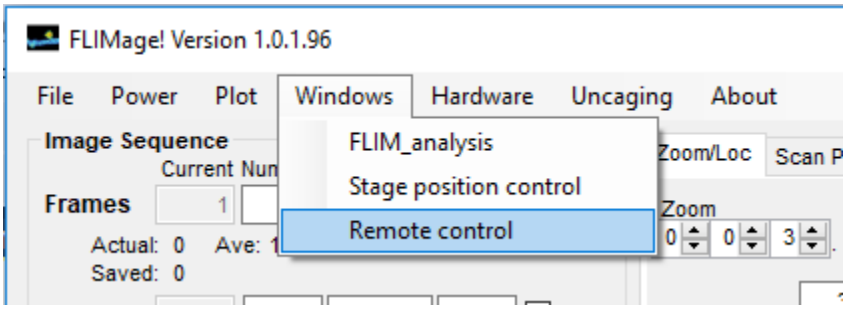
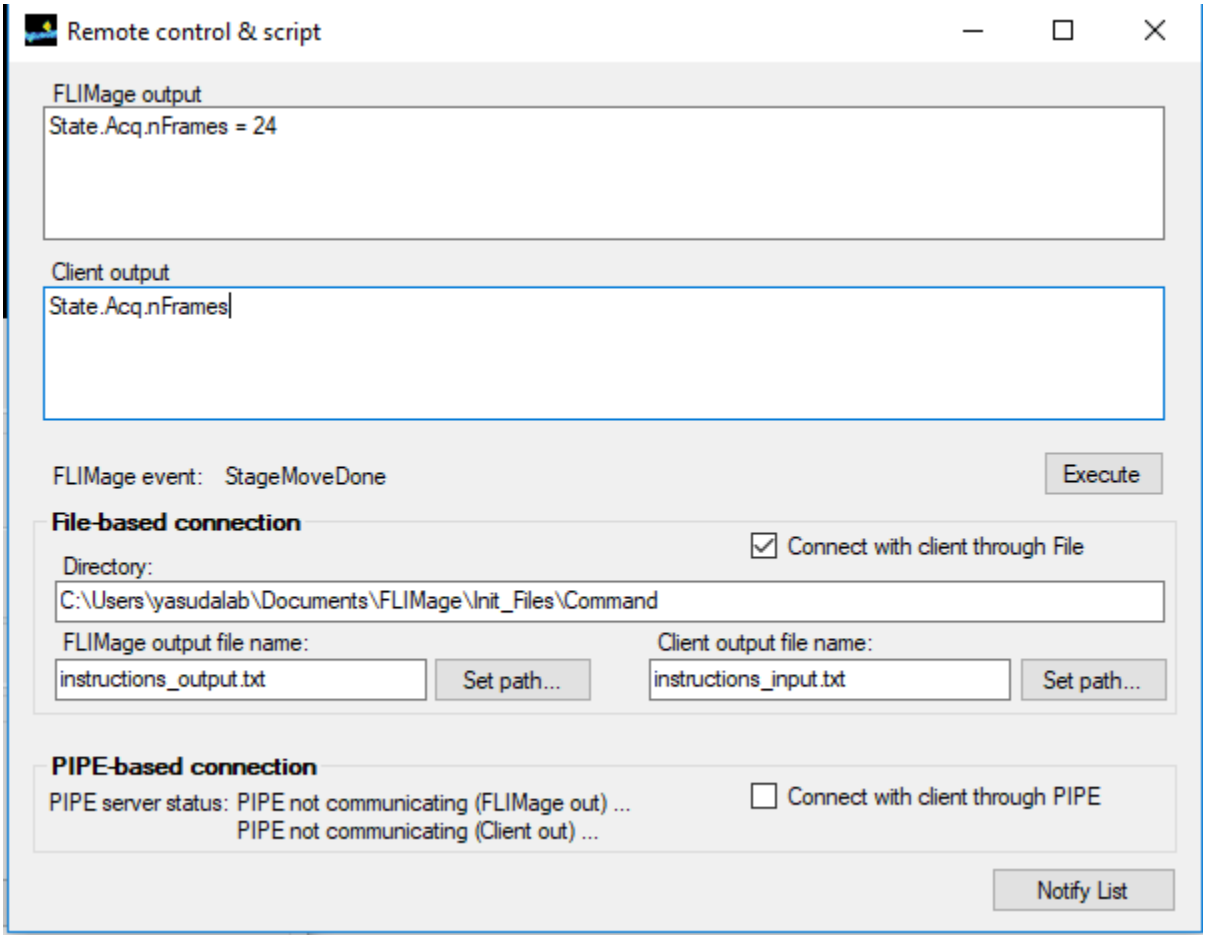
Remote control can be done either through text file or PIPE.
For controlling this feature, click “Windows menu” and then “Remote control” (see below).



You will see a window named “Remote control & script” pops up (see below).



Text file based communication is much easier than PIPE-based communication. You simply use files for output and input to communicate. For now, both output and input instructions need to be in the same folder. Press “set path” to select a folder and files for communication. The line must be appended to the last line of the file created. In C#, it will be something like:

```
File.AppendAllText(FilePath, Command + "\r\n");
```

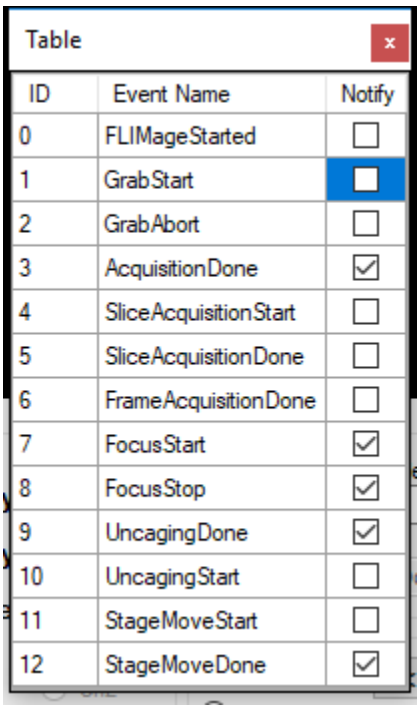
For opening of command file, make sure to use read-only mode.

If you want to use PIPE, turn on “Connect with client through PIPE”, and then turn on client PIPE. Handshaking and so on will be done through PIPE server. A example script for will be found in the folder (FLIM_pipeClient.py). For now, PIPE name is set to FLIMageW (for client to write) and FLIMageR (for client to read). Immediately after establishing connection, FLIMage will send a code “FLIMage”. Client needs to return “FLIMage” to make sure the connection. PIPE will be 1 command – to 1 response communication.

One can simulate sending commands from client by typing commands in “Client output” window, and press “Execute”.

Event notification from FLIMage to Client

To view the event notifications from FLIMage, press "Notify List" button at the bottom in the "Remote control & script" window:



-- sent after FLIMage start ---
command: FLIMageStarted
arguments: none

-- set after Grab start --
command: GrabStart

arguments: none

--sent after movement to new coordinates is complete--
command = StageMoveDone
arguments: x, y, z
example: StageMoveDone,1,34.2,-2

--sent after slice acquisition is done
Command = SliceAcquisitionDone
arguments; {current slice}, {total number of slices}

Execution command from Client to FLIMage

In general, there will be no return. It will execute command.

--Move to new stage position--
command = SetMotorPosition
arguments: x y z
example: SetMotorPosition,12,89.2,0
--Start grab --
command = StartGrab

--Start loop –
(Use parameters in “Loop Sequence” panel)
command = StartLoop

--Stop loop –
command = StopLoop

--Abort grab—
command = AbortGrab

--Start uncaging—
command = StartUncaging
arguments: ROI_x_pixels, ROI_y_pixels
example: StartUncaging,37,42
return: none

Parameter request (set, get) from Client to FLIMage

You can access to all parameters by typing the parameter name (see FLIMage\default.txt):
Example: State.Acq.nFrame
Return exmaple: State.Acq.nFrame = 24

All parameters can be set by inserting values as follows:
Example: State.Acq.nFrame = 24
Return: State.Acq.nFrame = 24

Other parameter requests:

--Load setting file
Command: LoadSetting
Arguments: file number or file name
Example: LoadSetting, 1
Example2: LoadSetting, C:\Users\yasudalab\Documents\FLIMage\Init_Files\Uncaging_imaging.txt
Example3: LoadSetting, Uncaging_imaging.txt
Return: Setting, file number or file name
Note: If there is it is not a full path, it will try default path (…. FLIMage\Init_Files\)

--Set Zoom to specific value
command = SetZoom
arguments: zoom
example: setZoom,20
return: Zoom, {zoom value}

--Request for current position to be sent--
command = GetCurrentPosition
arguments: None
return: CurrentPosition, {x}, {y}, {z}

--Request for FOV size--
command = GetFOVXY
arguments: None
return: FovXYum, {x value}, {y value}

--Request Galvo Scanning Position--
command = GetScanVoltageXY
arguments: None
example: GetScanVoltageXY
return: ScanVoltageXY, {x value}, {y value}

--Set Galvo Scanning Position
command = SetScanVoltageXY
arguments: x, y (in voltage)
example: SetScanVoltageXY,0.2,-4
return: ScanVoltageXY, {x value}, {y value}

--Request Galvo Scan Voltage Multiplier

command = GetScanVoltageMultiplier
arguments: None
return: ScanVoltageMultiplier, {x value}, {y value}

--Request Galvo Scan Voltage Range Reference
command = GetScanVoltageRangeReference
arguments: None
return: ScanVoltageRangeReference, {x value}, {y value}

--Set Number of Z Slices
command = SetZSliceNum
arguments: zSliceNum
example: SetZSliceNum,10
return: ZSliceNum, {z slice number}

--Set X,Y Imaging Resolution
command = SetResolutionXY
arguments: x,y
example: SetResolutionXY,128,128
return: ResolutionXY, {x pixel number}, {y pixel number}

--Get X,Y Imaging Resolution
command = GetResolutionXY
arguments: None
example: GetResolutionXY
return: ResolutionXY, {x pixel number}, {y pixel number}

--Convert pixel into voltage
command = PixelToVoltage
arguments: xpixel, ypixel
example: PixelToVoltage, 64, 64
return: PixelToVoltage, 0, 0

-- Turn Intensity Image saving On/Off
Command = `SetIntensitySaving`
Arguments: 0 or 1 (for on or off)
Return: IntensitySaving, {0 or 1}

--Request Image File Path
Command = GetIntensityFilePath
Arguments: None
Return: IntensityFilePath, {file path}

--Set channels to be saved--

Command=SetChannelsToBeSaved
Arguments: {channel to be saved}
Return: ChannelsToBeSaved, {channel to be saved}
Note: if channel == -1 (default), all channels will be saved.

--Ask if images are acquired:
Command = IsGrabbing
Return 0 or 1

--Ask if uncaging is going:
Command = IsUncaging
Return 0 or 1

--Ask if digital output is going:
Command = IsDORunning
Return 0 or 1

Commands for analysis (Useful for batch processing):

--Open FLIM file—
Command = "OpenFIle

Arguments: {Full path to Filename}
Return: None
Note: Open .flim file and display

-- Read ImageJ format ROIs—
Command = ReadImageJROI
Arguments: {Filename}
Return: None
Note: Open ImageJ format ROI file (zip file)

--Bin Pages/Frames—
Command = BinFrames
Arguments: {Number of frames to be binned}
Return: None
Note: Bin frames or pages to increase signal-to-noise ratio.
Same as "Bin time course…" menu.

--Calculate time course—
Command = CalcTimeCourse
Arguments: None
Note: Same as pressing button of "Calc

--Set FLIM intensity ranges—
Command = SetFLIMIntensityOffset
Arguments: Lower threshold, Higher threshold
Example: SetFLIMIntensityOffset, 20, 60

--Fix Tau for fitting—
Command = FixTau
Arguments: Tau1, Tau2
Example: FixTau, 2.6, 1.1

--Set fit range--
Command = SetFitRange
Arguments: StartPoint, EndPoint (in time point)
Example: SetFitRange, 5, 60

--Fix tau all—
Command = FixTauAll
Arguments: 0 or 1
Note: Fix or unfix all tau to the current values.

--Fit data--
Command = FitData
Arguments: none
Note: it will fit the fluorescence lifetime curve with current setting.

--Set Channel—
Command = SetChannel
Arguments: 1, 2, or 12
Note: Set display channel.

--Apply fit offset—
Command = ApplyFitOffset
Arguments: none
Note: It will fit the data and then adjust the offset of FLIM image display.

--Fit each frame—
Command = FitEachFrame
Arguments: 0 or 1 (for off or on)
Example: FitEachFrame, 1
Note: If turned on, it will fit fluorescence lifetime curve for each frame.

--Align frames—
Command = AlignFrames
Arguments: none

--Get number of pages of the opened file.—
Command = GetNPages
Return: number of pages of the opened file.

Using python example code for PIPE

You can run attached FLIM_pipeClient.py class.

Once you run it you can:

```
exec(open("FLIM_pipeClient.py").read())
value = flim.sendCommand('State.Acq.msPerLine?') #Return '2'
flim.sendCommand('State.Acq.msPerLine = 2')  #Change msPerline to 2
ms.
flim.sendCommand('StartGrab')  #Will grab.
flim.sendCommand('SetMotorPosition,12,89.2,0')  #set motor position.
```