In-Sight 3D Standard Lab Manual

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Lab Exercise 1.1 – Hardware & Connections

At the end of this lab exercise, Participants will be able to:

• Connect their In-Sight 3D L4000 camera to the network

The Participant will utilize the following In-Sight Functions to successfully complete this exercise:

- In-Sight Vision Suite
- Connect button

Follow the steps below to connect to the In-Sight 3D Camera:

- 1. Create a folder on your desktop named **IS3DClass** with the date appended, e.g., **IS3DClass021721.** This is where you will save the jobs you will develop in the lab exercises.
- 2. Double click the In-Sight Vision Suite shortcut icon on your desktop.



The In-Sight Vision Suite Launcher will display. The In-Sight Vision Device Pane displays the host names of the discovered devices, as well as the icons that indicate the model and status of the devices.

NOTE: When the launcher first starts, it will discover and enumerate all the In-Sight Vision Systems on the local subnet network in the In-Sight Device Pane.

🍳 In-Sight Vision Suite 🛛 🏫		
USNA-2313-1064 🌼 C 🛛	System Info	
In-Sight 3D In-Sight 3D In-Sight VDI System D 902M_TS D 902M_TS	H000-Training IP Address: 10.11.80.11 Mac let: 00-042-43-96-5e Firmware Version: 20.0 (8251)	
 isd905c_775d28 In-Sight VIDI System - Emulator × ↓ ↓ usna-2313-1064 (This PC) 	IP Address 101180.11 Mac Id 00-05-24-30-96-5e Firmware Version 2.00 (0231) Current State Offline Scrial Number 1420520006947 Model IS3D-14100 FFP Port 21 HTTP Port 80 Current Job Umaxed Job] Attached device(s) None	
	Utilities	
	Image: Constraint of the sector of	ings Industrial Ethernet
	Go Offline	e Project Nanagement



3. Click the name of your In-Sight 3D L4000 camera and click the **Connect** button.



The Loading Window displays.





The **Development Environment** displays. The *Acquisition* tab is active, notice that there is a second tab representing the blank *Spreadsheet*.







Lab Exercise 2.1 – Software and Image Acquisition

At the end of this lab exercise, Participants will be able to:

- Utilize the Acquisition Wizard to configure and control the acquisition settings
- Acquire an image using an In-Sight 3D-L4000 series camera

The Participant will utilize the following In-Sight Functions to successfully complete this exercise:

- Acquisition Wizard
- In-Sight Spreadsheet

Follow the steps below to acquire an image:

- 1. Connect to your camera.
- 2. Double click cell A0 to open the Acquisition Wizard.

The Acquisition Wizard displays.

- 3. On the **Trigger** Tab set the parameters as follows:
 - Trigger Source = Software
 - Motion Input = Encoder
 - *Encoder Direction* = LensToLaser
 - Acquisition Direction = LensToLaser

Trigger	Trigger Source Motion Input	Software Encoder
nsor	Distance Trigger Delay [mm]	0
Š	Encoder Type	Dual Channel Y
	Encoder Direction	LensToLaser 🗸 🗸
Correction	Acquisition Direction	LensToLaser 🗸
	Encoder Counter	4294966380 Reset

- 4. On the **Sensor** tab set the parameters as follows:
 - Exposure = Click the Auto button





- 5. On the **Correction** tab set the parameters as follows: *Target Correction*
 - *Target Model* = TS20

Click the Grab One and Perform Correction button.

				(2
gger	۲	Target Correction			1
Ę		Target Model	TS20 (20mm top side size)	~	
		Correction Mode	Fast	~	
		Estimated Scan Time [s]	0	5.000	
insor		Grab Or	e and Perform Correction		
Š					
		Manual Correction			
R				25.000	
rrecti				10.083	
රී				-0.507	
		Tilt [deg]	0	1.277	

6. Move your slider from left to right to acquire an image. The camera processes the parameters for motion state and performs field calibration.





- 7. On the Point Cloud tab set the parameters as follows:
 - Requested Scan Length = 100 mm
 - Change Requested Y Resolution [mm] = Click the Auto button



8. Place the good Demo Part on the demo station slider and click the **Trigger Once** button.



9. Move the demo station slider from left to right to acquire an image. Review the image.





10. Click the **Spreadsheet** tab to return to the spreadsheet, return the slider to the starting position and click the **Trigger Once** button.



11. Move the demo station slider from left to right to acquire an image.

A new **Point Cloud** image displays in the 3D display and behind the spreadsheet.



12. Click the **Show 3D Image from** buttons to view the 3D image from the different perspectives.



13. Click the **Change Height Coloring** button and move the color display bars to view the change in colors.



14. When you are happy with the colors, click the **Change Height Coloring** button again.



Color mapping is added to the 3D image.

NOTE: In the color mapping of the demo part, the base plane is a dark purple.



15. Save the job as **MyAcquisition3D** in the folder on the desktop created in Lab #1.









COGNEX

Lab Exercise 3.1 – Pattern Location using PatMax 3D

At the end of this lab exercise, Participants will be able to:

• Utilize the PatMax3D tools to locate a cuboid on the demo part

The Participant will utilize the following In-Sight 3D Functions to successfully complete this exercise:

- TrainPatMax3D
- FindPatMax3D
- Quick Drop Box

Follow the steps below to acquire an image:

- 1. Continue with the MyAcqusition3D job from the last lab exercise.
- 2. Save the job as MyPatMax3D in the folder that you created in Lab #1.
- 3. Enter the comment **Pattern Location** in cell A3. Be sure to start with an apostrophe ('). Format the cell so that the comments are noticeable in the spreadsheet.

	A	B	С	D	E
0	□PointClou	bu			
1	⊡lmage				
2					
3	Pattern Loo	cation			
4					

4. Insert a TrainPatMax3D tool into cell B5 of the spreadsheet.



- Double-click the **Region3D** parameter. The region displays on the 3D image window.
- 6. Click the Show 3D Image from Top button.



7. Click the Quick Drop Box button.



8. Draw a region over the corner cuboid and the corresponding corner and press the **<Enter>** key.



9. Uncheck the **Exclude Base Plane** checkbox and click the **Train Event** button.

Region3D	(36.967,40.358,26.623,20.494,-21.014,43.883,0, 🔊
External Region	0
Exclude Base Plan	9
🗈 Plane3D	(0,0,0,0,0)
External Plane	
Pattern Origin	(0,0,0,0,0,0)
Feature Size	Medium V = 1
Train Event	Train Event
Timeout	60000 \$
Show	hide all \checkmark = 0

10. Click the **OK** button to close the TrainPatMax3D Property Sheet. The **Model3D** Structure is added to the spreadsheet.

	A	B	С	D	E	F	G	Н
0	□PointClou	bi						
1	⊡lmage							
2								
3	3 Pattern Location							
4			Trained	Origin	Х	Y	Z	
- 5		⊡ Model3D	1.000	□Point3D	-27.437	-26.823	39.777	
6								





11. Insert a FindPatMax3D tool into cell B7 in the spreadsheet.



Double-click the **Region3D** parameter.
 The region displays on the 3D image window. View the Demo Part from the Top.



13. Click the **Quick Drop Box** button.



- 14. Draw a region over the entire part and press the <Enter> key.
 NOTE: The green checkmark (Accept Changes) button can also be used.
- 15. Uncheck the Exclude Base Plane checkbox.

Region3D	(125.8	(125.829,100.472,100,0.626,-49.391,						
External Region	0							
Exclude Base Plane			9					
🖶 Plane3D	(0,0,0,0	D,O)						



 Double-click the Model3D parameter to open – reference the TrainPatMax3D cell (B5) and press the <Enter> key.

Offset	1.000 🛟
Model3D	\$B\$5 = □Model3D
Num to Find	1 🕻
Accept Threshold	50.000 🗘

17. Allow all default settings to remain and click the **OK** button to close the FindPatMax3D Property Sheet.

The Patterns3D Structure is added to the spreadsheet.

	A	В	С	D	E	F	G	Н		J	K	L	М
0	PointClot	ud											
1	⊡lmage												
2													
3	Pattern Lo	cation											
4			Trained	Origin	Х	Y	Z						
5		□Model3D	1.000	□Point3D	-27.437	-26.823	39.777						
6			Num Found	Index	Score	Fixture	Х	Y	Z	Rotation	Tilt	Tilt Directio	n
7		□Patterns3D	1.000	0.000	93.377	□Fixture3D	-27.428	-26.824	39.776	0.009	0.003	94.049	
8						1. 1	1						



NOTE: The X, Y, Z, Rotation, Tilt and Tilt Direction parameters show the location of the found features.

18. Highlight the **Fixture3D** structure in cell **F7**.

3	Pattern Loo	cation											
4			Trained	Origin	Х	Y	Z						
5		□Model3D	1.000	□Point3D	-27.437	-26.823	39.777	•					
6			Num Found	Index	Score	Fixture	Х	Y	Z	Rotation	Tilt	Tilt Direction	
7		□Patterns3D	1.000	0.000	93.377	■Fixture3D	-27.428	-26.824	39.776	0.009	0.003	94.049	



19. Move the part and click the **Trigger Once** button to acquire a new image.



20. Review the results.



- 21. Enter the comment **Find Corners** in cell **A8**. Be sure to start with an apostrophe ('). Format the cell so that the comments are noticeable in the spreadsheet.
- 22. Enter a MultiBoxRegion3D tool into cell B9.
 NOTE: The MultiBoxRegion3D tool is found under Toolbox → 3D Structures.
 The MultiBoxRegion3D Property Sheet displays.
- 23. Double-click the **External Fixture** parameter to open reference the **Fixture3D** cell (F7) and press the **<Enter>** key.
- 24. Change the **Number of Boxes** parameter to *4*.





25. Click the Show 3D Image from Top button.



- 26. Double-click the **Box3D 0** parameter and position the region on the corner next to the cuboid and press the **<Enter>** key.
- 27. Repeat for the remaining Box3D parameters, placing each one in a corner of the demo part as shown below.



28. Click the **OK** button to close the MultiBoxRegion3D Property Sheet.



29. Save the job.

			🔍 In-S	ight Visi	ion Suite	•	MyPat	tMax3D	@ 4000	-Trainin	g ×			
			File Ed	it View	Insert F	ormat Im	age Job	Tools	Network	Help				
			i 🗈 🚄	🖻 関	_ਦ ੇ ⊘ Ve	rify \mid 👂 Or	nline ₌							
			📰 Sp	oreadshe	eet ×	Acquis	ition							
	A	В	С	D	E	F	G	Н	1	J	K	L	М	
0	□PointClou	bu												
1	⊡lmage													
2														
3	Pattern Lo	cation												
4			Trained	Origin	Х	Y	Z							
5		□Model3D	1.000	□Point3D	-27.437	-26.823	39.777							
6			Num Found	Index	Score	Fixture	Х	Y	Ζ	Rotation	Tilt	Tilt Direction		
7		□Patterns3D	1.000	0.000	92.990	■Fixture3D	-27.648	-33.759	39.790	359.907	0.267	131.139		
8	Find Corne	rs												
9		□Region3D	/											



Lab Exercise 4.1 – 3D Extract Tools

At the end of this lab exercise, Participants will be able to:

- Use the ExtractPlane3D function to extract one of more planes from the point cloud
- Find blobs that are both positive (above the plane) and negative (below the plane)
- Extract edges from the specified region of the point cloud

The Participant will utilize the following In-Sight Functions to successfully complete this exercise:

ExtractPlane3D	ExtractBlob3D
ExtractEdge3D	ExtractSphere3D
ExtractCvlinder3D	

Follow the steps below to complete the lab exercise:

ExtractPlane3D

- 1. Continue with the MyPatMax3D job from the last lab exercise.
- 2. Save the job as MyExtractTools3D in the folder created in lab #1.
- 3. Enter the comment **Base Plane** in cell **A10**.
- Insert an ExtractPlane3D tool in cell B12.
 NOTE: The ExtractPlane3D tool is found in the Toolbox → 3D Vision Tools → 3D Extract → ExtractPlane3D.

The ExtractPlane3D Property Sheet displays.

- 5. Set the property sheet parameters as follows:
 - *External Region* = Region3D Structure of the MultiBoxRegion tool (B9) Allow all other defaults to remain and click the **OK** button to close the property sheet. **NOTE**: *The ExtractPlane3D tool will use the region that was used in the MultiBoxRegion tool.*





- 6. Enter the comment **Block Plane** in cell **A13**.
- 7. Enter the comment **Middle Cube** in cell **B14**.
- 8. Insert an ExtractPlane3D tool in cell B16.
- 9. Set the property sheet parameters as follows: *External Fixture* = Fixture3D Structure of the FindPatMax3D tool (F7) Press the <Enter> key.
- 10. Double-click the **Region3D** parameter. The region displays on the 3D image window.
- 11. Click the Show 3D Image from Top button.



12. Click the Quick Drop Box button.



- 13. Draw a region over the middle cuboid and press the **<Enter>** key.
- 14. Click the **OK** button to close the ExtractPlane3D Property Sheet.



- 15. Enter the comment **Corner Cube** in cell **B17**.
- Insert an ExtractPlane3D tool in cell B19 and repeat steps 9 14 to find the corner cube.





10	Base Plane												
11			Num Found	Index	Score	Relative Tilt	Rectangle	Center	Х	Y	Z	Tilt	Tilt Direction
12		□Planes3D	1.000	0.000	89.835	0.042	□Rectangle3D	□Point3D	-5.665	-47.750	36.954	0.042	112.138
13	Block Plane												
14		Middle Cube											
15			Num Found	Index	Score	Relative Tilt	Rectangle	Center	Х	Y	Z	Tilt	Tilt Direction
16		□Planes3D	1.000	0.000	80.580	1.737	□Rectangle3D	□Point3D	-4.680	-32.493	46.813	0.064	101.250
17		Corner Cube											
18			Num Found	Index	Score	Relative Tilt	Rectangle	Center	Х	Y	Z	Tilt	Tilt Direction
19		□Planes3D	1.000	0.000	80.761	0.248	□Rectangle3D	□Point3D	-29.540	-31.283	46.818	0.083	47.846

17. Save the job.

ExtractBlob3D

- 1. Enter the comment **Blob Count** in cell **A20**.
- Insert an ExtractBlob3D tool in cell B22.
 NOTE: The ExtractBlob3D tool is found in the Toolbox → 3D Vision Tools → 3D Extract → ExtractBlob3D.

The ExtractBlob3D Property Sheet displays.

- 3. Set the property sheet parameters as follows:
 - *External Fixture* = Fixture3D structure from FindPatMax3D tool (F7)
 - Plane from Region checkbox = Unchecked
 - *External Plane* = Rectangle3D structure from Base Plane (G12)
 - *Number to Extract* = 6
- 4. Double-click the **Region3D** parameter.

The region displays on the 3D image window.

- 5. Click the Show 3D Image from Top button.
- 6. Click the Quick Drop Box button.
- 7. Draw a region over the base plane, rotate the demo part and reduce the size of the region from the top and bottom, and press the **<Enter>** key.







- 8. Click the **OK** button to close the ExtractBlob3D Property Sheet.
- 9. Rotate the part and review the results. Notice the ExtractBlob3D tool found 5 of the 6 blobs that we were looking for.

Blob Count							
	Num Found	Index	Volume	Height	Туре	Bounding E	
⊡ Blobs3D	5.000	0.000	4043.177	10.111	Positive	Box3D	
		1.000	4028.628	10.140	Positive	Box3D	
		2.000	3157.237	10.174	Positive	Box3D	
		3.000	2440.768	12.048	Positive	Box3D	
		4.000	1459.605	7.961	Positive	□Box3D	
		5.000	#ERR	#ERR	#ERR	#ERR	

- Open the ExtractBlob3D Property Sheet and expand the **Blob Types** parameter.
 NOTE: The ExtractBlobs3D tool is only searching for the blobs that are positive (above the base plane), notice that the 6th blob is under the base plane.
- 11. Check the **Negative** checkbox and click the **OK** button to close the property sheet.

Blob Types	(1,1,0)	9
Positive		
Negative		9
Unchanged		

12. Review the results. Notice now all 6 blobs (above and below the base plane) have now been found.



13. Save the job.



ExtractEdge3D

- 1. Enter the comment Find Edges in cell A28.
- Insert an ExtractEdge3D tool in cell B30.
 NOTE: The ExtractEdge3D tool is found in the Toolbox → 3D Vision Tools → 3D Extract → ExtractEdge3D.
 The ExtractEdge3D Property Sheet displays.

Set the preparty sheet peremeters as follows:

- 3. Set the property sheet parameters as follows:
 - *External Fixture* = Fixture3D Structure of the FindPatMax3D tool (F7)
 - Number to Extract = 3
 - *Feature Size* = Medium
 - Allow all other defaults to remain
- 4. Double-click the **Region3D** parameter.

The region displays on the 3D image window.

5. Click the Show 3D Image from Top button.



6. Click the Quick Drop Box button.



- 7. Draw a region over the pyramid and press the **<Enter>** key.
- 8. Click the **OK** button to close the ExtractEdge3D Property Sheet.





9. Rotate the part and review the results.



10. Save the job.

ExtractSphere3D

- 1. Enter the comment **Find Sphere** in cell **A33**.
- Insert an ExtractSphere3D tool in cell B35.
 NOTE: The ExtractSphere3D tool is found in the Toolbox → 3D Vision Tools → 3D Extract → ExtractSphere3D.
 The ExtractSphere3D Property Sheet displays.
- 3. Set the property sheet parameters as follows:
 - External Fixture = Fixture3D Structure of the FindPatMax3D tool (F7)
 - *Mode* = Robust
 - *Feature Size* = Medium
- 4. Double-click the **Region3D** parameter.

The region displays on the 3D image window.

- 5. Click the Show 3D Image from Top button.
- 6. Click the **Quick Drop Box** button.
- 7. Draw a region over the sphere and press the **<Enter>** key.





8. Click the **OK** button to close the ExtractSphere3D Property Sheet.



9. Save the job.

ExtractCylinder3D

- 1. Enter the comment **Find Cylinder** in cell **A36**.
- Insert an ExtractCylinder3D tool in cell B38.
 NOTE: The ExtractCylinder3D tool is found in the Toolbox → 3D Vision Tools → 3D Extract → ExtractCylinder3D.
 The ExtractCylinder3D Property Sheet displays.
- 3. Set the property sheet parameters as follows:
 - *External Fixture* = Fixture3D Structure of the FindPatMax3D tool (F7)
- Double-click the **Region3D** parameter. The region displays on the 3D image window.
- 5. Click the Show 3D Image from Top button.
- 6. Click the **Quick Drop Box** button.
- 7. Draw a region over the cylinder and press the **<Enter>** key.





8. Click the **OK** button to close the ExtractCylinder3D Property Sheet.



9. Save the job.



Spreadsheet:

	A	В	C	D	E	F	G	н	S 1	J	K	L	M	N	0	
0	PointCloud								3							
1	□lmage		6													
2									1							
3	Pattern Locat	lion							22							
4			Trained	Origin	х	Y	Z		·				-			
5		DModel3D	1.000	DPoint3D	8.598	-22.819	36.952									T
6			Num Found	Index	Score	Fixture	X	Y	Z	Rotation	Tilt	Tilt Directio	n			
7		DPatterns3D	1.000	0.000	81.328	□Fbdure3D	-36.007	-28.231	36.953	87.510	0.125	245.872	2			
8	Find Corners															
9		□Region3D	1													
10	Base Plane															
11			Num Found	Index	Score	Relative Tilt	Rectangle	Center	х	Y	Z	Till	Tilt Directio	n		
12		DPlanes3D	1.000	0.000	89.835	0.042	□Rectangle3D	DPoint3D	-5.665	-47.750	36.954	0.042	112.138)		
13	Block Plane															
14		Middle Cube														
15			Num Found	Index	Score	Relative Tilt	Rectangle	Center	х	Y.	Z	Tilt	Tilt Directio	on		
16		DPlanes3D	1.000	0.000	80.580	1.737	DRectangle3D	DPoint3D	-4.680	-32.493	46.813	0.064	101.250)		
17		Corner Cube														
18			Num Found	Index	Score	Relative Tilt	Rectangle	Center	х	Y	Z	Tilt	Tilt Directio	on		
19		DPlanes3D	1.000	0.000	80.761	0.248	□Rectangle3D	DPoint3D	-29.540	-31.283	46.818	0.083	47.846	i		
20	Blob Count															T
21			Num Found	Index	Volume	Height	Туре	Bounding Box								
22		DBlobs3D	6.000	0.000	4013.956	10.102	Positive	DBox3D								
23				1.000	3997.406	10.068	Positive	Box3D			1				9	
24			1	2.000	3154.911	10.120	Positive	Box3D								
25			1	3.000	2421.354	11.902	Positive	Box3D								
26				4.000	1459.861	7.990	Positive	Box3D								
27			1	5.000	903.482	3.480	Negative	Box3D								
28	Find Edges															
29			Num Found	Index	Transition 7	Score	Coverage	Sharpness	Vertical Ang	Horizontal Angle	Line	Midpoint	X0	Y0	Z0	X1
30		DEdges3D	3.000	0.000	Concave	95.098	100.000	45.237	0.044	1.255	DLine3D	DPoint3D	-15.473	-54.394	36.998	3
31				1.000	Convex	93.217	100.000	91.142	0.033	1.958	DLine3D	DPoint3D	-5.375	-54.394	48.644	4
32			1	2.000	Concave	95.323	100.000	45.669	0.051	0.955	□Line3D	DPoint3D	4.509	-54.394	37.025	5
33	Find Sphere		(
34			Num Found	Index	Score	Sphere	Center	Radius	х	Y	Z					
35		□Spheres3D	1.000	0.000	90.028	□Sphere3D	DPoint3D	10.253	19.335	-63.932	34.629				<u>)</u>	
36	Find Cylinder															
37			Num Found	Index	Score	Cylinder	Axis	Center	Radius	Length	х	Y	Z	Tilt	Tilt Directio	ən
38		Cylinders3D	1.000	0.000	93.017	Cylinder3D	DLine3D	□Point3D	10.017	29.498	-30.541	-61.508	36.851	89.882	268.822	2



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Lab Exercise 5.1 – 3D Measure Tools

At the end of this lab exercise, Participants will be able to:

• Find the height of the cuboid and angle of the pyramid on the demo part

The Participant will utilize the following In-Sight Functions to successfully complete this exercise:

- PointToPlane3D
- PlaneToPlaneAngle3D

Follow the steps below to complete the lab exercise:

- 1. Continue with the MyExtractTools3D job from the last lab exercise.
- 2. Save the job as MyMeasureTools3D in the folder created in lab #1.
- 3. Enter the comment Height Measure in cell A39.
- 4. Enter the comment Middle Cube in cell B40.
- Insert a PointToPlane3D tool in cell B42.
 NOTE: The PointToPlane3D tool is found in the Toolbox → 3D Measure → PointToPlane3D.
- 6. Set the property sheet parameters as follows:
 - *External Point* = Point3D Structure of the Base Plane (H12)

• *External Plane* = Rectangle3D Structure of the Block Plane (G16) Press the **<Enter>** key.

- 7. Enter the comment Corner Cube in cell B43.
- 8. Insert a PointToPlane3D tool in cell B45.
- 9. Set the property sheet parameters as follows:
 - *External Point* = Point3D Structure of the Base Plane (H12)
 - *External Plane* = Rectangle3D Structure of the Block Plane (G19)
 - Press the **<Enter>** key.





- 10. Rotate the part and review the results.
- 11. Enter the comment **Pyramid** in cell **B46**.
- 12. Insert an ExtractPlane3D tool in cell B48.
- 13. Set the property sheet parameters as follows:
 - *External Fixture* = Fixture3D Structure of the FindPatMax3D tool (F7)
 - *Mode* = Robust
 - Number to Extract = 2
- 14. Double-click the **Region3D** parameter.

The region displays on the 3D image window.

15. Click the Show 3D Image from Top button.



16. Click the Quick Drop Box button.



- 17. Draw a region over the pyramid and press the **<Enter>** key.
- 18. Click the **OK** button to close the ExtractPlane3D Property Sheet.



39	Height Measu	re											
40		Middle Cube											
41			X0	YO	Z0	X1	Y1	Z1	Tilt	Tilt Direction	Distance		
42		□Dist3D	-5.665	-47.750	36.954	-5.667	-47.739	46.829	0.064	101.250	9.876		
43		Corner Cube											
44			X0	YO	Z0	X1	Y1	Z1	Tilt	Tilt Direction	Distance		
45		□Dist3D	-5.665	-47.750	36.954	-5.655	-47.739	46.812	0.083	47.846	9.859		
46		Ругатid											
47			Num Found	Index	Score	Relative Tilt	Rectangle	Center	Х	Y	Z	Tilt	Tilt Direction
48		□Planes3D	2.000	0.000	78.890	48.744	□Rectangle3D	□Point3D	-0.308	-62.779	42.537	48.744	358.856
49				1.000	71.926	48.250	□Rectangle3D	□Point3D	-11.071	-63.139	42.410	48.251	178.836

19. Enter the comment **Angle Measure** in cell **A50**.

PlaneToPlane3D.

20. Insert a PlaneToPlaneAngle3D tool in cell B51.
 Note: The PlaneToPlaneAngle3D tool is found in the Toolbox → 3D Measure →



- 21. Set the property sheet parameters as follows:
 - External Plane 0 = Rectangle3D Structure of Height Measure Plane 0 (G48) Press the **<Enter>** key.

• External Plane 1 = Rectangle3D Structure of Height Measure Plane 1 (G49) Press the **<Enter>** key.

22. Click the **OK** button to close the PlaneToPlaneAngle3D Property Sheet.



- 23. Review the results.
- 24. Save the job.

51

Spreadsheet:

A	B	C	D	E	F	G	н	1	J	K	L	M	N	0
0 PointCloud			200											
1 Olmage						-							()	
2														
3 Pattern Loca	tion											1	-	
4		Trained	Origin	x	Y	Z								
5	CIModel3D	1,000	Point3D	8.598	-22.819	36,952								
6		Num Found	Index	Score	Fixture	x	Y	Z	Rotation	Tilt	Tilt Directio	n		
7	DPatterns3D	1.000	0.000	81 328	DEbdure3D	-36 007	-28 231	36 953	87 510	0.125	245 872			
8 Find Corners														
9	Begion3D				1				121					
10 Base Plane					-									
11	-	Num Found	Index	Score	Relative Tilt	Rectangle	Center	×	v	7	Tit	Tilt Directio	0	
12	CIPlanes 3D	1.000	0.000	00 025	0.042	CRectangle 3D	CIPoint3D	-5.885	.47.750	26.054	0.042	112 120		
12 Block Diano	Lar laitessu	1.000	0.000	08.033	0.042	Divectarigiese	Dr oniso	-0.000	-47.750	30.934	0.042	112.130		
13 DIOLA PIQUE	Middle Cube	-												
14	Nature Cape	Aburn Fraund	Index	0	Datation Till	Destructo	Contra	24	N.	-	Tim	THE Discostice	L	
15	and the second	Num Found	Index	acore	Perative Tht	Rectangle	Center	A	1	4	110	The Direction	1	
16	DPlanes3D	1.000	0.000	80.580	1.737	Directangle3D	DPoint3D	-4.680	-32.493	46.813	0.064	101.250	-	
17	Corner Cube						-			-	-	-		
18		Num Found	Index	Score	Relative Tilt	Rectangle	Center	X	Y	Z	THE	Tilt Direction	n	
19	OPlanes3D	1.000	0.000	80.761	0.248	CRectangle3D	DPoint3D	-29.540	-31.283	46.818	0.083	47.846	-	
20 Blob Count														
21		Num Found	Index	Volume	Height	Туре	Bounding Box	1						
22	Blobs3D	6.000	0.000	4013.956	10.102	Positive	DB0x3D							
23			1.000	3997.406	10.068	Positive	DB0x3D							
24			2.000	3154.911	10.120	Positive	DB0x3D							
25			3.000	2421.354	11.902	Positive	DB0x3D							
26			4.000	1459.861	7.990	Positive	DB0x3D					1		
27			5.000	903.482	3.480	Negative	DB0x3D							
28 Find Edges														
29	1	Num Found	Index	Transition '	Score	Coverage	Sharpness	Vertical Ang	Horizontal Angle	Line	Midpoint	×0	YO	Z0 2
30	CEdges3D	3.000	0.000	Concave	95.098	100.000	45.237	0.044	1.255	CLine3D	DPoint3D	-15.473	-54.394	36.998
31			1.000	Convex	93.217	100.000	91.142	0.033	1.958	CLine3D	DPoint3D	-5.375	-54.394	48.644
32			2.000	Concave	95.323	100.000	45.669	0.051	0.955	CLine3D	Point3D	4.509	-54.394	37.025
33 Find Sphere	1		100000					-	1			and the second second	anner bereinen ober	
34		Num Found	Index	Score	Sphere	Center	Radius	x	Y	z				
35	CSpheres3D	1.000	0.000	90.028	DSphere3D	DPoint3D	10.253	19.335	-63.932	34.629				
36 Find Cylinder			-											
37	1	Num Found	Index	Score	Cylinder	Axis	Center	Radius	Length	x	Y	Z	Tilt	Tilt Direction
38	Cvlinders3D	1.000	0.000	93.017	DCvlinder3D	DLine3D	DPoint3D	10.017	29 498	-30 541	-61 508	36,851	89.882	268 822
39 Height Measu	re	1.000	0.000	00.011				10.011	20.400	50.541	01.000	50.051	00.002	
40	Middle Cube						2					1 I		
41	Canada Canado	X0	V0	70	X1	¥1	71	THE	Tilt Direction	Distance		-		
42	mDist3D	.5 885	.47 760	28.054	.5 887	.47 720	46.000	0.064	101 250	9.976				
42	Corner Cube	-0.000	-47.700	30,034	-0.007	-41.738	40.023	0.004	101.250	3,070		-		
43	Control Cube	VO	VA	70	3/1	V1	71	Till	Tilt Direction	Distance				
46	mDiet2D	10	17 700	20.00		47 700	10.010	0.000	AT CHECOON	D D D D D				
40	Decamid	-5.665	-47.750	30.954	-5.655	-41./39	40.812	0.083	47.846	9.859			-	
40	Pyramiu	Muno Found	Index	Rearc	Dolother Till	Destancia	Contor	~	V	7	Tat	THE Direction		
4/	m Disco 27	Num Found	index	score	relative filt	Rectangle	Center		T	4	110	Int Direction	n	
48	CIPlanes3D	2.000	0.000	78.890	48.744	Likectangle3D	DPoint3D	-0.308	-62.779	42.537	48.744	358.856	-	
49			1.000	71.926	48.250	DRectangle3D	DPoint3D	-11.071	-63.139	42.410	48.251	178.836	<u> </u>	
50 Angle Measu	re													
51	83.005					-								



Lab Exercise 6.1 – Inputs/Outputs & Network Functions

At the end of this lab exercise, Participants will be able to:

• Use the TCPClient to define a spreadsheet cell as a TCP/IP client, initiating the communication with another TCP/IP device for sharing data over the network

The Participant will utilize the following In-Sight Vision Suite tools to successfully complete this exercise:

- TCPClient
- Format String
- Hercules

Follow the steps below to complete the lab exercise:

- 1. Continue with the **MyMeasureTools3D** job from the last lab exercise.
- 2. Save the job as MyCommunication3D in the folder created in lab #1.
- 3. Enter the comment **TCP/IP Inspection Output** in cell **A53**.
- 4. Enter the following comments in the spreadsheet to create the columns of your table:
 - Label in cell A54
 - Value in cell B54
 - Delimiter in cell C54

NOTE: Label describes the quantity we are going to output (strings must be entered after the comment character ' (apostrophe))

Value contains a string or a floating-point number representing the quantity to be sent as the output

Delimiter column has the string for the string for the Value field (strings must be entered after the comment character ' (apostrophe))',

- 5. Enter the following comments in the spreadsheet to create the rows of your table:
 - Inspection: in cell A55
 - # of 3D Blobs: in cell A56
 - Middle Cube: in cell A57
 - Corner Cube: in cell A58

53	TCP/IP Inspection Output								
54	Label	Value	Delimiter						
55	Inspection:								
56	# of 3D Blobs:								
57	Middle Cube:								
58	Corner Cube:								



- 6. Insert the following comments in the spreadsheet for your logic columns:
 - Height Check (Pass/Fail) in cell E54
 - Global Pass/Fail in cell G54
- 7. Insert the following comments in the spreadsheet in the *Delimiter* column:
 - , (comma) in cell **C55**
 - , (comma) in cell C56
 - *mm,* in cell **C57**
 - *mm* in cell **C58**,
- 8. Enter a **GetNFound** function in cell **B56**, the formula will reference the Blobs3D structure in cell **B22**.



9. Cell B57 will reference the Middle Cube Distance result in cell K42.



10. Cell **B58** will reference the *Corner Cube* Distance result in cell **K45**.

🔽 🔣 B58 🗸 = K45

- 11. Enter the logic statement in cell **E57** to confirm the height of the *Middle Cube*:
 - InRange(B57,9.5,10.5)



- 12. Enter the logic statement in cell **E58** to confirm the height of the Corner Cube:
 - InRange(B58,9.5,10.5)



- 13. Next, enter the logic statement in cell G57 for the Global Pass/Fail of the demo part:
 - And(E57:E58)



- 14. Enter the logic statement in cell **B55** for the *Inspection:* of the demo part:
 - If(G57=1,"Pass","Fail")



Good Part:

53	TCP/IP Inspectio	on Output					
54	t Label Value Delimiter			Height Che) Global Pass/Fai		
55	Inspection:	Pass	1				
56	# of 3D Blobs:	6.000	1				
57	Middle Cube:	9.876	mm,	1.000		1.000	
58	Corner Cube:	9.859	mm	1.000			



Bad Part:

53	TCP/IP Inspectio	on Output							
54	Label	Value	Delimiter		Height Check (Pass/Fail)		Height Check (Pass/Fail		Global Pass/Fail
55	Inspection:	Fail							
56	# of 3D Blobs:	6.000							
57	Middle Cube:	4.946	mm,		0.000		0.000		
58	Corner Cube:	9.892	mm		1.000				





- 15. Insert the comment *Format String* in cell **A60**.
- 16. Enter a **FormatString** function into cell **A61**.

NOTE: The FormatString function is found in the Toolbox \rightarrow Text \rightarrow String \rightarrow FormatString.

The FormatString Property Sheet displays.

Spreadsheet - Property Sheet - FormatString									×
Starting/Ending		Use Delimit							
Leading Text:									
Trailing Text:									
Terminators: CR+LF ~									
Arguments									
								۵dd	
Include Label Label	Cell	Data Type	Decimal Places	Fixed Width	Field Width	Padding		- Hud	
							— L	Delete	

17. Select CR+LF from the Terminators drop-down list.

NOTE: CR+LF = Carriage Return + Line Feed.

18. Click the **Add** button.

NOTE: You will add in all the cells in the table – they are entered one at a time. Do this in a logical way to ensure that no cells are missed. There should be 12-line items added.

Include Label	Label	Cell	Data Type	Decimal Places	Fixed Width	Field Width	Padding
	Label	\$A\$55	String ~				Leading Spaces \sim
	Label	\$B\$55	String ~				Leading Spaces 🛛 🗸
	Label	\$C\$55	String ~				Leading Spaces \sim
	Label	\$A\$56	String ~				Leading Spaces \sim
	Label	\$B\$56	Floating Point \sim	0 🛟			Leading Spaces \sim
	Label	\$C\$56	String ~				Leading Spaces 🛛 🗸
	Label	\$A\$57	String ~				Leading Spaces 🛛 🗸
	Label	\$B\$57	Floating Point \checkmark	0 🛟			Leading Spaces 🛛 🗸
	Label	\$C\$57	String ~				Leading Spaces 🛛 🗸
	Label	\$A\$58	String ~				Leading Spaces 🛛 🗸
	Label	\$B\$58	Floating Point ~	0 🗘			Leading Spaces V
	Label	\$C\$58	String ~	0 ‡		8 🗘	Leading Spaces 🛛 🗸

19. Review the string output at the bottom of the property sheet.

Output: 66 characters

Inspection:Fail,# of 3D Blobs:6 Middle Cube:5mm,Corner Cube:10mm



20. The cube heights are showing as a whole number – check the **Fixed Width** checkbox for the Floating Points in cells **B57** and **B58** and change the **Decimal Places** parameter to **2**.

Include Label	Label	Cell	Data Type	Decimal Places	Fixed Width	Field Width	Padding
	Label	\$A\$55	String ~				Leading Spaces 🛛 🗸
	Label	\$B\$55	String ~				Leading Spaces 🛛 🗸
	Label	\$C\$55	String ~				Leading Spaces 🛛 🗸
	Label	\$A\$56	String ~				Leading Spaces 🛛 🗸
	Label	\$B\$56	Floating Point 🗸 🗸	0 🗘			Leading Spaces \sim
	Label	\$C\$56	String ~				Leading Spaces \sim
	Label	\$A\$57	String ~	6 🗘			Leading Spaces \sim
	Label	\$B\$57	Floating Point \checkmark	2 🗘		8	Leading Spaces \sim
	Label	\$C\$57	String 🗸 🗸	6 🗘			Leading Spaces \sim
	Label	\$A\$58	String ~	6 🗘			Leading Spaces \sim
	Label	\$B\$58	Floating Point 🛛 🗸	2 🗘	~	8 🗘	Leading Spaces \sim
	Label	\$C\$58	String ~				Leading Spaces 🛛 🗸

21. Review the string output at the bottom of the property sheet and click the **OK** button. **NOTE**: *If label appears in the string delete the word from the Label column.*

Inspection:Pass,# of 3D Blobs:6,Middle Cube:	9.92mm,Corner Cube:	9.72mm		
			ок	Cancel

The string displays in cell A61.

60	Format String						
61 Inspection:Pass,# of 3D Blobs:6,Middle Cube: 9.92mm,Corner Cube: 9.72mm							
62							

- 22. Insert the comment TCP Client in cell A62.
- 23. Enter a TCPClient function in to cell A63.
 NOTE: The TCPClient function is found in the Toolbox → Input/Output → Network → TCPClient.

The TCPClient Property Sheet displays.

Spreadsheet - Pro	perty Sheet - TCPClient	-		×
Edit Insert Hel	p			
ें 👪 🏥 🏂 🖳	ğ 🕐 🖕			
]	
Port Number		3000 🗘]	
Packet Type	String Nullchar(0)			
Timeout		1000 🗘]	



- 24. Set the property sheet parameters as follows:
 - Host Name = IP address of the computer (ex. 192.168.0.1)
 - Port Number = 3000

Click the **OK** button.

TCPClient and WriteDevice are inserted into the spreadsheet.

62	TCP Client			
63	Device	□Write	Test string.	

25. Double-click the WriteDevice function in cell **B63** to open. Change the 3rd reference (cell C63) to the FormatString function (cell A61).



26. Delete the Test string function in cell C63 as it is not needed any longer.

62	TCP Client		
63	Device	⊐Write	
64			

27. Save the job.



Setting up Hercules

Note: Going forward if working with the software trigger the system can stay offline. If working with the hardware trigger the system must be put online by clicking the Online button.

When working with the hardware trigger, the trigger pulse is provided to the L4000 by clicking on the silver button located on the slider.

1. Start **Hercules**. There should be a shortcut on the computer's desktop.



The Hercules SETUP utility displays.

Second Se		– 🗆 X
UDP Setup Serial TCP Client TCP Server UDP	Test Mode About	
0 devices were found:	Required parameters Module IP Port Module IP mask Gateway Gateway Settings TCP TEA authorization Enable NVT Enable TCP setup Enable DHCP	Eind devices Apply changes Apply changes Mestore default values Device type: Unspecified device FW version: Unknown IP Filter IP Filter IP Filter Address Range IP Filter MASK
TCP Setup configuration		
🖗 Connect with TCP Client		HWgroup
③ Open in the WEB Browser		Hercules SETUP utility
		Version 3.1.2

2. Select the **TCP Server** tab.

Second Sector Weight HW-group.com	_		×
UDP Setup Serial TCP Client TCP Server UDP Test Mode About			
Received data	Server status		
	Port 3000	⊾	isten

- 3. Enter *3000* in the **Port** field and click the **Listen** button.
- 4. Trigger your camera.



5. Repeat using both the good and the bad part.

Review the results.



- 6. Click the **Close** button to end the connection.
- 7. Save the job.

Lab Exercise 7.1 – Operator Interface (HMI)

At the end of this lab exercise, Participants will be able to:

• Create a custom interface accessible from other devices, including status indicators, inspection results and interactive controls to view and affect the vision application

The Participant will utilize the following In-Sight Vision Suite tools to successfully complete this exercise:

- Tags
- WebPages
- User Inputs

Follow the steps below to complete the lab exercise:

1. Continue with the MyCommunication3D job from the last lab exercise.

2. Save the job as MyHMI3D in the folder created in lab #1.

Add a Pass/Fail display on the WebHMI:

3. Right-click on the **Global Pass/Fail** logic cell (G57) and select **Watch Cell** from the fly-out list.



The Filmstrip Settings dialog displays.

Filmstrip Settings	—	×
Queue		
Pass and Fail Results		
Watch Cell: G57		
Select	Cell	
Result Queue Size		
Automatic		~
	ОК	Cancel

4. Select *Pass and Fail Results* for the **Queue** parameter and click the **OK** button.



A new tag named **InspectionResult** displays in the Properties window.



5. Click the **Web Pages** tab and double-click on **Main** to open the Web Page.

Web Page	es		~ Ţ	×
主 🖬 Filt	er By Name:			
Address				
▲ 《》WebF ▷ 🛅 M	ages ain			
Toolbox	Web Pages	Tags	Templates	

The Main Web Page opens in a new tab.



6. Add a **Rectangle** to the top right corner of the Main page.

NOTE: The Rectangle is found in the Web Pages Toolbox \rightarrow Graphics \rightarrow Rectangle.

	Spreadsheet	Acquisition	Main			
8						
				Main	Label	

7. Click the **Source** arrows on the **Fill Color** property.

Properties	~	џ	
Rectangle	Rectangle		
Appearance	re	~	
Fill Color	🛄 Transparent 🛛 🗸		
Line Color	#FF8C8C8C ~		



The Expression Builder displays.

Expression Builder (Fill Color, CjsColor)	-	- 🗆 ×
		Help
		Validate
		Tag Selector
		Insert
		Tag
		Constant
L		Function
No binding	>	
	ОК	Cancel

8. Click the Tag Selector button.

The Tag Selector dialog displays. Only WebPages displays.

Tag Selector			—		×
🗈 🔳 Filter By Name:					
Address	Туре	Value	R/O	Comment	:
▷《》) WebPages					

9. Check the Show All Types checkbox at the bottom of the dialog.



10. Navigate to Tasks → InspectionTask → InspectionResult and click the Accept button.

Note: You can also type \$Tasks.InspectionTask.InspectionResult directly in the Expression Builder to build the expression.

11. The **Type mismatch** dialog displays. Click the **Yes** button to continue.





The Expression is built.

Expression Builder (Fill Color, CjsColor)	-	- 🗆 X
\$Tasks.InspectionTask.InspectionResult		Help
		Validate
		Associations
		Tag Selector
		Insert
		Tag
		Constant
L		Function
Missing association	>	
		Cancel

12. Click the Associations button.The Binding Associations dialog displays.

Binding Associations	×
Add Association	
Black	· · •
Current Associations	
Accept	Cancel

13. Build your Association and click the **Accept** button.

Binding Associations X							
Add Association	า						
	Red	~ 					
Current Associa	tions						
True	Green	~ 🗶					
False	Red	~ 🗶					
	Accept	Cancel					

14. The Association is built, click the **OK** button to close the Expression Builder.

- 15. Add a **Label** next to the Rectangle in the top right corner of the Main page. **NOTE**: The Label is found in the Web Pages Toolbox \rightarrow Data Display \rightarrow Label
- 16. Repeat steps 7 14 to add **PASS** or **FAIL** for the **Text** field association.

Binding Associations X									
Add Associa	Add Association								
FAIL 🔂									
Current Ass	Current Associations								
True	PASS	×							
False	FAIL	×							
	Accept	Cancel							

17. Move to the Acquisition tab and change the Trigger Source to Hardware.

	Spreadsheet	Acquisition	× [🗉 Ma	in
De					
					?
<u>u</u>	Trigger Source				Hardware 🗡
Trigg				Encoder	~
		O			
	Distance Trigger Dela	ay [mm] 🗍			O

- 18. Return to the **Main** tab and click the **Online** button to go Online.
- 19. Click the silver **Trigger** button on the backside of the demo station to acquire an image.

NOTE: Make sure to scan the part slowly – it the part is scanned too quickly it will return an error message.



Good Part:



Bad Part:



- 20. Click the **Offline** button to go Offline.
- 21. Save your job.



Add a New Web Page to Display Data from the Spreadsheet

- 1. Continue with the current project.
- 2. Right click on WebPages in the Project Explorer and select New Web Page.



- 3. Right click on WebPage and select **Rename**.
- 4. Rename the WebPage *Results* and press the **Accept** button.

Rename		×
Enter a new name for the Webl	Page.	
Results		
	Accept	Cancel

- Add a button to the Results WebPage.
 NOTE: The button is found in the Toolbox under User Inputs.
- 6. Set the button properties as follows:
 - Click Command = HMI.ShowPage
 - Page Name = *Main*
 - Text = Go to Main

Button Butto	on	
Frequently Us	ed	~
On Clicked	Ì	
Click Command	HMI.ShowPage	~
Page Name	Main	✓ <i>₹</i>
lcon		~
Text	Go to Main	4

- 7. Add a **button** to the *Main* WebPage.
- 8. Set the button properties as follows:
 - Click Command = *HMI*.ShowPage
 - Page Name = *Results*
 - Text = Go to Results



NOTE: The button can also be copied from the Results page and pasted to the Main page – simply change the information in the button properties to the Results page.

But	iton	Button			
Fr	requent	tly Used			~
On	Clicked		Ø		
Clic	Click Command		HMI.ShowPage	~	
	Page Name		Results	~	
lcor	า			~	
Text			Go to Results		

NOTE: The button can be customized by changing the settings in the Appearance section of the Toolbox.

Appearance		<
Background Color	#FF4A4A4A	
Border Color	#FF8C8C8C ~	
Border Size	1 🛟	
Border Style	Solid 🗸 🗸	

- 9. Go **Online** and confirm that clicking the button changes the HMI page.
- 10. Go Offline.
- 11. Return to the Spreadsheet.
- 12. Right click on cell **K42** (Middle Cube Height Measurement) and select **Publish** from the fly-out menu.

- 39	Height Measure	e										
40		Middle Cube										
41			X0	YO	Z0	X1	Y1	Z1	Tilt	Tilt Directio	Distance	
42		Dist3D	-14.476	-53.701	36.936	-14.627	-53.699	41.526	1.883	179.124	4.592	
43		Corner Cube									9	iš Cut
44			X0	YO	Z0	X1	Y1	Z1	Tilt	Tilt Directio	Distance 🕻	Сору
45		Dist3D	-14,476	-53,701	36.936	-14.268	-53.695	46.319	1.271	1.592	9.31	Paste
46	Pyramid											
47			Num Found	Index	Score	Relative Tilt	Rectangle	Center	х	Y	Z 🗖	
48		□Planes3D	2.000	0.000	36.974	0.052	□Rectangle3D	□Point3D	-12.239	-68.585	37.1	Publish
49				1.000	20.093	53.350	□Rectangle3D	□Point3D	-7.745	-68.495	42.3	Unpublish

13. A new output named Distance is added to the Web Pages properties list. Doubleclick to rename the output to **Middle_Cube_Height**.

Properties	~ Ŧ	Properties	~ 7
Cell Name	Cell	Cell Name	Cell
Pointcloud	<u>A0</u>	Pointcloud	<u>A0</u>
Greyscale	<u>A1</u>	Greyscale	<u>A1</u>
InspectionResult	<u>G57</u>	InspectionResult	<u>G57</u>
Distance	<u>K42</u>	Middle_Cube_Height	<u>K42</u>

14. Right click on cell **K45** (Corner Cube Height Measurement) and select **Publish** from the fly-out menu.



- 15. Change the name of the output to **Corner_Cube_Height**.
- 16. Repeat steps 13 and 14 for the following:
 - Cell C22 rename to Number_of_Blobs
 - Cell **B51** rename to **Pyramid_Angle**

Publish any other results that you would like to display in your HMI.

- 17. Return to the Results page.
- Add a Display3D control to the page, resize to fit in the top left corner.
 NOTE: The Display3D is found in the Toolbox → Vision Controls and Displays → Display 3D.
- 19. Add a **Display** control to the page, resize to fit next to the Display 3D control.

🗉 Main 🔳 Results ×	
Go to Main	
X,Y,Z [mm]:,,	

NOTE: The locations are suggestions, arrange the HMI page as you would like.

- 20. Add a **Button** and set the parameters as follows:
 - Click Command = Tasks.InspectionTask.TaskRun
 - Text = *Trigger Once*

Customize the look of the button using the *Appearance* parameters.

🔳 Main	🔳 Results	x	
Go	<mark>to Main</mark>		Trigger Once

21. Add a **Panel** and a **TextBox** to the page – place the TextBox on the top center of the Panel and change the Text to *Results*.



NOTE: The Panel and TextBox are found in the Toolbox \rightarrow User Inputs.



22. Drag the Tags that you published in the spreadsheet onto the Panel – adjust the text boxes to see the full information.

NOTE: Tags are found on the Tags tab under Tasks \rightarrow InspectionTask \rightarrow Spreadsheet.

Address	Туре		
⊿ 《》 Tasks	_		
A () InspectionTask			
▷ 《》 Acquire			
ExecutionTime	Double		
▷ 1 HasError	Boolean		
InspectionResult	Boolean	Results	
IsRunning	Boolean	results	
▲ 《》 Spreadsheet		Corner Cube Height	<u>889 0</u>
Image: Corner_Cube_Heigh	Double	Comer_Cube_neight	3.000
Image: GreyscaleView	View	Middle Cube Height	9.885
Middle_Cube_Heigh	Double		
Image: Image: Number_of_Blobs	Double	Number_of_Blobs	6.000
PointcloudView	View		
Pyramid_Angle	Double	Pyramid_Angle	82.574
D Timeout	Int64		
TriggerEnabled	Boolean		

23. Copy the Controls from the Main page and paste on this page. **Note**: To make the page more balanced the copied controls can be placed in a Panel similar to the Results panel.

Results					
Corner_Cube_Height	9.686	Trigger Once	Pause	Online	
Middle_Cube_Height	9.885				
Number_of_Blobs	6.000	La	bel		
Pyramid_Angle	82.574				



24. Go **Online**. Trigger your device and review the results. **NOTE**: To use the Trigger Once button the Trigger Source should be set to Software, if using the button on the demo station the Trigger Source should be set to Hardware.

Go to Main Trigger Once / 🔊 🗇 🗇 🔗 😭 🐐 💋 🔁 🔭 🔊 47 41 30 X,Y,Z [mm]: --, --, -Results Trigger Once Pause Corner_Cube_Height 9.552 Middle_Cube_Height 9.968 PASS Number_of_Blobs 6.000 Pyramid_Angle 84.366

Results Web Page:

- 25. Go Offline.
- 26. Save your job.



Add a New Web Page from Spreadsheet Cells

- 1. Continue with the current project.
- 2. Return to the spreadsheet.
- 3. Highlight cells **A53 through G58**.

53	TCP/IP Inspecti	on Output				
54	Label	Value	Delimiter	Height Che	ck (Pass/Fail)	Global Pass/Fail
55	Inspection:	Pass				
56	# of 3D Blobs:	6.000				
57	Middle Cube:	9.876	mm,	1.000		1.000
58	Corner Cube:	9.631	mm	1.000		

4. Right-click and select Create a WebPage from Selected Cells from the fly-out menu.

33	Cut
þ	Сору
â	Paste
	Create a WebPage from Selected Cells
	Publish

A new WebPage is created.

Web Pages	~	д	×
🗈 🔳 Filter By Name:			
Address			
▲《》WebPages ▷ 🎦 Main			
Results			
👂 🔳 WebPage			

- 5. Right-click and rename the page *Table*.
- 6. Highlight all items on the new WebPage.

CP/IP Inspection Output			eight Check (PassiFall)	Nobal Passifali
abel		1		
af 3D Biobs				
Sidle Cube	961	••••••••••••••••••••••••••••••••••••••	• • • • • • • • • • • • • • • • • • •	
omer Cube:	9 552 1 9 1	••••••		



7. Change the **Border Color** to *Blue*, **Border Size** to *5*, **Font Size** to *16* and **Text Alignment** to *Center*.

Properties			~	д
Frequently Used			~	
Border Color	Blue	~		
Border Size		5 🛟		
Font Size		16 🛟		
lcon		~		
Text			¢	
Text Alignment	Center	~		

- 8. Change the **Background Color** to *White*.
- 9. Customize the Appearance of the table there is a Panel with a Black background added behind the Table in this example.

TCP/IP Inspection Output			Height Check	(Pass/Fail)	il) Global Pass/Fail		
Label	Value	Delimiter					
Inspection:	Pass						
# of 3D Blobs:	6.000						
Middle Cube:	9.968	mm,	1.000		1.000		
Corner Cube:	9.552	mm	1.000				

- 10. Add 2 buttons that when clicked bring the user to the other WebPages. Format the text color and background color as you choose.
 - 1. Click Command = *HMI.ShowPage* Page Name = *Main*
 - Page Name = Mai
 - Text = Go to Main
 - Click Command = HMI.ShowPage Page Name = Results Text = Go to Results





- 11. Add a button to the Main page and Results page to go to the Table page.
 - Click Command = HMI.ShowPage
 - Page Name = Table
 - Text = Go to Table

		1010								
	Aco	quisition		Main	×		Table			
		Go to Resi	ults		Go	to T	able			
🔳 Result	s ×	Acquisition			Main		🔳 Table	2		
		G	<mark>o to</mark>	Ma	ain		Go t	<mark>o T</mark> a	able	

12. Go **Online**. Trigger your device and review the results.

Main Page:



Results Page:



Table Page:

		Delivertee	giit ono	in (i doorf dif)	Global	
Label	Value	Delimiter				
Inspection:	Fail					
# of 3D Blobs:	6.000					
Middle Cube:	9.762	mm,	1.000		0.000	
Corner Cube:	9.316	mm	0.000			

- 13. Go Offline.
- 14. Save your job.





Lab Exercise 8.1 – Deployment

At the end of this lab exercise, Participants will be able to:

• Utilize the utilities available in In-Sight Vision Suite to finish deploying the application

The Participant will utilize the following In-Sight Vision Suite Functions to successfully complete this exercise:

- User Settings
- Update Firmware
- Network Settings
- Backup
- Restore

NOTE: In order to complete this lab exercise, you should not be connected to your camera or emulator. This will allow you to access the Utilities.

User Settings

Follow the steps below to complete the lab exercise:

1. Click on the **User Settings** link – this is found in the **Utilities** menu.



The User Settings dialog displays.

User Settings		-	
Configure the user settings for usna-23	13-1064		
Name Access Level	Comment		Add
admin Full			Delete
		ОК	Cancel

A user with the Name admin should already be there, with Full access. Click the Add add button to create a new user.



A new line displays.

User Set	ttings					-		×
Configu	ire the user set	tings for 14000-3b9	9ae					
١	Name 4	 Access Level 	Comr	nent				Add
ſ	Default	Full						Delete
Chan	ge the user set	ttings:						
	User Name:	Default		Password:				
	Access Level:	Full	~	Confirm Password:				
	Comment:							
							T	
					ОК		Ca	ncel

3. Enter the new user's information in the appropriate fields and click the **OK** button.

NOTE: Create two new users, one with Protected access and one with Locked access. Choose the names you would like, use the password Cognex for both.

User S	ettings	0501		_	
Confic	ure the user settin	as for 14000-369	Эае		
001111	fare are user seam	gs 101 11000 005.			
	Name 🔺	Access Level	Comment		Add
	admin	Full			
	Оре	Protected			
	Qual	Full			
				ОК	Cancel

- 4. Connect to your camera. (If there is a job open on your camera, close it and open a new job).
- 5. Click the **Main** WebPage tab.
- 6. From the Job menu, select Settings from the drop-down list.





The Job Settings dialog displays.

7. Click Web HMI Settings and check the Enable Built-in Authentication checkbox.

	Job Settings					-		×
	Online	Enable Built-in Auth	nentication					
	Security	Inactivity Timeout					10 🗘	(min)
ų	Web HMI Settings							
				ок	Apply		Cance	-

- 8. Click the **OK** button.
- 9. Click the **Online** button to go Online.



10. Click the Home tab and click the Open HMI button.



11. A new web browser opens – login as admin (with no password)

Username	admin	
Password		
		Login



- Log into the HMI with the other users that you created. Notice the difference in the access that the different users have based on their access levels.
- 13. Return to your camera and click the **Offline** button to go offline. Do not save the job.





Firmware Update

NOTE: In this lab, you will look at the steps needed for a firmware update to the firmware and cameras, but you will **not** actually do an update.

1. From the Utilities tab select Firmware Update.



The Firmware Update dialog displays.

Select the Firmware version from the Update to: drop down list.



3. Do not actually do an update, but if you were, highlight the camera to be updated Update button. (In this screenshot there is only one camera and click the Update available).



The Update will begin.

4. Click the **Cancel** button to exit from this dialog.



Network Settings

1. From the Utilities tab select **Network Settings**.



The **Network Configuration** dialog displays and might look like one of the following:

Network Configuration - 14	000-3b99ae ×	Network Configuration - 14000-3b99ae			
Set network configuration of	on 14000-3b99ae i	Set network configuration on I4000-3b99ae			
Host Name:	I4000-3b99ae	Host Name:	I4000-3b99ae		
Address Assignment:	Auto (DHCP) O Static	Address Assignment:	🔿 Auto (DHCP) 🔍 Static		
	10 . 0 . 0 . 7	IP Address:	10 . 0 . 0 . 0		
	255 . 255 . 255 . 0	Subnet Mask:	255 . 255 . 255 . 0		
	10 . 0 . 0 . 1	Default Gateway:	0.0.0.0		
	10 . 0 . 0 . 1	DNS Server:	0.0.0.0		
		Domain Name:			
	Copy PC Network Settings		Copy PC Network Settings		
	OK Cancel		OK Cancel		

2. Review the settings.



Backup

1. From the Utilities tab select **Backup**.



The Backup dialog displays.

Ba	ickup			—		×
R	eady to backup o	devices. Press Backu	p to begin, cancel to close without backing up			
	Host Name	Firmware Version	Status			
	14000-3b99ae	2.0.0 (8251)				
			—		~ .	
				lackup	Cancel	
2	· Select the	e camera to ba	ckup and click the Backup	button.		





Restore

1. From the Utilities tab select **Restore**.



The **Restore** dialog displays.

- 🗆 X
14000-3b99ae
3/19/2021 1:59:46 PM ~
Restore Cancel

NOTE: If you want to see all the backups available on the network check the Show all backups checkbox.

- 2. Select the Backup that you would like to restore the camera from and click the **Restore** button.
- 3. Once the Restore is complete click the **Close** button.







