# Lean Aircraft Initiative
# Plenary Workshop

## The Role of the Schedule Development Process


**October 8, 1997**

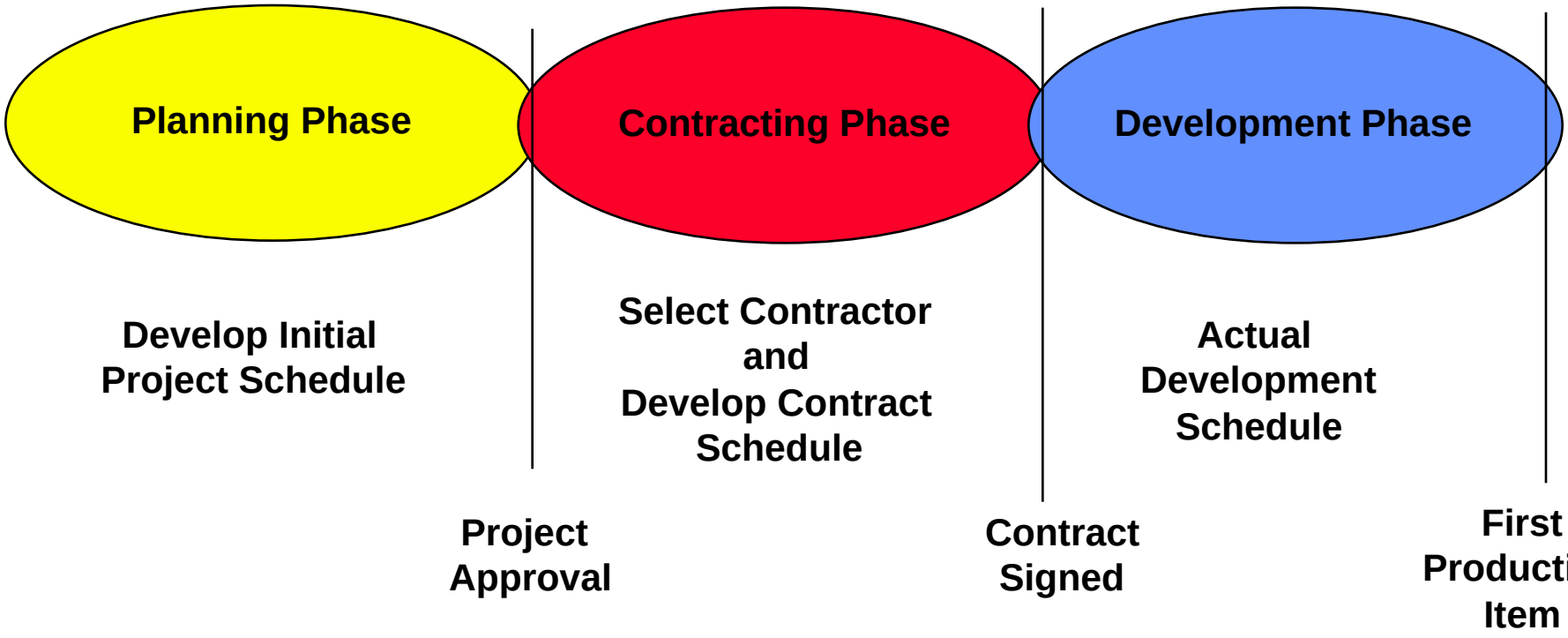
**Capt Ross McNutt**
MIT

# Overview

- Structure Method and Objectives
- The Schedule Development Story
- Schedule Process
- Small Group Discussions

LEAN AIRCRAFT INITIATIVE

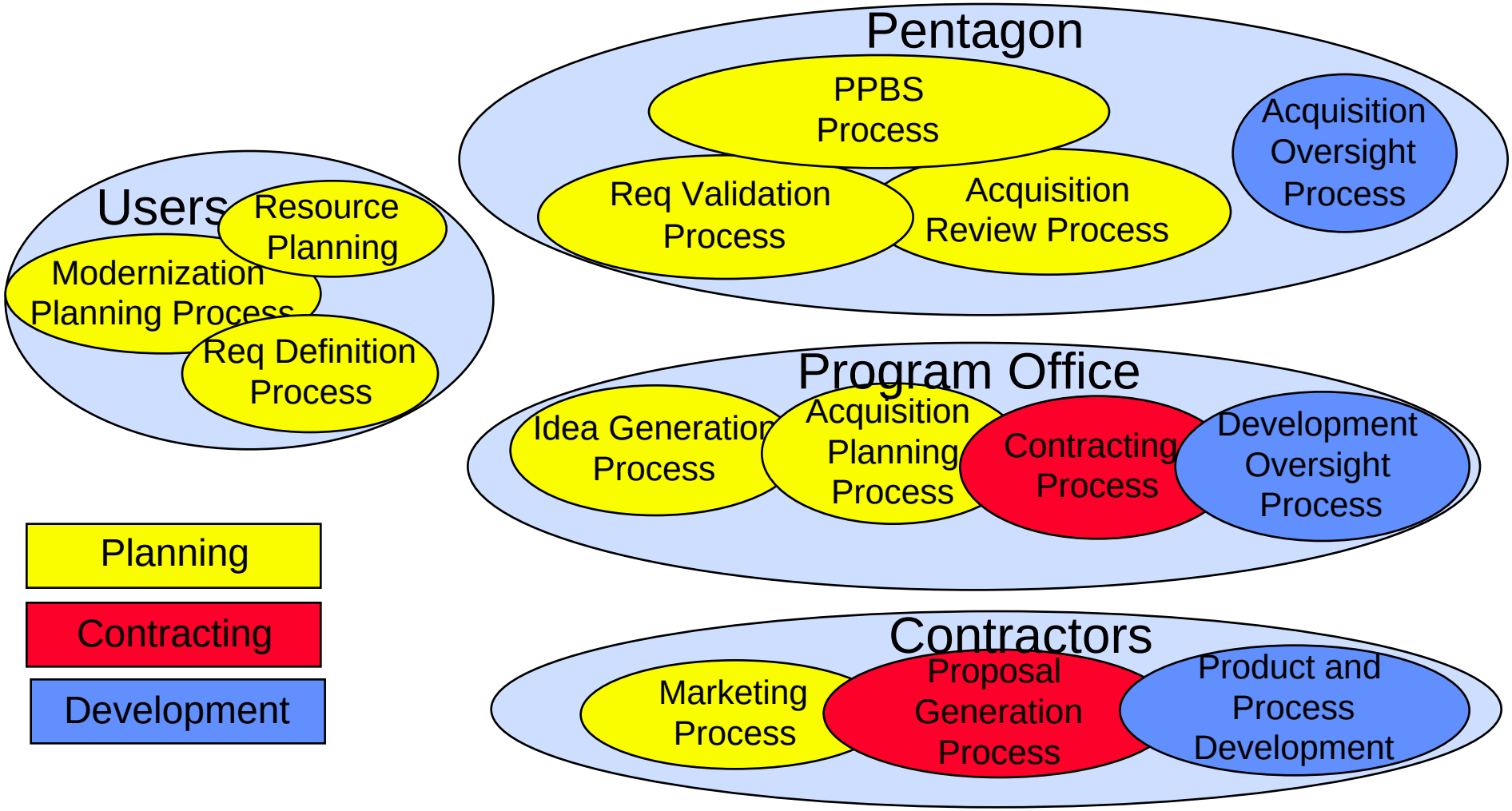
# Schedule Development Phases



LEAN AIRCRAFT INITIATIVE

# Defense Product Development Processes



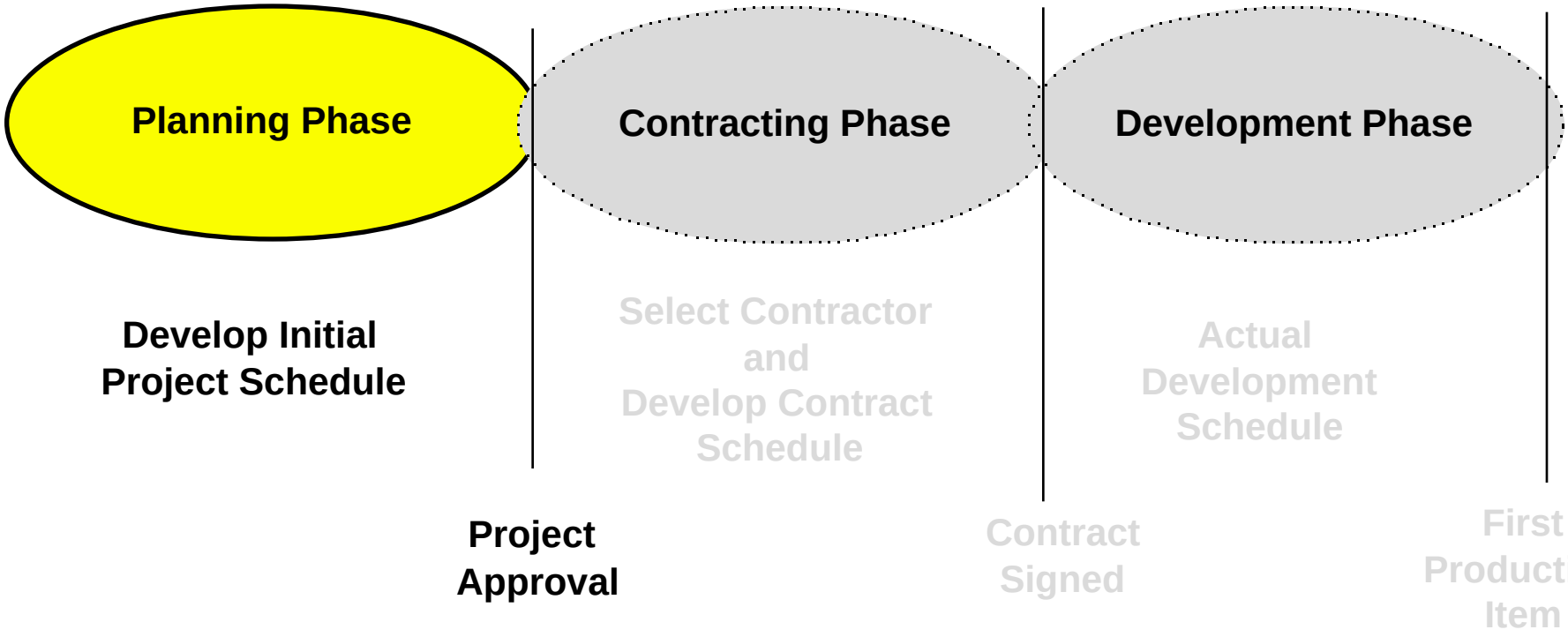
LEAN AIRCRAFT INITIATIVE

# Schedule Process Research Methodology

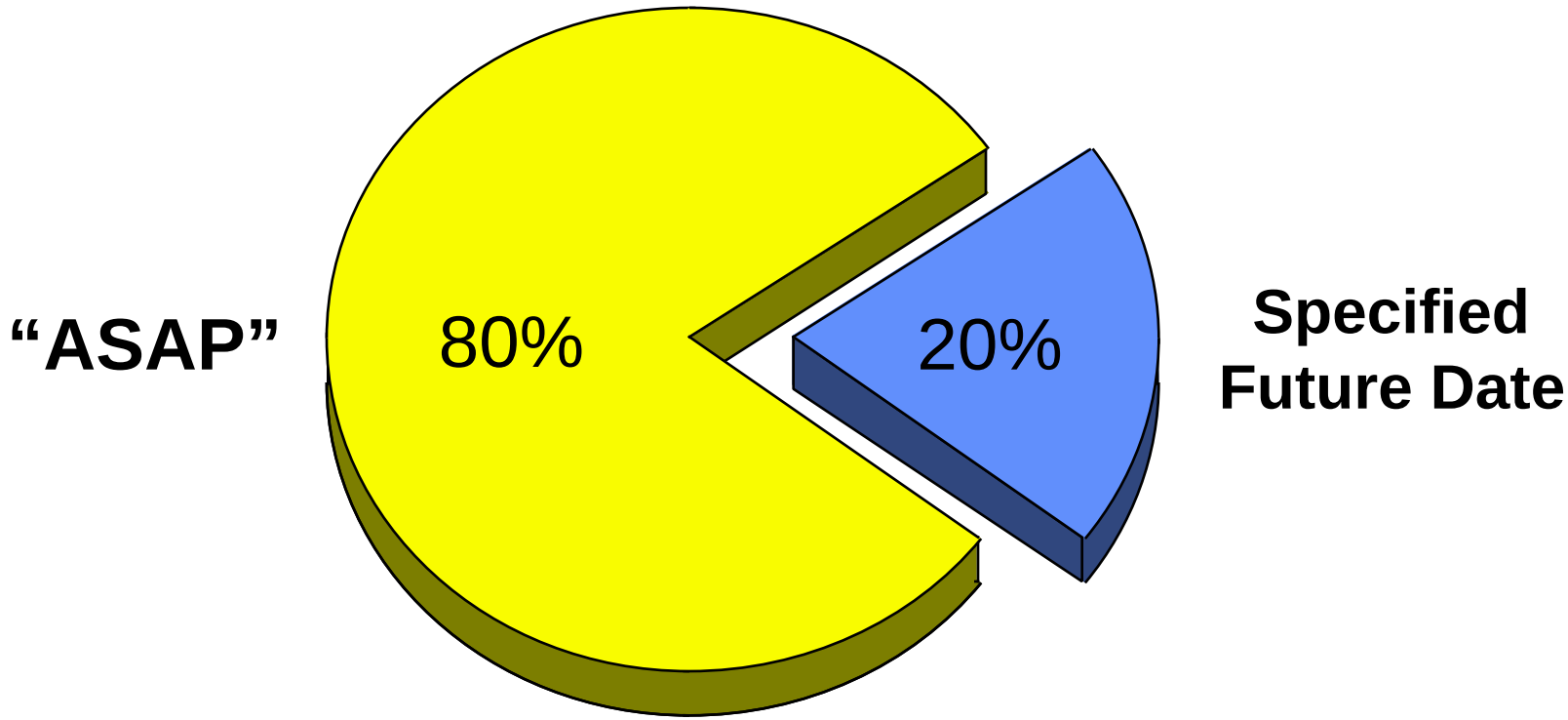
- **Objectives**
  - Identify the important factors involved in the development of project schedules
  - Determine the effect of those factors on project outcomes
- **Three Surveys - Different levels and roles in process**
  - Contractor — Program/Project Managers — 104
  - Program Office — Program/Project Managers — 151
  - Pentagon — Program Element Monitors — 62
  - **317 Project Surveys Completed**
- **Case Study**
  - Post Acquisition Reform Development Effort
  - Demonstration of Current Schedule Process

LEAN AIRCRAFT INITIATIVE

# Initial Schedule Development in the Planning Phase



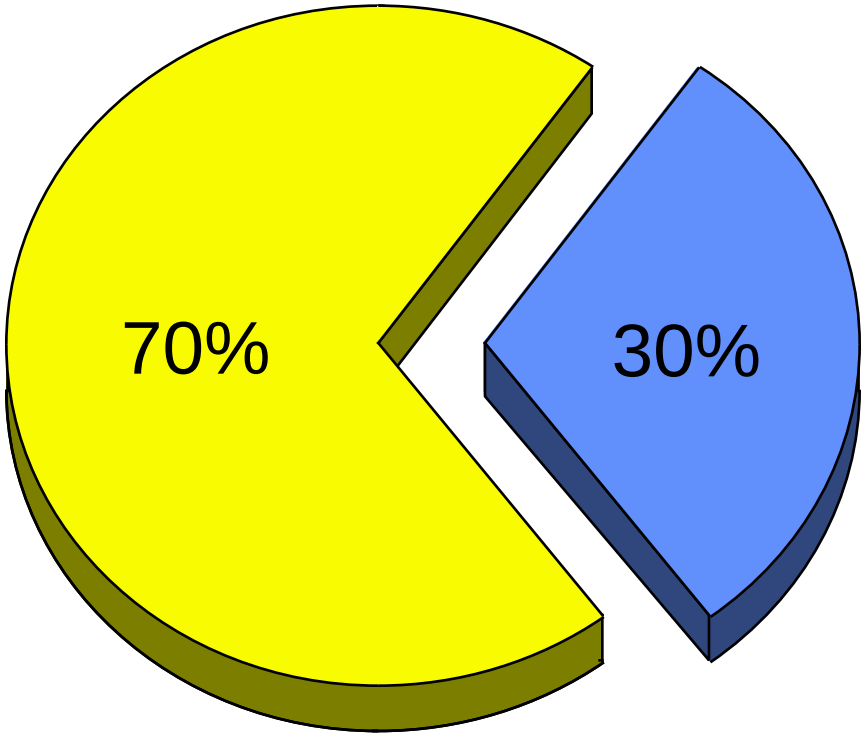
# User's Desired Date




Program Element Monitor Survey

# Operational Need Date

**Current Operational Deficiency**

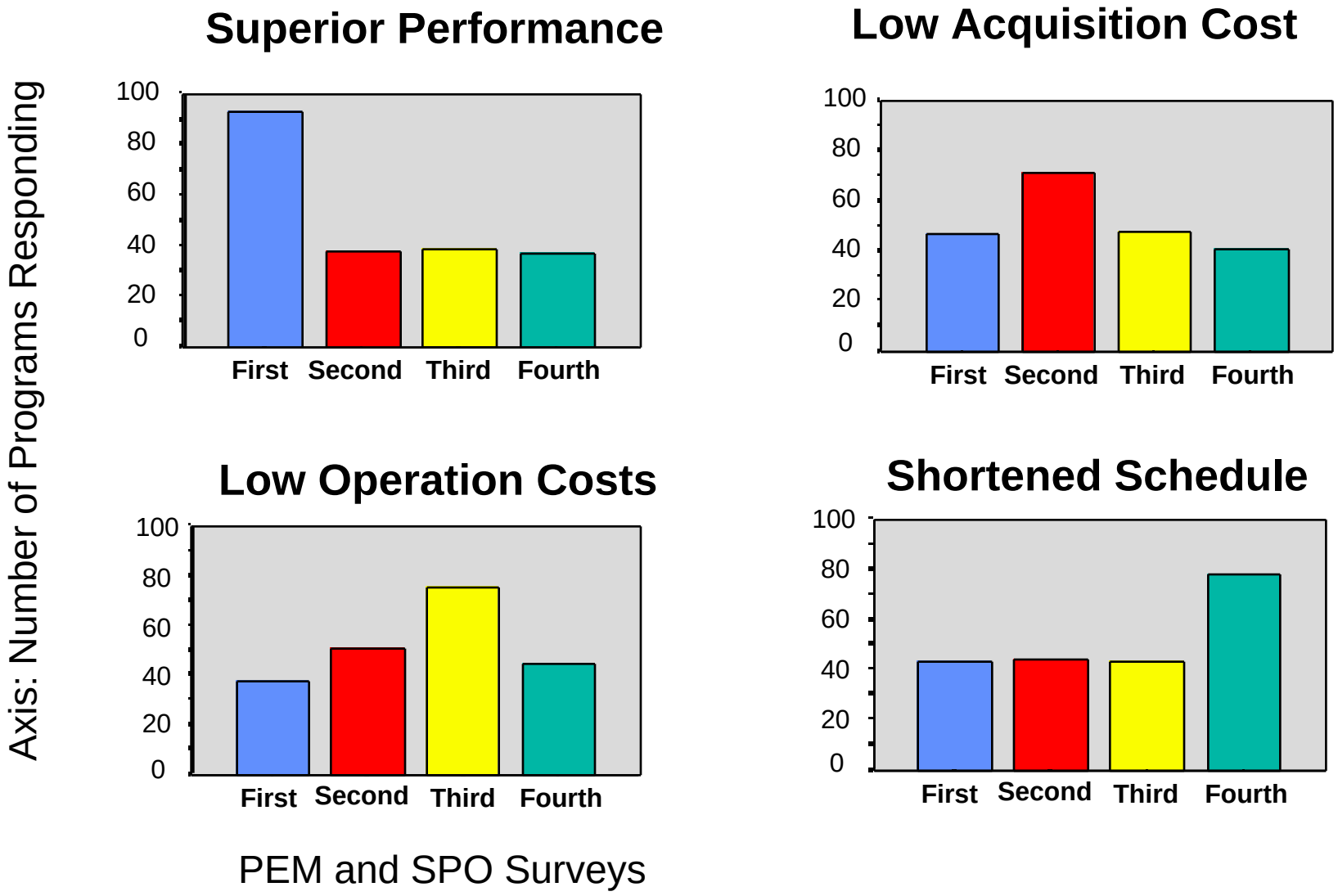



**Future or Projected Deficiency**

Program Element Monitor Survey

# Ranking of Program Objectives (1st to 4th)




PEM and SPO Surveys

# Program Objective Significance Table

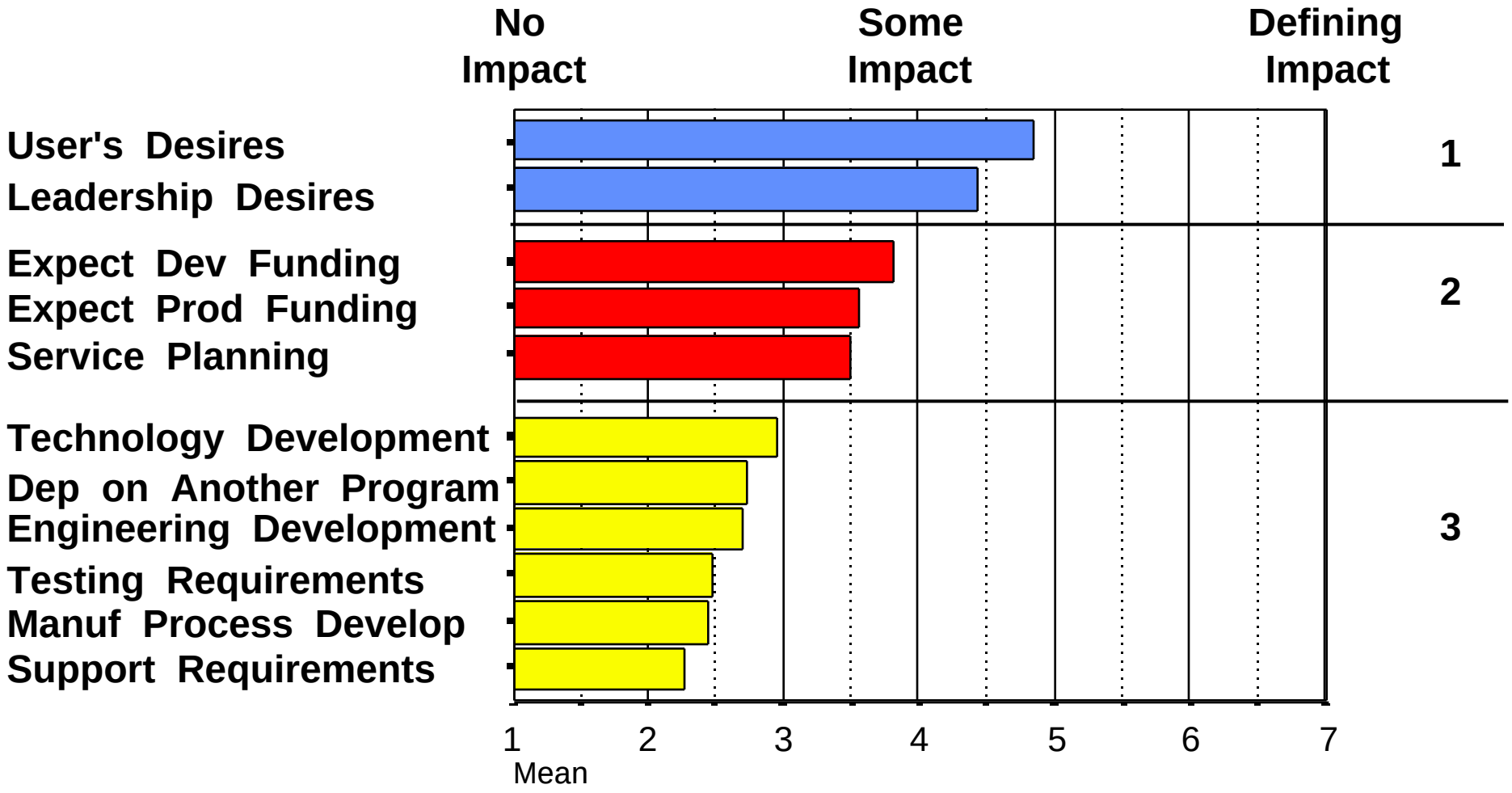
| Mode | Rank | Perf | Acq Cost | Ops Cost | Schd |
|---|---|---|---|---|---|
| Superior Performance | 1st | X | | | |
| Low Acquisition Cost | 2nd | .03 | X | | |
| Low Operational Cost | 3rd | <.001 | .05 | X | |
| Shortened Schedule | 4th | <.0001 | <.01 | .36 | X |

* Using the Non-parametric Wilcoxon Rank-sign Test
PEM and SPO Survey's N=209

LEAN AIRCRAFT INITIATIVE

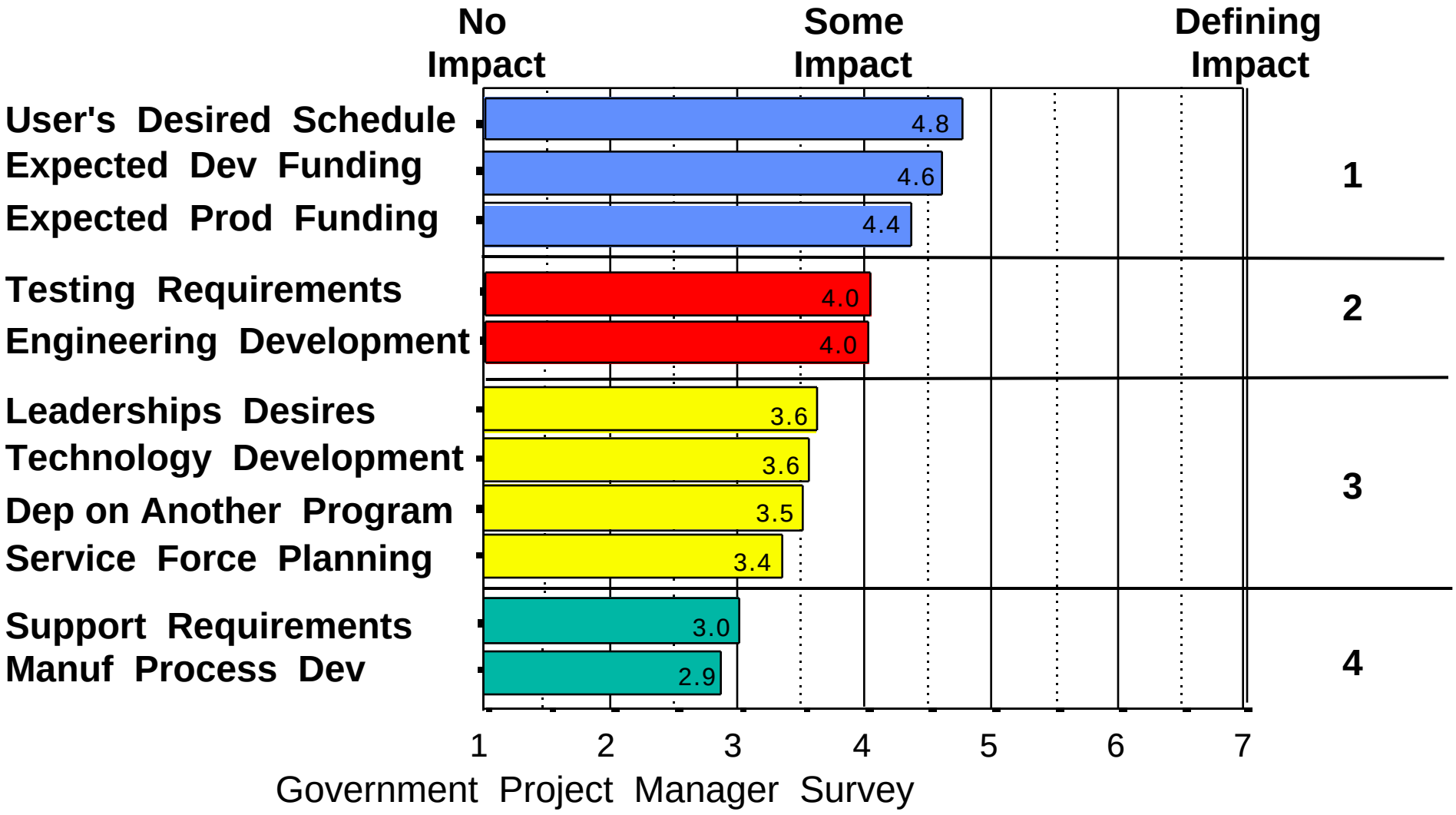
# Factors Influencing the Projects' Starting Date




Program Element Monitor Survey

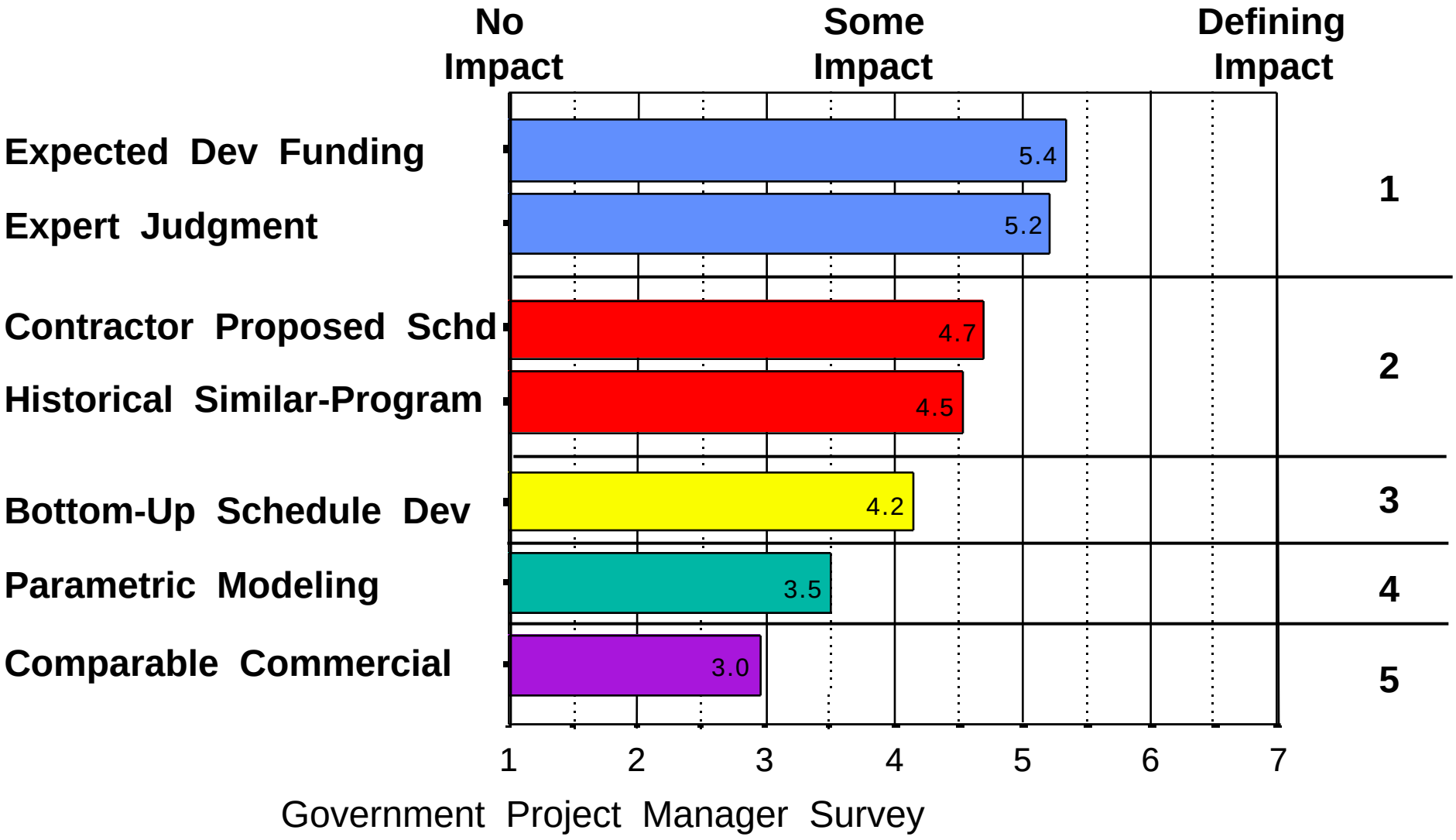
LEAN AIRCRAFT INITIATIVE

# Factors Influencing the Length of the Initial Schedule

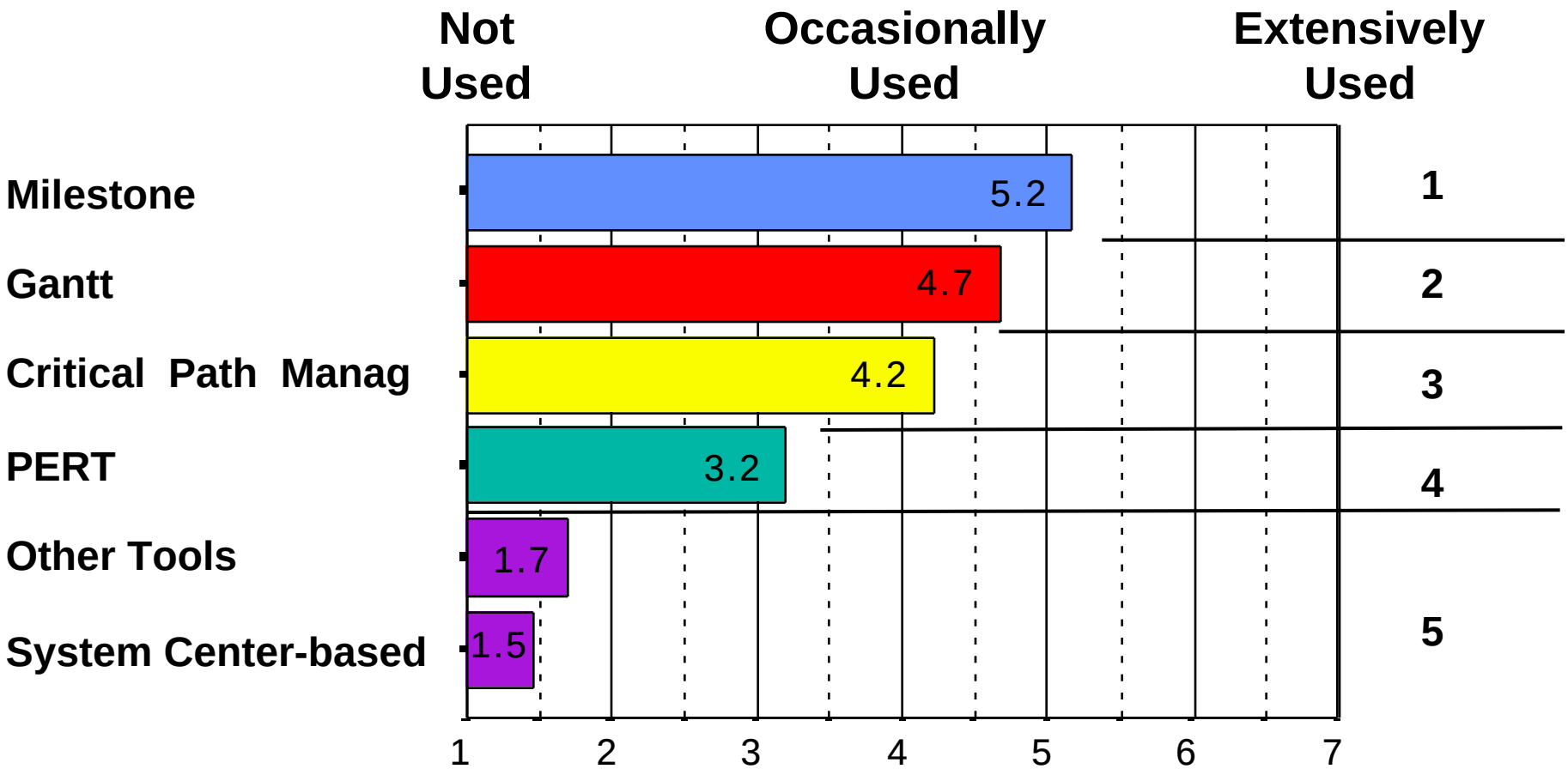


LEAN AIRCRAFT INITIATIVE

# Relative Order of Information Used for Initial Schedule



# Scheduling Tools Used




Government Project Manager Survey

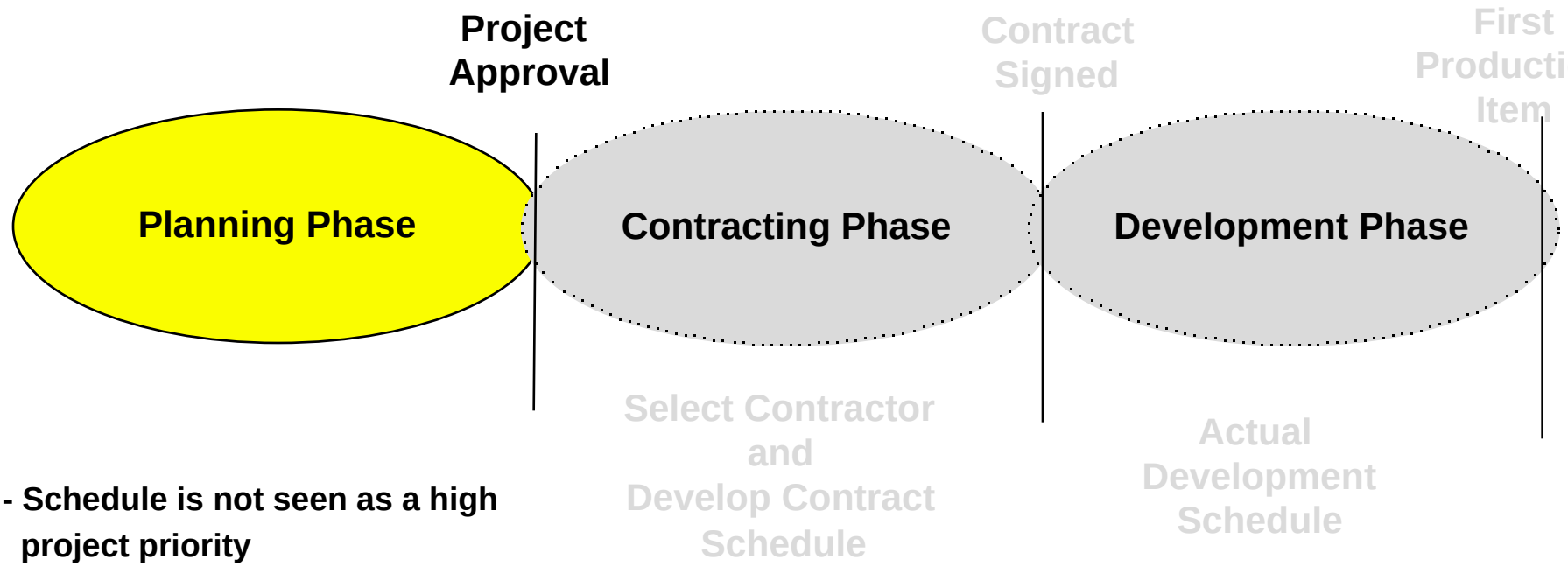
# Evident Across Many Project Categories

- **Same General Trend Occurs Across**
  - **All Program Sizes**
    - **ACAT I, II, and III**
  - **All Levels of Technological Advance**
    - **Revolutionary, New Generation, and Incremental Improvements**
  - **All System Types**
    - **Aircraft, Spacecraft, Electronic Systems, Munitions**

LEAN AIRCRAFT INITIATIVE

# Planning Phase Schedule Results

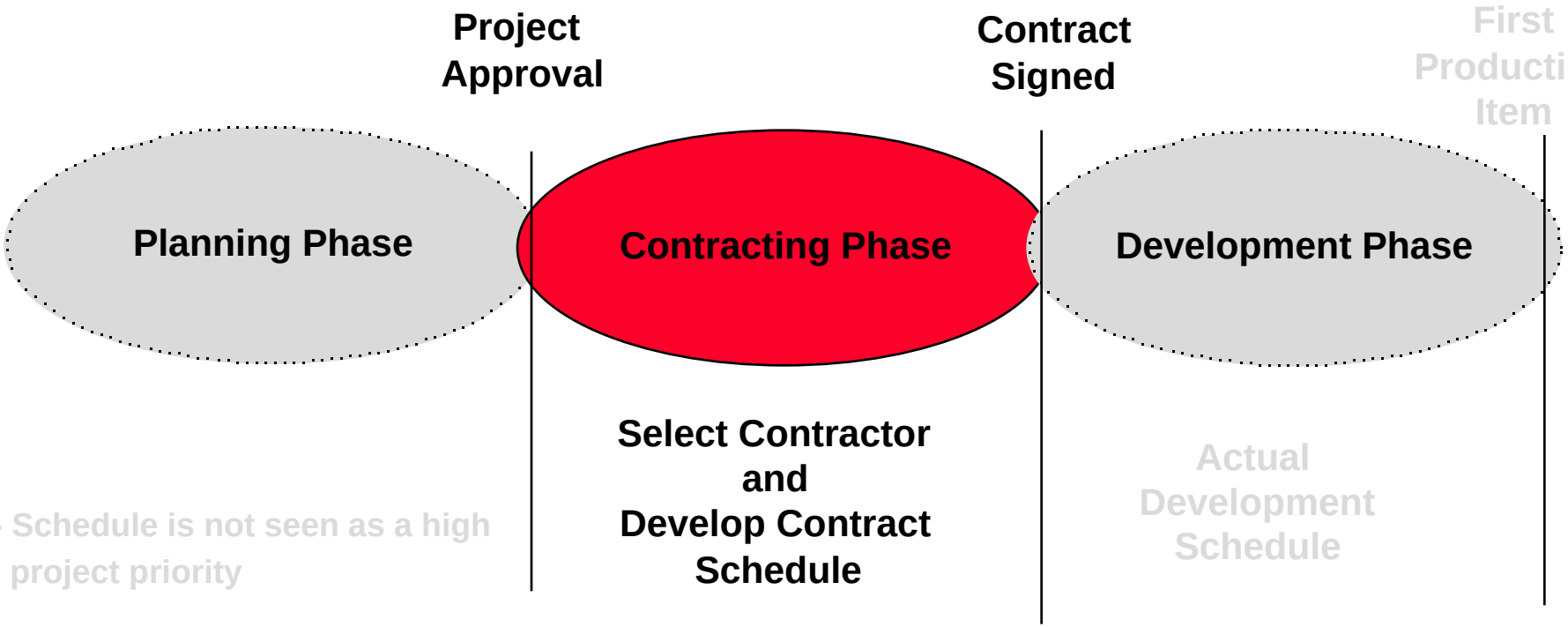



- Schedule is not seen as a high project priority

- Planned schedules determined by expected budget allocations - not development related requirements.

LEAN AIRCRAFT INITIATIVE

# Schedules in the Contracting Phase




- Schedule is not seen as a high project priority

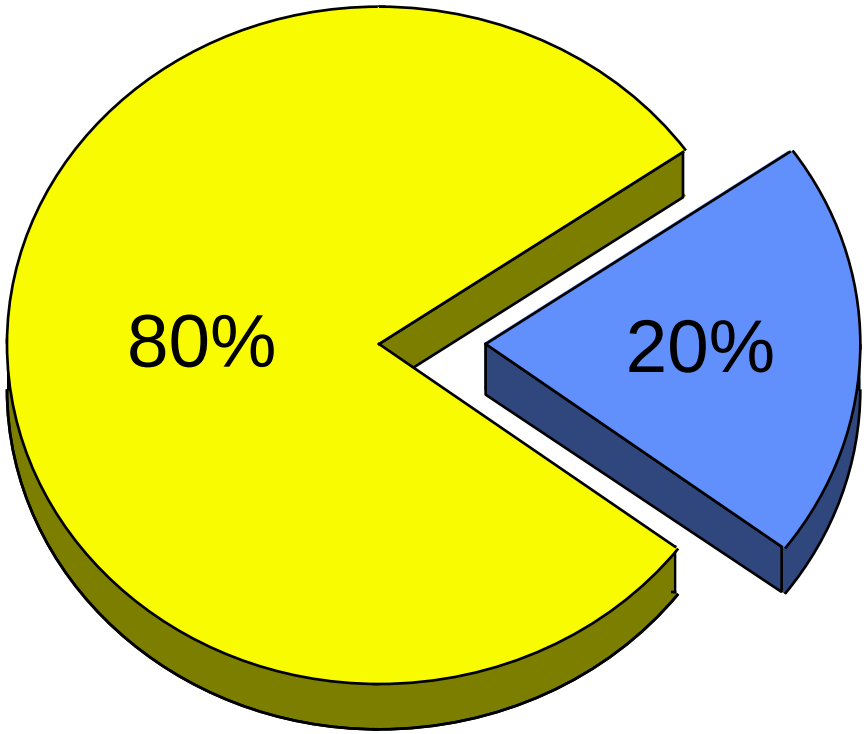
- Planned schedules determined by expected budget allocations - not development related requirements.

# Government Specified Schedule in RFPs

**“ Did the Government, through its RFP or other means, specify an expected project schedule to the contractors?”**

**Specified Expected Schedule**

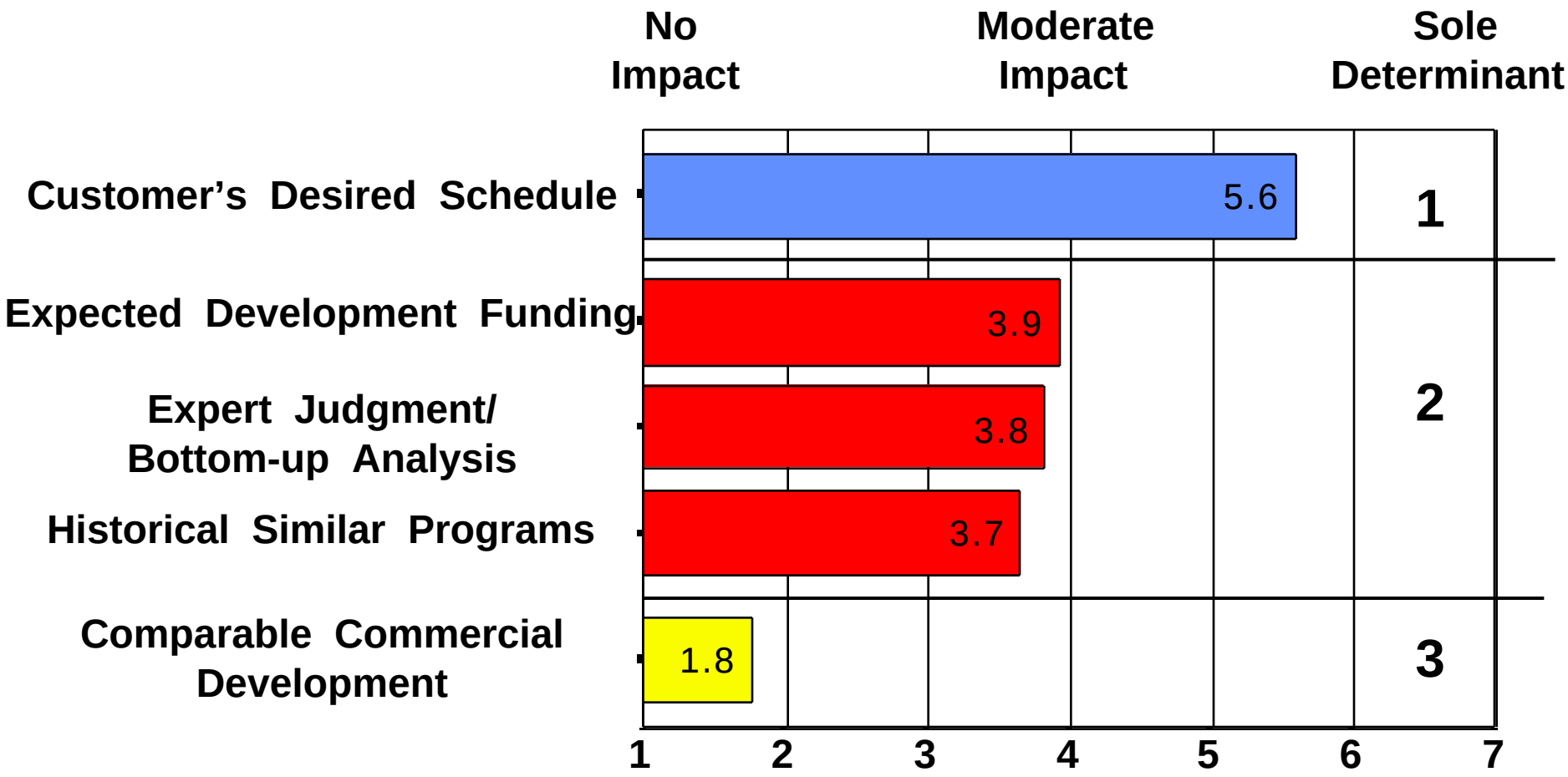



**Schedule Not Specified**

Program Element Monitor Survey

LEAN AIRCRAFT INITIATIVE

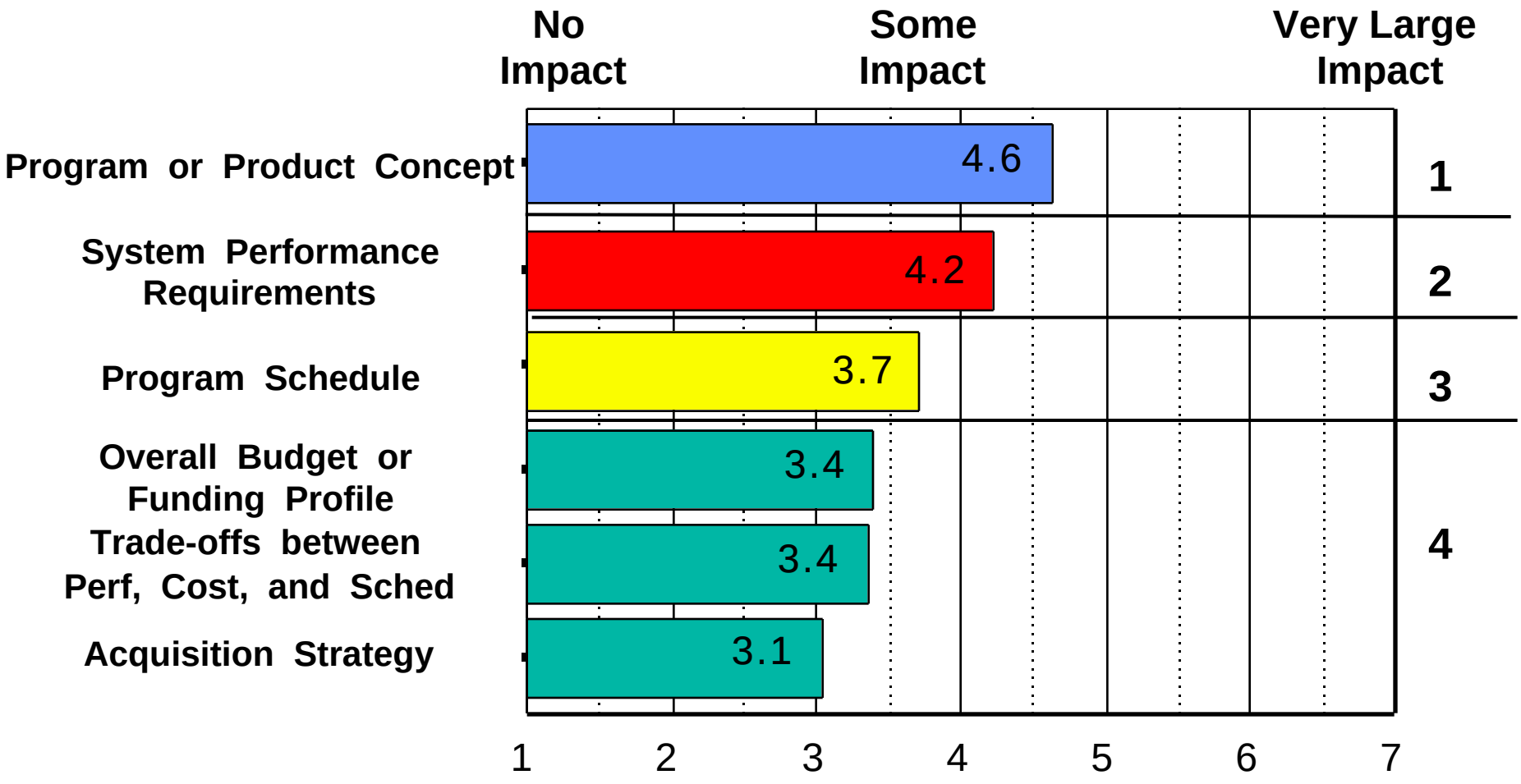
# Factors Influencing Contractor Proposed Schedules




Contractor Survey

LEAN AIRCRAFT INITIATIVE

# Contractor Ability to Influence Program



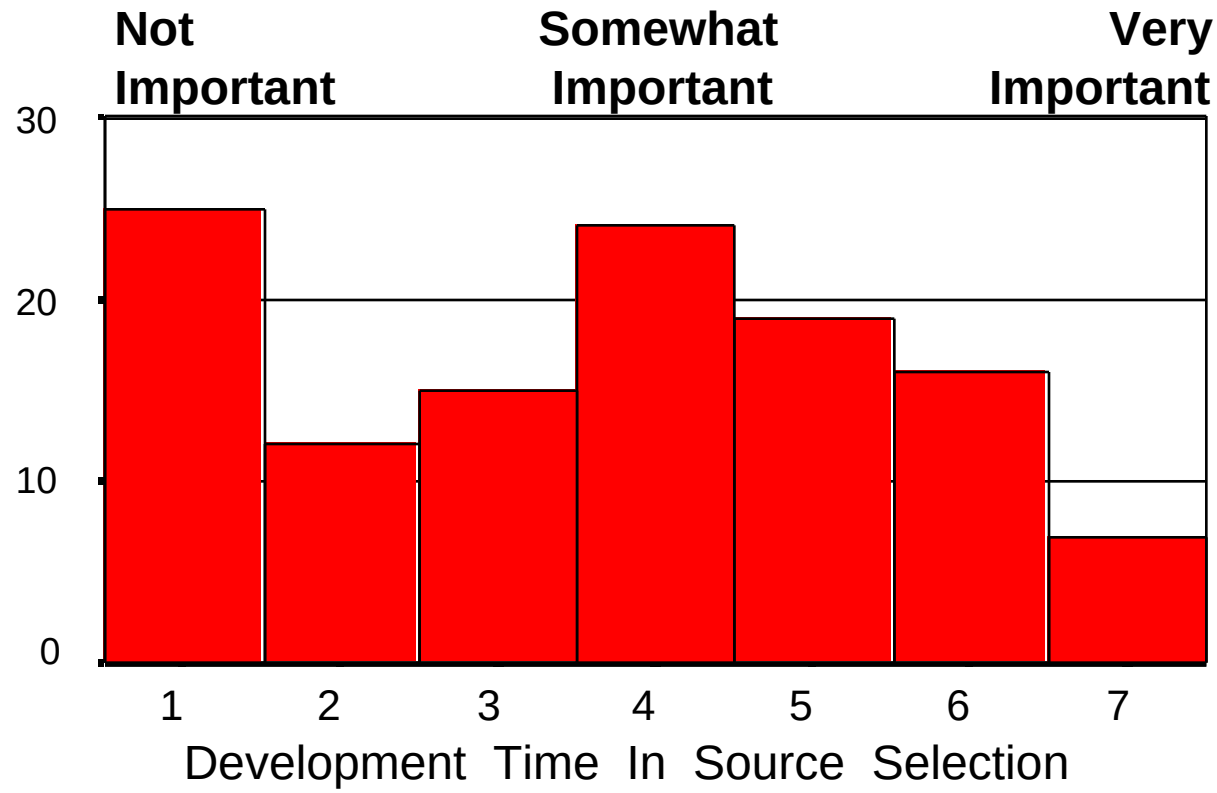

Contractor Survey

LEAN AIRCRAFT INITIATIVE

# Importance of Schedule For Source Selection

**"Was development time a significant evaluation criteria during your source selection?"**

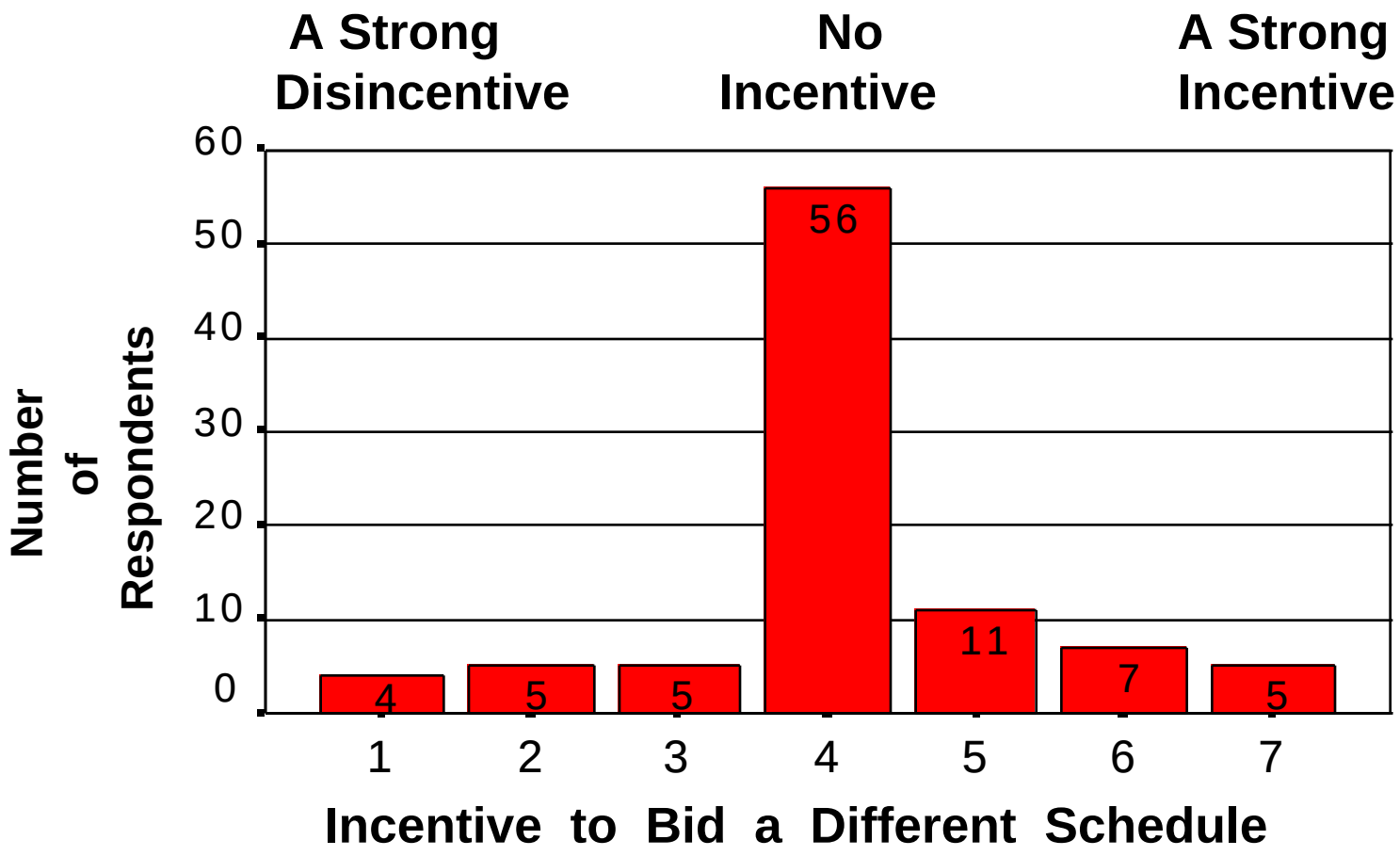



Government Program Manager Survey

Mean = 3.6

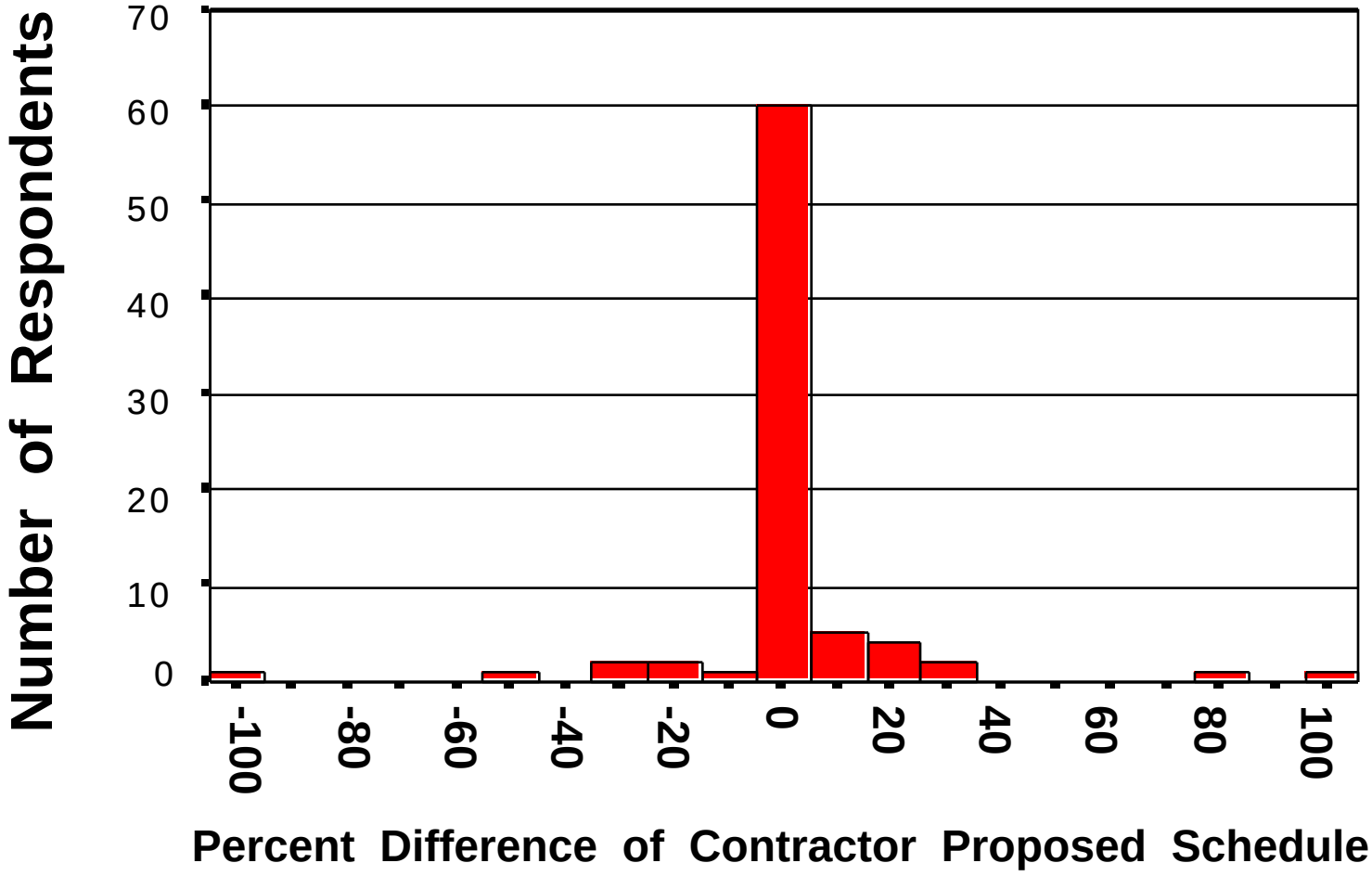
 

# Contractor Incentive to Bid a Different Schedule




Contractor Survey

# Contractor Bid Schedule Vs Government Plan

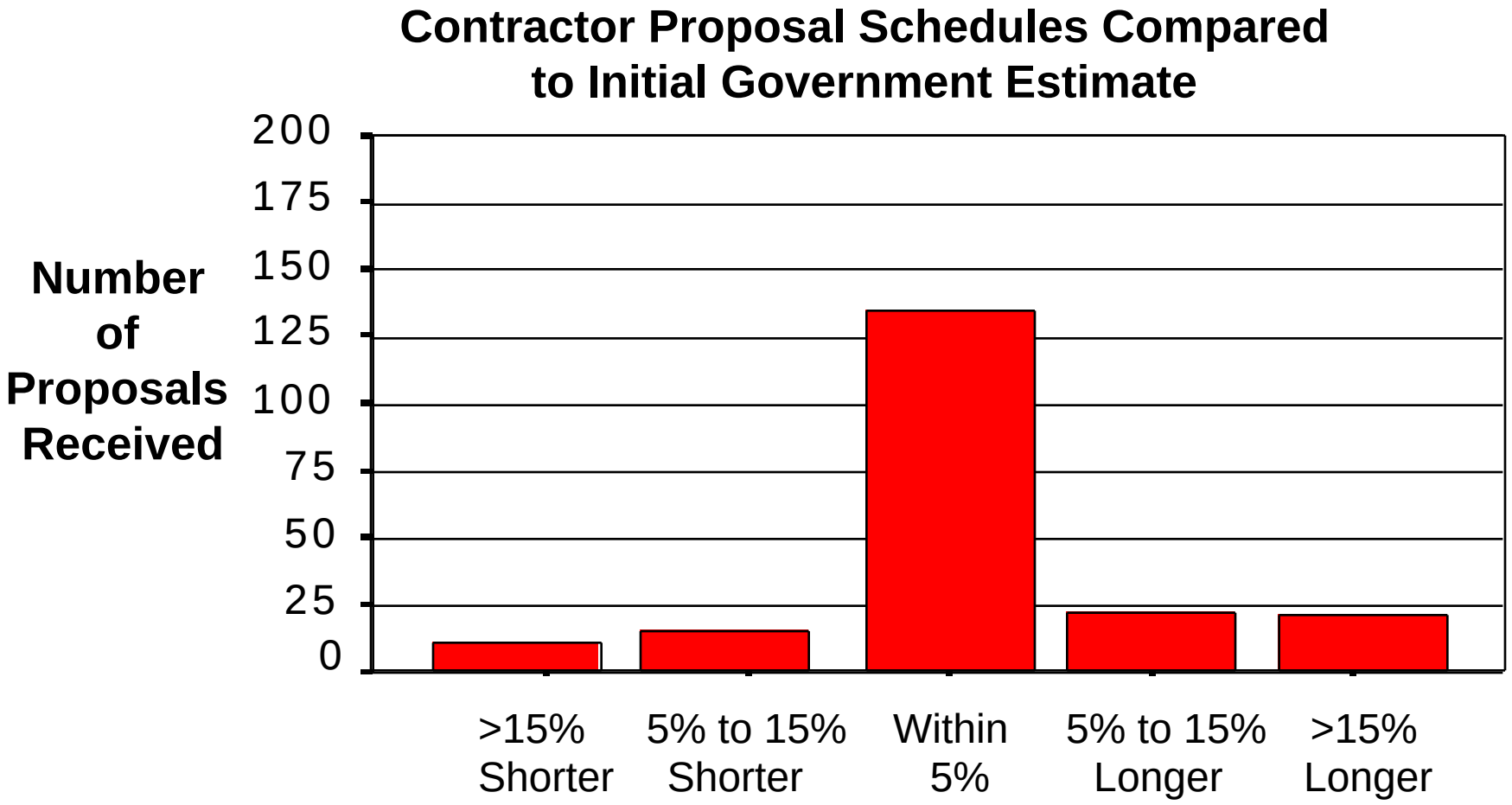



Contractor Survey

Mean = 0.9

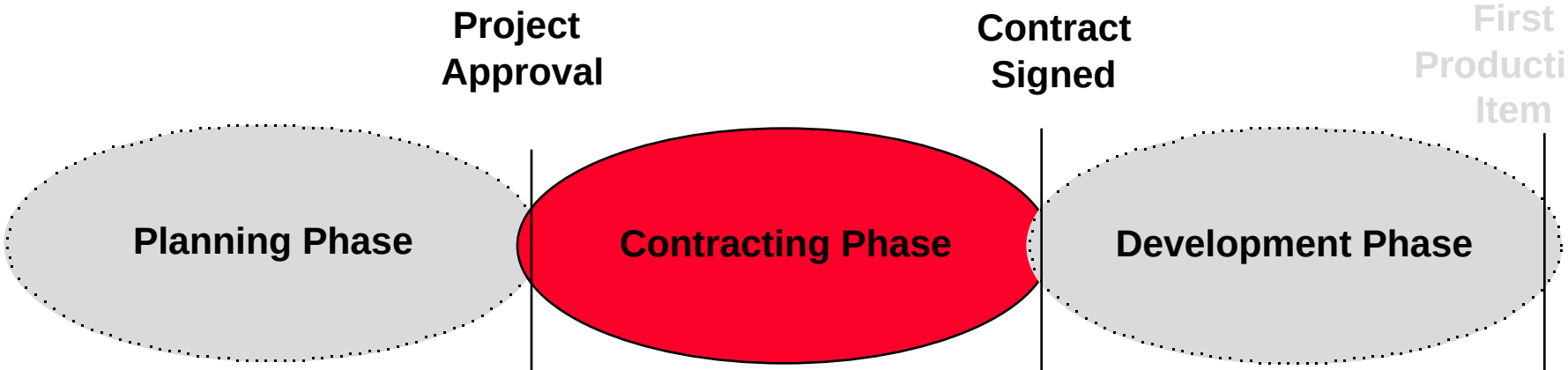
# Schedules of Proposals Received By Program Offices




Program Managers Survey

LEAN AIRCRAFT INITIATIVE

# Schedule Results of the Contracting Phase




- Schedule is not seen as a high project priority

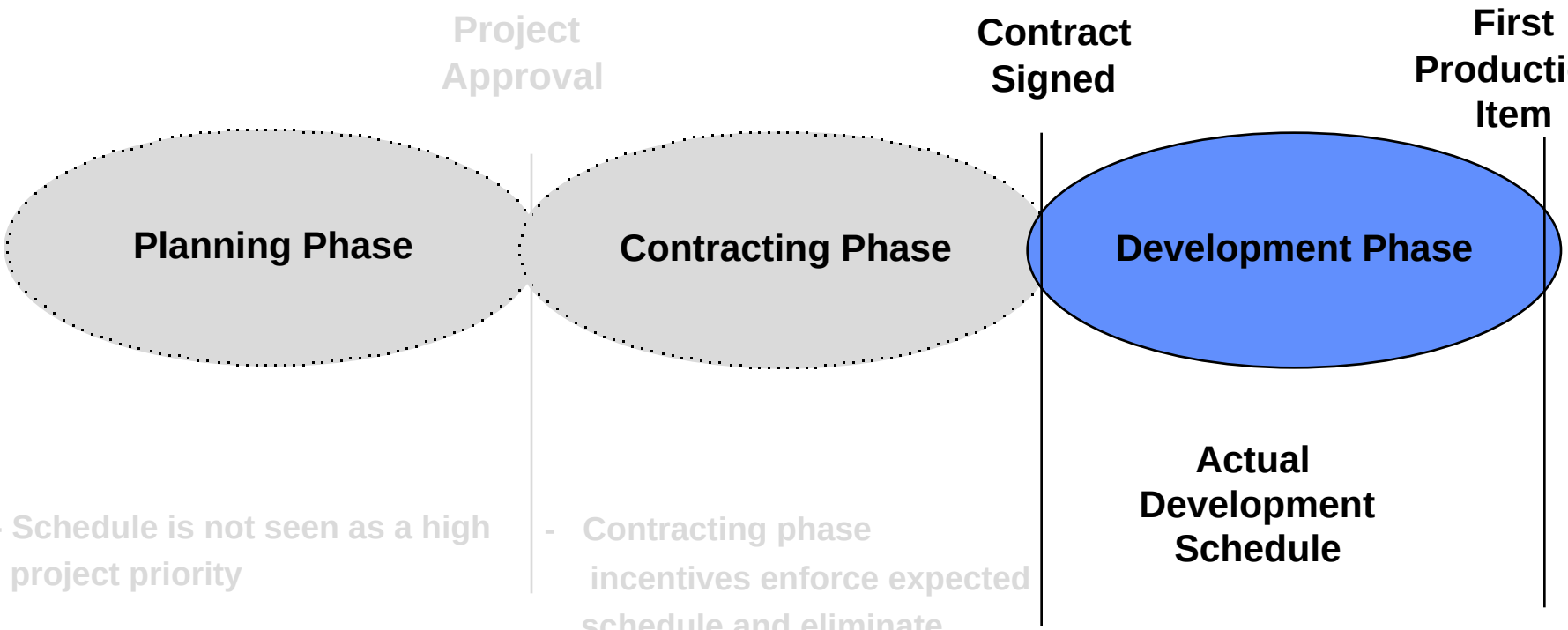
- Planned schedules determined by expected budget allocations - not development related requirements.

- Contracting phase incentives enforce expected schedule and eliminate possible alternatives.

Actual Development Schedule

LEAN AIRCRAFT INITIATIVE

# Schedules in the Execution Phase



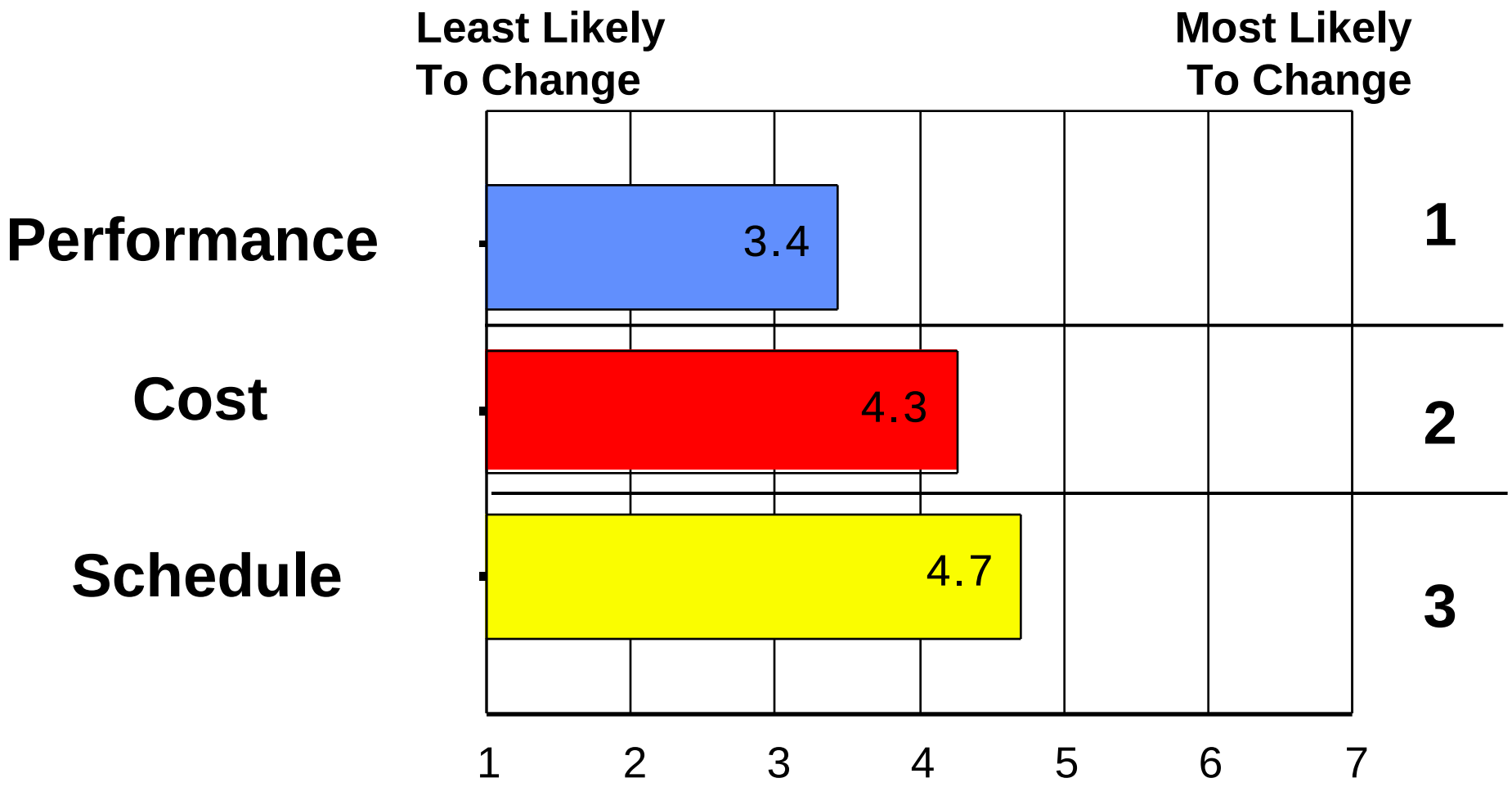

- Schedule is not seen as a high project priority

- Planned schedules determined by expected budget allocations - not development related requirements.

- Contracting phase incentives enforce expected schedule and eliminate possible alternatives.

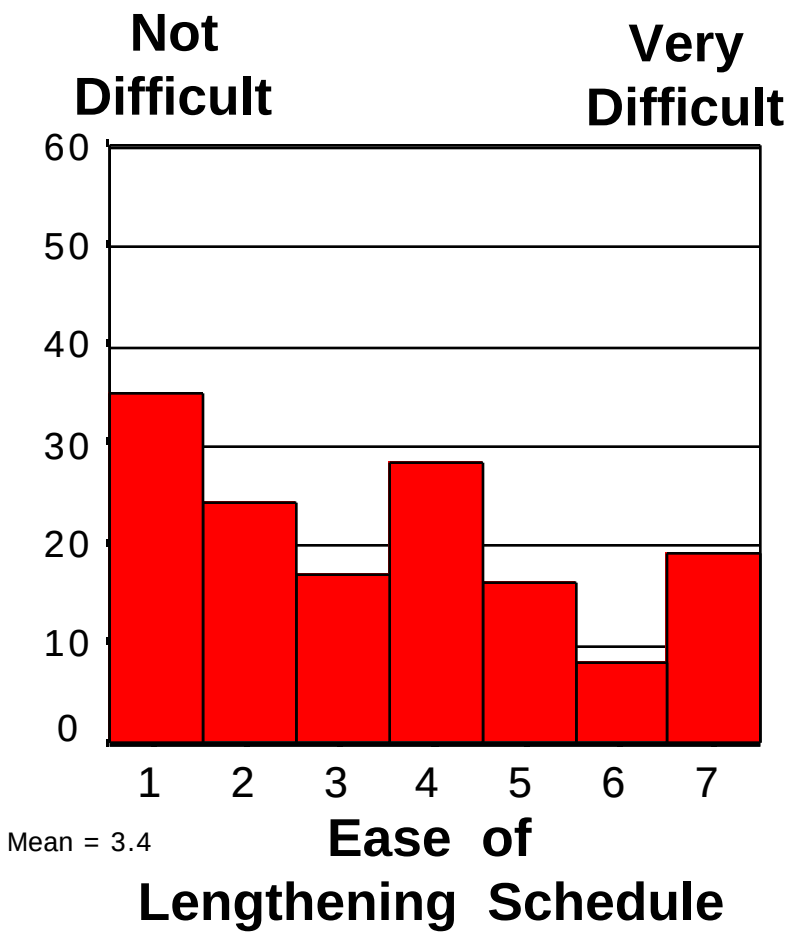
 

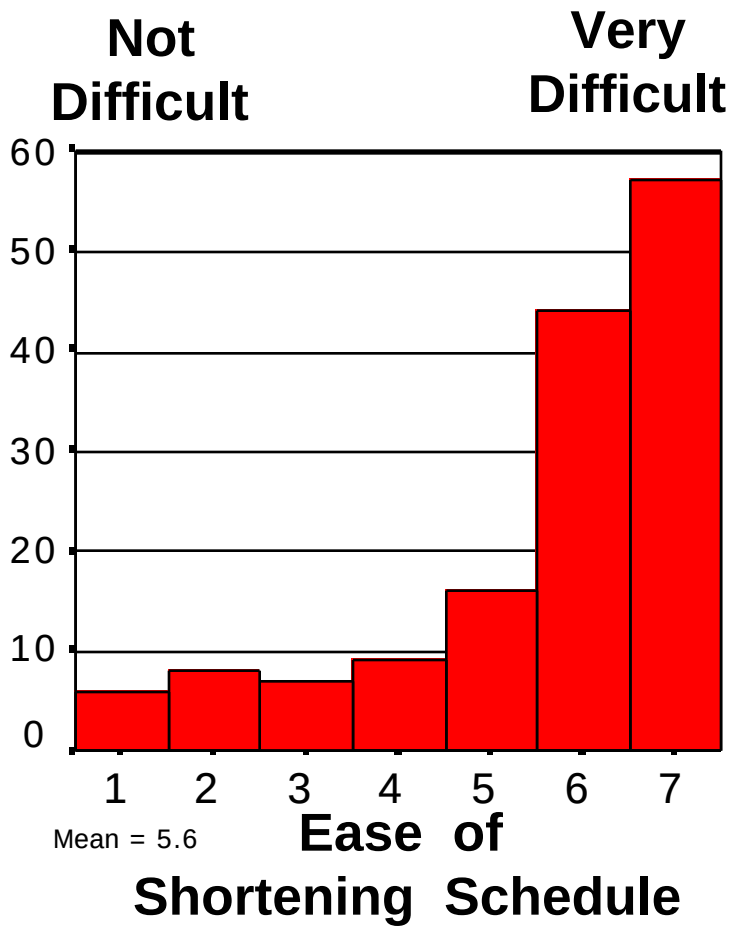
# Changes Due to Unforeseen Events




Government Program Manager Survey

# Ease of Changing Schedule



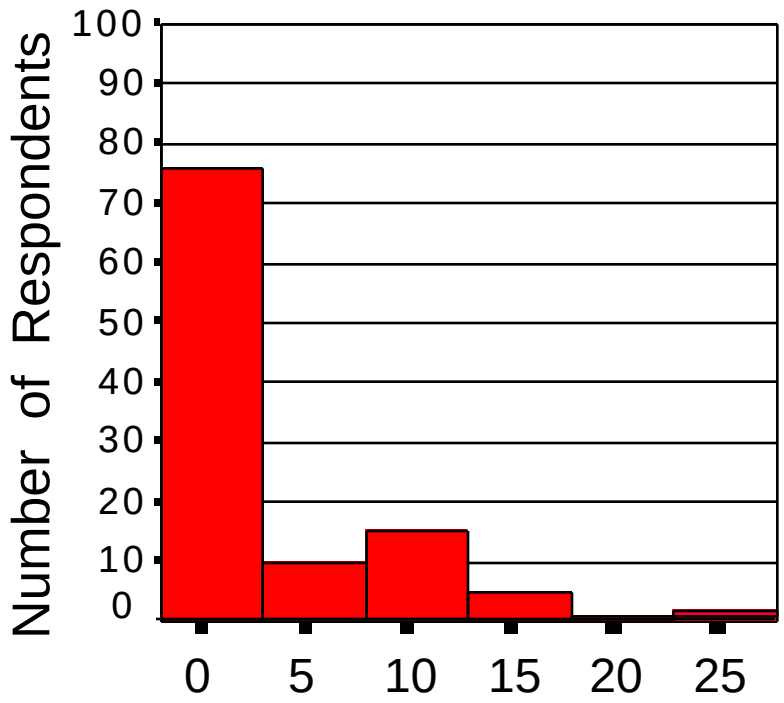




Government Program Manager Survey

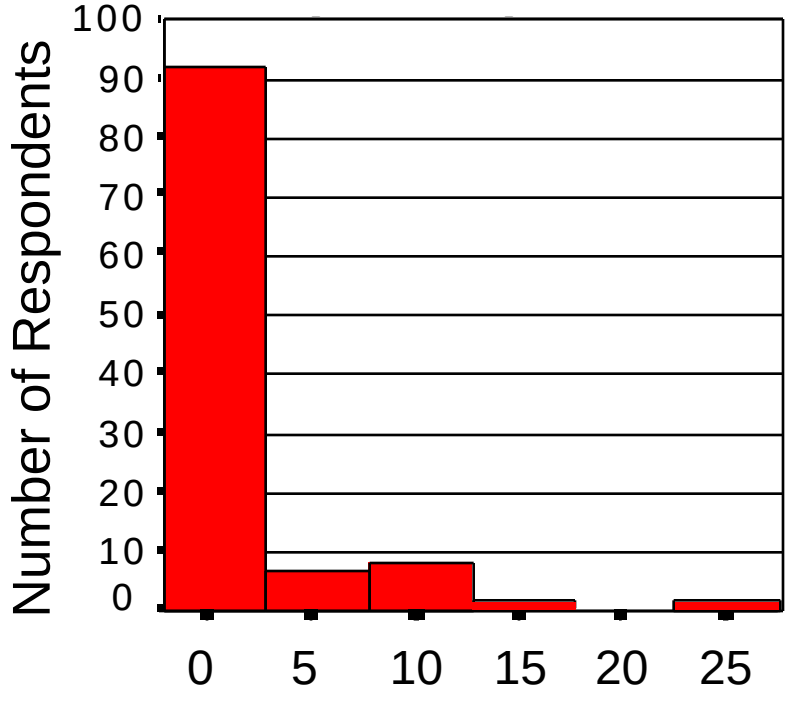
 

# Available Schedule-Related Incentive Fees

## On Time Completion



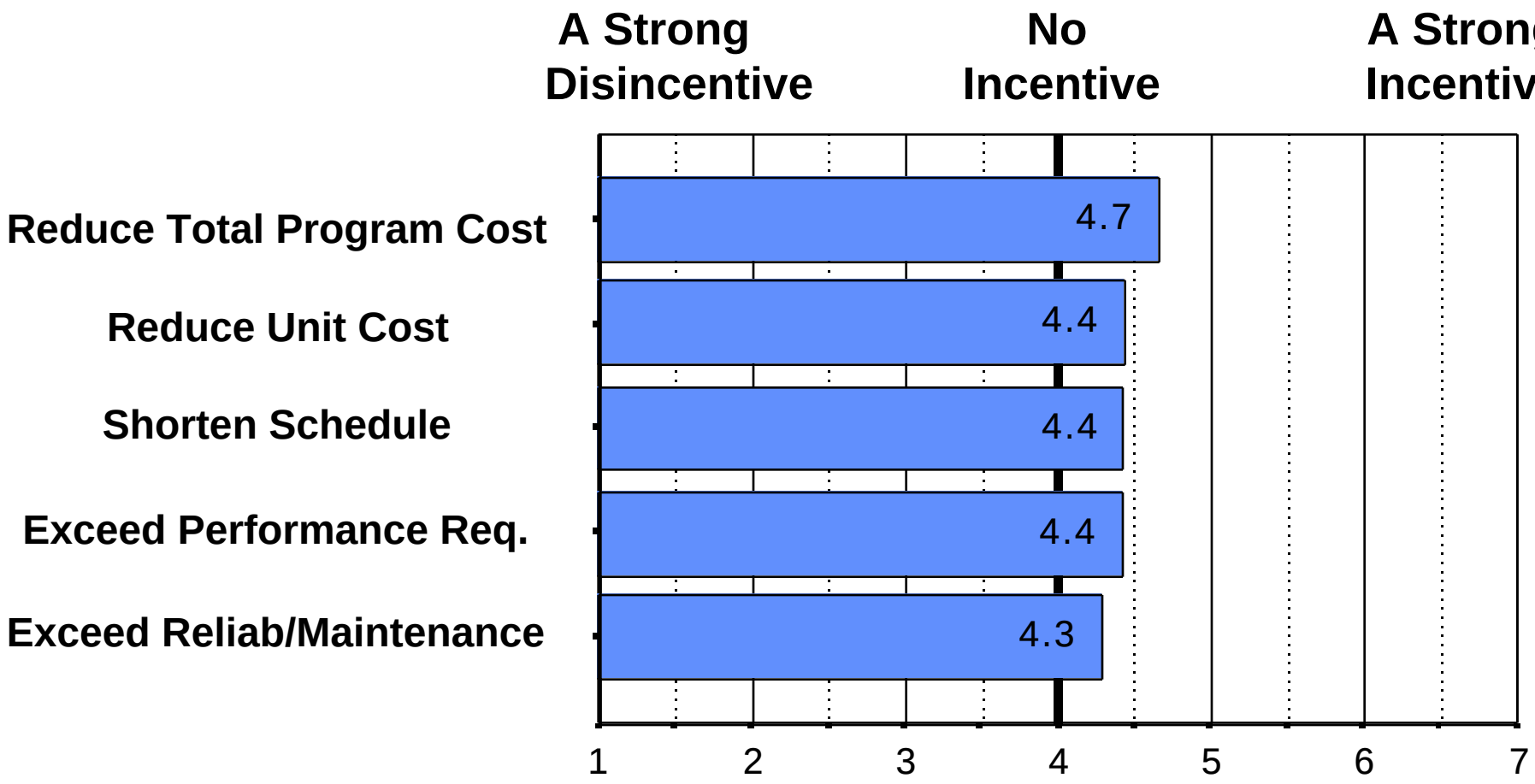

## Early Completion




Government Program Manager Survey

LEAN AIRCRAFT INITIATIVE

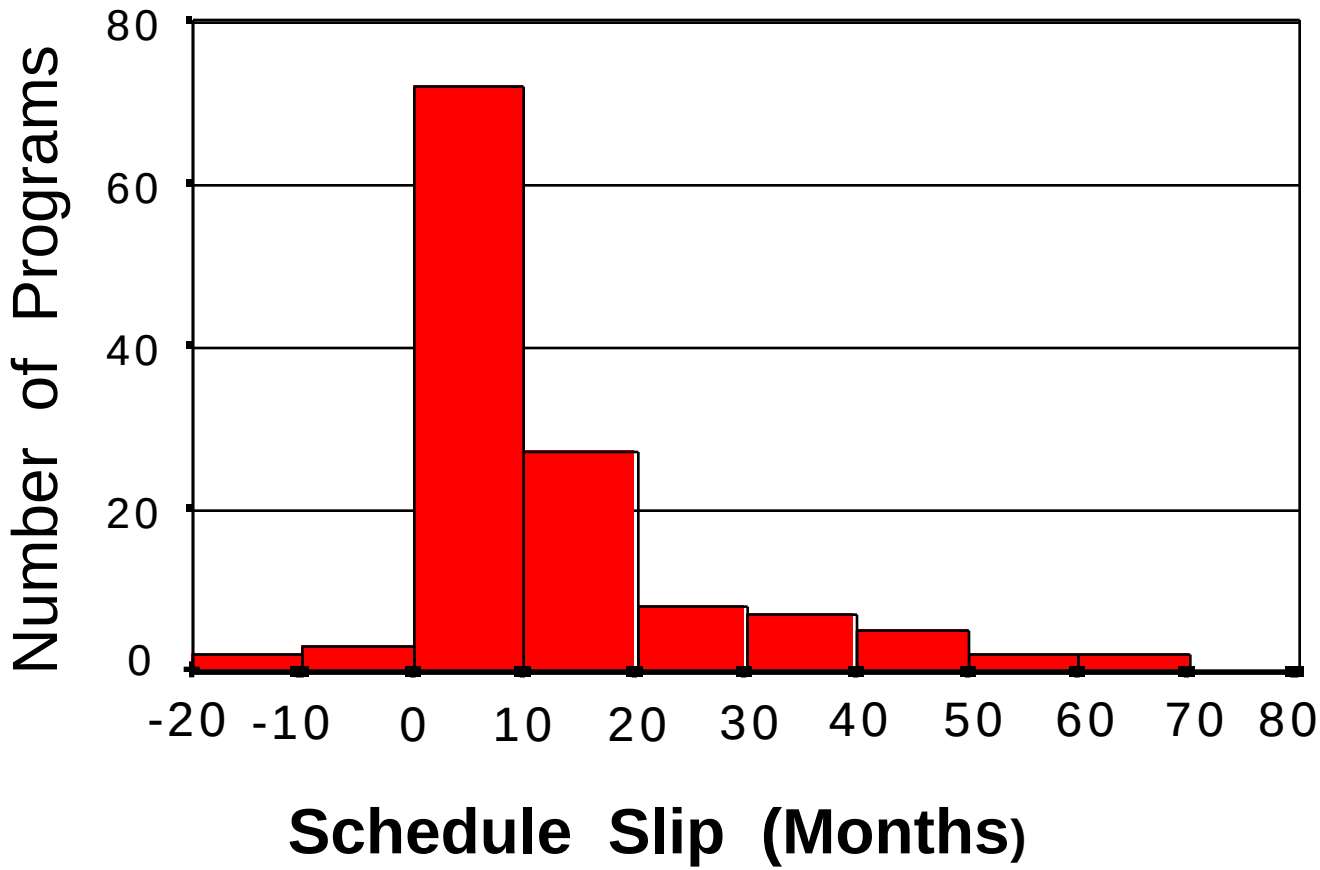
# Contractor View of Incentives




Contractor Survey

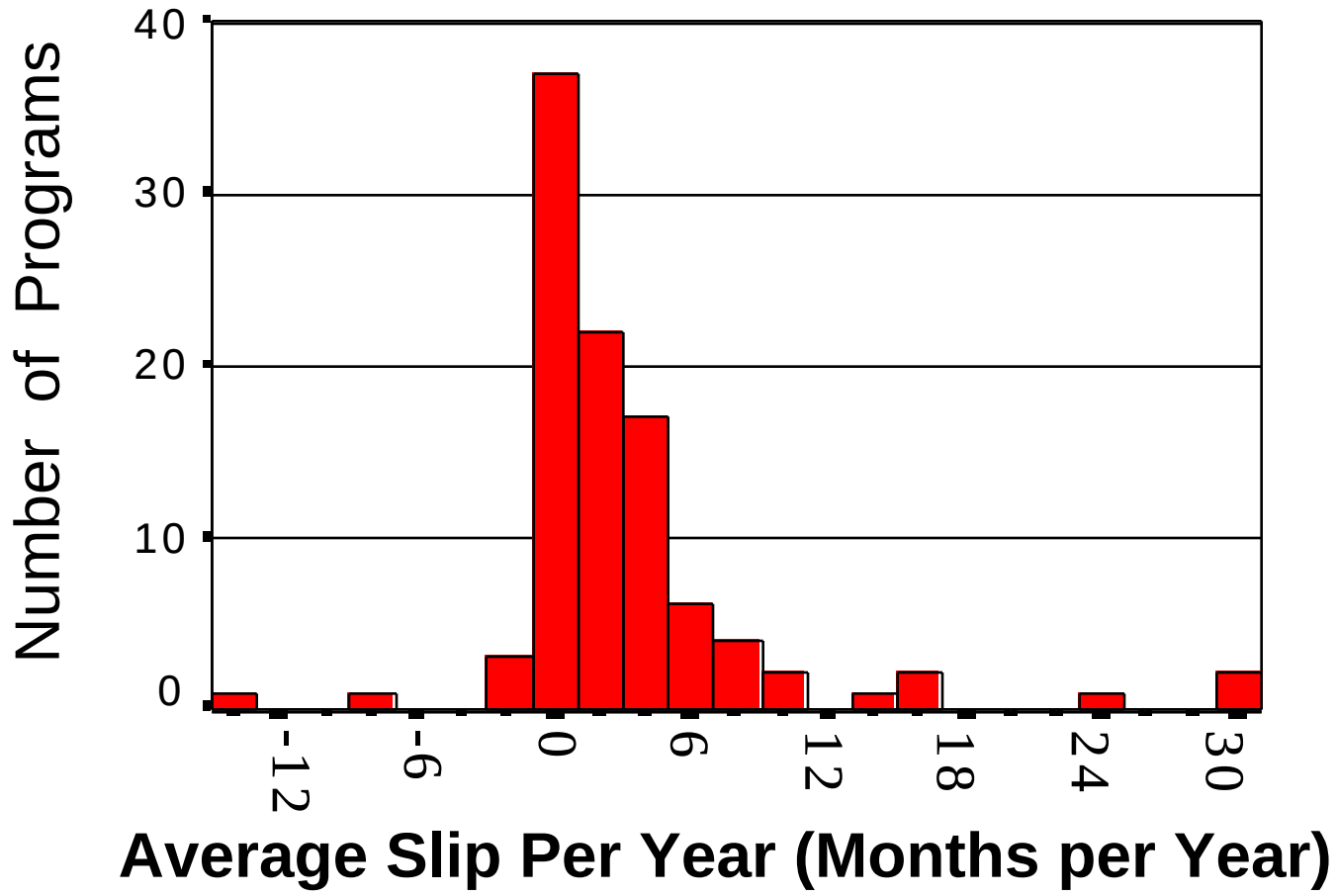
 

# Program Slip



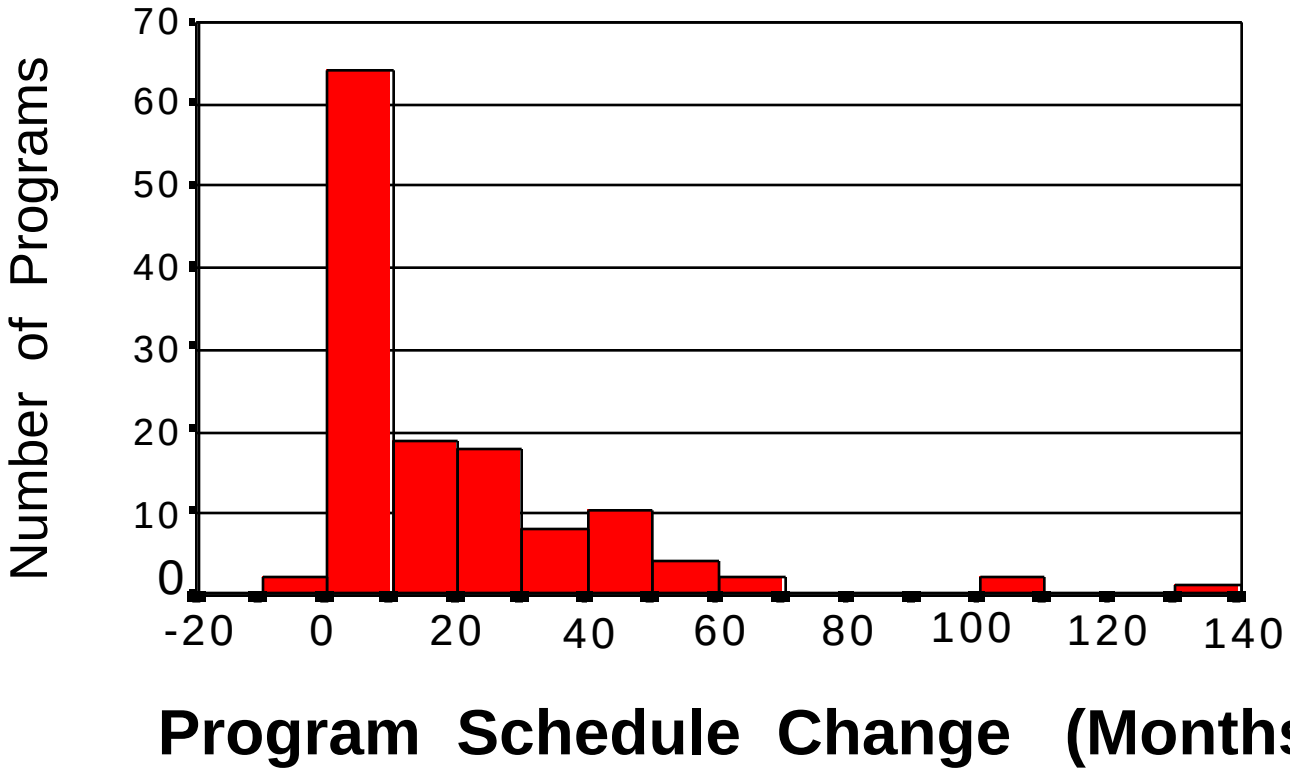

Government Program Manager Survey

# Program Slip Per Year




Government Program Manager Survey

# Program Slip
## Major Acquisition Programs

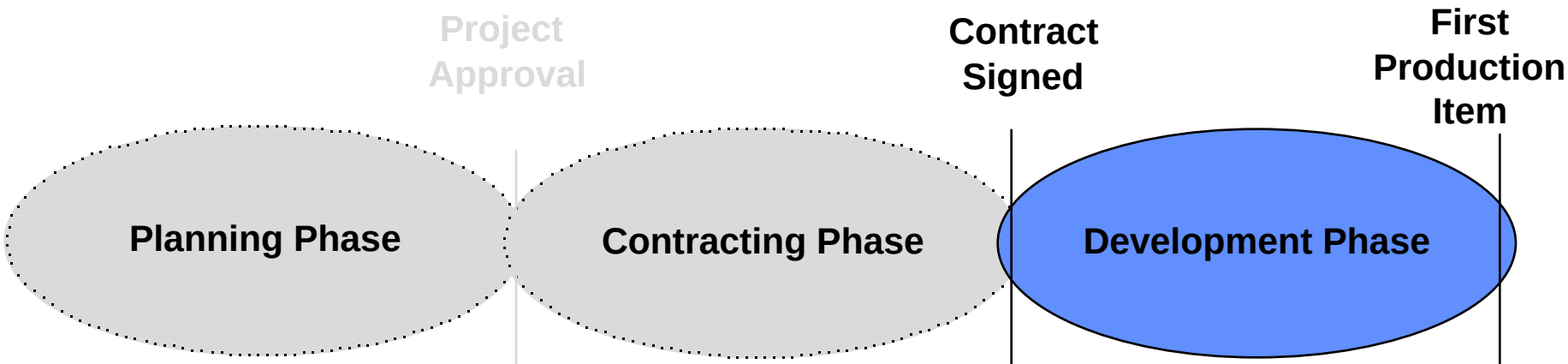



Rand Database: All DoD Major Acquisition Programs since 1965

LEAN AIRCRAFT INITIATIVE

# Execution Phase Schedule Results




- Schedule is not seen as a high project priority

- Planned schedules determined by expected budget allocations - not development related requirements.

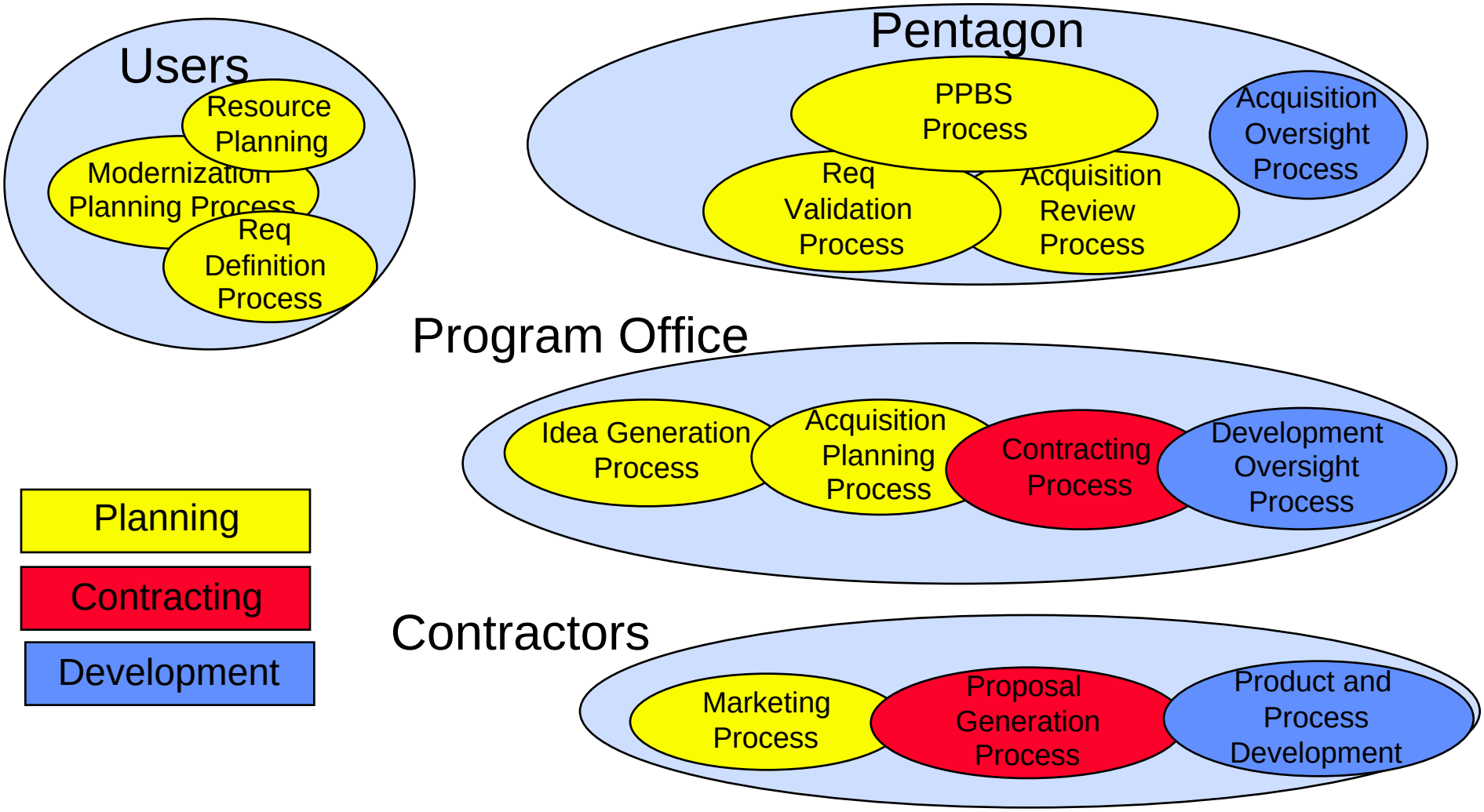
- Contracting phase incentives enforce expected schedule and eliminate possible alternatives.

- Development phase result - one way program slips.

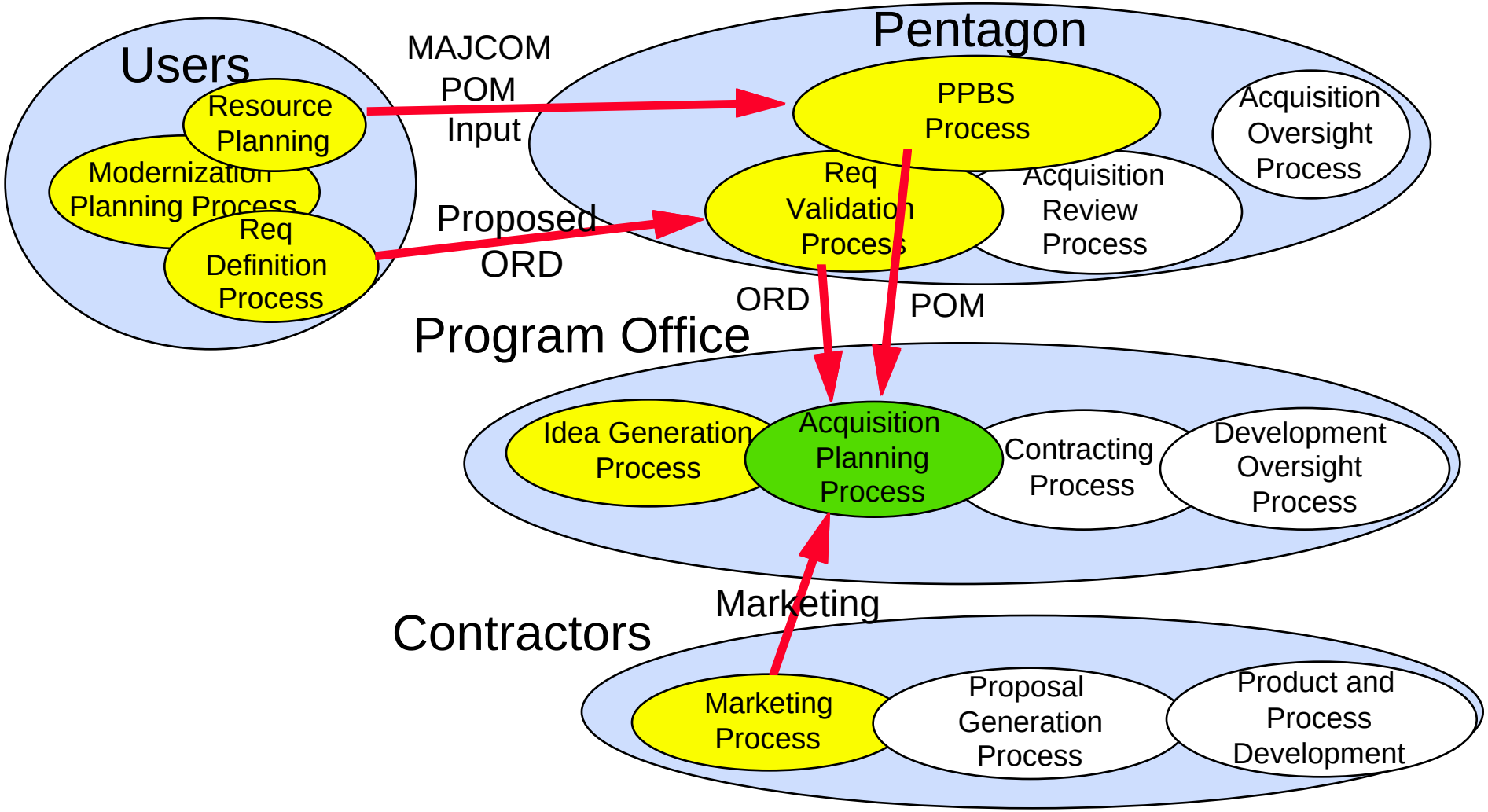
 

LEAN AIRCRAFT INITIATIVE

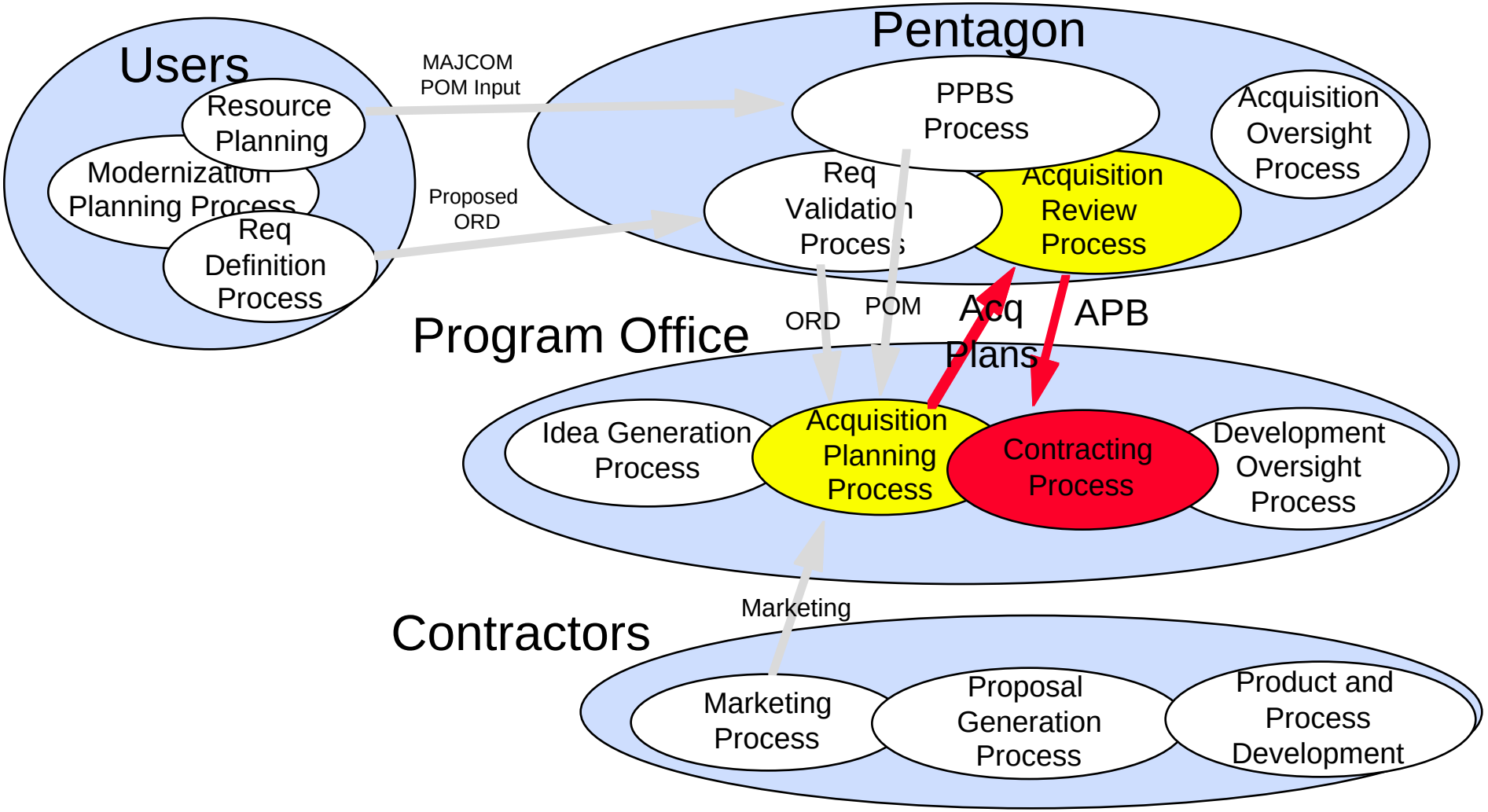
# Defense Product Development Process



# Schedule Planning Inputs

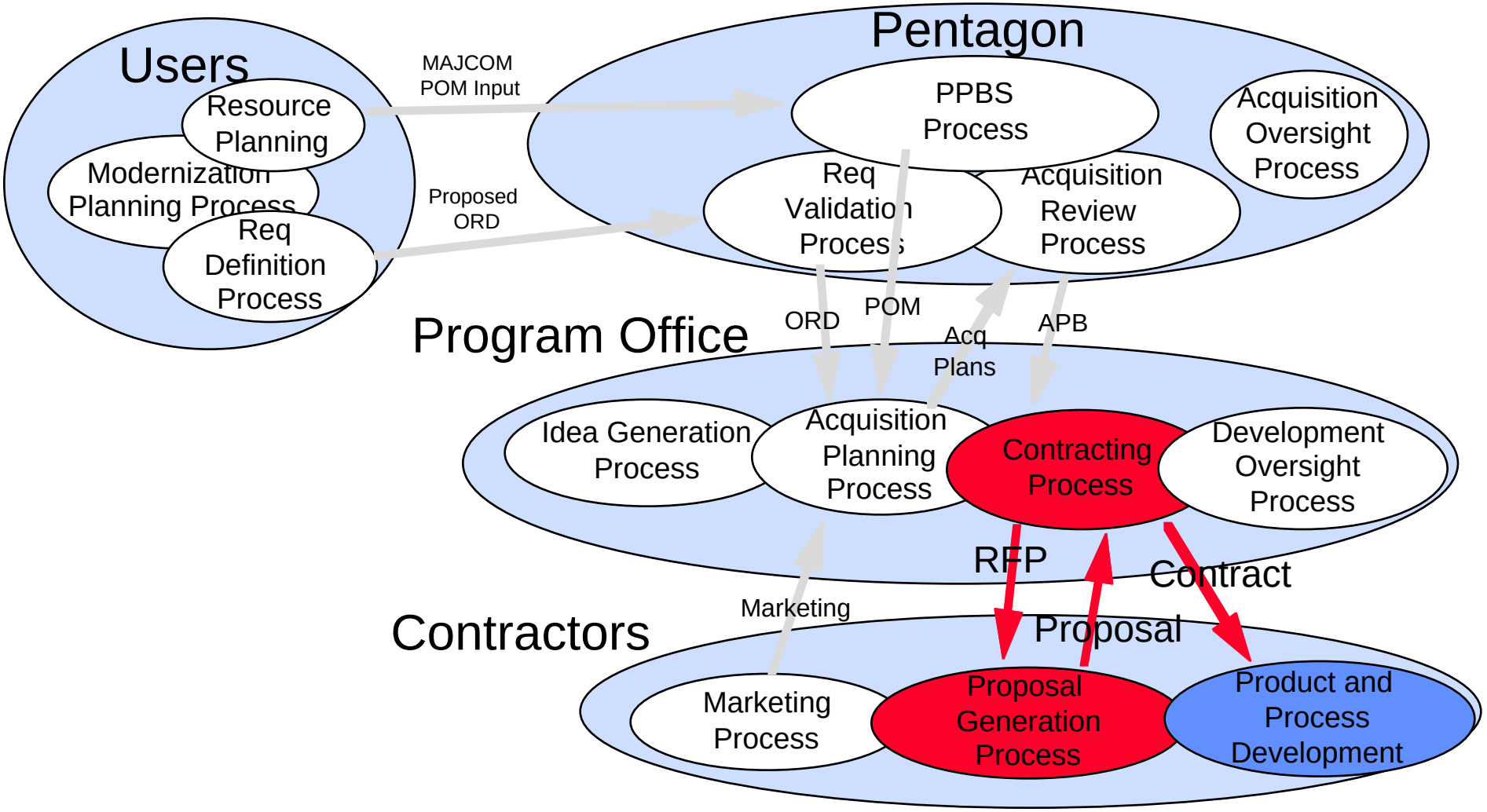


# Schedule Planning Outcomes

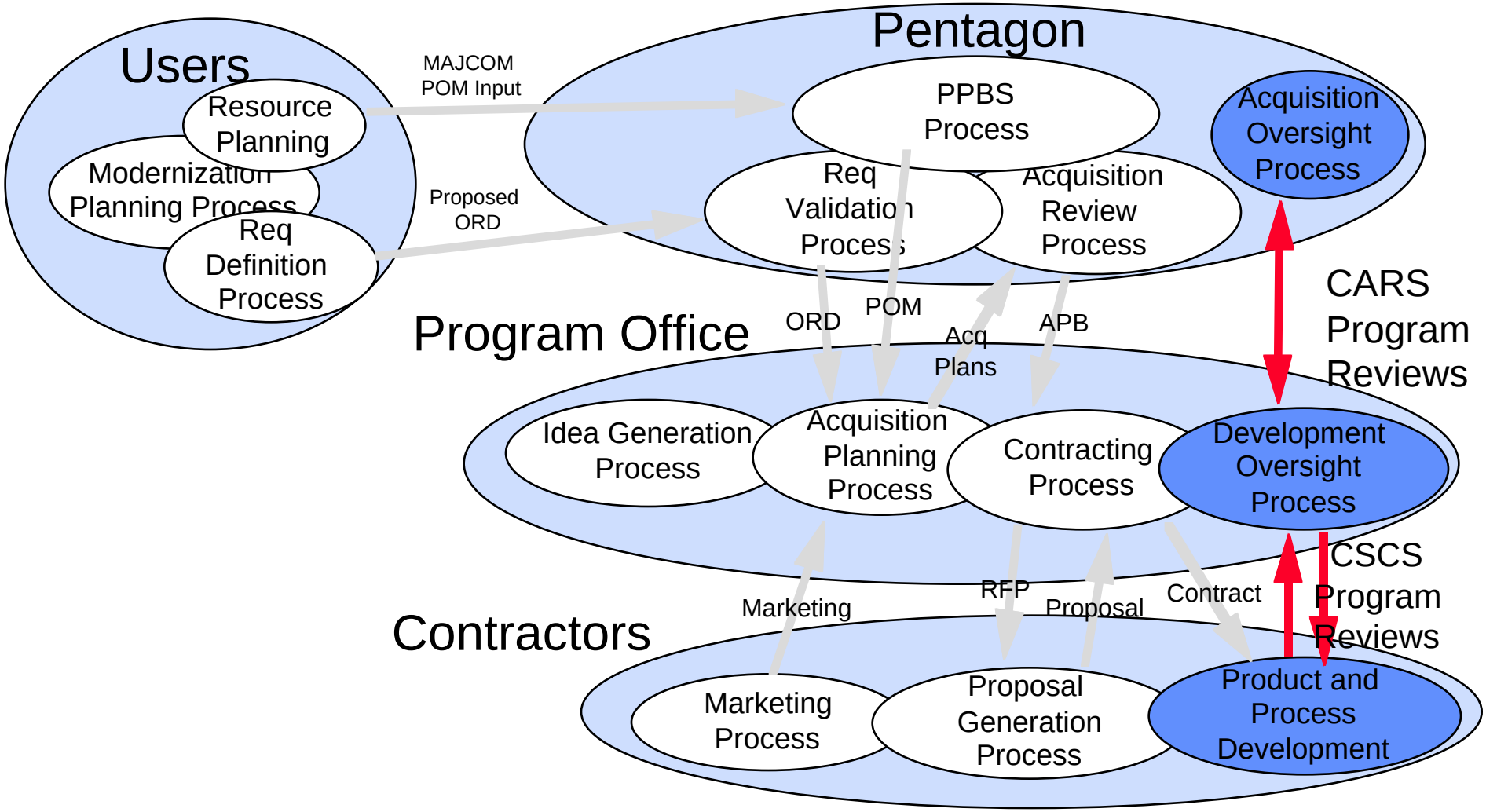


# Contracting Process

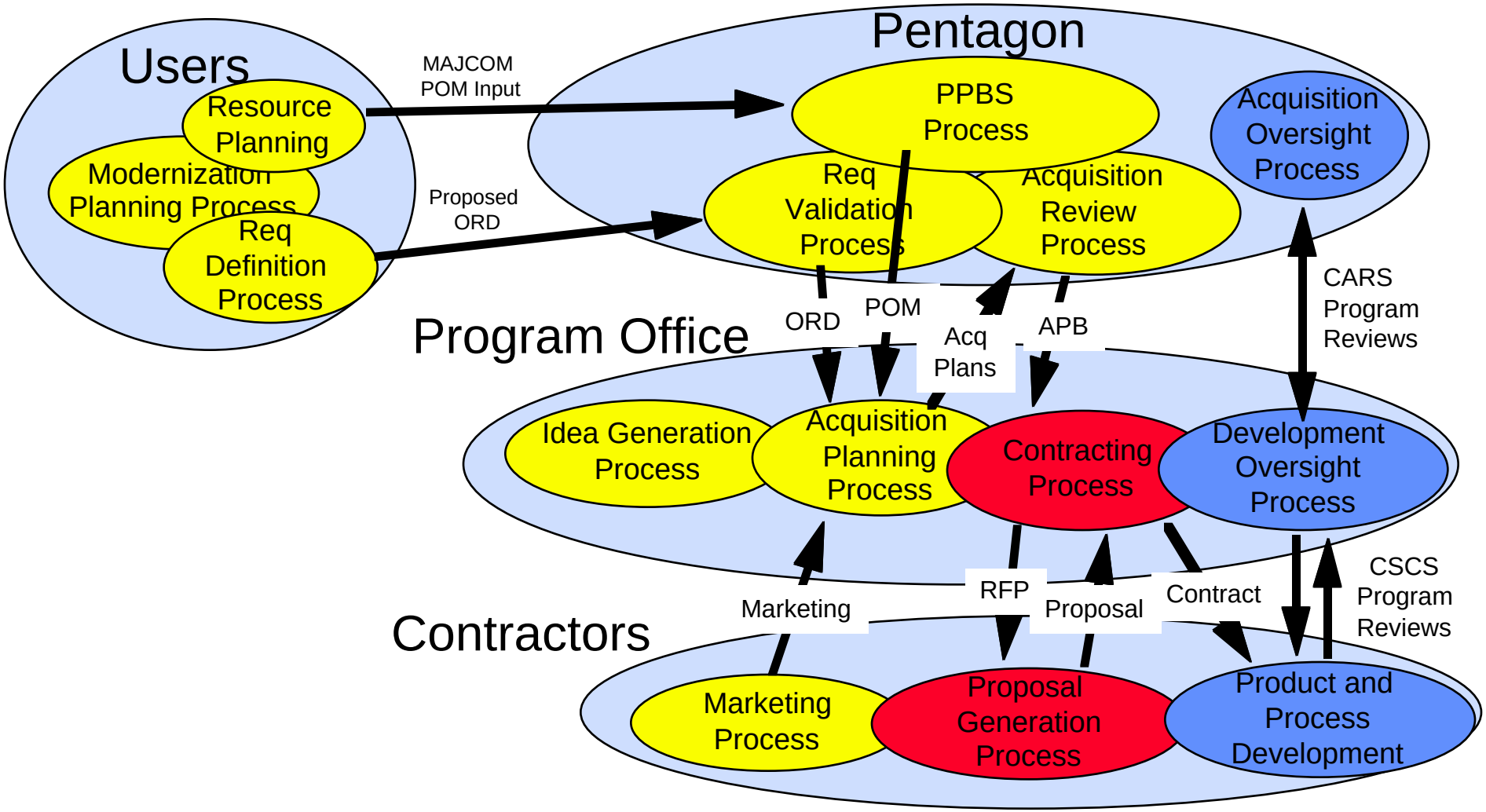


# Development Process



LEAN AIRCRAFT INITIATIVE

# Defense Product Development Process



# Preliminary Conclusions

- **Schedule Process Outcomes**
  - **Schedule is not seen as a high project priority**
  - **Planned schedules determined by expected budget allocations - not development related requirements.**
  - **Contracting phase incentives enforce schedule and eliminate possible alternative schedules.**
  - **Development phase result - one way program slips.**

# Other Schedule Related Research

- **Areas Researched But Not Presented At This Time**
  - **Barriers to shortening schedules**
  - **Effects of schedule planning factors on schedule performance to plan**
  - **Causes and impacts of program instability on program schedules**
  - **Program example: Post-acquisition reform case study**

LEAN AIRCRAFT INITIATIVE

# Small Group Discussions

- **Small Group Discussion** **15 Minutes**
  - Planning Phase
  - Contracting Phase
  - Development Phase
  - Overall Process

- **Questions to be Discussed**

  Do these data and conclusions match your experiences?

  What are the implications of these data on schedules and cycle time reduction?

  (If time permits: What can be done in each phase to change the results?)

- **Report by Group Leaders** **2-3 Min/each**
  - One table from each phase with comments from others
  - Each table completes a written table report

# LEAN ENTERPRISE

**“The most important way technology could enhance our military capability would be to cut the acquisition cycle in half.”**

**Chairman of the Joint Chiefs of Staff - Packard Commission 1986**

**“Even if one member makes a lot of progress in becoming lean, neither that member nor the stream as a whole will reap the full benefits if another member falls short”**

**James Womack and Dan Jones**
**Harvard Business Review March 1994**