

SPARTAN SCOUT ACTD



Unmanned Surface Vehicle (USV) For Assured Access and Force Protection

Presented To

JLOTS/Logistics-From-the-Sea

R&D Symposium III

27-29 January 2004

Presented by Mr. Pat Holder

Deployment Process Modernization Office (DPMO) for:

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NAVAL UNDERSEA WARFARE CENTER DIVISION, NEWPORT, RI



SPAWAR



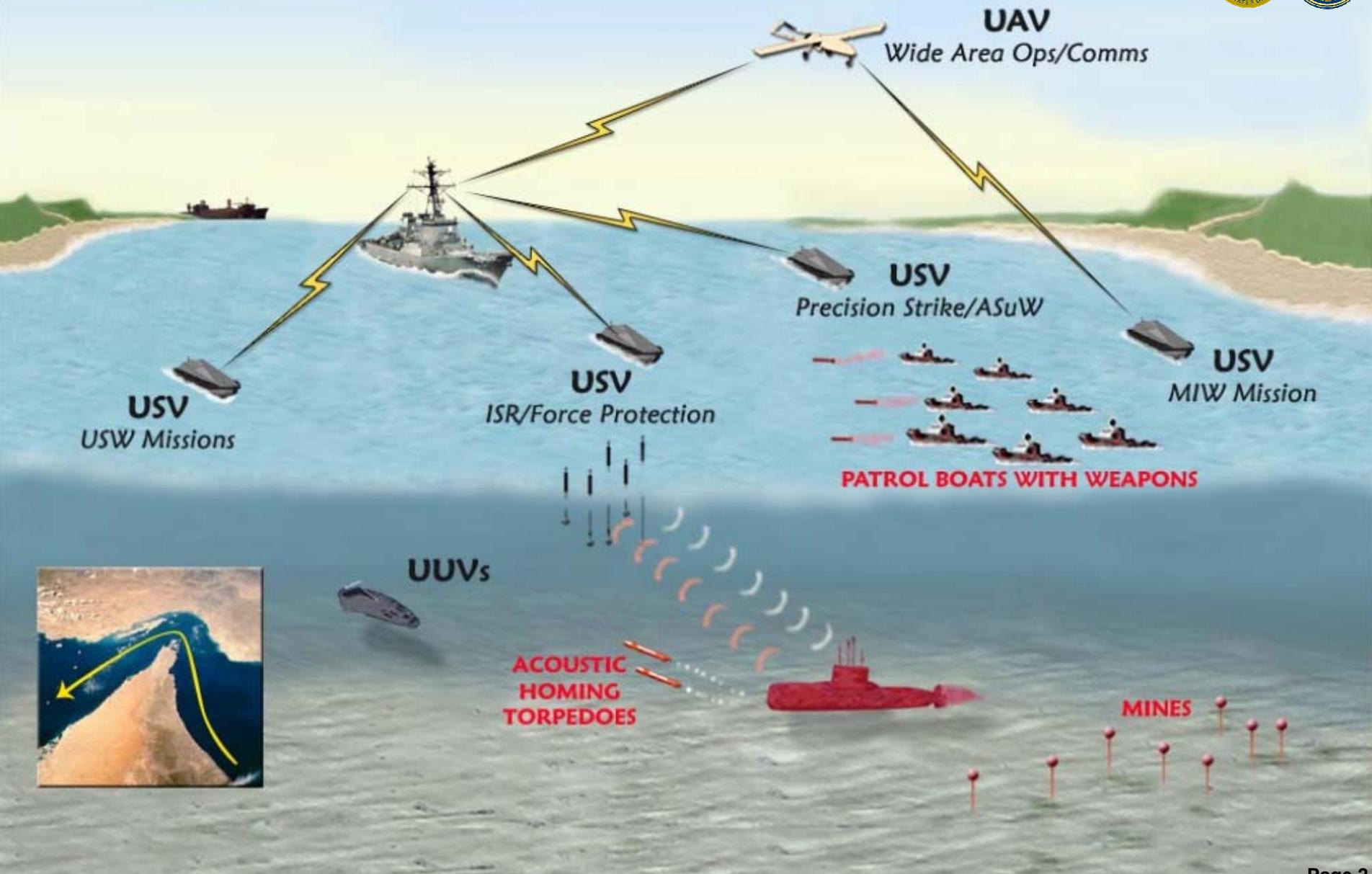
Raytheon

NORTHROP GRUMMAN



SPARTAN Scout Concept

Levels the Battlespace by Distributing the Combat System





SPARTAN SCOUT ACTD Objective



- ❑ **OBJECTIVE of this ACTD: Demonstrate the Military Utility of USVs for Assured Access and Force Protection in the Littorals and fill a void in capability that the fleet is in critical need of today**
 - Interoperable with joint and coalition forces
 - Conduct critical missions (FP/ISR, Precision Strike, MIW)
 - Prepare the waterspace for Amphibious and Sealift Ops
 - Minimize or eliminate unnecessary risk to personnel and capital assets
 - Provide port-protection when launched/operated from shore
 - Demonstrate USVs as a Force Leveler/Multiplier

- ❑ **SPARTAN ACTD on a spiral development process**
 - All developmental efforts for SPARTAN 7m USV are directly applicable to an 11m RHIB
 - Directly applicable to LCS warfighting capability



SPARTAN SCOUT

Participants



❑ OPERATIONAL

- **COCOM/User Sponsor:** PACOM
- **Operational Manager (OM):** 3rd Fleet
- **Users:** 3rd Fleet, Army (Watercraft Units), RSN

❑ SPONSORS

- Navy (OPNAV N76), Army (AMRDEC/DPMO), Republic of Singapore, DUSD (AS&C)
- Transition Manager: PEO-Ships (PMS 501) / PEO-LMW / Army (TBD)

❑ TECHNICAL

- **Navy:** NAVSEA: NUWC (TM); NSWC (Carderock, Crane, Dahlgren, Panama City), SPAWAR SC (San Diego, Charleston)
- **Army:** AMRDEC, TARDEC, TRADOC
- **Singapore:** DSTA
- **Industry:** Raytheon, Northrop Grumman, IMPI



SPARTAN ACTD Spiral Developments



FY	02	03	04	05	06	07	
SPARTAN SCOUT ACTD	-----		-----			-----	
		<i>Development & Demonstration</i>				<i>Transition and LRP</i>	
	ID ▲ 1 May 02	MP ▲ MAR 03	ENTCSG Deployment ▲ Spiral 1 ISR, C ³ & Core System	▲ Spiral 2 ISR/FP C ³ , & Core System	▲ Spiral 1 PS/ ASuW	▲ Spiral 2 PS/ ASuW	
			▲ Spiral 1 MIW	▲ Spiral 2 MIW	▲ Spiral 3 All Functional Categories (with Spiral 2 MIW)		
Funding (\$M)	\$2.25M	\$10.35M	\$14.21M	\$9.40M	\$9.15M	\$14.15M	

FUNCTIONAL CATEGORIES	SPIRAL 1	SPIRAL 2	SPIRAL 3
Core System	Core subsystems integrated into modified 7m RHIB test bed	Core subsystems on modularized 7m RHIB	Optimized core system with modular payload capability
Command, Control and Communication (C ³)	Remote control for single vehicle	Semi-autonomous, remote single vehicle control with obstacle avoidance	BLOS, Multi-vehicle, semi-autonomous control
MIW Module	AN/AQS-14 Side Scan Sonar	AN/AQS-24 Mine-hunting Sonar	AN/AQS-24 (from Spiral 2)
ISR/FP Module	ISR capability only	ISR/FP capability (with weapon certification)	IROSSS Gun vs moving target (ASuW)
PS/ASuW Module	Hellfire/Javelin Missile vs Stationary Target Sea State: 0 -1	Hellfire/Javelin Missile vs Moving Target Sea State: 1 - 2	Hellfire/Javelin Missile vs Moving Target at sea State: 2 - 3 (ASuW)



SPARTAN SCOUT

Plug 'n Play Modularity Increases Capability



USV
Core
System

+

- ISR-FP Module
- Precision Strike/
ASuW Module
- MIW Module

=

- Assured Access
- Force Protection
- Expanded Battlespace
Dominance
- Enhanced Net-centric
Capability



CORE SYSTEM

+



**RECONFIGURABLE
"PLUG 'N PLAY"
MISSION MODULE**

=



**WARFIGHTING
CAPABILITY**

**MODULAR PLATFORM ENABLES ADAPTABILITY TO MEET
NUMEROUS WARFIGHTING NEEDS WITH ONE CORE SYSTEM**

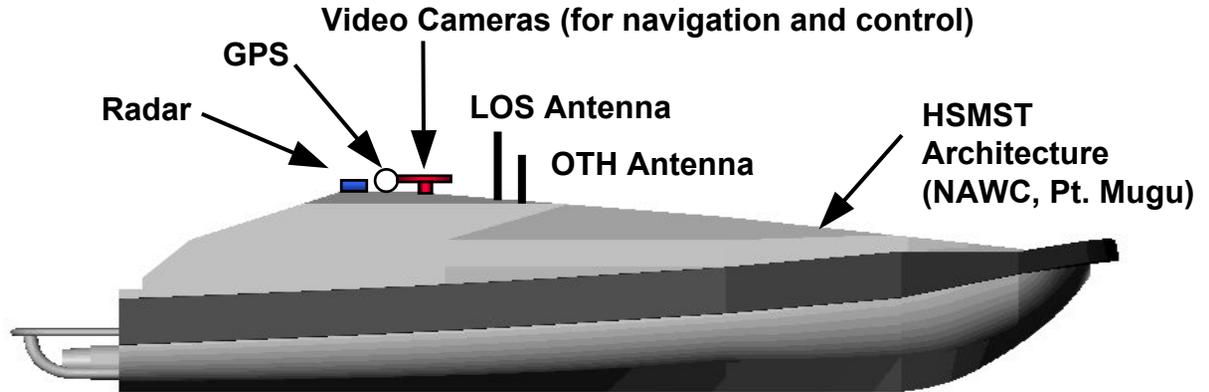


SPARTAN SCOUT Core System

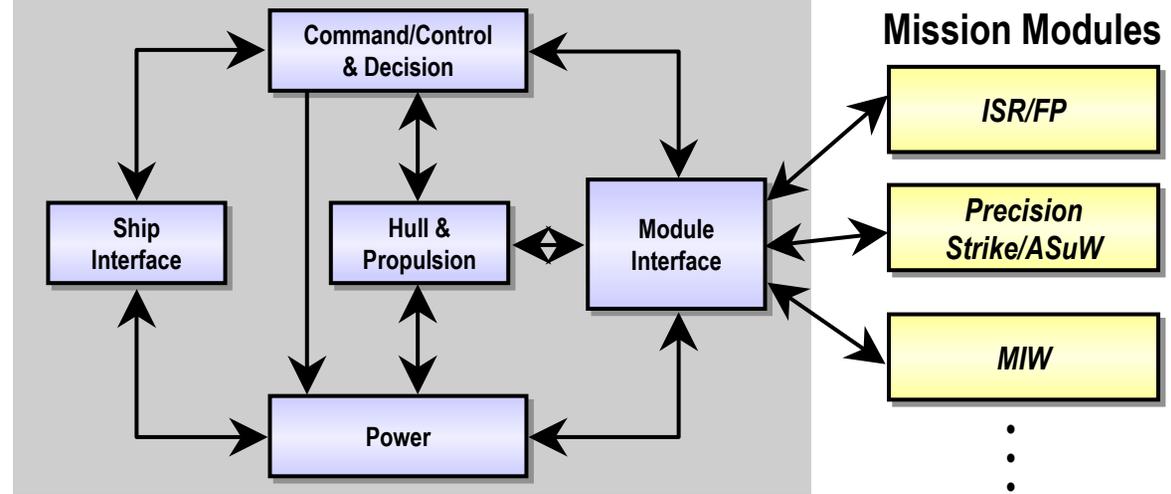


DESIGN GOALS

- Communications link independent
- Common mission module interface
- Off-the-shelf components
- Distributed architecture
- Open source software
- Minimize effort to exchange Mission Modules
- Ensure interoperability in joint and coalition environment



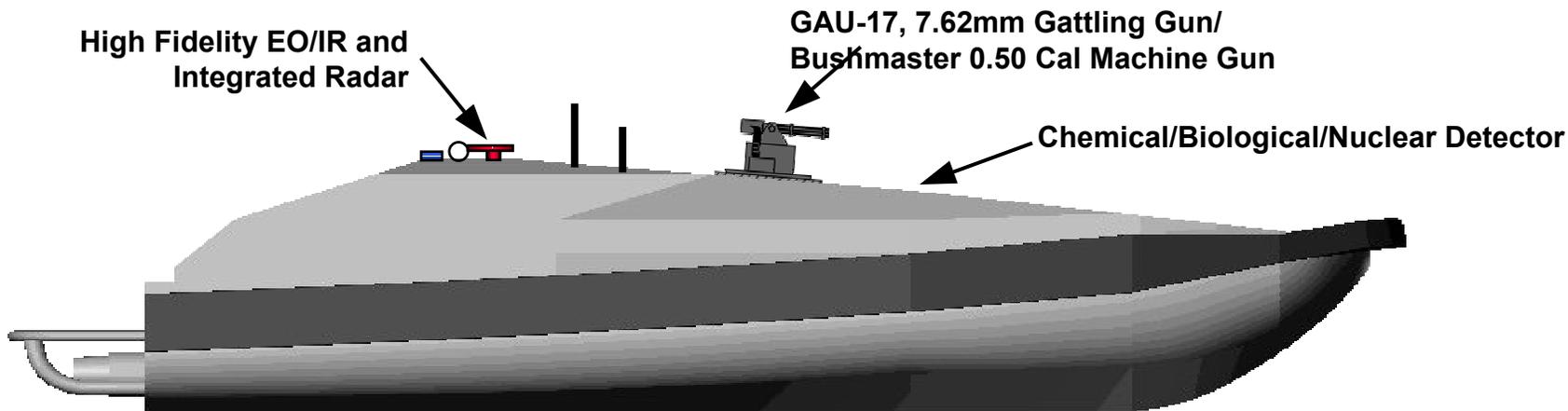
SPARTAN CORE SYSTEM



USE EXISTING LOGISTICS - INTEGRATED FIELDDED SYSTEMS



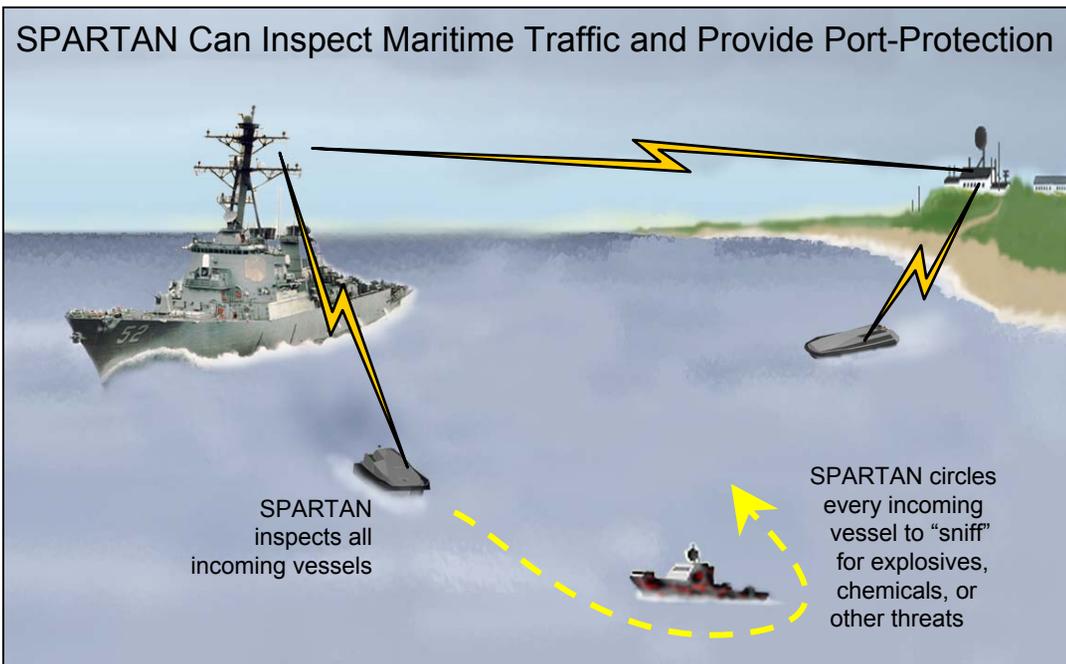
SPARTAN SCOUT ISR-FP Module Concepts



GAU-17 Gun



Bushmaster 50 Caliber Machine Gun



SPARTAN Can Inspect Maritime Traffic and Provide Port-Protection

SPARTAN inspects all incoming vessels

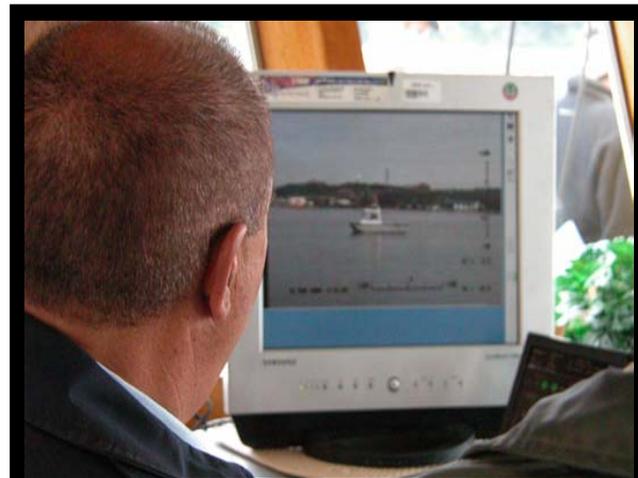
SPARTAN circles every incoming vessel to "sniff" for explosives, chemicals, or other threats



SPARTAN USV Mission Modules FY03 Demonstrations



ENTCSG ISR Demo (May-Jul 03)



**SUBASE Groton
Escort Demo (Sep 03)**



CMWC MIW Demo (Oct 03)



SPARTAN SCOUT

ISR/FP Mechanical Prototype (Dec 02)



Spartan Scout
Advanced Concept Technology Demonstration

Date: 3 December 2002
Temperature: 22°F
Wind: 20 - 30 kts
Wind Chill: -10°F

... Where no man needs to go ...





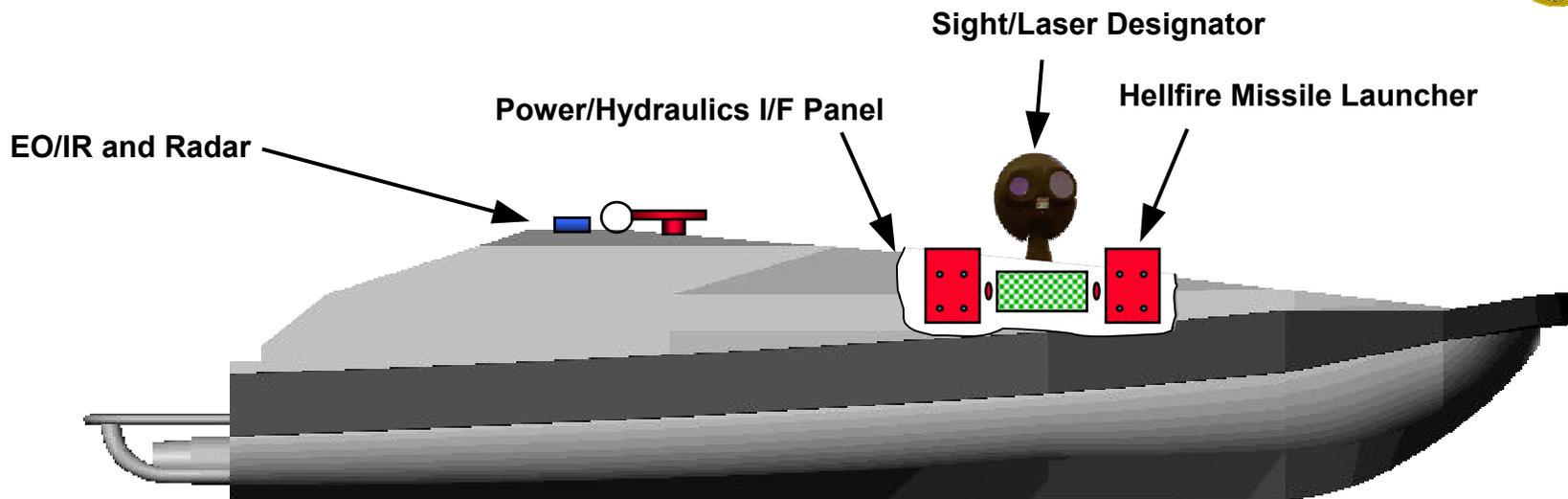
SPARTAN SCOUT

Integrated ISR Prototype for ENTCSG (Jul 03)





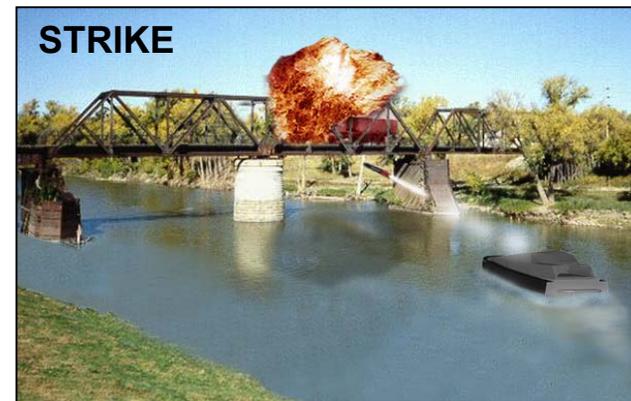
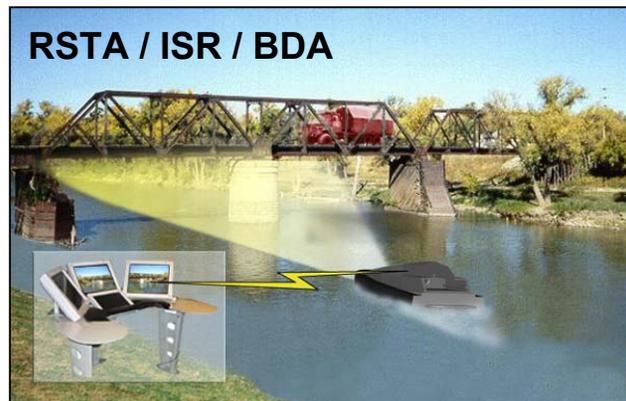
SPARTAN SCOUT ASuW (Precision Strike) Module Concept



Hellfire Missile



Javelin Missile



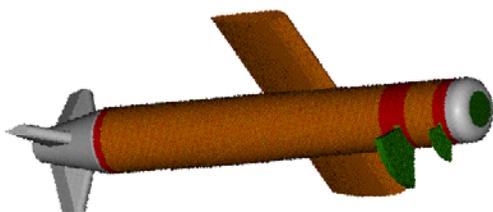
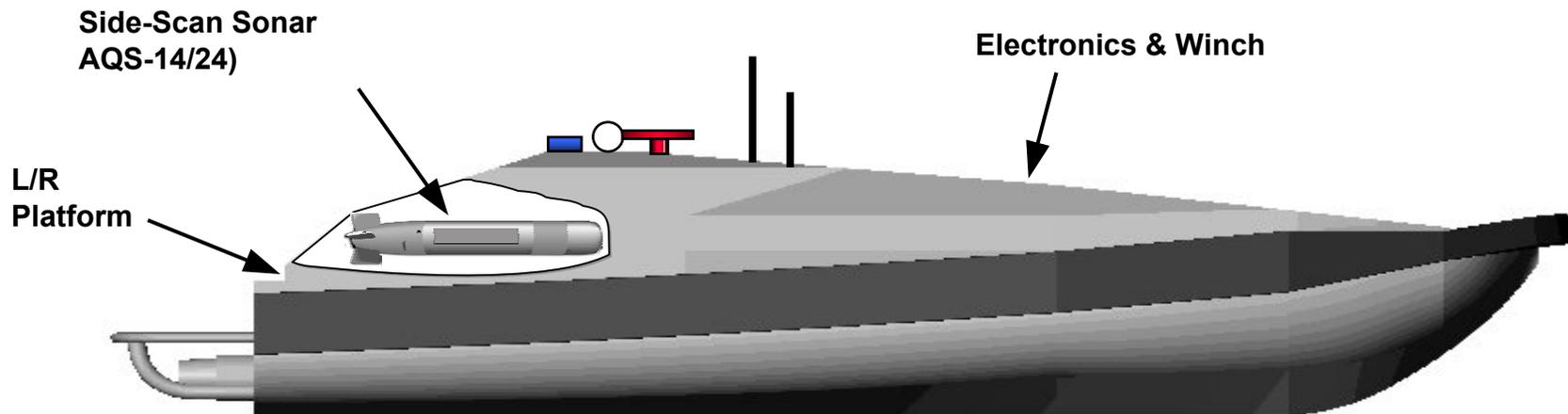
SPARTAN PROVIDES AN INTEGRATED SENSOR AND WEAPON SYSTEM

SPARTAN ACTD Program Chooses Konesburg RWS-J Mount

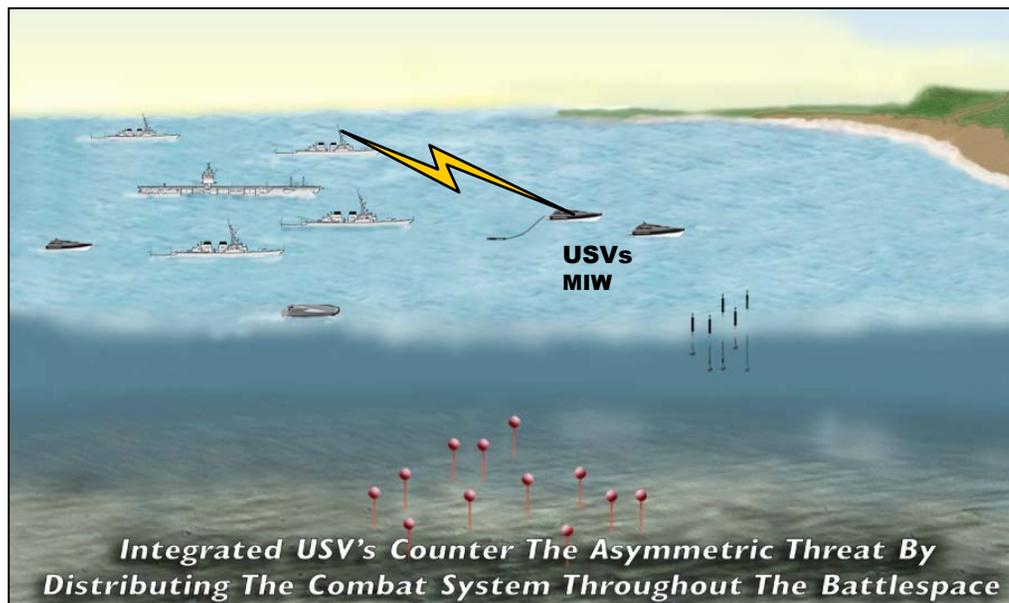




SPARTAN SCOUT MIW Module Concept



**AQS-14/24
High-Resolution Minehunting Sonars**





SPARTAN SCOUT

11-meter MIW Prototype (Sept/Oct 03)

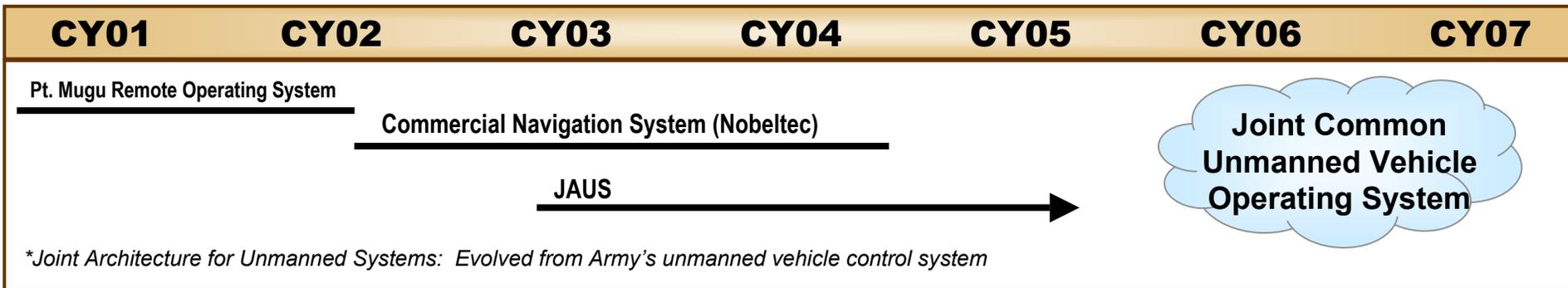


**Northrop Grumman AQS-24 High-Resolution Minehunting Sonar
with automated Deploy and Retrieval (D&R) System**





SPARTAN Command and Control



ENTERING ARGUMENT

- Navy has not chosen a common operating system. Likely candidate:
 - Joint Unmanned Systems Common Control (JUSCC) FY04 ACTD by NSWC (CSS).*
- Future Navy ships will carry multiple, interoperable unmanned vehicles to be controlled from a single workstation.



- Reliable, affordable, (preferably) open architecture system so that we can easily transition to a Joint Common Operating System.*
- Interoperable with Singapore.*
- Interoperable with Army.*



- GOTS system with primitive functionality for proof of concept.

- Low cost, robust, functional, easy-to-use navigation system for ENTCSG deployment.
- Not open for mitigation package and information distribution development.

- SPARTAN Team conducted a C2 trade study to meet ACTD needs.
- Initial product delivery in early CY04. Can be Test Bed for JUSC2 ACTD.

How SPARTAN will accomplish beyond Line-Of-Sight communications



OPTION 1
Aerial Vehicle

UAV

OPTION 2
Surface Relay

10nm

**For the
ACTD**

DEFINITIONS

Line of Sight
Control ship to 10nm

Beyond Line of Sight
10 to 100nm

Over the Horizon
10nm to indefinite

GOAL: Open System Architecture Compatible with FORCEnet



SPARTAN SCOUT

Rapid Prototype Development and Demonstration with Enterprise Carrier Strike Group





ACTD Reprioritization

Near-Term ENTCSG Support

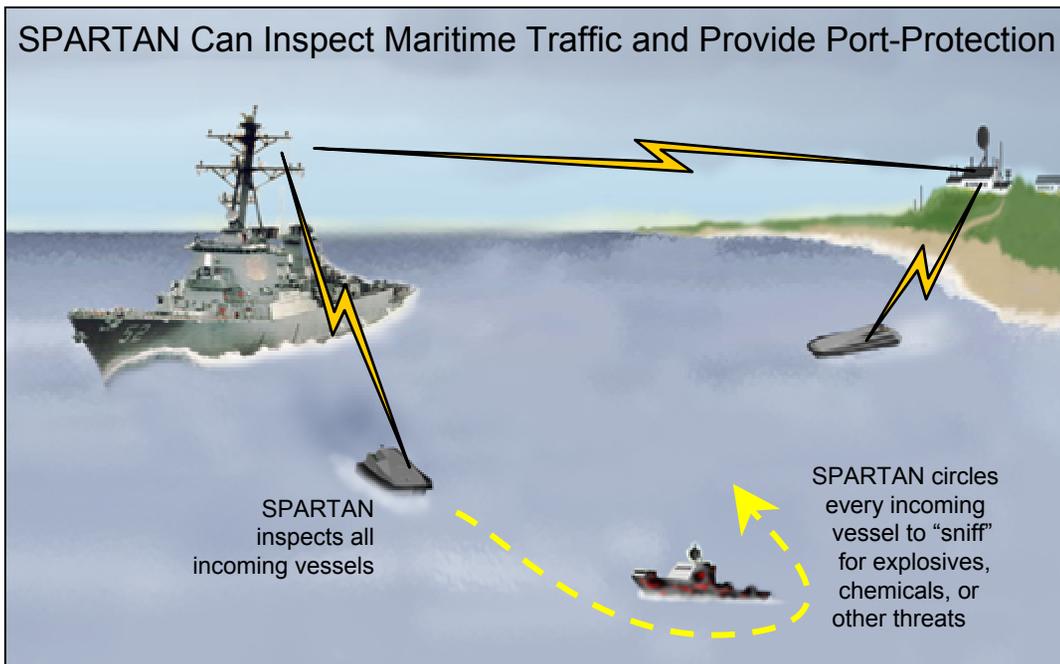
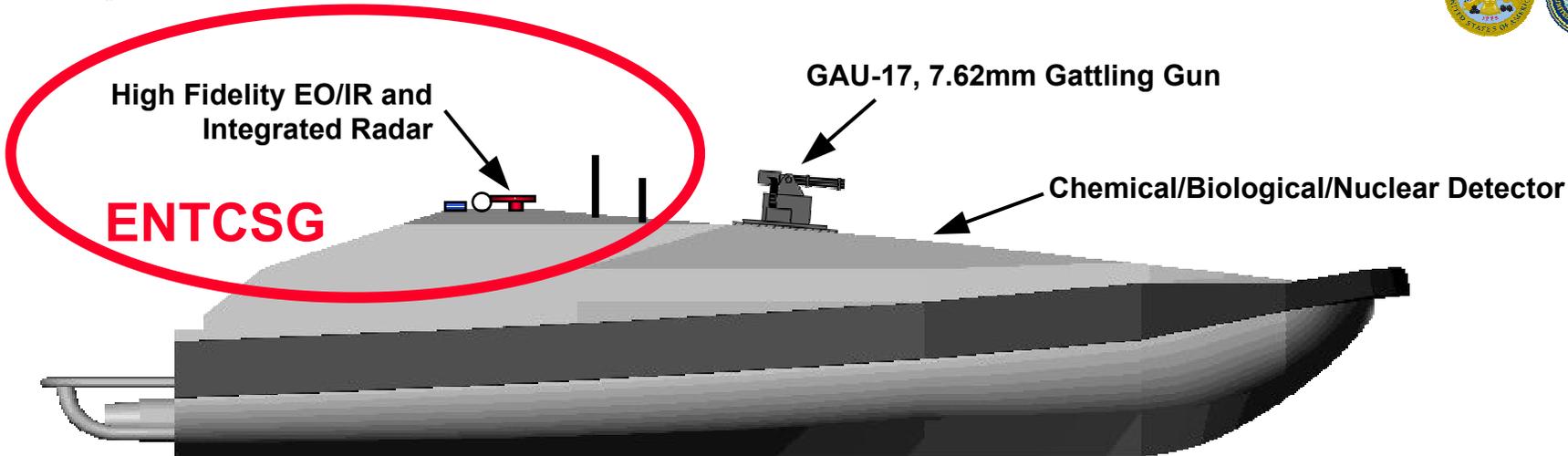


- ❑ **SPARTAN ISR Prototype Requested by CCDG-12 to Support ENTCSG deployment**
 - Missions: Force Protection, Recognize Maritime Picture (RMP), Maritime Interdiction Operations (MIO), etc.
- ❑ **Reprioritization of ACTD from Spiral 1 MIW to Spiral 1 ISR deemed best course of action***
 - Original Schedule: MIW demo in Sept 03; ISR demo in Apr 04
- ❑ **Concurrence obtained from all ACTD sponsors**
- ❑ **Completed Phases 1, 2, & 3 in Mayport, FL**
- ❑ **SPARTAN Deployed with USS GETTYSBURG (CG-64)**
- ❑ **DUSD (AS&C) committed to Spartan success; additional \$1M provided for ENTCSG**

*N763 memorandum for the record of 11 March 2003



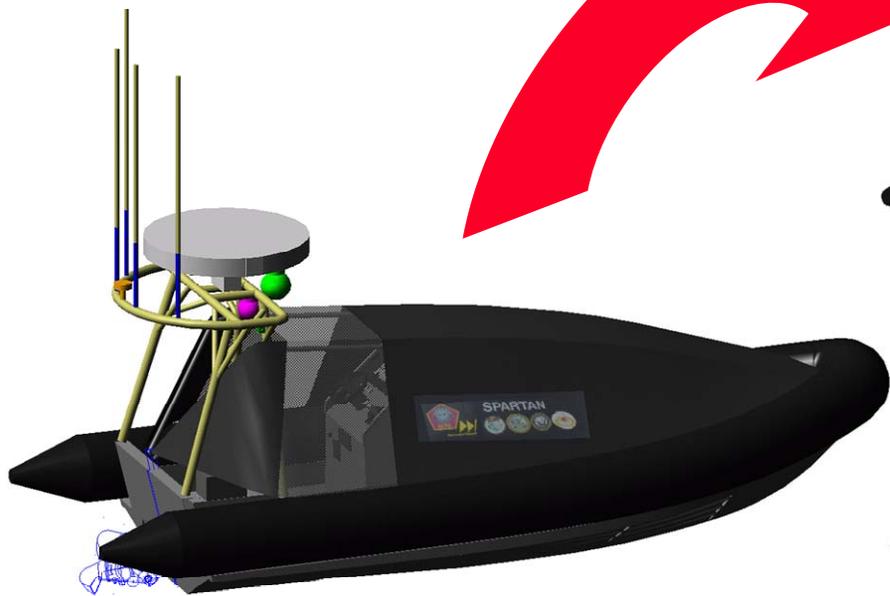
SPARTAN SCOUT ISR-FP Module Concepts



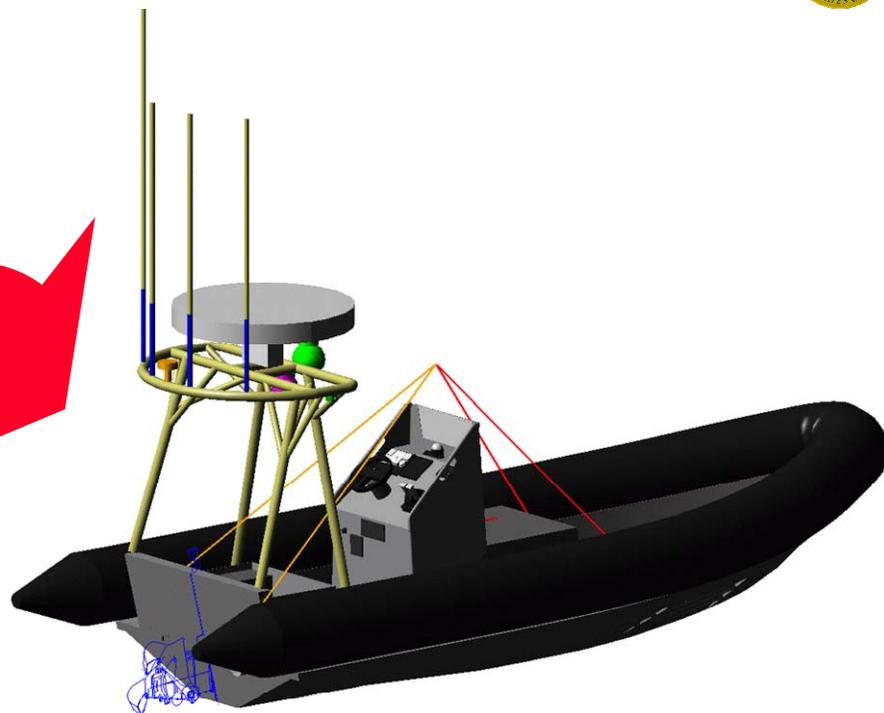


SPARTAN Dual Use

Convertible to support the Warfighter



Unmanned SPARTAN



Convertible to Manned RHIB



SPARTAN with USS GETTYSBURG

Phase 1: Mayport, FL – 13 May 2003



Port Vest Davit



ENTCSG Spartan ISR Capability



CIC Work Area



- C2, Video & ISR Laptops
- Video Monitors
- ISR Display
- Integrated Comms
- Video Recorders

SPARTAN with USS GETTYSBURG Mayport, FL – 12 May 2003



SPARTAN with USS GETTYSBURG

Phase 2: Mayport, FL – 14-15 July 2003



**SPARTAN Conducting Port/Harbor
Patrol Operations**



SPARTAN Control Station in CIC



**SPARTAN C2 Chart Display
with Radar Overlay**



**SPARTAN EO Sensor Images of
USS Kennedy in Heavy Rain**



Preliminary Phase 2, 3 and 4 Feedback



□ Phase 2 Demonstrated

- Operation in inclement weather
- Endurance in FP mode - 9 hours on station
- Hailed “red” boat at 50 yards and issued Level 1 Warning
- Conducted in-port L&R

□ Phase 3 Demonstrated

- Fuel contamination limited operations
- ISR System check and operations conducted in davit
 - » Tracked ship with EO sensor from 3 nmi to 10 nmi
- Limited EMI testing indicated raised no concerns
- Conducted underway L&R up to SS 2+

□ Phase 4 Scheduled for October-December 03

- Completed Phase 4 and received SIPRNET report from USS GETTYSBURG
- Five Unmanned Operations completed



SPARTAN "Scout" ACTD Summary

Army Perspective



- ❑ **Potential anti-access mitigation capabilities include, ISR, force protection, harbor security, bottom-mapping, and precision strike.**
- ❑ **Army has participated in development of ACTD Management Plan/draft CONOPS and will provide future support in the following areas:**
 - Provide a link to Army's concept, combat, and materiel developers.
 - Include SPARTAN capabilities in Army/Joint concepts, S&T initiatives, wargames, FOCs.
 - Facilitate integration of Army participation in applicable SPARTAN IPTs and workgroups.
 - Provide input to refined CONOPS based on Army mission areas for SPARTAN.
 - Integration of SPARTAN capability into Army Force Projection concepts, Force Operating Capabilities (FOC), port characterization requirements, maritime C2 (HCCC), etc.
- ❑ **Army Requirements:**
 - Deployment / employment considerations.
 - Command and Control.
 - Integrated Logistics Support (ILS).
 - Cost-benefit tradeoffs.
- ❑ **Near Term Schedule (2003):**
 - Operational Demonstration, Enterprise Battle Group (2nd Fleet), Jun 03-Present.
 - Develop Army FY05 STO ("Unmanned Maritime Surface Protection"), Jan 04.
 - Preliminary Design Reviews, Williamsburg, VA, 3-5 Feb 04.
 - Force Projection Symposium, Norfolk, VA, 18-20 May 04.
 - USARPAC operational demonstration with TSV, Fall 04.



SPARTAN USV Program Summary



OBJECTIVE: Demonstrate the Military Utility of USVs for ASSURED ACCESS and FORCE PROTECTION in the Littorals and fill a void in capability that the Fleet is in critical need of today

□ Approved FY02 ACTD

- Started May 2002
- Navy-led joint program
- Coalition partner: Republic of Singapore
- Warfighting Capability Demonstrations
 - » Force Protection
 - » Precision Strike/ASuW
 - » MIW
 - » C² of Multiple Spartans
 - » Bottom mapping (TBD)
- ISR SPARTAN deployed ENTCSG

□ PRODUCT: A RHIB which can be deployed from Surface Ships and Shore-based Facilities which has:

- Unmanned, semi-autonomous operations
- Existing systems and sensors
- Modular warfighting capability
- Cost effective force leveler/multiplier

□ Fleet Residuals [C3F]

- 3 Spartan Core Systems with 3 warfighting modules
 - » ISR/FP
 - » Precision Strike/ASuW
 - » MIW

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Raytheon

NORTHROP GRUMMAN



SPARTAN Scout Army Concept of Operations (CONOPS)



Force Protection
Harbor Security
Coastal Surveillance



Intra-theater
Operational
Maneuver



Strategic
Sealift
Throughput



USV
ISR / FP

USV
USW Mission



UUVs

Acoustic
Homing
Torpedoes

UAV
Wide Area Ops/Comms



USV
Precision
Strike

USV
ISR/Force Protection

Patrol Boats
With Weapons



USV
Bathymetry
Mapping

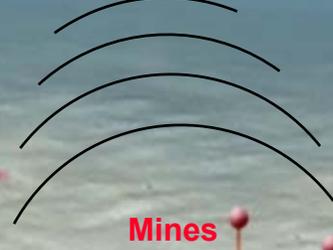


Strike

USV



Austere Port &
Riverine
Operations



Mines

Army Pursuing ISR/FP & Bathymetry Mapping Capabilities for Intra & Inter-Theater Sealift and Precision Strike Against Threat Targets