



Ascent Solar Technologies, Inc.

Corporate Presentation

March 2024



Forward-Looking Statements

Certain statements in this presentation may constitute "forward-looking statements" within the meaning of the Private Securities Litigation Reform Act of 1995. These forward-looking statements relate to a variety of matters, including, without limitation, statements related to the Company's expected revenue opportunities in 2024 and 2025.

By their nature, forward-looking statements involve risks and uncertainties because they relate to events, competitive dynamics, and regulatory developments and depend on the economic circumstances that may or may not occur in the future or may occur on longer or shorter timelines than anticipated.

These forward-looking statements are made based on the current beliefs, expectations and assumptions of the management of Ascent and are subject to significant risks and uncertainty. Investors are cautioned not to place undue reliance on any such forward-looking statements. All such forward-looking statements speak only as of the date they are made, and Ascent undertakes no obligation to update or revise these statements, whether as a result of new information, future events or otherwise. Although Ascent believes that the expectations reflected in these forward-looking statements are reasonable, these statements involve many risks and uncertainties that may cause actual results to differ materially from what may be expressed or implied in these forward-looking statements. For a further discussion of risks and uncertainties that could cause actual results to differ from those expressed in these forward-looking statements, as well as risks relating to the business of Ascent in general, see the risk disclosures in the Annual Report on Form 10-K of Ascent for the year ended December 31, 2023 and in subsequent reports on Forms 10-Q and 8-K and other filings made with the U.S. Securities and Exchange Commission by Ascent.

In addition, even if our results of operations, financial conditions and liquidity, and the development of the industries in which we operate are consistent with the forward-looking statements contained in this presentation, they may not be predictive of results or developments in future periods.

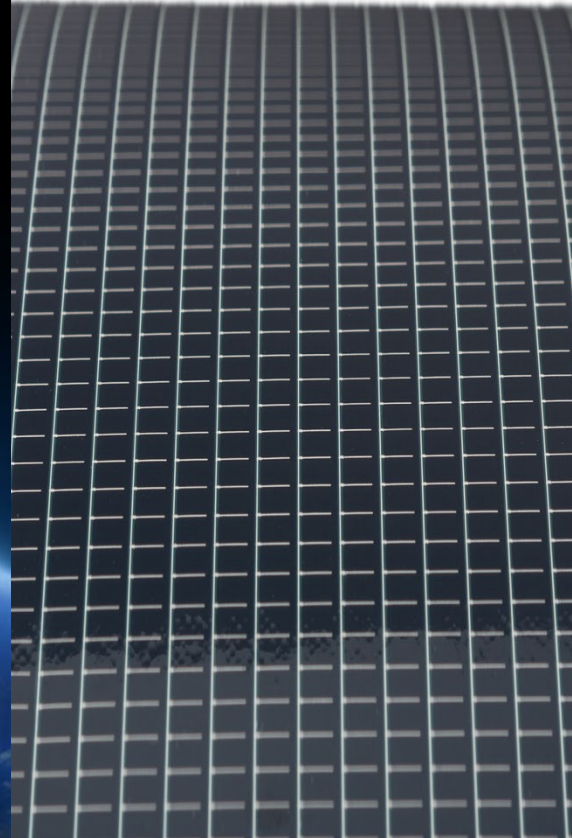
This investor presentation provides basic information about Ascent. Because it is only a summary, this document does not cover all the information that should be considered before investing in our securities. You should read carefully the factors described in the "Risk Factors" section of our Annual Report and subsequent reports to better understand the risks and uncertainties inherent in our businesses and any forward-looking statements.

Ascent Solar Technologies, Inc. (ASTI)

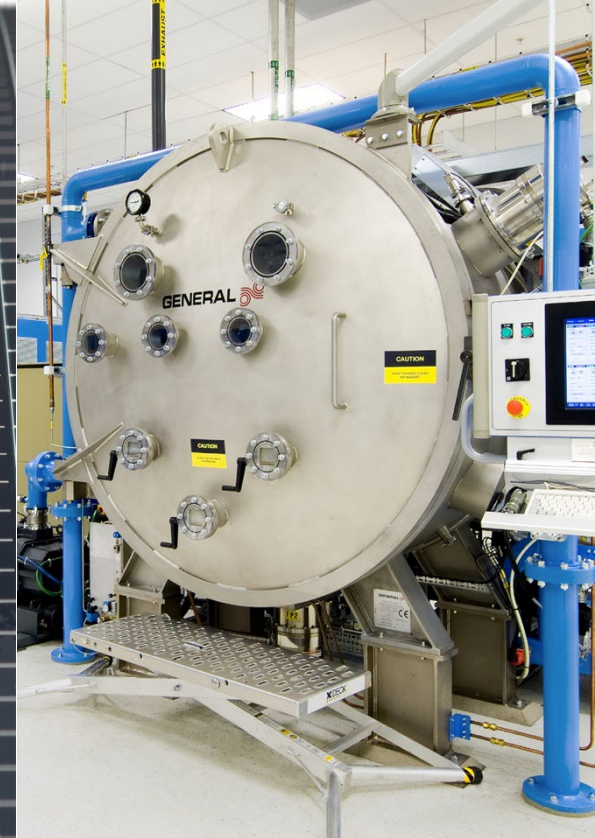
Ascent Solar delivers
lightweight, flexible and
reliable solar power modules
to the world's leading
engineering organizations.



ASTI is the leading provider of feather-weight, flexible, monolithically-integrated thin-film solar modules for the Space/Near-space, UAV/Defense, Agrivoltaic and Specialty markets.



The revolutionary attributes and superior performance of ASTI's photovoltaic (PV) modules are made possible through a proprietary CIGS (Copper-Indium-Gallium-Selenium) on polyimide substrate process and continuous process and technology improvements.



ASTI's HQ and nameplate production facility is based Thornton, Colorado USA, where we have over a decade of manufacturing experience.

Investor Opportunity

Markets for ASTI's products have accelerated in the last 12 months and are expected to grow in the next 5 to 8 years. ASTI is in early discussions with several parties now, which could potentially materialize into more than \$80 million in revenue by 2025.

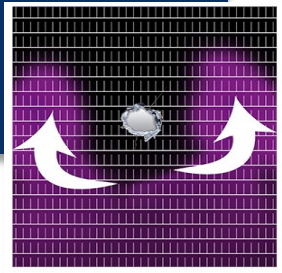
- **Targeted industry approach**
 - Aerospace and Space
 - Agri-voltaics
- **Profitable high growth targeted markets**
 - Could generate \$28 to \$35 per watt for terrestrial and \$30 to 45 per watt for space products
 - Projected satellite power needs are 10 MW per year now and growing to +80 MW per year in the next 6 to 7 years with existing industry capacity at 4 to 6 MW
- **Recent manufacturing and operational improvements have generated high efficiency**
 - Increased efficiency in CIGS technology from 10.8% to 17.73% due to addition of rubidium fluoride and improved manufacturing processes
 - ASTI fully-encapsulated arrays are now generating more than a watt per gram of integrated array panel, creating a notable differentiator between Ascent and other solar manufacturers active in the space tech market
- **New Executive Team focused on elevated margin and high growth industries**



ASTI's Thin Film Outshines the Competition

Durable

- ▶ Patented cell design allows a greater area of the solar module to produce power.
- ▶ The proprietary design provides system redundancy and unchallenged durability – in the event of surface damage or partial light conditions, ASTI PV continues to generate power.



Reliable

- ▶ TRL 9 in 2023
- ▶ Low part count for modules and arrays drastically reduces points of failure and increases system and unit reliability
- ▶ ASTI's thin-film PV is durable and reliable making it a preferred method of generating renewable power in challenging environments like Space and near-Space.

Lightweight

- ▶ ASTI panels are lighter than feathers and have a power to weight ration that makes them far superior to other solar products available for large scale use in space due to lower launch costs.

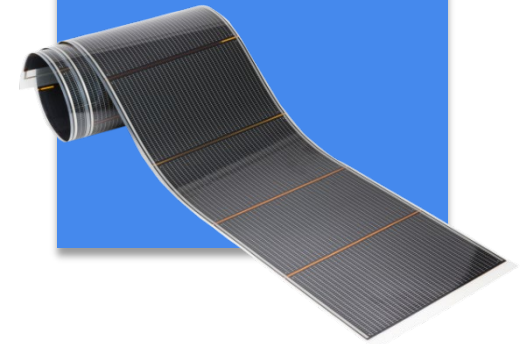


Fit for Purpose

- ▶ Simplified electrical and mechanical construction
- ▶ Customized cell shapes easily integrated into manufacturing process
- ▶ So lightweight, ASTI panels can be installed on satellites with minimal impact on flight performance.

Flexible

- ▶ Rollable-deployable configurations increase packing efficiency in launch vehicles (further lowers launch cost)
- ▶ >30° radius of curvature – better than Crystalline and Gallium Arsenide technology.



ASTI PV vs Other Technologies

	Ascent SOLAR	Amorphous Silicon	Monocrystalline & Polycrystalline	Gallium Arsenide
Highly Flexible	✓	✓	✗	✗
Shatterproof	✓	✓	✗	✗
Easy to customize Voltage & Current	✓	✓	✗	✗
Price per Watt per Kg	✓	✗	✗	✗
Non-Traditional Shapes Available	✓	✗	✗	✗
Long-term Power Stability	✓	✗	✓	✓
Specific Power	HIGH	LOW	MEDIUM	HIGH
Price Per Watt	💰 💰	💰 💰	💰	💰 💰 💰 💰 💰
Integration Complexity	EASY	EASY	DIFFICULT	MODERATE

Sector: Aerospace/Space

Space PV Market (Demand and Attributes)

- ▶ Current space solar market demand is 7 to 10 of MW per year.
- ▶ The space solar market is expected to reach 60 to 100+ of MW per year of demand before 2030
- ▶ Robust supply chain w/ minimal throughputs
- ▶ Ultra-lightweight, superior module specific energy (2.1kW/kg)
- ▶ Demonstrated to be optimal for enduring the harshness of the space environment's radiation, vacuum temperature extremes, and other hazards.

Competitor's Lack Capacity/Capability to Meet Market Need

- ▶ Sales prospects have indicated that competing space PV providers currently have lead times exceeding 12 months and prices exceeding \$100 per watt with highest performance triple junction cells fetching more than \$150 per watt.
- ▶ The space industry's leading PV providers have an estimated 3 to 4 MW per year in total of annual production capacity
- ▶ Inadequate supply chains for key materials such as gallium arsenide and space rated cover glass are weaknesses/threats that ASTI's solution negates.

The Space Industry presents a premium market opportunity with unmet customer demand where ASTI products are highly differentiated at +17% efficiency, but +17% has to be met on production scale manufacturing

¹ *The Federal Communications Commission (FCC), a regulatory approver for spacecraft being launched to orbit, is approaching approval of licenses for over 100,000 satellites to be launched. It is known from ASTI sales relationships that the average power generation requirements per satellites is 1 to 10 kW. Thus, a bottoms up market analysis would project current market demand backlog could exceed 100MW*



Satellite Power

Solar Sail Development

High Voltage Solar

High Altitude Airships

Power Beaming

Titan™

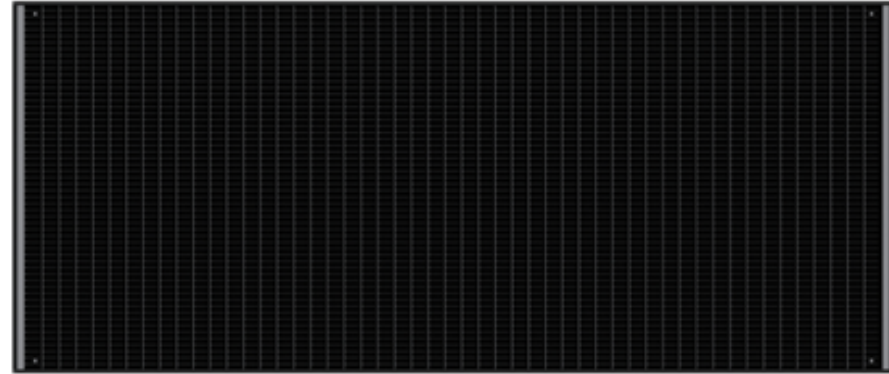
Optimized for Space

First CIGS Solar Module Engineered for Peak performance in Space

- ▶ Optimized Cell area to comply with neutral magnetic moment requirements
- ▶ Specific power of 2000+W/kg bare
- ▶ Larger module size results in fewer connection points required; reduces system risk
- ▶ Titan based arrays capable of high voltage – +300 volts – for propulsion systems

Titan Bare Module

MODEL B-006-110-342



TITAN FULL		TITAN MID	
Pmax	16.5 W	Pmax	14.1 W
Voc	34.2 V	Voc	34.2 V
Vmp	26.1 V	Vmp	26.1 V
Isc	0.722 A	Isc	0.617 A
Imp	0.633 A	Imp	0.541 A
Power / Weight	2100 W/kg	Power/Weight	2100 W/kg
Module Size	336 mm X 289 mm	Module Size	336 mm X 247 mm

Test Conditions: 25C, 1353 W/m², AM0

All electrical values typical, ±10%, All dimensions ± 1.0mm

Future Growth Opportunities Space

There are a few large constellations consisting of thousands of satellites that are currently being fielded. ASTI has been researching the prospective opportunities, mapping out corporate enterprise and opportunities, and charting out sales approaches.

- **Company A - Megaconstellations**

- Number of units: +2,500 Satellites in initial constellations
- Power Needs: ~5kW/Satellite (~16MW for the constellation)
- Current material: Undisclosed, but known to be 12 to 14% efficient at end of life, but voltage output lags ASTI's Titan product by 15 to 20%
- ASTI has small NRE project with Company A

- **Company B - Megaconstellations and Constellations**

- Large satellite production facility, pursuing additional megaconstellations
- 85% vertically integrated, but not power generation, potential for ASTI "Fables" production being added to their requirements
- Number of units: +8,000 satellite per year production capacity, estimated 3MW in total

- **Company C - Super Satellites (1 to 3 MW)**

- Number of units: 648
- Power Needs: undisclosed



Sector: Agrivoltaics

Dual Use Innovation



Market Type

- ▶ Industrial Scale
-

Margin

- ▶ Low-Medium
-

Value Proposition

- ▶ **Lightweight**

- 68.4 g/m

- ▶ **Flexible**

- 3mm radius of curvature
- Suitable for applications where rigid panels are inappropriate

- ▶ **High Specific Power**

- Highest available W/kg
-

Federal Funding Opportunity - 2024

- ▶ DE-FOA-0003057 – Silicon Solar Manufacturing, and Dual-use Photovoltaics Incubator

32 years of Awards & Validation



▶ Ascent Solar spun off from ITN (2005), New HQ & Factory opens (2007)



Defence:

▶ Passed US Military Standard 810G



UAV:

▶ Market Launch, Silent Falcon



Space:

▶ Selected by JAXA for PowerSolar Sail to Jupiter



Space:

▶ Selected for NASA MISSE-X project



Aerospace:

▶ Selected for Sceye High-altitude Airship

1990 - 2005

2005-2007

2010

2011

2014

2015

2016

2017

2018

2021

2023



▶ Thin-film dev begins at Martin Marietta (1990), ITN Energy created (1992) to develop thin-film on polyimide



R&D 100 Magazine

▶ 100 Most Innovative Technologies



Time Magazine

▶ 50 Best Innovations in the World



R&D 100 Magazine

▶ 100 Most Innovative Products



ISO

▶ ISO9001:2015 Quality Management manufacturing organization



SBIR Phase I

▶ Collaboration with Above Orbital on Phase I for AFRL

TRL 9 & 17.7% Efficiency

▶ Achieved TRL 9 with Momentus Vigoride 6 Flight
▶ Technology Improvement to 17.7%

Robust Patent Portfolio Protects Technology Investment

	Ascent
Granted Patents	US & Foreign
Granted (Active)	13
Granted (Inactive)	14
<i>Granted (All)</i>	27
Published Patent Applications	
Published Patent Applications (Active)	7
Published Patent Applications (Inactive)	30
<i>Published Patent Applications (All)</i>	37
Total Granted & Applied Patents as of Nov 2023	64



Revenue Potential

2024	In Dollars
Q2	\$1.0 million - \$1.2 million
Q3	\$3.0 million - \$5.0 million
Q4	<u>\$5.0 million - \$7.0 million</u>
Total	\$9.0 million - \$13.2 million
2025	\$50.0 million - \$80.0 million

- ▶ Revenue is derived from four different segments – a) Mega-constellation satellite companies, b) Space power production companies, c) Defense contractors, and d) Agri-voltaic companies
- ▶ Customers are under NDA, therefore we are not allowed to disclose names
- ▶ This revenue is not under contract and discussions are in different stages from placing small orders to test (with orders to follow test phase from 5 to 100MW) to multiple discussions around technology and production schedule

Our statements about future revenue opportunities are forward-looking statements based on the current beliefs, expectations and assumptions of the management of Ascent and are subject to significant risks and uncertainty. Revenue opportunities would require additional capital fund raising estimated to be at least \$7.5 million in 2024 and \$5 million in 2025.

ASTI Leadership Team

CEO - Paul Warley



Paul has over 35 years of experience and joined ASTI as CFO in December 2022 and was promoted to CEO in April 2023. Prior to Ascent, Warley was president of Warley & Company LLC, a strategic advisory firm from 2015 to 2022 – providing executive management services, capital advisory, and M&A to middle-market companies in the service, construction, technology, oil and gas, clean energy, food, retail, and green building sectors. While at Warley & Company from 2018 to 2019, he was engaged as CEO and CFO of 360Imaging, a provider of products and services for implant surgery and digital dentistry. From 2011 to 2015, Warley served clients in the alternative energy industry as a managing director and chief compliance officer with Deloitte Corporate Finance. From 1997 to 2011, Warley was managing director and region manager for GE Capital. From 1984 to 1997, Warley served as senior vice president with Bank of America and Bankers Trust. He also was a Captain in the US Army and was honorable discharged in 2002.

COO - Bobby Gulati



Bobby has over 30 years of executive leadership experience in engineering and manufacturing roles. Mr. Gulati joined Ascent in February 2012 as Head Equipment Engineer and was promoted to Director of Engineering, Chief Information Officer and in April of 2023 COO. From 2010 to 2012 Mr. Gulati was the Director of Equipment Engineering for Twin Creeks Technologies, an amorphous silicon solar manufacturing company, and was responsible for the operations of the 5MW solar cell manufacturing facility in Senatobia, Mississippi. From 2001 to 2010, Mr. Gulati was the co-founder and President of TriStar Systems, a manufacturer of automated manufacturing and assembly equipment for the solar, aerospace and disk drive industries. From 1992 to 2000, Mr. Gulati was the co-founder and COO of the publicly traded company NexStar Automation, whose focus was designing and building automated production equipment. Mr. Gulati earned his B.S. degree in Electrical Engineering with a minor in Computer Science and Robotics from the University of Colorado, Boulder.

CFO - Jin Jo



Jin Jo, CFO, has over 20 years in accounting. Ms. Jo joined the Company in June 2021 as VP Finance and promoted to CFO April 2023. From 2015 to 2021, Ms. Jo was the head of technical accounting of Empower Retirement, a financial services company, where her primary focus was accounting research for complex new products and new accounting standards implementation on International Financial Reporting Standards and US GAAP. From 2011 to 2015, Ms. Jo was an Inspection Specialist at the PCOAB where she assessed auditor compliance with audit professional standards. Ms. Jo started her career in public accounting, spending 11 years in the audit and assurance practice serving both public and private companies. Ms. Jo is a certified public accountant in the state of Colorado and earned her B.S. degree in Business Administration from the University of Colorado, Boulder.