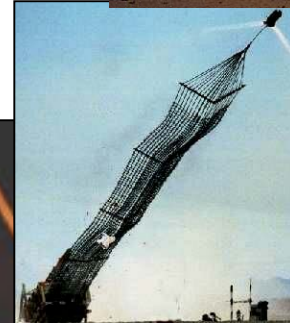




Navy Presentation to the NDIA Munitions Executive Summit



**Jerry LaCamera
18 February 2004**



Agenda...

- **The Navy - Industry Partnership**
- **Challenges - Today & Tomorrow**
- **A New Leadership Approach**
- **A New Technology Approach**



Navy - Industry Partnership...

Partners rather than competitors

- **Navy:**

- Translate warfighter needs into acquisition requirements
- Ensure the capability and capacity exist to solve technical challenges
- Serve as technical authority
- Rapidly identify technology for weapons applications
- Validate solutions and system effectiveness
- Production source of last resort

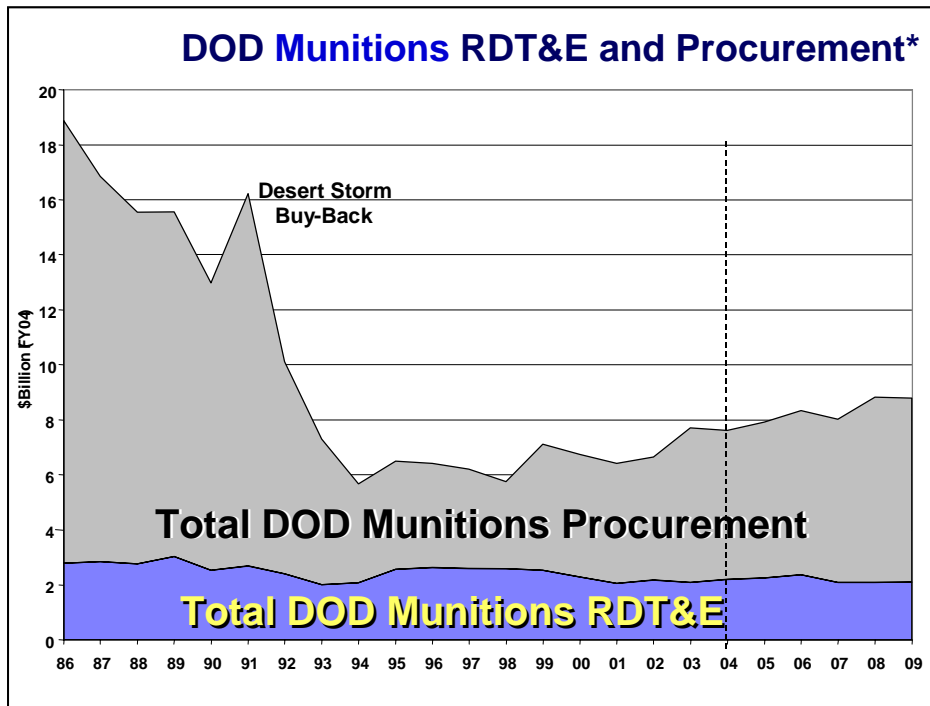
- **Industry:**

- Translate acquisition requirements into system designs
- Major player in advanced research*
- Provide system development and integration
- Produce and deliver quality products
- Perform intermediate and depot level maintenance



Challenges of Today...

DOD Munitions RDT&E and Procurement



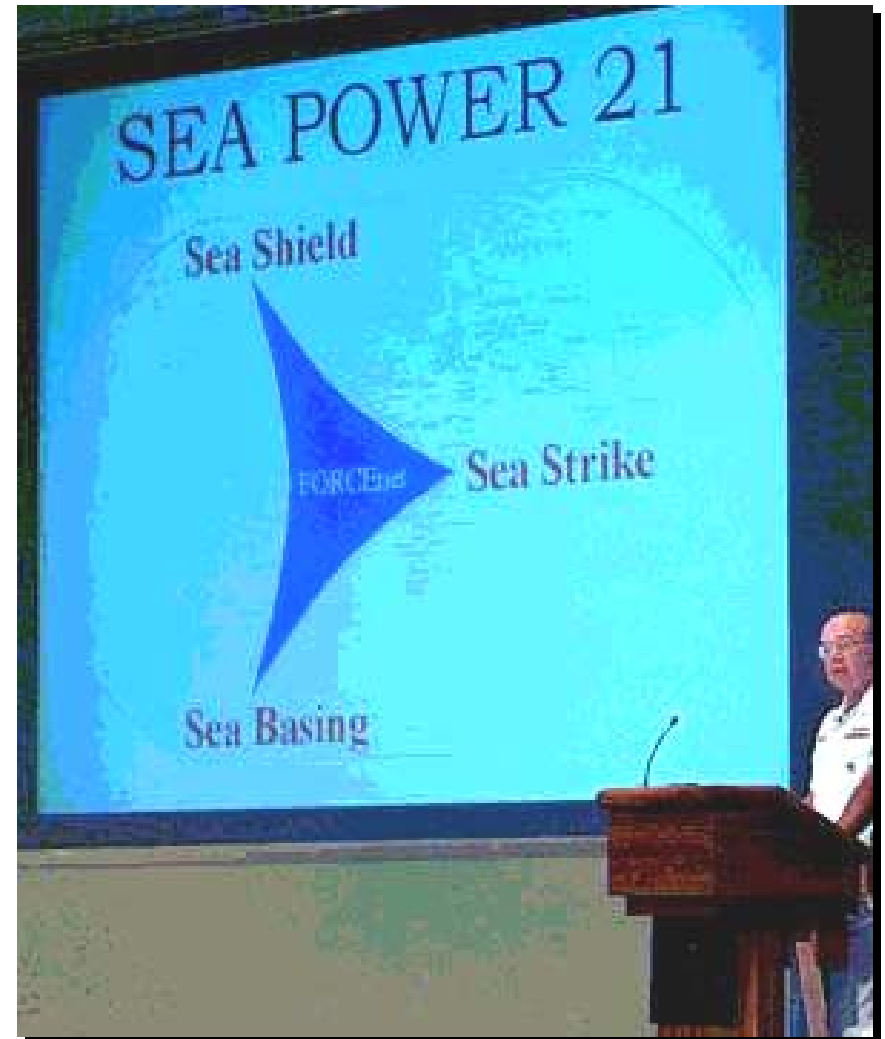
- Limited commercial market
- Specialized expertise
- Expensive facilities
- Production volume down
- DoD investment in energetics declined through last decade
- Environmental compliance costs up
- Eroding technical and industrial base

*From: OUSD(AT&L)/DS, LW&M office, Jan 04; data as of FY 04 PB

Challenges of Tomorrow...

CNO 2004 Guidance:

- Deliver the right readiness
- Expedite Sea Warrior
- Demonstrate our enhanced Fleet Response Plan (FRP) surge capability
- Improve productivity in everything we do
- Streamline and align total manpower structure
- Accelerate Sea Power 21 capabilities



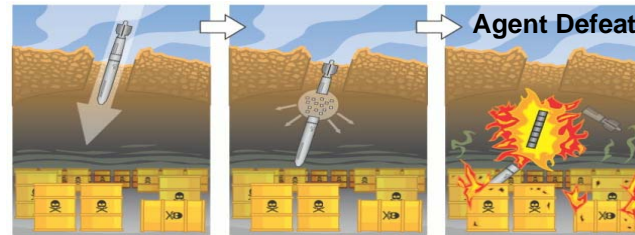
Challenges of Tomorrow...

Navy Transformation: Sea Power 21

Meeting 21st century Navy energetics / ordnance needs:

- **Sea Strike (Time-sensitive strike, covert strike):**

- Mission flexible propulsion and ordnance
- Reduced size ordnance with increased lethality
- Hard and deeply buried target defeat
- Chemical-biological agent defeat
- Extended range fire support
- Stand-off minefield breaching



- **Sea Shield (Theater air and missile defense, sea/littoral superiority):**

- Directed-energy weapons
- Extended-range, over-the-horizon ballistic missile defense missiles
- Organic mine countermeasures

- **Sea Basing (Precise and persistent firepower):**

- Combat safe insensitive munitions
- Packaging, handling and transportation of ordnance



Navy FY 04-09 Projections...

- Weapons Procurement (WPN):
 - **Increasing investment:**
 - Tomahawk
 - Advanced Medium Range Air-to-Air Missile (AMRAAM)
 - Standard Missile
 - Rolling Airframe Missile (RAM)
 - Airborne Mine Neutralization System (MNS)
 - Joint Standoff Weapon (JSOW)
 - **Sustained investment:**
 - Enhanced Sea Sparrow Missile (ESSM)
 - Sidewinder
- Procurement of Ammunition, Navy and Marine Corps (PANMC):
 - FY 03 up significantly
 - FY 04 down
 - Year-to-year variation but overall increase from FY 04 thru FY 09
- Research, Development, Test and Engineering (RDT&E):
 - Increased investment through FY 06, but returning to near FY 02 level by FY 09
 - Areas of munitions, ordnance and energetics level or down

A New Leadership Approach...

- **Navy Energetics Leadership Board (NELB) chartered by NAVSEA and NAVAIR:**
 - NELB provides a national focus for stewardship of Navy core competencies in Energetics
 - NELB is chaired by the Vice Commanders of NAVAIR and NAVSEA with participation from the NAWC and NSWC Commanders and Technical Directors
- **NAVSEA Warfare Centers (NSWC/NUWC) aligning to focus on product areas:**
 - Twelve (12) product areas
 - Each product area led by a SES Product Area Director (PAD)
 - Ordnance is one of the 12 product areas
- **NAVAIR realigning all Energetics functions into Weapons & Energetics Department:**
 - Energetics Research
 - Test & Evaluation
 - Weapons & Energetics Development and In-Service Engineering



Energetics...

Uniquely Military Products

- **Defined as... explosives, propellants, pyrotechnics, reactive materials, related chemicals and fuels, and their application in propulsion systems and ordnance***
- **Includes bombs, warheads, mines, fuzes, countermeasures, flares, obscurants, safe-arm devices, arming-firing devices, unguided rockets, missile rocket motors, ramjets, gas generators, gun projectiles and propelling charges, and cartridge and propellant actuated devices.**

* Adopted, with modification, from 1994 Laboratory Cross-Service Study "Energetics" data call

Who are the Navy Energetics Players?



**Stephen E. Mitchell, Chairman Navy Energetics IPT
& NAVSEA Warfare Center Ordnance Product Area Director**

mitchellse@ih.navy.mil



Why the change?

- **A core military and Navy competency is at risk:**
 - Recapitalization to meet new global threat (CNO, Aug 03)
 - Downsizing and budget constraints
- **NELB and Ordnance Product Area will:**
 - Enhance alignment with the warfighters' vision
 - Provide focus for stewardship of core Navy / national competencies in Energetics
 - Foster rapid transition of technology to the warfighter
 - Increase value to meet warfighters' needs...best technical solutions
 - Increase efficiency...long-term cost avoidance through sharing of people and facilities



A New Technology Approach...

Build on established track record of transitioning technology to industry and the warfighter...

- **Developmental products:**

- Developed over 80% of the explosives transitioned to Service use since 1985*
- Developed 100% of Navy aircraft expendable infrared countermeasures*
- Warheads – SLAM; AMRAAM; TOMAHAWK; Evolved Sea Sparrow Missile (ESSM); directional fuzes and warhead
- Rocket motors – AMRAAM, Mk 22 Line Throwing Rocket
- Anti-Personnel Ordnance Breaching System (APOBS)
- Extended range naval gun propulsion



- **Concept initiation:**

- MEMS S&A fuzing
- Army/Marine Corps Mongoose mine clearing system
- Hypergolic penetrators for assault mine breaching
- CCAT** modular warhead
- Joint Direct Attack Munition (JDAM)
- Joint Stand-off Weapon (JSOW)
- Precision imaging weapons
- Laser Guided Bomb

- **Quick reaction capability:**

- BLU-116 hard target penetrator
- BLU-118B thermobaric cave buster bomb
- Thermobaric warheads (Carl Gustav, Hellfire, SMAW**, LAW**)



* See Notes Pages for details.

** CCAT: Containerized countermeasures anti-torpedo torpedo;

SMAW: Shoulder-mounted, multi-purpose, assault weapon; LAW: Light assault weapon



A New Technology Approach...

- **Numerous new Energetics technologies are emerging to meet capability based requirements:**
 - Energetic materials by design
 - Structural energetic systems
 - Energetic materials for power generation systems
 - Micro detonics for sensor deployment
 - Nano material technology
 - High energy density materials
 - Reactive materials
 - Directed energy
 - Thermobarics
 - Micro Electro-Mechanical Systems
 - Adaptable ordnance
 - Miniature munitions
 - Hypergolic penetrators (MCM)
 - Non-toxic liquid propulsion
 - 0-signature
 - Low collateral damage ordnance
 - Selective effects
 - Green AP replacements



Inert Fragment Damage



Reactive Fragment Damage

- **Developed reactive material warhead**
- **Successful demonstration of full scale warheads**
 - **Enhanced catastrophic damage in AAW targets**
 - **Created recognizable damage in surface targets**
- **Firm technical basis for transitions**



Full Scale Arena Test

Summary...

- Energetics, ordnance, and munitions are core military competencies
- The Navy laboratory and industrial communities are serving the warfighter, PEOs and SYSCOMs well
- The Navy is transforming itself to better meet the warfighters' needs



A large, powerful explosion or volcanic eruption is shown, with a massive plume of white steam and dark smoke rising into a clear blue sky. The scene is set in a coastal area with a sandy beach and blue water in the foreground. In the background, there are low, brown hills. A dark, low-profile structure, possibly a ship or a building, is visible on the right side of the beach, partially obscured by the explosion's base. The word "BACKUP" is overlaid in the center of the image in a white, italicized, sans-serif font.

BACKUP

NAVSEA Warfare Centers Product Areas...

Force Level Warfare Systems

- Warfare Systems Analysis, Architecture and Requirements
- Warfare Systems Engineering, Integration, T&E and Assessment

Ships and Ship Systems

- Ship Integration and Design
- Hull Forms and Propulsors
- Machinery Systems and Components
- Structures and Materials
- Environmental Quality Systems
- Vulnerability and Survivability Systems
- Signature and Silencing Systems

Surface Ship Combat Systems

- Air and Surface Surveillance and Detection Systems
- Combat Control Systems
- Engagement Systems
- Electronic Warfare Systems
- Combat Systems Engr, Integration, T&E & Assessment

Littoral Warfare Systems

- Mine Warfare Systems
- Amphibious Warfare Systems
- Special Warfare Systems
- Diving and Life Support Systems

Navy Strategic Weapons Systems

- Targeting and Shipboard Subsystems
- Missile and Re-entry Systems
- Weapons System Level Analysis, Testing & Evaluation
- Non-Nuclear Strategic Weapons Systems

Ordnance

- Warheads, Rockets, Ammunition & Other Ordnance Systems
- Energetic Materials
- Ordnance Safety, Logistics & Environmental Technology
- Cartridge Actuated, Pyrotechnic, & Specialty Devices

USW Command and Control Systems

- Submarine Combat Systems
- Submarine Sonar Systems
- Submarine Imaging and Electronic Warfare
- Submarine Communications
- Surface USW

USW Weapon and Vehicle Systems

- Torpedoes
- Unmanned Undersea Vehicles
- Platform Defensive Systems
- USW Launchers
- Submarine Missile Launcher Integration

USW Ranges, Analysis and Assessment

- USW Ranges
- USW Analysis
- USW Operational Assessment
- USW Integration

USW Fleet Material Readiness

- Depots
- Obsolescence Engineering

Homeland Security and Force Protection

- Homeland Security and Measured Response Options
- Force Protection and Chemical/Biological Defense Systems
- Mission Assurance Capabilities

Surface Warfare Logistics & Maintenance

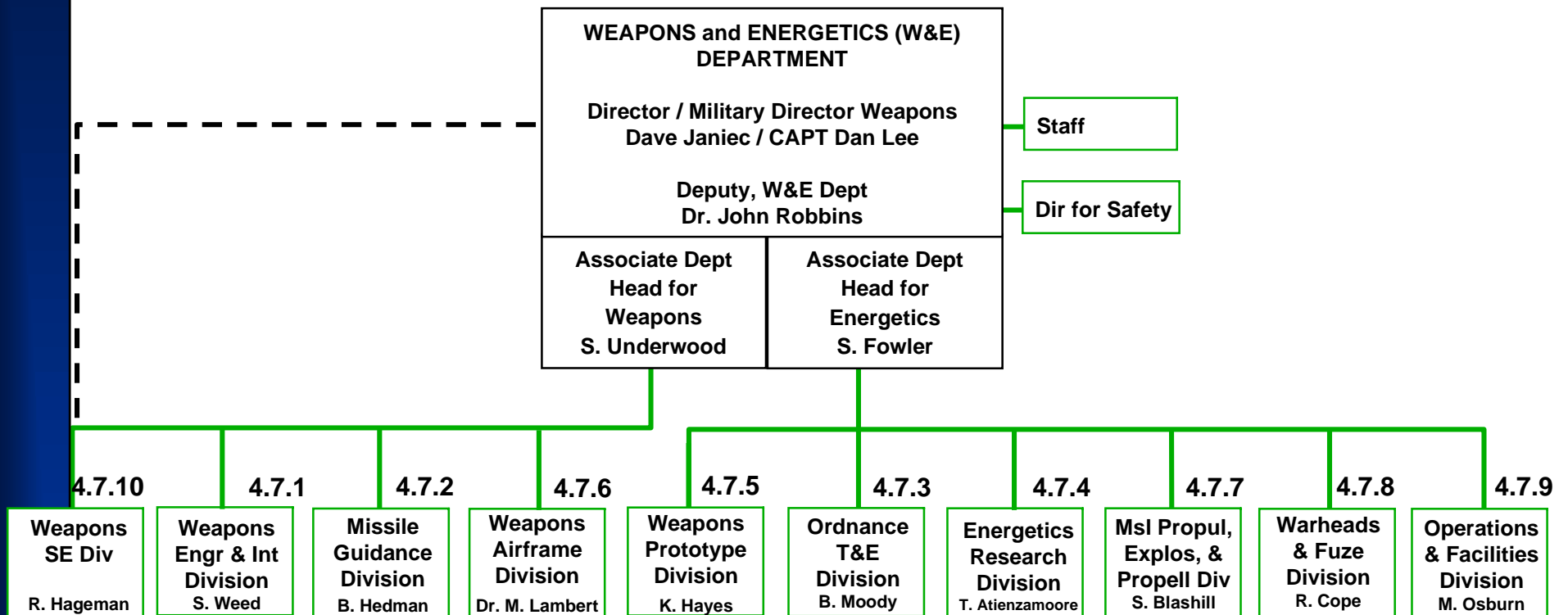
- Performance Based Logistics
- Maintenance Engineering
- Fleet Material Management



NAVAIR Consolidation of R&D and T&E...

- **Reduced 17 departments to 12**
- **Strengthens competency alignment**
- **Integrated R&D and T&E leadership and management**
- **Strengthens customer entry point concept**
- **Strengthens National Leadership**
- **Consolidated simulation and analysis capability**
- **Integrated system of systems test and experimentation capability**
- **New Engineering Sciences Department**
- **Integrated staff functions**

Tomorrow's AIR 4.7 - Weapons & Energetics Department...



Reactive Material Enhanced Bullet...



.50 cal SMK-1 Round



.50 cal SMK-1 Cut-a-way



Solid Rocket Motor Destruction



Liquid Fuel Ignition

Status:

- OSD quick response special program - NAVSEA NSWC Dahlgren Division and ATK/Thiokol
- Preliminary hazard analysis and interim hazard classification (DOD) complete assigned (1.2G) - NOSSA reviewing data for 1.4 designation
- OJAG approved
- Operational testing completed
- Technical Readiness Level (TRL): 7
- Awaiting WSESRB recommendation for Service release

Capability:

- Direct fire standoff ignition of liquid fuel and / or solid propellant missiles with a reactive material round fired from a standard issue .50 cal rifle
- Preliminary results demonstrated improved performance over baseline MK211 HE round

