



Vie de groupe CT IMS²

Bidart, le 25/05/2022



CNRS **EDR** Groupement de recherche
MACS Modélisation, Analyse et
Conduite des Systèmes dynamiques



*Société d'Automatique,
de Génie Industriel et de
Productique*

IMS²
**- Intelligent Manufacturing
Systems & Services -**

Ordre du jour

- Bilan Journées & perspectives
- Conférences passées et à venir
- Prochaine édition de l'école IMS²
- Parution de l'ouvrage issu de l'école IMS²
- Formation « Jumeau Numérique et Flexsim »
- Questions diverses



Bilan journées Bidart & perspectives

- Bilan:

- 2 sessions:

- 4 orateurs, environ 30 participants uniques et > 15 Laboratoires

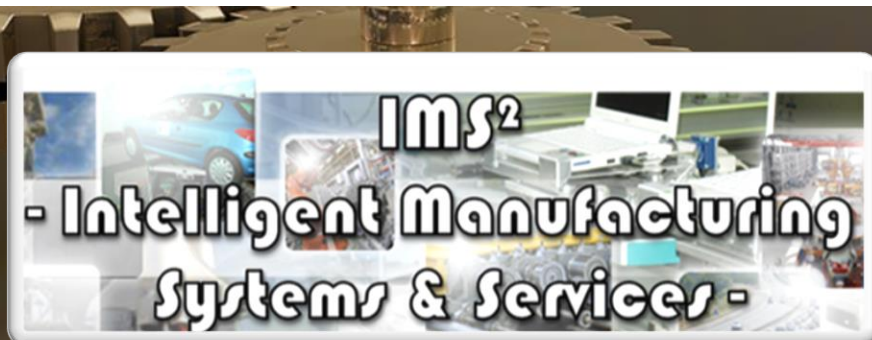
- Nantes, Valenciennes, Paris, Québec, Annecy, Grenoble, Strasbourg, Tarbes, Reims, Bordeaux, Albi, Lyon, Marseille, Nancy, Saint-Etienne, etc.

- Thématiques:

- CPPS – Pilotage – Lean – Digital Twin – Reverse logistics

- Perspectives:

- Prochaines journées STP probablement à l'automne 2022
 - Session commune INE? « Gestion des connaissances en CPIS »
 - Appel à autres propositions déjà ouvert 😊



Conférences passées et à venir - SOHOMA

- SOHOMA 21 à Cluny – Hybride
 - 9 sessions thématiques (Pilotage, Jumeau, MAS, HMS, RMS, éthique) – 42 papiers, 55 inscrits, 11 pays
- SOHOMA 22 à Bucharest – 22/23 septembre 2022
 - Full paper submission: 8 July 2022
 - 6 sessions spéciales: <https://www.sohoma22.cloud.upb.ro/submission/>
 - Low-cost Digitization for Industry 4.0
 - Education for Industry 4.0
 - Applications of multi-agent and holonic systems in smart manufacturing
 - Performance, ethics and operations management in internal logistics 4.0
 - Reconfigurable Manufacturing Systems
 - Digital Twins in Industrial Systems



Conférences passées et à venir – les autres

- IMS 2022 (Tel-aviv/Online – 29/30 Mars 2022)
 - Conférence majeure du TC5.1 IFAC
 - Peu de participation française...
 - Edition suivante 2024 en Pologne
- MIM 2022 (Nantes – 22/24 juin 2022)
 - Sessions spéciales
 - Resilience of Cyber-Physical Production Systems in Industry 4.0: Issues, Modelling, Implementation and Evaluation
 - Digital Twins in Cyber-Physical Production Systems
- GIN Conference on Logistics | New Technologies & Effective Circular Economy (Valenciennes – 6/8 juillet 2022)
- IFAC World Congress (Yokohama – 9/14 juillet 2023)



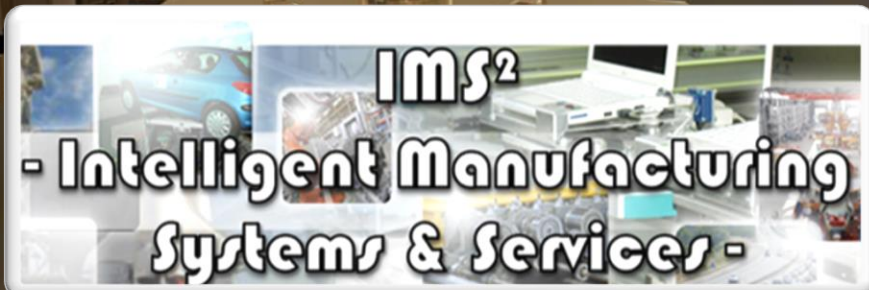
Bilan Ecole IMS² 2021-2022

- **4^e édition – en présentiel!**
- 5 participants de 5 établissements:
 - Nantes, Paris, Grenoble, Lyon, Compiègne
 - Effet COVID...
- Prochaine édition à l'automne 2022
 - Présentiel à Nantes
 - Prospectives:
 - Inclusion d'une session TP RMS
 - TP synchronisation Modèle virtuel / Système réel
 - Dates à définir
 - Semaines 40-41-42?
 - Lundi à Mercredi?

Module outline

- Global objective: teach you new ways to “Think industry”

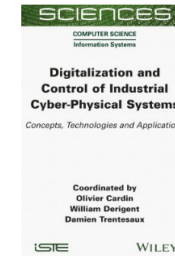
Date	French Time	Speaker	Topic
29/11/2021	13h45-15h45	Olivier Cardin (Univ. Nantes)	Introduction to Industry 4.0
29/11/2021	16h00-18h00	Olivier Cardin (Univ. Nantes)	From FMS to CPPS
30/11/2021	8h00-10h00	Olivier Cardin (Univ. Nantes)	Applications of CPPS
30/11/2021	10h15-12h15	William Derigent (Univ. Lorraine)	Intelligent products – Visio
30/11/2021	13h45-15h45	William Derigent (Univ. Lorraine)	Intelligent products (cont'd) – Visio
30/11/2021	16h00-18h00	Olivier Cardin (Univ. Nantes)	Introduction to Industrial Agents
01/12/2021	8h00-12h15	Catherine da Cunha (Centrale Nantes)	Smart Factory – Centrale Nantes
01/12/2021	13h45-15h45	Olivier Cardin (Univ. Nantes)	Introduction to Digital Twin
01/12/2021	16h00-18h00	Maroua Nouri (Univ. Nantes)	Sustainability issues in Industry 4.0: energy consumption stakes
02/12/2021	8h00-10h00	Hind Bril (Univ. Lorraine)	Sustainability issues in Industry 4.0: the human factor – Visio
02/12/2021	10h15-12h15	Olivier Cardin (Univ. Nantes)	Ethics concerns – Conclusion



Ouvrage pédagogique IMS²

- Sortie de la version anglaise
Mai 2022
- Version française à venir
- Site web en préparation
<https://industrial-cps.net/>

Digitalization and Control of Industrial Cyber-Physical Systems Concepts, Technologies and Applications SCIENCES - Computer Science



Edited by
Olivier Cardin, *Nantes University, France*
William Derigent, *University of Lorraine, France*
Damien Trentesaux, *University Polytechnique Hauts-de-France, France*

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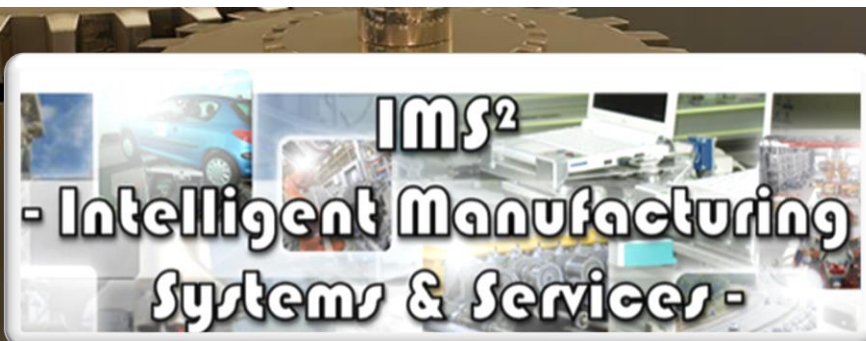
Co-publisher



Description

Industrial cyber-physical systems operate simultaneously in the physical and digital worlds of business and are now a cornerstone of the fourth industrial revolution. Increasingly, these systems are becoming the way forward for academics and industrialists alike. The very essence of these systems, however, is often misunderstood or misinterpreted. This book thus sheds light on the problem areas surrounding cyber-physical systems and provides the reader with the key principles for understanding and illustrating them.

Presented using a pedagogical approach, with numerous examples of applications, this book is the culmination of more than ten years of study by the Intelligent Manufacturing and Services Systems (IMS2) French research group, part of the MACS (Modeling, Analysis and Control of Dynamic Systems) research group at the CNRS. It is intended both for engineers who are interested in emerging industrial developments and for master's level students wishing to learn about the industrial systems of the future.



Ouvrage pédagogique IMS² - Contenu

- Part 1. Conceptualizing Industrial Cyber-Physical Systems.
 - 1. **General Concepts**, Olivier Cardin and Damien Trentesaux.
 - 2. **Moving Towards a Sustainable Model: Societal, Economic and Environmental**, Patrick Martin, Maroua Nouiri and Ali Siadat.
- Part 2. Sensing and Distributing Information Within Industrial Cyber-Physical Systems.
 - 3. **Information Flow in Industrial Cyber-Physical Systems**, Thierry Berger and Yves Sallez.
 - 4. **The Intelligent Product Concept**, William Derigent.
- Part 3. Digitalizing at the Service of Industrial Cyber-Physical Systems.
 - 5. **Virtualizing Resources, Products and the Information System**, Theodor Borangiu, Silviu Raileanu and Octavian Morariu.
 - 6. **Cybersecurity of Industrial Cyber-Physical Systems**, Antoine Gallais and Youcef Imine.
- Part 4. Controlling Industrial Cyber-Physical Systems.
 - 7. **Industrial Agents: From the Holonic Paradigm to Industrial Cyber-Physical Systems**, Paulo Leitao, Stamatis Karnouskos and Armando Walter Colombo.
 - 8. **Holonic Control Architectures**, Olivier Cardin, William Derigent and Damien Trentesaux.
- Part 5. Learning and Interacting with Industrial Cyber-Physical Systems.
 - 9. **Big Data Analytics and Machine Learning for Industrial Cyber-Physical Systems**, Yasamin Eslami, Mario Lezoche and Philippe Thomas.
 - 10. **Human-Industrial Cyber-Physical System Integration: Design and Evaluation Methods**, Marie-Pierre Pacaux-Lemoine and Frank Flemisch.
- Part 6. Transforming Industries with Industrial Cyber-Physical Systems.
 - 11. **Impact of Industrial Cyber-Physical Systems on Reconfigurable Manufacturing Systems**, Catherine Da Cunha and Nathalie Klement.
 - 12. **Impact of Industrial Cyber-Physical Systems on Global and Interconnected Logistics**, Shenle Pan, Mariam Lafkihi and Eric Ballot.
 - 13. **Impact of Industrial Cyber-Physical Systems on Transportation**, John Mbuli and Damien Trentesaux.
 - 14. **Impacts of Industrial Cyber-Physical Systems on the Building Trades**, William Derigent and Laurent Joblot.
 - 15. **Impact of Industrial Cyber-Physical Systems on the Health System**, Franck Fontanili and Maria Di Mascolo.
- Part 7. Envisioning the Industrial Cyber-Physical Systems of the Future.
 - 16. **Ethics and Responsibility of Industrial Cyber-Physical Systems**, Sylvie Jonas and Françoise Lamnabhi-Lagarrigue.
 - 17. **Teaching and Learning ICPS: Lessons Learned and Best Practices**, Bilal Ahmad, Freeha Azmat, Armando Walter Colombo and Gerrit Jan Veltink.

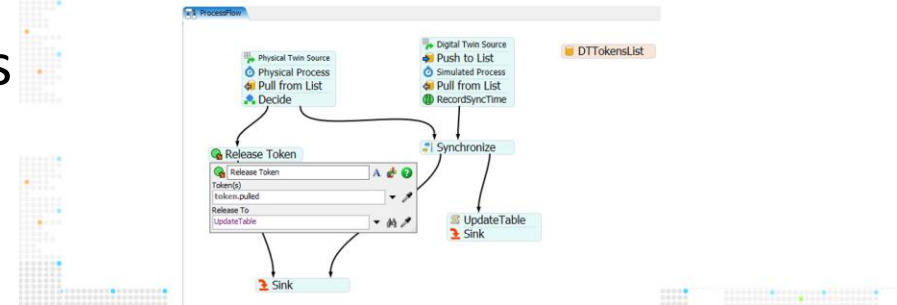


Formation JN et Flexsim

- Formation issue de l'école MACS
- Objectifs:
 - Apprendre à synchroniser 2 modèles dynamiques
 - Synchroniser un modèle et un système industriel
- Prérequis
 - Formation basée sur Flexsim, pas de pré-requis
 - Connaissance de base de formalisme RdP
- Organisation commune IMS² – S.Mart
- Automne 2022 à Nantes! Contact: olivier.cardin@ls2n.fr

Practical 1: hard case - simulation is late

- To introduce the test, we add a Decide block
 - If the Pull operation failed, then PT is late so we can connect to the Synchronize introduced in the first part
 - To avoid an error, we need to add the initial creation of the label "Failed" in the source
 - If it did not fail, then we need to interrupt the Simulated Process with a "Release Token"



Questions diverses

- Quand est-ce qu'on mange?



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