



# IITSEC 2024



## Data Collection, Reduction and Analysis Initiative

### Integrating US Army Data Plan into Warfighter Qualifications

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NTSA



# The Problem Space



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WASHINGTON, DC 20301-1010

MAY 05 2021

MEMORANDUM FOR SENIOR PENTAGON LEADERSHIP  
COMMANDERS OF THE COMBATANT COMMANDS  
DEFENSE AGENCY AND DOD FIELD ACTIVITY DIRECTORS

SUBJECT: Creating Data Advantage

Data is a strategic asset. Transforming the Department of Defense (DoD) to a data-centric organization is critical to improving performance and creating decision advantage at all echelons from the battlespace to the board room, ensuring U.S. competitive advantage. To accelerate the Department's efforts, leaders must ensure all DoD data is visible, accessible, understandable, linked, trustworthy, interoperable, and secure.

- **Thousands** of training events done every year in the US Army but there is no published policy, process or architecture to collect that data for the above strategy requirement.
- Very few units are collecting, reducing, analyzing and storing the potential **petabytes** of data produced from each training event across the Army; data that could reveal key insights into lessons of lethality, excellence, needed improvement, predictive trends and training future AI.

# DCRA-STE Training Domain Focus: IWTS

## US Army's Integrated Weapons Training System

Echelon	Table 1	Table 2	Table 3	Table 4	Table 5	Table 6
	PREREQ	PREREQ	PREREQ	COLLECTIVE TASK-PROFICIENCY	COORD / REHEARSAL / PRACTICE	LIVE-FIRE PROFICIENCY EXEVAL
	CRAWL	CRAWL	WALK	RUN	RUN	RUN
Battalion / Squadron	TEWT <i>Live</i>	STAFFEX <i>Blended</i>	CPX <i>Live</i>	FTX <i>TADSS</i>	FCX <i>Blended</i>	CALFEX <i>Live-Fire</i>
Company / Troop	TEWT <i>Live</i>	V-STX <i>Virtual</i>	STX <i>TADSS</i>	FTX <i>TADSS</i>	FCX <i>Live-Fire</i>	CALFEX <i>Live-Fire</i>
Platoon	CLASS Local SOP <i>Live</i>	V-STX <i>Virtual</i>	STX <i>TADSS</i>	FTX <i>TADSS</i>	FCX <i>Live-Fire</i>	LFX <i>Live-Fire</i>
Section						
Squad						
Mortar Formation	Gunnery Skills Test <i>Live</i>	V-STX <i>Virtual</i>	STX <i>TADSS</i>	FTX <i>TADSS</i>	Practice <i>Live-Fire</i>	Qualification <i>Live-Fire</i>
Crew Platform				Basic <i>Live-Fire</i>		
Special Purpose Weapons	CLASS Marksmanship Instruction <i>Live</i>	V-STX <i>Virtual</i>	Drills <i>TADSS</i>	Basic <i>Live-Fire</i>	Practice <i>Live-Fire</i>	Qualification <i>Live-Fire</i>
Crew Served Weapons						
Individual Weapons						
<b>Legend:</b>	CALFEX COORD CPX EXEVAL FCX FTX PREREQ	Combined Arms Live Fire Exercise Coordinated Exercise Command Post Exercise External Evaluation Fires Coordination Exercise Field Training Exercise Prerequisite Training	SOP STAFFEX STX TADSS  TEWT V	Standard Operating Procedures Staff Exercise Situational Training Exercise Training Aid Devices, Simulations & Simulators Tactical Exercise Without Troops Virtual (Semi-Immersive)		

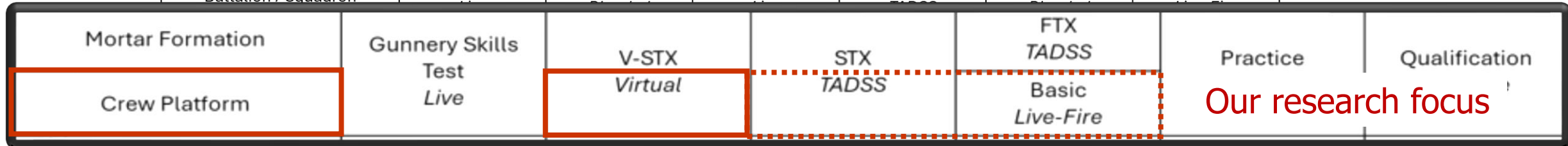
*Each of these require several "engagements" (reps) in different tactical conditions, each potentially producing Gigabytes of data for analysis and feedback*

*Currently little of this data is saved and analyzed*

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Battalion / Squadron	TEWT	STAFFEX	CPX	FTX	FCX	CALFEX



Squad	Gunnery Skills Test Live	V-STX Virtual	STX TADSS	FTX TADSS	Practice Live-Fire	Qualification Live-Fire
Mortar Formation	Gunnery Skills Test Live	V-STX Virtual	STX TADSS	FTX TADSS	Practice Live-Fire	Qualification Live-Fire
Crew Platform				Basic Live-Fire		
Special Purpose Weapons	CLASS Marksmanship Instruction Live	V-STX Virtual	Drills TADSS	Basic Live-Fire	Practice Live-Fire	Qualification Live-Fire
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# DCRA-STE Project Research Capability Objectives



Data Process	Objectives
<b>Data Collection</b>	<u>Collect multi-modal data during training exercises</u> that support training task performance objectives.
<b>Data Reduction and Formatting</b>	<u>Format, align, filter, reduce and aggregate collected data</u> to facilitate its analysis, transport or storage.
<b>Data Analysis and Visualization</b>	<u>Test and refine optimal tools and visualizations</u> for stakeholders to analyze and visualize training data efficiently and effectively.
<b>Assessment and Reporting</b>	<u>Support training managers (Master Gunners) and Commanders assessments</u> of unit state, performance and training outcomes.



# DCRA-STE Supporting Active Training Facility

## Fort Cavazos, Warrior Skills Training Center (WSTC) Data Sources\*



Virtual BattleSpace (VBS)



VBS+LaserShot



TRACR @Ranges\*\*



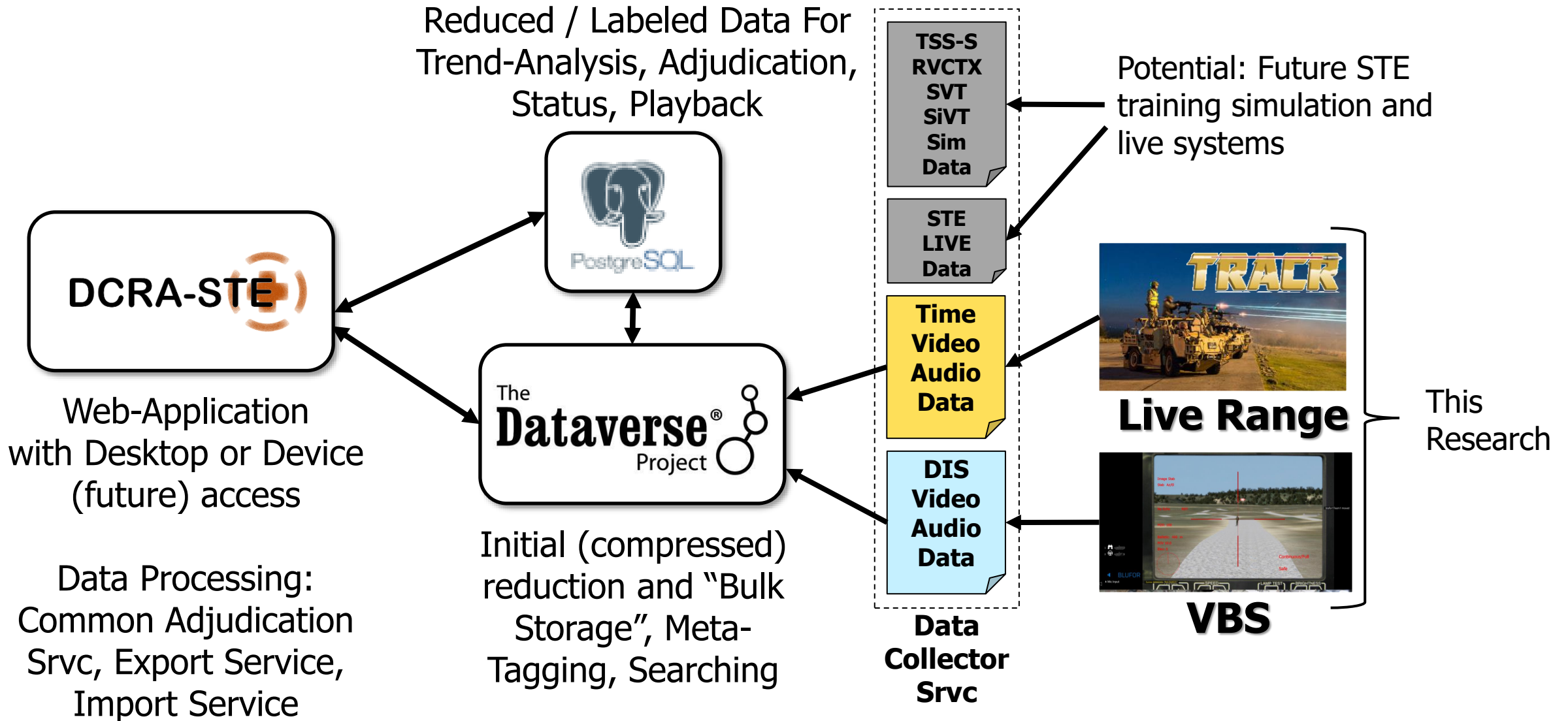
VBS+SVCT



\*WSTC Doesn't Manage Ranges only collects TRACR Data for Gunnery Tracking

\*WSTC staff very innovative and proactive in automating and collecting training data.

# DCRA-STE Data Architecture



# DCRA-STE Data Visualization and Decisional Information (Unit Training State)

## Organization Selection and Event History

The screenshot displays the DCRA-STE web application interface. The top navigation bar includes links for Home, Crew Rollops, Score Cards, Organizations (selected), Browse, Upload, Debug, and LOGOUT. The main content area is split into two panels. The left panel shows a tree view of organizational units, with the 'Recovery Vehicle: Full Tracked' unit highlighted in grey. The right panel shows a 'Timeline of event history for a selected unit' with a horizontal timeline and a table of event history. The table has columns for Event, Date, Gate, and Score, with all scores marked as 'Fail'. A pagination bar at the bottom of the table indicates 'Rows per page 10' and '1-5 of 5'.

**Army Org Server based list (filtered to specific user's unit/echelon)**

- Forward Support Company (Cavalry Squadron) BSB (Armored Brigade Combat Team (ABCT))
- Forward Support Company (Field Artillery Battalion) BSB (Armored Brigade Combat Team (ABCT))
- Forward Support Company (Combined Arms Battalion) (Armor) BSB (Armored Brigade Combat Team (ABCT)) A**
- Company Headquarters
- Field Feeding Section
- Distribution
- Maintenance Platform
- Truck: Heavy Palletized Load System (PLS)
- #2 Bradley Fighting Vehicle System (BFVS) Maintainer
- #3 Bradley Fighting Vehicle System (BFVS) Maintainer
- Motor Sergeant
- Senior Bradley Fighting Vehicle System (BFVS) Maintainer
- Truck: Light Arm/Shelter/Expansion Se
- Truck: Medium Tracked Vehicle (MTRV)
- #1 Bradley Fighting Vehicle System (BFVS) Maintainer
- Recovery Vehicle: Full Tracked**
- #1 Tracked Vehicle Recovery Operator
- #2 Tracked Vehicle Recovery Operator
- Field Maintenance Team (Armored) B
- Field Maintenance Team (Armored) A
- Forward Support Company (Combined Arms Battalion) (Armor)/BSB (Armored Brigade Combat Team (ABCT)) B
- Forward Support Company/(Combined Arms Battalion) (IN)/BSB (Armored Brigade Combat Team (ABCT))
- 23rd Adjutant General Center

**Color indicating: Completion of scheduled training and Outcome of training**

**Color is a roll-up of all units within an echelon**

**Timeline of event history for a selected unit**

Event	Date	Gate	Score
T12_2023102	2023-10-02T05:00:00.000Z	GT II	Fail
A11_2023102	2023-10-02T05:00:00.000Z	GT II	Fail
A-13_2023103	2023-10-03T05:00:00.000Z	GT II	Fail
A6_2023103	2023-10-03T05:00:00.000Z	GT II	Fail
A6_2023102	2023-10-02T05:00:00.000Z	GT II	Fail

Rows per page 10 1-5 of 5

**Table of Event history, auto-filtered for the user and a selected unit**

# DCRA-STE Data Visualization and Decisional Information (Unit Training State)

## Data Records in Repository

DCRA-STE [Home](#) [Crew Rollups](#) [Score Cards](#) [Organizations](#) [Browse](#) [Upload](#) [Debug](#) [LOGOUT](#)

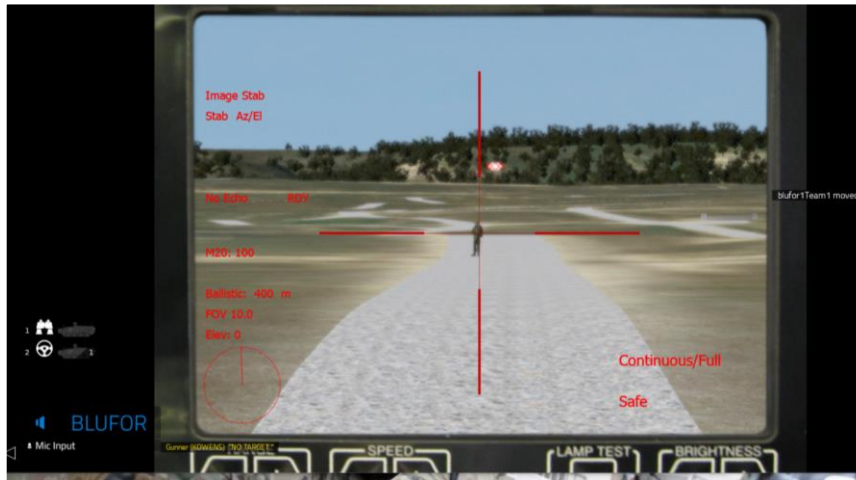
*Can filter by any field to view trend for that property*

Bumper Number	Vehicle Platform	Unit	Date	Vehicle Commander	Qualified	Commander Day	Commander Night	Gunner	Driver	
112		215 BSB	2023-10-02T05:00:00.000Z	CPT ZIDLOR	false	CPT ZIDLOR		SPC ROWLES	SPC Harris	S
A11		ADC 215th BSB	2023-10-02T05:00:00.000Z	Mancillas	false	Mancillas		Parrilla	Foloki	B
A-13		215 BSB ADC	2023-10-03T05:00:00.000Z	SGT Cooley	false	SGT Cooley		SPC Ashworth	PV2 Palmer	
a26		215th	2023-10-02T05:00:00.000Z	cpt epstine	false	cpt epstine		spc parilla	spc foloki	s
A36		215TH BSB	2023-10-03T05:00:00.000Z	Epstein	false	Epstein		tambunga	mneil	
A6		ADC, 215th BSB	2023-10-03T05:00:00.000Z	EPSTEIN, NOAH	false	EPSTEIN, NOAH		LYMON, WILLIAM	JACKSON, KAYLA	M
a36		215	2023-10-02T05:00:00.000Z	cpt epstine	false	cpt epstine		spc tambunga	spc mcniel	s
A26		215 BSB	2023-10-03T05:00:00.000Z	CPT Epstein	false	CPT Epstein		SPC Parilla	SPC Foloki	S
A6		215 BSB	2023-10-	CPT EPSTEIN	false	CPT EPSTEIN		SPC LYMON	SPC JACKSON	S

Rows per page 100 1-25 of 25

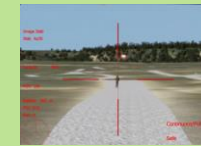
# Automating Data Extraction From Simulation

## Virtual Battlespace



DIS

## STEEL-R AIS Data Collector



*Video*

111000100  
100101010  
100000011  
0101

*Activity, Audio, Bio*

Meta-Tag

The  
**Dataverse**<sup>®</sup>  
Project

## Raw Training Data-Lake

**Type of task-relevant gunnery activity data being saved**

**Enables full reconstruction of all training events beyond proprietary AAR tools.**

**More historic correlation and insight (trend data).**

**Enables adjudication automation.**

# DCRA-STE Automated Data Assessment Reporting (Engagement Score Sheet)

## An Engagement Scorecard

COMMON CREW SCORE SHEET														
For use of this form, see TC 3-20.31; the proponent agency is TRADOC.														
1. ENGAGEMENT			2. OWN VEHICLE POSTURE			3. VEHICLE CREW EVALUATOR			4. DATE		5. UNIT			
<p><b>Auto-assist the engagement scoring process and print out scorecards for unit records or (future) auto-transfer to a future training management system (e.g., Army Integrated Training System)</b></p>														
7a. CONDITIONS (CHECK ALL THAT APPLY.)														
8. TARGET 1 (Most Dangerous)														
a. TYPE			b. RANGE			c. POSTURE			a. TYPE			b. RANGE		
d. AMMO TYPE			e. AUTHORIZED			f. EXPENDED			d. AMMO TYPE			e. AUTHORIZED		
g. Firer			g. Firer			g. Firer			g. Firer			g. Firer		
12a. UP / FIRE / ACTIVE TARGET														
12b. VEHICLE DOWN														
TARGET ENGAGEMENT TIME	1	6	11	16	21	26	31	36	41	46	50			
POINTS	99	97	95	93	91	89	87	85	83	81	80			
13. TARGET 1														
a. KILL TIME			a. KILL TIME			a. KILL TIME			a. KILL TIME			a. BREECH UP		
b. MODIFIER			b. MODIFIER			b. MODIFIER			b. MODIFIER			b. CASE BASE		
c. DEFILADE			c. DEFILADE			c. DEFILADE			c. DEFILADE			c. MISFIRE		
d. BREAK			d. BREAK			d. BREAK			d. BREAK			d. BREAK		
e. ENG TIME			e. ENG TIME			e. ENG TIME			e. ENG TIME			e. THERMAL FAIL		
<p><b>Raw data also used for validation/playback, low-level trend analysis and long-term competency management</b></p>														
<p>NOTES: Assess DQ, AZ, and 30-point penalties and enter penalties in Block 20e. Assess 5-point penalties at the end of each day or night phase on the Common Crew Roll-Up and enter points in Block 21c.</p>														
20a. NUMBER OF IMMEDIATE DISQUALIFICATION (DQ) PENALTIES:										21a. ENG SCORE (from block 20f):		87		
b. NUMBER OF AUTOMATIC ZERO (AZ) PENALTIES:										b. TOTAL 5-POINT DEDUCTIONS (Multiply Block 20d times 5 points):		0		
d. NUMBER OF 5-POINT PENALTIES:										c. TOTAL FUNDAMENTAL CREW PENALTY DEDUCTION ALLOWED AT END OF FIRING PHASE (Use the lesser of Block 21a or 21b):		0		

**More lethality data is available but not used**



# DCRA-STE Automated Data Assessment Reporting (Engagement Score Sheet)

## Engagement Summary

DCRA-STE										
COMMON CREW ROLL-UP		J851_2023103-Task56	J851_2023103-Task57	J851_2023103-Task58-2	J851_2023103-Task55	J851_2023103-Task59	J851_2023103-Task55-2	J851_2023103-Task50-2		
J851_2023103-Task57-2		J851_2023103-Task53	J851_2023103-Task52	J851_2023103-Task54	J851_2023103-Task53-2	J851_2023103-Task51	J851_2023103-Task51-2	J851_2023103-Task52-2	J851_2023103-Task59-2	
J851_2023103-TestFire		J851_2023103-Task58		J851_2023103-Task50		J851_2023103-Task56-2		J851_2023103-Task54-2		
<p><b><i>Auto-assist the roll-up of an engagement event.</i></b></p> <p><small>For use of this form, per 10 CFR 3-20.31, the proponent agency is TRADOC.</small></p>										
1. BUMPER NUMBER		<b><i>Can recommend final qual status (still up to</i></b>			2. VEHICLE PLATFORM		3. UNIT		4. DATE	
5a. VEHICLE COMMANDER RANK AND NAME		<b><i>Master Gunner to agree)</i></b>			b. GUNNER RANK AND NAME		c. DRIVER RANK AND NAME		d. LOADER RANK AND NAME	
SGT Barbee					SGT Prado					
6a. SIMULATOR TYPE					b. VIRTUAL GATE-TO-LIVE-FIRE LEVEL		c. VIRTUAL GATE-TO-LIVE-FIRE DATE		d. VIRTUAL GATE-TO-LIVE-FIRE SCORE	
7. SCORING DATA					8. MALFUNCTIONS					9. REMARKS
a. DAY / NIGHT	b. ENGAGEMENT NUMBER	c. ENGAGEMENT SCORE	d. VALUE OF 5-PT PENALTIES ALLOWED	e. QUALIFIED YES / NO	a. BREECH UP (BU)	b. CASE BASE (BC)	c. MISFIRE (MF)	d. STOPPAGE (ST)	e. THERMAL FAIL (TF)	
D	TestFire	91	0	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	0	0	0	0	0	
D	Task53	100	0	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	0	0	0	0	0	
D	Task56	87	0	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	0	0	0	0	0	
D	Task58	97	0	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	0	0	0	0	0	
D	Task52	100	0	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	0	0	0	0	0	
D	Task50	100	0	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	0	0	0	0	0	
D	Task54	91	0	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	0	0	0	0	0	
D	Task59	48	0	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	0	0	0	0	0	
D	Task57	47	0	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	0	0	0	0	0	
D	Task51-2	100	0	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	0	0	0	0	0	
D	Task56-2	92	0	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	0	0	0	0	0	
D	Task55-2	98	0	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	0	0	0	0	0	
D	Task53-2	100	0	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	0	0	0	0	0	

***All raw data also available to "playback" the engagement so others can review for validation or as example to others units.***

# DCRA-STE Future Prospective Research

- Expand data collection into live tables.
- Integrate with other DEVCOM Data S&T
- Integrate existing CTC instrumented data





# IITSEC 2024



## Any Questions?

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