

Appendix C: DARPA Grand Challenge 2004 and 2005 Timeline

I. DARPA GRAND CHALLENGE 2004 AND 2005 TIMELINE

The author compiled the following list of important dates and milestones for the 2004 and 2005 GCE (herein referred to as “the timeline”) based on review of the published record:

I.A. 2004 GCE

I.A.1. February 22, 2003

DARPA held a “Competitor's Conference” as the official start of the 2004 GCE. DARPA stated: “Conference goals were to provide information about the upcoming event to potential participants, sponsors, and the media; provide a forum in which interested individuals, teams, and sponsors could meet to exchange ideas and set up partnerships leading to eventual entry in the event; and give DARPA a sense of the number of participants interested in competing in the Grand Challenge. The conference attracted over 400 attendees.” ([3], p. 3).

An “Overview Presentation” hosted by DARPA via the “Team Resources” hyperlink on the Archived Grand Challenge 2004 website ([17]) established a proposed 2004 GCE course length of 300 miles. DARPA stated the proposed 2004 GCE course was a “300-mile course of off- and on-road terrain between Los Angeles and Las Vegas” ([263]).

The “Overview Presentation” is undated⁴⁴, and did not establish a maximum corrected time. As a result, the author considers it likely this presentation pre-dates revision “April 1.2” of the 2004 GCE rules, which established a maximum corrected time of 10 hours, and was probably given during the Competitor's Conference on February 22, 2003. In addition, the author concluded the maximum corrected time exceeded 10 hours at the time this presentation was given.

I.A.2. April 1, 2003

DARPA published revision “April 1.2” of the 2004 GCE rules ([1]).

The “April 1.2” revision of the 2004 GCE rules established a proposed 2004 GCE course length of 360 +/- 60 miles. DARPA stated: “The Checkpoint Area is a mandatory stop between the Departure and Arrival Lines.” ([1]) and “The location of the Checkpoint Area will be approximately 180 +/- 30 miles from the Departure Line.” ([1]). Because the Checkpoint Area was “that area that has been designated as such by DARPA for the purpose of automated maintenance and servicing of Challenge Vehicles.” ([1]) the author considers it likely the Checkpoint Area was located near the midway point of the proposed 2004 GCE course, and that the proposed 2004 GCE course length was less than twice the distance from the Departure Line to the Checkpoint Area Entry Waypoint, or 360 +/- 60 miles.

The “April 1.2” revision of the 2004 GCE rules also established a maximum corrected time of 10 hours. DARPA stated: “The maximum corrected time to receive the Grand Challenge Prize is now ten hours.” ([1]) and “The Winner is the Participant whose Challenge vehicle has completed the prescribed Route in the least corrected time at or under ten hours.” ([1]).

April 1, 2003 was the first day of the application period for the 2004 GCE. DARPA stated: “The period of application begins on April 1, 2003...” ([1]).

I.A.3. June 18, 2003

DARPA stated the proposed 2004 GCE course length was: “approximately 250 miles” ([261]).

DARPA also stated: “As of June 18, 2003, 27 teams had submitted applications to enter the Grand Challenge.” ([261]).

I.A.4. October 14, 2003

October 14, 2003 was the last day of the application period for the 2004 GCE. DARPA stated: “The period of application... ends on the application deadline at noon, Eastern Daylight Time, on October 14, 2003.” ([1]).

DARPA inconsistently used the words “applicant” and “application”. Although DARPA stated: “A complete application consists of several documents that need not be submitted simultaneously. These documents include the application form, application addenda (if required), the technical paper, and technical paper addenda (if required).” ([1]), DARPA later stated: “The Grand Challenge attracted 106 applicants, 86 of which submitted technical papers by the October 14 deadline.” ([83]). The author concluded 86 teams, not 106, submitted applications by the October 14, 2003 deadline because the technical proposal was a required submission for the team application to be considered complete.

I.A.5. November 5, 2003

Of the 86 teams which submitted complete applications by the October 14, 2003 application deadline, DARPA selected 19 whose technical proposals were “completely acceptable” and invited those teams “to participate in the Grand Challenge Qualification, Inspection and Demonstration (QID) event at the California Speedway, March 8-12, 2004.” ([83]). DARPA stated: “An additional 26 teams were evaluated as 'possibly acceptable' and eligible for a site visit that could qualify them for the final 6 slots at the QID.” ([83])

The list of teams whose technical proposals were evaluated as “completely acceptable” by DARPA included many teams which submitted proposals with a large number of technical mistakes, or otherwise reported confusing or inadequate technical

detail. See paragraph V.E. In addition, review of submitted technical proposals indicated several of the technical proposals evaluated as “completely acceptable” were revised continuously between November 5, 2003 and the 2004 QID and GCE, and that they referred to future actions, in particular planned test and evaluation. See paragraph XIV.D.1.

Although DARPA established requirements for technical proposal accuracy and stated: “Challenge Vehicles presented for the Qualification Inspections and Demonstration (QID) that deviate substantially from the description in the approved technical paper (including approved addenda) will be disqualified.” (see paragraph V.E.1.a.), the author was unable and unwilling to conclude, based on a comprehensive review of team technical proposals, that DARPA refused to allow teams, which were not in compliance with requirements DARPA itself established, to participate in either the 2004 QID or GCE. The author concluded DARPA attempted to maintain an appearance of objectivity, but selected some teams on the basis of a novel technology in use by the team (see paragraph X.D.1.) or a desire to stimulate good public relations. Based on the general quality of team technical proposals and the performance of some teams during the 2004 QID and GCE, the author questions whether it was appropriate for DARPA to allow teams which little or no chance of successfully completing the 2004 GCE to participate in the 2004 QID and GCE.

I.A.6. November 26, 2003

DARPA published responses to questions asked by teams participating in the 2004 QID and GCE on or around November 26, 2003, and which was not hosted by DARPA via the Archived Grand Challenge 2004 website ([17]). A copy of DARPA's responses was downloaded from the Team 2004-20 website ([20]), a repository of records independent of DARPA. The copy ([264]) is undated⁴⁵. DARPA stated: “There will no longer be a Checkpoint or Checkpoint area. The total route length will be less than the published maximum distance to the Checkpoint Area (approximately 210 miles).” ([264]).

I.A.7. December 19, 2003

DARPA announced 25 teams were selected to participate in the 2004 QID. DARPA stated: “Twenty-five teams from a wide variety of backgrounds, organizations and areas of the country have been selected to participate in the Qualification, Inspection and Demonstration (QID) Event...” ([254]).

I.A.8. December, 2003 or January, 2004

DARPA distributed an “information package” in December, 2003 or January, 2004 which contained “QID information/slides” among other resources ([265]), and which was not hosted by DARPA via the Archived Grand Challenge 2004 website ([17]). A copy of the “QID information/slides” was downloaded from the Team 2004-20 website

([20]), a repository of records independent of DARPA. The “QID Process Description” presentation ([266]) is undated⁴⁶.

I.A.9. January 5, 2004

DARPA published revision “5 January 2004” of the 2004 GCE rules ([6]), and which was not hosted by DARPA via the Archived Grand Challenge 2004 website ([17]). A copy of the “5 January 2004” revision of the 2004 GCE rules was downloaded from the Team 2004-20 website ([20]), a repository of records independent of DARPA. The “5 January 2004” revision of the 2004 GCE rules did not establish a proposed 2004 GCE course length. However, DARPA stated: “There is no longer a checkpoint on the route.” ([6]).

The “5 January 2004” revision of the 2004 GCE rules established a maximum corrected time of 10 hours. DARPA stated: “The Winner is the Participant whose Challenge vehicle has completed the prescribed Route in the least corrected time at or under ten hours.” ([6]).

I.A.10. March 8 - 12, 2004

The 2004 QID was held March 8 - 12, 2004. DARPA stated ([3], p. 5):

The QID was used to determine the final 20 participants for the Grand Challenge. The 25 teams that passed the technical paper review process were invited (21 actually participated) to the QID at the California Speedway in Fontana, California, March 8-12, 2004... The QID comprised several distinct activities: a static, safety, and technical inspection of the robotic vehicles and their systems; a separate practice area; and a demonstration course of approximately 1.4 miles that the vehicles were required to traverse.

The technical inspection ensured that each vehicle complied with all rules and was safe to operate. The demonstration course ensured that each vehicle could demonstrate intelligent autonomous sensing and navigational capabilities around a series of static and movable obstacles designed to represent those that might be found on the actual course... The course also provided an opportunity to test the electronic-stop (E-stop) systems of each vehicle and other equipment and procedures that would be used during the actual event.

Each vehicle was ranked according to its overall time to complete the course, and point deductions were taken for impacting obstacles, exceeding established speed limits, or deviating from the established course. Over the 5-day period, eight teams completely finished the course, nine teams partially finished the course, two teams terminated within the starting area, and two teams officially withdrew from the event. On March 12, 2004, DARPA announced that 15 of the 21 teams at the QID qualified for the Grand Challenge event.

I.A.11. March 13, 2004

The 2004 GCE was held March 13, 2004. No team successfully completed the 2004 GCE. No team completed more than 7.4 miles of the 2004 GCE course.

I.B. 2005 GCE

I.B.1. June 8, 2004

DARPA announced a “Participant's Conference” would be held on August 14, 2004 ([267]).

DARPA announced the 2005 GCE would be held on October 8, 2005 ([3], p. 11).

I.B.2. August 14, 2004

Although DARPA did not state the “Participant's Conference” was the official start of the 2005 GCE, the author selected the date of the “Participant's Conference” as the official start of the 2005 GCE because of the similarity to the “Competitor's Conference” held on February 22, 2003 which was the official start of the 2004 GCE.

I.B.3. October 8, 2004

DARPA published the 2005 GCE rules ([2]).

The 2005 GCE rules established a proposed 2005 GCE course length of “no longer than 175 miles” ([2], p. 4).

The 2005 GCE rules also established a maximum corrected time of 10 hours. DARPA stated: “DARPA will award a prize ... of \$2 million to the team ... whose vehicle completes the route with the shortest corrected time ... under 10 hours...” ([2], p. 5).

I.B.4. February 11, 2005

Parts 1 and 2 of the 2005 GCE application were required to be submitted by February 11, 2005 ([2], p. 6).

I.B.5. March 11, 2005

Parts 3 (“Vehicle Specification Sheet”), 4 (“Video Demonstration”), and 5 of the 2005 GCE application were required to be submitted by March 11, 2005 ([2], p. 6).

I.B.6. April 4, 2005

DARPA stated the “Announcement of teams selected for site visits” would take place on April 4, 2005 based on the “Results from review of vehicle specification sheet and video demonstration” ([2], p. 6).

I.B.7. May 2 - 15, 2005

DARPA stated site visits would take place May 2 - 15, 2005 ([2], p. 6).

I.B.8. June 1, 2005

DARPA stated the “Announcement of 40 teams selected for National Qualification Event (semifinalists)” would take place on June 1, 2005 based on “results from site visits” ([2], p. 7). DARPA selected 43 teams to participate in the 2005 NQE ([268]).

I.B.9. August 15, 2005

Team technical proposals were required to be submitted by August 15, 2005 ([2], p. 7).

I.B.10. September 27 - October 6, 2005

DARPA announced the 2005 NQE would be held between September 27 and October 6, 2005 ([2], p. 7). DARPA stated 20 teams would be selected to participate in the 2005 GCE ([2], p. 7).

The 2005 NQE was held September 28 - October 5, 2005 ([242]). DARPA selected 23 teams to participate in the 2005 GCE ([242]).

I.B.11. October 8, 2005

The 2005 GCE was held October 8, 2005. Four teams successfully completed the 2005 GCE ([5]).

II. TIMEFRAMES AND OBSERVATIONS

II.A. 2004 GCE

- Time between the official start of the 2004 GCE on February 22, 2003 and the last day of the application period for the 2004 GCE on October 14, 2003: 234 days.
- Time between the official start of the 2004 GCE on February 22, 2003 and the first day of the 2004 QID on March 8, 2004: 380 days.
- Time between the last day of the application period for the 2004 GCE on October 14, 2003 and the first day of the 2004 QID on March 8, 2004: 146 days.
- DARPA published at least two revisions of the 2004 GCE rules, one before and one after the last day of the application period for the 2004 GCE on October 14, 2003. The earliest revision of the 2004 GCE rules the author is aware of is the “April 1.2” revision of the 2004 GCE rules. The version number implies there were prior revisions, which may not have been published.
- DARPA revised the proposed course length continuously in the months prior to the 2004 GCE: on February 22, 2003 (300 miles), April 1, 2003 (360 +/- 60 miles), June 18, 2003 (250 miles), November 26, 2003 (210 miles), and January 5, 2004, when the proposed course length was deleted from the “5 January 2004” revision of the 2004 GCE rules.
- DARPA revised the maximum corrected time from greater than 10 hours to 10 hours on April 1, 2003.

II.B. 2005 GCE

- Time between the official start of the 2005 GCE on August 14, 2004 and the last day of the application period on March 11, 2005: 209 days.
- Time between the official start of the 2005 GCE on August 14, 2004 and the first day of the 2005 NQE on September 28, 2005: 410 days.
- Time between the last day of the application period for the 2005 GCE on March 11, 2005 and the first day of the 2005 NQE on September 28, 2005: 201 days.
- DARPA published one revision of the 2005 GCE rules on October 8, 2004 before the last day of the application period for the 2005 GCE on March 11, 2005.
- DARPA did not revise the course length (175 miles) or maximum corrected time (10 hours) after the 2005 GCE rules were published on October 8, 2004.