

Improving the Cost Estimating Capability at the Federal Aviation Administration (FAA)

Presented to: 2007 International Society of Parametric Analysts (ISPA) and Society of Cost Estimating & Analysis (SCEA) Joint Conference in New Orleans, LA

By: Katrina Hall, FAA Air Traffic Organization, Finance Service Unit, Office of Investment Planning and Analysis

Date: June 12-15, 2007



**Federal Aviation
Administration**



Agenda

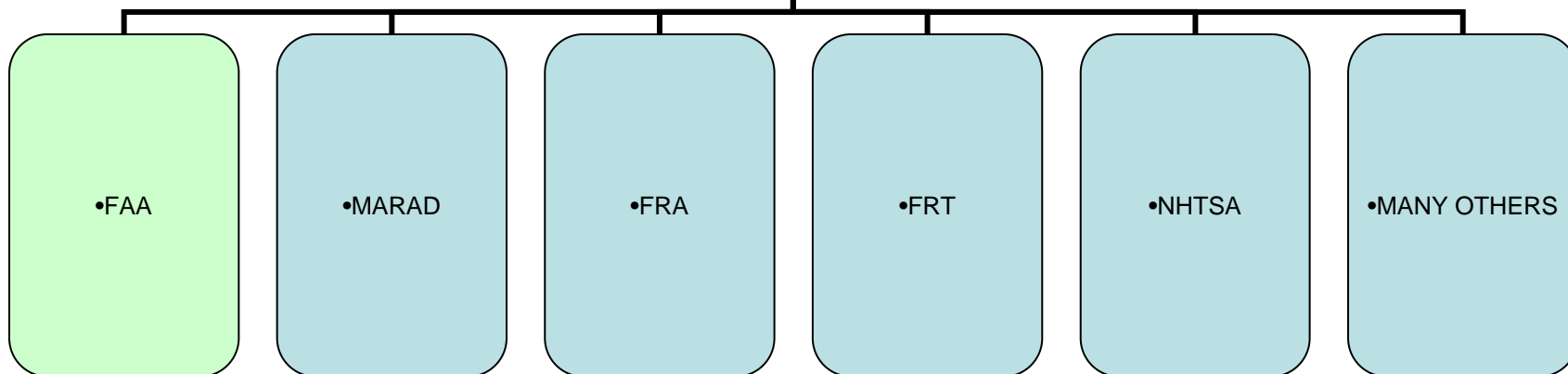
- Background
- The Problem
- FAA Progress to Date
- Next Steps
- Q&A

THE FAA

DOT HISTORY: The Department of Transportation was established by an act of Congress on October 15, 1966, the Department's first official day of operation was April 1, 1967. The mission of the Department is to:

•DOT

DOT Mission *Serve the United States by ensuring a fast, safe, efficient, accessible and convenient transportation system that meets our vital national interests and enhances the quality of life of the American people, today and into the future.*



FAA Mission

- **The FAA provides a safe, secure, and efficient global aerospace system that contributes to national security and the promotion of U.S. aerospace safety.**
- **As the leading authority in the international aerospace community, the FAA is responsive to the dynamic nature of customer needs, economic conditions, and environmental concerns.**

See also <http://www.faa.gov/about/mission/>

The FAA's Air Traffic Organization

Foundation

- COO hired in Aug. 2003
- Established in Feb. 2004
- Performance-Based Organization (PBO) focused on results
 - Revenue: \$9.1 billion
 - Employees: 36,336
 - National Airspace System operational facilities: 40,997
 - ATC facilities: 649

Focus

CUSTOMERS



Commercial Aviation

- Airlines
- Cargo

Business Aviation

Private Aviation

DHS (and other Government Agencies)

Military (DOD)*

*Partner with ATO

OWNERS

U.S. Citizens*

Traveling public*

Taxpayers*

*As represented by Congress

Office of Management and Budget

Secretary of Transportation

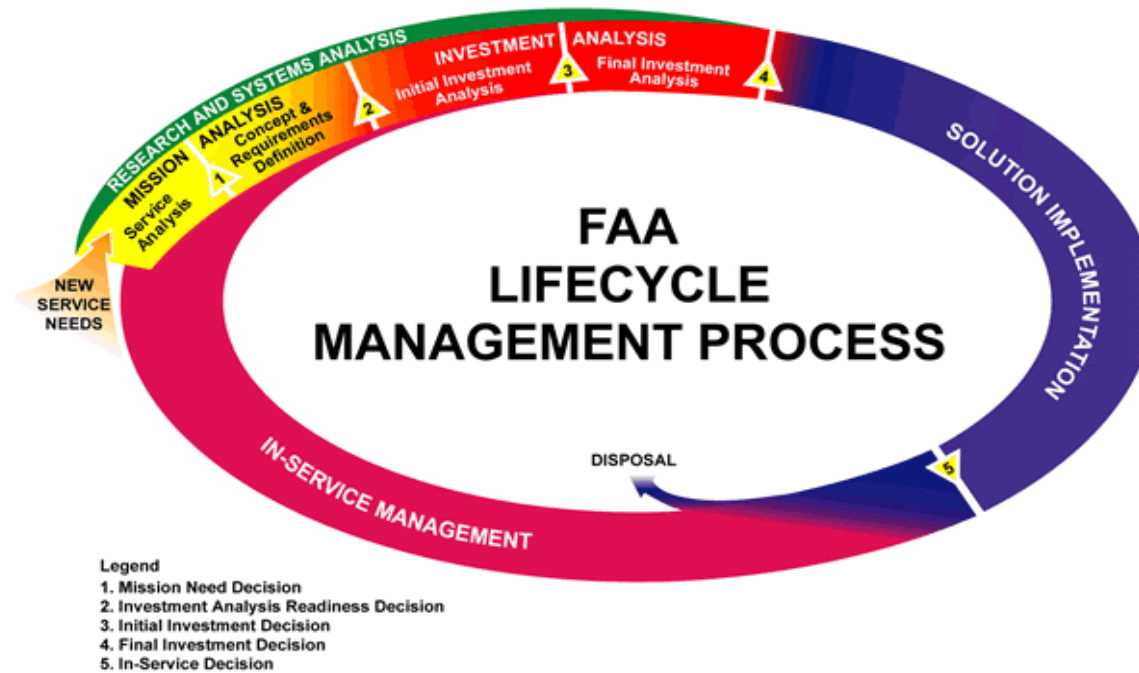
Inspector General

EMPLOYEES

ATO Individual Federal Employees

Labor Unions

Acquisition Management System - Policy



- **AMS launched – April 1996**
- **Investment Analysis responsibility defined – October 1996**
- **Initial and Final Phases published in the FAA Acquisition System Toolset (FAST) – March 2001**
- **Mission Analysis change approved November 2004**

Problem

There needs to be greater standardization of cost estimating processes across the agency

- Underestimating has a financial implication in that the program would require allocated funds from other sources
- Overestimates lead to underutilized resources that could be used for other activities
- Engages scarce resources to rework cost estimates as they are presented for independent review
- Loss of credibility with legislative agencies such as OMB and Congress

Other Drivers for Change

▪ **Government Accounting Office (GAO)**

- High Risk List
 - FAA modernization program has been on the GAO high-risk list for twelve years
 - 4 Focus Areas were developed in response to GAO recommendations
 - Focus Area 1: Improve processes and capabilities for acquiring software intensive systems
 - Focus Area 2: Implement and enforce a complete enterprise architecture.
 - **Focus Area 3: Improve cost estimating and cost accounting practices.**
 - Focus Area 4: Effective information technology investment processes.
- Findings from GAO Reports

GAO Report Drove The Need for Cost Estimating Skills at FAA-ATO

- **Cost growth and schedule delays of major acquisitions continue to stall NAS modernization efforts***
- **FAA needs to develop a comprehensive strategy for modernizing the NAS to ensure major acquisition programs are delivered within cost, schedule, and performance milestones***

*** STATUS OF FAA'S MAJOR ACQUISITIONS: COST GROWTH AND SCHEDULE DELAYS CONTINUE TO STALL AIR TRAFFIC MODERNIZATION**
Federal Aviation Administration
Report Number: AV-2005-061
Date Issued: May 26, 2005

Other Drivers for Change – cont.

▪ **Office of Management and Budget (OMB)**

- Major FAA Acquisitions are required to submit OMB Exhibit 300 Documents
- OMB Policy Letter 05-01: Developing & Managing the Acquisition Workforce
 - Requires alignment of civilian and defense acquisition workforce requirements
 - Sets Government-wide standards for education, training, and experience based on core competencies and common certification programs
 - FAA has named ‘cost estimators’ as an acquisition role and developed draft cost competencies

Other Drivers for Change – cont.

▪ **FAA Agency Goals**

- Organizational Excellence Goal: to ensure success of the FAA's mission through stronger leadership, a better trained workforce, enhanced cost-control measures, and improved decision-making based on reliable data
 - Eliminate the reasons FAA is on the Government Accountability Office's High Risk List for Air Traffic Control Modernization by FY 2008
 - Invest in prioritized solutions that provide positive return on time, on budget
 - Develop strong business skills in the ATO

FAA Progress to Date

- **Defined Agency Cost Estimating Competencies**
 - Using SCEA Body of Knowledge as framework
 - Defined Acquisition Workforce with Cost Estimating as a defined role

- **Cost Estimating Included as Part of Investment Decision Processes**
 - Cost Estimates are developed within the Service Units and reviewed by Independent Evaluators
 - Greater Emphasis on Business Case Development and Economic Analysis Metrics
 - Increased level of scrutiny through decision process

FAA Progress to Date

■ **Increased Adherence to Standards and Guidance**

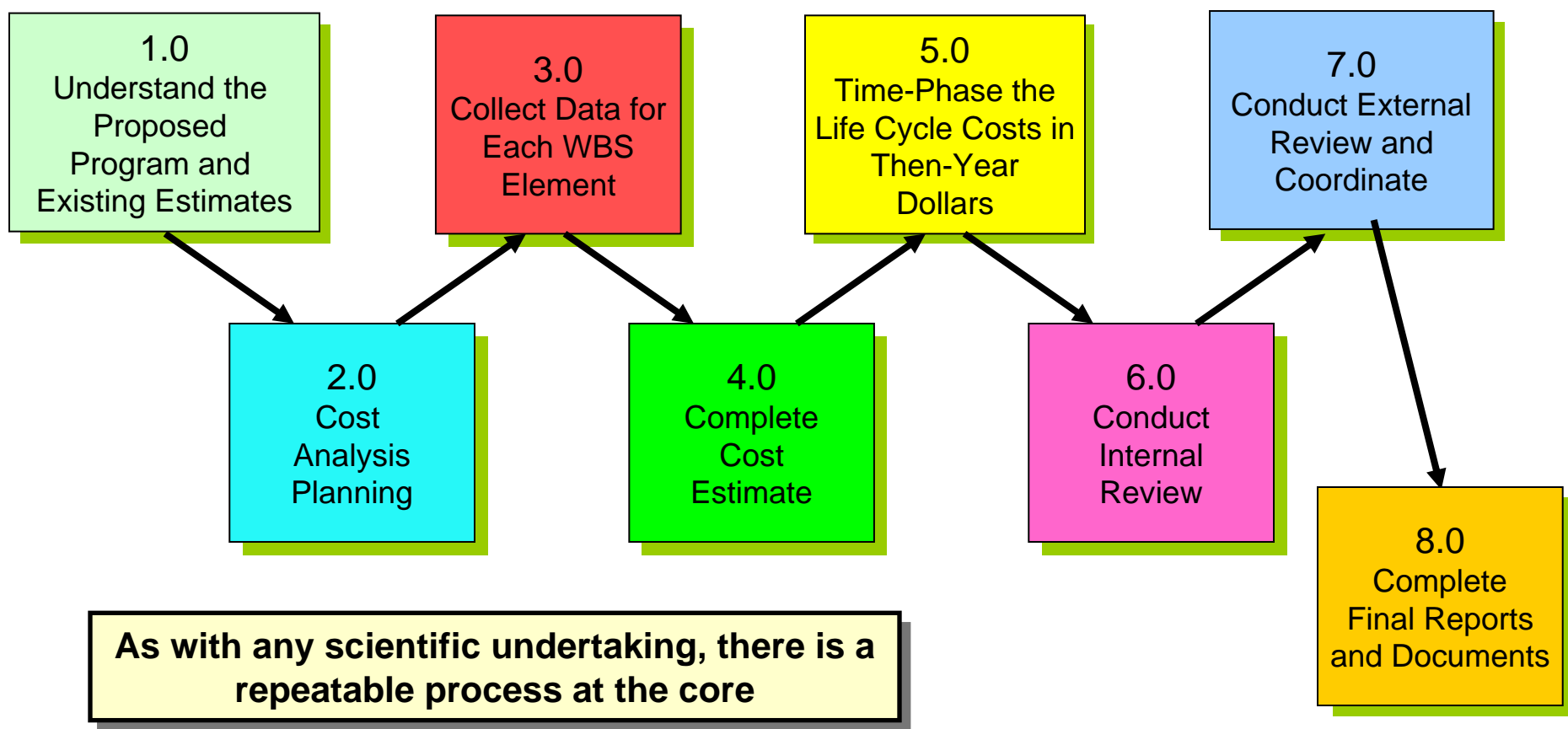
- Standard Work Breakdown Structure
- Basis of Estimate documentation standard
- Cost Estimate Legacy Definition
- Standard Cost Estimation Methodology
- Mandatory risk adjustment; Baseline at 80% confidence level

■ **Training**

- Performed agency wide cost estimating skill set gap analysis
- Defined cost estimating competencies and training requirements
- Defined knowledge, skills, and abilities required for cost estimators
- Developed core training courses and plan for additional courses

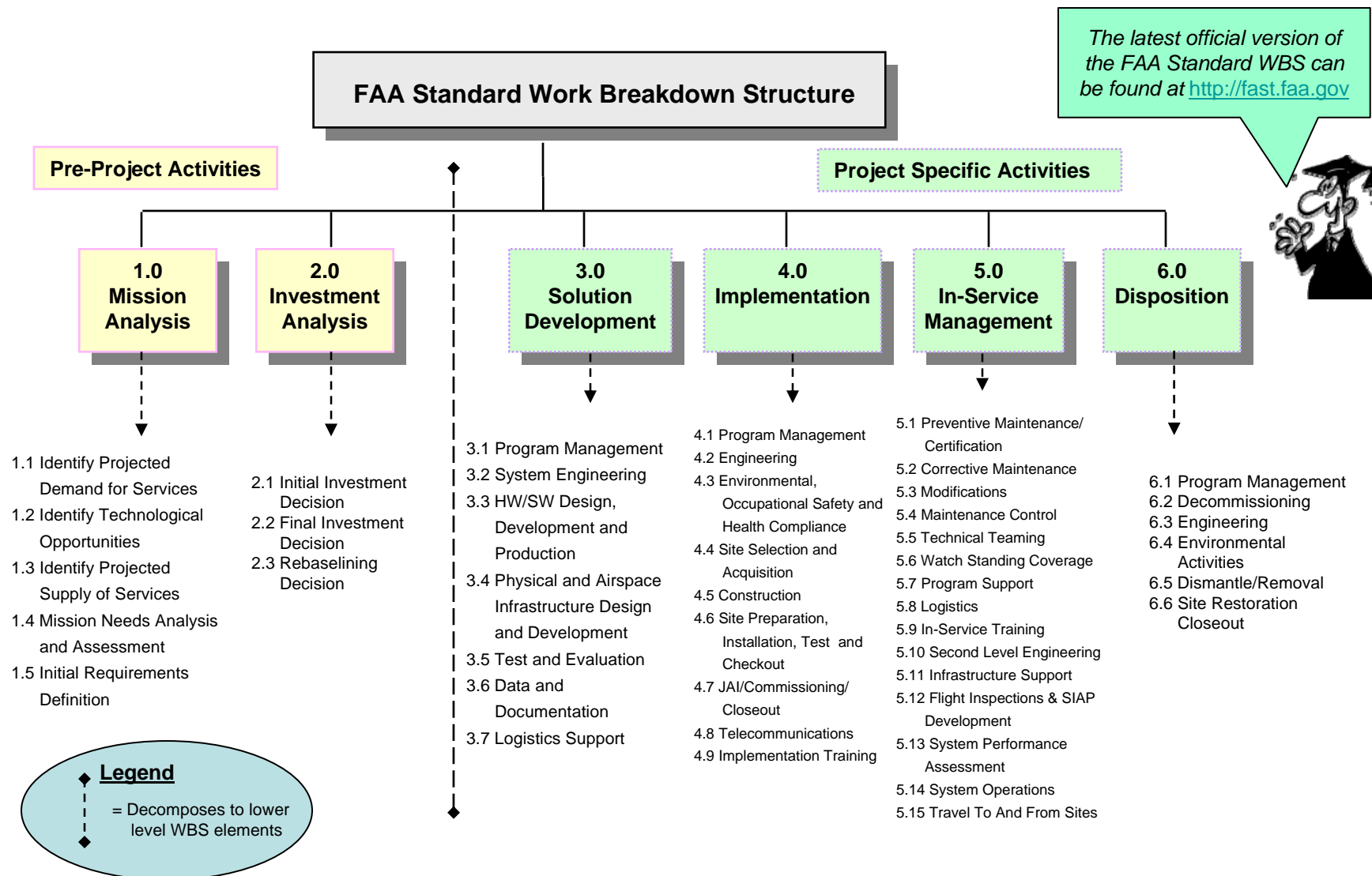
FOR EXAMPLE.....

FAA Standard Cost Estimating Methodology

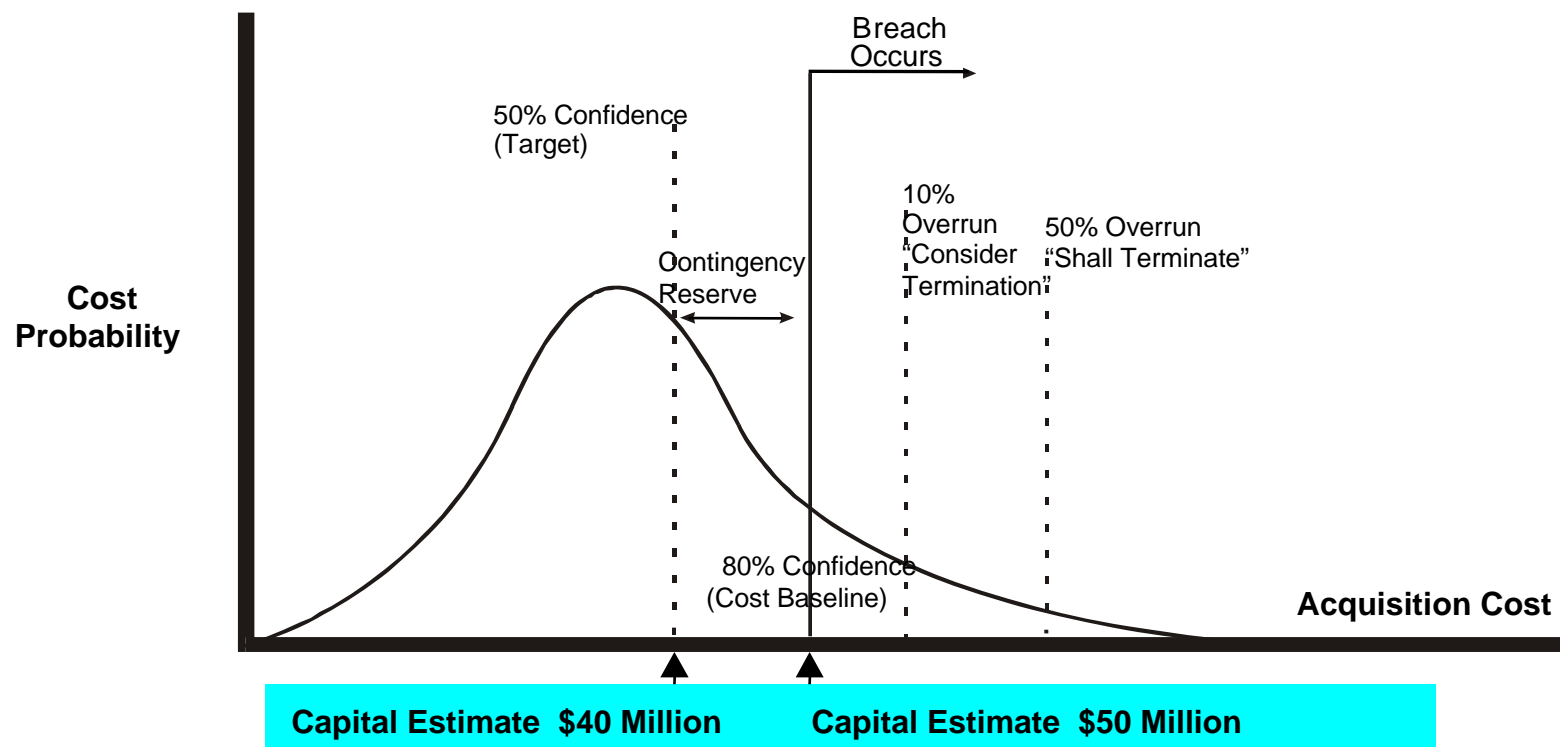


From: FAA Standard Cost Estimation Methodology, April 2003, v.1

FAA Standard WBS Structure



FAA Cost Baseline Management Approach



Contingency Reserve = S \$(80% Confidence – 50% Confidence) Estimates
\$10M = \$50M - 40M

Example of how the cost baselining process will work for a hypothetical new program. The Service Unit must deliver the program for \$50 million, but should be expected to deliver it at lower cost. Program will report spending of contingency reserve.

FAA Investment Analysis Curriculum

Practitioner

Courses

(no prerequisites)

**Benefits
Estimating
Workshop
(1 day)**

**Risk and
Schedule
Assessment
(3 days)**

**Introduction
to Cost
Estimating
(2 days)**

Foundation/familiarization Course

(no prerequisites)

**FAA Investment
Analysis Process:
Building the Business
Case for Capital
investment
(2 days)**

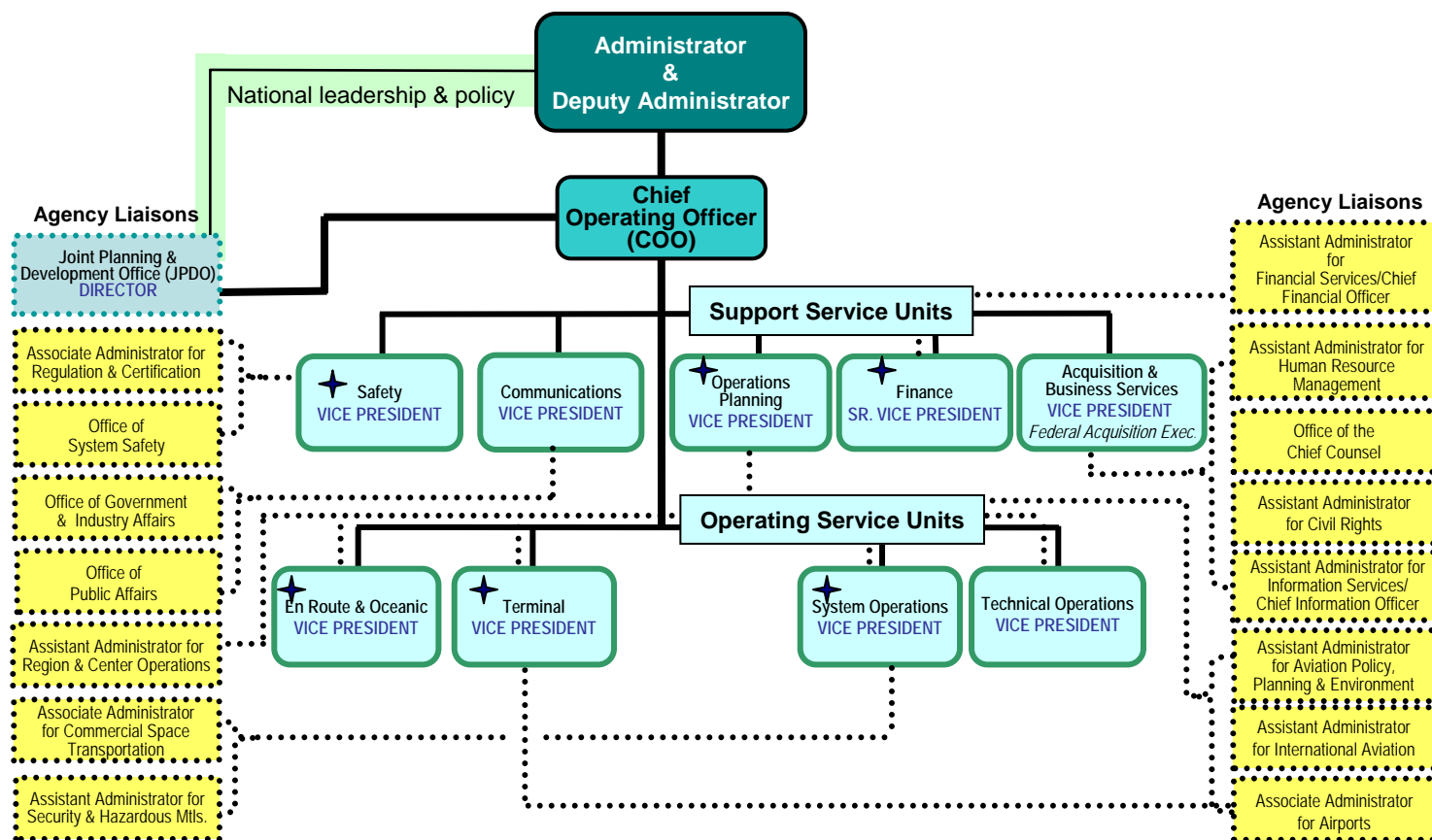
Next Steps

- **The Agency's Made Progress toward improving the Cost Estimating Capability at the FAA**
 - Conducted 6 course offerings of Introduction to Cost Estimating
 - In FY2006 the agency met all of its cost performance target and remained within acceptable cost baseline limits
 - Aligned agency goals to improving capability
 - Defined plan and milestones for getting off the GAO High Risk List
- **Continue work to build a quality Cost Estimating presence at FAA**
 - Define other Cost Estimating Standards and Guidance for agency wide use
 - Establish in-house databases that collect cost data for tracking actuals to program estimates
 - Offer comprehensive Cost Estimating Training Curriculum
 - Partner with other established/benchmarked cost estimating communities

BACKUP

Air Traffic Organization

We are organized around our customers' service needs, with special focus on safety, service delivery, and financial management



The Context of Investment Analysis: Applicable Orders and Guidelines

Government

Office of Management and Budget (OMB) A-94

- Benefit-Cost and Cost-Effectiveness Analysis
- Alternatives Analysis
- Net Present Value (NPV)
- Discount Rates

OMB A-11 (Exhibit A-300)

- New Budget Submittal Requirements (Capital Planning and Investment Control)
 - Business Case Focus
 - Return on Investment (ROI): NPV and Payback
 - Risk Analysis & Mitigation Plans

DOT

- Policy Values
 - Fatalities
 - Injuries
 - Passenger Time

FAA/APO

- Aviation Forecasts
- Economic Values
 - Aircraft Operating Costs
 - Aircraft Replacement Costs

Best Practices

FAA/ATO F & P

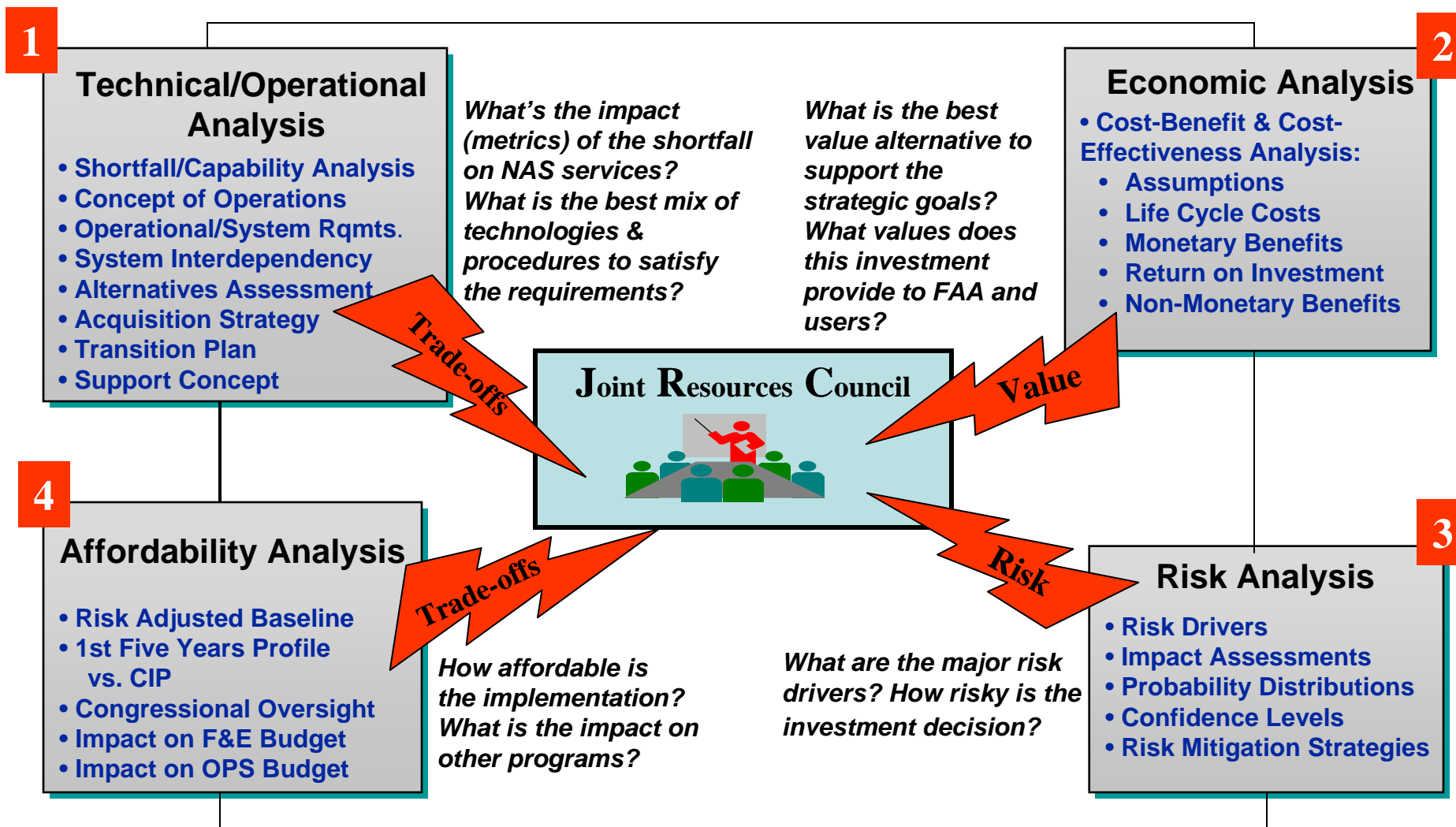
- Probabilistic Analysis
- Work Breakdown Structure of Costs and Benefits
- Risk Analysis

Legislation/Congress

- Clinger–Cohen Act (IT investment management)
- Government Performance and Results Act (GPRA)
- Chief Financial Officer's (CFO) Act



Building the Business Case

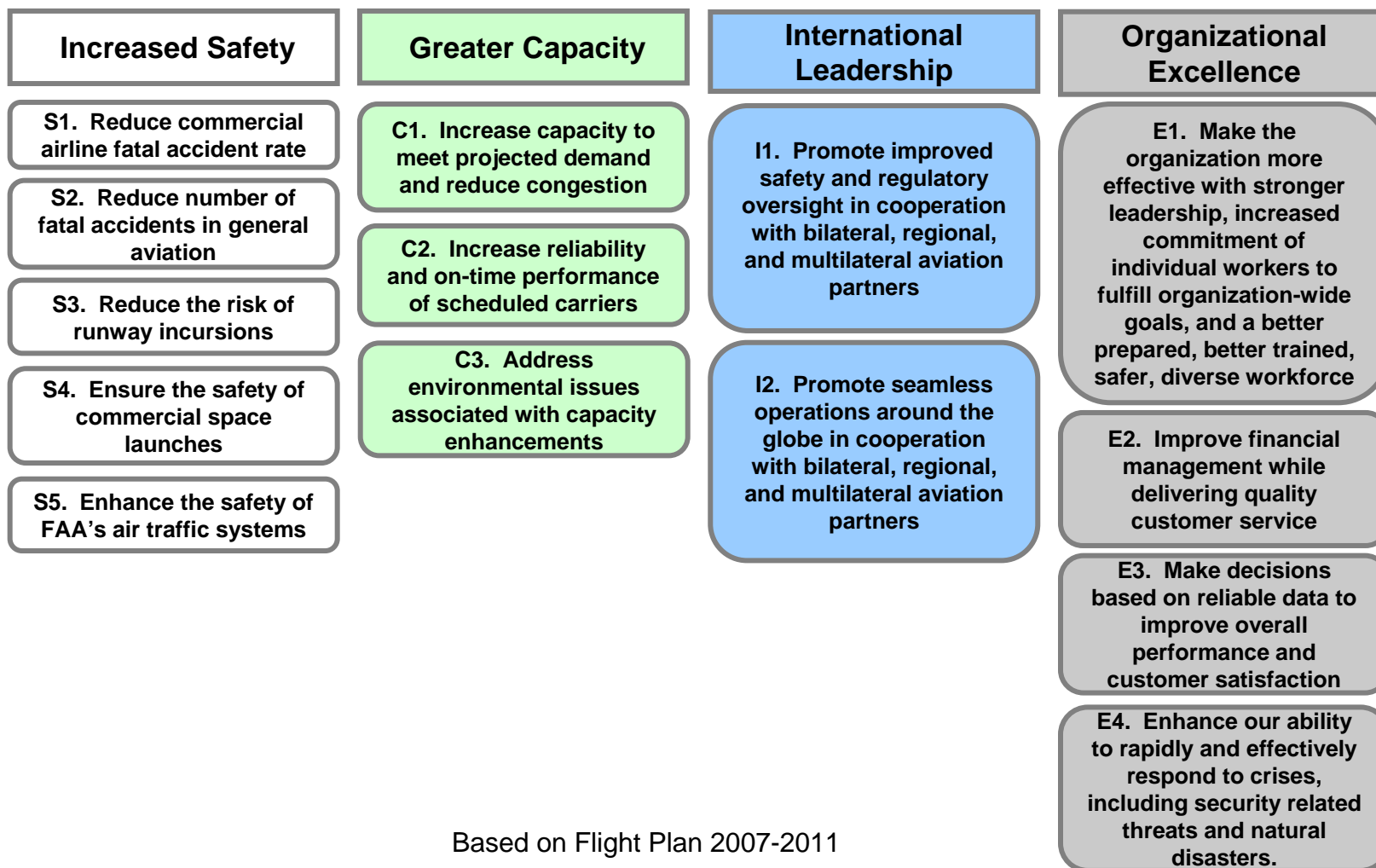


“Running the FAA ‘Like a Business’”

- **ATO Finance Has Reviewed 81 Programs Over The Last 2 Years**
 - 67 Capital Programs
 - 14 Operations Budget Programs
- **6 Programs Have Been Terminated or Restructured**
- **Quarterly Reviews to Assess Cost / Schedule Performance and Monitor Requirements Changes**
- **Link Investments to Strategy Objectives and Define Outcomes and Measures**
- **Investment Decisions are Data-Driven / Economically Driven**

The Flight Plan Sets Forth FAA's Overall Aims

FAA Flight Plan Objectives



Based on Flight Plan 2007-2011

How Decisions Are Made and Reviewed

- Emphasis is on Business Case Analysis, however other agency indicators are also reviewed
 - Capital Investment Plan (CIP) Allocations
 - Performance Gaps
 - Alternative Analysis
 - Agency Goals and Strategic Management Plan (SMP) Objectives
 - Forward looking plans – NextGen
 - Alignment to NAS Architecture
- After a decision, there are processes in place to review status and progress
 - Post Implementation Reviews
 - Program Reviews
 - Yearly Budget Documentation (RPDs, FY Budget Reviews, etc)

Risk Tools

Once the risks have been identified, a model can help quantify the risks. Quantifying risk means putting a value on risk. Sample listing of tools:

- Cost Tools
 - Crystal Ball: Performs Monte Carlo simulations of Excel spreadsheets
 - FARAD: FAA tool that distributes risk by WBS

- Cost & Schedule Tools
 - @Risk: Microsoft Project or Excel spreadsheet embedded schedule risk analysis tool that runs Monte Carlo simulations around task durations
 - SEER-SEM, COCOMO-II, COCOTS: Software development

- Schedule Tools
 - Risk+: Microsoft Project embedded schedule risk analysis tool that runs Monte Carlo simulations around task durations

- Program Teams
 - Risk Radar (FAA Tool): database software package that allows the program office to document over time how risk is changing and the steps that it has taken to reduce and manage risk

GAO Focus Area 3: Milestones and Progress

4QFY07 - Publish life cycle cost model based on database of historical cost estimates.

Progress: On Track for Completion. The cost model is being upgraded to receive Facilities & Equipment inputs. Current model only captures Operations and Maintenance cost estimates.

4QFY07 – Implement quarterly reporting on the status of programs staying within annual cost targets at Flight Plan reviews.

Progress: On Track for Completion. The December Flight Plan review will include the status of programs staying within cost targets. This will be reviewed monthly instead of quarterly for the year.

GAO Focus Area 3: Other Activities Undertaken (ATO)

Key components to improving cost estimating practices is providing targeted training and developing cost estimating guidelines and procedures. Since FAA High Risk Activities are underway, the following additional activities are included in support of Focus Area 3 completion:

- **4QFY07 – Publish recommended course list for cost estimating based on cost estimating core competencies.**

Progress: On Track for Completion – Benchmarking activities currently underway. Recommended courses will follow industry core competencies for cost estimating.

- **4QFY07 - Publish four cost estimating guidelines**

Progress: On Track for Completion – Published “Guidelines for Evaluating FAA Cost Estimates” 1st FY07. Other documents planned for one per quarter.

- **4QFY07 - Deliver at least four cost estimating training courses to headquarter and regional personnel**

Progress: On Track for Completion – Completed delivery of one Introduction to Cost Estimating training course December 2006. Other courses planned for 2nd and 4th Quarter FY07.