ATILA can be used for analysis of sonar and other acoustic transducers using piezoelectric or magnetostrictive materials, or a combination of both. Fluid model contains the isotropic fluid media with or without losses for axisymmetrical, plane strain, and 3D models. Radiating boundary option includes fluid open-boundary radiating elements for axisymmetrical, plane strain, and 3D models. Transmitting Voltage Response (TVR) can be also analyzed.

EQI is a boundary element solver that can be coupled to ATILA to carry out FEM-BEM analyses of scattering and radiating problems in the frequency domain. The computation of the far-field pressure is then obtained by numerical integration of the mechanical impedance information at those radiating and scattering surfaces. Results of an ATILA-EQI computation include displacements, stresses, electrical impedance, far-field pressures, as well as acoustic radiation and scattering quantities.

ATILA FEM for Underwater Analysis

Figure 1. Water pressure and displacement generated by Tonpilz transducer.

Figure 2. Transmitting Voltage Response with radiating boundary conditions.

Figure 3. 3D FEM-BEM analysis of piezoelectric device for underwater applications.