VMAT CSI Automated Planning Preparation Script User Guide

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Contents

1 Launching the script

- Open a patient structure set in external beam planning and run the 'LaunchVMAT-TBICSIAutoPlan.cs' script (located in the /bin folder of the VMAT-TBI-CSI code)
- Select the VMAT CSI button

2 Automated import/export of data for auto-contouring

- Launch the CSI auto-planning script (Section 1)
- Select the newly created image in on the 'Export CT' tab
- Hit the 'Export CT Data' button
- Following successful export, the script will automatically close and then launch a console window that functions to wait for the RT structure set to be generated from the auto-contouring model (i.e., it monitors the import data folder specified in the preparation script configuration file)
- Once a matching RT structure set is found for this patient, the console application automatically imports the data to Aria and closes upon successful finish
- Proceed to the contouring workspace to review the autocontours and make any necessary adjustments

3 Target specification

- Once the normal tissues have been contoured and reviewed, launch the preparation script and select the 'Specify Targets' tab
- Select any plan template from the template list (doesn't matter which for target prep)

3.1 Prep for Targets

- Hit the 'Run Prep' button and a small progress popup window will appear and report the progress of the operation
- Once the prep for targets has been completed, close the preparation script and save your changes
- At this point, inform the physician that you are ready for OAR structure review and targets
- **Make sure the physician approves the final target structure(s) when they are finished**

  - For low-dose CSI, PTV_CSI must be approved
  - For full-dose/high-risk CSI, PTV_CSI and PTV_Boost must be approved

3.2 Set Targets

- Once the approved targets have been recieved from the physician, launch the preparation script
- Select the desired plan template from the templates list
- Select the 'Specify Targets' tab and the 'Set Targets' subtab
- Review the pre-populated targets and make any necessary changes
- Once satisified with the selected targets, hit the 'Set Targets' button at the bottom of the UI

4 Structure Tuning

- Once the targets are set, proceed to the 'Structure Tuning' tab
- Review all of the prepopulated items on the various subtabs and make any necessary changes (see the full guide for details on what each subtab represents)
- Once satisified, hit the 'Perform TS Generation & Manipulation' button on the Structure Manipulation tab
- A small popup window will appear (Figure 1) that will report the progress of Structure Tuning
- Depending on the size of the patient, the CT resolution, and requested structure tuning operations this step can take between 1–5 minutes
- If there is an error, the progress bar will turn red and report a failed message (Figure 1d)
  - Hit the details dropdown and look at the error message. If it complains about read or writing protected memory, close the script and try again (an issue on Varian's side, not the script). It should work the second time
  - Otherwise, address the issue reported in the details window
- The progress window will automatically close upon successful completion of Structure Tuning and the Structure Tuning Tab will turn green
- Proceed to the Beam Placement tab

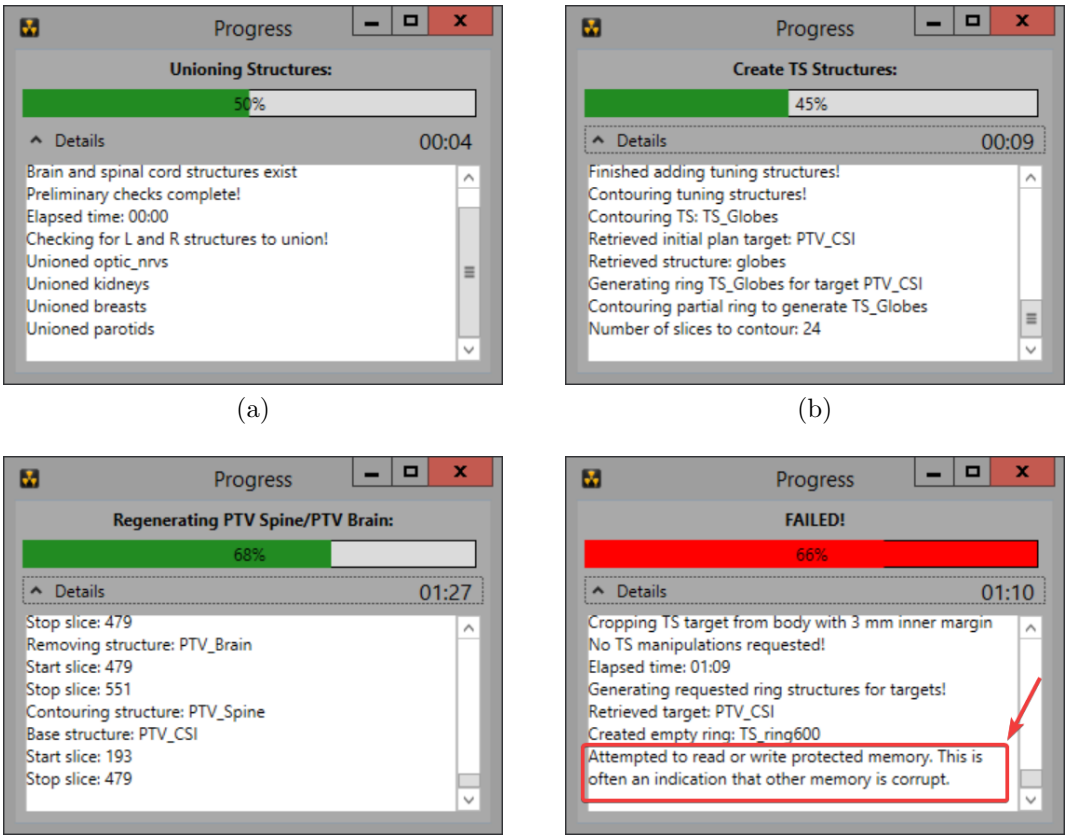

Figure 1: Progress windows detailing the various stages of the script performing structure tuning. a) Unioning identified left and right structures, b) Creation of TS_Globes and TS_Lenses, c) Regeneration of PTV_Spine and PTV_Brain, and d) Example of a failed structure tuning operation. Should structure tuning fail, the cause of the failure will be printed in the progress window details (red box and arrow in d)).

5 Beam Placement

- The script uses the specified targets and the calculated number of isocenters from the Structure Tuning operations to determine how many plans are needed, how many isocenters should be assigned to each plan, and what the names of the isocenters should be
  - The script automatically handles initial plan and initial + boost plan cases
  - From the calculated number of isocenters, the script will suggest names for each isocenter. These isocenter names will automatically be propagated to the generated plan(s) and beams
- Select the 'Contour overlap between VMAT isocenters' option on the Beam Placement tab and enter 1.0 cm in the text box that appears
- Hit the 'Place Beams' button
- Another small progress window will appear and detail the progress of plan generation and beam placement
- Following successful beam placement, the Beam Placement tab will turn green
- Proceed to the Optimization Setup tab

6 Optimization Setup

- If a treatment plan template is selected, the objective list will be populated with the objectives in the template
- Review the suggested optimization constraints
- Once satisified, hit the 'Set Optimization Constraints' button
- Upon successful assignment of the optimization objectives, a warning message will be displayed indicating the user should close the script, review the generated tuning structures, placed isocenters and beams, and the assigned optimization objectives

7 Plan Preparation

- The Plan Preparation tab of the GUI was added to assist the user with preparation of the plan for treatment including separation of the combined VMAT plan into separate plans, generating setup fields, creating a plan sum, etc.
- Hit the 'Generate shift note' button and paste the note into the excel spreadsheet containing the shift information for the plan and into a journal note

- Hit the separate plans button
  - If there are multiple VMAT plans in the same course, the script will prompt you to select a plan to prepare
  - **NOTE: YOU WILL NEED TO MANUALLY SET THE PRIMARY REFERENCE POINT AND TARGET STRUCTURE IN EACH OF THE SEPARATED PLANS**