

# AS318103

## Drone Matching – Aligning your 3D Concept Over an Existing Site

Presenter:

Christopher Lyner

Practice & Innovation Leader

Experience Design Team - VLK Architects







# About the speaker

## Christopher Lyner – VLK Architects

Having worked in the Architectural Visualization industry for the past 14 years, I bring professional experience to architectural and engineering projects, large or small. I have worked on projects all over the globe from entire cities to mega sports and entertainment complexes, to world class hospitals, hotels, museums, government facilities, auto malls, high-end residential, and educational facilities. I have worked with large firms, small firms, and everything in between. I work for VLK Architects as an Experience Designer promoting our services to clients through the use of 3d renderings, animations, and video. Some of the projects I have worked on that have won notable awards and recognition are: Hail Edutainment District, Sidra, Bahrain Medical Center, Dammam Hospital, Doha Ports, Mayo Clinic, Regions Hospital, Children's Hospital, U.S. Bank Stadium, TDECU Stadium, Vaught-Hemingway Stadium, Cyber-Ops Center, Exxon Mobil HQ, Capitol Tower, Hard Rock Hotel, Fifth & West Tower, Condit Elementary, Energy Institute, Dan Dipert CTE.



# Drone Matching – Aligning your 3D Concept

Getting your client to understand the intent of your design is one of the most difficult obstacles in the architecture business. So how do we creatively show architectural designs in a way that the client can understand? One of the best ways is to show that design pre-conceptually over the proposed site it will live on. In this class, you'll learn how to set up a drone and how to best control it for applying 3D compositing. We'll cover the basics (as well as some tricks) to get the best possible drone match animation, covering pre-production to post-production and everything in between.



# Main Objectives:



+



## OBJECTIVE 1

PRE-PRODUCTION:

DISCOVER BASIC DRONE  
SETUP AND FLIGHT  
CONTROL FOR GETTING  
THE BEST FOOTAGE.  
EXPORTING SHOTS FOR  
CAMERA MATCHING



**SynthEyes**  
Andersson Technologies LLC

## OBJECTIVE 2

PRODUCTION:

DISCOVER BASIC IMPORT  
TECHNIQUES WITHIN  
SYNTHEYES TO CALCULATE  
THE BEST POINT DATA



## OBJECTIVE 3

PRODUCTION:

IMPORTING THE POINT  
DATA FROM SYNTHEYES  
TO 3DS MAX AND ALIGNING  
THE DATA TO YOUR 3D  
MODEL



## OBJECTIVE 4

POST-PRODUCTION:

UNDERSTANDING HOW TO  
COMPOSITE THE RENDER  
DATA WITH THE CAPTURED  
FOOTAGE



# Main Objectives:



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MODEL

## OBJECTIVE 4

POST-PRODUCTION:

UNDERSTANDING HOW TO  
COMPOSITE THE RENDER  
DATA WITH THE CAPTURED  
FOOTAGE





- Now what???
- Shooting method
- Frame size
- Frame rate





- Now what???
- Shooting method
- Frame size
- Frame rate

-  **YouTube**

- Let's Connect!

[clyner@vlkarchitects.com](mailto:clyner@vlkarchitects.com)



# Main Objectives:



## OBJECTIVE 1

PRE-PRODUCTION:

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**EXPORTING SHOTS FOR  
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FOOTAGE



Project: Waller HS\_3

Waller HS\_3.prproj

1 of 28 items selected

| Name               | Frame Rate |
|--------------------|------------|
| > Animation        |            |
| > Audio            |            |
| > Footage          |            |
| > Graphics         |            |
| > Images           |            |
| > Renderings       |            |
| > Sequences        |            |
| 00_Aerial          | 29.97 fps  |
| 01_Aerial          | 29.97 fps  |
| 02_Aerial          | 29.97 fps  |
| ChoppingBlock      | 29.97 fps  |
| Collab_Ext         | 29.97 fps  |
| DroneFootageRAW    | 29.97 fps  |
| DroneMatch01_Scale | 29.97 fps  |
| DronePOV           | 29.97 fps  |
| Logo               | 29.97 fps  |
| Logo End           | 29.97 fps  |

Effect Controls

Audio Clip Mixer: DroneFootageRAW

Metadata

Source: (no clips)

Program: DroneFootageRAW

DroneFootageRAW \* DJI\_0039.MP4

Video

- fx Motion
  - Position: 960.0 540.0
  - Scale: 100.0
  - Scale Width: 100.0
  - Uniform Scale: ☒
  - Rotation: 0.0
  - Anchor Point: 960.0 540.0
  - Anti-flicker Filter: 0.00
- fx Opacity
  - Opacity: 100.0 %
  - Blend Mode: Normal
- fx Time Remapping

0 2655

Fit 1/2

DroneFootageRAW

0 480 960 1440 1920 2400 2880 3360 3840 4320 4800

V2 V1 A1 Master

DJI\_0039.MP4 [1] DJI\_0041.M DJI\_0041.M DJI\_0042.MP4 DJI\_0042.M DJI\_0 DJI\_0042.

0.0



# Main Objectives:



**SynthEyes**  
Andersson Technologies LLC

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PRODUCTION:  
DISCOVER BASIC IMPORT  
TECHNIQUES WITHIN  
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## OBJECTIVE 1

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## OBJECTIVE 4

POST-PRODUCTION:  
UNDERSTANDING HOW TO  
COMPOSITE THE RENDER  
DATA WITH THE CAPTURED  
FOOTAGE



(no selection)

AUTO

Normal Motion

Green Screen

☐ Zoom lens☐ On Tripod

Hold

☐ Corners☐ Fine-tune

Settings

Run Auto-tracker



Solve

Not solved

☐ Run tracker cleanup☒ Run auto-place

Place

Coords

Lens Workflow

Save Sequence





(no selection)

AUTO

Normal Motion

Green Screen

☐ Zoom lens☐ On Tripod

Hold

☐ Corners☐ Fine-tune

Settings

Run Auto-tracker



Solve

Not solved

☐ Run tracker cleanup☒ Run auto-place

Place

Coords

Lens Workflow

Save Sequence



Toolbars

Display

Mesh

Selection

View

View Fill 50% 100% 200% Follow 2D Follow 3D Gamma RGB Red Green Blue Alpha

X: 235.9 Y: 158.3 U: -0.754 V: -0.707 Sel: (none)

&lt;&lt; &lt; &gt; &gt;&gt; 0 &gt; &gt;&gt; &gt;&gt;&gt; &gt;&gt;&gt;&gt;



Tracker106  
**Go!** more

Error: 0.3108 hpix

Automatic

Undirected

☐ Slow but sure☐ Hold ☐ Constrain☐ Independent

Begin: 40

End: 207

World Size &lt; 100,000 &gt;

Filtering Control

Axis Locks more

L/R F/B U/D FOV

Pan Tilt Roll

Field of View &lt; 64.893 &gt;

Focal Length &lt; 19.577 &gt;

☐ Known☐ Fixed, Unknown☐ Fixed, with Estimate☐ Zooming, Unknown

Identical

Lens Weight

Distortion &lt; 0.00000 &gt;

☐ Calc. Distortion more

Lens Workflow

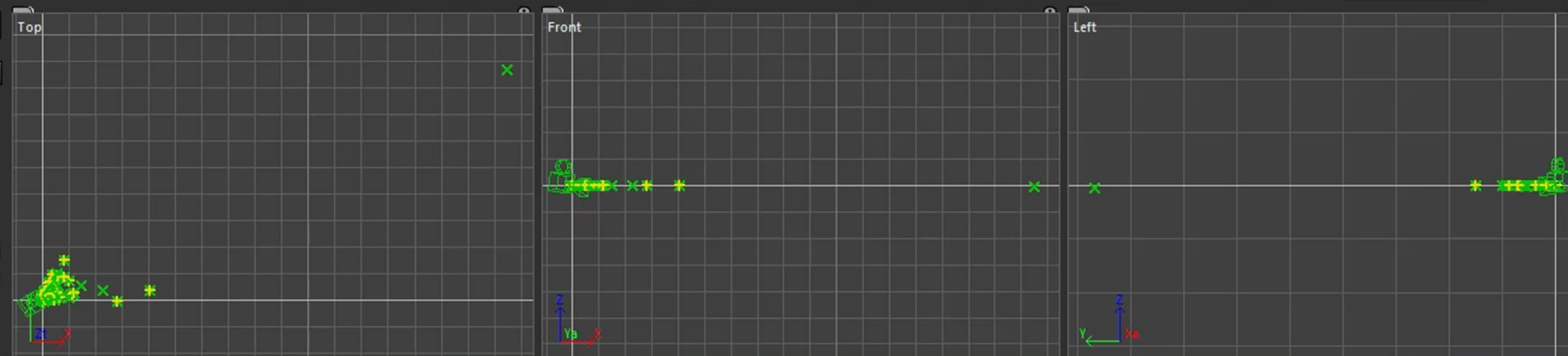
Add Line

Kill Line

&lt;/&gt; Length

(not set)

Align!



Camera01: Please set up a position (origin) constraint.  
Camera01: Please set up an orientation constraint.  
Camera01: Please set up a size (scale) constraint.  
Camera01: Beginning automatic estimation  
Camera01: Using frames 40 and 207 for starters  
Camera01: Completed point estimation, best fom 0.000289771  
Adding 200 frames: Camera01 41-240  
Beginning optimization: 1/0 objs, 201/245 frms, 72/48 pts active/remaining.  
Optimization complete, 52 iterations, RMS error 0.21 hpix (FOV 64.9 deg)  
Adding 38 trackers  
Beginning optimization: 1/0 objs, 201/245 frms, 110/10 pts active/remaining.  
Large update encountered, mitigating (trackers should be far?)  
Optimization complete, 21 iterations, RMS error 0.25 hpix (FOV 64.9 deg)  
Adding 200 frames: Camera01 241-440  
Beginning optimization: 1/0 objs, 401/45 frms, 110/10 pts active/remaining.  
Optimization complete, 12 iterations, RMS error 0.29 hpix (FOV 64.9 deg)  
Adding 8 trackers  
Beginning optimization: 1/0 objs, 401/45 frms, 118/2 pts active/remaining.  
Optimization complete, 8 iterations, RMS error 0.30 hpix (FOV 64.9 deg)  
Adding 45 frames: Camera01 0-39, 441-445  
Beginning optimization: 1/0 objs, 446/0 frms, 118/2 pts active/remaining.  
Optimization complete, 9 iterations, RMS error 0.31 hpix (FOV 64.9 deg)  
Adding 1 trackers  
Beginning optimization: 1/0 objs, 446/0 frms, 119/1 pts active/remaining.  
Optimization complete, 4 iterations, RMS error 0.31 hpix (FOV 64.9 deg)  
Camera01: Please set up position (origin) constraints. Camera position used tempora  
Camera01: Please set up orientation constraints. Camera orientation used tempora  
Camera01: Please set up a size (scale) constraint. Using a semi-arbitrary size.  
Camera01: auto-assigning a coordinate system.  
Selected 0 made-Far, 0 made-ZWT, and 1 unsolved trackers.  
Finished solving, 2.5 sec.  
Camera01: 0.3108 hpix  
Solved the scene.



(no selection)

 **Go!** more

Error: 0.3115 hpix

Automatic

Undirected

☐ Slow but sure☐ Hold ☐ Constrain☐ Independent

Begin: 40

End: 207

World Size &lt; 500,000 &gt;

Filtering Control

Axis Locks more

L/R F/B U/D FOV

Pan Tilt Roll

Field of View &lt; 65.087 &gt;

Focal Length &lt; 19.504 &gt;

☐ Known☒ Fixed, Unknown☐ Fixed, with Estimate☐ Zooming, Unknown

Identical

Lens Weight

Distortion &lt; 0.00000 &gt;

☐ Calc. Distortion more

Lens Workflow

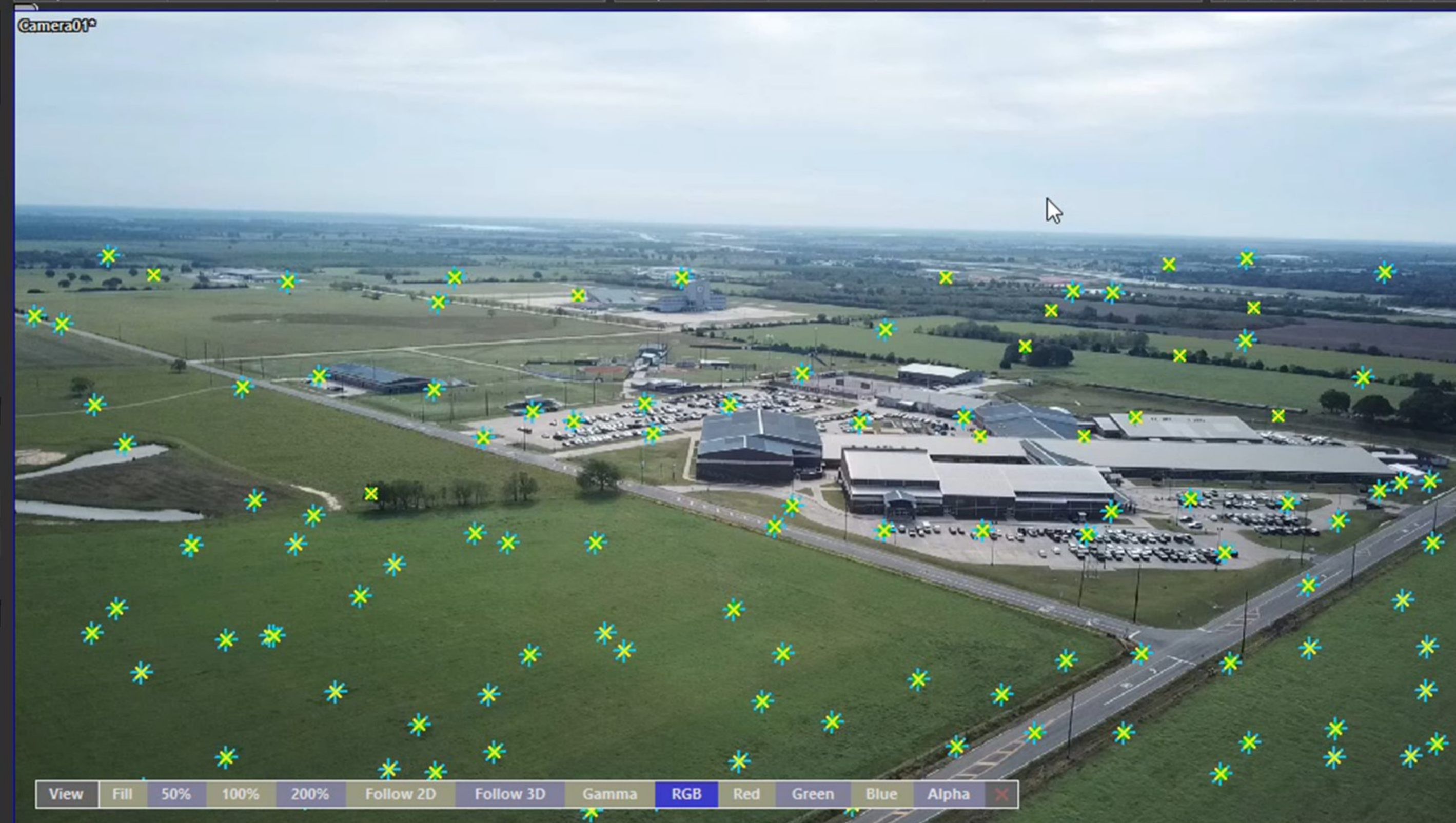
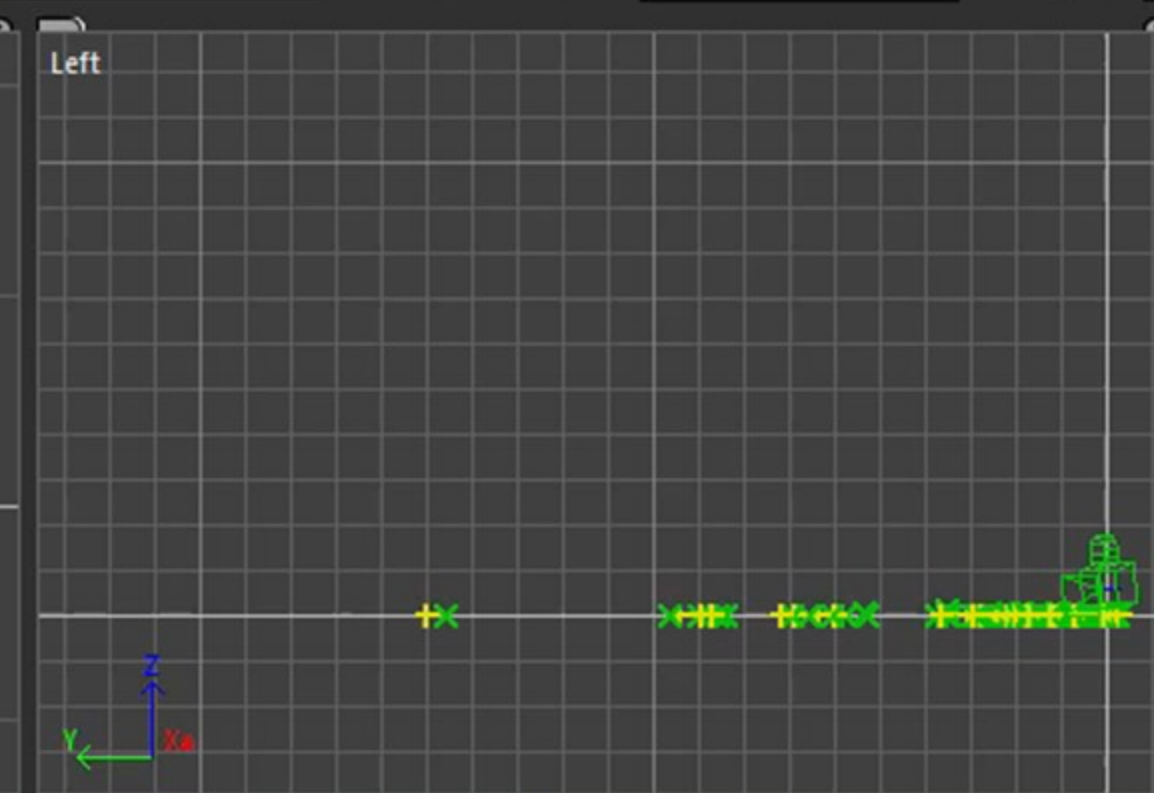
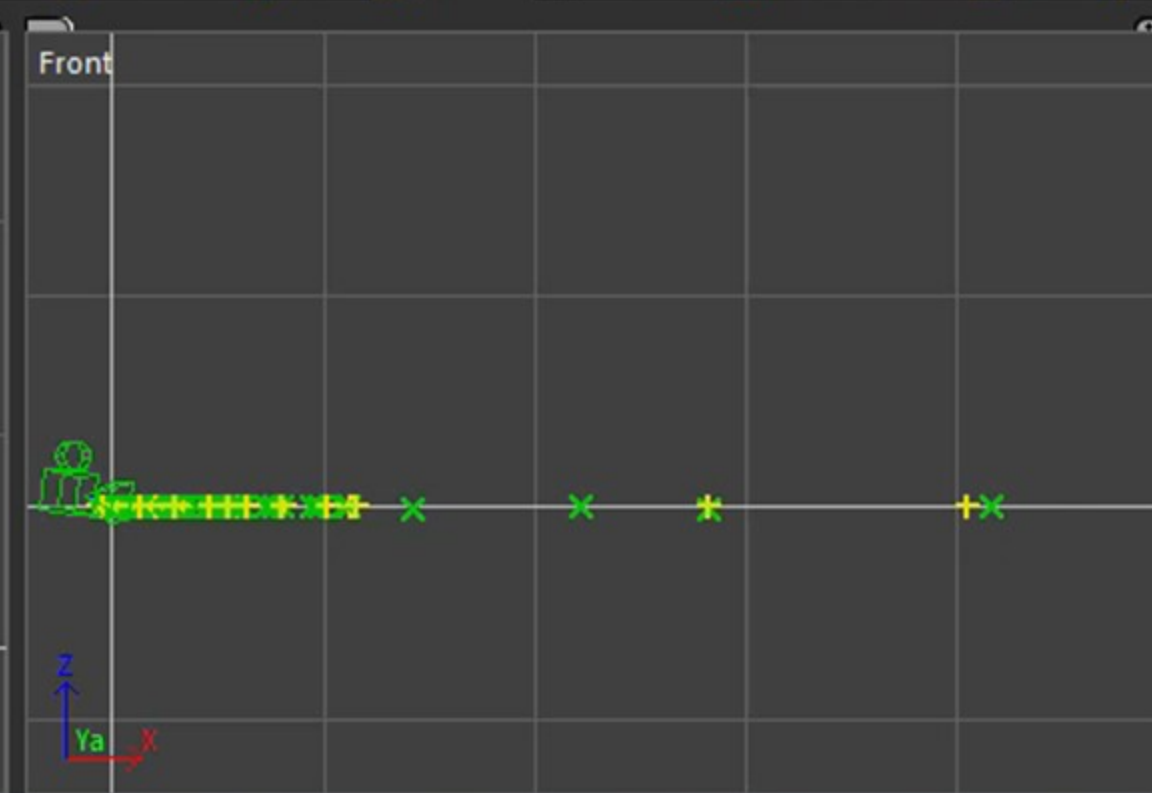
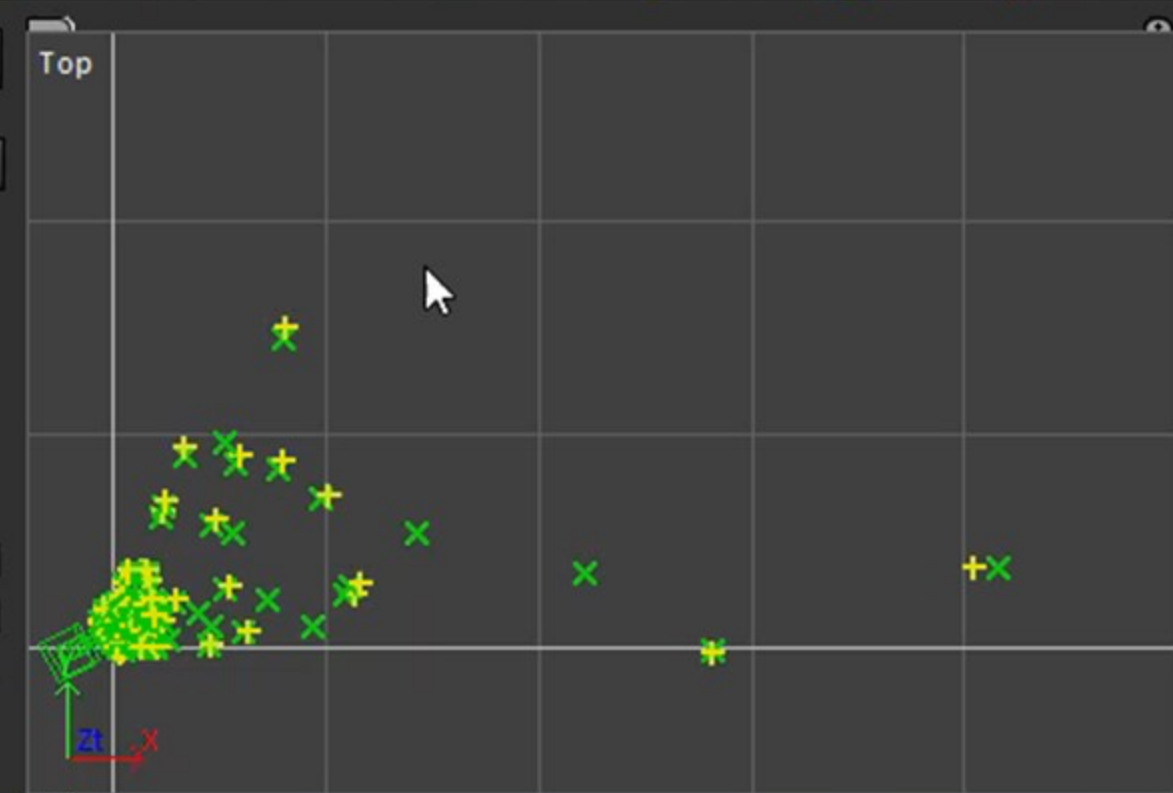
Add Line

Kill Line

&lt;/&gt; Length

(not set)

Align!

**Toolbars**  
Display  
Mesh  
Selection  
View

Camera01: Beginning automatic estimation  
Camera01: Using frames 40 and 207 for starters  
Camera01: Completed point estimation, best fom 0.000289771  
Adding 200 frames: Camera01 41-240  
Beginning optimization: 1/0 objs, 201/245 frms, 90/30 pts active/remaining.  
Optimization complete, 52 iterations, RMS error 0.21 hpix (FOV 65.0 deg)  
Adding 21 trackers  
Beginning optimization: 1/0 objs, 201/245 frms, 111/9 pts active/remaining.  
0 iterations, RMS error 24.83 hpix (FOV 65.0 deg)  
Caught 1 runaway trackers  
Large update encountered, mitigating (trackers should be far?)  
53 iterations, RMS error 0.25 hpix (FOV 64.6 deg)  
Caught 1 runaway trackers  
Optimization complete, 70 iterations, RMS error 0.24 hpix (FOV 65.0 deg)  
Adding 200 frames: Camera01 241-440  
Beginning optimization: 1/0 objs, 401/45 frms, 111/9 pts active/remaining.  
Optimization complete, 12 iterations, RMS error 0.29 hpix (FOV 65.1 deg)  
Adding 8 trackers  
Beginning optimization: 1/0 objs, 401/45 frms, 119/1 pts active/remaining.  
Optimization complete, 8 iterations, RMS error 0.30 hpix (FOV 65.1 deg)  
Adding 45 frames: Camera01 0-39, 441-445  
Beginning optimization: 1/0 objs, 446/0 frms, 119/1 pts active/remaining.  
Optimization complete, 9 iterations, RMS error 0.31 hpix (FOV 65.1 deg)  
Adding 1 trackers  
Beginning optimization: 1/0 objs, 446/0 frms, 120/0 pts active/remaining.  
Optimization complete, 4 iterations, RMS error 0.31 hpix (FOV 65.1 deg)  
Rough preorientation, 0.283588  
Fine-tuned preorientation, 0.055412  
\*\*\*\* Changed 2 trackers to 'far' with reduced weight. \*\*\*\*  
Selected 2 made-Far, 0 made-ZWT, and 0 unsolved trackers.  
Finished solving, 3.1 sec.  
Camera01: 0.3115 hpix  
Solved the scene.



(no selection)

 **Go!** more

Error: 0.3080 hpix

Automatic

Undirected

☐ Slow but sure☐ Constrain☐ Independent

Begin: 40

End: 204

World Size &lt; 500,000 &gt;

Filtering Control

Axis Locks more

L/R F/B U/D FOV

Pan Tilt Roll

Field of View &lt; 64.923 &gt;

Focal Length &lt; 19.565 &gt;

☐ Known☐ Fixed, Unknown☐ Fixed, with Estimate☐ Zooming, Unknown

Identical

Lens Weight

Distortion &lt; 0.00000 &gt;

☐ Calc. Distortion more

Lens Workflow

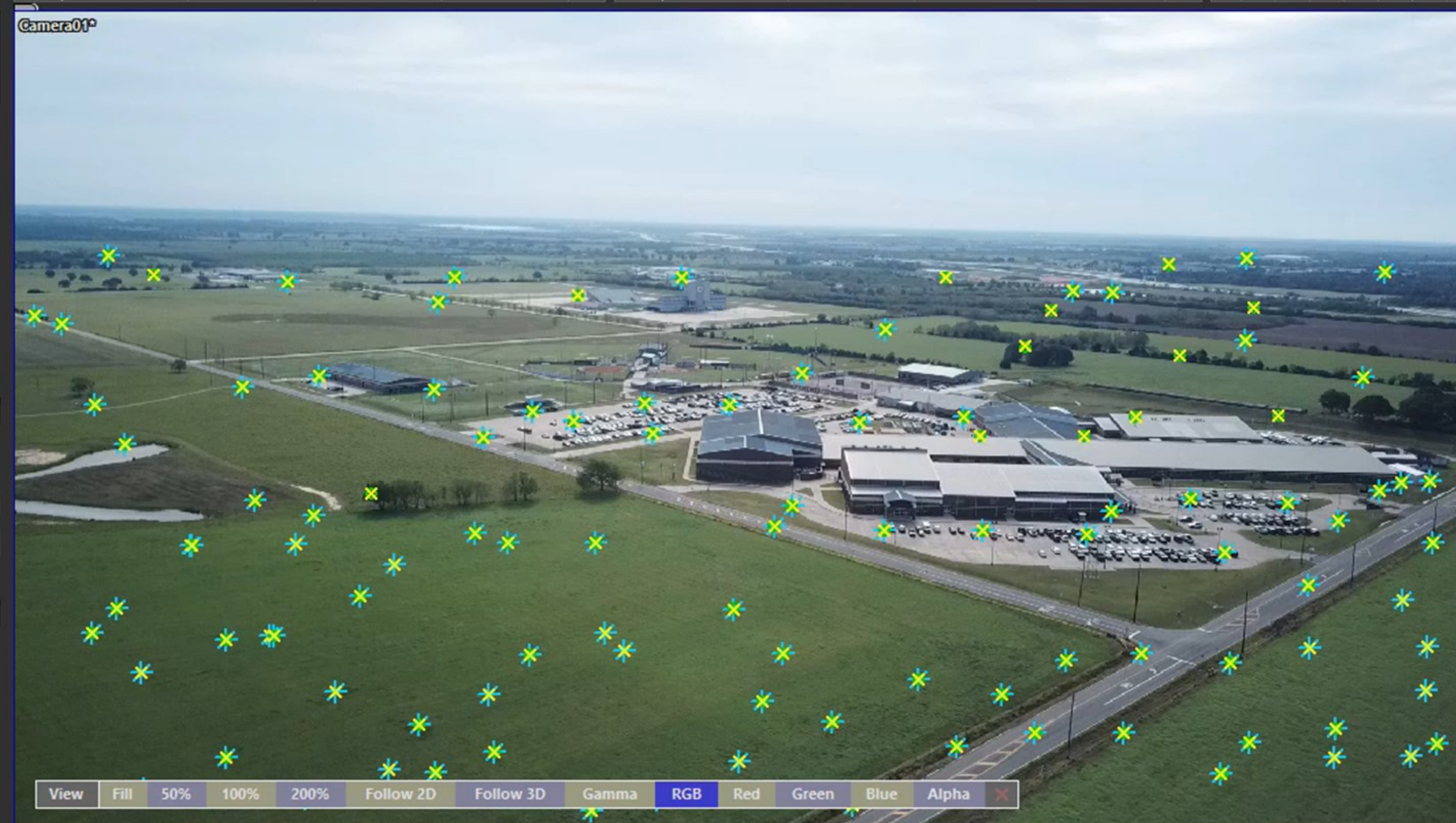
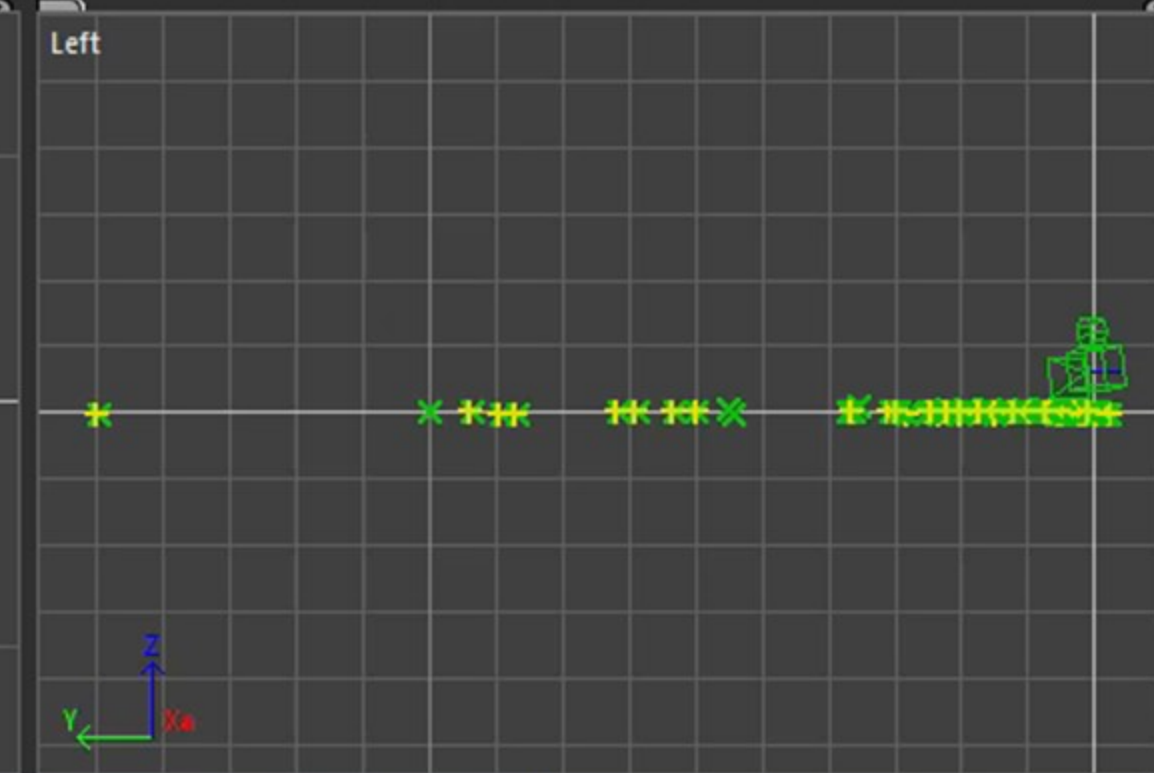
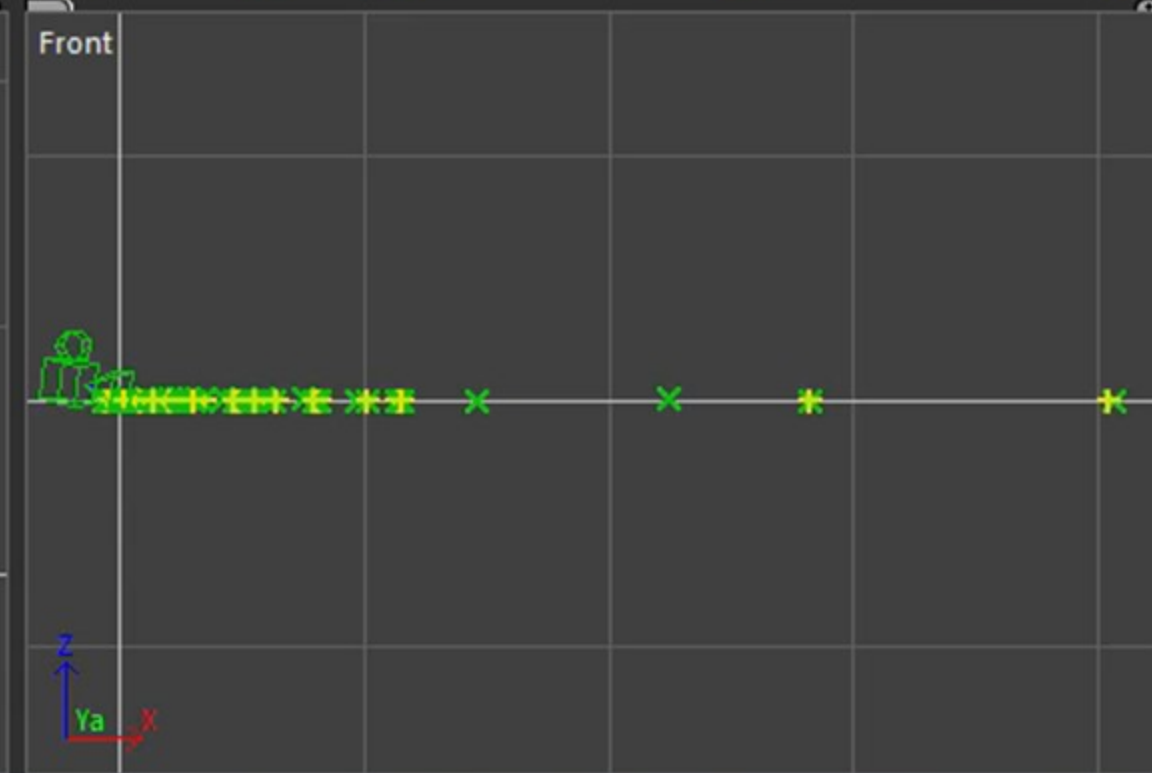
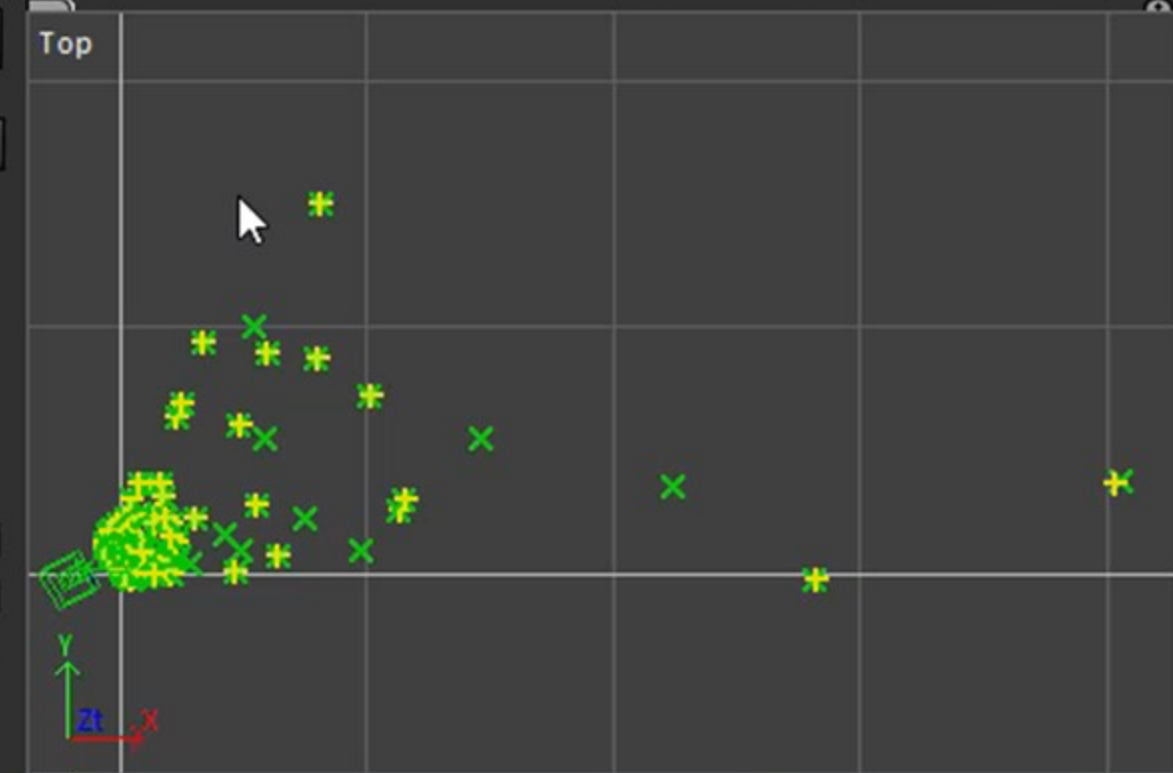
Add Line

Kill Line

&lt;/&gt; Length

(not set)

Align!



Toolbars

Display

Mesh

Selection

View

Camera01: Beginning automatic estimation  
Camera01: Using frames 40 and 204 for starters  
Camera01: Completed point estimation, best fom 0.000619838  
Adding 200 frames: Camera01 41-240  
Beginning optimization: 1/0 objs, 201/245 frms, 88/30 pts active/remaining.  
Optimization complete, 28 iterations, RMS error 0.21 hpix (FOV 65.0 deg)  
Adding 21 trackers  
Beginning optimization: 1/0 objs, 201/245 frms, 109/9 pts active/remaining.  
Optimization complete, 17 iterations, RMS error 0.24 hpix (FOV 64.9 deg)  
Adding 200 frames: Camera01 241-440  
Beginning optimization: 1/0 objs, 401/45 frms, 109/9 pts active/remaining.  
Optimization complete, 12 iterations, RMS error 0.29 hpix (FOV 64.9 deg)  
Adding 8 trackers  
Beginning optimization: 1/0 objs, 401/45 frms, 117/1 pts active/remaining.  
Optimization complete, 8 iterations, RMS error 0.30 hpix (FOV 65.0 deg)  
Adding 45 frames: Camera01 0-39, 441-445  
Beginning optimization: 1/0 objs, 446/0 frms, 117/1 pts active/remaining.  
Optimization complete, 9 iterations, RMS error 0.31 hpix (FOV 64.9 deg)  
Adding 1 trackers  
Beginning optimization: 1/0 objs, 446/0 frms, 118/0 pts active/remaining.  
Optimization complete, 4 iterations, RMS error 0.31 hpix (FOV 64.9 deg)  
Rough preorientation, 0.027523  
Fine-tuned preorientation, 0.000712  
Finished solving, 2.3 sec.  
Camera01: 0.3080 hpix  
Solved the scene.



(no selection)

 **Go!** more

Error: 0.3080 hpix

Automatic

Undirected

☐ Slow but sure☐ Constrain☐ Independent

Begin: 40

End: 204

World Size &lt; 500,000 &gt;

Filtering Control

Axis Locks more

L/R F/B U/D FOV

Pan Tilt Roll

Field of View &lt; 64.923 &gt;

Focal Length &lt; 19.565 &gt;

☐ Known☒ Fixed, Unknown☐ Fixed, with Estimate☐ Zooming, Unknown

Identical

Lens Weight

Distortion &lt; 0.00000 &gt;

☐ Calc. Distortion more

Lens Workflow

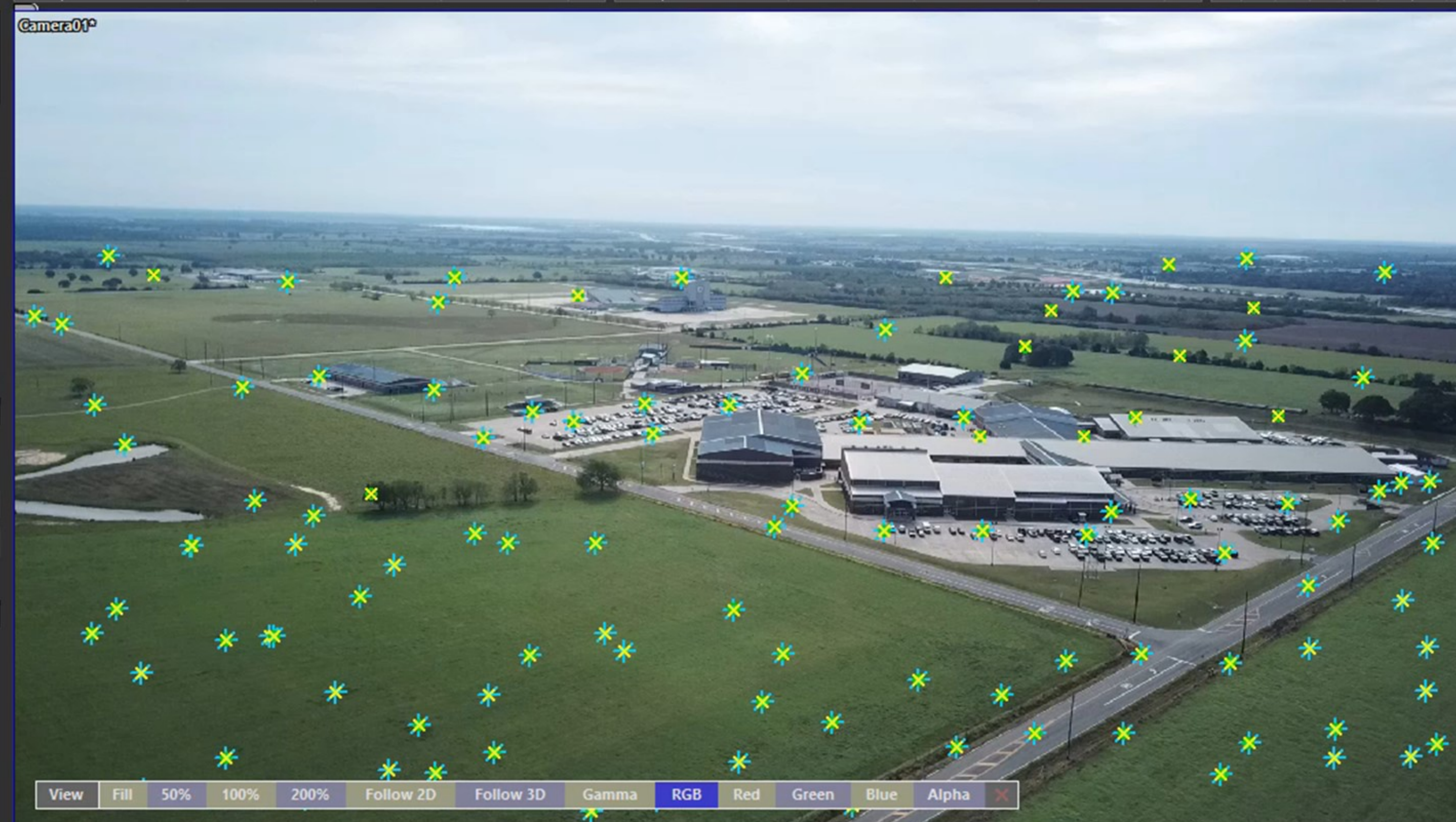
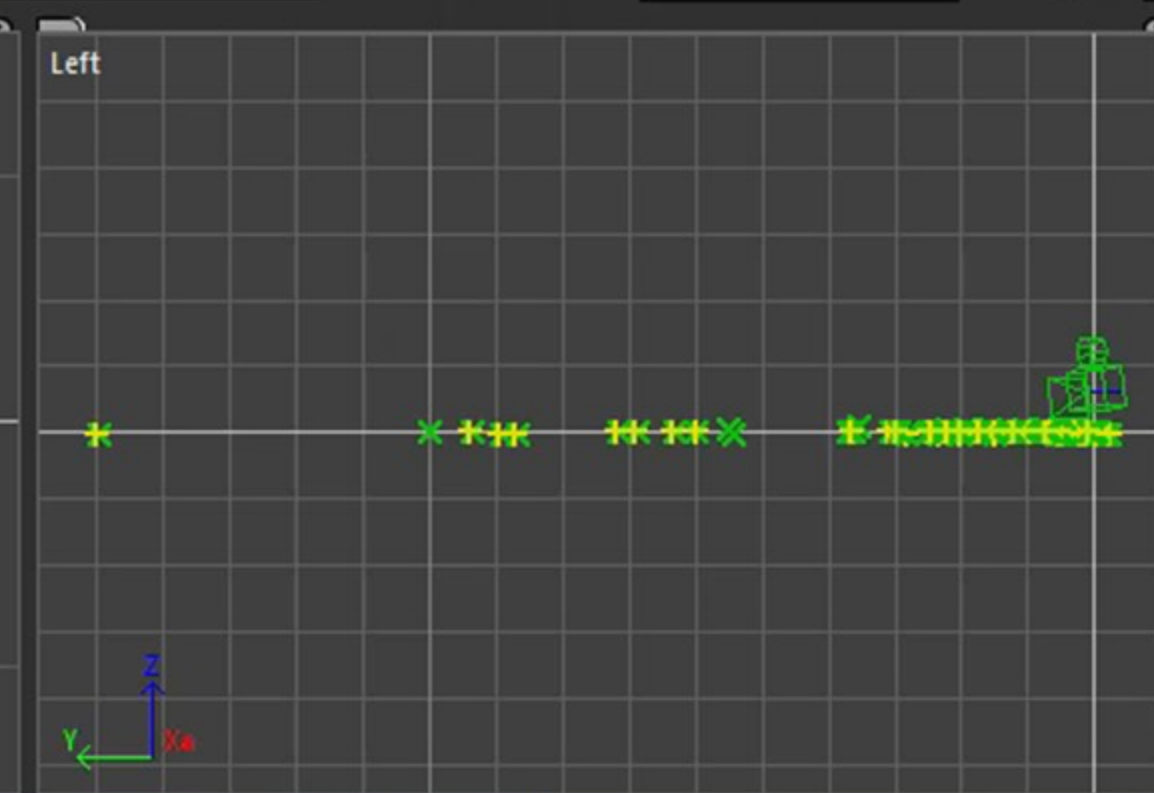
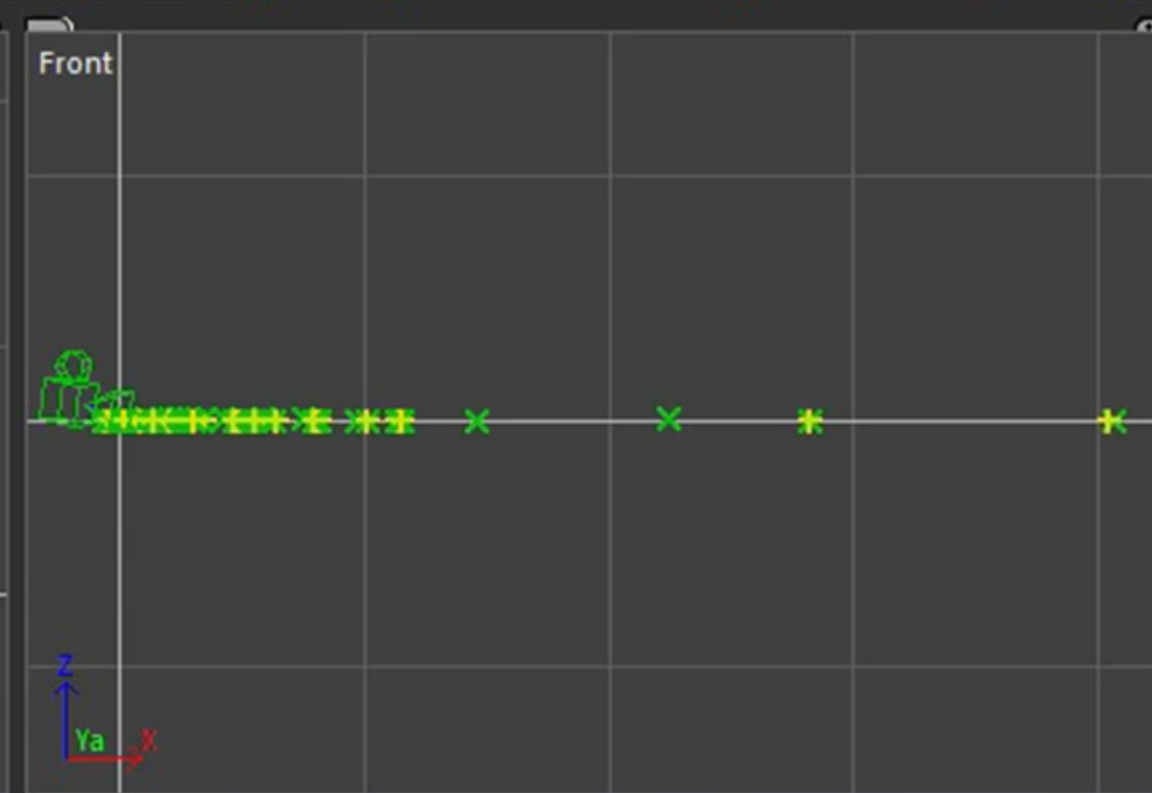
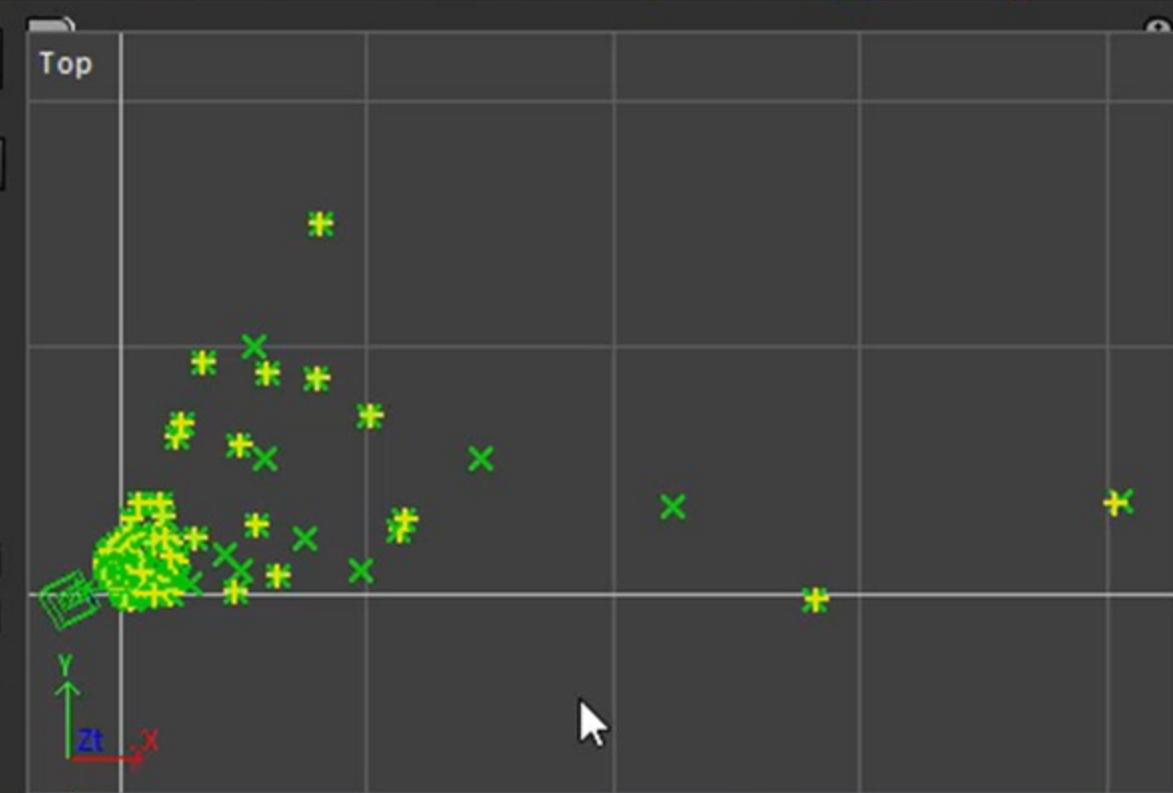
Add Line

Kill Line

&lt;/&gt; Length

(not set)

Align!



Toolbars

- Display
- Mesh
- Selection
- View

Camera01: Beginning automatic estimation  
Camera01: Using frames 40 and 204 for starters  
Camera01: Completed point estimation, best fom 0.000619838  
Adding 200 frames: Camera01 41-240  
Beginning optimization: 1/0 objs, 201/245 frms, 88/30 pts active/remaining.  
Optimization complete, 28 iterations, RMS error 0.21 hpix (FOV 65.0 deg)  
Adding 21 trackers  
Beginning optimization: 1/0 objs, 201/245 frms, 109/9 pts active/remaining.  
Optimization complete, 17 iterations, RMS error 0.24 hpix (FOV 64.9 deg)  
Adding 200 frames: Camera01 241-440  
Beginning optimization: 1/0 objs, 401/45 frms, 109/9 pts active/remaining.  
Optimization complete, 12 iterations, RMS error 0.29 hpix (FOV 64.9 deg)  
Adding 8 trackers  
Beginning optimization: 1/0 objs, 401/45 frms, 117/1 pts active/remaining.  
Optimization complete, 8 iterations, RMS error 0.30 hpix (FOV 65.0 deg)  
Adding 45 frames: Camera01 0-39, 441-445  
Beginning optimization: 1/0 objs, 446/0 frms, 117/1 pts active/remaining.  
Optimization complete, 9 iterations, RMS error 0.31 hpix (FOV 64.9 deg)  
Adding 1 trackers  
Beginning optimization: 1/0 objs, 446/0 frms, 118/0 pts active/remaining.  
Optimization complete, 4 iterations, RMS error 0.31 hpix (FOV 64.9 deg)  
Rough preorientation, 0.027523  
Fine-tuned preorientation, 0.000712  
Finished solving, 2.3 sec.  
Camera01: 0.3080 hpix  
Solved the scene.



(no selection)

 **Go!** more

Error: 0.3080 hpix

Automatic

Undirected

☐ Slow but sure☐ Constrain☐ Independent

Begin: 40

End: 204

World Size &lt; 500,000 &gt;

Filtering Control

Axis Locks more

L/R F/B U/D FOV

Pan Tilt Roll

Field of View &lt; 64.923 &gt;

Focal Length &lt; 19.565 &gt;

☐ Known☒ Fixed, Unknown☐ Fixed, with Estimate☐ Zooming, Unknown

Identical

Lens Weight

Distortion &lt; 0.00000 &gt;

☐ Calc. Distortion more

Lens Workflow

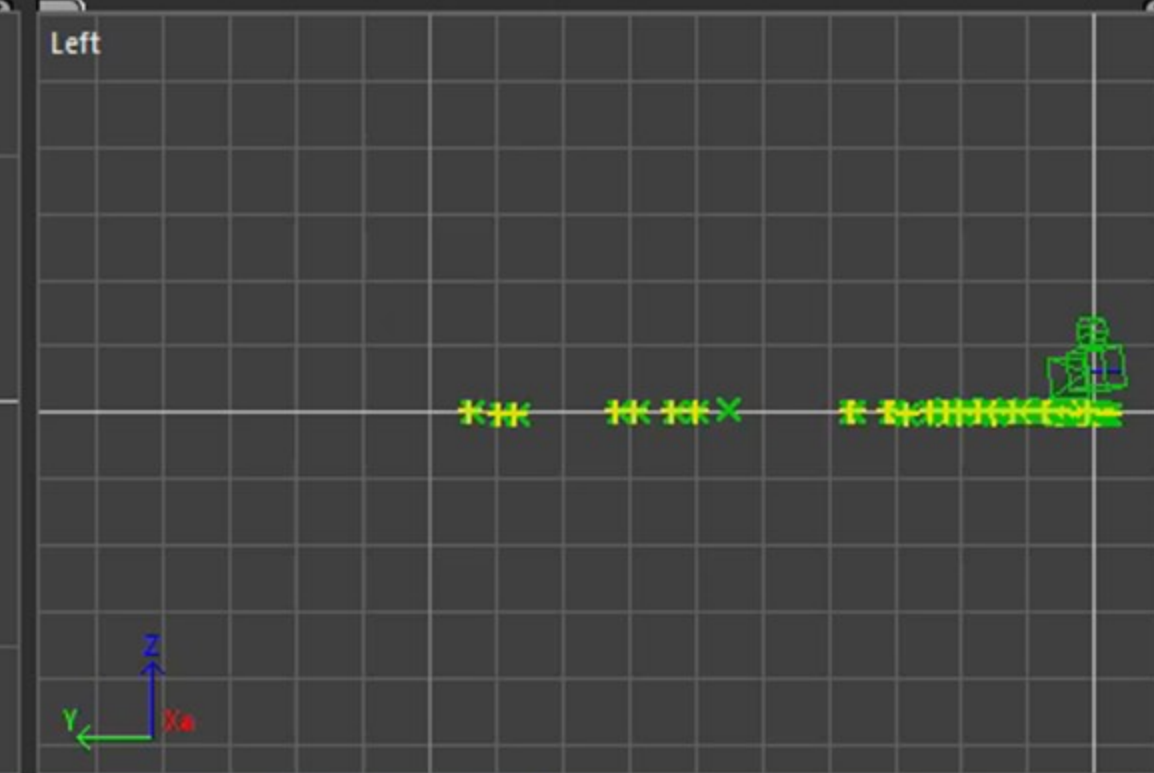
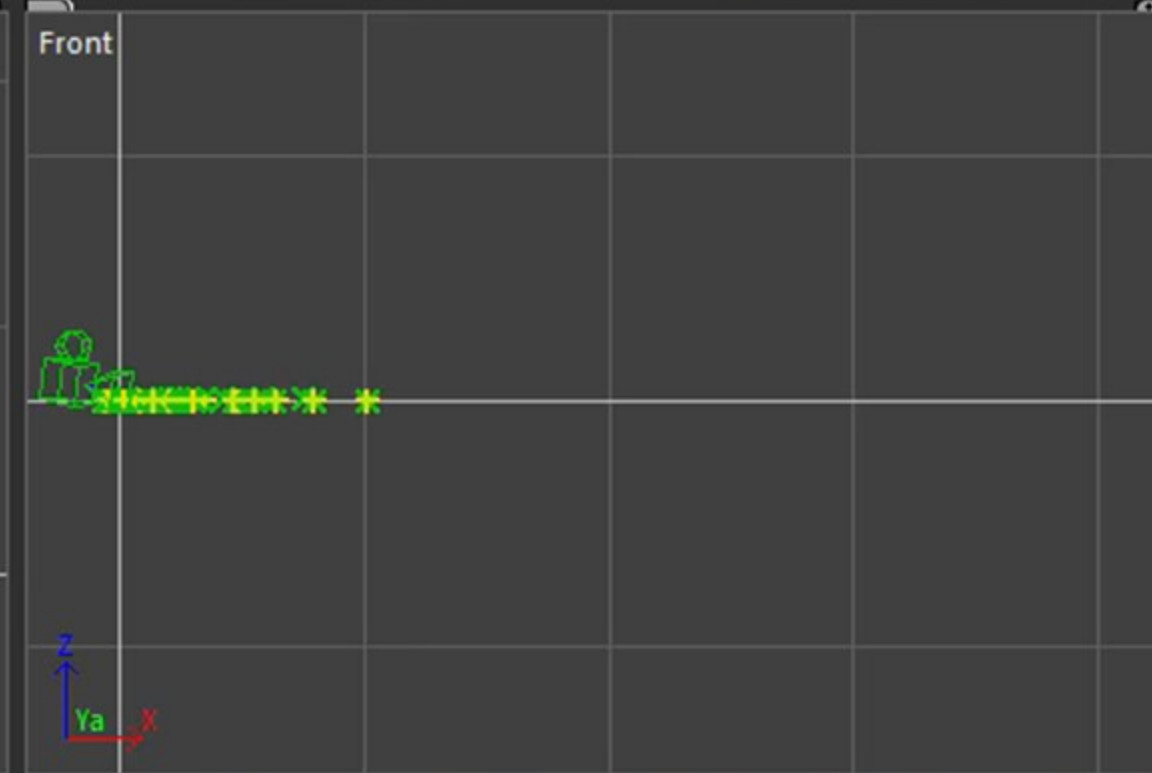
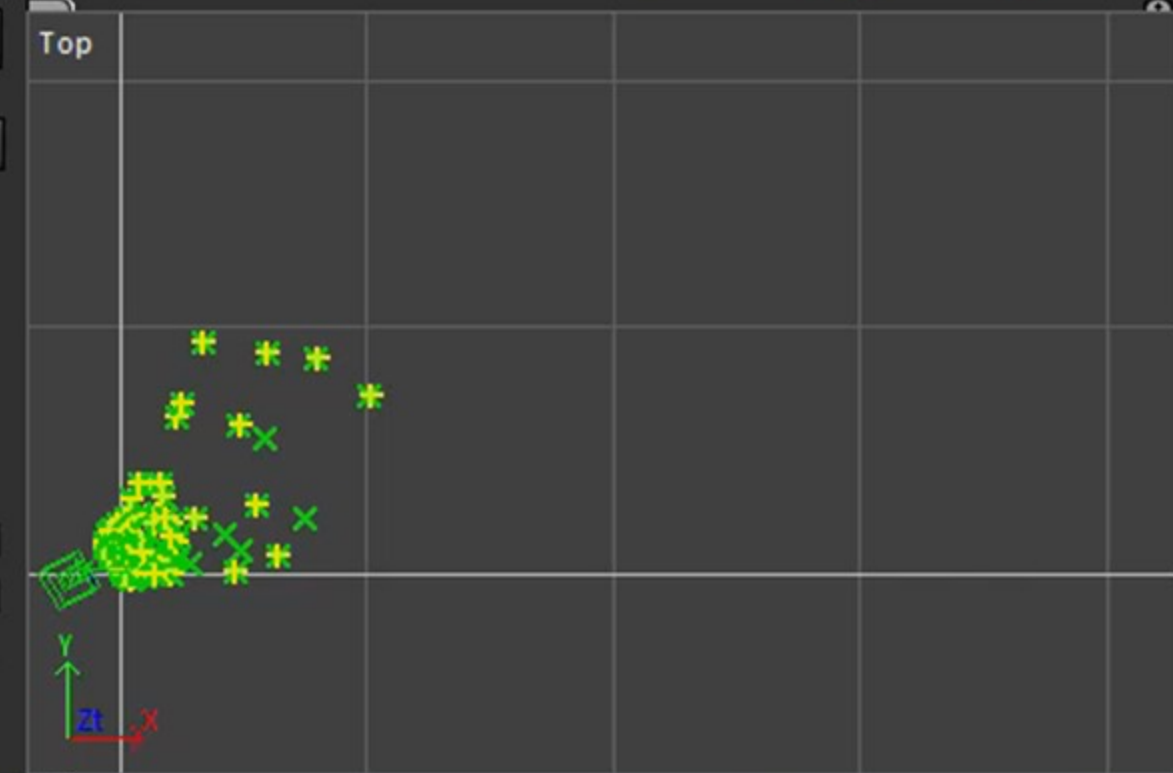
Add Line

Kill Line

&lt;/&gt; Length

(not set)

Align!

**Toolbars**  
Display  
Mesh  
Selection  
View

Camera01: Beginning automatic estimation  
Camera01: Using frames 40 and 204 for starters  
Camera01: Completed point estimation, best fom 0.000619838  
Adding 200 frames: Camera01 41-240  
Beginning optimization: 1/0 objs, 201/245 frms, 88/30 pts active/remaining.  
Optimization complete, 28 iterations, RMS error 0.21 hpix (FOV 65.0 deg)  
Adding 21 trackers  
Beginning optimization: 1/0 objs, 201/245 frms, 109/9 pts active/remaining.  
Optimization complete, 17 iterations, RMS error 0.24 hpix (FOV 64.9 deg)  
Adding 200 frames: Camera01 241-440  
Beginning optimization: 1/0 objs, 401/45 frms, 109/9 pts active/remaining.  
Optimization complete, 12 iterations, RMS error 0.29 hpix (FOV 64.9 deg)  
Adding 8 trackers  
Beginning optimization: 1/0 objs, 401/45 frms, 117/1 pts active/remaining.  
Optimization complete, 8 iterations, RMS error 0.30 hpix (FOV 65.0 deg)  
Adding 45 frames: Camera01 0-39, 441-445  
Beginning optimization: 1/0 objs, 446/0 frms, 117/1 pts active/remaining.  
Optimization complete, 9 iterations, RMS error 0.31 hpix (FOV 64.9 deg)  
Adding 1 trackers  
Beginning optimization: 1/0 objs, 446/0 frms, 118/0 pts active/remaining.  
Optimization complete, 4 iterations, RMS error 0.31 hpix (FOV 64.9 deg)  
Rough preorientation, 0.027523  
Fine-tuned preorientation, 0.000712  
Finished solving, 2.3 sec.  
Camera01: 0.3080 hpix  
Solved the scene.



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## OBJECTIVE 3

PRODUCTION:

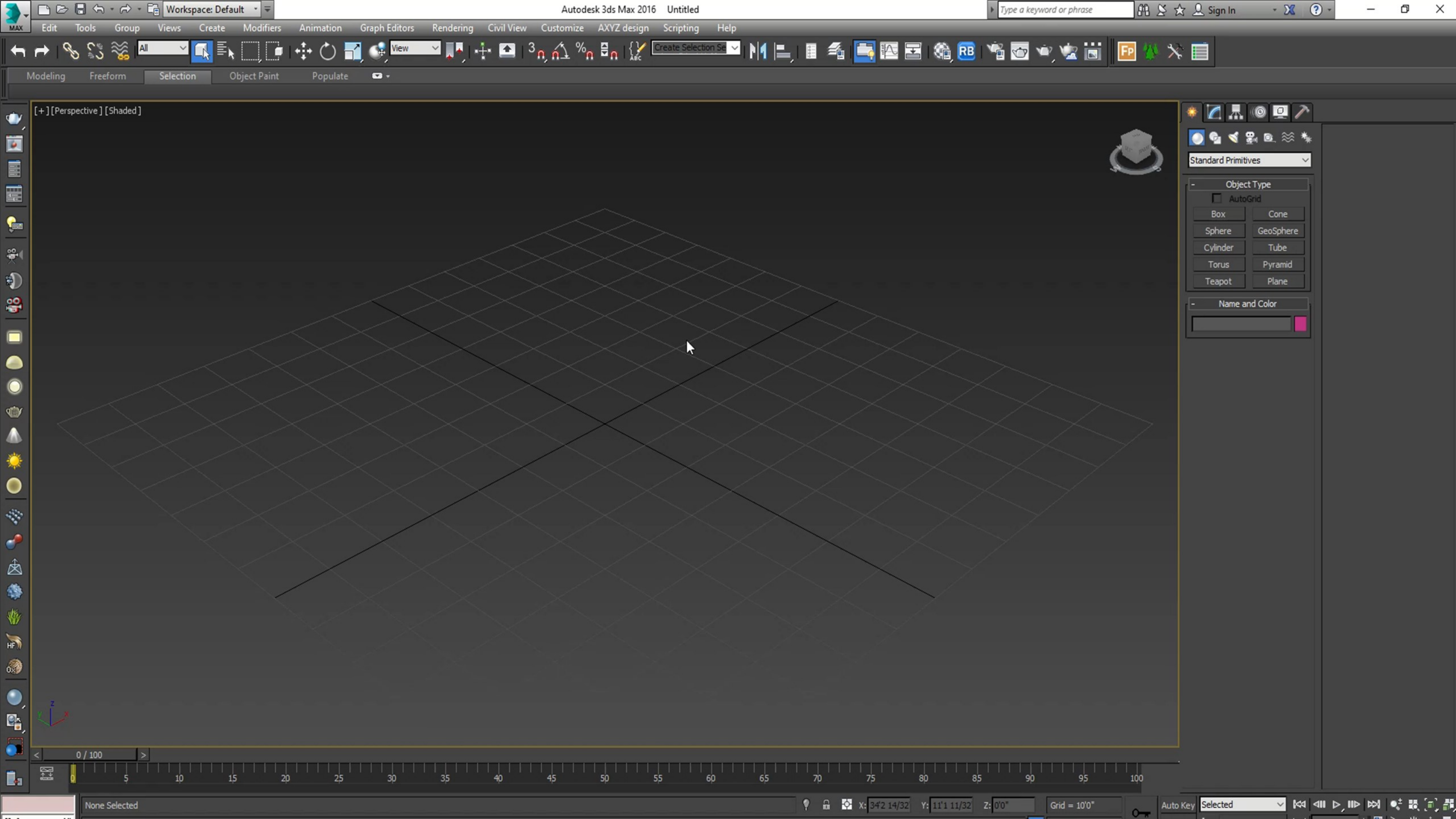
IMPORTING THE POINT  
DATA FROM SYNTHEYES  
TO 3DS MAX AND ALIGNING  
THE DATA TO YOUR 3D  
MODEL

## OBJECTIVE 4

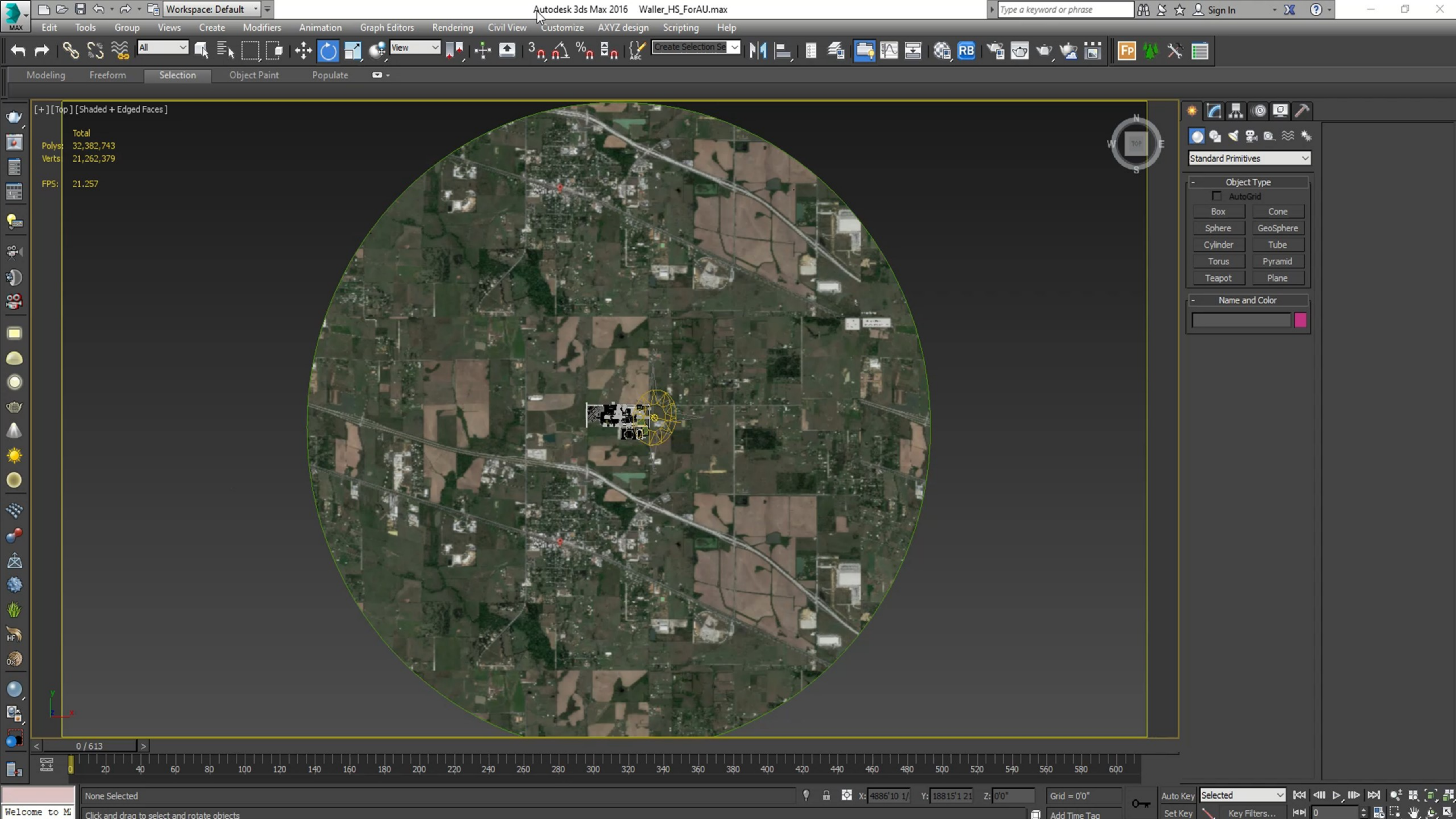
POST-PRODUCTION:

UNDERSTANDING HOW TO  
COMPOSITE THE RENDER  
DATA WITH THE CAPTURED  
FOOTAGE

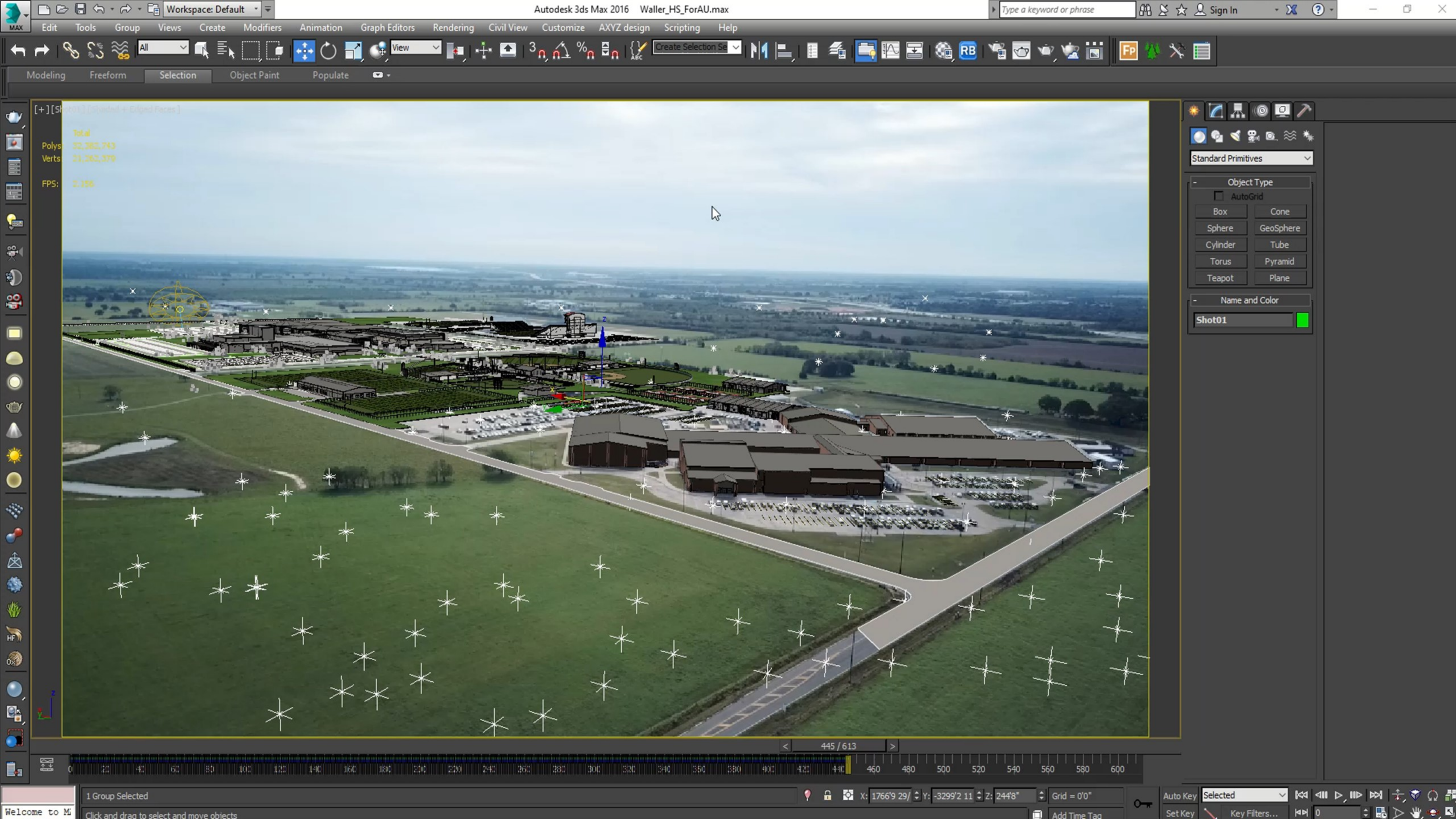
















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THE DATA TO YOUR 3D  
MODEL

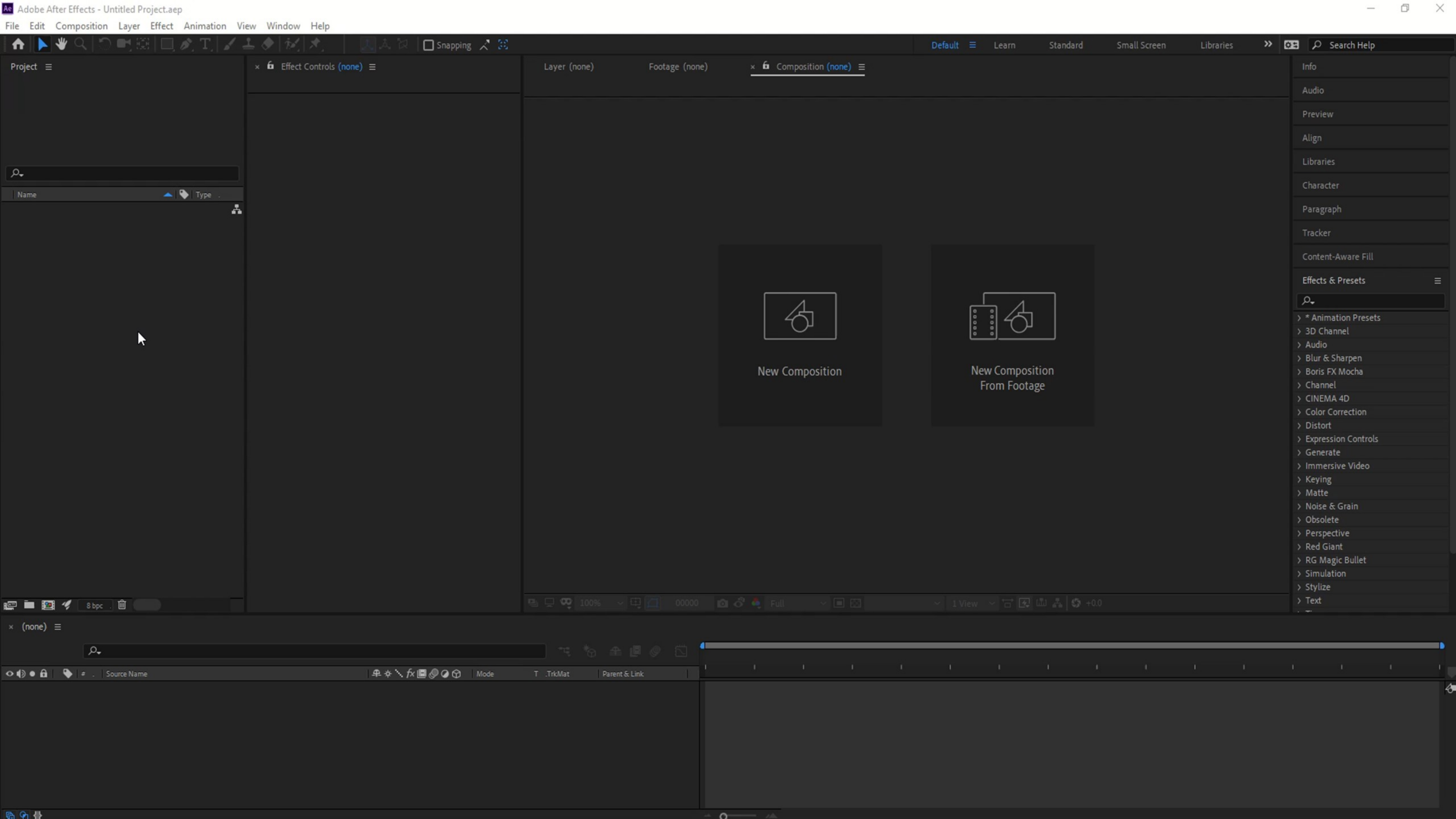
## OBJECTIVE 4

---

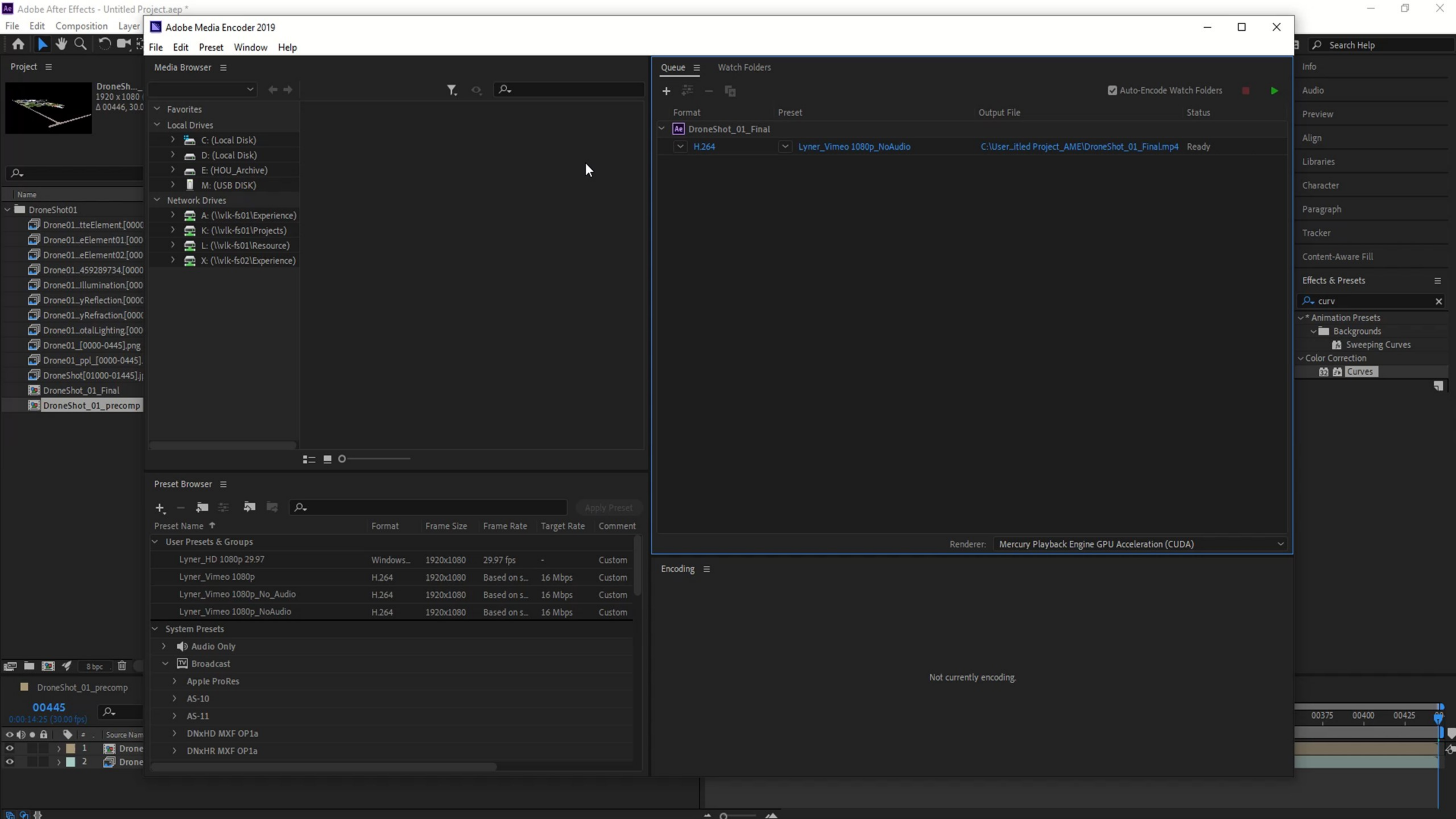
POST-PRODUCTION:

UNDERSTANDING HOW TO  
COMPOSITE THE RENDER  
DATA WITH THE CAPTURED  
FOOTAGE

















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