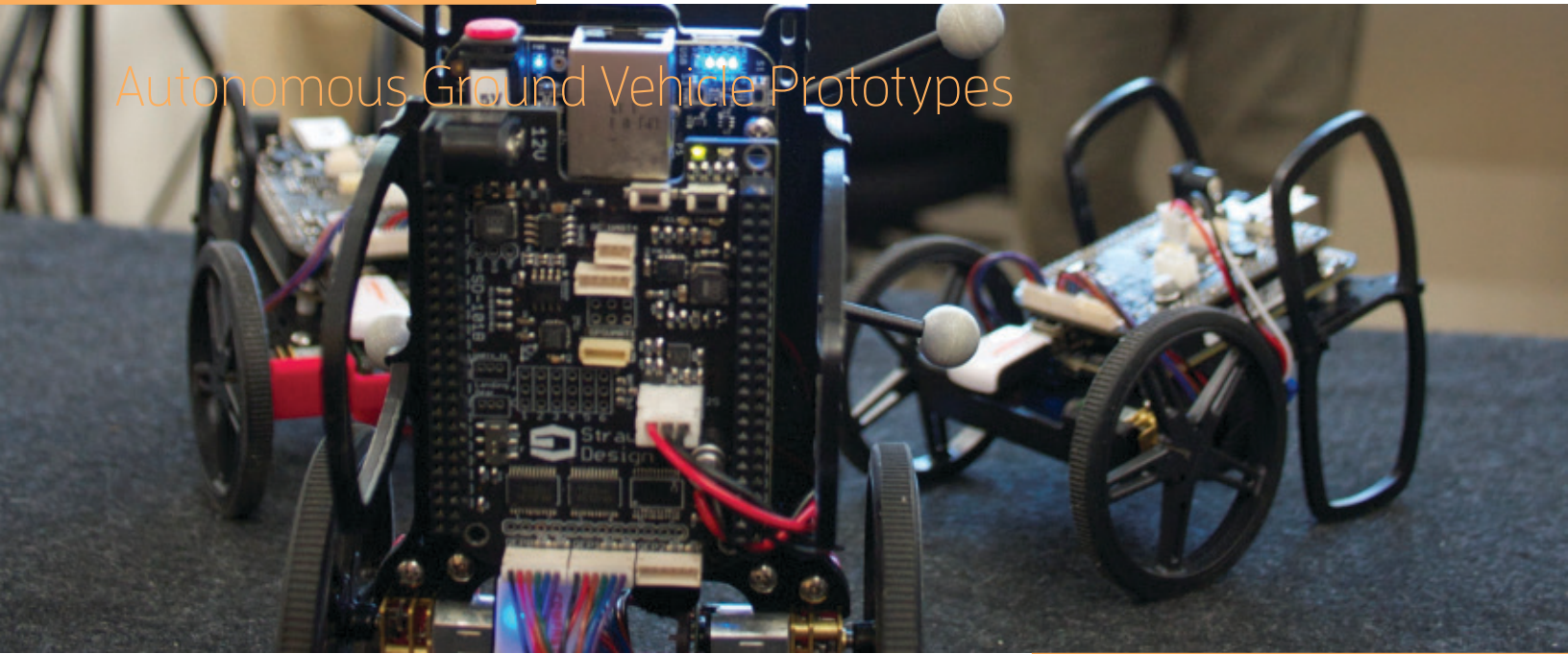


Autonomous Ground Vehicle Prototypes



Case Study

OVERVIEW

ATA Engineering, Inc., (ATA) has been working with the UCSD Coordinated Robotics Lab to develop working prototypes of a number of innovative robotic UGVs (unmanned ground vehicles). We have focused on three specific areas with our low-cost, feedback-stabilized robotic vehicles: embedded control and robotics education, search and rescue within burning buildings, and design for low-cost manufacturing. The Mobile Inverted Pendulum (MIP) vehicle is dynamically unstable and uses advanced embedded controllers to provide balance and enhanced maneuverability across various kinds of terrain. This UGV has the potential to become the basis for a range of robust, agile, and high-function devices for a variety of applications in challenging environments.

TASKS PERFORMED & KEY OUTCOMES

- Provided key support in development of the robot's control software and of the educational curriculum in robotics for UCSD's Embedded Control and Robotics course.
- Developed innovations in the advanced Linux-based software architecture used in such UGV prototypes to prioritize critical balance loops over less time-critical sensing tasks.
- Supported development of a UGV for exploring structure fires by hardening the robot to operate in intense fire environments and survive a one-meter fall, as part of research into potential deployments for search and rescue, disaster recovery, and mine safety.
- UCSD and WowWee Robotics developed an engaging and playful toy version of the MIP, bringing significant low-cost manufacturing experience to the UCSD/ATA team.



Consumer version of MiP (produced and marketed by WowWee)