Traceable machine vision systems for digital industrial applications: the DI-Vision project

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https://projects.lne.eu/jrp-di-vision/
https://www.linkedin.com/company/di-vision-project
https://www.instagram.com/di_vision_project/

Aims of the project

The overall objective of the DI-Vision project is to ensure the traceability of machine vision systems (MVSs) deployed in industry for macro and micro-scale applications. The specific aims are:

1. to establish traceability of existing and newly developed MVSs;
2. to develop and validate DTs of existing and newly developed MVSs;
3. to investigate novel methods of image matching algorithms using soft-gauges (reference data);
4. to investigate and validate while addressing industrial use cases;
5. to facilitate the take up of the developed technologies (dissemination and standardisation).
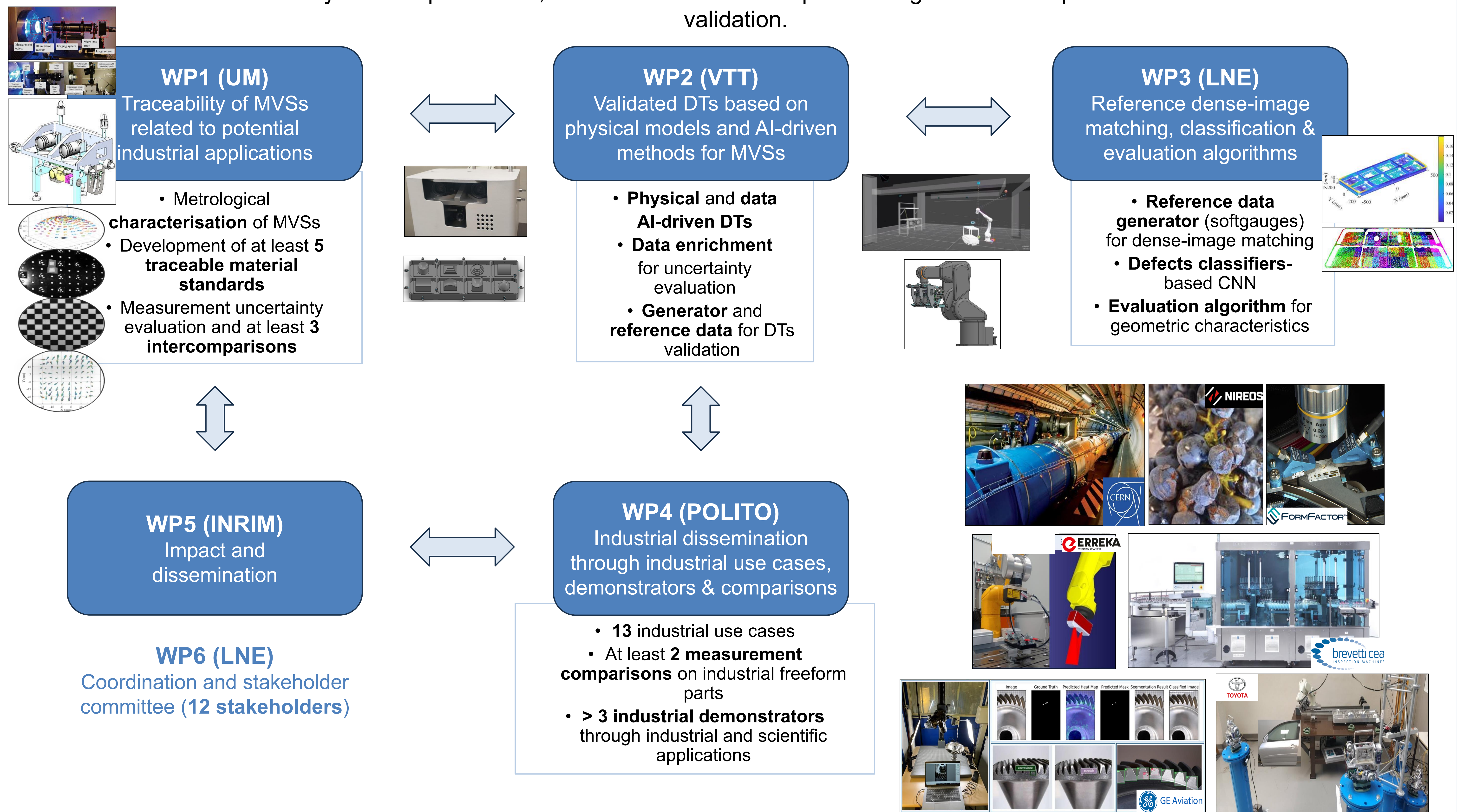
Target groups

- Manufacturers of MVSs and companies in computer vision
- Automotive, aeronautic, food, semiconductors, pharmaceutical sectors, etc
- European metrological committees
- Academic Research labs and institutions
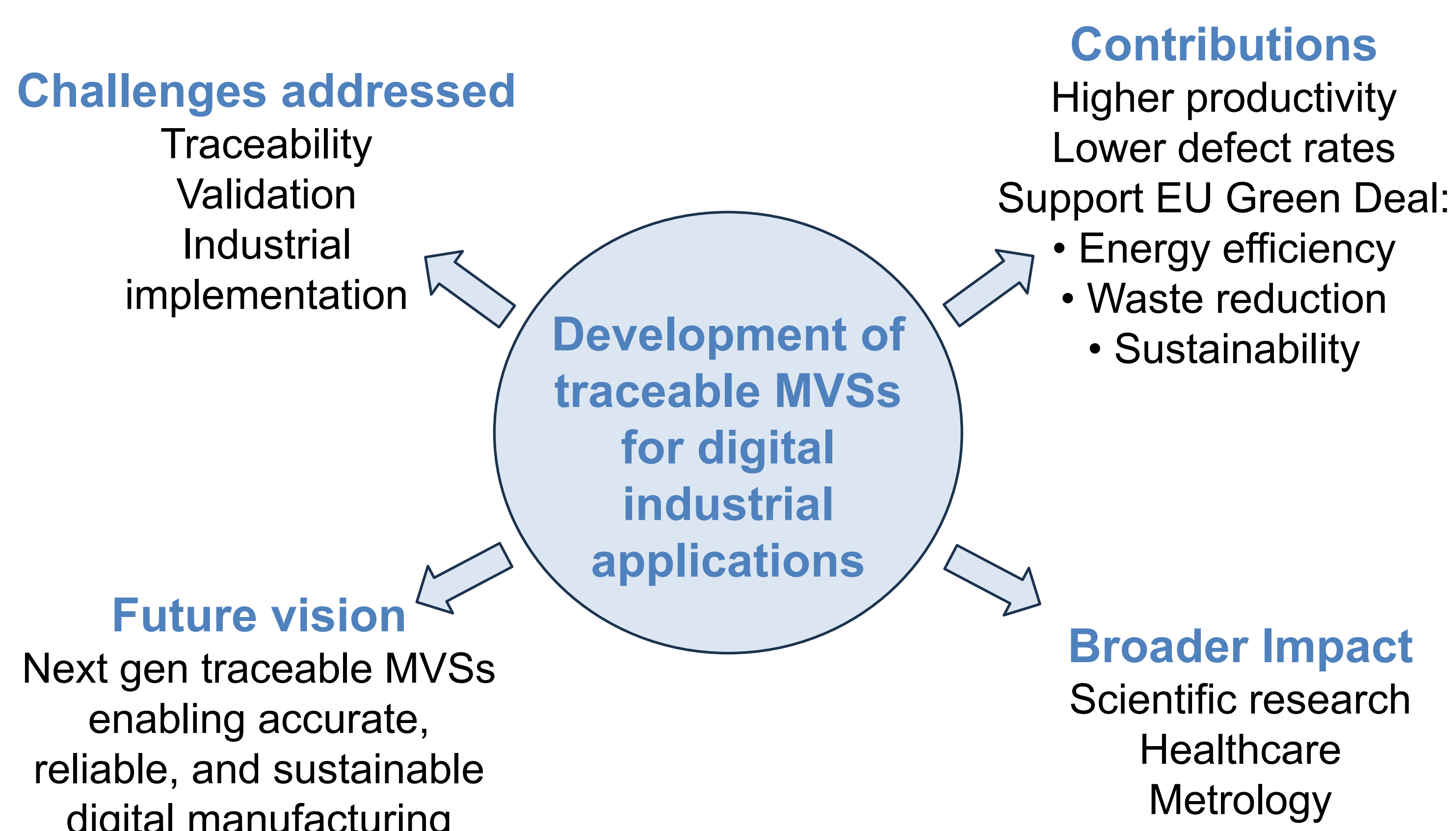
Work programme and key deliverables

Key deliverables include:
- new calibration standards for MVS traceability;
- validated DTs for error analysis and optimisation;
- GPGs for industrial adoption;
- technical reports on algorithm development and industrial validation.

WP1 (UM)
Traceability of MVSs related to potential industrial applications
- Metrological **characterisation** of MVSs
- Development of at least **5 traceable material standards**
- Measurement uncertainty evaluation and at least **3 intercomparisons**

WP2 (VTT)
Validated DTs based on physical models and AI-driven methods for MVSs
- **Physical** and **data AI-driven DTs**
- **Data enrichment** for uncertainty evaluation
- **Generator** and **reference data** for DTs validation

WP3 (LNE)
Reference dense-image matching, classification & evaluation algorithms
- **Reference data generator** (softgauges) for dense-image matching
- **Defects classifiers**-based CNN
- **Evaluation algorithm** for geometric characteristics

WP5 (INRIM)
Impact and dissemination

WP4 (POLITO)
Industrial dissemination through industrial use cases, demonstrators & comparisons
- **13** industrial use cases
- At least **2 measurement comparisons** on industrial freeform parts
- **> 3 industrial demonstrators** through industrial and scientific applications

WP6 (LNE)
Coordination and stakeholder committee (**12 stakeholders**)

Outlook

Challenges addressed
Traceability
Validation
Industrial implementation

Development of traceable MVSs for digital industrial applications

Contributions
Higher productivity
Lower defect rates
Support EU Green Deal:
- Energy efficiency
- Waste reduction
- Sustainability

Future vision
Next gen traceable MVSs enabling accurate, reliable, and sustainable digital manufacturing

Broader Impact
Scientific research
Healthcare
Metrology

Consortium

Acknowledgements