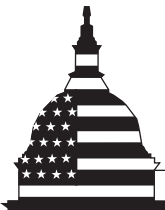


March 2011

INFORMATION
TECHNOLOGY

Better Informed
Decision Making
Needed on Navy's
Next Generation
Enterprise Network
Acquisition



G A O

Accountability * Integrity * Reliability

Report Documentation Page

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Highlights of [GAO-11-150](#), a report to congressional requesters

Why GAO Did This Study

The Department of the Navy (DON), a major component of the Department of Defense (DOD), has launched its Next Generation Enterprise Network (NGEN) program to replace the Navy Marine Corps Intranet (NMCI) program. NGEN capabilities, such as secure transport of voice and data, data storage, and e-mail, are to be incrementally acquired through multiple providers. As planned, the first increment is expected to provide comparable NMCI capabilities, additional information assurance, and greater DON network control, at a cost of about \$50 billion through fiscal year 2025. Given the size, importance, and complexity of NGEN, GAO was asked to determine whether DON has sufficiently analyzed alternative acquisition approaches and has a reliable schedule for executing the program, and whether program acquisition decisions have been performance- and risk-based. To do this, GAO reviewed the NGEN analysis of alternatives, integrated master schedule, and key milestone decisions.

What GAO Recommends

GAO is recommending that DOD limit further investment in NGEN until it conducts an interim review to reconsider the selected acquisition approach and addresses issues discussed in this report. In its comments, DOD stated that it did not concur with the recommendation to reconsider its acquisition approach; GAO maintains that without doing so, DOD cannot be sure it is pursuing the most cost-effective approach.

View [GAO-11-150](#) or key components. For more information, contact Valerie C. Melvin at (202) 512-6304 or melvinv@gao.gov.

March 2011

INFORMATION TECHNOLOGY

Better Informed Decision Making Needed on Navy's Next Generation Enterprise Network Acquisition

What GAO Found

DON did not sufficiently analyze alternative acquisition approaches for NGEN because the alternatives analysis contained key weaknesses, and none of the alternatives assessed match the current acquisition approach. Specifically, the cost estimates for the respective alternatives were not reliable because they were not substantially accurate, and they were neither comprehensive nor credible. Further, the operational effectiveness analysis, the other key aspect of an analysis of alternatives, did not establish and analyze sufficient measures for assessing each alternative's ability to achieve program goals and deliver program capabilities. Moreover, the acquisition approach that DON is actually pursuing was not one of the alternatives assessed in the analysis, and it is riskier and potentially costlier than the alternatives analyzed because it includes a higher number of contractual relationships. According to program officials, the analysis reflects the most that could be done in the time that was available to complete it, and they do not view the alternative selected as materially different from the assessed alternatives, even though it is about \$4.7 billion more costly. (See table for comparison of alternatives.)

Comparison of NGEN Alternative Approaches

	Status quo	Alt. 2	Alt. 3 variant	Alt. 3	Current approach
Contractual relationships	3	3	10	15	21
Estimated cost ^a	\$10.3	\$10.8	\$10.8	\$10.7	\$15.6
Relative risk	Least	More	Greater	Greatest	Undetermined

Sources: DON data (status quo and alternatives 2, 3 variant, and 3); GAO analysis of DON data (current approach).

^aFiscal year 2011-2015 in billions.

DON does not have a reliable schedule for executing NGEN. Only two of the four subschedules that GAO reviewed, each of which help form the master schedule, adequately satisfied any of the nine practices that are associated with developing and maintaining a reliable schedule. These weaknesses have contributed to delays in key program milestones. During the course of GAO's review, DON stated that action was taken to address some, but not all, of these weaknesses. According to program officials, schedule estimating was constrained by staffing limitations.

NGEN acquisition decisions were not always performance- and risk-based. In particular, the program was approved in the face of known performance shortfalls and risks. For example, the program was approved at a key acquisition review despite the lack of defined requirements, which was recognized as a risk that would impact the completion of other key documents, such as the test plan. This risk was later realized as a critical issue. According to program officials, the decisions to proceed were based on their view that they had sufficiently mitigated known risks and issues.

Collectively, these weaknesses mean that DON does not have a sufficient basis for knowing that it is pursuing the best approach for acquiring NGEN capabilities and the program's cost and schedule performance is unlikely to track to estimates.

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Abbreviations

AOA	analysis of alternatives
CAPE	Cost Assessment and Program Evaluation
CIO	chief information officer
DAS	Defense Acquisition System
DOD	Department of Defense
DON	Department of the Navy
IT	information technology
MAIS	Major Automated Information System
NGEN	Next Generation Enterprise Network
NMCI	Navy Marine Corps Intranet
OSD	Office of the Secretary of Defense
USD (AT&L)	Under Secretary of Defense (Acquisition, Technology, and Logistics)

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G A O

Accountability * Integrity * Reliability

United States Government Accountability Office
Washington, DC 20548

March 11, 2011

The Honorable Claire McCaskill
Chairman
The Honorable Kelly Ayotte
Ranking Member
Subcommittee on Readiness and Management Support
Committee on Armed Services
United States Senate

The Honorable Richard Burr
United States Senate

The Department of the Navy (DON) established the Next Generation Enterprise Network (NGEN) program in 2007 to replace the Navy Marine Corps Intranet (NMCI), which is provided through a DON-wide network services contract. As envisioned, NGEN capabilities, including secure transport of voice and data, data storage, and e-mail, are to be incrementally acquired through multiple providers. The first increment is to include capabilities comparable to NMCI, as well as enhanced information assurance and increased government control over network operations. To date, NGEN has reportedly spent about \$432 million on work associated with the transition from NMCI. The first increment is to be fully operational in March 2014 and is to cost approximately \$50 billion through 2025.

As agreed, our objectives were to determine whether (1) DON has sufficiently analyzed alternative approaches for acquiring NGEN, (2) DON has a reliable schedule for executing NGEN, and (3) acquisition decisions have been performance- and risk-based. To accomplish our objectives, we analyzed the NGEN alternatives analysis report and underlying support, the program's integrated master schedule, program performance assessments and risk reports, and executive acquisition decision briefings and meeting minutes, among other things. We conducted this performance audit from October 2009 to February 2011, in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. Additional details on our objectives, scope, and methodology are discussed in appendix I.

Background

DON is a major component of the Department of Defense (DOD), consisting of the Navy and the Marine Corps. It is a large and complex organization, whose primary mission is to organize, train, maintain, and equip combat-ready naval forces capable of winning wars, deterring aggression by would-be foes, preserving freedom of the seas, and promoting peace and security. To support this mission, DON performs a variety of interrelated and interdependent information technology (IT)-dependent functions. In fiscal year 2010, DON's IT budget was approximately \$7.4 billion, for 971 investments. NGEN is one such system investment.

Overview of NGEN

NGEN is to provide secure data and IT services, such as data storage, e-mail, and video-teleconferencing, to the Navy and the Marine Corps. NGEN is also intended to provide the foundation for DON's future Naval Networking Environment.¹ DON is acquiring NGEN through multiple providers (contractors) to replace and improve the enterprise network and services provided by NMCI. It is to be developed incrementally, with the first increment to provide comparable NMCI capabilities,² additional information assurance, and increased government control of the network. Future increments have yet to be defined. The program's preliminary life cycle cost estimate (through fiscal year 2025) for the first increment is about \$50 billion. As of September 30, 2010, the NGEN program had reportedly spent about \$432 million.

To bridge the time frame between the end of the NMCI contract and the full transition to NGEN, DON awarded a \$3.7 billion continuity of services contract in July 2010 to the NMCI service provider, Hewlett Packard Enterprise Services. In addition to providing continuity of network services, the contract includes transition services and transfer to DON of

¹The Naval Networking Environment is to be an iterative set of integrated, phased programs that share a common enterprise architecture and standards. It includes NGEN and the Consolidated Afloat Networks and Enterprise Services program, among others, and is to be in place by 2016.

²NMCI provides about 382,000 workstations to approximately 700,000 users across 2,500 Navy and Marine Corps locations around the world. NMCI is composed of transport infrastructure, such as cables, routers, and switches; end-user equipment, such as computers, monitors, and keyboards; and software. It provides, among other things, data storage, e-mail, transport of voice and data, and video-teleconferencing.

NMCI infrastructure and intellectual property,³ as the NGEN contracts are to require use of the NMCI infrastructure and access to processes, procedures, and technical data. The continuity of services contract is scheduled to run from October 2010 through April 2014.

To reduce the risk during the transition period from NMCI to NGEN, DON is currently performing eight early transition activities. The activities are discrete efforts intended to establish government management capabilities, allow for greater participation in operational decisions, and help expedite the transition time. Table 1 describes each of these activities.

Table 1: Early Transition Activities

Dollars in millions

Early transition activity	Start date	End date	Cost	Description
Information Technology Service Management Process Development	October 2008	May 2011	\$20.5	Develop Information Technology Infrastructure Library ^a version 3-based service strategies, processes, and procedures.
Contractor Technical Representative Workforce Reconstitution	January 2009	April 2011	\$3.3	Conduct job task analysis and assess learning tools for contractor technical representatives; develop enterprise-wide position descriptions and occupational standards for training, advancement, criteria, and performance objectives.
Comprehensive Facilities and Infrastructure Inventory	January 2009	December 2010	\$12.0	Evaluate, analyze, and validate current NMCI infrastructure inventory consisting of technical data, assets, configuration items, and system components.
Defense Information System Network Core Extension Phase 1 and Maritime Operation Center Implementation	April 2008	May 2011	\$6.7	Bring consistent wide area network connectivity from the Defense Information System Network to eight major nodes at fleet headquarters (Norfolk, Virginia, and Pearl Harbor, Hawaii).
Global Network Operations Command and Control Workforce Establishment	October 2008	July 2011	\$14.3	Develop the personnel, processes, and tool requirements, and organizational analysis and alignment.
Wide Area Network and Enterprise Services Upgrade	April 2009	August 2012	\$46.0	Demonstrate network operational control capability and validate the NGEN System Design baseline through early implementation.

³The NMCI contractor will deliver in place the NMCI infrastructure and provide DON with a Government Purpose Rights license for NMCI technical data, computer software, and computer software documentation.

Dollars in millions

Early transition activity	Start date	End date	Cost	Description
Enterprise Tools Strategy and Implementation/Integration	April 2009	May 2011	\$56.6	Analyze current tool capabilities to support information technology service management processes, and develop design requirements and tool integration specifications.
Nonclassified Internet Protocol Router Network Migration – Marine Air-Ground Task Force IT Support Centers East Pilot	October 2009	August 2011	\$12.9	Assess the transition of base area network, local area network, and end-user equipment for about 1,200 users from the continuity of services contract to the government-owned/government-operated NGEN environment.

Source: GAO analysis of DON data.

³Information Technology Infrastructure Library is a framework intended to align an organization's IT services with its organizational needs. It consists of service strategy, design, transition, operation and continual improvement best practice guidance.

To deliver NGEN capabilities, DON plans to award five contracts.⁴ See table 2 for a description of these contracts.

Table 2: Planned NGEN Program Contracts

Contract	Award date	Purpose
Independent Security Operations, Oversight and Assessment Support	April 2011	Provide independent third-party security assessments of NMCI and NGEN. The contract is planned to include the option to support all DON networks within the naval network environment.
Transport Services	May 2012	Provide for the operation and sustainment of the transport infrastructure, associated services, and level-of-effort support for those services. The contract is planned to include technology refresh of cable plant, routers, and switches; some leasehold improvements; and moveable infrastructure associated with local network operations.
End-User Hardware	December 2011	Provide end-user equipment such as computers, monitors, and keyboards.
Enterprise Software Licenses	March 2012	Provide software licenses to meet DON-wide requirements.
Enterprise Services/Service Coordination	August 2012	Provide the Enterprise Service Desk, seat services supporting end-user devices, and data center services such as storage and e-mail along with hardware and software specific to Enterprise Services that are not covered under the End-User Hardware and Enterprise Software Licenses contracts. As the service coordinator, this contract is planned to cover coordination across all NGEN vendors for the successful delivery of NGEN services.

Source: GAO analysis of DON data.

⁴In addition to these contracts, DON plans to enter into an interagency agreement with the Defense Information Systems Agency to provide wide area network services.

According to the NGEN Acquisition Strategy, DON plans to complete the Marine Corps' initial transition to NGEN in January 2012 and final transition in February 2013. The Navy's initial and final transition to NGEN are scheduled to be completed in December 2012 and March 2014, respectively.⁵

NGEN Oversight and Management Roles and Responsibilities

To manage the acquisition and deployment of NGEN, DON established a program management office within the Program Executive Office for Enterprise Information Systems. The program office manages the program's cost, schedule, and performance and is responsible for ensuring that the program meets its objectives. In addition, various DOD and DON organizations share program oversight and review responsibilities. Table 3 lists key entities and their roles and responsibilities.

Table 3: Organizations Responsible for NGEN Acquisition Oversight and Management

Entity	Roles and responsibilities
Under Secretary of Defense for Acquisition, Technology, and Logistics	Serves as the milestone decision authority, with overall responsibility for the program, to include approving the program to proceed through its acquisition cycle on the basis of, for example, the acquisition strategy, an independently evaluated economic analysis, and the Acquisition Program Baseline.
Director, Cost Assessment and Program Evaluation, Office of the Secretary of Defense (OSD CAPE)	Issued NGEN analysis of alternatives (AOA) guidance, reviewed the AOA study plan, and approved the AOA results. Verifies and validates the reliability of cost and benefit estimates found in economic analyses.
NGEN AOA Advisory Group	Oversaw the conduct of the NGEN AOA. Led by the DON Chief Information Officer.
Assistant Secretary of the Navy, Research, Development, and Acquisition	Serves as DON's acquisition oversight organization for the program, to include enforcement of Under Secretary of Defense for Acquisition, Technology, and Logistics policies and procedures. Determines when all key milestones are ready to be submitted to the milestone decision authority.
Chief of Naval Operations and Commandant of the Marine Corps	Serve together as resource sponsors for NGEN requirements and funding.

⁵NGEN program documentation defines initial transition for the Navy as execution and operation of NGEN services for 5 percent of the Navy management domain, and for the Marine Corps as execution and operation of 5 percent of Marine Corps seats. Final transition is defined as complete when increased government operational control and visibility are established and test and evaluation requirements are verified and validated for 80 percent of the Navy management domain and when 80 percent of Marine Corps seats are transitioned and increased operation control of the network and visibility activities are implemented at the global, regional, and local level.

Entity	Roles and responsibilities
Department of the Navy, Program Executive Office for Enterprise Information Systems	Oversees a portfolio of large-scale projects and programs designed to enable common business processes and provide standard capabilities. Reviews the acquisition strategy, economic analysis, and the Acquisition Program Baseline prior to approval by the milestone decision authority.
Department of the Navy Chief Information Officer (CIO)	Supports DON's planning, programming, budgeting, and execution processes by ensuring that the program has achievable and executable goals and conforms to financial management regulations, and DON, DOD, and federal IT policies in several areas (e.g., security, architecture, and investment management); works closely with the program office during milestone review assessments. Oversaw NGEN AOA, which was led by the Center for Naval Analyses and supported by Deloitte Consulting.
NGEN Program Management Office	Performs day-to-day program management and, as such, is the single point of accountability for managing the program's objectives.
Space and Naval Warfare Systems Command	Reviewed the NGEN AOA cost analysis. Reviews the NGEN program life cycle cost estimates and economic analysis. Serves jointly with the Marine Corps Systems Command as the NGEN technical authority.
Marine Corps Systems Command	Serves jointly with the Space and Naval Warfare Systems Command as the NGEN technical authority.

Source: GAO analysis of DON data.

Overview of DOD and DON Acquisition Processes and NGEN Status

NGEN is subject to both Office of the Secretary of Defense (OSD) and DON Major Automated Information System (MAIS) acquisition policy and guidance,⁶ which require it to comply with Defense Acquisition System (DAS)⁷ requirements. According to these requirements, all MAIS programs require a Materiel Development Decision prior to entering the first DAS phase. In making this decision, the milestone decision authority is to review the Initial Capabilities Document, which defines operational goals and needed capabilities, and authorizes the phase in which the program is to enter the DAS. The system consists of five key program life cycle phases and three related milestone decision points. Table 4 provides a description of each DAS phase.

⁶Department of Defense Instruction 5000.02, *Operation of the Defense Acquisition System*, Dec. 8, 2008, and Secretary of the Navy Instruction 5000.2D, *Implementation and Operation of the Defense Acquisition System and the Joint Capabilities Integration and Development System* (Oct. 16, 2008).

⁷The DAS five-phase acquisition process is intended to translate mission needs and requirements into stable, affordable, and well-managed acquisition programs.

Table 4: Description of DAS Phases

Phase	Description
Materiel Solution Analysis	Prior to entering this phase the milestone decision authority completes a Materiel Development Decision. The purpose of the phase is to assess, through an AOA, potential solutions to satisfy an approved capability need.
Technology Development	Prior to entering this phase, the milestone decision authority conducts a Milestone A decision review of the proposed solution and a draft Technology Development Strategy. The purpose of the phase is to determine the appropriate set of technologies to be integrated into the solution and to refine user requirements.
Engineering and Manufacturing Development	<p>Most acquisition programs enter the DAS in this phase. Prior to entering the phase, the milestone decision authority completes a Milestone B review to approve the Acquisition Strategy and Acquisition Program Baseline.^a The purpose of the phase is to develop a system or system increment. The phase has two major efforts: Integrated System Design and System Capability and Manufacturing Process Demonstration.</p> <p><i>Integrated System Design:</i> This effort includes a post-Critical Design Review assessment of design maturity, and issues and risks that could result in a breach to the Acquisition Program Baseline or substantively impact cost, schedule, or performance.</p> <p><i>System Capability and Manufacturing Process Demonstration:</i> This effort is to demonstrate the ability of the system to operate according to the approved Key Performance Parameters^b and ends when the system or system increment meets approved requirements.</p>
Production and Deployment	Prior to entering this phase, the milestone decision authority conducts a Milestone C review of the Capability Production Document and the Test and Evaluation Master Plan, among other things, and authorizes limited deployment to support operational testing. The purpose of the phase is to achieve an operational capability that satisfies the mission needs, verified through independent operational test and evaluation, and to implement the system at all applicable locations. During this phase, the milestone decision authority also conducts a Full Deployment Decision Review.
Operations and Support	The purpose of this phase is to operationally sustain the system in the most cost-effective manner over its life cycle.

Source: GAO analysis of DOD documentation.

^aAccording to DOD’s acquisition guidebook, an Acquisition Program Baseline is a program manager’s estimated cost, schedule, and performance goals. Goals consist of objective values, which represent what the user desires and expects, and threshold values, which represent acceptable limits. When the program manager determines that a current cost, schedule, or performance threshold value will not be achieved, the milestone decision authority must be notified, and a new baseline developed, reviewed by decision makers and, if the program is to continue, approved by the milestone decision authority.

^bKey Performance Parameters are attributes or characteristics of a system that are considered critical or essential to the development of an effective military capability.

In addition to Defense Acquisition System requirements, according to DON guidance and policy, all DON MAIS and pre-MAIS programs are required to

go through a “Two-Pass/Six-Gate” acquisition review process.⁸ The first pass, which consists of Gates 1 through 3, is focused on requirements development and validation and is led by the Chief of Naval Operations or the Commandant of the Marine Corps. The second pass, which consists of Gates 4 through 6, is focused on developing and delivering a solution via systems engineering and acquisition and is led by the Assistant Secretary of the Navy (Research, Development, and Acquisition). In addition to meeting specific criteria for passing a given gate and proceeding to the next gate, all gate reviews are to consider program health (i.e., satisfactory cost and schedule performance, known risks, and budget adequacy) in deciding whether to proceed. Table 5 lists the key purpose of each gate review.

Table 5: Purpose of DON Gate Reviews

Gate	Purpose
1	To approve the Initial Capabilities Document and to validate AOA guidance and assumptions.
2	To review the AOA and approve the preferred alternatives resulting from the analysis.
3	To authorize the Capability Development Document, which defines the system’s Key Performance Parameters and includes information necessary to develop an affordable system or system increment, to be submitted to Joint Staff for review, and to approve the Concept of Operations.
4	To approve the System Design Specification, which specifies the system requirements and is derived from the Capability Development Document.
5	To approve the release of a request for proposal to industry.
6	To review overall program health, following award of a contract and satisfactory completion of an Integrated Baseline Review. ⁹ Also, to approve the Capability Production Document and program health prior to and after Milestone C and the Full Deployment Decision Review.

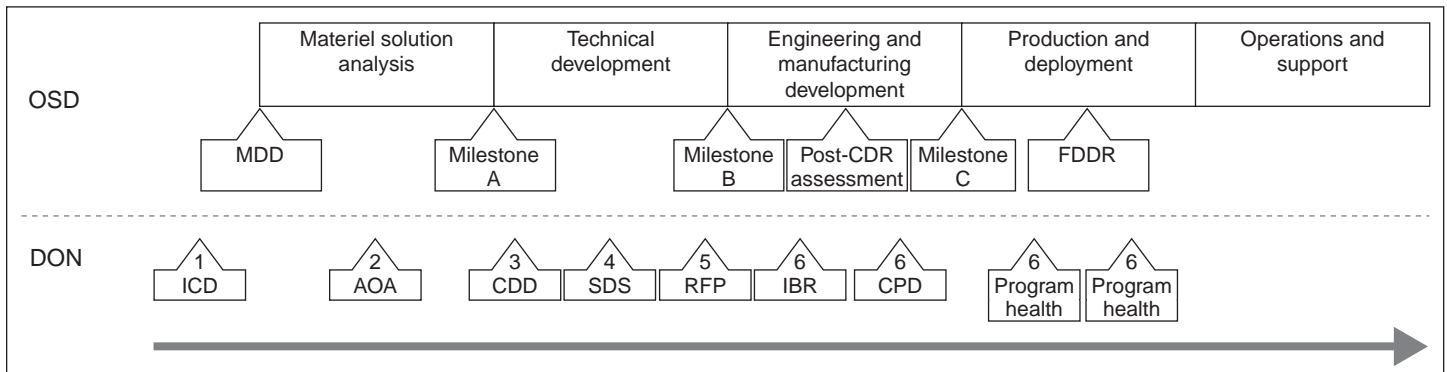
Source: GAO analysis of DON documentation.

⁹An Integrated Baseline Review is performed to obtain stakeholder agreement on a contractor’s Performance Measurement Baseline, which represents the cumulative value of planned work and serves as the baseline against which variances are calculated.

The DAS and DON acquisition phases and decision points for MAIS programs are illustrated in figure 1.

⁸Secretary of the Navy Instruction 5000.2D, *Implementation and Operation of the Defense Acquisition System and the Joint Capabilities Integration and Development System* (Oct. 16, 2008).

Figure 1: Simplified View of OSD DAS and DON Gate Review Process



Source: GAO analysis of DOD and DON policy and guidance.

Note: MDD = Materiel Development Decision; CDR = Critical Design Review; FDDR = Full Deployment Decision Review; ICD = Initial Capabilities Document; AOA = analysis of alternatives; CDD = Capability Development Document; SDS = System Design Specification; RFP = request for proposal; IBR = Integrated Baseline Review; and CPD = Capability Production Document.

As depicted in figure 2, DON completed a Gate 3 review of NGEN requirements in April 2008.⁹ In April 2009, the DON CIO completed the AOA for NGEN increment 1, and at the Gate 2 review the same month, the Deputy Chief of Naval Operations (Integration of Capabilities and Resources) and the Deputy Marine Corps Commandant for Programs and Resources approved the AOA to be submitted to the NGEN AOA Advisory Group.¹⁰ The advisory group subsequently approved the analysis and forwarded it in April 2009 to OSD Cost Assessment and Program Evaluation (CAPE), which approved it in December 2009. DON conducted a Gate 4 review of its System Design Specification in November 2009, and a Gate 5 review of its Transport Services request for proposal in October 2010. DON plans to conduct a Gate 6 review in July 2011.

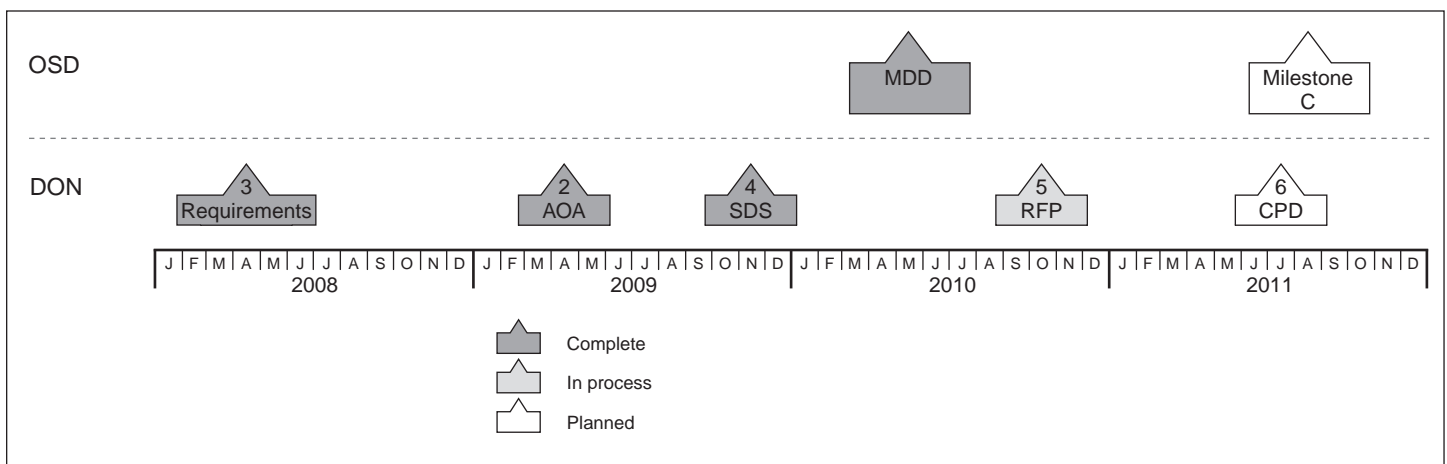
In May 2010, the USD (AT&L) completed the NGEN Materiel Development Decision, which designated the first increment of NGEN as a MAIS and

⁹The gate process had not been established at the time. DON reported that Gate 1 was nominally held in a series of Chief of Naval Operations Executive Board meetings during the winter of 2007/2008.

¹⁰Gate 2 was initially waived because DON's original acquisition approach was to continue to use the existing NMCI technology and, therefore, a traditional analysis of alternative technologies was not planned. Subsequently, OSD identified the program as a pre-Major Automated Information System acquisition, and as a result an analysis of acquisition alternatives was directed. A Gate 2 review was conducted to review the AOA.

authorized the program to enter the DAS in the production and deployment phase. A Milestone C review is currently planned for August 2011. In June 2010, the USD (AT&L) approved the current acquisition approach.

Figure 2: NGEN Review Schedule



Source: GAO analysis of DON data.

Note: MDD = Materiel Development Decision; AOA = analysis of alternatives; SDS = System Design Specification; RFP = request for proposal; and CPD = Capability Production Document.

Current NGEN Acquisition Approach Is Not Grounded in a Reliable AOA

An AOA is intended to help identify the most promising acquisition approach by comparing alternative solutions' costs and operational effectiveness. The NGEN AOA contained key weaknesses in its cost estimates and operational effectiveness analysis that impaired its ability to inform investment decision making. Further, none of the alternatives in this analysis match the current acquisition approach, and these differences have not been analyzed to determine the breadth of risk that exists. According to DON officials, the AOA reflects the most that could be accomplished in the time available to meet an imposed deadline. In addition, OSD officials stated that the differences between the current approach and the alternatives that were assessed are, in their view, not significant. However, the current approach is estimated to cost at least \$4.7 billion more than any of the AOA alternatives. Without sufficient information to understand the differences in the relative costs and operational effectiveness among alternatives, decision makers lack assurance that their selected approach is the most promising and cost-effective course of action.

NGEN AOA Was Not Based on Reliable Cost Estimates

According to relevant guidance,¹¹ a key component of an AOA is a cost analysis that provides for cost estimates of each alternative. As such, cost estimates should be reliable in order to provide the basis for informed investment decision making, realistic budget formulation, meaningful progress measurement, and accountability for results. Our research has identified four characteristics of a high-quality, reliable cost estimate: well-documented, comprehensive, accurate, and credible.¹²

The NGEN AOA assessed four alternatives.¹³ All alternatives were assumed to deliver the same NMCI capabilities and the technology across alternatives was assumed to be substantially the same. The primary differences among the alternatives were how NGEN was to be acquired, managed, and operated. Table 6 below provides a description of each alternative.

Table 6: Summary of Four Alternatives in the NGEN AOA

Alternative	Description
Alternative 1 (status quo)	A recompetes of the NMCI contract, in which the contractor was to be responsible for end-to-end integration of services and control of the network.
Alternative 2 (enhanced status quo)	A single contract similar to NMCI but with upgraded terms and conditions that were to address known NMCI deficiencies. ^a The contractor was to be responsible for end-to-end integration of services, and the government would control the network.
Alternative 3 Variant (3V) (segmented ^b approach)	Multiple contracts with different vendors. The government was to be responsible for end-to-end integration of services and control of the network.
Alternative 3 (segmented approach)	A greater number of contracts than alternative 3V. The government was to be responsible for end-to-end integration of services and control of the network.

Source: NGEN Analysis of Alternatives report, Center for Naval Analyses, April 2009.

^aSee, for example, GAO, *Information Technology: DOD Needs to Ensure That Navy Marine Corps Intranet Program Is Meeting Goals and Satisfying Customers*, [GAO-07-51](#) (Washington, D.C.: Dec. 8, 2006), for information on NMCI deficiencies.

^bSegments are components of IT services to be delivered for NGEN through multiple contracts.

¹¹GAO, *GAO Cost Estimating and Assessment Guide: Best Practices for Developing and Managing Capital Program Costs*, [GAO-09-3SP](#) (Washington, D.C.: March 2009); Defense Acquisition University, *Defense Acquisition Guidebook*, Section 3.3 “Analysis of Alternatives” (accessed Mar. 19, 2010).

¹²[GAO-09-3SP](#).

¹³DON officials stated that the NGEN AOA was not intended to be a traditional analysis to determine a system solution; rather, it was an analysis of alternative acquisition approaches.

The four alternatives' estimated costs for increment 1 from fiscal year 2011 to fiscal year 2015 ranged from \$10.25 billion (alternative 1) to \$10.84 billion (alternatives 2 and 3V). However, the estimates were not reliable because they substantially met only one of the characteristics of reliable cost estimates. Specifically,

- The AOA cost estimates were substantially well-documented. To be well-documented, the cost estimates should state the purpose of the estimate; provide program background, including a system description; provide a schedule for developing the estimates; specify the scope of the estimate (in terms of time and what is and is not included); disclose key ground rules and assumptions, data sources, calculations performed and their results, the estimating methodology and rationale, and the results of a risk analysis; and provide a conclusion about whether the cost estimate is reasonable. Moreover, this information should be captured in such a way that the data used to derive the estimate can be traced to their sources. Finally, the cost estimates should be reviewed and accepted by management.

Although the AOA did not sufficiently document the schedule, scope, and results of the risk analysis, it defined the purpose of the estimate; provided program background (e.g., system description); and disclosed ground rules and assumptions, data sources, calculations performed and their results, and the estimating methodology. Also, the data used to derive the estimates were captured in such a way that they could largely be traced to their sources, and the final AOA was reviewed and accepted by DON and OSD oversight entities.

- The AOA cost estimates were not comprehensive. To be comprehensive, the cost estimates should include all government and contractor costs over the program's full life cycle, from program inception through design, development, deployment, and operation and maintenance to retirement. They should also provide sufficient detail and reflect all cost-influencing ground rules and assumptions.

However, the cost estimates were not full life cycle costs. Instead, they only included government and contractor costs for a 5-year period from fiscal year 2011 to fiscal year 2015, covering 2 years of continued NMCI services with the current provider, 2 years of transition to the new provider(s), and 1 year of NGEN operation and maintenance. DON and OSD CAPE officials attributed this to the assumption that NGEN increment 1 contracts would have a 5-year period of performance and that future NGEN increments might be introduced after that period.

Further, while the estimates were based on a cost element structure that was decomposed to a sufficient level of detail, and the documentation largely identified ground rules and assumptions, the cost estimates did not reflect all assumptions identified in the AOA, such as schedule and performance risks associated with (1) implementing IT processes, (2) expanding the government workforce, and (3) formulating the NGEN contracts. These were significant cost-influencing risks and thus should have been incorporated into the estimates.

- The AOA cost estimates were not substantially accurate. To be accurate, the cost estimates should not be overly conservative or optimistic and should be, among other things, based on an assessment of the most likely costs, and adjusted properly for inflation. In addition, steps should be taken to minimize mathematical mistakes and to ground the estimate in documented assumptions that can be verified by supporting data and a historical record of actual cost and schedule experiences on comparable programs.

To DON's credit, the cost estimates were developed based on NMCI historical cost data, were adjusted properly for inflation, contained few mathematical mistakes, and were largely grounded in documented assumptions. However, the supporting data for key assumptions were not verified. For example, all estimates assumed that transition activity costs would amount to about 18 percent of the estimated cost of NGEN in its first year of operation, and alternative 3's estimate assumed that total cost would be reduced by 10 percent due to increased competition from its multicontract approach. However, the supporting data used by Deloitte Consulting for these assumptions were not provided to DON or the independent government review team for verification because the data were proprietary to the contractor. Further, NMCI historical data were only available at an aggregate level, so the team had to rely on subject-matter experts and other sources to estimate costs at a finer level of detail.

- The AOA cost estimates were not credible. To be credible, the cost estimates should discuss any limitations in the analysis due to uncertainty or biases surrounding the data and assumptions. Major assumptions should be varied and other outcomes computed to determine how sensitive the estimate is to changes in the assumptions. Risk and uncertainty inherent in the estimate should be assessed and disclosed. Further, the estimate should be properly verified by, for example, comparing the results with an independent cost assessment.

While the AOA identified limitations in the cost analysis, such as the use of NMCI data that did not reflect prices of other service providers, and evaluated the impact on costs of using different transition timeline scenarios, it did not include a sensitivity analysis of the key cost driver (i.e., the number of personnel needed to manage NGEN), despite concerns that the Navy's estimates of these numbers were not stabilized at the time of the AOA. In addition, while each cost estimate included a cost risk analysis based on the quality of data used, there were discrepancies in how the analysis was conducted and reported. For example, the cost for local area network facilities was estimated based on the contractor's experience, which was considered by the cost team to be a less credible data source, but it was scored higher on their risk scale, indicating that the data source was more credible. Also, schedule and performance risks were not quantified and reflected in the estimates, which is significant because a qualitative assessment of schedule and performance risks among alternatives revealed increased risk in implementing a segmented approach. If such risks had been quantified and reflected in the estimates, the results would have shown higher costs associated with alternatives 3 and 3V. Nevertheless, the AOA concluded that there was no significant cost difference among the alternatives.

In addition, the cost estimates were not validated by the independent team responsible for reviewing the cost analysis. Specifically, independent review team officials told us that they participated in a line-by-line review of the cost model where they raised comments and questions to the cost team. However, about 69 percent of the team's comments were not fully addressed and included notable concerns, such as the questionable use of certain industry-based assumptions that may not be comparable to a program as large as NGEN or to the government environment. Independent review team officials attributed the comments not being closed to the fact that the team did not have authority over the cost model to ensure that its comments were addressed. Further, these officials told us that they were not asked to review the final version of the cost model, which was the version that first introduced alternative 3V, and their review of the final version of the AOA report occurred after the DON CIO had submitted it to OSD CAPE for final approval.

According to officials responsible for developing the AOA, the weaknesses in the AOA cost estimates largely exist because there was not enough time to conduct a more thorough analysis. Specifically, they told us that the AOA schedule was constrained because the program wanted to get requests for proposals for NGEN contracts out by a predetermined date. This position was also supported by various management meeting minutes

and other artifacts that we reviewed. However, DOD and DON officials disagreed with this position and told us that the time allotted to conduct the AOA did not negatively impact its quality or scope. A time-constrained approach is not consistent with DOD guidance, which states that the scope of an alternatives analysis should be proportionate to the amount of resources affected by the decision, with more significant programs receiving more analytical attention. The combination of the AOA weaknesses we identified, and the fact that NGEN has a preliminary program life cycle cost estimate of about \$50 billion for increment 1 and is intended to provide the foundation for DON's future networking environment, suggest the need for considerable analytical attention to alternative approaches.

Without reliable cost estimates for each alternative, decision makers did not have a sound basis for making an informed decision on an NGEN solution. Most notably, since the estimates did not reflect increased risks associated with the segmented approach, the differences in the alternatives' costs were understated, and the amount of risk and costs accepted by proceeding with a segmented approach were not fully understood.

AOA Did Not Sufficiently Assess Operational Effectiveness

In addition to including reliable cost estimates, an AOA should assess how well each alternative satisfies required capabilities or goals. According to DOD guidance,¹⁴ such an analysis should (1) identify the operational capabilities and goals to be achieved with the system solution, (2) establish quantitative or qualitative measures for evaluating the operational effectiveness of each alternative, and (3) assess the ability of each alternative to achieve these measures.

While the AOA identified program capabilities and goals, it did not sufficiently assess the alternatives' operational effectiveness, making it unclear how well the alternatives would actually satisfy NGEN capabilities and goals. Specifically,

- The AOA identified capabilities and goals that the system solution should achieve. Among other things, these included addressing NMCI capability limitations identified based on 8 years of operational experience, as well

¹⁴*Defense Acquisition Guidebook*, Section 3.3 "Analysis of Alternatives" (Mar. 19, 2010); *DON Acquisition and Capabilities Guidebook* (December 2008); and *Air Force Analysis of Alternatives Handbook* (July 2008).

as capabilities needed to support DOD and DON networking strategies for DOD's Global Information Grid Network Operations and DON's future Naval Networking Environment. (See table 8 for these capabilities and goals.)

- The AOA did not establish quantitative or qualitative measures for assessing the alternatives' ability to achieve the identified NGEN capabilities and goals, as shown in table 8. For example, one of the capabilities was visibility into root causes for major network outages, which the AOA merely concluded that alternatives 2, 3V, and 3 were equally effective in addressing, even though no quantitative or qualitative measures of the alternatives' respective ability to provide visibility into root causes were defined. Further, the AOA did not discuss the methodology for assessing the alternatives. Rather, it simply states that it was a qualitative assessment.

While the AOA did not establish measures for assessing the alternatives' ability to achieve NGEN capabilities and goals, it did establish several quantitative measures to differentiate among the alternatives' respective approaches to acquiring, managing, and delivering NMCI capabilities. However, these measures alone do not provide insight into how they would influence the operational effectiveness of each alternative because they were not linked to NGEN capabilities and goals, and they did not provide sufficient insight for selecting a preferred alternative. For example, while the AOA recognized that an increase in the number of contractual relationships would result in more complexity and risk in implementing the alternative, it did not include measures for quantifying how much more risk is introduced as the number of contractual relationships increases. (See table 7 for the measures that were provided in the AOA.)

Table 7: Measures Related to Overseeing, Operating, and Managing NGEN

	Status quo	Alternative 2	Alternative 3V	Alternative 3
Government personnel as a percentage of total NGEN personnel	28	39	40	41
Number of seams ^a managed by the government	1	1	36	36
Number of contractual relationships managed by the government	3	3	10	15

Source: NGEN Analysis of Alternatives report, Center for Naval Analyses, April 2009.

^aSeams are the relationships between segments (e.g., local area networks, service desks, and enterprise hardware).

In addition, the AOA included a separate assessment of the likelihood of each alternative to successfully implement IT best practices for end-to-end IT service delivery (i.e., IT Service Management framework).¹⁵ To DON's credit, the approach used to measure the alternatives in this assessment was more structured and better documented. Specifically, the AOA team conducted table-top exercises with subject-matter experts representing each of the communities that will contribute to the acquisition, operation, and oversight of NGEN, and it worked through scenarios, such as everyday operations and responding to a computer network incident, to determine the extent to which each alternative could employ IT best practices to address a given scenario. The team captured comments made by participants and used them to infer rankings that resulted in numerical scores for each alternative.

The AOA did not assess the alternatives' ability to address capabilities and goals using defined measures of operational effectiveness because, as stated previously, no measures were established. Instead, it compared the alternatives based on qualitative determinations of whether the capability or goal was either met or partially met. (See table 8 for the results of DON's assessment.)

¹⁵To support DON's Naval Networking Environment goals, NGEN plans to implement an IT service management framework to measure and report on all aspects of end-to-end IT service delivery. DON plans to use the IT Infrastructure Library best practices to implement this framework.

Table 8: DON's Qualitative Assessment of Alternatives' Ability to Meet NGEN Capabilities and Goals

	Status quo	Alternative 2	Alternative 3V	Alternative 3
Capabilities				
• NMCI capabilities and services as of September 2010	✓	✓	✓	✓
• Address NMCI deficiencies				
• Solve problem with out-of-scope government directed action		✓-	✓-	✓
• Sufficient visibility/situational awareness of network operations		✓	✓	✓
• Visibility into root causes		✓	✓	✓
• Adequate log keeping		✓	✓	✓
• Technology refresh/architecture upgrades		✓	✓	✓
• Network Operations Concept of Operations				
• Support Network Operations Concept of Operations		✓	✓	✓
• Proactive control/defense of network		✓	✓	✓
Goals				
• Supports Naval Networking Environment				
• Enterprise network interoperability		✓	✓	✓
• Government operational control		✓	✓	✓
• Support transformation to service-oriented architecture	✓	✓	✓	✓
• Open architecture and standards	✓	✓	✓	✓
• Implement IT services management		✓-	✓-	✓
• Implement portfolio management process		✓	✓	✓
• Active monitor/report of service level agreements	✓	✓	✓	✓

Source: NGEN Analysis of Alternatives report, Center for Naval Analyses, April 2009.

Note: A checkmark indicates that the government's goal or concern would be addressed by the alternative; a check minus indicates that the government's goal or concern would be partially addressed by the alternative.

As with the cost estimates, officials responsible for developing the AOA told us that the operational effectiveness analysis was subject to time constraints so that requests for proposals could be issued on time. Although DOD and DON officials told us that the time allotted to conduct the AOA did not negatively impact its quality or scope, our review suggests otherwise. Further, the time-constrained approach is not consistent with DOD guidance, which states that the scope of an alternatives analysis should be proportionate to the resources affected by the decision, with more significant programs receiving more analytical attention.

Without a more thorough effectiveness analysis, decision makers did not have a sound basis for making an informed decision on the best NGEN alternative to pursue. Instead, DON has selected a segmented approach on the basis that it would provide increased flexibility in meeting NGEN capabilities and goals with no additional cost, even though the degree of increased flexibility among the alternatives remains unclear.

Current Acquisition Approach Was Not Addressed in the AOA and Is Riskier and Costlier Than Other Approaches in the Analysis

According to DOD guidance,¹⁶ an AOA should examine viable solutions with the goal of identifying the most promising option, thereby informing acquisition decision making. However, the segmented approach currently being pursued by DON was not one of the alternatives assessed in the AOA. Specifically, the current approach has more contracts, a different segmentation scheme, and a different transition timeline than the analyzed alternatives. Further, the impact of these differences in terms of how they compare to the original alternatives was not assessed.

The approach that is being pursued by the program office includes a higher number of contracts than those analyzed in the AOA. Given that the AOA highlighted greater schedule and performance risks as the number of contracts and contractual relationships in the approach increase, the relative schedule and performance risks for the current approach are likely greater than those for alternative 3, and therefore are likely to result in greater costs. In support of this likelihood, DON's November 2009 risk-adjusted preliminary program life cycle cost estimate for the current approach for fiscal year 2011 through fiscal year 2015 shows that the current approach will cost at least an estimated \$4.7 billion more than any of the alternatives in the AOA. (See table 9 for a comparison of the current approach to the approaches assessed in the AOA and fig. 3 for an illustration of the contractual relationships associated with DON's current approach.)

¹⁶*Defense Acquisition Guidebook*, Section 3.3 "Analysis of Alternatives" (Mar. 19, 2010).

Table 9: Comparison of NGEN AOA Alternatives and Current Approach

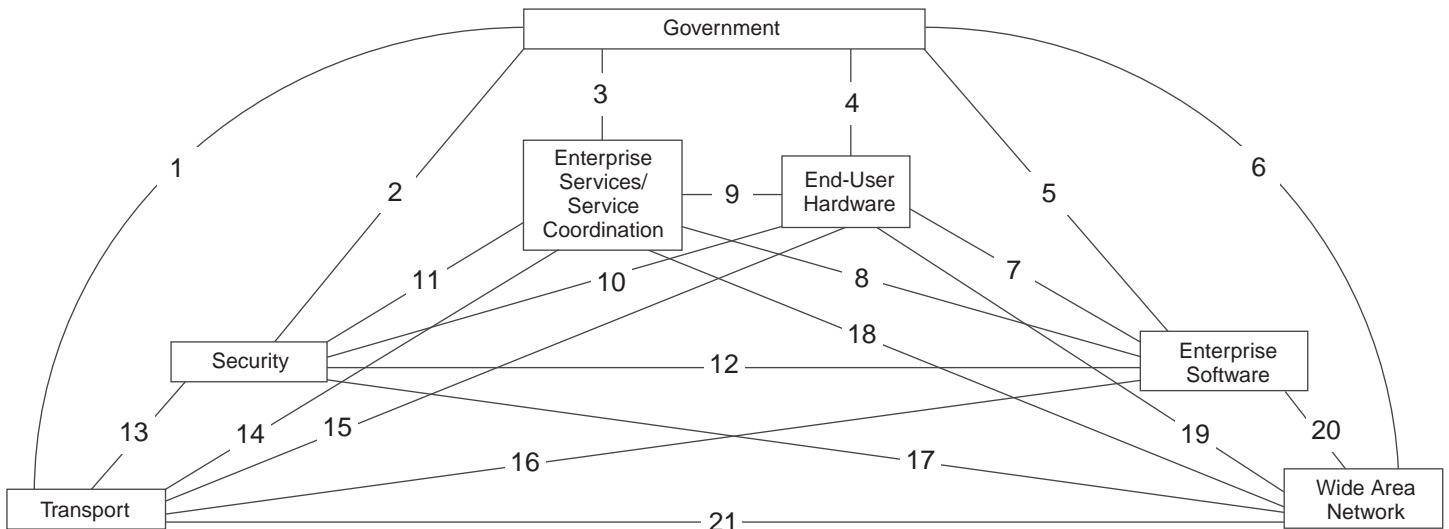
	Status quo	Alternative 2	Alternative 3V	Alternative 3	Current approach
Contracts ^a	2	2	4	5	6
Contractual relationships	3	3	10	15	21
Fiscal year 2015 operating cost (billions)	\$2.25	\$2.62	\$2.64	\$2.65	\$2.94
Fiscal years 2011 to 2015 total cost (billions)	\$10.3	\$10.8	\$10.8	\$10.7	\$15.6
Relative schedule risk	Least	More	Greater	Greatest	(not determined)
Relative risk in delivering planned performance	Least	More	Greater	Greatest	(not determined)
Transition timeline	24 months of continued NMCI services before 24 months of transitioning to new provider, and then 12 months of NGEN steady-state	Same timeline as alternative 1	Same timeline as alternative 1	Same timeline as alternative 1	14 months of continued NMCI services before 29 months of transitioning to new providers in staggered phases, and then 17 months of NGEN steady-state

Sources: NGEN Analysis of Alternatives report, Center for Naval Analyses, April 2009 (status quo and alternatives 2, 3V, and 3); GAO analysis of DON data (current approach).

Note: The difference between the total fiscal year 2011 to fiscal year 2015 cost for the current approach and alternative 3V is about \$4.7 billion due to rounding.

^aIn all alternatives, wide area network services will be provided by the Defense Information Systems Agency. DON's relationship with the Defense Information Systems Agency will be contract-like in that it is an interagency agreement, in which DON must pay for services and will have to manage its relationship with the service providers.

Figure 3: Contractual Relationships in Current NGEN Approach



Source: GAO analysis of DON data.

OSD CAPE officials told us that they believe the differences between the current approach and alternatives assessed in the AOA are not significant because DON is still pursuing a segmented approach and that the differences were the result of “an appropriate evolution of the segmented approach.” They further said that the increased risks in the current approach are offset by mitigating factors, such as the use of staggered phases to implement NGEN and the use of more efficient segmentation schemes. However, we have yet to receive any analysis to support their positions, and the current approach is estimated to cost about \$4.7 billion more. As a result, DON cannot demonstrate that it is pursuing the most cost-effective approach for acquiring NGEN capabilities and meeting NGEN goals.

NGEN’s Schedule Does Not Provide a Reliable Basis for Program Execution, and Program Delays Are Occurring

The success of a large-scale acquisition program depends in part on having a reliable schedule that defines, among other things, when work activities and milestone events will occur, how long they will take, and how they are related to one another. As such, the schedule not only provides a road map for systematic program execution but also provides the means by which to gauge progress, identify and address potential problems, and promote accountability. Without a reliable schedule, it is likely that established program milestones will slip. In the case of NGEN, such delays are already being experienced.

Our work has identified nine best practices associated with developing and maintaining a reliable schedule. These are (1) capturing all activities, (2) sequencing all activities, (3) assigning resources to all activities, (4) establishing the duration of all activities, (5) integrating schedule activities horizontally and vertically, (6) establishing the critical path¹⁷ for all activities, (7) identifying reasonable “float”¹⁸ between activities, (8) conducting a schedule risk analysis, and (9) updating the schedule using logic and durations. See table 10 for a description of each of these best practices.

Table 10: Description of Scheduling Best Practices

Practice	Description
Capturing all activities	The schedule should reflect all activities (steps, events, outcomes, etc.) as defined in the program’s work breakdown structure to include activities to be performed by both the government and its contractors.
Sequencing all activities	The schedule should sequence activities in the order that they are to be implemented. In particular, activities that must finish prior to the start of other activities (i.e., predecessor activities), as well as activities that cannot begin until other activities are completed (i.e., successor activities) should be identified.
Assigning resources to all activities	The schedule should reflect who will do the work activities, whether all required resources will be available when they are needed, and whether any funding or time constraints exist.
Establishing the duration of all activities	The schedule should reflect the duration of each activity. These durations should be as short as possible and have specific start and end dates.
Integrating schedule activities horizontally and vertically	The schedule should be horizontally integrated, meaning that it should link the products and outcomes associated with sequenced activities. The schedule should also be vertically integrated, meaning that traceability exists among varying levels of activities and supporting tasks and subtasks.
Establishing the critical path for all activities	The critical path represents the chain of dependent activities with the longest total duration in the schedule.
Identifying reasonable float between activities	The schedule should identify a reasonable amount of float—the time that a predecessor activity can slip before the delay affects successor activities—so that schedule flexibility can be determined. As a general rule, activities along the critical path typically have the least amount of float.

¹⁷The critical path represents the chain of dependent activities with the longest total duration in the schedule.

¹⁸Float is the amount of time a task can slip before affecting the critical path.

Practice	Description
Conducting a schedule risk analysis	A schedule risk analysis is used to predict the level of confidence in the schedule, determine the amount of time contingency needed, and identify high-priority schedule risks.
Updating the schedule using logic and durations	The schedule should use logic and durations in order to reflect realistic start and completion dates, be continually monitored to determine differences between forecasted completion dates and planned dates, and avoid logic overrides and artificial constraint dates.

Source: GAO.

In December 2009, NGEN established a baseline integrated master schedule¹⁹ composed of over 25 separate underlying schedules (or subschedules) to capture program milestones and the expected completion dates for activities leading up to them. However, the most current version of this schedule (May 2010) that was available at the time we began our review was not reliable because only two of the four subschedules²⁰ that we analyzed substantially met any of the nine practices. The results of our analysis of the four subschedules are summarized in table 11.

¹⁹This schedule, considered to be an informal baseline schedule, was approved by the program manager to allow for later comparison to the current plan and to manage the overall scope of work to be conducted within the program. An official baseline schedule is expected to be approved by the USD (AT&L) as part of the Acquisition Program Baseline at Milestone C.

²⁰These schedules were the Transition Integrated Product Team, IT Service Management Process Development, Comprehensive Facilities Inventory Phase 2 Plan of Action and Milestones, and Contract Technical Representative Workforce Reconstitution. These subschedules represented the ongoing and/or planned work on NGEN to be completed prior to the deployment phase, as well as high-level plans for remaining work to be completed postdeployment.

Table 11: Summary Results of Selected NGEN Schedules' Satisfaction of Schedule Estimating Practices

Schedule practice	Transition Integrated Product Team	IT Service Management Process Development	Comprehensive Facilities Inventory Phase 2 Plan of Action and Milestones	Contract Technical Representative Workforce Reconstitution
Capturing all activities	●	●	●	●
Sequencing all activities	●	●	●	●
Assigning resources to all activities	○	○	○	○
Establishing the duration of all activities	●	●	●	●
Integrating schedule activities horizontally and vertically	●	●	●	●
Establishing the critical path for all activities	●	●	●	●
Identifying reasonable float between activities	●	●	●	●
Conducting a schedule risk analysis	○	○	○	○
Updating the schedule using logic and durations	●	●	●	●

Source: GAO analysis of DON data.

- "Met" = DON provided complete evidence that satisfied the criterion.
- "Substantially Met" = DON provided evidence that satisfied more than one-half of the criterion.
- "Partially Met" = DON provided evidence that satisfied about one-half of the criterion.
- "Minimally Met" = DON provided evidence that satisfied less than one-half of the criterion.
- "Not Met" = DON provided no evidence that satisfied any portion of the criterion.

Note: The Transition Integrated Product Team subschedule contains work associated with transition planning, such as development of the Transition Management Strategy and Transition Concept of Operations. The IT Service Management Process Development subschedule contains early transition activity work focused on developing service management processes and procedures. The Comprehensive Facilities Inventory Phase 2 Plan of Action and Milestones subschedule contains early transition activity work associated with the evaluation, analysis, and validation of the current NMCI infrastructure inventory. The Contract Technical Representative Workforce Reconstitution subschedule contains early transition activity work associated with job task analysis and the assessment of learning tools for contract technical representatives.

- *Capturing all activities.* All four subschedules partially met this practice. Specifically, the majority of the activities contained in these subschedules could be mapped back to the program's NGEN work breakdown structure. However, this structure is defined at a high level and is not expected to be further decomposed into planned work products and deliverables until the program enters the deployment phase when NGEN contracts are awarded. Until this structure is sufficiently defined, it cannot be determined whether the program schedules capture all work needed to accomplish program objectives. For example, we identified risk mitigation activities for 10

active risks that should have been, but were not, captured as scheduled work.

During our review, program officials told us that they had since taken steps to ensure that all risk mitigation activities are added to the schedule. However, until NGEN work is sufficiently defined, the program does not have complete assurance that the activities currently captured in the various schedules support NGEN increment 1.

- *Sequencing all activities.* One subschedule substantially met this practice while the other three minimally met it. The subschedule that substantially met this practice had less than 1 percent of activities missing a predecessor or successor dependency. Of the remaining three subschedules, two did not identify predecessor or successor activities for over half of the activities in their schedules. This is of concern because if an activity that has no logical successor slips, the schedule will not reflect the effect of these slips on the critical path, float, or scheduled start dates of “downstream” (i.e., later) activities. Additionally, one subschedule had “constraints” placed on about 73 percent of its activities, meaning that these activities cannot begin earlier even if upstream work is completed ahead of schedule. According to program officials, they are working to reduce the number of constraints in the schedule. However, until activities are properly sequenced, these issues reduce the credibility of the dates calculated by the scheduling tool.
- *Assigning resources to all activities.* Program officials told us that they do not assign resources to any of the program schedules. They stated that the effort necessary to assign resources within the schedules would be significant and that they did not have the staff available to do this. However, without proper allocation of resources in the schedule, the program office cannot accurately forecast the likelihood that activities will be completed by their projected end dates, and the risk that key milestones will slip increases.
- *Establishing the duration of all activities.* Two subschedules met this practice while two only minimally met it. The two subschedules that met this practice had established activities with reasonable durations—the majority of which were under 30 days. The remaining two did not establish reasonable durations for their activities. For example, the majority of the activities that were in progress for the Transition Integrated Product Team subschedule had durations ranging from 50 days to 1000 days. When such long durations are assigned to work activities, it is likely that the activity is not defined to the necessary level to identify all the work that must be performed.

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- *Integrating schedule activities vertically and horizontally.* One of the subschedules substantially met and the other three partially met this practice. The subschedule that substantially met the practice is horizontally aligned, meaning activities are logically sequenced, and vertically aligned, meaning that detailed activities roll up into larger summary tasks. The other three subschedules are also vertically aligned; however, they are unable to demonstrate horizontal integration because, as previously discussed, activities were not all logically sequenced.

The integration issues identified on these subschedules also impact the NGEN master schedule. Because of the high number of missing dependencies, the number of in-progress activities with durations exceeding 30 days, and the high number of constraints, the master schedule is likely not fully horizontally integrated.

Further, one of the subschedules is not vertically aligned with the master schedule because none of the key work activities in the subschedule were included in the master schedule. In addition, the master schedule was not integrated with the approved NGEN acquisition strategy. Program officials told us they did not revise the dates in the master schedule until after the continuity of services contract was awarded (July 2010), and that the dates in the acquisition strategy reflected the current information. By using a source other than the program office's working schedule, oversight officials' expectations about when milestones will be met may not be realistic.

- *Establishing the critical path for all activities.* None of the four subschedules fully met this practice. Specifically, the scheduling tool was unable to generate a valid critical path for the subschedules due to the extent of issues associated with the sequencing of activities, integration of activities, and identification of reasonable float (discussed below). Program officials stated that they do not manage a critical path generated by the scheduling tool. Instead, these officials stated that they track activities associated with the deployment phase decision (Milestone C), which they have designated as being critically important to them. However, such practice does not allow the program to have immediate insight into the full sequence of activities (both critical and noncritical) that, if delayed, would impact the planned completion date of Milestone C, as well as a projected completion date should one of these activities be delayed.
- *Identifying reasonable float between activities.* Two subschedules partially met this practice, while the remaining two minimally met it. Each of these subschedules identified float; however, the amount of excessive float varied. Both the Contract Technical Representative Workforce

Reconstitution and IT Service Management Process Development subschedules partially met this practice because only 25 percent and 41 percent of their work activities had float of 100 days or greater, respectively. The two remaining subschedules minimally met this practice because over 60 percent of their activities contained float of 100 days or greater.

Excessive float values are indicative of schedule logic that is flawed, broken, or absent. As such, these float values are of limited value to mitigate risk by reallocating resources from tasks that can safely slip to tasks that must be completed on time.

- *Conducting a schedule risk analysis.* The program has not performed a schedule risk analysis. Instead, according to program officials, schedule risks are considered during risk management board meetings and program health assessments. However, without this analysis, it is not possible to determine a level of confidence in meeting program milestones. A schedule risk analysis will calculate schedule reserve, which can be set aside for those activities identified as high-risk. Without this reserve, the program faces the risk of delays if they were to occur on critical path activities.
- *Updating the schedule using logic and durations.* All four subschedules partially met this practice. According to program officials, status updates are performed on the subschedules once a week. However, despite status updates, date anomalies exist. For example, the Contract Technical Representative Workforce Reconstitution subschedule included five activities with an actual start date in the future. Furthermore, the subschedules' inability to produce a valid critical path indicates that the sequencing of activities is not appropriate, thus impairing the scheduling tool's ability to generate realistic start and end dates.

According to program officials, they were aware of some of these schedule weaknesses based on a May 2010 assessment of the schedule performed by a support contractor. Among other things, the contractor's assessment found that the schedule did not provide for stakeholder review of most of the major acquisition documents or steps to mitigate known risks, and that it lacked a valid critical path due to network logic issues and activity constraints. Officials told us that they plan to address these issues.

In addition, program officials stated that they hold monthly program management reviews to discuss schedule quality issues, as well as risks or issues that might affect the schedule. However, these reviews are not addressing key schedule issues. Specifically, the NGEN schedule

management plan calls for the schedule to be resource-loaded from a centralized resource pool approved by the program manager, activities beginning within 90 days to have durations of no more than 20 days, and activities for mitigating approved program risks to be added to the schedule. However, our analysis of the schedule showed that

- resources are not assigned within the schedule,
- activities that are to begin within 90 days have durations that exceed 20 days, and
- activities for mitigating 10 approved program risks were not included.

Collectively, the weaknesses in implementing the nine key practices for the program’s integrated master schedule increase the risk of schedule slippages and related cost overruns and make meaningful measurement and oversight of program status and progress, as well as accountability for results, difficult to achieve. Moreover, they undermine the schedule’s ability to produce credible dates for planned NGEN milestones and events. In the case of increment 1, this risk has already been realized. Specifically, the NGEN master schedule was rebaselined in August 2010, resulting in delays in a number of key dates, including a 5-month delay of the Milestone C decision. See table 12 for a summary of key event and milestone delays.

Table 12: Delays in Key NGEN Program Events and Milestones, as of August 2010

Event/milestone	Status of event/milestone	Delay in months^a
Milestone decisions		
Materiel Development Decision	Completed	3
DON Gate 5 Review	In progress	4
DON Gate 6 Review	Not yet occurred	7
Milestone C	Not yet occurred	5
Documents complete		
Acquisition Strategy	Completed	4
Economic Analysis	In progress	0
Cost Analysis Requirements Description	In progress	4
Preliminary Program Life Cycle Cost Estimate	In progress	4
Capability Production Document	In progress	9
Systems Engineering Plan	In progress	10

Event/milestone	Status of event/milestone	Delay in months^a
Milestone decisions		
Test and Evaluation Master Plan	In progress	14
Acquisition Program Baseline	In progress	3
Contracts		
Independent Security Operations, Oversight and Assessment Support Contract Award	Not yet awarded	4
Continuity of Services Contract Award	Completed	5
Transport Request for Proposal Release	Not yet released	4
Transport Contract Award	Not yet awarded	5
Hardware Contract Award	Not yet awarded	0
Software Contract Award	Not yet awarded	0
Enterprise Services Request for Proposal Release	Not yet released	0
Enterprise Services Contract Award	Not yet awarded	2

Source: GAO analysis of DON data.

^aDelays were calculated by comparing data in the December 2009 schedule with the data in the August 2010 schedule. Delays were rounded to the nearest month.

While officials stated that they have addressed some of the weaknesses identified above in the August 2010 rebaselined integrated master schedule, they conceded that this schedule does not assign resources to work activities, and the scheduling tool is unable to generate a valid critical path. Because these key scheduling practices are not being performed, the schedule is still not reliable.

Without a fully integrated and reliably derived schedule for the entire NGEN program, the program office cannot identify when and how it will proceed through Milestone C and ultimately transition from NMCI to NGEN, and it cannot adequately manage and measure its progress in executing the work needed to do so.

NGEN Acquisition Decisions Were Not Always Performance- and Risk-Based

Successful execution of system acquisition programs depends in part on effective executive-level governance, to include having organizational executives review these programs at key milestones in their life cycles and make informed performance- and risk-based decisions as to how they should proceed.²¹ DON policy recognizes the importance of such milestone reviews. According to this policy, acquisition programs must proceed through a series of gate reviews (as discussed above), during which program performance is assessed and satisfactory program health must be demonstrated prior to moving forward.

Currently, program performance and health at each gate are assessed using the Naval Probability of Program Success assessment methodology, which was established in September 2008. This assessment addresses four aspects of a program: (1) requirements, (2) resources, (3) planning/execution, and (4) external influencers. Associated with each aspect are two or more metrics, each of which is scored based on underlying criteria that are unique to each gate. (See table 13 for a description of each metric.) At a given gate review, the criteria are rated in terms of green, yellow, or red.²² Further, the metrics can be designated as critical, meaning that any significant issues that are associated with these metrics must be resolved before the gate can be exited.

²¹GAO, *Information Technology: Federal Agencies Need to Strengthen Investment Board Oversight of Poorly Planned and Performing Projects*, [GAO-09-566](#) (Washington, D.C.: June 30, 2009).

²²Criteria are rated green, yellow, or red based on the extent to which the program meets necessary elements associated with that criteria. These measures can vary and are defined specifically for each criterion. For example, it could be based on the status of a deliverable (i.e., green if completed, yellow if in progress, or red if not yet started), the significance of issues (i.e., green if no issues, yellow if some issues, or red if significant issues), a percentage (i.e., green if less than 10 percent, yellow if between 10 percent and 30 percent, or red if greater than 30 percent cost growth), or schedule (i.e., green if less than 6 months, yellow if between 6 and 12 months, or red if greater than 12 months schedule slip).

Table 13: Naval Probability of Program Success Metric Definitions

Program aspect	Metric	Definition
Requirements	Parameter status	Progress toward defining capability requirements and meeting those requirements; requirements traceability and validity of the threat assessment.
	Scope evolution	Stability of performance parameters from the established baseline and the impact of requirements changes on total program cost and schedule.
	Concept of operations	Progress toward developing and scoping the concept of operations, using it to inform program requirements, acquisition approaches, and strategies, and the validity of the concept of operations over time.
Resources	Budget and planning	Sufficiency of funding based on last approved budget controls and degree of deviation from the current cost estimate. Also assesses how well acquisition, systems development, and sustainment strategies are evolving in ways intended to mitigate Total Ownership Cost growth.
	Manning	Stability and adequacy of Resource Sponsor and Program Office staffing (availability, skills, experience, certification, and training).
Planning/execution	Acquisition management	Completeness of the program master schedule, status of milestone documentation development, and progress toward defining derived requirements in the System Design Specification.
	Industry/company assessment	Assesses market research activities, industrial base health, and an understanding of industrial implications for cost, schedule, and technical risks. For major contracts, assesses each company's financial health, financial systems, and manufacturing/production capabilities.
	Total ownership cost estimating	Adequacy of the elements required to produce sound cost estimates: program description information, cost data, cost estimating process, cost estimate stability and comparisons, and cost estimate measures.
	Test and evaluation	Progress toward defining and executing the Test and Evaluation Strategy and Test and Evaluation Master Plan.
	Technical maturity	Maturity of the system and subsystems design, as well as the technical maturity of critical technology elements in accordance with an approved Technology Development Strategy.
	Sustainment	Progress toward defining and executing the sustainment strategy, and the resource adequacy applied toward the life cycle sustainment activities.
	Software	Status of software management and engineering activities by government agencies and/or contractors that are integral to program deliverables.
	Contract planning and execution	Status of procurement activities and achievement of contracting milestones against the planned schedule; performance of major contractors and/or government performers.
	Government program office performance	Progress toward defining and executing intragovernment requirements; responsiveness to deliverable submissions; delivery of facilities, funding, and government furnished equipment/information in accordance with scheduled requirements; and effectiveness of configuration management and risk management boards.
	Technology protection ^a	Progress of safeguarding the research, technology information, and applied knowledge associated with the program.
External influencers	Fit in vision	Alignment with current documented OSD guidance and Navy/Marine Corps strategies.

Program aspect	Metric	Definition
	Program advocacy	Support from key stakeholders, such as USD (AT&L) (or equivalent), CAPE, international partners, and other military services.
	Interdependencies	Status of dependent programs' delivery of the requisite capability or quantity on schedule.

Source: DON Naval Probability of Program Success Guidebook version 2.2.

^aThis was a new metric introduced in the Naval Probability of Program Success version 2 framework.

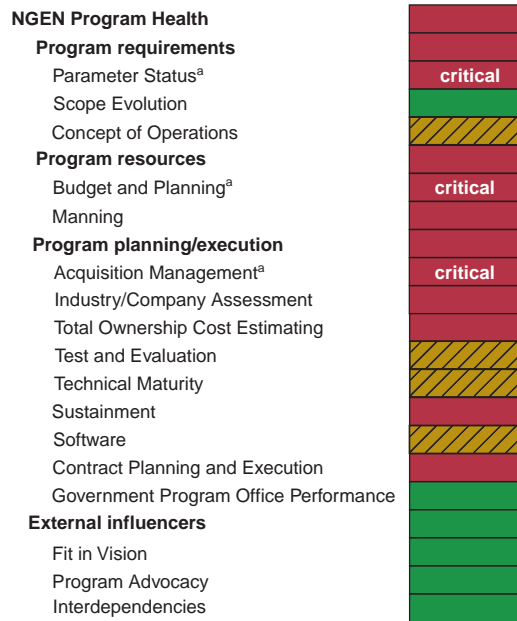
As noted earlier, a Gate 1 review was not held because the gate-review process was not established when the program began. In lieu of a Gate 1 review, according to the NGEN Acquisition Strategy, the Chief of Naval Operations Executive Board met to confirm NGEN requirements during the winter of 2007/2008 and these meetings were “nominally” a Gate 1 review. Subsequent to the establishment of the DON gate process, an NGEN Gate 2 review—intended to focus on an analysis of alternatives—was waived in early 2008 because the department planned to continue the use of existing NMCI technology, and NGEN entered the DON review process at Gate 3 in April 2008. OSD later identified the program as a pre-MAIS acquisition, resulting in the direction to conduct an analysis of acquisition alternative approaches. As such, DON held a Gate 2 review in April 2009, one year after the Gate 3 review. Since then, DON held a Gate 4 review in November 2009, as well as a Gate 5 review in October 2010. As discussed below, the extent to which each of the gate reviews was performance- and risk-based varied.

- Gate 3 review.* At the time of this review, which was in April 2008, the Probability of Program Success assessment methodology was not yet in place. Therefore, program review documentation focused on, for example, program activities that had been completed, were under way, and were planned. However, these activities were not presented relative to any benchmark or goal, and thus program performance was not apparent in the documentation. Further, while program documentation shows that risks were disclosed, such as funding shortfalls for fiscal years 2008 and 2009, as well as workforce and training challenges, the scope and nature of the information presented did not extend to the level that the assessment methodology provides. For example, the information presented did not address the realism and achievability of the program master schedule and the confidence level associated with the current cost estimate, including the difference between the program office and independent cost estimates, which are both relevant criteria under the assessment methodology for the gate. Notwithstanding these gaps in information that would have limited informed program decision making, the program was approved to proceed.

-
- *Gate 2 review.* At the time of this review, which was in April 2009, the Probability of Program Success assessment methodology was in place. However, it was not used to inform program decision making. Instead, the review focused on the AOA, next steps, and the overall program timeline. While briefing documentation shows that cost estimates for the alternatives exceeded planned funding, the documentation did not disclose the range of AOA and integrated master schedule weaknesses discussed earlier in this report, and the risks associated with these limitations. This is significant because the Gate 2 assessment criteria focus on, among other things, whether the AOA cost estimates and master program schedule are reliable and whether program execution is on schedule. Notwithstanding these weaknesses, the program was approved to proceed.
 - *Gate 4 review.* For this review, DON used its Probability of Program Success methodology and assessed the health of the program against each of the 17 metrics,²³ including 3 that DON designated as potentially critical—parameter status, budget and planning, and acquisition management. According to the program health assessment used at this gate, 8 of the 17 metrics were rated as red, meaning that the program had identified significant issues that would inhibit delivery of capability within approved cost and schedule constraints and that mitigation strategies had not been identified. Moreover, the 8 metrics rated as red included 3 that were designated as critical, meaning that these issues needed to be resolved before exiting the gate. Specifically, the parameter status metric was rated as red because NGEN requirements that increment 1 is to meet had not yet been defined; the budget and planning metric was rated as red because the program was not fully funded; and the acquisition management metric was rated as red because the USD (AT&L) had yet to authorize the milestone at which the program would enter the Defense Acquisition System. (See fig. 4 for the assessment results for all 17 metrics.) Moreover, the gate briefing document highlighted a number of risks facing the program. For example, it faced the risk that key program documentation, such as the System Engineering Plan and the Test and Evaluation Master Plan, would not be completed until NGEN requirements were defined. Further, it faced the risk that insufficient funding would impact the program office’s ability to acquire NMCI assets. Nevertheless, the program was approved to proceed.

²³At the time of the Gate 4 review, DON was using the Probability of Program Success version 1 framework that consisted of 17 metrics. Technology Protection was added in version 2 of the framework.

Figure 4: NGEN Gate 4 Probability of Program Success Assessment (November 2009)



Source: GAO analysis of DON data.

Note: Green means that the program is on track to provide capability within approved cost and schedule constraints; yellow (pattern) means that the program has identified some significant issues with providing capability within approved cost and schedule constraints, but mitigation strategies are being executed; red means that the program has identified significant issues that will inhibit delivery of capability within approved cost and schedule constraints and mitigation strategies have not been identified; and "critical" means that a potential nonexecutable situation exists for the program that must be remedied.

^aThese metrics are considered critical when they are scored red.

- Gate 5 review.* For this review, which was conducted in October 2010, DON again used its Probability of Program Success methodology and assessed program performance and risk against all 18 metrics, including 9 that DON designated as potentially critical. Three metrics were rated as red; 1, test and evaluation, was deemed critical. According to the assessment, the test and evaluation metric was rated as red because the Test and Evaluation Master Plan was not complete; the budget and planning metric was rated as red because of significant NGEN funding reductions; and the manning metric was rated as red because of inadequate program office contracting, engineering and logistics personnel. Further, according to the assessment, the Test and Evaluation Master Plan was not complete because the requirements were not defined. As discussed above, the program recognized, at Gate 4, the risk that a

delay in defining NGEN requirements would impact the completion of this plan. (See fig. 5 for the assessment results for all 18 metrics.) According to the gate briefing document, these red ratings introduced a number of risks, such as the risk that the program would not be able to execute its current acquisition approach and meet program milestones.

In addition, even though the assessment rated the acquisition management metric as green, this rating is not consistent with our findings in this report about the NGEN integrated master schedule. Specifically, the rationale for the green rating was that the August 2010 rebaselined schedule was viewed as realistic and achievable by key stakeholders. However, as stated earlier, program officials conceded that the schedule does not assign resources, and the scheduling tool is unable to generate a valid critical path, which are key scheduling practices; thus the August 2010 schedule was not reliable. The approval of the Assistant Secretary of the Navy (Research, Development and Acquisition) for NGEN to proceed beyond Gate 5 was made conditional on the program satisfactorily completing action items focused on releasing the request for proposals for the Transport Services contract (scheduled for January 2011) and resolving its funding shortfall.

Figure 5: NGEN Gate 5 Probability of Program Success Assessment (October 2010)



Source: GAO analysis of DON data.

^aThese metrics are considered critical when certain underlying criteria are rated red. This approach is different from the Gate 4 assessment because DON used a revised version of the Probability of Program Success framework when it conducted the Gate 5 assessment.

As shown above, DON has demonstrated a pattern of approving NGEN at key acquisition review gates in the face of both limited disclosure of the program’s health and risks and known program risks and shortfalls in performance. According to DON officials, the decisions to pass the gates and proceed were based on their view that they had sufficiently mitigated known risks and issues. By not fully ensuring that NGEN gate decisions sufficiently reflected program challenges, DON has increased the likelihood that the NGEN acquisition alternative that it is pursuing is not the most cost-effective course of action, and that the program will cost more and take longer to complete than planned.

Conclusions

Given the enormous size, complexity, and mission importance of NGEN, it is vital that DON and DOD assure decision makers, including the congressional defense committees, that the approach to acquiring needed capabilities is the most cost-effective and that its execution is guided by a well-defined schedule and informed milestone decision making. To date,

this has not occurred to the degree that it should. Most notably, while DON produced substantially well-documented cost estimates, the NGEN acquisition approach currently being followed is not grounded in a reliable analysis of alternative approaches, and the selected approach was not even assessed and is about \$4.7 billion costlier and introduces more risk than the alternatives that were assessed. Further, the program's execution to date has not been based on the kind of reliably derived integrated master schedule that is essential to program success. While the program office is aware of some of the schedule weaknesses and intends to address them, additional work is needed to ensure that the schedule can produce credible dates for planned NGEN milestones and events. Exacerbating this is an equally troubling pattern of missed milestones and delays in key program documentation, as well as gate review decisions that have allowed the program to proceed in the face of significant performance shortfalls and risks.

While NGEN is scheduled for an OSD-level milestone review in August 2011, the above schedule limitations make it likely that this review date will slip. It is thus imperative, given the scope and nature of the program's problems, that swift and immediate action be taken to ensure that the most cost-effective acquisition approach is pursued and that a reliable schedule and performance- and risk-based decision making are employed. To do less increases the chances that needed NGEN capabilities will be delivered late and be more costly than necessary.

Recommendations for Executive Action

To ensure that NGEN capabilities are acquired in the most cost-effective manner, we recommend that the Secretary of Defense take the following two actions:

- direct the Under Secretary of Defense for Acquisition, Technology, and Logistics to conduct an interim NGEN milestone review, and
- direct the Secretary of the Navy to immediately limit further investment in NGEN until this review has been conducted and a decision on how best to proceed has been reported to the Secretary of Defense and congressional defense committees.

At a minimum, this review should ensure that DON pursues the most advantageous acquisition approach, as evidenced by a meaningful analysis of all viable alternative acquisition approaches, to include for each alternative reliably derived cost estimates and metrics-based operational effectiveness analyses. In addition, the review should consider existing

performance shortfalls and known risks, including those discussed in this report.

To facilitate implementation of the acquisition approach resulting from the above review, we further recommend that the Secretary of Defense direct the Secretary of the Navy to take the following two actions:

- ensure that the NGEN integrated master schedule substantially reflects the key schedule estimating practices discussed in this report, and
- ensure that future NGEN gate reviews and decisions fully reflect the state of the program's performance and its exposure to risks.

Agency Comments and Our Evaluation

In written comments on a draft of this report, signed by the Deputy Assistant Secretary of Defense (C3, Space and Spectrum), and reprinted in appendix II, DOD stated that it concurred with one of our four recommendations, did not concur with one recommendation, and partially concurred with two. The department's comments are discussed below.

- The department partially concurred with our recommendation to conduct an interim milestone review that provides assurance that DON is pursuing the most advantageous acquisition approach. Specifically, the department stated that it intended to leverage the next OSD-chaired NGEN Overarching Integrated Product Team meeting in February 2011 for the review and that following this meeting, the USD(AT&L) will conduct a Milestone Decision Authority review of the current NGEN approach, along with risks. According to the department, this approach balances the review processes already in place, resource constraints, and the need for an additional milestone review. Further, the department said it had concluded that DON's AOA was sufficient and that the analysis had been approved by CAPE. DOD added that it will complete an economic analysis—a post AOA-activity—for the August 2011 Milestone C review, which will include a follow-on independent cost estimate and an updated determination of the most cost-effective solution.

While these are important steps, DOD's planned actions do not appear to fully address our recommendation. Specifically, the department did not indicate any intent to reevaluate whether the current solution is indeed the most advantageous approach, despite the weaknesses contained in the AOA identified in this report and the fact that the current approach was not included in its analysis. According to the September 2010 draft NGEN economic analysis development plan, only the status quo and the current

approach are to be analyzed, not the other three alternatives that were included in the AOA. Without a meaningful analysis of alternatives, DOD will be unable to determine the most cost-effective solution in its two upcoming key reviews.

- The department did not concur with our recommendation that it limit further investment in NGEN until a decision has been made on how best to proceed based on an interim review that considers all viable alternative acquisition approaches and this decision has been reported to the Secretary of Defense and to congressional defense committees. The department stated that DON's NGEN acquisition strategy and program management have been approved by the milestone decision authority, and that adequate oversight is in place to ensure regulatory and statutory compliance. Further, the department said that the limitation on NGEN investments will impact future DON business operations and, ultimately, Naval warfighting capabilities. The department added that it will make adjustments to NGEN investments if it determines they are required; however, it also said it must continue to execute the investments within the time frame of the continuity of services contract.

While oversight is in place for the NGEN program, it is not effective. Specifically, as discussed in this report, DON's past reviews have resulted in decisions that were not always performance- and risk-based. Given that DON is continuing to proceed in the face of the problems we are reporting, it is even more important that adequate oversight be provided by the Secretary and congressional defense committees.

Moreover, we maintain that limiting further investment in NGEN, thereby delaying the Milestone C event and its associated activities, is the most prudent action at this time. By not evaluating all viable acquisition approaches before proceeding with further investment in NGEN, the department cannot be assured that it is pursuing the most cost-effective approach. Further, by selecting an approach that, as discussed in this report, carries greater relative schedule and performance risks than other alternatives and is being executed against an unreliable program schedule, the department increases the risk that its approach will lead to future cost overruns, requiring it to expend additional resources that could otherwise be used to provide other warfighting capabilities. Furthermore, even if the department proceeds along its current course, the issues we have identified with the program's schedule, along with the delays already experienced, raise concerns that it will be unable to complete the transition as planned within the time frames of the current continuity of services contract.

-
- The department partially concurred with our recommendation that the Secretary of Defense direct the Secretary of the Navy to ensure that the NGEN integrated master schedule substantially reflects the key schedule estimating practices discussed in this report. DOD stated that the integrated master schedule was developed in accordance with industry best practices. However, as discussed in this report, none of the subschedules that we analyzed reflected all the practices that our work has identified as necessary to develop and maintain a reliable schedule. To its credit, DOD also said it would seek ways to improve schedule performance and that DON will review the scheduling practices discussed in this report and incorporate those found to be beneficial. We continue to believe that the Secretary of the Navy should ensure that the NGEN integrated master schedule incorporates all of the best practices for schedule estimating discussed in this report to help manage and measure its progress in executing the work needed to proceed through Milestone C and ultimately transition from NMCI to NGEN.
 - The department concurred with our recommendation to ensure that future NGEN gate reviews and decisions fully reflect the state of the program's performance and its exposure to risks. In this regard, the department stated that it plans to continue to conduct monthly risk management board meetings and program health reviews, and report the results to program leadership. It will be critical that decisions on NGEN fully reflect the state of the program's performance and exposure to risks.

We are sending copies of this report to the appropriate congressional committees; the Director, Office of Management and Budget; the Congressional Budget Office; the Secretary of Defense; and the Secretary of the Navy. The report also is available at no charge on the GAO Web site at <http://www.gao.gov>.

If you or your staff members have any questions on matters discussed in this report, please contact me at (202) 512-6304 or melvinv@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made major contributions to this report are listed in appendix III.



Valerie C. Melvin
Director, Information Management
and Human Capital Issues

Appendix I: Objectives, Scope, and Methodology

Our objectives were to determine whether (1) the Department of the Navy (DON) sufficiently analyzed alternative approaches for acquiring its Next Generation Enterprise Network (NGEN), (2) DON has a reliable program schedule for executing NGEN, and (3) acquisition decisions have been performance- and risk-based.

To address the first objective, we evaluated the analysis of alternatives (AOA) report and its supporting documentation against relevant Department of Defense (DOD) guidance¹ and GAO's *Cost Estimating and Assessment Guide*² and compared the alternatives in the AOA final report with the NGEN Acquisition Strategy. More specifically,

- For the cost analysis, we compared the AOA cost estimating documentation, such as the cost model spreadsheet, supporting documentation for the cost model, and the final NGEN AOA report, against the four characteristics of a reliable estimate³ in GAO's *Cost Estimating and Assessment Guide* to determine the extent to which the cost estimates reflected each of the four characteristics.
- For the operational effectiveness analysis, we compared an NGEN alternatives performance assessment report and the AOA final report against the relevant DOD guidance to determine the extent to which the analysis was sufficient. In addition, we reviewed NGEN AOA Advisory Group meeting minutes and documentation containing the results of a Space and Naval Warfare Systems Command review of the cost analysis. We also interviewed cognizant DON and Office of the Secretary of Defense officials about the AOA's development and results.

To address the second objective, we first reviewed the integrated master schedule and 4 of the 29 subschedules that existed when we began our review and that comprised the early transition activities intended to address key program risks, as well as high-level plans for postdeployment.⁴ Accordingly, we focused on assessing the May 2010

¹Defense Acquisition University, *Defense Acquisition Guidebook*, Section 3.3 "Analysis of Alternatives" (accessed Mar. 19, 2010); *DON Acquisition and Capabilities Guidebook* (December 2008); and *Air Force Analysis of Alternatives Handbook* (July 2008).

²[GAO-09-3SP](#).

³These are (1) comprehensive, (2) well-documented, (3) accurate, and (4) credible.

⁴These schedules were the Transition Integrated Product Team, IT Service Management Process Development, Comprehensive Facilities Inventory Phase 2 Plan of Action and Milestones, and Contract Technical Representative Workforce Reconstitution.

subschedules against the nine key schedule estimating practices⁵ in GAO's *Cost Estimating and Assessment Guide* using commercially available software tools to determine the extent to which each subschedule reflected each of the nine practices (e.g., a logical sequence of activities and reasonable activity durations). Further, we characterized the extent to which each subschedule satisfied each of the practices as either met, substantially met, partially met, minimally met, or not met.⁶ In addition, we compared the baseline schedule, established in December 2009, to the rebaselined schedule, established in August 2010, to identify whether key event and milestone dates had slipped. We also interviewed cognizant officials about development and management of the integrated master schedule and underlying subschedules. We also reviewed program documentation, such as the NGEN schedule management plan, program performance reports, program management reviews, and the acquisition strategy.

To address the third objective we compared program review documentation, such as briefings, program performance assessments, and meeting minutes, to DON acquisition review policies and procedures, as well as to other programmatic documents, such as risk registers and risk management board briefings and meeting minutes. We also interviewed cognizant program officials regarding NGEN performance and program risks.

To assess the reliability of the data that we used to support the findings in this report, we reviewed relevant program documentation to substantiate evidence obtained through interviews with agency officials. We determined that the data used in this report are sufficiently reliable. We have also made appropriate attribution indicating the sources of the data.

⁵These are (1) capturing all activities, (2) sequencing all activities, (3) assigning resources to all activities, (4) establishing the duration of all activities, (5) integrating activities horizontally and vertically, (6) establishing the critical path for all activities, (7) identifying reasonable "float" between activities, (8) conducting a schedule risk analysis, and (9) updating the schedule using logic and durations.

⁶"Met" means DON provided complete evidence that satisfies the entire criterion. "Substantially Met" means DON provided evidence that satisfies a large portion of the criterion. "Partially Met" means DON provided evidence that satisfies about half of the criterion. "Minimally Met" means DON provided evidence that satisfies a small portion of the criterion. "Not Met" means DON provided no evidence that satisfies any of the criterion.

We conducted this performance audit at DOD offices in the Washington, D.C., metropolitan area and at the Space and Naval Warfare Systems Command in San Diego, California, from October 2009 to February 2011 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Appendix II: Comments from the Department of Defense



NETWORKS AND INFORMATION
INTEGRATION

OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE

6000 DEFENSE PENTAGON
WASHINGTON, D.C. 20301-6000

FEB 15 2011

Ms. Valerie C. Melvin
Director, Information Management and Human Capital Issues
U.S. Government Accountability Office
441 G Street, NW
Washington, DC 20548

Dear Ms. Melvin:

This is the Department of Defense (DoD) response to the GAO Draft Report, GAO-11-150, 'INFORMATION TECHNOLOGY: Better Informed Decision Making Needed on Navy's Next Generation Enterprise Network Acquisition,' dated December 15, 2010 (GAO Code 310679). We acknowledge receipt of the draft report and note that the Department's written comments are included.

Our point of contact is Mr. Mark Godino at (703) 602-2720, ext 142. Please contact him with any questions or if you need clarification.

Sincerely,

Dr. Ronald C. Jost
Deputy Assistant Secretary of Defense
(C3, Space and Spectrum)

Enclosure:
As Stated

GAO DRAFT REPORT DATED DECEMBER 15, 2010
GAO-11-150 (GAO CODE 310679)

**“INFORMATION TECHNOLOGY: BETTER INFORMED DECISION
MAKING NEEDED ON NAVY’S NEXT GENERATION ENTERPRISE
NETWORK ACQUISITION”**

**DEPARTMENT OF DEFENSE COMMENTS
TO THE GAO RECOMMENDATIONS**

RECOMMENDATION 1: The GAO recommends that the Secretary of Defense direct the Under Secretary of Defense for Acquisition, Technology and Logistics (USD(AT&L)) to conduct an interim Next Generation Enterprise Network (NGEN) milestone review.

DOD RESPONSE: Partially Concur. The Department concurs with the finding that an interim milestone review may provide additional benefit, even though a thorough review was conducted by the Office of the Secretary of Defense (OSD) chaired, NGEN Overarching Integrated Product Team (OIPT) in November 2010. The Department intends to further leverage the next upcoming OSD chaired NGEN OIPT scheduled for 17 February 2011, for this purpose. Following this OIPT meeting, the USD(AT&L) will conduct a Milestone Decision Authority (MDA) review of the current NGEN acquisition approach, along with the risks. This approach reconciles the balance between recognition of vetted consensus review processes already in place, resource constraints, and the need for an additional milestone review. The Department has concluded the Department of the Navy (DON) Analysis of Alternatives (AoA) was sufficient. The Office of the Director of Cost Assessment and Program Evaluation (CAPE) approved the NGEN Increment 1 AoA in December 2009. Per Clinger-Cohen Certification and DoD requirements, a follow-on independent cost estimate and an updated determination of the most cost effective solution are completed as part of the Economic Analysis. The Economic Analysis is a post-AoA activity and will be completed at Milestone C, when the NGEN program is baselined (MDA approves Acquisition Program Baseline (APB)) in August 2011.

RECOMMENDATION 2: The GAO recommends that the Secretary of Defense direct the Secretary of the Navy to immediately limit further investment in NGEN until this review has been conducted and a decision on how best to proceed has been reported to the Secretary and Congressional defense committees.

DOD RESPONSE: Nonconcur. The DON's Next Generation Enterprise Network (NGEN) program management and investment strategy is well defined in its Acquisition Strategy, which was approved by the MDA and further clarified in subsequent Acquisition Decision Memorandums (ADMs). Additionally, the NGEN program has definitive, dedicated, and qualified acquisition oversight in place to ensure its regulatory and statutory compliance. The DON is presently in the midst of a limited-period Continuity of Service Contract (CoSC) that is providing bridge services during the transition from the present Navy Marine Corps Intranet (NMCI) network to the future NGEN state. If, during the upcoming interim review by the

USD(AT&L), the Department feels adjustments are required to the current or planned NGEN investments, actions will be taken at that time. Limitation of NGEN investments, at this time, will significantly impact future DON business operations and ultimately, Naval warfighting capabilities. In the near term, such limitations would impair Program Management Office activities critical to support planned Milestone C events in the Fourth Quarter of FY11. Timely execution of NGEN investments must continue in order to successfully transition from CoSC within the contractually obligated timeframe allotted.

RECOMMENDATION 3: To facilitate implementation of the acquisition approach resulting from the above review, the GAO recommends that the Secretary of Defense direct the Secretary of the Navy to ensure that the (NGEN) integrated master schedule substantially reflects the key schedule estimating practices discussed in this report.

DOD RESPONSE: Partially Concur. The NGEN Integrated Master Schedule (IMS) was developed in accordance with industry best practices for scheduling and was recently finalized and approved by the Program Manager (PM) on 26 August 2010. The NGEN IMS will continue to evolve as we move forward to Milestone C and an approved Acquisition Program Baseline (APB). As the NGEN IMS evolves, the Department will continue to seek out ways to improve our schedule performance. The Department will review the key schedule estimating practices discussed in this report and will consider incorporating those found to be beneficial.

RECOMMENDATION 4: To facilitate implementation of the acquisition approach resulting from the above review, the GAO recommends that the Secretary of Defense direct the Secretary of the Navy to ensure that future NGEN gate reviews and decisions fully reflect the state of the program's performance and its exposure to risks.

DOD RESPONSE: Concur. The NGEN PM will continue to conduct monthly formal Risk Management Board (RMB) and Probability of Program Success (PoPS) (V2.0) reviews. Results of both of these formal meetings are regularly reported in the NGEN Program Dashboard, which is distributed weekly to program leadership and monthly to the Navy Senior Integration Board (NSIB) chaired by Principal Civilian Deputy Assistant Secretary of the Navy (Research, Development, and Acquisition) (PCDASN(RDA)). Additionally, program risk status is briefed at the OSD chaired OIPT meetings. Finally, both past and future NGEN gate reviews have and will continue to fully reflect the state of the program's performance and its exposure to risk.

Appendix III: GAO Contact and Staff Acknowledgments

GAO Contact

Valerie C. Melvin, (202) 512-6304, or melvinv@gao.gov

Staff Acknowledgments

In addition to the individual named above, key contributors to this report were Randolph C. Hite, Director; Carol Cha, Assistant Director; Monica Anatalio; Mathew Bader; Neil Doherty; Cheryl Dottermusch; James Houtz; Kaelin Kuhn; Neela Lakhmani; Lee McCracken; Jeanne Sung; and Adam Vodraska.

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