Installation Requirements

	Recommended PC Specification
CPU	Intel Core i7-4790K @ 4.00GHz
RAM	32.0GB
GPU	NVidia GeForce 1070 GTX 8GB
Video Drivers	Version 461.92 or later.
Free Disk Space	25GB
Operating System	Microsoft Windows 10 professional 64 bit (version 1909)

Installation

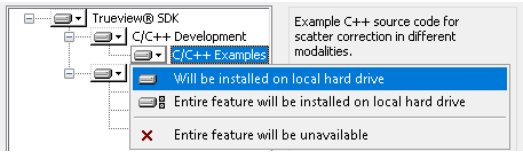
1. First copy the following files to the PC:
   - **Trueview.2.5.0.1402.msi**
   - **SampleData_DR.zip** (if supplied)
   - **SampleData_CBCT.zip** (if supplied)
   - **SampleData_Mammo.zip** (if supplied)

2. Run the '**Trueview.2.5.0.1402.msi**' installer. If the "Windows protected your PC" window is presented, select the "More info" followed by the "Run Anyway" option to proceed.

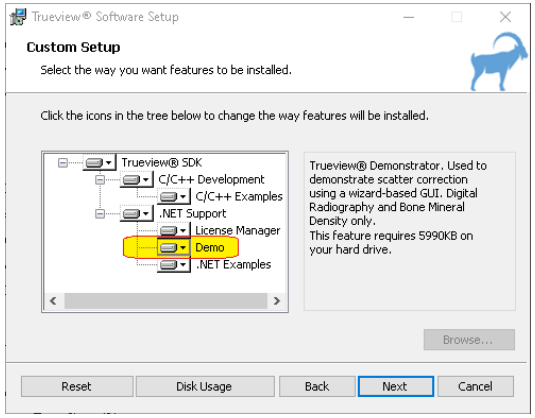
3. When the Trueview Software Setup window is presented, press "Next" to proceed to the license agreement.

4. Once the license terms have been accepted, proceed to the setup options by pressing "Next" again.

5. The installer allows you to select which features to install on the PC. By default, all items will be installed, but the various items can be disabled with the drop-down controls:



Select the options required, including the **"Demo"**.



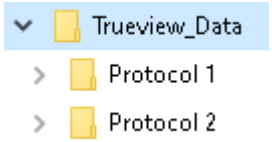
6. Press "Next" and "Install".

7. The installer will now install the Trueview® software and the Demonstrator application. A shortcut icon should be created on the desktop. When the install operation finishes, the system may require a restart to complete the process.

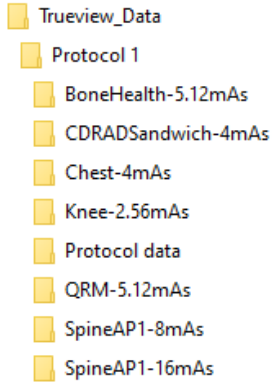
8. Once the demonstrator application has been installed the sample data should be unpacked. This may be accomplished within a Windows Explorer by right-clicking the **SampleData.zip** icon and selecting “Extract All…”

Folder/File Structure of Data

The top-level structure of the extracted folder follows the format:



Any number of “Protocol” folders can be added and named arbitrarily. The structure of such a folder might be:



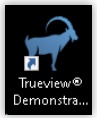
It is a requirement that the images to be processed are located in the subdirectories (e.g., “Chest-4mAs”; the name of the subdirectory is arbitrary), and that a suitable “**Protocol data**” folder provided by IBEX is available in the same folder, as indicated above.

Installing a license

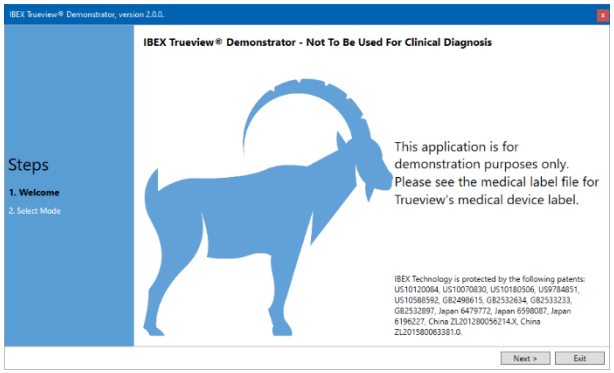
Before the demonstrator can be used, a license must be installed. Licenses are not delivered with the installer. They are generated by IBEX for a variety of user situations, and users are asked to discuss their requirements with IBEX directly. Please refer to the Licensing Quick Start Guide for more information.

Running the Demonstrator

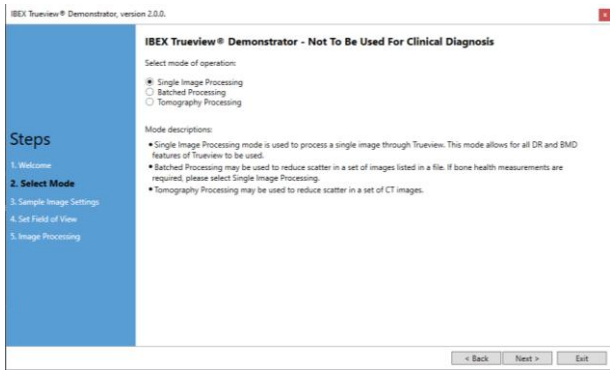
To run the GUI double click the Trueview® Demonstrator icon that was installed on your desktop during installation.



When the application starts, the following welcome screen is presented:



To start, the user presses the 'Next' button, which triggers a brief system check process. When completed, the user is directed to select a service. NB, only services for which licenses are available can be used.



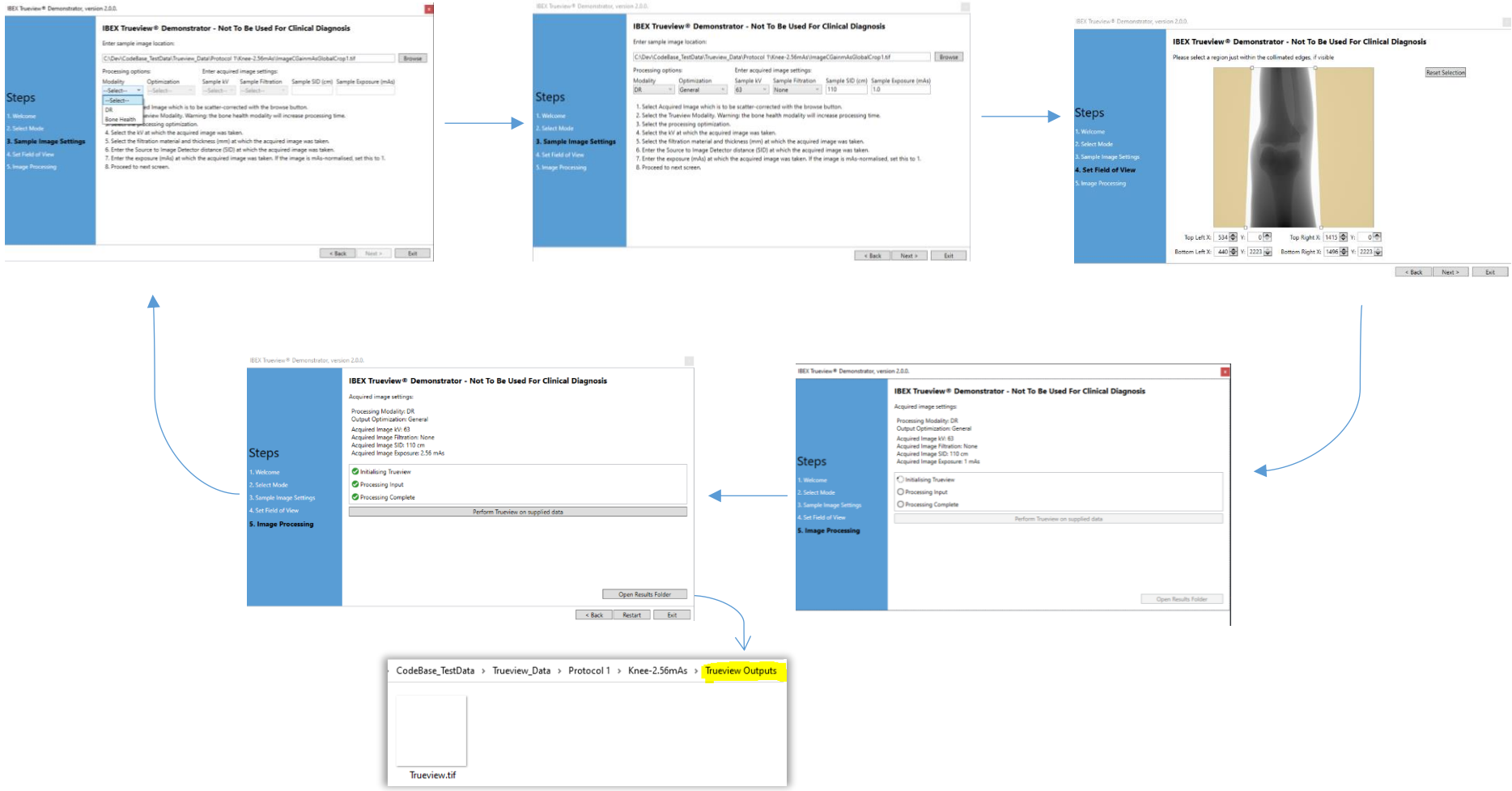
If the user wishes to interactively select images and select the appropriate inputs (kV, Filters, etc.) the default mode '**Single Image Processing**' should be selected. Examples of interactive operation for 'DR' and 'Bone health' modalities have been recorded on pages 4 and 5. The workflow for the 'Mammography' modality is the same as for 'DR'. The full set of services are available to the user in this mode.

If the user wishes to apply the scatter reduction process to a collection of images, the mode '**Batched Processing**' should be selected. Currently, this mode does not support the 'Bone Health' and 'CBCT' modalities.

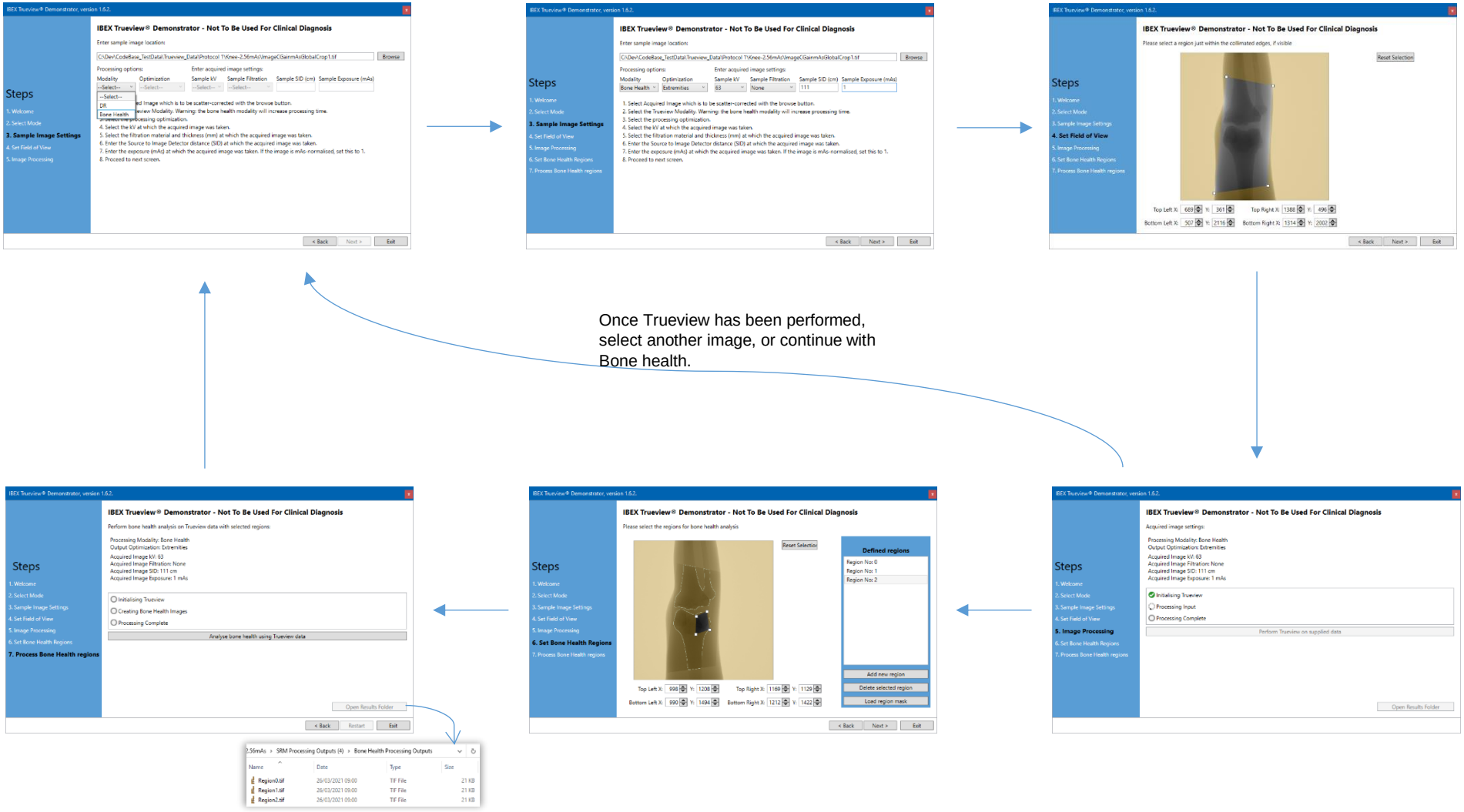
In this mode, the only interaction available to the user is to provide a file in comma-separated-value (CSV) format file which defines the processing to be performed. More detail on this mode of operation is provided on pages 6 and 7.

The '**Tomography Processing**' mode is available for CBCT samples and discussed on page 9.

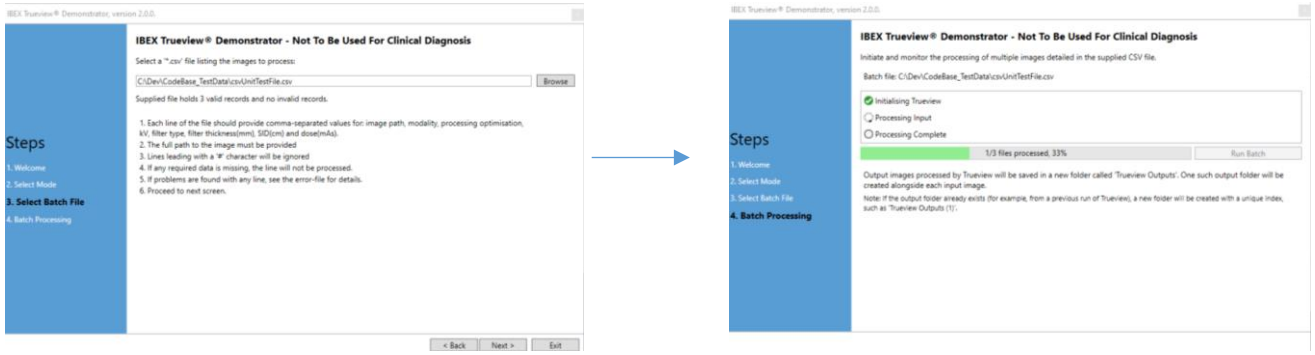
Manual usage, DR or Mammo Modality



Manual Bone Health usage



Batched Mode Usage



When the batch processing mode is running, a log file will be generated to report any issues found with the CSV file, or any issues that arose during the processing of the images. The log file will be located within the same folder as the selected CSV file.

In this example, the log file would be created as the file ‘c:\Dev\Test\BatchFile_log.txt’, and would contain the following:

```
CSV Line:       11      c:\Dev\Test\Batch Dir\test1.tif,  DR , General, 73, Brass, 0.11, 113, 0.34
Errors  :               Same file already in list

4 valid records
1 invalid records

--- 15/01/2021 09:40:56 ---

FilePath: c:\Dev\Test\Batch Dir\imageD.dcm
Comment: Output folder: "c:\Dev\Test\Batch Dir\SRM Processing Outputs (27)"
Comment: Processing complete


FilePath: c:\Dev\Test\Batch Dir\test1.tif
Comment: Output folder: "c:\Dev\Test\Batch Dir\SRM Processing Outputs (28)"
Comment: Processing complete


FilePath: c:\Dev\Test\Batch Dir\test2.tif
Comment: Output folder: "c:\Dev\Test\Batch Dir\SRM Processing Outputs (29)"
Comment: Processing complete


FilePath: c:\Dev\Test\Batch Dir\test3.tif
Comment: Output folder: "c:\Dev\Test\Batch Dir\SRM Processing Outputs (30)"
Comment: Processing complete
```

When the CSV file is loaded, the GUI reports the number of records that can be processed, and any records that have problems. Any problems are reported in the log file. The example here indicates that the same image has been listed more than once.

During the processing step, the progress through the images is also recorded in the log, along with any faults that might occur.

The specific output folder created for each image is also recorded here.

CSV File format for Batch Mode

The CSV file is made up of one record per line, each with 9 mandatory fields. The fields required for a valid entry in the CSV file are:

- Path to the source image
  (absolute or relative to the CSV file).
- Path to the segmentation image
  (optional, leave empty if none).
- The modality indicator (must be 'DR' or 'Mammo').
- An optimisation indicator
  (see supported presets on page 8).
- The peak-voltage value (in kV).
- Filter Material indicator ('None' if no filter used).
- Filter thickness (in mm).
- SID value (in cm, leave empty for Mammo).
- Dose (in mAs).

Any line that starts with the '#' character will not be processed.

Users may use Microsoft Excel to generate CSV files, using the "Save as" option and selecting the *.csv filetype.

Double quotation marks "…" must not be used around file paths, even if the path contains whitespace characters.

NB: When using floating point numbers (e.g. filter thickness) within the comma-separated lines, **US English** (**en-US)** norms for writing numbers must be used, e.g. "**0.2**" and not "0,2".

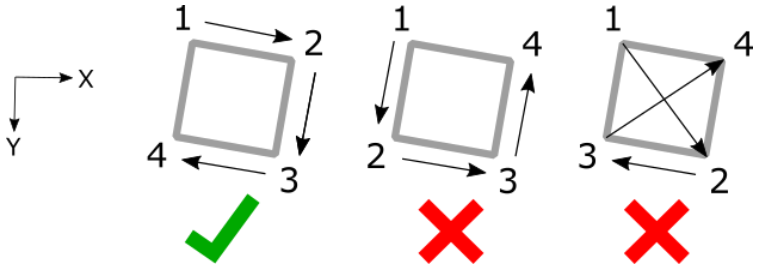
Example CSV file for Batch Operation

```
# Filepath, Segmentation   , Modality, Optimisation, kV, Filter  , Filter Thickness, SID, Dose
#         , (empty if none), DR/...  , Pelvis/..   , 60, Material, mm              , cm , mAs

Chest.tif,,DR,General,63,None,0,103,1

Knee.tif,,DR,General,63,None,0,83,1

Spine.tif,SpineSegmentation.tif,DR,General,63,None,0,123,1
```

Adding a mask to the CSV record

If a user wishes to provide a mask, outside of which the source image data is not considered, 8 integers may follow the initial mandatory fields. These integers are paired into 4 (*X, Y*) points, which form a masking quadrilateral. Only points inside the quadrilateral will be processed. The *X* and *Y* values must lie within the dimensions of the image.

The ordering of the points should be clockwise around the shape: Top-left, top-right, bottom-right and finally bottom-left. Crossed or concave quadrilaterals will be rejected.



Example CSV file with mask coordinates:

```
# Mandatory fields ..........................................    Optional Image Mask Fields ......................
Chest.tif, Segmentation.tif, DR, General, 63, None, 0, 103, 1,    200, 200,   1300, 200,   1300, 2000,    200, 2000
```

List of supported optimisation presets

DR

- *General*
  Settings suitable for all body parts.
- *Flat Phantoms*
  Settings optimised for flat phantoms and other non-anatomical samples.

BoneHealth

- *Extremities*
  Settings optimised for hands, arms, feet, and legs.
- *Pelvis*
  Settings optimised for pelvises.
- *Flat Phantoms*
  Settings optimised for flat phantoms and other non-anatomical samples.

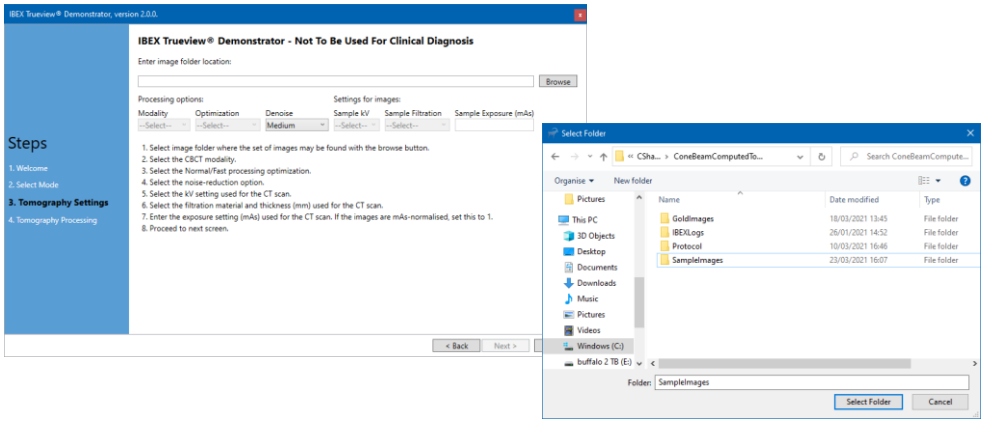
Mammo

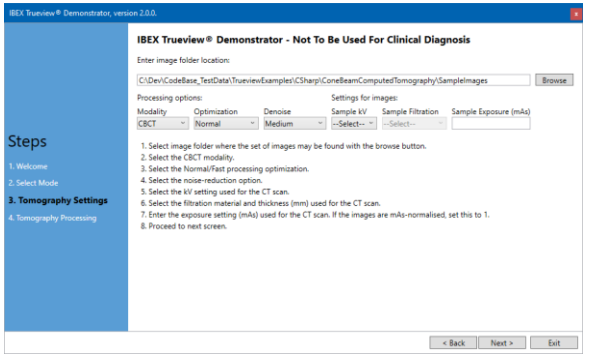
- *S=X% D=Y*
  Remove 'X%' of the predicted scatter, and apply a post-processing denoise with a strength of 'Y' (setting 'Y' to zero disables the denoise pass). Both values must be entered and separated by a single white space.
  Allowed values for 'X': [65%, 75%, 85%, 100%].
  Allowed values for 'Y': [0, 3, 5, 7].
  Example: S=100% D=3

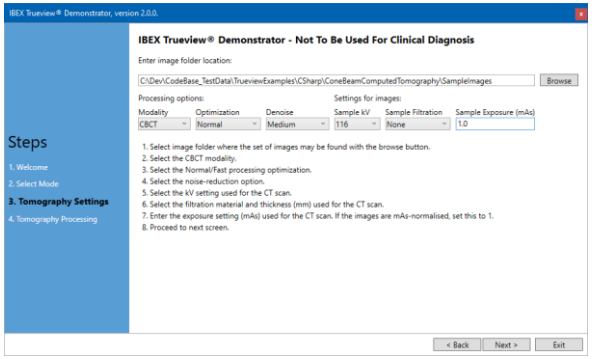
CBCT

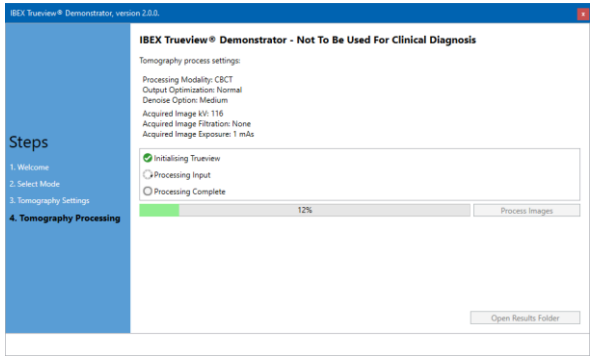
- *Normal*
  Standard settings for best quality output.
- *Fast*
  Reduce the processing time at the cost of a lower output quality.

Tomography Mode

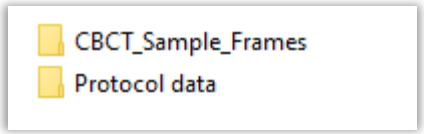








Tomography Mode requires a folder containing the collection of CT images. The process starts with selecting the folder. A “Protocol data” folder must be available in the sample folder’s parent:



When the sample folder is selected, the CBCT modality is selected.

There are 2 optimisations offered at this point, “Normal“ and “Fast”. The Fast option employs more interpolation to accelerate the process.

Further, a noise-reduction control is offered also. The dropdown shown above offers the following options: {Off, Low, Medium (the default value), High}.

As with scatter reduction for DR, the source potential (kV) must be selected from the protocol data, along with any filtering employed and the exposure setting (in milliAmpere-seconds).

Once the form is complete, with valid data in the folders, the application can proceed to the next panel, where the “Process Images” button is offered. As there can be a large number of images in a CBCT set, scatter-reduction can take some time. The progress bar will report the time taken to process the images. Once complete (100%) the images are written to the disk. A folder named “Trueview Outputs” is created within the sample folder to hold the output images. The output images are named as follows:

TV0001.tif, TV0002.tif, …

If a previous run has generated the output folder “Truview Outputs”, an index is appended so that all outputs are retained.