Laboratory for Percutaneous Surgery

Image-guided intervention software development for adaptive radiotherapy — using the SparKit

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Background /1

- OCAIRO: Ontario Consortium for Adaptive Interventions in Radiation Oncology
  - from 2010 to 2015
  - $7M from Ontario Research Fund (total project value $20M+)

8 institutions in Ontario:
- Toronto University Health Network (lead institution; PI: David Jaffray)
- Cancer Centre of South Eastern Ontario (CCSEO)
- London Health Sciences Centre (LHSC)
- Queen's University (QU)
- Robarts Research Institute (RRI)
- Sunnybrook Health Sciences Centre (SHSC)
- The Ottawa Hospital Regional Cancer Centre (TOHRCC)
- University of Toronto (UT)

16 private sector partners:
- Elekta Ltd., Elekta Instrument AB, Elekta Inc.
- Sentinelle Medical Inc.
- IMRIS Inc.
- Philips Medical Systems Canada, Philips Electronics North America
- Best Theratronics Ltd.
- Eigen
- TomoTherapy Inc.
- GE Healthcare
- Claron Technologies Inc.
- Modus Medical Devices Inc.
- CMS
- MediRecon
- NDI
- Quanser Consulting Inc.
- Ultrasonix
- Raysearch Medical Laboratories AB

Background /2

- OCAIRO themes:
  - Imaging and Instrumentation for Adaptive Radiation Therapy (D. Jaffray)
  - Adaptive Radiation Therapy Processes (J. Battista)
  - Validation of Image Signal and Dose Accumulation in Adaptive RT (L. John Schreiner)
  - Open Source Software Platforms and Databases for the Adaptive Process (T. Peters/G. Fichtinger)

    => Through **SparKit** (G. Fichtinger): funded by separate Cancer Care Ontario grants. Group of 6-8 people & infrastructure funded for 5 years, starting 2011.

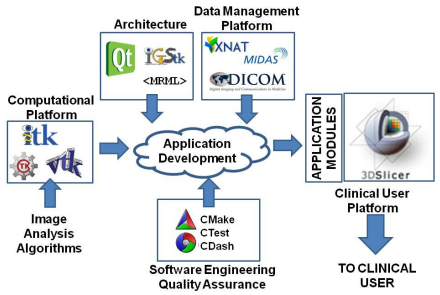
Software platform and adaptive radiotherapy kit (SPARKit)

- Software Platform (SP): shared, reusable, and customizable basic software components
- Adaptive Radiotherapy Kit (ARKit): Specific toolkit for adaptive radiation therapy and associated image-guided interventions

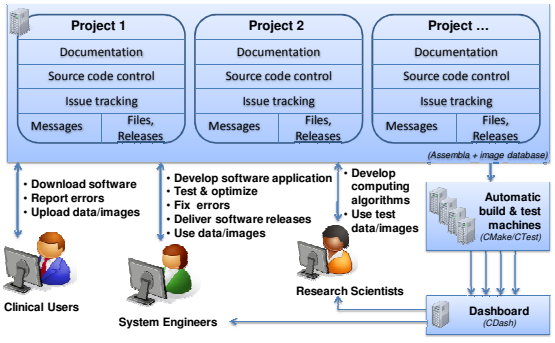
Goals:
- Validate clinical hypotheses in clinical trials in adaptive radiotherapy
- Ready-to-use image analysis and visualization capabilities (avoid re-development)
- Quickly deployable systems (minimize system engineering effort)

SPARKit tools

Based on the NA-MIC kit (OCAIRO buy-in confirmed).



Collaboration infrastructure



SPARKit services

- Consult with clinical users to define SPARKit requirements
- Assist development & testing of clinical trial systems at the user's location
- Deploy tools, provide technical support for users
- Train users using hands-on and web-based demonstrations and tutorials
- Transfer novel computing algorithms and image analysis tools into SPARKit for dissemination and sharing
- Promote SPARKit in appropriate events and conferences to clinical research community

Some specific needs

- DICOM-RT support in 3D Slicer
- Interface between 3D Slicer and
  - Washington University's Computational Environment of Radiation Research (CERR) and
  - Pinnacle Treatment Planning system
- Image and protocol data sharing infrastructure

Where are we?

- OCAIRO articulates the need ✔
- Funding secured ✔
- **Set up team & infrastructure**
- **Set up collaborations**
- **Identify needs**
- Create & follow the plan

Thank you.

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