Analysis of Alternatives

Keys to Success

NPS Annual Acquisition Research Symposium
May 16-17, 2012

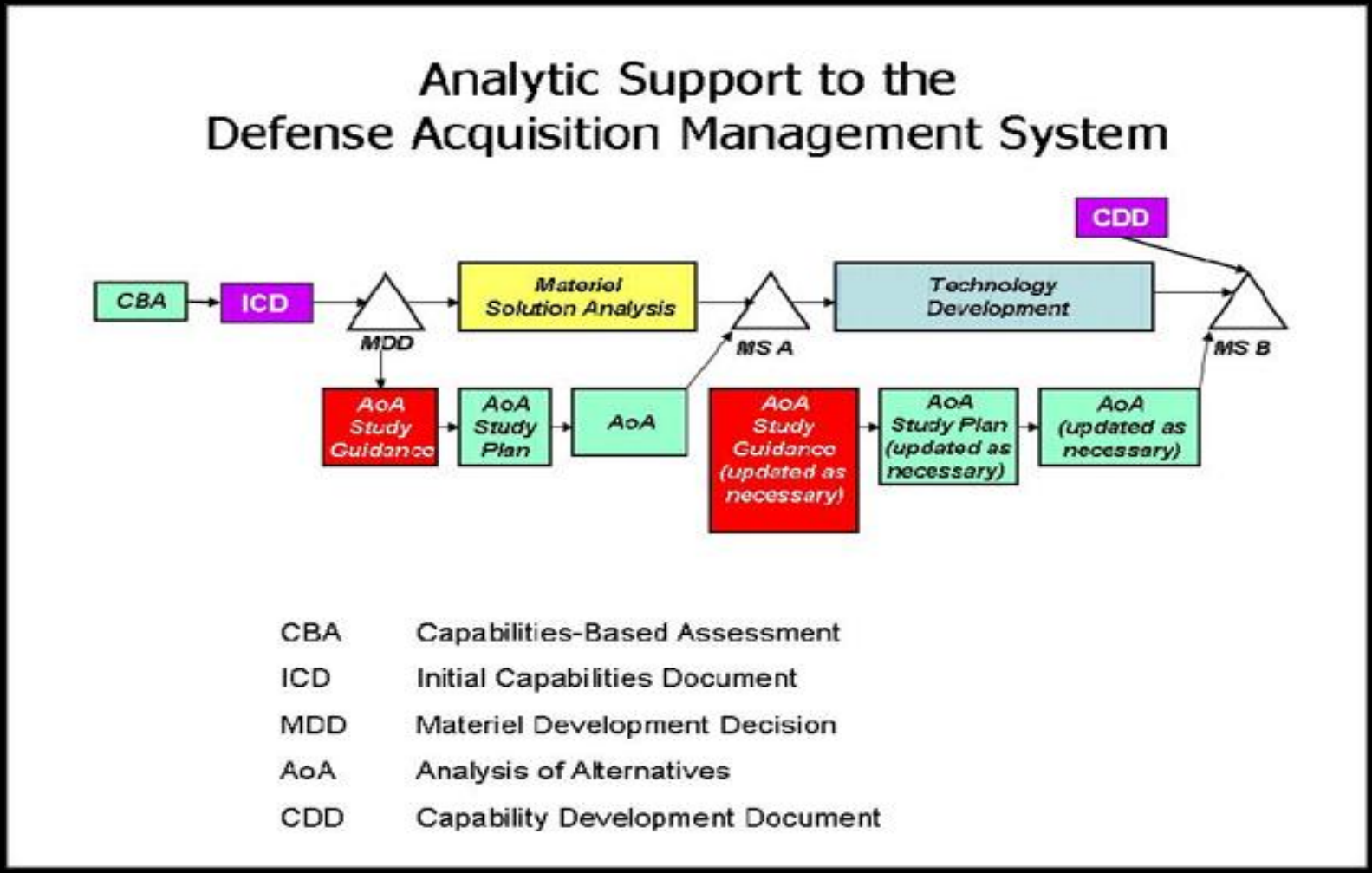
AoAs Are an Important Part of the Acquisition Process

- **Inform agencies, department, and Congressional decisionmakers on the relative cost effectiveness of viable alternatives that can satisfy operational shortfalls**

- **Support Acquisition Executive review by:**
  - **Determining critical characteristics and performance requirements**
  - **Identifying alternatives that meet those requirements**
  - **Measuring the cost and benefits of each alternative**
  - **Showing impact of trade-offs**

- **Accomplishes these objectives by developing an analytical framework for evaluating and recommending alternatives based on cost, performance, and operational analysis**

An AoA is a Prerequisite for Milestone B



Source: Defense Acquisition University

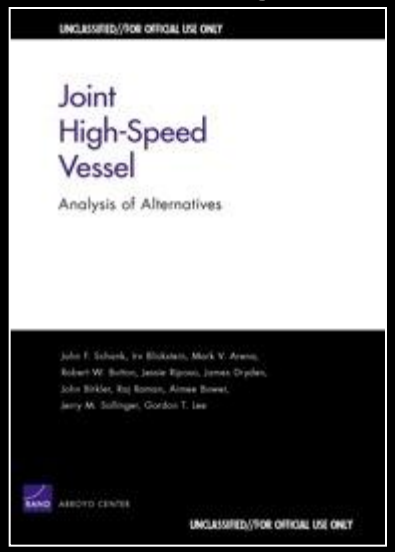
GAO Has Criticized Past AoAs

- Consider a narrow range of alternatives
- Do not adequately consider cost, schedule, and performance trade-offs
- Have not fully understood requirements
- Base schedule and cost estimates on optimistic assumptions
- Lack sufficient knowledge of technologies, design risks, and production impacts
- Do not have adequate guidance from OSD and the Services

Source: Many Analyses of Alternatives Have Not Provided a Robust Assessment of Weapon System Options, GAO-09-665, September 2009

RAND NDRI Has Conducted Six AoA Studies

Army



USSOCOM

Navy

Coast Guard

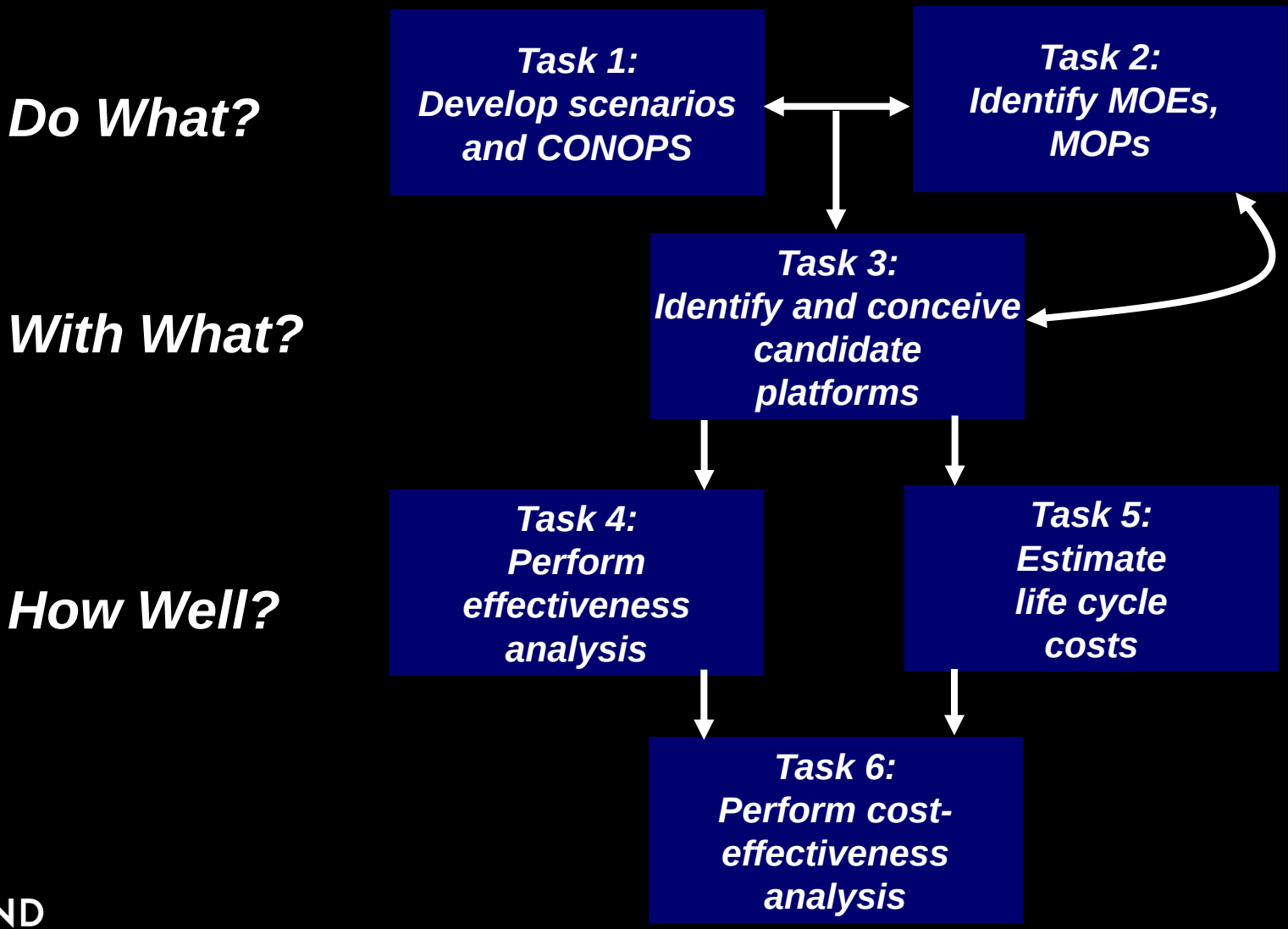
An AoA Requires Answering Three Questions

Do What?

With What?

How Well?

Answering These Questions Requires Six Tasks



Important Considerations for a Successful AoA

- **Develop a thorough study plan**
- **Consider a range of alternatives and baselines**
- **Form effective relationships with oversight committees**
- **Conduct trade-off analyses and examine sensitivities**
- **Have a flexible analysis methodology**
- **Display results that are easily and quickly understood**
- **Recognize and estimate technical, design, and production risks**

A Well Thought Out Study Plan is Key to a Successful AoA

- **Provides guidance and objectives for conduct of the AoA**
- **Identifies:**
  - **Scope and ground rules**
  - **Scenarios and CONOPS**
  - **Draft MOEs and MOPs**
  - **Broad classes of alternatives**
  - **Range of costs to include**
  - **Oversight responsibilities**
  - **Schedules**
- **Enables a consensus among all stakeholders**

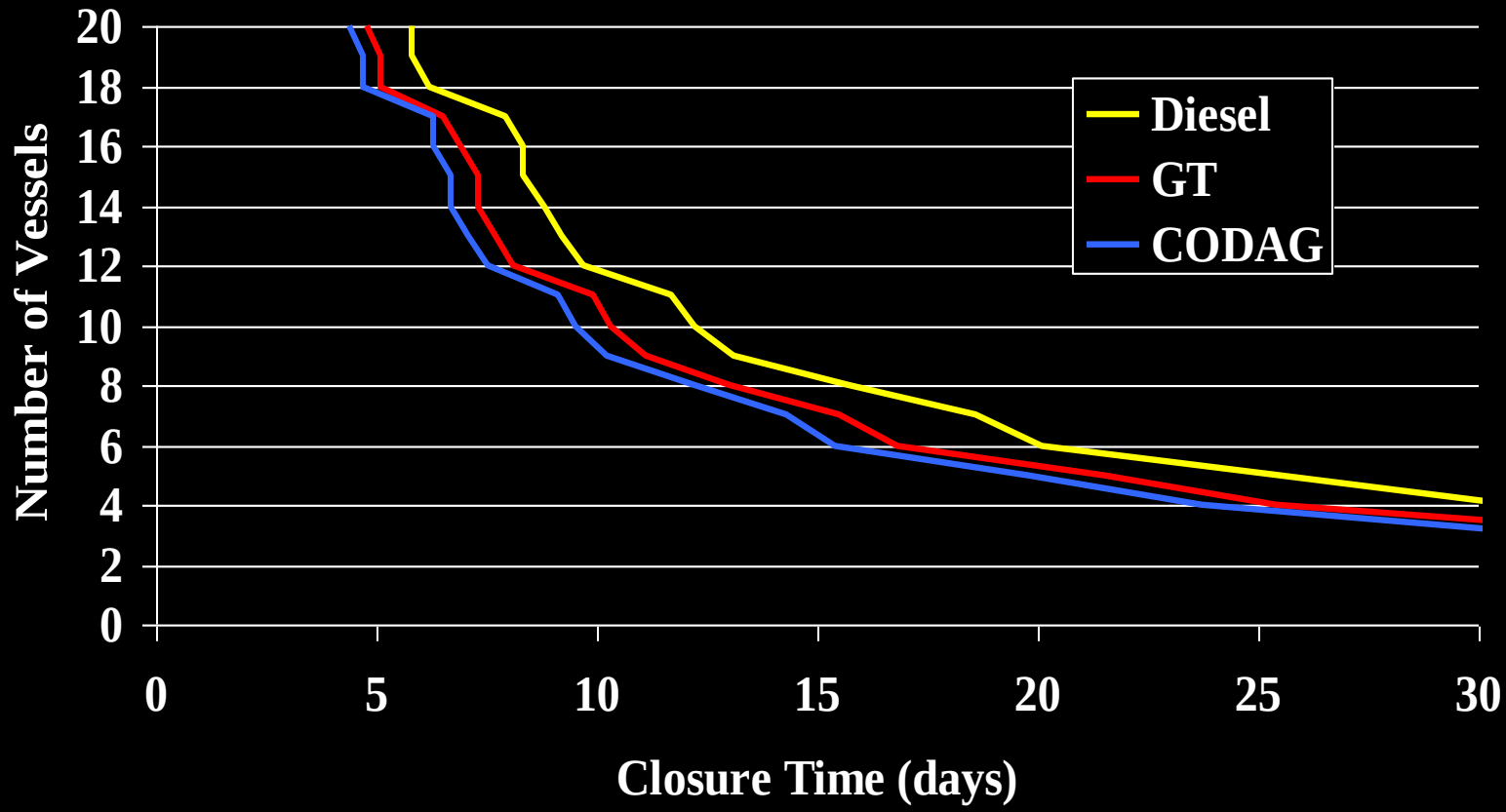
An Effective Steering Group Will Be Necessary for the Successful Conduct of the AoA

- **Role**
  - **Provide on-going guidance as issues arise**
  - **Provide access to stakeholders and experts**
  - **Approve study director decisions as work progresses (e.g. final set of alternatives)**
- **Representation (need authority to make decisions or can quickly resolve – probably equivalent of O6 level)**
  - **R&D Centers**
  - **Program Office**
  - **Cost organization**
  - **Operations**
  - **Support & Logistics**
  - **Technical experts**
- **Administration**
  - **Monthly meetings (present issues, discuss progress, get feedback)**
  - **Government needs to appoint a chairperson(s)**

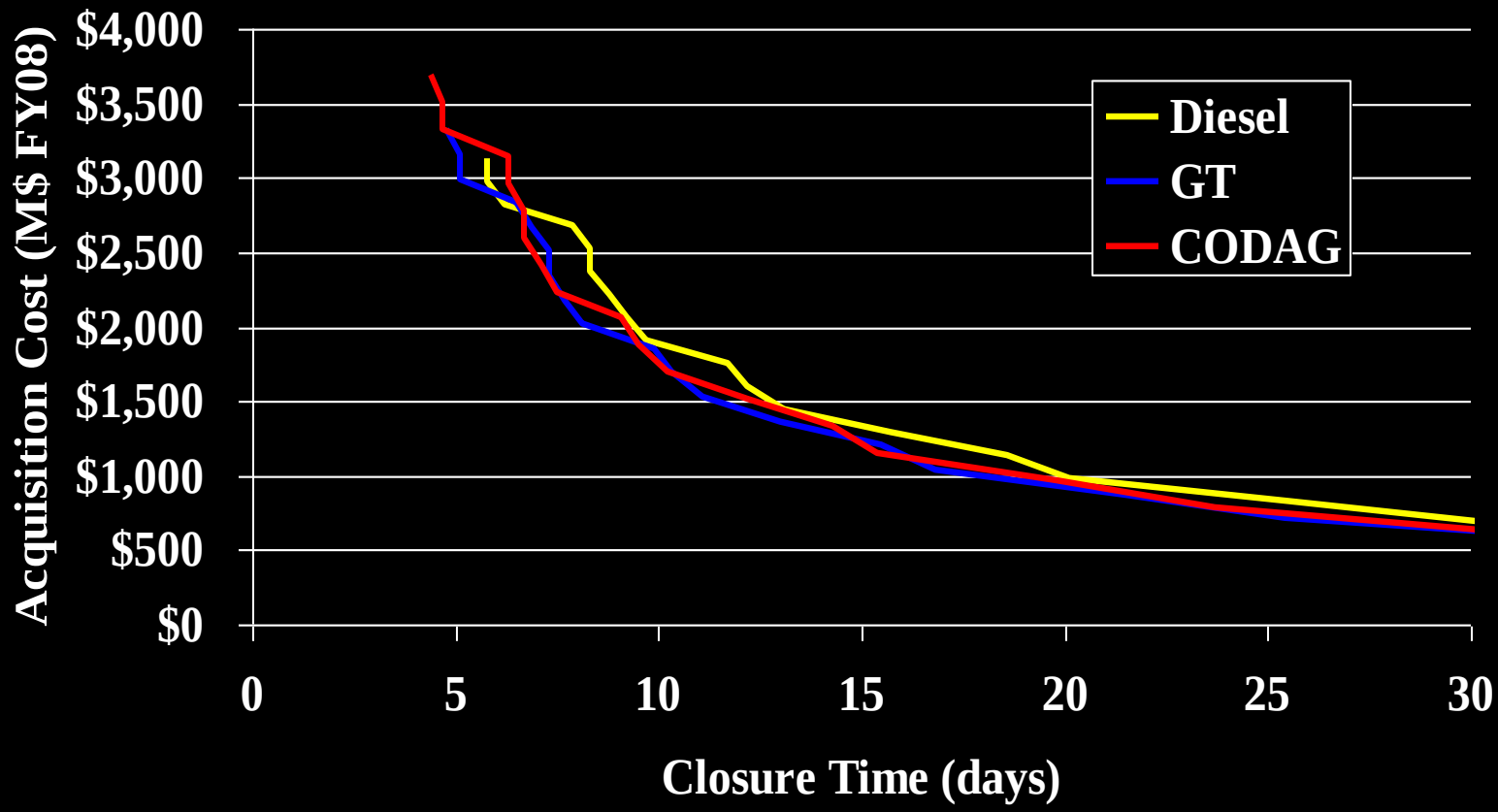
Trade-Off Analyses and Sensitivities Are Essential for Making Informed Decisions

- **How do operational requirements drive system performance?**
- **What is the operational impact of relaxing various system requirements?**
- **What new technologies (and associated risks) are needed to achieve operational goals?**
- **How does cost relate to desired system performance?**
- **Which attributes drive costs and risks?**

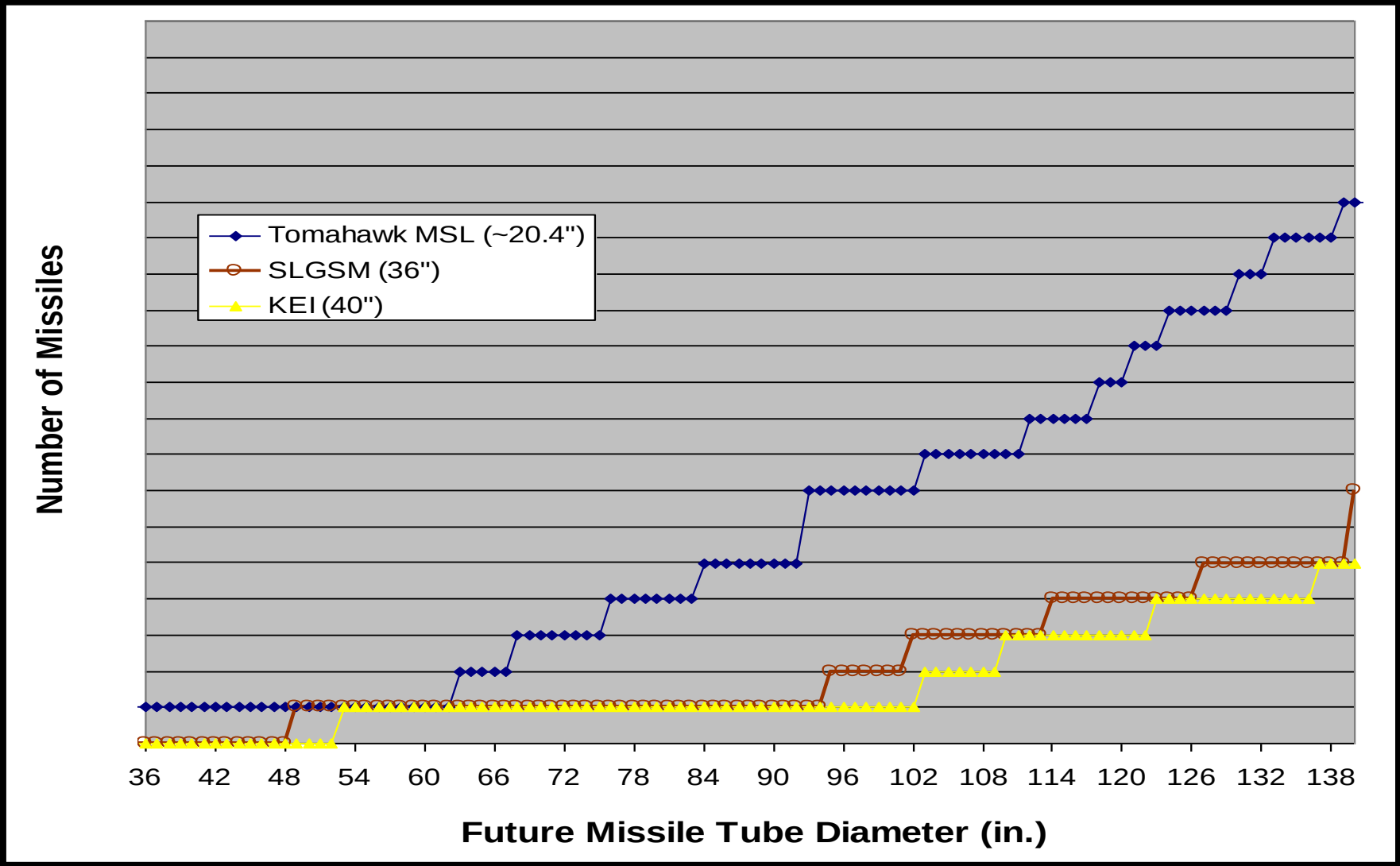
Choice of Propulsion System Impacts Number of Ships



Different Force Levels Impact Acquisition Costs



Number of Missiles Impact Missile Tube Diameter



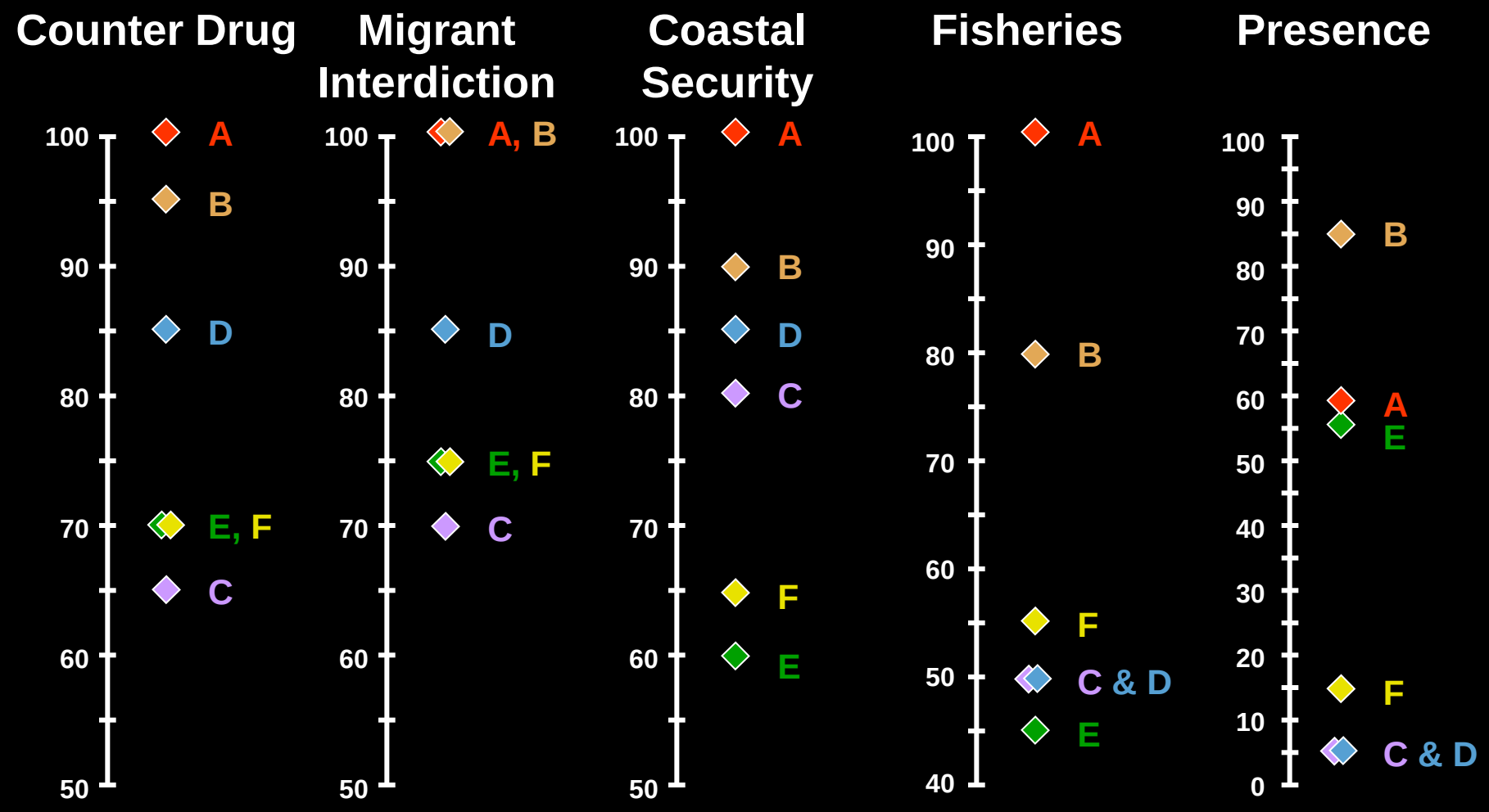
Analysis Methodologies Must Be Flexible

- AoAs must recognize things will change
  - New alternatives and scenarios will be proposed
  - New technologies will be available
  - New analysis questions will arise
  - Important, new MOEs and MOPs will emerge
- Analytical methodologies must be able to adapt to those changes
  - Analysis transparency is important
  - Several simple models are often better than a single, complex model

Analysis Results Must Be Displayed In a Way That is Easily Understood

- AoAs typically deal with complex issues
  - Interaction of several variables
  - Relationships between requirements, performance, and cost
- Displays must capture the complexity but clearly show the interdependencies
  - Typically best to keep charts simple
  - Use a series of charts to build to the primary points

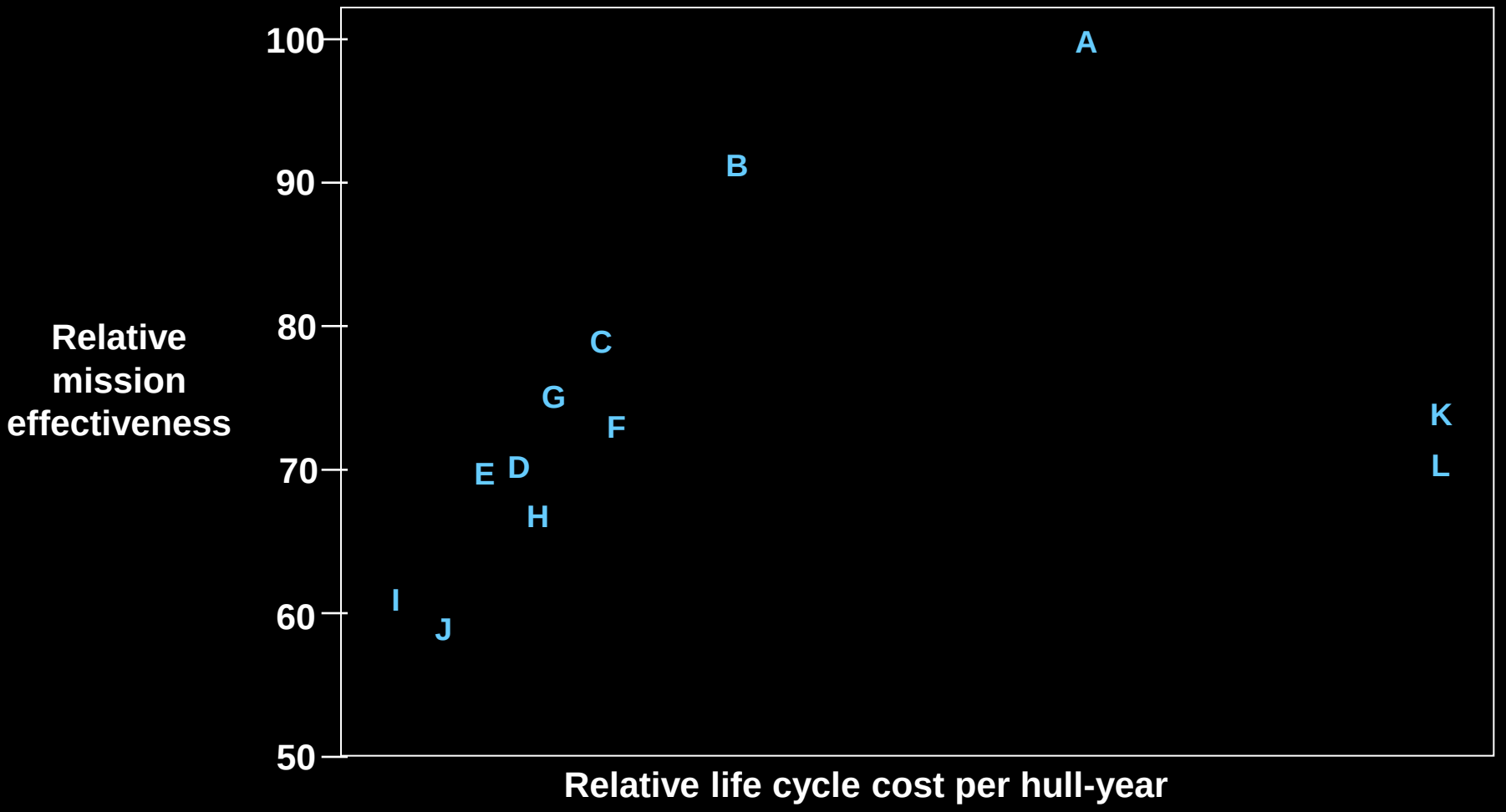
Example for Multiple Mission Display…



Mission Scorecard for MOPs and MOEs

Alternative	Measures of Effectiveness		Measures of Performance		
	%of TOI Prosecuted	% of Traffic Detected	Small Boats	Advanced C4I	Aviation
A	20%	31%	3	Yes	HH60/VUAV
B	15%	27%	2	No*	HH65
C	14%	24%	?	No	HH60/VUAV
D	17%	27%	?	No	HH60/VUAV
E	20%	31%	2	Yes	HH60/VUAV
F	15%	26%	2	No	HH65
G	20%	31%	2	SWAP	HH60/VUAV
H	18%	29%	2	No	HH60
I	18%	29%	2	No	HH60
J	18%	29%	2	No	HH60
K	18%	29%	3	No	HH60
L	18%	29%	2	No	HH60

Example of Cost Effectiveness



Recognizing and Estimating Risks Are an Important Part of AoAs

- **Ignoring or underestimating risks can lead to incorrect decisions and future cost and schedule growth**
  - **Must clearly know the state of technologies**
  - **Subject matter/technical experts should be a part of the AoA team**
  - **Risks may also arise from the industrial base especially the second tier vendors**
- **Risks may also arise from other programs the AoA system is dependent upon**

Summary Comments

- Keep in mind other complicating factors
  - Alternatives with unequal service lives
  - System-of-systems
  - Alternatives with greatly different expenditure profiles
- There are numerous players in the approval chain
  - They will have their own, unique ideas
  - Involve key organizations early
- Be prepared for late changes and questions