



goldbeck
solar

Heliomatix

→ Industrialising Utility-Scale Solar Plant Construction



HeliomatiX introduces a fundamental change in utility scale solar construction by replacing labour intensive, weather dependent, manual installation with an automated, robotics based installation system. This approach restructures a traditionally fragmented construction process into a controlled and repeatable industrial workflow.

Current Challenges in Utility-Scale Solar Plant Construction



Utility scale photovoltaic plant construction today is largely based on manual assembly processes. This leads to several key challenges:

- High dependency on skilled labour availability and rising workforce costs.
- Exposure of workers to physically demanding manual tasks due to increasing module size and weight, resulting in higher safety risks.
- Productivity losses due to weather and site conditions (heat, cold, snow, wind, rain)
- Fragmented logistics resulting in numerous repeated on-site transport movements.
- Variability in installation quality due to differences in skill levels, potentially leading to rework.

As project sizes increase and module dimensions and weights continue to grow, these constraints directly limit scalability, schedule reliability, and cost predictability.

The Automated Installation Solution

HelioMatix addresses these challenges by restructuring the installation methodology rather than optimising individual manual tasks.

The system integrates pre-assembly, autonomous logistics, and robotic installation into a single, coordinated automation workflow.

The Automation consist of three components:

1. AssemblyHub
2. Autonomous Transport Vehicle
3. Robotic Installation

This end-to-end workflow enables continuous, controlled module installation under defined process conditions and reduces dependency on manual site activities.



System structure

Crawler

An electric, autonomous transport platform delivers pre-assembled elements from the AssemblyHub directly to the installation rows.

AMoS

(Automated Mounting System)

AMoS is a sensor-guided robotic system for precise module installation.

AssemblyHub

A mobile, containerized on-site pre-assembly unit that assembles modular elements consisting of module rails and up to four modules.

1



AssemblyHub

- Module-to-rail integration prior to field installation
- Serial number scanning enabling digital identification and traceability of individual modules
- Integrated quality inspection during pre-assembly

2



Crawler

- Continuous logistics synchronisation
- Reduces heavy vehicle movements on-site
- Lower soil compaction
- All terrain capability for uneven site conditions

3



AMoS (Automated Mounting System)

- Automated positioning of module elements
- Consistent and verifiable installation quality
- Digital tracking of installed components

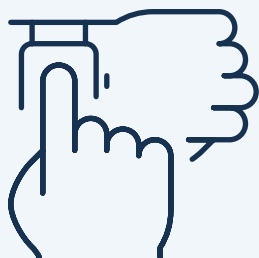
Performance

↓ 30 %

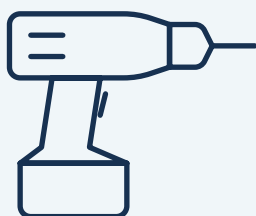
lower module installation costs per kWp
compared to fully manual process

↓ 85 %

reduction in manual working hours
required for handling and installing
modules and racking rails



Continuous installation
workflow



Higher consistency and repeatability
of installation quality



Reduced productivity losses caused
by weather-related conditions

Stakeholder Benefits

Investors

- Faster project implementation enables earlier commissioning and revenue generation
- More predictable construction schedules through reduced weather related disruptions and the ability to operate extended shifts
- Consistent installation quality across the entire site through standardised, automated processes

EPCs / Installation companies

- Mitigation of skilled labour shortages through significantly reduced on-site manpower requirements for module installation
- Improved schedule reliability and reduced dependency on weather and site conditions
- Lower health and safety risks due to reduced manual handling of large and heavy modules
- Reduced module installation costs per kWp through automated, process driven installation

Relevance for utility-scale solar deployment

As solar modules become larger and project sizes continue to grow worldwide, traditional construction methods are reaching their limits. **Reliable, repeatable, and scalable** installation processes are required to deliver large projects on schedule and with consistent quality. By transforming manual installation into a structured automation workflow, HeliomatiX establishes an industrial benchmark for solar park construction.



Let's shape the
future together!

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