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"Integration and Interoperability in Automated and Smart Manufacturing Systems"

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Systems integration and interoperability, although different but complementary, have a lot in common and sometimes overlap either in terms of concepts, principles or technologies. Integration is about "joining entities together to make one, i.e. a seamless whole", while interoperability is about "using data/information/knowledge or functionality from others with minimum efforts". Both contribute to fluidify information/decision/control flows and improve interoperations within or across systems. Largely based on Information & Communications Technologies (ICTs) as well as systems sciences and organisation sciences, both have significantly contributed to major advances on automated systems over the last 40 years. This has concerned many application domains but more specifically industrial and manufacturing automation (from CAD/CAM integration, CIM, integrated and interoperable manufacturing systems, supply chains or collaborative networked organisations up to emerging Industry 4.0 and Smart Manufacturing environments). The talk will review and analyse these concepts in the context of Automated and Smart Manufacturing Systems, explaining their different dimensions and levels of applicability and highlighting essential technologies required to support horizontal and vertical integration, either in terms of communication, coordination, cooperation or collaboration (or the 4 C's). It will then investigate how these concepts can contribute and should evolve to foster developments of I4.0 and Smart Manufacturing. Finally, it will conclude with some personal thoughts on the cooperation between humans, robots and smart devices in the Factories of the Future.