

# Business News Letter

excagol medtech

## 5 Operational test of the semi-automated venipuncture automate

Recently a laboratory demonstrator for the semi-automatic venipuncture automate was constructed, including hardware and software.

In the middle of January, in order to assess the capabilities of the laboratory demonstrator, it was tested using an ultrasound phantom filled with artificial blood. The ultrasound phantom simulates the feel and ultrasound properties of human tissue and is therefore an ideal test object. Within the phantom there are four artificial blood vessels of varying diameter and depth. To conduct the test, it is placed right below the ultrasound transducer which is built into the laboratory demonstrator.



**The excagol medtech team testing the laboratory demonstrator.**

The user can interact with the laboratory demonstrator via a graphical user interface. After an initial login procedure and some preparatory steps, the user is presented with the live feed of the ultrasound transducer. If a blood vessel is detected it is highlighted in the ultrasound window. The user can then start the vessel selection process. First, all detected vessels are analyzed and displayed to the user, including a recommendation which one is most suitable for puncture. After the user chooses a vessel for puncture, they are provided with visual guidance in order to place the needle right above the vessel. This is done by manually moving the laboratory demonstrator relative to the ultrasound phantom. During this process the position of the selected vein is constantly analyzed in order to provide live feedback to the user. By moving the laboratory demonstrator back and forth along the vessel, the user can also align the needle along the course of the vessel. Once the needle is adequately placed, the user can initiate the puncture process. After a final analysis of the vessel position, the depth of the vessel is sent from the PC to a microcontroller. Following that, the microcontroller calculates the movements that the motors need to complete in order to insert the needle into the vein. By using suitable motors, the inclination angle of the needle and the movement along two axes can be controlled, allowing the puncture angle and puncture depth to be adjusted according to the vein depth.

The laboratory demonstrator was able to successfully puncture the selected artificial blood vessels in the ultrasound phantom, while providing live feedback to the user. Now the goal is to optimize the functionality of the laboratory demonstrator and implement additional capabilities. Specifically, the use of different needle types and the deployment of catheters are planned.