



Earned Value

A Manager's Tool

Integrated Cost, Schedule and Technical Performance Management

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EVM Web Site - www.acq.osd.mil/pm

Earned Value Management

Topics

- **Earned Value “Reengineered”**
 - ◆ What is EVM?
 - ◆ Management vs. Reporting
 - ◆ Why?
 - ◆ Key Building Blocks
 - ◆ Results

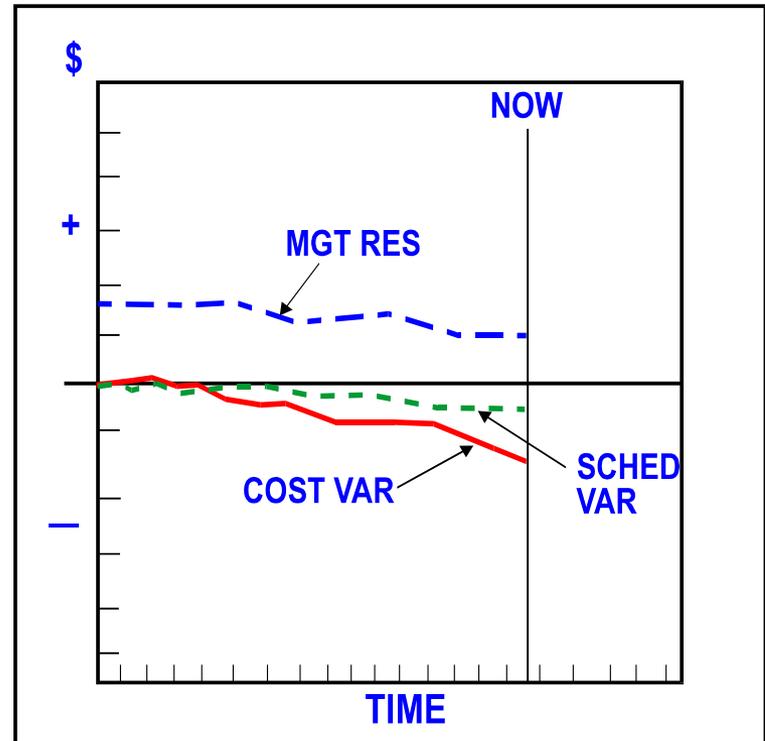
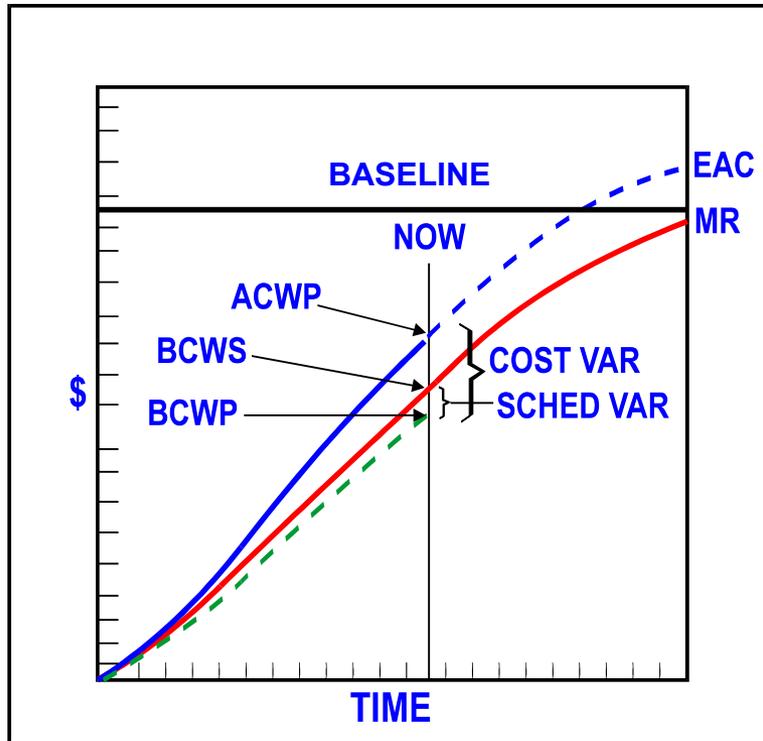
Industry Standard

ANSI/EIA 748-98 EVMS, 1998

- **What is EVMS:**
 - ◆ 32 management systems/process **attributes**
 - Organization
 - Planning
 - Accounting
 - Analysis
 - Changes

Graphic Analysis

Key Data Elements (cont'd)



Earned Value Management Systems (EVMS)

What's the objective?

- **COMPREHENSIVE PLANNING PROCESS**
 - ◆ Covers entire statement of work
 - ◆ Schedules activities
 - ◆ Allocates resources
- **FULLY INTEGRATED MANAGEMENT SYSTEMS**
 - ◆ Scheduling systems integrated with one another, and with work authorization system, accounting system, MRP, work measurement system, etc. For example:
 - Interdependencies between department, functional, and/or IPT schedules (horizontal integration)
 - Interdependencies from lowest level to master schedule (vertical integration)

Earned Value Management: Implementation Problems

- “Financial Management”
- Audit-like reviews
- Government-required reporting
- Too many “surprises”
 - ◆ A-12 (Navy)
 - ◆ AAWS-M (Army)
 - ◆ C-17 (Air Force)
- Challenge: keep good principles, stop bad practices



"ABIDING CULTURAL PROBLEM"

- **"Existing control mechanisms,**
- **properly operated,**
- **would have been sufficient to identify the nature and extent of the problems."**

The Navy's investigation into the A-12

(the "Beach report")

How much is it going to cost?

(One way to do it)

- Cost Performance Index

$$\frac{\text{BCWP}}{\text{ACWP}} = \frac{33}{37} = 0.89$$

- Estimate at Completion

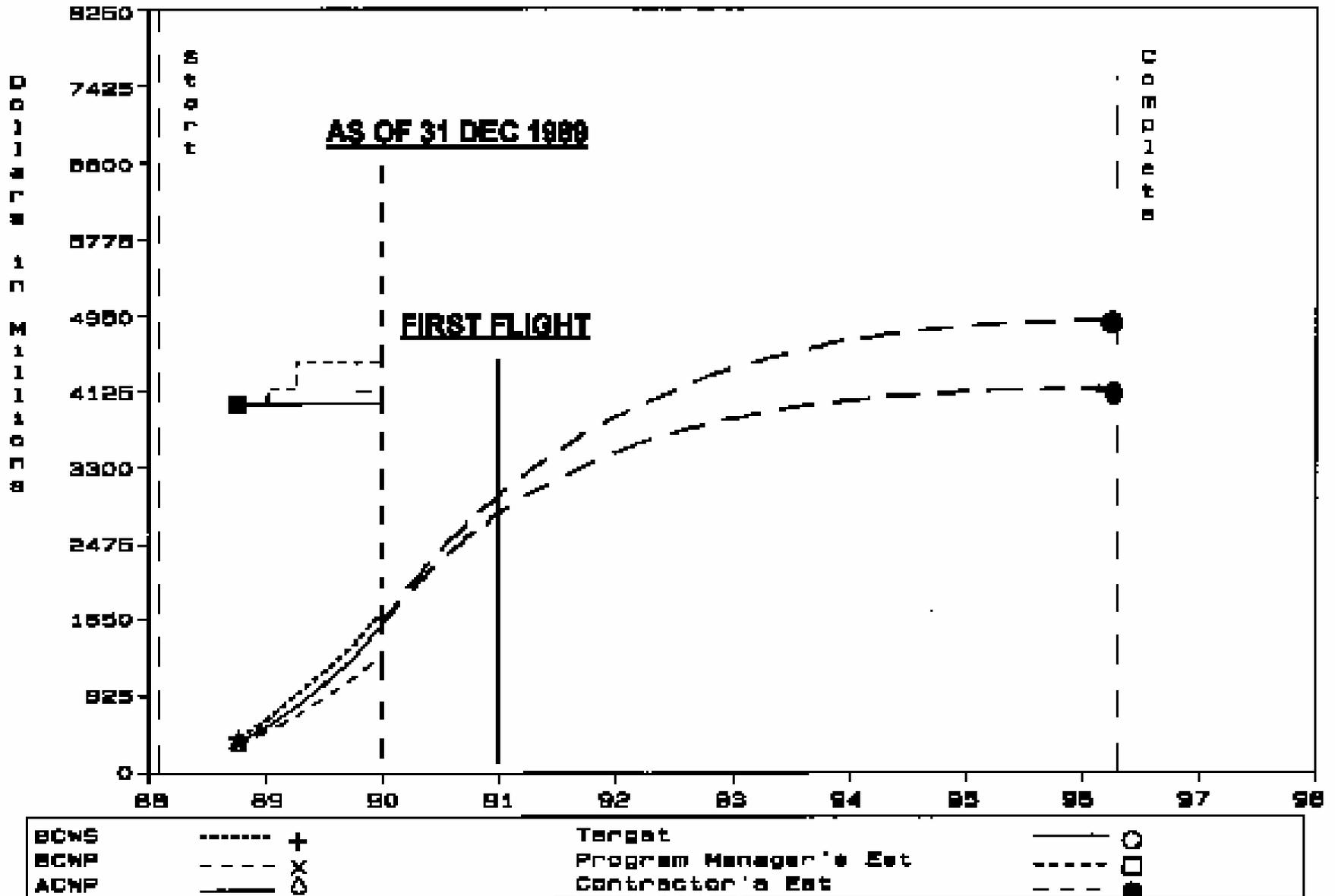
$$EAC = \frac{\text{Target Cost}}{\text{Index}} = \frac{100}{0.89} = 112$$

CONTRACT PERFORMANCE

DD/MCAIR

A-12 ADV TBC ACFT (N)

A-12 FEED N00019-88-C-0050 (FPI)

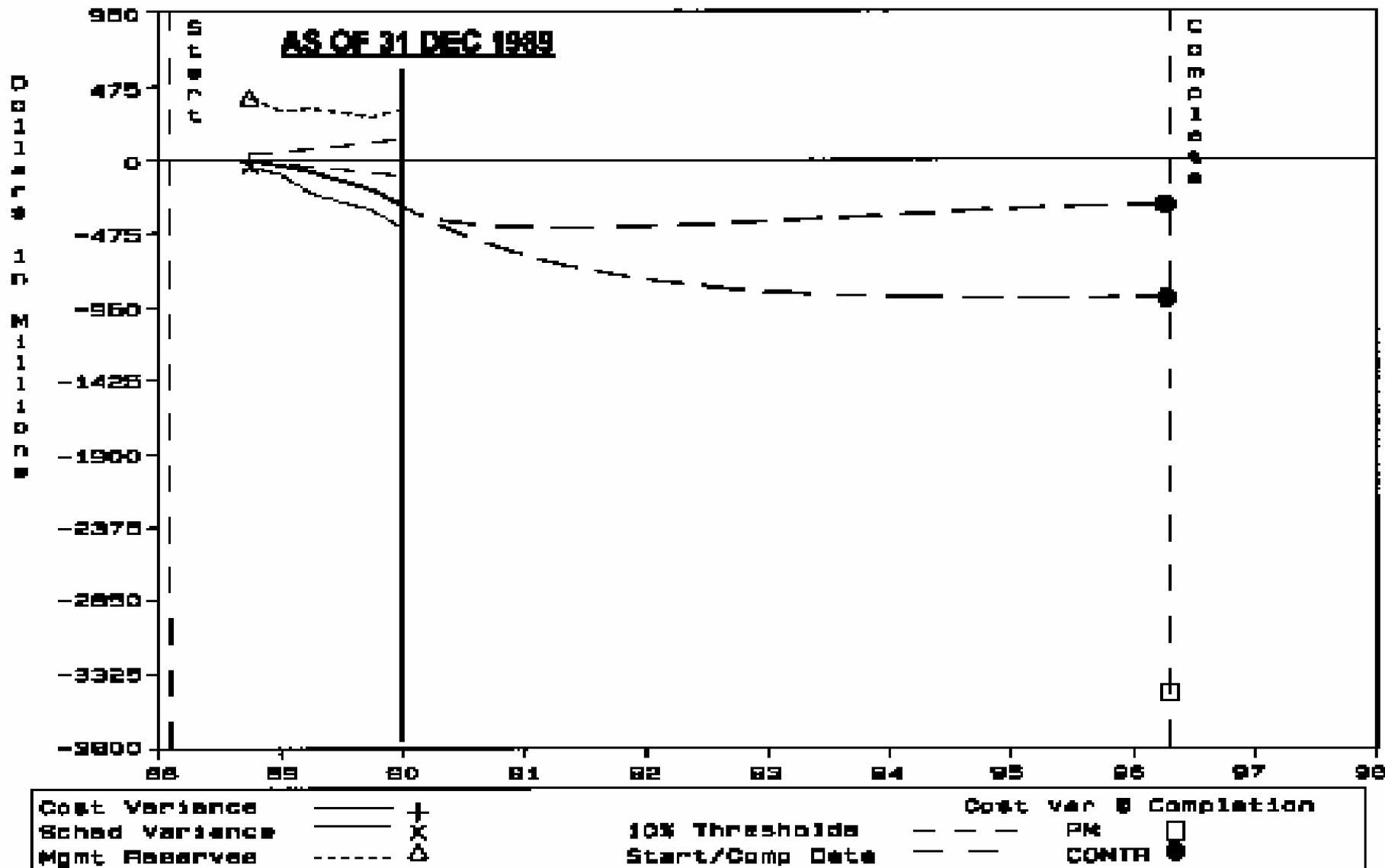


COST/SCHEDULE VARIANCE TRENDS

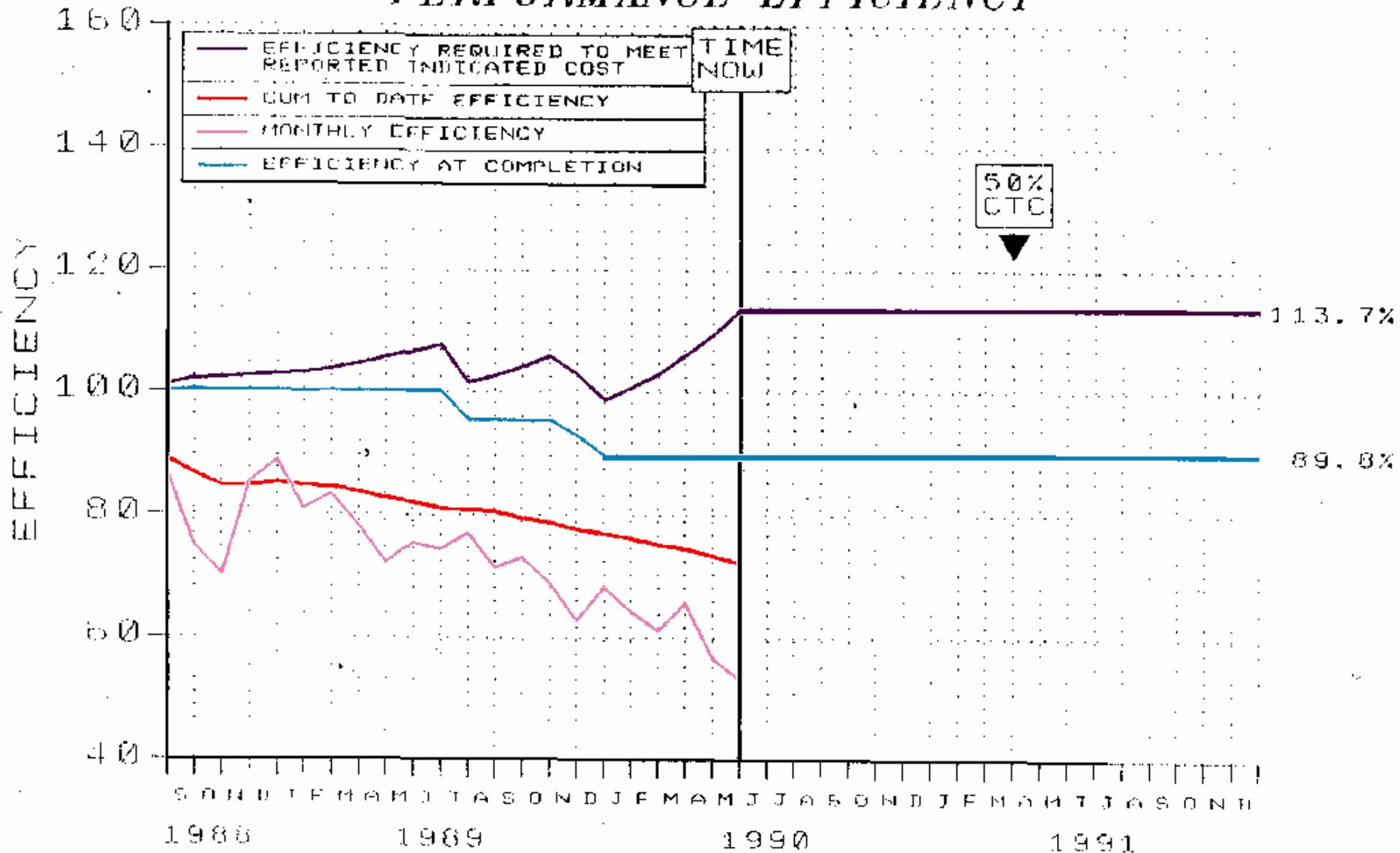
8D/MCAIR

A-12 Adv Tac Acft (N)

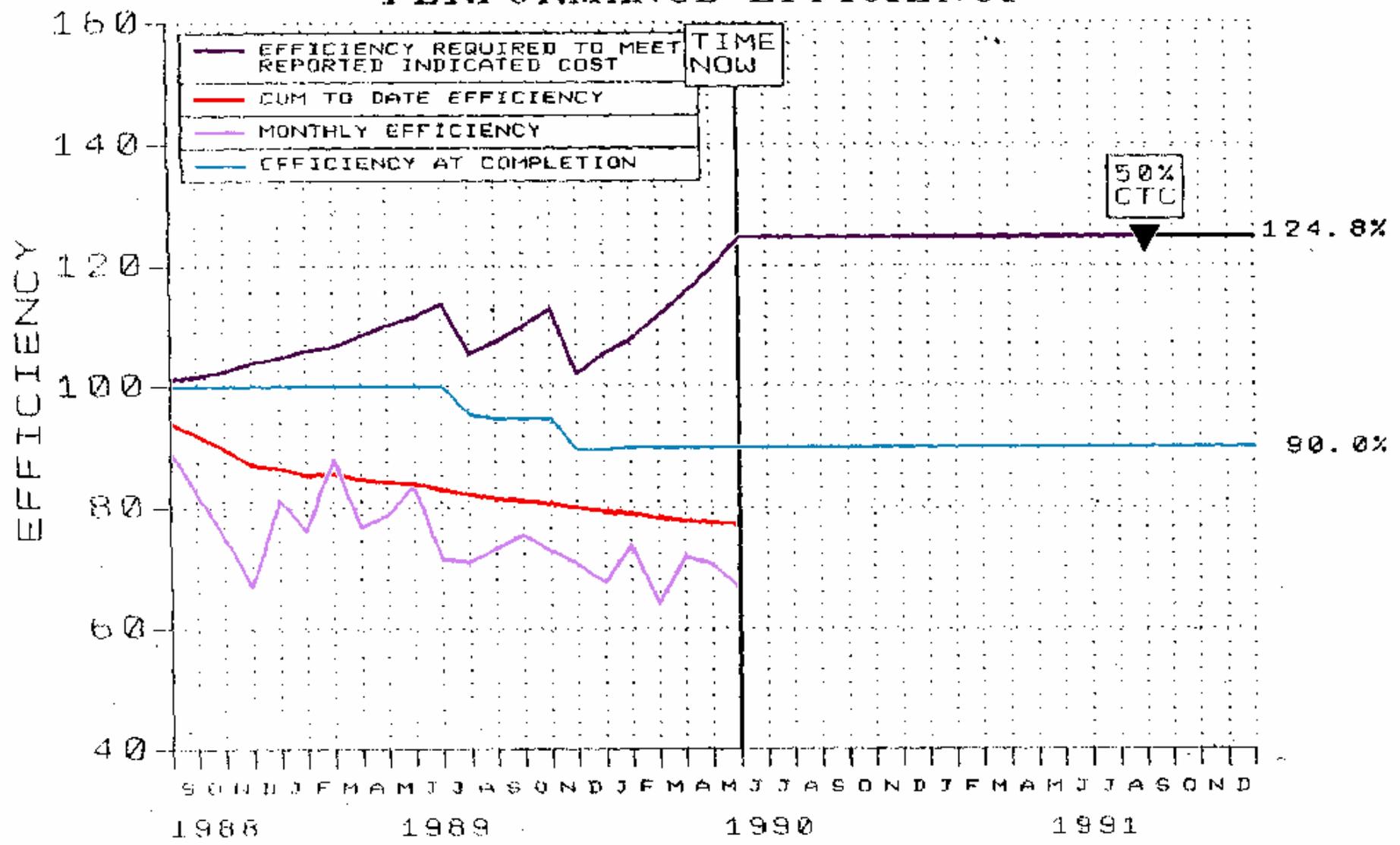
A-12 FSED NO001B-BB-C-0050 (FPI)



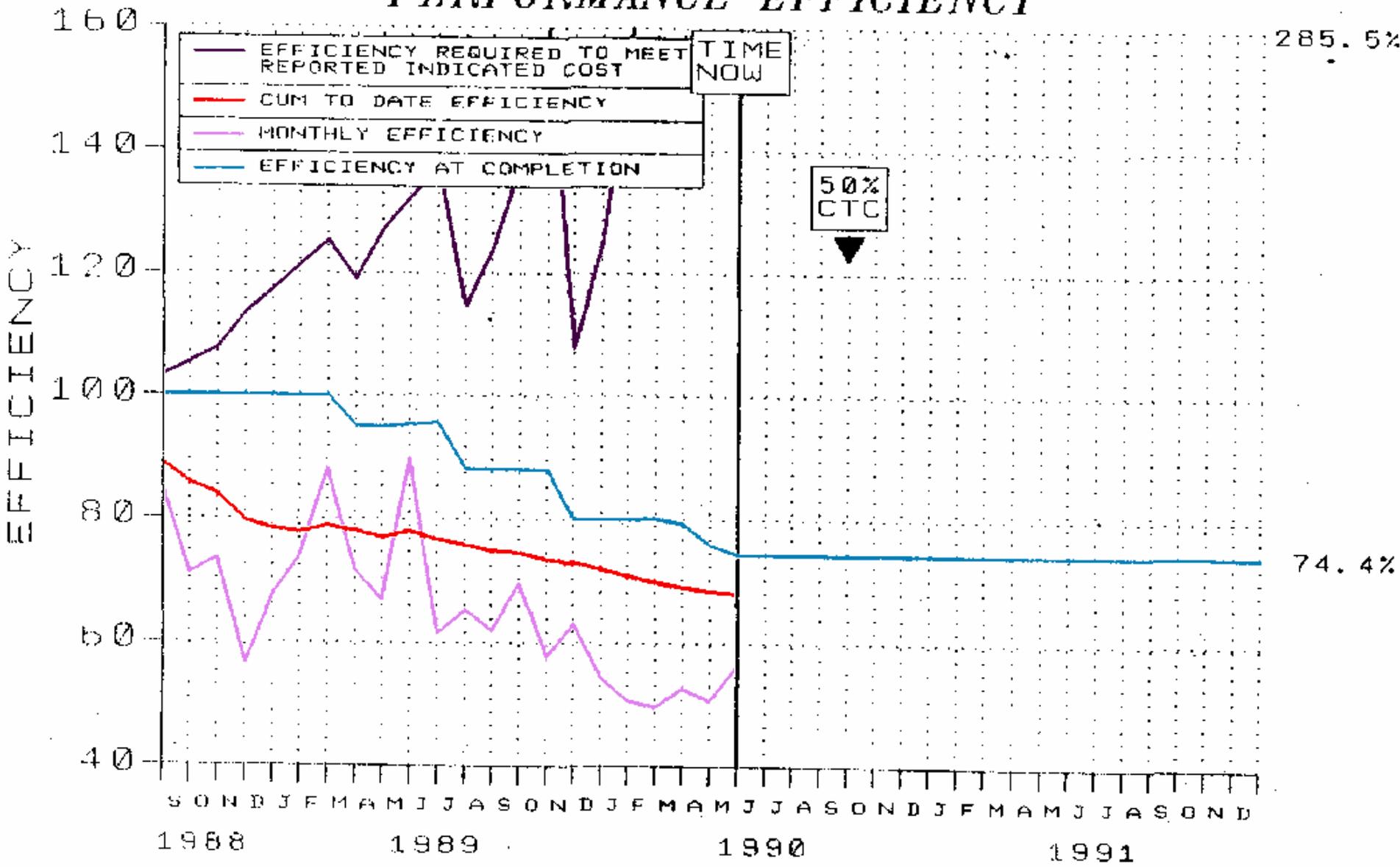
A-12 FSD
**TOTAL PROGRAM
 PERFORMANCE EFFICIENCY**



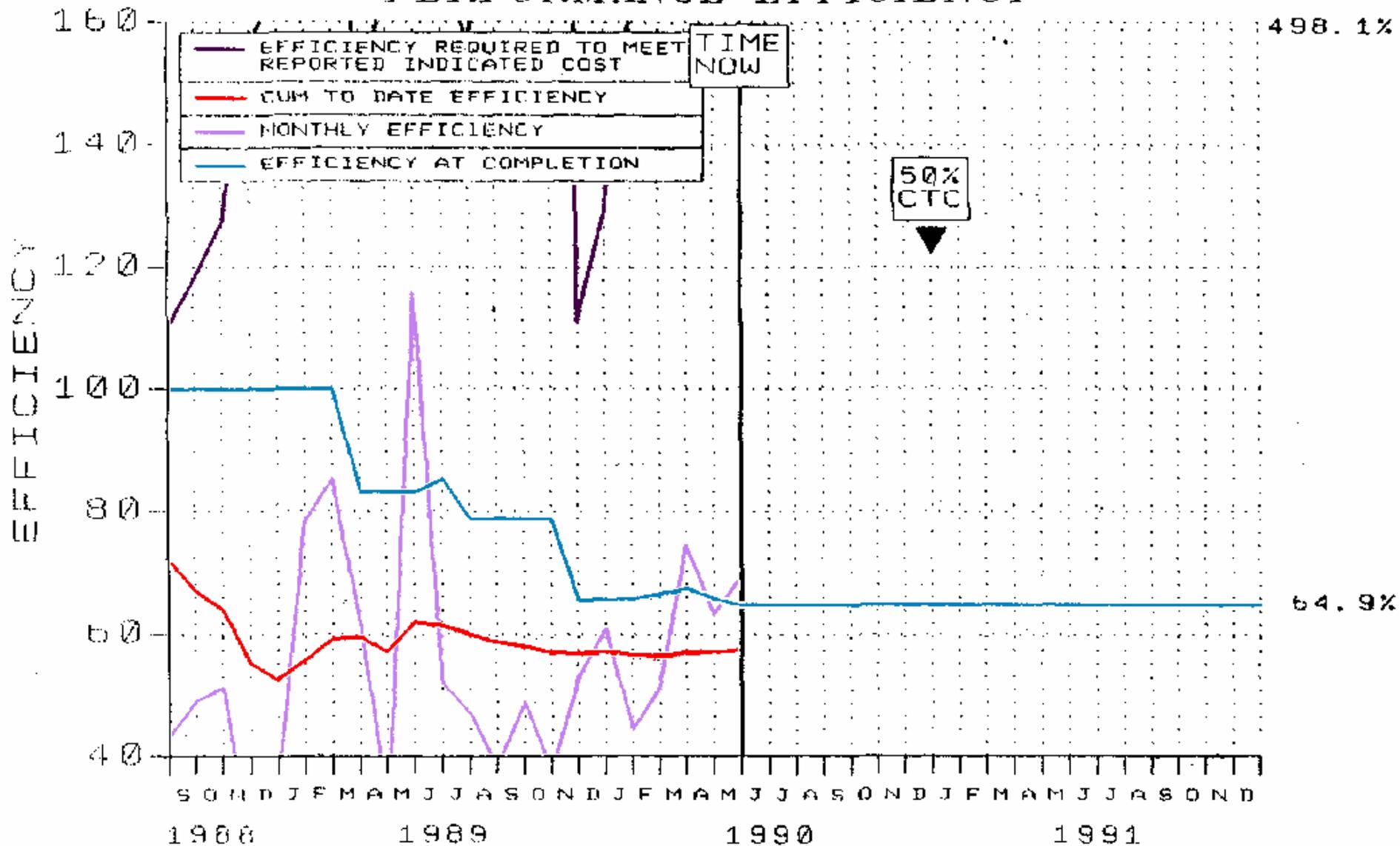
FSD ENGINEERING PERFORMANCE EFFICIENCY



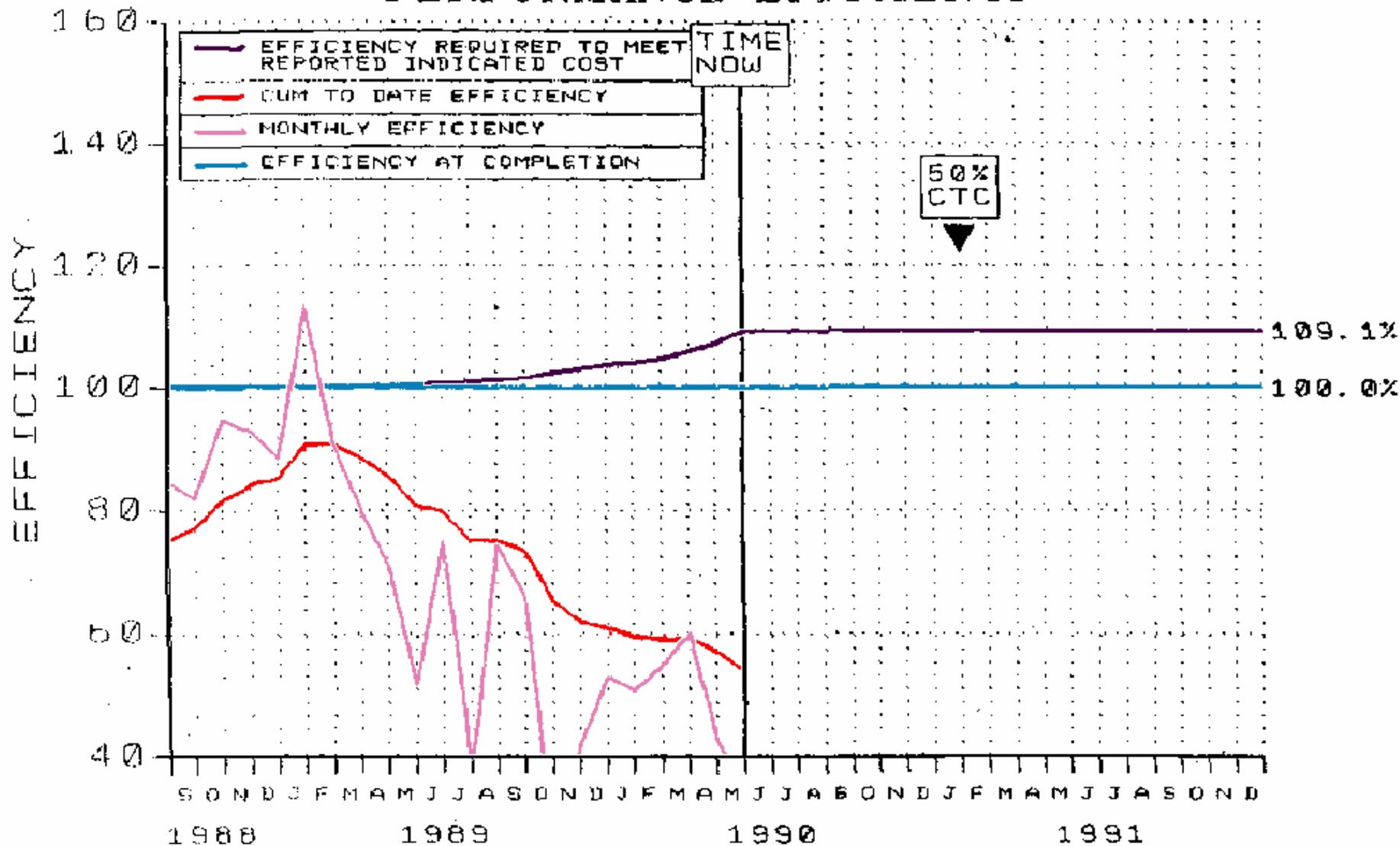
FSD ENGINEERING - WBS 1100 PERFORMANCE EFFICIENCY



A-12 FSD ENGINEERING - WBS 1110 PERFORMANCE EFFICIENCY



FSD MANUFACTURING (EXCLUDING TOOLING) PERFORMANCE EFFICIENCY



Lesson of the A-12

The “Beach” Report, A-12 Administrative Inquiry, 28 Nov 1990

- Too often, earned value insights remain the sole province of the supporting program control staff of both contractors and the government.
 - ◆ Earned value must be an **integral** part of the performing design and manufacturing organizations.
 - ◆ Only when **program technical staffs** are held accountable for earned value analysis, will they begin to understand its implications.

C&L/TASC Cost Drivers:

Cost without a requirement

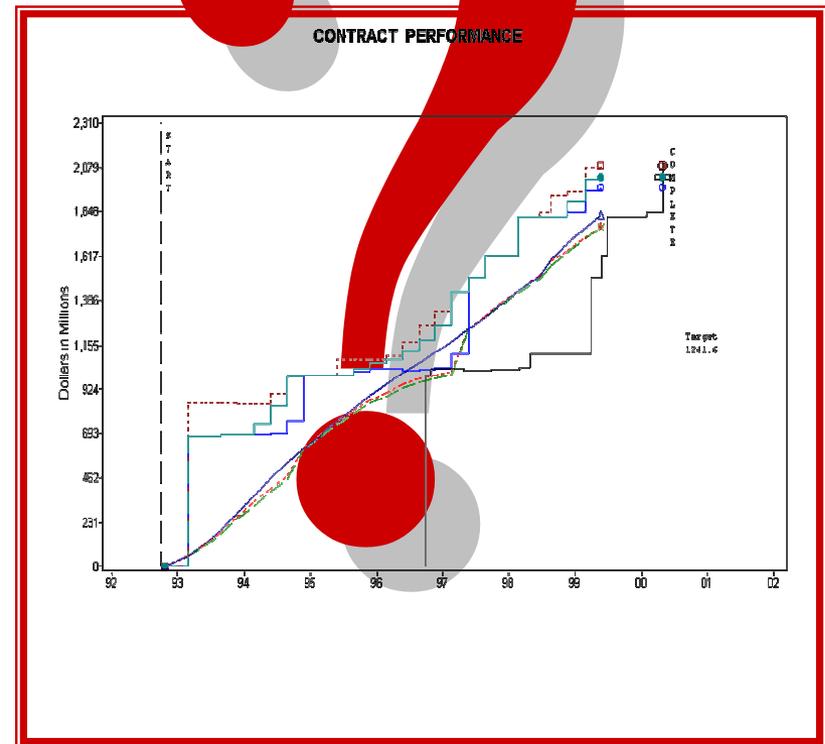
- **C/SCS Cost Premium is 0.9%**
 - ◆ Nearly 3/4 is in Eng'g/Prog Mgmt
 - Written control account variances
 - ◆ Most of Remainder is in administrative and external reporting activities

**“The DoD Regulatory Cost Premium:
A Quantitative Assessment”**

December, 1994, Coopers & Lybrand/TASC Study:

The OTB Problem

- 50% Overrun
- No Variances
- Assessment: **GREEN**



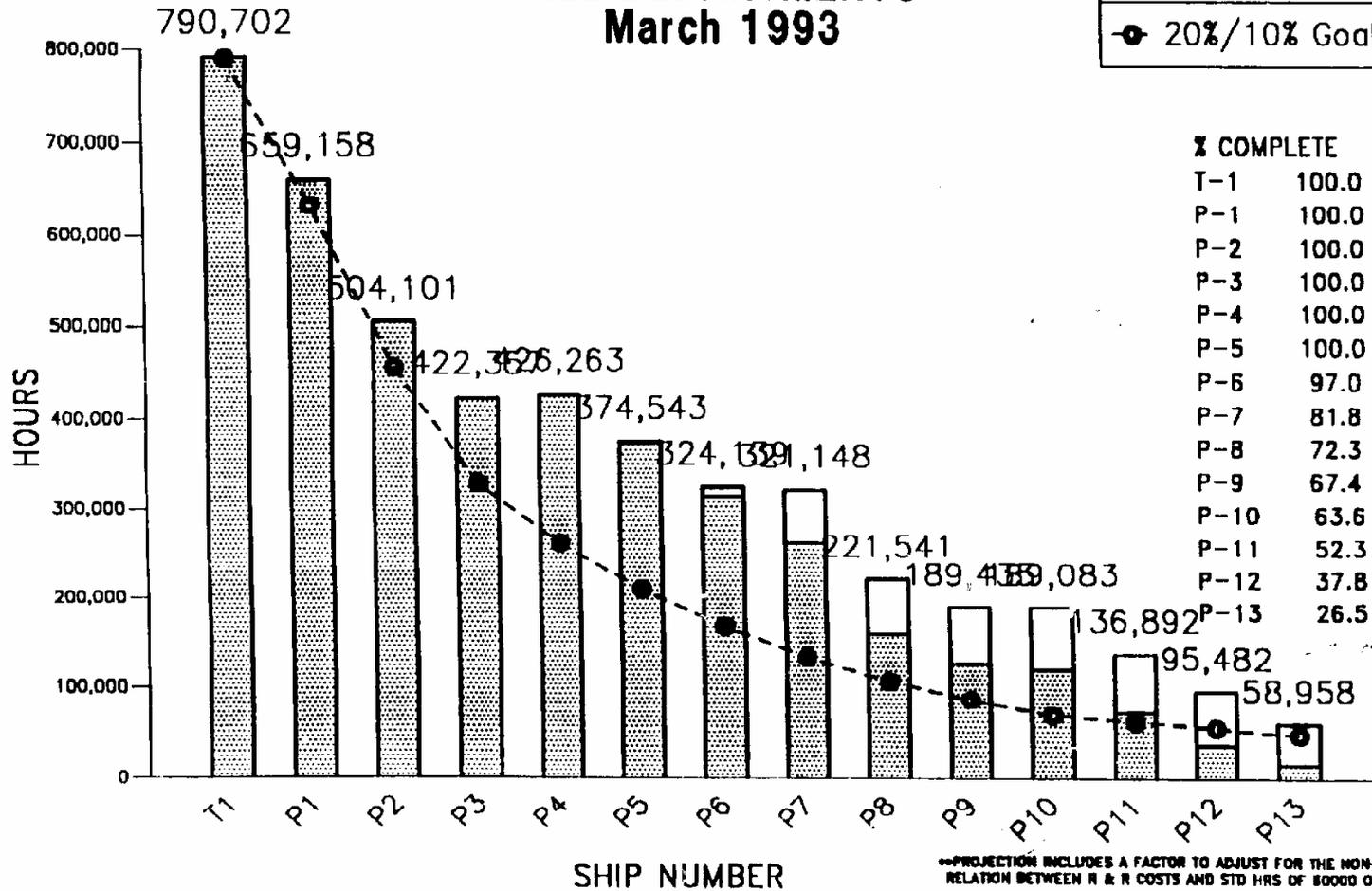
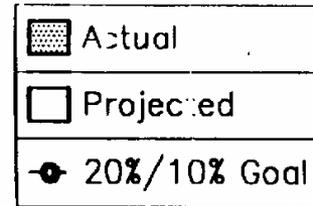
What happens without OTBs?

“... management systems were closely **aligned with . . . C/SCSC compliance**; they could not be reset without **contractual relief**. Without a reset, large variances occurred between existing contractual requirements and **actual plans**. The system could not handle such variances, and **ad hoc systems** began to evolve . . . ad hoc systems could not keep pace and **disconnects resulted**, significantly impacting the Production Plan.”

- CEO to USD(A&T) June, 1993

C-17 Quality Tech
 Chart I.D. RRALL
 Phone: 593-0306
 Data as of 04/04/93
 Source: MALP/IMSA

C-17A PROGRAM REWORK AND REPAIR HOURS ALL DEPARTMENTS March 1993



**PROJECTION INCLUDES A FACTOR TO ADJUST FOR THE NON-LINEAR RELATION BETWEEN R & R COSTS AND STD HRS OF GOOD OR LESS

Whose management system?

- **Contractor's management system**
 - ◆ Don't hinder contractor's ability to use its own management systems!
- **EVMS is NOT:**
 - ◆ Reporting system
 - ◆ contract administration
 - ◆ cost analysis
 - ◆ accounting

OTB Approval

A MANAGEMENT Decision

- Need to manage the contract **effort** is paramount to **ALL** other considerations!
- Three conditions:
 - ◆ Problem is understood
 - ◆ New plan is ready
 - ◆ **CONTRACTOR** needs OTB to effect proper management control
- Issue goes to the heart of EVMS ownership & reform.

The paradigm must change

- **EVMS reporting system is of little value;**
- **Program Management, not audits;**
- **The Vision:**

The quality of a contractor's management system is determined not by the absence of defects, but by the presence of management value.

So why not use commercial practices?

**“There is no such thing as
‘standard commercial practice.’
We all talk about it as if it exists,
but each company has their own
variation.”**

Daniel L. Kugel
NDAA System Program Director
Acquisition Reform Senior Steering Group
February 13, 1996

Services & industry Challenged

Implement “Model Program”

- **Initiated Oct 93**
- **Shift Ownership From Financial Management to Program Management**
 - ◆ Change emphasis from government system to contractor systems
 - ◆ Reduce the review burden
 - ◆ Limit reporting

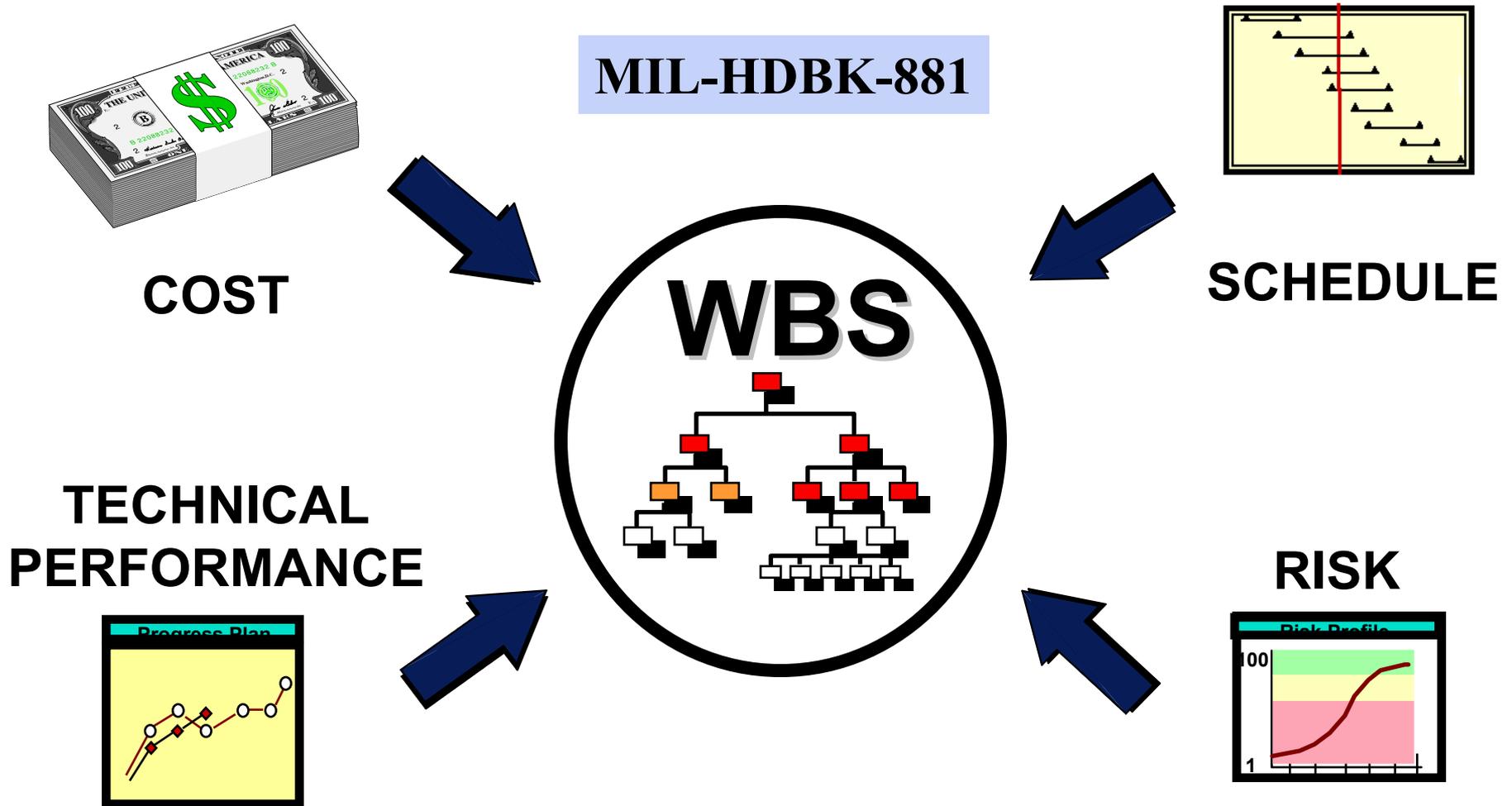
- ⊕ **Ensure comprehensive planning and common understanding of the task**
- ⊕ **Integrate cost, schedule, technical performance, and risk management**

Integrated Program Management Initiative

September 1994

- **Acquisition Executives**
- **Key Building Blocks**
 - ◆ **WBS**
 - ◆ **IPTs**
 - ◆ **Integrated Baseline Review (IBR)**
 - ◆ **“Right Size” Reporting**

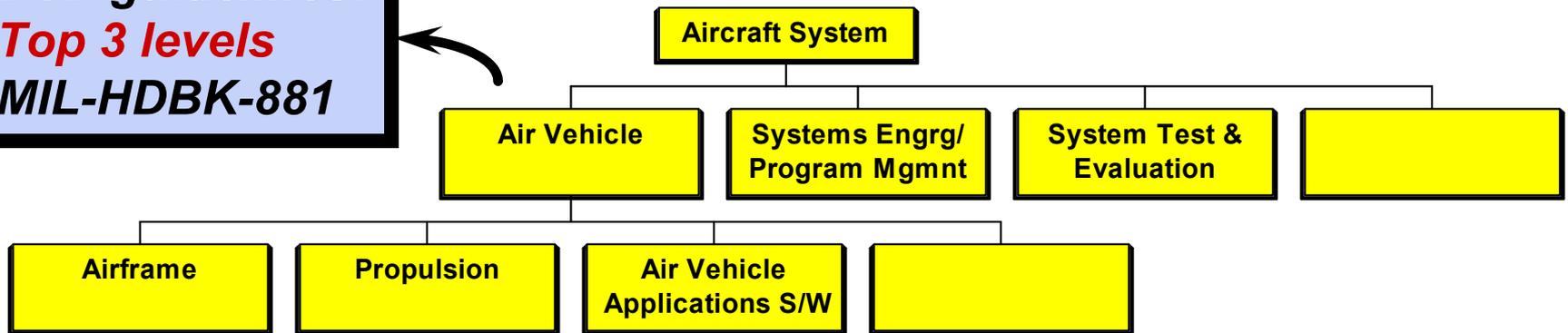
Work Breakdown Structure: The Key to Integration



Integrated Management: Work Breakdown Structure

*Program "Dictionary" (defines the program)
Product-Oriented - h/w, s/w, services*

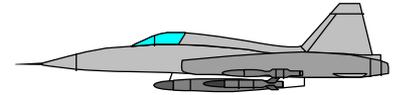
*DoD guidelines:
Top 3 levels
MIL-HDBK-881*



**Contractor extension:
How work will be done**

The Control Account: Where the Action is

- *Plan*
- *Budget*
- *Schedule*
- *Corrective Action*



WBS

ORGANIZATION



CAs under IPTs as appropriate

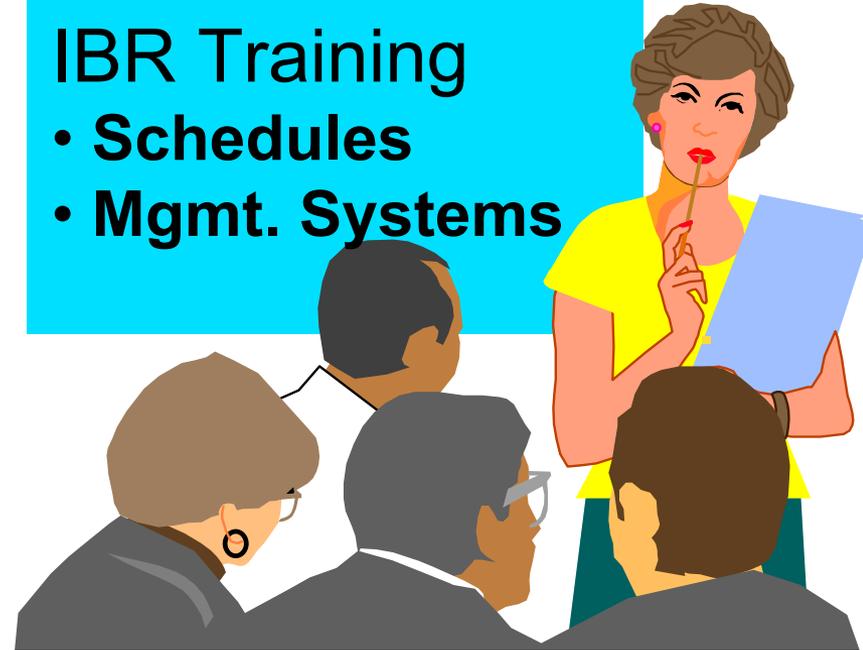
Reengineering EVM: Integrated Baseline Reviews

- Within 6 months of award
- Mutually understand plan
 - ◆ Scope
 - ◆ Schedule
 - ◆ Resources
- Planning process vs. event
- PM leads
 - ◆ EVM staff supports
 - ◆ Management system reviews effectively eliminated BUT:

Risk

IBR Training

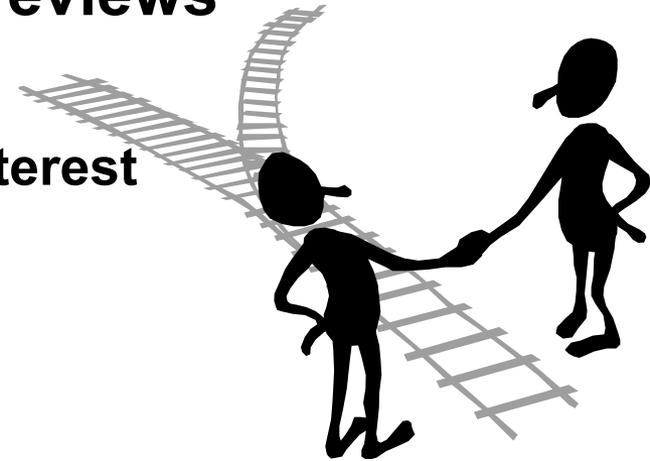
- Schedules
- Mgmt. Systems



**NOT A REPLACEMENT FOR MANAGEMENT
SYSTEMS REVIEW FOR CAUSE!!!**

Growing Consensus: Gov't/Industry Best Practice

- Dec. '96 DoD accepted industry EVMS guidelines as C/SCSC replacement
 - ◆ Reserved right for government reviews
 - For cause - DCMC, PMO
 - “Self-certification” not in public interest
 - Encouraged “true” standard
- ANSI/EIA 748-98 EVMS, 1998
 - ◆ Accepted by DoD Dec. '98
 - DoD and industry EVMS criteria are equal



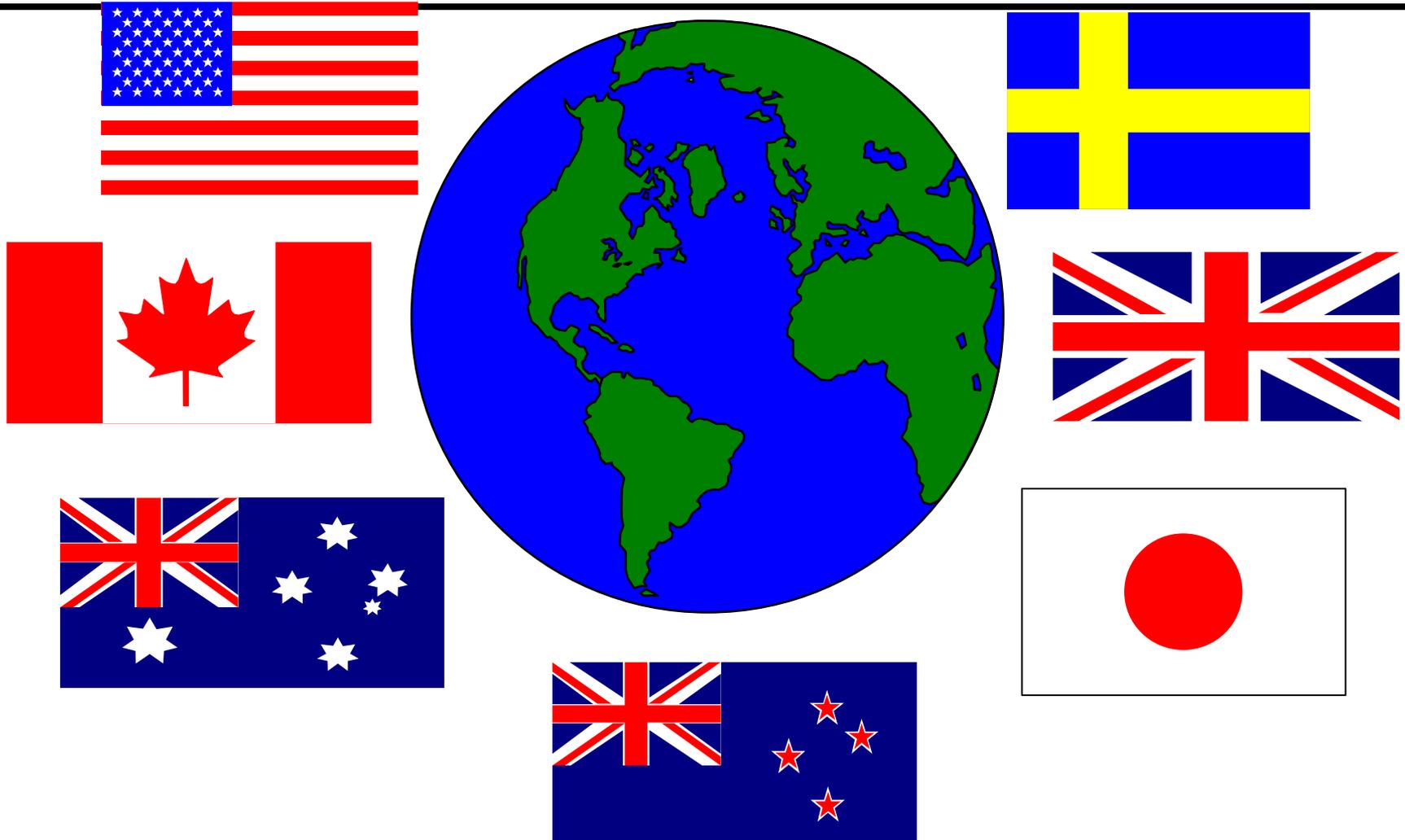
Roadmap - Requirements to Competitive Advantage

- **Common Business Processes** give the Program Manager the tools to avoid reinventing the wheel for each program.
- **EV** is a tool integrating technical, schedule and cost performance measurement and analysis data for management.
- **Cost savings and competitive advantage** come from a broad business application.

Program by program application isn't good enough.

International EVMS

Integrated Program Management Council



DoD Since 1993... Results!

- **DoD EVM**
 - ◆ Value reaffirmed
 - ◆ Shifted to Industry; DCMC Exec. Agent
 - ◆ OMB policy
 - ◆ Trilateral MoU
 - ◆ Intl. Perf. Mgmt. Council
 - ◆ Adopted by NASA, FAA, NRO, FBI, CoE
- ◆ Prof. Associations
- ◆ In-house
- ◆ Enterprise-wide
 - Boeing
 - Raytheon
 - Lockheed Martin
- ◆ Commercial
 - Motorola Iridium tm
 - Navistar
 - Delco Electronics
- ◆ No major surprises

Aggregate overrun 5.5% (\$1.2B on \$72.8B; 66% comp.)

The Future

Global A&D Exchange - Potential IDE Capabilities

e-Accounts

- Account Management
- Invoice Tracking
- Billing
- Financial Services

e-Assets

- Location and Visibility
- Maintenance Planning
- Operational Status & Service Availability

e-Engineer

- Electronic Publishing
- Data Transfer
- Collaborative Engineering

e-EVMS

- Common EVMS Platform
- Collaborative Access
- Integrated Reporting
- Integrated Planning

e-Logistics

- Shipment Tracking
- Delivery Management
- Inventory Visibility
- Supply Chain Alignment

e-Procurement

- RFQ Processes
- Purchase Orders
- Electronic Procurement Documentation

e-Sales

- RFQ Response
- Online Ordering
- Availability
- Customer Support

e-Spares

- Shared Inventory
- Availability
- Lowest Cost vs. Asset Readiness

The Major Issue Today

- **Industry is more supportive than it has ever been, and**
- **A few PMOs with the best implementations ever,**

BUT

- ◆ **Government support/understanding may be lowest ever.**

The forgotten element of the “Vision”

- **“...I see no threat to anyone in these proposals. What I do see is a redefinition of jobs and functions, a redefinition ... that will make our community an integral part of the management of our most important projects.”**

C/SCSC Workshop Reston, VA October 1993

Earned Value Management

Integrated Product Team

- Evaluate processes by which EVM information is obtained and used by PEO, MSC, Service HQ
- Identify obstacles or institutional barriers
- Evaluate adequacy of EVM expertise
- Review the IBR process (with industry)
 - ◆ Is it meeting the stated goals and purposes?
- Review the functions and structure of the Performance Management Advisory Council
- Recommend changes

AF EVM IPT MEETING

28 JUNE 2000

- **PRODUCT CENTER BRIEFINGS:**
 - ◆ EVM Initiatives
 - ◆ How Your Product Center Uses EVM Data
 - ◆ Ongoing EVM Training
 - ◆ Examples of How PM's Are Using EVM Data in Managing Programs
 - ◆ Biggest Challenge