

Session: 19258

**JSSAP Science and Technology Advisory Council
2017 ARMAMENT SYSTEMS FORUM**

May 3rd, 2017



Barton H. Halpern, Ph.D.

**Chairman, Joint Service Small Arms
Program Science and Technology Advisory
Council (JSTAC)**



Today's Agenda

- **Purpose**
- **Mission of the JSSAP Organization – JSTAC Intersection**
- **JSSAP Science and Technology Advisory Council**
- **The Joint Small Arms Technology Development Strategy (JSATDS)**
 - **Technical Challenges**
 - **The Strategy**
- **Key Takeaways**



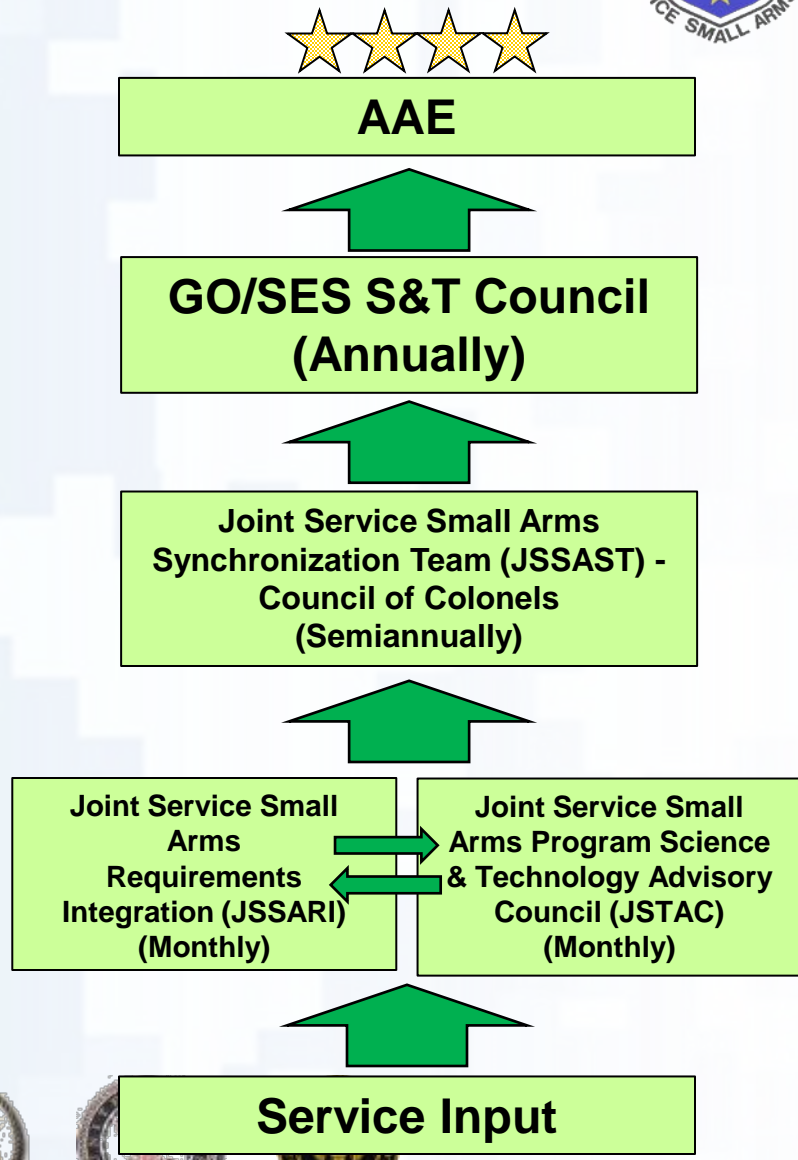
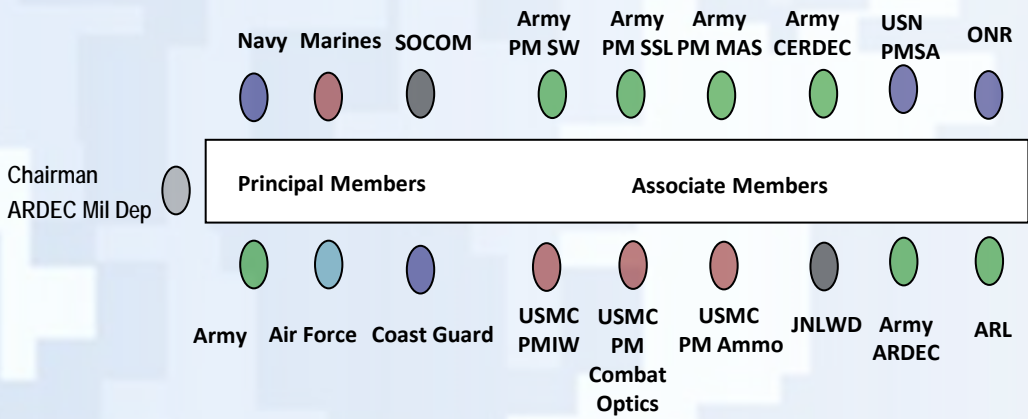


Joint Small Arms Synchronization Team Framework

Mission

The JSSAST Charter identifies 5 principal areas of responsibility:

1. Intensive Management of the DoD Small Arms Tech Base
2. Harmonization of Requirements
3. Transition to Project Managers for Engineering and Manufacturing Development
4. Long Range Plans and Strategies
5. Influence of International Small Arms Activities



Joint Service Small Arms Program Science and Technology Advisory Council (JSTAC) Update



JSTAC Charter Mission Essential Tasks



JSTAC Approved for Execution on June 11, 2014 by the JSSAST

1. Establish a process for the timely exchange of Science & Technology information
2. Develop and maintain a Joint Service Small Arms Technology Development Strategy (JSATDS)
3. Maintain an awareness of the small arms Science & Technology portfolio
4. Maintain an awareness of both domestic and foreign technology and identify areas of possible exploitation
5. Recommend to the JSSAST prioritized plans, programs and strategies semi annually

JSTAC Participants

1. Army (ARCIC, ARDEC, ARL, ASA ALT, CERDEC, MCoE, PM MAS, PM SSL, PM SW, PEO Soldier, PEO Ammunition, RDECOM RFEC)
2. Navy (ONR, Navy Small Arms Programs, Naval Surface Warfare Center Crane)
3. Air Force (USAF HQ Security Forces Center)
4. Marines (PM MERS, PM IWS, S & T lead MARCORSSCOM, USMC Capabilities Development Directorate)
5. Coast Guard (Specialized Capabilities CG-721)
6. SOCOM (SORDAC S&T, SOF AT&L, PEO-SW)
7. Other Agencies: DARPA, JNLWD



JSSAP Small Arms Systems R&D Strategy



Futures Conferences



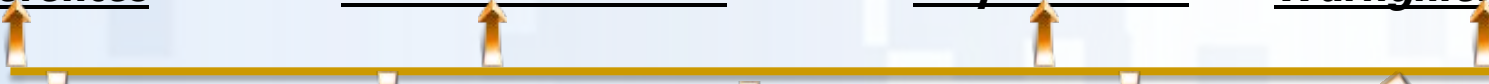
Small Arms Capability Based Assessments



Documented Requirements



TRADOC Gaps Warfighter Outcomes



Technology Information Exchanges



International Small Arms Activities



JSSAST Priorities



The National Armaments Consortium



Joint Small Arms Technology Development Strategy



Joint Small Arms Technology Development Strategy (JSATDS) - Synergistic S&T Investments - Small Arm Weapon Systems

- V6 (DIST F) Briefed to JSSAST June 2015
- V6 Used as the basis of POM 18-22 submission August 2015
- V7 (DIST F) created with Lead/Shape/Watch justifications to support POM 18-22
- Distribution A v1 version created Jan 2016
- V8 (DIST F) created to support POM 19-23 June 2016
- V9 (DIST F) to be created to support POM 20-24

DISTRIBUTION A. Approved for public release; distribution unlimited.

**JOINT SMALL ARMS TECHNOLOGY
DEVELOPMENT STRATEGY
FOR
JOINT SERVICE SMALL ARMS
SCIENCE AND TECHNOLOGY
INVESTMENTS**

26 January 2016

SA TDS- Version Distribution A: Approved for public release; distribution unlimited. Page 1

Weapon System Enablers	ARDEC
Ammunition	ARL
Optics & Fire Control	ONR
Scalable Effects	JNLWD
Training & Human Perf.	USMC
System Integration & Demo	JSSAP
Deep Future	JSSAP
International	JSSAP/RDECOM

Foundational Strategies in BA 6.2 and 6.3 That Will Lead To Dominant Future Capabilities



Joint Small Arms Technology Technical Challenges



BA 6.2: Weapon Systems and Enablers	<ul style="list-style-type: none"> • <u>Weapon systems</u>, as a whole, must be designed as a system • Most significant contributor to the weapon error budget is operator induced aim error • Higher recoil energies • Higher operating pressures and more muzzle energy often come with increased weapon signature and weight
BA 6.2 Ammunition	<ul style="list-style-type: none"> • Higher muzzle velocities and muzzle energies are needed for improvement in accuracy, range, and lethality • Lack of knowledge regarding levels of noise, flash, IR signatures, and what levels these signatures result in detections • Seeker navigation that allows the munition to adjust while in flight
BA 6.2 Optics & Fire Control	<ul style="list-style-type: none"> • Positive threat Identification at Range night/day • Low SWaP-C sensors integrated across all of or parts of the visual, near-short-mid-long wavelength infrared (Vis-NIR-SWIR-MWIR-LWIR) range of frequencies • Biometric sensors for Human Tagging, Marking, and Tracking
BA 6.2 Scalable Effects	<ul style="list-style-type: none"> • Desired operational impact with increased range – multi mission/ multi effects • Miniaturization of Directed Energy Technologies for Small Arms • Sensors and non-lethal weapons
BA 6.2 Training & Human Performance	<ul style="list-style-type: none"> • Cognitive Burden of S&T investments on the Soldier as a System • Objective system to measure and analyze the performance of the soldier together with his/her weapon, equipment, ammunition, and training
BA 6.3 System Integration and Demonstration	<ul style="list-style-type: none"> • Integration of 6.2 key enablers onto applicable platforms, and demonstrate them in relevant environments as in integrated system
BA 6.2 Deep Future Plans	<ul style="list-style-type: none"> • Advanced Propulsion • Electromagnetic Launch • Battery Tech – High Density. Lightweight, Fast Charging
International Strategy	<ul style="list-style-type: none"> • Avoiding Technological Surprise



Joint Small Arms Technology Development Strategy (JSATDS) - Synergistic S&T Investments - Small Arm Weapon Systems

BA 6.2 S&T Investment Areas (Ranked 1-N)

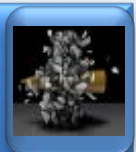
Weapon System/ Enablers

1. Accuracy / Controllability
2. Advanced Weapon Operation
3. Signature Reduction
4. Maintenance and Reliability
5. Enabling Weapon Technology Areas
6. Remote Weapon Technologies
7. Deep Futures



Ammunition

1. Advanced Weapon Operation
2. Signature Reduction
3. Propulsion
4. GNC for defilade kill
5. Improved Projectiles
6. Reduced Range Training Ammo
7. Deep Futures




Optics & Fire Control

1. Optics Sensors, Imagers, & Displays
2. Deformable Visible Optics
3. Enhanced Ballistic Computer
4. Active Barrel Stabilization
5. Human Tagging, Marking, and Tracking
6. Wind and Environmental Sensing
7. Steerable Range Finding
8. Ballistic Trajectory Shaping and Off-path Lethality
9. Deep Futures




Scalable Effects

1. Multi mission/ Multi effects
2. Adjustable range and velocity
3. Directed Energy Miniaturization
4. Embedded Sensors
5. Deep Futures




Training & Human Performance

1. Adapt LEAP - A to characterize task/ condition/ standards parametric data for small arm Soldier in the Loop Performance
2. Human Factor Studies - reduction of training for operations, reduction in cognitive burden



Deep Future Plans

1. Advanced Propulsion
2. Electromagnetic Launch
3. Advanced Fire Control System
4. Future Studies
5. Increased S&T Exchanges w/ Research Labs , DARPA & Dept of Energy Labs
6. Dedicated 10% of 6.2 Investments



International Strategy

1. Create an additional 7 Project agreements with NATO Allies and Partners for Peace
2. NATO Leadership
3. Leverage RDECOM RFEC



BA 6.3 S&T Investment Areas



- SI&D**
1. Integrated Fire Control
 2. Weapons & Ammo for NGSAR
 3. Ammunition
 4. Lightweight Dismounted Machine Gun
 5. Smart Munitions
 6. Scalable Effects
 7. Squad Level Active Collaborating Knowledge (SLACK)

Foundational Strategies in BA 6.2 and 6.3 That Will Lead To Dominant Future Capabilities

The JSATDS provides a great example of the Success of the JSSAP Organization and Stakeholders.

Key Takeaways:

1. JSSAP continues to fulfill its mission through a series of strategic engagements (JSSAST, JSSARI and JSTAC) with key stakeholders at multiple echelons at the service component level.
2. JSATDS section leads were provided from ARDEC, ARL, USMC, JSSAP, JNLWD, and ONR creating a Joint document from inception. This document serves as a partnership with shared accountability (creation and financial), with joint engagement, joint learning and decision making. The JSATDS supports the tenets of the chartered mission of the Joint Service Small Arms Program (JSSAP) office.
3. JSATDS summarizes by investment taxonomy and Army Budget Activity dollars, associated investments necessary to mitigate the JSSAST Top 50 Opportunity Areas, Supports Program Objective Memorandum FY19-23 submission to support the Dismounted Warfighter, portrayed through the lens of the Soldier Modernization Deep Dive.
4. The resultant POM 1-23 Strategy requires a significant increase in budget activity funds 6.2 & 6.3 to support near term product improvements and far term revolutionary investments in order to Maintain and Achieve Overmatch.

