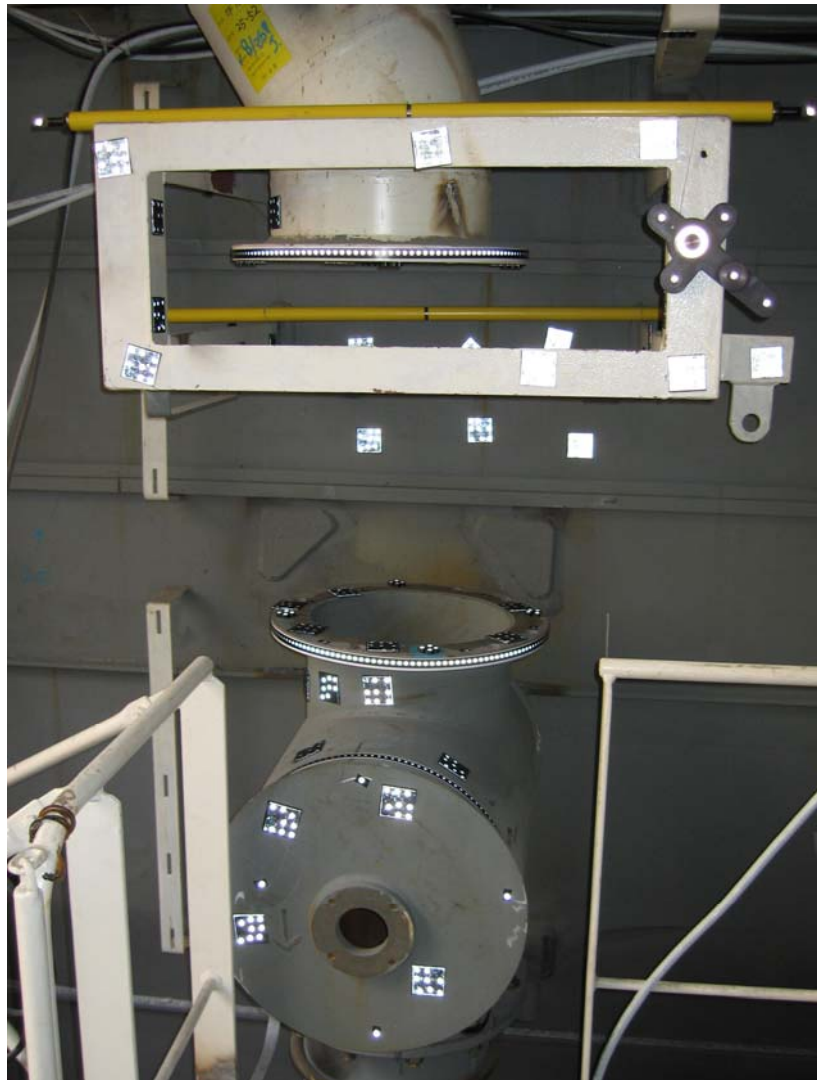




V-STARS S8 Demonstration  
Measurement Report for

Sumsung Heavy Industries  
Korea



September 2005

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## Object Measured

Two areas were measured as part of the V-STARs demonstration. Each area had two pipe flanges that required measurement.

The primary objective of these measurements was to determine the centre point of the pipe flanges as well as the coordinates of four bolt holes for each pipe.

## Equipment Used

1. V-STARs S8 INCA3 Camera (INCA3 camera shown in image below)
2. Scale Bars
3. AutoBar
4. Coded targets
5. Single dot targets
6. Edge targets



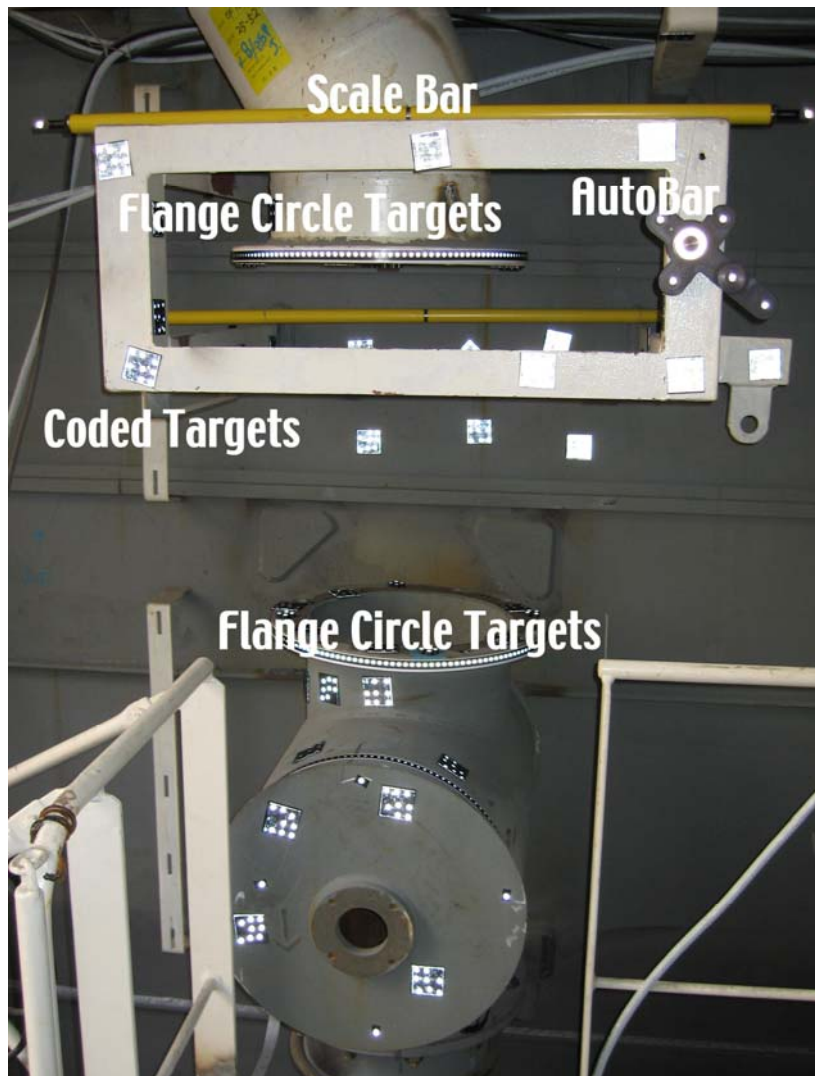
## Measurement Objectives

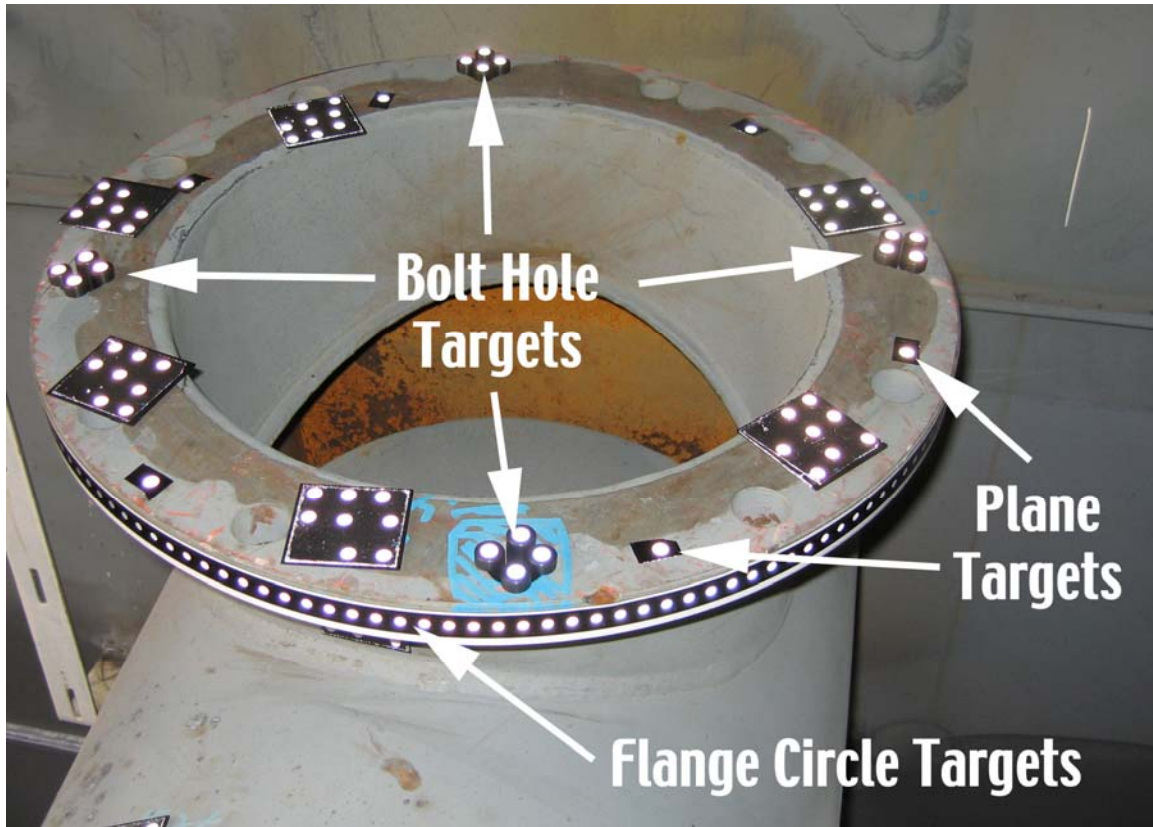
1. Demonstrate INCA3 camera use
2. Determine location of key centre points
3. Create planes, circles and lines

## Targeting

The necessary targeting for the measurements was very similar for both areas. The targeting used for the first measurement is shown below.

1. AutoBar for initial coordinate system
2. Reference coded targets to tie photography together
3. Two scale bars
4. Single dot targets
5. Edge targets

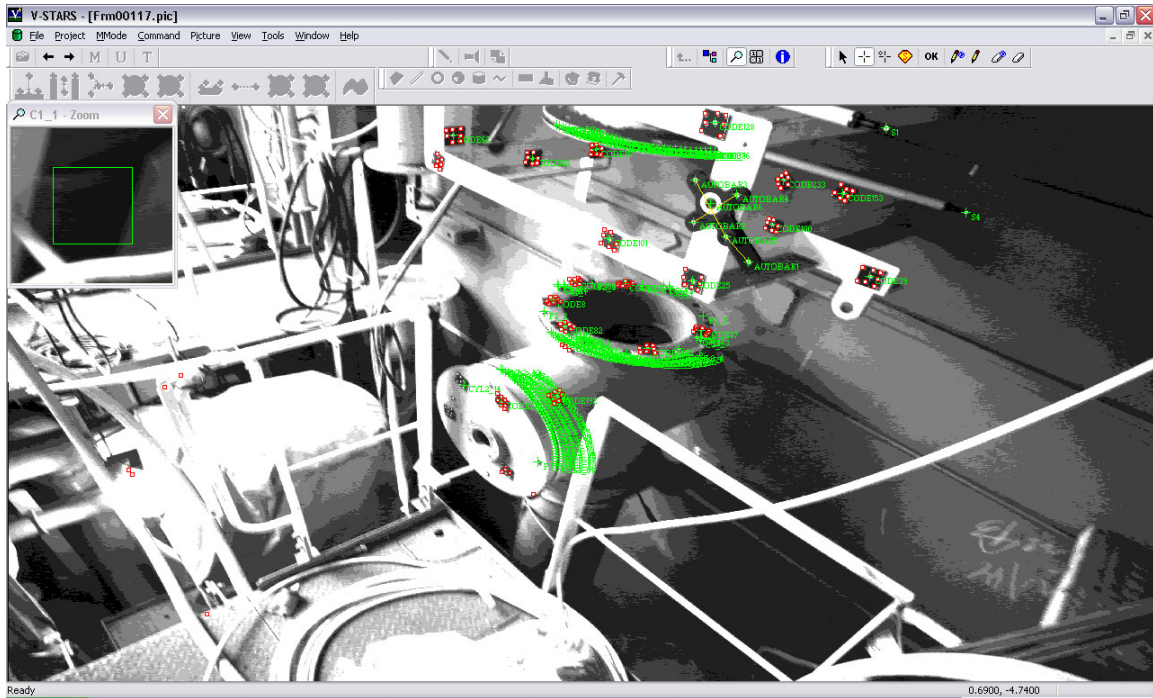




## Measurement Statistics

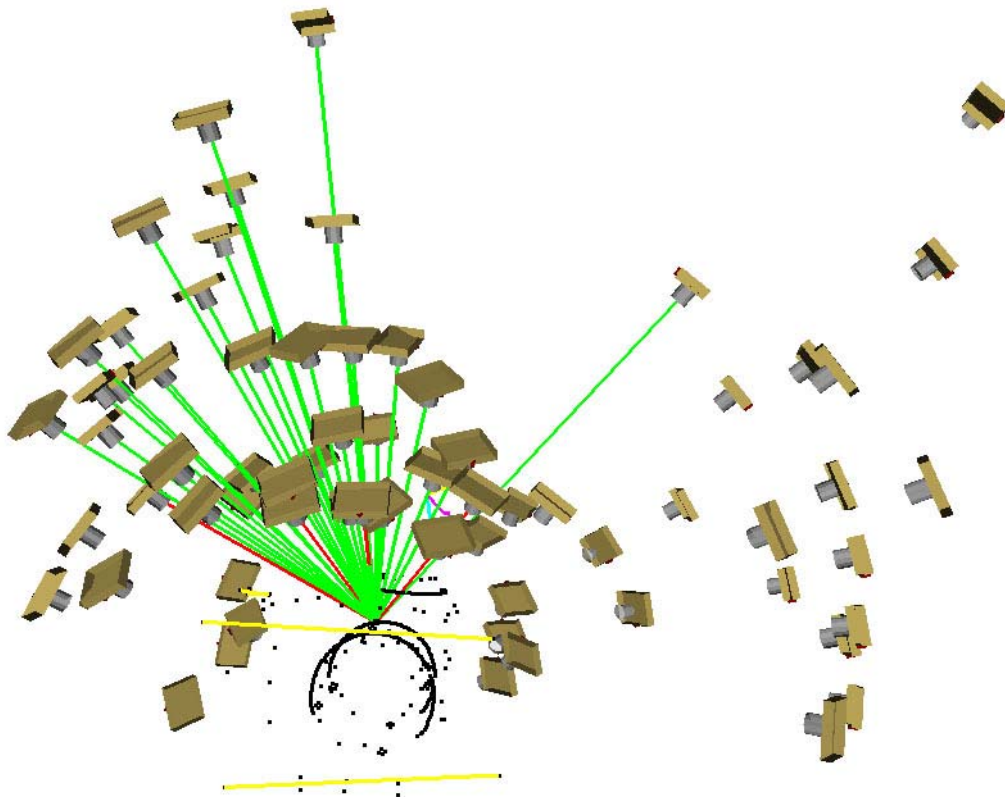
Area 1		Area 2	
No. of photos	70	No. of photos	42
No. of points	377	No. of points	156
Accuracy RMS X,Y,Z		Accuracy RMS X,Y,Z	
X	0.016mm	X	0.023mm
Y	0.017mm	Y	0.015mm
Z	0.010mm	Z	0.016mm
Scale Agreement = 0.010mm		Scale Agreement = 0.020mm	



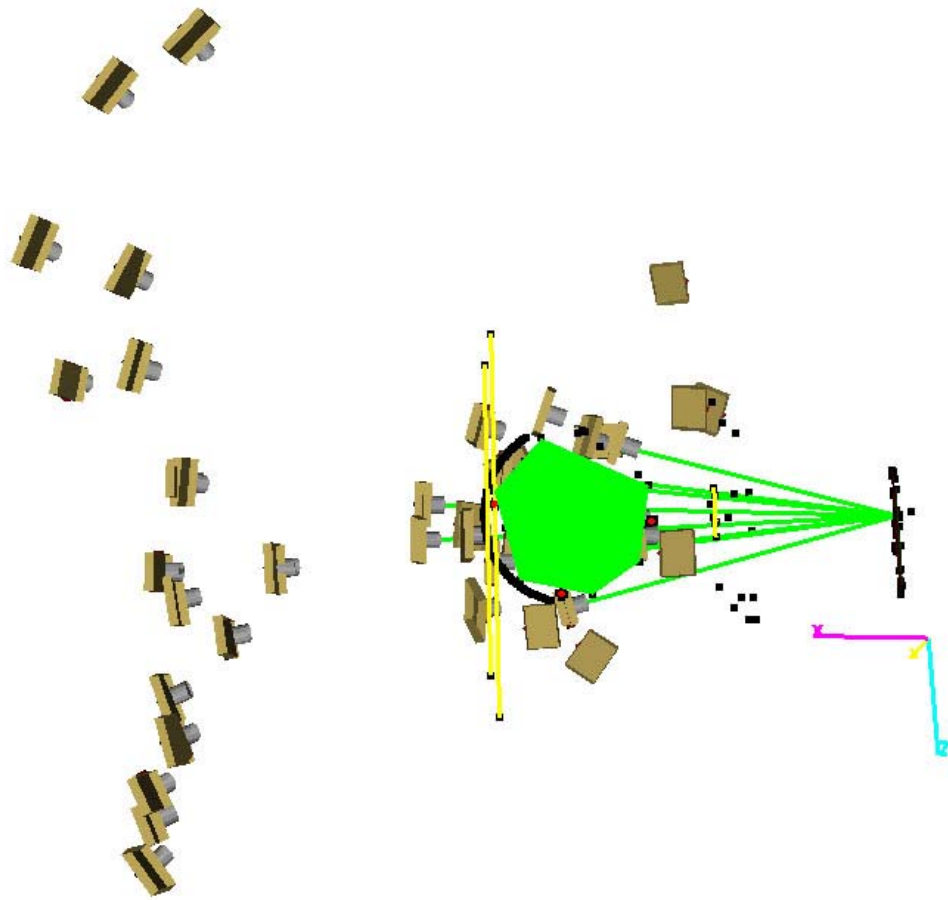


*Typical V-STARS measurement image*

The diagram below illustrates the geometry used to create the point cloud for the first and second area.



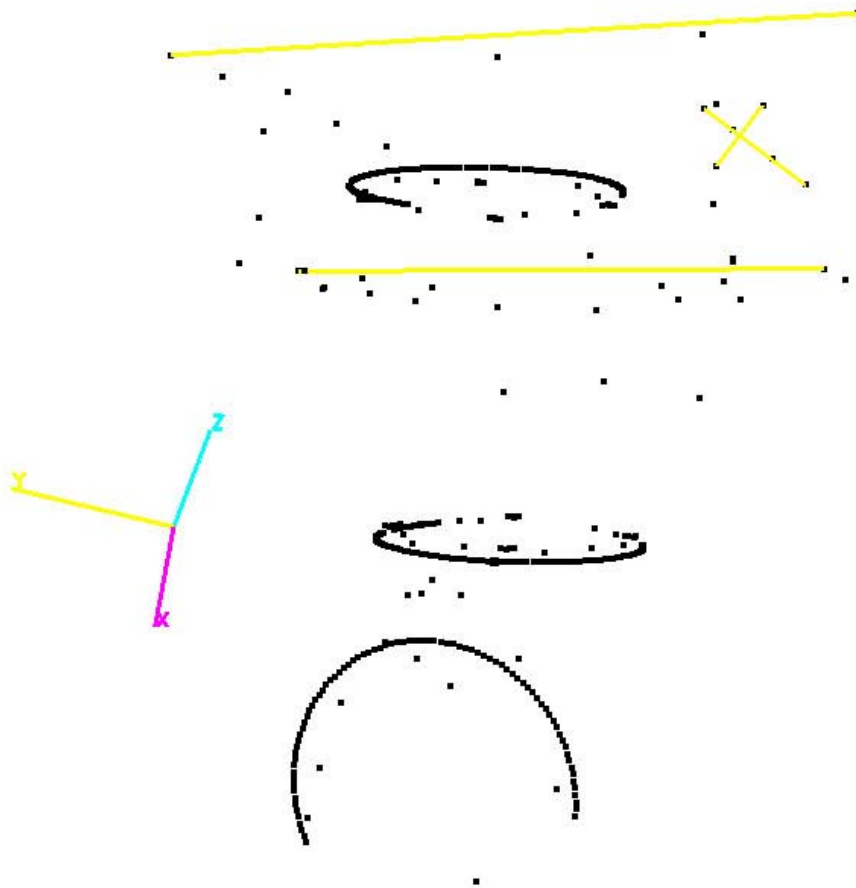
*Area 1 Network - Top View*



*Area 2 Network - Top View*

## Point Cloud

The point cloud produced for the first area is shown below:



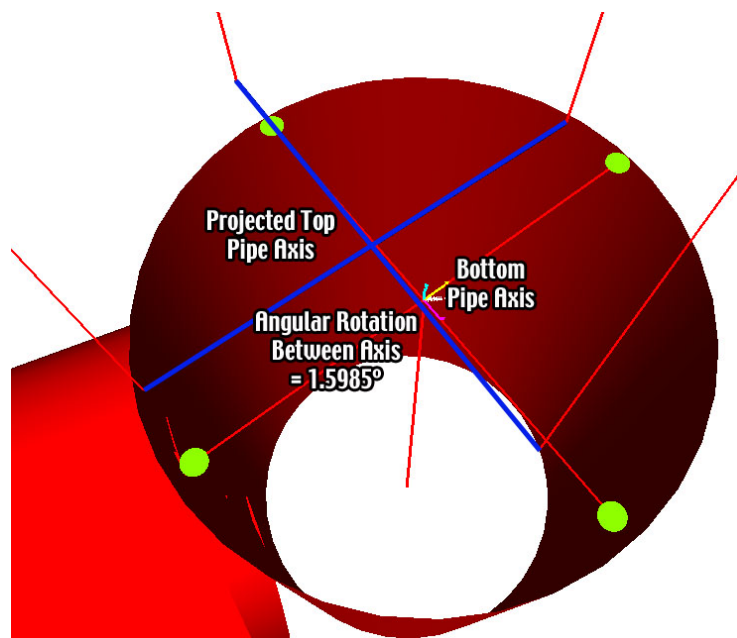
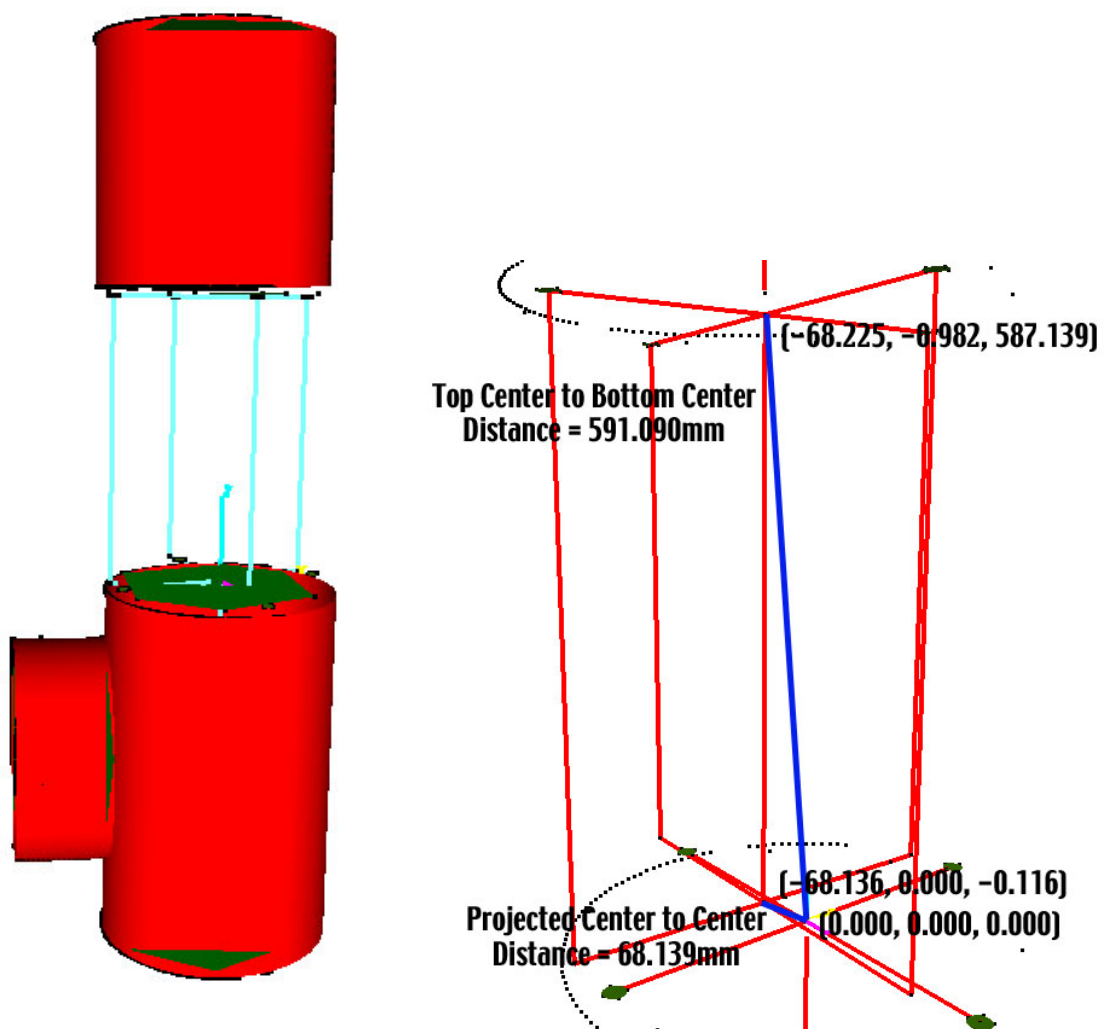
## Piece Alignment

No alignment was carried out on either measurement area.

## Area 1 - Piece Analysis

The data collected was used to create some key planes, circles and lines. The geometric items created are shown in the image below:



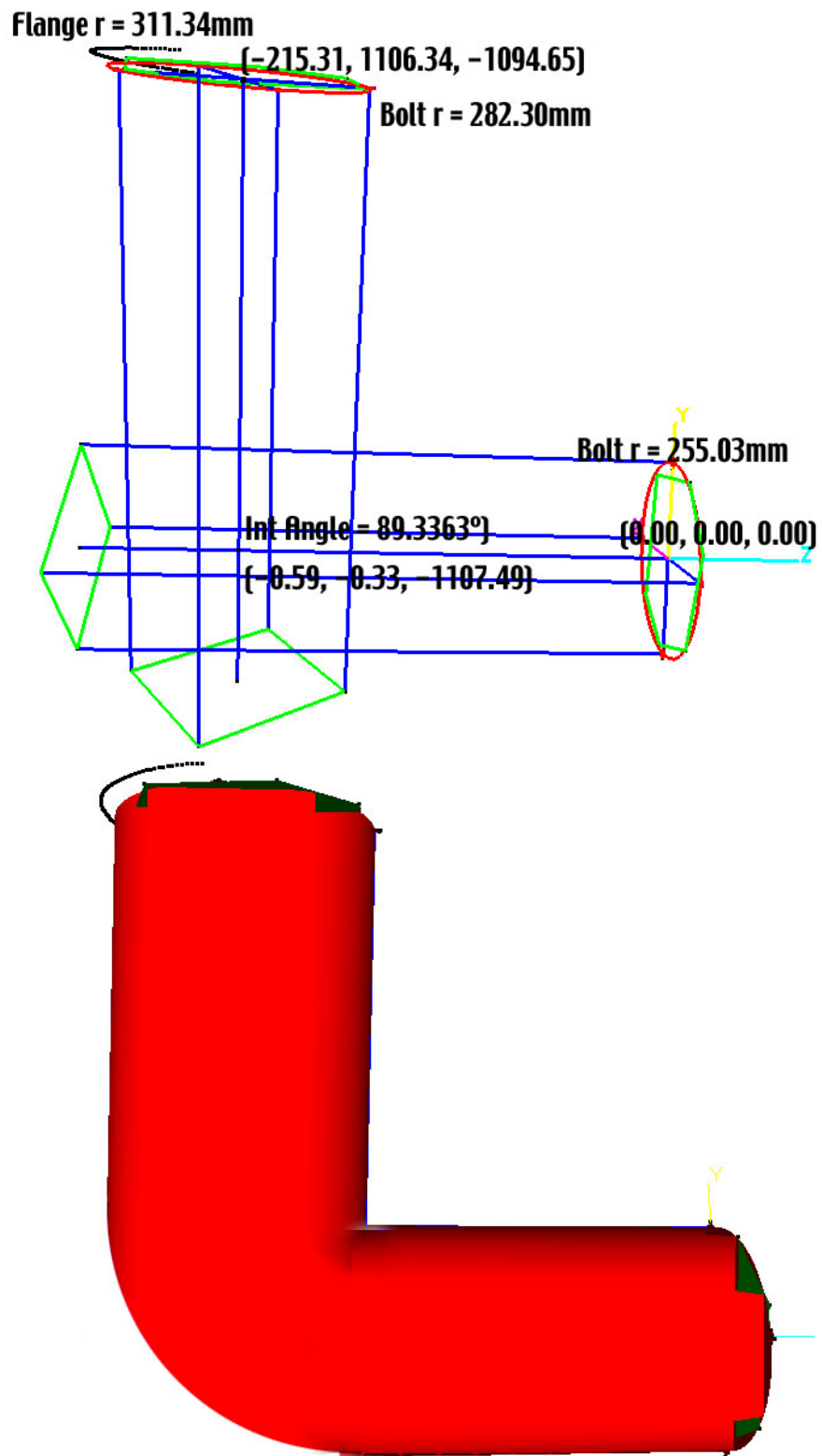


## Area 2 - Piece Analysis

The second area measured is shown in the image below:



The data collected was used to create the following geometric analysis.



## Time Summary

	Area 1	Area 2
Initial Investigation	1 minute	1 minute
Targeting	10 minutes	5 minutes
Photography	2 minutes	2 minutes
Processing	2 minutes	2 minutes
Analysis	5 minutes	5 minutes
<b>Total</b>	<b>20 minutes</b>	<b>15 minutes</b>

## Concluding Remarks

The measurement undertaken has shown that V-STARS can be a very powerful measurement tool. The results of the measurement undertaken were very accurate and produced quickly.

GSI would like to thank Samsung for welcoming us into their facility. We will be happy to discuss the results of this report or any other aspect of the technology presented.