MaxIm DL

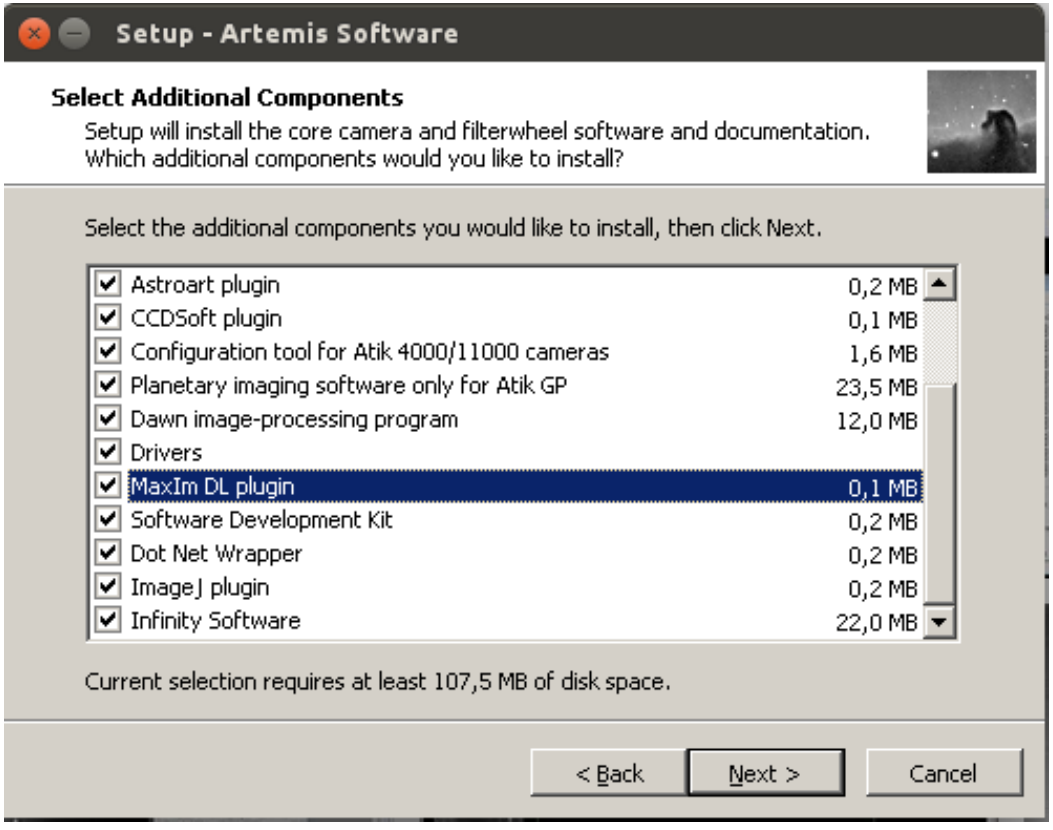
Materiał na szkolenie z obsługi programu

Ernest Świerczyński

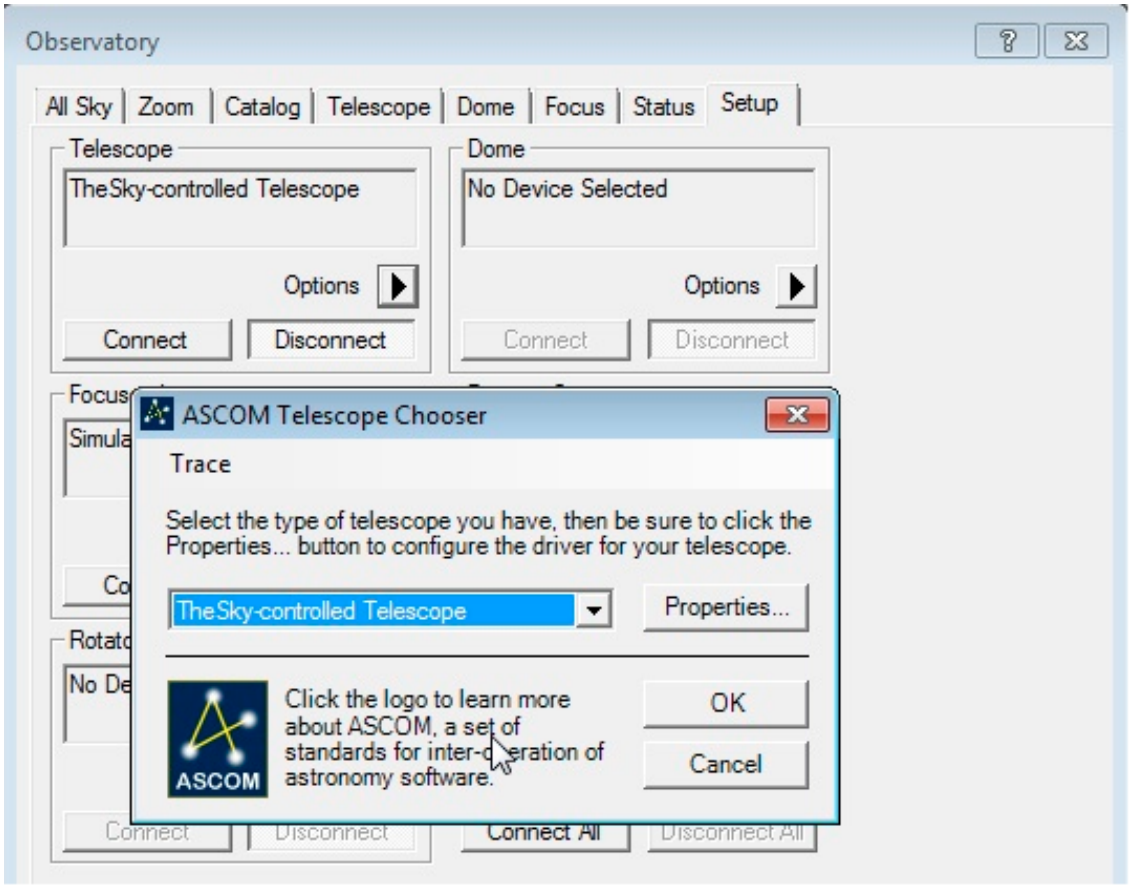
8 grudnia 2015

Połączenie z teleskopem i kamerą

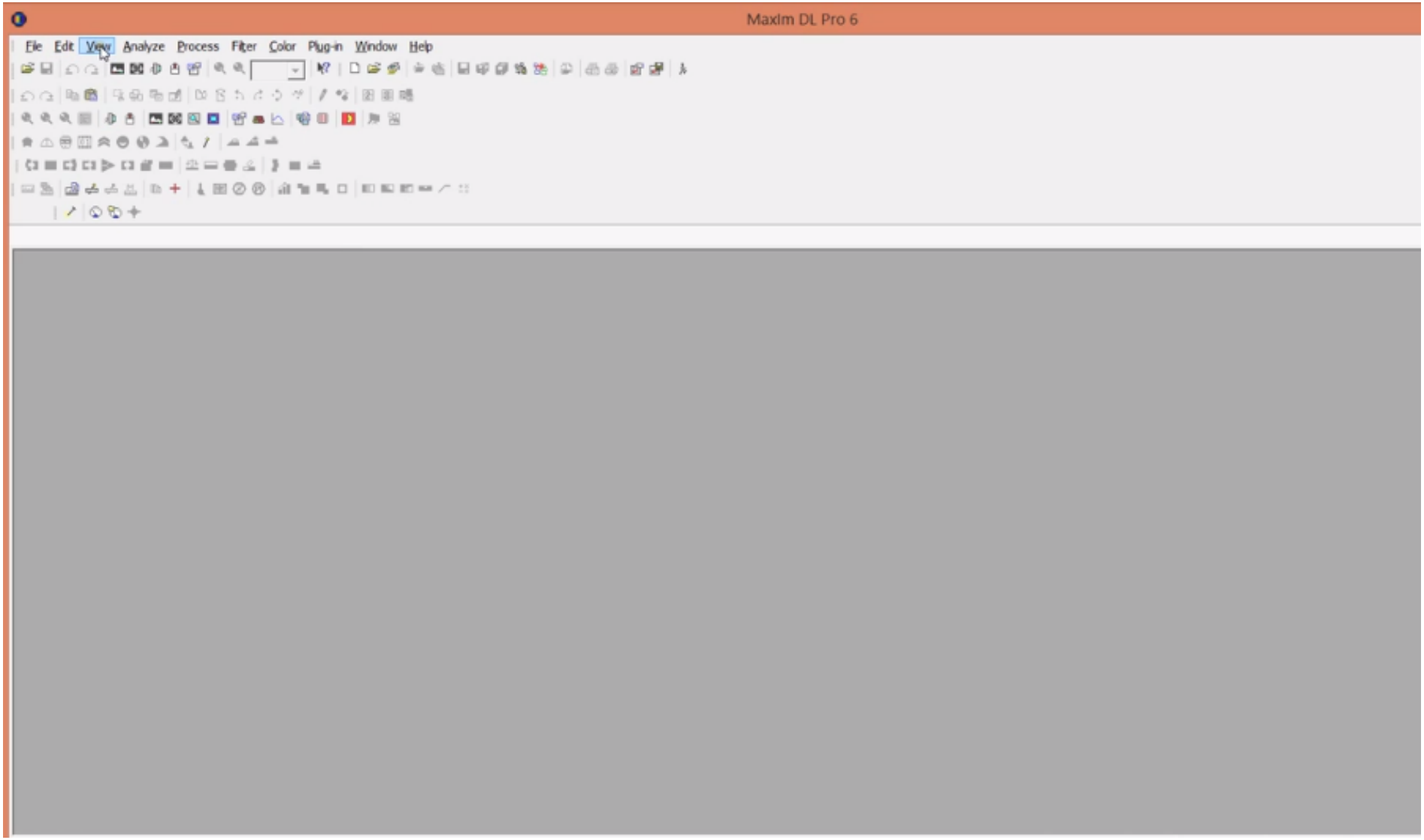
podczas instalacji kamery Atik, przy wyborze składników zaznaczamy opcję MaximDl plugin lub znajdujemy plik .exe na płycie CD



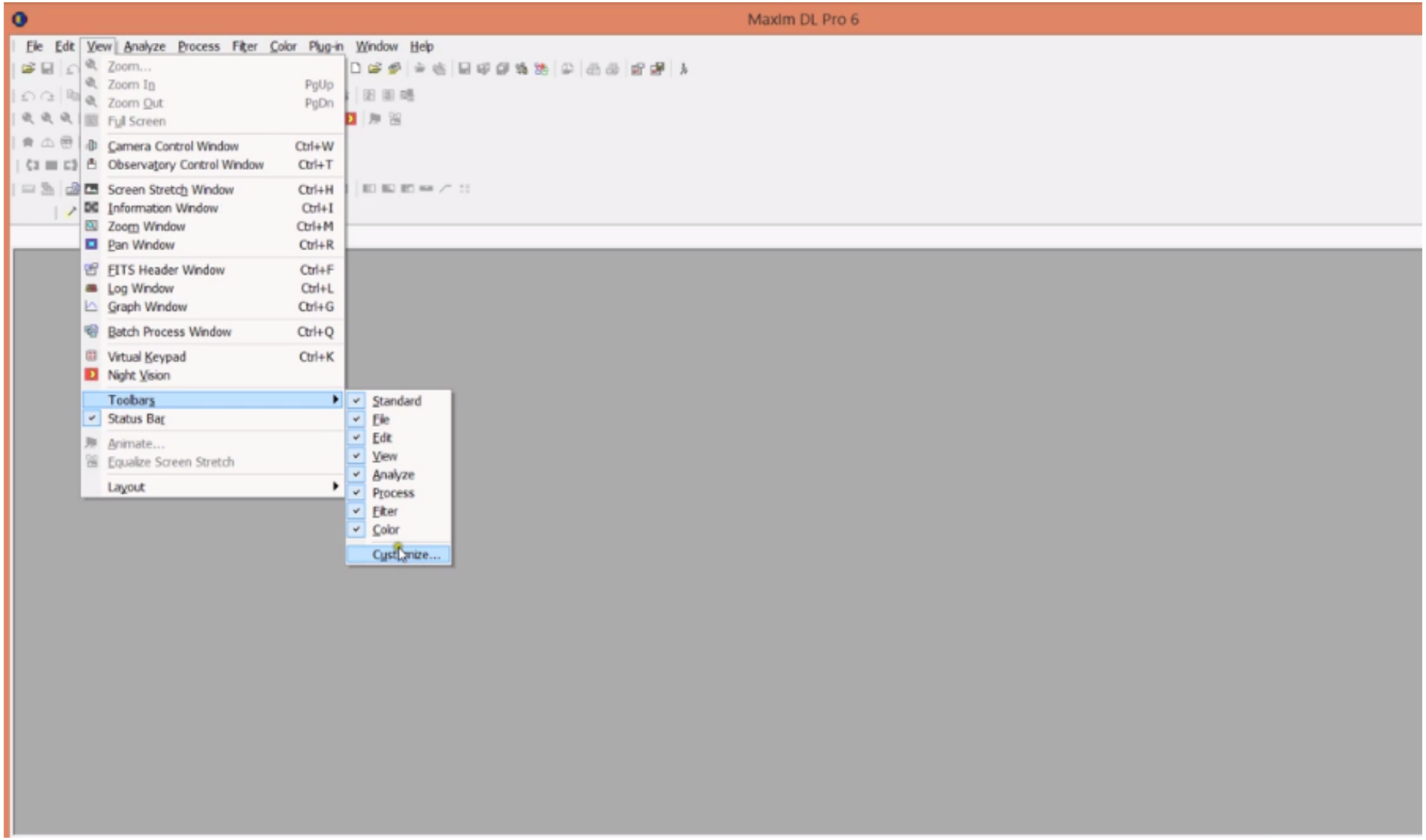
potrzebujemy zainstalować sterowniki i pluginy do obsługi teleskopu, które będą wykorzystane przez program (standard ASCOM)



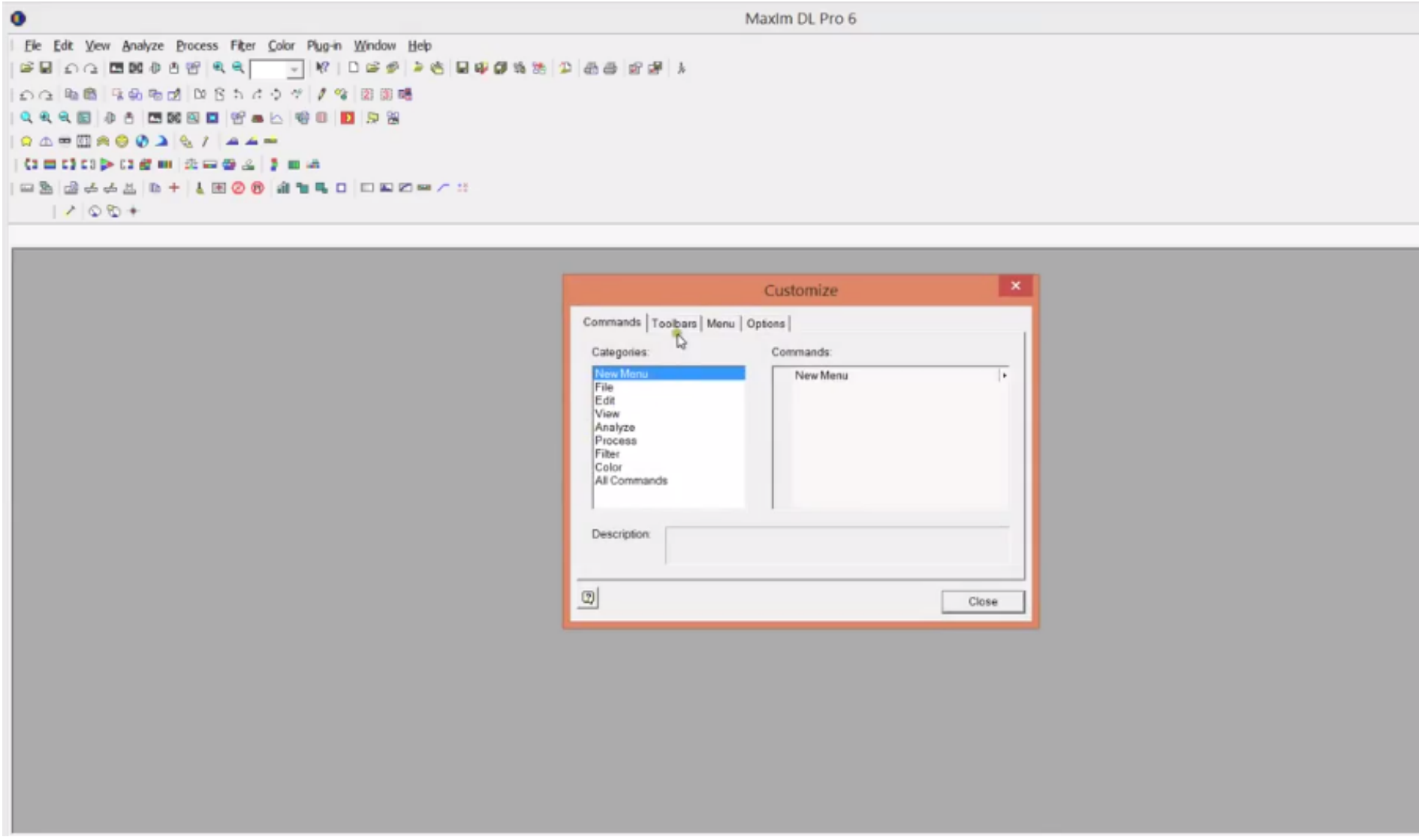
porządkujemy widok programu usuwając rzadziej używane ikony



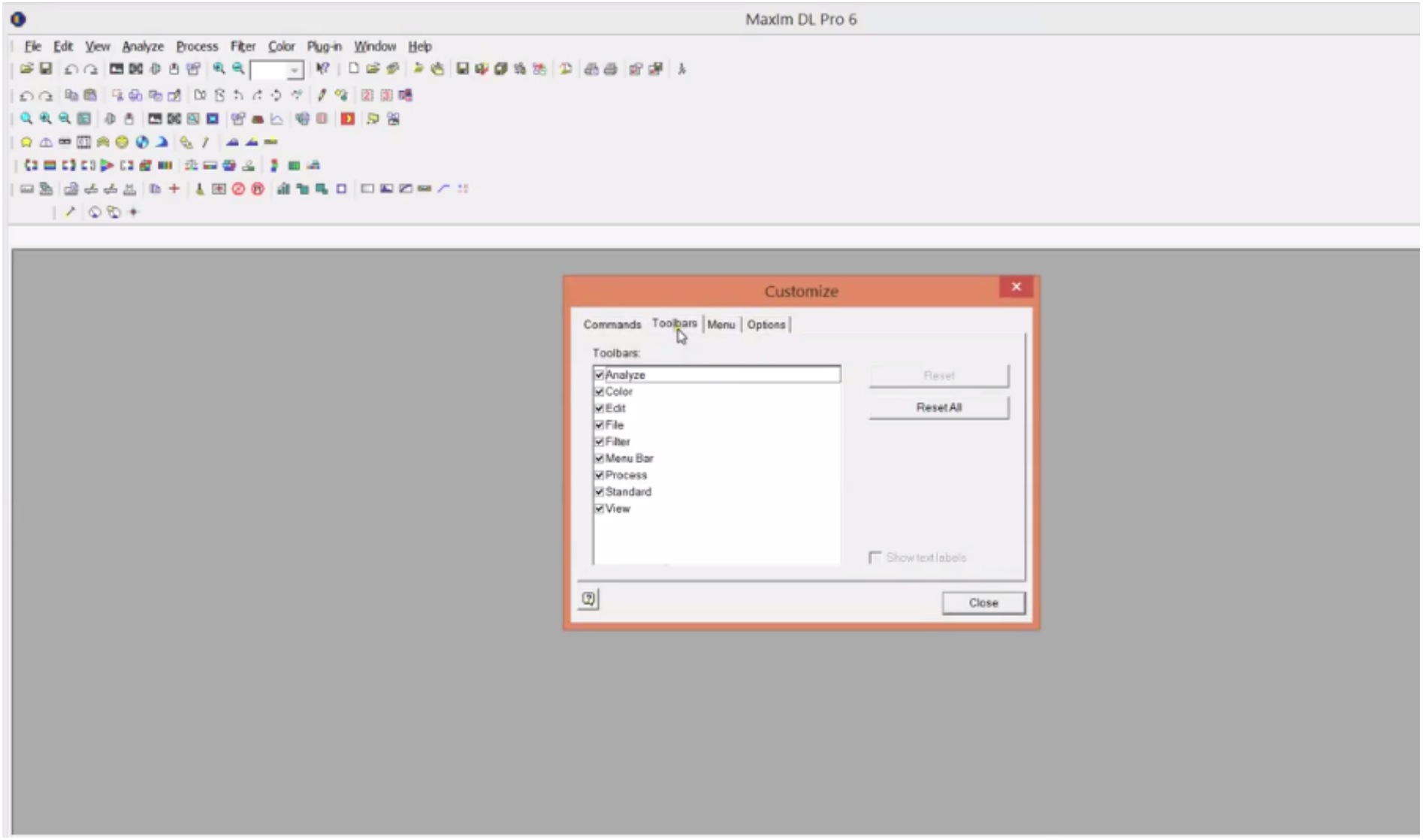
View → Toolbars → Customize

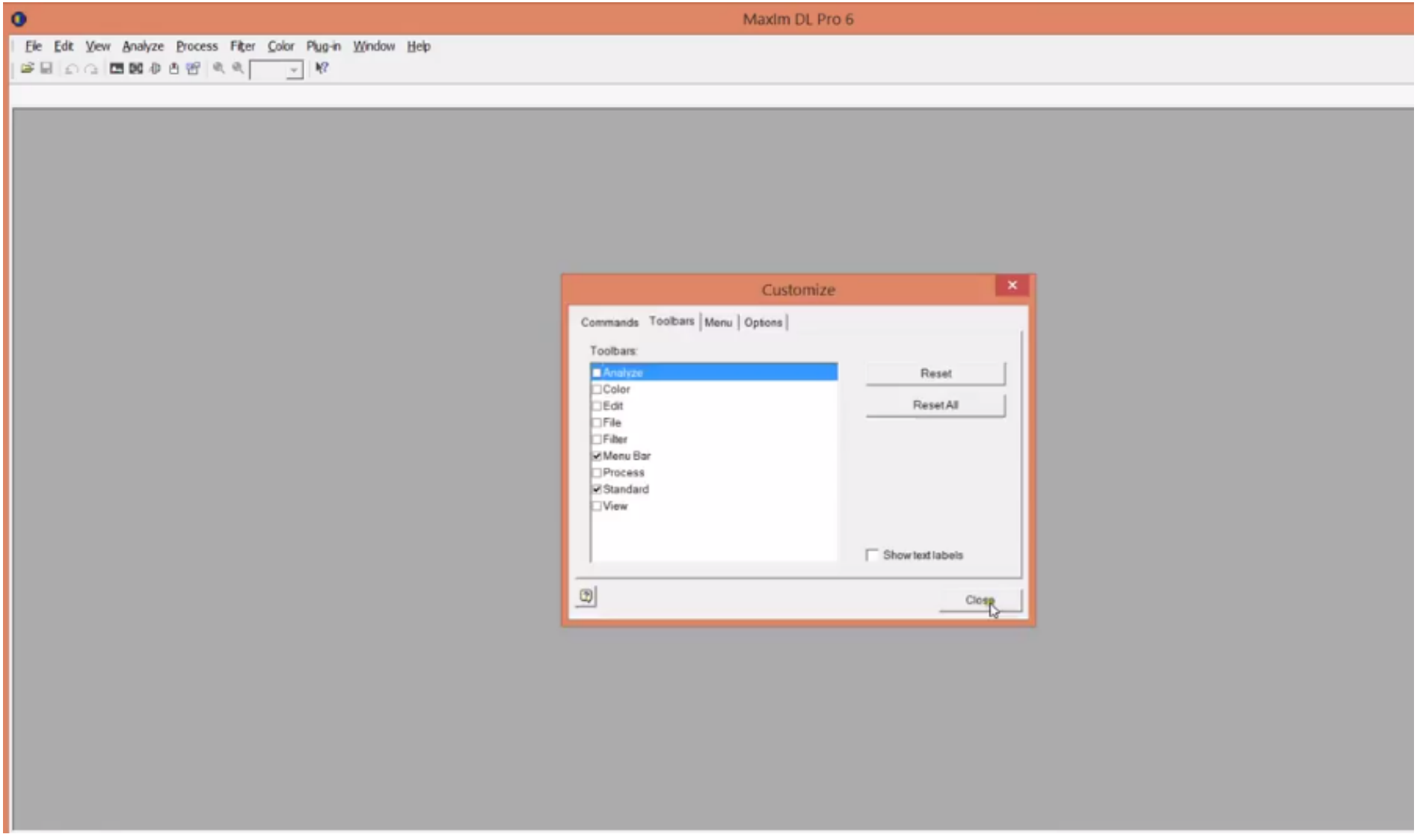


Toolbars

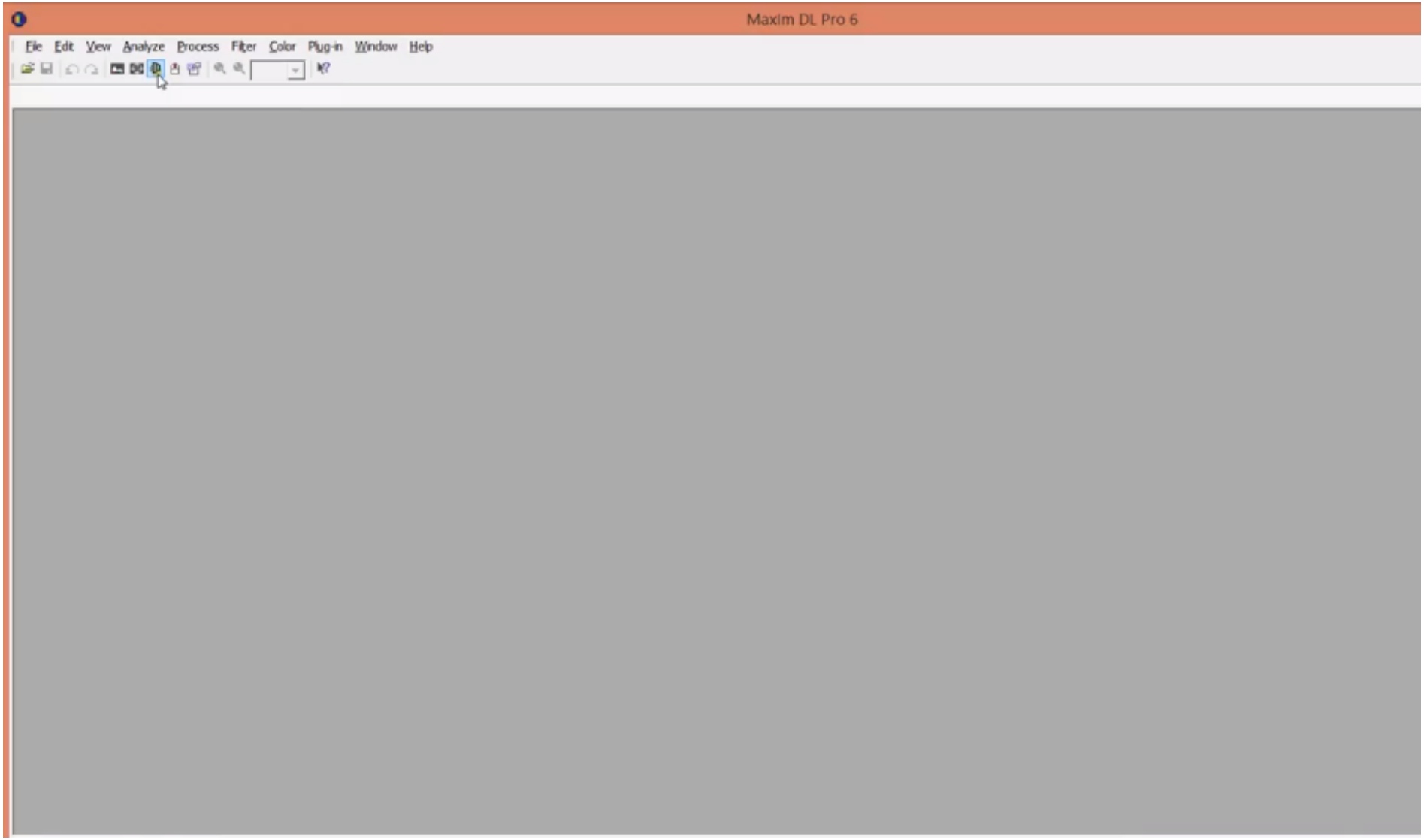

Maxim DL Pro 6
File Edit View Analyze Process Filter Color Plug-in Window Help
Customize
Commands Toolbars Menu Options
Categories:
New Menu
File
Edit
View
Analyze
Process
Filter
Color
All Commands
Commands:
New Menu
Description:
Close

Odznaczamy większość opcji, zostawiając najważniejsze ikony

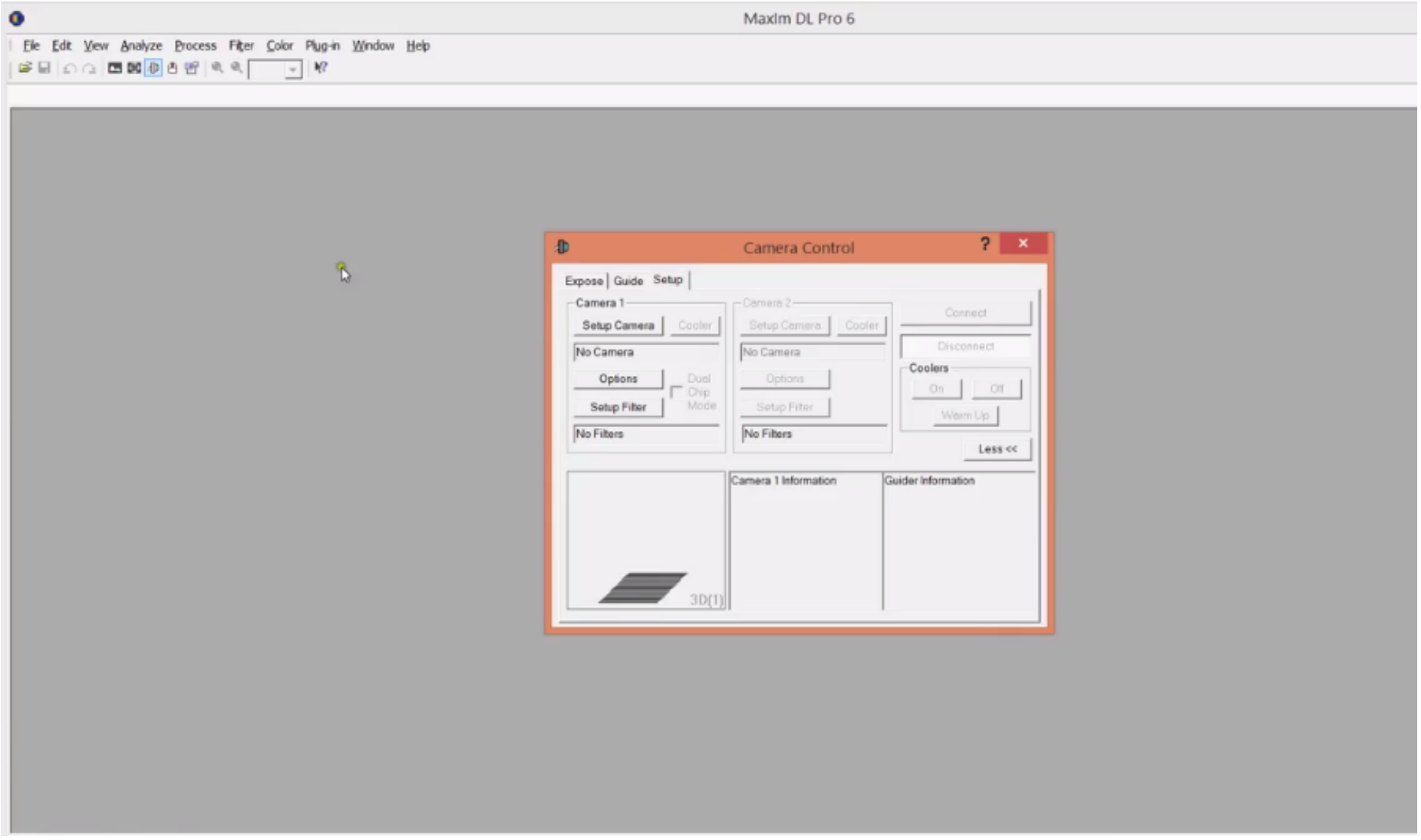


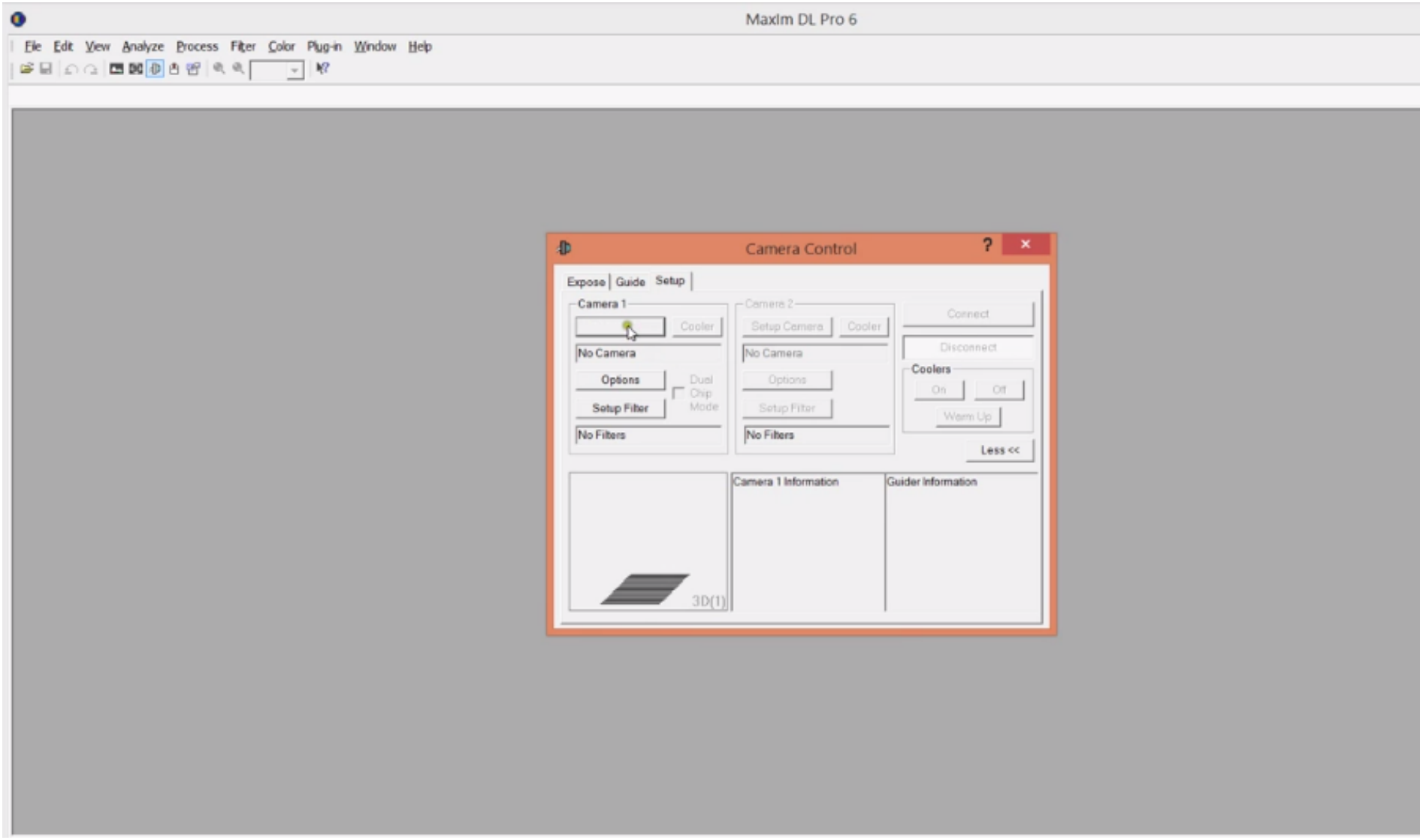

Maxim DL Pro 6
File Edit View Analyze Process Filter Color Plug-in Window Help
Customize
Commands Toolbars Menu Options
Toolbars:
Analyze
Color
Edit
File
Filter
Menu Bar
Process
Standard
View
Reset
Reset All
Show text labels
Close

wybór i konfiguracja kamery CCD

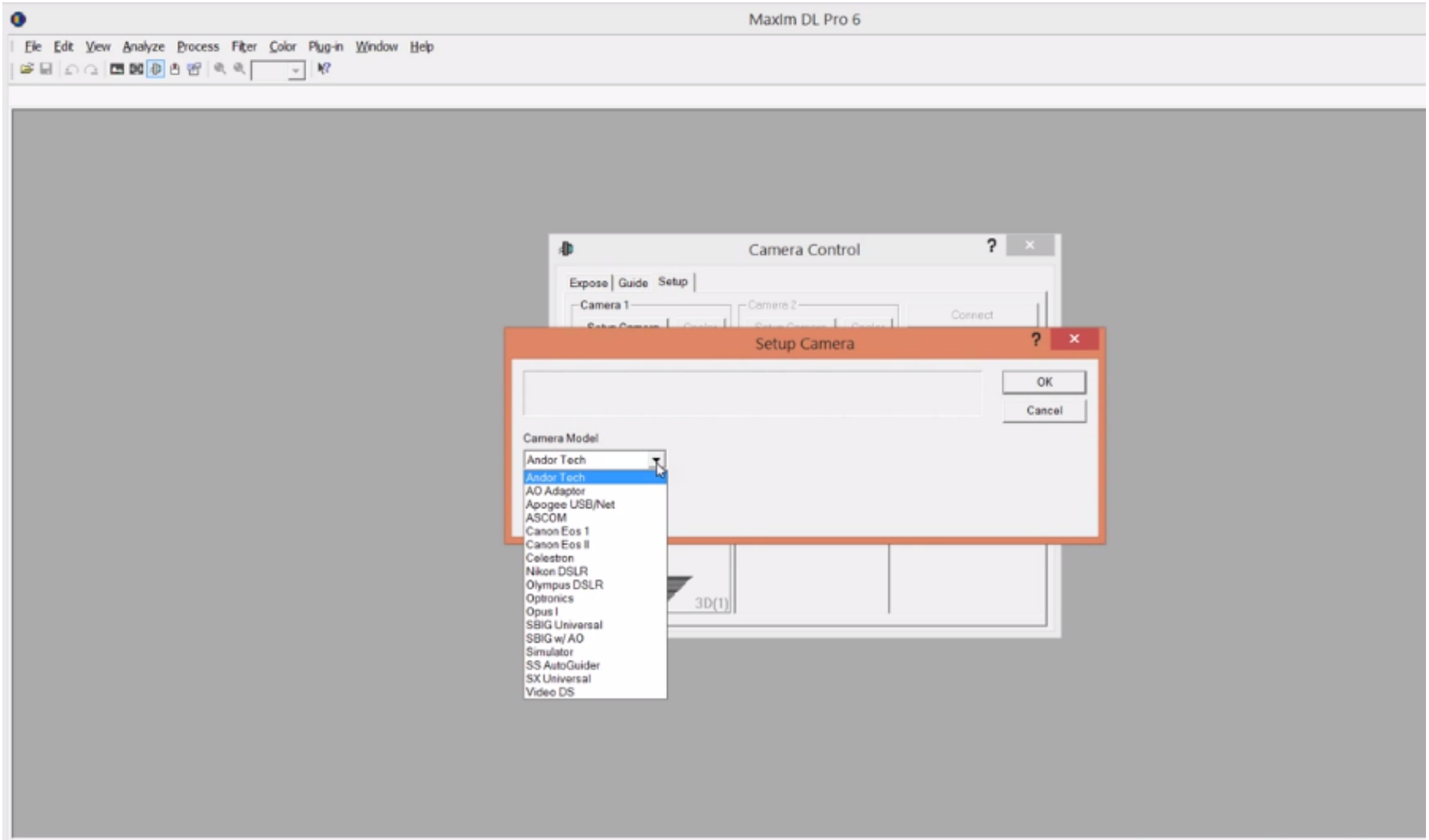


Setup Camera

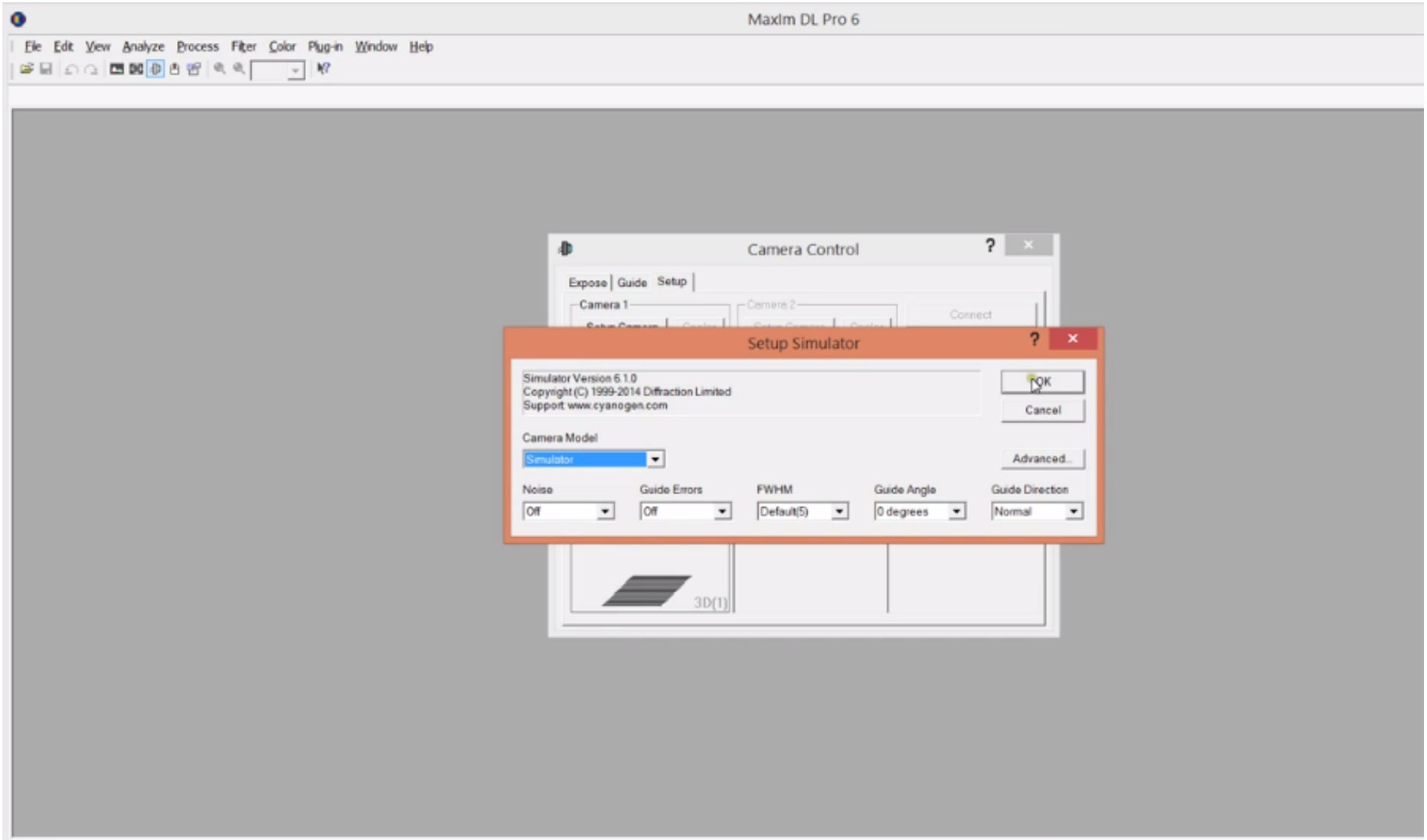



Maxim DL Pro 6
File Edit View Analyze Process Filter Color Plug-in Window Help
Camera Control
Expose Guide Setup
Camera 1
Cooler
No Camera
Options
Dual Chip Mode
Setup Filter
No Filters
Camera 2
Setup Camera
Cooler
No Camera
Options
Setup Filter
No Filters
Connect
Disconnect
Coolers
On
Off
Warm Up
Less <<
Camera 1 Information
Guider Information
3D(1)

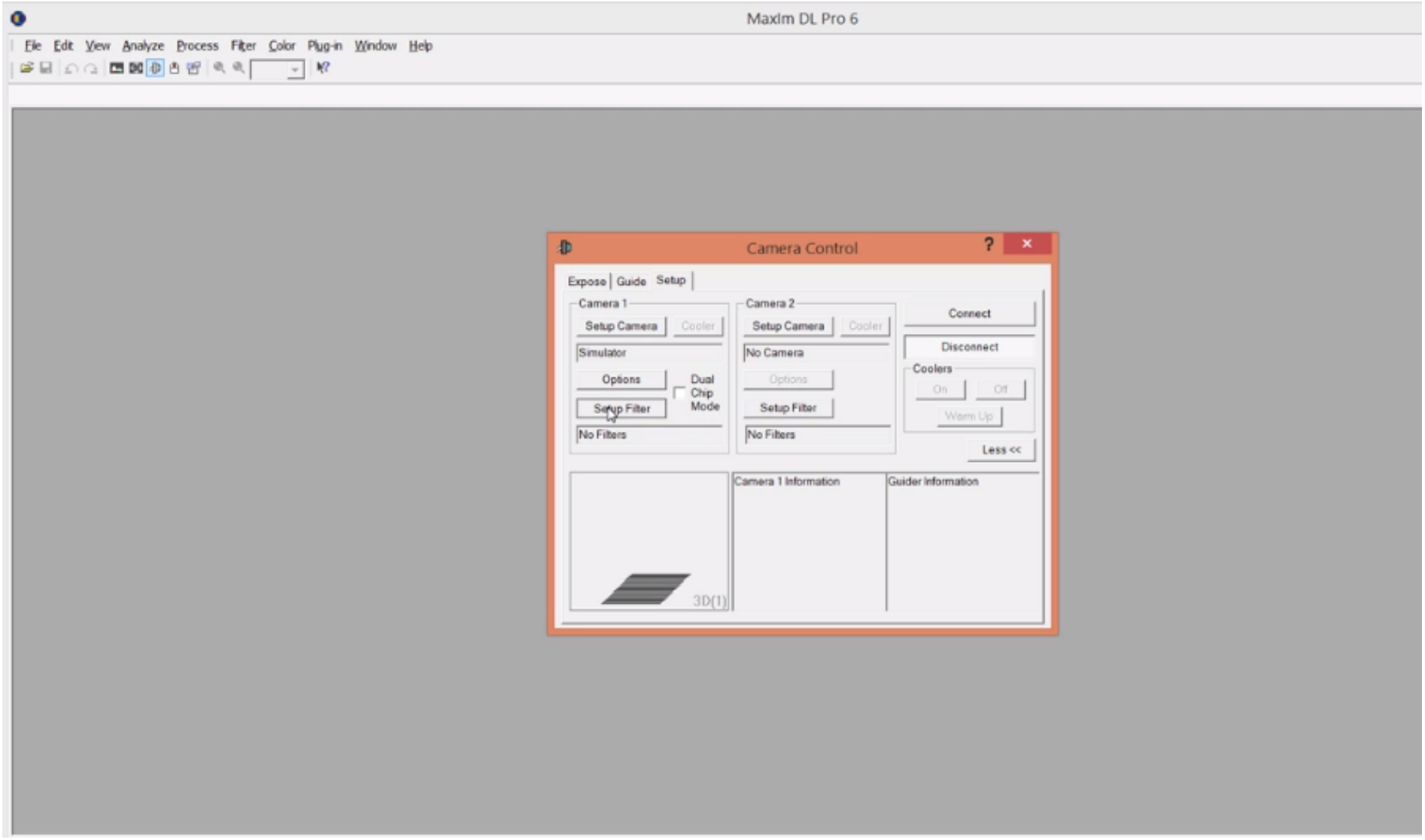
wybieramy model kamery, w naszym przypadku najcześciej jest ukryta pod nazwą Artemis



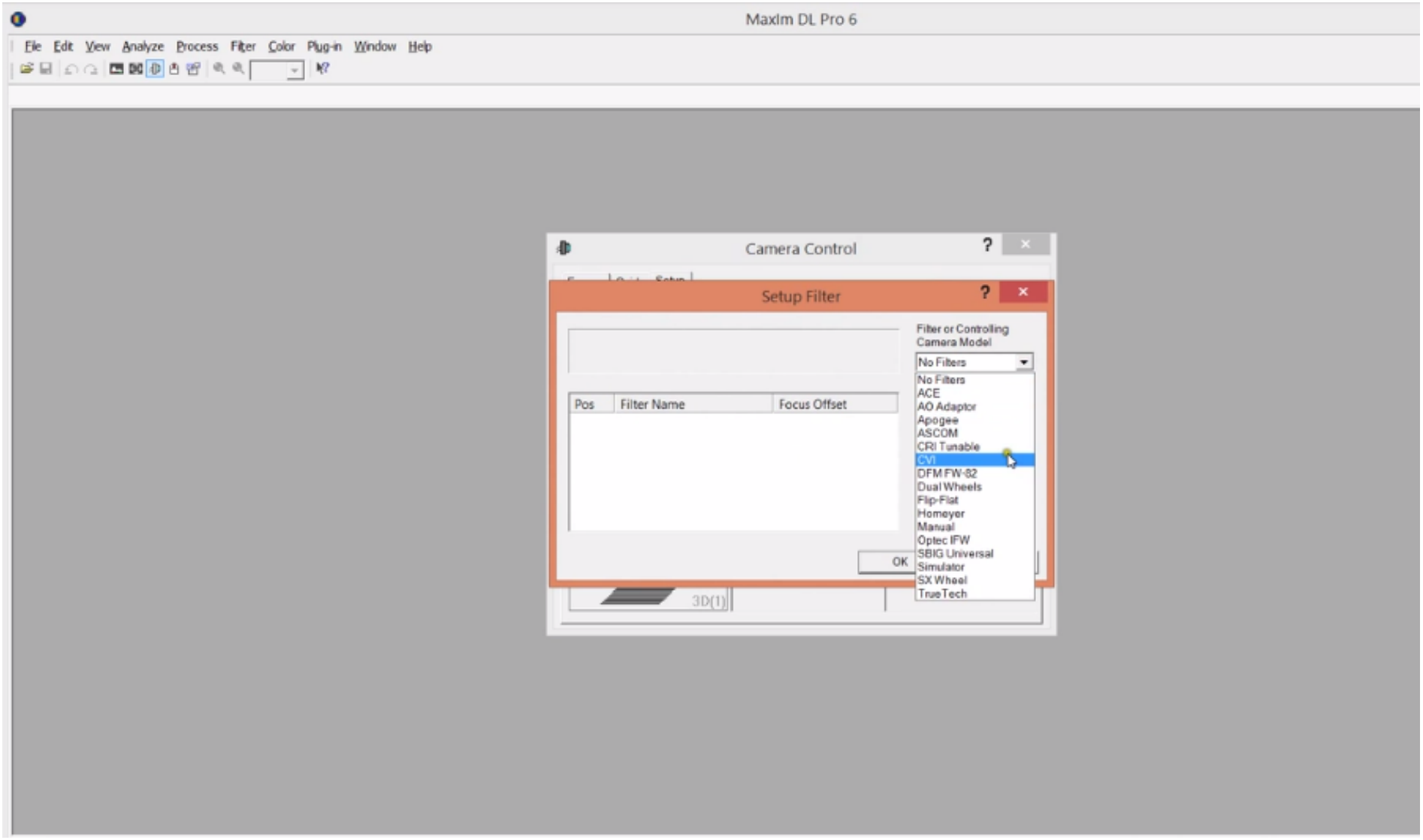
gdy kamery brak można użyć opcji Simulator do nauki programu



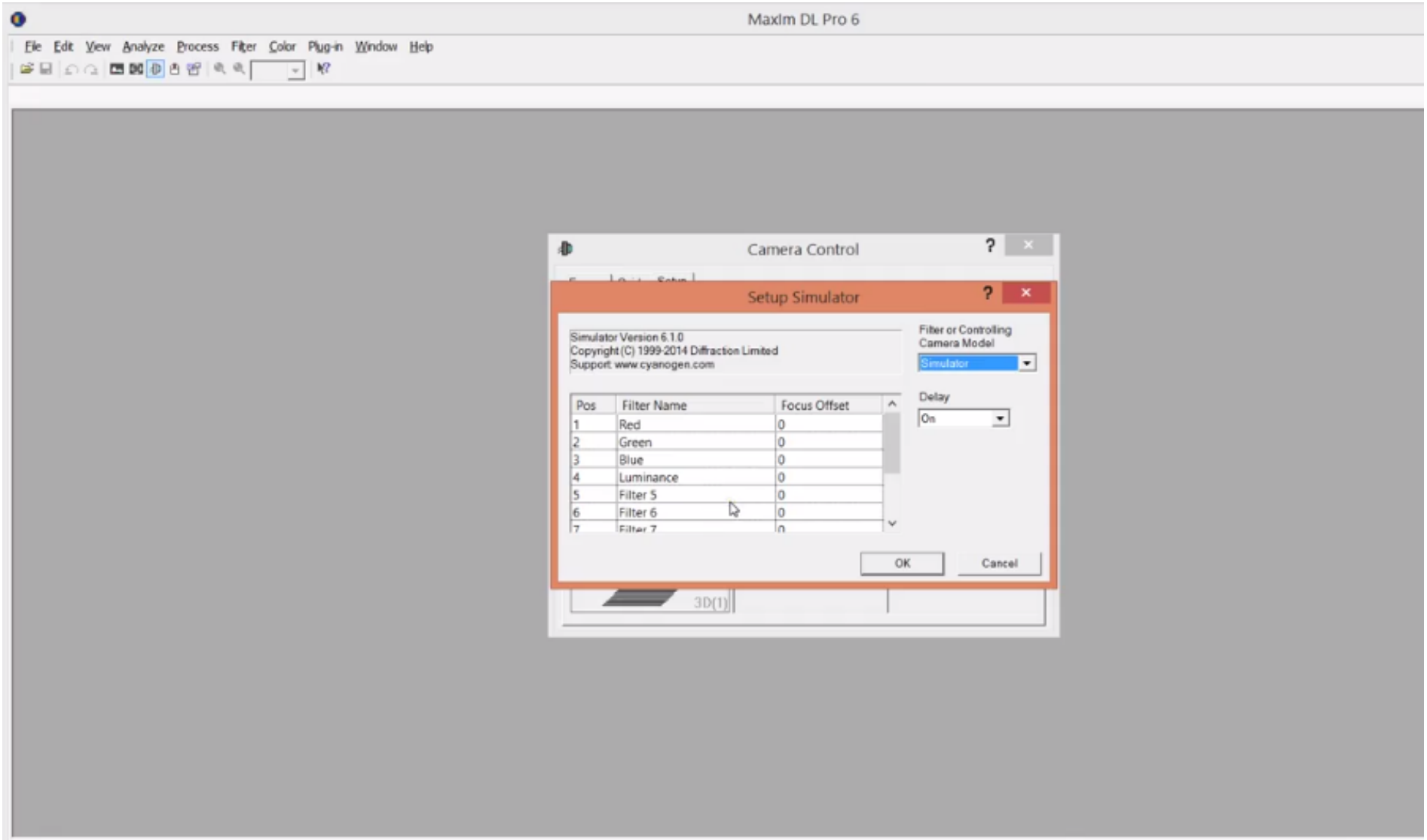
wybieramy koło filtrów Setup Filter



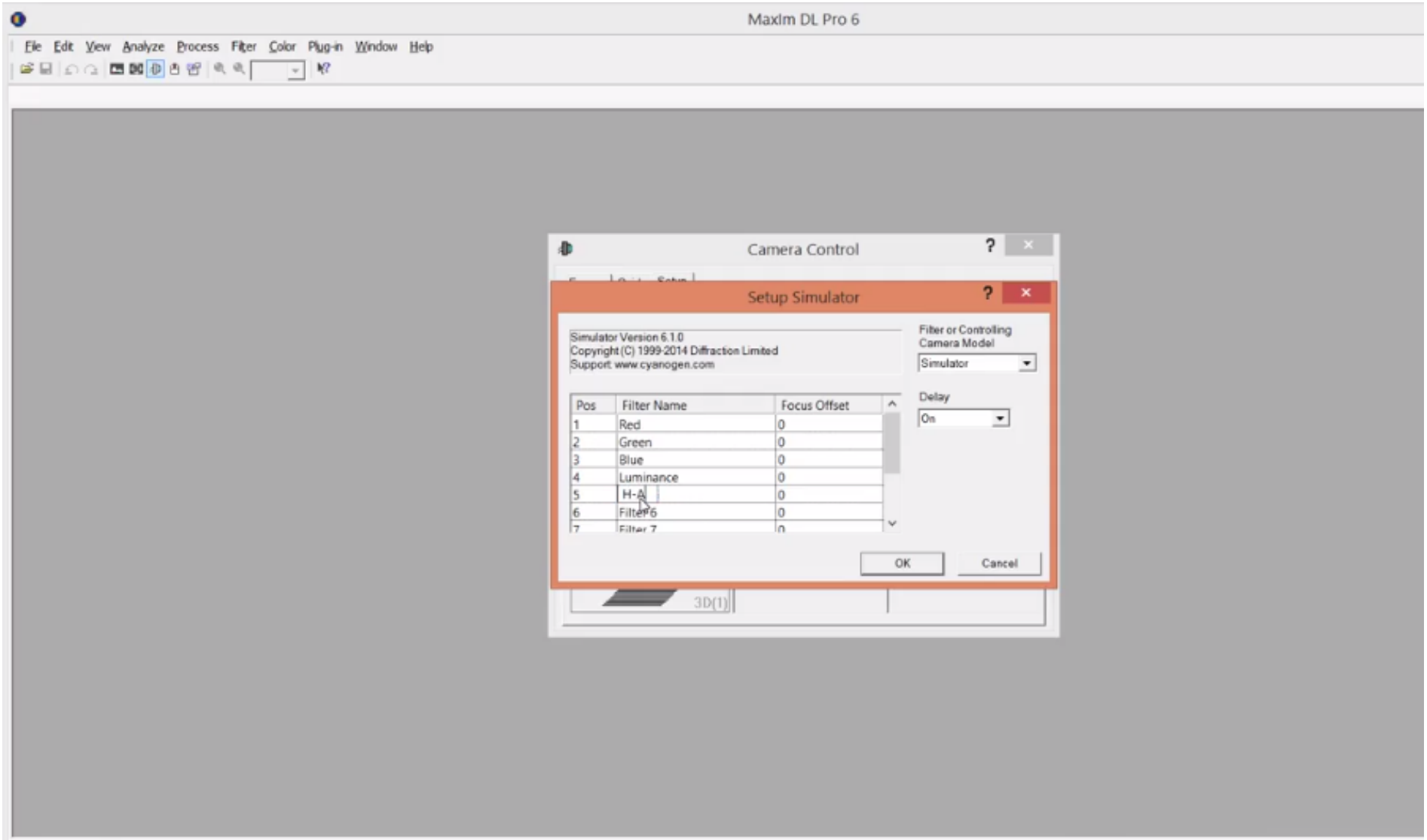
jeśli brak to wybieramy Simulator

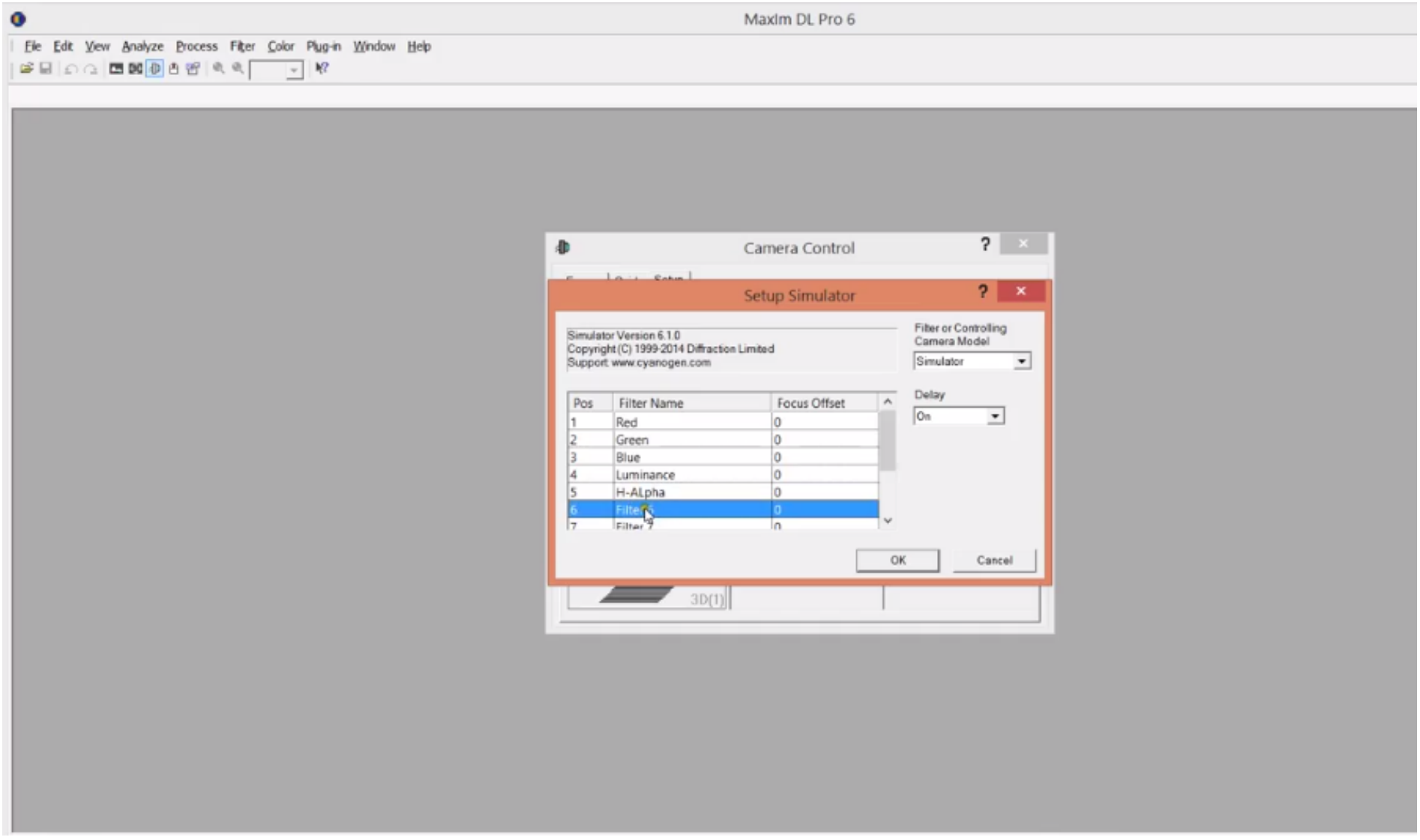


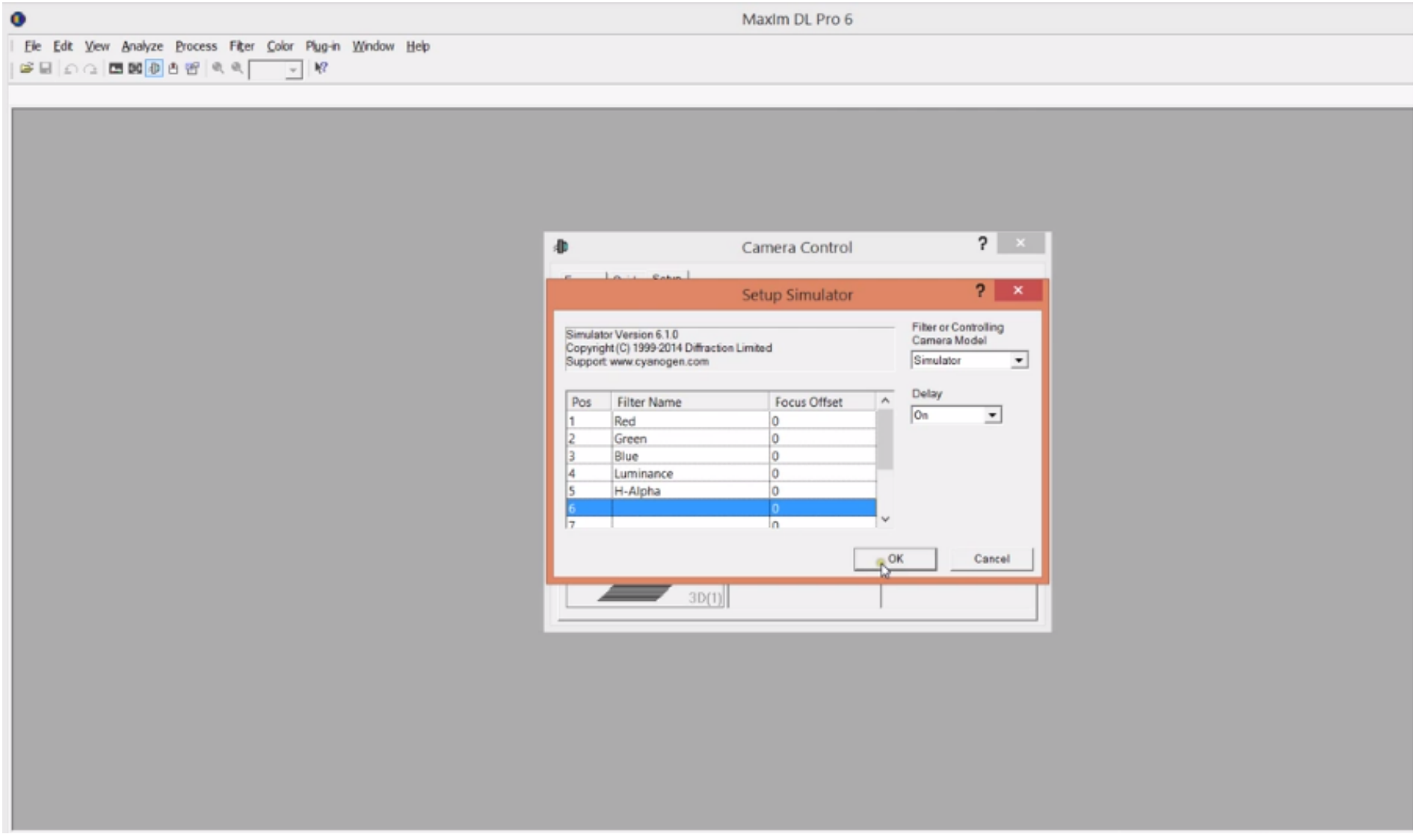
ustawiamy przystępne nazwy dla odpowiedniej pozycji koła filtrów



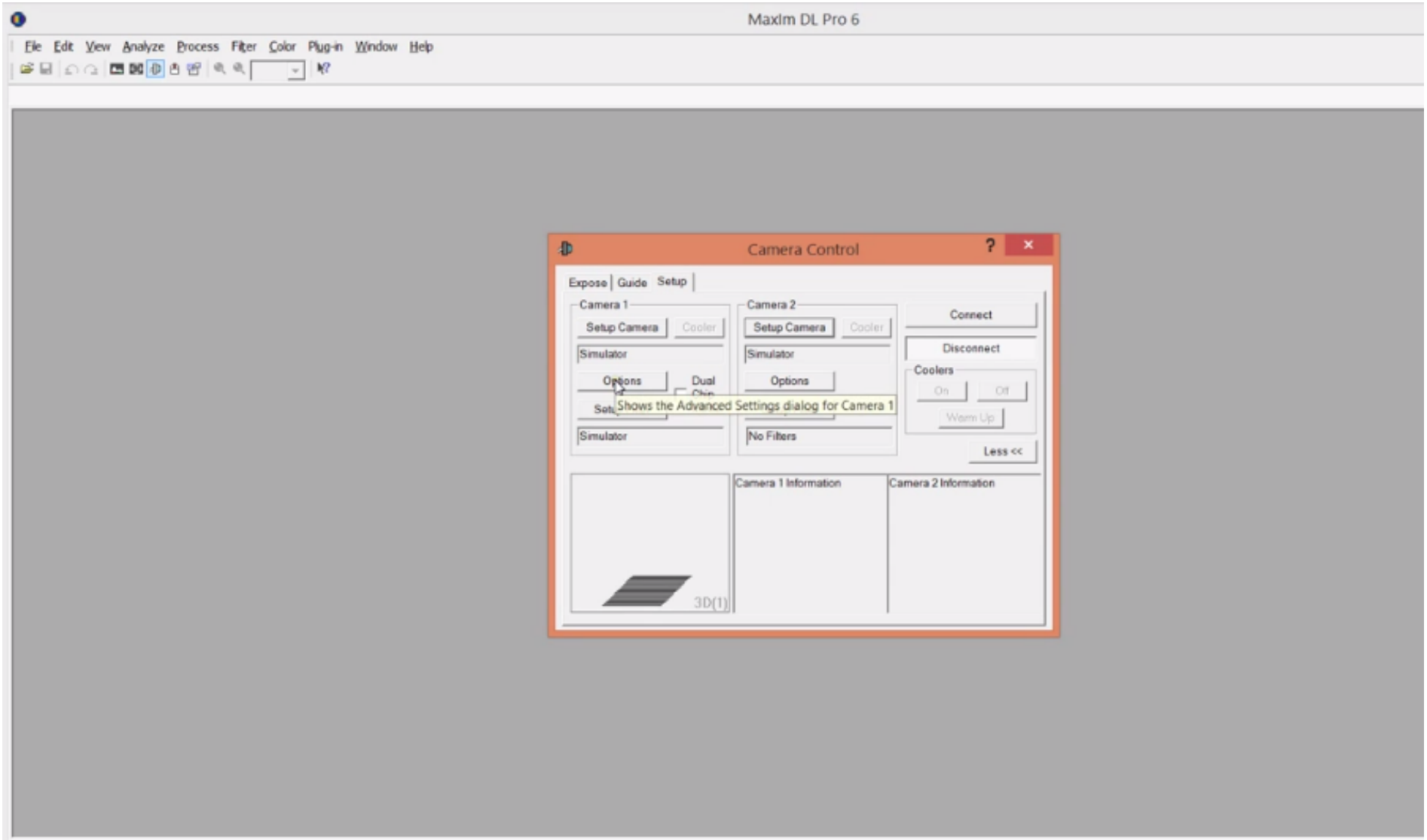
nazwy można modyfikować i usuwać



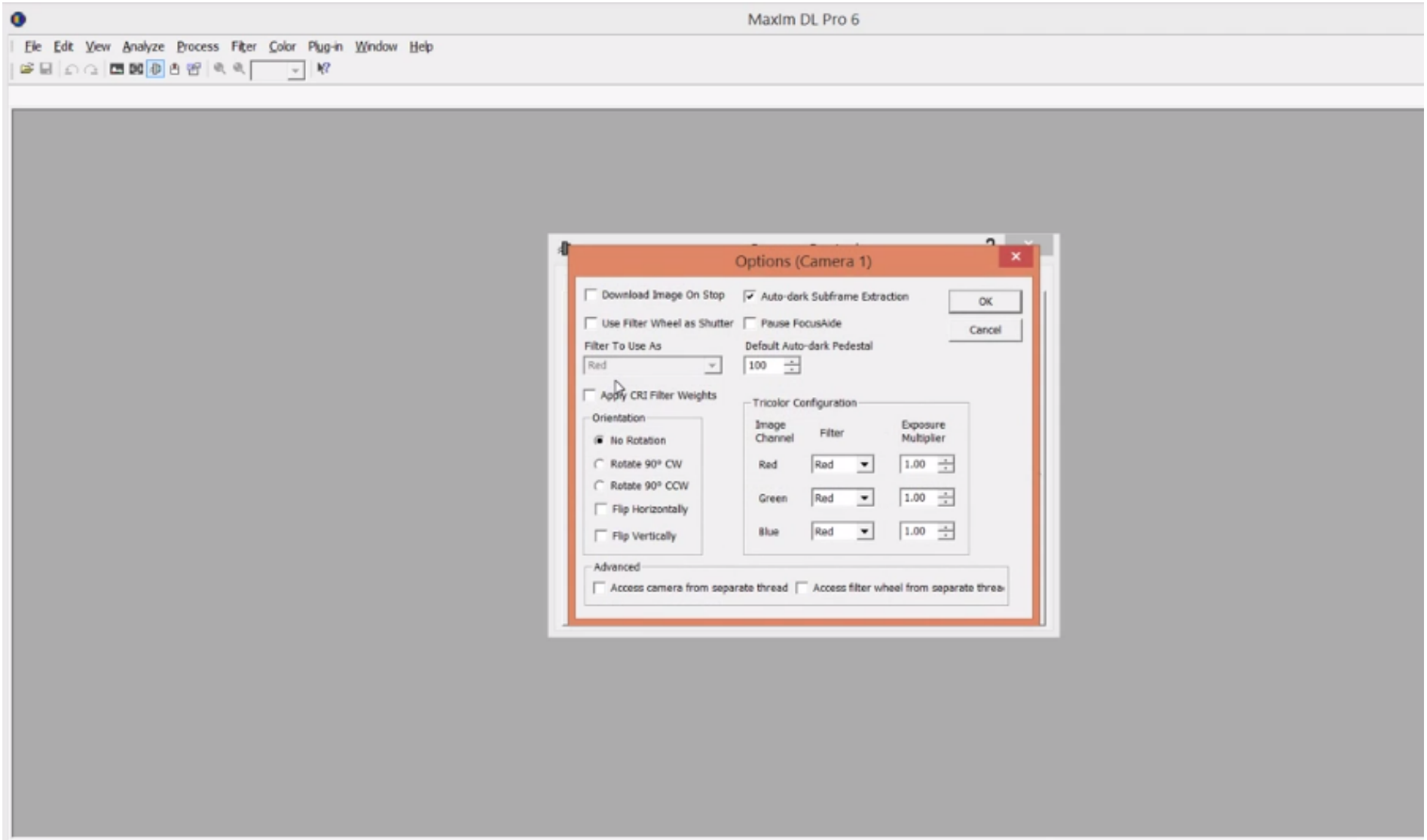

Maxim DL Pro 6
File Edit View Analyze Process Filter Color Plug-in Window Help
Camera Control
Setup Simulator
Simulator Version 6.1.0
Copyright (C) 1999-2014 Diffraction Limited
Support: www.cyanogen.com
Filter or Controlling Camera Model
Simulator
Delay
On
Pos
Filter Name
Focus Offset
1 Red 0
2 Green 0
3 Blue 0
4 Luminance 0
5 H-ALpha 0
6 Filter 0
OK
Cancel
3D(1)

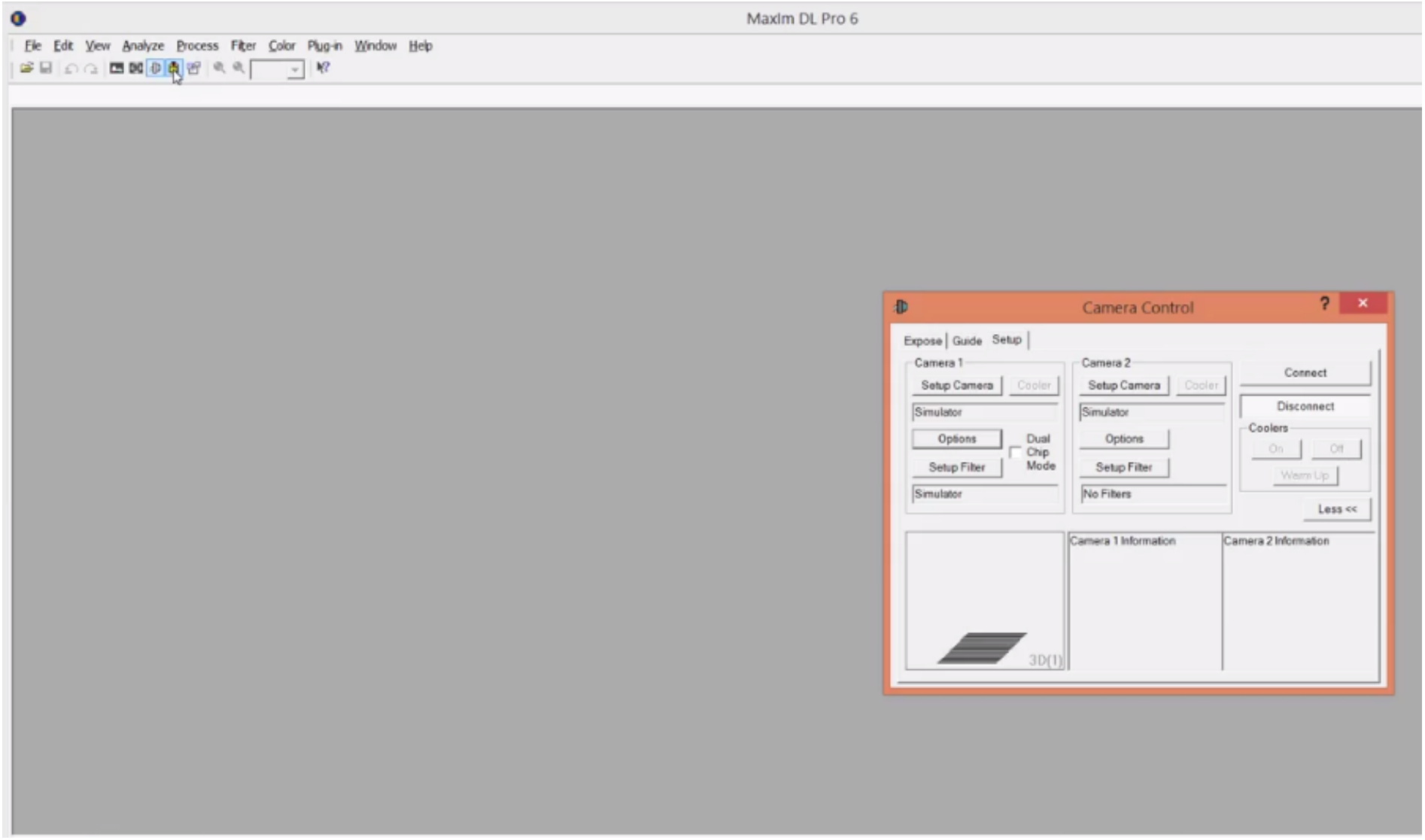

Maxim DL Pro 6
File Edit View Analyze Process Filter Color Plug-in Window Help
Camera Control
Setup Simulator
Simulator Version 6.1.0
Copyright (C) 1999-2014 Diffraction Limited
Support: www.cyanogen.com
Filter or Controlling Camera Model
Simulator
Delay
On
Pos
Filter Name
Focus Offset
1 Red 0
2 Green 0
3 Blue 0
4 Luminance 0
5 H-Alpha 0
6 0
OK
Cancel
3D(1)

ustawiamy dodatkowe opcje kamery

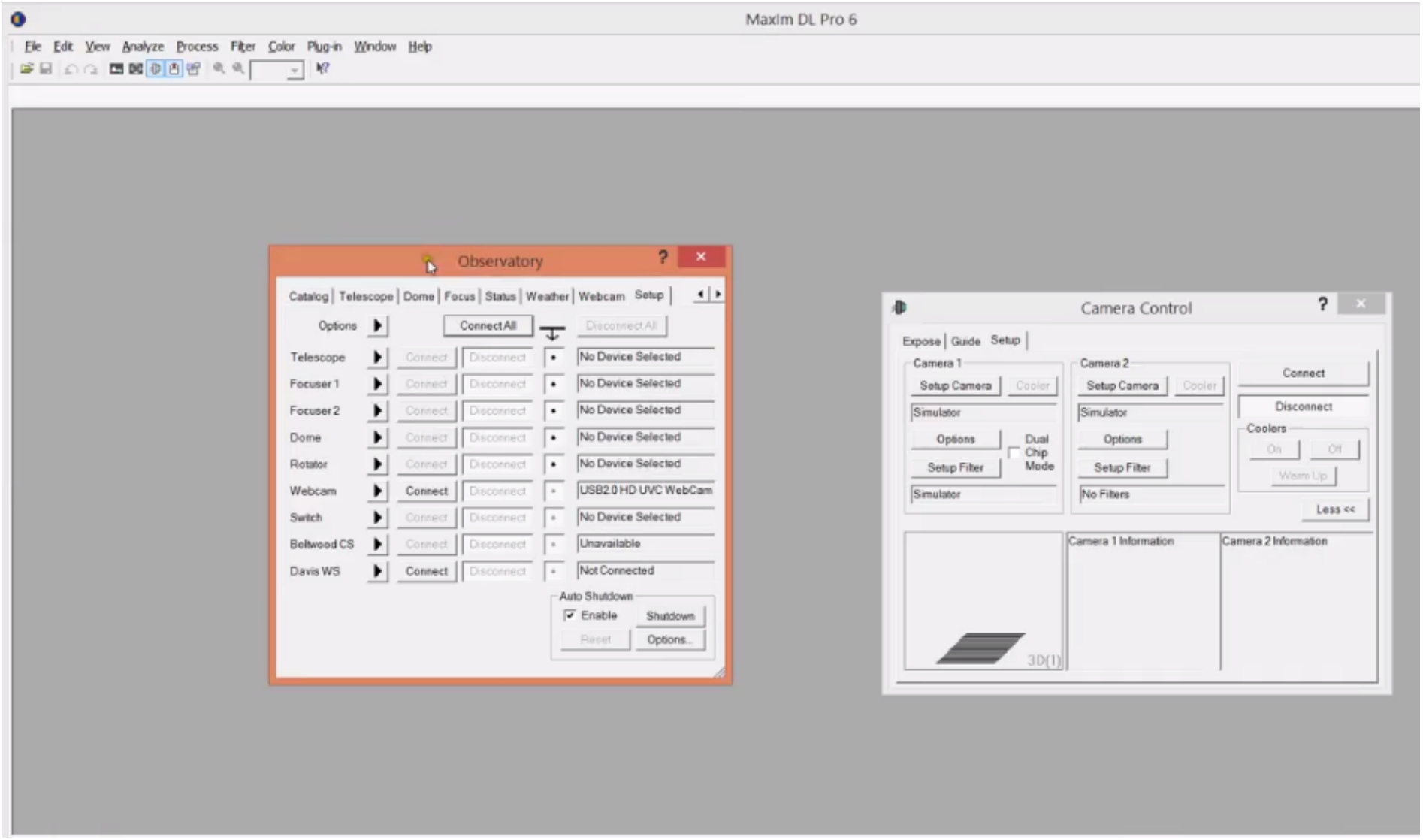


Download Image On Stop przydatne przy długich ekspozycjach

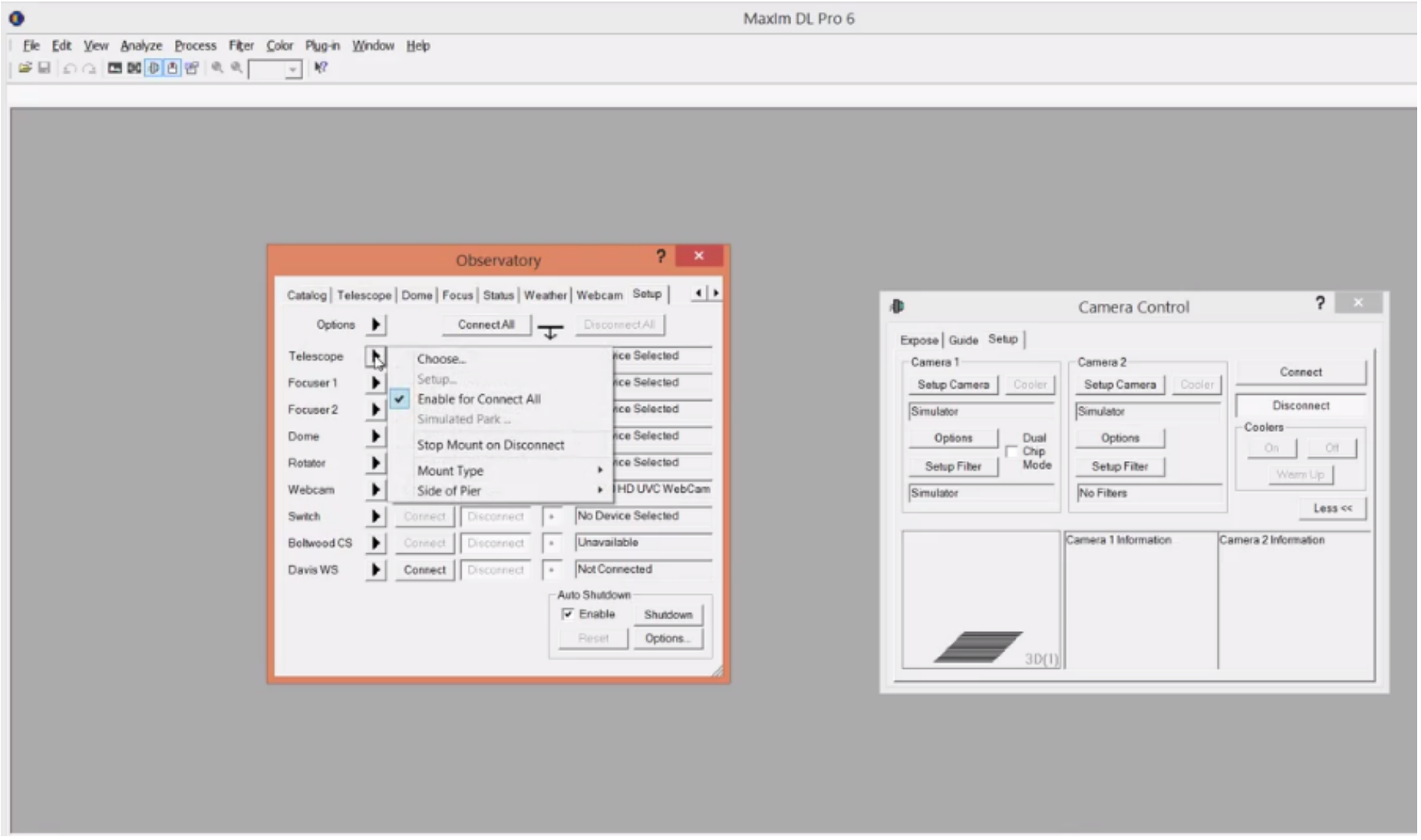


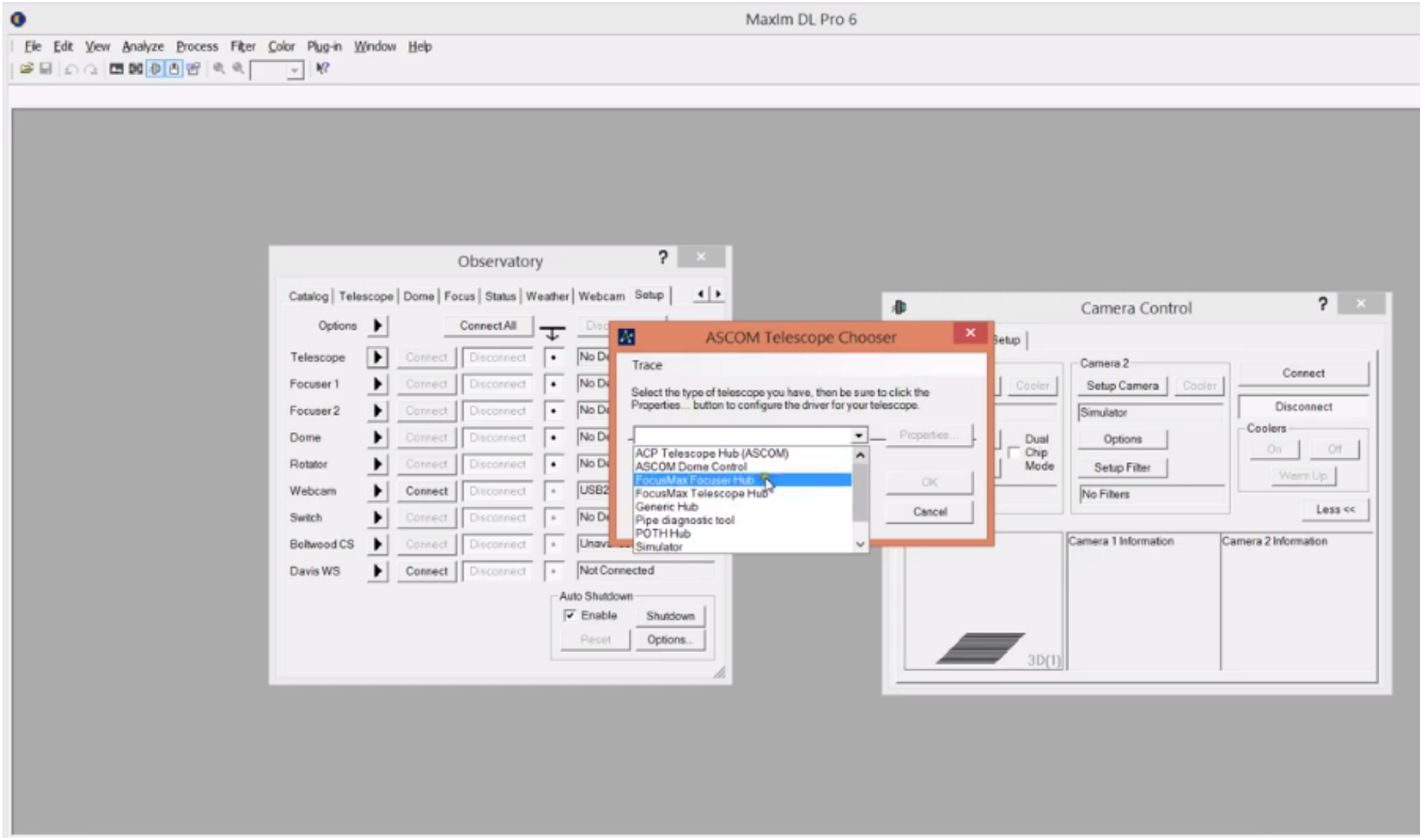

Maxim DL Pro 6
File Edit View Analyze Process Filter Color Plug-in Window Help
Camera Control
Expose Guide Setup
Camera 1
Setup Camera
Cooler
Simulator
Options
Dual Chip Mode
Setup Filter
Simulator
Camera 2
Setup Camera
Cooler
Simulator
Options
Setup Filter
No Filters
Connect
Disconnect
Coolers
On
Off
Warm Up
Less <<
Camera 1 Information
Camera 2 Information
3D(1)

Observatory

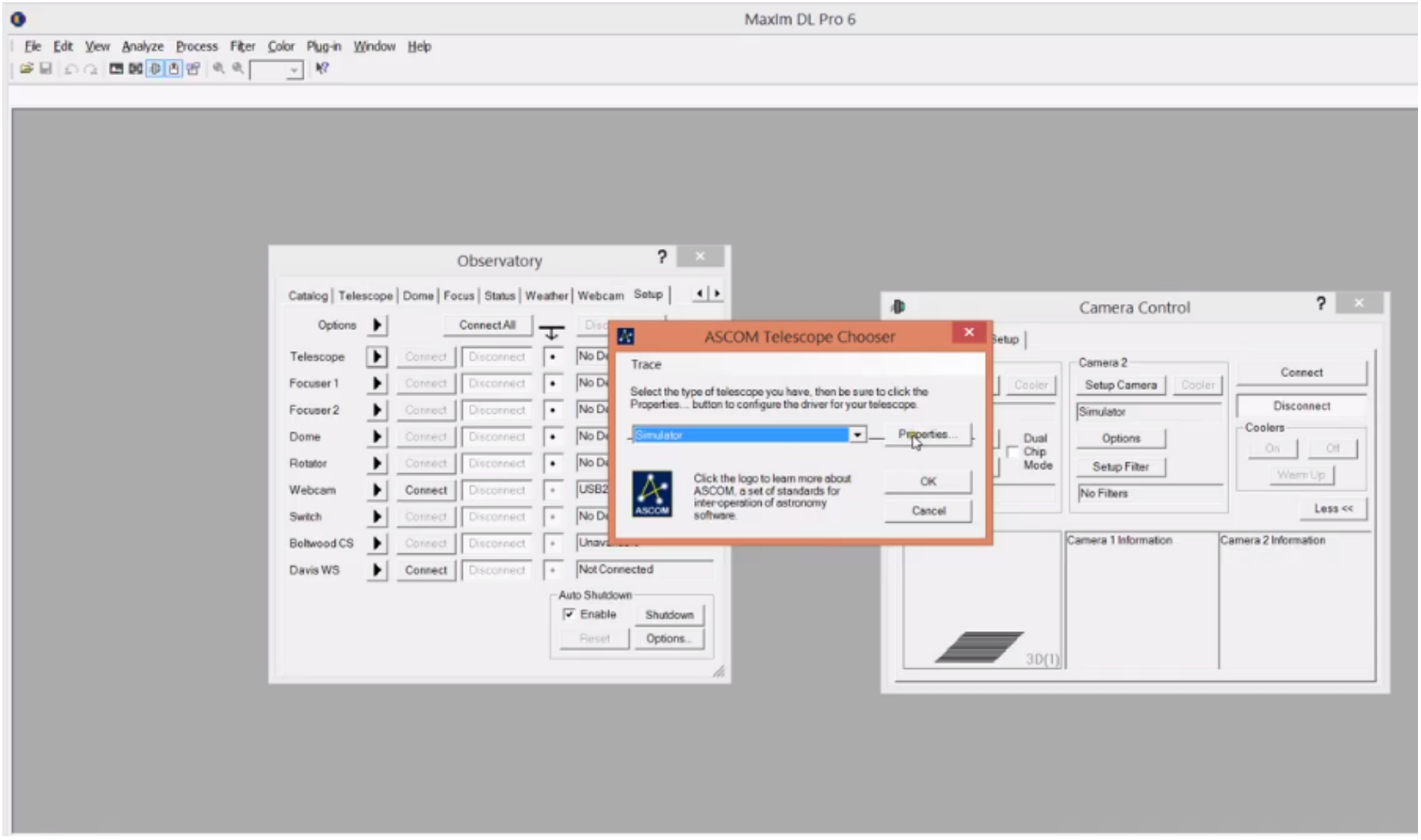


Choose

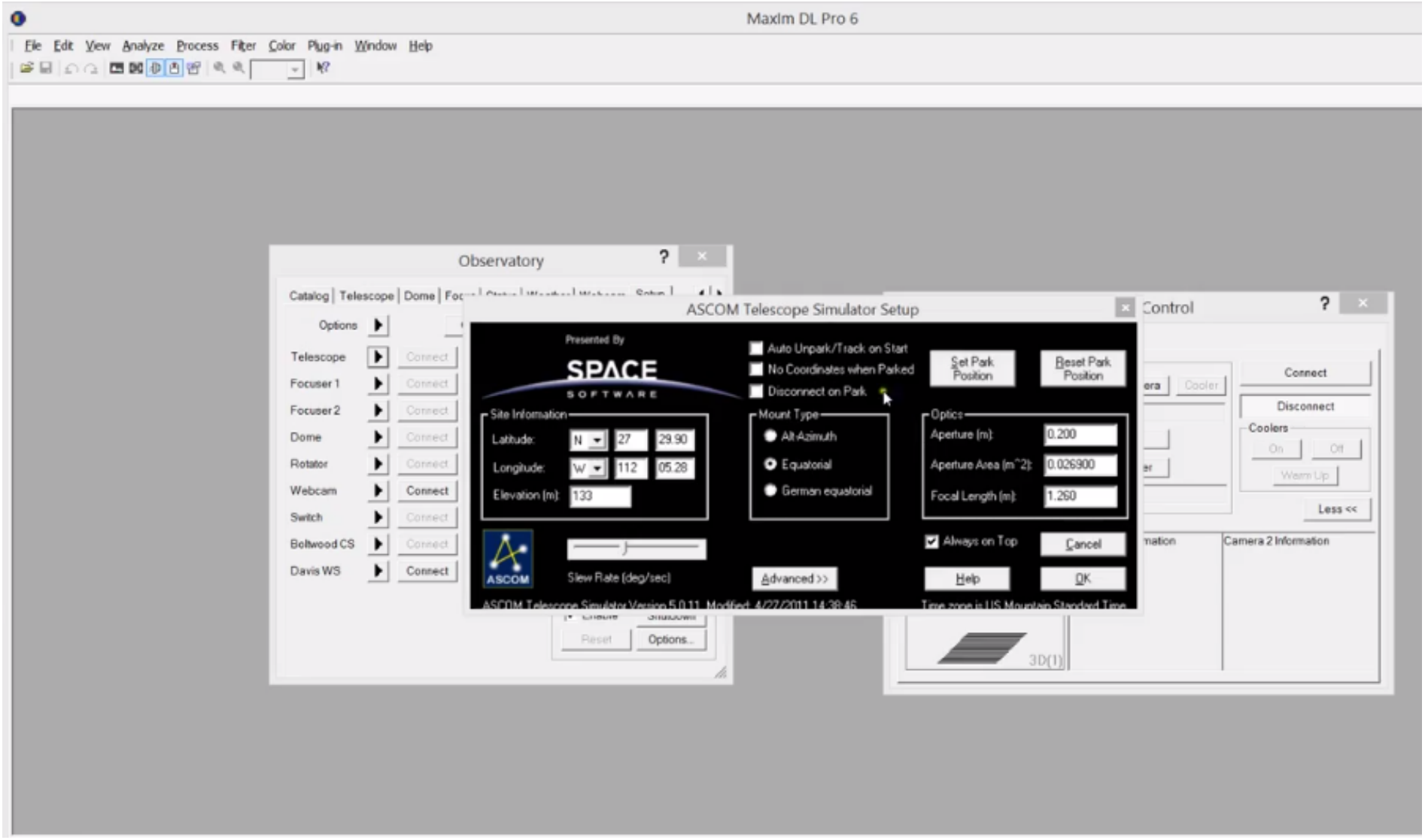

Maxim DL Pro 6
File Edit View Analyze Process Filter Color Plug-in Window Help
Observatory
Catalog | Telescope | Dome | Focus | Status | Weather | Webcam | Setup
Options
Connect All
Disconnect All
Telescope
Focuser 1
Focuser 2
Dome
Rotator
Webcam
Switch
Boltwood CS
Davis WS
Choose...
Setup...
Enable for Connect All
Simulated Park ...
Stop Mount on Disconnect
Mount Type
Side of Pier
HD UVC WebCam
Connect
Disconnect
No Device Selected
Unavailable
Not Connected
Auto Shutdown
Enable
Shutdown
Reset
Options...
Camera Control
Expose | Guide | Setup
Camera 1
Setup Camera
Cooler
Simulator
Options
Dual Chip Mode
Setup Filter
Camera 2
No Filters
Connect
Disconnect
Coolers
On
Off
Warm Up
Less <<
Camera 1 Information
Camera 2 Information
3D(1)


Maxim DL Pro 6
File Edit View Analyze Process Filter Color Plug-in Window Help
Observatory
Catalog | Telescope | Dome | Focus | Status | Weather | Webcam | Setup
Options
Connect All
Telescope
Focuser 1
Focuser 2
Dome
Rotator
Webcam
Switch
Boltwood CS
Davis WS
Connect
Disconnect
Not Connected
Auto Shutdown
Enable
Shutdown
Reset
Options...
ASCOM Telescope Chooser
Trace
Select the type of telescope you have, then be sure to click the Properties... button to configure the driver for your telescope.
ACP Telescope Hub (ASCOM)
ASCOM Dome Control
FocusMax Focuser Hub
FocusMax Telescope Hub
Generic Hub
Pipe diagnostic tool
POTH Hub
Simulator
Properties...
OK
Cancel
Camera Control
Setup
Camera 2
Setup Camera
Cooler
Simulator
Options
Setup Filter
No Filters
Dual Chip Mode
Connect
Disconnect
Coolers
On
Off
Warm Up
Less <<
Camera 1 Information
Camera 2 Information
3D(1)

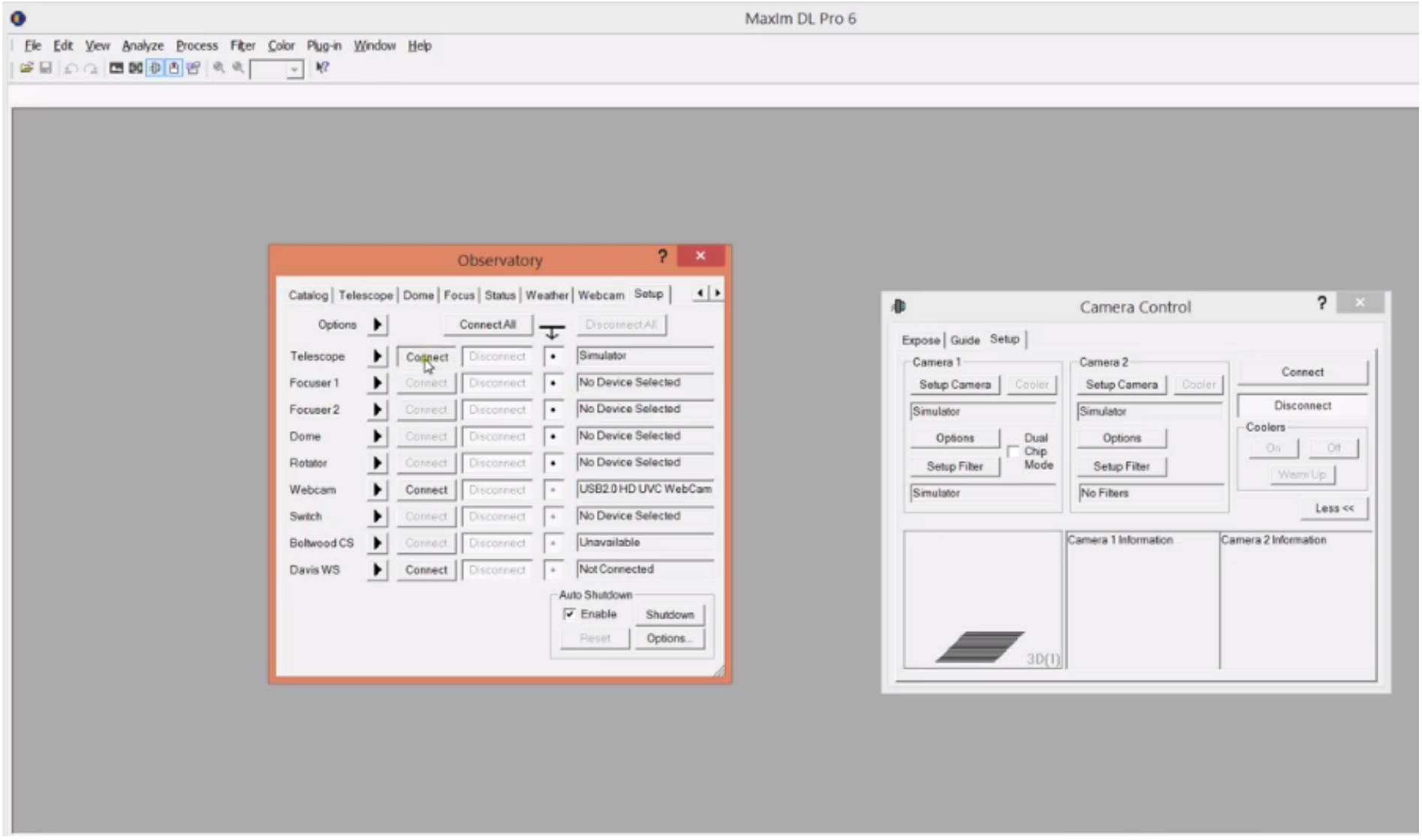
dostępna jest opcja Simulator, klikając na Properties



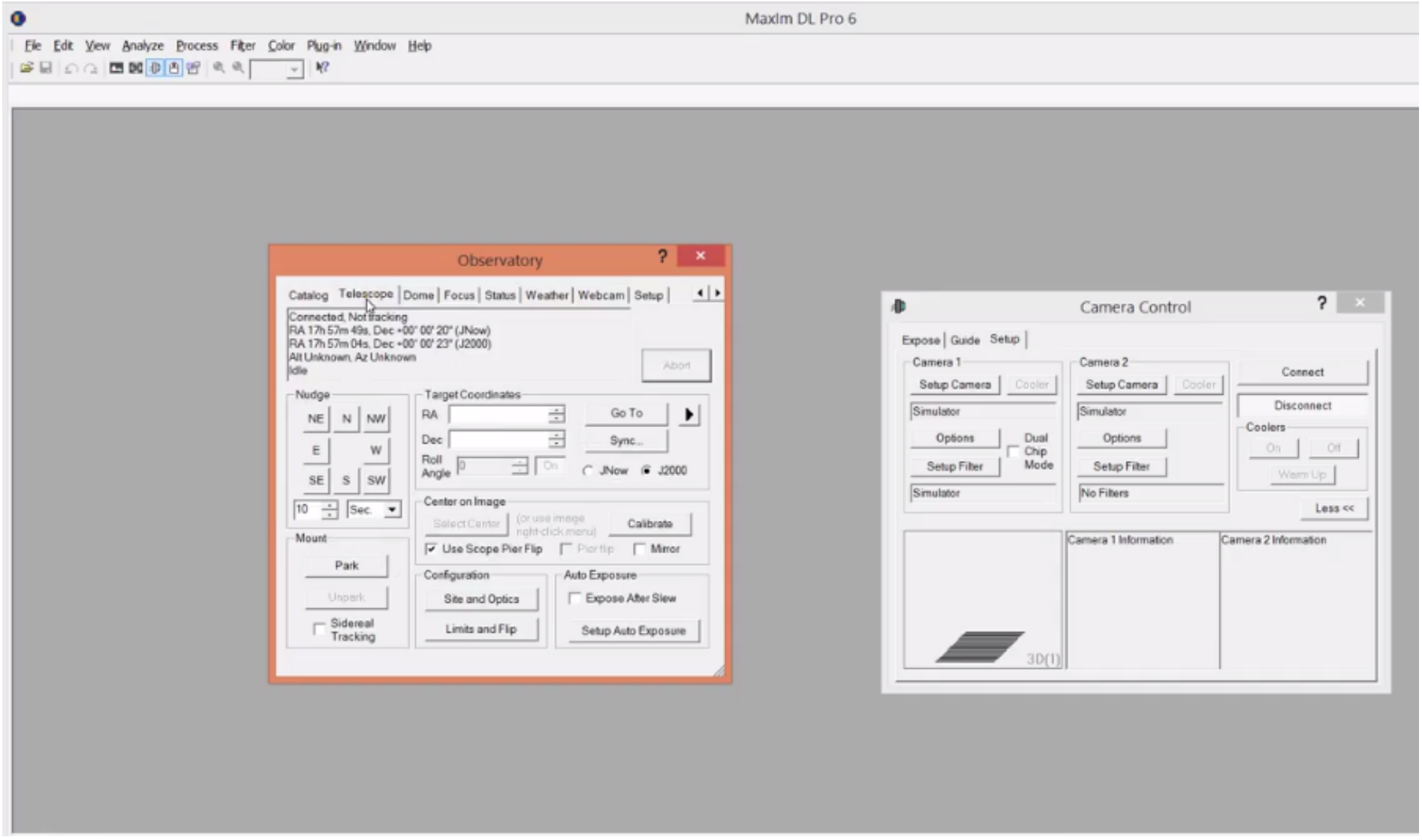
pokazuje się okno dialogowe do obslugi teleskopu



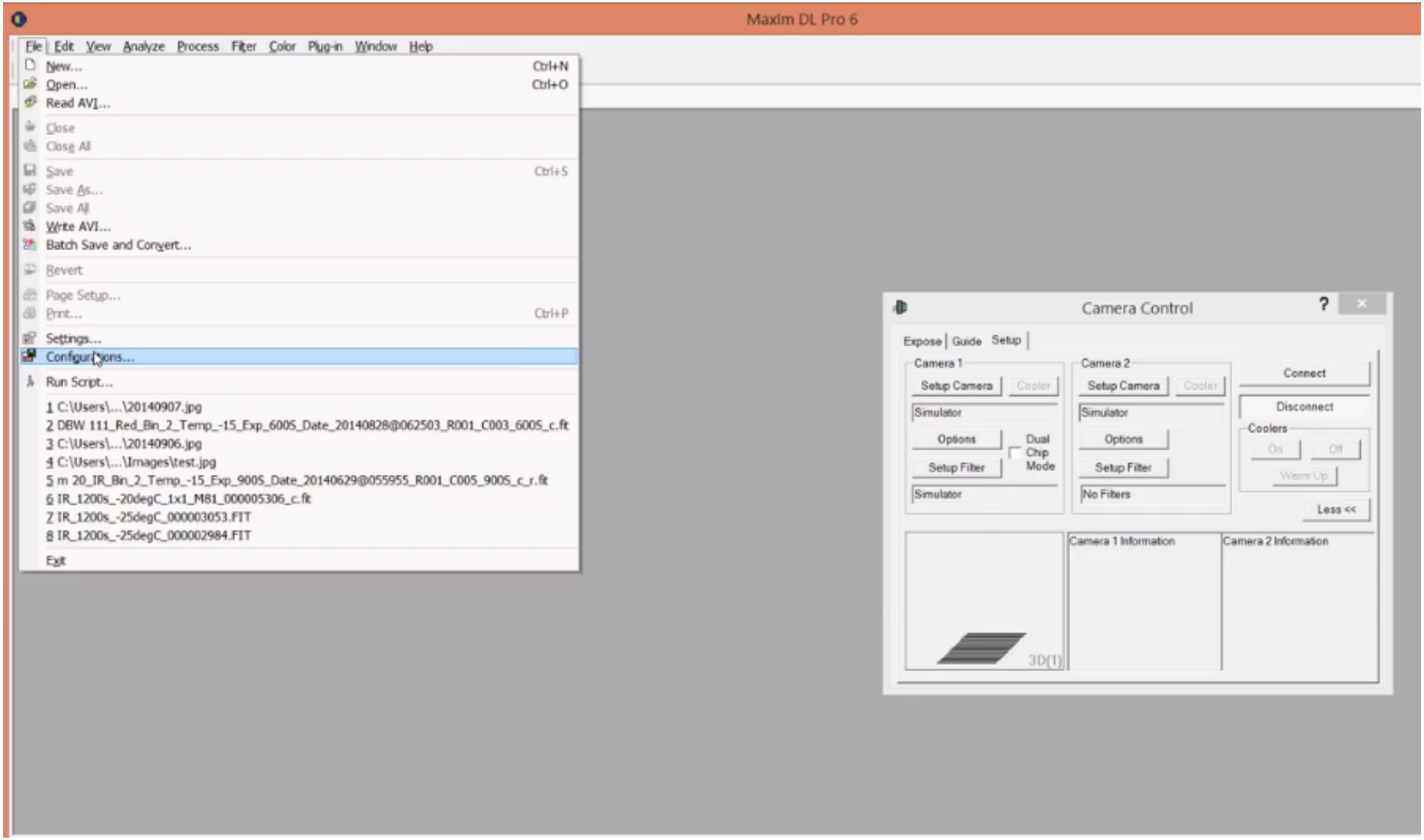
podłączenie teleskopu

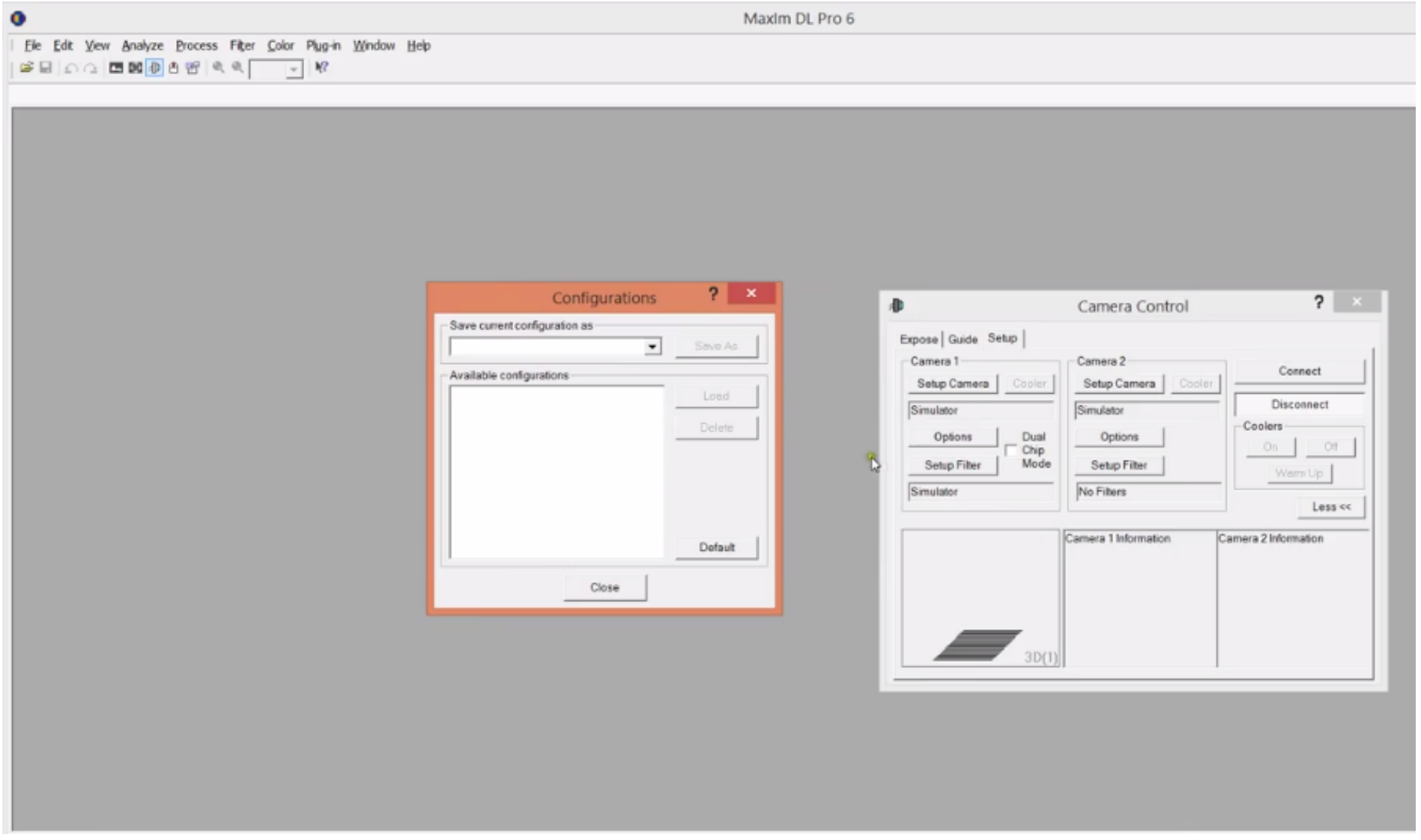


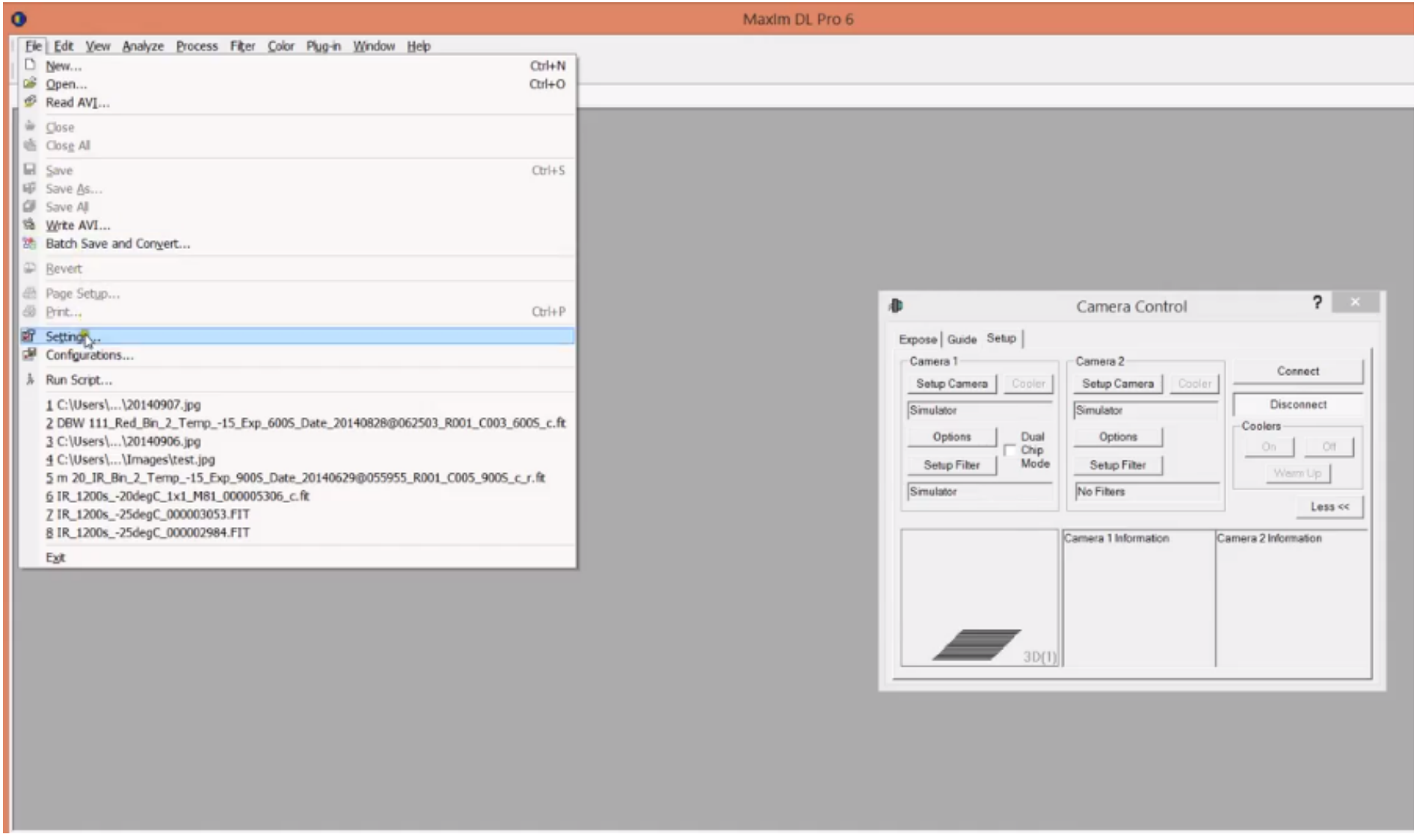
aktywuje się zakładka Telescope do sterowania teleskopem



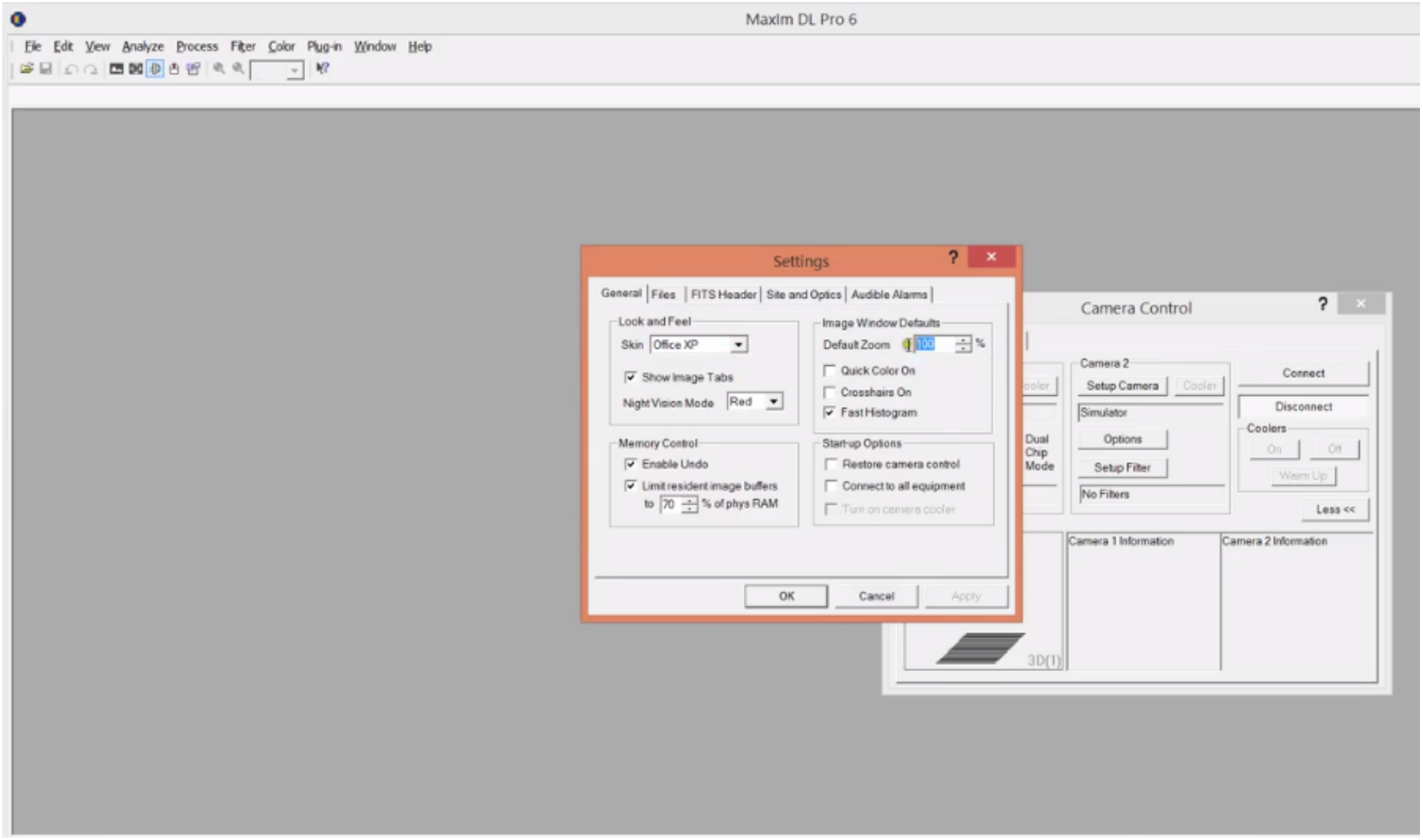
bieżącą konfigurację można zapisać i załadować w razie potrzeby z pliku konfiguracyjnego



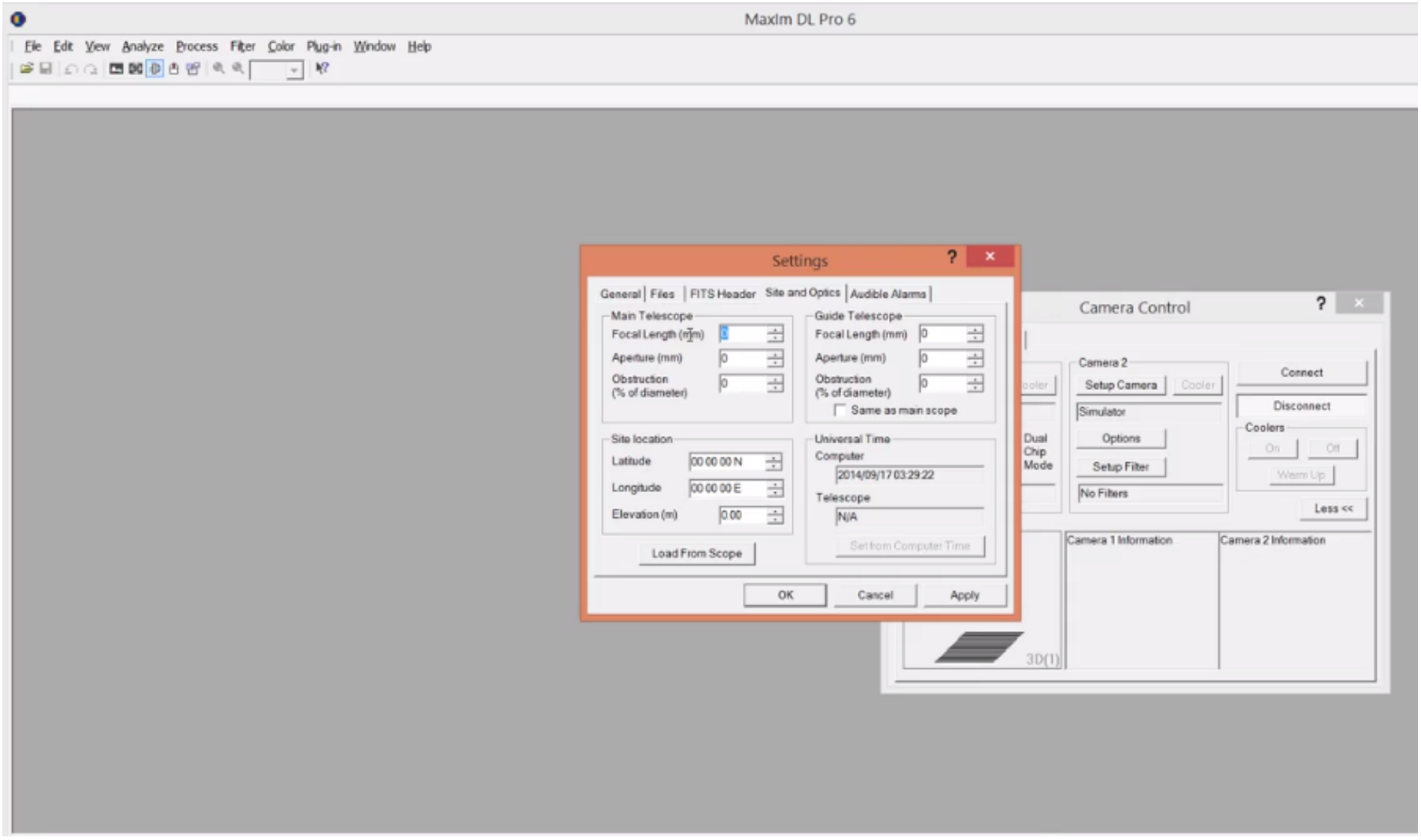

MaxIm DL Pro 6
File Edit View Analyze Process Filter Color Plug-in Window Help
Configurations
Save current configuration as
Save As
Available configurations
Load
Delete
Default
Close
Camera Control
Expose Guide Setup
Camera 1
Setup Camera
Cooler
Simulator
Options
Dual Chip Mode
Setup Filter
Simulator
Camera 2
Setup Camera
Cooler
Simulator
Options
Setup Filter
No Filters
Connect
Disconnect
Coolers
On
Off
Warm Up
Less <<
Camera 1 Information
Camera 2 Information
3D(1)


Maxim DL Pro 6
File Edit View Analyze Process Filter Color Plug-in Window Help
New... Ctrl+N
Open... Ctrl+O
Read AVI...
Close
Close All
Save Ctrl+S
Save As...
Save All
Write AVI...
Batch Save and Convert...
Revert
Page Setup...
Print... Ctrl+P
Setting...
Configurations...
Run Script...
1 C:\Users\...\20140907.jpg
2 DBW 111_Red_Bin_2_Temp_-15_Exp_600S_Date_20140828@062503_R001_C003_600S_c.fit
3 C:\Users\...\20140906.jpg
4 C:\Users\...\Images\test.jpg
5 m 20_IR_Bin_2_Temp_-15_Exp_900S_Date_20140629@055955_R001_C005_900S_c_r.fit
6 IR_1200s_-20degC_1x1_M81_000005306_c.fit
7 IR_1200s_-25degC_000003053.FIT
8 IR_1200s_-25degC_000002984.FIT
Exit
Camera Control
Expose Guide Setup
Camera 1
Setup Camera
Cooler
Simulator
Options
Dual Chip Mode
Setup Filter
Simulator
Camera 2
Setup Camera
Cooler
Simulator
Options
Setup Filter
No Filters
Connect
Disconnect
Coolers
On
Off
Warm Up
Less <<
Camera 1 Information
Camera 2 Information
3D(1)

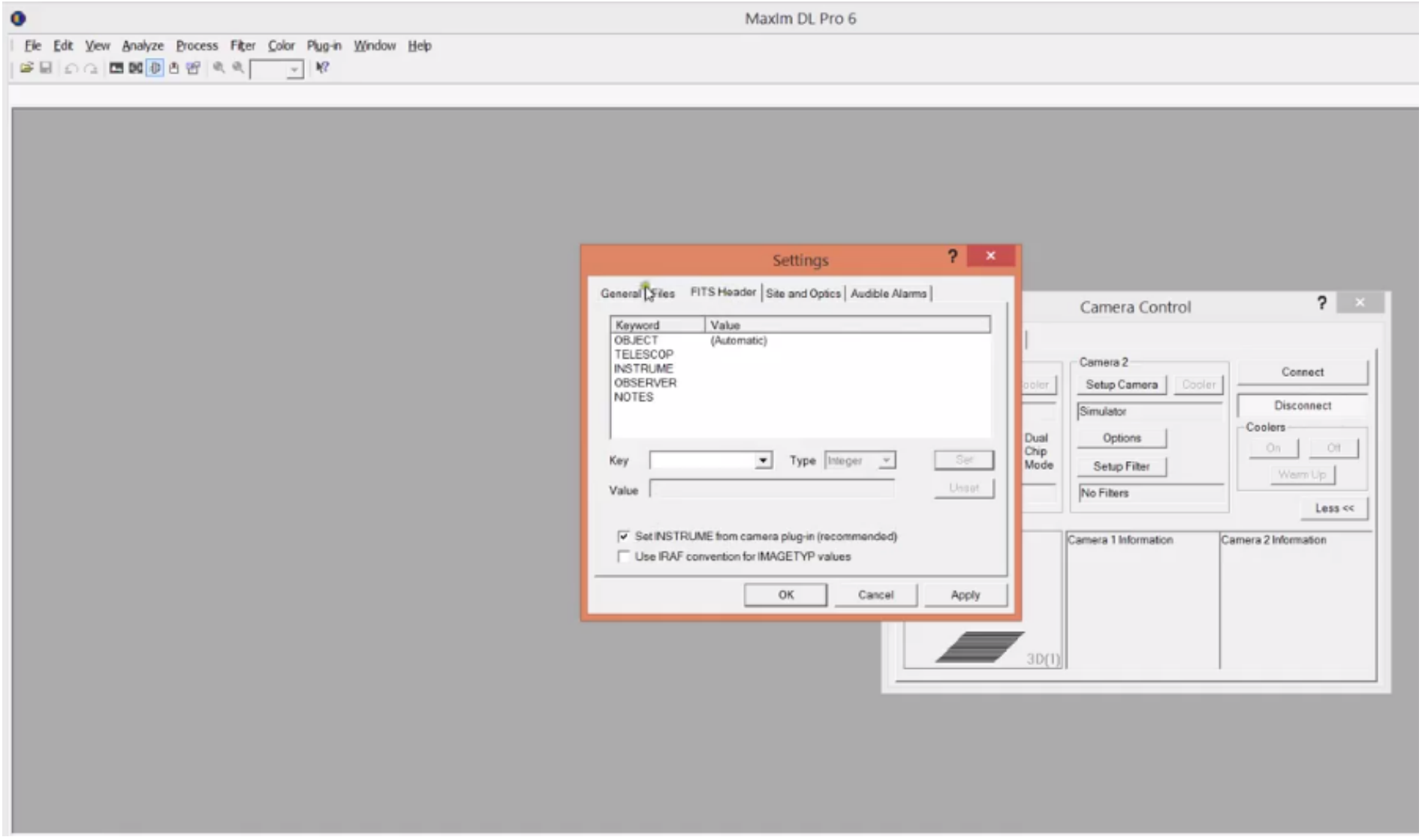
ogólne ustawienia - General



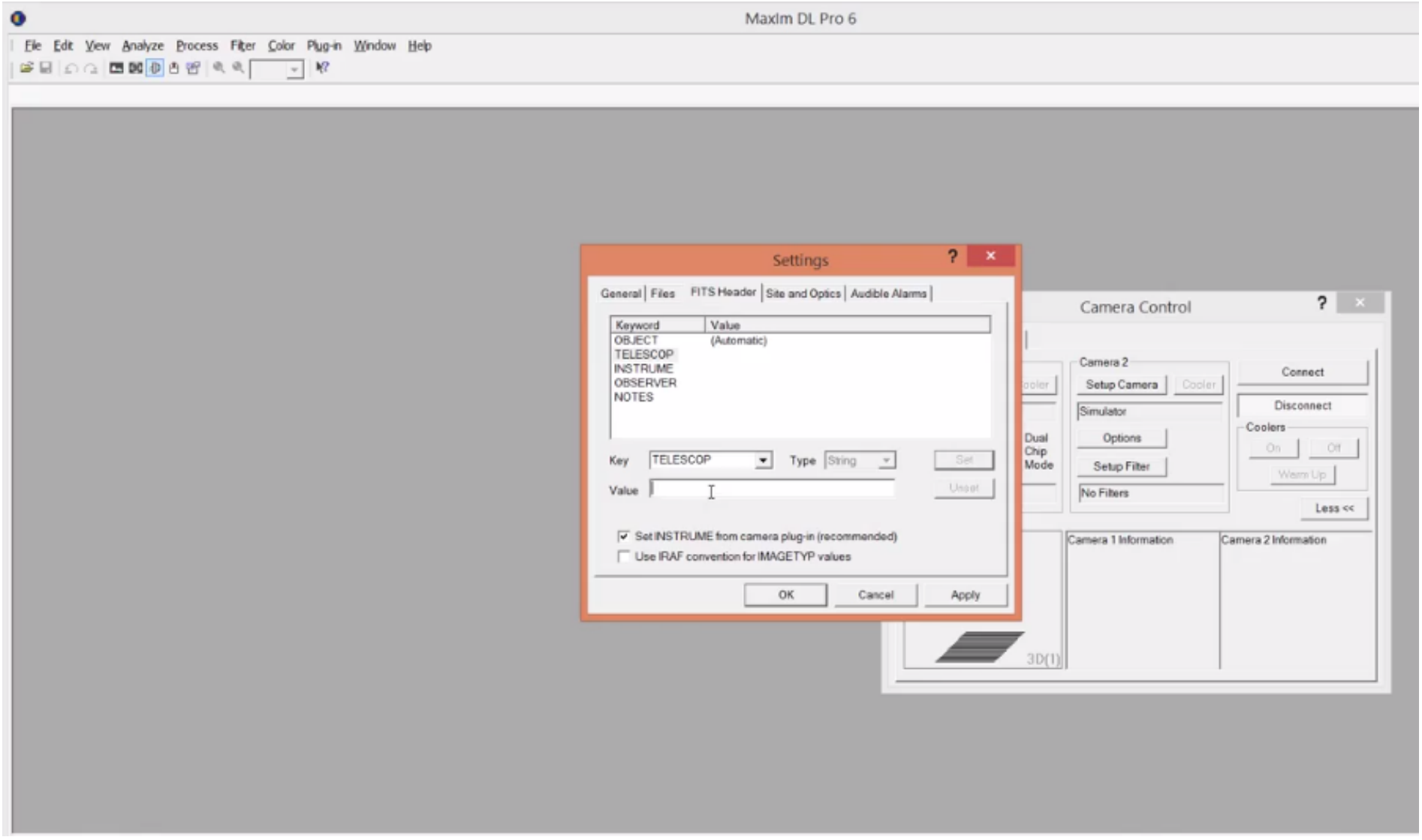
ustawienia miejsca obserwacji i cech teleskopu



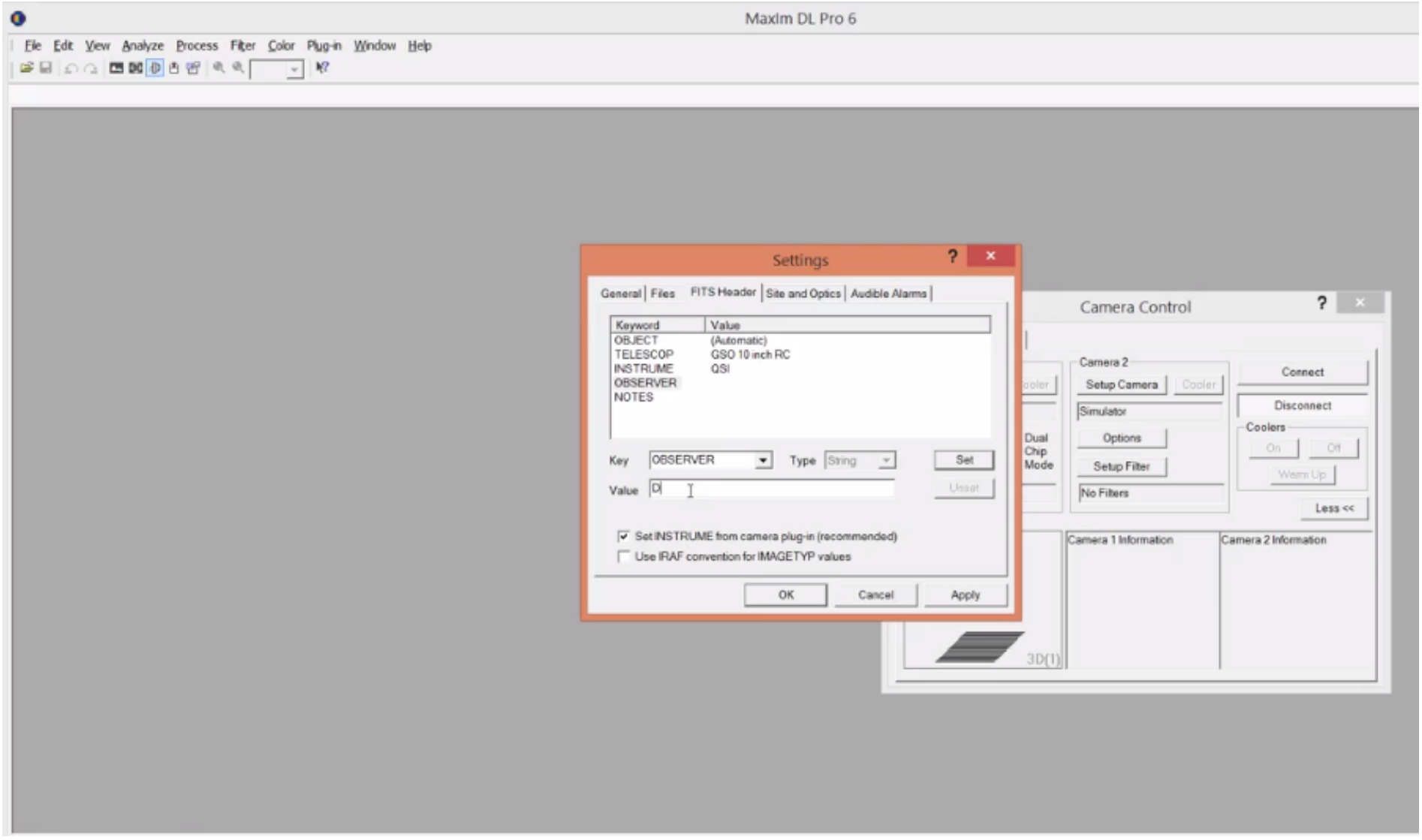
ustawienia własnych słów kluczowych w nagłówku plików FITS



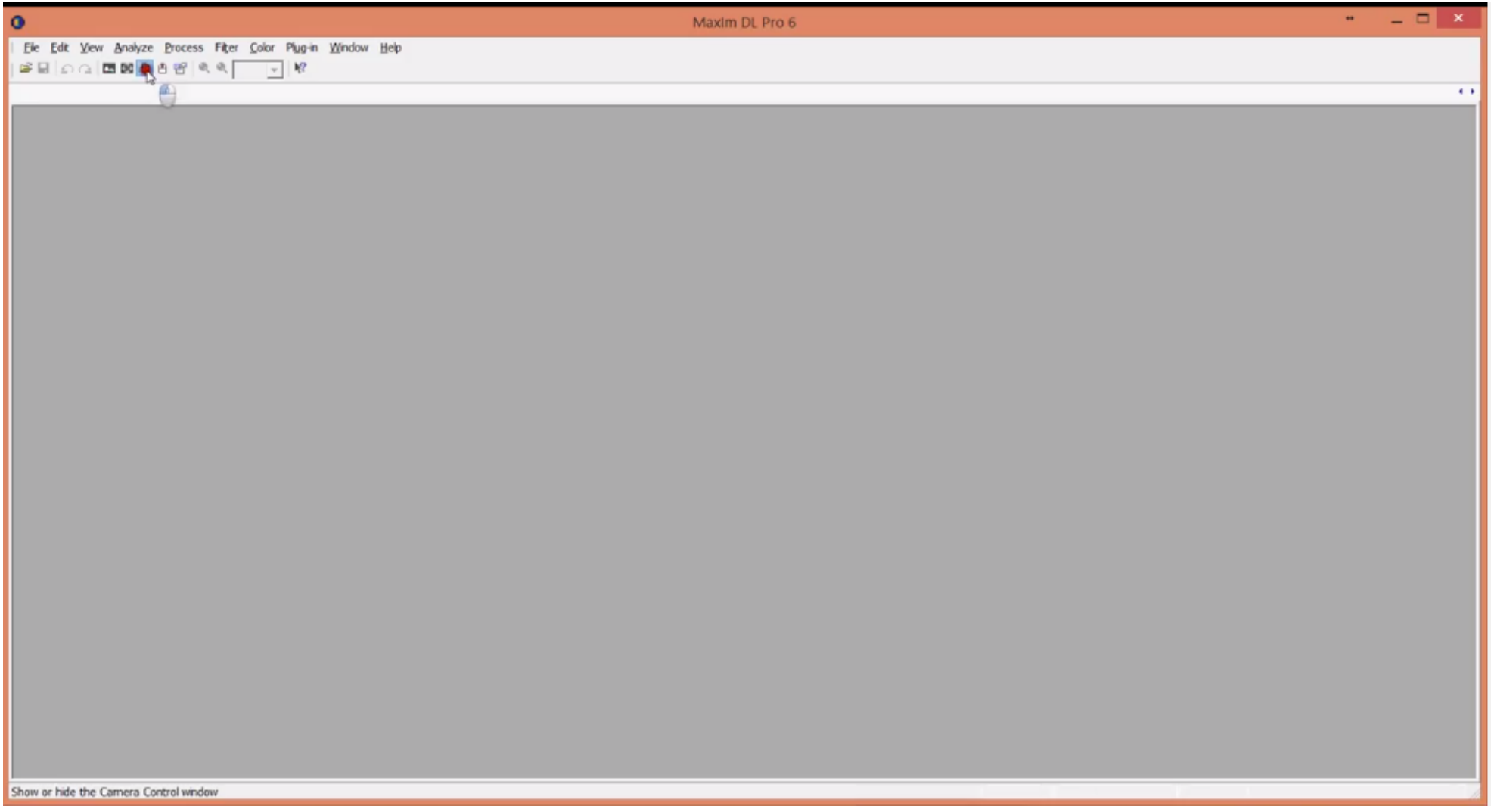
dodajemy słowo kluczowe Telescop



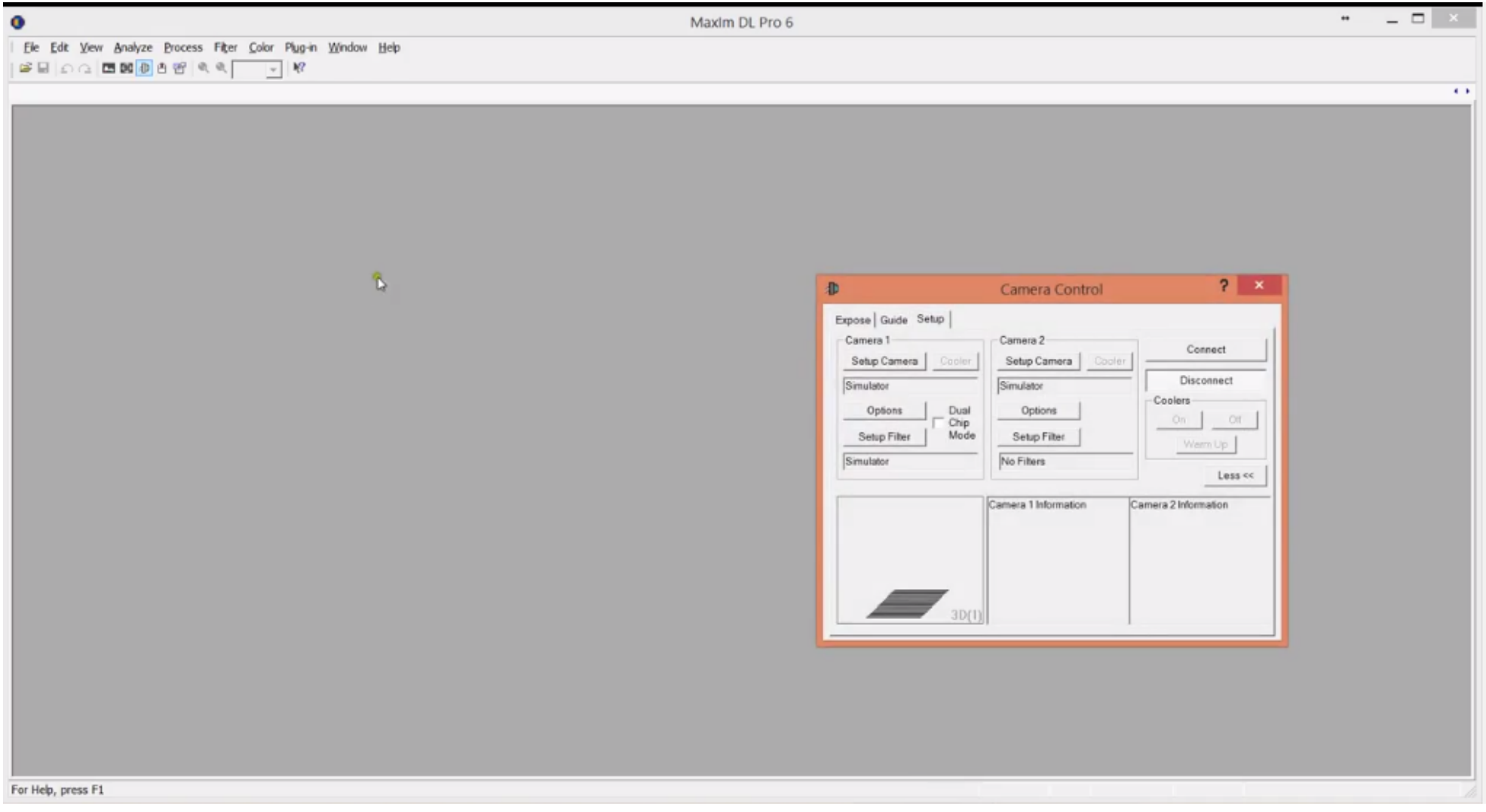
dodajemy słowo kluczowe Observer



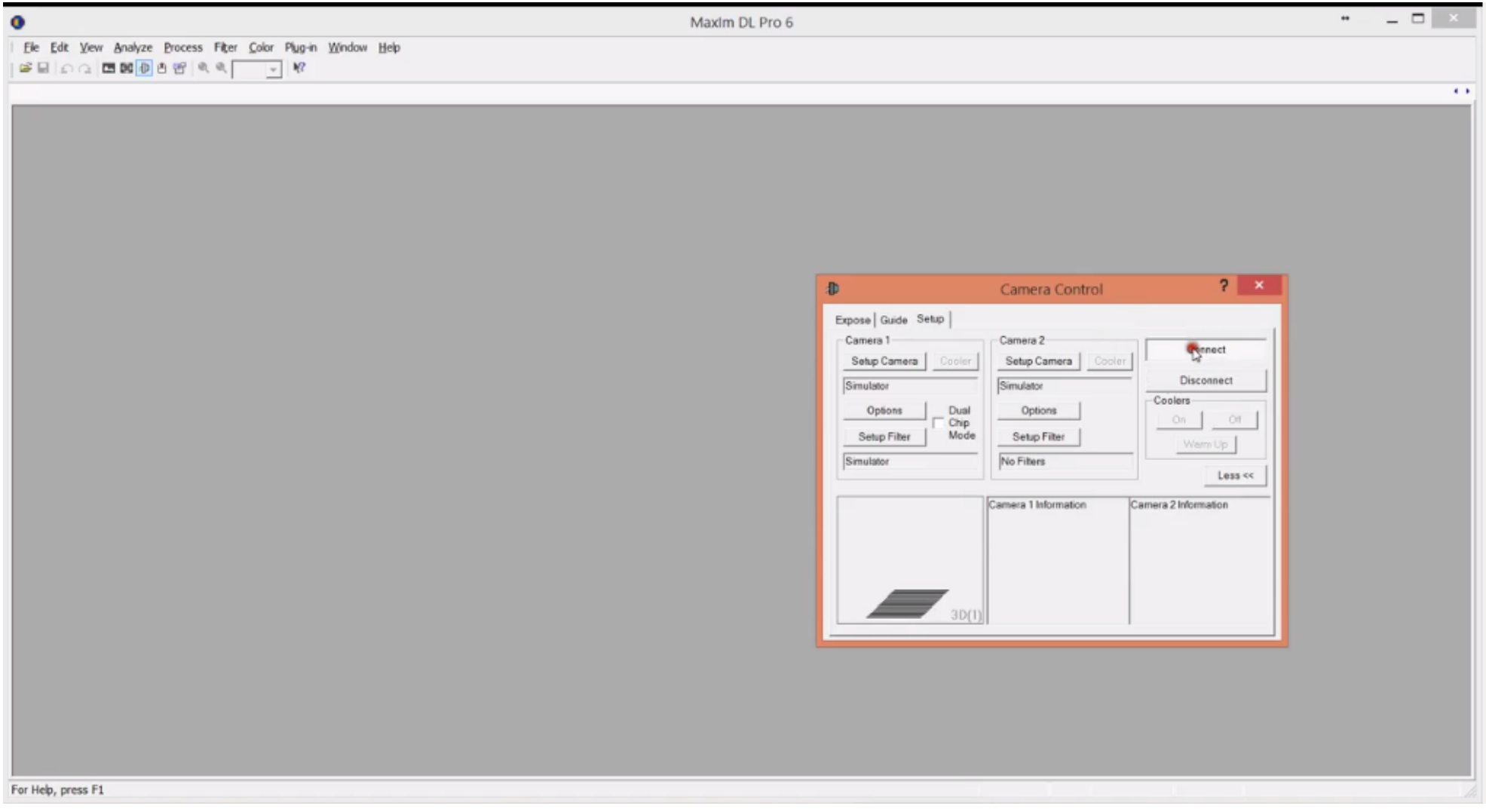
wracamy do kamery aby ją włączyć i użyć



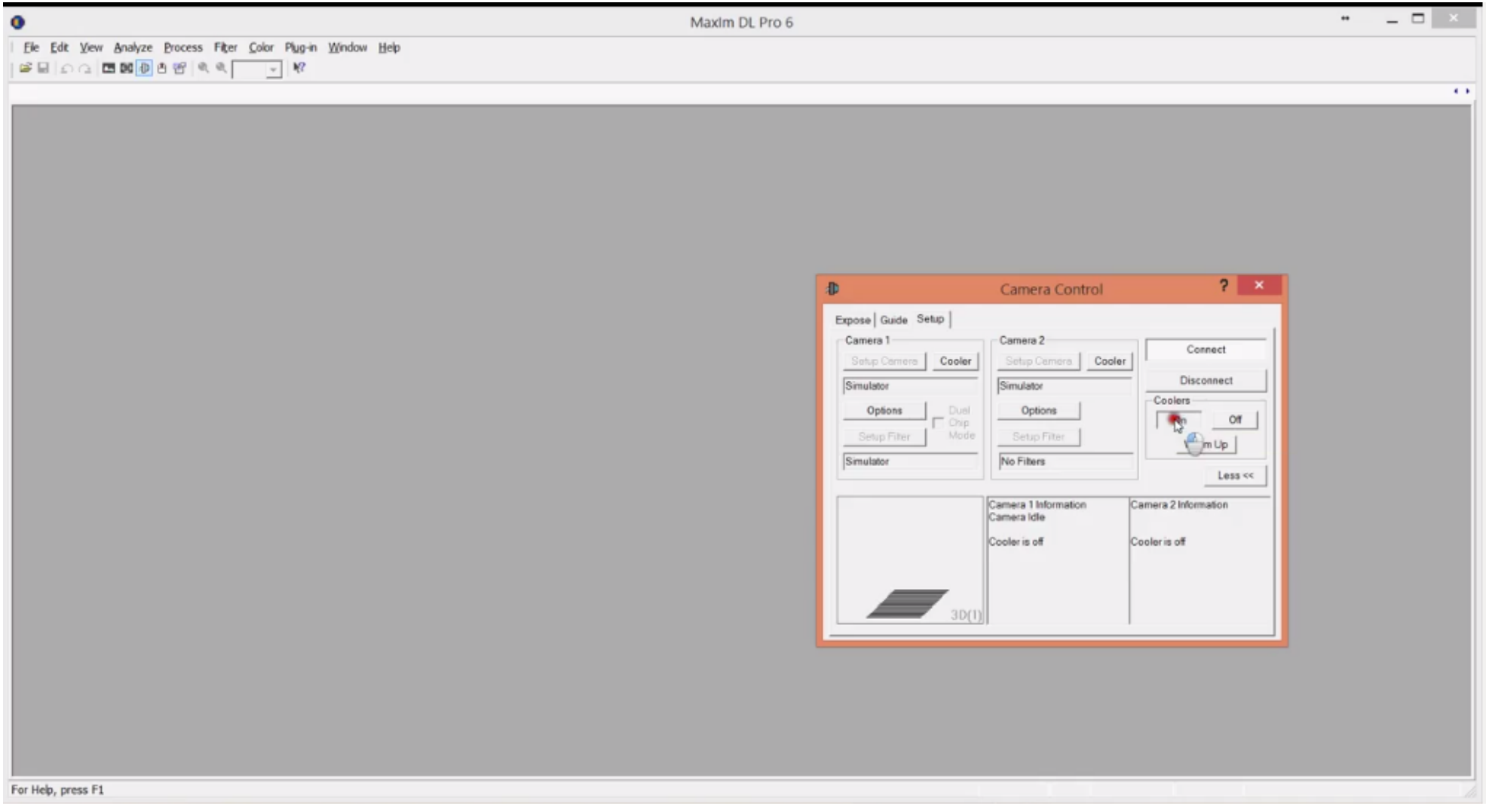
otwiera się okno kontroli pracy kamery



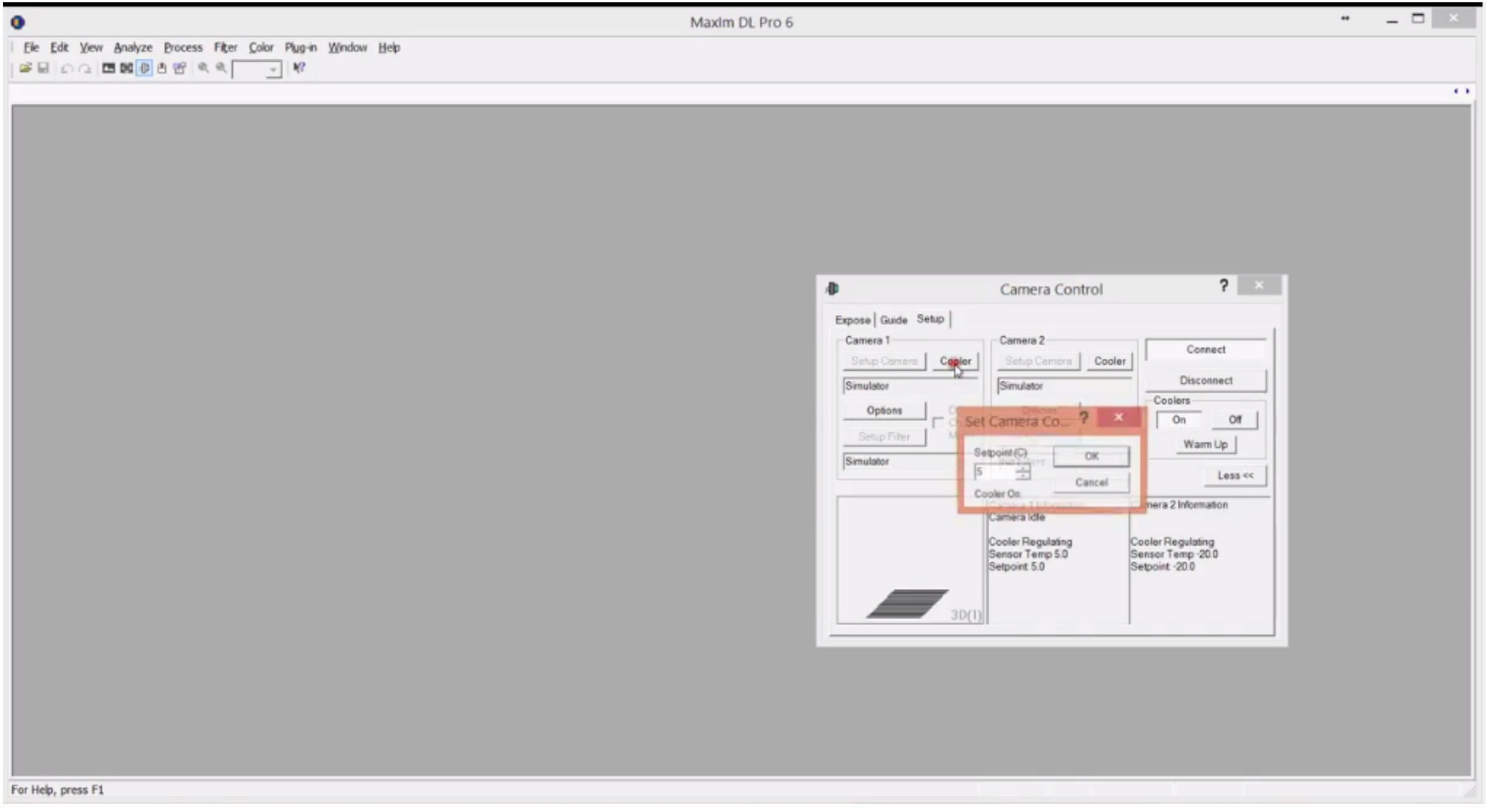
klikamy Connect

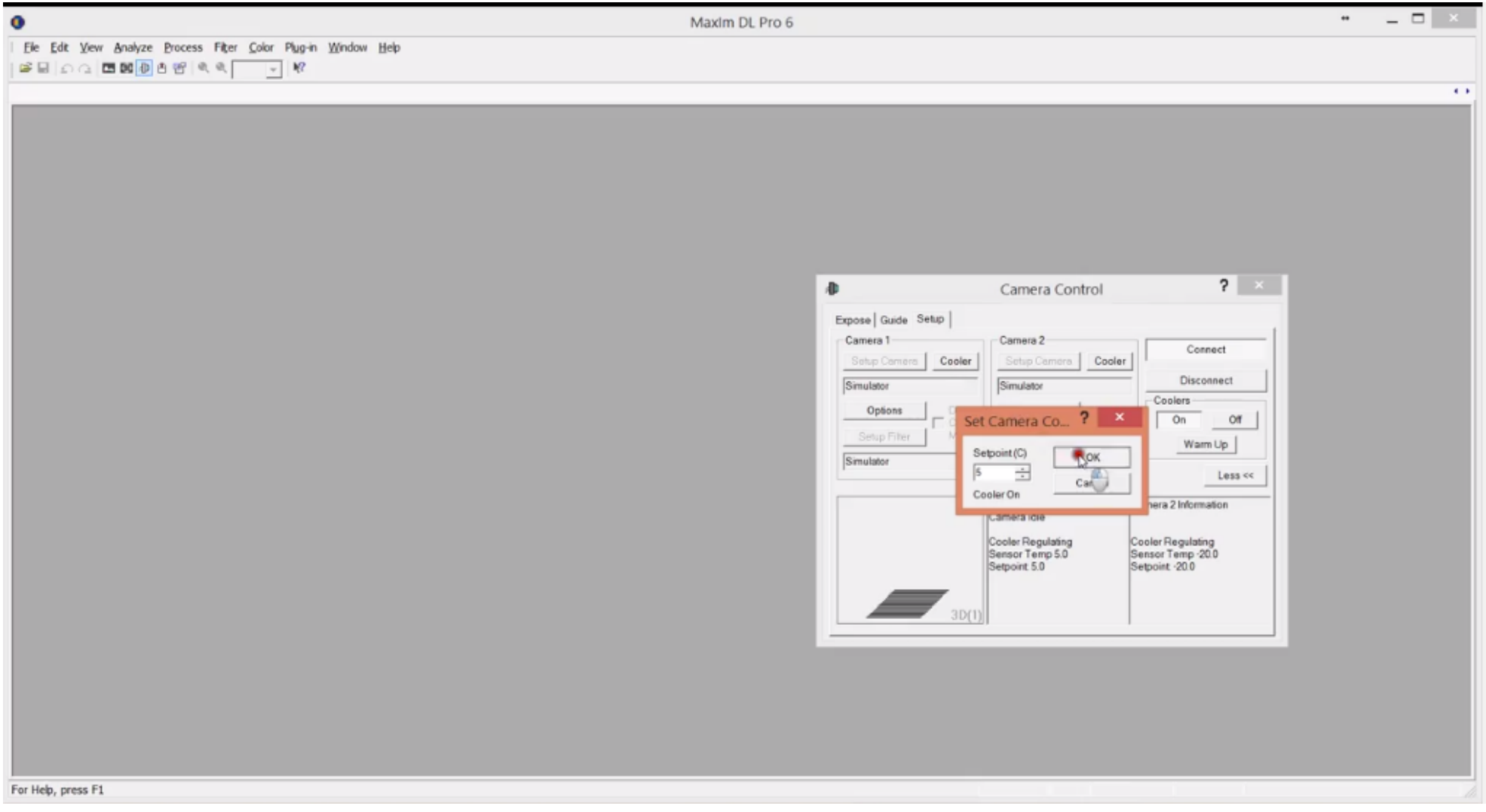


włączamy chłodzenie kamery lub kamer

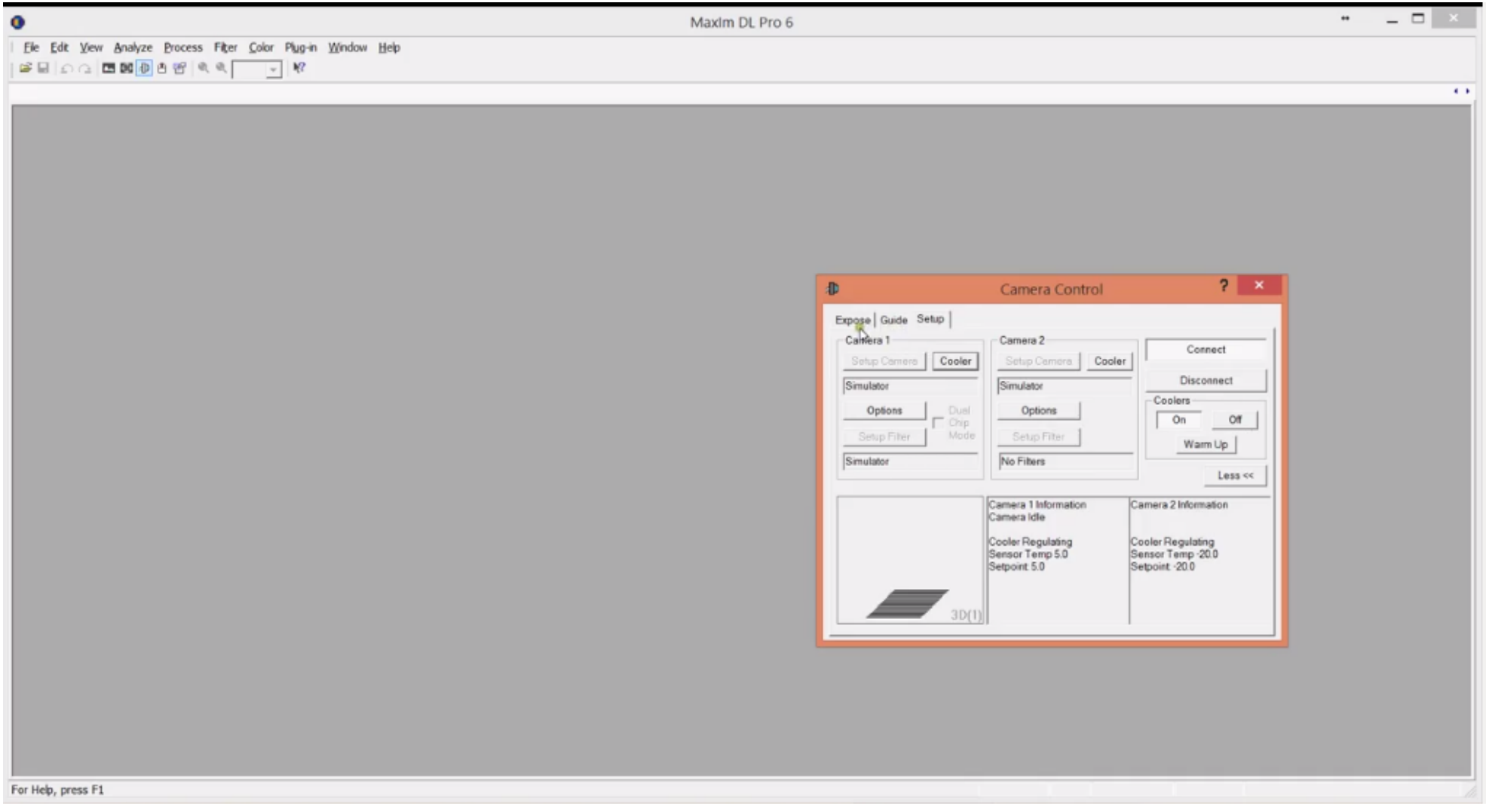


ustawiamy temperaturę pracy kamery

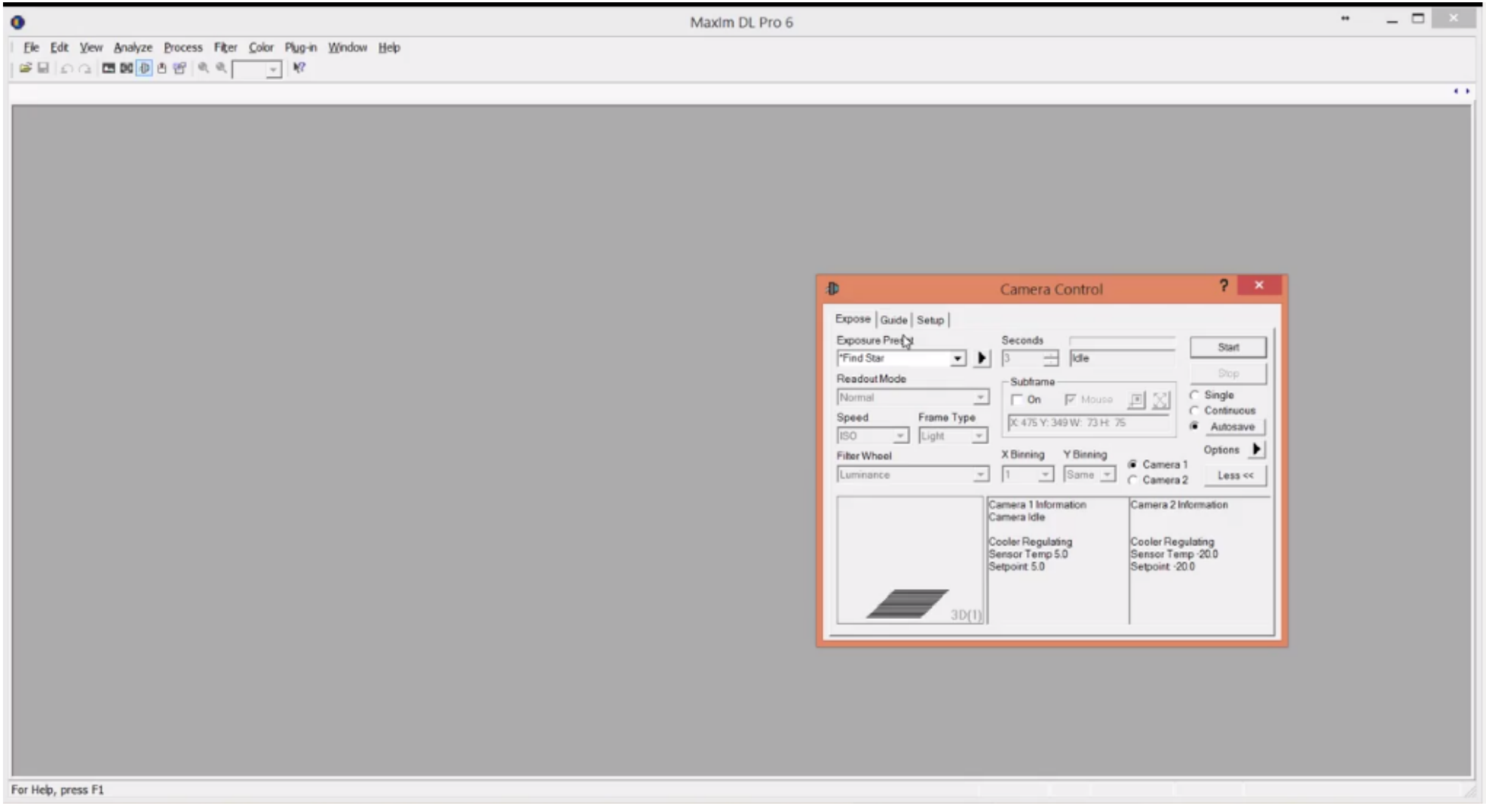



Maxim DL Pro 6
File Edit View Analyze Process Filter Color Plug-in Window Help
Camera Control
Expose Guide Setup
Camera 1
Setup Camera
Cooler
Simulator
Options
Setup Filter
Simulator
Camera 2
Setup Camera
Cooler
Simulator
Connect
Disconnect
Coolers
On
Off
Warm Up
Less <<
Set Camera Co...
Setpoint (C)
5
Cooler On
OK
Cancel
Camera Idle
Cooler Regulating
Sensor Temp 5.0
Setpoint 5.0
Cooler Regulating
Sensor Temp -20.0
Setpoint -20.0
3D(1)
For Help, press F1

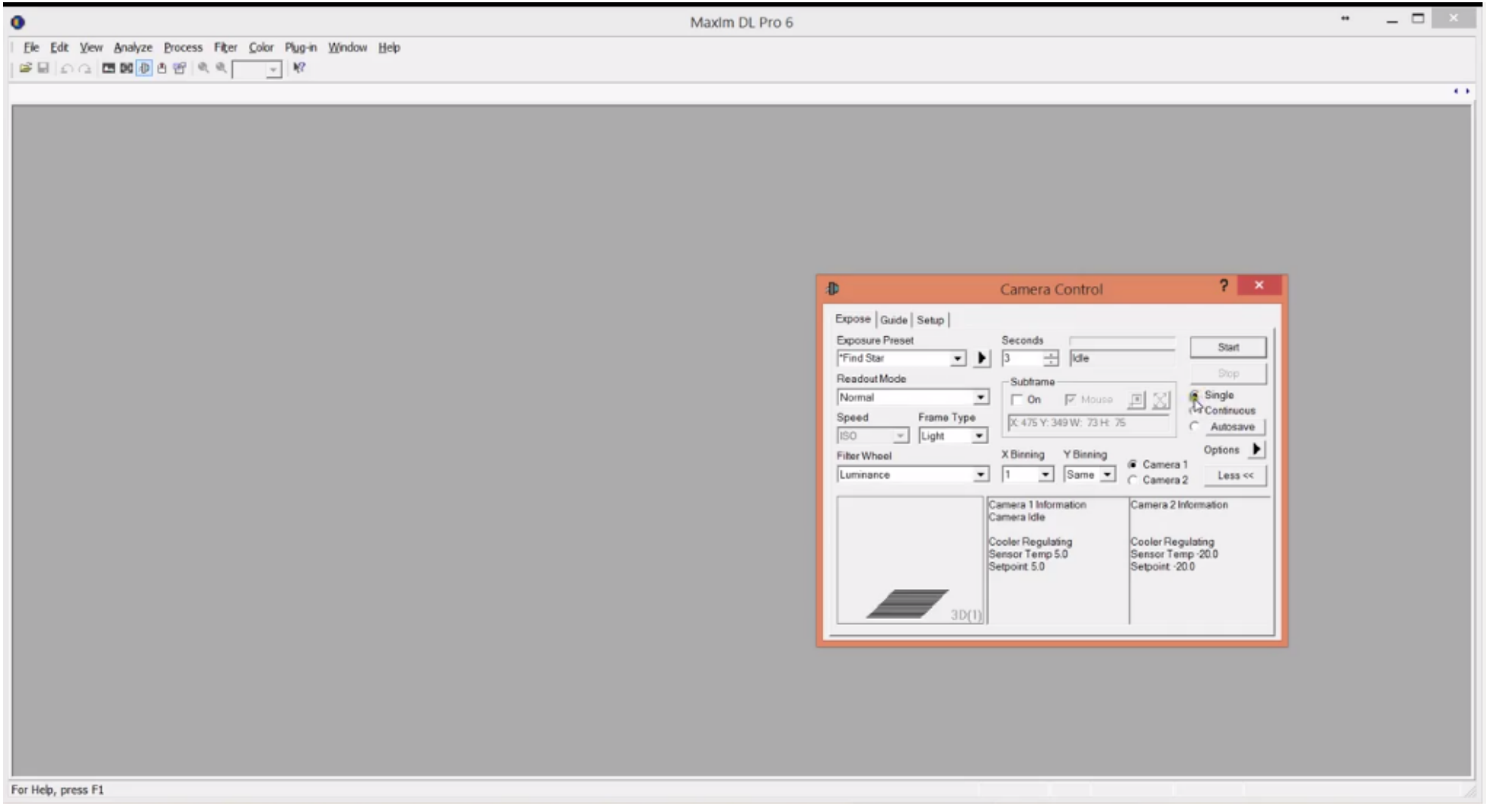
wybieramy zakładkę Expose

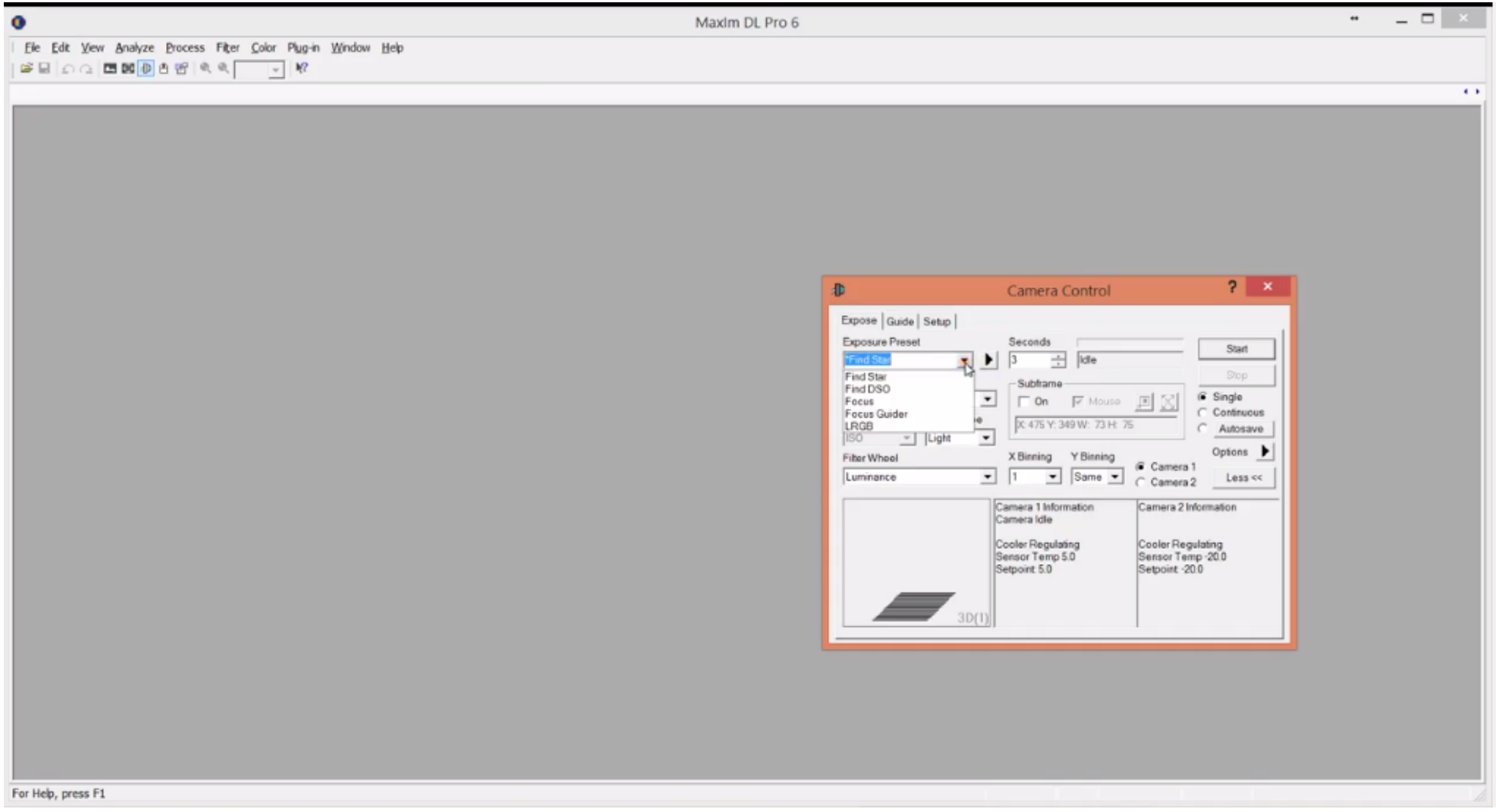


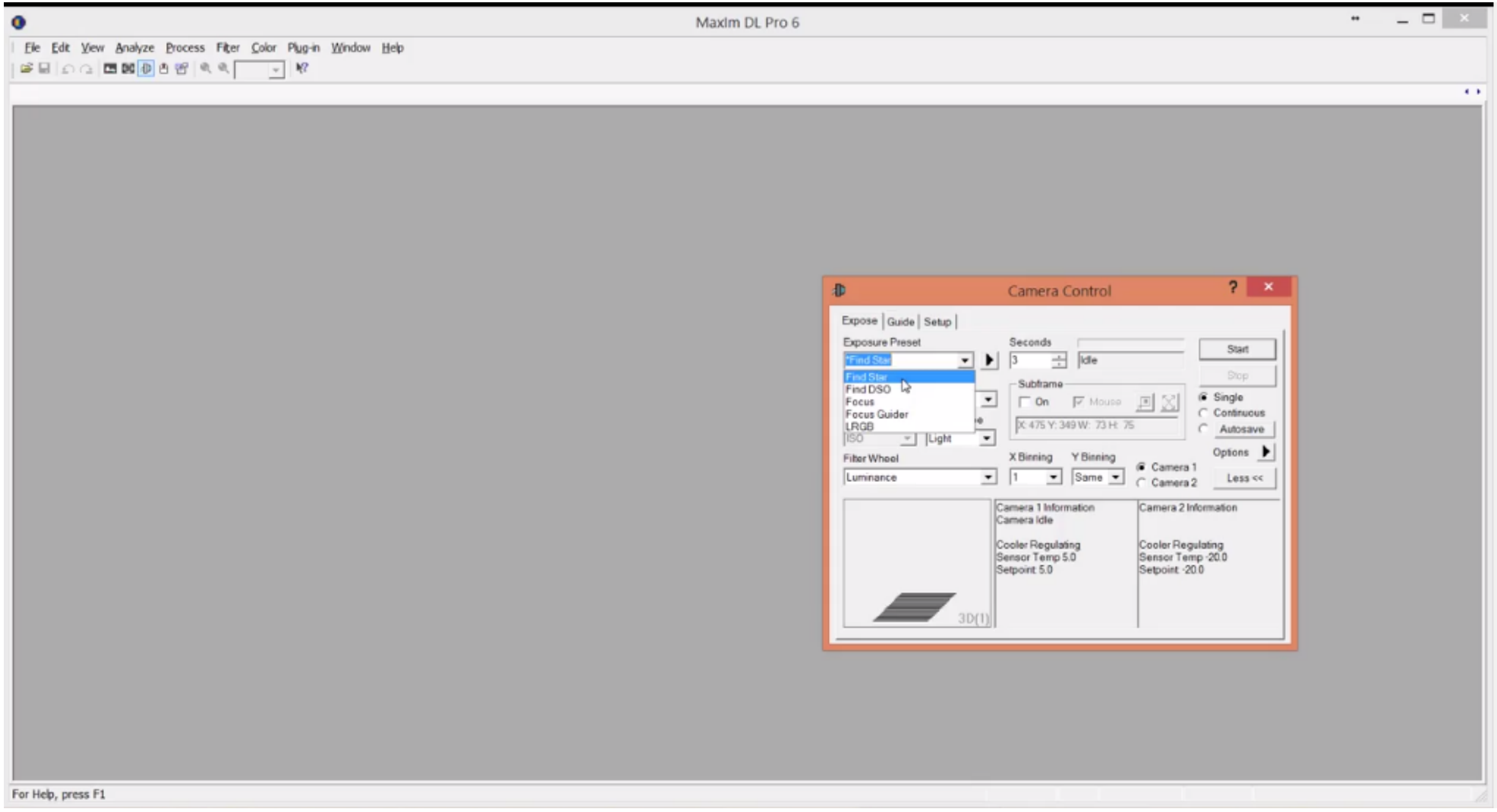
wybieramy właściwą kamerę



wybieramy na początek opcję ekspozycji typu Single i Find Star




MaxIm DL Pro 6
File Edit View Analyze Process Filter Color Plug-in Window Help
Camera Control
Expose Guide Setup
Exposure Preset
*Find Star
Find Star
Find DSO
Focus
Focus Guider
LRGB
Seconds
3
Idle
Start
Stop
Subframe
On
Mouse
X: 475 Y: 349 W: 73 H: 75
Single
Continuous
Autosave
Options
Less <<
ISO
Light
Filter Wheel
Luminance
X Binning
Y Binning
1
Same
Camera 1
Camera 2
Camera 1 Information
Camera Idle
Cooler Regulating
Sensor Temp 5.0
Setpoint 5.0
Camera 2 Information
Cooler Regulating
Sensor Temp -20.0
Setpoint -20.0
3D(1)
For Help, press F1


MaxIm DL Pro 6
File Edit View Analyze Process Filter Color Plug-in Window Help
Camera Control
Expose Guide Setup
Exposure Preset
*Find Star
Find Star
Find DSO
Focus
Focus Guider
LRGB
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Subframe
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Mouse
X: 475 Y: 349 W: 73 H: 75
Single
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Autosave
Options
Less <<
ISO
Light
Filter Wheel
Luminance
X Binning
Y Binning
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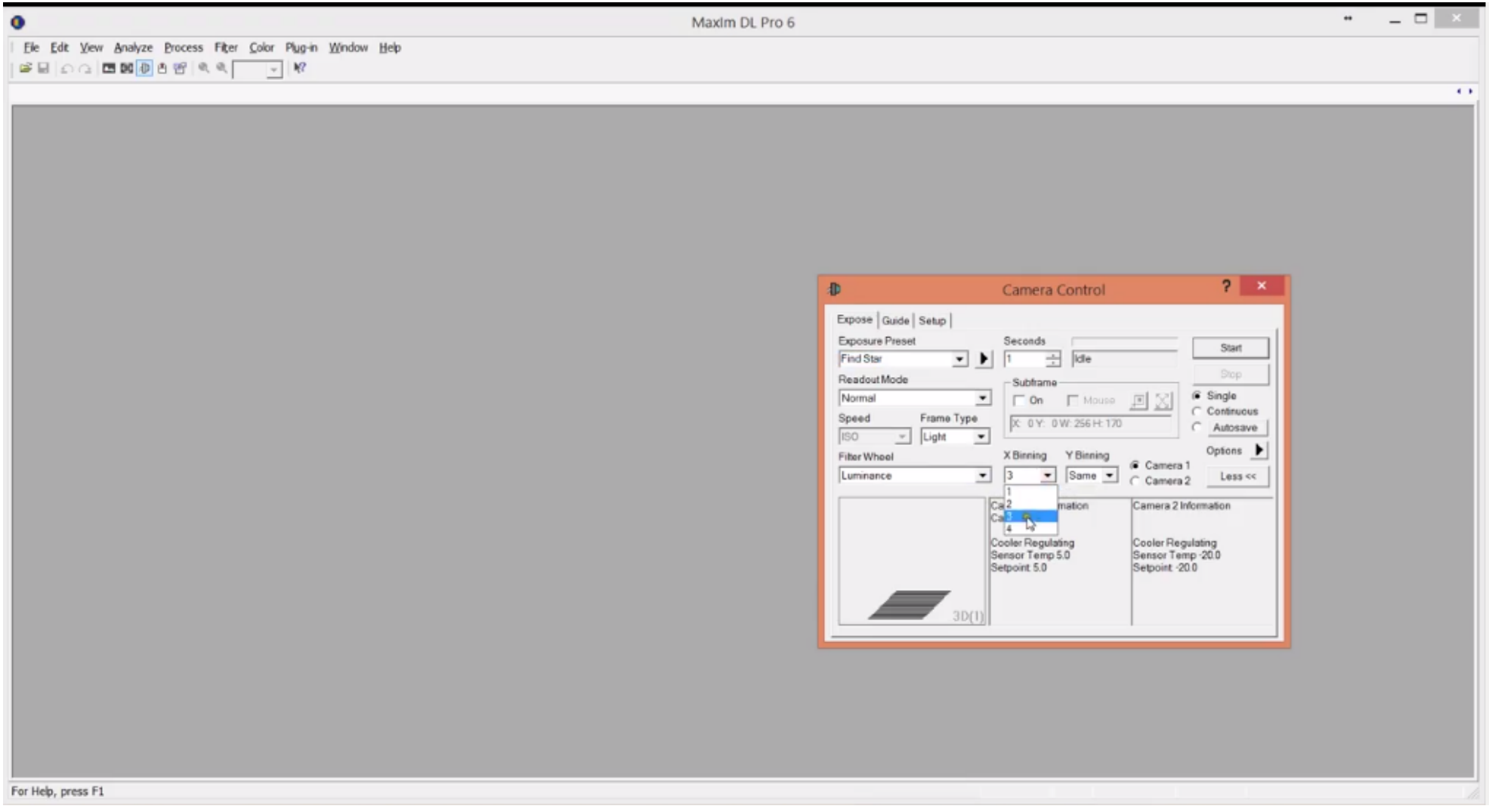
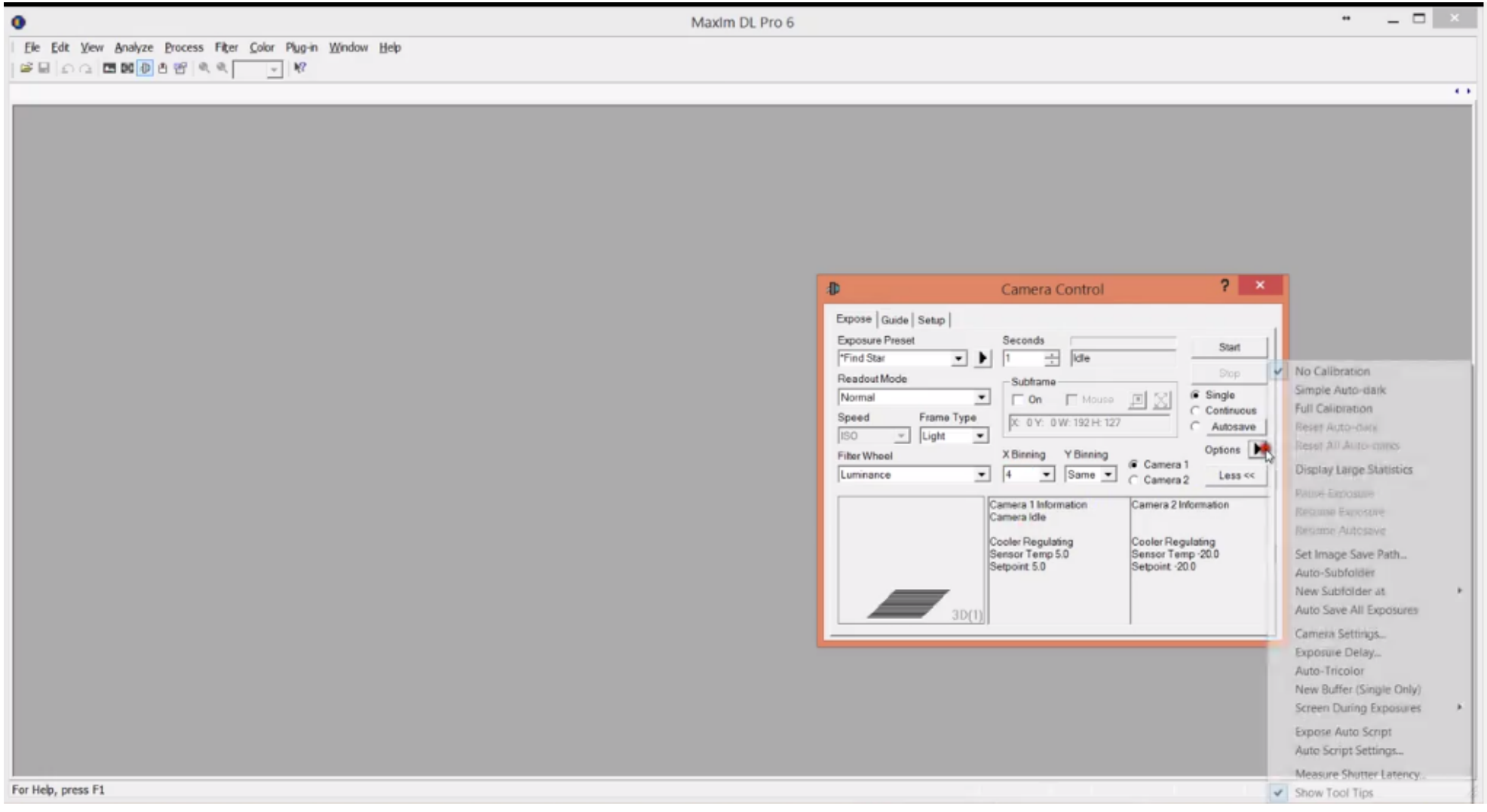
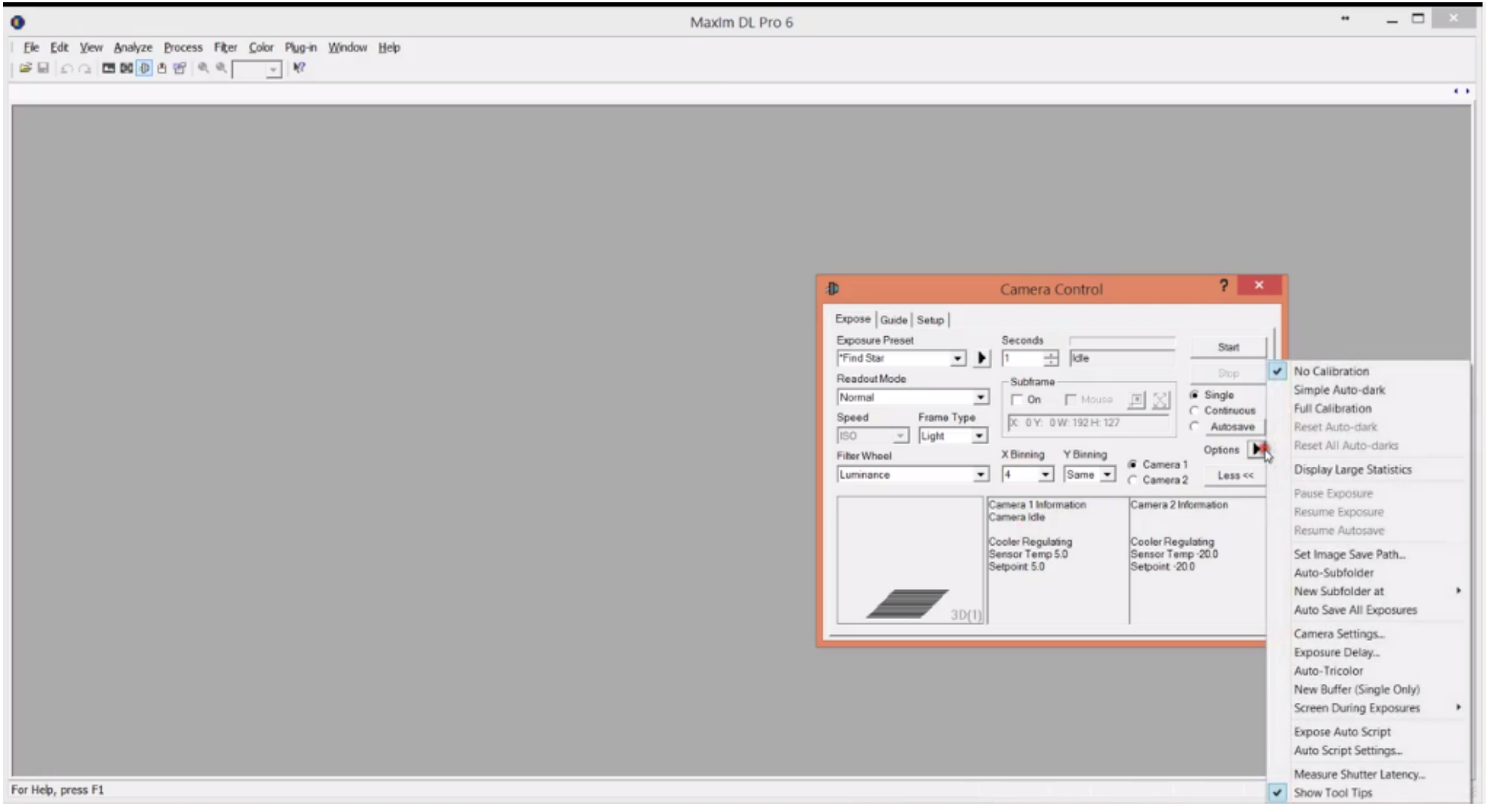
Same
Camera 1
Camera 2
Camera 1 Information
Camera Idle
Cooler Regulating
Sensor Temp 5.0
Setpoint 5.0
Camera 2 Information
Cooler Regulating
Sensor Temp -20.0
Setpoint -20.0
3D(1)
For Help, press F1

ustawiamy czas ekspozycji, filtr, binowanie dla jednej ekspozycji

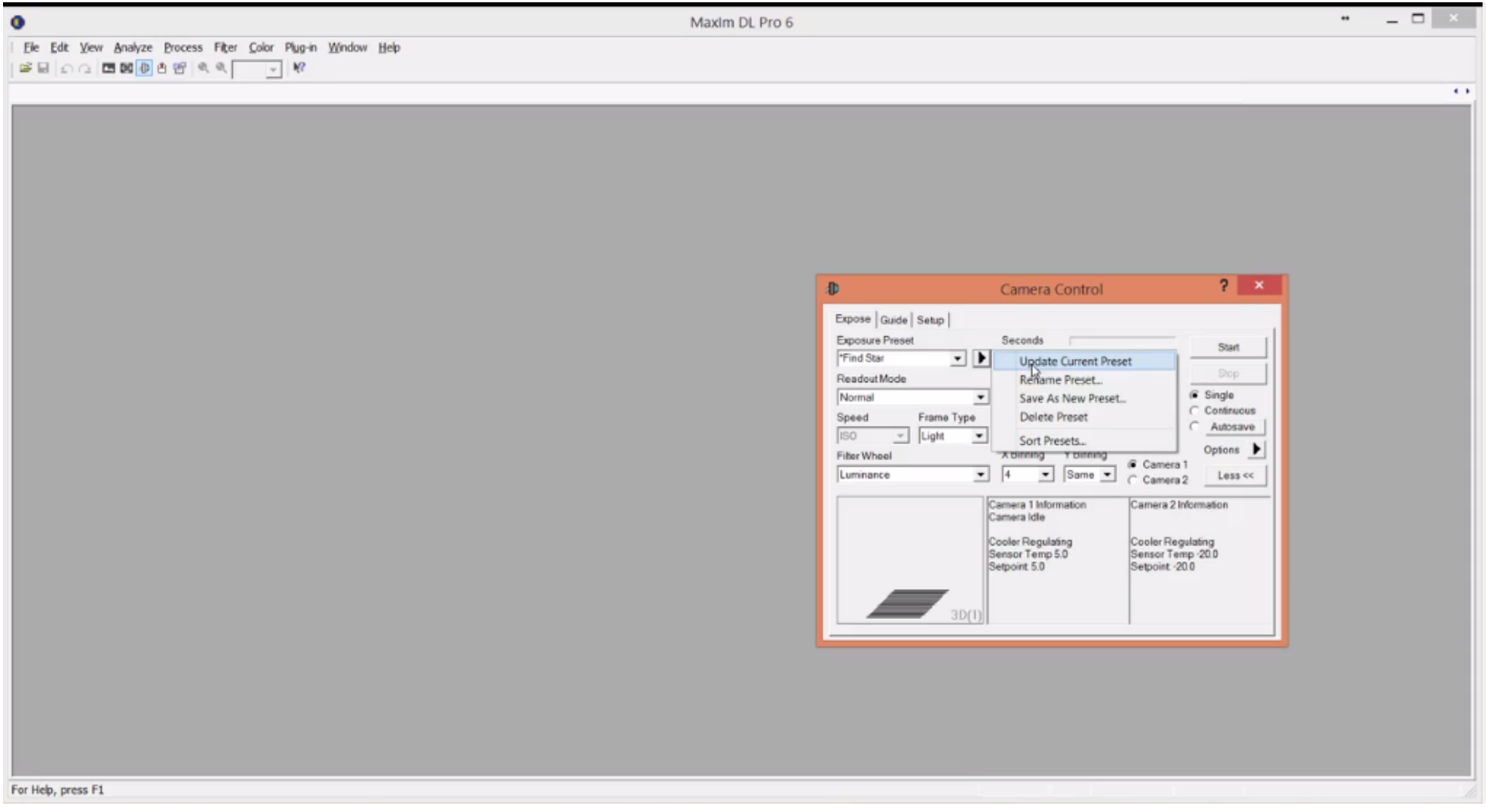



MaxIm DL Pro 6
File Edit View Analyze Process Filter Color Plug-in Window Help
Camera Control
Expose Guide Setup
Exposure Preset
*Find Star
Seconds
1
Idle
Start
Stop
Readout Mode
Normal
Subframe
On
Mouse
X: 0 Y: 0 W: 192 H: 127
Single
Continuous
Autosave
Speed
ISO
Frame Type
Light
Filter Wheel
Luminance
X Binning
4
Y Binning
Same
Options
Camera 1
Camera 2
Less <<
Camera 1 Information
Camera Idle
Cooler Regulating
Sensor Temp 5.0
Setpoint 5.0
Camera 2 Information
Cooler Regulating
Sensor Temp -20.0
Setpoint -20.0
3D(1)
No Calibration
Simple Auto-dark
Full Calibration
Reset Auto-dark
Reset All Auto-darks
Display Large Statistics
Pause Exposure
Resume Exposure
Resume Autosave
Set Image Save Path...
Auto-Subfolder
New Subfolder at
Auto Save All Exposures
Camera Settings...
Exposure Delay...
Auto-Tricolor
New Buffer (Single Only)
Screen During Exposures
Expose Auto Script
Auto Script Settings...
Measure Shutter Latency...
Show Tool Tips
For Help, press F1

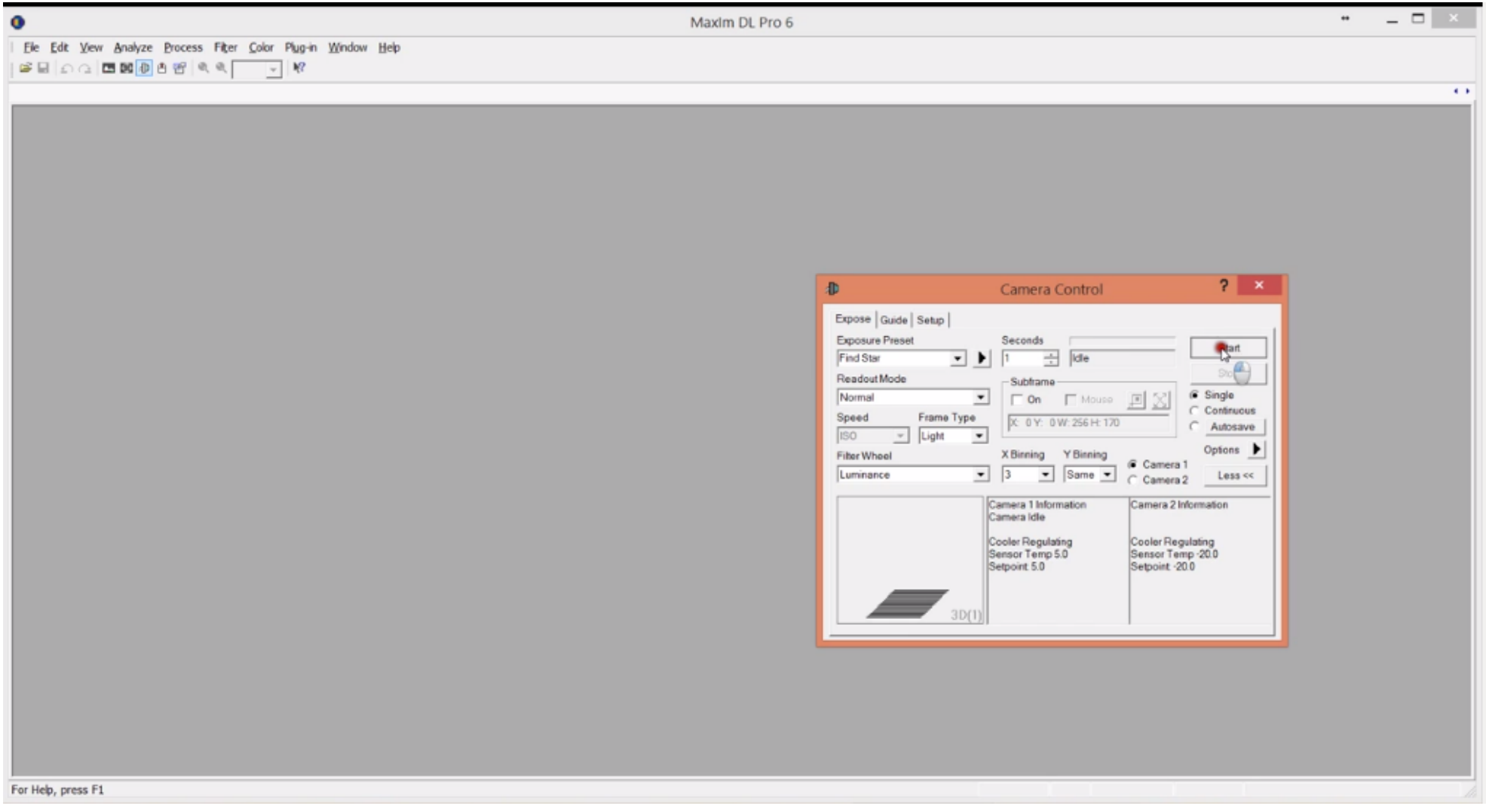
rozwijamy dodatkowe opcje



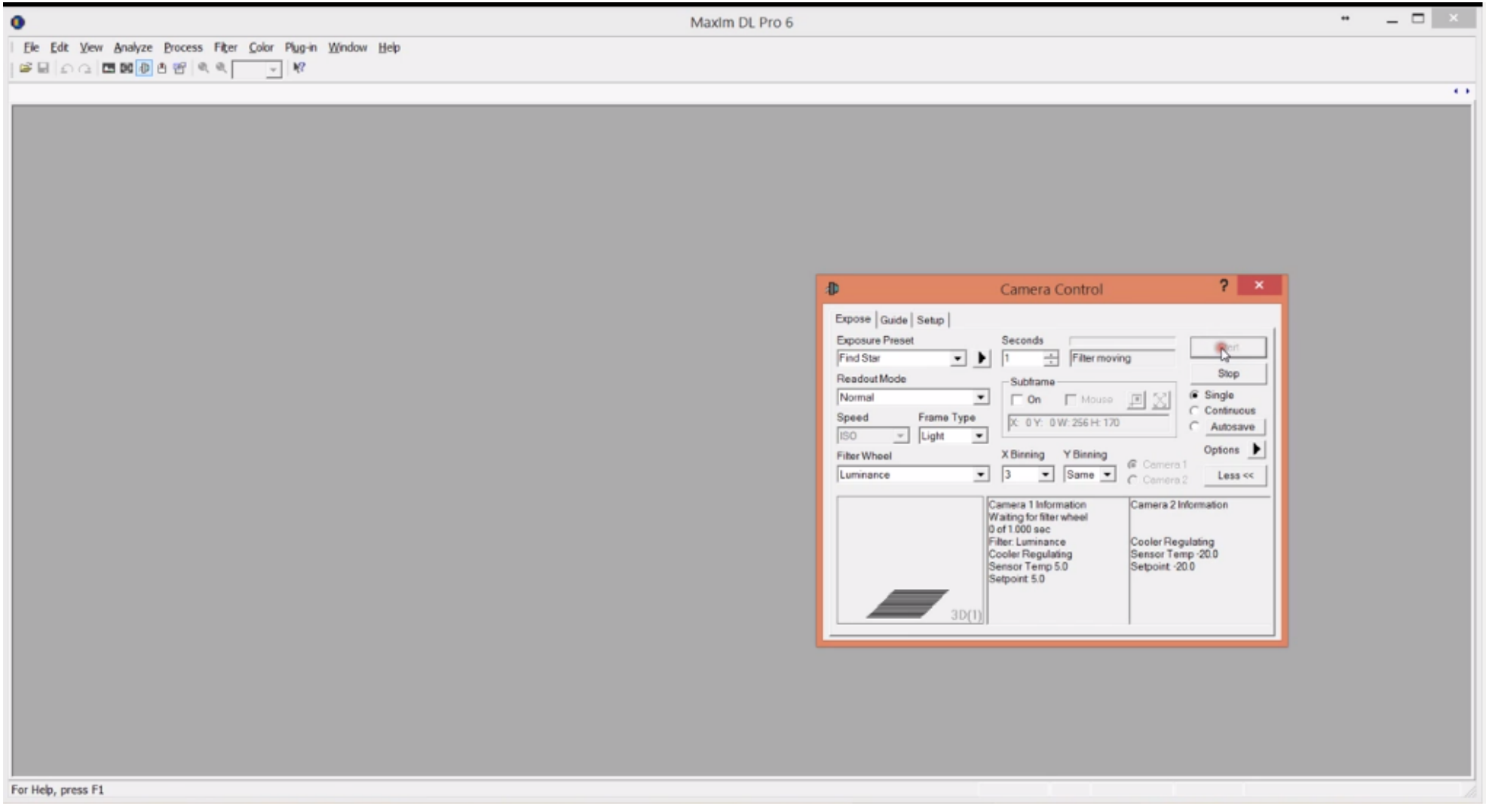
odświeżamy ustawienia



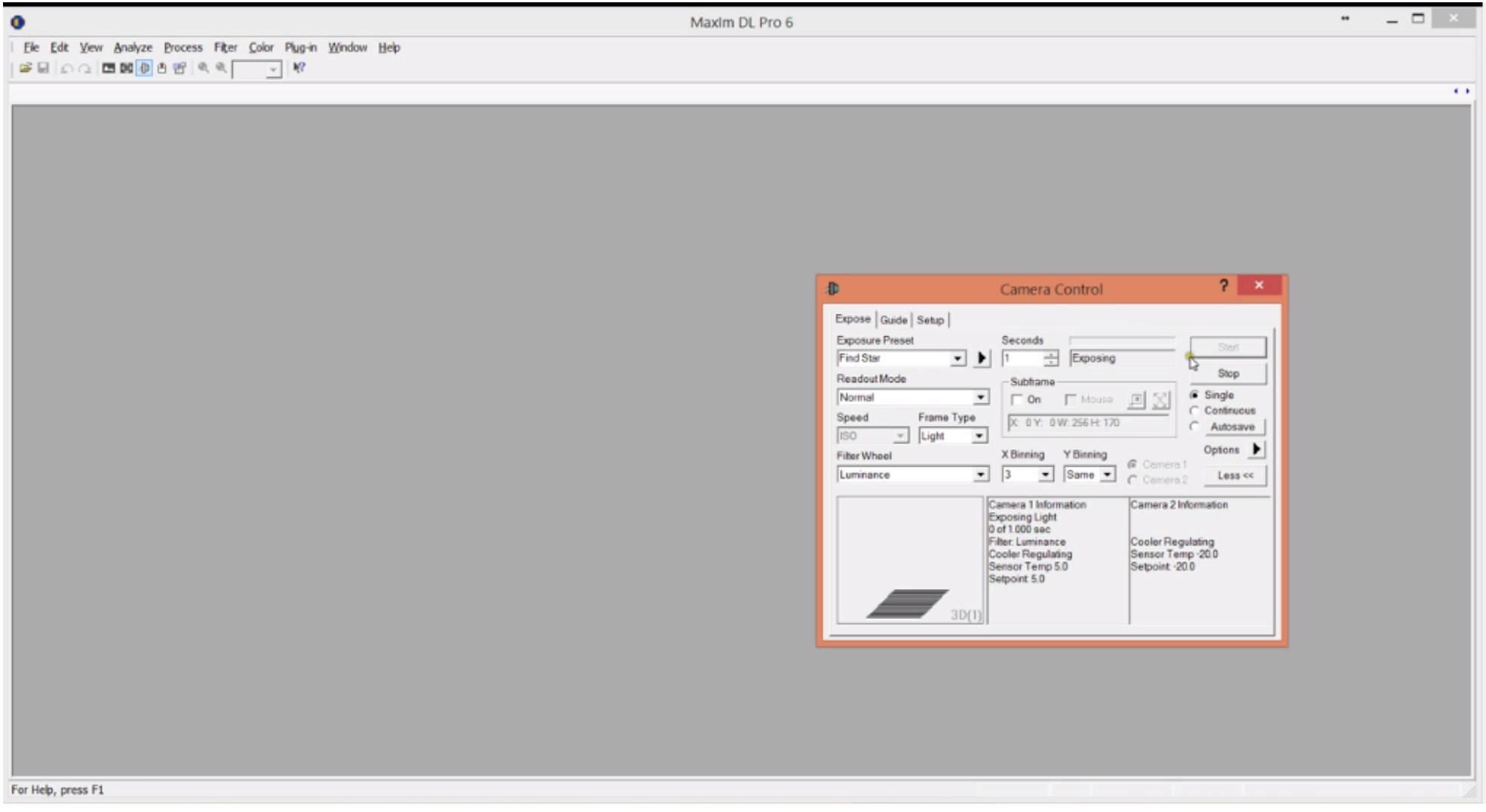
klikamy Start aby wykonać ekspozycję



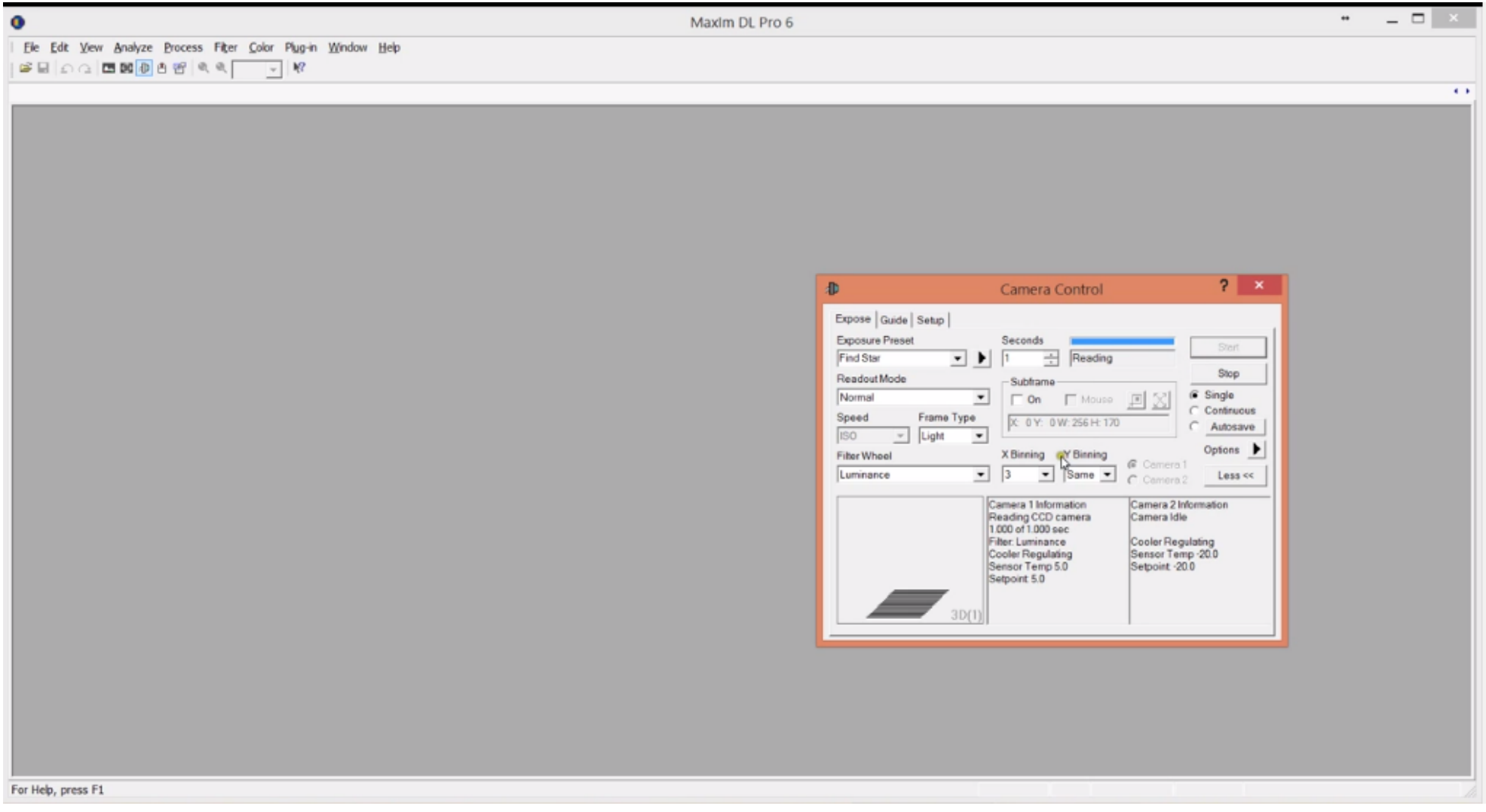
następuje wybór filtra



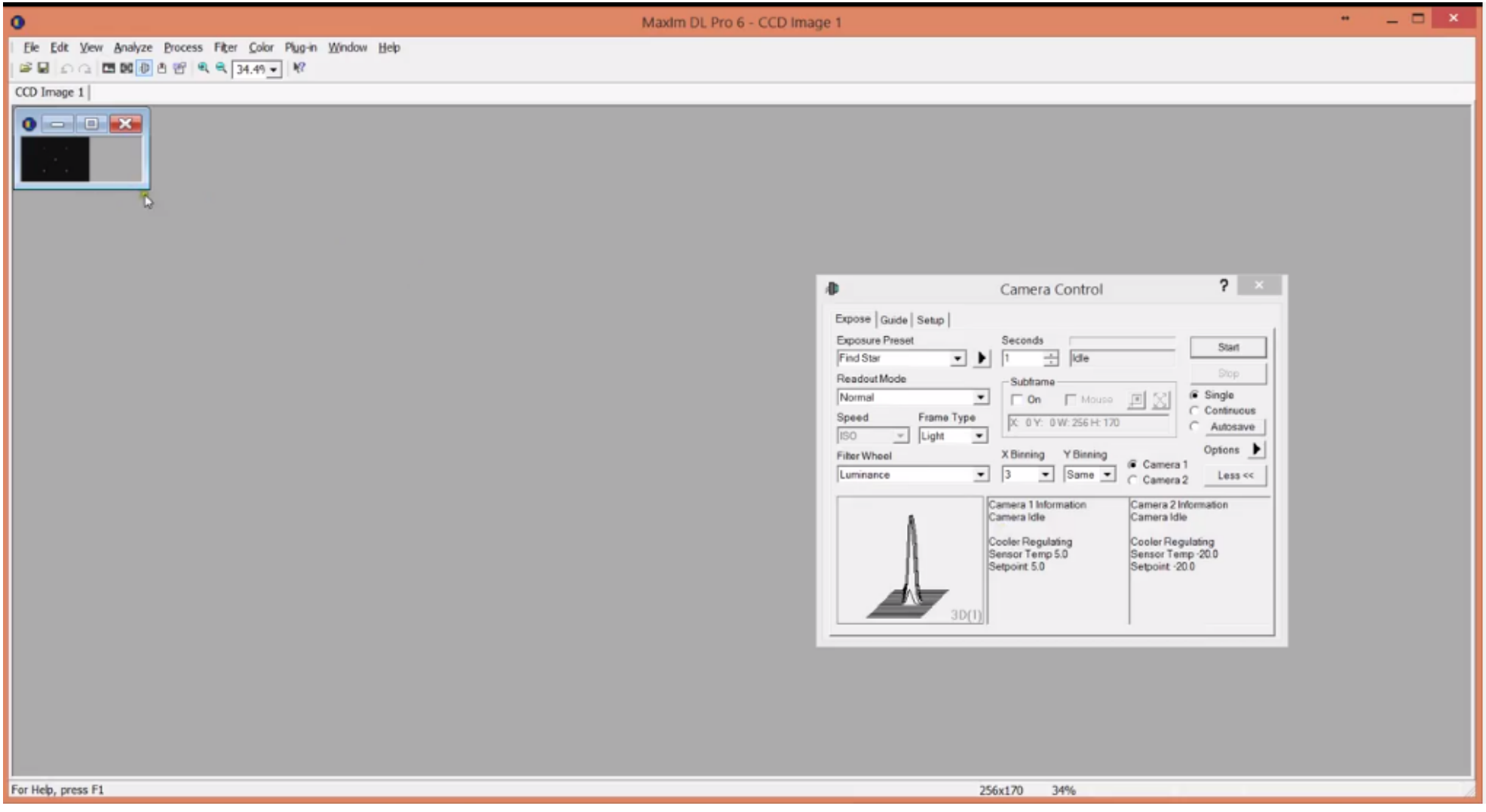
trwa ekspozycja



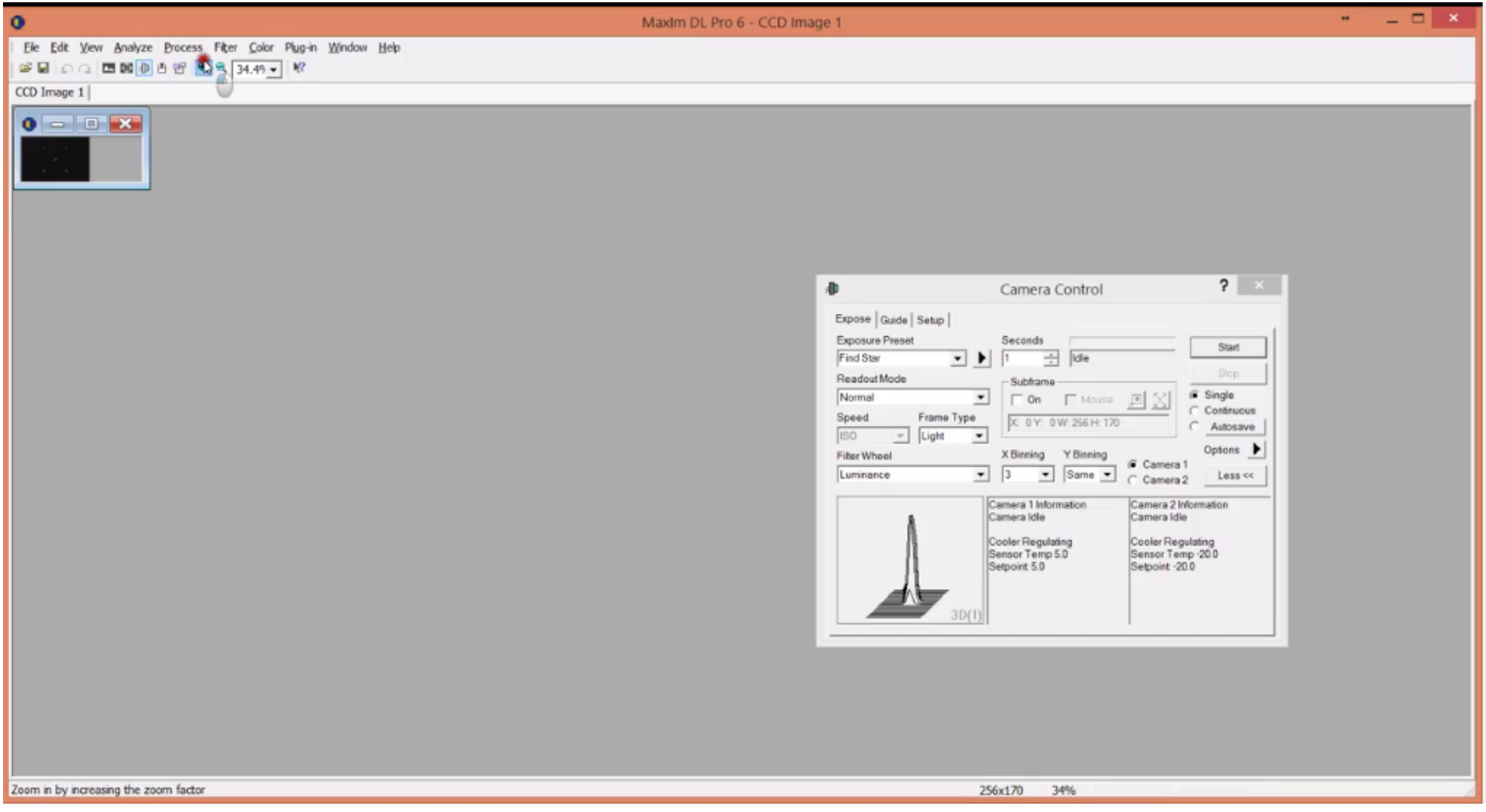
zczytywanie obrazu



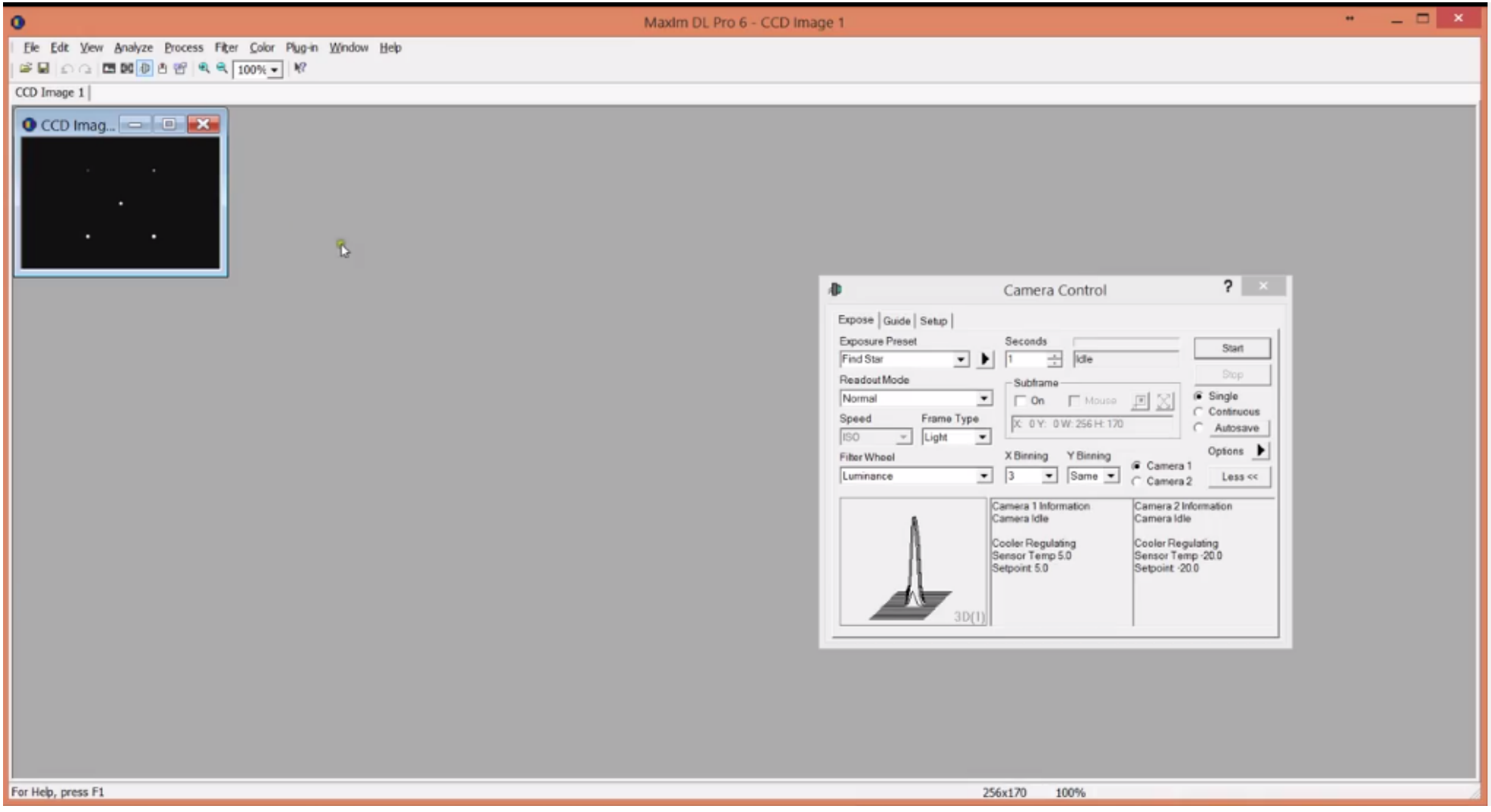
otwiera się nowe okno z obrazem



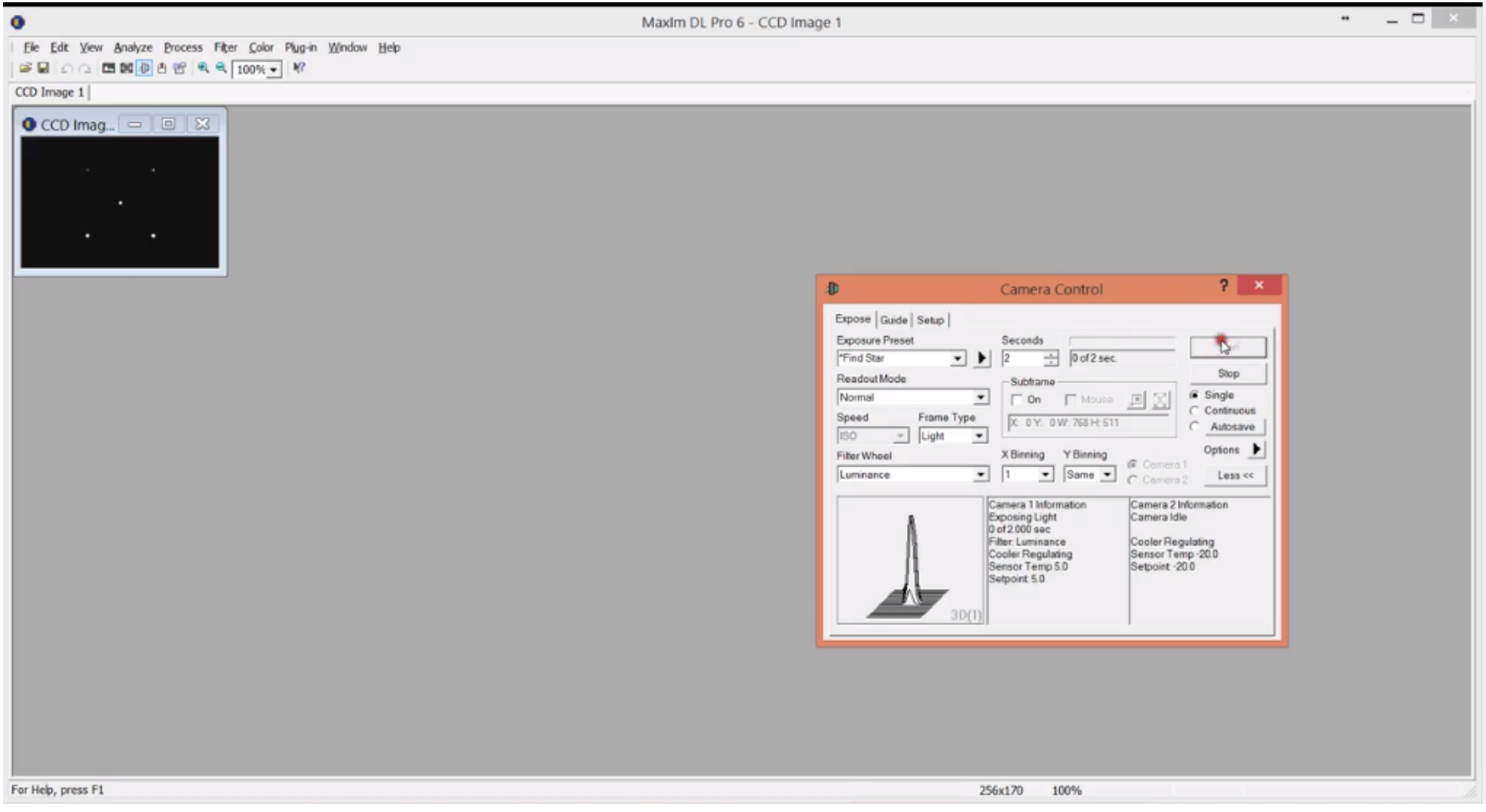
można powiększyć aby zobaczyć szczegóły



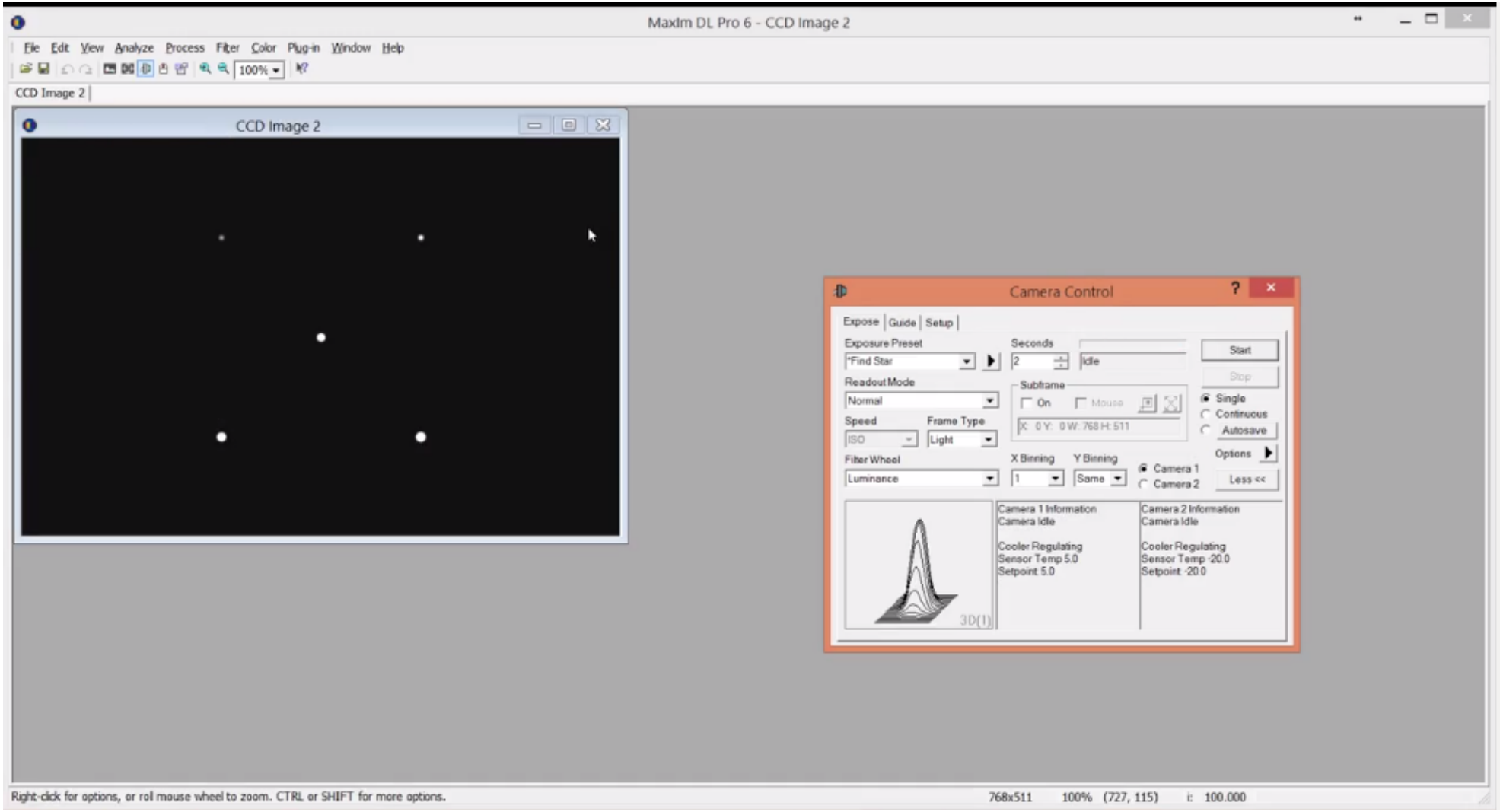
w przypadku niewystarczającej rozdzielczości rezygnujemy z binowania

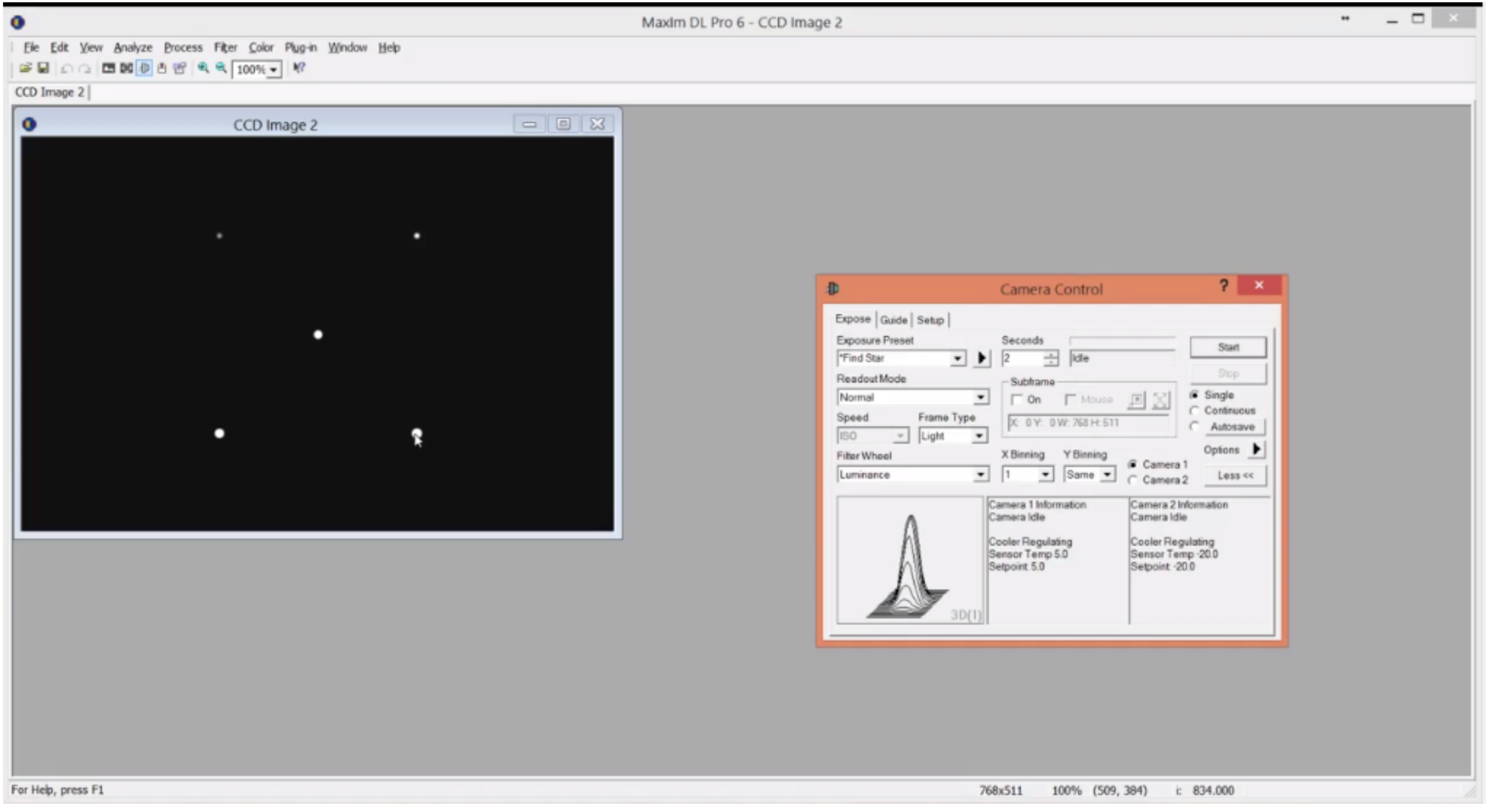


efektem wykonania kolejnej ekspozycji jest obraz o większej rozdzielczości

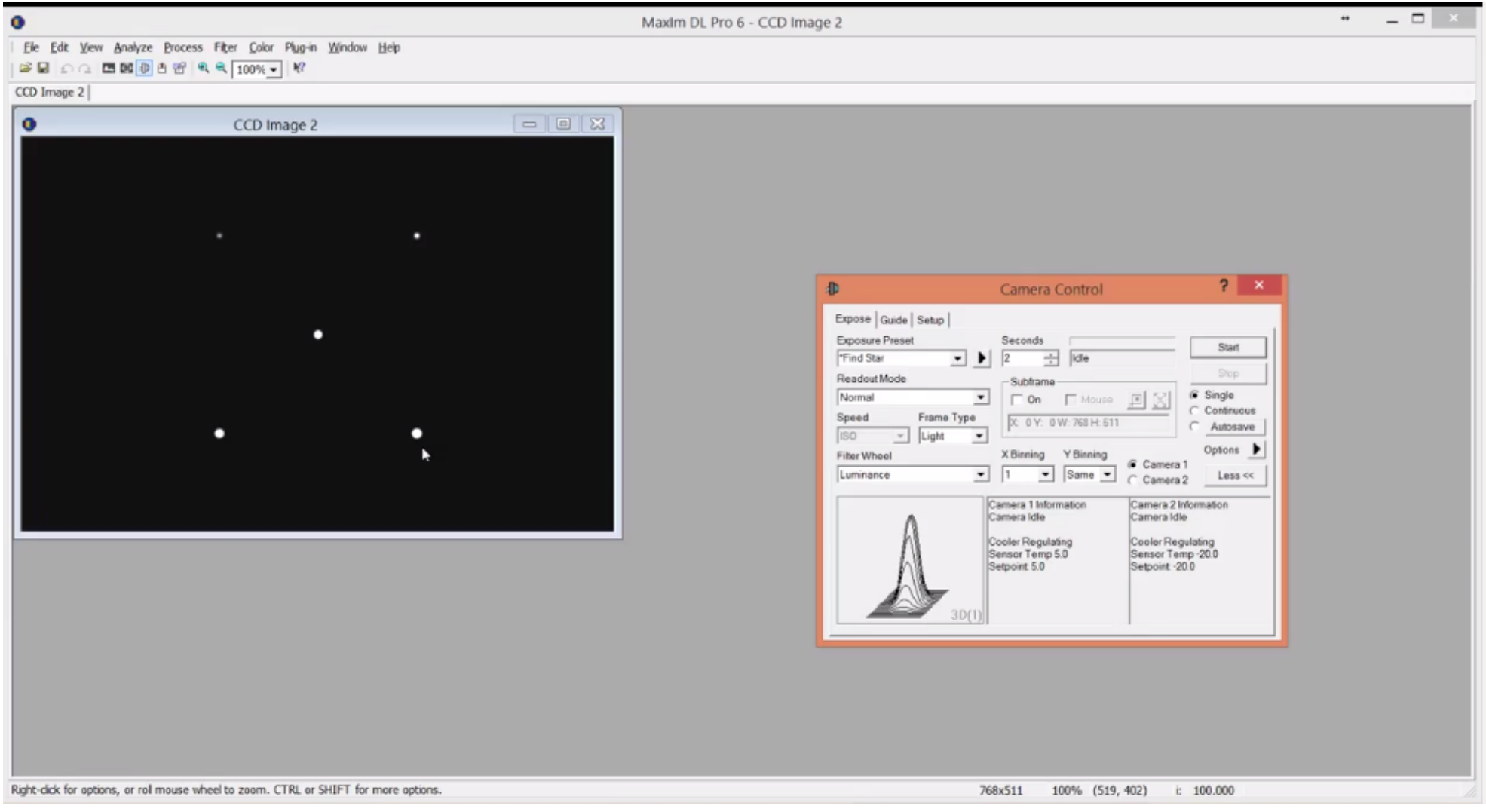


poruszając kursosem po obrazie rejestrujemy zmianę położenia kursowa w obrębie mapy pikseli i wartości zliczeń w pikselu

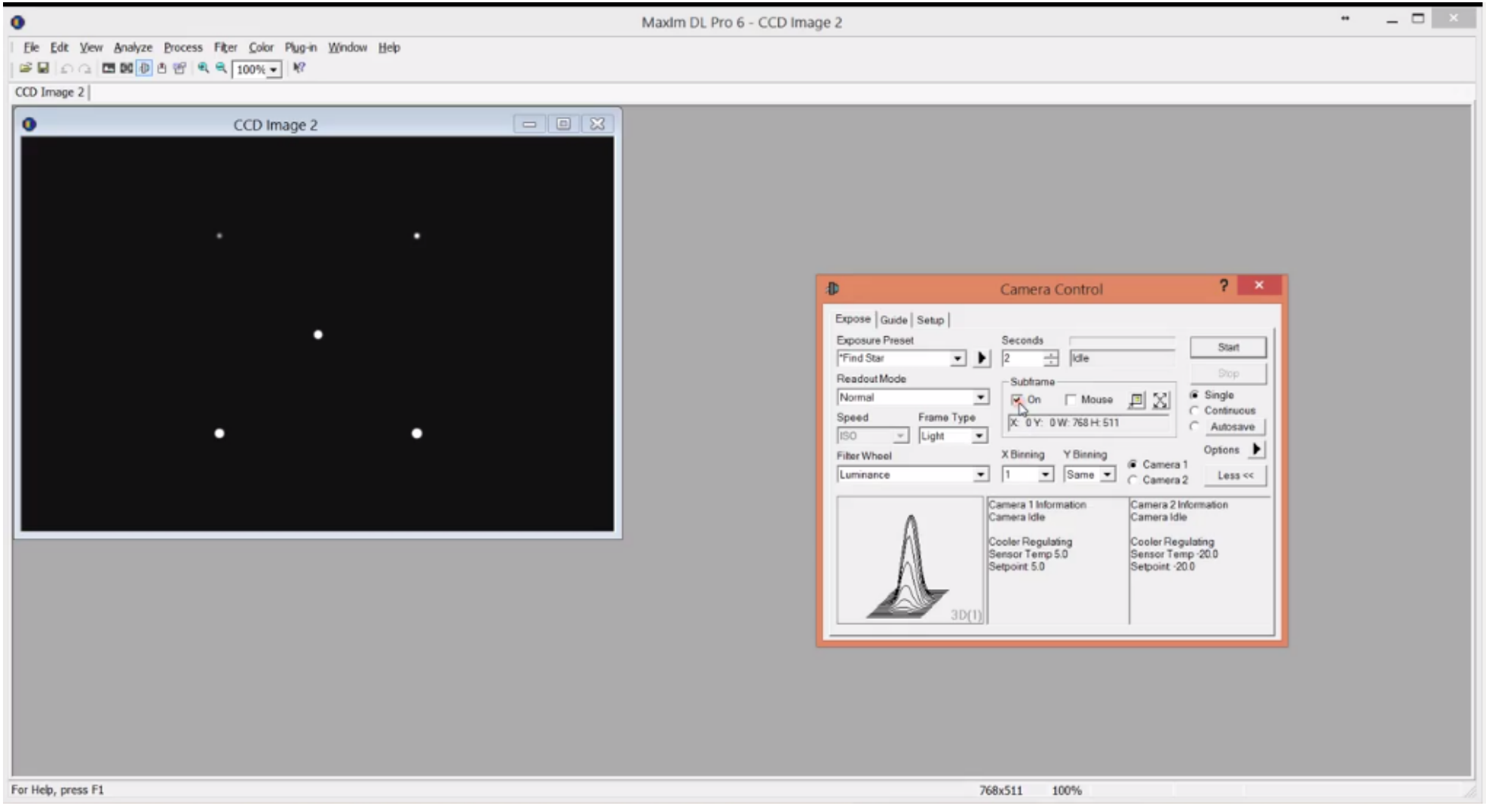


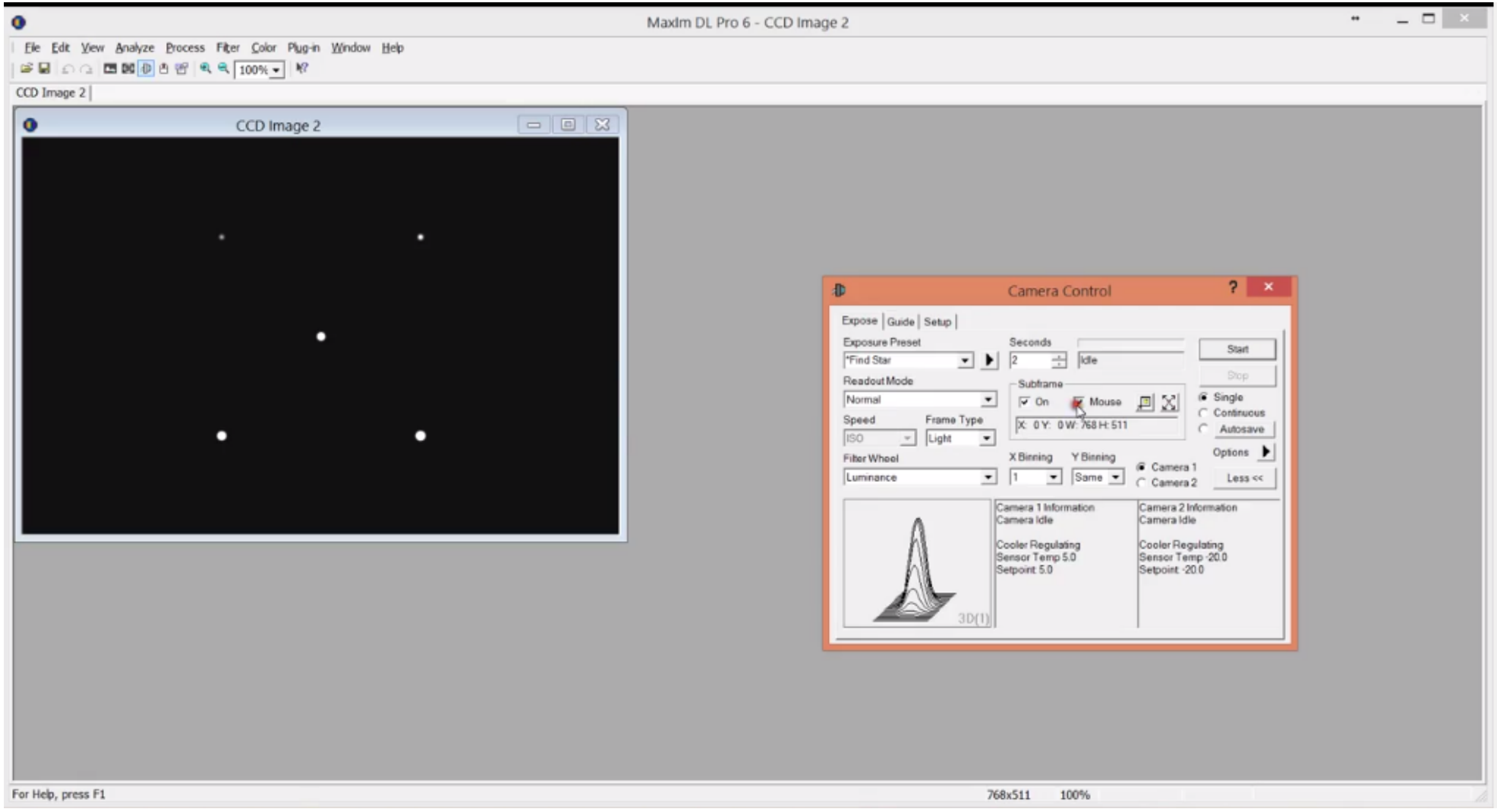

MaxIm DL Pro 6 - CCD Image 2
File Edit View Analyze Process Filter Color Plug-in Window Help
100%
CCD Image 2
CCD Image 2
Camera Control
Expose Guide Setup
Exposure Preset
*Find Star
Seconds
2
Idle
Start
Stop
Readout Mode
Normal
Subframe
On
Mouse
X: 0 Y: 0 W: 768 H: 511
Single
Continuous
Autosave
Speed
ISO
Frame Type
Light
Filter Wheel
Luminance
X Binning
1
Y Binning
Same
Camera 1
Camera 2
Options
Less <<
3D(1)
Camera 1 Information
Camera Idle
Cooler Regulating
Sensor Temp 5.0
Setpoint 5.0
Camera 2 Information
Camera Idle
Cooler Regulating
Sensor Temp -20.0
Setpoint -20.0
For Help, press F1
768x511
100%
(509, 384)
834.000

ogniskowanie obrazu odbywa się na pojedyńczej gwieździe



jej wyboru dokonujemy za pomocą opcji Subframe i Mouse




MaxIm DL Pro 6 - CCD Image 2
File Edit View Analyze Process Filter Color Plug-in Window Help
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CCD Image 2
CCD Image 2
Camera Control
Expose Guide Setup
Exposure Preset
*Find Star
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Readout Mode
Normal
Subframe
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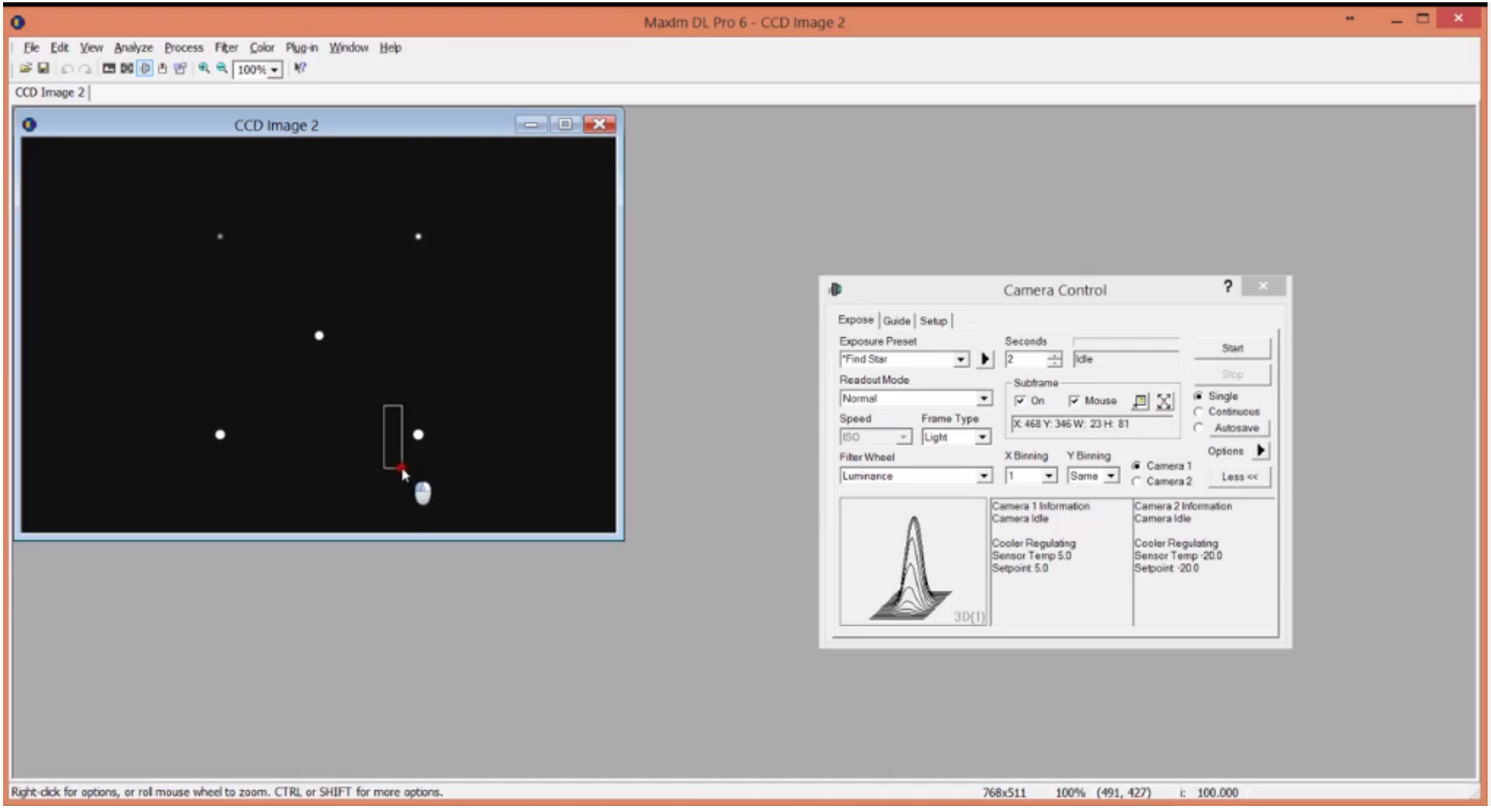
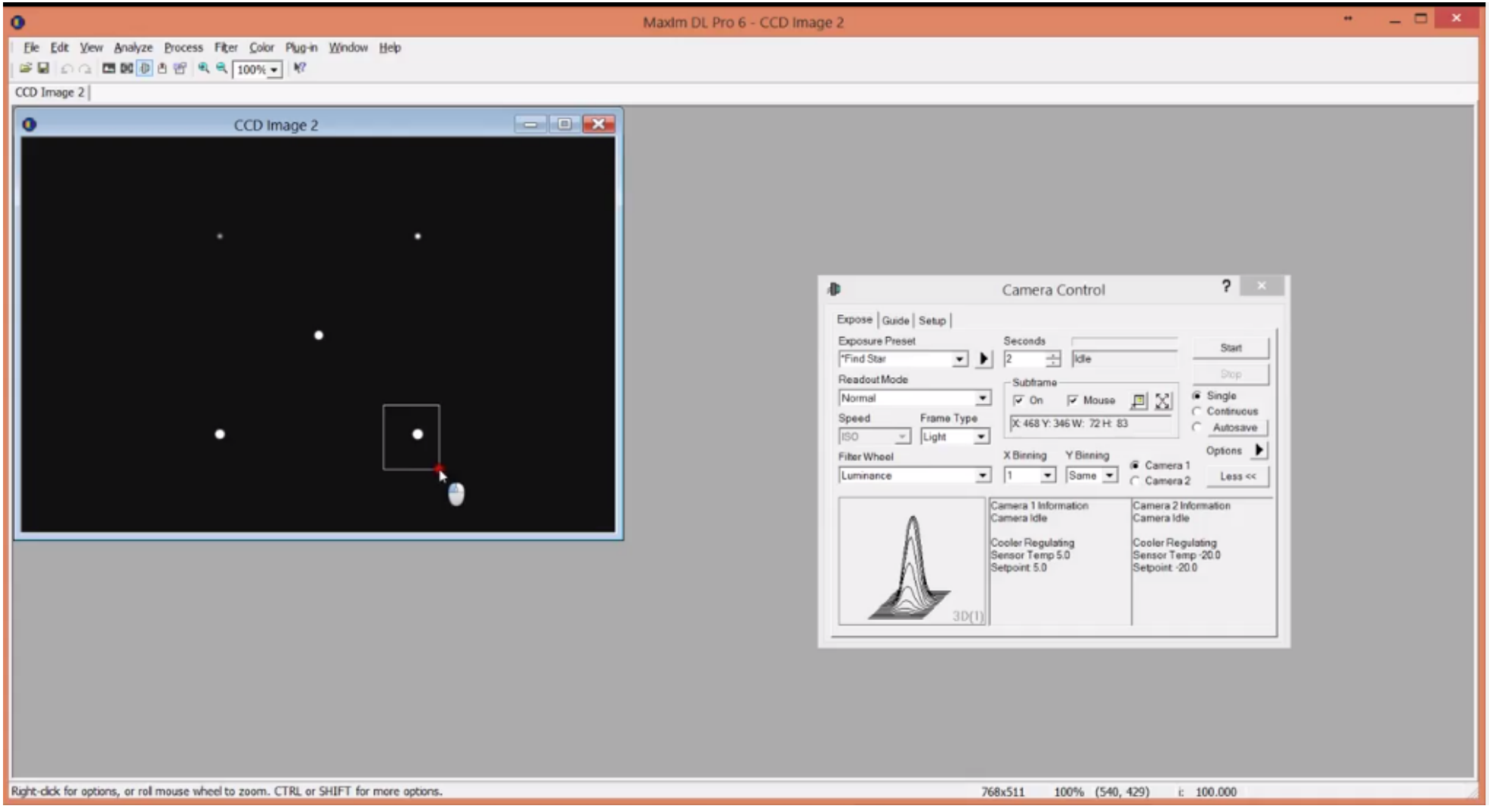
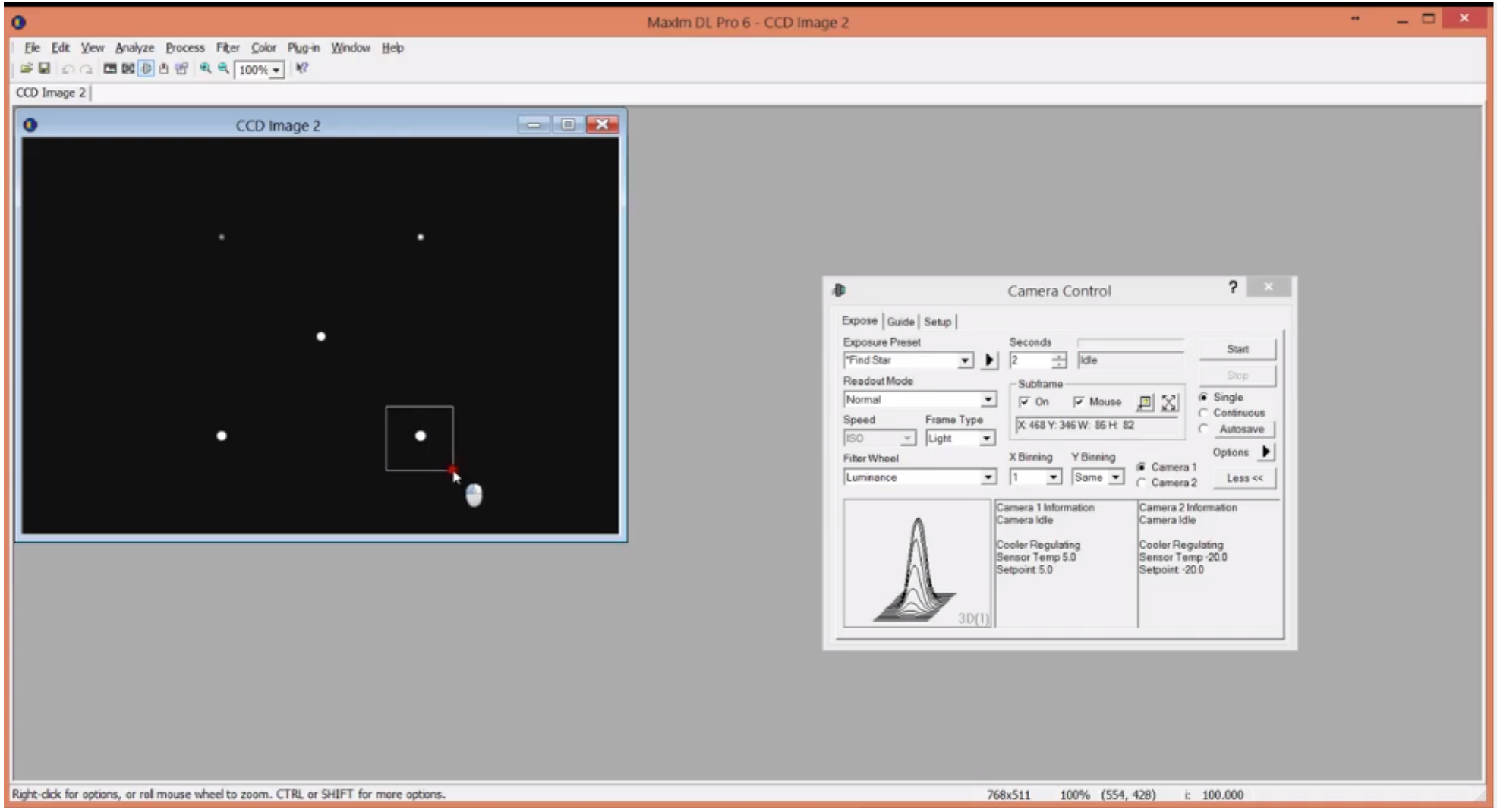
Mouse
X: 0 Y: 0 W: 768 H: 511
Single
Continuous
Autosave
Speed
ISO
Frame Type
Light
Options
Filter Wheel
Luminance
X Binning
1
Y Binning
Same
Camera 1
Camera 2
Less <<
3D(1)
Camera 1 Information
Camera Idle
Cooler Regulating
Sensor Temp 5.0
Setpoint 5.0
Camera 2 Information
Camera Idle
Cooler Regulating
Sensor Temp -20.0
Setpoint -20.0
For Help, press F1
768x511
100%

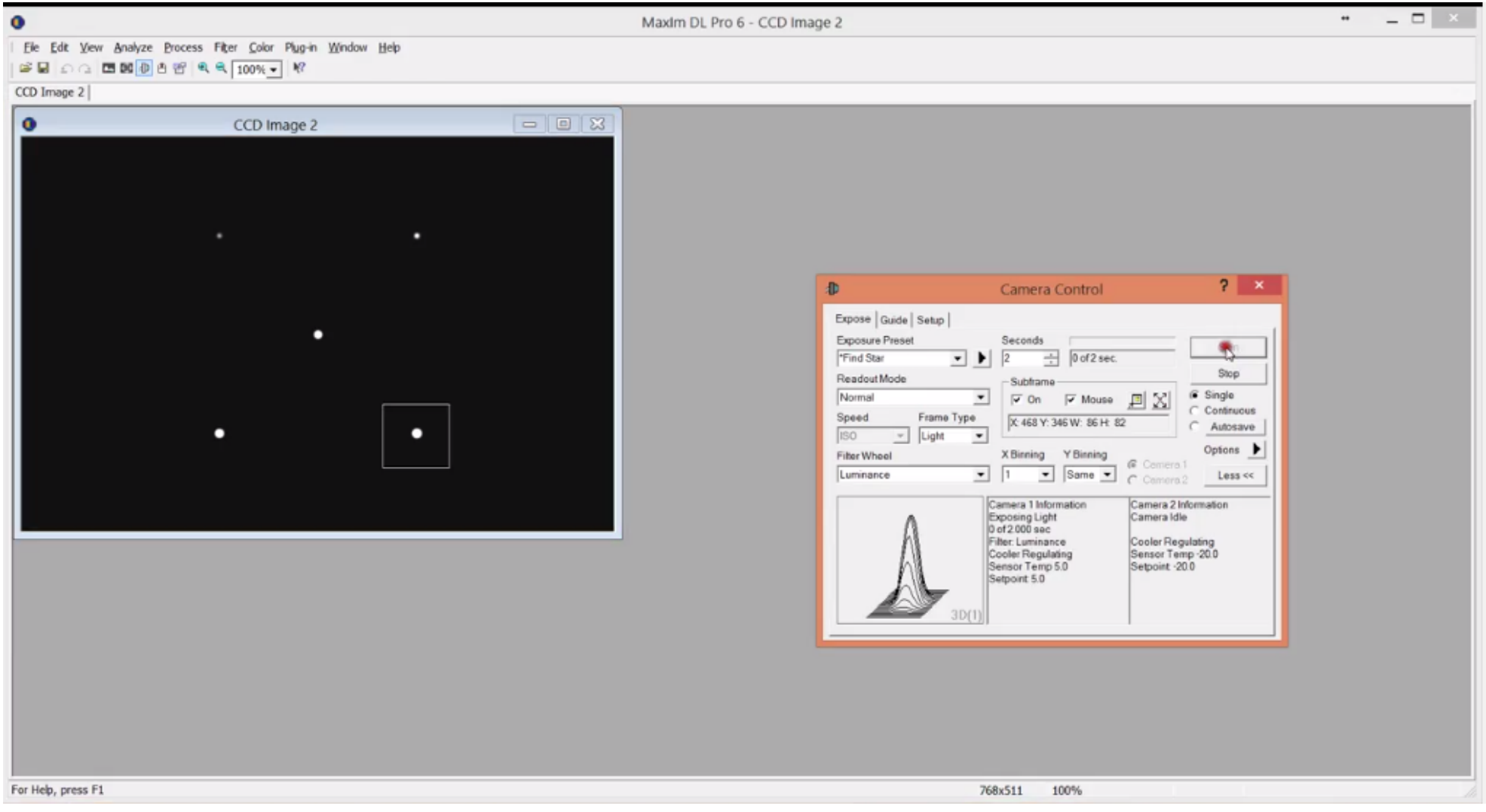
za pomocą myszy zaznaczamy nieduży obszar wokół wybranej gwiazdy



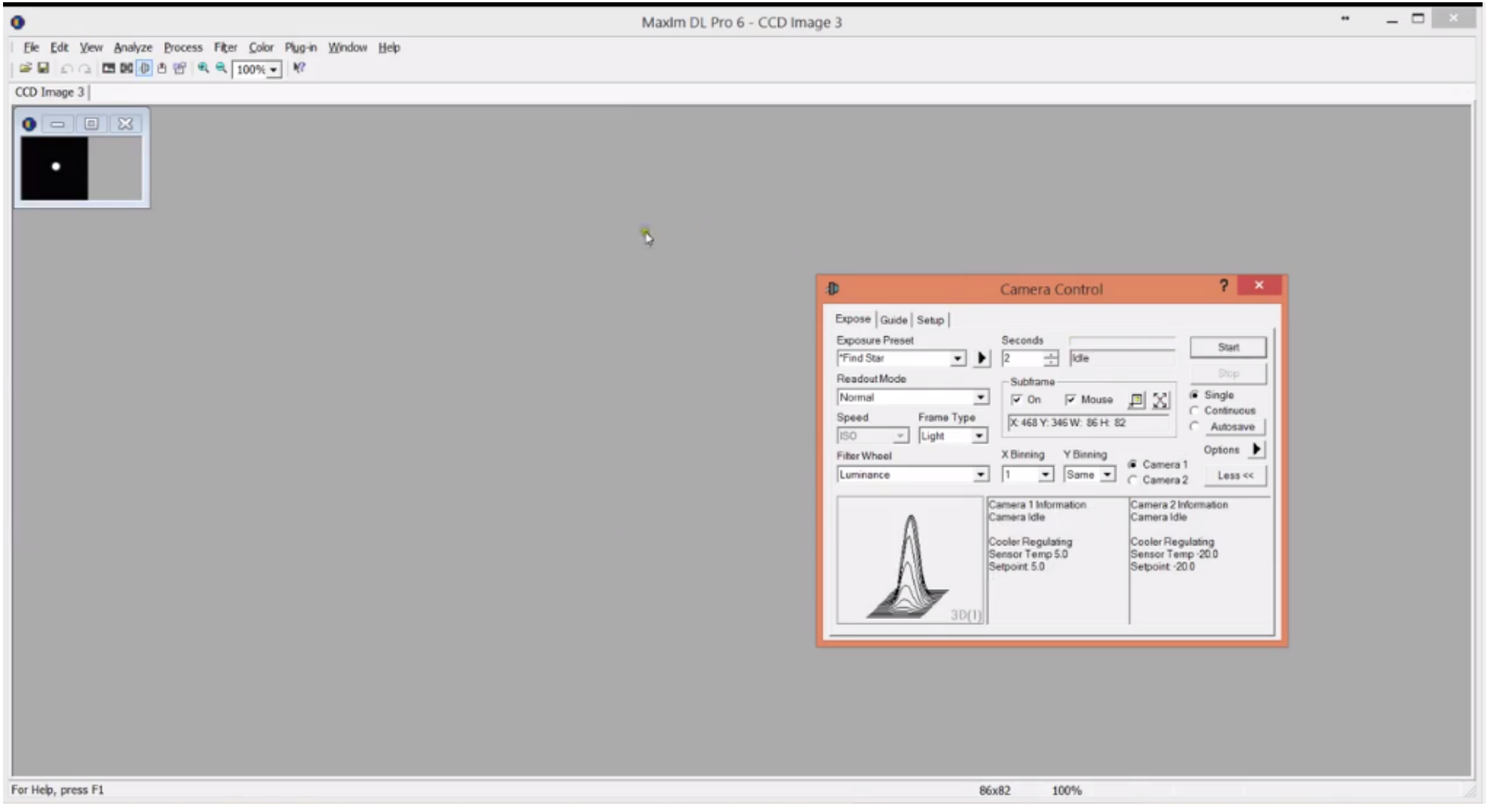

MaxIm DL Pro 6 - CCD Image 2
File Edit View Analyze Process Filter Color Plug-in Window Help
100%
CCD Image 2
CCD Image 2
Camera Control
Expose Guide Setup
Exposure Preset
*Find Star
Seconds
2
Idle
Start
Stop
Readout Mode
Normal
Subframe
On
Mouse
X: 468 Y: 346 W: 72 H: 83
Single
Continuous
Autosave
Speed
ISO
Frame Type
Light
Options
Filter Wheel
Luminance
X Binning
1
Y Binning
Same
Camera 1
Camera 2
Less <<
3D(1)
Camera 1 Information
Camera Idle
Cooler Regulating
Sensor Temp 5.0
Setpoint 5.0
Camera 2 Information
Camera Idle
Cooler Regulating
Sensor Temp -20.0
Setpoint -20.0
Right-click for options, or roll mouse wheel to zoom. CTRL or SHIFT for more options.
768x511
100%
(540, 429)
100.000


MaxIm DL Pro 6 - CCD Image 2
File Edit View Analyze Process Filter Color Plug-in Window Help
100%
CCD Image 2
CCD Image 2
Camera Control
Expose Guide Setup
Exposure Preset
*Find Star
Seconds
2
Idle
Start
Stop
Readout Mode
Normal
Subframe
On
Mouse
X: 468 Y: 346 W: 86 H: 82
Single
Continuous
Autosave
Speed
ISO
Frame Type
Light
Options
Filter Wheel
Luminance
X Binning
1
Y Binning
Same
Camera 1
Camera 2
Less <<
3D(1)
Camera 1 Information
Camera Idle
Cooler Regulating
Sensor Temp 5.0
Setpoint 5.0
Camera 2 Information
Camera Idle
Cooler Regulating
Sensor Temp -20.0
Setpoint -20.0
Right-click for options, or roll mouse wheel to zoom. CTRL or SHIFT for more options.
768x511
100%
(554, 428)
100.000

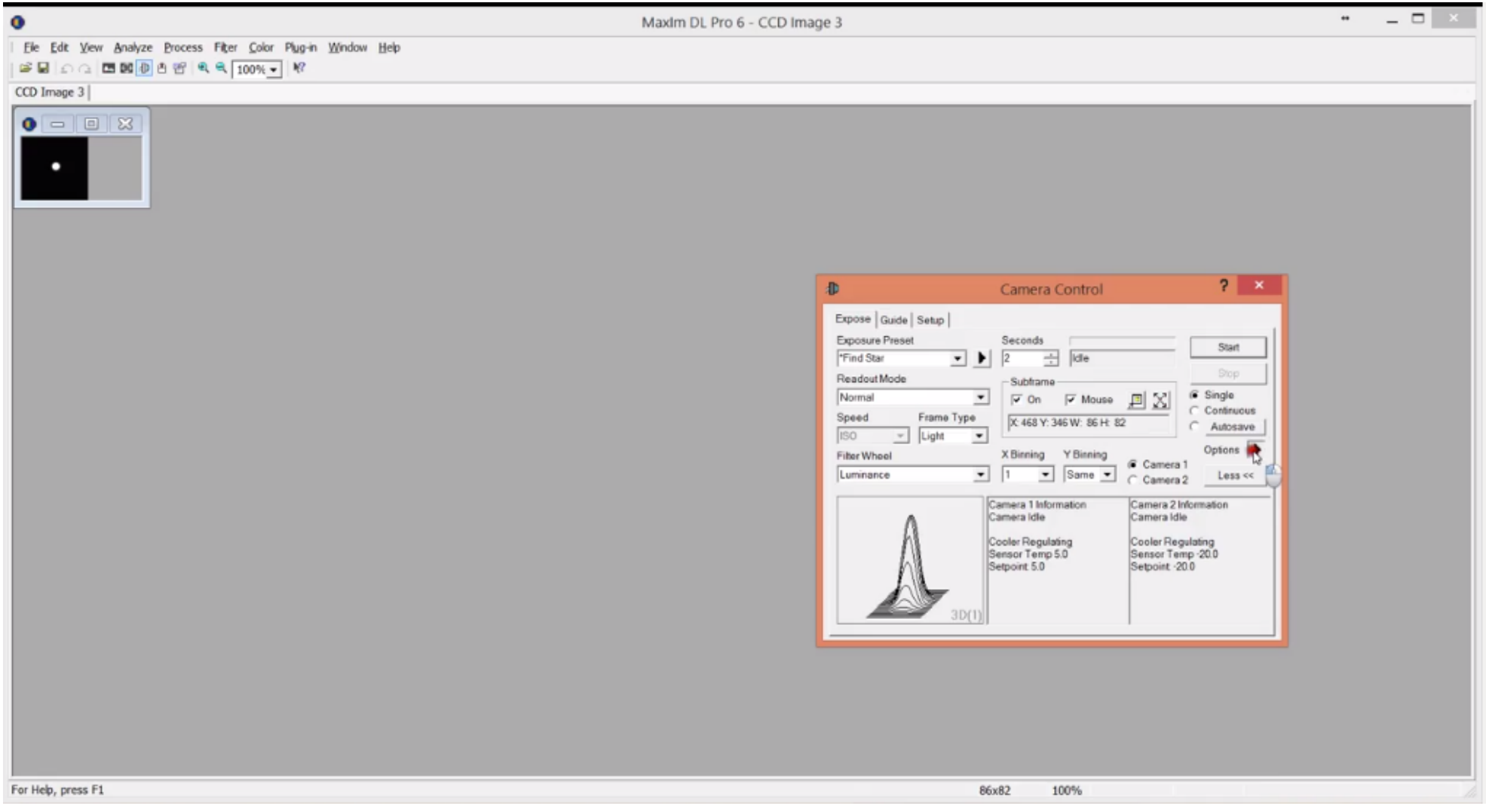
klikamy Start



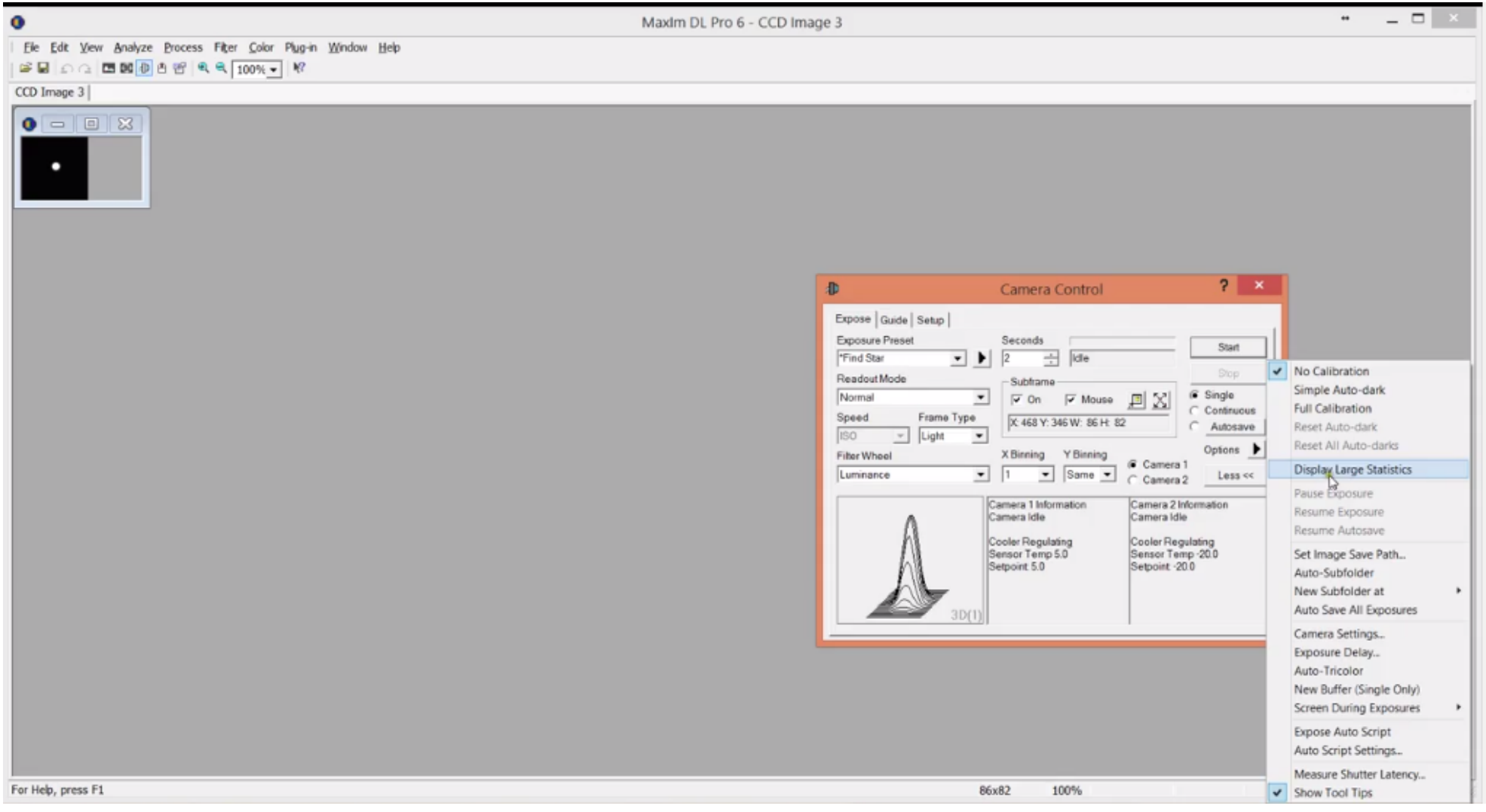
wynikiem jest klatka obrazu z gwiazdą do ogniskowania



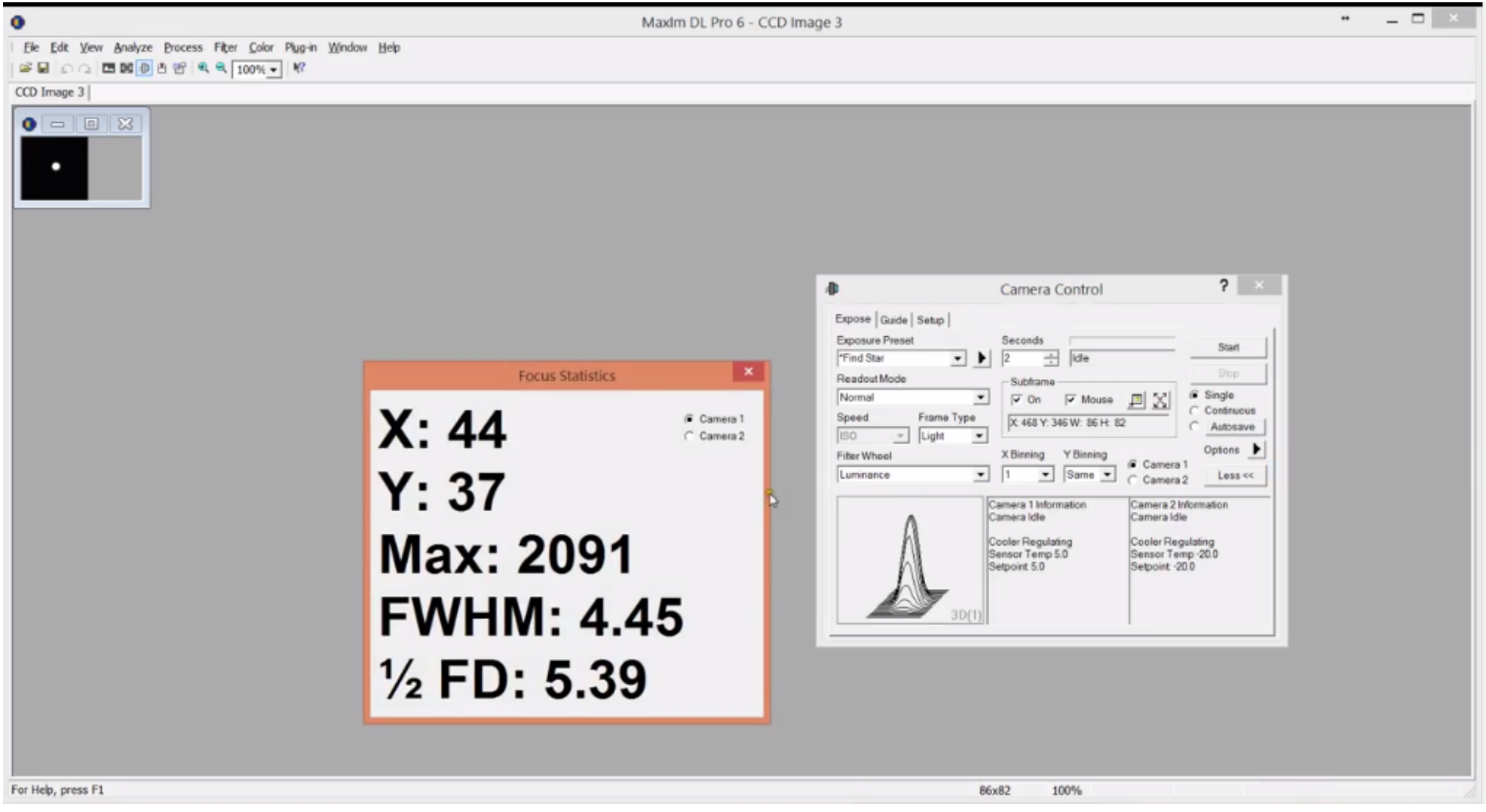
wybieramy Options



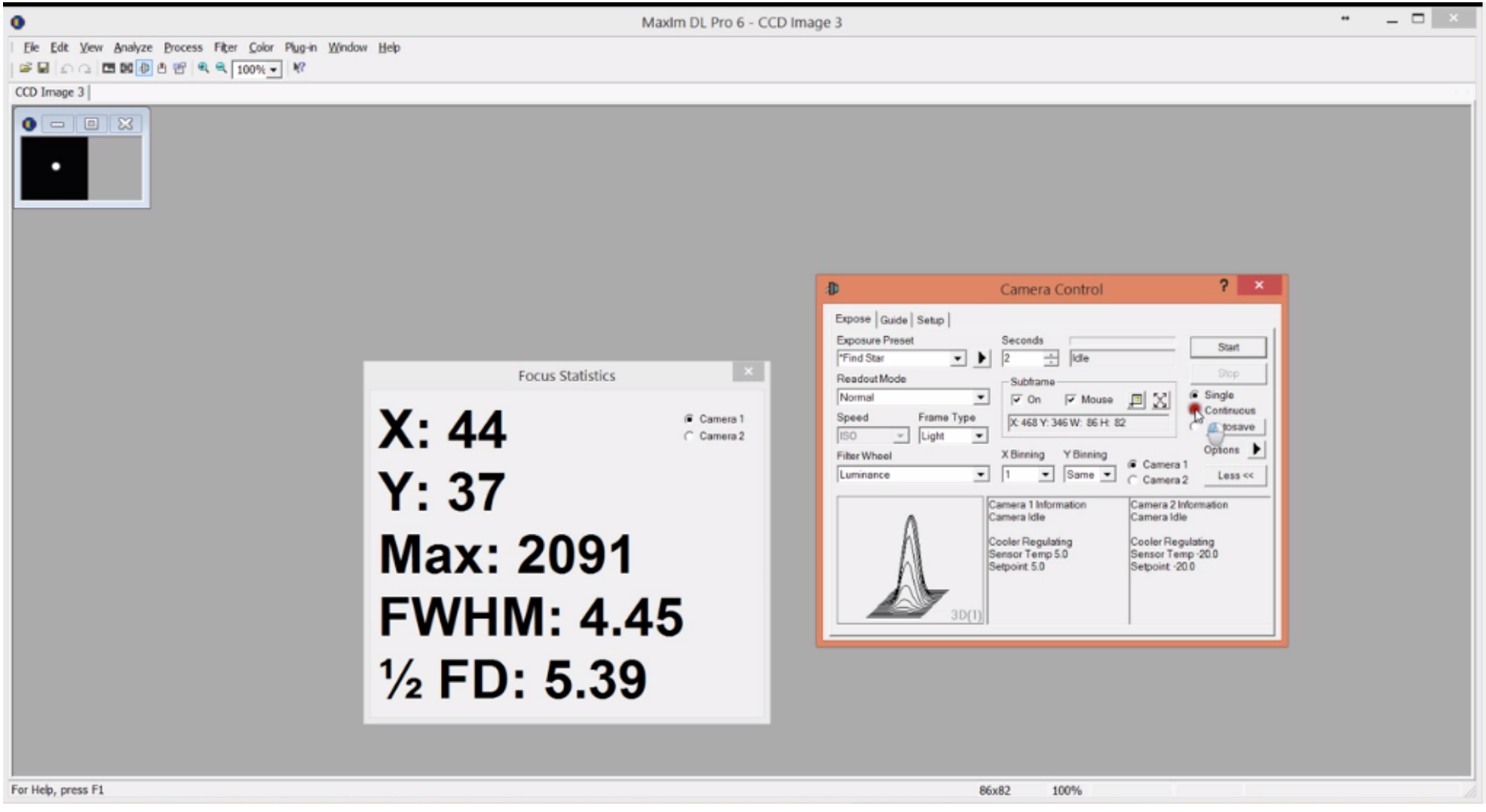
i Display Large Statistic



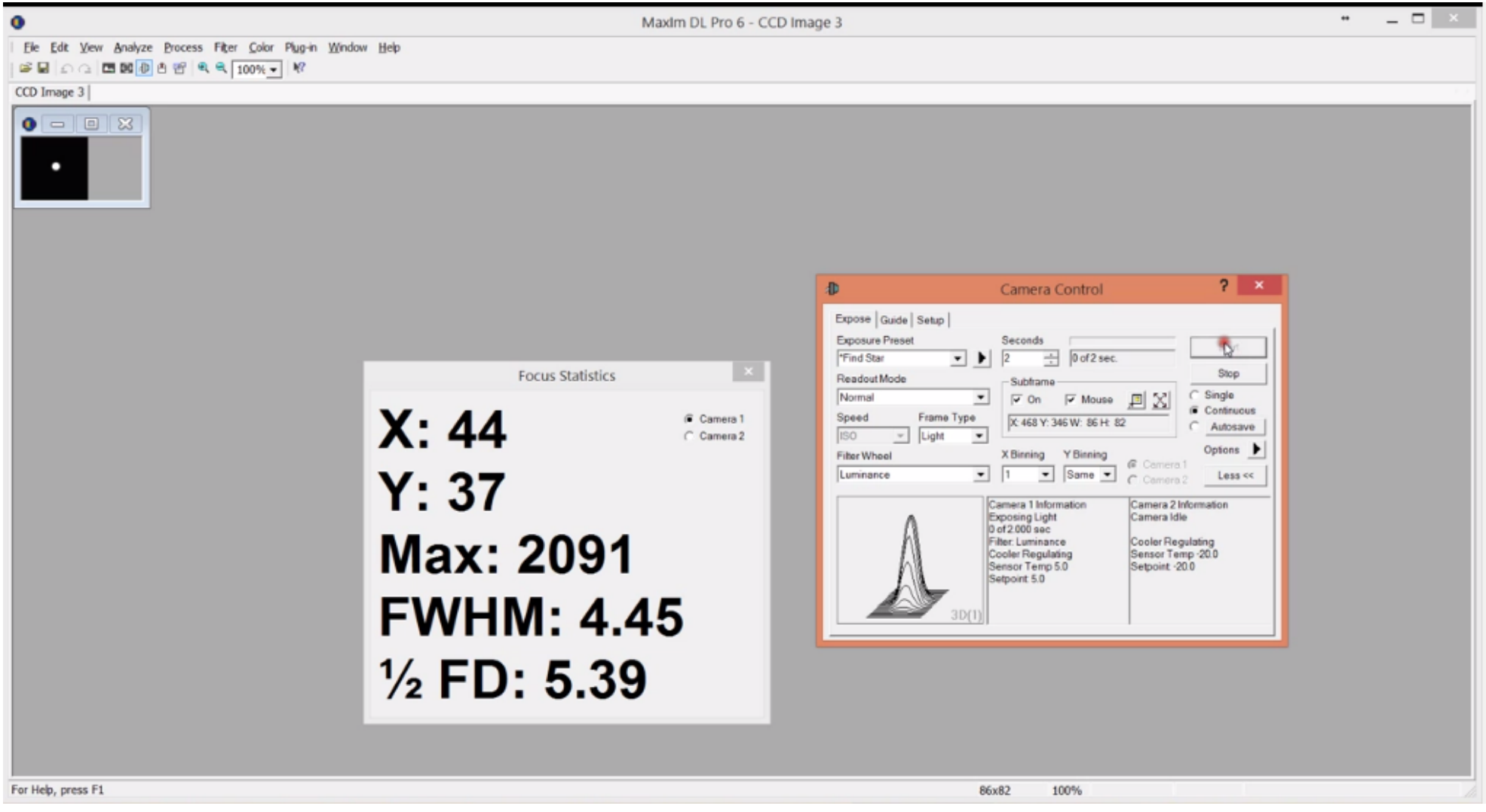
pojawia się okno z dobrze widocznymi informacjami o położeniu gwiazdy i cechach jej obrazu



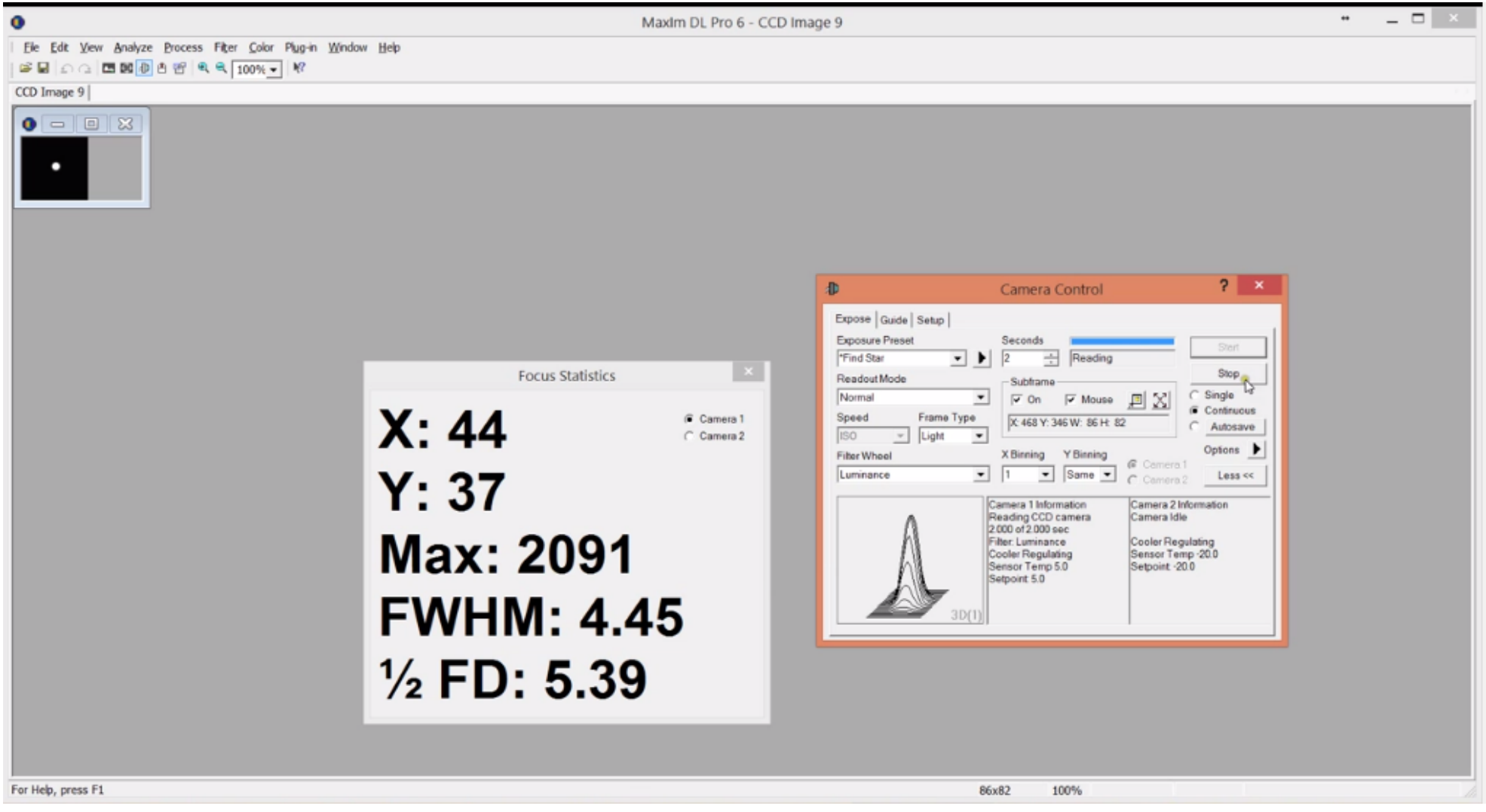
zmieniamy tryb ekspozycji z Single na Continous

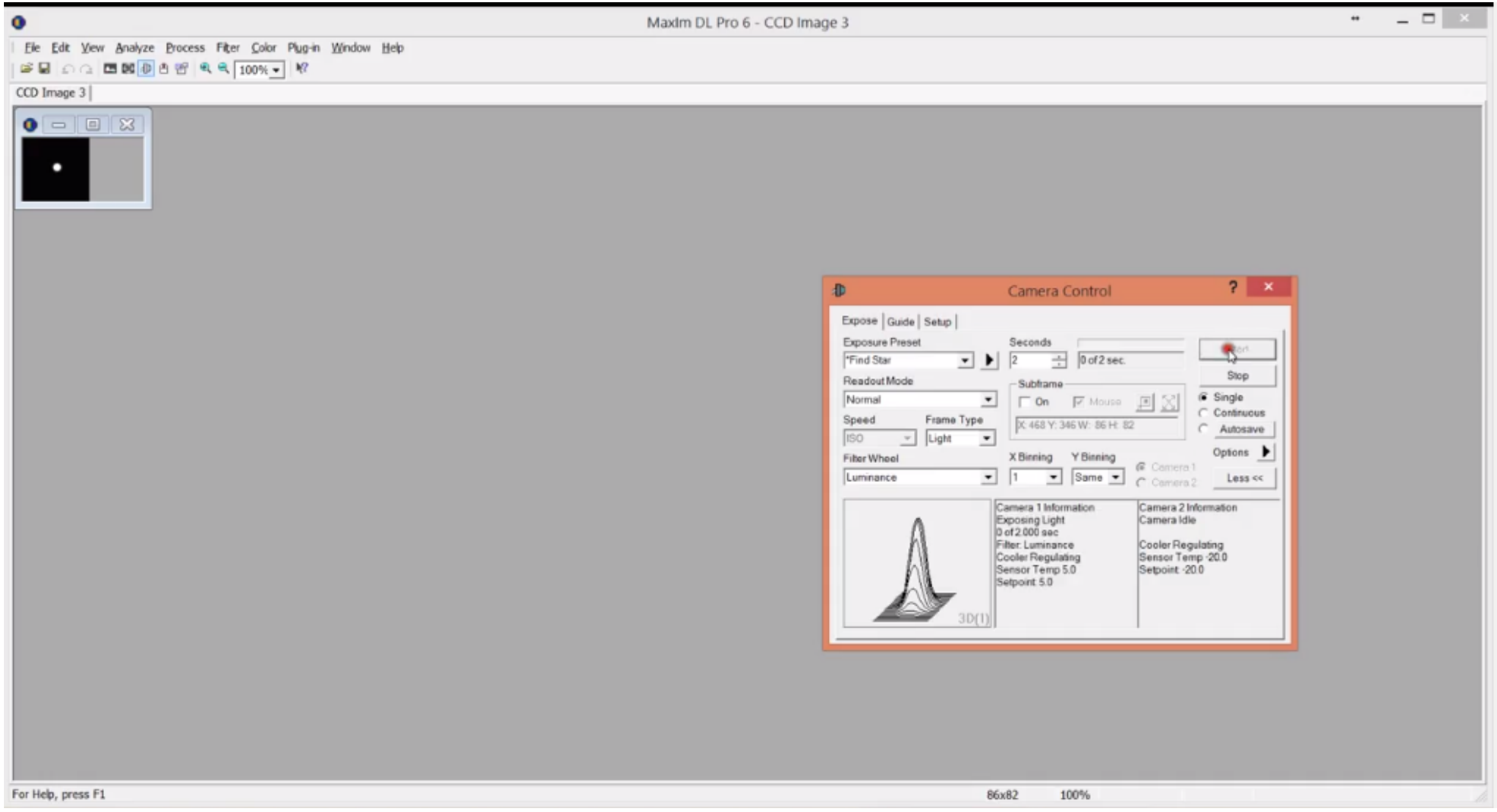


klikamy Start

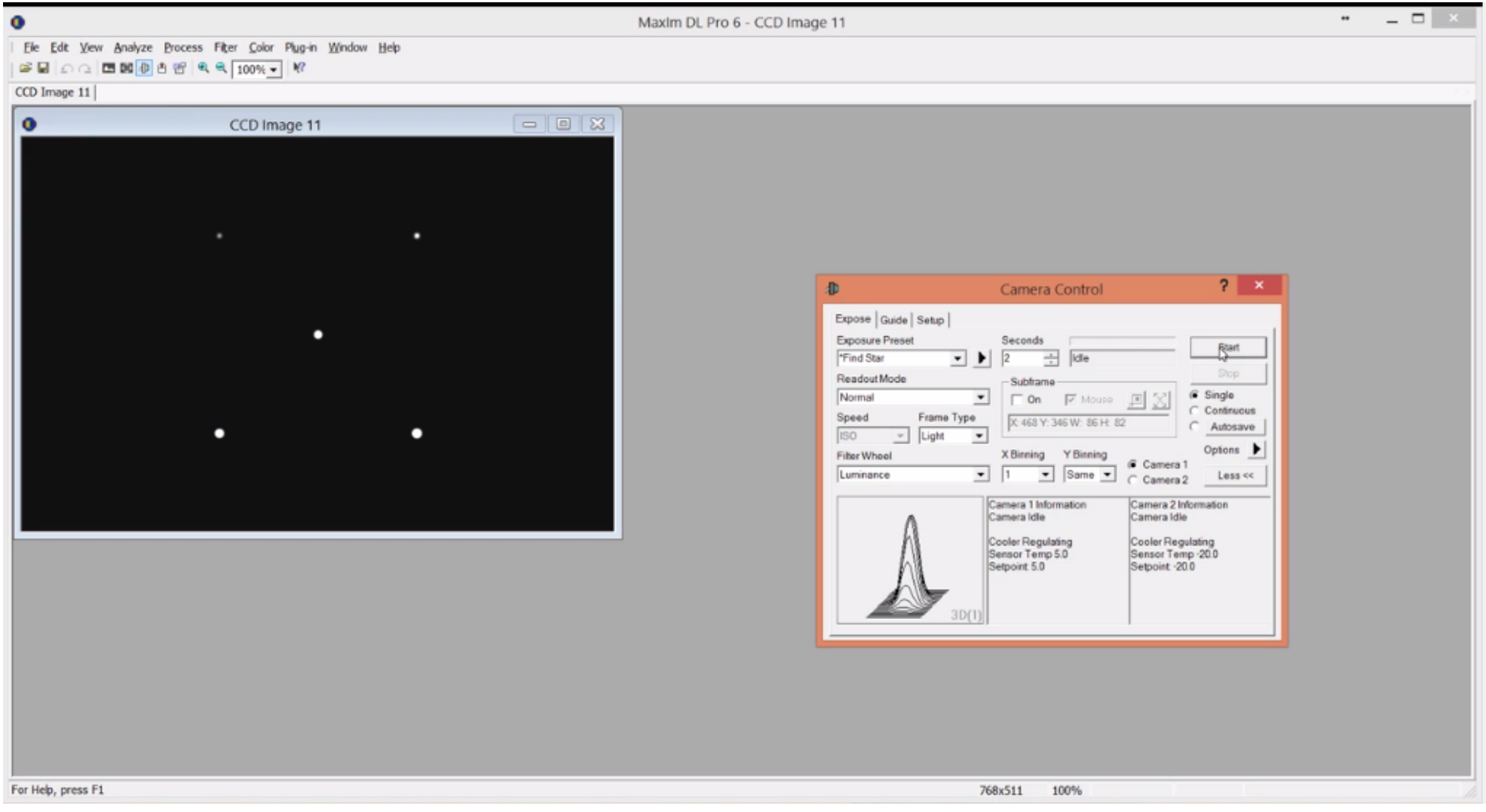


wykonywana jest seria ekspozycji, w tym czasie można zmieniać ognisko teleskopu i kontrolować efekty

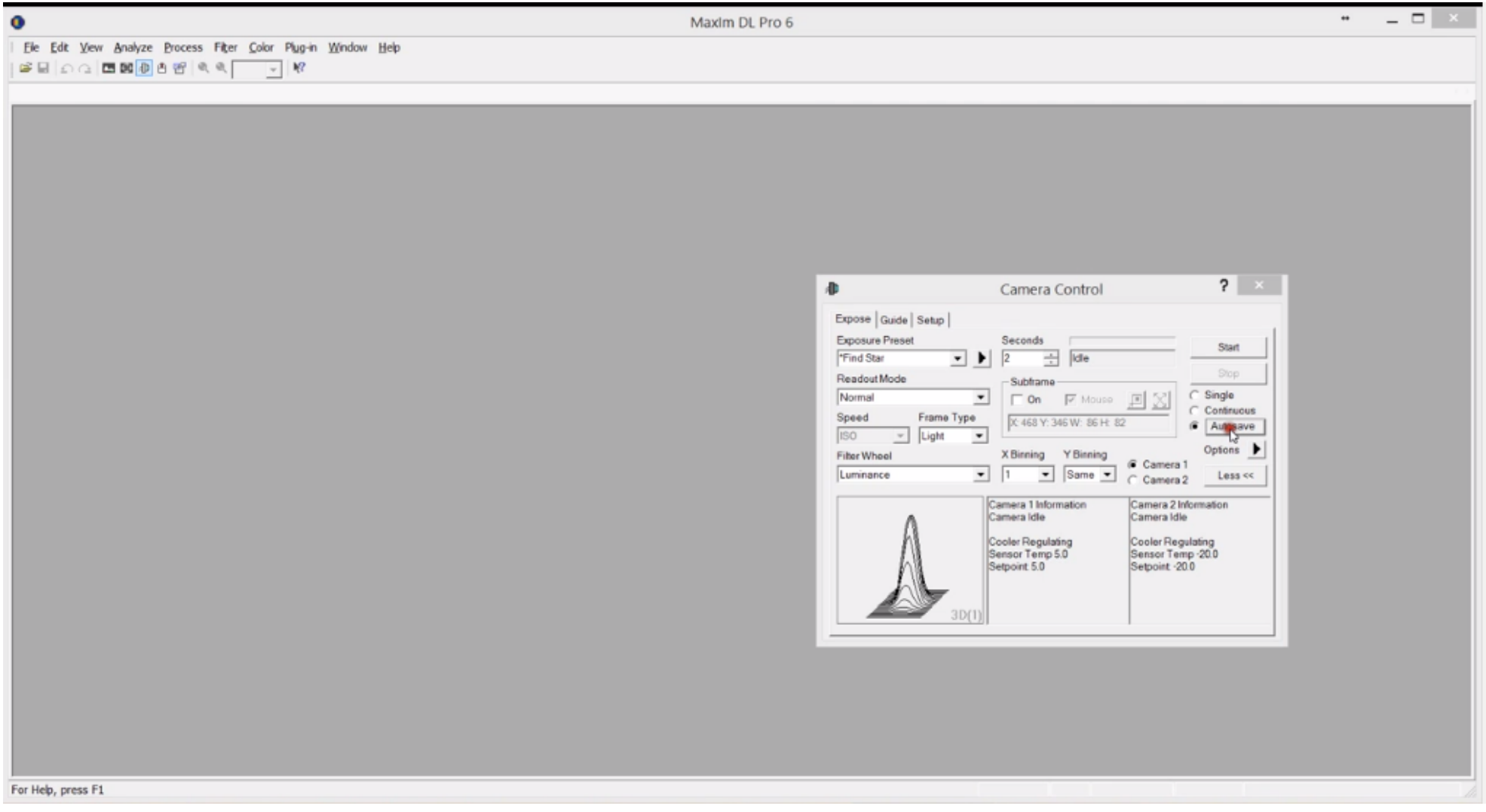



MaxIm DL Pro 6 - CCD Image 3
File Edit View Analyze Process Filter Color Plug-in Window Help
100%
CCD Image 3
Camera Control
Expose Guide Setup
Exposure Preset
*Find Star
Seconds
2
0 of 2 sec.
Start
Stop
Readout Mode
Normal
Subframe
On
Mouse
X: 468 Y: 346 W: 86 H: 82
Single
Continuous
Autosave
Speed
ISO
Frame Type
Light
Options
Filter Wheel
Luminance
X Binning
1
Y Binning
Same
Camera 1
Camera 2
Less <<
3D(1)
Camera 1 Information
Exposing Light
0 of 2.000 sec
Filter: Luminance
Cooler Regulating
Sensor Temp 5.0
Setpoint 5.0
Camera 2 Information
Camera Idle
Cooler Regulating
Sensor Temp -20.0
Setpoint -20.0
For Help, press F1
86x82
100%

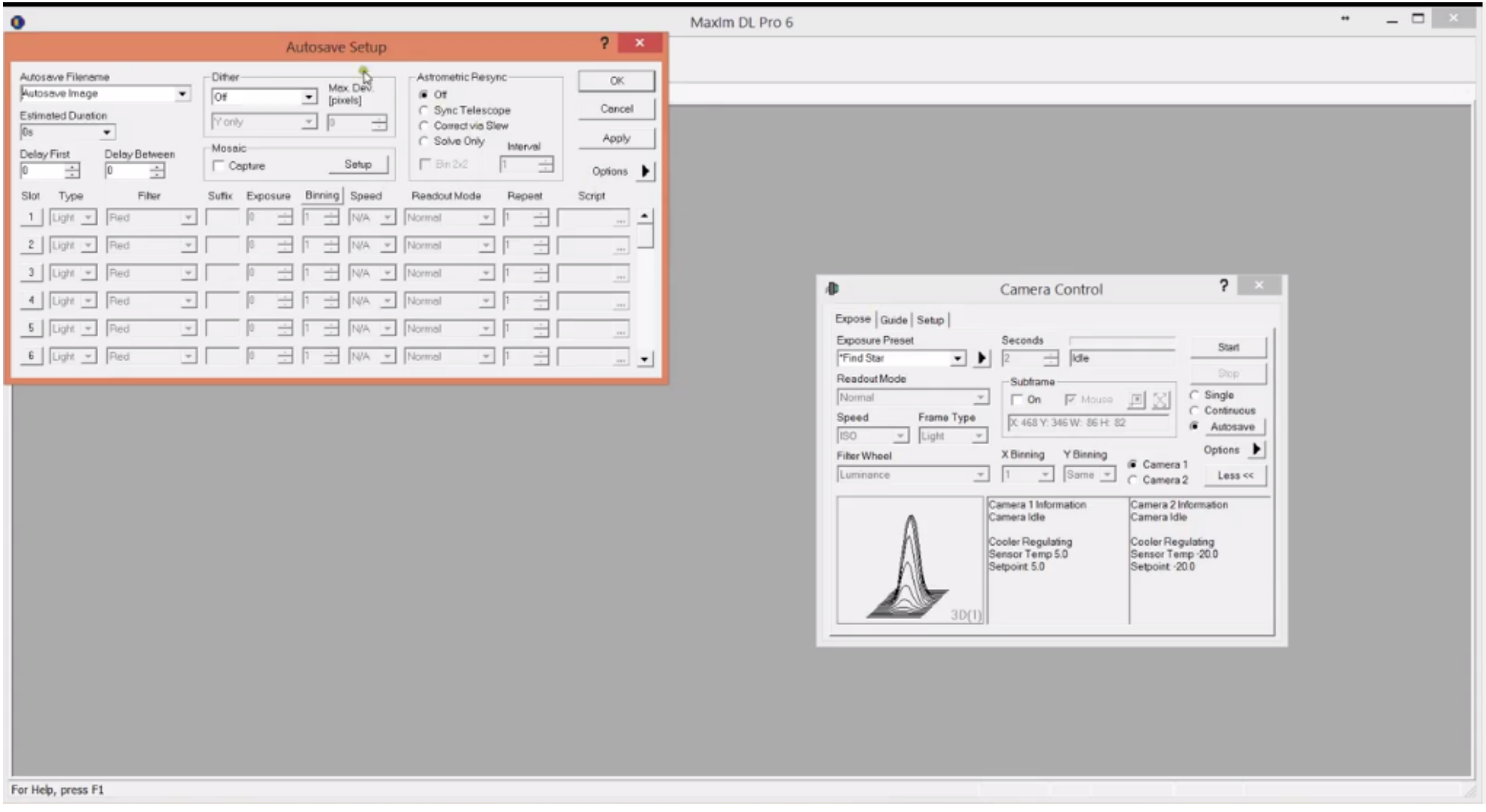
po zogniskowaniu odznaczamy opcję Subframe i wykonujemy obraz kontrolny całego pola kamery w trybie Single



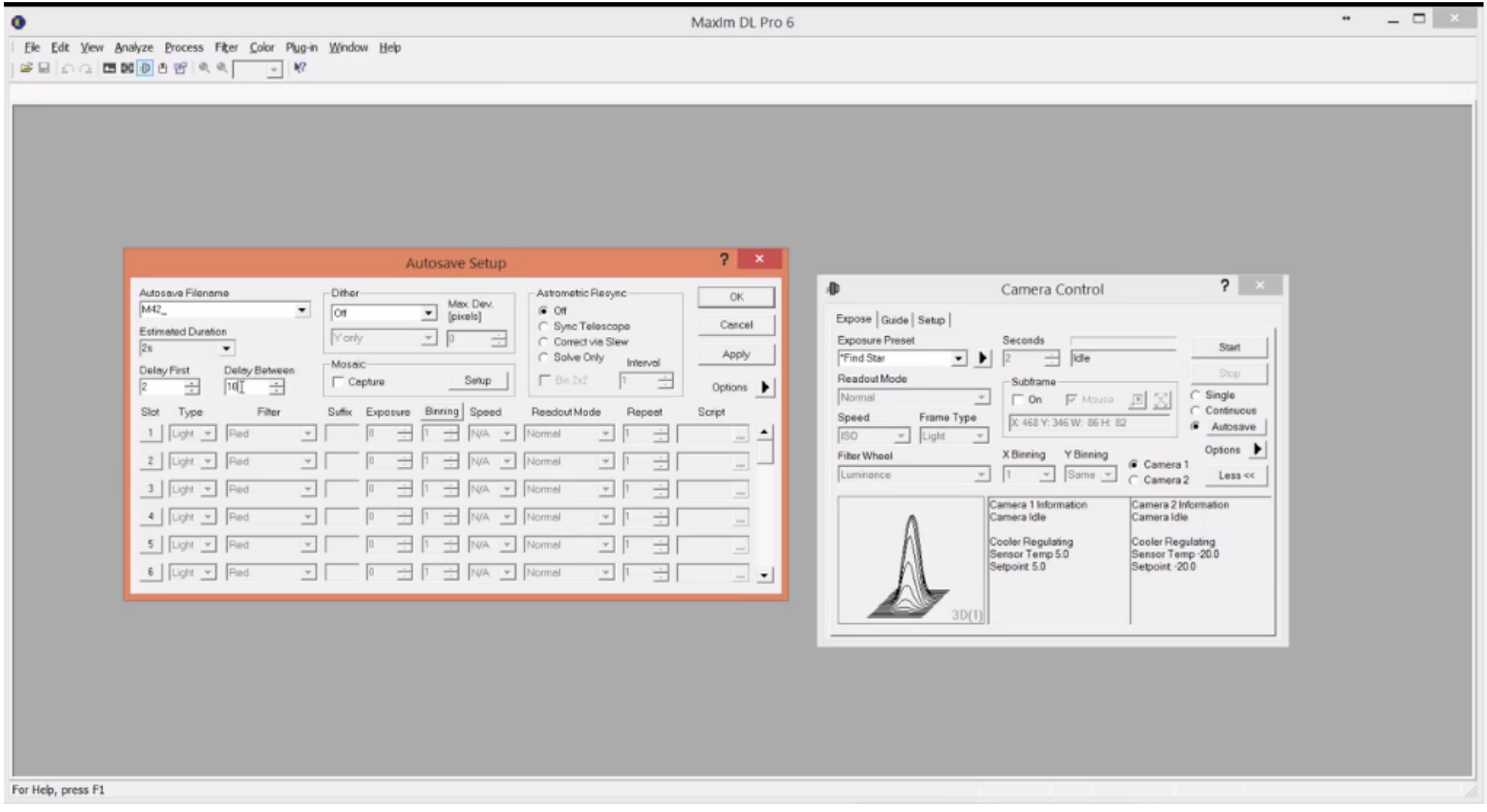
w celu wykonania właściwej sekwencji obrazów używamy trybu ekspozycji Autosave



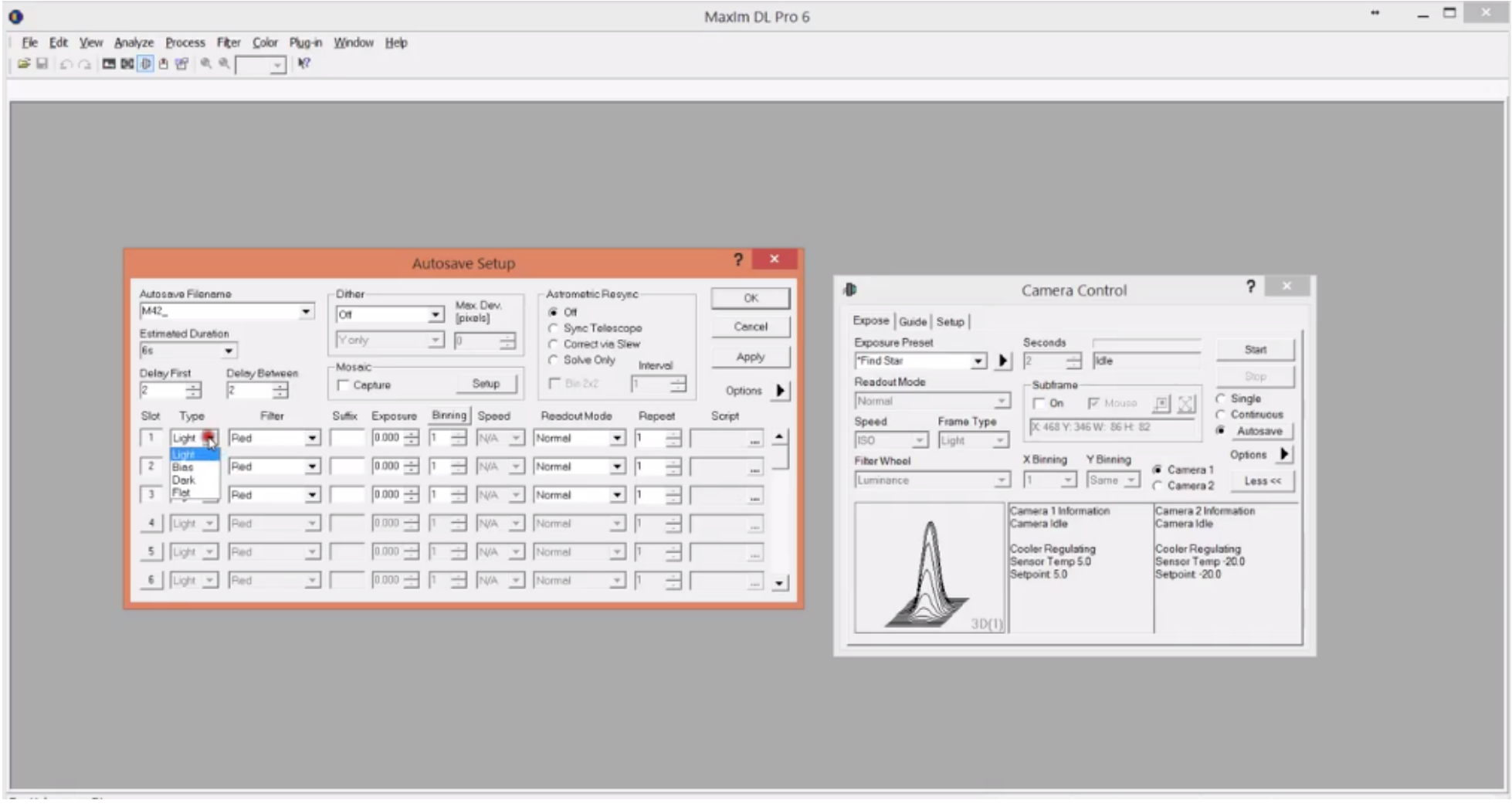
otwiera się okno ustawień



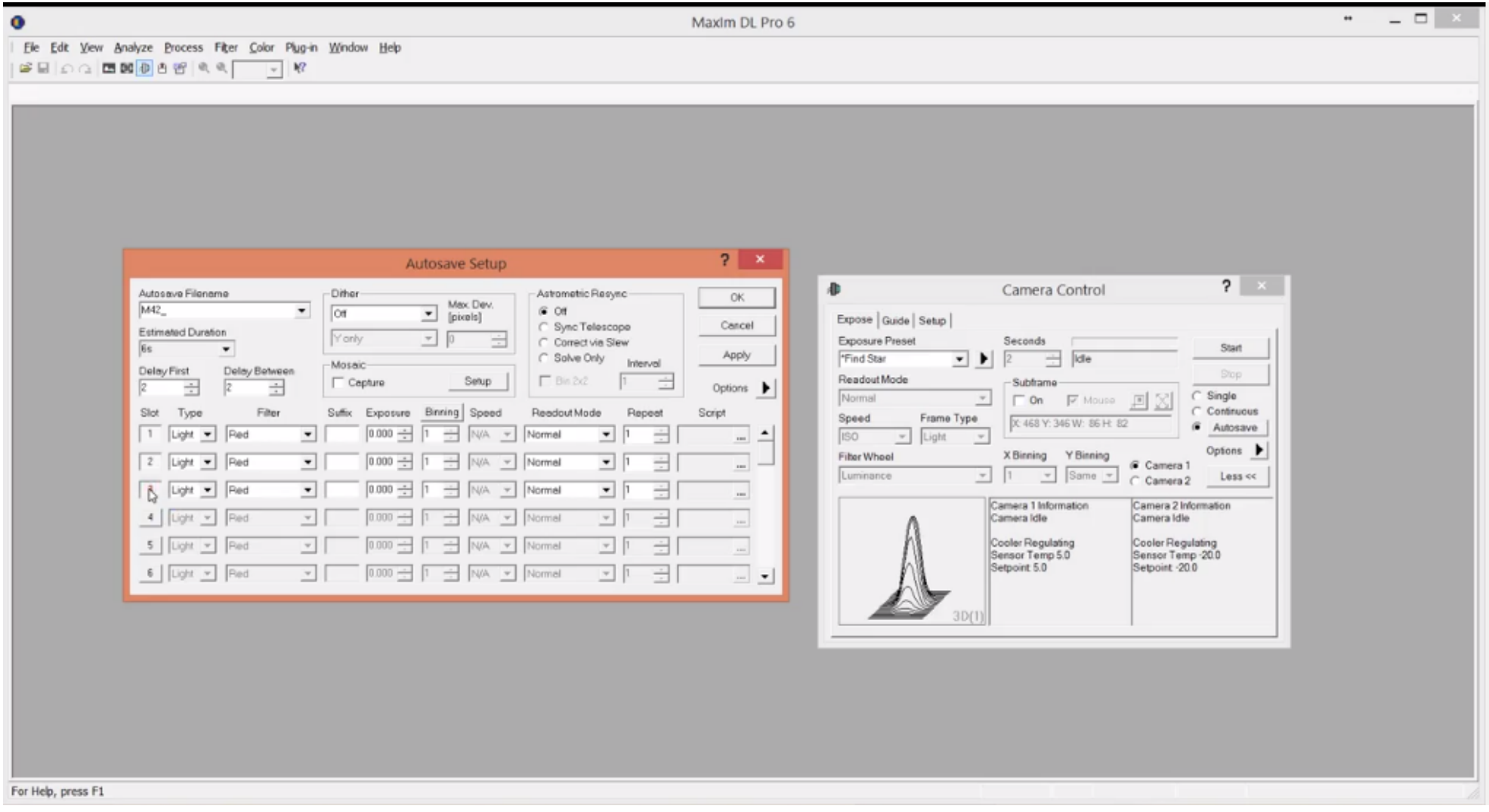
ustalamy pierwszy człon nazwy plików przechowujących obrazy oraz wartości opóźnień w ich wykonywaniu



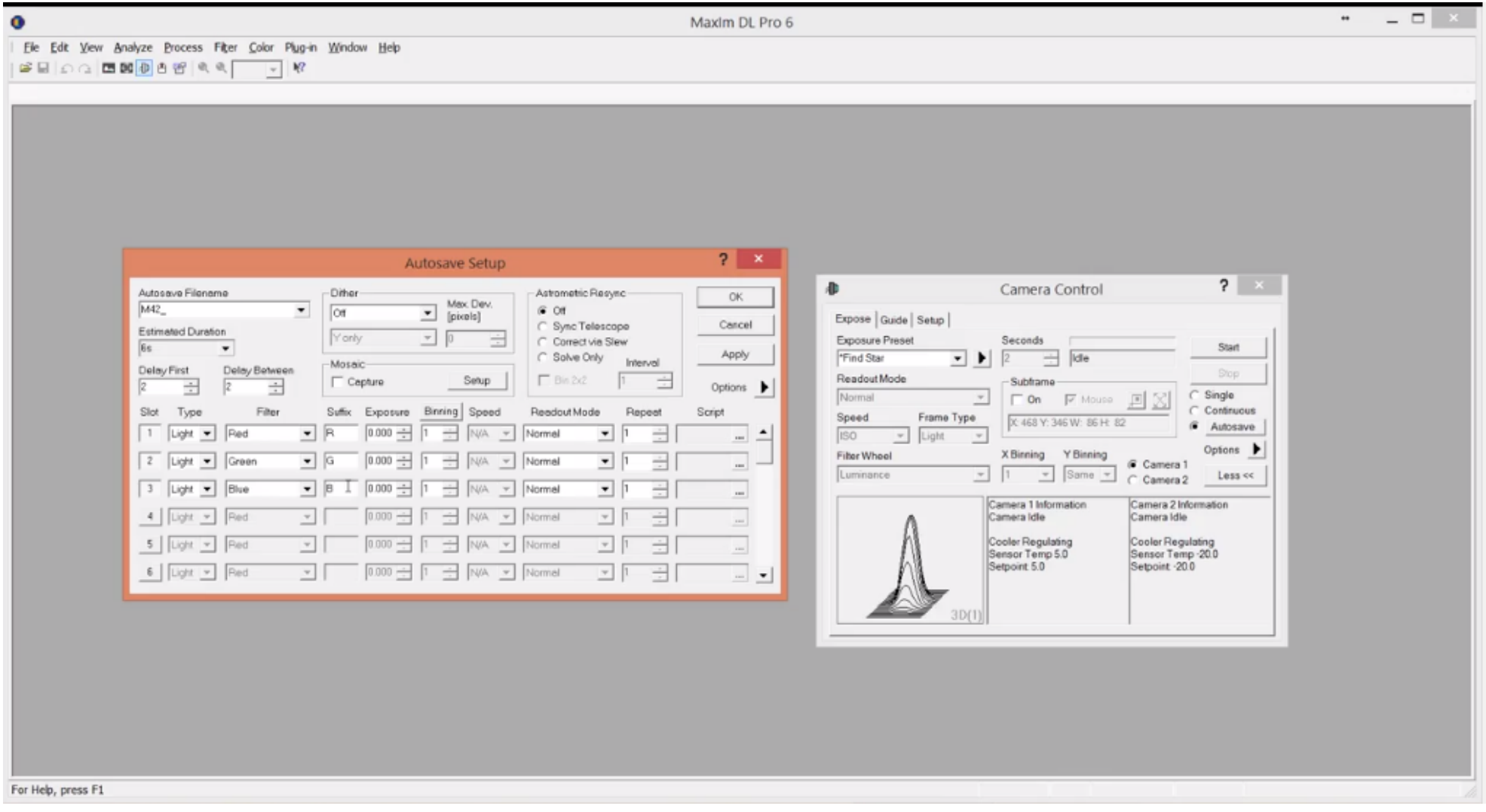
ustalamy typ obrazu

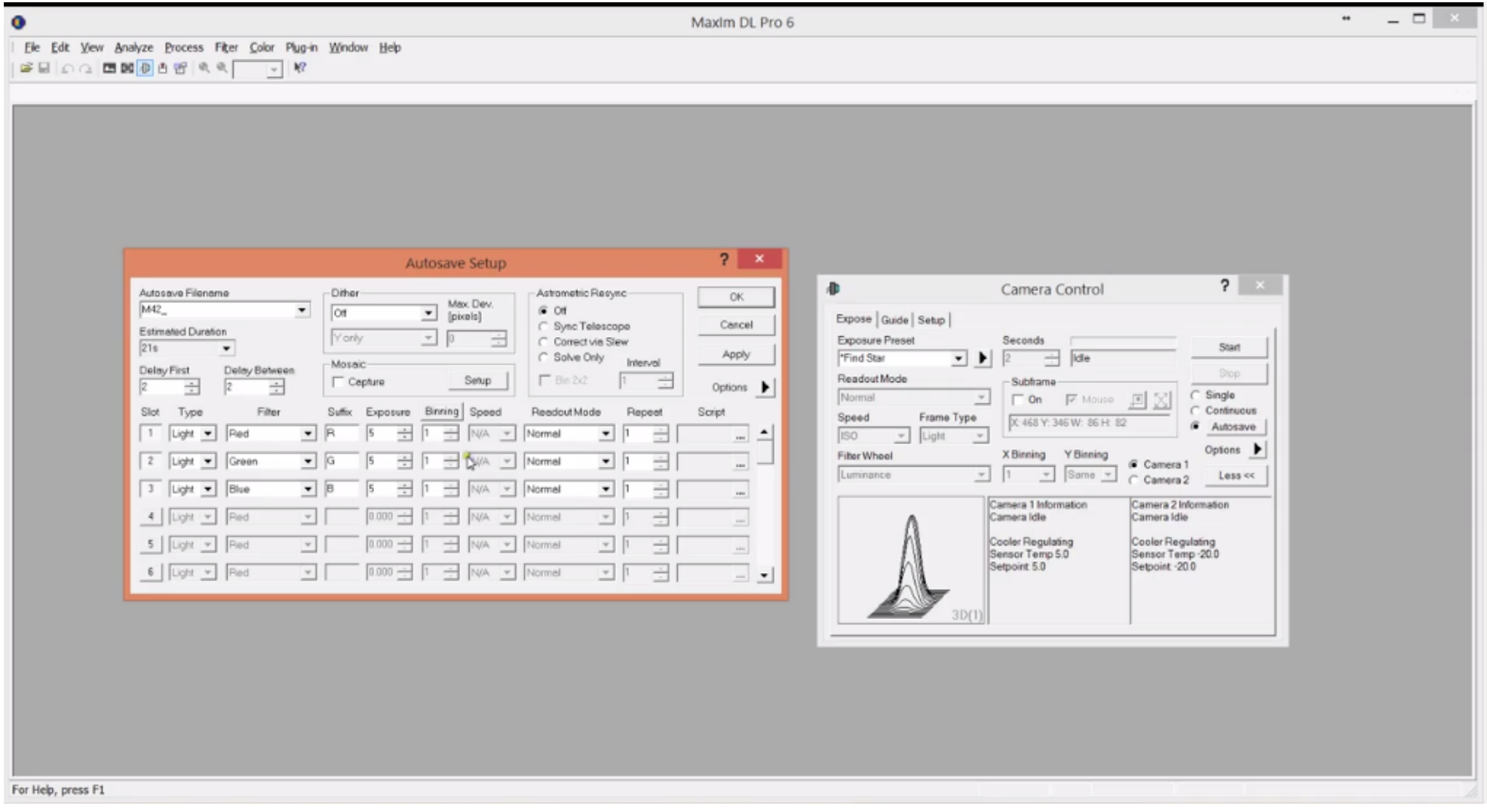


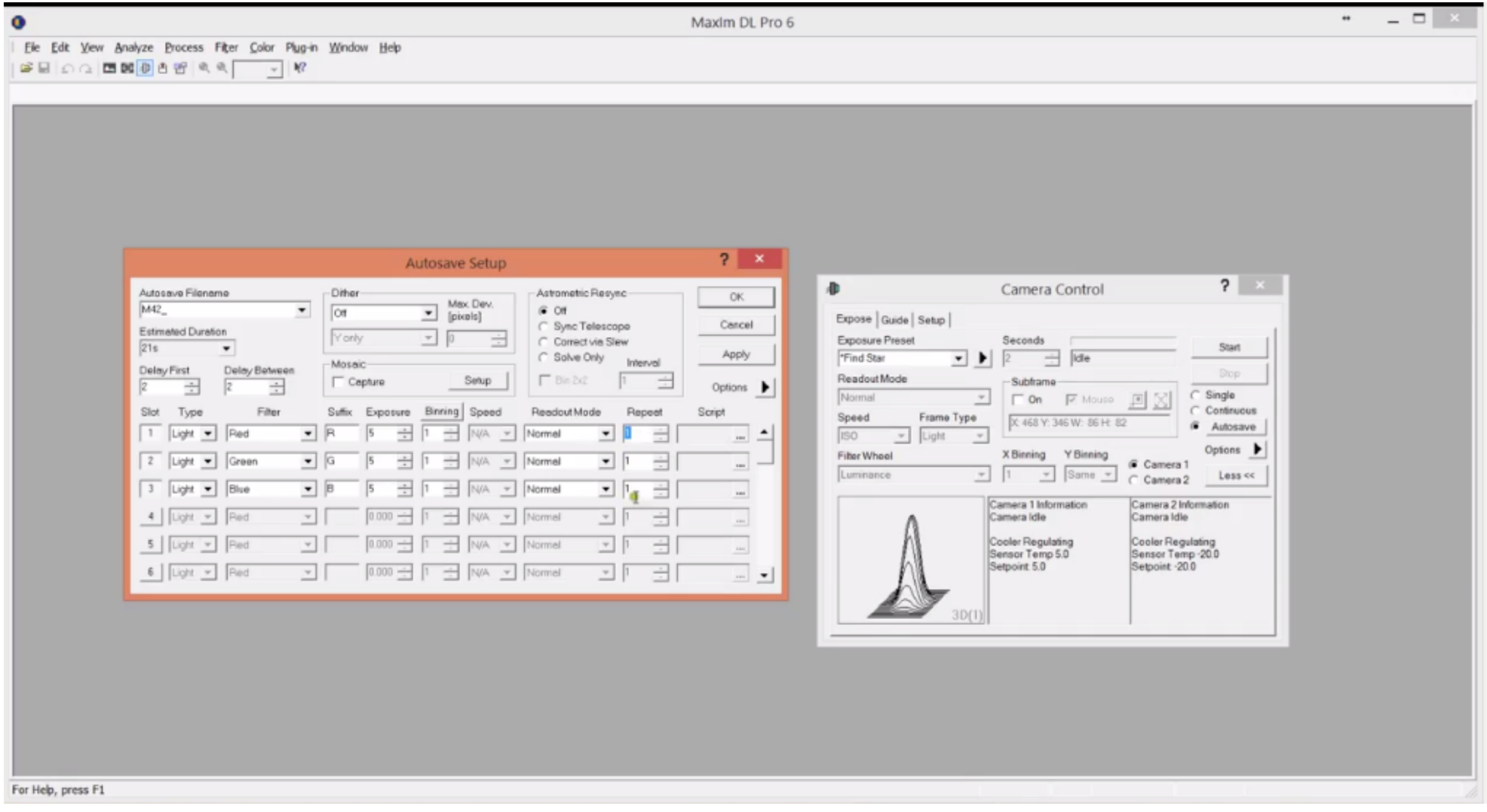
ustalamy rodzaj filtra, czas ekspozycjji i ilość powtórzeń dla kilku zestawów wymienionych parametrów



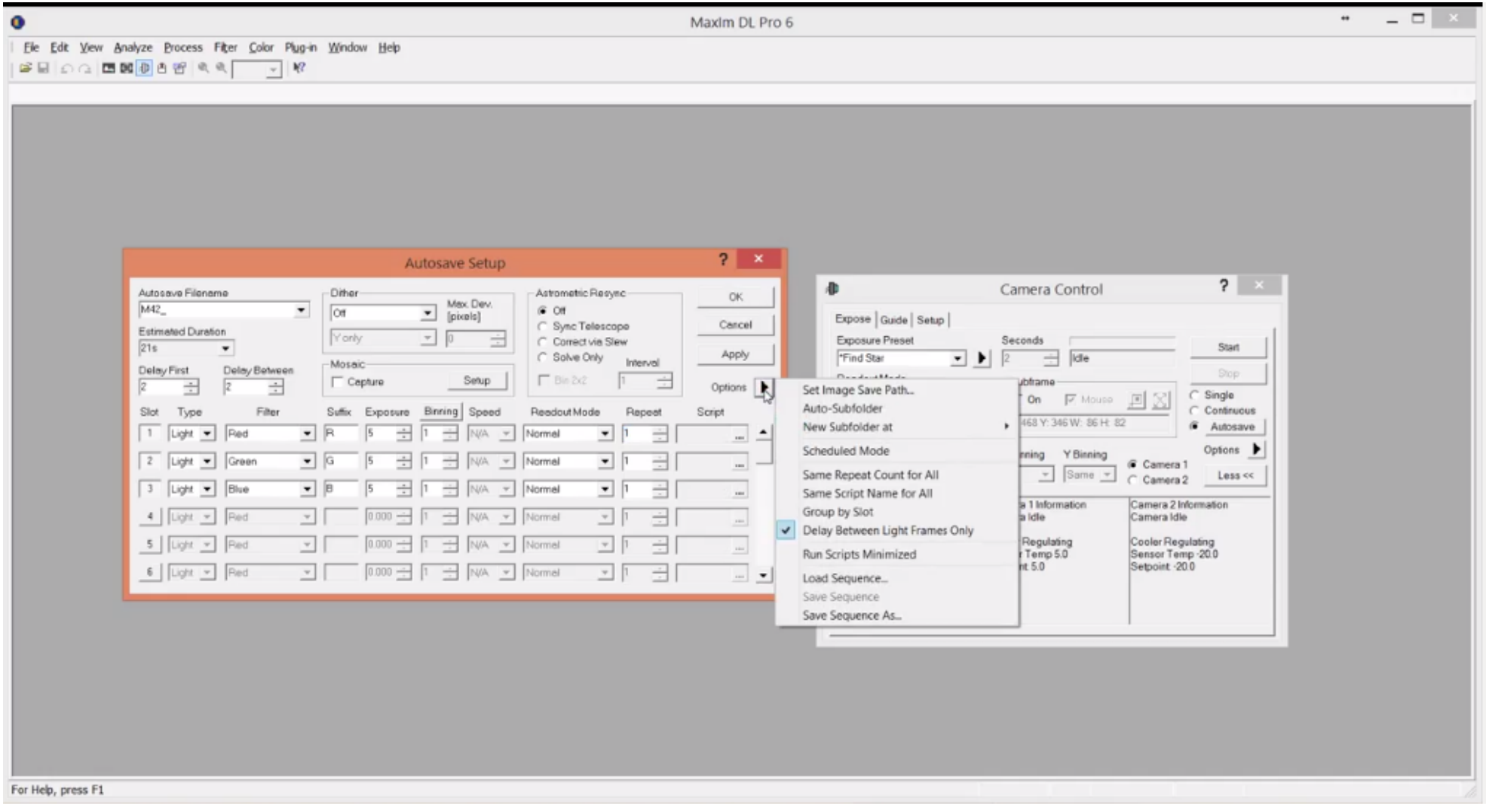
dodajemy człon do nazwy w postaci kodu filtra

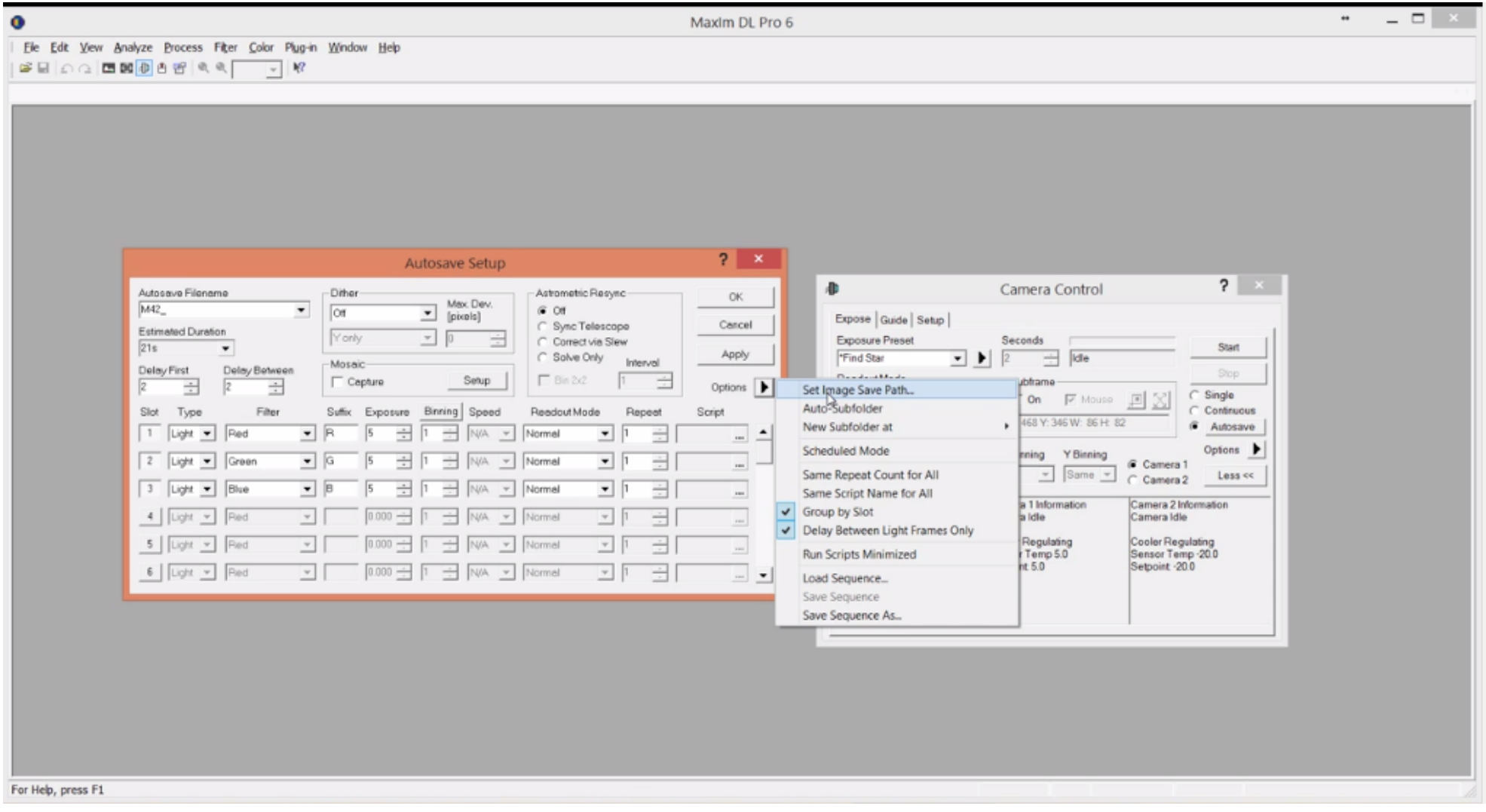


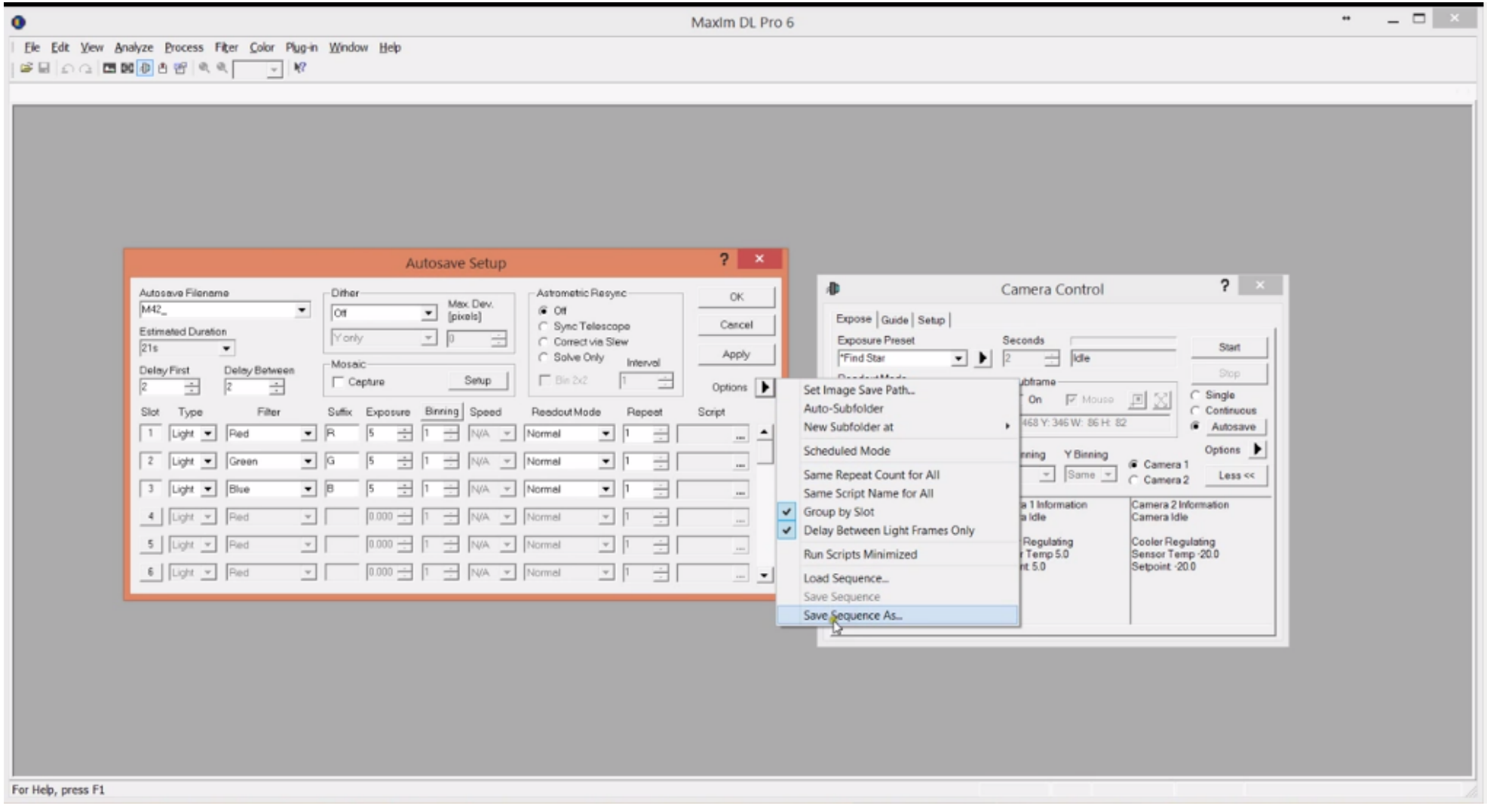

Maxim DL Pro 6
File Edit View Analyze Process Filter Color Plug-in Window Help
Autosave Setup
Autosave Filename
M42_
Estimated Duration
21s
Delay First
Delay Between
Dither
Off
Max. Dev. (pixels)
Y only
Mosaic
Capture
Setup
Astrometric Resync
Off
Sync Telescope
Correct via Slew
Solve Only
Bin 2x2
Interval
OK
Cancel
Apply
Options
Slot Type Filter Suffix Exposure Binning Speed Readout Mode Repeat Script
1 Light Red R 5 1 N/A Normal 1
2 Light Green G 5 1 N/A Normal 1
3 Light Blue B 5 1 N/A Normal 1
4 Light Red 0.000 1 N/A Normal 1
5 Light Red 0.000 1 N/A Normal 1
6 Light Red 0.000 1 N/A Normal 1
Camera Control
Expose Guide Setup
Exposure Preset
*Find Star
Seconds
Idle
Start
Stop
Readout Mode
Normal
Subframe
On
Mouse
X: 468 Y: 346 W: 86 H: 82
Single
Continuous
Autosave
Speed
ISO
Frame Type
Light
Filter Wheel
Luminance
X Binning
Y Binning
Same
Camera 1
Camera 2
Options
Less <<
3D(1)
Camera 1 Information
Camera Idle
Cooler Regulating
Sensor Temp 5.0
Setpoint 5.0
Camera 2 Information
Camera Idle
Cooler Regulating
Sensor Temp -20.0
Setpoint -20.0
For Help, press F1


Maxim DL Pro 6
File Edit View Analyze Process Filter Color Plug-in Window Help
Autosave Setup
Autosave Filename
M42_
Estimated Duration
21s
Delay First
Delay Between
Dither
Off
Max. Dev. [pixels]
Y only
Mosaic
Capture
Setup
Astrometric Resync
Off
Sync Telescope
Correct via Slew
Solve Only
Bin 2x2
Interval
OK
Cancel
Apply
Options
Slot Type Filter Suffix Exposure Binning Speed Readout Mode Repeat Script
1 Light Red R 5 1 N/A Normal 1
2 Light Green G 5 1 N/A Normal 1
3 Light Blue B 5 1 N/A Normal 1
4 Light Red 0.000 1 N/A Normal 1
5 Light Red 0.000 1 N/A Normal 1
6 Light Red 0.000 1 N/A Normal 1
Camera Control
Expose Guide Setup
Exposure Preset
*Find Star
Seconds
Idle
Readout Mode
Normal
Subframe
On
Mouse
X: 468 Y: 346 W: 86 H: 82
Speed
ISO
Frame Type
Light
Filter Wheel
Luminance
X Binning
Y Binning
Same
Camera 1
Camera 2
Start
Stop
Single
Continuous
Autosave
Options
Less <<
3D(1)
Camera 1 Information
Camera Idle
Cooler Regulating
Sensor Temp 5.0
Setpoint 5.0
Camera 2 Information
Camera Idle
Cooler Regulating
Sensor Temp -20.0
Setpoint -20.0
For Help, press F1

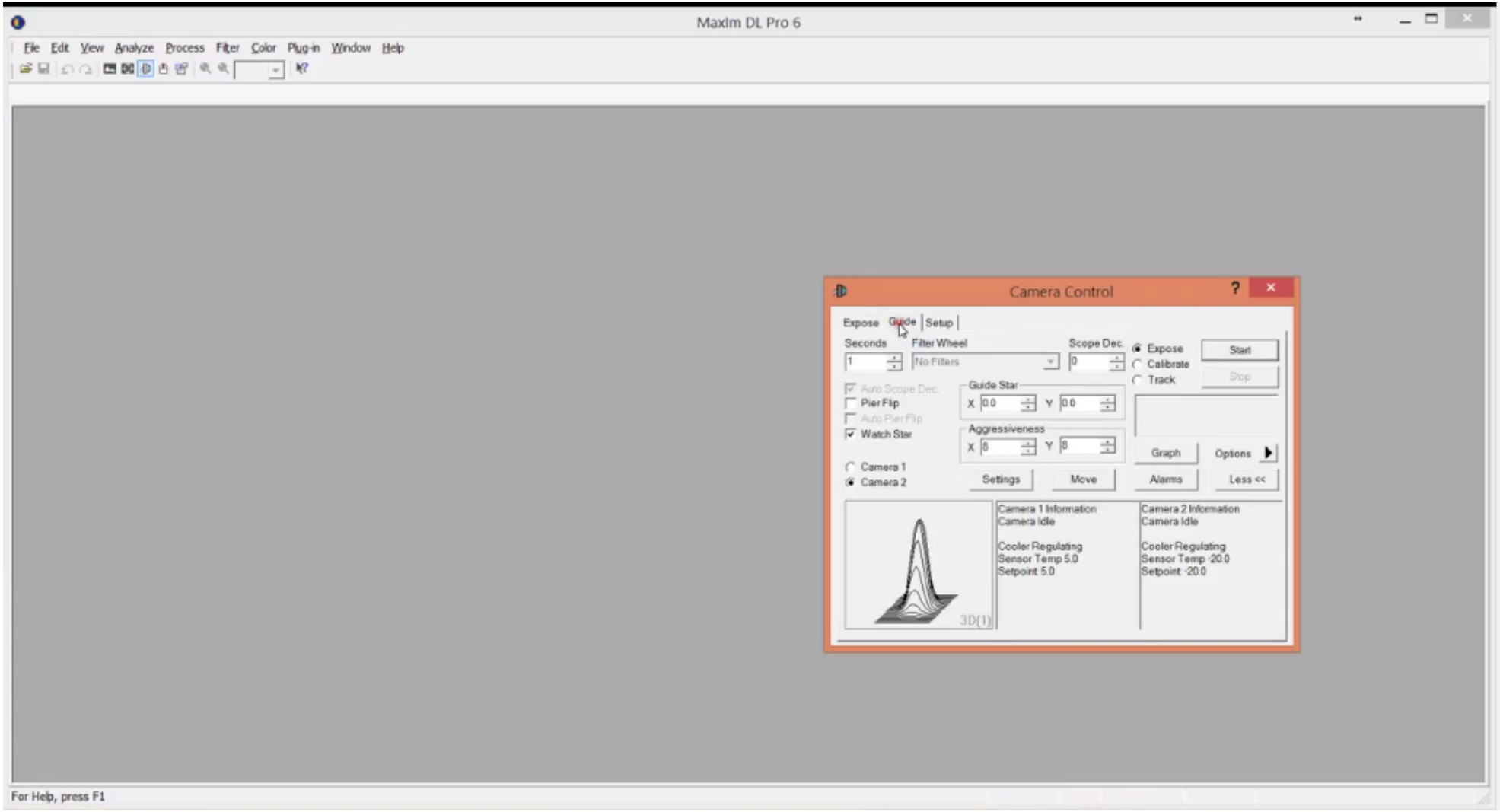
ustalamy folder zapisu

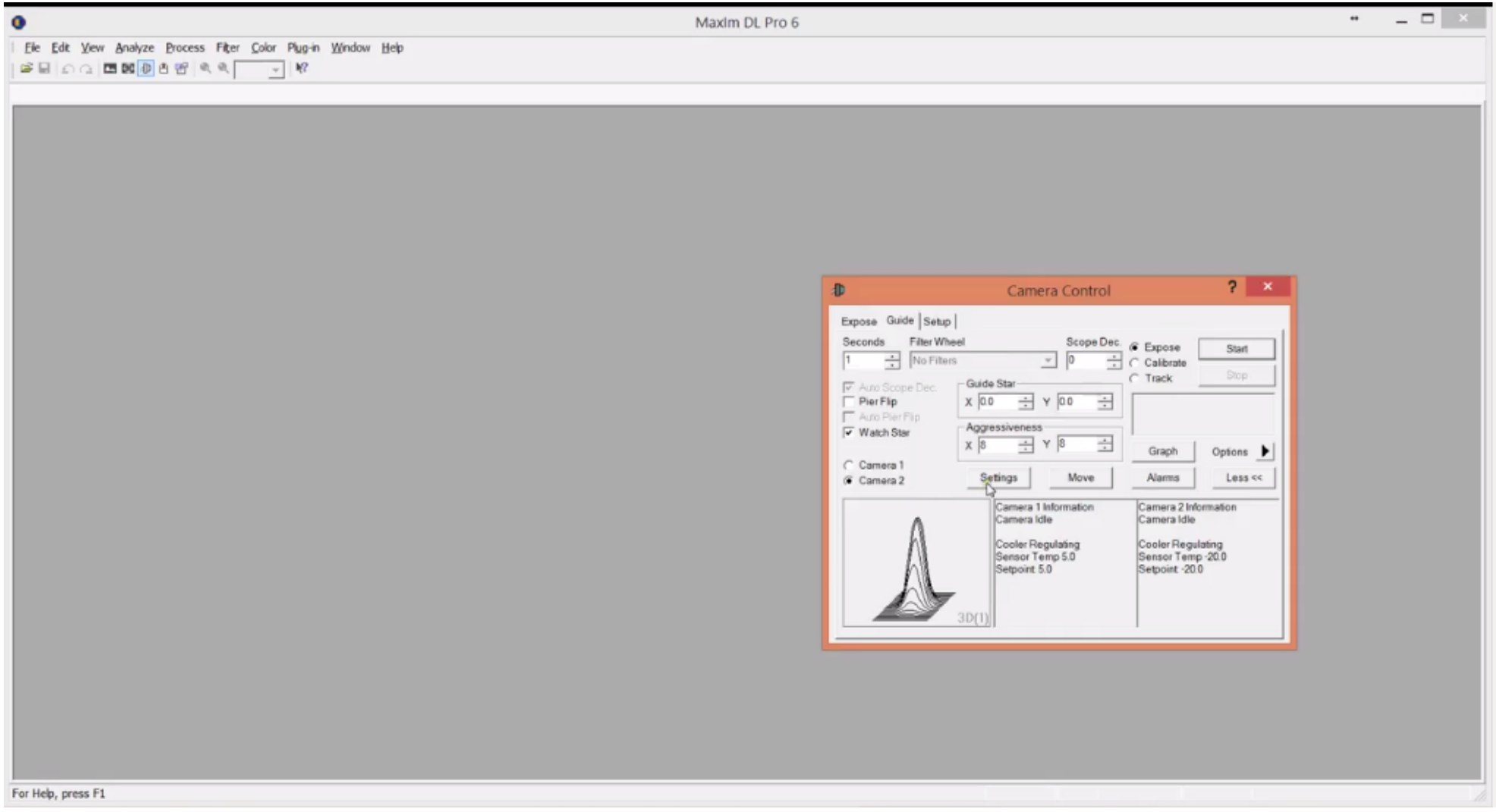



MaxIm DL Pro 6
File Edit View Analyze Process Filter Color Plug-in Window Help
Autosave Setup
Autosave Filename
M42_
Estimated Duration
21s
Delay First
Delay Between
Dither
Off
Max. Dev. (pixels)
Y only
Mosaic
Capture
Setup
Astrometric Resync
Off
Sync Telescope
Correct via Slew
Solve Only
Interval
Bin 2x2
OK
Cancel
Apply
Options
Slot Type Filter Suffix Exposure Binning Speed Readout Mode Repeat Script
1 Light Red R 5 1 N/A Normal 1
2 Light Green G 5 1 N/A Normal 1
3 Light Blue B 5 1 N/A Normal 1
4 Light Red 0.000 1 N/A Normal 1
5 Light Red 0.000 1 N/A Normal 1
6 Light Red 0.000 1 N/A Normal 1
Set Image Save Path...
Auto-Subfolder
New Subfolder at
Scheduled Mode
Same Repeat Count for All
Same Script Name for All
Group by Slot
Delay Between Light Frames Only
Run Scripts Minimized
Load Sequence...
Save Sequence
Save Sequence As...
Camera Control
Expose Guide Setup
Exposure Preset
*Find Star
Seconds
Idle
Start
Stop
Single
Continuous
Autosave
Options
Less <<
Y Binning
Same
Camera 1
Camera 2
Camera 2 Information
Camera Idle
Cooler Regulating
Sensor Temp -20.0
Setpoint -20.0
For Help, press F1

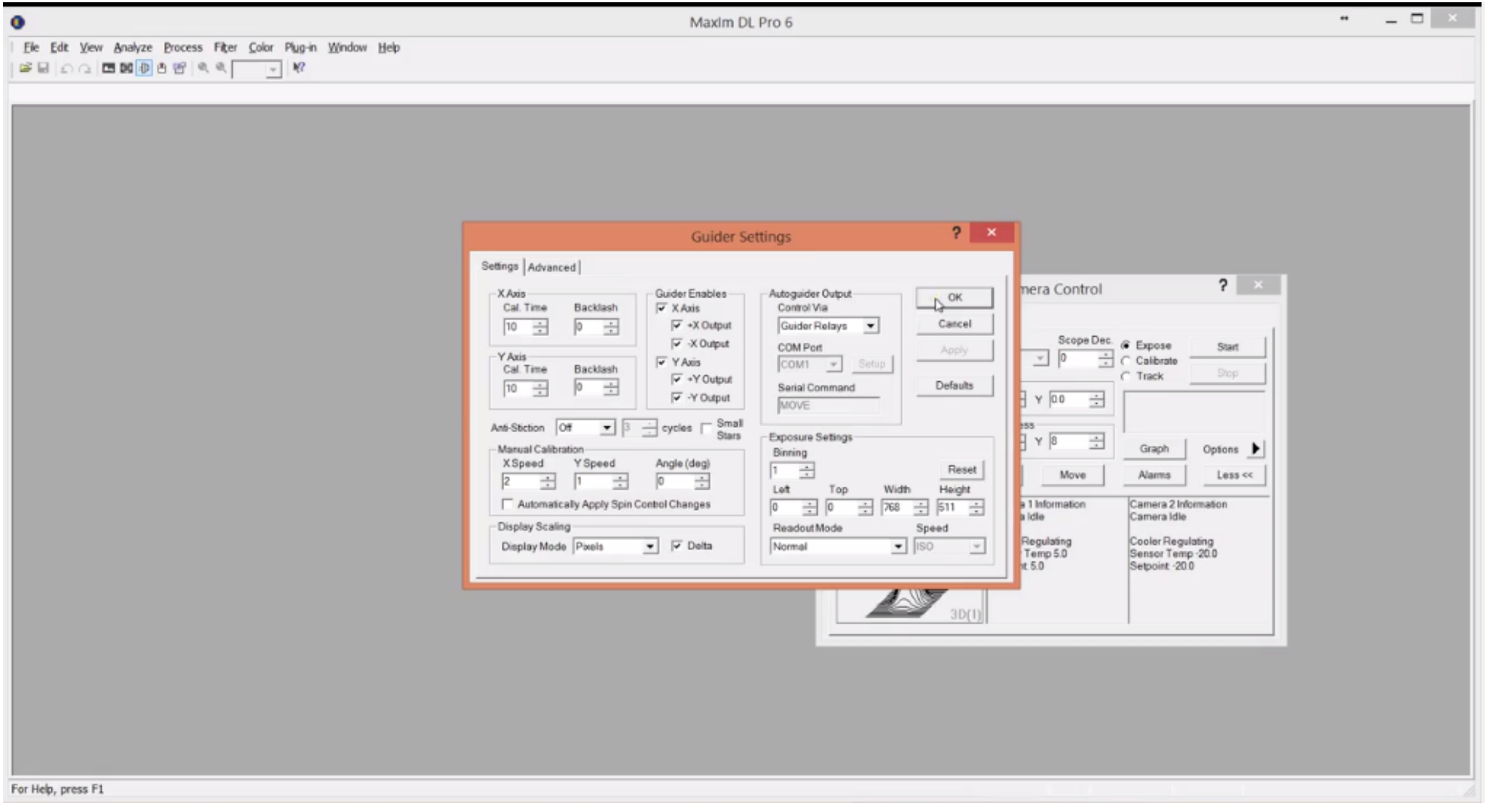

MaxIm DL Pro 6
File Edit View Analyze Process Filter Color Plug-in Window Help
Autosave Setup
Autosave Filename
M42_
Estimated Duration
21s
Delay First
Delay Between
Dither
Off
Max. Dev. (pixels)
Y only
Mosaic
Capture
Setup
Astrometric Resync
Off
Sync Telescope
Correct via Slew
Solve Only
Interval
Bin 2x2
OK
Cancel
Apply
Options
Slot Type Filter Suffix Exposure Binning Speed Readout Mode Repeat Script
1 Light Red R 5 1 N/A Normal 1
2 Light Green G 5 1 N/A Normal 1
3 Light Blue B 5 1 N/A Normal 1
4 Light Red 0.000 1 N/A Normal 1
5 Light Red 0.000 1 N/A Normal 1
6 Light Red 0.000 1 N/A Normal 1
Set Image Save Path...
Auto-Subfolder
New Subfolder at
Scheduled Mode
Same Repeat Count for All
Same Script Name for All
Group by Slot
Delay Between Light Frames Only
Run Scripts Minimized
Load Sequence...
Save Sequence
Save Sequence As...
Camera Control
Expose Guide Setup
Exposure Preset
*Find Star
Seconds
Idle
Start
Stop
Single
Continuous
Autosave
Options
Less <<
Camera 1
Camera 2
Y Binning
Same
Camera 2 Information
Camera Idle
Cooler Regulating
Sensor Temp -20.0
Setpoint -20.0
For Help, press F1

gdy mamy do dyspozycji drugą kamerę lub kamerę typu DualChip - możemy użyć funkcji korekty śledzenia - autoguidingu

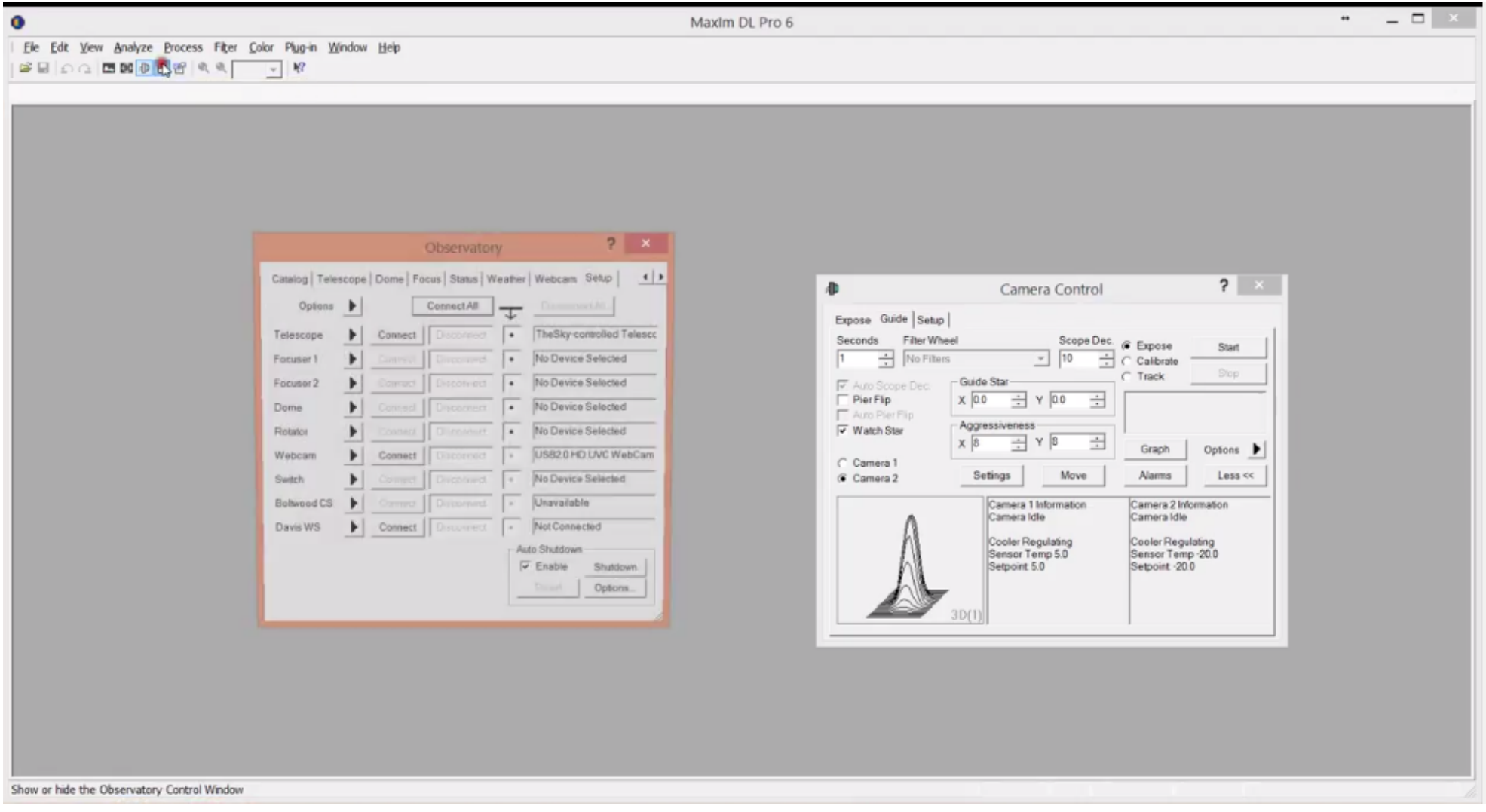


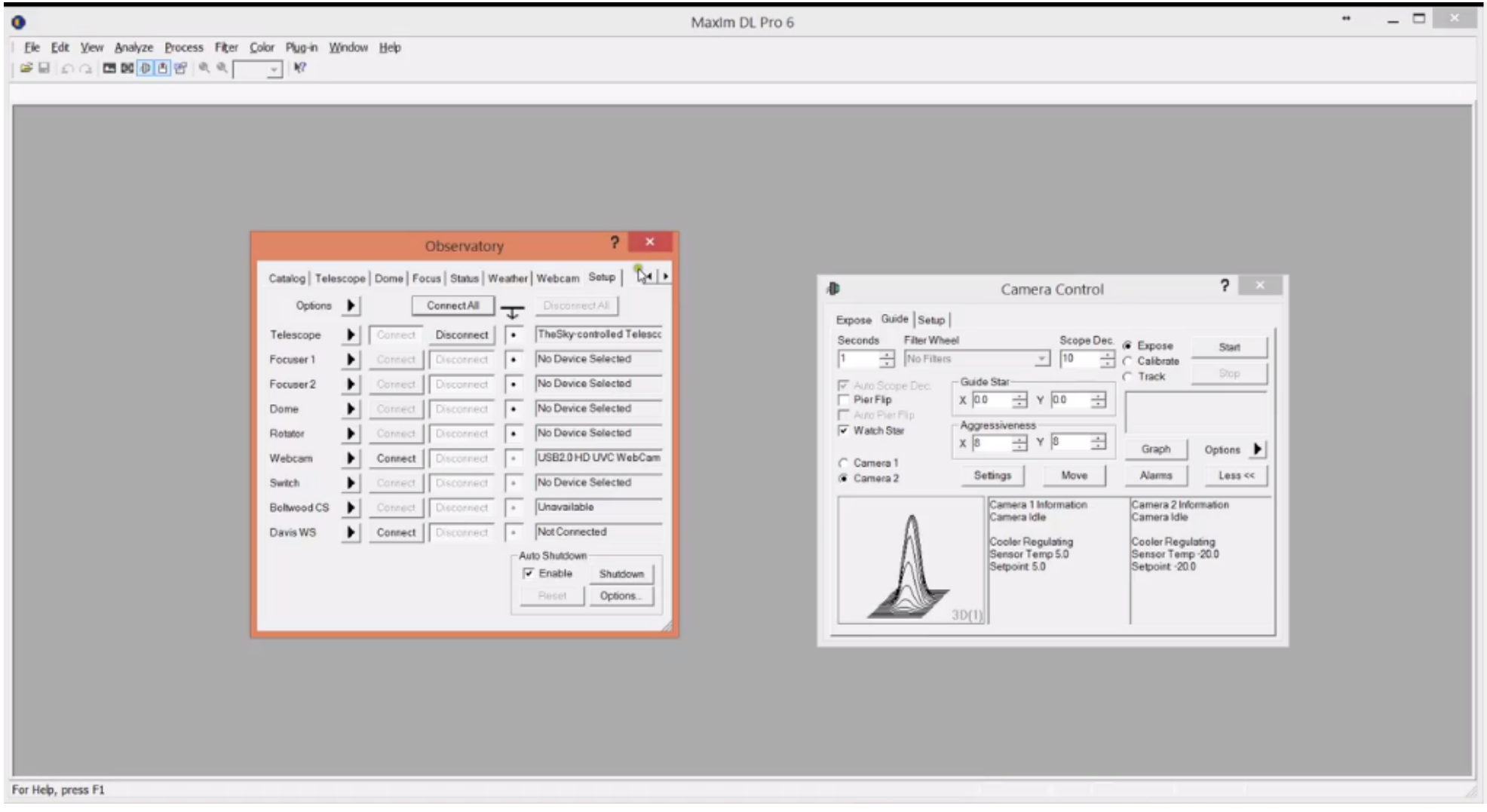

MaxIm DL Pro 6
File Edit View Analyze Process Filter Color Plug-in Window Help
Camera Control
Expose Guide Setup
Seconds
Filter Wheel
No Filters
Scope Dec.
Expose
Calibrate
Track
Start
Stop
Auto Scope Dec.
Pier Flip
Auto Pier Flip
Watch Star
Guide Star
X 0.0 Y 0.0
Aggressiveness
X 8 Y 8
Graph
Options
Camera 1
Camera 2
Settings
Move
Alarms
Less <<
Camera 1 Information
Camera Idle
Cooler Regulating
Sensor Temp 5.0
Setpoint 5.0
Camera 2 Information
Camera Idle
Cooler Regulating
Sensor Temp -20.0
Setpoint -20.0
3D(1)
For Help, press F1

szczegóły prowadzenia, wybór osi

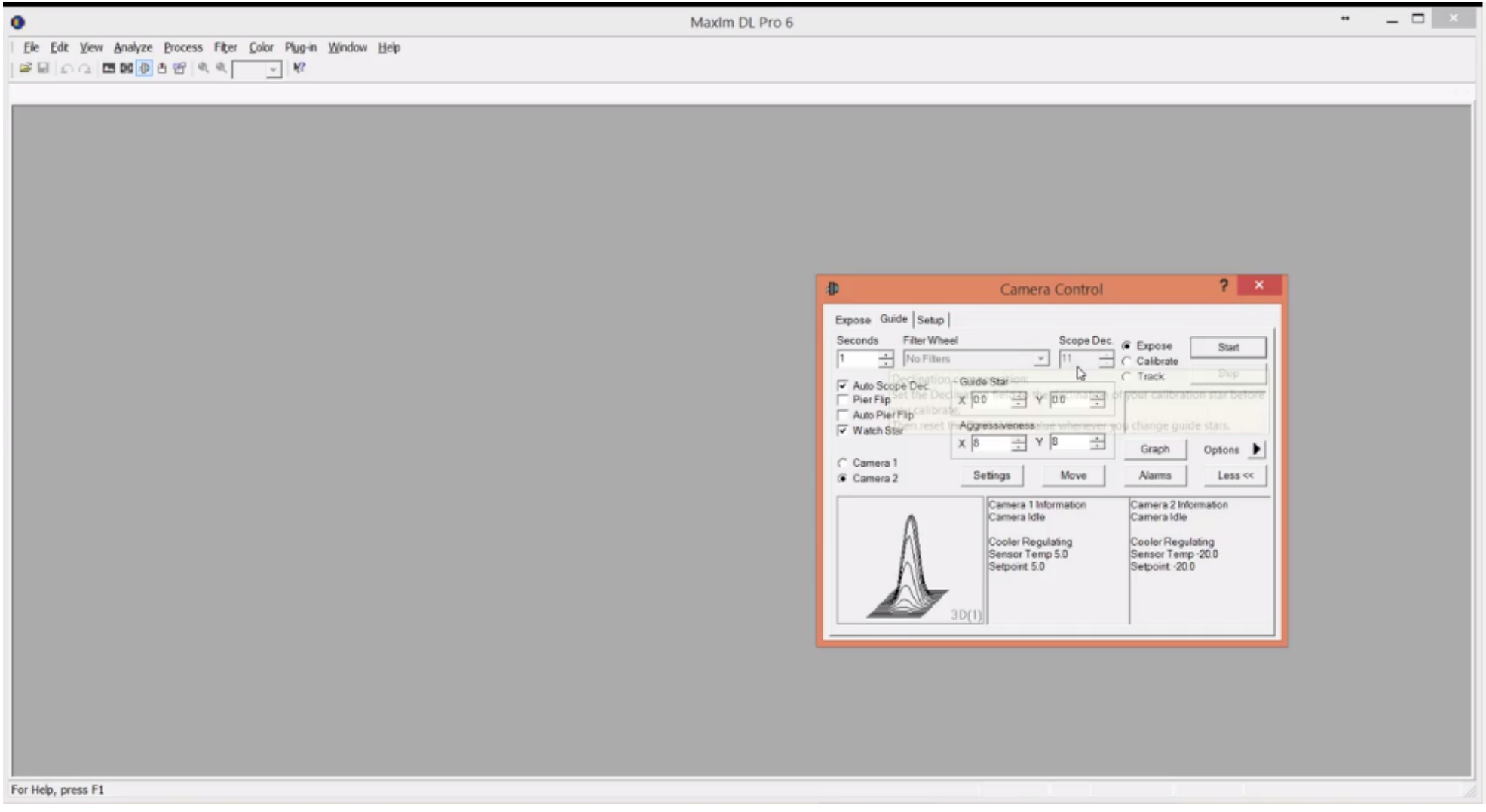


teleskop podłączony

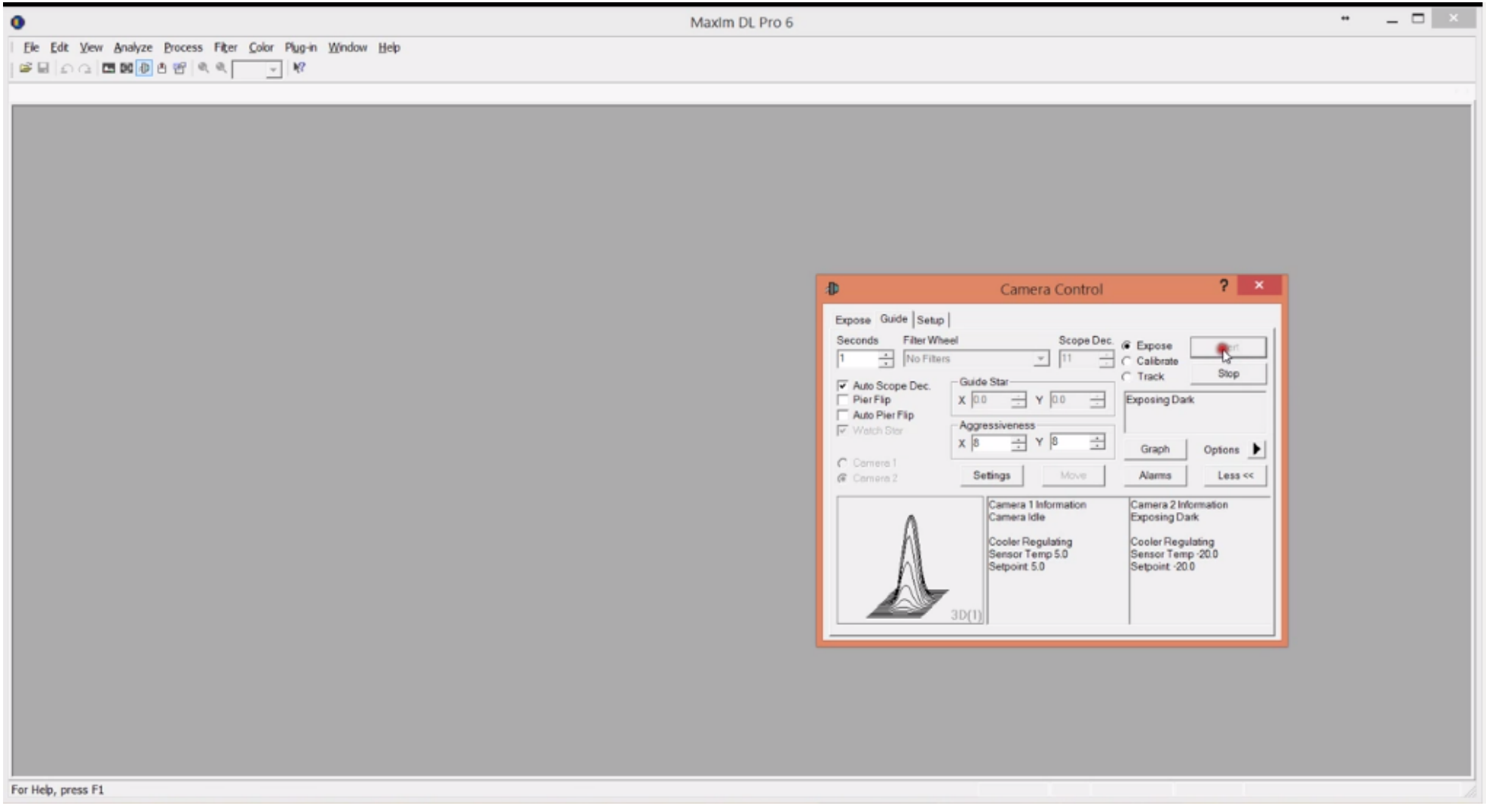



MaxIm DL Pro 6
File Edit View Analyze Process Filter Color Plug-in Window Help
Observatory
Catalog | Telescope | Dome | Focus | Status | Weather | Webcam | Setup
Options
Connect All
Disconnect All
Telescope Connect Disconnect TheSky-controlled Telesc
Focuser 1 Connect Disconnect No Device Selected
Focuser 2 Connect Disconnect No Device Selected
Dome Connect Disconnect No Device Selected
Rotator Connect Disconnect No Device Selected
Webcam Connect Disconnect USB2.0 HD UVC WebCam
Switch Connect Disconnect No Device Selected
Bellwood CS Connect Disconnect Unavailable
Davis WS Connect Disconnect Not Connected
Auto Shutdown
Enable
Shutdown
Reset
Options...
Camera Control
Expose Guide Setup
Seconds
Filter Wheel
No Filters
Scope Dec.
Expose
Calibrate
Track
Start
Stop
Auto Scope Dec.
Pier Flip
Auto Pier Flip
Watch Star
Guide Star
X 0.0 Y 0.0
Aggressiveness
X 8 Y 8
Graph
Options
Camera 1
Camera 2
Settings
Move
Alarms
Less <<
3D(1)
Camera 1 Information
Camera Idle
Cooler Regulating
Sensor Temp 5.0
Setpoint 5.0
Camera 2 Information
Camera Idle
Cooler Regulating
Sensor Temp -20.0
Setpoint -20.0
For Help, press F1

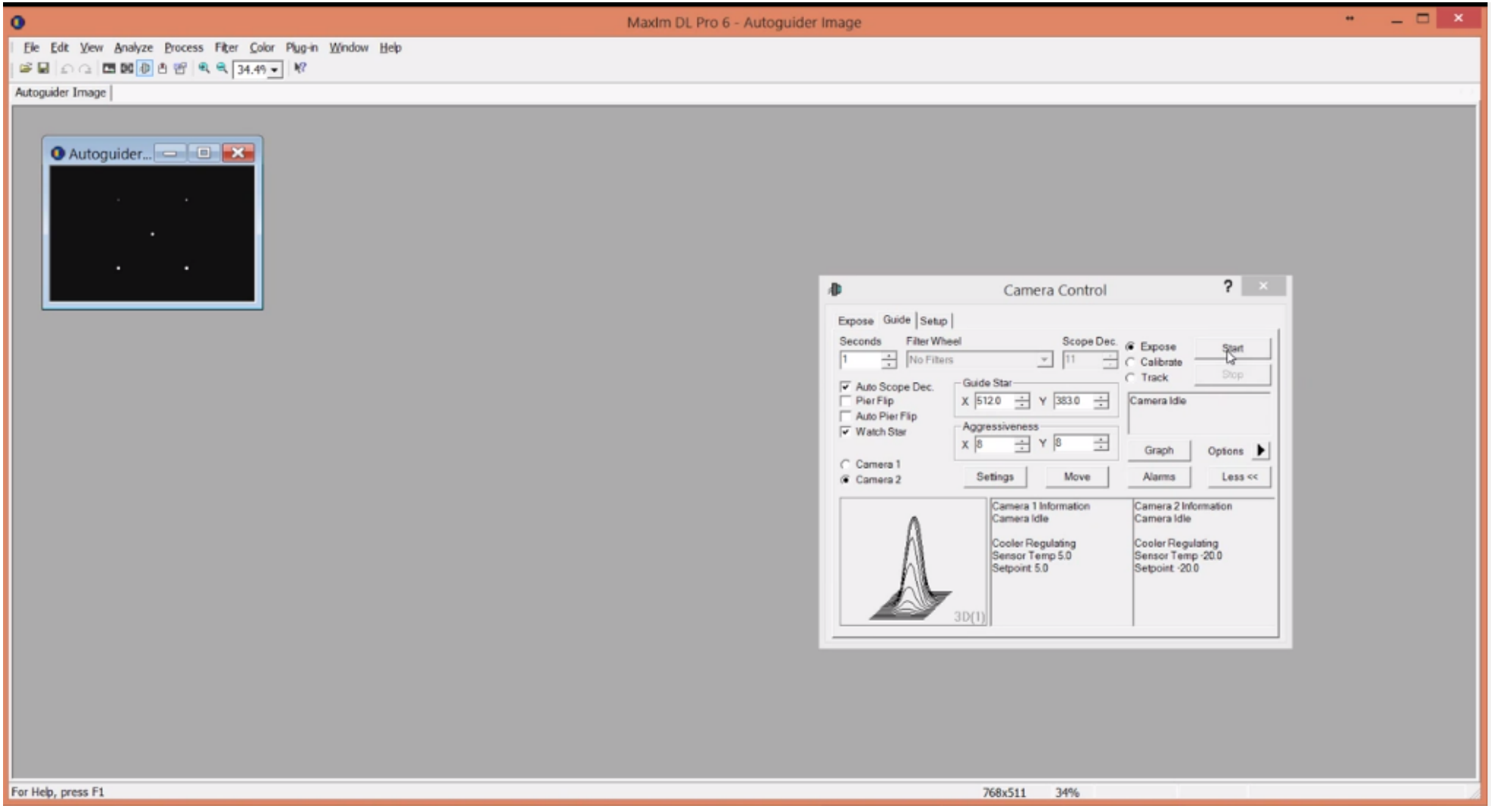
pozwala to zastosować poprawkę do deklinacji



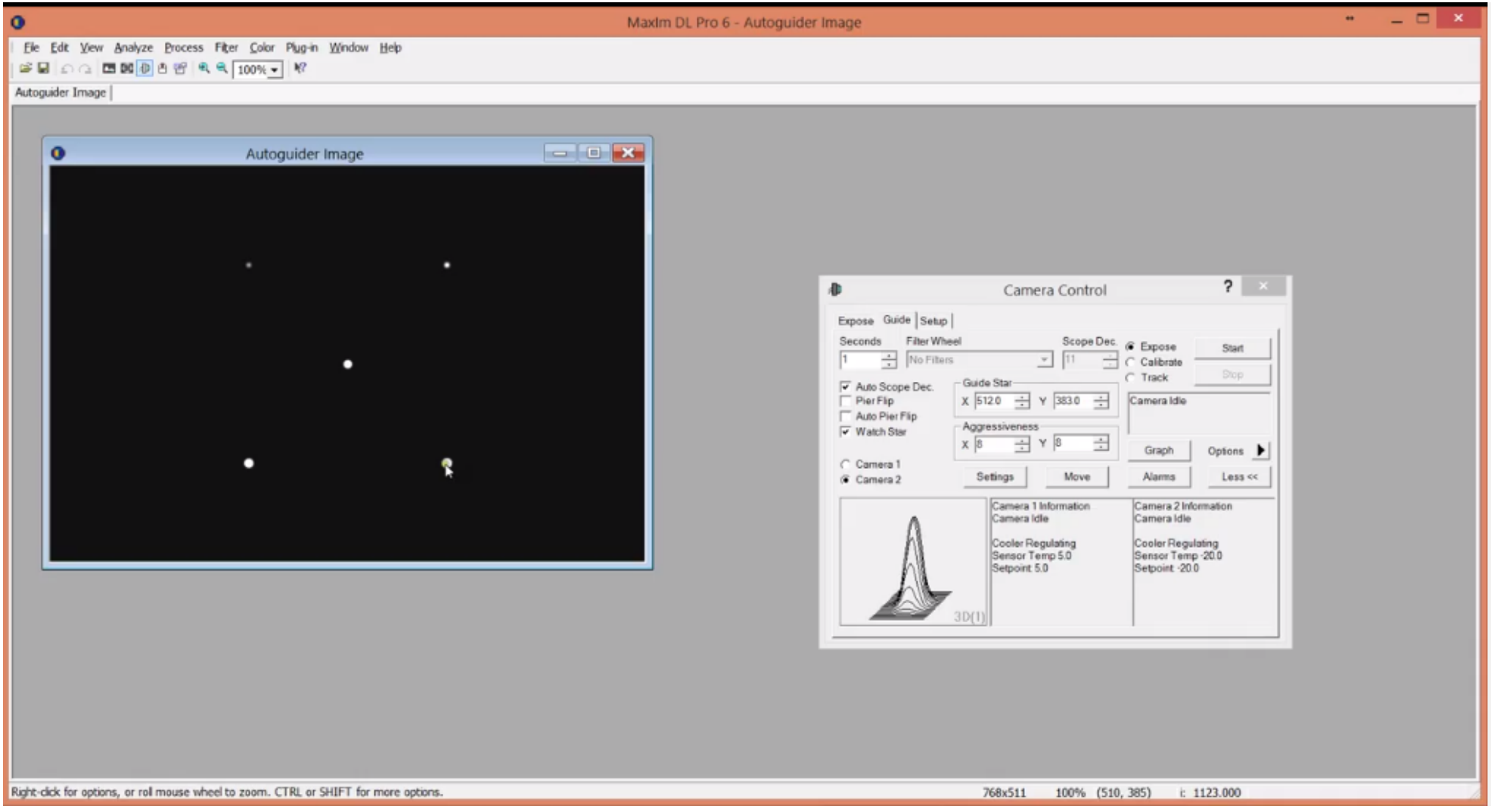
wykonujemy ekspozycję pamiętając, że używamy tym razem kamery nr 2



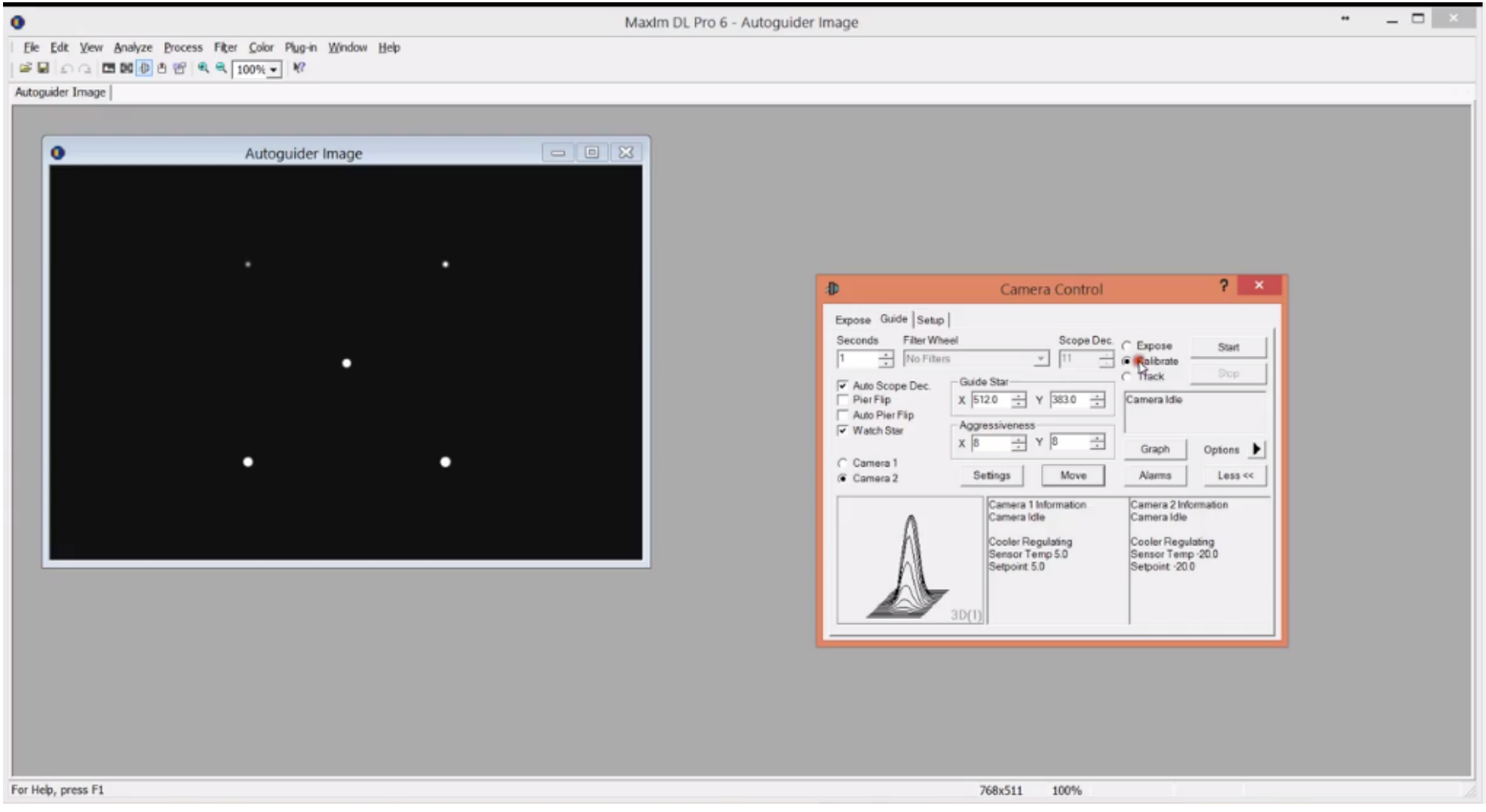
pojawia się obraz z kamery do prowadzenia

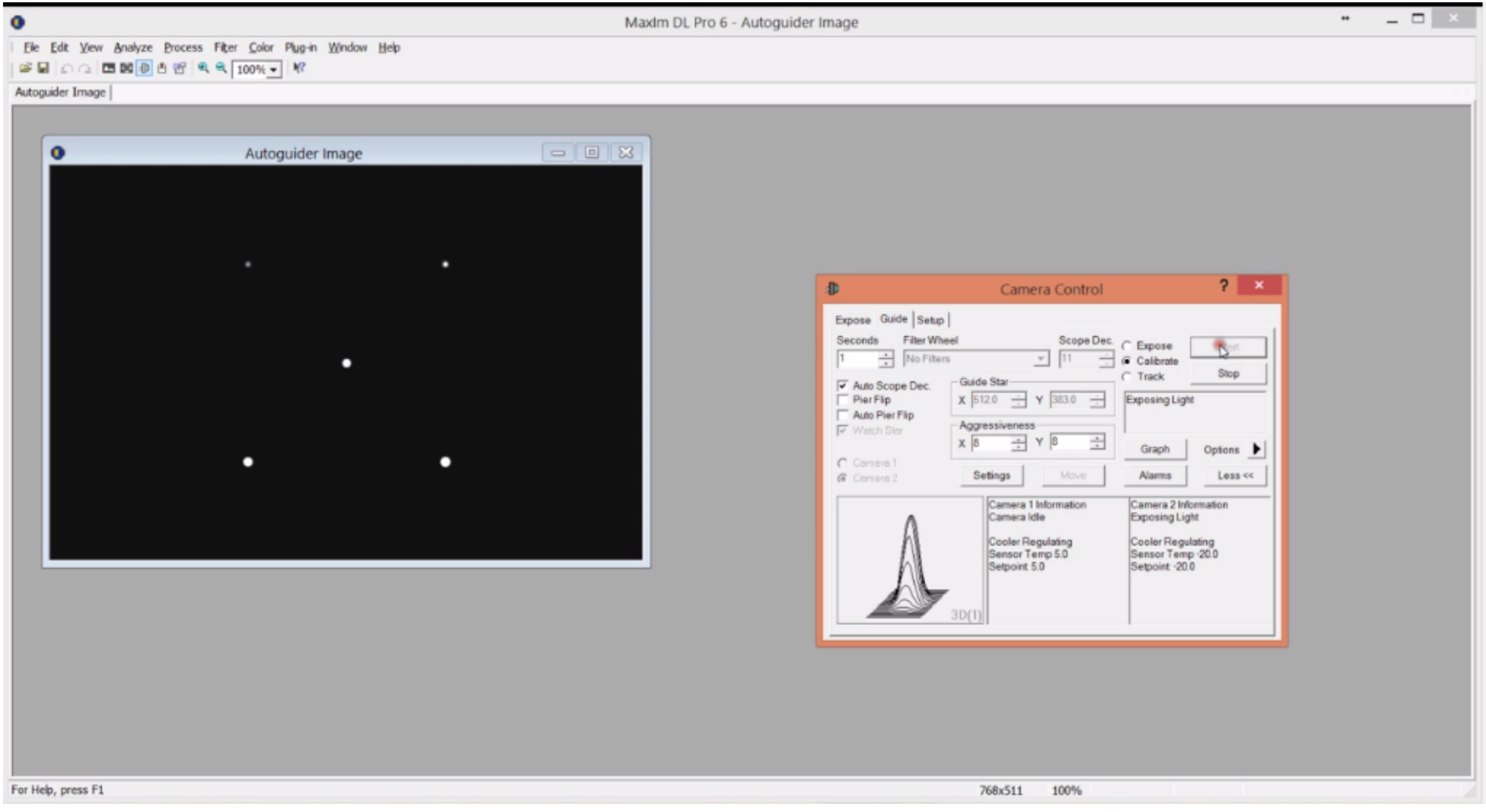


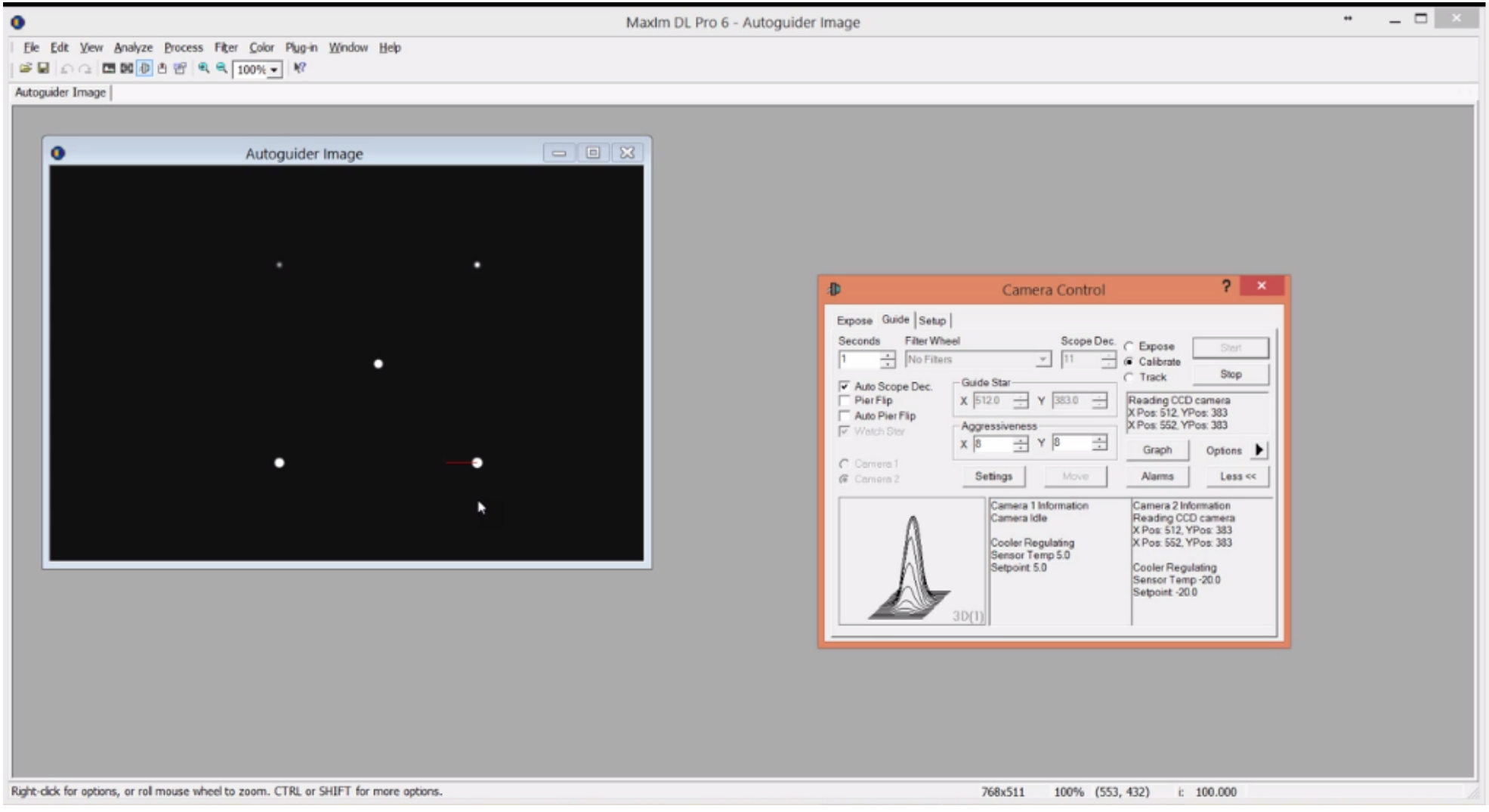
program automatycznie wybiera do prowadzenia najjaśniejszą gwiazdę w polu

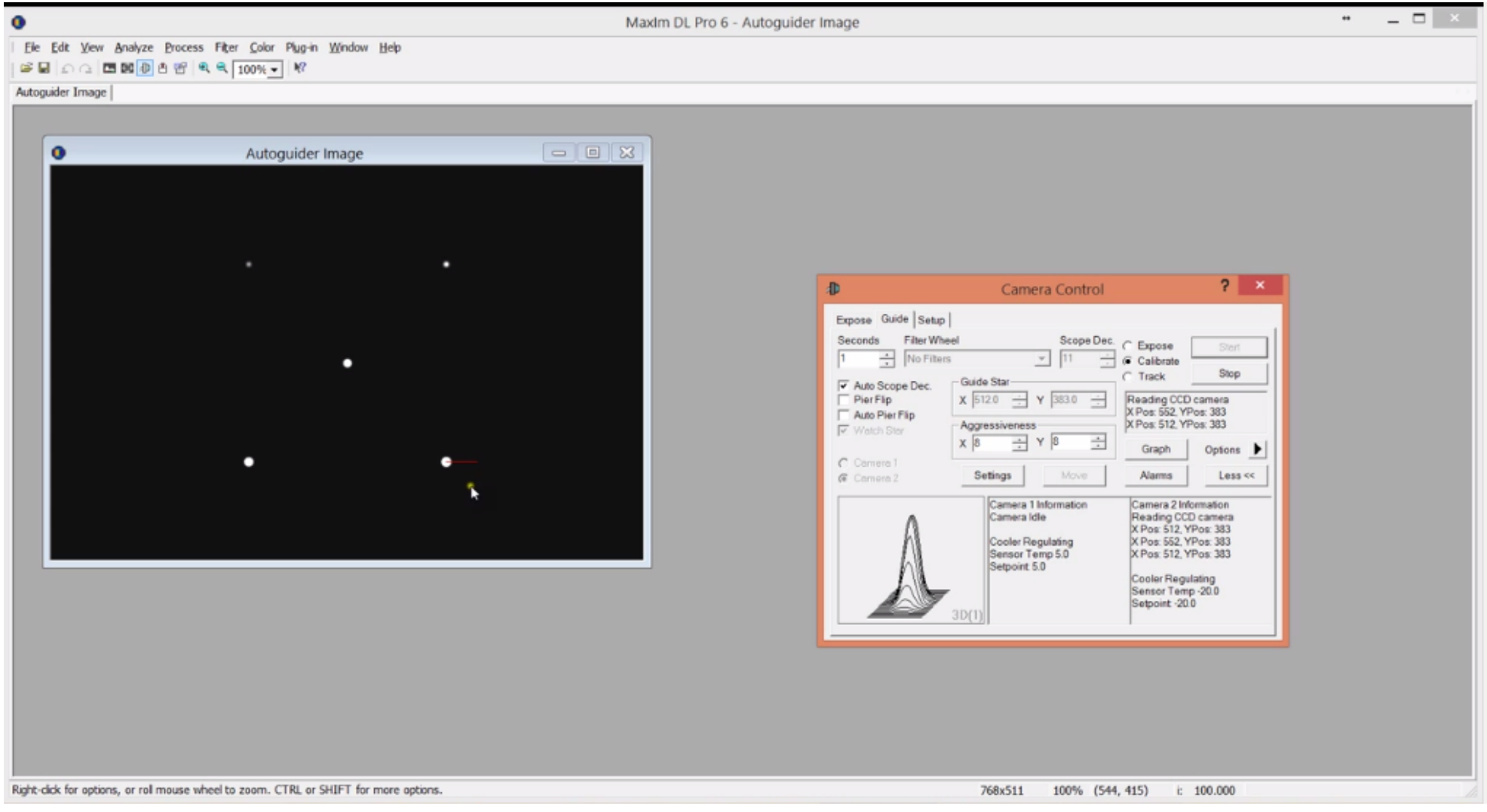


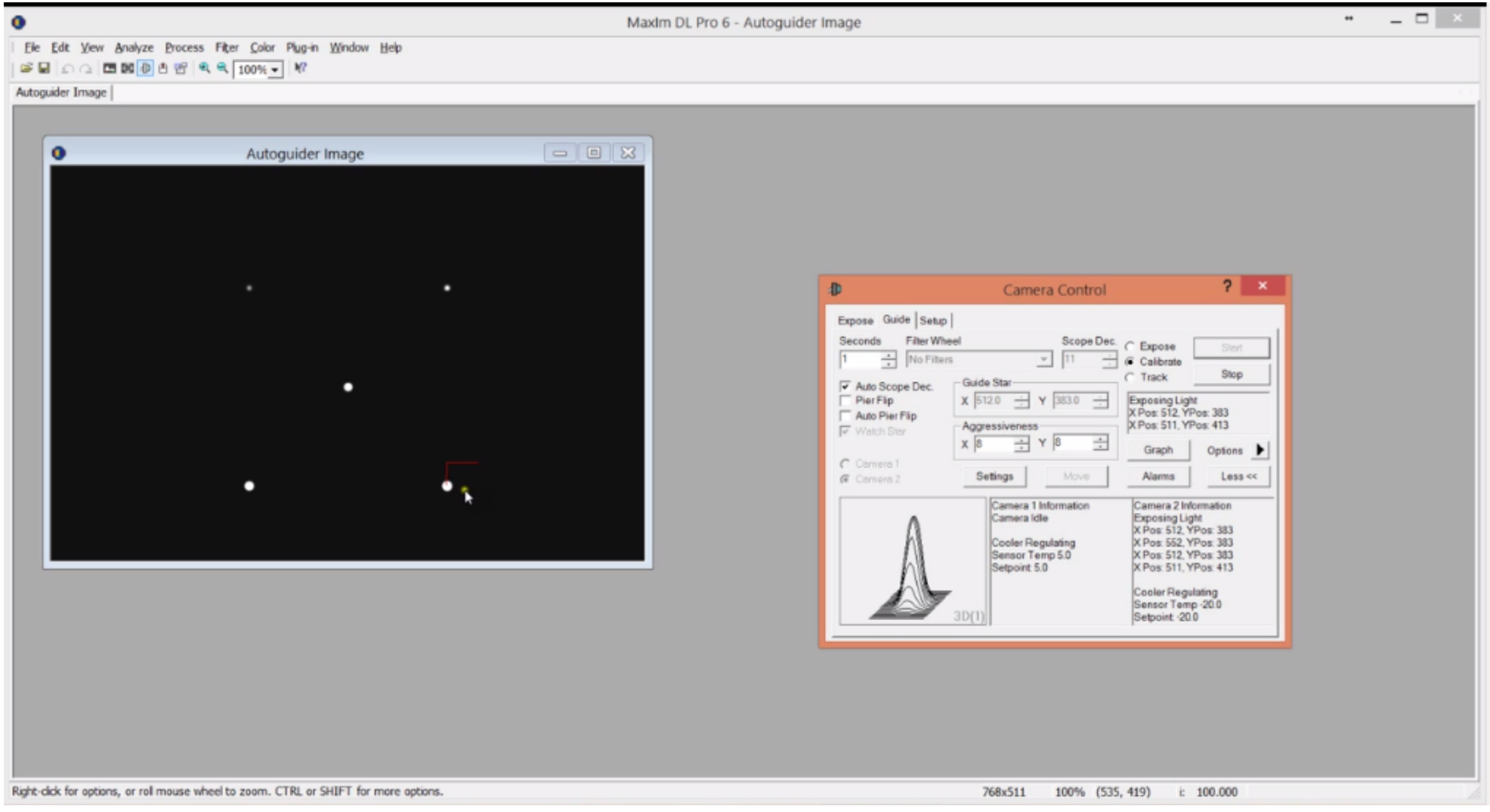
kalibracja obrazu przebiega w kilku krokach

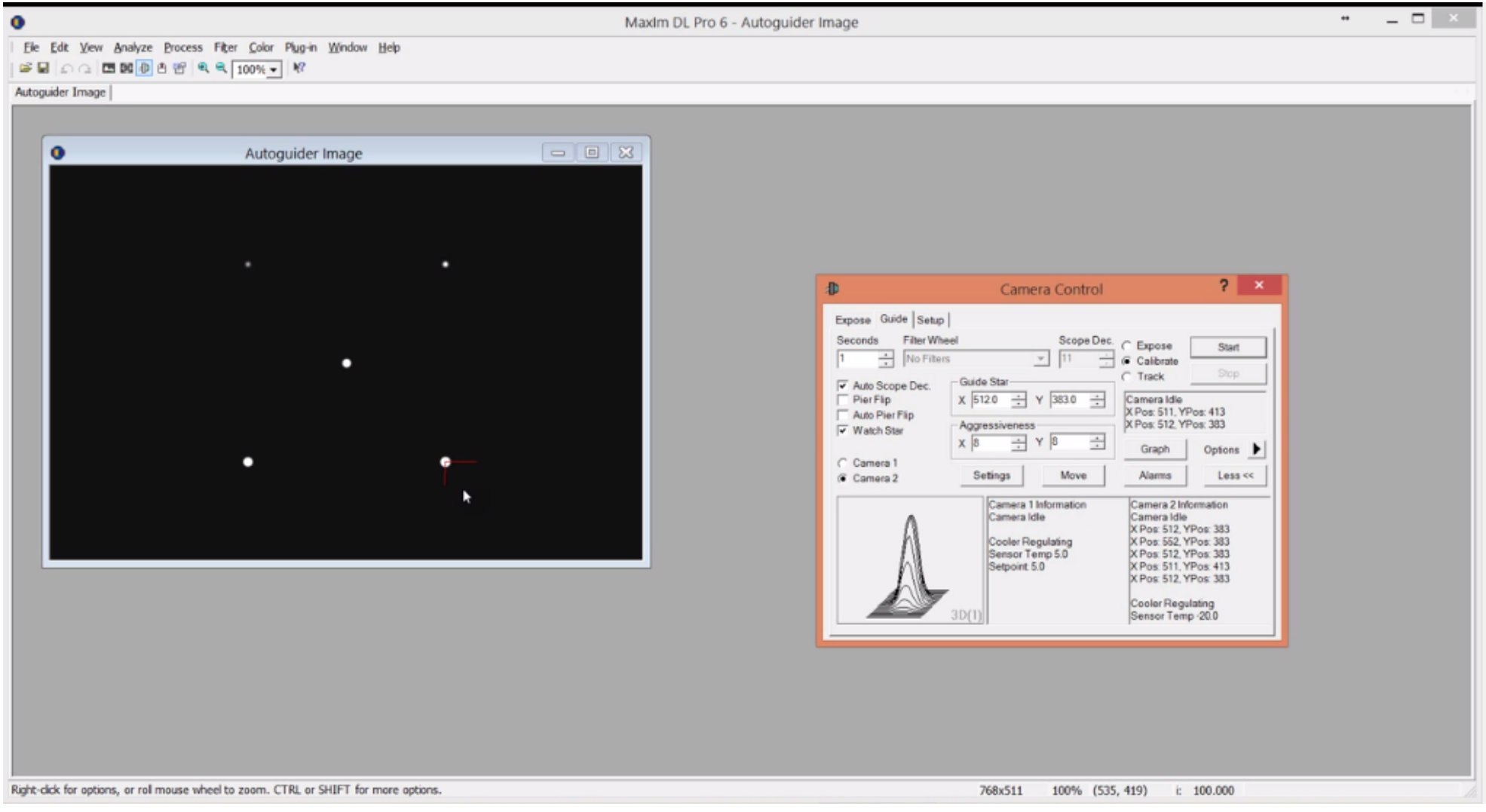



MaxIm DL Pro 6 - Autoguider Image
File Edit View Analyze Process Filter Color Plug-in Window Help
100%
Autoguider Image
Autoguider Image
Camera Control
Expose Guide Setup
Seconds
Filter Wheel
No Filters
Scope Dec.
Expose
Calibrate
Track
Stop
Auto Scope Dec.
Pier Flip
Auto Pier Flip
Watch Star
Guide Star
X 512.0 Y 383.0
Aggressiveness
X 8 Y 8
Exposing Light
Graph
Options
Camera 1
Camera 2
Settings
Move
Alarms
Less <<
Camera 1 Information
Camera Idle
Cooler Regulating
Sensor Temp 5.0
Setpoint 5.0
Camera 2 Information
Exposing Light
Cooler Regulating
Sensor Temp -20.0
Setpoint -20.0
3D(1)
For Help, press F1
768x511
100%

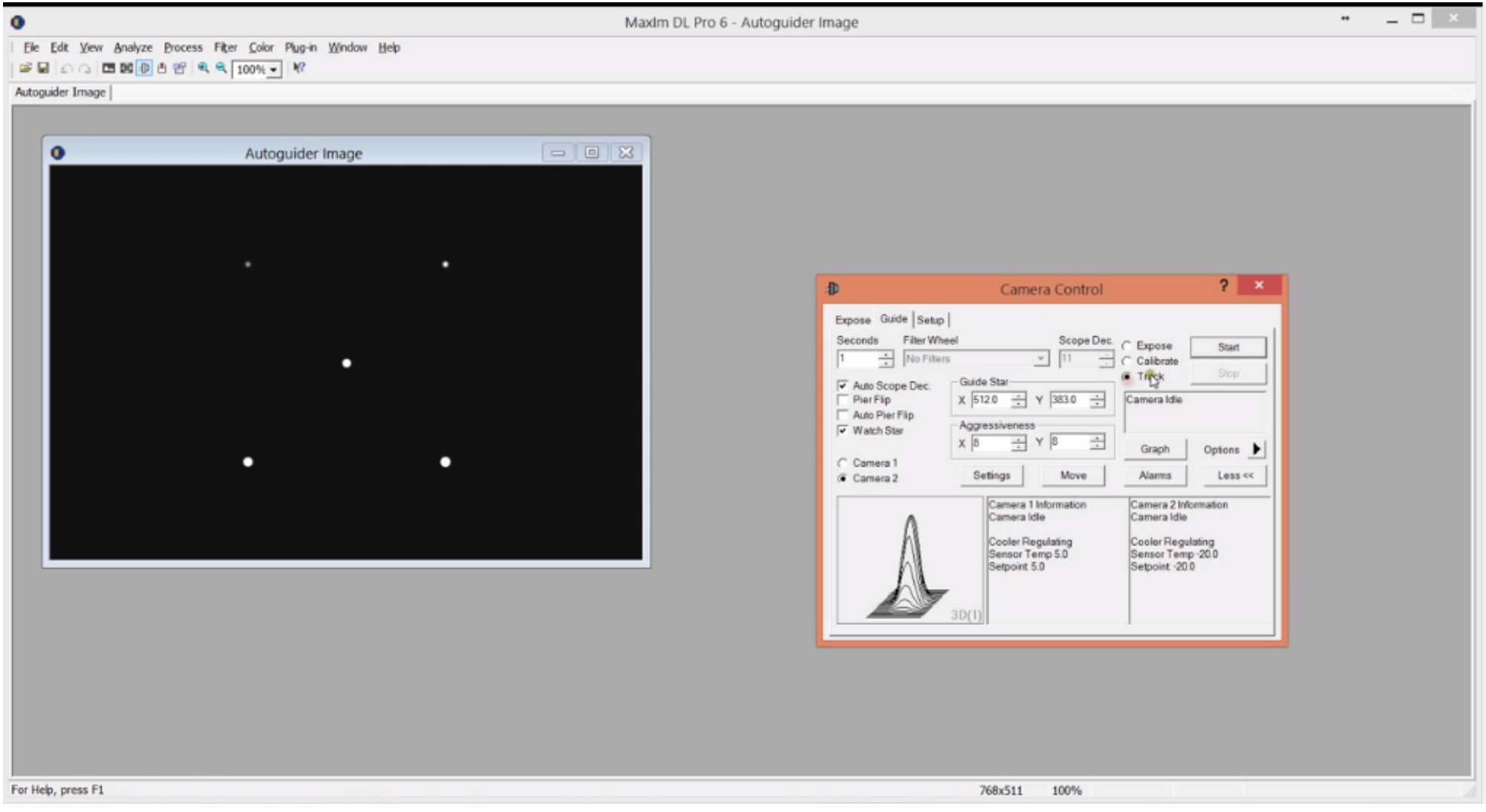

MaxIm DL Pro 6 - Autoguider Image
File Edit View Analyze Process Filter Color Plug-in Window Help
100%
Autoguider Image
Autoguider Image
Camera Control
Expose Guide Setup
Seconds
Filter Wheel
No Filters
Scope Dec.
Expose
Calibrate
Track
Start
Stop
Auto Scope Dec.
Pier Flip
Auto Pier Flip
Watch Star
Guide Star
X 512.0 Y 383.0
Aggressiveness
X 8 Y 8
Reading CCD camera
X Pos: 512, YPos: 383
X Pos: 552, YPos: 383
Graph
Options
Camera 1
Camera 2
Settings
Move
Alarms
Less <<
3D(1)
Camera 1 Information
Camera Idle
Cooler Regulating
Sensor Temp 5.0
Setpoint 5.0
Camera 2 Information
Reading CCD camera
X Pos: 512, YPos: 383
X Pos: 552, YPos: 383
Cooler Regulating
Sensor Temp -20.0
Setpoint -20.0
Right-click for options, or roll mouse wheel to zoom. CTRL or SHIFT for more options.
768x511
100%
(553, 432)
100.000

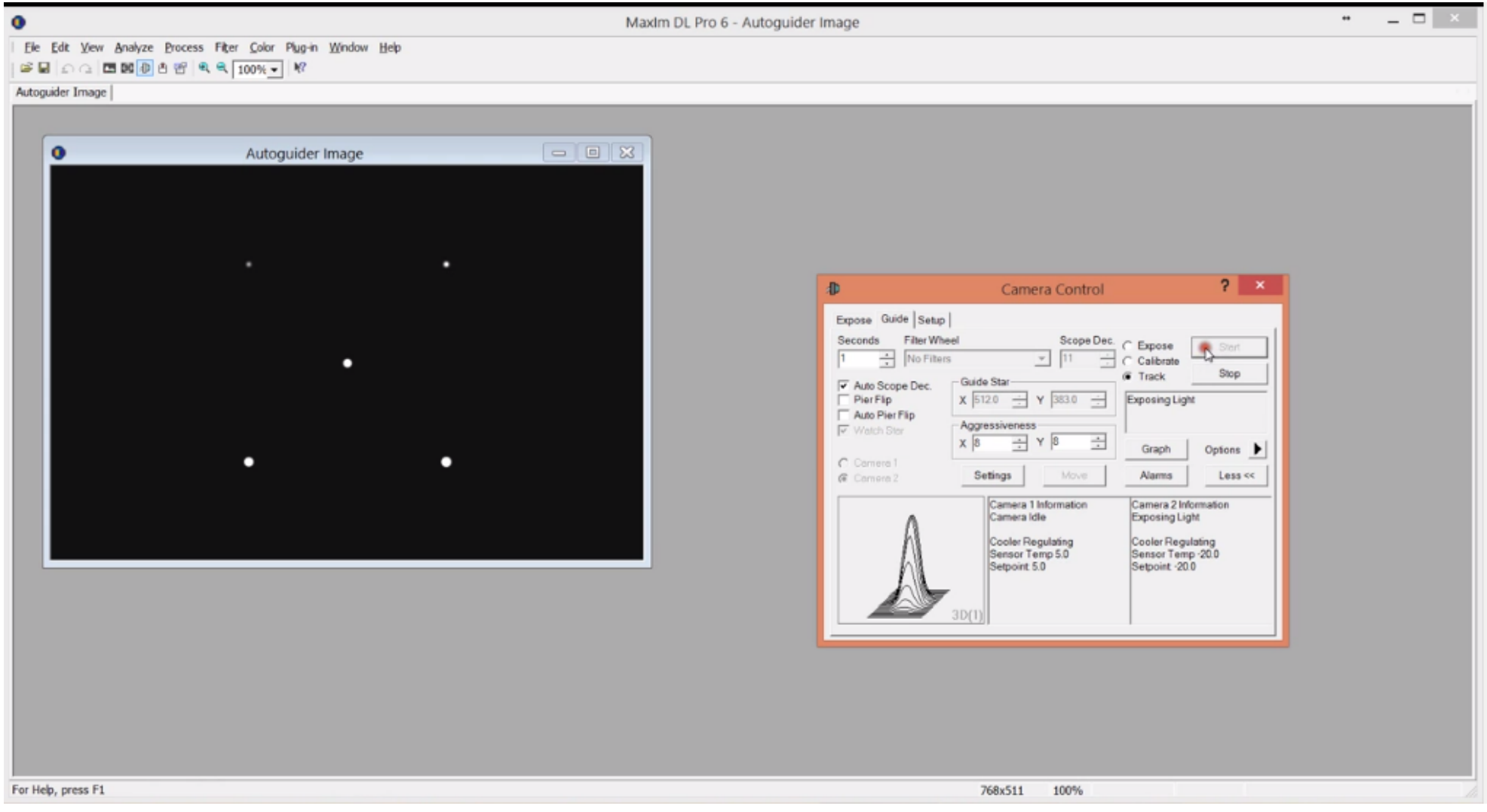

MaxIm DL Pro 6 - Autoguider Image
File Edit View Analyze Process Filter Color Plug-in Window Help
100%
Autoguider Image
Autoguider Image
Camera Control
Expose Guide Setup
Seconds
Filter Wheel
No Filters
Scope Dec.
Expose
Calibrate
Track
Start
Stop
Auto Scope Dec.
Pier Flip
Auto Pier Flip
Watch Star
Guide Star
X 512.0 Y 383.0
Aggressiveness
X 8 Y 8
Reading CCD camera
X Pos: 552, YPos: 383
X Pos: 512, YPos: 383
Graph
Options
Camera 1
Camera 2
Settings
Move
Alarms
Less <<
3D(1)
Camera 1 Information
Camera Idle
Cooler Regulating
Sensor Temp 5.0
Setpoint 5.0
Camera 2 Information
Reading CCD camera
X Pos: 512, YPos: 383
X Pos: 552, YPos: 383
X Pos: 512, YPos: 383
Cooler Regulating
Sensor Temp -20.0
Setpoint -20.0
Right-click for options, or roll mouse wheel to zoom. CTRL or SHIFT for more options.
768x511
100%
(544, 415)
100.000

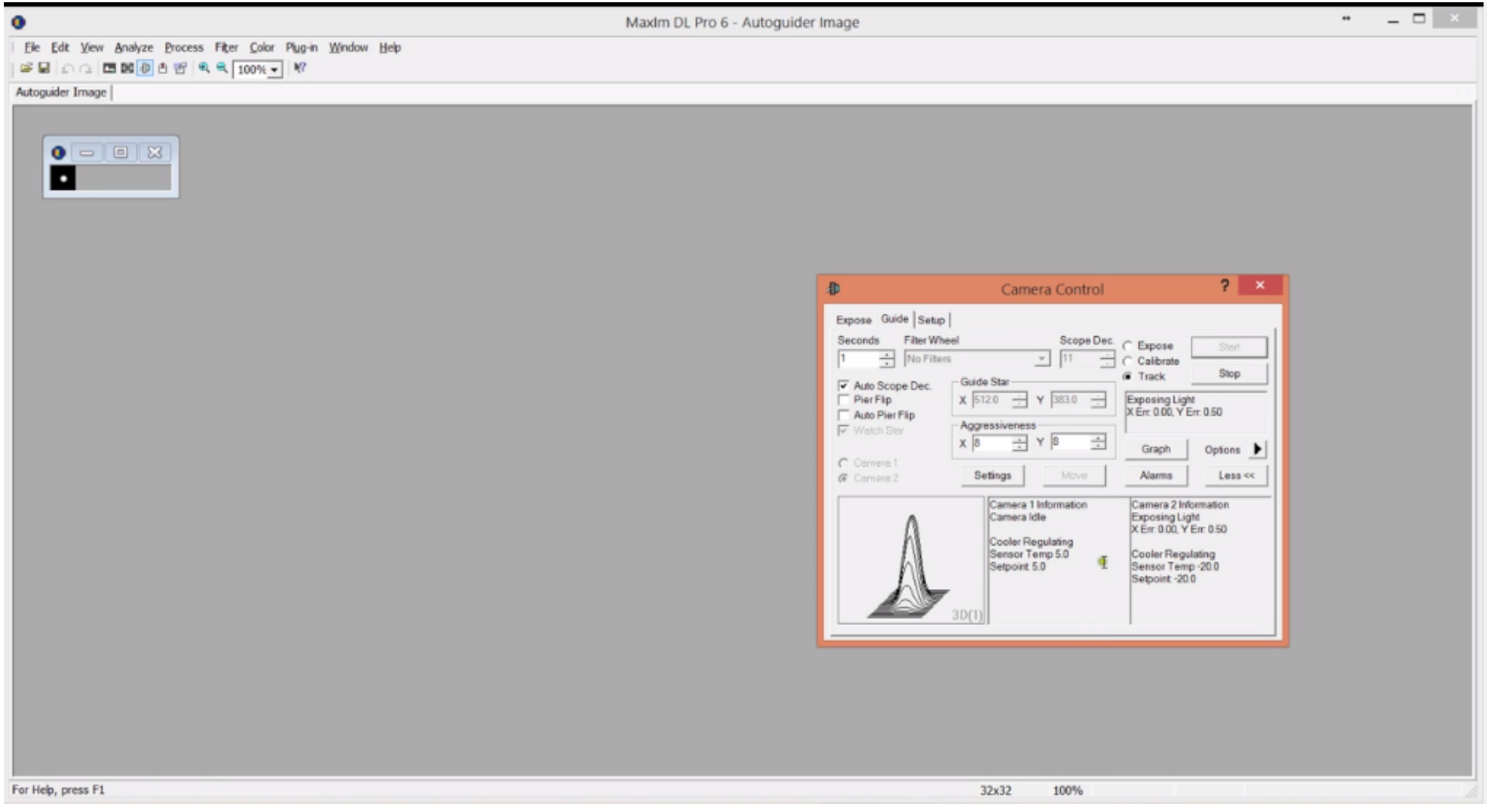

MaxIm DL Pro 6 - Autoguider Image
File Edit View Analyze Process Filter Color Plug-in Window Help
100%
Autoguider Image
Autoguider Image
Camera Control
Expose Guide Setup
Seconds
Filter Wheel
No Filters
Scope Dec.
Expose
Calibrate
Track
Start
Stop
Auto Scope Dec.
Pier Flip
Auto Pier Flip
Watch Star
Guide Star
X 512.0
Y 383.0
Aggressiveness
X 8
Y 8
Exposing Light
X Pos: 512, YPos: 383
X Pos: 511, YPos: 413
Graph
Options
Camera 1
Camera 2
Settings
Move
Alarms
Less <<
3D(1)
Camera 1 Information
Camera Idle
Cooler Regulating
Sensor Temp 5.0
Setpoint 5.0
Camera 2 Information
Exposing Light
X Pos: 512, YPos: 383
X Pos: 552, YPos: 383
X Pos: 512, YPos: 383
X Pos: 511, YPos: 413
Cooler Regulating
Sensor Temp -20.0
Setpoint -20.0
Right-click for options, or roll mouse wheel to zoom. CTRL or SHIFT for more options.
768x511
100%
(535, 419)
100.000


MaxIm DL Pro 6 - Autoguider Image
File Edit View Analyze Process Filter Color Plug-in Window Help
100%
Autoguider Image
Autoguider Image
Camera Control
Expose Guide Setup
Seconds
Filter Wheel
Scope Dec.
1
No Filters
11
Expose
Calibrate
Track
Start
Stop
Auto Scope Dec.
Pier Flip
Auto Pier Flip
Watch Star
Guide Star
X 512.0
Y 383.0
Aggressiveness
X 8
Y 8
Camera Idle
X Pos: 511, YPos: 413
X Pos: 512, YPos: 383
Graph
Options
Camera 1
Camera 2
Settings
Move
Alarms
Less <<
3D(1)
Camera 1 Information
Camera Idle
Cooler Regulating
Sensor Temp 5.0
Setpoint 5.0
Camera 2 Information
Camera Idle
X Pos: 512, YPos: 383
X Pos: 552, YPos: 383
X Pos: 512, YPos: 383
X Pos: 511, YPos: 413
X Pos: 512, YPos: 383
Cooler Regulating
Sensor Temp -20.0
Right-click for options, or roll mouse wheel to zoom. CTRL or SHIFT for more options.
768x511
100%
(535, 419)
100.000

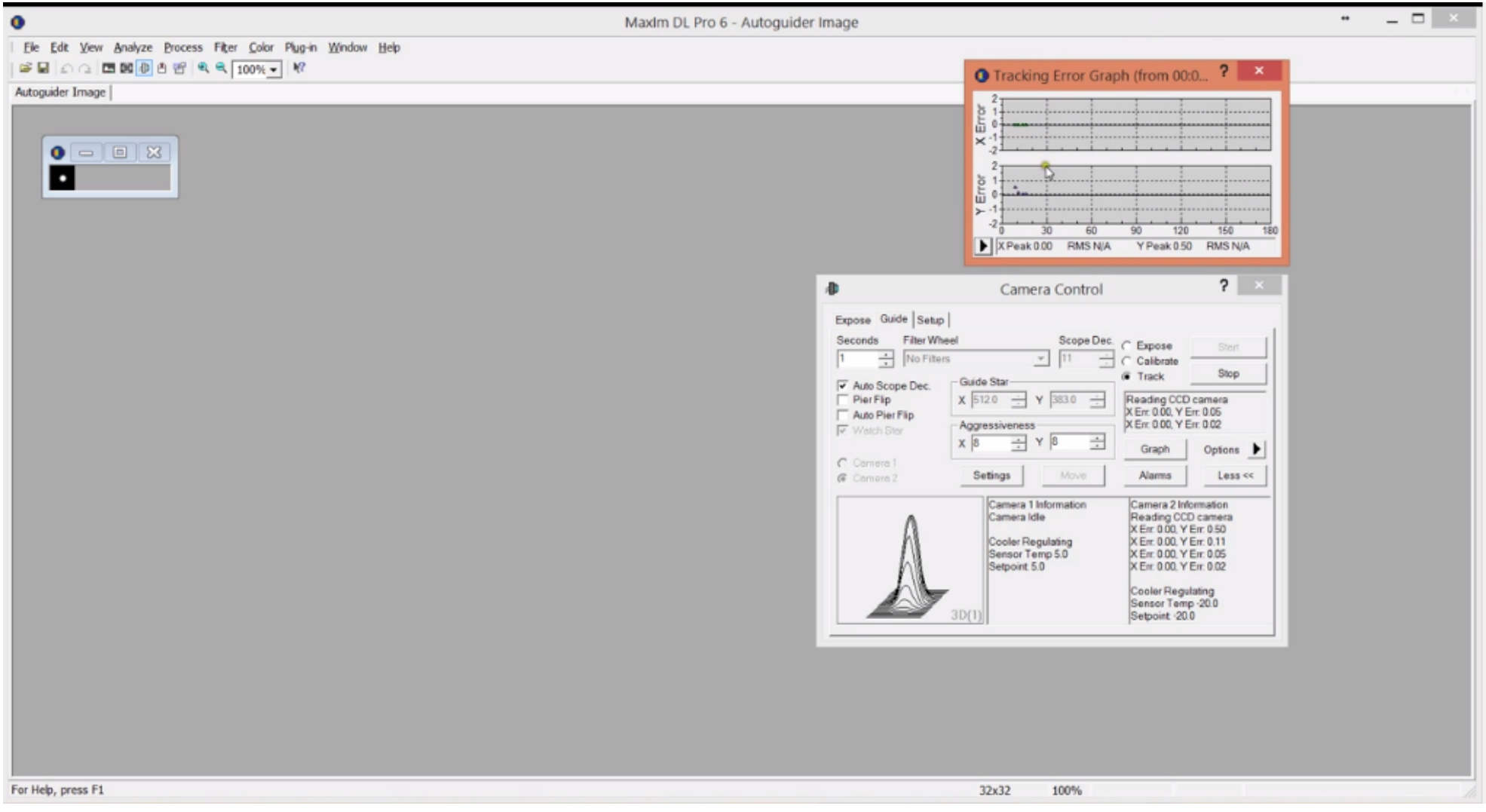
uruchamiamy korektę śledzenia, podczas której co sekundę będzie wykonywana klatka kontrolna

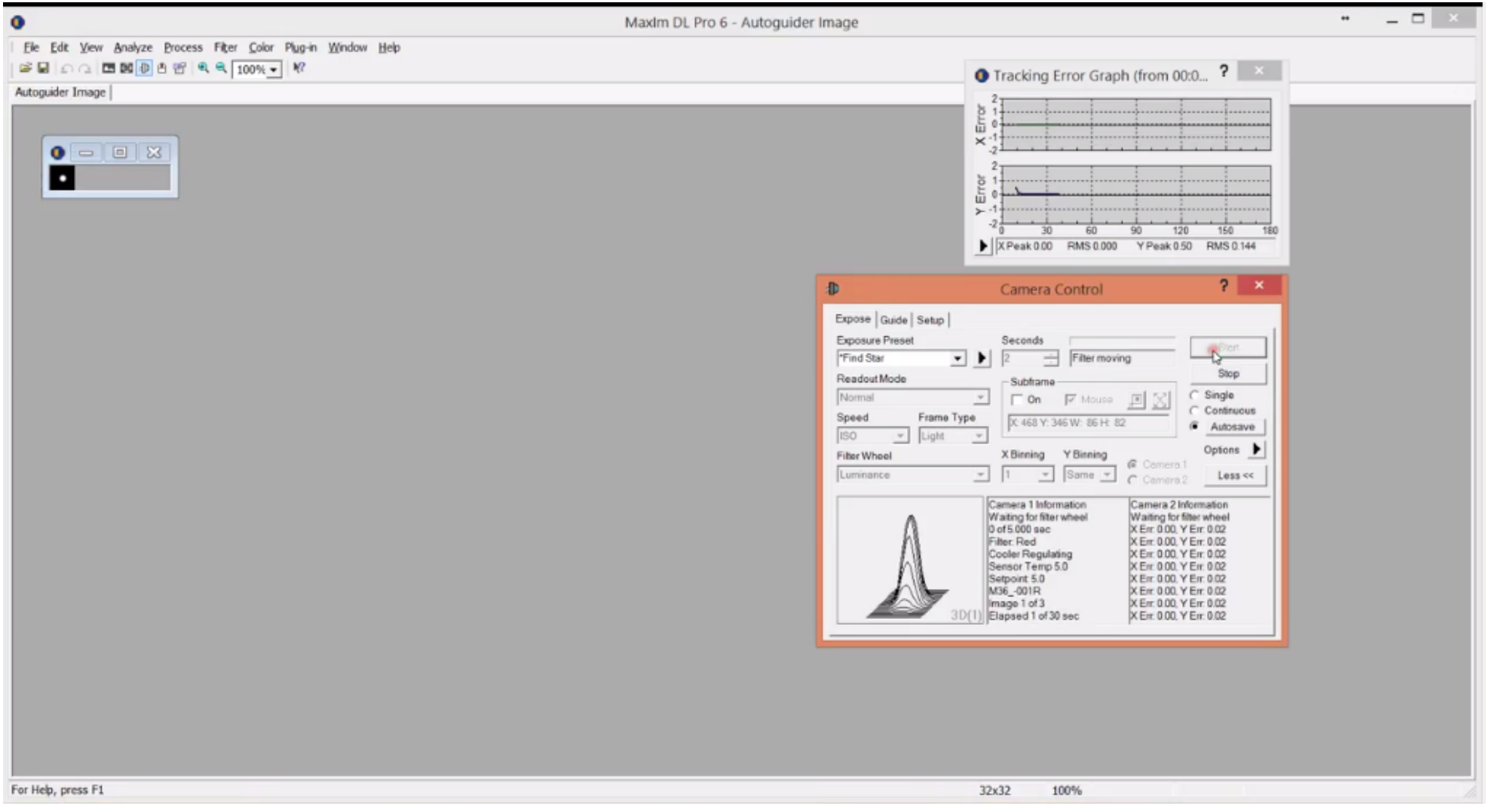



MaxIm DL Pro 6 - Autoguider Image
File Edit View Analyze Process Filter Color Plug-in Window Help
100%
Autoguider Image
Autoguider Image
Camera Control
Expose Guide Setup
Seconds
Filter Wheel
No Filters
Scope Dec.
Expose
Calibrate
Track
Start
Stop
Auto Scope Dec.
Pier Flip
Auto Pier Flip
Watch Star
Guide Star
X 512.0 Y 383.0
Aggressiveness
X 8 Y 8
Exposing Light
Graph
Options
Camera 1
Camera 2
Settings
Move
Alarms
Less <<
Camera 1 Information
Camera Idle
Cooler Regulating
Sensor Temp 5.0
Setpoint 5.0
Camera 2 Information
Exposing Light
Cooler Regulating
Sensor Temp -20.0
Setpoint -20.0
3D(1)
For Help, press F1
768x511
100%

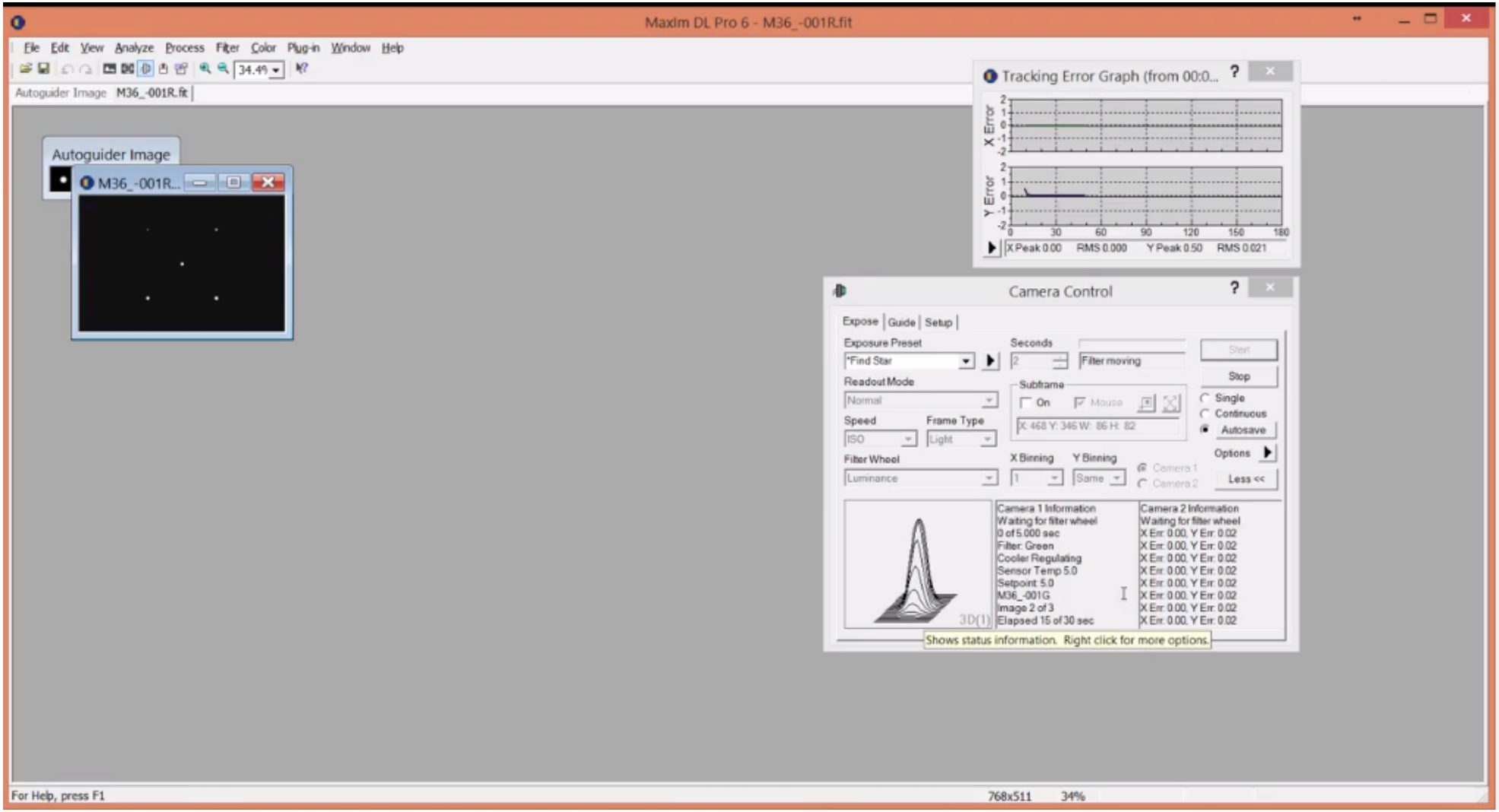

MaxIm DL Pro 6 - Autoguider Image
File Edit View Analyze Process Filter Color Plug-in Window Help
100%
Autoguider Image
Camera Control
Expose Guide Setup
Seconds
Filter Wheel
No Filters
Scope Dec.
Expose
Calibrate
Track
Start
Stop
Auto Scope Dec.
Pier Flip
Auto Pier Flip
Watch Star
Guide Star
X 512.0 Y 383.0
Exposing Light
X Err: 0.00, Y Err: 0.50
Aggressiveness
X 8 Y 8
Graph
Options
Camera 1
Camera 2
Settings
Move
Alarms
Less <<
3D(1)
Camera 1 Information
Camera Idle
Cooler Regulating
Sensor Temp 5.0
Setpoint 5.0
Camera 2 Information
Exposing Light
X Err: 0.00, Y Err: 0.50
Cooler Regulating
Sensor Temp -20.0
Setpoint -20.0
For Help, press F1
32x32
100%

opcja Graph pokazuje błędy prowadzenia wykryte w czasie obserwacji w formie wykresu



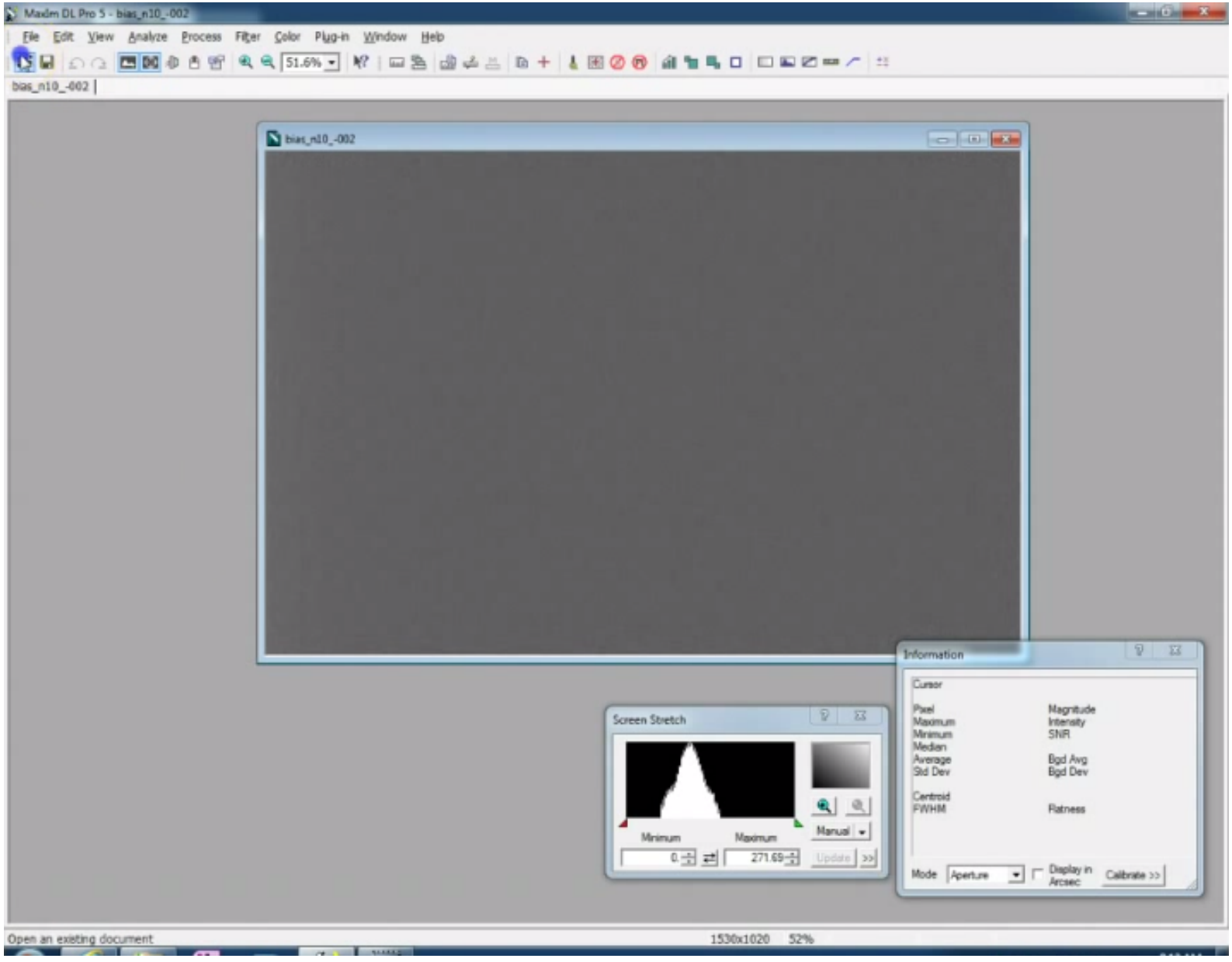

MaxIm DL Pro 6 - Autoguider Image
File Edit View Analyze Process Filter Color Plug-in Window Help
100%
Autoguider Image
Tracking Error Graph (from 00:0...
X Error
Y Error
0 30 60 90 120 150 180
X Peak 0.00 RMS 0.000 Y Peak 0.50 RMS 0.144
Camera Control
Expose Guide Setup
Exposure Preset
*Find Star
Seconds
2
Filter moving
Start
Stop
Readout Mode
Normal
Subframe
On
Mouse
X: 468 Y: 346 W: 86 H: 82
Single
Continuous
Autosave
Speed
ISO
Frame Type
Light
Options
Filter Wheel
Luminance
X Binning
1
Y Binning
Same
Camera 1
Camera 2
Less <<
3D(1)
Camera 1 Information
Waiting for filter wheel
0 of 5.000 sec
Filter: Red
Cooler Regulating
Sensor Temp 5.0
Setpoint 5.0
M36_-001R
Image 1 of 3
Elapsed 1 of 30 sec
Camera 2 Information
Waiting for filter wheel
X Err: 0.00, Y Err: 0.02
For Help, press F1
32x32
100%

wracamy do zakładki Expose aby wykonać właściwą sekwencję zdjęć, jednocześnie w tle wykonują się zdjęcia kontrolne, a wykres błędów jest uzupełniany o kolejne punkty

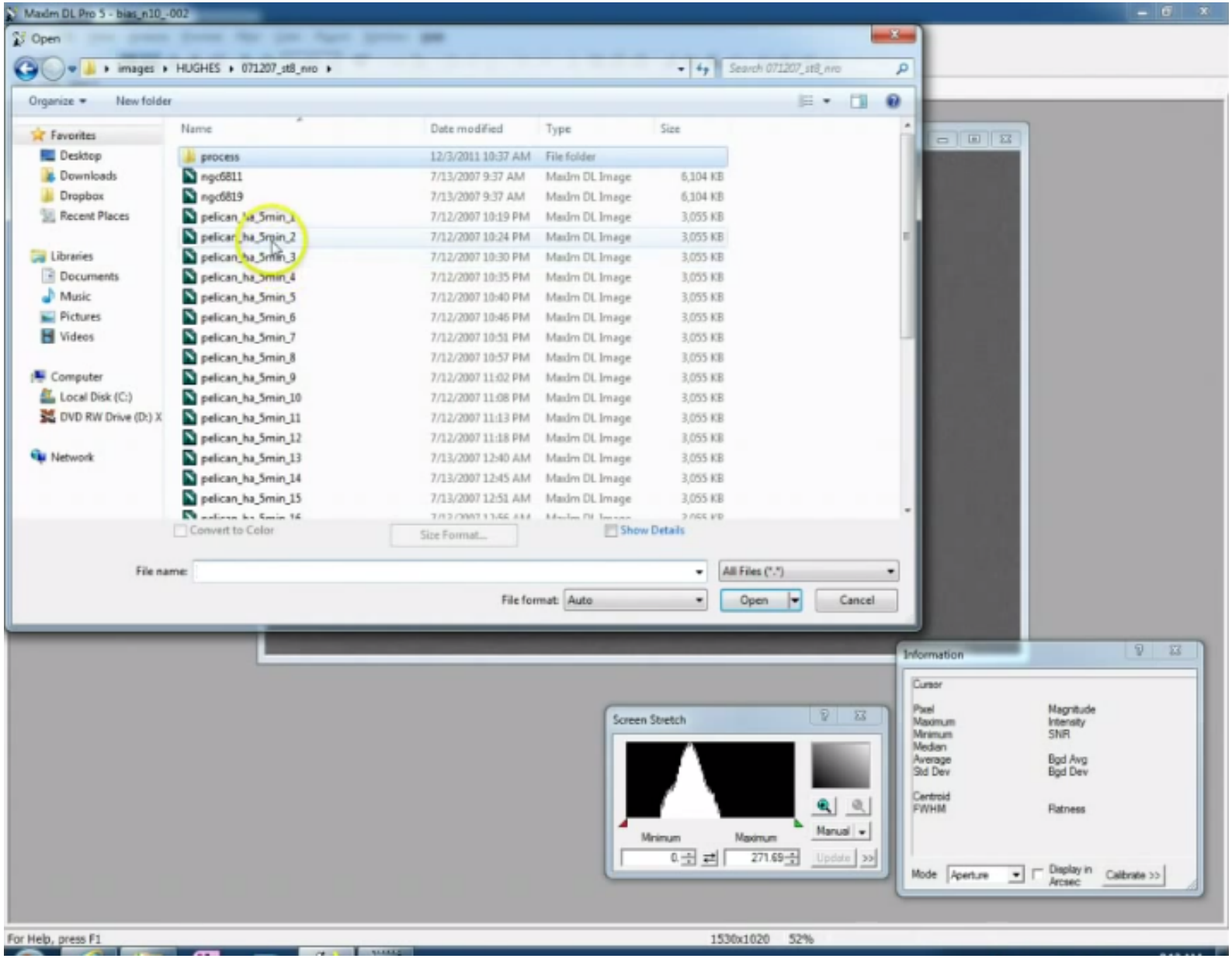


Redukcja obrazów

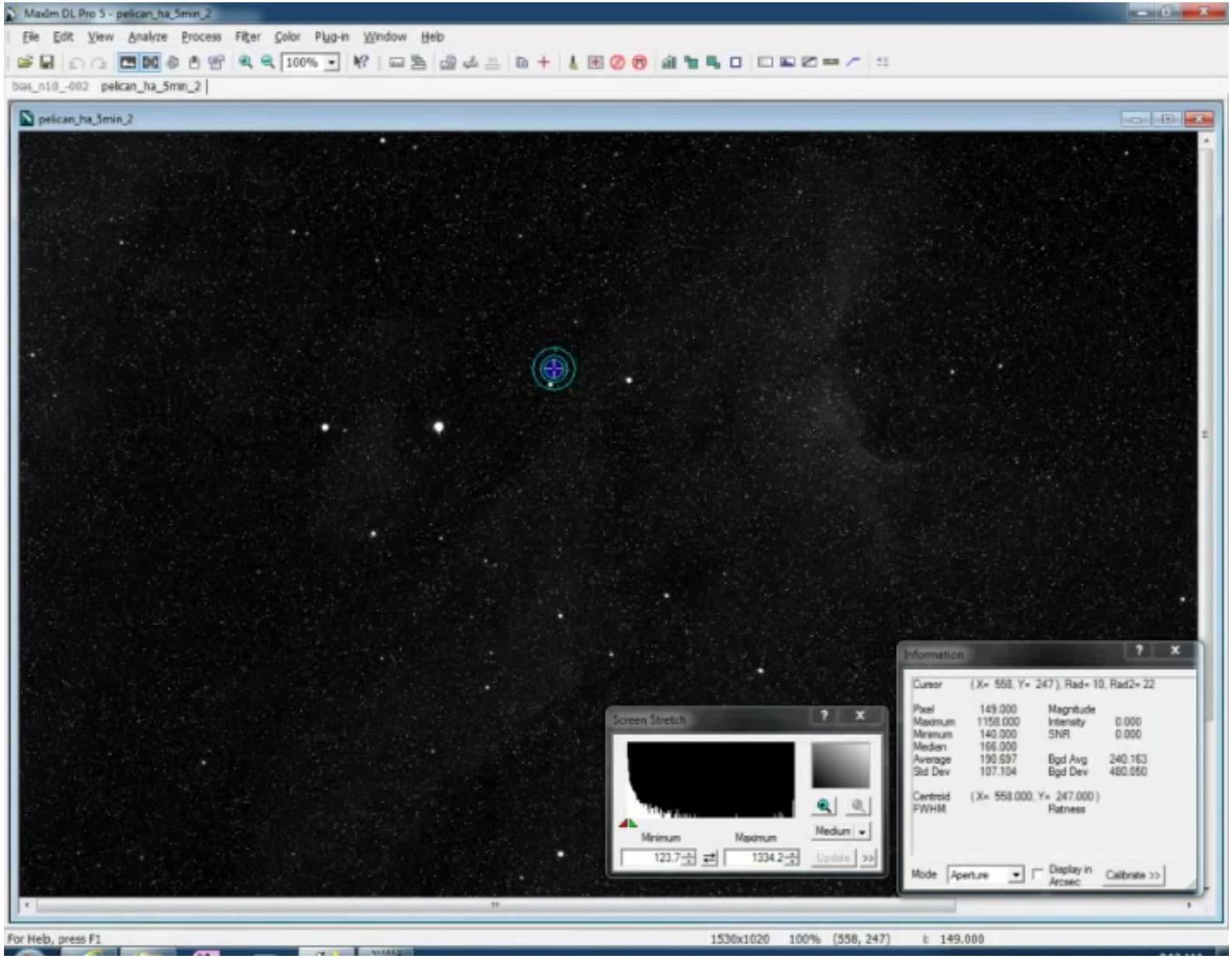
przykładowa klatka kalibracyjna typu bias



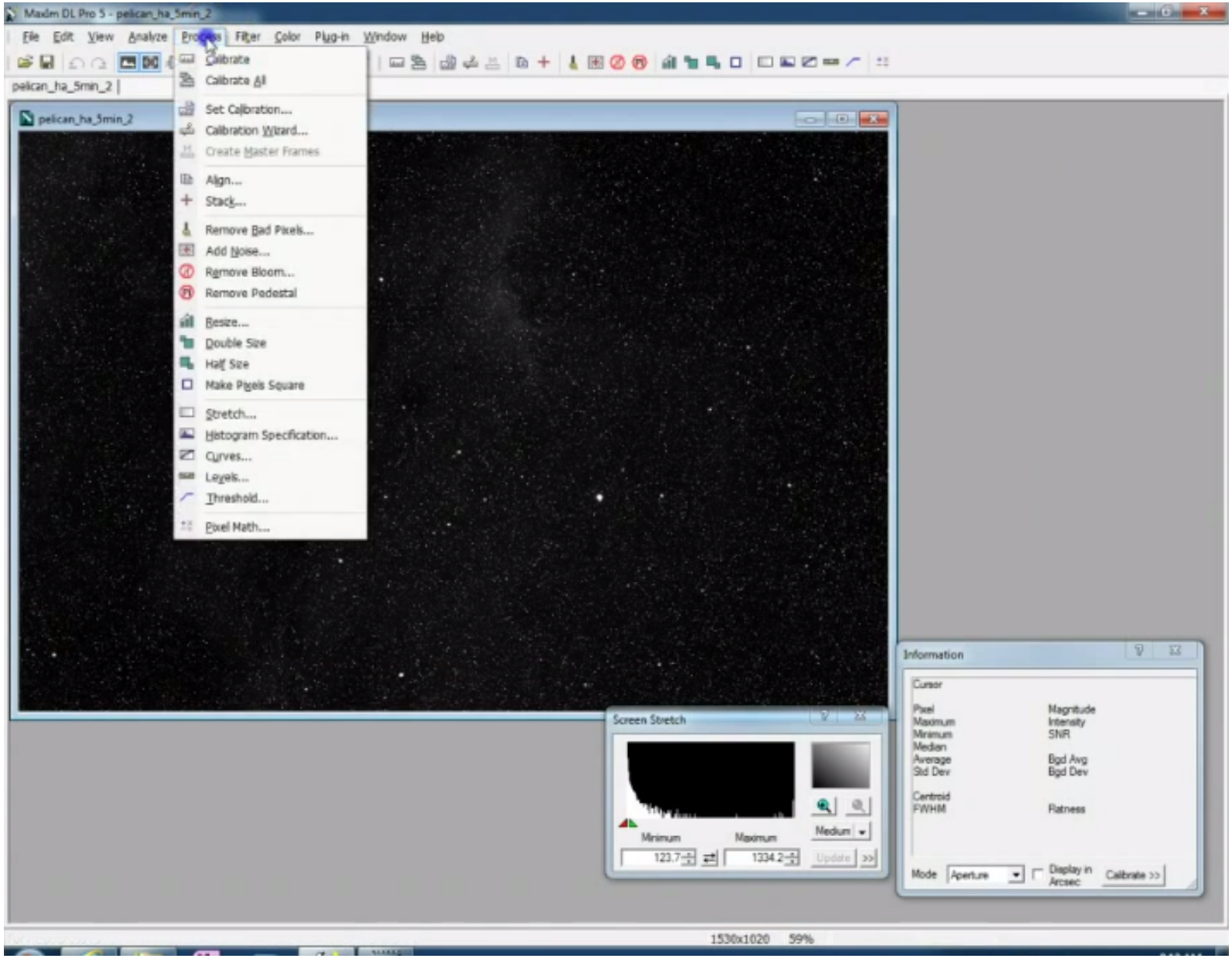
otwieramy klatkę obrazu pola

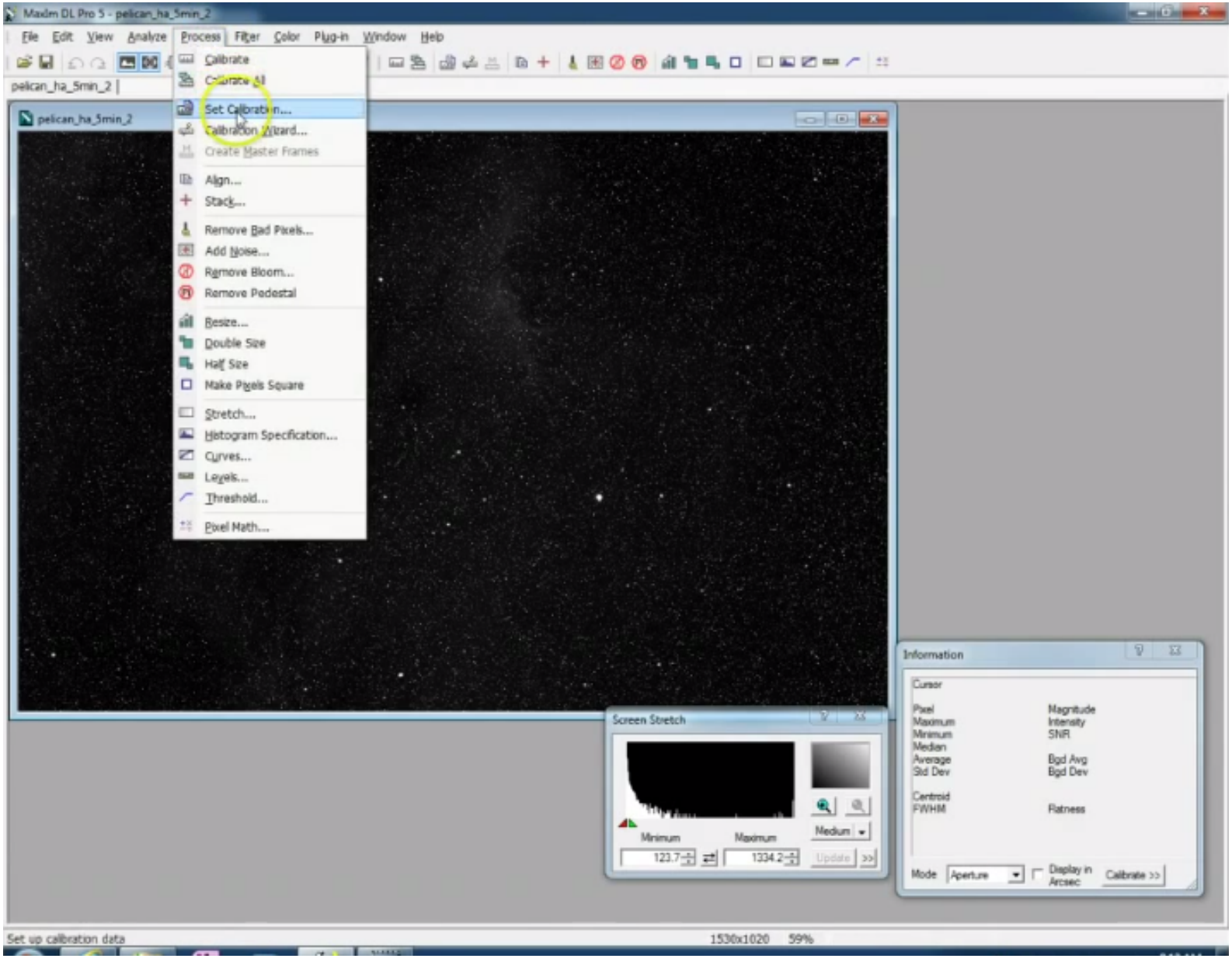


klatka jest wyraźnie zaszumiona

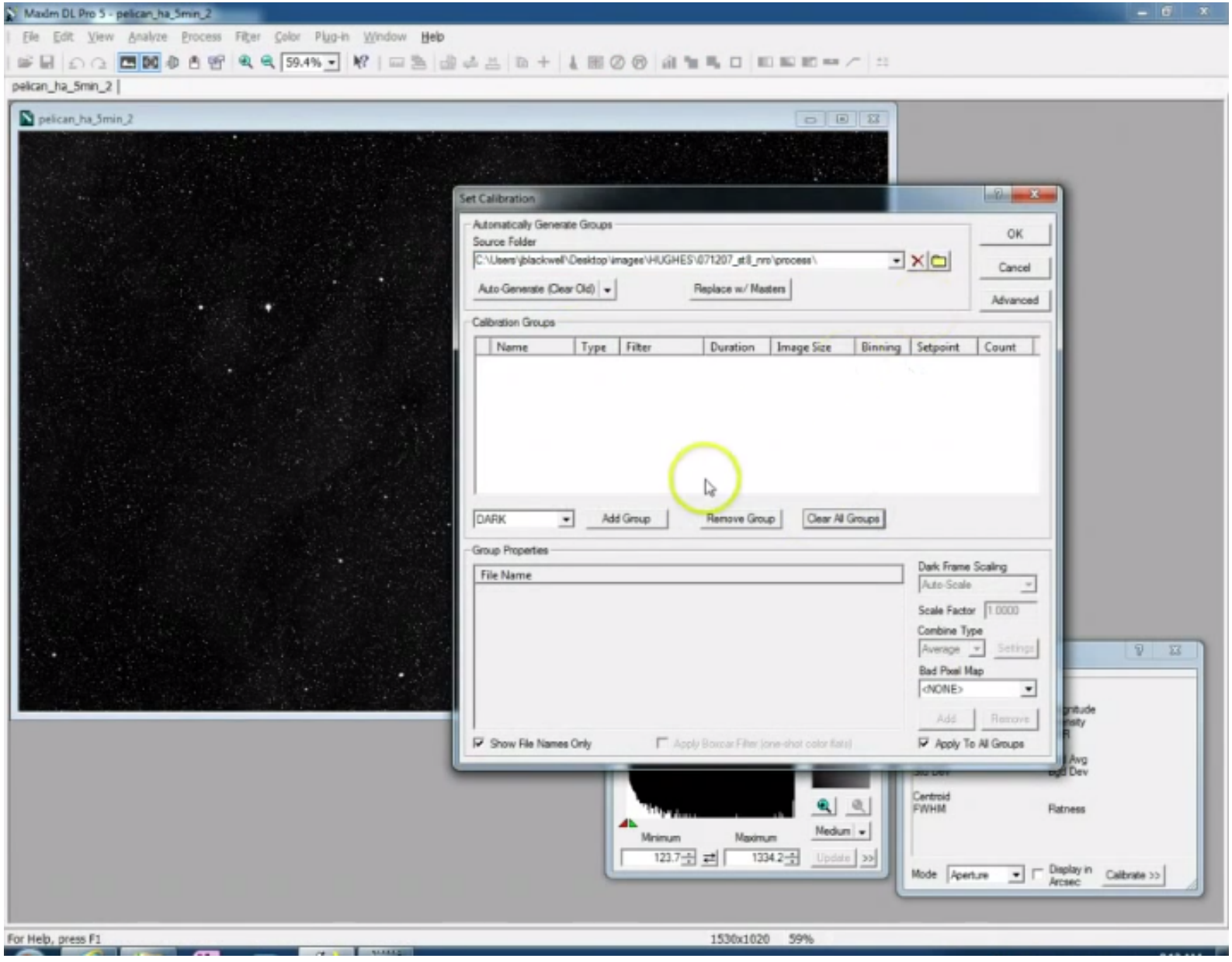


w rozwijanym menu Process znajdujemy opcję Set Calibration

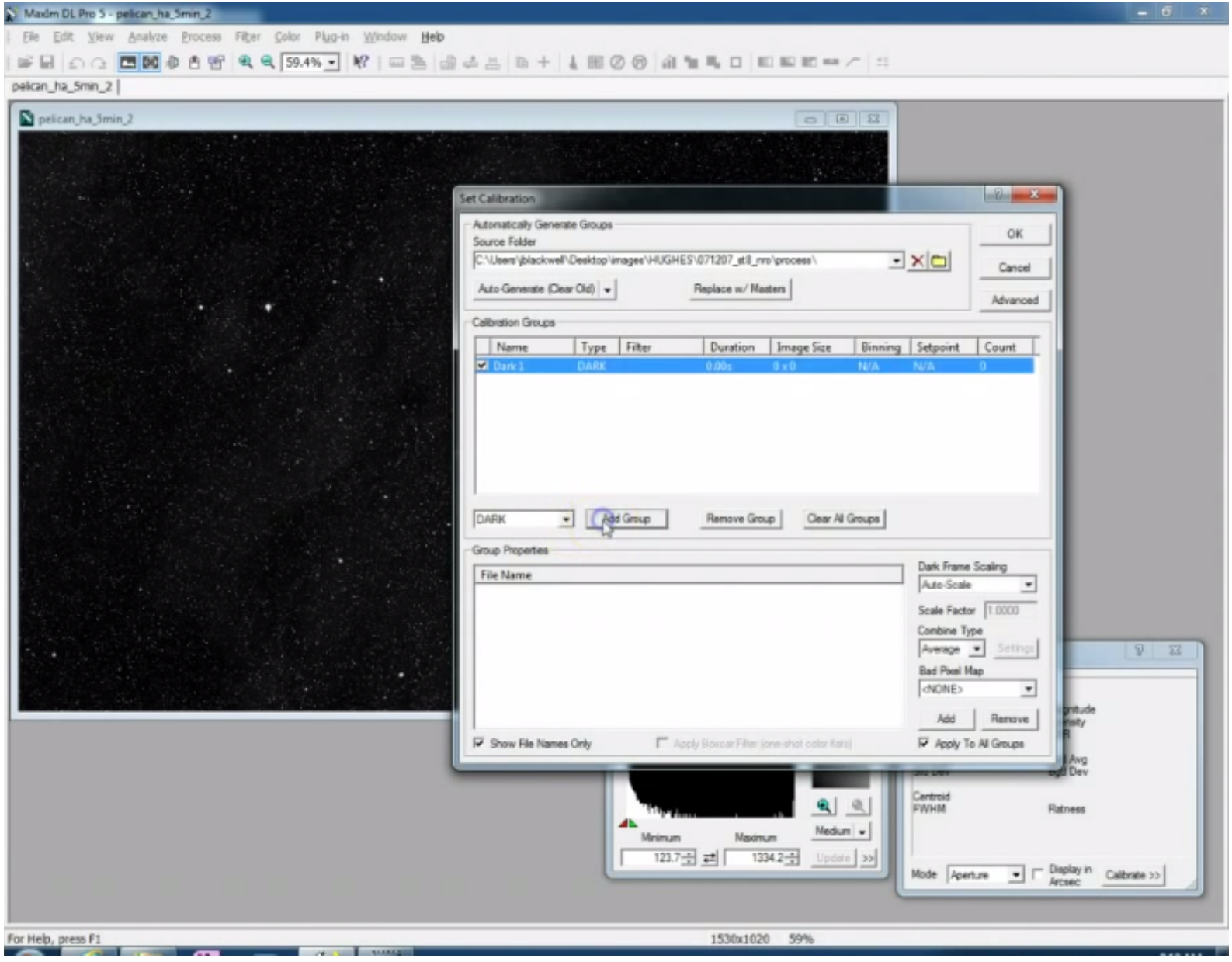



Maxim DL Pro 5 - pelican_ha_5min_2
File Edit View Analyze Process Filter Color Plug-in Window Help
Calibrate
Calibrate All
Set Calibration...
Calibration Wizard...
Create Master Frames
Align...
Stack...
Remove Bad Pixels...
Add Noise...
Remove Bloom...
Remove Pedestal
Resize...
Double Size
Half Size
Make Pixels Square
Stretch...
Histogram Specification...
Curves...
Levels...
Threshold...
Pixel Math...
pelican_ha_5min_2
Screen Stretch
Minimum
Maximum
Medium
123.7
1334.2
Update
Information
Cursor
Pixel
Maximum
Minimum
Median
Average
Std Dev
Centroid
FWHM
Magnitude
Intensity
SNR
Bgd Avg
Bgd Dev
Flatness
Mode
Aperture
Display in Arcsec
Calibrate >>
Set up calibration data
1530x1020
59%

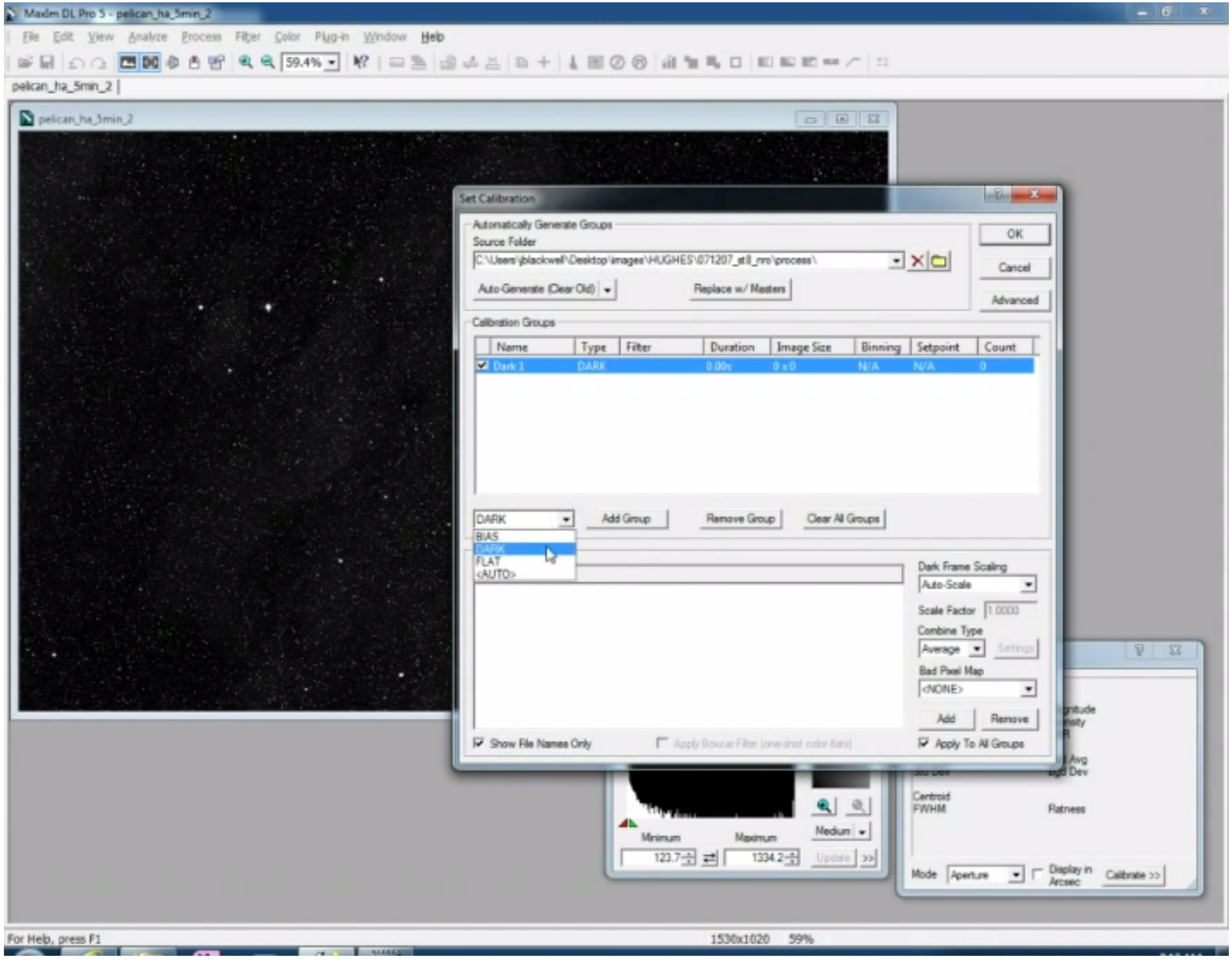
dodajemy grupę klatek kalibracyjnych tego samego typu



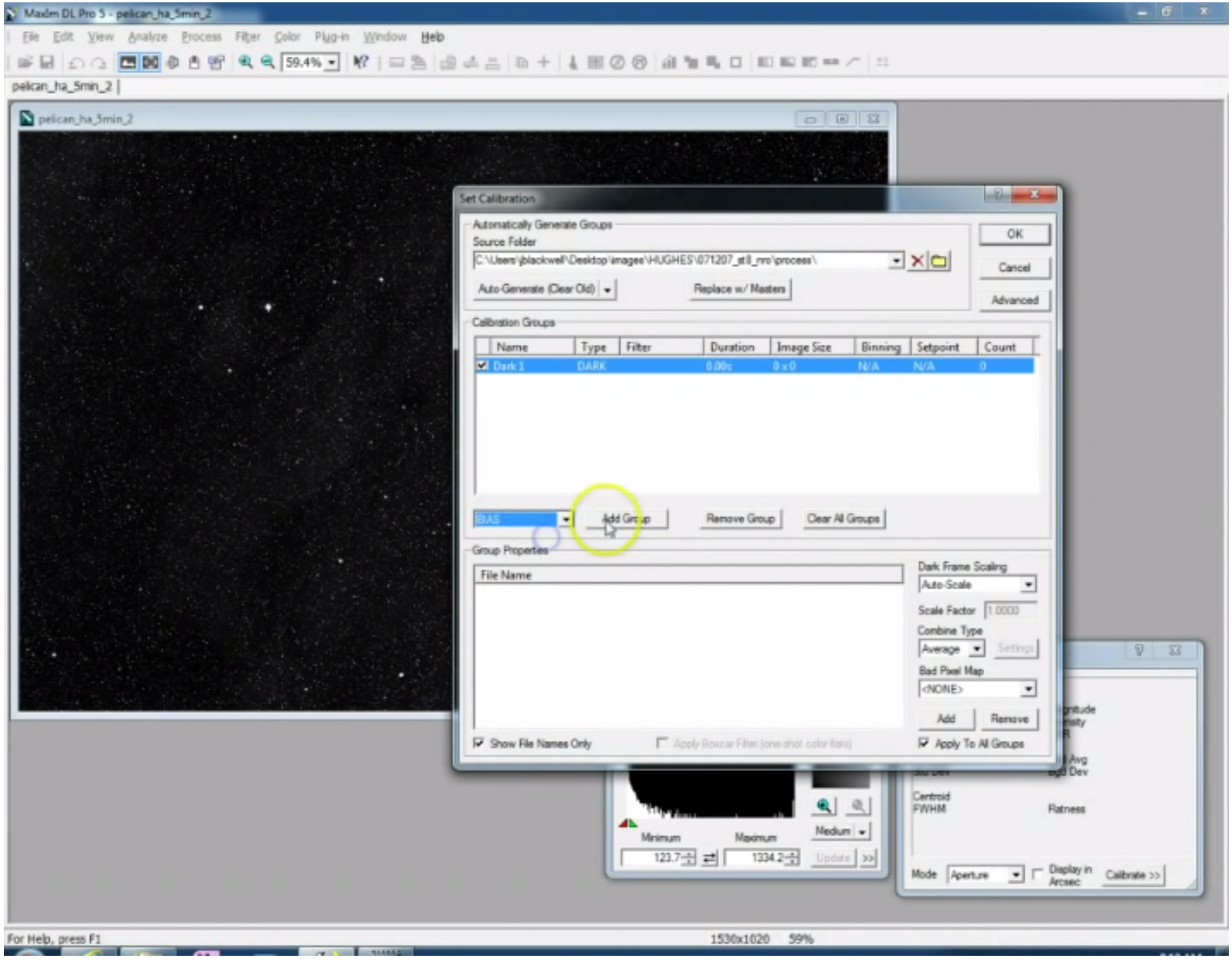
typ dodanej grupy wybieramy z rozwijanej listy



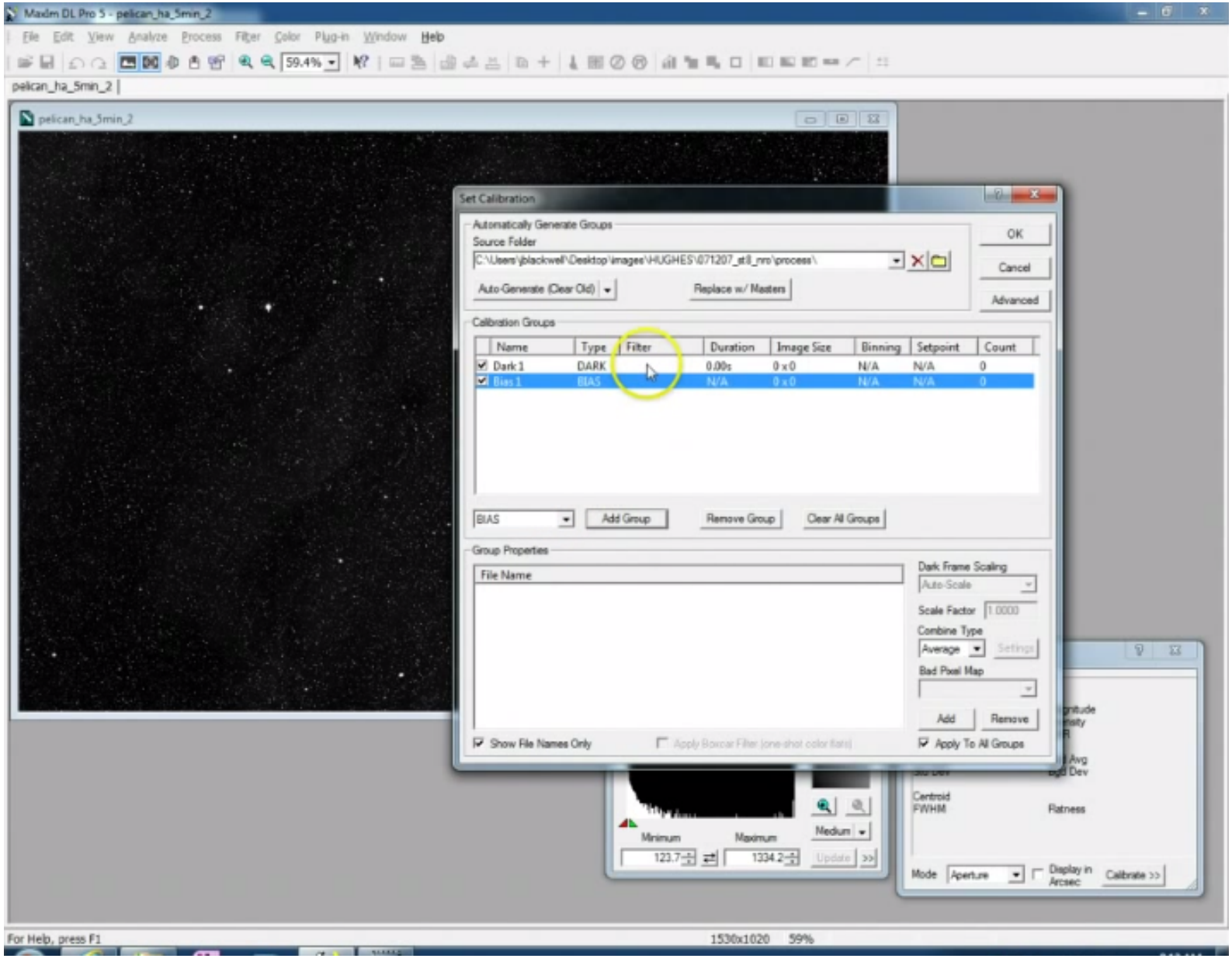
tworzymy dwie grupy - klatek typu dark i typu bias

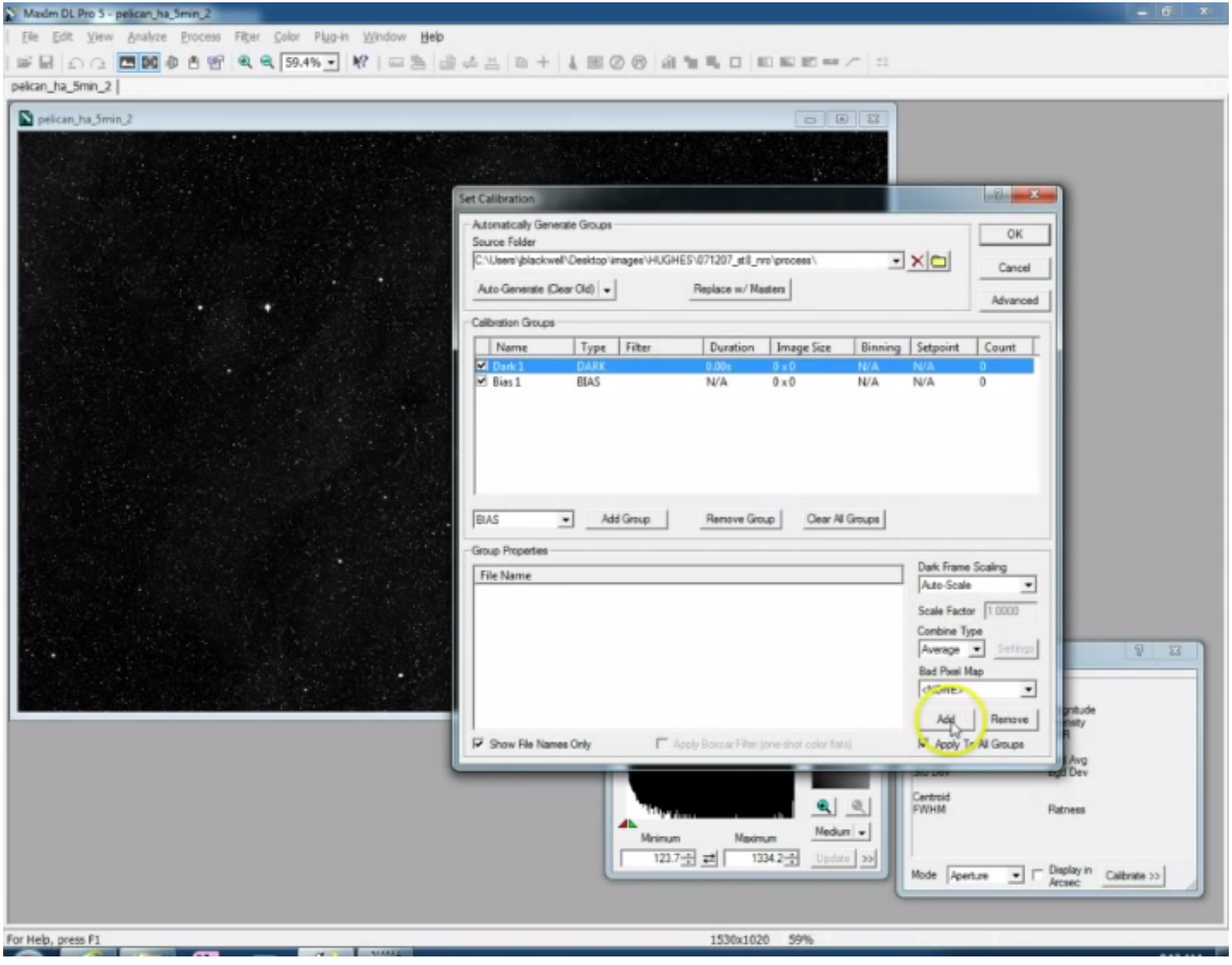


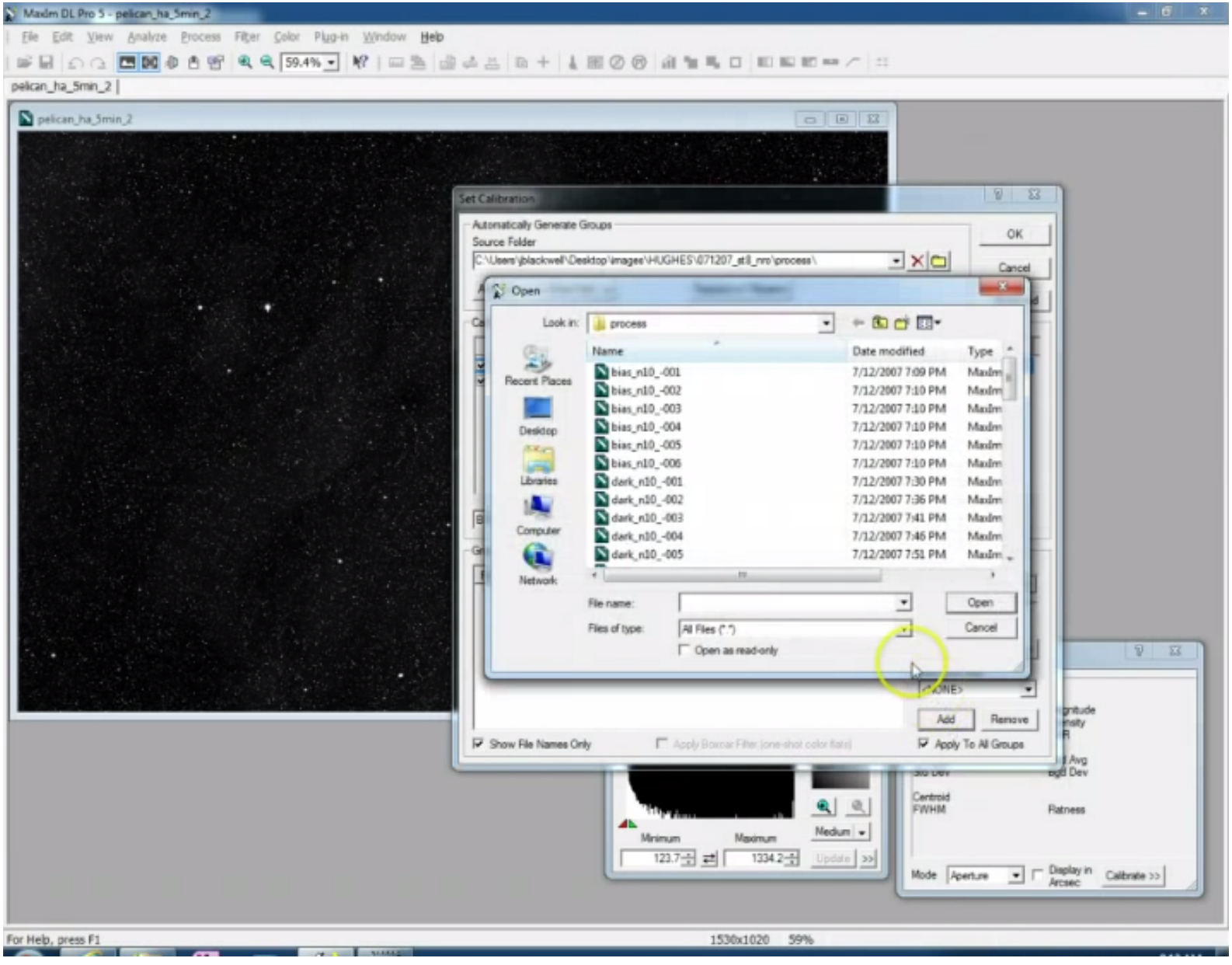
potrzebne są podstawowe informacje o klatkach jak czas ekspozycji, rozmiar, binowanie

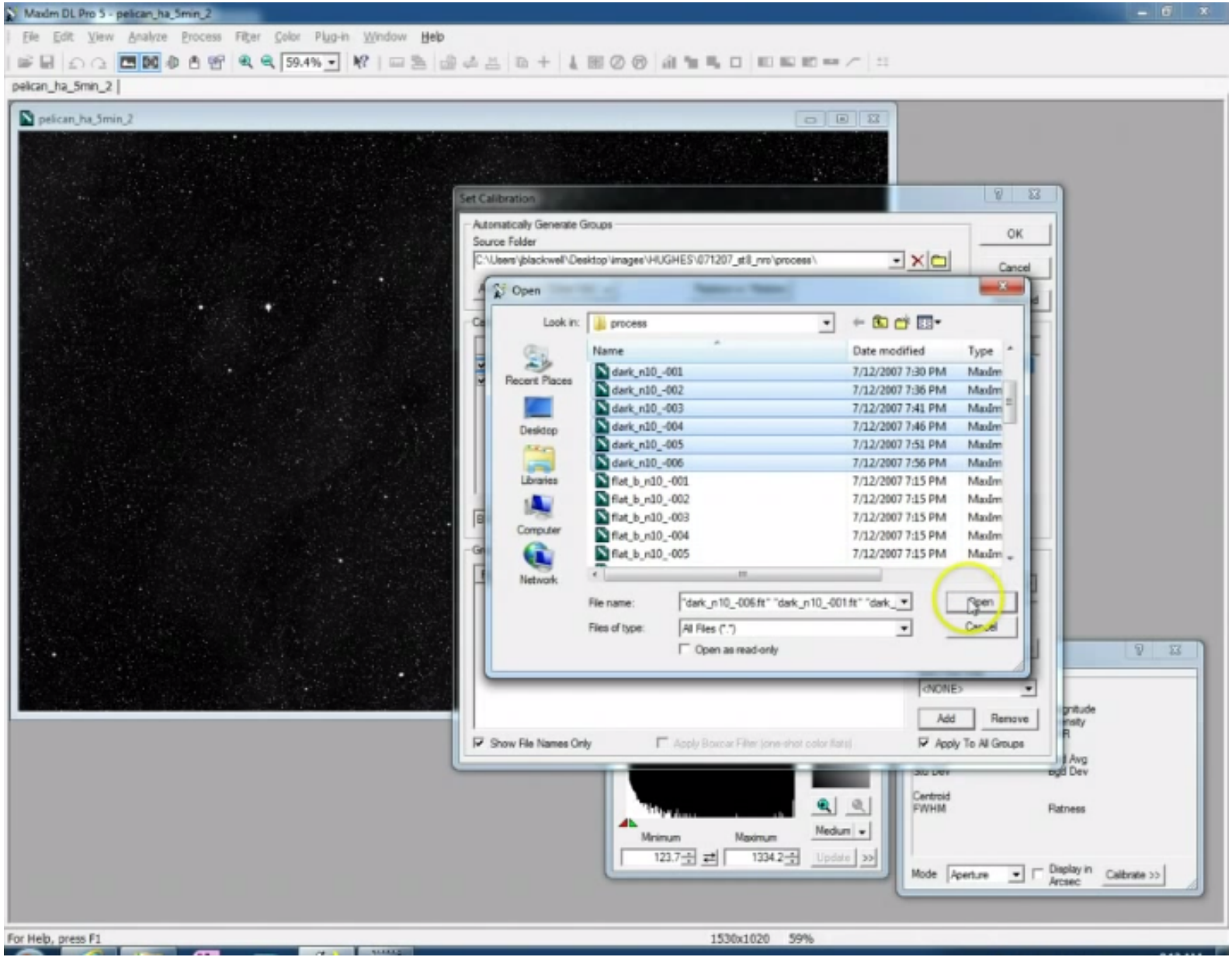


wypełniamy grupę Dark klatkami o tych samych parametrach aby później je uśrednić

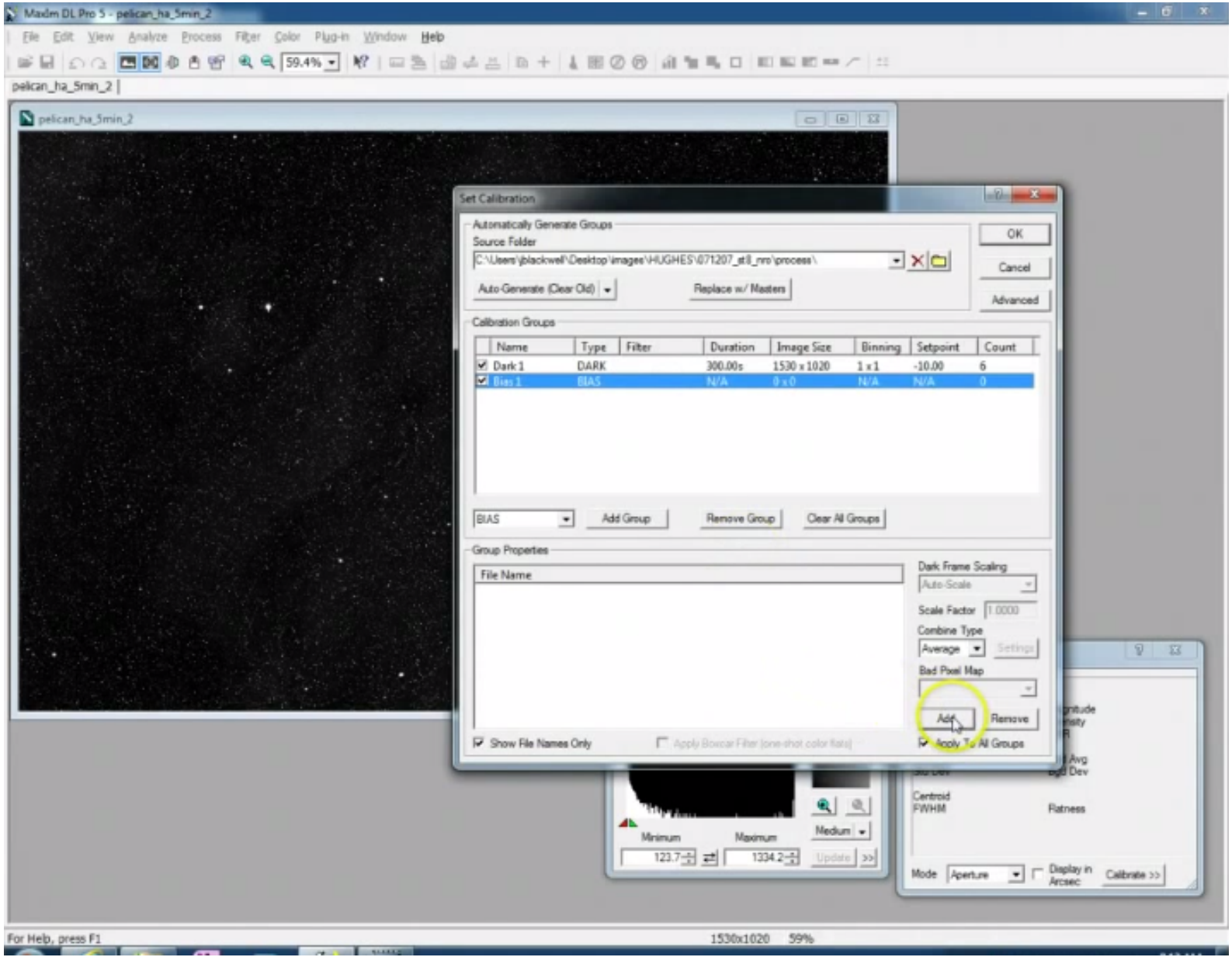


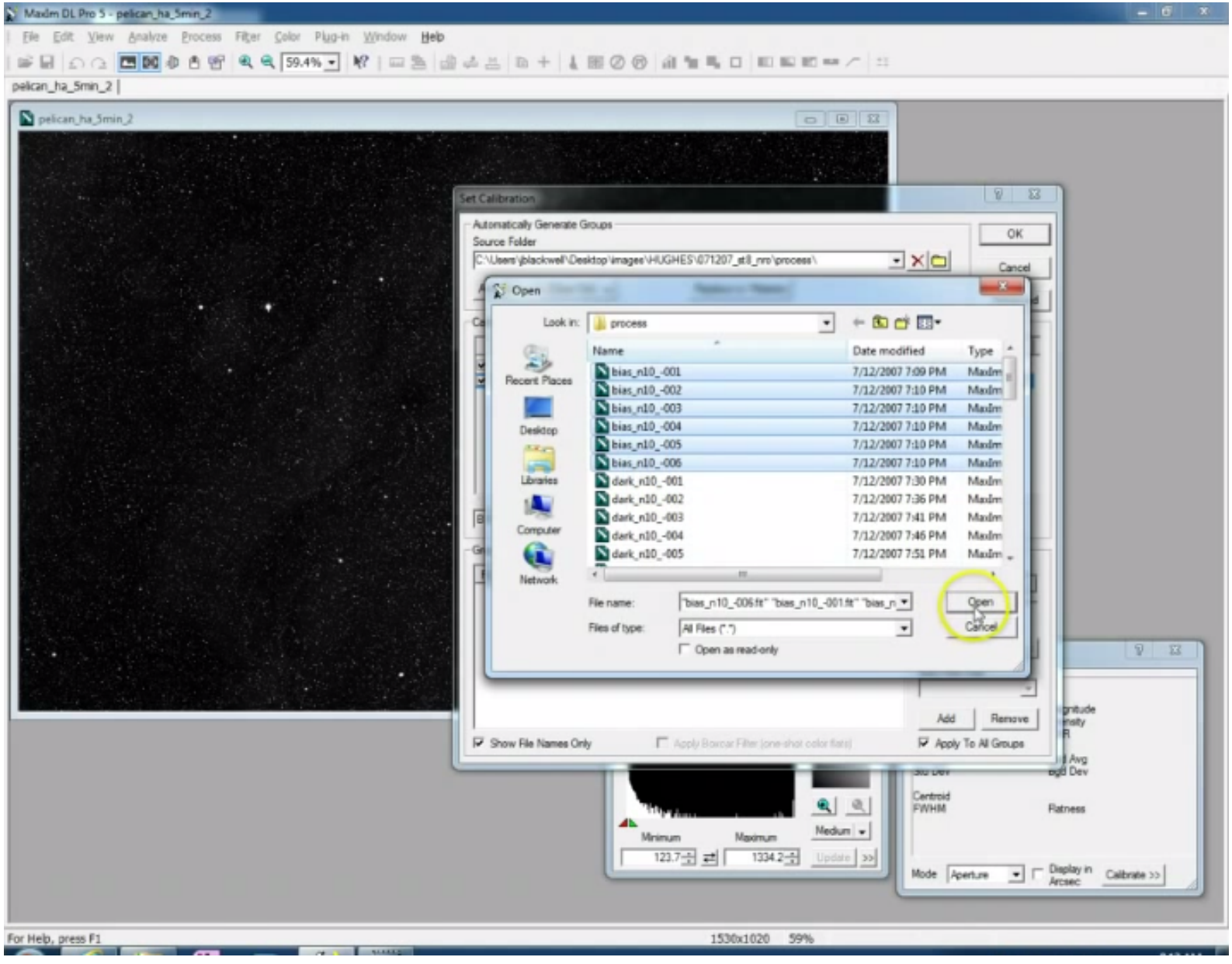

Maxim DL Pro 5 - pelican_ha_5min_2
File Edit View Analyze Process Filter Color Plug-in Window Help
59.4%
pelican_ha_5min_2
pelican_ha_5min_2
Set Calibration
Automatically Generate Groups
Source Folder
C:\Users\jblackwell\Desktop\images\HUGHES\071207_stll_nrb\process\
Auto-Generate (Clear Old)
Replace w/ Masters
OK
Cancel
Advanced
Calibration Groups
Name Type Filter Duration Image Size Binning Setpoint Count
Dark 1 DARK 0.00s 0 x 0 N/A N/A 0
Bias 1 BIAS N/A 0 x 0 N/A N/A 0
BIAS
Add Group
Remove Group
Clear All Groups
Group Properties
File Name
Dark Frame Scaling
Auto-Scale
Scale Factor 1.0000
Combine Type
Average
Settings
Bad Pixel Map
Add
Remove
Show File Names Only
Apply To All Groups
Minimum
Maximum
Medium
123.7
1334.2
Update
Centroid
FWHM
Flatness
Mode
Aperture
Display in Arcsec
Calibrate >>
For Help, press F1
1530x1020
59%


Maxim DL Pro 5 - pelican_ha_5min_2
File Edit View Analyze Process Filter Color Plug-in Window Help
59.4%
pelican_ha_5min_2
pelican_ha_5min_2
Set Calibration
Automatically Generate Groups
Source Folder
C:\Users\jblackwell\Desktop\images\HUGHES\071207_stll_nrb\process\
OK
Cancel
Open
Look in: process
Name
Date modified
Type
Recent Places
Desktop
Libraries
Computer
Network
bias_n10_-001 7/12/2007 7:09 PM
bias_n10_-002 7/12/2007 7:10 PM
bias_n10_-003 7/12/2007 7:10 PM
bias_n10_-004 7/12/2007 7:10 PM
bias_n10_-005 7/12/2007 7:10 PM
bias_n10_-006 7/12/2007 7:10 PM
dark_n10_-001 7/12/2007 7:30 PM
dark_n10_-002 7/12/2007 7:36 PM
dark_n10_-003 7/12/2007 7:41 PM
dark_n10_-004 7/12/2007 7:46 PM
dark_n10_-005 7/12/2007 7:51 PM
File name:
Files of type: All Files (*.*)
Open
Cancel
Open as read-only
Add
Remove
Show File Names Only
Apply To All Groups
Minimum
Maximum
Medium
Update
Centroid
FWHM
Flatness
Mode Aperture
Display in Arcsec
Calibrate >>
For Help, press F1
1530x1020
59%

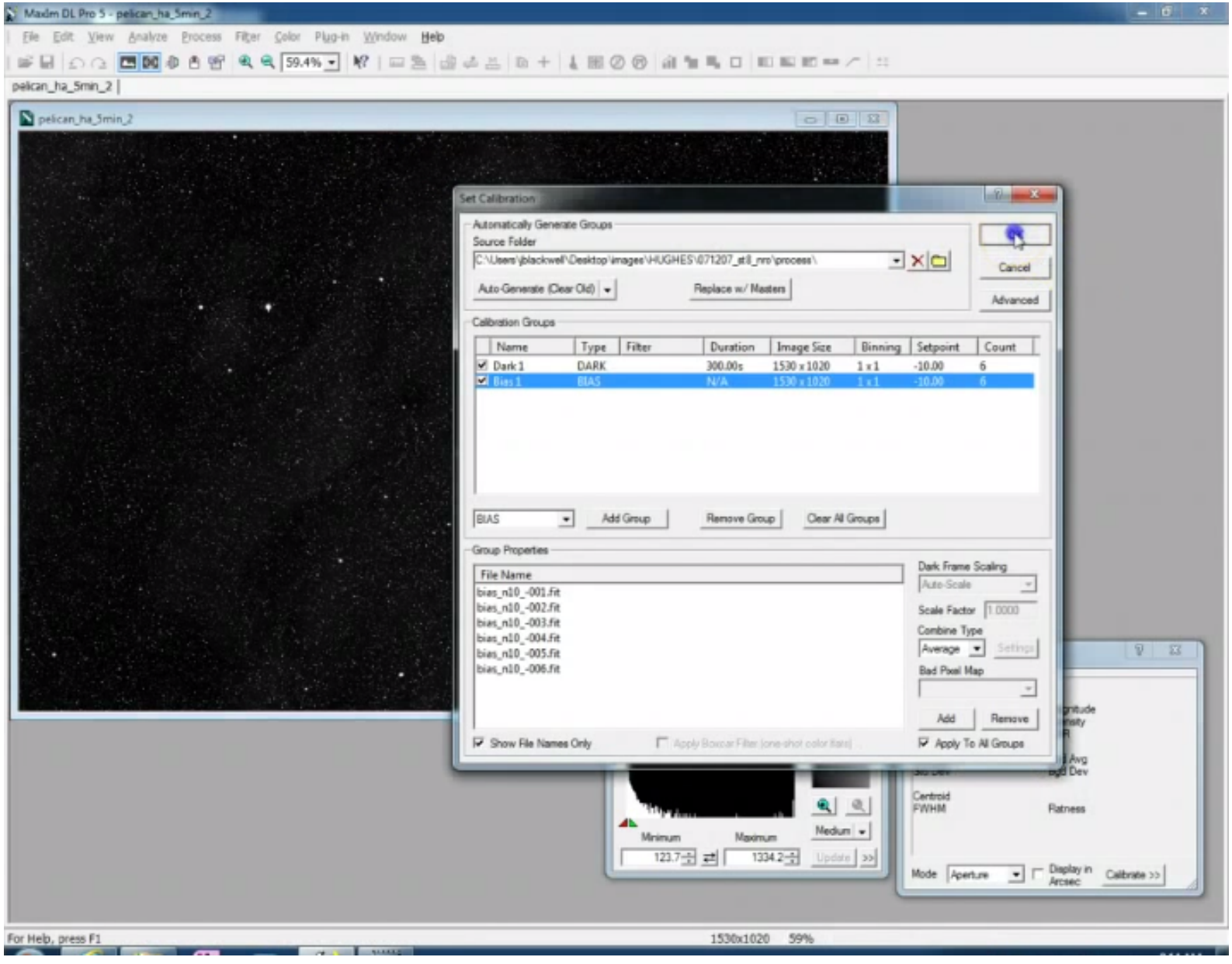

Maxim DL Pro 5 - pelican_ha_5min_2
File Edit View Analyze Process Filter Color Plug-in Window Help
59.4%
pelican_ha_5min_2
pelican_ha_5min_2
Set Calibration
Automatically Generate Groups
Source Folder
C:\Users\jblackwell\Desktop\images\HUGHES\071207_stll_nrb\process\
OK
Cancel
Open
Look in: process
Recent Places
Desktop
Libraries
Computer
Network
Name
Date modified
Type
dark_n10_-001 7/12/2007 7:30 PM
dark_n10_-002 7/12/2007 7:36 PM
dark_n10_-003 7/12/2007 7:41 PM
dark_n10_-004 7/12/2007 7:46 PM
dark_n10_-005 7/12/2007 7:51 PM
dark_n10_-006 7/12/2007 7:56 PM
flat_b_n10_-001 7/12/2007 7:15 PM
flat_b_n10_-002 7/12/2007 7:15 PM
flat_b_n10_-003 7/12/2007 7:15 PM
flat_b_n10_-004 7/12/2007 7:15 PM
flat_b_n10_-005 7/12/2007 7:15 PM
File name:
Files of type: All Files (*.*)
Open as read-only
Open
Cancel
<NONE>
Add
Remove
Show File Names Only
Apply To All Groups
Minimum
Maximum
123.7
1334.2
Medium
Update
Centroid
FWHM
Flatness
Mode Aperture
Display in Arcsec
Calibrate >>
For Help, press F1
1530x1020 59%

wypełniamy grupę Bias w podobny sposób

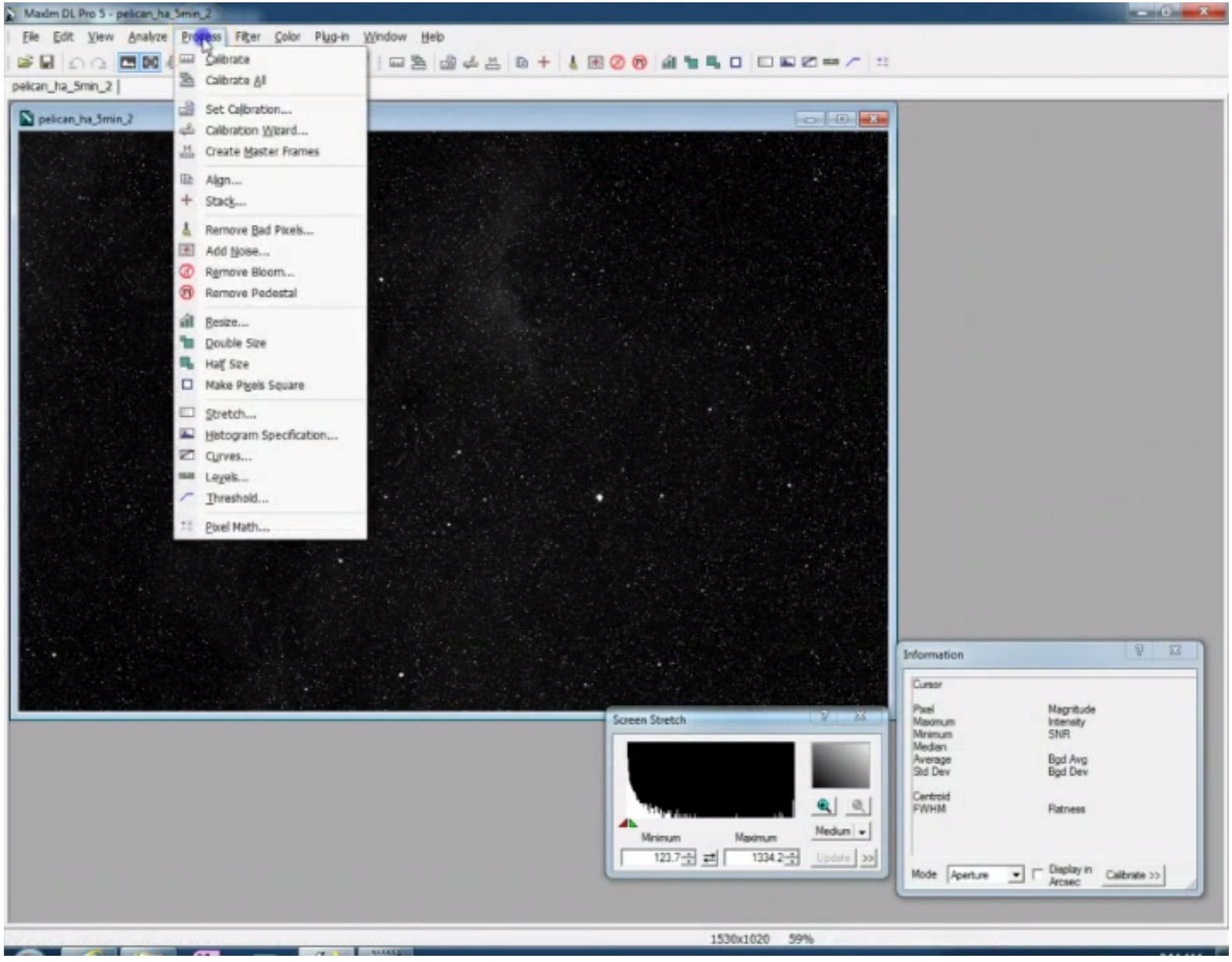



Maxim DL Pro 5 - pelican_ha_5min_2
File Edit View Analyze Process Filter Color Plug-in Window Help
59.4%
pelican_ha_5min_2
pelican_ha_5min_2
Set Calibration
Automatically Generate Groups
Source Folder
C:\Users\jblackwell\Desktop\images\HUGHES\071207_st8_nrp\process\
OK
Cancel
Open
Look in: process
Recent Places
Desktop
Libraries
Computer
Network
Name
Date modified
Type
bias_n10_-001 7/12/2007 7:09 PM
bias_n10_-002 7/12/2007 7:10 PM
bias_n10_-003 7/12/2007 7:10 PM
bias_n10_-004 7/12/2007 7:10 PM
bias_n10_-005 7/12/2007 7:10 PM
bias_n10_-006 7/12/2007 7:10 PM
dark_n10_-001 7/12/2007 7:30 PM
dark_n10_-002 7/12/2007 7:36 PM
dark_n10_-003 7/12/2007 7:41 PM
dark_n10_-004 7/12/2007 7:46 PM
dark_n10_-005 7/12/2007 7:51 PM
File name: "bias_n10_-006.ft" "bias_n10_-001.ft" "bias_n
Files of type: All Files (*.*)
Open
Cancel
Open as read-only
Add
Remove
Show File Names Only
Apply To All Groups
Minimum
Maximum
123.7
1334.2
Medium
Update
Centroid
FWHM
Flatness
Mode
Aperture
Display in Arcsec
Calibrate >>
For Help, press F1
1530x1020
59%

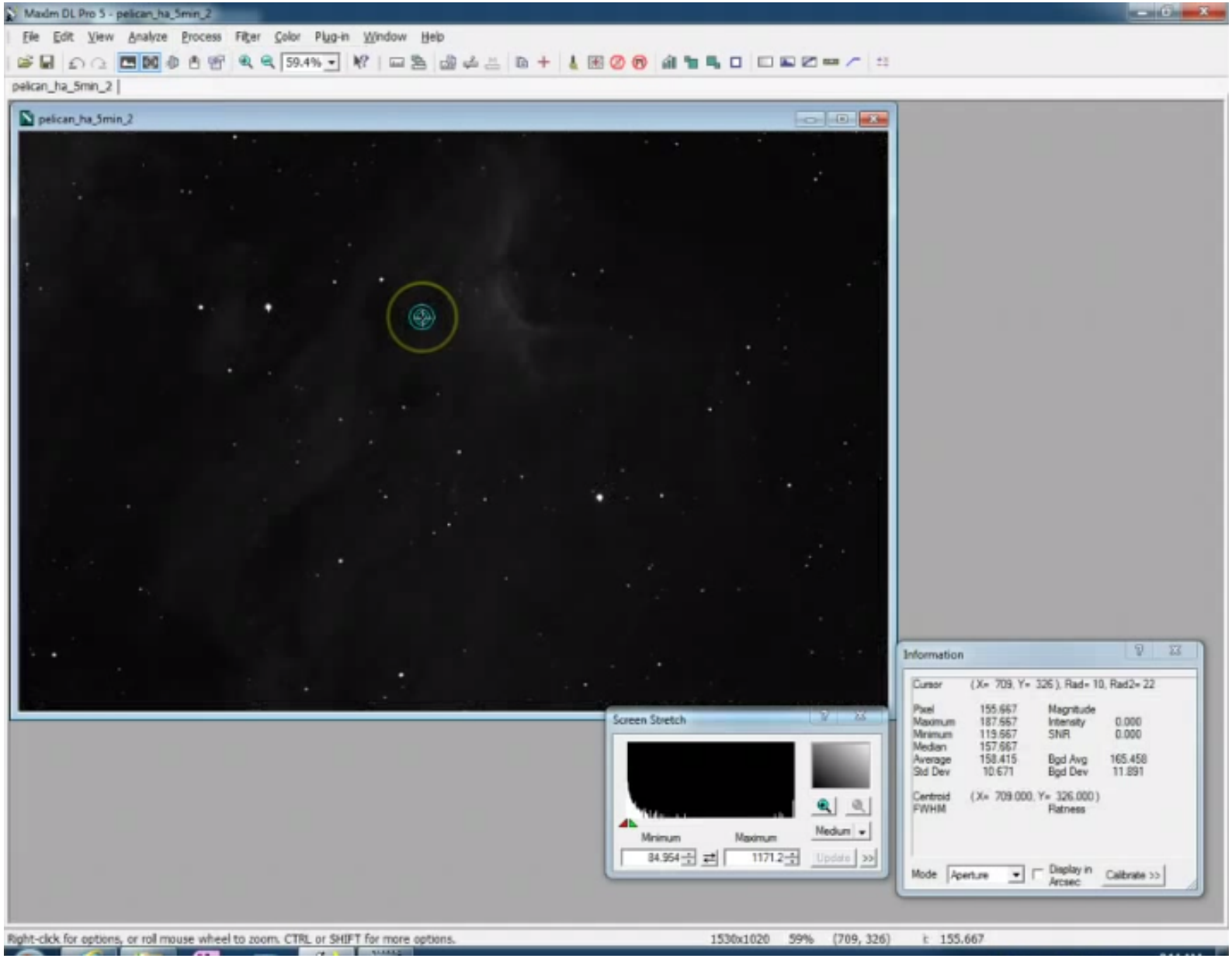
klikamy OK


Maxim DL Pro 5 - pelican_ha_5min_2
File Edit View Analyze Process Filter Color Plug-in Window Help
59.4%
pelican_ha_5min_2
pelican_ha_5min_2
Set Calibration
Automatically Generate Groups
Source Folder
C:\Users\jblackwell\Desktop\images\HUGHES\071207_stll_nrb\process\
Auto-Generate (Clear Old)
Replace w/ Masters
Cancel
Advanced
Calibration Groups
Name Type Filter Duration Image Size Binning Setpoint Count
Dark 1 DARK 300.00s 1530 x 1020 1 x 1 -10.00 6
Bias 1 BIAS N/A 1530 x 1020 1 x 1 -10.00 6
BIAS
Add Group
Remove Group
Clear All Groups
Group Properties
File Name
bias_n10_-001.fit
bias_n10_-002.fit
bias_n10_-003.fit
bias_n10_-004.fit
bias_n10_-005.fit
bias_n10_-006.fit
Dark Frame Scaling
Auto-Scale
Scale Factor
1.0000
Combine Type
Average
Settings
Bad Pixel Map
Add
Remove
Show File Names Only
Apply To All Groups
Minimum
Maximum
Medium
123.7
1334.2
Update
Centroid
FWHM
Flatness
Mode
Aperture
Display in Arcsec
Calibrate >>
For Help, press F1
1530x1020
59%

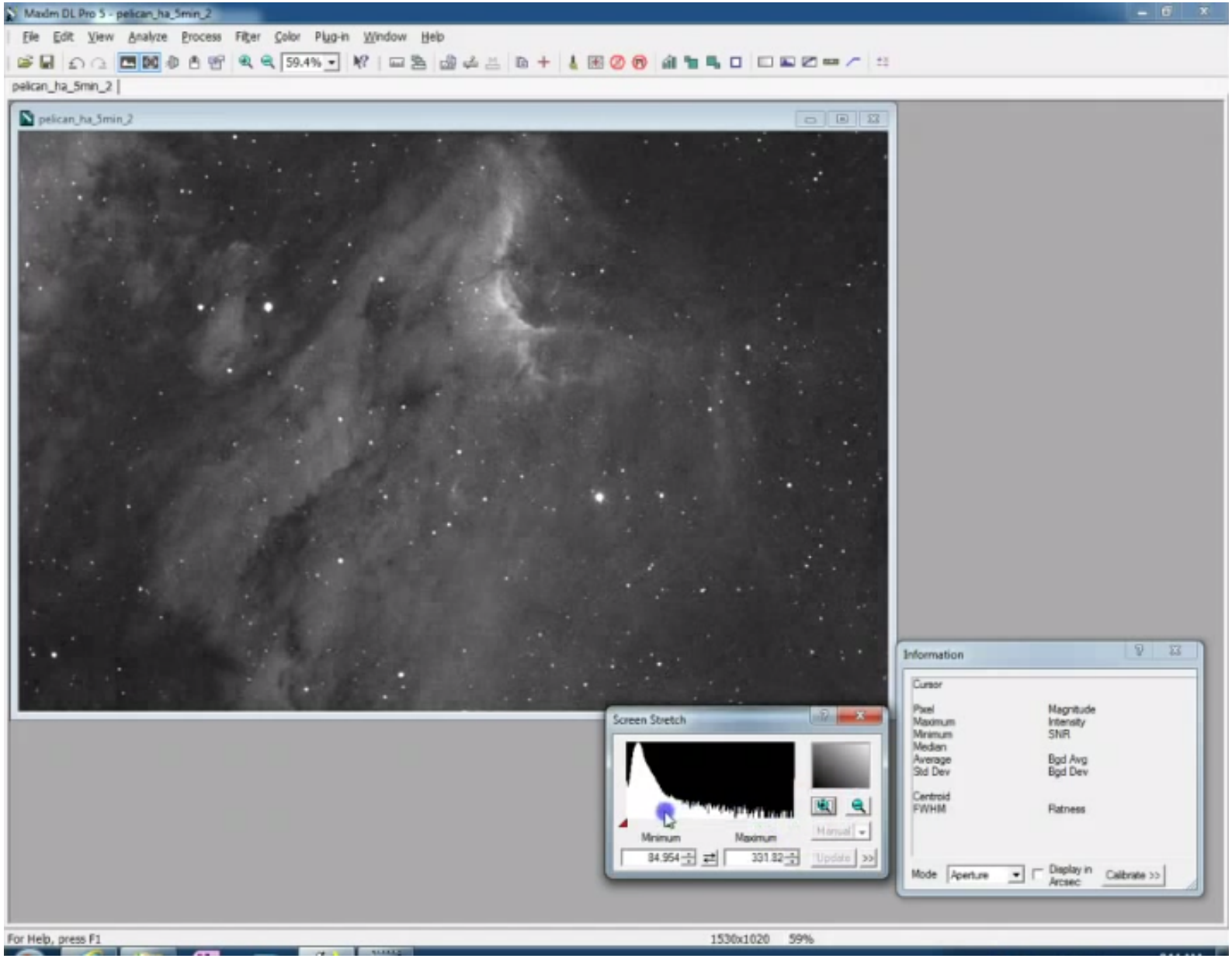
z menu Process wybieramy Calibrate aby uruchomić process redukcji



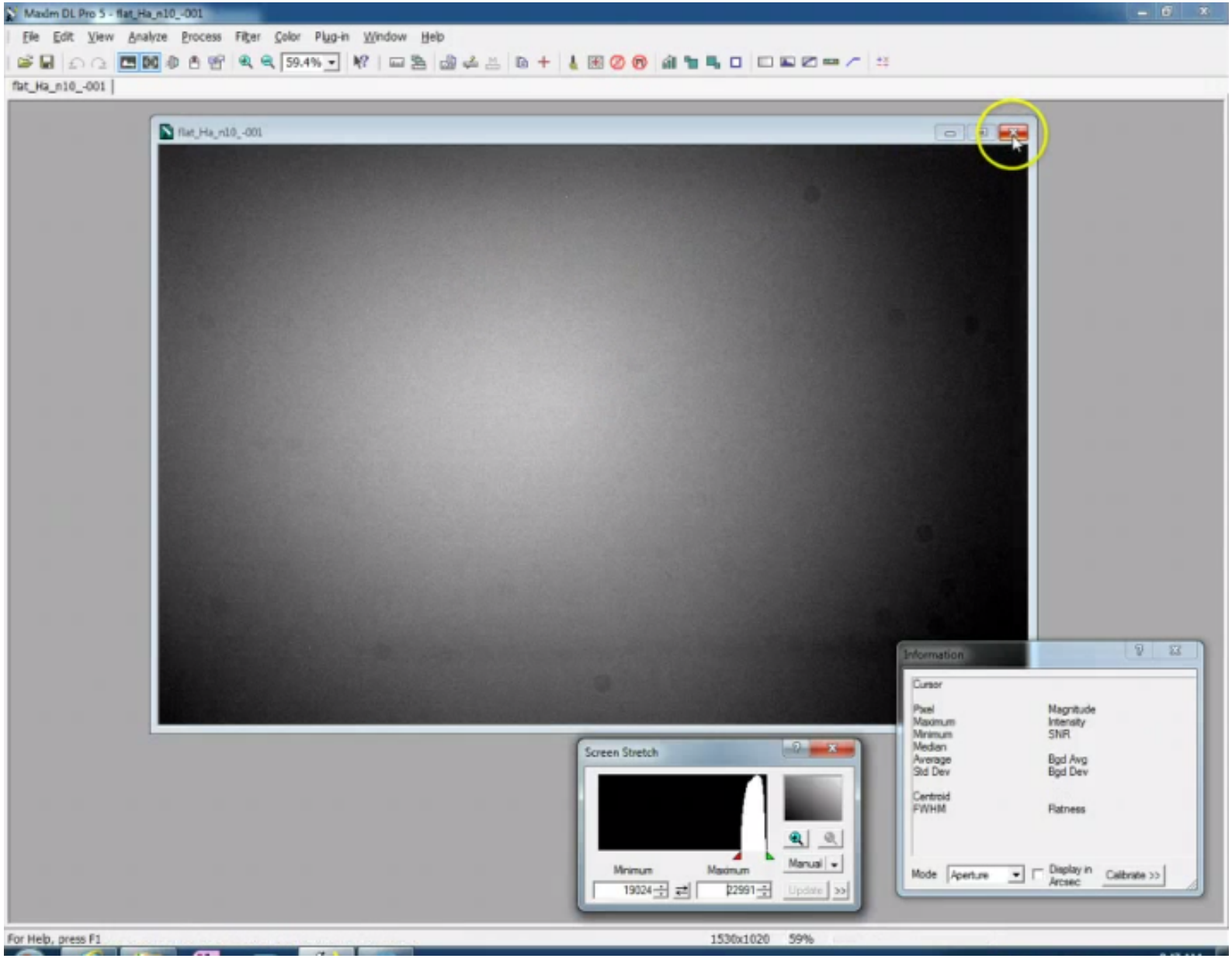
zdjęcie jest wyraźnie odszumione



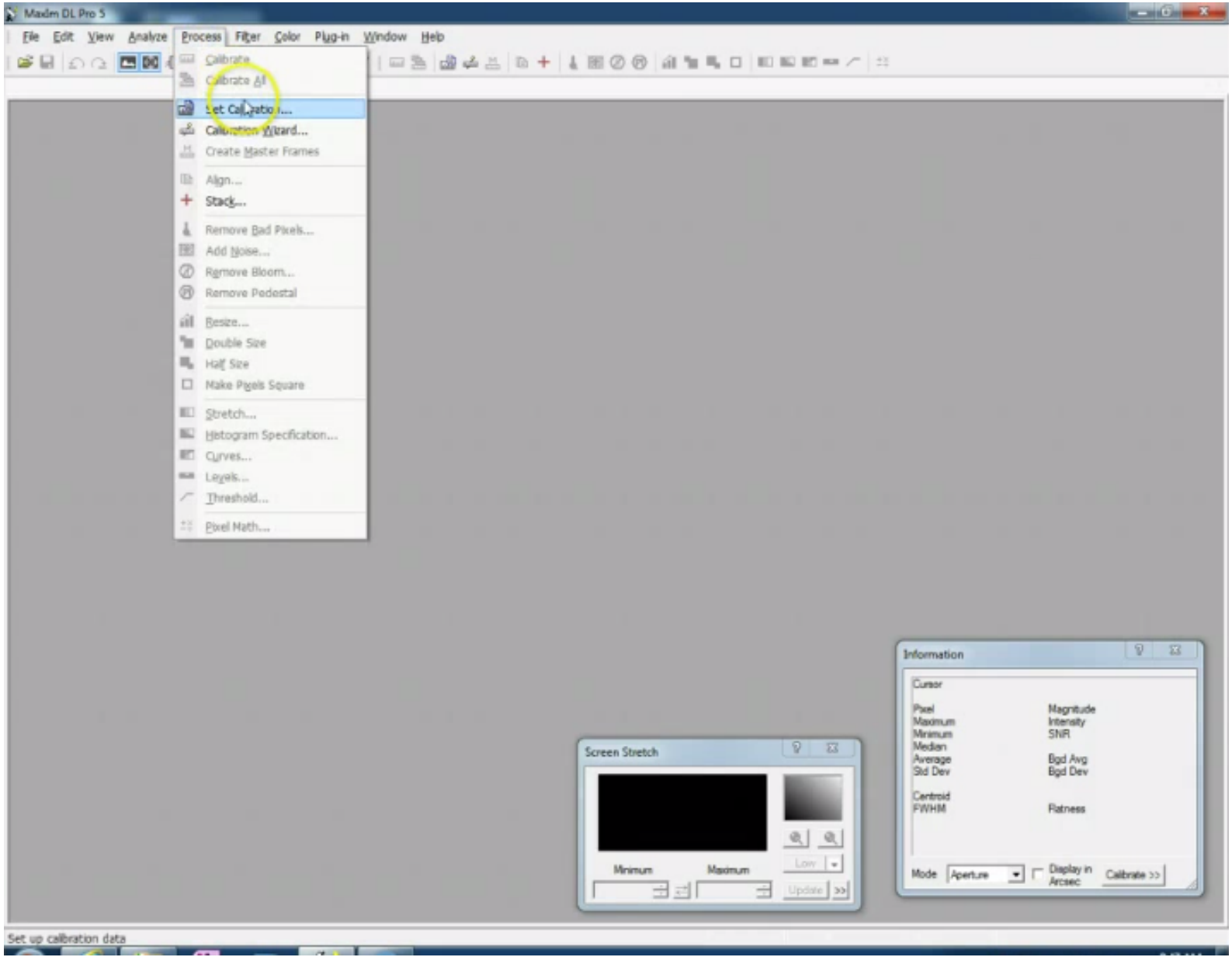
można zmienić kontrast aby zobaczyć szczegóły

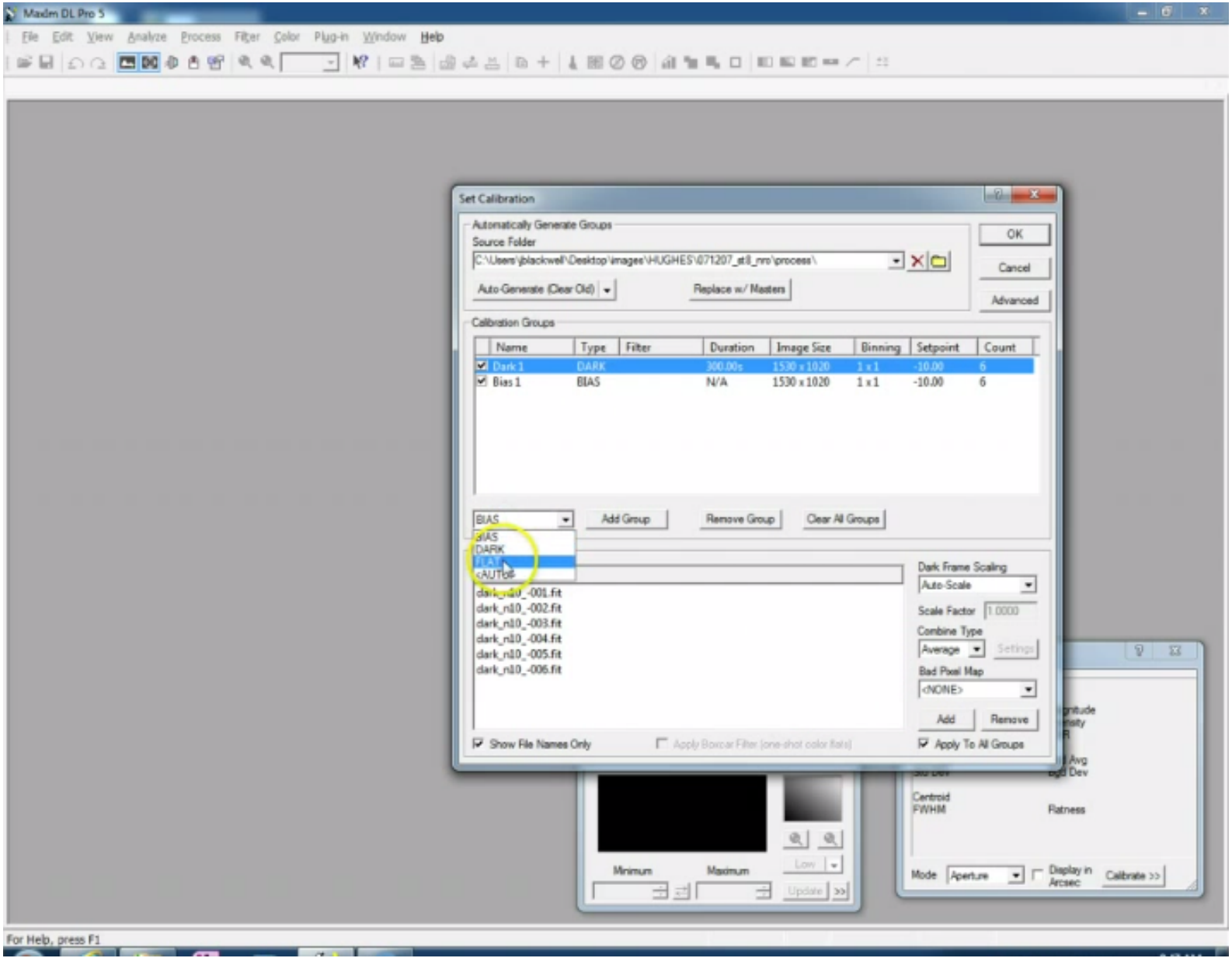


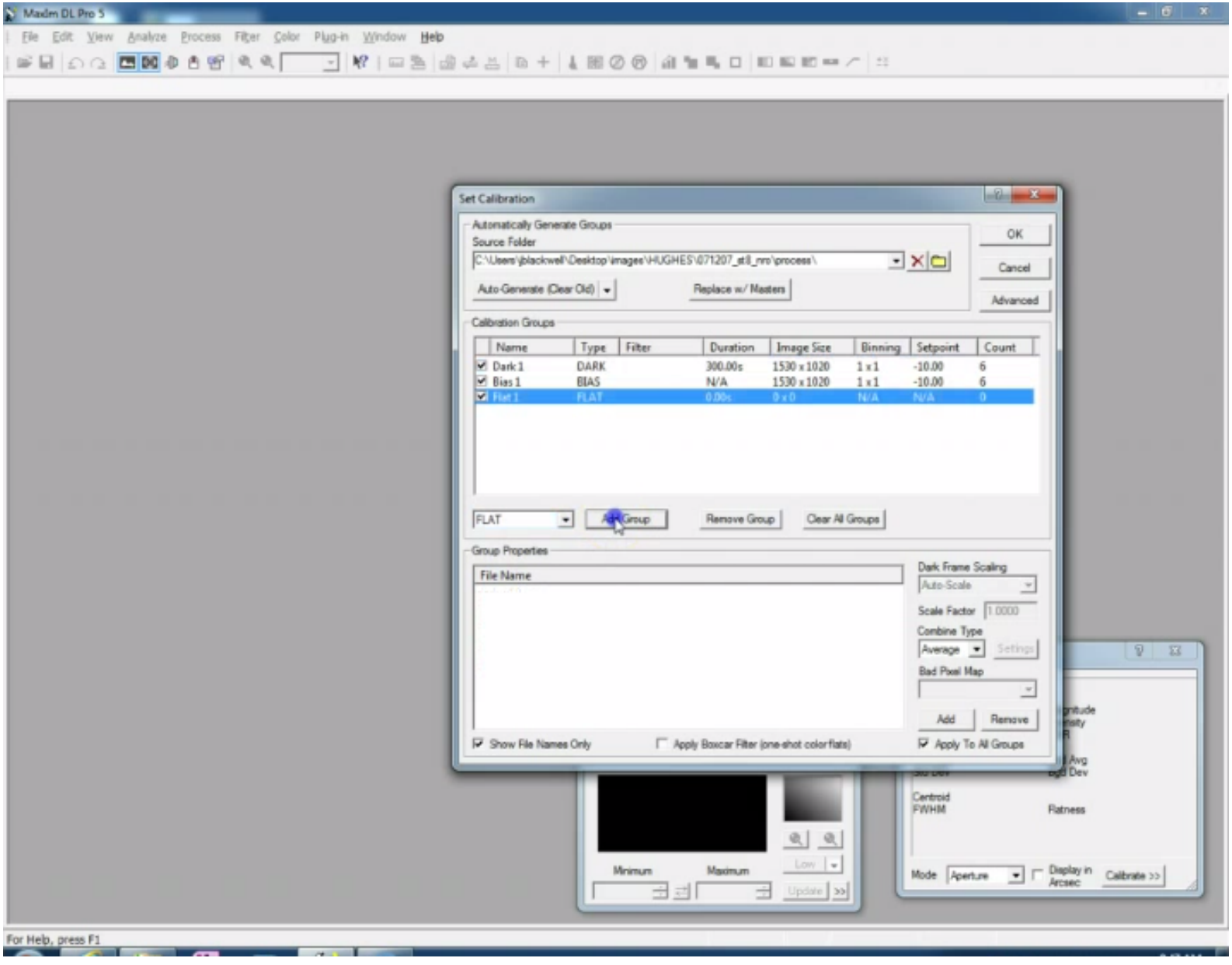
przykładowa klatka typu Flat

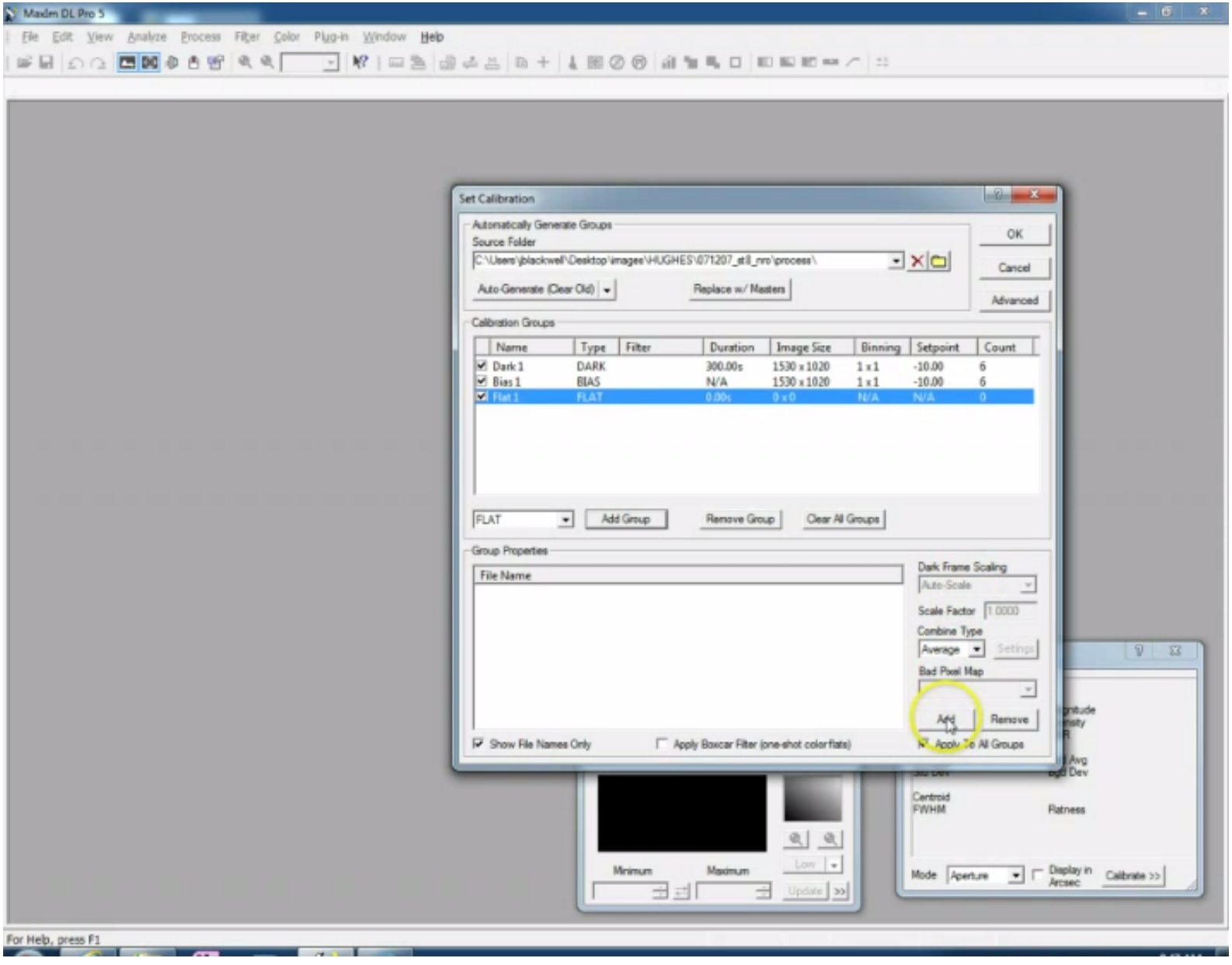


dodajemy do zestawu klatek kalibracyjnych użytych wcześniej grupę klatek typu Flat

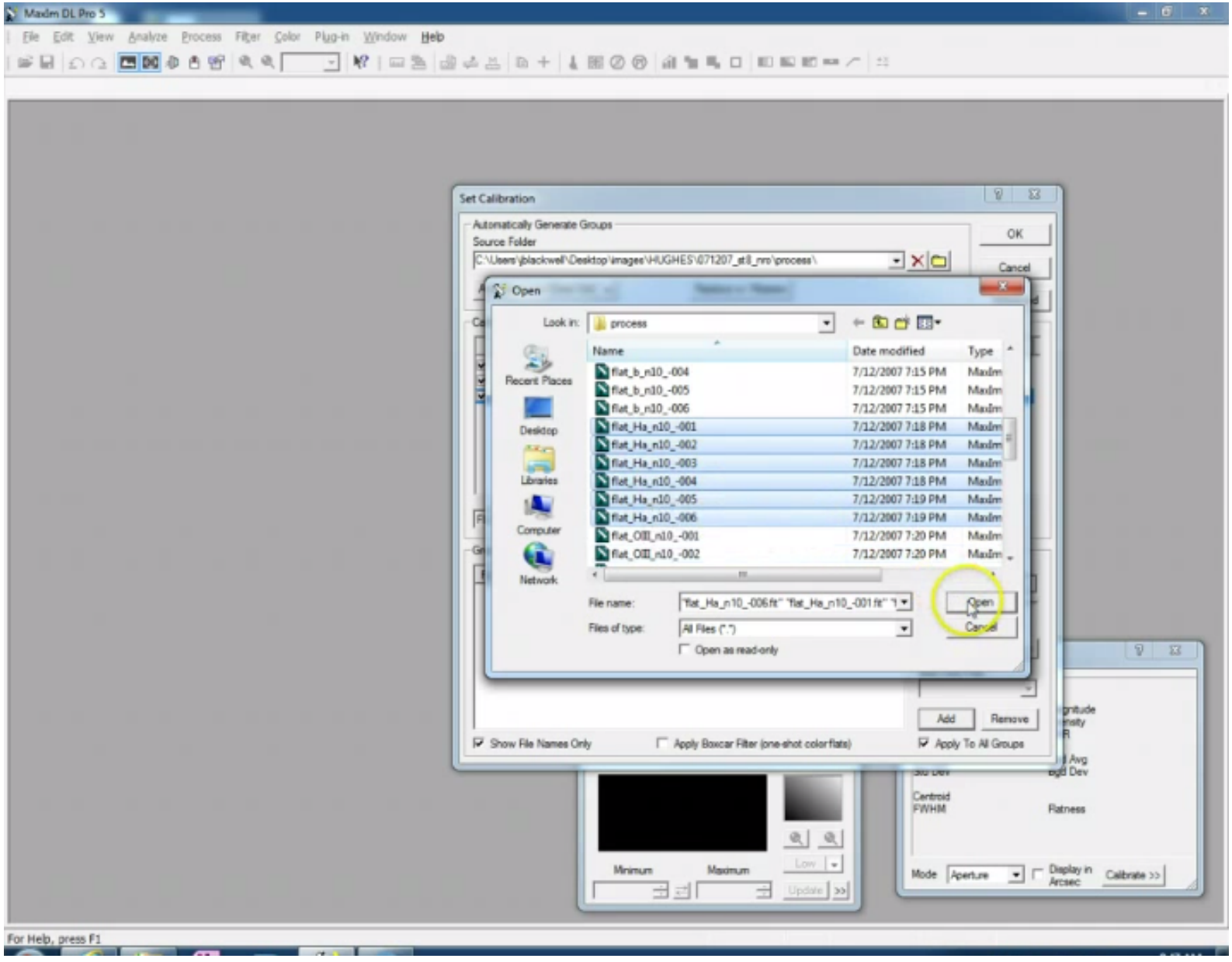


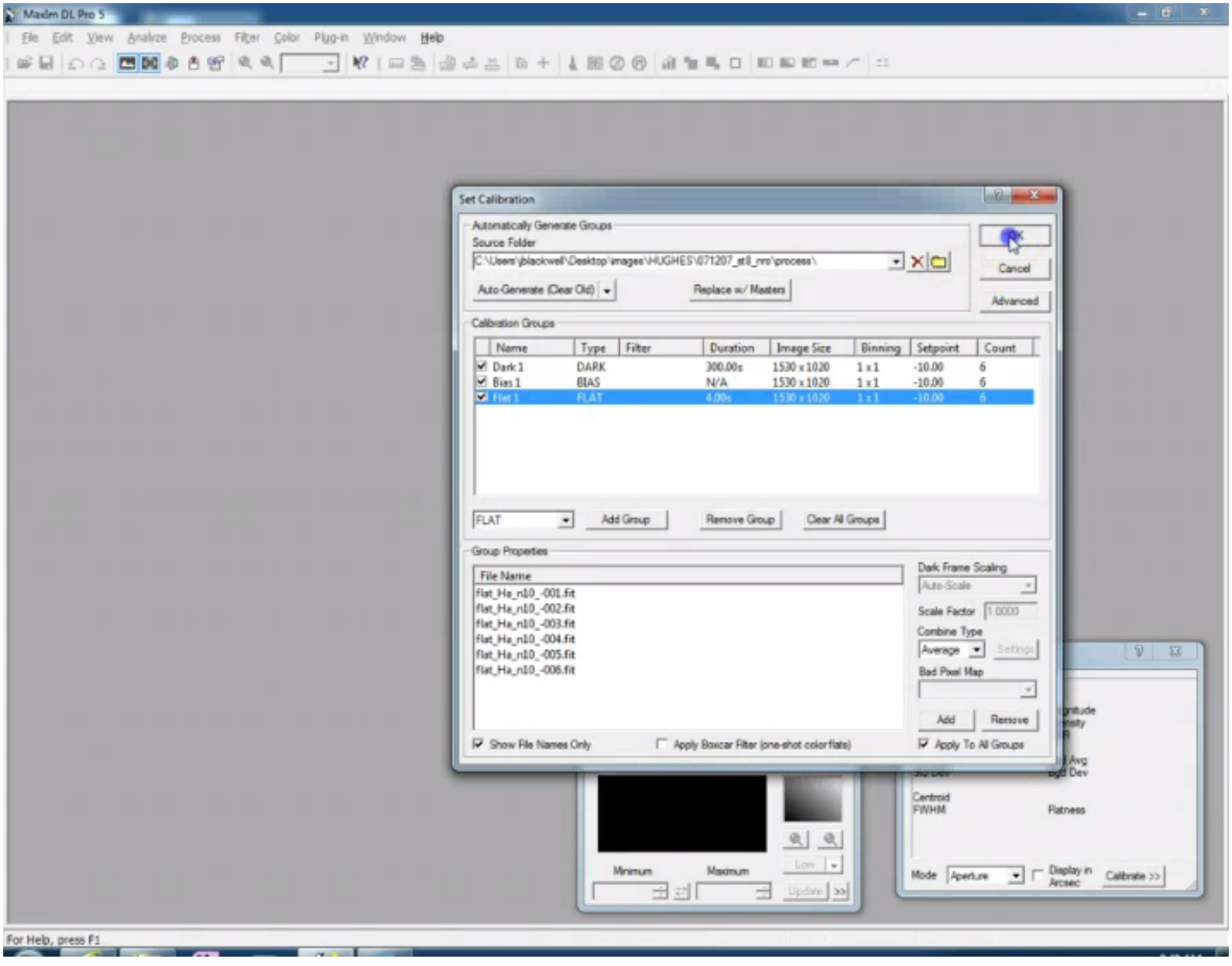

Maxim DL Pro 5
File Edit View Analyze Process Filter Color Plug-in Window Help
Set Calibration
Automatically Generate Groups
Source Folder
C:\Users\jblackwell\Desktop\images\HUGHES\071207_st8_nro\process\
Auto-Generate (Clear Old)
Replace w/ Masters
OK
Cancel
Advanced
Calibration Groups
Name Type Filter Duration Image Size Binning Setpoint Count
Dark 1 DARK 300.00s 1530 x 1020 1 x 1 -10.00 6
Bias 1 BIAS N/A 1530 x 1020 1 x 1 -10.00 6
BIAS
Add Group
Remove Group
Clear All Groups
BIAS
DARK
FLAT
<AUTO>
dark_n10_-001.fit
dark_n10_-002.fit
dark_n10_-003.fit
dark_n10_-004.fit
dark_n10_-005.fit
dark_n10_-006.fit
Dark Frame Scaling
Auto-Scale
Scale Factor 1.0000
Combine Type
Average
Settings
Bad Pixel Map
<NONE>
Add
Remove
Show File Names Only
Apply Bayer Filter (one-shot color files)
Apply To All Groups
Minimum
Maximum
Low
Update
Centroid
FWHM
Flatness
Mode
Aperture
Display in Arcsec
Calibrate >>
For Help, press F1


Maxim DL Pro 5
File Edit View Analyze Process Filter Color Plug-in Window Help
Set Calibration
Automatically Generate Groups
Source Folder
C:\Users\jblackwell\Desktop\images\HUGHES\071207_st8_nro\process\
Auto-Generate (Clear Old)
Replace w/ Masters
OK
Cancel
Advanced
Calibration Groups
Name Type Filter Duration Image Size Binning Setpoint Count
Dark 1 DARK 300.00s 1530 x 1020 1 x 1 -10.00 6
Bias 1 BIAS N/A 1530 x 1020 1 x 1 -10.00 6
Flat 1 FLAT 0.00s 0 x 0 N/A N/A 0
FLAT
Add Group
Remove Group
Clear All Groups
Group Properties
File Name
Dark Frame Scaling
Auto-Scale
Scale Factor 1.0000
Combine Type
Average
Settings
Bad Pixel Map
Add
Remove
Show File Names Only
Apply Boxcar Filter (one-shot color flats)
Apply To All Groups
Minimum
Maximum
Low
Update
Centroid
FWHM
Flatness
Mode Aperture
Display in Arcsec
Calibrate >>
For Help, press F1

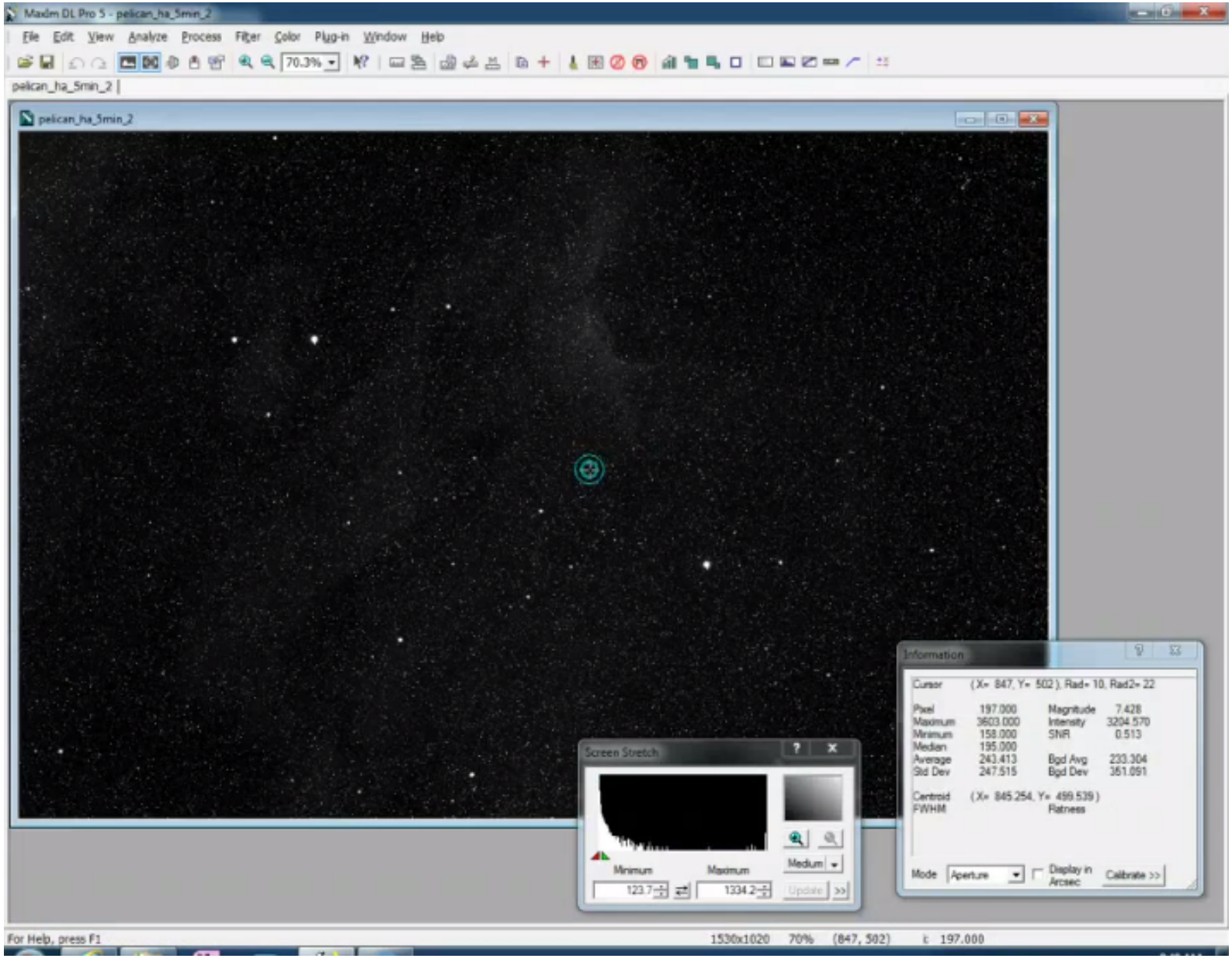

Maxim DL Pro 5
File Edit View Analyze Process Filter Color Plug-in Window Help
Set Calibration
Automatically Generate Groups
Source Folder
C:\Users\jblackwell\Desktop\images\HUGHES\071207_st8_nro\process\
Auto-Generate (Clear Old)
Replace w/ Masters
OK
Cancel
Advanced
Calibration Groups
Name Type Filter Duration Image Size Binning Setpoint Count
Dark 1 DARK 300.00s 1530 x 1020 1 x 1 -10.00 6
Bias 1 BIAS N/A 1530 x 1020 1 x 1 -10.00 6
Flat 1 FLAT 0.00s 0 x 0 N/A N/A 0
FLAT
Add Group
Remove Group
Clear All Groups
Group Properties
File Name
Dark Frame Scaling
Auto-Scale
Scale Factor 1.0000
Combine Type
Average
Settings
Bad Pixel Map
Add
Remove
Show File Names Only
Apply Boxcar Filter (one-shot color flats)
Apply To All Groups
Minimum
Maximum
Low
Update
Centroid
FWHM
Flatness
Mode Aperture
Display in Arcsec
Calibrate >>
For Help, press F1

uważamy aby wybrać klatki Flat wykonane z tym samym filtrem co klatki redukowane

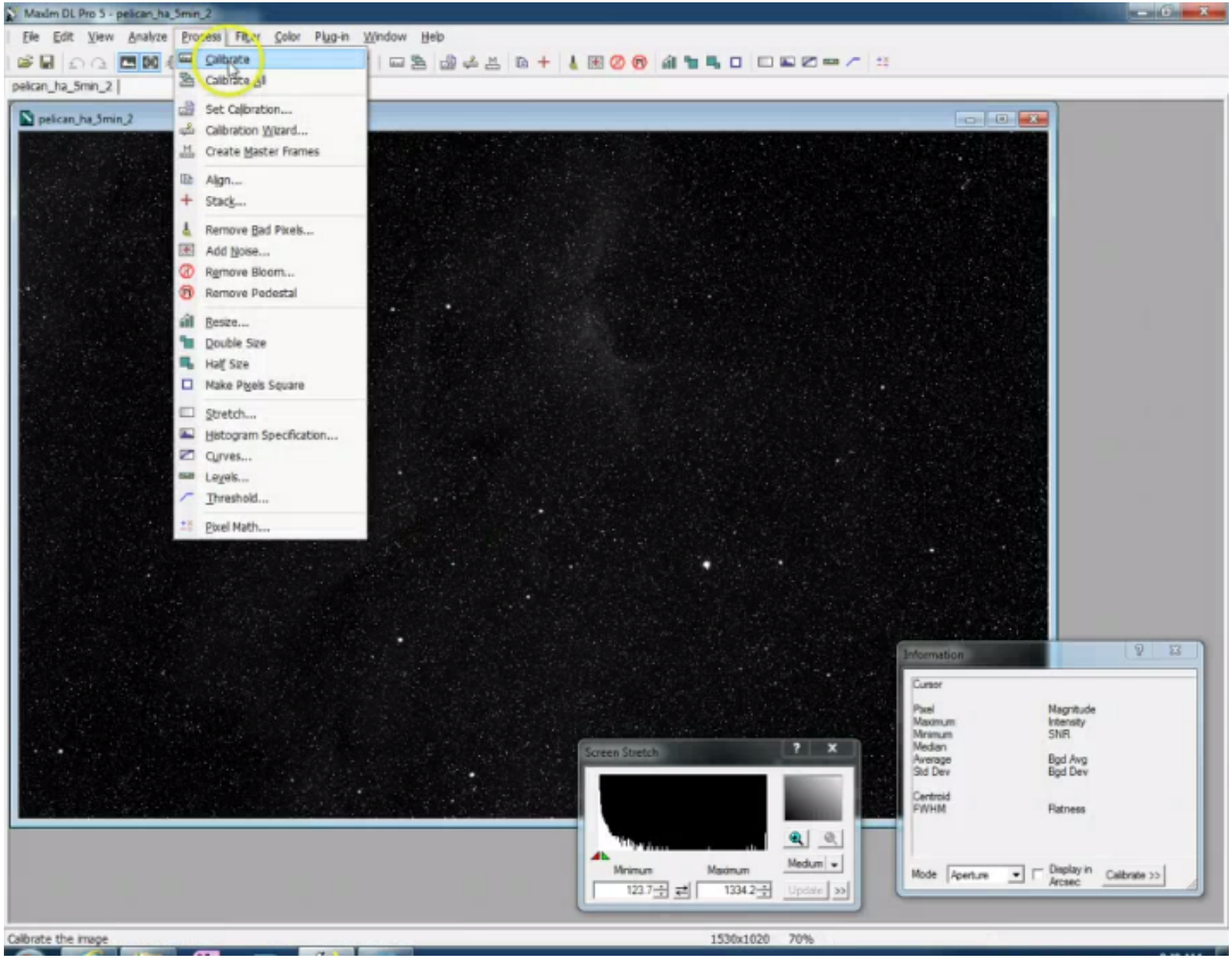



Maxim DL Pro 5
File Edit View Analyze Process Filter Color Plug-in Window Help
Set Calibration
Automatically Generate Groups
Source Folder
C:\Users\jblackwell\Desktop\images\HUGHES\071207_st8_nrs\process\
Auto-Generate (Clear Old)
Replace w/ Masters
OK
Cancel
Advanced
Calibration Groups
Name Type Filter Duration Image Size Binning Setpoint Count
Dark 1 DARK 300.00s 1530 x 1020 1 x 1 -10.00 6
Bias 1 BIAS N/A 1530 x 1020 1 x 1 -10.00 6
Flat 1 FLAT 4.00s 1530 x 1020 1 x 1 -10.00 6
FLAT
Add Group
Remove Group
Clear All Groups
Group Properties
File Name
flat_Ha_n10_-001.fit
flat_Ha_n10_-002.fit
flat_Ha_n10_-003.fit
flat_Ha_n10_-004.fit
flat_Ha_n10_-005.fit
flat_Ha_n10_-006.fit
Dark Frame Scaling
Auto-Scale
Scale Factor
Combine Type
Average
Settings
Bad Pixel Map
Add
Remove
Show File Names Only
Apply Boxcar Filter (one-shot color flats)
Apply To All Groups
Minimum
Maximum
Low
Update
Centroid
FWHM
Flatness
Mode
Aperture
Display in Arcsec
Calibrate >>
For Help, press F1

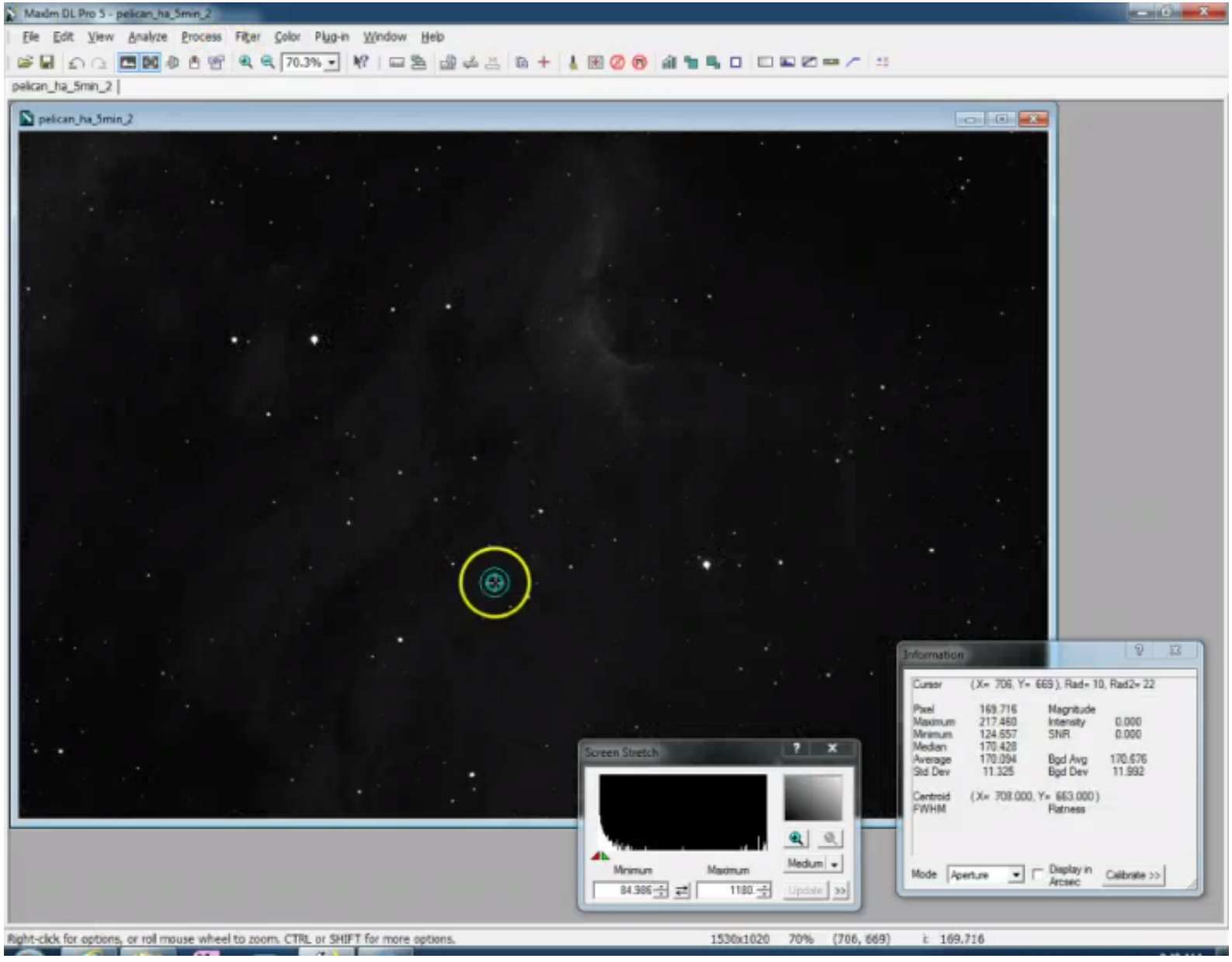
ponownie wybieramy surowy obraz



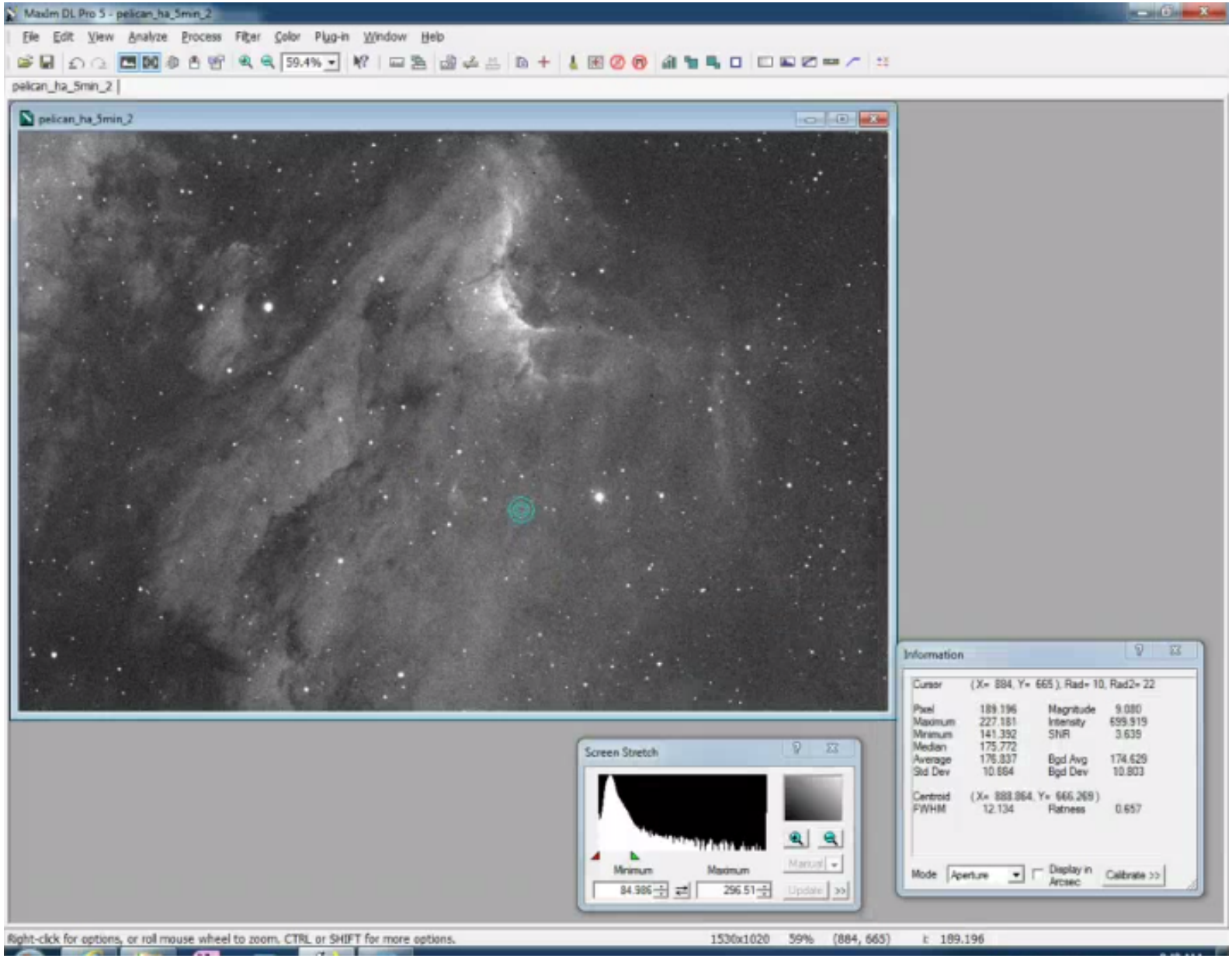
i wykorzystujemy opcję Calibrate tym razem wykorzystując klatki typu Bias, Dark i Flat



przeprocesowane zdjęcie po pozbyciu się nieporządanych efektów kamery i teleskopu

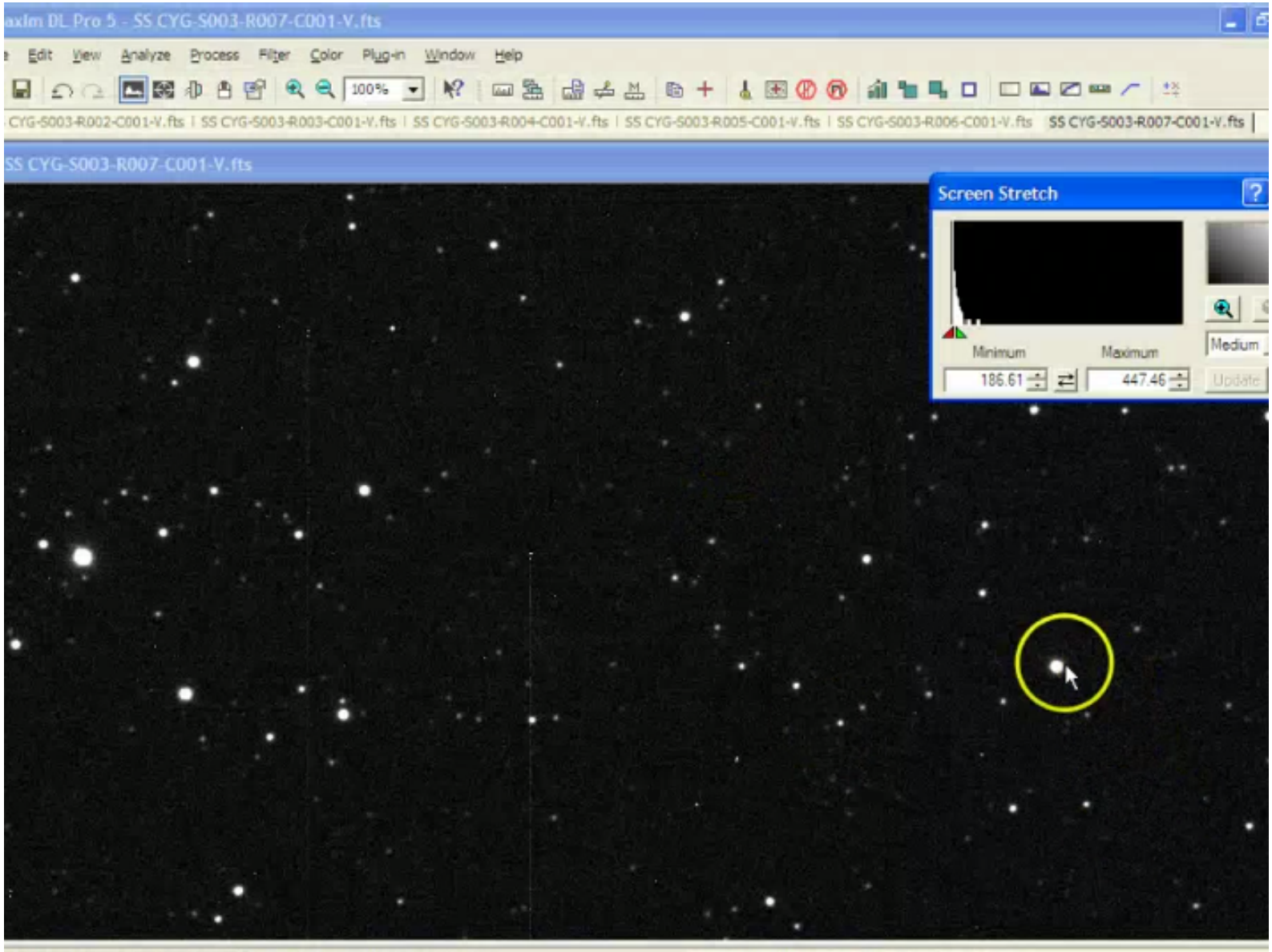


tutaj z poprawionym kontrastem

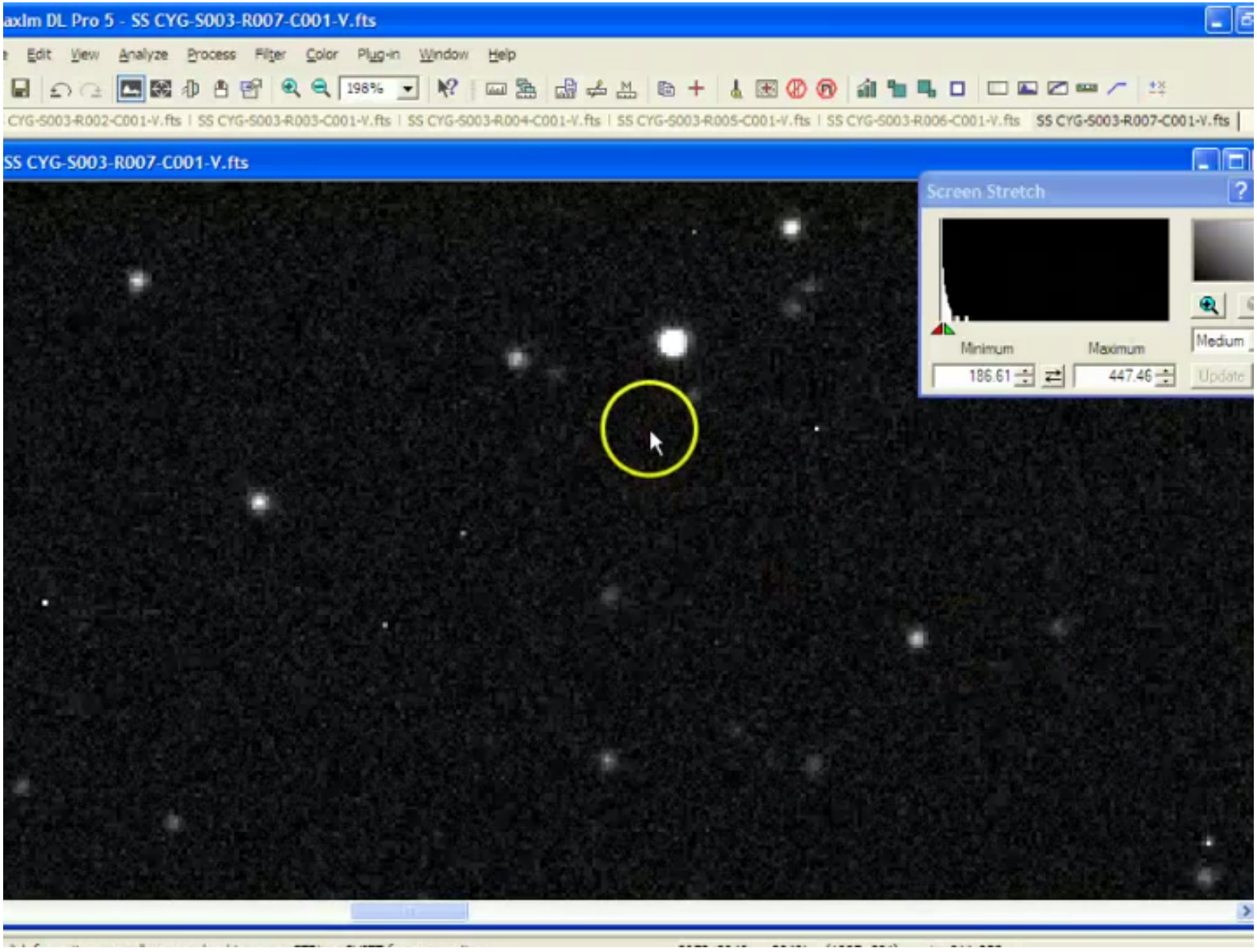


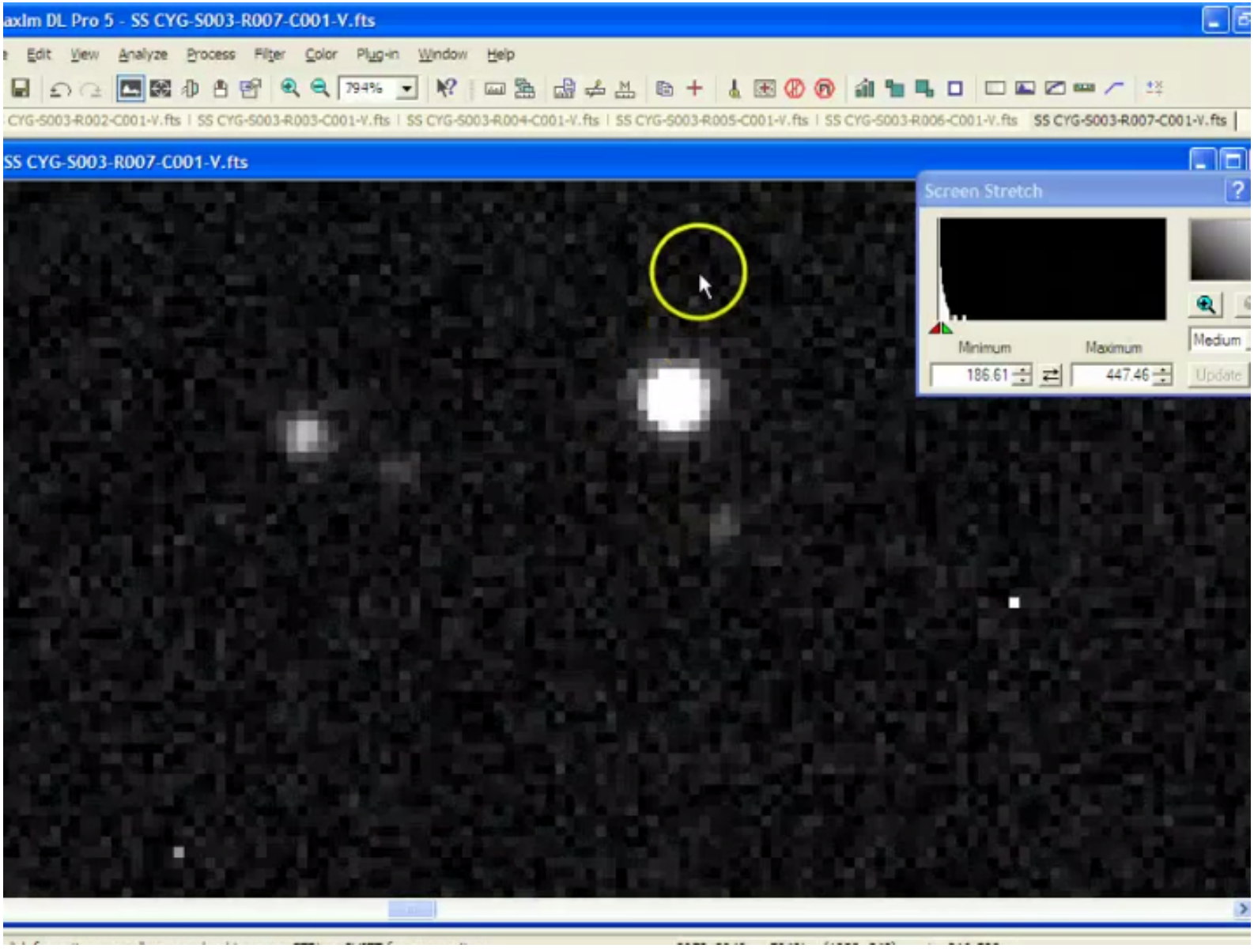
Fotometria

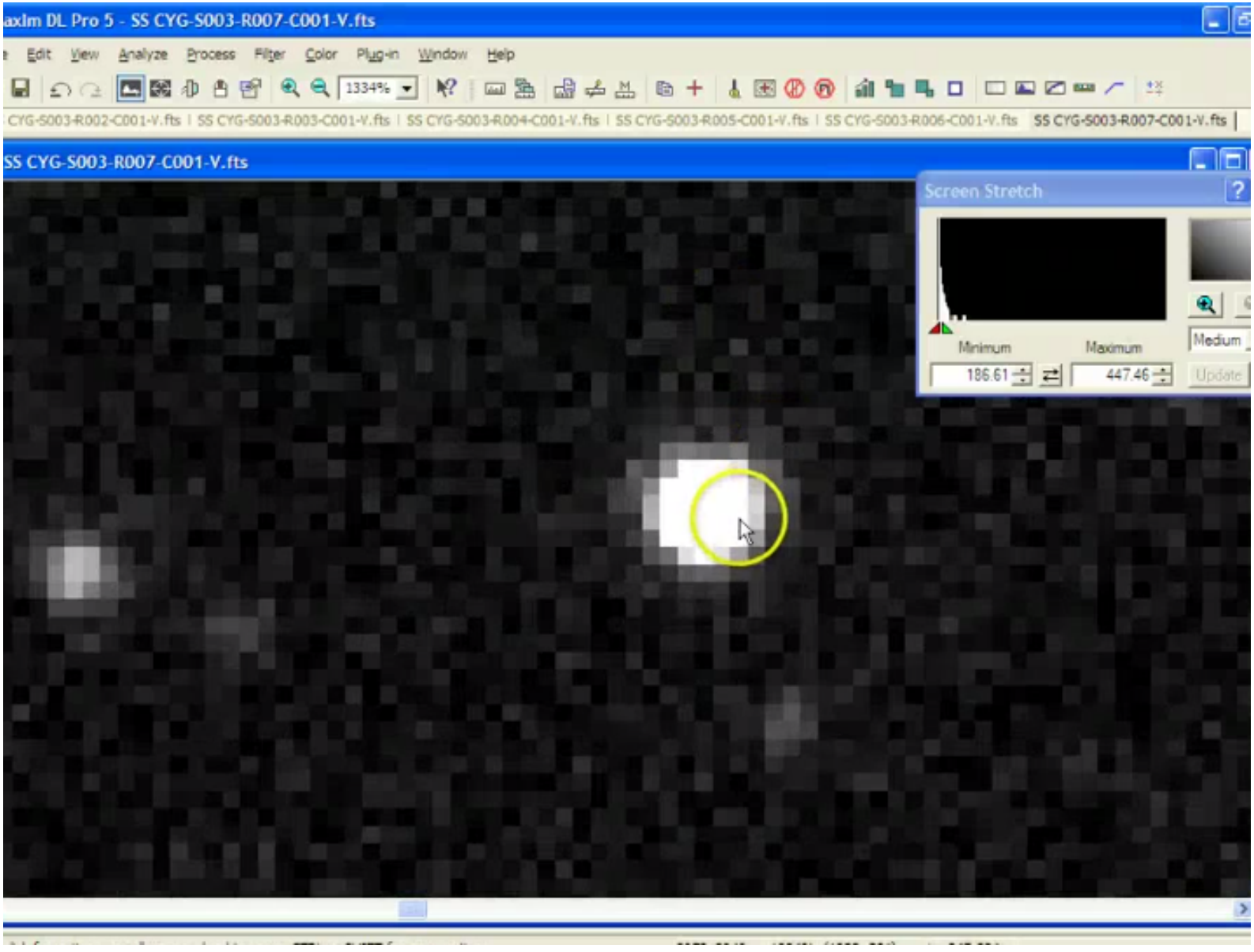
przykładowe zdjęcie pola gwiazdy SS Cyg, jasność można zmierzyć gdy zdjęcie lub seria zdjęć są otworzone i można je podejrzeć



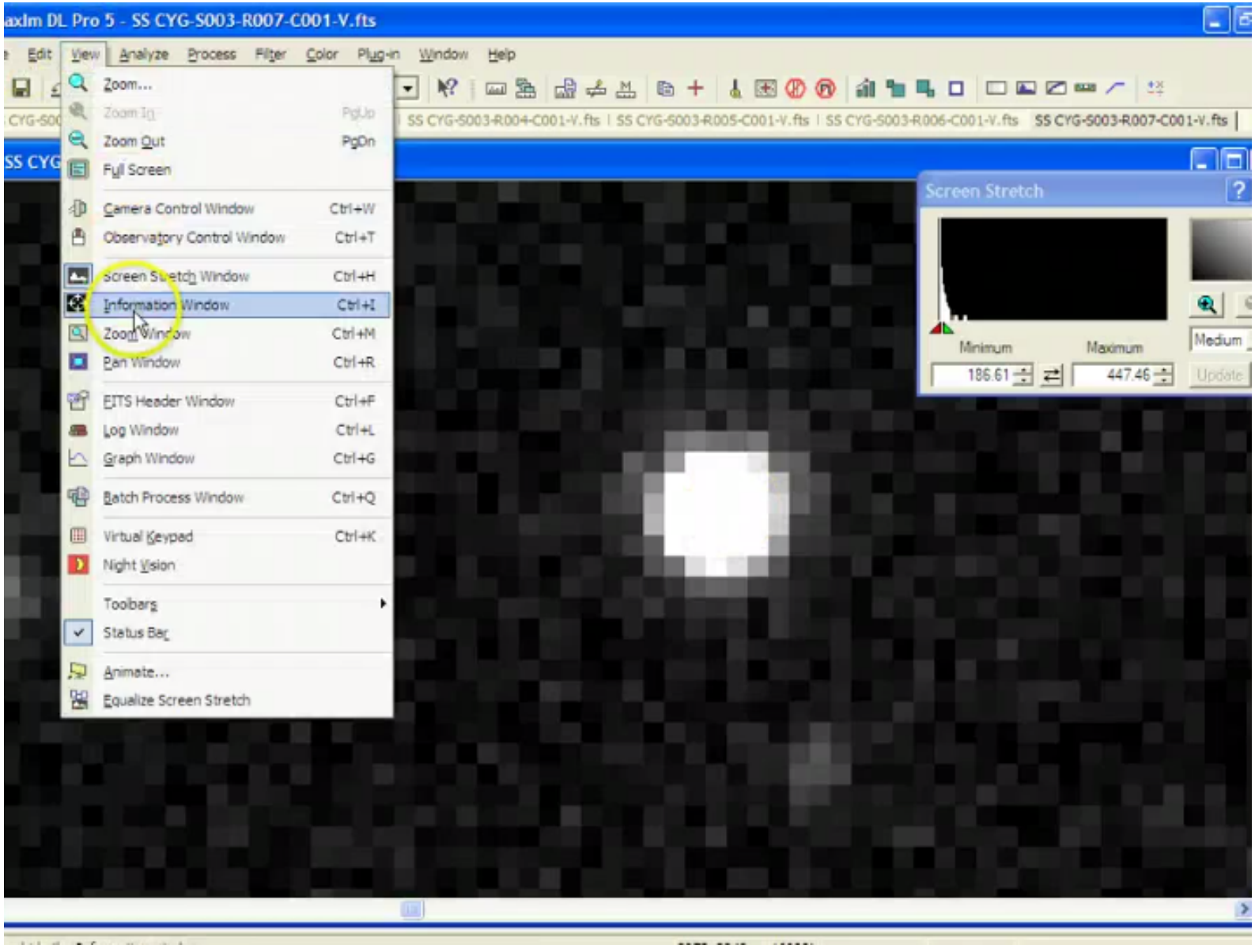
powiększamy wybrany obszar aby przyjrzeć się profilom gwiazd

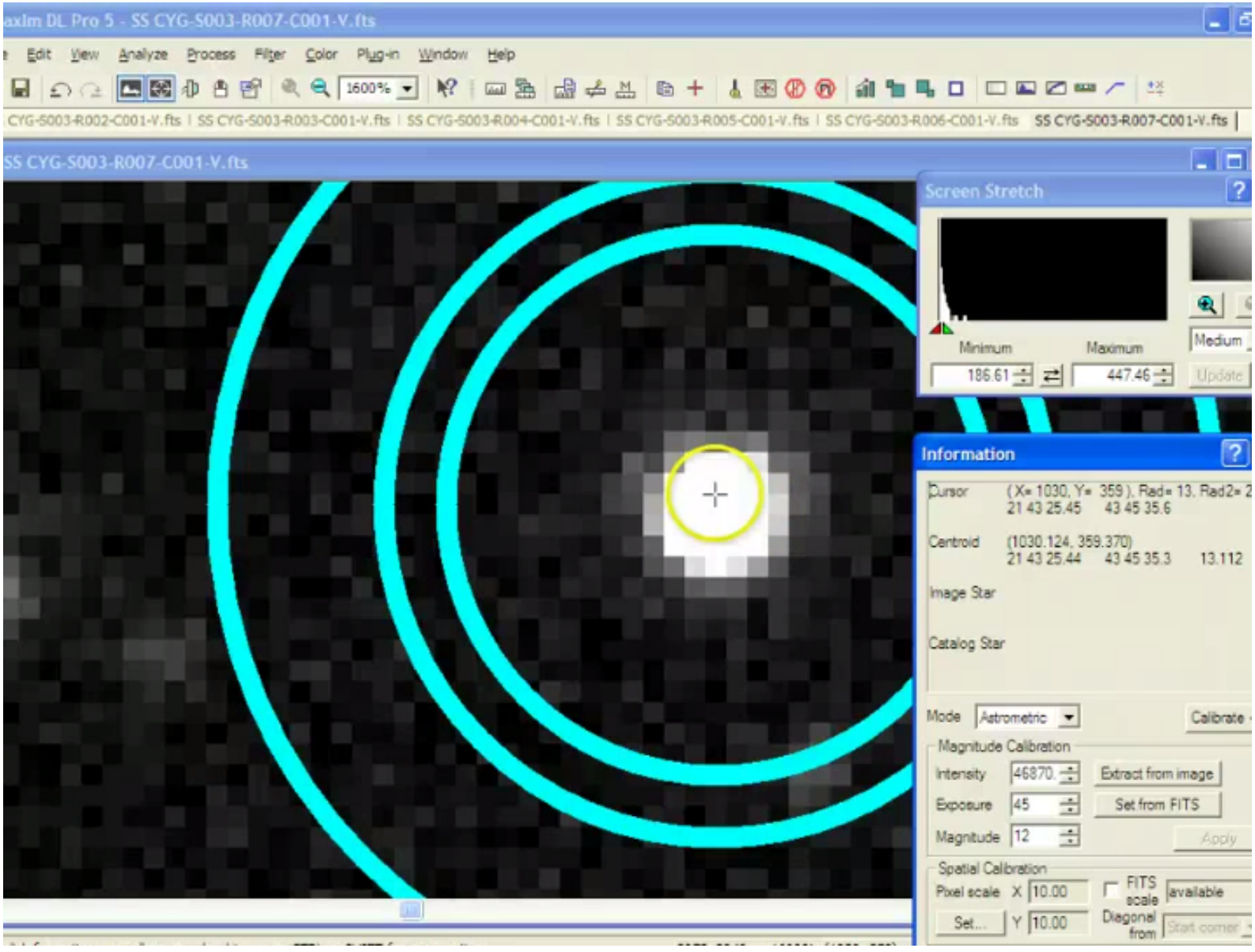



axlm DL Pro 5 - SS CYG-S003-R007-C001-V.fts
Edit View Analyze Process Filter Color Plug-in Window Help
794%
CYG-S003-R002-C001-V.fts | SS CYG-S003-R003-C001-V.fts | SS CYG-S003-R004-C001-V.fts | SS CYG-S003-R005-C001-V.fts | SS CYG-S003-R006-C001-V.fts SS CYG-S003-R007-C001-V.fts
SS CYG-S003-R007-C001-V.fts
Screen Stretch
Minimum
Maximum
186.61
447.46
Medium
Update

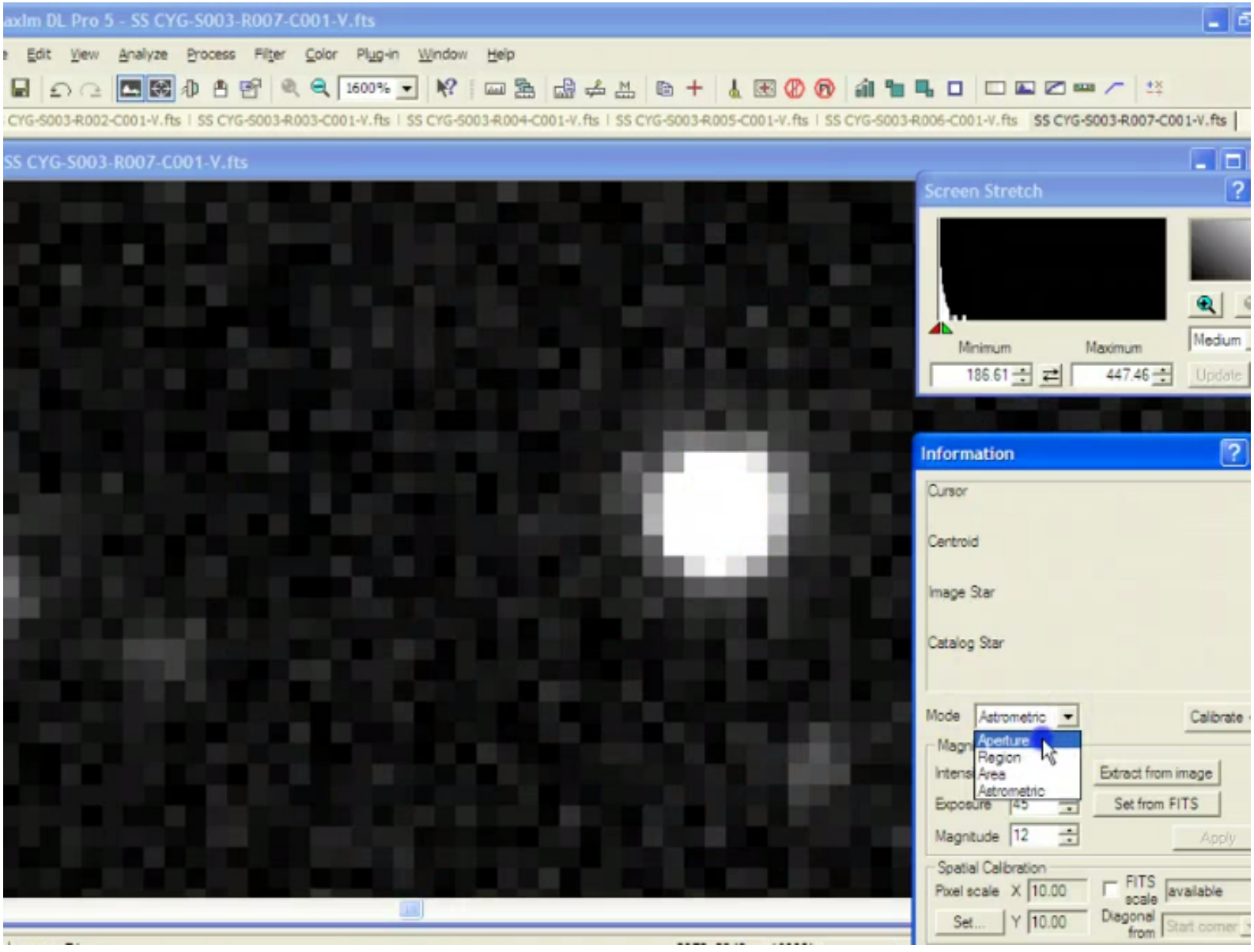

axlm DL Pro 5 - SS CYG-S003-R007-C001-V.fts
Edit View Analyze Process Filter Color Plug-in Window Help
1334%
CYG-S003-R002-C001-V.fts | SS CYG-S003-R003-C001-V.fts | SS CYG-S003-R004-C001-V.fts | SS CYG-S003-R005-C001-V.fts | SS CYG-S003-R006-C001-V.fts | SS CYG-S003-R007-C001-V.fts
SS CYG-S003-R007-C001-V.fts
Screen Stretch
Minimum
Maximum
186.61
447.46
Medium
Update

otwieramy Information Window z zakładki View

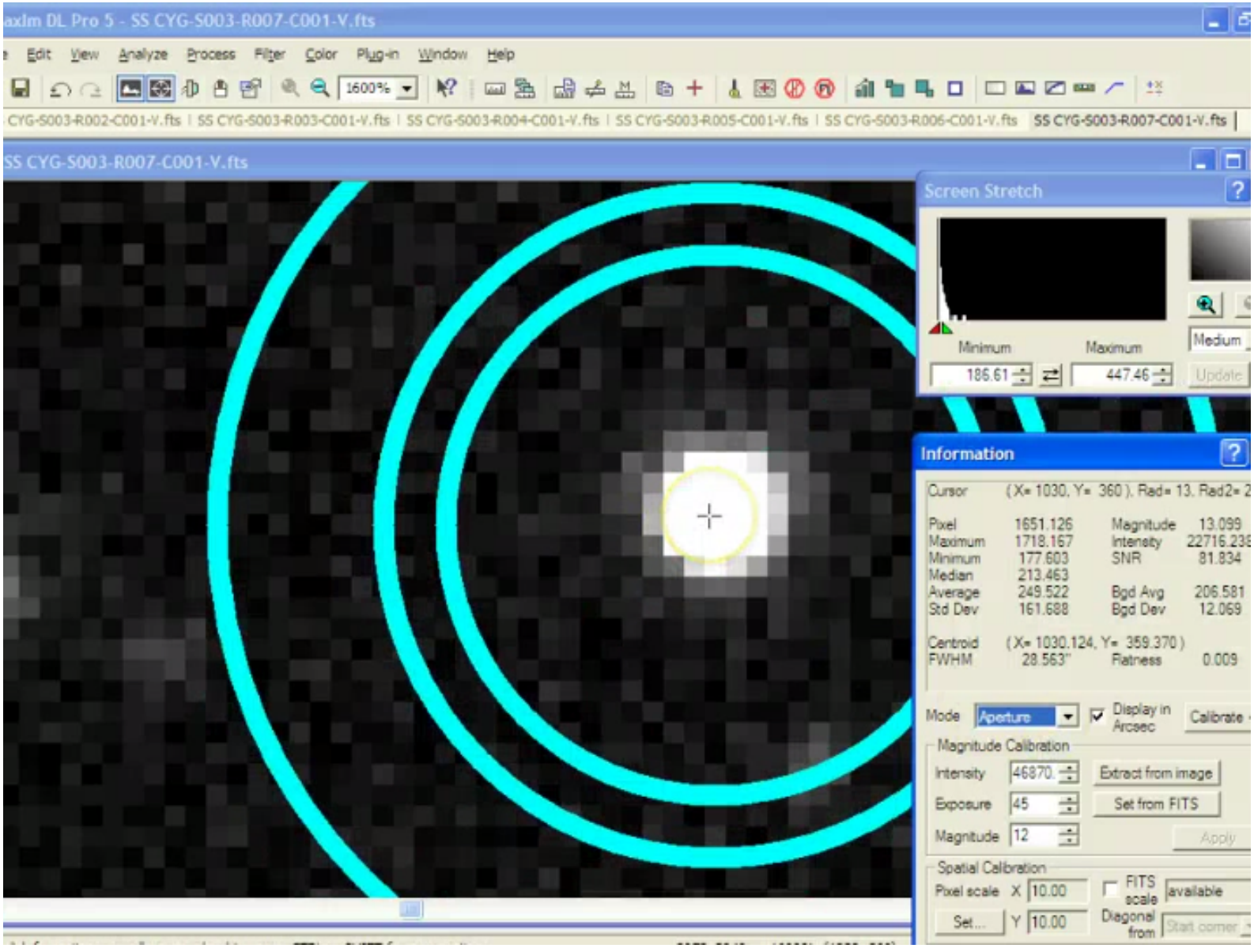



axim DL Pro 5 - SS CYG-S003-R007-C001-V.fts
Edit View Analyze Process Filter Color Plug-in Window Help
1600%
CYG-S003-R002-C001-V.fts | SS CYG-S003-R003-C001-V.fts | SS CYG-S003-R004-C001-V.fts | SS CYG-S003-R005-C001-V.fts | SS CYG-S003-R006-C001-V.fts SS CYG-S003-R007-C001-V.fts
SS CYG-S003-R007-C001-V.fts
Screen Stretch
Minimum
Maximum
186.61
447.46
Medium
Update
Information
Cursor (X= 1030, Y= 359), Rad= 13, Rad2= 2
21 43 25.45 43 45 35.6
Centroid (1030.124, 359.370)
21 43 25.44 43 45 35.3 13.112
Image Star
Catalog Star
Mode Astrometric
Calibrate
Magnitude Calibration
Intensity 46870
Extract from image
Exposure 45
Set from FITS
Magnitude 12
Apply
Spatial Calibration
Pixel scale X 10.00
FITS scale
available
Set...
Y 10.00
Diagonal from
Start corner

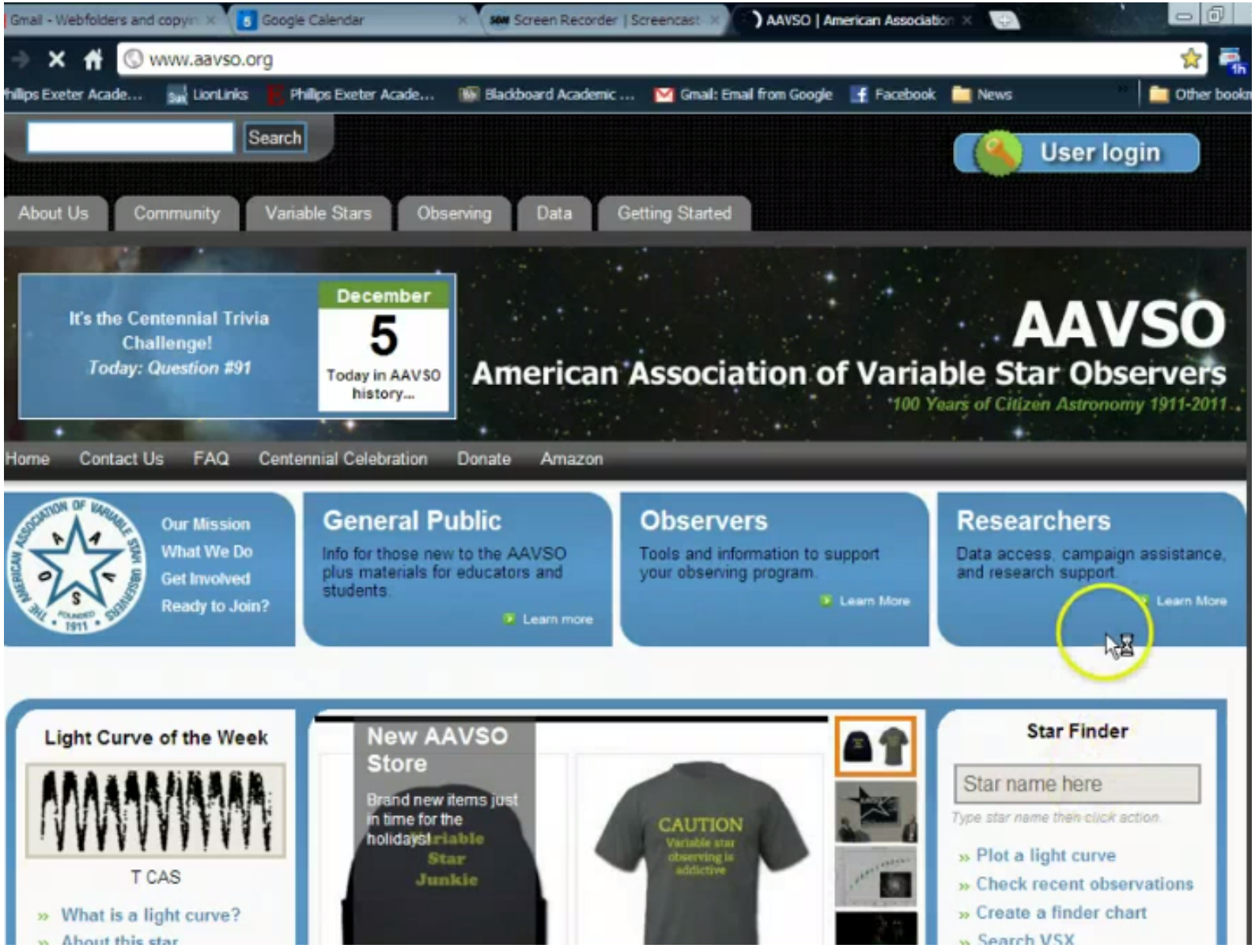
ustawiamy pole Mode na Aperture



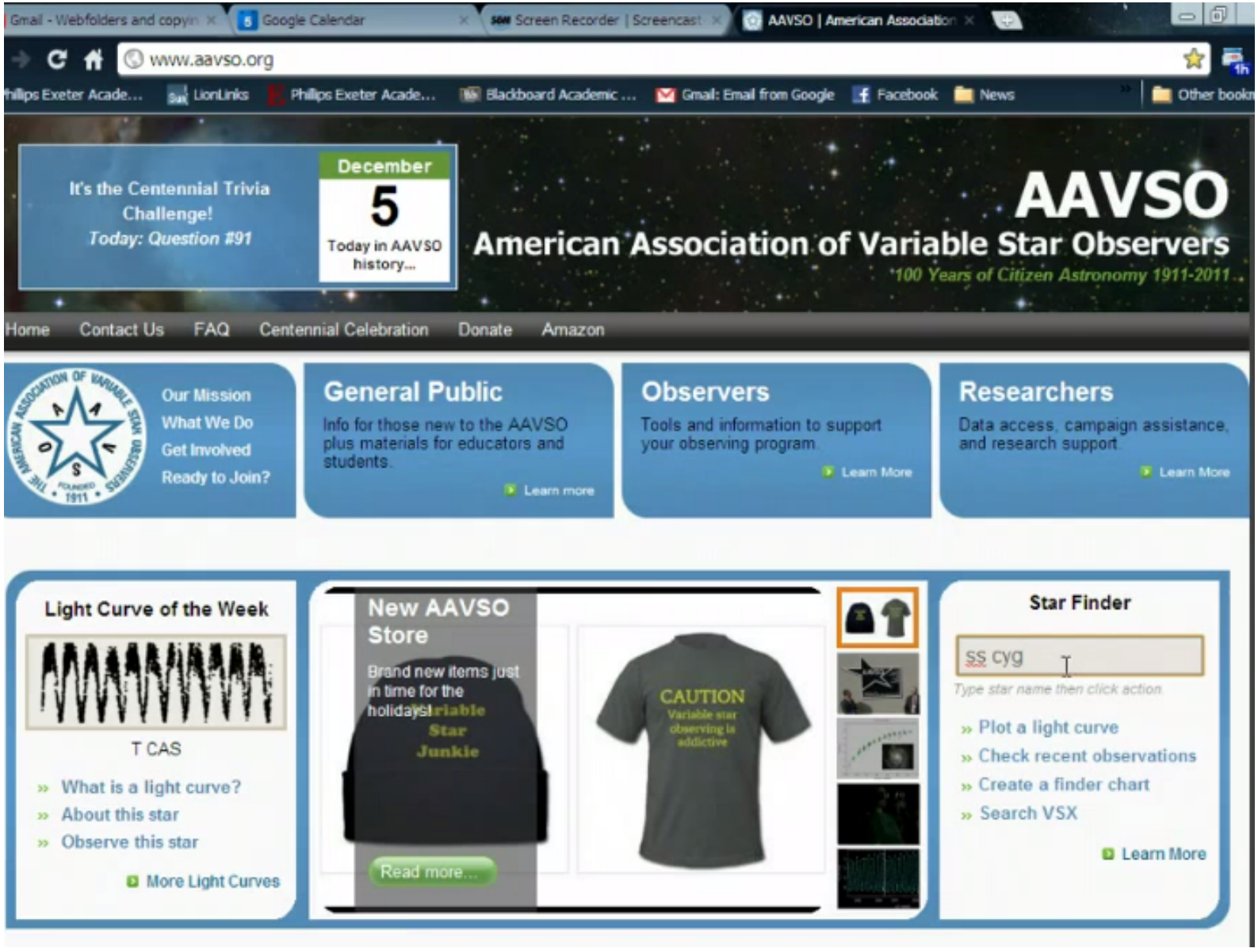
pojawia się szereg użytecznych informacji o profilu gwiazdy i jej jasności instrumentalnej

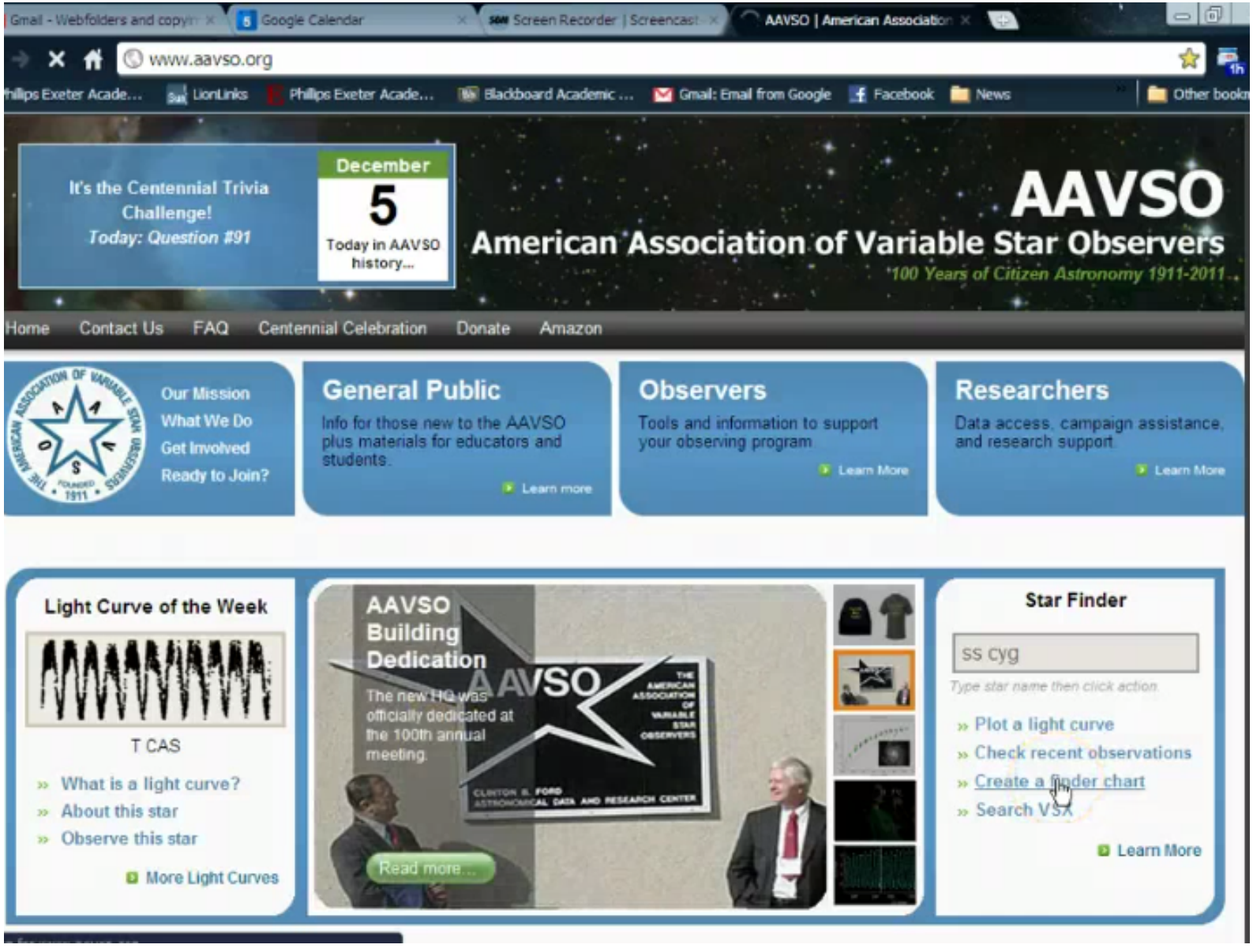


aby wyznaczyć jasność rzeczywistą potrzebujemy ustalić gwiazdę porównania o stałej i znanej jasności

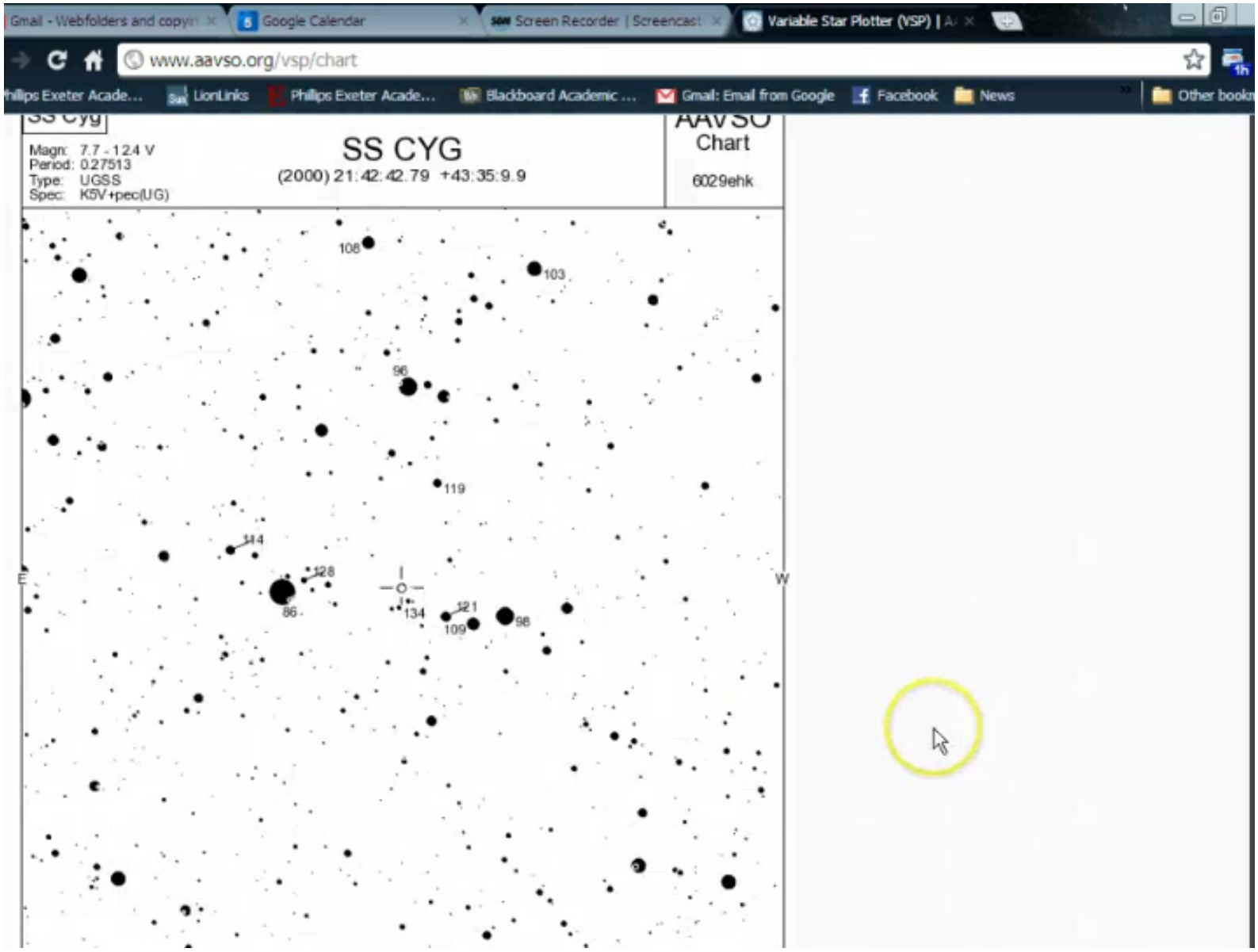


dla znanych gwiazd zmiennych korzystamy z kreatora mapki AAVSO

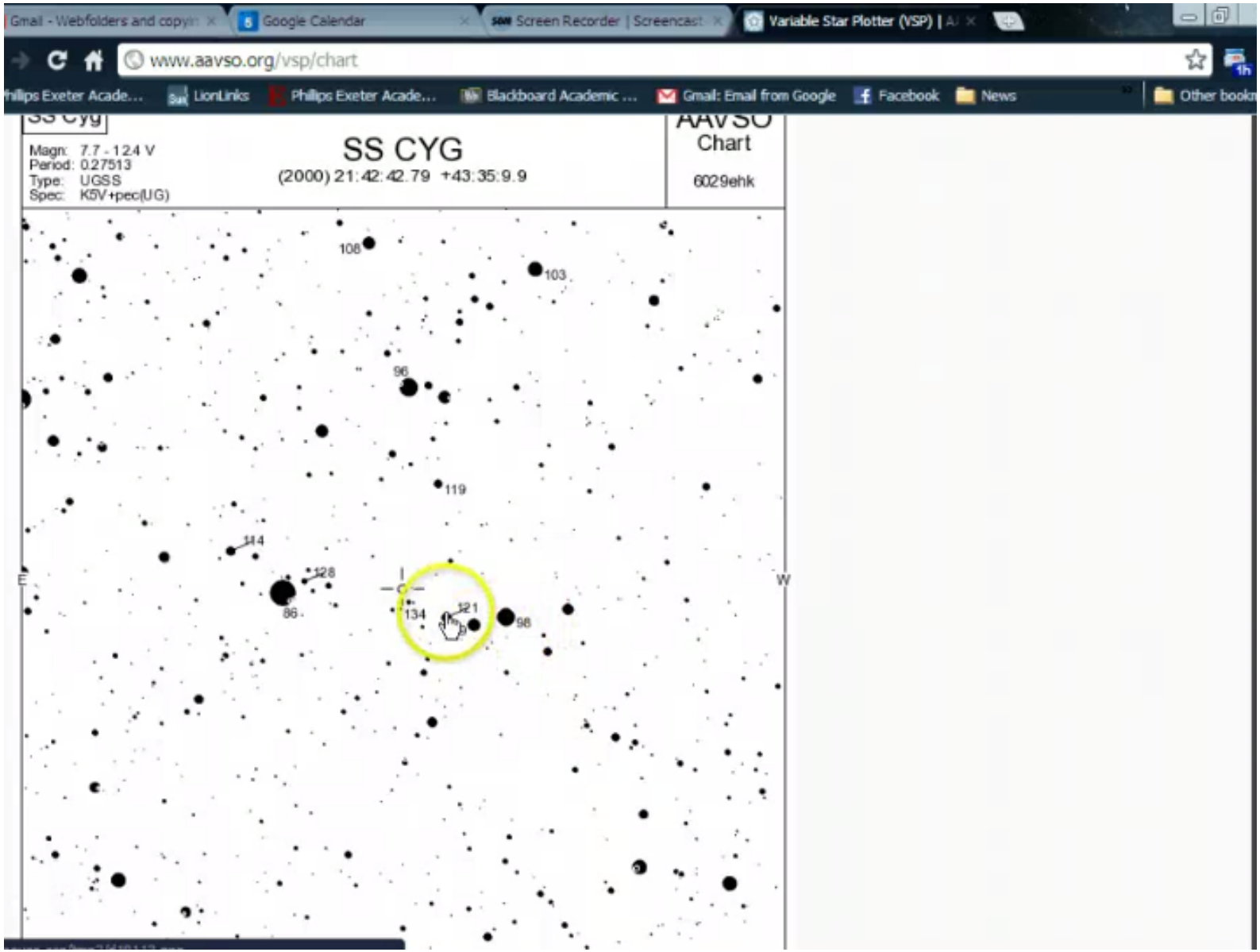



Gmail - Webfolders and copyin
Google Calendar
Screen Recorder | Screencast
AAVSO | American Association
www.aavso.org
Phillips Exeter Acade...
LionLinks
Phillips Exeter Acade...
Blackboard Academic ...
Gmail: Email from Google
Facebook
News
Other bookm
It's the Centennial Trivia Challenge!
Today: Question #91
December
5
Today in AAVSO history...
AAVSO
American Association of Variable Star Observers
100 Years of Citizen Astronomy 1911-2011
Home
Contact Us
FAQ
Centennial Celebration
Donate
Amazon
Our Mission
What We Do
Get Involved
Ready to Join?
General Public
Info for those new to the AAVSO plus materials for educators and students.
Learn more
Observers
Tools and information to support your observing program
Learn More
Researchers
Data access, campaign assistance, and research support
Learn More
Light Curve of the Week
T CAS
What is a light curve?
About this star
Observe this star
More Light Curves
AAVSO Building Dedication
The new HQ was officially dedicated at the 100th annual meeting.
Read more...
Star Finder
ss cyg
Type star name then click action
Plot a light curve
Check recent observations
Create a finder chart
Search VSX
Learn More

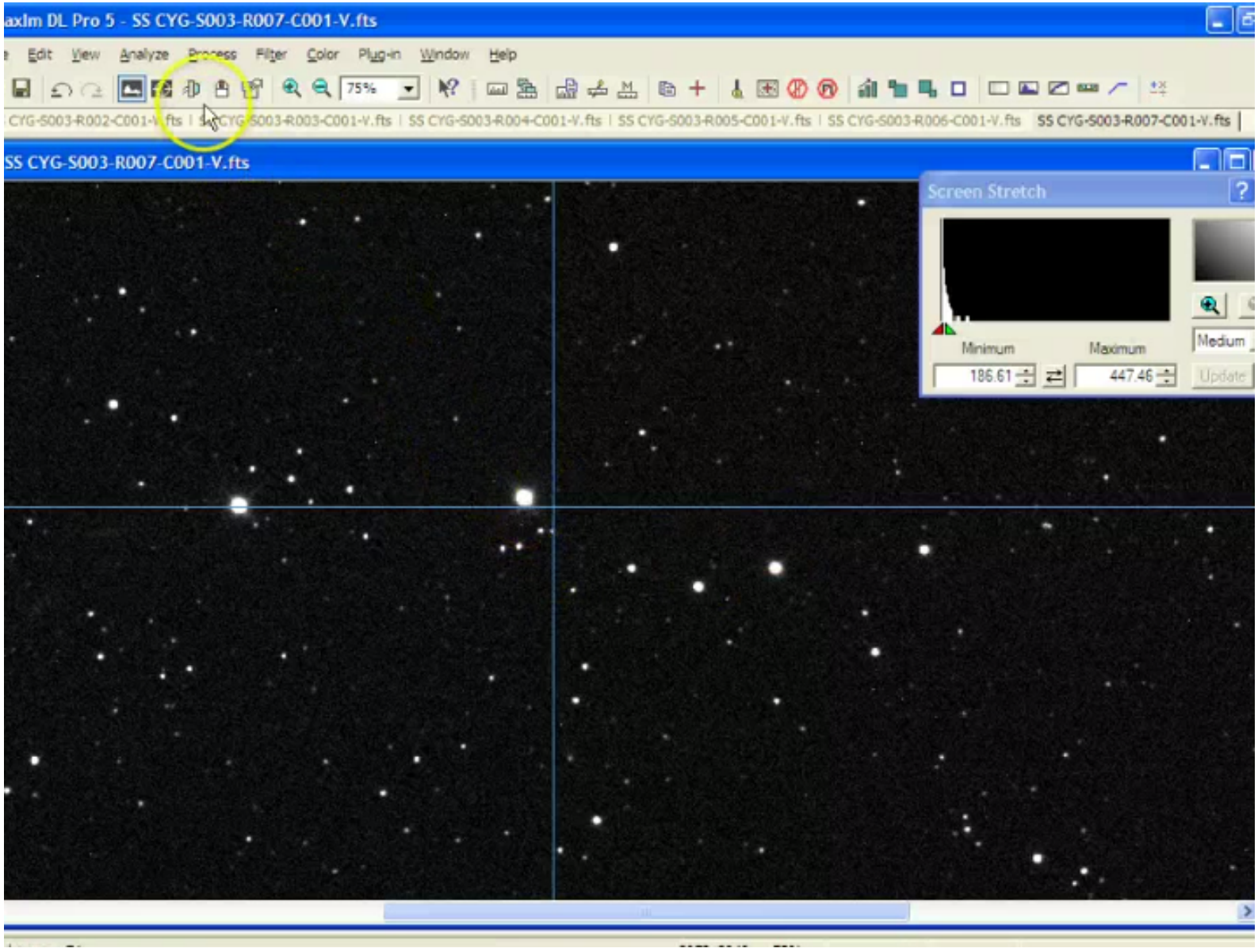
na mapce podane są jasności gwiazd porównania



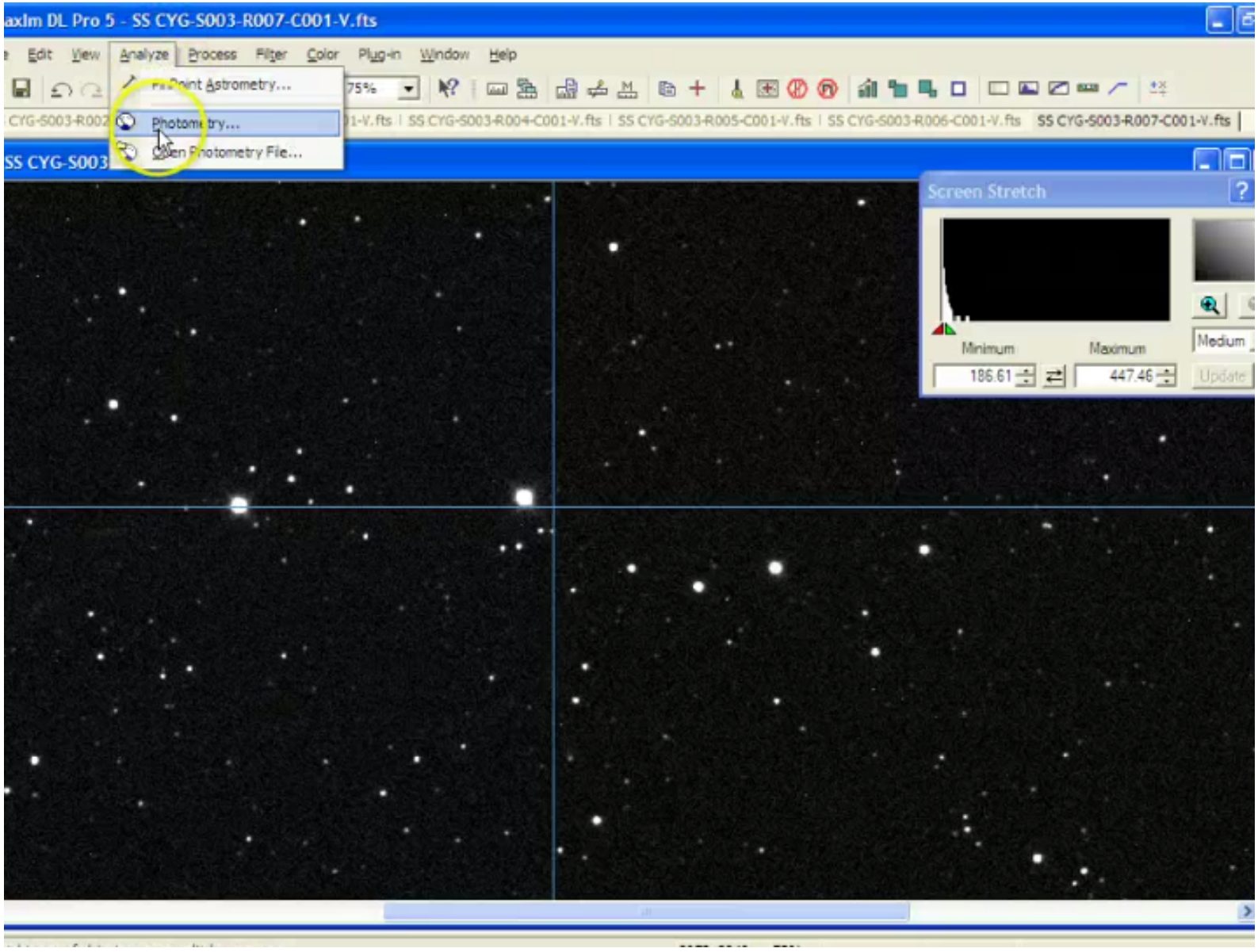
należy ustalić położenie tej samej gwiazdy badanej i gwiazdy porównania na mapce i na naszym zdjęciu

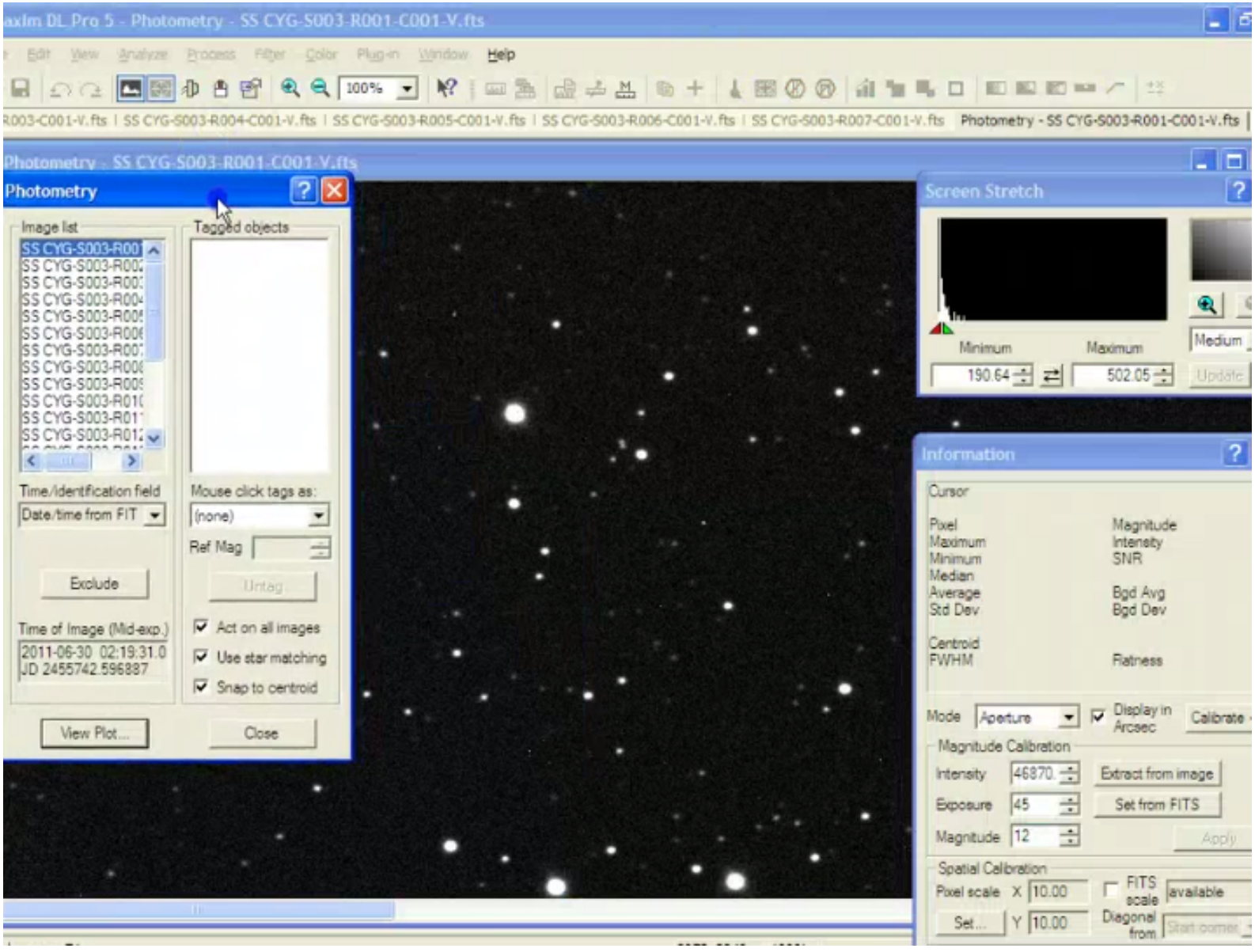


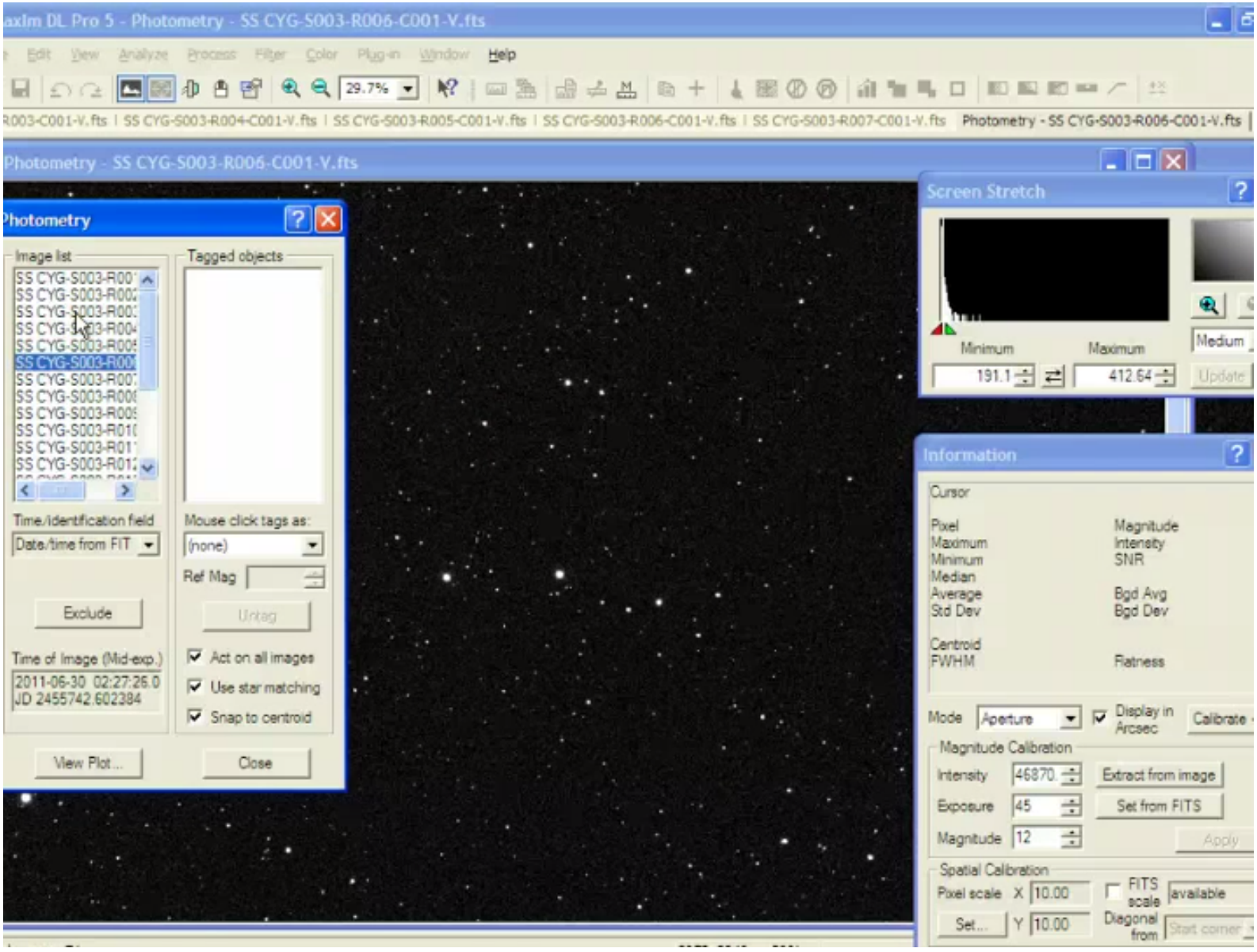
gdy się to udało wybieramy menu Analyse i Photometry

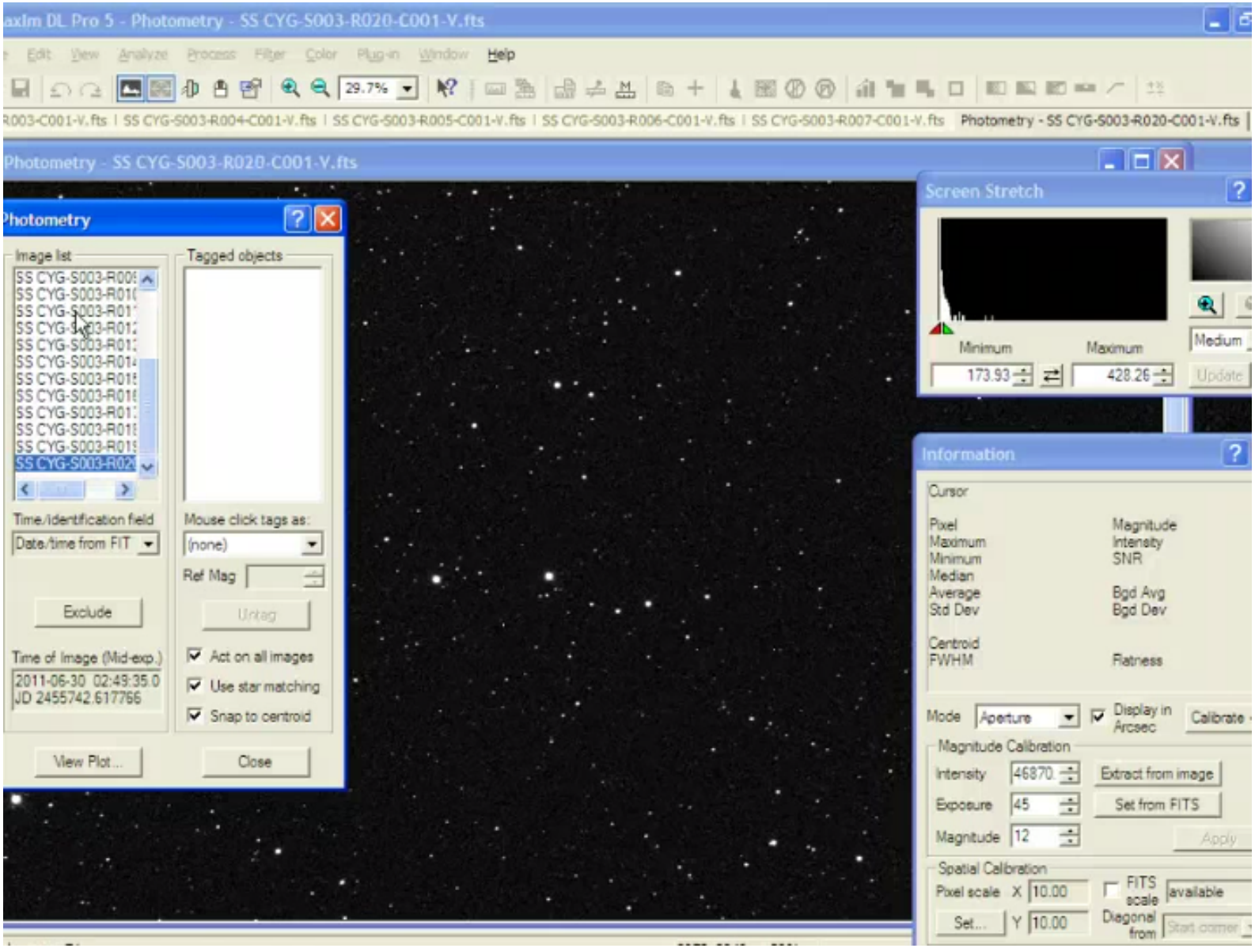


pojawia się okno z wyszczególnionymi nazwami otwartych obrazów

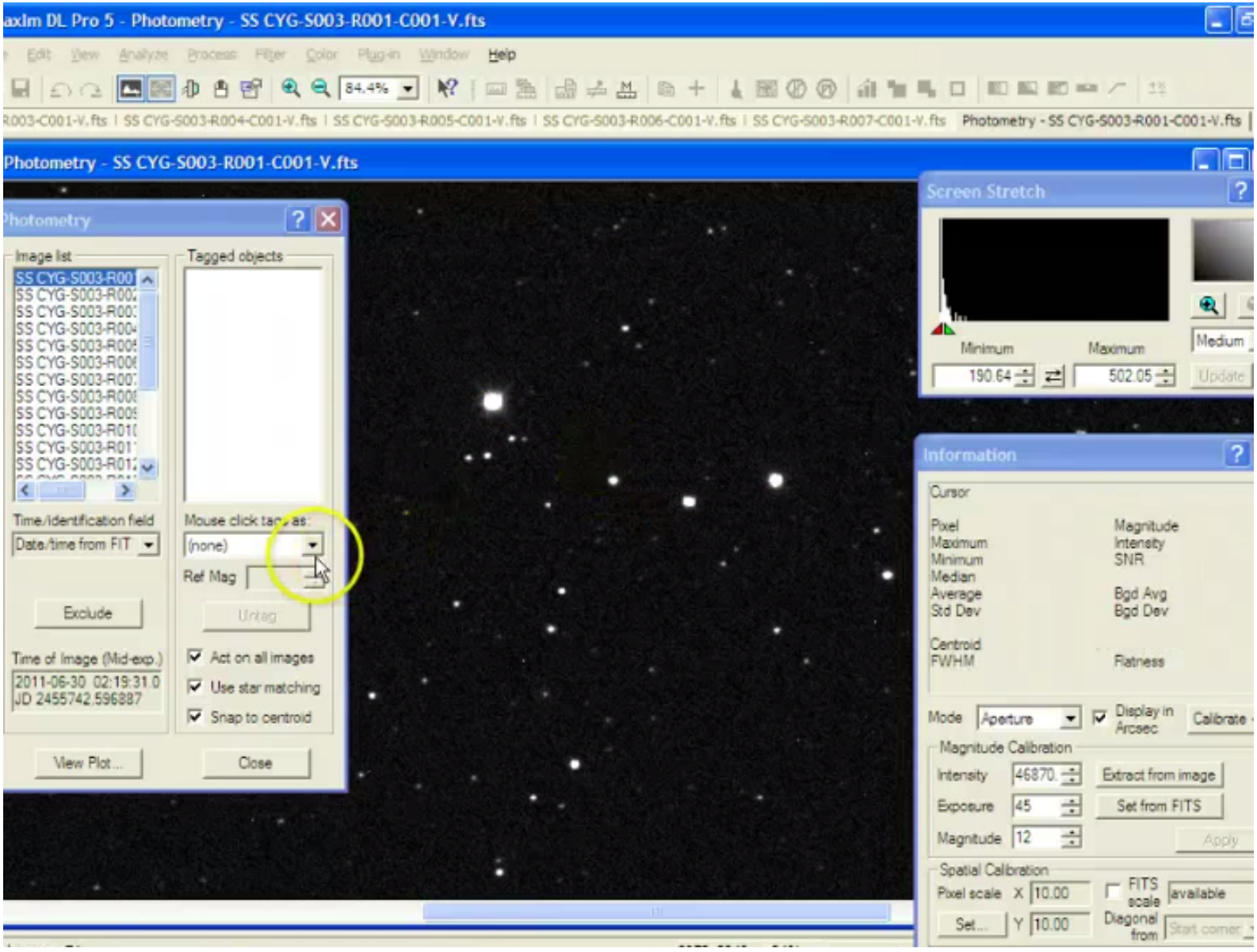



MaxIm DL Pro 5 - Photometry - SS CYG-S003-R001-C001-V.fts
Edit View Analyze Process Filter Color Plug-in Window Help
100%
R003-C001-V.fts | SS CYG-S003-R004-C001-V.fts | SS CYG-S003-R005-C001-V.fts | SS CYG-S003-R006-C001-V.fts | SS CYG-S003-R007-C001-V.fts | Photometry - SS CYG-S003-R001-C001-V.fts
Photometry - SS CYG-S003-R001-C001-V.fts
Photometry
Image list
Tagged objects
SS CYG-S003-R001
SS CYG-S003-R002
SS CYG-S003-R003
SS CYG-S003-R004
SS CYG-S003-R005
SS CYG-S003-R006
SS CYG-S003-R007
SS CYG-S003-R008
SS CYG-S003-R009
SS CYG-S003-R010
SS CYG-S003-R011
SS CYG-S003-R012
Time/identification field
Date/time from FIT
Mouse click tags as:
(none)
Ref Mag
Exclude
Untag
Time of Image (Mid-exp.)
2011-06-30 02:19:31.0
JD 2455742.596887
Act on all images
Use star matching
Snap to centroid
View Plot...
Close
Screen Stretch
Minimum
Maximum
190.64
502.05
Medium
Update
Information
Cursor
Pixel
Maximum
Minimum
Median
Average
Std Dev
Centroid
FWHM
Magnitude
Intensity
SNR
Bgd Avg
Bgd Dev
Flatness
Mode
Aperture
Display in Arcsec
Calibrate
Magnitude Calibration
Intensity
46870
Extract from image
Exposure
45
Set from FITS
Magnitude
12
Apply
Spatial Calibration
Pixel scale X
10.00
FITS scale
available
Set...
Y
10.00
Diagonal from

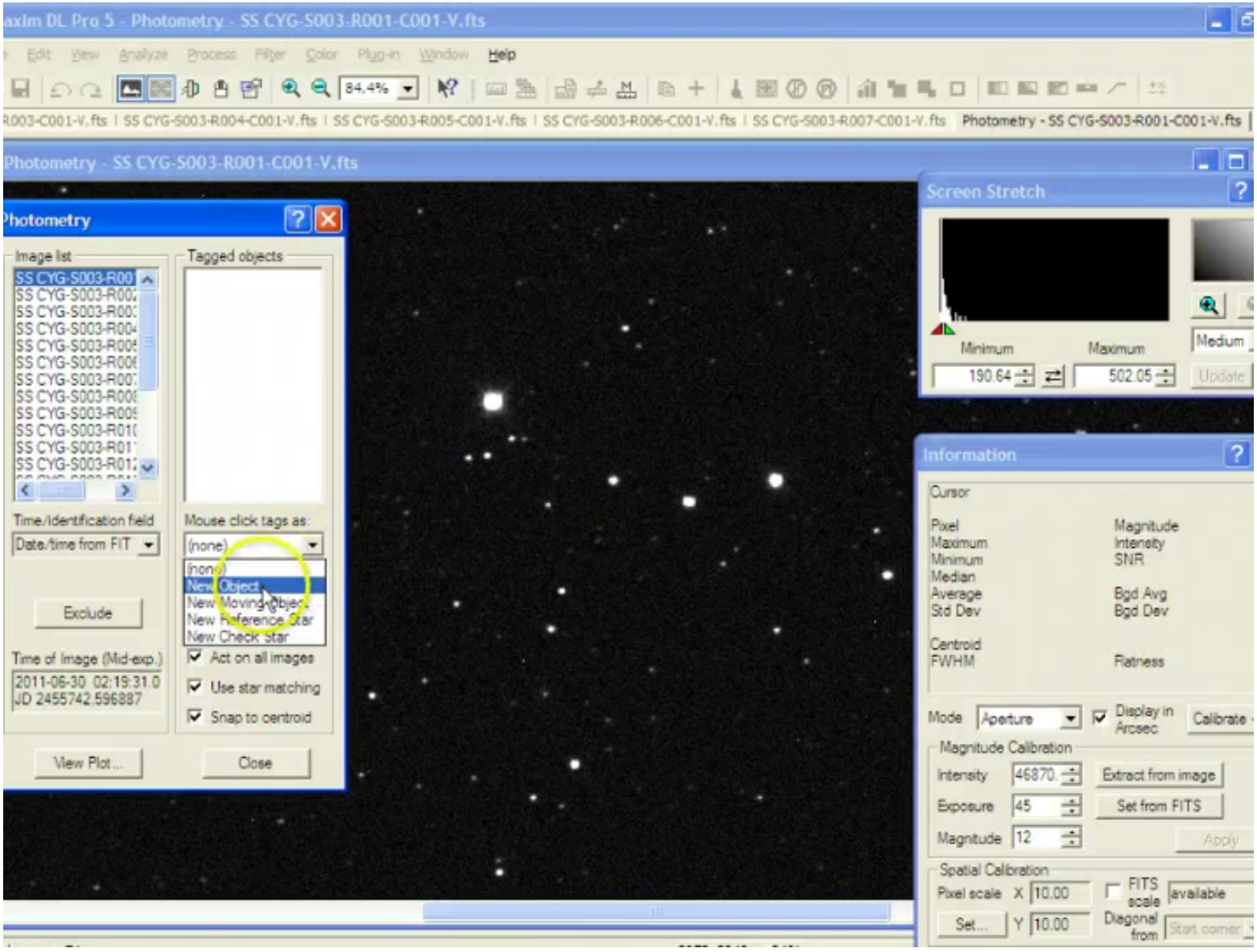

axim DL Pro 5 - Photometry - SS CYG-S003-R006-C001-V.fts
Edit View Analyze Process Filter Color Plug-in Window Help
29.7%
R003-C001-V.fts | SS CYG-S003-R004-C001-V.fts | SS CYG-S003-R005-C001-V.fts | SS CYG-S003-R006-C001-V.fts | SS CYG-S003-R007-C001-V.fts | Photometry - SS CYG-S003-R006-C001-V.fts
Photometry - SS CYG-S003-R006-C001-V.fts
Photometry
Image list
Tagged objects
SS CYG-S003-R001
SS CYG-S003-R002
SS CYG-S003-R003
SS CYG-S003-R004
SS CYG-S003-R005
SS CYG-S003-R006
SS CYG-S003-R007
SS CYG-S003-R008
SS CYG-S003-R009
SS CYG-S003-R010
SS CYG-S003-R011
SS CYG-S003-R012
Time/identification field
Date/time from FIT
Mouse click tags as:
(none)
Ref Mag
Exclude
Untag
Time of Image (Mid-exp.)
2011-06-30 02:27:26.0
JD 2455742.602384
Act on all images
Use star matching
Snap to centroid
View Plot...
Close
Screen Stretch
Minimum
Maximum
191.1
412.64
Medium
Update
Information
Cursor
Pixel
Maximum
Minimum
Median
Average
Std Dev
Centroid
FWHM
Magnitude
Intensity
SNR
Bgd Avg
Bgd Dev
Flatness
Mode
Aperture
Display in Arcsec
Calibrate
Magnitude Calibration
Intensity
46870
Extract from image
Exposure
45
Set from FITS
Magnitude
12
Apply
Spatial Calibration
Pixel scale X
10.00
FITS scale
available
Set...
Y
10.00
Diagonal from
Start corner


MaxIm DL Pro 5 - Photometry - SS CYG-S003-R020-C001-V.fts
Edit View Analyze Process Filter Color Plug-in Window Help
29.7%
R003-C001-V.fts | SS CYG-S003-R004-C001-V.fts | SS CYG-S003-R005-C001-V.fts | SS CYG-S003-R006-C001-V.fts | SS CYG-S003-R007-C001-V.fts | Photometry - SS CYG-S003-R020-C001-V.fts
Photometry - SS CYG-S003-R020-C001-V.fts
Photometry
Image list
SS CYG-S003-R020-C001-V
Tagged objects
Time/identification field
Date/time from FIT
Mouse click tags as:
(none)
Ref Mag
Exclude
Untag
Time of Image (Mid-exp.)
2011-06-30 02:49:35.0
JD 2455742.617766
Act on all images
Use star matching
Snap to centroid
View Plot...
Close
Screen Stretch
Minimum
Maximum
173.93
428.26
Medium
Update
Information
Cursor
Pixel
Maximum
Minimum
Median
Average
Std Dev
Centroid
FWHM
Magnitude
Intensity
SNR
Bgd Avg
Bgd Dev
Flatness
Mode
Aperture
Display in Arcsec
Calibrate
Magnitude Calibration
Intensity
46870.
Extract from image
Exposure
45
Set from FITS
Magnitude
12
Apply
Spatial Calibration
Pixel scale X
10.00
FITS scale
available
Set...
Y
10.00
Diagonal from
Start corner

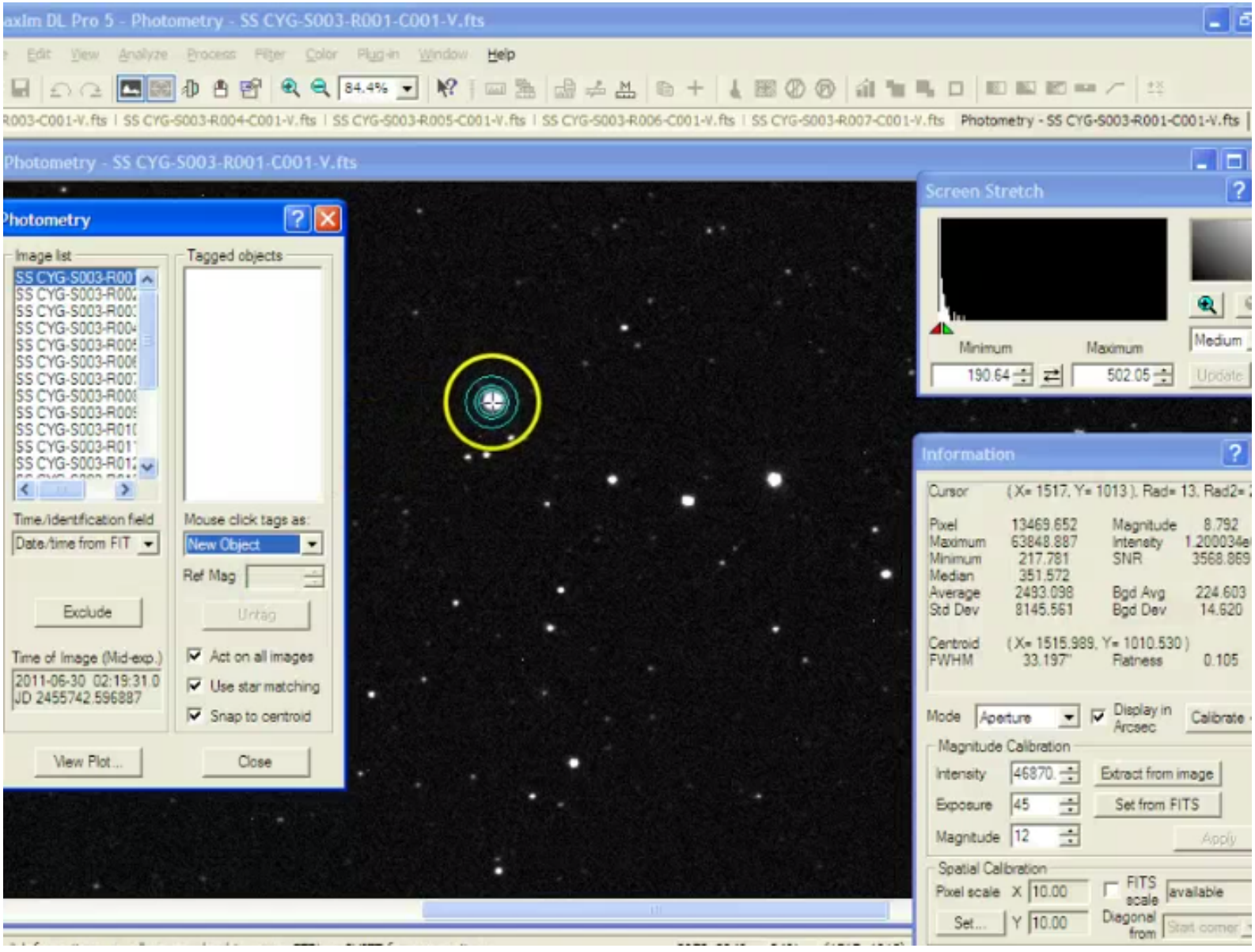
wybieramy gwiazdę badaną klikając na nią myszką po wcześniejszym wybraniu z listy rodzaju gwiazdy



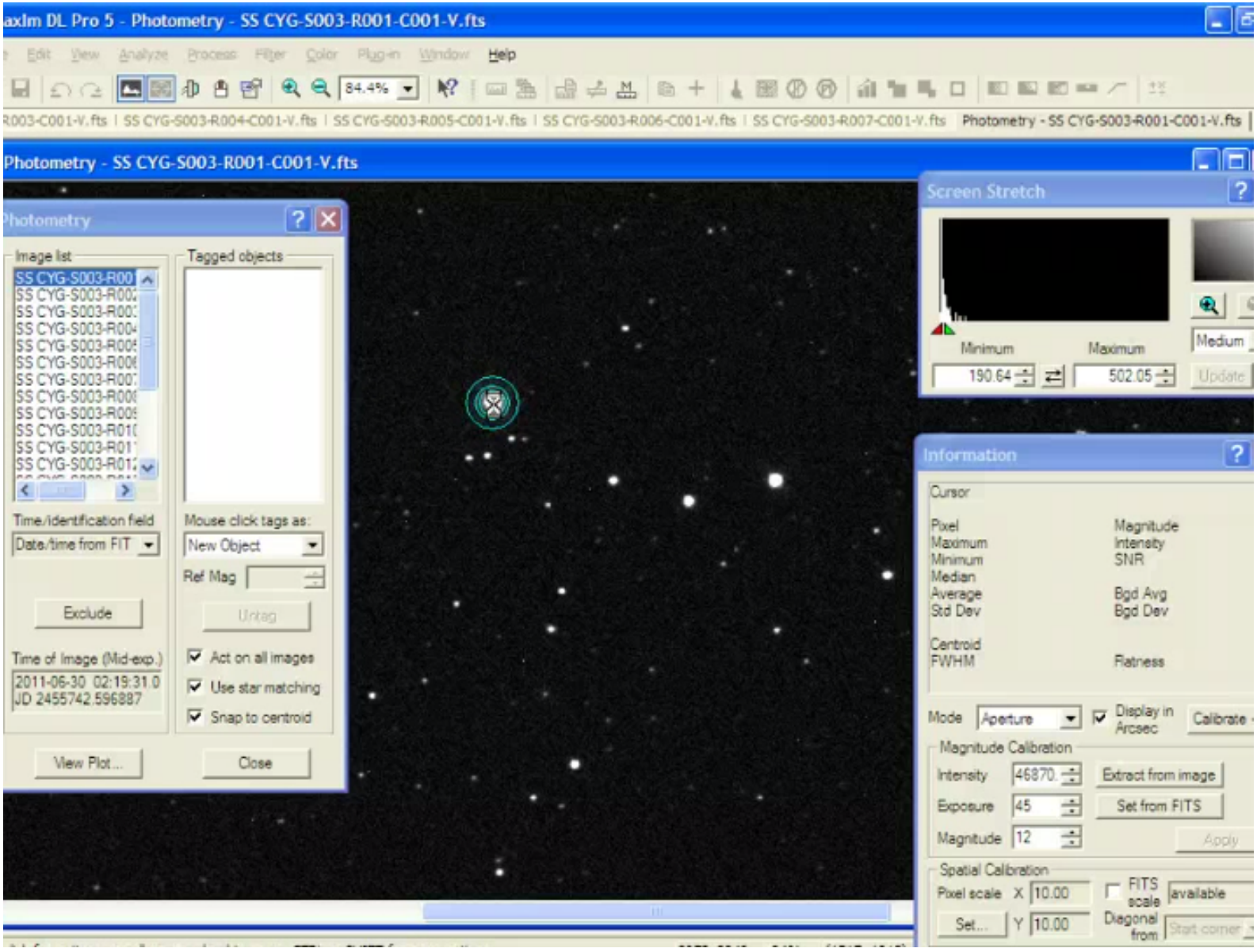
gwiazda badana kryje się pod opcją New Object

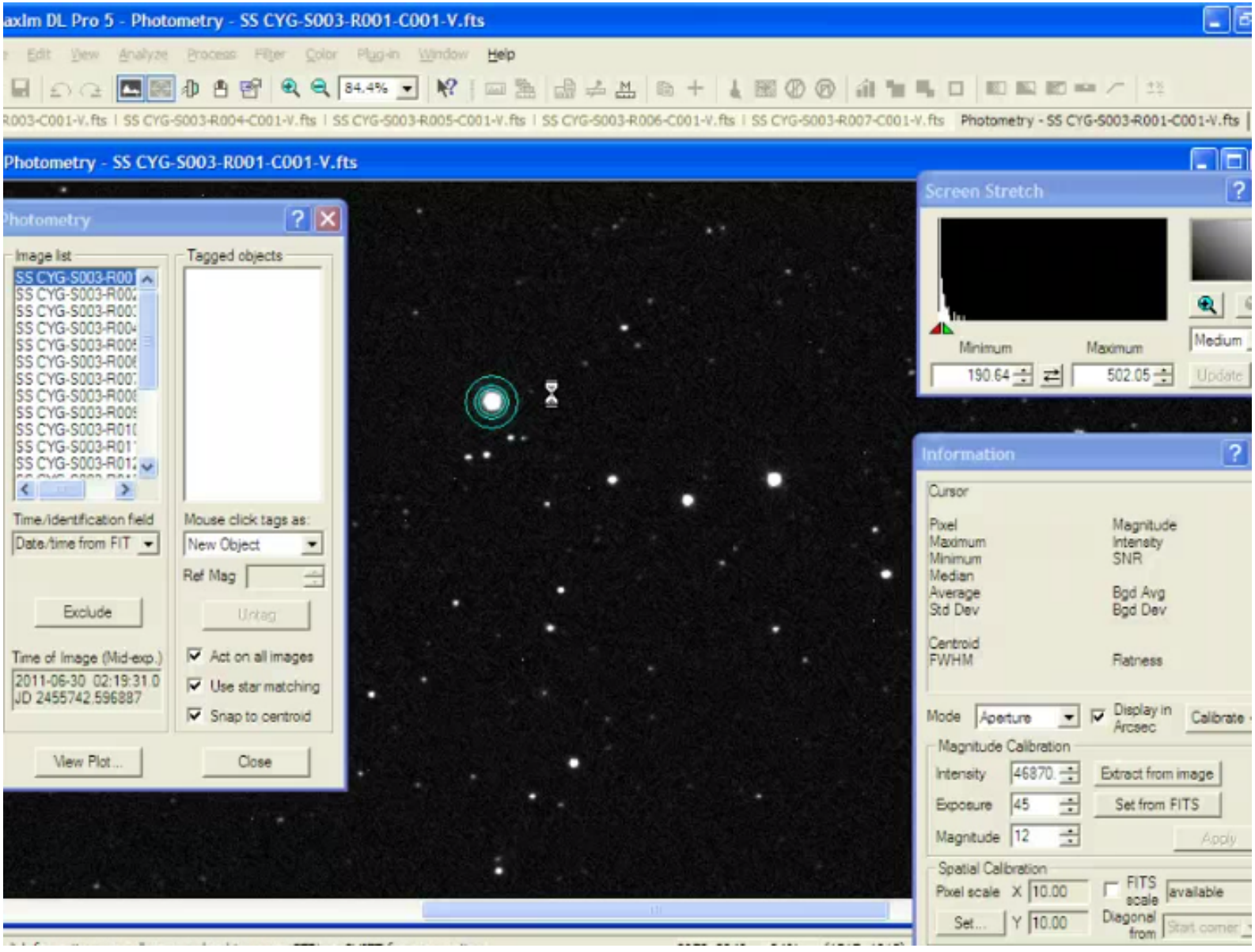


klikamy na zdjęcie w miejsce gwiazdy badanej

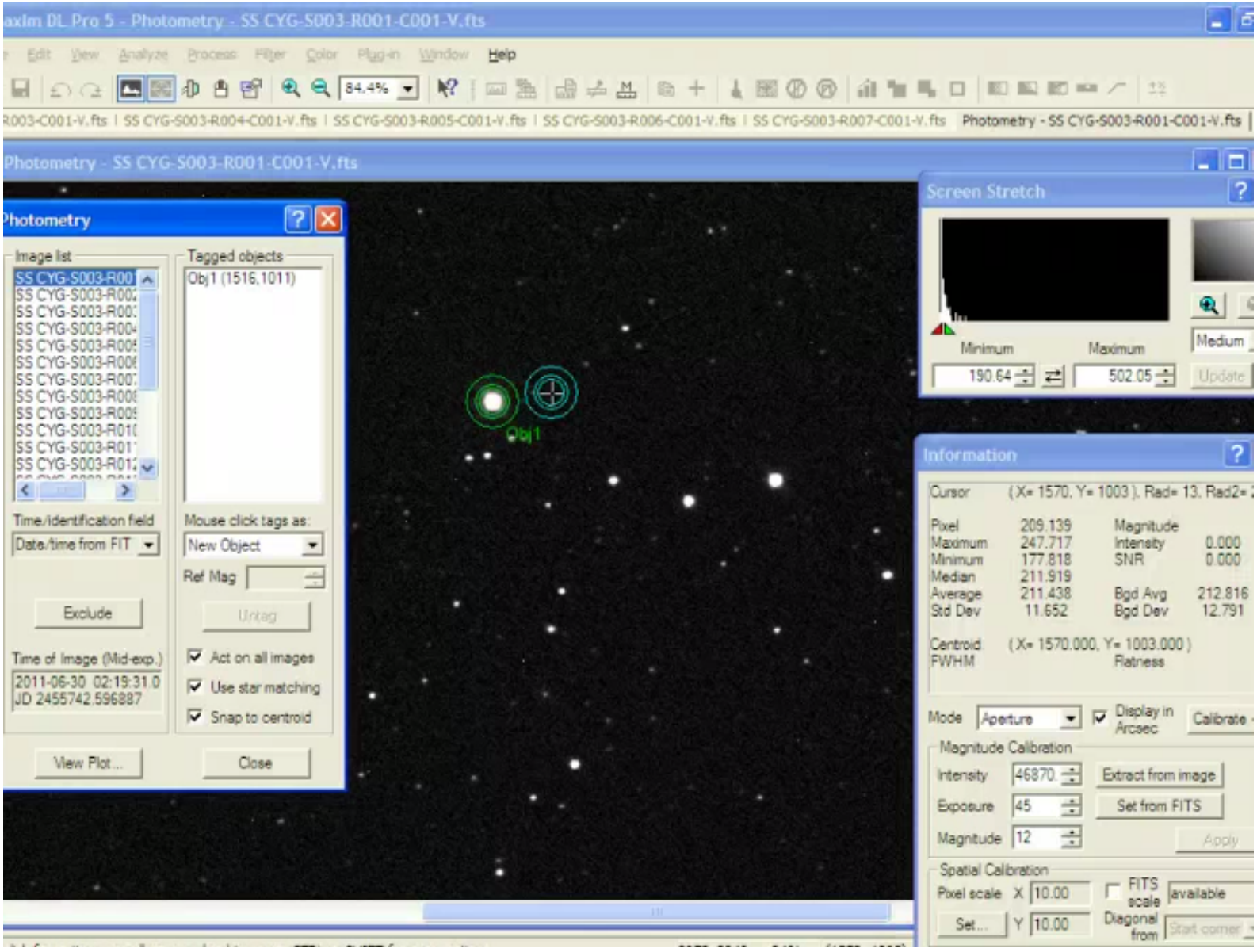


czekamy aż program zakończy identyfikację gwiazdy na pozostałych zdjęciach

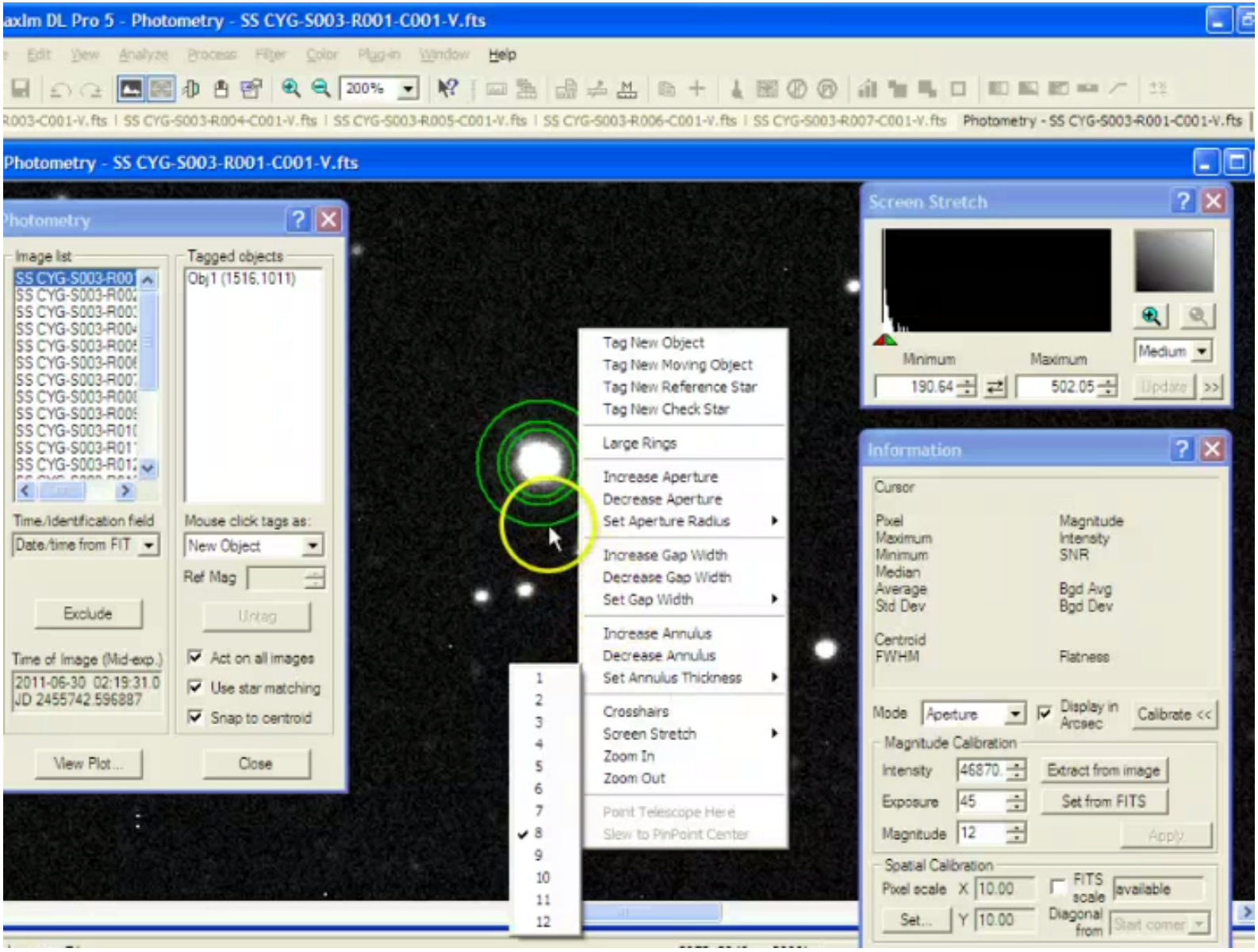


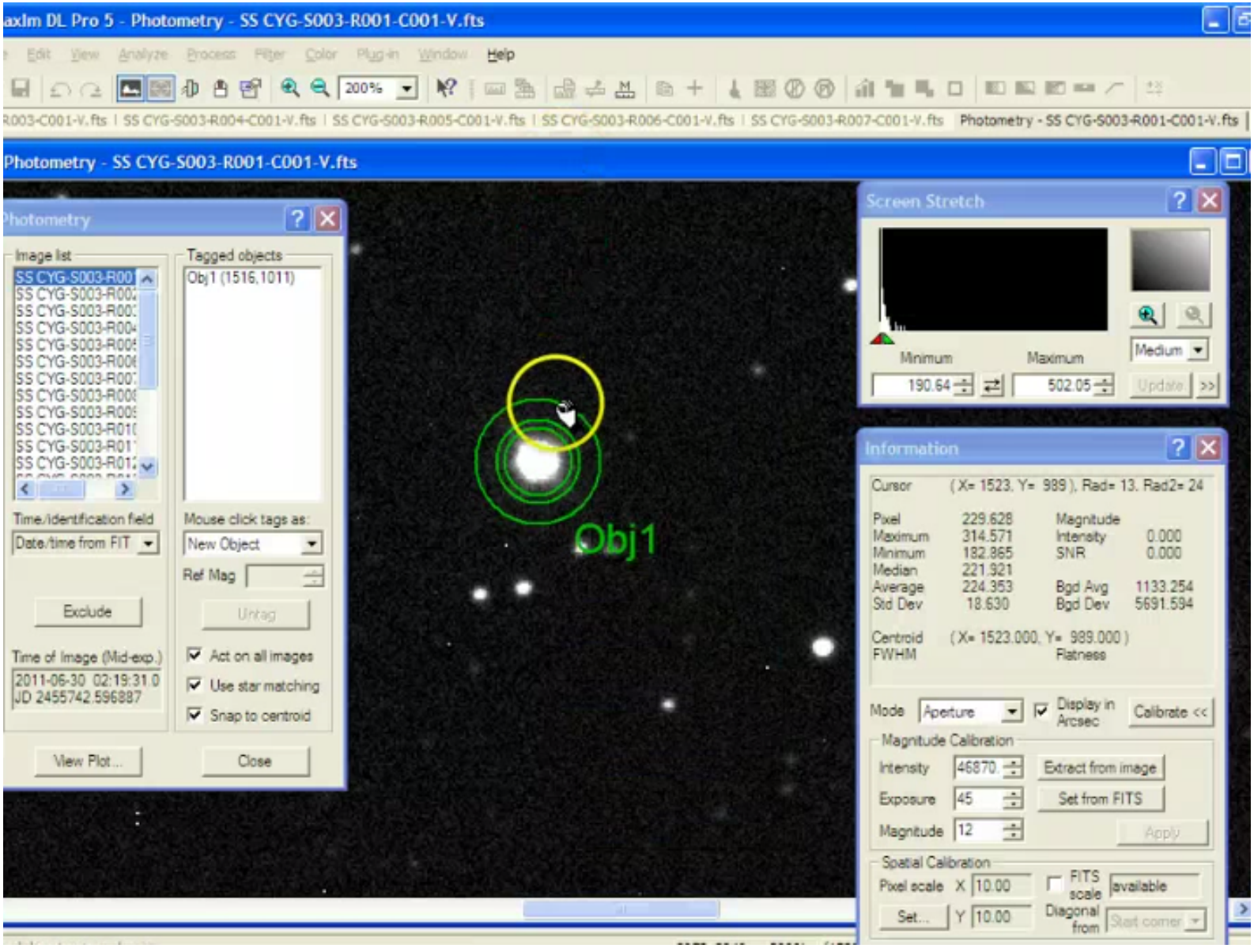

axim DL Pro 5 - Photometry - SS CYG-S003-R001-C001-V.fts
Edit View Analyze Process Filter Color Plug-in Window Help
84.4%
Photometry - SS CYG-S003-R001-C001-V.fts
Photometry
Image list
Tagged objects
Time/identification field
Date/time from FIT
Mouse click tags as:
New Object
Ref Mag
Exclude
Untag
Time of Image (Mid-exp.)
2011-06-30 02:19:31.0
JD 2455742.596887
Act on all images
Use star matching
Snap to centroid
View Plot...
Close
Screen Stretch
Minimum
Maximum
190.64
502.05
Medium
Update
Information
Cursor
Pixel
Maximum
Minimum
Median
Average
Std Dev
Centroid
FWHM
Magnitude
Intensity
SNR
Bgd Avg
Bgd Dev
Flatness
Mode
Aperture
Display in Arcsec
Calibrate
Magnitude Calibration
Intensity
46870
Extract from image
Exposure
45
Set from FITS
Magnitude
12
Apply
Spatial Calibration
Pixel scale X
10.00
FITS scale
available
Set...
Y
10.00
Diagonal from

po zakończeniu identyfikacji pojawiają się zielone okręgi symbolizujące rozmiar pierścieni do mierzenia zliczeń

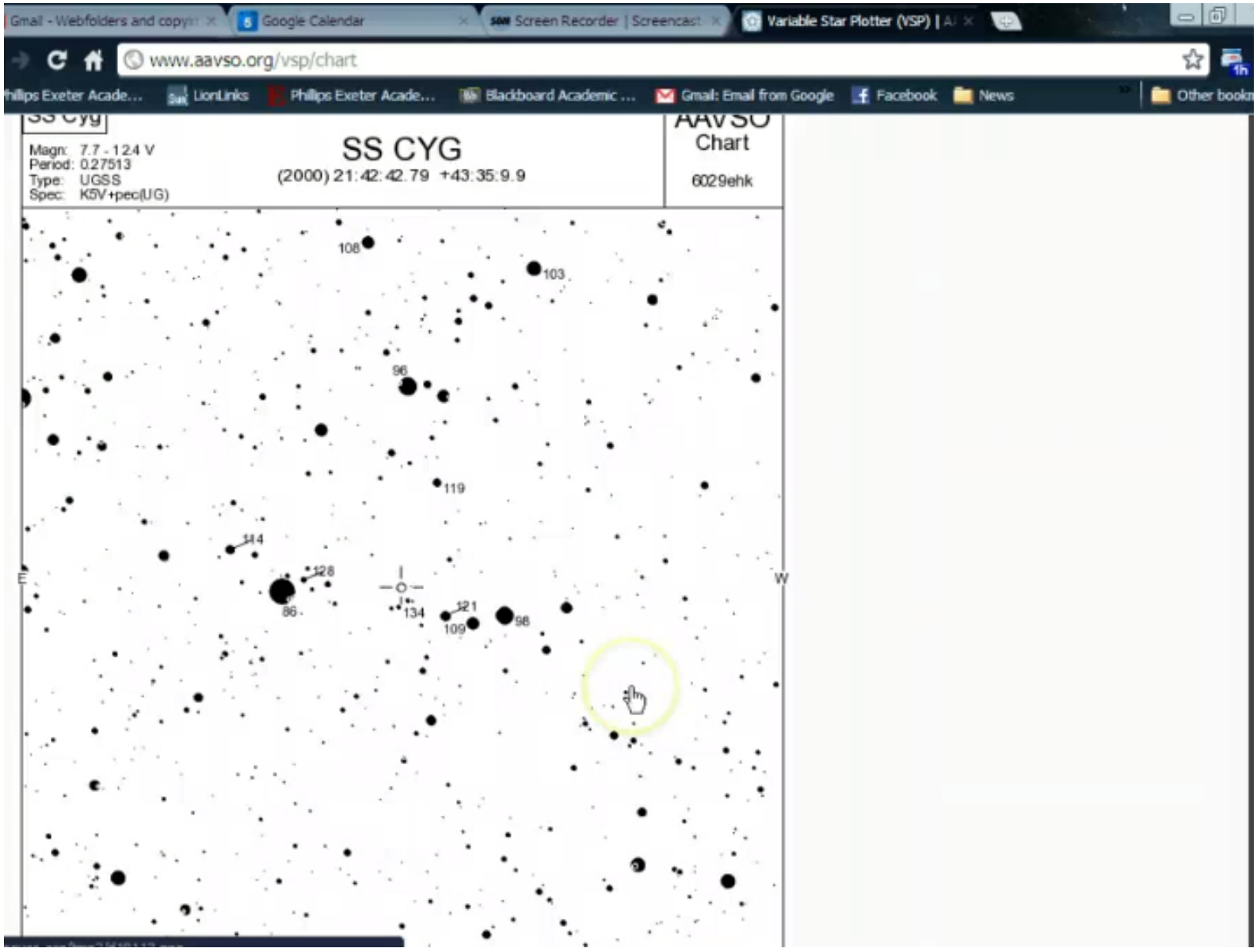


rozmiary pierścienia można zmieniać samodzielnie

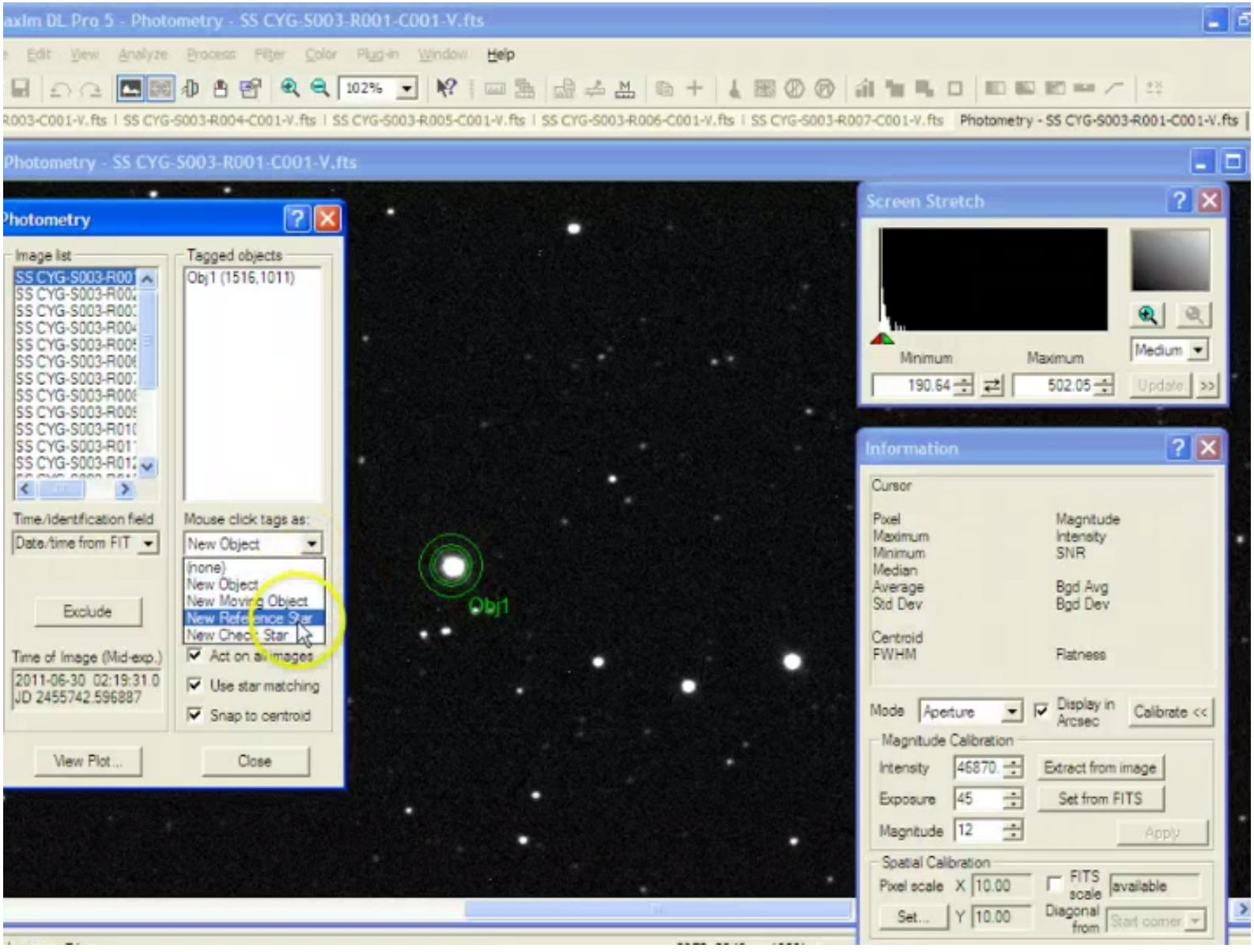



axIm DL Pro 5 - Photometry - SS CYG-S003-R001-C001-V.fts
Edit View Analyze Process Filter Color Plug-in Window Help
200%
R003-C001-V.fts | SS CYG-S003-R004-C001-V.fts | SS CYG-S003-R005-C001-V.fts | SS CYG-S003-R006-C001-V.fts | SS CYG-S003-R007-C001-V.fts | Photometry - SS CYG-S003-R001-C001-V.fts
Photometry - SS CYG-S003-R001-C001-V.fts
Photometry
Image list
SS CYG-S003-R00
Tagged objects
Obj1 (1516,1011)
Time/identification field
Date/time from FIT
Mouse click tags as:
New Object
Ref Mag
Exclude
Untag
Time of Image (Mid-exp.)
2011-06-30 02:19:31.0
JD 2455742.596887
Act on all images
Use star matching
Snap to centroid
View Plot...
Close
Obj1
Screen Stretch
Minimum
Maximum
190.64
502.05
Medium
Update
>>
Information
Cursor (X= 1523, Y= 989), Rad= 13, Rad2= 24
Pixel 229.628
Maximum 314.571
Minimum 182.865
Median 221.921
Average 224.353
Std Dev 18.630
Magnitude
Intensity 0.000
SNR 0.000
Bgd Avg 1133.254
Bgd Dev 5691.594
Centroid (X= 1523.000, Y= 989.000)
FWHM
Flatness
Mode Aperture
Display in Arcsec
Calibrate <<
Magnitude Calibration
Intensity 46870
Exposure 45
Magnitude 12
Extract from image
Set from FITS
Apply
Spatial Calibration
Pixel scale X 10.00
Y 10.00
FITS scale
available
Set...
Diagonal from
Start corner

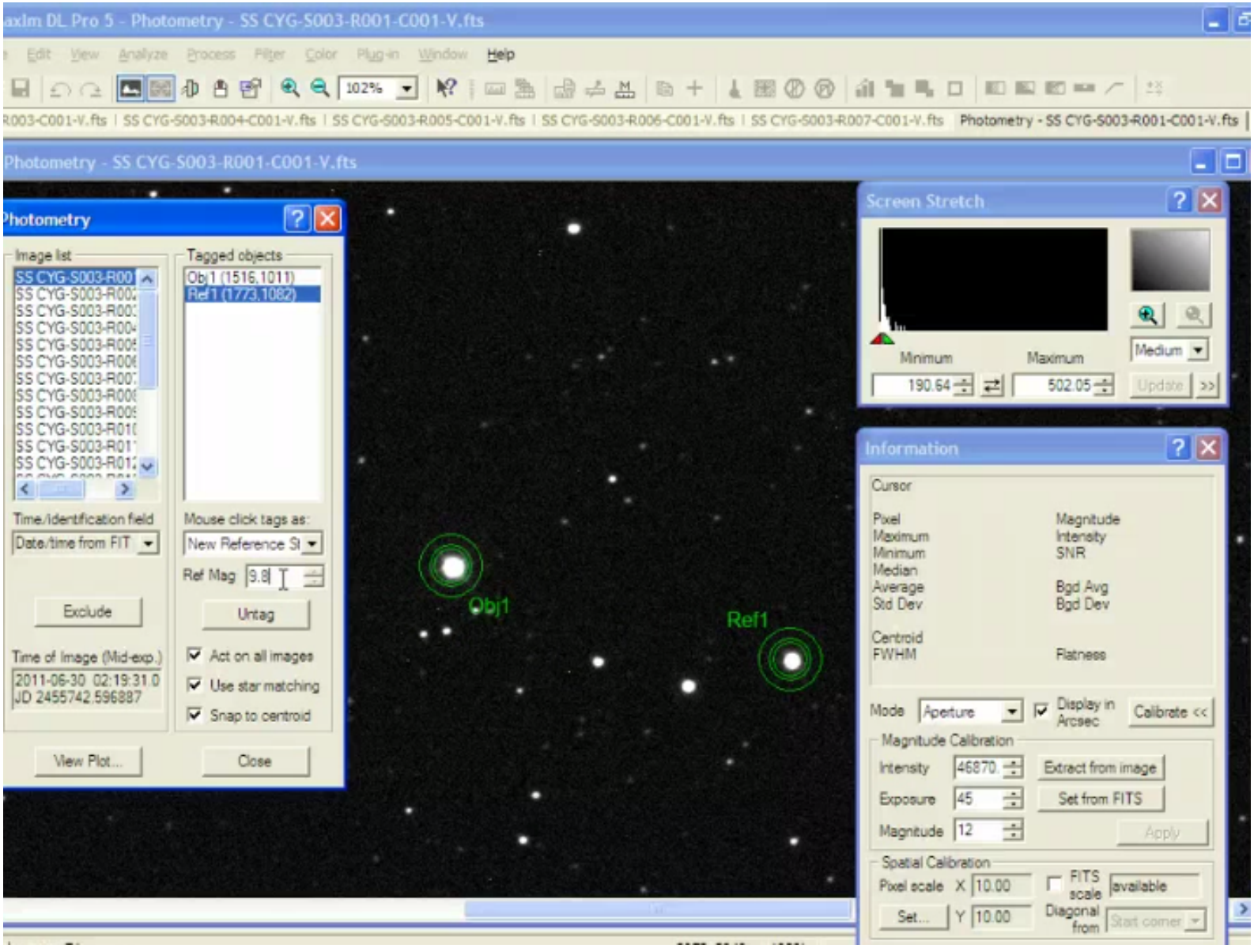
sprawdzamy gwiazdę porównania odczytując jej jasność z mapki



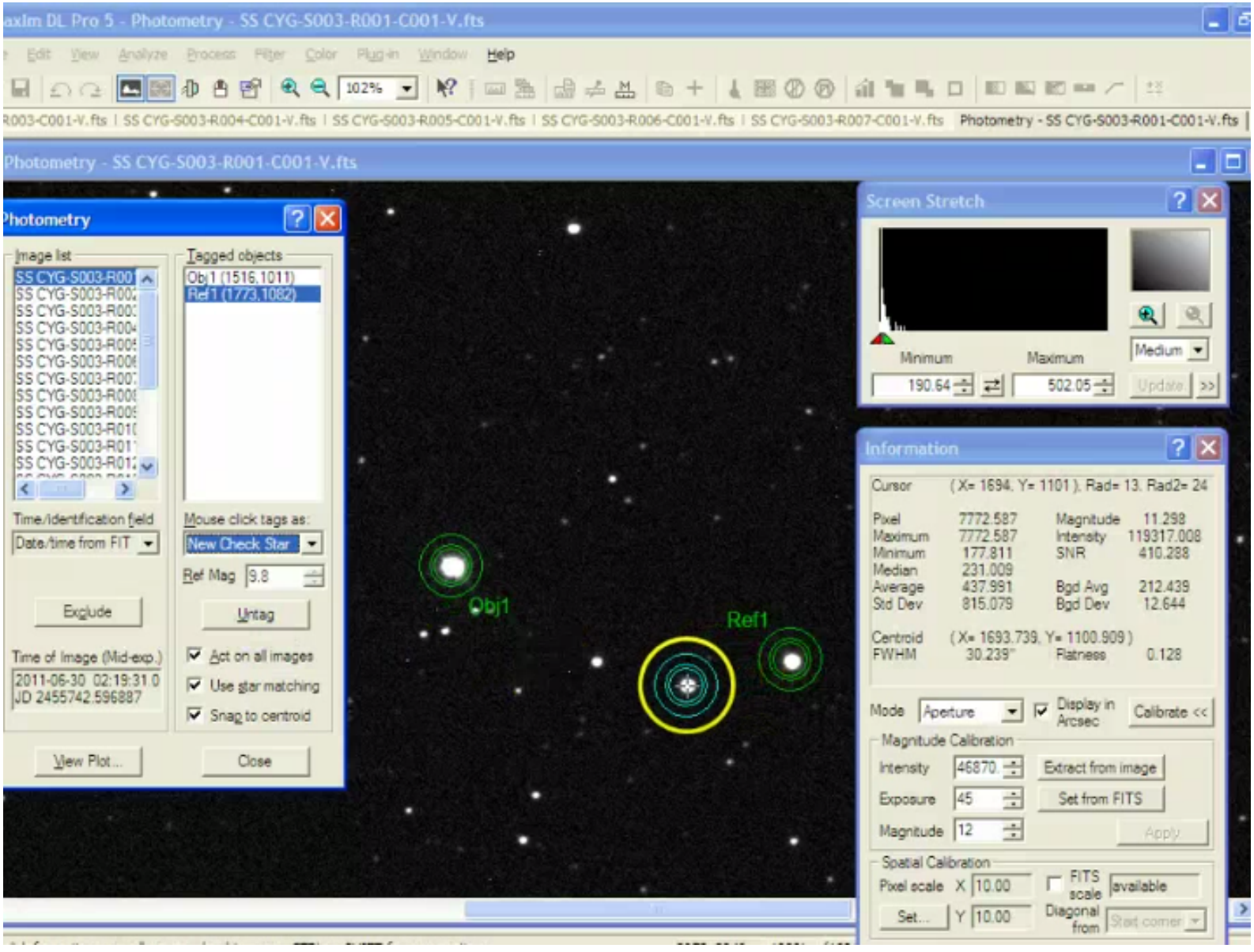
wybieramy New Reference Object z rozwijanej listy

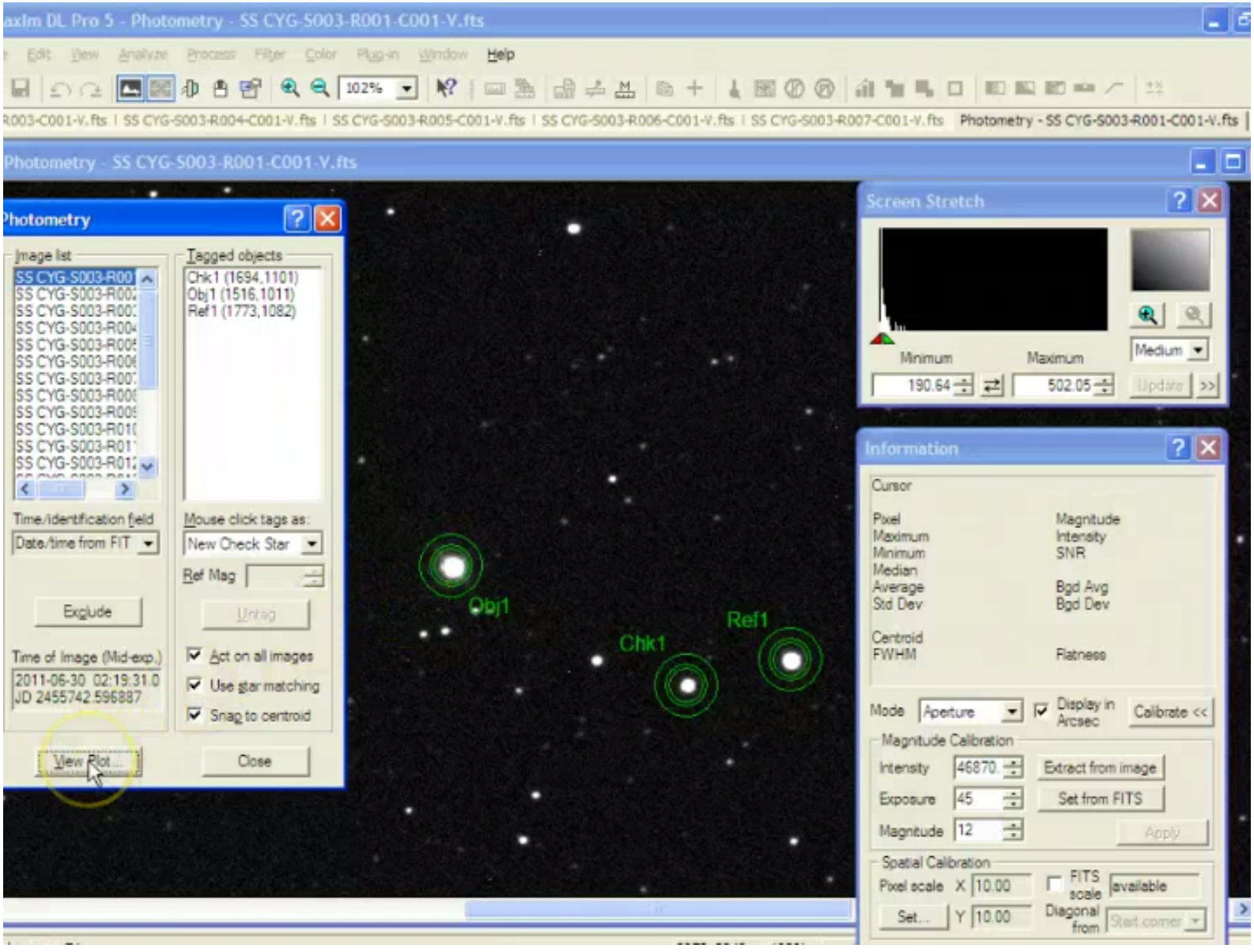


i klikamy na gwiazdę porównania, uzupełniając wartość jej jasności

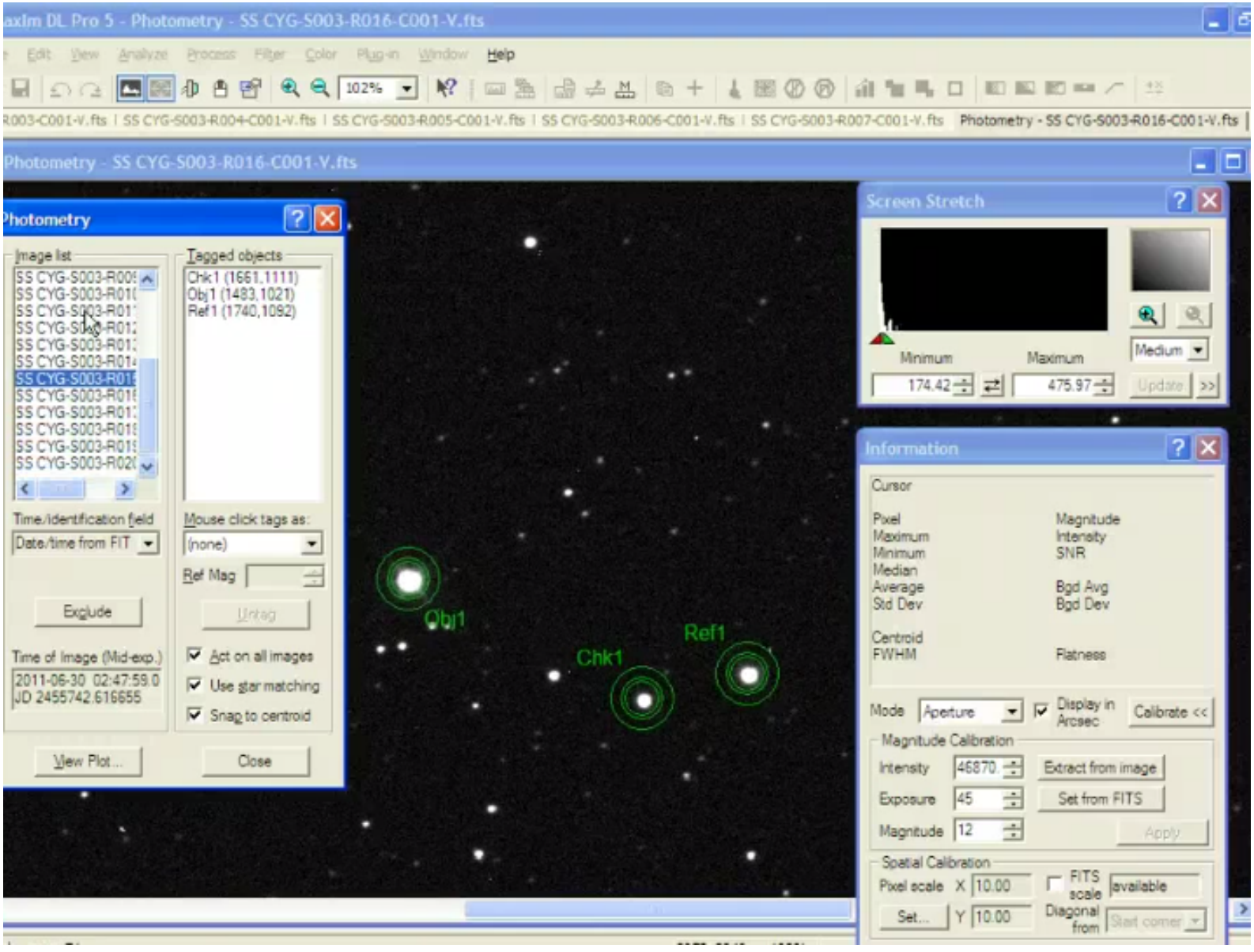


wybieramy New Check Star i wyszukujemy gwiazdy kontrolnej

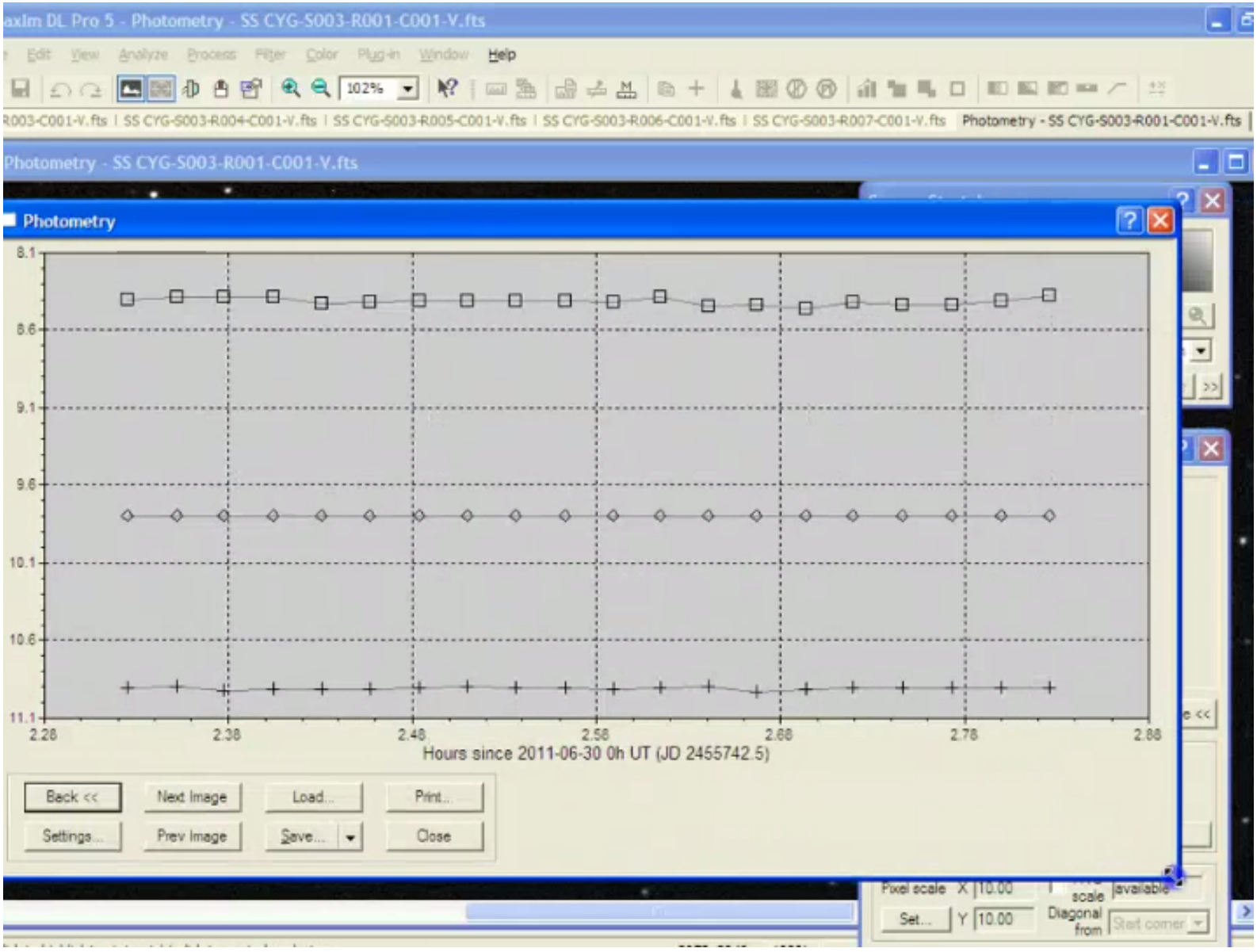



MaxIm DL Pro 5 - Photometry - SS CYG-S003-R001-C001-V.fts
Edit View Analyze Process Filter Color Plug-in Window Help
102%
SS CYG-S003-R004-C001-V.fts | SS CYG-S003-R005-C001-V.fts | SS CYG-S003-R006-C001-V.fts | SS CYG-S003-R007-C001-V.fts | Photometry - SS CYG-S003-R001-C001-V.fts
Photometry - SS CYG-S003-R001-C001-V.fts
Photometry
Image list
SS CYG-S003-R00
Tagged objects
Chk1 (1694,1101)
Obj1 (1516,1011)
Ref1 (1773,1082)
Time/identification field
Date/time from FIT
Mouse click tags as:
New Check Star
Ref Mag
Exclude
Untag
Time of Image (Mid-exp.)
2011-06-30 02:19:31.0
JD 2455742.596887
Act on all images
Use star matching
Snap to centroid
View Plot...
Close
Obj1
Chk1
Ref1
Screen Stretch
Minimum
Maximum
190.64
502.05
Medium
Update
Information
Cursor
Pixel
Maximum
Minimum
Median
Average
Std Dev
Centroid
FWHM
Magnitude
Intensity
SNR
Bgd Avg
Bgd Dev
Flatness
Mode
Aperture
Display in Arcsec
Calibrate <<
Magnitude Calibration
Intensity
46870
Extract from image
Exposure
45
Set from FITS
Magnitude
12
Apply
Spatial Calibration
Pixel scale X
10.00
FITS scale
available
Set...
Y
10.00
Diagonal from
Start corner

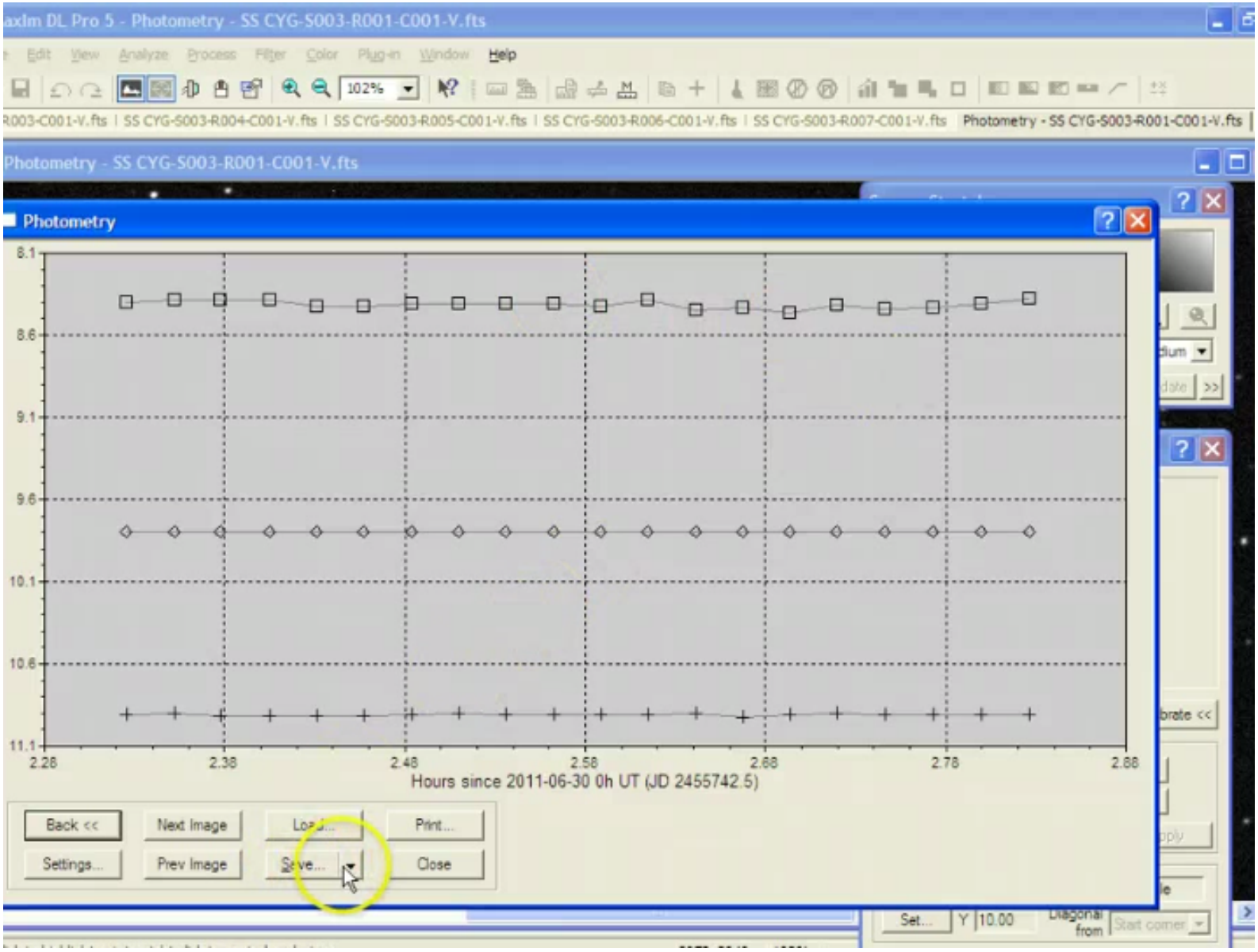
wszystkie gwiazdy powinny mieć podobną jasność

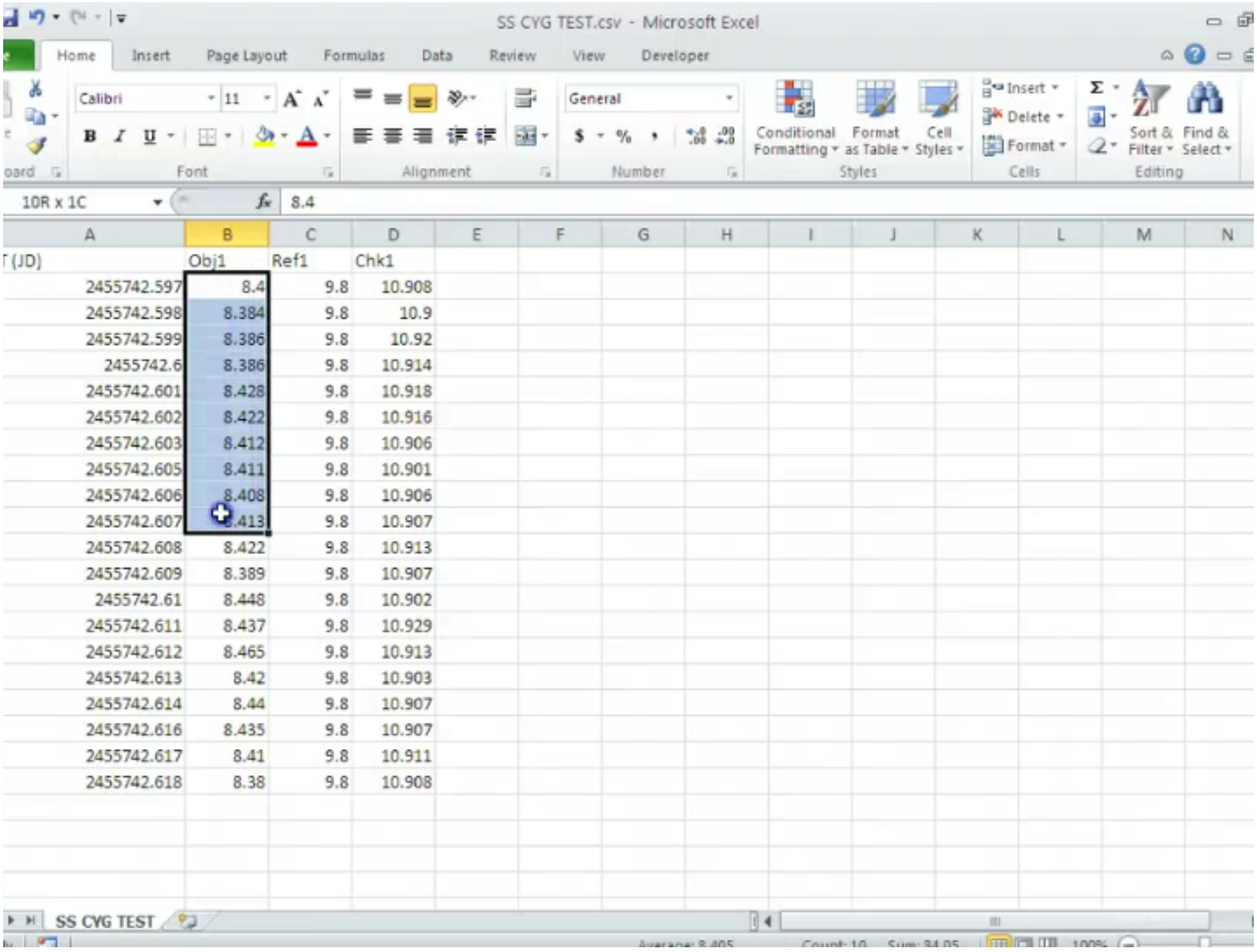


klikamy na View Plot aby obejrzeć krzywą blasku



wyniki pomiaru jasności można zapisać do pliku tekstowego

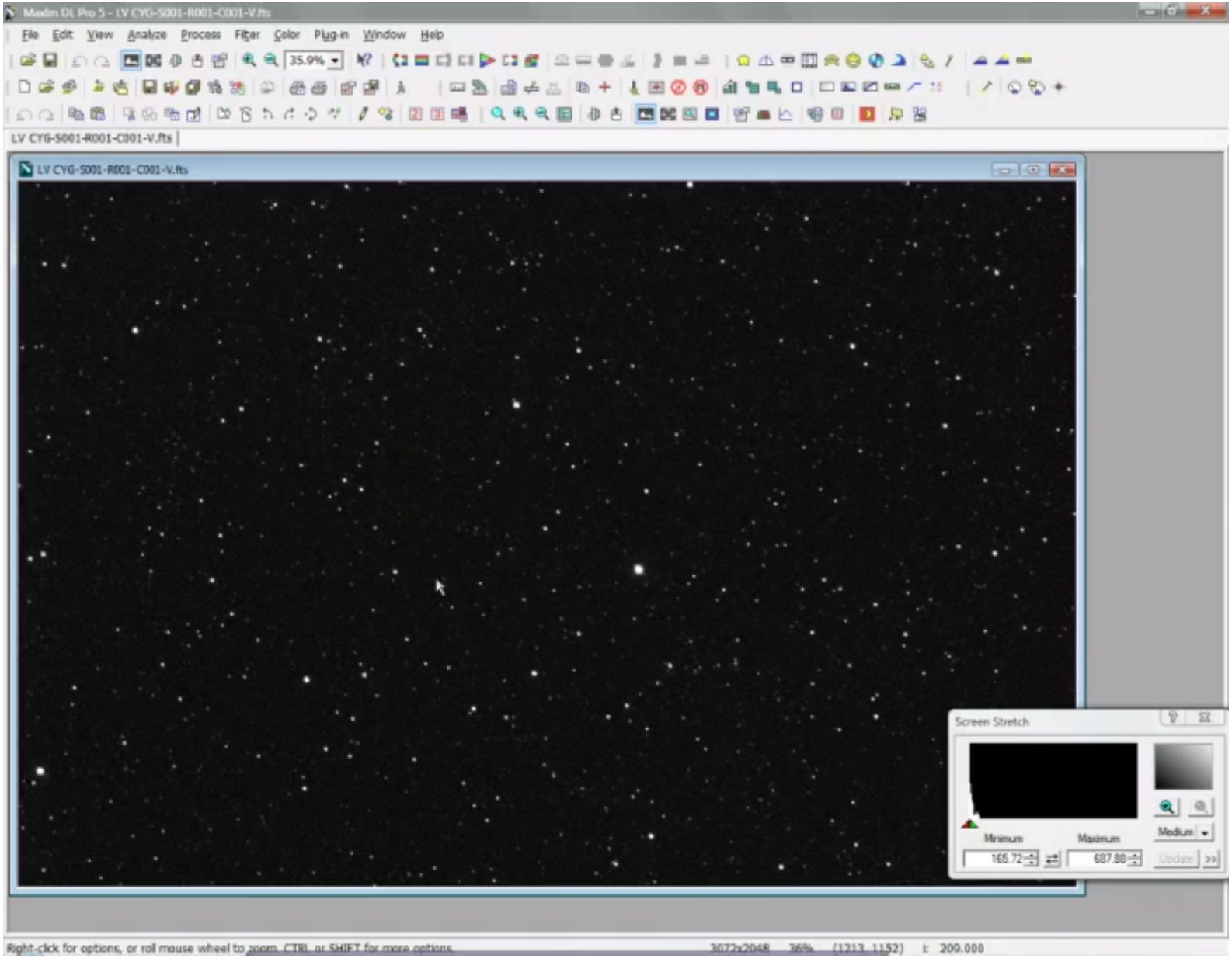




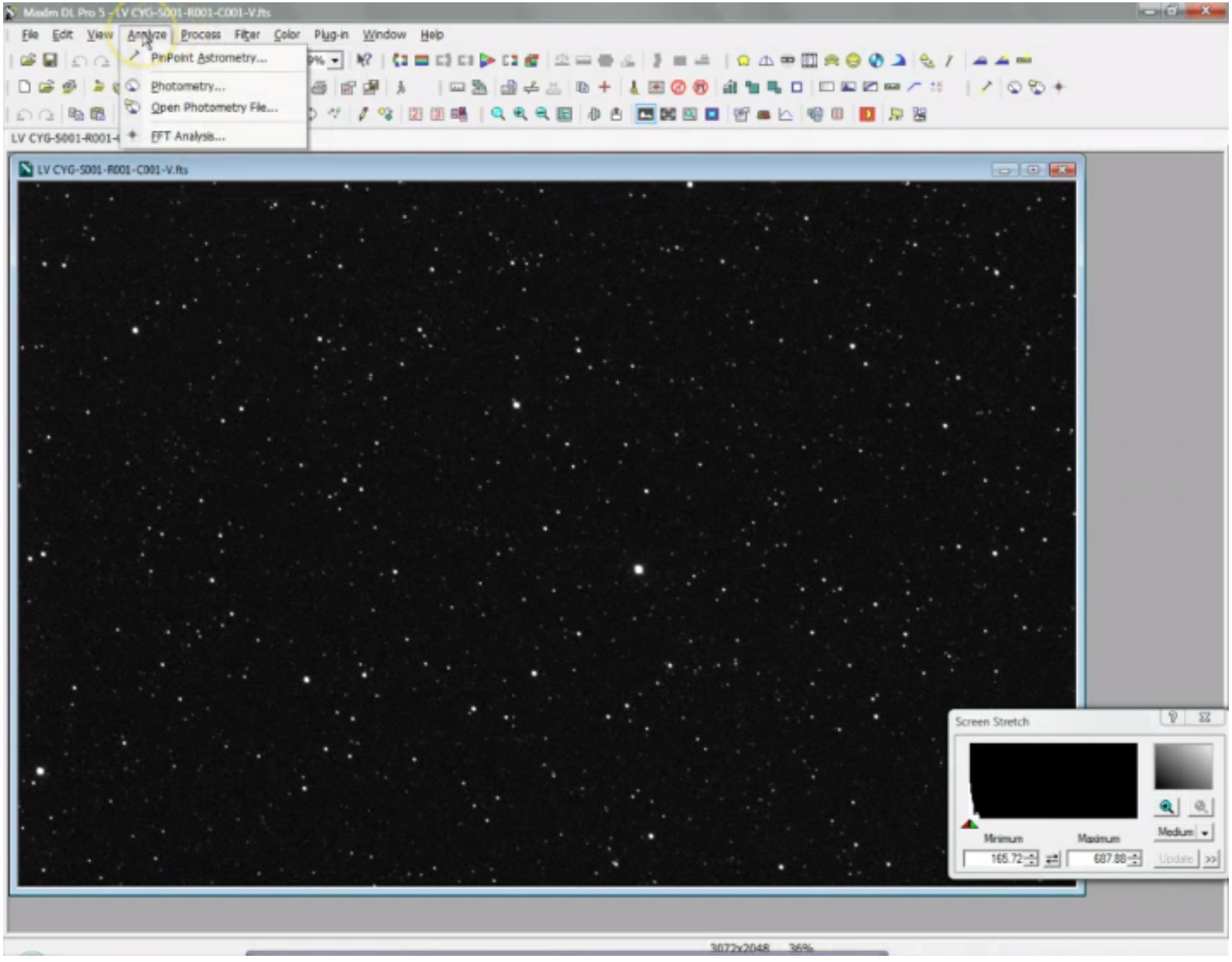
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
	T (JD)	Obj1	Ref1	Chk1										
	2455742.597	8.4	9.8	10.908										
	2455742.598	8.384	9.8	10.9										
	2455742.599	8.386	9.8	10.92										
	2455742.6	8.386	9.8	10.914										
	2455742.601	8.428	9.8	10.918										
	2455742.602	8.422	9.8	10.916										
	2455742.603	8.412	9.8	10.906										
	2455742.605	8.411	9.8	10.901										
	2455742.606	8.408	9.8	10.906										
	2455742.607	8.413	9.8	10.907										
	2455742.608	8.422	9.8	10.913										
	2455742.609	8.389	9.8	10.907										
	2455742.61	8.448	9.8	10.902										
	2455742.611	8.437	9.8	10.929										
	2455742.612	8.465	9.8	10.913										
	2455742.613	8.42	9.8	10.903										
	2455742.614	8.44	9.8	10.907										
	2455742.616	8.435	9.8	10.907										
	2455742.617	8.41	9.8	10.911										
	2455742.618	8.38	9.8	10.908										

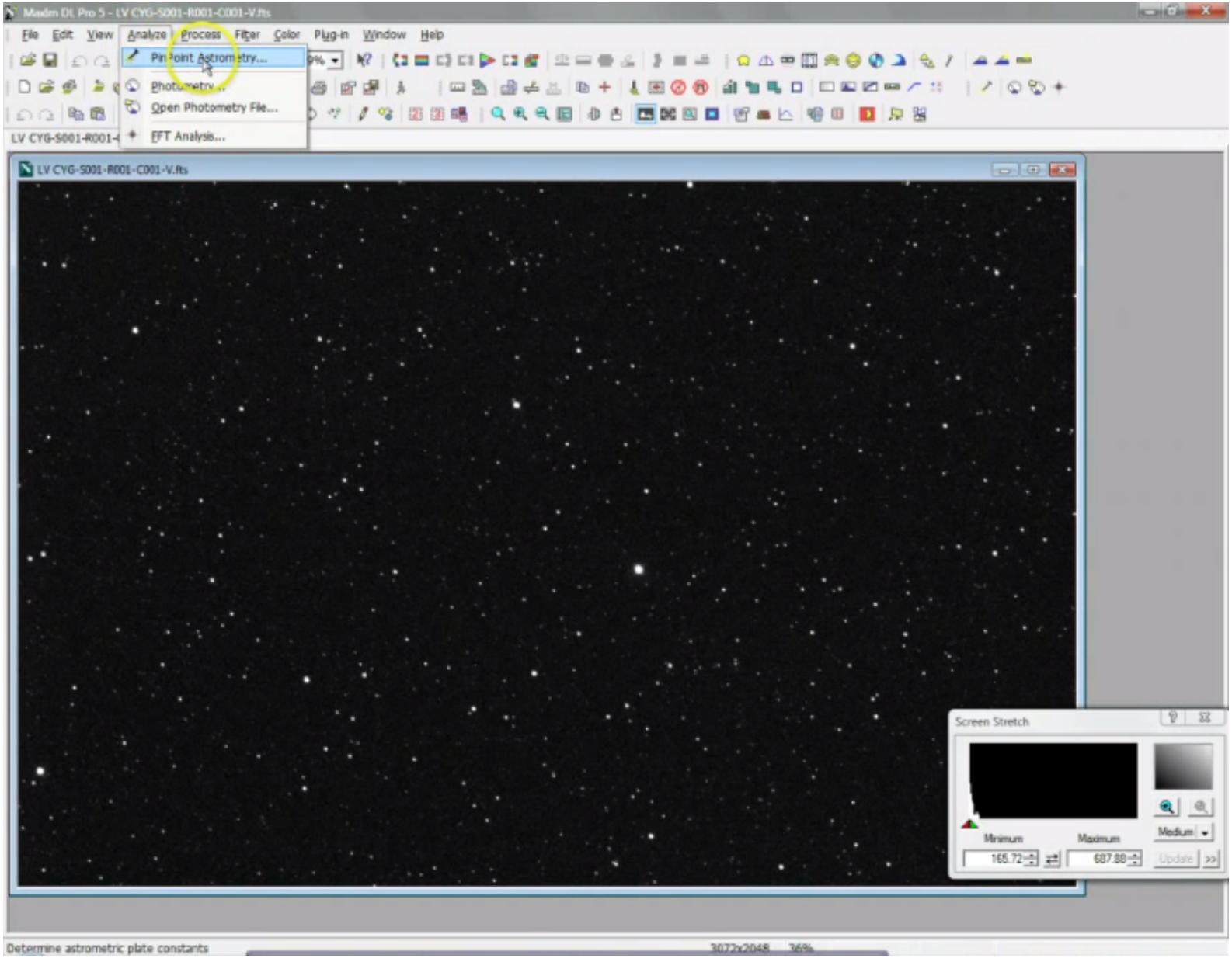
Astrometria

identyfikacja gwiazd w polu może przebiegać w oparciu o ich współrzędne niebieskie - rektascencje i deklinacje

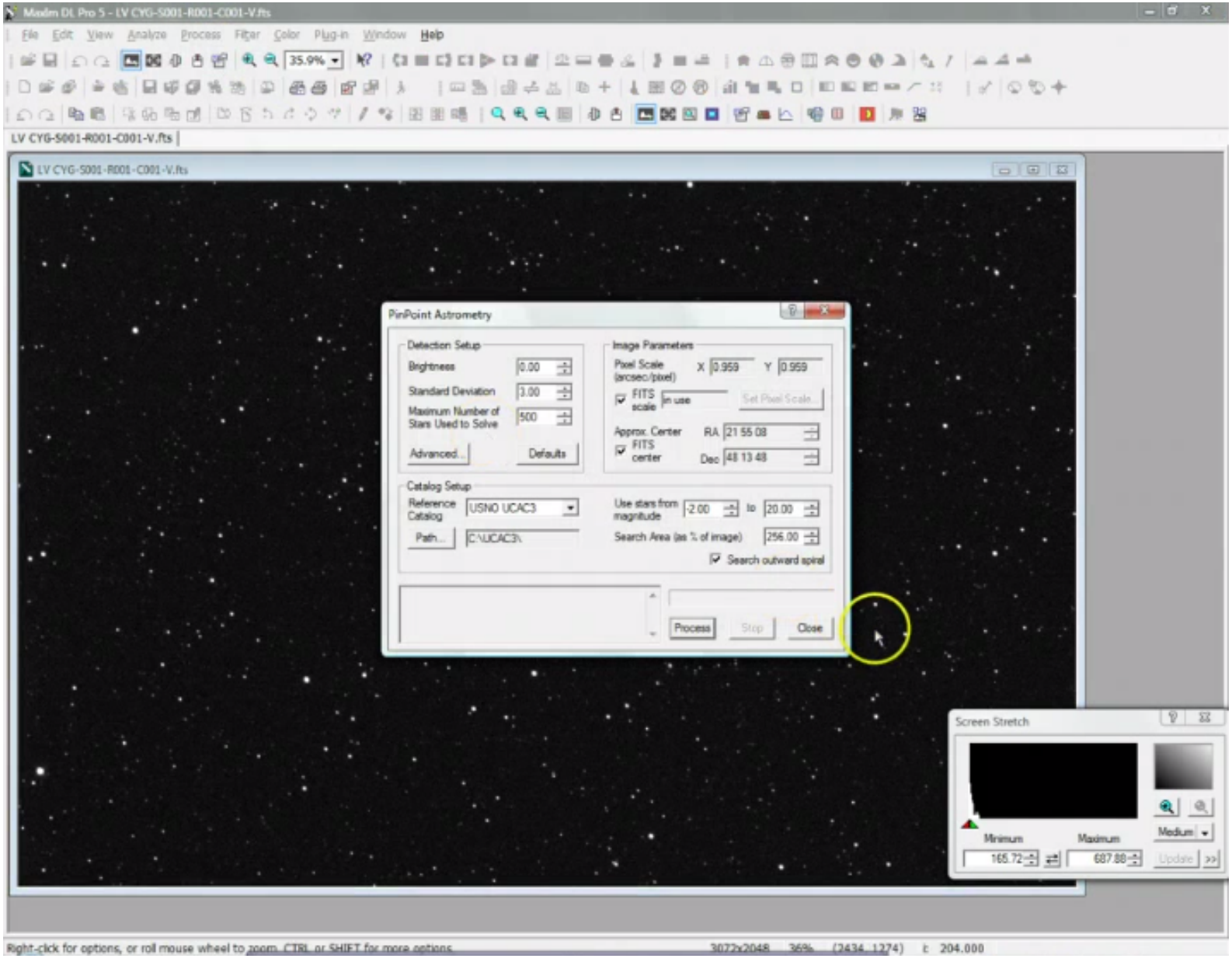


wybieramy menu Analyse i PinPoint Astrometry

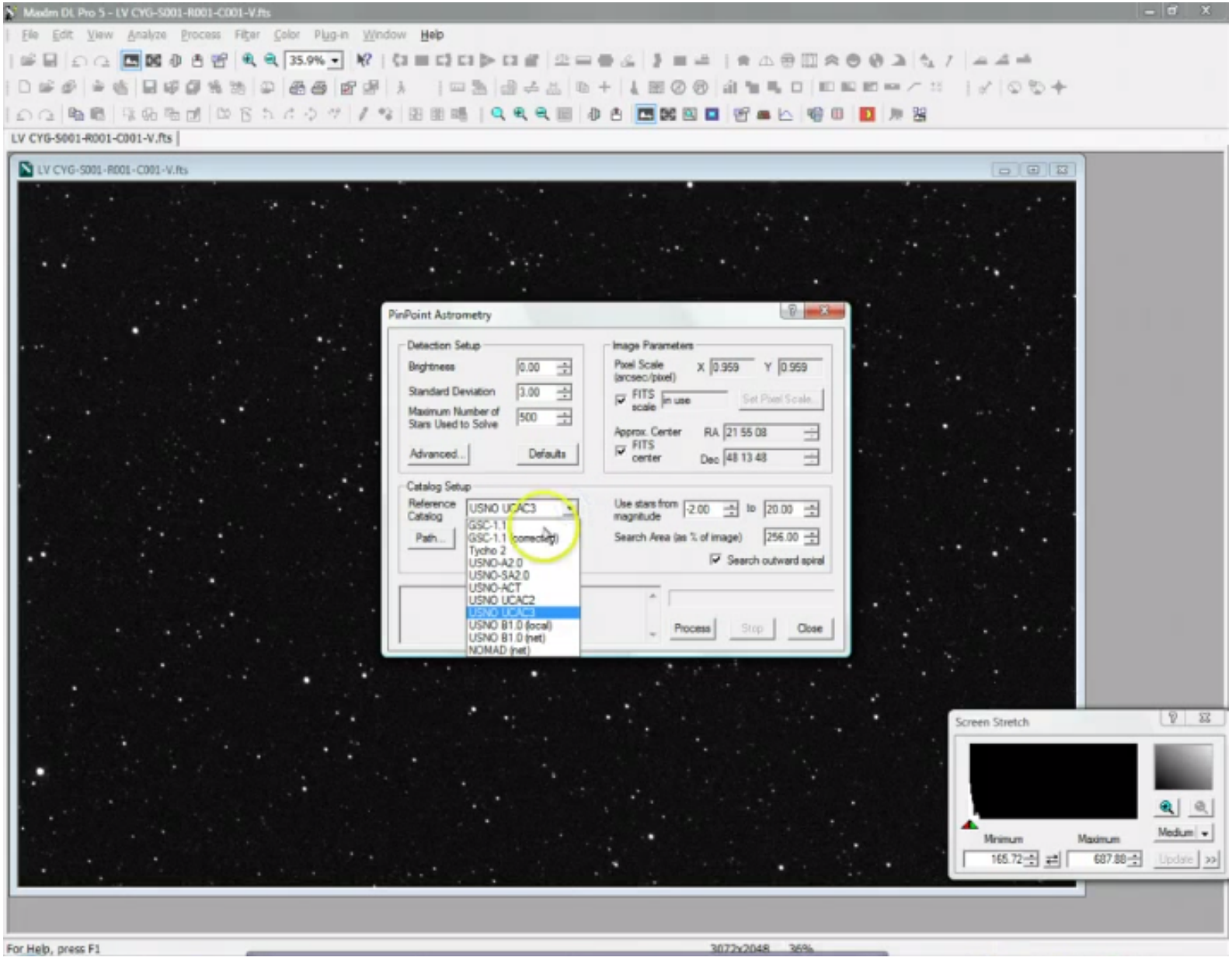



Maxim DL Pro 5 - LV CYG-S001-R001-C001-V.fts
File Edit View Analyze Process Filter Color Plug-in Window Help
PinPoint Astrometry...
Photometry...
Open Photometry File...
EFT Analysis...
LV CYG-S001-R001-C001-V.fts
Screen Stretch
Minimum
Maximum
165.72
687.80
Medium
Update
Determine astrometric plate constants
3072x2048 36%

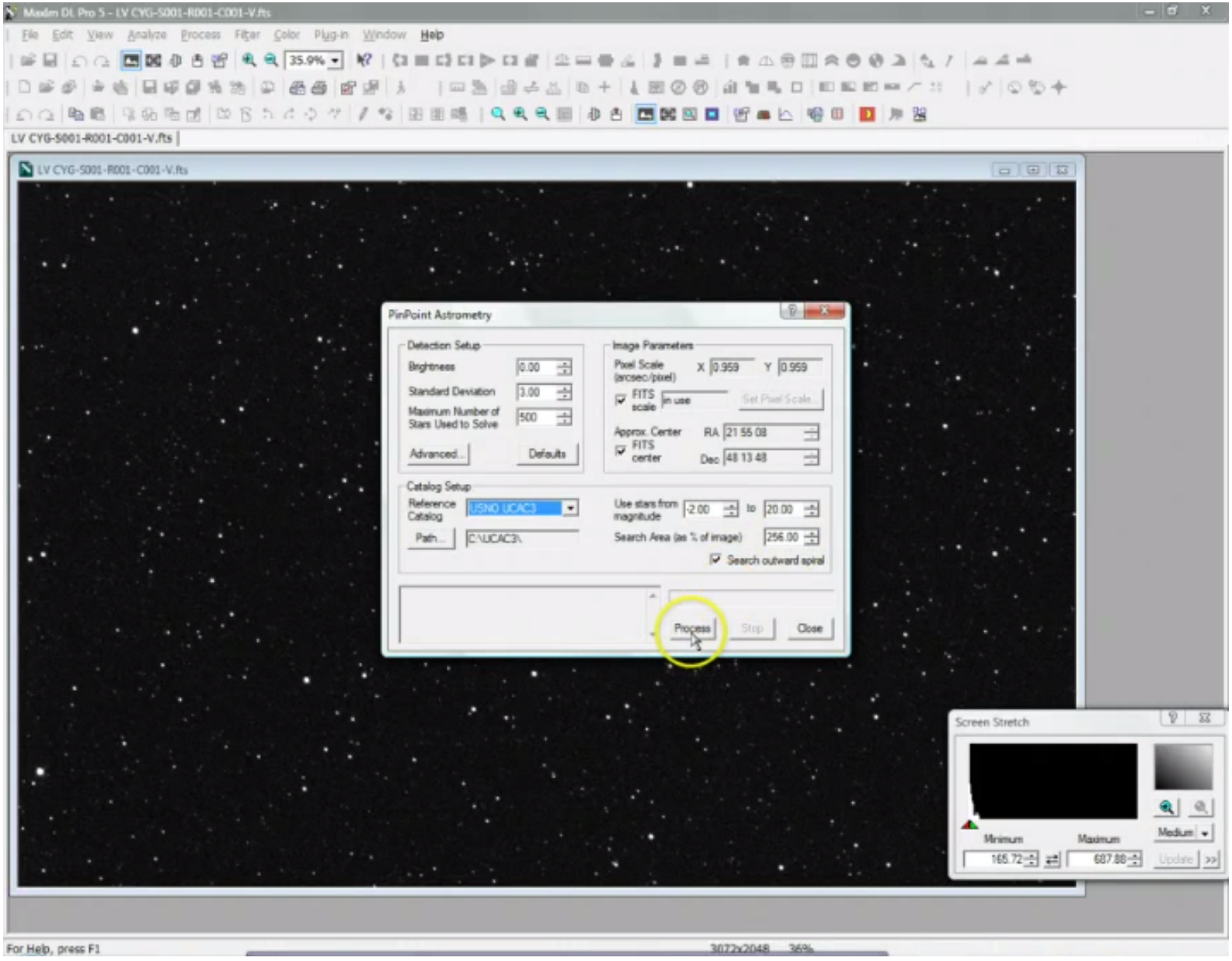
pojawia się okno z podstawowymi parametrami do prawidłowego przekształcenia współrzędnych każdego piksela we współrzędne niebieskie

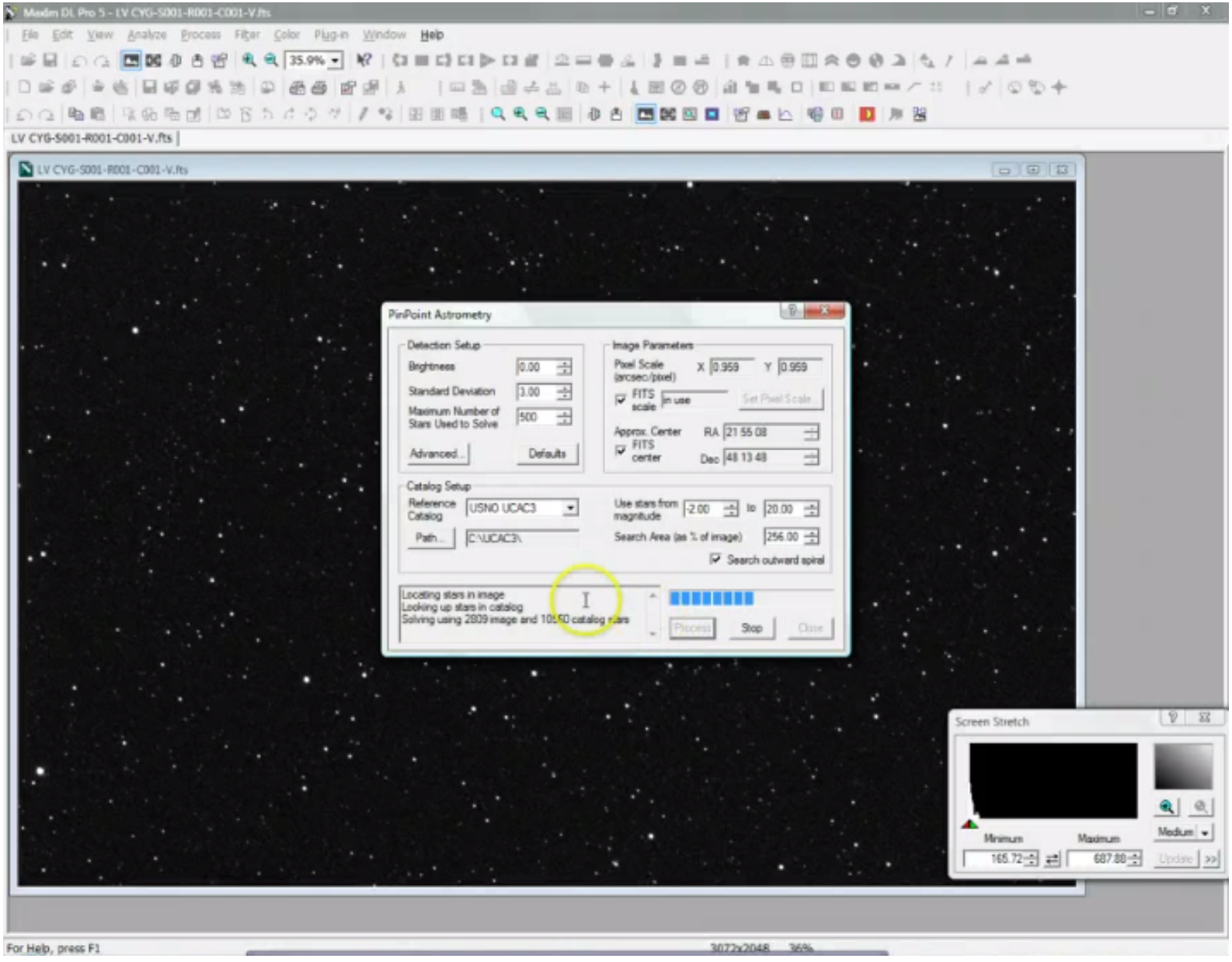


wybieramy katalog obiektów odpowiedni dla naszego pola

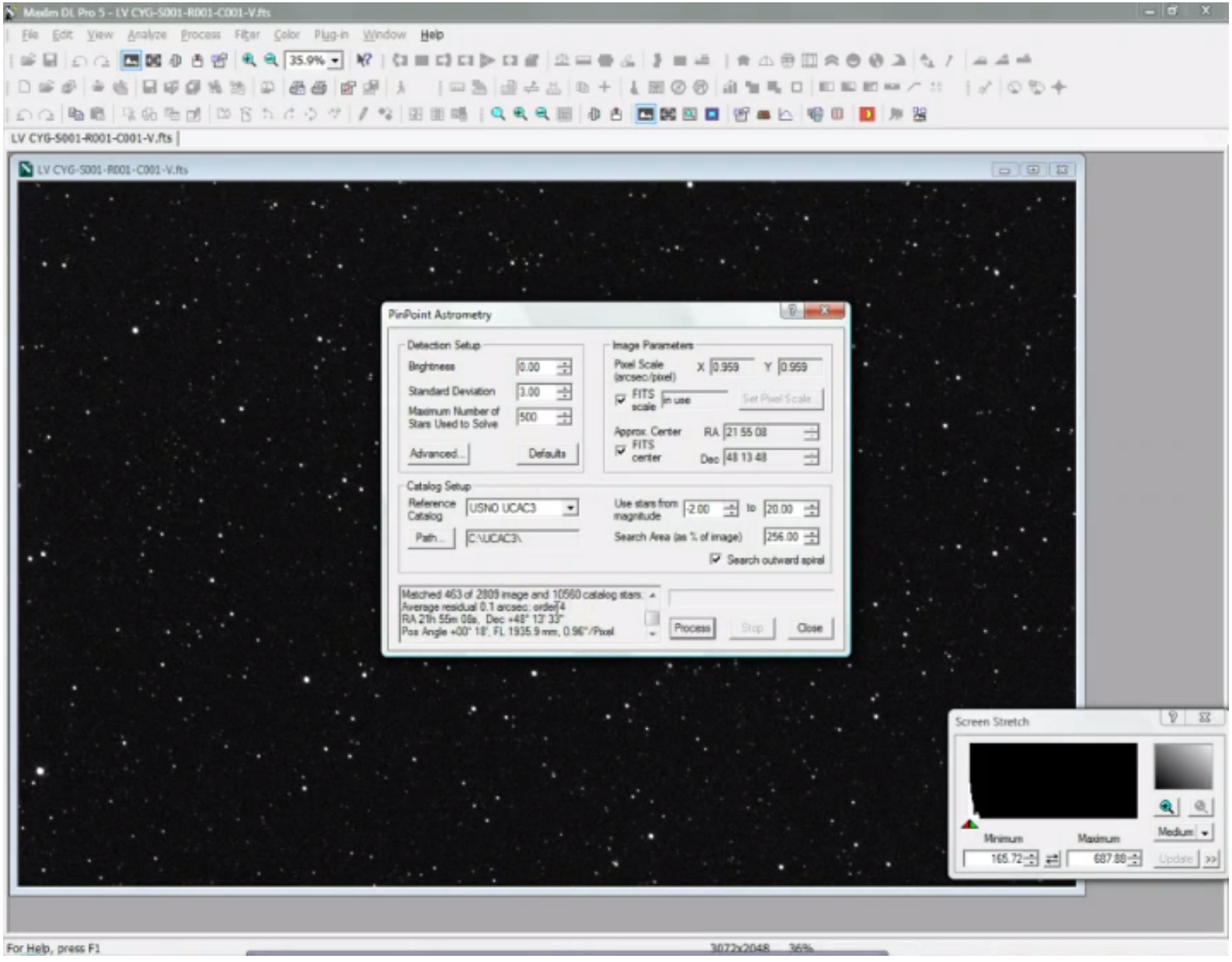


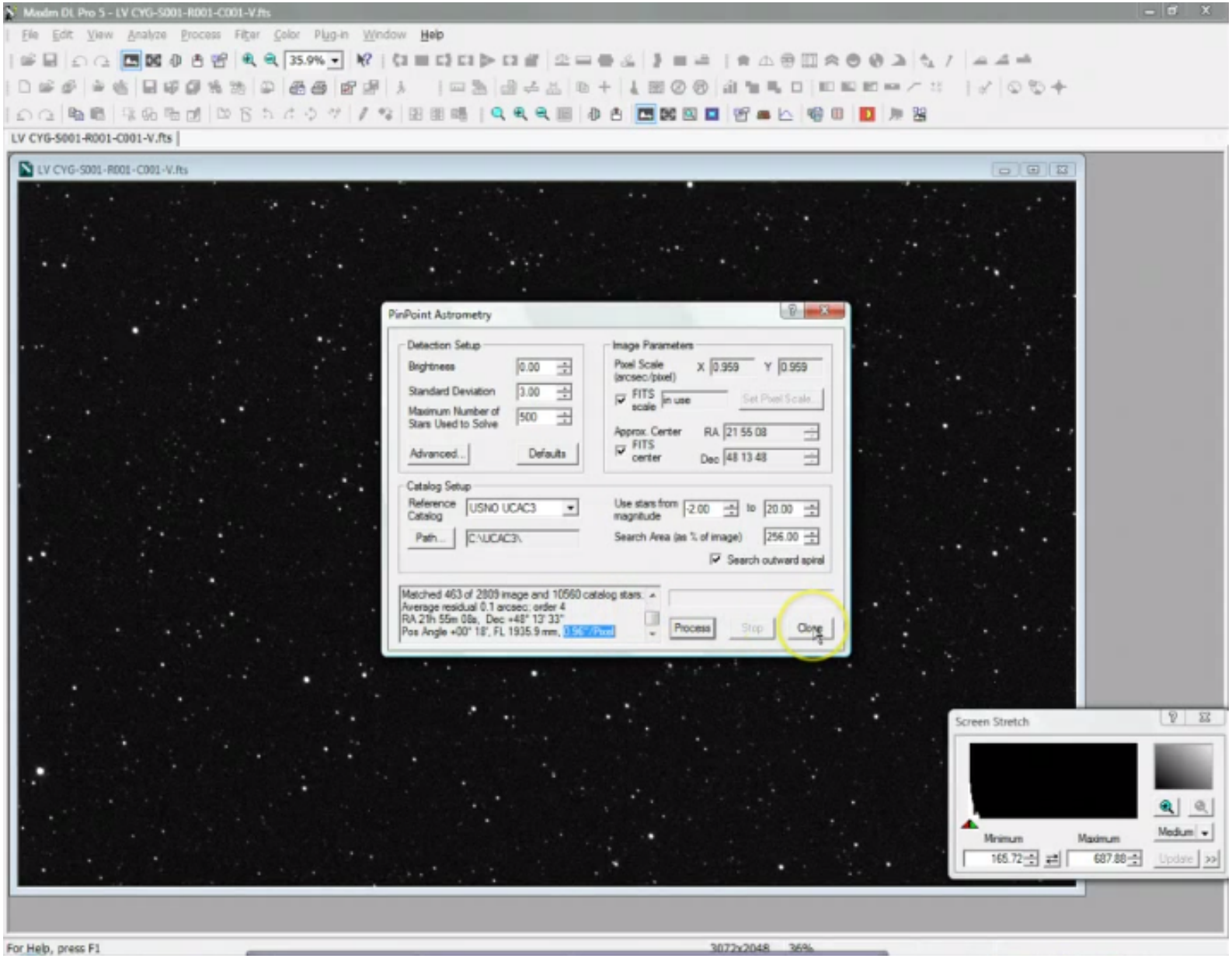
klikamy Process, aby powiązać ze sobą gwiazdy z katalogu i naszego zdjęcia



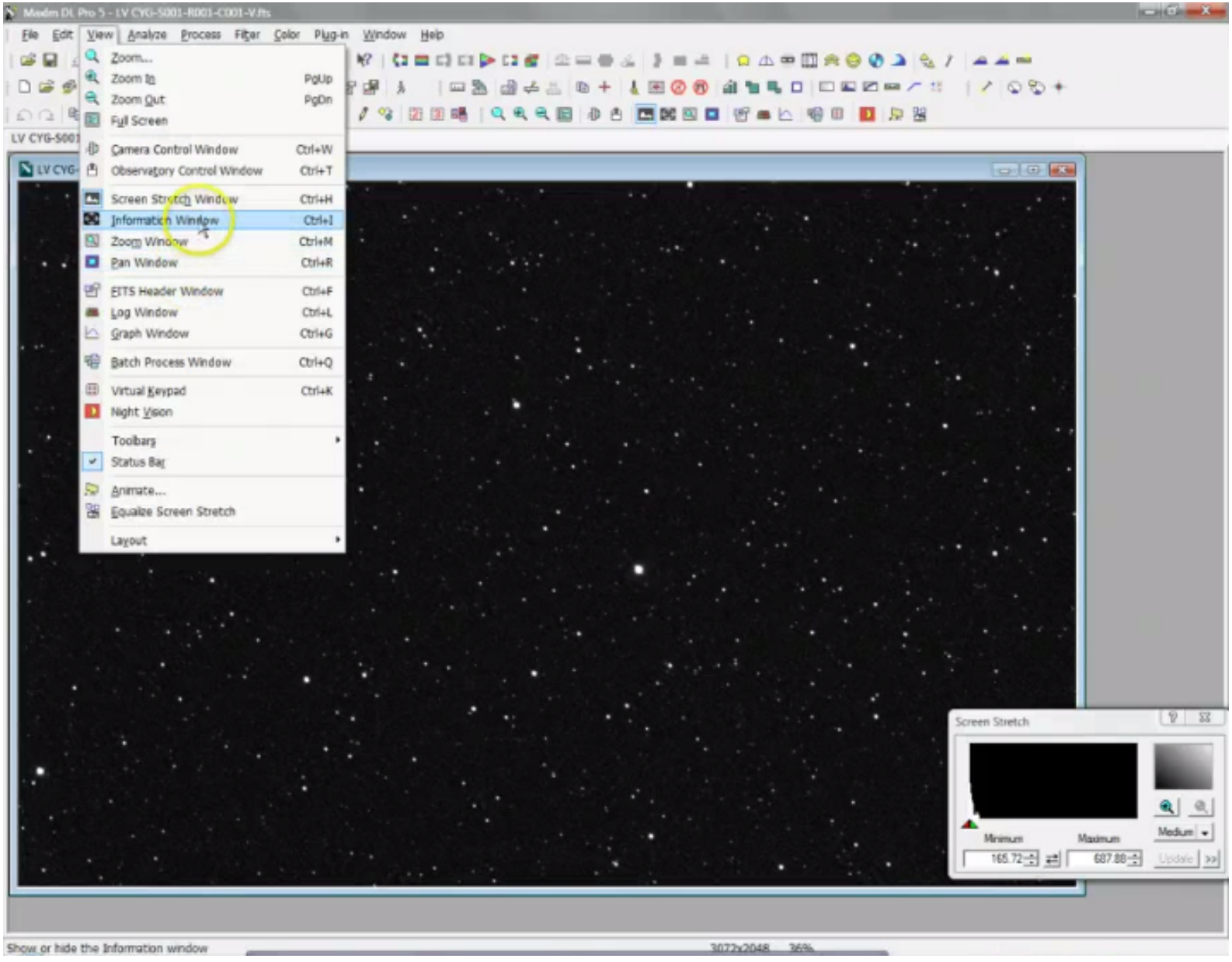

Maxim DL Pro 5 - LV CYG-S001-R001-C001-V.fts
File Edit View Analyze Process Filter Color Plug-in Window Help
35.9%
LV CYG-S001-R001-C001-V.fts
LV CYG-S001-R001-C001-V.fts
PinPoint Astrometry
Detection Setup
Brightness 0.00
Standard Deviation 3.00
Maximum Number of Stars Used to Solve 500
Advanced...
Defaults
Image Parameters
Pixel Scale (arcsec/pixel) X 0.959 Y 0.959
FITS scale in use
Set Pixel Scale...
Approx. Center RA 21 55 08
FITS center Dec 48 13 48
Catalog Setup
Reference Catalog USNO UCAC3
Path...
C:\UCAC3\
Use stars from magnitude -2.00 to 20.00
Search Area (as % of image) 256.00
Search outward spiral
Locating stars in image
Looking up stars in catalog
Solving using 2809 image and 10550 catalog stars
Process
Stop
Close
Screen Stretch
Minimum
Maximum
165.72
687.80
Medium
Update
For Help, press F1
3072x2048 36%

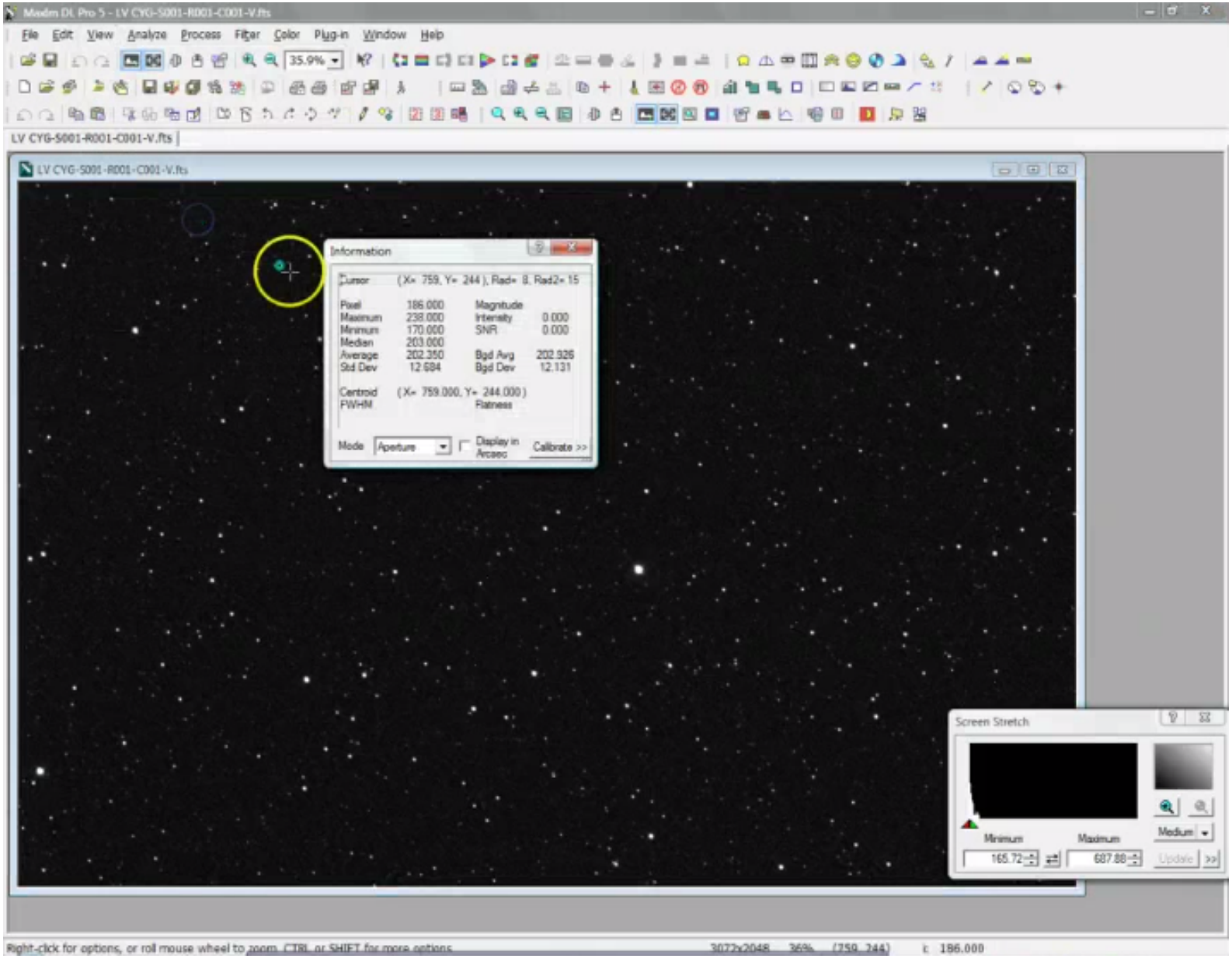
pojawia się informacja o dopasowaniu obrazów i gwiazd



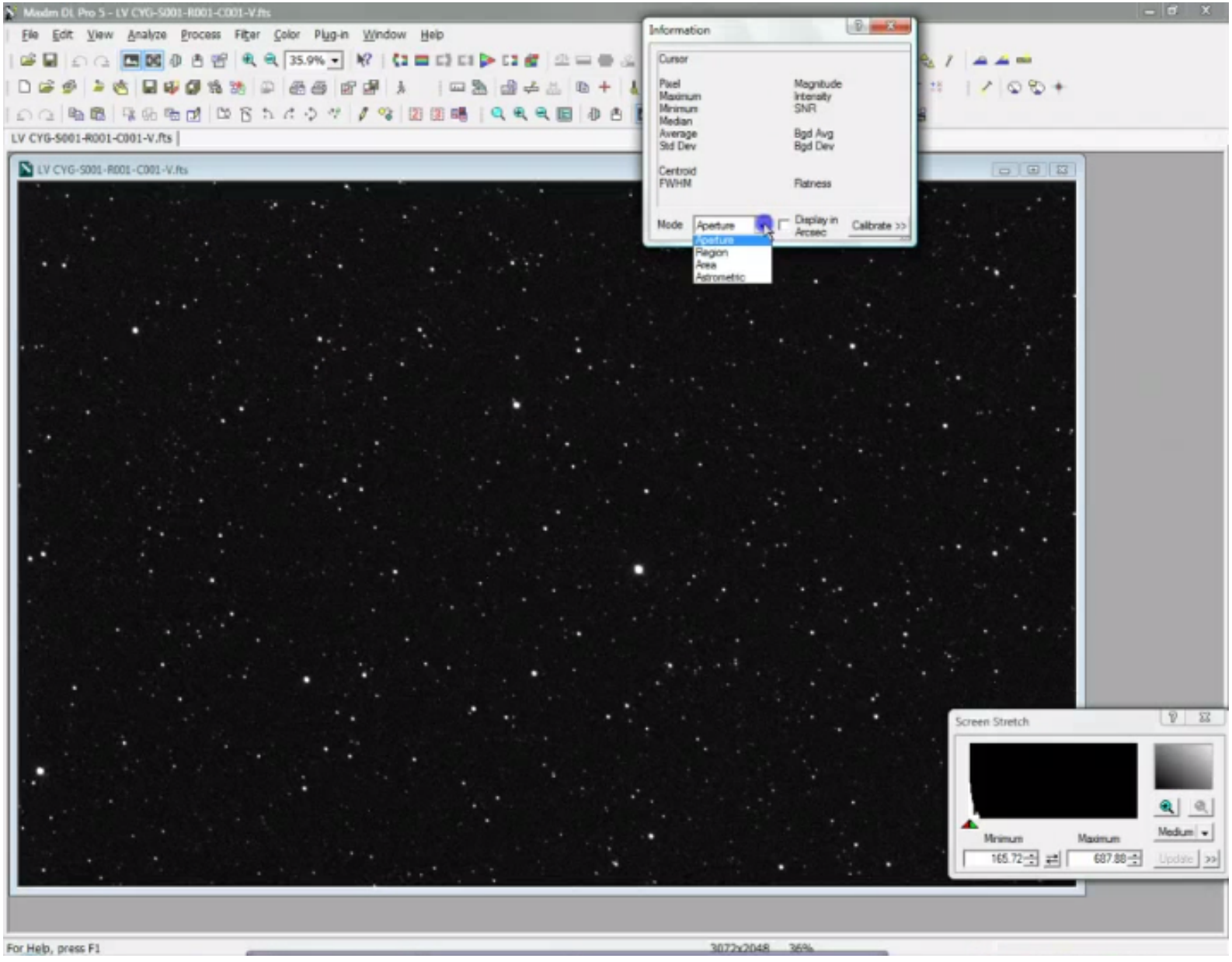

Maxim DL Pro 5 - LV CYG-S001-R001-C001-V.fts
File Edit View Analyze Process Filter Color Plug-in Window Help
LV CYG-S001-R001-C001-V.fts
PinPoint Astrometry
Detection Setup
Brightness 0.00
Standard Deviation 3.00
Maximum Number of Stars Used to Solve 500
Advanced... Defaults
Image Parameters
Pixel Scale (arcsec/pixel) X 0.959 Y 0.959
FITS scale in use
Set Pixel Scale...
Approx. Center RA 21 55 08
FITS center Dec 48 13 48
Catalog Setup
Reference Catalog USNO UCAC3
Path... C:\UCAC3\
Use stars from magnitude -2.00 to 20.00
Search Area (as % of image) 256.00
Search outward spiral
Matched 463 of 2809 image and 10560 catalog stars.
Average residual 0.1 arcsec, order 4
RA 21h 55m 08s, Dec +48° 13' 33"
Pos Angle +00° 18', FL 1935.9 mm, 0.96"/Pixel
Process Stop Close
Screen Stretch
Minimum Maximum
165.72 687.88
Medium
Update
For Help, press F1
3072x2048 36%

otwieramy okno Information Window

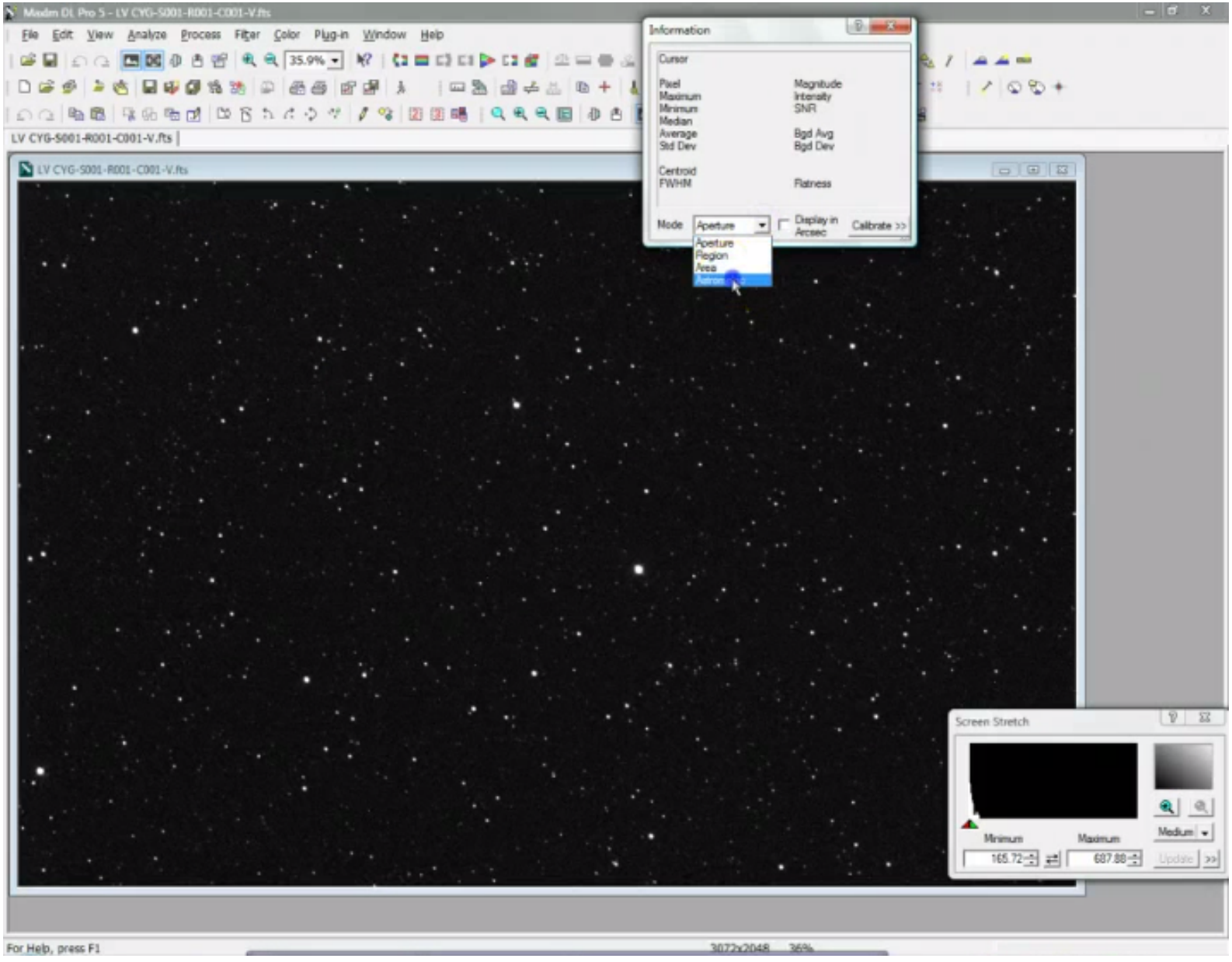


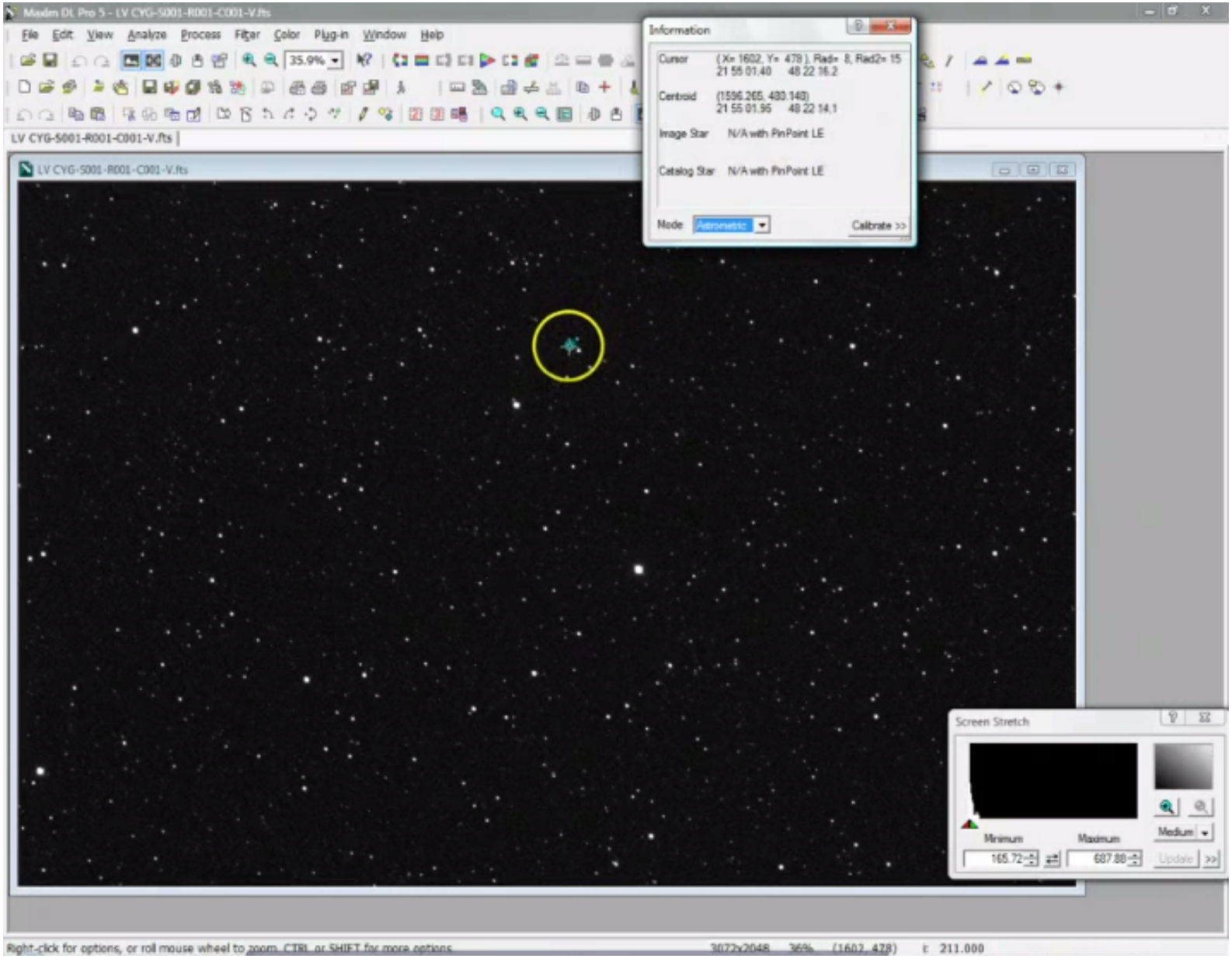

Maxim DL Pro 5 - LV CYG-S001-R001-C001-V.fts
File Edit View Analyze Process Filter Color Plug-in Window Help
35.9%
LV CYG-S001-R001-C001-V.fts
LV CYG-S001-R001-C001-V.fts
Information
Cursor (X= 759, Y= 244); Rad= 8, Rad2= 15
Pixel 186.000 Magnitude
Maximum 238.000 Intensity 0.000
Minimum 170.000 SNR 0.000
Median 203.000
Average 202.350 Bgd Avg 202.326
Std Dev 12.684 Bgd Dev 12.131
Centroid (X= 759.000, Y= 244.000)
FWHM Flatness
Mode Aperture
Display in Arcsec
Calibrate >>
Screen Stretch
Minimum
Maximum
165.72
687.88
Medium
Update
Right-click for options, or roll mouse wheel to zoom, CTRL or SHIFT for more options
3072x2048 36% (759, 244) i: 186.000

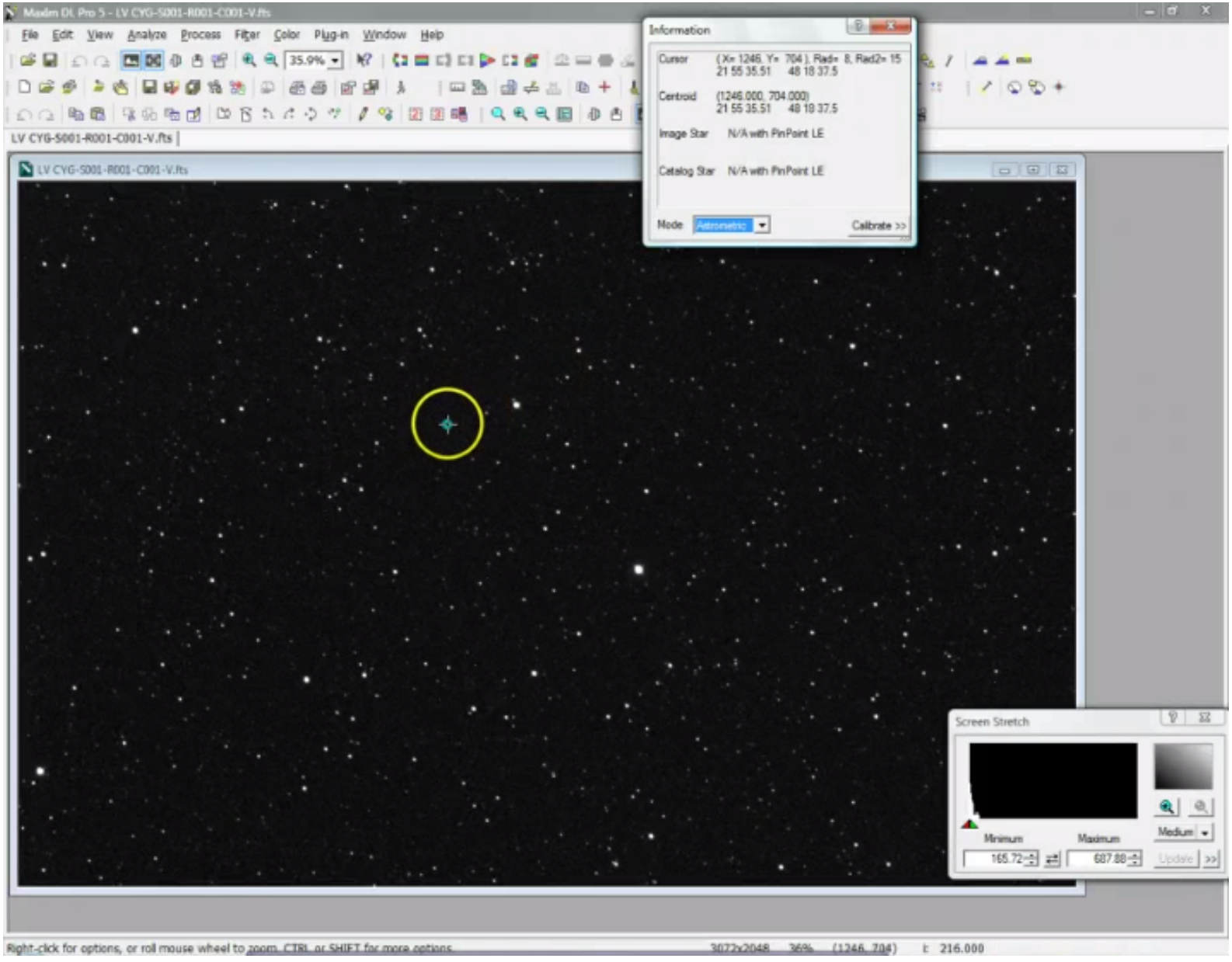
z rozwijanej listy wybieramy opcję Astrometric

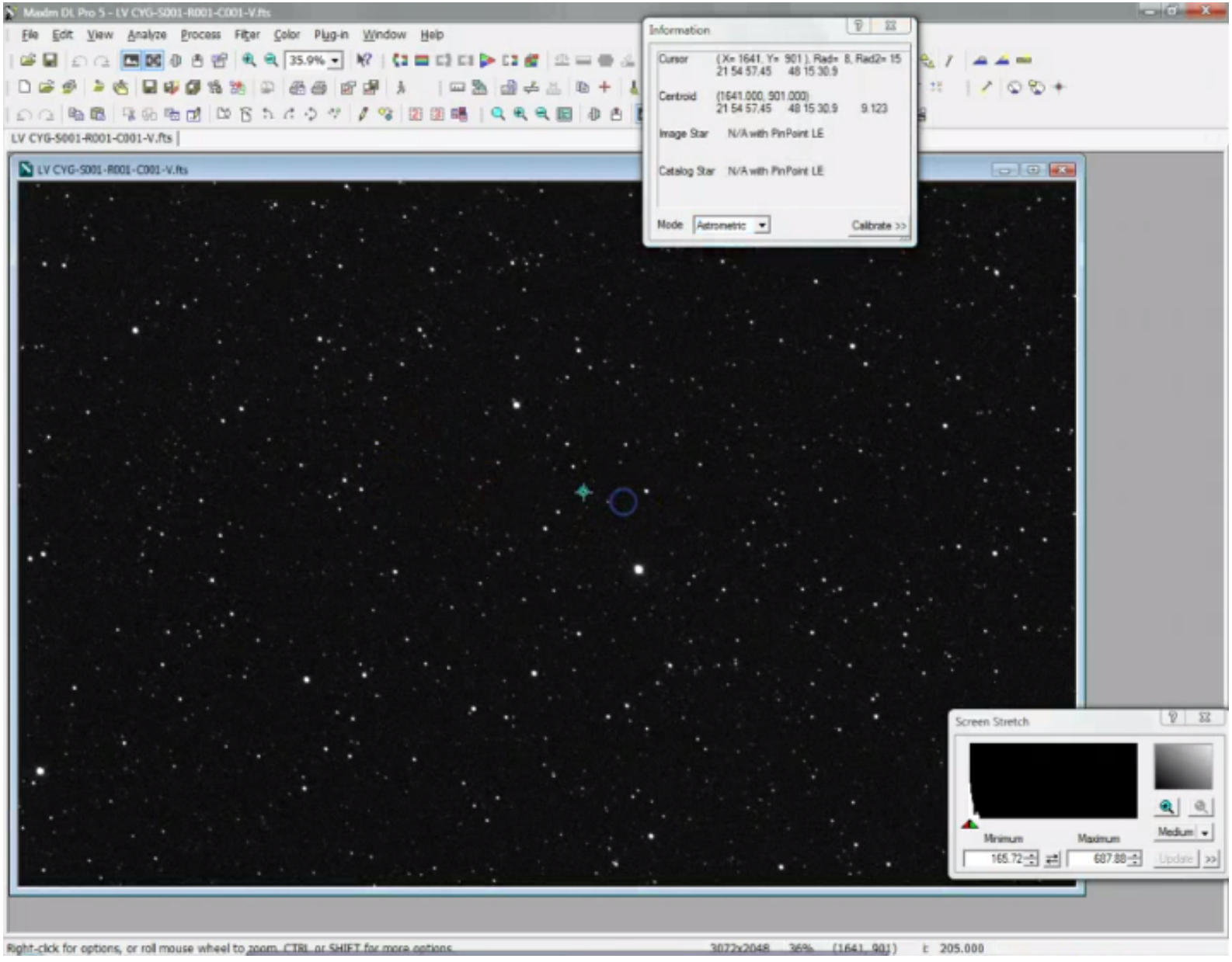


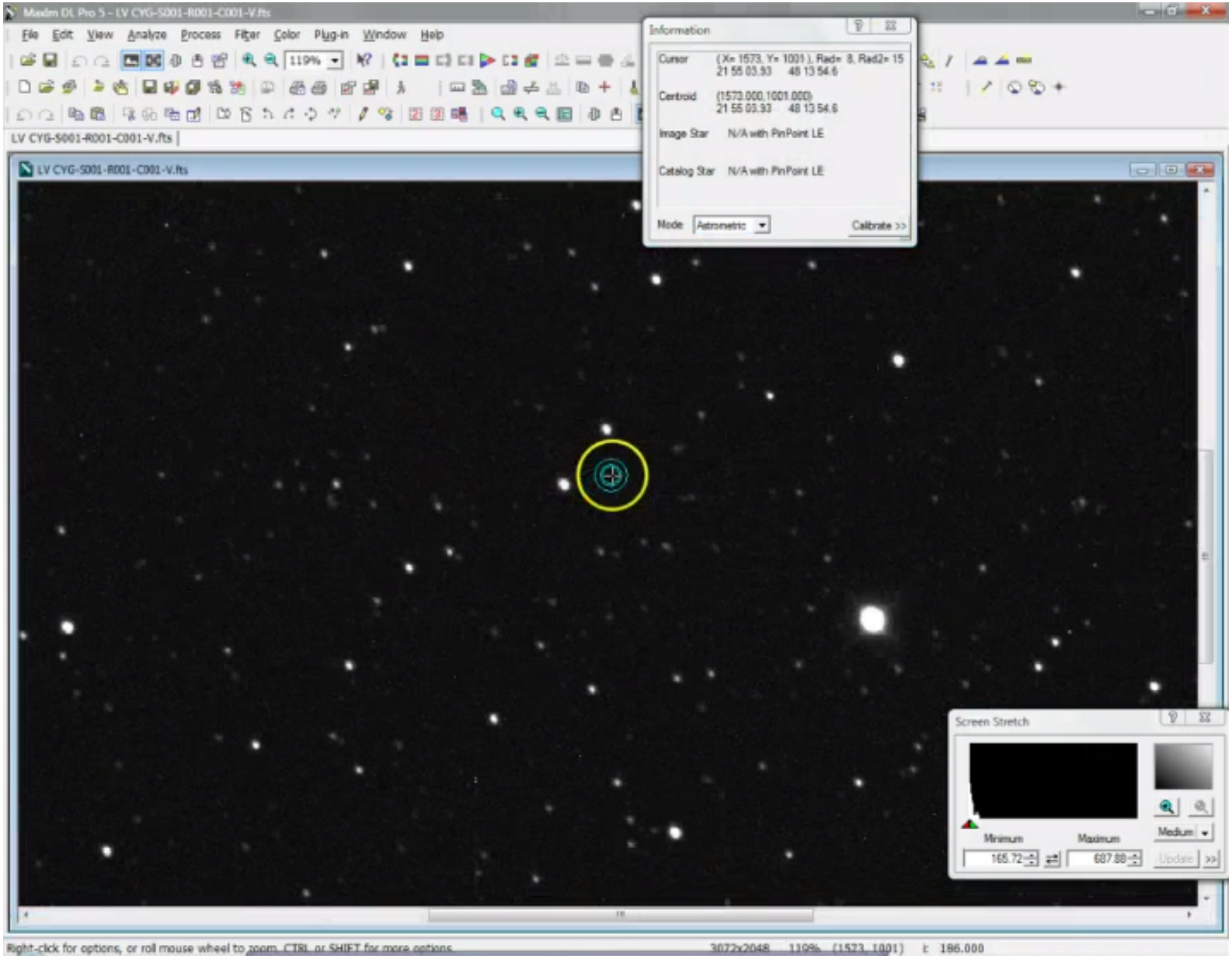
każda gwiazda ma ustalone współrzędne niebieskie

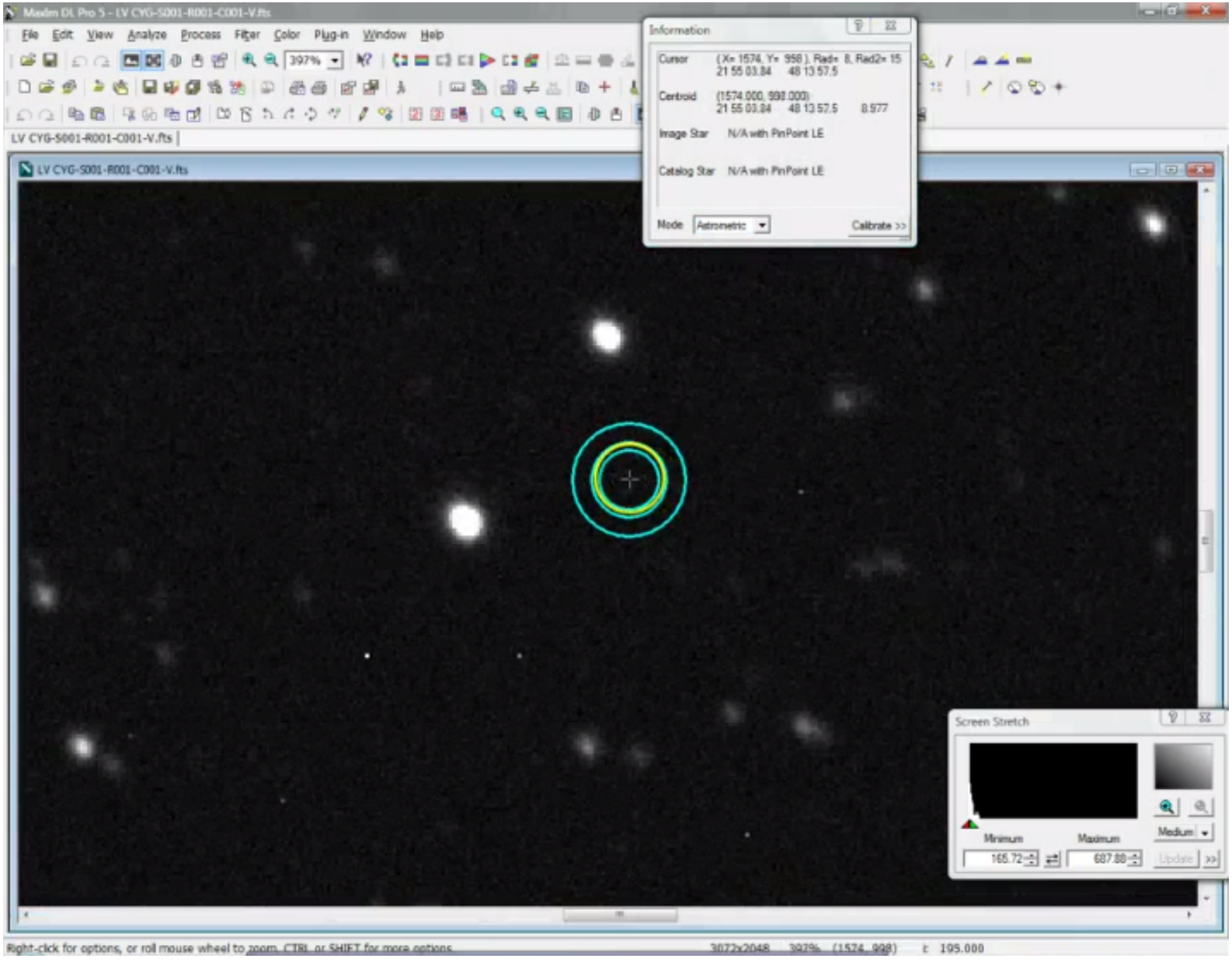


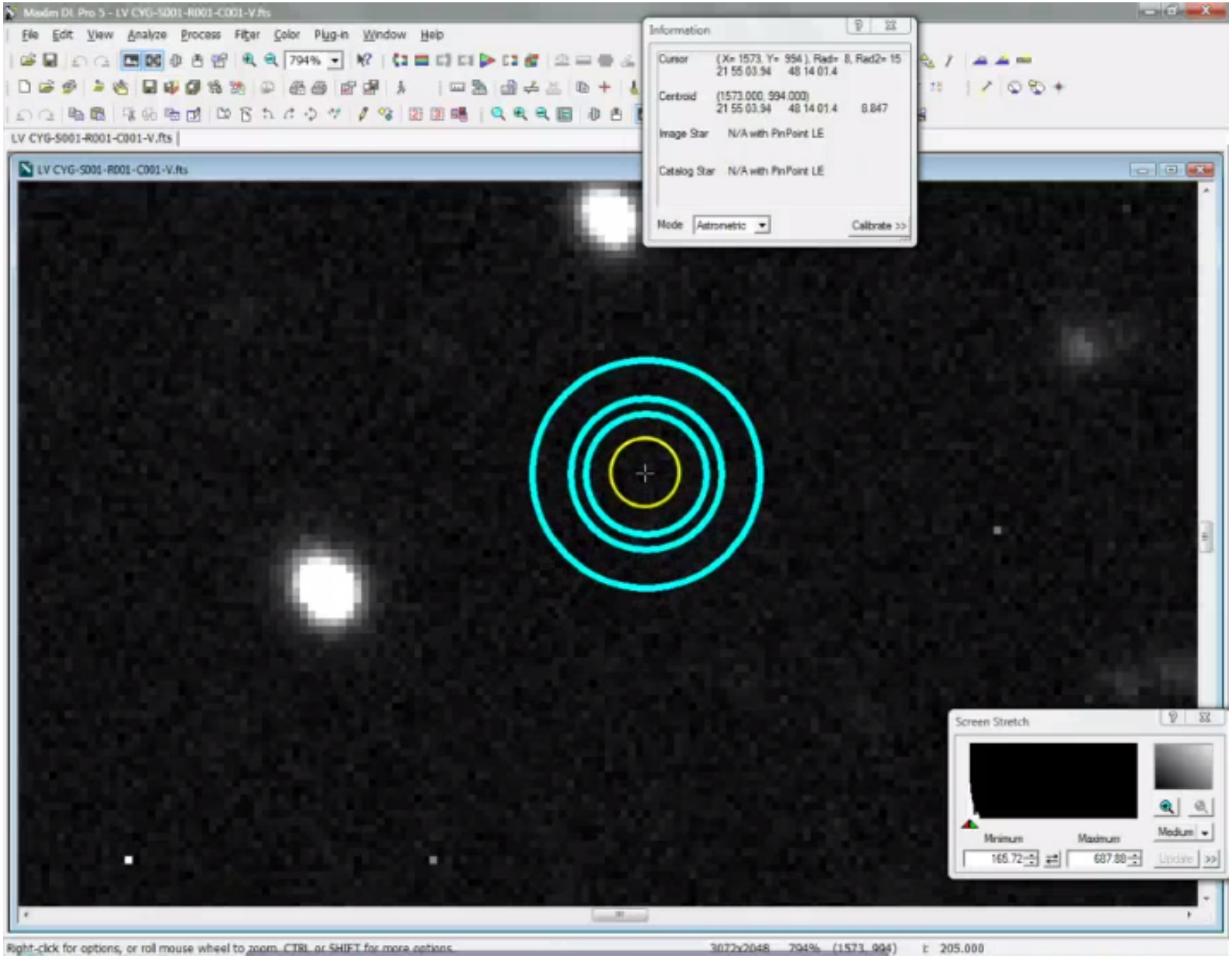

Maxim DL Pro 5 - LV CYG-S001-R001-C001-V.fts
File Edit View Analyze Process Filter Color Plug-in Window Help
35.9%
LV CYG-S001-R001-C001-V.fts
Information
Cursor (X= 1602, Y= 478), Rad= 8, Rad2= 15
21 55 01.40 48 22 16.2
Centroid (1596.265, 480.140)
21 55 01.95 48 22 14.1
Image Star N/A with PinPoint LE
Catalog Star N/A with PinPoint LE
Mode Astrometric
Calibrate >>
LV CYG-S001-R001-C001-V.fts
Screen Stretch
Minimum
Maximum
165.72
687.80
Medium
Update
Right-click for options, or roll mouse wheel to zoom. CTRL or SHIFT for more options
3072x2048 36% (1602, 478) t: 211.000

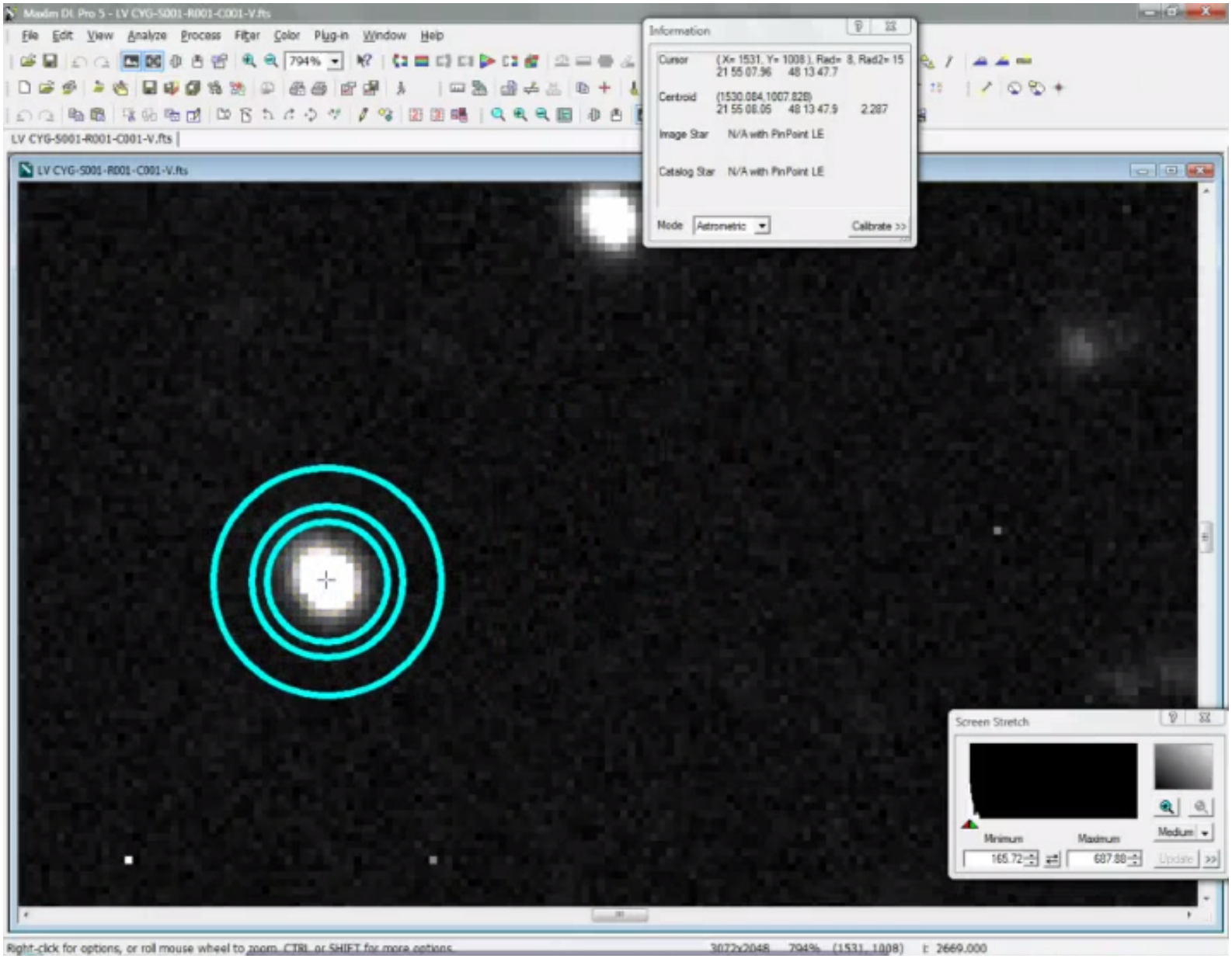

Maxim DL Pro 5 - LV CYG-S001-R001-C001-V.fts
File Edit View Analyze Process Filter Color Plug-in Window Help
35.9%
LV CYG-S001-R001-C001-V.fts
Information
Cursor (X= 1246, Y= 704), Rad= 8, Rad2= 15
21 55 35.51 48 18 37.5
Centroid (1246.000, 704.000)
21 55 35.51 48 19 37.5
Image Star N/A with PinPoint LE
Catalog Star N/A with PinPoint LE
Mode Astrometric
Calibrate >>
LV CYG-S001-R001-C001-V.fts
Screen Stretch
Minimum
Maximum
165.72
687.88
Medium
Update
Right-click for options, or roll mouse wheel to zoom. CTRL or SHIFT for more options
3072x2048 36% (1246, 704) t: 216.000


Maxim DL Pro 5 - LV CYG-S001-R001-C001-V.fts
File Edit View Analyze Process Filter Color Plug-in Window Help
35.9%
LV CYG-S001-R001-C001-V.fts
Information
Cursor (X= 1641, Y= 901), Rad= 8, Rad2= 15
21 54 57.45 48 15 30.9
Centroid (1641.000, 901.000)
21 54 57.45 48 15 30.9 9.123
Image Star N/A with PinPoint LE
Catalog Star N/A with PinPoint LE
Mode Astrometric
Calibrate >>
LV CYG-S001-R001-C001-V.fts
Screen Stretch
Minimum
Maximum
165.72
687.88
Medium
Update
Right-click for options, or roll mouse wheel to zoom. CTRL or SHIFT for more options
3072x2048 36% (1641, 901) t: 205.000

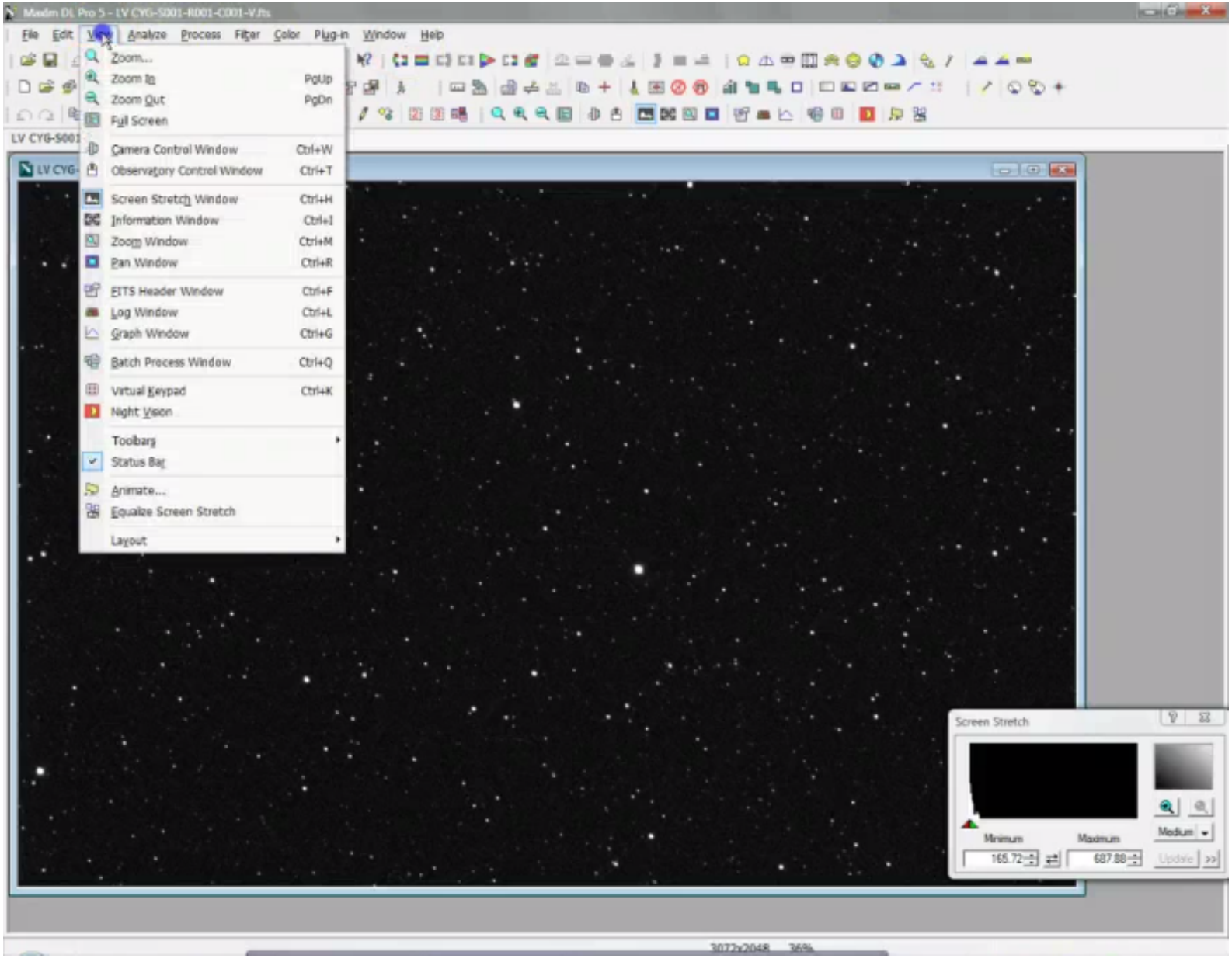

Maxim DL Pro 5 - LV CYG-S001-R001-C001-V.fts
File Edit View Analyze Process Filter Color Plug-in Window Help
LV CYG-S001-R001-C001-V.fts
Information
Cursor (X= 1573, Y= 1001), Rad= 8, Rad2= 15
21 55 03.93 48 13 54.6
Centroid (1573.000,1001.000)
21 55 03.93 48 13 54.6
Image Star N/A with PinPoint LE
Catalog Star N/A with PinPoint LE
Mode Astrometric
Calibrate >>
Screen Stretch
Minimum
Maximum
165.72
687.88
Medium
Update
Right-click for options, or roll mouse wheel to zoom. CTRL or SHIFT for more options
3072x2048 119% (1573, 1001) t: 186.000


Maxim DL Pro 5 - LV CYG-S001-R001-C001-V.fts
File Edit View Analyze Process Filter Color Plug-in Window Help
LV CYG-S001-R001-C001-V.fts
Information
Cursor (X= 1574, Y= 998), Rad= 8, Rad2= 15
21 55 03.84 48 13 57.5
Centroid (1574.000, 998.000)
21 55 03.84 48 13 57.5 8.977
Image Star N/A with PinPoint LE
Catalog Star N/A with PinPoint LE
Mode Astrometric
Calibrate >>
Screen Stretch
Minimum
Maximum
165.72
687.88
Medium
Update
Right-click for options, or roll mouse wheel to zoom. CTRL or SHIFT for more options
3072x2048 397% (1574, 998) t: 105.000

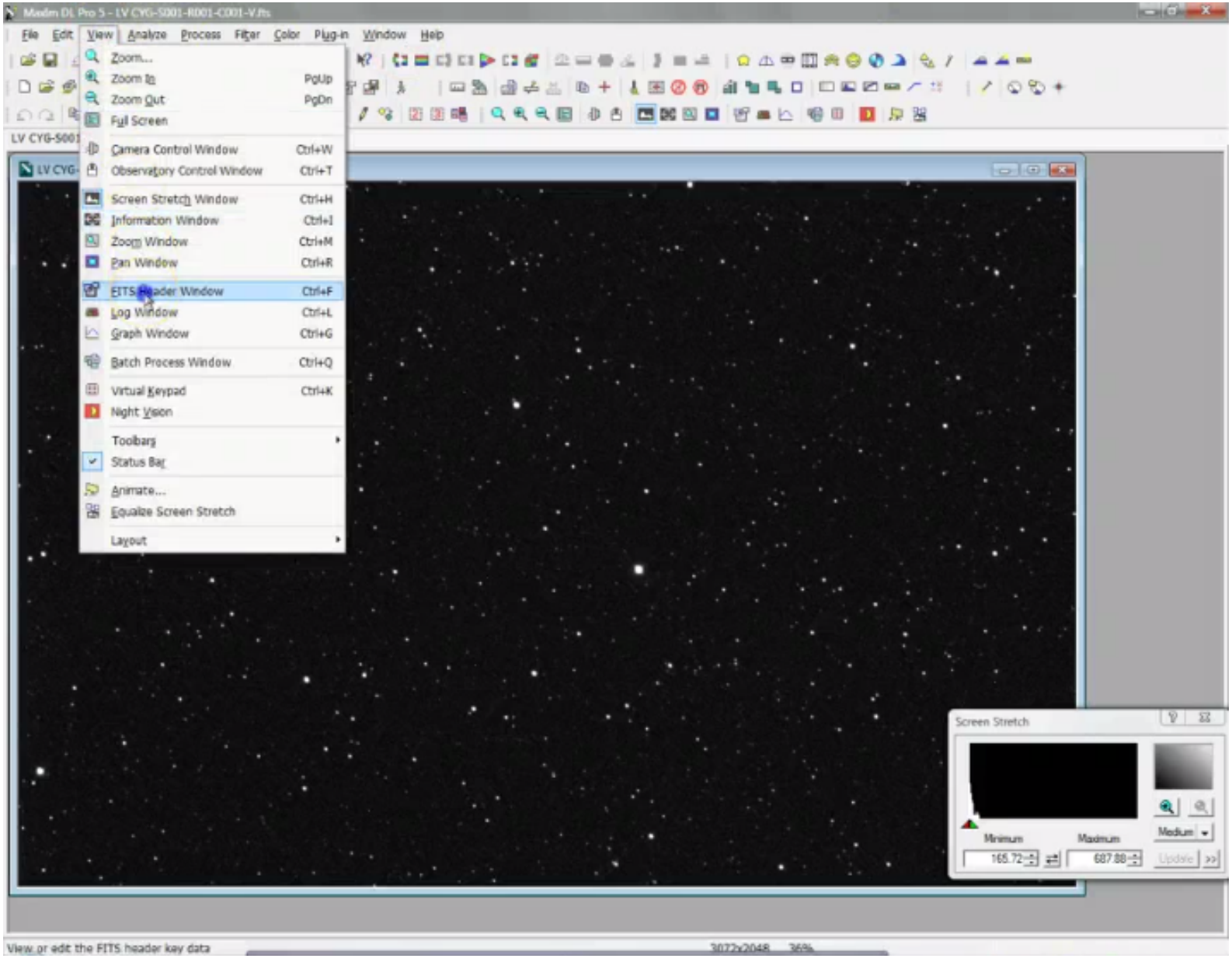

Maxim DL Pro 5 - LV CYG-S001-R001-C001-V.fts
File Edit View Analyze Process Filter Color Plug-in Window Help
794%
LV CYG-S001-R001-C001-V.fts
Information
Cursor (X= 1573, Y= 994), Radi= 8, Rad2= 15
21 55 03.94 48 14 01.4
Centroid (1573.000, 994.000)
21 55 03.94 48 14 01.4 8.847
Image Star N/A with PinPoint LE
Catalog Star N/A with PinPoint LE
Mode Astrometric
Calibrate >>
LV CYG-S001-R001-C001-V.fts
Screen Stretch
Minimum
Maximum
165.72
687.80
Medium
Update
Right-click for options, or roll mouse wheel to zoom. CTRL or SHIFT for more options
3072x2048 794% (1573, 994) t: 205.000


Maxim DL Pro 5 - LV CYG-S001-R001-C001-V.fts
File Edit View Analyze Process Filter Color Plug-in Window Help
794%
LV CYG-S001-R001-C001-V.fts
Information
Cursor (X= 1531, Y= 1008), Rad= 8, Rad2= 15
21 55 07.96 48 13 47.7
Centroid (1530.084,1007.828)
21 55 08.05 48 13 47.9 2.287
Image Star N/A with PinPoint LE
Catalog Star N/A with PinPoint LE
Mode Astrometric
Calibrate >>
Screen Stretch
Minimum
Maximum
165.72
687.80
Medium
Update
Right-click for options, or roll mouse wheel to zoom. CTRL or SHIFT for more options
3072x2048 794% (1531, 1008) I: 2669.000

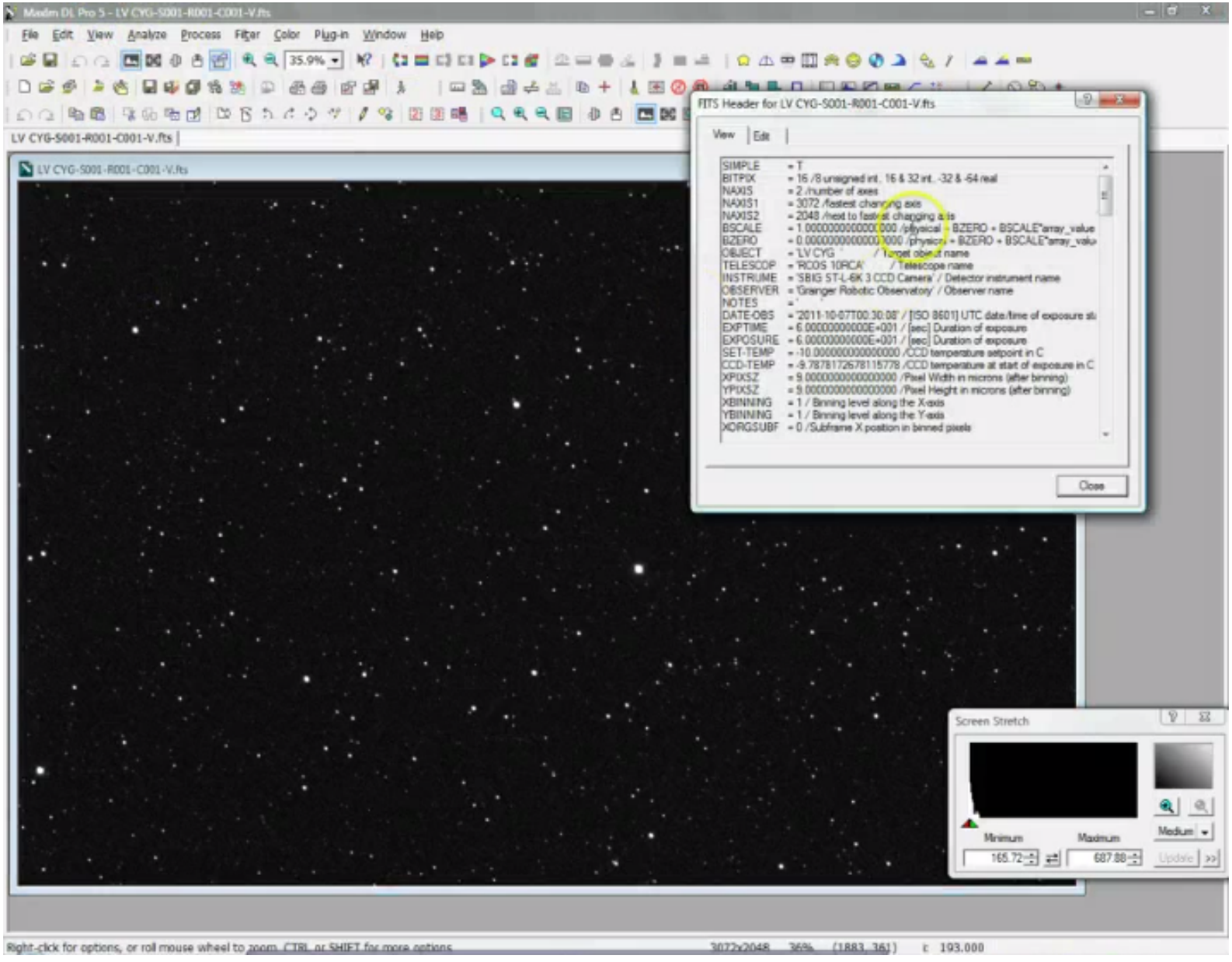
wybieramy podgląd nagłówka obrazu

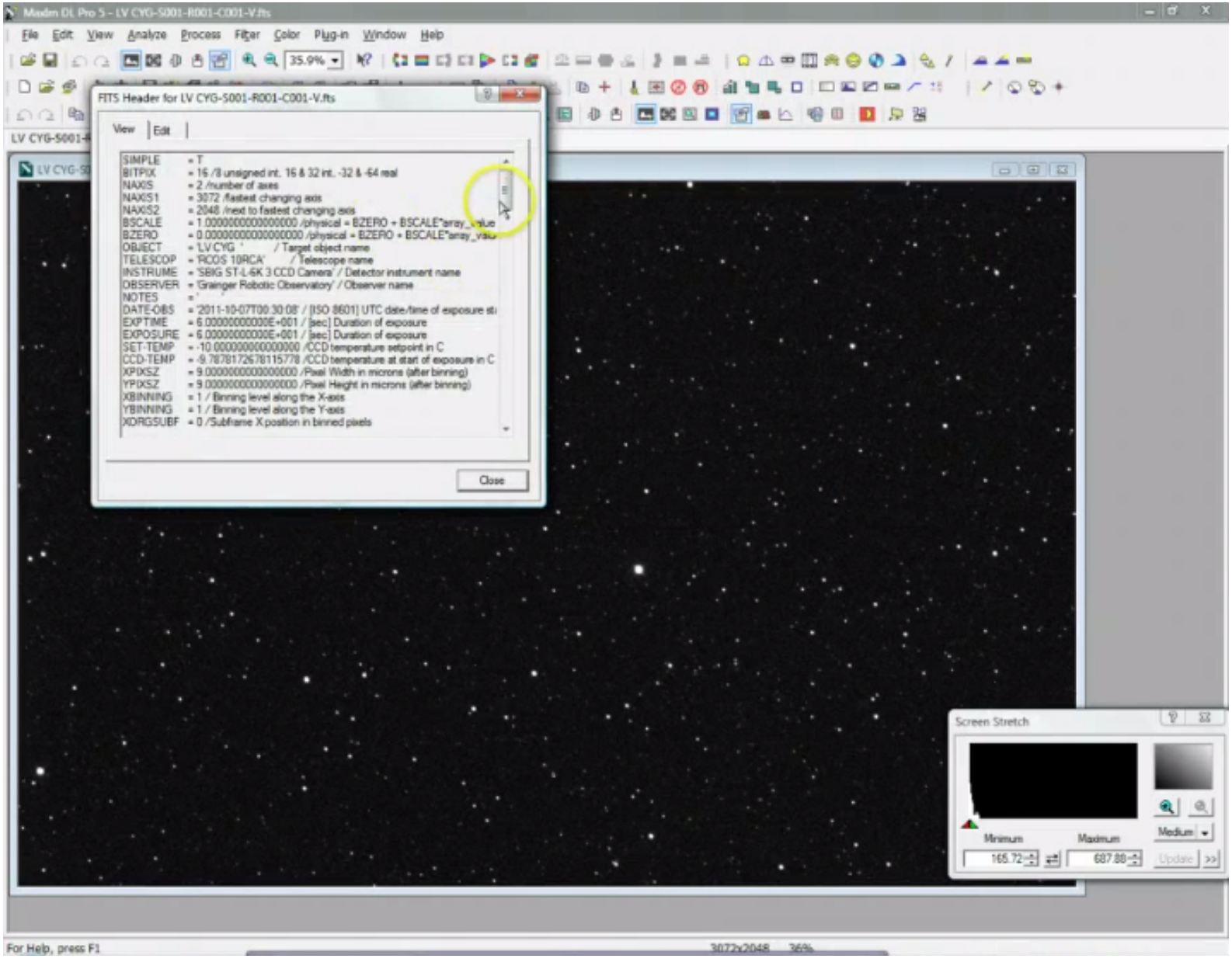


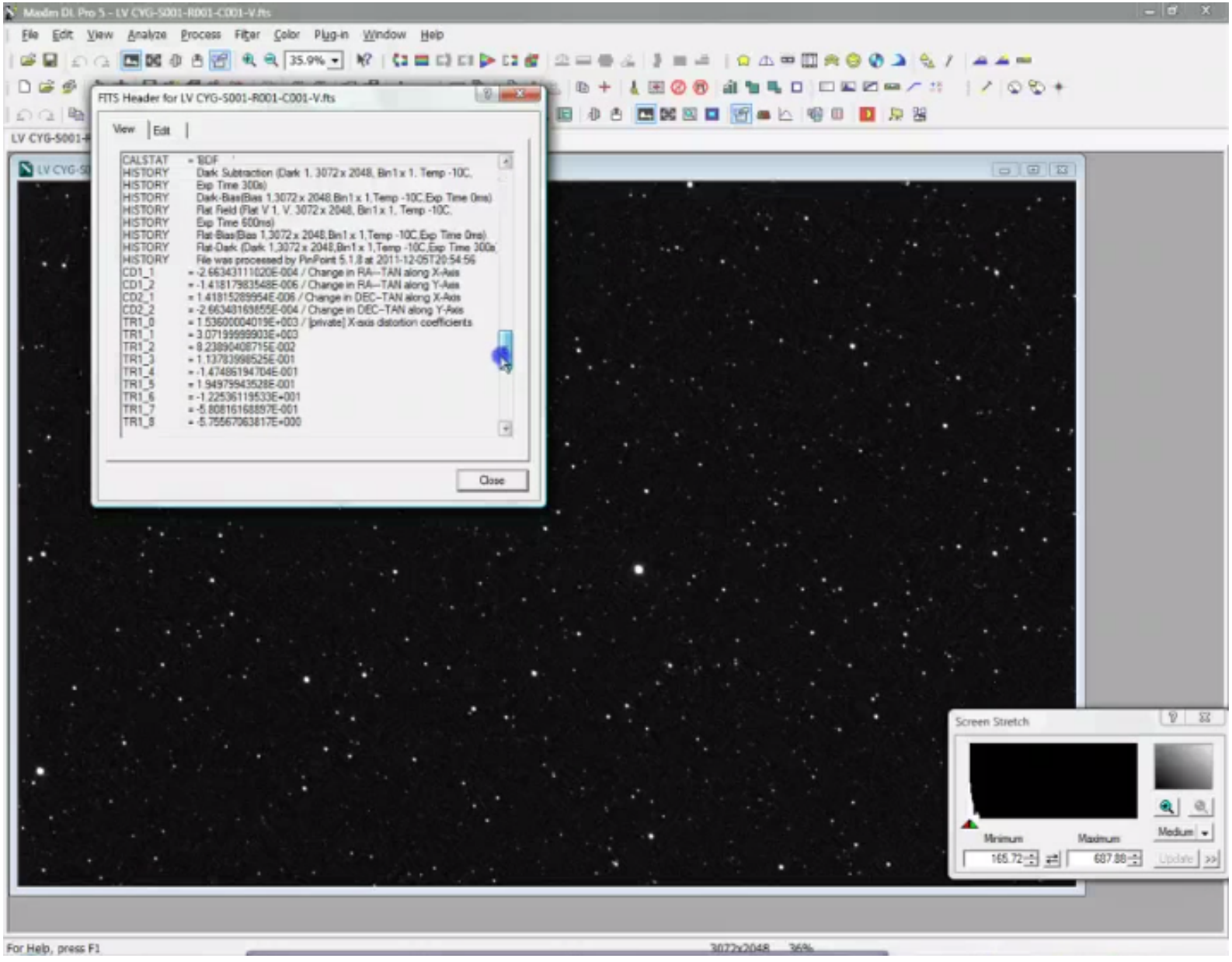
FITS Header Window

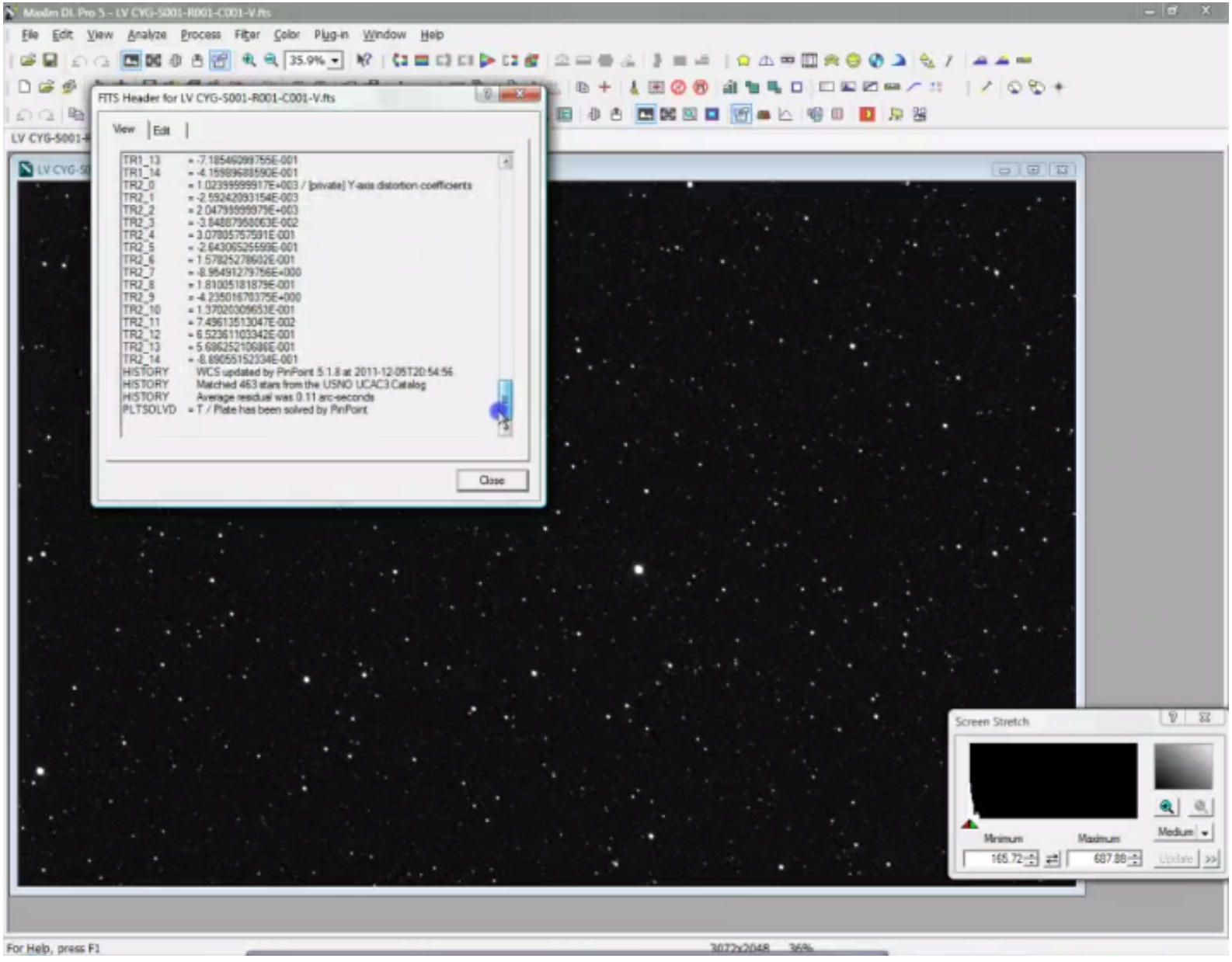


na samym końcu listy słów kluczowych i ich wartości są podane wzory transformacyjne dla naszego zdjęcia w standardzie WCS




Maxim DL Pro 5 - LV CYG-S001-R001-C001-V.fts
File Edit View Analyze Process Filter Color Plug-in Window Help
35.9%
FITS Header for LV CYG-S001-R001-C001-V.fts
View Edit
SIMPLE = T
BITPIX = 16 /8 unsigned int, 16 & 32 int, -32 & -64 real
NAXIS = 2 /number of axes
NAXIS1 = 3072 /fastest changing axis
NAXIS2 = 2048 /next to fastest changing axis
BSCALE = 1.0000000000000000 /physical = BZERO + BSCALE*array_value
BZERO = 0.0000000000000000 /physical = BZERO + BSCALE*array_value
OBJECT = 'LV CYG ' / Target object name
TELESCOP = 'RCOS 10RCA' / Telescope name
INSTRUME = 'SBIG ST-L-6K 3 CCD Camera' / Detector instrument name
OBSERVER = 'Grainger Robotic Observatory' / Observer name
NOTES = ''
DATE-OBS = '2011-10-07T00:30:08' / [ISO 8601] UTC date/time of exposure start
EXPTIME = 6.00000000000E+001 / [sec] Duration of exposure
EXPOSURE = 6.00000000000E+001 / [sec] Duration of exposure
SET-TEMP = -10.000000000000000 /CCD temperature setpoint in C
CCD-TEMP = -9.787817267811577 8 /CCD temperature at start of exposure in C
XPIXSZ = 9.000000000000000 /Pixel Width in microns (after binning)
YPIXSZ = 9.000000000000000 /Pixel Height in microns (after binning)
XBINNING = 1 / Binning level along the X-axis
YBINNING = 1 / Binning level along the Y-axis
XORGSUBF = 0 /Subframe X position in binned pixels
Close
Screen Stretch
Minimum
Maximum
165.72
687.88
Medium
Update
For Help, press F1
3072x2048 36%


Maxim DL Pro 5 - LV CYG-S001-R001-C001-V.fts
File Edit View Analyze Process Filter Color Plug-in Window Help
35.9%
FITS Header for LV CYG-S001-R001-C001-V.fts
View Edit
CALSTAT = 'BDF '
HISTORY Dark Subtraction (Dark 1, 3072 x 2048, Bin1 x 1, Temp -10C,
HISTORY Exp Time 300s)
HISTORY Dark-Bias(Bias 1,3072 x 2048,Bin1 x 1,Temp -10C,Exp Time 0ms)
HISTORY Flat Field (Flat V 1, V, 3072 x 2048, Bin1 x 1, Temp -10C,
HISTORY Exp Time 600ms)
HISTORY Flat-Bias(Bias 1,3072 x 2048,Bin1 x 1,Temp -10C,Exp Time 0ms)
HISTORY Flat-Dark (Dark 1,3072 x 2048,Bin1 x 1,Temp -10C,Exp Time 300s
HISTORY File was processed by PinPoint 5.1.8 at 2011-12-05T20:54:56
CD1_1 = -2.66343111020E-004 / Change in RA--TAN along X-Axis
CD1_2 = -1.41817983548E-006 / Change in RA--TAN along Y-Axis
CD2_1 = 1.41815289954E-006 / Change in DEC--TAN along X-Axis
CD2_2 = -2.66348163655E-004 / Change in DEC--TAN along Y-Axis
TR1_0 = 1.53600004019E+003 / [private] X-axis distortion coefficients
TR1_1 = 3.07199999903E+003
TR1_2 = 9.23890408715E-002
TR1_3 = 1.13783998525E-001
TR1_4 = -1.47486194704E-001
TR1_5 = 1.94979943528E-001
TR1_6 = -1.22536119533E+001
TR1_7 = -5.80816168857E-001
TR1_8 = -5.75567063817E+000
Close
Screen Stretch
Minimum
Maximum
165.72
687.88
Medium
Update
For Help, press F1
3072x2048 36%


Maxim DL Pro 5 - LV CYG-S001-R001-C001-V.fts
File Edit View Analyze Process Filter Color Plug-in Window Help
35.9%
FITS Header for LV CYG-S001-R001-C001-V.fts
View Edit
TR1_13 = -7.18546099755E-001
TR1_14 = -4.15989688590E-001
TR2_0 = 1.02399999917E+003 / [private] Y-axis distortion coefficients
TR2_1 = -2.59242093154E-003
TR2_2 = 2.04799999979E+003
TR2_3 = -3.84887958063E-002
TR2_4 = 3.07805757591E-001
TR2_5 = -2.64306525599E-001
TR2_6 = 1.57825278602E-001
TR2_7 = -8.95491279756E+000
TR2_8 = 1.81005181879E-001
TR2_9 = -4.23501670375E+000
TR2_10 = 1.37020309653E-001
TR2_11 = 7.49613513047E-002
TR2_12 = 6.52361103342E-001
TR2_13 = 5.69625210686E-001
TR2_14 = -8.89055152334E-001
HISTORY WCS updated by PinPoint 5.1.8 at 2011-12-05T20:54:56
HISTORY Matched 463 stars from the USNO UCAC3 Catalog
HISTORY Average residual was 0.11 arc-seconds
PLTSOLVD = T / Plate has been solved by PinPoint
Close
Screen Stretch
Minimum
Maximum
165.72
687.88
Medium
Update
For Help, press F1
3072x2048 36%