

RF data for the scientific research in MATLAB environment

Majority of the commercial ultrasound machines are closed for the researchers and do not provide access to raw RF signals. These signals carry valuable information about acoustic wave and tissue interactions and it could be employed for the developments of new diagnostic methods. TELEMED offers research tools for scientific engineers working in biomedical ultrasound field which allows to analyze RF data acquired by the new generation TELEMED ultrasound scanner ArtUS which is currently in the development stage.

The research package is implemented in the MATLAB® (MathWorks, Inc., Natick, Massachusetts) environment and contains graphical user interface (Fig. 1) which allows to import and review annotated RF data and collection of scripts illustrating conventional RF signal processing steps, which are typically used in the B mode image formation engine.

The **tools** open **new possibilities** for:

Engineering viewpoint	Clinical practice viewpoint
✓ Developments of novel ultrasonic quantitative tissue characterization methods	✓ Derivation of novel biomarkers for: recognition, characterization and assessment of treatment (i.e. thermal ablation efficiency, sonoporation)
✓ Investigation of acoustic properties of tissue and tissue mimicking materials	✓ <i>In-vitro</i> studies of tissue (i.e. investigation of biopsy samples)
✓ Developments of novel parametric imaging techniques	✓ New sources of contrast for imaging of various lesions (tumors, tissue fibrosis, atherosclerotic plaques and much more)
✓ Creation of advanced digital image processing algorithms for speckle reduction, and image enhancement	✓ Better quality of ultrasound diagnostic images more appropriate for visual expert's evaluation
✓ Developments of RF data-based automatic measurement and image segmentation techniques	✓ Reduced observer's variability, repeatability of measurements, radiology experts time savings
✓ Education of biomedical ultrasonic imaging basics purposes	

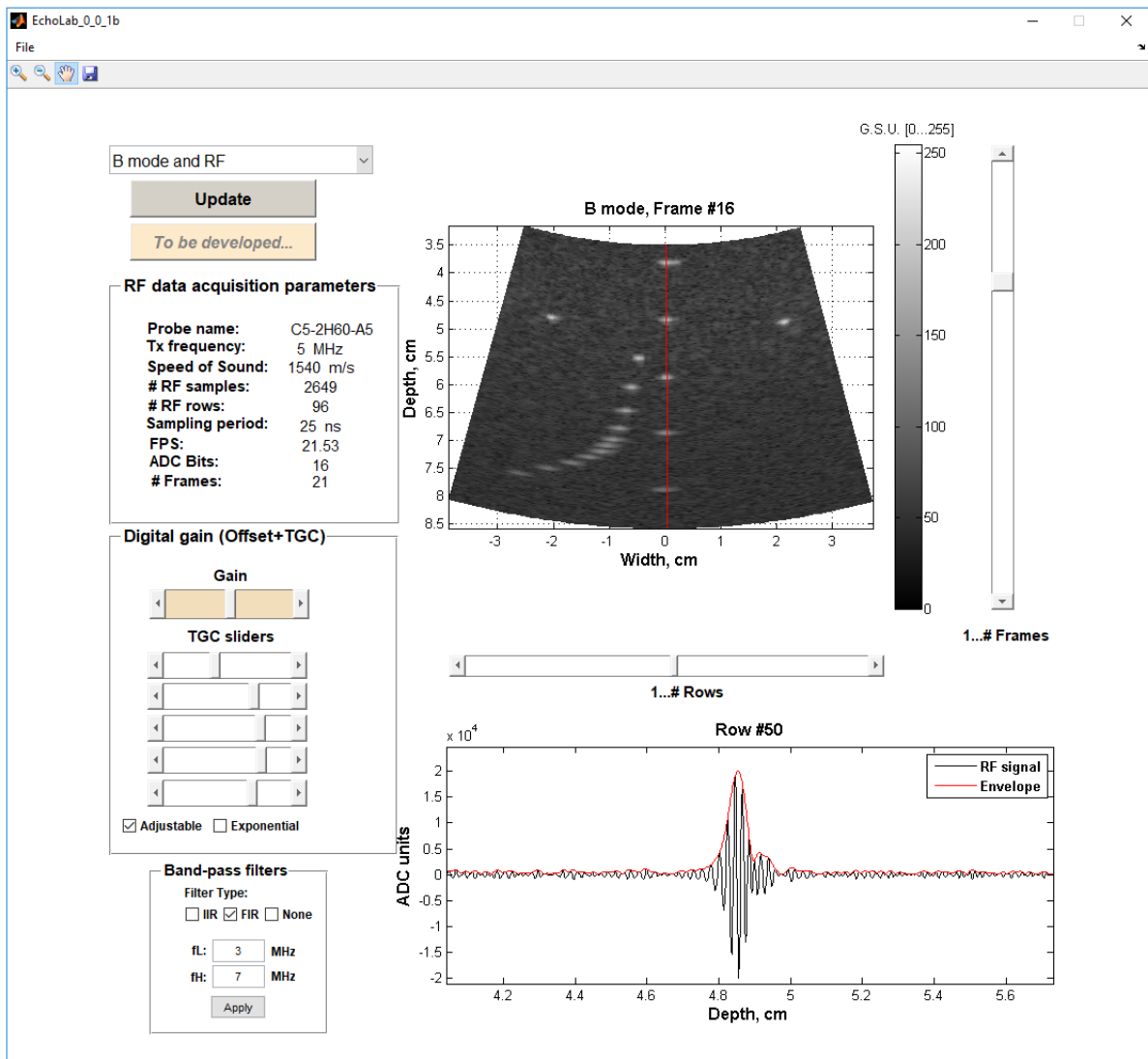


Fig. 1. Front panel of EchoLab graphical user interface

