**MIM for Physicists**
1/14/2016 EP

# DO NOT print this document. Instructions will be updated.

# MIM Support: 866-421-2536

1. How to automatically generate image registration QA reports:

   **Concept**: Site-specific setup workflows are used to automatically detect, load, register, arrange, and adjust display properties of images used for target and OAR delineation. The image registrations require QA by physics and physics can capture a charge for QA of multimodality image registrations. MIM is able to automate creation of image registration QA reports. The registration analysis can be performed from your MCW computers running local instances of MIM.

   a. In the patient list, select the saved session created by setup workflow and click the Open button in the lower left of the screen.
   b. Use the left or right arrow keys to switch pages to the "RegQA" pages.
   c. Review the intra-modality and inter-modality registrations using image blender, checkerboard, linked cursor tools, etc.
      i. Note that the registrations are "live"; any updates will automatically update the images on the delineation pages.
      ii. When you are satisfied with the registration, lock the alignment by clicking on the gear and selecting "Lock Alignment"
   d. Click the camera icon in the toolbar to grab screen captures of the registrations for the image registration QA report.
   e. Click the yellow hard hat in the top toolbar and run the workflow "FH Registration QA – Rigid". A report will be automatically generated with the screen captures and saved on the R drive under "R:/pdf_output/_MIMReports/Rigid_Registration".
   f. Launch Moniqa and log in. Go to the Tools menu and select "Physics Report".
   g. Enter the patient RT number, then hit tab.
   h. In the Report Type combo box, select the "Rigid Registration" report type.
   i. Click the Add button, navigate to "R:/pdf_output/_MIMReports/Rigid_Registration" and select the patient motion report.
   j. Click the Create Report button. The final registration report will be copied to W:/RTP/ESCAN/Physics.
   k. Load the registration report as an ESCAN document for the patient in Mosaiq. Click on Encouter and select yourself as the reviewer and the physician as the cosigner.

2. How to perform 4D motion analysis in MIM:

   **Concept**: MIM provides tools for 4D motion assessment (including grid, ruler, and cine movie loop). The motion analysis can be performed from your MCW computers running local instances of MIM.

   a. Select the 4D image(s) in the patient list and run the "FH Analyze 4D Motion" workflow.
   b. Follow the instructions provided by the workflow, playing a cine movie loop and using the grid to determine maximum target extents along the cardinal directions. The motion analysis report will be saved on the R drive under "R:/pdf_output/_MIMReports/4D_Motion".
   c. Launch Moniqa and log in. Go to the Tools menu and select "Physics Report".
   d. Enter the patient RT number, then hit tab.
   e. In the Report Type combo box, select the 4D Analysis (Gated) or 4D Analysis (Non-Gated) report type based on the motion analysis.
   f. Click the Add button, navigate to "R:/pdf_output/_MIMReports/4D_Motion" and select the patient motion report.
   g. Click the Create Report button. The final motion analysis report will be copied to W:/RTP/ESCAN/Physics.
   h. Load the motion analysis report as an ESCAN document for the patient in Mosaiq. Click on Encouter and select yourself as the reviewer and the physician as the cosigner.

3. Deform old dose to new or rescan CT for use as bias dose in Monaco:

   **Concept**: MIM can deform a previous dose to a new (or rescan) CT. The deformed dose can be used as a bias dose in Monaco. The current process assumes utilizes a dummy plan created on the new (or rescan) CT in Monaco. This issue will be resolved in MIM 6.6.

   a. Create a dummy plan on the new or rescan CT in Monaco and calculate dose.
   b. Export the dummy plan, dose, CT, and structures to MIM Clinical.
   c. In MIM, select the CT and dose to deform (the old dose) and the new or rescan CT and dummy dose. Then run the "FH Create Deformed Bias Dose" workflow.
   d. Adjust the rigid and deformable registration when prompted by the workflow. Click OK at the prompt to save the deformed bias dose.
   e. Send the new (or rescan) CT, plan, deformed bias dose, and structures to Monaco and import. Note that the structures will be those sent with the dummy plan, not the old plan.

4. How to create Matlab extensions for MIM:

   **Concept**: MIM permits users to call custom Matlab and Java functions through extensions. Using extensions users can focus on algorithm development and avoid worrying about user interface development.

   a. Prepare the Matlab function to run as a MIM extension:

i. Convert input variables to double (optional)
ii. Convert output variables to int16 (required)

b. Create a directory for your extension, with subdirectories labeled *dist*, *src*, and *resources*
c. Copy "matlabExtensionBuilder.jar" file to extension directory
d. Copy matlab m-file to *src* subdirectory
e. Copy "info.properties" file to *resources* subdirectory and update it with relevant information about your extension. The two most important properties are the ENTRY_FUNCTION and NAME.
f. Double click on the matlabExtensionBuilder.jar file to compile the extension. The compiled extension will be placed in the *dist* subdirectory and copied into MIM.
g. Launch MIM, and add the extension to your toolbar.
h. Optional: Create a workflow to automate use of the extension.

5. How to sort GE 4DCT data:

**Concept**: Sorting of GE 4DCT data can be performed in MIM. Sorting of Siemens 4DCT data is performed on the scanner console.

a. Confirm the *.vxp file resides under:
\\192.227.58.151\focaldata\RPM
b. Select the raw 4D scan in the MIM patient list and run "FH Bin GE 4D CT Data".