



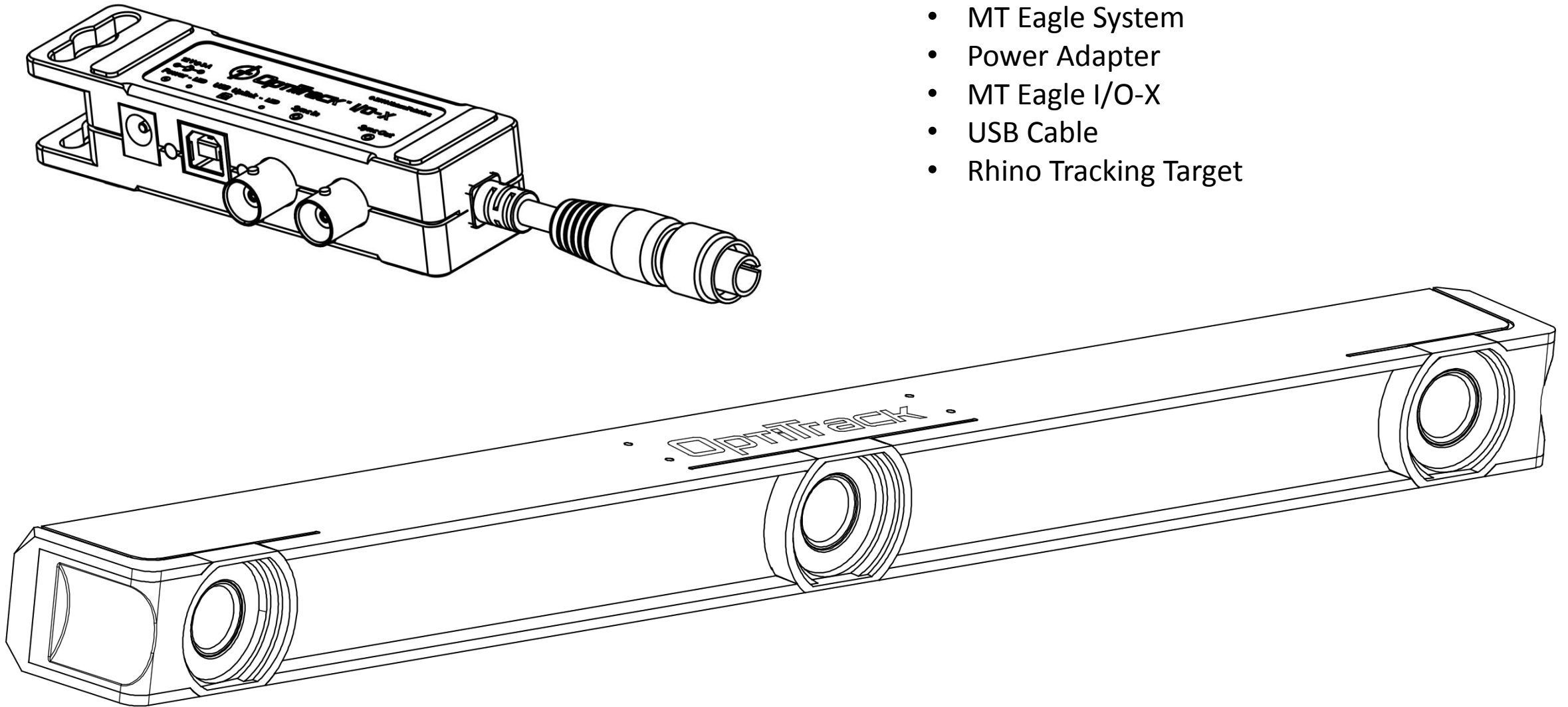
# MT Eagle Quick Reference

MT Eagle is a **motion tracking system** that unlocks a feature in the 3DSL NDT software suite that streamlines the image capture and image stitching process. By **automating the process**, the 3DSL NDT software suite makes **scanning large surface areas** faster, easier, and more reliable.

# What is an MT Eagle System?

## Components of MT Eagle

- MT Eagle System
- Power Adapter
- MT Eagle I/O-X
- USB Cable
- Rhino Tracking Target



# How does MT Eagle work?

**LED Illumination** is infrared spectrum reflecting off spheres.

Spheres are blobs by **Thresholding** binarization.

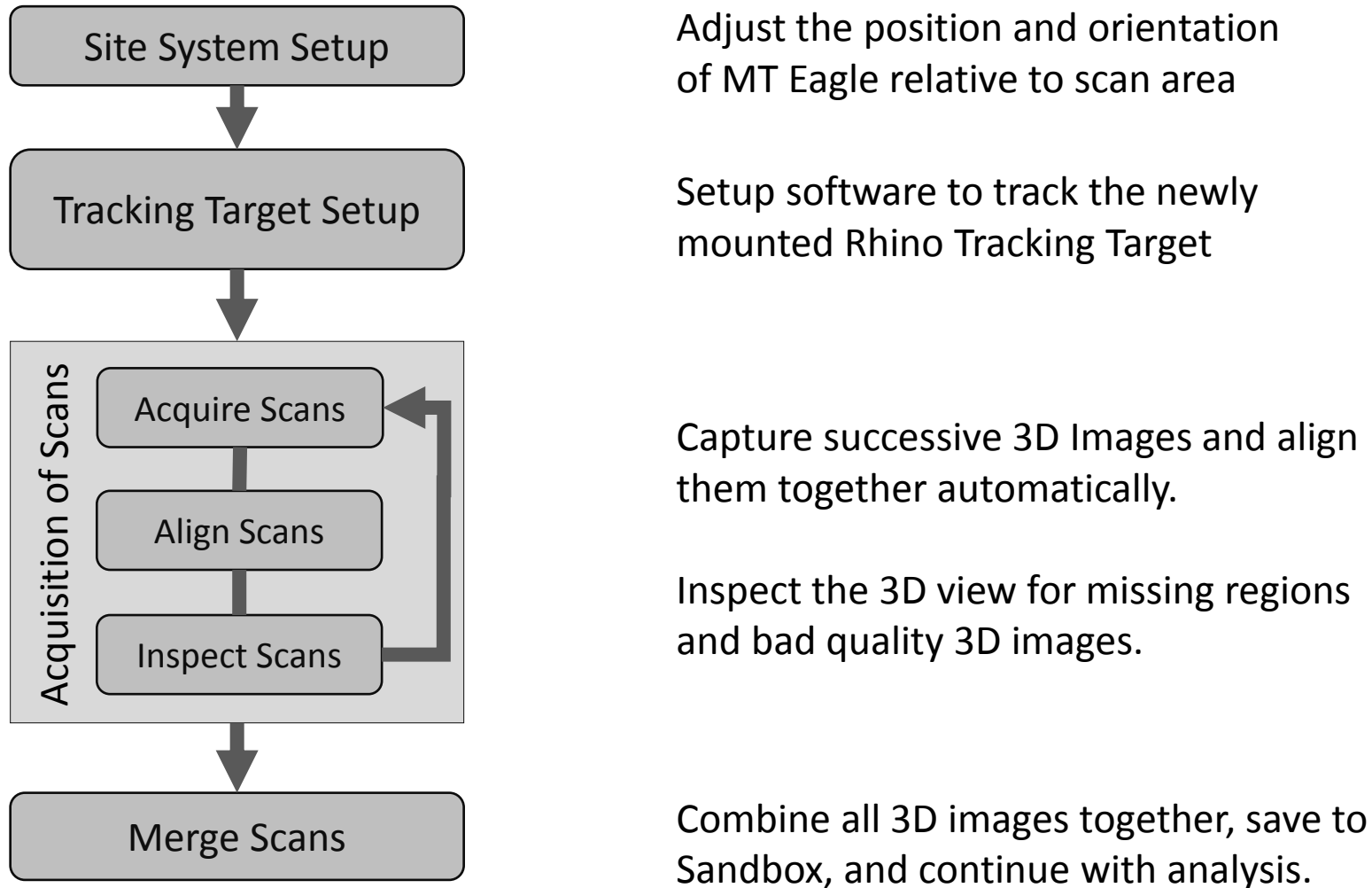
Triangulation of blobs across **multiple cameras** form 3D points.

Multiple 3D points form a **Tracking Target**.

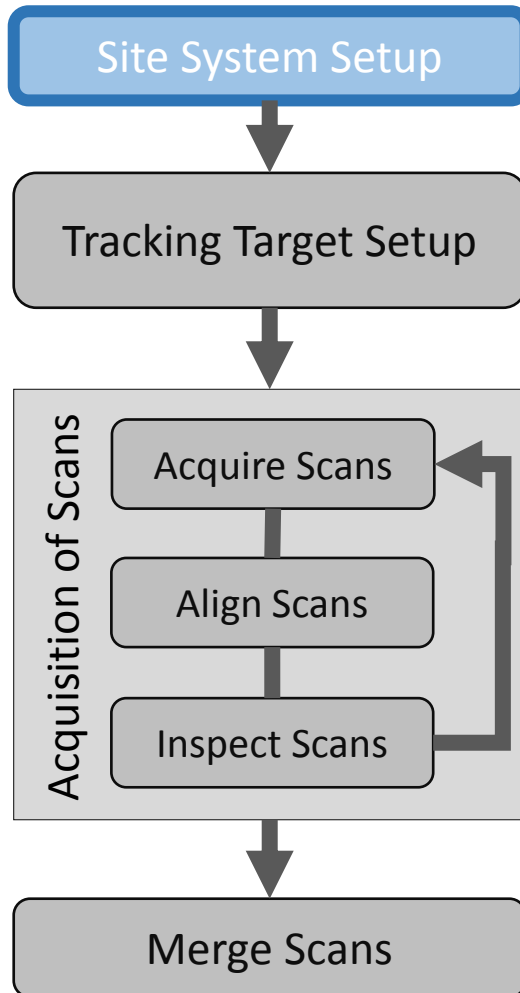
Real time identification and location of Tracking Targets.

# How do we use an MT Eagle?

## *Overview*



***GOAL: Position and orient MT Eagle for scanning a particular area***



## Placement and Making Connections

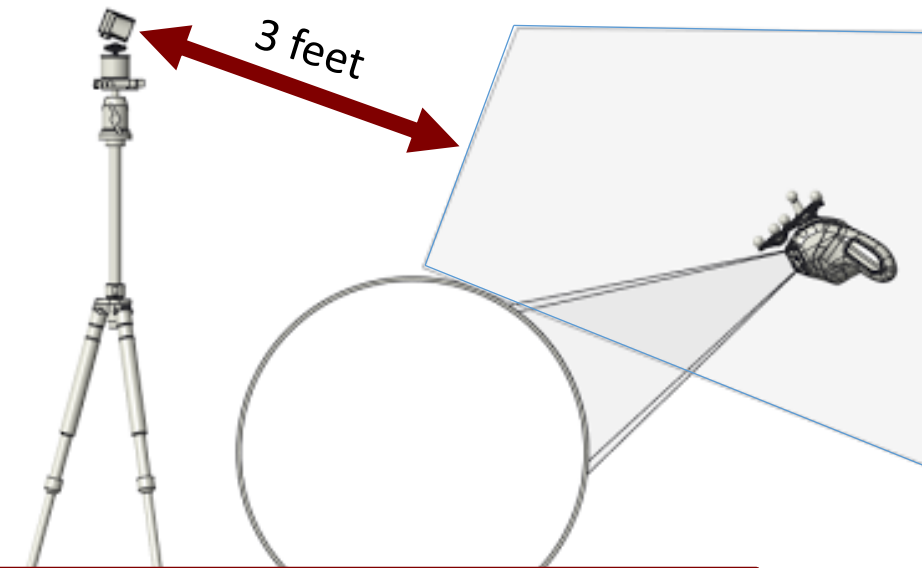
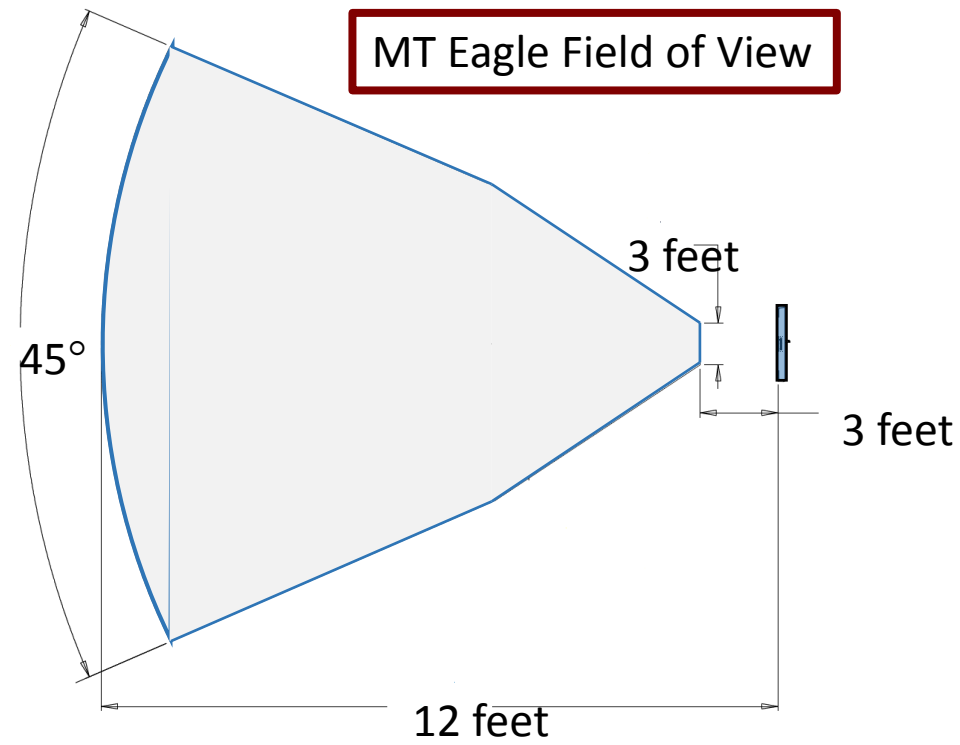
1. Determine area to scan.
2. Roughly position Tripod relative to area.
3. Place Laptop next to Area
4. Mount MT Eagle on Tripod
5. Connect cable from I/O-X Box to MT Eagle system.
6. Connect USB Cable between I/O-X Box and Laptop
7. Connect Power to I/O-X Box.
8. Mount Rhino Tracking Target onto the Rhino with the provided thumb screws.
9. *Procedure Continues with Software.*

**WARNING: This must be done last, or the MT Eagle system could be damaged.**

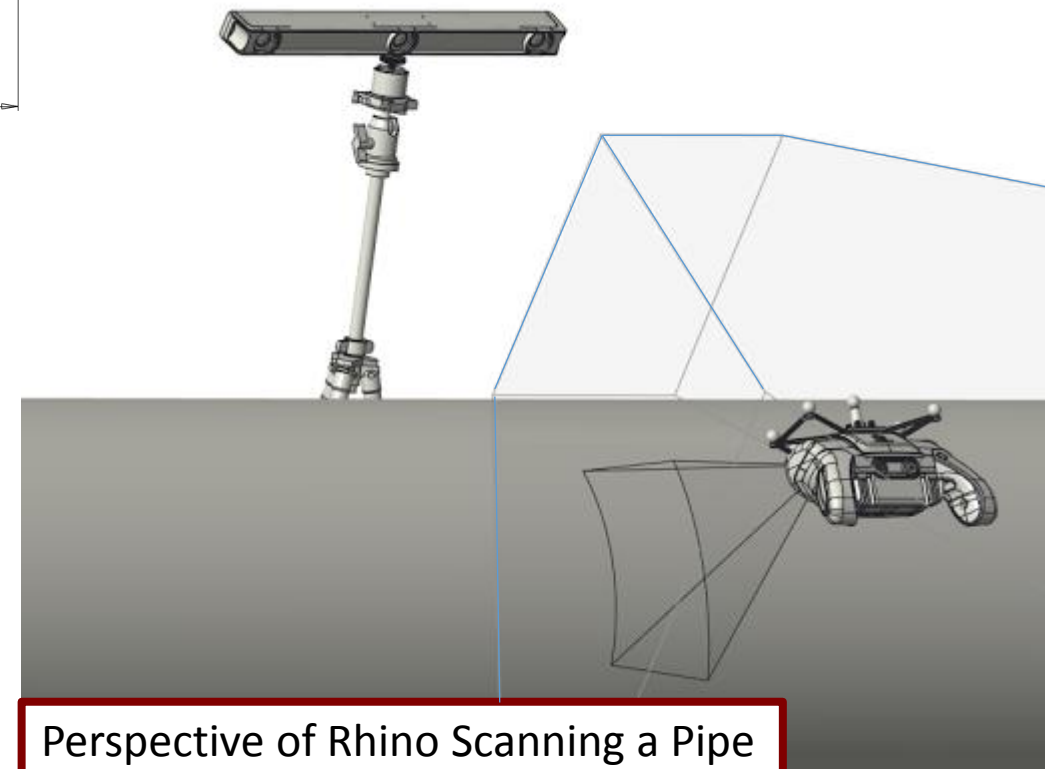
# Mount the Tracking Target to Rhino



MT Eagle Field of View

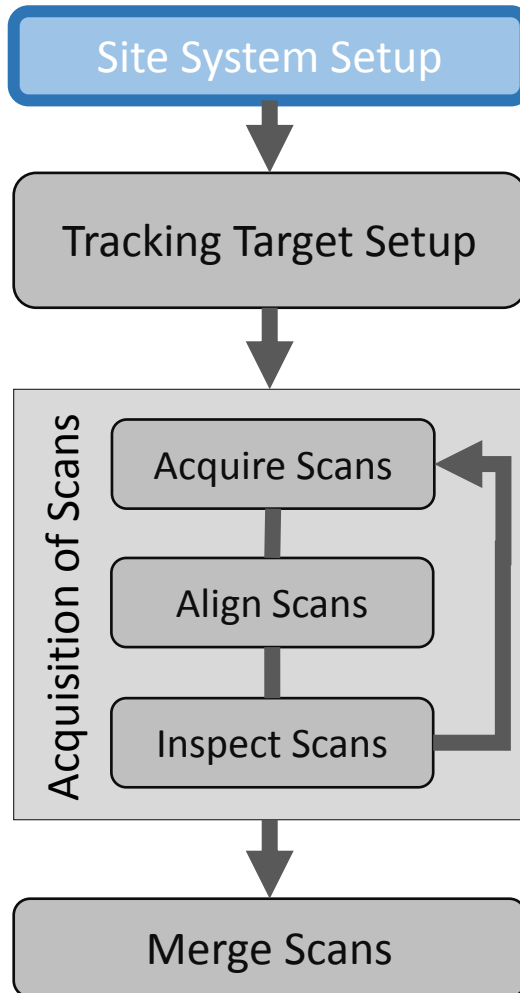


Minimum Working Distance of Eagle



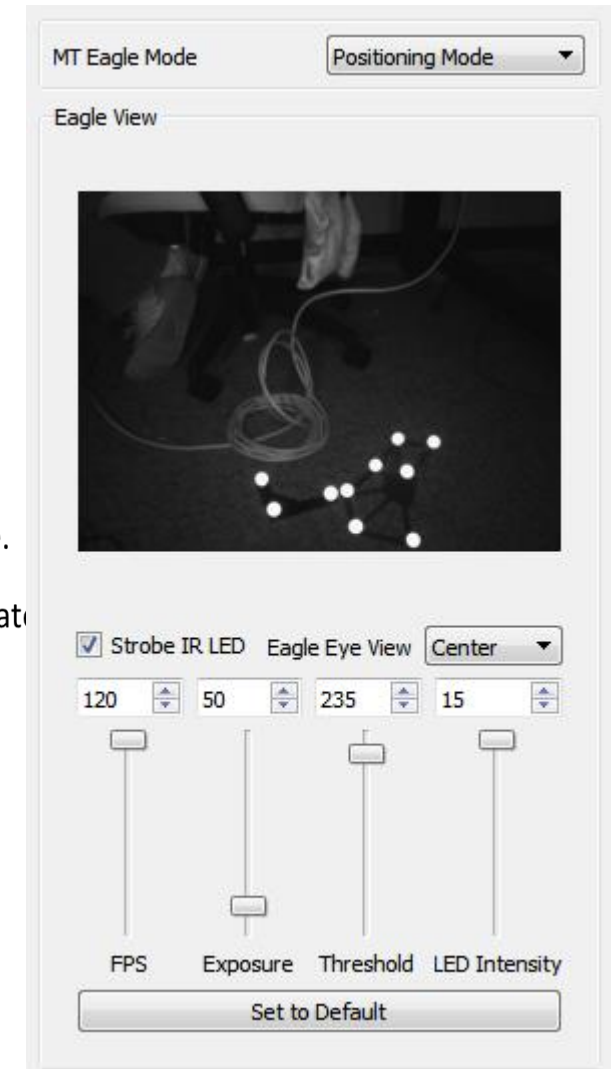
Perspective of Rhino Scanning a Pipe

***GOAL: Position and orient MT Eagle for scanning a particular area***

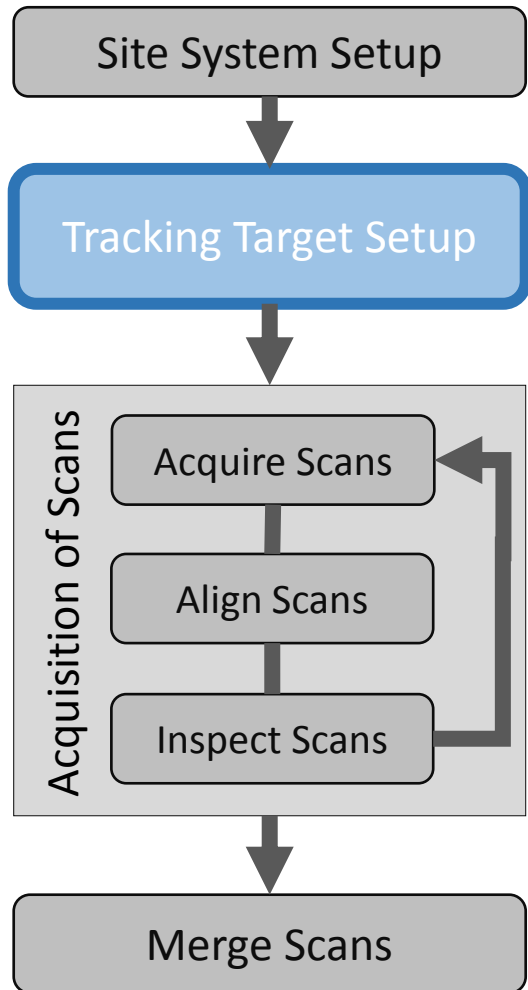


## Use the Eagle View to optimize setup

- |                       |   |
|-----------------------|---|
| <b>FPS</b>            | Sets the framerate of the MT Eagle Cameras  |
| <b>Exposure</b>       | Sets the exposure values used by the MT Eagle Cameras   |
| <b>Threshold</b>      | Sets the threshold for binarizing the MT Eagle System. This is used for optimal detection of the reflective spheres on the Tracking Targets and should be set to make the Spheres the only areas of white in the image. |
| <b>LED Intensity</b>  | Controls the brightness of the MT Eagle LEDs which are used to illuminate the tracking targets so that they can be accurately tracked.  |
| <b>Set to Default</b> | Resets the four MT Eagle settings to their default values.  |








**GOAL: Setup software to track the newly mounted Rhino Tracking Target**



## Enable Tracking Target Setup Mode

***Rhino Tracking Target***

***CS100/Verification Target***

1. Place ***CS100/Verification Target*** in field of view of MT Eagle and Rhino.
2. Verify Tracking of both Targets (***CS100/Verification Target*** and Rhino Tracking Target)
3. Take a scan of the CS100/Verification Target
  1. Follow good practices.
4. Process the scan 
5. Possible error messages, and what to do if they get a specific error

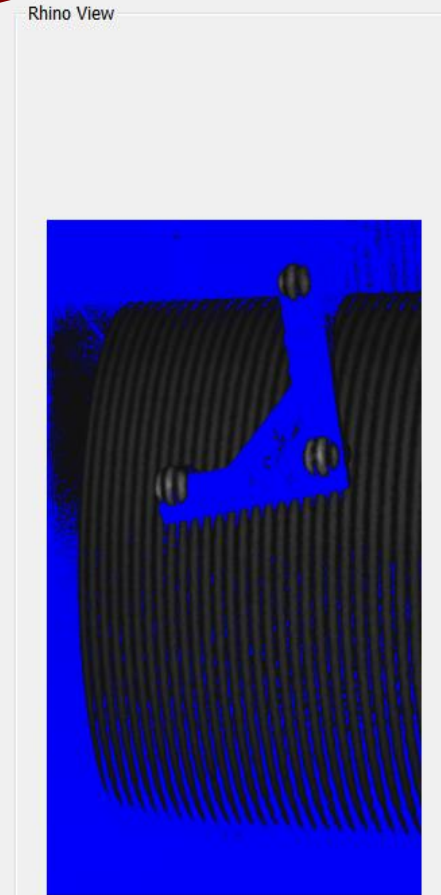
# What a successful Setup Scan looks like

Spheres are clearly visible

Both Tracking Targets are tracked

Exposure is set using the blue/red or colormap selected in Portfolio

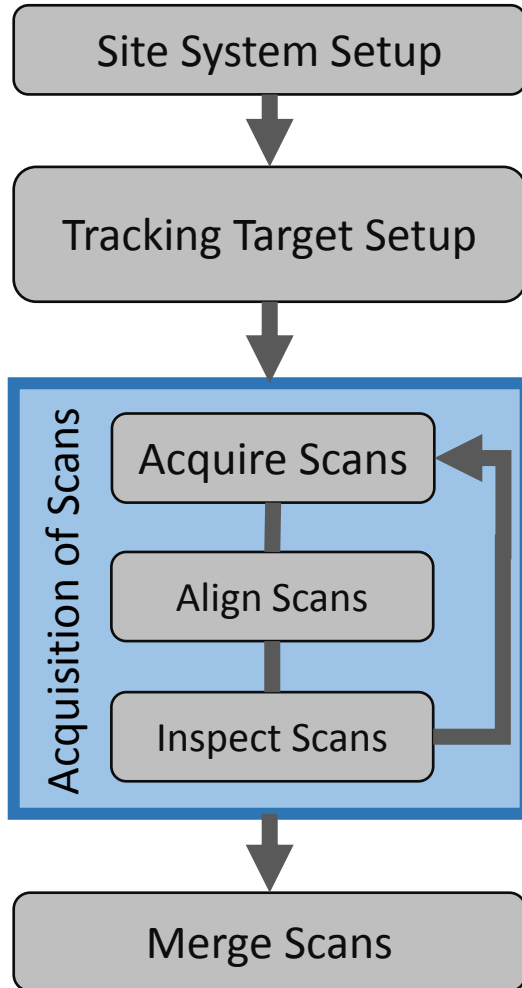
MT Eagle Mode Tracking Mode  
Scanner Target Tracked ✓ ☒ High Visibility Mode  
Setup Target Tracked ✓ ☒ High Visibility Mode



Exposure 0.60  
☐ Use Colormap

*GOAL: Capture 3D images and align them automatically...*

# Acquisition of Scans



**Use good 3DSL Rhino scanning practices:**

- Exposure Settings
- Limit Motion
- Orthogonal to surface-ish
- Ambient Light Protection

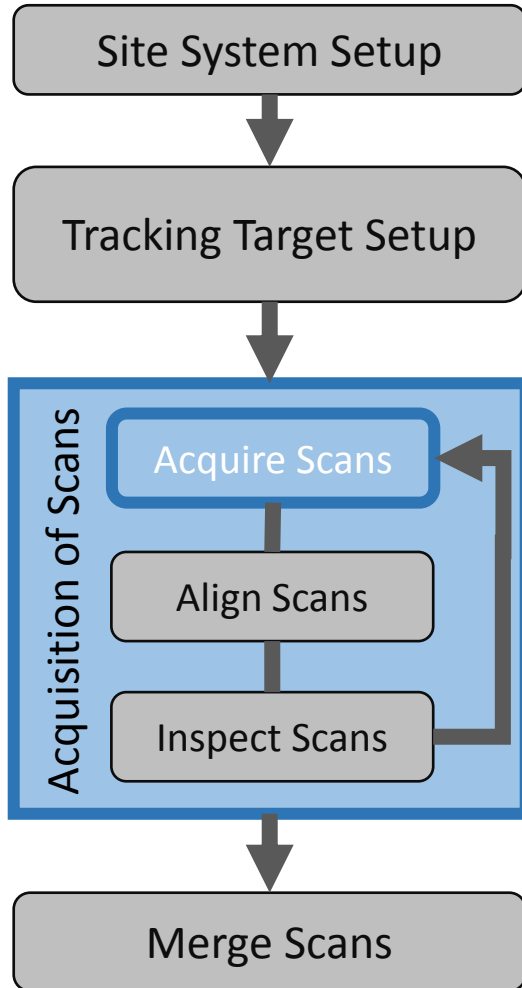
The diagram shows a 3D scanner (a small robot-like device) positioned on a circular base. It is emitting three distinct conical fields of view (FOV) towards a large, light-colored rectangular surface. A circular callout with a red border highlights the central area of the base, indicating the optimal starting position for the first scan.

**Take first scan in middle of the circumferential region that you want to scan.**

**For best results:**

Avoid Extreme angles for good tracking.

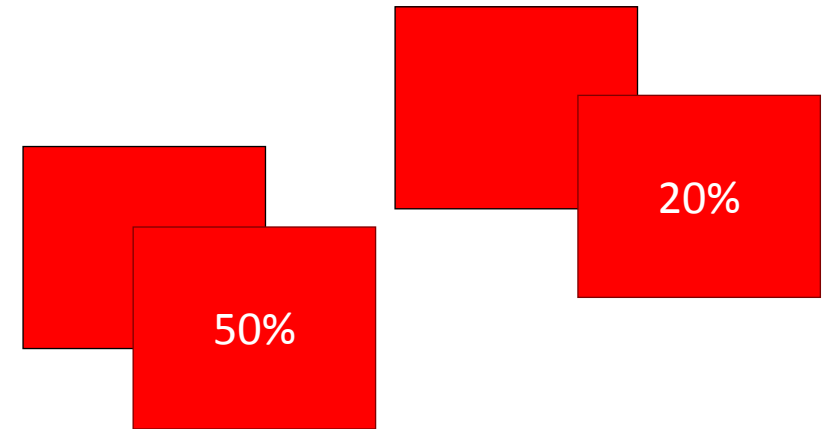
**GOAL: Capture 3D images and align them automatically...**



**Allow sufficient overlap between adjacent scans.**

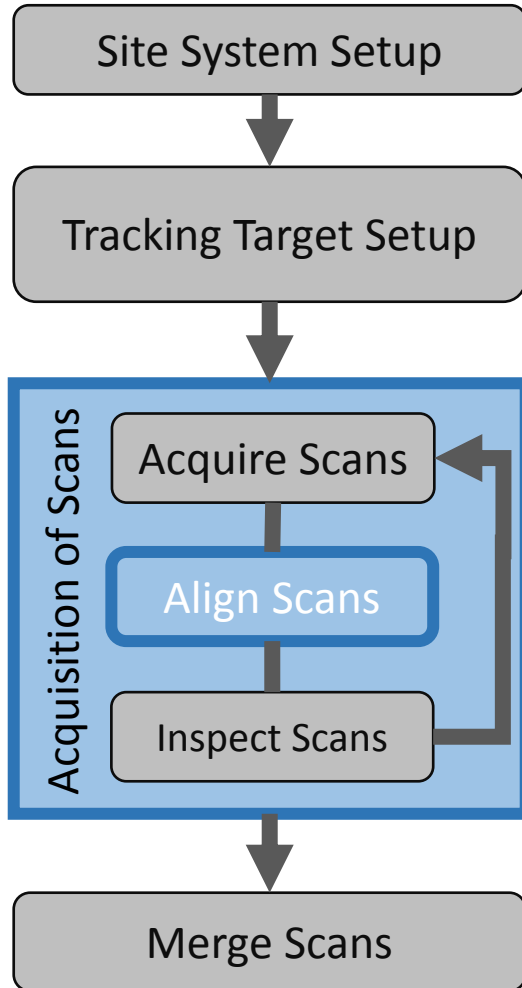
- **Very Important: Overlapping regions MUST contain the same features/defects or geometry in both scans**
- Less geometry for alignment requires more overlap
- More geometry requires less overlap
- Ideally 50% overlap (20% overlap minimum)

**For Best Results:** Scans should follow defect spacing, not necessarily uniform spacing



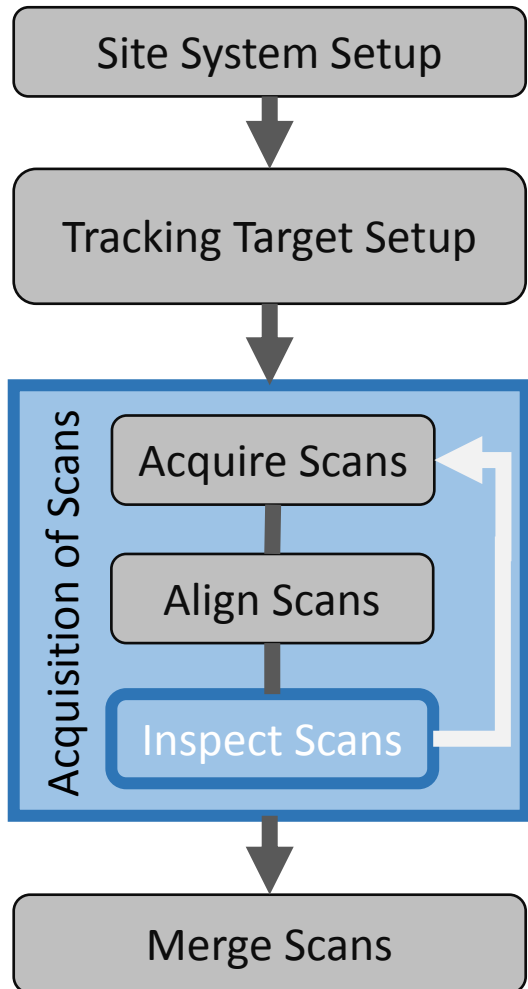
**... make sure you are tracked, and Click the button!!**

***GOAL: ... and align them automatically...***



**When ready to Align, Click the button!**





**GOAL:** ...inspect the 3D view for missing regions and bad quality 3D images.

### Verify that the Alignment and/or 3D data is good by:

- Checking individual scan status – Were all scans aligned?
- Observing gaps – Was a region of the scan area missed?
- Confirming 3D Image quality – Was exposure okay, and motion limited?

If a scan is bad, then Delete it and retake the image. Repeating the Align Scans step.

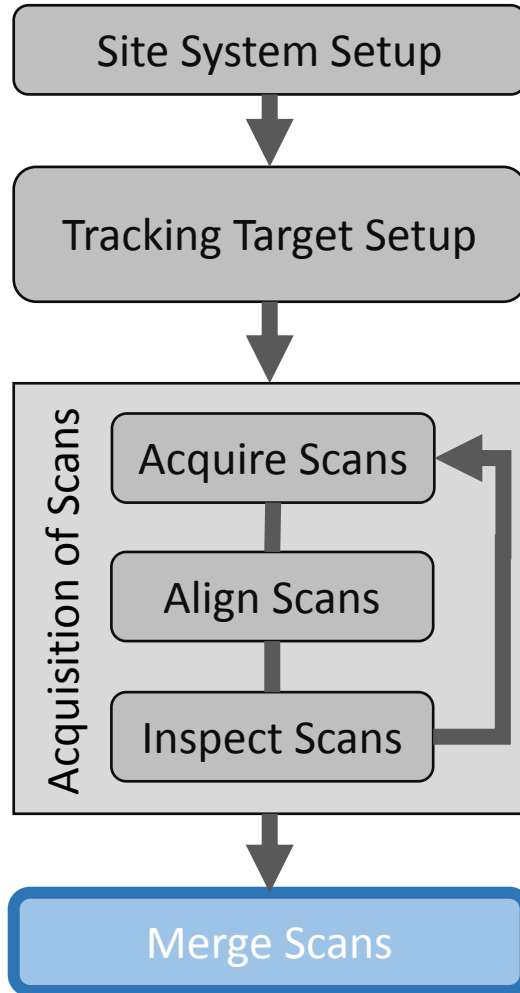
The screenshot shows a software window titled 'Image List'. It contains a table with four columns: 'Visible', 'Name', 'Status', and 'Delete'. There are three rows of data. The first two rows show 'Image 1' and 'Image 2' with green checkmarks in the 'Status' column. The third row shows 'Image 5' with a red 'X' in the 'Status' column. Each row has a 'Delete' button with a trash icon.

Visible	Name	Status	Delete
<input checked="" type="checkbox"/>	Image 1	✓	
<input checked="" type="checkbox"/>	Image 2	✓	
<input checked="" type="checkbox"/>	Image 5	✗	

### Advanced Problem Solving Technique:

***If the un-aligned 3D images look poorly aligned, then this could indicate a poorly setup Rhino Tracking Target.***

**GOAL:** Combine all 3D images and save the result to Sandbox.



**When Ready:**

- Click the Merge Button
- Type in a File Name
- Proceed with Analysis of Scan

**Warning: This Exits the Auto Align Window.**