

## CHAPTER XVI. RESEARCH METHODOLOGY

The foundation of much of this research is *critical scholarship*. To the extent possible, any conclusions presented by the author are supported by *objective evidence*. For the purposes of this research, objective evidence is considered to be that presented by primary public and academic sources which can be independently confirmed. These sources are referred to herein as “published records”. The complete body of published records is referred to herein as “the published record”.

To support objective, independent analysis, the author has attempted to separate the reputations of the universities and corporations involved from analysis where possible through the use of team numbers, in lieu of names, focus on participation in the 2004 and 2005 GCE in lieu of competition, and eliminate completely the use of informal testimony, or hearsay.

It is possible that participants in the 2004 and 2005 GCE are able to remember details and events which did not become part of the published record, and many of the teams which participated in the 2004 and 2005 GCE maintain websites providing points-of-contact through which the author could have solicited additional technical information or requested clarification of published records. However, the author determined that reliance on informal testimony or hearsay would introduce an additional element of uncertainty into what is already an uncertain record, and the decision was made early to rely on published records alone. As a result, no attempt was made to reconcile the published record with informal testimony or hearsay through email or telephone conversations with the teams.

The author does not consider manufacturer product literature to which access is directly controlled by the manufacturer or indirectly controlled by an agent of the manufacturer to be published records. Although the manufacturer may have a practice of granting access to product literature on a non-discriminatory basis, the manufacturer is in the sole position of being able to revise such literature without review. Although access to academic sources is similarly controlled, in general, publishers grant access to academic sources on a non-discriminatory basis, and academic sources are peer-reviewed. The author considers the scrutiny of peer review to be essential to the reliability of academic sources as published records. The lack of equivalent independent peer review of manufacturer product literature is a significant deficiency.

Where the author was unable to present adequate objective evidence, anecdotal evidence is presented, and is so noted.

In addition, from detailed review of technical guidance published by DARPA, technical proposals published by teams participating in the 2004 and 2005 GCE, and final published results, it is clear that published records are self-contradictory, provide incomplete or incorrect technical information, and do not provide enough information to answer key questions concerning team strategies during the 2004 and 2005 GCE, which

would allow the author to independently assess the success of the DARPA Grand Challenge in one of its principal goals ([3], p. 2):

Accelerate autonomous ground vehicle technology development in the United States in the areas of sensors, navigation, control algorithms, vehicle systems, and systems integration.

As a result, the decision was made early to reconcile published records with other published records where possible.

Since the conclusion of the 2007 Urban Challenge, the author has become aware of two additional sources of published records: a “privately compiled” collection of public domain files and documents ([251]) and a book about the Grand Challenge ([252]).

The publisher alternately stated the author of the collection ([251]) was the Department of Defense and: “Our news and educational discs are privately compiled collections of official public domain U.S. government files and documents - they are not produced by the federal government.” ([253]). The author concluded review of the collection, as a “privately compiled” collection of public domain files and documents, would not result in improvement in quality over the existing published record. As a result, the author did not review the collection.

Review of the table of contents for the book ([252]) hosted by an Internet retailer ([253]) indicates the articles published by the Journal of Field Robotics constitute the majority of source material. The author concluded review of the book would not result in improvement in quality over the existing published record. As a result, the author did not review the book.