

Of Princes, Frogs, and Marine Corps' Budgets: Institutionalizing Decision Analysis over 23 Years



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Overview

- **Setting the Stage**
- **What is the Decision Analysis Solution?**
- **Benefits to the USMC**
- **Conclusions**



In the beginning . . .





The Decision Analysis Problem

- **Maximize** the expected value received
- By selecting among **hundreds of programs**
- Across a variety of “**objectives**”
- For a specified **budget constraint**



The Real Problem

- **The Decision Analysis Problem**
 - Maximize the expected value received
 - By selecting among hundreds of programs
 - Across a variety of “objectives”
 - For a specified budget constraint

- **Operationalize a budgeting process that**
 - Obtains the **best USMC** fighting force
 - **Takes care of** Marines and their families
 - **Satisfies** a spectrum of General Officers
 - **Adapts and endures** through the years



What is the Marine Corps?

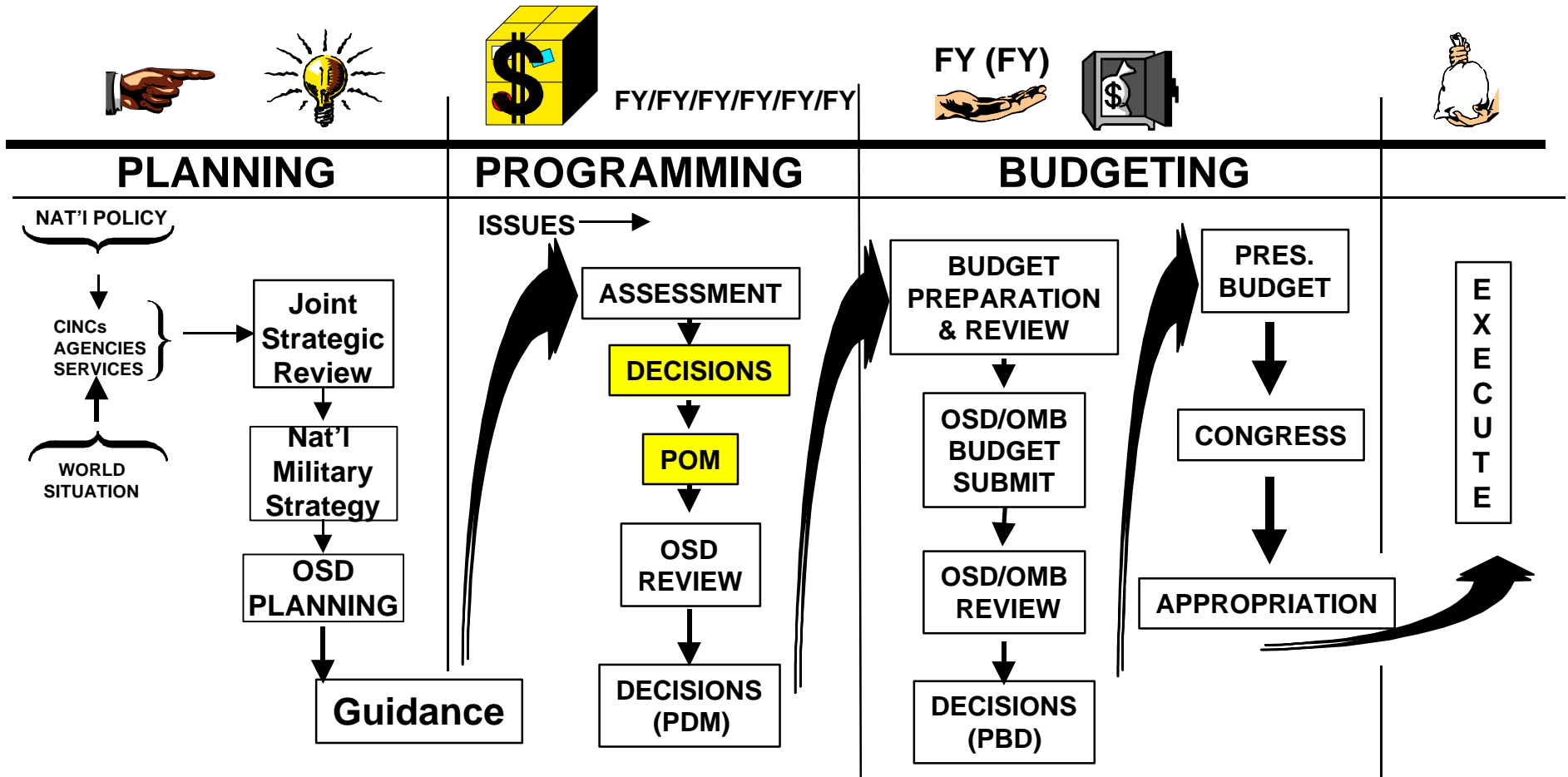
The Nation's Premier Force-in-Readiness

- 3 Divisions / 3 Wings
 - 172,200 Active Duty Marines
 - 39,000 Reserve Marines
 - 17,000 Civilian Marines
- 17 Major Bases and Stations
- \$20 Billion Plant Value
- \$12 Billion Annual Budget

**Our Business:
Make Marines, Win Battles**



PPBS: The Big Picture





USMC POM before Decision Analysis

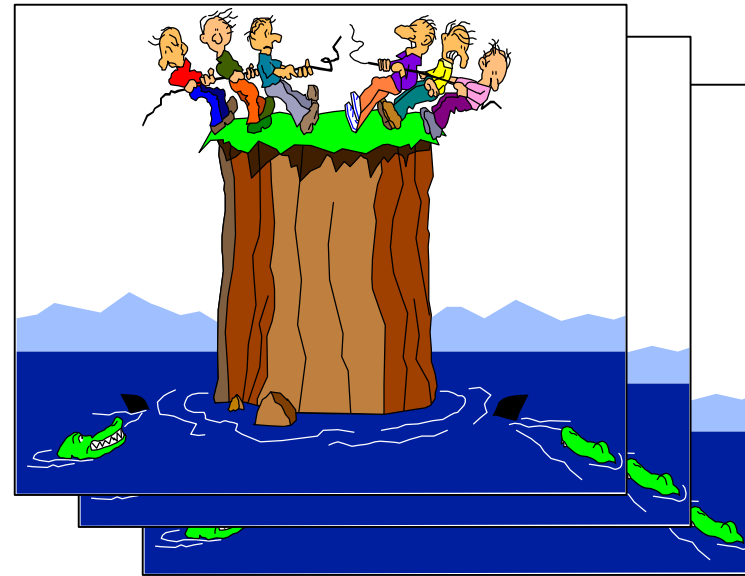
The Process: Negotiation

Proponents' Objective:

- If I can get one more item funded, which should it be?

The most beneficial!

Who Wins?



**New negotiation each time
funding constraint changes**



USMC POM with Decision Analysis

The Process: “Structured Conversation”

- USMC Objectives
- Explicit tradeoffs

USMC-wide Objective:

- If we have a fixed budget, what should we buy?

Most Bang-for-the-Buck

~~Who~~ What Wins:

- Best rationale for USMC



Robust order-of-buy



The Decision Analysis Solution

$$\text{For } x_i = \begin{cases} 1 & \text{if item } i \text{ is funded} \\ 0 & \text{if item } i \text{ is not funded} \end{cases}$$
$$\text{Max } \sum_i x_i B_i$$
$$\text{Such that } \sum_i x_i C_i < C$$

measure

expert team

balance beam

multi-attribute

estimate

guidelines

uniform categories

Σ Constant \$
years

$$\text{Max } \sum_i x_i (B_i - IC_i)$$

$$\text{Set } x_i = 1 \text{ where } B_i > IC_i$$

$$B_i / C_i > \mathbf{1}$$

adjust

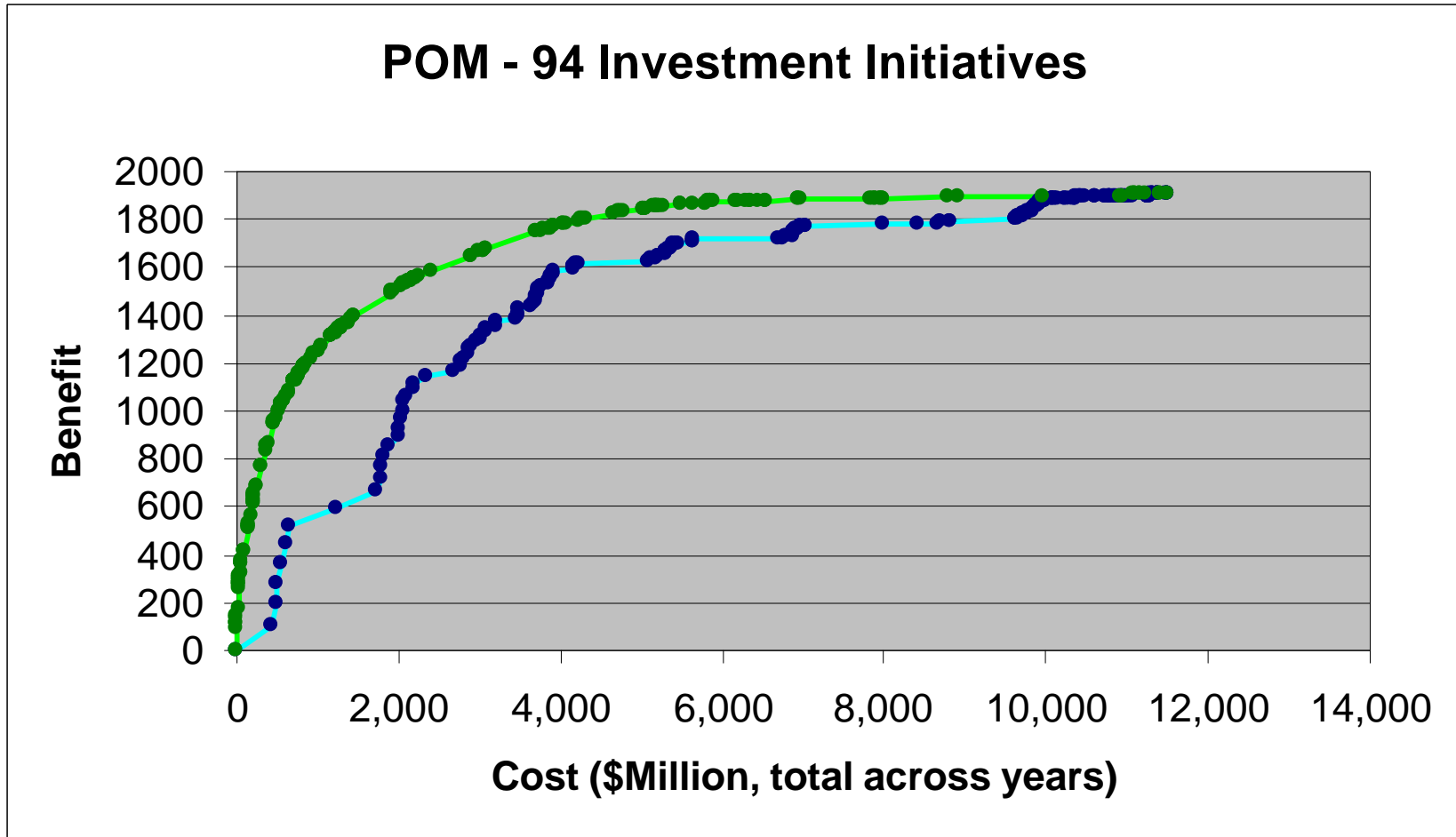
B/C priority

Order of Buy
Consensus

“Real Problem”
Adjustments



The Payoff





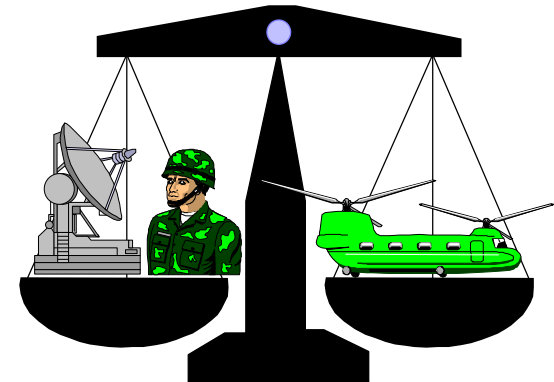
What do we mean by benefit?

Benefit – a perception of value based on facts, discussion, experience, and expectation

Quantified in accordance with conjoint measurement theory

Enables tradeoffs

Enables benefit-cost analysis

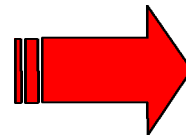
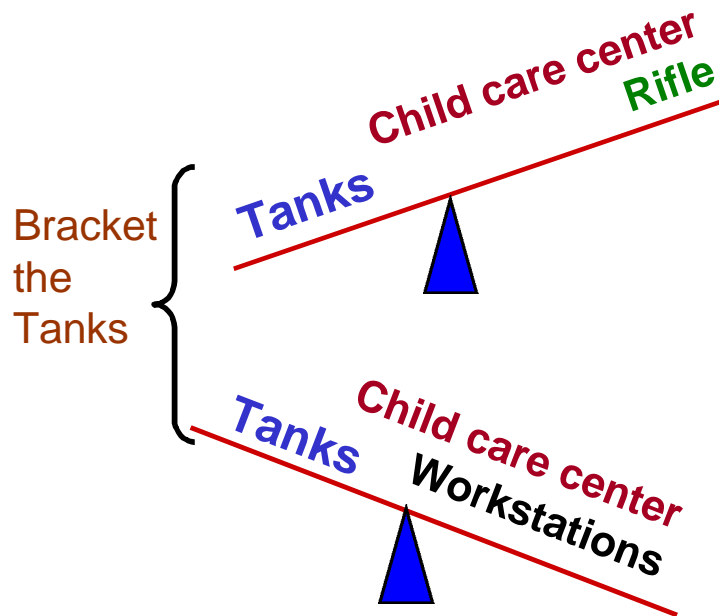


<u>Initiative</u>	<u>Benefit</u>
Tanks	100
Child care	70
New radar	40
Workstations	33
New rifle	21
...	
Hose reels	.007



How are the benefits of POM initiatives measured?

Which side is heavier?



$$X_1 > X_2 + X_5$$

$$X_1 < X_2 + X_4$$

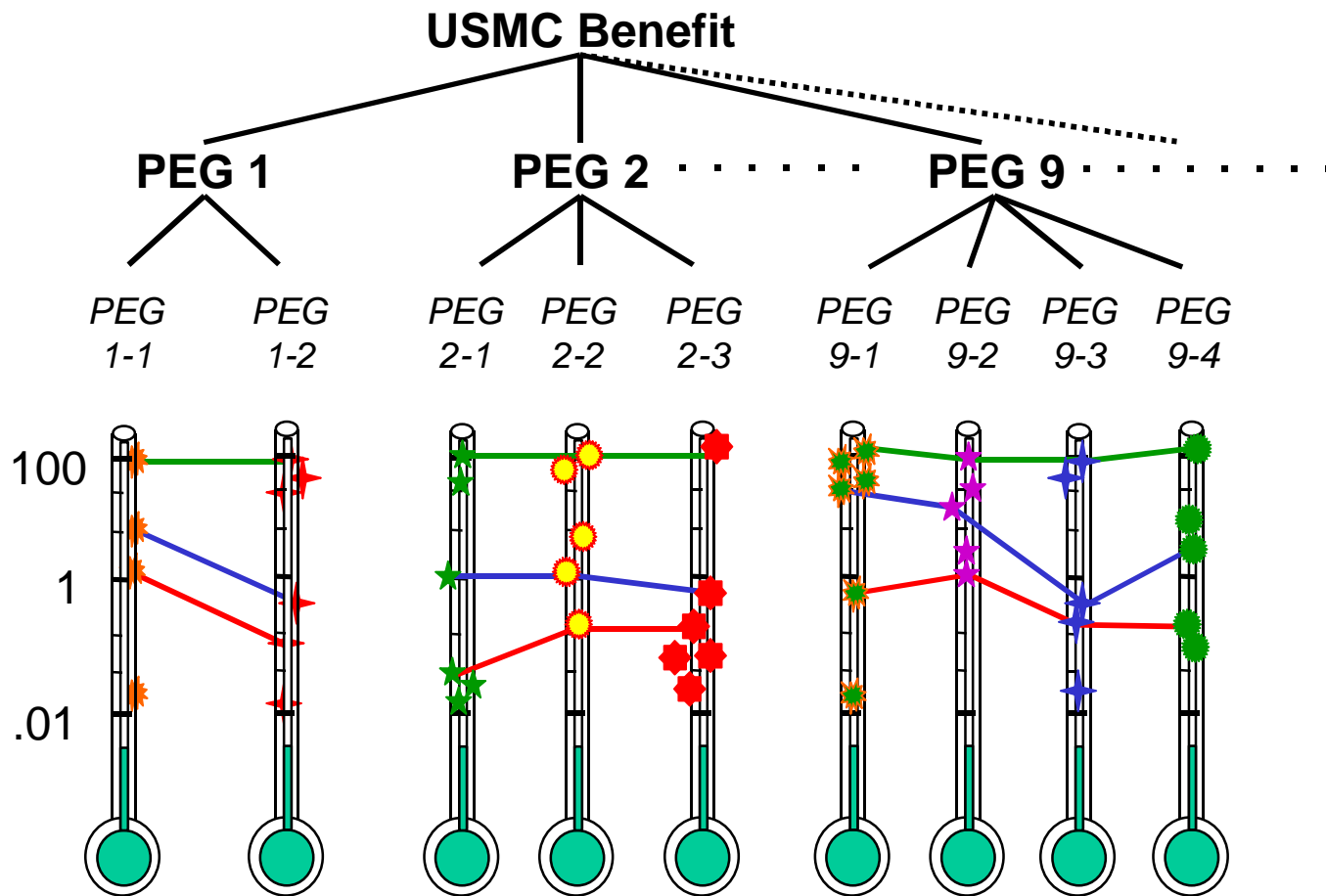
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Assess relationships,
Infer numbers!

<u>Initiative</u>	<u>Benefit</u>
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...	
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How are the benefits compared across categories?



**18
Program
Evaluation
Groups**

**~300
Program
Initiatives**

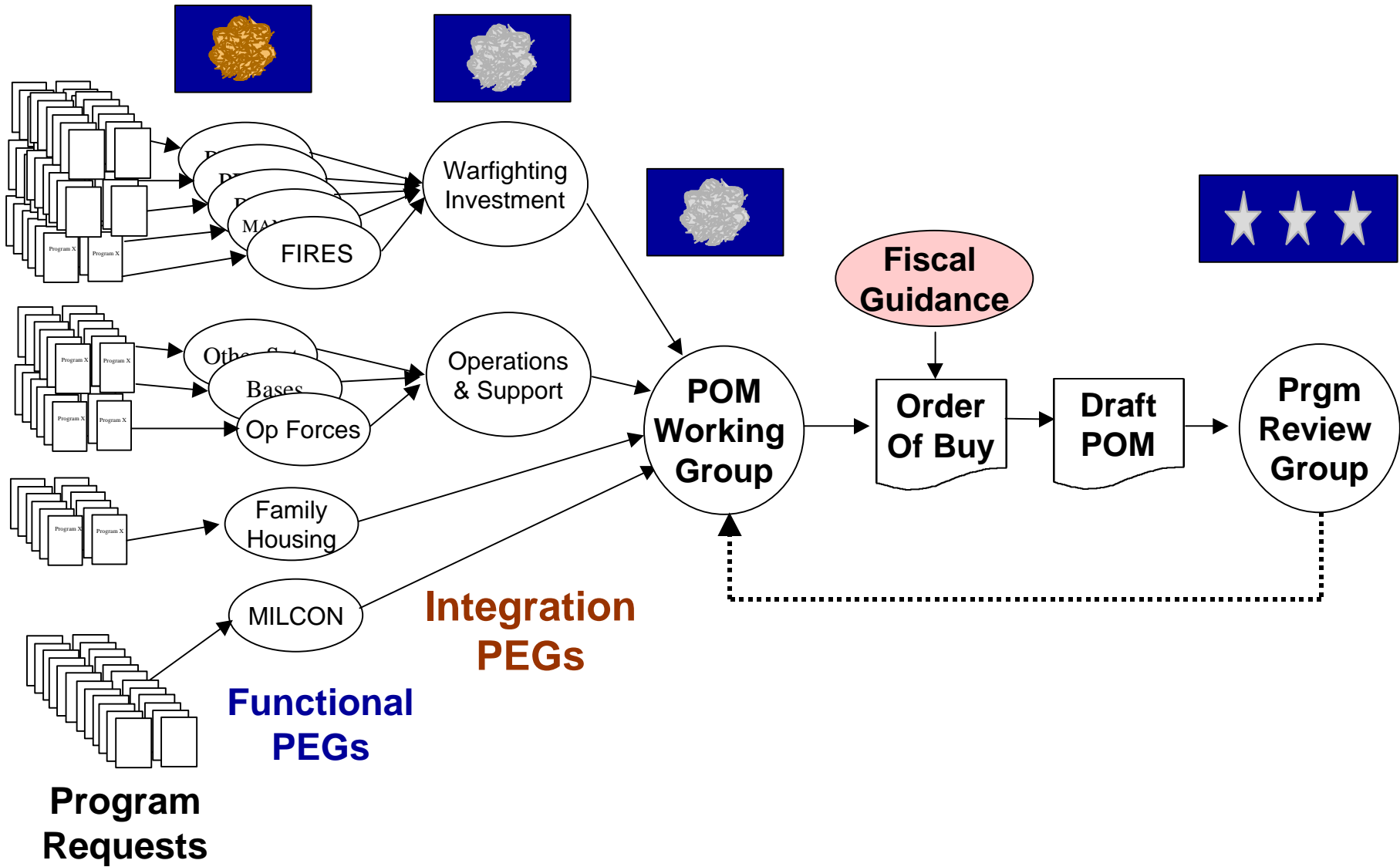


Innovations/Challenges

- 1977** Balance beam assessment process invented and tested
Sponsors walk out of first briefing; benefits accepted, costs rejected
Benefits assessed by mission areas
- 1980** Cost guidelines accepted and used
Benefit/Cost ratio drives decisions; PEG institutionalized
Initial documentation – process, methods, theory, software
USMC takes ownership of software
Conditional benefits assessed for C4 items
- 1985** All CMC budget categories come under the new process
Navy-in-support-of-USMC categories come under new process
- 1990** HQMC reorganization, new processes documented in depth
Methods institutionalized: HQMC Handbook for Resource Allocation
- 1995** Closed BOGSAT imposed, redone with participative methods
Groupware anonymity imposed on group, redone with open methods
AHP ratings tried, redone with balance beam measurement
- 2000** Emphasizing basics, refining process



How does it work for the Corps?





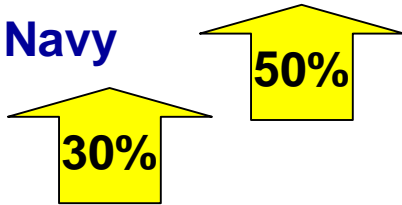
Why has it endured?

- The Marines own and control the process
 - It forces professional discussions about what is best for the USMC
 - It allows all relevant voices to be heard at the right time
 - The process permits rapid analysis and modification
 - It supports decisions based upon the best-available information
 - It creates an effective synergy between:
 - a **quantitative** framework and **qualitative** judgments
 - a **people-oriented** process and **automation**
 - **rational** and **irrational** input
 - **complex** thinking and **simple** modeling
 - It has adapted over time to changing organizational needs
- It works!!**



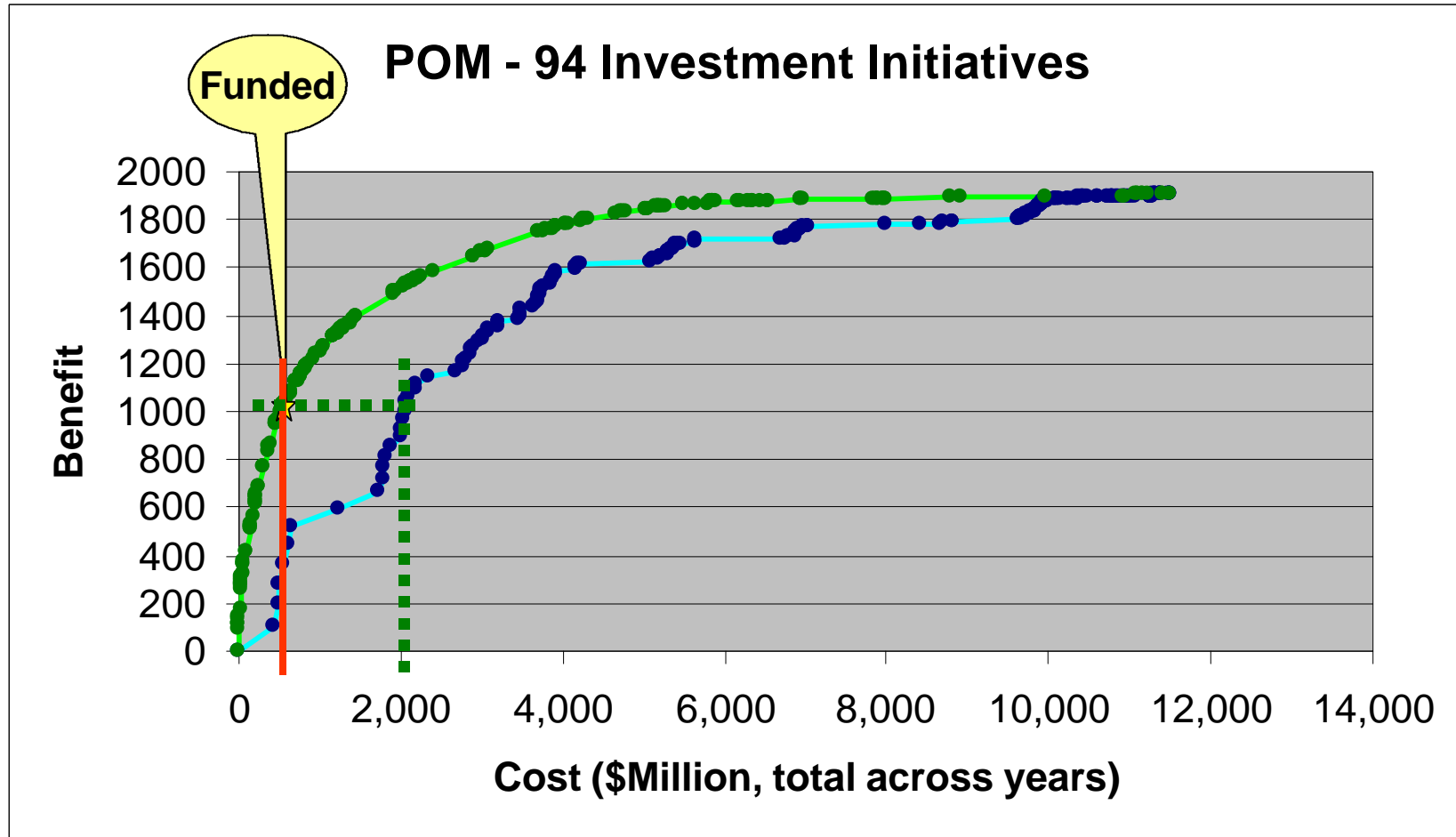
How Has the USMC Fared?

- **Some Recent (POM-01) Indicators**
 - **Fewer Issues at SECDEF level for Resolution**
 - Navy - 15 Issues => \$8.4B
 - USAF - 31 Issues => \$10.3B
 - Army - 13 Issues => \$7.8B
 - **USMC - 0 Issues => \$0**
 - **OSD Directed Post-Program Adjustments**
 - Navy => \$800M (0.18%)
 - USAF => \$2.3B (0.52%)
 - Army => \$850 M (0.23%)
 - **USMC => \$50M (0.07%)**
- **The Long Term Results: Increased Market Share**
 - As part of Dept of Navy
 - As part of DoD





Actual Results



- C/B strategy, 50 funded of 215 provide 55% of potential benefit
- Benefit-only strategy: 4 items, providing only 18 % of the benefit



Decision Analysis Has Provided

- **23 years of optimally allocating scarce tax dollars**
 - Continuous improvement and innovation
 - Successfully warding off challenges
 - Adaptation
- **An analytical compass**
 - Balance beam for benefit measurement
 - B/C ratio for priorities
 - Consensus based order of buy
 - Platform for structured dialog and debate
- **Budgets that are**
 - Decisive
 - Analytical
 - Collaborative
 - Sellable

Added benefit equivalent to billions of tax dollars