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Sommario/riassunto	This SI presents the latest achievements, challenges and prospects for drives, actuators, sensors, controls and robot navigation with reverse validation and applications in the field of industrial automation and robotics. Automation, supported by robotics, can effectively speed up and improve production. The industrialization of complex mechatronic components, especially robots, requires a large number of special processes already in the pre-production stage provided by modelling and simulation. This area of research from the very beginning includes drives, process technology, actuators, sensors, control systems and all connections in mechatronic systems. Automation and robotics form broad-spectrum areas of research, which are tightly interconnected. To reduce costs in the pre-production stage and to reduce production preparation time, it is necessary to solve complex tasks in the form of simulation with the use of standard software products and new technologies that allow, for example, machine vision and other imaging tools to examine new physical contexts, dependencies and connections.