

Invited session:

“Knowledge & Data-driven Decision-Making in Smart Maintenance”

Organized by:

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Sponsorship: This invited session is supported by:

- the IFAC TC5.1 on Manufacturing Plant Control,
- the IFAC TC5.1 WG on Advanced Maintenance Engineering Services and Technology (AMEST),
- the IFAC TC5.3 on Integration and Interoperability of Enterprise Systems, and
- the IFIP WG 5.7 on Advances in Production Management Systems (TO BE CONFIRMED).

Over the last decade, manufacturing has witnessed a shift towards “digitalization”. Reduced hardware costs for sensing, transmitting, and processing acquired data and the ability to manage such data at large scale and in distributed ways through services have led to a radical transformation in business processes and decision-making models. As a result, maintenance is amongst the business processes that are experiencing a major industrial transition. The management approach will move towards knowledge and data-driven decision-making, which drives disruptive changes at different levels of the maintenance function, from equipment and plant level to company and eventually to the extended enterprise level. The scope of such changes is very broad: it includes technological, organizational, and human aspects, leading to added value creation from advanced maintenance decision-making. To effect such changes and benefit from the new opportunities, various challenges should be addressed in the coming years. Maintenance planning will be changing, relying on predictive and prescriptive analytics, and exploiting the systemic principles of self-organization, self-adaptation, and self-learning of smart assets. Different types of data from a variety of sources (e.g.: design, engineering, operations, maintenance, and quality) will be valuable for data analysis. Information management and integration across different enterprise information systems (e.g.: MES, CMMS, EAM, APM, and PLM) as well as intra- and inter-enterprise interoperability, at both technical and semantic level, will be essential to ensure knowledge sharing for value creation through asset lifecycle management. This opens up significant potential for collaborative decision-making aimed at optimizing the performance of manufacturing systems and their extended enterprise. The role of human capital will be also fundamental. While decision augmentation clearly benefits from digitalization, the reverse is also seen as an increasingly value-adding option: “placing the human-in-the-loop of technical systems”. A prime example is machine learning-driven human decision-making but also the human in the machine learning loop. Eventually, new opportunities to reinforce the importance of value networks will grow both to enable machine learning at scale as well as organizational learning induced by strategic relationships between end-users and key suppliers. Product-Service Systems (PSS) business models are expected to hold an eminent role in such industrial transitions.

To discuss all aspects of digital transformation towards knowledge and data-driven decision-making in smart maintenance, this invited session calls for high-quality contributions that investigate main research challenges, technology developments, case studies, and applications related to the following topics (but not limited to): Data-driven, or knowledge-driven, or joint data and knowledge-driven:

- Methods for maintenance, repair, diagnostics & prognostics.
- Joint decision-making in production, maintenance planning, and logistics.
- Ontologies and data models for information management and integration in advanced maintenance systems.
- Role of information systems in smart maintenance & lifecycle management of industrial assets.
- The operator 4.0 in a data & knowledge-driven maintenance management
- Systems-of-systems interoperability for distributed collaborative control.
- Value networks in advanced maintenance systems.
- New business models for smart maintenance services.

PAPER SUBMISSION:

Contributions consisting either of empirical studies, collaborative projects and action research in an industrial context are particularly welcome.

INVITED SESSION CODE: i385i

When you submit your paper to the IFAC system, you will be required this ID number in order to associate your paper to the invited session:

<https://ifac.papercept.net/>

IMPORTANT deadlines:

Full papers submission: **7th November 2020**
Notification of acceptance: **15th December 2020**
Final papers submission: **1st February 2021**
Early registration deadline: **8th February 2021**
Late registration deadline: **1st April 2021**
Conference dates: **7th-9th June 2021**