



Squad Overmatch Study – Tactical Combat Casualty Care (SOvM-TC3)

2015 Study Outbrief Summary

4 NOV 2015



Rob Wolf
PEO STRI
SOvM-TC3
Project Director



Squad Overmatch Study Background



The Army Study Program Management Office (Army Chief of Staff G-8) awarded the Squad Overmatch Study as its #1 priority program to PEO STRI in 2013 and 2014 to analyze training methodologies that have the potential to optimize human performance and resilience, with guidance to:

- 1) Integrate training for advanced situational awareness, resilience and stress management (physiological, cognitive) into warrior skills training
- 2) Replicate realistic stressors in existing gaming, virtual, and live training environments
- 3) Utilize and supplement existing Programs of Instruction (POI) and Programs of Record (POR)
- 4) Provide future integrated training methodology recommendations

Nov 2014: Squad Overmatch Study was nationally recognized as the Army Modeling & Simulation's #1 Team Training program of the year

Currently:

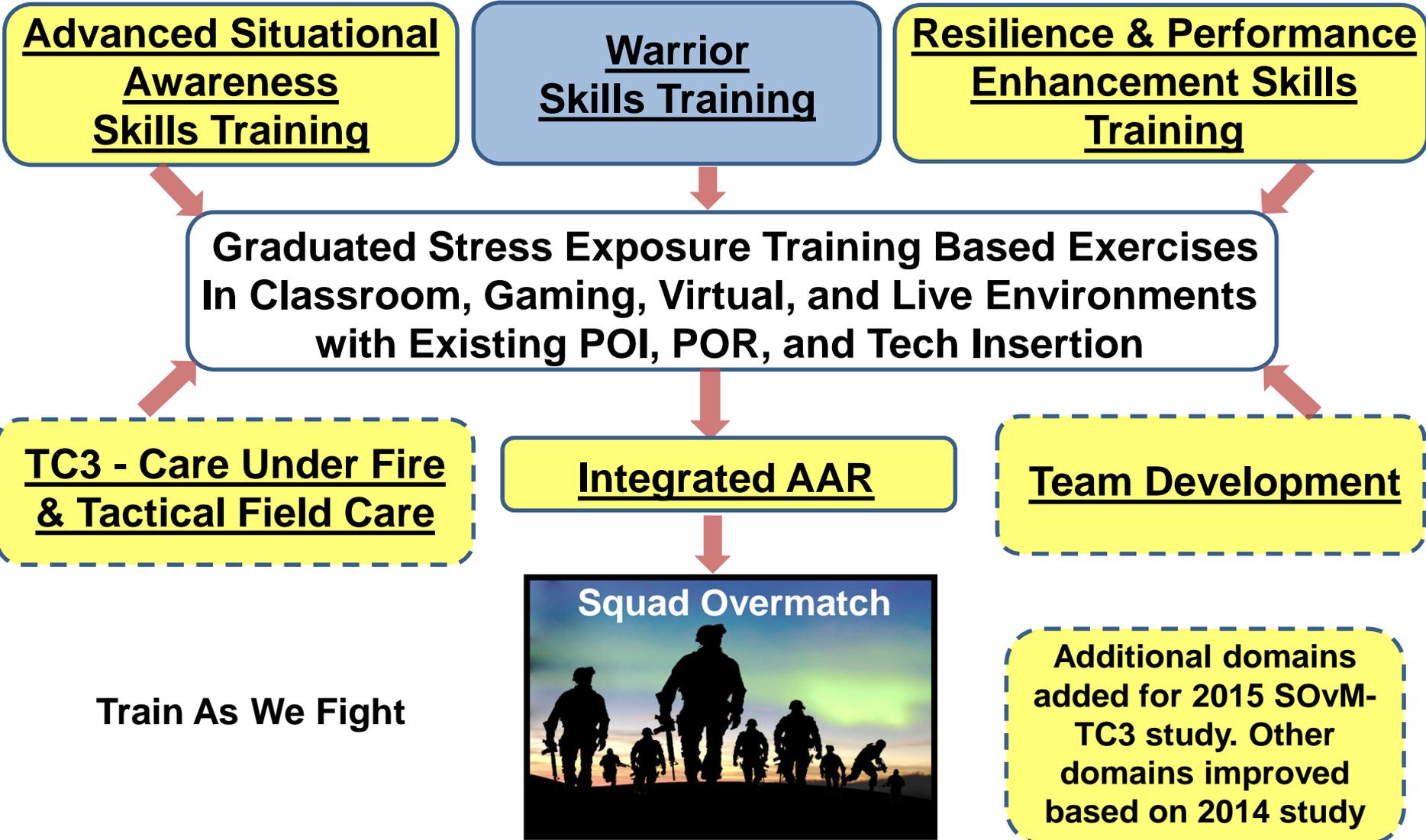
- ✓ **Army Study Program Management Office** continues to support the Squad Overmatch Study in 2015 & 2016 with emphasis on integrating human performance enhancement skills development into POIs and PORs.
- ✓ **Defense Health Program (DHP) Joint Program Committee for Medical Simulation and Training (JPC-1) funded** the Squad Overmatch Study – Tactical Combat Casualty Care (SOvM-TC3) to expand SOvM 2014 to include TC3 care under fire and tactical field care (2015 & 2016).





SOvM Integrated Training Approach

2014 Study with 2015 Enhancements



Train As We Fight





SOvM-TC3 Supporting Organizations



Program Executive Office
for Simulation, Training
and Instrumentation



Walter Reed Army
Institute of Research
Soldier Health • World Health



Naval Air Warfare
Center - Training
Systems Division



Revolutionary Research . . . Relevant Results

US Army & USMC Squads



USMC
PM TRASYS



- *Including 21 POI, POR, and new technology insertion providers & products.*
- *Team of distinguished SMEs across each domain supporting curriculum development, instruction, and integrated AARs.*





Realistic Training in a Complex World



To win and survive in ambiguity and chaos, Army home-station training must be more realistic, challenging, and affordable. Casualties are a Combat Reality.

Training



Reality



We Can Do Better!

- 80% of 1st responders are the casualty or his buddy, not the Medic!
- 24% OEF/OIF deaths were “potentially survivable“
- Army Ranger DOW Rate 1.7% vs All Forces 5.8%

Squad Overmatch Study - Tactical Combat Casualty Care (SOvM-TC3) incorporates SOvM 2014 Study findings, curriculum design improvements and integrated technologies to create a Force 2025B Integrated Training Approach (ITA) with a focus on Human Performance Enhancement (HPE)

- Training in the **Human Dimension**
- Leverages gaming, virtual and live **realistic** simulations
- Incorporates **lifesaving** 75th Ranger Regiment concepts

- Increases **Situational Awareness**
- Builds Psychological **Resilience**
- Develops **Teamwork**
- Integrates **HPE behaviors** in AARs

SOvM-TC3: Optimizing Warriors - Achieving Squad Overmatch - Saving Lives

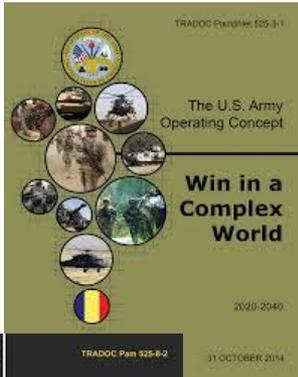




SOvM-TC3 A Balance of Multiple Challenges



Building Squad Capability is the Key to the Decisive Force

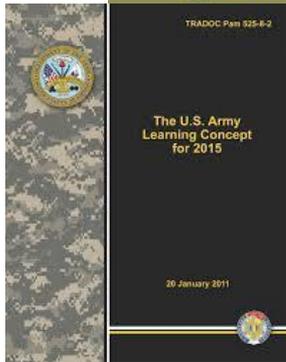


Win in a Complex World
F2025B

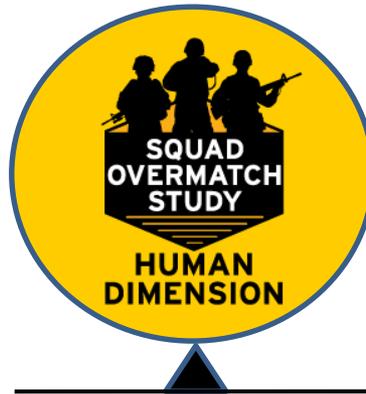


Fiscal Constraints

Tactical Combat Casualty Care



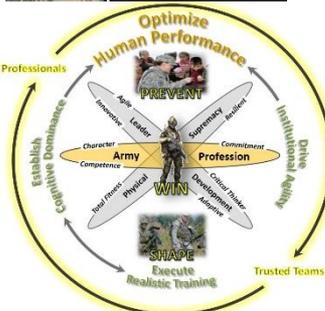
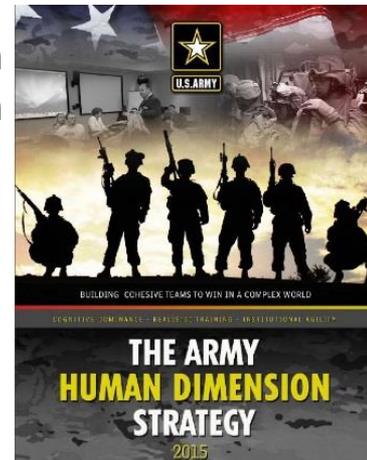
Improved Learning Model to Provide Relevant Training
ALC 2015



Sustaining Readiness



The Human Dimension



Optimize Human Performance



Developing Ready and Resilient Warriors





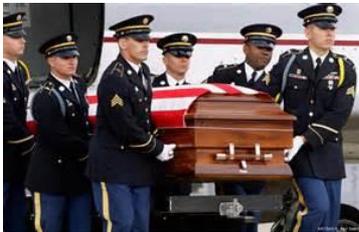
Sustaining TC3 Improvement



Overall Casualty Survival rate increased from 90% to 97% after 10+ years of war learning mostly on real patients (2001-2014)

- Sustaining and improving survivability at and above 97% requires realistic integrated training across the Army/DoD enterprise.

Realistic TC3 training in an integrated environment has the potential to further improve casualty survival rates.



“Death on the battlefield” statistics*:

- **4,596 American casualties** died between OCT 2001- JUN 2011
- **976 (24.3%)** were deemed **potentially survivable**
- **87.3% died before** reaching a medical treatment facility
- **90.9%** of the **potentially survivable bled to death**

**The First Person to Place a Tourniquet Saves a Life....
Self Aid, Buddy Aid, CLS, or Medic!**

*Data Source: Eastridge et al. “Death on the battlefield (2001-2011): Implications for future combat casualty care,” (J Trauma Acute Care Surg. 2012;73: S432-437)





Adopting Rangers TC3 Lessons Learned



- **75th Ranger Regiment Commander Casualty Response System**
 - Rangers Instituted **Command directed Casualty Response System** in 1999
 - Every Ranger is a Combat Life Saver (CLS) and Casualty Response is a **practiced battle drill**
 - Robust **TC3** Training system supported by **realistic simulation**
 - **Active AAR process** and casualty **data collection system** provide feedback to Medics and Commanders for casualty response system management

All Forces

Died of Wound (DOW) Rate (5.8%)

Killed in Action (KIA) Rate (16.4%)

Rangers

DOW Rate (1.7%)

KIA Rate (10.7%)

Despite severe wounds, there were no preventable deaths in Ranger prehospital casualties vs 24% in all forces

• DOW is the number of all deaths that occur after reaching a Medical Treatment Facility (MTF)
• KIA is the number of combat deaths that occur before reaching an MTF

Data Source: Kotwal et al. "Eliminating Preventable Death on the Battlefield." (Arch Surg 2011; 146 (12):1350-1358)





SOvM-TC3 is Balanced Across Multiple Life Saving Domains



Squad Overmatch Study-TC3 and is an expansion of the SOvM 2014 study with improvements in curriculum design and new technology integration leveraging existing Program of Instruction (POI) & Program of Record (POR) demonstrating the Integrated Training Approach.

Advanced Situational Awareness (ASA)

Enables pattern/threat recognition and decision making in complex environments.

Team Development (TD)

TD develops teamwork skills: Information Exchange, Communication Delivery, Supporting Behavior, & Initiative/Leadership.

Integrated AAR (AAR)

AAR framework designed to facilitate squad initiative and ownership in AAR execution.

Tactical Combat Casualty Care (TC3)

Training effective communications and decision making in managing combat casualties.

Resilience and Performance Enhancement (RPE)

Training to help the squad maintain tactical effectiveness under combat stress.

Building on Existing Warrior Skills Training





Integrated Training Approach



✓ What you train

- Integrated curriculum across multiple key domains
- Realistic Scenarios developing decision making skills, mental models, and behaviors needed to adapt and win in complex environments

✓ When you train

- The right level, content, and context at the right time
- Graduated Stress Exposure / *Incremental resilience building*
- Increasingly Complex Scenarios / *Decision Making and Competency*

✓ How you train

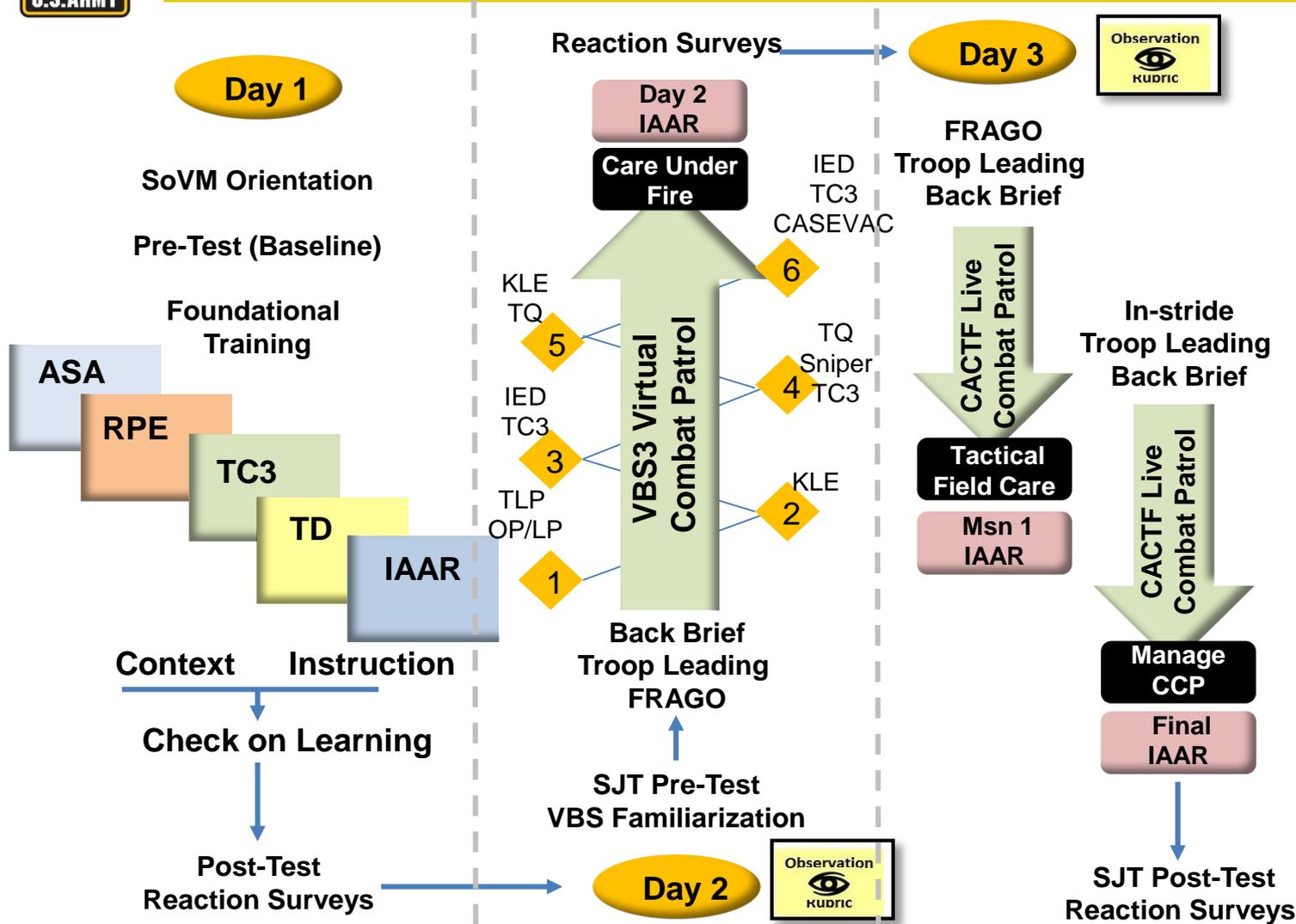
- Adult learning – information with discussion / *Not death by PPT*
- Engaging instructional mechanisms - videos, games, avatars...
- Realistic Immersive and interactive environments – *Cognitive Realism*
- Experiential learning (IPA) - *Learn by doing in realistic environments*

IPA: Instruction (classroom), Practice (gaming/virtual), Application (live)





Instructional Methodology



Assess an integrated training curriculum for increasing knowledge, skills and abilities used by Squads to make decisions and solve problems in gaming and live simulations with increasing scenario complexities.

- Day 1 Instruction
- Day 2 Practice
- Day 3 Application

IPA: Instruction (classroom), Practice (gaming/virtual), Application (live)

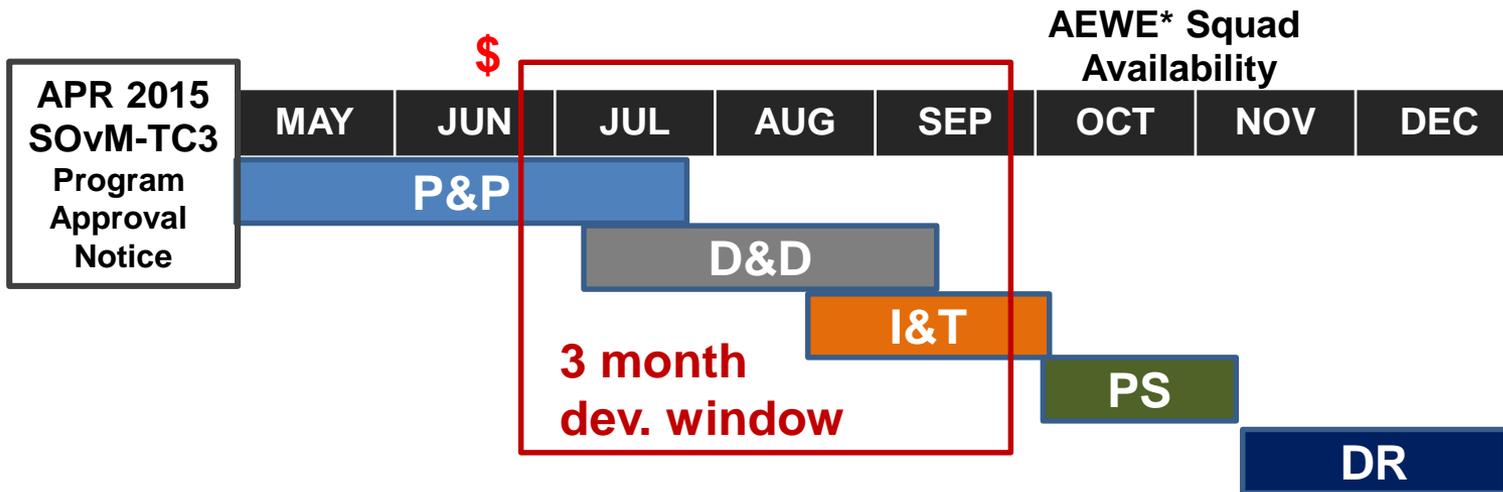




2015 Study Schedule



- ✓ Planning & Preparations P&P
- ✓ Design & Development D&D
- ✓ Integration & Test I&T
- ✓ Study Exercises SE
- ✓ Post Exercise Data Reduction, Report, & 2016 Adjustments DR



* Army Expeditionary Warfighting Experiments (AEWE)





Day 1 - Classroom Based Instruction

Clarke Simulation Center



Foundation training across 5 domains

1. Advanced Situational Awareness - Basic (ASA-B)

- 316th Cavalry Brigade's ASA 5 day program condensed to ~1 hour

2. Tactical Combat Casualty Care (TC3)

- Based on Joint TC3 Committee findings, over 10 years of data

3. Resilience and Performance Enhancement (RPE)

- Skills adapted from Army Resiliency Directorate curriculum, and WRAIR's Deployment Cycle Resilience Training

4. Team Development (TD)

- Based on the Tactical Decision Making Under Stress ONR project, 20 years of research and data (Army, Navy and public safety teams)

5. Integrated After Action Review (IAAR)

- Integrated model based on 25 years research & joint best practices





Day 2 Practice in AGfT-VBS3

Army Games for Training – Virtual Battlespace Simulation



- **Graduated Stress Exposure Training (GSET)**
- **Two Scenarios, each comprising 3 vignettes (6 total)**
- **Each Vignette followed by focused skill area reviews**

GSET scenarios across all domains, ASA, TC3, RPE, TD followed Integrated AAR

Vignette 1 – Movement to LP/OP

Vignette 2 – Conduct KLE

Vignette 3 – React to IED Attack

Vignette 4 – Sniper Fire and Civilian Casualties

Vignette 5 – Tactical Questioning & Care Under Fire

Vignette 6 – Tactical Field Care & Succession of Command





TC3 Training in AGfT-VBS3



SOvM-TC3 Modeled the Improved First Aid Kit (IFAK) II in VBS3 Supporting Self, Buddy, CLS, and Medic Treatment



IFAK II modeled in VBS3 with interactive* components

IFAK II Injury displayed and TC3 treatment selection / application

Tourniquet (2)*, Nasal Pharyngeal Airway*, Chest Decompression Needle*, Chest Seal*, TCCC Card*, Bandage*, Compression Bandage, Eye Shield, Gloves, Marker, Tape.



Day 3 Live Application

McKenna MOUT Site



Graduated Stress Exposure Training (GSET)

- Two Scenarios with 18 focused learning events
 - ✓ ASA, TC3, RPE, TD
- Each Scenario followed by an Integrated AAR

Morning Scenario

- Movement to LP/OP
- Tactical questioning informant & KLE
- React to Sniper
- Care Under Fire and Civilian Casualties

Afternoon Scenario

- React to IED & Engage Hostiles
- Care Under Fire
- Tactical Field Care & Succession of Command

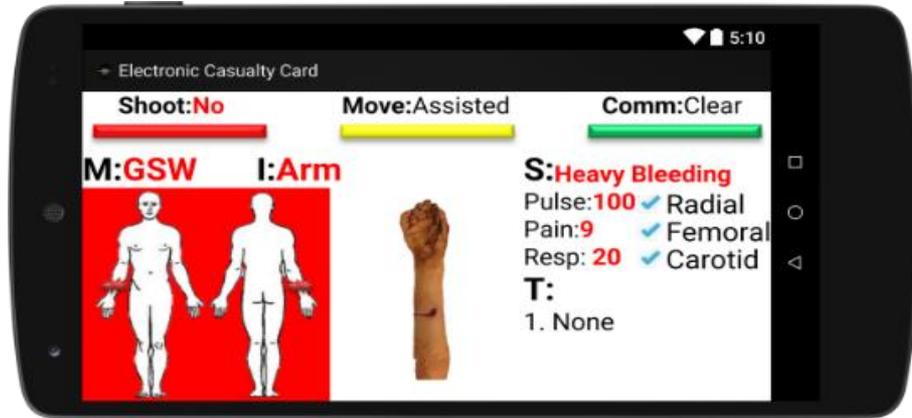




MILES TC3 Live Training



MILES Causality Display Device (MCDD) and instrumented life saving TC3 devices enable self, buddy, CLS, & Medic rescue in Live exercises



MCDD prototype replaces paper MILES casualty card that are over 30 years old



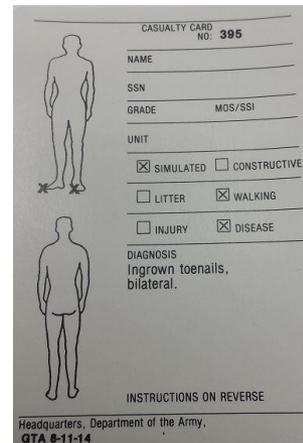
Tourniquet



CDN



NPA



Innovative technologies revolutionize the MILES system generating real time data to improve the Commander's Casualty Response System, individual TC3 training, and AAR





MILES Casualty Display Device Overview



- **MILES Casualty Display Device (MCDD)** interfaces to existing MILES physically and electronically
- MCDD is worn “face in”
- When activated, MILES buzzer sounds for 10 seconds alerting 1st responder to look at MCDD
- Soldier can easily turn the MCDD to view its display





Basic MCDD Display



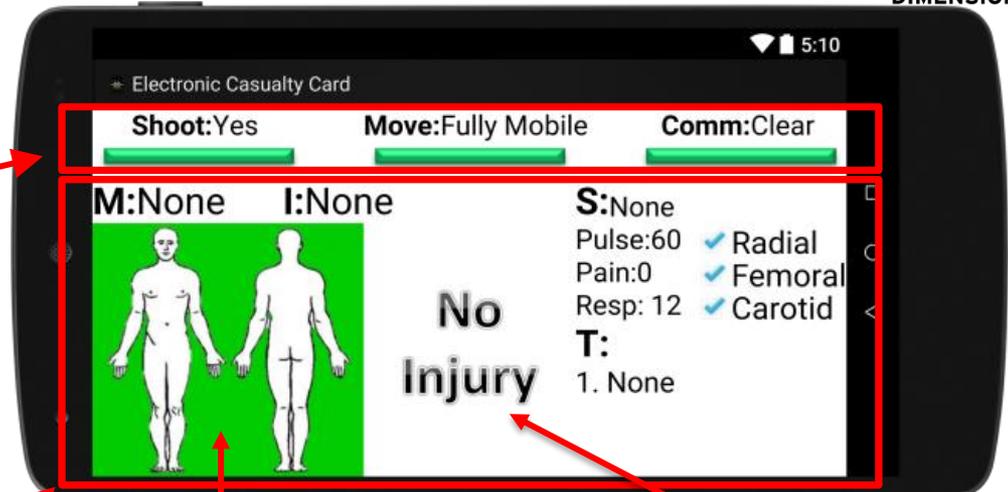
• Tactical information

- Shoot
- Move
- Communicate

• Casualty Information (MIST)

- Mechanism of Injury
- Injury
- Signs & Symptoms
- Treatment

MCDD data fields reinforce TCCC Card with dynamic visual updates of tactical, injury, and vital signs



Background color indicates severity

Injury Location, if any (Image, Video)



MCDD Injury Progression

Electronic Casualty Card

Shoot: Yes Move: Fully Mobile Comm: Clear

M: None I: None S: None

Pulse: 60 Pain: 0 Resp: 12 T: 1. None

✓ Radial ✓ Femoral ✓ Carotid

No Injury



Electronic Casualty Card

Shoot: No Move: Assisted Comm: Clear

M: GSW I: Arm S: Heavy Bleeding

Pulse: 100 Pain: 9 Resp: 20 T: None

✓ Radial ✓ Femoral ✓ Carotid

Gun Shot Wound to Arm

Vitals and Tactical Status updated over time



Looping video of arterial arm hemorrhage due to injury

Electronic Casualty Card

Shoot: No Move: Assisted Comm: Confused

M: GSW I: Arm S: Bleeding Stopped

Pulse: 150 Pain: 5 Resp: 30 T: TQ: 150933ROCT15

✓ Radial ✓ Femoral ✓ Carotid



If treated with Tourniquet bleeding stops in image



No Treatment 4-6 Minutes

Electronic Casualty Card

Shoot: No Move: Immobile Comm: None

M: GSW I: DOW S: Bleeding Stopped

Pulse: 0 Pain: 0 Resp: 0 T: 1. None

✓ Radial ✓ Femoral ✓ Carotid



Instrumented Top 3 Live Saving Devices



Actual Device

Instrumented Device



**Combat
Application
Tourniquet**

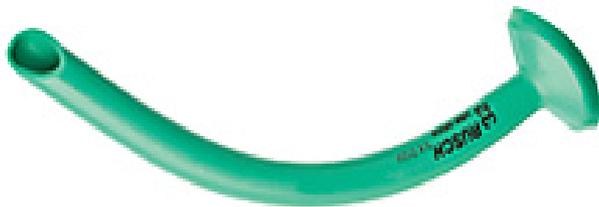


**Massive Hemorrhage
60%**

**Chest Decompression Needle
“Needle-D”**



**Tension Pneumothorax
33%**



**Nasal Pharyngeal
Airway (NPA)**



**Airway Obstruction
7%**

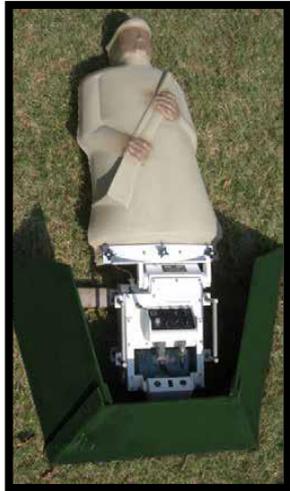




Live Training Targets / Avatars



Current Training Presentation

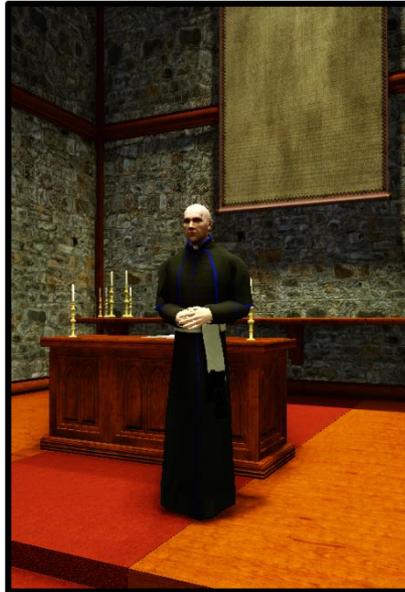


Pop-Up Civilians in Church & Street

SOvM-TC3 Avatars / MILES Interactive

Level 1

Scripted Dialogue / Trip Sensor Initiated



Father Romanov Informant in back of Church

Level 2

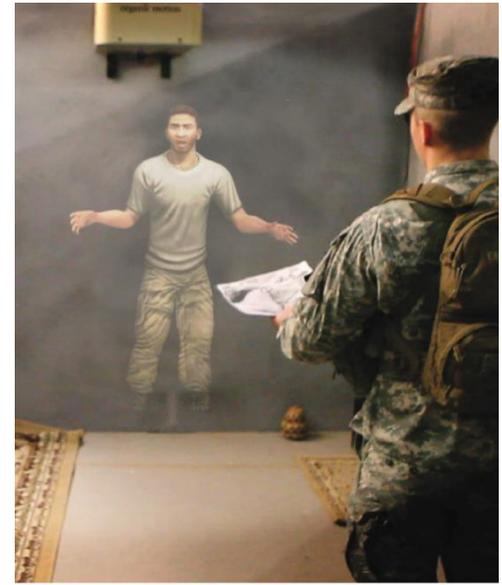
Dynamic Engagement with Soldiers/Marines



Terrorist Guards 2nd Floor of House (5 Locations)

Level 3

Fully Interactive Dialogue with Body Language and Eye Movement



- Multiple Characters**
- ✓ *Informant in Church*
 - ✓ *1st Floor - Mother*
 - ✓ *2nd Floor - Key Target*





U.S. ARMY

Non-Pyro Battlefield and Casualty Effects



Suicide Bomber & Gun Shot Wound



IED / Artillery / Indirect Fire / Booby Trap



Realistic Non-Pyro Battlefield Effects Eliminates the need for special transportation/storage (ASP) requirements. Safely and affordably implements Realistic Battlefield & Casualty effects using compressed air





Medical Simulation Training Centers (MSTC)



Casualty Training Mannequin



Moulage Components (Amputations, Flesh Wounds, Blast Injuries)



The First Person to Place a Tourniquet Saves a Life....
Self Aid, Buddy Aid, CLS, or Medic!

Enabling Soldiers to Practice and Develop TC3 Skills

- Tourniquet Application, Chest Decompression, Airway Management -





SOvM-TC3 2015 / 2016 Events



- **2015: SOvM-TC3 Pilot Study - Preparation & Execution**
 - Risk reduction in preparation for 2016 experiment
 - Identify experiment parameters for enhancement
 - TC3 tasks, performance measures, instruction-based curriculum, practical exercises, virtual scenarios, live scenario, technologies, data collection, AARs.
- **2016: SOvM-TC3 Training Effectiveness Experiment**
 - Apply lessons learned from Pilot Study
 - Implement improvements to Pilot (addition, deletion, modification)
 - Execute Experiment (June 2016 at Fort Benning, GA *(pending JAN funding)*)
 - Publish findings and recommendations
- **2016 Army Warfighting Assessment (AWA) 17.1 Ft. Bliss *(if funded)***
 - *19 October through 3 November 2016 (tentative dates)*
- **2017: SOvM-TC3 Train the Trainer Implementation *(2015/16 results)***
 - SOvM-TC3 Implementation strategy - Training Support Package and Technology Insertion / Requirements implementation recommendations





Realistic Training? We can Do Better!



- **1st Step: Acknowledge the gap and embrace change!**
- **Integrated Training Approach** – Rapid knowledge & skills transfer, optimizing warrior and human dimension skills
- **Training shouldn't stop when injuries occur (Gaming, Virtual, or Live)**
 - That's when critical decision making and actions determine mission success and lives saved.
 - Self, Buddy, CLS and Medic roles need to be integrated to train as we fight and help Squad Leaders and Team Leaders be more effective and lethal.
- **Realistic training - creating a suspension of disbelief**
 - Forces critical decision making in the moment across the squad





Path to Success



- **Embrace Change, We Can do Better!**
- **Challenge the “System”, Break the Barriers, & Status Quo**
- **Realistic Training** is driven by a number of **Army Warfighting Challenges**; in particular, '#8 Enhance Training', '#9 Improve Soldier, Leader and Team Performance', and '#10 Develop Agile and Adaptive Leaders'
- **The Integrated Training Approach will Enhance Squad Performance and Save Lives!**

Optimize Warriors - Achieve Squad Overmatch - Save Lives

Train As We Fight





SOvM-TC3 Study Team



Dr. Joan Johnston
USA RDECOM
ARL HRED, Principal Investigator

CDR Henry Phillips, PhD
NAVAIRSYSCOM, NAWCTSD Team Lead
46T Deputy for Research & Technology

SGM Alan D. Higgs
Senior enlisted Advisor to PEO STRI

CDR Robin Toblin, PhD, Dr. Toby Elliman
Walter Reed Army Institute of Research (WRAIR)

DHP JPC-1 Program Sponsor
Dr. Janet Harris, Dr. Kevin Kunkler

Mr. Rob Wolf
PEO STRI Project Director /
Training Technology Lead

MITRE – Program Support
Mr. Paul Butler – Team Lead
Mr. Pat Ogden – Live Scenario Dev
Mr. Mark Evans – Virtual Scenario Dev

Cognitive Performance Group
Mr. Bill Ross, Mr. Brandon Woodhouse,
Ms. Katie Smith

USA - Fort Benning (Training/Combat Developer)

- **MCoE:** Dr. Jay Brimstin, Mr. Chris Jaques, Mr. Milton Fields, CPT Rogers, Mr. Sam Rhodes, Mr. Rich Eggers
- **Maneuver Battle Lab:** Mr. Harry Lubin
- **Clarke Simulation Center:** Mr. Pegan, Mr. Valez
- **McKenna MOUT Site:** Mr. Rob Harbison, Mr. Mike Kelso, Mr. Roger Emerson, Mr. Jason Rakocy
- **3rd/3rd ID – SOvM-TC3 Validation Squad**
- **690th Medics:** CPT Hoffman (7 Medics)

USMC

- **USMCII MEF:** 3 Squads & Corpsmen
- **PM TRASYS:** Col Yates, LtCol Harris

Experimental Design, Data Collection, Metrics, & Analysis

Dr. Joan Johnston, CDR Hank Phillips, PhD, Ms. Lisa Townsend, Dr. Laura Milham, Dr. Dawn Riddle, Mr. Bill Ross, Ms. Katie Smith

Curriculum Development Leads / Team / Instructors

- **ASA:** Dr. Laura Milham / Mr. Bill Ross
SFC Lodahl, SFC Everett, SFC Wright, SSG Neth, Rich Funke, Mr. Jones, Mr. Tubbs, Richard Eggers, Paul Butler, Patrick Ogden, SGM Higgs
- **R&PE:** CDR Hank Phillips / Dr. Joan Johnston
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- **TDT:** Ms. Lisa Townsend / Dr. Joan Johnston
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- **IAAR:** Ms. Lisa Townsend / Pat Ogden
Paul Butler, Bill Ross, Katie Smith, Dr. Joan Johnston, David Holness, SGM Higgs, Pat Ogden
- **TC3:** Dr. Dawn Riddle / CDR Hank Phillips
COL Dan Irizarry, MD, Dr. Russ Kotwal, SFC David Lowe, LTC Jim Pairmore, Jim Montgomery, LTC Stephen DeLellis, MSG Michael Chavaree, Paul Butler, Bill Ross, Matthew Hackett, Katie Smith, Patrick Ogden, Frank Colletti, Dr. Wes Milks

Innovation & Technology Providers / Product (Team)

- **Curriculum**
 - ✓ **ASA:** ASA-Basic (MCoE) , Captivating Virt. Inst. Training (CVIT) (USC ICT), VBS3 (AGFT)
 - ✓ **R&PE:** CSF2 (WRAIR, MCoE) , STRIVE (USC ICT), VBS3 (AGFT)
 - ✓ **Teamwork:** TDT (NAWC TSD), VBS3 (AGFT)
 - ✓ **AAR:** Team Self Correction (TSC)-AAR (NAWC TSD)
 - ✓ **TC3:** TC3 Guidelines (COTCCC), Dragon Leader Course (18th ABN Corps), VBS3 (AGFT)
- **Virtual/Gaming**
 - ✓ **MITRE & CPG / AGFT VBS3 Scenarios** (Mr. Evans, Mr. Woodhouse, Mr. Hobby, Ms. Truong)
 - ✓ **SE Core / PM ITE / LEIDOS,** McKenna MOUT rendering (Mr. Kher, Mr. Reyes, Mr. Sedlak, Mr. Griffin, Mr. Treu)
 - ✓ **ECS / TC3 SIM, IFAK II modeling** (Mr. Miles, Mr. Quintero, Mr. Colletti)
- **Live**
 - ✓ **ARA / ECC SW & Event Viewer** (Dr. Milks, Mr. Sowden, Mr. Dominguez, Mr. Lichtman)
 - ✓ **ZelTech / ECC & TC3 Instrumentation** (Mr. Preston, Mr. Kerslake, Mr. Penner)
 - ✓ **Cubic / EST & MILES IWS** (Mr. Syme, Mr. Doolittle, Mr. Quicker, Mr. Miller, Mr. Rheault)
 - ✓ **Laser Shot / Virtual Shoot House** (Mr. Findlay, Dr. Arseneau, Mr. Mask, Mr. Murray)
 - ✓ **Organic Motion / LIVE** (Mr. Kirkwood, Mr. Amerson, Mr. Miller)
 - ✓ **MIL-SIM-FX / IEDES** (Ms. Hammond, Mr. Rapai, Ms. Clark-Carmichael, Mr. Hammonda)
 - ✓ **SETCan / StressX Belt** (Mr. Bochinski, Mr. Quail)
 - ✓ **ScentAir / ScentWave** (Mr. Oxford)
 - ✓ **STTC / MSTC Components** (Mr. Hackett)
 - ✓ **Threat Tec / Role Players & Props** (Mr. Baroudi)
 - ✓ **PEO SOLDIER & SEKRI Industries / IFAK II** (Ms. McCulley)
 - ✓ **McKenna MOUT / MCoE** (Mr. Rob Harbison, Mr. Mike Kelso, Mr. Roger Emerson)

