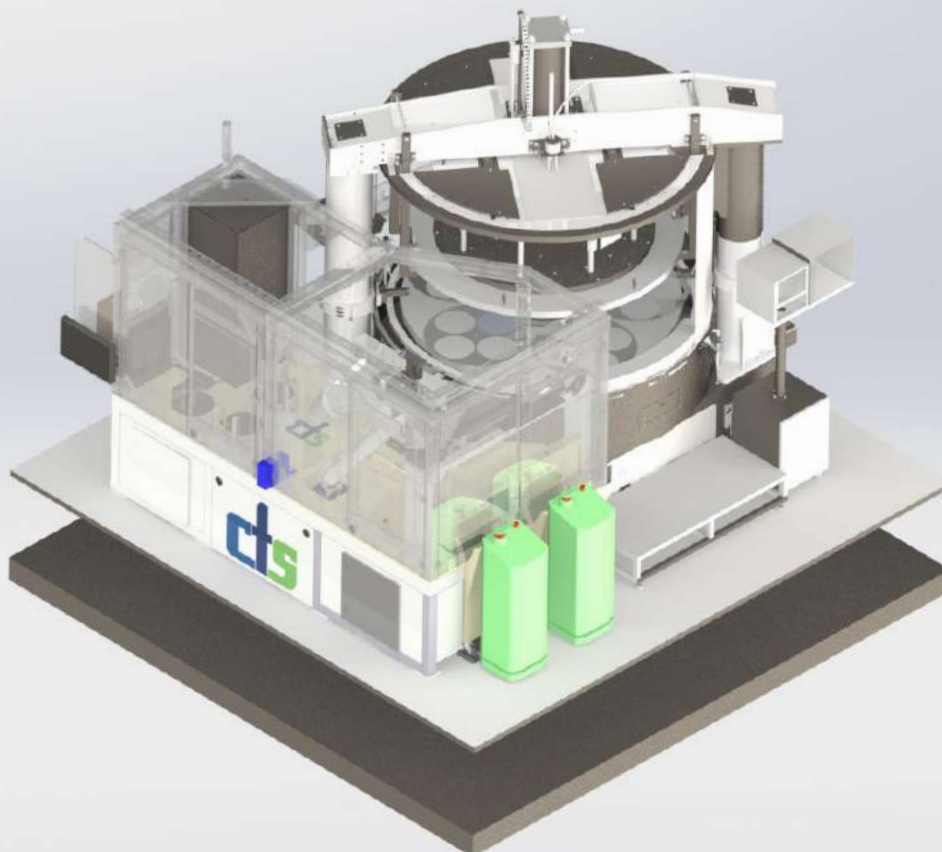




APOLLU – NEXT LEVEL LOADING/ UNLOADING OF POLISHER & LAPPER

FAST & FULLY AUTOMATED LOADING/UNLOADING OF WAFER POLISHERS AND LAPPERS

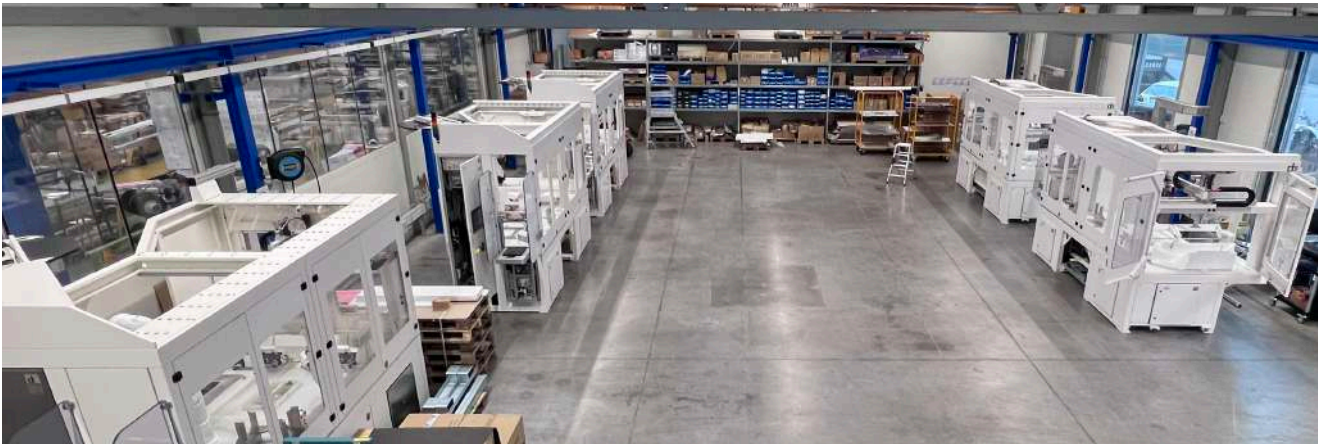
Fast. Precise. Reliable.



Polishing as well as lapping of wafers is a very critical process in Semiconductor manufacturing, several well-established polishing and lapper machine builders offer such precision systems.

The precise loading and unloading of the machine are crucial parts of the process, which takes some time to achieve the needed accuracy and care to handle the precious wafers. With the **cts APOLLU** system design, we achieved a significant speedup of the loading & unloading process! Instead of aligning each wafer before loading into the machine or unloading it into the pocket carrier, we use a high precision vision system with a smart algorithm to grab the wafer only once and place it precisely into its target position. The same process is used for unloading – which brings the whole process speed to a new level!

The **APOLLU** system is the fastest fully automatic wafer polishing and wafer lapping machine loading/unloading system on the market today, by handling the wafers with an unbeatable combination of speed and precision. Combined with an easy-to-handle operating concept and an intuitive, user-friendly HMI. The entire system conforms with Cleanroom Class ISO 7 according to EN ISO 14644-1



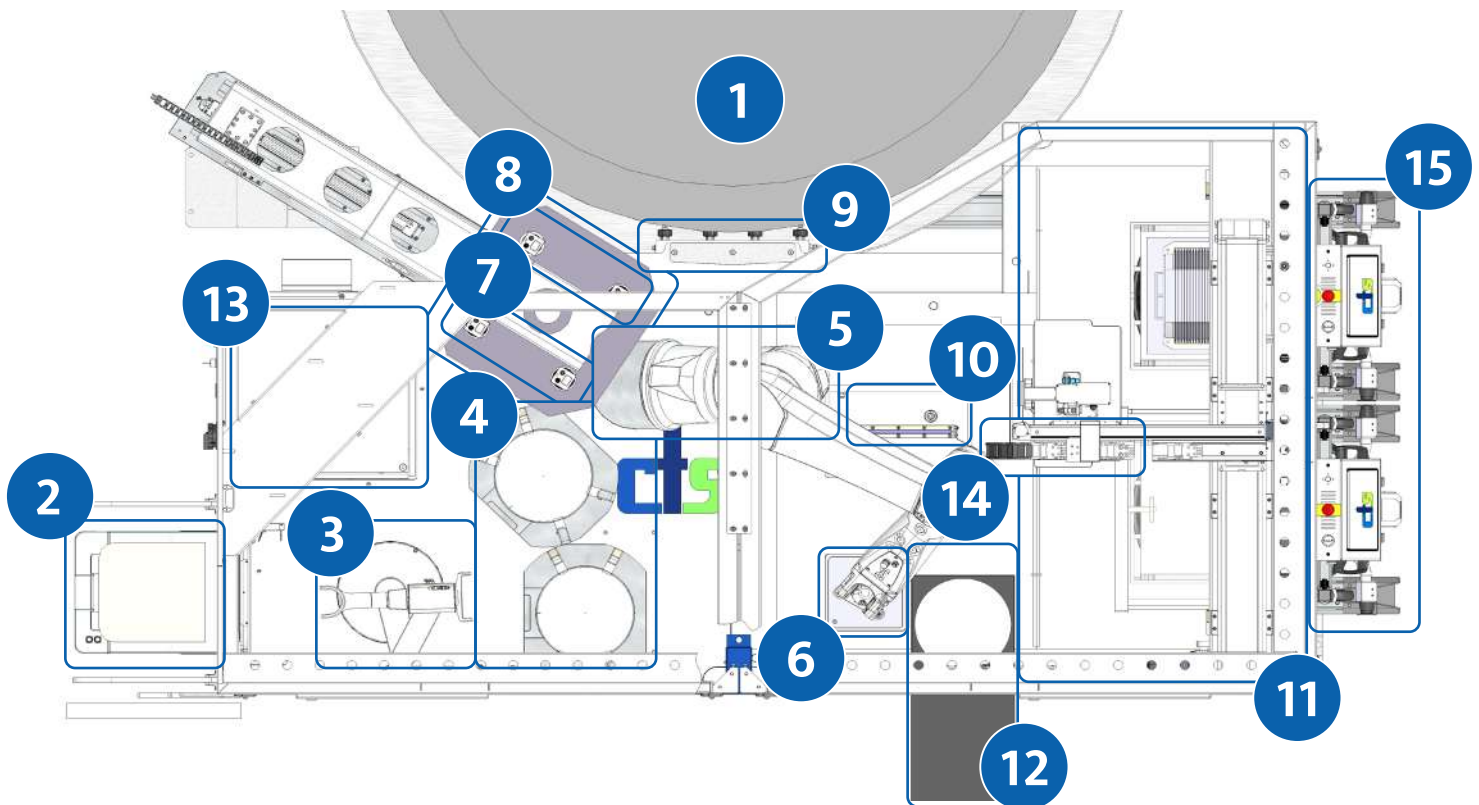
The Key Functions at a Glance:

- Fully automatic wafer loading/unloading process
- Loading wafer in <15s *(with 15+ Wafer)*
- Unloading of wafer in <20s *(with 15+ Wafer)*
- High accuracy positioning system – vision based
- Unique trolley system on wet unloading side – for manual and AMR/AGV operation
- Cleanroom ISO-7 compliant
- Easy to operate

Main Technical Features:

- Dimensions: (W/L/H) ca. 2.1 m x 4.1 m x 2.9 m (6.9' x 13.5' x 9.5')
- Standard FOUP load port to receive dry wafers
- Double Wafer Carrier Port in unique trolley system for wet wafers (polished/lapped)
- High accuracy vision system
- High speed loading/unloading of polishing machine
 - No multi-step wafer alignment needed
- SECS/GEM interface
- E84 interface on the FOUP – as well as Wafer Carrier ports
- Spray bar for immediate first step cleaning of polished wafer
- On-The-Fly cleaning of the Wafer back-side surface in the Wafer Bath

Position	Designation
1	Polisher/Lapper (not included)
2	FOUP Load Port
3	SCARA-Robot
4	Wafer Buffer
5	6-axis Robot
6	Gripper Bath
7	Vision system
8	LED Panel vision system
9	Nozzle Bar
10	Wafer Bath (Water Wave)
11	Wafer wet carrier on trolley Load Port 1/2
12	Optional: Scratch detection
13	Main Control Cabinet +S01
14	Water Gun with Spiral Hose
15	Trolley-AMR in docked position (not included)
	<i>Optional: Raised-Floor Base Frame</i>



Optional features:

- Scratch detection
- Quartz coin handling
 - Quartz coin magazine – Loaded by Operator from the outside
 - Automatic exchange of quartz in pocket carrier

The Loading Process:

- FOUP delivery → Placing FOUP in Load-Port (manual/automatic);
- Identification of FOUP ID
- Slot inspection (Cross-/Double-Slot occupancy, free slot and Wafer breakage)
- Retrieval of all Wafers and placement on Wafer Buffer with top or bottom-side facing up
- OHT is retrieving empty FOUP and brings next full FOUP
- Waiting for Polisher or Lapper to be ready for loading
- Image capturing of the Carrier Disk, ID and position of pockets
- Retrieval of topmost Wafer from Wafer Buffer and placement into the first Wafer pocket of the first/next Carrier Disk

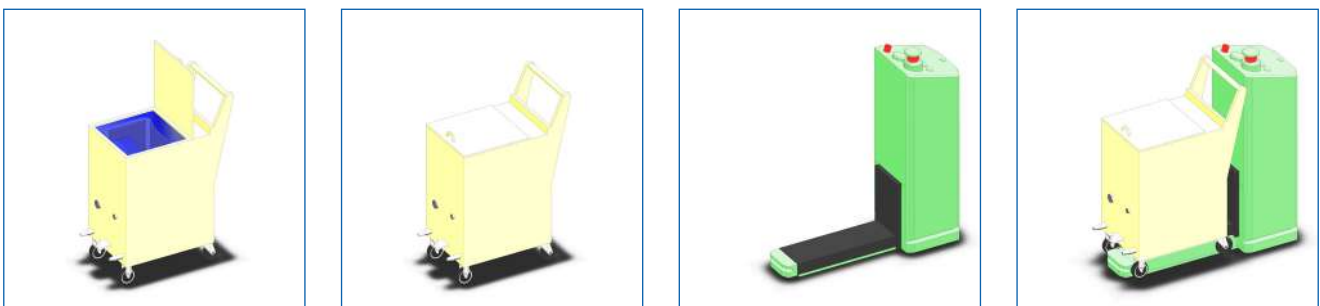
(Repeat process)

The Unloading Process:

- Polisher or Lapper run is completed
- Polisher or Lapper positions the first/next pocket carrier in the defined loading/unloading area
- Cleaning of the visible Wafer surface using the spray bar
- Image Capture of the pocket carrier ID and position of the pockets
- Removal of the first/next Wafer and "On-The-Fly" cleaning the back-side of the Wafer in-side the Wafer Bath
- Transfer of Wafer into a wet carrier on a trolley
- When the wet carrier on a trolley is full, automatic switch to second trolley is done
 - Operator or AGV/AMR receives info to exchange trolley

(Repeat process)

Trolley Exchange via AGV/AMR



Transfer of Wafer into wet carrier on a trolley

Wet carrier on trolley is full and needs to be exchanged

AGV/AMR receives info to exchange the trolley

AGV/AMR picks up trolley and brings back an empty trolley