



Tomahawk Asymmetric & Time Sensitive Strike

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Technology Symposium**
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Presented by Mike Thumm



BLK

II

III

IV

SHIPS

SUBS

TAs

ATWCS

TTWCS

TC2S



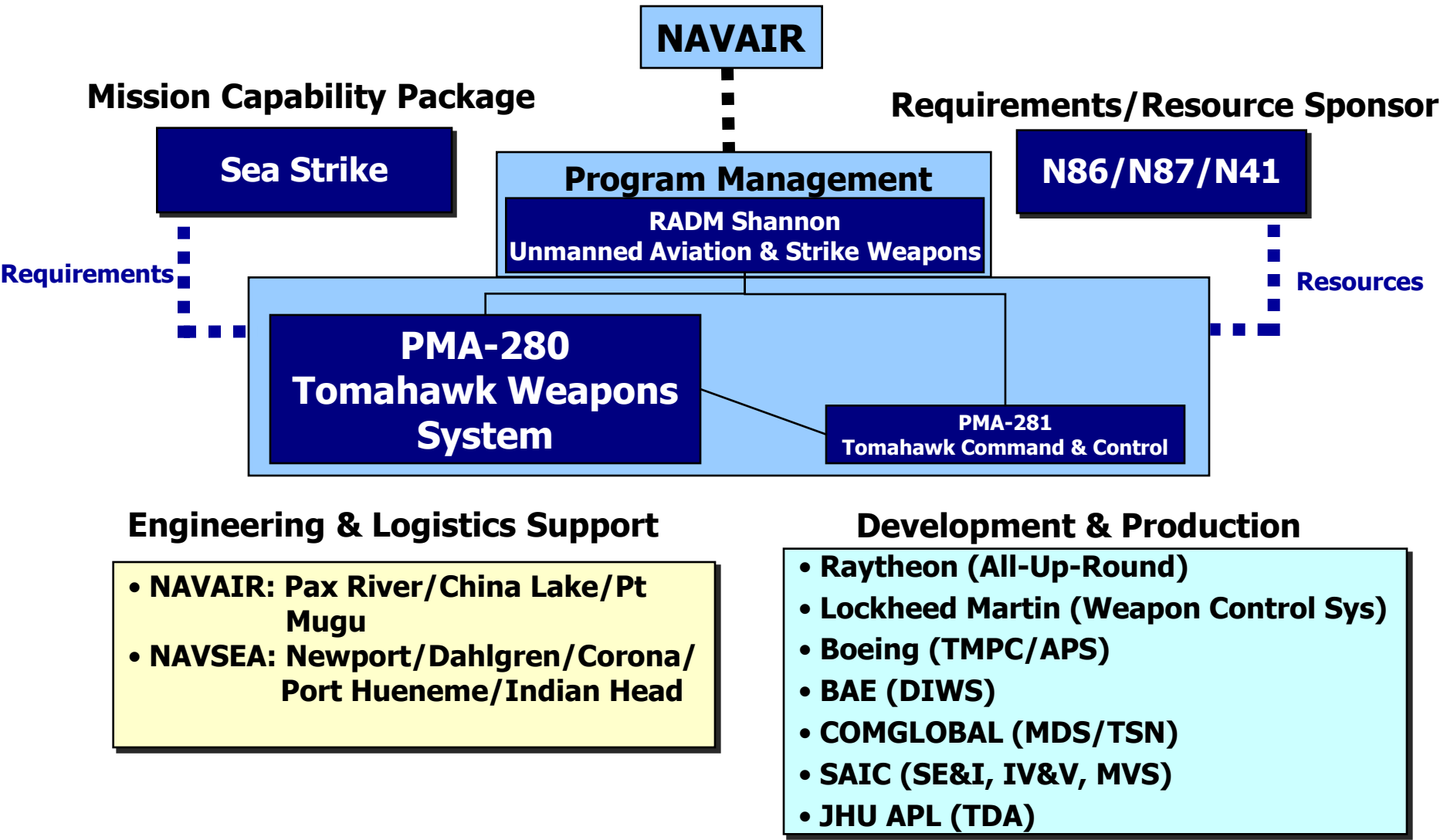
CAPT Dave Davison

PMA-280

david.d.davison@navy.mil



TWS Team Organization

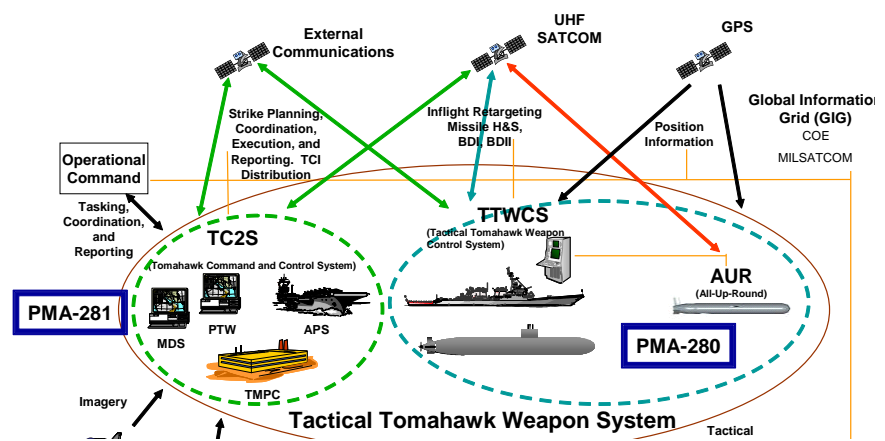




PMA-280 Overview



TWS Critical Interfaces



Development/Production Programs

Tomahawk BLK IV AUR Program (ACAT IC)

Major Milestones	Date
FY04-08 MY Contract-1945 Missiles	Aug 04
CLS Contract Award	Apr 10
FY09 MY Contract-207 Missiles	Mar 09
FY10 Production Option Exercise- 196 Missiles	Jan 10
FY11-15 MY Contract Award-196 Missiles	Jan 11

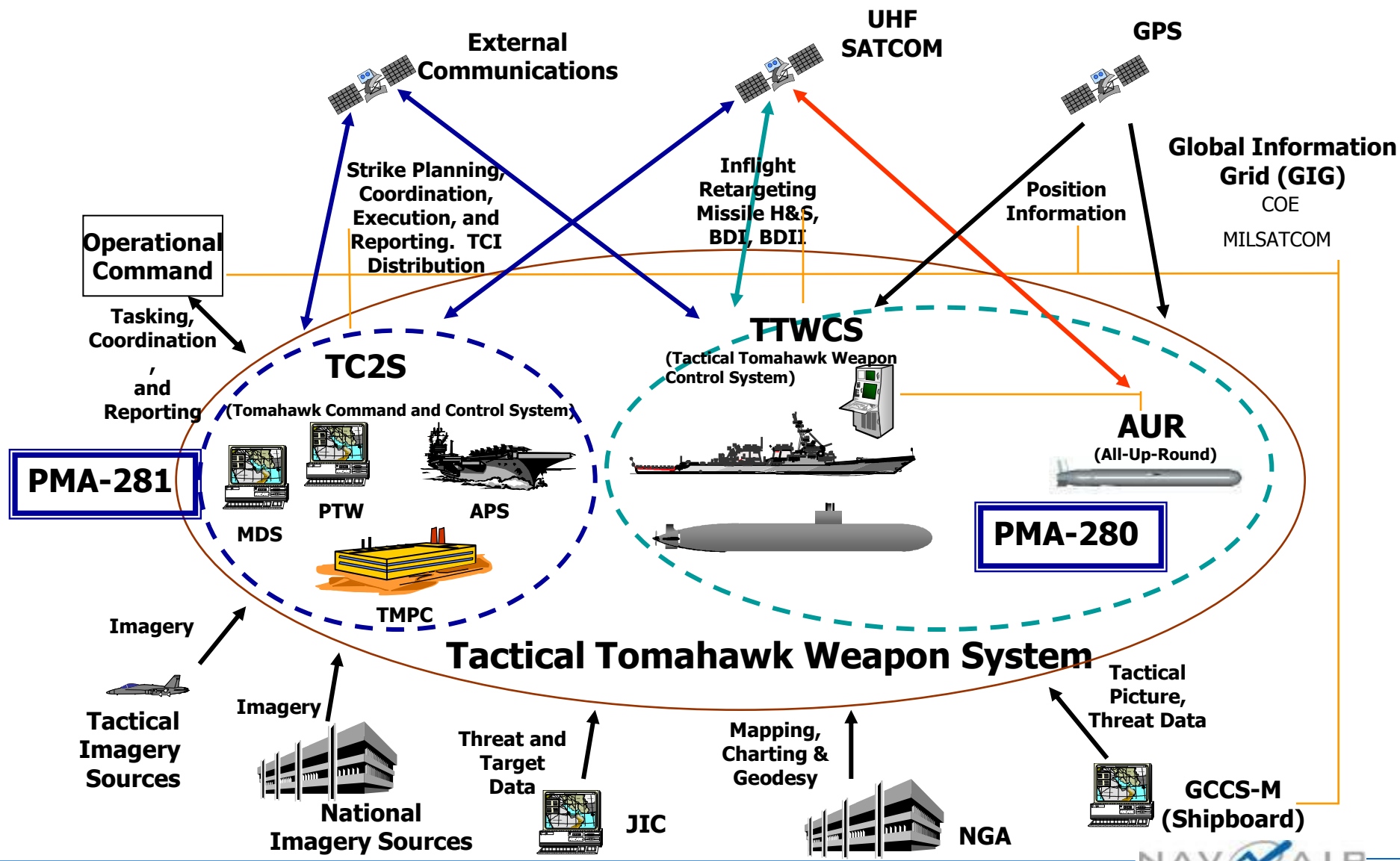
TTWCS Program (non-ACAT)

Next Major Milestone	Date
Version 5.4.1 Increment 2 PDR	Oct 09
Version 5.4.1 Increment 2 CDR	Mar 10
Version 5.4.1 Increment 3 SRR	Sep 10
Version 5.4.0 Fleet Release	Mar 11

- Enhance the Kill Chain
- Horizontal Integration
- Near Real Time / Re-targetable
- Agile
- Enterprise vs. Network
- Long Range Unmanned Precision Strike
- Prompt Strike on Critical Targets



Tactical Tomahawk Weapon System Overview





USN/UK Tomahawk Shooters

SURFACE



TICONDEROGA (CG)
22 Platforms
• VLS



ARLEIGH BURKE (DDG)
54 Platforms
• VLS

SUBMARINE



LOS ANGELES 688
47 Platforms
• CLS/TTL



SEAWOLF
2 Platforms
• TTL Only



SSGN
4 Platforms
• CLS (MAC)



VIRGINIA Class
5 Platforms
• CLS/TTL

UK



TRAFALGAR
7 Platforms
• TTL Only

- Remote Shooters
- Minimal Infrastructure / Interruption to Deployed Forces
- Fire and Forget
- No Tanker Support Needed
- Mobile and Concealed With Minimal Footprint



Concept of Employment



Strategic

- Long Term
- Strategic Targets
- OPLANS
- CMSA Support
- Non-time sensitive / Deliberate Planning

Tactical

- High Value Targets
- Planned at Fleet or Firing Units (FRU)
- Flexible Targeting in Flight
- BDII
- Time sensitive / Tactical Mission Support

Non – Traditional/Asymmetric Warfare

- Al Qaeda Targets / Overseas Contingency Ops

- Near Real Time Targeting

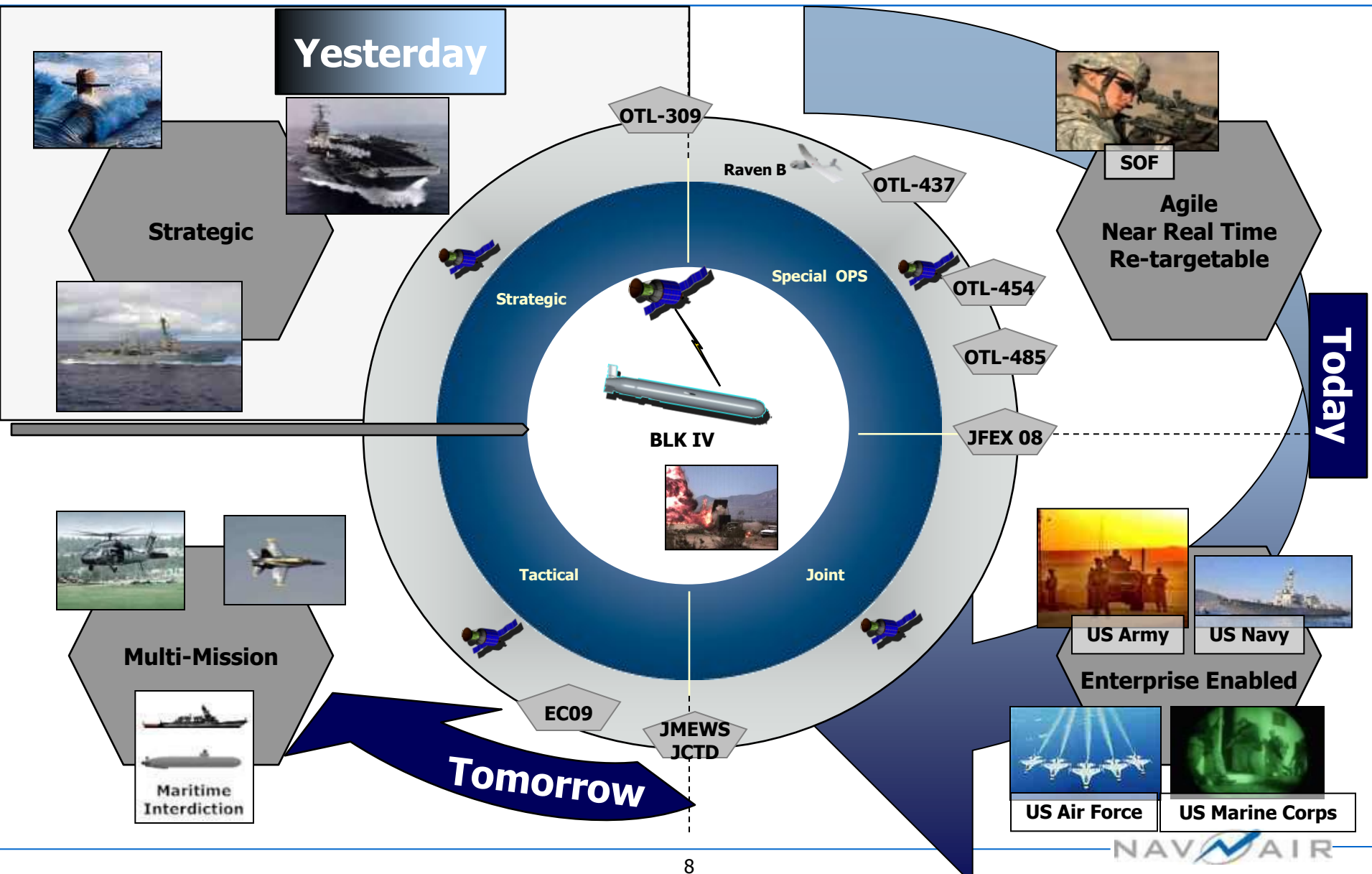
Ability to plan with JSPEARS in the Field

- Loiters
- Communicates / Network
- Flexible Targeting in Flight
- Third Party Targeting





Horizontal Integration Expanding Role of TACTOM





Special Forces Re-Targeting of a BLK IV Tactical Tomahawk



Tomahawk/Special Forces Near Real-Time Targeting, Tech Demo

- Demonstrated ability to mensurate both commercial satellite and Unmanned Aerial Systems (UAS) imagery in the field
 - Target TLAM BLK IV by generating (Category 1) coordinates using commercial satellite imagery matched to Digital Point Precision Database (DPPDB)
 - Precision Fires Image (PFI)s loaded on Personal Data Assistant (PDA)s for Special Operations Forces (SOF) observer prior to launch
- While BLK IV missile inbound to preplanned primary/secondary targets, SOF personnel sent target coordinates to Commander 3rd Fleet (C3F) via nine-line message
- C3F transmitted Aimpoint Update In-flight Mission Modification Message (IMMM) to BLK IV missile via UHF Tomahawk Strike Network
- Missile prosecuted the SOF Aimpoint
- Post mission Battle Damage Assessment (BDA) collected by Scan Eagle UAS

OTL-473 Validated Multiple Satellite and UAS Sources Capable of Supporting BLK IV Near Real Time Re-Targeting and BDA



OTL-473 Video





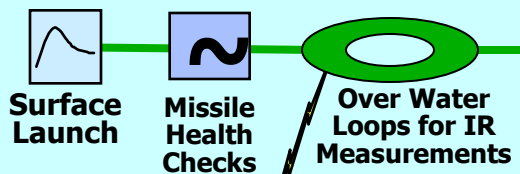
Mission Overview

Mission:

- TC2S Pre-Planned
- GPS-only

Launch:

- TOL Engagement
- One or More Ship-Entered Waypoints
- Overwater Contact Scenario



FRU: IMMM #1 Request H&S

CSP STT: IMMM #2 Flex IMMM

Health & Status Messages:

- Scheduled: 10-min intervals
- Event: All except Planned Turn Complete

W-289
NAVAIR Sea Test Range

Third Party Targeting:

- SOF downloads and mensurates satellite imagery.
- SOF downloads and mensurates Raven UAS image imagery
- SOF provides 9 line tasking to C3F via JFCOM (based on Raven image)

BDII

Near Real Time Re-Targeting Aimpoint

IR-200

NAVAIR Land Test Range (R2508 / R2505)

Terminal Conditions:

- Flex overland paths are similar to Primary Mission Route
- Inert Warhead/Fuzeze
- Operational Fuzeze Setting
- Post impact BDA by Scan Eagle

Primary Route

Flex Route

Aimpoint Update Route

(C-Sam Site Point D)
GPS Only Operational VDM

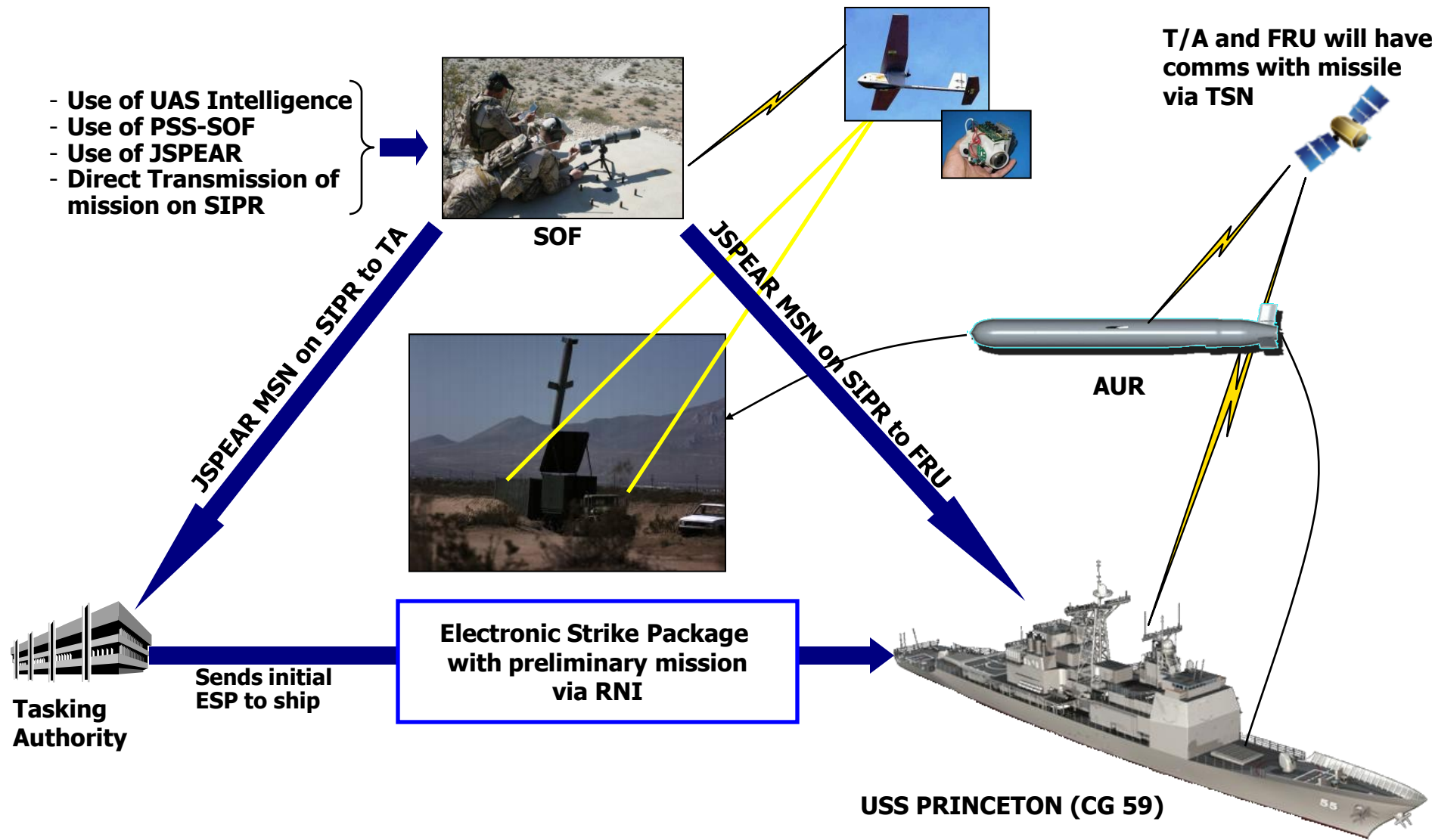
(C-Sam Site Point E)
GPS Only Operational VDM

(C-Sam Site Center)
GPS Only Operational VDM

Primary Route:	
Flex Route 1:	
Aimpoint Update:	
Intended Outcome:	
Primary Target:	
Alternate Target:	
Branch Point:	



Tactical Real Time Employment Of TACTOM





Asymmetric TACTOM Employment



Tomahawk Missile Systems available for Non-Traditional support

- Proven Asymmetric Warfare (Overseas Contingency Operations)
- Ability to support third party targeting
- Only network enabled long range weapon
- Mission flexibility
 - In-flight flexibility for changing real-time targets
 - In-flight health monitoring (IMMM) messaging
 - Battle Damage Imagery
 - Responsiveness to nine line brief/calls for fire tasking

**Tomahawk meets the Requirement of Asymmetric Warfare
& Training Joint Forces in Calls for Fire**