year 2021, although Cobo Hall is expanding. AUTOFACT '87 will be held in Cobo Hall, Detroit Nov. 9-12, 1987 as indicated above.

10. CAD/CAM Quotes - 1979 to 1987

- "At the conclusion of its first year of operation, the CAD/CAM [Advancement] council issued to the Department of Industry, Trade and Commerce a summary report recommending actions to encourage the rapid adoption of CAD/CAM technologies into industry. The work was carried out by members of the council on the basis of their own experience with CAD/CAM technology in Canada and a fairly extensive survey of current users of this technology. It concludes that (1) there exists a lack of understanding by middle and top management in many Canadian companies of the advantages of this technology, particularly as it applies to numerical control equipment (2) there is a shortage of competent N/C programming and qualified service technicians, as well as a need for a standard Canadian APT programming language."

CAD/CAM Newsletter, Issue #2, Sept., 1979

- "The Council report identifies many issues, discusses each in turn and makes specific recommendations. In summary, however, the council makes three main recommendations, one each to government, industry, and educational institutions.

A - To government, council recommends that a small inter-departmental task force be formed to prepare a formal response to the [72] recommendations involving government contained throughout the report, and to initiate action where appropriate. There is a degree of urgency to this. Priority should be given to establishing the proposed Canadian Centre for CAD/CAM in an effective manner at the earliest date possible, and to those recommendations concerned with awareness, manpower, education and training.

B - Council recommends to industry that virtually every manufacturing company in Canada should designate at least one person in a technical management capacity within the organization to become aware of developments in CAD/CAM technology, if this is not already being done, and to plan the response of the firm to the threats and opportunities that this new technology involves. A second step should be to establish links and mechanisms through development centres and technical societies for the definition and undertaking of projects meeting common needs on a group basis at minimum cost.

C - To educational institutions, particularly, universities and community colleges, council recommends that they examine their course curricula to ensure that CAD/CAM technology, particularly its systems and application nature, is adequately represented. It is further recommended that educational institutions examine opportunities open to them for the education and training of personnel in industry in computer aided design and computer aided manufacturing, with emphasis being given to course material and programs for in-plant training."

CAD/CAM Council 1980 report "Strategy for Survival"

- "The CAD/CAM Council recommends the establishment of a major centre in Canada for the development of user oriented CAD/CAM technology on a cooperative basis through coordinated discussions between government, universities and industry as a response to this report.

  In order to ensure maximum service to industry, and to make maximum use of existing organizations it is recommended the role of the centre should be primarily devoted to:

  - information dissemination to stimulate awareness and improve the knowledge base on CAD/CAM Technology in Canada, especially in industry and,
  - contracting out of user oriented and defined CAD/CAM development projects to appropriate development centres and companies of defined projects meeting the common needs of manufacturing companies in Canada."

CAD/CAM Council 1980 report "Strategy for Survival."

- "The centre, as originally conceived, would have two main functions:

  1- Information dissemination.
  2- Contracting out of well defined development projects.

  In view of the number of regional centres now planned or being implemented, it is evident that two additional functions should be added:

  3- Coordination and information sharing between the various regional centres.
  4- Provision of a national and international perspective to a greater degree than any of the provincial or regional centres could be expected to maintain."

CAD/CAM Council 1983 report "Closing the Gap."

- "At TI, CIM is much broader than traditional definitions. Its total impact is growing from our vendors to our customers and touching everything in between. We have learned it is not an end in itself, but rather it is a journey involving all aspects of our businesses. The progress we are making across TI is very exciting. But its importance to our future has never been so clear. Technology is offering us many new tools, be we are having to change our culture to make full use of them. We have stumped our toes many times along this difficult journey. But we are convinced it is "the" answer to where we must go in today's competitive world."

J.N. Ray, Senior Vice President of Industrial Automation
Texas Instruments
Keynote address, APICS Logistics Conference, Dallas, Texas, May 1987.

- "Manufacturing is very important for the well being of this nation, of you and me. We might be led to believe that giving up manufacturing and going entirely into a service economy is the wave of the future - but there is no way the rest of the world will absorb our balance of trade in services."

P. Urban, President Camex Corporate Consultants Inc.
CIM Seminar, Simon Fraser University, May 1987.

11. Forty Selected Abstracts Provide a World View on CAD

Almost last, but not least, for a review of CAD/CAM developments around the world, please refer to the selection of twenty abstracts for each of July and August in the section attached.

By obtaining and using some of the references cited it is possible for industrial companies to save valuable management and engineering time in project planning and responding to the challenges of computer integrated manufacturing.

12. Newsletter Availability

The CAD/CAM Newsletter is available without charge and may be reproduced in whole or in part. Reprinting in other Canadian publcations is encouraged. Acknowledgement to the Canadian CAD/CAM Council would be appreciated.

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Department of Regional Industrial Expansion
235 Queen Street
Ottawa, Ontario K1A 0H5

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Bldg. M-50
National Research Council of Canada
Ottawa, Ontario K1A 0R8

Although this appears to be the final issue of the newsletter issued by the CAD/CAM Council, it is expected that CAN-MATE will be continuing with a similar publication. Arrangements for continuity are being made by the CAD/CAM Council as noted in item three above.

The reports of the council will continue to be available from the Department of Regional Industrial Expansion until current supplies are exhausted.

Requests for reports prepared by the CAD/CAM Council, or those of the department, should be addressed to:

Information Technologies Industry Branch
Dept. of Regional Industrial Expansion, 5th Floor East
235 Queen Street
Ottawa, Ontario
K1A 0H5
Telephone: (613) 954-3472

A list of reports available from the CAD/CAM Council, DRIE and the National Research Council was included in the April CAD/CAM Newsletter.