BOVIAR

sistemi integrati per la diagnostica e il monitoraggio

Tomo Tool v.2.0

USER MANUAL

Developed by

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Getting started

TomoTool v.2.0 is a simple tool to aid the tomographic 2D analysis of building structures. This software manages and elaborates data acquired using the multi-channel device for sonic and ultrasonic testing BOVIAR-TDAS.

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, following a procedure described in the report generated by TomoTool v.2.0.

In the following, the procedure is described step by step making reference to the tomography of a structure.

Launch TomoTool v.2.0 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:
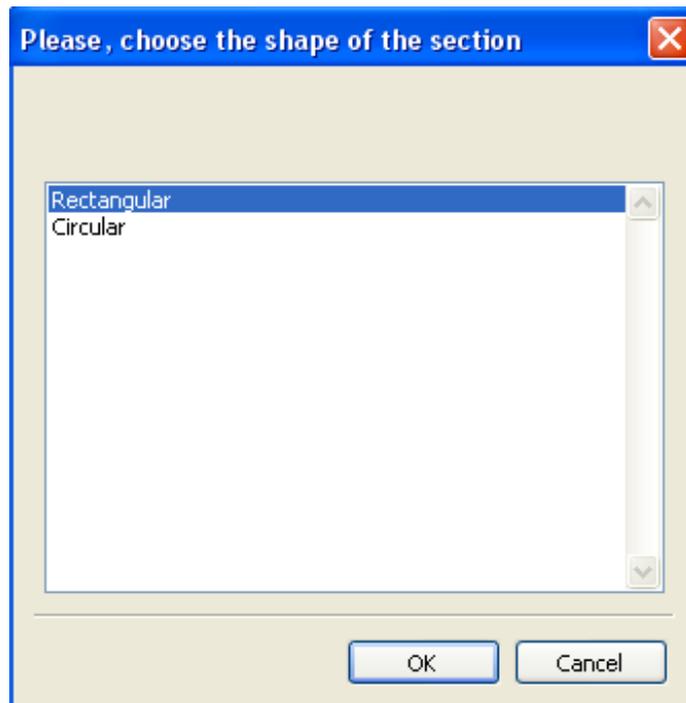

Figure 1:   Dialog box for the choice of the section.

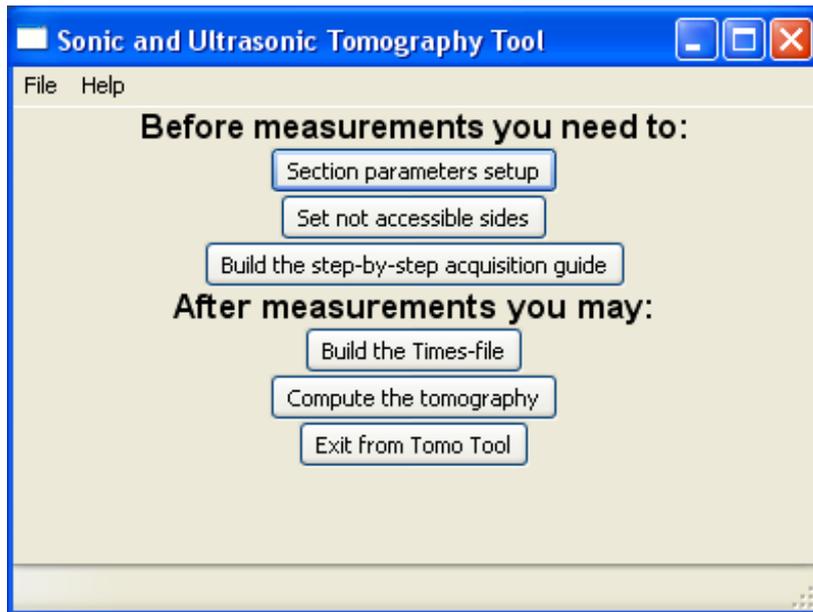Press **OK** button for opening the **Main Dialog Box** (fig. 2):

Figure 2:   Main Dialog Box.

2) Setup of section parameters

Let us consider a pillar having a 30x20 cm rectangular section. Particulars with dimension less than 9cm will not be processed, i.e. the resolution is 9 cm.
First of all the section characteristics have to be set.
Click the button **Section parameters setup** (Fig. 3) to open the **Section parameters** dialog box (fig. 4).
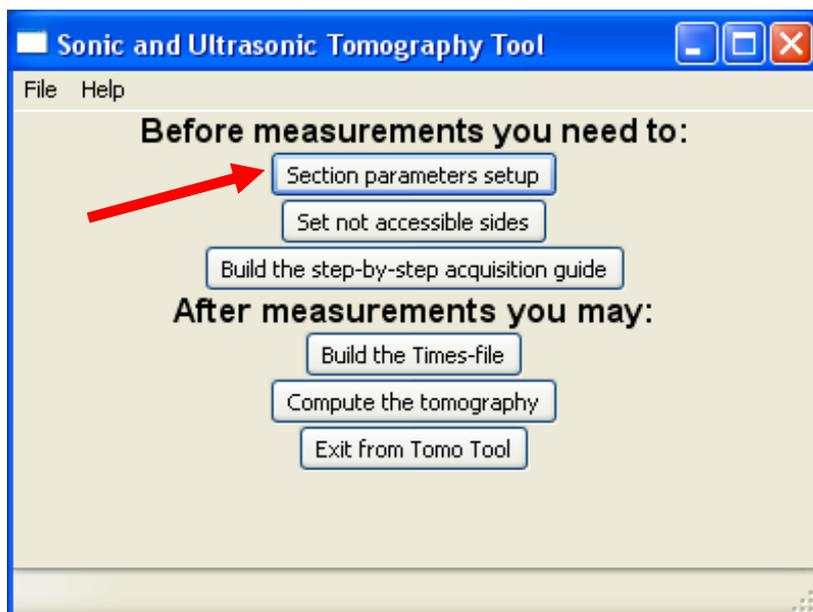

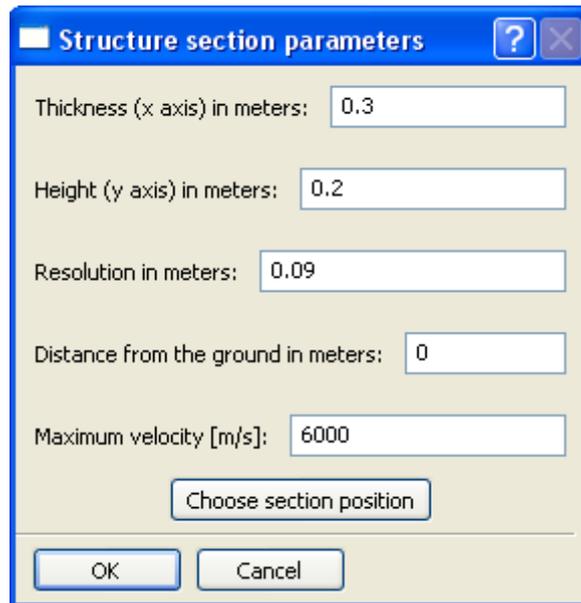**Figure 3**:   Button to open the **Section parameters setup.**

Figure 4:   **Structure section parameters** dialog box.

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. Note that to obtain high resolution velocity models, a small cell size is required for the tomography.

If one or more sides of your structure are not accessible, you have to put a tick on the corresponding box (Fig. 5 – 6).

Note that, due to the unfavourable geometry, the velocity map could be less accurate close to the inaccessible sides. Unfavourable geometries could also prevent from acquiring a sufficient number of measurements to perform the tomography.
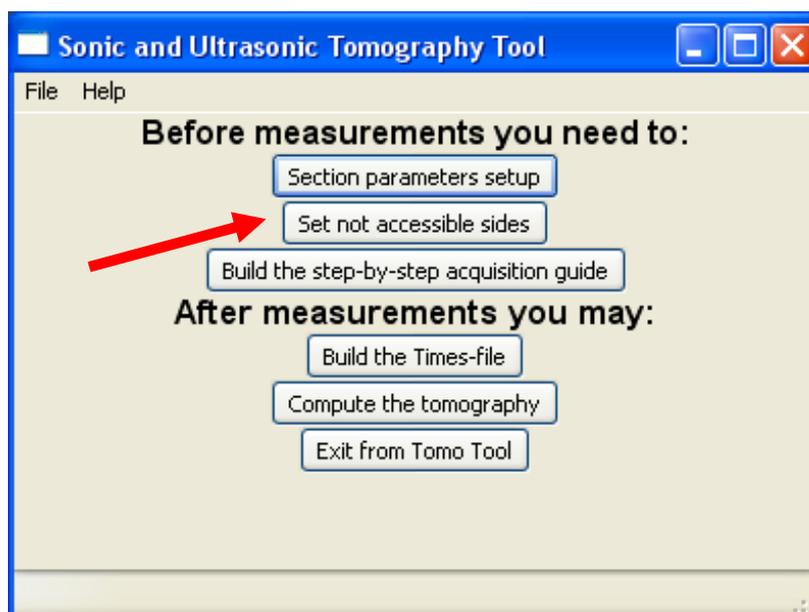

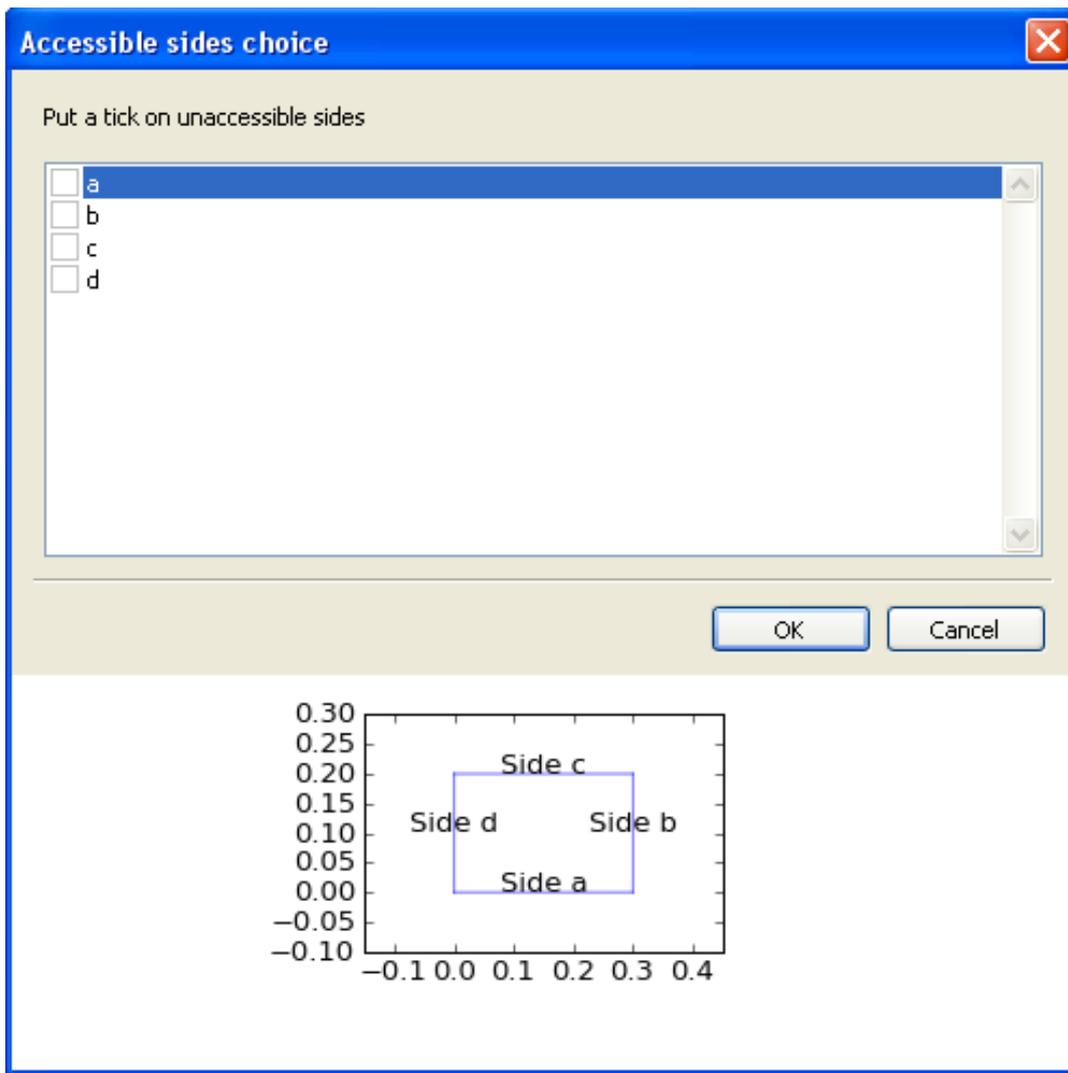**Figura 5**:   Choose not available sides

Figura 6:   Set not accessible sides.

3) Creation of the data acquisition guide

TomoTool v.2.0 calculates the positions of the transmitters and of the receivers and creates a report by clicking on the button **Build the step-by-step acquisition guide** (fig.7). A **pdf** file is generated in which the procedure to be strictly followed is described.
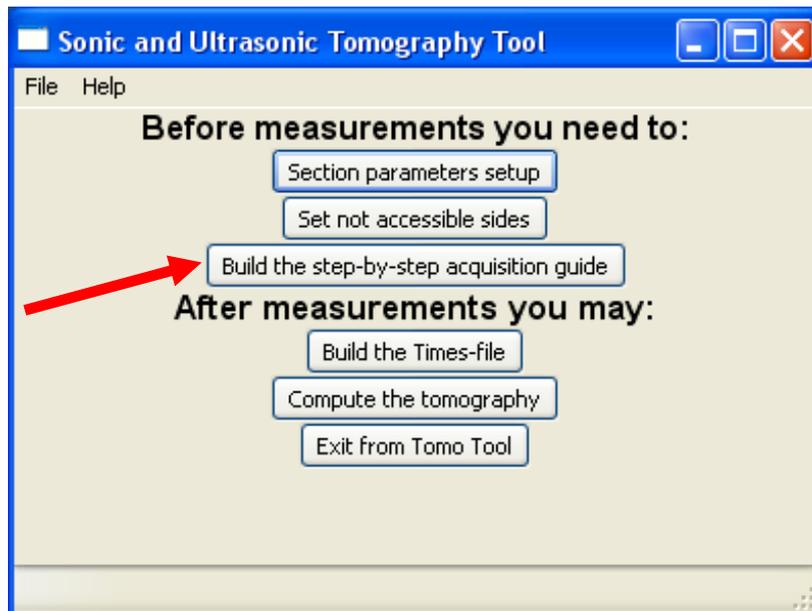

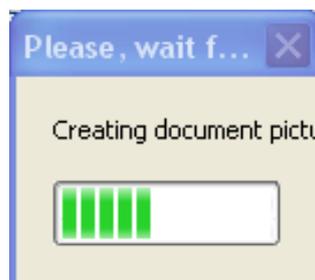**Figure 7**:   Printing the instructions files.

Figure 8:   Waiting dialog box.

A waiting dialog box appears during **the guide generation** (fig. 8) and a new dialog box is opened.
This dialog box allows one to choose where saving the file **infoSteps.am** (fig. 9).
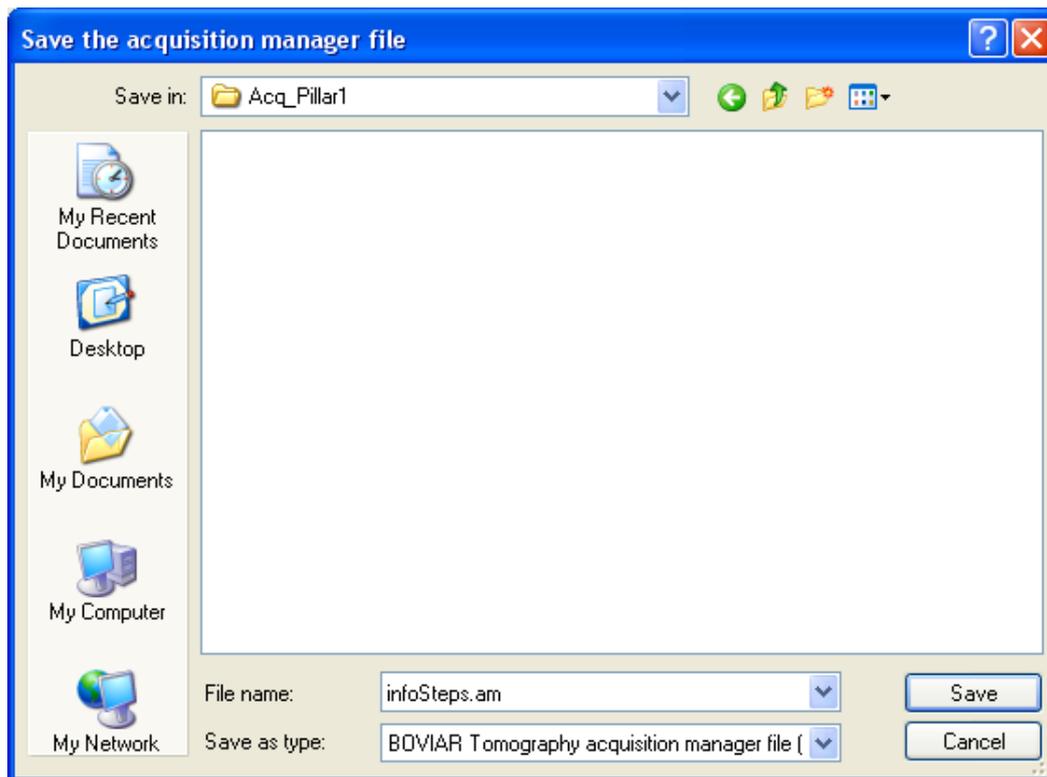
Figure 9:   Dialog box asking where to save the instructions file.

The file **infoStep.am** explains how carry out the whole set of measurements of first arrival times, using the BOVIAR-TDAS device.
A dialog box recommends that the file **infoStep.am** is located in the same folder containing the acquisition files created and saved using the BOVIAR-TDAS device. (fig. 10).
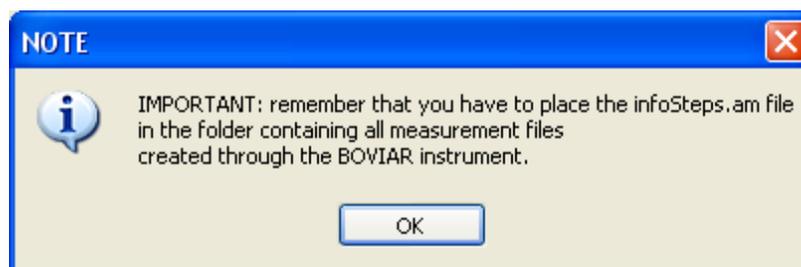

Figure 10:   Alert message remembering that the file of instruction has to be located in the same folder of the acquisition files.

4) Creation of the file of the first arrival times

TomoTool v.2.0 creates a file containing the first arrival times by clicking the button **Build the Times File** (fig. 11). The times-file is created from the data acquisition files saved by the BOVIAR-TDAS device during the measurements.
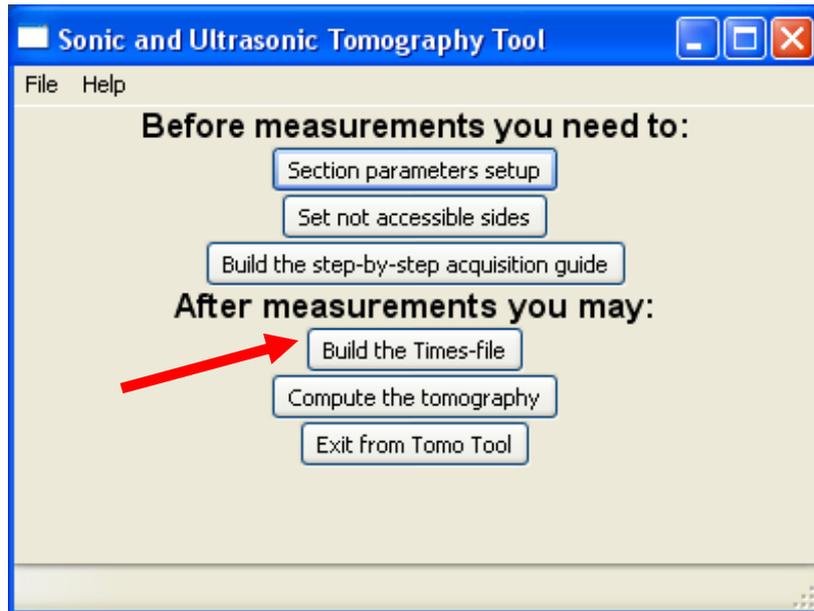The dialog box asks for selecting the file **infoStep.am**.

Figure 11:   Building the times file.

In this example the file is located in a folder named Acq_Pillar1 (fig. 12), in which the acquisition files created using the BOVIAR-TDAS device are saved.
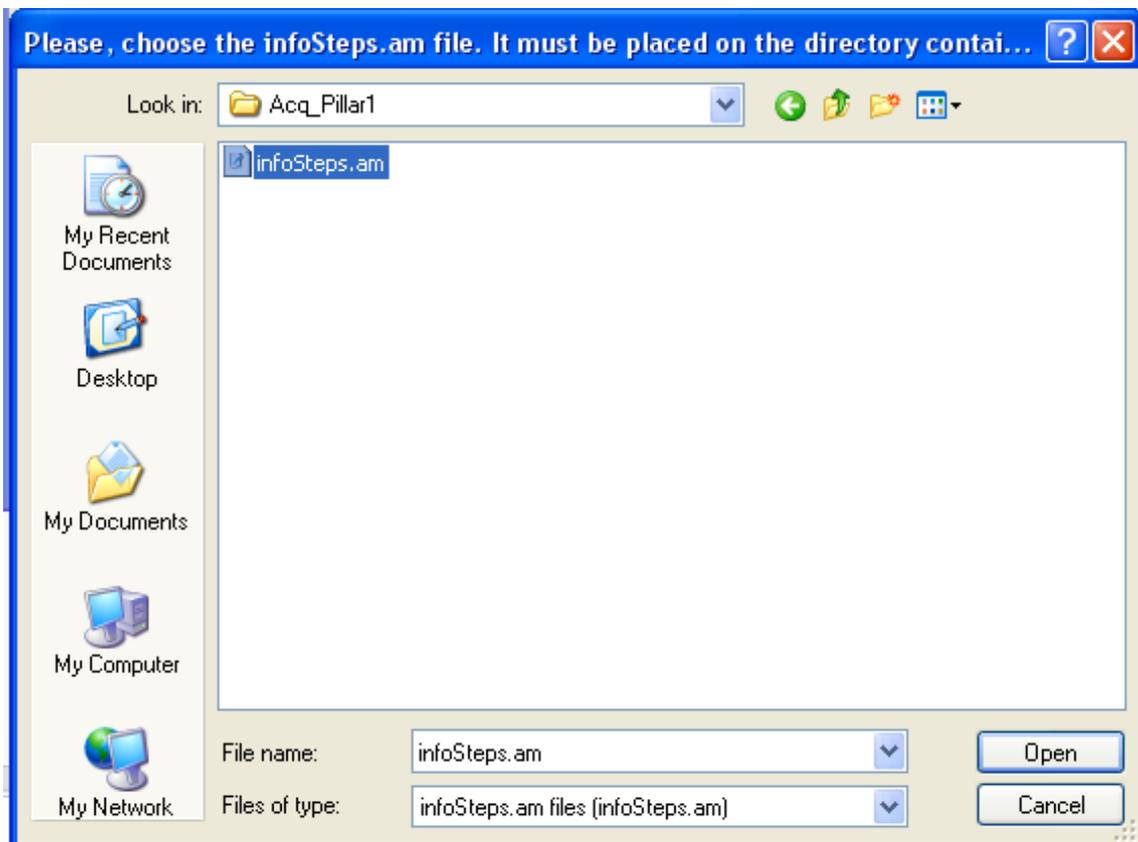

Figure 12:   Selecting the file **infoStep.am.**

A message box will notice that the procedure for creating the times file has been executed successfully (fig. 13):
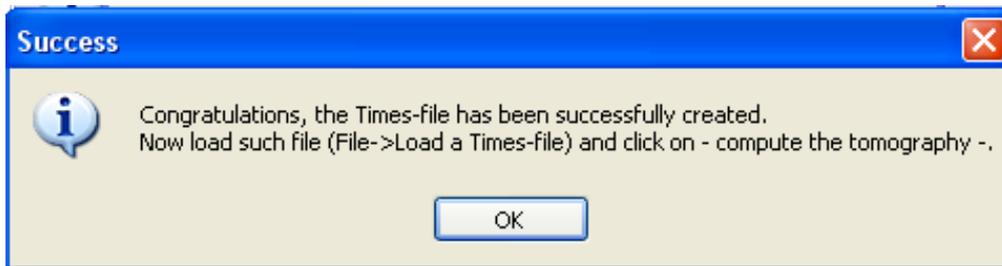

Figure 13: Message box for the correct creation of the time file.

The file **times.txt** is created in the same folder of the file **infoStep.am.**
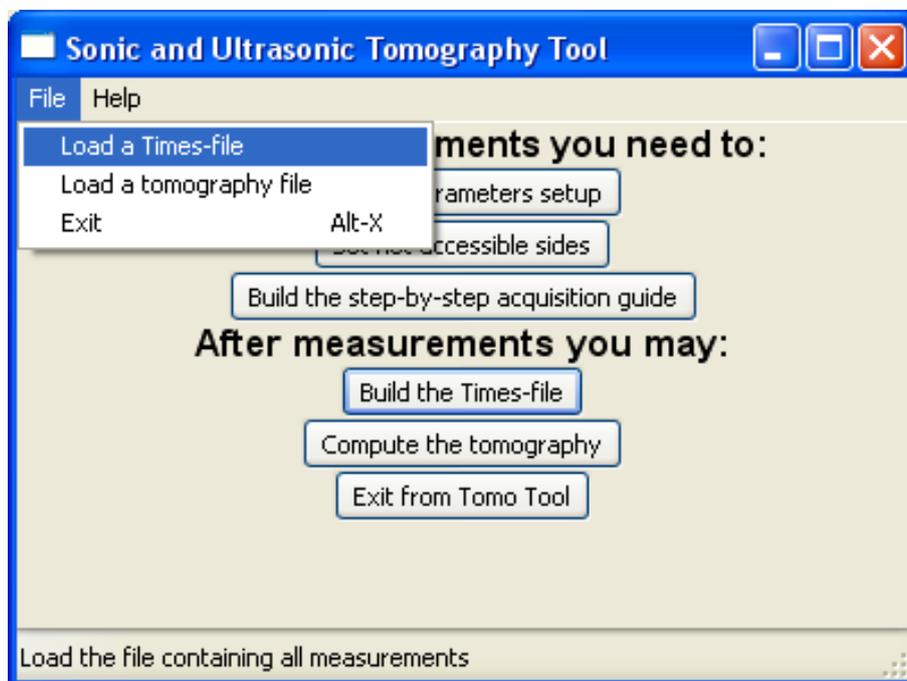The file **times.txt** is loaded by the **File → Load a Times-file** menu (fig. 14).

Figure 14: Loading the file of first arrival times.

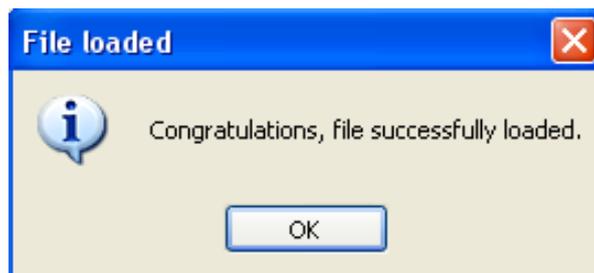A message box informs about the correct loading of the file:

Figure 15: Loading the file of first arrival times.

At this point the tomography can be performed.

Note: the file of times **times.txt** can be loaded **only if** the number and the order of measurements are coherent with the specified parameters, and thus with the scheme proposed by TomoTool v 2.0.

5)   Tomographic analysis

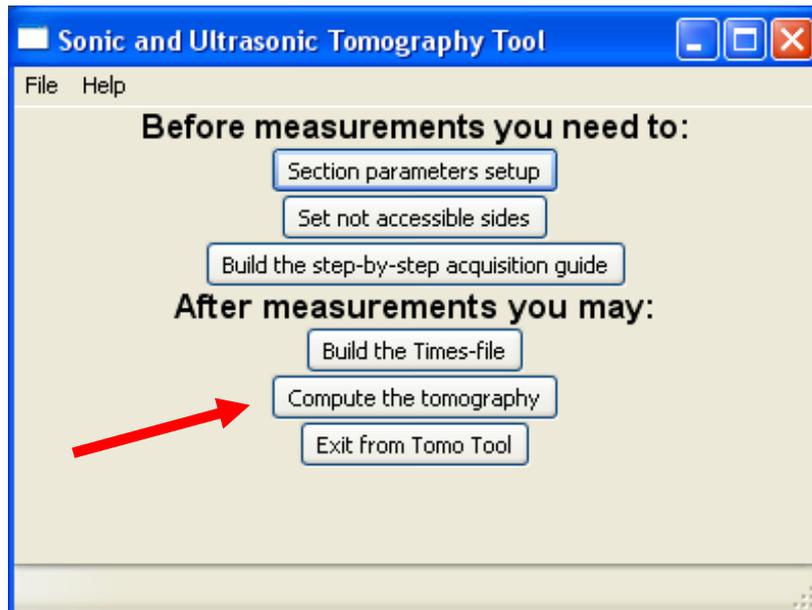Click on **Compute the Tomography** to start the tomographic analysis (fig. 16):

Figure 16: Computation of the tomography.

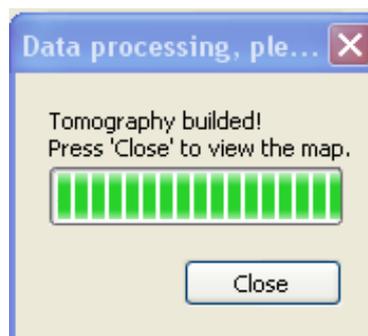A message box indicates that the analysis has been successful.

Figure 17: End of the analysis.

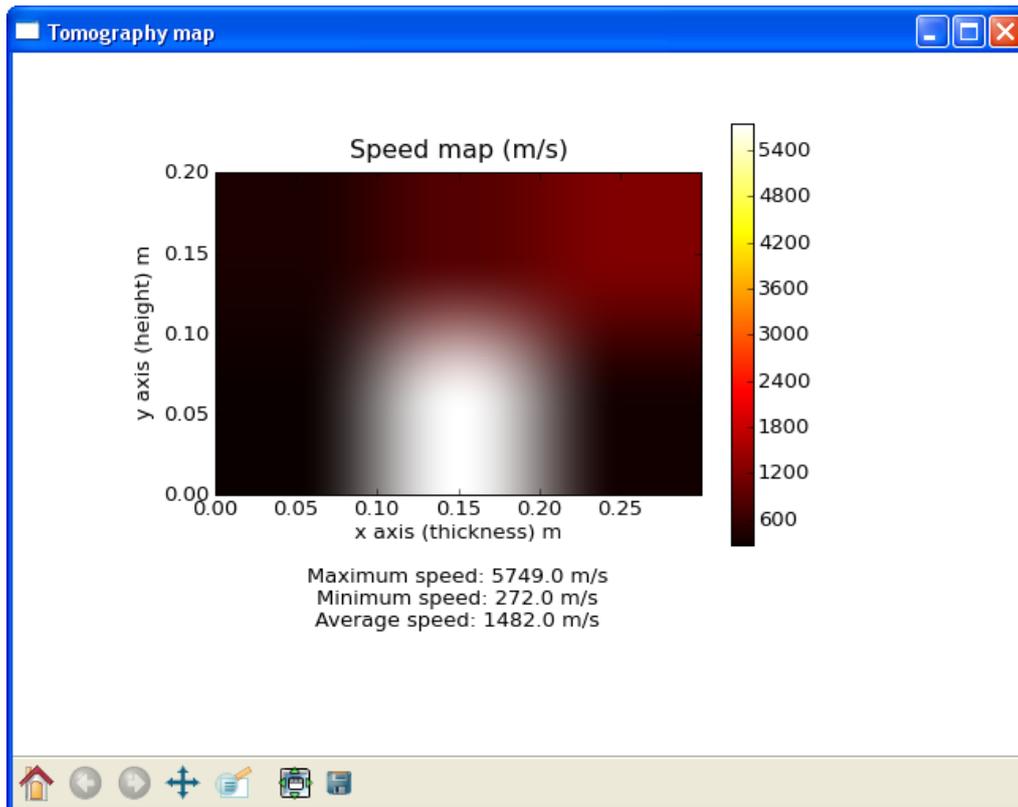By clicking the button **Close,** the tomography (fig. 18) and a dialog box are shown (Fig. 15).
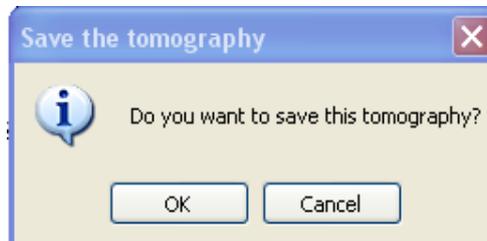
Figure 18: Tomography map.

Figure 19: Save the tomography.

The dialog box allows one to save the tomographic map as .tmg object of TomoTool v.2.0, whereas the map can be saved in several image formats.

Figure 20: Tomography

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.