Template:

1. **Program Name**:

**L**inac **S**imulation **D**icom editor for **tab**le pitch/roll/rotation correction (LSDtab)

1. **This proposal is being requested for**:

Primarily for the clinic

~~□ Primarily for research~~

~~□ Both clinic and research~~

1. **Describe the goal to be achieved with the program:**

Pull approved images associated with an individual patient’s sim plan on a linac.

Zero the table roll, pitch, and rotation angles, create new UID, and verify all 4 images are in same Frame of Reference.

Upload back into patient in Aria or upload images into an import directory for dosimetry to import for planning/reference images.

1. **Describe the potential clinical or research impact; include the approximate number of patients or patient plans which would be affected**:

Allows more patients to be simmed on linac, and makes process linac independent – can only use C-series with 4DOF table now.

This is a new service, and anticipate palliative COVID patients will be planned this way. Also likely to expand to other palliative cases, especially if CT sim is busy or down.

This software dev request provides a workaround solution to be able to use both the C-series with 4DOF couches and Truebeams with 6DOF couches in our dept for 2D simulation. Varian is aware of issue with pitch/roll in acquired images, but unsure when a fix will be deployed.

1. **Describe any known safety considerations?**
2. **Usability considerations:**

Would need a documented and accessible by dosim/physics manual backup process if the auto pull/edit failed.

1. **Requested Output (check all that apply):**

~~□ On screen feedback~~

~~□ PDF required for import into Eclipse/Aria~~

~~□ Exportable data for use in other programs~~

□ Other; please describe: edited dicom files uploaded into patient or dumped into an import directory.

**Overview of primary steps and/or data sources (see example below):**

Scenario:

1. A simulation is scheduled on an accelerator for a patient.
2. A simulation plan is made for the patient by dosimetry.
3. RTTs mode up the simulation plan for the patient at a linac.
4. RTTs immobilize patient and localize isocenter with physician using imaging.
5. Images (2D kV or CBCT) are taken and automatically saved back into the patient.
6. Physician approves images to indicate localized isocenter and images to use for reference.
7. The software-to-develop should automatically pull approved images from this simulation, sanity check table angles (within 0.1 or 0.2 deg of 0) then edit the dicom data to zero out the table roll, pitch, and rotation (new UID needed as well, but nothing else in dicom should change).
   1. Verify that frame of reference is same for all 4 kV images.
   2. Some way of communicating the sanity check failed (text file in import directory, email, etc)
8. Then the images are either automatically uploaded back into the patient, or placed in a directory for dosimetry to import.
9. **Additional information which may be relevant:**

We can have a plan name that should be searchable (e.g. 2DkVsim, CBCTsim, etc.)

1. **Estimated resources (expectation to figure out with Marc and a developer)**
2. **Testing:**
   1. Database (Development, Clinical, Projects)
      1. Dev if going to push back automatically
      2. Clinical for other cases with $ patients.
   2. Test and the cases to conduct those tests – names and description of courses (see Plan Checker Commissioning Report for an Example of the details)
      1. This will be used by the Developer as they develop software so that they are able to do some initial validation of the software code. Additional tests are needed for commissioning and are the responsibility of the person requesting the script.