Welcome to the
Urban Challenge
Participants Conference
<table>
<thead>
<tr>
<th>Time</th>
<th>Agenda Item</th>
<th>Presenter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1130 – 1145</td>
<td>Welcome</td>
<td>Dr. Tony Tether</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DARPA Director</td>
</tr>
<tr>
<td>1145 – 1200</td>
<td>Grand Challenge 2005</td>
<td>Mr. Ron Kurjanowicz</td>
</tr>
<tr>
<td></td>
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<td>DGC05 Program Manager</td>
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<tr>
<td>1200 – 1315</td>
<td>Program Plan</td>
<td>Dr. Norm Whitaker</td>
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<tr>
<td></td>
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<td>Urban Challenge Program Manager</td>
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<tr>
<td></td>
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<td>Ms. Kristen Fuller</td>
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<tr>
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<td>DARPA Contracts Officer</td>
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<tr>
<td>1315 – 1330</td>
<td>Break</td>
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<tr>
<td>1330 – 1400</td>
<td>Rules</td>
<td>Dr. Norm Whitaker</td>
</tr>
<tr>
<td>1400 – 1430</td>
<td>Questions</td>
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</table>
What is DARPA?

The Defense Advanced Research Projects Agency is the central R&D arm of the Department of Defense with the primary responsibility to conceive, explore, and demonstrate breakthrough system concepts and the most advanced technologies.
DARPA Grand Challenge

DGC I
Barstow to Primm
March 13, 2004
142 miles
10 hours
$1M

DGC II
Desert Classic
October 8, 2005
132 miles
10 hours
$2M

DGC III
Urban Challenge
November 3, 2007
60 miles
6 hours
$2.75M

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On-Site Conference Participation

Representatives from 29 states

Canada
Germany
United Kingdom
Grand Challenge 05
City to City Driving

• Terrain
  – Desert
  – Flat
  – Mountainous

• Obstacles
  – Bridges
  – Underpasses
  – Debris
  – Paved roadways
  – Poor roadways
  – Other Vehicles

Typical distances:
100 -150 miles

100 km
60 Mile Supply Mission Through the City
Urban Challenge

City Driving

• Obey traffic laws
• Safe entry into traffic flow
• Safe passage through busy intersections
• Safe following or passage of moving vehicles
• Safe passage of a stopped vehicle
• Drive an alternate route when the primary route is blocked
• Safe U-turn
Prizes & Tracks A & B

Challenge: Complete 60 miles in traffic under 6 hours

• Prizes
  – First Place: $2,000,000
  – Second: $500,000
  – Third: $250,000

Track A: Submit proposal to Broad Agency Announcement. Best compliant proposals receive up to $1 million technology development funds. Program ends at end of NQE. Successful performers invited to compete for Urban Challenge top three prizes.

Track B: Submit application, send video, get selected for DARPA site visit. Teams that succeed at the site visit receive $50,000 to participate in National Qualification Event (NQE). Teams that succeed at NQE receive $100,000 to participate in final event and compete for Urban Challenge top three prizes.
DARPA’s Prize Authority

• 1999 - Today:

The Secretary of Defense, acting through the Director of the Defense Advanced Research Projects Agency, may carry out a program to award cash prizes in recognition of outstanding achievements in basic, advanced, and applied research, technology development, and prototype development that have the potential for application to the performance of the military missions of the Department of Defense.

• Expires September 30, 2007 (End of Fiscal Year 2007)

• New legislation sought to extend authority past FY 2007
**Prize Authority Legislation**

**House**
Armed Services Committee

House Bill extends DARPA's prize authority to FY2010.
No other changes

House voted and approved bill

**Senate**
Armed Services Committee

Bill extends prize authority to FY2011, but removes DARPA and adds other DoD organizations

Bill not official yet. Awaiting Senate vote; expected by July 4
Senate’s Proposed Revision to Existing Prize Authority Law

• 1999 - Today:

The Secretary of Defense, acting through the Director of the Defense Advanced Research Projects Agency, may carry out a program to award cash prizes in recognition of outstanding achievements in basic, advanced, and applied research, technology development, and prototype development that have the potential for application to the performance of the military missions of the Department of Defense.

• Senate Armed Services Committee Proposed Change:

The Secretary of Defense, acting through the Director of Defense Research & Engineering and the Service Acquisition Executives of the military departments may carry out programs to award cash prizes.
Impact on Urban Challenge if Proposed Revision Becomes Law

• Prizes
  – First Place: $2,000,000
  – Second: $500,000
  – Third: $250,000

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Urban Challenge will be held, but DARPA will not have authority to award cash prizes.
Grand Challenge 2005
195 Applicants
February 2005

Teams from 36 states
3 High Schools / 35 Universities
Site Visits

Test Course
• 8 meters wide
• 200 meters long
• 11 gates
• Obstacles
The Grand Challenge
43 Semifinalists

43 teams from 15 states
1 high school team / 17 university teams
National Qualification Event

California Speedway, Ontario California
September 27 – October 5, 2005
H1ghlander
September 19, 2005

7 days before National Qualification Event
23 Grand Challenge 2005 Finalists

Axion Racing
Westlake Village, CA

Team CajunBot
Lafayette, LA

Team Caltech
Pasadena, CA

CIMAR
Gainesville, FL

Team Cornell
Ithaca, NY

Team DAD
Morgan Hill, CA

Desert Buckeyes
Columbus, OH

Team ENSCO
Springfield, VA

The Golem Group
UCLA
Santa Monica, CA

Gray Team
Metairie, LA

Intelligent Vehicle
Safety Technologies I
Littleton, CO

The MITRE
Meteorites
McLean, VA

MonsterMoto
Cedar Park, TX

Mojávaton
Grand Junction,
CO

Princeton
University
Princeton, New
Jersey

Red Team
Pittsburgh, PA

Red Team Too
Pittsburgh, PA

SciAutonics/
Auburn Engineering
Thousand Oaks, CA

Stanford Racing Team
Stanford, CA

Team TerraMax
Oshkosh, WI

Virginia Tech
Team Rocky
Blacksburg, VA

Virginia Tech
Grand Challenge
Team
Blacksburg, VA

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Command Operations Center
The Course

- Narrow Underpass
- Long Tunnels
- Lake Beds
- Narrow Gates
- Rough Roads
- Close Obstacles

Start/Finish

131.6 mi

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Beer Bottle Pass – Mile 123
Grand Challenge Video
# 2005 Grand Challenge Results

## Status Board

<table>
<thead>
<tr>
<th>ID</th>
<th>Team</th>
<th>Time</th>
<th>Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Stanford Racing Team</td>
<td>6h 53m</td>
<td>131.70</td>
</tr>
<tr>
<td>19</td>
<td>Red Team</td>
<td>7h 4m</td>
<td>131.70</td>
</tr>
<tr>
<td>25</td>
<td>Red Team Too</td>
<td>7h 14m</td>
<td>131.70</td>
</tr>
<tr>
<td>30</td>
<td>Gray Team</td>
<td>7h 30m</td>
<td>131.70</td>
</tr>
<tr>
<td>21</td>
<td>Team TerraMax</td>
<td>12h 51m</td>
<td>131.70</td>
</tr>
<tr>
<td>28</td>
<td>Team ENSCO</td>
<td>DNF</td>
<td>81.20</td>
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<tr>
<td>23</td>
<td>Axion Racing</td>
<td>DNF</td>
<td>66.20</td>
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<tr>
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<td>Virginia Tech Grand Challenge</td>
<td>DNF</td>
<td>43.50</td>
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<td>Virginia Tech Team Rocky</td>
<td>DNF</td>
<td>39.40</td>
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<td>10</td>
<td>Desert Buckeyes</td>
<td>DNF</td>
<td>29.00</td>
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<tr>
<td>4</td>
<td>Team DAD (Digital Auto Drive)</td>
<td>DNF</td>
<td>26.20</td>
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<td>14</td>
<td>Insight Racing</td>
<td>DNF</td>
<td>25.60</td>
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<td>Mojavatons</td>
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<td>The Golem Group / UCLA</td>
<td>DNF</td>
<td>22.40</td>
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<td>Team CajunBot</td>
<td>DNF</td>
<td>17.20</td>
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<td>20</td>
<td>SciAutonics/Auburn Engineer</td>
<td>DNF</td>
<td>15.90</td>
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<tr>
<td>15</td>
<td>Intelligent Vehicle Safety TecI</td>
<td>DNF</td>
<td>14.00</td>
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<tr>
<td>8</td>
<td>CIMAR</td>
<td>DNF</td>
<td>13.60</td>
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<tr>
<td>41</td>
<td>Princeton University</td>
<td>DNF</td>
<td>9.50</td>
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<tr>
<td>26</td>
<td>Team Cornell</td>
<td>DNF</td>
<td>8.90</td>
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<tr>
<td>2</td>
<td>Team Caltech</td>
<td>DNF</td>
<td>8.00</td>
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<tr>
<td>16</td>
<td>MonsterMoto</td>
<td>DNF</td>
<td>7.20</td>
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<tr>
<td>37</td>
<td>The MITRE Meteorites</td>
<td>DNF</td>
<td>0.73</td>
</tr>
</tbody>
</table>

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Stanley

Vehicle
Team
Hometown
Team Leader
Finishing time

Stanley
Stanford Racing Team
Palo Alto, California
Michael Montemerlo
6h 53m (19.2 mph)
Sandstorm

Vehicle
Team
Hometown
Team Leader
Finishing time

Sandstorm
Red Team
Pittsburgh, Pennsylvania
Red Whittaker
7h 04m (18.7 mph)
H1ghlander

Vehicle  H1ghlander
Team  Red Team Too
Hometown  Pittsburgh, Pennsylvania
Team Leader  Kevin Peterson
Finishing time  7h 14m (18.3 mph)
KAT-5

Vehicle          KAT-5
Team             Gray Team
Hometown         Metairie, Louisiana
Team Leader      Eric Gray
Finishing time   7h 30m (17.6 mph)
TerraMax

Vehicle
Team TerraMax

TerraMax

Team
TerraMax

Vehicle

Hometown

Oshkosh, Wisconsin

Team Leader

Jim Fravert

Finishing time

12h 51m (10.3 mph)
Living on the Edge
Program Plan
Program Objective

Safe autonomous driving in traffic

• Safe
  No collisions

• Capable
  Turns, stops, intersection, passing, merging, parking, following

• Robust
  Blocked roads, erratic drivers, sparse waypoints, GPS outage
Program Scope

YES

• Passing moving vehicles
• Merging into traffic
• Dirt roads, potholed roads

NO

• Speeds greater than 30 mph
• Highway driving
• Traffic signals or yield signs
• Difficult terrain
Rules and the PIP

• Rules will change
  • Send suggestions to grandchallenge@darpa.mil
  • June 2, 2006 deadline

• PIP amendments will be posted to FedBizOpps
  • PIP and Rules consistency
  • Objectives will not change
We are not making new rules today

Follow:

• BAA/PIP and Rules
• www.darpa.mil/grandchallenge
• baa06-36@darpa.mil
Program Technical Team

• Sean O’Brien
• Jon Hahn
• Harry Berman
Program Plan

• Overview
• Track A
• Track B
How to Participate

1. Form a Team
2. Select Track A or Track B
3. Submit an Application or Proposal
4. Develop a Vehicle
5. Qualify
6. Compete
1. Form a Team

• Team Leader
  21 year-old U.S. citizen and resident

• Team members
  Individuals can be on only one team
  No nationality restrictions

• Sponsors
  No restrictions

  (see rules regarding Government assets and organizations).
Documentation Requirement

U.S. Citizenship: • U.S. passport
    • Current drivers license and birth certificate

U.S. Residency: • Payroll stub issued by employer in the last 2 months
    • Utility bill not more than 2 months old issued to team leader (gas, electric, sewer, water, cable phone but not cell)
    • Receipt for personal property taxes or real estate taxes paid within the last year to a U.S. state, commonwealth, or locality
    • Current automobile or life insurance bill (cards or policies not accepted)
    • Voter Registration Card from U.S. state or commonwealth
    • Deed, mortgage, monthly mortgage statement, or residential rental/lease agreement

PIP and Rules will be changed
Team Example

Team Widget from Widget Industries
Mary Engineer and other employees

Team Leader: Mary Engineer
Team Members: Other employees
Team Sponsor: Widget Industries
2. Select Track A or B

A
Proposal
BAA and PIP

B
Application

Site Visit

National Qualification Event

Final Event

Rules

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Comparing Tracks

**Track A**

- Submit proposals
- Up to $1M available through payable milestones
- Government Purpose Rights to technology

**Track B**

- Submit application including video
- $50K for Semi-finalists  $100K for Finalists
- Government claims no rights to technology

**Identical Technical Criteria**
3. Submit Application or Proposal

Track A

- **Proposal** in required format
- June 23, 2006 deadline
- Optional video

Track B

- **Application**: 4 parts
- October 5, 2006 Deadline
- Mandatory video
Government Participation

• Below the Federal level
  Unrestricted: state universities on either track

• At the Federal level
  Track B participation only
  (if allowed by charter)
Funding Restriction

• None
  Track A teams are not limited to contract dollars

• Use of other Government program assets
  Disclose in part 1 of the application
4. Develop a Vehicle

Vehicle Requirements

• **Weight**: 2000 to 30,000 lbs

• **Wheelbase**: Min. 72 inches  Max.  U-turn  30 foot-wide road

• **Production vehicle or documented safety record**

• **Manual E-stop required.**

• **Wireless communication prohibited while autonomous** (see rules).

• **Warning light and audible alarm. Brake lights and directionals.**

• **Team E-stop for Site Visit. DARPA E-stop for NQE.**

**PIP will change: Same requirements on Tracks A and B**
5. Qualify

Qualification Process

Milestone 2

Site Visit

National Qualification Event

Milestones 3,4

Final Event

Proposal

Application
Site Visit

- DARPA Staff
  - June 11 – July 20, 2007
- Location of your choice
  - In the United States
- 4 hours max
- Submit RNDF in advance
- Provide one traffic vehicle and one control vehicle
- Follow the DARPA guidelines

NQE Selection Announcement
August 10, 2007
National Qualification Event (NQE)

- October 21-31, 2007
- Location to be announced
- Teams must arrive prepared
- Test integration of Government E-stop
- Advanced Navigation Test (Milestone 3)
  - No moving traffic
- Advanced Traffic Test (Milestone 4)
  - Repeated testing in moving traffic
  - Preparation for the Final Event

Goal – no collisions
Qualification

Track B Semi-finalist limit: 20 Teams

Only fully competent vehicles will be allowed in the Final Event.
6. Compete at the Final Event

Urban Route Network

All vehicles on the course together, completing equivalent missions by visiting checkpoints.
Creating Equivalent Missions

Many equivalent routes are possible

1 4 3 4 2 4 5 ≅ 5 4 2 4 1 4 3
The Final Event

- Route network distributed at least 24 hours in advance
- Teams perform multiple missions

Pit crew performance counts
Mission Start

UFE only

final mission waypoint

team takes control of vehicle

Start Area

reload and launch

12

route 12

Start chutes

Route Area

start next mission

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Program Plan

• Overview
• Track A
• Track B
Must Know Info

• Proposals must be received on or before June 23, 2006 at 5:00 p.m. EDT

• Revisions, if any, will be posted to FEDBIZOPPS

• Send all communications to BAA06-36@darpa.mil

• FAQs: www.darpa.mil/grandchallenge

• Proposal instructions are found in the Proposer Information Pamphlet (PIP)
• Only Fixed Price FAR Contracts or Other Transaction for Prototype Agreements will be awarded

• Proposals must be entered into DARPA TFIMS before the proposal due date
  – Must apply for a password for the system, so don’t wait until the last minute
PIP Highlights

• Rights in Data
  – Government Purpose Rights (GPR) to milestone reports and other documentation submitted at milestone meetings and technical interchange meetings
  – GPR to all elements of intellectual property for this program created in whole or in part using Government funding
  – Unlimited Rights to vehicle technical paper

• Intellectual Property (IP) Claims
  – Proposers are required to submit a listing (proposal Attachment E) of any pre-existing noncommercial components of IP to which a claim is asserted
PIP Highlights

• Foreign Access to Technology
  – Teams must notify DARPA if the Arms Export
    Control Act, Export Administration Act, or
    International Traffic In Arms Regulations (ITAR)
    apply

• Organizational Conflict of Interest
  – Proposal must include a completed copy of
    affirmation as proposal Attachment C

• Waiver and Release of Indemnity and Liability
  – Must sign and notarize waiver and release of
    indemnity and liability (proposal Attachment D)
More on Contract Type

• Proposals should not address profit as a separate element
  – Stimulating research and development, not acquiring goods or services. Funds for performance of technical effort

• A model Other Transaction Agreement is included in the PIP
  – Proposals for OTs must include proposal Attachment B
  – Not required when proposing a FAR contract
Contract Types

- **Contract** - the principal purpose of the instrument is acquisition by purchase, lease, or barter of property or services for the direct benefit or use of the Federal Government or whenever DARPA determines in a specific instance that the use of a type of procurement contract is appropriate.

- **Other Transaction for Prototype** - a legally binding instrument other than a procurement contract, grant, cooperative agreement, or other transaction for research/TIA used for a prototype project proposed to be acquired or developed by the Department of Defense (DoD)

  Must meet one of the following requirements:
  - Non-traditional Defense Contractor
  - Provide one-third cost share
  - SPE determines exceptional circumstances exist
OTs and Cost Sharing

• Current costs only, not sunk costs
  – Sunk costs are those that were invested prior to the award of the OT
  – The value of the sunk costs is realized in a positive proposal evaluation

• The best forms of cost sharing are cash and IR&D because they are readily quantifiable
Proposal Evaluation

• Evaluation Criteria and Weighting
  – Listed in descending order of importance
    • Technical Approach
    • Management and Funding Plan
    • Strength of Team

• Scoring
  – Proposal ratings will range from 1 through 4, where 4 is the highest rating and 1 the lowest
Other Information

• Teaming and Eligibility
  – Only one proposal per prime. May participate as subcontractor on more than one team
  – Teams selected under Track A may not enter any other vehicles for either track
  – Government organizations may not respond to the BAA

• Only a duly authorized Contracting Officer may obligate the Government

• Proposals are treated by DARPA as Competitive Information/Source Selection Sensitive
  – Proposals may be handled by support contractor personnel subject to Non-Disclosure Agreements
Program Plan

• Overview
• Track A
• Track B
Track B Application

part 1: Team Information

- Team leader and alternate required
- Pictures and other information for the website
- Vehicle technical information
- Use of Government contract assets information
Track B Application

part 2a: Proof of Citizenship (photocopy)

- Passport or
- Birth certificate and driver’s license
- Due October 5, 2006

part 2b: Waiver and Release of Indemnity and Liability

- Signed and notarized
- Due October 5, 2006
part 3: **Site Visit Information** (due March 2, 2007)

- Description and directions to site visit location
- Route Network Definition File for the site

part 4: **Video Demonstration** (due April 13, 2007)

- 5 minutes maximum
- CD with video in .wmv format
- Content guidelines will be released by DARPA
Emergency Stop System

- Teams provide E-stop for site visit.
- DARPA will issue an E-stop system to all semi-finalists
  - Equipment remains Government property
  - Integrate according to instructions prior to NQE
- E-stop modes
  - RUN – autonomous operation
  - PAUSE – controlled halt
  - DISABLE – shut down engine
Technical Paper

- Publication quality
- Available for public release
  - Do not submit proprietary information

- 25% of site visit score

- Will be published after completion of Urban Challenge

- Track A: Due at Milestone 2
- Track B: Due April 13, 2007

DARPA Grand Challenge

Technical Paper for TerraMax
Submitted by Oshkosh Truck Co.
and
The Ohio State University

1. System Description
   a. Mobility
      
      Describe the means of ground contact. Include a diagram showing the size and
gometry of any wheels, tracks, legs, and/or other suspension components.

The vehicle platform is an Oshkosh Trucks MTVR MK23. A brochure with technical
specifications can be found at http://www.oshkoshtruck.com/pdf/Oshkosh_MTVR_brochure.pdf
which we also attach here. The minimum turning radius is 42.7 feet. However, if necessary, in
“robot” mode (explained below) the vehicle will be able to turn a tighter corner in multiple
back-forth motions. The vehicle can traverse a 60% grade and a 30% side slope. The vehicle
cab and exhaust stack have been shortened to the dimensions given in section 3.1.2 to
accommodate known requirements of the course.

Figure 1. TerraMax arriving at the OSU Campus.
Summary Schedule

March 2, 2007  Site Visit RNDF due
April 13, 2007  Video + Tech Paper due
May 11, 2007  Site Visit Announcement
August 10, 2007  Semi-finalist Announcements

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Rules

• Route Definition
• Technical Criteria
• Event Operations
Route Definition

**RNDF**
Route Network Definition File
At least 24 hours in advance of start

**MDF₁**
Mission Data File
At least 5 minutes before start

**MDF₂**
At least 5 minutes before second mission

+ optional additional missions
RNDF - Route Network Definition File

Example

RNDF

segment  zone

17

lane

17.2

perimeter

waypoint

17.2.3

perimeter_point

spot

waypoint

+ optional fields
Segments and Lanes

SEGMENT M

Lane width

solid_white

double_yellow

broken_white

Waypoint M.3.2

LANE M.1

LANE M.2

LANE M.3
Exits and Checkpoints

CHECKPOINT 21
12.1.3

EXIT
ENTRY
STOP SIGN
WAYPOINT
CHECKPOINT
How to visit a checkpoint

Front bumper must completely pass over checkpoint in the proper lane

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Road Markings

- Stop Line
- Curb
- double_yellow
  - in RNDF
- white
  - not in RNDF
- lane width

Stop Line
Zones and Parking

- Unmarked
- Obstacles

Zone

K-rail

static obstacles

parking spot
MDF - Mission Data File

- Checkpoints
  - 7
  - 23
  - Random start
  - Follow in order
  - May repeat

- Speed limits
  - Speeds in miles per hour
  - May change from mission to mission
  - Per segment
Rules

• Route Definition
• Technical Criteria
• Event Operations
Required Behaviors

- Basic Navigation
- Basic Traffic
- Advanced Navigation
- Advanced Traffic
- Live Traffic

- Site Visit
- NQE part 1
- NQE part 2
- UFE
Technical Criteria
Examples
Basic Navigation

Vehicle stays entirely within travel lane around corners.
Basic Navigation

Vehicle stops within 1 meter of stop line.

Front bumper of vehicle must be in this zone during stop.
Basic Navigation

Vehicle exhibits less than 10 seconds of delay when intersection is clear.

clock starts when this vehicle clears the intersection
Basic Navigation

Vehicle completes passing maneuver in 40-meters or less maintaining 8-meter safety buffer

vehicle entirely within passing lane

stopped vehicle

vehicle leaves lane

vehicle entirely back in lane

40m

<8m

<8m

robot
Basic Traffic

Vehicle exhibits correct precedence order at intersection.

First to reach stop line is the first to leave.
Basic Traffic

Vehicle stops between 5 and 10 meters behind stopped lead vehicle.
Basic Traffic

Vehicle maintains 15 meter safety buffer at 15 mph.
A U-turn may be effected through one or more three-point turns.

- **Waypoint**
- **Entry waypoint**
- **Exit waypoint**
Advanced Navigation

Vehicle exhibits correct parking lot behavior with less than 10 seconds excess delay.
What is Excess Delay?

To avoid jamming up roads and parking lots, vehicles need to move when the way is clear.

Excess delay is timed during “stop and stare”
Taxicab Algorithm
Advanced Navigation

Vehicle re-plans when primary route is blocked.
Advanced Navigation

Vehicle navigates roads with sparse waypoints.

Intersection not called out in RNDF

Sparse waypoints on curved road

One-way road
Advanced Navigation

Road-following situations:

• Curbs, berms, vegetation
• Street lines may be missing
• Winding roads
• Sparse waypoints - may not be in center of road
Advanced Traffic

- Vehicle should pull into traffic when oncoming vehicles leave a gap of at least 10 seconds.

- Vehicle maintains 8 meter safety gap.
Advanced Traffic

Vehicle makes a left turn across moving traffic and proceeds with less than 10 seconds excess delay.
Advanced Traffic

Vehicle navigates parking area in the presence of moving traffic
Advanced Traffic

Vehicle exhibits safe behavior at all times to avoid collisions and near collisions.
Rules

• Route Definition
• Technical Criteria
• Event Operations
Rules

1. Penalties

• DARPA will have official observers on the course
• Causing a collision is grounds for disqualification
• Dangerous driving is grounds for disqualification
• Time penalties will be used for traffic infractions
• Rules of the Road with penalty table will be released
Rules

2. Collisions

• All-vehicles E-stopped and course cleared.
• Responsibility assessed by DARPA
• Vehicles causing collisions may be disqualified
• Victim vehicles may be allowed minor repair and re-start
• Chief Judge’s decisions are final

DARPA will not use E-stop to prevent course collisions
3. Time Corrections

- E-stop pauses
- Start chute offset
- Penalties
- Chief Judge corrections

NOT

- Time between missions
Rules

4. Pre-running

- Pre-running is forbidden.
- Gaining advantage by using information that is not generally available is forbidden.
- DARPA will release advance information about the course.
- Course area may be closed before the event.

Emphasis is on the comparison of technical approaches using the same starting information.
Rules

5. Other rules documents

- Master Schedule
- RNDF and MDF
- Video Guidelines
- Technical Paper Guidelines
- Site Visit Procedures
- E-stop Guidelines
- Rules of the Road
- National Qualification Event Procedures
- Final Event Procedures
- NQE Route Network Definition File
- UFE Route Network Definition File

Please send feedback to the DGC mailbox
Priorities

1. No collisions
2. Complete the mission
3. Minimize penalties