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В збірнику представлені тези доповідей науково-педагогічних працівників, наукових співробітників, аспірантів та студентів НУБіП України, провідних вітчизняних і закордонних вищих навчальних закладів та наукових установ, в яких розглядаються завершені етапи розробок.

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ENGINEERING MANAGEMENT OF GRAIN SAMPLER WITH MOISTURE AND TEMPERATURE SENSOR OF GRAIN HARVESTER

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Let's start with the Trimble Harvest yield monitoring system, designed to simultaneously determine crop yield and grain moisture [1]. The principle of its operation is that the GPS tracker in real time links the indicators of the yield sensor to an electronic map that contains data from all combines equipped with such software [2]. The optical sensor located on the conveyor, through which the cleaned grain enters the hopper [3], is directly responsible for measuring the yield [4]. The principle of calculating the volume of grain is based on the length of time that the vanes of the conveyor cover the light beam: the higher the layer of grain on the conveyor, the longer the light beam will be covered [5]. At the same time, Trimble equipment allows you to view maps, yield records and moisture data in real time, making the necessary corrections if necessary [6]. It is also possible to compare the performance of different varieties of seeds throughout the territory (Fig. 1).

Trimble equipment can be integrated into the already existing equipment of the combine (installed from the factory [7]), and it is also possible to choose a complete set for s/s combines that are not prepared for yield monitoring and mapping systems. Trimble's displays are multi-tasking and, in addition to building an interactive map of the crop, can simultaneously be active in auto-driving mode [8]. This combination

allows the operator to concentrate as much as possible on the technological process of harvesting and not be distracted by other, less important processes.

Fig. 1. Maps, yield records and real-time moisture data.

The leading American manufacturer of equipment for precision agriculture began its history with a yield mapping (monitoring) system in 1992. Company president Al Myers had been developing it on his father's farm in Illinois for five years before that (Fig. 2). In 1992, the first model, the Yield Monitor 2000, was introduced to the market and the company was launched. By the way, Al did not have enough money to start production and used all the money from credit cards, which he was able to pay back only after a few years. This device forever changed our understanding of agriculture and gave a powerful impetus to the technology of differential application. Today, Ag Leader's yield mapping components can be seen on conveyor-mounted combines from leading manufacturers such as John Deere, Case, New Holland and Agco.

The main components of the system are a yield flow sensor (strain sensor) installed on the top of the clean grain elevator and an EMS (elevator mounting system) – a grain sampler with a moisture and temperature sensor, which enables online monitoring and storage of grain moisture with reference to coordinates This system gives you the best accuracy on the market. The error does not exceed 1–3%, depending on the condition of the combine (Fig. 2). A distinctive feature of the system is the need for only one calibration per crop only once a year.

Fig. 2. Interactive crop maps in driving mode.

All data is displayed and stored on InCommand displays, which can transfer it online to the AgFiniti cloud service for further analysis or processing. In addition, Ag Leader introduced CartAce technology two years ago, which allows a tractor with a hopper loader to drive under the combine's discharge auger and retrace the combine's path without the risk of losing grain or colliding with the combine.

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