

# Human Factors in off-highway vehicles – design and prototyping of a control and information visualization system

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## **Abstract**

Over recent years, the off-highway vehicles domain, i.e. agricultural, ground movement and construction machinery, has been considerably modified by on-board electronic networks and in-vehicle devices, similarly to what happened in other domains. Efforts were made towards better control of vehicles' basic and advanced functions. Despite the domain's growing complexity and the widespread acceptance of User-Centered Design, human factors have not made their way in the designing process of off-highway vehicles on-board systems yet.

In this intervention, a portrait of the current situation of the off-highway vehicles domain is drawn, explaining why it should be considered as a self-standing context for human factors research, listing the domain's most relevant peculiarities; secondly, relevant innovations in on-vehicle technologies for off-highway machinery will be reviewed, sketching a scenario for recent evolution and its impact on Human Machine Interaction (HMI) issues; thirdly, a brief review of existing literature will be presented, showing that a very limited number of published works really deal with human factors for off-highway machinery; finally, the activity being conducted on a public funded project named ProTract, in the framework of which efforts are being made to explore the peculiarities of the domain that was labelled "off-highway driving", will be briefly sketched.

## **The off-highway domain**

In off-highway vehicles users can find him/herself operating in a huge variety of conditions, whose heterogeneity seemingly outruns that of the automotive domain. Such heterogeneity stems from a set of factors, here listed as a tentative set of relevant variables for the drawing of the off-highway domain's borders. It must be noticed that off-highway and automotive (or generally *on-highway*) dimensions partly overlap – as when driving a tractor with implements attached on a road:

In D. de Waard, K.A. Brookhuis, and A. Toffetti (Eds.) (2006), *Developments in Human Factors in Transportation, Design, and Evaluation* (pp. 101 - 100). Maastricht, the Netherlands: Shaker Publishing.