EC Petal Loading "Quick-start" Guide

Setup: Un-Zip Folder

Un-Zipped Files:

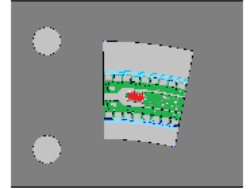|	
AdminFolder (Folder)	
- AerotechFunctions (Folder) ⟶	Spare folder of all Aerotech functions
- Reference_Images (Folder) ⟶	Folder of all Images used in code
- gantryValues (Excel File) ⟶	Values related to module loading
- glueValues (Excel File) ⟶	Values used for gluing
- surveyValues (Excel File) ⟶	Values used for surveying placements
- Users (Excel File) ⟶	File of usernames and passwords
- MATLAB_ATLAS_5MP (Cognex file) ⟶	File which Cognex camera uses
Output (Folder)	
- Output_Images (Folder) ⟶	Folder where saved images go
- Petals (Folder) ⟶	Folder where info on each petal goes
- Coordinates (Text File) ⟶	Text file where saved coordinates go
- GantryLog (Text File) ⟶	Text file of general gantry log
EC_ModuleLoading_GUI_2019b_Vn (MATLAB File) ⟶	Main app file

Steps:

- Unzip the folder to desired location on computer
- Create a shortcut to the MATLAB file
  - If desired, change icon to "matlab_gui_logo_18K_icon" found in Reference_Images folder ⟶
- **Recommended:** Create another shortcut of the "Output" folder (this is where all the output information will go – see above)
- Open "Users" file and change the usernames and passwords to suit the users at your site
- Open "gantryValues" file and change the camera/glue dispenser offset values as well as the pickup tool locations to match their locations (the Z value is the actual height the gantry head is at when in contact with the tool)
- ***Note**: Check and ensure excel is set for using periods for decimals instead of commas
- **All other folders/files should not be modified**
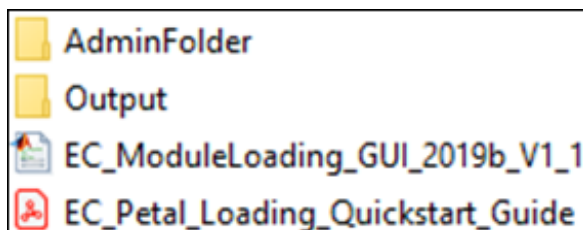
42	PickUp Tools		(absolute x, y, z location of pick-up tools on gantry)
43	R0		
44	524.887931	-498.7446	-130.21
45	R1		
46	268.887931	-498.7446	-120
47	R2		
48	452.887931	-498.7446	-130.21
49	R3		
50	524.887931	-498.7446	-130.21
51	R4		
52	268.887931	-498.7446	-120
53	R5		
54	524.887931	-498.7446	-130.21

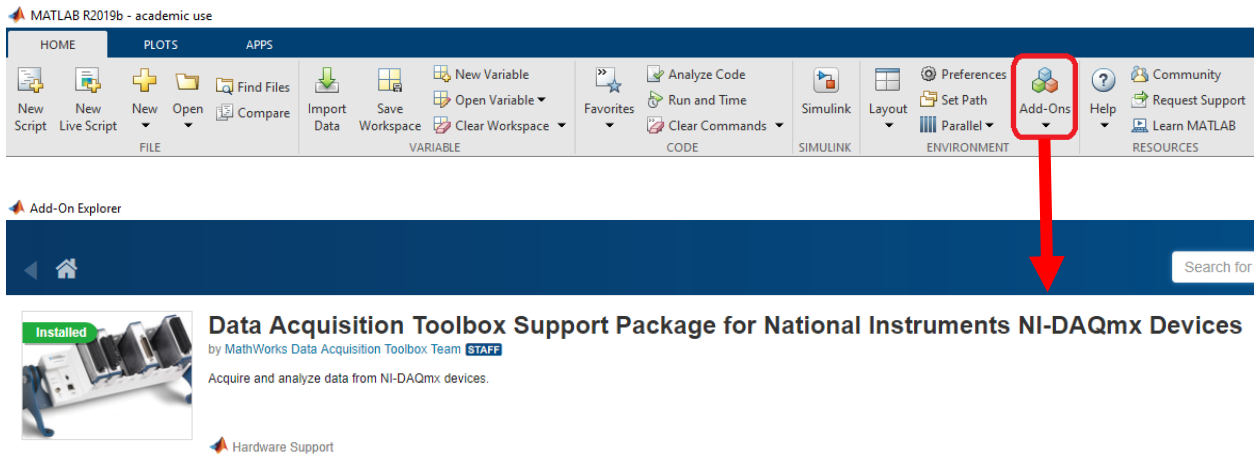| 58	Camera			
59	117.2707436	-0.356491969	-42.5	<-- x, y, z offset of camera foal point relative to gantry axis
60	689.32	-449.74	-91.39	<-- x, y, z location of camera calibration piece on gantry
61	115.7561	1.2652	-20	<-- x, y, z offset of glue tip relative to gantry axis

- There are two "Angle" cells: one for the orientation of the module vacuum chuck (located just below the module locations) and for the pick-up tools (located just below the pick-up tool locations) mounted on your gantry. In both cases, zero is being aligned with the gantry coordinate system (refer to right-most image(s) of tools and module). <u>Note</u>: positive angles are counter-clockwise.

39	Angle	
40		0 Angle of module vacuum jig (based on fiducials along straight edges)
55	Angle	
56		0 Angle of pick-up tool holder (0 = along x-axis)

Setup: MATLAB
- Download/install MATLAB (Version 2019b)
- Download/install NIDAQmx Add-On for MATLAB
  o Select "Add-Ons" and type in NIDAQmx to find it

Data Acquisition Toolbox Support Package for National Instruments NI-DAQmx Devices
by MathWorks Data Acquisition Toolbox Team STAFF
Acquire and analyze data from NI-DAQmx devices.

Installed

Hardware Support

- Go to: **Preferences → MATLAB → Web**
  o Ensure "System Web Browser" checkbox is <u>unchecked</u> (this is mainly for the Cognex camera)
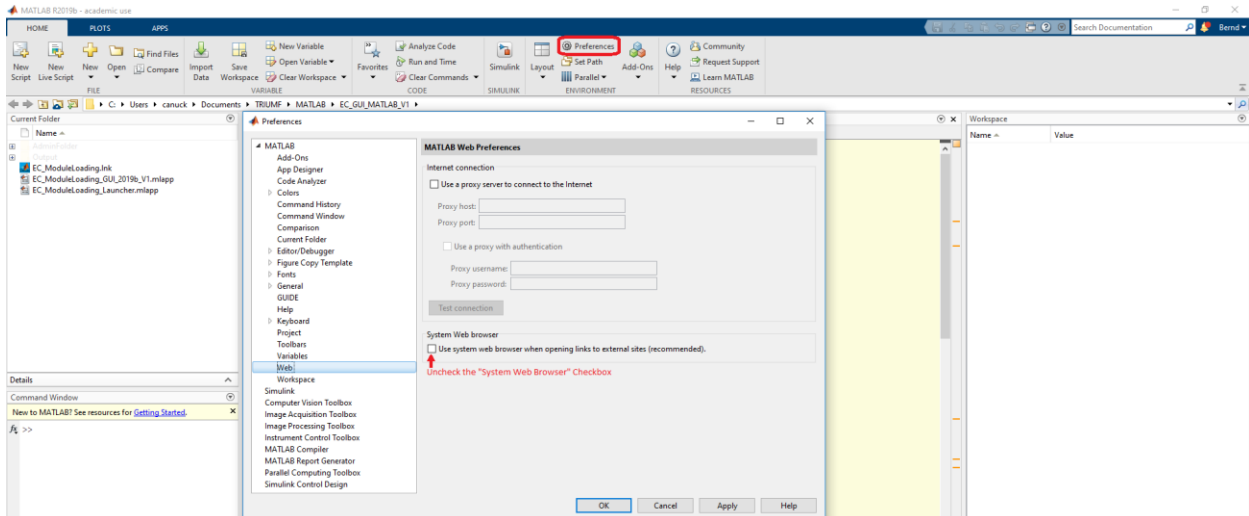
# Setup: Cognex Camera/Software (Once IS8405 camera has been acquired)

- Mount camera to gantry (ensure it is aligned with the gantry coordinate system)
- Download/install In-Sight Explorer (Version 5.7.3)
    - https://support.cognex.com/en-ca/downloads/in-sight/software-firmware
- Connect to camera (select the appropriate camera from the list and click "Connect"
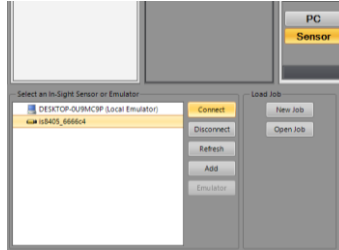
- Open job file ("MATLAB_ATLAS_5MP.job", found in the AdminFolder)
- Save the job file (use "Save Job As") to the camera, found under "In-Sight Sensors" tab
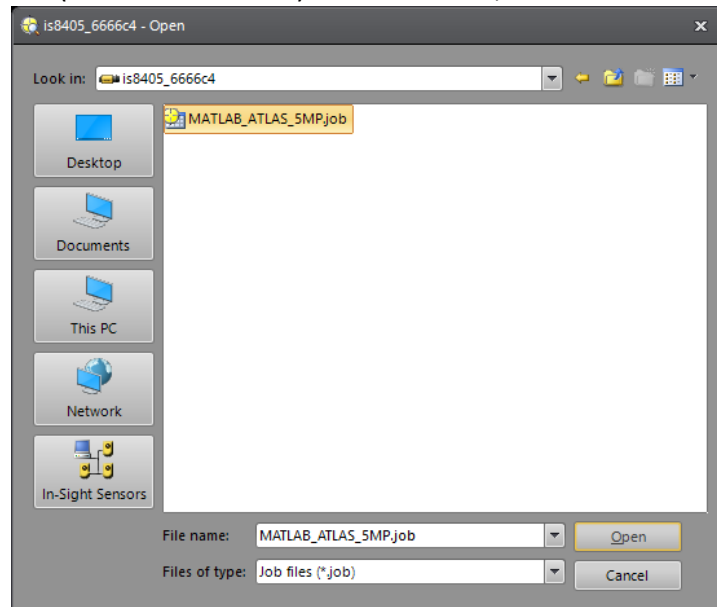
- Change to "Spreadsheet" View
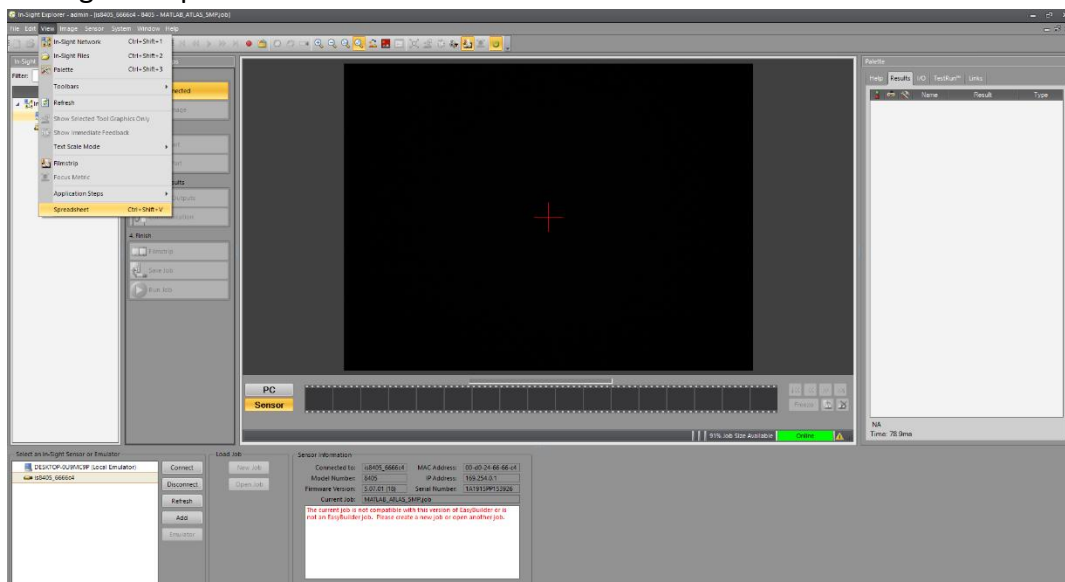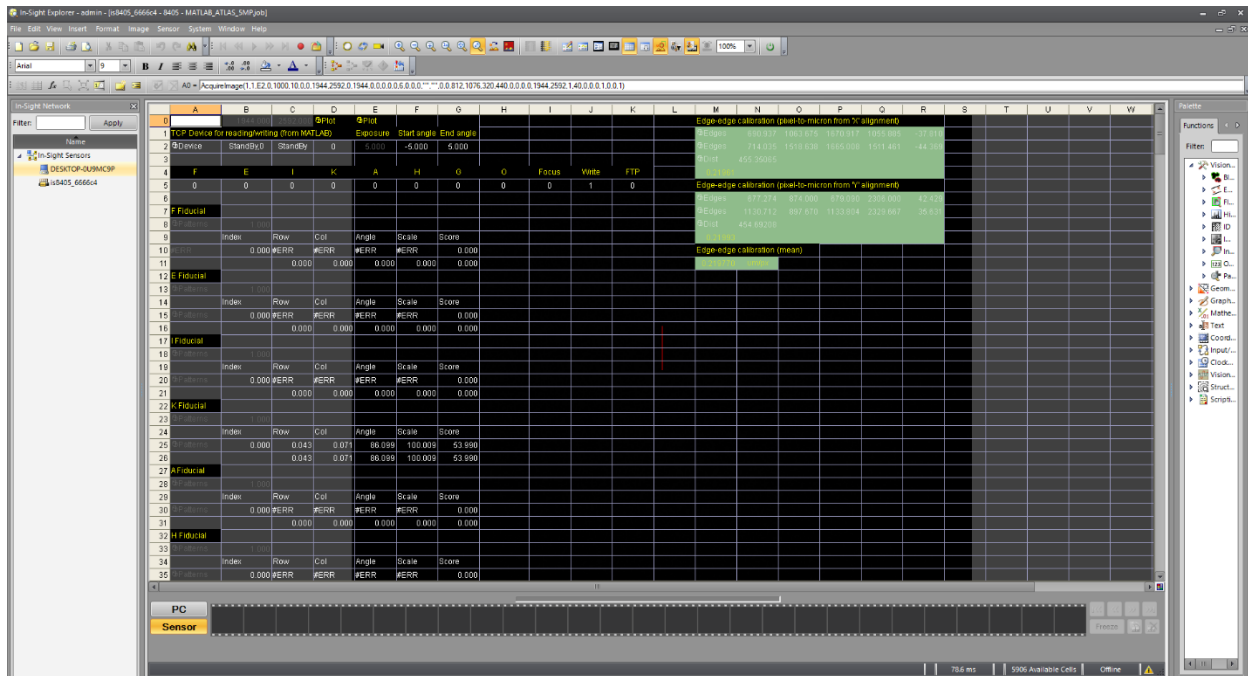
(Spreadsheet view of In-Sight software)

- Double-click the "FTP" cell (red rectangle in image below) to open a dialog
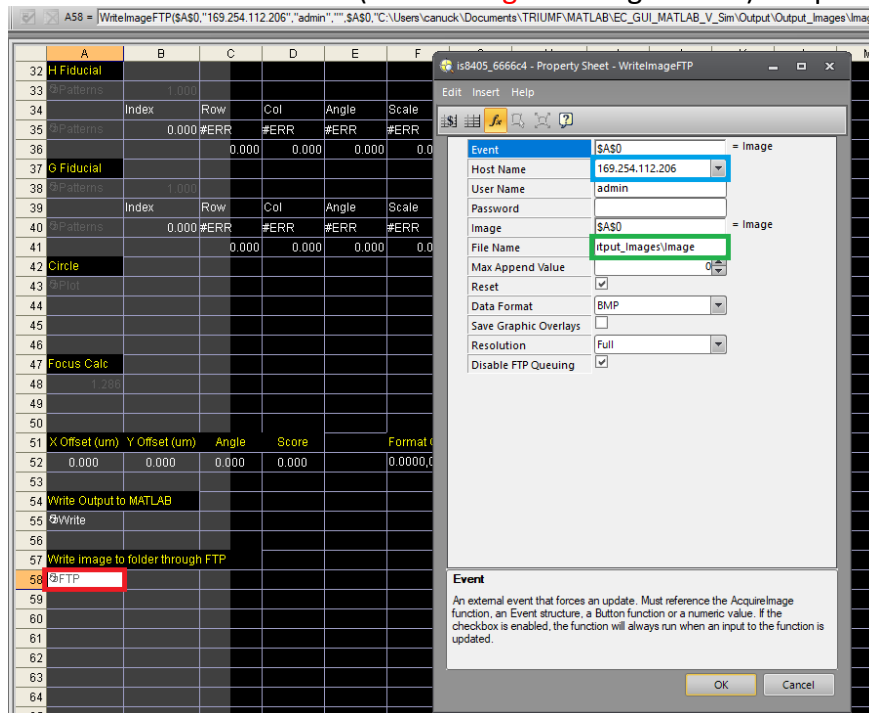
- Change two sections:
    o "File Name" (green rectangle): Enter the entire pathname of the Output_Images folder followed by *"/Image"* – "Image" is what the image is saved as in the output folder, which MATLAB changes appropriately
   o "Host Name" (blue rectangle): Open the command prompt and enter "ipconfig"

- o Find the IP Address (IPv4) of the Ethernet adaptor that the camera is connected to and enter it into the "Host Name" section in the In-Sight dialog

- Ensure the camera firmware is correct:
- Go to **System → Update Firmware…**
  - o Select your camera as well as "force update" and ensure the "New Version" is 5.07.XX and click the Next button
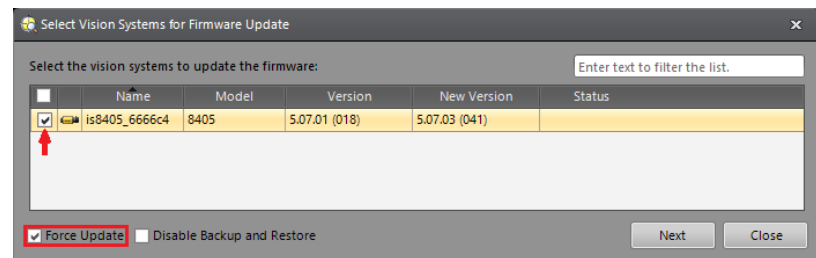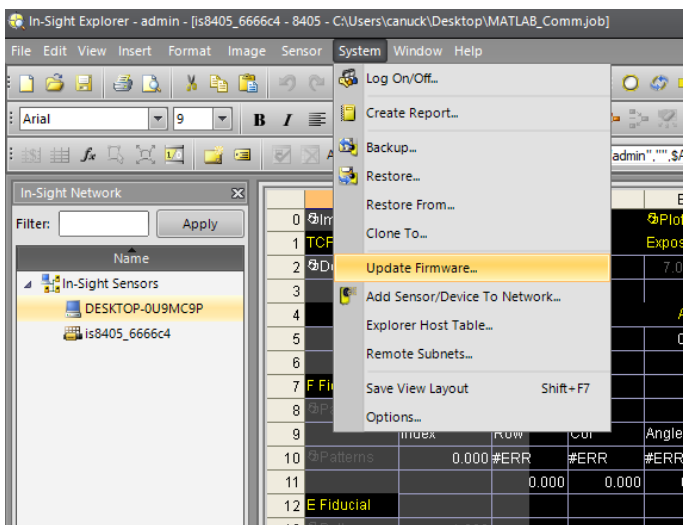
- Go to **System → Options…**
  - o In the "Emulation" tab, set the "FTP Logins" to **21** and change the "Authorized FTP Directory" to the "Output_Images" folder found in the "Output" folder
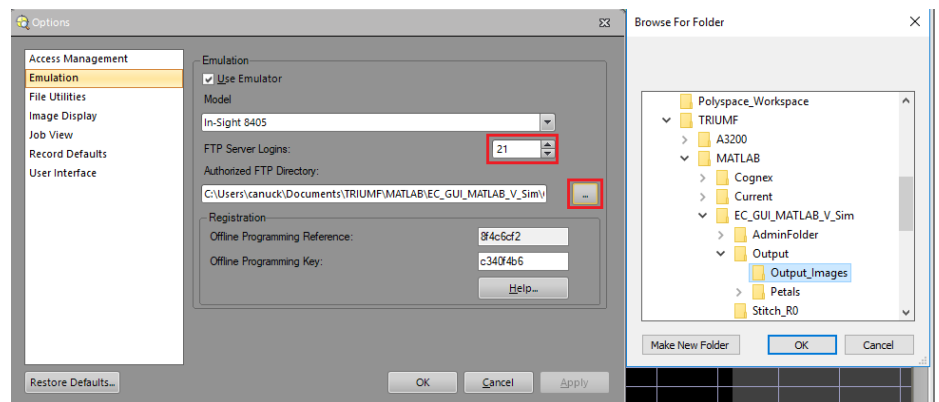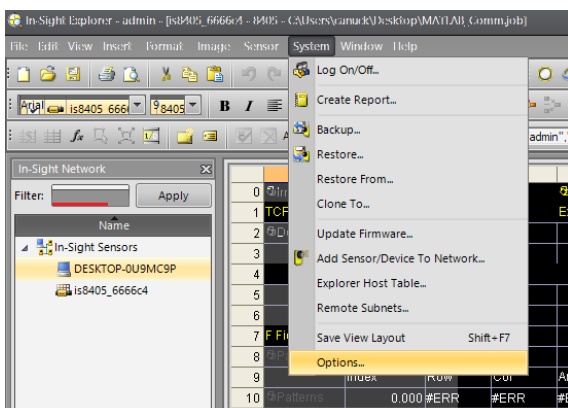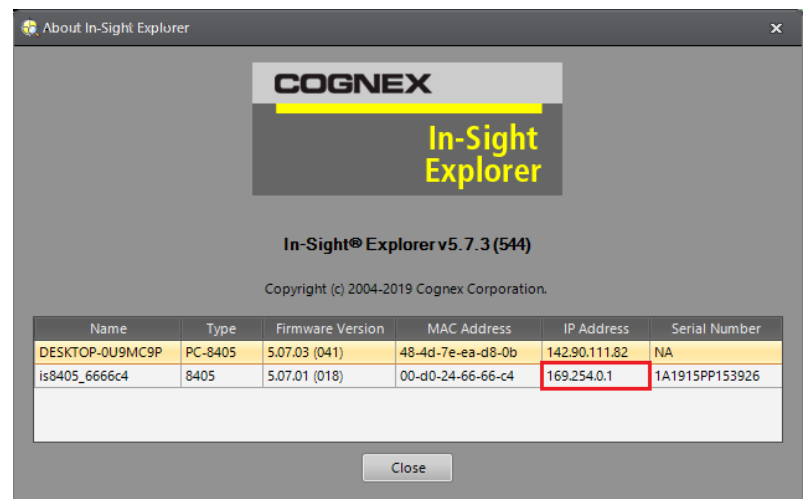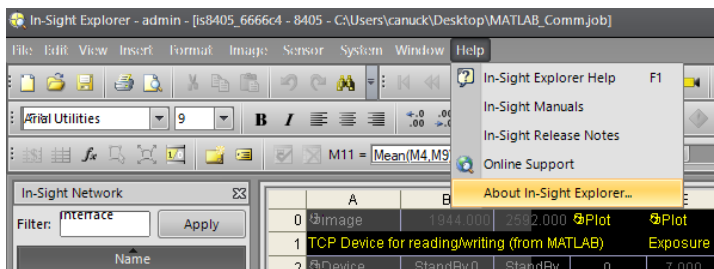
The following steps are for acquiring the necessary information to add to the "Cognex" section in the "gantryValues.xlsx" file (very bottom of sheet):
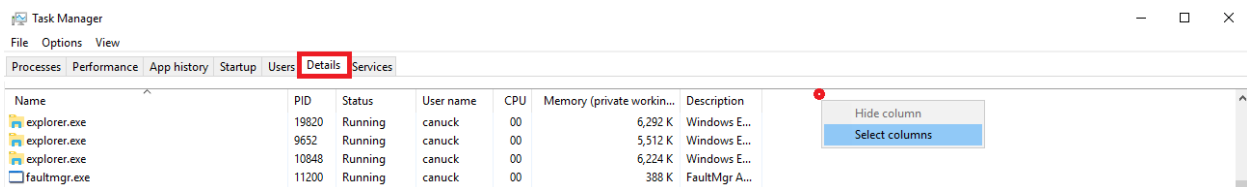

Obtain camera IP Address:
- Go to **Help → About In-Sight Explorer…**
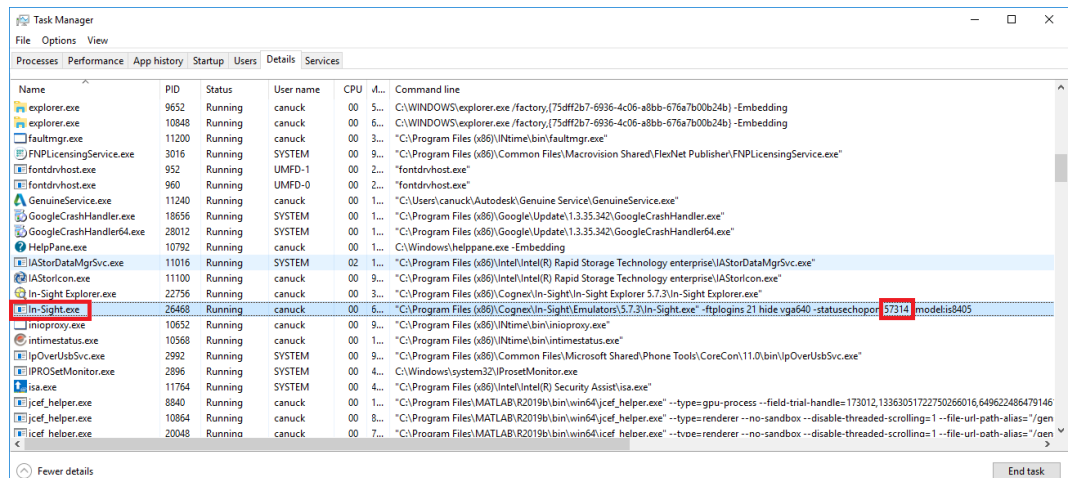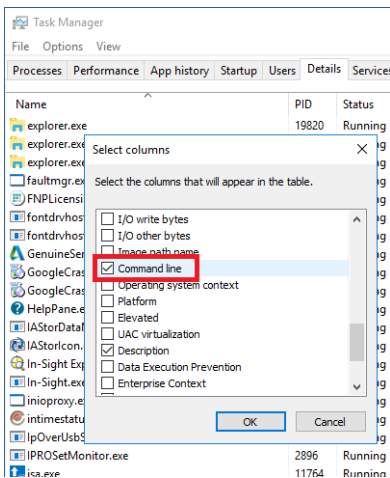- Copy down the IP Address of the camera

Obtain "FTP Echo Port":
- Open Task Manager and open the "Details" tab
- Right-click somewhere on the title space and select "Select columns"

- Find and check "Command Line" (this will create another section)
- Scroll down and find "In-Sight.exe" and copy down the 5-digit number in the "Command Line" section

** **Note:** The first time you set this value, it may change after running MATLAB software
- o If this happens, find the 5-digit number again as it may have changed
- o Once established, it should not change again

Obtain micron-pixel ratio:
- Place and locate a linear gauge on the gantry (used to find distance)
  - o Turn on the through-the-lens light and set the camera to "Live Video" to get the live view from the camera (turn off live view when you have aligned the linear gauge and are ready to measure)
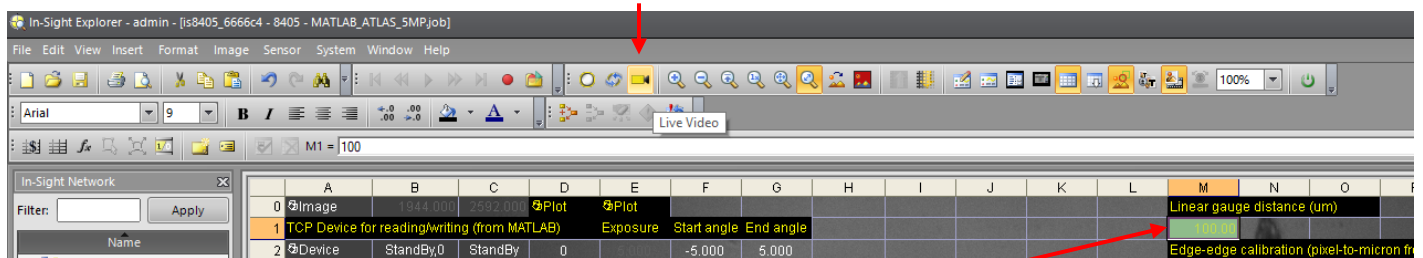

- Enter the distance (in μm) in the "Linear gauge distance (um)" cell (here, we measured 100 μm)

- Highlight one of the alignment sections (if you are measuring a distance along the x-axis, highlight the 'X' alignment; if you are measuring a distance along the y-axis, highlight the 'Y' alignment) in the In-Sight spreadsheet and change the "Cell State…" to 'Enabled'
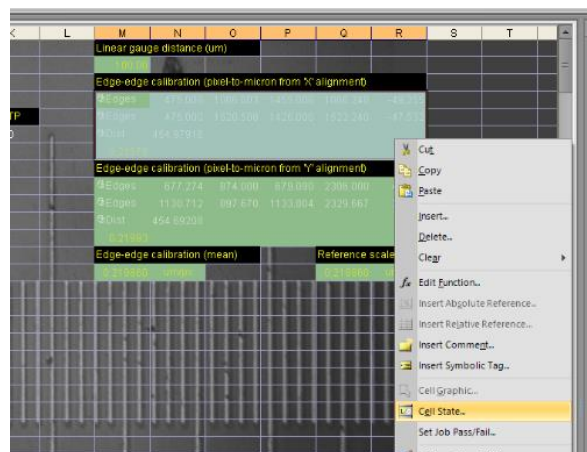
- Double-Click the first "Edges" cell to open a dialog
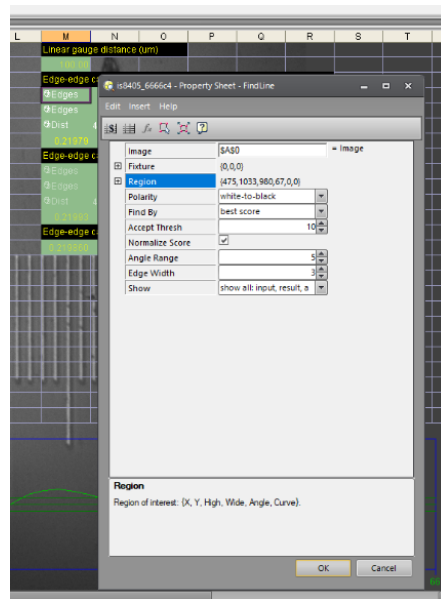
- Double-click "Region" to show camera image and a red rectangle
    - Adjust the shape of the rectangle to fit around a single line/edge
    - **Note:** The small arrows on the box perimeter indicate which direction the algorithm will search for a line, along with the "Polarity" cell method
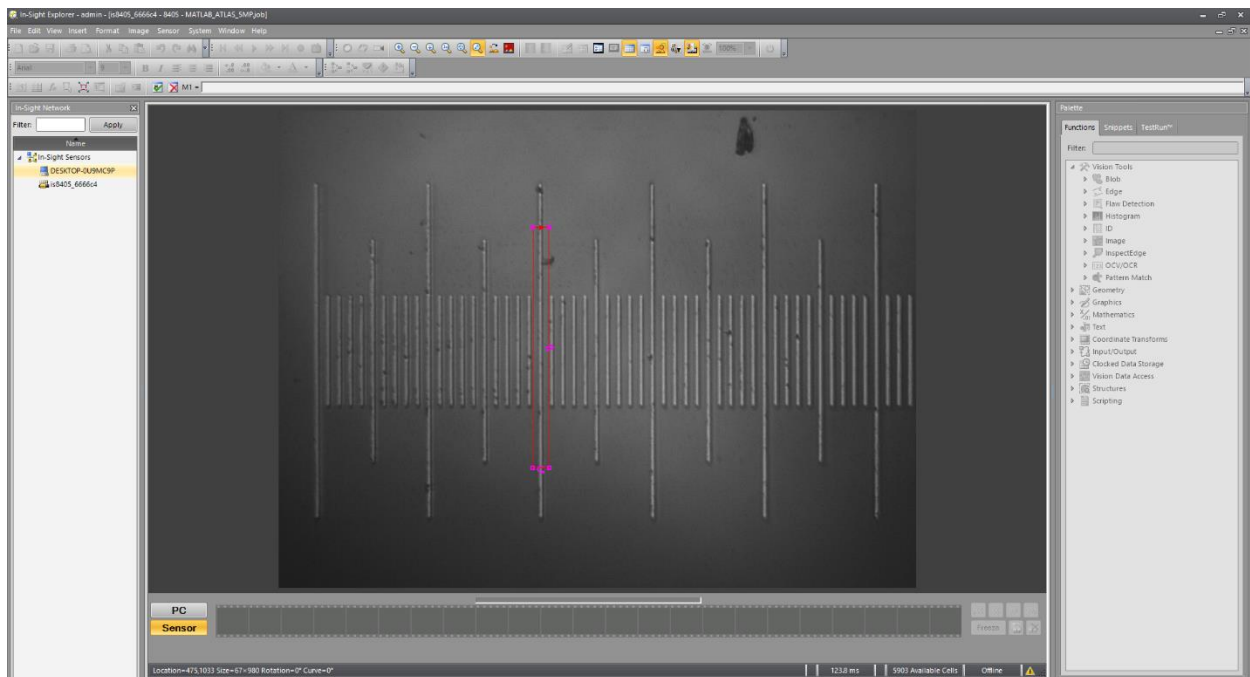
- Repeat the steps for finding a line with the second "Edges" cell
- Once both lines have been found, the pixel-µm ratio will automatically be determined (yellow number at the bottom of the green section)

- Highlight the section and disable it by going back to "Cell State…"
Repeat the above steps for the other axis alignment

- Once both axes' pixel-μm ratios have been determined, enable the "Edge-edge calibration (mean)" cell and then disable it right after
    o This takes the mean of the two ratios just determined (the pixels are square so they should be close to the same)

Once ALL steps have been complete, save over both files (one located on the camera and one located in the "AdminFolder")