

PROGRAM



ANNIVERSARY CONFERENCE & WORKSHOP

September 22 and 23, 2003

Renaissance Harborplace Hotel
Baltimore, MD 21202

Phone: 1-410-547-1200; Fax: 1-410-783-9676

Anniversary Conference

✓ Come to Learn

September 22, 2003

9:00 AM – 5:30 PM

The DICOM Anniversary Conference is the first Advanced Seminar ever offered by the DICOM Standards Committee. It provides a unique opportunity to obtain a broad, strategic view of the recent (or soon to be issued) additions to the DICOM Standard. Tune in as 17 leaders of the DICOM Community share their views of “What’s New & Exciting in DICOM.” Presentations by standard developers and users will address:

- How to leverage recently issued features of the DICOM Standard.
- How to prepare for soon-to-be-completed (within a year) features of the DICOM Standard.
- Experiences in developing, deploying or using DICOM applications.

Registration and Continental Breakfast

8:00 AM – 9:00 AM

DICOM Overviews

Peter Mildenerger, M.D., University of Mainz – Chair

9:00 AM – 10:30 AM

DICOM – Providing Solutions for Hospital’s PACS

Donald Van Syckle (DVS Consulting)

PACS systems have been employing DICOM to facilitate imaging integration solutions since 1994. This paper illustrates the successful progression of DICOM as it has been used in our hospitals. Beginning from the commonly implemented applications (SOP Classes), such as image storage, query/retrieve, printing and Modality Worklist. Applications becoming more available in our hospitals, Modality Performed Procedure Step (MPPS), Storage Commitment and finally, the emerging SOP Classes, Structured Reporting, Presentation State, etc.

The focus is upon how the hospitals view DICOM and the solutions enabled to them. Highlighted is the implementation time line of the above SOP Classes and typical examples of the DICOM workflow being used in many current hospital environments. Although no specific vendor products are mentioned, the examples illustrate commonly implemented products such as modalities, workstations, printers, PACS archives, information systems, etc.

Ten Years of DICOM at the U. S. Department of Veterans Affairs

Peter Kuzmak (U.S. Department of Veterans Affairs)

The U. S. Department of Veterans Affairs was the first to integrate the use of DICOM with a Hospital Information System (HIS). In VA hospitals, DICOM images are acquired by the HIS, associated with the corresponding patient reports, and displayed on clinicians' workstations throughout the hospital. This integration effort began in 1993 at the Baltimore VA medical center. All DICOM images from a commercial PACS were automatically transferred to the HIS for incorporation into the patient record. Within four years, the HIS had its own diagnostic reading capability and could acquire DICOM images directly from acquisition modalities. Recently, the VA has extended the use of DICOM into ophthalmology, dentistry, and endoscopy. Today the VA supports more than 200 different DICOM modalities. DICOM is now in use at about 120 of the 172 VA medical centers, and more than 100 million images have been processed.

The VA has been a significant force in the development of requirement specifications for image acquisition modalities. Many of the original VA radiology requirements have been incorporated into the IHE Technical Framework. Our recent work extending DICOM beyond radiology is having a major impact on the dental and ophthalmology vendors and their standardization effort.

Media Management

David Clunie, M.D. (RadPharm)

With the proliferation of film-less radiology, patients need to carry their images from one site to another; CD has proven useful and cost effective for this.

Poor compliance of such CDs with DICOM has led to failure importing to PACS. Some sites thus refuse to accept CDs, insisting on film to digitize instead. Creators must comply with DICOM, and readers need to be more tolerant. Workflow and patient identifier reconciliation issues of media import from another institution have not been addressed in the standard, and could benefit from IHE attention.

Workflow and management of media creation is being addressed. The trend has been towards standalone devices that burn, verify and label media in response to a request from a workstation, analogous to printing. A new SOP Class adds a mechanism to send media creation requests, specify the content of labels, and monitor status.

DVD profiles provide seven-fold greater raw capacity than CD, as well as mandatory support for lossy and lossless compression by all readers, using JPEG or JPEG 2000. The proliferation of incompatible DVD media types remains a significant risk to the success of these profiles, and is mitigated by insisting that only media readable in a DVD-ROM drive be used.

New media profiles in development support the low cost, high capacity and high-speed RAM-based media (such as USB and Compact FLASH), for portable applications such as transfer to and from PDA devices.

Multilanguage – Internationalization

Michio Kimura, M.D., Ph.D. (Hamamatsu Univ.)

In Asian countries, we primary use Chinese characters as ideographic representations. However, we also use some kinds of phonetic characters for pronunciations and sometimes as a sorting key, because one Chinese character may be pronounced in many ways and is hard to sort.

In the 90's, HIS began handling Chinese characters, so modalities were also required to handle them. In 1996, as DICOM supplement 9, multiple byte character handling was specified. The method was the same as internet practice in Japan. It is an ISO 2022 escape sequence to go between base 1 byte ASCII and 2 byte character sets. As MIME label, it is ISO-2022-JP. In 2000, ISO-2022-KR for Korean characters was approved in DICOM.

Now, the method is within DICOM base standard, Section 6 Value Encoding of Part 5. UNICODE UTF-8 is also included in the standard, since the XML consortium declared UTF-8 as its default character set. UNICODE is a totally 2 byte character set which includes ASCII, many Latin extensions, Greek, Hebrew, Hangul, Katakana, Hiragana, and Chinese-Japanese-Korean unified ideographic characters. UNICODE is just a second best solution, because CJK unification of ideographics is over-unified leading to awkwardness.

Character representation issue is just the surface of the problem. Users of one byte characters would not believe that our HIS has many name representations for one person: ideographics to appear in print, and phonetics to pronounce, and sort, which may cause total a re-design of a database of one byte characters. Moreover, surname or last name does not necessarily represent the family name in some cultures, not to mention the complexity of the addressing system.

Overcoming with these problems with thoughtfulness to each culture is the real internationalization issue. IHE (or IHE-J, IHE-Asia-Pacific) would be providing the solution as guidelines.

30 Minute Refreshment Break

The DICOM Standards Committee wishes to thank Barco Medical Imaging Systems

The logo for Barco Medical Imaging Systems, featuring the word "BARCO" in a bold, sans-serif font. The letter "O" is stylized as a circle with a smaller circle inside, resembling an eye or a lens.

for providing the "DICOM Theater® Projection System" used for all presentations.

DICOM Applications

Hidenori Shinoda, Toshiba Medical Systems – Chair
11:00 AM – 12:30 PM

DICOM in Cardiology

Harry Solomon (GE Medical Systems) and Tim Becker, Ph.D. (University Hospital, Kiel)

In 1992, the American College of Cardiology made a strategic decision to leverage the DICOM standard for developing a new format for digital X-ray angiographic cine images. That effort has resulted not only in the XA image object definition, but also a standard for DICOM image exchange on CD-R and DVD media, hemodynamic and electrocardiographic waveform object definitions, an intravascular ultrasound image object definition, and templates for catheterization procedure logs, hemodynamic measurements, and cath clinical reports.

Implementation of the XA IOD and media exchange is now nearly universal; a remaining challenge is to move the other parts of the standard into implementation and demonstrated interoperability. A new effort, IHE for Cardiology, will focus on this task.

Experience Using DICOM RT Objects for Clinical Trials QA

Walter R. Bosch, D.Sc.¹, John W. Matthews, D.Sc.¹, Vincent A. Frouhar, Ph.D.², Jatinder R. Palta, Ph.D.², James A. Purdy, Ph.D.¹ (¹ = Washington Univ. at St. Louis; ² = Univ. of Florida)

Advances in the medicine and technology of radiation therapy have driven the need to acquire volumetric images as well as radiotherapy treatment planning information for patients enrolled in clinical trials. Participants in multi-institutional clinical trials must be able to submit imaging modalities as well as RT modalities (RT Structure Set, RT Plan, RT Dose, and RT image) to QA centers responsible for evaluating plans and correlating dosimetric measures with patient outcomes. The NCI-sponsored Advanced Technology Consortium (ATC) has been active in the development and deployment of DICOM RT objects for the exchange of treatment planning information in cooperative-group clinical trials. The ATC has participated in the development of Clinical Trials Identification modules (DICOM WG18) and has sponsored a series of DICOM Implementers' Workshops to assist manufacturers in implementing RT objects needed for clinical trials.

Interactions with manufacturers have exposed several problems in interpretation and implementation of the DICOM standard resulting from the complexity of the DICOM RT objects and differences in design and capabilities of the treatment planning systems. A web-based Remote Review Tool, which allows visualization of images, structure sets, and dose distributions, has proven to be of great help to manufacturers in developing and verifying implementations.

Supported by NIH U24 grant CA81647, "Advanced Technology QA Center"

Applying the DICOM Standard to Dentistry

Allan Farman, Ph.D., D.Sc. (Univ. of Louisville)

There are > 160,000 dentists licensed in the USA. The dentist is both radiologist and treating clinician for the patient. The American Dental Association (ADA) has been a member of the DICOM Standards Committee since 1996. DICOM v.3 provides image object definitions for digital transmission radiography (Dx) with special categorization for intraoral projections (Io), and also provides for color photography used in dentistry. Digital dental x-ray images include transmission radiographs of the head and jaws, pantomography, tomography and cone-beam CT.

In 2000, the ADA resolved to strive for interoperability of digital dental images, using the DICOM Standard as the backbone of the effort. ADA Working Group 12.1 was tasked with development of specifications and also with educating the dental profession concerning DICOM and interoperability. ADA WG 12.1 has designated three levels to grayscale dental radiographic image specifications reflecting increasing service-object-pair (SOP) requirements for different application environments; namely: Level A requires the ability to READ and WRITE valid DICOM datasets including the DICOMDIR (DICOM Directory) to removable media; Level B additionally supports STORAGE of acquired images to a DICOM storage system over a NETWORK connection; and Level C additionally supports both QUERY-RETRIEVE and the Modality Worklist.

Visible Light Video Sequences

Juergen Thiem, (Sony Business Europe)

Video recording plays a dominant role in VL modalities. Today it is based on tape media having a recording time of three hours and in the best case some written patient identification with a sticker. Several manufacturers of (VL) medical instruments are offering MPEG video-recording options to their instruments. All of the known manufacturers have implemented propriety standards. Because the built-up databases are incompatible with the DICOM standard, vendors and users wish to propose an MPEG-2 DICOM standard. Visible Light IODs are correct for static images, although not commonly used, yet. MPEG-2 extensions could make them attractive for vendors and users in that DICOM provides a consistent solution for both still and compressed motion images. The main idea of the supplement is to allow DICOM embedding of so-called Visible Light video sequences, and to add in DICOM a new encoded transfer syntax based on MPEG2 Main Level @ Main Profile. WG-13 is working on a new Application Profile using MPEG-2 (MP@ML) Transfer Syntax for existing Visible Light IODs on DVD. Submission of the supplement to WG-06 has been scheduled for September 2003.

One-hour Break – Lunch Provided

DICOM Partnerships
David Best, Eastman Kodak – Chair
1:30 PM – 3:30 PM

The History and Future of DICOM and HL7

Fred Behlen, Ph.D. (LAI Technology)

The relationship of DICOM with HL7 long precedes the formation of the common working group (DICOM WG-20 / HL7 Imaging Integration SIG). DICOM has long been aware of the institutional information system context in which DICOM systems operate, and early value representations followed HL7 models. Later, the ISIS model for Imaging System – Information System integration influenced both the development of broker devices and the creation of services for Modality Worklist and Performed Procedure Step. Today, DICOM and HL7 have a formal cooperation agreement, and the common working group meets three times annually at the HL7 Working Group Meetings. Version 2.5 of the HL7 standard now has an imaging order message capable of conveying the procedure and procedure step breakdown of imaging orders.

Looking ahead, DICOM is influencing the development of HL7 standards as they affect the imaging domain. The evolution of HL7 document standards, in the Clinical Document Architecture (CDA), has been informed by DICOM experience with composite information objects. CDA is expected to play a significant role in the integration of reporting with diagnostic image display.

As DICOM and HL7 continue to work together, the gaps between the standards are closing and we move toward more productive and seamless connectivity of imaging systems with the enterprise information environments in which they operate.

DICOM and Integrating the Healthcare Enterprise: Five Years of Cooperation and Mutual Influence

Andrei Leontiev (IDX Systems) and Charles Parisot (GE Medical Systems)

In this paper, authors will review the history of the five-year effort of developing the Integrating the Healthcare Enterprise (IHE) Technical Framework for Radiology, and how this Framework influenced development and modification of many features in DICOM. Most attention will be paid to the topics that have been subject of strong debate and influenced development and acceptance of DICOM in such areas like Structured Reporting, Workflow Management, and acquisition and management of non-imaging evidence objects.

Close cooperation of DICOM and IHE also promoted a significant synergy in the efforts of DICOM and HL7 in the area of Imaging Integration, emphasized the quality of DICOM as not only imaging but the workflow management standard for imaging specialties and brought it from the radiology-specific niche status to the attention of healthcare IT in general. That may, also, be extended to the newly expressed appreciation of DICOM by the international healthcare IT communities in Europe and Asia.

Areas of DICOM development that have influenced very successful process of the IHE Technical Framework development will also be presented.

WADO – Web Access to DICOM Persistent Objects

Emmanuel Cordonnier (ETIAM)

The DICOM Standards Committee has decided in order to accelerate the use of its standard:

- To create an A-type liaison with ISO/TC215 (Medical Informatics).
- To develop new work items enabling better harmonization with Internet technologies.

As part of the collaboration with ISO/TC215 WG2 (Message and Communication), the DICOM WG-10 (Strategy Advisory) has proposed to define a new mechanism for retrieving DICOM persistent objects (images, reports...) from Web pages or XML documents, using the URL/URI syntax (Uniform Resource Locator/Identifier). The work item is studied by an ad hoc "WADO" group, co-chaired by Hidenori Shinoda (Toshiba) and Nick Brown (B.I.R.). The proposal defines the syntax for the "HTTP query" parameters, including mainly the UID for SOP instances, series and study, and also the format in which the object has to be retrieved, in compliance with the MIME syntax (e.g. application/dicom for DICOM original format, or image/jpeg). It creates a great opportunity for DICOM to be widely adopted as the unique standard for integrating images into information systems, increasingly based on web technologies.

The proposal will be presented to WG-06, and will be sent to DICOM and ISO for public comment phase. It should be published on both "channels", ISO and DICOM, end of 2003 or early 2004.

Enterprise-Wide Reporting & Continuity of Care: The Role of DICOM SR and HL7 CDA

Helmut König, M.D. and Frank Krickhahn (both of Siemens Medical Solutions)

Continuous access to information is one of the core elements of the medical treatment process. Continuity-of-care initiatives take a patient-centric view and focus on the temporal aspects of care. The DICOM SR (Structured Reporting) standard is well accepted in the medical imaging area, while HL7 CDA (Clinical Document Architecture) gains momentum in the field of information systems. Harmonization of these standards will facilitate cross-boundary continuity in supplying integrated patient records where medical imaging information plays an important role for decision-making and long-term care.

DICOM's WG-08 cooperates with various other DICOM Working Groups in developing SR Templates in multiple medical fields. The transfer of medical imaging results and documents, access to relevant historical patient information and HL7 CDA documents as well as semantic interoperability through the common use of coding schemes have gained increased importance. DICOM WG-20 addresses these issues jointly with HL7 Technical Committees in order to foster the integration of imaging and information systems.

Achievements that have been made by DICOM WG-08 and WG-20 will be outlined. We will describe the typical scenarios for exchange of DICOM SR and HL7 CDA documents with regard to continuity of care.

30-Minute Refreshment Break

New Directions for DICOM

Lawrence Tarbox, Ph.D. (Siemens Corporate Research) – Chair
4:00 PM – 5:30 PM

New DICOM MR Object Will Enhance the Clinical Operation for MR

Kees Verduin (Philips Medical Systems)

DICOM has been successfully used since 1994 to exchange MR Images between a large variety of MR acquisition devices, storage and display systems. However, major advances in MR technologies required a new generation of DICOM Image Object Definitions that offer a higher level of interoperability for basic and more advanced applications such as: Functional Imaging, MR Diffusion Imaging, and MR Spectroscopy. The resulting supplement (49) has been included in the DICOM 2003.

With this, three new MR Information Object Definitions have been standardized: Enhanced MR Image, MR Spectroscopy and Raw Data. The exchange of richer and better-standardized image data is believed to lead to more clinical interoperability.

A new Multi-Frame concept which allows to dynamically group attributes that do not vary on a frame-to-frame basis will lead to data reduction and faster network transport.

Other important differences include:

1. Many attributes that were previously optional are now mandatory.
2. New techniques are supported by many new attributes.
3. Color encoding for functional information.
4. Real-World Values support.
5. Dimensionality information for post-processing applications.
6. A new referencing method for earlier created objects not only describes the reference information but also the purpose of the reference.

The presentation will discuss the enhanced interoperability in many MR clinical applications in distributed networks once it will be implemented in both modalities and workstations.

Towards Clinically-relevant Standardization of Image Quality

Ehsan Samei, Ph.D. (Duke Univ.), Alan Rowberg, M.D. (Univ. of Washington), Ellie Avraham (Eastman Kodak), Craig Cornelius (Eastman Kodak)

Background: In recent years, notable progress has been made on standardization of medical image presentations in the definition and implementation of the DICOM Grayscale Standard Display Function (GSDF). In parallel, the AAPM TG18 has provided much needed guidelines and tools for visual and quantitative assessment of medical display quality. In spite of these advances, however, it is still unclear how display technical data relate directly to the diagnostic usability and performance of displays.

Methods: In this presentation, the authors propose three specific steps that DICOM, AAPM, ACR, and SCAR may collectively take to bridge the gap between technical performance and clinical use. 1) DICOM does not provide means and acceptance criteria to evaluate the conformance of a display device to GSDF nor address other image quality characteristics. DICOM can expand beyond luminance consistency, extending the measurable, quantifiable elements of TG18, such as reflection and resolution. 2) The question of clinical significance of image quality metrics has rarely been addressed by prior efforts. DICOM may help to initiate research to determine the clinical consequence of variations in hardware and software aspects of image quality and to define what constitutes image quality from a diagnostic perspective. 3) In a large PACS installation, it is critical to continually track the performance of multiple output devices. DICOM may help with this task by defining a Display Service Class for communication and control of image quality parameters between applications and devices.

Conclusion: In spite of unprecedented success, there are currently notable gaps in the effectiveness of DICOM GSDF to assure consistent and high quality display of medical images. A closer collaboration between DICOM, AAPM, ACR, and SCAR in the forms suggested above may further the reach and impact of DICOM toward quality medicine.

Auditing for Accountability in Healthcare

Rob Horn (Agfa Healthcare) and Glen Marshall (Siemens Medical Solutions)

Privacy and security concerns in healthcare have been focused by regulations such as HIPAA and the EU Privacy directives, and by good ethical practices, on the need for automatic facilities to support privacy and security. We have chosen the approach of using audit controls rather than access controls due to the primary importance of patient safety. The standards effort for defining audit controls is being performed using the Internet Engineering Task Force (IETF) as the umbrella organization to provide a base standard that will be extended with domain specific capabilities defined by HL7, DICOM, and ASTM. The IHE organization is being used to provide trial use verification and validation of the standards.

There is an interim trial use document from the IHE that will be replaced in 2004 by these finished standards. This trial use audit trail system uses an XML encoded message and the IETF Syslog standard. It has been implemented and tested. The new standards will also be XML encoded, but will use a more general vocabulary-driven encoding. This permits the base standard to define the common vocabulary for common audit events, and each discipline can add new definitions as needed for their specific discipline.

Automatic Configuration of DICOM Network Applications

Andrew Hewett, Ph.D. (Siemens Medical Solutions)

Every DICOM Network Application must be configured to know the names and communication parameters of other Network Applications in order to successfully interoperate. When a new device is installed, its identifying parameters must be carefully chosen to ensure uniqueness, and each existing device in the network must be visited and updated so that it knows about the newly installed device. Device name, unique Application Entity Titles, hostnames, Port Numbers and a variety of additional information must normally be manually entered. This makes the configuration of Network Applications a tedious and error-prone task.

The DICOM Base Standard Working Group (WG-06) has developed a Supplement that aims to significantly simplify the configuration and maintenance of Network Applications. Supplement 67 (Configuration Management) defines profiles in terms of industry-standard network protocols and appropriate options to enable more automatic, accurate and up-to-date configuration.

This paper describes some of the typical operational scenarios for the automatic configuration of Network Applications and highlights the benefits of a searchable directory for Network Applications in comparison with the existing manual configuration process. An overview of the necessary supporting technology is given together with experience gained during prototyping with the “Frozen Draft for Trial Use” version of Supplement 67.

The DICOM Conformance Statement - A Proven Power within DICOM

Dwight A. Simon (Merge eFilm)

There are many things within DICOM that have made it a powerful and versatile electronic medical image and information communications standard. The DICOM Conformance Statement (DCS) has a 10-year proven track record as being one of the real powers within DICOM.

Part of its power comes from being required. If a vendor wishes to claim to have an application that utilizes the DICOM protocol for communications, then, that product is required to have a DCS available as a public document. This document then allows users and integrators to compare one product to another, each with the various DICOM features that have been implemented within it.

Now, after 10 years, the DICOM Conformance Statement is even more powerful. PS3.2 (Part 2) of the DICOM Standard, the part that tells you how to write a conformance statement, has been completely rewritten and expanded. It not only includes enhanced DICOM requirements for products, but also has a wider range of examples that deal with the majority of possible DICOM features that can be implemented within a product.

This presentation will identify how all aspects of the both the current and new DICOM Conformance Statements will remain the Power within DICOM!

Anniversary Banquet

✓ Come to Celebrate

September 22, 2003

6:00 PM to 10:00 PM

Over the past 20 years, hundreds and hundreds of individuals from around the world have contributed their expertise and leadership to create, to expand and to refine the DICOM Standard. On this, the 20th Anniversary of DICOM's earliest beginnings, a gala celebration has been planned. As many of the early pioneers as could be found, all of the people currently involved in the work of the DICOM Standards Committee and numerous others who are interested in its development and applications have been invited to participate.

On Monday evening, September 22, members of the DICOM Community will gather at the Renaissance Harborplace Hotel in Baltimore's Inner Harbor to reminisce with old friends, to make some new ones and to be reminded of DICOM's path to worldwide acceptance. The celebration will include:

- A one hour reception with hors d'oeuvres and liquid refreshments (6 PM to 7 PM),
- A four-course banquet (7 PM to 8 PM) and
- A nine-part presentation of "The DICOM Story" – told in an entertaining way by some of its most memorable characters – with assistance from the audience (8 PM to 10 PM).

Anniversary Workshop

✓ Come to Share

September 23, 2003

8:00 AM – 1:00 PM

On Tuesday morning, September 23, three or four leaders of the Medical and Information Technology communities, who are not directly involved in the DICOM world, will present their vision of how healthcare is expected to evolve over the next 5 to 10 years. Following each speaker, a panel of experts will lead a 20-30 minute discussion – highlighted by interaction with the audience – aimed at exploring the impact that such changes could have on the DICOM standardization strategy for the coming years.

World-class experts/visionaries will address:

- a. Treatment and therapy, image guided surgery, therapy planning, and other "-ologies,"
- b. Information Technology trends and their impact in the medical domain. These would include such topics as wireless, media, regional/community infrastructures, ubiquitous computing and intelligence.
- c. The future of diagnostic imaging – Medical Informatics in its broadest sense.

Registration and Continental Breakfast

7:30 AM – 9:00 AM

Special Early-Bird Session

David Clunie, M.D., RadPharm – Chair

8:00 AM – 8:30 AM

Current Status of the SCAR TRIP™ Initiative

Dr. Katherine Andriole
Associate Professor and PACS Clinical Coordinator
Department of Radiology and Biomedical Informatics
University of California at San Francisco

Transforming the Radiological Interpretation Process (TRIP™) is an initiative of the Society of Computer Applications in Radiology to spearhead research, education, and discovery of innovative solutions to the problem of information and image data overload. Burgeoning medical image data sets acquired by digital imaging devices requires the radiological community to shift its image interpretation and management process. The SCAR TRIP™ Initiative will foster interdisciplinary research on technology as well as environmental and human factors to better manage and exploit the massive amount of information available.

The SCAR TRIP™ Initiative will focus on three fundamental objectives:

1. Improving efficiency of interpretation of large data sets
2. Improving the timeliness and effectiveness of communication, and
3. Decreasing medical errors.

The ultimate goal of the initiative is to improve the quality and safety of patient care. This presentation will review the current status and development of the initiative. Aspects of DICOM already incorporated but not widely used will be discussed, as well as features and functionality that may need to be added to accommodate the transformation occurring in medical imaging.

DICOM Anniversary Workshop

Cor Loef, Philips Medical Systems – Chair

9:00 AM – 1:00 PM

Imaging and Intervention – From Crisis Management to Risk Management

Colonel Michael R. Marohn, USAF, MC, FS (FACS)
Associate Professor & Vice Chair, Department of Surgery
Uniformed Services University (USU), Bethesda, MD

Dr. Marohn has been a pioneer in laparoscopic surgery since its beginning in the late 1980s, as well as an expert in endocrine surgery, with special interests in minimally invasive approaches. After 25 years as a military surgeon, he will join the faculty of the Johns Hopkins University Department of Surgery in January 2004.

Dr. Marohn has worked with all three US Military services advancing videoendoscopic surgery over the past fifteen years. He co-founded and co-directs the Tri-Service Emerging Surgical Technologies Program at USU, where he has taught over 200 courses for over 2,000 US military surgeons in basic and advanced laparoscopic and emerging

surgical technologies, including cryoablative therapy, radiofrequency ablation, radio-imaged guided surgery, and surgical ultrasound. He is Associate Program Director of General Surgery Residency at Walter Reed Army Medical Center, and helped establish its Surgical Robotics Program. At Andrews AFB, he is Chief of General Surgery, Malcolm Grow USAF Medical Center. In addition, he attends at the National Institutes of Health (NIH), and at Bethesda National Naval Medical Center.

Dr. Marohn is a member of the National Ultrasound Faculty of the American College of Surgeons (ACS) and co-chairs the ACS Surgical Education: Principles and Practice course. Dr. Marohn works with Dr. Rick Satava as a consultant for the Defense Advanced Research Projects Agency (DARPA), on the “OR of the Future” and “Virtual Soldier” programs.

Dr. Marohn’s vision of the future merges imaging and intervention, driving a paradigm shift from crisis management to risk management. His wealth of experience with innovative surgical technologies allows him to see surgeons and imagers commingling as invasive and noninvasive interventionalists who can put digital imaging to therapeutic use. For example:

- Imaging already guides diagnostic interventions, helps physicians plan treatment simulations, and guides use of non-invasive therapeutic energy sources. 3-D image guided interventions will evolve to early recognition and ablation of tumors.
- 3-D imaging already allows preoperative planning for selected surgeries. When integrated with functional platforms, as robotics, we will move from ‘virtual’ to real, rehearsed, robotic surgery.
- Digital imaging will allow transfer of imaging data to enhance treatment applications. In this way, a hologram derived from a CT scan will blend seamlessly with an MRI, can be compared with a portable, hand-held ultrasound image, even in a remote, hostile, environment. Imaging will be sufficiently precise, fast, and functional to provide anatomic, physiologic, and chemical recognition of diseases well before they are symptomatic.

Dr. Marohn asks: Why wait for diseases to become symptomatic when imaging can detect them years earlier? Why wait for diseases to become catastrophic when we can intervene early and change their course?

30 Minute Refreshment Break

Trends in Information Technology

Neil de Crescenzo

Partner and the Healthcare Industry Leader, Global and Americas

IBM Business Consulting Services

IBM Business Consulting Services (BCS) is the world's largest consulting and services organization, with more than 50,000 professionals in over 50 countries. BCS helps clients capitalize on information technology to improve business performance – all the way from strategic thinking to implementation, with accountability for results. It's a comprehensive capability that spans ideas to benefits.

In his 20-year career, Mr. de Crescenzo has worked in operational roles as well as technology leadership roles. He worked in healthcare administration at the University of Massachusetts Medical Center, the Lahey Clinic outside of Boston, Massachusetts and at Blue Cross Blue Shield of Massachusetts, the largest health plan in New England with over \$3 billion in revenues. Prior to becoming a healthcare operations executive, Mr. de Crescenzo was a Vice President with Dillon, Read & Co., an investment bank headquarter in New York City and subsequently purchased by UBS. During his career at Dillon Read, Mr. de Crescenzo worked in the mergers and acquisitions, corporate

finance, and private equity investment groups, and performed advisory services for clients in North America, Europe and South America.

At IBM, Mr. de Crescenzo has held a number of senior executive roles in IBM's healthcare business worldwide. Mr. de Crescenzo has a B.A. in Political Science from Yale University and an MBA in High Technology from Northeastern University.

30 Minute Refreshment Break

Modern Imaging Technology and Its Impact on Medical Care and Medical Education

Reuben Mezrich MD, Ph.D. FACR
Professor and John M. Dennis Chair of Radiology
University of Maryland School of Medicine

An innovator in radiology and imaging, Dr. Mezrich spent the first half of his career as an electrical engineer, developing and improving technology in the lab. He holds 25 patents, many of which were obtained before he became a physician.

One of his most memorable inventions is a holographic imaging system that uses a laser pulse and magnetic field to write and erase images on magneto-optic film. Recalling the exhilaration he felt when he realized that his idea worked, Dr. Mezrich said, "I jumped so high, I hit my head on an overhead beam. I felt no pain as I ran up and down the halls with blood streaming over my face, looking for someone to witness the results."

Before CT and MRI came into wide use, Dr. Mezrich invented an ultrasound technique that could produce real time TV images of the human body. That technology was featured in a recent issue of *Engineering in Medicine and Biology* as one of the most important developments in biomedical engineering over the past 50 years.

As an electrical engineer at Johnson and Johnson, Dr. Mezrich developed ultrasound mammography systems to detect breast cancer. While testing this technology, Dr. Mezrich discovered that he enjoyed working with patients even more than working in the lab. And that led to his decision to enter medical school at the age of 38.

From 1996 to 1999, Dr. Mezrich was an attending radiologist and associate professor of radiology at the University of Pennsylvania. In addition to serving as chief of emergency radiology, Dr. Mezrich was the interim chair of the department. Prior to that, he was professor of bioengineering at Rutgers University and an associate professor of bioengineering at Robert Wood Johnson (RWJ) Medical School. He was also director of magnetic resonance imaging and an attending radiologist at RWJ University Hospital St. Peter's Medical Center in New Brunswick, New Jersey.

Dr. Mezrich received a B.S., M.S., and Ph.D. in electrical engineering from the Polytechnic Institute of Brooklyn and his M.D. from the University of Miami.

As both a physician and engineer, Dr. Mezrich has a unique understanding of how innovative technology can be used to extend the frontiers of research and improve patient care.

Workshop Summary
David Clunie, M.D., RadPharm
12:30 PM – 1:00 PM

Dr. David Clunie, Producer Co-Chair of the DICOM Standards Committee, will provide a short summary of the Conference and Workshop highlights.

**✓ Come for Additional
Opportunities to Participate**

- Sept. 15 – 19: WG-06 (Base Standard) meets at NEMA in Rosslyn, VA.
- Sept. 23: WG-10 (Strategy) meets at Renaissance Hotel 2 PM – 6 PM.
- Sept. 24: DICOM Standards Committee meets at Renaissance Hotel 9 – 5.
- Sept. 25: WG-14 (Security) meets at Renaissance Hotel 9 – 5.
- Sept. 25 – 26: WG-16 (MR) meets at Renaissance Hotel 9 – 5 and 9 – 3.
- Sept. 25 – 26: Ad Hoc Working Group on Publishing DICOM in XML meets at Renaissance Hotel 9 – 5 and 9 – 3.