

PhD Thesis Abstract
CONTRIBUTIONS ON THE HUMAN-MACHINE INTERACTION AT BCI LEVEL
WITHIN INTEGRATED TECHNICAL CIVIL AND MILITARY SYSTEMS

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Motto: “ *The human mind is just a circle, spinning round and round, but the human soul is infinite* ”

Main scientific purpose of the thesis “**Contributions on the human-machine interaction at bci level within integrated technical civil and military systems**” is the study using the laws and principles of the acquisition and processing of biosensors, the operation of integrated human-machine technical systems through validation and testing methods based on original concepts of technology and equipments.

Chapter 1 - "General aspects of human machine interaction" presents the aspects related to the human-machine interaction with emphasis on the technologies that make this possible and with the presentation of the general aspects of interaction.

Chapter 2 - "BCI Interaction Considerations" includes in particular and in detail the BCI - Brain Computer Interface aspects. In this chapter are presented technical, technological and conceptual aspects regarding everything that currently means the direct or mediated connection between the human brain and various auxiliary technical equipment commonly called "computers". A military scenario simulator based on BCI and VR is presented and proposed.

Chapter 3 - "Mathematical, Statistical, and Technical Matters for Acquisition, Processing, and Interpreting the EEG Signal" makes a review of what it means to retrieve, comprehend and process the EEG signal from a mathematical point of view.

Chapter 4 - "Technical Systems and Devices based on EEG Signal Processing " is based on important own contributions, presents and describes technical systems built or to be created and developed based on the BCI interaction and the EEG signal being processed. Two concept systems are proposed and presented on the basis of the EEG signal and its processing: the peripheral device control based on the EEG signal processing and a concentration and attention training system based on the retrieval and processing of the individual EEG signal.

Chapter 5 - "Determining Individual Capacity in BCI Interaction. Interaction Quality Aspects "deals with the nature of the quality of the BCI-type interaction by introducing an own concept of analysis and determining what the PhD candidate has generally called the BCITCI (Brain Computer Interface Temporary Compatibility Indicator) parameter. Another aspect dealt within this chapter is the ethics and best practices related to the use of the EEG signal and its processing. Given the sensitivity of this subject of the brain signal, given the "traditional fantasies" associated with human brain signals, perhaps for the first time in the national technical literature, the author approaches this subjects as an integral part of the field general issues.

Chapter 6 - "Conclusions, Contributions, Perspectives" is the chapter that includes the conclusions drawn from the study of the field during the preparation and drafting of the PhD thesis, as well as the contributions of the author, which are theoretical and practical-applicative. The chapter also includes future perspectives necessary to continue the research in the field.

The thesis is a useful tool for researchers, specialists, economists and engineers, but also for managers in the field, as a scientific work, but also as a method of addressing the problems of modern human-machine interaction.