Linking of CAN-Bus machine data to forest operations
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description of a software add-on
A Technical note

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Forestry machines – like any other vehicles nowadays – are using the controller area network (CAN) bus for sending communication messages on engine and machine status. These messages do contain information, which may become interesting not only for pure engine monitoring, but on a higher level they are in particular useful in combination with the operation, which these machines conduct.

With the IEMS (Ziesak, 2010) a software package exists, which has the ability to link site data with the active adjustment of tyre inflation pressure of machines, additionally it can link with electronic scales for controlling the loading cycles such as on forwarders. With this ability to interact with maschines it therefore was obvious to extend this platform with the ability to connect to the CAN Bus. This extension is meant as an propriety independent access means to these data, well knowing that there exist solutions coming from manufacturers.

From the data level typical elements which can be read from the CAN Bus include diesel engine parameters like revolutions (per minute), engine load percent, fuel consumption on a intermittent and cumulative level; but also other signals which get broadcast over the CAN Bus may get collected. These could be system pressure and flow data for the hydraulic system, but it might also be operator generated signals for controlling the machine.

The options for using this data link are quite enormous; the following selection makes clear how wide the applications for such a data link may be, as described from several authors:

- Nuutinen, 2013 for instance is using CAN-bus data for doing time studies.
- Lamminen et al. 2012, want to use harvester CAN-bus data for mobility mapping.
- Suvinen and Saarilahti, 2006, used the CAN-bus together with GPS data for terramechanical studies measuring the mobility parameters of forwarders.
- Svenson and Fjeld, 2012 use CAN-bus readings for fuel efficiency considerations in the transport process with logging trucks.

Some details are given on the development of this data link in the presentation, as well as the encountered challenges and difficulties.

Literature

NUUTINEN, Y. (2013): Possibilities to use automatic and manual timing in time studies on harvester operations. Dissertation at the University of Eastern Finland, 67 p.

LAMMINEN, S.; ALA-ILOMÄKI, J.; VÄÄTÄINEN, K.; SIRÉN, M.; ASIKAINEN, A. (2012) Operator tutoring systems for wood harvesting – EffFibre WP3 Task 3; Metla http://fibic.fi/wp-content/uploads/2012/11/Vaatainen_etal_posteri_201112.pdf November 2013

SUVINEN, A.; SAARILAHTI, M. (2006): Measuring the mobility parameters of forwarders using GPS and CAN bus techniques. Journal of Terramechanics 43, p. 237–252

SVENSON, G.; FJELD, D. (2012): The Influence of Road Characteristics on Fuel Consumption for Logging Trucks. 12th International Symposium on Heavy Vehicle Transportation Technology – Sweden http://road-transport-technology.org/Proceedings/HVTT%2012/The%20Influence%20of%20Road%20Characteristics%20on%20Fuel%20Consumption%20for%20Logging%20Trucks%20-%20Svenson.pdf November 2013

ZIESAK, M. (2010): The development of an Integrated Equipment Management System (IEMS). In P A Ackerman, H Ham & C Lu (ed): Proceedings of the International Precision Forestry Symposium. Stellenbosch University, South Africa. 1 - 3 March 2010 . 85p. http://academic.sun.ac.za/forestry/pf%202010/Proceedings%20Precision%20Forestry%20Symposium%202010.pdf November 2013