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IMPLEMENTATION ASSESSMENTS OF ERO-GLONASS NAVIGATION SYSTEM IN AGRICULTURAL AUTONOMOUS VEHICLES IN THE TERRITORY OF UZBEKISTAN

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Abstract

The paper addresses the implementation assessments of ERO-GLONASS navigation system in Agricultural Autonomous Vehicles (AAV) in the territory of Uzbekistan due to usage of new possibilities provided by modern technologies. The proposed approach extends such systems as ERA-GLONASS and e Call via service network composition enabling not only transmitting additional information but also information fusion for defining required emergency means as well as planning for a whole emergency response operation. The main idea of the methodology is to model the elements of the cyber-physical human system by the resources that serve them. The systems have the ability to self-contextualize and adapt their actions agriculturally to the context of the car-driver process. The method is explained through the example of a response system to navigation system in AAV in the territory of Uzbekistan.

Keywords: GPS system, Eroglonass Navigation System, Agricultural Agricultural Vehicles(AAV).

1. Introduction

Advantages of GPS monitoring of vehicles on the territory of Uzbekistan is a big issue: tracking traffic on the map using satellite navigation system and obtaining complete citadelic information, counting the distance traveled, reducing fuel costs, controlling passenger and freight traffic. If we apply this system to agricultural machines and scales, it will make maintenance services easier and increase agricultural productivity. It should be noted that this system developed in our country has several advantages. The system can also switch off the engine and close the door remotely. This allows the dispecher to take action against a vehicle that does not follow the instructions. Without the development of the transport system it is impossible to ensure the social and economic development of the regions of your country. Increase in passenger, freight and agricultural production increases requirements for speed and reliability of movement, and modern technology contributes to the effective solution of these problems. In short, the widespread introduction of state-of-the-art technology to the benefit of all participating government agencies will benefit drivers and passengers. The use of GPS navigation systems in cars, trucks, agricultural vehicles, as well as security, is becoming economically viable.

2. Perspectives of the EROGLONASS system in Uzbekistan

The main purpose of the implementation Eroglonass system is to reduce the time required to provide fast information to emergency services. Furthermore, we learned the benefits of installing this Eroglonass emergency system on agricultural tractors. The Eroglonass system is designed to deliver emergency response systems to our agricultural tractors, as a failure of the auto tractor during agricultural operations may result in the failure of the operator to notify the maintenance and start the work. Agricultural production is delayed and affects economic efficiency. Of course, these play an important role in every agricultural production, and without their support it is difficult to do any agricultural work. So, when installing the Eroglonass system on the agricultural auto tractors, we use the emergency system to bring the situation to the maintenance department, where they can quickly come to terms with the situation. The paper describes the relevance of the chosen topic, the use of a navigation system for the efficient use of time in the event of malfunctions in agricultural machinery that perform agro-technical activities, and one type of disorder is studied. At the same time, the working conditions for the troubleshooting in the field were investigated, and the effects of the combine on the environ-

ment from the hazardous and hazardous factors were studied and described. The units of time spent to correct failures in techniques performing agro technical activities were studied. Moreover, the unit spent time informing the operator about troubleshooting about the problem during the grain harvest season. If there are delays in the harvest season, 5% of the wheat can be sown in 2 days, the daily grain harvesting capacity is 99.3 tons, and the waste is 4.9 tons. On average, 17 minutes a day interruptions in the system used are prevented. 3.5 tons of wheat is consumed during the season.

Carrying out agricultural activities in the field of agricultural equipment fault condition occurs, it is not enough to compensate for the mobile workshops and mobile workshops for technical services from the center. Based on the literature review, we have considered the example of a grain harvester for the installation of an ergonomic navigation system for emergency machinery for agricultural machinery. Practical research shows that, first of all, we considered the number of failures in the harvester during the season. This information is due to the failure of the Class combine wheel tires and hydraulic system hydraulics. To overcome this, there is an urgent need to apply to the mobile service center. We have learned that using Eroglonass navigation systems to optimize time is the best solution to address these problems.

3. Economic and technical efficiency of the EROGLONASS system

Lots of shortcomings have been made in the maintenance work lately. There are also some disadvantages when it is monitored during maintenance. It is necessary to take into consideration the vehicles will be three types of failures can be allocated. Pave the infringement, that does not happen randomly. There are also citatory tariffs that describe such disorders using the rules of probability theory. As an example, let us include the statistical calculation of accidental disturbance. A car accident is defined as a failure that can occur when a set of conditions fulfilled and cannot occur. For example, a grain harvester or sniper blade may break in a field with heavy stalks of grass, or the ribbon of a sidewalk may be broken. Therefore, in such situations, technical service and support will be necessary. Working in the field are able to set the tractor or farm machinery, or pointer to show the production of deterioration in the economic and technical efficiency is going to fall. In general, the park will increase the bumpy starts, stops due to technical reasons. If they are not properly addressed, they may be broken. In this case, we will be able to provide emergency services using the Eroglonass emergency system, which will be eliminated and the process will continue. We provide maintenance services for agricultural machinery. Recently there are many shortcomings in maintenance. Regardless of how much control we have in doing this maintenance work, there are drawbacks.

According to our investigation, the best economic efficiency will be achieved by establishing and introducing a system of mass-scale technical maintenance to prevent these repairs. The results of practical observation and research indicate that the time spent before the operator informs the service company that it took 17 minutes. This is when we calculate the cost-effectiveness of reporting a message to the operator's technical service. If we use the Eroglonass system to prevent 17 minutes in case of combine failure. If the time lost during the season is 7 hours, the daily loss time is 17 minutes 7 hours. Grain harvested using one combine (ΔM_1):

$$\Delta M_1 = \Delta m_1 \Delta t_y = 9,9 \cdot 7 \text{ hours } \Delta M_1 = 69.3 \text{ tons}$$

Given that the average purchase price of one ton of grain (at the price of 2018) is Xn = 1500,000 soums, the farmer's income from the sale of harvested grain at the time saved (ΔD) will be equal to:

$$\Delta D = \Delta M_1 \cdot X_H = 69.3 \cdot 1500000$$

$$\Delta D = 103,950,000 \text{ som.}$$

Nowadays, the world-renowned John Deere and Class major agricultural machinery companies are also working to fix the technical issues by telephone with the operator in case of field damage, which will be cost-effective.

4. Technical analysis and solution of the scientific project

Major economic efficiency is lost as a result of in the field machine failure or equipment breaches. Currently, the dealer companies are working with foreign companies on a contractual basis to facilitate agricultural production and crop cultivation on agricultural machinery in the territory of Uzbekistan.Class, John Deer and Keys are the most commonly used techniques in the farms. In turn, we learned how to operate these equipment and how to troubleshoot them in the field. This modernized agricultural machinery has improved the system of regional technical maintenance of machines. Due to the results of the initial evaluation trials, it can be observed that this multi-sensor navigation system can provide

guidance to agricultural vehicles performing various agricultural operations in both straight and curved roads. This work discussed many fundamental and applicable issues along with the guidance dynamics of steering systems and posture sensors and the ability to apply multiple commercial sensing systems to automatic guidance for agricultural tractors. Sample ERA-GLONASS in agricultural machine systems consist of certain parts, along with an antenna in-band modem (such as GSM or UMTS) for transmitting an emergency call, a collision location GNSS transmitter, accident warning crash detectors, a voice communications microphone and speaker, an alternative power supply and a manual activation pushbutton. The in-band modems must be highly reliable as a security system and transmit MSD data correctly. For wired networks designed for voice communication such as GSM and WCDMA, this is particularly critical. The system's main feature is an integrated device that continuously tracks failure sensors and satellite positioning receiver to trigger an automatic data and twisted pair voice call via a dedicated wireless modem (e.g. GSM, UMTS) in the event of an accident. The ability of in-band modems, the ability to transmit data across the voice network, is a key system requirement. As a matter of fact, there is an ordinary mobile phone inside the car that automatically makes a call when the airbags are triggered and "informs the operator about what happened," and that's where the ERA-GLONASS system's key technical "chip" tonal modem is located. When the system is specifically designed to work in places where there may not be a mobile Internet connection (even GPRS is not always available), a protocol has been developed that allows a small amount of emergency data to be transmitted, called the Minimum Data Set (MND).

Conclusion

In conclusion, we can summarize that drivers struggle because they crash and live in rural regions like deserts and mount areas because ERA-GLONASS plan is not in our country at this time. In the Russian Federation (ERA-GLONASS) And also in European countries (eCall system) many cars are equipped with GLONASS modules and are preserving countless lives by adopting this method of projects according to these statistics.

High productivity in agriculture depends on the level of equipping farmers with the necessary equipment, and on providing them with high-quality services. In this regard, special attention is paid to the provision of modern machinery and provision of operational services to economic entities specializing in agricultural production. Test results show that the machinery defects information can be managed and monitored conveniently and effectively with this method.

References

1. Mathematical and cytopathic models of the system of mass corporate technical servicing of modern agricultural machines. M Toshboltaev. Rustamov Tashkent 2011.

2. Sh.U.Yuldashev. Reliability of machines and bases for their repair. - Tashkent Uzbekistan 2006 696 b.

3. Sh.U.Yuldashev. Reliability of machines and bases for their repair. - Tashkent Uzbekistan 1994

4. M.Tashboltaev, R.Rustamov, M.Kh. Kabulov. Regional firm technical service system in agriculture. UzRFA 2007 page 182.

5. M Toshboltaev Mathematical and cytopathic models of the system of mass corporate technical servicing of modern agricultural machines. Tashkent 2011.

6. R.Rustamov. Improvement of Regional Brand Maintenance of Modern Agricultural Machines 2017.

7. I. Ashirbekov "Organization and planning of production at repair and maintenance enterprises" Tashkent 2005. 216 pages.

8. M. Tashboltaev. Guidelines for the Establishment and Technology Equipment of Modern Maintenance and Repair Enterprises. Tashkent 2011

9. A Akilov, A Kakhorov, M Saidov.The general structure of the car. Tashkent 2011

10. T. Abdullaev, M. Shoumarova Grain combine and cotton pickers. Tashkent 1999.

11. Sh.P. Magdiev. The text of lectures on the technical operation of cars. Tashkent 2014

12. Birol.Kaysoglu, Yenal.Engih. Developing an Automatic Tire Pressure Control System To Improve the Tractive Efficiency of Tractors (Journal of agricultural machinery science) 2014 10 (03) 253 259.

13. ИНФОРМАЦИОННЫЙ БЮЛЛЕТЕНЬ «Текущее состояние и оценка рынка навигационных услуг и прикладных навигационных технологий за рубежом»

14. 2014 IEEE International Conference on Vehicular Electronics and Safety (ICVES) December 16-17, 2014. Hyderabad, India/ AUTOMATED TYRE PRESSURE MONI-

TORING AND REGULATING SYSTEM G Petchinathan, K Srinivasa Sricharan, R R Bharath, T Thiyagarajan, S Sushanth Kumar.

15. Integrated control of agricultural tractors and implements: a review of potential opportunities relating to cultivation and crop establishment machinery.Andrew J. Scarlett Robotics and Automation Group, Silsoe Research Institute, Wrest Park, Silsoe, Bedford MK 4 5 4 HS, UK.

16. www.klaas-e-systems.com/ен/компаний

17. http://www.nis-glonass.ru/projects/era_glonass/

18. uzagroservis.uz.

19. https://ru.wikipedia.org/wiki/%D0%AD%D0%A0%D0%90-%D0%93%D0%9B%D0%9E%D0%9D%D0%90%D0%A1%D0%A1

20. http://www.nis-glonass.ru/projects/era_glonass/

21. http://geokos.ru/aktivnye_ohranno__poiskovye_sist

22. https:// finance.rambler. ru/ economics

23. www.iksmedia. ruthless / articles/ sputnikovi- manitoring-na-transpot.