

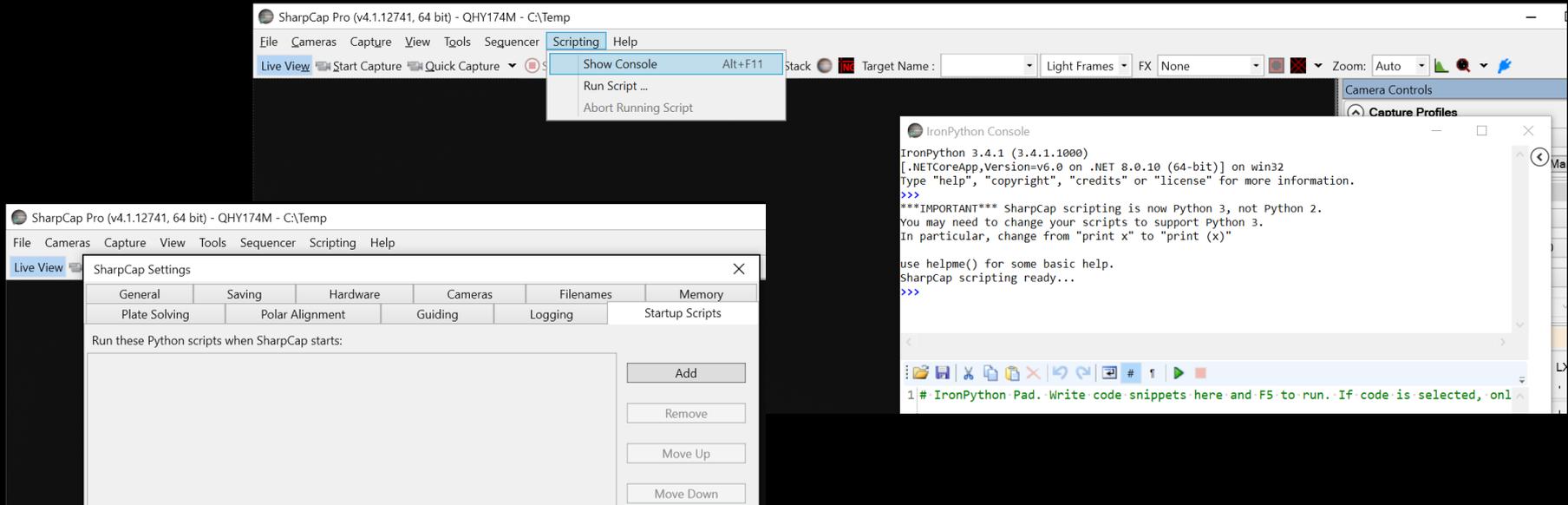
ALLER PLUS LOIN AVEC LES SCRIPTS DE SHARPCAP

Rencontres du Ciel et de l'Espace 2024

Jean-François Pittet, 11 novembre

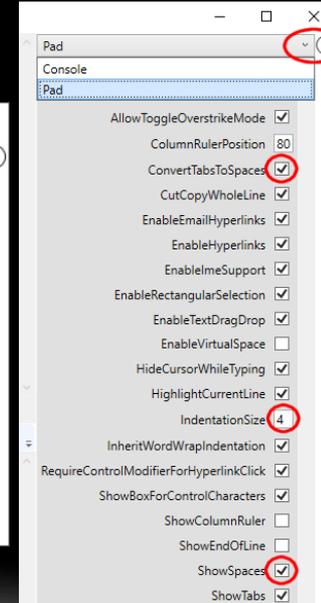
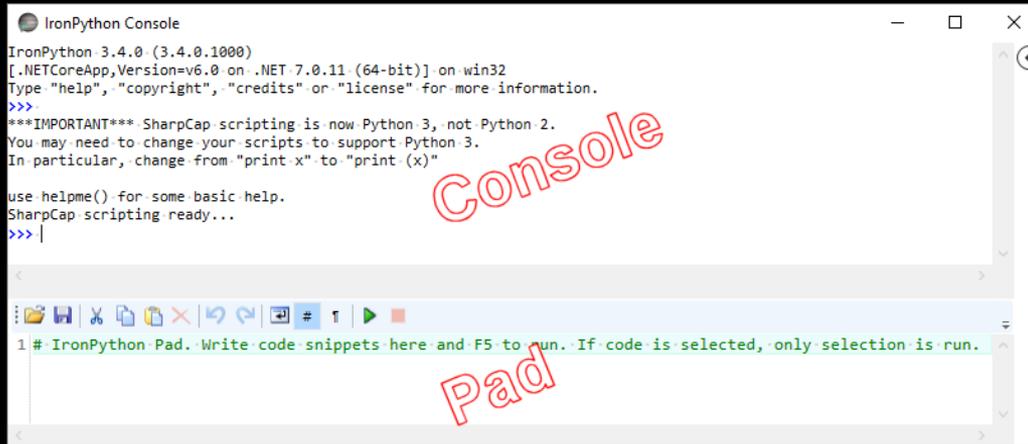
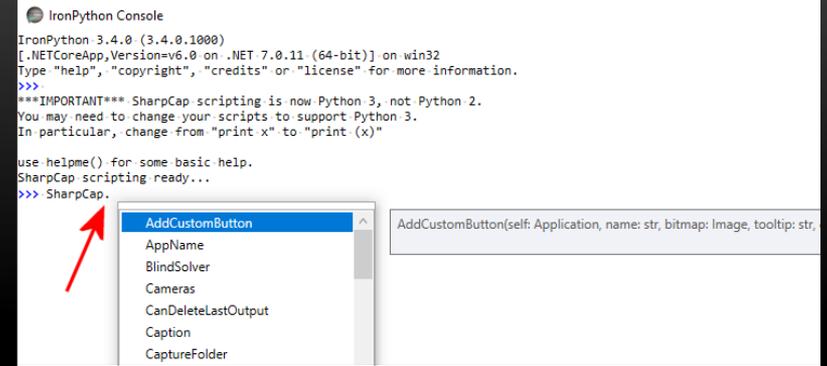
Démarrage des scripts:

- Les scripts sont une fonction de *SharpCap Pro*
- 1. Paramètre au démarrage de SharpCap: `sharpcap.exe /runscript d:\files\test.py`
- 2. Console IronPython: "Scripting" - "Show console" ou Alt+F11
- 3. Démarrage avec SharpCap: "File" - "SharpCap Settings" - "Startup Scripts"



Console IronPython:

- Proposition des Settings de "Pad"
- Numéro des lignes
- Attention ! ... pas de "Sauver sous" (seulement une fois si le Pad est au départ vide)
- Affichage des fonctions ou attributs avec "."



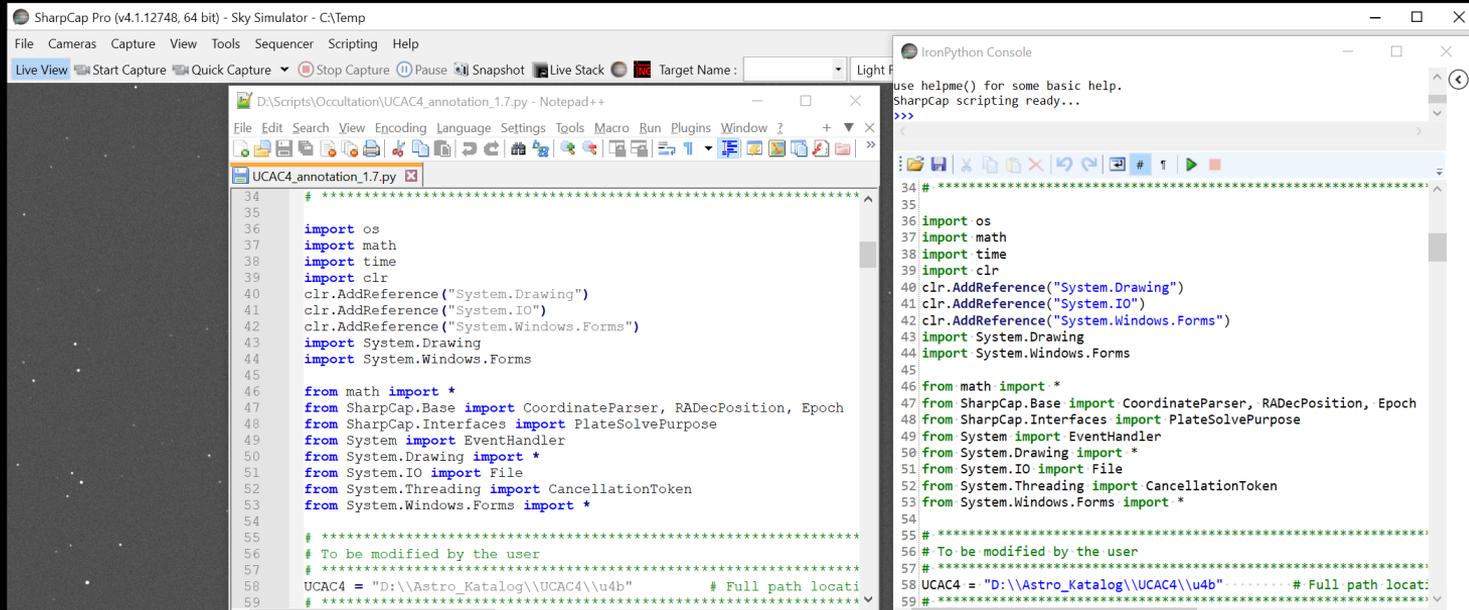
IronPython ... qu'est-ce que c'est ?:

- Python version 3.4.1 avec Windows .NET
- Script en pur Python. Pas de librairies compilées en C (ou partie)
- Pas possible d'avoir directement "numpy" ou "scipy"
Mais il y a souvent des équivalents en C# (C-sharp) ... NumSharp ou Numpydotnet
- <https://www.amazon.de/Professional-IronPython-Wrox-Guides/dp/0470548592>
- <https://www.amazon.de/Iron-Python-Action-Michael-Foord/dp/1933988339>



IronPython ... comment programmer ?:

- Python et IronPython avec Microsoft Visual Studio Code, mais ...
- Pas de "connexion" possible avec SharpCap, donc pas possible d'écrire un code dans Visual Studio Code et de le lancer directement dans SharpCap
- Mais c'est possible de programmer dans Visual Studio Code (ou bien Notepad++) et d'ouvrir dans SharpCap le programme depuis la console IronPython



IronPython ... quelques fonctions utiles:

- **math**: fonctions mathématique
- **os**: fonctions du système d'exploitation (exit, access, getcwd, getenv, path, remove, rename, ...)
- **time**: fonctions calcul du temps (ctime, sleep, gmtime, localtime, strftime, strptime, time, ...)
- **datetime**: fonctions calcul des dates (date, datetime, timedelta, timezone, total_seconds, time, ...)
- **sys**: fonctions sur l'interpréteur (argv, byteorder, exit, getsizeof, modules, path, ...)
- **clr**: importer des librairies .NET (ASCOM, Oxyplot, NumpyDotNet, ...)
- **System**: fonctions de Windows (Data, Drawing, IO, Speech, Windows.Forms, Threading, ...)
- **SharpCap**: fonctions de SharpCap

```
import os
import math
import time
import datetime
import pathlib
import urllib.request # Web module
import sys
import winsound
import clr
clr.AddReference("ASCOM.Com") # ASCOM, if SharpCap version above 4.1
clr.AddReference("ASCOM.Tools") # ASCOM, if SharpCap version above 4.1
clr.AddReference("ASCOM.DriverAccess") # ASCOM, if SharpCap version below 4.1
clr.AddReference("ASCOM.Astrometry") # ASCOM, if SharpCap version below 4.1
clr.AddReference("OxyPlot")
clr.AddReference("OxyPlot.WindowsForms")
clr.AddReference("NumpyDotNet.dll")
clr.AddReference("System.Data")
clr.AddReference("System.Drawing")
clr.AddReference("System.IO")
clr.AddReference("System.Speech")
clr.AddReference("System.Windows.Forms")

import OxyPlot
import NumpyDotNet.np as np
import System.Data
import System.Drawing
import System.Windows.Forms
import System.Speech.Synthesis as speech

from ASCOM.Com import * # ASCOM, if SharpCap version above 4.1
from ASCOM.Tools import * # ASCOM, if SharpCap version above 4.1
from ASCOM.DriverAccess import * # ASCOM, if SharpCap version below 4.1
from ASCOM.Astrometry import * # ASCOM, if SharpCap version below 4.1

from ctypes import POINTER, c_int, c_uint, c_dll

from System import Array, EventHandler
from System.Drawing import *
from System.Drawing.Drawing2D import InterpolationMode
from System.IO import File, Directory, Path
from System.Windows.Forms import *
from System.Environment import GetFolderPath, SpecialFolder
from System.Threading import Thread, ApartmentState, ParameterizedThreadStart, CancellationToken

from SharpCap.Base import BufferFrame, Interfaces, CoordinateParser, RADecPosition, Epoch
from SharpCap.UI import CaptureLimitType
from SharpCap.Interfaces import PlateSolvePurpose
```

Hardware ... accès depuis SharpCap:

- Caméra, Télescope, Focuser, Roue à filtres, Rotateur et Switch
- Accès à partir de SharpCap ou bien directement à partir du driver ASCOM
- Les fonctions et attributs sont visibles si un hardware est connecté
- Hardware quelconque si driver et software utilisable depuis Python (Thorlabs photodiode)

Ordinateur ... accès depuis SharpCap:

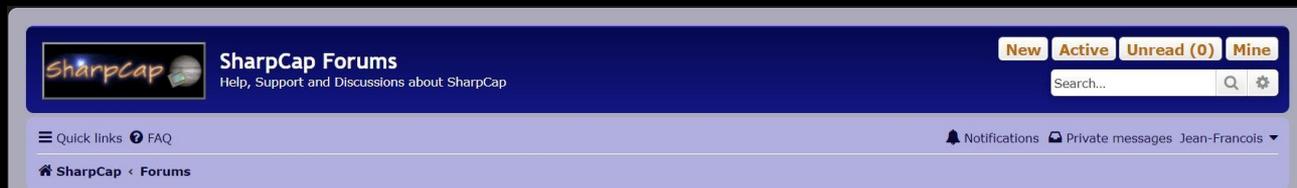
- Lire ou écrire des fichiers sur le disque
- Lancer un programme externe
- Avoir accès à un autre ordinateur par Web ou Internet

```
>>> SharpCap.CaptureFolder
'C:\\temp'
>>> Q = SharpCap.CaptureFolder
>>> Q
'C:\\temp'
>>> SharpCap.CaptureFolder = 'C:\\Installation'
>>> SharpCap.CaptureFolder
'C:\\Installation'
>>>
```

The image shows two screenshots of the SharpCap Python console. The top screenshot displays the attribute list for `SharpCap.Mounts.SelectedMount` when no telescope is selected. The list includes methods such as `Equals`, `GetType`, `MemberwiseClone`, `ReferenceEquals`, `Tostring`, and `__class__`. A red annotation "Pas de télescope sélectionné" is overlaid on the screenshot. The bottom screenshot displays the attribute list for `SharpCap.Mounts.SelectedMount` when a telescope is selected. The list includes methods such as `Altitude`, `AscromMount`, `Azimuth`, `CanConfigure`, `CanGoto`, `CanGuide`, `CanMoveAxis`, `CanParkUnpark`, `CanPulseGuide`, `CanReportLocation`, `CanReportPointing`, `CanSetSideOfPier`, and `CanSetTracking`. A red annotation "Avec un télescope sélectionné" is overlaid on the screenshot.

Source des scripts ... sur le forum de SharpCap:

- Les scripts se trouvent sur le forum de SharpCap: <https://forums.sharpcap.co.uk/>
- Il faut avoir un login pour pouvoir voir les images et télécharger les fichiers (raison de sécurité depuis quelques mois)

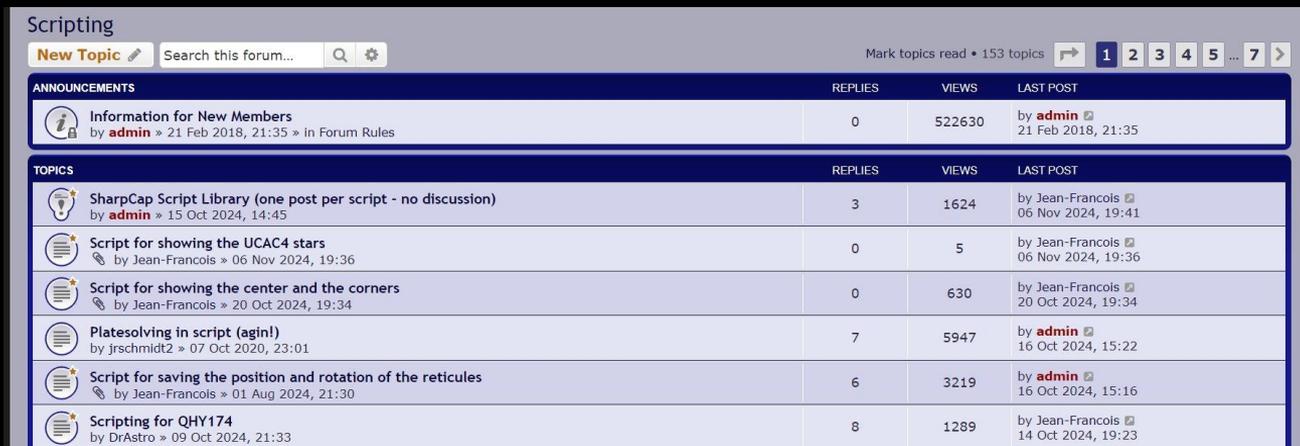


SharpCap Forums
Help, Support and Discussions about SharpCap

Quick links [FAQ](#)

Notifications Private messages Jean-Francois

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Scripting

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ANNOUNCEMENTS			
	REPLIES	VIEWS	LAST POST
 Information for New Members by admin » 21 Feb 2018, 21:35 » in Forum Rules	0	522630	by admin » 21 Feb 2018, 21:35

TOPICS			
	REPLIES	VIEWS	LAST POST
 SharpCap Script Library (one post per script - no discussion) by admin » 15 Oct 2024, 14:45	3	1624	by Jean-Francois » 06 Nov 2024, 19:41
 Script for showing the UCAC4 stars by Jean-Francois » 06 Nov 2024, 19:36	0	5	by Jean-Francois » 06 Nov 2024, 19:36
 Script for showing the center and the corners by Jean-Francois » 20 Oct 2024, 19:34	0	630	by Jean-Francois » 20 Oct 2024, 19:34
 Platesolving in script (agin!) by jrschmidt2 » 07 Oct 2020, 23:01	7	5947	by admin » 16 Oct 2024, 15:22
 Script for saving the position and rotation of the reticules by Jean-Francois » 01 Aug 2024, 21:30	6	3219	by admin » 16 Oct 2024, 15:16
 Scripting for QHY174 by DrAstro » 09 Oct 2024, 21:33	8	1289	by Jean-Francois » 14 Oct 2024, 19:23

Exemple 1 ... Étoiles du catalogue UCAC4:

- Les étoiles utilisées par SharpSolve (Plate Solve interne) peuvent être affichées, mais sans le numéro d'un catalogue. Il n'y a pas de catalogue astrométrique dans SharpCap

The screenshot displays the SharpCap Pro interface. The main window shows a star field with several stars annotated with their magnitudes (Mag: 12.55, 12.35, 11.65, 12.50, 13.25, 12.70, 12.60, 13.45, 13.20, 11.55, 13.45, 13.40, 12.75, 13.00, 13.25). A 'Deep Sky Annotation Results' dialog box is open in the foreground, showing the 'Plate Solve Index Stars' checked under the 'Object Types' section. The 'Show on Image' section has 'ID' and 'Magnitude' checked. The status bar at the bottom indicates 'Previewing: 124 frames (0 dropped) in 0:03:03.9, 0.5 fps | Memory: 1 of 3730 frames used, Disk: 672 GB free | Cooler: 0%, Temp: 10.0°C, Target: 0.0°C'.

Exemple 1 ... Étoiles du catalogue UCAC4:

- Génération d'un fichier des étoiles depuis un programme séparé pour lire le catalogue UCAC4
- Le script UCAC4 affiche les étoiles du catalogue UCAC4 sur l'image actuelle

The screenshot displays the SharpCap Pro interface with a simulated star field. The main window shows a dark sky with numerous stars, many of which are annotated with UCAC4 identifiers and magnitudes. For example, stars are labeled with IDs like 434-072039 (Mag: 12.39) and 435-071642 (Mag: 11.53). Several windows are open over the main view:

- IronPython Console:** Shows the output of a script: "1410 stars found below the magnitude limit. Stars paste to the Deep Sky Annotation." followed by a list of script lines: "1 #", "2 #", and "3 # SharpCap script 'UCAC4_annotation_1.7.py'".
- UCAC4 stars (1.7):** A dialog box with a "Mag. limit:" set to 16 and a message "1410 stars found in 1592". It contains "Show UCAC4 stars" and "Plate Solve" buttons.
- Deep Sky Annotation Results:** A window with tabs for "Objects In View", "Objects Nearby", "Display", and "Settings". The "Object Types" list has "UCAC4" checked. The "Catalogs" list includes Melchioris (2043), Messier (110), Miles (583), NGC IC (13328), Solar System (11), Variable Stars (858), WolfRayet (226), Plate Solve Index Stars, and "Pasted from Clipboard (1410 objects)". The "Show on Image" section has "ID", "Object Type", and "Magnitude" checked.

The status bar at the bottom indicates: "Previewing: 181 frames (0 dropped) in 0:04:28.6, 0.5 fps | Memory: 1 of 3730 frames used, Disk: 672 GB free | Cooler: 0%, Temp: 10.0°C, Target: 0.0°C".

Exemple 2 ... Affichage des 4 coins de la caméra:

- Pour l'alignement de la caméra ou bien de l'optique, le script affiche les 9 zones (4 coins, 4 bords et le centre)
- Il est possible de bouger les zones, de changer le contraste et de sauver une image

The screenshot displays the SharpCap Pro (v4.1.12741, 64 bit) - Sky Simulator - C:\Temp interface. The main window shows a dark sky with a 3x3 grid of red lines, indicating the 9 zones. A 'Nine Zones' dialog box is open, showing 'Size: 100' and 'Zoom: 200%'. An 'IronPython Console' window is also open, displaying the following code:

```
Start script Ninezone
>>> Can not show the bitmap.
Can not show the bitmap.
...
1 # *****
2 # SharpCap script "Nine_zone_menu.py"
3 # 2024/10/05 Jean-Francois
4 #
5 # Version: 2.5.1:---Add night mode
6 # Version: 2.5.0:---Modify for long exposure
```

The interface also includes a 'Camera Controls' panel on the right, an 'ASCOM Simulator Focuser Driver' panel, and a status bar at the bottom showing 'Previewing: 664 frames (0 dropped) in 0:16:20.1, 0.4 fps' and 'Memory: 3 of 3730 frames used, Disk: 672 GB free'.

Exemple 3 ... Sauvegarde de la position des réticules:

- La position et l'angle des réticules de SharpCap ne sont pas sauvés
- Le script sauve la position et l'angle des réticules pour 3 caméras. En plus il peut afficher un rectangle pour simuler la fente d'un spectromètre

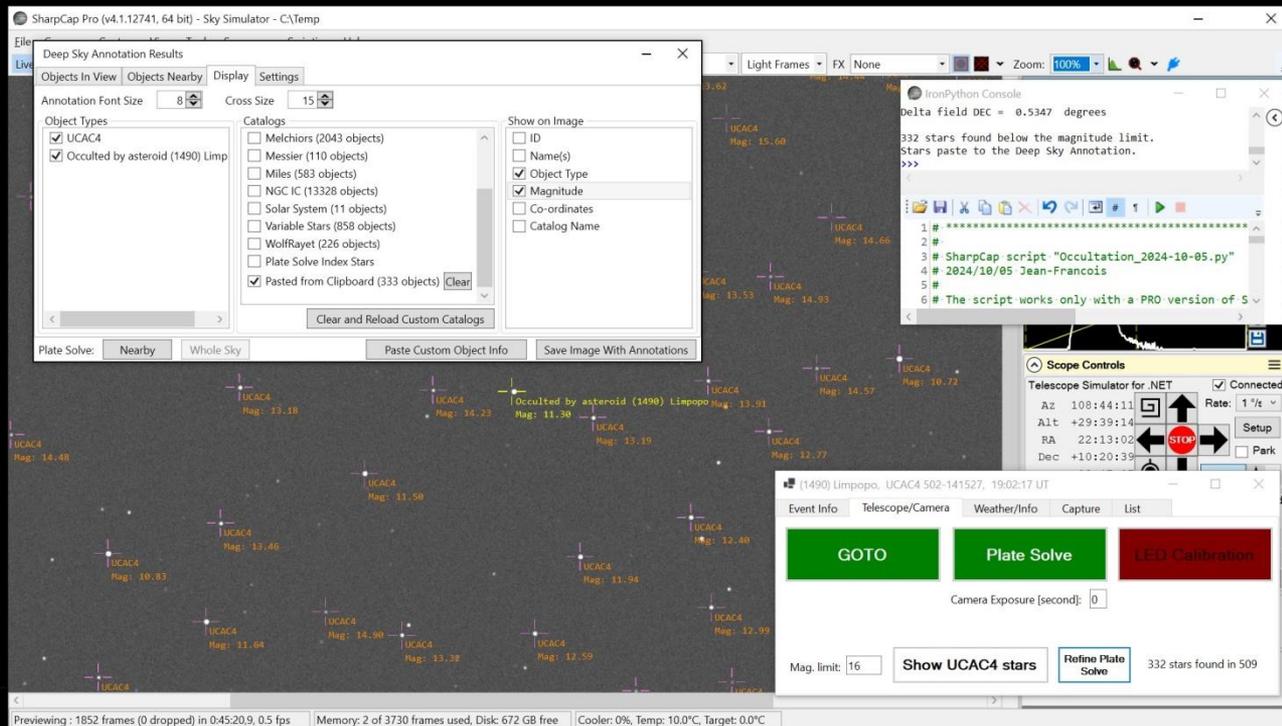
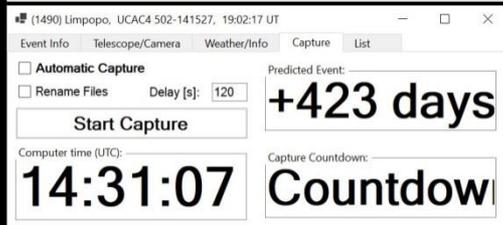
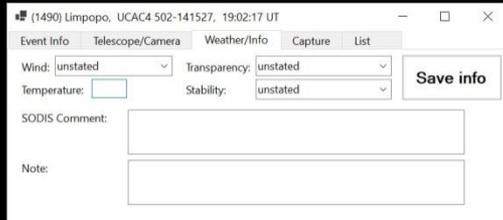
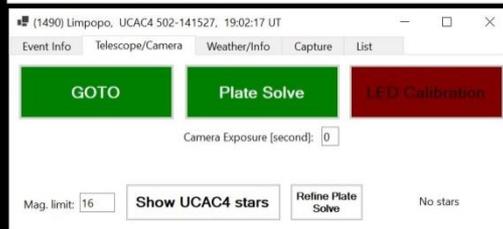
The screenshot displays the SharpCap Pro (v4.1.12741, 64 bit) - Sky Simulator - C:\Temp window. The main view shows a star field with red crosshairs. A 'Sky Simulator' dialog box is open, showing options for reticle type (No Reticule, Crosshairs, Circle, Single, Alternative, Multi, Finder, Guider, Science) and a checked 'Show the Slit' option. An 'IronPython Console' window is open, displaying a script path and a script that saves reticle data. The script content is as follows:

```
1 #  
2 # SharpCap script "Reticule_2024-10-22.py"  
3 # 2024/10/22 Jean-Francois  
4 #  
5 # Version: 1.3: ---- Add the Multi Reticules and small mod  
6 # Version: 1.2: ---- Add the angle and radius, add the Nig
```

The 'Tracking' control panel is visible in the bottom right, showing 'Dec -03:13:12', 'HA +00:30:47', and 'Tracking' status. The status bar at the bottom indicates 'Previewing: 1242 frames (0 dropped) in 0:30:30.1, 0.5 fps', 'Memory: 2 of 3730 frames used, Disk: 672 GB free', 'Cooler: 0%, Temp: 10.0°C, Target: 0.0°C'.

Exemple 4 ... Capture des occultations d'astéroïde:

- La capture presque automatique des occultations d'astéroïde
- Génération d'un fichier d'observation depuis OccultWatcher avec un Addin (programme séparé pour OccultWatcher)



Et voilà ... « yapluka »

Et ... « Happy ~~painting~~ ... coding »