

**LEADING EDGE OF CYBERNICS: INNOVATIVE CYBORG-TYPE ROBOT
“HAL” TO IMPROVE, SUPPORT, AND EXPAND HUMAN’S ABILITY**

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“Cybernetics: the fusion and combination of humans, robots and information systems” is a new interdisciplinary academic field centering on cybernetics, mechatronics and informatics in which neuroscience, robotics, information technology, physiology, psychology, laws, ethics, and business administration are deeply intertwined. HAL (Hybrid Assistive Limb) is the world’s first cyborg-type robot. HAL, developed through Cybernetic technologies, detects faint bio-electrical signals transmitted from the wearer’s brain through the nervous systems to the muscles, and assists the user’s intended movement. This technology is sensing accurately potential signals while moving human body, making HAL move a little earlier than human muscle contractions. HAL (Hybrid Assistive Limb) was realized by it to improve, support, and expand human’s ability.

This technology can help realizing the dream of the disabled on wheelchairs and the aged that they could stand on their own feet again, and alleviating the heavy labor of the nursing care. Like this, HAL can be applied to various fields

HAL having already had world famous achievement and advancement, the system of the relationship among industry, academia and government for applying HAL was constructed.



Figure 1: Robot Suit HAL (Hybrid Assistive Limb)



Figure 2: HAL series line-up