



Robot for solar

Fully Automated PV Module Installation Using Robotics

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Automatic PV
Module Installation



Automatic Cleaning
of PV Module



Unmanned Intelligent
Power Plant Inspection

Why Automation?

PART 1

SYSTEMS



Why Is Change Needed?



High Labor Costs & Labor-Intensive

High labor costs

Large labor demand with difficult management



300 AED/d



600 AUD/d



450 EUR/d



300 USD/d



Harsh Working Environments

Low operational safety

Restricted by natural geographical conditions



Extreme high temperature



Extensive uninhabited areas



Remote areas



Low Assembly and Operation & Maintenance Efficiency

Mismatched supply and demand rhythm

Widespread challenges in installation and inspection



Slow installation and delivery



Uneven quality levels



Inefficient O&M and inspection



Imbalanced distribution of service resources

LEAPTING Robotic Solution



Application
Scenario

PV Installation Business



Module Mounting



Material Handling



Structure Installation



Module Cleaning

PV Cleaning Business



Product
Portfolio

Autonomous Navigation Module Mounting Robot



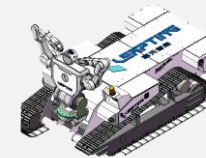
Scaling phase initiated
following Product-Market Fit
(PMF) validation

PV Forklift Robot



Commercialized
Phase

PV Operational Robot



R&D Phase

PV Module Cleaning Robot



Commercialized Phase
Successfully deployed in
multiple PV plants worldwide



Technical
advantages

Installation time:
30s/module

3x-5x efficiency
improvement

700+ daily
installations

50% cost reduction

Precision operation
achieved

Full-process field
automation

Proprietary universal
chassis

Unified software
architecture

Robot Replacement

The market for robotic solutions in PV installation, cleaning, and operation & maintenance is taking off.

Connect the Supply-
Demand Gaps

Policy Drive

ESG Requirements



Cost Advantage

Cycle and Quality
Advantage

Safety Guarantee



MMR: Module Mounting Robot



World's First to Launch Industry's Only Fully Automatic Solution with Mass Production and Delivery

1

30s / 1 module

Single module installation speed

2

3 – 5 times

Efficiency improvement over manual labor

3

700 + ↑

Daily average Installed modules

4

25%

Project construction period can be shortened by

5

< ± 1mm

Installation accuracy error:

AFR(Auto-forklift Robot)



Autonomous Material Handling for Challenging Outdoor PV Sites

GNSS-RTK + Laser SLAM

High-precision autonomous navigation with multi-sensor perception

Intelligent Pallet Recognition

Detects pallet loading status and supports EUR/EPAL and JIS standards

Tracked Chassis

Low ground pressure
Stable across complex terrain

360° Safety Protection

LiDAR, warnings, and multi-level braking



AGV Cleaning Robot



Fully Autonomous and Adaptive Cleaning for Utility-Scale PV Plants

SLAM Navigation

Automatic path planning and navigation for unmanned cleaning

Dry & Wet Cleaning

Supports both dry cleaning and water washing

Adaptive 6-DOF Robotic Arm

Automatically adjusts to module height and tilt

>99%

Dust Removal Rate

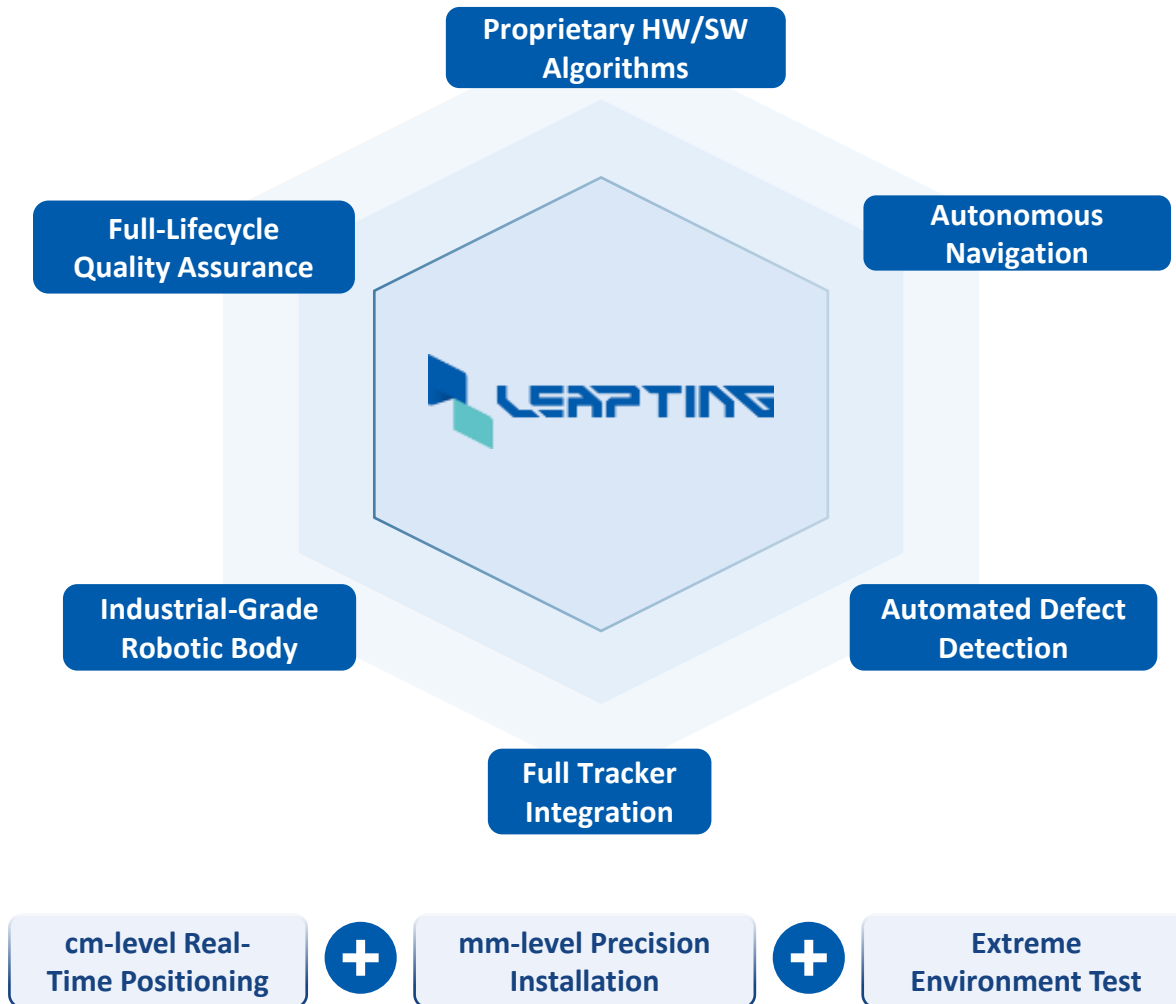
Beyond Equipment

PART 2

SYSTEMS



Integrating Multiple Core Technological Advantages, Setting the Benchmark for the New Generation of Intelligent PV Robots



Core Technology

Proprietary Algorithms

- ✓ Hardware, software and algorithms for the cleaning equipment control system with independent intellectual property rights.

Autonomous Navigation

- ✓ Equipped with **omnidirectional sensors** for autonomous positioning and intelligent navigation.

Auto Defect Detection

- ✓ Combined with IR imaging, it achieves **fully automated component defect detection**, and can be implemented in EL (Visual Recognition and AI technology).

Full Tracker Integration

- ✓ **Full backend integration** with solar trackers.

Industrial-Grade Robot Body

- ✓ Designed with **robotic arm structure and control drivers**, and molded to achieve protection **rating above IP66**.

Full-Lifecycle Quality Assurance

- ✓ Rigorous **design, simulation, and testing** to ensure long-term reliability.

Our Technology Advantage

Traditional Technologies and Challenges

On-site mapping

- **Time-consuming** machine debugging and low efficiency
- Requires data transmission back, relies heavily on network

Real-Time Kinematic

- Requires construction of RTK calibration stations with high investment costs
- Insufficient accuracy of GNSS/GPS

High specular reflection of PV panels

- Visual recognition fails, cannot generate valid images

Impact of rainy and overcast weather

- Unable to operate under rainy and overcast weather conditions

Insufficient PV scenario data

- Requires massive accumulation of real-scenario data

No large-scale data available

Core Advantages of LEAPTING

Autonomous Driving Without Pre-Mapping

Unique scene-based SLAM technology

Ready to use right out of the box, mapping while operating

Overcomes the “long corridor” effect

Anti-Interference Capability of Multimodal Perception

Vision + LiDAR multimodal fusion, dual-model strategy

Failure rate < ~0.01%

Achieved engineering implementation

Advantages of data barriers

Large-scale real-world scene data

Largest PV robot database

Centimeter-level positioning and millimeter-level installation

Low Cost, High Efficiency

Proven in Extreme Environments

High-Precision and Robustness

Manual vs. Robotic Installation



Project Cases

PART 3

DESIGN



Global Deployment

2025 saw explosive growth in overseas installation business

- Feb — Secured the first order in **Australia**
- Jun — Won **repeat orders** from **Australia**
- July — Entered the **South African** market
- Aug — Signed **GW-scale** orders with **Middle Eastern** clients, with 60 robots put into operation
- Oct — Secured the first **European** order
- Nov — Entered the **South American** market
- Dec — Secured **another project in Western Australia's mining areas**, expanding MMR application scenarios to complex mining environments



60+ MMR units deployed globally in 2025.



Total capacity of projects serviced by deployed units reaching **4 GW**.



Spain

2 MMR units
50MW



Middle East

45 MMR units
3.5GW



South Africa
1 MMR units
50MW



India



Sinagore



Australia



2 MMR units
200MW



China



America



Peru

1 MMR units
178MW

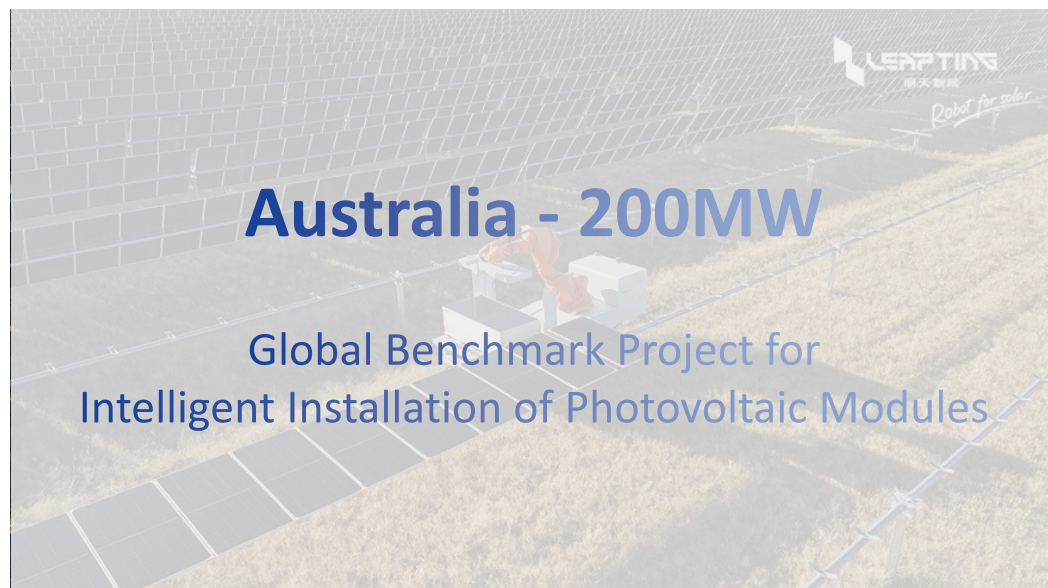


Company Deployment Locations



MMR Equipment Deployment Locations

Project Highlight: Australia



Co-operation Background

- It is hoped that LeapTing's autonomous navigation PV module laying robots will effectively address the challenges of labor shortages, low manual installation efficiency, and excessive safety risks.



Achievement & Effect

- Modules Installed: **10,000 units+**
- Installation Efficiency: **3–5 times higher** than manual labor
- Module Damage: **0**, Personnel Casualties: **0**



Replace high-intensity manual labor

Improve efficiency and reduce costs for power station construction

Significantly enhance construction safety

New South Wales | Australia



Project Highlight: UAE



Co-operation Background

- LeapTing Helps helps deepen clean energy cooperation in the Middle East and promote sustainable development.
- Assisting with PV module installation in extreme desert high-temperature environments and achieving efficient and high-quality delivery.



Achievement & Effect

- modules: **2 million pieces +**
- Installation capacity: **600 pieces/unit/day**
- Operation in extreme desert weather: **60°C**



Large-scale module installation

Guarantees installation and delivery efficiency

Replaces manual labor in extreme environments



Abu Dhabi | UAE

G1 Project Highlight: India



India - 8GW

A Benchmark Case of
"Intelligent Manufacturing in China" Going Global



Co-operation Background

- Localizing Indian manufacturing for cleaning robot. Which will optimize the cost and supply cycle.
- Fully automatic cleaning robot solution and long-term AMC.



Achievement & Effect

- Total 16GW signed regarding cleaning robot.
- more than 30% market share in India. And some major client we achieved 70%.



Water-free or ultra-low-water

Night-time operation, no power
interruption

Remote control and monitoring



About LEAPTING

PART 4



LEAPTING

ABOUT LEAPTING

Huzhou LEAPTING Technology Co., Ltd. is a high-tech company specializing in intelligent robots for photovoltaic and industrial applications. It provides full-lifecycle solutions for PV power plants, focusing on automated module installation, smart cleaning, and unmanned inspection.

Its core products—Automatic Navigation PV Module Mounting Robots, Automatic G1 Cleaning Robots, and Solar Project Inspection Robots—integrate autonomous driving, pose recognition, and digital twin technologies, supported by a big-data cloud platform for connectivity, monitoring, and remote control.

So far, LEAPTING has delivered solutions to large-scale PV projects worldwide, covering a total installed capacity of **12 GW**.

Patent Advantage



40

Invention patents



8

Software copyright certificates



300+

Patent applications



102

Utility model patents

* According to data as of May 2026.

Corporate Honors

Recognized as a National Science and Technology Base Small and Medium-sized Enterprise.

August 2024

Recognized as a specialized, refined, innovative, and coordinated small and medium-sized enterprise (SME) in Zhejiang Province.

January 2025

Honored to be listed on the "THE FIRST FORBES CHINA INVESTMENT-WORTHY STARTUPS 100 SELECTION SERIES" list.

April 2025



Continuous Accumulation of Technology and Products,
Gradual Expansion of Commercialization

Explosive Growth Of The Company's
Installation Business

Overseas Revenue
Accounting For 95%+

Established With International Capabilities And
Established A Strong Presence Overseas

Explosive Growth of
Installation Business in 2025

The first **Autonomous Navigation Module Mounting Robot** was successfully delivered for overseas projects

Total signed orders for G1 cleaning robots in overseas markets exceeded **2GW**.

Solar Project Inspection Robot was launched for the global market.

G1 cleaning robot achieved **4GW of orders**

Indian branch was established to accelerate deployment in the global market

Global shipments **exceeded 10,000 units**

The cumulative total of global project applications reached **10GW**

LEAPTING's Huzhou **smart factory** was successfully completed and put into production

In February, a fully automatic navigation module installation robot (MMR) successfully completed its **first commercial project in Australia**.

In June, **repeat orders** were secured.

Jul: entered the **South African** market

Aug: signed a **GW-level order** with a Middle Eastern customer

Oct: completed the first order in **Europe**

Nov: expanded into the **Central Asian** market for the first time

Dec: signed another project in the mining area of Western **Australia**

The **PV3/1.5GW** installation robot project in Abu Dhabi, Middle East was officially launched

Mar: an additional **3.3GW repeat order** was secured for the Middle East project

LEAPTING
was formally
established.

2022

2023

2024H1

2024H2

2025H1

2025H2

2026

Service Network





THANK YOU!

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