

### **N303. Japan's ARTRA Robot Moves Forward**

Work on the Japanese ARTRA (Advanced Robot Technology Research Association) robot has progressed to the point where a demonstration robot has been built. However, much work remains before ARTRA can realize its goal of developing a highly sophisticated remote controlled robot to replace the human maintenance worker.

ARTRA was set up to coordinate one of Japan's large-scale national research and development projects to develop and commercialize highly versatile, sophisticated, remotely controlled robots. The aim was to be able to replace humans in tasks that have to be carried out in a radioactive environment, where complicated equipment is located in a small area. The advanced robot project was promoted by the Agency of Industrial Science and Technology from 1983 to 1990, the actual research being conducted by the various companies which participated in ARTRA.

The research was carried out in two phases. The first phase was to develop a quadruped walking mechanism because this was ideally suited for:

- Smoothly traveling in normal passages
- Walking up or down stairs
- Stepping over piping and thresholds
- Moving around appropriately as the work progresses
- Standing up solidly and resisting the reaction forces during work

The second phase of the research was to design a complete robot system (called the "total system robot") which would not be manufactured. A demonstration robot had been developed and tested and the future design of the total system robot would:

- Reflect the demonstration robot test results
- Examine technologies not incorporated into the demonstration robot
- Add the functions and performance required for improvements in workability, locomotion, controllability (including operability) and reliability
- Reduce component size and weight to reduce the overall weight

The final realization of highly advanced robots is expected to come from the development of various small sensor technologies, control technologies for improved operability, the practical development of mechanics, and new lightweight components.

For more, "Japan's ARTRA Robot Moves Forward," by K. Takehara. *Nuclear Engineering International*, pp. 39-41, January 1992.