Final Report for NASA Research Grant NAG9-1276 - JSC-11-00-9679
Proposal Entitled: Pittsburgh Public School District / Carnegie Mellon University Robotics Team Participation in the US First Competition

Submitted by: Ashley Stroupe, Doctoral Candidate
Robotics Institute, Carnegie Mellon University

FIRST, For Inspiration and Recognition of Science and Technology, is an international program designed to encourage junior and senior high school students to participate in science and technology related activities. FIRST attempts to increase enthusiasm for technology by providing a competitive environment in which to demonstrate robotics technology designed for a particular set of tasks. The competitive environment also exposes students to many different ways of approach the task, broadening their understanding, and to a diverse group of students from across the United States and other countries. FIRST also attempts to build stronger relationships between students, educators, and those in technological professions by building teams. In addition to these goals, as an educational institution, Carnegie Mellon University provided student members of the project the opportunity to complete the design, construction, testing, and operation of a robot. Electrical, mechanical, and programming skills were stressed, with both adult and senior students acting as mentors for more junior members. Teamwork and integration was also stressed in order to provide students with a realistic feel for project-based work. Finally, an emphasis was placed on recruiting students with greater difficulty in entering technological fields: girls and ethnic minorities and students leaning toward humanities (especially art). As part of this project, Carnegie Mellon built a relationship with Taylor Allderdice High School that lasted four years.

During the four years support of the Allderdice team by Carnegie Mellon, the success of the project increased each year. Each term, the students successfully designed and built a working robot that could fully participate in the competition. Performance usually ranked the team in the middle at regionals and nationals, though the robot usually was able to perform as designed. Senior students with competition experience learned to mentor younger students and pass on their knowledge to improve the team for future years. Students learned to overcome social divisions among different groups to work together for a common goal. Success on a project of this scale improved self-esteem among participating students. Several students who first joined out of generic interest with no intention to pursue technical majors in college went on to major in a science or engineering. During the last three years, participation rose from approximately 10 core students to 25 or more. Participation by girls increased from 1 to 6, while participation by black students increased from 0 to 2.

In the recent year, the team has become self-sustaining, illustrating the success in building enthusiasm and support for technology projects in the students and in the community. The enthusiasm of the students has been the cornerstone of the recruit of new students, keeping the project growing and vital. Carnegie Mellon's participation with Allderdice has been an overall great success.