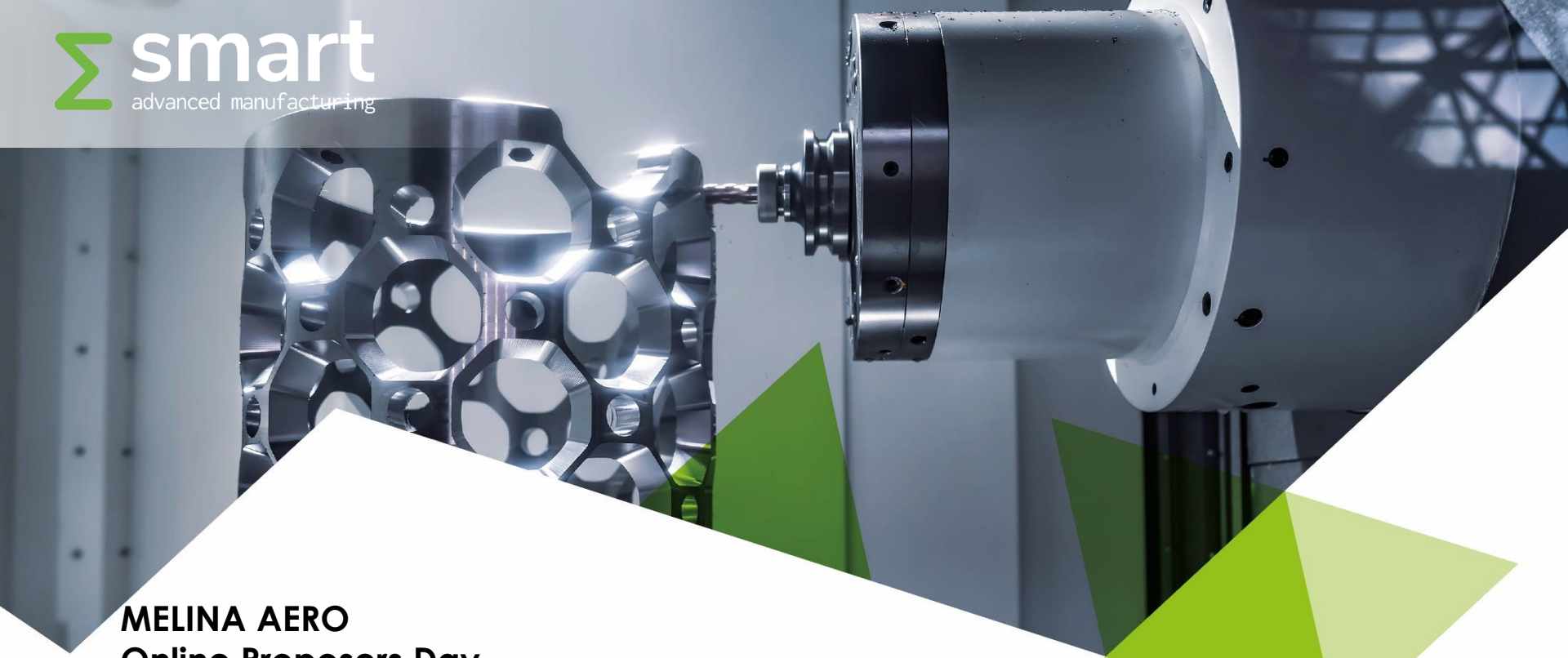
smart
advanced manufacturing



MELINA AERO
Online Proposers Day
5th November 2020

HARMONIZED AI & DOMAIN EXPERTISE ON INTEGRATED DATA INFRASTUCTURES FOR MANUFACTURING SYSTEMS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ORGANISATION PROFILE

Melina Aero Technology Development and Design Corp. was founded in 2016 within ITU Arı Technopolis by Prof.Dr. Onur Tuncer. Melina Aero is developing model-based design and simulation software (FlowNetMaster) for the creation of digital-twins of physical systems. Melina Aero is a micro-scale SME with five employees, a multi-disciplinary team with mechanical and electrical engineers, a computer scientist and a graphical designer.

MelinaAero

" Teknolojinin Kara Kutusu "

FlowNetMaster
www.flownetmaster.com

PROPOSAL INTRODUCTION (I)

Vision: We propose a dual approach to address these shortcomings and enable more efficient usage of AI-powered tools within the manufacturing industry

Motivation: Current implementations of smart (AI-powered) manufacturing systems in the industry are quite limited in scope, highly sensitive to quality of data collection and management flow and overall lack the support of domain knowledge and physics-based modeling. These shortcomings prevent such methods from gaining widespread usage and limit the degree of automation that can be exploited by implementation of AI-powered methods. Integration of cloud services, data security, novel software development and hardware implementations are also of concern to our proposed project effort.

Content:

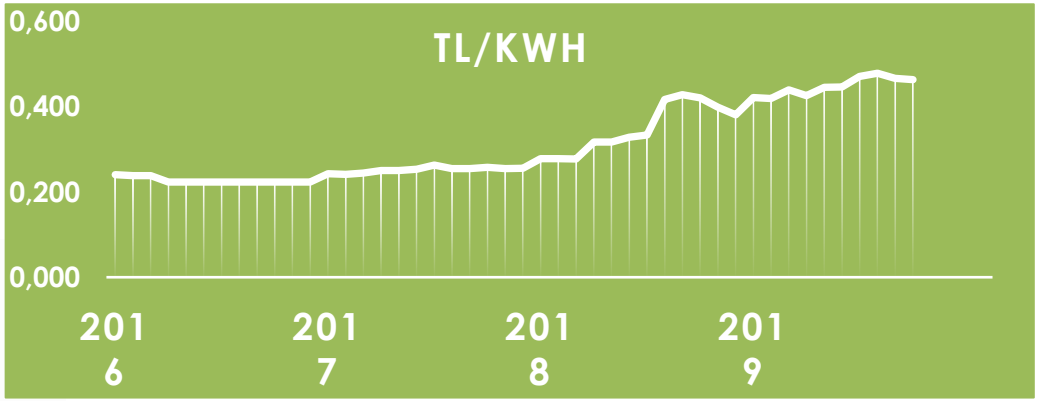
- Integrated Design of IoT Network, Data Management and Machine Learning Pipelines
- integration of domain knowledge and Physics-Based Models with AI-powered Systems

USECASE (I)

Expected outcome: To apply combination of ICTs (Big Data Analysis , IoT , DT and AI) in order to control the major parameters which are highly effective in electricity consumption for a rolling mill.

Impacts: energy consumption reduction could be realized as well as having environmental footprint reduced

Schedule: 01/03/2021 – 24 months



USECASE (II)

Expected outcome: A use-case for the automation of some manual decision steps that require expertise in the testing stages of the TV, one of Vestel's important products.

Impacts: The optic tests are most critical tests and need expertise. There are some stages that are approved by the human eye by looking at some parameters such as color shift on the screen. All necessary variables can be parameterized in this decision mechanism. Here, an AI can be trained for all situations detected by a human, and the decision-making mechanism can be automated with the machine learning for the testing process.

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Schedule: 01/03/2021 – 24 months

USECASE (III)

Expected outcome: Alarm handling in service provider networks is crucial for smooth network operations. Such controls are usually done via fault management systems which have pre-defined rulesets in a telco network which may or may not have root-cause detection capabilities. If an alarm rule is not defined in an appropriate way, then alarms can be missed or several unnecessary alarms might be created.
Impacts:

A1-based Topology aware fault management with root-cause analysis capabilities
empowered with performance metrics
Network topology (Location-device-connection)
• Performance metrics (CPU, Ram, througput)
Active alarms
• Outputs: Redesigned Fault Management system with A1-based root-cause-analysis module for telco applications
More efficient (less time consuming)
• Automized (no manual rule definition)
More intelligent (can learn symptoms and create fault models)

Schedule: 01/03/2021 – 24 months

USECASE (IV)

Expected outcome: Energy management in IOT networks is an important issue for long lasting operations. Although there are lots of brands and sensor types for water distribution sector, these devices are not always in capable of serving the customer needs in terms of their battery life. They are usually dummy devices and can communicate with the network server only at scheduled times. If a water sensor has no consumption value, then there is no need for it to be active and use the channel frequently. Moreover, low signal quality during the uplink-downlink messaging drains the battery of the water sensors.

Impacts:
Extended Battery Life for Water Sensors
A1-based Energy Management Module with channel and time related load balancing
and scheduling capabilities empowered with,
Device data (battery level, device id, region, impulse, forward-backward flows, timestamp etc.)
Network server data (RSSI, SNR, channel usage) A new Energy Management approach in IOT networks with device-based modelling and resource
scheduling
- Long lasting batteries
- Load balancing on network server (time-channel scheduling)

More intelligent (can learn device-based parameters and create battery models)

Schedule: 01/03/2021 – 24 months

PARTNERS

Current

Turkey (Turkish consortium is completed.)

- Melina Aero (Project Coordinator)
- Borçelik (Use Case Provider)
- Vestel (Use Case Provider)
- Istanbul Technical University (Sub-contractor)

Partner search:
Different use case providers
SMEs with data and/or AI focus
Universities

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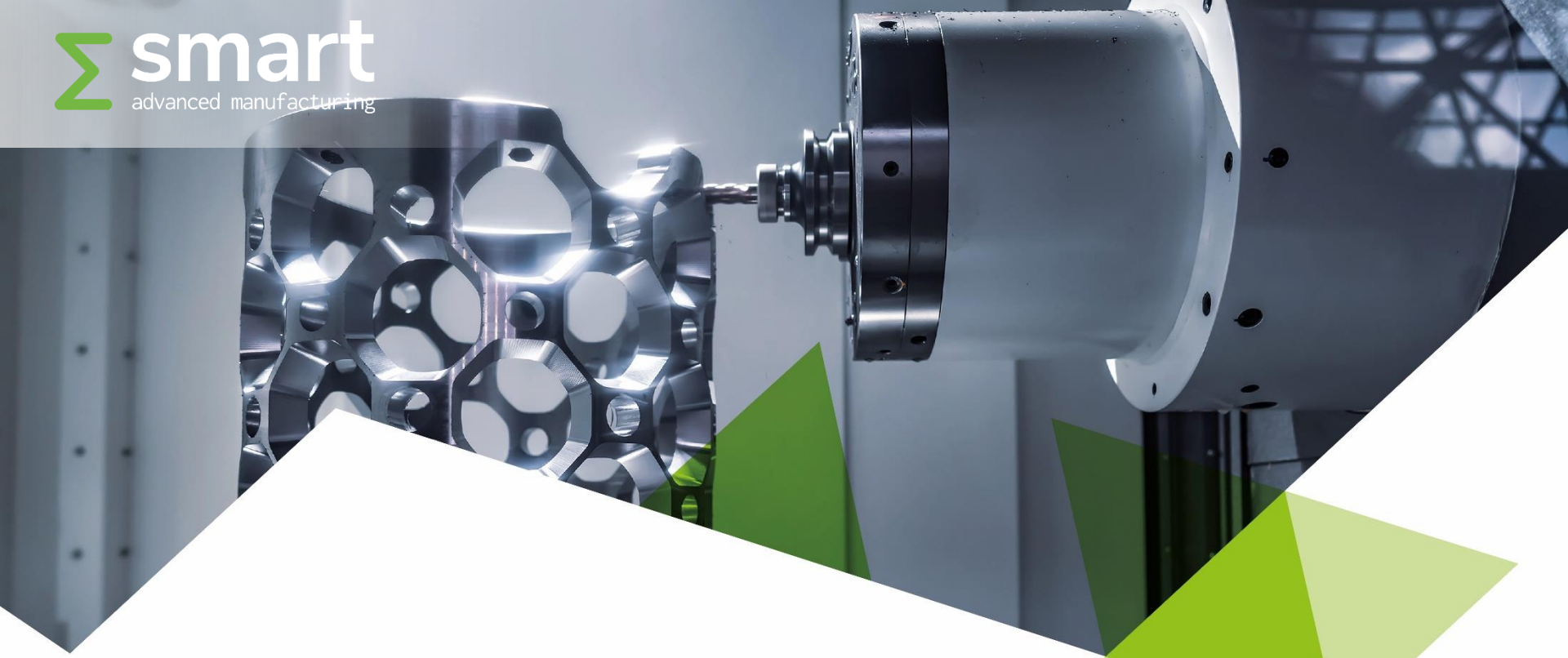

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