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Autonomous Mobile Machines in Agricultural Engineering – What’s Next?

Agriculture 4.0 is the vision of the future, in which intelligent systems are connected, communicating and cooperating with each other in a way that highly automated production becomes possible. There are already a large number of intelligent and digital helpers, and there are also more and more ideas for smaller machines that can operate independently and driverless. This would be a paradigm shift and fundamental change in agricultural technology. The trend toward larger machines is being replaced by autonomously operating, configurable, task-oriented and scalable equipment systems with distributed electrical drives, which are gradually entering the market, starting from Western Europe. The operator will be part of the system, but not every single machine will have an operator. The farmer is the swarm leader who monitors, organizes and configures the system. This is the collaborative approach, where the operators continuously interact with the system and can take over tasks, which are difficult or not economical to automate. Collaborative automation is in essence an enabler of full automation.

Surveys and projections propagate time horizons around 2030, but even if almost 50 % of farmers can imagine this, it will not be possible on a broad scale, because technology is

not yet ready for this type of growth. However, we will certainly see such developments in individual niches: in horticulture, in fruit growing, in smaller farms, or in organic farms. Areas where higher value creation can be achieved and where labor shortage has become a problem. There is a long transition period to be expected and not all machines as we know them today will disappear. More likely, a new world of smaller intelligent machines, capable of cooperating and interacting with the old world, will emerge.

The farmers are and will remain irreplaceable in their skills in plant production and they do not have to become an IT and smart farming specialist. The industry currently overburdens the farmer with technology islands and applications that cannot be connected. The effort to transfer data and deal with its incompatibility often compensates the achievable benefits. In the future, the farmer needs to be able to work with easy-to-use applications and tools of various service providers correctly, coordinate them and link them together on his farm in such a way that the production process is profitable, high quality, transparent and sustainable. Just as the farmer organizes his machinery world today, farmers will configure their portfolio of services in the future.