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## **IMPLEMENTATION OF MODERN INFORMATION TECHNOLOGIES IN THE AGRICULTURAL SPHERE OF UKRAINE**

**Abstract.** *This article researches the problem and providing innovative application of advanced technologies in the domestic agriculture. Analyzed existent advanced information technologies and their effectiveness. Principle of operation of GPS-navigators were given. The factors that hindering the intensive application of information technology were established.*

**Keywords:** *agricultural sphere, innovative technology, agrokopter, GPS-navigator, implementation, information.*

### **Problem definition**

Today in the agricultural sector more acute raises the question of implementation informational systems and technologies with the purpose of elevation efficiency of its operation, increase the level of competitiveness Ukraine's agricultural sector on the global market and increase the level of population employment in agrarian sector. Nowadays this question is actual and requires future research.

### **Analysis of recent research and publications**

A lot of national and foreign scientists researched information support of agricultural complex. In particular, significant contributions about research of this question was done by such famous scientists as O.M. Borodina, M.A. Latynin, V. Y. Ambrosov, L.V. Bilozor, M.F. Kropyvko, S.V. Maistro. Selected aspects of agricultural production technologies were studied by M.V. Roik, M.R. Romashenko, S.O. Tribel and others. Main attention of these authors was given to the definition of the problems of use the innovation in agriculture and the need of introduction of powerful technology.

Constant change the last thing and update requires detailed investigation which also requires the use of different methods and mechanisms of implementation and adaptation to the current development of the agricultural sector. The issue of

detailed analysis of possible problems and prospects of adapting new technologies and technical- technological solutions of farming in modern conditions requires further of substantial studies [1].

**Purpose** of this article is explore question about implementation of modern information technologies on agriculture for increase efficiency of its operation.

### **Presentation of main material**

Modern development of any country almost impossible imagine without the introduction and using different innovations. It provides a level of competitiveness, as in domestic, so in foreign markets (in both, domestic and foreign markets). Because comprehensive introduction of innovations contributes to improvement labor productivity, economy of different resources, reduction of expenses, reduction the cost of agro-food products, increasing the amount and improving the efficiency of agricultural production, that influencing to attract investment [2].

Nowadays development and implementation of information technology in the agricultural sector is widely developed by using of advanced technologies, the safety of some of them has not explored thoroughly. So these processes are accompanied by the emergence of various risks, for example: the negative impact on the health of the population through consumer products and in areas where products are grown; neglect of natural resources, especially soil and ground waters through intensification agricultural, agro-food activities and uncontrolled use not checked innovative technologies in the production process [3]. This, in turn, impacts on lowering demand of the population in connection with distrust of these innovative technologies.

Every year the technology develops faster and faster and therefore the introduction of modern innovative technologies is a very topical issue. In modern conditions the economy of agricultural sector develops very slowly in connection with economic crisis, expensive requalify of staff, insufficient stimulus of government engage of an issue of introduction IT-technology in the agricultural sector and low attractiveness of the area (industry, branch) to invest money in the development of this issue.

Many various agricultural companies involved in the issues of implementation of the newest information technology in the agricultural sector. Among them, should be noted the companies CLAAS and John Deere, which has made a very important step in the development of IT-technologies of agricultural machines. The company John Deere introduces such innovative technologies as receiver StarFire; display GreenStar 1800; systems LightBar, Parallel Tracking, iGrade, i-Farming, AutoTrac Row Sense, AutoTrac and other interesting and very favorable technologies. But unfortunately these technologies are very expensive. The company «Agro IT» also had made important contributions with developing such technologies as COPILOT

S7, CRUISE PILOT, CEBIS, CEMOS and many other interesting innovations. These technologies are also not cheap. But despite the expensive price of innovations, they are very useful and economical.

The innovative technology of company John Deere, GreenStar LightBar, «technology of green and red lighting lamps» is very popular among specialists, who work in agroholdings and large agricultural companies. The system GreenStar LightBar is 27 diode lamps, which helps the drivers of agricultural machines to control deviations from the course. This system provides a good overview of the field, even in bad visibility [4].

This technology is quite easy to use and very effective. Agrofirms economize (save the money) thanks to this system, which gives a great demand for it, both in domestic and foreign markets. But this technology is not cheap, and for small farmers, who work for themselves, it seems disadvantageous.

The other effective technology is the system CLAAS Copilot. The design of parallel driving system CLAAS Copilot convenient and easy to use. Using the equipment CLAAS Copilot requires no special training. That in itself is very important during the field work. CLAAS Copilot makes it possible to control speed, direction, marking a working strip. The advantages of CLAAS Copilot driving are easy to reinstall from machine to machine. It does not require specific skills and intuitive operating performance. Uses free navigation signals to have the same high accuracy positioning. All this certainly makes use of CLAAS Copilot most comfortable [5].

Another good system is innovation of John Deere «Parallel Tracking». This is improved system- guide of manual driving. This technological innovation is also very common and known in the market. Many professionals use it because it is really effective and appropriate for a variety of agricultural machinery, which is also a plus for her. System Parallel Tracking – a perfect manual universal navigation solution for the empowerment of various field work. In addition, the system is installed on display GreenStar. The system economizes your budget. The system can easily upgrade to the system of automatic steering. Simply select the path: Parallel Tracking display will show visual signs and sounds that allow you to follow a given path and improve the efficiency of work. This, in turn, saves you time, your materials of expenses and fuel [6]. Parallel Tracking – system that has a number of advantages, among them are: work on straight and curved trajectories; appropriate for use with tillage equipment, sprayers and fertilizer spreaders; is the basic component for all display GreenStar; increased speed in the field, even in poor visibility; the ability to use wide-equipment such as planters, sprayers and spreaders.

Owners of agricultural companies who bought special technology with a system Parallel Tracking, were satisfied with this innovation. Some experts say that green and yellow John Deere equipment is always satisfied, satisfied and will satisfy

in the future. This technique has only one drawback – it cost. But effective is expensive, so it is not surprising, because it really is a good result.

Agrokopters, in other words, drones are also widely spread in the agricultural sector. Many fields have unequal relief. But look the relief of large fields almost impossible. So for this purpose these drones are used. Agrokopters are able to fly round the field at high speed. So these drones don't just overfly the field, but also make a photo or video, which is very useful for large agricultural holdings. The use of drones allows farmers to monitor the condition of the soil, the quality of plowing and sowing, harvest forecast, protect the area from fire and thefts and even «point» to improve the condition of the soil, making fertilizers. About half of the pesticides and herbicides, which use in crop production, are futile if expended in larger quantities than necessary, or use not where it should.

But today's technology came to the fact that small drones weighing only a few kilograms able to fly round large areas of fields with a speed of 80 km/h, examining it and giving the information to specialists, who need it for further action. Experience of using of drones has shown advantage of using drones helicopter type compared with aircraft in agrarian sphere. For aircraft even with short cycle takeoff and landing without normal conditions for landing poorly performing. Although some may not even need a runway, flying up from a catapult and landing by parachute.

Also agrokopters can fly on the set of ground coordinates the computer for a long time with enabled video surveillance system, to monitor the real economic activity and therefore use the services of agro consultancy or security services online.

The market of civil unmanned engineering, aimed at the agricultural area, is considered the most perspective for today. According to normative documents of EU, the distribution of consumer demand on civil drones in the period from 2015 to 2020, will look as follows: 25 % – fire drones, 13 % – drones in agriculture and forestry, 10 % – energetics, 6 % – control of the earth surface, 1 percent – communication. But the researchers of the American organization AUVSI, which examined the market of drones, came to interesting for us conclusion. It is expected that by the middle of the XXI century the main consumers of civil unmanned production in the world will be none other than farmers [7].

Some companies provide services of using drones and give some recommendation and analytical information. It is very efficient because the value of agrokopters is very high at the current market. Moreover, analytical information was provided by professional personnel which is also important in the agricultural sector. Also these companies give guarantee for their work.

We need developing of this sector, but it has some drawbacks. One of them is the involvement huge amounts for development, that really is a problem. Pilotless

drones are the future of the agricultural sector and they will do better working conditions and will serve as a good advisor for farmers.

Unfortunately, many investors do not understand it. There are great expectations that investors will be interested in this issue and they will begin to help in the development of innovation. Also, these agrokoptery need special knowledge to use them, and it also needs money. But if we will develop it, it really will have the result.

Another question is how all these informational technology works within the enterprise. Large agricultural corporations are using GPS-navigators. Principles of operation of these GPS-navigators is shown in fig. 1.

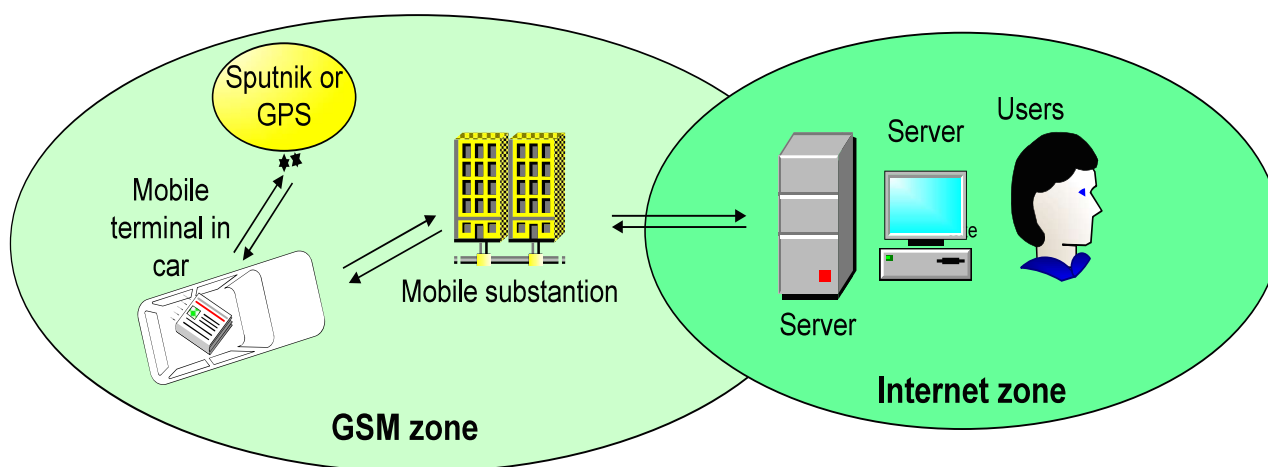


Fig. 1. The principle of operation of GPS-navigators

The idea is that the mobile terminal installed on the agricultural machine. It with the help of global positioning system GPS determines the current location of the agricultural machine. The received data are transmitted to the server using a cellular GSM / GPRS and the Internet. And after that data are available for monitoring of users [8].

Agrofirms using this system, for analyze the ready results that the program can be represented as cartograms, graphs or charts. This technology does not need special knowledge to work with it, which is very convenient.

### Conclusions

Information technology occupies a very important and prominent place in the agricultural sector. Many companies develop innovative technologies, equipment for agricultural machines of its production. They offer agrokoptery (drones) in both domestic and foreign markets. Many farmers and owners of agricultural holdings are satisfied with the work of these innovations. Unfortunately, every good thing in this world has its weaknesses.

First, it is expensive cost of these innovation. Large agricultural holdings buy various innovative technologies, because they have a large turnover of money and so the price is not a problem for them. But many farmers can not afford spending big money to purchase for example the agrokopters. Therefore, the expensive cost of innovation is a pressing problem today.

Second, many investors do not want to invest money in development of information technologies because they do not know exactly whether this area will develop and whether they can make money in this area. With the development of information technology, the agricultural sector will have a success, especially in Ukraine, in the agrarian country.

Thirdly, new information technologies require specific knowledge to use them without problems. Producers might develop some courses or seminars in order to learn to work with their information technologies. But it is additional costs. And employees who work with these innovations must pass the special courses for raising qualifications. Because it is not very well developed in our country, our agricultural sector is almost completely static, not developing.

Manufacturers of innovation shall have the aim not only earn money from selling their innovation but also to teach people how to work with them. They can allocate some money and create courses for people who need knowledge about the correct using of their information technology. This opposite also encourage farmers and workers to buy and use these innovations in their work, which is a good marketing decision. Buy some equipment or technology and get free lectures to how to use this equipment.

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## **ВПРОВАДЖЕННЯ СУЧАСНИХ ІНФОРМАЦІЙНИХ ТЕХНОЛОГІЙ У СІЛЬСЬКОГОСПОДАРСЬКУ ГАЛУЗЬ УКРАЇНИ**

**Анотація:** В статті досліджено питання щодо інноваційного забезпечення та впровадження передових технологій у вітчизняному сільському господарстві. Проаналізовані існуючі передові інформаційні технології та їх ефективність. Наведено принцип функціонування GPS-навігаторів. Встановлено чинники, що перешкоджають інтенсивному впровадженню інформаційних технологій.

**Ключові слова:** сільськогосподарська галузь, інноваційні технології, агрокоптер, GPS-навігатор, впровадження, інформація.

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## **ВНЕДРЕНИЕ СОВРЕМЕННЫХ ИНФОРМАЦИОННЫХ ТЕХНОЛОГИЙ В СЕЛЬСКОХОЗЯЙСТВЕННУЮ ОТРАСЛЬ УКРАИНЫ**

***Аннотация.** В статье исследовано проблему инновационного обеспечения и внедрения передовых технологий в сельском хозяйстве. Проанализированы существующие передовые информационные технологии и их эффективность. Приведен принцип функционирования GPS-навигаторов. Установлены факторы, препятствующие интенсивному внедрению информационных технологий.*

***Ключевые слова:** сельскохозяйственная сфера, инновационные технологии, агрокоптер, GPS-навигатор, внедрение, информация.*

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