Lidar teknologia metsäkoneessa - PONSSE ’TDA’

Koneyrittäjät – Ratkaisevat tekijät

22.9.2023 Scandic Rosendahl
Tampere

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Ratkaisevat tekijät
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www.koneyrittajat.fi/ratkaisevat

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Thinning Density Assistant

Drivers for Thinning Density Assistant

- Thinning forest to right density in all conditions 24/7 is not easy for even the most experienced operators
- Cognitive strain for the operator is high and it can be lowered with right kind of assist systems – while quality of work is improved
- Faulty thinning density leads to growth losses and lower carbon sequestration - too heavy thinning is prohibited by law in Finland
- Also right & optimal forest strip road spacing asks for assist
- Recorded data of thinning stand after operation has remarkable value also e.g. for stand rotation simulations
- Machine perception like this is also the first step towards assist features with obstacle avoidance
- Let’s take a Lidar based system into use!

Talous | HS Ympäristö

Suomen metsien harvennuksissa kaatuu laittoman paljon puuta: ”Tulokset ovat huolestuttavia”

Suomessa ensiharvennukset tehdään suosituksia ronskimmin, mikä pienentää metsän kasvua, puunmyyntituloja ja hiilensidontaa, ilmenee Metsäkeskuksen selvityksistä.

Laura Kukkonen HS
20.12.2022 14:42


https://www.youtube.com/watch?v=aO-9d31F8VI

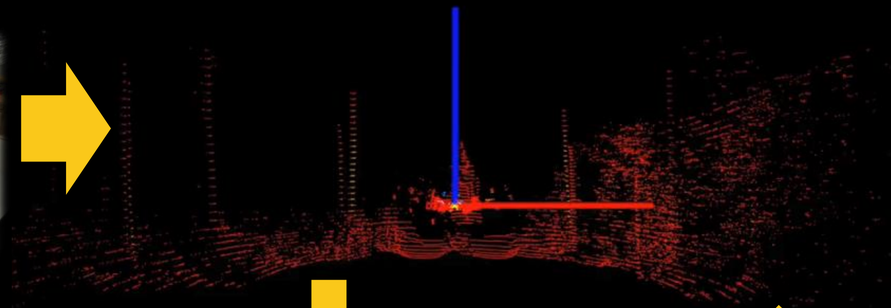
Lidar?

- A long way here

Closer look how it works?

Forest is scanned by LiDAR

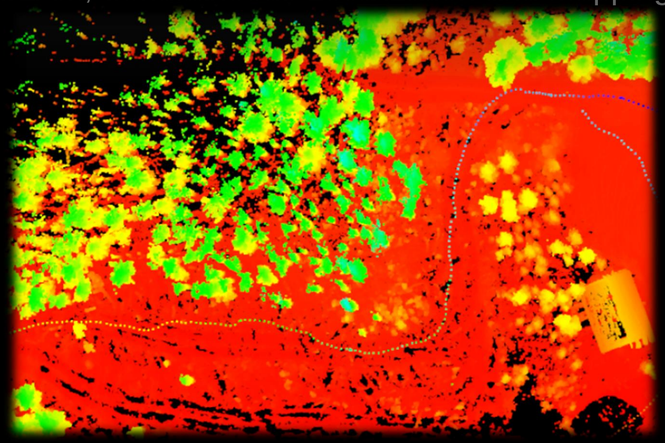
One frame



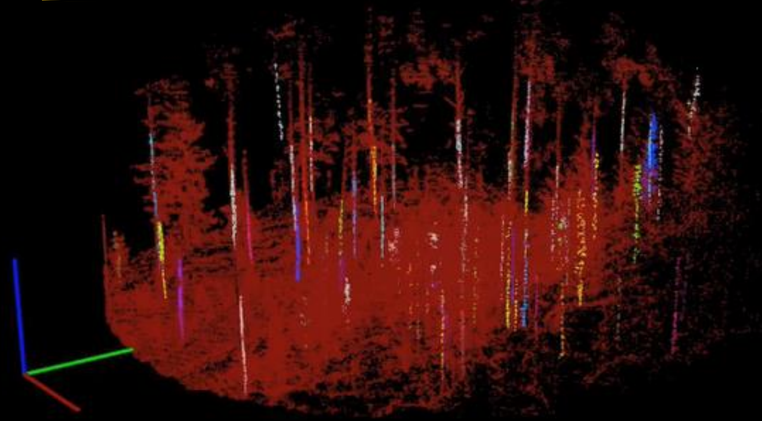
Key frames are combined and stored for a bigger point cloud.

Accurate position of the machine

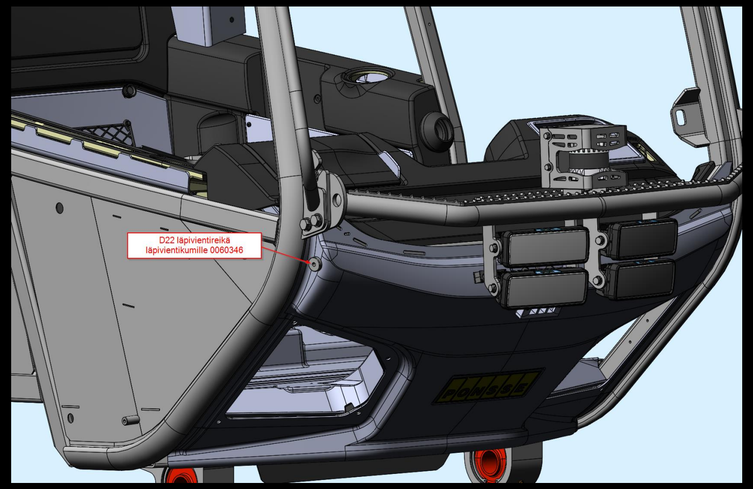
(SLAM, Simultaneous Localization and Mapping)

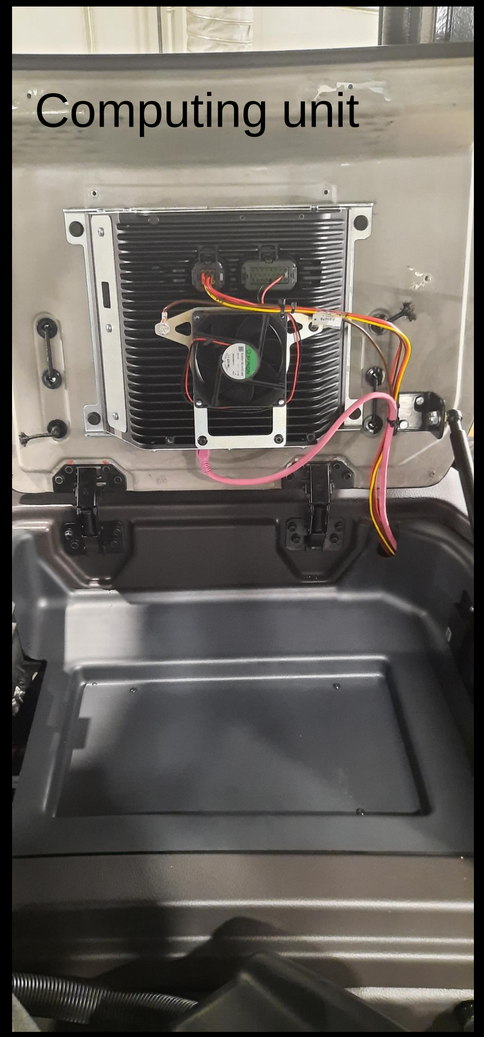


Tree recognition and map of trees.



TDA concept prototype installations





TDA key features

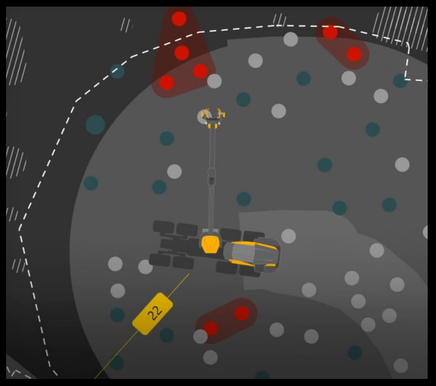
- Detects surrounding trees of the machine in real time with LiDAR
- Provides accurate location of machine and trees
- Operator assistance systems helps operator to achieve target thinning density and optimize strip road network
- Map of trees can be exported automatically out of the system for later use
- Highest possible added value to thinning operation through optimized thinning quality
- TDA is currently a technology concept in forest tests (Scorpion, 5G)


Finnmetko 2022: Ponsse toi laserkeilaimen hakkuukoneeseensa

Keilain avustaa kuljettajaa kertomalla jäljellä olevan puuston runkoluvun, tuotantokoneissa uutta laitetta ei vielä ole.

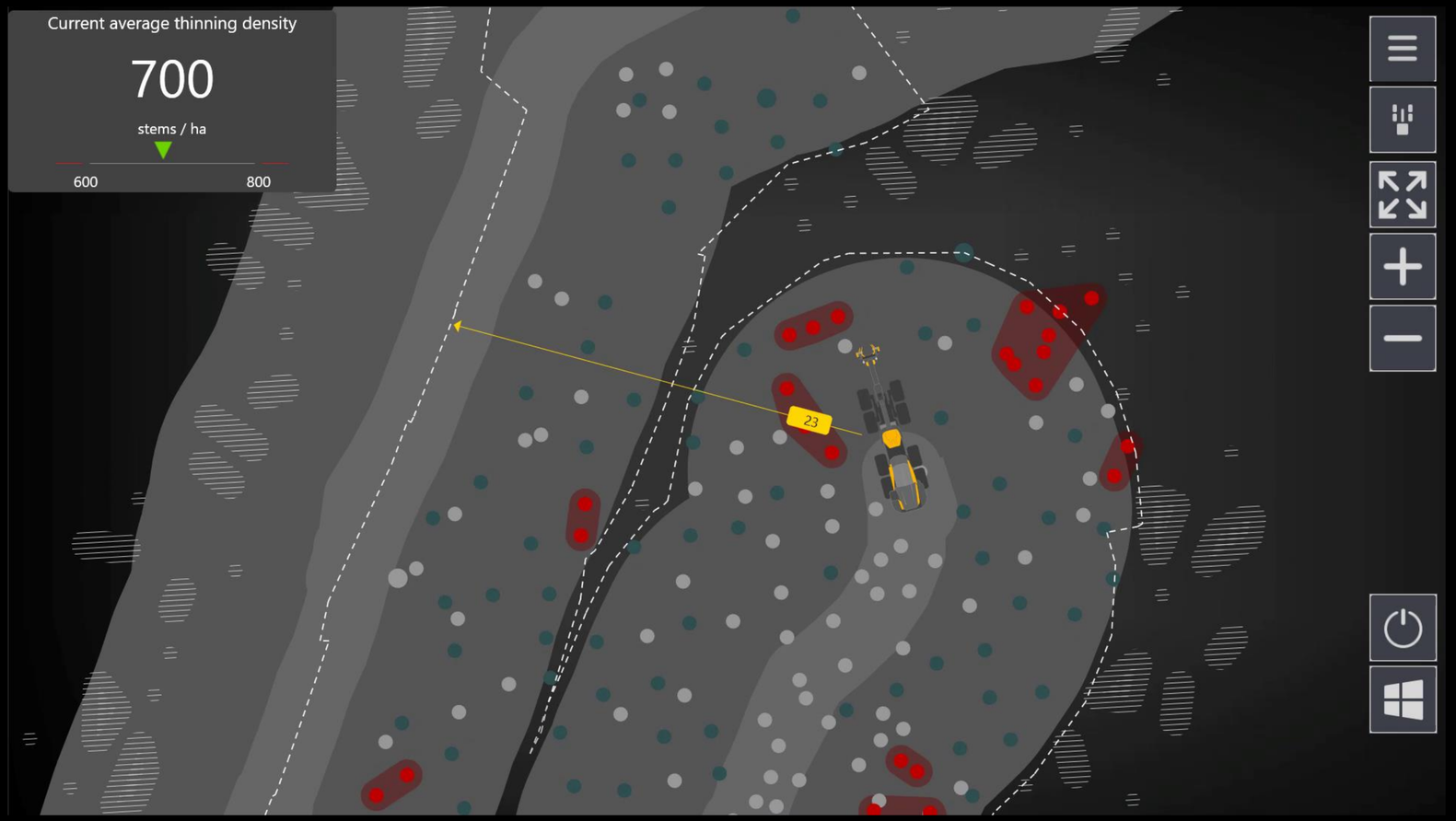
Koneen ympäristöä luotaava keilain on kiinnitetty ohjaamon etureunaan. (Kuva: Mikko Riikilä)

Ponsse on kehittänyt laserkeilaimeen perustuvaa järjestelmää, joka avustaa kuljettajaa oikean harvennustiheyden saavuttamisessa. Ponsse Scorpion -hakkuukoneen ohjaamon etureunaan kiinnitetty keilain luotaa koneen ympäristöä hieman puomin ulottumaa kauemmas ja määrittää puuston runkolukua lehtaarilla.



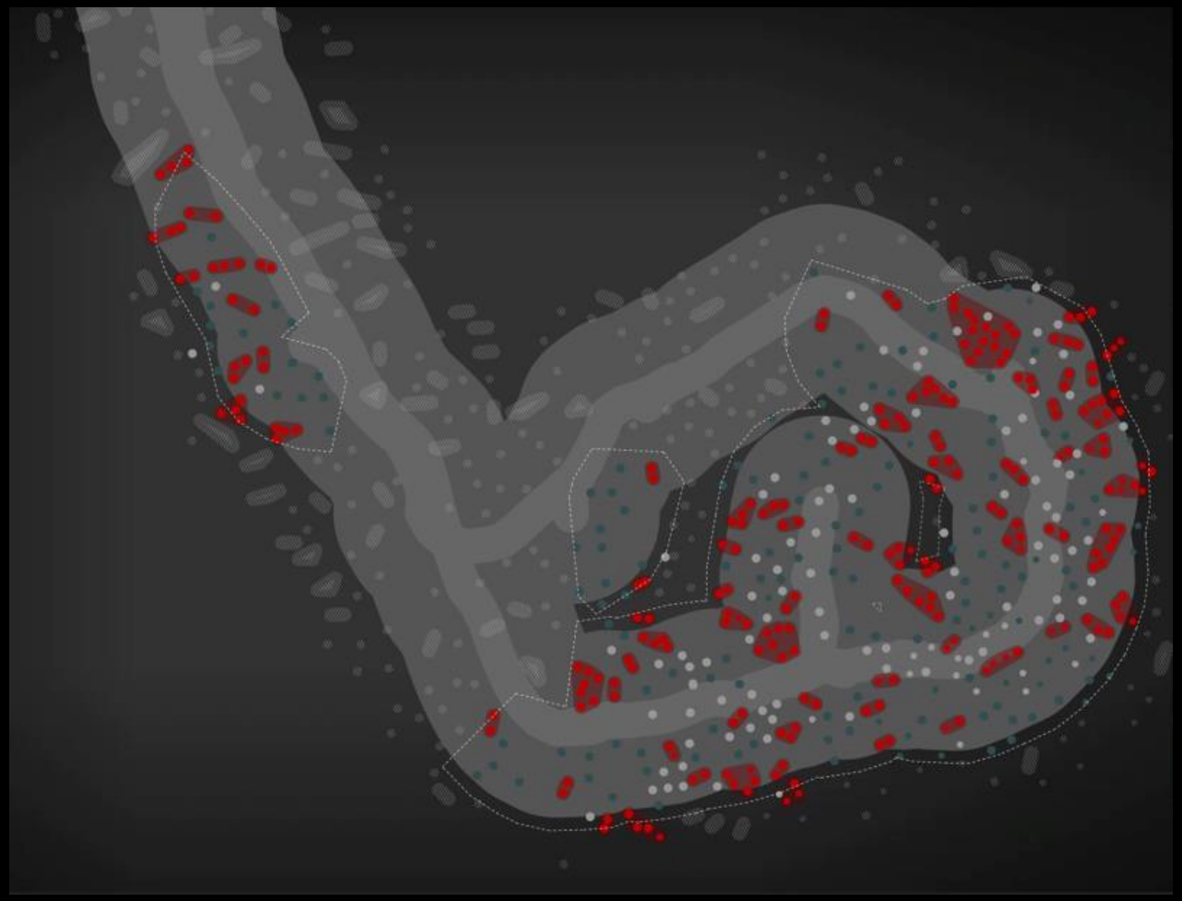
Strip road spacing assist and average thinning density

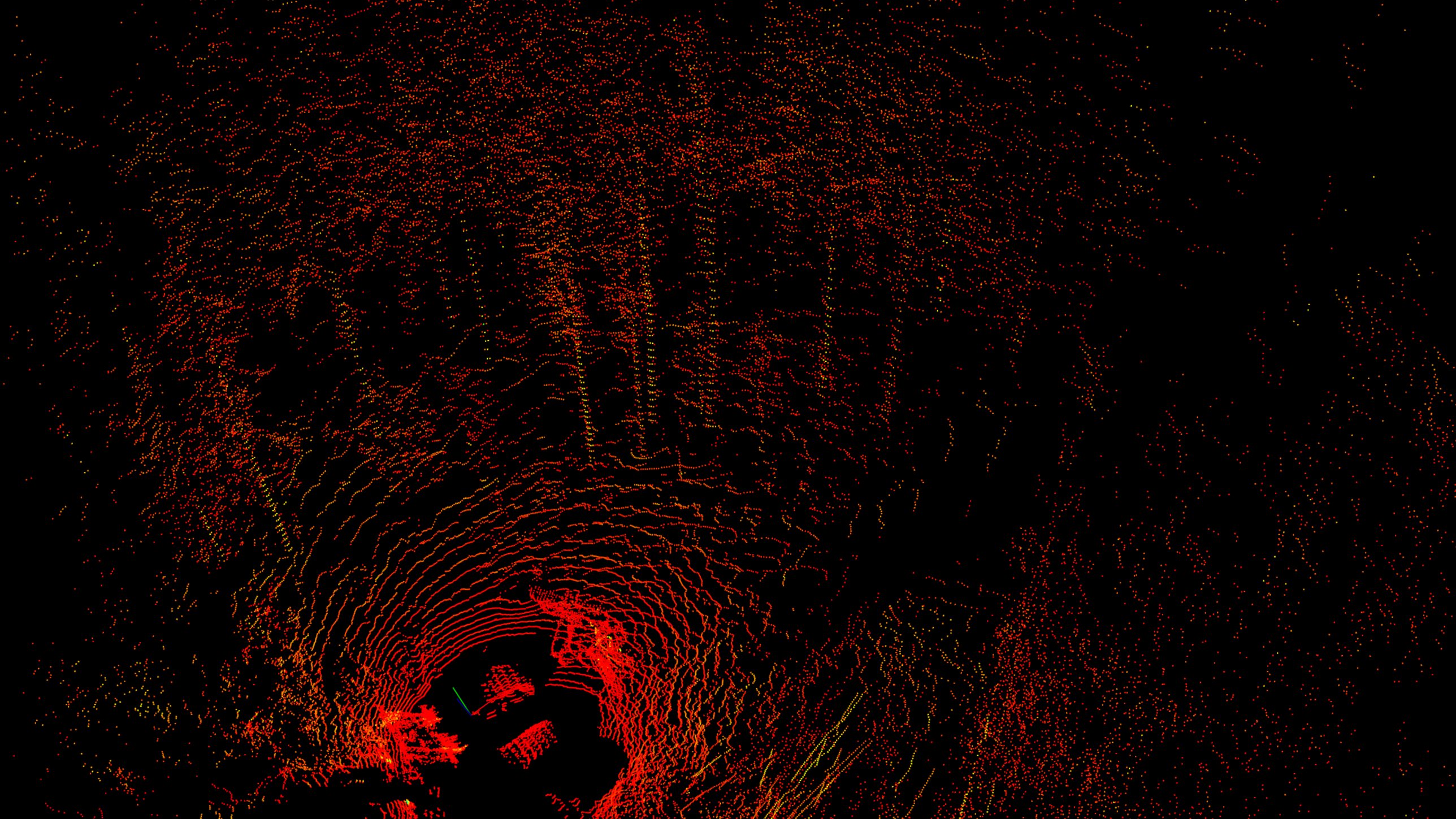
- Path assistance will help operator to keep track distance at a specified distance, even if there’s not much visibility at forest
- Harvested area is detected automatically and average thinning density is calculated (stems / hectare)
- Map of the work area and position of felled and remaining trees is created



Mapping of large areas

- SLAM (Simultaneous Localization And Mapping) is used for accurate positioning of the machine and mapping of the surrounding environment
- Managing large datasets in the background while UX needs to run smoothly in real time with reasonable computational power (system cost)

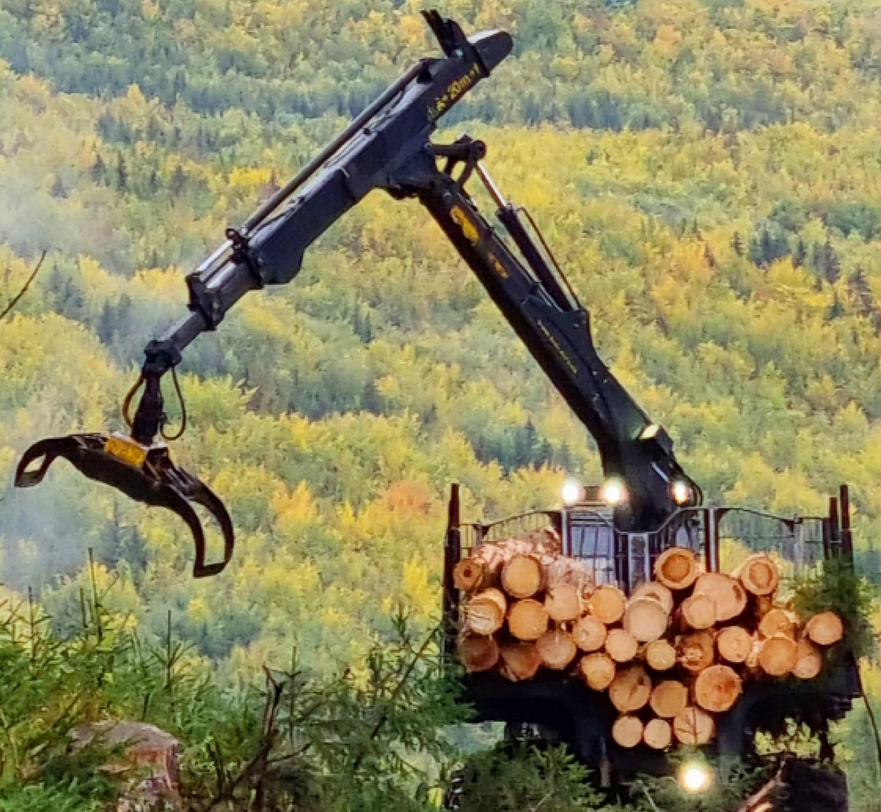





https://www.ponsse.com/fi/forward-27#/

PONSSE

Thank You!



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