Each UT transducer of the plurality of flexoelectricity UT transducers has a front-end and a back-end and the front-end of each UT transducer is attached to the back surface of the PTFE layer, where the PTFE layer is configured as an audio membrane of the front-end of each UT transducer. The plurality of flexoelectricity UT transducers is arranged along the back surface of the PTFE layer as a two-dimensional array and each UT transducer is configured to vibrate in a normal direction to the back surface of the PTFE layer. The multiplexer in signal communication with each UT transducer, where the plurality of flexoelectricity UT transducers is sandwiched between the multiplexer and the PTFE layer.

A method for inspecting a part with the flexoelectricity UT transducer imaging system as described is also disclosed. In an example of operation, the part is covered with the flexoelectricity UT transducer imaging system. A first set of voltages are applied to the plurality of flexoelectricity UT transducers with the multiplexer to produce vibrations in the plurality of flexoelectricity UT transducers. The vibrations of the plurality of flexoelectricity UT transducers and the PTFE layer produce the sounds waves that are transmitted towards the part under inspection with the PTFE layer. A plurality of reflected sound waves from the part under inspection are then received with the PTFE layer which cause the flexoelectricity UT transducers to vibrate and produce a second set of voltages that are received by the multiplexer. The multiplexer then transmits pixel data corresponding to each UT transducer within the two-dimensional array to a controller to produce a full image of the part under inspection.

Other devices, apparatuses, systems, methods, features, and advantages of the invention will be or will become apparent to one with skill in the art upon examination of the following figures and detailed description. It is intended that all such additional devices, apparatuses, systems, methods, features, and advantages be included within this description, be within the scope of the invention, and be protected by the accompanying claims.