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LESSONS LEARNED FROM THE YORK UNIVERSITY ROVER TEAM (YURT) AT THE UNIVERSITY ROVER COMPETITION 2008

Abstract

In this paper, we explorer the lessons learned from the work of the York University Rover Team, which designed, built, and operated a prototype rover for the University Rover Competition 2008. As one of the new competitors in an international competition, the York University team successfully completed all four tasks and placed third in the overall ranking among 11 universities around the world. We outline the competition and the team with a brief description of the York University space engineering program. The design of the York University rover is described with focuses on the manipulator arm design, instrumentation interfaces and the drive system design and algorithms. Also, the value of this project as an educational medium is evaluated with respect to traditional classroom education, including individual feedback from the participating students themselves.

The University Rover Challenge 2008 took place in June 2008, at the Mars Research Desert Station (MRDS) in Hanksville, Utah. Under a simulated Martian environment, competing teams remotely operated mobile robotic systems to perform four mission critical tasks: geology; soil characterization, emergency navigation and construction. Each team was allowed one robotic system (a rover) of maximum 50kg mass which must be a remotely operated, self-powered, GPS navigated mobile platform. Total mass, excluding backup power and rover accessories can not exceed 50 kg, and the onboard systems must be able to resist airborne dust, light rain and 38 degree Celsius temperatures. The York University Rover Team designed the rover to accommodate three distinct payloads: a spectrometer for geological analysis, soil analysis tools, and a wrench system for the construction task.

The York University Rover project is one of several engineering projects aimed to provide experiential education to engage the science and engineering students through hand-on experience and apply skills and technology within the classroom as well as in the real-world environment. With participating students from wide range of disciplines (including space, computer, and geomatics engineering, physics, biology and chemistry) the project proved to be an inter-disciplinary, cooperative educational tool.