Armed Unmanned Systems

A Perspective on Navy Needs, Initiatives and Vision

Rear Admiral Tim Heely, USN
Program Executive Officer
Strike Weapons and Unmanned Aviation
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NAVAIR

Armed UASs

A first time for everything

Sperry Unmanned Aerial Torpedo Attack Aircraft
Circa 1918

Armed UAS Roles & Missions

PROVIDE

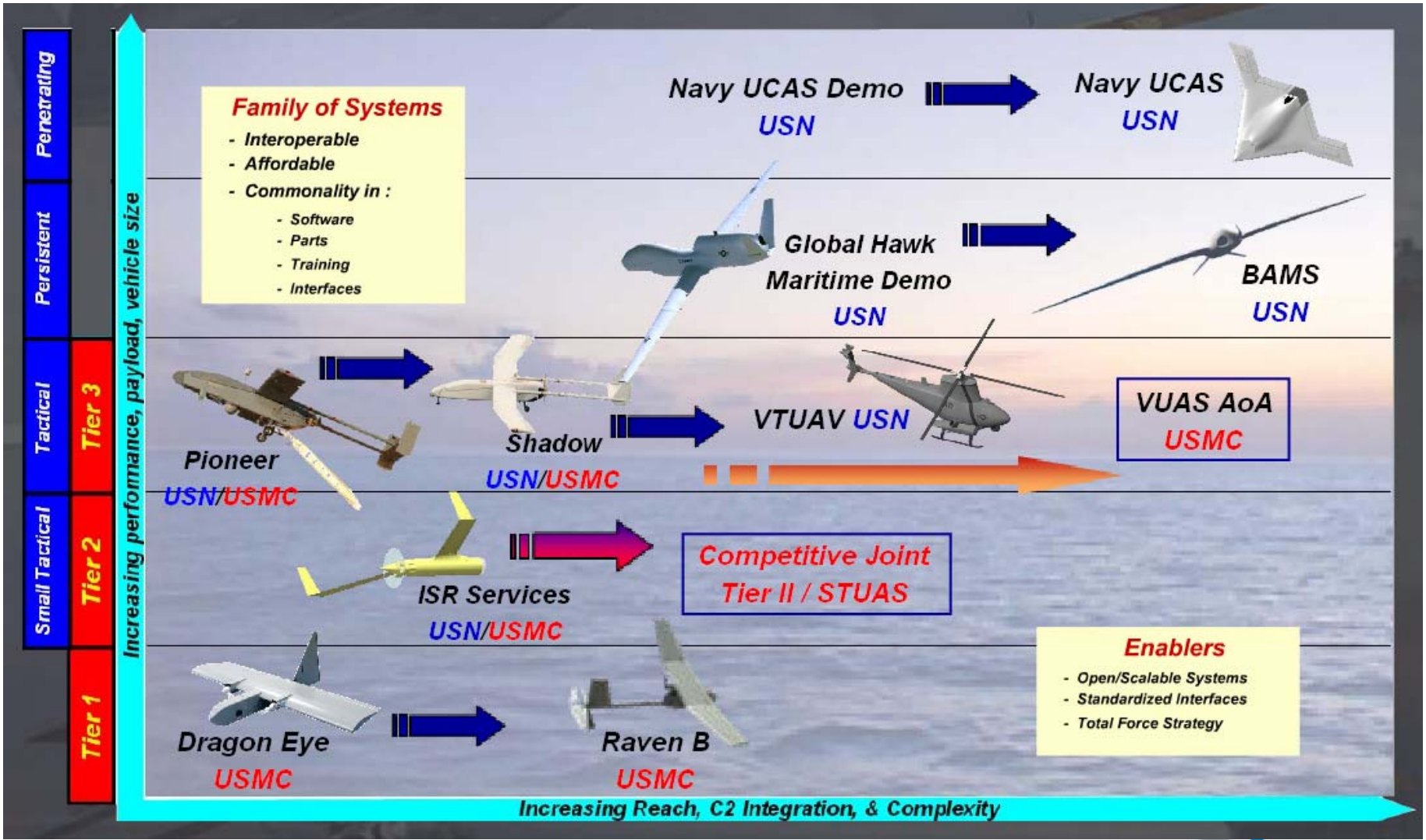
- ISR
- PRE-PLANNED ATTACK
- TGTS OF OPPORTUNITY
- SEAD
- BDA
- RE-ATTACK
- SPECIALIZED FUNCTIONS

AGAINST

- MOBILE TARGETS
- PROTECTED TGTS
- CHEM BIO SITES
- UNPROTECTED DISBURSED TGTS
- DEFENSIVE TGTS
- MARITIME TGTS
- TIME CRITICAL TGTS

Success Will Require a Broad Array of Platforms, Sensors and Weapons

Navy UAS
Family of Systems

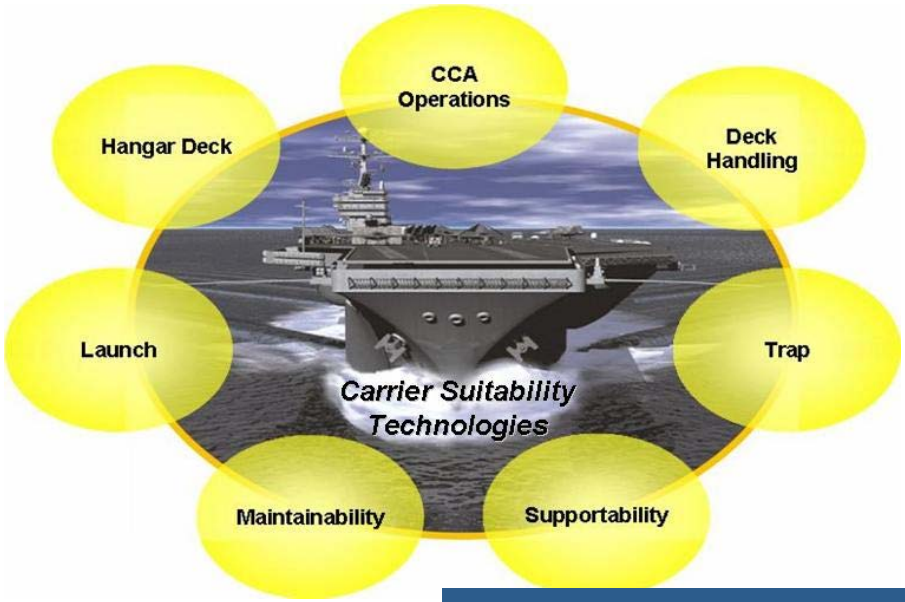


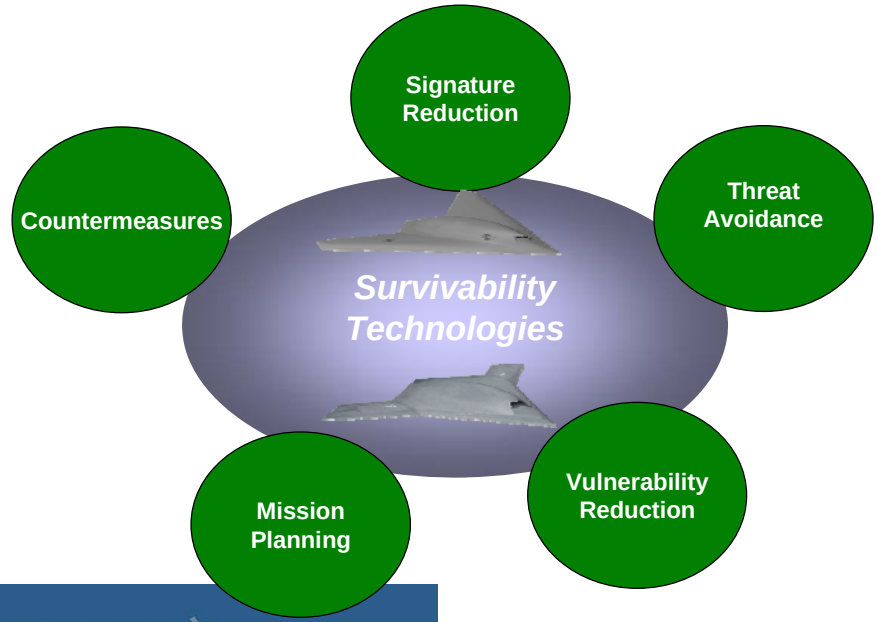
Navy UCAS Objective

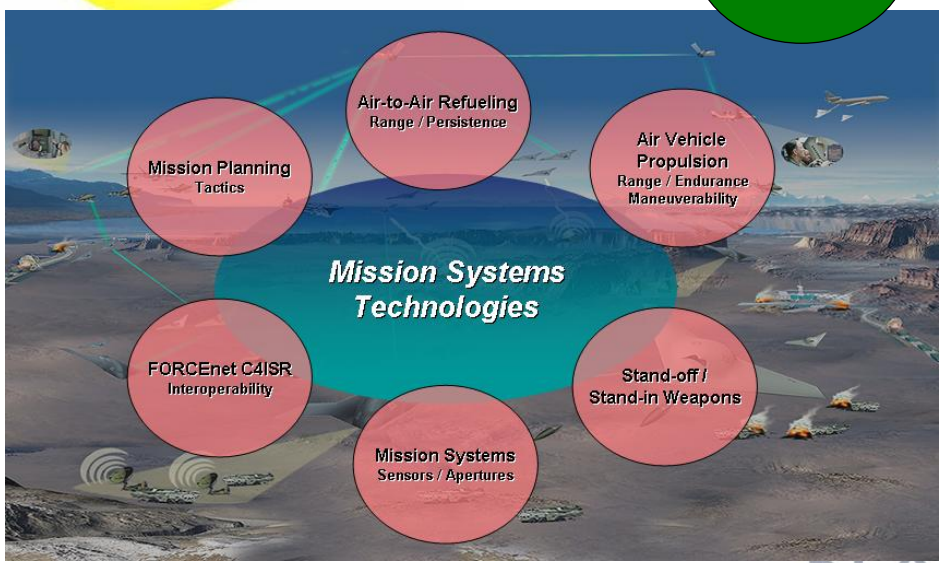
- Navy UCAS Program matures technologies which supports entry into SDD for a Persistent, Penetrating, Carrier-based Strike ISR platform.
  - Leverages past DARPA, USAF, and USN J-UCAS efforts
  - Funded for Navy UCAS CV Demonstration (also called UCAS-D)

- Near-Term Program Goals:
  - Demonstrate Carrier Suitability of Persistent ISR Relevant, Unmanned, LO-Planform Air Vehicle

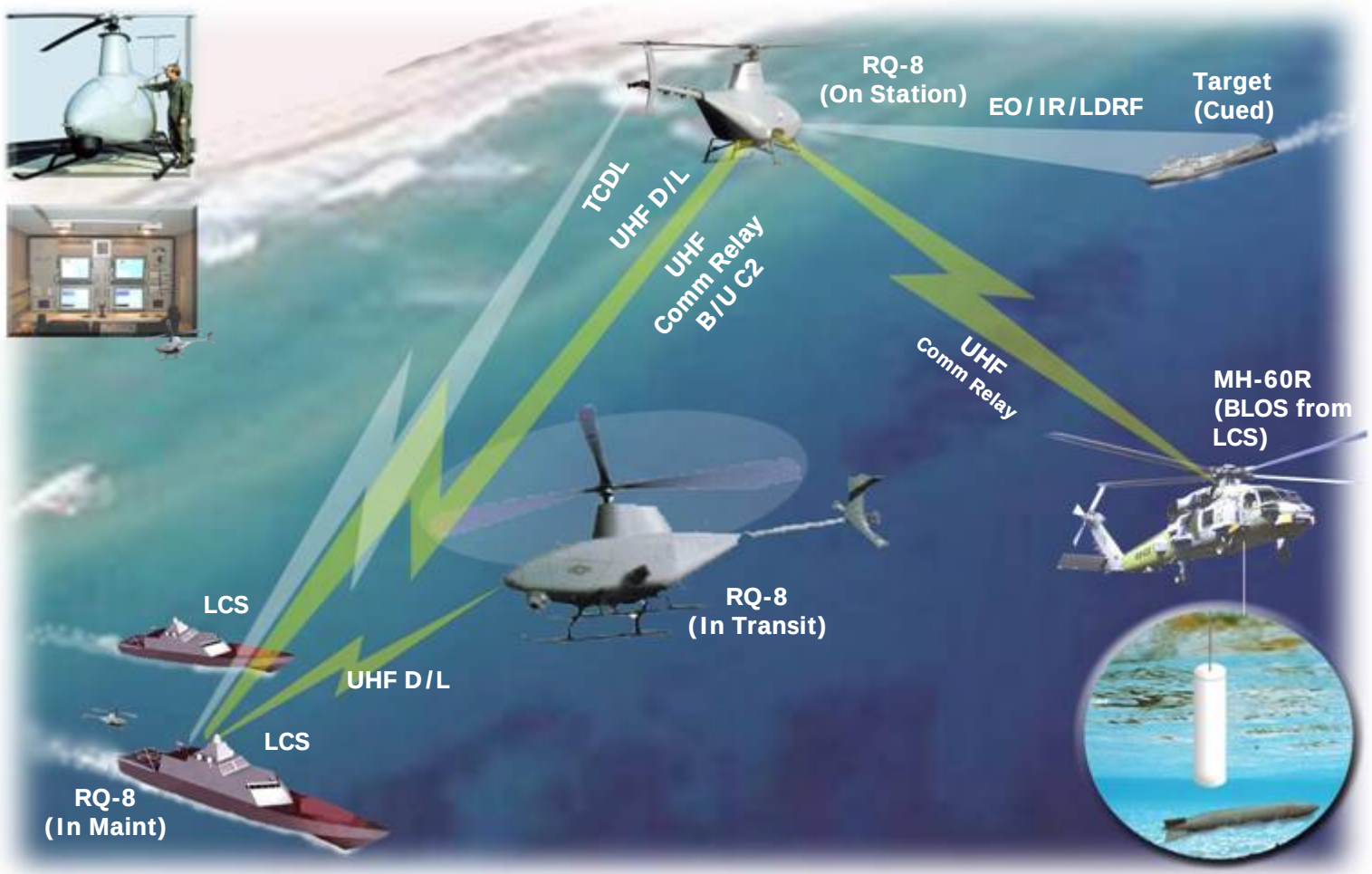
N-UCAS Technology Focus Areas







VTUAV System Overview



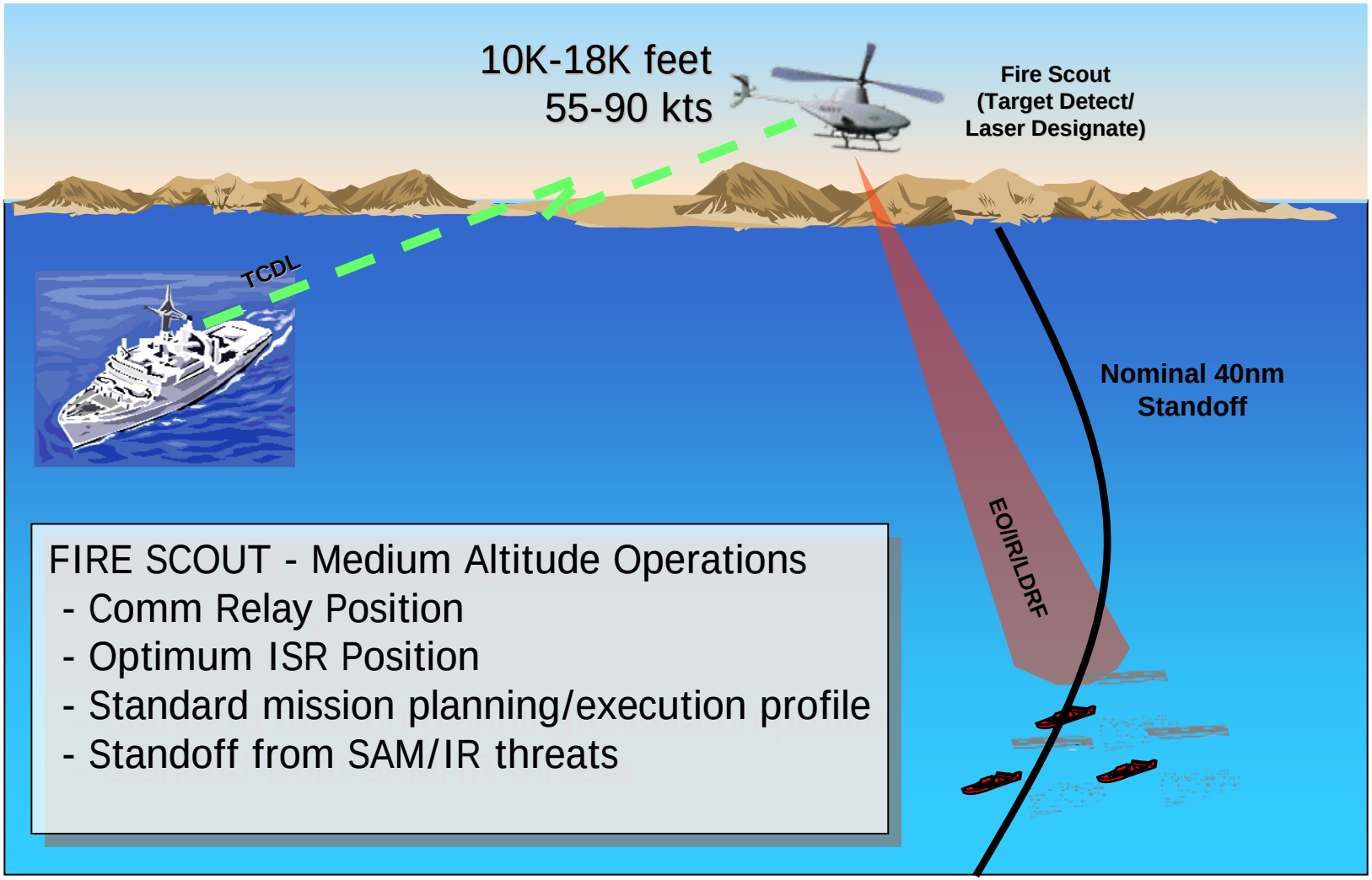
Fire Scout
Primary Mission

- Primary operational mode is Reconnaissance, Surveillance & Tracking.
  - Detect, Identify, Report, & Designate suspected threats
  - Avoid surface threats engagement envelope
- Neutralize time critical threats with on-board weapons while maintaining safe standoff distance.
  - Significant reduction in LCS “kill chain” if threat is engaged at maximum range.
- Threats from Ground based IR/Radar SAMs
  - Drives VTUAV operational altitude
  - Increased standoff necessary

MQ-8B Capabilities and First Flight

	MQ-8B
Horsepower	340
Gross Weight, lb Sea Level w/ 200FPM climb rate	3150
Payload, lb	600
Max Fuel Load, gal	190
Mission Radius, nm (200 lb Payload, 3 hr TOS)	205
Maximum TOS, hr (200 lb Payload, 110 nm Radius)	>5.6
Maximum TOS, hr (600 lb (Payload + Weapons), 110 nm Radius)	2.2
Max Speed, ktas (MGW at SL and 10,000 ft PA)	112 / 93
Survivability Improvements	Significant IR & acoustic improvements
Supportability Improvements	Significant
Payload Volume, cu. ft.	26
Plug and Play	Yes
Weapons Capable	Yes
STANAG 4586	Yes

Fire Scout
Conceptual Weapons Engagement



Potential Target Set

- Fast Attack Craft
  - Ships
  - 40mm to 76mm guns, SAMs, torpedoes and ASCM
- Fast Inshore Attack Craft
  - Smaller, more maneuverable patrol boats, drones, suicide craft
  - 7.62mm, 12.7mm, Shoulder Launched Missiles
  - Loaded w/Explosives
- Derived from:
  - LCS CONOPS
  - LCS Threat Assessment
  - In-theater Inventory

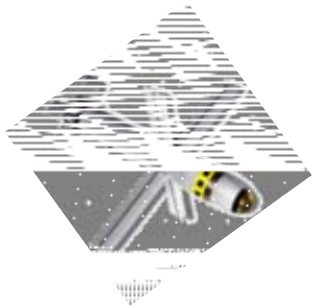
Live Fire Demonstration – Yuma Proving Grounds

Fire Scout Weapons Study
Initial Weapons Selection Criteria

- Weapon Weight < 250lbs
  - Weight of weapon is a tradeoff with usable fuel which equates to range/time on station
  - Low cost/sufficiently lethal weapons typically lightweight
- Precision Guidance or Projectiles
- Warhead applicable to Fast Attack Craft threat
- In Production or Final Stage Development
- Practical on UAV Platform
  - Delivery method
  - Sensor integration
  - Ship board operations/certification

FIRE SCOUT
Weapons Recommendations

Smart Bombs most conducive to Fire Scout mission



Fire and Forget Missiles good match when developed

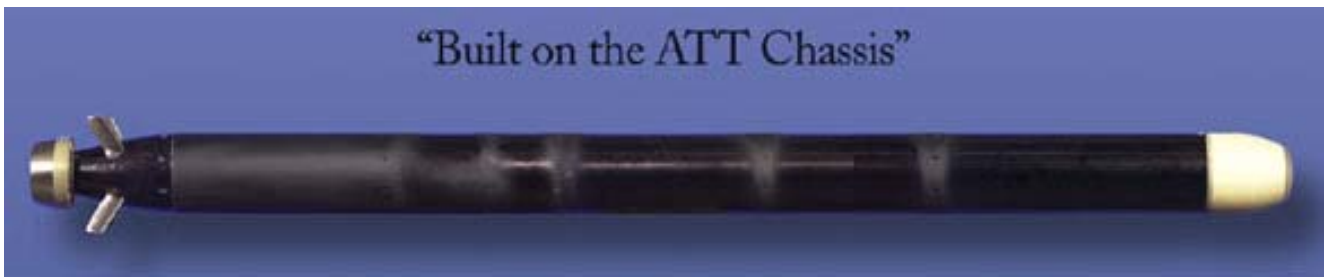
Viper Strike
- Laser guided
- $65k per Unit
- Used on Army Hunter UAV in Iraq
- Manufacturer: Northrop Grumman

PGMM
- Laser Guided – no moving parts
- $15k per unit
- Army precision mortar program
- Manufacturer: ATK

LOGIR/APKWS
- Inertial/IIR/Laser guidance
- $10K to $15K per unit
- China Lake Effort on 2.75” rocket
- Manufacturer: TBD

Other Potential Weapons Efforts

- **Compact Rapid Attack Weapon (CRAW)** – Compact (~85” length, 6.75” diameter, <220lb) weapon capable of being deployed from remotely operated unmanned platforms (VTUAV, USV) against submarines.
  - Builds on successful completion of Anti-Torpedo Torpedo
  - Requires Magnetometer equipped VTUAV
  - ONR/N76 lead for ACTD



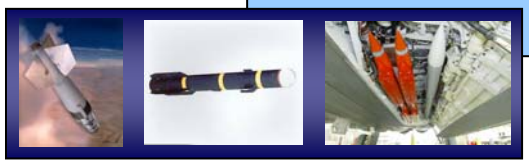
- **China Lake SPIKE** – CNO level interest in SPIKE employed on VTUAV.
  - Supports LCS Layered Defense concept
  - Developmental weapon, light weight
    - China Lake lead for ACTD

Armed UAVs
Part of a Larger Mission Force

Other Manned Aviation

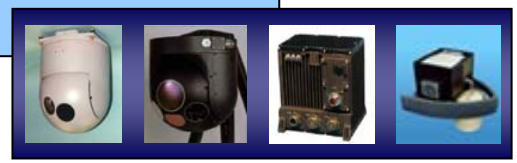
Other UAVs

Vehicles



Weapons

Data Link



Payloads

Data Link

Other Surface Nodes

GCS

Some Armed UAV Challenges

- Architecture & Standards
  - Ground Stations
  - Payload
  - Weapons
- Flexible “Payload” Areas
- Shipboard Operations
- HSI Emphasis and Consistency
- Vehicle Survivability
- Adaptive Control and Collaborative Operations
- CONOPS and Demonstrations
- Integration with Mission Forces