OVERVIEW OF ROBOTICS TECHNOLOGIES FOR NUCLEAR HAZARDOUS ENVIRONMENT

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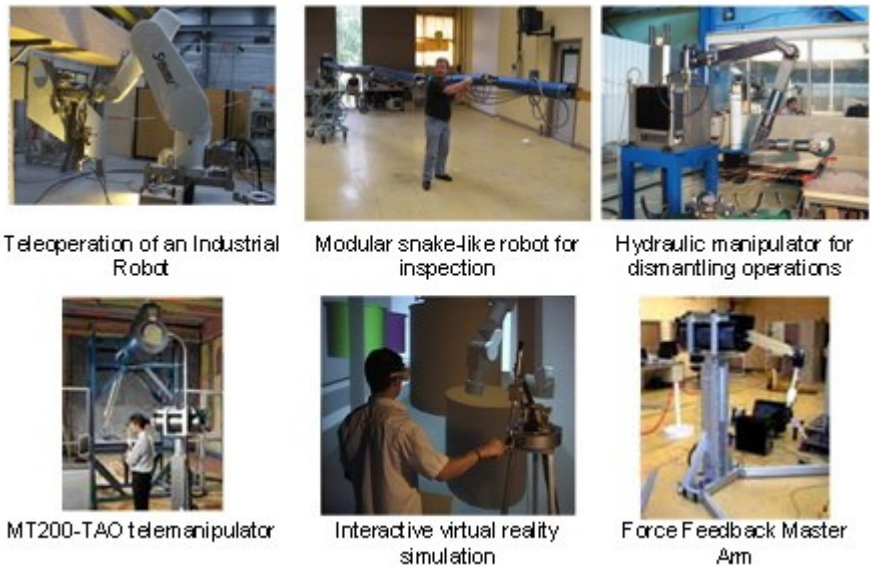
In the nuclear facilities as nuclear fuel manufacturing and reprocessing plants, power reactors, waste temporary storage units, materials handling must be carried out remotely, taking into account the nuclear radiating environment. Telerobotics technologies aim clearly to improve the working conditions of human operators with respect to the ALARA principle.

Along the last ten years, the Lab of Applied Research on Software-intensive Technologies of the French Nuclear Agency (CEA LIST) has developed robotics and remote handling technologies for operational nuclear fuel cycle facilities and old nuclear facilities to be dismantled.

The paper gives an overview of the progress of the developments which are been carried out in the range of force-feedback master-salve systems, master arms, electrical and hydraulic slave manipulators, long range inspection snake-like robots, radiation tolerant electronic systems, interactive environment modeling and simulation software, as well as generic control software for teleoperated systems.

Several recent applications are presented in the paper:
- electrical industrial robot arm remotely operated with force feedback
- hot cell manipulator remotely operated with an electrical master arm
- hydraulic manipulator with its embedded electronics controller
- modular articulated carrier for inspection of a tokamak vessel

The paper shows how the results of this R&D program carried out by CEA LIST has been valuable for the introduction of Robotics and Remote Systems in nuclear Hazardous environments in France.



Applications examples