

DD 21 Objectives

\$750M Ship

\$2.7K Per Hour
Underway

Crew Size of
95

In January 1998, Under Secretary of Defense for Acquisition and Technology (USD A&T), Dr. Jacques Gansler, signed the DD 21 program's Acquisition Decision Memorandum noting three "preeminent objectives:"

- Procurement cost for the fifth ship at each shipyard of \$750 million (in Fiscal Year 1996 dollars)
- Operating and support (O&S) cost of \$2,700 per hour underway (70% less than DDG 51 class destroyers)
- 95 person crew size (70% less than DDG 51)

These objectives pose a unique challenge to a modern shipbuilding program -- providing the most advanced capability in the Navy across multiple warfare areas, while

- Dramatically reducing procurement costs, operations and support costs and DD 21 related manning, both onboard and offboard the ship
- Maintaining a 90% availability
- Maintaining flexibility in design to affordably accommodate the CG 21 functionality



Affordable Capability

**Business
as usual**

**Acquisition
reform**

**Reduced
O&S costs**

**Reduced
manning**

Total Life Cycle Cost



Reduced LCC

Goal

Acquisition Reform initiatives, such as use of Other Transaction Authority, Cost as an Independent Variable (CAIV), Mil-Spec and Standard reduction, Single Process Initiative (SPI), Simulation Based Design (SBD), and early Industry involvement are essential to meeting cost goals.

To reduce the operation and support cost by 70%, a quantum change in how we operate and support our ships is necessary:

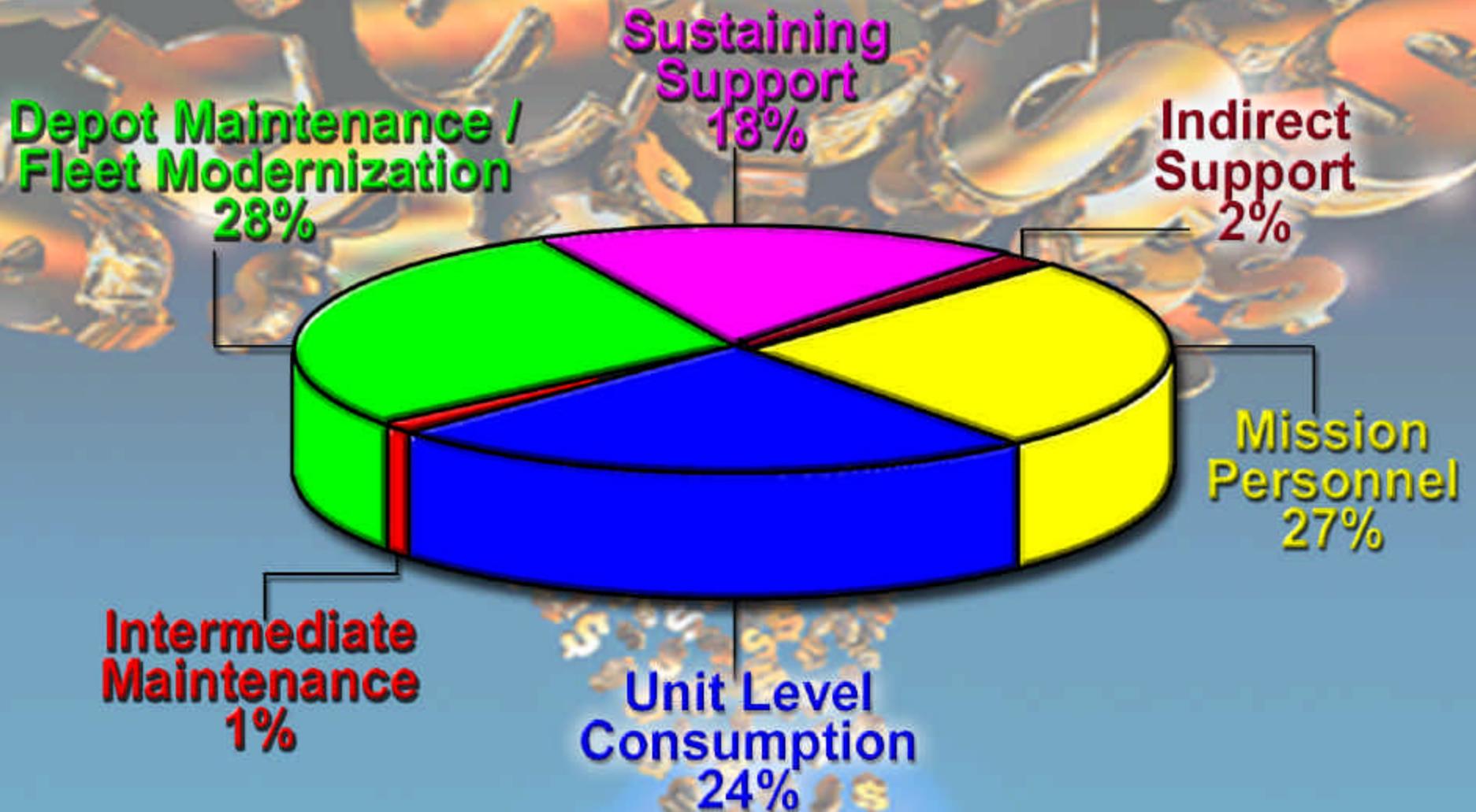
- By bringing Industry in earlier in the process than ever before, Industry will build ships from the concepts and designs that they developed
- In their early efforts, Industry will factor in supportability aspects in their designs
- Industry will propose their concepts on how they will support the ship class in their role as the Full Service Contractor

DD 21 leaders are applying Total Ownership Cost (TOC) principles to manage the program from a “Cradle to Grave” perspective. TOC is the summation of all costs associated with the ship over its life. TOC initiatives - intended to optimize DD 21’s performance versus the cost to procure and maintain it - will yield dramatic long-term savings for the Navy.

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Typical Combatant O&S Distribution



DD 21 Design Must Address Every Area

While DD 21 design will address all aspects of operation and support costs, the greatest benefits will be derived from changes in the four dominant cost areas:

- Depot Maintenance / Fleet Modernization (28%)
- Mission Personnel (27%)
- Unit Level Consumption (24%)
- Sustaining Support (18%)

Changes include:

- Designing the ship and its systems for reduced maintenance
- Open system design for efficient upgrades through modular construction and compatible computer software / middleware
- Designing for scalability to maintain affordable technological superiority and transition to CG 21
- Revolutionary manning reductions via automation and system reliability
- Greatly reduced fuel consumption via use of highly efficient power generators and hull design
- Global on-line reach back to provide highly efficient sustaining support

The DD 21 program has laid the groundwork for innovative maintenance and logistics concepts that are expected from Industry under an evolving Full Service Contractor concept.



The DD 21 program has laid the groundwork for innovative maintenance and logistics concepts

Manning Goals

DD 21 Manning is:

*Operations
Evolutions
Maintenance
Damage Control
Support
Administration
Helo Det*

Start with zero people!
What are the cost tradeoffs
to achieve the objective?

**Traditional
Manning**

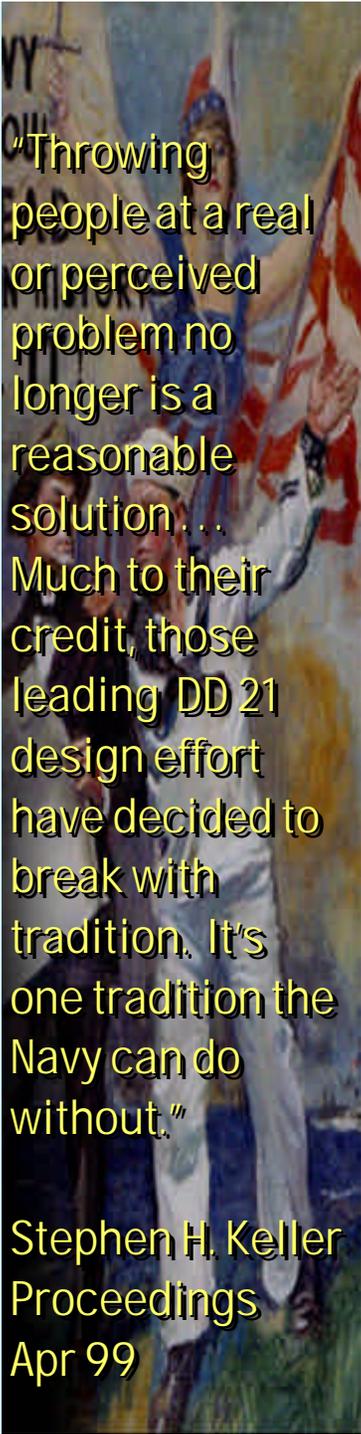
**DD 21
Objective
95 People**



One key element in reducing life cycle cost is a substantial reduction in manning. In support of DD 21's TOC and O&S cost objectives, DD 21 leaders have implemented a vigorous "zero-based" manning strategy requiring justification for each personnel billet. We must eliminate or automate traditional, labor-intensive shipboard functions. Industry is taking this challenge head on.

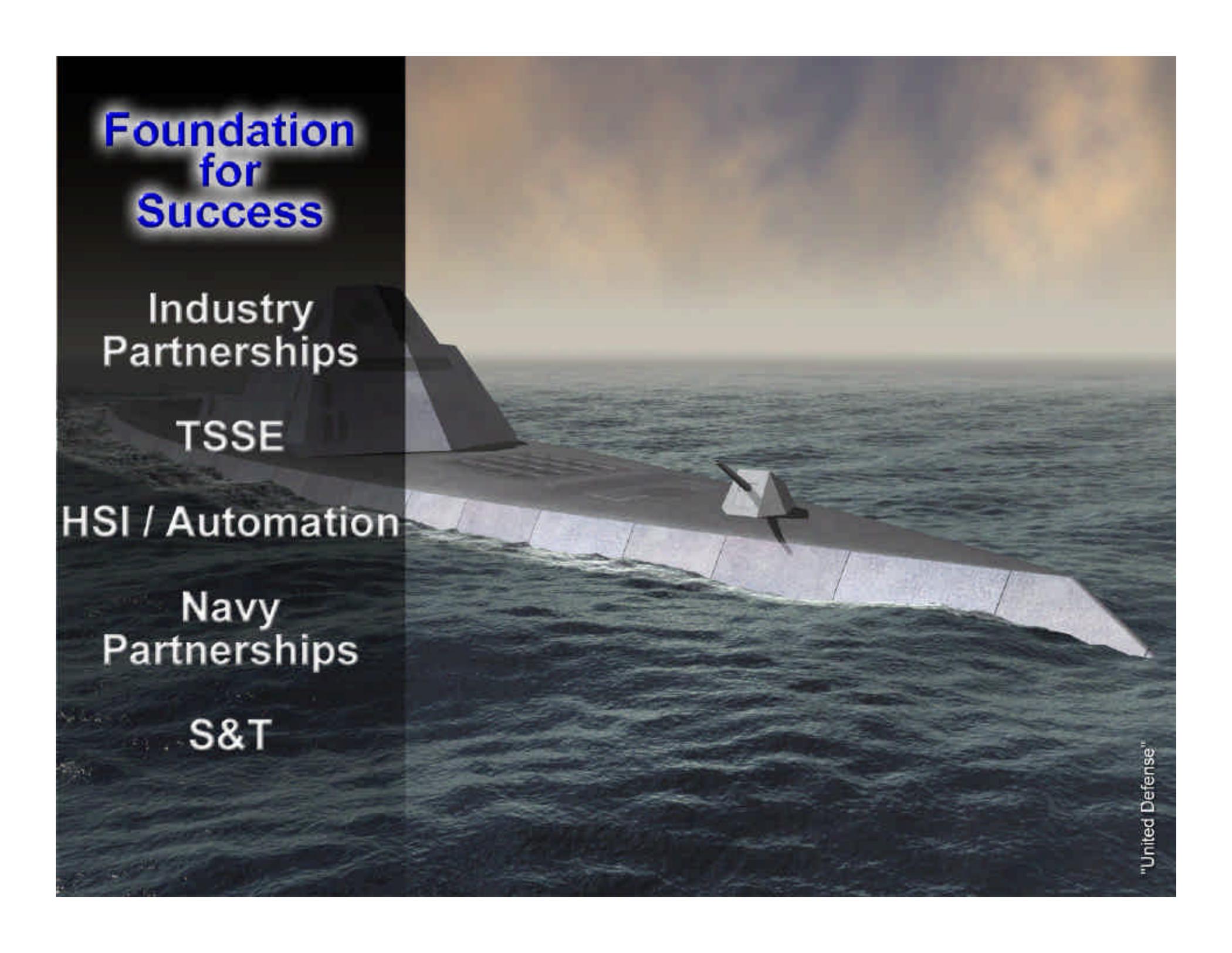
For example, each component of a ship typically comes with a requirement for periodic maintenance. The ultimate goal is to have components that will not require any planned maintenance. At a minimum, components should not require any major maintenance during the ship's extended deployment of 24 to 36 months.

What was once cheap and easy, is no longer applicable, affordable, or desirable.



"Throwing people at a real or perceived problem no longer is a reasonable solution... Much to their credit, those leading DD 21 design effort have decided to break with tradition. It's one tradition the Navy can do without."

Stephen H. Keller
Proceedings
Apr 99

A large, white, stealthy aircraft, possibly a B-2 Spirit bomber, is shown in flight over a dark blue ocean. The aircraft is viewed from a low angle, emphasizing its massive size and sleek, angular design. The sky is a mix of orange and grey, suggesting a sunset or sunrise. The overall mood is serious and technological.

**Foundation
for
Success**

Industry
Partnerships

TSSE

HSI / Automation

Navy
Partnerships

S&T

The success of DD 21 is built on a strong foundation of:

- Innovative partnerships with Industry and other government agencies
- A revolutionary engineering and design approach that includes the human as part of the system
- A science and technology program focused on DD 21 needs



Acquisition Reform... Partnering with Industry

**Compete - apply free
market mechanisms**

**= Acquisition strategy will
radically alter ship
procurement practices**

**Re-engineer - adopt
modern engineering
practices**

**= Simulation based design...
Smart Product Model**

**Consolidate - Streamline
organizations**

**= Full Service Contractor
concept will change existing
maintenance, supply and
training organizations**

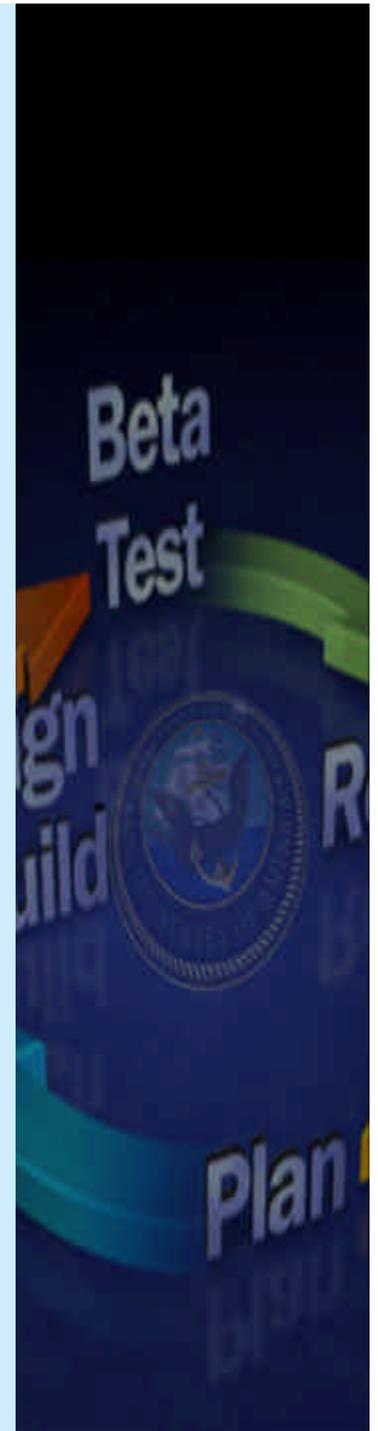
Goal: Lower Total Cost of Ownership

The Department of the Navy is changing the way it does business. SECNAVINST 5000.2 eliminates unnecessary regulation, delegates decision authority to the lowest possible organizational level, eliminates non-essential military specifications and standards, and encourages maximum use of Commercial-Off-the-Shelf (COTS) equipment. DoN has embraced the use of integrated product and process development teams, simulation based design, and the use of full service contracting for developing, acquiring and supporting technologically superior and affordable systems.

Modeling and simulation will play a major role in efficiently and optimally designing DD 21. The Smart Product Model will be a digital representation of the ship to be used in iterative validations of designs and ship interface. It will also be used as alternatives for training, modernization and logistics functions for the life of the ship.

The Industry teams competing for DD 21 will be proposing their concepts regarding LCE&S Full Service Contracting and identifying recommended changes to existing infrastructure.

From the beginning, the DD 21 program has used the principles of acquisition reform in developing its acquisition strategy. The program expects to achieve a revolutionary design and substantially lower “ownership” cost by empowering industry and aggressively implementing acquisition reform initiatives.



Revolutionary Acquisition for Warships

Government

Program leader

Requirements provider

Systems certifier

Tactical trainer

No mandated GFE

Industry

Provide system concepts and all performance specifications

Perform engineering developments

Acquire systems the most affordable way

Execute Cost as an Independent Variable (CAIV)

Plan, design, build and execute logistics support for entire life cycle



Partners for Success

DD 21's acquisition philosophy maximizes innovation and design flexibility while facilitating cost savings through use of commercial market technologies and non-developmental items. Instead of using conventional Federal Acquisition Regulations, the Navy decided to use Other Transaction Authority (for prototypes) authorized by Section 845/804 of the 1994/97 National Defense Acts. This strategy is substantially different than previous ship acquisitions. It has:

- Enabled early partnering and direct communications between Industry and Government (Industry is developing performance specs from Navy requirements)
- Facilitated competitive teaming arrangements to accommodate unique strengths
- Simplified and streamlined acquisition / accounting procedures
- Focused investment by Industry teams on product development and risk mitigation

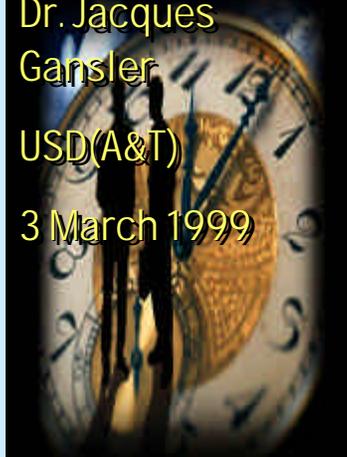
Under Section 845 / 804, Industry has been given far more latitude, early on, to develop, build and support a ship class than ever before. COTS is encouraged and there is no mandated Government Furnished Equipment. The Government provides leadership through insight and active participation with the Competing Teams.

"The Navy's DD 21 Program has not only showcased a new way of doing business for our surface ship community, but it has also put several key ideas for reforming acquisition to work in a 'real world' laboratory."

Dr. Jacques Gansler

USD(A&T)

3 March 1999



Competitive Solution

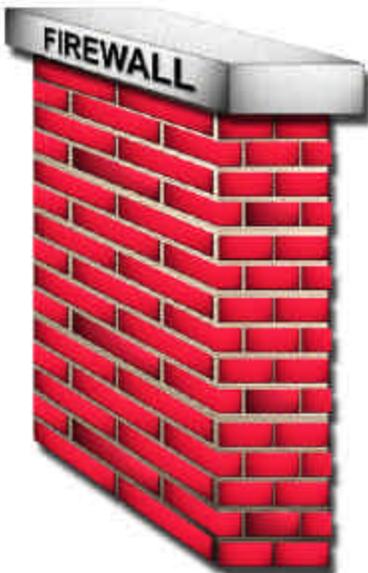


Common Process IPT
BIW / ISI / LM / RSC / Navy

Alliance

Blue Team
BIW / Lockheed Martin

- Gibbs and Cox (NY)
- General Dynamics (CT)
- L3 Communications (NJ, UT)
- Micro Analysis & Design (CO)
- Northrop Grumman (CA, FL, MD)
- SAIC (CA, MD, VA)
- Solipsys (MD)
- United Defense LP (MN)
- ...and more



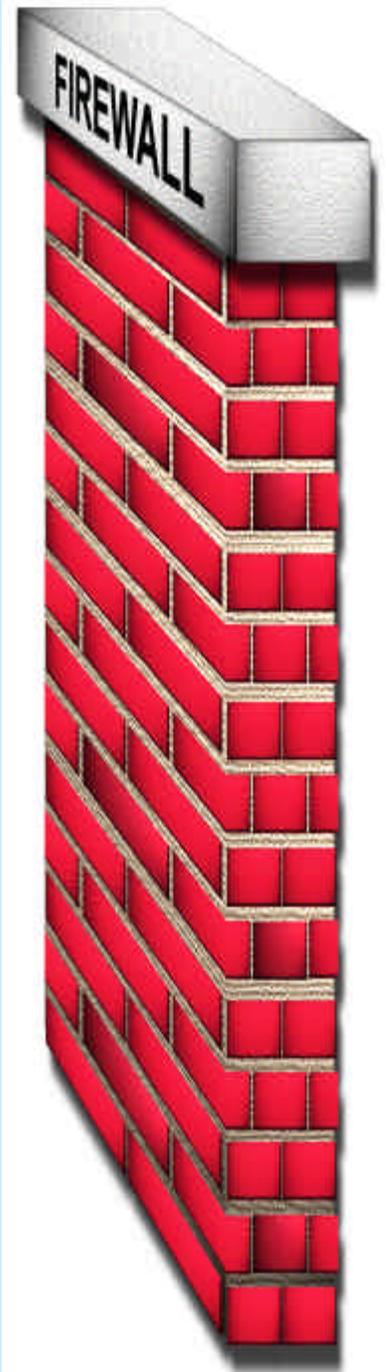
Gold Team
Ingalls / RSC

- Boeing (WA)
- Illgen (CA)
- JMA (DC, PA)
- Northrop-Grumman (CA, MD)
- Sperry Haines (DC)
- Trident Systems (DC)
- United Defense LP (MN)
- ...and more

There are two competing teams working under a Shipbuilding Alliance formed by Bath Iron Works (BIW) and Ingalls Shipbuilding, Inc. (ISI). The competing teams, Blue led by BIW and Lockheed Martin and Gold led by ISI and Raytheon, are firewalled as they develop independent, diverging, and competing system and life cycle support concepts. ISI and BIW will compete for production through the entire 32 ship class. Lockheed Martin and Raytheon Systems Corporation will compete as the DD 21 system integrators through Phase II.

BIW leads the Alliance for Phases I and II of the DD 21 Program under a Firm Fixed Price Other Transaction Authority. This development agreement was awarded to Industry in a June 1998 Contractual direction from the Navy communicated solely to the Alliance, who in turn, appropriately provide that direction to the Blue and Gold Teams. The Alliance also chairs the Common Process IPT with membership from all four principles and the Navy. Collaboration between Industry and Government is accomplished through integrated product teaming via an Internet-based integrated data environment, which facilitates efficient communication and cooperation between physically separated teams.

Encouraging innovation through competition is critical to DD 21 acquisition.



The DD 21 acquisition will be accomplished over five contracting phases. During Phase I (System Concept) the competing Industry teams have focused on developing completely independent DD 21 system concepts. Phase II (Initial System Design) will expand on proposed system concepts and include a virtual prototyping of DD 21, referred to as the Smart Product Model. The Navy will then select one design team to enter Phase III (Complete System Design).

First ship Detail Design and Construction (Phase IV) is expected to begin in Fiscal Year 2004, followed by construction of three ships per year beginning in FY 2005. The Navy will take delivery of DD 21 in 2008, when Phase V (Engineering and Logistics Life Cycle Support) will begin. Fleet introduction of DD 21 is scheduled for 2009.



DD 21 Acquisition Strategy

"The Navy plan is to contract with a full service contractor capable of providing the resources necessary to design, build and support DD 21"

*DD 21 Single Acquisition
Management Plan
25 Feb 1998*

LCE&S Activities

Define / Develop
Understand / Evaluate
Provide / Build
Certify / Approve
Conduct / Operate
Maintain / Support

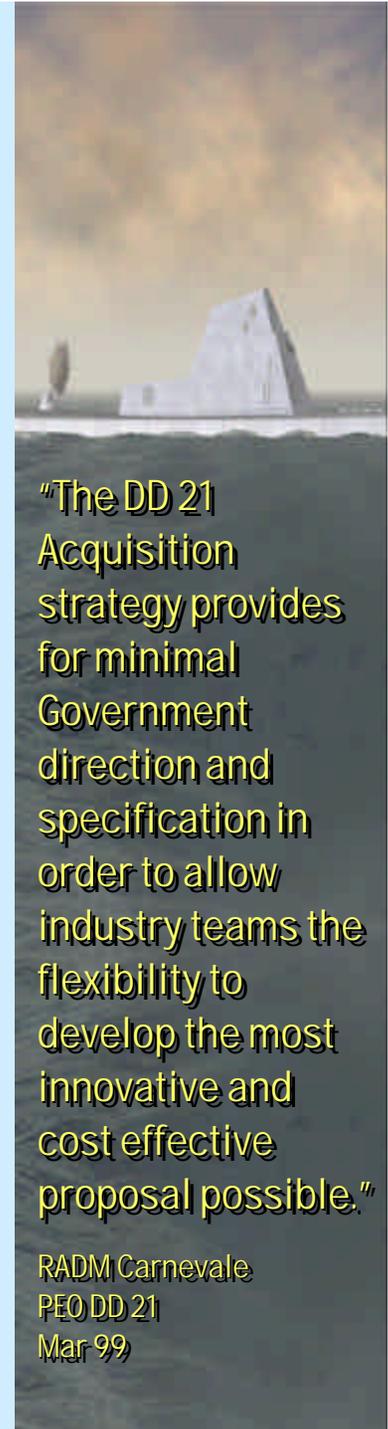
LCE&S Funtions

- Operational context
- Engineering and design
- Production and construction
- Operator / equipment training
- Tactical training
- Test and evaluation
- Certification
- Modernization and upgrade
- Maintenance and logistics
- Disposal

The teams are competing for the Life Cycle Engineering and Support (LCE&S) of DD 21. LCE&S is defined as the engineering and support required to design, build, deliver, maintain and upgrade the ship system from acquisition authorization to disposal. Specific functions are:

- Operational context
- Engineering and design
- Production and construction
- Operator / equipment training
- Tactical training
- Test & evaluation
- Certification
- Modernization and Upgrade
- Maintenance and Logistics
- Disposal

These functions include both Government and Industry responsibilities. However, under a Full Service Contracting approach, primary responsibility for many of the LCE&S functions will be shifted to Industry. This gives the teams the opportunity to design in, up front, features that will significantly reduce total ownership cost of the ship.



"The DD 21 Acquisition strategy provides for minimal Government direction and specification in order to allow industry teams the flexibility to develop the most innovative and cost effective proposal possible."

RADM Carnevale
PEO DD 21
Mar 99

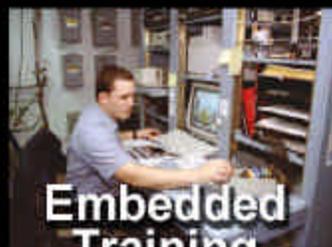
Global On-Line Reachback



Maintenance



Administration



Embedded Training



Readiness Center / PSD

Full Service Contractor Concept



Supplier



Global Logistics

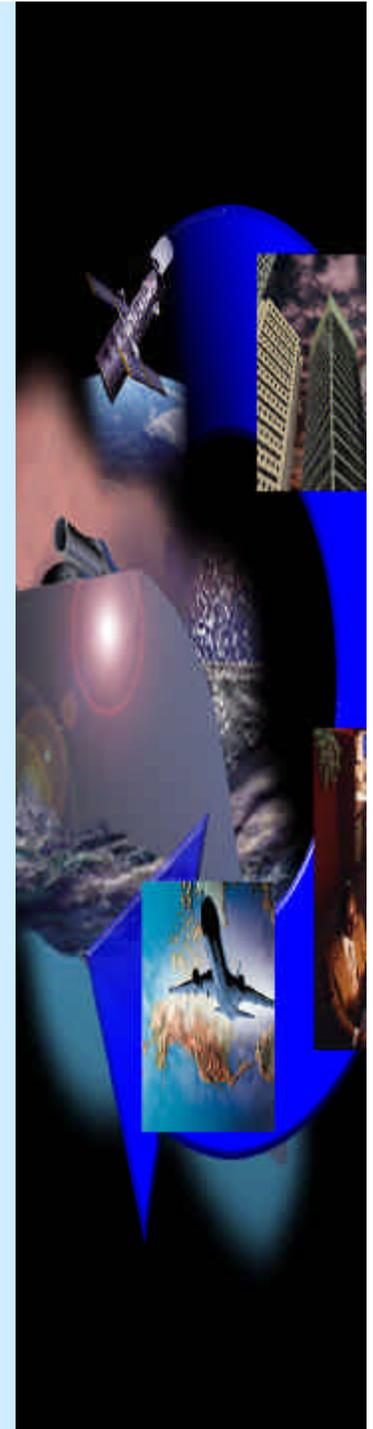
On-Line Training, Maintenance and Logistics Support

To ensure the reduction in total ownership cost, the DD 21 system design will, by definition, extend beyond the lifelines of the ship. It will reach around the globe and to the shore and back again to the ship.

Embedded training allows operators to train at their watchstations to enhance proficiency and to conduct team training, thereby eliminating lengthy and expensive pipelines. The shore infrastructure is on-line to monitor, understand and support readiness. Regardless of where the ship is forward deployed, there is on-line access to training, maintenance, administration and logistics support. For example:

- Requisitions for replacement items can be made via satellite link with the Readiness Center and replacement items can be delivered from the supplier to the ship automatically.
- On-line shore based maintenance support can instantly provide maintenance expertise to shipboard crew members.
- On-line training support can instantly provide training curricula to shipboard crew members.

The crew and everything they need to train, operate, maintain, and support the ship will be engineered as a part of the ship system from the beginning.



DD 21 Total Ship System Engineering



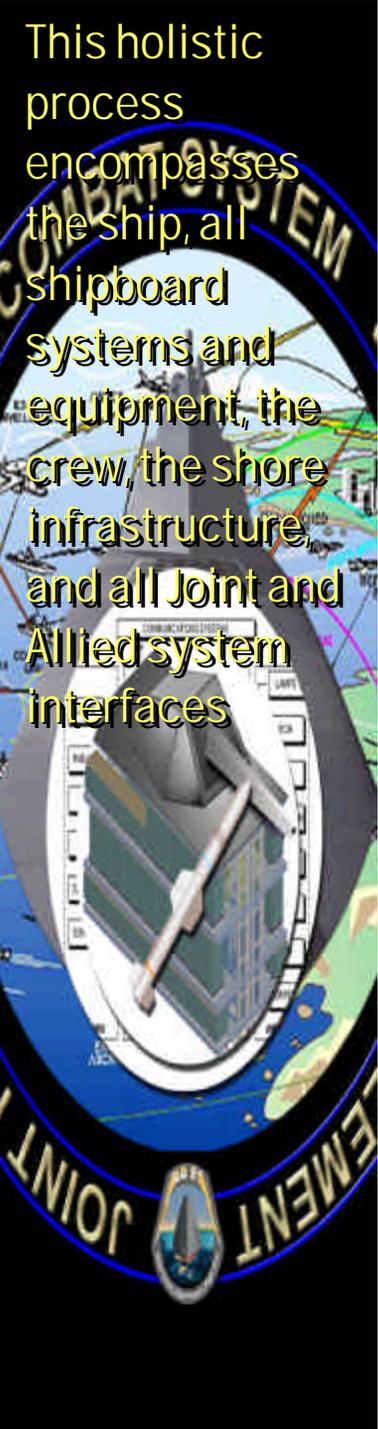
At All Levels

A significant portion of DD 21's procurement cost savings will result from the application of advanced design and construction techniques. DD 21 will be the first U.S. surface combatant designed under the principle of Total Ship System Engineering (TSSE) which treats the entire ship as a single, integrated system from design inception. This holistic process encompasses the ship, all shipboard systems and equipment, the crew, the shore infrastructure, and all Joint and Allied system interfaces.

Extensive Navy studies and analysis have shown that modern warfighting environments demand seamless joint force interoperability. DD 21 is being system engineered at all levels - element through total ship, and individual unit through Joint force - to ensure connectivity and compatibility with Joint / Allied system interfaces.

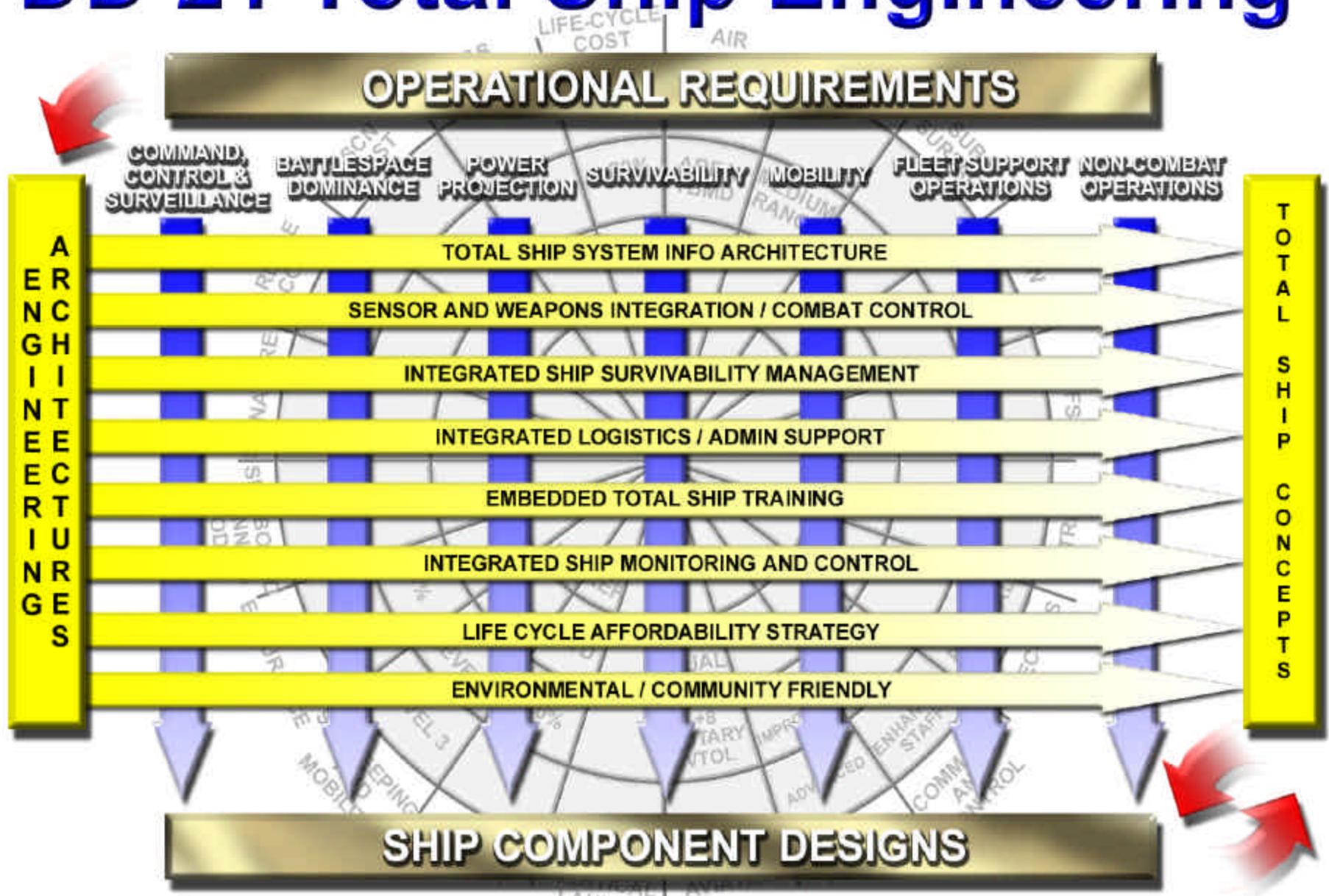
The Joint Littoral Warfare environment poses new, often more stressing technical challenges as compared to traditional open-ocean naval warfare. These include engineering requirements for:

- Expanded land attack warfare missions
- Revolutionary ship survivability and signature levels
- Joint interoperability
- Automated systems to increase effectiveness



This holistic process encompasses the ship, all shipboard systems and equipment, the crew, the shore infrastructure, and all Joint and Allied system interfaces

DD 21 Total Ship Engineering

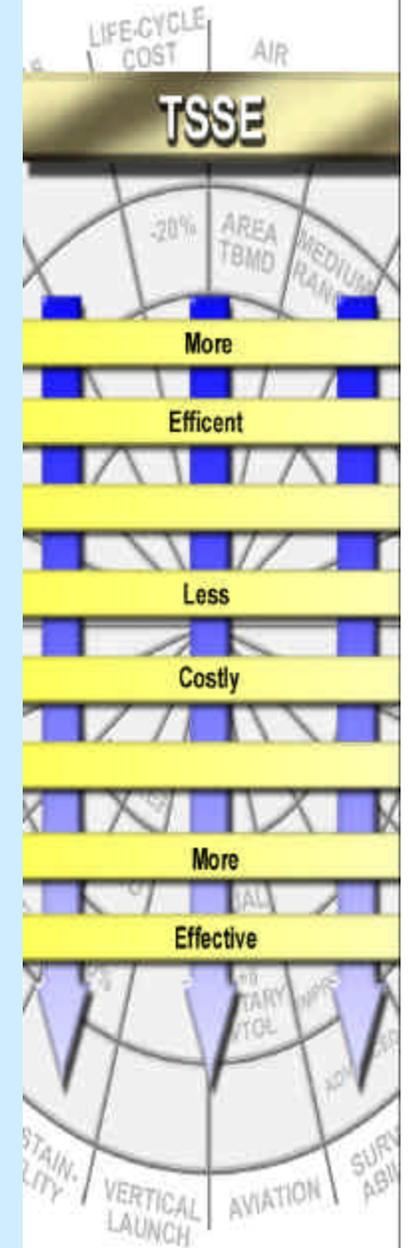


More Efficient...Less Costly...More Effective

“Horizontal Engineering” opportunities, with broad application to other mission areas, can be found by looking *across* mission areas.

This total ship system engineering approach enables:

- Increased ship and system performance
- Reduced manning
- Increased system flexibility
- Increased ship survivability and mission effectiveness
- Reduced total ownership costs



HSI Critical to Total Ship System Engineering

Total Ship Design Considerations

Human
Factors
Engineering

Manpower

Personnel

Training

Safety

Optimizing
Total System Performance and Life Cycle Cost

The Sailor is engineered into the system from the beginning

Human Systems Integration (HSI) is a human-centered systems engineering process, which addresses the human as an integral part of the total system. It focuses on the roles, responsibilities, and requirements for the human. The process, tools, and data required to integrate human performance are also part of HSI.

Key areas that must be addressed include human factors engineering, manpower, personnel, training, safety, and life support. These areas must be addressed throughout the systems engineering process in order to optimize the total system.

The end-user – the warfighter, should be included in every step of this process from requirements definition through usability testing to certification. Not only will this provide a better product and ensure that the product meets the needs of those in the fleet, but it will also inform and educate the warfighter community so that there will be buy-in and support for the new systems, rather than fear of the unknown when new systems eventually deploy.

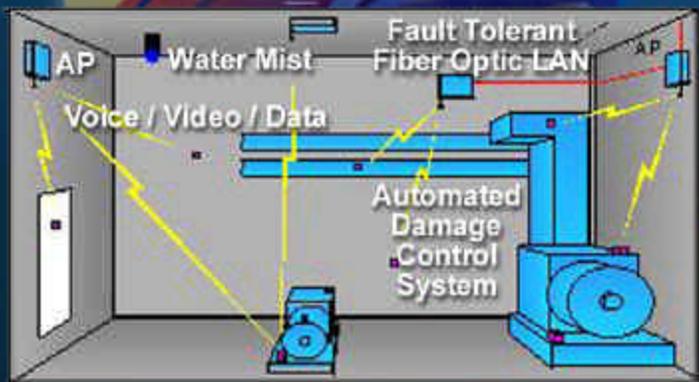
Through HSI, mission function and task allocation can be analytically applied to hardware, software or people by looking intelligently at performance and life cycle cost tradeoffs. It is absolutely critical that the Sailor be engineered into the system from the beginning.



HSI / Advanced Automation



This...



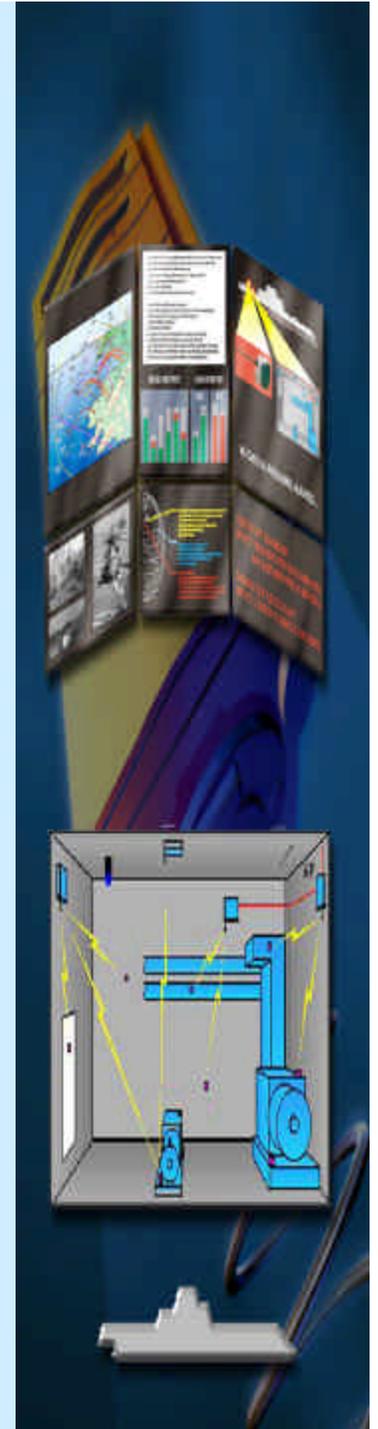
Ship's Information Backbone



Not this



Manpower aboard ship should be reserved for things where people are indispensable, such as planning and decision making, and the systems aboard ship should be designed to optimize the crew's ability to do those things. Displays must provide knowledge in the context of the tactical situation and they must do it with an easy to understand, easy to control, multi-modal type of interface. Sensors, intelligent interfaces, and automated systems should enable rapid detection, reaction, and elimination of fires and other problems. Crew members should be put in harms way for these activities only when the problem is too difficult for the system to completely control. Even then automated systems can assist with rapid reaction and containment capabilities. This same philosophy must be applied across all ship systems in order to optimize the total ship system.



Quality of Life

Better Hotel Services

Privacy / berthing / food service



Decreased Custodial Burden

Reduced inport burden will free Sailors to perform in-rate duties vice custodial chores

Embedded Training

Eliminates / reduces pipeline training



Increased Professional Responsibility



Ship - Shore Electronic Interface

On-line maintenance / admin / medical support

VTC / internet / family lifeline



The DD 21 Sailor, the most important part of the DD 21 system, will be part of an elite new generation that takes pride in the increased professional responsibility that comes with the opportunity to serve on the world's most technologically advanced warship. To enable excellence in the performance of their responsibilities and to improve retention, quality of life considerations must be addressed in the design:

- **Staterooms for the crew** combined with fitness facilities are a must.
- **Improvements in food quality** and nutritional considerations will not only help morale, but actually enable better performance, both in normal situations and under stress.
- **Embedded and remote training capabilities** provide for job excellence and professional growth opportunities, while decreasing the need to travel to sites away from the ship, home, and the family for training.
- **On-line maintenance and medical support** make available higher levels of expertise while decreasing pressures on shipboard personnel be able to deal with every possible contingency on their own.
- **Access to outside administrative and other information services** make everything from banking to career planning to house hunting accessible while still aboard ship.
- **Easy and inexpensive internet lifeline** to the family when at sea will eliminate potential stressors of family life while deployed.

By reducing the inport workload, Sailors will have more free time to relax and enjoy family life, so that they can come back fresh and energized to their shipboard duties.



Navy Partnerships



Today, the Program Executive Office for DD 21 (PEO DD 21) and the DD 21 Program Office (PMS500), within the Naval Sea Systems Command, are leading the acquisition of America's next generation surface combatants. Working in partnership with Industry and supported by naval warfare research centers nation wide, these organizations are reengineering the Fleet for the 21st century.

PMS500 created Tech Team 21 to leverage the wealth of technical knowledge and expertise resident with the major Government laboratories. This team includes representation by Naval Sea Systems Command (NAVSEA 03,) Naval Surface Warfare Center (NSWC Dahlgren, NSWC Crane, NSWC Carderock, NSWC Coastal Systems Station, and NSWC Port Hueneme), the Naval Air Warfare Center (NAWC Training Systems Division and NAWC Aircraft Division), Naval Undersea Warfare Center (NUWC, Newport), the Space Surveillance Center (SSC San Diego), and the Johns Hopkins University Applied Physics Laboratory (JHU/APL). Tech Team 21 supports the DD 21 Program Office by:

- Providing independent, unbiased technical support
- Assisting Navy leadership in making complex technical and acquisition decisions
- Facilitating government / industry teaming relationships
- Maintaining technical consistency throughout acquisition of the SC-21 family of ships



Government Partnerships



The DD 21 effort is about teamwork and people committed to change. People throughout the United States are transforming dreams into reality. . . science into technology. . . technology into systems. . . and systems into ships. Dedicated professionals who are translating new concepts, complex requirements and engineering challenges into a modern warship.

On September 22, 1998, PEO DD 21 signed a Management Plan to execute the Memorandum of Agreement between Chief of Naval Research and PEO DD 21. This MOA ensures that the Navy's S&T investments most relevant to DD 21 will have the greatest opportunity for incorporating risk reduction.

On March 26, 1999 PEO DD 21 and PEO Carriers signed an agreement to identify specific common technologies, systems and processes critical to both aircraft carrier and DD 21 development. This MOA establishes focus teams to evaluate and recommend those common areas and agrees to implement those recommendations in a timely manner.

In November 1998 discussions were initiated with NASA to investigate options to share technology and management advancements.

Discussions are also underway with SPAWAR for C4ISR technical support.

"One of my challenges is to make sure we have the R&D effort properly focused to ensure that DD 21 has the kind of capability we expect."

RADM Mullen
N86
Seapower Mag.
Sept 98



S&T Vision



**Decrease
Ownership Cost**

**Increase
Combat Effectiveness**

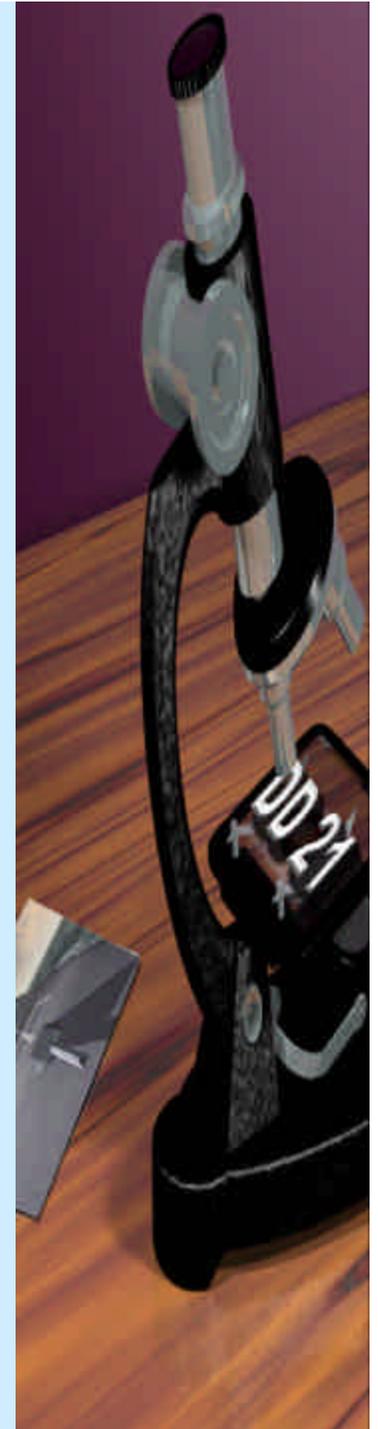
**Increase
Survivability**

The agreement with the Chief of Naval Research focuses traditional pre-acquisition efforts, such as Advanced Technology Demonstrations (ATD), to address the DD 21 technology needs. The resulting DD 21 S&T Program Plan ensures that DD 21 and competing Industry teams receive the maximum possible benefit from relevant Navy S&T programs.

DD 21 Industry teams are working closely with PEO DD 21 and the Office of Naval Research to evaluate the total range of Navy S&T efforts and to identify specific programs for inclusion in the DD 21 S&T Program Plan. Pertinent projects are being modified to support DD 21 system concept designs and to meet development schedules.

The Science and Technology (S&T) efforts are focused on decreasing ownership costs, increasing combat effectiveness, and increasing survivability. Specific areas of concentration are

- Integrated topside systems
- Reduced manning
- Power and distribution systems
- Undersea dominance
- Maritime dominance / land attack
- Hull and mechanical



Partnership S&T Programs



Optimized Manning

- Condition based maintenance
- Human factors engineering
- Damage control for reduced manning
- Multi-modal watchstations
- Advanced embedded training systems

Power and Distribution System

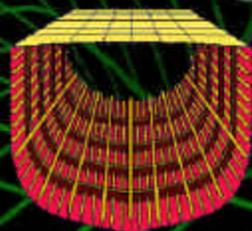
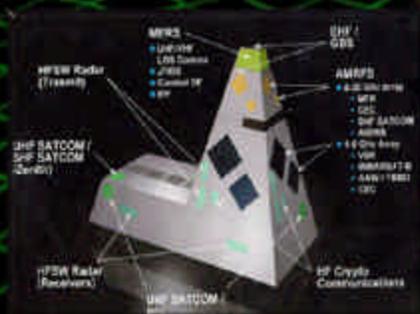
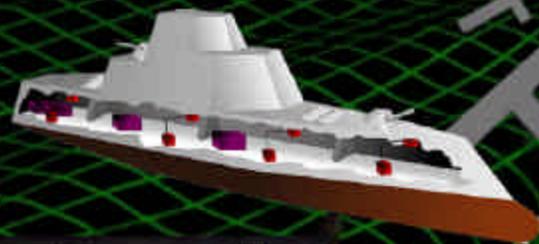
- Advanced electric distribution system
- Fuel cell power systems
- Power node control system
- Power electronic building blocks

Hull and Mechanical

- Advanced composite materials
- Integrated topside design
- Advanced double hull
- Integrated hull propulsors

Littoral Environment

- Advanced degaussing
- Advanced surface situational awareness ATD
- Lightweight broadband variable depth sonar
- Automated periscope detection / discrimination
- Advanced IR search and track

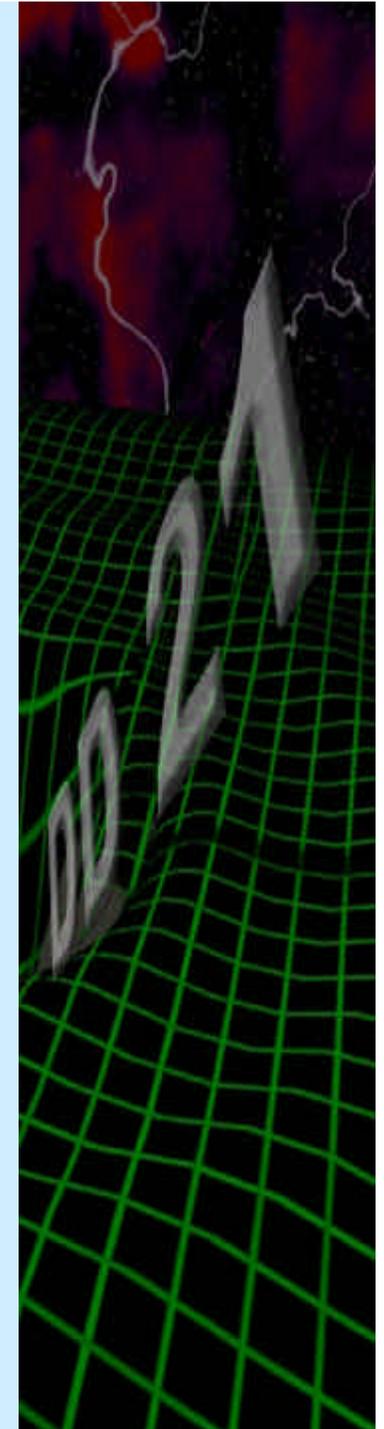


Trends in the area of *manning reductions* are moving toward remote sensing, monitoring, and response; improved decision aids; human factors engineering in system concept and design; and integrated training systems incorporating human centered design tools.

Trends in the area of *power and distribution systems* are moving toward electrically re-configurable ships.

Trends in the area of *hull and mechanical systems* are moving toward an integrated topside design, lower signatures (infrared, magnetic, and acoustic), more aggressive hydrodynamic concepts, and affordability and manning reductions through low maintenance materials and greater automation.

Science and Technology efforts are also responding to the shift from open-ocean naval warfare to joint littoral warfare.



How is DD 21 Unique?



Leverages technology to provide advanced capabilities at reduced life cycle cost

These on-going S&T efforts, combined with innovation from Industry and other government agencies will produce the most unique surface combatant ever built. DD 21 will provide advanced capability that pushes the limits of technology in the following areas:

- *Gun and munitions* to bring major offensive gun capability
- *Precision Strike* to bring the capability to attack armored forces
- *Mine avoidance* to provide in-stride mine avoidance capability
- *Integrated topside design* for improved warfighting hard-kill and soft-kill capability through signature control, advanced composites, antenna integration, and HM&E technologies
- *Knowledge Centric Integrated Command Environment* to bring a coherent tactical picture capability to all watchstations for all warfare environments
- *Total Ship Computing Environment* to enable the “open and distributed” engineering functionality essential to maintaining DD 21 mission capable and affordable
- *Integrated power systems* for fully integrated power and propulsion systems
- *Quality of life* for the sailor designed in up front
- *Reduced cost of ownership* to sustain the required force structure
- *Reduced Manning* to reduce cost of ownership and the number of souls put at risk



DD 21 Will...

Destroy land targets including TBM launchers

Destroy surface targets

Defeat enemy missiles and torpedoes

Destroy air targets

Avoid and neutralize mines

Destroy submarine targets

Be fully integrated with Joint Forces

Maintain capable, affordable force levels



U.S. naval expeditionary forces serve as America's front-line defense. Our surface combatants *daily*, unobtrusive, global presence helps to shape the international environment by providing a credible deterrent and demonstrating U.S. interests in regional stability.

Today's uncertain international security environment, unrelenting operational overseas commitments, and modern military strategies and concepts demand that we transform our naval forces for the 21st century, particularly in regard to Joint littoral warfare. PEO DD 21 and PMS500, in partnership with private industry and the U.S. Navy's scientific community, are helping to make that requirement a reality.

When DD 21 joins the Fleet in 2009 it will be

- An offensive force multiplier
- Multi-mission capable
- Survivable in all environments
- Interoperable with Joint and Combined forces
- Affordable over its service life

"DD 21 is going to do things we have never been able to do before."

ADM Johnson
CNO
Mar 99



DD 21...Leading the Way

"The DD 21 Acquisition Strategy provides for minimal Government direction and specification in order to allow industry teams the flexibility to develop the most innovative and cost-effective proposals possible."

*RADM Joseph A. Carnevale,
Program Executive Officer
DD 21 and Associated Systems*

Navy Message to Surface Type and Numbered Fleet Commanders, 4 March 1999

"The Navy's DD 21 Program has not only showcased a new way of doing business for our surface ship community, but it has also put several key ideas for reforming acquisition to work in a "real world" laboratory."

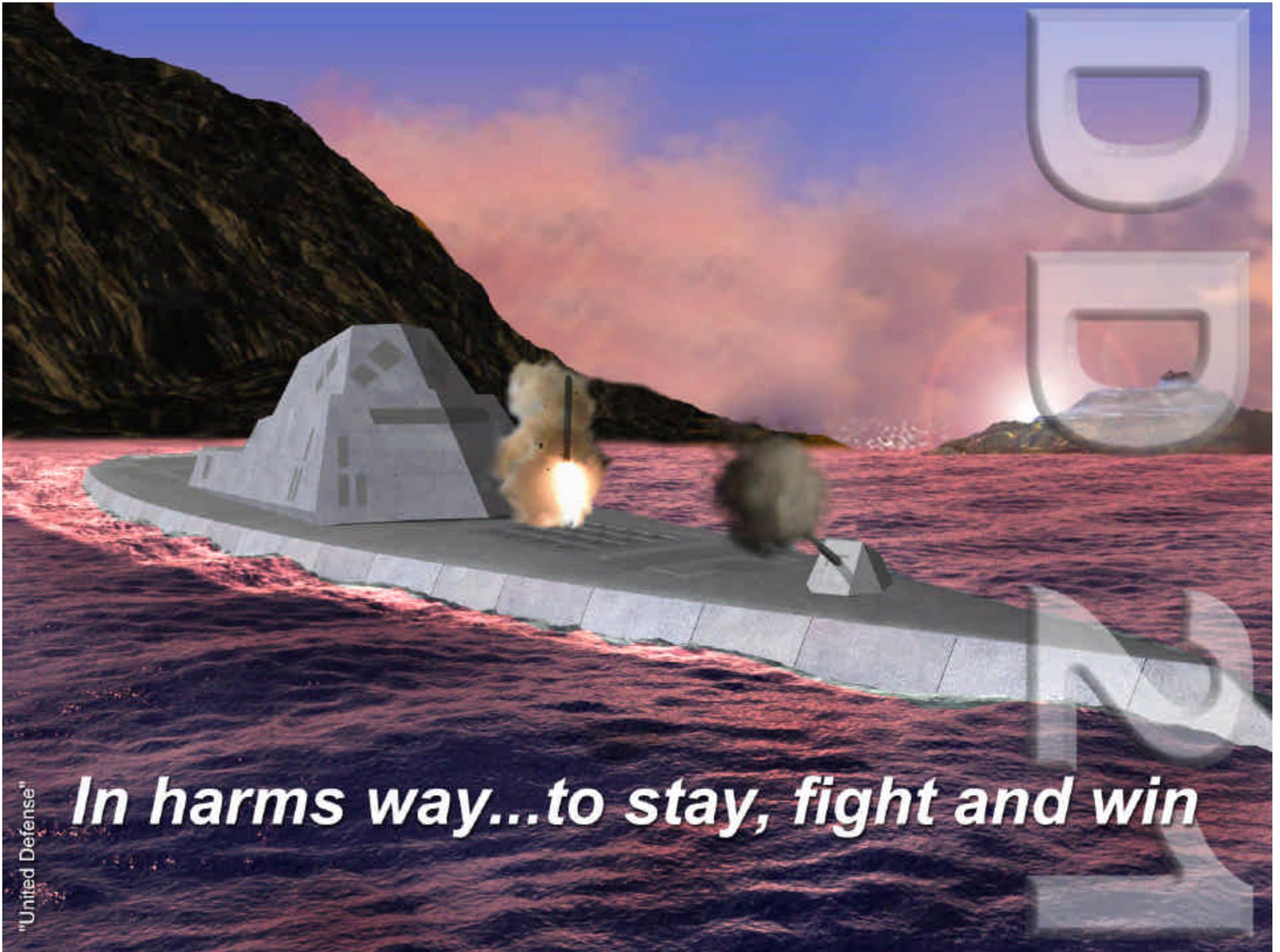
*Dr. Jacques S. Gansler
Under Secretary of Defense for
Acquisition and Technology*

Before the Senate Armed Services Seapower Subcommittee, 3 March 1999

"DD 21 is going to do things we have never been able to do before. When you think about a surface combatant that will be able to generate the kinds of combat power it will be able to generate, manned at fewer than 100 people, that is pretty impressive."

*ADM Jay L. Johnson
Chief of Naval Operations*

During an interview with Jane's Defense Weekly, 24 March 1999



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