1. **MobileRobots Examples** **2/2018**

MIT Turtlebots cooperate **Useful MIT Research** **3.2 minutes**

http://www.latimes.com/food/dailydish/la-dd-mit-beer-robot-20150817-story.html

History

This page was last edited on 3 February 2018, at 05:42.

https://en.wikipedia.org/wiki/Mobile_robot#History **Wiki Version**

Shakey and STAIR (Skip any advertisements)

https://www.youtube.com/watch?v=qXdn6ynwpiI Skakey Video 24 minutes

Note the sensors, motion, and processing described.

http://stair.stanford.edu/

Turtlebot

https://www.youtube.com/watch?v=MOEjL8JDvd0 Willow Garage 1 minute

One of the first affordable and useful robots for research

Husky

http://www.clearpathrobotics.com/husky-unmanned-ground-vehicle-robot/ Specs

https://www.youtube.com/watch?v=85tOYjuPO1s Video at NI week 2011

https://www.youtube.com/watch?v=N95z3OIDsDU Husky and RVIz - note skid turning

2. **Rodney Brooks**

http://people.csail.mit.edu/brooks/index.html Home page – VIEW THIS

READ THIS https://en.wikipedia.org/wiki/Subsumption_architecture

DARPA Grand Challenge: Final Part 1 Stanley from Stanford 10.54

https://www.youtube.com/watch?v=M2AcMnfzpNg

Sebastian Thrun helped build Google's amazing driverless car, powered by a very personal quest to save lives and reduce traffic accidents. 4 minutes

 https://www.ted.com/talks/sebastian_thrun_google_s_driverless_car

THE GREAT ROBOT RACE – documentary 52 Minutes

https://www.youtube.com/watch?v=8W2pqtbaybE

Published on Jan 21, 2016
Join NOVA for an exclusive backstage pass to the DARPA Grand Challenge—a raucous race for robotic, driverless vehicles sponsored by the Pentagon, which awards a $2 million purse to the winning team. Armed with artificial intelligence, laser-guided vision, GPS navigation, and 3-D mapping systems, the contenders are some of the world's most advanced robots. Yet even their formidable technology and mechanical prowess may not be enough to overcome the grueling 130-mile course through Nevada's desert terrain. From concept to construction to the final competition, "The Great Robot Race" delivers the absorbing inside story of clever engineers and their unyielding drive to create a champion, capturing the only aerial footage that exists of the Grand Challenge.

It would seem that the essentials to road racing are clear—a fast car and talented driver, right? Wrong. The Pentagon's Defense Advanced Research Projects Agency (DARPA) turns this assumption on its head with its Grand Challenge, a contest solely for autonomous vehicles that go relatively slowly. Following its success with unmanned aircraft, DARPA is pushing for the same on-ground advantage to keep soldiers out of harm's way. Private Jessica Lynch's ambush in Iraq might well have been avoided if the U.S. Army could have had a robotic supply truck to carry out missions in dangerous zones.

The program begins with a look back at the first DARPA Grand Challenge, held in March 2004, an event notable for the sheer number of things that went wrong. Highlighting the intense complexity of the task, 15 robots qualified to race, but most barely made it out of the starting gate. These off-road vehicles applied the term too literally—pummeling into barriers that protected the crowd, flipping into ditches, or moving painstakingly forward only to stop inexplicably when confronted with rocks or brush.

From the time the second race is announced, NOVA immerses itself in the prerace planning and production. This one-of-a-kind contest draws bright individuals to a tough technical problem: the design and construction of thinking machines that read and adjust to unpredictable terrain without any guidance from their creators. Nearly 200 teams from around the globe enter, yet only 23 of them survive the qualifying rounds. Their creations boast names such as "TerraMax," "Bad Ricky," and "Cajunbot". Behind-the-race footage takes viewers into the workshops and onto the field (see Meet the Teams).

Headlining the film is Carnegie Mellon University's "Red Team," led by Red Whittaker, an ambitious and relentless innovator with world-renowned expertise in the field of robotics. Under his leadership, 50 students and professionals give up their personal lives and outside distractions for an intensive all-out devotion to not one but two robots—"Sandstorm" and "H1ghlander" (the latter named for its H1 Hummer body). Pittsburgh's miserable winter weather makes for long, cold field tests, and 16-hour days are cushioned by brief bouts of sleep. Through it all, viewers witness firsthand what Whittaker calls the "violent and wretched time of birthing a new machine." (See an outtake of the Red Team racing in the desert.)

Each team faces the same major tasks, and each goes about them in its own unique way. An electromechanical system is needed to steer and brake, and sensors—video, laser, or otherwise—to "see." The machines must have a software "brain" to process information, avoid obstacles, and follow the course. Eye-popping race footage and 3-D animation bring the complex technology

to life and provide a robot's-eye view of the world. (Go to What Robots See for more on this.)

Not all the race entrants are high-end machines built by large corporate-sponsored teams. Taking on the powerhouse Red Team are many dedicated underdogs, surviving on bare-bones budgets and sheer determination. "Ghostrider," the only motorcycle entrant, is the wobbly creation of a lone Berkeley grad student. The cycle's ingeniously designed ability to right itself after a fall will have viewers rooting for The Ghost! "Team DAD" consists of two eclectic brothers who have competed on TV's "Battlebots" and who placed an impressive third in the first Challenge. Outfitted with a truck, laptop, and video camera, they are confident that simplicity will serve them well. NOVA also meets "Stanley," produced by Stanford University, the contestant most likely to give Carnegie Mellon's "Sandstorm" and "H1ghlander" a run for their money.

No autonomous vehicles have ever driven so far so fast. As the race unfolds, NOVA captures the crashes, pitfalls, frustration, fun, excitement, dirt, determination, and an eventual victory as one robot wins and several others make it all the way through the punishing desert course.

DARPA Urban Challenge (2007) 37 Minutes

https://www.youtube.com/watch?v=-xibwwNVLgg