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Rapid Acquisition of Army Command and Control Systems

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Summary

For the past decade, the U.S. Army has been engaged in extended overseas conflicts in Afghanistan and Iraq. These conflicts tested the technologies the military developed during the preceding Cold War and post–Cold War periods in many unanticipated ways. The wartime[1] operational pressures revealed gaps in the Army's capabilities, and spurred an urgent drive from both the Army and the Department of Defense (DoD) to fill those gaps with new technology solutions.

What followed was a period of organizational creativity within the Army, where decisionmakers responding to the urgent operational needs from the field were also equipped in an unprecedented manner with a source of immediate flexible funding to respond to those needs: congressionally allocated supplemental funding. Perceiving both urgent needs and having in hand the resources to address them, the Army did not rely on the full formal structures of the Defense Acquisition System reflected in DoD Instruction 5000.02 on Operation of the Defense Acquisition System, because following that process would have taken too long to deliver the needed items.[2]

Instead, the Army and DoD developed, viewed from the highest level, two types of methods to perform rapid acquisition during this period:

- Establishing named, formally designated, rapid acquisition structures (i.e., processes and organizations)
- Applying the traditional acquisition structures in an unusual, non-"program of record," ad hoc manner.[3]

The Army used rapid acquisition methods to acquire a wide variety of capabilities, including weapon systems, vehicles, and individual equipment. In this work, our particular focus is on command and control (C2) systems, which are a subset of the larger

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[1] By "wartime," we refer to an environment where the military is engaged to a significant and extended degree in combat (vice minor policing actions or small-scale special operations).

[2] *Army Strong: Equipped, Trained and Ready: Final Report of the 2010 Army Acquisition Review*, January 2011, states that it takes the acquisition system four years to go through the expected steps without producing anything at all.

[3] Programs of record follow DoDI 5000.02 and adhere to a standard set of decision processes and milestones. According to the Defense Acquisition University, a program of record is "recorded in the current Future Year's Defense Program (FYDP) or as updated from the last FYDP by approved program documentation (e.g., [APB, acquisition strategy, SAR])." Defense Acquisition University, "Glossary of Defense Acquisition Acronyms and Terms," Fifteenth Edition, December 2012. As of January 3, 2013: https://dap.dau.mil/glossary/pages/2492.aspx

category of information technology (IT)-based systems. Defense acquisition of IT systems has a number of unique attributes, including a high degree of reliance on commercial off the shelf (COTS) technologies that refresh in the commercial sector at a rapid rate, posing a significant risk of obsolescence at first fielding if delivery of a new IT system takes too long. C2 systems, as IT systems, also depend on other systems, and acquisition of C2 needs to consider interoperability. Yet at the same time, compared to other IT, a distinct aspect of the acquisition of C2 systems is that they are likely to be pulled by the urgent needs of war.

As shown in Figure S.1, the Army's reliance on these alternative mechanisms to support rapid acquisition has caused a new set of problems. These problems have included poor integration with existing systems, incurring additional operational risks, increased security risks, and a lack of sufficient support for the rapidly acquired systems. The question we were asked is, given the Army's recent experiences with rapid acquisition: How can DoD, and the Army more particularly, better perform rapid acquisition within the current policies and procedures?

The objective of our study was to discern how the DoD acquisition system can more rapidly develop, procure, and field effective C2 systems, and to provide the Army with recommendations to improve future rapid acquisitions of C2. In addition, we probed issues and challenges posed by rapid acquisition of C2. Finally, we identified factors that have enabled previous successful rapid acquisitions of C2.

Figure S.1. Study Motivation
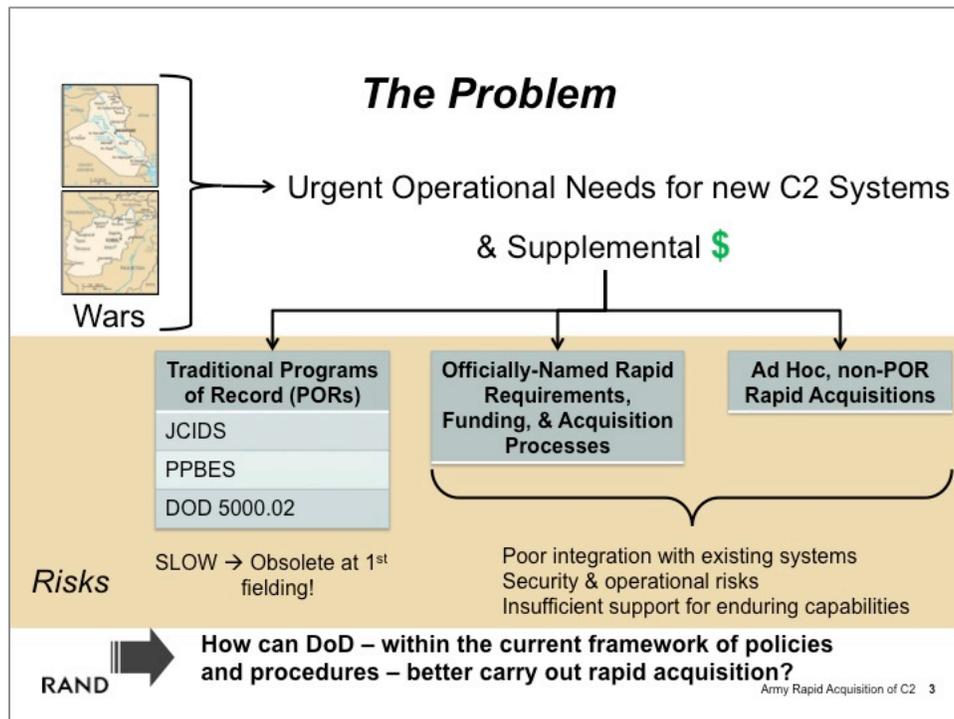
Our approach was twofold. First, we selected three rapid acquisitions of Army C2 systems to serve as case studies from which to derive lessons learned. Second, largely to enhance the analysis and conclusions from the case studies, we surveyed established rapid requirements, funding, acquisition, and transition processes. This secondary survey provided context, and it confirmed some of our case study findings and broadened our recommendations.

During our selection process, we considered as case study material 289 different programs suggested by the sponsor and other subject matter experts. From among that number we selected our three case study programs qualitatively on the basis of five main criteria:

- We could gain access to suitable information on the program to support the research task.
- The acquisition took place more rapidly than would normally occur, in the opinion of subject matter experts.
- The program would be considered a "success," in the sense that it was fielded and users liked it.
- The acquisition of the C2 program relied on nontraditional processes
- The set of programs represented a variety of program sizes.

After considering the assorted programs, and taking into account the fact that a particular air defense program called the "Fire Coordination Cell" motivated our sponsors to ask the original question behind this study, we selected the following three programs to serve in the case study approach:

- Joint Network Node (JNN): a satellite-based beyond-line-of-sight communication system
- Command Post of the Future (CPOF): a real-time decision support system
- Fire Coordination Cell (FCC): an air and missile defense system used to coordinate targeting

Figure S.2. Factors Enabling Rapid Acquisition of Army C2

Factors Enabling Rapid Acquisition of Army C2

		FCC	CPOF	JNN
Wartime-driven attributes	Answers need the Army perceives as valid and urgent		X	X
	Able to rely on a source of immediate flexible funding		X	X
	Built on matured technology (COTS/GOTS)	X	X	X
	Users accept less than 100% desired performance	X	X	X
	Army/DoD accept higher operational risk	X	X	X
Normal but affected by wartime	Leverages existing programs and documentation		X	X
	Demonstrates useful capability quickly	X	X	X
	Endorsed and advocated by operational champion	X	X	X
Common to successful acquisition programs	Coevolves the technology and the operational concept		X	
	Plans carefully a transition to normal acquisition status to ensure long term existence and support		X	X
	Includes ongoing user feedback during development	X	X	X
	Ensures personnel on program staff consistent			X
	Ensures contractor personnel consistent	X	X	X
	Retains senior retired military consultants as advisors		X	

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As a result of our analysis of these programs, we have identified a number of factors that enabled them to deliver a successful rapid acquisition of a C2 system for the Army. Figure S.2 lists those factors, grouped by row into categories. For each factor, the table indicates whether or not it applied to each case study program. In general, CPOF and JNN, which have transitioned into the long-term inventory of the Army, incorporated more of those factors into their acquisition processes than FCC, which had not developed a viable sustainment arrangement as of the original writing of this report (2009–2010).

Two of the three case study programs were responding to urgent needs from the theater, and for them, war was a driving factor. The top group of program attributes we judged to be directly or indirectly war-driven. The middle group were less affected by the war, but still influenced by it. The bottom group we would consider to be common across successful acquisitions, rapid or otherwise.

**Figure S.3. War Drives Many Factors Enabling Rapid Acquisition,
and the Factors Influence Each Other**
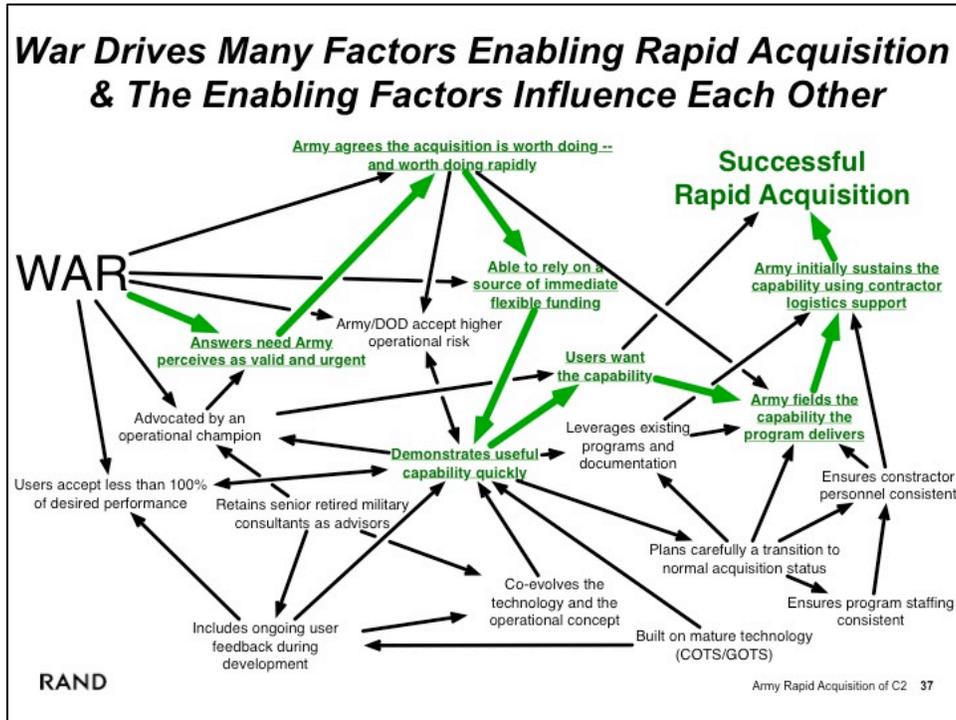
Figure S.3 takes these same enabling factors and shows their complex interactions. In effect, it can serve as a kind of map for future program managers seeking to conduct rapid acquisition. Green portions indicate the most essential flow of accomplishments for successful rapid acquisition. The figure shows how the enabling factors for rapid acquisition influence each other to create an institutional posture that is conducive to rapid acquisition success. Certainly, upon some study of this figure, it is possible to see that war is a major driver for successful rapid acquisition, influencing institutional motivations in a variety of ways. The urgency of a wartime environment enables traditional acquisition processes to be bypassed. War is a driver of many of the factors enabling rapid acquisition, and those factors depend upon and influence each other.

Figure S.4. Summary of Key Findings on Army Rapid Acquisition of C2

Summary of Key Findings

High-level champions are critical to the success of rapid acquisitions

Organizational and user flexibility enables rapid acquisition of new capabilities

- Wartime environments motivate bureaucratic flexibility
- For needed equipment, with good program office communication, users will tolerate operational risk and less than 100% of desired performance
- Ongoing user feedback enables iterative capability enhancement
- Rapid acquisitions require an immediate flexibly-tasked source of funding

A large variety of named rapid acquisition processes have supplied a number of wartime capabilities for DoD and the Army

- These designated processes have not met every rapid acquisition need of the Army
- The case study programs did not rely heavily on these named processes.

Relying on existing technology and documentation speeds acquisitions

- "Faster" can mean leveraging existing requirements, contracts, and documentation from other programs
- Rapid acquisitions require mature technology

C2 rapid acquisitions have ensured field support and sustainment via contractor warranties and eventual transition to an Army POR

- C2 rapid acquisitions have relied on multi-year warranties
- Transition planning and staffing consistency during the transition is essential

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For this study we also conducted a broad review of Army and Joint urgent need, rapid acquisition, and transition processes. From the case studies and informed by the review of existing acquisition processes, we identified a set of key findings (shown in Figure S.4) regarding how the Army has supported rapid acquisition of C2 during the last decade.

Our case study findings show that successful rapid acquisitions have relied on the patronage and support of highly placed individuals within the Army. These individuals substantiated the utility of a new capability as perceived by the rest of the Army organization, and supplied the required lobbying power to secure funding, support for development, and—especially—fielding.

In addition, the case studies have illustrated the types of flexibility required from the Army and DoD to support rapid acquisition of C2. The acquisition bureaucracy must be flexible in terms of business processes, and users must be flexible in terms of cost/schedule/performance tradeoffs.

The existence of war has been essential to successful rapid acquisition. War convinced the institutional Army that there was an urgent need for a new capability. War infused the bureaucracy with motivation for tolerating unusual process flexibility. War motivated Congress to supply the Army with a source of flexibly-taskable funding. Again, war motivated users to accept less than one hundred percent of the capabilities they had requested, and the Army to accept increased operational risks. Finally, war

motivated operational champions to care enough about proposed solutions to problems to advocate for programs.

Another significant finding was that relying on existing technology and documentation sped the acquisition of C2 programs. The rapid acquisition program must build on mature technology. It can evolve the concept in constant feedback with users to increase the chances of delivering a useful capability. More surprisingly, programs can use contracts, requirements documents, and sustainment structures of existing programs to choreograph rapid initiation of a concept and ensure its fielding and sustainment.

DoD is currently planning to institutionalize rapid acquisition, that is, to plan its rapid processes so they persist in a structured and predictable way in the absence of large-scale conflicts.[4] As shown in Figure S.5, institutionalizing rapid acquisition poses both challenges and opportunities for the Army.

Challenges may impede DoD's push for institutionalization. For instance, it will be difficult to motivate (or justify) rapid acquisition in the absence of war. It will also be a challenge in the face of expected congressional skepticism to establish a flexible stream of funding to support rapid acquisition. Stakeholders for various traditional acquisition concerns will also push to have their interests more fully integrated, potentially slowing acquisitions.

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[4] Also cited in the main body of the report, a June 14, 2012 DepSecDef memo on "Rapidly Fulfilling Combatant Commander Urgent Operational Needs" directs the department to establish policy and procedures to conduct rapid acquisition.

Figure S.5. Institutionalizing Rapid Acquisition Poses Both Challenges and Opportunities
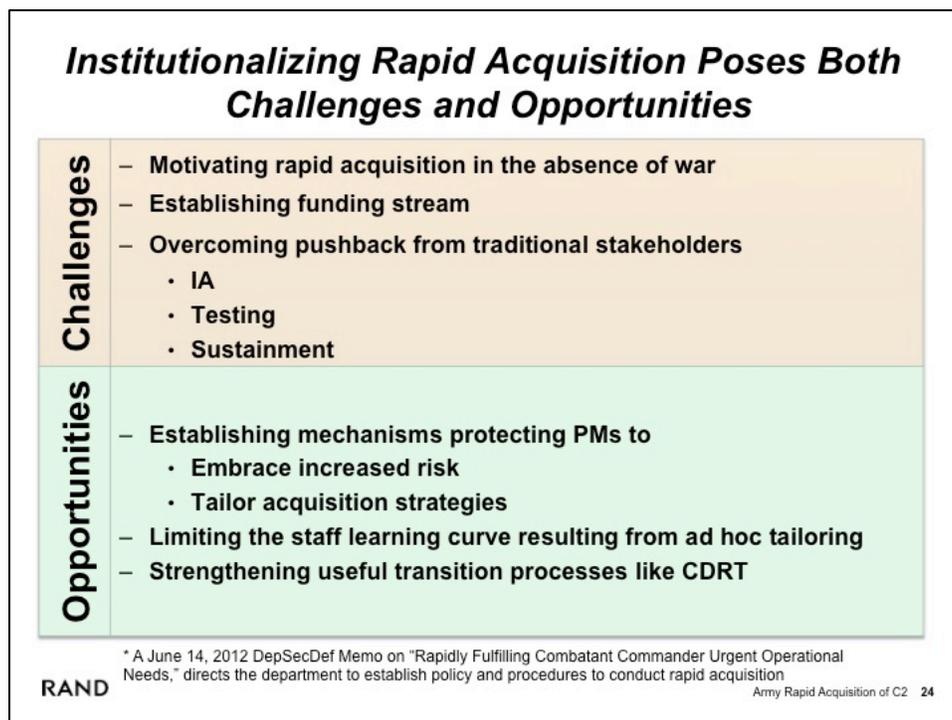
For the Army, however, institutionalization also provides some opportunities. It can establish mechanisms to protect program managers when they embrace increased risks within their programs, and help them tailor their acquisition strategies. Institutionalization also can minimize the required learning curves for staff seeking to replicate rapid acquisition techniques. It can, moreover, enable the Army to strengthen important processes to transition rapid acquisitions into the standard system as the program matures.

Figure S.6 contains our recommendations for how the Army can better conduct rapid acquisitions of C2 in the future.

The Army should regularly and systematically capture "Lessons Learned" from rapid acquisition.

One of our most easily actionable recommendations is that the Army should document its recent experiences in rapid acquisition to capture lessons learned and best practices, and develop metrics for program managers while the difficult-to-replenish reservoir of talent experienced in rapid acquisition expertise is still accessible and remembers much of what it has accomplished.

Figure S.6. Recommendations for the Army to Improve Rapid Acquisition of C2

Summary of Recommendations

- Regularly & systematically capture "Lessons Learned" from rapid acquisitions
- Establish and support flexible mechanisms for funding acquisition efforts outside of the 2-yr. POM cycle, without supplemental funding.
- Promote awareness of and strengthen existing Army processes for transition of non-PORs to official standing, such as CDRT
- Establish ways to expedite testing to support rapid acquisition
- Train the institution to expect PMs to tailor their acquisition strategy and mechanisms used
- Enable PMs to prioritize and make trade-offs in meeting requirements based on user feedback
- View acquisition documents, staff, and contracts of existing programs as potential enablers of rapid acquisition
- Require PMs to assess planned rapid acquisitions for inclusion of the enabling factors discussed here

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The Army should make it a priority to convince Congress to allocate flexible funding for rapid acquisitions of a needed type of capability on an ongoing basis.

The Army should seek ways to convince Congress to allocate some flexible funds to support rapid acquisition on a ready basis, even after current conflicts end. Funding for rapid acquisitions should be by type of activity, rather than "by thing." Because Congress prefers to retain its oversight and decisionmaking authorities, this is a potentially difficult case for the Army to make; it may be helped if the Army collects comparative data on the time necessary to initiate work on programs after an idea is conceived.

The Army should promote awareness of and strengthen existing Army processes for transition of non-PORs to official standing, such as CDRT.

The strengthening of these mechanisms should include establishing institutionally recognized mechanisms to *implement* the transition to a program of record (POR), not just establishing a mechanism to decide to do the transition.

The Army should explore ways to expedite testing in support of rapid acquisition.

How to tailor testing for a rapid program still seems an organizationally unsolved problem.

The Army should train the institution to expect program managers to tailor their acquisition strategy and mechanisms used.

Currently, program managers seeking to conduct rapid acquisition face considerable institutional resistance when planning to abridge or omit any of the standard parts of the 5000.02 acquisition process, as performing every aspect of the 5000.02 to full specification would slow the acquisition beyond the urgent needs of the Army.

The Army should make the requirements change process for rapid acquisitions easy and unencumbered to enable program managers to prioritize and make tradeoffs.

It should train its senior personnel, those developing and managing requirements, and program managers to empower program managers to prioritize requirements and make tradeoffs among them. The Army should also support program managers who significantly tailor their acquisition strategies to expedite acquisitions.

Both the institutional Army and program managers should view existing related programs as structures that can help acquire related capabilities quickly.

Existing programs have many of the sorts of documents and agreements that a new related program needs. In many cases, prior successful rapid acquisitions have appropriated those documented requirements, contracts, and support mechanisms, and also internal institutional Army documents, and modified them to include the new desired capability. The case studies in this research illustrate how the process of modifying these documents and agreements is less cumbersome than creating them anew.

In the course of future rapid acquisitions, we recommend that the Army require program managers to assess the rapid acquisition enabling factors from this report (shown in Figures S.2 and S.3), and to account for whether they have included those factors in their program appropriately.

In conclusion, the Army has considerable opportunities to improve rapid acquisition of C2 systems within the existing framework of policies and processes. By capturing lessons learned, implementing the recommendations in this document, and explaining to program staff the importance and interdependence of the factors shown in the guidemap for rapid acquisition of C2 shown earlier in Figure S.3, future rapid acquisitions may find it easier to replicate the success of past endeavors.

The Army has considerable opportunity to conduct and improve rapid acquisition of C2 and other systems within the framework of existing policies and processes. However, maintaining the wartime cultural and policy environment that enables and supports rapid acquisition in the absence of war is a significant challenge. We believe that the single most important action that the Army can take to institutionalize and improve upon

existing rapid acquisition capability is to carefully capture the rapid acquisition experience of the last decade by fully documenting the program management and acquisition strategies of both successful and less so rapidly acquired systems, and make that documentation available to future program managers. A core lesson is understanding how the factors affecting success interact with and reinforce each other, and applying that understanding to the design of future rapid acquisition policies, processes, and programs.