

ATLANT 3D[®]



www.atlant3d.com



● PRODUCT BROCHURE

NANOFABRICATOR[®] PRO

Our DALP[®]-enabled platform for industrial R&D
and pilot production.



NANOFABRICATOR[®] PRO

Accelerating Industrial R&D, Material & Process Development, and Advanced Manufacturing at the Atomic Scale.

NANOFABRICATOR[®] PRO is a high-performance platform for material discovery, process integration, advanced device development, and industrial fabrication — designed for both R&D environments and integration into semiconductor and advanced manufacturing process lines.

Powered by ATLANT 3D's proprietary Direct Atomic Layer Processing (DALP[®]) technology, NANOFABRICATOR[®] PRO enables precise, software-defined, localized multi-material processing in ultra-clean, tightly controlled environments.

Engineered for repeatability, scalability, and seamless fab integration, NANOFABRICATOR[®] PRO delivers atomic-scale fabrication with advanced process control, accelerating experimentation and rapid iteration while supporting the transition from development to high-volume manufacturing.



Multi-Material Deposition



- Enables deposition and etching of complex multi-material stacks
- Accelerates advanced material and device architecture innovation



High-Precision Patterning



- 50–400 μm line width for precise localized patterning
- Delivers additive and subtractive atomic layer processes



Industrial Substrate Compatibility



- Supports wafers up to 8" (200 mm), upgradeable to 12" and adheres to SEMI standards
- Designed for industrial-scale processing environments



Ultra-Clean Controlled Processing



- Operates in a controlled process chamber
- Ensures high repeatability and process stability

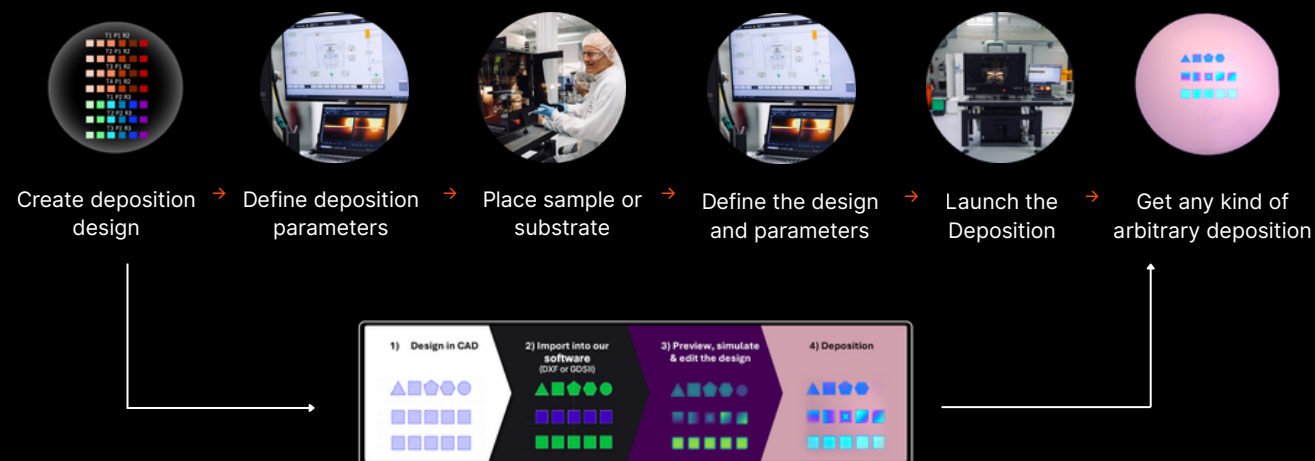
DALP[®] TECHNOLOGY

DALP[®] enables direct, localized atomic-scale material processing by positioning a micronozzle at a controlled working distance above a moving substrate.

ATLANT 3D's proprietary Direct Atomic Layer Processing (DALP[®]) technology supports precise deposition and etching of multiple materials, reducing reliance on conventional batch-based fabrication workflows and enabling software-defined manufacturing at the atomic scale.

End-to-End Material Workflow

A seamless process from digital design to physical fabrication, enabling rapid iteration and scalable production.

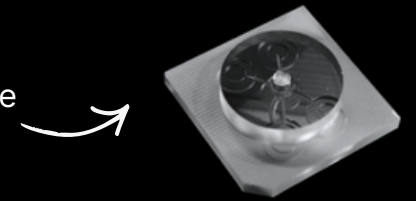


NOZZLES

There are three types of interchangeable quartz nozzles required for tool operation. They can be cleaned for re-use, or purchased as a consumable. We have a dedicated team behind the development of innovative nozzle architectures, meeting the needs of an ever-growing set of applications.

+ DALP[®] Micronozzle:

Standard line width resolution: 350-400 μm , with finer line width nozzles in development.

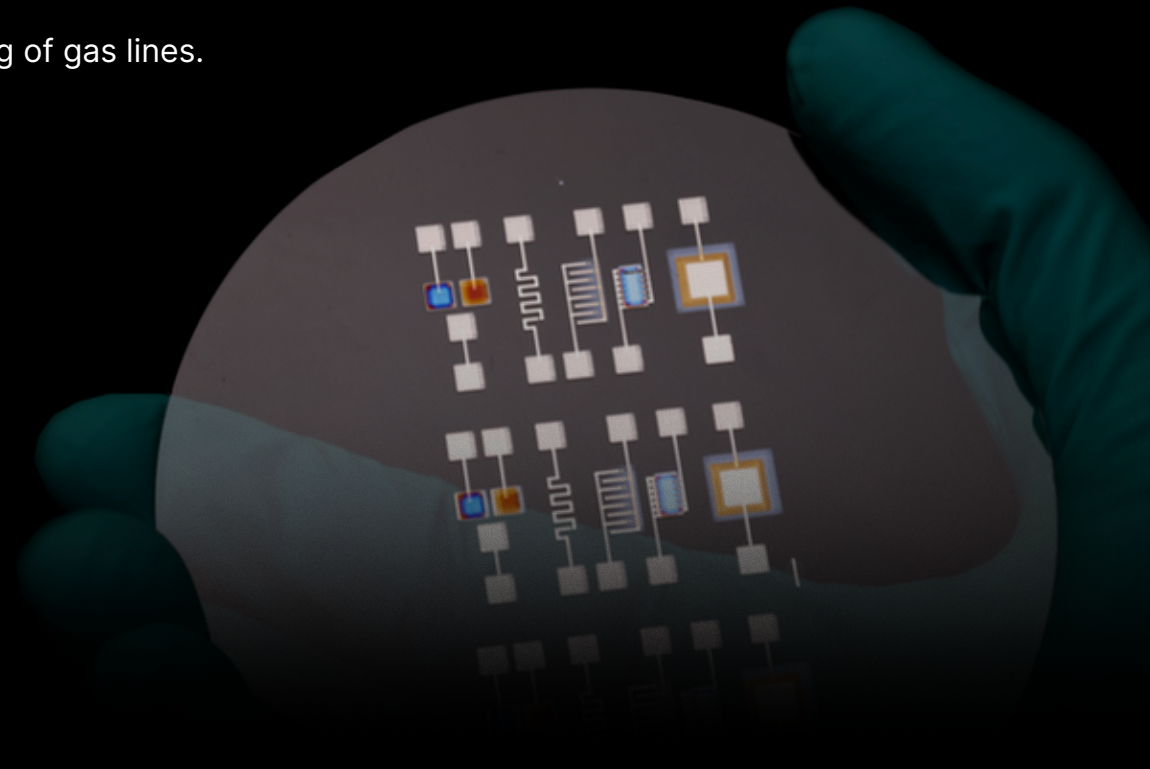


+ BLANK Nozzle:

For capping gas system when not in use.

+ PURGE Nozzle:

For extensive purging of gas lines.



INDUSTRIAL COLLABORATIONS & PILOT APPLICATIONS

From Atomic-Scale Innovation to Fab-Ready Deployment

NANOFABRICATOR® PRO is engineered to bridge material innovation and industrial manufacturing, enabling precise, localized atomic layer processing within fab-compatible environments and on substrates up to 8".

Through active pilot programs and joint development initiatives with semiconductor, photonics, advanced packaging, and mobility partners, ATLANT 3D is accelerating next-generation fabrication workflows from proof-of-concept and process validation to manufacturability and industrial deployment of DALP® platform technology.

The applications shown opposite represent active industrial engagements across semiconductor manufacturing, advanced packaging, automotive MEMS, energy storage, and photonics, each one demonstrating PRO's ability to deliver atomic-scale precision under real-world manufacturing constraints.

APPLICATION HIGHLIGHTS



AUTOMOTIVE MEMS & OPTICS

Encapsulation of Suspended Micromirror Structures

Direct maskless dielectric deposition for LiDAR and adaptive optics applications. DALP® protects sensitive 3D MEMS structures while preserving optical and electrical performance.



Joint Development | Validation Stage



SEMICONDUCTOR MANUFACTURING

Wafer-Edge Passivation for Advanced Packaging

Localized atomic-precision edge protection for advanced chiplet stacks. DALP® applies conformal low-temperature barriers to reduce moisture, corrosion, and mechanical-stress failures.



Tier-1 Semiconductor Collaboration | Manufacturability Validation



ENERGY STORAGE & MOBILE DEVICES

Edge Passivation for Lithium-Ion Pouch Cells

Spatial-ALD edge deposition of defect-free Al₂O₃ coatings during roll-to-roll manufacturing while keeping electrical tabs clean.



OEM Pilot Program | Scaling Pathway Defined



PHOTONICS & OPTOELECTRONICS

Void-Free Filling of Nanoporous Substrates

Direct localized multi-material processing inside high-aspect-ratio nanoporous structures for advanced metasurface and optoelectronic devices.



Strategic Partnership | Commercialization Roadmap Underway

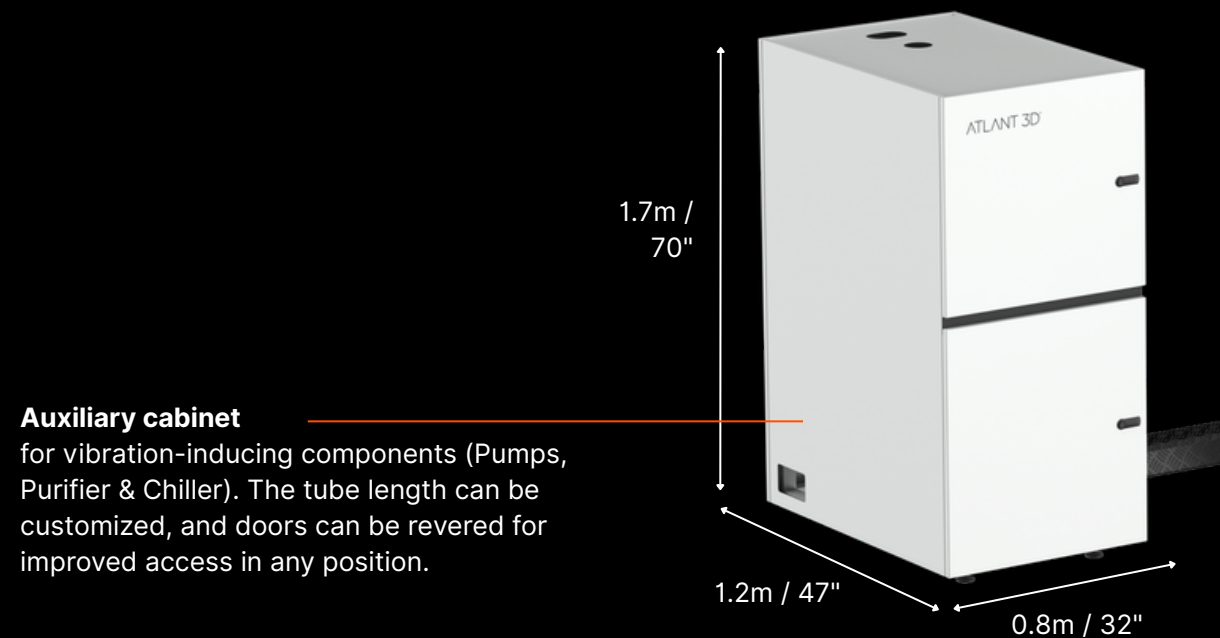
FEATURES

The NANOFABRICATOR® PRO has been developed by a skilled team of Industrial designers and engineers to create a highly functional, operator-friendly, and reliable tool. The high-precision inert chamber is accessible via industry-standard glove ports, and our own patent-pending glove port blockers developed to keep operators out of harms way during high-speed depositions.

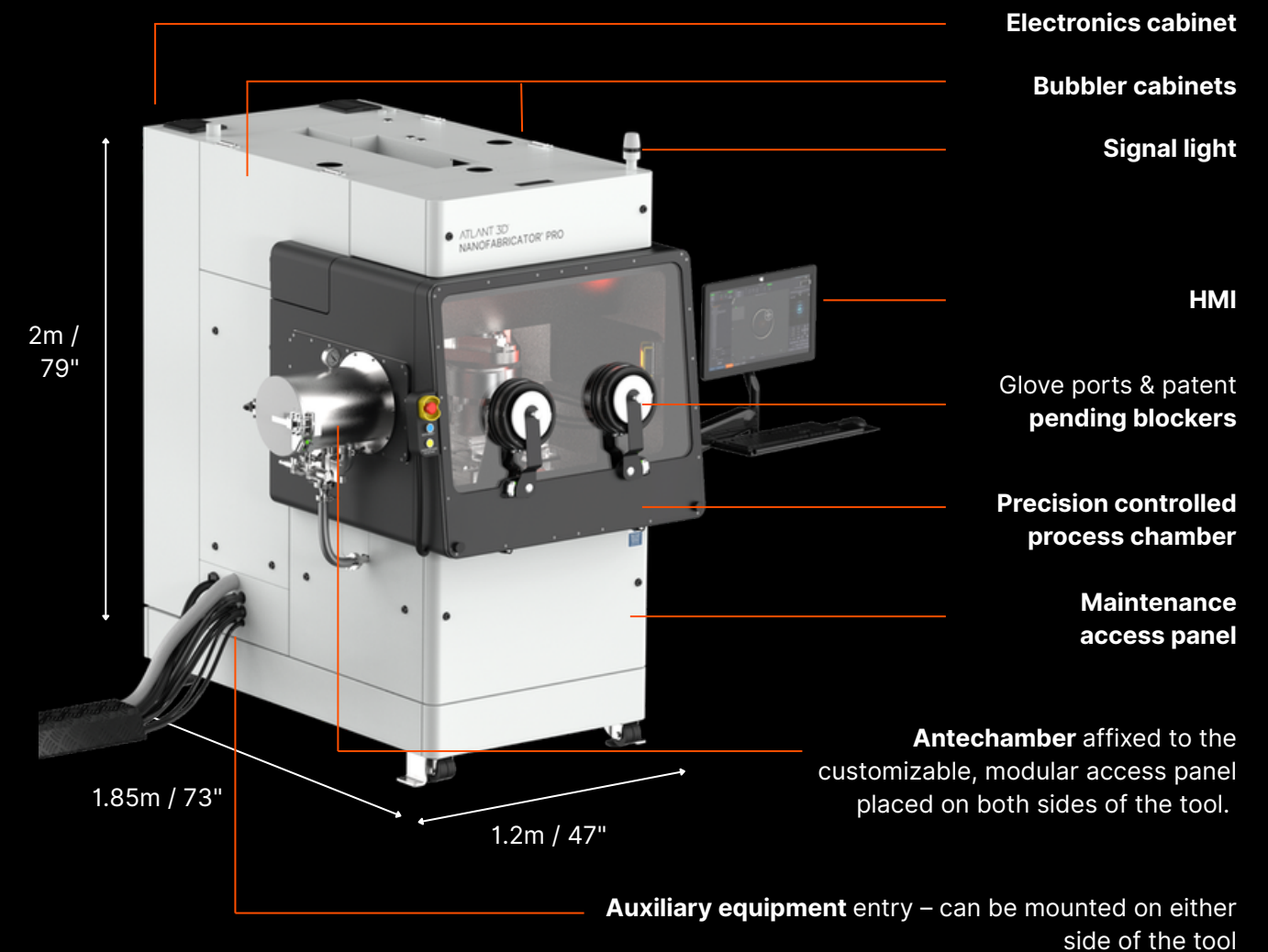
PRO's integrated Human Machine Interface (HMI) comprises a touch-screen display, mouse and keyboard to control PRO's onboard Pilot software, launching depositions and capturing process telemetry with ease.

Key features:

- Multi-material deposition
- 50-400 μm line width for precise patterning (micronozzles are interchangeable)
- Up to 8" (200 mm) substrate, compatible with upgrade to 12"
- 500 mm/s maximum deposition speed
- Ultra-clean controlled process chamber



INSTALLATION



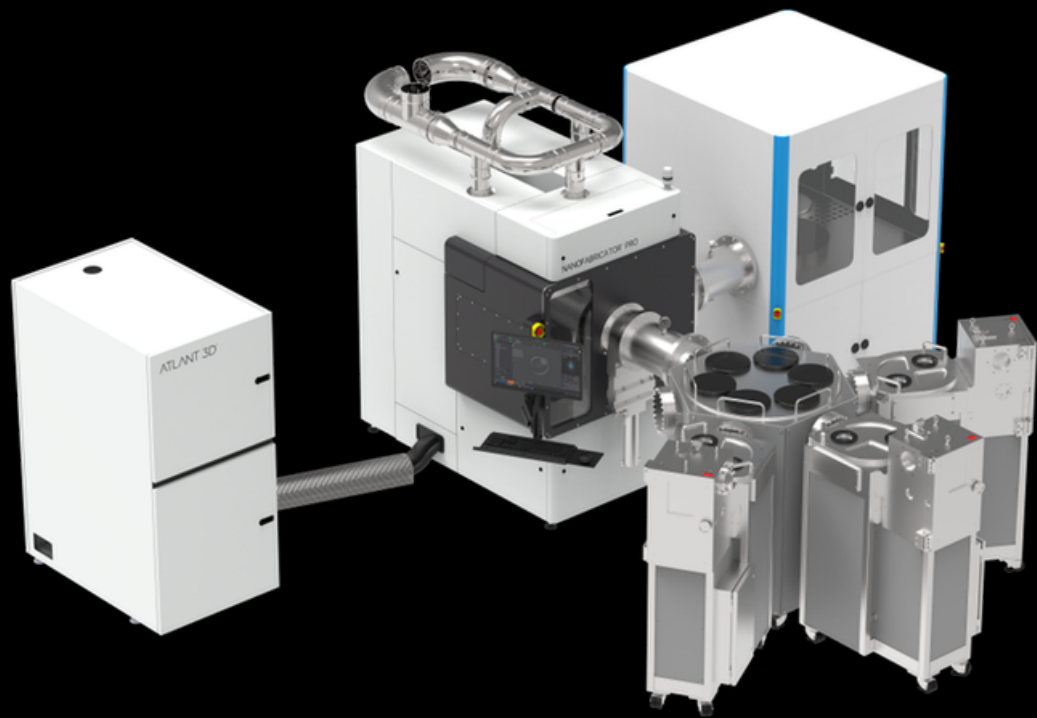
kg NF PRO approx.:
1000 Kg
2200 lb

INTEGRATION & AUTOMATION

The NANOFABRICATOR® PRO is the first atomic-layer discovery and process-integration platform built for Industrial R&D, material development and Industrial fabrication.

It deposits multiple materials sequentially under ultra-clean controlled conditions on wafers up to 8" or custom substrates with unrivaled versatility.

PRO accelerates testing, enables iterative prototyping in hours, and transforms breakthrough ideas into scalable, production ready processes for next generation devices.



In the cluster configuration above, PRO interfaces with adjacent tools on two sides, enabling the continuous pre- and post-processing of wafers. This specific configuration is purely illustrative, and real-world set-ups and integrated equipment are based on application needs.

TECHNICAL SPECIFICATIONS

Power	Voltage	208-230 VAC
	Frequency	50-60 Hz
	Phase configuration	1 Phase (1W+N+G) 2 Phase (2W+G)
Substrate	Substrate Size	Up to 8" (200 mm) wafer, including common sizes such as: 4" (100 mm) 6" (150 mm) 8" (200 mm)
	Max Thickness	2 mm
	Z/Vertical Direction Shape	Flat
	Holding Method	Vacuum (3 separate zones)
	Loading Method	Manual, by operator
	Heater Temperature	Max 400°C
Processing Chamber	Heater Uniformity	± 1%
	Environment	Controlled inert environment
	Processing Speed	Up to 500 mm/s
	Deposition Area	Up to 1.5 mm from wafer edge
	DALP® Resolution	50-400 µm
Gas System	Precursor Temperature	RT to 150°C
	No. of Precursor Bubbler	2 (Upgradable to 3)
	No. of Reactant Bubbler	1 (H ₂ O default)
	No. of Gas Reactant Interface	1 (Upgradable to 2)
	Gas compatibility	O ₂ , O ₃ , 1-10% NH ₃
Motorized Linear stage	Horizontal X Travel	+/- 100 mm (200 mm total)
	Horizontal Y Travel	+/- 100 mm (200 mm total)
	Vertical Z Travel	+/- 12 mm (24 mm total)
	Max. velocity	Design: 500 mm/s
Gap Measurement	Gap Measurement	Interferometry
	Gap Verification (Go/No-Go)	Side Camera
Head	Head Adjustment	Linear Actuators (Vertical Axis)
Sample	Sample Scanning	Top Camera
System	Weight	1000 kg (2200 LB)
	Dimensions	Depth: 1820 mm
		Width: 1200 mm Height: 1932 mm

SOFTWARE

Our NANOFABRICATOR® platforms are operated with the same software; our custom interface for building experimental designs and launching jobs.

There are two software's, providing a fully developed suite of tools at different stages of the process; DALP® Designer, and DALP® Pilot.

DALP® Designer Software

DALP® Designer is the design and simulation software for preparing device and experimental layouts for DALP® processing. It allows users to:

- Import or draw device and experimental designs
- Assign material recipes
- Set deposition properties
- Generate deposition previews
- Export projects directly to DALP® Pilot

DALP® Designer enables a smooth transition from design to automated deposition.

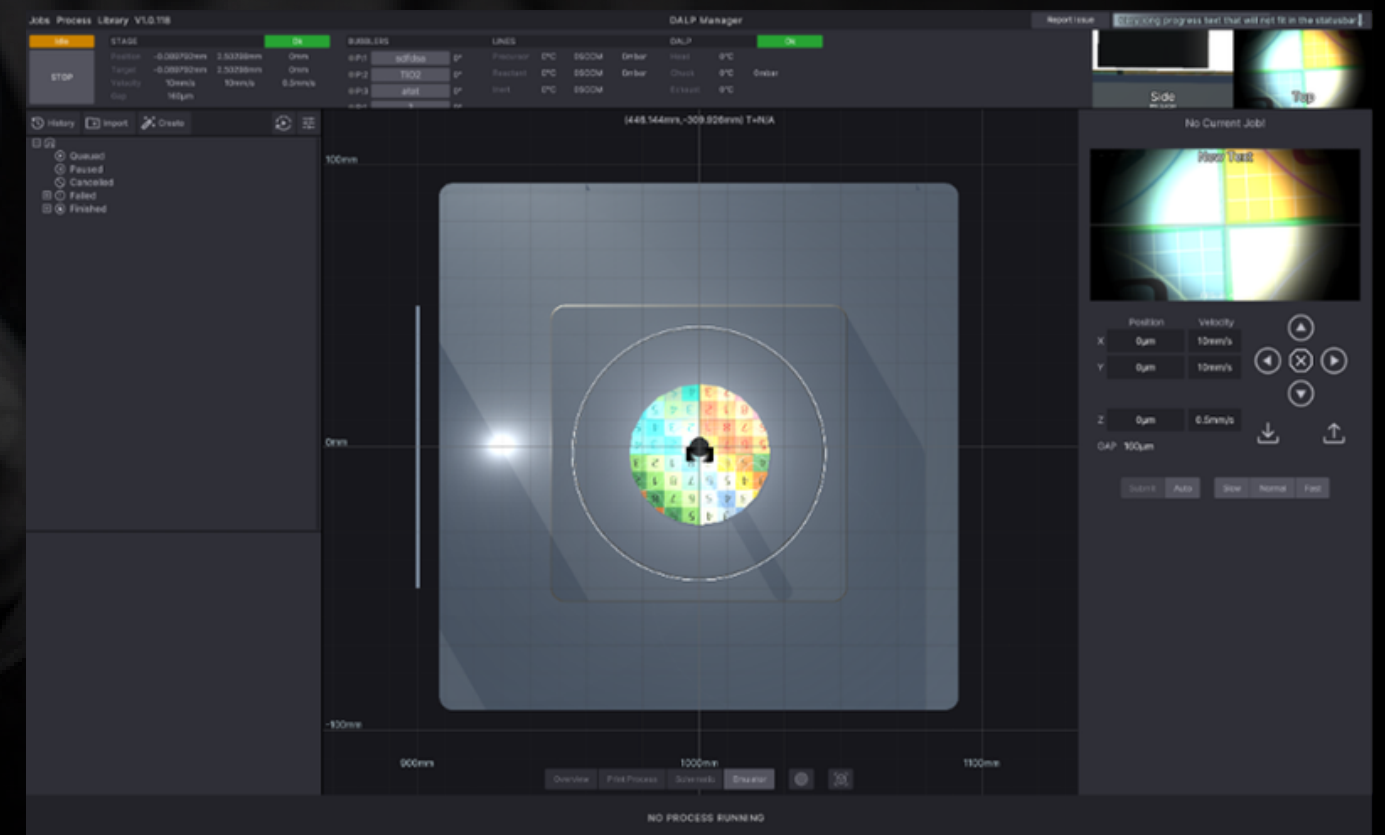


DALP® Pilot Software

DALP® Pilot is the machine control software and allows:

- Automated deposition process with guided instructions
- Scheduling of processing jobs
- Monitoring of vital machine parameters
- Capturing of process telemetry

The DALP® Pilot software can import complete projects from design, including deposition trajectories, metadata for recipe control, and alignment markers.



DALP® Pilot software showing the "virtual" chuck in the middle, the job queue on the left, and the camera view and stage controls on the right. The top of the screen shows selected telemetry values.

START THE CONVERSATION

Let´s Explore how NANOFABRICATOR® PRO can accelerate your industrial R&D and integration.



+ Dr. Bonnie Tsim

VP of Commercial Strategy and Partnerships

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LET’S DISCUSS

- Materials & device applications
- Process development & validation
- NANOFABRICATOR® PRO integration
- Pilot projects & strategic partnerships



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