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SMALL UNMANNED GROUND VEHICLES APPLICATION IN AGRICULTURE

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This article covers the topic of unmanned ground vehicles which are the field scouts adapted to scientific exploration and field conditions. The purpose of the robots is being under the consideration and its abilities are being developed by the leading engineers world-wide.

Field scouting in agriculture is the regular examination of fields to measure pest, humidity levels or reveal diseases affection of the plants. Field robots are built in high quality conditions to ensure future reliability in use. These are the intelligence robots that can be successfully applied in agricultural industry.

The official name of the field scout used for military purposes is SUGV, Small Unmanned Ground Vehicle. It is a remote controlled self-propelled robot. The first robot example was developed by an American company, iRobot in 2008. The first SUGV Early robot model weighed about 13.5 kilograms. The robot was small and movable. That gave it the ability to move quickly and be unobtrusive due to neutral colors, gray, dirty gold, silver. It was equipped with a video camera which had a solid structure and a clear image of the necessary reconnaissance site. Its visual information was transmitted to the control center. SUGV belonged to the PackBot series of military robots developed by iRobot for the DARPA agency.

The SUGV models used today are designed as lightweight robots that can be carried by people. They also have touch sensors. Those sensors enable distinguishing movements and other dangerous factors. The military robots are able to distinguish which weapon was fired by the shot. This ability could be transformed into the advantage for the field scout in agriculture as well.

It is also used to detect explosive devices. The sapper profession fades into the background. This robot provides military operations in urban environments, tunnels, pipes and basements. Those operations could be extrapolated on the rodent destruction. The scout must perform intelligence functions, oversight functions, work in conditions that are dangerous to people, reducing the risks of military personnel. The SUGV can be controlled either with a standard remote control system or with an Xbox 360 gamepad. The robot has the ability to connect additional equipment (plug-and-play). It is so easy to establish and control it. The main goal of the scout robot is to prevent any situations on the field and alert the situation around it.

The analysis of the Small Unmanned Ground Vehicle characteristics developed for the military purposes enabled the conclusion to adapt this robot to the agricultural production. This could remove the human from the field operations and provide automation of the agricultural industry. In this case we could predict that more and more field operations will be controlled by an artificial mind if our

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life is designed and improved. It is obvious that the SUGV robot is a masterpiece of our time. The combination of small size, ease of movement, maneuverability, the presence of a video camera, recognition sensors, as well as control with a remote control, these are definitely all the criteria for calling this robot the "Robot of the future".

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COMPUTERIZATION OF AGRICULTURAL MACHINERY

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The paper presents the visions of upcoming introduction of computer programs and applications into tractor's operation as well as into the operation of other farm machines. Some changes in the machine construction and their results were analyzed.

Undoubtedly, the main trend in the development of the agricultural machinery market at the beginning of the 21st century is its "computerization". You won't surprise anyone with the presence of a GPS-navigator on the tractor today, but modern gadgets and programs that are only being tested at European and American factories are amazing.

The control system applied on the tractor or any farm machine allows to control the sowing process (seeds, fertilizers, micro-granules), receive information about the configuration of the machine, turn off individual sections, manage markers, save and process data. At the same time, the control system is compatible with a virtual spare parts store. The application provides easy recognition of parts in 3D, and also allows to order products directly from the tractor cab, says the developer's website. The app always contains updated parts data and the latest instructions for the machines.

Germany was the first country where the application was launched. More countries and families are coming. Almost all the leading manufacturers of combines and tractors are working on the implementation to control and monitor the processes be means of the touch-screen method. A huge tablet-like screen is used instead of a large abundance of levers and buttons. It is going to appear in front of the driver, who will have an access to almost all manipulations.

Although the automation is being swiftly introduced into tractor systems and operations, in the foreseeable future, pedals, steering wheel and many "levers" will not go anywhere, but manufacturers seriously intend to reduce them to a reasonable limit. So it means the emergence of new models, computer programs and applications that can be used for the control.

Another question is the tractor operator training. New or previously learned skills can be trained on the simulator prior to the start of seasonal work in order to improve the productivity in the field or reduce operational errors. It should be noted that for several years now similar programs have existed