Abstract template for the conference "A century of national forest inventories – informing past, present and future decisions"

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On page two, you are asked to fill in your abstract in the format and font size indicated. Please remember to include authors affiliation information in the footer section of page two. The length of the abstract may not be more than one page including references.

Abstract title:		Using TLS data for volumetric modelling – experiences from Finland
Take-home message:		*Point cloud data produced by terrestrial laser scanning has a great potential to provide detailed data for volumetric modelling of trees. The resulting accuracy has however limitations which need to be understood.*
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General topic, see website: (please double click on the check box and activate the relevant one)	☐	Improving future NFIs by learning from the past
	☐	NFIs today and in the future
	☒	Cutting edge and futuristic inventory techniques and technologies
Preferred presentation form:	☐	Oral presentation
	☒	Poster
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Using TLS data for volumetric modelling
– experiences from Finland

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Introduction: Dense point clouds produced by terrestrial laser scanning (TLS) can be used to detect trees and model their structures. Further, this structural data can be used for various purposes, such as to calculate volumetric dimensions of the trees. Given the high information content of the TLS-based measurements, the accuracy of these volumetric estimates can greatly outperform traditional methods which are normally based on equations with a few field-measured parameters. There are, however, various challenges in the TLS-based models which need to be taken into account in the analysis.

Materials and methods: To test the applicability and accuracy of TLS-based volumetric estimates, a set of field plots were first scanned with TLS scanner from several stations, and these point clouds were combined. The combined point cloud was used to detect the trees and reconstruct their trunk shapes as cylinders, which were further refined with a few additional steps. From the same field plots, about 50 trees were felled, followed by measuring diameters at various heights along the whole trunk and collecting detailed information regarding to branches. These measurements were then compared to both TLS-based results as well as to traditional models with a limited number of parameters.

Results and conclusions: At the time of this abstract, TLS scanning was done, initial TLS-based models were created, and reference trees were felled and measured. Some of the TLS processing phases as well as actual comparisons were however not performed, therefore not providing any final results or conclusions yet. These will be provided in the final poster.

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