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The New Beginning: Mechatronics

The term «mechatronics» was coined by Tetsuro Mori, a senior engineer of the Japanese company Yaskawa in 1969. Mechatronics is a design process that includes a combination of mechanical engineering, electrical engineering, control engineering and computer engineering. Mechatronics is a multidisciplinary field of engineering, that is to say, it rejects splitting engineering into separate disciplines. Originally, mechatronics included the combination of mechanics and electronics; hence the word is a combination of mechanics and electronics.

In a short time, mechatronics has evolved into a universally accepted engineering concept. It integrates mechanics with electronics and with engineering itself. The result is expanded into technological capabilities and assembly-line successes like the Cartesian multi-axis robot. Because it enables more flexible automated production, users can precisely control parameters such as weight, speed, reach, and work envelope. That is why mechatronics can be the answer to a variety of design challenges. A mechatronics approach is a 3-stage ongoing process: design, integration; implementation.

Nowadays, mechatronic-design methods emphasize mechanical modeling before any hardware is built. However, we often do not see this same approach when developing embedded systems. In most traditional cases, engineers address software validation very late in the development process, only testing their software on hardware prototypes. Errors found in hardware or software at this stage create costly delays. It can be time-consuming to trace problems back to their root cause. Errors related to incomplete, incorrect, or conflicting requirements may even necessitate a fundamental redesign.

Mechatronics is clearly a cross-disciplinary science, requiring expertise in mechanical and electrical engineering as well as electronics and computers. But few have a background in all these disciplines. Those with expertise in one particular area, such as electrical engineering, may end up doing on-the-job training in other aspects of mechatronics, or trying to learn how to incorporate components from an unfamiliar manufacturer.

The design of a mechatronics system requires a multidisciplinary focus in order to root out potential difficulties before they grow into time-consuming, costly and distracting problems.

Mechatronics should not change the design process, efficiently; so that communications with other engineering disciplines are improved. Client and market satisfaction are the major goals in the field of mechatronics.