

Strategic Summary for WG24

WG-24 (DICOM in Surgery)

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Co-Chair (surgery/radiology)	tbd
Co-Chair (industry)	tbd

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1. Scope of WG24

“To develop DICOM objects and services related to image guided surgery (IGS)”.

2. Roadmap

1. Identify and build up a user community of IGS disciplines in WG24. Initially five surgical disciplines (Neuro, ENT, cardiac, orthopaedics, thoracoabdominal and interventional radiology) are selected. Anaesthesia is included as long as surgery is affected (I/O).
2. Encourage experts from vendor and academic institutions to join WG24. Vendors of endoscopic and microscopic devices as well as implants (templates) should be included in addition to the classic vendors of medical imaging and PACS.
3. Compile a representative set of surgical workflows (with a suitable high level of granularity and appropriate workflow modeling standards and surgical ontologies) as a work reference for the scope of WG24. Initially, 3-5 workflows, characteristic for each discipline, should be recorded with sufficient level of detail. Workflow tools can be provided by the Innovation Center Computer Assisted Surgery, Leipzig, Germany.
4. Derive potential DICOM services from these surgical workflows.
5. Design an information/knowledge model based on electronic medical record (EMR) related work and identify IOD extensions to DICOM. Because of similarities to the IHE activities, a close relationship to IHE should be established.
6. Take account of the special image communication (1D - 5D) requirements for surgery and mechatronic devices. A close cooperation with WG 2 and 17 should be established.
7. Work in close cooperation with DICOM experts from radiology, cardiology, radiotherapy and related fields which are represented in WG1 - WG23.
8. Encourage close cooperation with working groups in the International Society for Computer Aided Surgery (ISCAS), Japan Institute of CARS (JICARS), German Society for Computer- and Robot-Assisted Surgery (CURAC), European Federation for Medical Informatics (EFMI), European Association for Endoscopic Surgery, American College of Surgery, International Society for Surgery, etc.
9. Disseminate knowledge gained following the roadmap through workshops, conferences and special seminars. Special presentations should be planned each year for CARS, SPIE, RSNA, DICOM-Meeting, and at a minimum for one surgical conference.
10. Connect to integration profiles specified for surgery by IHE activities.

3. Short Term Goals

1. Specify the scope of WG24 relating to peri-operative workflows.
2. Consolidate the relatively large number of interested individuals of WG24 into effective project groups.
3. Produce a White Paper which identifies the current problems with IGS, possible solutions and derive from this a more detailed roadmap for WG24.
4. The following project groups (PG) have been established (project group chairs and co-chairs in brackets):
 - PG1 WF/MI Neurosurgery (**N. Hata?**, R. Fahlbusch?)
 - PG2 WF/MI ENT and CMF Surgery (**J. Raczkowski**, G. Strauss?, H. Zeilhofer?)
 - PG3 WF/MI Orthopaedic Surgery (**A. Loepfe**, U. Stoeckle, L. Joskowicz)
 - PG4 WF/MI Cardiovascular Surgery (**K. Verstreken**, V. Falk?)
 - PG5 WF/MI Thoraco-abdominal Surgery (**K. Vosburgh?**, A. Pietrabissa?)
 - PG6 WF/MI Interventional Radiology (**L. Berliner**, K. Cleary, R. Kikinis?)
 - PG7 WF/MI Anaesthesia (**W. Sandberg**, NN)
 - PG8 S-PACS Functions (**W. Korb**, T. Layden, R. Chau,)
 - PG9 WFMS Tools (**O. Burgert**, R. Ellis, P. Jannin)
 - PG10 IPD (**R. Shahidi?**, J. Sabczynski, S. Zachow?)
 - PG11 Ultrasound in Surgery (**S. Horii**, T. Layden)
 - PG12 White Paper (**H. Lemke**, O. Ratib, S. Horii)
5. Each PG shall be included in the White Paper. There may be two or three PG leaders coming from the technical and medical disciplines respectively. They are responsible for providing the content of the White Paper.
6. PG 10 and PG 11 are planned to achieve some short (12-18 months) and/or middle term (18-36 months) results. For example, they could select some image acquisition, image processing and display functionalities, specific to IGS, and relate them to DICOM objects and services.
7. Establish a working relationship to professionals in anesthesia.
8. During the starting phase it is planned to have four WG24 meetings per year.
9. Meetings of WG24 for 2006 are scheduled for SPIE, CARS, World Congress of Endoscopic Surgery and RSNA.

4. Current Status:

- The inaugural meeting of WG24 took place at CARS 2005 in Berlin on 25th June, 2005, which was attended by more than 50 participants.
- Consolidation of the many opinions expressed during the Berlin meeting as regards scope, roadmap and short term goals, etc. has been carried out in WG24 meetings in Budapest, 28th September 2005 and Chicago, 29th November 2005.

5. Current Work Items

- Preparation and editing/updating of a strategic summary for WG24.
- Preparation of a White Paper for WG24.

6. Risks:

- The complexity of surgical workflows (absence of good/best practice surgical procedures) may render the implementation of a surgical PACS and the definition of DICOM objects and services a difficult task. To establish a balanced “voice of surgeons” in different surgical disciplines may require risky compromises and may not be achievable.

7. Challenges and Opportunities:

Challenges

- IGS takes on very different forms between the surgical disciplines. It is important to include the right spectrum of users from different fields of surgery into WG24. In order to reduce image communication and management functions from the different IGS disciplines to a canonical set suitable for DICOM supported services, it requires not only analytical but also innovative work. It is therefore also important to include the right spectrum of experts from vendor and academic institutions into WG24. An additional challenge is to achieve the above on an international level.
- Workflows for surgical procedures need to be integrated within the overall workflow of patient care, with the aim to integrate the ICT (Information and Communication Technology) island of the OR with the rest of the hospital. Contrary to many other health care activities, a generally accepted surgical ontology and good/best surgical workflow practices are not available to serve as a basis for the activities of WG24. Links to appropriate R&D activities need to be established.

Opportunities

- The digital Operating Room (DOR) is becoming a reality. The market potential for those institutions which bring into the OR digital systems (e.g. a surgical PACS) which conform to standards, such as a suitable DICOM extension, is extremely high.
- Last but not least, patients will benefit from every step taken towards an EMR (Electronic Medical Record) which is embedded in a standard DOR infrastructure.

8. Relationship to other Standards and Standard Bodies

1. Geometric models (stl, vtk, ...)
2. X-ray-dose
3. anaesthesia protocols / measurements
4. Electronic patient record (IEEE/ISO 11073 part 5&6)
5. DICOM WG2
6. DICOM WG17 (Standards for high definition displays)
7. IHE

9. Election of WG24 Co-Chairs

- In addition to the general chair, WG24 decided to have two co-chairs: one medical (user) and one industry/vendor co-chair.
- The medical co-chair will be established after the medical project groups (PG 1 – PG 7) are running.
- The industry co-chair will be established after the participating vendors in WG24 have compiled a list of potential candidates. Industry co-chair candidates should give a short summary about their intent to serve as a co-chair to fschweikert@cars-int.org.

10. Miscellaneous

Any comments referring to the Strategic Summary of WG24 (December 7, 2005) should be mailed to the general chair (hulemke@cars-int.org) of WG24.

Glossary:

CMF – Cranio-Maxillofacial

DOR – Digital Operating Room

EMR – Electronic Patient Record

ENT – Ear, Nose and Throat

ICT – Information and Communication Technology

IGS – Image Guided Surgery

IOD - Information Object Definition

IPD – Image Processing and Display

MI – Medical Imaging

S-PACS – Surgical PACS

WF - Workflow

WFMS – Workflow Management System