



3D Brachy Software – Nova Surface Applicator Version 2023.1.0 Updates

Release Date: June 22, 2023



What's New?

Version 2023.1.0 Updates



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8. Trajectory Planning Revamped!
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 - b. Tunnel Shortening
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 - d. Lateral Node Movement
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 - f. Multiple Trajectories
9. Design Summary

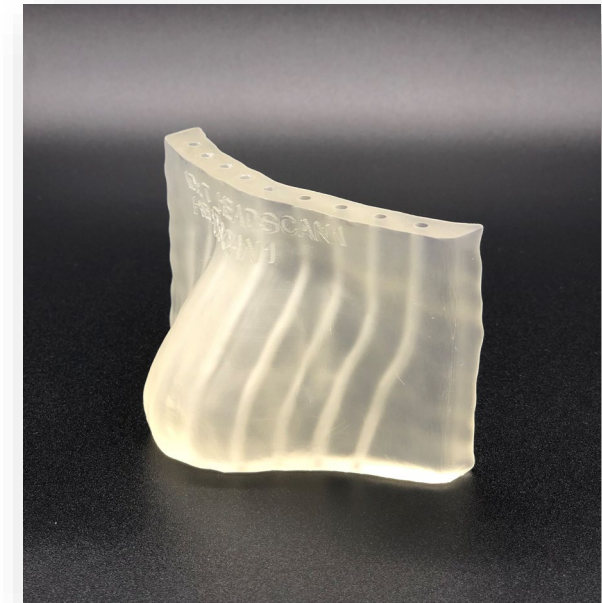
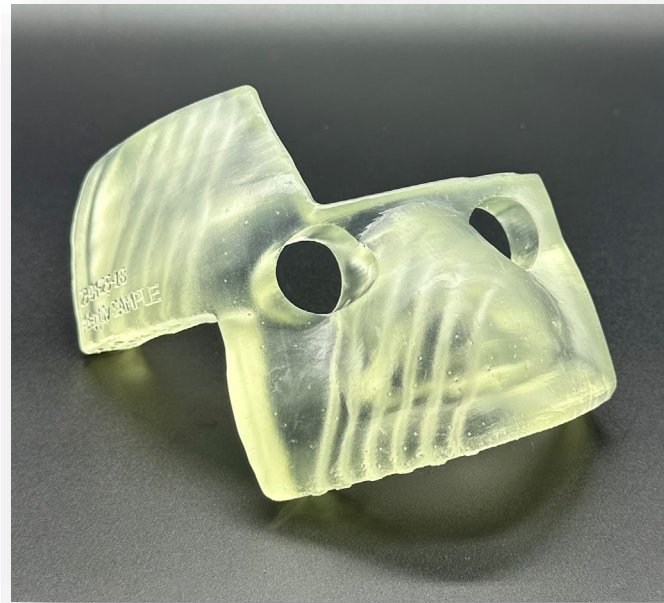
Introducing Nova Surface Applicator

- Adaptiiv has rebranded the name of its software module from Surface Brachytherapy Applicator to Nova Surface Applicator.



Adaptiiv On Demand

- Users can now order Nova surface applicators via Adaptiiv On Demand (AOD).
- AOD applicators are 3D printed using Formlabs SLA printing technology, specifically designed for healthcare to produce high-fidelity rigid parts that meet clinical requirements.



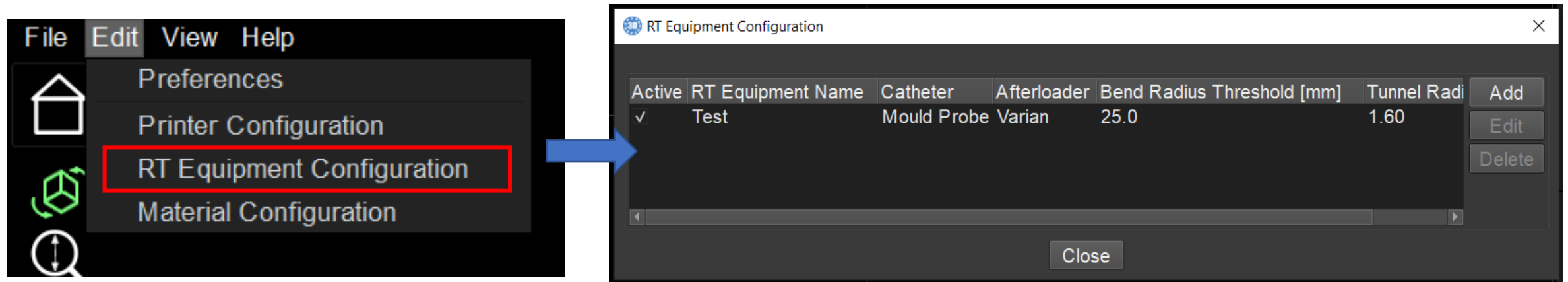
Varian Compatibility

- Compatibility has been confirmed with Varian's BRAVOS™ afterloader system.
- BRAVOS™ compatibility for Nova surface applicators can be stated with the following catheter tunnel limitations:
 - Radius of catheter tunnel bending shall not be less than 25 mm (bend radius threshold).
 - Inner catheter tunnel radius shall not be less than 1.3 mm and larger than 1.4 mm.
 - Sum of catheter tunnel bending angle shall not be more than 180°.



RT Equipment Configuration

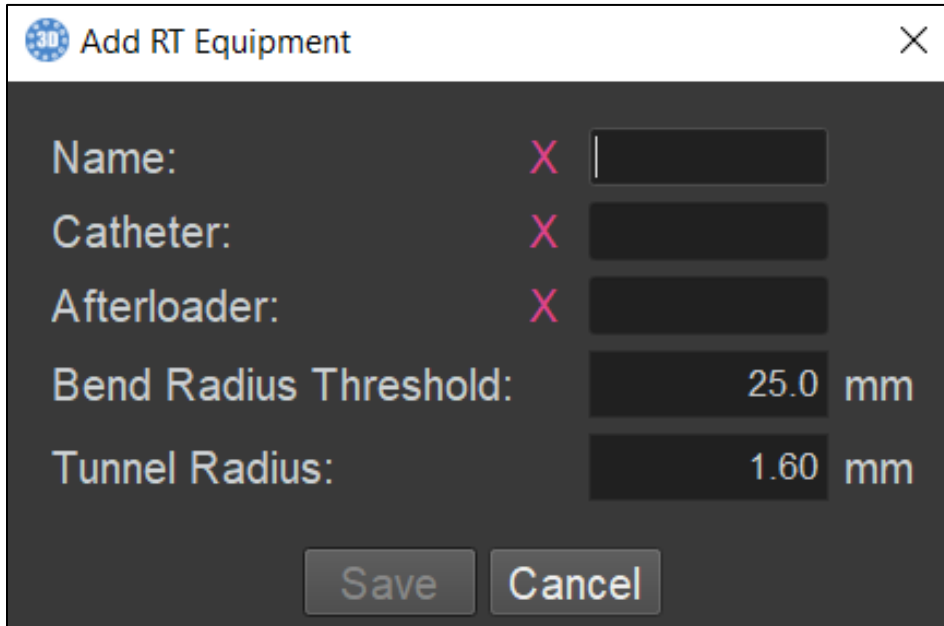
- The RT Equipment parameters are now stored as an independent setting.
 - Store multiple configurations, depending on your equipment.



- Here, users can add, edit, or delete various configurations.
- In order to create a Nova surface applicator, at least one of the configurations **MUST** have the Active box checked.

RT Equipment Configuration

- When adding an RT Equipment configuration, users must specify the following:



The screenshot shows a dialog box titled "Add RT Equipment" with a close button (X) in the top right corner. The dialog contains the following fields:

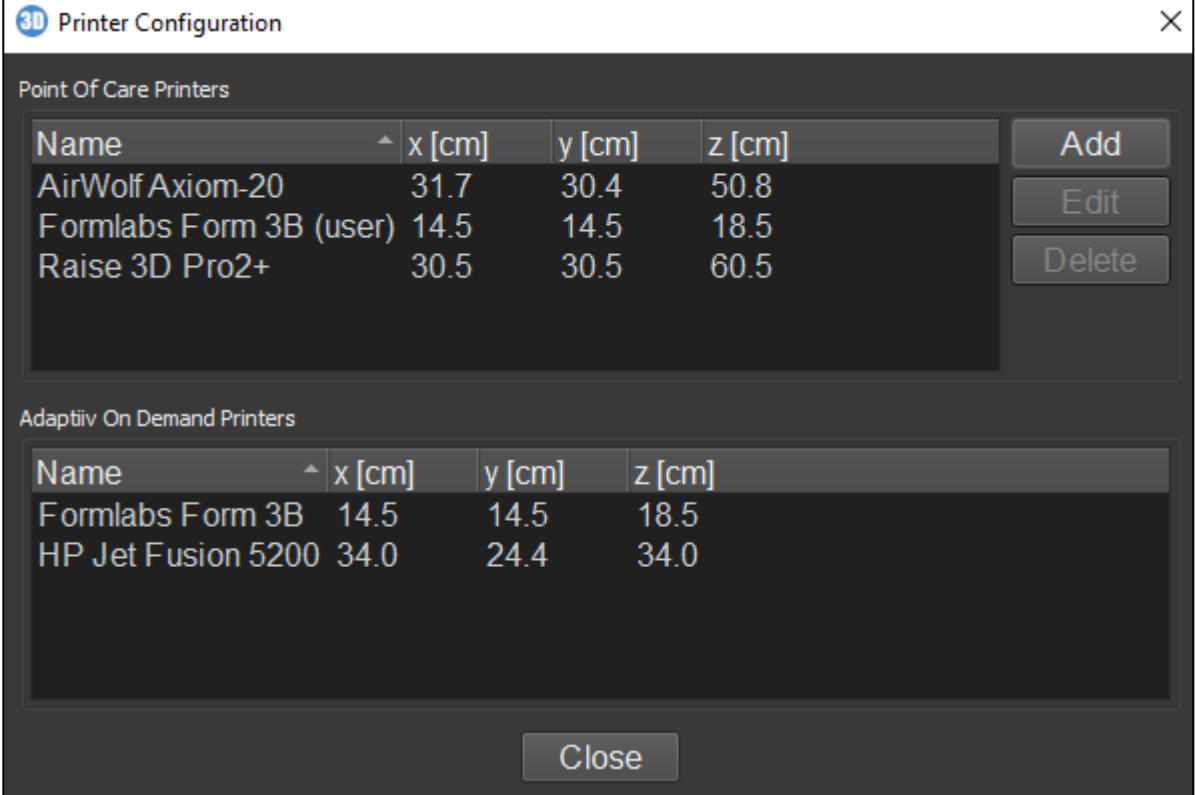
- Name: [Red X] [Empty text box]
- Catheter: [Red X] [Empty text box]
- Afterloader: [Red X] [Empty text box]
- Bend Radius Threshold: [25.0 mm]
- Tunnel Radius: [1.60 mm]

At the bottom of the dialog are two buttons: "Save" and "Cancel".

- The text boxes can be filled to your discretion; however, we recommend being as accurate and descriptive as possible.
- The bend radius threshold will depend on the combination of afterloader and catheters used. Please reach out to your afterloader/catheter vendor for more information on the minimum bend radius.
- The tunnel radius will depend on the catheters used. Adaptiiv recommends using 0.25 mm or larger to ensure the fit is not too snug.

Printer Configuration

- In the Edit > Printer Configuration menu, users will find a few default printers with maximum print bed dimensions stored.
- Users can add new printers if the printer has not been validated by Adaptiiv.
- Simply use the **Add**, **Edit**, and **Delete** buttons to configure additional printers.



The screenshot shows a window titled "3D Printer Configuration" with a close button in the top right corner. The window is divided into two sections:

Point Of Care Printers

Name	x [cm]	y [cm]	z [cm]	
AirWolf Axiom-20	31.7	30.4	50.8	Add Edit Delete
Formlabs Form 3B (user)	14.5	14.5	18.5	
Raise 3D Pro2+	30.5	30.5	60.5	

Adaptiiv On Demand Printers

Name	x [cm]	y [cm]	z [cm]
Formlabs Form 3B	14.5	14.5	18.5
HP Jet Fusion 5200	34.0	24.4	34.0

A "Close" button is located at the bottom center of the window.

Material Configuration

- After the RT Equipment Configuration is set up, users must specify the Material Configuration.

Material Configuration
✕

Default material: ---No Default---

Point Of Care Material Configuration Table

Active	Material Configuration Name	Manufacturing Process / 3D Printer Settings	3D Printer	RT Equipment	RED	
<input type="checkbox"/>	3D Fuel Standard PLA_Pro2+_0.8mm_20%infill	Raise3D_Brachy 20% infill.bin-export.bin	Raise 3D Pro2+	---Select RT Equipment---		<div style="margin-bottom: 5px;">Add</div> <div style="margin-bottom: 5px;">Edit</div> <div style="margin-bottom: 5px;">Delete</div>
<input type="checkbox"/>	3D Fuel Standard PLA_Axiom20_Nozzle1_0.8mm_20%infill	Axiom20_Brachy20%infill_EX1_PLA.ini	AirWolf Axiom-20	---Select RT Equipment---		
<input type="checkbox"/>	3D Fuel Standard PLA_Axiom20_Nozzle2_0.8mm_20%infill	Axiom20_Brachy20%infill_EX2_PLA.ini	AirWolf Axiom-20	---Select RT Equipment---		
<input type="checkbox"/>	3D Fuel Standard PLA_Pro2+_0.8mm_100%infill	Raise3D_Brachy 100% infill_0.8mm-export.bin	Raise 3D Pro2+	---Select RT Equipment---		
<input type="checkbox"/>	3D Fuel Standard PLA_Axiom20_Nozzle1_0.8mm_100%infill	PLA_Axiom20_Nozzle1_100%infill_0.8mm.ini	AirWolf Axiom-20	---Select RT Equipment---		

Adaptiv On Demand Material Configuration Table

Active	Material Configuration Name	Manufacturing Process / 3D Printer Settings	3D Printer	RT Equipment	RED	
<input type="checkbox"/>	Formlabs Clear v4_Form 3B_100%infill	Formlabs Form 3B default settings	Formlabs Form 3B	---Select RT Equipment---		Edit

Close

Material Configuration

- After the RT Equipment Configuration is set up, users must specify the Material Configuration.
 - The **Active** toggle box indicates what material(s) can be used to create a device. In order to create a Nova surface applicator, at least one Material Configuration must be selected as Active.

Material Configuration

Default material: ---No Default---

Point Of Care Material Configuration Table

Active	Material Configuration Name	Manufacturing Process / 3D Printer Settings	3D Printer	RT Equipment	RED
<input type="checkbox"/>	3D Fuel Standard PLA_Pro2+_0.8mm_20%infill	Raise3D_Brachy 20% infill.bin-export.bin	Raise 3D Pro2+	---Select RT Equipment---	
<input type="checkbox"/>	3D Fuel Standard PLA_Axiom20_Nozzle1_0.8mm_20%infill	Axiom20_Brachy20%infill_EX1_PLA.ini	AirWolf Axiom-20	---Select RT Equipment---	
<input type="checkbox"/>	3D Fuel Standard PLA_Axiom20_Nozzle2_0.8mm_20%infill	Axiom20_Brachy20%infill_EX2_PLA.ini	AirWolf Axiom-20	---Select RT Equipment---	
<input type="checkbox"/>	3D Fuel Standard PLA_Pro2+_0.8mm_100%infill	Raise3D_Brachy 100% infill_0.8mm-export.bin	Raise 3D Pro2+	---Select RT Equipment---	
<input type="checkbox"/>	3D Fuel Standard PLA_Axiom20_Nozzle1_0.8mm_100%infill	PLA_Axiom20_Nozzle1_100%infill_0.8mm.ini	AirWolf Axiom-20	---Select RT Equipment---	

Adaptiv O Demand Material Configuration Table

Active	Material Configuration Name	Manufacturing Process / 3D Printer Settings	3D Printer	RT Equipment	RED
<input type="checkbox"/>	Formlabs Clear v4_Form 3B_100%infill	Formlabs Form 3B default settings	Formlabs Form 3B	---Select RT Equipment---	

Close

Material Configuration

- After the RT Equipment Configuration is set up, users must specify the Material Configuration.
 - The **Material Configuration Name** will contain the general configuration file name for the 3D printer, if applicable.

Material Configuration

Default material: ---No Default---

Point Of Care Material Configuration Table

Active	Material Configuration Name	Manufacturing Process / 3D Printer Settings	3D Printer	RT Equipment	RED	
<input type="checkbox"/>	3D Fuel Standard PLA_Pro2+_0.8mm_20%infill	Raise3D_Brachy 20% infill.bin-export.bin	Raise 3D Pro2+	---Select RT Equipment---		Add
<input type="checkbox"/>	3D Fuel Standard PLA_Axiom20_Nozzle1_0.8mm_20%infill	Axiom20_Brachy20%infill_EX1_PLA.ini	AirWolf Axiom-20	---Select RT Equipment---		Edit
<input type="checkbox"/>	3D Fuel Standard PLA_Axiom20_Nozzle2_0.8mm_20%infill	Axiom20_Brachy20%infill_EX2_PLA.ini	AirWolf Axiom-20	---Select RT Equipment---		Delete
<input type="checkbox"/>	3D Fuel Standard PLA_Pro2+_0.8mm_100%infill	Raise3D_Brachy 100% infill_0.8mm-export.bin	Raise 3D Pro2+	---Select RT Equipment---		
<input type="checkbox"/>	3D Fuel Standard PLA_Axiom20_Nozzle1_0.8mm_100%infill	PLA_Axiom20_Nozzle1_100%infill_0.8mm.ini	AirWolf Axiom-20	---Select RT Equipment---		

Adaptiv On Demand Material Configuration Table

Active	Material Configuration Name	Manufacturing Process / 3D Printer Settings	3D Printer	RT Equipment	RED	
<input type="checkbox"/>	Formlabs Clear v4_Form 3B_100%infill	Formlabs Form 3B default settings	Formlabs Form 3B	---Select RT Equipment---		Edit

Close

Material Configuration

- After the RT Equipment Configuration is set up, users must specify the Material Configuration.
 - The **Manufacturing Process / 3D Printer Settings** will contain the settings file name for the slicing software, if applicable.

Material Configuration

Default material: ---No Default---

Point Of Care Material Configuration Table

Active	Material Configuration Name	Manufacturing Process / 3D Printer Settings	3D Printer	RT Equipment	RED	
<input type="checkbox"/>	3D Fuel Standard PLA_Pro2+_0.8mm_20%infill	Raise3D_Brachy 20% infill.bin-export.bin	Raise 3D Pro2+	---Select RT Equipment---		<input type="button" value="Add"/> <input type="button" value="Edit"/> <input type="button" value="Delete"/>
<input type="checkbox"/>	3D Fuel Standard PLA_Axiom20_Nozzle1_0.8mm_20%infill	Axiom20_Brachy20%infill_EX1_PLA.ini	AirWolf Axiom-20	---Select RT Equipment---		
<input type="checkbox"/>	3D Fuel Standard PLA_Axiom20_Nozzle2_0.8mm_20%infill	Axiom20_Brachy20%infill_EX2_PLA.ini	AirWolf Axiom-20	---Select RT Equipment---		
<input type="checkbox"/>	3D Fuel Standard PLA_Pro2+_0.8mm_100%infill	Raise3D_Brachy 100% infill_0.8mm-export.bin	Raise 3D Pro2+	---Select RT Equipment---		
<input type="checkbox"/>	3D Fuel Standard PLA_Axiom20_Nozzle1_0.8mm_100%infill	PLA_Axiom20_Nozzle1_100%infill_0.8mm.ini	AirWolf Axiom-20	---Select RT Equipment---		

Adaptiv On Demand Material Configuration Table

Active	Material Configuration Name	Manufacturing Process / 3D Printer Settings	3D Printer	RT Equipment	RED	
<input type="checkbox"/>	Formlabs Clear v4_Form 3B_100%infill	Formlabs Form 3B default settings	Formlabs Form 3B	---Select RT Equipment---		<input type="button" value="Edit"/>

Close

Material Configuration

- After the RT Equipment Configuration is set up, users must specify the Material Configuration.
 - The **3D Printer** will contain the name of the printer.

Material Configuration

Default material: ---No Default---

Point Of Care Material Configuration Table

Active	Material Configuration Name	Manufacturing Process / 3D Printer Settings	3D Printer	RT Equipment	RED	
<input type="checkbox"/>	3D Fuel Standard PLA_Pro2+_0.8mm_20%infill	Raise3D_Brachy 20% infill.bin-export.bin	Raise 3D Pro2+	---Select RT Equipment---		<input type="button" value="Add"/> <input type="button" value="Edit"/> <input type="button" value="Delete"/>
<input type="checkbox"/>	3D Fuel Standard PLA_Axiom20_Nozzle1_0.8mm_20%infill	Axiom20_Brachy20%infill_EX1_PLA.ini	AirWolf Axiom-20	---Select RT Equipment---		
<input type="checkbox"/>	3D Fuel Standard PLA_Axiom20_Nozzle2_0.8mm_20%infill	Axiom20_Brachy20%infill_EX2_PLA.ini	AirWolf Axiom-20	---Select RT Equipment---		
<input type="checkbox"/>	3D Fuel Standard PLA_Pro2+_0.8mm_100%infill	Raise3D_Brachy 100% infill_0.8mm-export.bin	Raise 3D Pro2+	---Select RT Equipment---		
<input type="checkbox"/>	3D Fuel Standard PLA_Axiom20_Nozzle1_0.8mm_100%infill	PLA_Axiom20_Nozzle1_100%infill_0.8mm.ini	AirWolf Axiom-20	---Select RT Equipment---		

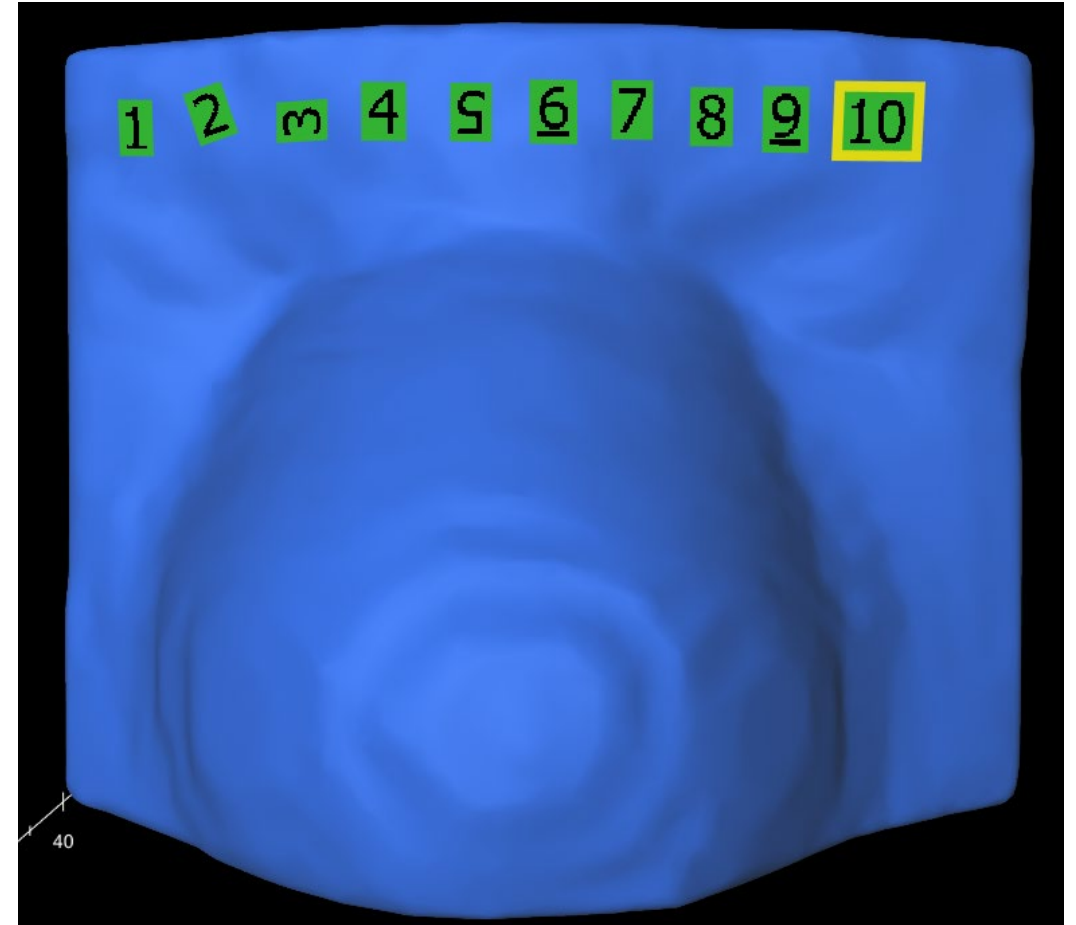
Adaptiv On Demand Material Configuration Table

Active	Material Configuration Name	Manufacturing Process / 3D Printer Settings	3D Printer	RT Equipment	RED	
<input type="checkbox"/>	Formlabs Clear v4_Form 3B_100%infill	Formlabs Form 3B default settings	Formlabs Form 3B	---Select RT Equipment---		<input type="button" value="Edit"/>

Close

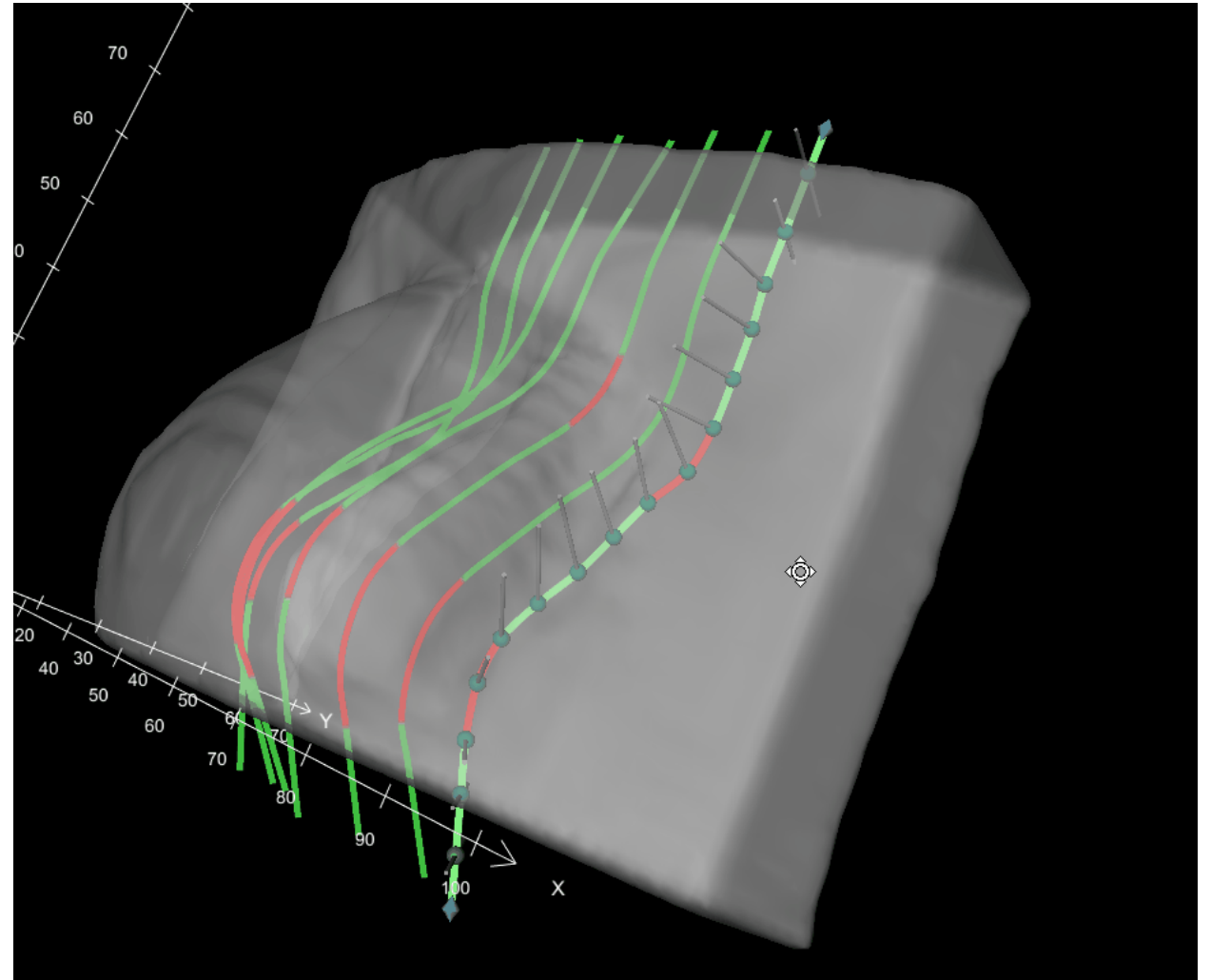
Tunnel Labels

- Tunnel labels can now be rotated upon placing them.
- Simply hold CTRL and scroll the mouse wheel to rotate the label.
- The numerals 6 and 9 have now been underlined to distinguish them from one another.



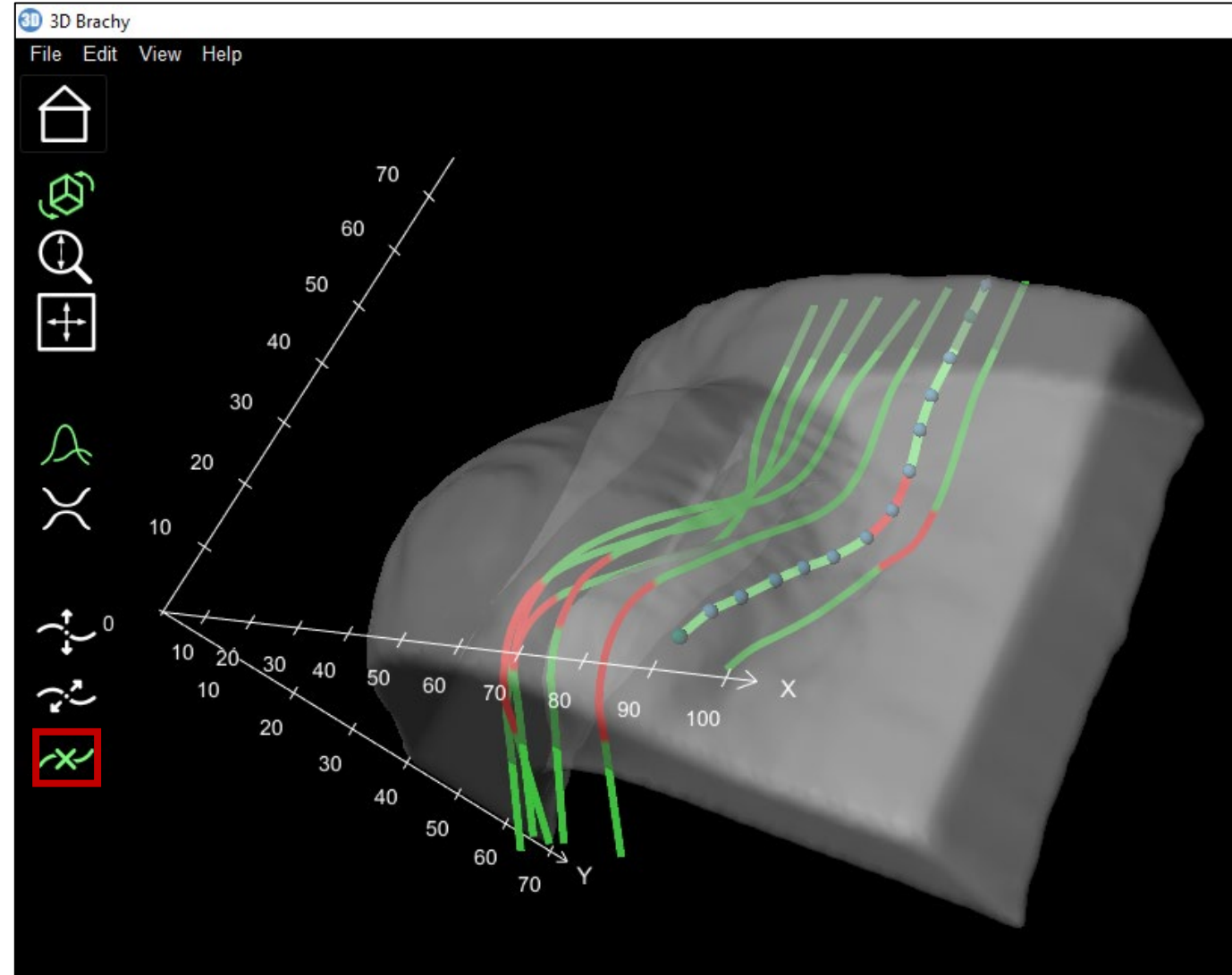
Trajectory Optimized in Real-Time

- Upon moving a node for optimization, the visual indicator (red / green) will now change in real-time.
- **Note:** Users can no longer continue to the Subtraction step until all the trajectories satisfy the bend-radius requirements.



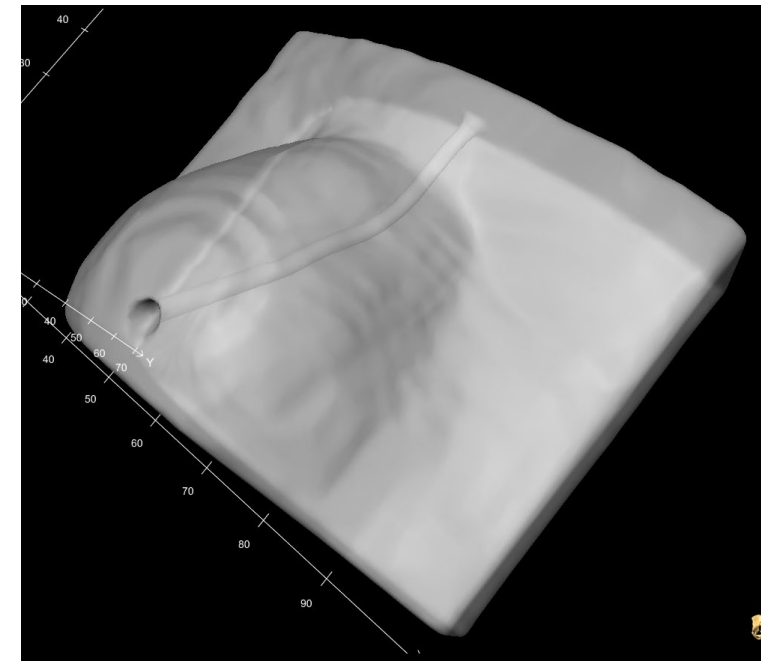
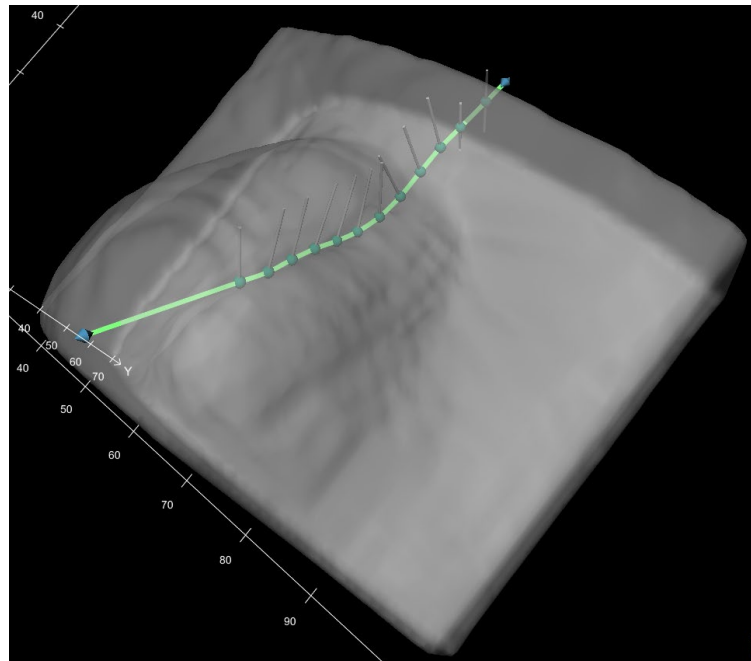
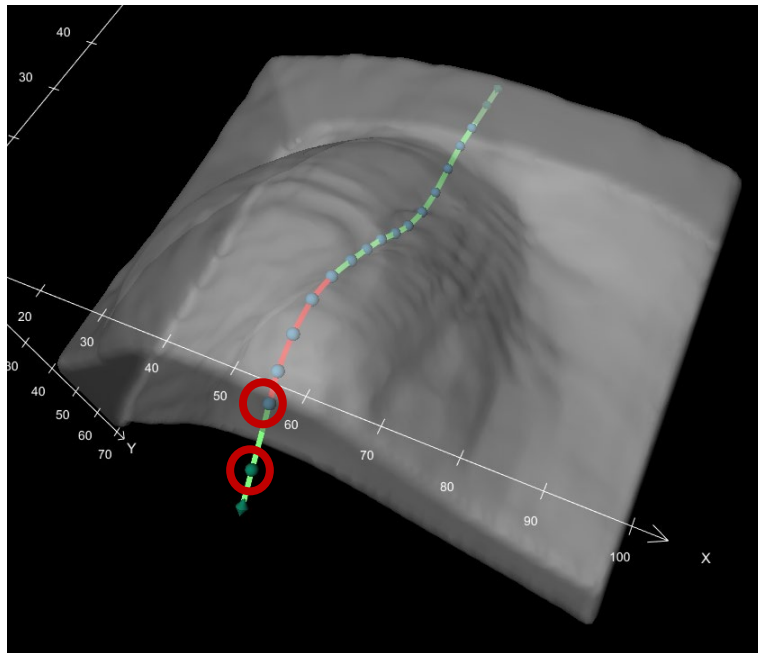
Trajectory Shortening + Modification

- During the trajectory modification step of the workflow, users can now shorten the trajectory prior to accepting the trajectories.
- To create a dead-end tunnel, select the Remove Trajectory Nodes button, then select the nodes starting from the outermost node.



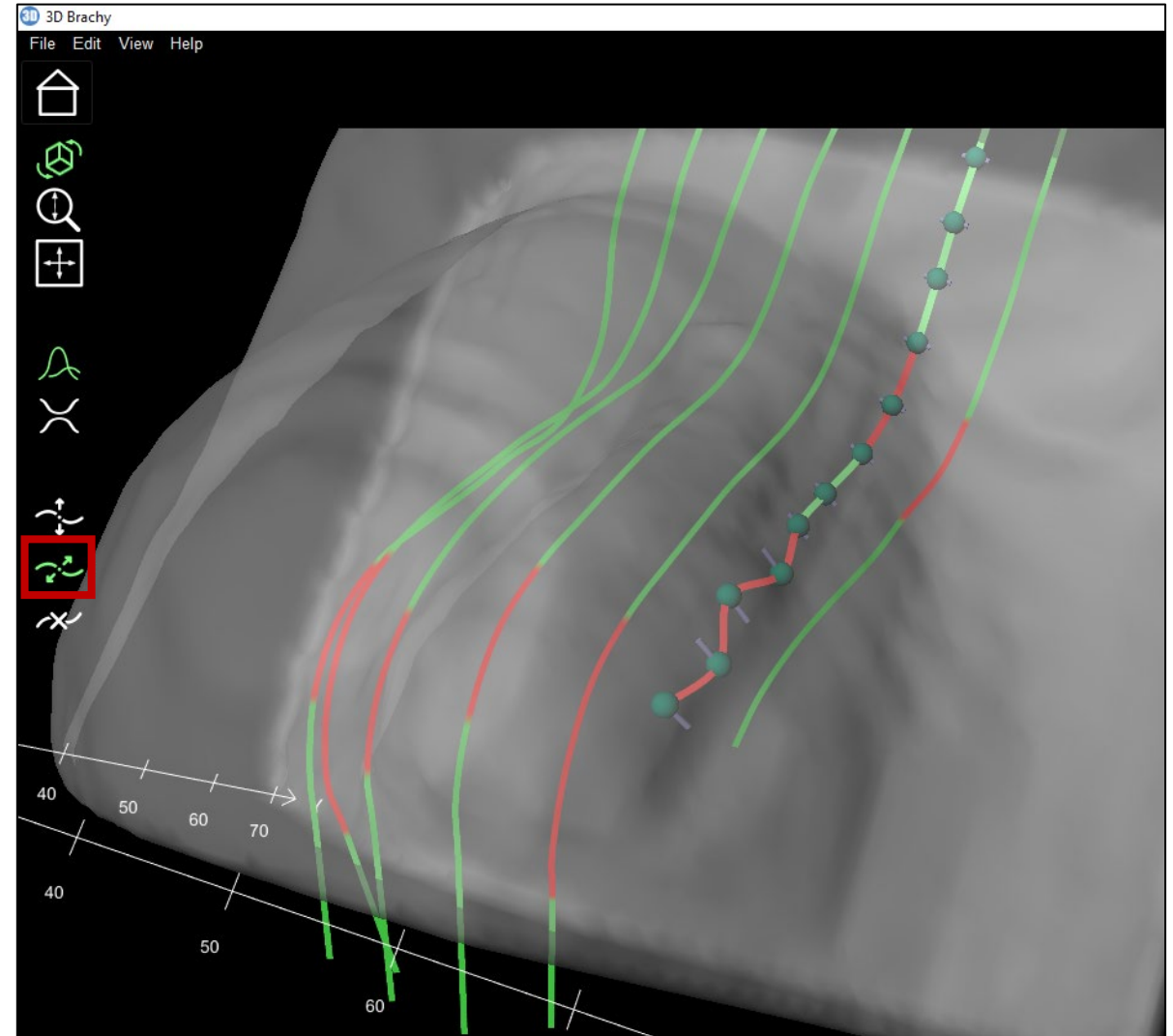
Trajectory Tunnel Exit

- Instead of shortening a trajectory, users can now move where the tunnel will exit the applicator.
 - Remove as many nodes (except for the last diamond shaped node) as required.
 - Move the inner trajectory node to move the exit accordingly.



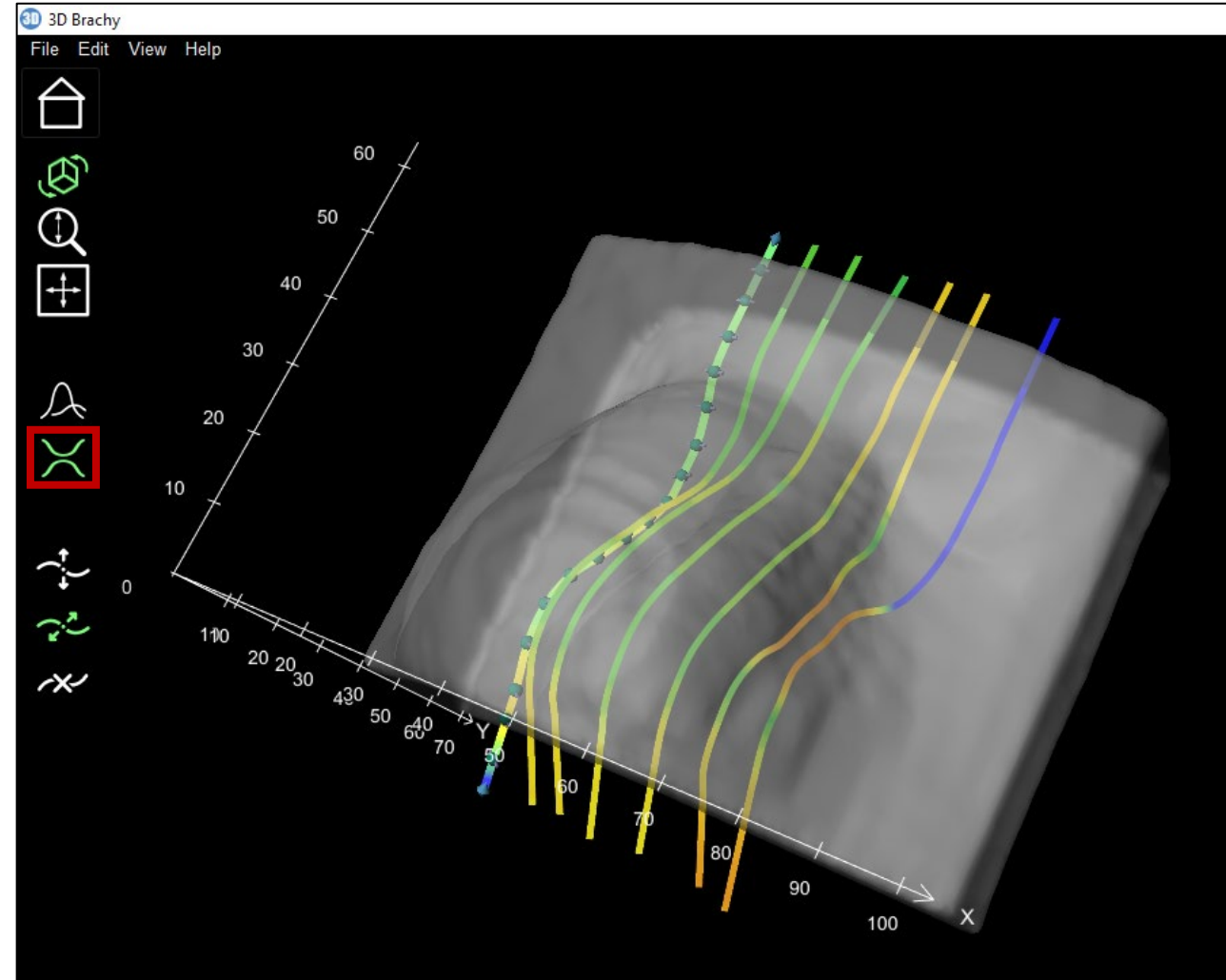
Lateral Node Adjustment

- During the trajectory optimization step, the nodes can now be moved vertically (increasing / decreasing the standoff distance) AND laterally.
- The lateral movement makes optimizing the trajectories a much simpler task.



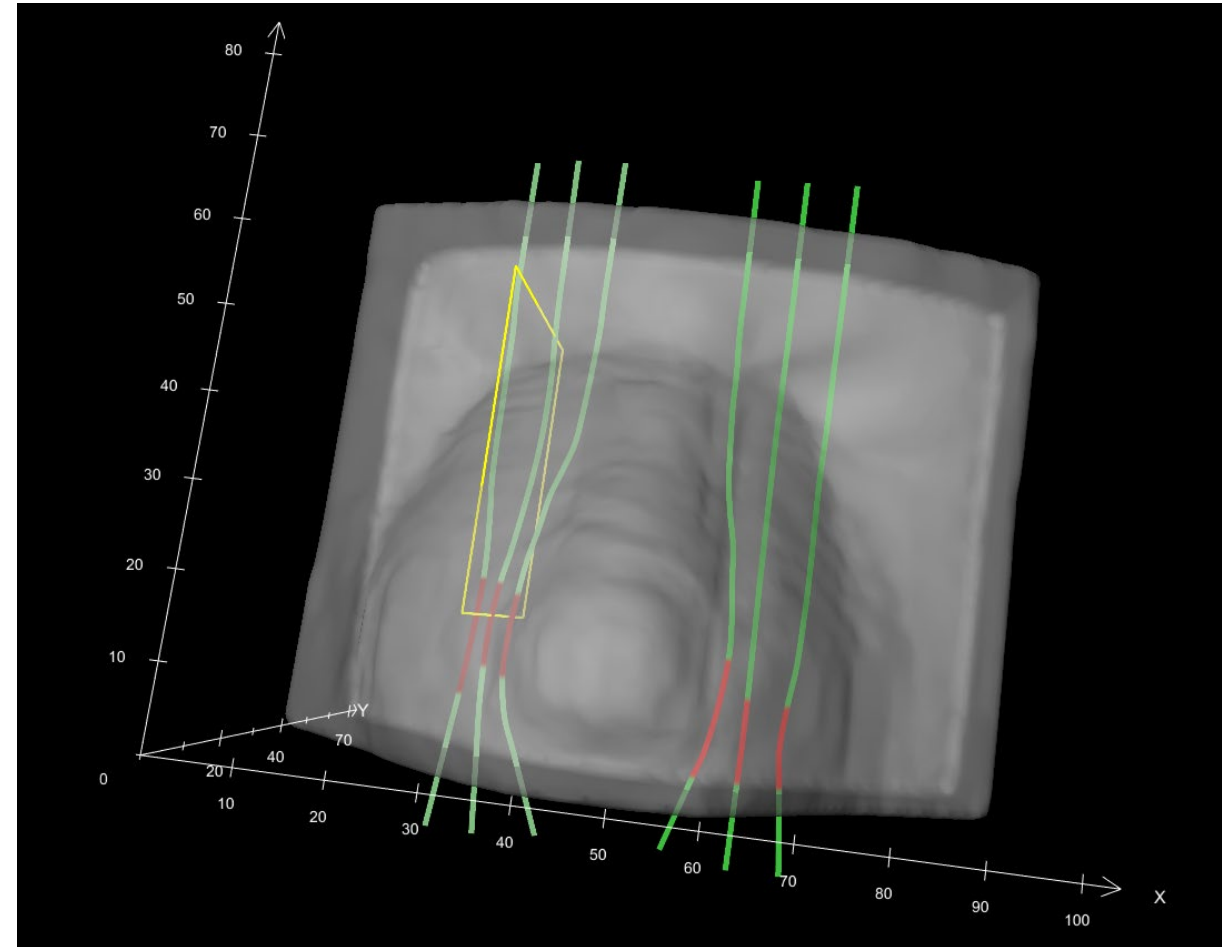
Inter-Trajectory Distance Indicator

- The inter-trajectory distance deviation can now be displayed visually.
 - **Green** = Accurate
 - **Red** = Trajectories closer than the specified inter-trajectory distance
 - **Blue** = Trajectories farther away than the specified inter-trajectory distance



Bend-Radius for Multiple Trajectories

- When adding a second (or more) set of trajectories, the prior set optimization will now persist.
- This is true for both the bend-radius threshold and the inter-trajectory proximity threshold.



Nova Surface Applicator Design Summary

- Upon export, the user will be prompted with a Summary of their applicator design.
- The Summary can be exported to PDF for record keeping / QA purposes.

Confirmation

Summary Save To PDF...

Case Summary / Preferences Nova Surface Applicator Design Summary Post-Processing

Case Summary

• Patient name:	HEADSCAN1
• Patient ID:	T_HEADSCAN1
• RT plan label:	n/a
• Structure set label:	BrachyBolus_15.4
• Selected body structure:	BODY
• Selected applicator RT structure:	Bolus_Nose
• Designed applicator RT structure:	NS_100523_182916

Nova Surface Applicator Preferences

• Inter-node distance:	6.0 mm
• Tunnel label font size:	4.0 mm
• Tunnel label font thickness:	0.8 mm
• Enable 'Add More Trajectories':	Yes

Confirmation

Summary Save To PDF...

Case Summary / Preferences Nova Surface Applicator Design Summary Post-Processing

Nova Surface Applicator Design Summary

• Number of trajectories:	2
• Enable 'Curvature Mode':	No
• Using 'Blind Tunnels':	No
• Exit tunnel at specified location:	No
• Using 'Tunnel Labelling':	No
• Using 'Countersinks':	Yes
- Countersink radius:	2.5 mm
- Countersink height:	5.0 mm
• Inter-trajectory distance:	10.0 mm
• Surface distance:	5.0 mm
- Global minimum:	4.8 mm
- Global maximum:	5.2 mm

Material Configuration

• Material configuration name:	Formlabs Clear v4_Form 3B_100%infill
• Printer name:	Formlabs Form 3B
• RT equipment name:	Test2
• Bend radius threshold:	16.0 mm
• Tunnel radius:	1.2 mm
• RED:	1.00

Confirmation

Summary Save To PDF...

Case Summary / Preferences Nova Surface Applicator Design Summary Post-Processing

Post-Processing

• Using 'Cropping':	No
• Using 'Cleaving':	No
• Using 'Patient Label':	No
• Using 'Dosimetry':	No