1.0 PURPOSE:

Scans on the eXplore Locus scanner are directed by parameters outlined in a protocol. The values of these parameters will vary depending on the nature of the specimen and the desired image quality of the acquired scans. Protocol parameters will affect the total scan time, the resolution and quality of the projections, the resolution and quality of the final reconstructed volumes, the file size of the final reconstructed volumes, and the time needed to create reconstructed volumes.

2.0 SCOPE:

These protocols will differ between scan subjects. The meaning of the various parameters as well as the process of developing a protocol will be outlined. It is up to the user to provide the appropriate values. Working knowledge of the Locus scanner is assumed.

3.0 RESPONSIBILITIES:

A user with qualified training and working knowledge of Locus scanner should develop protocols.

4.0 DEFINITIONS:

SNR – signal-to-noise ratio.

5.0 REFERENCES:

GE Healthcare eXplore Locus User Manual

6.0 SOFTWARE:

eXplore Scan Utility.

7.0 PROTOCOL PARAMETERS

Below is a compiled list of the parameters included in a protocol.

Angle of Increment – represents the increment (measured in degrees) between one image and the next. Valid values are between 0.4 and 5.0, and are typically between 0.4 and 1.0. The value must be an integer multiple of 0.1. If a 360 Degree scan is performed, the setting must be a whole number that is a factor of 360. The lower the angle of increment, the better the resolution.

Frames to Average – represents the number of projections which are averaged on a per pixel basis to produce a single projection. Averaging projections improves the SNR.

X-ray tube voltage / kVp – controls the energy of the x-ray beam. The higher the energy, the less likely the beamed photons will be absorbed. A high setting is suitable for high-density material. Valid values are between 35kVp and 80kVp. Typical setting is 80kVp.

X-ray tube current / mA – affects the intensity of the beam. The higher the current, the better the SNR. Too much current will saturate the camera with x-rays. Valid values are between 100µA and 500µA. Typical setting is 450µA.

Number of views / VIEWS –The number of projections acquired during the scan. If your scan technique is 360 Degree, VIEWS x ANG_INC must be greater than or equal to 360. If your scan technique is Short Scan, VIEWS x ANG_INC must be greater than or equal to 200.

Exposure time / INTEGRATION_TIME – Minimum exposure time for all bin settings is 90ms. This is the time that the detector is exposed to X-rays. If a small current is used, a longer exposure time is recommended.

Scan technique – The scan technique options are 360 Degrees and Short Scan. In a 360 Degrees scan, the gantry will make a 360 degree rotation. In a Short Scan, it will rotate approximately 200 degrees.

Detector bin mode / BIN_MODE - Available settings are 1, 2, or 4. Binning involves the grouping of adjacent pixels. Bin mode 4 will group 4x4 pixels (16) as one, reducing the resolution, but improving the SNR.

Effective pixel size – Determined by the selected bin mode, it is the size of each binned pixel in millimeters.

Scans Required – Displays the number of scans that will be acquired with one press of the Start button in Can Control. Multiple scans are acquired when "stitching".

User,

7.0 PROCEDURES:

Editting or creating a protocol file requires an understanding of the fundamental science of CT imaging to maximize the utility of the scanner.

7.0.1 LOAD THE PROTOCOL EDITOR

1. Run **eXplore Protocol Editor**.
2. Click **New**.

7.0.2 EDITTING AN EXISTING PROTOCOL

1. Click the **Edit** button next to Protocol to display the Protocol Editor screen.

7.0.3 CREATING A NEW PROTOCOL

1. Fds
2. fds

7.3 PRECAUTIONS FOR RISK REDUCTION:

7.3.1 Caustic/Harmful chemical or biological handling instructions/warnings, general safety precautions, protective equipment to be used, etc.

7.3.2 Commonly encountered difficulties or errors, situations that can increase the danger to personnel.

7.5 CALCULATIONS:

State method of making any calculations in the procedure. Provide examples of calculations where appropriate.

7.6 ACCEPTANCE RANGES:

List specifications, limits, requirements or acceptance criteria.

7.7 CONTINGENCIES:

List any anticipated problems that may arise and course of action to be taken, including person (by job title) to consult when each contingency arises.

9.0 REVIEWS AND REVISIONS:

This procedure shall be reviewed for compliance and effectiveness and revised as necessary (or at a specified interval).