

25.YEAR

**teknopar**  
Industrial Automation

Teknopark Ankara, İvedik OSB Mah.  
2224. Cad. No:1 F48- 06378  
Yenimahalle / ANKARA- TÜRKİYE

İvedik Organize Sanayi Bölgesi  
1471. Cad. No: 3-5  
06370 Yenimahalle / ANKARA-  
TÜRKİYE

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[www.teknopar.com.tr](http://www.teknopar.com.tr)

## Dr. Perin ÜNAL



- PhD, Information Systems, Informatics Institute, METU
- BSc, Industrial Engineering, Bilkent University
- Managing Partner, Head of R&D, TEKNOPAR
- H2020 ICT Project Evaluation Expert for RIA and IA proposals and COST Actions (50+) (5+ years)
- H2020 SME Instrument Project Evaluation Expert (100+) (6+ years)
- EUREKA Eurostars Project Evaluation Expert (60+) (8+ years)
- Expert Advisory Group Member "Innovation in SMEs" (for 3 years)
- H2020 Certified Mentor Program
- Country Coordinator/ Work Package Leader (H2020, EUREKA, ITEA, ERA-NET)

# Company Profile

**Teknopar is an R&D performing SME, founded in 1996 and based in Ankara, and it is one of the leading providers of automation systems and solutions in Turkey for industrial facilities, energy, defense and transportation sectors.**

## SCOPE OF APPLICATION



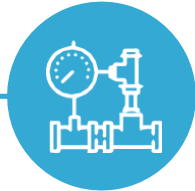
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Teknopar offers complete solutions as a single contractor for the design, application and assembly of industrial facilities' mechanical, electrical, electronic and hydraulic systems. By following information technologies closely, the latest developments are included in industrial applications and compliance with the Industry 4.0 standard is ensured.

## FIELDS OF ACTIVITY



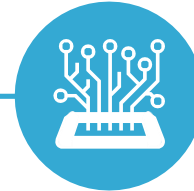
**MECHANICS**



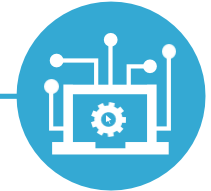
**HYDRAULICS**



**AUTOMATION**



**ELECTRIC-  
ELECTRONICS**



**INFORMATION  
TECHNOLOGY**

**INDUSTRIAL  
FACILITIES**



**ENERGY SECTOR  
APPLICATIONS**



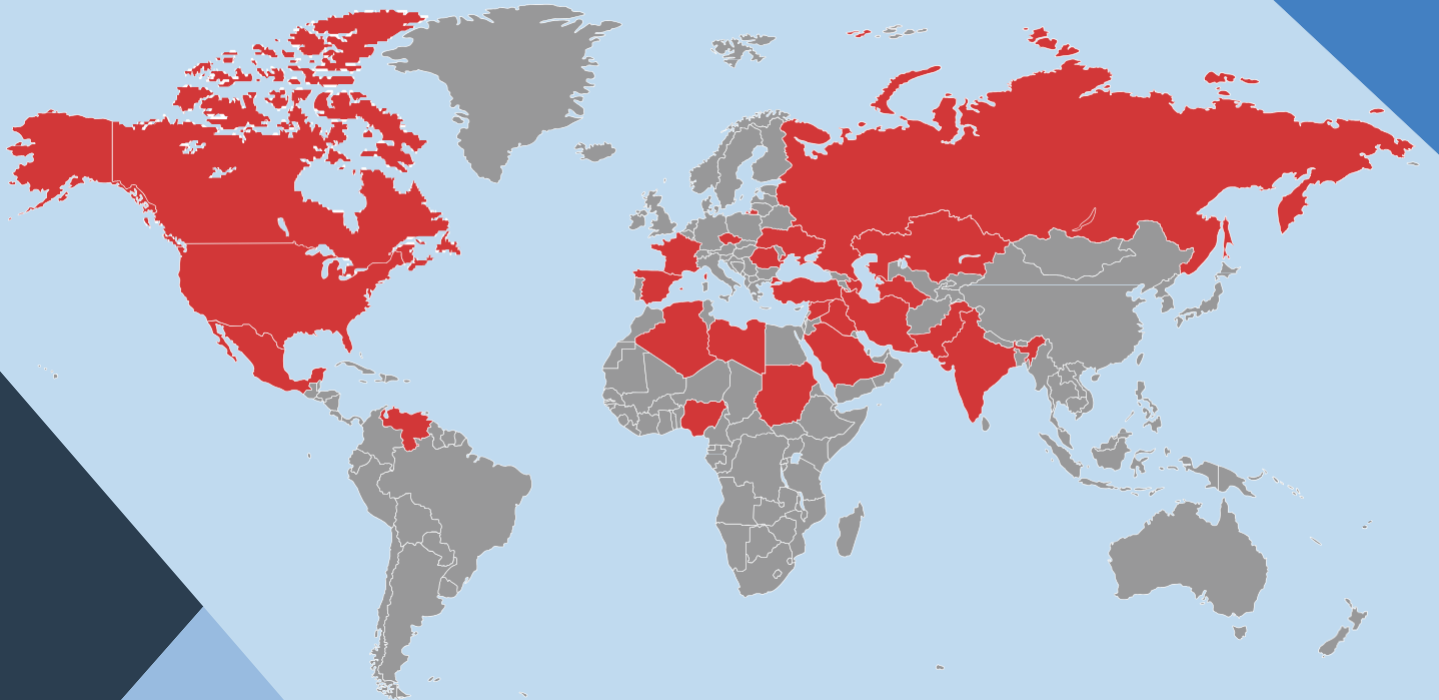
**ON VEHICLE  
APPLICATIONS**



**DEFENCE INDUSTRY  
APPLICATIONS**



To date, Teknopar has implemented more than 500 projects at 27 countries.



## OUR REFERENCES



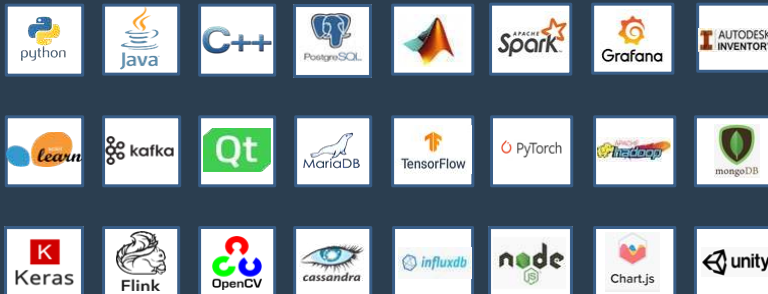
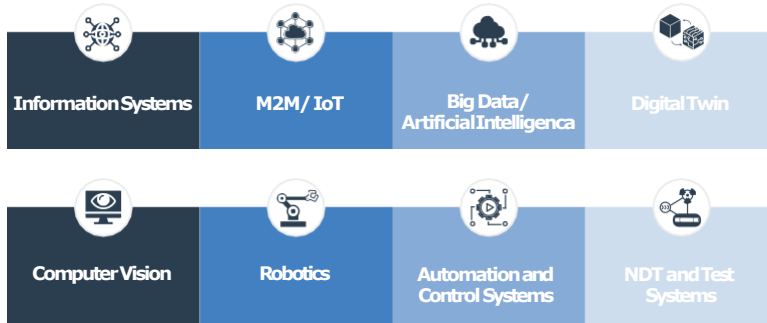
- ASELSAN
- ROKETSAN
- BMC
- SDT SPACE & DEFENCE TECHNOLOGIES
- TUBITAK SAGE
- YOLBAK
- ERDEMİR
- BORUSAN MANNESMANN - GEMLİK
- ÇİMTAŞ - GEMLİK

- ÖZTREYLER
- TOSÇELİK
- MNG HOLDING
- TOSÇELİK - ALGERİA
- NOKSEL - SPAIN
- NOKSEL - İSKENDERUN
- SKYLINE STEEL - USA
- HANSON - USA
- IMPERIAL STEEL - USA

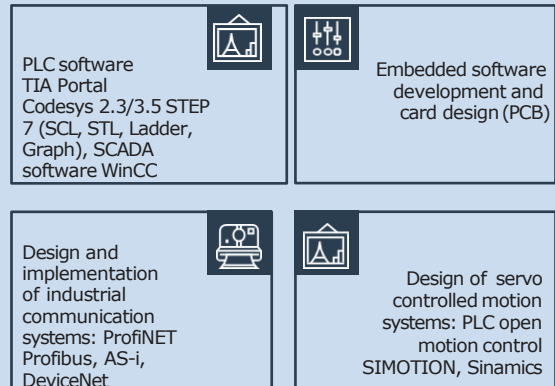
- AMERICAN SPIRAL WELD PIPE - USA
- AMERON - USA
- MID AMERICAN PIPE - USA
- AMERICAN PIPE - USA
- SOLTUCA - VENEZUELLA
- ARCELOR MITTAL - CZECH REPUBLIC
- TZINOROT - ISRAEL
- METCO - ISRAEL
- APC - SAUDI ARABIA

- ORUMIEH - IRAN
- KOWSAR - IRAN
- RATNAMANI - INDIA
- TUBERIA LAGUNA - MEXICAN
- BYARD - NIGERIA
- ORMAZABAL - SPAIN
- AREVA - SPAIN
- SOFRATEST - FRANCE

## OUR INFORMATION TECHNOLOGY CAPABILITIES



## ADVANCED INDUSTRIAL SOFTWARE



## KEEPING PACE WITH TECHNOLOGY

- Big Data Value Association (BDVA) PPP
- EFFRA (European Factories of Future)
- Vision 2020
- SMART Advanced Manufacturing EUREKA Cluster
- TWI Innovation Network - Technology Acceleration Programmes (TAPs)
- Academic Cooperation (ODTÜ, Bilkent, TOBB, Hacettepe, Uludağ, Yıldırım Beyazıt Universities)
- Networking and Brokerage events

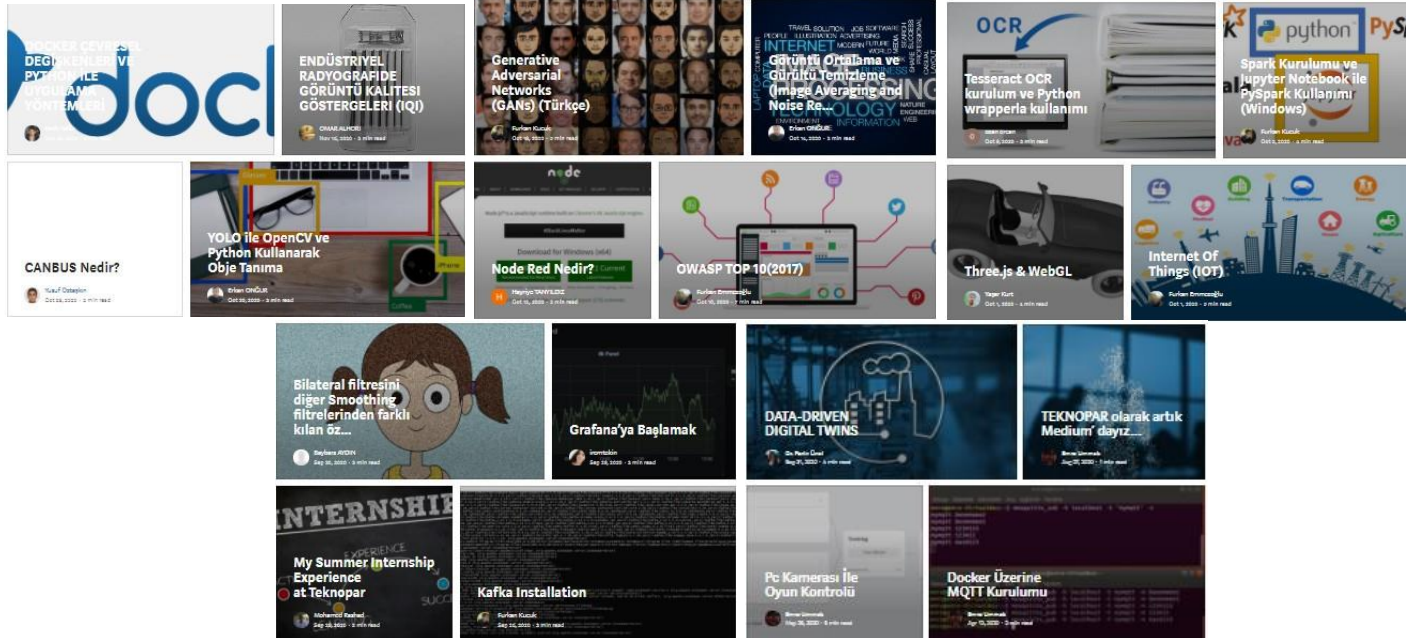




# Research Contributions

## TEKNOPAR has contributed to the following publications and organizations:

- Unal, P. (Contributor) Strategic Research, Innovation and Deployment Agenda (2020) AI, Data and Robotics Partnership, BDVA, available at: <https://aidata-robotics-partnership.eu/wp-content/uploads/2020/09/AI-Data-Robotics-Partnership-SRIDA-V3.0.pdf>
- BDVA TF7 SG6: Smart Manufacturing Industry SMI 2017 Position Paper [https://jam4.sapjam.com/groups/meAUIRzqW2WQSePaemuxn3/documents/teaQt1RutZAqqmZWnbq5QL/slide\\_viewer?label=Page+1](https://jam4.sapjam.com/groups/meAUIRzqW2WQSePaemuxn3/documents/teaQt1RutZAqqmZWnbq5QL/slide_viewer?label=Page+1)
- BDVA Smart Manufacturing Industry Discussion Paper (2018) A Discussion Paper on Big Data challenges for BDVA and EFFRA Research & Innovation roadmaps alignment, available at: [http://www.bdva.eu/sites/default/files/BDVA\\_SMI\\_Discussion\\_Paper\\_Web\\_Version.pdf](http://www.bdva.eu/sites/default/files/BDVA_SMI_Discussion_Paper_Web_Version.pdf)
- Big Data Challenges in Smart Manufacturing Industry (2019) A Discussion Paper on Digital Europe Big Data challenges for Smart Manufacturing Industry, available at: <http://www.bdva.eu/node/1002>
- SMEs in the European Data-Economy A representative sample from the BDVA community November 2017, available at: [http://www.bdva.eu/sites/default/files/BDVA\\_SME\\_Booklet\\_2017.pdf](http://www.bdva.eu/sites/default/files/BDVA_SME_Booklet_2017.pdf)
- Contributed to the CCSAGT National Cloud Computing Standardization studies in Turkey.
- Served as the Head of the Manufacturing Sector for 5GTRForum 5G and Beyond White Book: <https://www.btk.gov.tr/uploads/announcements/5g-ve-otesi-beyaz-kitap/5gtr-beyazkitap.pdf>
- International organizations sponsored by TEKNOPAR are: Deep Learning and Machine Learning in Emerging Applications (DEEP-ML 2019), Future Internet of Things and Cloud (FiCloud 2019), Big Data Innovations and Applications (Innovate-Data 2019), Mobile Web and Intelligent Information Systems (MobiWis 2019 - 2020 - 2021)



# Academic Publications

- Ünal P., Albayrak Ö., Jomâa M., Berre A. (2021) Data-driven Artificial Intelligence and Predictive Analytics for the Maintenance of Industrial Machinery with Hybrid and Cognitive Digital Twins. Technologies and Applications for Big Data Value, Book Chapter 14. BDVA/DAIRO
- Smart Steel Pipe Production Plant via Cognitive Digital Twins: A Case Study on Digitalization of SWP, The 3<sup>rd</sup> ESTEP WORKSHOP Impact and opportunities of Artificial Intelligence in the Steel Industry, <https://www.estep.eu/assets/Uploads/AI-ML-Workshop-Program-Keynote-lecturer-flyer-programme-final.pdf>
- Albayrak, Ö. and Ünal, P., "Smart Steel Pipe Production Plant via Cognitive Digital Twins: A Case Study on Digitalization of Spiral Welded Pipe Machinery" in Advances in Intelligent Systems and Computing Volume 1338: "Impact and Opportunities of Artificial Intelligence Techniques in the Steel Industry: Ongoing Applications, Perspectives and Future Trends", V. Colla, C. Pietrosanti Eds., ISBN 978-3-030-69366-4, pp. 132-143.
- Unal, P. (2019) Reference Architectures and Standards for the Internet of Things and Big Data in Smart Manufacturing. In 2019 7th IEEE International Conference on Future Internet of Things and Cloud (FiCloud).
- Unal, P., Kocak, Y. (2018). Endüstri 4.0 ile İmalat Sektörünün Dijitalleştirilmesi Kapsamında Yapılan Çalışmalar, Savtek 2018, 9. Savunma Teknolojileri Kongresi, 27-29 Haziran 2018, ODTÜ, Ankara
- Awan, I., Younas, M., Ünal, P., & Aleksy, M. (2019) Mobile Web and Intelligent Information Systems. Springer International Pu.
- Unal, P., Kocak, Y., & Donmez, Y. (2018). A Smart Winter Service Platform and Route Planning Algorithm. In 2018 IEEE 6th International Conference on Future Internet of Things and Cloud (FiCloud) (pp. 192-196).

# Submitted Academic Publications

## A Comparison of Feature Extraction and Deep Transfer Learning Methods for Bearing Fault Detection

**Keywords:** Transfer learning, GoogleNet, CNN, bearing fault diagnostics, traditional feature extraction, CWRU bearing dataset, deep learning, machine learning

The 8th International Conference on Future Internet of Things and Cloud (<http://www.ficloud.org/2021/>)



FiCloud  
2021

## Digitalization of a Steel Pipe Production Factory: STEEL4.0- A Family of Products Developed on Routes from Industry 3.0 to Industry 4.0

**Keywords:** Digitalization, industry 4.0, steel industry, process industry, automation, artificial intelligence Fifth International Iron & Steel Symposium (<https://udcs21.karabuk.edu.tr/>)



UDCS21

## A Data Processing Platform for Predictive Maintenance in Industrial Context

**Keywords:** Predictive analytics, Predictive Maintenance, Data Processing Platform, Machine Learning Data Science in Process Industries, European Network for Business and Industrial Statistics (ENBIS) (<https://conferences.enbis.org/event/6/abstracts/>)



ENBIS



FiCloud  
2021



SIU

## A Comparison of Recent AI Algorithms on Time Series Data for Predictive Maintenance

**Keywords:** Remaining Useful Life, Artificial intelligence, Predictive Maintenance, Hyper- parameter Tuning  
The 8th International Conference on Future Internet of Things and Cloud (FiCloud 2021) (<http://www.ficloud.org/2021/>)

## Performance Analysis of Machine Learning Models for Object Recognition in Underwater Video Images

**Keywords:** Underwater image analysis, computer vision, object recognition, deep learning, machine learning

# Selected R&D Software Projects

## COGNITWIN

Cognitive Plants Through Proactive Self-Learning Hybrid Digital Twins

## MACHINAIDE

Knowledge-based Services for and Optimisation of Machines

## CONSTRUMATIC 4.0

Industry 4.0 Based Advanced Robot Technology

## FACTORY4.0

Development of Industry 4.0 Based Digital Twin Platform for Production Data Processing and Analysis

## TX-VISION

Automatic Defect Detection for X-Ray Test Systems

## FLOW-CAM

Floating Offshore Wind Turbine Cable Monitoring

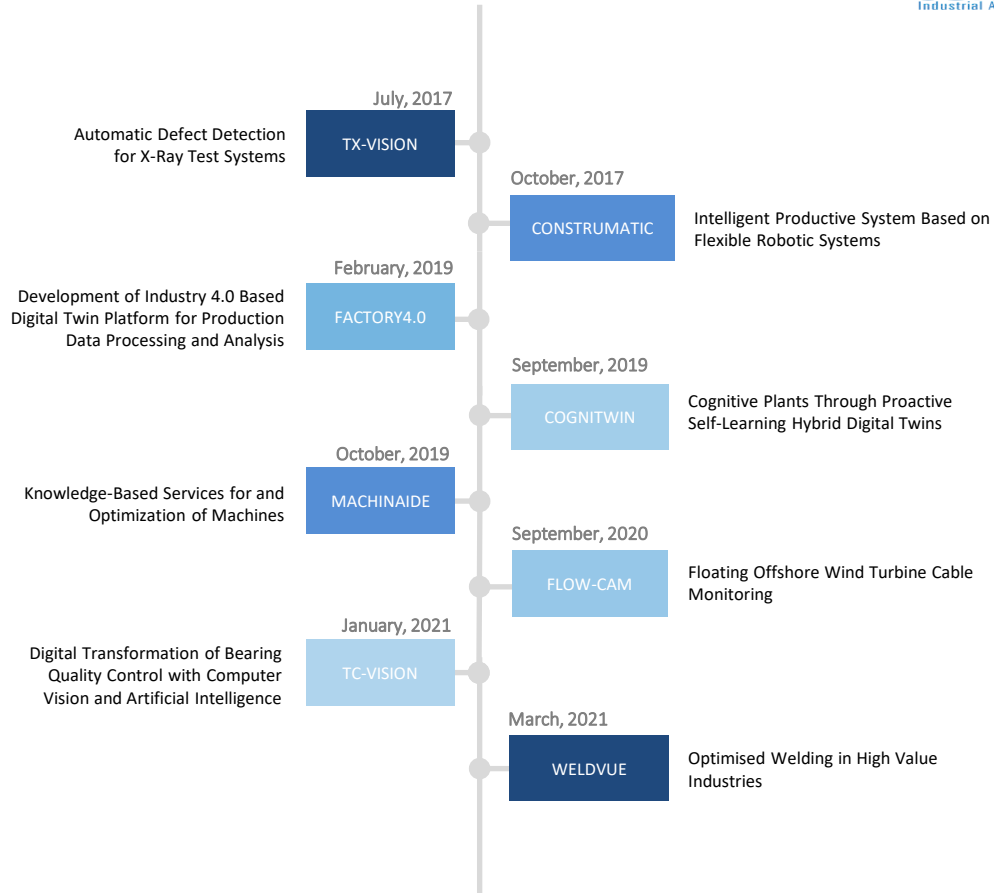
## TC-VISION

Digital Transformation of Bearing Quality Control with Computer Vision and Artificial Intelligence

## WELDVUE

Optimized Resource in High Value Sectors

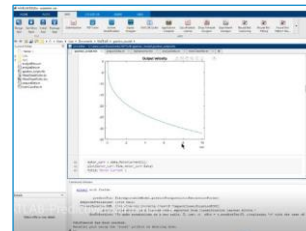
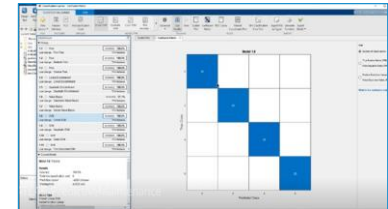
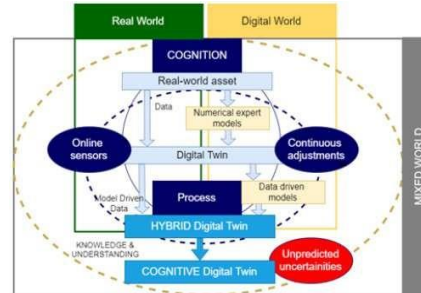




## COGNITWIN

### Cognitive Plants Through Proactive Self-Learning Hybrid Digital Twins

The aim of the COGNITWIN project is to add cognitive elements to existing process control systems to provide these systems' ability to self-organize and offer solutions to unpredictable behaviors. The project will bring a new level of operations focused on Industry 4.0 by bringing new data sources to industry partners, then integrating new and existing data, and applying machine learning techniques that generate hybrid, self-learning and proactive systems to cognitive factories as part of their digital transformation journeys.



## COGNITWIN

Cognitive Plants Through Proactive Self-Learning Hybrid Digital Twins



### INDUSTRIAL PARTNERS

Noksel Çelik Boru  
Hydro Aluminium Deutschland GmbH  
SHI FW Energia Oy  
Sidenor Aceros Especiales Europe S.L.  
Elkem ASA  
Saarsthal AG



### UNIVERSITY AND R&D INSTITUTES

SINTEF AS  
The German Research Center for Artificial Intelligence (DFKI)  
Fraunhofer-Gesellschaft  
University of Oulu



### TECHNOLOGY PROVIDERS

TEKNOPAR  
Cybernetica AS  
Nissatech  
Scortex

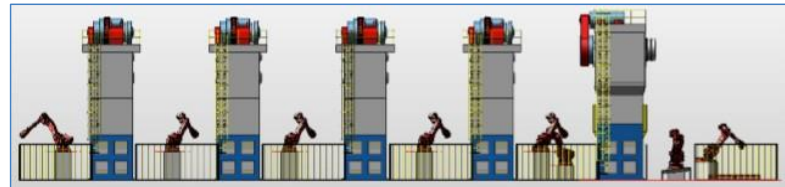
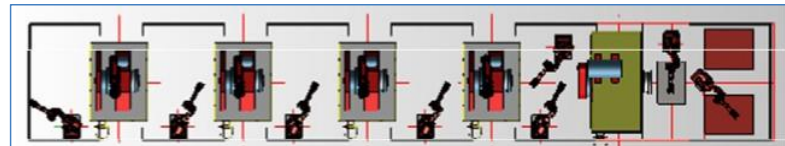
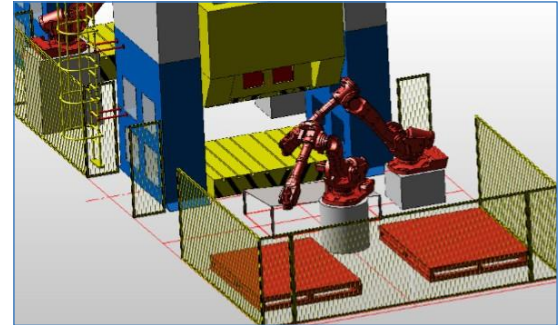




## MACHINAIDE

### Knowledge-based Services for and Optimisation of Machines

MACHINAIDE is a project taking into account the latest developments in digitization and Artificial Intelligence. The aim of the project includes developing a Digital Twin by applying artificial intelligence methods, ensuring the interoperability of multiple Digital Twins that contain more than one ecosystem, increasing the availability of machines, and defining innovative Human-Machine Interfaces and new business models that offer innovative services.



## MACHINAIDE

Knowledge-based Services for and Optimisation of Machines



### INDUSTRIAL PARTNERS

Additive Industries  
Konecranes Global Corporation  
Lely Industries N.V  
ERMETAL



### UNIVERSITY AND R&D INSTITUTES

Aalto University  
Eindhoven University of Technology  
ETRI  
RollResearch International Oy  
TNO  
VTT Technical Research Centre



### TECHNOLOGY PROVIDERS

TEKNOPAR  
Dakik Yazılım Teknolojileri  
Doğru Bilgi Teknolojileri  
ERSTE Software  
CIP System  
IDEAL PLM  
KE-works BV  
Remion



ITEA3



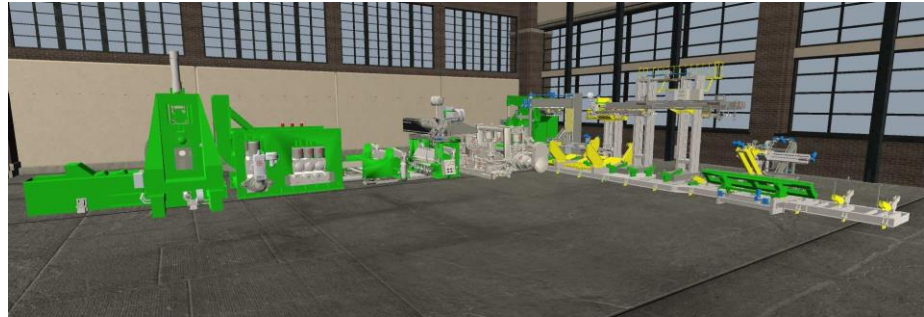
machinaide

## FACTORY4.0

### Development of Industry 4.0 Based Digital Twin Platform for Production Data Processing and Analysis

The project aims developing a digital platform with Industrial Internet of Things Platform, Data Analytics, Data Visualization, Machine Learning Library and Industrial Security modules for the manufacturing industry.

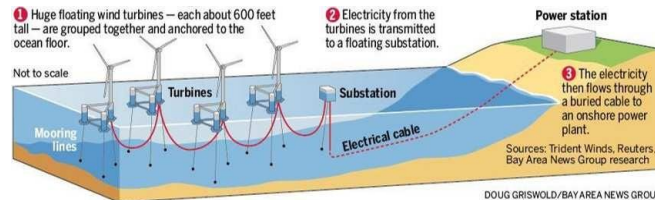
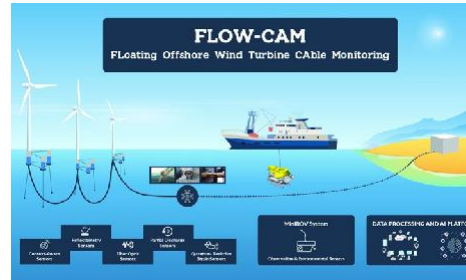
FACTORY4.0 consists of Operational Technologies (OT), Information Technologies (IT), and Digital Twin (DT) components and collects data using the IIoT components, visualizes and interprets the collected data.



## FLOW-CAM

### Floating Offshore Wind Turbine Cable Monitoring

The FLOW-CAM project aims to detect and monitor the structural and operational conditions of underwater cables of offshore wind turbines. The project utilizes new methods to inspect and determine these conditions.



**INDUSTRIAL  
PARTNERS**

ENERJİSA- AYEDAS



**UNIVERSITY AND  
R&D INSTITUTES**

CEA LIST  
IFSTAR COSYS



**TECHNOLOGY  
PROVIDERS**

TEKNOPAR  
Desistek Robotik Ltd. Sti.  
MEDYSYS

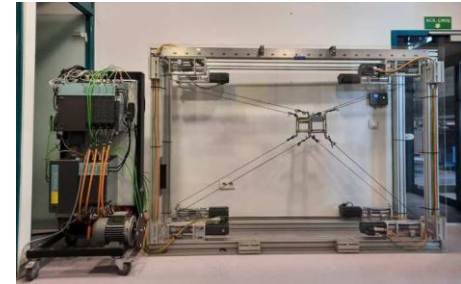
## CONSTRUMATIC 4.0

### Industry 4.0 Based Advanced Robot Technology

In the CONSTRUMATIC 4.0 project, it is aimed at developing planning and virtual reality-based tasks by applying Industry 4.0 in the industry with real monitoring of motion control, reducing production times and increasing productivity by adapting the system to different application areas, load movements on the construction site, developing a functional robotic system that can perform tasks such as auditing, tracking, control and measurement, establishing a portable and practically compatible system with every project, and with the integration to Industry 4.0,



**EUREKA**  $\Sigma$   
 innovation across borders



**INDUSTRIAL  
 PARTNERS**

Coprosa Group



**TECHNOLOGY  
 PROVIDERS**

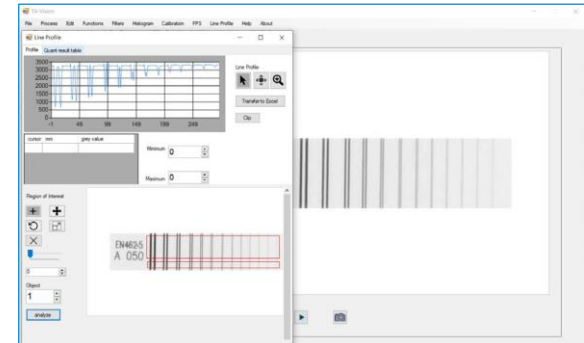
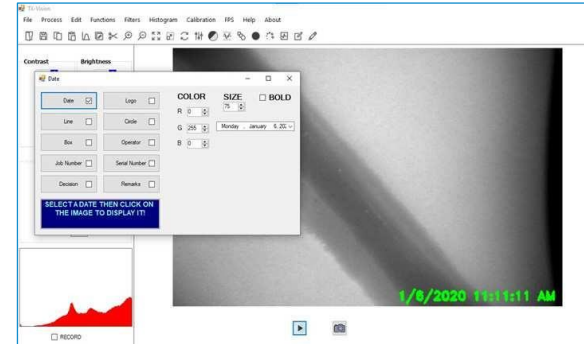
TEKNOPAR

IDONIAL

## TX-VISION

### Image Processing System Development and Prototype Manufacturing for Non-Destructive Inspection Testing (NDT) X-Ray Test Device

TX-VISION is a software designed for computer aided image processing, object recognition and anomaly detection. This software supports the Digital Imaging and Communications (DICONDE) format which is a widely used standard to interoperate with different devices and facilitate communication. In this project, image processing system design and prototype manufacturing that is main constituent of radioscopic test systems, compliance with related ISO standards and imported from abroad has been carried out for improving the welding process, detecting defective welding areas and, when necessary repairing.

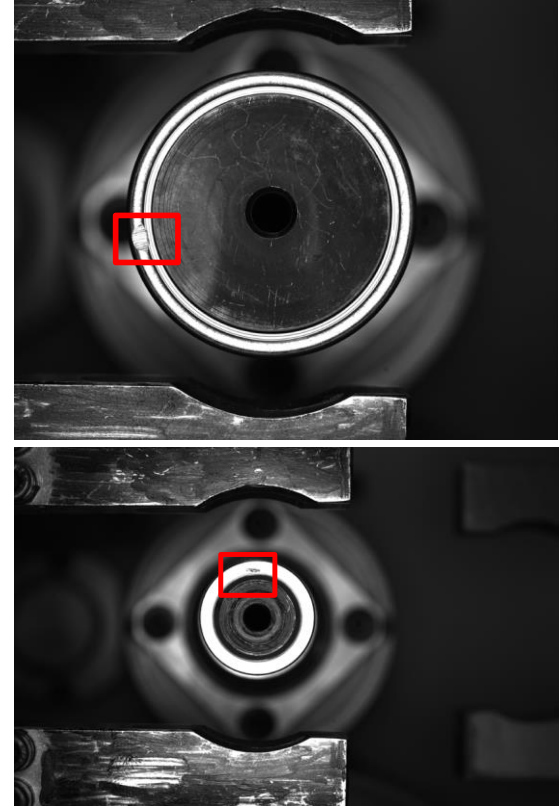


## TC-VISION

### Digital Transformation of Bearing Quality Control with Computer Vision and Artificial Intelligence

TC-VISION aims to ensure the error detection of different types and sizes of products produced in factories in various sectors by minimizing the human factor. The user will choose the software package options according to his/her needs. When the prepared general purpose defect detection algorithm is desired to be used in a new sector, TC-VISION will be ready to detect defects with relatively less training data.

Statistics of objects passing through defect detection, data, such as the status of the devices, can be integrated into the company's existing MES system, and production efficiency will be increased via monitoring performance.



## WELDVUE

### Optimized Resource in High Value Sectors

The purpose of the WeldVue project is to implement an advanced artificial intelligence based model for the optimization and restructuring of automotive parts production processes. The project aims at developing a quality control system as a hybrid non-destructive test platform which will be the first of its kind.



#### INDUSTRIAL PARTNERS

COŞKUNÖZ Kalıp Makine



#### UNIVERSITY AND R&D INSTITUTES

Brunel University



#### TECHNOLOGY PROVIDERS

TEKNOPAR  
STL Tech Limited  
ETHER NDE Limited  
TWI Ltd.

**SMART**  $\Sigma$   
advanced manufacturing program





**teknopar**  
(Beta Version)

Search

Search List:

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- Project
- Call

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*See it in action*



## Evaluation Criteria (Research and Innovation Actions/Innovation Actions)

### Excellence

*To the extent that the proposed work corresponds to the topic description in the work programme:*

- **Clarity and pertinence of the objectives**
- **Soundness of the concept, and credibility of the proposed methodology**
- **Extent that proposed work is beyond the state of the art, and demonstrates innovation potential (e.g. ground-breaking objectives, novel concepts and approaches, new products, services or business and organizational models)**
- **Appropriate consideration of interdisciplinary approaches and , where relevant, use of stakeholder knowledge and gender dimension in research and innovation content.**

### Impact

- **The expected impacts listed in the work programme under the relevant topic**
- Any substantial impacts not mentioned in the WP, that would enhance innovation capacity; create new market opportunities, strengthen competitiveness and growth of companies, address issues related to climate change or the environment, or bring other important benefits for society
- Quality of proposed measures to exploit and disseminate project results (including IPR, manage research data where relevant);communicate the project activities to different target audiences

### Implementation

- Quality and effectiveness of the work plan, including extent to which resources assigned in work packages are in line with objectives/deliverables
- Appropriateness of management structures and procedures, including risk and innovation management
- Complementarity of the participants and extent to which the consortium as a whole brings together the necessary expertise
- Appropriateness of allocation of tasks, ensuring that all participants have a valid role and adequate resources in the project to fulfill that role

## Proposal Tips

- Demonstrate real-world usage of solutions
- Show the potential to address the needs of different stakeholders
- Support the creation of an industrial ecosystem
- Get Return-on-Investment with wide applicability and usage potential
- Deliver solutions that can be used by the target users at the end of a given period
- Deliver solutions with clear benefits to the market and business
- Deliver usable solutions that can be sold
- Deliver solutions that are aligned with your strategic plan and commercialization roadmap

# https://h2020.org.tr

The screenshot displays the HORIZON 2020 website interface. At the top, the logo 'HORIZON 2020' is followed by an email input field, a password input field with a blue arrow button, and links for 'Register' and 'Forgot password?'. A Twitter icon and a 'WHO'S WHO?' link with an envelope icon are also present. A blue circular button with 'TR' is in the top right corner.

The main content area is divided into two columns: 'Supports' and 'Awards'.

**Supports**

- ERC PRINCIPAL INVESTIGATOR ADVANCEMENT PROGRAM (Icon: person with plus)
- TRAVEL SUPPORT FOR RESEARCHER LIVING ABROAD (Icon: person with gear)
- TRAVEL SUPPORT (Icon: paper plane)
- SUPPORT FOR THE MEMBERSHIP TO THE NETWORKS (Icon: U-shape)
- COORDINATORS SUPPORT (Icon: puzzle pieces)
- MARIE CURIE PRE-EVALUATION SUPPORT (Icon: group of people)

**Awards**


- ABOVE-THRESHOLD-AWARDS (Icon: star)
- COST ACTION AWARD (Icon: hierarchy chart)
- SUCCESS AWARDS (Icon: trophy)

# THANK YOU

**Perin ÜNAL, PhD**

Vice President - R&D

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