

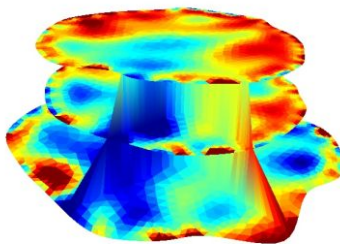
Electric Resistance Tomography

The PiCUS : TreeTronic uses electric current/voltage to examine the tree. The resulting measurements are displayed in a two-dimensional map showing the apparent electrical resistance of the wood, called an Electrical Resistance Tomogram (ERT). The electric resistance of the wood is influenced most of all by:

- Water content
- Chemical elements which change according to the status of wood and
- Cell structure: reaction wood or roots do have different resistances compared to normal wood.



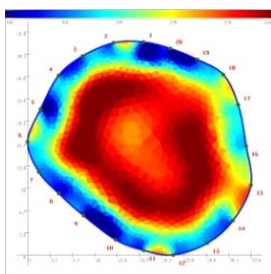
The 3D graphic of a tree shows a blue high conductivity area where an active fungus is living.



- Blues indicate areas of low resistance (high water content, etc)
- Greens and yellows show increasing resistance
- Red colours indicate areas of high resistance (lower water content)

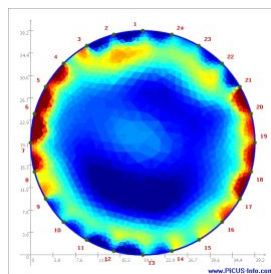
How to read TreeTronic Tomograms

The main aspect of interpreting ERTs is the distribution of high and low conductive areas. You are looking to see where high resistance is and where low resistance is. This information needs to be compared with the normal resistance distribution in sound trees of this particular species. Each species has a typical resistance (water/moisture) distribution. So far we have identified three types of typical resistivity distributions in trees:

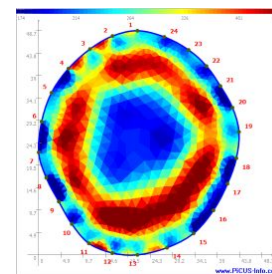


ERT type 1

Most European tree species belong to ERT type 1: betula, tilia, fagus, pinacea, populus and many others.



ERT Type 2



ERT Type 3

PiCUS : TreeTronic[®] 3



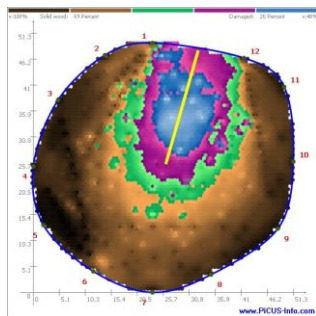
Combining Sonic and Electric Resistance Tomography

When used in combination with a Sonic Tomograph, an ERT offers you more information about the tree. When analysing both SoT and ERT it is often possible to

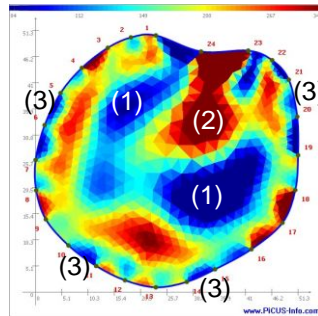
- Distinguish between different types of damage (for instance crack/cavity vs. Decay)
- Detect early stages of decay
- Measuring the size of hard or sapwood
- Get information about areas above or below the measuring level. This is interesting for analyzing root decay problems.

Decision tables like this help to bring SoT and ERT together. This is the ERT type 1 table.

SoT <i>Sonic velocity [m/s]</i>	ERT <i>Resistivity [Ohm]</i>	Conclusion
High (brown)	High (red)	Healthy
High (brown)	Low (blue)	Still safe, but early decay
Low (blue/violet)	High (red)	Cavity / dead decay
Low (blue/violet)	Low (blue)	Active decay



The Sonic Tomogram clearly shows the defect. What type of damage did it find?



The ERT shows low and high conductive wood - active (1) and dead decay (2).

Living sapwood is on the edge(3).



TreeTronic 3 - the fastest ERT ever

- **New compact system design:** one main control unit only.
- **Two cables only:** clamps are assembled to a robust cable harness.
- **Rapid data collection.**
- Up to **24 measuring points** - scans take maximal 30 seconds.
- **NO PC needed** in the field. Can operate the entire tomography scan with or without PC
- ERT tomogram shown on PC only.
- Main control unit **saves over 100 scans** on solid state memory.
- **Lightweight** - much less weight than previous models.
- Built in **GPS** and **Bluetooth**.



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