BA-4 Account
Advanced Component Development and Prototypes

2011 Naval Research Advisory Committee
Briefing to
The Honorable Sean Stackley
ASN RDA

October 2011

Panel Membership

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Executive Secretary

Mr. Bob Smith
ONR

Study Terms of Reference (TOR)

- **Objective:**

  The NRAC shall assess the Naval BA-4 account in a manner that focuses on its adequacy as a primary transition vehicle for Naval S&T and as the first step in the formal systems acquisition process.

- **Specific Taskings:**

  The NRAC shall assess the Naval BA-4 investment, examining issues such as governance, strategic planning and oversight, technical quality and effectiveness as a transition vehicle for Naval S&T investment .

  – **The study shall address:**

    - **Leverage of the BA-4 account to enhance the CNO's "Speed to Fleet" initiative.**
    - **Governance and investment strategy of the Naval BA-4 account. The investment balance decision process; how to ensure the best technical solutions are pursued.**
    - **Technical content of the BA-4 account, especially non-ACAT BA-4. Is it appropriate for the funding category, and does it represent an appropriate technical cross-section for transition of Naval S&T into systems acquisition?**
    - **Coupling of BA-4 to Naval S&T. The ability of the current BA-4 investment to transition Naval S&T efforts; establishment of funded transition plans from S&T.**
    - **Transition of BA-4 programs to systems acquisition. Potential applicability of private sector technology transition processes for transition from BA-4 to BA-5 programs.**

Study Context

- **Builds on results of 2010 NRAC review of Naval Research and Development Establishment and extends some themes of that study**
- **The compressed schedule limited the depth of review of the technical content of the BA-4 account**
- **The study panel crafted actionable recommendations for BA-4 in the context of broader technology transition challenges**

Speed To Fleet

“The rapid pace of technological change in today’s world outpaces how we currently deliver capabilities; we must realize that our current processes won’t serve us well going forward, particularly the excessive, inefficient developmental and operational test regimes to which we subject ourselves. We must rethink how we get ‘speed to Fleet.’”

Admiral Roughead, Jan. 2011

Bottom Line

- **Shift the BA-4 focus to accelerate transition**
- **Build teams you can trust**
- **Instill a willingness to take risks early, fail if necessary and learn from failure**
- **Re-engage the Fleet**

Who We Met With

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LOCKHEED MARTIN
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Massachusetts Institute of Technology

Google

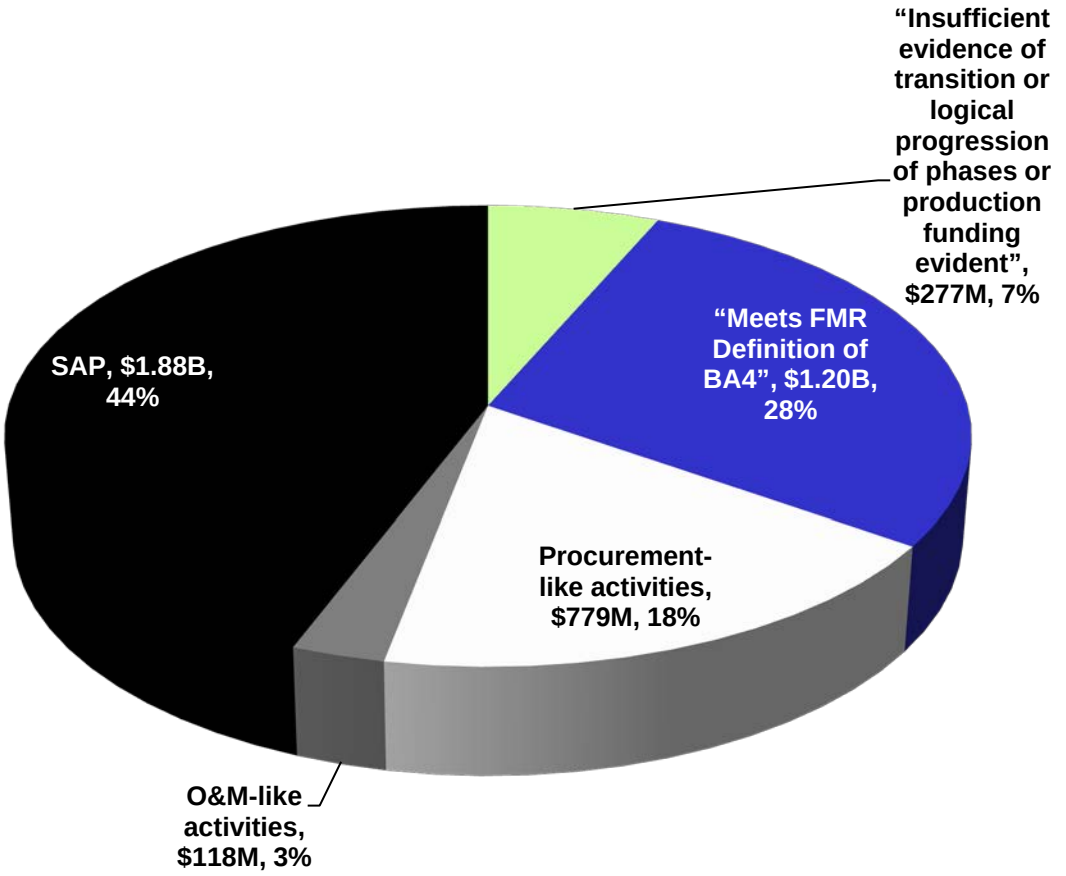
See complete list in backup

NRAC

What is BA-4

- **Efforts prior to Milestone B including technology demonstrations**
- **Advanced Component Development and Prototypes**
- **Proving component and subsystem maturity**
- **Completion of TRL 6 and 7 should be achieved for major programs**

Navy BA4
FY11 Total Appropriated



Navy BA4 ≈ $3.79B (PB 2011)

Source: Ms Nancy J. Harned
Director, Advanced Components & Prototyping
Research Directorate, ASD(R&E)

Relevant Significant Findings from Past Reports on BA-4

- **Chasm exists between S&T (TRL 5) and acquisition (TRL 7)**
- **No overall Naval leadership or responsibility in developing investment strategy for BA-4**
- **Freezing requirements too early causes mismatch between technology enabled capabilities and requirement expectations**
- **Ability to specify, develop, test and insert new technologies into programs has atrophied**

CNO Sailing Directions (excerpts)

Over the next 10 to 15 years, the Navy will evolve and remain the preeminent maritime force.

- **The reach and effectiveness of ships and aircraft will be greatly expanded through new and updated weapons, unmanned systems, sensors, and increased power.**
- **The Air-Sea Battle concept will be implemented to sustain U.S. freedom of action and Joint Assured Access.**
- **Unmanned systems in the air and water will employ greater autonomy and be fully integrated with their manned counterparts.**
- **The Navy will continue to dominate the undersea domain using a network of sensors and platforms - with expanded reach and persistence from unmanned autonomous systems.**
- **Cyberspace will be operationalized with capabilities that span the electromagnetic spectrum – providing superior awareness and control when and where we need it.**

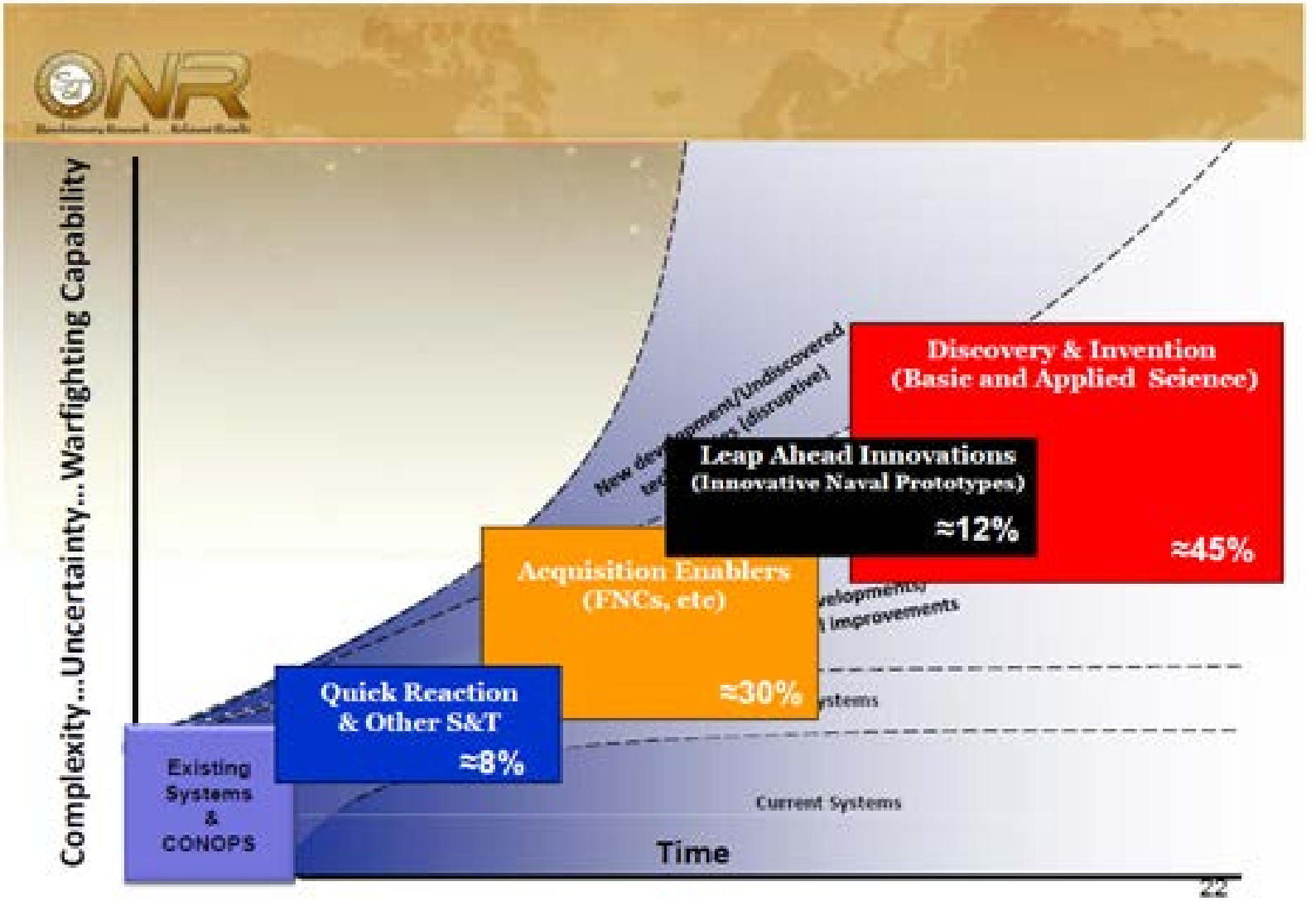
NRAC

CNO Sailing Directions Transition Challenges

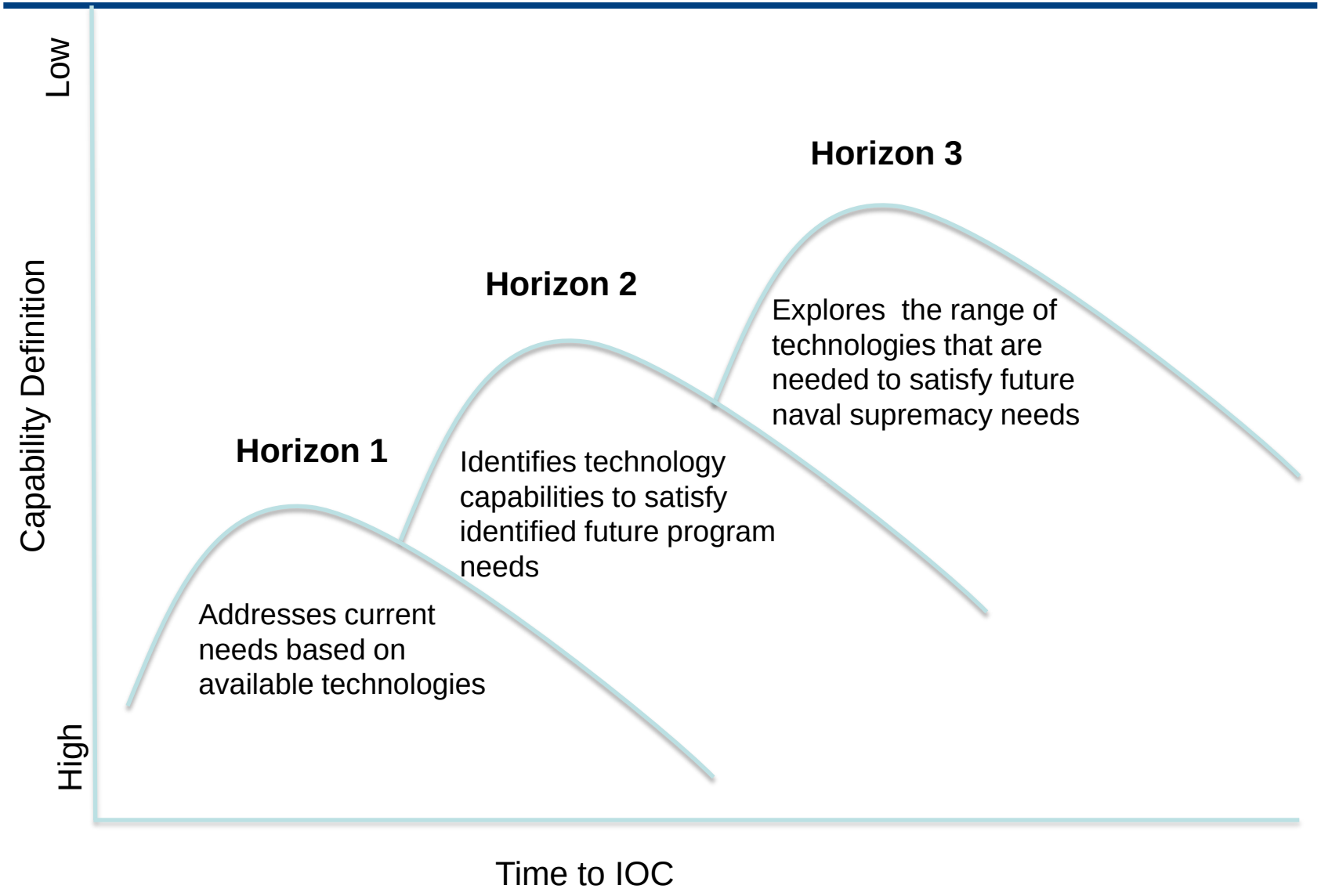
- **Unmanned and autonomous systems feature prominently in transformation of Naval capabilities**
  - **Program of Record structure largely oriented towards existing classes of platforms.**
  - **Although 6.1-6.3 active in unmanned systems, no place for the 'transition bridge' to land.**
  - **See NRAC Studies on Underwater Maritime Domain Awareness and Critical Undersea Infrastructure**
- **Cyberspace recognized as key to future of DoN**
  - **Computer network advances are driving large-scale transformations in society**
  - **DoN processes too slow to leverage massive industry investment**
  - **See NRAC study on COTS Networking**

Transformative activities central to CNO vision

Future Naval Capabilities



Managing the Portfolio of RDT&E Investment by Horizon



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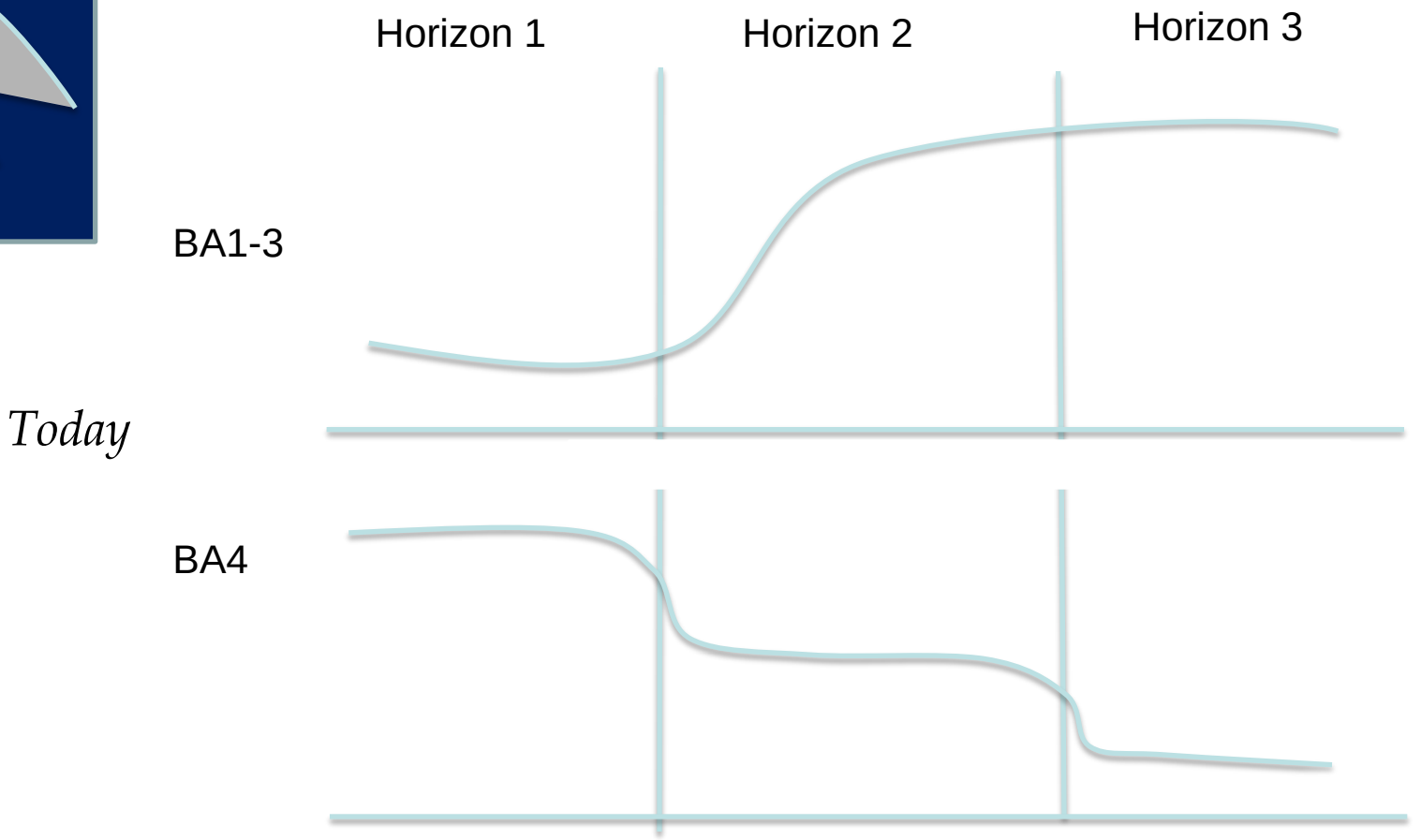
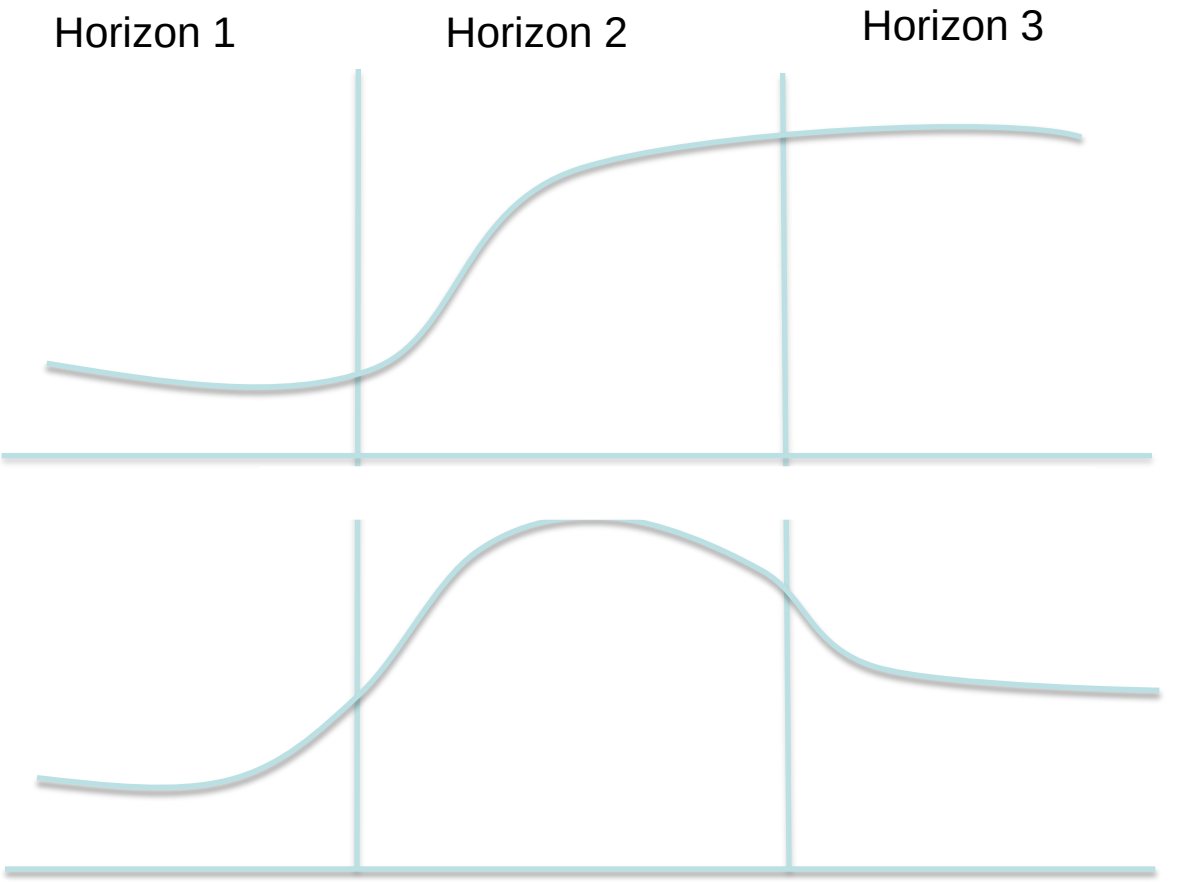
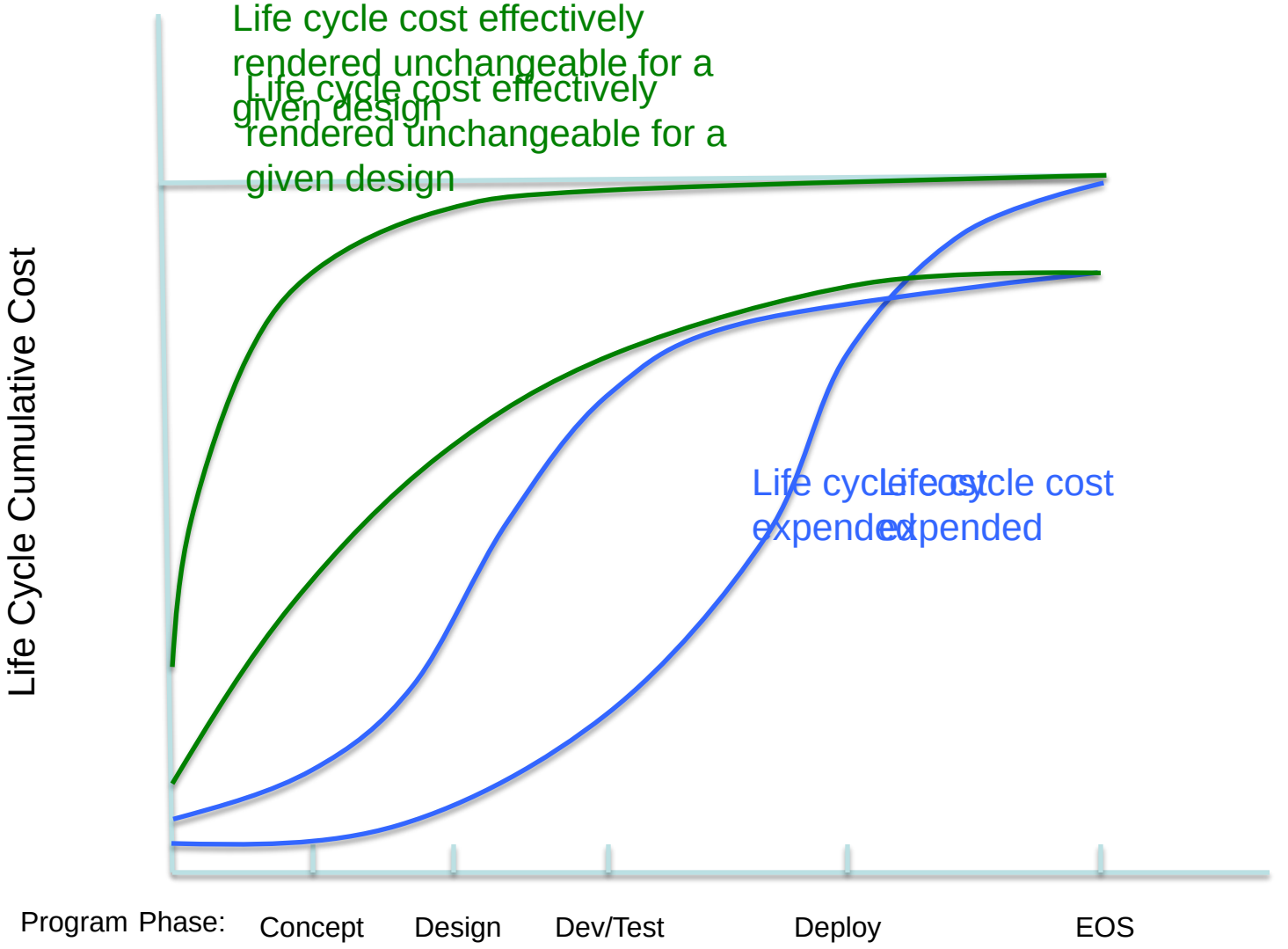


Managing the Portfolio of RDT&E Investment by Horizon

Desired



Shifting BA-4 improves flexibility and cost



How does Hi-Tech Approach Transition?

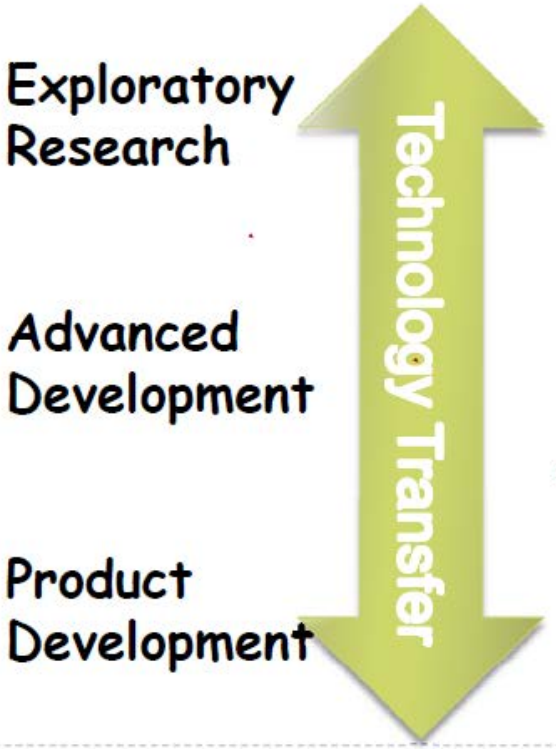
Venture Capital Calculus (It's a Hits Business)

Idea Maturity	Nice Outcome	Failure Pareto
Exploratory Research	It's Possible	>(>) 50%
Advanced Development	It's Practical	< 50%
Product Development	It's Profitable	< 20%

From Greg Papadopoulos, NEA Presentation to NRAC, Sept 10

How does Hi-Tech Approach Transition?

Oh, yes "Technology Transfer"…
…is a Contact Sport*



* Dr. Jim Mitchell

From Greg Papadopoulos, NEA
Presentation to NRAC, Sept 10

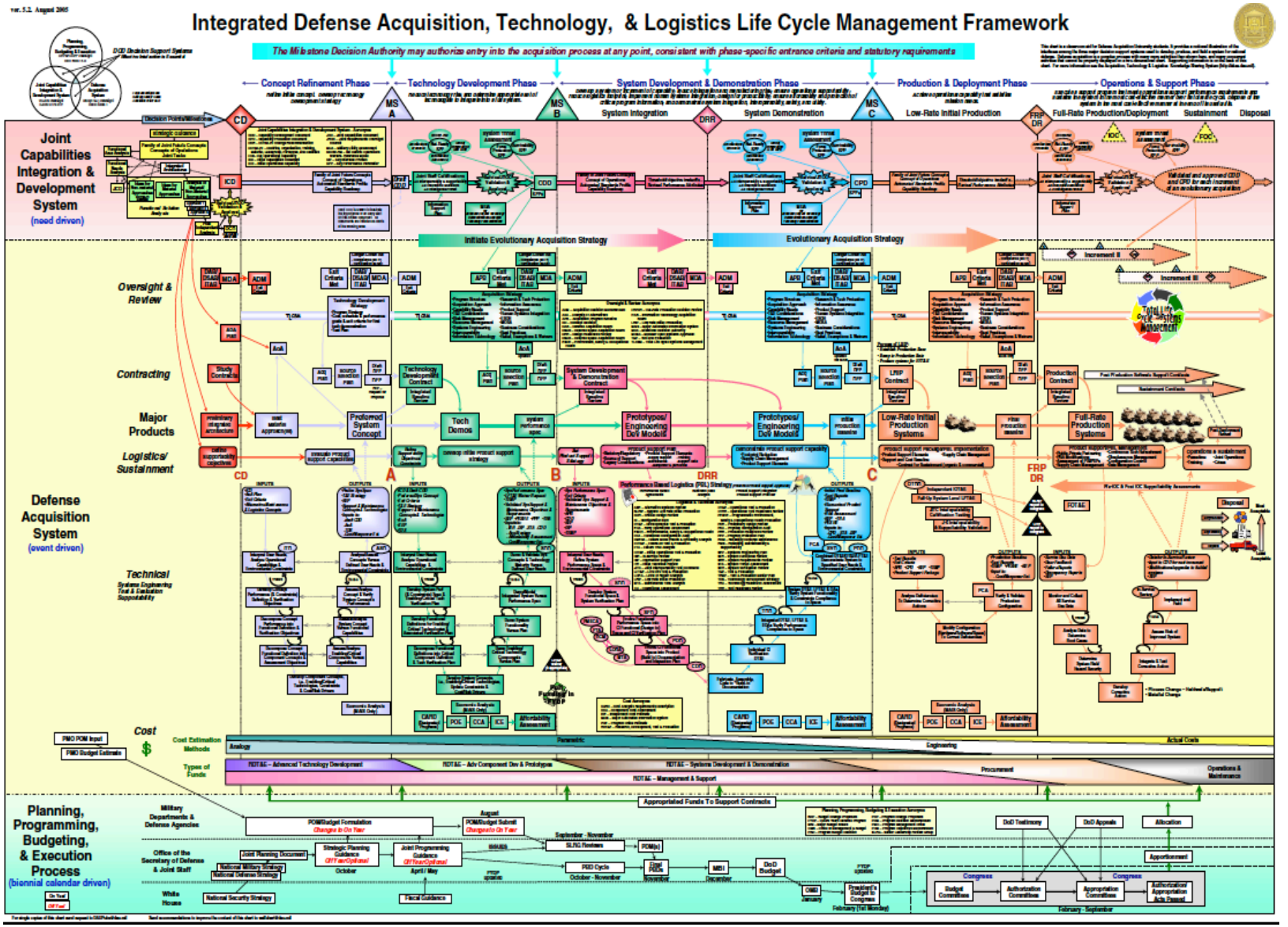
Creating an Entrepreneurial Culture

- **MIT alumni have created companies with 3 million employees that produced great value (Ed Roberts)**
- **How do they foster this?**
  - **Mens et Manus (mind and hands) culture**
  - **Nationwide Young Alumni Entrepreneurship seminars (1969-1971)**
  - **MIT Enterprise Forum (1978)**
  - **Re-oriented Technology Licensing Office (1985)**
  - **MIT Entrepreneurship Center (1990)**
  - **MIT $100K Business Plan Competition (1990)**
  - **Venture Mentoring Service (2000)**
  - **MIT Deshpande Center (2002)**
  - **MIT Sloan Entrepreneurship & Innovation MBA Track (2006)**

Observations on DON SBIR program

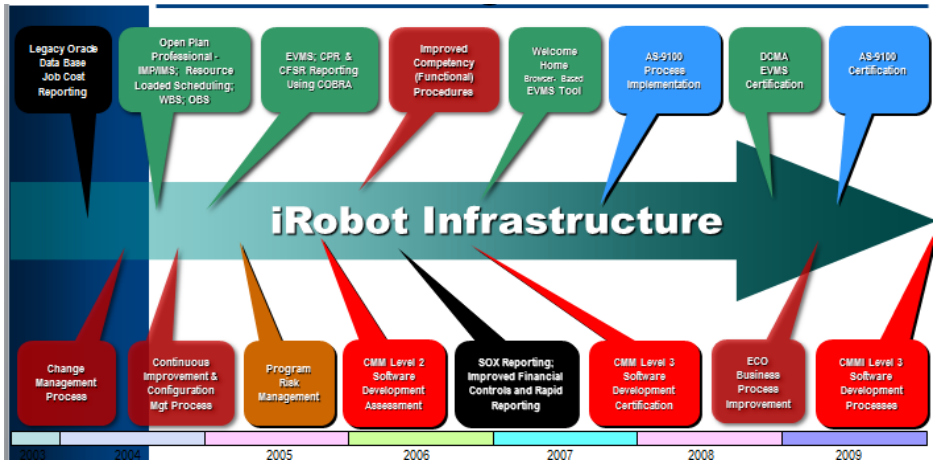
- **Gated process (e.g. Phase II.5) kills underperforming projects ($ go into pool to fund higher potential projects)**
- **SYSCOM defined topics / PEO involvement create higher probability of transition**
- **Process shows value of "failing fast"**
- **Allows for risk taking**

Burden of working within DoD framework



Burden of working within DoD framework

- **Regulatory demands on industry are very high**



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- **Statutory and regulatory underpinnings of these burdens will not easily change**
- **We need to look to BA-4 improvements to enable our ability to protect the future of naval supremacy with reduced resources**

Upcoming Fiscal Environment

- **Deficit reduction creates additional pressure on resource levels**
  - **$450B is just the starting point, could be twice that through sequestration process**
  - **Early indications are that recapitalization programs will be severely reduced**
- **Potential for force restructure and other structural changes**
- **The challenge is in protecting the future**

Implications for R&D Investment

- **Need to place a higher premium on technology readiness for the future to prevent atrophy of technical capability in the Naval Establishment**
- **Need alternative path for transition when FNC transition funding is lost**
- **Need to be more focused on our objectives for technology investment**
- **Need to be more focused on the allocation of resources in BA-4 to better prepare for future capability readiness**

Summary, Recommendations and Actions

Summary

- **Insufficient emphasis on technology push**
- **Culture is intolerant of failure and unwilling to take risk**
- **Fragmented responsibilities and no clear lines of authority**
- **Insufficient engagement of user at the right point in the technology development process**

Change BA-4 Process

- **Apply portfolio management to BA-4 to ensure adequate focus on maturing horizon 3 (future Naval supremacy) technologies.**
- **To improve the process of technology maturation and prototyping use a competition process to distribute BA-4 resources to satisfy overarching naval priorities and mature promising technologies:**
  - **Competition process would be run by a senior level selection board comprised of a cross section of line officers from the fleet plus material functional experts.**
  - **Selection Board follows a precept developed by DASN (RDT&E) and approved by the CNO and Commandant**
- **Adopt early iteration of technology and operational concepts to accelerate the transition process.**

Shift the BA-4 focus to *Accelerate Innovation*

Actions 1-3

- **ASN RDA define and monitor BA-4 portfolio balance among horizons 1-2-3 to ensure adequate focus on maturing horizon 3 (future Naval supremacy) technologies.**
- **ASN RDA establish a competition process to distribute BA-4 resources to satisfy overarching naval priorities and mature promising technologies:**
  - **Competition process would be run by a senior level selection board comprised of a cross section of line officers from the fleet plus material functional experts.**
  - **Selection Board follows a precept developed by DASN (RDT&E) consistent with the BA-4 portfolio balance and approved by the CNO and Commandant.**
- **ASN RDA establish a process for early iteration of technology and operational concepts to accelerate the transition process.**

Changes in Culture

- **Invest in skills and accountability of personnel to allow a reduction in bureaucratic barriers to flexibility and breakthrough innovation.**
- **Improve probability of success by embracing industry best practice of incenting movement of key personnel from project idea through prototype/productization.**
  - **Tie the incentive of BA-4 competition to the retention and recruitment of integrated teams (as would be the case for a venture capital plan).**
  - **Team members encouraged to migrate as the project matures and new skills are required (as is often the case with start-ups)**

Talent trumps process (!) – build teams you can trust

Actions 4-5

- **ASN RDA identify the resources and processes necessary to support the investment in skills and human capital development so as to:**
  - **enhance technical expertise**
  - **improve flexibility**
  - **encourage early risk taking**
  - **reward entrepreneurial behaviors**
- **ASN RDA establish a program that will encourage the retention and recruitment of integrated teams and encourage team members to move with their project as it progresses through the transition process.**

Changes in Structure

Recommendation

- **Enhance SYSCOM commanders ability to mature promising technologies and deliver innovative capabilities to the fleet including the use of additional line officers assigned to the materiel establishment.**

Action 6

- **RDA coordinate with the CNO to assign additional line officers to the materiel establishment to be “technology scouts”.**

Re-engage the Fleet

Transformational Ideas

Innovation Culture

- **Create and encourage entrepreneurial skills within the Navy:**
  - **Create opportunities for cross-organizational, cross-disciplinary team formation.**
  - **Create leave of absence mechanism to allow movement from Government job to an entrepreneurial company with guaranteed return.**
  - **Facilitate movement between organizations internal to the Navy (i.e. ONR, Warfare Centers, PEOs, UARCs, Fleet).**
  - **Conspicuously recognize and reward risk-taking for Navy needs (may be well after the fact).**
  - **Draw on academic and industry experience fostering entrepreneurship.**

Instill a willingness to take risks early, fail if necessary and learn from failure

Action 7

- **ASN RDA develop a program to foster entrepreneurial skills within the Naval Establishment by drawing on academic and industry experience.**

Senior Line Officer

Recommendation

Restore the assignment of a senior line officer to direct the focus of BA-4 and oversee the development of capabilities incorporating technology and innovation for delivery to the fleet.

Action 8

CNO: Reestablish a 3 Star position with responsibilities similar to Director of Research and Development Requirements, Test and Evaluation OP-098.

This position would be the OPNAV counterpart to DASN RDT&E.

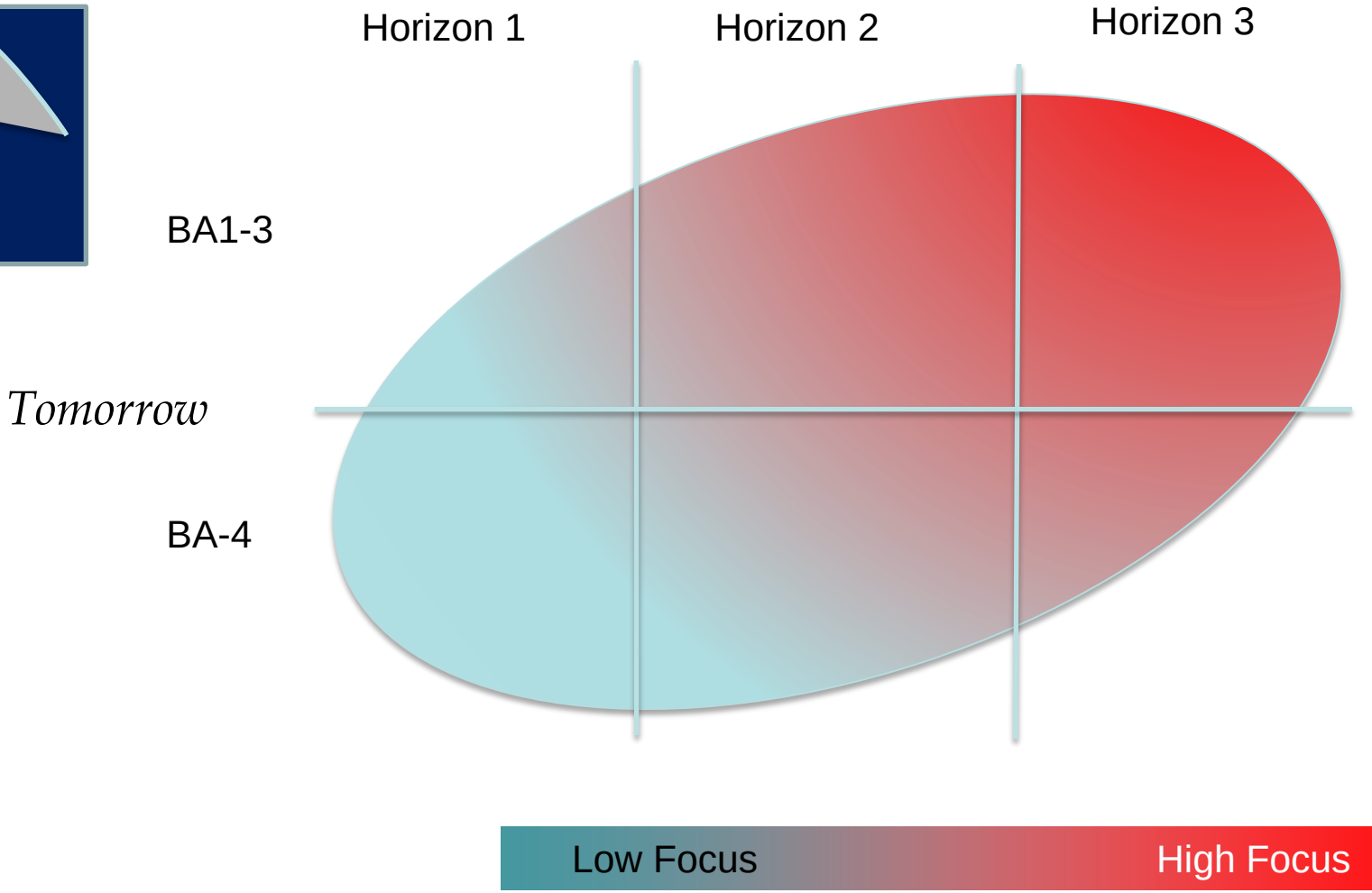
Re-engage the Fleet

Bottom Line

- **Shift the BA-4 focus to accelerate transition**
- **Build teams you can trust**
- **Instill a willingness to take risks early, fail if necessary and learn from failure**
- **Re-engage the Fleet**

Back Up

Managing the Portfolio of RDT&E Investment by Horizon



Navy BA-4 Program Elements

PE	Program Element Title	FY 2009	FY 2010 (Base & OCO)	FY 2011 Total Request	FY 2011 Appropriated	FY 2012 Total Request
	Aviation					
0603207N	Aviation Survivability	15,373	29,575	9,480	9,480	10,893
0603216N	Aircraft Systems		0	0	0	10,497
0603237N	Joint Precision Approach and Landing Systems	74,060	143,546	159,151	159,151	121,455
0603251N	Tactical Air Directional Infrared Countermeasures (TADIRCM)	42,832	49,067	51,693	51,693	64,107
0603254N	ASE Self-Protection Optimization		4,000	0	0	711
		116,892	***226,188***	***220,324***	***220,324***	***207,663***
	C4ISR					
0603382N	Deployable Joint Command and Control	6,876	8,644	4,275	4,275	3,702
0603502N	Tactical Airborne Reconnaissance	5,743	9,605	6,452	6,452	5,978
0603506N	Combat System Integration	62,472	20,822	24,344	34,344	34,157
0603512N	Single Integrated Air Picture (SIAP) System Engineer (SE)	40,587	46,087	0	0	0
0603513N	Space and Electronic Warfare (SEW) Architecture/Engineering Support	46,251	38,711	34,793	34,793	33,621
0603525N	Electronic Warfare Development - MIP	0	0	663	663	625
		161,929	***123,869***		***80,527***	***78,083***
	Marine Corps					
0603527N	Marine Corps Assault Vehicles	256042	302,099	242,765	222,765	12,000
0603536N	Marine Corps Ground Combat/Support System	57718	72,411	40,505	28,505	79,858
0603542N	Nonlethal Weapons	50424	50,945	43,272	43,272	40,992
		364184	***425,455***	***326,542***	***294,542***	***132,850***

Navy BA-4 Program Elements
(continued)

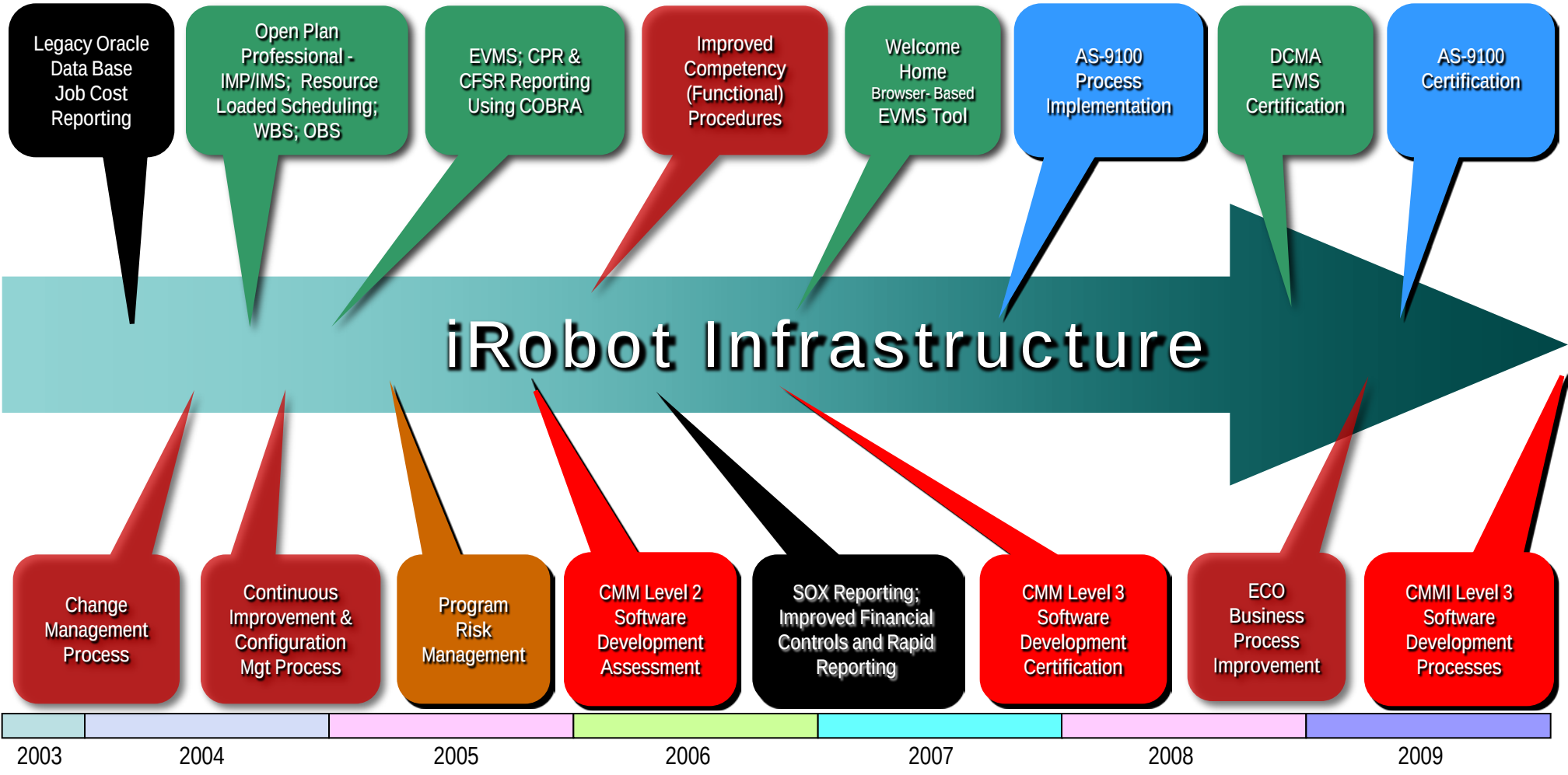
PE	Program Element Title	FY 2009	FY 2010 (Base & OCO)	FY 2011 Total Request	FY 2011 Appropriated	FY 2012 Total Request
	Other					
0603553N	Conventional Munitions	6368	4,087	5,388	5,388	4,753
0603561N	Joint Service Explosive Ordnance Development	111,850	20,253	26,873	26,873	35,154
0603562N	Cooperative Engagement	43424	58,278	52,282	52,282	54,783
0603563N	Ocean Engineering Technology Development	9,492	16,652	13,560	13,560	9,996
0603564N	Environmental Protection	20557	20,707	20,207	20,207	21,714
0603570N	Navy Energy Program	10,271	18,643	30,403	30,403	70,538
0603573N	Facilities Improvement	18,034	9,715	3,746	3,746	3,754
0603576N	Navy Logistic Productivity	18,514	13,400	4,139	4,139	4,137
0603581N	NATO Research and Development	10,767	9,804	9,196	9,196	9,140
0603582N	Counterdrug RDT&E Projects	62439	14,522	0	0	0
0603609N	Joint Counter Radio Controlled IED Electronic Warfare (JCREW)	0	63,485	56,542	50,242	62,044
0603611M	Precision Strike Weapons Development Program	0	39,478	25,121	25,121	22,665
		311,716	***289,024***	***247,457***	***241,157***	***298,678***
	SAP					
0603635M	PILOT FISH	84119	85,100	81,784	81,784	96,012
0603654N	RETRACT LARCH	91183	121,715	142,858	142,858	73,421
0603658N	RETRACT JUNIPER	155636	112,864	134,497	134,497	130,267
0603713N	CHALK EAGLE	236510	392,224	447,804	447,804	584,159
0603721N	CHALK CORAL	105673	71,855	71,920	71,920	79,415
0603724N	RETRACT MAPLE	142877	213,100	219,463	219,463	276,383
0603725N	LINK PLUMERIA	69044	62,009	58,030	58,030	52,721
0603734N	RETRACT ELM	136991	148,795	183,187	183,187	160,964
0603739N	LINK EVERGREEN	21895	84,160	41,433	41,433	144,985
0603746N	Special Processes	59413	82,987	36,457	36,457	43,704
		1,103,341	***1,374,809***	***1,417,433***	***1,417,433***	***1,642,031***

Navy BA-4 Program Elements
(continued)

PE	Program Element Title	FY 2009	FY 2010 (Base & OCO)	FY 2011 Total Request	FY 2011 Appropriated	FY 2012 Total Request
	Ships					
0603748N	Advanced Combat Systems Technology	12,071	3,605	1,658	1,658	1,418
0603751N	Surface Ship Torpedo Defense	48,215	57,922	57,796	50,796	118,764
0603755N	Carrier Systems Development	178095	171,441	93,830	91,830	54,072
0603764N	Shipboard System Component Development	35,748	32,008	51	51	0
0603787N	Radiological Control	1,069	1,325	1,358	1,358	1,338
0603790N	Ship Concept Advanced Design	36,240	23,166	17,883	17,883	14,308
0603795N	Ship Preliminary Design & Feasibility Studies	22884	30,928	1,796	1,796	22,213
0603851M	Advanced Surface Machinery Systems	3192	17,319	5,459	5,459	18,249
0603860N	Littoral Combat Ship (LCS)	372,036	421,994	226,288	189,588	286,784
0603879N	Ship Self Defense	9784	6,644	4,385	4,385	0
0603889N	Land Attack Technology	15,966	9,733	905	905	421
0603925N	Directed Energy and Electric Weapon Systems	4,548	18,989	0	8,000	0
		739,848	***795,074***	***411,409***	***373,709***	***517,567***
	Subs/USW/ASW					
0604272N	Air/Ocean Tactical Applications	65,532	112,516	123,331	118,331	94,972
0604279N	ASW Systems Development	38,370	25,144	8,249	8,249	7,915
0604653N	Surface and Shallow Water Mine Countermeasures	94,393	93,750	81,347	79,247	142,657
0604659N	Surface ASW	47,506	21,420	21,673	21,673	29,797
0604707N	Advanced Submarine System Development	153,783	523,132	608,566	559,266	856,326
0303354N	Submarine Tactical Warfare Systems	13,749	10,869	5,590	5,590	9,253
0303562N	Advanced Nuclear Power Systems	157,839	258,803	366,509	366,509	463,683
0304270N	ASW Systems Development - MIP	0	0	2,161	2,161	1,078
0408042N	Submarine Tactical Warfare Systems - MIP	0	0	4,253	4,253	0
		571,172	***1,045,634***	***1,221,679***	***1,165,279***	***1,605,681***

Revevant Reports Addressing BA-4

- **Department of Defense "Report to the Congress on Technology Transition" Aug 2007**
- **GAO Report to the Congress "Defense Acquisitions, DOD's Research and Development Requests to the Congress" Sep 2007**
- **Air Force Studies Board of the National Research Council "Evaluation of USAF Pre Acquisition Technology Development" 2011**
- **Naval Audit Service Report on BA-4 2011**
- **Panel chaired by Dr James Meng report "In Search of Navy Budget Activity 4 (BA-4) Metrics for Effective Technology Transition" Aug 2011**


Legacy Oracle Data Base Job Cost Reporting
Open Plan Professional - IMP/IMS; Resource Loaded Scheduling; WBS; OBS
EVMS; CPR & CFSR Reporting Using COBRA
Improved Competency (Functional) Procedures
Welcome Home Browser- Based EVMS Tool
AS-9100 Process Implementation
DCMA EVMS Certification
AS-9100 Certification
iRobot Infrastructure
Change Management Process
Continuous Improvement & Configuration Mgt Process
Program Risk Management
CMM Level 2 Software Development Assessment
SOX Reporting; Improved Financial Controls and Rapid Reporting
CMM Level 3 Software Development Certification
ECO Business Process Improvement
CMMI Level 3 Software Development Processes
2003
2004
2005
2006
2007
2008
2009

Panel Briefs

Contributor	Organization
Ms. Mary Lacey	Deputy Assistant Secretary of the Navy – Research, Development, Testing & Evaluation
Dr. James Sheehy	Chief Technology Officer, Naval Aviation Enterprise
Dr. Jim Meng	Naval Sea Systems Command, Special Projects
Ms. Nancy Harned	Director, Advanced Components & Prototyping, Research Directorate, Office of the Secretary of Defense
CAPT Mark Howell	Office of the Chief of Naval Operations, Warfare Integration Division (N8F)
RADM Nevin Carr	Chief of Naval Research
Mr. Richard Rumpf	Rumpf Associates International
Dr. Regan Campbell	Deputy Chief Technology Officer, Undersea Enterprise
Mr. Larry McWilliams	Naval Audit Service
Mr. Steve Smolinski	Office of Naval Research (FNC Management Office)
Dr. Peter Craig	Office of Naval Research, C4ISR Department (FNC Transition Case Studies)
COL Sam Kirby, USMC	Office of Naval Research, Expeditionary Maneuver Warfare and Combating Terrorism Department (Transition Case Study)
Mr. Hugh Montgomery	Special Assistant to the Principal Civilian, ASN RD&A

Panel Briefs (cont'd)

Contributor	Organization
Mr. Doug Marker	Technical Director, Program Executive Office, Integrated Warfare Systems
Dr. Mike McGrath	Vice President, Systems and Operations Analysis, ANSER
RADM James Shannon	Chief Technology Officer, Surface Warfare Enterprise
CDR Joe Santos and Dr. GP Sandhoo	Office of the Chief of Naval Operations, Naval Warfare Assessment (N00X)
Dr. Greg Popadopoulos	New Enterprise Associates, Inc. (Venture Capitalist)
Dr. Reg Kelly	California Institute for Quantitative Biosciences
Dr. John Hanke	Google – Mobile Incubator (a founder and former CEO of Keyhole)
Dr. Bill Vass	President & CEO of Liquid Robotics (former CEO of Sun Microsystems Federal)
Dr. Ken Washington	Vice President and Chief Privacy Leader, Lockheed Martin Space Systems Company
Dr. Edward Roberts	David Sarnoff Professor of Management of Technology, MIT Sloan School of Management
Mr. David Kelly	CEO, Bluefin Robotics
Mr. Jack Turner	Associate Director, MIT Technology Licensing Office
Dr. David Mindell	NRAC Panel Consultant, MIT Professor

Panel Briefs (cont'd)

Contributor	Organization
VADM Joe Dyer (USN-ret)	Chief Operating Officer, iRobot
Mr. John Williams	Director, Department of the Navy, Small Business Innovation Research Program
VADM Bill Landay	Director Defense Security Cooperation Agency (Former CNR, PEO LMW, and PEO Ships)
RDML(Sel) David Johnson	Program Executive Officer, Subs
RDML David Lewis	Program Executive Officer, Ships

Bottom Line

- **Re-engage the Fleet**
  - Assign a senior line officer to direct the focus of BA-4
  - Give SYSCOM commanders the responsibility for delivering innovative capabilities to the fleet
- **Shift the BA-4 focus to accelerate innovation**
  - Apply portfolio management
  - Create a competition process to distribute BA-4 resources
  - Iterate technology and operational concepts early.
- **Build teams you can trust**
  - Invest in skills and accountability of personnel
  - Keep people with projects
- **Instill a willingness to take risks, fail early, and learn from failure**
  - Create entrepreneurial teams within the Navy

What is BA-4

Budget Activity 4,

Advanced Component Development and Prototypes (ACD&P)

Efforts necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment are funded in this budget activity. The ACD&P phase includes system specific efforts that help expedite technology transition from the laboratory to operational use. Emphasis is on proving component and subsystem maturity prior to integration in major and complex systems and may involve risk reduction initiatives. Program elements in this category involve efforts prior to Milestone B and are referred to as advanced component development activities and include technology demonstrations. Completion of Technology Readiness Levels 6 and 7 should be achieved for major programs. Program control is exercised at the program and project level. A logical progression of program phases and development and/or production funding must be evident in the FYDP.

Findings

- BA-4 exists in three categories: SAP, MDAP, and non MDAP categories and each is managed in a different manner
- BA-4 is used to fix problems and to mature technologies, but there is little evidence that it is being used to avoid problems in future acquisition programs
- Unlike BA 1 through 3, which is managed by the CNR who looks after the interests of the entire Navy, BA 4 has no equivalent manager with equivalent scope and horizon.
- There is no corporate governance process and consequently uniform management practices are lacking.
- As a result of the lack of the BA-4 governance structure this account provides the greatest flexibility for program execution while at the same time lacking the focus necessary to transition science and technology activity.
- BA-4 needs to be examined in the continuum of RDT&E activity.

Findings

- **The UONS process has become a work-around to the normal acquisition process.**
- **There is dissatisfaction among the warfighters with the pace of innovation .**
- **The warfighter is not part of the early exploration of technology solutions.**
- **The cadre of uniformed Navy who intimately understand technology development is dwindling.**

Findings

- **The technology development process has been defined to defend and control budgets not to nurture and mature technologies. The end result is cumbersome and lengthy R&D cycles and an unwillingness to adopt new technologies.**
- **Effectively using BA-4 for prototyping allows early operator feedback on solutions and can result in a lower overall lifecycle cost.**
- **Since budgets are distributed to manage gaps the remaining funds in BA-3 and BA-4 to address long-range future technology superiority (horizon 3) is limited.**
- **In a reduced budget environment, the linkage of RDT&E to ongoing acquisitions may choke transition and further drive resource sponsors to use RDT&E to fix current problems.**

Findings

- **No evidence of iterating new technologies and concepts to allow the Fleet, NRDE, and the resource sponsors to converge on disruptive capabilities.**
- **No incentive to take risk: failure can be career limiting rather than viewed as an opportunity for learning.**
- **No upside for new technology insertion but significant downside for failing to deliver on time and on budget.**

Findings

- **Communications between the operators and the NRDE is too rigid and structured, slowing processes down.**

- **The Navy resource & acquisition programs are driven from a platform view and innovation outside that framework is not supported.**

- **Lack of continuity of personnel leads to a reduced sense of ownership, reduced accountability for outcome and diminished technical savvy (judgment) in program management.**

Early Decisions Affect Life Cycle Cost