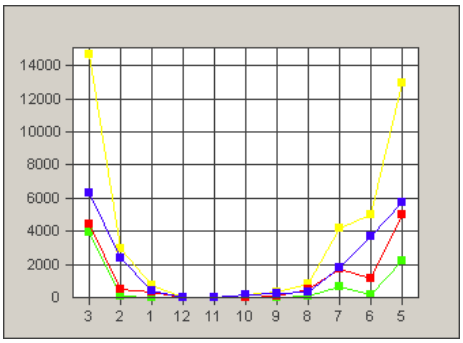
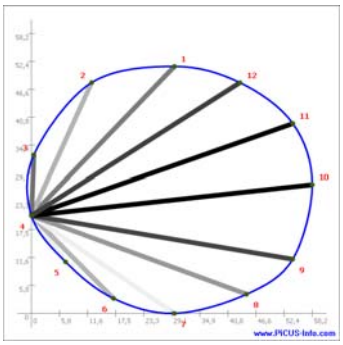
New functions in PiCUS Q72 Software

1. New Measuring Modules: PiCUS 2.0

In addition to the time of flight measurements of the sonic waves, the PiCUS Hardware 2.0 measures the intensity of the waves. The intensity (or loudness of the signal) decreases with distance from tapping point. Conclusions about the type of defect can be drawn by analysing the attenuation of waves.
The left diagram shows the attenuation of the intensity of sonic waves on a sound aesculus tree.



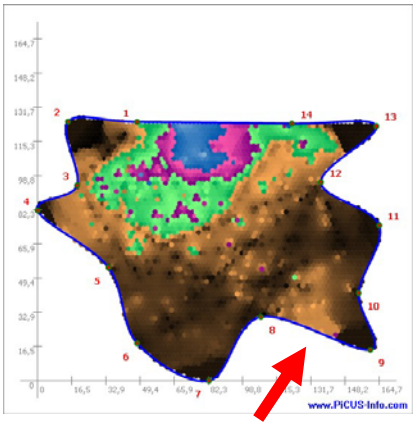
Intensity

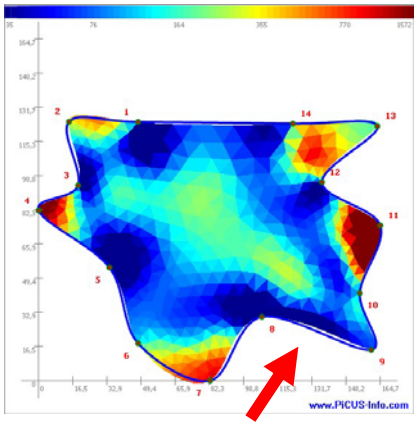

Sonic Velocity

2. Information about roots using PiCUS : Sonic Tomograph and PiCUS : Treetronic®

In some cases the Electric Impedance Tomograms of the Treetronic can be used to detect fungus infections in roots: information about large roots can be obtained because the electric field is affected by the wood above and below the measuring level.

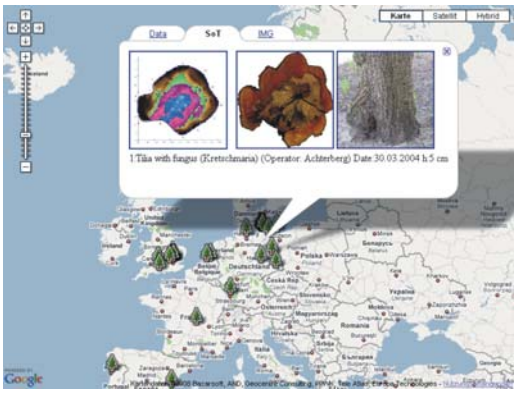
The example shows a beech with Meripilus giganteum. The sonic tomogram (SoT) shows a slight decrease of sonic velocity near MP 8-9 (light brown). The EIT shows higher conductivity than roots normally have. Roots should have a low conductivity (high resistivity).





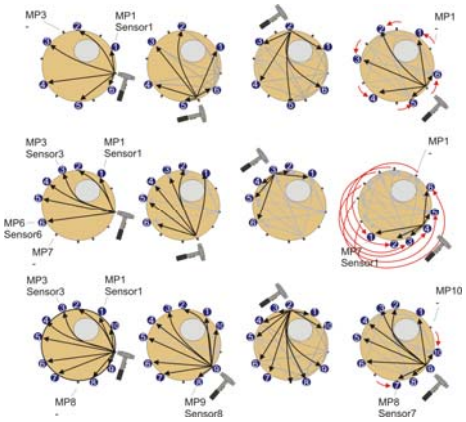
3. „PiCUS World of Tomograms“ – International Tomography database on the argus web site

On www.picus-info.com we have created an international database for comparing and discussing results of Sonic and Electric impedance tomography from all over the world.



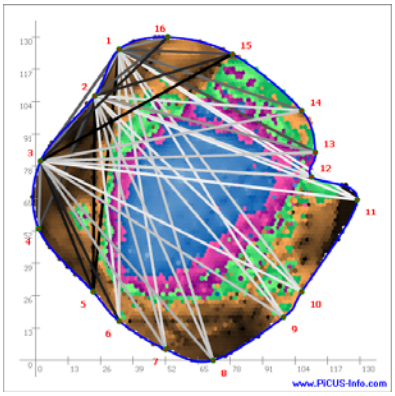
4. Electronic Hammer

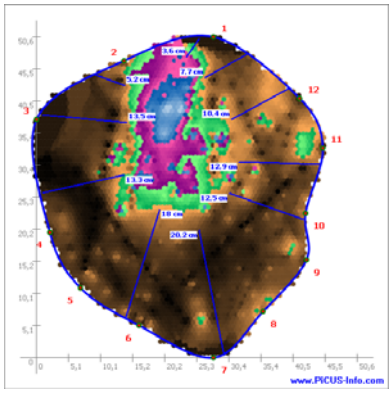
The electronic hammer allows to use more measuring points (nails) than sensors are available. This increases the accuracy of tomograms or makes it possible to measure bigger trees.



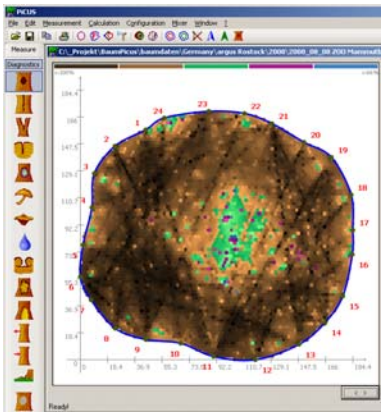
5. New Calculation and Analysis Functions in PiCUS Q72

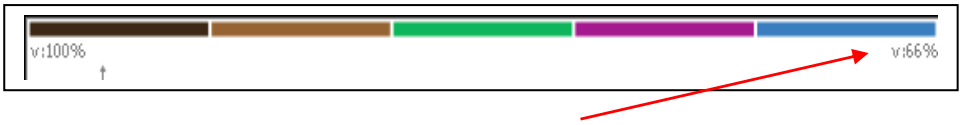
5.1. Multiple Measurements





5.2. Relative velocity shown in tomogram

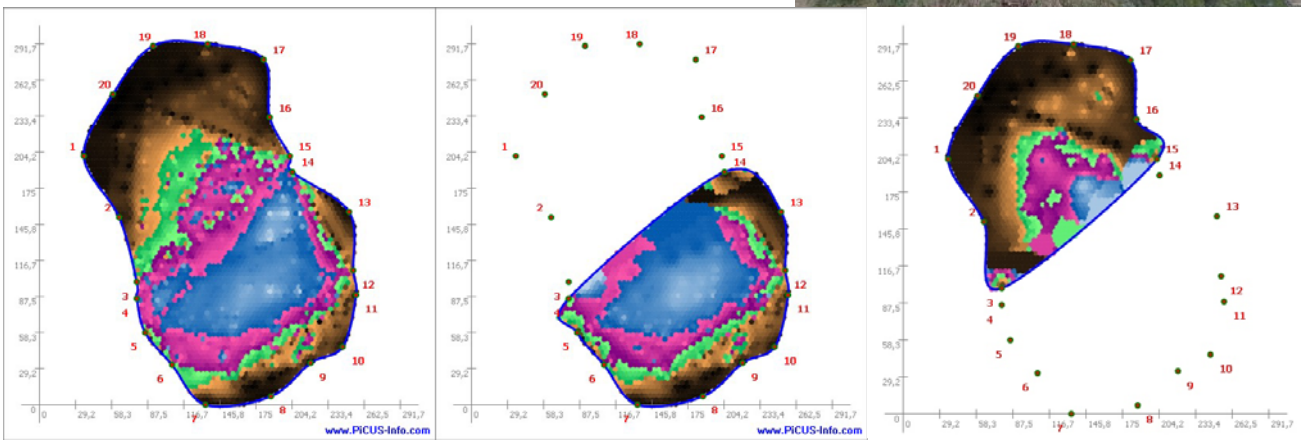




The relative sonic velocity used are shown in the legend above the tomogram. The absolute velocities are shown in the table inside the information frame.

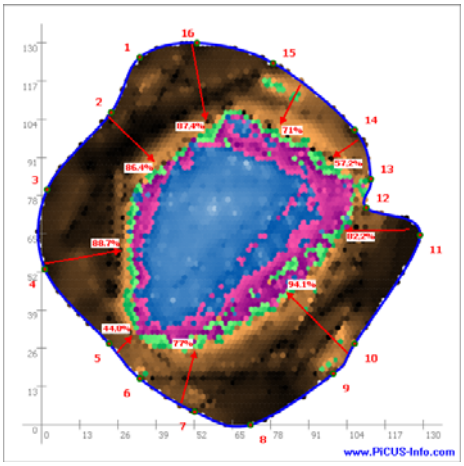
5.3. Multistem testing in single operation and Analysing different parts of the trunk separately

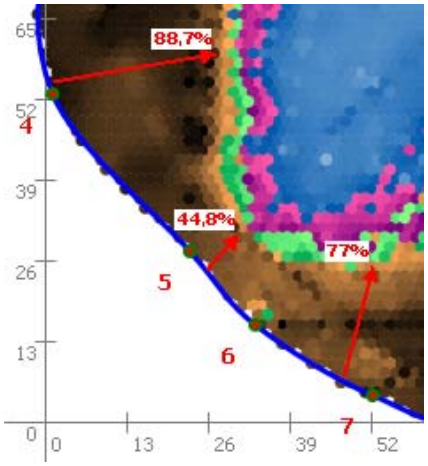
Co-dominant stems require the use of many measuring points: the use of the electronic hammer is recommended in this case.
When calculating the tomogram, it might be useful to calculate each part of the trunk separately. The Q72 software allows deactivating measuring points without deleting them.



5.4. Raw Estimation of loss of stability

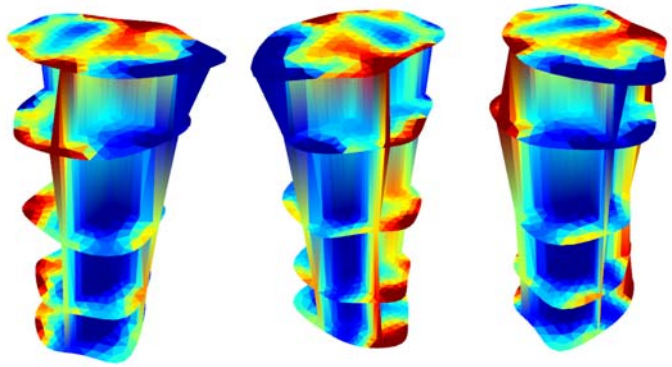
A rough estimate of the loss of stability of the remaining wall in damaged trees can be given by using the geometrical moment of inertia. The values shown refer to homogenous material (which we do NOT find in trees) and only work as guideline.

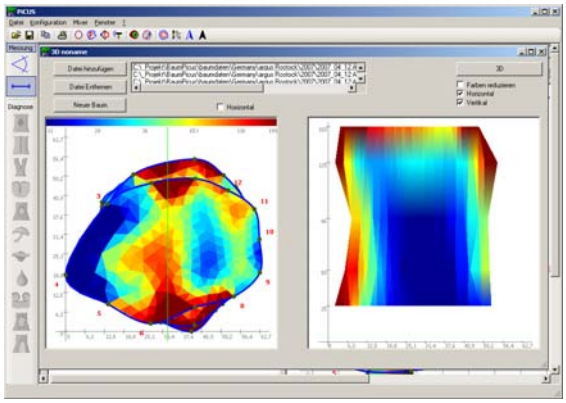




5.5. 3D Presentation of Treetronic Tomograms (EIT measurements)

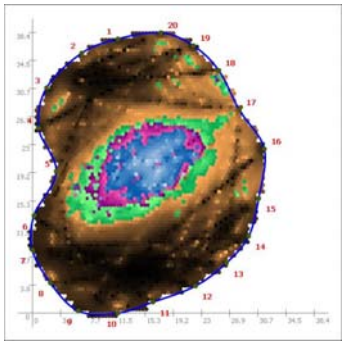
The results of Treetronic EIT's can now be shown in 3D.





5.6. Overlay of Tomograms (SoT, EIT) and Photos

Sonic Tomograms (SoT) and electric Impedance tomograms (EIT) can be overlaid using the „Mixer" function.



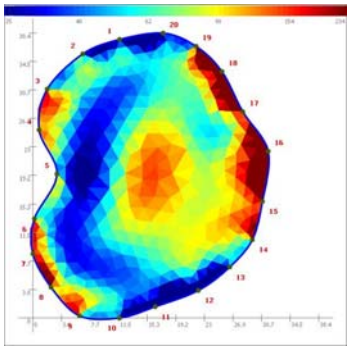
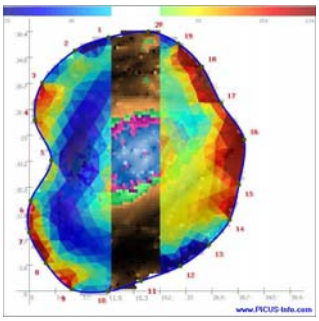
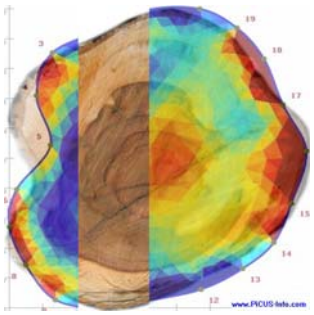
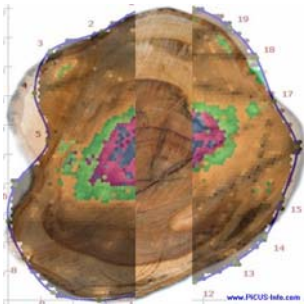
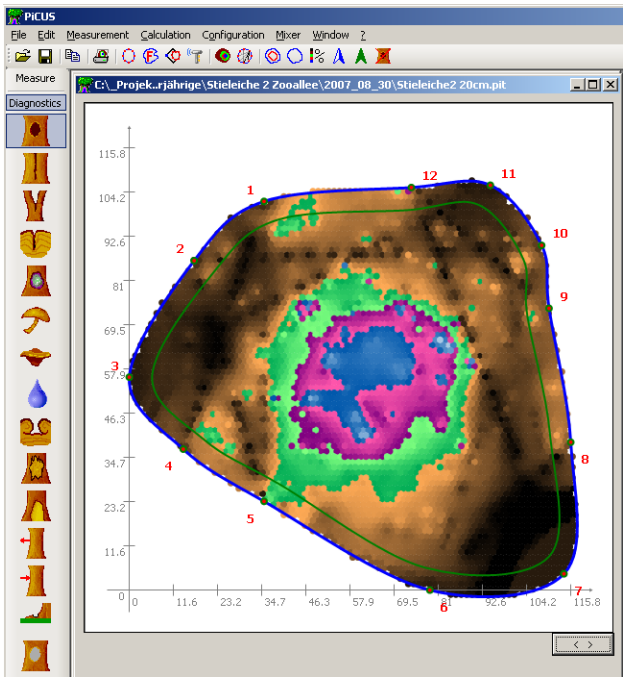


Photo of maple with crack and decay, SoT and EIT and overlay below:

5.7. Icons for Labelling Defect areas

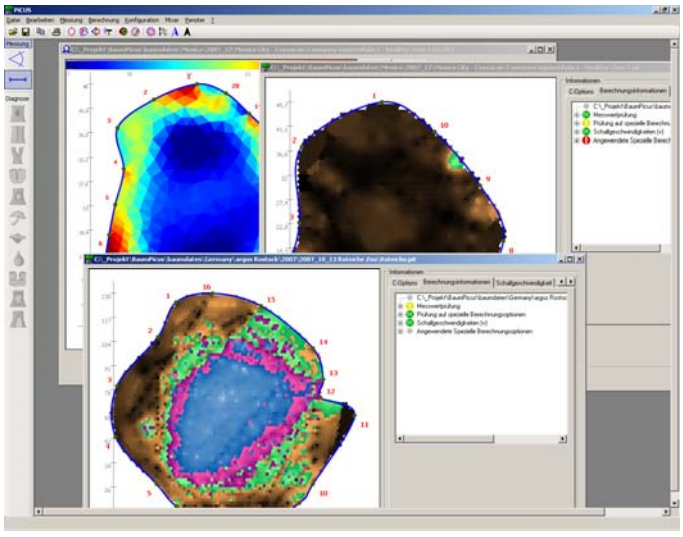
By using small symbols we can now label specific areas in the tomogram.



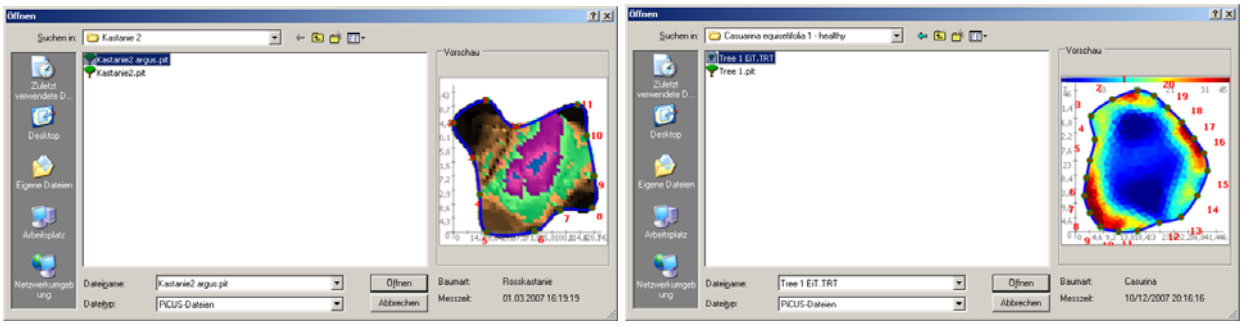
Symbols for

- Open Cavity
- Crack
- Co-dominant Stems
- Included bark
- Bracket Fungus (1)
- Toadstool Fungus(2)
- Effluent (Water, Resin)
- Occluding wound
- Bark Anomaly
- Mechanical Damage
- Tension Wood
- Compression Wood
- Damaged Roots
- Foreign material (concrete etc)

5.8. Open multiple Windows (since Q70 Expert)



5.9. Tomogram preview in File-Open Dialog

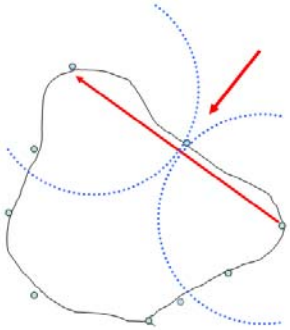


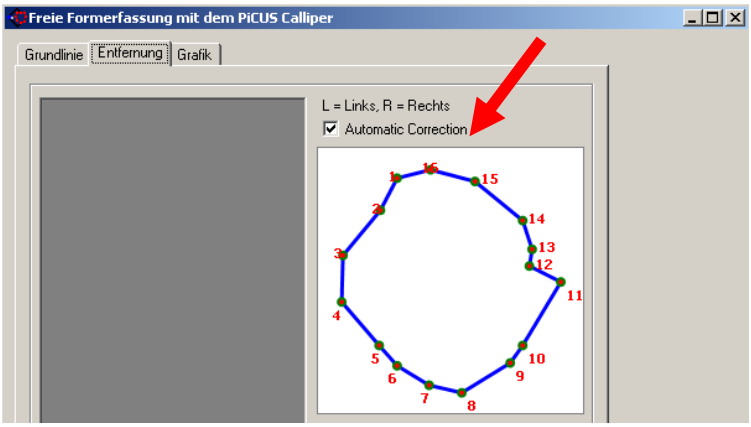
„*.pit“ – preview

TreeTronic preview

5.10. Automatic Correction of Triangulation Errors

Small errors in measuring distances can cause problems when using the free shapes geometry function. Error message: „No triangle…. “. The sketch shows the reason: the circles do not have intersections.

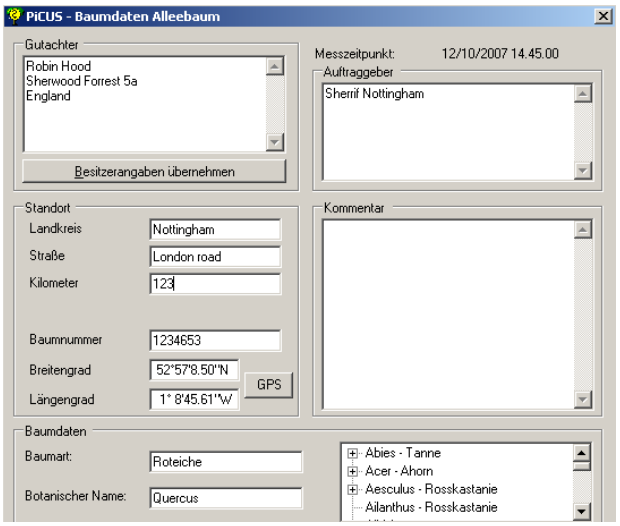




Q72 calculates the most likely intersection without the error message.

5.11. Import GPS Coordinates from external GPS Device

GPS coordinates of trees can be entered into the PiCUS file manually or automatically via a serial connection. This supports our web data base: „PiCUS world of tomograms“ at www.argus-electronic.de



5.12. Mandatory Entry of Tree Species and Height of Measuring Level

Mandatory entries for tree species and high of measurement support the workflow.

5.13. Enhanced Delete Function

In the sonic measurement window it is more convenient to remove faulty measurements. This function was written to support the correction of users errors when using the electronic hammer.

5.14. Add additional MP after Testing

Measuring points (MP) can be added to the tomogram after, or during the sonic data is recorded. In particular on big trees the need for additional points may arise after the tomogram was recorded. The new “Add-“ function is much faster than recording new geometry and repeating the whole measurement.

5.15. Manual Moving of MP

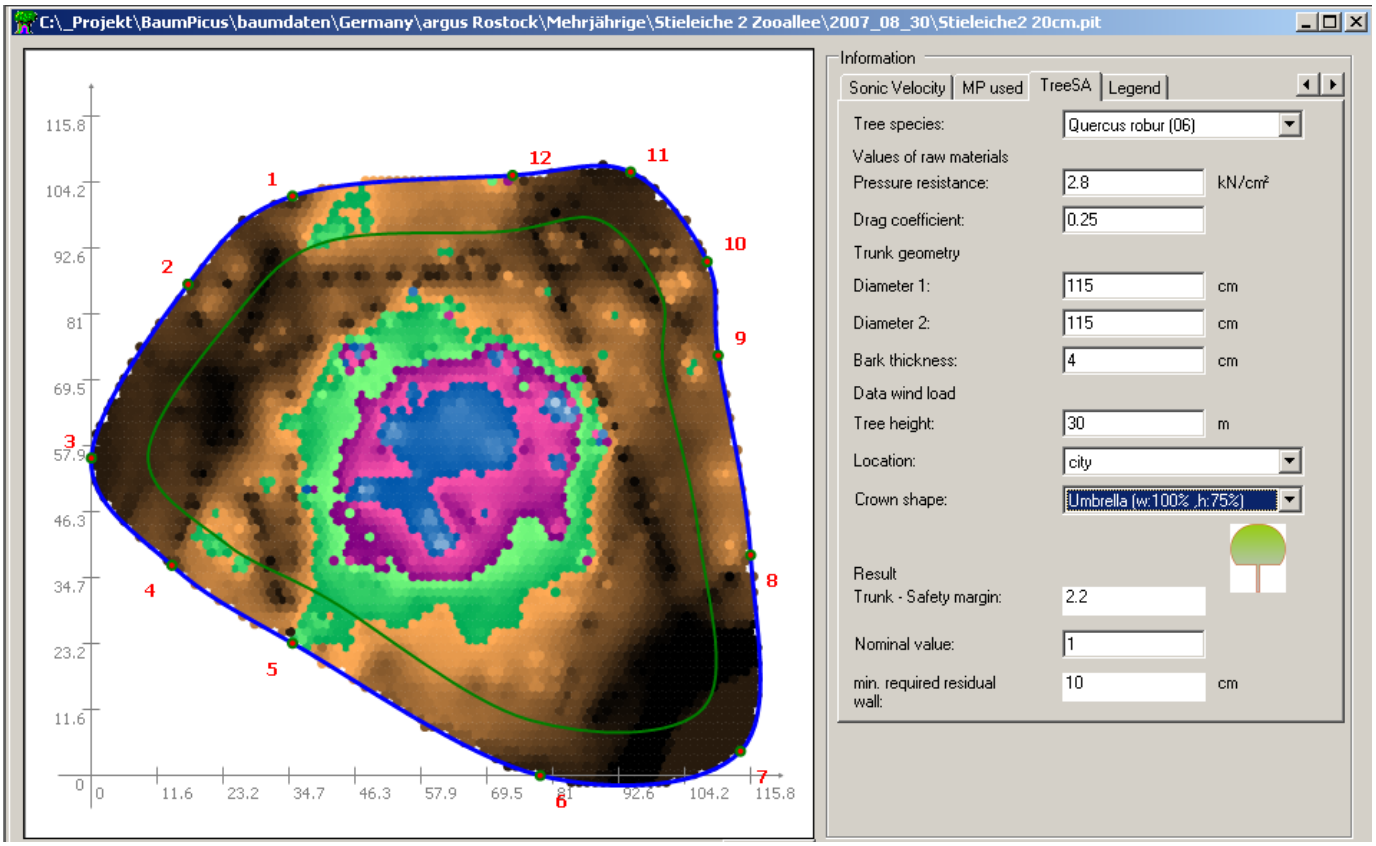
Measuring points can be moved by mouse-click, if other methods to record the tree geometry failed (because the tree is too big etc)

5.16. Export Sonic Velocities to simple Text File

The table of the sonic velocities can be exported to a simple text file.

5.17. TreeSA – Static integrated Tree Stability assessment

The TreeSA Tree Safety Assessment is based on the publications of Dr. L. Wessolly and Martin Erb in „Handbuch der Baumstatik“ (Patzerverlag). The software calculates the minimal residual wall required for tree. This minimal residual wall can be shown in the tomogram (green line).



Version Comparison Q59 ↔ Q71 ↔ Q72

Function	**Q59**	**Q71 Exp**	**Q72 Std**	**Q72 Exp**
Open multiple Windows (*.pit, *.TRT)		x		x
Tomogram Preview in File Open Dialog *.pit and „*.trt“			x	x
Automatic correction of triangulation errors			x	x
Rough estimate of remaining strength of the cross section using the geometrical moment of inertia				x
Mandatory entry of tree species and height of measuring level			x	x
Overlaying tomogram with sonic „bee-lines“		x		x
Icons for labelling defect areas			x	x
Multiple measurements (distance, angle, addtional device) in Tomogramm			x	x
Adjust sensitiveness of „cog-wheel“ compensation				x
Access to calculation options (incl. CalcB 2007)			x	x
Import GPS coordinates from external GPS device				x
Manual moving of MP			x	x
Add additional MP after testing			x	x
Overlay of tomograms (SoT, EIT) and photos				x
Export sonic velocities (text file)				x
Enhanced delete function in sonic measurement window			x	x
3D graphic of EIT tomograms (Treetronic)				x
Multistem testing in single operation and analysing different parts of the trunk separately				x
Automatic calculation of all „*.pit“ files in a directory				x
Using more measuring points than sonic sensors (only with electronic hammer)		x	x	x
Faster calculation of bar-graphs during sonic measurement when using many MP			x	x
TreeSA - Static integrated **Tree S**tability **A**ssessment				x
Relative velocity range is shown in tomogram			x	x