# Austin Robot Technology/The University of Texas at Austin

## Team Fact Sheet

**Members**

**Alberto Alonso,** Vehicle Controls
**Patrick Beeson**, Graduate Research Assistant
**Jon Brogdon,** Actuator Controls
**Arturo Martin-de-Nicolas,** President
**Jorge Martin-de-Nicolas,** Alternate Team Leader
**Juan Martin-de-Nicolas,** Mechanical Systems, Vehicle Integration
**Donald W. McCauley,** Vision System & Logic Design
**Jack O'Quin,** Operating Systems and Realtime Processing
**Professor Peter Stone,** Artificial Intelligence, UT Department of Computer Sciences
**Stephen Straus,** Fund raising, Development Committee Chair
**David Tuttle,** Team Leader, Program Management, Advisor
**Laura P. Wright,** BlabberMouth Public Relations (laura@blabbermouthpr.com)

## Summary

**Austin Robot Technology/UT-Austin's self-driving SUV has proven its ability to make intelligent decisions in simulated traffic conditions. The team is a semifinalist in the internationally renowned DARPA Urban Challenge, which will take place at the former George Air Force Base in Victorville, California on November 3, 2007.**

## Technology Segments

### Sensor Integration

One of the fundamental problems to be solved as part of the Urban Challenge is the interpretation and integration of high-density sensory data toward a complete, real-time model of the world that includes an awareness of local terrain and any obstacles or other vehicles in the vicinity. ART is integrating sensory information from several SICK lasers, a GPS sensor, an inertial navigation unit, a state-of-the-art high-density 3D laser sensor and several video cameras.

### Artificial Intelligence

Another fundamental problem to be solved as part of the Urban Challenge is how to achieve precise, safe vehicle control that takes into account the real-world model, including reaction to observed and predicted behaviors of other vehicles. ART is using modern path planning and localization algorithms to meet this challenge.

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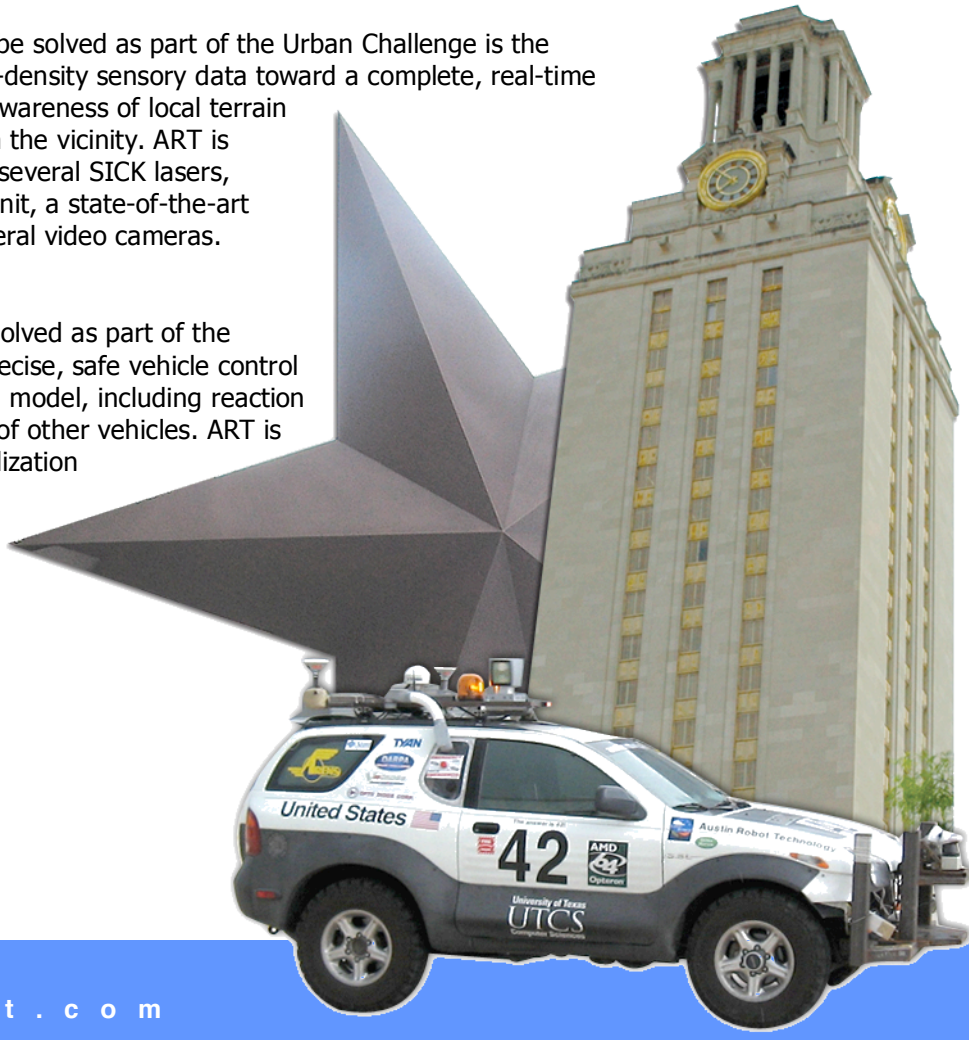


DARPA GRAND CHALLENGE

**Machine Learning**
Vehicles participating in the Urban Challenge will be faced with many unpredictable environmental scenarios. Conservative use of machine learning algorithms, including for sensor calibration and integration, will increase the car's robustness to uncertainty.

## Business Segments

**Defense Industry**
The Defense Advanced Research Projects Agency (DARPA) is the central research and development organization for the Department of Defense. The DARPA Urban Challenge will be a field test intended to accelerate research and development in autonomous ground vehicles that will help save American lives on the battlefield.

**Software Development**
ART's innovations in the areas of graphic chip and digital sensor development will allow those industries to offer improved microcontrollers, 3D room mapping, tracking sensors and computer graphics.

**Automotive Industry and Automotive Electronics Manufacturing**
ART's autonomous vehicle incorporates technologies that could allow the automotive industry to develop valuable systems for use in everyday vehicles, allowing for such options as auto-drive controls and sensors that improve safety by making corrections based on environmental factors, e.g. slowing vehicle when road is wet.

**Vision Industry**
ART's innovative vision system running on graphics processing units could lead to technologies such as mobile vision headsets that could allow the visually impaired to "see."

## About Austin Robot Technology

Austin Robot Technology is a team of engineers preparing their autonomous SUV to compete in the DARPA Urban Challenge, an internationally renowned competition for robotic vehicles that will take place at the former George Air Force Base in Victorville, California on November 3, 2007. ART will compete in the National Qualifying Event on October 26 – 31, which also will be held at the military training facility.

ART's elite team of technologists offers the only Texas entry with a vehicle that successfully participated in the 2005 DARPA Grand Challenge. ART is currently seeking additional sponsors for its DARPA entry. For more information about this outstanding opportunity, please visit www.austinrobot.com or contact Dave Tuttle at 512-796-9771 or info@austinrobot.com. For information on the DARPA Urban Challenge, visit http://www.darpa.mil/GrandChallenge/index.asp.

## The University of Texas at Austin

ART's partner, The University of Texas at Austin, is dedicated to improving the quality of life for the people of Texas, the nation and the world. In education and research, its depth and diversity are unmatched by most public universities. As an enduring symbol of the spirit of Texas, the university promotes economic activity and social progress and is a leading center of knowledge and creativity.

ART's Isuzu VehiCross SUV, dubbed "Marvin," was the subject of a course in the department of Computer Science at UT-Austin. This course provided unmatched hands-on experience with autonomous vehicle technology, and those students continue to work with the vehicle as it prepares for the DARPA competition.