



Scout-and-Scan Control System Reconstructor

Quick Reference Guide

For use by operators who have completed basic training

Basic Steps

- Find Center Shift
- Find Beam Hardening Constant
- Fill in the reconstruction parameters
- Start Reconstruction

Detailed Steps

(Detailed instructions can be found in the manual)

1. Open Scout-and-Scan Control System Reconstructor 11.0.xxxx
2. Browse and load the file to reconstruct (.txrm) using the Input File dialog box .
3. At the Output File or Folder option, click on Browse and input the name for the reconstructed tomography dataset (*.txm file).
4. Accept the defaults for file type (.txm), data type (ushort 16 bit) and recon output down sampling (1).
5. For Auto Center Shift option
 - 5.1. Under the Parameter Search Tool tab, select the Auto Center Shift (CS) option.
 - 5.2. Using the default values, click on Start. When completed the CS value will be displayed.
 - 5.3. If the image looks unfocused, please proceed to do a manual center shift find.
6. For Manual Center Shift
 - 6.1. Under the Parameter Search Tool tab, select the Manual Center Shift option.
 - 6.2. Click on Start 'search reconstruction' using default value for start shift, step size and end shift.
 - 6.3. If you need to reset the histogram, click on  and then click on the Custom Range option. Using the mouse, click and drag in the white area to adjust the image contrast and brightness.
 - 6.4. Once the "Reconstruction job complete" status appears, using the scroll bars look for the sharpest image just like you would while focusing an optical microscope.
 - 6.5. If the images don't seem to start focusing, the center shift value is not in the default range. Widen/change the range and repeat the search E.g.: -30 to 30 with step size 5.
 - 6.6. Once you find the most focused image, note the center shift number which is located on the upper left corner of the window in red.
 - 6.7. Now fine focus on the sample by selecting the range of about $\pm 2-3$ pixels of the coarse center shift number found in Step 6.6, and use a smaller step size of 0.2. Repeat step 6.4.
 - 6.8. Go to image selected with the best focused features and click on "Use current slice recon settings".

7. For Beam Hardening
 - 7.1. Under the Parameter Search Tool tab, select the Beam Hardening option.
 - 7.2. Click on Start 'search reconstruction' using default values for the parameters.
 - 7.3. Once all the images with the different beam hardening constants are reconstructed, go to image 1 using the scroll bar.
 - 7.4. Click  to enable the Line Plot annotation tool.
 - 7.5. Draw a line plot across the image and change the line width (scroll bar) to about 50, to have an averaged signal.
 - 7.6. Scrolling through the images, select the smallest beam hardening constant that gives an approximately flat plot over a homogenous area.
 - 7.7. In case of a complicated sample with various materials, draw a line plot over a smaller feature and select the beam hardening constant that gives a somewhat flat plot.
 - 7.8. Go to image selected with the desired beam hardening constant and click on "Use current slice recon settings".
8. For Changing Rotation Angle
 - 8.1. Under the Parameter Search Tool tab, select the Rotation Angle option.
 - 8.2. Click on Start 'search reconstruction' using default values for the parameters.
 - 8.3. If the desired angle is not in this range, widen/change the range and repeat the search.
 - 8.4. Go to image selected with the desired rotation angle and click on "Use current slice recon settings".
9. Select the "Reconstruction Settings" tab in the main panel.
10. If the user has clicked on the "Use current slice recon settings" or manually input the parameters while searching for center shift, beam hardening or rotation, those parameters will be already populated. If not, populate those parameters.
11. Fill in the parameters using the following guidelines.

Parameter	Recommended Values
Center Shift	Determined in Step 5 or 6
Rotation Angle Shift	Determined in Step 8
Ring Removal	None (default)
Beam Hardening configuration file	Standard Beam Hardening Correction
Beam Hardening Constant	Determined in Step 7
Recon Filter	Smooth
Recon Filter Constant	0.7 (for bin1) and 0.5 (for bin2) Value may be increased with the noise level
Secondary Reference Correction	None (default)
Byte Scaling	Global (default)

12. Click on Start Final Reconstruction in the side panel to commence reconstruction