



Callisto Installer Guide

This guide describes the Callisto Installer software tool, which is recommended for installing the Callisto application software. This tool simplifies installation but does not replace the **Callisto Software Setup Guide**. The **Callisto Software Setup Guide** provides more detail and should be referenced after the Callisto Installer is run. The installation tool is for the Windows operating system.

Besides the Callisto Installer tool, additional software requires installation including PERL, System Scheduler and Java. Perl is used for a script that sends Callisto FITS data files via FTP to the Callisto data server. System Scheduler is used to periodically run the Perl script, and Java is used to view FITS data files as spectrograms.

The Callisto Installer installs several applications and software tools used with the Callisto spectrometer. These include: callisto.exe (spectrometer control software); SchedulerGeni.exe (sunrise/sunset calculator); GenFrqPrg.exe (frequency file generator); PlotLC.exe (light curve plotter); M9703APlotter.exe (spectral overview plotter); Jv_20070109.jar (FITS data file viewer); and wwwgeni.exe (light curve image generator).

The steps listed below should be followed in order.

I. QuickStart

A. Preliminary:

1. Determine whether your operating system is 32 bit (x86) or 64 bit (x64) from **Start – Control Panel – System – System Type**
2. Determine your antenna coordinates to one decimal place – longitude, latitude and elevation or altitude.
3. Request the FTP password for FITS data upload from the Principal Investigator (PI) at monstein@retired.ethz.ch or cmonstein@swissonline.ch.
4. Determine if your PC has a native serial (COM) port or requires a USB-Serial Converter. If it requires a converter, install a USB-Serial Converter that is compatible with the operating system and be sure to also update the drivers to the latest available. Determine the serial (COM) port number from **Start – Control Panel – Device Manager – Ports (COM & LPT)** and write it down for use later.
5. Connect a straight-through DB-9M to DB-9F cable between the Callisto serial port and PC serial port or USB-Serial Converter. The cable must support at least pins 2, 3 and 5 and should be shielded and as short as possible.
6. Connect the Callisto to the antenna or LNA front-end and a 12 V power supply.
7. Apply power to Callisto, front-end electronics and antenna rotator (if used).

B. Supporting software programs:

1. Download and install
 - a. Java: <https://www.java.com/en/> (free)
 - b. Perl: <https://www.perl.org/> (free). Be sure to select the appropriate download package for the 32 bit (x86) or 64 bit (x64) operating system as found previously
 - c. System Scheduler: <https://www.splinterware.com/index.html> (free)

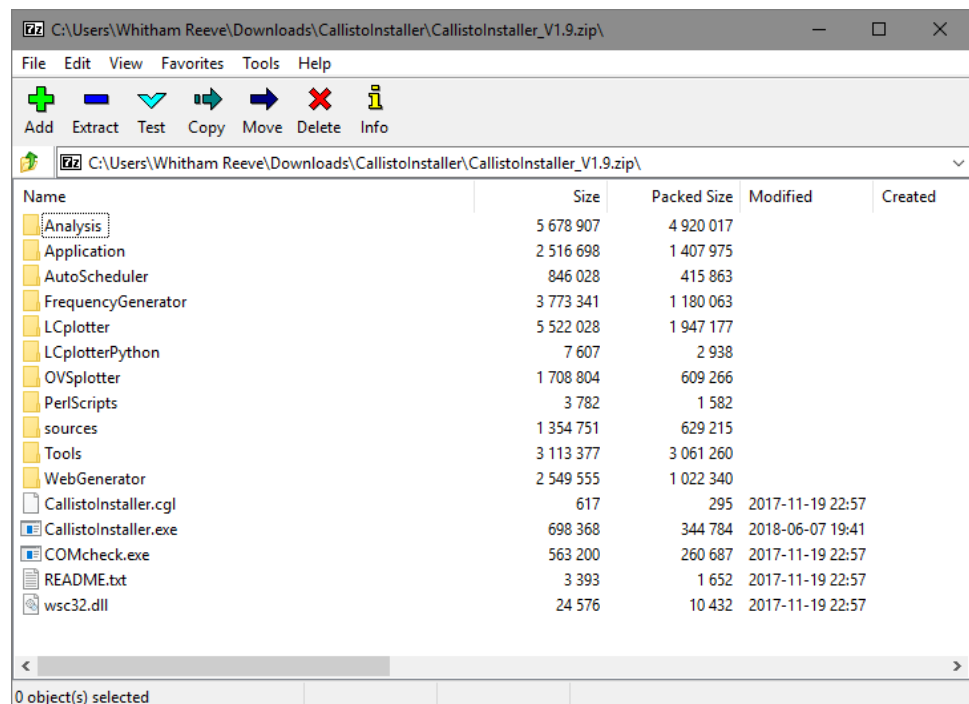


2. The Java installation is straight-forward and no configuration is necessary – just follow the on-screen prompts. The Perl installation also is straight-forward but it should be checked for proper installation. System Scheduler requires additional setup. The Perl and System Scheduler installations are described in section II.

C. Callisto Installer

1. Decide on an appropriate filename for the FITS data files. The name typically is the country in which the Callisto station is located. The name may be abbreviated and it must use only alpha-numeric characters and the dash or minus character (-) but no special characters. Examples: ANGOLA or ZIMBABWE or Sri Lanka.
 - a. To avoid any conflict, please check with the PI (at emails above) to determine if your chosen name fits into the system (several scripts higher up at server level need to be generated).
 - b. If there is more than one instrument in the country include additional information such as city or observatory; for example, ANGOLA-LUXILO. For a list of countries that have existing Callisto stations go to: http://www.e-callisto.org/Callisto_DataStatus_Vwww.pdf. Number the first instrument at a given location 01. Additional instruments may be installed later by repeating these procedures for each instrument and numbering them 02, 03 and so on.
2. Download the CallistoInstaller software package at: <http://www.e-callisto.org/Software/Callisto-Software.html> . Save the zipped file to a temporary folder such as C:\Users\YourName\Downloads\CallistoInstaller\. The file contents may be viewed in Windows File Explorer or with a zip tool such as 7ZIP. See figure 1.

Figure 1
Contents of the Callisto
Installer zipped file as
available on the website.



3. Unzip (extract) the file to the same temporary folder using the built-in Windows tool or 7Zip. See figure 2.

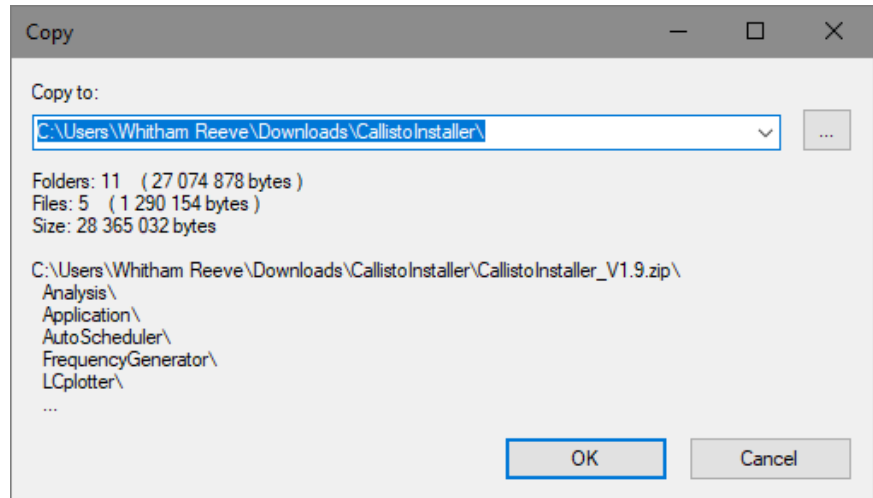


Figure 2

Extraction of the zipped file to a temporary folder using the 7Zip software tool.

4. The new folders and files may be viewed with Windows File Explorer. Execute the file CallistoInstaller.exe. See figure 3.

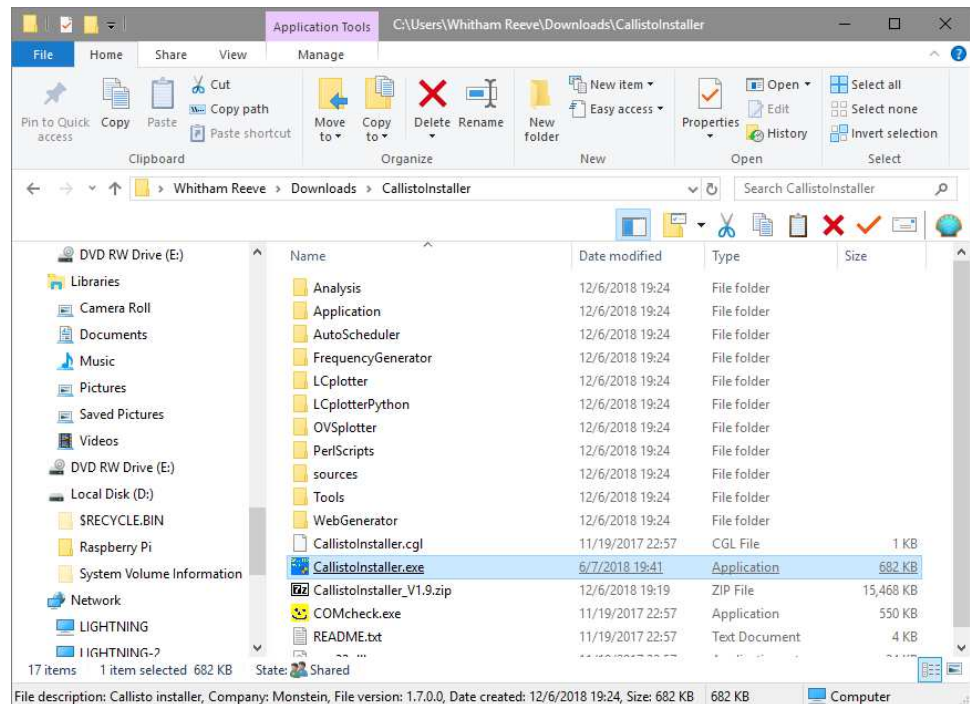


Figure 3

File Explorer showing folders and files extracted to the temporary Callisto Installer folder

5. Check that the Callisto is connected to the PC serial port and powered. When the Callisto Installer window appears (see figure 4), click the button “Check Ports” to find an available serial (COM) port. The found port should correspond to the working port determined in section A above. If the correct port is not found, check the Callisto connections and click on the button “Search Again”. Do not go to the next step until the correct working port is found. See figure 5.

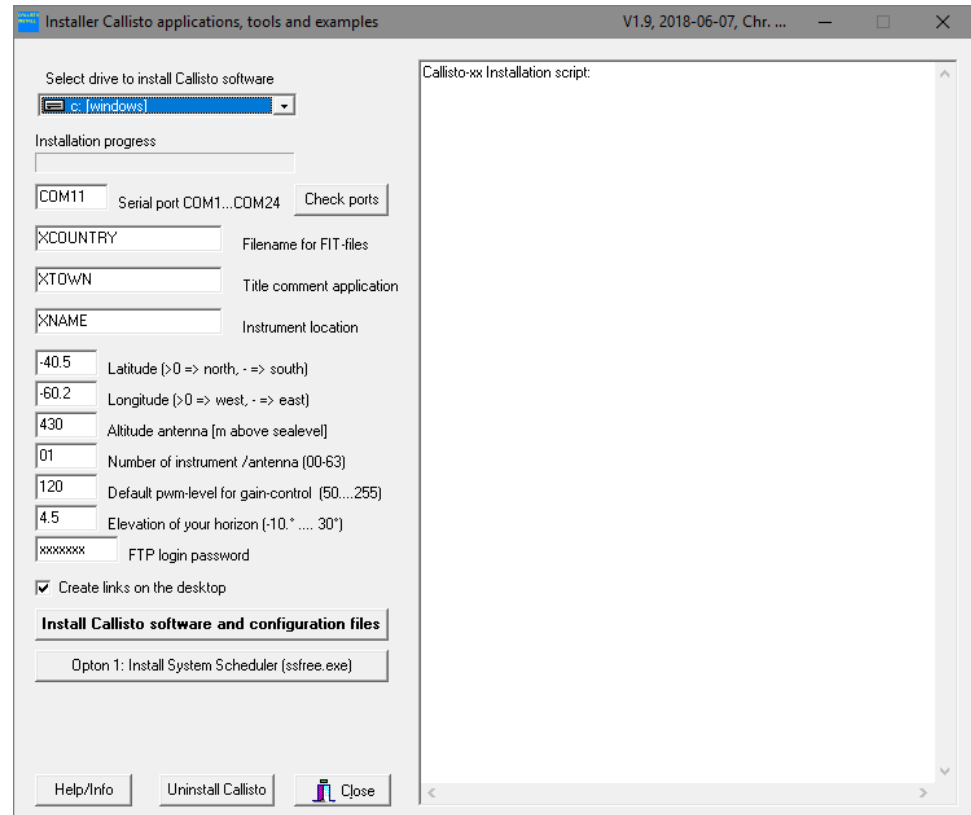


Figure 4

Default configuration which must be edited to use local parameters.

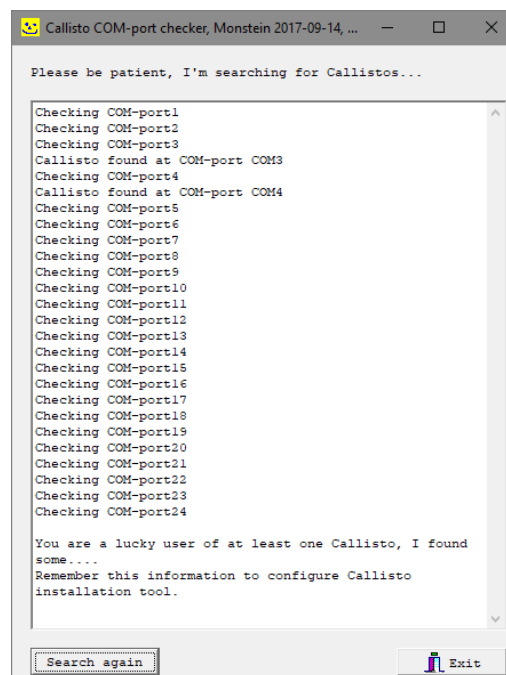


Figure 5

Several Callistos can be operated simultaneously by one PC. Here, two Callistos were found, one on port 3 and one on port 4. Remember which port belongs to which instrument.

6. Fill in all edit fields in the left part of the Callisto Installer window with the above information including the serial (COM) port. Do not change the Default **pwm level or gain control** (it may be changed later). Be sure to include the FTP login password received from the PI.
7. Decide if you want to have Callisto software shortcuts on your Desktop. If so, check the box "Create links on the desktop"; otherwise, uncheck the box. See figure 6.



Figure 6
Example of a correct configuration setup. The password is hidden here for security reasons. Ask the PI for the password. Remember, that in the Perl application, special characters like '\$' need to be entered with a preceding '\' character, as in '\\$'.

The screenshot shows the 'Installer Callisto applications, tools and examples' window. The title bar indicates version V1.9, dated 2018-06-07. The window is divided into two main sections. The left section contains configuration fields: 'Select drive to install Callisto software' (set to 'c: [windows]'), 'Installation progress' (empty), 'Serial port COM1...COM24' (set to 'COM3' with a 'Check ports' button), 'Filename for FIT-files' (set to 'ALASKA-COHOE'), 'Title comment application' (set to 'LWA-01'), 'Instrument location' (set to 'COHOE'), 'Latitude (>0 => north, - => south)' (set to '60.4'), 'Longitude (>0 => west, - => east)' (set to '151.3'), 'Altitude antenna [m above sealevel]' (set to '22'), 'Number of instrument /antenna (00-63)' (set to '01'), 'Default pwm-level for gain-control (50...255)' (set to '120'), 'Elevation of your horizon (-10.° 30°)' (set to '4.5'), and 'FTP login password' (masked with 'xxxxxxx'). A checkbox 'Create links on the desktop' is checked. Below these fields is a button 'Install Callisto software and configuration files'. The right section is titled 'Callisto-xx Installation script:' and is currently empty. At the bottom of the window are buttons for 'Help/Info', 'Uninstall Callisto', and 'Close'. A status bar at the very bottom shows 'Option 1: Install System Scheduler (ssfree.exe)'.

8. Click the button "Install Callisto software and configuration files". The right window of Callisto Installer will show the installation progress. See figure 7. After the installation is completed, the new folders and files may be viewed with the Windows File Explorer. See figure 8.



Figure 7
Installation progress which
takes a few seconds,
depending on PC
resources.

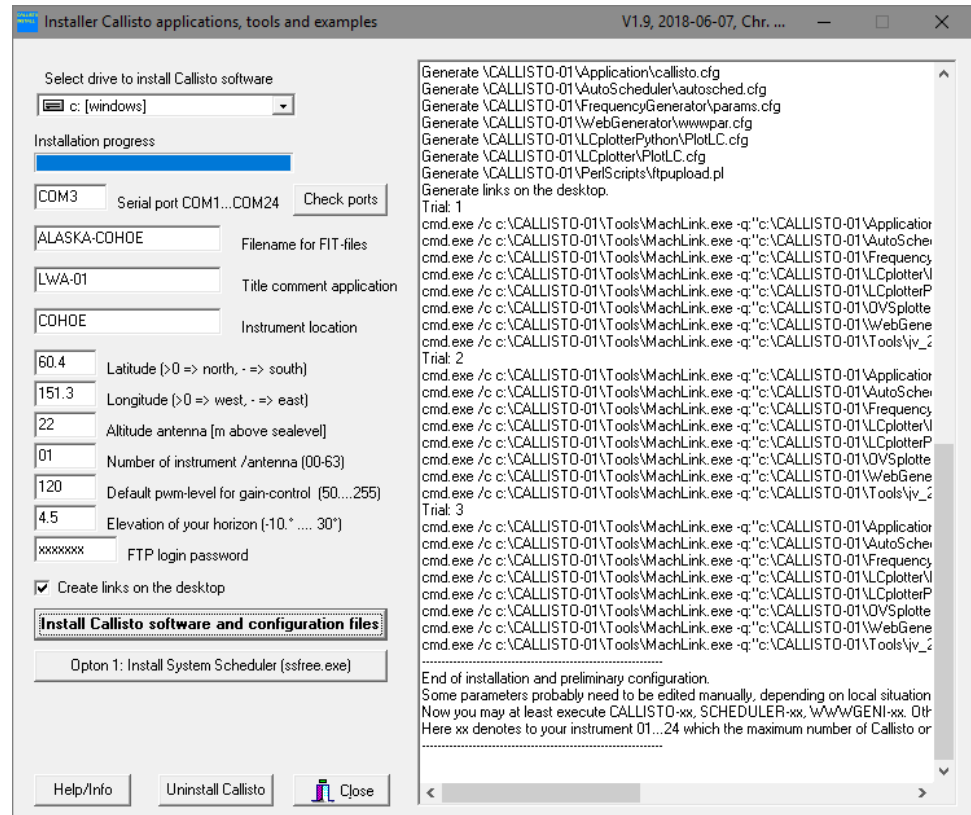
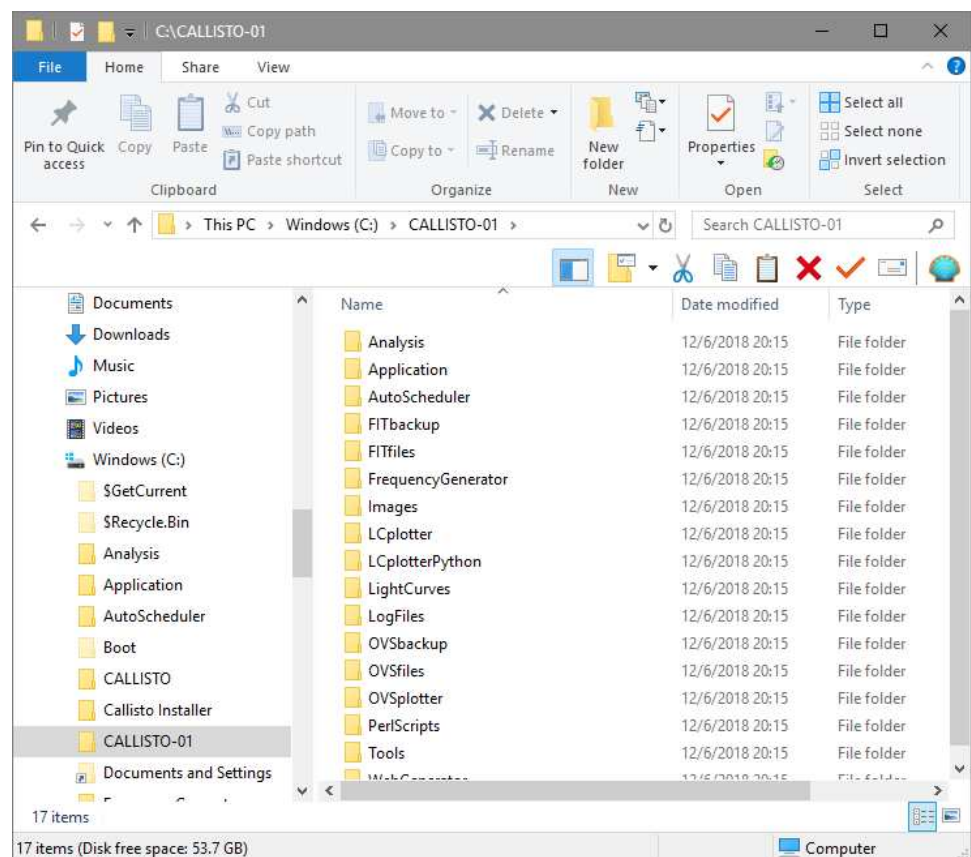


Figure 8
Installed folder containing
all required tools and
applications to operate
Callisto.





9. If you wish to reinstall the Callisto software or are not happy with the installation, click on the button “Uninstall Callisto”. The Callisto software AND any associated data will be deleted. Therefore, if the installation is to be deleted after data has been collected, first move or copy the data somewhere else.
10. If some folders, scripts or desktop shortcuts are missing, perhaps due to slow PC or aggressive virus scanner, simply click on “Install Callisto software and configuration files” again.
11. All configuration files and Perl scripts can be manually edited with any ASCII text editor such as NotePad or NotePad++. See figure 9 for an example.

Figure 9
A typical configuration file, generated by the CallistoInstaller.exe. This file can be edited manually using any ASCII text editor.

```
callisto.cfg - Notepad
File Edit Format View Help
/* Callisto configuration file generated by CallistoInstaller.exe */
/* Automatically generated at 2018-12-06, 20:32:02 */
/* Author: Christian Monstein, 2017-07-28, Version 1.1 */
/*
[rxcomport]=COM3 // Serial communication port COM1...COM18
[observatory]=12 // Instrument CALLISTO=12, please don't change
[instrument]=ALASKA-COHOE // Filename for FIT-file -> instrument code in the data archive
[titlecomment]=IWA-01 // title of the application and keyword in OVS-files
[origin]=COHOE // place of the instrument (town, village or name)
[latitude]=N.060.40 // Instrument latitude [']
[longitude]=W.151.30 // Instrument longitude [']
[height]=0022.0 // antenna altitude [m] asl
[clocksource]=1 // 1=internal clock, 2=external 1MHz 5V TTL
[filetime]=900 // observation time for one FIT-file = 15minutes
[frqfile]=frq00001.cfg // default frequency file/program
[focuscode]=01 // focus-code = number of instrument per location
[mmode]=3 // recording mode: 2=calibrated data, 3=raw data
[fitsenable]=1 // 0=no FIT-files, 1=write FIT-files to disc
[datapath]=c:\CALLISTO-01\FITfiles\ // default data path
[logpath]=c:\CALLISTO-01\LogFiles\ // default logfile path
[lcpath]=c:\CALLISTO-01\LightCurves\ // default light curve path (LC*)
[ovspath]=c:\CALLISTO-01\OVFiles\ // default spectral overview path (OVS*)
[chargepump]=1 // 0=pump off, 1=pump on
[agclevel]=120 // PWM level for tuner gain controil 50...255, default 120
[detector_sens]=25.4 // sensitivity of log. detector in mV/dB, default 25.4
[db_scale]=5 // dB per division in XY_plot (1...10)
[autostart]=0 // 0=no autostart, 1=autostart after power fail
[priority]=1 // 0=NORMAL, 1=ABOVE, 2=HIGH, 3=REALTIME PRIORITY
```

D. Additional Information:

1. Before starting observations, check your PC time and date. The time must be set to Coordinated Universal Time (UTC) and synchronized with a time server. The Network Time Protocol (NTP) is the preferred method for properly synchronizing a PC. An NTP installation guide is available at: http://www.reeve.com/Documents/Articles%20Papers/Reeve_NTP-MeinMon_Install.pdf.
2. A very detailed Callisto Software Setup Guide can be found at: <http://www.reeve.com/Documents/CALLISTO/CALLISTOSoftwareSetup.pdf>.
3. If you need support during installation, install TeamViewer (TV) for remote help and send login data (Your ID and password) to the PI's email address. TeamViewer is available at: <https://www.teamviewer.com/en/> (free). It is suggested to set a fixed password in TV because by default the TV password changes after each execution. To set a fixed password, go to **Extras – Options – Safety – Password** in TeamViewer and set the desired password.
4. For reference, applications that should be run at all times with the Callisto are:
 - a. callisto.exe to operate the Callisto spectrometer
 - b. SchedulerGeni.exe to calculate sun-rise and sun-set times
 - c. ssfree.exe to trigger the Perl script for uploading FIT-files



Other applications and software tools installed by the Callisto Installer are optional and include: GenFrqPrg.exe, PlotLC.exe, M9703APlotter.exe, jv_20070109.jar, and wwwgeni.exe. Refer to the Callisto Software Setup Guide to setup and use these programs.

II. System Scheduler and Perl Installation for Callisto

- A. In addition to the applications previously described, the Callisto Installer software tool installs a Perl-FTP-Upload script, which is used to trigger uploading of Callisto FITS data files to FHNW in Switzerland. The upload script requires Perl, which is a general purpose interpreted programming language. The script is automatically invoked by System Scheduler at regular intervals. The installations of Perl and System Scheduler are described in this section.
- B. For reference, the Perl-FTP-Upload script does the following:
- ⚙ Check the Callisto data directory for FITS files;
 - ⚙ If a new FITS file is available, copy it to the FTP-server at FHNW using File Transfer Protocol;
 - ⚙ Move the new FITS file to a predetermined location for backup such as another Windows folder, another drive on the same PC, a mapped drive, USB-stick, or USB-disk;
 - ⚙ Wait 15 minutes and repeat the whole process under control of the System Scheduler application.
- C. System Scheduler and Perl Installation and operation:
1. Install ActivePERL (PERL5 or higher) on your Windows-PC from <http://www.ActiveState.com> or <http://www.activestate.com/activeperl>. Be sure to install the appropriate version, either 32 bit (x86) or 64 bit (x64) as mentioned in section I. After installation, Restart the PC. Perl will load and run automatically after login when the PC is restarted.
 2. Open the Windows console (command line interface) with **Start – Run – cmd.exe**.

3. Enter `perl -v` to confirm that Perl is running, see image right.

```
Administrator: C:\Windows\system32\cmd.exe
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\Users\Administrator>perl -v

This is perl 5, version 24, subversion 1 (v5.24.1) built for MSWin32-x86-multi-thread-64int
(with 1 registered patch, see perl -U for more detail)

Copyright 1987-2017, Larry Wall

Binary build 2402 [401627] provided by ActiveState http://www.ActiveState.com
Built Jan 5 2017 01:57:19

Perl may be copied only under the terms of either the Artistic License or the
GNU General Public License, which may be found in the Perl 5 source kit.

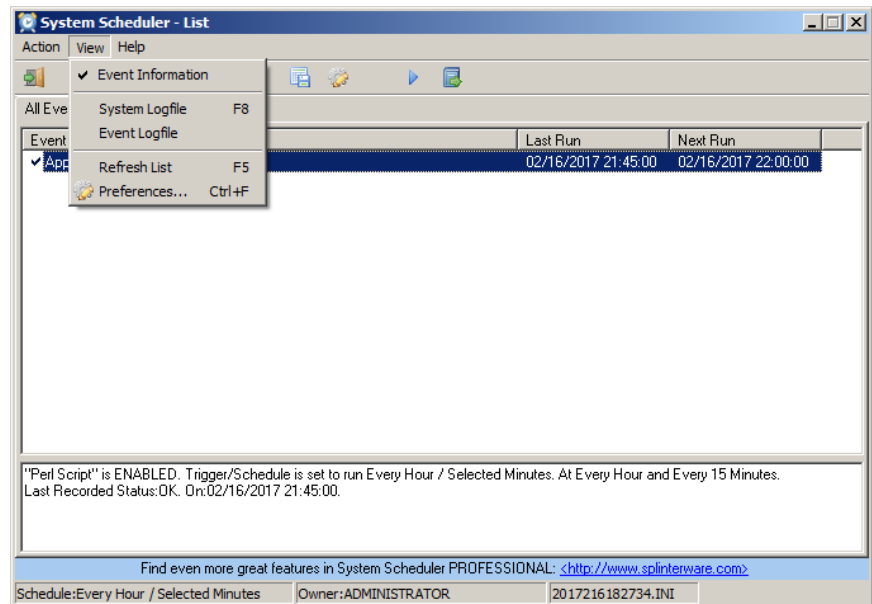
Complete documentation for Perl, including FAQ lists, should be found on
this system using "man perl" or "perldoc perl". If you have access to the
Internet, point your browser at http://www.perl.org/, the Perl Home Page.

C:\Users\Administrator>perl -U
Summary of my perl5 (revision 5 version 24 subversion 1) configuration:
```

4. Install the Splinterware System Scheduler from <http://www.splinterware.com/>. Do not install the application in the Program Files folder; a suggested location is C:\Tools\.
5. By default System Scheduler loads and runs automatically after login when the PC is restarted, but it must be setup to trigger the FTP upload. This setup is described in the following paragraphs.

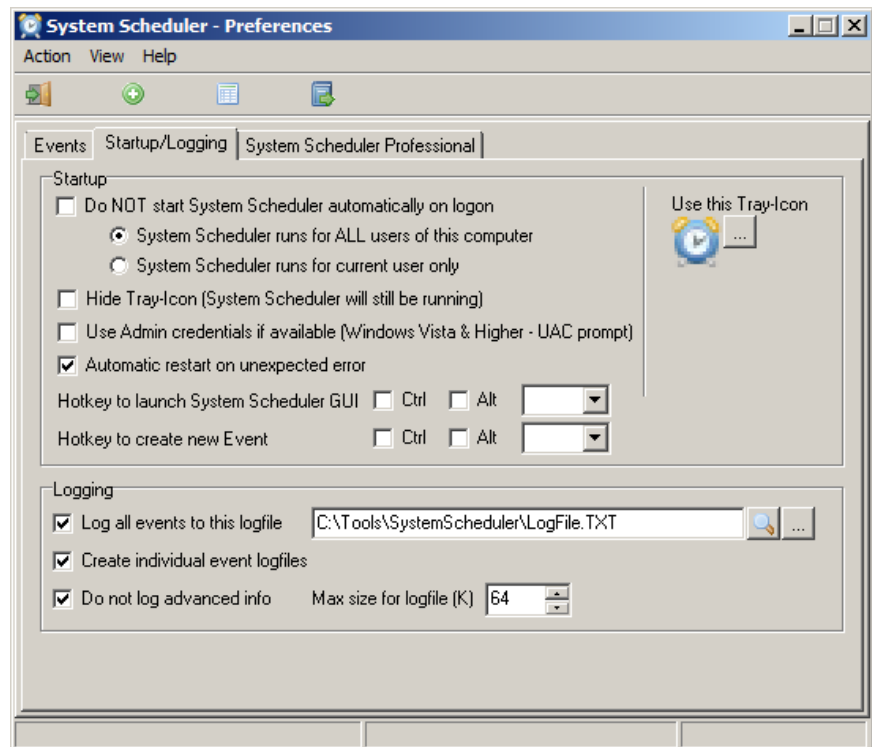
- a. Open System Scheduler if it is not already running.

Select the **View** menu and click on **Preferences**. See image right.



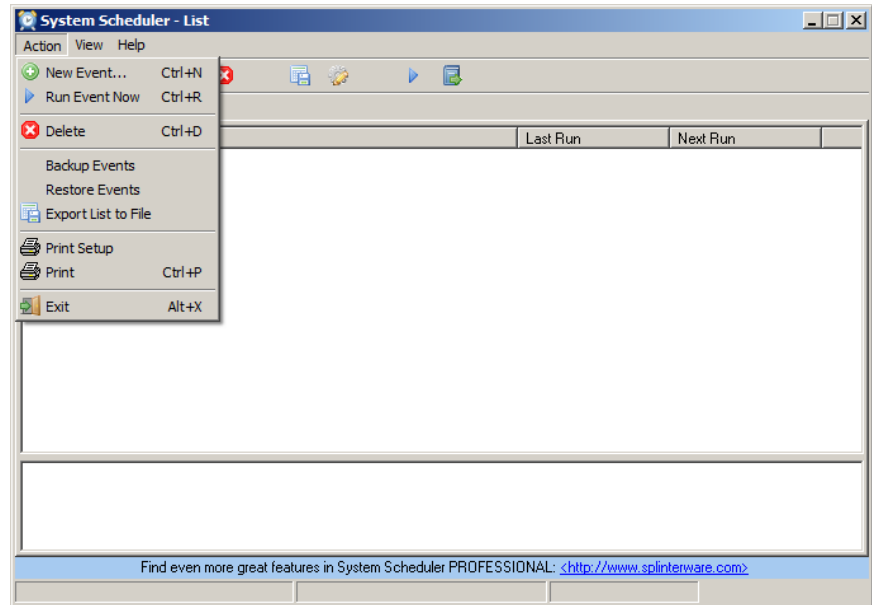
- b. The **Preferences** window will open. The Default settings in the **Event** and **Startup/Logging** tabs do not need to be changed.

Be sure the Startup box **Do NOT start System Scheduler automatically on Login** is NOT checked. See image right.





- c. Select **Action** menu and click **New Event...** See image right.



- d. An **Event** setup window will open. See image right.

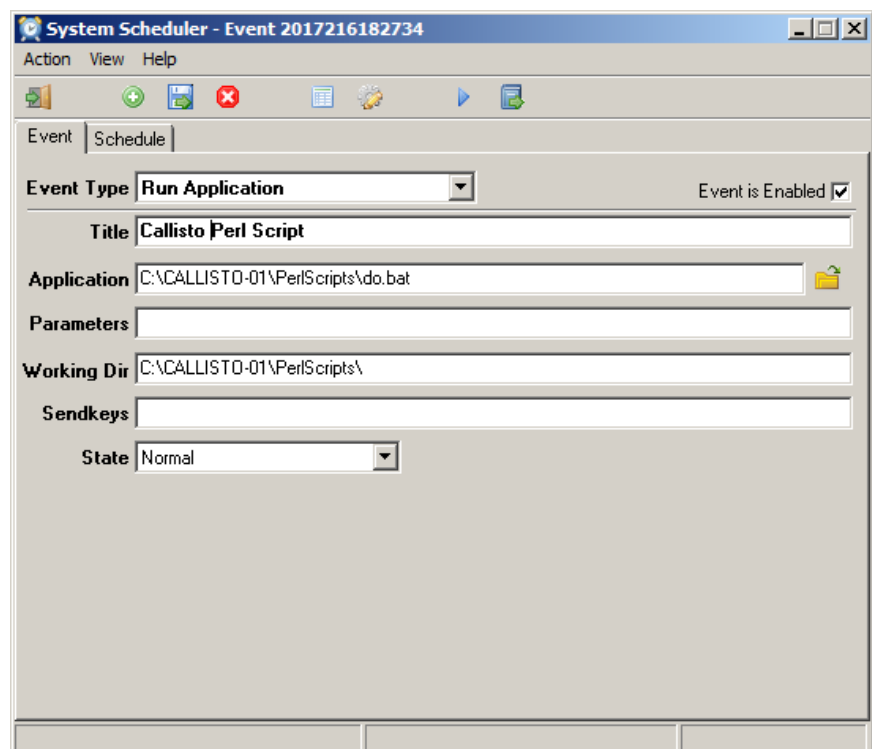
In the **Event** tab, select **Run Application** in the **Event Type** dropdown window.

Enter a title such as **Callisto Perl Script** in the **Title** field.

Click on the **Browse** button to the right of the **Application** field. Browse to the **do.bat** file in the folder setup previously and select it (example, C:\Callisto-01\PerlScripts\do.bat).

Enter the **Working Dir** for the script (example, C:\Callisto-01\PerlScripts\).

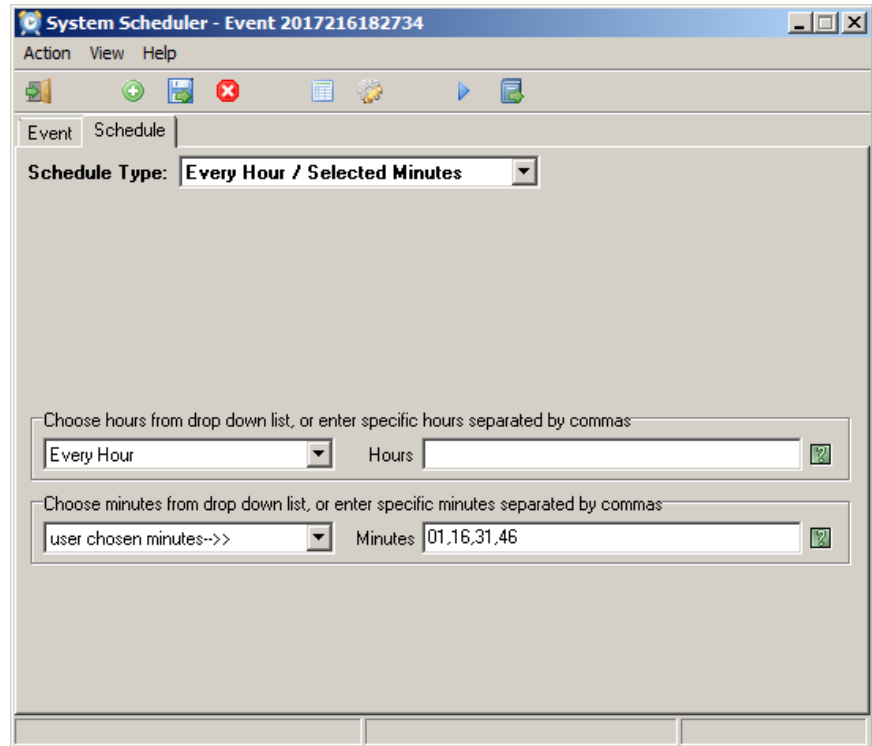
Enable the Event by checking the **Event is Enabled** box in the upper-right corner.



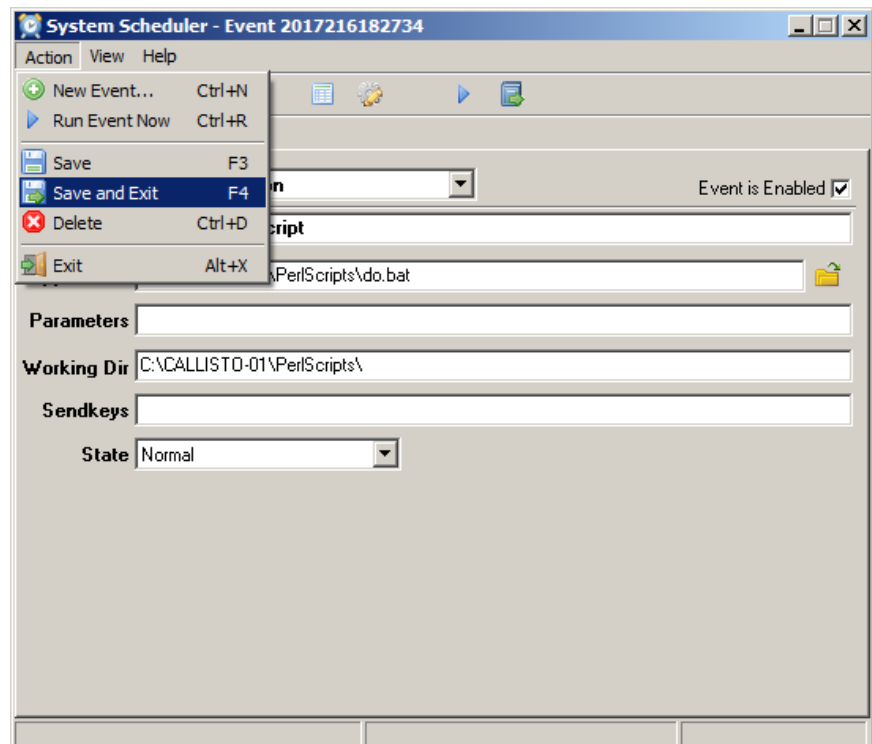


- e. Select the **Schedule** tab.
In the **Schedule Type** dropdown menu, select **Every Hour / Selected Minutes**. See image right.

Four dropdown fields will appear below. Select **Every Hour** and **user chosen minutes -->** as shown right. The **Hours** field will be blank. In the **Minutes** field enter the values **01,16,31,46**. These values avoid data upload as the files are being written. Other values may be used to suit specific site requirements but avoid using default values.

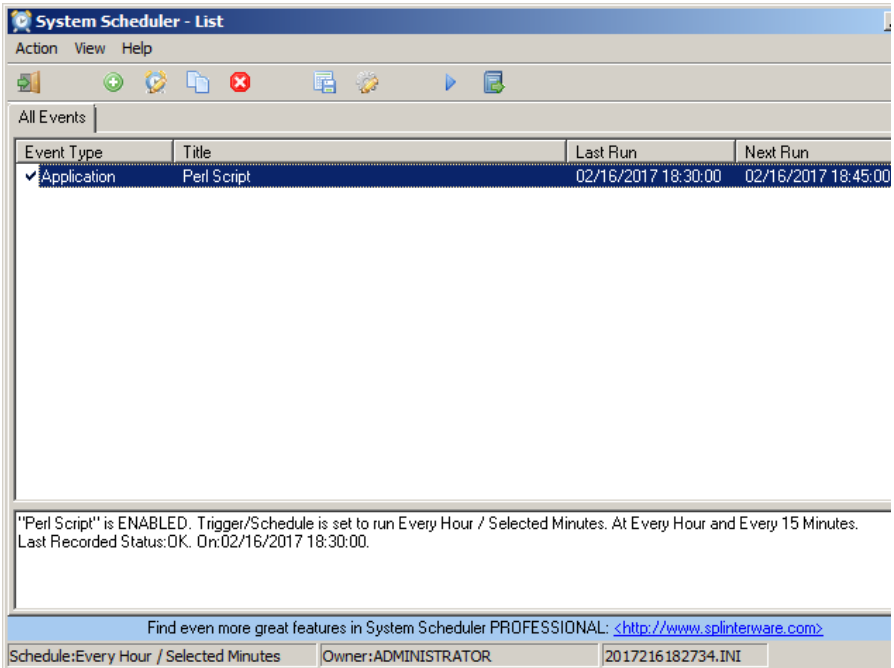


- f. To save the event and exit to the main window, select **Save and Exit** in the **Action** menu or press the **F4** function key. See image right.

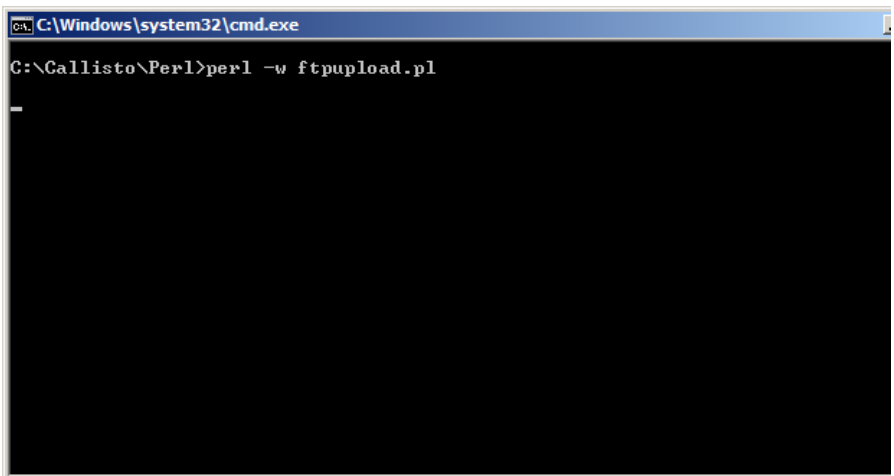




- g. After the settings are saved, the System Scheduler main window will change to show the scheduled event with the status shown near the bottom. At this point, the schedule is running, indicated by a checkmark ✓ in the Event Type field and will upload the FITS files every 15 minutes. See image right. When the event is not enabled an X will be shown in the Event Type field.



6. When System Scheduler is running successfully, the console (command line interface) will open every 15 minutes (time interval determined by System Scheduler). The window will remain open during the file upload as shown right. The console window can be hidden as described later.



7. If Perl-FTP-Upload seems to be failing due to not being able to resolve the FTP server name, possibly due to timeouts on a satellite link or slow internet connection, it will be necessary to edit the Perl-FTP-Upload script to enter the destination IP address in place of the FTP server name. The script line below shows what is changed. Note that it shows "ftpexchange.cs.technik.fhnw.ch" as the FTP server. It is this field that needs to be changed to show the IP address:

Original showing server name:

```
my $ftp = Net::FTP->new("ftpexchange.cs.technik.fhnw.ch", Timeout => 500, Passive => 1, Debug => 0);
```

Modified showing server IP address:

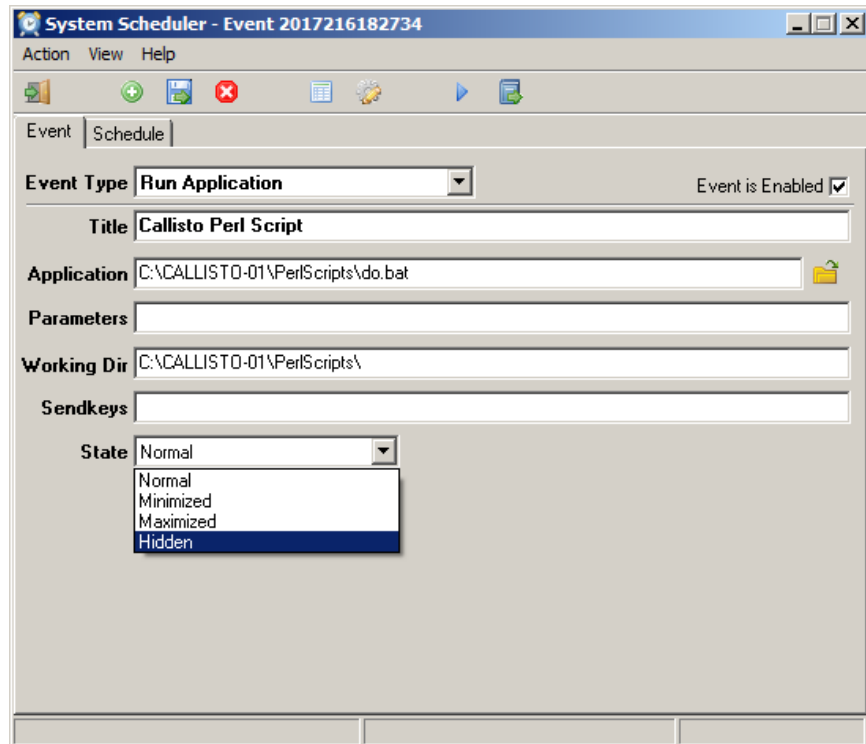
```
my $ftp = Net::FTP->new("147.86.8.73", Timeout => 500, Passive => 1, Debug => 0);
```

8. For testing purposes, the Perl-FTP-Upload script may be manually started in a console window (command line interface) by typing **perl -w ftpupload.pl** or double clicking the batch file **do.bat**. See Troubleshooting section if you have problems.



9. After testing is completed, the console (command line interface) window can be hidden so that it does not “grab” the screen focus whenever System Scheduler runs the upload script.

- With the System Scheduler window open, select View menu and check Event Information.
- Right-click the Event that is to be hidden. Select Edit.
- On the Event tab, select Hidden in the State drop-down list at the bottom as shown right (default state is Normal).

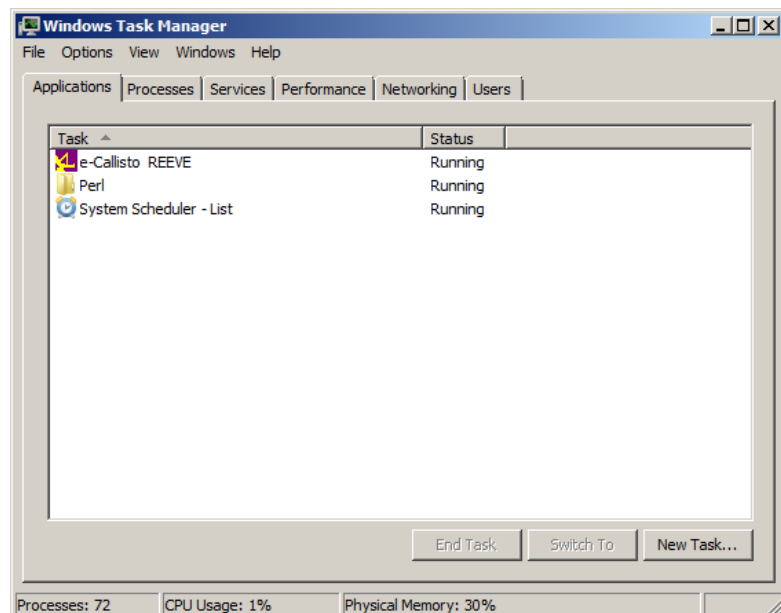


- On the Event window select Action menu – Save and then close the window.
- Repeat steps b. through d. for each Event.
- On the Main window select Action menu – Backup Events. Navigate to the desired backup folder for the System Scheduler Events to backup the configuration.
- Close the System Scheduler window. It will continue to run in the background.

10. Both System Scheduler and Perl normally run in the background.

If Perl needs to be ended for any reason, open the Windows Task Manager as shown right. Select Perl and then click on the **End Task...** button at bottom-right.

System Scheduler can be ended by selecting **Exit** in its Action menu





11. Troubleshooting:

- a. If the **do.bat** file does not run properly, it is possible the operating system has not yet recognized the Perl installation. Open the **do.bat** file in a text editor such as NotePad and revise the string to explicitly call out the path to the Perl executable. The default path is C:\Perl\bin\ as shown below. Your path may be different and you should check it first:

Before: perl -w ftpupload.pl

After: C:\Perl\bin\perl.exe -w ftpupload.pl



Document information

Author: Whitham D. Reeve

Revision: 0.0 (Original draft, 06 Dec 2018)

0.1 (Edits per C. Monstein; also reformatted and inserted SS & Perl instructions, 08 Dec 2018)

0.2 (Final draft, 09 Dec 2018)

0.3 (Revised par. 1.C.1 to include - character, 25 Feb 2019)