CITADELS

TESTBED DESCRIPTION

Cultivating Industry 5.0 Talents: Academia-industry collaboration and empowerment through accessible DEep technoLogieS

Project acronym:	CITADELS
Project topic:	HORIZON-WIDERA-2024-TALENTS-03-01
Project number:	101217281
Type of action:	HORIZON-CSA
Project starting date:	1 September 2025
Project duration:	48 months
Dissemination level	PU

1 SIMSCAN 42 Portable 3D Scanning System

TestBed title	SIMSCAN 42 Portable 3D Scanning System

1.1 Short summary

The SIMSCAN 42 TestBed is a portable, high-precision 3D scanning system designed to support experimentation, validation, and deployment of advanced metrology, reverse engineering, and digital inspection processes. Its compact handheld design (570 g), dual-camera blue-laser scanning technology, and acquisition rate of up to 2.8 million points per second enable accurate digitisation in constrained and complex environments. With an accuracy of up to 0.020 mm, the system supports applications such as quality control, rapid prototyping, and digital model generation from physical objects. It enables the acquisition and processing of high-resolution point-cloud data for industrial and research use. The TestBed provides a controlled and accessible environment for Proof-of-Concept activities, process validation, and training in 3D scanning and digital manufacturing workflows. It supports DeepTech applications in 3D data acquisition and processing and aligns with Industry 5.0 principles by enabling precise and efficient interaction between physical and digital systems.	
Principal Investigator Name	Marko Močnik
Position / institutional role	Director
Email	marko@p-tech.si
Phone No.	+386 2 530 82 00
ORCID persistent identifier (PID)	N/A
TestBed Responsible Name (if different from PI)	
Funding source(s) for TestBed's acquisition	Interreg Danube Region Programme
Relevant Keywords	3D scanning, metrology, reverse engineering, digital inspection, point cloud processing, digital manufacturing

1.2 Hosting Institution

Name of Host Organization	Pomurje Technology Park
Department or Lab	N/A
Name of Building	Pomurje Technology Park
Physical Address	Plese 9 A 9000 Murska Sobota
Website Links	https://www.p-tech.si/en/
Institutional contact name	Marko Močnik
Institutional contact email	marko@p-tech.si

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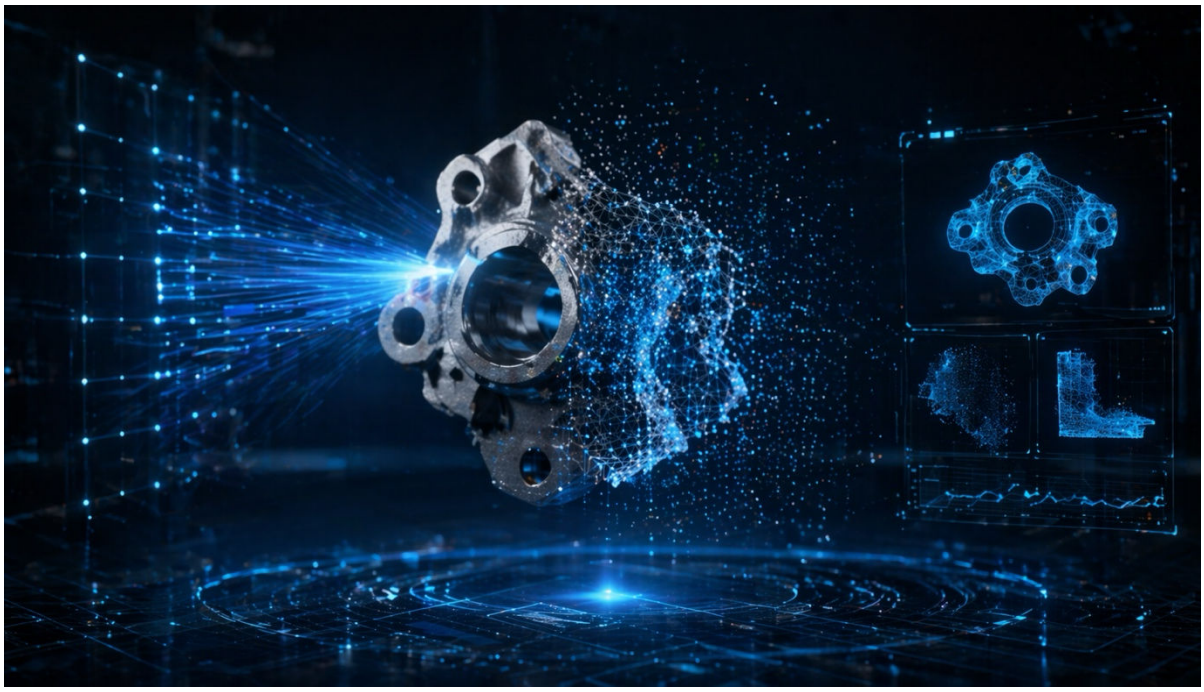
1.3 Photos/videos

Main photo:



1.4 DeepTech Area and Application Domain

DeepTech Area	Check all that apply	Check ONE main area
Extended Reality	☐	
Robotics	☐	
Artificial Intelligence	☐	
Human Machine Interfaces	☐	
Biotechnology	☐	
Other: Optical Metrology, 3D Data	✓	✓

The TestBed operates within the domain of industrial inspection by enabling high-precision 3D digitisation of physical objects for measurement, validation, and quality control. It is based on optical metrology technologies, using blue-laser scanning to capture accurate geometric data and generate high-resolution point clouds for further analysis. The system supports reverse engineering, inspection workflows, and integration of scanned data into digital manufacturing environments, enabling reliable and repeatable measurement processes.

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Application Domain	Check all that apply
Manufacturing 	✓
Healthcare 	☐
Logistics 	☐
Agriculture 	☐
Maintenance & inspection 	☐
Other	☐

1.5 Potential Stakeholders and Exploitation Scenarios

Non-academic stakeholders	
Industrial Partners	✓
SMEs	✓
Startups	✓
Government Bodies	☐
Professional Associations	☐
Community	☐
Others 1 (comma-separated)	
Academic stakeholders	
Undergraduate students	✓
MSc students	✓
PhD students	✓
Researchers	✓
Others 2 (comma-separated)	
Other types of stakeholders	

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Others 3 (comma-separated)	

	Check all that apply	Short notes (optional)
Internal academic research only	☐	
Collaborative research with external academic partners	✓	
Contract research / Proof-of-Concept for industry	✓	
Pilot / DeepTech Deployment in operational environment	✓	
Training services (courses, workshops, certification)	✓	
Service provision (testing, benchmarking, validation)	✓	
Open access for walk-in users (e.g. open days / hackathons)	☐	
Other (specify): _____	☐	

1.6 Formal Access Conditions

Type of partner asking for access	Type of contractual relationship	Check all that apply
Academic partners	No contract (direct access)	☐
	Direct contract between parties (e.g., research agreement)	✓
	Indirect contract between parties (e.g., project framework)	✓
	Other / Describe	☐
Industrial	No contract (direct access)	☐
	Direct contract between parties (e.g., research agreement)	✓
	Indirect contract between parties (e.g., project framework)	✓
	Other / Describe	☐

Type of prerequisites	Description of prerequisites	Check all that apply
Agreements	Confidentiality agreement for proprietary algorithms	☐
	Data sharing agreement for datasets generated	✓
	IP agreements	✓
	Other / Describe	☐
Insurance	Users must have appropriate liability coverage through their home institution	✓
	Other / Describe	☐

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1.7 Training and Safety

Mandatory technical training	Basic training covering safe handling of the device, correct scanning procedures, data management practices.
Recommended technical training	N/A
Mandatory safety requirements	Avoid direct eye exposure to Class II visible blue lasers, follow established safety procedures during operation, supervised operation in accordance with laboratory safety guidelines.

1.8 Technical description

Hardware	• SIMSCAN 42 3D scanner: Handheld blue-laser scanning device with dual industrial cameras and precision optics for high-accuracy digitisation.
	• Scanning performance: Measurement rate of up to 2,800,000 points per second, accuracy of up to 0.020 mm, and volumetric accuracy of 0.030 mm/m.
	• Optical system: Structured blue-laser patterns enabling precise capture of complex geometries.
	• Data acquisition: Real-time point-cloud generation supporting stable and consistent scanning results.
	• Device design: Compact and ergonomic housing suitable for operation in constrained or complex environments.
Software needed to run the TestBed	• ScanViewer software: Supports data processing workflows including alignment, meshing, GD&T analysis, deviation analysis, and CAD comparison.
	• Data export: Enables export in multiple formats (e.g., STL, OBJ, PLY, IGS) for integration into downstream digital workflows.
Standards that apply	• VDI/VDE 2634-3 for optical 3D measurement systems.
	• ISO-based calibration practices for verification of measurement accuracy, including ISO 17025-aligned workflows.

1.9 Existing Software Assets (i.e. in GitHub)

Link:	Short description:
N/A	N/A

1.10 TestBed documentation

Type	Short description:	Name and source (link):
Documentation	Official product page with technical specifications, system description, and key application areas.	SIMSCAN 3D Scanner – Scantech official website, https://www.3d-scantech.com/product/simscan-3d-scanner/

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1.11 Application cases

Application case:	Short description:	Photo of the Application case
Dimensional inspection and quality control	Use of the system for measuring and validating component geometry, including tolerance verification and surface deviation analysis.	N/A
Reverse engineering and design reconstruction	Digitisation of existing components to create accurate digital models for redesign, modification, or reproduction of parts.	N/A
Mold, tool, and component analysis	Application of 3D scanning for analysis of molds, tools, and complex or small components in industrial environments.	N/A
Digital model generation and visualization	Creation of detailed 3D models from physical objects for use in digital workflows, including simulation and visualization environments.	N/A
Applied industrial and research cases	Use of the system for validating manufacturing tolerances, reconstructing legacy mechanical components, and generating digital models for training and simulation purposes.	N/A

Possible TRL application range	TRL4	☐
	TRL5	☐
	TRL6	☐
	TRL7	☐
	TRL8	✓

1.12 Funding source

Funding source acknowledgements
Interreg Danube Region Programme

1.13 Ethical and societal aspects

Ethical and societal aspect:	Short description:
Societal impact	Supports safe and non-contact measurement processes, reducing the need for invasive inspection methods.
Environmental impact	Supports efficient use of resources by enabling digital inspection and reducing the need for physical prototypes.

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Ethical perspective	Data handling must comply with applicable data protection regulations, including GDPR. Special attention is required when scanning identifiable human features or proprietary industrial components. Such data may contain sensitive or protected information and must be stored and processed in accordance with institutional data governance and confidentiality requirements.

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