smart
advanced manufacturing
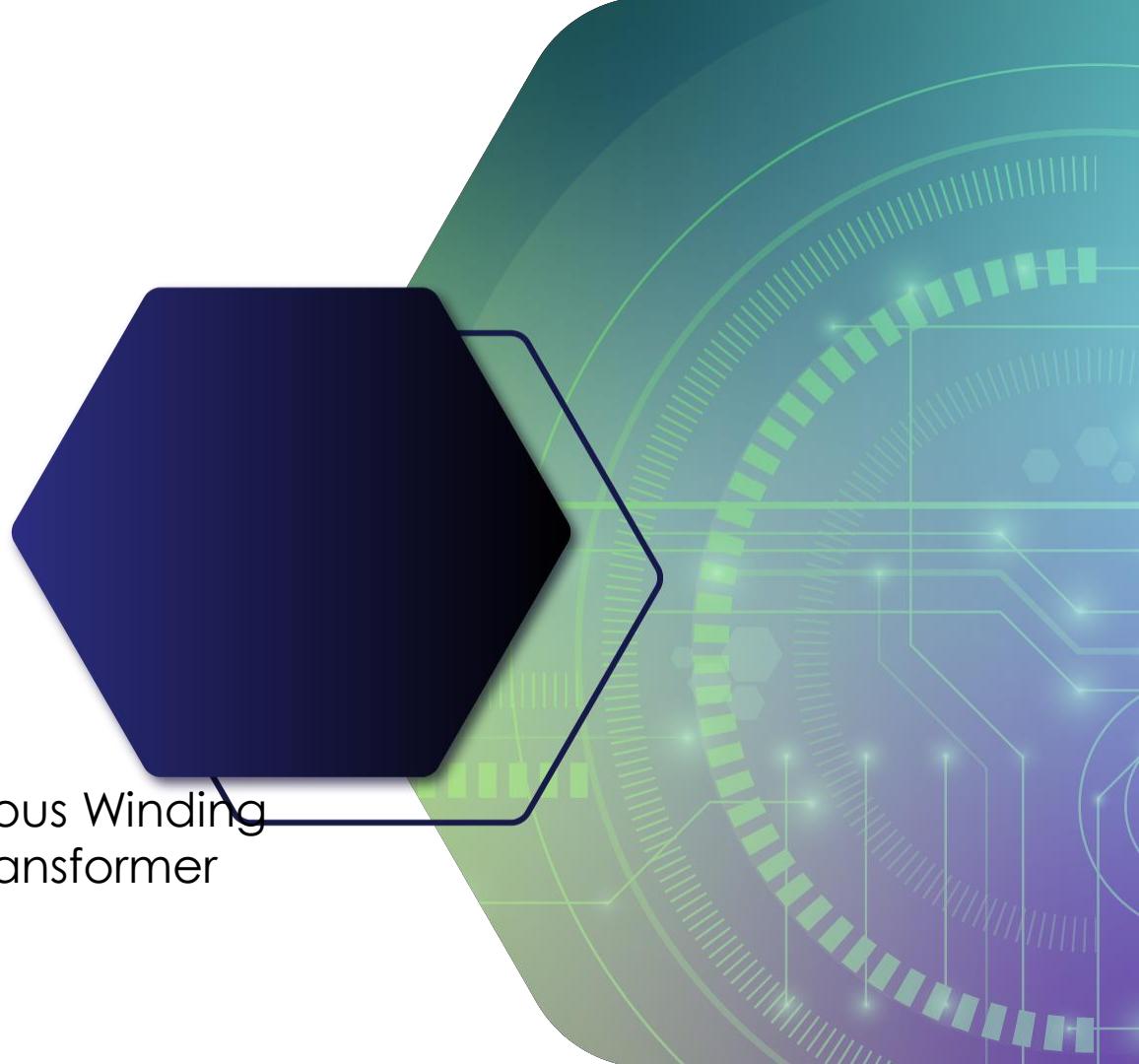
AI-Driven Fully Autonomous Winding System for Low-Power Transformer Manufacturing

ORGANISATION PROFILE

CEKA Software & R&D Ltd. is an SME specialised in artificial intelligence and smart manufacturing systems, focusing on applied R&D for industrial digitalization. The company works on AI-driven industrial systems, computer vision, sensor fusion, and web-based manufacturing platforms.

CEKA has an agile R&D team with experience in machine learning, explainable AI approaches (including Neuro-Fuzzy models), and real-time system integration. The company develops intelligent automation and digital manufacturing solutions tailored to industrial environments.

Within the project, CEKA Software & R&D contributes its strong background in AI-driven industrial systems, computer vision, and web-based manufacturing platforms, with proven experience in applied R&D and system integration for smart manufacturing applications.

PROPOSAL INTRODUCTION (I)

Vision: The vision of the proposed project is to enable fully autonomous, AI-driven winding of low-power transformers. The project aims to ensure consistent quality, high efficiency, and full digital traceability by applying closed-loop control and smart manufacturing principles.

Motivation: Current transformer winding processes are largely semi-automatic and operator-dependent, resulting in quality variations, scrap, and production inefficiencies. The industry needs intelligent manufacturing systems that can detect deviations in real time, self-correct the process, and support sustainable and competitive production.

Content: The proposed project will develop a fully autonomous winding system covering automatic loading, wire preparation, AI-supported closed-loop winding, termination, and unloading. In addition, a web-based platform will be implemented to enable real-time monitoring, recipe management, quality analytics, and digital product traceability.

PROPOSAL INTRODUCTION (II)

Expected outcome: The main outcome of the project will be a smart winding system validated at TRL 7 in a pilot production environment. Expected results include improved process stability, reduced scrap and rework, lower energy consumption per unit product, and full production traceability.

Impacts: The proposed solution will strengthen the competitiveness of low-power transformer manufacturers, particularly SMEs, by improving quality and reducing production costs. It will also support digital transformation and green manufacturing objectives in European and international markets.

Schedule: The project is planned with a total duration of 24 months. It will start after approval and conclude with pilot validation and industrial demonstration activities.

PARTNERS

Partner Search – Required Expertise

Industrial Manufacturing & Machinery: Companies experienced in transformer manufacturing, winding machines, automation systems, or industrial equipment design and integration.

Robotics & Mechatronics: Partners with know-how in robotic handling, automatic loading/unloading systems, motion control, and mechatronic system design.

Sensors, Hardware & Embedded Systems: Expertise in industrial sensors (tension, vision, force), embedded control systems, and real-time data acquisition.

Mechanical Design & System Engineering: Partners with experience in mechanical system design, precision mechanisms, structural components, and industrial machine development, including prototyping and integration into automated production lines.

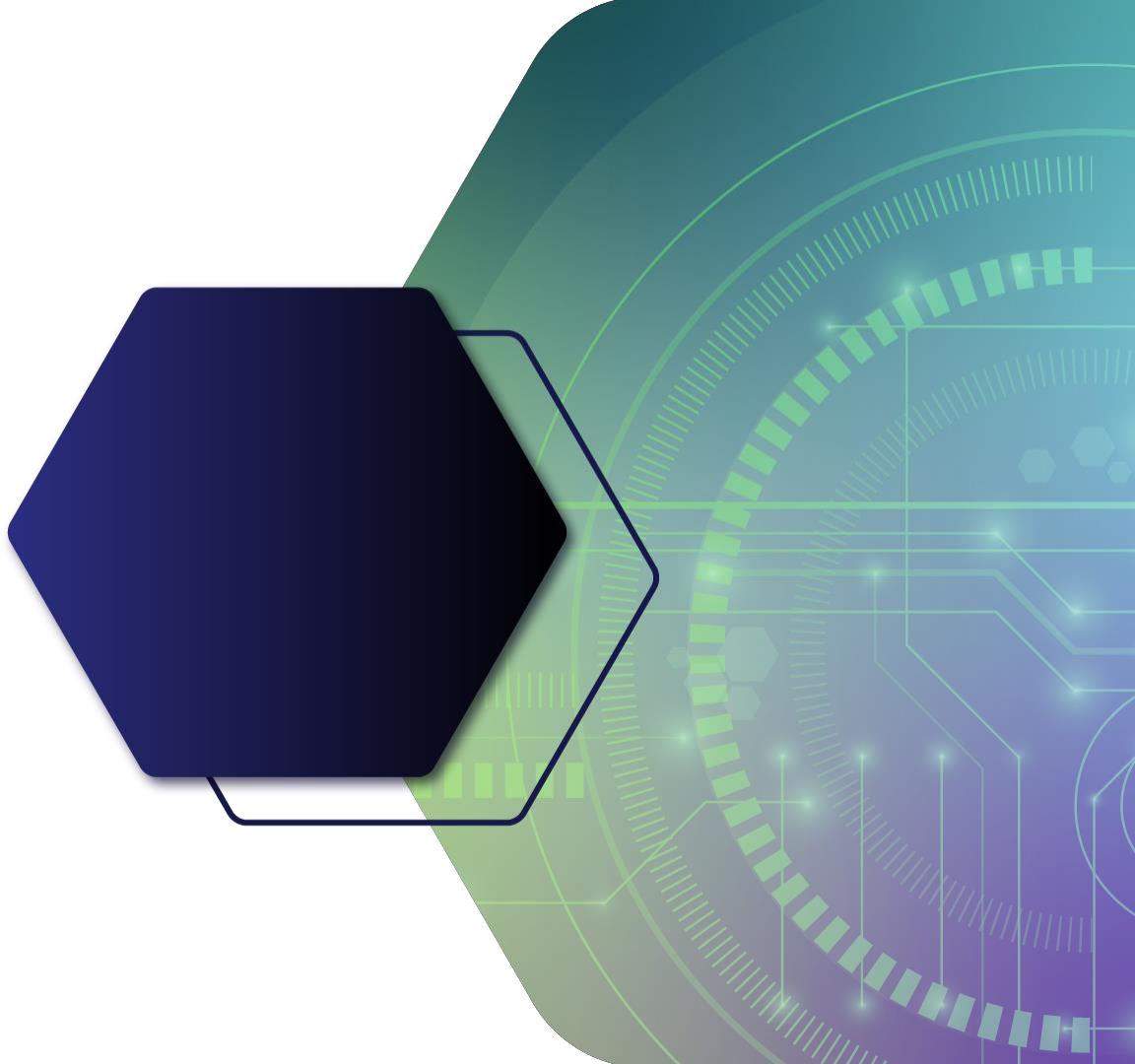# CONTACT INFO

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