

2019-2020 Senior Design Project Proposal

Title: Autonomous Subway Inspection Vehicle

Advisor: Prof. Connington

Number of Students: 5

Description:

Due to usage, the New York City subway system experiences significant wear and tear. Track integrity is important for keeping subway cars in working condition. To determine if sections of track need to be replaced, the entire track network needs to be inspected regularly. In the past, inspection was done manually, with trained inspectors walking the track lines throughout the city. Recently (2015), the city has deployed more modern technology to inspect the track in the form of “track geometry cars.” These are essentially subway cars fitted with track inspection equipment. While this is a drastic improvement to manual inspections, the expense of these cars has resulted in a fleet of only four cars. Even with the fleet working every day, the track system is limited to being comprehensively inspected only a few times a year.

The track geometry cars have many specialized inspection functions, but the primary inspection criteria are relatively simple; i.e. making sure the tracks are parallel, level, and a constant track gauge, or width. A smaller inspection device can accomplish these tasks, or at least a subset of them, at a fraction of the cost. The goal of the project is to develop a small inspection device that can autonomously navigate a particular track route and perform the inspection along the way. A much larger fleet of these specialized, cheap devices/vehicles could provide enhanced network coverage, reduce wear and tear on the subway system, and save money on repair costs.

See the related Popular Mechanics article.