



Cost Estimating in Decision Making and Resource Allocation

Richard P. Burke, Ph.D.
Division Director, OAPPD
Cost Analysis Improvement Group

Outline

- Cost Estimating in Acquisition Decision Making
 - Defense acquisition decision making process
 - Cost as a consideration for Milestone approval
- Cost Estimating in resource allocation
 - Planning, Programming and Budgeting System (PPBS)
 - Cost estimating for PPBS
 - Cost estimating for program management
 - Evaluation of cost reduction initiatives

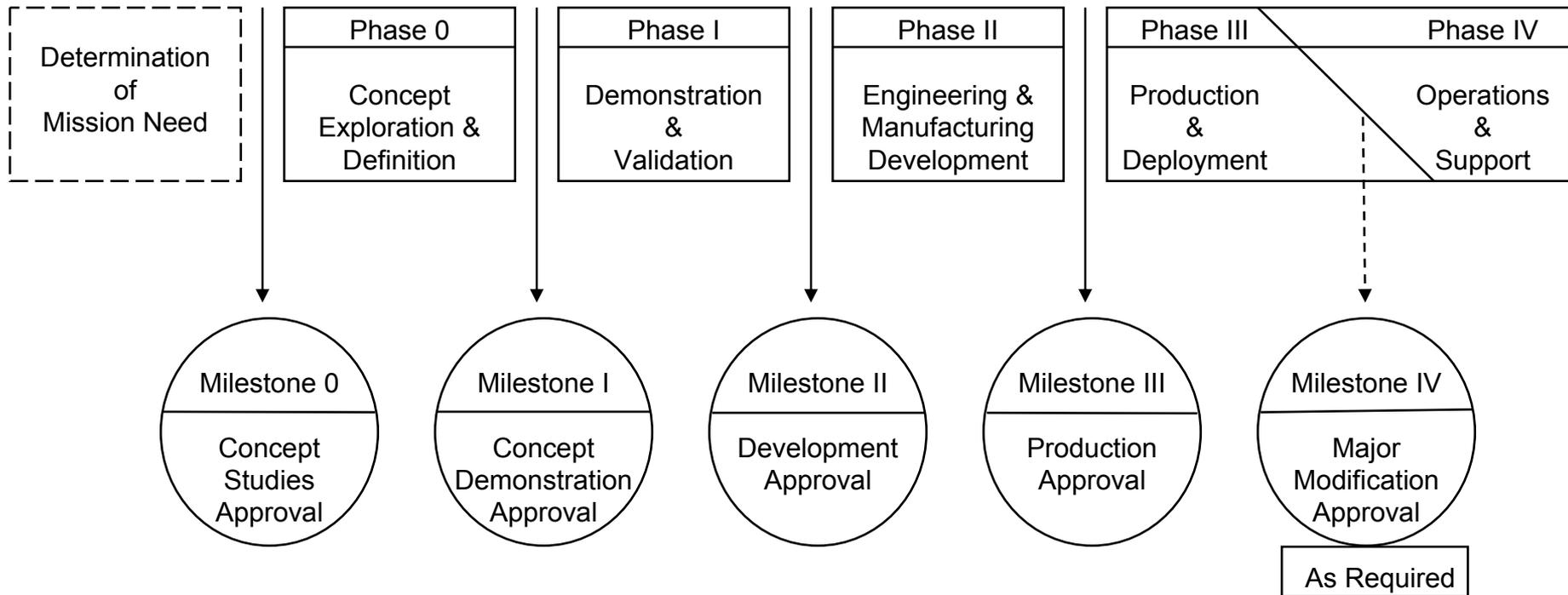
Acquisition Decision Making

- Major defense acquisitions programs (MDAP) are managed through a “Milestone” review process.
 - MDAP
 - Thresholds (FY96 \$) \geq \$355M RDT&E, or \geq \$2.1B Procurement
or,
 - Designated by the Secretary of Defense
- Decision authority : Under Secretary of Defense (Acquisition, Technology and Logistics).
- USD(AT&L) advised by Defense Acquisition Board (DAB) through a formal process.

Members of the DAB

- Chair: USD(AT&L)
- Vice Chair: Vice Chairman of the JCS
- Other Principal Members:
 - Principal Deputy USD(AT&L)
 - the Under Secretary of Defense (Comptroller)
 - the Assistant Secretary of Defense (Strategy and Threat Reduction)
 - the Assistant Secretary of Defense (C3I)
 - the Director of Operational Test and Evaluation (DOT&E)
 - the Director of Program Analysis and Evaluation (PA&E)
 - the Director of Defense Research and Engineering (DDRE)
 - Services Acquisition Executives
 - cognizant OIPT leader, Program Executive Officer (PEO) and Program Manager (PM)
 - the DAB Executive Secretary

Acquisition Milestones and Phases*

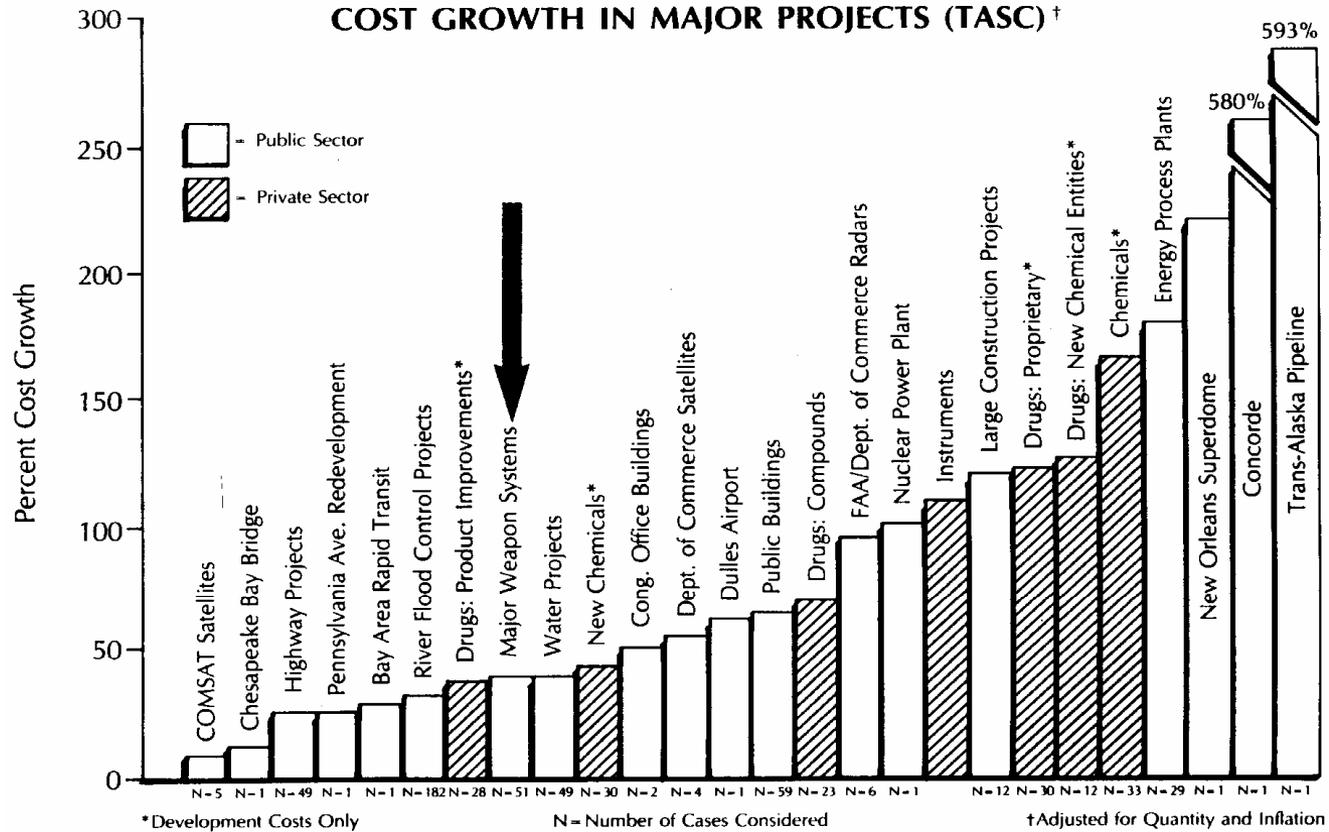


*** New DoD 5000 will have three potential Milestone points:**

MS X, MS D and MS C to enter into initial exploration phase, demonstration phase and commitment to rapid acquisition.

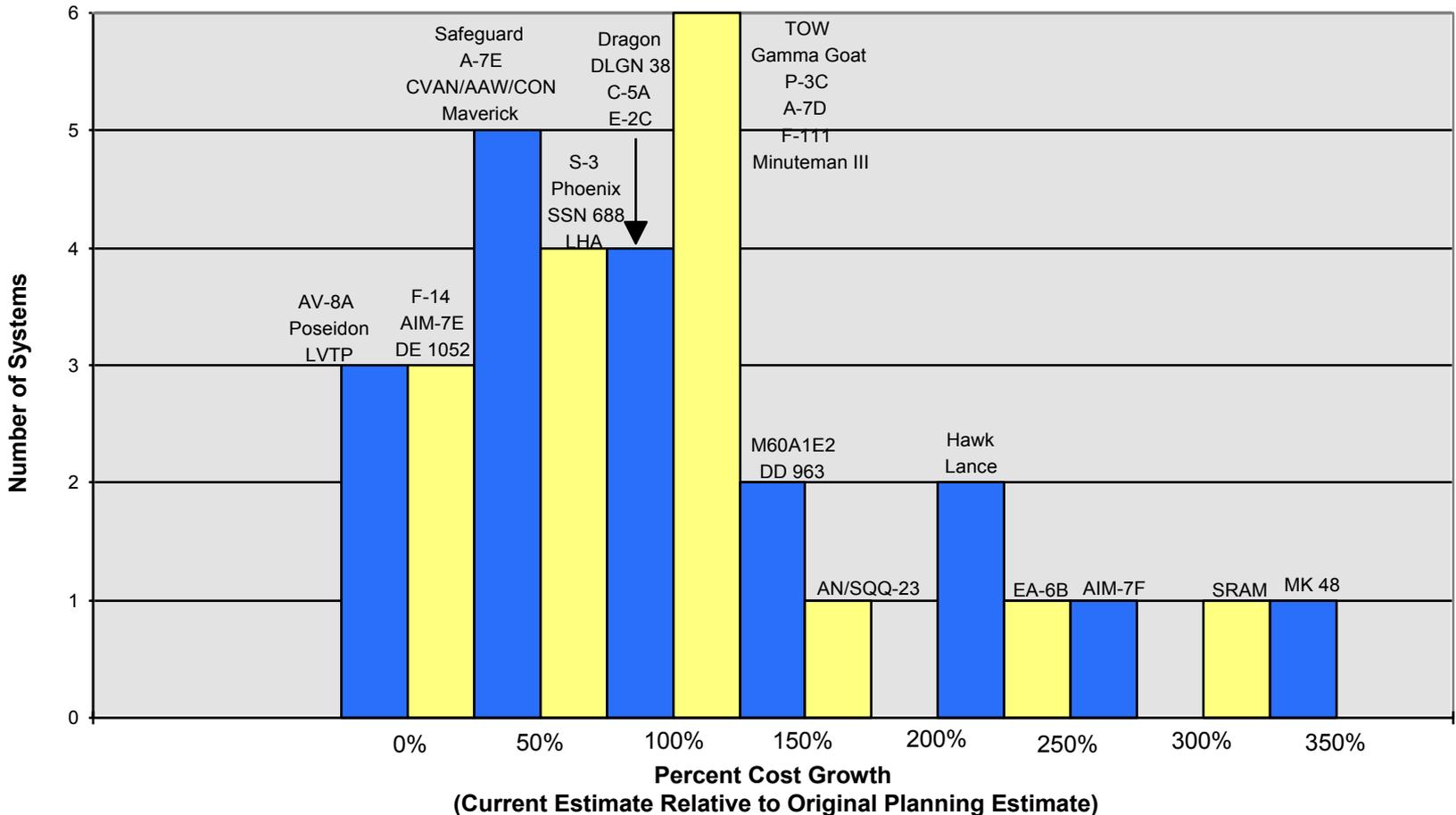
Cost Growth in Defense and Non Defense Programs

1986 Packard Commission Report



Source: F. Biery, The Analytic Sciences Corporation (TASC), "Cost Growth and the Use of Competitive Acquisition Strategies," The National Estimator (Journal of The National Estimating Society), Vol. 6, No. 3 (Fall 1985).

Cost Growth Mid to Late 1960s



Emphasis on Cost Estimates

- Packard Memorandum (Dec 71)
 - cited poor initial estimates as root cause of program cost growth
 - directed Services to improve cost analysis capabilities
 - use of ICE in DSARC (now DAB) process
- Laird Memorandum (Jan 72)
 - re-affirm Packard objectives
 - established OSD Cost analysis Improvement Group (CAIG)
- USC Title 10, Section 2434 :
 - The SecDef may not approve EMD, or the production and deployment, of an MDAP unless an independent estimate of the full life-cycle of the program ... [has] been considered by the Secretary.

Scope of cost estimates

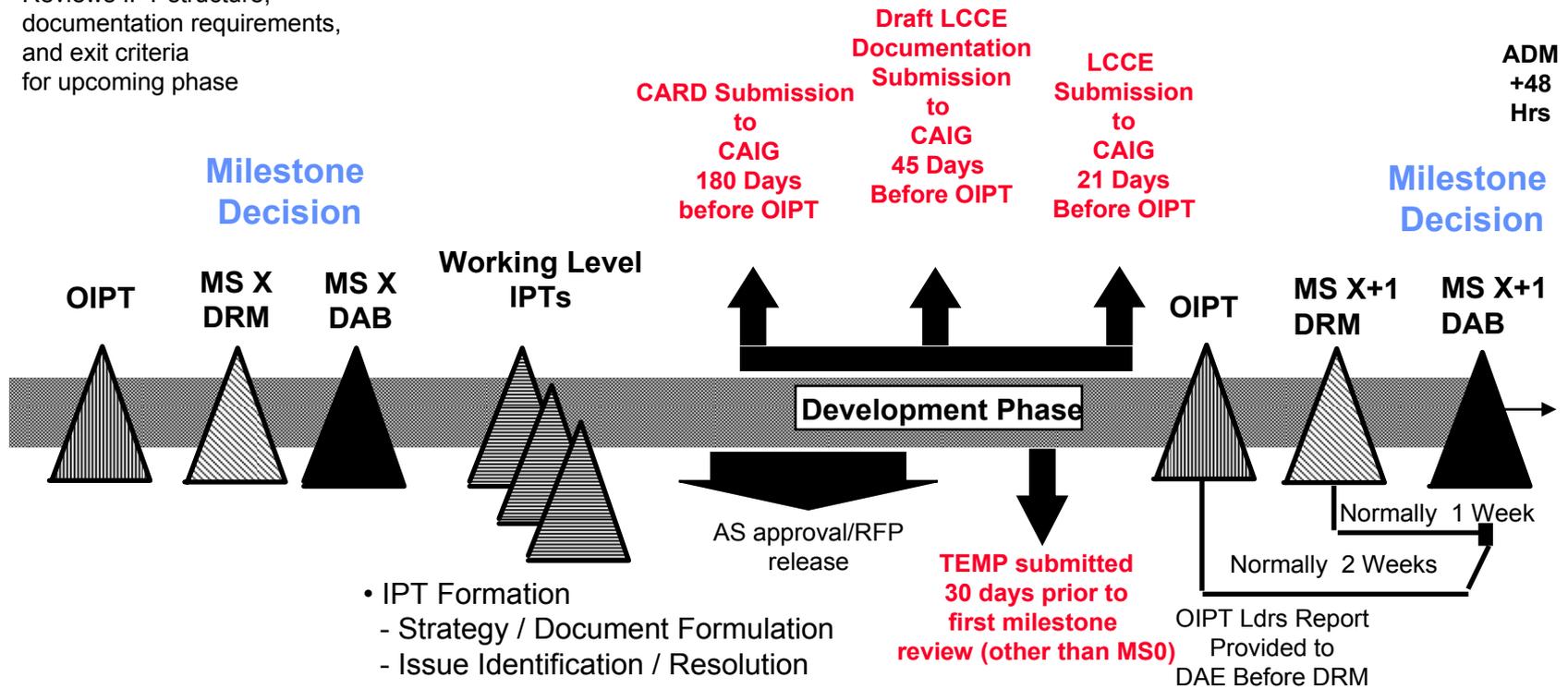
- Milestone Decision
 - requires full life cycle cost estimate
 - **How much will the program cost?**
 - **Is the program affordable and fully funded?**
 - ICE required to assure realistic costing
- Program Reviews and budget reviews
 - depending on the issue, may require only part of the life cycle cost estimate, i.e. RDT&E and/or procurement
 - to allocate resources among competing programs
 - to establish resource requirements for alternatives

What Cost Estimates?

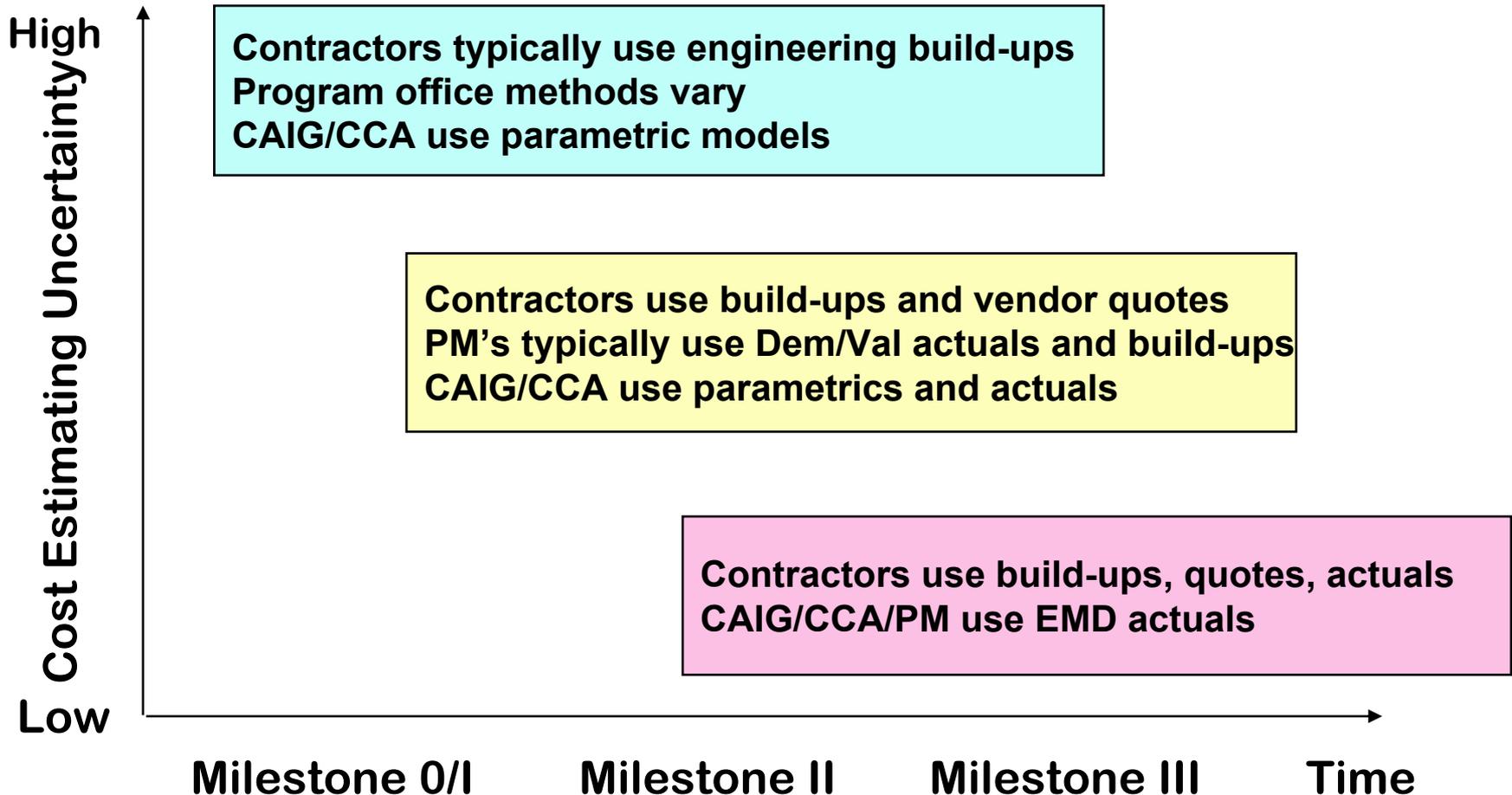
- Program Office Estimate (POE)
 - to support Milestone decision, budget justification and program review
 - prepared by Program Office, or matrix support organization
- Independent Cost Estimate (ICE)
 - required all ACAT I programs for all Milestone reviews after MS 0
 - prepared by OSD CAIG
- Component Cost Analysis (CCA)
 - for programs with significant cost risk or high visibility
 - upon request of the Service Acquisition Executive (SAE)
 - prepared by Services Cost Centers

Key Events Leading to a Milestone Decision

Reviews IPT structure, documentation requirements, and exit criteria for upcoming phase



Cost Estimating Techniques



OSD/CAIG

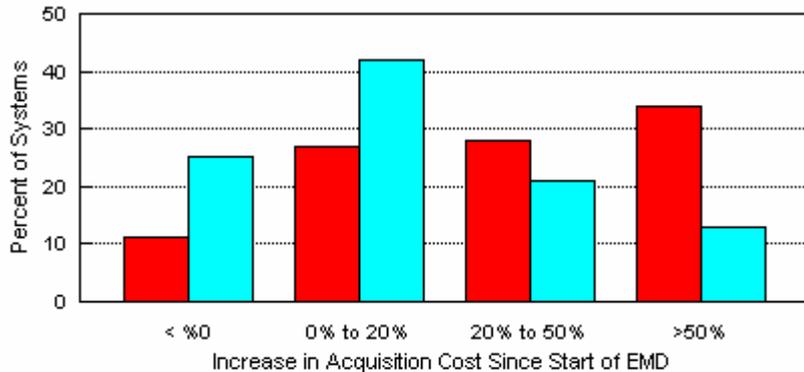


Cost Estimating 101

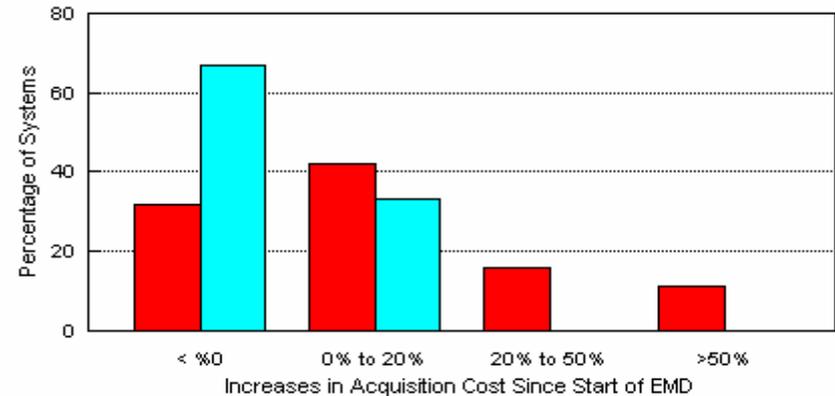
- **Estimate should be complete**
 - follow work breakdown structure, addresses all elements of cost
 - hardware, software, integration, MILCON, test assets and others
- **Estimate should be supportable**
 - assumptions used are consistent with actuals or history of analogous programs, or,
 - sufficient rationale to deviate from past experience or standard practices
- **Estimate should be comprehensive**
 - technical challenges and schedule risks
 - acquisition strategy—dual sourcing, multiyear procurement
 - special contractual provisions, claims and pending litigation
 - changes in business base and foreign military sales (FMS)
 - business decisions, changes in design and production process etc.

Cost Growth Before and After 1983

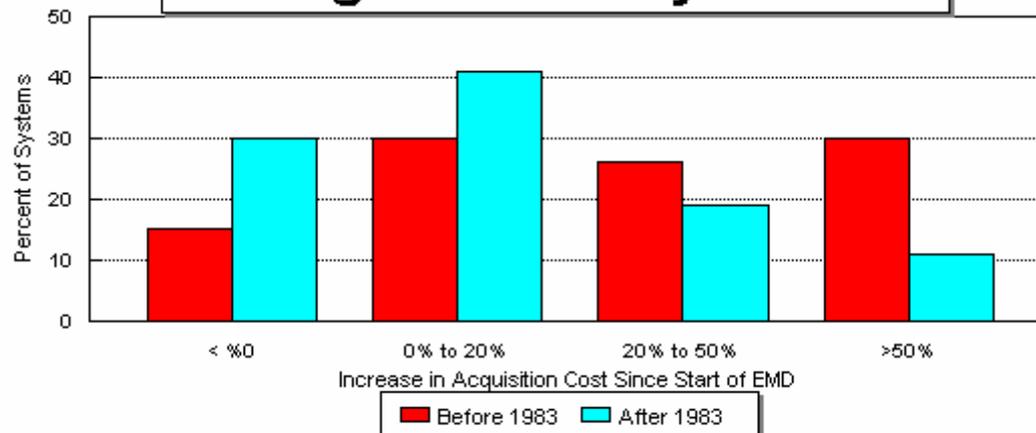
Small Systems



Large Systems



Large & Small Systems

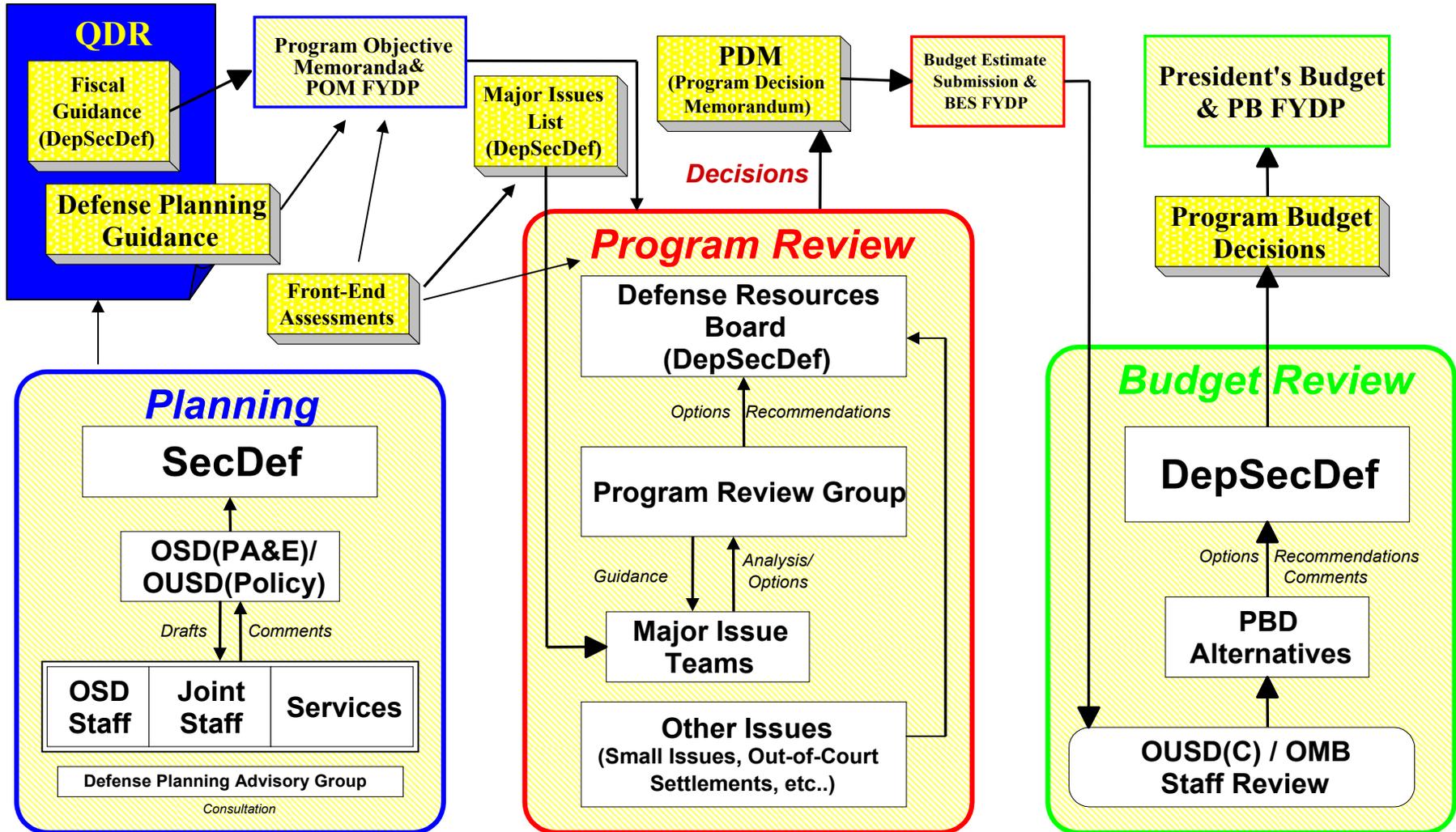


Large Systems = 22
 Small Systems = 106
 January 1996

Planning, Programming and Budgeting System (PPBS)

- an executive management tool
- a resource allocation process for administering:
 - an annual budget of more than \$280 billion
 - more than 2 million service members and civilians
 - capital assets exceeding \$1 trillion (facilities, equipment)
- a rational methodology for balancing:
 - internal (*DoD-wide*) and external (*Administration and Congressional*) priorities
 - central planning vs. delegated management
 - stability vs. change

PPBS Process Flow

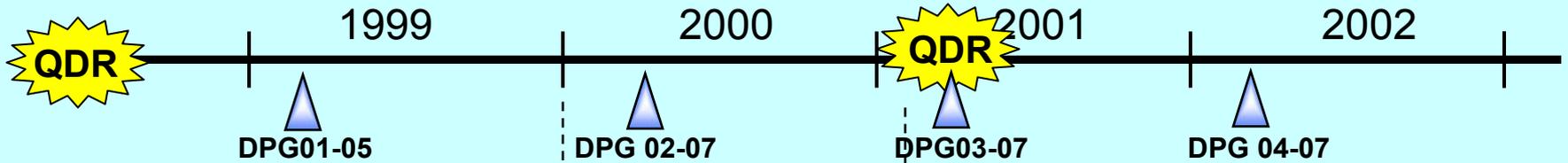


Cost Estimating for PPBS

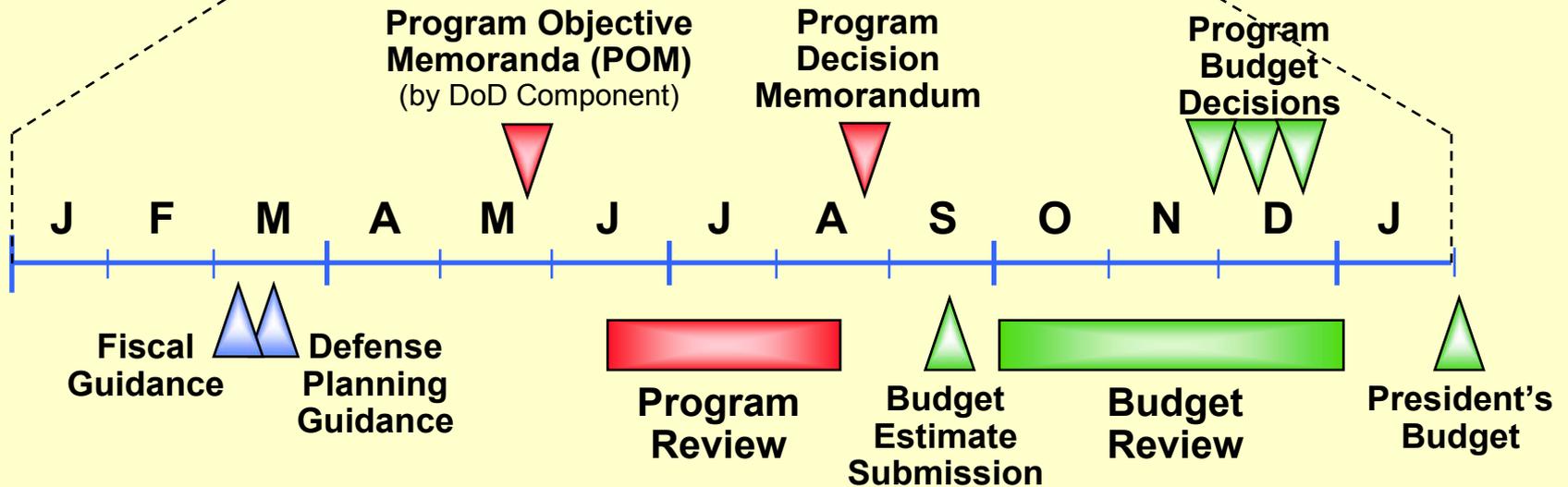
- **Strategic Plan (QDR) & Defense Planning Guidance (DPG)**
 - **resource requirement important consideration to decide on**
 - what defense capabilities are needed
 - what alternative(s) are affordable to implement National Security Strategy
- **POM (Program Objective Memorandum)**
 - **services submit budget quality cost estimate to identify budget requirement**
- **Program Review**
 - competing priorities: readiness, forces, S&T, BUR enhancements, system acquisition, infrastructure .
 - **cost always a key consideration in program alternative selection**
- **PDM (Program Decision Memorandum)**
 - direction to services for budget submission
 - direction to Comptroller for the preparation of President's Budget

Calendar

Strategic Planning



Annual Program and Budget Development



Cost Estimates in PBD Review

- Budget Estimate Submission (BES) (mid-September)
 - **cost estimate to formulate services' BES**
- PBD adjustments
 - OSD Comptroller and OMB budget reviews focus on requirement
 - **cost estimate to reflect changes in quantities, schedule, phasing per PBD**
- President's Budget (PB) submission for Congressional approval (February)
 - **update cost estimate to support final budget submission**
- POM input starts new cycle
 - **cost estimates to support new POM submission**

Cost Estimating in Program Management

- Budget submission
 - POM, BES, PB etc.
- Budget changes are way of life
 - change in inflation, across the board cuts, “taxes”
 - budget realignment, reprogramming
- Cost estimates to support managerial decisions to adjust programs to revised new budgets
 - program stretches, quantity reductions, re-phrasings

Cost Reduction Initiatives

- Cost estimates account for “savings” associated with acquisition strategies
 - multi-year procurement
 - sole source versus dual source
 - allocation versus competition
- Cost estimates to assess cost reduction initiatives
 - commercial practices
 - departing from MIL Standard/MIL SPEC
 - Integrated Process and Product Development (IPPD)

CAIV and TOC Reduction

- Cost As an Independent Variable (CAIV) and Total Ownership Cost (TOC) reduction initiatives
 - trade-offs between military requirements and costs
 - trade-off between investment costs and operating and support costs
- Cost estimating tools must link requirements and performance to cost
- Total ownership cost consideration early in the program

Summary

- Cost estimating is an indispensable tool in
 - decision making
 - resource allocation
 - day-to day program management
 - implementation of cost reduction initiatives
- Cost estimating discipline a must for sound business and financial management