

## ADVANCED AND NEW PROBLEMS INVOLVING NEW TECHNOLOGIES IN MECHATRONICS AND MANUFACTURING

**Harms, Hans-Heinrich** e-mail h.harms@tu-braunschweig.de

*Institute of Agricultural Machinery and Fluid Power, Technische Universitaet Braunschweig, Langer Kamp 19a, 38106 Braunschweig, Germany*

**Abstract.** The main purpose of this lecture is to show that the introduction of mechatronic solutions in nearly all machines is absolutely necessary. This is accepted in a lot parts of the engineering areas. It is seldom known that this is also a challenge in mobile working machines and especially in agricultural machines. This kind of machines become much more professional and will have to cover a new job in delivering the people not only with food and feeding livestock but additionally with bio-material as raw-material for “energy-production” and as substitute for mineral based fuel so-called BTL (biomass to liquid). Some years ago many economists saw a decreasing importance of the agricultural scene. The consumer noticed, that all food can be bought just around the corner and didn't consider how to get there. Today one can realize, that agricultural machinery is one of the essential key industries in the 21<sup>st</sup> century. Worldwide the demand for agricultural raw material becomes higher and higher. To cover these requirements the machines have to operate faster, much more accurately and nearly without a stop. The servicing of these machines should make them possible to operate nearly round the clock during the short harvest period. For this is the only time in which the machines are able to earn money. The steering, the suspension, the automation have to be optimized. The driver should be able to operate the machine nearly without any stops. In more and more areas of mobile machines recuperation and the introduction of CVT-gearboxes (continuously variable transmissions) and in some cases electrical drives are in preparation or already existing. This leads to a lot of different problems in the training and the servicing area. Therefore it might be possible that this leads to various solutions for different countries. At the moment in all companies full electrical drives are in discussion. But in my opinion this will not become an acceptable solution on mobile working machines generally, for the energy that can be stored for driving and operating the machine is too large and the needed batteries are far too heavy and too expensive. This leads to more flexible solutions e.g. by using renewable resources like BTL. So mechatronic systems will be integrated in these solutions more and more. In the past simple mechanic signals were cascaded in different levels like speed, rpm, position etc. Modern mechatronic systems are integrated in very complex levels that are able to control the machine itself and additionally the attachments. By that these solutions should be able to plan the optimized route of the machine and the trajectory on which the machine and the implement have to operate. If the machine is operating as a self propelled machine, the system can be optimized for the separately running complete system. The problem becomes much more complicated if the attachment is driven by a tractor. So the tractor is able to optimize the trajectory, but to optimize the parameters the attachment is operating best can better be done on a separate processor on the machine. This processor has to give some of the calculated data as a required data list to the tractor. So the attachment may be able to control some parameters of the the tractor automatically without an action of the operator. This leads to a complete new thinking: Attachment controls the tractor.

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