# *The MotionMonitor xGen Hardware Guide: Southwest Research Institute ENABLE configuration and Real Time workflow*

This document reviews the real time workflow options for The MotionMonitor xGen and Southwest Research Institute's ENALBE markerless processing engine. Although The MotionMonitor xGen can be used in a purely post processing capacity, where videos captured using any application and the resulting C3D files generated by ENABLE can be imported into The MotionMontior xGen, this guide will focus on the automated processes of sending video files captured using The MotionMonitor xGen to ENABLE. The data generated by ENABLE is then automatically reincorporated into the original Activity where a biomechanical model is applied and this data is synchronized with any other peripheral data such as force plates, EMG, EEG, eye tracking, or data from other kinematic tracking systems that were captured along with the original video files in The MotionMonitor xGen.

1) The ENABLE application first needs to be installed on your computer with CUDA enabled graphics cards. Contact your Client Support Engineer for assistance with performing the installation or to receive the installer.

2) Within The MotionMonitor xGen, the camera devices will need to be calibrated. Refer to the Knowledge Base article for Calibrating Cameras for instructions on how to perform this process. Only Basler cameras that have been calibrated will be used for markerless tracking. Webcam videos will not be sent to ENABLE even if they have been calibrated.

3) A Subject will need to be added to the Live Workspace before performing data collections.
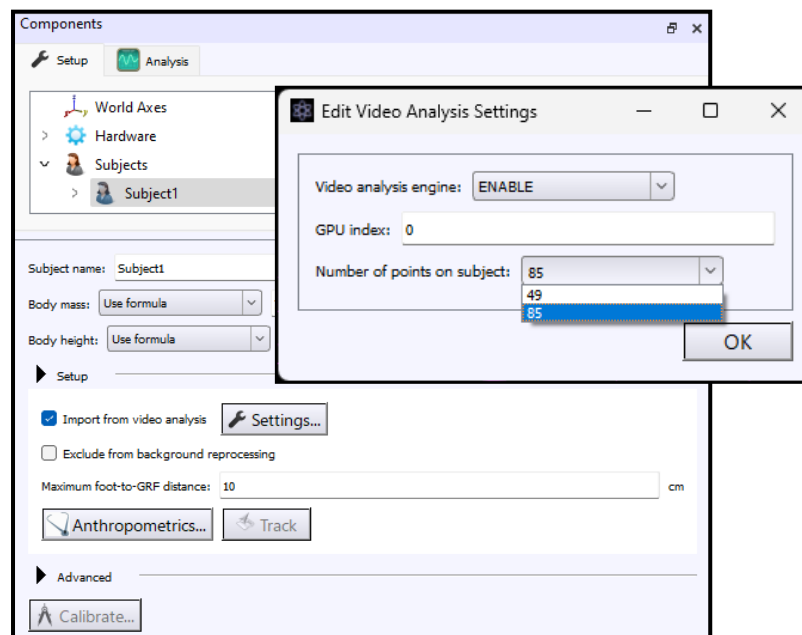
Expand the Setup node in the Subject parameters panel and enable the "Import from video analysis" check box. This is the setting that will indicate to the software that any calibrated Basler videos should be sent to ENABLE. Click on the "Settings" button to open the "Edit Video Analysis Settings" dialog and select "ENABLE" from the "Video analysis engine" drop list. The GPU index refers to which GPU on the computer will be used for processing by ENABLE and the Number of points refers to the number of points in the processing network. The 49 point network is slightly faster, but for many motions the 85 point network will yield more robust results.

When selecting graphics cards to use, careful consideration will need to be made to determine the optimal configuration for which GPUs ENABLE will use. Depending on the number of GPUs and whether The MotionMonitor xGen and ENABLE will be running on the same computer and if the applications will be running concurrently will determine which GPU to assign. The GPUs assigned to The MotionMonitor xGen for video processing and ENABLE would ideally be different. After making GPU assignments, it's always helpful to monitor the GPU usage through Task Manager when the applications are running to ensure that the configured settings are optimized. On computers configured by Innovative Sports Training, Inc, this process will have already been completed.

The "Exclude from background reprocessing" checkbox will prevent the recorded Activity file from being reprocessed when using the Reprocess in Background option, which will be described later. For instance, this might be the desired behavior when using the Analyze|Extract trials processing feature to separate longer Activities into several shorter Activities, thus reducing the total processing time. There may be any number of reasons why it would be desired to prevent an Activity from being reprocessed, but this setting can be modified after an Activity has been recorded and saved.

4)   When performing recordings, the method in which video is reprocessed will determine when The MotionMonitor xGen will send the video files to ENABLE for processing. The method in which video files are processed is selected from the Edit Recording Parameters dialog prior to data collection. Click on the Record|Edit Recording parameters menu or Edit Recording parameters icon to open the Edit Recording Parameters dialog.
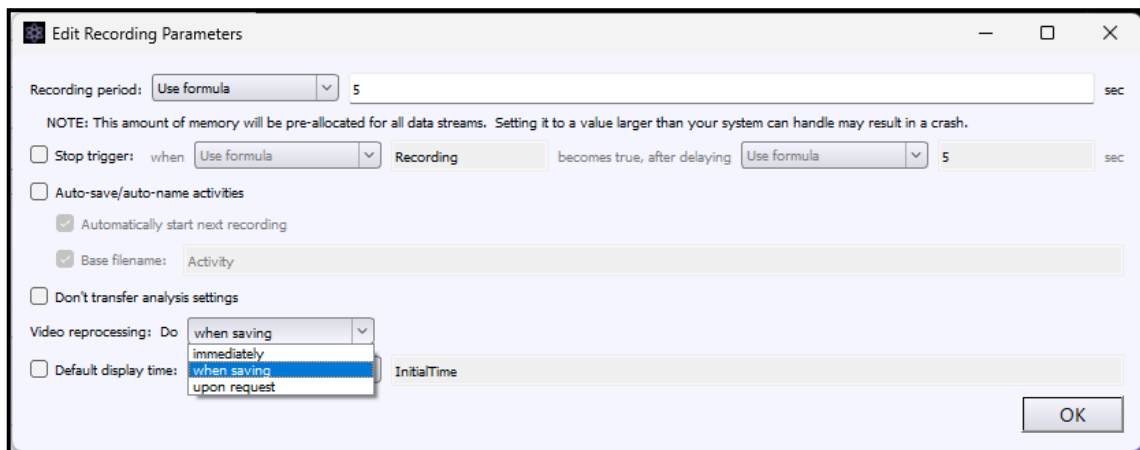

When processing "immediately" is selected, the videos will be immediately sent to ENABLE for processing upon completion of the recording and The MotionMonitor xGen will wait for the data to be retrieved from ENABLE before proceeding. When processing "when saving" is selected, the videos will not be sent to ENABLE for processing until the Activity is saved. Other data captured in the Activity can be reviewed before saving and sending the video files to ENABLE for processing or the video files will be discarded if the Activity is not saved. When the Activity is saved, The MotionMonitor xGen will wait for the data to be retrieved from ENABLE before proceeding. When processing "upon request" is selected, the user will be prompted to send the video files to ENABLE for processing each time the activity is opened, until the reprocessing has been performed.

Individual or batch processing of activity files with the video reprocessing set to "upon request" can be performed through the File|Reprocess Video or File|Reprocess in Background menus from the Live Workspace window.
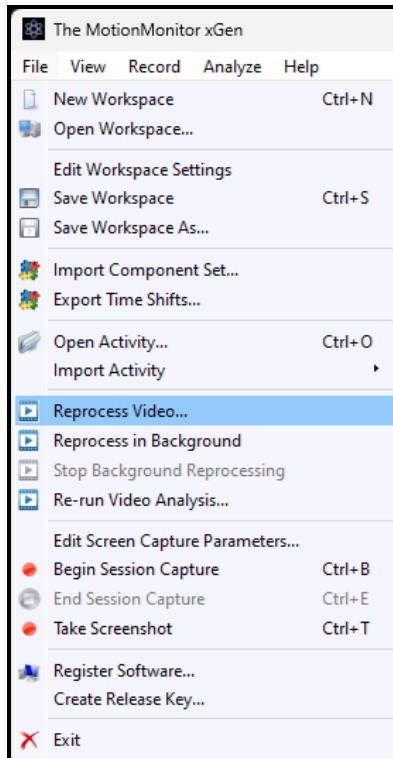

The Reprocess Video option will open a file browser window where the desired Activities to be processed can be selected. You will not be able to perform other operations within the application until the processing has run to completion or unless the process has been cancelled.

The Reprocess in Background option allows for video files to be sent to ENALBE in the background while subsequent Activities can be recorded or while performing other tasks within The MotionMonitor xGen. This can be run from another instance of The MotionMonitor xGen software on the same computer or on a networked computer. Running from a separate instance of The MotionMonitor xGen will help ensure that any data collection threads aren't interfered with by the background processing threads. Consideration of the GPU selection, as mentioned previously, is important to ensure available GPU resources for The MotionMonitor xGen and ENABLE when running concurrently on the same computer.
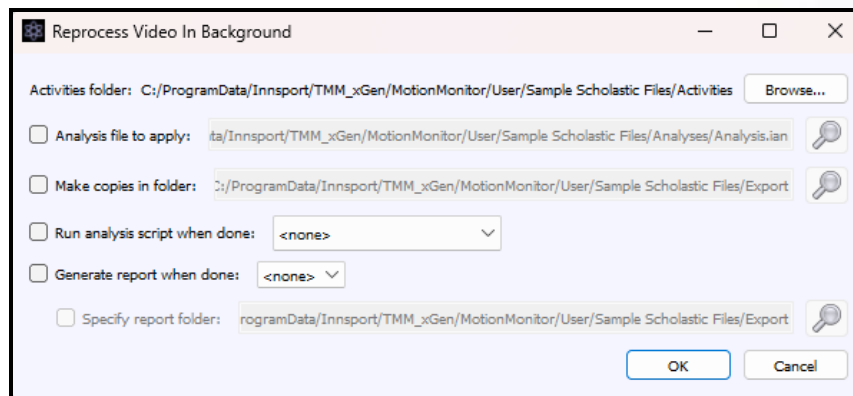
The Reprocess Video In Background dialog includes a file browser selection button for selecting the target directory where the application will look for files that need to be reprocessed. There are also optional settings that can be applied to the Activity files when being reprocessed. If the "Analysis file to apply" option is enabled, the specified Analysis file will be applied to each Activity after the reprocessing step. This feature can ensure that the appropriate analysis settings are applied to Activities for when they are subsequently opened, allowing you to still keep any analyses applied in the Live workspace to a minimum. If the "Make copies in folder" option is enabled, a copy of the Activity will be created in the target directory after the reprocessing step. If the "Run analysis script when done" option is enabled, the selected analysis script will run after the background reprocessing has completed. If the "Generate report when done" option is enabled, the selected report will be generated after the background reprocessing has completed, and you may also specify the folder to which this report is exported. The selections for the analysis script to run and generate report refer to what's in the current workspace, not the Activities.

When initially performing data collections or when selecting to run Reprocess Video or Reprocess in Background from another computer, the "Browse" button can be selected from The MotionMonitor xGen "Login" screen when first opening the software. This will allow you to work from and save Activity files to a shared or networked directory. The MotionMonitor xGen will default to this directory until another directory is selected when starting the software.
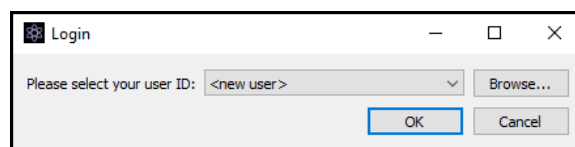
If logging into the same User directory, care should be taken when making any modifications to the workspace while running a separate instance of The MotionMonitor xGen since both instances will be modifying the same Current.iws workspace file for that User ID.

5)   When ENABLE data are brought into The MotionMontior xGen Activity files, biomechanical data can be analyzed and displayed in graphs or visualized in the Animation window and as an overlay in video windows, if enabled.

6)   Activities and their associated video files can be processed through ENABLE again using the File|Re-run Video Analysis menu item. This option will open a file browser window where the desired Activities to be re-processed through ENABLE can be selected. The new Activity files will overwrite the existing files, so backup copies should be created first, if desired.