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Fixing the Weapon Systems Acquisition Pipeline

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In late January, Defense Secretary Robert Gates told congressional leaders that the Pentagon's procurement of expensive weapons systems was afflicted with "repeated and unacceptable problems with requirements, schedule, cost and performance."

He then listed a number of recent big-ticket weapons systems spanning the services that have cost overruns and are well behind schedule: Osprey, Future Combat Systems, Armed Reconnaissance Helicopter, Joint Strike Fighter "and so on."

Since the end of World War II, the Pentagon has conducted nearly 130 studies on the acquisition and procurement process -- to little avail, said Gates. But the unfolding financial crisis gives this problem greater urgency and forces the Department of Defense (DOD) to develop a better system for how it acquires goods and services using taxpayer dollars.

"I do not believe there is a silver bullet, and I don't think the system can be reformed in a short period of time," Gates noted during his testimony last month. "That said, I do believe we can make headway and I have already begun addressing these issues."

One of the main issues the Pentagon will try to tackle is how many procurement decisions remain "overwhelmingly" service-centric even as military operations become joint efforts. Mark Kagan, research manager at International Data Corporation's Government Insight unit, provides an older example that still underscores the problems of service-centric procurement. In the late 1950s and early 1960s, the Air Force set up its first ballistic missile system aimed at the Soviet Union. The Navy wanted to create a whole new, but similar, system known as the Polaris Missile Submarines. It eventually became the Triad -- with airborne, land-based and sea-borne missiles. "Someone had the brilliant idea of navalizing the missiles that the Air Force had already developed instead of starting a whole new program," said Kagan. "But the Navy responded that the way they had designed their ballistic missile submarines, the Air Force missiles wouldn't fit into the missile tubes. It was about a six-inch difference."

This inefficiency is repeated today. Gates is pushing to change that outlook to a greater unified approach. "We may have to invest more in the future-oriented program of one service and less in that of another service -- particularly when both programs were conceived with the same threat in mind," he said during his testimony.

The inability to remain within budget is another pervasive problem with the military procurement process. Cost-overruns occur for several, often interconnected reasons: Engineers encounter design issues with technology as the weapons system moves from blueprint to implementation; the Pentagon shifts program requirements; or, perhaps there is little benchmarking and evaluation of the development process by the DOD. Concerns can also arise as to how the contract is structured between the defense contractor and Pentagon. That has tremendous ramifications on the final cost and timeliness of the project. Until recently, the contracts signed between vendors and the Pentagon were mostly cost-plus contracts, in which a contractor would tally the costs for building the weapons systems and open the books to show the Pentagon how much it had spent. The Pentagon would then reimburse that cost, plus an agreed-upon percentage markup. In this model, the government assumes all risk. "This type of contract does not for a minute stimulate the supplier to reduce costs or to be more efficient in anyway," said Wharton School management professor Serguie Netessine. "Whatever I spend is going to be reimbursed, so why even bother?"

Another model is the fixed-price contract in which the company could spend as much as it takes but the government will only pay a fixed amount for the product. "It is incredibly hard to convince contractors [to contract this way] because they assume all the risks," said Netessine. "What if there are some unforeseen circumstances that cause the costs to run over?" The answer: You're stuck with the costs – and that makes this model the most unacceptable for companies.

"There's a pretty monumental transformation going on right now," said Netessine. "It goes under many names, but the most common name is 'performance-based' contracting." This model is based on actual performance of the systems. For a jet, that would mean actual flying hours rather than airplane maintenance and spare parts.

Morris Cohen, a professor of operations and information management at Wharton, is a noted expert on performance-based contracting and believes this model allows the interests of the government and the contractor to be more closely aligned. "The Defense Department doesn't want to be responsible any more for maintaining its weapons systems," said Cohen. "The DOD wants the supplier to maintain them and they want to pay the supplier for the value that they get from using those products and not for resources required to maintain them."

Performance-based contracting, says Cohen, "leads to lower cost of ownership of the product, high reliability, better performance and more availability and uptime of the product."

This model is being used not only by the DOD but also in other branches of the government that require acquisitions and logistics services from contractors.

But some analysts believe that performance-based contracts work only when dealing with established or proven products -- for those programs have data that already have tested expenses and production schedules. The model can be more problematic, however, when it is used in the development of new systems. "It is rarely about cutting corners on quality," said Kagan. "What invariably happens is that the contractor comes back and says that we underestimated what was required and how much it would cost."

Shifting requirements from the Pentagon are also a major source of delay and cost overruns. Gates last month called for a freeze to requirements when a contract is awarded.

The relationship between the government and the defense contract is different to begin with. "The customer -- in this case the government -- designs the product or dictates what the product has to do at a very detailed level," said Cohen. "It's not like Apple coming up with a brand new version of a computer."

In this situation, the kind of competition most companies face in the market is non-existent because they basically have one customer.

In addition, many requirements are often untested and, some say, unrealistic. The defense contractors who agree to the terms invariably find it takes longer to develop these systems than they had estimated. "The problems with the requirements turn up once the Pentagon is already committed," said Kagan. The only option quickly becomes, "We are just going to have to put more money into it because we have already spent all this money."

The current practice is to add requirements even as a system is in development. By the time it is completed, the original design does not function as intended. Both sides aggravate

this "scope-change" and "mission-creep," with the government asking for too many changes and the contractor promising unrealistic results.

In response to these entrenched practices, the Pentagon issued a major revision to its acquisition policy in December 2008 -- the first in over five years. John Young, the Undersecretary of Defense for Acquisition, Technology and Logistics, introduced the following changes:

1. A mandatory acquisition process entry point to ensure that the programs are based on approved requirements and that a rigorous assessment of alternatives has been conducted.
2. All programs will undergo a competitive prototyping phase in which two or more competing teams will produce prototypes. Most importantly, the technologies in the program will have to be demonstrated and proven before engineering development is even started.
3. Programs already under way must pass two key engineering reviews for the acquisition officials to assess the programs' progress.
4. The programs must also face a board review to put a stop to destabilizing requirements. Program managers are encouraged to use this forum to control requirement creep.
5. The program will also have to undergo independent reviews that will certify the maturity of the technologies involved before it can progress to the costly final phase of development.
6. During the engineering and manufacturing development phase, all technology must be functional before proceeding to the costly initial production phase.
7. More effective tests and evaluations will be integrated into every acquisition development phase to root out technical and operational problems.

But in order for these revisions to have an impact, the DOD will need something as basic as more qualified senior acquisition officials to oversee the revisions. Gates told lawmakers last month that over the past eight years, the Pentagon was operated with vacancies in key acquisition positions ranging from 13% in the Army to 43% in the Air Force.

Most analysts believe the revisions will take a while to implement -- especially because of the key positions that must be filled and the training required to put the revisions into action.

"You have a lot of momentum in the programs already underway. It will be like trying to turn or stop an aircraft carrier in the middle of the ocean that is going at 30 knots," said Kagan. "But it's a few steps in the right direction."