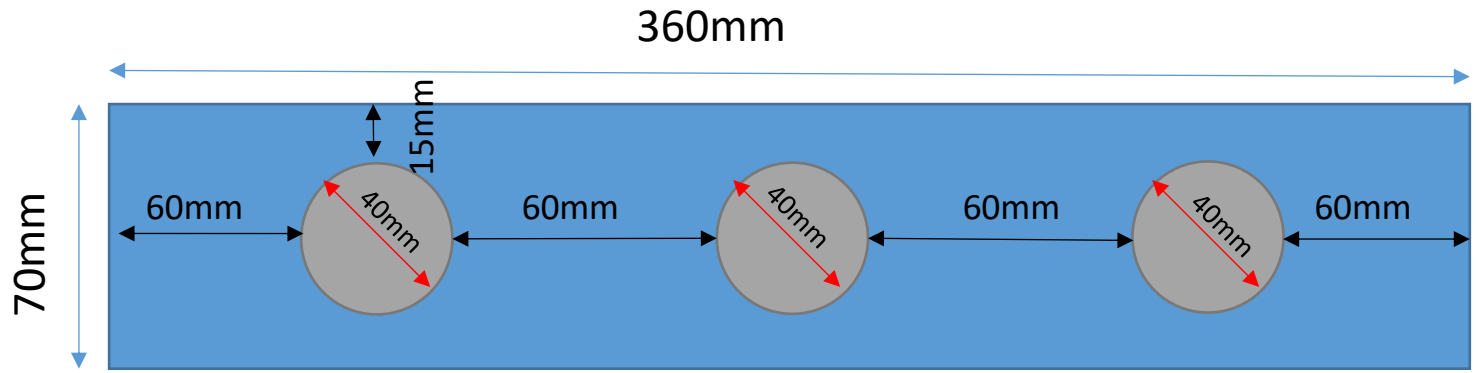
Multi-Altiz Alignment

Calibration Tool

One line

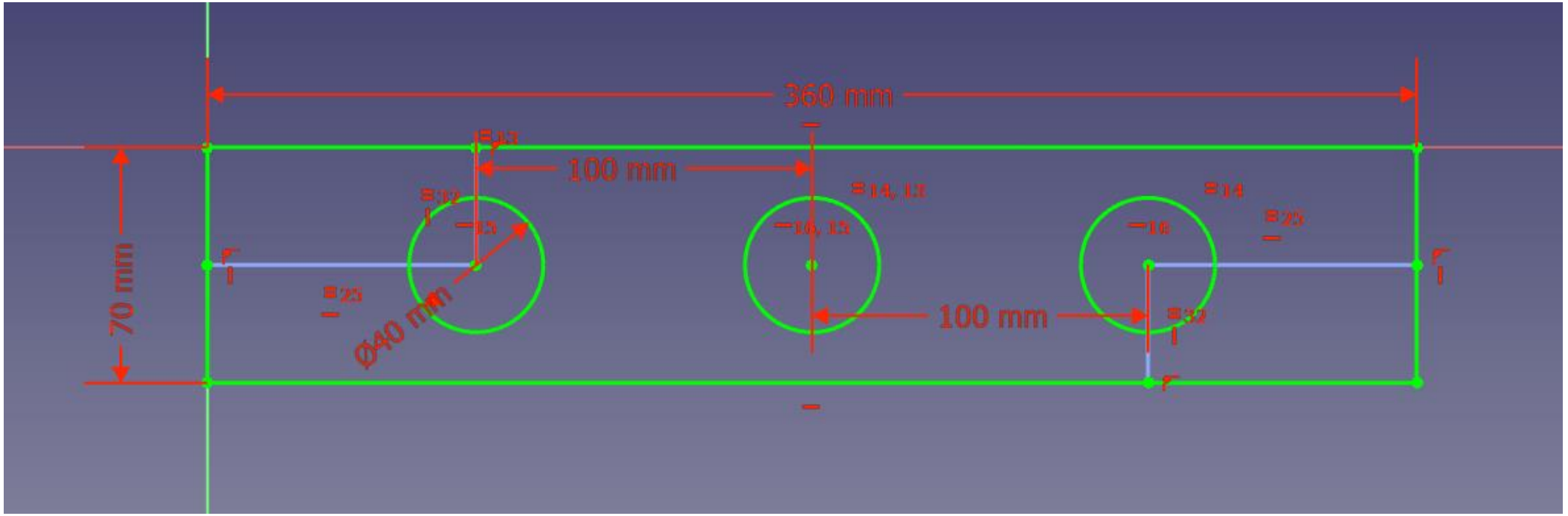
Sketch 2D model one line

For information only. Dimensions are subject to change.

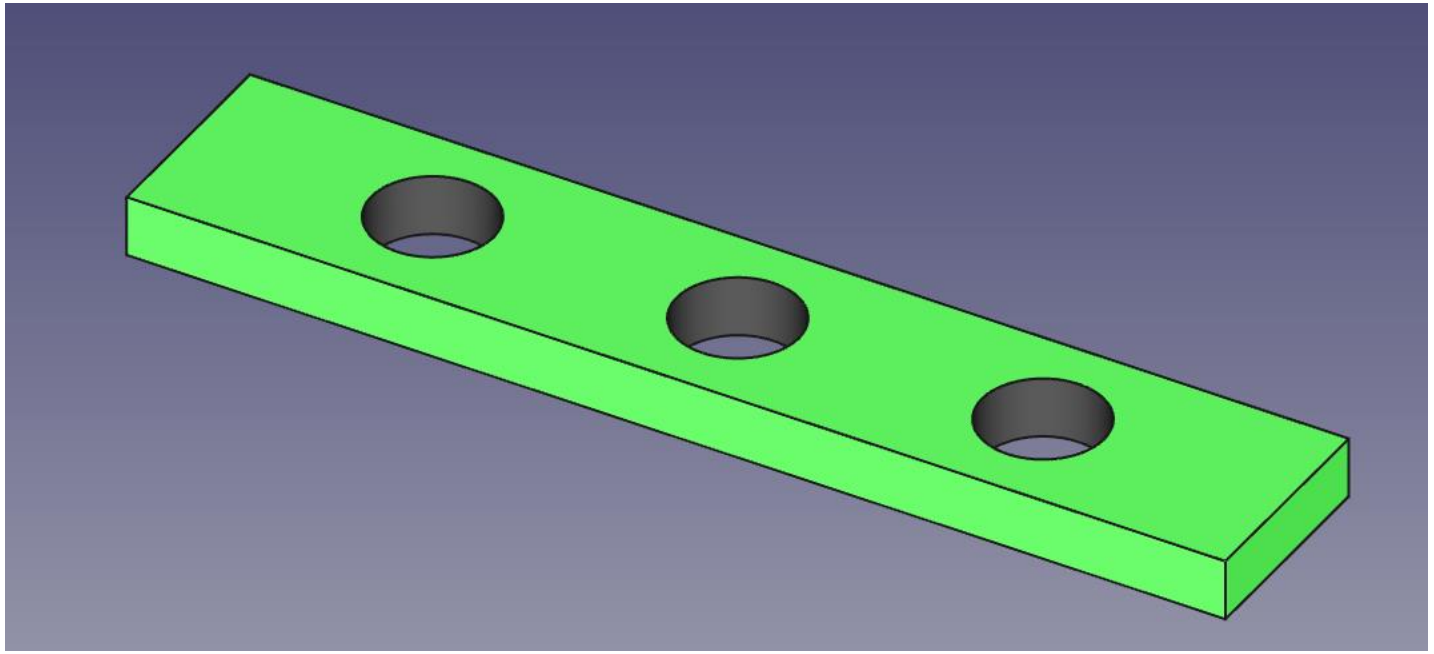


Sketch 2D model

For information only. Dimensions are subject to change.



3D model

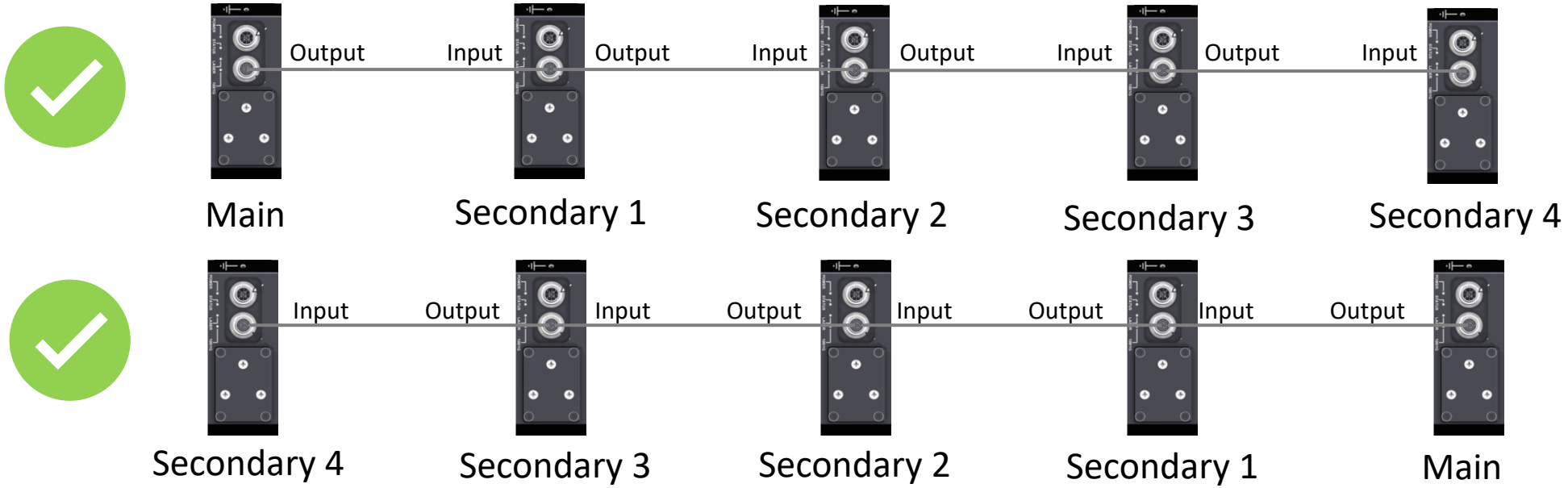


Material

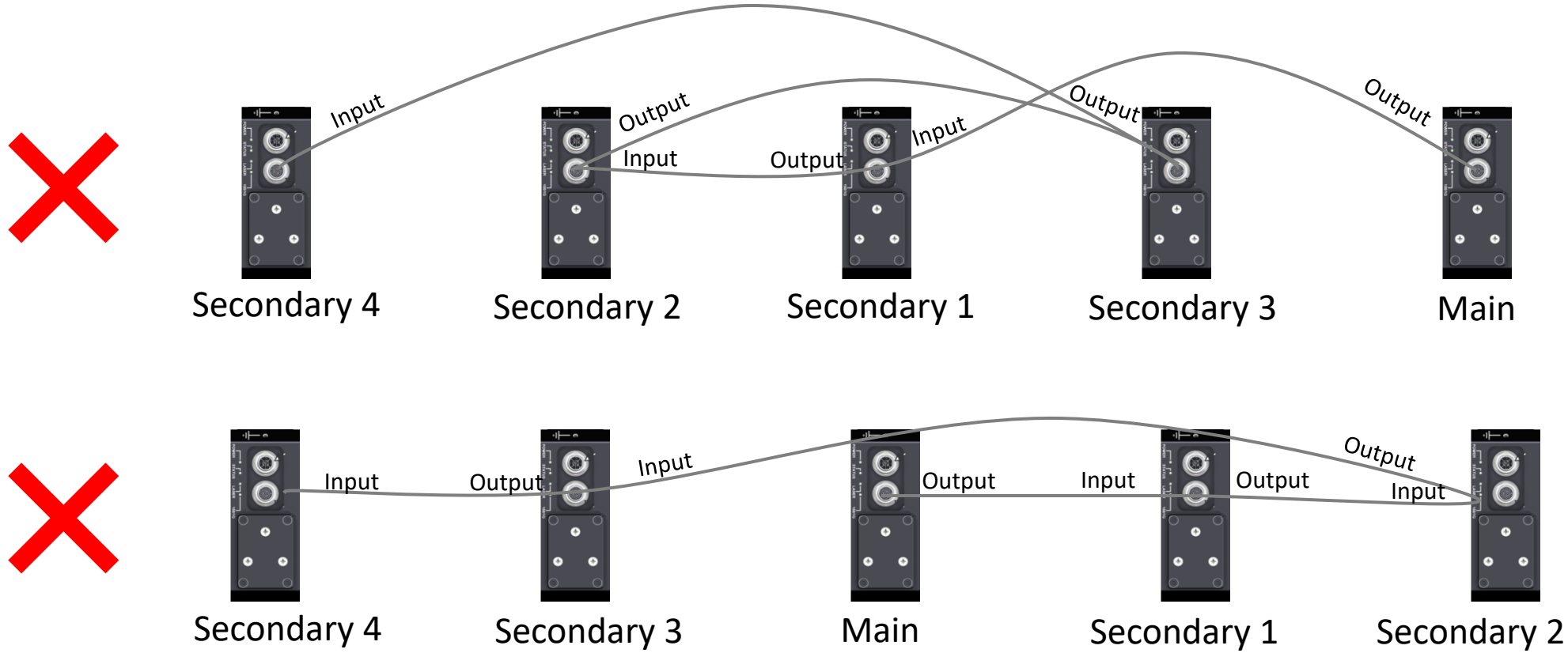
- The tool should have a matte finish to reduce reflections. Matte paint can be used:

Constraints (1)

- The Altiz must be ordered with the main camera at one end.
  - Example:

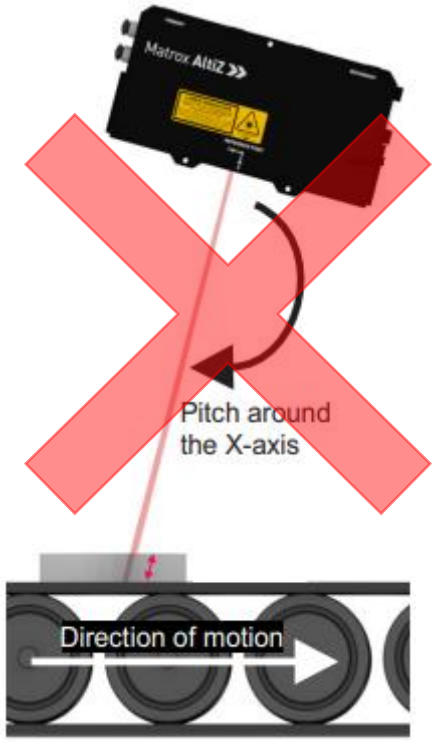


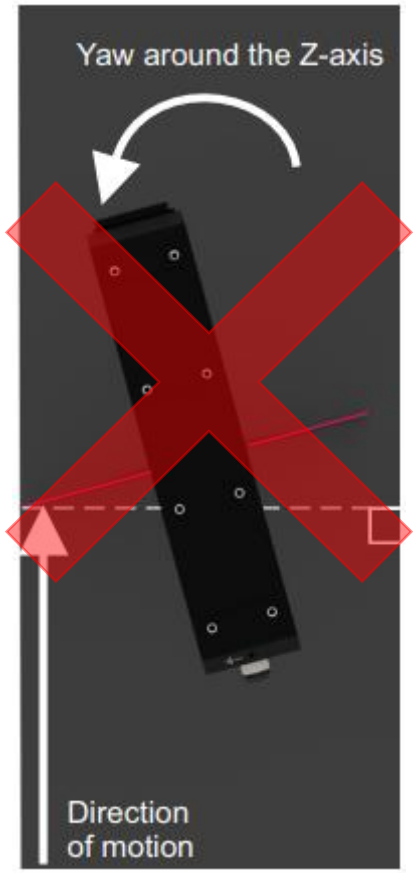
Constraints (1)



Constraints (2)

- The Altiz should not have any rotation around their X and Z axis.





Constraints (3)

- Grab must only be performed on the Main camera.
- Plugin support a maximum of 6 Altiz.

Installation (1)

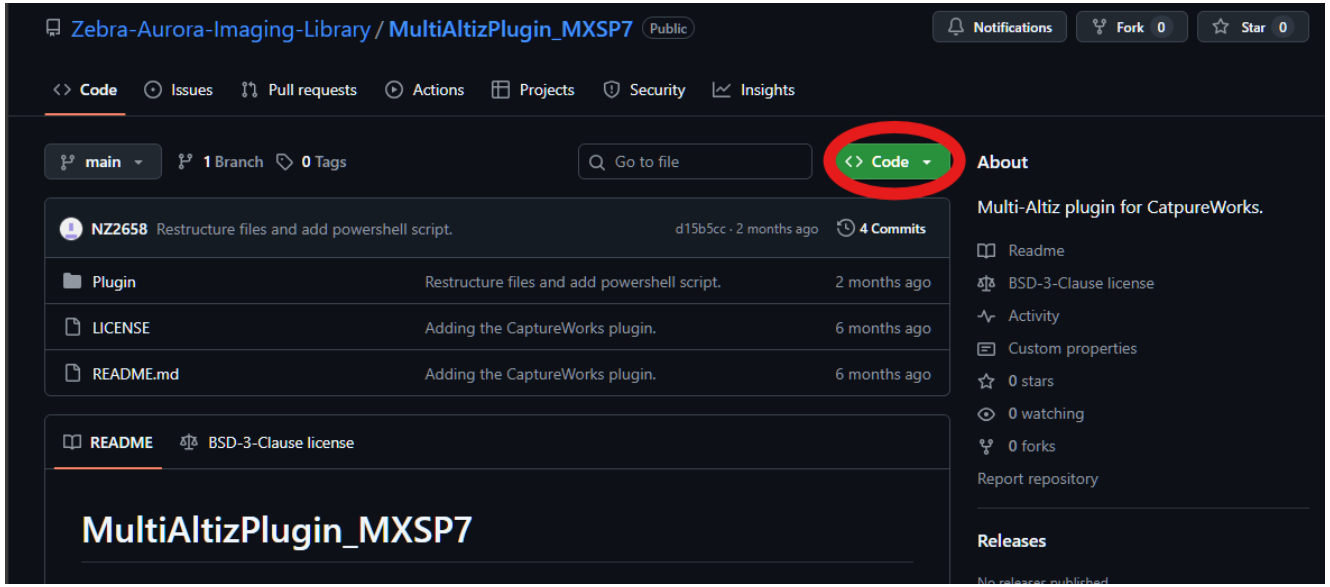
- Required:
  - ❑MIL X 23H2 and U149 minimum .
  - ❑SP7 minimum.
  - ❑Image Processing module license.
- To add a plugin in Capture Works:
  - ❑Download the plugin Zip folder on GitHub. (see next slide)
  - ❑Unzip. Inside you'll find a PowerShell script (.ps1) and a folder containing the plugin.
  - ❑Open PowerShell as an administrator.
  - ❑Use the "cd" command to navigate to the directory containing your PowerShell script.
  - ❑Write .\MultiAltizInstallScript.ps1 and press enter. The script will check:
    - ✓ Python installed in your machine.
    - ✓ pip package install.
    - ✓ Mil Python package. If not, it will install it.

  Once all checking are done it will copy the plugin folder in CaptureWorksPlugin folder.

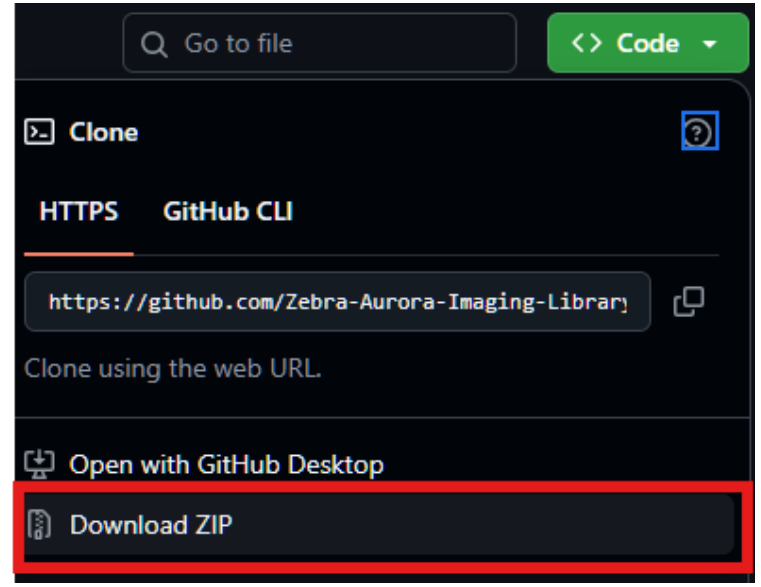
Installation (2)

Download the plugin Zip folder on GitHub

1- Click on “Code”:

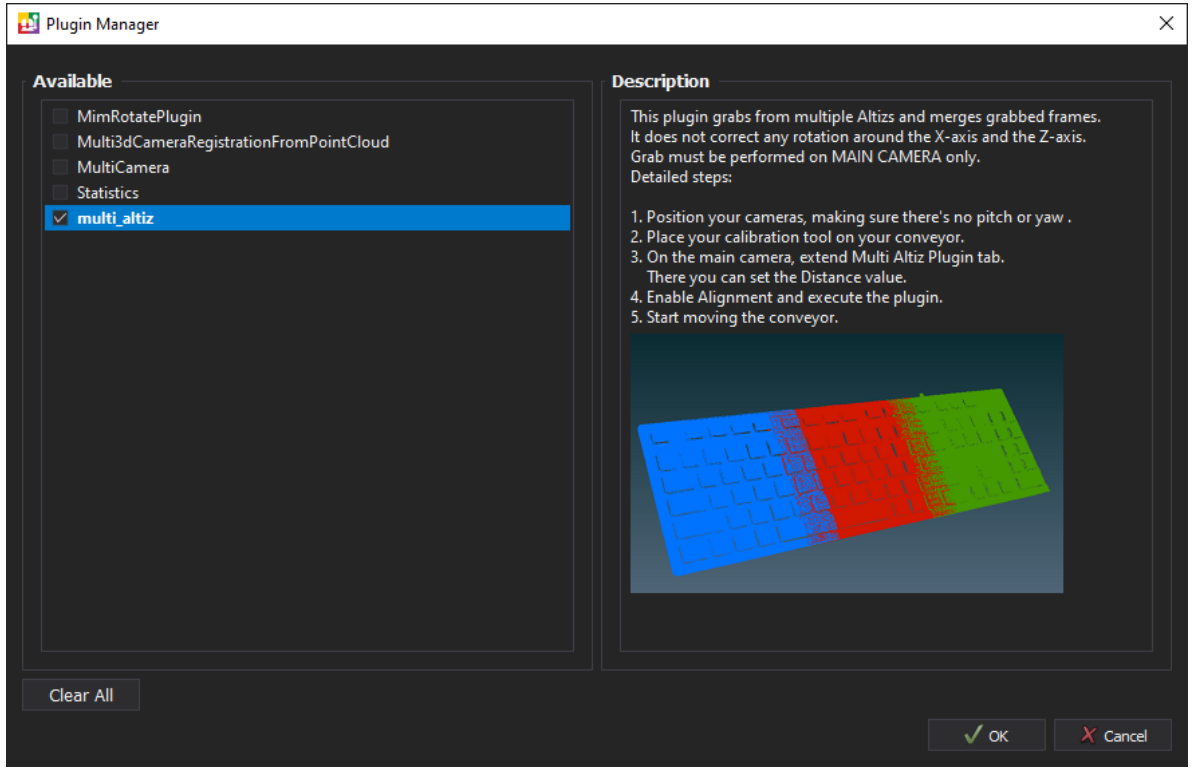


2- Click on “Download ZIP”



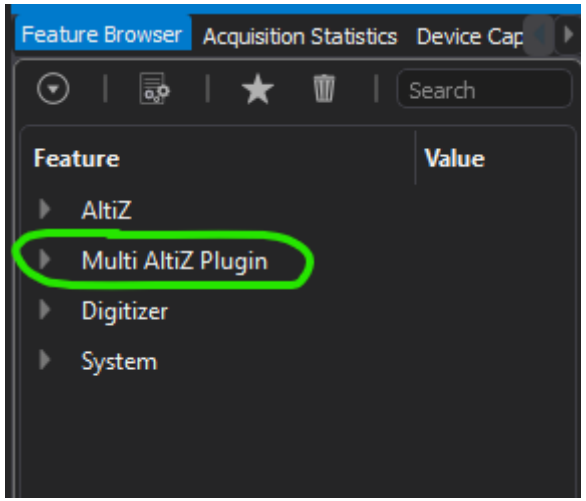
User guide

- After opening CaptureWorks  open the “Plugin manager”  :
- Select “multi_altiz” then clic on OK



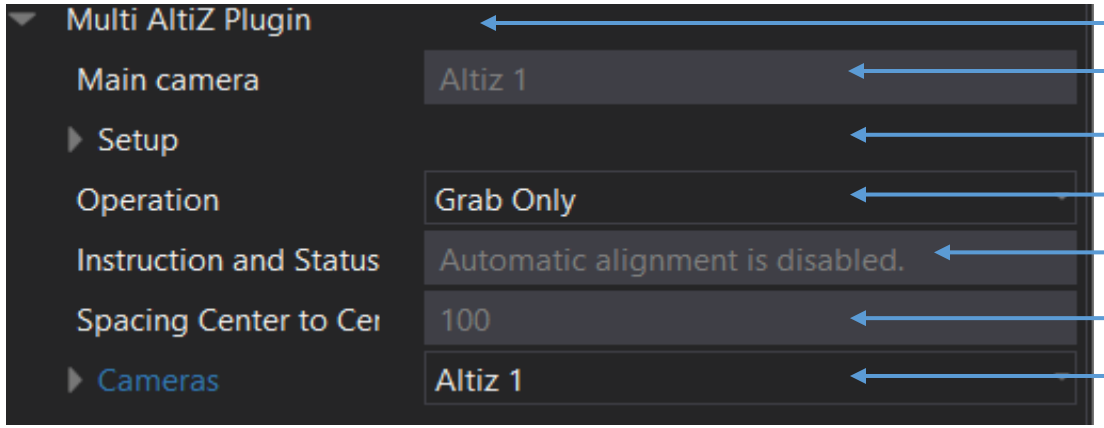
User guide

- Allocate each secondaries camera and **then** allocate the main camera. You should see a new tab called “Multi AltiZ Plugin”:



User guide

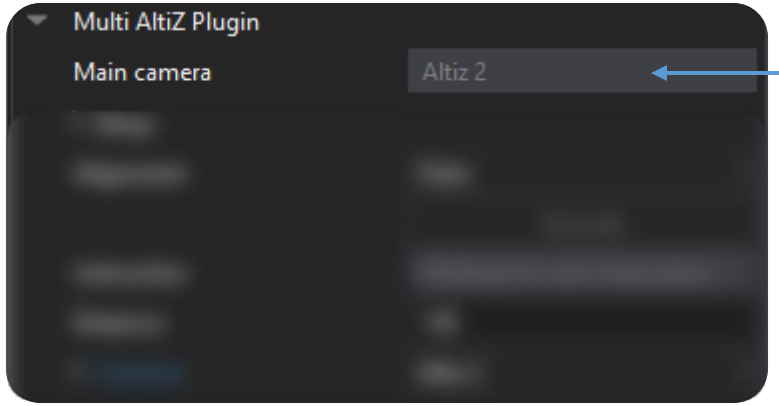
- Extend the Multi AltiZ Plugin tab to see all the features it contains. (1)



Plugin’s name.
Main camera name.
Sub tab allowing the user to set the plugin’s parameters.
Set whether you want to perform alignment.
Instruction and status of alignment.
Sets the distance between the holes along Altiz’s X-axis.
Control cameras parameters.

User guide

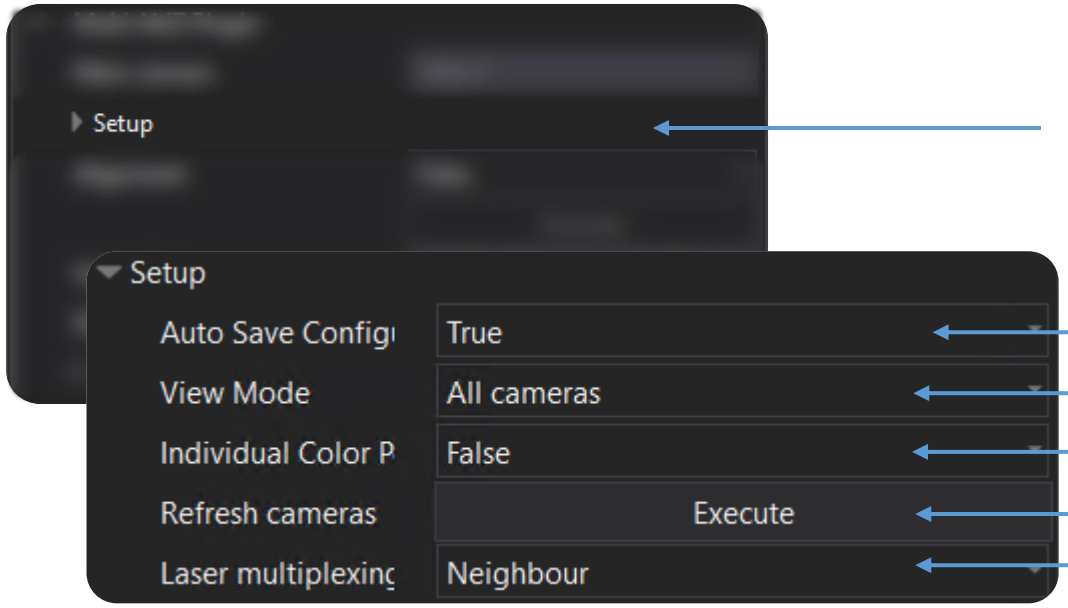
- Extend the Multi AltiZ Plugin tab to see all the features it contains. (2)



Based on the IO, the plugin will automatically find topology and identifies the main camera (when it is allocated).

User guide

- Extend the Multi AltiZ Plugin tab to see all the features it contains. (3)



Sub tab allowing user to set plugin's parameters.

Selects whether you want to save settings in a camera. Note that when activated, it slows the plugin just before the grab. Make sure the "Acquisition…" status is on before moving the stage.

Keep the data of all the grabs and not only the merge.

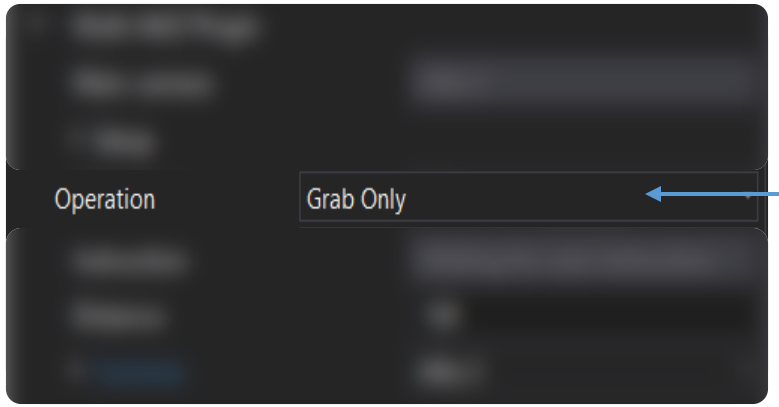
Assign a unique color per PC grabbed by each AltiZ.

Refresh values on the feature browser.

Setup the laser multiplexing mode: - Neighbour (default)
- Off
- Custom

User guide

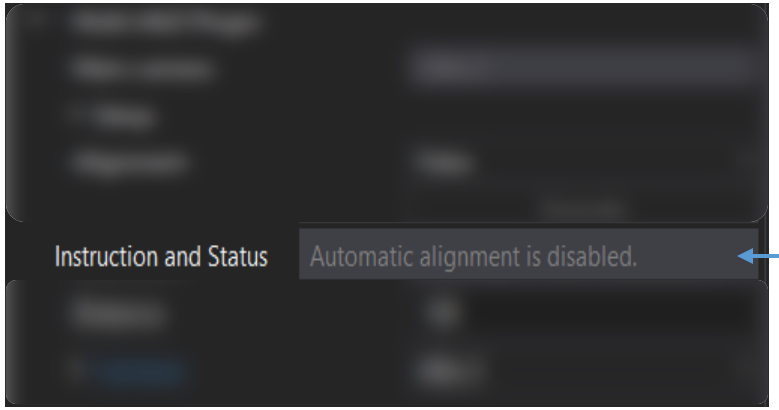
- Extend the Multi AltiZ Plugin tab to see all the features it contains. (4)



Set whether you want to perform alignment. When feature is set to “**Alignment**”, simply press the Single Grab button to performs the grab and alignment. Or set this feature to “**Grab Only**” when an alignment has already been made. The conveyor can be moved.

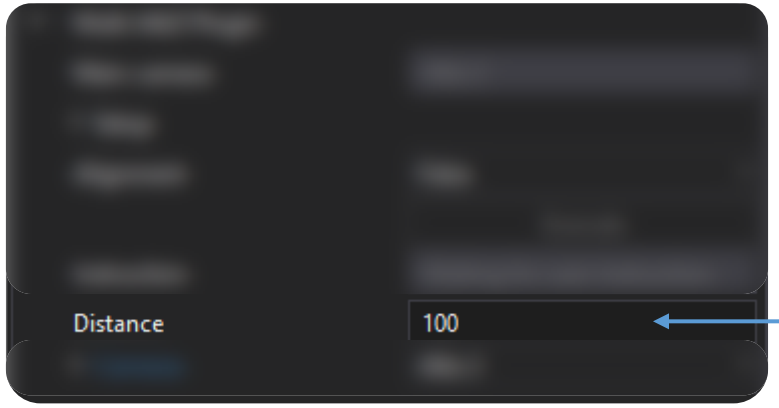
User guide

- Extend the Multi AltiZ Plugin tab to see all the features it contains. (5)

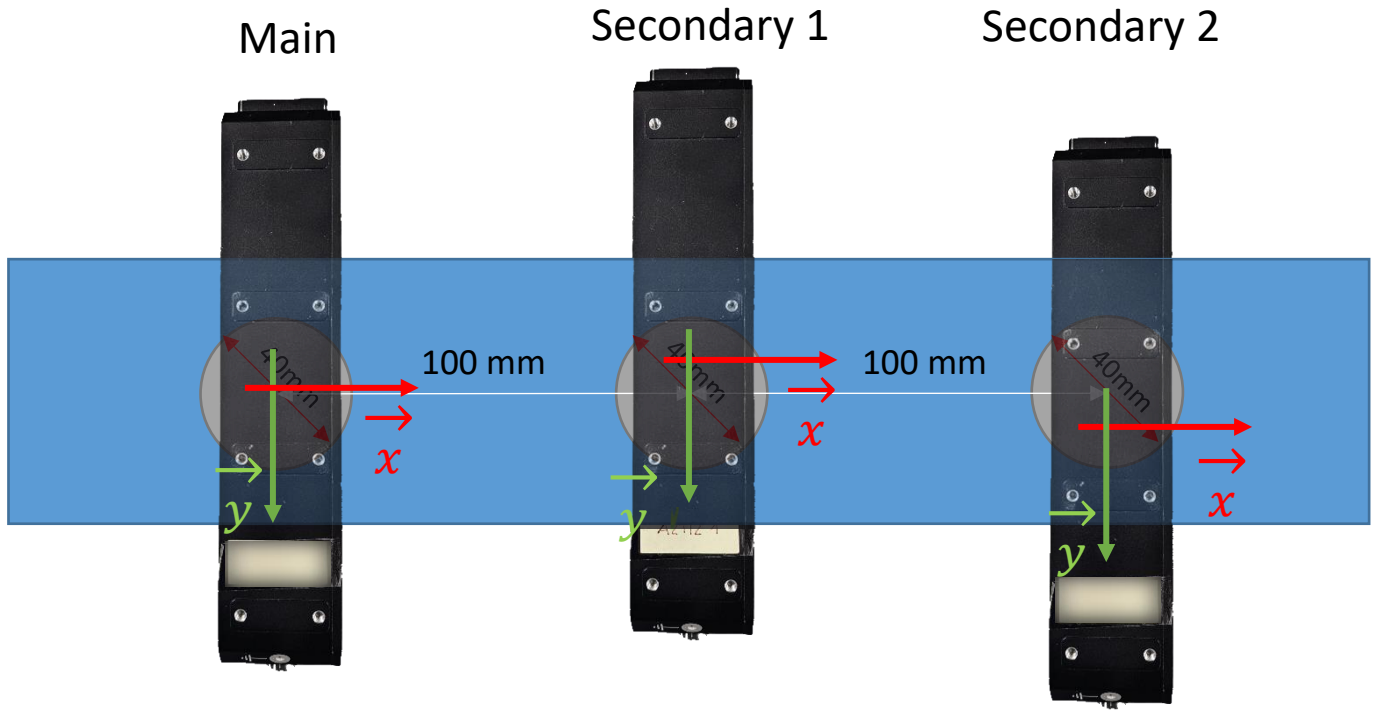


Indicates if the plugin is ready to align or not.

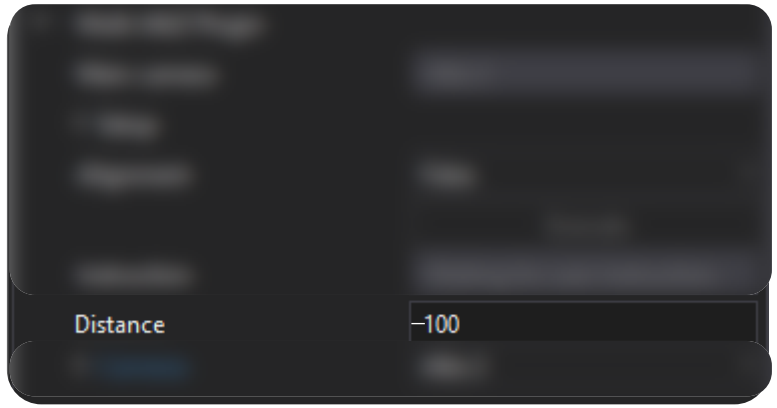
- Extend the Multi AltiZ Plugin tab to see all the features it contains. (6)

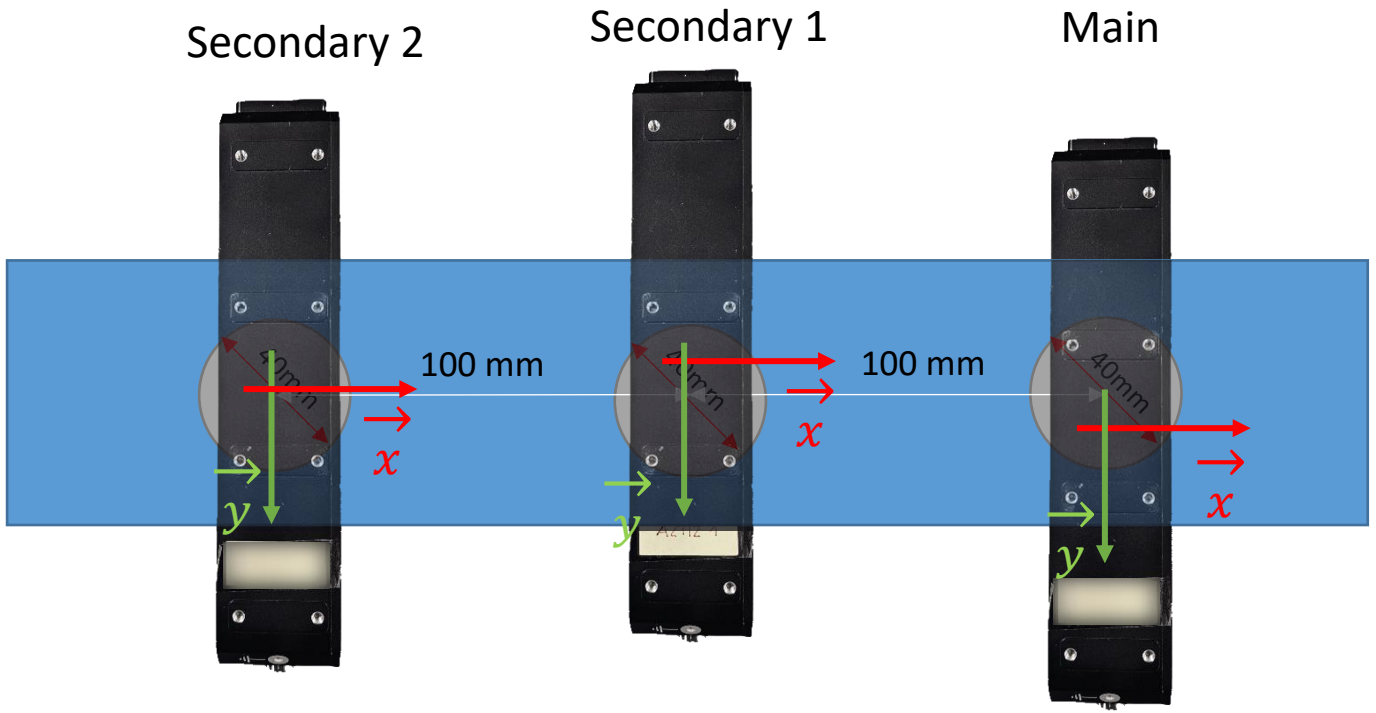


Set the distance between the holes along Altiz's X-axis from the main camera.

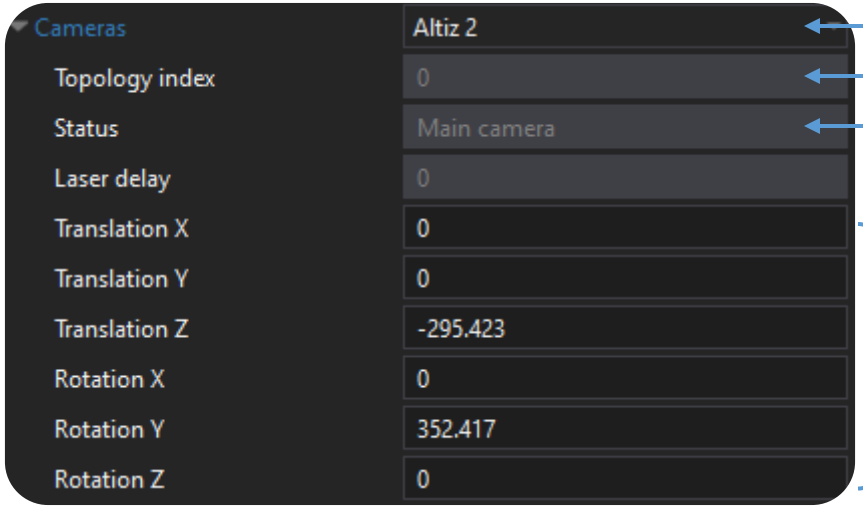


- Extend the Multi AltiZ Plugin tab to see all the features it contains. (6)



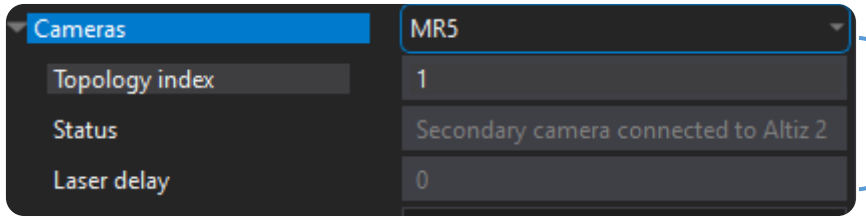


- Extend the Multi AltiZ Plugin tab to see all the features it contains. (7)



Control cameras parameters.
Indicates position of the selected camera in the topology.
Indicates whether the selected camera is the main camera.
If not, it indicates which camera it is connected to.

Transformation values for the alignment.
Automatically filled after an alignment but the user can enter his own values.
The transformation values are relative to the main camera frame.

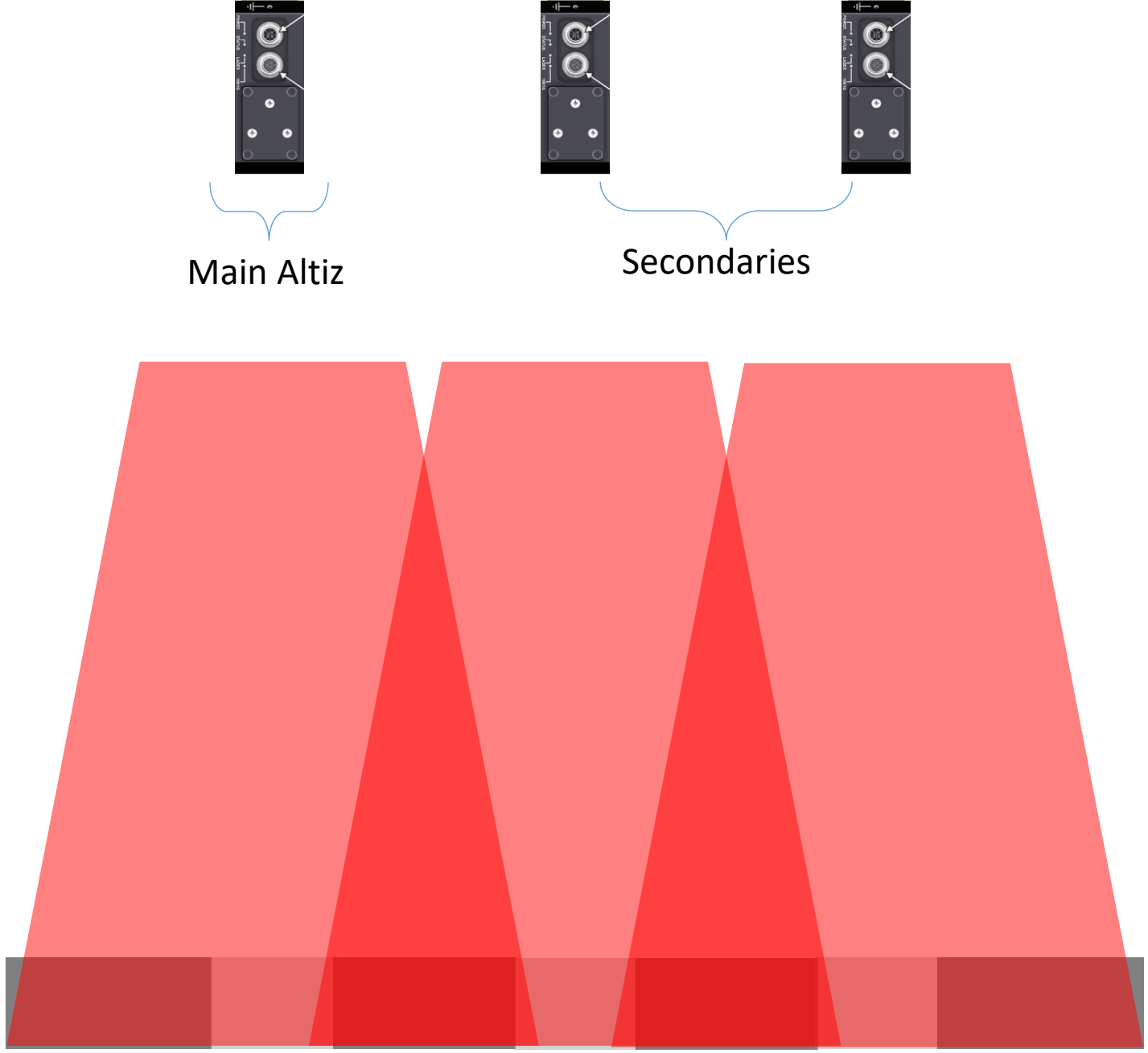


Example of a secondary camera.

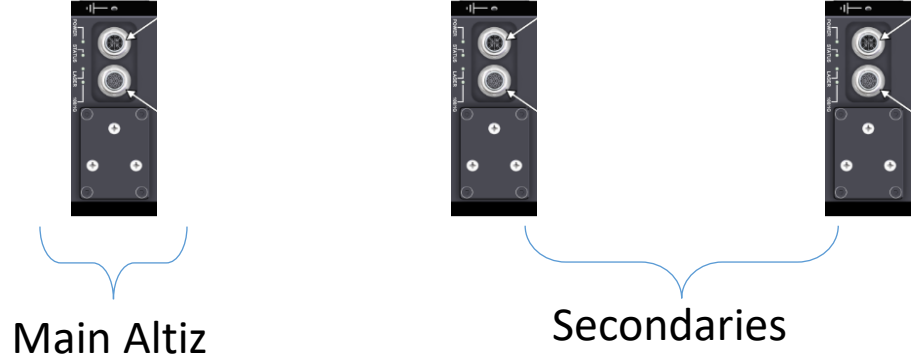
Setup time

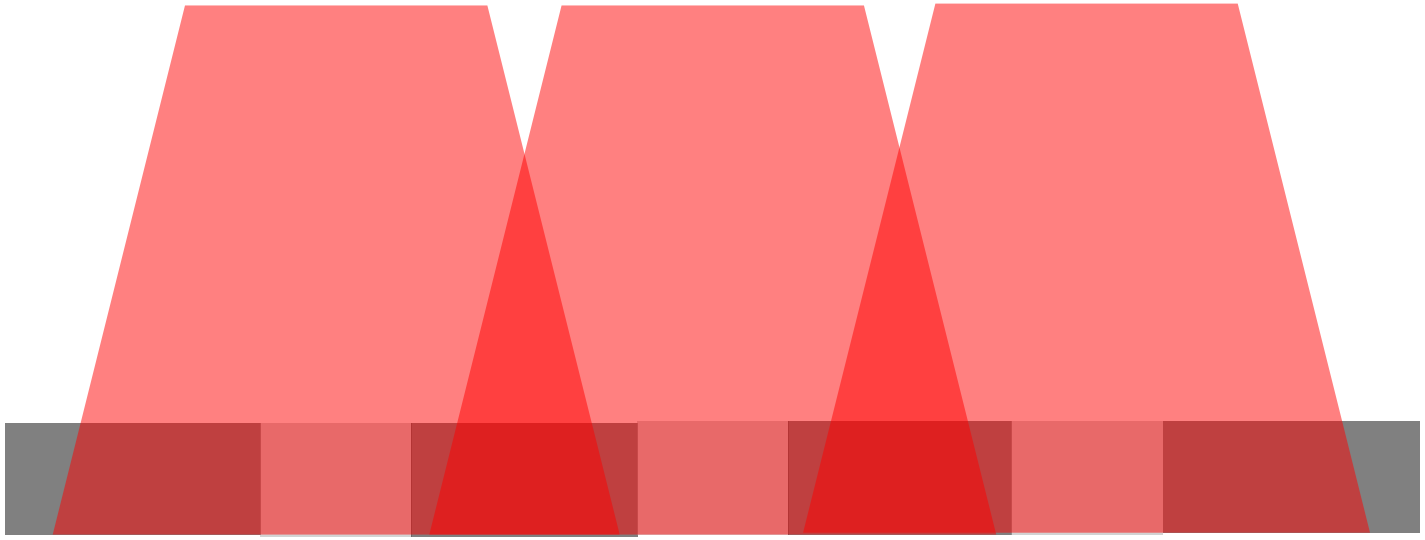
- *Step 1*: Position the cameras, making sure there's no pitch or yaw by using the setup view on CaptureWorks that will only shoot the laser.
- *Step 2*: Place the calibration tool on the conveyor. The calibration tool doesn’t have to be perpendicular to direction of motion. One hole should be under each camera. If there is Roll around the Y-axis, it is ok if the camera sees more than one hole.

Section of the calibration tool using Medium Altiz



Section of the calibration tool using Small Altiz





Runtime (Alignment ON)

- *Step 1*: In the same instance of CaptureWorks, allocate all cameras, ending by the main camera, to obtain the complete topology on this camera.
- *Step 2*: Set cameras parameters such as "***Length World***" or the "***Motion Step World***".
- *Steps 3*: On the main camera, extend "***Multi Altiz Plugin***" expander. There, set the "***Distance***" value.
- *Step 4*: Set ***Operation*** to *Alignment.* Click on ***Single Grab*** to find the transformation matrices of each cameras.

Runtime

- *Step 5*: Start moving the conveyor.
- *Step 6*: The merge point cloud is displayed (if ***View Mode*** is set to *All cameras,* then all grabs from each camera are display too). If the result is good, turn ***Operation*** to *Grab Only.* You can save the buffer for later processing. The transformation values are now saved on each camera.
- *Step 7*: Place an object to scan and click on CaptureWorks ***Single Grab*** button. This will only perform the merge with the transformation values obtained during alignment.

Runtime (Alignment OFF)

- *Step 1*: In the same instance of CaptureWorks, allocate all cameras, ending by the main camera, to obtain the complete topology on this camera.
- *Step 2*: Set cameras parameters such as "***Length World***" or the "***Motion Step World***".
- *Step 3*: Set ***Operation*** to *Grab Only.* Click on ***Single Grab***. This will only perform the merge with the transformation values obtained during alignment.
- *Step 4*: Start moving the conveyor.
- *Step 5*: The merge point cloud is displayed (if ***View Mode*** is set to *All cameras,* then all grabs from each camera are display too). You can save the buffer for later processing.