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## Understanding the burden of government oversight on engineering work: Adding empirical data to the debate

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### ABSTRACT

This paper presents results from a 6-month time-allocation study of the impact of oversight-related activities on engineering work at a major aerospace contractor. Previous studies have reported a wide range of estimated burdens – from 2% of a total system's cost to factors of 5 times the cost of commercially available alternative products. The wide range of estimates of the burden of oversight can be attributed to measurement challenges and to the phenomenon being measured. Our new data provides an empirically valid estimate of the time spent on these activities, allowing us to reconcile differences between previous measures of oversight. We observe that when the definition of oversight is limited to non-value added external monitoring, the extent of burden is on the order of 6% of total time spent on work performed. However, when the definition of oversight includes both externally driven burden and the government-support infrastructure internal to the contractor, the burden ranges from 1.2 to 1.6 times. In addition, we use this data to test widely held beliefs about the impact of oversight on daily contractor work. Specifically, we found that the particular customers who are generally perceived to drive oversight-related burden actually have a small impact on resultant work time; but they drive more non-value-added requests than others. Additionally, while communications and administrative tasks are perceived as the main content of oversight-driven work, most of the time spent on these tasks was not driven by oversight. Implications of these findings for how the acquisition process can be improved are discussed.

### 1. Introduction

Oversight activities permit the government customer to evaluate the performance of contractors developing complex aerospace systems on their behalf [1]. In the United States, oversight manifests through the rules themselves and the procedures put in place to ensure implementation of those rules. The rules consist of the Federal Acquisition Regulations (FAR), each agency's specific acquisition rules, and contract structures that govern the relationship between the government and its hired contractors. Oversight as the implementation of rules includes monitoring activities that enable the government to know what its contractors are doing. These activities consist of audits, meetings, reports, and other required activities that contractors must perform in addition to the work they would normally do for a non-government, commercial customer. In the broadest sense, oversight can also be thought to include its second order effects – the suite of internal processes, procedures and business systems that contractors have evolved to accommodate their ongoing relationship with the government customer.

While it is generally acknowledged that monitoring activities are necessary for ensuring the success of high-risk programs by double-checking important budget, schedule, and technical work performed on a program, the act of performing these activities can result in additional program costs. These activities, while intended to mitigate risks, can be extremely detail oriented and require time to complete. They often involve a large number of stakeholders, long acquisition timelines, and extensive review processes leading stakeholders to believe that monitoring activities take a significant amount of time away from program execution tasks. [2,3] These two perspectives – that monitoring activities are costly but necessary and that monitoring activities impose extra, unnecessary burden – are the source of much debate among acquisition stakeholders. These perspectives lead stakeholders to discuss what the appropriate role of government should be in contracting for goods and services from the government. While some stakeholders argue for high levels of oversight, others argue that the government should be willing to take more risks with less oversight in order to save costs.

Part of the reason for unresolved debate is the lack of clear evidence

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to substantiate the claims on either side. Previous assessments of the burden of oversight have reported varied results on the impact of regulations and oversight on acquisitions, ranging from 2% to a factor of 5 times [3–5]. The wide range of estimates of the burden of oversight can be partially attributed to measurement challenges, but we contend, that an important aspect is variations in the boundary of the phenomenon being measured. In terms of measurement issues, many of these estimates are based on subjective assessments of the time spent on oversight or expert opinions that compare the cost of Department of Defense (DoD) products to similarly available commercial alternatives. [4,6,7] These types of retrospective assessments, however, tend to overestimate or underestimate positive memories [8–10]. As a result, the extent of oversight's burden could be overstated or understated based on an individual's memory [8,9]. With regards to the phenomenon being measured, the different estimates are based on implicit definitions of oversight – each emphasizing different parts of the process [3]. Since each study measures oversight with a different definition, the scope of oversight's burden greatly varies.

While many studies exist documenting the cost growth of national security space programs, few have focused on the burden of oversight on space system acquisition. Most studies have reported on the cost growth of space systems by comparing costs of programs from selected acquisitions reports to previous years' costs rather than assessing the impact of different rules and regulations [2,11,12]. For instance, in examining the impact of oversight cost in the aerospace sector, the United States Air Force (USAF) has claimed that mission assurance (a type of monitoring activity that enables verification and validation of technical analyses) costs approximately 2–5% of a total product's cost [13]. Other industry scholars have focused on the full extent of mission assurance and all FAR related requirements, stating that complying with all rules and regulations increase the cost of national security space programs by factors of 3–5 times more than commercial space systems [5].

As a result of the limited data available to assess oversight's burden on space acquisition, many beliefs about the scope and nature of the burden of oversight have been promulgated. For example, at the working level, there is a strong sense that oversight-related work constitutes a significant portion of the time spent at work. In recent interviews with aerospace contractor employees, one engineering interviewee reported spending 90% of his work related time on oversight requests. This represents a high estimate of interviewees' experiences, but it illustrates the sentiment that oversight-related work constitutes a significant portion of daily work. Another widely held belief is that Federally Funded Research and Development Centers (FFRDCs) and Systems Engineering and Technical Assistant companies (SETAs) play a disproportionate role in driving extra, unnecessary work. As one engineer recently explained, “I'd say we're spending a good part of our work, at least 20% of our time, just supporting the FFRDCs and SETAs.” A third belief is that the burdensome part of oversight manifests as communications and administrative related tasks. When asked to explain how oversight showed up in his daily work, one engineer stated that the time spent on these tasks adds up through “the things you have to redo and the meetings you have to support, the phone calls you have to take.” Another interviewee stated, “I spend most of my time talking to [the customer]. They don't have the background, hardware background, so there are always questions about hardware.”

What can be done to ensure that oversight, as implemented, achieves the necessary objective of monitoring government funded activities without imposing unnecessary, extra burden on the contractors that are performing the work? Before reasoned action can be taken, there is a need for a better, more balanced, empirically valid understanding of how oversight actually manifests at the working level. To that end, this paper leverages the real-time experience/work sampling method to measure the time-impact of monitoring activities on engineering work [14]. We use this data to reconcile the many definitions of oversight that focus on different parts of the process.

Specifically, we show how oversight is inconsistently being defined as parts of external monitoring, internal monitoring, or a combination of the two. As a result, our data can be compared to the results of other studies on common ground by measuring similar phenomena. This data is then used to assess the validity of the kind of beliefs described above. Rather than implying that oversight is unnecessary or that the costs of these activities exceed their benefits, our intent is to provide the data needed for productive debate.

## 2. Past assessments of the burden of oversight

There are numerous studies covering various aspects of oversight, yet few studies have been conducted to isolate its burden. These oversight-related studies have been characterized by scholars into four categories: qualitative, congressional panels/studies looking at regulations resulting in the consolidation of the defense industrial base; studies recommending the use of commercially available alternatives and projected cost savings; studies focused on delays associated with program deliverables when complying with DoD rules/regulations; and studies focused on contractor compliance costs when adhering to DoD rules/regulations. [3,4]. Those studies which fall in the last category are the most similar to our work. In this section, we review two of the publically available studies isolating the burden of oversight, highlighting how they inform the present study (detailed in the methods section).

The 1994 study entitled *The DoD Regulatory Cost Premium: A Quantitative Assessment*, conducted by Coopers and Lybrand and TASC, conducted a study to measure the cost premium associated with the DoD regulatory environment. It collected data from 10 contractor sites, focusing specifically on the impact of 130 DoD regulations [6]. These sites were chosen in consultation with DoD and represented a range of facility sizes, locations, defense industry sectors, and commercial industry customers. The Coopers and Lybrand team evaluated the direct, value-added costs associated with regulatory compliance using activity based costing. These value-added costs are equal to the total costs excluding material purchases, profits, and corporate general and administrative allocations. Using each company's 1994 budget estimates, the researchers developed a cost model that indicated all of the activities performed at each facility to determine the company's value-added costs. The researchers then performed in-depth interviews with executives, managers, and key workers to estimate the cost of each activity if commercial-like practices were used instead of DoD's regulations and oversight. The comparison of these two costs – the value-added commercial like activity costs and the budgeted value-added FY94 activity costs – were used to determine the cost burden of DoD regulations. The researchers found that across the 10 facilities, compliance with DoD regulations add a cost burden of 18 percent to the value-added costs of similar commercial products [6].

The Coopers and Lybrand study made a significant contribution to acquisitions reform research by empirically quantifying the burden of oversight. Similar to our work, they specifically focused on the impact of oversight on contractors at managerial and working levels. Coopers and Lybrand's study has been criticized for some methodological limitations. Specifically, they have been criticized for using subjective opinions to compare the cost of defense products to commercially available alternatives [3]. In addition, the experts used had limited experience with comparable commercial products. As a result, these experts could have overestimated or underestimated the costs associated with complying with oversight rules and regulations. In addition, the Coopers and Lybrand study has been criticized for only looking at the costs associated with oversight rather than acknowledging the benefits of oversight [15,16].

The RAND Corporation published a study in 2007 entitled *Measuring the Statutory and Regulatory Constraints on Department of Defense Acquisition*. The goal of this study was to quantify the effects of certain statutes or regulations on specific weapons systems programs at the

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