



ADVANCED MATERIALS

AgeNT heaters for all weather Lidar

20 November 2025

*Creating innovative product platforms for a **SAFER, MORE CONNECTED** and **SUSTAINABLE** world.*



Our mission is to develop and
manufacture advanced carbon nano materials
**to create a safer, more connected
and sustainable world.**

Through two CHASM **PRODUCT PLATFORMS**

NTeC[®]

Reinforcing Additives
for sustainable concrete



Conductive Additives
for better Li-ion batteries



AgeNT[®]

Transparent Heaters
for reliable ADAS sensors



Transparent Antennas
for 5G, IoT and beyond



Why are Lidome Heaters needed?

21% of the six million vehicle accidents in the U.S. are weather-related

Lidar Function is impaired by perception error caused by Moisture, Fog, and Ice

Perception error influence is moderate for SAE Level 3 and severe for Level 4

The Best Liar lens is a Clean Lens



Ice and snow on a **LiDAR** lens reduce **reliability** and can disable critical safety functions. Regular cleaning and use of heating or coatings are **key to maintaining optimal sensor performance in winter weather.**



Issue	Effect on Safety	Preventive Action
Ice/snow blocks LiDAR lens	Sensor cannot detect obstacles	Manual cleaning or heated lens
Reduced detection accuracy	Delayed obstacle/vehicle recognition	Regular sensor inspection
"Ghost objects"/false returns	Unreliable system action	Use sensor fusion & clean surfaces
No warning from vehicle	Driver unaware of impairment	Routine manual checks

CHASM's Transparent Heater Solution

Compatible with **Camera, LiDAR & Radar Sensors**

Delivers Rapid, Uniform Heating **@ 12V**

Highly Transparent and **No Visible Microwires**

Highly Robust – **Flexible, Environmentally Stable**

Can be **Mass-produced at Low-cost**

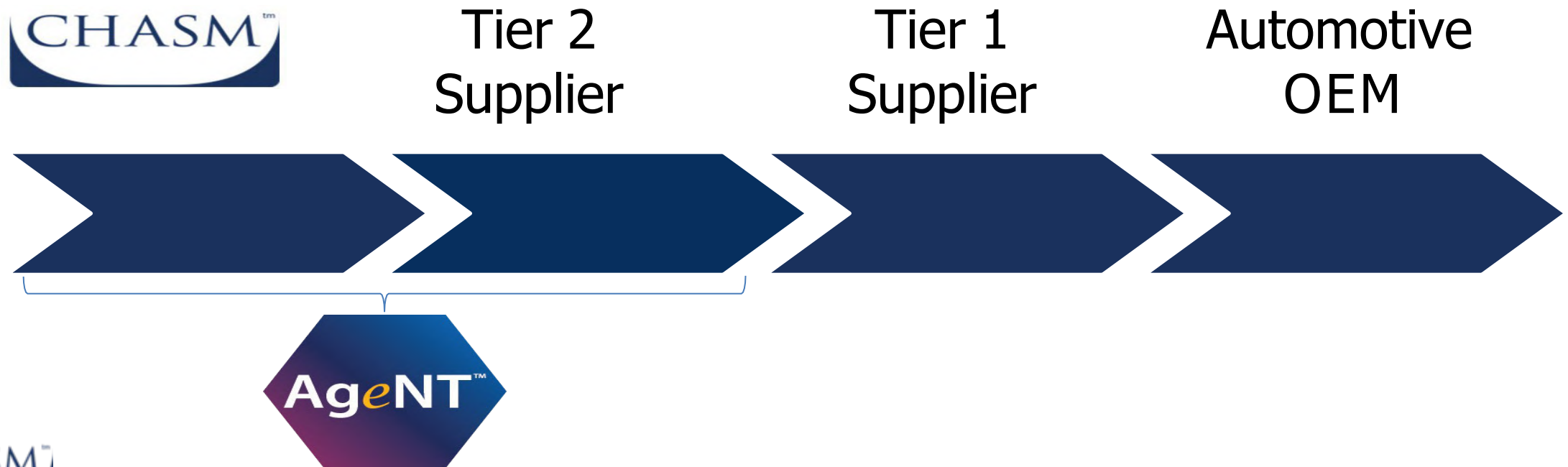
CHASM's Business Model

CHASM is a Materials company delivering materials and heater designs to Tier One and Two Companies

CHASM can Design, Simulate, and produce prototype heaters at our Headquarters in Canton, Ma

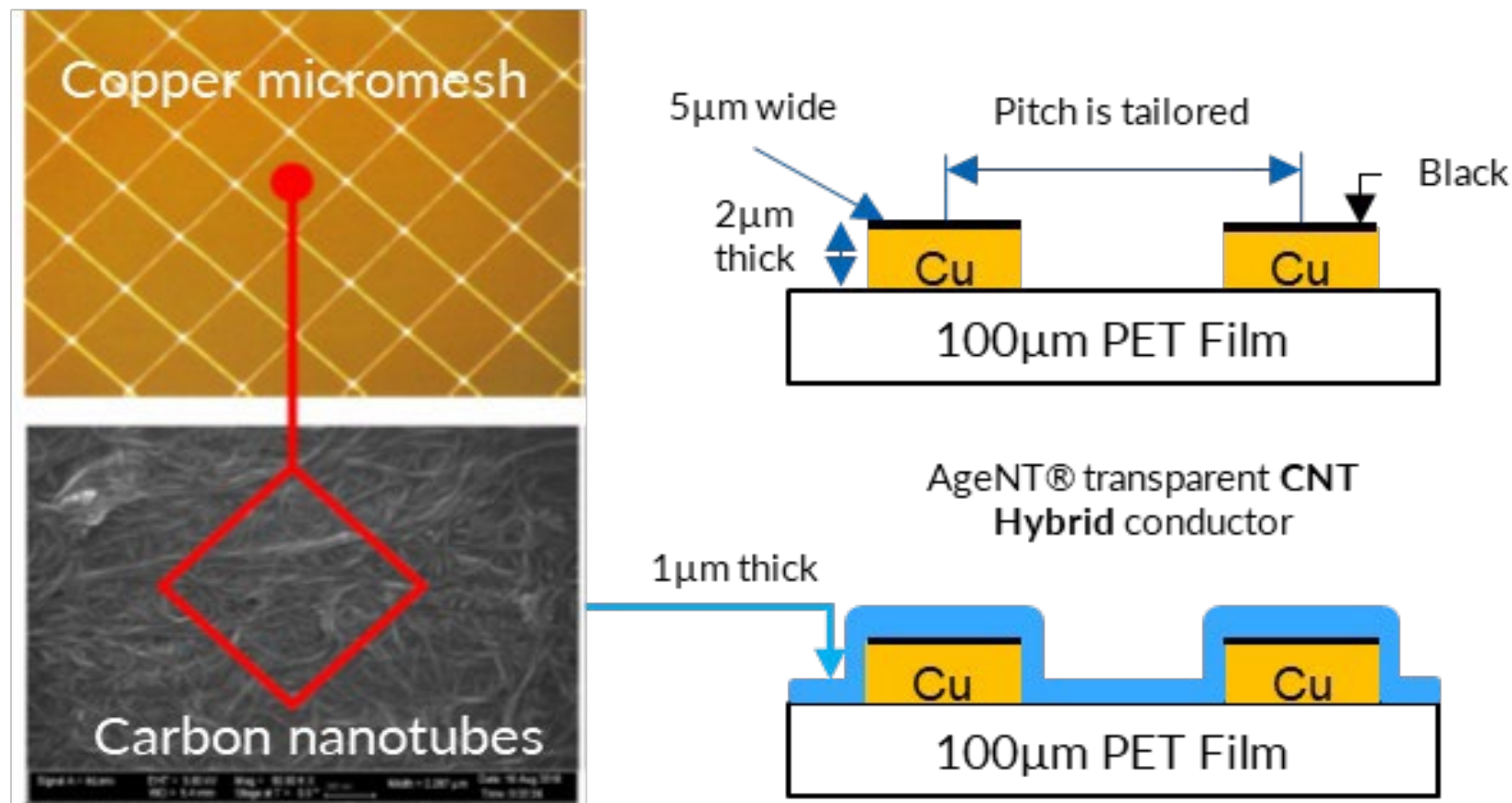
We have IATF 1649 certified partners in the Americas, APAC, and EMEA.

CHASM's Supply Chain Model



CHASM's Technology

AgeNT® Transparent CNT Hybrid Conductors*

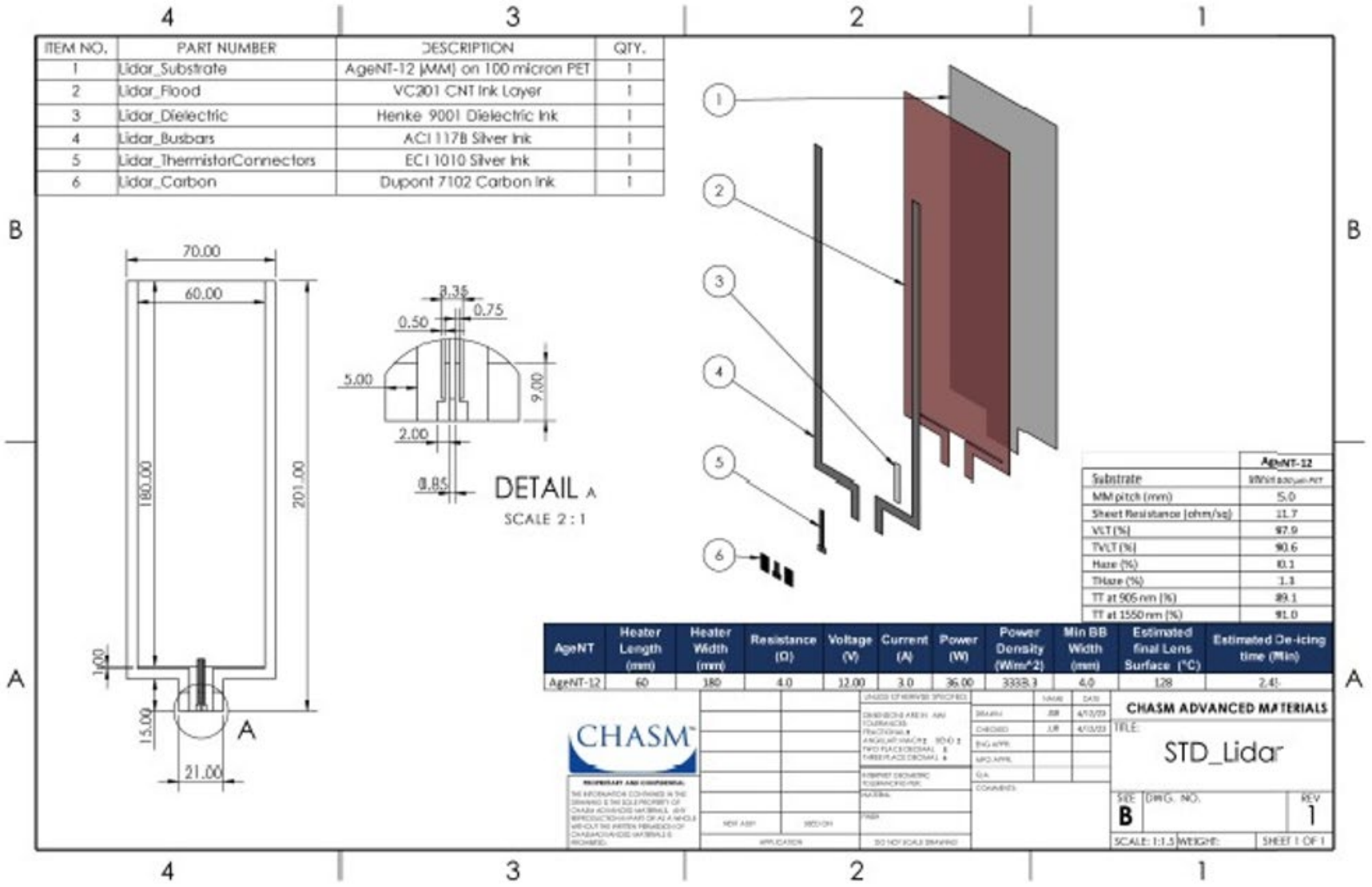


* Proven, Patented Technology

CHASM's Heater Foil Specifications

Heater Foil Solution		De-Icing Time	Without Anti-reflective or other coatings			Loss (dB)
			Total Transmittance (%)			
CNT Hybrid	R_s (Ω/\square)	5-10 min or less at 12V	Camera 550 nm	LiDAR 905 nm 1,550 nm		Radar 77 GHz
AgeNT-12	11.7	✓	90.6	89.1	91.0	0.1
AgeNT-3	2.6	✓	89.9	88.0	88.3	0.6

Generic Lidome Heater Stack up Drawing



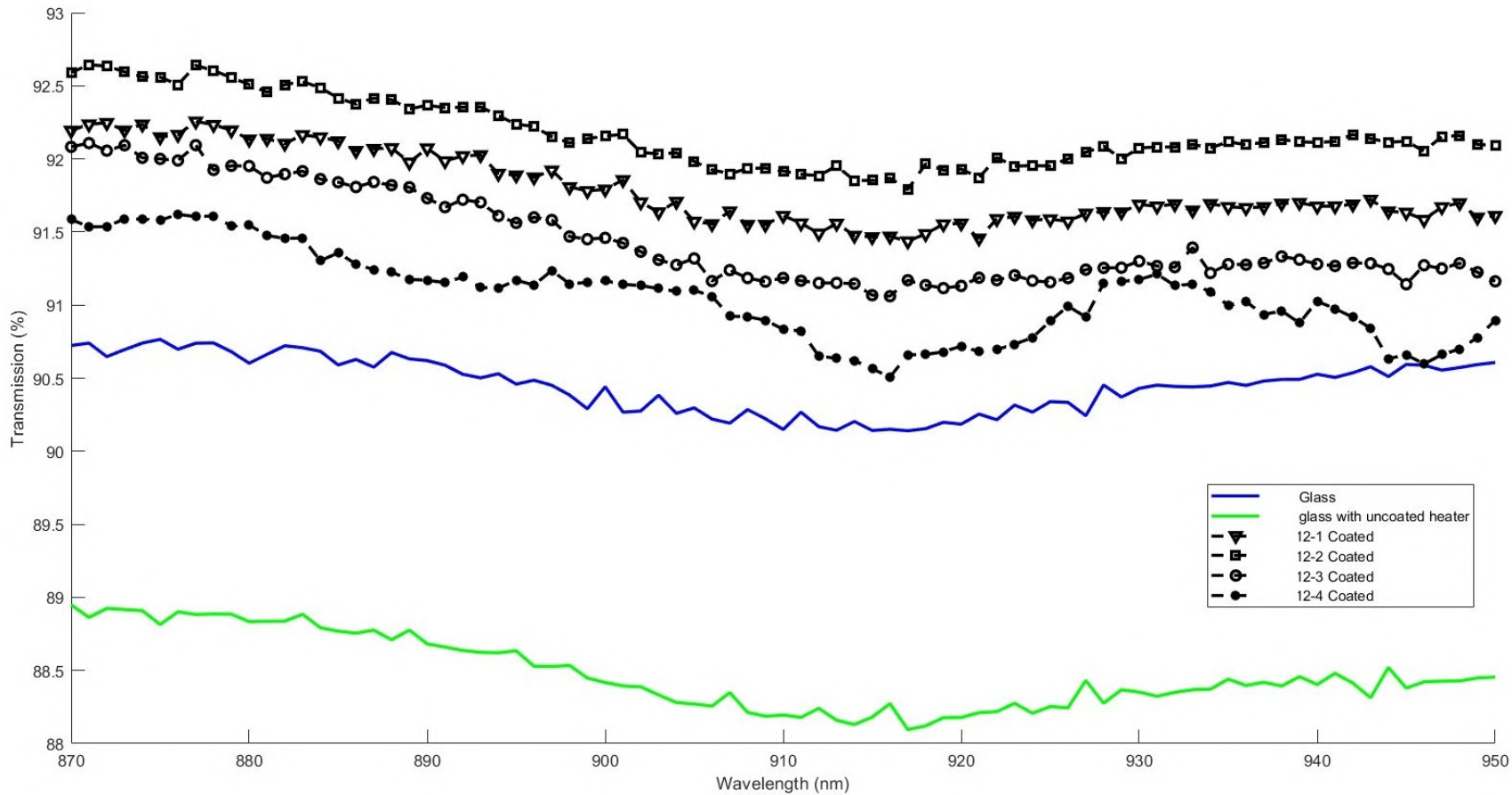
Independent Lidar Test Lab Summary Results

Minimal scattering, reflection, point cloud loss

Lidar performed the same with and without the CHASM Heater and with the Heater powered

AR Coating for LiDAR

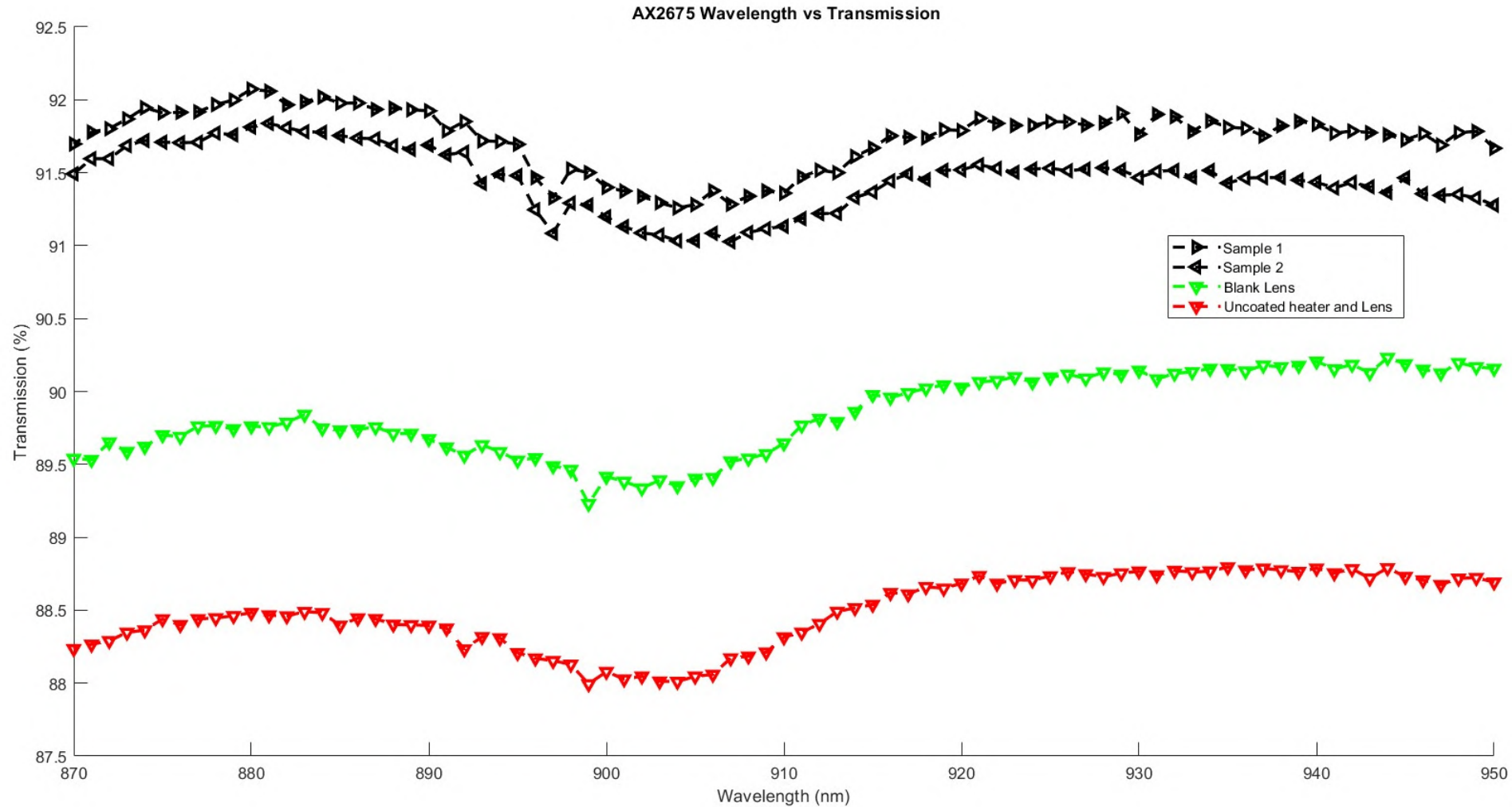
IR transmitting cover glass lidome



Up to 92%
transmission for
905nm w/ Anti-
Reflective
coating

AR Coating for LiDAR

IR transmitting polycarbonate lidome



Over 91%
transmission for
905nm w/ Anti-
Reflective coating

Beam Deflection Analysis

COMPARISON TO REFERENCE (BLANK) SUBSTRATES

Polycarbonate Lidome with and without AgeNT-12 Heater Foil

	BD mean abs (mrad)	delta BD abs (mrad)
Blank PC	0.134	0.106
PC + AS4700	0.1605	0.0845
PC + OCA + AgeNT-12	0.121	0.098
PC + AS4700+ OCA + AgeNT-12	0.1215	0.0905
PC+ AS4700+ OCA + AgeNT-12+ AR	0.181	0.0805

Glass Lidome with and without AgeNT-12

	BD mean abs (mrad)	delta BD abs (mrad)
Blank Glass	0.02	0.007
Glass + OCA + AgeNT-12	0.035	0.0115
Glass + OCA + AgeNT-12 + AR	0.018	0.026

COMPARISON WITH HEATING

Polycarbonate Lidome with AgeNT-12 Heater Foil Powered on and off

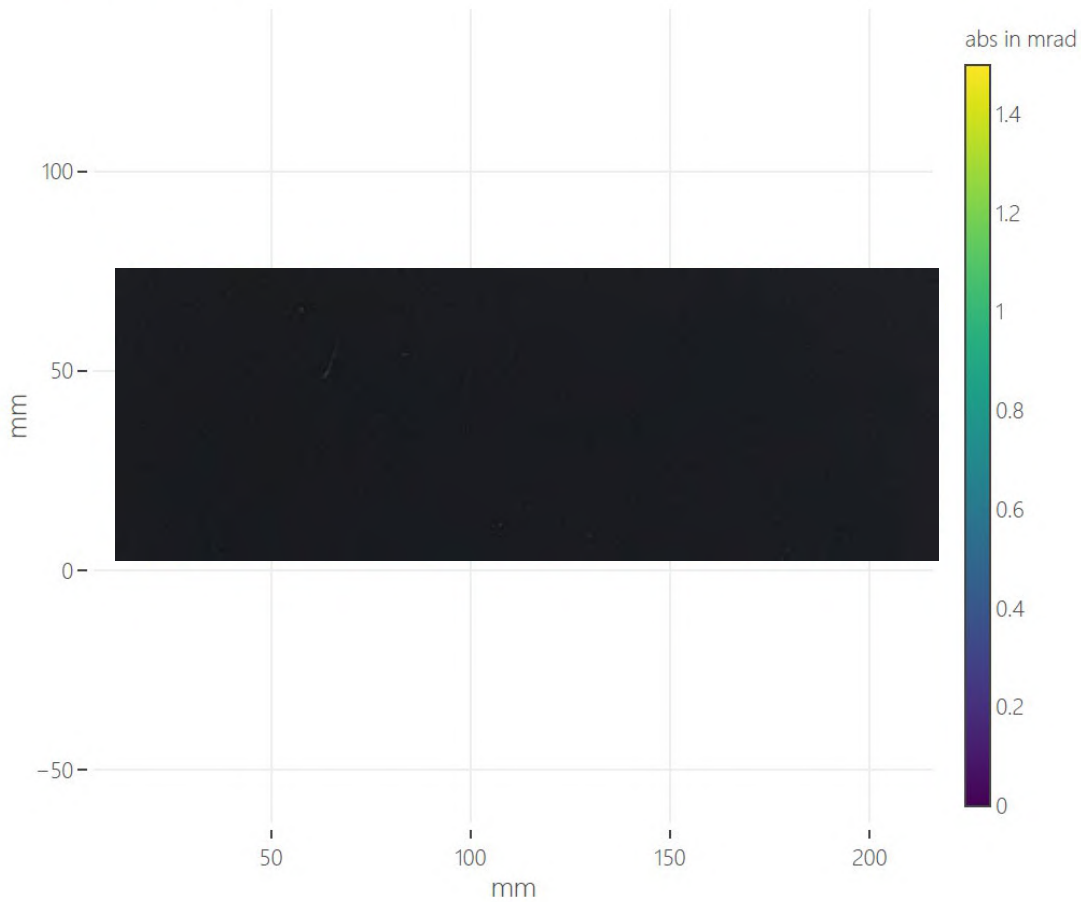
	BD mean abs (mrad)	delta BD abs (mrad)
PC + OCA + AgeNT-12 + AR (Unheated)	0.191	0.184
PC + OCA + AgeNT-12 + AR (Heated)	0.166	0.159
PC + OCA + AgeNT-12 (Unheated)	0.191	0.14
PC + OCA + AgeNT-12 (Heated)	0.223	0.125

Glass Lidome with AgeNT-12 Heater Foil Powered on and off

	BD mean abs (mrad)	delta BD abs (mrad)
Glass + OCA + AgeNT-12 (Unheated)	0.047	0.007
Glass + OCA + AgeNT-12 (Heated)	0.042	0.009

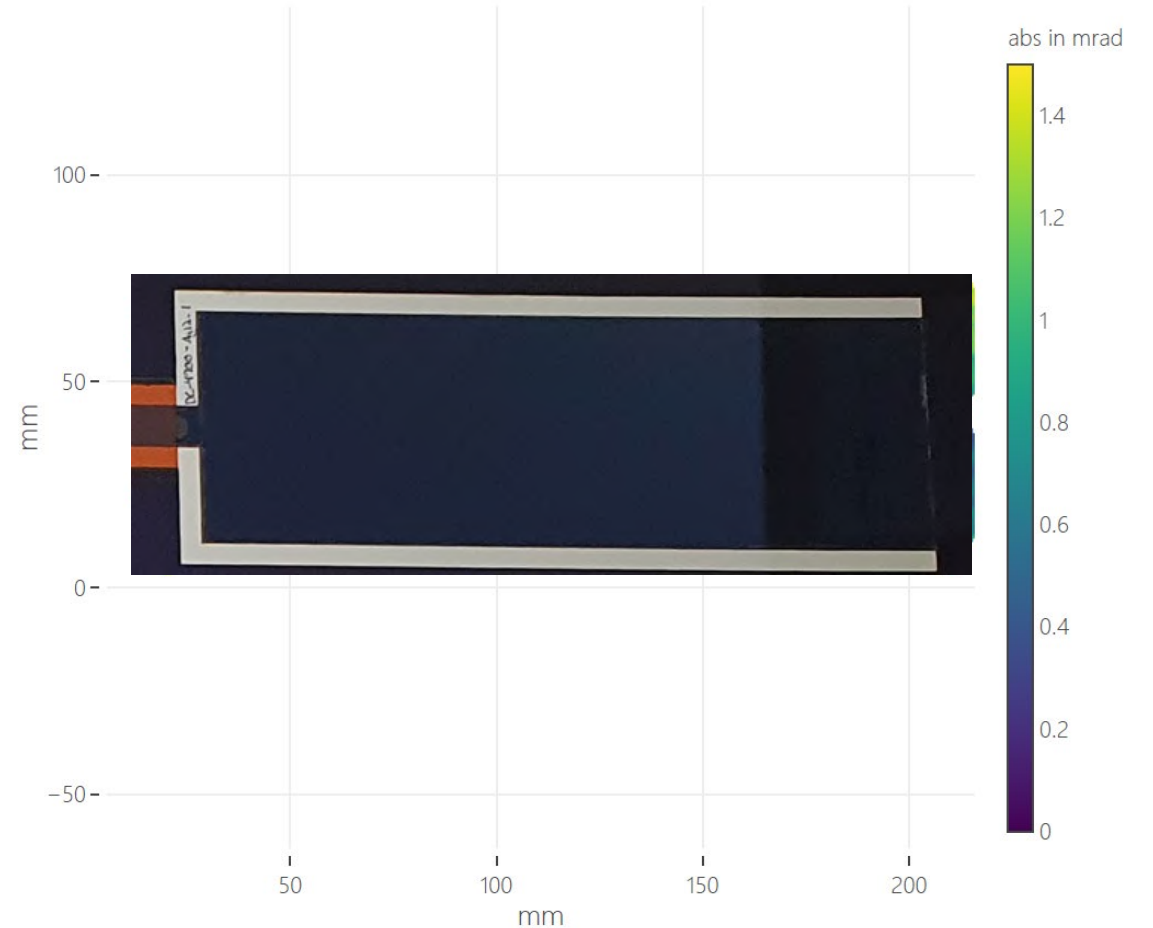
Beam Deflection Analysis

Deflection magnitude 0.0 mrad























Covestro AX2675 + Momentive AS4700

Deflection magnitude 0.1 mrad



Covestro AX2675 + Momentive AS4700 + CHASM AgeNT-12

The Competition

	AgeNT-12	Microwire	Peripheral	CNT
Power Density @ 12V				
Aesthetics				
ADAS perf (Camera)*				
ADAS perf (LiDAR)*				
ADAS perf (Radar)*				

* ADAS sensor performance when Heaters are designed for **12V** systems

STRONG IP & TECHNOLOGY

Solution platform approach using our core IP & technology

40+ Patents plus
several tightly
held trade secrets

1

World's Best Carbon Nanotube (CNT) Technology

- ✓ **Precise control of CNT structure** for transparent printed electronics and ultra permeable RO membranes.
- ✓ **Lowest-cost and most scalable process** for mass production of CNT additives for sustainable Cement and better Lithium batteries.

2

Unique Ability to Integrate Nanotubes into Applications

- ✓ Nanotube product solutions, tailored for target applications, with **superior performance, lower cost and greater ease of use:**
 - Self-dispersing additives for sustainable cement and better Lithium-ion batteries;
 - Transparent heater foils that can be molded into 3D shape headlight lenses;
 - Peel & stick transparent antennas for glass windows in cars & buildings.

LEADERSHIP TEAM

Experienced and talented team in place to accelerate growth



David Arthur

Co-Founder and CEO

40+ years advanced materials industry experience, having served as CEO of SouthWest NanoTechnologies, CEO of TPI Composites, VP Strategic Programs of Helix Technologies, VP Engineering of AT Cross, R&D Director of Rogers Corp. MS in Chemical Engineering and MBA. Recognized as a leader in the nanotechnology field with 30+ patents and a proven track record of innovation.



Michael Fetcenko

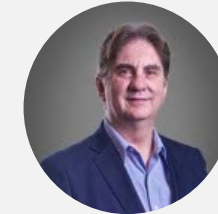
Chairman

40+ years battery industry experience, having served as Executive Chairman for Sion Power (advanced Li-ion batteries), President of Ovonic (NiMH batteries) and Managing Director of BASF Battery Materials. With 70+ patents and 100+ publications in the NiMH and Li-ion field, recognized as a thought leader and an expert in patents, licensing, and commercialization.



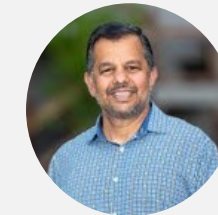
Bob Praino

Co-Founder and COO



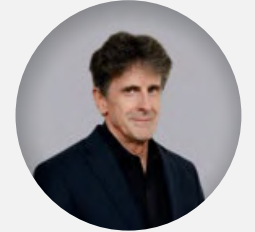
Dr. Ricardo Prada Silvy

CTO



Dr. Hari Harikumar

VP Advanced Carbons



David Rainey

CFO



Ina Jiang

VP Marketing



Dan Skiba

VP Printed Electronics



ADVANCED MATERIALS

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