

# I. Introduction

Some trends have been emerging over the last several years that significantly effect the way the Department of Defense (DoD) conducts R&D. One trend is the fact that budgets for R&D (in real dollars) will continue to decrease. Also the development of commercial high tech industries will continue to be a source of innovation for military procurements in some industrial sectors. With the shrinking of the federal R&D budget and the proliferation of technology, Federal laboratories need to find alternative ways to leverage their R&D through alliances with industry.<sup>1</sup> Industry also prefers to leverage their own R&D efforts by exchanging ideas, accessing unique facilities, and building on the work the labs have done.<sup>2</sup>

The purpose of technology transfer is to make federally generated scientific and technological developments accessible to private industry and the state and local governments. The users are then encouraged to develop the technology further into new products, processes, materials, or services that will enhance the nation's industrial competitiveness or otherwise improve the nation's quality of life. The Cooperative Research and Development Agreement, CRADA, is one technology transfer mechanism.

CRADAs join the Government and industry in mutually beneficial research, and although they represent only a small fraction of the federal R&D budget, they leverage money in the public and private sectors, causing an economic impact far larger than that suggested by the program budgets alone.<sup>6</sup>

Since 1986, when the CRADA mechanism was extended to DoD through the Federal Technology Transfer Act of 1986, there has not been an assessment of the benefits that this mechanism has returned to DoD. A prior GAO study<sup>7</sup> did review the role of CRADAs in successfully transferring technology to the private sector, however, this study evaluated 10 CRADAs from DoD, DoC, DoA, and HHS. Another study<sup>8</sup> conducted by David Roessner et al, provided some insight into how industry feels about collaborating with Federal laboratories, including the DoD. Roessner's study surveyed Chief Technical Officers and laboratory or R&D Division Directors of companies associated with the Industrial Research Institute, a professional trade association in Washington, DC. For this study, the Office of the Secretary of Defense, Director Defense Research and Engineering (DDR&E) is interested in understanding what is being accomplished through the use of the CRADA mechanism and the impact these accomplishments are having on the Labs' mission.

The flexibility of the CRADA mechanism makes it an important tool for forming partnerships. The following chart shows some of the many uses of the CRADA mechanism.

### *Uses of the CRADA Mechanism*

- Knowledge-Share
- Information Exchange
- Facility Use
- Personnel Exchange
- Technical Assistance

In assessing the value/benefit that CRADAs bring to the DoD, one needs to define what constitutes a successful CRADA and what value is as it relates to the DoD mission. The success of a CRADA can be difficult to quantify. Some believe that a CRADA is successful when partners fulfill their intentions as stated in the statement-of-work. While one can sometimes point to tangible outcomes to measure success, quite often the benefits are intangible. The following chart has a sampling of tangible and intangible outcomes that can result from a CRADA.

*Possible Outcomes from a CRADA*

- Access to State-of-the-Art Technologies
- New or Improved Product
- New or Improved Process
- Patent
- Cost Avoidance
- Advanced Knowledge
- Leveraging of R&D
- Formation of New Relationships

The value of a CRADA to DoD can be identified in the requirements of the CRADA itself, that the objectives of the CRADA be consistent with the DoD laboratory's mission. In the framework of this report, a CRADA supports the laboratory mission if it meets one or more of the management principles, as described in the Defense Science and Technology Strategy.

It is the objective of this study to evaluate a sample of DoD CRADAs to assess the benefits that DoD is reaping from participation in these agreements. This report starts out with an overview of technology transfer legislation and the role of the CRADA mechanism in technology transfer. A summary of the CRADA sampling selection process is outlined as well as a synopsis of the methodology used in assessing the benefits of CRADAs to DoD. A series of generalized and specific findings on the CRADA mechanism are presented with supporting information from the CRADAs in this study. The value of CRADAs to the DoD S&T program is determined by tying each of the CRADAs selected in this study to the five management principles as defined in the Defense Science and Technology Strategy. Lastly, a CRADA from each of the three services, is showcased in detail to illustrate its value to the DoD and the private sector partners. Summaries of each of the CRADAs evaluated in this study, interview guides, Point-of-Contact lists, and a bibliography are provided in the Appendices.