Recent Advances in Robotics and Mechatronics - From Space to Surgery

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Abstract: *After briefly explaining how we are interpreting the term mecha-tronics today, the talk briefly comments the development and evolve-ment of industrial robots over the past 20 years. It emphasizes the impor-tance of mechatronic concepts and sensory feedback for more precision and autonomy in the future. The progress and perspectives in space ro-botics are addressed next. Space technology is characterized as major driver for a new generation of power-saving ultralightweight arms and articulated hands – an important prerequisite for the emerging field of mobile production assistants and service robotics. The technological po-tentials are demonstrated by DLR`s space robot experiments and the newest light weight arm and four-finger hand generation, which are fully joint-torque-controlled and thus are provided with programmable carte-sian impedance – a feature which allows for new programming tech-niques and 'human-friendly' operational modes. One of the most chal-lenging application fields for these new technologies is surgical robotics; its state of the art and perspectives are briefly outlined. However mecha-tronics is of crucial importance for artificial organs and prostheses, too.*