



sistemi integrati per la
diagnostica e il monitoraggio

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Tomo Tool FP-2.1

USER MANUAL

Developed by



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Getting started

TomoTool FP-2.1 is a simple tool to aid the tomographic 2D analysis of masonry structures.

TomoTool FP-2.1 manages and elaborates data acquired using any device for sonic and ultrasonic testing.

In order to achieve a correct tomographic analysis, it is necessary to suitably place transmitters and receivers, to pick-up the first-arrival times and to manage the acquired data.

Launch TomoTool FP-2.1 by double-clicking on the icon on the desktop of your PC. A dialog box appears.

1) Choice of the shape of the section

Select the shape (rectangular or circular) of the section of the structure to be analyzed:

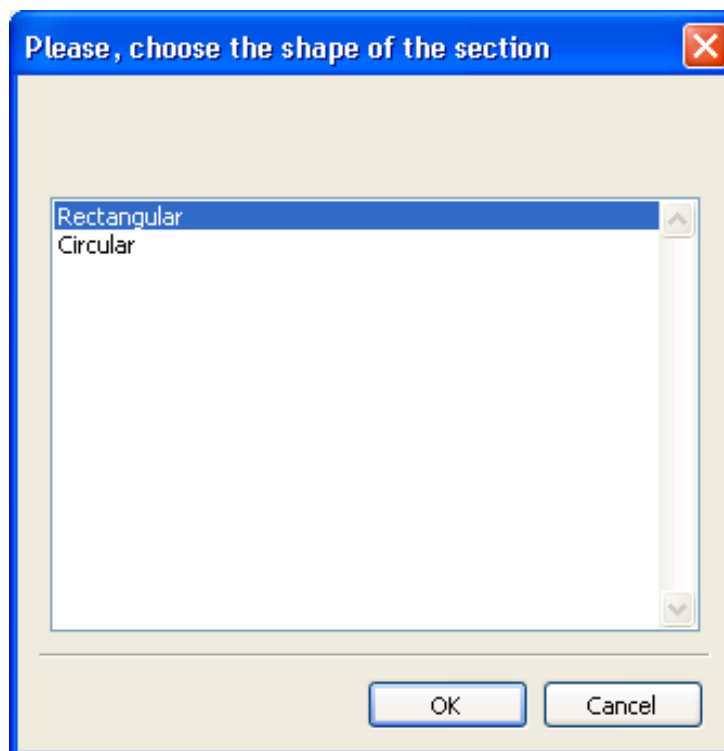


Figure 1: Dialog box for the choice of the section

Press **OK** button for opening the **Main Dialog Box** (fig. 2):

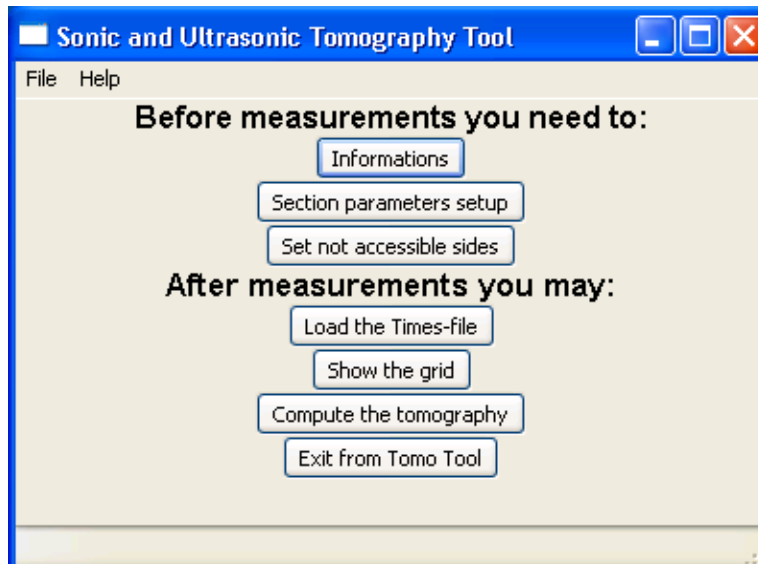


Figure 2: Main Dialog Box

2) Input of the data related to the measurement campaign

Click the button **Informations** (Fig. 3) to open the dialog box in order to set the diameter of the transducer that will be used for measurements, and the data of section analyzed.

A default value of the diameter of the transducer equal to 6 cm has been inserted because it is the value of the diameter of the transducers used with the BOVIAR-TDAS instruments.

Regarding the section data, the name of **Site**, the name of the **Element** to be analyzed, the **ID Section** and the **Section Location** has to be included (Fig. 4).

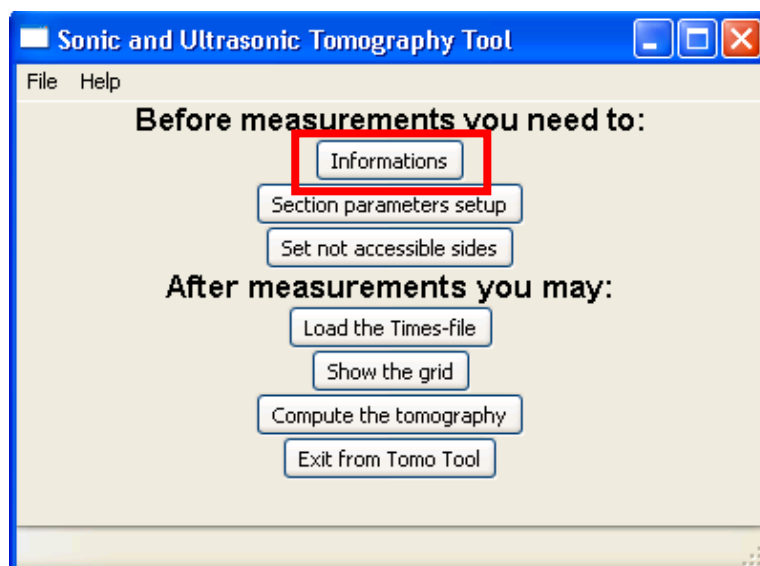


Figure 3: Button to open the box of the **Informations Setup**.

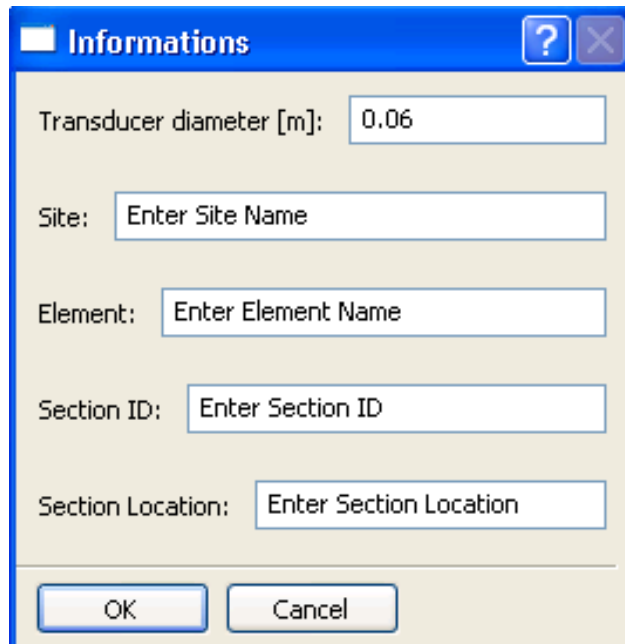


Figure 4: Dialog box to set the informations of the analysis.

3) Setup of section parameters

First of all the section characteristics have to be set.

Click the button **Section parameters setup** (Fig. 5) to open the **Section parameters** dialog box (Fig. 6).

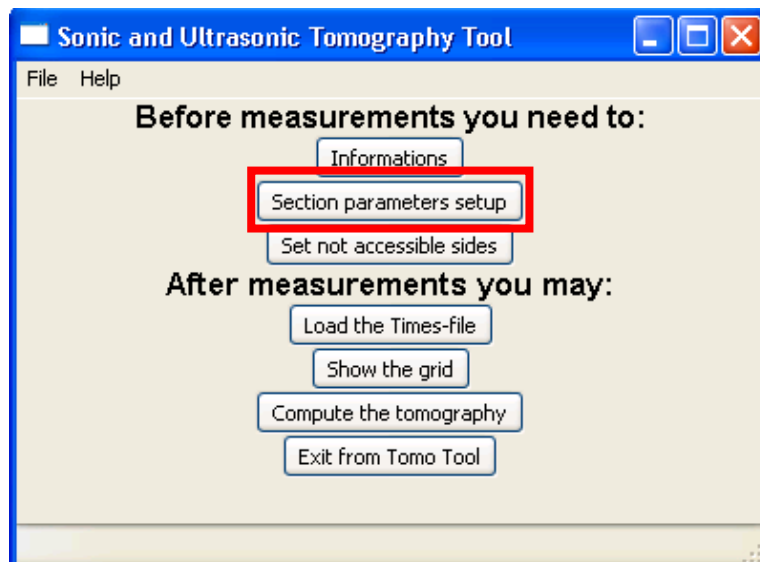


Figure 5: Button to open the **Section parameters setup**

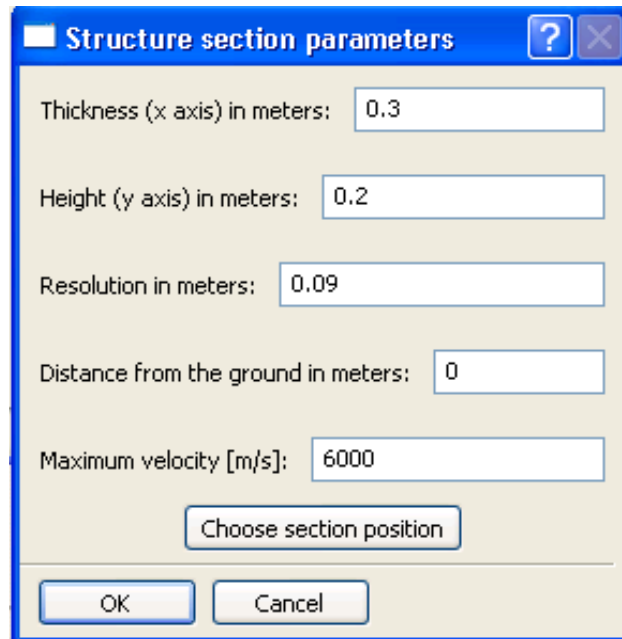


Figure 6: Structure section parameters dialog box

The values shown in Figure 6 refer to an example of a pillar with rectangular cross section of 0.30x0.20 m. In the example the resolution is 0.09 m, i.e., the minimum dimension of the defect which can be discriminated in the tomography is equal to 9 cm.

In this dialog box you may set the thickness and the height of the section, the resolution (i.e., the size of the cell), the distance of the section from the ground, the position of the section (horizontal or vertical) and the expected maximum value of the velocity.

If one or more sides of your structure are not accessible, you have to put a tick on the corresponding box (fig. 7 - 8).

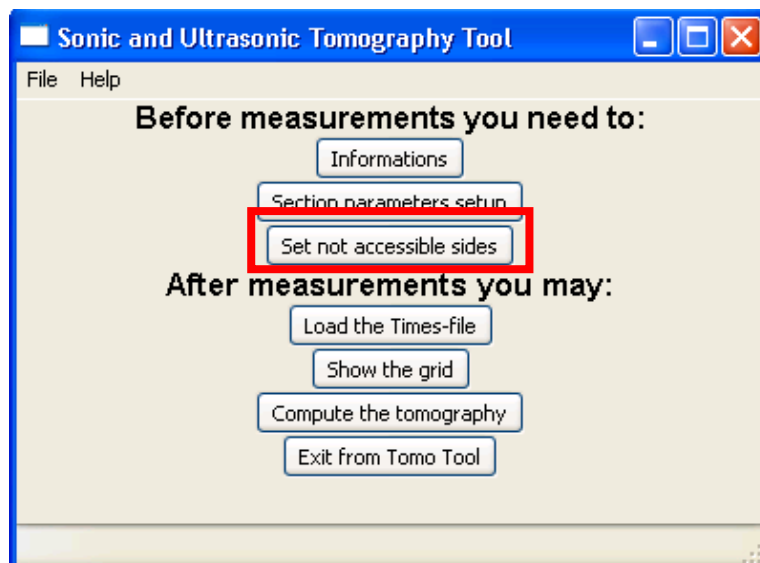


Figure 7: Choose not available sides

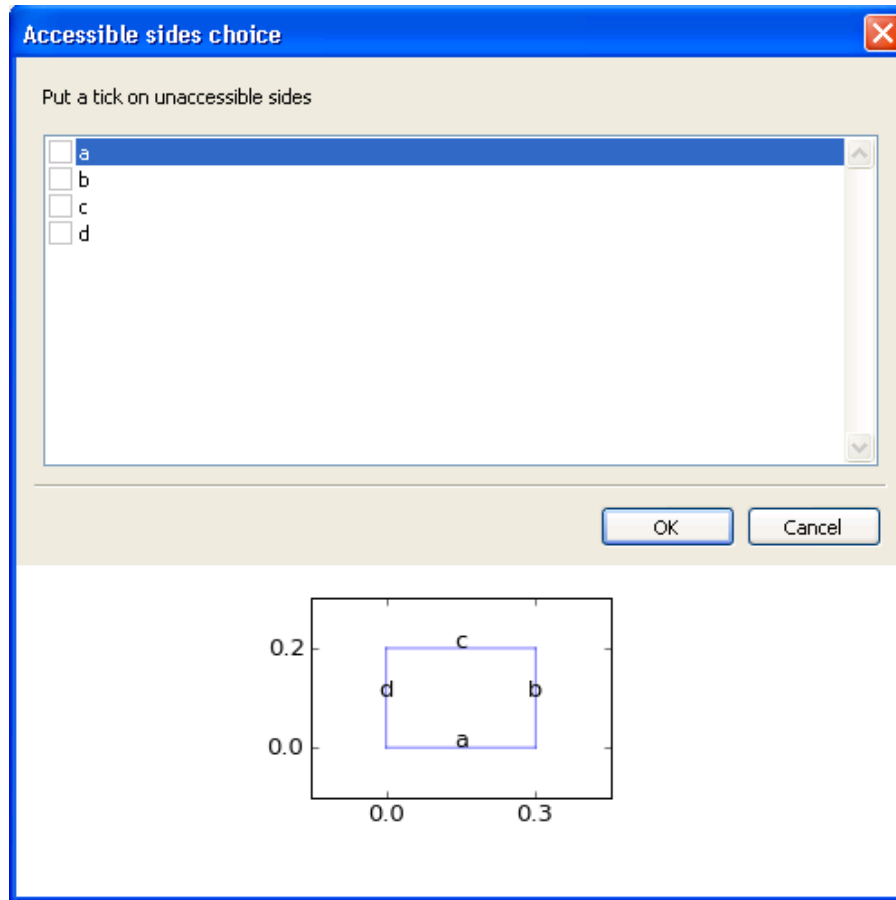


Figure 8: Set not accessible sides

4) Load the Times-file

The file containing the measurements of arrival times can be loaded by clicking on the button **Load the Times-file** (Fig. 9). The file has to be previously created by the user, and its extension has to be .txt.

Each line of the arrival times file contains the information of a single measure:

$(posTX_i, posTY_i) (posRX_i, posRY_i) ArrivalTime_i$

e.g.:

$(0.15,0) (0.3,0.15) 0.1996$

where $posTX_i$, $posTY_i$ e $posRX_i$, $posRY_i$ are the coordinates of the transmitters and receivers used in the measurement of the i -th arrival time ($ArrivalTime_i$). The coordinates of the transducers are expressed in meters, the arrival times in milliseconds. Lines beginning with # are not processed during the processing.

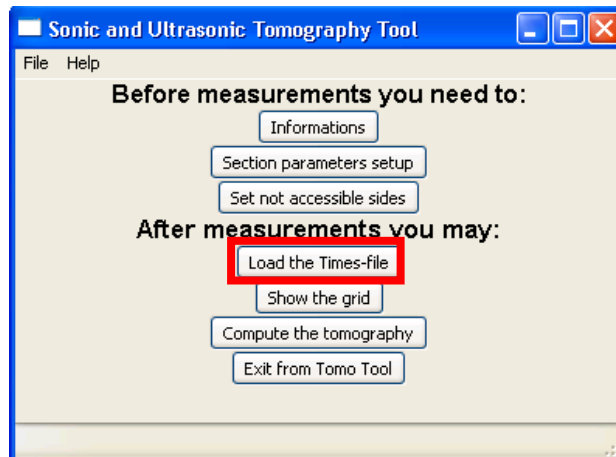


Figure 9: Load the Times-file

A message box informs you about the correct loading of the file:

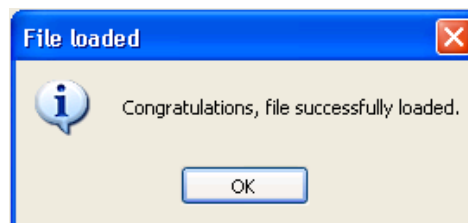


Figure 10: Times-File loaded correctly.

Now it is possible to check the coverage of the inspected Section or to directly run the tomographic analysis.

5) Display of the coverage of Section

Click on **Show the grid** to see the grid in the analyzed section and its coverage with the paths loaded in step 4 (Fig. 11-12):

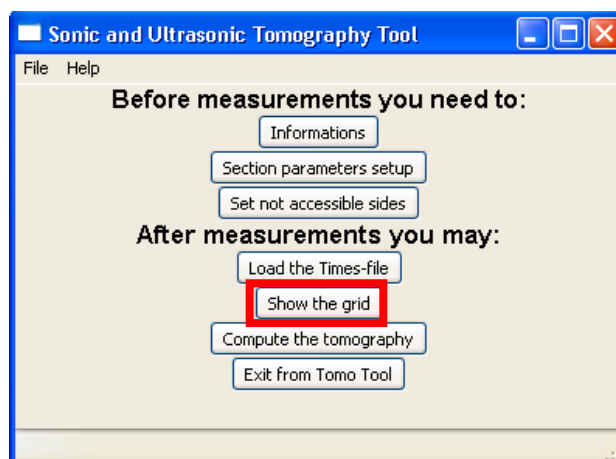


Figure 11: Show the grid of the section and its coverage.

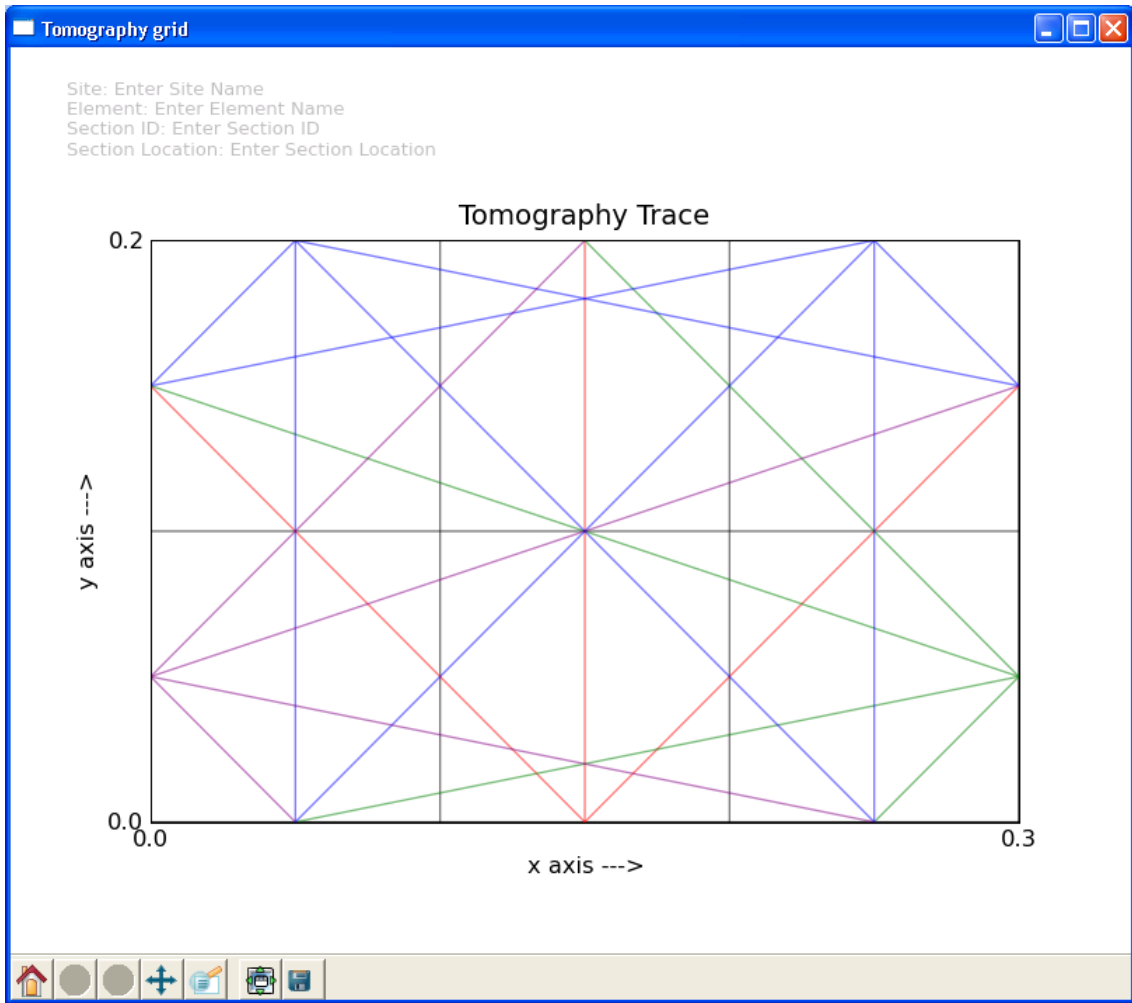


Figure 12: Grid and coverage of the analyzed section.

5) Tomographic analysis

Click on **Compute the Tomography** to start the tomographic analysis:

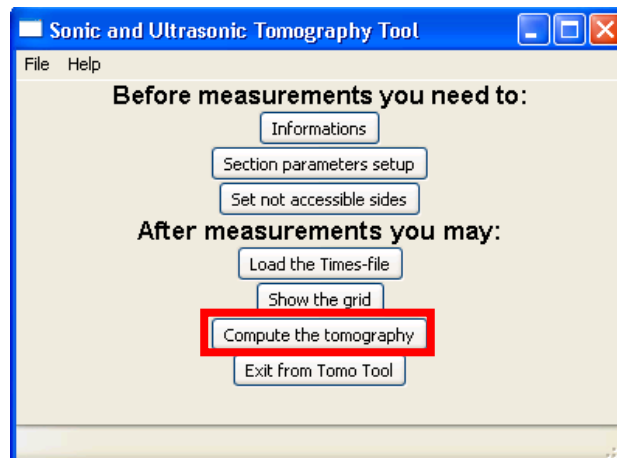


Figure 13: Computation of the tomography

A message box indicates that the analysis has been successfully performed:

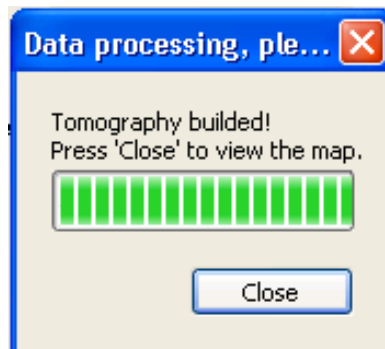


Figure 14: End of the analysis.

By clicking the button **Close**, the tomography (fig. 15) and a dialog box are shown (fig. 16).

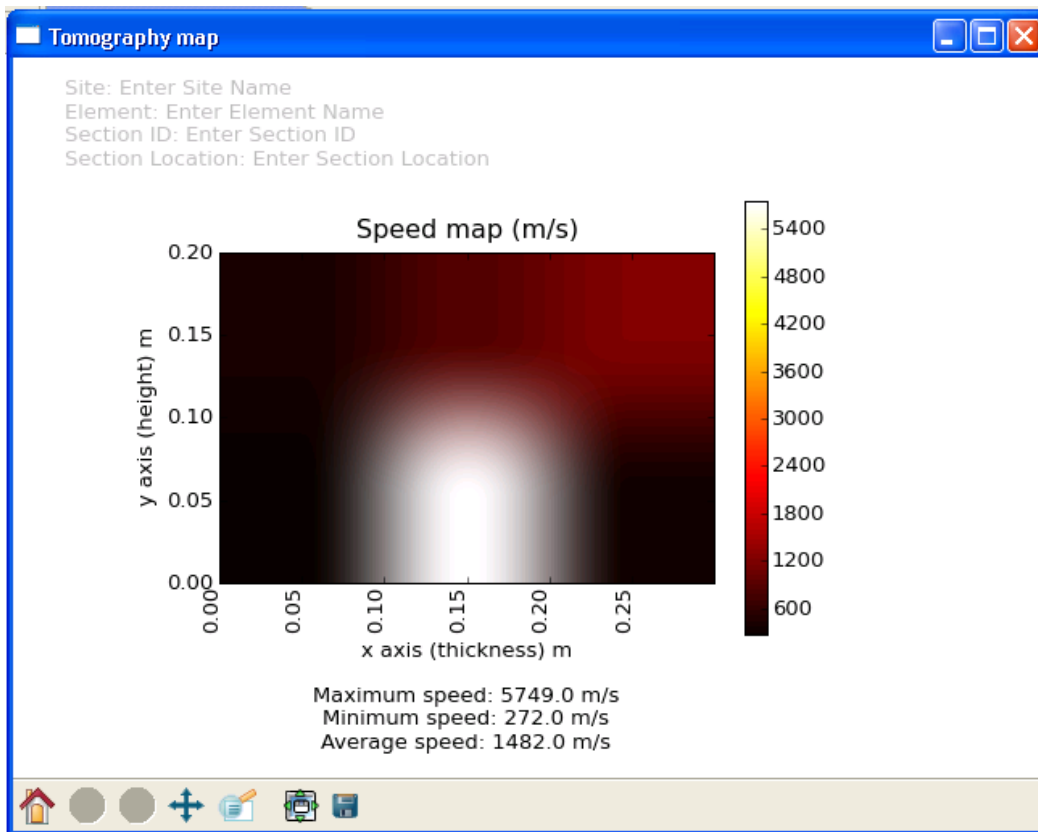


Figure 15: Tomography map.

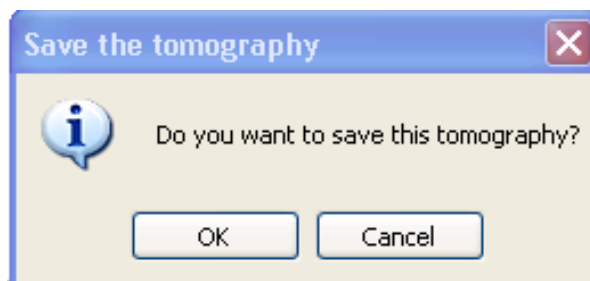


Figure 16: Save the tomography.

The dialog box allows one to save the tomographic map as **.tmg** object of TomoTool FP-2.1, furthermore the map can be saved in several image formats:

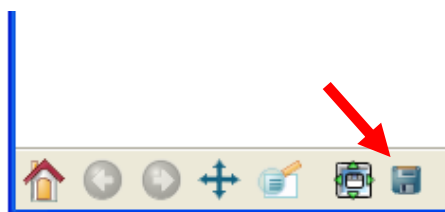


Figure 17: Save the map with different image formats.

By the **File -> Load a Tomography File** menu a tomography previously saved can be opened, or the values of velocities can be saved in a .txt format allowing future analyses and visualization of the tomographic data.

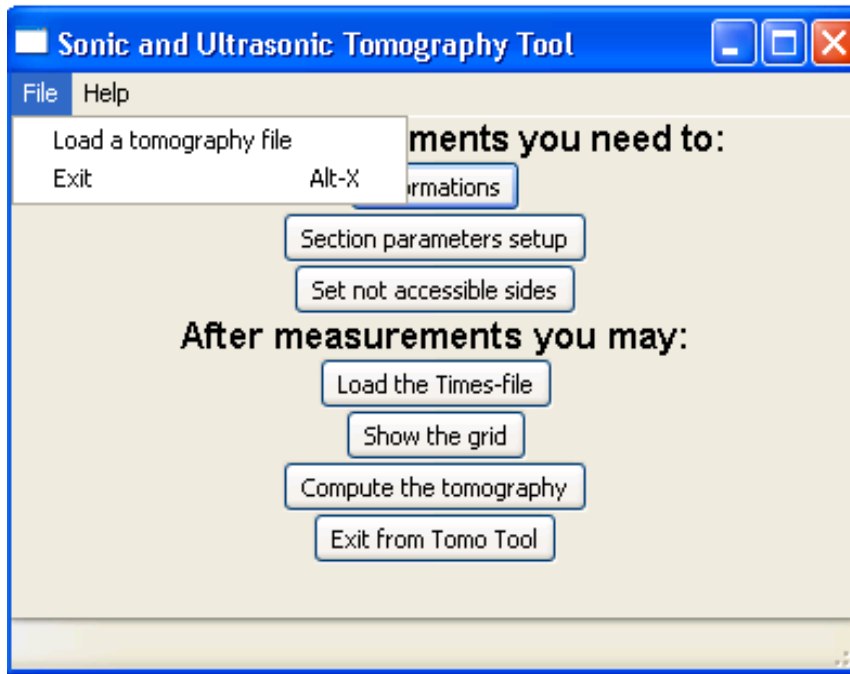


Figure 18: Load a tomography file.