Multipurpose Platform Stabilization System (MPSS)

Sharoian, Migran (School: Municipal Classical Lyceum)
Khakimov, Pavel (School: Municipal Budgetary Educational Institution)

This project aims to develop a technology-based solution that gives people opportunity to realize a way of transportation in which cargo platform keeps horizontal position during all time, for example, if we put a glass full of water on the platform it won’t be spilled even if transportation is quite dynamic. Multipurpose Platform Stabilization System (MPSS) consists of 3D printed construction, commutatorless motors and electronics. Mathematical algorithms that were used in the project's software work on a series of measurements observed over time, containing statistical noise and other inaccuracies of gyroscope and accelerometer sensors ,and produces estimates of unknown variables that tend to be more accurate than those based on a single measurement alone. Commutatorless motors were used in the project because these types of motors are highly efficient in producing large amount of torque over a vast speed range. Project faced with the challenge of dealing with a three-phase high-power system that demands precise control to run efficiently. An independent damper system was constructed to reduce natural vibrations of the cargo platform that were detected by a vibrometer. A buggy-type chassis was designed and built in order to do controllable testing of system and perform the intended task. Using electronic level and special measurement software was revealed that system suggests a high level of stabilization accuracy because the range of angular vibration didn't exceeded 4.2 degrees. The results of testing have shown that mathematical filtration of incoming signals is on appropriate level. However, further research is needed to increase the system's functionality and to improve its performance.

Awards Won:
Fourth Award of $500