SWTW18-8

A second study on chuck automatic tilting and chuck force sensing for minimizing probe pin damage and optimization of overdrive

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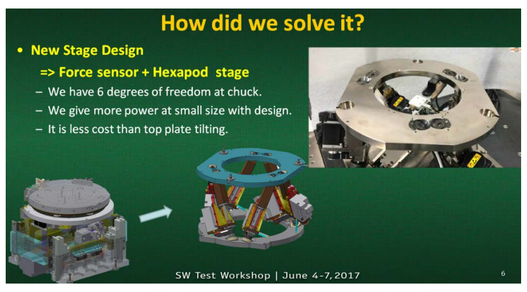
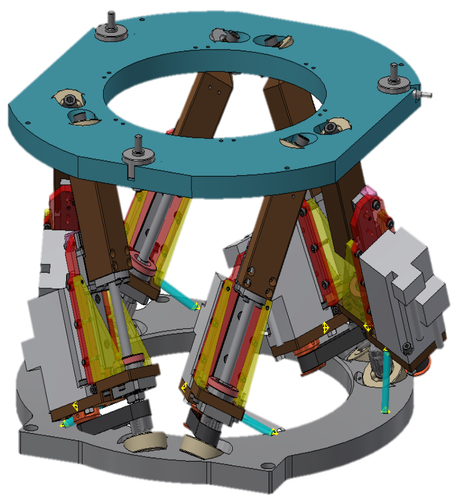
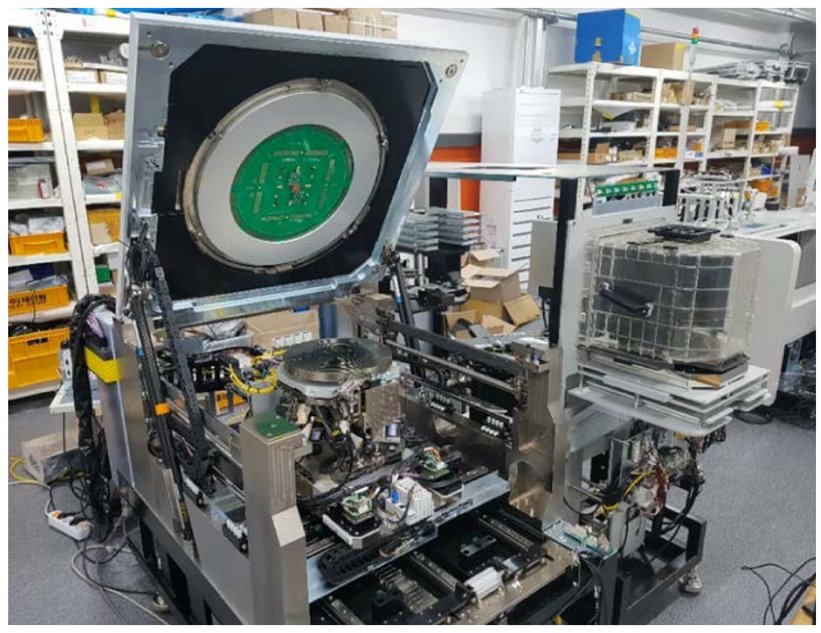
- **Introduction**
  - We had to improve on Hexapod Z since last year.

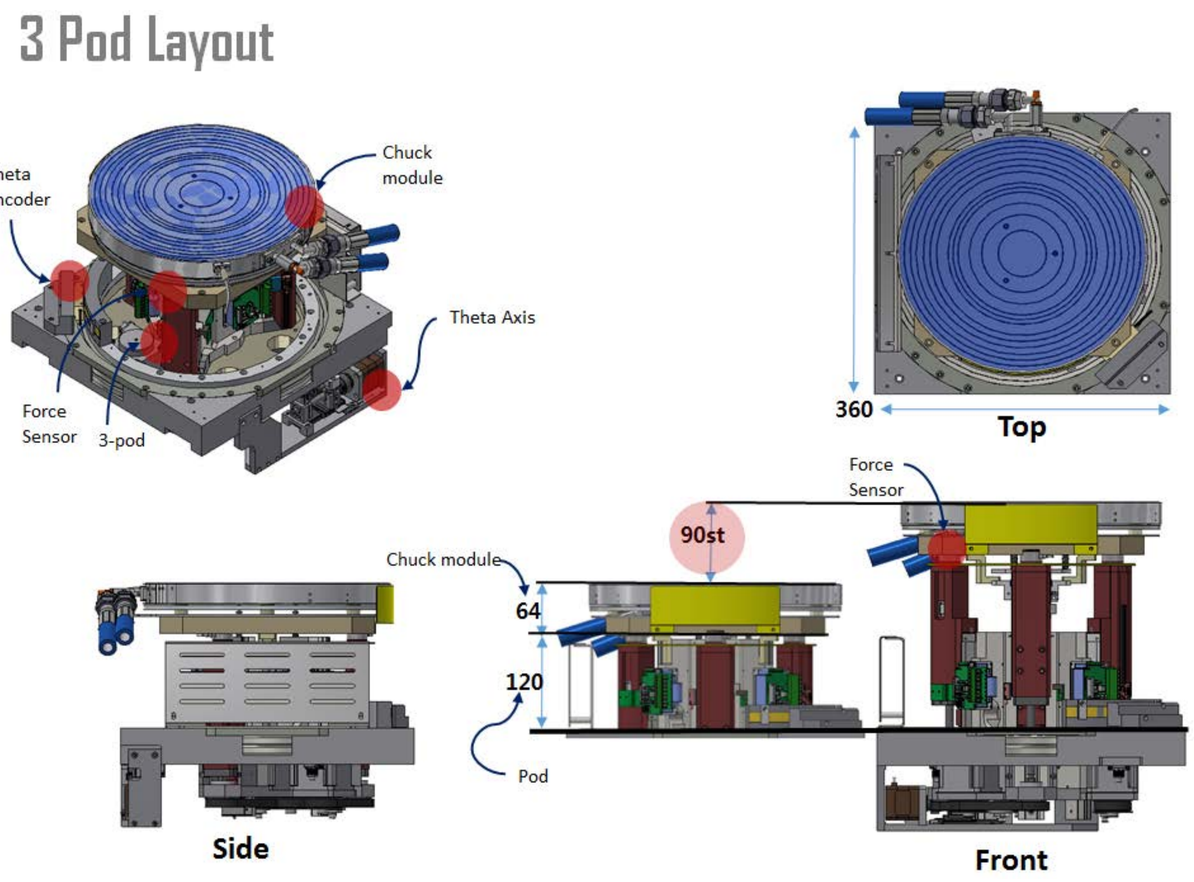






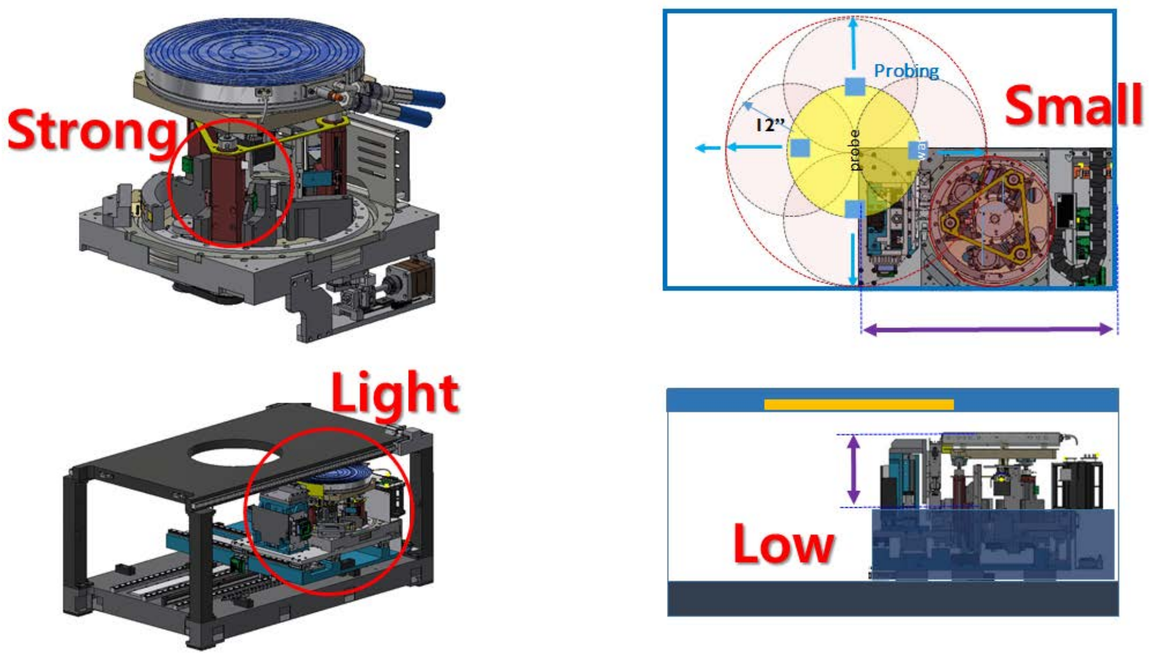
XY moving of Hexapod was not required for Z operations.
The module height was too high to allow for a compact configuration.

- **3POD concept**
- Low module height (120mm) to long stroke distance (90st) can be operated.
- Provides the ability to make parallel contact with the card posture in the individual actions of the pod.
- We can accurately recognize and remember the distribution of force acting on the chuck.



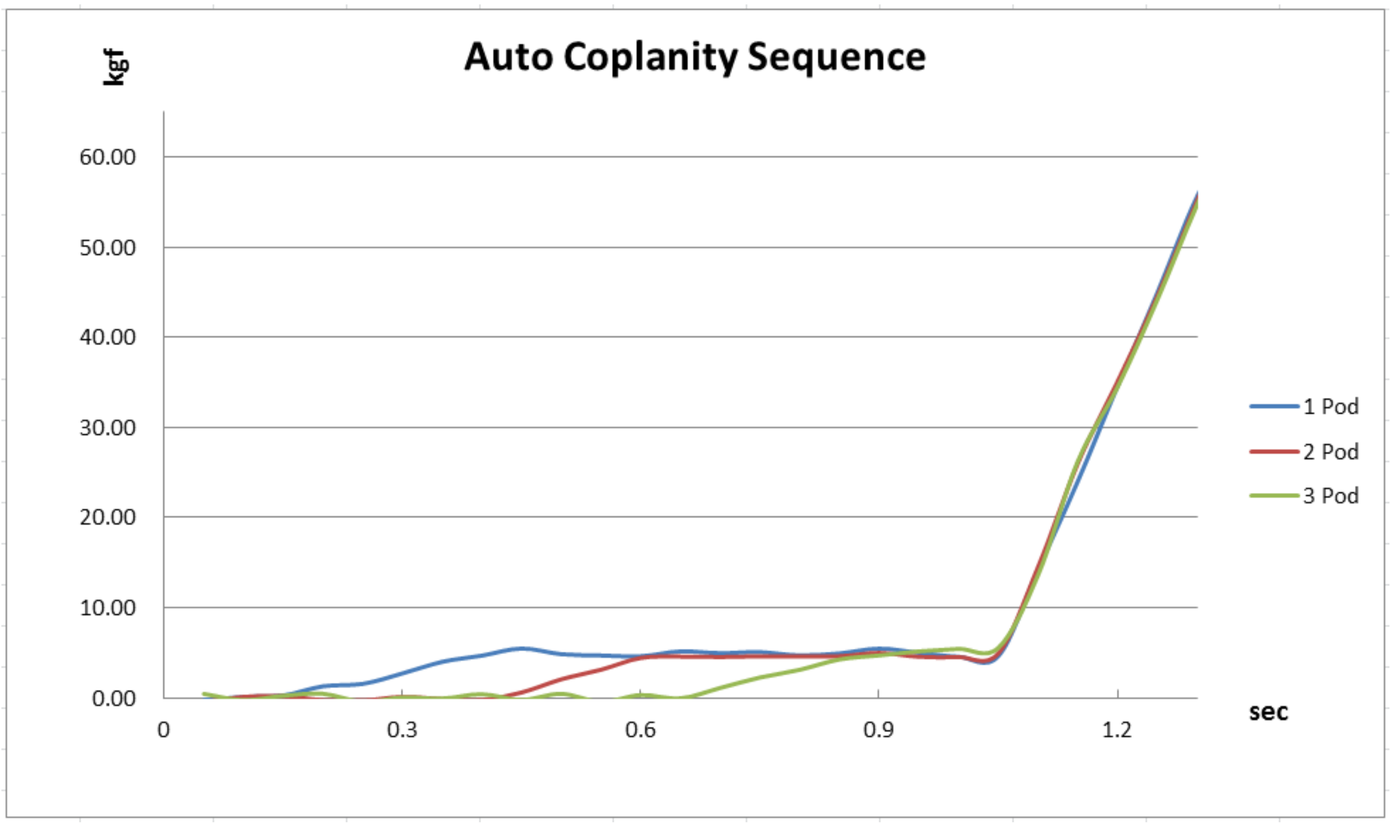
3 Pod Spec

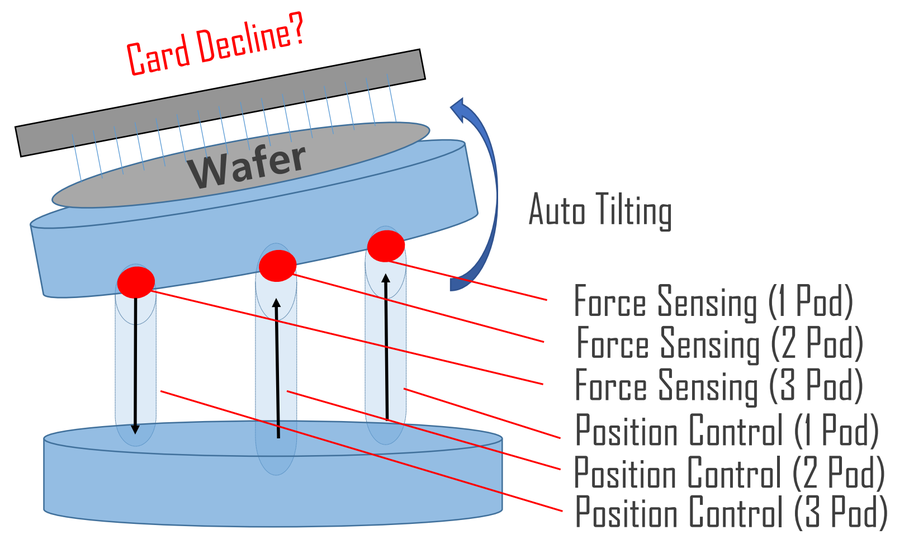
1, Active Stiffness				
1.1 center Zone	Withstand load max	540	kgf	
(Under 200 dia)	Stiffness (active off)	2	kgf/um	
	Stiffness (active On)	100	kgf/um	
	Response Time	100	msec	Compensation completion time after load action
	Overshoot	15	%	deflection compared to deflection of off case
	Control accuracy	±2	um	Z direction
	Control accuracy	±2	um	x,y direction
	Co-Planarity	±2	um	tilting direction
1.2 Eccentric Zone	Withstand load max	180	kgf	
(at 260 dia)	Stiffness (active off)	0.7	kgf/um	
	Stiffness (active On)	30	kgf/um	
	Response Time	100	msec	Compensation completion time after load action
	Overshoot	15	%	deflection compared to deflection of off case
	Control accuracy	±3	um	Z direction
	Control accuracy	±3	um	x,y direction
	Co-Planarity	±3	um	tilting direction
2. Auto Tilting				
2.1 theta_x	Tilting Range	±0.3	deg	
	Max Tilting Velocity	1	deg/sec	
	Tilting Resolution	0.1	arcsec	4x10^-5 deg
2.2 theta_y	Tilting Range	±0.3	deg	
	Max Tilting Velocity	1	deg/sec	
	Tilting Resolution	0.1	arcsec	4x10^-5 deg



More rigid
It has a smaller size
Made lighter
At a lower height
We were able to put the core functionality of the 3pod in the narrow space of the Prober.

- **3 POD Test**
  - The Measurement of Auto tilting Test.





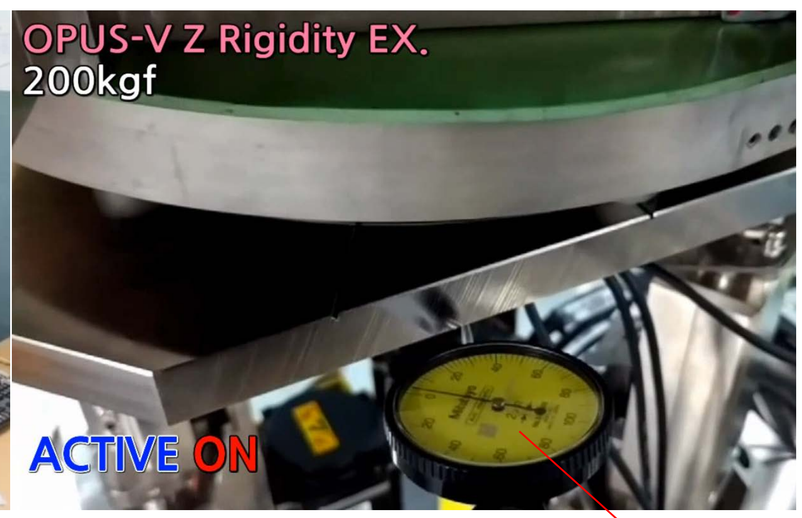
0 ~ 0.45 sec Block : First Contact at 1 Pod Position,
1 & 2 & 3 Pod Continue to Up
~ 0.7 sec Block : Second Contact at 2 Pod Position,
1 Pod Stop to Up, 2 & 3 Pod Continue to Up
~ 1.0 sec Block : All contact and Up to same Load
1 & 2 Pod Stop to Up, 3 Pod Continue to Up
~ Time of change Card : Motion with same decline

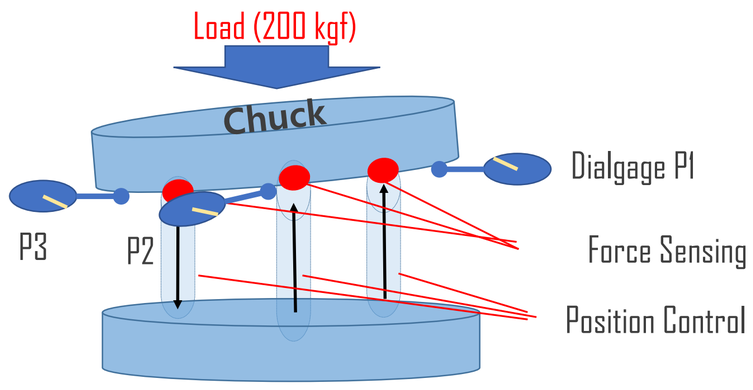
12 inch Tablet PC

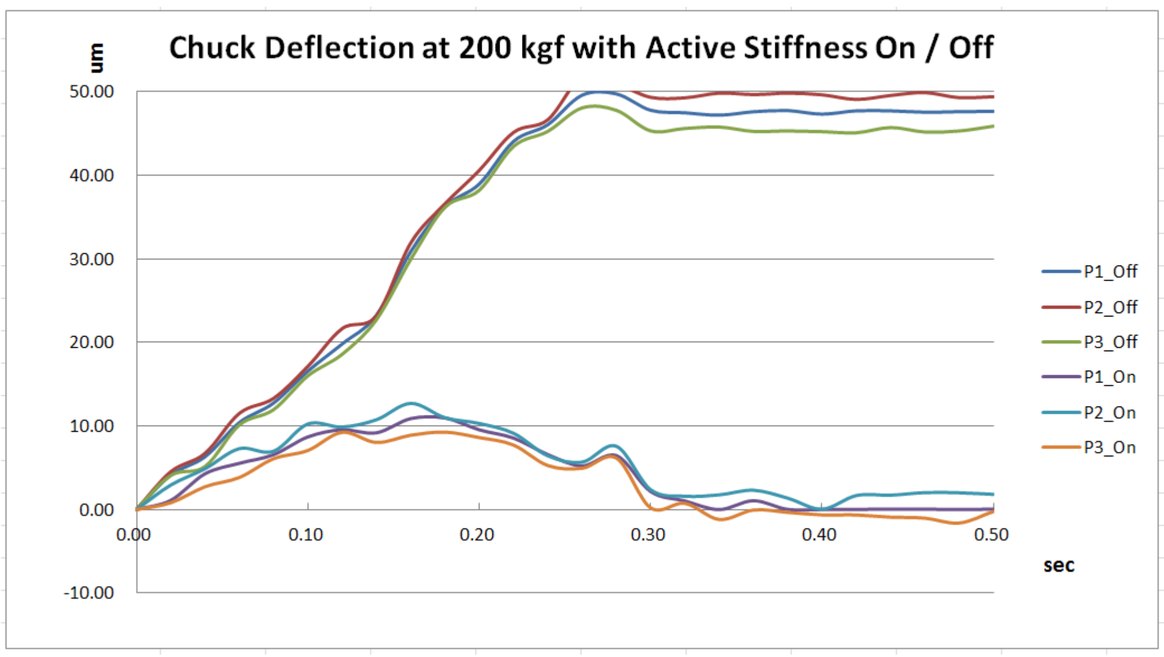
Contents :

1. Hexapod dancing
2. Shortcut of 3pod CAD Model
3. Testing of Auto Tilting
4. Testing of Active Stiffness
5. Shortcut of OPUS V Prober
6. Shortcut of Group Prober

- Measurement of Active Stiffness Test.





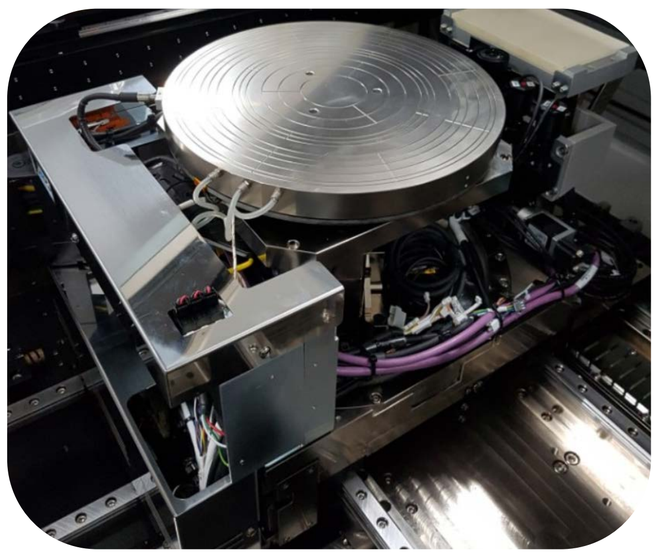


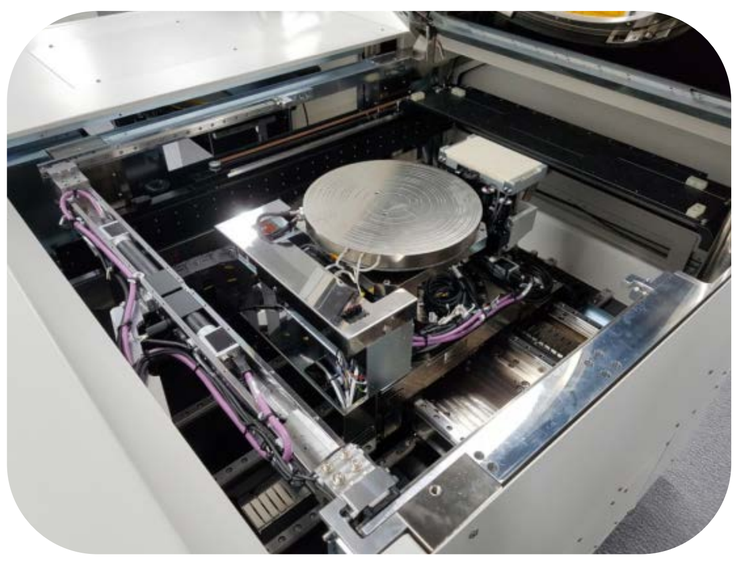
P1_Off ~ P3_Off : Off mode of Active Stiffness
Put down 200kg in the around center by a forklift.
As put it down slowly, the displacement also increases slowly.
P1_On ~ P3_On : On mode of Active Stiffness
Put down 200kg in the around center by a forklift.
As put it down slowly, The displacement increases more slowly,
then decreases and approaches zero.

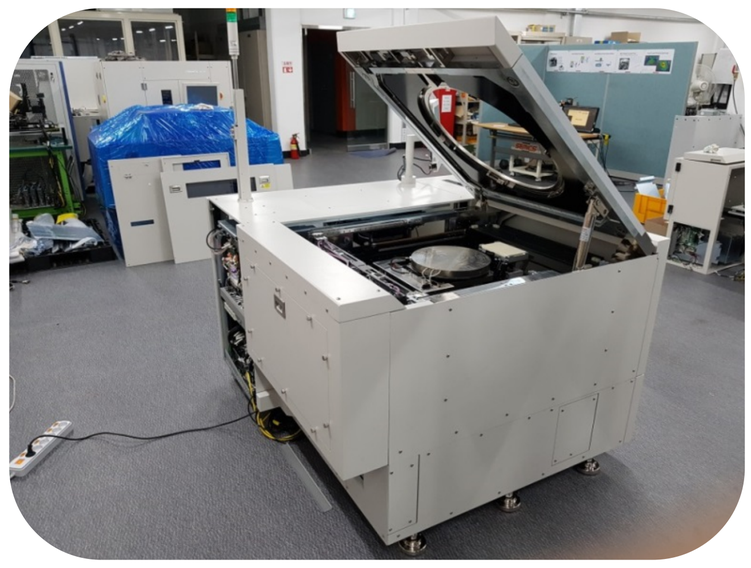
- The benefits of applying 3POD.

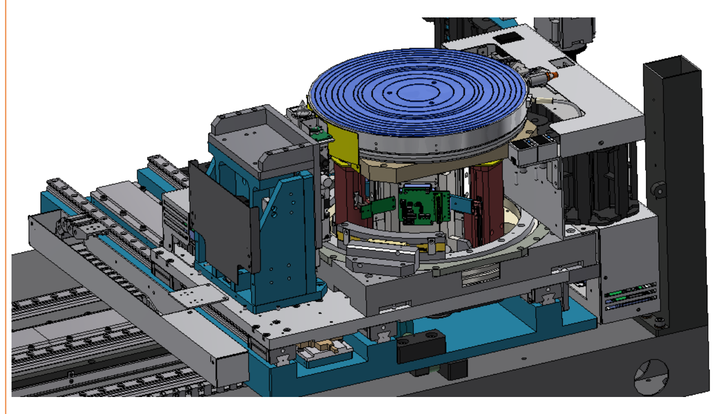
  The only Z Stage with “Chuck Auto Tilt Function“ for easy co-planarity.
  The only Z Stage with “Active Stiffness” for highest rigidity.
  The only Z Stage can withstand over 800 kgf payload. (with change of option)
  Z Stage with the most "optimal space utilization and unit modularization".
  Z Stage with the most "light weight realization".

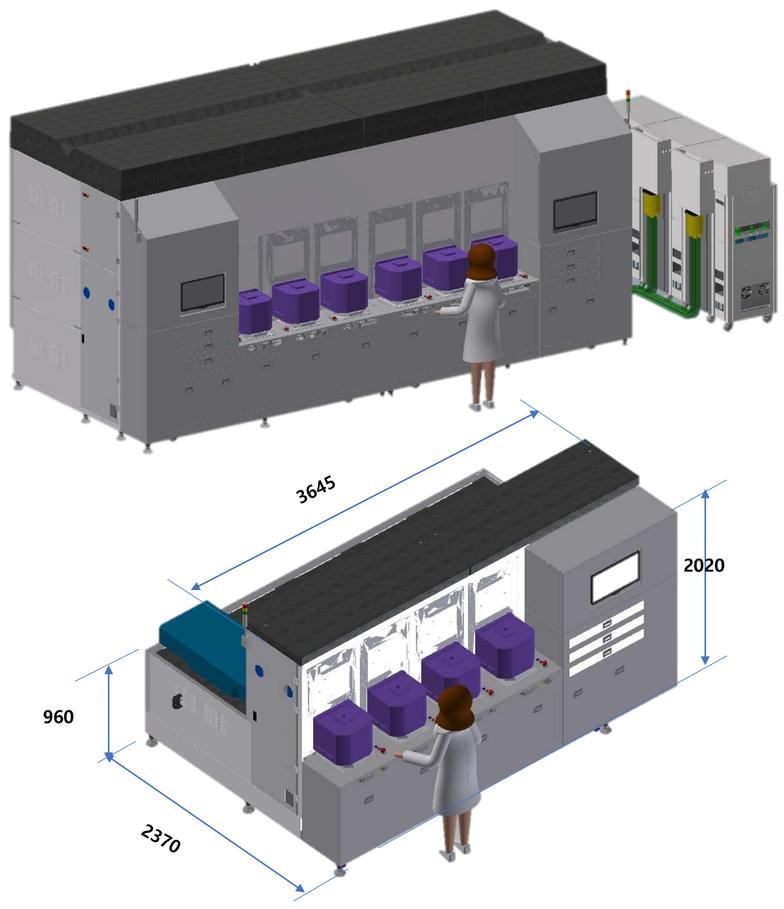
- **Actual Application of 3POD : Opus V and Group Prober**

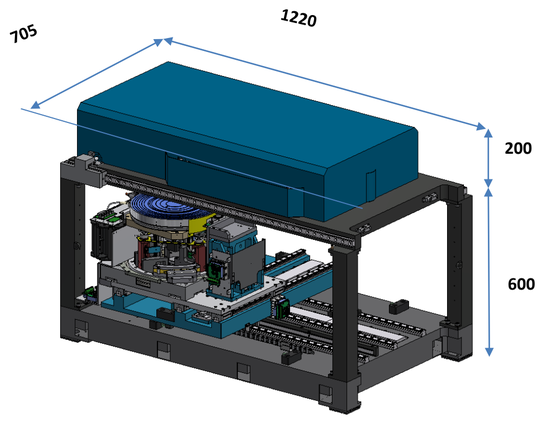


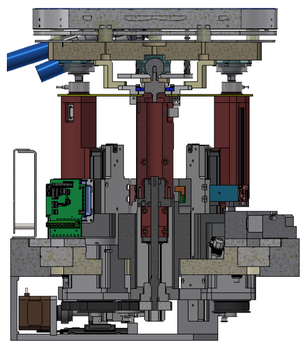












Questions ?

If you have any questions, please contact

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Useful Links for Technical Posters

Why semiconductor testing people are great. (Youtube)

- https://www.youtube.com/watch?v=RBWn-6FdQ3Y&feature=youtu.be