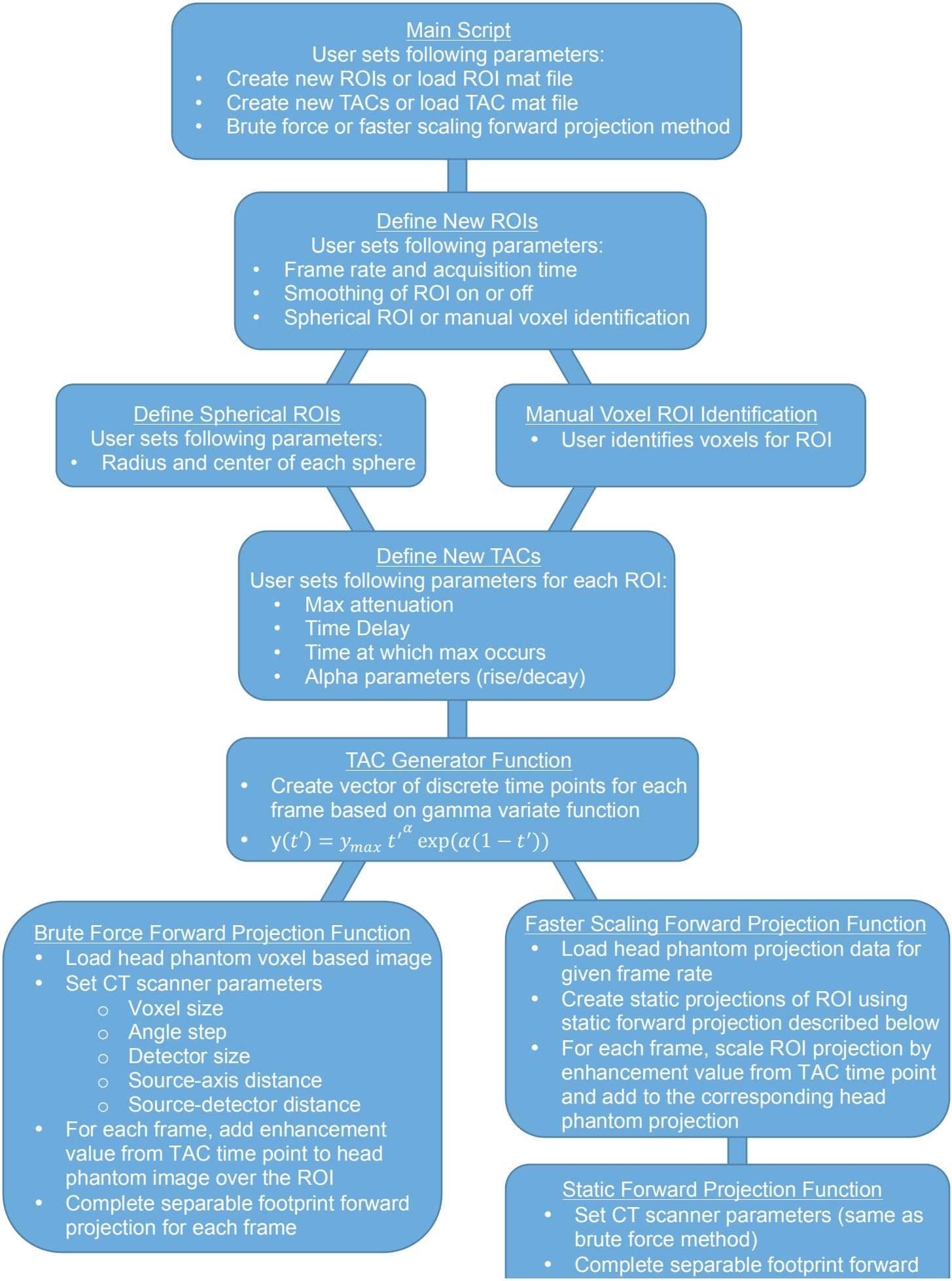
Main Script
User sets following parameters:
• Create new ROIs or load ROI mat file
• Create new TACs or load TAC mat file
• Brute force or faster scaling forward projection method
Define New ROIs
User sets following parameters:
• Frame rate and acquisition time
• Smoothing of ROI on or off
• Spherical ROI or manual voxel identification
Define Spherical ROIs
User sets following parameters:
• Radius and center of each sphere
Manual Voxel ROI Identification
• User identifies voxels for ROI
Define New TACs
User sets following parameters for each ROI:
• Max attenuation
• Time Delay
• Time at which max occurs
• Alpha parameters (rise/decay)
TAC Generator Function
• Create vector of discrete time points for each frame based on gamma variate function
• $y(t') = y_{max}\, t'^{\alpha} \exp(\alpha(1 - t'))$
Brute Force Forward Projection Function
• Load head phantom voxel based image
• Set CT scanner parameters
○ Voxel size
○ Angle step
○ Detector size
○ Source-axis distance
○ Source-detector distance
• For each frame, add enhancement value from TAC time point to head phantom image over the ROI
• Complete separable footprint forward projection for each frame
Faster Scaling Forward Projection Function
• Load head phantom projection data for given frame rate
• Create static projections of ROI using static forward projection described below
• For each frame, scale ROI projection by enhancement value from TAC time point and add to the corresponding head phantom projection
Static Forward Projection Function
• Set CT scanner parameters (same as brute force method)
• Complete separable footprint forward