IAF MATERIALS AND STRUCTURES SYMPOSIUM (C2)
Manufacturing and industrialization for Launch Vehicle and Space Vehicle Structures and components (High volume production, industrialization, automatization and digitalization) (7)

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Abstract

This presentation explores the new challenges and solutions of industrialization within the launcher industry, where the seamless integration of digitalization, automation versatility, and artificial intelligence (AI) is propelling a new era of efficiency, reliability, and innovation. The convergence of these technologies is reshaping the design, manufacturing, and operation of launch vehicles, promising to redefine the capabilities and economics of accessing space in a harsh competition. Key focal points of the presentation include: 1. Digital Twin Technology for Launcher Design: Examining how digital twin technologies are reshaping the design, prototyping phases and manufacturing of launch vehicles, enabling real-time simulations, optimization, and rapid iterations for enhanced performance and reliability. 2. Automated Manufacturing Processes: Investigating the versatility of automation in launcher manufacturing, from precision machining and additive manufacturing to assembly and quality control, showcasing how automation is streamlining production processes and ensuring consistency in component fabrication. 3. Predictive Maintenance and Fault Diagnosis: Exploring how AI-driven predictive maintenance models are minimizing downtime, extending launcher lifespans, and improving overall reliability by anticipating and addressing potential issues before they impact launch schedules. 4. Supply Chain Optimization through Digitalization: Discussing how digitalization is optimizing supply chains by enhancing communication, tracking, and coordination among suppliers, reducing lead times, and improving overall supply chain resilience. The presentation aims to provide the evolution of the industrialization of launcher production with valuable insights into the transformative potential of digitalization, automation versatility, and artificial intelligence.