MarsBots: A National Robotics Education Learning Module for Grades 3&4. A. J. Shaner¹, M. Laura², K. Wilkins³, L. Tidwell¹, D. Lombardi¹, ¹The University of Arizona, 1415 N. 6th Ave., Tucson, AZ 85705, ²DeMiguel Elementary School, 3500 S. Gillenwater Dr., Flagstaff, AZ 86001, ³Central Arizona College, 8470 N. Overfield Rd., Coolidge, AZ 85228.

Introduction: The Phoenix Mars Scout Mission’s Education and Public Outreach (E/PO) program and NASA’s Science, Engineering, Mathematics, and Aerospace Academy (SEMAA) at Central Arizona College (CAC) partnered to create a national standards-based robotics learning module for grades 3 and 4 with extensions for younger students. MarsBots is an interdisciplinary learning module containing hands-on, minds-on activities which engage students in simulated investigations of the Martian environment and the robotic technologies of space exploration. All lessons are aligned with national science, math, and language arts standards. The MarsBots learning module supports the robotics strand of the Phoenix Mission’s E/PO program and expands the robotics strand of JPL’s Mars Public Engagement Program. The module will be submitted to the NASA Science Mission Directorate Space Science Education Product Review in February.

MarsBots Activities: Lessons 1-8 teach students about Mars and why scientists and engineers want to explore Mars with robots. These lessons focus on comparing physical characteristics of Earth and Mars. One lesson entitled “Mars Match Game” turns students into planetary scientists as they match images of Mars with terrestrial analogs.

Lessons 9-16 teach students the fundamental principles of robotics and how these principles are applied to design, construct, and test robotic explorers. Lessons begin by introducing students to simple machines and finish with students designing their own robotic lander. In “Phoenix’s Robotic Arm”, student “engineers” command student “robotic arms” to perform a task using one word commands.

Testing and Validation: The learning module was first field-tested in classrooms in Pinal County, AZ during the 2004-05 school year. This initial field-testing involved over 300 students and teachers in rural schools. Revisions to the module were made following recommendations from teachers during field-testing. Further testing was conducted during summer camps at the University of Arizona in 2005 with subsequent revisions made to the learning module following these camps.

Additional Information: If you have any questions or would like additional information regarding MarsBots contact Doug Lombardi at (520) 626-8973 (or e-mail at lombardi@lpl.arizona.edu).