TOWARD HUMAN-MACHINE COOPERATION

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Abstract: In human machine systems human activities are mainly oriented toward decision-making: monitoring and fault detection, fault anticipation, diagnosis and prognosis, and fault prevention and recovery. The objectives combine the human-machine system performances (production quantity and quality) as well as the global system safety. In this context human operators may have a double role: (1) a negative role as they may perform unsafe or erroneous actions on the process, (2) a positive role as they can detect, prevent or recover an unsafe process behavior due to an other operator or to automated decision makers. Two approachs to these questions are combined in a pluridisciplinary research way : (1) human engineering which aims at designing dedicated assistance tools for human operators and at integrating them into human activities through a human machine cooperation, (2) cognitive psychology and ergonomics analysing the human activities, the need for such tools and their use. This paper focuses on the concept of cooperation and proposes a framework for implementation. Examples in Air Traffic Control and in Telecommunication networks illustrate these concepts.

BRIEF BIOGRAPHY

Born in 53 he received a PhD in Automatic Control (79) an is Docteur d'Etat es Sciences (87). He is full Professor at the University of Valenciennes since 89. He conducts research on Automation Sciences, Artificial Intelligence, Supervisory Control, Human Machine Systems, Human Reliability with applications to production telecommunication and transport systems (Air Traffic Control, Car Traffic, Trains Metro.). His scientific production covers about 175 publications, collective books, conference proceedings. Research Director of 35 PhD students and 9 HDR since 89, reviewer of 50 PhD Thesis and 9 HDR from other universities. Head of the research group "Human Machine Systems" in LAMIH since 87 till 04 (25 researchers). Vice-head then head of LAMIH between 96 and 05 (222 researchers and engineers). Vice Chairman of the University of Valenciennes since October 05 in charge of research.

Scientific head or Member of the scientific board or Manager of several regional research groups on Supervisory Control (GRAISYHM 96-02) on Transport System Safety (GRRT since 87,pôle ST2 since 01 with 80 researchers of 10 labs). Member of the French Council of the Universities (96-03), member of the scientific board of the french national research group in Automation Sciences supported by CNRS (96-01). Partner of several European projects and netwoks (HCM networks 93-96, 2 projects since 02 on Urban Guided Transport Management Systems and the Network of Excellence EURNEX since 04). Member of the IFAC Technical Committee 4.5 Human Machine Systems since 00. IPC member of several International Conferences and Journals.