

## mobile robots

### Search and Rescue Robots



**Customer:**

University of Freiburg, Germany

**Website:**

[RescueRobots Freiburg](#)

**Product Xsens:**

[MTi AHRS](#)

On 19th June 2006 the University of Freiburg in Germany won the RoboCupRescue Autonomy Challenge during the RoboCup World Championship in Bremen. They used the MTi to control their



Search and Rescue robot. Together with other sensor systems, they could map the arena and search for 'victims'. Search and Rescue Robots are already used in hazardous or confined environments, such as collapsed buildings and tunnels.

Download the [video of the winning run](#) (37 MB).

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### DARPA Grand Challenge



**Customer:**

University of Louisiana at Lafayette, LA, USA

**Website:**

[www.cajunbot.com](http://www.cajunbot.com)

**Product Xsens:**

[MT9 Inertial Measurement Unit](#)

The Cajunbot team of the University of Louisiana at Lafayette, LA, USA participates in a \$1million DARPA contest: an unmanned vehicle race from Los Angeles to Las Vegas. Thanks to Xsens Technologies' MT9 Inertial Measurement Unit, the vehicle's laser sensor is stabilized, and the vehicle's high-grade navigation system has a backup system.



Twenty-five teams from across the USA will compete on March 13, 2004 in the Grand Challenge, a contest sponsored by the Defense Advance Research Project Agency (DARPA), an arm of the Defense Department for a \$1 million prize. The first to complete the race from Los Angeles to Las Vegas, roughly 200 miles of dessert in less than 10 hours without a driver or remote control wins the \$1 million prize. Each team is to prepare a vehicle that can navigate a designated route using GPS signals for direction and laser sensors which detect upcoming obstacles. Using artificial intelligence, each vehicle will have to react to obstacles, passing over or round ditches, water, rocks, barbed wire and other vehicles along the path.

The Cajunbot team chose to integrate an MT9 Inertial Measurement Unit in the autonomous vehicle for two purposes: supply of redundant information to a higher grade Inertial Navigation System, and measurement of pitch and roll of the laser sensor. The MT9 measures amongst others 3D rate-of-turn and 3D accelerations, which information is provided to the navigation system, and software calculates pitch and roll, which is used to stabilize the vehicle's laser sensor. Professor Arun Lakhota of the Cajunbot team explains the value of the MT9: "We mount the MT9 on the laser sensor, introduce a mechanism to tilt the sensor and use the MT9 to measure its angles. With its light weight, the MT9 is perfect for this application."



Cajunbot on CNN: On February 17 and 18, 2004 team Cajunbot was filmed and interviewed for a Grand Challenge special to run on Next@CNN March 6 at 2 p.m. and again March 7 at 4 p.m. The CNN crew decided to film and interview team Cajunbot because of its uniqueness and freshness to the contest.

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## **Autonomous robot navigation**

Massachusetts Institute of Technology is doing research in order to let a robot perform autonomous tasks. Seeing the high potential of the sensor, they have also used it in a real time 3D laser scanning task together with GPS, a SICK laser scanner and an AVT Marlin camera.

### **Project goal**

Teach a robot about a physical space by interacting with it in much the same way we'd interact with a new lab member or coworker. Walk the robot around the space and verbally describe the surroundings and features. The robot would then be able to localize itself and navigate within the environment using the verbal cues as well as with a geometric model of the space. Having once told the robot, "this is my office, and here's my desk", we'd one day be able to say "bring me the book on my desk" and have it be done.

- [Autonomous robot research](#)
- [3D laser scanning drive movie](#) (30 MB)