

автоматически направляется в гараж после выполнения задачи, распознает препятствия, оповещает о них оператора или сам ищет путь, как их преодолеть [2].

Как и в любой другой сфере, полное или частичное исключение человека из процесса влечет экономию. Без кабины, кондиционера, кучи экранов и элементов управления трактор станет дешевле и экономичнее. Более того, в перспективе один оператор сможет управлять целым флотом беспилотных работников. При этом нет никаких сомнений, что на следующем этапе эволюции сельская техника станет электрической, что еще больше снизит затраты на ее использование и скажется на цене урожая [3].

Новые тракторы позволят получать актуальную информацию о ходе пахоты и проведения других сельско-хозяйственных работ в реальном времени, экономить на зарплате и топливе. Будущее сельского хозяйства – это роботизированные машины.

1. Agricultural robots – present and future applications [Electronic resource]. - Mode of access: <https://www.techemergence.com/.../> Agricultural robots...- Date of access: 28.03.2018

2. Future of farming: driverless tractors [Electronic resource]. - Mode of access: www.cnn.com/future-of-...- Date of access: 28.03.2018

3. Driverless tractors [Electronic resource]. - Mode of access: <https://www.wallacesfarmer.com/Driverless-tractors...>- Date of access: 28.03.2018

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INNOVATIONS IN AGRICULTURE: COMBINES WITH GPS

Student – Kizitskiy D., 35 ts, 1 year, TSF

Scientific

supervisor – Misiuk S., senior teacher

*EI «Belarusian State Agrarian Technical University»,
Minsk, the Republic of Belarus*

Agriculture provided the foundation for civilization, and modern innovations in agriculture could help save it. Advances in technology and farming practices have helped farmers become much more productive, growing crops efficiently in areas most suitable for agricultural production.

Farm equipment manufacturers have ushered in a new era of combine technologies in the last few years that have really pushed the limits of efficiency. Combine harvester technology has come a long way since the first machine was introduced in 1843 and by the 2030s farmers could have autonomous combines running through the night on controlled traffic tramlines, adjusting to harvesting conditions and stockpiling grain ready for haulage to store at the start of a new day.

The Global Positioning System (GPS) provides opportunities for agricultural producers to manage their land and crop production more precisely. The GPS enables capabilities such as yield mapping, which incorporates mass flow and moisture data from sensors on a harvesting combine with GPS location data to determine how much of the harvest is coming from each part of the field. Such information can help farmers allocate future resources and determine which hybrids and management practices are the most productive [1].

The GPS allows farmers to get machines in the field that would guide themselves with a lot less overlap. Eliminating overlap also cuts down on fuel costs, wear and tear on the machinery. Self-guidance has a big impact on the cost of the product farmers are producing, the amount, and often the quality [2].

Farmers are using combine harvesters with GPS to make the most of good weather as they bring in the harvest - the technology making it easy to keep working in the fields through the night.

The technology can also help map which parts of a field yield the best crop, to allow fertilisers to be targeted precisely where they are needed - cutting costs and environmental impacts of farming [2].

The global positioning system in combines enables harvesting without the need for daylight, and will also help farmers get their winter crops in the ground as the nights draw in during the autumn.

Instead of "telling us not to turn left or right" the GPS helps set out a path across the field, and travels up and down with a degree of accuracy of up to 2cm to ensure the most efficient harvesting of the crop [1].

The system means the vehicle's driver is not having to concentrate hard for hours on steering the combine harvester, relieving pressure on the farmers during busy periods such as harvests.

The technology also enables the farmer to measure and map exactly which part of the field is reaping the best yield, analysis which can then be used to target problems in those areas [3].

Such precision could allow the targeting of fertilisers and other inputs, and prevent run-off of excess chemicals into the local environment.

Farmers and agriculture service providers can expect even further improvements as GPS continues to modernize. It will enhance both the quality and efficiency of agricultural operations in the future.

1. Farmers use combine harvesters with satnav [Electronic resource]. – Mode of access: <https://www.telcgraph.co.uk/.../Farmers-use-combine-har...> – Date of access: 21.03.2018

2. Twenty-first-century combines [Electronic resource]. – Mode of access: www.farministrynews.com/combindes/twenty-first-centu... – Date of access: 21.03.2018

3. GPS for yield mapping on combines [Electronic resource]. – Mode of access: <https://www.sciencedirect.com/science/.../pdf...> – Date of access: 21.03.2018.

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NEW HORIZONS IN FARMING: SELF-DRIVING TRACTORS

*Students – Shumik I., 86 e, 1 year APF;
Maslovski N., 86 e, 1 year, APF;
Smolikov E., 35 ts, 1 year, TSF*

*Scientific
supervisor – Zakharyeva L, RhD in Pedagogy
EI «Belarusian State Agrarian Technical University»,
Minsk, the Republic of Belarus*

Engineers and researchers works to increase the level of autonomous machinery in agriculture and the best solution is to design and build robots capable to work continuously without human guidance. Robots deployed for agricultural purposes can deliver high accuracy and low costs while the farmers can have in real-time a situation of tasks already completed.

Robots could be designed to include many agricultural techniques using a limited set of tools and replacing the human laborers.

A fully autonomous agricultural robot should have the ability to understand the environment, work for an unlimited time without any operator intervention, capable for environment adaptation when changes occur, and to ensure the security for humans.