



24 January 2013

Industry Day Unmanned Influence Sweep System (UISS)

CAPT Michael Tesar USN
PMS 406U



UISS Industry Day Agenda



0730 Check-in

0800 Principal APM, PMS 406U, CAPT M. Tesar

- General Announcements
- Ground Rules
- Question submission

0830 PEO LCS, RDML J. Murdoch - Welcoming Remarks

0845 Program Manager, PMS 406, CAPT D. Ashton

- Program Overview
- Program Background
- Program Plan
- Long Term Objectives - Multi-functional USV

0945 Break



UISS Industry Day Agenda



1000 UISS APM, PMS 406U1, Ms. P. Young and Systems Design Manager, SEA05L, Mr. John Madaio

– UISS Program Technical Overview (all information presented is available in the UISS SRD)

- System Overview
- Concept of Operations
- Requirements
- Prototype Shortfalls
- Design Considerations

1130 Bidders submit written questions

Facility available for use until 1600

UISS Industry Day Facilities

FEDERAL GATEWAY CONFERENCE CENTER

1100 New Jersey Ave., Suite 200 Washington, DC 20003



UISS Industry Day

LOCAL CUISINE AND PARKING OPTIONS



All parking is limited, not guaranteed, and available on a first come first serve basis.

● CUISINE

- 1. 5 Guys**
1100 New Jersey Ave SE
Phone: 202-863-0570
- 2. Subway**
1100 New Jersey Ave SE
Phone: 202-488-0112
- 3. Food Trucks**
1100 New Jersey Ave SE
- 4. Starbucks**
1200 New Jersey Ave SE
Phone: 202-488-1101
- 5. Courtyard Cafe**
140 L St SE
Phone: 202-479-0027
- 6. LOT 38 Espresso**
156 L St SE
Phone: 202-758-0677
- 7. Cornercopia**
1000 4rd St SE
Phone: 202-525-1653
- 8. Sizzling Express**
300 M St SE
Phone: 202-484-6300
- 9. Metro Center Cafe**
80 M St SE
Phone: 202-488-8600
- 10. Justin's Cafe**
1025 First St SE
Phone: 202-652-1009
- 11. Quizno's**
810 Potomac Ave SE
Phone: 202-544-2538
- 12. Barracks Row**
Restaurants & Cafes
- 13. Dominos Pizza**
900 M St SE
Phone: 202-484-3030

◆ PARKING

- 1. Alion Federal Gateway
1100 New Jersey Ave.**
Hourly \$9.00
Daily \$17.00
Monthly \$232.00
Handicap parking
- 2. Marriott Courtyard**
0-1 hour \$8.00
1-2 hour \$16.00
2-24 hour \$25.00
Handicap parking
- 3. William C. Smith**
Daily \$7.00
Monthly \$130.00
- 4. U Street Outside Lots
3rd Street**
Daily \$10.00
Monthly \$158.00
- 5. Colonial Parking
100 M & First Street**
Per Hour \$6.25 (before 9am)
Per Hour \$8.47 (after 9am)
Max \$18.00
- 6. U Street Navy Yard
M Street - Outside Lot**
Daily \$10.00
Monthly \$158.04
- 7. Colonial Parking**
Daily \$6.00
Monthly \$100.00
- 8. The Yards Parking Lots**
0-1 hour \$5.00
1-2 hour \$7.00
2-3 hour \$9.00
3-24 hour \$12.00
Monthly \$100.00
- 9. Colonial Parking
M & First Street - Outside**
12 Hours \$9.00
24 Hours \$8.00

Catering Services	Via Cucina/La Prima* Phone: 202-783-1001	Office Catering* Phone: 202-387-1033	Saint Germain Phone: 703-506-9396
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*Requires Charge Card



Question format



- All questions shall be submitted in writing on the provided form
- Include reference citation i.e. RFP, SOW, SRD, Attachment section and paragraph; Industry Day Brief slide #; Bidder's library document and relevant section; Administrative/General
- Include Point of Contact information
- Questions and answers will be posted to FBO

Government reserves the right to only answer questions it chooses



24 January 2013

**Industry Day
Unmanned Influence Sweep
System (UISS)
Program Overview**

CAPT Duane Ashton USN

PMS 406



UISS Overview

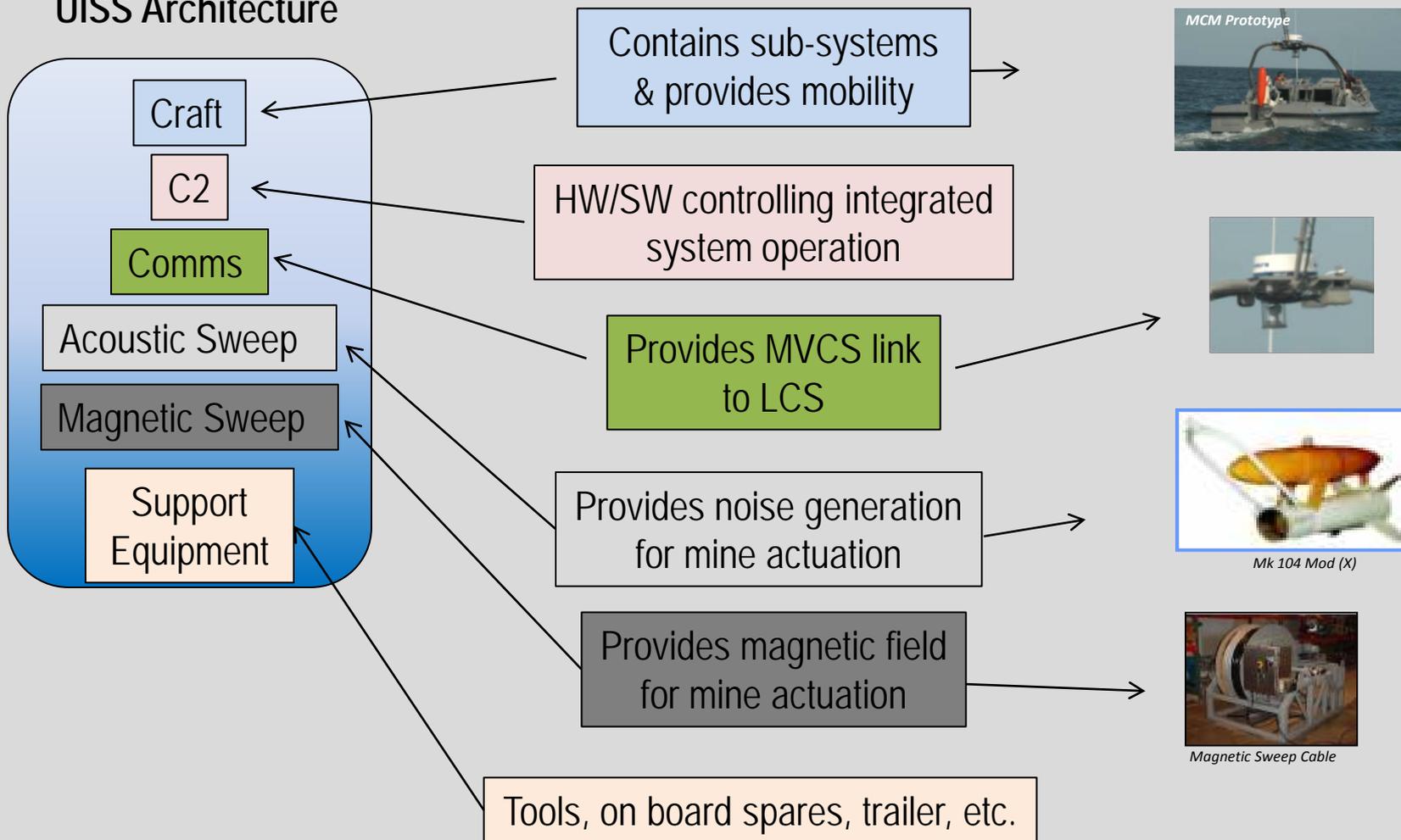


- Provides LCS with stand-off, long endurance, semi-autonomous minesweeping capability to counter acoustic and/or magnetic influence mine threats
- Planned as an Increment 3 Mission System in the LCS MCM Mission Package
 - Mission System = Vehicles, C2, Communications, and Weapon Systems
 - LCS Mission Module = Mission Systems + Support Equipment + Software
 - LCS Mission Package = MMs + Crew Detachments

Solicitation is for the development and procurement of the Mission System and Mission System specific Software and Support Equipment

UISS Architecture

UISS Architecture



*Pictures depict the prototype system and does not represent Government's desired system



UISS Operational Overview



Host Ship Software

Multi-Operator Control Unit,
Core System Controller.
Payload Control Interfaces,
Video, Mission Planning

Support Equipment

Support Module, Spares,
Tools and Test Equipment, Handling Equipment,
Slings, Cradle

Radios/Comms

Multi-Vehicle Communication System,
Antennas

Launch & Recovery

Manned Portable Control Unit,
LCS Interfaces

Unmanned Influence Sweep System

USV Subsystem
Command, Control, Communications and Computer Subsystem
Sweep Subsystem

Acoustically/magnetically sweep underwater mines using an LCS
deployed unmanned watercraft which follows preplanned routes

- Mission Planning and Upload
- Pre-Launch and Launch
- Transfer of Control
- Transit
- Sweep System Initialization
- Sweeping
- Return Transit and Recovery
- Post-Mission



UISS KPPs



- KPPs
 - Area Coverage Rate Sustained (ACRS): Classified
 - Net-Ready
 - Sustainability
 - Operational Availability (A_o)
 - Threshold = 0.80
 - Objective = 0.85
 - Materiel Availability (A_m): Classified
 - Energy Efficiency
 - Threshold = 40 gallons/hour
 - Objective = 25 gallons/hour



UISS Background



- Two prototype systems built & tested
 - Aluminum USV
 - Acoustic and Magnetic Sweep
 - System Integration
- Fleet operated & maintained during LCS MCM MP End-to-End tests, Aug 09 & Sept 10
 - USV satisfactorily tested unmanned
 - Unmanned Surface Sweep System (US3) redesigned to improve sustainability (FY10-11)
- Improved prototype system successfully Full Mission profile tested, Jun-Sept 11
- Magnetic Sweep Cable Endurance tested, Apr 12
- Underwater Explosion event, Oct 12



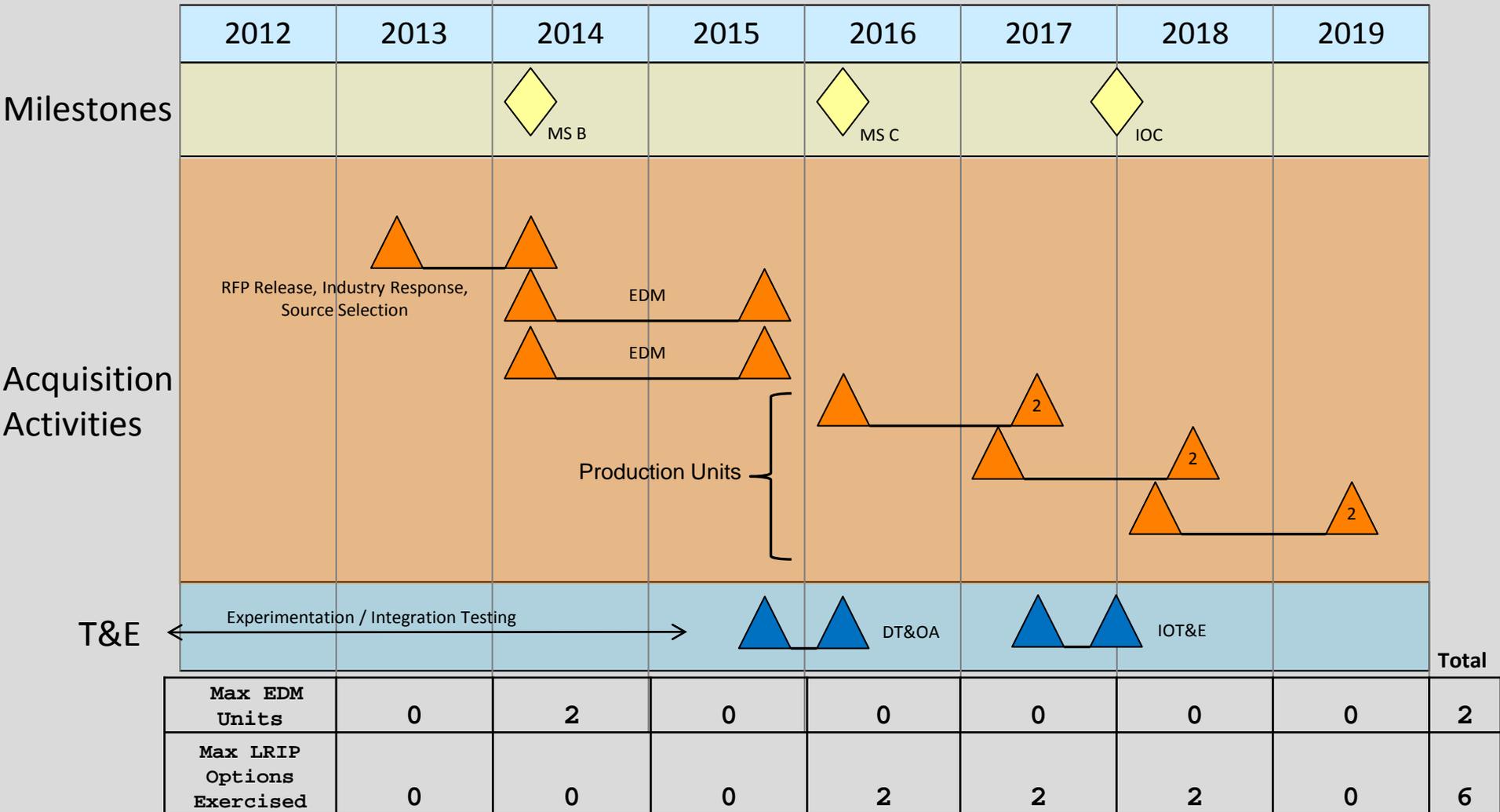
Unmanned Sea Keeping
in SS3 Completed



Fit Check with LCS-2 Completed

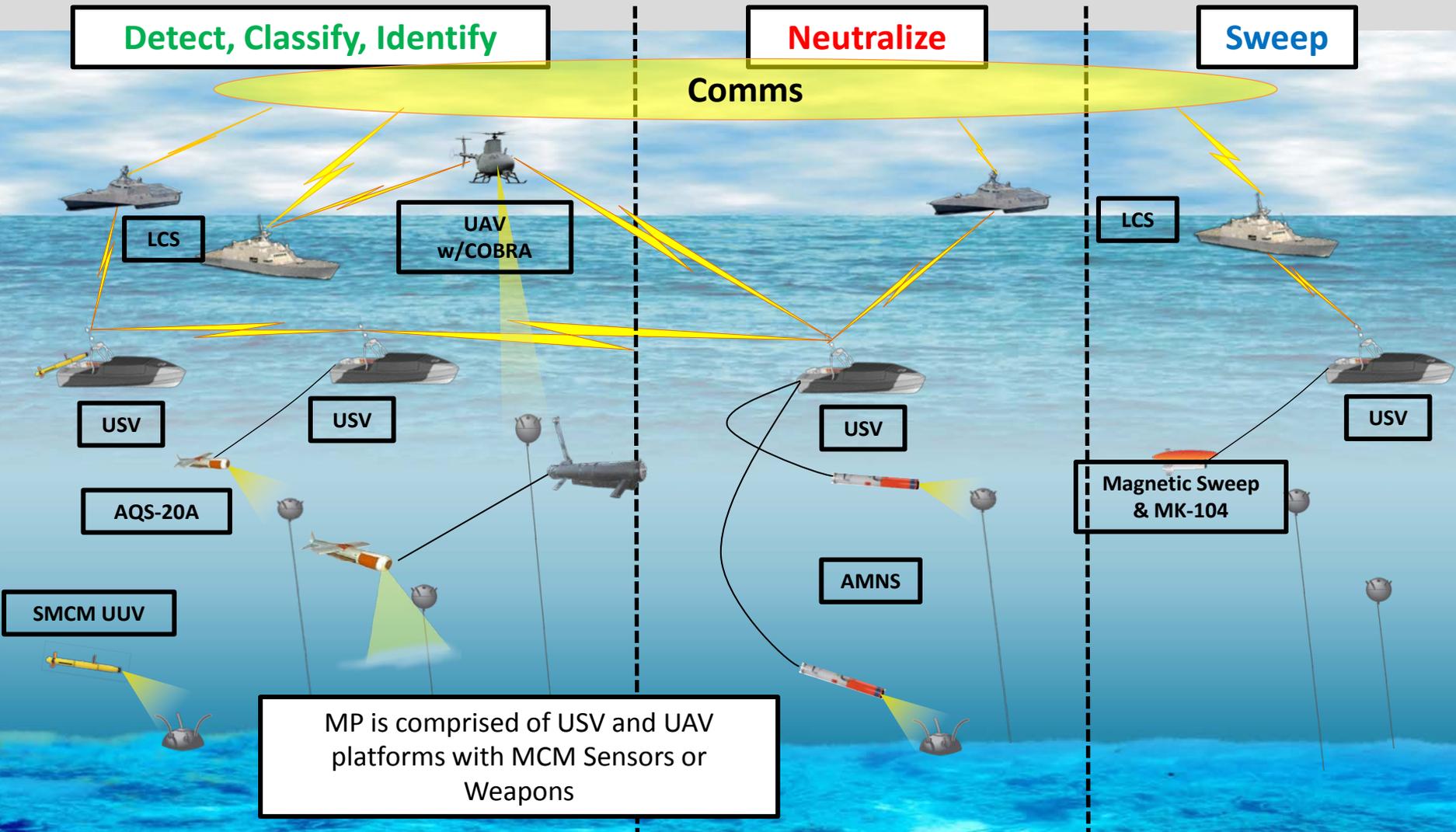


UISS Anticipated Milestones and Procurement





Multi-Function USV Vision





PMS 406 USV Programs



- PMS 406 has proposed “Flights” of USVs
 - Flight 1: Minesweeping
 - USV + sweeping
 - Flight 2: Minesweeping & Hunting
 - USV + sweeping + minehunting sonar (Q-20)
 - Flight 3: Minesweeping, Hunting & Neutralization
 - USV + sweeping + minehunting sonar (Q-20) + neutralizers
 - Flight 4: Multi-Function, Multi-Mission USV
- This solicitation is for Flight 1 only
 - Unmanned Influence Sweep System
 - Part of the LCS MP Increment 3

USV modularity is key to achieving future Flights



24 January 2013

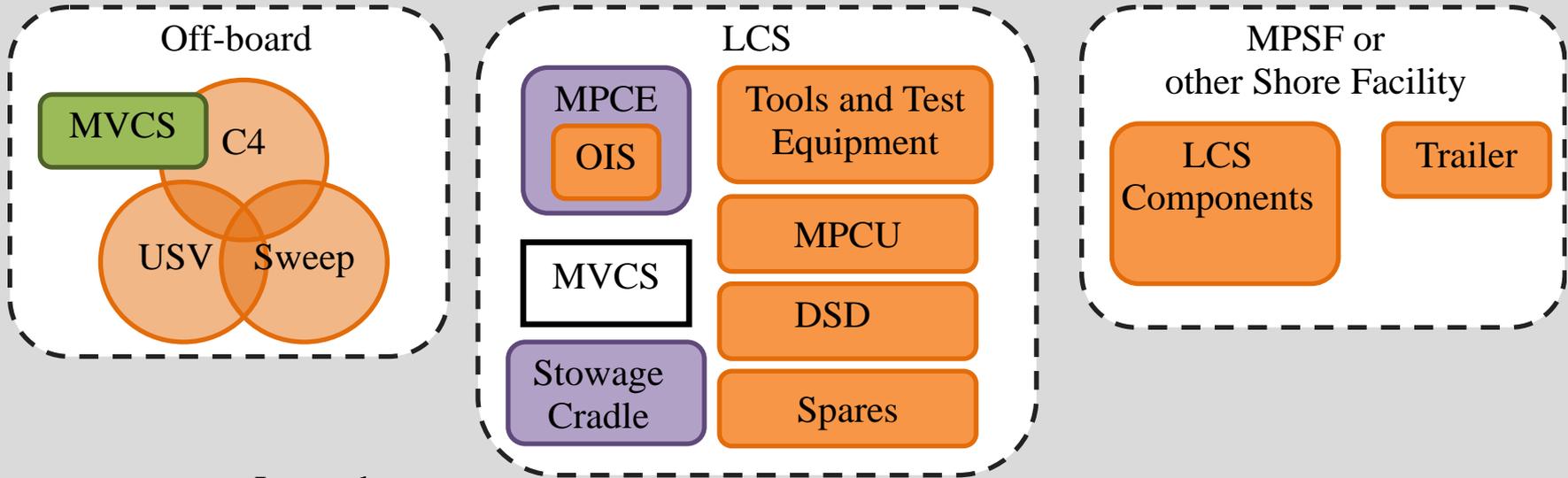
**Industry Day
Unmanned Influence Sweep
System (UISS)
Technical Overview**

Ms. Pearl Young, UISS APM

Mr. John Madaio, SEA 05L



System Overview



Legend



*Note: "GFP for use" is labeled "GLP" in UISS SRD

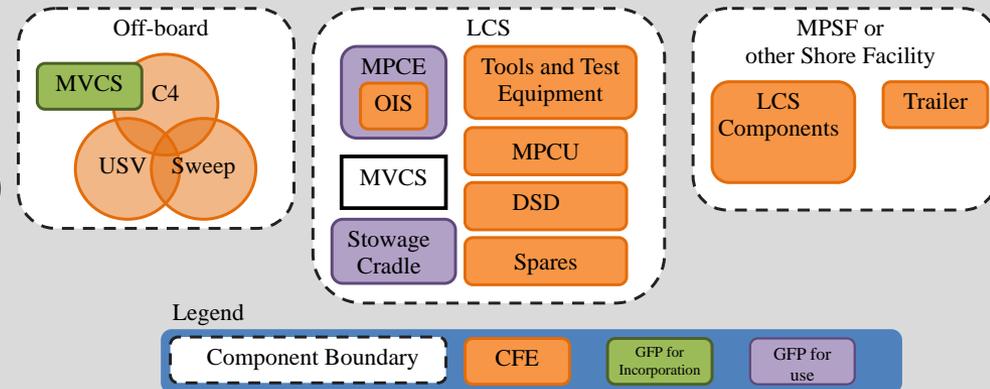


System Overview



UISS consists of a(n):

- Off-board Modular Component
 - USV
 - Sweep System (includes magnetic and acoustic emitters)
 - Command, Control, Communications, and Computer (C4) Equipment
 - MVCS (GFP for Incorporation)
- LCS Component
 - Operator Interface Software (OIS)
 - Man Portable Control Unit (MPCU)
 - Stowage Cradle (GFP for use)
 - MPCE (GFP for use)
 - Spares
 - Tools and Test Equipment
 - Diagnostic Support Device (DSD)
- Mission Package Support Facility (MPSF) Component
 - LCS Components
 - Trailer





UISS Operational Overview

Host Ship Software

Multi-Operator Control Unit,
Core System Controller,
Payload Control Interfaces,
Video, Mission Planning

Support Equipment

Support Module, Spares,
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UISS Requirements

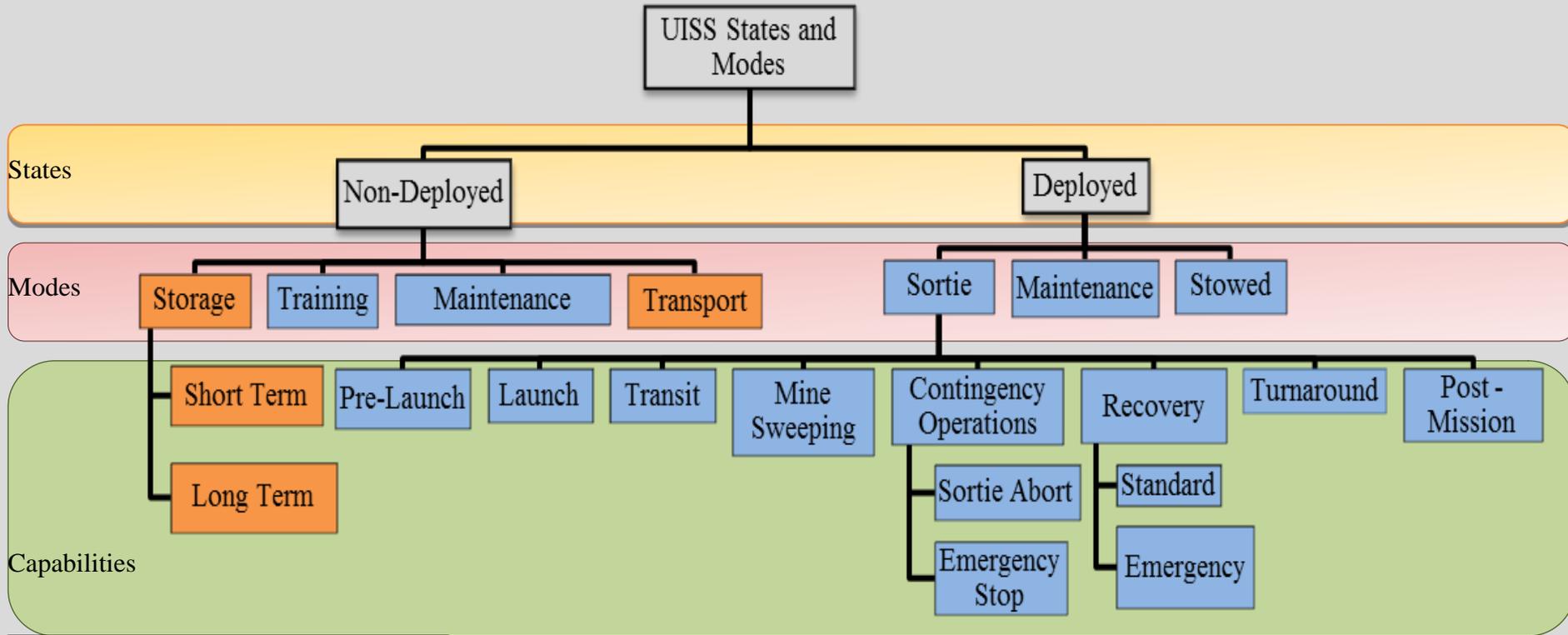


- The UISS Mission System shall be a self-propelled, unmanned, semi-autonomous surface vehicle capable of operating independently in shallow water regions of the ocean to sweep magnetic & acoustic mines
 - Must be compatible with both LCS variants*
- The following slides provide an overview of the following:
 - States & Modes
 - Key Performance Parameters (KPPs)
 - Physical Requirements/Limitations
 - Environmental Requirements
 - Key System Attributes (KSAs)
 - Additional Requirements

* See the LCS ICD and LCS Launch, Recovery, Handling, and Stowage Amplification Guide for information . These documents will be provided as GFI, if the Government releases a final RFP.



UISS Requirements States & Modes



Legend	
	No Environmental Requirements
	Non-Operating Environmental Requirements
	Operating Environmental Requirements



UISS KPPs



- KPPs
 - Area Coverage Rate Sustained (ACRS): Classified
 - Net-Ready
 - Sustainability
 - Operational Availability (A_o)
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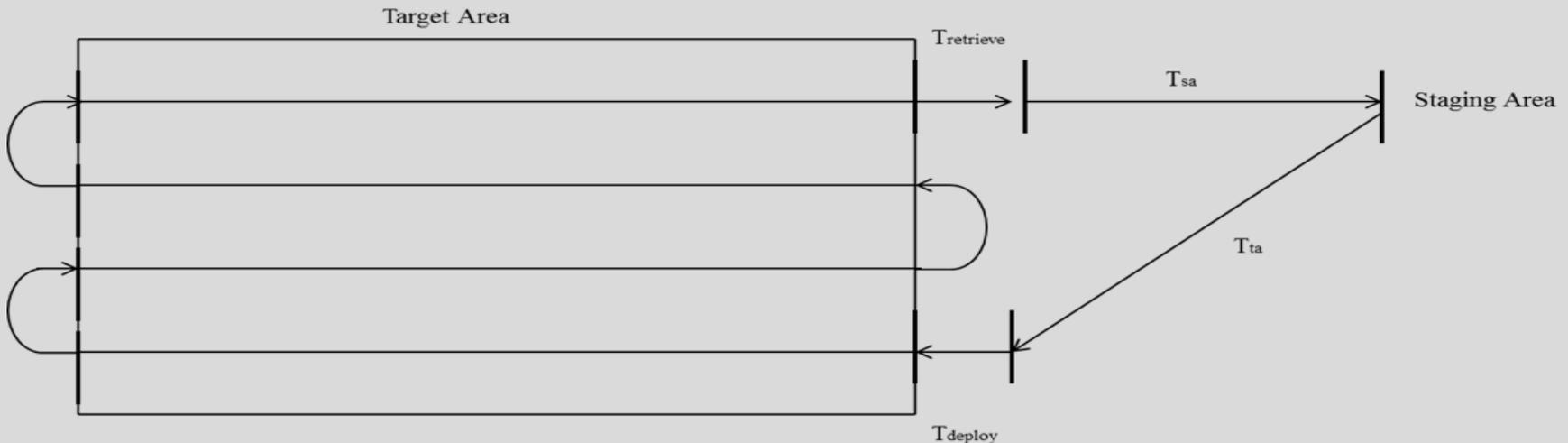


UISS Requirements



Key Performance Parameters (KPPs)

- ACRS (nm²/hr): Classified
 - Is defined as the area of water (in nautical miles squared) covered by the UISS sweep swath per hour as averaged over an entire mission
 - Encompasses all the aspects of mine sweeping in order to provide the acquisition community the greatest trade space to develop the UISS
 - Mission time begins with the initiation of pre-mission preps with the UISS Mission System in its stowage location on the LCS
 - Figure below depicts the sortie and illustrates the times associated with the various segments of the sortie





UISS Requirements

Key Performance Parameters (KPPs)



- Sustainment: Operational Availability (A_o): 0.80
Threshold / 0.85 Objective
 - A_o is defined as where uptime is divided by uptime plus down time
 - Uptime is the time when the system is considered to be ready for use and is either operating, in standby, or off as measured against the Design Reference Mission Profile
 - Downtime is the time the system is down for repair of operational mission hardware failures and/or for restoration from operational mission software faults, including off-board logistic delays
- Sustainment: Materiel Availability (A_m): Classified
 - A_m is a measure of the percentage of the total inventory of UISS's operationally capable of performing an assigned mission at a given time, based on materiel condition

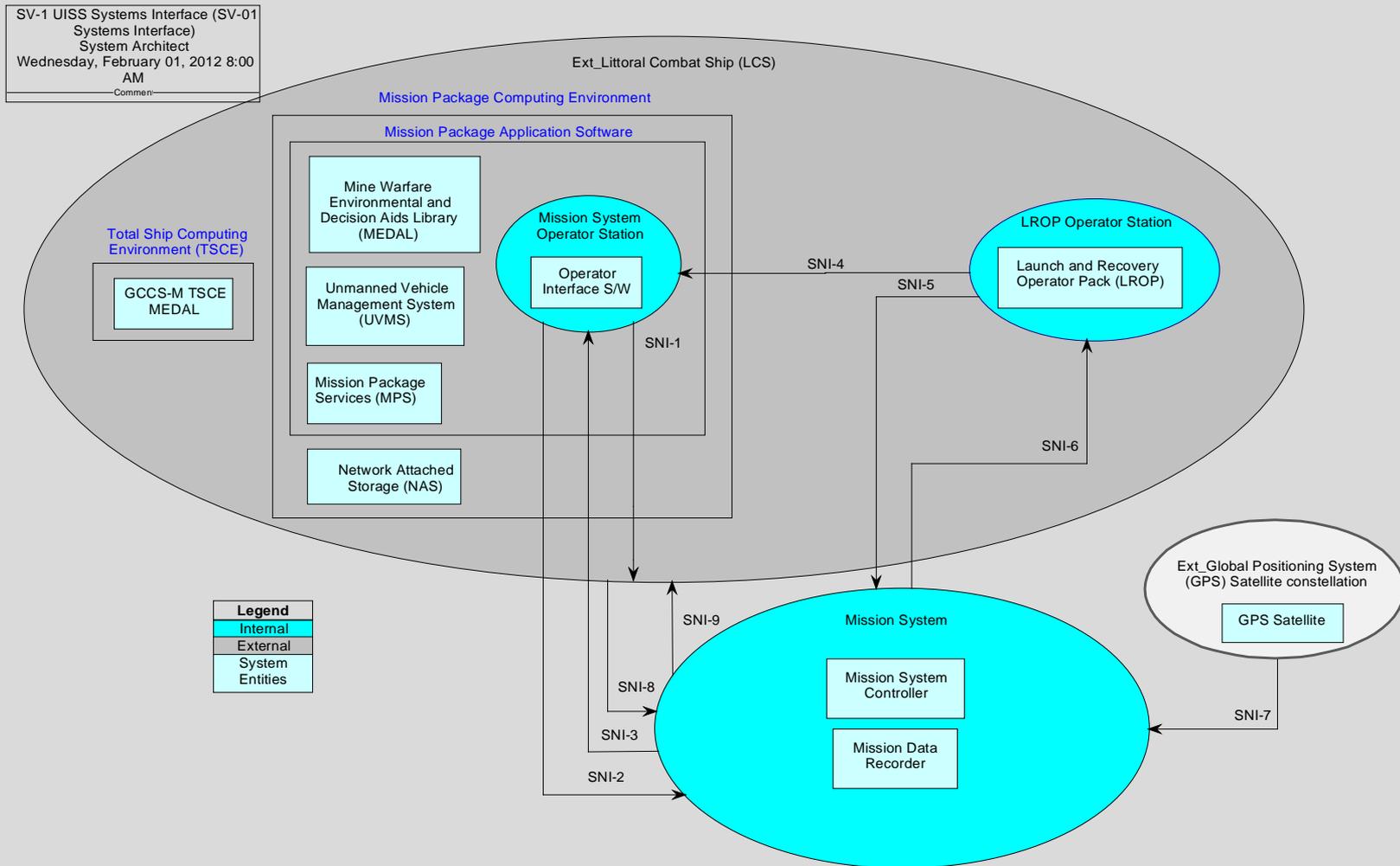


UISS Requirements

Key Performance Parameters (KPPs)



- Net Ready: Invoked through Information Assurance and Program Protection requirements





UISS Requirements

Key Performance Parameters (KPPs)



- Energy Efficiency: 40 gph Threshold / 25 gph Objective
 - Defined as the average fuel consumption of all Off-board Components over the course of one sortie

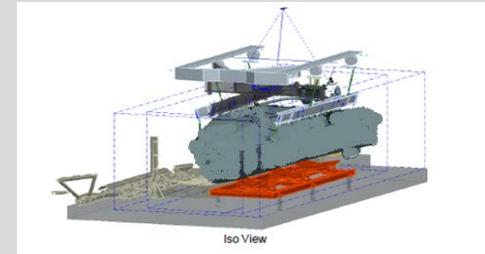
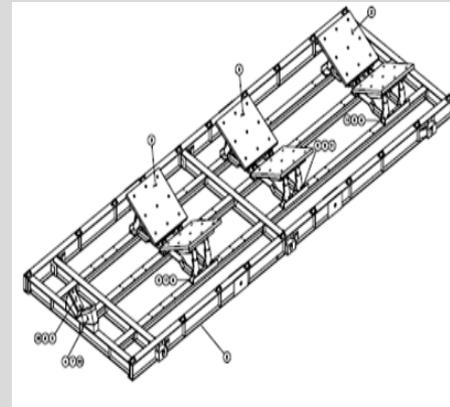


UISS Requirements

Physical Requirements/Limitations



Parameter	Requirement
Length	X<12.2 m
Width	X<3.6 m
Height	X<3.3 m
Height on Cradle	X<3.6 m
Weight	X<10,250kg
LCG	See ICD and LCS Launch, Recovery, Handling, and Stowage Amplification Guide



Pictures of the LCS Stowage Cradle and 11m RHIB for illustrative purposes



UISS Requirements

Operational Environmental Parameters



Parameter	Requirement
Humidity	0-100%
Salt Fog	MIL-STD-810-G (Sect 509.5)
Solar Radiation	0-1120 W/m ² for 16 of 24 hrs
Daylight/Nighttime Ops	Bright sunlight to full darkness (w/o artificial visible light)
Water Temperature	32°F to 100°F
Air Temperature	-4°F to 115°F
Shock	MIL-S-901D Grade B when Stowed
Vibration	MIL-STD-167-1A
Salinity	> 20 PSU (T), > 10 PSU (O)
Transportation Altitude	40,000ft



UISS Requirements

Operational Environmental Parameters



- Sea State (SS) requirement is for three conditions of operation:
 - Normal Conditions: UISS shall maintain full mission capability
 - Degraded Conditions: UISS mission capability shall degrade such that it may continue sweeping with reduced effectiveness
 - Survival Conditions: UISS with the sweep gear retrieved and secured, if applicable, shall survive environment and resume operations as the environment improves

ENVIRONMENTAL PARAMETERS	THRESHOLD	OBJECTIVE
Normal Conditions	SS3	N/A
Degraded Conditions	N/A	SS4
Survival Conditions	N/A	SS5



UISS Requirements

Key System Attributes (KSAs)



- Mean Time Between Failure (MTBF): 125 hours Threshold / 200 hours Objective
 - Total System Operating Hours/Number of Hardware Failures and Software Faults
- Effective Influence Depth Range (EID): Classified
 - The maximum depth that a mine's logics can be "fooled" into triggering the mine explosive, thus causing it to detonate
- Vulnerability to Mine Shock: Classified
 - Mission Survival: The Off-board Component shall be designed and built to survive a mine fire event such that it may continue a sortie
 - Craft Survival: The Off-board Component shall be designed and built to survive mine fire loads such that it shall be salvageable



UISS Requirements

Additional Requirements



- Communications Range: Classified
 - The maximum distance, in nautical miles, the UISS can operate from the LCS and still maintain continuous communications regarding health, performance, situational awareness
- Mean Time to Repair (MTTR): 2 hours Threshold / 1 hour Objective
 - The average time required to repair the system after failure and includes active repair time
- Modular Open Systems Architecture (MOSA): The UISS Program shall perform document trade studies on open systems interface standards and products being considered for use in redesign efforts
- Safely Integrate: UISS shall have the capability to safely integrate and safely interoperate with all ship frames, aviation, and MCM systems
- Legal: Must comply with all applicable laws
- Military Transportability: Must be capable of being transported by all modes of military transportation as well as commercial carriers within weight and volume limitations of each potential carrier
- Navigation and Obstacle Avoidance: UISS will have the capability to detect and avoid surface contacts and hazards to navigation that are greater in size than a 24ft boat



Prototype Shortfalls



- UISS Requirements in the RFP not achieved/tested by Prototype
 - Night time and low light operations
 - Mine fire survivability
 - Sweep operations in SS3
 - Sweep signature output monitoring
 - Deploy & Retrieve sweep payload in SS4
 - COLREGs requirements
 - Situational Awareness
 - Mine fire detection
 - Communications range
 - Launch and recovery from LCS
 - Service Life Growth Margin



Design Considerations



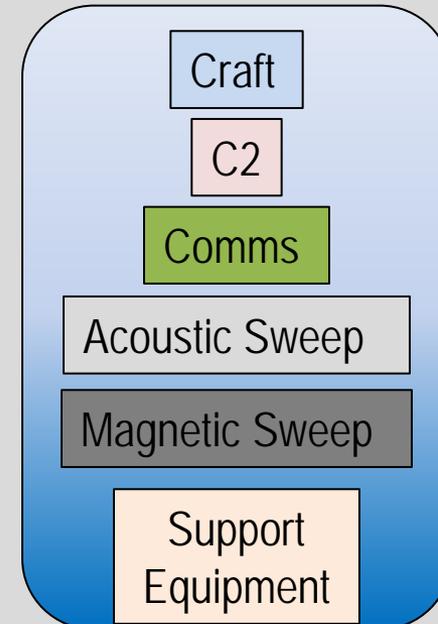
- UISS Requirements (Ref. SRD)
 - Based on Prototype experience, the following requirements are likely to be key design drivers
 - Operations in SS3/Survive in SS5
 - Sensors
 - Loading from SS
 - Hullform trade-offs
 - Maintaining consistent speed
 - Compatibility with LCS multiple ship designs
 - Size
 - Weight
 - LCG – maintaining LCG regardless of fuel load
 - Launch and recovery
 - Mission Bay interfaces
 - Mine fire survivability
 - Hardening systems to withstand mine blast while still meeting weight requirements
 - Design hull structure to withstand mine blast while still meeting weight requirements
 - Training
 - Classroom, hands-on, and training system(s) for training UISS operation and maintenance
 - Training for incorporation into LCS Mission Modules Common Mission Package Trainer or Mission Package Training System (MPTS)



UISS Big Picture



- Represents the baseline for future Mine Countermeasure systems for the Navy – modular design
- Evolution of technology influences both the threat and countermeasure capabilities
- A unique, multi-disciplinary engineering challenge
 - Marine
 - Mechanical
 - Electrical
 - Software
 - Automation
 - Communication





Question format



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