

SMART FORWARDER FOR SUSTAINABLE AND EFFICIENT FOREST OPERATION AND MANAGEMENT.

FORWARDER 2020 SUSTAINABLE AND SMART LOGGING

Forwarder2020

Modul 5: Smart Forwarder – Monitoring System

Introduction:

Smart Forwarder means to have a telematic device in combination with a Windows- based tablet- PC (for GeoMail and iFOS) in the forwarder. The collected and displayed data prove on the side of the forest machine owner how productive the machines work under different operational conditions. The operator will get good and easy to understand information of his working area and current operations. Automatically derived productivity models support better operational management plans. A forest owner is able to see that a contractor has fulfilled the given requirements. Conservation organizations will be able to monitor forestry harvesting processes to make sure that the environmental impact is as low as possible. During the project, this collected data will be used to prove how efficient and environmental friendly the new machine works.

Background information:

The main challenge was to get the machine data and the geo information into one clear and easy to use web platform that can be used by all involved parties. The second challenge was to develop a tool that gives an idea of the actual machine load and to compare this with the ground pressure. There are already existing software solutions from several machine manufactures that send regularly machine related data to a platform. This data are only machine relevant figures that show efficiency and maintenance status. So far, there is no solution that compares machine parameters with environmental impact factors like the machine ground pressure or the working in protected areas.

Functioning of the monitoring system

Research showed that new designs, particularly telematics systems can fulfil the requirements for a smart forwarder. So there are two hardware pieces for the data collection, accumulation and visualization in the Forwarder. The ESX-TC3G module of the German provider STW to get the Information directly from the Canbus. The second hardware piece will be the Windows tablet to visualize filtered and pre determined sensors on the Forwarder. A specially designed cloud interface enables the use of machine data in forestry, due to the fact that on remote operational forest sites internet access may be very limited (see fig. 1). On the new forwarder existing machine data are massively extended or enriched by many additional sensors, which help to completely describe the process status. The Sensor Info's will be pushed into the Cloud. From there on different clients can make database inquiries. So e.g. people sitting in the office can see on different parameters what is happening on the forwarder and they can react just in time- they can send commands to the Forwarder to adjust the tasks and the performance of the machine. As the different data streams can have a very high resolution, different buffer sizes and storage concepts might be necessary and are going to be prepared. Further results are productivity tracking and predictions and automatic eco-controlling

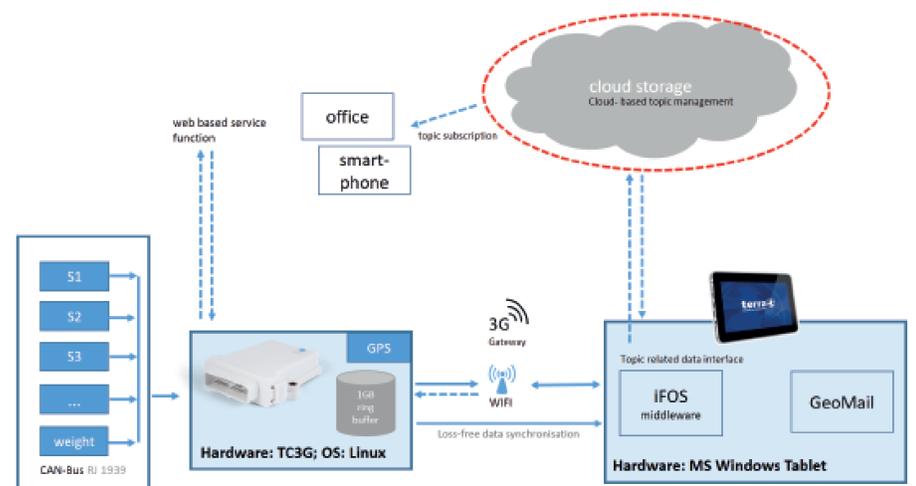


Figure 1: Structural scheme of data flow and WiFi / cloud connection for the Forwarder2020 - Monitoring System

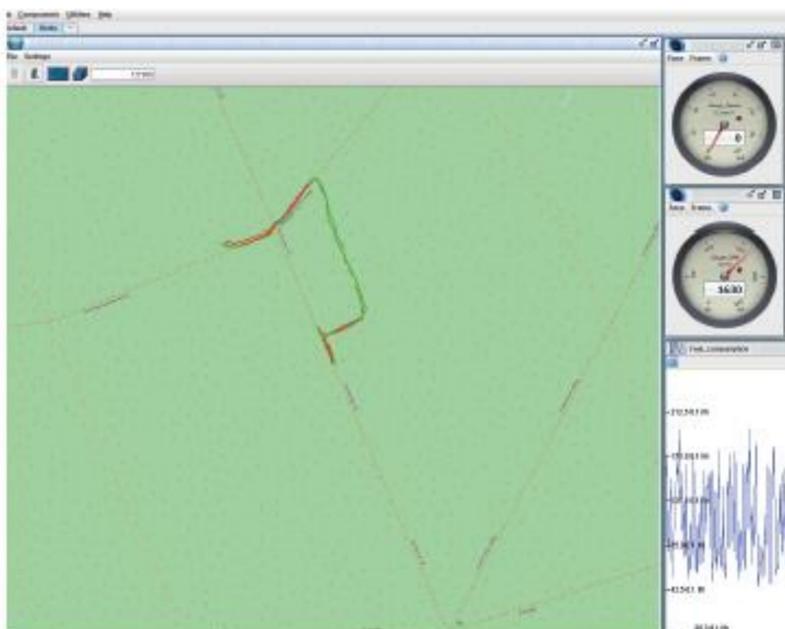


Figure 2: Screen shot from iFOS, taken during a forwarding operation in Saxony, with color coded travel speed [left], speedometer, revolutions meter and diesel consumption over time [right]

iFOS - Data processing, Visualisation and Interpretation

The iFOS software is a middleware solution, which is processing and displaying incoming machine data in real time or for longer time periods using datasets that either were locally stored or requested from the connected cloud storage. This preprocessing of data reduces the data volume (currently 1.4 MB / minute) and prepares the data for the evaluation purpose. As a further aim of development, the partly automatically derived variables can potentially interact with existing GeoMail environment solutions, also for increasing the level of automated recording of logging parameters. An in the cloud implemented topic management guarantees the restricted access only to the related user group.

Partner:



Technik die Freude macht.



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