



INTERVIEW – Dr. Martin Ziesak, professor at the University of Applied sciences in Bern, expresses his views on the challenges taken up by the Forwarder2020 project

The Forwarder2020 project is coordinated by HSM, a forestry machines developer and builder located in Germany. In this interview, Dr. Martin Ziesak, Professor at the University of Applied Sciences in Bern and specialist on forest operations, takes time to express his views about the challenges taken up by the Forwarder2020 project and the future of the forestry machines market. A great opportunity to learn more about the growing links between forestry machines, efficiency and environment, and wood exploitation.

The University of Applied Sciences Bern (BFH) has around 7150 students and 2250 employees in six departments located throughout the Canton of Bern, Switzerland. The “Hochschule für Agrar-, Forst- und Lebensmittelwissenschaft” (HAFL), Department of Forestry is not only an educational establishment but also an accredited training and competence center for forestry in Switzerland. It focuses on applying ecologically management principles that enable forestry graduates to help sustain the protective, economic and leisure functions of forests and it plays a central role in the development and implementation of novel solutions in sustainable forest management. Their research and development is innovative, practical and need-oriented. They are both nationally - as well as internationally oriented.

Short Biography



Dr. Martin Ziesak is professor for forest engineering at the HAFL in Zollikofen, Switzerland. The three pillars in teaching as well as in research are forest operations, work science and forest road management.

Martin received a PhD in forestry at TU Munich. He actively worked in lot of applications such as EU applications like the multinational MARIE Curie IRSES project (CLIMATE-FIT FORESTS, PRSES-GA-2011-295136) or the SME-targeted collaborative FOCUS project (FP7-NMP-2013-SME-7). Besides these also national funds like from BAFU, the “Wald- und Holzforschungsfonds” in Switzerland are used by Martin to advance its work. Martin has likewise a strong collaboration with German federal bodies. Finally from the time being affiliated at TU Munich, Martin actively worked on the integration of electronic scales, tyre inflation system and soil types in forwarder operations through optimisation and control.





Dr. Ziesak, you are a specialist in forestry issues and you are especially more involved in the development of integrated forest operation softwares. You are then a key partner in the development of the smart forwarder in this project. Why has your organisation decided to join this Forwarder2020 project?

There exist several reasons, why we are very pleased to be partner in this Forwarder2020 project.

First: We had a very interesting predecessor activity on EU level. In that recent FOCUS project we implemented an active control idea to the forest value chain. Among the many partners was HSM. So we know the company, the team, and its spirit quite well. Actually we did one of the hardware implementations on an HSM skidder. Based on that cooperation we created a mutual understanding and trust which was a good starting point for a new proposal, the Forwarder2020 initiative.

Second: Right from the beginning it was clear that in this “Innovation Action” we would not only develop ideas and concepts, but we would focus on the development of a machine, meant for immediate introduction to the market. This request puts definitely some pressure on the development, but it offers also several positive thrills and several chances, which we like.

Third: The clear structure around five technical modules with us being heavily involved in the IT part, made it as well attractive for us to participate. In this IT-part it is the idea to convert the forwarder into a “smart forwarder”. This thinking is pretty much in line with our vision for future forestry supply chains, so this project matches our strategic thinking very well.

What are the main (strategical) objectives of BFH within the process of building an intelligent forwarder?

BFH has two major roles in the project. The first one is centred on the conversion of the machine into a “smart forwarder”, the second is on the realisation of prototype testing and the proof, on how much better the different components perform during machine operation in the forest.

Up to now, which are the main achievements of BFH on these issues?

After an internal evaluation it was decided to use our software product “iFOS” as middleware in the forwarder. iFOS will be implemented on the machine to do smart data handling. On top of that comes the task for iFOS to provide data visualisation of any of these data streams, but also the task to provide data aggregation and interpretation of the collected data. So our software is in a very prominent role. Meanwhile we added several necessary new functionalities to it.

Furthermore we finalised our discussion about the essential and many extra sensors, which need to be embedded in the prototypes. Based on this huge sensor set we are able to tell much more about what the forwarder is doing, how it is performing and what will be the next follow-up steps in an active working process of the machine.





At this time the necessary data cloud gets implemented and we are thrilled to do first data transfer tests with iFOS into this machine data cloud. Furthermore we are keen to get first data aggregated from the CAN-bus and the many extra sensors directly from the machine, showing how the prepared software is able to handle the huge data streams.

Furthermore we finalised our international, Europe wide survey on market needs concerning the forwarding activity. It is good to know that the five planned innovative modules in the new forwarder will match pretty much typical needs, both from contractors and forest owners.

Finally – as the first prototype is just about to be rolled out – we are preparing our first in-house test schedules and in-forest field test procedures.

How is the Forwarder2020 project aligned with your objectives?

Our strategy here at BFH, respectively in my team, is to implement industry 4.0 concepts in forestry. As we want to support our Forest and Timber industry, we need not only to see, but to implement the many new revolutionary concepts as they are envisaged by this fourth industrial revolution. It is necessary to add further sensors in the many actors as we see them being used in the forest and timber value chain, but we also need to tap into the existing data streams, as they do already exist in the working machines. By combining these data streams we improve the digitalisation to a new level. When we get all these data networked, we can generate huge new value. A core component, a cyber-physical system (CPS) such as iFOS, being positioned in such a strong strategic role like in this project is a major advantage for us. But it's an advantage for the industry as well, as we rely on open, non-proprietary standards.

Lastly I want to highlight the fact, that as a research institution it is nowadays necessary and standard to work in international groups and projects. Our research landscape was and is rather international. Therefore we feel pretty much at home in this 14-partner set-up of forwarder2020.

Why is the BFH team working in Forwarder2020 so excited about the project?

The implementation of industry 4.0 concepts into marketable products is thrilling – as mentioned above. But we should not forget that the new forwarder has two further major advantages: it has a much lower environmental impact and a boosted productivity. And it is exciting to see this becoming alive.

What is your view, as a scientist specialised in forest operations, on the future of forestry machines and forest management in Europe? What paradigms will have to be changed? Where do you see the main changes in a near future?

In order to understand and predict future trends we should separate enabling factors from demanding constraints.

On the enabling side I see industry 4.0 concepts as very promising. Since decades the empowering of the rather complex timber supply chain, with its many and so





different actors, like forest owners, contractors, haulers and timber industries, has not really seen a major breakthrough. This is due to its complexity, lack of transparency and rather diverging different individual interests. Here I expect major changes through “industry 4.0” concepts. This will include new technical approaches, new business models but also new structural paradigms, what we may expect here.

On the side of restrains we again have to see several aspects. The need to operate much gentler with and within the ecosystem forest will force us to reduce the fossil CO₂-release further, we will have to lower the impact on forest soils, we have to bring down emission loads, etc.. Right now the very first measure in timber harvesting is pretty much cost driven, we know and compare our operations, but only measure in currency costs per cubic meter produced timber (such as €/m³). In future a much wider, more holistic approach will be necessary, where all these other measures will need to be quantified and get included.

Saying this, does not neglect, that the cost pressure in the supply of timber will stay high. Therefore a trend for further economisation will both increase future productivity and reduce necessary cost components.

With that in mind the future oriented vision of forwarder2020 may become even more evident.

What will be the highest impact of Forwarder2020 on the forestry sector and on logging activities in general? (Added-value for foresters and wood industry)

I see three major impacts, coming from forwarder2020:

- The better fuel efficiency, the higher productivity [expressed in m³/h], but also the option to monitor and actively steer the forwarding phase, will boost the cost effectivity of the new forwarder.
- The lower environmental impact, the ability to operate highly mechanised on soils with low bearing capacities will help to both widen the operational areas and increase general acceptance of fully mechanised forwarding.
- Through the smart forwarder concept I see two things: the new forwarder evolves to a clever actor, which “knows” what it is supposed to do, registering automatically deviations of any kind and requesting attention, when needed. Furthermore the smart forwarder will offer a much more seamless integration of the forwarding cycle into the timber-harvesting supply chain; our new forwarder may become the driving agent for this trend.

