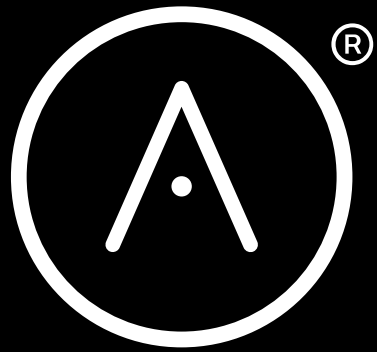


ATLANT 3D[®]



www.atlant3d.com

● APPLICATIONS BROCHURE

PLATFORMS & APPLICATIONS

Enabling atomic-scale innovation from AI-driven materials to next-generation devices.

CONTENTS

05	Introduction	18	Advanced Materials & Discovery
06	Our Proprietary Technology - DALP®	19	Semiconductors & Advanced Packaging
08	Our End-to-End Platform	20	MEMS & Sensors
09	Platform Portfolio	21	Energy & Electrochemical Systems
09	NANOFABRICATOR® ZERO-G	22	Photonics & Optoelectronics
10	NANOFABRICATOR® LITE	23	Aerospace Defense & Secure Systems
10	NANOFABRICATOR® PRO	24	
10	NANOFABRICATOR® PRO-CLUSTER INTEGRATED	24	Innovation-as-a-Service
11	Nozzle Architecture	26	Partner with Us
12	Software		
14	Capabilities & Key Advantages		
16	Applications & Use Cases		

INTRODUCTION TO ATLANT 3D

Shaping the Future of Advanced Materials Innovation and Atomic-Scale Manufacturing.

ATLANT 3D is pioneering a new era of advanced manufacturing built on atomic precision. At the core of our platform is our proprietary Direct Atomic Layer Processing (DALP®) technology — a programmable nanofabrication process that deposits and etches materials locally and directly onto substrates without masks, batch tools, or vacuum breaks. Compatible with 450+ materials, DALP® compresses innovation cycles from years to days while reducing chemical and energy consumption by over 90% compared with conventional cleanroom workflows.

Powered by DALP®, our NANOFABRICATOR® systems provide a full-stack platform integrating hardware, software, materials and process IP, and a data layer to accelerate materials discovery, process development, and device integration. The platform supports applications across semiconductors, advanced packaging, energy, MEMS and sensors, quantum technologies, aerospace, and other emerging industries.

Founded in 2018, ATLANT 3D collaborates with leading industrial and research partners worldwide to accelerate the path from R&D to qualified production. Headquartered in Copenhagen with operations across the US and UK, we have built the physical infrastructure that transforms AI-designed materials into functional devices for industry impact.

PARTNERS & CUSTOMERS

SONY**NASA****MERCK****esa****SAL**
SILICON AUSTRIA LABS**FAU**
Friedrich-Alexander-Universität
Erlangen-Nürnberg**ThalesAlenia**
Space**SIEMENS****University**
of Vermont**NUS**
National University
of Singapore**SLOVENSKÁ**
AKADÉMIA
VIED

OUR PROPRIETARY TECHNOLOGY

Bridging digital intelligence and industrial fabrication to enable AI-driven materials discovery, process development and integration into scalable production.

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®) platform 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.

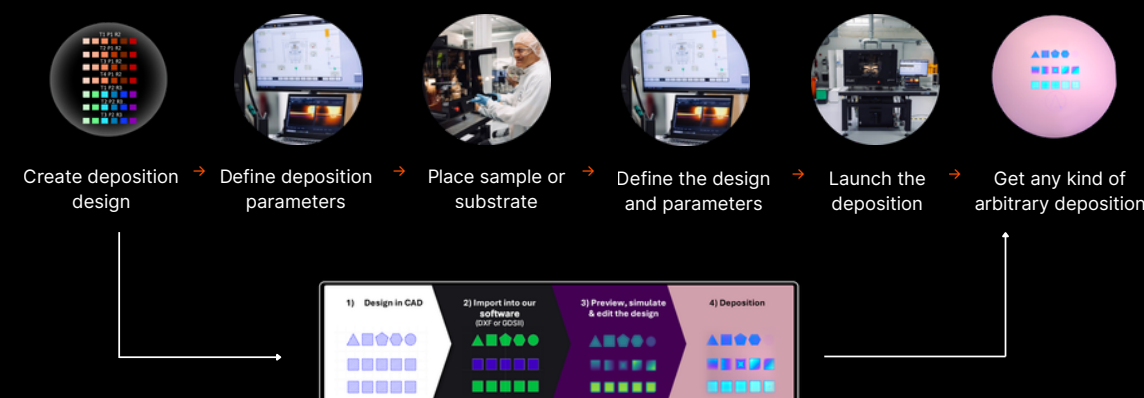
“As a scientist, I believe the future of innovation depends on our ability to discover, develop, and manufacture new materials faster and more precisely than ever before. At ATLANT 3D, we are building the platform that allows researchers and engineers to develop advanced materials and devices with atomic-scale precision, accelerating the transition from R&D to industrial impact.”

Dr. Mira Baraket
Chief Technology Officer



End-to-End Material Workflow

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



Why it Matters

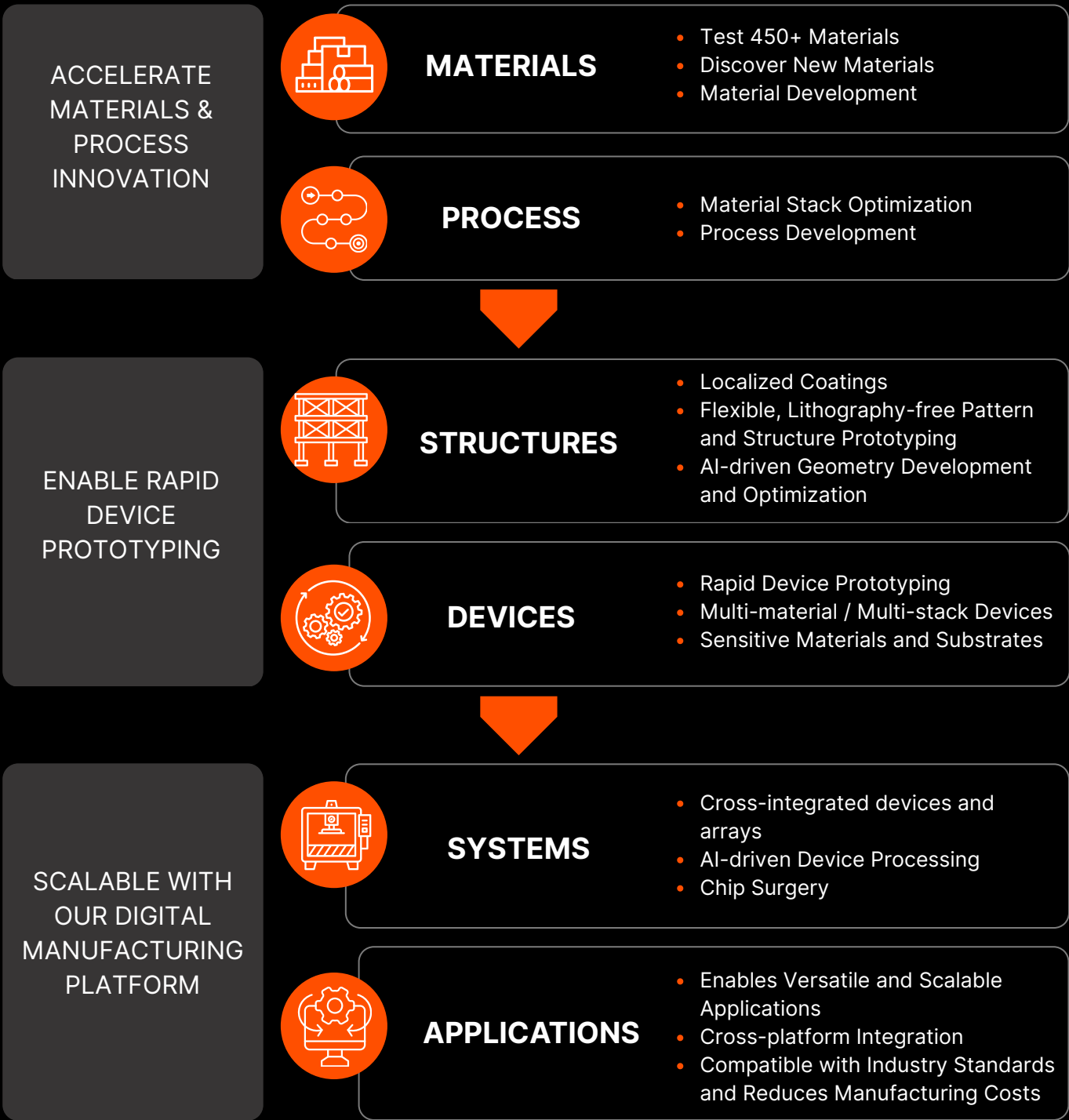
- Accelerates materials innovation **from years to days**
- Accelerates device prototyping and industrial integration
- Enables direct transition from **lab to fab**
- Reduces reliance on complex global supply chains
- Supports more **sustainable** and **localized manufacturing**

Key Advantages

- ✓ Direct-write patterning at micron scale
- ✓ Localized ALD, ALE, and MLD processes
- ✓ No photoresist, masks or etching
- ✓ Multi-material deposition in a single workflow
- ✓ Reduced process steps and tool transfers

OUR END-TO-END PLATFORM

Lab-to-fab and fab-in-lab: one platform for materials discovery, process development, and device solutions.



PLATFORM PORTFOLIO

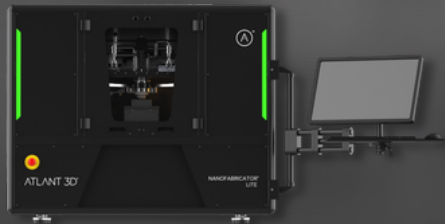
DALP®-enabled NANOFABRICATOR® platforms enabling lab-to-fab and fab-in-lab for materials discovery, process development and scalable device solutions.

NANOFABRICATOR® ZERO-G



- DALP®-enabled platform for in-space microfabrication and advanced prototyping
 - Enables in-space fabrication and microdevice repair
 - High-precision localized material processing
 - Autonomous operation with remote control capability
- NANOFABRICATOR® ZERO-G is designed for microgravity environments, enabling high-precision material processing, localized microdevice repair, and reliable operation in space.

NANOFABRICATOR® LITE



- Benchtop DALP®-enabled platform for scientific R&D
- Multi-material deposition and atomic layer processing
- Interchangeable micronozzles for precise, localized fabrication
- Supports up to 4" substrates

NANOFABRICATOR® LITE is designed for advanced R&D, materials discovery, process development, and rapid device prototyping.

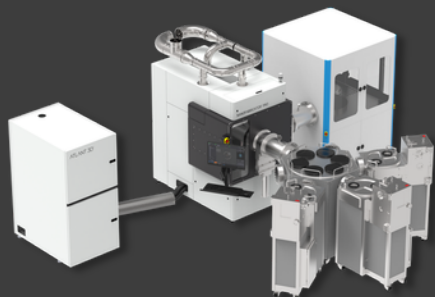
NANOFABRICATOR® PRO



- DALP®-enabled platform for industrial R&D and pilot production
- Multi-material processing in controlled environments
- Interchangeable micronozzles for precise, localized fabrication
- Compatible with up to 8" wafers (upgradeable to 12")

NANOFABRICATOR® PRO is designed for scalable materials and process development, pilot production, and advanced manufacturing.

NANOFABRICATOR® PRO: CLUSTER-INTEGRATED



- DALP®-enabled platform for scalable manufacturing and production integration
- Modular and integration-ready
- Consistent, repeatable processing
- PRO can be fully integrated into a cluster configuration for production line integration

NANOFABRICATOR® PRO Cluster delivers reliable, high-throughput manufacturing of advanced materials, enabling efficient scaling from development to production.

THE CORE OF DALP®: NOZZLE ARCHITECTURE

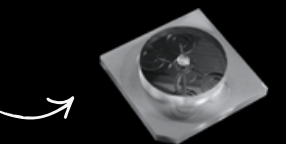
Engineered for precision and adaptability, enabling localized material processing at the heart of every DALP® system.

A dedicated team continuously develops advanced nozzle architectures to meet evolving material and application requirements.

NOZZLE TYPES

+ DALP® Micronozzle

Enables localized material deposition with high precision. Line width: 350–400 µm (finer resolutions in development).



+ Blank Nozzle

Used to seal and cap the gas system when not in operation.

+ Purge Nozzle

Designed for efficient purging of gas lines, ensuring system cleanliness and process stability.

SOFTWARE

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

There are two software solutions, 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.

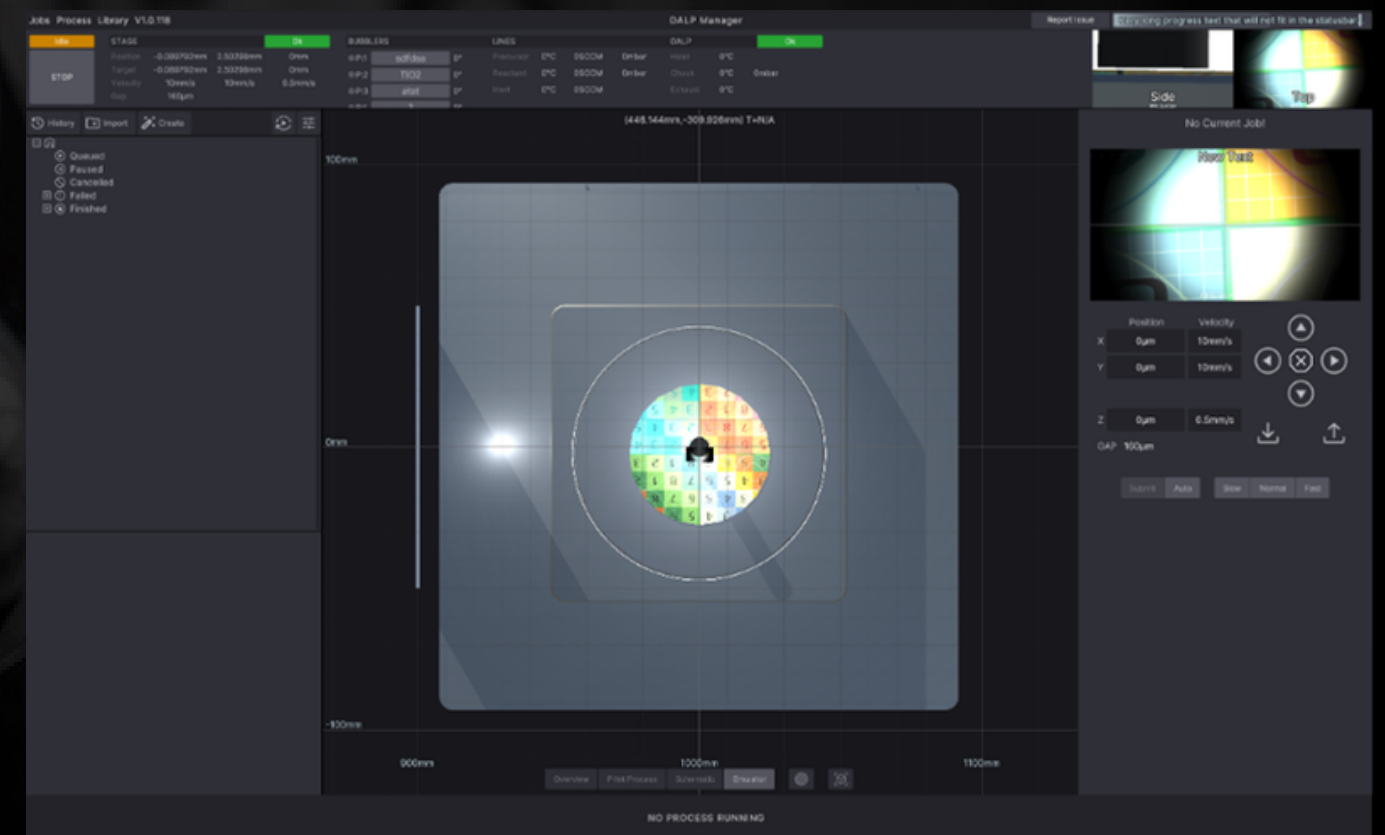


DALP® Pilot Software

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.

CAPABILITIES & KEY ADVANTAGES

Combining atomic-scale precision with software-defined manufacturing, DALP® enables faster innovation, simplified workflows, and seamless scalability from research to production.



Atomic-Scale Precision

Software-defined, localized material processing with high accuracy.

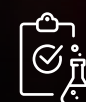
- Localized atomic layer deposition and etching
- Precise, site-specific atomic layer fabrication
- Enables complex micro- and nanostructures, including gradients.



Multi-Material Flexibility

Process and combine diverse materials within a single, flexible workflow.

- Wide range of material compatibility
- Seamless switching between materials and processes
- Supports complex material stacks



Rapid Prototyping & Device Innovation

Accelerate development from concept to fabrication.

- From design to fabrication in hours
- Faster iteration and testing cycles
- Reduced material, process and device development time



Scalable from R&D to Production

DALP® platform technology is scalable across substrate sizes.

- Consistent workflows from lab to fab
- Reduced process transfer complexity
- Supports pilot and volume production



Maskless & Localized Fabrication

Direct-write processing for efficient and flexible manufacturing.

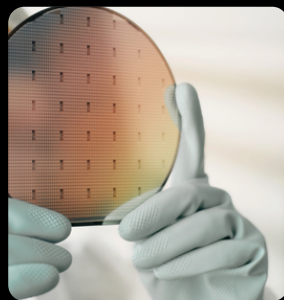
- No masks or lithography required
- Reduced material waste and processing steps
- On-demand, digitally-defined localized fabrication

APPLICATIONS & USE CASES

From materials discovery to advanced manufacturing, DALP® empowers next-generation innovation across semiconductors, MEMS, energy, photonics, aerospace, and beyond.

ADVANCED MATERIALS & DISCOVERY

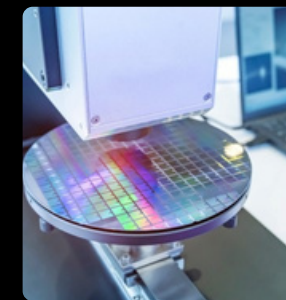
01



- Combinatorial materials screening
- AI-driven materials development
- Custom material stacks

SEMICONDUCTORS & ADVANCED PACKAGING

02



- Camera bonding & surface engineering
- Edge passivation & defect repair
- Chiplet & heterogeneous integration

MEMS & SENSORS

03



- Multi-gas and electrochemical sensors
- MEMS functionalization & hybrid integration
- Multi-material sensor arrays

ENERGY & ELECTROCHEMICAL SYSTEMS

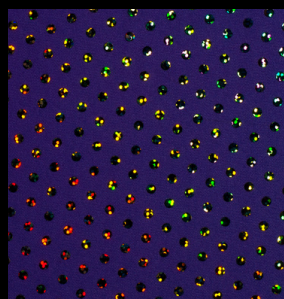
04



- Battery interface engineering
- Hydrogen catalysts & electrolysis
- Solar cell passivation

PHOTONICS & OPTOELECTRONICS

05



- Optical coatings & waveguides
- Metasurfaces & flat optics
- AR/VR and photonic components

AEROSPACE, DEFENSE & SECURE SYSTEMS

06

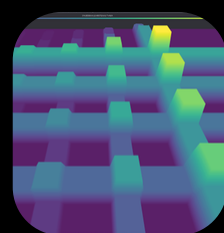


- In-space fabrication & repair
- Microgravity materials discovery
- On-demand manufacturing

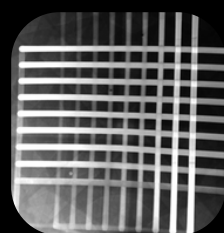
ADVANCED MATERIALS & DISCOVERY

Accelerating AI-driven materials discovery and rapid prototyping through direct-write atomic-scale fabrication.

RAPID COMBINATORIAL MATERIAL SCREENING



Gradient combinatorial fabrication



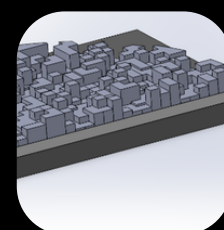
Localized multi-material deposition

Multi-material atomic-scale fabrication for accelerated materials discovery

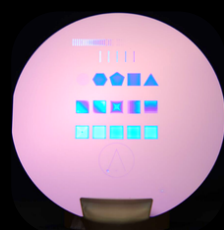
Programmable multi-material deposition for accelerated materials discovery and composition screening. DALP® enables localized fabrication of combinatorial structures with tunable material compositions and gradient architectures.

- Multi-material combinatorial fabrication in a single deposition workflow
- Rapid composition screening for advanced materials development

PROGRAMMABLE SURFACE STRUCTURES



Engineered metasurface structures



Localized functional patterning

Precise surface patterning for advanced functional surfaces

Programmable atomic-scale surface engineering for advanced functional surfaces. DALP® enables selective localized deposition with precise pattern control for metasurfaces and hybrid bonding applications.

- Precise atomic-scale pattern control with selective area deposition
- Flexible multi-material processing for metasurfaces and hybrid bonding

SEMICONDUCTORS & ADVANCED PACKAGING

Enabling higher yield, reliability, and integration in next-generation semiconductor manufacturing through atomic-scale precision.

CAMERA MODULE BONDING & SURFACE OPTIMIZATION



Localized bonding surface optimization



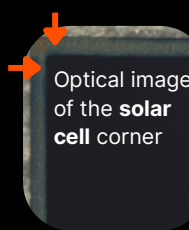
Consumer electronics camera module

Atomic-scale surface engineering for high-yield electronics manufacturing

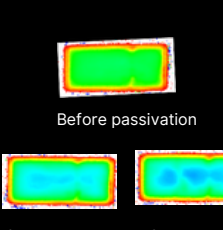
DALP® enables ultra-thin film deposition and rapid process validation for optimized camera module bonding, improving manufacturing yield, accuracy, and production efficiency in consumer electronics.

- Atomic-scale surface tuning for improved bonding
- Rapid screening of multiple bonding conditions
- Reduced scrap and rework in production

LOCALIZED EDGE PASSIVATION



Optical image of the solar cell corner



Before passivation
After passivation
After annealing T1

Localized atomic-layer edge passivation for advanced solar cells

DALP® enables direct and conformal TiO_2 deposition along solar cell edges, eliminating complex multi-step fabrication processes while improving carrier lifetime and device performance.

Higher carrier lifetime →



Result:
Carrier lifetime improvement after edge passivation

- Direct localized deposition without lithography
- Conformal atomic-layer coating on complex edges
- Improved carrier lifetime and device performance

MEMS & SENSORS

Accelerating the development of intelligent, multi-functional sensing systems through precise, multi-material fabrication.

INTEGRATING 2.5D CAPABILITIES IN DEVICE DESIGN



Pt Top electrode -
Vertical

Pt Bottom electrode -
Horizontal

Programmable gradient structures for advanced electronics and sensing

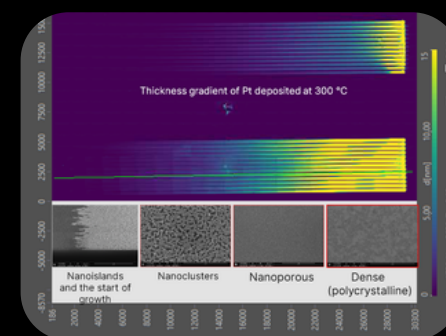
DALP® enables direct-write fabrication of gradient dielectric structures in a single process, supporting rapid prototyping and characterization of advanced device architectures.

- Precise gradient control through programmable deposition
- Seamless integration into sensing devices
- Rapid fabrication and characterization workflows

ENERGY & ELECTROCHEMICAL SYSTEMS

Enabling advanced energy systems through localized materials engineering and atomic-scale process control.

TAILORING FUNCTIONAL PROPERTIES ACROSS SURFACES



Programmable Pt thickness gradients

Programmable thickness gradients for catalyst and electrochemical materials discovery

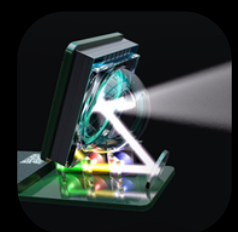
DALP® enables localized gradient deposition with precise thickness control, supporting rapid screening and optimization of catalyst and electrochemical material properties.

- Precise programmable thickness gradients
- Rapid combinatorial materials screening
- Tunable nanostructures for catalyst optimization

ADVANCED PACKAGING FOR MEMS & OPTICS



Deposition Result



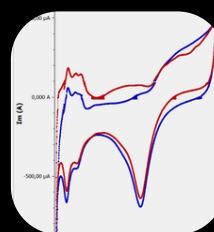
Application example:
Optimized micromirrors

Direct dielectric patterning for suspended MEMS structures

DALP® enables localized dielectric deposition on sensitive MEMS devices without lithography, preserving optical performance while enabling advanced packaging and integration.

- Precise dielectric deposition without resist spinning
- Targeted patterning on suspended MEMS structures
- Preserved optical and electrical device performance

WATER SPLITTING & H₂ GENERATION



Catalytic Activity
Analysis



Localized Pt Coating

Localized Pt deposition for efficient electrochemical catalyst development

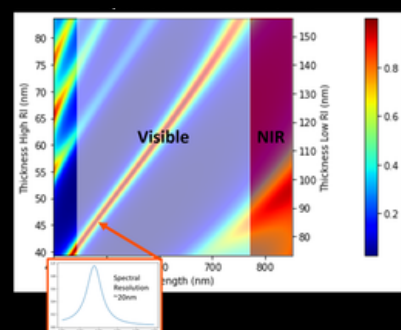
DALP® enables precise platinum deposition on complex substrates, supporting efficient catalyst fabrication and improved electrochemical performance for hydrogen generation applications.

- Precise localized Pt deposition on complex surfaces
- Reduced precious metal consumption through selective coating
- Enhanced catalytic activity and electrochemical performance

PHOTONICS & OPTOELECTRONICS

Advancing next-generation photonic devices through precise atomic-scale material integration and selective deposition.

PROGRAMMABLE OPTICAL FILTER FABRICATION FOR MULTISPECTRAL SENSING



Expected transmittance measurement heatmap

Programmable optical filter fabrication for multispectral sensing

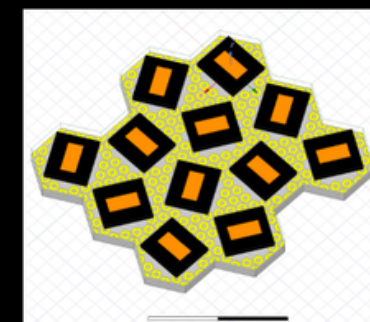
DALP® enables direct fabrication of gradient optical structures for compact multispectral filters with tunable spectral response and high transmission efficiency.

- Precise gradient control for optical filter tuning
- Compact multispectral filter integration
- High transmission efficiency for sensing applications

AEROSPACE, DEFENSE & SECURE SYSTEMS

Enabling flexible, high-precision manufacturing for space technologies and advanced dual-use innovation applications.

RF SHIELDING & ANTENNA MODULE INTEGRATION



Custom RF resonator array

Localized fabrication of custom metal resonators for RF shielding

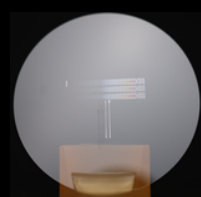
DALP® enables direct deposition of custom RF resonators and shielding structures, improving signal integrity, electromagnetic compatibility, and antenna module integration for aerospace and defense applications.

- Enhanced RF performance through custom resonator structures
- Reduced integration complexity with localized fabrication
- Improved EMI shielding for aerospace and defense systems

DIRECT WRITE OF PHOTONIC DEVICES & WAVEGUIDES



Target multi-material, multi-layer photonic device



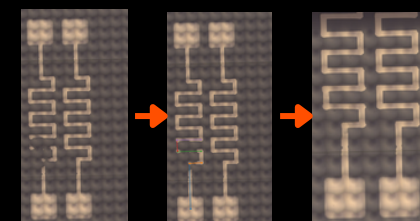
Waveguide testing sample image

Direct-write fabrication of integrated photonic waveguides

DALP® enables maskless multi-material deposition for rapid prototyping of photonic waveguides with precise thickness and geometry control.

- Direct deposition of photonic waveguides
- Rapid prototyping with programmable geometries
- Maskless fabrication with high spatial precision

CHIP SURGERY & DEFECT CORRECTION



Scan & Inspect

Draw a patch

Deposit, scan & inspect

Real-time correction of microfabrication defects

DALP® enables localized repair and correction of deposition errors directly on-chip, reducing material waste and improving manufacturing reliability for advanced electronic systems.

- Real-time identification and correction of defects
- Localized material deposition without process restart
- Reduced rework, waste, and production downtime

INNOVATION-AS-A-SERVICE

At ATLANT 3D, we offer a structured, low-risk pathway from complex challenges to validated, production-ready processes, engaging seamlessly at any stage of your innovation journey.



Proof of Concept

Rapidly validate technical feasibility with minimal risk.



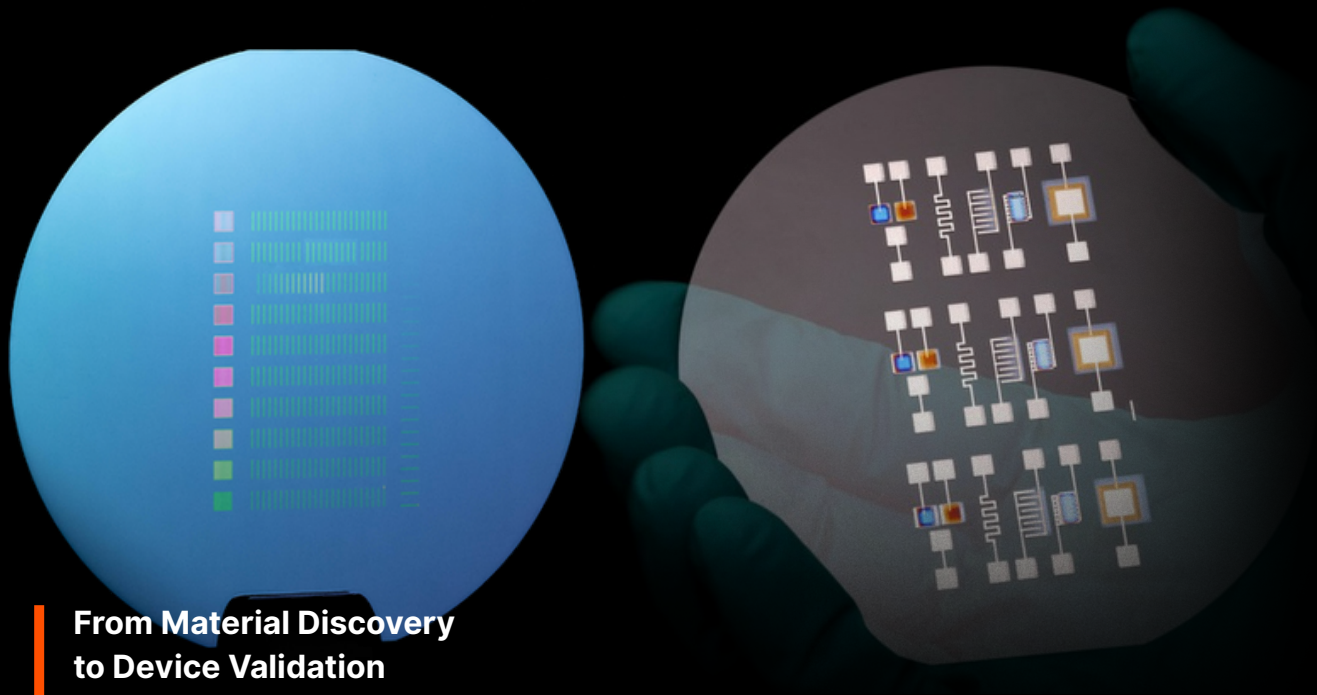
Pilot

Refine and optimise processes for production-relevant conditions.



Joint Development

Collaborate on application-specific innovation and IP development.



From Material Discovery
to Device Validation



Proof of Concept

0.5 – 2 months

We address your material or process challenge through rapid feasibility testing on our DALP® platform, delivering early validation with minimal upfront commitment.

What you get:

- Feasibility validation on your specific use case
- Initial performance data and reference results
- Clear go/no-go recommendation for next steps



Pilot Project

2 – 6 months

A focused engagement to validate and optimise processes on your substrates, ensuring alignment with your target manufacturing environment.

What you get:

- Process validation on customer substrates
- Optimized and application-specific deposition recipes
- Defined pathway to Joint Development or equipment deployment



Joint Development

6 – 12 months

A collaborative program to develop application-specific materials and processes, enabling industrial-scale validation and a clear path to deployment.

What you get:

- Co-funded development programs with shared objectives
- Jointly developed materials, processes, and application IP
- Production-ready validated processes

PARTNER WITH US

At ATLANT 3D, we collaborate with partners across academia, industry, and government to accelerate materials innovation and enable scalable, real-world impact across multiple industries.

TECHNOLOGY & INNOVATION PARTNERSHIPS

Work with us to explore new materials, co-develop processes, and accelerate innovation using our DALP® platform technology.

RESEARCH & ACADEMIC COLLABORATIONS

Engage in joint research, knowledge exchange, and talent development to bridge science and industrial application.

INDUSTRIAL DEPLOYMENT

Integrate ATLANT 3D systems into your development and production workflows to accelerate time to market and scale capabilities.

A-HUB PARTNERSHIPS

Partner with ATLANT 3D to establish or participate in A-HUBs, enabling localized innovation and access to advanced materials infrastructure.



LET’S BUILD THE FUTURE OF MATERIALS INNOVATION TOGETHER.

START THE CONVERSATION

www.atlant3d.com

BUSINESS DEVELOPMENT & SALES

sales@atlant3d.com

SCAN TO
CONTACT SALES



A-HUB & STRATEGIC PARTNERSHIPS

VP of Commercial Strategy and Partnerships
Dr. Bonnie Tsim
bt@atlant3d.com
+44 7920 265 583

ATLANT 3D HQ

Mårkærvej 2B, 2630 Taastrup
Copenhagen, Denmark
+45 2229 0080

