United States General Accounting Office

GAO

Report to Congressional Committees

May 2002

CUSTOMS SERVICE MODERNIZATION

Management Improvements Needed on High-Risk Automated Commercial Environment Project

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GAO-02-545

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Highlights

CUSTOMS SERVICE MODERNIZATION
Management Improvements Needed on High-Risk Automated Commercial Environment Project

Highlights of GAO-02-545, a report to the Subcommittee on Treasury and General Government, Senate Committee on Appropriations, and the Subcommittee on Treasury, Postal Service, and General Government, House Committee on Appropriations.

Why GAO Did This Study

The U.S. Customs Service is in the early stages of a multiyear, multibillion-dollar project: the Automated Commercial Environment (ACE), a new import processing system that is to support effective and efficient movement of goods into the United States. By congressional mandate, Customs' spending plans for ACE must meet certain conditions, including being reviewed by GAO. In this study, GAO addresses whether Customs' latest plan satisfies congressional conditions and is consistent with open GAO recommendations, and it identifies opportunities for strengthening project management.

What GAO Recommends

To increase the chances of delivering needed system capabilities on time and within budget, GAO is making recommendations to the commissioner aimed at improving Customs' management of ACE, including strengthening system alignment with Customs' enterprise architecture, cost estimating, human capital capacity, software process maturity, and sequencing of incremental releases. Customs concurred with GAO's recommendations and described specific actions that it is taking to respond to each.

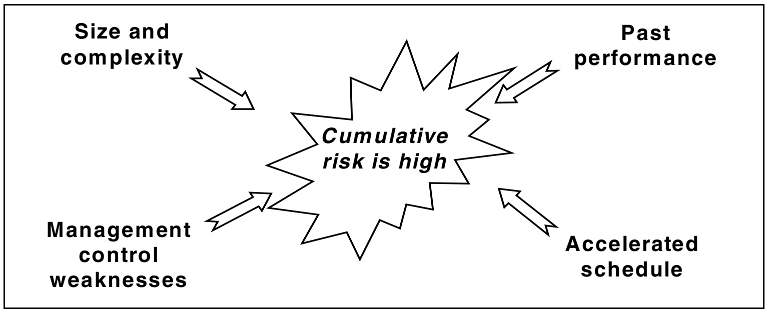
What GAO Found

Customs' February 2002 ACE spending plan is the second in a series of legislatively required plans. This plan covers certain project management tasks as well as the definition, design, and development of the first ACE increment. GAO found that the plan meets the legislative conditions that Congress imposed on Customs and is consistent with GAO's open recommendations. Nevertheless, investment in ACE is a high-risk endeavor for several reasons:

- The system's size, performance parameters, and organizational impact make it technically and managerially complex. For example, the estimated cost for acquisition alone is about $1.5 billion, the system is to operate around-the-clock, and it is to drive fundamental business process reform not only within Customs, but also within numerous other federal agencies and countless private sector importers.
- Customs fell far short of key commitments made in its first spending plan because it severely underestimated costs. This track record casts doubt on Customs' ability to meet future commitments.
- Despite progress, Customs still lacks important acquisition management controls. For example, it needs to update its enterprise architecture (its agencywide modernization blueprint) to support system design and development, and it needs to advance its acquisition office's human capital and software management processes.
- Customs has recently decided to compress its time frame for delivering the system from 5 to 4 years. This exacerbates the level of project risk by introducing more overlap among incremental system releases.

Because of the system's national importance, Customs is taking a schedule-driven approach to acquiring ACE. However, without the management capacity to effectively acquire such a large and complex system, particularly in light of Customs' performance to date and the accelerated acquisition and deployment schedule, this approach could backfire. Full system capabilities may take longer and cost more to acquire, deploy, and make operational, because the system delivered under the accelerated schedule could require considerable rework.

ACE Is High Risk for Several Reasons



This is a test for developing highlights for a GAO report. The full report, including GAO's objectives, scope, methodology, and analysis is available at www.gao.gov/cgi-bin/getrpt?GAO-02-545. For additional information about the report, contact Randolph C. Hite (202-512-3439). To provide comments on this test highlights, contact Keith Fultz (202-512-3200) or E-mail HighlightsTest@gao.gov.

United States General Accounting Office
Washington, D.C. 20548

May 13, 2002

The Honorable Byron L. Dorgan
Chairman
The Honorable Ben Nighthorse Campbell
Ranking Minority Member
Subcommittee on Treasury and General Government
Committee on Appropriations
United States Senate

The Honorable Ernest J. Istook, Jr.
Chairman
The Honorable Steny H. Hoyer
Ranking Minority Member
Subcommittee on Treasury, Postal Service,
and General Government
Committee on Appropriations
House of Representatives

Pursuant to the U.S. Customs Service's fiscal year 2002 appropriation,[1] Customs submitted to Congress in February 2002 its second expenditure plan, requesting $206.9 million for its Automated Commercial Environment (ACE) project. ACE is intended to be Customs' new import processing system and the first project under the Customs Modernization Program. As required by the act, we reviewed the expenditure plan. Our objectives were to (1) determine whether the second plan satisfied the legislative conditions specified in the act, (2) determine whether the plan is consistent with our open ACE recommendations, and (3) provide observations about the second plan and Customs' management of ACE.

On March 8 and 11, 2002, we briefed your offices on the results of this review. This report officially transmits to you the results of our work and the recommendations we made to the commissioner of Customs. The full briefing, including our scope and methodology, is reprinted as appendix I.

In brief, we determined that Customs' expenditure plan satisfies the legislative conditions specified in the appropriations act. The plan provides for (1) meeting the Office of Management and Budget's (OMB) capital planning and investment control review requirements; (2) complying with

[1] Public Law 107-67, dated Nov. 12, 2001.

Customs' enterprise architecture;[2] and (3) complying with federal acquisition rules, requirements, guidelines, and systems acquisition management practices. Further, it was reviewed and approved by Customs' Investment Review Board,[3] the Department of the Treasury, and OMB.

Regarding the second objective, activities described in the plan are consistent with our open recommendations for Customs to (1) justify and make investment decisions incrementally; (2) strengthen ACE software acquisition management; (3) immediately transfer responsibility and accountability for the International Trade Data System[4] (ITDS) pilot to the ACE modernization program manager; (4) include any plans for further investing in the ITDS pilot, including cost, benefit, and risk justification, in the next ACE expenditure plan; and (5) clarify the roles and responsibilities of the ACE modernization independent verification and validation[5] (IV&V) agent to ensure that independence is not compromised.

Finally, we made the following observations:

- ACE is technically and managerially complex and challenging. Planned ACE functional and performance parameters are demanding, and the system is estimated to cost at least $1.5 billion just to put in place, not including operation and maintenance. Also, ACE aims to fundamentally change Customs' and many other organizations' business processes through the introduction of new system capabilities. Further, the system is to be available around-the-clock to provide critical information and support important commercial and enforcement systems.

- Customs did not meet key commitments made in its first ACE expenditure plan because of a significant underestimation of funding requirements (actual requirements were about 90 percent higher than

[2] An enterprise architecture is an institutional blueprint for guiding and constraining investments in business process change and systems.

[3] Customs' Investment Review Board makes information technology funding decisions on the basis of comparisons and trade-offs among competing project proposals.

[4] ITDS is a component of the ACE project that is to support governmentwide collection, use, and dissemination of trade data.

[5] The purpose of IV&V is to provide an independent review of system processes and products. The use of IV&V is a recognized best practice for large and complex systems development and acquisition projects. To be effective, IV&V should be performed by an entity that is independent of the processes and products that are being reviewed.

estimated). This history casts uncertainty on Customs' ability to reliably estimate costs and meet future commitments.

- Despite progress, Customs does not yet have important ACE management controls in place in the following four areas:

1. Enterprise architecture: Customs' enterprise architecture has not yet been updated and extended to support ACE engineering tasks; consequently, Customs risks having an enterprise architecture that is not sufficiently complete to support ACE design activities. As a result, near-term system design and development decisions could later necessitate system rework to align ACE with the agency's operating vision, embodied in the updated enterprise architecture. If such rework is necessary, promised system capabilities are unlikely to be delivered on time and within budget.

2. Human capital: ACE is being managed by the Customs Modernization Office (CMO). However, this office does not have the people in place to perform critical system acquisition functions. Moreover, the CMO does not have an effective strategy for meeting its human capital needs. This also increases the risk that promised system capabilities will not be delivered on time and within budget.

3. Software acquisition management: Customs has yet to establish software acquisition process controls that are recognized as best management practices.[6] In particular, Customs has not begun to establish process controls for determining whether acquired software products and services satisfy contract requirements before acceptance, nor to establish related controls for effective and efficient transfer of acquired software products to the support organization responsible for maintenance. These control weaknesses further reduce the level of assurance that ACE capabilities will be delivered on time and within budget.

[6] These best practices are described in the Software Acquisition Capability Maturity Model (SA-CMM), developed by the Software Engineering Institute (SEI). In this model, SEI has provided criteria for characterizing an organization's software development and acquisition processes according to five levels of maturity, with level 2 providing the minimum level of acceptable effectiveness. The Capability Maturity Model is a service mark of Carnegie Mellon University, and CMM is registered in the U.S. Patent and Trademark Office.

4. Cost estimation: Customs has not validated its ACE expenditure plan cost estimates, and its estimates of management reserve costs are not justified. As a result, its plan does not provide Congress with credible cost information needed for overseeing the project.

- Customs has compressed its ACE acquisition plans from 5 to 4 years. This compression increases the degree of overlap of program increments, which in turn further increases the risk that ACE capabilities will not be delivered on time and within budget.

Recommendations for Executive Action

To improve Customs' ACE modernization management, we recommend that the Customs Service commissioner direct the chief information officer, as the designated modernization executive, to take the following actions:

- Before building each ACE release (i.e., beginning detailed design and development), certify to Customs' House and Senate appropriations subcommittees that the enterprise architecture has been sufficiently extended to provide the requisite enterprise design content and has been updated to ensure consistency and integration across business areas.
- Immediately develop and implement a CMO human capital management strategy that provides both near- and long-term solutions to the CMO's human capital capacity limitations, including defining the office's skill and capability needs in terms that will allow Customs to attract qualified individuals and that will provide sufficient rewards and training, linked to performance, to promote their retention.
- Develop and implement process controls for the SEI SA-CMM level 2 key process areas and the level 3 acquisition risk management key process area.
- By September 30, 2002, conduct and report to Customs' House and Senate appropriations subcommittees on the results of an internal assessment of the CMO's maturity against the SEI SA-CMM level 2 key process areas and the level 3 acquisition risk management key process area.
- Develop and implement a rigorous and analytically verifiable cost estimating program that embodies the tenets of effective estimating as defined in SEI's institutional and project-specific estimating models.

- Limit future expenditure plan requests for management reserve funds to 10 percent of the total funds requested for the program or adequately justify any management reserve requests in excess of 10 percent.

- Address the risks associated with the accelerated ACE acquisition strategy, including (1) immediately analyzing the risks associated with the degree of design, development, and testing concurrency across ACE increments that is inherent in Customs' 4-year, schedule-driven acquisition strategy; (2) reconsidering the merits of this accelerated strategy; and (3) within 90 days of the date of this briefing, reporting to Customs' House and Senate appropriations subcommittees on the agency's strategy for going forward and its plans for mitigating the inherent risks associated with this strategy.

Agency Comments

In written comments on a draft of this report, the director, Office of Planning, U.S. Customs Service, concurred with our recommendations and described specific actions that are being taken to respond to each. The director's comments are reprinted in appendix II.

We are sending copies of this report to the chairmen and ranking minority members of other Senate and House committees and subcommittees that have authorization and oversight responsibilities for the Customs Service. We are also sending copies to the secretary of the treasury, the commissioner of the Customs Service, and the director of OMB.

Should you or your staff have any questions on matters discussed in this report, please contact me at (202) 512-3439. I can also be reached by e-mail at HiteR@gao.gov. Key contributors to this report were Mark Bird, Barbara Collier, Tamra Goldstein, Randolph Tekeley, Scott Pettis, and Aaron Thorne.

Randolph C. Hite
Director, Information Technology Architecture
and Systems Issues

Customs' Second Automated Commercial Environment (ACE) Expenditure Plan

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Customs' Second Automated Commercial Environment (ACE) Expenditure Plan

Briefing for the staffs of the
Subcommittee on Treasury and General Government
Senate Committee on Appropriations
and
Subcommittee on Treasury, Postal Service, and General Government
House Committee on Appropriations

March 8 and 11, 2002

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Briefing Overview

- Introduction
- Objectives, Scope, and Methodology
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- Agency Comments

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Introduction

The U.S. Customs Service is acquiring a new trade processing system known as the Automated Commercial Environment (ACE)/International Trade Data System (ITDS).[1] This project is intended to fundamentally transform not only Customs' internal import processing operations, but also the manner in which it and numerous other federal agencies interact with each other and with the trade community. According to Customs, the project will, for example,

- enable more efficient import processing;
- minimize the gap between revenue that should be collected and revenue that is actually collected;
- increase the flow of legitimate commerce; and
- provide the trade community a single interface with 104 federal agencies that have trade-related missions.

[1] Hereafter referred to as ACE.

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Introduction (cont.)

Customs' FY 2001 and FY 2002 appropriations acts[2] provided $130 million and $300 million, respectively, for ACE. The acts specified that these funds not be obligated until Customs submits to the Congress for approval ACE expenditure plans that

- meet the Office of Management and Budget's (OMB) capital planning and investment control review requirements;
- comply with the Customs Service's enterprise architecture;
- comply with federal acquisition rules, requirements, guidelines, and systems acquisition management practices;
- are reviewed and approved by the Customs Investment Review Board, the Department of the Treasury, and OMB; and
- are reviewed by GAO.

[2] Public Laws 106-554 and 107-67, respectively.

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Introduction (cont.)

On February 1, 2002, Customs submitted its second ACE expenditure plan to its House and Senate appropriations subcommittees, seeking release of $206.9 million from the ACE appropriations.

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Objectives, Scope and Methodology

Objectives

As agreed, our objectives were to

- determine whether the second ACE expenditure plan satisfies the legislative conditions,
- determine whether the plan is consistent with our open ACE recommendations, and
- provide observations about the plan and Customs management of ACE.

Objectives, Scope and Methodology (cont.)

Scope and Methodology

To accomplish our objectives, we

- analyzed the plan against the legislative conditions, to determine if the conditions were met;
- analyzed the plan to determine consistency of actions taken by Customs in response to our open recommendations;
- interviewed ACE and ITDS program management, support contractor, and modernization contractor officials to understand the scope and content of plans, and to clarify information in supporting documentation;
- analyzed ACE supporting documentation to ensure consistency with information in the expenditure plan and to determine progress made in implementing program management capabilities (e.g., acquisition management, enterprise architecture, human capital, and cost and schedule estimating);

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Objectives, Scope and Methodology (cont.)

- determined progress made against commitments in first expenditure plan;
- coordinated with the Treasury inspector general to avoid duplication of effort in reviewing ACE;
- did not evaluate the ACE Investment Strategy and Cost Benefit Analysis, which we received on February 13, 2002; and
- as agreed, did not independently validate Customs' provided information, including cost estimates and project content and status information.

We performed our work from December 2001 through March 2002 in accordance with generally accepted government auditing standards.

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Results in Brief: Objective 1

Customs' expenditure plan satisfies the legislative conditions.

Legislative conditions	Satisfies	Does not satisfy
1. Meets OMB capital planning and investment control review requirements, including OMB Circular A-11, part 3.[3]	✓	
2. Complies with the Customs Service's enterprise architecture.	✓	
3. Complies with federal acquisition rules, requirements, guidelines, and systems acquisition management practices.	✓	
4. Is reviewed and approved by the Customs Investment Review Board, Treasury, and OMB.	✓	
5. Is reviewed by GAO.	✓	

[3] Customs provided us with a draft of the expenditure plan before it was approved by Treasury and OMB. We told Customs that the version provided did not satisfy OMB Circular A-11, part 3, requirements. Customs amended the plan before submitting it to the House and Senate Appropriations Committees.

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Results in Brief: Objective 2

Customs' expenditure plan is consistent with open GAO recommendations.

GAO open recommendations	Consistent		Inconsistent
	Complete	In progress	
1. Justify and make investment decisions incrementally.		✓	
2. Strengthen ACE software acquisition management.		✓	
3. Immediately transfer responsibility and accountability for the ITDS pilot to the ACE modernization program manager.	✓		
4. Include any plans for further investing in the ITDS pilot, including cost, benefit, and risk justification, in the next ACE expenditure plan.	✓		
5. Clarify the roles and responsibilities of the ACE modernization independent verification and validation (IV&V) agents to ensure that independence is not compromised.	✓		

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Results in Brief: Objective 3

Other observations: Customs faces considerable risk in acquiring and implementing ACE.

1. ACE is technically and managerially complex and challenging. → Adds risk

+

2. Customs did not meet key commitments made in its first ACE expenditure plan. → Adds risk

+

3. Despite progress, Customs does not yet have important ACE management controls in place. → Adds risk

+

4. Customs has accelerated its ACE acquisition plans. → Adds risk

↓

CUMULATIVE RISK IS HIGH

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Background

ACE Overview

ACE is intended to support Customs' efforts to protect our nation's borders, enforce trade laws, and facilitate the movement of legitimate trade. For example, ACE is to

- support all Customs functions associated with trade compliance (such as defining, capturing, and managing regulations for import and export compliance; establishing and managing accounts for trade participants; and verifying credentials and managing compliance levels);
- support other functions such as data analysis for trade law enforcement and border security purposes;
- support the trade information collection, processing, and dissemination needs of 104 other government agencies; and
- provide the trade community a single interface to the federal government.

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Background (cont.)

According to Customs, ACE will permit, for example, more efficient import and export operations; increased legitimate cargo flow; reduced paper burden; and more efficient and effective account management, including revenue billing and collection operations.

We have testified that the need for Customs to modernize its trade processing capability is undeniable because, among other things, Customs' existing import processing system was paper-intensive, error-prone, transaction-based, and out of step with the just-in-time inventory practices of the trade community.[4]

[4] U.S. General Accounting Office, *U.S. Customs Service: Observations on Selected Operations and Program Issues*, GAO/T-GGD/AIMD-00-150 (Washington, D.C.: Apr. 20, 2000).

Background (cont.)

ACE Acquisition Strategy

Customs is using an integration contractor, supported by subcontractors, to develop and deploy ACE. The contractor and its subcontractors are collectively called the e-Customs Partnership or eCP.

Initial modernization contract activities include establishing a management foundation (e.g., people, processes, tools) for Customs' overall modernization program. ACE is to be the first modernized system under this program.

Customs' current plans call for release of ACE capabilities in four increments implemented over 4 years. Each increment is to contain discrete functionality, while building on the functionality in the previous increments.

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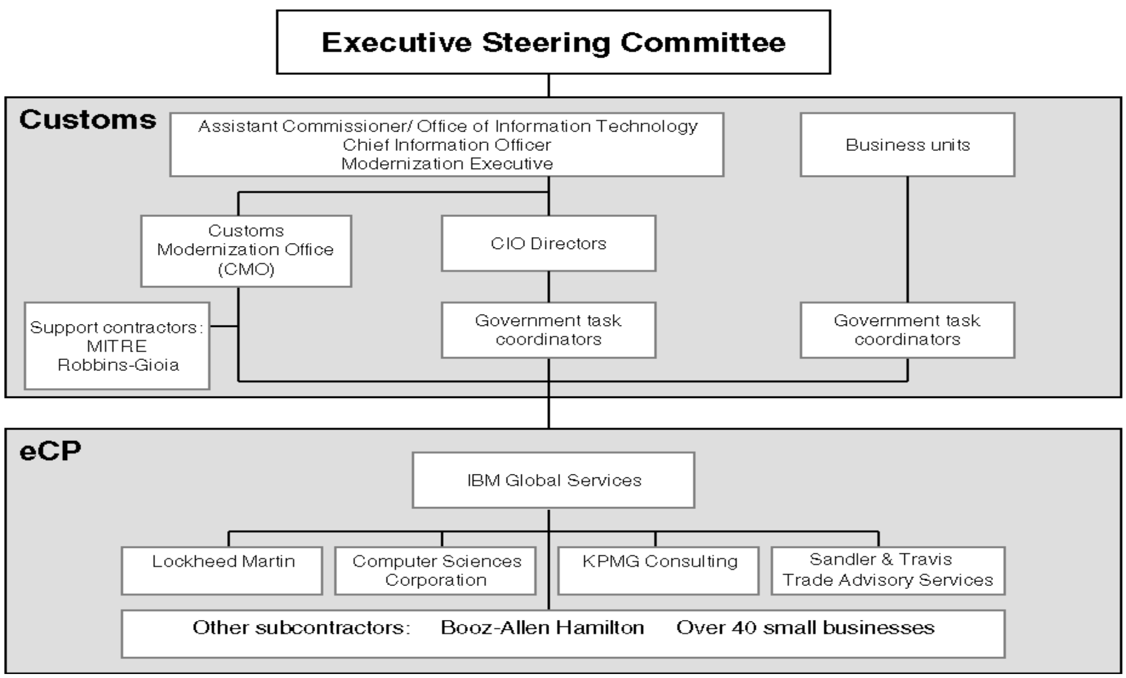
Background (cont.)

ACE Management Structure



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Background (cont.)

Chronology of ACE Expenditure Plans and Funding

On March 5 and 6, 2001, Customs' House and Senate appropriation subcommittees, respectively, released to Customs $5 million in stopgap funding to sustain program activities until Customs submitted its first expenditure plan.

On March 26, 2001, Customs submitted its first ACE expenditure plan to Congress for $45 million.

On April 23, 2001, we briefed your offices on the results of our review of the first ACE expenditure plan. In summary, we reported that

- the plan satisfied the legislative conditions;
- the plan was consistent with our February 1999 recommendations that Customs
  - justify and make ACE investment decisions incrementally, and
  - strengthen ACE software acquisition management;

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Background (cont.)

- Customs was investing in an ITDS pilot project in parallel with, and separate from, ITDS efforts under the ACE modernization program; and
- Customs had defined conflicting roles and responsibilities for its independent verification and validation (IV&V) contractor.

Accordingly, we made the following recommendations, which Customs agreed to implement:

- Immediately transfer responsibility and accountability for the ITDS pilot to the ACE modernization program manager.
- Include any plans for further investing in the ITDS pilot, including cost, benefit, and risk justification, in the next ACE expenditure plan.
- Clarify the roles and responsibilities of the ACE modernization IV&V agent to ensure that independence is not compromised.

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Background (cont.)

On April 24 and 25, 2001, Customs' House and Senate appropriation subcommittees, respectively, released to Customs an additional $45 million in response to Customs' first ACE expenditure plan.

On April 27, 2001, Customs awarded a 5-year, indefinite-delivery indefinite-quantity contract, with options to extend the contract to not more than 15 years, to International Business Machines (IBM) Global Services.

On February 1, 2002, Customs submitted its second ACE expenditure plan, seeking release of $206.9 million.

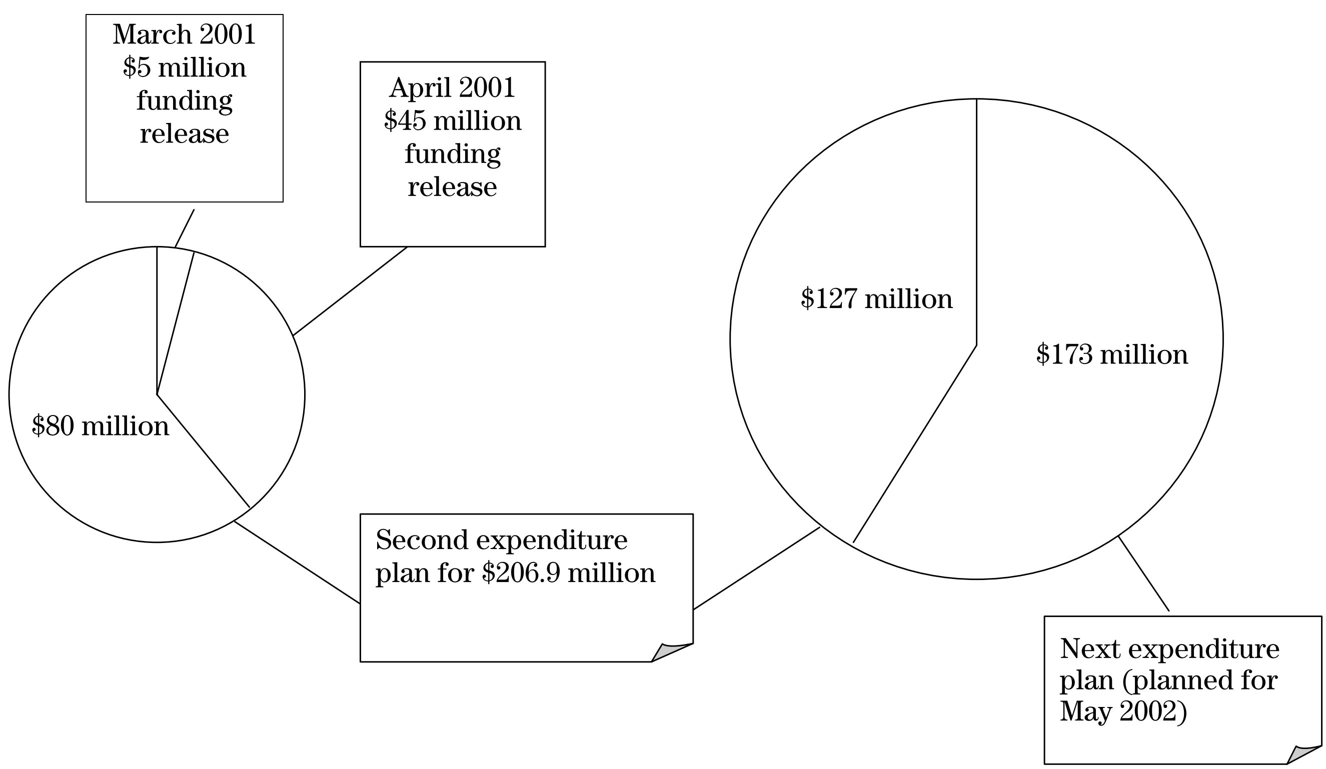
The following two figures illustrate the recent history of ACE appropriations, expenditure plans, funding, and major contract events.

Background (cont.)

ACE funding releases shown by fiscal year appropriations

FY 2001 appropriations = $130 million

FY 2002 appropriations = $300 million



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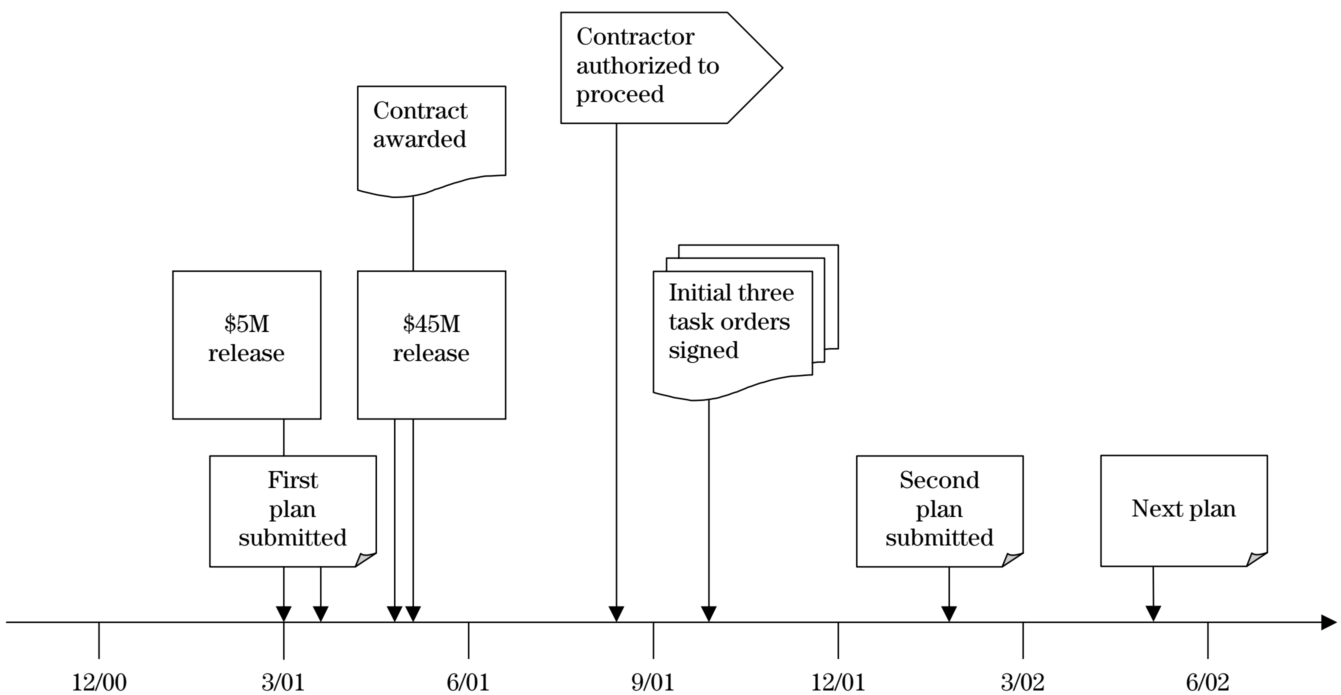
Background (cont.)

Illustrated chronology of ACE expenditure plans and funding



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Background (cont.)

Customs' second ACE expenditure plan requests funding for the following:

Areas of expenditure	Amount (millions)
Funds to cover first expenditure plan cost variance[5]	$22.4
National Customs Automation Program (NCAP) operations & maintenance	$3.1
Program management and support	$23.5
SAP[6] infrastructure	$7.3
ACE increment 1, release 1.0 design, development, test, and deployment	$104.0
ACE increment 2, detailed requirements and planning	$11.2
Customs Modernization Office (CMO) management reserve	$35.5
Total	$206.9

[5] The second expenditure plan requests funding equivalent to the difference between the negotiated price for the task orders ($47.4 million) and the funding released as a result of its first expenditure plan ($25 million).

[6] These funds will be used to acquire hardware and supporting infrastructure for Customs' SAP Implementation Project, a joint project of the Office of Finance and the Office of Information Technology. SAP AG is a vendor that makes a software package called R/3, which is to be used by ACE to account for payments, collections, and refunds. Additionally, R/3 is to replace Customs' existing core budget, accounting, procurement, and property accountability systems.

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Background (cont.)

Customs attributes its first expenditure plan variance to underestimates or omissions in the following areas:

Labor: $12.9 million (58 percent of the total variance)	Variance (millions)
Labor rates and skill mix	$6.8
Tasks (e.g., change management, Stakeholder Relations Council)	$4.5
Other (e.g., performance-based contracting)	$1.6
Other direct cost: $9.9 million (42 percent of the total variance)	
Task order planning	$2.0
Facilities and support infrastructure	$6.7
Other (e.g., performance-based contracting, travel costs)	$1.2
Total	$22.8

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Results: Objective 1

Customs' expenditure plan satisfies the legislative conditions.

Legislative conditions	Satisfies?	Results of our analysis
1. Plan meets OMB capital planning and investment control review requirements, including OMB Circular A-11, part 3.	✓	OMB circular A-11, part 3 sets requirements for budget justification and reporting requirements for major acquisitions. To respond to A-11 requirements, agencies are to cover key topics such as: • compliance with federal security and privacy regulations; • compliance with Government Paperwork Elimination Act requirements; • compliance with strategic planning requirements that demonstrate how the project will use a performance-based measurement system; and • cost and schedule information. The expenditure plan and supporting documentation address each of these key topics.

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Results: Objective 1 (cont.)

Legislative conditions	Satisfies?	Results of our analysis
2. Plan complies with Customs' enterprise architecture.	✓	The expenditure plan and supporting documentation provide for the development of an ACE system architecture that is to comply with Customs' enterprise architecture.
3. Plan complies with federal acquisition rules, requirements, guidelines, and systems acquisition management practices.	✓	The expenditure plan and supporting documents include, for example, steps for implementing the Software Engineering Institute's (SEI) Software Acquisition Capability Maturity Model (SA-CMM)[7] key process areas. If implemented effectively, these processes should enable Customs to meet important federal acquisition rules, requirements, guidelines, and systems acquisition management practices.

[7]Capability Maturity Model^{SM} is a service mark of Carnegie Mellon University, and CMM is registered in the U.S. Patent and Trademark Office. The SA-CMM identifies key process areas that are necessary to effectively manage software-intensive system acquisition. Level 2 is the second level of the SA-CMM's five-level scale and means that an organization has the software acquisition rigor and discipline to repeat project successes.

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Results: Objective 1 (cont.)

Legislative conditions	Satisfies?	Results of our analysis
4. Plan is reviewed and approved by Customs Investment Review Board (IRB), Treasury, and OMB.	✓	Customs IRB approved the expenditure plan in two parts on September 26, 2001, and October 16, 2001. Treasury approved the plan on December 20, 2001. OMB approved the plan on January 31, 2002.
5. Plan is reviewed by GAO.	✓	Our review was completed on March 1, 2002.

Results: Objective 2

Customs' expenditure plan is consistent with GAO open recommendations.

GAO recommendations	Consistent?		Actions planned or taken
	Complete	In progress	
1. Justify and make investment decisions incrementally, and for each increment:		✓	Customs expenditure plan and February 12, 2002, ACE Investment Strategy and Cost Benefit Analysis[8] describe an incremental approach to investing in ACE that
• Use disciplined investment processes;			• Entails compliance with Customs investment management process, which we determined meets OMB's policy for management of federal information resources;
• Prepare realistic and supportable benefit expectations;			• Identifies costs and benefits for the first ACE increment;
• Require a favorable return on investment and compliance with Customs architecture before making an investment decision; and			• Identifies a positive return on investment and compliance with Customs' enterprise architecture, as required by Customs' investment management process; and
• Validate actual costs and benefits once an increment is piloted.			• Plans for validation of actual costs and benefits as determined in post-implementation reviews.

[8] We did not evaluate the ACE Investment Strategy and Cost Benefit Analysis, which we received on February 13, 2002.

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Results: Objective 2 (cont.)

GAO recommendations	Consistent? Complete	In progress	Actions planned or taken
2. Strengthen ACE software acquisition management by • establishing an effective process improvement program and correcting any weaknesses in ACE software acquisition processes identified in this report thereby bringing ACE processes to at least SEI CMM level 2; and • requiring at least CMM level 2 processes of all ACE software contractors		✓	Customs' expenditure plan includes funds to continue software acquisition process improvement efforts, including • establishment of a software acquisition process improvement program, correction of software acquisition processes, and demonstration of progress toward bringing ACE processes to at least SEI SA-CMM level 2. • Customs instituted a policy requiring CMM level 2 processes of all software contractors, and is requiring that its prime modernization contractor maintain level 3 processes.

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Results: Objective 2 (cont.)

GAO recommendations	Consistent? Complete	Consistent? In progress	Actions planned or taken
3. Immediately transfer responsibility and accountability for ITDS pilot to the ACE modernization program manager.	✓		Effective May 2, 2001, Customs transferred all ITDS program management responsibilities to the Customs Modernization Office, which is headed by the ACE modernization program manager.
4. Include any plans for further investing in the ITDS pilot (including cost, benefit, and risk justification) in the next ACE expenditure plan.	✓		Customs suspended the ITDS pilot on September 11, 2001, to devote all available resources to maintaining its "Level One Alert" status at border crossings. Customs does not plan to restart the ITDS pilot.
5. Clarify the roles and responsibilities of the ACE modernization IV&V agent to ensure that independence is not compromised.	✓		Customs has clarified the ACE IV&V agent's role by eliminating the agent's program support responsibilities in areas where it has IV&V responsibility.

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Results: Objective 3

Other observations: Customs faces considerable risk in acquiring and implementing ACE.

1. ACE is technically and managerially complex and challenging. → Adds Risk

+

2. Customs did not meet key commitments made in its first ACE expenditure plan. → Adds Risk

+

3. Despite progress, Customs does not yet have important ACE management controls in place. → Adds Risk

+

4. Customs has accelerated its ACE acquisition plans. → Adds Risk

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Results: Objective 3

Observation 1: ACE is technically and managerially complex and challenging.

Planned ACE functional and performance parameters are demanding. For example, ACE is to

- be deployed and used at about 300 ports of entry.
- be available 24 hours a day, 365 days a year.[9]
- provide functionality currently provided by about 15 other systems, including the following:
  - Automated Commercial System (which tracks, controls, and processes all goods imported into the United States);
  - Automated Export System (which allows electronic transmissions of key export data from exporters, exporters' agents, and outbound carriers);

[9] A specific system availability requirement has not yet been defined.

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Results: Objective 3 (cont.)

- Treasury Enforcement Communications System (which is to support inspection personnel at borders and ports of entry along with other mission areas such as investigations, interdiction, and intelligence analysis); and
- Seized Currency and Asset Tracking System (which tracks all activity associated with seizures from the initial enforcement interest in the property until its final disposition);

- process about 29 million transactions annually;[10]
- account for over $20 billion in revenue annually; and
- require the integration of several large commercial off-the-shelf (COTS) software products using customized software (i.e., glue code).[11]

[10] According to Customs, it processed about 29 million import transactions in 1998.

[11] Customs did not yet have software size and complexity measures. Further, while the suite of COTS products to be used has yet to be defined, Customs plans indicate that COTS packages will likely include customer relationship management software, electronic document management and workflow software, workflow product and collaborative groupware software, relational database management system (RDMS) software, and online analytical processing and rules software.

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Accountability * Integrity * Reliability

Results: Objective 3 (cont.)

ACE is a large undertaking, as measured by the level of development resources needed. In particular, the cost of developing the entire system is estimated to be between $1.5 and $1.6 billion, and the number of professional staff needed to develop the system is estimated to be about 500 to 700.

ACE is also intended to support and satisfy the needs of 104 other government agencies with international trade-related missions as well as the needs of thousands of importers. Accordingly, acquiring a system that meets this diverse set of needs will require an enormous level of stakeholder participation, cooperation, and interaction.

ACE is intended to fundamentally change not only the way that Customs operates internally but also the way that importers and other government agencies operate. The ability of these organizations to accept and absorb such operational change is not guaranteed; their uncertainty has been recognized as a reason that COTS-based modernization efforts have not consistently met expectations.

Results: Objective 3 (cont.)

Observation 2: Customs did not meet key commitments made in its first ACE expenditure plan.

One indication of future performance, and thus risk, is past performance. Customs' past performance in acquiring ACE fell short of the commitments it made in the first expenditure plan.

In the first plan, Customs requested $25 million for three ACE tasks: (1) program management, (2) enterprise engineering, and (3) requirements development. Customs reports that it met commitments for task 3, but it did not meet all of the commitments for tasks 1 and 2. Specifically, because the cost to complete the three tasks collectively increased $22.8 million over what Customs requested in the first plan, Customs funded the first two tasks for only 6 months, rather than 18 months as specified in its expenditure plan. (See table on next page.)

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Results: Objective 3 (cont.)

Task	Summary of commitment in first plan	Actual result	Impact on second plan
1. Program management	Establish a program office to manage the modernization program for an 18-month period.	Work was performed for 6 months.	$22.4 million to fund the remaining 12 months on the first two task orders.
2. Enterprise engineering	Establish and maintain the systems engineering capability for implementing ACE for an 18 month period. This work includes, for example, updating and maintaining Customs' Enterprise Architecture, Enterprise Life Cycle Model, and Technical Reference Model.	Work was performed for 6 months.	
3. ACE requirements and planning	Develop high-level ACE system requirements, and detailed increment 1 requirements, as well as ACE project plan outlining the transition from ACS to ACE. This work was to be done within 6 months.	ACE system requirements, including the detailed requirements for ACE increment 1, along with project plan, were delivered within 6 months.	None.

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Results: Objective 3 (cont.)

According to Customs, the $25 million request in the first expenditure plan was based on a 1999 estimate. Customs officials acknowledged that derivation of this estimate lacked sufficient rigor because it was not based on detailed work statements.

Customs' inability to meet its initial commitments casts uncertainty on its ability to meet future commitments and thus introduces an element of risk to the ACE project.

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Results: Objective 3 (cont.)

Observation 3: Despite progress, Customs does not yet have key management controls for ACE.

a. Extension of the enterprise architecture to support ACE engineering tasks is not complete.

Enterprise architectures are corporate blueprints to guide and constrain operational and technological change, particularly investments in large system development or acquisition efforts, such as ACE. To effectively guide and constrain these efforts, enterprise architectures should be updated to ensure that they reflect changes in the strategic business direction of the enterprise. Further, they should be updated in a way that ensures consistency and integration across the full scope of the enterprise's business areas; for Customs, these areas are commercial, enforcement, and administration. Also, these architectures should be sufficiently extended to recognize system-specific business requirements upon which later design decisions will be based. Such extensions are both normal and a necessary part of methodologically sound system design and development. To minimize risk, these architectural activities should be completed before system design and development begins.

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Results: Objective 3 (cont.)

Customs recognizes the need to ensure that its ACE system architecture is further defined, and it has instituted processes for providing such assurance. For example, it is having eCP extend the ACE system architecture to include logical data models and data flows and expand the standards for Web services. However, Customs has yet to commit to work on its enterprise architecture that eCP officials say is needed to ensure that Customs' enterprise architecture is internally consistent, sufficiently scoped, and adequately extended.

Instead, Customs' plans to provide "just enough" enterprise architecture "just-in-time" to guide and constrain the design of future ACE increments. According to eCP officials, parallel definition of the enterprise and system architectures is not typically done. The reason it is not typically done is because it risks not having sufficient enterprise context available to effectively design the system.

We believe that the reason for Customs' parallel approach is the priority being given to meeting the ACE schedule. In our view, such a schedule-driven approach risks producing an enterprise architecture extension that is not sufficiently complete to support ACE design activities; this, in turn, could result in costly system rework and a failure to deliver system capabilities on time and within budget.

Results: Objective 3 (cont.)

b. Customs does not have an effective strategy for meeting its modernization human capital needs.

Effective human capital management is fundamental to any organization (or organizational component), such as the CMO. To be effective, information technology (IT) human capital management strategies should provide for

- identifying knowledge, skills, and experience requirements;
- continuously assessing existing capabilities; and
- developing effective strategies and implementing plans to fill any gaps, including developing compensation packages to attract and retain qualified individuals.

Since the CMO's establishment in June 2000, its approach to meeting its human capital needs has been to identify a set of CMO positions, develop position descriptions for each, advertise these positions, and select among applicants.

Using this approach, the CMO currently does not have the human capital capacity it needs to effectively manage ACE. (See table on next page.) To compensate, Customs' approach has been to rely on support contractors.

GAO Accountability * Integrity * Reliability

Results: Objective 3 (cont.)

Status of CMO positions:

Position title	Level	Filled?	Number of months vacant
Executive Director	SES	Yes	—
Deputy Director	GS-15	No	2
Requirements Executive	GS-15	Yes	—
Requirements Executive	GS-15	Yes	—
Executive Support	GS-14	Yes	—
Executive Support	GS-7	Yes	—
Requirements Management Lead	GS-14	No	7
Business Management Lead	GS-14	No	5
Communications Lead	GS-14	No	10
Program Control Lead	GS-14	No	0
Systems Engineering Lead	GS-13/14	No	9
Program Analyst	GS-9/13	No	0
Program Analyst	GS-9/13	No	5

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Results: Objective 3 (cont.)

In our view, the CMO's lack of adequate human capital can be traced to not having defined and implemented an effective human capital strategy. Such a strategy would, at a minimum, completely and correctly define the CMO's human capital needs (both the proper skill levels and the commensurate compensation packages needed to attract and retain them) and provide Customs' full commitment (resources and management attention) for pursuing short-term and long-term actions to meet them. Unless Customs addresses its human capital weaknesses, it increases the risk of not delivering ACE capabilities on time and within budget.

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Results: Objective 3 (cont.)

c. Software acquisition management processes are incomplete.

Effective IT management processes, such as processes for acquiring software, are essential to software-intensive system acquisitions. SEI, recognized for its expertise in software processes, has defined the tenets of effective software acquisition. The SA-CMM identifies, among other things, a number of key process areas that are necessary to effectively manage software-intensive system acquisition.

As discussed earlier, Customs is addressing our recommendations aimed at correcting the ACE software acquisition management weaknesses that we identified in our February 1999 report,[12] and Customs officials told us that they plan to eventually assess their SA-CMM capabilities, although no time frame has been set.

[12] U.S General Accounting Office, *Customs Service Modernization: Serious Management and Technical Weaknesses Must Be Corrected*, GAO/AIMD-99-41, Washington, D.C., Feb. 26, 1999.

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Results: Objective 3 (cont.)

Using Customs' reported data on the status of its efforts to address these weaknesses, we determined that one of the SEI key process areas is generally complete (i.e., the vast majority of practices in a key process area are in place), five key process areas are works in progress (i.e., one or more practices in a key process area are in place), and two key process areas are not started (i.e., no practices in a key process area are in place).

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Results: Objective 3 (cont.)

Status at Customs on SEI key process areas:

SEI SA-CMM key process area	Generally complete	Work in progress	Not started
Software acquisition planning: ensuring that reasonable planning for the software acquisition is conducted and that all elements of the project are included.		✓	
Solicitation: ensuring that award is made to the contractor most capable of satisfying the specified requirements.		✓	
Requirements development and management: establishing a common and unambiguous definition of software acquisition requirements understood by the acquisition team, system user, and the contractor.	✓		
Project office management: managing the activities of the project office and supporting contractor(s) to ensure a timely, efficient, and effective software acquisition.		✓	
Contract tracking and oversight: ensuring that the software activities under contract are being performed in accordance with contract requirements, and that products and services will satisfy contract requirements.		✓	

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Results: Objective 3 (cont.)

SEI SA-CMM key process area	Generally complete	Work in progress	Not started
Evaluation: determining that the acquired software products and services satisfy contract requirements prior to acceptance and transition to support.			✓
Transition to support: providing for the transition of the software products being acquired to the eventual software support organization.			✓
Acquisition risk management:[13] identifying risks as early as possible, adjusting acquisition strategy to mitigate those risks, and developing and implementing a risk management process as an integral part of the acquisition process.		✓	

[13] Acquisition risk management is an SEI SA-CMM level 3 key process area.

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Results: Objective 3 (cont.)

As shown in the table above, Customs has yet to complete many key processes and, in particular, the *evaluation* and *transition to support* key process areas have not been started. The purpose of evaluation is to determine that the acquired software products and services satisfy contract requirements before acceptance. *Evaluation* should include developing and managing evaluation requirements in conjunction with developing software technical requirements. *Transition to support* is to provide for the effective and efficient "hand off" of the acquired software products to the support organization responsible for software maintenance and should include designating a group that is responsible for coordinating transition and support activities.

Customs officials agree that its software acquisition processes are incomplete and told us that Customs delayed addressing the evaluation and transition to support key process areas because resources (i.e., staff) were needed for higher priority activities. In the absence of an evaluation capability, Customs said that they are using a support contractor to perform evaluation activities.

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Results: Objective 3 (cont.)

Because Customs has not yet established effective software acquisition processes, it does not have adequate assurance that ACE capabilities will be delivered on time and within budget.

Results: Objective 3 (cont.)

d. Expenditure plan cost estimates have not been validated by Customs.

Producing reliable cost estimates for inclusion in ACE expenditure plans is essential. Without such estimates, Customs cannot provide congressional committees with the information needed to exercise important ACE oversight. Ensuring that cost estimates are reliable requires, at a minimum, that Customs satisfy itself that rigorous, analytically verifiable methods are used to derive the estimates. To this end, SEI has defined models for (1) establishing an institutional estimating capability and (2) validating the reliability of a project-specific estimate.[14]

As discussed earlier, Customs' cost estimates for the initial ACE tasks in its first expenditure plan were not reliable because Customs did not use a rigorous approach in deriving them.

[14] Software Engineering Institute, *Checklists and Criteria for Evaluating the Cost and Schedule Estimating Capabilities of Software Organizations (*CMU/SEI-95-SR-005*)* and *A Manager's Checklist for Validating Software Cost and Schedule Estimates (*CMU/SEI-95-SR-004*)*.

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Results: Objective 3 (cont.)

For its second expenditure plan, Customs did not use any method to derive contract-related costs. Instead, it simply passed along estimates developed by the ACE contractor, except for Customs' internal (CMO) costs and the management reserve. According to Customs, it plans to use an independent contractor to validate cost estimates after it submits future expenditure plans and to use this information in negotiating task orders.

For the management reserve of $35.5 million requested in the second expenditure plan, Customs used a contractor to derive this estimate. This estimate represents about 21 percent of the total funds requested (excluding the reserve) in the expenditure plan. We found that this reserve estimate lacked analytical justification and relied extensively on the unsubstantiated assumptions and subjective judgments of a few individuals. In fact, we could have used the same methodology used by the contractor, made our own equally valid assumptions and judgments, and produced estimates either considerably higher or lower.

Results: Objective 3 (cont.)

Moreover, available information from studies and comparable system undertakings, such as the Internal Revenue Service's Business Systems Modernization (BSM), do not support this level of management reserve. For example, the BSM management reserve is 10 percent, and a study covering about 500 Defense contracts showed a mean management reserve of about 4 percent.

We conclude that the management reserve cost estimate appears overstated, and the reliability of the other estimates in the second expenditure plan is uncertain. Without reliable estimates, Customs increases the risk that it will repeat its first expenditure plan performance, and that it will not meet expenditure plan commitments.

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Results: Objective 3 (cont.)

Observation 4: Customs has accelerated its ACE acquisition plans.

When a system is incrementally acquired, it is important to carefully manage the extent to which design, development, testing, and implementation of the increments overlap (i.e., occur concurrently). The goal is to ensure that a given increment has been sufficiently matured (so that it is free of material defects and performs as intended) before later, dependent increments are built.

While some degree of increment concurrency is appropriate, extensive overlap of increments' detailed design, development, and testing activities is generally not desirable because it increases the risk of overall system rework. Reasons for this include, carrying over unresolved defects into later increments; maintaining control over a proliferating number of system versions; stretching critical resources (such as people, development and testing laboratories); and introducing incremental change into the organization with such frequency that it exhausts the organization's capacity to absorb the change.

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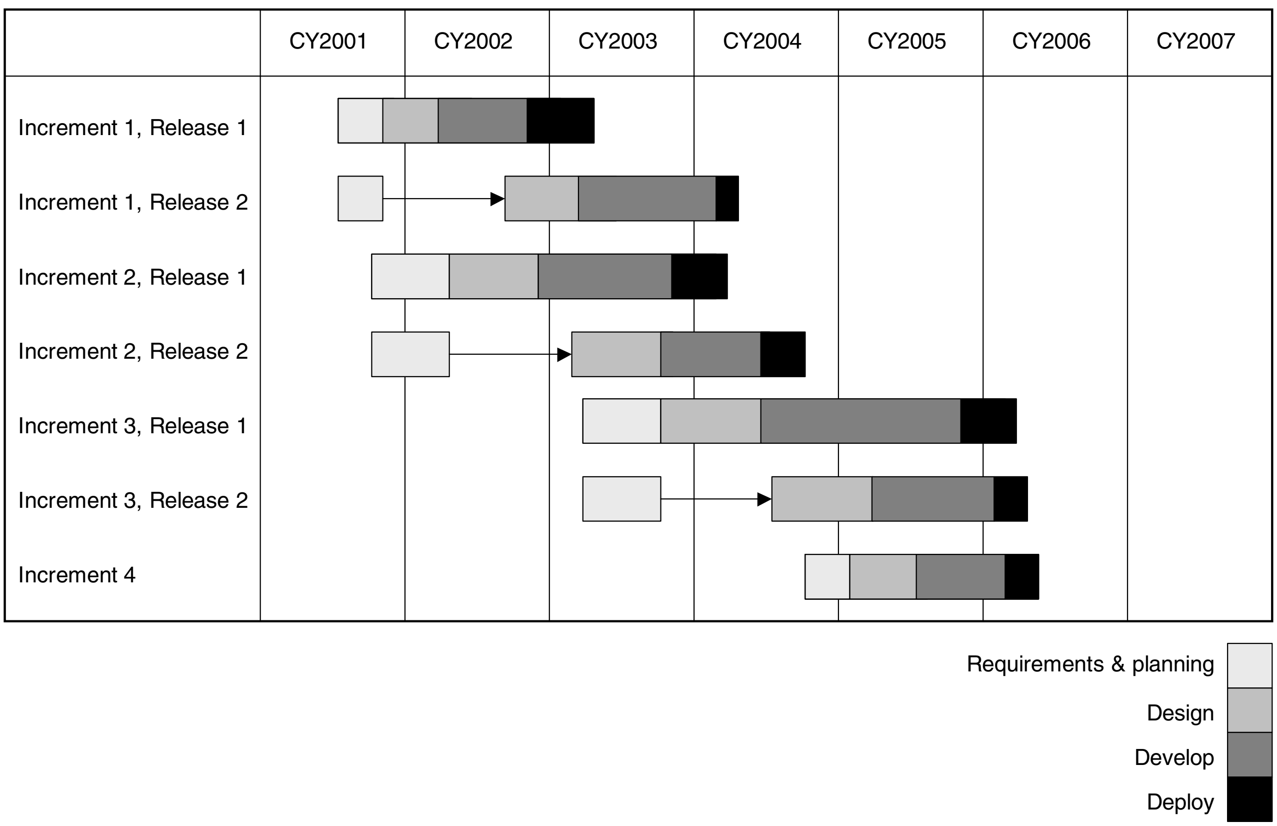
Results: Objective 3 (cont.)

As previously stated, Customs has committed to implementing our prior recommendation to incrementally acquire and invest in ACE. Until recently, Customs' incremental strategy provided for acquiring and deploying ACE in four major increments spanning 5 years, with the first three of the four increments consisting of two subincrements or releases. Even under this 5-year strategy, Customs' plans provided for some overlap among increments. For example, design activities in one increment were generally occurring concurrently with development activities in later increments. (See figure on next page.)

In January 2002, Customs decided to accelerate its plans for acquiring and deploying ACE, electing to deliver ACE's four increments in 4 years rather than 5 because, according to the Commissioner of Customs, ACE is important to our country's security and the future of trade facilitation. While Customs has yet to develop a program schedule detailing the extent to which this compressed schedule will increase concurrency among system increment design, development, and testing, Customs and its integration contractor acknowledge that increased concurrency among increments will occur.

Results: Objective 3 (cont.)

ACE 5-year implementation plan:



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Results: Objective 3 (cont.)

The contractor has also acknowledged that this increased concurrency will exacerbate preexisting risks, such as

- the possibility that an increment's requirements will not be fully understood before design and development is to begin;
- the possibility that the delivery of COTS and hardware products will not be timely; and
- the possibility that changes will be required to Customs' legacy systems with which ACE must interface.

The contractor has also stated that the compressed schedule introduced new risks, such as

- funding requirements will be so high that budget approval is unlikely;
- staffing requirements will be so high that physical housing of all personnel will be difficult; and
- the trade community will not have sufficient lead time to make changes necessary to support ACE.

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Results: Objective 3 (cont.)

Combined with the other risks that we cited earlier (i.e., unresolved defects carrying over to later increments, version control, overtaxing core resources, and capacity for change absorption), the chances of not delivering ACE capabilities on time and within budget are increased appreciably.

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Conclusions

Customs' second ACE expenditure plan satisfies the legislative conditions and is consistent with our open recommendations. Nevertheless, ACE introduces a host of unavoidable risks, including the complexity of the work, the dependence of successful implementation on the interaction of a large and diverse set of stakeholders, and these stakeholders' ability to absorb the considerable operational changes to be introduced through ACE.

One indicator of Customs' ability to successfully address these risks and deliver ACE capabilities on time and within budget is its past performance. Customs did not fulfill important commitments that it made in its first expenditure plan because the plan's estimated costs for certain tasks were not reliable. Because of this track record, the risks in moving forward on ACE are amplified.

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Conclusions (cont.)

Another indicator of Customs' ability to successfully acquire and implement ACE is the effectiveness of the management controls it has in place to govern its system acquisition and implementation activities. For various reasons cited by Customs officials, including limited resources and schedule demands, Customs has yet to establish several important management controls, such as an updated enterprise architecture, adequate human capital capacity, complete software acquisition management processes, and reliable cost estimating. The absence of these controls further compounds the risks facing Customs on ACE.

Notwithstanding these risks, Customs has recently decided to develop and deploy the system faster. This decision exacerbates an already risky undertaking by increasing the difficulty of the work without first providing for a commensurate increase in the capabilities needed to perform the work.

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Recommendations for Executive Action

To address the risks discussed in this briefing, we recommend that the Customs Service Commissioner direct the Chief Information Officer, as the designated Modernization Executive, to take the following actions:

- Before building each ACE release (i.e., beginning detailed design and development), certify to Customs' House and Senate appropriation subcommittees that the enterprise architecture has been sufficiently extended to provide the requisite enterprise design content and has been updated to ensure consistency and integration across business areas.
- Immediately develop and implement a CMO human capital management strategy that provides both near-term and long-term solutions to the CMO's human capital capacity limitations, including defining the office's skill and capability needs in terms that will allow Customs to attract qualified individuals and that will provide sufficient rewards and training, linked to performance, that promote their retention.

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Recommendations for Executive Action

- Develop and implement process controls for the SEI SA-CMM level 2 key process areas and the level 3 acquisition risk management key process area.
- By September 30, 2002, conduct and report to Customs' House and Senate appropriation subcommittees on the results of an internal assessment of the CMO's maturity against the SEI SA-CMM level 2 key process areas, and the level 3 acquisition risk management key process area.
- Develop and implement a rigorous and analytically verifiable cost estimating program that embodies the tenets of effective estimating as defined in SEI's institutional and project-specific estimating models.
- Limit future expenditure plan requests for management reserve funds to 10 percent of the total funds requested for the program or adequately justify any management reserve requests in excess of 10 percent.

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Recommendations for Executive Action

- Address the risks associated with the accelerated ACE acquisition strategy, including (1) immediately analyzing the risks associated with the degree of design, development, and testing concurrency across ACE increments that is inherent in Customs' 4-year, schedule-driven acquisition strategy; (2) reconsidering the merits of this accelerated strategy; and (3) within 90 days of the date of this briefing, reporting to Customs' House and Senate appropriations subcommittees on the agency's strategy going forward and its plans for mitigating the inherent risks associated with this strategy.

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Agency Comments

In commenting on a draft of this briefing, the Customs Modernization Office Executive Director agreed with our findings, conclusions, and recommendations.

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Comments from the U.S. Customs Service

U.S. Customs Service

Memorandum

DATE: **April 24, 2002**

FILE: AUD-1-OP MD

MEMORANDUM FOR RANDOLPH C. HITE
U.S. GENERAL ACCOUNTING OFFICE

FROM: Director
Office of Planning

SUBJECT: Draft Audit Report on the United States Customs Service's Second Automated Commercial Environment (ACE) Expenditure Plan

Thank you for providing us with a copy of your draft report entitled "Customs Service Modernization: Management Improvements Needed on High-Risk Automated Commercial Environment Project" and the opportunity to discuss the issues in this report.

We agree with GAO's overall observations that the Customs Modernization program is large, complex and important, and thus represents considerable risk. We have taken, and will continue to take prudent steps to address the risks associated with the Modernization program. Key actions are highlighted below:

- While we believe that the Customs Modernization Office (CMO) was appropriately staffed and structured for the early phases of the program, our early experiences also led to recognition that a new structure and additional resources were required to oversee application development and deployment. A new, expanded organizational structure has been approved doubling the size of the CMO. These positions are being filled now.

- We have taken a number of steps to improve our cost estimating capability including use of an independent government cost estimator and implementation of software tools that allow for a reliable cost estimation process. These efforts will be reflected in future Expenditure Plans.

TRADITION

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SERVICE

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HONOR

-2-

Although the original cost estimate differed from the actual cost, this is not representative of Customs current cost estimating capabilities. The cost estimates from the first ACE expenditure plan pre-dated the contract award and did not include task order changes recommended by eCP and approved by the CMO. Once the scope changes were approved, Task Orders 1-3 have come in on time, on budget, and without modification. Customs believes that now that the task statements are being developed collaboratively with eCP, and with the cost estimation improvements that CMO has implemented, the issue of large cost variances will pass.

- Customs and eCP recognize the risks associated with pursuing a 4-year application rollout. We have identified the inherent risks of this 4-year approach, analyzed the potential impacts, and briefed the Modernization Executive Steering Committee. The CMO and eCP are employing risk management procedures that conform to Systems Engineering Institute standards to mitigate risks associated with the entire Modernization program, including the first ACE release. Prior to receiving authorization to proceed in each of the subsequent 6 releases, we commit to re-assessing the risk environment and developing mitigation strategies to meet cost and quality targets. At any point, if risks cannot be credibly mitigated Customs and its Integration Contractor will recommend schedule adjustments.

- Customs has tasked eCP to update and extend the existing enterprise architecture in concert with ACE requirements, planning and engineering work to provide the requisite design content, and consistency and integration across the full scope of the Customs business areas. We will do this in an incremental and logical fashion to minimize risks of subsequent re-work. We believe we can accomplish this objective by completing the basic enterprise architecture frameworks prior to beginning detailed design for each increment. Thus, the enterprise architecture frameworks and relevant derivative artifacts pertinent to the specific ACE increment content will be sufficiently complete prior to beginning detailed design for each increment.

-3-

- The CMO is proceeding with implementation of software acquisition controls that comply with the Software Engineering Institute's Software Acquisition Capability Maturity Model and is 75 percent complete. The CMO continues to focus on the most critical plans, processes and procedures first across all KPAs as we proceed through the Modernization effort.

The attachment to this memorandum details the specific actions that are being taken to respond to the recommendations.

If you have any questions regarding these comments, please contact Ms. Michele Donahue at (202) 927-0957.

William F. Riley

Attachment

Attachment

U.S. CUSTOMS SERVICE
GAO Review of Second Automated Commercial Environment Expenditure Plan

Recommendation 1: *Before building each ACE release (i.e., beginning detailed design and development), certify to Customs' House and Senate appropriation subcommittees that the enterprise architecture has been sufficiently extended to provide the requisite enterprise design content and has been updated to ensure consistency and integration across business areas.*

Response:

Customs recognizes and supports the imperative to establish and incrementally enhance the enterprise architecture to effectively guide and constrain large system development or acquisition projects such as ACE. Customs has tasked eCP to update and extend the existing enterprise architecture in concert with ACE requirements, planning and engineering work in order to provide the requisite design content, and consistency and integration across the full scope of the Customs business areas. The tasking and schedules are specifically designed to ensure the necessary enterprise architecture framework is in place to adequately guide and constrain each release of the ACE system, while also reflecting any resulting changes in the strategic business direction of the enterprise.

Customs agrees with the GAO recommendation to certify that extensions to the enterprise architecture provide sufficient context to effectively design the system prior to building each ACE release and reflect any necessary strategic business updates required to ensure consistency and integration across all business areas. eCP has recommended tailoring of Customs System Development Life Cycle (SDLC) to include a Preliminary Design Review (PDR) which will include an enterprise and ACE system architecture assessment component. This review occurs prior to beginning detailed design and development, and therefore is the proper point in the lifecycle to demonstrate the necessary architectural framework and content exists to proceed. The results of this review will provide the objective evidence necessary to provide certification of the enterprise architecture to the House and Senate appropriation subcommittees.

Customs expects to demonstrate compliance with this recommendation prior to the start of Task Order 4 detailed design work in June 2002.

Target Date: June 30, 2002
Responsible Executive: Charles Armstrong

2

Recommendation 2: *Immediately develop and implement a CMO human capital management strategy that provides both near-term and long-term solutions to the CMO's human capital capacity limitations, including defining the office's skill and capability needs in terms that will allow Customs to attract qualified individuals and that will provide sufficient rewards and training, linked to performance, that promote their retention.*

Response:

Customs believes it did apply appropriate program management resources to the initial phases of the Modernization program. However, Customs concurs with GAO that additional resources are required to manage the expanding complexity of the project. To that end, the CMO has defined a new organizational structure for managing the developmental phases of the Modernization program that more than doubles the government positions from 11 to 23. Knowledge and skills required to perform each role have already been identified. Customs is proceeding to staff the new organizational structure now, and by May 1, 2002, the CMO will have filled a number of positions with full-time, Customs-experienced individuals leading the efforts in executive support, program management, workforce transition, integration, ACE requirements development, and ACE Increments 1 and 2 implementation. New CMO members will be quickly oriented to the Modernization Program and provided necessary training as defined in the Modernization Training Plan for Fiscal Year 2002. Customs will continue an aggressive recruiting program both within and external to Customs to fully staff the CMO. Further, the CMO will work with appropriate other Customs Offices to develop a human resources strategy by September 30, 2002 that will focus on defining core competencies to support recruiting, retention and training efforts; tying performance and reward programs to Modernization goals; and developing a succession plan to enable Customs to effectively adapt to personnel changes.

Target Date: September 30, 2002
Responsible Executive: Charles Armstrong

3

Recommendation 3: *Develop and implement process controls for the SEI SA-CMM level 2 key process areas and the level 3 acquisition risk management key process area.*

Response:

The CMO's comprehensive SA-CMM process development effort is 75 percent complete and spans all of SEI's SA-CMM Level 2 Key Process Areas (KPAs)—including the Evaluation and Transition to Support KPAs—and to the Level 3 KPA, Acquisition Risk Management (ARM). As originally noted in the CMO's briefing to GAO on February 26, 2001, the CMO continues to focus on the most critical plans, processes and procedures first across all KPAs as we proceed through the modernization effort.

As the processes are completed, they are immediately released to the organization for use in an institutionalization effort. Process institutionalization will continue after the last plan, process and procedure is approved and will end when all SA-CMM process artifacts are in systematic use within the CMO.

The CMO anticipates that the process development activities will culminate in an internal self-assessment that will be completed by September 2002, and the CMO will use the September internal self-assessment to baseline the process institutionalization activities as well. The capstone of the institutionalization effort will be a SA-CMM external pre-assessment at the end of December 2002. The results of the external pre-assessment will be used to schedule the full SEI assessment in 2003.

Target Date: September 30, 2002
Responsible Executive: Charles Armstrong

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Recommendation 4: *By September 30, 2002, conduct and report to Customs' House and Senate appropriation subcommittees on the results of an internal assessment of the CMO's maturity against the SEI SA-CMM level 2 key process areas, and the level 3 acquisition risk management key process area.*

Response:

The CMO's current Process Improvement schedule supports the GAO's recommendation to conduct and report to Customs' House and Senate appropriation subcommittees on the results of an internal assessment of the CMO's maturity against SA-CMM Level 2 KPAs and the Level 3 acquisition risk management KPA. Customs will report the results of its internal self-assessment by September 30, 2002.

Target Date: September 30, 2002
Responsible Executive: Charles Armstrong

Recommendation 5: *Develop and implement a rigorous and analytically verifiable cost estimating program that embodies the tenets of effective estimating as defined in SEI's institutional and project-specific estimating models.*

Response:

Customs agrees with the GAO recommendation that a rigorous and analytically verifiable cost-estimating program is essential to the success of ACE. Customs has taken measures that have proven successful in providing a solid foundation on which the program has effectively contracted for three large Task Orders with no cost over-runs.

While there was a variance from the original cost estimates for Task Orders 1 and 2, that delta was due to a two-year old estimate, and a significant change in scope. To remedy the situation, Customs employed an independent contractor, MCRI to develop Independent Government Cost Estimates (IGCEs) in line with SEI's estimating checklist. When the IGCEs were delivered and the subsequent contract negotiations took place, Customs was able to issue Task Orders 1-3 that have come in on-time, on-budget, and without modification. Using the IGCE method to provide independent validation of eCP estimates, Customs has recently contracted for two more Task Orders (4 and 5) that fell well within the acceptable range of the initial estimates from MCRI.

Customs is always exploring ways to refine its cost estimating practices, and will implement improvements as they are identified. One such improvement that has already been implemented is the use of Crystal Ball® risk analysis software to calculate levels of certainty around different estimating values. This software tool was used in formulating the Expenditure Plan that is currently undergoing

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Executive Branch review prior to submission to Congress. This software tool, employing elements of SEI's cost estimation checklist, will be used to formulate all subsequent expenditure plans, elevating the estimating rigor, providing a greater level of confidence in the estimates, and allowing for better planning for known program risks.

Target Date: Customs believes it has taken actions responsive to this recommendation.
Responsible Executive: Charles Armstrong

Recommendation 6: *Limit future expenditure plan requests for management reserve funds to 10 percent of the total funds requested for the program or adequately justify any management reserve requests in excess of 10 percent.*

Response:

The CMO understands GAO concerns regarding management reserve. To better define risk and uncertainty, CMO is using Crystal Ball®, a risk analysis tool. Consequently, Customs will have adequate justification for future expenditure plan requests for management reserve funds.

Target Date: Customs believes it has taken actions responsive to this recommendation.
Responsible Executive: Charles Armstrong

Recommendation 7: Address the risks associated with the accelerated ACE acquisition strategy, including (1) immediately analyzing the risks associated with the degree of design, development, and testing concurrency across ACE increments that is inherent in Customs 4-year, schedule-driven acquisition strategy, (2) reconsidering the merits of this accelerated strategy, and (3) within 90 days of the date of this briefing, reporting to Customs House and Senate appropriations subcommittees on the Agency's strategy going forward and its plans for mitigating the inherent risks associated with this strategy.

Response:

Customs and its Integration Contractor have already identified the inherent risks of this 4-year approach, analyzed the potential impacts, and briefed the Modernization Executive Steering Committee. The CMO and eCP are employing risk management procedures that conform to Systems Engineering Institute standards to mitigate risks associated with the entire Modernization program, including the first ACE release. Prior to receiving authorization to proceed in each of the subsequent 6 releases, the risk environment will be re-assessed and

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mitigation strategies will be developed to meet cost and quality targets. At any point, if risks cannot be credibly mitigated, Customs and its Integration Contractor will recommend schedule adjustments. As suggested by the GAO, Customs will also provide a report to the House and Senate Appropriation Committees by April 30, 2002, outlining the risks identified and the corresponding mitigation plans. Within this same time period, Customs will also reconsider and analyze the merits of the current ACE program plan and include the findings in this report.

Target Date: April 30, 2002
Responsible Executive: Charles Armstrong

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