



Introduction to ZAMINEX

Last updated: January 2026

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This documentation provides an overview of ZAMINEX and the integrated tools required for geophysical modeling and inversion workflows.

ZAMINEX Suite is a software package designed for geophysical modeling and inversion. It consists of three main components:

- **MAGNUM:** Programs for geophysical modeling and inversion:
 - VIDI: Mesh-based inversion
 - FOGO: Forward modeling
 - DYNO: Surface-based geometry inversion
- **PODIUM:** Programs for data preparation and model manipulation.
- **TETRIUM:** Program for unstructured mesh generation.

In TETRIUM, the meshing engine is **Gmsh**, a finite-element mesh generator whose source code and precompiled binaries are available at <https://gmsh.info>. You need to download the *Software Development Kit (SDK)* for your operating system. You may also refer to `gmsh_tutorial.pdf` to learn the essential features of this software for geophysical modeling (optional).

To visualize models and data, they are converted to VTU format so they can be opened and viewed in **ParaView**. ParaView is an open-source, multi-platform application for data analysis and model visualization based on the Visualization Toolkit (VTK). It can be downloaded from: www.paraview.org.

- Examples, user manuals, and tutorials for each program are available at:
<https://www.geotexera.com/zaminex-help>
- All programs in ZAMINEX were originally independent and executed manually through command-line terminals. ZAMINEX provides a graphical workflow management system that allows users to visually create, manage, and execute sequences of programs. This approach makes complex workflows more intuitive and easier to manage.
- Users should read the following user manuals and tutorial files: `zaminex_tutorial.pdf`, `tetrium_tutorial.pdf`, and `paraview_tutorial.pdf`
- PODIUM and MAGNUM programs are briefly described in the Help sections of their dialog windows. For comprehensive details, refer to `magnum_tutorial.pdf` and `podium_tutorial.pdf`. In general, you only need to be familiar with the available programs; when needed, you can consult the manuals for detailed instructions. Note that there may be slight differences between program names in ZAMINEX and their executable file names in the documentation (e.g., "Node to VTU" vs "node2vtu", "Add Noise" vs "add_noise" or "addnoise").
- When executing a program in ZAMINEX, ZAMINEX runs the program exactly as it would be executed in a terminal: *program input(s) output(s) [options]*
The complete command is displayed in the Log Panel, allowing users to verify execution by comparing it with the command-line usage described in `magnum_tutorial.pdf` and `podium_tutorial.pdf`.
- Geotexera also provides example projects accompanied by tutorial files. You are encouraged to try these examples to better understand the workflow and procedures. Note that the `.gtxr` project files included in the examples are intended for learning purposes only and may not be fully compatible with all versions of ZAMINEX.
- ZAMINEX is licensed by Geotexera Inc. For any questions and information, please contact info@geotexera.com.