Applying Prediction Markets to RFPs to Lower Program Acquisition Risk

Do you know where your risks are?

Robert N. Charette
President
ITABHI Corporation

"A Vexing and Disturbing Reality"

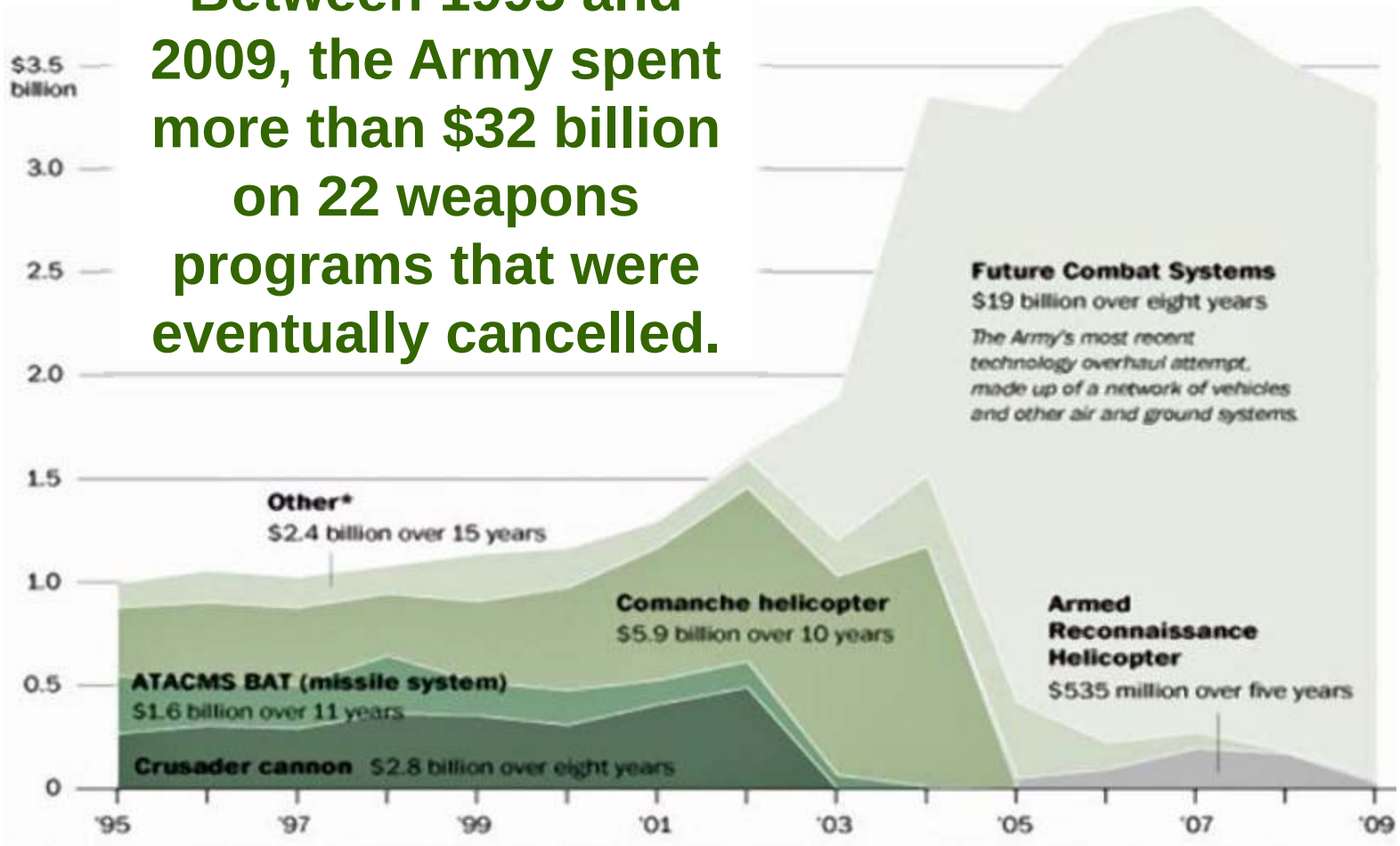
"Since 9/11, a near-doubling of the Pentagon's modernization accounts…

… more than $700 billion over 10 years in new spending on procurement, research and development – has resulted in relatively modest gains in actual military capability."

Robert M. Gates
24 May 2011

"A Vexing and Disturbing Reality"

Between 1995 and 2009, the Army spent more than $32 billion on 22 weapons programs that were eventually cancelled.



*Includes the Armored Gun System, Stinger RPM Block II missile system, Wolverine Heavy Assault Bridge armored vehicle, Grizzly Breacher armored vehicle, Sense and Destroy Armor Munition, Line-Of-Sight Anti-Tank weapon, Joint Common Missile, Land Warrior and Aerial Common Sensor.

Bone Yard of Misfit Programs

Profiting From Risk

Ubiquitous Issue

In March 1794, Congress authorized the building of six large frigates, which were to form the backbone of the Navy. The then-War Department was assigned the task of acquiring the ships. Nearly 17 months later, six keels were laid. Shortly thereafter, due to delays and cost overruns, the program was cut back to three frigates.

Ubiquitous Issues

"There exists both a systematic bias toward underestimating the costs and a substantial uncertainty in estimating the final cost of DoD programs. A primary reason is the lack of useable risk information that can be properly incorporated into cost estimates."

Impossible Certainty: Cost Risk Analysis for Air Force Systems. Arena, Mark et al., Rand Report MG-415-AF, 2006.

Presentation Framework

- *Improving Decision-making*
- *Economics 101*
- *Information/Prediction Markets*
- *Using Market Ideas In RFPs*
- *Limitations & Constraints*

Decision-Making Prerequisites

Barring luck, decisions are only as good as the information considered

Profiting From Risk

Profiting From Risk

Single Deck, Dealer Hits on Soft 17

Your hand	Dealer's card 2	3	4	5	6	7	8	9	10	A
8	H	H	H	D	D	H	H	H	H	H
9	D	D	D	D	D	H	H	H	H	H
10	D	D	D	D	D	D	D	D	H	H
11	D	D	D	D	D	D	D	D	D	D
12	H	H	S	S	S	H	H	H	H	H
13	S	S	S	S	S	H	H	H	H	H
14	S	S	S	S	S	H	H	H	H	H
15	S	S	S	S	S	H	H	H	H	H/R
16	S	S	S	S	S	H	H	H	H/R	H/R
17	S	S	S	S	S	S	S	S	S	S/R
A,2	H	H	D	D	D	H	H	H	H	H
A,3	H	H	D	D	D	H	H	H	H	H
A,4	H	H	D	D	D	H	H	H	H	H
A,5	H	H	D	D	D	H	H	H	H	H
A,6	D	D	D	D	D	H	H	H	H	H
A,7	S	Ds	Ds	Ds	Ds	S	S	H	H	H
A,8	S	S	S	S	Ds	S	S	S	S	S
2,2	H/P	P	P	P	P	P	H	H	H	H
3,3	H/P	H/P	P	P	P	P	H/P	H	H	H
4,4	H	H	H/P	D/P	D/P	H	H	H	H	H
5,5	D	D	D	D	D	D	D	D	H	H
6,6	P	P	P	P	P	H/P	H	H	H	H
7,7	P	P	P	P	P	P	H/P	H	S/R	H/R
8,8	P	P	P	P	P	P	P	P	P	P
9,9	P	P	P	P	P	S	P	P	S	S/P
10,10	S	S	S	S	S	S	S	S	S	S
A,A	P	P	P	P	P	P	P	P	P	P

Strategy from ***WizardOfOdds.com***

H	Hit
S	Stand
D	Double if allowed, else hit
Ds	Double if allowed, else stand
P	Split
H/P	Split if double after split, else hit
S/P	Split if double after split, else stand
D/P	Split if double after split, else double
H/R	Surrender if allowed, else hit
S/R	Surrender if allowed, else stand

What is the value of this added risk information?

How Much Do We Know?

How many dogs are there in the United States?

Information Markets

"The economic problem of society is thus not merely a problem of how to allocate 'given' resources ... it is a problem of the utilization of knowledge which is not given to anyone in its totality."

Friedrich Hayek
The Use of Knowledge in Society
1945

Prediction/Future Markets

- *Elections*
- *New products*
- *Product launch dates*
- *Resource allocations*
- *Development schedules*

Small Digression to Review Econ 101

Profiting From Risk

The Economist's Dictum:

You don't know what something costs until you have seen the alternative.

Basic Economic Notion

PROFIT is:
Provider's Risk - Customer's Risk

All exchanges of goods and services are exchanges of risk and opportunity.

Basic Economic Notion

All exchanges of goods and services are exchanges of risk and opportunity.

What Do We Exchange?

- Information

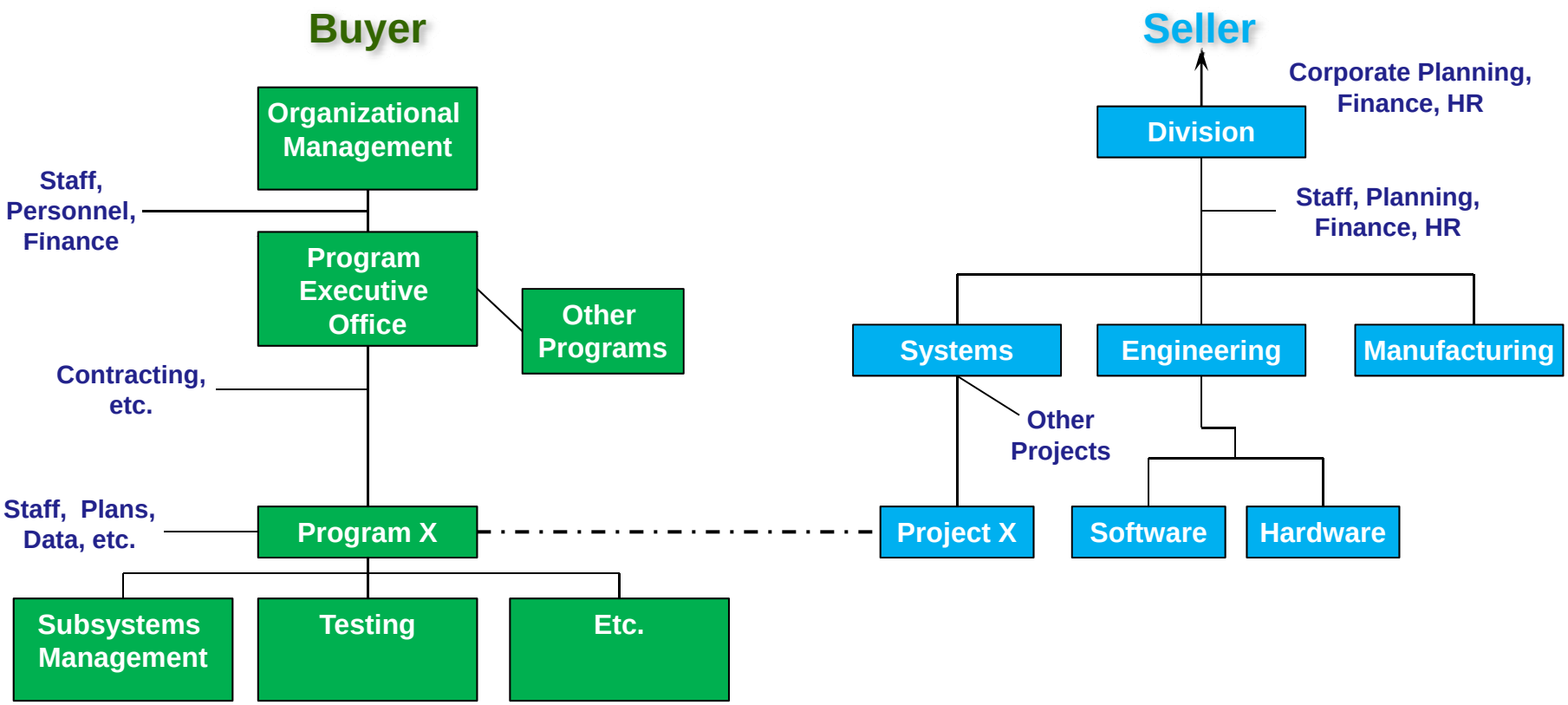
- Control

- Time

Information Markets

- *The most efficient exchanges occur when all risk information is transparent to all parties to the exchange (i.e., info is not asymmetrical in some way where some information is deliberately withheld by one or more parties to the exchange)*
- *Information markets or exchanges (e.g., stock, commodities, auctions, etc.) tend to be the most transparent*
- *Exchanges that are asymmetrical (not transparent) create information distortions that increase transaction (and usually later operational) costs and risks (e.g., bid protests, program surprises, etc.)*

Monopsony Economics



John J. Marciniak and Donald J. Reifer, Software Acquisition Management, Wiley, 1990

Very Inefficient Market

Defense acquisitions today are information markets operating with (too much) asymmetric risk-related information on both the buyer's and seller's part

Very Inefficient Market

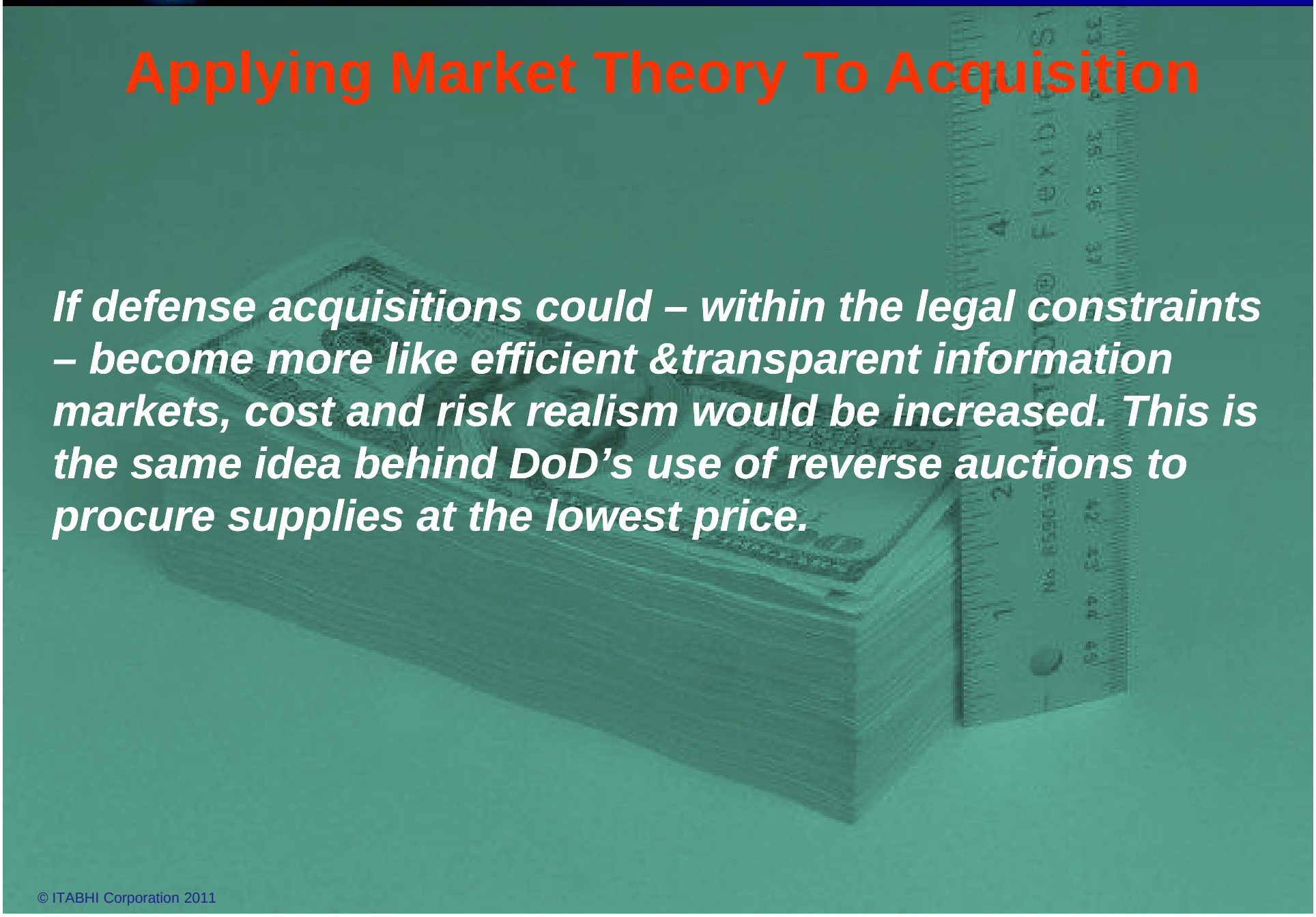
- *Risks – but less so cost – are not tied directly to WBS items, making it difficult to link program risks to program decisions/trade-offs to final estimated program costs.*
- *Acquisition risk is assumed to be mostly created by the contractor, and not the government. Detailed program risk information and program assumptions/constraints from the government perspective are often kept from bidders.*
- *Assessment of program risk/cost seems to ignore subsequent contract negotiations that can significantly skew program risk, especially in terms of assumptions.*
- *Historical program risk information is not required to be kept. Where past risk information is kept, it is often not consistently kept (apples and oranges problem). Using a "standardized" but tailored, context-sensitive risk typology is a good means to resolve this issue by providing a "risk baseline."*

Very Inefficient Market

- ***Risk/cost information available for use in independent cost analyses is generally not transparent, i.e., it is typically not:***
  - ***revealed to all the required stakeholders***
  - ***accessible to all the required stakeholders***
  - ***relevant to all the required stakeholders***
  - ***of sufficient quality (i.e., deep and broad vs. thin, shallow and superficial) for the required stakeholders to make intelligent, risk-informed decisions***

As a result, the best fact-based risk and cost information is not available to those who need it most when they need it

Applying Market Theory To Acquisition



If defense acquisitions could – within the legal constraints – become more like efficient &transparent information markets, cost and risk realism would be increased. This is the same idea behind DoD's use of reverse auctions to procure supplies at the lowest price.

Government Requirements:

- *Programs to identify and assess risk information related to achieving program objectives & requirements using the CARD*
- *Do so in a consistent manner against a SOW WBS using a standard but tailored risk typology*
- *Then, make this information available to cost estimators for its independent cost estimates*
- *Later, make risk information available (minus WBS for legal reasons) to potential bidders during the RFI/RFP phases*

Bidder's Requirements:

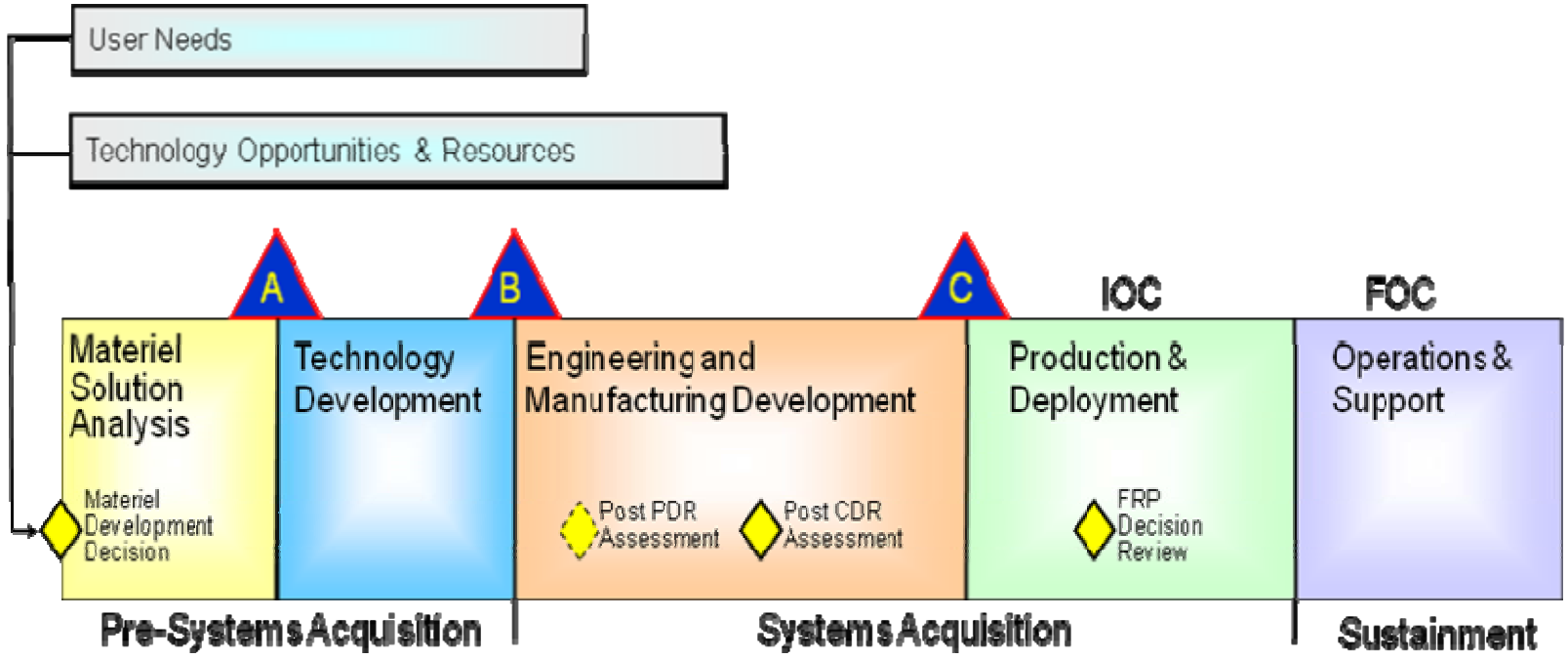
Assess government's RFI/RFP risk assessment for completeness as well as integrity of program assumptions & constraints:

- ***Bidder could agree or disagree with Government's risk assessment based on its own experience/judgment***
- ***Provide mitigation strategies for these Program-identified risks, as well as any risks the Bidder creates in meeting Program-objectives***
- ***Describe how Bidder's risk assessment and management approach aligns to Program's risk assessment approach***
- ***Link Bidder's risks, mitigation strategies and costs to a proposed SOW WBS and cost estimate***

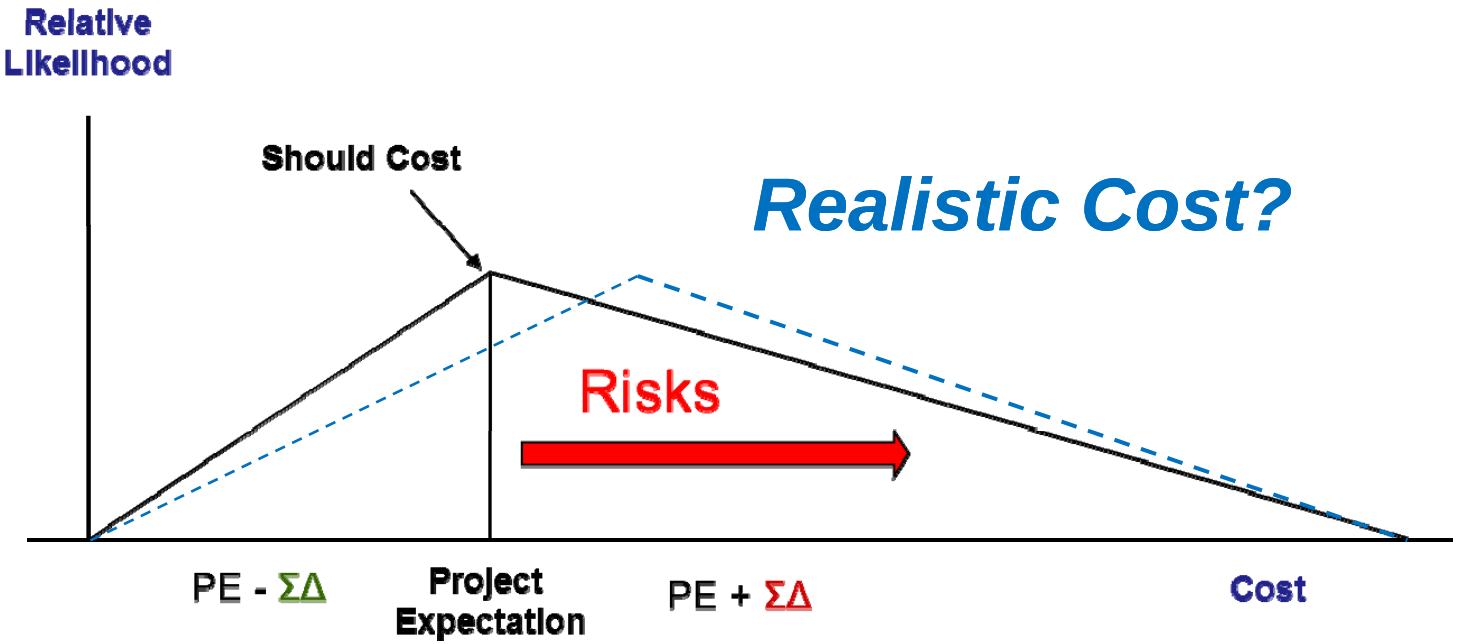
Contract Negotiations:

- *Program would compare Bidder's risk assessment against Government's risk assessment to see what, if any, risk gaps or disagreements exist, as well as how well risk mitigation strategies are proposed to be financed by Bidder*
- *During contract negotiations, Government and Bidder agree to a baseline program risk profile and financing of that profile; once agreed, Bidder accepts cost consequences of risks. This moves contract closer to a fix-priced contract, and provides incentives to both Government and Bidder not to change program requirements*
- *Risk information from RFP, bid and operational program at major milestone reviews would be captured in an systemic risk database for future analysis. Using a standardize risk typology would allow for a "level playing field" analysis*

Applying Approach Throughout the Acquisition Life-cycle



DoD Public Prediction Market?



Benefits

- ***Promotes transparent exchange of risk information; reduces incentives to hide risk information***
- ***Helps create a program's risk/cost story to be credible, coherent and independent***
- ***Supports DoD move to contain requirements creep, program complexity, and achieve 80% confidence level in cost estimates***
- ***Builds on scenario based approach already suggested in DoD cost handbooks***
- ***Increases likelihood of fact-based, risk-informed decisions systemic database of historical risk information could begin to be built***

Limitations

- *Program risk is widely seen as equating to program problems, regardless of DoD instructions since 1969 to actively identify and manage risk*
- *Natural reaction in tough times is to hide program risks and hope for the risk management fairy to appear; tough times are now here again, making non-disclosure of risk perceived as more valuable than disclosing it*
- *Getting a standardized risk typology accepted by all stakeholders is admittedly difficult*
- *No program would volunteer to go first for fear of seeing their funding targeted; all or nothing approach*
- *Bidders might balk; they too desire risk ambiguity and uncertainty*
- *Contract negotiations can reduce or eliminate all the benefits of the approach*

Profiting From Risk

"Every dollar squandered on waste is one denied to the warfighter."

Donald Rumsfeld

"Knowledge has power. It controls access to opportunity and advancement."

Peter Drucker

"You can avoid reality, but you can not avoid the consequences of avoiding reality."

Ayn Rand