Chapter XII

Business Process Reengineering in the Automotive Area by Simulator-Based Design

Torbjörn Alm, Linköping University, Sweden
Jens Alfredson, Saab AB, Aerosystems, Sweden
Kjell Ohlsson, Linköping University, Sweden

Abstract

The automotive industry is facing economic and technical challenges. The economic situation calls for more efficient processes, not only production processes but also renewals in the development process. Accelerating design work and simultaneously securing safe process outcome leads to products in good correspondence with market demands and institutional goals on safe traffic environments. The technique challenge is going from almost pure mechanical constructions to mechatronic systems, where computer-based solutions may affect core vehicle functionality. Since subcontractors often develop this new technology, system integration is increasingly important for the car manufacturers. To meet these challenges we suggest the simulator-based design approach. This chapter focuses on human-in-the-
loop simulation, which ought to be used for design and integration of all car functionality affecting the driver. This approach has been proved successful by the aerospace industry, which in the late 1960s recognized a corresponding technology shift.

Introduction

For the automotive industry, the recent years have been characterized by huge economic losses among some major companies. This occurs from time to time and usually initializes efforts, which can be described as business process reengineering. We have seen much of this concerning the production parts of the companies and in the flow of components and sub-systems from subcontractors. Just-in-time deliveries and lean production are buzzwords we all have heard. But, has anyone noticed something similar from the R&D side? Of course, most people interested in cars have read about shared platforms and so forth over a number of models. But this is not business process reengineering, this is just technique rationalization. Since a long time ago the design process is computer supported in many ways, but what steps could the automotive industry take now in order to improve the design process? We believe that a more extensive use of virtual prototyping and simulation could be that answer. This statement is supported by the ongoing technology shift for all kinds of ground vehicles; from purely mechanical artifacts to more complex systems with computerized functions, more convenient to implement in a simulated environment than the old mechanical solutions ever were.

Figure 1. Concept car from GM (How GM’s Hy-wire works, http://auto.howstuffworks.com/hy-wire.htm, January 10, 2006)
Usefulness of Agent-Based Simulation in Testing Collective Decision-Making Models
Pablo Lucas and Diane Payne (2014). *Interdisciplinary Applications of Agent-Based Social Simulation and Modeling* (pp. 72-87).
www.igi-global.com/chapter/usefulness-of-agent-based-simulation-in-testing-collective-decision-making-models/106762?camid=4v1a