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REMOTE ACCESS OF ISOBUS WORKBENCH FOR THE ISOAGLIB STUDY AND IMPLEMENTATION

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ABSTRACT The number of electronic devices connected to agricultural machinery is increasing to support new agricultural practice tasks related to Precision Agriculture such as spatial variability mapping and variable rate technology. These practices have demanded an increase number of researches in embedded electronics and communication networks for data acquisition and control in the farms fields. Methodologies and devices for on-the-go measures are being developed to equip agricultural machinery to support the required tasks. The Distributed Control System (DCS) is a suitable solution for the decentralization of data acquisition systems and Controller Area Networks (CAN) and is a major trend among the embedded communications protocols. This technology provides significant benefits and has been used as an embedded control network in agricultural machinery and vehicles. The implementation of the ISO 11783 (ISOBUS) standard represents the standardization of the CAN protocol for application in agricultural machinery. The application of soil correctives is a typical problem in Brazil. The efficiency of this correction process is highly dependent on the inputs were soil and the occurrence of errors affect directly agricultural yields. Following this guideline, this paper presents the development of a CAN-based distributed control system for a Variable Rate Technology (VRT) systems for soil correctives in agricultural machinery. The VRT system is attached to a tractor-implement that applies a desired rate of inputs according to the georeferenced prescription map of the farm field to support PA. The distributed system consists in five devices, or Electronic Control Units (ECUs), responsible to control the VRT corrective applications on the soil. Four ECUs are located in the tractor: ECU0, ECU1, ECU2 and ECU3. The ECU0 is responsible for the Differential Global Positioning System (DGPS) by positioning and transmiting the coordinates in the CAN network. The ECU1 manages the prescription map and controls the implement through the CAN network. The ECU2 is monitors the entire application analyzing the CAN network. The ECU3 measure tractor velocity with a radar sensor and provides this information to the CAN network. The fifth device (ECU4) is located in the implement, which is responsible interpretation of the commands received in the CAN network from the ECUs of the tractor and control the mechanical-hydraulic device that does the variable application. The evaluation of the performance the CAN-based DCS for VRT system was done by experimental tests and by analyzing the CAN messages transmitted while operating of the complet system. The results of the control error according to the necessity of agricultural application allow the conclusion that the developed VRT system with CAN-based DCS is suitable for agricultural productions reaching an acceptable response time and application error.

Keywords: CAN Protocol, Electronic Control Unit (ECU), ISOBUS, Precision Agriculture