United States Army
Special Operations Aviation Command

Special Operations Forces
Industry Conference (SOFIC)

“Warfighter Requirements”
Science & Technology Fusion in
Army Special Operations Aviation

Systems Integration
Management Office (SIMO)

LTC McDonald
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Purpose

• SOFIC Overview addressing Requirements including Science and Technology
• Provide top-level assessment for future requirements across the SOF Aviation Battlefield
• Path and Vision
• S&T potentials
• Conclusion
SIMO Mission

- **Design, Develop and Deliver Aviation Capability** to the Army Special Operations Aviation Enterprise.

- Empowering **War Fighter Domination** through the most capable rotary-wing, unmanned aerial systems (UAS), fixed-wing and mission systems in the world.

- Maintaining **ARSOA Comparative Advantage** by means of a technology driven SOF Warrior Focus.
SIMO Core Competencies
(Applies to rotary-wing, unmanned systems and fixed-wing*)

1. Joint/SOF Capabilities Development
2. Systems Engineering and Integration
3. Developmental Testing and Evaluation
4. Operational Testing and Evaluation
5. System Fielding and Lifecycle Sustainment planning and resource oversight/User Voice
6. Aviation Resources and Contractor Oversight
7. Transition Property Management–Cross Enterprise
8. Government Flight Representation-Cross Enterprise
9. Publications Development (Training/Systems Data)
10. Modification Line Oversight and System Acceptance
11. Rapid Reaction/Production
12. Science and Technology Exploration

New Requirements
Product Design, Platform Integration, Development, DT/OT
Product Fielding, fleet resource planning and product optimization, product support, property management “Not Maintenance”
Incremental product improvements, rapid technology injection off modernization cycle
Next Generation

Continuous process improvement
*Expected with C27J fielding
SIMO executes its mission and accelerates the force by following four key acquisition principles:

• Delivers capability to the user expeditiously;

• Exploits proven techniques and methods;

• Keeps Warfighters involved throughout the process; and

• Takes risk and manages it.

“Provide the ground commanders the speed, agility, lethality, survivability, depth and networked SA to prevent, shape and win”
Army Special Operations
Aviation SOF Tenets

- **Speed, Range, Payload**
  - >200-250KIAS
  - Worldwide deployable with Aerial Refuel
  - Ground Forces own the payload

- **Objective Maneuverability**
  - Effective maneuver on and around the objective (Air and Ground Element)

- **Lighter**
  - Fuel efficiency and greater payload

- **Modular and Reconfigurable**
  - Plug and Play
  - Common Backplanes and Avionics – interchangeable across platforms

- **Adaptable**
  - Design prevents the Technology from being an Achilles' Heal

- **Non-proprietary**
  - Government Purpose Rights
The future operational environment demands *simultaneous, distributed, non-contiguous, worldwide* operations.

*Increased reliance on global force projection by Army Special Operations Aviation*
Our S&T Challenge

Problem Statements:

“I want vertical lift aircraft that fly faster, go farther and carry more stuff…,” while maintaining comparative advantage

Brigadier General Clay Hutmacher, Commander United States Army Special Operations Aviation Command (Airborne)

- Food for Thought: We need an affordable and effective integrated pilotage system across the SOF Aviation fleet, to enhance full spectrum operations, especially in degraded visual environments including integrated seamless networked solutions with effective maneuverability on the objective
S&T Roadblocks

The biggest impediment for rapid insertion of technology into our aircraft is the platform specific, proprietary architectures that require us to develop, test and field unique solutions for incorporation of technology improvements.

Ultimately, SOF Aviation platforms, must perform these tasks to standard, worldwide, in conditions ranging from standard sea level @103° F to high/hot (6K Pressure Altitude / 95° F) across the full spectrum of environmental conditions.
Bridging the Valley of Death
RDTE Integration with the PPBE Process

1. POM Planners unable to predict the future state of S&T with sufficient accuracy and confidence to develop specific low-risk program plans to fund transitions (assuming a JCIDS requirement exists in order to plan against)

2. POM 17-21 Funding Requests submitted early in FY15 at the PM level

3. S&T successes technically able to transition must endure >24-month POM lag or are addressed by displacing existing program efforts (program instability)

Can this be mitigated through recurring, persistent RDTE transition budgets (ie “transition ration”)?

S&T: Necessarily risk-permissive process

Acquisition and PPBE processes

System PM: Necessarily risk-averse process

FY14 FY15 FY16 FY17 FY18 FY19 FY20 FY21 FY22

2nd Road Block

VOLARE OPTIMOS

WARNING CHALLENGES AHEAD
# Current Technology Roadmap

## Hostile Fire Indication
Detect/Defeat Threat Weapons, Disable Shooters

<table>
<thead>
<tr>
<th>Current Capability</th>
<th>Tech Path</th>
<th>Objective Capability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detect and counter guided munitions with expendables</td>
<td>Detect unguided projectiles, geolocate source, slave sensors</td>
<td>Disable guided and fused weapons prior to launch; surface fire feeds AOR targeting systems</td>
</tr>
</tbody>
</table>

## Signature Management
Reduce Detection Radius, Disrupt Aiming

<table>
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<th>Current Capability</th>
<th>Tech Path</th>
<th>Objective Capability</th>
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</thead>
<tbody>
<tr>
<td>Exhaust Suppression (Infrared)</td>
<td>Reduction of visual signature</td>
<td>Active signature manipulation; electromagnetic spectrum exploited for feints, saturation and surprise</td>
</tr>
<tr>
<td></td>
<td>Reduction of radar signature; agile and cooperative jamming</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reduction of acoustic signature</td>
<td></td>
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</tbody>
</table>

## Degraded Visual Environment System
Operate Safely in Brownout, Whiteout, and IMC

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<th>Current Capability</th>
<th>Tech Path</th>
<th>Objective Capability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flight Instruments, CAAS cueing</td>
<td>DAFCS, synthetic vision for increased control and cueing</td>
<td>Integrated Synthetic vision via HUD, expand portion of available of EM spectrum &amp; data available to Crew Members</td>
</tr>
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## Integrated Airborne Networking System
Holistic Waveform Management

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<th>Current Capability</th>
<th>Tech Path</th>
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<tr>
<td>Federated Rover 6 and PRC-117 (Carry-On) Case-by-case MANET</td>
<td>Integrated Waveforms &amp; MANET’, Federated Link 16</td>
<td>Fully Displayable, Modular, Air vehicle OFP de-synced Dynamic Tactical Airborne Network with Anti-Cognitive Jamming</td>
</tr>
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## Increased Effectiveness, Suitability, and Survivability Enroute and on the Objective

**VOLARE OPTIMOS**

**SIMO** 16
# ARSOA S&T Interest Areas

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<tr>
<th>Survivability</th>
<th>Situational Awareness</th>
<th>Affordability</th>
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<tr>
<td>Signature Reduction</td>
<td>Virtual Cockpit</td>
<td>On Condition Maintenance</td>
</tr>
<tr>
<td>Acoustic, RF, IR</td>
<td>UAS Associates</td>
<td>Non-proprietary software</td>
</tr>
<tr>
<td>Aircraft Hardening</td>
<td>Degraded Visual Environment (DVE) Control</td>
<td>Commonality</td>
</tr>
<tr>
<td>Redundancy</td>
<td>Sensor Fusion</td>
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<tr>
<td>Speed &amp; Range</td>
<td>Foliage Penetrating Sensors</td>
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<td>Next Generation Active Protection</td>
<td>GPS Denied High Accuracy Precision Navigation</td>
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<tr>
<td>Performance</td>
<td>Network</td>
<td>Lethality</td>
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<td>Hybrid Engines</td>
<td>GIG Compatibility</td>
<td>Directed Energy</td>
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<td>Active Rotor Control/Coaxial</td>
<td>Multi-level Security</td>
<td>Scalable</td>
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<td>Swashplateless</td>
<td>SW driven waveforms</td>
<td>Auto/Ai Target recognition</td>
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<td>Variable Geometry</td>
<td>Integrated Assured Comms</td>
<td>Selectable yield warheads</td>
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<td>Rotors</td>
<td>Seamless Operations (self-joining, self-healing)</td>
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<tr>
<td>Seamless Sea Based</td>
<td>Anti Cognitive Jamming</td>
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# ARSOA S&T Interest Areas

| Performance            | Network                                                    | Lethality                                        |
| Hybrid Engines         | GIG Compatibility                                          | Directed Energy                                  |
| Active Rotor Control/Coaxial | Multi-level Security                                   | Scalable                                         |
| Swashplateless         | SW driven waveforms                                        | Auto/Ai Target recognition                      |
| Variable Geometry      | Integrated Assured Comms                                   | Selectable yield warheads                        |
| Rotors                 | Seamless Operations (self-joining, self-healing)           |                                                  |
| Seamless Sea Based     | Anti Cognitive Jamming                                     |                                                  |
Conclusion

Based upon the ARSOAC Priorities

- Key Areas of Engagement
  - Platform
    - Speed, Range, Payload
    - Maneuverability on the Objective
  - Mission Equipment
    - Survivability
    - Situational Awareness
    - Performance
    - Networking
    - Lethality
    - Affordability
- Solve tomorrows gaps through vision, leading edge technology, rapid fielding, employment and ultimately, “Violence of Force”