

nursing care named HAL is being developed by Professor Yoshiyuki Sankai at the University of Tsukuba.

In the process of developing such a robot, the Brain-Machine Interface (BMI) will be a key element in the future. BMI is a technology that digitally signals the state of brain activity, and reflects it in the operations of machines and of information and communication equipment. Conversely, it will also be possible to transform an external stimulus into electrical signals, and send them into the human brain, allowing diverse human sensory functions to be resuscitated and reinforced. Autonomy-supporting

robots fitted to arms or legs that can be directed by the brain through thought will become available in the near future. We can go so far as to say that thanks to BMI, it will be possible to lead an autonomous daily life for as long as sound brain functions are maintained. BMI is an innovative technology that will enable us to take a giant step toward our visionary goal of every individual being able to lead an autonomous daily life with dignity and happiness.

The process of engineering science is an innovative one that moves constantly toward solving societal problems. This process is almost the same

as creating, step by step, a refined total system in which a diversity of elemental technologies are perfectly integrated. The examples I have introduced as some of the major challenges facing the Japanese engineering science community will realistically confirm this point. Engineering science that is oriented toward a Platinum Society now requires the capability to identify and structure a concrete agenda, as well as the competence to effectively mobilize and systematically integrate a variety of human resources, ideas, and technologies to solve problems.

# Comment on the Latest Achievement by the Department of Biomedical Engineering of the Thoraxcenter, Erasmus MC

Engineering 2015, 1(1): 20  
DOI 10.15302/J-ENG-2015020

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Biomedical Engineering, a research group that is part of the Thoraxcenter of the Erasmus Medical Center, has a long tradition of innovation in the “golden triangle” of academic engineers, clinical doctors, and industry. This tradition started in the early 70s with, for example, the development of echocardiography- and catheter-based ultrasound imaging. The founder, Professor Nicolaas Bom, and his successor, Professor Antonius van der Steen, are both members of the Netherlands Academy

of Technology and Innovation (AcTI). Heartbeat OCT is this research group’s latest development. It is a micromotor-based imaging catheter that can make crisp motion-artifact-free images of the coronary arteries. By using these imaging catheters, the catheter-based treatment of heart attack and chest pain can be guided, and its quality will be improved so that fewer people will have to be re-treated. This development will have an enormous impact on health care and its concomitant costs.



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