



The banner features the IFAC logo on the left, the text 'Second Call for Papers' and 'www.IFAC2023.org' in the center, and the IFAC 2023 Yokohama logo on the right. Below the text, it states 'The 22<sup>nd</sup> World Congress of the International Federation of Automatic Control' and 'July 9 – 14, 2023, Yokohama, Japan'. A map of Japan highlights Tokyo and Yokohama. The background shows a cityscape with skyscrapers.

**Second Call for Papers**  
[www.IFAC2023.org](http://www.IFAC2023.org)

**The 22<sup>nd</sup> World Congress of the International Federation of Automatic Control**  
**July 9 – 14, 2023, Yokohama, Japan**

The IFAC World Congress is the largest event in the field of control science and technology, held every three years since 1960. It offers the most up-to-date and complete view of control techniques, with the widest coverage of application fields, and is attended by a worldwide audience of scientists and engineers from academia and industry. **The IFAC World Congress 2023 will be held in Yokohama, Japan**, which is the second congress hosted in Japan with the first being IFAC 1982 in Kyoto.

## **Invited Session: Challenges and opportunities in applying Additive Manufacturing in Supply Chains**

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Additive Manufacturing (AM) has recently emerged as a disruptive manufacturing technology since it allows to produce in a fast and simple way parts with a level of complexity not even imaginably achievable with conventional manufacturing (CM) techniques (e.g., casting, rolling, etc.). Aerospace and automotive sectors were the pioneers in exploiting the possibilities achievable via producing parts in AM, and its use has now expanded to other sectors and applications. The biomedical sector, for example, has started producing implants via AM since it enables to produce implants that matches the human body requirements closer than what achievable via CM techniques, while after-sales companies have been attracted by the possibility provided by AM to reduce the stock levels by producing spare parts on demand. Furthermore, the possibility of AM to produce parts on the site of use makes so that AM has repercussions not only on the production phase, but on the whole supply chain. In fact, by producing parts on the site of use, the supply chain complexity can be decreased (less echelons are required), as well as its environmental footprint, while its responsiveness can be highly increased. This is particularly important considering the current times where the Covid-19 pandemic is still affecting our lives and the frequency of natural disasters might increase due to the global warming. In such a context, AM can increase the resilience and viability of supply chains, as well as support humanitarian organizations in the first recovery phase after the occurrence of natural disasters or other disruptive events.

However, despite all the above-mentioned potentialities and benefits of AM, its deployment is still limited. Some main limitations, in fact, hamper its diffusion. Firstly, AM parts are more expensive than CM counterparts, hence reducing or even cancelling some of the above-mentioned economic benefits achievable. This is further exacerbated if parts need to be qualified according to the different standards (ISO, ASTM, ...): a very limited number of companies/institutions is currently certified to qualify AM parts (contrarily to CM parts), and this hence has a high impact on AM parts' costs. Moreover, the still high investments necessary for buying an AM machine limit the cases where producing parts on the site of use is economically convenient. Furthermore, recent years have seen an increasing number of legal actions for Intellectual Property (IP) infringement when using AM parts (for example for face masks during the battle against Covid-19 pandemic), and this highly affect the possibilities to use AM in the first recovery phase after the occurrence of natural disasters or other disruptive events. Finally, some dilemmas arise also from an environmental perspective. In fact, on the one hand, AM allows to reduce

the environmental footprint by producing parts on the site of use, but, on the other hand, the AM production process is very demanding in terms of energetic consumptions. Consequently, the overall environmental footprint might not be reduced if the whole product lifecycle is considered. It is hence still not clear when it is really convenient to adopt AM, and this becomes even more uncertain if we include in the analysis the risks of disruptions: the adoption of AM might lead to higher costs, but it might ensure the viability of the supply chain. This session aims at solving these dilemmas collecting novel and innovative studies that support the adoption of AM by identifying under which conditions the benefits of AM are such to overcome their limitations.

Topics may include (but are not limited to):

- Adoption of AM in supply chains
- Impact of AM on supply chain design
- AM for supply chain resilience/viability
- AM for spare parts supply chains
- AM for biomedical supply chains
- AM for humanitarian supply chains
- AM for sustainable supply chains
- Qualification tests in AM supply chains
- IP issues in AM supply chains
- Scheduling and nesting of AM machines
- Environmental footprint of AM life cycle

Both quantitative and qualitative works are welcome.

**Submission**

For author guidelines, please refer to <https://www.ifac-control.org/conferences/author-guide>. All papers must be submitted electronically using Symposium Manuscript Management System (CMMS). All papers must be prepared in a two-column format in accordance with the IFAC manuscript style. Please use the official IFAC instructions and template to prepare your contribution as full-length draft paper and submit it online by October 31, 2021. Submission details are available on the symposium website. All submissions must be written in English. All papers that conform to submission guidelines will be peer-reviewed by IPC members. The corresponding author submits the paper online (pdf format) as an invited session paper. **Submission as an invited paper requires the invited session code XXX. Special issues of IFAC World Congress 2023 are planned in IFAC and other high-ranked journals**

**IMPORTANT DATES:**

Draft paper submission deadline:	31/10/2022
Notification of acceptance:	21/02/2023
Final papers submission deadline:	31/03/2023
Conference date:	09-14/07/2023