

Hi! We are the team "Intrepid" from Saint-Petersburg, Russia. Schools №619.

We present our project "EIVIK - ROBOTIZED MOTOR-DOG WITH MYO CONTROL USING PELTIER ELEMENTS"

My name is Alexander Feldsherov. In our project, I am responsible for robot design and bioengineering.

Hi! My name is Andy Yakovlev and in our project I'm responsible for developing the robot programming and robot presentation.

Our team mentor is Petshak Stanislav Nikolaevich.

Who of you ever got you phone empty, for example, because of freeze? While in the city, there's no problem to find a power socket. Now imagine yourself in Antarctica, in the middle of icy desert. Not only success of expedition, your life will depend on charge level of GPS receiver, phone, flashlight. We thought about this problem and assumed that Peltier elements would successfully work on the difference of temperatures between human body and the environment, so when built into the researcher's jacket, they would produce enough power to charge a phone or GPS receiver. Also we developed a remote control system for a motorized towing vehicle using myo control placed under clothes that allows to keep hands warm. It is especially important for ultra-low temperatures.

Our project is based on Arduino platform and developed using Arduino IDE. We created a human-machine interface to control the motor-dog using operator's muscle (registration of electromyogram). Here is the transceiver architecture on the schema, the signal comes from EMG sensors and once it reaches the programmed level, the certain led turns on and the signal goes to the certain motor's receiver using Bluetooth HC-05 module.

To analyze EMG signal we will use BiTronics Studio. Information about muscle tension or relaxation will be sent to a serial port as separate symbols. Depending on the symbol, the servo-motor shaft will take different positions.

To estimate how many Peltier elements we will need in real conditions to provide enough power for motor-dog's controller, we made an experiment. We put a Peltier element to

a warm 3D printer's table. On one side we got a temperature of 50 degrees and 23 degrees on the other. Measured with a multimeter.

To understand how widely our invention can be used, we analyzed climatic zones of Russian Federation. The research showed that over 30% of our country's territory has temperatures lower than -30 degrees during more than 100 days a year, which makes possible to use Peltier elements to get electric power on the temperature difference between human body (36.6) and the environment.

In these conditions, using robotized motor-dog with myo control powered by Peltier elements built into user's clothes looks like a promising idea.