

**Spring 2014, CIS II Project #8, Johns Hopkins University**

**Checkpoint Presentation:  
A New Generation of Quality Assurance  
For Radiation Oncology**

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**RAVEN QA**

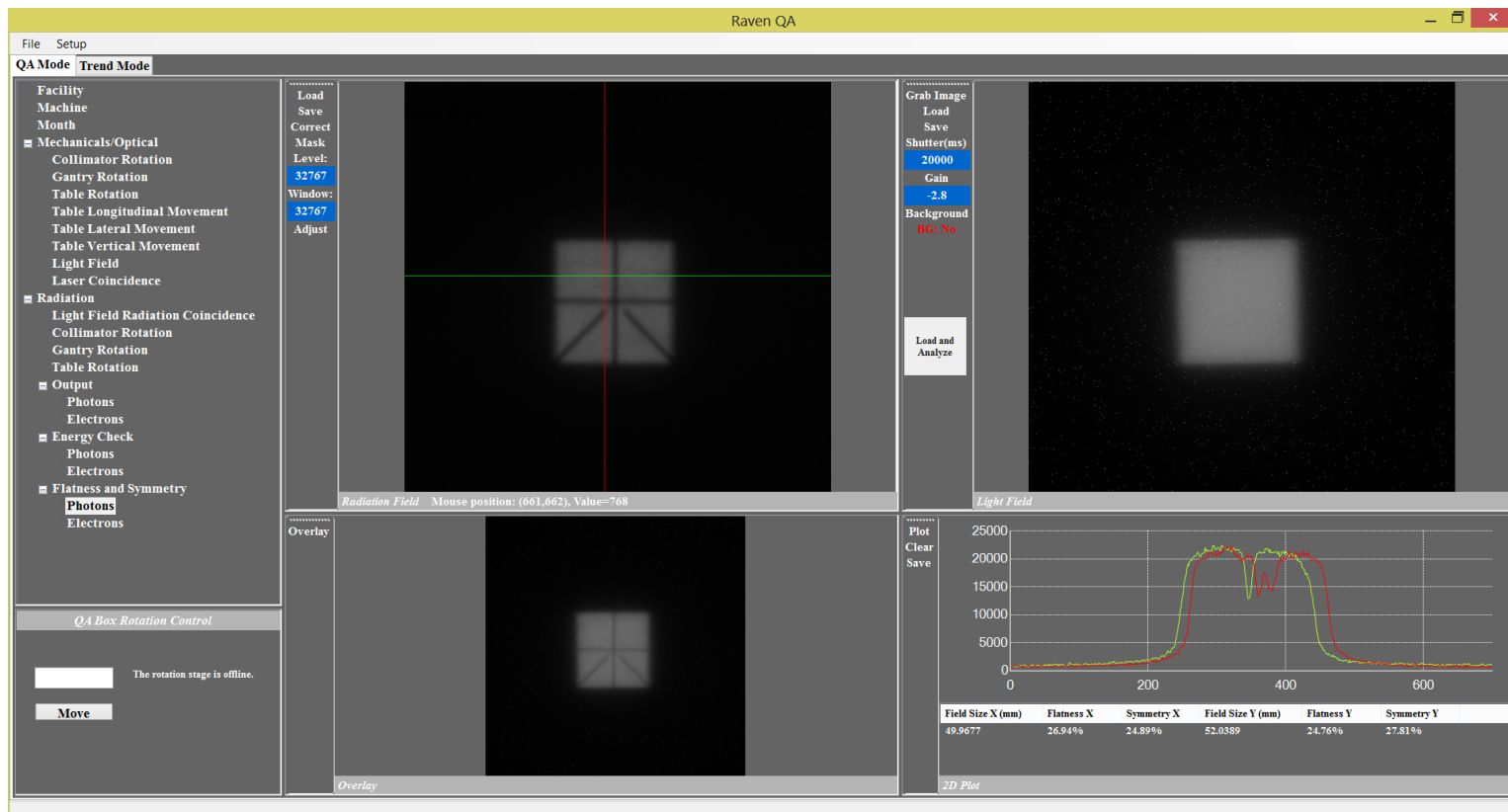


# 1. Project Overview



Design and release a **commercial** software for Raven QA which includes:

- Image Acquisition
- Image Processing
- Motor Control
- User Workflow Guidance.



## 2. Deliverables Review

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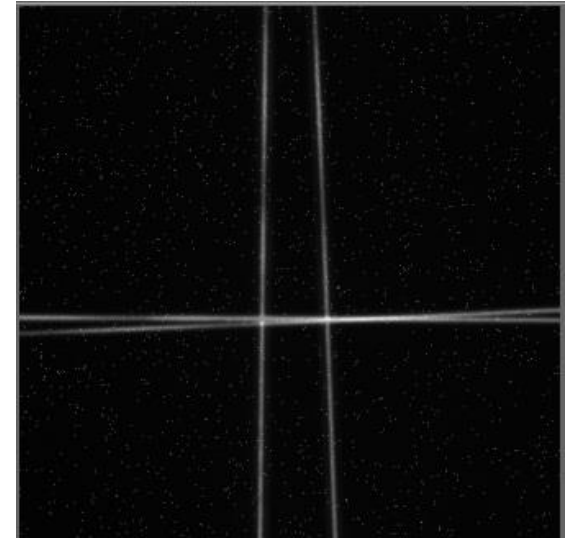
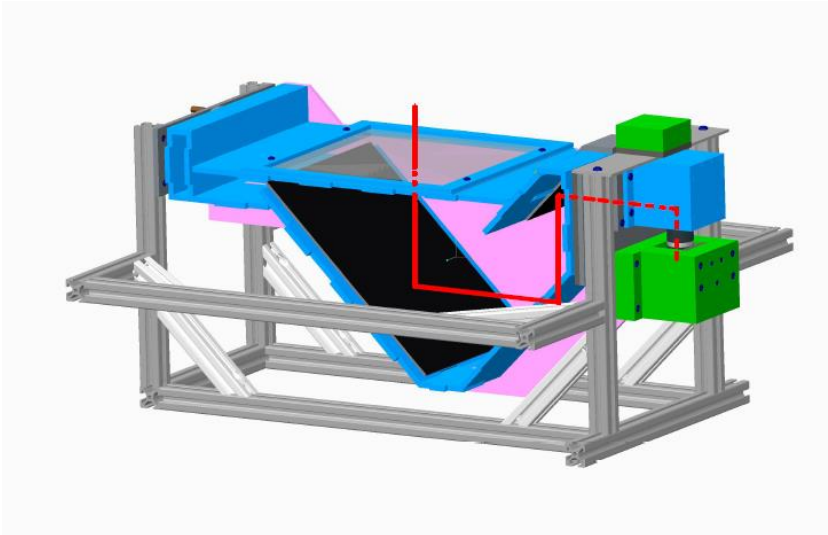


- **Minimum Deliverables:**
  - **Image Acquisition**
    - **Camera Correction** Done
  - **Image Processing** Done
  - **Motor Controlling**
    - **Step Motor Control** Done
    - **Inclinometer Control** Not started yet
- **Expected Deliverables:**
  - **3D Rendering** Done
  - **Workflow Guidance** Done
  - **Report Generation** Done
- **Maximum Deliverables:**
  - **Internet database** Partially Done
  - **Software Documentation** Draft Done

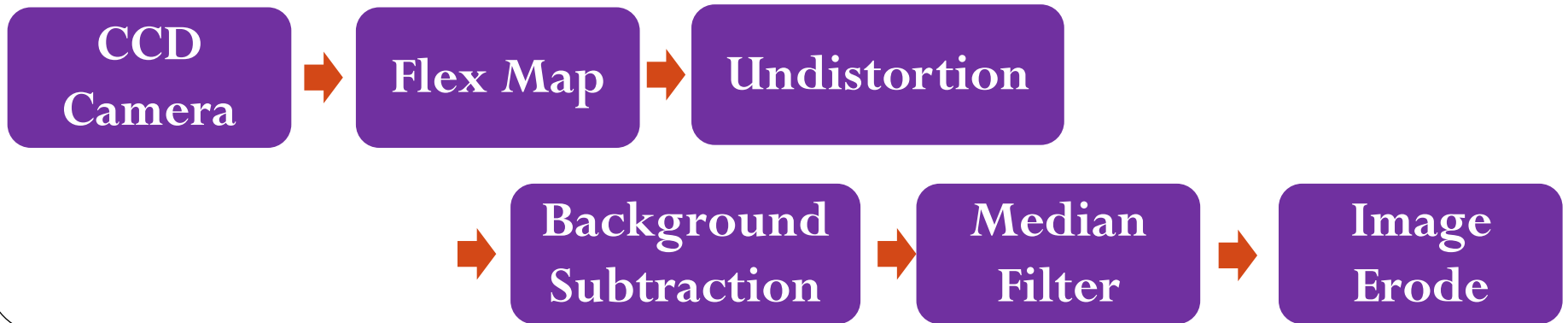
### 3. Technical Approach: Image Acquisition

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- 16-bit grey scale images
- Image morphing while QA Box rotates



- Image correction



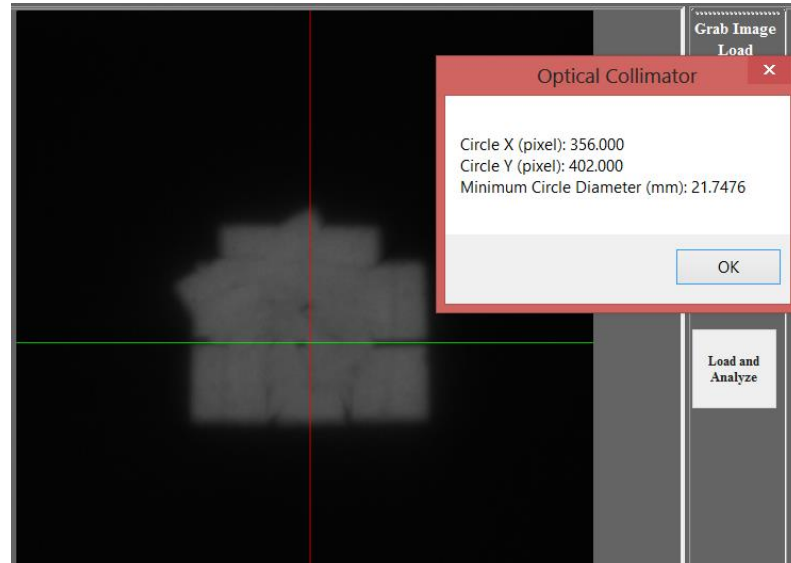
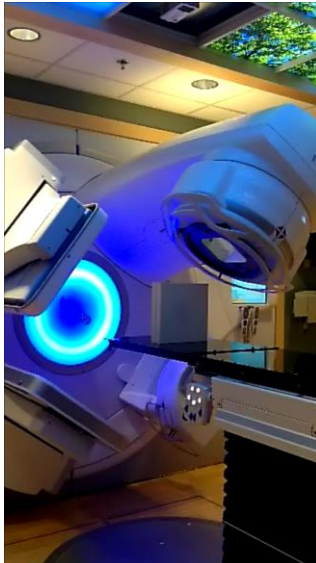
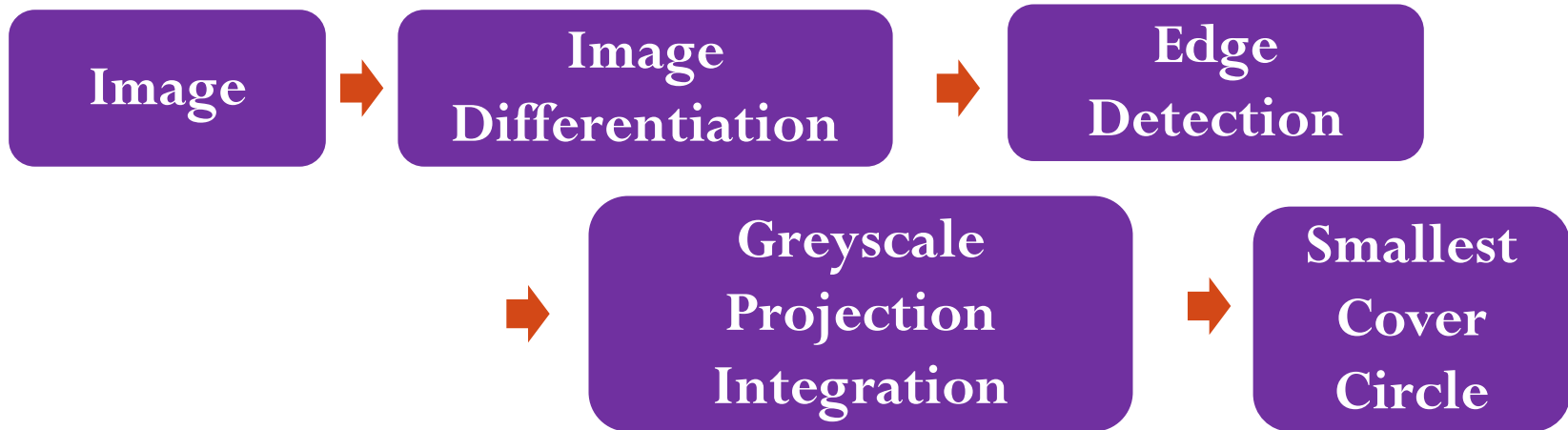
# **3. Technical Approach: Image Processing**

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- **Light Field Collimator Center**
- **Image Movement**
- **Light Field Radiation Coincidence**
- **Light Field Parameter Calculation**
- **Radiation Field Collimator Center**
- **Laser Coincidence**
- **Image Comparison**

# 3. Technical Approach: Image Processing

- Light Field Collimator Center



# 3. Technical Approach: Workflow Guidance

Facility

Machine

Month

■ Mechanicals/Optical

Collimator Rotation

Gantry Rotation

Table Rotation

Table Longitudinal Movement

Table Lateral Movement

Table Vertical Movement

Light Field

Laser Coincidence

■ Radiation

Light Field Radiation Coincidence

Collimator Rotation

Gantry Rotation

Table Rotation

■ Output

Photons

Electrons

■ Energy Check

Photons

Electrons

■ Flatness and Symmetry

Photons

Electrons

### Machine Setup

- INFINITY
  - 6MV
  - INFINITY1
    - 6MV
    - 15MV
    - 6MeV
    - 9MeV
    - 12MeV
    - 15MeV
    - 18MeV
    - 10FFF
  - tryOptical
    - Optical

Machine Label:

Serial Number:

Type:

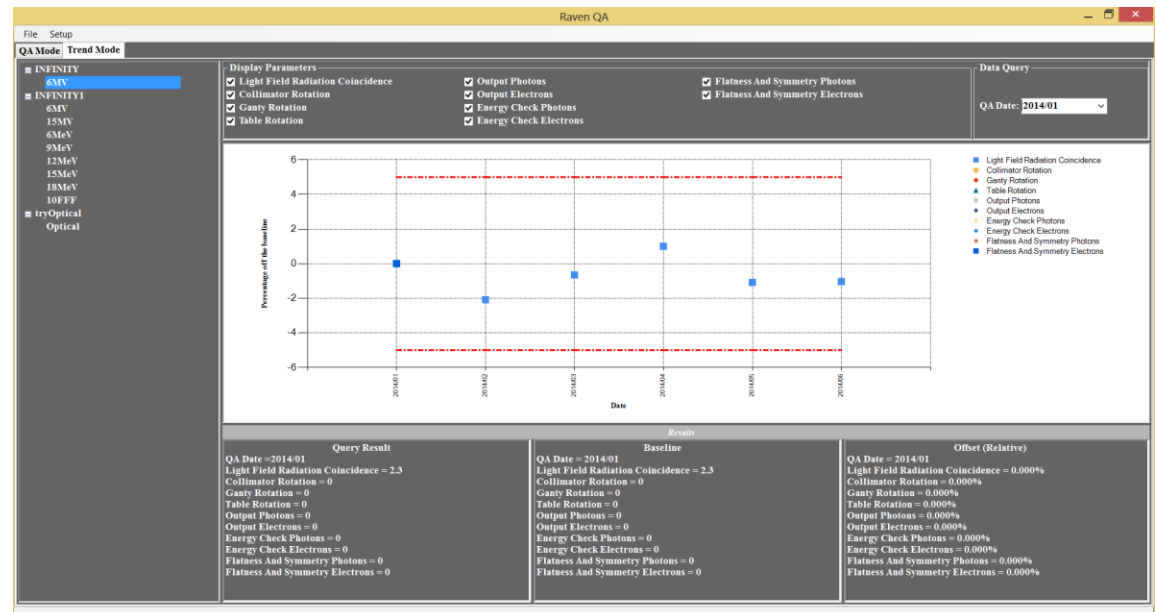
Comments:

- Add Template to Machine

Energy:  MV

Existing Templates: 

6MV



## **4. Milestones**

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- **March 7: Software Image Processing Demo**
- **March 17: Software Documentation Draft**
- **March 28: Software Demo**



## **5. Management Plan in the future**

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- **April 10: Get the Inclinometer**
- **April 20: Validate Control Laws**
- **April 25: Extend Local Database to Internet Database**
- **April 30: Finish Software Documentation**

**Thanks for your attention!**

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