

Special Feature

An e-RA is an online, real-time, dynamic auction between a buying organization and a group of suppliers who compete against each other to win the business.

Perhaps no other term has invaded the vernacular and imagination of today's maintenance community more than *high velocity*. The very idea of accelerating processes and pushing aircraft through maintenance activities is at the heart of many of the key initiatives that are in work today.

Thinking about logistics

Electronic Reverse Auctions—Removing Barriers to Unleash Savings in Federal Procurement

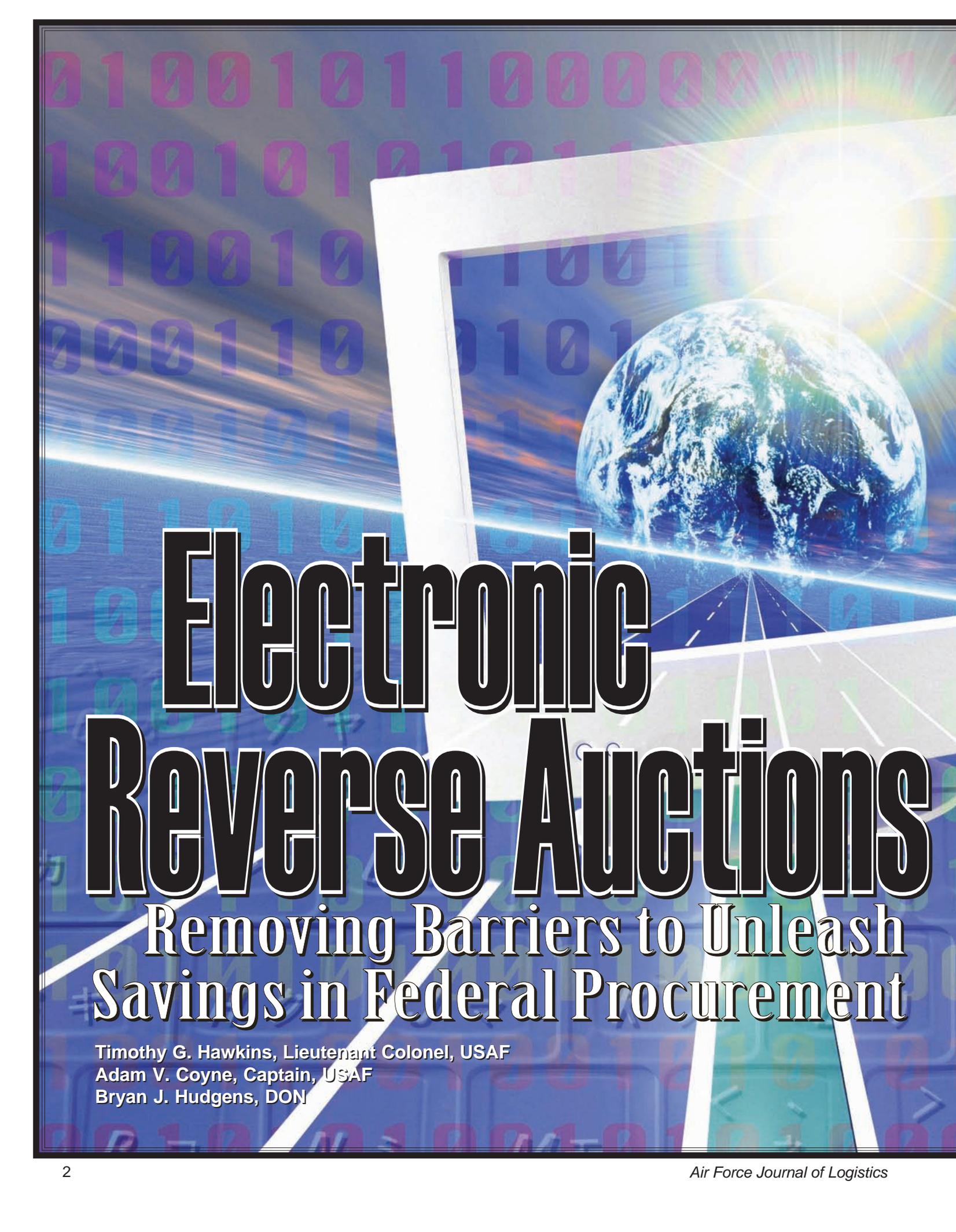
High-Velocity Maintenance—Air Force Organic PDM: Assessing Backshop Priorities and Support

This edition of the Journal presents two featured articles: “Electronic Reverse Auctions—Removing Barriers to Unleash Savings in Federal Procurement” and “High-Velocity Maintenance—Air Force Organic PDM: Assessing Backshop Priorities and Support.”

In “Electronic Reverse Auctions—Removing Barriers to Unleash Savings in Federal Procurement,” the authors present a case study that explores the first and only electronic reverse auction (e-RA) conducted by the United States Air Force in Kuwait and addresses gaps in e-RA application within the Department of Defense (DoD). The research examines procedures DoD contracting officers could follow to use e-RAs for stateside and contingency procurements—and expected savings from doing so. A spend analysis of fiscal years 2007 and 2008 Air Force

procurement transactions, extrapolated across the DoD, suggests the DoD is leaving billions of dollars on the table by not using e-RAs. Drawing on the results, implications for practice and recommendations are made at the conclusion of the article.

The second featured article examines high-velocity maintenance and its implementation at the depot level. Major Branson notes that there is one primary factor affecting proper execution of aircraft programmed depot maintenance orchestrated under the high-velocity maintenance (HVM) construct—scheduling chaos. The capacity to overcome unforeseen maintenance requirements is critical for HVM as the compressed time line makes such occurrences much more acute. Branson makes the point that, given the rigidity resident in the HVM process, the capacity to address such events may reside within the depot's supporting backshops.



Electronic Reverse Auctions

Removing Barriers to Unleash
Savings in Federal Procurement

Timothy G. Hawkins, Lieutenant Colonel, USAF

Adam V. Coyne, Captain, USAF

Bryan J. Hudgens, DON



Introduction

On 17 March 2008 members of a contracting unit in Kuwait conducted an electronic reverse auction (e-RA) for the procurement and installation of 29 power generators. Over the course of 278 bids, five suppliers competed for nearly four hours before reaching the final price of \$1,588,000. Shortly thereafter, the supplier submitting the lowest-priced, technically acceptable (LPTA) quote received the award in accordance with *Federal Acquisition Regulation (FAR) Parts 12, Acquisition of Commercial Items* and 13, *Simplified Acquisition Procedures* and the stated evaluation criteria. Savings totaled \$395,000—a 19.9 percent savings from the lowest initial bid price prior to the start of the auction. Contracting personnel were praised by the media for their innovative approach and by their military commanders in performance reports.¹

**Special
Feature**

An e-RA is “an online, real-time, dynamic auction between a buying organization and a group of... suppliers who compete against each other to win the business.”² Electronic reverse auctions essentially work “like eBay in reverse”³ with multiple suppliers bidding down the amount they will charge a buyer for providing a good or service. The business case for e-RAs is compelling. Studies show buyers can typically save 5 to 40 percent (with an average of 20 percent) on the cost of goods and services they procure by allowing multiple bids per offeror, versus the typical one shot (or limited exchanges) currently used in government contracting.^{4,5} This is important because, on average, manufacturing firms spend 55 percent of their revenue on goods and services.⁶ Other benefits include the reduction of award cycle-time by up to 40 percent, increased bidding transparency, and higher price visibility.^{7,8} Given these savings, it is no surprise that 31 percent of firms reported using e-RAs as one tool in their mix of strategic sourcing strategies and the trend is growing.^{9,10}

In early 2000, the Department of Defense (DoD) took note of e-RA savings, investigated whether e-RAs conflict with regulations or laws governing federal acquisitions, and concluded that no regulatory or statutory conflicts precluded e-RA use.¹¹ Initial success prompted the Navy and Army to develop e-RA applications and policy in order to leverage industry for commercially-available, low-dollar commodities. The Air Force, however, took a different approach in 2001 by: (1) acknowledging e-RAs as a pricing tool and (2) decentralizing its use as a judgment call by individual contracting officers (CO) without providing training.¹² Consequently, Air Force COs, already burdened by the operational tempo in Iraq and Afghanistan and downsizing, rarely used e-RAs in procurements.¹³ However, other federal agencies often employed e-RAs and saved millions of dollars while exceeding socioeconomic goals.¹⁴ The variance in policy and leadership support for e-RAs suggests that the tool may be underutilized.

The purpose of our study and this article is to explore e-RA use within the federal government as a strategic sourcing tool. First, using spend analysis, we confirm the underutilization of e-RAs. Next, using the e-RA for generators as a case study, we explore how the government can integrate e-RAs into its source

Article Highlights

The DoD is failing to achieve maximum savings by limiting e-RA use to simplified, low-dollar acquisitions. Substantially greater savings are obtainable through strategically identifying goods or services in large volume in order to maximize economies of scale.

“Electronic Reverse Auctions—Removing Barriers to Unleash Savings in Federal Procurement” explores electronic reverse auction (e-RA) use within the federal government as a strategic sourcing tool. The authors, using spend analysis for fiscal years 2007 and 2008, confirm the underutilization of e-RAs. Next, using an e-RA for generators (the first and only reverse auction conducted by the Air Force in Kuwait) as a case study, they examine and explain how the government can integrate e-RAs into its source selections while easing the learning curve for individual contracting officers, maximizing e-RA use where appropriate, and saving substantial taxpayer dollars.

According to the authors’ data analysis, the Air Force and Department of Defense (DoD) are leaving billions of dollars worth of savings on the table each year by not using e-RAs strategically. Analyzing spend data using two methods provides a range of potential savings of \$2.59B to \$25.35B for Air Force spend and \$11.9B to \$117B for the DoD. Even by using a more conservative benchmark, the DoD and its agencies are clearly underutilizing e-RAs. Thus, paradoxically, the government is opting out of opportunities for substantial savings at the same time it is seeking contract spend reductions of 7 percent.

The authors make the following recommendations.

- Add e-RA data collection to contract action reports and to Federal Procurement Data System—Next Generation. Capture that an e-RA was used, whether it encompassed an evaluation of nonprice factors, and savings from the independent government estimate.
- The Air Force should set goals for use and routinely track progress toward goals. Research indicates a top-down implementation approach to e-RAs is more effective than a bottom-up approach in minimizing

selections, thereby: (1) easing the learning curve for individual COs, (2) maximizing e-RA use where appropriate, and (3) saving substantial taxpayer dollars.

Congressional and executive agencies criticized the DoD for failing to take a strategic approach to improve DoD acquisition.¹⁵ In 2003, the General Accountability Office called for “high level attention” to transform DoD’s acquisition of commercial goods and services. According to the report, the broad scope of this effort should reduce purchasing costs through a more strategic approach using commercial best practices.¹⁶ The Office of Federal Procurement Policy (OFPP) also weighed in, citing e-RAs as an industry “best practice” that maximizes competition and serves as a model to maximize DoD’s return on investment.¹⁷ This call for reform echoed earlier guidance from the Office of the Under Secretary of Defense, Acquisition, Technology and Logistics (USD/AT&L) to improve acquisition by “apply[ing] appropriate commercial best practices, [using] appropriate contracting techniques and approaches, and enhanc[ing] training” in order to “improve the effectiveness of DoD contract management.”¹⁸ Given the backdrop of business transformation and strategic sourcing, the memo suggests e-RA is one “commercial best practice” that can answer these calls for action.¹⁹ Our research facilitates agencies meeting these calls for action by providing FAR-compliant processes explaining how to integrate e-RAs into source selections, a spend analysis that highlights potential savings from e-RA use, and a comprehensive heuristic for COs to use to determine whether an e-RA is suitable for sourcing a given requirement.

Electronic Reverse Auction Appropriateness

Electronic reverse auction appropriateness is defined as “the degree to which a sourcing professional views the use of an e-RA as a fit between the attributes of the tool, the specific requirement being sourced, and the supply market.”²⁰ By assessing e-RA appropriateness, researchers can identify the contextual circumstances where e-RA use is more likely to lead to success of the auction.²¹ Determinants of e-RA appropriateness include: specifiability, competition, leadership influence, a price-based selection criterion,²² type of spend, expected savings, and attractiveness (purchase volume and excess capacity).²³

Researchers point out that while price is an important factor for e-RA appropriateness, buyers can also evaluate nonprice factors (for example, delivery lead time, quality, and warranty) using a multi-attribute auction.²⁴ The ability to use both price-only and multi-attribute evaluations allows buyers to use e-RA for three of four types of spend. It excludes strategic spend, where the high criticality and high supply complexity of the requirement make partnerships and alliances more appropriate.²⁵ The other three spend categories that are appropriate for e-RA use include *noncritical* (low criticality, low supply complexity), *leverage* (high criticality, low supply complexity), and *bottleneck* (low criticality, high supply complexity).²⁶

Another reason for the recent interest in e-RA appropriateness is that academicians disagree on when e-RA use is appropriate and how the improper use of e-RAs may impact the buyer-seller relationship. The concern is whether short-term savings outweigh potential long-term consequences. Some view e-RAs as a technology-assisted, power-based bargaining technique that creates distrust and invites retaliatory pricing or fails to account for the total ownership cost.²⁷ Others fear long-term buyer-

Article Highlights

supplier relationship erosion²⁸ because some suppliers feel buyers use the tool opportunistically²⁹ to squeeze supplier profit margins and overhead to a breaking point.³⁰ Because of this effect, some suppliers indicate an inclination to retaliate by seeking post-award changes or by quality shirking in order to *get well*. While these arguments are compelling, very little empirical research finds evidence to support a causal link to relationship³¹ or performance degradation.³² In the focal case study, two no-cost modifications were negotiated, the contractor completed the work on time, and the government was satisfied with the contractor's work. Nonetheless, it may be prudent for buyers to avoid using e-RAs where many post-award changes are anticipated.

Identifying Good e-RA Candidates

The e-RA appropriateness model (EAM) shown in Figure 1 should help buyers determine whether to use an e-RA to source a given requirement. Increased appropriateness should increase the odds of achieving positive outcomes such as significant savings.³³ The EAM is broken down into a series of questions in three distinct phases. Affirmative responses to each question suggest that the acquisition is suitable for sourcing via e-RA. Most questions are self-explanatory; however, two require elaboration.

If You Have a Transaction Cost Associated with e-RA Use, Will Your Estimated Savings Exceed Your Transaction Costs?

Using a potential 20 percent savings, estimate how much savings your organization stands to achieve by using an e-RA. In general, larger volumes and values increase attractiveness, which leads to increased competition and higher savings. Finally, many e-RA service providers charge a fee ranging from 1 percent to 10 percent of the estimated value of the procurement, depending on the level of service needed and their business model. Typical business models of e-RA service providers include the following.

- **Winning seller pays a per-transaction fee (percent of pre-auction estimated value of procurement).** The e-RA service provider assists with market research, builds the e-RA in the software, trains bidders, and runs the e-RA bidding event (full service option).
- **Buyer pays a per-transaction fee (percent of pre-auction estimated value of procurement).** The e-RA service provider helps with market research, builds the e-RA, trains bidders, and runs the e-RA (full service option).
- **Software-only option.** The buyer acquires a license to use e-RA software, builds each auction, and conducts e-RAs in-house. Here, the buyer must provide training to bidders and conduct all market research.
- **Outsourced option.** The buyer contracts with an e-RA service provider for a fixed price per time period (or for an estimated number of e-RA events). For each requirement the e-RA service provider helps with market research, builds the e-RAs, trains bidders, and runs the e-RA bidding events during this time period.

Are Third Party e-RA Service Providers Available?

Table 1 shows some of the e-RA service providers. Note that providers offer varying levels of service ranging from software only to full service. A unit with a complex requirement and limited time or resources to conduct market research could benefit from the assistance of a full-service provider. The first business model above

resistance from other functional areas in the organization.

- Electronic reverse auctions use should be evaluated by the Defense Contract Management Agency when conducting contractor purchasing system reviews to ensure contractors are securing fair and reasonable prices from subcontractors. Firms outsource most of their revenue to suppliers. If prime contractors are not maximizing e-RA use, then prices (ultimately passed on to the US government) are likely higher than they could be. While e-RAs force contractors to squeeze profit margins, they also force suppliers to become more efficient by reducing their operating costs.
- Each military department and each civilian agency should build the supporting structure to support e-RA use. This includes establishing an e-RA center of excellence (as is common in industry), developing and deploying e-RA training to include a DoD guide, communicating the availability of e-RA software, incorporate e-RA training through the *Defense Acquisition Workforce Improvement Act* certification process, and motivating e-RA use with incentives (promotion, recognition, future budgets). Implementing these changes should assist federal government agencies in reaping the full benefits of e-RAs.

Article Acronyms

CAPS – Center for Advanced Purchasing Studies
CECOM – Army Communication-Electronics Command
CLIN – Contract Line Item Number
CO – Contracting Officer
DIBBS – DLA-BSM Internet Bid Board System
DoD – Department of Defense
DSCC – Defense Supply Center-Columbus
EAM – e-RA Appropriateness Model
e-RA – Electronic Reverse Auction
FAR – Federal Acquisition Regulation
FPDS-NG – Federal Procurement Data System–Next Generation
FPR – Final Proposal Revision
FY – Fiscal Year
GSA – General Services Administration
LPTA – Lowest-Priced, Technically Acceptable
OFPP – Office of Federal Procurement Policy
SAP – Simplified Acquisition Procedures
SSA – Source Selection Authority

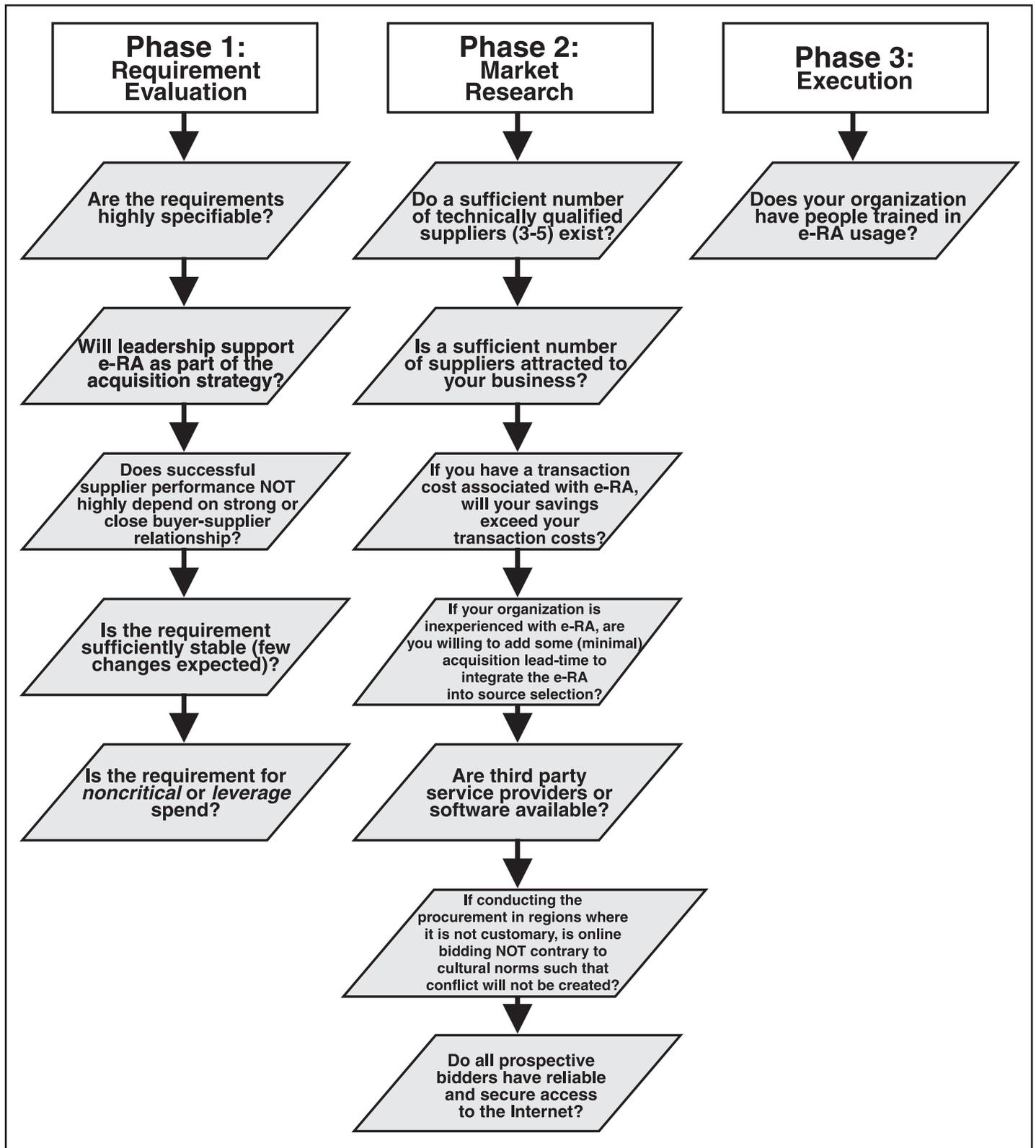


Figure 1. e-RA Appropriateness Model (EAM)

offers convenience and speed to the buyer because funding and contracting for e-RA support is not necessary. For more seasoned e-RA users, the Army Communication-Electronics Command's (CECOM) no-cost software or Ariba's sourcing tool (also no cost) might suit their needs better because experienced, available in-house COs will have the requisite knowledge to build the e-RA, conduct market research to find and build interest in the supply base, train offerors on use of the tool, and conduct the bidding event.

DoD's Use of e-RAs

Attracted by success in the commercial sector, the US Navy launched the first federal e-RA with the assistance of a third party, commercial e-RA provider in May 2000. That same month, CECOM launched two e-RA events of its own. The results were compelling. The Navy saved 28 percent, totaling \$830,000, while CECOM netted savings of 20 percent and 50 percent respectively.³⁴ In September 2000, the General Services Administration (GSA) launched an e-RA platform of its own called Buyers.gov. Over the following three months, 212 events were conducted, with one buy saving \$2.2M on a procurement valued at \$10M.³⁵ Around this same time period, the Defense Supply Center-Columbus (DSCC) launched its own e-RA application called DLA-BSM Internet Bid Board System (DIBBS) to target acquisitions less than \$25,000. Besides the typical 20 percent cost savings,³⁶ DSCC officials observed an 84 percent lead-time reduction—from 87 days to just 14.³⁷ By August 2000, DIBBS awards exceeded 4,500 contracts.³⁸ Currently, both CECOM and the Navy offer e-RA services to their commands. Table 2 shows how civilian agencies have experimented with e-RA use as well.

Despite cost and cycle-time savings available from e-RAs, the DoD has not set uniform e-RA policy, goals, or metrics despite pressure from executive and congressional leadership to reduce costs through strategic sourcing and commercial best practices.³⁹ While e-RA use differs across the military services,⁴⁰ the spend analysis that follows shows that use substantially lags opportunity. Since 2000, the US Army has conducted 10,913 auctions, with a total savings of \$100.7M. In contrast, data from FedBid

Provider	Email	Phone Nbr	Web Site	Level of Service
Ariba*	Contact Us Form	1-650-390-1000	www.ariba.com	Full Service
ChemConnect	Customer-service@chemconnect.com	1-832-789-9619	www.chemconnect.com	Full Service
Exostar	Saleslead@exostar.com	1-703-561-0500	www.exostar.com	Full Service
FedBid	ClientServices@FedBid.com	1-877-933-3243	www.FedBid.com	Full Service
HedgeHog	sales@hedgehog.com	1-800-208-2335	www.hegdehog.com	Full Service
iASTA	support@iasta.com	1-317-594-8600	www.iasta.com	Full Service
OnDemand Sourcing	sales@ondemandsourcing.com	1-412-454-5550	www.ondemand sourcing.com	Full Service
Perfect Commerce	insight@perfect.com	1-877-871-3788	www.perfect.com	Full Service
Sorcity	ContactUs@sorcitey.com	1-800-525-2401	www.sorcitey.com	Full Service
USAAVE (US Army)	Links to help desk are on website	1-732-427-1633	https://usave.monmouth.army.mil	Software Only

*Ariba's e-RA application (self-service) is available to Federal agencies for no fee under a government contract through NAVICP Mechanicsburg and DLA (DSCP). Contact Judith Flores at DSCP (215-737-3865) to establish a user account.

Table 1. e-RA Providers

Agency	e-RA Count	Target Price	Award Price	Savings (\$)	Savings (%)
DHHS	160	\$8,702,910	\$7,303,318	\$1,399,592	16.10%
DHS	1,789	\$256,627,681	\$235,435,869	\$21,191,811	8.30%
DOC	67	\$4,613,605	\$4,239,962	\$373,643	8.10%
DOE	17	\$368,776	\$343,954	\$24,822	6.70%
DOJ	192	\$14,156,306	\$12,791,797	\$1,364,509	9.60%
DOS	1,590	\$140,986,334	\$125,547,482	\$15,438,852	11.00%
DOT	17	\$2,408,938	\$2,261,472	\$147,465	6.10%
EPA	173	\$4,279,334	\$4,004,659	\$274,675	6.40%
GSA	283	\$33,074,838	\$30,767,155	\$2,307,683	7.00%
IAGC	216	\$14,071,487	\$12,506,986	\$1,564,501	11.10%
NASA	31	\$565,439	\$492,625	\$72,814	12.90%
SSA	20	\$895,335	\$841,087	\$54,248	6.10%
TREAS	131	\$7,141,771	\$6,535,051	\$606,720	8.50%
VA	127	\$2,701,748	\$2,392,352	\$309,396	11.50%

Note: Figures denote e-RA usage through FedBid only.

Table 2. Other Agencies Using e-RAs

and Sorcity indicates the Air Force has conducted approximately 315, with a total savings of \$5.4M. These numbers suggest the Air Force is leaving considerable money on the table by not using more e-RAs.⁴¹ However, nearly all of the 315 transactions were initiated and conducted by the GSA on behalf of the Air Force. While the scope of this research does not include an explanation of the seemingly low diffusion rate, probable barriers to implementation include a high operational tempo since 9/11, a lack of leadership emphasis, a lack of policy or guidance, a lack of training, a lack of e-RA awareness, structural barriers (such as lack of or unknown access to e-RA service providers and their e-RA software applications), perceived risk of bid protests, the DoD's lack of accountability for minimizing total ownership costs, and the prioritization of transforming procurement structures for strategic sourcing—efforts that have netted the Air Force \$98M in cost avoidance in fiscal year (FY07).⁴² Nonetheless, with such a need for cost savings, it is puzzling why a commercially mature capability like e-RA with such a substantial potential for tangible savings, and with pockets of demonstrated success, has not been pushed harder at the agency level.

Methodology

We followed Yin's case study methodology to examine the e-RA used to source generators in Kuwait.⁴³ We also adopted recognized procedures for conducting a spend analysis.⁴⁴ According to Yin,⁴⁵ a case study methodology is appropriate when three conditions exist.

- The type of research question is exploratory in nature and takes the form of a *what* question.
- The researcher has no control of the behavioral events being researched (cannot manipulate behaviors then measure results as in a controlled experiment).
- The focus is on contemporary events.⁴⁶

Our research met all three of these criteria. A qualitative research design best answers: what lessons from this case may be leveraged for further e-RA use by the DoD?

The research design required us to conduct interviews with Air Force and Army procurement officials outside of the event; gather and analyze spend data; and gather regulatory, policy, and procedural information surrounding federal procurement and e-RA use and training throughout the DoD. Qualitative research combines a number of different data collection methods including archives, interviews, and questionnaires.⁴⁷ We conducted 14 interviews, and recorded and transcribed each. To ensure validity, we sent transcripts to each informant to verify their accuracy—no exceptions were noted. Informants included the contingency contracting officer, three of the bidders, one prospective subcontractor, one nonbidder, two project engineers, a staff officer from Headquarters Air Forces Central, a member of CECOM, and two e-RA service providers. We conducted follow-on interviews with two bidders in order to verify initial ideas.

We also collected archival data to include 58 e-mails; 17 contractual documents; Air Force FY07 and 08 spend data; top-level FY01 to 06 Air Force spend data; policy memos; Army, Navy, and Air Force e-RA spend data; and trend data from e-RA providers on e-RA use. The data was used to construct and validate the EAM and to understand how the e-RA was integrated into a best-value source selection.

Spend Analysis

We conducted a spend analysis to identify areas of spend that are appropriate for sourcing via e-RA, then to forecast potential savings. Our methodology entailed the following.

- Obtained Air Force spend data for FY07 and 08.
- Sorted Air Force spend data to remove categories that were not appropriate for e-RA use. Categories included all research and development (typically is not specifiable, is highly relational, and entails fluid requirements); all contract types other than firm-fixed price, fixed-price-with-economic-price-adjustment, and fixed-price-award-fee (indicators of low specifiability and fluid requirements); construction (highly susceptible to post-award changes); and all contracts not awarded under full and open competition.

From the preceding step, we estimated a typical percentage of total spend that was *auctionable* (appropriate) based on the FY07 and 08 data.

- Obtained FY01 to 09 Air Force and DoD procurement spend from the Federal Procurement Data System-Next Generation (FPDS-NG).
- Applied an average 20 percent savings to the *auctionable* (appropriate) portion of FY01 to 09 Air Force and DoD spend data.⁴⁸

In order to maximize objectivity, we used two very different approaches to identify a range of potential savings. Method one (above) filtered out inappropriate e-RA requirements and method two applied an industry benchmark of total spend typically sourced via e-RA. According to Monzcka et al., industry sources 2.58 percent of its total purchases using e-RAs.⁴⁹ A weakness of this report, however, is that it was based on a small sample size of 17 firms. Additionally, given the 4 percent response rate to their survey, its external validity is questionable. Using the two methods, the DoD's probable, appropriate usage of e-RAs can be expected to fall within this range.

Results

Spend Analysis

Method 1. Removing the contracts described above reduced FY07 spend from \$70.2B to \$17.7B, leaving 25.22 percent of total spend being deemed appropriate for e-RA sourcing. Applying the same methodology, we reduced the FY08 spend from \$63.6B to \$16.9B, or 25.13 percent of total spend being deemed appropriate for e-RA sourcing. We then averaged both percentages to reach a two-year average e-RA appropriate spend as a percentage of total spend (25.18 percent). According to this method, on average, 25.18 percent of the total Air Force spend could be awarded using e-RAs. We then applied the two-year average to FY01 to 09 to calculate an annual amount of spend appropriate for e-RA sourcing. Finally, we applied an industry average savings of 20 percent to the e-RA appropriate total for each year, leaving a potential Air Force savings of \$25.35B for FY01 to 09.⁵⁰

Method 2. Using the Center for Advanced Purchasing Studies (CAPS) benchmark (2.58 percent), we multiplied the total spend for each year by 2.58 percent to determine an amount appropriate for e-RA sourcing, which we label as *Method 2, e-RA Appropriate Spend*. Finally, we applied the industry average savings of 20

percent to the CAPS benchmark to determine a potential savings for the DoD, Air Force, Navy, and US Army for FY01 to FY09 (see Table 3). Taking the Air Force as an example, the potential \$2.59B savings are 12.88 times the actual combined Army, Navy, and FedBid savings of \$201M.

Taking the two methods together, we can conservatively conclude that the potential savings for the Air Force for FY01 to FY09 was between \$2.59B and \$25.35B, or between \$288M and \$2.82B per year.

For the DoD, the total savings using method one resulted in \$117B and \$11.9B for method 2. By providing a range from maximum auctionable spend (using spend analysis) to a conservative estimate (using an industry benchmark), the estimates sufficiently demonstrate a significant potential for savings using e-RAs (see Table 4).

FAR-Compliant e-RA Process

According to CECOM, there are several reasons COs are not using e-RAs for more complex, best value acquisitions (pursuant to either FAR Part 12/13 or FAR Part 15, *Contracting by Negotiation*).

First, simple auctions are easiest to set up and execute. Another reason is complexity, both on the side of the buyer and supplier. CECOM's US Army Auction and Valuation Engine platform has the capability to conduct multi-line auctions, as well as full trade-off auctions with nonprice factors, such as delivery schedule, warranty, and quality. To date, COs have steered away from the tool because it may be perceived that adding nonprice factors into an auction and the use of an algorithm to determine the winner may increase the chance of a bid protest. Finally, the lack of best-value e-RA experience among practitioners has resulted in a natural barrier to implementation. COs who want to incorporate e-RAs into best value acquisitions face a learning curve, perceived protest risk, and—at least initially—some added procurement lead time. For flowcharts covering other types of source selections, contact the lead author.

Therefore, we provide COs FAR-compliant

processes for most types of source selections ranging from simplified acquisitions to full trade-off procurements pursuant to FAR Part 15. These flowcharts should help reduce CO learning curves, minimize protest risk, and provide guidance for implementation by explaining the e-RA-specific tasks and how they integrate into a federal source selection. Figure 2 highlights extra steps COs will need to include in their acquisitions. The following discussion describes each additional step in more detail (shaded or partially shaded). Rather than address each model separately, we focus only on the simplified acquisition procedures Lowest-Price, Technically Acceptable (SAP: LPTA) model. This model has the greatest propensity for use, entails the assessment of nonprice factors, can be used with minimal additional steps, and uses streamlined procedures in accordance with FAR Part 13.

Step 1: Thoroughly Define Requirement. An e-RA adds value when bidders share a common understanding of the required supplies and services, and can bid it at a fixed price. Additionally, the requirement should be sufficiently determined to minimize post-award changes.

Fiscal Year	Contract Dollar Pool Available	Potential e-RA Appropriate Procurements (\$ Billions)	Potential Annual Savings @ 20%, Method 1	Potential e-RA Appropriate Procurements (\$ Billions) Using Benchmark Method	Potential Annual Savings @ 20%, Method 2
FY01	\$40,658,636,487	\$10,235,811,735.60	\$2,047,162,347	\$1,048,992,821	\$209,798,564
FY02	\$47,398,465,802	\$11,932,563,765.65	\$2,386,512,753	\$1,222,880,418	\$244,576,084
FY03	\$55,554,711,050	\$13,985,898,506.84	\$2,797,179,701	\$1,433,311,545	\$286,662,309
FY04	\$55,047,330,757	\$13,858,165,518.07	\$2,771,633,104	\$1,420,221,134	\$284,044,227
FY05	\$55,581,405,190	\$13,992,618,756.58	\$2,798,523,751	\$1,434,000,254	\$286,800,051
FY06	\$62,656,276,631	\$15,773,717,641.85	\$3,154,743,528	\$1,616,531,937	\$323,306,387
FY07	\$70,210,415,739	\$17,707,066,849.38	\$3,541,413,370	\$1,811,428,726	\$362,285,745
FY08	\$63,636,840,892	\$15,991,938,116.16	\$3,198,387,623	\$1,641,830,495	\$328,366,099
FY09	\$52,746,175,463	\$13,278,849,672.81	\$2,655,769,935	\$1,360,851,327	\$272,170,265
	Total \$ Available for e-RA Use (from FY01–FY09)	\$126,756,630,563	\$25,351,326,113		\$2,598,009,731
		FY07 e-RA Appropriate %	25.22%		
		FY08 e-RA Appropriate %	25.13%		
		AVG FY07/FY08 Appropriate %	25.18%		

Table 3. Air Force Spend Analysis FY01 – 09

Organization	Total Spend (from FY01–FY09)	e-RA Appropriate Spend (from FY01–FY09 at 25.18% of Total Spend)	Potential Savings (Method 1)	Potential Savings (Method 2)
CONUS Agency Level				
USAF	\$503,490,258,011	\$126,756,630,562	\$25,351,326,113	\$2,598,009,731
USA	\$788,479,482,606	\$197,030,573,008	\$35,279,475,857	\$3,645,645,373
USN	\$600,671,375,441	\$151,219,018,767	\$26,660,817,006	\$2,732,270,422
DoD	\$2,324,437,837,203	\$585,177,225,516	\$117,035,445,103	\$11,994,099,240

Table 4. DoD Spend Analysis

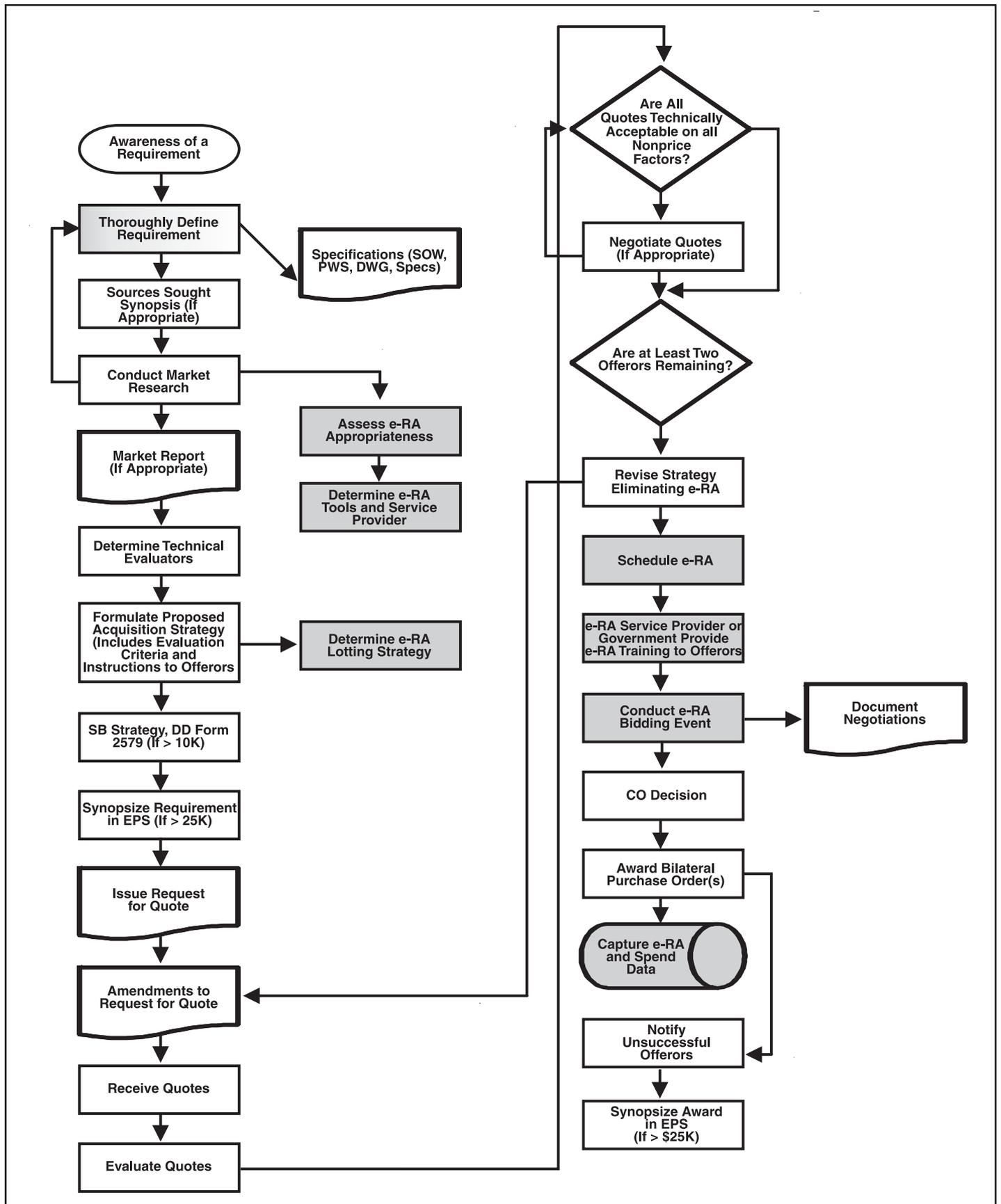


Figure 2. SAP: LPTA Process

Steps 2 and 3: Assess e-RA Appropriateness and Select e-RA Provider. Both of these steps were previously described.

Step 4: Determine e-RA Lotting Strategy. A lotting strategy, in general, allows a buyer to structure the e-RA in a manner for suppliers to efficiently bid on the requirement.⁵¹ It resembles a contract line item (CLIN) structure. For example, a buyer may have 500 line items of supplies to place on contract and, after market research, may determine that he or she can get maximum bidding at a better price if he or she divides them into five separate groups (CLINs or bid lots). This allows suppliers to bid in subcategories that are more suited to their market niche or area of expertise while not having to bid on all CLINs or bid lots. Sometimes, awarding multiple contracts will allow the buyer to achieve the lowest total price by *cherry picking* the lowest bid from each lot and awarding multiple contracts. The key, according to Sorcity, is to balance the buyers' needs to the suppliers' capabilities. Third party providers, like Sorcity, can help identify optimal lotting strategies based on their experience with e-RAs and their knowledge of cost drivers of the requirement and cost structures of the market. In the e-RA for generators, the squadron commander conducted initial market research and determined to use a single lot because there were sufficient distributors or resellers that could provide the entire lot and multiple awards were not practical.

Step 5: Schedule e-RA. COs should schedule the date for the e-RA after negotiations on nonprice factors have concluded because negotiation time is highly variable.

Step 6: e-RA Service Provider or Government Provide Training to Offerors. It is a good idea to provide offerors training on using the bidding software prior to the event. Most e-RA service providers offer training either through a tutorial, which can run mock auctions for practice, or through hands-on training. Buyers should ensure that each bidder understands the auctioning software, the auction duration, rules regarding overtime, and how to handle contingencies during the bidding. Levels of support vary; therefore, buyers who are new to e-RAs will need to either develop their own training or ensure the e-RA service provider can provide training.

Step 7: Conduct e-RA Bidding Event. Contingencies, such as Internet interruptions, should be considered during solicitation planning and be addressed in the instructions to offerors. Simple mechanisms, such as having the provider and buyer on telephone standby to be able to place and receive manual bids, pausing the auction, and providing real-time assistance can help overcome these hurdles. Improper handling of the auction itself could result in a protest; thus, buyers need to plan for the unexpected.

Step 8: Capture e-RA and Spend Data. Capturing spend data helps provide buyers an accurate, historical database of market prices for goods and services (compared to non-e-RA prices). It also provides data to senior strategic sourcing planners for analysis, reporting, planning, goal setting, and organizational improvement.

Integrating e-RAs Into Full Trade-Off Source Selections.

Electronic reverse auctions can be integrated into full trade-off source selections by using either SAP or formal procurements under FAR Part 15. There are three different means to do this. First, different e-RA service providers' auctioning applications

provide different functionality. Generally, many offer multi-attribute bidding where certain factors, such as price, delivery, and quality are assigned weights. These factors can be dynamically bid in real time where a composite score indicates the best value. Since these scores are mathematically derived, they violate some agencies' procurement policies (those that require qualitative ratings such as the Army and Air Force). While this method could be used with SAP, it would violate FAR Part 15 procedures. Therefore, it is not further discussed.

The second method entails the trade-off of predetermined levels of objective, nonprice factors and allows these varying performance levels to be bid dynamically during the e-RA. For example, a CO may need to assess the value of taking faster delivery or of acquiring higher quality. To do so would require a special construction of bid lots shown in Table 5. Essentially, the CO would need to build a bid lot (resembles a CLIN) for each possible combination of levels of nonprice factors—in this case delivery and quality. The solicitation would need to state the relative importance of price and nonprice factors. Assume for this example that, taken together, nonprice factors are as important as price. With the following lowest bids per offeror per bid lot taken from the e-RA, the source selection authority's (SSA) integrated assessment must consider these prices and performance levels.

This bid scenario from an e-RA-enhanced procurement poses no different challenge or process for the SSA than any other full trade-off source selection. The SSA must assess the value of higher performance levels traded off against price differentials (see Table 6). Here, the SSA may choose to go with basic performance levels awarding to offeror D for \$415,000, or award to offeror D for \$518,000 and take delivery 60 days sooner. Alternatively, if the benefit of an extra year of warranty coverage exceeds the added cost, the SSA may elect to pay a quality premium of \$81,000 and award to offeror C for \$496,000. If delivery and quality are valuable, the SSA may deem the best value is provided by offeror C who is the lowest with a 60-day delivery and 2-year warranty. As usual, the SSA would be constrained by the language of the solicitation as to the relative importance of price and nonprice factors and would need to justify the trade-offs. The benefits of executing this trade-off via an e-RA are the efficiency (speed and minimum effort) of negotiations in each lot (in each possible combination of performance levels) and the intense competition offered by e-RAs in each lot.

Using a third method, a CO could integrate an e-RA into a full trade-off source selection where objective performance levels and ratings are not possible. For example, if the government must (in order to manage risk) evaluate the offeror's experience or technical approach, subjective ratings are necessary. In this case, the source selection process would be nearly identical to that of a source selection not involving an e-RA. The only difference would be that after conducting all of the discussions necessary to allow offerors remaining in the competitive range to address weaknesses, risks, and deficiencies, the CO would then schedule and conduct the e-RA. It is important to note that by using an e-RA in this manner, the CO may not award without discussions. Successive bids in an e-RA held after receipt of proposals would constitute proposal revisions. Also, after the close of the e-RA, the CO must request and evaluate final proposal revisions (FPR), wherein the offeror could again alter its price—upward or

downward. If, in its FPR, the offeror makes no change to its price, the offeror's last bid price in the e-RA would be the evaluated price that would be traded off with nonprice factors in accordance with the best value provisions of the solicitation.

Conclusion

The federal government has much to gain by incorporating e-RAs into its source selections. However, caution must be exercised. This research aims to ease the learning curve for COs, helping to ensure e-RAs are used prudently and only for appropriate buys. First, we identify a potentially significant cost savings that the Air Force and DoD as a whole could obtain using

e-RAs. Second, we presented an EAM to assist COs in identifying requirements appropriate for e-RA sourcing. Finally, we provided a FAR-compliant process flowchart, which shows how to incorporate e-RA into federal procurements. Our process models indicate where e-RA-specific steps are needed and the elements in each step necessary to reduce protest risk and increase the effectiveness of the e-RA.

According to our data analysis, the Air Force and DoD are leaving billions of dollars worth of savings on the table each year by not using e-RAs strategically. Analyzing spend data using two methods provides a range of potential savings of \$2.59B to \$25.35B for Air Force spend and \$11.9B to \$117B for the DoD. Even by using a more conservative benchmark, the DoD and

its agencies are clearly underutilizing e-RAs.⁵² Thus, paradoxically, the government is opting out of opportunities for substantial savings at the same time it is seeking contract spend reductions of 7 percent.⁵³

Managerial Implications

First, the DoD is failing to achieve maximum savings by limiting e-RA use to simplified, low-dollar acquisitions. Substantially greater savings are obtainable through strategically identifying goods or services in large volume in order to maximize economies of scale. While focusing on simple commodities saves cycle time, our research indicates that contractors have more room to bargain with larger volumes.

Second, fair and reasonable prices, in many cases, are not being obtained where e-RAs are appropriate but not being used—by an average margin of 20 percent.⁵⁴ While fair to the seller, prices obtained without an e-RA are hardly fair to the buyer, and certainly not reasonable. For example, by obtaining at least two offers or quotes, COs declare their prices to be fair and reasonable; whereas, in reality, they may not be. “The mere presence of competition is inadequate to assure that the prices proposed are fair and reasonable.”⁵⁵ Additionally, COs and buying activities are not held accountable for obtaining optimal, fair, and reasonable prices or costs. While acquisition professionals must

Item*	Supplies/Services	Quantity	Unit	Unit Price	Total Amount
0001	Firm-Fixed Price. Deliver and install standby generators in accordance with the attached statement of work. FOB: Destination Delivery: 60 Days ARO. Warranty: 1 Yr	10	EA	\$_____	\$_____
0002	Firm-Fixed Price. Deliver and install standby generators in accordance with the attached statement of work. FOB: Destination Delivery: 90 Days ARO. Warranty: 1 Yr	10	EA	\$_____	\$_____
0003	Firm-Fixed Price. Deliver and install standby generators in accordance with the attached statement of work. FOB: Destination Delivery: 120 Days ARO. Warranty: 1 Yr	10	EA	\$_____	\$_____
0004	Firm-Fixed Price. Deliver and install standby generators in accordance with the attached statement of work. FOB: Destination Delivery: 60 Days ARO. Warranty: 2 Yrs	10	EA	\$_____	\$_____
0005	Firm-Fixed Price. Deliver and install standby generators in accordance with the attached statement of work. FOB: Destination Delivery: 90 Days ARO. Warranty: 2 Yrs	10	EA	\$_____	\$_____
0006	Firm-Fixed Price. Deliver and install standby generators in accordance with the attached statement of work. FOB: Destination Delivery: 120 Days ARO. Warranty: 2 Yrs	10	EA	\$_____	\$_____

*Note: The government will award only one of the bid lots above in accordance with the best value evaluation criteria stated in the solicitation.

Table 5. Bid Lots

secure the best value, this is a nebulous term.⁵⁶ It is true that more goes into value than price or cost alone. However, when industry procures the same or similar commercial items and services for substantially lower prices or costs using e-RAs, the government's best value determinations are, at best suspect, and at worst, erroneous.

Government buying activities are principally assessed by three metrics: contract award dollars, number of contracts awarded, and procurement lead time.⁵⁷ The *Government Performance Results Act of 1993* requires that organizations measure themselves against desired outcomes. Is price or cost performance not a desirable outcome?

Research of the many studies conducted by the Navy indicates that the hierarchy may not be interested in how efficient a contracting office performs. Instead, it appears that they are more interested in appeasing the interests of their many stakeholders.⁵⁸

In contrast, industry procurement activities are strictly held accountable for price and cost. Common metrics include:

1. Target prices—based on cost reduction goals, product and service budgets, and competitor prices;
2. Cost reduction (comparing actual prices paid in a current period to actual prices paid in a prior period);
3. Rate of actual price change to market index rate of change; [and]
4. Cost avoidance.⁵⁹ There is enormous waste in government procurements...[and] the problem is not the people, it is the processes being used.⁶⁰

Recommendations

The following recommendations provide a way forward. First, add e-RA data collection to contract action reports and to FPDS-NG. Capture that an e-RA was used, whether it encompassed an evaluation of nonprice factors, and savings from the independent government estimate. Second, the Air Force should set goals for use and routinely track progress toward goals. Research indicates a “top-down implementation approach to e-RAs is more effective than a bottom-up approach in minimizing resistance from other functional areas in the organization.”⁶¹ Third, e-RA use should be evaluated by the Defense Contract Management Agency when conducting contractor purchasing system reviews to ensure contractors are securing fair and reasonable prices from subcontractors. Firms outsource most of their revenue to suppliers. If prime contractors are not maximizing e-RA use, then prices (ultimately passed on to the US government) are likely higher than they could be. While e-RAs force contractors to squeeze profit margins, they also force suppliers to become more efficient by reducing their operating costs. Finally, each military department and each civilian agency should build the supporting structure to support e-RA use. This includes establishing an e-RA center of excellence (as is common in industry), developing and deploying e-RA training to include a DoD guide, communicating the availability of e-RA software, incorporating e-RA training through the *Defense Acquisition Workforce Improvement Act* certification process, and motivating e-RA use with incentives (promotion, recognition, future budgets). Implementing these changes should assist federal government agencies in reaping the full benefits of e-RAs.

Future Research

The following areas could provide added value to the DoD as a buying activity or to e-RA theory in general. First, explore why

Bid Lot 0001		Bid Lot 0002		Bid Lot 0003	
Del 60/Warr 1 Yr		Del 90/Warr 1 Yr		Del 120/Warr 1 Yr	
Offer	Price	Offer	Price	Offer	Price
D	\$518,000	D	\$423,000	D	\$415,000
B	\$526,000	B	\$441,000	B	\$441,000
A	\$533,000	C	\$452,000	C	\$452,000
C	\$534,100	A	\$455,000	A	\$453,000
Bid Lot 0004		Bid Lot 0005		Bid Lot 0006	
Del 60/Warr 2 Yr		Del 90/Warr 2 Yr		Del 120/Warr 2 Yr	
Offer	Price	Offer	Price	Offer	Price
C	\$589,400	C	\$496,000	C	\$496,000
D	\$602,300	D	\$513,000	D	\$525,000
B	\$610,000	A	\$527,000	A	\$539,000
A	\$619,000	B	\$540,000	B	\$540,000

Table 6. e-RA Results

the Air Force has lagged other Services in e-RA use. Very few e-RAs have been conducted by the Air Force while the other branches have conducted hundreds, saving over \$100M from 2000 to 2009. Researchers should explore the slow diffusion to understand better the structural barriers in place. Second, inaccurate and incomplete contract award data could be improved. During our CLIN-level analysis of FY07 and FY08 Air Force spend data, we discovered that it was not possible to accurately categorize and sort transactions into strategic *buckets* because the product service code or federal supply code data was either not entered at the CLIN level or contract writing systems are not capturing and importing the data into FPDS-NG and the Contracting Business Intelligence System. Additional research into the causes of low data fidelity could help strategic sourcing leadership conduct more accurate spend analyses.

Study Limitations

This research was not without limitations. First, the research was based on a single case study. Ideally, we would have preferred to compare responses from informants across multiple bidding events in order to increase the range, number, and depth of observations contained in the data—build credibility.⁶² Still, we made every effort to increase credibility by triangulating data and by including interviews of the entire logistic chain from end users to a second-tier supplier.⁶³ Another limitation was the methodology we used to conduct the spend analysis. Because of the inaccuracy of CLIN-level data from FPDS-NG, we had to conduct our data analysis at the contract level. This essentially meant that large cost-type contracts may have included smaller fixed-price CLINS that were appropriate for e-RA use, but were excluded from our analysis since it was all coded as cost reimbursement. Additionally, FY01 to 06 FPDS-NG data pulls were limited to total spend because contract-level data for the Air Force, Navy, and Army was not available or accurate prior to FY07. Finally, since we could not closely evaluate every transaction, and because of the aforementioned weaknesses in the data, undoubtedly some transactions that are truly

inappropriate for e-RA use were included in (and therefore inflated) the e-RA-appropriate percentage (25.18 percent).

Summary

While the e-RA is not appropriate for every transaction, our analysis indicates the DoD is leaving billions of dollars on the table by not incorporating it into larger acquisitions involving *noncritical* and *leverage* types of spend.⁶⁴ Put into perspective, using the most conservative method of analysis, the potential savings generated by e-RA use over the past nine years could have funded the following high priority platforms.

- Air Force: 65 RQ-1 Predators. Price: \$40M each⁶⁵
- Navy: 78 F-18 E/Fs. Price: \$35M each⁶⁶
- Army: 2,800 MRAPS II: RG-33s. Price: \$1.3M each⁶⁷

Our analysis sends an important message: An e-RA is a powerful tool that, if used appropriately, has the potential to increase transparency, competition, efficiency, and taxpayer savings. The tools provided herein are designed specifically to help COs overcome structural barriers including training, operational tempo, and a lack of e-RA policy and guidance. Specifically, our processes and models should help COs select appropriate requirements, contact e-RA service providers for assistance if necessary, and appropriately structure e-RAs for optimal savings, compliance with the FAR, and minimum risk. Finally, the DoD levied a \$100 billion savings goal over the next five years, and the federal government has a mandate from the Office of Management and Budget (OMB) to reduce contract spend by 7 percent by FY11.⁶⁸ Further, the OMB mandated that agencies must negotiate more favorably priced contracts, implying that the government contracts at other than fair and reasonable prices and costs. Electronic reverse auctions generate, on average, 20 percent savings.⁶⁹ What if an agency could reply, “I see your 7 percent, and raise you 13”?

Notes

1. J. McCree, “Innovative Idea Saves Nearly \$400,000,” *Air Force News*, July 2008, [Online] Available: <http://www.af.mil/news/story.asp?id=123094234>, accessed 15 October, 2008.
2. S. Beall, C. Carter, P. Carter, T. Germer, T. Hendrick, S. Jap, et al., *The Role of Reverse Auctions in Strategic Sourcing*, CAPS Research Report, 2003, [Online] Available: <http://www.capsresearch.org/publications/pdfs-public/beall2003es.pdf>, accessed 30 June, 2007.
3. FedBid, Inc, “FedBid Overview,” presentation at Naval Postgraduate School, Monterey, California, January 2009.
4. S. Tully, “The B2B Tool That Really Is Changing the World,” *Fortune*, Vol 141, No 6, 132–145.
5. L. Cohn, “B2B: The Hottest Net Bet Yet?” *Business Week*, 17 January 2000, 36–37.
6. R. Monczka, R. Trent, and R. Handfield, *Purchasing and Supply Chain Management*, 2^d ed, Cincinnati, Ohio: South-Western College Publishing, 2002.
7. S. Beall, et al., 2003.
8. R. W. Schrader, J. T. Schrader, and E. P. Eller, “Strategic Implications of Reverse Auctions,” *Journal of Business-to-Business Marketing*, Vol 11, No 1/2, 2004, 61–80.
A. Smart and A. Harrison, “Reverse Auctions as a Support Mechanism in Flexible Supply Chains,” *International Journal of Logistics: Research and Applications*, Vol 5, No 3, 2002, 275–284.
L. Kaufmann and C. R. Carter, “Deciding on the Mode of Negotiation: To Auction or Not to Auction Electronically,” *Journal of Supply Chain Management*, Vol 40, No 2, 2004, 15–26.
9. I. Amelinckx, S. Muylle, and A. Lievens, “Extending Electronic Sourcing Theory: An Exploratory Study of Electronic Reverse Auction Outcomes,” *Electronic Commerce Research & Applications*, Vol 7, No 1, 2008, 119–133.
10. T. G. Hawkins, M. J. Gravier, and C. M. Wittmann, “Enhancing Reverse Auction Use Theory: An Exploratory Study,” *Supply Chain Management: An International Journal*, Vol 15, 2010, 21–42. Author’s interview with Sorcity.com, 26 March 2009, retrieved 15 August 2009 from transcription.
11. W. E. Brown and L. B. Ray, “Electronic Reverse Auctions in the Federal Government,” graduate thesis, Naval Post Graduate School, Monterey, California, 2007.
Secretary of the Air Force, Acquisition (SAF/AQC), memorandum, subject: Reverse Auction (RA) Guidance, 2001.
S. Turley, *Wielding the Virtual Gavel—DoD Moves Forward With Reverse Auctions*, Washington, DC: Headquarters, Department of the Army, Under Secretary of Defense (USD AT&L), 2002.
12. Secretary of the Air Force, 2001.
S. Turley, 2002.
13. Commission on Army Acquisition and Program Management in Expeditionary Operations, *Urgent Reform Required: Army Expeditionary Contracting*, Gansler Commission Final Report, 31 October 2007, [Online] Available: www.army.mil/docs/Gansler_Commission_Report_Final_071031.pdf.
14. FedBid, Inc, January 2009.
15. Government Accounting Office (GAO), *Taking a Strategic Approach Could Improve the DoD’s Acquisition of Services*, Report Number GAO-02-230, Washington, DC, GAO, 2002.
16. Government Accounting Office (GAO), *High Level Attention Needed to Transform DoD Services Acquisition*, Report Number GAO-03-935, Washington, DC: GAO, 2003.
17. Office of Federal Procurement Policy (OFPP), memorandum, subject: Effective Practices for Enhancing Competition, 18 July 2008, [Online] Available: http://www.whitehouse.gov/omb/procurement/memo/enhancing_competition_071808.pdf, accessed 10 March 2009.
18. Under Secretary of Defense Acquisition Technology and Logistics (USD/AT&L), memorandum, subject: Government Accountability Officer High Risk Area of Contract Management, [Online] Available: <http://www.acq.osd.mil/dpap/policy/policyvault/2006-0104-DPAP.pdf>, accessed 15 January 2009.
19. *Ibid.*
20. T. G. Hawkins, W. S. Randall, and C. M. Wittmann, “An Empirical Examination of Reverse Auction Appropriateness in B2B Source Selection,” *Journal of Supply Chain Management*, Vol 45, No 4, October 2009, 55–71.
21. *Ibid.*
22. *Ibid.*
23. T. G. Hawkins, M. J. Gravier, and C. M. Wittmann, (forthcoming), “Enhancing Reverse Auction Use Theory: An Exploratory Study,” *Supply Chain Management: An International Journal*, Vol 15, No 1, 21–42.
24. T. G. Hawkins, W. S. Randall, and C. M. Wittmann, October 2009.
25. S. Beall, et al., 2003.
26. *Ibid.*
P. Kraljic, “Purchasing Must Become Supply Management,” *Harvard Business Review*, Vol 61, No 5, 1983, 109–117.
27. M. L. Emiliani, “Sourcing in the Global Aerospace Supply Chain Using Online Reverse Auctions,” *Industrial Marketing Management*, Vol 33, No 1, 2004, 65–72.
28. S. Jap, “Online Reverse Auctions: Issues, Themes, and Prospects for the Future,” *Journal of the Academy of Marketing Science*, Vol 7, No 1, 2002, 506–525.
S. Jap, “An Exploratory Study of the Introduction of Online Reverse Auctions,” *Journal of Marketing*, Vol 67, No 3, 2003, 96–107.
S. Jap, “The Impact of Online Reverse Auction Design on Buyer-Supplier Relationships,” *Journal of Marketing*, Vol 71, No 1, 146–159.
S. Jap and E. Haruvy, “Interorganizational Relationships and Bidding Behavior in Industrial Online Reverse Auctions,” *Journal of Marketing Research*, Vol 45, No 5, 2008, 550–561.
29. S. Jap, “An Exploratory Study of the Introduction of Online Reverse Auctions,” 2003.

30. S. M. Wagner and A. P. Schwab, "Setting the Stage for Successful Electronic Reverse Auctions," *Journal of Purchasing and Supply Management*, Vol 10, No 1, 2004, 11–26.
31. S. Jap, "The Impact of Online Reverse Auction Design on Buyer-Supplier Relationships," 2007.
32. T. Schoenherr and V. A. Mabert, "Online Reverse Auctions: Common Myths Versus Evolving Reality," *Business Horizons*, Vol 50, No 5, 373–384.
33. T. G. Hawkins, W. S. Randall, and C. M. Wittmann, October 2009.
34. Defense Acquisition University, Continuous Learning Module, CLC 031: Reverse Auctions, [Online] Available: <https://learn.dau.mil/html/clc/Clc.jsp>, accessed 15 February 2009.
35. S. Turley, *Wielding the Virtual Gavel—DoD Moves Forward With Reverse Auctions*, Washington, DC: Headquarters, Department of the Army, Under Secretary of Defense (USD AT&L), 2002.
36. L. Cohn, "B2B: The Hottest Net Bet Yet?" *Business Week*, 17 January 2000, 36–37.
37. S. Turley, 2002.
38. *Ibid.*
39. Office of Federal Procurement Policy (OFPP), 18 July 2008. Office of Management and Budget (OMB), memorandum, subject: Improving Government Acquisition, dated 29 July 2009, [Online] Available: http://www.whitehouse.gov/omb/assets/memoranda_fy2009/m-09-25.pdf, accessed 15 August 2009.
40. S. Turley, 2002.
41. J. McCree, "Innovative Idea Saves Nearly \$400,000," *Air Force News*, July 2008, [Online] Available: <http://www.af.mil/news/story.asp?id=123094234>, accessed 15 October 2008.
42. Government Accounting Office (GAO), *Air Force Operating and Support Cost Reductions Need Higher Priority*, Report Number GAO/NSIAD-00-165, Washington, DC: GAO, 2000. Air Force Contracting Fact Sheet 2008, *Strategic Sourcing* (data file), [Online] Available: [https://rso.my.af.mil/afknprod/Download/files/Strategic_Sourcing_Fact_Sheet_\(14Jul08\)_FINAL.pdf?DocID=3730210](https://rso.my.af.mil/afknprod/Download/files/Strategic_Sourcing_Fact_Sheet_(14Jul08)_FINAL.pdf?DocID=3730210), 2008.
43. R. K. Yin, *Case Study Research, Designs and Methods*, Thousand Oaks, California: Sage Publications, 2009.
44. Pandit, Kirit, and H. Marmanis, *Spend Analysis: The Window Into Strategic Sourcing*, Fort Lauderdale, Florida: J. Ross Publishers, 2008.
45. R. K. Yin, 2009.
46. *Ibid.*
47. K. M. Eisenhardt, "Building Theories from Case Study Research," *Academy of Management Review*, Vol 14, No 4, 1989, 532–550.
48. L. Cohn, January 2000.
49. R. Monczka, PhD, and K. J. Peterson, PhD, *Supply Strategy Implementation: Current State and Future Opportunities*, CAPS Research Report, 2008, 1–60.
50. L. Cohn, January 2000.
51. Author's interview with Sorcity.com, 26 March 2009, retrieved 15 August 2009 from transcription.
52. R. Monczka, PhD and K. J. Peterson, PhD, 2008.
53. Office of Management and Budget (OMB), 29 July 2009.
54. L. Cohn, January 2000.
55. J. Cibinic, Jr and R. C. Nash, Jr, *The Formation of Government Contracts*, 3rd ed, Washington, DC: George Washington University Law School, Government Contracts Program, 1998.
56. Federal Acquisition Regulation (FAR) 1.102-1, *Statement of Guiding Principles for the Federal Acquisition System*, [Online] Available: https://www.acquisition.gov/comp/seven_steps/library/FAR1-102.pdf.
57. J. Cavadias, "Contract Administration in a Performance-Based Acquisition Environment is Serious Business," *Defense Acquisition Review Journal*, 2004, 1–12.
58. Daniel O'Sullivan, "What Model Should Be Used to Evaluate the Efficiency and Effectiveness of a Field Contracting Office," graduate thesis, Naval Postgraduate School, Monterey, California, 2003.
59. P. L. Carter, R. M. Monczka, and T. Mosconi, *Strategic Performance Measurement for Purchasing and Supply*, CAPS Research Report, 17.
60. *Ibid.*
61. S. Beall, et al., 2003.
62. K. Charmaz, *Constructing Grounded Theory: A Practical Guide Through Qualitative Analysis*, Thousand Oaks, California: Sage Publications, Inc, 2006.
63. R. K. Yin, 2009.
64. P. Kraljic, "Purchasing Must Become Supply Management," *Harvard Business Review*, Vol 61, No 5, 1983, 109–117, [Online] Available: http://www.whitehouse.gov/omb/assets/memoranda_fy2009/m-09-25.pdf, accessed 15 August 2009.
65. Air Force Fact Sheet, *RQ-1 Predator Unmanned Aerial Vehicle* [data file], 2009, [Online] Available: <http://usmilitary.about.com/library/milinfo/affacts/blrq-1.htm>, accessed 15 September 2009.
66. United States Navy, *F/18A Description and Specification* [data file], 2009, [Online] Available: <http://usmilitary.about.com/library/weekly/b1102899-2.htm>, accessed 15 September 2009.
67. "RG-33 MRAP II," *Army Guide*, [Online] Available: <http://www.army-guide.com/eng/product.php?prodID=3551>, accessed 15 September 2009.
68. Office of Management and Budget (OMB), 29 July 2009.
69. L. Cohn, January 2000.

Lieutenant Colonel Timothy G. Hawkins, USAF, PhD, is an assistant professor at the Naval Postgraduate School in Monterey, California. He directs and teaches in the Strategic Purchasing program aimed at transforming military procurement. He has 17 years of sourcing experience in industry and government. Lieutenant Colonel Hawkins has published articles on opportunism in buyer-supplier relationships and on electronic reverse auctions in scholarly publications such as the *Journal of Supply Chain Management*, *Industrial Marketing Management*, *Supply Chain Management: An International Journal*, the *Journal of Marketing Channels*, and the *Journal of Public Procurement*. His current research interests include electronic reverse auctions, procurement ethics, buyer-supplier relationships, strategic sourcing and services procurement.

Captain Adam V. Coyne, USAF, currently serves as Chief, Strategic Sourcing Operations Flight, Enterprise Sourcing Group, Installation Acquisition Transformation at Air Force Materiel Command Headquarters, Wright-Patterson Air Force Base, Ohio. He is a recent graduate of the Naval Postgraduate School where he earned his master of science degree in Business Administration in Defense-Focused Strategic Purchasing. His experience stems from base-level, contingency, and system-level contracting in continental US, outside the continental US, and contingency theaters of operation.

Lieutenant Colonel (Ret) Bryan Hudgens, USAF, is a lecturer in logistics and operations management in the Graduate School of Business and Public Policy at the Naval Postgraduate School. He has published his research in the *International Journal of Logistics Management* and the *Journal of Small Business and Entrepreneurship*, as well as at many academic conferences around the world. His recent research interests include the maturity of organizational and interorganizational relationships, coordinating emergency first-responders, and understanding the private military industry.



Visit the *Journal* online at: <http://www.aflma.hq.af.mil/lgj/journals.asp>