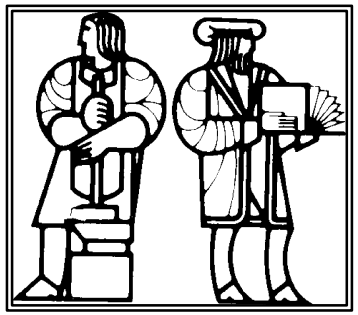
Lean Aircraft Initiative
Plenary Workshop

Program Instability



March 5, 1997

Presented by:

Eric Rebentisch

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Outline

- Background
- Executive Board actions
- Data sources
- Policy recommendation topics
- Supporting data
- Summary

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Background

- **Program Instability research objectives:**
  - **Identify primary sources of instability**
  - **Measure instability-related cost premium**
  - **Investigate strategies to avoid instability or mitigate its impact**
- **Focus to date at program and project level**
- **Data collected from government and contractor sources**

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November 1996 Executive Board Actions

- Validate survey findings
  - PEO/PM briefings
  - Accuracy of cost growth segregation
- Compare findings with previous CBO research
- Develop policy change recommendations and present at April 1997 LAI Executive Board

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General Response From PEOs and PMs

- **Program Instability research presented to PEOs, PMs**
  - **2 USAF PEOs (BG Reiter, Mr. Schulte)**
  - **26 PMs in 22 programs/projects at ASC, ESC, Redstone**
- **Positive response overall**
- **Value in multi-service perspective**

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Survey Data Sources

Government Survey

- 500 surveys distributed
  - ASC, ESC, NAVAIR, ATCOM, Redstone
  - Distribution complete
- 153 returned to date
  - 55 SPO/PMOs represented

Contractor Survey

- 300 surveys distributed:
  - 53 programs identified in SPO survey
  - Additional programs in LAI member companies
- 106 returned to date
  - Prime and subcontractors contractors

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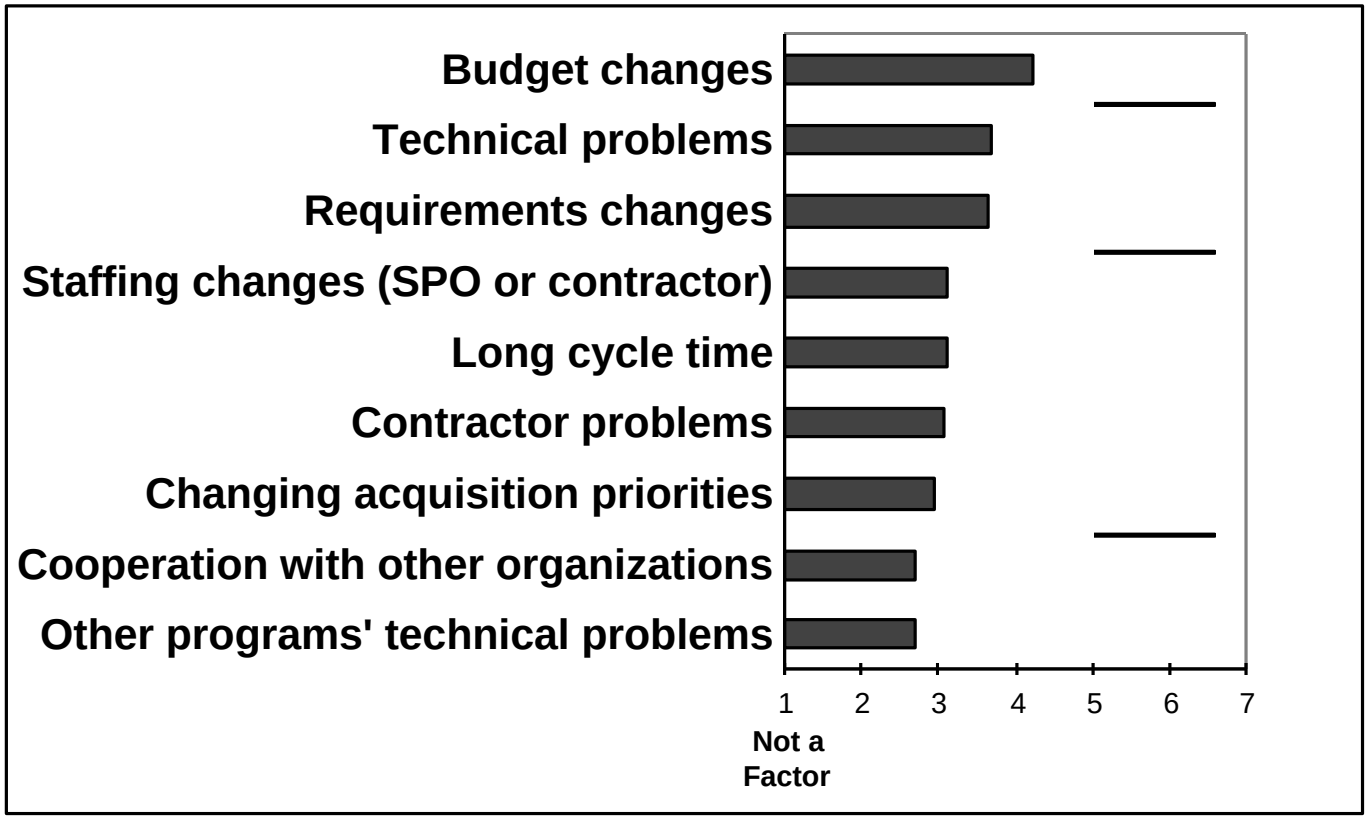
Government PM Ratings of Program Instability Sources



Source: 1996 Government PM survey.

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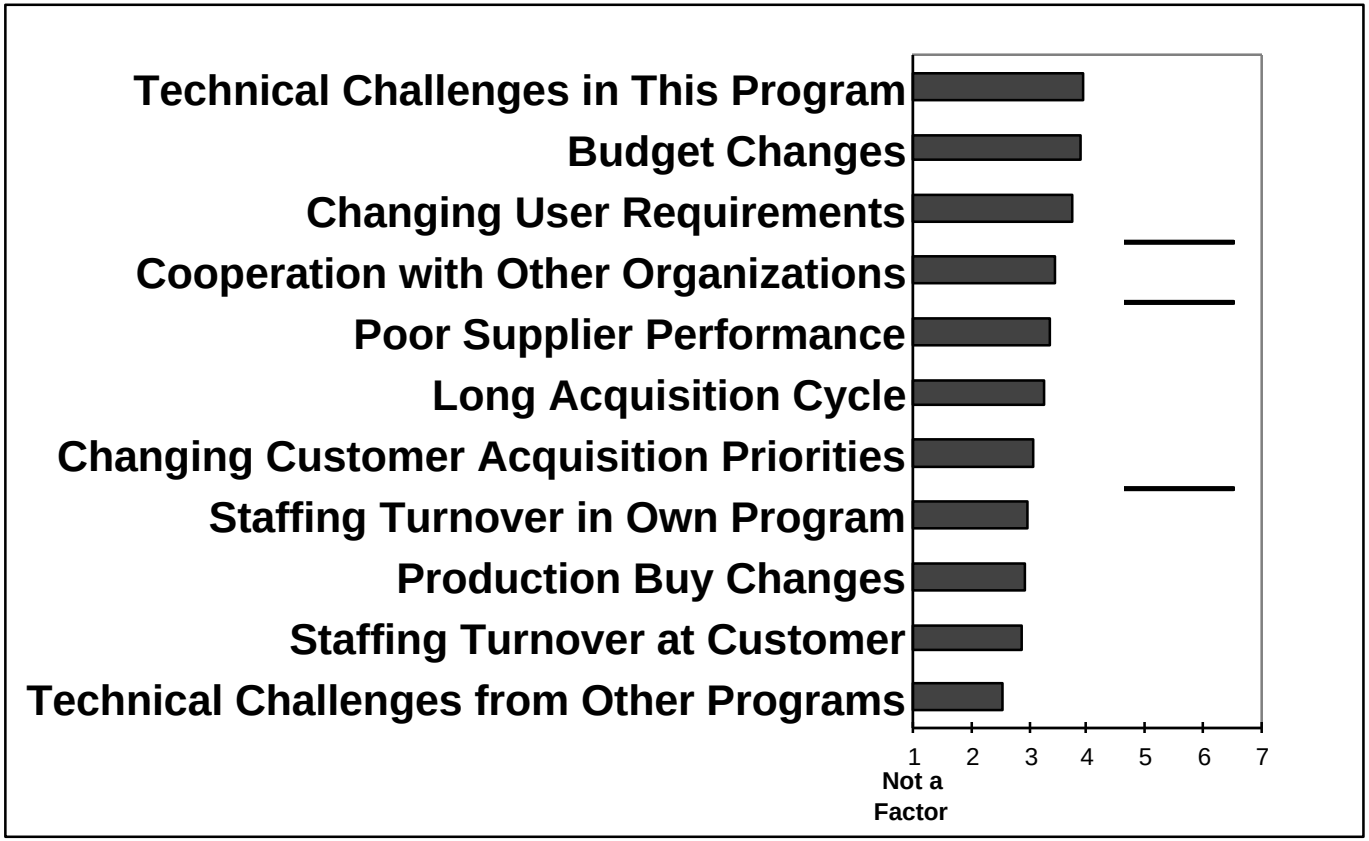
Contractor PM Ratings of Program Instability Sources



Source: 1996 Contractor PM survey.

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Government PM Ratings of Instability Avoidance Strategies

Source: 1996 Government PM survey.

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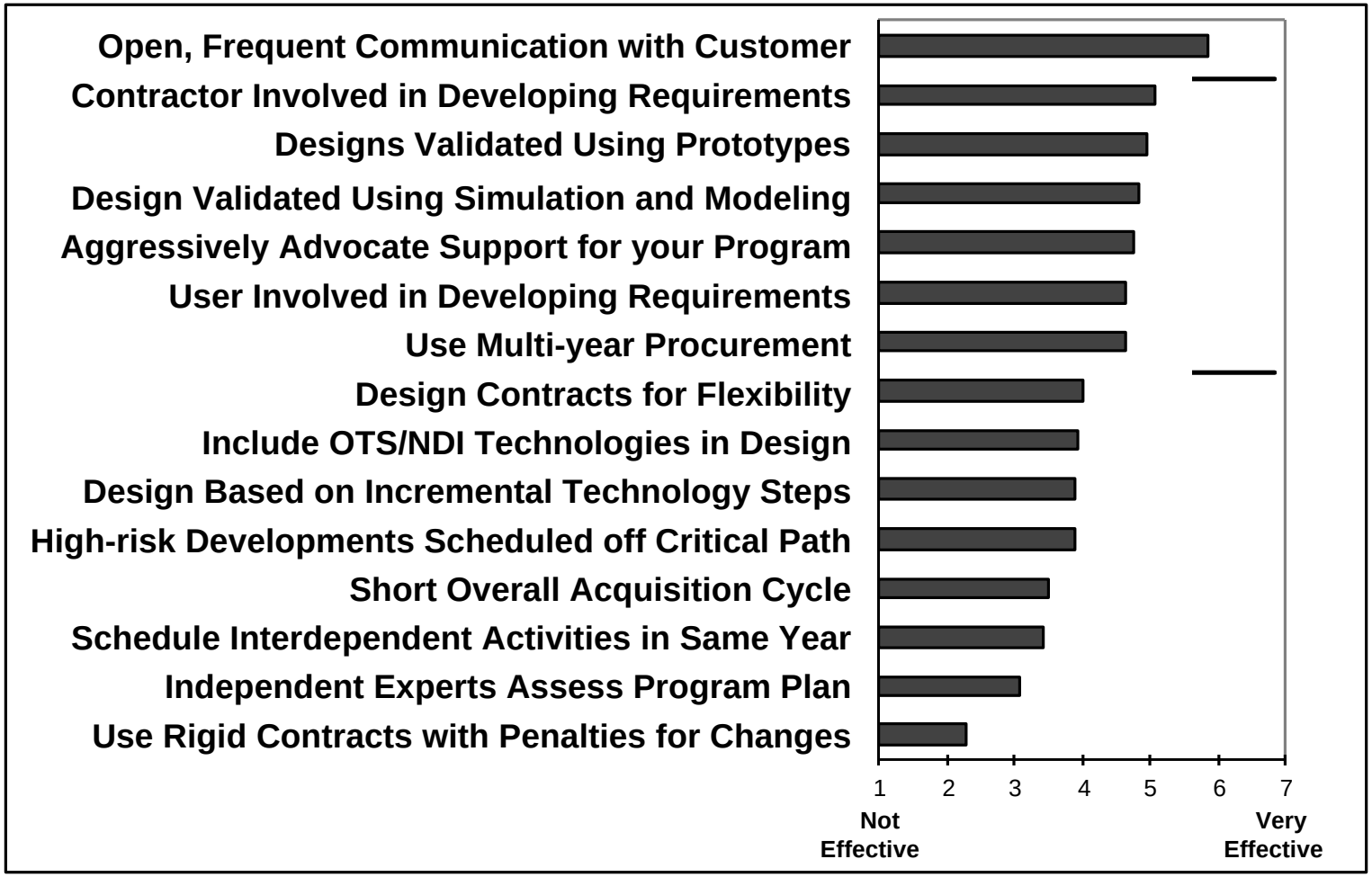
Contractor PM Ratings of Instability Avoidance Strategies



Source: 1996 Contractor PM survey.

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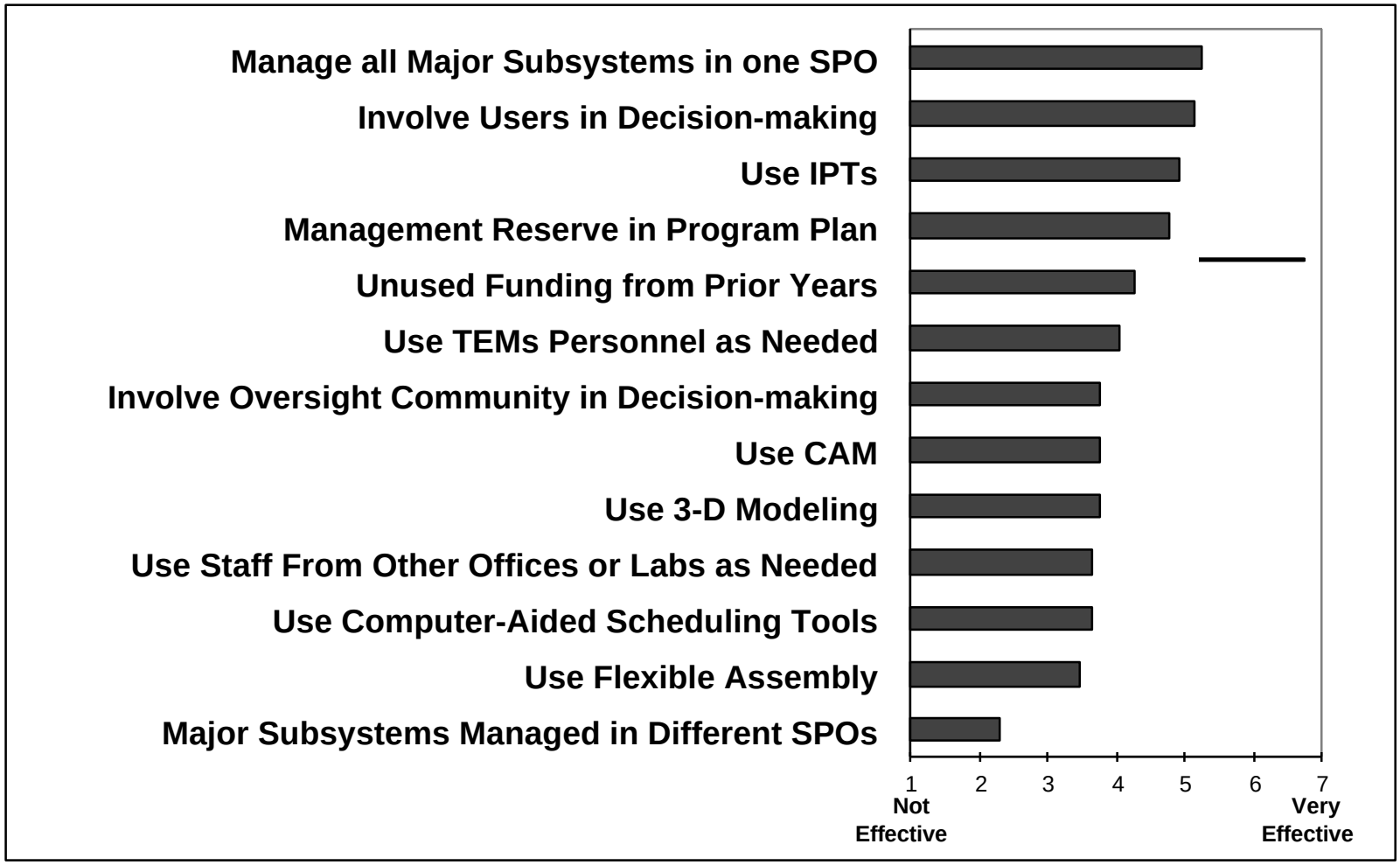
Government PM Ratings of Instability Mitigation Strategies



Source: 1996 Government PM survey.

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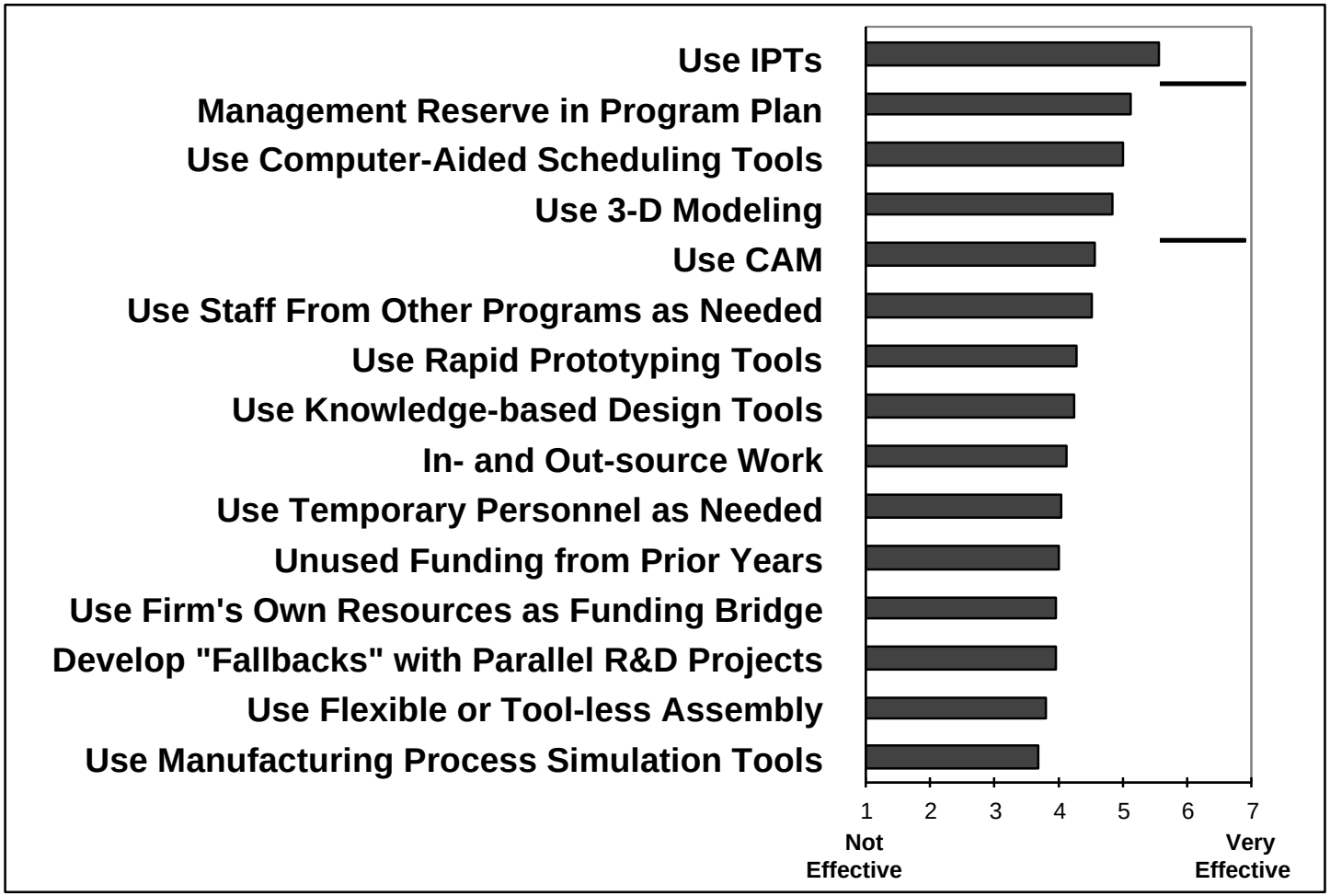
Contractor PM Ratings of Instability Mitigation Strategies



Source: 1996 Contractor PM survey.

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Instability Sources Summary

SPO and Contractor survey similarities:

Same 3 sources of program instability in top tier grouping:

- **Budget changes**
- **Technical problems**
- **Requirements changes**

Common sources of instability in second tier grouping:

- **Problems with other organizations**
- **Long acquisition cycle**
- **Changing acquisition priorities**

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Elements of Cost Growth

Preliminary - For Discussion Only

- **Cost growth (average annual)**

	Government	Contractor
– Budget changes	2.2%	1.8%
– Technical difficulties	2.4%	2.7%
– Changes in user requirements	2.5%	2.7%
– Other sources	0.3%	0.8%
– Total	7.4%	8.0%

- **Case studies of government programs underway to validate cost growth estimates.**

Source: 1996 Government PM survey, 1996 Contractor PM survey.

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Primary Program Instability Research Findings

- 6 principal themes
  - Budget stability
  - Technology risk management
  - Requirements generation and stability
  - Program staffing continuity
  - Stakeholder participation in program planning and execution
  - Training in avoiding/mitigating program instability

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Budget Stability

- **Funding instability accounts for ~1/3 of average annual cost growth (2.2%)**
  - **PEOs and PMs generally support findings**
  - **Interactions between budget stability, technical problems, and requirements changes may understate overall cost impact of budget changes**
- **Other issues:**
  - **Focus to date at program level**
  - **Acquisition community perspective on problem only**
  - **Potential additional research:**
    - **Budget build-up process**
    - **Other stakeholders' contributions and perspectives**

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Technical Risk Management

- **SPO Survey**
  - **Top-rated instability mitigation strategies:**
    - **Management reserve in program plan**
  - **On/under budget programs rate as more effective instability *mitigation* strategies:**
    - **Use 3-D modeling, CAM, computer-aided scheduling tools**
  - **On/under budget programs rate as more effective instability *avoidance* strategies:**
    - **Use incremental technology steps, plan high-risk developments off critical program path**
- **Contractor survey:**
  - **Top-rated instability mitigation strategies:**
    - **Management reserve in program plan**
    - **Use computer-aided scheduling tools, 3-D modeling, CAM**

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Technical Risk and Program Performance

Program Characteristic	Over Budget	On/under Budget
Product technology advance	More revolutionary programs	More evolutionary programs
Technical advance required in key subsystems	More new development	More non-developmental
Character of key enabling technologies	More military-unique	More commercial
Advance in underlying enabling technologies	More change — less current	Less change — more current
OTS/NDI value content (%)	34%	51%
Total Development Time	65 months	42.5 months
"Fast Track" program status (Fast Track/Not Fast Track)	—	4.7x more likely to be "fast track"
Total Program Budget ($M)	$4,447	$1,018
Impacted by Program Instability	More instability	Less instability

On/under budget programs represent "smaller, faster, cheaper" system approach

Source: 1996 Government PM survey.

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Requirements Generation and Stability

- **Requirements changes the largest single source of cost growth overall (2.5%)**
  - **Largest component of cost growth in programs with largest cost over-runs**
  - **Requirements changes-related cost growth increases through system life cycle**
  - **The source of greatest savings in on/under budget programs**
- **User involvement universally cited as critical to program success by PEOs and PMs**
  - **Potential additional research:**
    - **Role of user in requirements generation**
    - **Best practices from other industries on user involvement**

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Staffing Continuity

- On/under budget programs have (compared with cost overrunning programs):
  - More staff continuity:
    - 43% vs. 17% original staff since program start
  - Fewer program managers:
    - 2.5 vs. 3.8 program managers since program start
  - Finding persists while controlling for differences in program length
- PEOs/PMs support need for more staffing continuity at all levels
  - Existing rules are often overridden

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Stakeholder Participation

- **SPO survey:**
  - **Top-rated instability avoidance strategies:**
    - **User involved in developing requirements**
    - **Aggressively advocate support for your program**
    - **Contractor involved in developing requirements**
    - **Contractor involved in developing schedule**
  - **Top-rated instability mitigation strategies:**
    - **Users involved in decision-making**
- **Contractor survey:**
  - **Top-rated instability avoidance strategies:**
    - **Open, frequent communication with customer**
    - **Contractor involved in developing requirements**
    - **Aggressively advocate support for your program**
    - **User involved in developing requirements**

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Training in Instability Management Practices

- Instability avoidance and management a stated priority in program management guidelines
- Wide range in responses in PM evaluations of instability avoidance and mitigation strategies suggests potential uneven realization of goal
- No specific data from surveys to provide additional insight into training effectiveness or requirements

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Summary

- **Survey data on program instability collected, validated through practitioner review**
- **Policy focus team identified most promising areas for policy change recommendations**

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