Electron Beams

In the Beams block users can manage all the beams, as well as any blocks, boluses, or other devices included with them, included in the plan. In addition, new beams can be created and added to the plan from here.

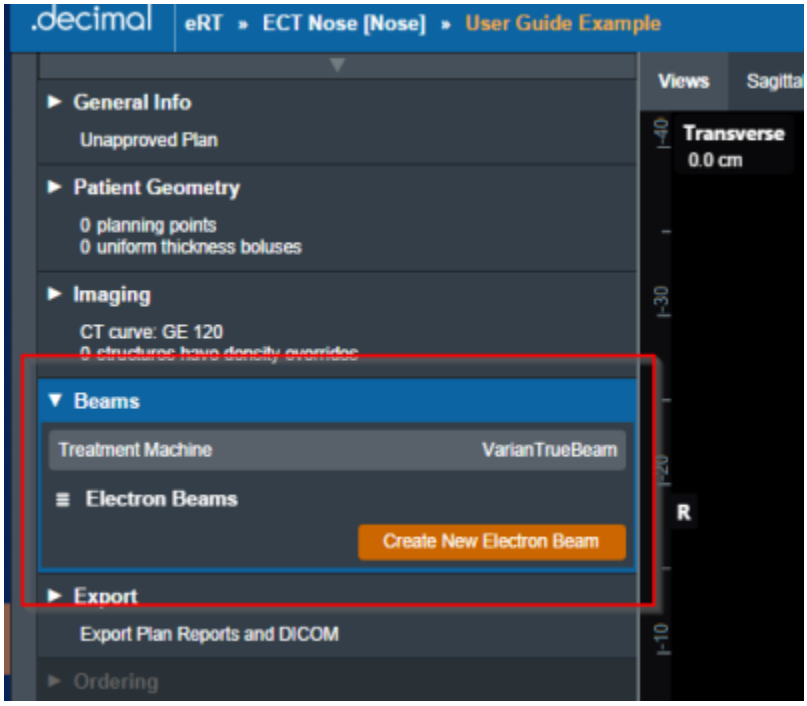

Fig. 1: Beams Block

Managing Existing Beams

The electronRT application will list all beams included in a plan, for each of these existing beams selecting it will show a summary of the details for that beam. Additionally, as shown below the user has three options for the selected beam:

- **Clone**: Creates an identical copy of the selected beam and add it to the plan.
- **Edit**: Open the editing dialog to change any editable property of the beam.
- **Delete**: Removes this beam from the plan.

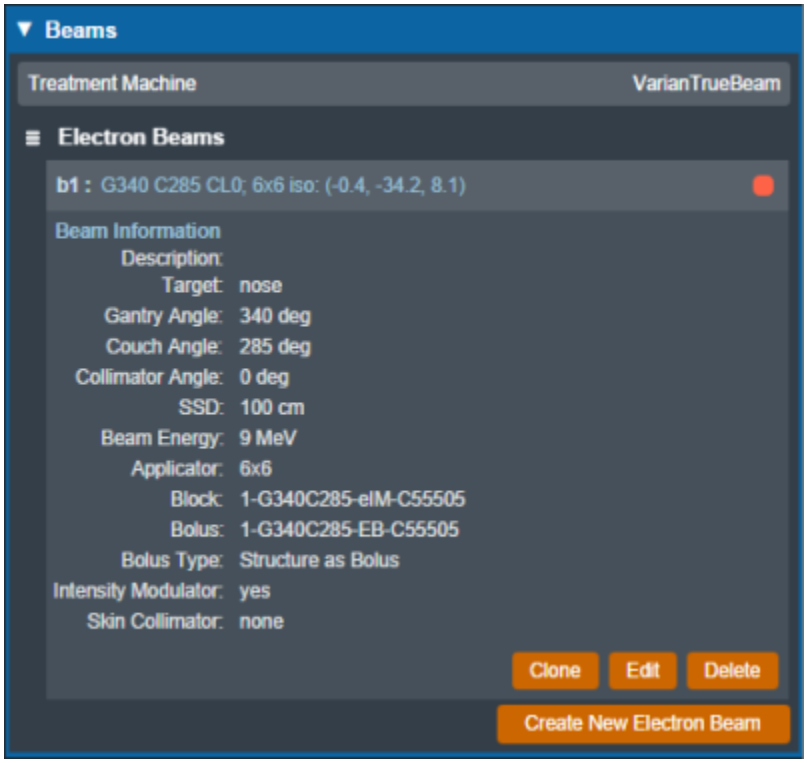

Fig. 2: Existing Beam Example

The editing dialog allows the user to edit any property of the beams that is defined in the “Structure of a Beam” section below. All changes made in this section will be added to the beams once the user selects “Done”.

Fig. 3: Beam Editing

Creating New Beams

Selecting the “Create New Electron Beam” directs the user to a similar section as editing an existing beam with the exception of some blocks being disabled until a prior required step is completed. An in-

depth explanation of each of these sections is defined in the “Structure of a Beam” section below.

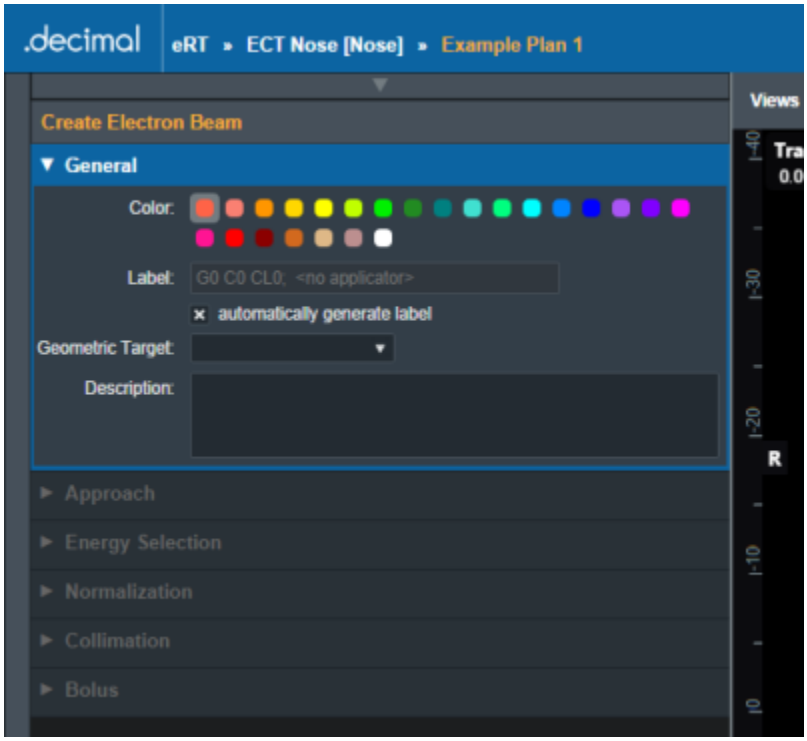

Fig. 4: Creating a New Beam

Structure of a Beam

General

In the “General” Section of the Beams block allows the user to set the following fields for the beam:

- **Color**: Set the color for this beam, this is used for displays, graphs and beam lists in the User Interface.
- **Label**: Open the editing dialog to change any editable property of the beam. By default, the “automatically generate label” option is enabled for new beams, un-selecting this option allows the user to manually name this beam.

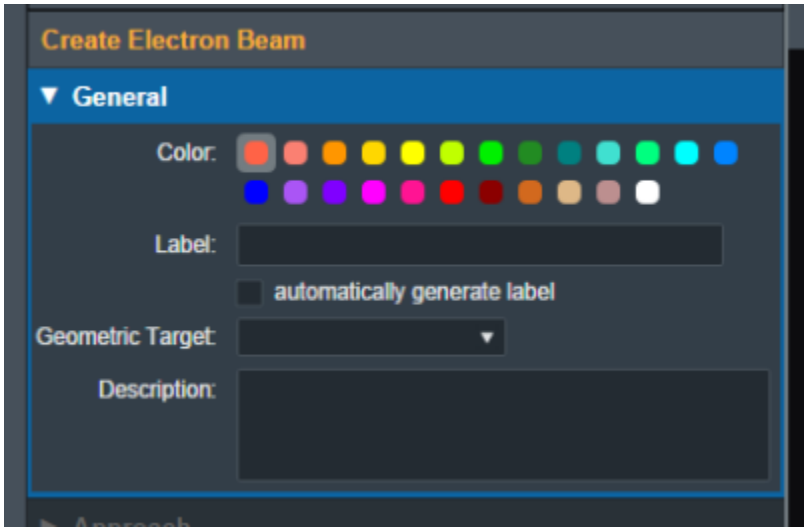

Fig. 5: General Block

- **Geometric Target**: Sets the target for this beam from a list of possible targets from the structure list.

Once a geometric target has been set, the application will attempt to automatically calculate and set:

1. **Beam Approach:** A computed best guess at an orthogonal beam approach. The gantry or couch angles will be snapped to 0 degrees if:
    1. The gantry angle is less than 5.0 or greater than 355.0 degrees
    2. The couch angle is less than 10.0 and greater than -10.0 degrees
2. **Beam Energy:** The minimum commissioned energy to reach the distal edge of the target
3. **Block Size:** The smallest fitting block size enabled for the selected treatment machine

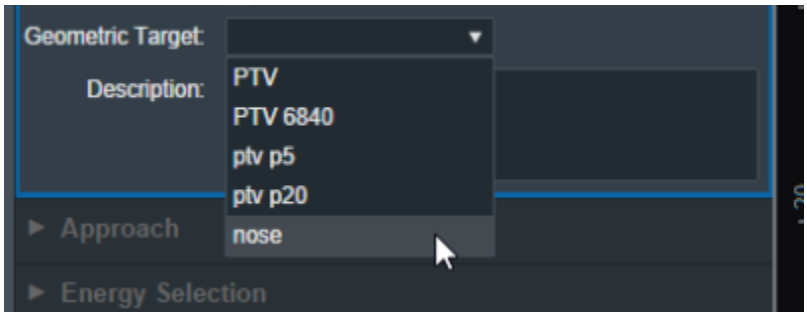

Fig. 6: Geometric Target Options

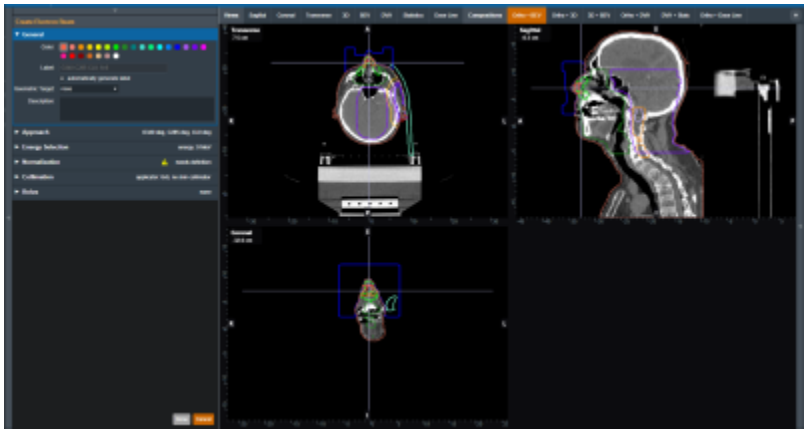

Fig. 7: UI updated with the new target

- **Description**: An optional description for the beam.

Once the beam has a color, label, and target the user will be able to move on to the next block in the beam creation if this is a new beam.

Approach

The Approach block is where the user can control the values for how the beam and dose reaches the patient. Here the user can set:

- **Gantry Angle**: Sets the Gantry angle for the beam.
- **Couch Angle**: Sets the Couch angle for the beam.
- **Collimator Angle**: Sets the Collimator angle for the beam.
- **SSD**: Sets the Source-to-surface distance.

As the values are set you should see the image of the beam update in the UI as new values are set in the “Approach” Block.

Note: If any of these values cause a collision with the patient you will receive a warning and the beam will be unable to be created/saved until the issue is cleared or the warning is overridden.

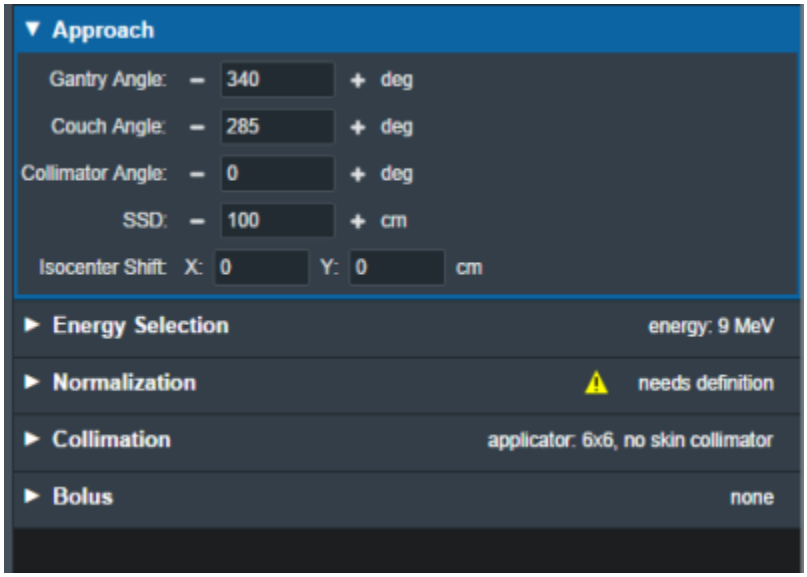

Fig. 8: Approach Block

Energy Selection

In this block the user can set what energies are used for the dose calculations of this beam. Users are able to set:

- **Planning Isodose:** The user can set the planning isodose level for the distal edge of the selected target.
- **Beam Energy:** The user is able to select an energy for this beam. This list of energies is derived from the machine data in the site configuration.

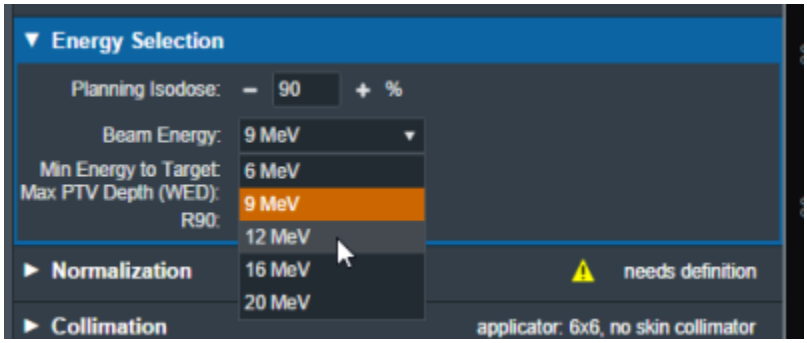

Fig. 9: Energy selection block

This block also displays the following values that are calculated and are not editable.

- **Min Energy to Target:** The minimum energy necessary for the selected target.
- **Max PTV Depth (WED):** The maximum water equivalent depth.
- **R90:** The computed R90 value for this beam.

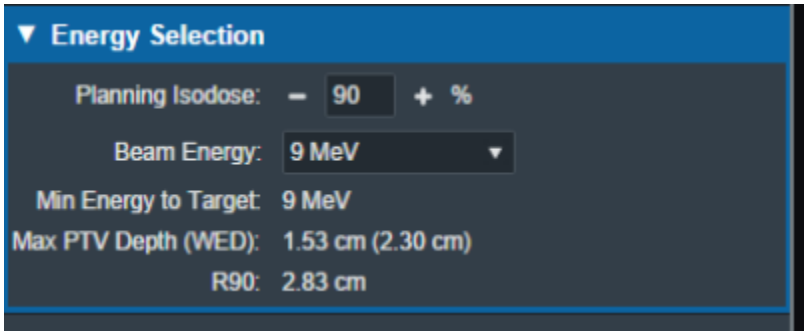

Fig. 10: Beams Block

Block

Here the user can add or edit an electron block for this beam, more details on electron blocks can be found in the Electron Block Creation section below.

Bolus

Here the user can add or edit a bolus for this beam, more details on bolus creation can be found in the Electron Bolus Creation section below.