Electron Bolus Creation

An electron bolus is an option device for each electron treatment beam. A user is able to add an electron bolus to their beams to aid in proper distribution of dose.

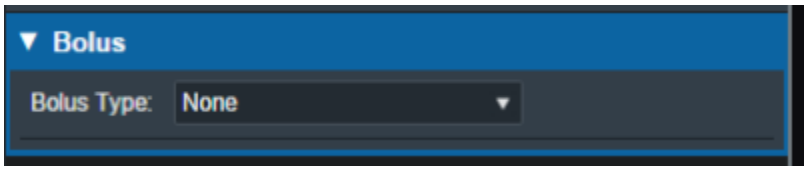

Fig. 1: Beams Block

There are four options for boluses in the decimal eRT app as defined below:

Optimized Thickness Bolus

The first option a user has for creating an bolus for the selected beam is an optimized thickness bolus. The user can select the “Generate Bolus” option and have the application automatically create an optimized bolus that will best attempt to put the beam's specified isodose level to the distal edge of the target. Once the application has finished calculating you will notice the bolus gets added to the beam.

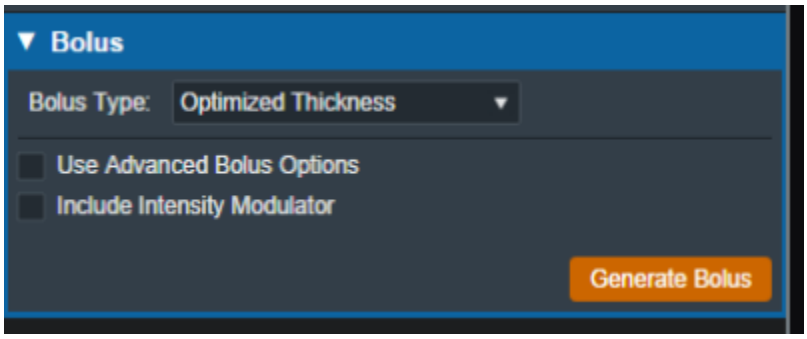

Fig. 2: Beams Block

If the need arises a user can also access advanced options for modifying an existing bolus or create a new one from scratch.

In the advanced options you can add the following operators to augment your bolus:

The following operators are only available when first creating a new bolus.

- **Automated Marching**
- **Geometric Sequence**
- **Single shift Sequence**
- **Double Shift Sequence**
- **Create**

Fix Me! Kevin may want to add details here for what each operator does in terminology that best jives with end uers.

The following operators are only available after one of the above bolus creation operators have been performed:

- **Smooth**
- **Isodose shift**
- **Truncate**
- **Specified Shift**
- **Intensity Modulation**

For each operator once it is selected from the list the UI updates to show the options for that operation. Once the options have been finalized the user can add the operator and re-compute for and existing bolus or generate a new one with the selected operator.

Here we have an example of adding the automated marching to a new bolus:

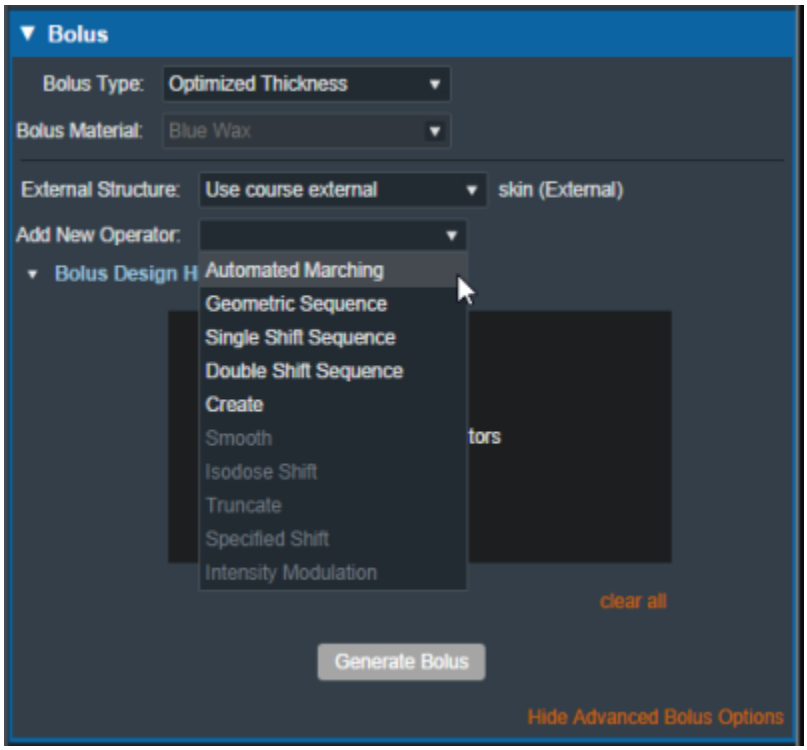

Fig. 3: New bolus operator options

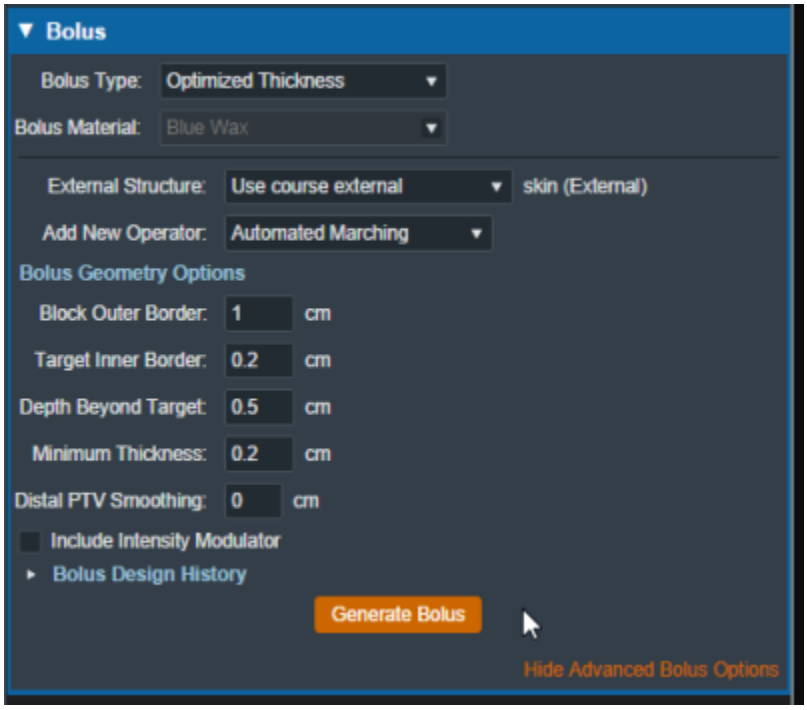

Fig. 4: Adding an automated marching operator

Additionally by selecting the “Bolus Design History” you can see a list of every step in the bolus design, each step is removable individually as well as having the option to clear all steps and start from scratch.

Fig. 5: Bolus design history list

Uniform Thickness Bolus

When adding a uniform thickness bolus the user must add the UTB to all the beams in the plan. Once the plan level bolus has been selected the dose will be recalculated to reflect the new bolus.

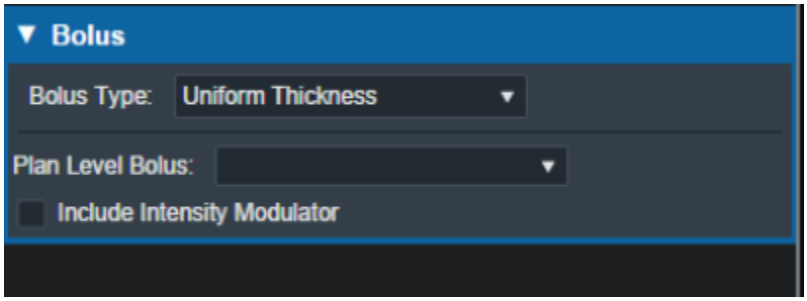

Fig. 8: Beams Block

Bolus as a Structure

The user also has the option to instead include a bolus as a separate structure in the structure list. Once the option is chosen the user will be able to find the bolus structure from the drop down structure list and the app will set it as the bolus for this beam.

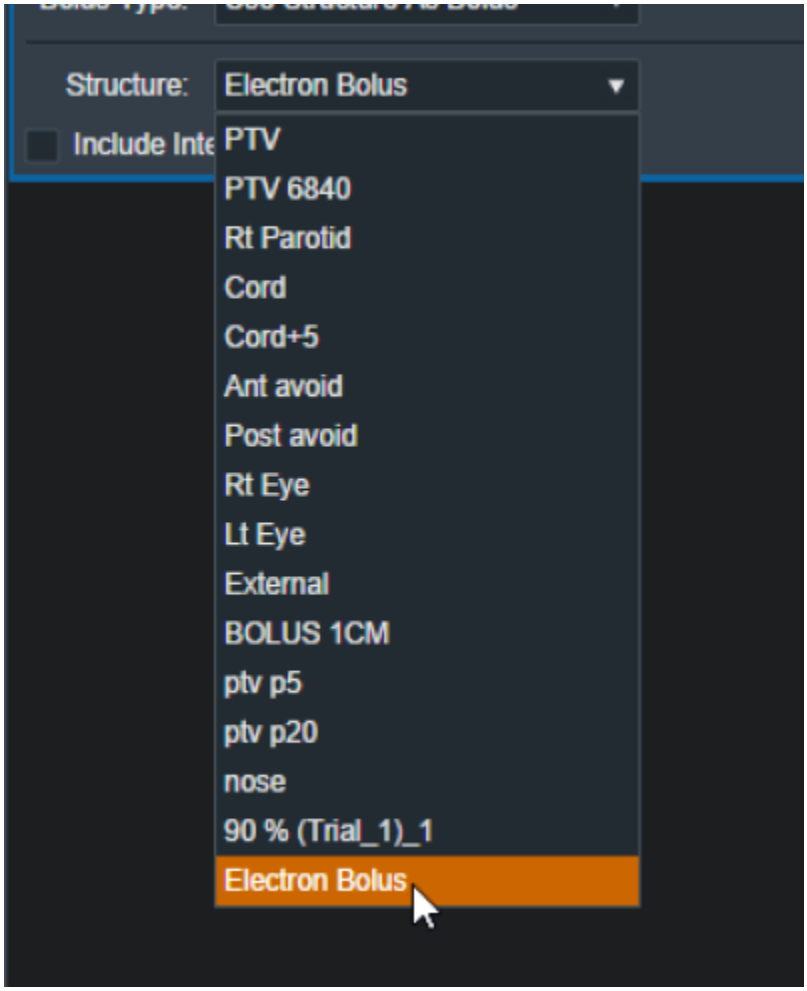

Fig. 9: selecting from the structure list

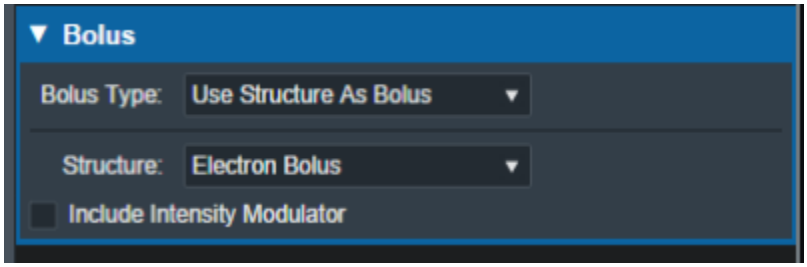

Fig. 10: selecting a Bolus as a structure

Once the structure is selected the bolus will be added to this beam and dose re-calculated as expected.

Note: The bolus is displayed in the BEV for this beam even though the “Electron Bolus” structure is hidden through the right hand side controls. This shows that the displayed bolus is added as a bolus on this beam and not appearing as a structure.

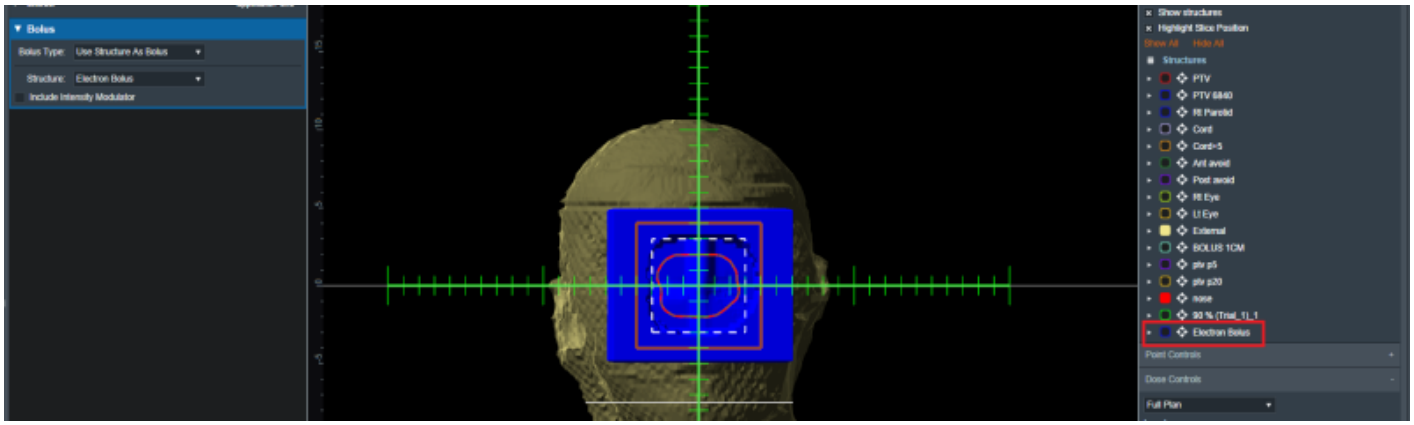

Fig. 11: Bolus in BEV

If you with to import a bolus that is not currently in your structure list please refer to the DICOM Patient Import section of the user guide for how to re-import a structure set.

IMET Device

Additionally if any type of bolus is added to a beam the user is able to also include an intensity Modulator by siply selecting the option below any bolus type. The application with calculate the device and display it in the beams UI.

NOTE: In order to add an IMET device the selected beam MUST have a valid bolus first.

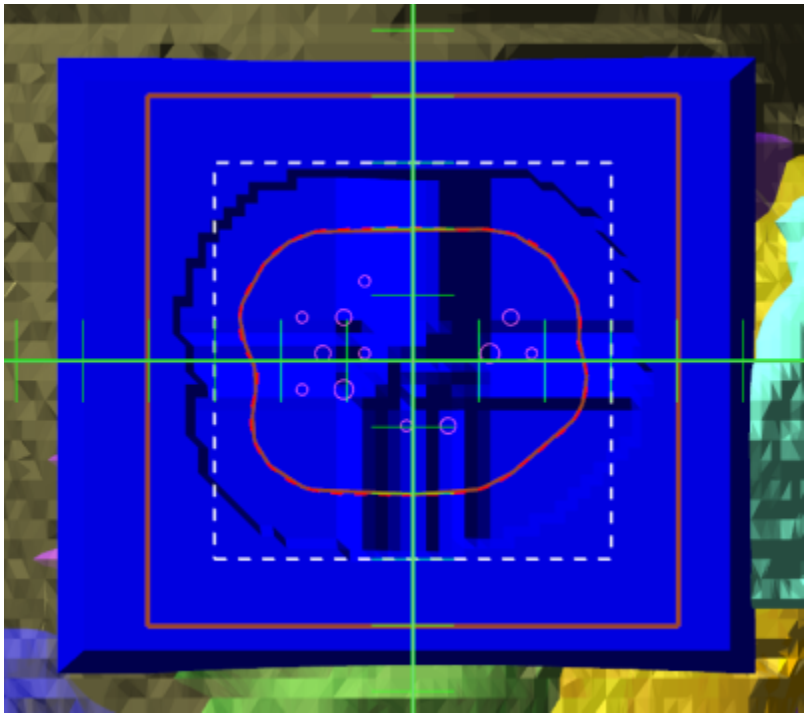

Fig. 12: BEV IMET

And as with a bolus the device can be hidden and un-hidden from the display using the beam controls on the right hand size.

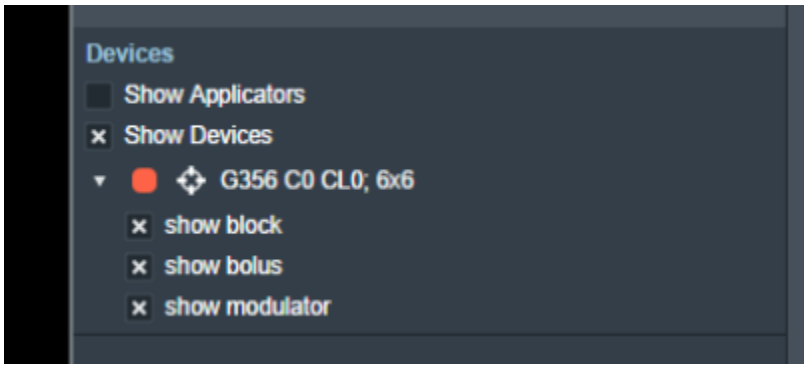

Fig. 14: RHS options to hide/show devices