Electron Block Creation

Here the user can create and edit Electron Blocks for the selected beam as well as edit values for an existing block.

▼ Beams					
Treatment Machine				Variar	TrueBeam
■ Electron Beams					
b1 : G341 C285 CL	.0; 6x6 iso: (-0.4, -3	4.2, 8.0)			
Gantry Angle Couch Angle Collimator Angle SSD Beam Energy Beam Normalization Normalization Type Applicator Block Bolus Bolus Type Intensity Modulator Skin Collimator	 nose a41 deg 285 deg 0 deg 100 cm 9 MeV 54 Gy Structure: nose; 6x6 1-G341C285-ell 1-G341C285-EB Structure as Bolic yes 	1-C55505 -C55505		24	Delata
			Clone	Edit	Delete
			Create Ne	w Electr	on Beam

Fig. 1: Block size selection

Block Size

• **Size:** Select the block size. The list of available block sizes is derived from the list of applicator (cone) sizes available for the selected machine. Applicator sizes can be enabled and disabled from editing the machine data in the site configuration.

Note: When first creating a beam the eRT app will auto calculate the smallest block that will fit the current aperture shape.

▼ Collimatio	n
🔲 Use Skin C	ollimation
Block Size	
Size:	6x6 🔻
Description:	6x6
	10x10
	15x15
🔲 Use Primiti	20x20
Target Margin	25x25
Margin:	- 1 + cm
Avoidance St	uctures
Add Structure	•
Manual Edits Draw on the be	Enable eam's eye view to manually add or remove material.
Shape Smoot	hing
Level	- 10 +

Fig. 2: Block size options

Note Selecting a block size that is too small for the aperture shape will cause an error that will not allow the creation/saving of the beam until an appropriate size is selected.

▼ Collimation	
A Invalid block size for selected target	
Use Skin Collimation	
Block Size	
D: (0.10	

Fig. 3: Block size too small

• **Description:** An optional description for this block used to identify it.

Target Margin

Margin: The value (in cm) of the margin around the target structure as projected to isocenter. A
negative margin can be used to specify a contraction around the beam target while positive values
will cause an expansion. The default block target margin can be configured in the Site
Configuration Machine Settings.

Note: The app will automatically recalculate and display changes to the block as the margin is edited.

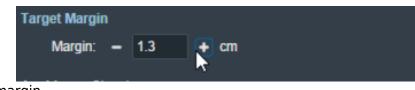


Fig. 4: Block target margin

Avoidance Structures

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The user may select one or more structures in the structure list here to add as an avoidance structure. Avoidance structures will decrease the block opening to remove all areas within the projection of the structure.

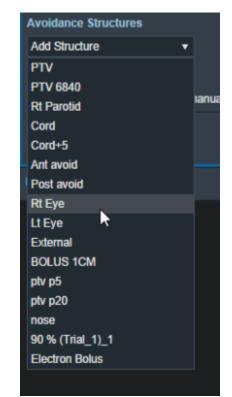


Fig. 6: Avoidance structure selection

Once the structure is selected you will be able to set the values for how it should be avoided. Including:

• Avoidance Margin: required, sets the margin of avoidance around the selected structure's projection to the isocenter plane.

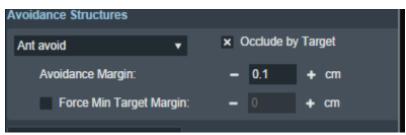


Fig. 7: Selected avoidance structure

• Force min target margin: disabled by default, when enabled it will force a minimum margin around the target taking priority over the settings of the avoidance structure.

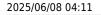
For example: As shown below, there is an overlap between the margin set for the avoidance structure and our target structure. Since "force min target margin" is disabled, the avoidance margin has priority

over the target.

cimal Electron/El														- 0
ectimal err + ECT Nose [Nose] + 3														Daniel Patenaude
	Views	Segital Cor	onal Transvers	30 80	DVH State	acs Dose Line	Compositions	Ortho + BEV	Ortho + 3D	30 + BEV	Ortho + DVH	DVH + Stats	Ortho + Dose Line	
													Controls / Options	
	nose 🗠												General Display Option	
Approach 0356 deg, 00 deg, 01.6													CT Controls	
Energy Selection energy: 9	Merv												Structure Controls	
Block Size: 6.6 size: 6.6 arget Margin: . Margin: = 1.25 Appl: Margin: . . Reschulten: . . Faces Min Target Margin: . . Margin: . . . Margin: . . . Margin: . . . Margin: . . .						Avoidan		Target	t Margin)		Situations Situ	4 12_1

Fig. 8: Force min target margin is off

If the user decides that the target should have priority over the avoidance structure we can enable the "force min target margin" and set a min margin for our target. As you can see below the min margin set takes priority over our avoidance margin and there is no more overlap.



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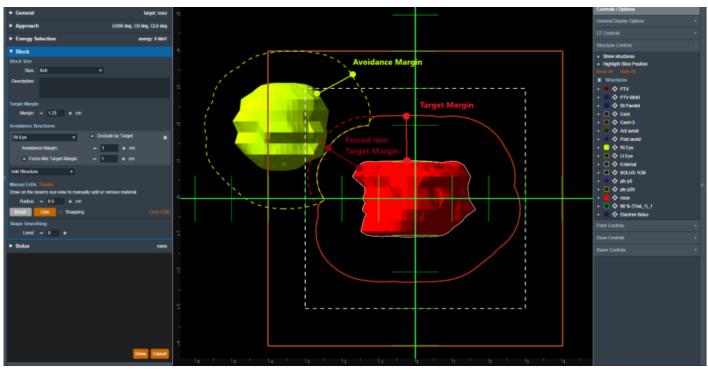
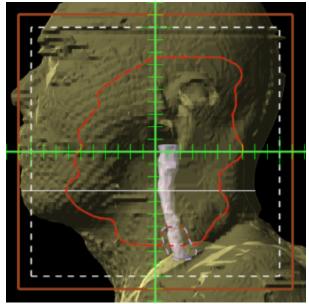


Fig. 9: Force min target margin is on

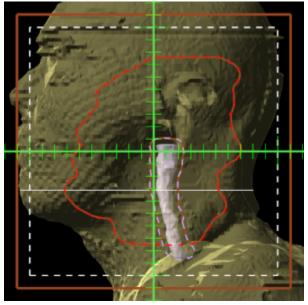
 Occlude by target: The user may also choose to occlude the structure by the target or not by using the "Occlude by Target" option. For the following examples we will use the Spinal Cord as it shows a dramatic example of differences of using or not using the "Occlude by Target" option. A 5mm margin was applied to the Cord for the following examples.

		-		
▼ Collimatio	on			
🔲 Use Skin C	Collimation			
Block Size				
Size:	20x20	•		
Description:				
Target Margin				
Margin:	- 1 + cm			
Avoidance St	ructures			
Cord	•	Occlude by	Target	×
Avoidan	ce Margin:	- 0.5	+ cm	
Ford	e Min Target Margin:		+ cm	
Add Structure	•			

Checking the "Occlude by Target" option makes the calculations account for the relative depth positions of the target and avoidance structure when determining the area to avoid. More specifically, the visible portion of the target (target volume that is in front of the avoidance structure) will not be blocked by the aperture. Note that just the inferior edge of the Cord is blocked by the aperture as this is the only portion that is visible (not behind the target) and the part of the Cord that is behind the PTV is not blocked.



 Unchecking the "Occlude by Target" option makes the calculations ignore the depth order. This means the entire avoidance structure will be blocked, regardless of whether it is behind or in front of the target. In this example, the aperture now blocks out all of the Cord.



Manual Edits

By default manual editing of the block shape it disabled, but a user can elect to enable the ability to manually change the block shape.

Manual Cali	Disable			
Manual Edit				2
Draw on the	beam's ey	e view to manually add	d or remove material.	
Radius	: - 0.5	+ cm		
Brush	Line	× Snapping	Clear Edits	
Channe Carro	- 41-1			

Fig. 10: Enabling manual edits

Once manual editing has been enabled you will see the cursor update to reflect the editing tool. You can choose to edit with the Brush cursor or by drawing straight lines using the Line tool. Both take in the radius that can also be set by the user to alter the size of the editing tool.

Note: Drawing on the "Exterior" of the aperture shape will shrink the shape of the block as can be seen below.

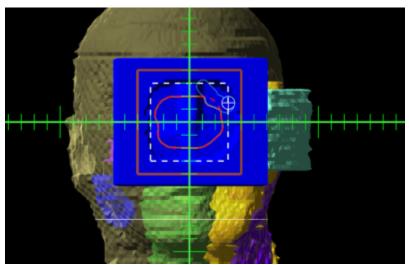


Fig. 11: Shrinking the block shape

Note: Drawing from the "Interior" of the aperture shape will expand the shape of the block as can be seen below.

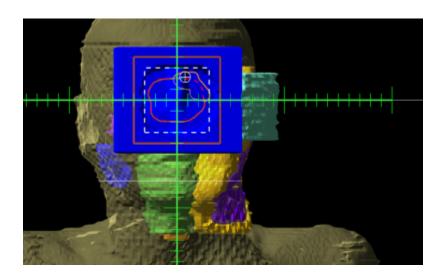


Fig. 12: Expanding the block shape

Shape Smoothing

• Level: Sets the level of smoothing applied to the block shape.

Note: The app will automatically recalculate and display changes to the block based on the set smoothing level.

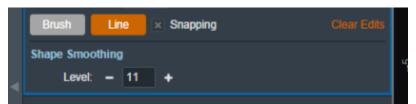


Fig. 13: Setting the smoothing level for the block

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