SPECIAL OPERATIONS FORCES
ACQUISITION, TECHNOLOGY, & LOGISTICS

Winning Left of Conflict

INTEGRATED STRIKE PROGRAM
Air-launched Loiter Munitions (ALM)

Collaboration Event (CE)

02 November 2023

Mike Melnick
Munitions Engineer
PMO-Strike, PEO-Fixed Wing
SOF AT&L, USSOCOM
Munitions Overview

**50 lb Class**

**AGM-176 Griffin**  
Raytheon  
Employed from Common Launch Tube (CLT)  
Integrated on Gunships and Surrogate Aircraft  
Length: 43” w/ 5” Diameter  
Weight: 34 lbs  
Warhead: 13 lbs; 3.2 lbs Net Explosive (NEW)  
Weapons Data Link (WDL)  
SOF-p

**50 lb Class**

**AGM-114 SOF Hellfire Variants**  
Lockheed Martin (Missile) / Various (Warhead)  
Low Collateral Damage Variants  
Integrated Gunship on MQ-9  
Length: 64” w/ 7” Diameter  
Weight: 109-118 lbs  
Warhead: 20-29 lbs; 0-8 lbs  
AF Common, SOF-p Modified

**Common Launch Tube**

Dimensions: 5.95” ID x 42”  
-- for internal payload  
Interfaces: Common external ICD interface

**250 lb Class**

**GBU-39 B/B Laser Small Diameter Bomb**  
Boeing  
Integrated on Gunships and MQ-9  
Length: 70.8” w/ 6” Diameter  
Weight: 267 lbs  
Warhead: 36 lbs  
Modified SDB

**100 lb Class**

**GBU-69/B Small Glide Munition**  
Dynetics, Inc.  
Employed from CLT  
Integrated on Gunships, MQ-9 and Surrogate Aircraft  
Length: 42” w/ 4.5” Diameter  
Weight: 59 lbs  
Weapons Data Link (WDL)  
SOF-p

**50 lb Class**

**GBU-39/B Small Diameter Bomb**  
Boeing  
Employed from CLT  
Integrated on Gunships and Surrogate Aircraft  
Length: 42” w/ 4.5” Diameter  
Weight: 59 lbs  
Weapons Data Link (WDL)  
SOF-p
MUNITIONS ROADMAP

- Close-in
- GPS-reliant
- Laser-guided
- Data Linked
- Irregular Warfare / Counter-Violent Extremist Orgs

- Standoff
- Contested environment, next gen guidance
- Open, modular alt-seeker modalities
- Networked, Collaborative, autonomous
- Campaign, compete, win versus peer threats

SO-P HELLFIRE VARIANTS   LASER SMALL DIAMETER BOMB   LOITER MUNITIONS   MINI/SMALL CRUISE MISSILES
## Cruise vs Loiter Munitions

### Cruise Missiles

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Long Range</th>
<th>Long Endurance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimized Flight Profile (Aero/Propulsion)</td>
<td>Max Range (faster)</td>
<td>Max Endurance (slower)</td>
</tr>
<tr>
<td>Use Case</td>
<td>Stand Off</td>
<td>Wx, Hand Off, Leave Behind, Quick Strike</td>
</tr>
<tr>
<td>Launch Profile</td>
<td>To a target</td>
<td>To a flight plan</td>
</tr>
<tr>
<td>Phases of Flight</td>
<td>Launch, Transit, Fix, Finish</td>
<td>Launch, Transit, Find, Fix, Finish</td>
</tr>
<tr>
<td>Sensor</td>
<td>Seeker – Fixed Zoom and Forward Looking</td>
<td>Camera – Zoom Lens and Gimballed Turret</td>
</tr>
<tr>
<td>(typical) Data Link</td>
<td>BLOS / lower bandwidth (WDL)</td>
<td>LOS / Higher bandwidth (C-2 &amp; FMV)</td>
</tr>
</tbody>
</table>

### Loiter Munitions

<table>
<thead>
<tr>
<th>CLT Requirement</th>
<th>Non-CLT Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>(150 nm w/ 15-lb payload)</td>
<td>(500 nm w/ 35-lb payload)</td>
</tr>
<tr>
<td>CLT (45 min at 20 nm)</td>
<td>Non-CLT (2 hours at 60nm)</td>
</tr>
</tbody>
</table>

**Cruise Missiles**
- **Mini Cruise Missile (MCM)** SBIR Phase II
- **Small Cruise Missile (SCM) CRADA**
Integrate and Demonstrate

https://events.sofwerx.org/loiter

Air-launched Loiter Munition (ALM)
Collaboration Event (CE)

Request to Attend Closed 12 October 2023

Purpose

SOFWERX, in collaboration with USSOCOM Program Executive Office – Fixed Wing (PEO-FW), Stand-Off Precision Guided Munitions (SOPGM) Program, will host a series of events to demonstrate and integrate Air-launched Loiter Munition (ALM) capabilities. These engagements with Industry, Academia, and Government Labs, will help USSOCOM identify potential material solutions and investigate trade-space. USSOCOM intends to survey industry for mature, non-developmental, technology that may support rapid fielding of this capability.
The SOPGM Program Office currently supports Special Operations Forces (SOF) aircrews with short range munitions that are employed directly to known targets, visually identified by the shooter aircraft before launch, and utilize Global Positioning System (GPS) or Semi-Active Laser (SAL) for terminal guidance. The dependencies for this employment method will place SOF Operators at an unacceptable risk during engagements in highly contested areas. New solutions are required to provide identification, tracking, and engagement of moving or mobile targets in a time compressed environment. SOF aircraft must be prepared to efficiently engage moving targets on the time scale it would face during any potential conflict with a well-resourced peer or near-peer adversary attempting an act of aggression. Traditional airborne moving target intelligence, surveillance, and reconnaissance (ISR) sensors currently employed by SOF will be inadequate for such a scenario due to deficiencies in survivability, speed, range, or sensor performance. Considering these capability gaps, USSOCOM is looking for ALMs to decrease the engagement time from minutes to seconds, improve targeting solutions, and increase the survivability of SOF.
Given DoD’s pacing challenges & the anticipated future operating environment, AFSOC lacks the concepts and technologies to provide effects in contested and denied environments.

**AFSOC Problem Statement**

**Strategy:**
- Transform AFSOC munitions to smart, capable, and cost effective
- Accept technical, requirements, and programmatic risk to field capability rapidly

**Facts**
- AFSOC aircraft are not survivable in contested and denied environments… neither are the weapons…
- Global threats drive an aggressive timeline
- AFSOC must support across the 4C’s…
  - Crisis
  - Counter VEO
  - Competition
  - Conflict

**Assumptions**
- AFSOC will conduct operations in contested and denied environments with its existing Mission Design Series (MDS)
- AFSOC will need larger quantities of collaborative, semi-autonomous/autonomous, loitering munitions
- Current Costs of munitions are unsustainable
United States Army
Special Operations Aviation Command

Organization Overview

The Systems Integration Management Office (SIMO)

“Success must be proactive – not reactive.”
-SOF truths
DOMINATE
Full Spectrum Dominance through Comparative Advantage

TRANSFORM
Transform from Legacy to the Future “Shaping the Advantage”

WIN
Maintain our Current Technology and Training Overmatch.

Equip the soldiers of the USASOAC Enterprise with the most capable rotary wing aircraft and mission systems in the world. Facilitate the sustainment and improvement of USASOAC highly modified and/or unique aircraft and mission systems.
OV1 Discussion/ Questions
ALM SOFWERX Engagement Objectives

1) Explore potential ALM solutions with Industry, Academia, and Labs based upon an understanding of current SOCOM use cases and operational landscapes for future conflicts. Recent conflicts in Ukraine and elsewhere have demonstrated mature ground-launched loiter munition capabilities. This, combined with the emergence of Air Launched Effects (ALE), should provide a shorter path to viable and mature ALMs.

2) Investigate the trade-space, to include:
   a) Endurance, Range, Cruise and Max Airspeeds
   b) Payload Capacity
   c) Sensors/Seekers, Semi-Active Laser (SAL), Electro-Optical/Infrared (EO/IR), Radio Frequency (RF), Automatic Target Recognition (ATR), Automatic Target Detection (ATD)
   d) Command and Control (C2) Data-Link, Telemetry, Transponder, Flight Termination System
   e) Counter Detection
   f) Warhead and Fusing
   g) Employment from various SOCOM aircraft (ex: AC-130J, MQ-9, MQ-1, MH-60, and others)
   h) Aircraft Integration standards such as MIL-STD-1760/1553, Universal Armament Interface (UAI), Battle Management System (BMS), Common Launch Tube (CLT), and 14-inch lug racks.

3) Future proof the system for technology upgrades, with considerations for Model Based Systems Engineering (MBSE), Modular Open Systems Approach (MOSA), Weapons Open Systems Architecture (WOSA), and Weapons Government Reference Architecture (GRA), as well as producibility concerns.

4) Identify Risks, Issues, and Opportunities.
# Suggested Discussion Topics

<table>
<thead>
<tr>
<th>CONOP</th>
<th>Material Solution</th>
<th>Flight Test</th>
<th>Acquisition</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Targeting Solution</td>
<td>- Aircraft Integration</td>
<td>- Government Dependencies (DT vs CT)</td>
<td>- Program of Record</td>
</tr>
<tr>
<td>- Autonomous Behaviors</td>
<td>- MOSA/WOSA/GRA</td>
<td>- Risk Reduction</td>
<td>- Economy of Scale</td>
</tr>
<tr>
<td>- Bingo before Target</td>
<td>- Communications</td>
<td>- Lab Test</td>
<td>- Program Protection</td>
</tr>
<tr>
<td>- Tactics, Techniques, and</td>
<td>- Investigate Trade Space</td>
<td>- Ground Shots/Releases</td>
<td>(Cyber, AT, SCRM)</td>
</tr>
<tr>
<td>Procedures (TTPs)</td>
<td>- What is in in the art of the possible?</td>
<td>- Fit Checks</td>
<td>- Configuration Management</td>
</tr>
<tr>
<td></td>
<td>- What is readily available?</td>
<td>- EMI/EMC</td>
<td>(Production)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Captive Carry</td>
<td>- Training</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Safe Separation</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 1&lt;sup&gt;st&lt;/sup&gt; Flight</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Configuration Management in T&amp;E</td>
<td></td>
</tr>
</tbody>
</table>
Questions?
(tentative) Schedule

Phase 2 - 05 December 2023 to 05 January 2024 Submissions to the Assessment Event (AE) Open: Interested respondents who could potentially provide solutions that meet the needs of USSOCOM are encouraged to submit their capability for USSOCOM review. To submit your technology for potential Phase 4 attendance, please review the assessment criteria and follow the submission instructions that will be near the bottom of this webpage on/around 05 December.

Phase 2a - 11 December 2023 Q&A Telecon: Interested offerors may participate in a virtual Q&A session to better understand the PM’s specific technology objectives. The telecon will take place on 11 December 2023 2:00-3:00 PM ET. RSVP form will be available on/around 05 December.

Phase 3 - 08 January 2024 to 18 January 2024 Downselect: USSOCOM will downselect those respondents/submissions they feel have the highest potential to satisfy their technology needs. Favorably evaluated submissions will receive an invitation to attend the AE on/around 19 January.

Phase 4 - 06 February 2024 to 08 February 2024 Assessment Event (AE): During the AE, selected participants will be allotted a one-on-one session with the USSOCOM evaluation panel to pitch, demonstrate, and/or discuss their solutions. The forum will include a Q&A portion and discussions may continue outside of the event. Solution brief presentation guidelines will be outlined in the event invitation and solutions will be assessed according to the criteria in the link provided below. If the USSOCOM evaluation panel favorably evaluates a solution brief, negotiations for Phase 5 may immediately begin.

Note: The event details are subject to change. This event will be held in person at SOFWERX.

Phase 5 - Path Forward: Successfully negotiated awards may fall under any combination of these categories:

UNCLASSIFIED