

Plenary Talk 3



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MTO (Man-Technology-Organization) Research at the OECD Halden Reactor Project

The Halden Reactor Project is a joint undertaking of nuclear organizations in 18 countries sponsoring an international jointly funded nuclear research programme under the auspices of the OECD NEA. The programme is renewed every third year. The three main research areas at the Halden Project are: Fuels-, Materials- and Man-Technology-Organization (MTO).

Japan has been a member to the Halden project since 1967 where JAEA – (former JAERI) is the Signatory member. The main interest of Japan has been in the fuels- and materials area through experiments in the Halden reactor. However, over the last years good co-operation has also been established in the MTO area mainly with JAEA (former JNC) in Tsuruga in a large program on the decommission planning of the Fugen reactor using VR, the Kyoto University in the areas of Virtual and Augmented Reality technologies and with utilities, such as Yonden, in the area of reactor core surveillance.

Advanced computer-based systems and innovative human system interfaces are now being introduced into existing nuclear power plants to replace existing interfaces. New interfaces are also planned introduced in all future nuclear power plants. This development may have significant implications on plant safety in that they will affect

the overall function of the personnel in the system: the amount, type, and presentation of information; the ways in which personnel interact with the system; and the requirements imposed upon personnel to understand and supervise an increasingly complex system.

The Halden MTO research programme is intended to address the above issues by means of extensive development and experimental work in the areas of Human performance, Innovative Human System Interfaces, Control Room design, Virtual and Augmented Reality technologies, Computer-based Support systems and Software System Dependability. The work is based on experiments and demonstrations carried out in the experimental facility called HAMMLAB (HALden Man-Machine LABoratory). Pilot-versions of several operator aids and human system interfaces are adopted and integrated to the HAMMLAB simulators and demonstrated and tested with licensed operators in a full dynamic setting. The Halden VR laboratory is an integral and important part of the programme. A new laboratory for studying Collaborative Work Environments has recently been inaugurated.

The presentation will introduce the facilities used for the MTO research and examples and results from research programs will be provided. The presentation will mainly address our work on Human reliability, Innovative Human System Interfaces and Virtual and Augmented Reality.

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Fridtjov Owre is Research Director, IFE Sector Safety-MTO, Institutt for energiteknikk, (IFE) Halden, Norway. He **was born in** Kristiansund, Norway in 1949 and graduated from Institute of Physics and Cybernetics at University of Oslo, Norway, in 1975. His work experience since then are serving as :Engineer at IFE, Halden 1975 – 1976; Engineer at Scandpower AS, Halden 1976-1978 ; Researcher, IFE, Halden 1978-85 ; Section head, Alarm systems group, IFE, Halden 1982 ; Senior researcher, IFE, Halden 1985-93 ; Division head, Operational Support Systems, IFE, Halden 1992 ; Research manager, Man-Machine Systems research, IFE, Halden 1994 ; Deputy Project Manager, Halden Reactor Project 1994 – present ; Project Manager, Halden Reactor Project 1996 (temporary position) ; Research Director, Sector Safety-MTO IFE, Halden, 2000 – present. His key technical areas are :human factors, control room design, human system interfaces and advanced operational support systems and simulation, design of large-scale information systems, and his general interests are Mountain trekking, Biking, Nordic cross country skiing, Orienteering, Wine, Literature.