# PARTNERS

12 European Partners:

- **Four research centers** and **one university** with a strong knowledge in the development of spectroscopic methodologies, imaging, artificial intelligence and data management

- **Two research centers** with strong know-how in advanced PV technologies and with industrial pilot line facilities

- **A Metrology SME** with strong know-how in the implementation of industrial process monitoring applications

- **Two SMEs** in charge of dissemination, exploitation and communication actions
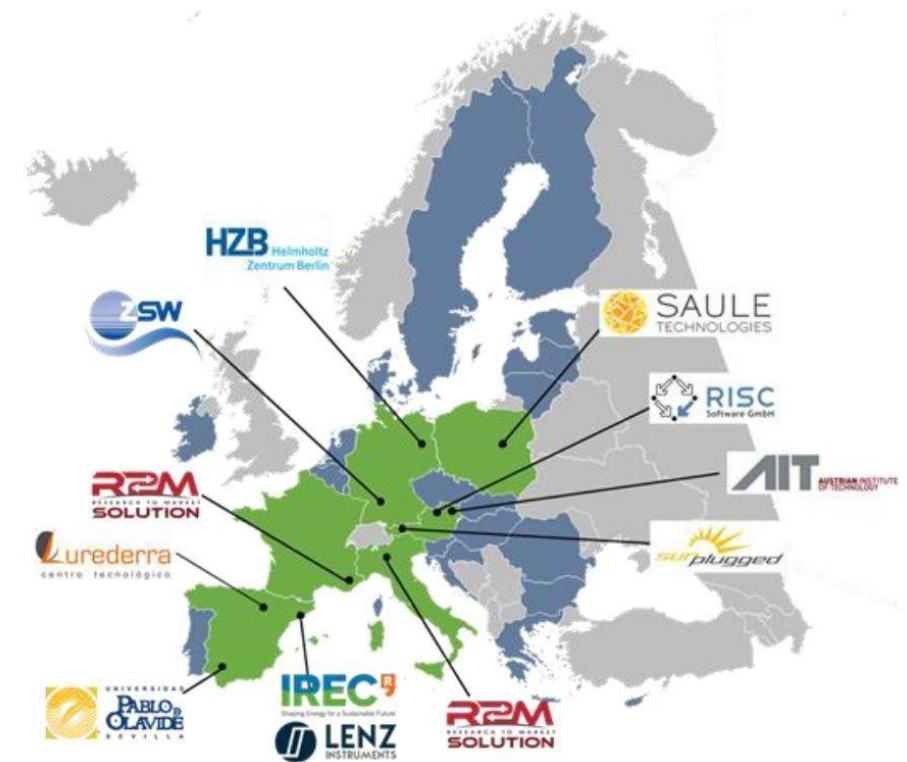
THE CONSORTIUM

CONTEXT

- Solar photovoltaic provides an important contribution of **3.1%** to the EU energy mix (Eurostat)

- Solar energy has the potential to meet **20%** of the EU's electricity demand in 2040 (Bloomberg)

- 3rd generation PV technologies combine high performance with a strong flexibility for ubiquitous integration (in buildings, vehicles, products, agriculture...)

- The high complexity of this new generation of PV devices makes them prone to the appearance of defects during manufacturing, leading to significant production waste and affecting their cost and quality
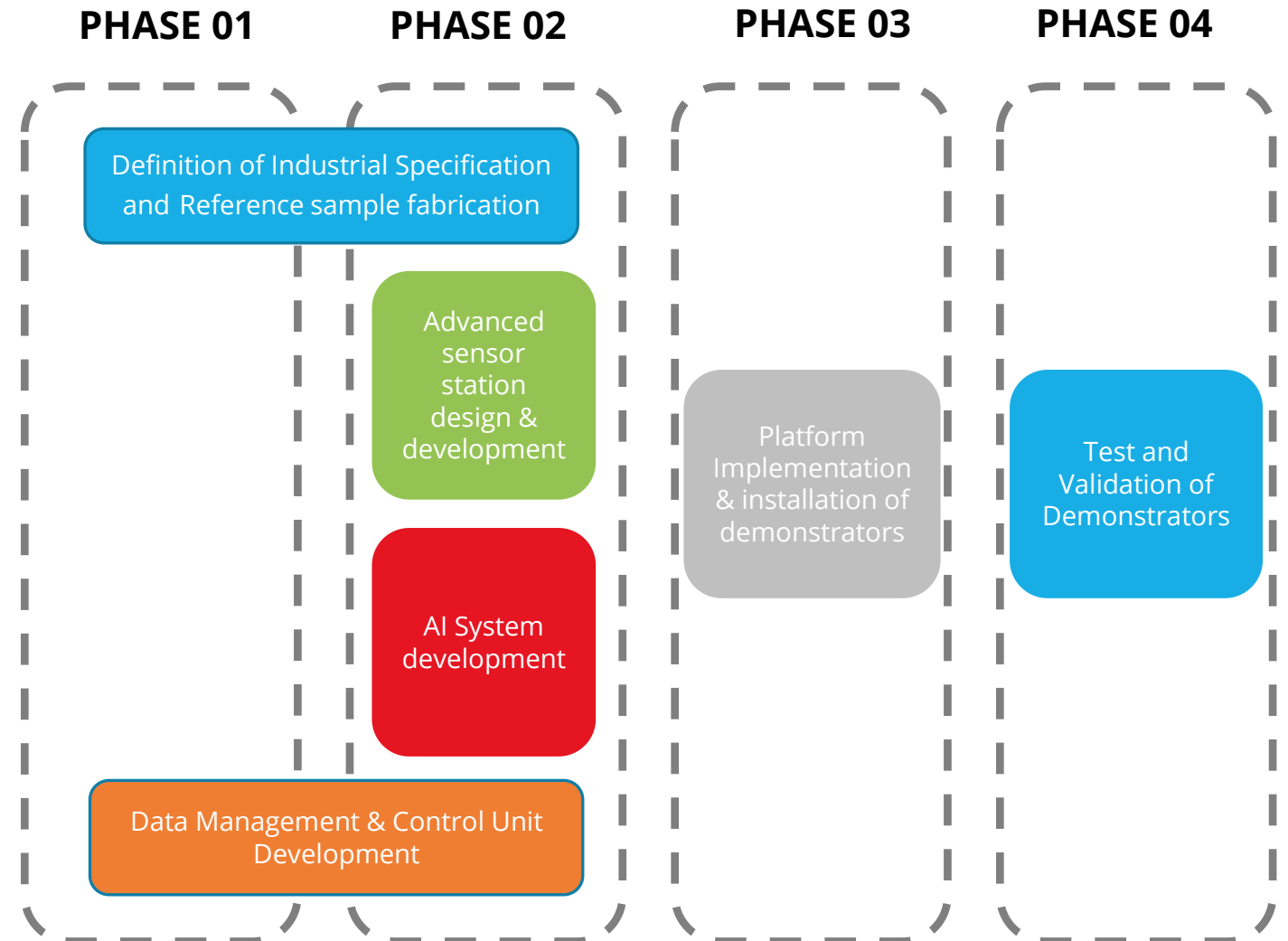
ABOUT The PROJECT

- Platform-ZERO develops a new customizable in-line process monitoring platform, supported by Artificial Intelligence, for achieving zero-defect manufacturing for the PV Industry

- Projects innovations will be tested in 4 PV and PV –related industrial pilot plants across Europe

- The project aims to:

  - ✓ Substantially lower PV fabrication costs
  - ✓ Improve production quality of PV devices

TECHNICHAL MAPPING & METHODOLGY

4M approach

- Mapping (year 1)
- Manufacturing (year 2)
- Making (year 3)
- Monitoring (year 4)

PHASE 01 **PHASE 02** **PHASE 03** **PHASE 04**

Definition of Industrial Specification and Reference sample fabrication

Advanced sensor station design & development

AI System development

Platform Implementation & installation of demonstrators

Test and Validation of Demonstrators

Data Management & Control Unit Development

JUNE 2023

✓ FABRICATION OF FIRST REFERENCE SAMPLES

✓ 1ST GENERATION BIG DATA MANAGEMENT INFRASTRUCTURE

FEB 2024

✓ DESIGN OF SEMI-AUTOMATIZED MODULAR SENSORS PROTOTYPES

MAY 2024

✓ DESIGN OF SENSORS FOR ADVANCED SENSING STATIONS

✓ 1ST GENERATION AI IMPLEMENTATION

✓ GENERATION OF FIRST DATABASE

✓ FABRICATION OF SECOND REFERENCE SAMPLES

SEPTEMBER 2023

MARCH 2024

TIMELINE (2023-24)

JUNE 2024

✓ UPDATE OF THE 2ND GENERATION DATABASE

MARCH 2025

✓ ALGORITHMS DESIGN FOR CONTROL, SELF-CALIBRATION AND DATA CONDITIONING

AUGUST 2025

✓ AI-BASED CONTROL UNIT IN PLACE

✓ 2ND GENERATION AI IMPLEMENTATION

✓ DESIGN OF HOLISTIC PLATFORM

OCTOBER 2024

JUNE 2025

TIMELINE (2024-25)

DEMONSTRATORS

Platform-ZERO innovations will be tested in 4 PV and PV-related manufacturing lines throughout Europe

Smart coatings for PV — Lurederra, Spain

High efficiency CIGS solar modules — ZSW, Germany

Customizable CIGS flexible solar foil — Sunplugged, Austria

Perovskite solar modules — SAULE, Poland

OBJECTIVES

1) Development of advanced sensor stations

2) AI system for autonomous monitoring and control

3) Implementation of a big data management infrastructure and control system
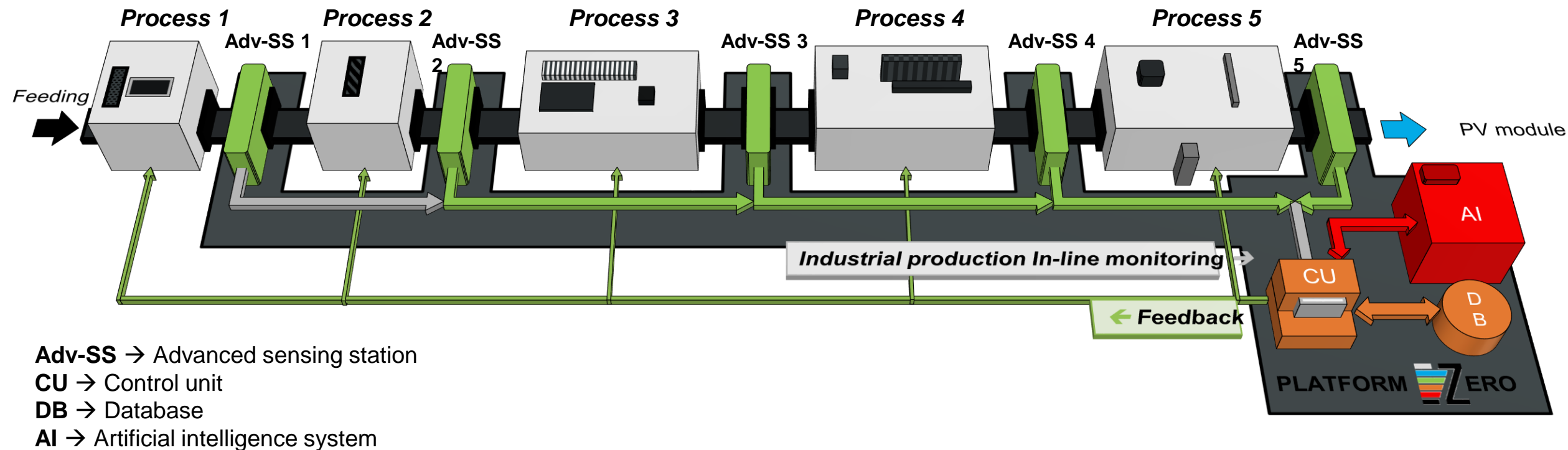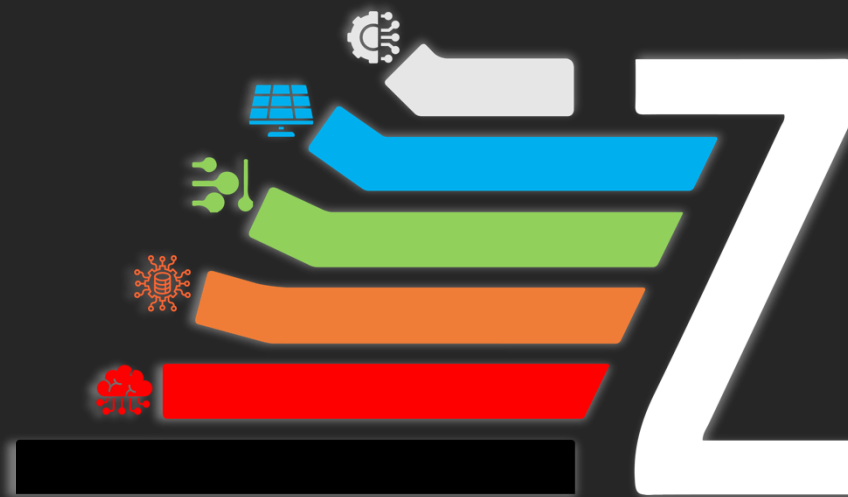
4) Implementation and installation of functional process monitoring platforms

5) PV manufacturing optimization

Process 1 **Adv-SS 1** **Process 2** **Adv-SS 2** **Process 3** **Adv-SS 3** **Process 4** **Adv-SS 4** **Process 5** **Adv-SS 5**

Feeding

PV module

Industrial production In-line monitoring

← **Feedback**

AI

CU

DB

PLATFORM ZERO

Adv-SS → Advanced sensing station
CU → Control unit
DB → Database
AI → Artificial intelligence system

- Increase of sustainable PV production through improved control systems

- Tools to detect pre-critical manufacturing defects at early manufacturing stages to prevent the generation of defects

- Diagnostic methodologies for in-line monitoring of industrial PV production

- Increase of efficient use of materials and reduced related product production costs

Expected impacts:

➢ 10% increase in productivity of the EU's PV industry

➢ 10% decrease in consumption of high-value critical raw materials

OUTCOMES

PROJECT KPIs

1) Sensor's sensitivity to deviations >5%

2) Monitoring flow capability

3) Implementation of AI-based algorithms library

4) Implementation of data management and control algorithms library

5) Implementation of GUI software for monitoring, data visualization and decision-making advising

6) Implementation of fully operational platform demonstrators compatible with a real-time industrial process monitoring

7) Detection of process deviations
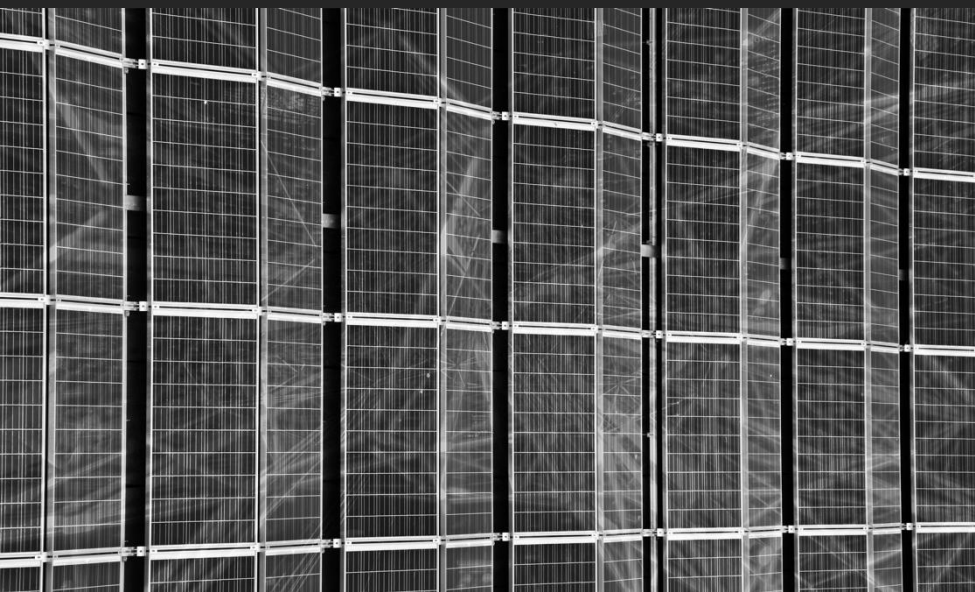
THANK YOU, GET IN TOUCH!

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