Association for Coordinate Metrology Canada
Association canadienne de métrologie de coordonnées

NEWS

Dear ACMC members,

I would like to briefly bring you up-to-date on a number of events that have taken place and on what is in store for the near future.

Last June, we held our 4th annual meeting. This was a very successful meeting with a total of eleven presentations. All participants received a complete Summary of Lectures binder which should prove a valuable reference. As at previous meetings we had both international experts in Coordinate Metrology as well as experienced Canadian presenters. As an added bonus, the McMaster Campus offered beautiful surroundings at that time of year.

At the '98 AGM, a draft proposal regarding the certification of CMM operators was presented. With strong affirmation from the members and meeting participants, work has proceeded on the definition of CMM operator certification and the definition of a Body of Knowledge. Our aim is for this to eventually become a national standard. Operators will be able to take a test to become certified. Two levels are envisaged: CMM Inspector and CMM Senior. You too can contribute to this project directly by interacting with us via the ACMC web site.

The ACMC web site is another important initiative which will ensure sustained exchanges among members from one AGM to the next. The interactive site can already be accessed by all members (read further on in this newsletter) allowing visitors to read and also contribute material. We hope you will find this sufficiently user-friendly to contribute regularly with comments and ideas.

In November 1998, the ACMC supported Forum Metrologie 98 which took place at Université Laval in Québec City. This three-day event included over 50 presentations. Training and technical and advanced sessions ensured that there was something for everyone working in the metrology area.

Your committee is now busy putting together the program for the '99 AGM. We are pleased to announce that NRC's Integrated Manufacturing Technologies Institute (IMTI) in London, Ontario will host the meeting. This will make the event even more productive as participants will have the chance to visit the laboratories and learn of IMTI activities aimed at supporting discrete product manufacturers. As you will see from the preliminary program, the '99 meeting promises to keep you abreast of recent technological development in coordinate metrology and to help you use the technology wisely.

I look forward to meeting you in June.

ACMC Chairman
René Mayer, ing PhD.

ACMC Annual General Meeting 1999

Where
NRC's Integrated Manufacturing Technologies Institute
London, Ontario
(see map and hotel info enclosed)

When
17-18 June 1999

Agenda
(see agenda enclosed)

Cost
$150 for ACMC members
$200 for non-members
$75 for students

Registration
(see registration form enclosed)

Questions?
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April 1999

CMM Operator Certification

The biggest challenge in the four years since ACMC inception is the effort of our Working Group for the Canadian implementation of the “Certification of CMM Operators”. The leader of the working group is Prof. Stelian George-Cosh of Conestoga College. Prof. George-Cosh will report on the progress of the project at the June meeting. It is important to mention that this initiative has been supported by our U.S. colleagues (see http://www.mimetek.com/sources/cmmtest.html). In addition to the development of the body of knowledge for operator certification, the involvement of educational institutions in this initiative is paramount so that specially targeted programs and courses can be developed.

The solution to the inconsistencies in the knowledge base and capabilities of CMM users in Canada is a fundamental "Body of Knowledge" document. This document will guide the design of training and education for CMM operators, and provide the base criteria for examination questions. The steering committee is currently working on the expression of detail under the following headings:

1. Technical mathematics
2. Technical drawings
3. Applied statistics for manufacturing
4. Measurement instruments (other than CMMs)
5. CMM hardware
6. CMM software
7. Measuring errors and uncertainty
8. Machine capability
9. CMM operations
10. Standards and specifications, user groups and associations, certification bodies

The Steering Committee also has an obligation to begin to prepare the “culture” of uncertainties. One of the issues you will hear a lot about is the estimation of measuring uncertainties and their application during part acceptance. This will become a very important part of the CMM operator’s work. It will not happen overnight since the matter is very complicated. Support on this front is being offered by the National Research Council of Canada. With sufficient participant inscription (20 persons), NRC is prepared to offer two one-day seminars: the first, “Introduction to measuring uncertainties and practical methods for uncertainties estimation" involving some theory and a lot of practical cases studies, and the second, “CMM error sources, their estimation and practical methods for uncertainties reduction”. If you are interested please call (613) 991-0265 or 993-7578.

A program such as the “Certification of CMM Operators” requires an administrative body to keep personnel records, conduct examinations, etc. We are very pleased that Dr. Richard V. Murphy, Manager Non-Destructive Testing Certification at the Material Technology laboratory (CANMET/MTL) in Ottawa has indicated that his organization would be willing to assist us in this regard.

International News

FROM ITALY:

"CMM OPERATOR CERTIFICATION PROGRAM ALREADY RUNNING IN ITALY"

The Italian scheme for the Certification of CMM Operators goes ahead. The scheme follows that for Non-Destructive Testing (NDT) personnel, normalised by the European Standard EN 473 (similar to ISO/DIS 9712). Three levels of certification are available: operator (1st), senior technician (2nd), metrology manager (3rd). At the moment, 13 people have been certified at the 3rd level. According to the regulations 3rd level personnel is required for the training and certification of lower level personnel. Therefore, the 3rd level has been given priority in the implementation of the scheme. We are presently working on the detailed definition of the body of knowledge required for 2nd level personnel. We expect to run the first exam(s) for them by the end of this year. For details, contact the Italian CMM Club secretary at segreteria@cmmclub.it.

Alessandro Balsamo
Consiglio Nazionale delle Richerche (CNR)
Istituto di Metrologia "G. Colonnette" (IMGC)

FROM AUSTRALIA:

NEWS FROM THE CMM GROUP

The *CMM Group* was formed in Australia as a joint initiative of The National Measurement Laboratory and Australian industries using or proposing to use CMMs. Its first meeting was held in December 1988. During its first decade of operation *The CMM Group* held many successful meetings in Sydney, Melbourne and Adelaide drawing on the expertise of numerous international speakers. The ongoing success of the group has inspired the formation of a number of similar groups overseas.

In 1993 the Metrology Society of Australia was formed as an association to cover the full range of metrological disciplines. It soon had a large membership and a formal structure to manage it. The concept of associating with *The CMM Group* was discussed for some time and late in 1998 the *CMM Group* became a technical group of the Metrology Society of Australia.

The first meeting of the new venture was held at NML Sydney on 10 February 1999 with speakers chosen from the many experts at NML for an ISO/TC 213 meeting. The report on this most successful meeting can be viewed on the Metrology Society home page at: http://www.ozemail.com.au/~ausmet/index.html under Coordinate Measuring Machine Technical Group.

The *CMM Group* looks forward to a new millennium with closer ties and a sharing of information with its overseas counterparts.

Carl Sona, Chairman
CMM Group subcommittee.

1999 AGM Speakers and Presentations

TECHNICAL PRESENTATIONS

Mr. John Buttress of Hutchinson Technology in Minnesota is a Corporate Standards Engineer and a member of several working groups of the B89.4 Subcommittee on Coordinate Measuring Systems Technology including B89.4.20 "Measurement Uncertainty on CMMs", B89.4.9 "Scanning Performance", and B89.4.15 "Dynamic Performance of CMMs".

John will speak about requirements and capabilities for tactile probing in the measurement of high precision tooling with a CMM. The introduction will include a brief discussion of the probing requirements and their drivers. The paper examines a specific analog probe head used in discrete point collection mode and the various error sources in the calibration of probe styli through both a discussion of the probe compensation procedure and a presentation of some related test results. Also briefly discussed is related preliminary testing of the same probe head in the continuous scanning mode. The conclusion addresses recommendations regarding probe selection and performance assessment.

Mr. Bob Stone of Origin International, Mississauga, and member of the Dimensional Measuring Interface Standard (DMIS) committee, will review the progress of DMIS. The original objective of DMIS was to provide a bi-directional exchange of coordinate metrology data between measurement equipment and computer systems. With the recent extensions to DMIS, the standard is being used increasingly as a direct dimensional measuring equipment language without translation. The presentation will determine what DMIS is, what it can do for your company, what capabilities exist in the current revision of the DMIS standard, and a glimpse at the additional capabilities being incorporated in the burgeoning 4.0 DMIS specification.

Stan Kowala and Yixin Liu of NRC's Integrated Manufacturing Technologies Institute have provided the following abstract for their presentation: *Optimal CMM path planning for laser digitizing scanners.*

This presentation summarizes the preliminary results of an on-going study conducted by IMTI and the University of Western Ontario that looks at the characteristics of high-speed 3-D laser digitizing for verifying free-form surface geometry. The study focuses primarily on the generation of optimal path plans for the CMM/laser measurement system to achieve optimum coverage and near uniform digitizing accuracy. The first stage of this project is to identify how the accuracy of laser digitizing varies with respect to the process variables. Systematic variations of the depth of field and the incidental angle of the laser scan plane have been identified. The tests were performed using a reciprocating point laser digitizer, driven by a computer controlled CMM to scan a reference artifact through a range of scanning depths and angular positions. The test results provide the basis for optimal CAD-based path planning. This presentation will also discuss the issue of feature-based datum referencing by integrating a touch trigger probe with the laser scanner for part reference alignments. A practical demonstration will be provided.

Helium Mak of NRC's Integrated Manufacturing Technologies Institute, will present " An overview of STEP and its current involvement in dimensional inspection".

Dr. Allan Spence of McMaster University will present "Intelligent Hand-Held Operator Interfaces for CMMs" on a hand-held teach/interface pendant that includes a Palm Pilot computer, joystick, and digital feedback to the CMM controller.

Kostadin Doytchinov of NRC's INMS will speak about GD&T and best-fitting techniques. The presentation will show how best-fitting techniques can be applied during CMM measurements to correctly address GD&T callouts—how to deal with not fully constrained coordinate systems and with not well defined datums. Special attention will be paid on examples with MMC and LMC modifiers applied to datums.

MANUFACTURER PRESENTATIONS AND SUPPORT

We are pleased to report that we have been successful in engaging the participation of major CMM manufacturers. We will have presenters from **Brown & Sharpe, Mitutoyo,** and **Renishaw**. The speakers from commercial companies have agreed to focus on the generic attributes of their products so that the ACMC can maintain its neutral position.

Mr. Chris Garcia, President of the newly formed **Brown & Sharpe Information Systems Inc.** will address Brown & Sharpe's vision of the future of metrology and its role between design intent and manufacturing.

Mr. Shigeo Kikuchi, Deputy Chief Design Engineer of Mitutoyo Corporation will present "Development of Ultra-High Speed CMM, Obstacles and Accomplishments".

Mr. Andrew Huber of Renishaw, U.S.A. will present "Selecting the right probe for coordinate measuring machines".

Zeiss is unable to give a presentation this year but is generously supporting us with a $500 US cheque to help defray the cost of our 1999 Annual General Meeting.

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ACMC WEB SITE

The ACMC web site has been moved to a NRC server and is up and running. The URL is http://acmc.inms.nrc.ca/. This is not a typical web site. It is using a product called Project Site which permits interaction while maintaining a level of security. The product has been donated and the Steering Committee would like to thank Workscape Corporation (www.workscape.com) for their help.

Follow these directions and you will be navigating the site within minutes!

1. First, select the language.
2. Enter your name and password. For now you can log on with the name “user” and password “user”. Later each ACMC member will have his/her own password.
3. Click on Project Site and you will enter the Projects menu. The information is organized by projects.
4. Click on the project you would like to investigate. This will bring you to the “What’s new” menu. Here you will see if anything has happened in the last 10 days.
5. From here click on Documents (up, right) to get to the documents menu. From this menu you can open the posted documents by clicking on the “page icon”. In order to see the document you will need the appropriate application on your computer. For example if we have posted an MS Excel file you need to have MS Excel on your computer.
6. To make a comment, click on the title of the document, then click on Comments and then on New Comment. Your comment will be posted automatically and will be visible by all of the members. We welcome the interactivity capability and its potential to quickly provide feedback and input.

ACMC members will be able to post measurement problems in the form of drawings (jpg, gif files) or descriptions and see what kind of solutions will be offered by their colleagues. Later, an “expert” can give an opinion on the solutions provided. If you wish to submit a problem call the ACMC Secretary (613) 991-0265 or contact any of the Steering Committee members.

METROLOGY-RELATED WEB SITES

http://www.nrc.ca/inms/
http://www.npl.co.uk/ssfm/index.html
http://qualitymag.com/
http://www.asq.org/standcert/cert.html
http://www.mimetek.com/
http://www.cmmclub.it/
http://www.ozemail.com.au/~ausmet/index.html
http://www.csiro.au/csiro/structure/meas.htm
http://www.ptb.de/english/welcome.htm
http://www.nml.csir.co.za/
http://www.lne.fr/
http://www.nist.gov/public_affairs/labs2.htm
http://mit.tut.fi/imeko/
http://www.iso.ch/
http://www.fasor.com/~iso25/
http://www.nrc.ca/inms/int_coop/noramet.html

Measurement problems with the right solution!

There is enthusiastic talk among Steering Committee members about a competition for students enrolled in any Canadian university or college: a competition in which applicants solve a measurement problem on a CMM and document their solution on videotape.

Members of ACMC will judge the CMM program and results and the selected winner(s) will be invited to an ACMC Annual General Meeting to receive the prize(s).

The search is on for sponsors. We will keep you informed.