

# ***86th Fighter Weapons Squadron*** ***COMBAT HAMMER***

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*Evaluating PGM Weapon Systems – Weapon Storage Through Impact*

## **Air-to-Ground Weapons System Evaluation Program (WSEP)**



**Lt Col Dean Ostovich**  
**86 FWS/CC**



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**UNCLASSIFIED**

*Perfecting Lethality*



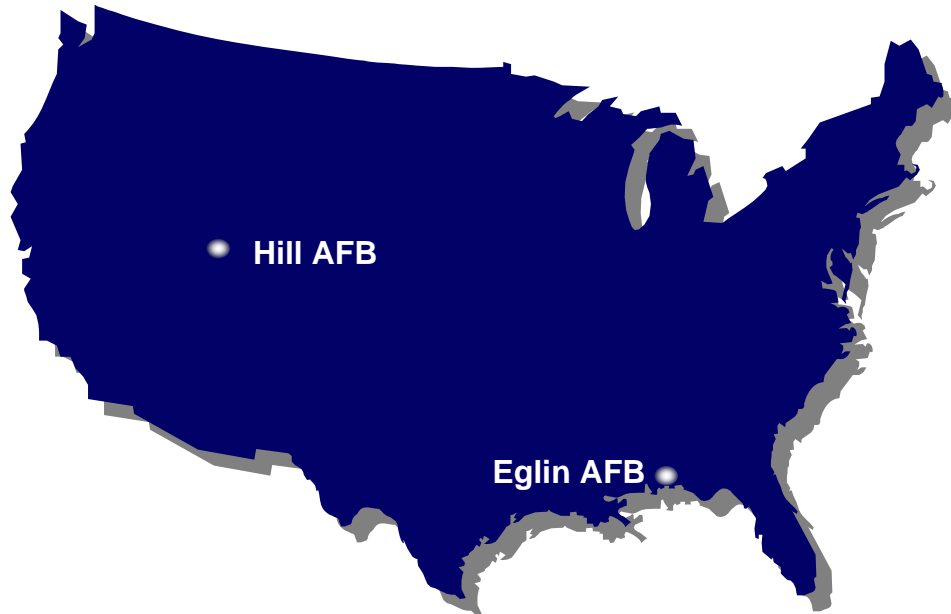
# Overview

- 86 FWS Program
- Ranges and Targets
- Instrumentation / Data Collection
- Statistical Methods
- Future Focus





# 86 FWS



## Perfecting Lethality



# Mission Statement



# COMBAT

# HAMMER

**“Evaluate the effectiveness, maintainability, suitability, and accuracy of precision guided munitions and high technology A/G munitions from tactical deliveries against realistic targets with realistic enemy defenses.”**



# A/G WSEP Mission

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- **End-to-end Evaluation**
- **Integral Part of AF / DOD Life Cycle Acquisition and Sustainment Program**
- **Not just ACC...Evaluations Support AFMC / DoD WRM Considerations**
  - **Extensive Program Office liaison**
  - **Symbiotic relationship (Hardware & Software)**



# 1986 - 2008

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- Initial Charter 1986 - *COMACC PLAN 90, “Air-to-Ground Weapon Systems Evaluation Program”*
- 1986: 9 Units / 50 Weapons
- 2007: 19 Units / 369 Weapons
- Aug 08: 7 Units / 183 Weapons
- We Own a Growth Industry
  - Annual program resource requirements (infrastructure, funding, manpower) increasing in scope commensurate with rapid rise in CAF PGM capabilities
  - Sustained requirement is 20 WSEPs annually with a 22-24 WSEP “surge” capacity in any given year employing 350 weapons



# CAF Air-to-Ground Arsenal

- **B-1B**
  - GBU-31/38
  - GBU-39
  - CBU-103/4/5
  - AGM-154A
  - AGM-158
- **B-2A**
  - GBU-31/38
  - GBU-39
  - AGM-154A
  - AGM-158
- **B-52H**
  - GBU-12
  - GBU-31/38
  - GBU-39
  - AGM-86C/D
  - CBU-103/4/5
  - AGM-154A
  - AGM-158
- **F-117A**
  - GBU-10/12/27
  - GBU-31
- **MQ-1 Predator**
  - AGM-114
- **MQ-9 Reaper**
  - GBU-12
  - GBU-38
  - GBU-39
  - AGM-114
- **A/OA-10**
  - AGM-65D/G/G2/H/K
  - GBU-10/12
- **A/OA-10C**
  - GBU-10/12
  - GBU-31/38
  - AGM-65D/G/G2/H/K/E
  - CBU-103/4/5
- **F-15E**
  - GBU-10/12/24
  - (E)GBU-15/28
  - GBU-31/38/53
  - GBU-39
  - CBU-103/4/5
  - AGM-130
- **F/A-22A**
  - GBU-32
  - GBU-39
- **F-16B30**
  - GBU-10/12/24
  - GBU-31/38
  - AGM-65D/G/G2/H/K/E
  - AGM-88
  - CBU-103
- **F-16B40**
  - GBU-10/12/24
  - GBU-31/38/53
  - AGM-65D/G/G2/H/K/E
  - CBU-103/4/5
  - AGM-154A
- **F-16B50**
  - AGM-65D/G/G2/H/K/E
  - AGM-88
  - AGM-154A
  - GBU-31/38/53
  - CBU-103/4/5
  - GBU-10/12
  - AGM-158

**FY07 - 12 Platforms**  
**39 Weapon System Combinations**





# A/G WSEP Mission Execution

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- **Fighter Squadrons Deploy to Eglin and Hill AFB**
  - 8-12 jets; one and two week evaluation deployments
    - Typical unit 12-18 aircrews; 100-150 people deployed
    - Ammo troops up front (2 wks early)
- **Bomber / UAS Squadrons Execute From Home Station**
- **Hammer Constructs Realistic Scenarios**
- **Weapons, Platforms, and Targets “Instrumented”**
- **Hammer Collects Data, Conducts Analysis, and Determines Weapon System Effectiveness**





# Ranges and Targets

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- **Eglin (35%)**
  - High humidity / green environment
  - Shoot cones more restrictive
  - Moving target
  - Urban CAS village (FY09/1)
  
- **UTTR (65%)**
  - Desert / barren environment
  - Permissive shoot cones
  - Urban CAS village
  - Moving target
  - High speed moving target (FY09/4)



# Ranges and Targets





# Ranges and Targets





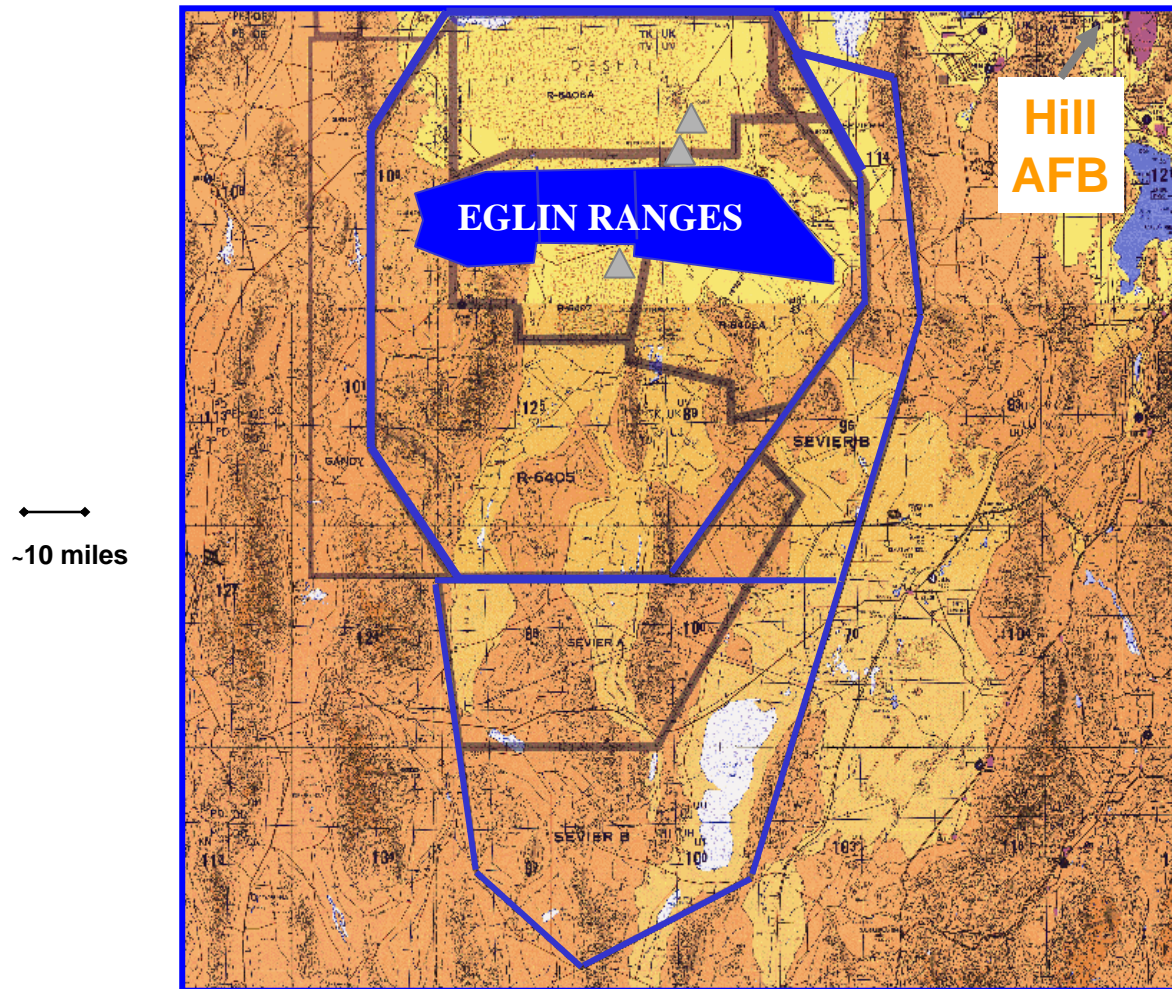


# Ranges and Targets





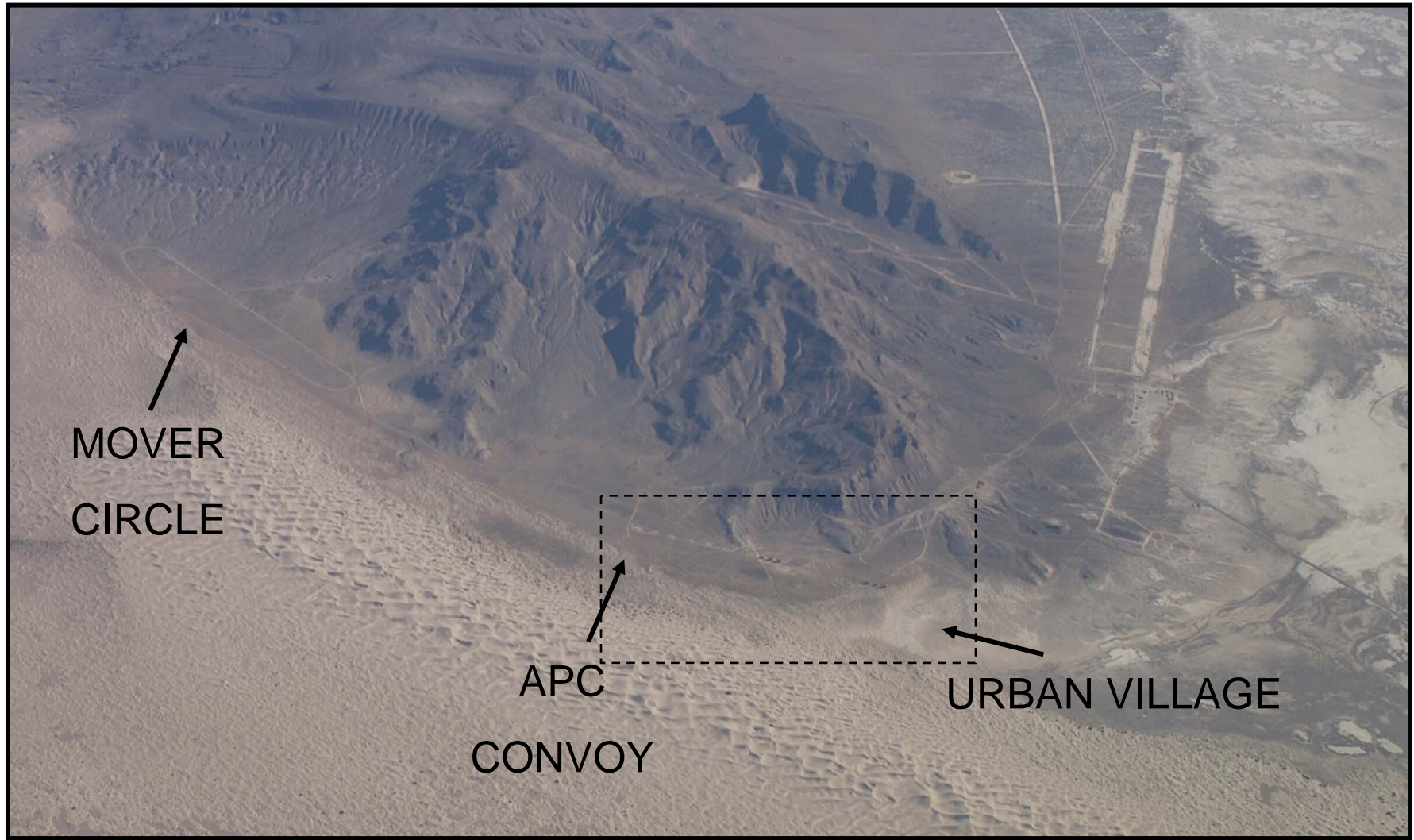
# Ranges and Targets







# Ranges and Targets





# Ranges and Targets







# Ranges and Targets





# Ranges and Targets







# China Lake Mover





# Instrumentation / Data Collection

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- **Time / Space / Position / Information (TSPI)**
  - Radar tracking
  - Global Positioning System (GPS)
  - A/C AVTR / DVR-S
  
- **Telemetry**
  - Used to the maximum extent possible
  - Assess weapon performance--launch to impact
  - Paveway / AGM-130 exceptions
  
- **Improve Laser Tracker (ILAST)**
  - Measures laser designator performance
    - Power output, spot stability, and spot position
    - Boresight check



# Instrumentation / Data Collection

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- **Videometric Analysis System (VMAS)**
  - Measures weapon impact conditions
  - Impact angle, bomb body yaw, and impact position
  
- **Effects (LPA)**
  - Video record of target condition - before / after
  - Video record of munitions impacts relative to DPI / DMPI
  
- **Chase Aircraft**
  - Assess tactics and weapon performance post release
  - Ensures range safety
  - Fills in where no telemetry available
  - Desired - not required



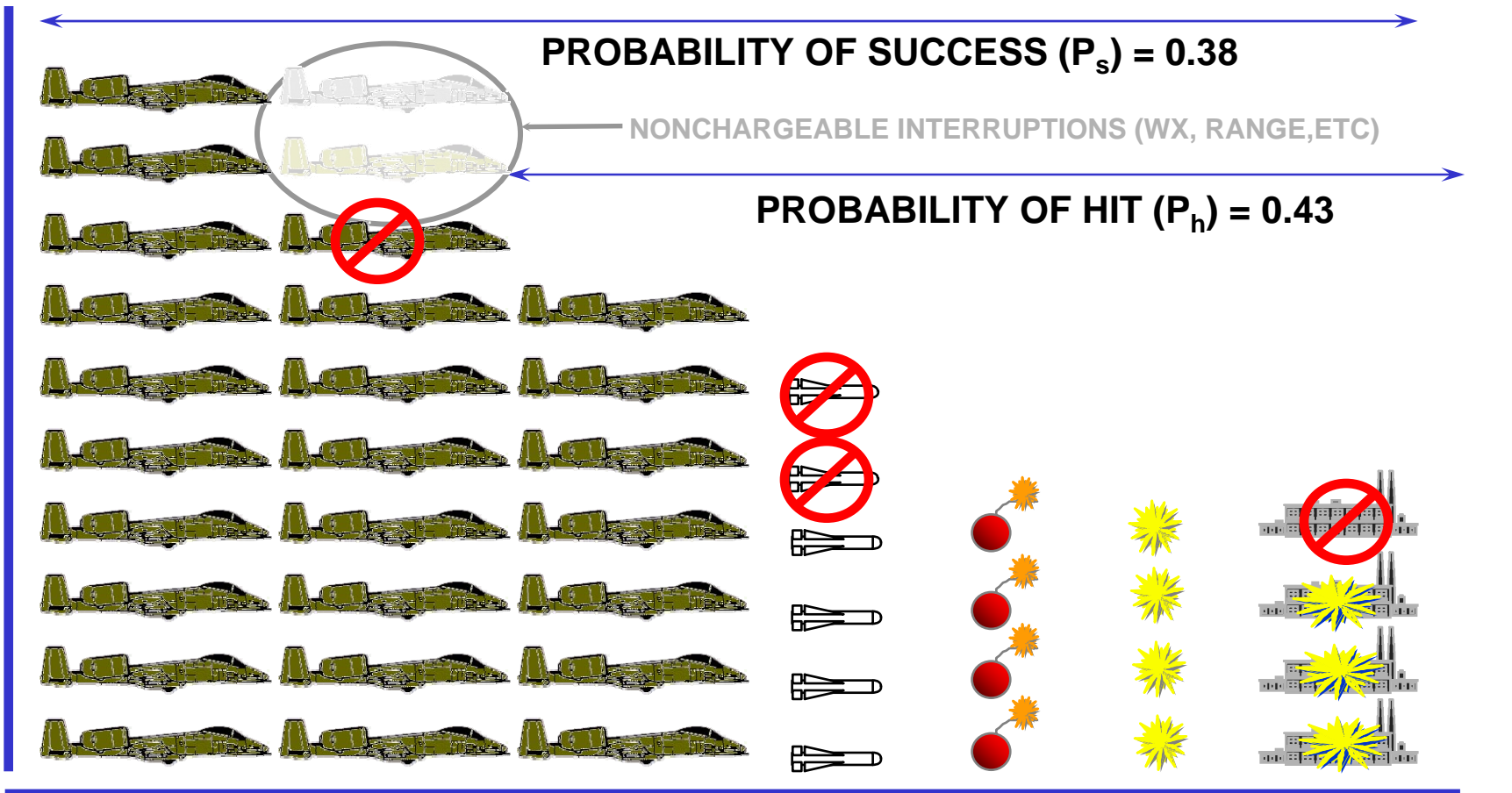
# Statistical Analysis

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- **8 Evaluation Phases**
  - Munitions buildup
  - Ground, enroute
  - Employment, guidance, fuzing, warhead, target damage
- **Probability of Success**
  - Encompasses all phases except munitions buildup
- **Probability of Hit**
  - Encompasses last 5 phases
  - Probability of target damage given the opportunity to employ
- **Non-chargeable Interruptions**
  - Weather, range closure, TM failure



# Statistical Analysis



GROUND		ENROUTE		EMPLOYMENT		GUIDANCE	FUZING	WARHEAD	TGT DAMAGE
10/10		7/8		6/7		4/6	4/4	4/4	3/4
1.0	X	.88	X	.86	X	.67	1.0	1.0	.75 = .38





# Statistical Analysis

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- **As defined by COMACC Plan 90:**
  - **80% confidence level**
  - **10% accuracy level**
  - **80% chance Hammer probabilities will be replicated in the real world (± 10%)**



# Statistical Analysis

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- **Can't Meet Statistical Significance All The Time**
  - Currently 98 different weapons system combinations
  - Goal achievable over 5 year period (7-10 Wpns per Yr)
  
- **Confidence Level Does Not Differentiate Between:**
  - Different delivery parameters
  - Environmental factors
  - OFP changes
  - Scenario



# Future Focus

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- **Combined Archer / Hammer**
- **ACC drawdown vs. USAFE / PACAF / ARC**
- **Weapons**
- **Telemetry**
- **Emitters**

## Video



# Combat Hammer Charter

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- **EMPLOY** A/G PGMs and High Technology Weapons
  - A/G WSEP “COMBAT HAMMER”
  - Investigative Firing Program
  
- **ASSESS/VALIDATE** Combat Capabilities
  - Total weapons system
  - “Storage through impact”
  - Ops units, combat realistic scenarios, and realistic threat replication
  
- **IMPROVE** A/G PGM Effects
  - Telemetry
  - Recommend changes
  - Maintain comprehensive database
  
- **PROVIDE** Expertise on Demand
  - “ON-CALL” capability



# 53<sup>D</sup> Weapons Evaluation Group

*Integrity - Service - Excellence*

