1. Introduction

1.1 The Role of Construction & Building in the Economy

In 1999, the nation invested roughly $860 billion—more than 9 percent of the nation’s GDP—for the building and construction of new facilities and infrastructure. Roughly 47 percent of this investment was for residential structures (e.g., single family homes, multi-family apartments), 33 percent was invested by the private sector in non-residential structures (e.g., commercial buildings, factories, utilities, farms), and 20 percent was invested by governments in public facilities and infrastructure (e.g., public buildings, highways, sewers, etc.) (BEA, 2001). While the specific percentages and component breakdowns vary annually, investments in new construction and building typically represent 8 to 10 percent of the nation’s GDP, with more than 40 percent of this investment being for new housing.

This new construction, along with the nation’s existing facilities provide Americans with their homes, workplaces, and the infrastructure needed to support our quality of life and allow our economy to function. Yet, as new construction is built, operating and maintaining these facilities and infrastructure gets progressively more expensive. To provide just one example of the costs involved in operating and maintaining facilities, the federal government—the nation’s largest owner and operator of buildings—spends more than $3 billion annually on electricity for the 420,000 buildings that it owns and the 88,000 buildings that it leases (FEMP, 2000; GSA, 2000a; GSA 2000b). Given the importance of these facilities and infrastructure to the nation’s economy and quality of life, becoming more effective at designing, building, operating, and maintaining our new and existing facilities will continue to be an important component of our economy as well as an investment in the future.

1.2 The Role of R&D in Improving Construction, Building, and Housing

While the size of this industry makes it important in its own right, that fact that financial resources for facilities and infrastructure are scarce in both the public and private sectors suggests that learning to design, build, operate, and maintain
our infrastructure “smarter” is a good idea. However, it is generally believed that the construction and building industry invests less than 0.5 percent of the value of its sales in R&D, whereas the national average is close to 3 percent (NIBS, 1996; NSB, 1998).

In response to this apparent under-investment in R&D, the National Science & Technology Council’s Construction and Building Subcommittee developed the National Construction Goals in the mid-1990s. These goals were then endorsed by industry and led to several efforts to improve coordination among the industry’s diverse stakeholders. These efforts included the Partnership for Advancing Technology in Housing (PATH), the Partnership for the Advancement of Infrastructure and its Renewal (PAIR), and an effort to streamline the nation’s building regulatory system. Together these efforts work toward improving the affordability, performance, safety, durability, and other characteristics of the built environment.

1.3 This Report’s Contribution to Understanding the Federal Government’s R&D on Construction, Building, and Housing

One of the primary ways by which the federal government can improve the value of its R&D investment is to improve the coordination and leveraging of public and private sector funds by making its activities and their results more accessible to the public.

To assist in these efforts and provide precisely this type of information, the NSTC’s Construction & Building Subcommittee and PATH jointly asked RAND to conduct two related searches of RAND’s database on “Research & Development in the United States” (RaDiUS) for Fiscal Year 1999 (FY99).

The first search was to be broad and capture the full scope of the construction and building industry. The second search was to focus on federal R&D related to housing. Since housing was to be a component of the broader search, the second search was to be a subset of the first.

RAND was also asked to produce a published report documenting the search results and to develop an electronic database of those results. This document is
the final report and the database has been provided to both the C&B Subcommittee and PATH for public access and distribution.

1.4 What is RaDiUS?

RaDiUS—an acronym for “Research and Development in the United States”—was developed by RAND, in cooperation with the National Science Foundation, to better support the White House Office of Science and Technology Policy (OSTP) and the National Science and Technology Council (NSTC).

RaDiUS is a web-based search engine and database of all unclassified federally-funded R&D activities. The database contains detailed project and funding information on the 450,000+ projects and roughly $80 billion in R&D funded by the federal government each year.

The data contained in RaDiUS originates directly from the President’s budget as well as information submitted by individual federal agencies to RAND. The information is then organized hierarchically based on Congressional appropriations and Office of Management & Budget (OMB) budget categories.\(^2\) The hierarchical organization makes it possible to track dollars from the agency level down to individual projects.

More information on RaDiUS, how it works, and how to register for an account can be found on the RaDiUS webpage located at www.rand.org/scitech/radius.

1.5 Why is RaDiUS helpful?

Given the size of the federal R&D investment, managing this portfolio to achieve specific goals is difficult to say the least. If one seeks to analyze, understand, or affect change in any part of the portfolio, the first step is likely to be to identify what is currently being funded by the federal government. RaDiUS is the first and only tool that allows one to begin the process by allowing one to search for relevant R&D activities, obtain detailed project information, and aggregate and compare funding levels.

\(^2\) An important aspect of RaDiUS is that it contains only federally funded activities that are properly coded to reflect the OMB definition of R&D as defined in OMB Circular No. A-11 which can be downloaded from http://www.whitehouse.gov/omb/circulars/.