

Bone and Muscle Ultrasonometer BoMUS

(Experimental complex developed at EDI within the LZP FLPP project lzp-2021/1-0290 “Comprehensive assessment of the condition of bone and muscle tissues using quantitative ultrasound” (BoMUS))

Intended use: BoMUS is intended for quantitative assessment of the condition of muscle and bone tissues of human extremities (legs, arms) using the characteristics of ultrasound propagation in tissues as indirect indicators of tissue condition. BoMUS is based on the registration of ultrasound propagation signals in through and surface transmission of ultrasound in muscles and bones of human extremities and further determination of a number of ultrasound propagation characteristics in tissues using computational algorithms and programs. BoMUS is an experimental system intended for biomedical research in laboratory, clinical and training environments indoors.

Research fields related to quantitative assessment of bone and muscle conditions:

- Age-related of bone and muscle atrophy: osteoporosis and sarcopenia;
- Effects of training and lack of load: sports, immobilization, antigravity;
- Effects of metabolism and diseases: obesity, edema, poor mineralization, osteopenia.

BoMUS system composition:

The system consists (Figure 1) of an electronic data acquisition unit (1), three replaceable plug-in probes: a muscle scanner (2), a bone surface scanner (3) and a wrist probe (4). The electronic unit (1) is controlled by a laptop or PC (5) using operating software.

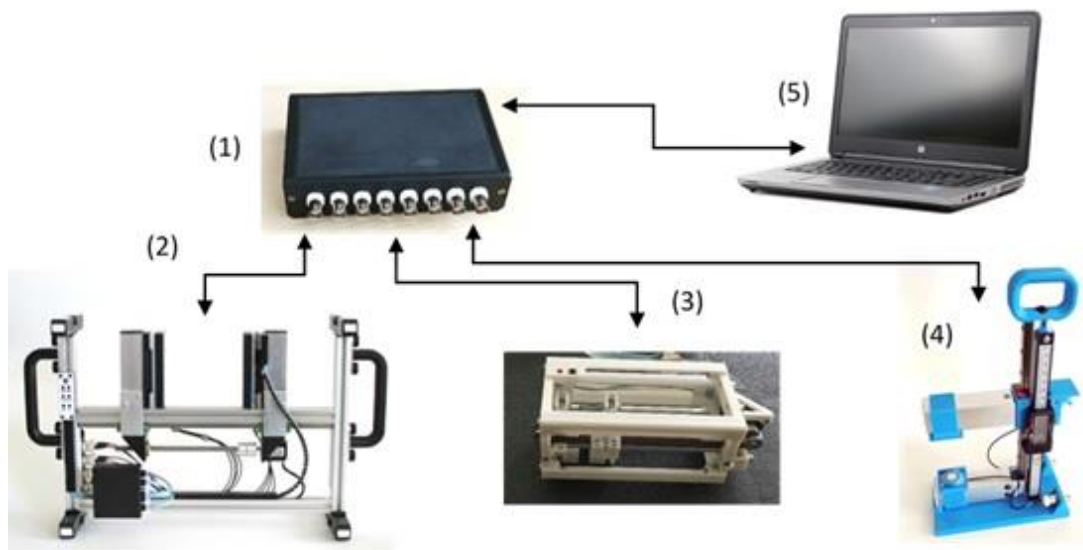


Figure 1. BoMUS system composition: 8-channel electronic unit (1); muscle scanner (2); bone scanner (3); wrist probe (4); laptop or PC (5).

The 8-channel electronic unit (1) is designed to generate and collect ultrasonic signals in pitch-catch and pulse-echo modes with customizable data collection patterns in all 8 channels. Three replaceable ultrasonic probes (2, 3, 4) can be connected depending on the purpose of the study and the type of object being studied: compact bone tissue in the tibia and forearm bones or muscle tissue in the arm and leg.