SISO-REF-079-2025

Reference for
UCATT
Consolidated Enumerations

Version 1.00

15 November 2024

SAC Approved: 01/15/2025 **EXCOM Approved: 01/25/2025**

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Revision History

Version	Section	Date (MM/DD/YYY)	Description
Initial Version	All	11/15/2024	

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1 INTRODUCTION

The large demand for joint military operations world-wide drives the military training requirements for combined training. The North Atlantic Treaty Organization (NATO) Urban Combat Advanced Training Technology (UCATT) group studied the NATO instrumentation needs for live simulation training and concluded that there is a requirement for a set of open, international standards to allow live simulation systems to interoperate in a multinational training environment.

A set of open, international standards for live simulation training has benefits for both the Government and Industry. Benefits for the Military/Government include:

1. Joint and combined training using live simulation
2. Access to each other's Combat Training Centers (CTC's)
3. The ability to purchase components instead of systems
4. Reduction of vendor lock-in
5. Lower interoperability costs and reduction of stovepipe systems

For the Industry, benefits include:

1. Access to market areas now closed off by competitors
2. UCATT acting as a user group for live simulation customers
3. Enabling manufacturers to focus on their strong points

As part of its efforts to achieve these goals and benefits, the Simulation Interoperability Standards Organization (SISO) chartered the UCATT Product Development Group (PDG) in November 2013. The PDG analyzes User Requirements, Use Cases, and technology relevant to providing interoperability for live simulations. It also develops products that implement a functional architecture with clear definitions for the interfaces to be standardized.

The UCATT PDG envisions a family of standards and reference documents which will allow the use of live simulation systems from multiple vendors in one (distributed) training area, without imposing system design. This reference document, defining the enumerations to be used on the various interfaces, is part of that family.

1.1 Purpose

In the domain of live simulation and within the architecture of Urban Combat Advanced Training Technology (UCATT), there is a requirement for multinational and coalition training of defense forces. This involves the use of equipment and systems from different developers and manufacturers. The purpose of this document is to consolidate in a single location a set of enumerations, that if utilized by the community, will:

1. enable the exchange of data between live simulation systems from different suppliers and end-users,
2. enable data exchange between subsystems of live simulation systems from different manufacturers and end-users,
3. ensure interoperability between disparate systems, and
4. maximize training effectiveness by ensuring consistent results regardless of equipment in use.

1.2 Scope

This document addresses enumeration definitions that encompass multiple systems and interfaces. Those interfaces are separately defined as SISO Standards, supported by enumerations defined herein. Interfaces include:

1. The UCATT Federation Object Model (U-FOM) enumerations which enable the data exchange between EXCONs of different Live Simulation Systems via the High-Level Architecture (HLA).
2. The UCATT Ammunition Table enumerations which define the type of ammunition used in (primarily) optical communication of a simulated weapon engagement between a weapon simulator platform and a target simulator platform.
3. The Area Weapons Effect Simulation (AWES) engagement type enumerations which include Indirect Fire, Mines, CBRN and others.
4. The enumerations that might occur in SISO standards concerned with interfaces and interoperability between UCATT Instrumentation Systems and Tactical Engagement Simulation Systems (IS-TESS).

1.3 Objectives

The primary objective here is to consolidate into a single document all the enumerations used within UCATT Standards pertaining to Live Ground Simulation and Training. It is felt that this consolidation will increase interoperability between (and within) systems by defining standards for the exchange of information between equipment/systems from different vendors and manufacturers. This, in turn, will enhance coalition and multinational training exercises by ensuring consistent results regardless of equipment in use.

1.4 Intended Audience

The primary audience for this document is the Live Simulation and Training community (whether in Industry, Government, or Academia) who design, acquire, supply and/or utilize systems for simulation-based live training. Within the Modeling & Simulation (M&S) community, this document is intended for (industry) system engineers, procurement agency personnel and (military) end-users. Other related communities of interest, although not the intended primary audience, are encouraged to leverage the reference described here for use in their domains.

2 Document Description

This document consists of this front section and separate appendices for specific interface standards. The front section provides an introduction and background material to provide context for the contents of the appendices. It also attempts to unify the information and provide a sole source of information for the intended audience.

Appendix A is the UCATT Federation Object Model (FOM) Enumerations. It defines the enumerations required to support the exchange of data between different Exercise Control (Centers) EXCONs of Live Simulation systems in a multinational training environment. It thereby enables interoperability between Live Simulation EXCONs provided from different vendors and manufacturers.

Appendix B is the UCATT Ammunition Table and defines the type of ammunition used in a simulated direct fire weapon engagement.

Appendix C is the Area Weapons Effect Simulation (AWES) munition enumerations. These engagements are typically referred to as Indirect Fire engagements and are executed at the EXCON.

Appendix D is the Live Instrumentation System / Tactical Engagement Simulation Systems (IS-TESS) Enumerations and provides the data necessary to ensure interoperability between the UCATT Instrumentation System and the TESS.

3 DEFINITIONS

Term	Definition
Combat Training Center	A Combat training center is an instrumented range, urban operations training village or exercise area. It can also be a mobile system capable of instrumenting a training area.
Dynamic Object	A live, virtual, or constructive element in the training environment that 1) has a presence in the environment and either 2) has a valid status, or 3) can influence the status of other DOs (execute engagements) or possesses both characteristics. Ad 1. Presence: a DO can be seen, observed, or detected in the training environment. For example, a vehicle can be seen by the naked eye, observed in infra-red, detected by radar and be tracked by C4I systems. A CBRN area can be detected with specific sensors. Associated with its presence is its position. During an exercise the position of a DO can be dynamic (e.g., a soldier can move around) or static (e.g., a wall stays on the same position during an exercise). Ad 2. Status: indicates the (level of) capabilities of a DO. It can be considerably basic (for example dead/alive for human beings, or operational/destroyed for weapon systems and infrastructure), or it can be more complex, distinguishing between more levels of degraded performance. The status of a DO can be changed during and exercise, either by engagements from other DOs or by (interventions from) the training system. Although it could be required that a DO has a fixed status that cannot be changed, thus rendering it untouchable or indestructible in an exercise. A typical example of such a DO is an O/C, its status cannot be changed, but it can engage other DOs. Ad 3. Engagement: a DO can influence the status of other DOs, especially in the context of urban combat. For example, a soldier can fire an anti-tank weapon at a vehicle or at a building, a wall could be destroyed and with its debris it can engage DOs in its vicinity, and a CBRN area can affect unprotected DOs that enter it. However, examples of DOs that cannot engage are a pop-up target or an unarmed UAV, which is just a sensor platform.
Exercise Control	The ability to conduct the following functions: exercise planning, exercise preparation, conducting an exercise, preparing, and providing After Action Review.
Interoperability	The ability of a model or simulation to provide services to and accept services from other models and simulations, and to use these exchanged services to operate effectively together.
Live Simulation	A simulation involving real people operating real systems.
Model	A physical, mathematical, or otherwise logical representation of a system, entity, phenomenon, or process.
Modelling & Simulation	The discipline that comprises the development and/or use of models and simulations.

4 ACRONYMS AND ABBREVIATIONS

Acronym/Abbr	Definition
AWES	Area Weapons Effect Simulation
CBRN	Chemical, Biological, Radiological and Nuclear
EXCON	Exercise Control (Center)
FOM	Federation Object Model
HLA	High Level Architecture
IS	Instrumentation Systems
M&S	Modeling and Simulation
NATO	North Atlantic Treaty Organization
PDG	Product Development Group
SISO	Simulation Interoperability Standards Organization
TESS	Tactical Engagement Simulation Systems
UCATT	Urban Combat Advanced Training Technology

Appendix A

Urban Combat Advanced Training Technology (UCATT) Federation Object Model (FOM) Enumeration Tables

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A1.0 INTRODUCTION

The Urban Combat Advanced Training Technology Federation Object Model (U-FOM) enables the data exchange between different EXCONs of (different) Live Simulation Systems via HLA [3].

This Simulation Interoperability Standards Organization (SISO) Reference product presents the U-FOM specific enumerations supporting the UCATT FOM standard.

A1.1 Purpose

In the domain of live simulation and the architecture of Urban Combat Advanced Training Technology (UCATT) the U-FOM enables the exchange of data between systems, which can influence the course of the training session and has a dynamic, time critical character. Examples of such event data exchange are (updates of) status of DOs and the creation of a minefield in System A, which is communicated to System B.

A1.2 Scope

This document presents the U-FOM specific enumerations. These are defined in addition to the enumerations used by the RPR-FOM 2.0 [1], [2].

A1.3 Objectives

The primary objective of this U-FOM enumerations reference product is to present the U-FOM specific enumerations supporting the U-FOM standard.

The objective of the U-FOM standard is to establish a standard interface for the communication of different EXCONs of Live Simulation systems in a multinational training environment. Compliance with this interface enables interoperability between Live Simulation EXCONs provided from different vendors and manufacturers.

A1.4 Intended Audience

The primary audience for this document is the Live Simulation community since it is developed with live simulation systems in mind.

Within the M&S community, this document is primarily intended for (industry) system engineers, procurement agency personnel and (military) end-users.

A2.0 REFERENCES

A2.1 SISO Documents

The following SISO documents were used in generating the policies and procedures defined herein. When the following documents are superseded by an approved revision and that causes a conflict with this document, the revision of the below-referenced documents shall supersede this document. These documents are available by through the SISO web site at https://www.sisostandards.org/.

	Document Number	Title
1	SISO-STD-001.1-2015	Standard for Real-time Platform Reference Federation Object Model, Version 2.0
2	SISO-STD-001-2015	Standard for Guidance, Rationale, and Interoperability Modalities for the Real-time Platform Reference Federation Object Model, Version 2.0

A2.2 Other Documents

	Document Number	Title
3		U-FOM 1.0 in PDF format

A2.3 Bibliography (Informative)

For the convenience of users of the U-FOM it has been converted into a hyperlinked PDF format, for easier reading.

Description	File Name
U-FOM 1.0 in PDF Format	U-FOM_v1.0.pdf

These files are informative parts of the specification and can be downloaded from:

https://www.sisostandards.org/page/DataFiles

A2.4 Bibliography (Normative)

These FOM Modules, specified according to IEEE Std 1516.2™-2010, constitute the U-FOM standard

Module Name	File Name
Base FOM Module	U-FOM-Base_v1.0.xml
E8 FOM Module	U-FOM-Module_v1.0.xml
Enumerations FOM Module	U-FOM-Enumerations_v1.0.xml

These files are normative parts of the specification and can be downloaded from:

https://www.sisostandards.org/page/DataFiles

A3.0 DEFINITIONS

Term	Definition

A4.0 ACRONYMS AND ABBREVIATIONS

Acronym/Abbr	Definition
C4I	Command, Control, Communications, Computers, and Intelligence
C4ISR	C4I, Surveillance and Reconnaissance
DO	Dynamic Object
EXCON	Exercise Control (Center)
FOM	Federation Object Model
HLA	High Level Architecture
M&S	Modelling and Simulation
SISO	Simulation Interoperability Standards Organization
UCATT	Urban Combat Advanced Training Technology
U-FOM	UCATT Federation Object Model

A5.0 ENUMERATED DATATYPES

A5.1 Enum_Advanced_Platform_Damage_State_L1

Enumerator	Value
Operational	0
HitNoEffect	1
Miss	2
MobilityKill	3
WeaponKill	4
C4ISRKill	5
PayloadKill	6
TotalKill	7
TamperingKill	8
AdministrativeKill	9

A5.2 Enum_Advanced_Platform_Damage_State_L2

Enumerator	Value
None	0

A5.3 Enum_Advanced_Platform_Damage_State_L3

Enumerator	Value
None	0

A5.4 Enum_Advanced_Platform_Damage_State_L4

Enumerator	Value
None	0

A5.5 Enum_Platform_Protective_Measures

Enumerator	Value
Passive_Armour	0
Active_Armour	1
Active_Protection_System	2
CBRN_Protection	3
EMP_Protection	4
Jammer_Protection	5
IR_Camouflage	6
Stealth	7
DugIn	8
Flares	9
Chaff	10
Smoke	11

A5.6 Enum_Lifeform_Protection_Measures

Enumerator	Value
Helmet	0
BodyArmour_Type_I	1
BodyArmour_Type_II	2
BodyArmour_Type_IIA	3
BodyArmour_Type_III	4
BodyArmour_Type_IIIA	5
BodyArmour_Type_IV	6
ProtectiveMask_AX	7

Enumerator	Value
ProtectiveMask_A	8
ProtectiveMask_B	9
ProtectiveMask_E	10
ProtectiveMask_K	11
ProtectiveMask_CO	12
ProtectiveMask_Hg	13
ProtectiveMask_Reactor	14
ProtectiveMask_P	15
ProtectiveMask_ABEK	16
ProtectiveSuit_Hazmat_Type_1	17
ProtectiveSuit_Hazmat_Type_2	18
ProtectiveSuit_Hazmat_Type_3	19
ProtectiveSuit_Hazmat_Type_4	20
ProtectiveSuit_Hazmat_Type_5	21
ProtectiveSuit_Hazmat_Type_6	22

A5.7 Enum_Advanced_Lifeform_Damage_State_L1

Enumerator	Value
Operational	0
HitNoEffect	1
Miss	2
Wounded	3
C4ISRKill	4
Kill	5
AdministrativeKill	6
TamperingKill	7

A5.8 Enum_ALDS_Wounding_Area_L2

Enumerator	Value
Head	1
Chest	2
Torso	3
Abdomen	4
LeftArm	5
RightArm	6
LeftLeg	7
RightLeg	8
Neck	9
Back	10
Pelvis	11

A5.9 Enum_ALDS_Wounding_Type_L3

Enumerator	Value
Bleeding	1
Blast	2
Burn	3
Fracture	4
Chemical	5
Biological	6
Radiation	7
Nuclear	8
Electrical	9
Removed	10

A5.10 Enum_Wounding_TreatmentTier

Enumerator	Value
None	0
CasualtyCollectionPoint	1
Role1	2
Role2	3
Role3	4
L1_CareUnderFire	5

Enumerator	Value
L2_BasicFirstAid	6
L3_FieldMedic	7
L4_AssemblyArea	8
L5_Hospital	9

A5.11 Enum_Jamming_modes

Enumerator	Value
None	0
Jamming	1
Spoofing	2

A5.12 Enum_MinefieldBreachType

Enumerator	Value
BreachedAll	0
BreachedAT	1
BreachedAP	2

A5.13 Enum_Obstacles

Enumerator	Value
Minefield	0
AntiTankDitch	1
Abatis	2
Logs	3
Beampost	4
Crater	5
Rubble	6
Berm	7
Flooding	8
AntiLZ	9
BridgeDamage	10

A5.14 Enum_Obstacles_BreachForType

Enumerator	Value
Breached_All	0
Breached_WheeledVehicle	1
Breached_TrackedVehicle	2
Breached_Personnel	3
Breached_None	4

A5.15 Enum_Trajectory

Enumerator	Value
Direct	0
Low	1
High	2

A5.16 Enum_ValidFor

Enumerator	Value
All	0
Bluefor	1
Opfor	2
Neutral	3
Unknown	4
Independent	5
None	6

A5.17 Enum_DecontaminationArea

Enumerator	Value
All	0
Chemical	1
Biological	2
Radiological	3
Nuclear	4

A5.18 Enum_WeaponEffectModification

Enumerator	Value
Ditch	0
Wall	1
Trees	2
OpenTerrain	3
BoggyTerrain	4
RockyTerrain	5
SandyTerrain	6
FrozenTerrain	7
SnowyTerrain	8
UndulatingTerrain	9
FloodedTerrain	10
WoodenStructures	11
ConcreteStructures	12

A5.19 Enum_PrisonerHoldingArea

Enumerator	Value
DetentionControlPoint	0
DetentionHoldingArea	1

A5.20 Enum_AirspaceType

Enumerator	Value
AirCorridor	0
MinimumRiskRoute	1
TemporaryMinimumRiskRoute	2
TransitCorridor	3
TransitRoute	4
LowLevelTransitRoute	5
SpecialCorridor	6
StandardUseArmyAircraftRoute	7
RestrictedOperationZone	8
AirtoAirRefuellingArea	9
AirborneCommandandControlArea	10
AirborneEarlyWarningArea	11

Enumerator	Value
CloseAirSupportArea	12
CombatAirPatrol	13
ElectronicCombat	14
DropZone	15
LandingZone	16
PickupZone	17
ReconnaissanceArea	18
SpecialOperationsForceArea	19
SurfacetoSurfaceMissileSystemArea	20
SurfacetoSurfaceMunitionsArea	21
UnmannedAircraftArea	22

A5.21 Enum_RepairType

Enumerator	Value
All	0
Wheeled	1
Tracked	2
Aircraft	3
Vessel	4

A5.22 Enum_RestrictedType

Enumerator	Value
All	0
TrackedVehicles	1
WheeledVehicles	2
Personnel	3
Aircraft	4
Vessel	5

A5.23 Enum_RestrictedAreaType

Enumerator	Value
NoGoArea	0
NoFireZone	1
NoStrobeZone	2
NoPyroZone	3

Enumerator	Value
NoFireArea	4
NoFlyArea	5

A5.24 Enum_NoFireArea

Enumerator	Value
All	0
DirectFire	1
IndirectFire	2
CAS	3

A5.25 Enum_UmpireCode

Enumerator	Value
Test	1
Kill	2
Wounded_DamagedMedium	3
Reset	4
WeaponKill	5
HitNoEffect	6
WeaponKillVisual	7
MedicalTreatmentActivated	8
TamperingKill_Destroy	9
ConfigurationWithHelmet	10
MobilityKill	11
MobilityKillVisual	12
ExercisePause	13
RadioCommunicationDestroy	14
WoundedSeriously_HeavyDamage	15
ConfigurationWithoutHelmet	16
ConfigurationWithBallisticProtectiveVestOn	17
Reactivate	18
NearMiss	19
DugInSet	20
DugInReset	21
WoundedButCanStillWalk	22

Enumerator	Value
WoundedShallSitOrLieDown	23
WoundedShallLieDown	24
Wounded	25
MedicalReset	26
TurretStabilizationDestroy	27
ToggleTargetSimulatorCharacteristics	28
SightDestroy	29
Contaminate	30
CleanFromContamination	31
PrisonerSet	32
PrisonerReset	33
Spare_34	34
Spare_35	35
Spare_36	36
Spare_37	37
Spare_38	38
Spare_39	39
LogBufferReset	40
TimeMark_BookMark	41
ControllerAccess	42
TargetLifterDown	43
TargetLifterUp	44
StandBy	45
EmergencyStop	46
NonActiveMode	47
BallisticProtectiveVestOn	48
BallisticProtectiveVestOff	49
SimulationMode_BFT	50
SimulationMode_ExerciseMode	51
Reserved_52	52
Reserved_53	53
Reserved_54	54
Reserved_55	55

Enumerator	Value
Reserved_56	56
Reserved_57	57
Reserved_58	58
NBCProtectionOn	59
NBCProtectionOff	60
Spare_61	61
Spare_62	62
Spare_63	63
Spare_64	64

A5.26 Enum_Advanced_Infrastructure_Damage_State_L1

Enumerator	Value
Undamaged	0
HitNoEffect	1
Miss	2
Damaged	3
C4ISRKill	4
Destroyed	5
PayloadKill	6
TamperingKill	7
AdministrativeKill	8

A5.27 Enum_Advanced_Infrastructure_Damage_State_L2

Enumerator	Value
None	0

A5.28 Enum_Obstacles_Breachtype

Enumerator	Value
MFByHand	1
MFByMinePlough	2
MFByMineRoller	3
MFByMineFlail	4
MFByExplosives	5
MFByArtillery	6
ObstacleByFacines	7

Enumerator	Value
ObstacleByLandfill	8
ObstacleByBridgelaying	9
ObstacleByDisplacement	10

Appendix B

Urban Combat Advanced Training Technology (UCATT)

U-LEIS Ammunition Tables

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B1.0 OVERVIEW

B1.1 Scope

The UCATT Ammunition Table primarily applies to the UCATT Interface Standard for Laser Engagement, describing how to communicate a simulated weapon engagement from a weapon simulator platform to a target simulator platform.

The UCATT Ammunition Table defines the type of ammunition used in primarily optical communication of a simulated weapon engagement. The subsequent assessment of the simulated effect on the target is not part of this Ammunition Table and thus it must be separately defined. The intent is that the ammunition type of a simulated weapon engagement is abstracted from the target simulated effect evaluation, i.e., direct fire optically simulated engagement may be complimented or replaced by another type of communication with the same interface requirements to maintain the coalition interoperability objectives.

B1.2 Purpose

There is a requirement for coalition training of defense forces. Weapons effect simulation has in the past typically evolved with national training requirements resulting in proprietary specifications satisfying specific national needs. The Ammunition Table primarily refers to a laser simulated engagement methodology for direct fire weapon simulation used for e.g., gunnery and combat training. The realization of training specifications across coalition platforms enables interoperability in a live ground training environment.

B1.3 Objectives

The primary objective of the UCATT Ammunition Table is to establish a specification for the communication of a laser based simulated weapon engagement in a training environment. The intent is to prescribe the use of several classes of ammunition types for simulating direct fire weapon systems.

The UCATT Interface Standard for Laser Engagement specifies how the different weapon simulators interact on the exercise area. All simulators on the exercise area must follow the specification, to ensure that simulators can interoperate properly. The requirements in the UCATT Interface Standard for Laser Engagement and the UCATT Ammunition Table are specifically important when different weapon simulators from different manufacturers shall interact on the exercise area.

B2.0 REFERENCES (NORMATIVE)

B2.1 SISO References

The following SISO documents were used in generating the policies and procedures defined herein. When the following documents are superseded by an approved revision and that causes a conflict with this document, the revision of the below-referenced documents shall supersede this document. These documents are available by through the SISO web site at https://www.sisostandards.org/.

Document Number	Title	Date
SISO-STD-016-2016	Standard for UCATT Laser Engagement Interface	

B2.2 Other

Document Number	Title	Date
none included		

B3.0 DEFINITIONS, ACRONYMS AND ABBREVIATIONS

English words are used in accordance with their definitions in the latest edition of Webster's New Collegiate Dictionary except when special SISO Product-related technical terms are required.

B3.1 Definitions

None included.

B3.2 Acronyms and Abbreviations

Acronym or Abbreviation	Meaning	Note
AP	Armor Piercing	
APC	Armored Personnel Carrier	
API	Armor Piercing Incendiary	
*APimp	Armor-Piercing, Improved	More lethality than an AP. See Note APimp.
*APtop	Armor-Piercing, Top Attack	
DPICM	Dual-Purpose Improved Conventional Munitions	
ERA	Explosive Reactive Armor	
GL	Grenade Launcher	
HE	High Explosive	
*HEair	High Explosive Air Burst	Exploding in the air. See Note HEair.
*HEimp	High Explosive, Improved	More lethality than HE. See Notes APimp.
HEAT	High Explosive Anti-tank	
*HEBB	High Explosive Bunker Buster	
*HEcani	High Explosive Canister	The canister cartridge provides a short-range anti-personnel capability
HEDP	High Explosive Dual Purpose	
HE-FRAG	High Explosive Fragmentation	Can be considered as APERS
HEI	High Explosive Incendiary	
HEMP	High Explosive Multi-Purpose	
*HEMPair	High Explosive Multi-Purpose, Air Burst	Exploding in the air. See Note HEair.
*HEMPdd	High Explosive Multi-Purpose with Delayed Detonation	HEMP with delayed detonation. See Note HEMPdd.
*HEMPimp	High Explosive Multi-Purpose, Improved	More lethality than HEMP. See Note APimp.
*HEMPimpair	HEMPimp, Air Burst	Exploding in the air.

Acronym or Abbreviation	Meaning	Note
		See Notes APimp and HEair
*HEORT	High Explosive Obstacle Reduction Tank	
HEP	High-Explosive Plastic	US acronym for HESH
HESH	High Explosive Squash Head	See Note HESH
HVAP	High Velocity Armor Piercing	Like APCR
HVAPDS	High or Hyper Velocity APDS	
IFV	Infantry Fighting Vehicle	
IUC	Interoperability User Community	
ITKK	Ilmatorjuntakonekivääri	Heavy 12.7mm Machine Gun in Finland
*KETF	Kinetic Energy Time Fuse	ABM-KETF in direct hit role.
*KETFair	Kinetic Energy Time Fuse Air Burst	ABM-KETF detonating in the air.
KVKK	Kevyt Konekivääri	Light Machine Gun in Finland
MPI	Multi-Purpose Incendiary	See Note MPI
MRM-CE	Mid-Range Munition, Chemical-Energy	
MRM-KE	Mid-Range Munition, Kinetic-Energy	
NMISS	Near Miss	
NLETH	Non-lethal	
PKM	Pulemjot Kalašnikova Modernizirovannyi	Heavy 7.62mm Machine Gun in Finland
PPHE	Programmable Pre-fragmented HE	
RCL	Recoilless Rifle	
RHA	Rolled Homogeneous Armor	
RPG	Rocket Propelled Grenade	Russian language: Reaktivnyy/Ruchnoy Protivotankovyy Granatomyot. Handheld anti-tank grenade launcher
SABOT	A carrier designed to center a smaller caliber projectile in a larger gun barrel.	When the SABOT round is fired, it is normally discarded after leaving the muzzle.
SISO	Simulation Interoperability Standards Organization	
SLAP	Saboted Light Armor Penetrator	Small arms APDS
STAFF	Smart Target Activated Fire-and-Forget	
THBAR	Thermobaric	See Note Thermobaric

Acronym or Abbreviation	Meaning	Note
TNT equivalent	Trinitrotoluene equivalent	The explosive yield of TNT is considered a standard measure of strength of bombs and other explosives.
TPDS	Training-Practice, Discarding-Sabot	
UCATT	Urban Combat Advanced Training Technology	
WB	Wall Breaker	
3P	Programmable, Pre-fragmented and Proximity	As in KSGR40 3P

1. NOTE- *Ammunition Table acronym only.

2. NOTE- APimp-APimp stands for “AP improved” and is used in categories in which the effect spectrum generated by the different calibers and weapon platforms is too wide for one AP code only. APimp has a higher lethality than an AP, a result of longer barrel or modified propellant and/or heavier or stronger penetrator.

3. NOTE- HEair-The HEair (HE Air Burst) acronym is used for fused HE ammunitions, set to detonate in air.

4. NOTE- HEMPdd-The acronym is used for HEMP ammunitions with delayed detonation, i.e., detonation not at but after impact. It can be achieved by use of, for instance, point-detonation fuse with delay.

5. NOTE- HESH- HESH rounds are thin metal shells filled with plastic explosive and a delayed-action base fuse. On impact, the plastic explosive is "squashed" against the surface of the target and spread out to form a disc or "pat" of explosive. A tiny fraction of a second later, the base fuse detonates the explosive, creating a shock wave that, owing to its large surface area and direct contact with the target, conducts very effectively through the material. In the case of metal armor of a tank, the compression shock wave conducts through the armor to the point where it reaches the metal/air interface (the hollow crew compartment) and where some of the energy is reflected as a tension wave. At the point where the compression and tension waves intersect, a high stress zone is created in the metal causing pieces of steel to be projected off the interior wall.

6. NOTE- MPI. This cartridge is effective against airborne and light surface threats at ranges up to 2,000 meters. The Multipurpose Concept projectile with delayed reaction carries the effectiveness inside the threat with large fragments and incendiary effects.

7. NOTE- Thermobaric- The lethality results from a thermobaric overpressure blast rather than fragmentation. As a result of the thermobaric reaction, all enemy personnel within the effective radius will suffer lethal effects.

B4.0 UCATT AMMUNITION TABLE

B4.1 Introduction

A typical weapon simulator is principally built up by two parts, the fire simulator, and the target simulator. The weapon simulator may then simulate fire against a target and at the same time receive simulated fire from other weapon simulators.

A weapon simulator may also be made up of only the fire simulator part, as in an anti-tank weapon, or only the target simulator part as on a truck.

The weapon systems have different price levels, and the simulator requirements may differ as for example:

- A tank weapon system is an expensive weapon system, and the hit accuracy requirements are usually important.
- An anti-tank weapon system is comparatively less expensive, but the simulator might have to consider that it shall simulate a "Fire-and-Forget" weapon system.
- A small arms weapon system is even less expensive but the simulator data transfer from the fire simulator to target simulators can be time critical.
- Similar or even equal ammunition type is used in different weapon systems (e.g., 7.62mm coax and machine gun) where the simulator systems requirements still differ.

Consequently, the Ammunition Table must support different optical encoding methods used to meet the different laser simulator requirements.

B4.2 Optical Coding Structure

There are four basic optical codes defined in the UCATT Interface Standard for Laser Engagement. The optical codes with related ammunition number series can briefly be described as follows:

The below Table B- 1 summarizes the optical codes characteristics.

Table B- 1 Optical Code Characteristics Summary

Optical Code	Simulation Principle	Typically a scanning transmitter	Comment
Real-Time	Two-Way	Yes	Ballistic projectiles and guided missiles
Fire-and-Forget	Two-Way	Yes	Fire-and-Forget weapons
Short-Time Scanning	One-Way	Yes	Against soldiers without retroreflectors
Short-Time	One-Way	No	Small arms weapons

B4.3 Ammunition Type Grouping

To reduce the number of ammunition types and the resulting number of ammunition numbers, the ammunition types with similar lethality are grouped as illustrated in the example Table B- 2 below:

Table B- 2 Ammunition Table Section 2

Ammunition Type Grouping Examples

UCATT Ammunition Type	Real Ammunition Type		UCATT Ammunition Type	Real Ammunition Type
AP	AP		HE	APAM
	APCR			APERS
	APDS			DPICM
	APFSDS			HE
	APFSDS-DU			HE-FRAG
	APSE			HEI
	APEP			
	HVAP			
	HVAPDS			
HEAT	HEAT		HEMP	HEDP
	HESH			HEMP
	HEP			

B4.4 Ammunition Numbering Summary

The Table B- 4 and Table B- 5 in this section summarize the ammunition numbering that come with the UCATT Ammunition Table and to what simulation characteristics they apply.

The ammunition numbering of the UCATT Ammunition Table is divided into two sections.

- Section 1:
  - Ammunition numbers 1 through 79.
  - Non-alternating coded ammunition numbers.
- Section 2:
  - Ammunition types 2001 through 2280 with a vast number of related ammunition numbers.
  - Alternating coded ammunition numbers.

This document referred child ammunition numbers are supplemental numbers providing further simulation potential. Each grandparent or parent ammunition number has one or more related child ammunition numbers. It is possible to fine tune the lethality or for specific training purposes alter the grandparent or parent ammunition lethality using child ammunition numbers. Child ammunition numbers are free to use as for example for national training purposes but are at least target simulator evaluated as its grandparent ammunition number vulnerability when in multinational training.

Another typical simulation characteristic example is that a top attack engaging missile can detonate with a simulated projectile position above the target and still the target simulator realistically simulates the engagement result.

The Table B- 4 and Table B- 5 summary tables include Real-Time Code simulation characteristics that can briefly be described as follows:

Table B- 3 Real-Time Ammunition Numbering Simulation Characteristics

Simulation Characteristics	Abbrevi-ation	*Target simulator(s) typical measured engagement position	Number of fire simulator simulated projectiles or missiles for each optical engagement simulation.
Burst of Fire	RB	Surface impact x-y coordinate	Two. The target simulator(s) compen-sate(s) with raised vulnerability
Direct Impact	RD	Surface impact x-y coordinate	One
Unarmed	RU	Surface impact x-y coordinate. Impact before arming distance (without explosives detonation)	
Top Attack	RT	Detonation above or surface impact x-y coordinate	
Air Burst 2D	RA	Two-dimensional (2D) x-y coordinate.	
Air Burst 3D	RA	Three-dimensional (3D) x-y-z coordinate used for calculating engagement distance	

NOTE-*Target simulators also simulate fly-by and ground hit engagement positions.

B4.5 Numbering Summary Section 1

The UCATT Interface Standard for Laser Engagement includes non-alternating coded ammunition numbers 1 through 79 and contains additional Short-Time coded child ammunition numbers. Each of the Short-Time ammunition numbers 47-76 has five related child ammunition numbers as illustrated by the below Table B- 4.

As for example fused HE ammunition is simulated and optically communicated to the targets to recognize that the engagement was detonating as an air burst. The air burst engagement effect is simulated with a basis of a two dimensional (x-y) measured engagement position.

The following Table B- 4 summarizes the numbering summary section 1 ammunition numbering and how the numbering supports simulation characteristics:

Table B- 4 Ammunition Numbering for Ammunition Table Section 1

Simulation Characteristics	*Parent-Child Relationship	Optical Code						
		Real-Time				Short-Time	Fire-and-Forget	Short-Time Scanning
		Section 1a				Section 1c	Section 1b	Section 1d
		Direct Impact	Top Attack	Burst of Fire	Air Burst 2D			
Abbreviation / Ammo Type		RD	RT	RB	RA	N.A.	FF	N.A.
1-79	None	1-24, 26-29, 31-46				N.A.	25, 30	77-79
	Grand-parent	N.A.				47-76	N.A.	N.A.
	Child	N.A.				1547-1576 1647-1676 1747-1776 1847-1876 1947-1976	N.A.	N.A.

B4.6 Numbering Summary Section 2

To the ammunition numbers in section 1 are in section 2 added several hundreds more alternating coded ammunition numbers allowing simulation of numerous weapon platforms and ammunition types. In addition to growth potential, these ammunition numbers also allow the users to as for example:

- Achieve interoperability between coalition forces
- Separate between weapon systems in the battlefield
- Support training against simulated OPFOR weapons.

Together with the ammunition numbers in section 2 there is also an additional support of enhanced simulation principles as for example:

- Three-dimension air burst
- Engagement distance dependent lethality
- Weapon arming distance dependent lethality
- More accurate target simulator measurement of projectile or missile engagement position as fire simulator weapon cant angle can be transferred to target simulator.

As illustrated in Table B- 5 below, the basic number series 1 through 280 is repeated with different digit(s) prefixes. The number series 2001 through 2280 represents the basic ammunition types and the ammunition number prefixes reflect the Ammunition Table support of the UCATT Interface Standard for Laser Engagement multiple optical codes and other simulation characteristics.

As for example, HE ammunition can be simulated and optically communicated to the targets to recognize that the engagement was a direct hit, ground hit, a fly-by or that it was fused and thus detonating as an air burst. The air burst engagement effect is simulated with a basis of a three dimensional (x-y-z) measured engagement position then calculated as an engagement distance.

Another functionality example is interaction with simulator systems without retroreflectors. The Real-Time two-way simulated ammunitions, requiring target retroreflectors, are also supplemented with a corresponding ammunition number for Short-Time Scanning one-way simulation requiring no retroreflectors.

The following Table B- 5 summarizes the numbering summary section 2 ammunition numbering and how the numbering supports simulation characteristics:

Table B- 5 Ammunition Numbering for Ammunition Table Section 2

Simulation Characteristics	*Parent-Child Relationship	Optical Code						
		Real-Time					Fire-and-Forget	Short-Time Scanning
		Direct Impact	Top Attack	Burst of Fire	Air Burst 3D	Unarmed		
Abbreviation / Ammo Type		RD	RT	RB	RA	RU	FF	SS
2001-2280	Grand-parent	2001-2280		N.A.				
	Parent	N.A.		4001-4280	6001-6280	8001-8280	12001-12280	22001-22280
	Child	3001-3280		5001-5280	7001-7280	9001-9280	13001-13280	23001-23280

B4.7 Ammunition Tables

The UCATT Ammunition Table presents ammunition type numbers with related ammunition numbers, caliber/weapon, and ammunition type. In case the “Real Ammo Type” is equal to the “UCATT Interface Standard for Laser Engagement Ammo Type” it is for matter of brevity not always written.

B4.8 Section 1

Section 1 contains four sections related to fire simulator used optical code.

- 1a. Real-Time
- 1b. Fire-and-Forget
- 1c. Short-Time
- 1d. Short-Time Scanning

B4.9 Section 1a

This section contains ammunition numbers related to the Real-Time optical code.

Table B- 6 Ammunition Table Section 1a

Ammo No.	Simulation Characteristics					Caliber or Weapon	UCATT Ammo Type	Description	Real Ammo Type
	RD	RT	RB	RA	FF				
1	RD					AP 120mm <2500m	AP		
2	RD					AP 120mm >2500m	AP		
3	RD					HE 120mm	HE		
4	RD					HE 120mm delayed detonation	HE	Detonation behind the wall	
5	RD					AP 105mm	AP		
6	RD					HE 70-90mm	HE		
7	RD					HEAT 105mm	HEAT		
8	RD					HE 105mm	HE		
9	RD					AP 35mm Cannon	AP		
10	RD					AP 20mm Cannon	AP		
11			RB			Ball 5.56mm MG vehicle, burst of fire	Ball	COAX	
12	RD					HOT, anti-tank helicopter	HEAT		
13	RD					MELLS, GILL, Spike, Bill 2, - direct hit	HEAT		
14	RD					TOW, Bill 1 direct hit	HEAT		
15	RD					MILAN	HEAT		
16	RD					HEAT PzF3	HEAT	CG84 HEAT 551, HL PAR 66/79	
17	RD					ABM 30mm direct hit	HE		
18	RD					HEI 20mm Cannon	HEMP		HEI
19	RD					Non-Lethal Weapon, vehicle	Ball		
20	RD					Ammunition without effect	NLETH	Non-lethal ammo, rubber projectiles	
21			RB			AP 20mm Cannon, burst of fire	AP		
22			RB			HE 20mm Cannon, burst of fire	HEMP		
23			RB			Ball 7.62mm MG vehicle, burst of fire	Ball	COAX	
24	RD					HEI PzF3 heavy	HE		HEI
25					FF			See section 1b	
26	RD					HEAT 40mm, AGL	HEAT		

Ammo No.	Simulation Characteristics					Caliber or Weapon	UCATT Ammo Type	Description	Real Ammo Type
27	RD					HEI 40mm, AGL	HEMP		HEI
28	RD					HEI 35mm Cannon	HEMP		HEI
29	RD					HEMP 12.7mm / HMG / BMG	HEMP		
30					FF			See section 1b	
31	RD					HEAT PzF3 heavy tandem	HEAT	CG84 HEAT 751	
32	RD					PzF Bunkerfaust	HE BB	Bunker buster, CG84 HE 441 direct hit, PAR 66/79 direct hit	
33				RA		ABM 35mm time fused	HEair		ABM
34		RT				Bill 1 Top attack	HEAT		
35		RT				Bill 2 Top attack	HEAT		
36				RA		PzF middle air burst	HEair	CG84 HE 441 air burst, PAR 66/79 Hoch	HE
37	RD					AP 12.7mm / HMG / BMG	AP		
38	RD					Bill 2 soft target	HEAT		
39	RD					HEAT PzF light	HEAT	RGW60	
40				RA		ABM 30mm time fused	HEair		HE
41				RA		AGL ABM 40mm time fused	HEair		HE
42				RA		ABM 120mm time fused	HEair		HE
43	RD					Ball 12.7mm HMG / BMG	Ball		
44	RD					AP 30mm	AP		
45	RD					PzF middle	HEAT	CG84 HEAT 651, L-HL PAR 66/79, Ammo with tracer	
46	N.A.					Not yet used	NLETH	Spare	

B4.10 Section 1b

This section contains ammunition numbers related to the Fire-and-Forget optical code.

Table B- 7 Ammunition Table Section 1b

Ammo No.	Caliber or Weapon	UCATT Ammo Type	Description
25	Fire-and-Forget middle, 70mm helicopter rocket	HEAT	
30	PARS LR, MELLS, GILL, Spike, (F&F heavy)	HEAT	TRIGAT LR

B4.11 Section 1c

This section contains ammunition type numbers related to the Short-Time optical code. The ammunition type numbers are then related to ammunition numbers as further described in section “B4.5 Numbering Summary Section 1”.

Table B- 8 Ammunition Table Section 1c

Ammo Type No.	Corre-sponding Near Miss No.	Caliber or Weapon	UCATT Ammo Type	Description
47		Not yet used	NLETH	Spare
48	59	IED light, TNT < 5kg, remote range	HE	HEW Mine Hit, Remote range M19 Anti-Personnel Note M19 *Sector charge ammunition code
49	65	IED middle, TNT 5 - 20kg, remote range	HE	HEW Mine Hit, Remote range M100 Anti-Personnel Note M100 *Sector charge ammunition code
50	59	HEMP Hand Grenade	HE	
51	57	Ball 5.56mm MG	Ball	Machine Gun MG4, C7, C8, Minimi, HK416
52	65	Truck bomb TNT >100kg	HE	Truck bomb
53	59	Grenade-thrower	HE	Grenade thrower
54	65	HEMP 12.7mm HMG	HEMP	Heavy Machine Gun MP, Sniper MP
55	57	Non-Lethal Weapon, tear gas	NLW	Tear gas
56	57	Ball 5.56 / 7.62mm Assault weapon	Ball	Assault rifle 5.56: G36, StG 77 7.62: G3, AG-3, HK417
57	57	Near Miss – light handheld weapon	NMISS	Light Small Arms Weapon Near Miss StG, C7, C8, Minimi
58	59	Ball 7.62mm MG	Ball	Machine Gun MG3, MG74, MAG Inf, KVKK (Light MG), PKM (HMG), Chain gun

Ammo Type No.	Corre-sponding Near Miss No.	Caliber or Weapon	UCATT Ammo Type	Description
59	59	Near Miss – middle handheld weapon	NMISS	Middle Small Arms Weapon Near Miss SSG, MG74, MAG Inf.
60	65	HEW Off Route Anti-Tank Kill, short range	HEMP	HEW Vehicle Kill DM-12 PARM, 125mm HEAT *Sector charge ammunition code
61	65	HEW Off Route Anti-Tank Hit, remote range	HEMP	HEW Soldier Kill *Sector charge ammunition code
62	59	Indirect kill, against transported personnel	Kill	Indirect Kill e.g., inside the vehicle
63	59	Indirect kill, back blast	Kill	Backfire from a recoilless weapon AT4 back-blast
64	65	Ball 12.7 mm HMG / Long range rifle	Ball	ÜsMG, Browning .50, ITKK
65	65	Near miss heavy handheld weapon	NMISS	Heavy Small Arms Weapon Near Miss ÜsMG, Browning .50, Accuracy 8.6mm
66	59	HEMP Hand Grenade	HE	
67	67	Non-Lethal Weapon, rubber projectile, concussion grenade	NLW	
68	59	IED light, TNT < 5kg, short range	HE	HEW Mine Kill, Short range M19 Anti-armor Note M19 *Sector charge ammunition code
69	65	IED middle, TNT 5 - 20kg, short range	HE	HEW Mine Kill, Short range M100 Anti-armor Note M100 *Sector charge ammunition code
70	65	IED heavy, TNT 20 - 100kg	HE	
71	65	AP 12.7mm HMG / Long range rifle	AP	G82, ITKK APS, APS

Ammo Type No.	Corre-sponding Near Miss No.	Caliber or Weapon	UCATT Ammo Type	Description
72	59	AP 7.62mm / 8.6mm Sniper	AP	Sniper 7.62mm: G22, SSG69, NM-149 8.6mm: Accuracy, TAK
73	59	HEAT 40mm Grenade Pistol, AG36	HEAT	Grenade Pistol/Rifle
74	59	HEMP 40mm Grenade Pistol, AG36	HE	Grenade Pistol/Rifle
75	57	Ball 4.6mm Machine Pistol, MP7	Ball	Sub-Machine Gun
76	57	Ball 9mm Machine Pistol MP5, Pistol P8	Ball	Pistol, Sub-Machine Gun MP5, Glock 17

Note *: Sector charge ammunition code, defined in SISO-STD-016-2016 of Section B2.1 as a Short Time Code with some additional timing rules (e.g. for the sector charged mine, each block can be transmitted up to 12 times within 400ms).

B4.12 Section 1d

This section contains ammunition numbers related to the Short-Time Scanning optical code.

Table B- 9 Ammunition Table Section 1d

Ammo No.	Caliber or Weapon	UCATT Ammo Type	Description
77	Vehicle HE	HE	
78	Vehicle MG	Ball	COAX
79	Anti-tank HE	HE	

B4.13 Section 2

This section contains ammunition type numbers related to the Real-Time, Fire-and-Forget or Short-Time Scanning optical codes. The ammunition number is given by the below tabled basic ammunition type number and ammunition number digit(s) prefixes. The ammunition number digit(s) prefixes selects optical code as well as other characteristics to the simulation as further described in section “B4.6 Numbering Summary Section 2”.

Table B- 10 Ammunition Table Section 2

Ammo Type No.	Simulation Characteristics							Caliber or Weapon	UCATT Ammo Type	Description	Real Ammo Type
	RD	RT	RB	RA	RU	FF	SS				
								5.45-6.5mm Assault Rifle Machine Gun		**5.56mm Cal. 0.223**	
2001	RD		RB					5.45x39mm	AP		AP
								5.56x45mm		M995 AP	
2002	RD		RB					5.45x39mm	Ball	5,45mm M74 (USSR/Russia)	Ball
								5.56x45mm		Similar as ammo no 56 AK5, Ksp90	
								5.56mm		.223 Remington / 5,56 NATO (USA) M855 NATO Ball, M193 Ball	
								6.8-8.6mm Assault Rifle Machine Gun		**6.8mm Cal. 0.27** **7.62mm Cal. 0.30**	
2003	RD		RB					7.62x39mm	AP		AP
								7.62x51mm			
2004	RD		RB					6.8x43mm	Ball	Similar as ammo no 58 6.8x43mm SPC (Spec. Purpose Cartridge)	Ball
								7.62x39mm			
								7.62x51mm		AK4, Ksp58, Psg90, Ksp m/39, Ksp94	
								7.62mm		M59, M61, M64, M80 Ball	
								5.45-8.6mm Sniper		**5.56mm Cal. 0.223**	

Ammo Type No.	Simulation Characteristics							Caliber or Weapon	UCATT Ammo Type	Description	Real Ammo Type
	RD	RT	RB	RA	RU	FF	SS				
										7.62mm Cal. 0.30	
2005	RD							7.62X51mm	AP	Psg90	AP/SLAP
								7.62X54Rmm			
								8.6X70mm			
2006	RD							5.56x45mm	Ball	Mk 262 Sniper	Ball
								7.62X51mm		M118 Long Range	
								7.62X54Rmm			
								8.6X70mm			
								5.56mm **Coax** **Main Gun**		**5.56mm Cal. 0.223** **Tank, IFV, and APC coaxial gun** **IFV and APC main gun**	
2007	RD		RB					5.56mm	AP		AP
2008	RD		RB					5.56mm	Ball	Vehicle MG	Ball
								6.8-8.6mm **Coax** **Main Gun** **HMG**		**7.62mm Cal. 0.30** **Tank, IFV, and APC coaxial gun** **IFV and APC main gun** **Heavy Machine Gun**	
2009	RD		RB					7.62mm	AP		AP
2010	RD		RB					7.62mm	Ball	Small Arms (M16, M60, Coax), Vehicle Mounted Vehicle coaxial Vehicle MG, Turret MG, Ksp58C, Ksp m/39, Ksp94	Ball
							SS			Against one-way targets Vehicle coaxial 7.62mm	
								12.7-14.5mm **Sniper Rifle** **Anti-Material Rifle**		**12.7mm Cal. 0.50**	
2011	RD							12.7x99mm	AP	Ag90	AP
								12.7x107mm			
2012	RD							14.5x114mm	AP		AP
2013	RD							12.7x99mm	Ball	Ag90	Ball
								12.7x107mm			
								14.5x114mm			
2014	RD							12.7x99mm	HEMP	Ag90	MP
								12.7x107mm			
								14.5x114mm			

Ammo Type No.	Simulation Characteristics							Caliber or Weapon	UCATT Ammo Type	Description	Real Ammo Type
	RD	RT	RB	RA	RU	FF	SS				
								12.7mm **Coax** **Main Gun** **HMG**		**12.7mm, Cal 0.50** **Tank, IFV, and APC coaxial gun** **IFV and APC main gun** **Heavy Machine Gun**	
2015	RD		RB					12.7x99mm	AP	M2, M8, M20	AP
								12.7mm		sMG, BMG, üsMG, XA-203 OWS, ITKK	
										M903 SLAP, M962 SLAPT	SLAP
								12.7x107mm			AP
2016	RD		RB					12.7x99mm	APS		APS
2017	RD		RB					12.7x99mm	Ball	Heavy MG M2, M85, M82, M95 Barrett sMG, BMG, üsMG (weich) KSP (Tksp)	Ball
								12.7x107mm			
								12.7mm		XM1022	
							SS			Against one-way targets Vehicle coaxial 12.7mm	
2018	RD		RB					12.7x99mm	HEMP	Mk 211 MP sMG, BMG, üsMG KSP (Tksp)	MP
								12.7x107mm			
								14.5mm **Coax** **Main Gun** **HMG**		**Tank, IFV, and APC coaxial gun** **IFV and APC main gun** **Heavy Machine Gun**	
2019	RD		RB					14.5x114mm	AP		AP
2020	RD		RB					14.5x114mm	Ball	BTR-80, RSKK RSKK: Raskas konekivääri	Ball
2021	RD		RB					14.5x114mm	HEMP		HEMP
								20-50mm **Grenade Rifle**		**20, 25, 30, 35, 40, 43mm**	
2022	RD							40x46	APERS		HE
								40mm	HE	M406	
				RA					APERS	M576 Using the 3D detonation model, detonating when directly leaving the gun muzzle	Buckshot
2023	RD							40mm	HEMP	M433	HEDP

Ammo Type No.	Simulation Characteristics							Caliber or Weapon	UCATT Ammo Type	Description	Real Ammo Type
	RD	RT	RB	RA	RU	FF	SS				
										M430 40x46 MEI Hellhound	
										M79	
								Shotgun		**10-, 12-, 16-, 20-, 28-, 67-Gauge**	
2024	RD							Shotgun	APERS		Buckshot
				RA						Using the 3D detonation model, detonating when directly leaving the gun muzzle	
2025	RD							Shotgun	HEMP		Buckshot
				RA						Using the 3D detonation model, detonating when directly leaving the gun muzzle	
								AGL ≤35mm		**AGL: Automatic Grenade Launcher 20, 30mm**	
2026	RD			RA				20, 25mm	HE		HE
				RA					HEair	XM1018, XM1019	
2027	RD							20, 25mm	HEcani		APERS
				RA						Using the 3D detonation model, detonating when directly leaving the gun muzzle	
2028	RD							20, 25mm	HEMP		HEDP
2029	RD							20, 25mm	HEAT		HEAT
								AGL >35mm		**AGL: Automatic Grenade Launcher 40, 43mm**	
2030	RD			RA				40x53	HE	AGL HE	HE
2031	RD							40mm	HEcani	MK19 with M1001 Canister	APERS
				RA						Using the 3D detonation model detonating when directly leaving the gun muzzle	
2032	RD							40mm	HEMP	MK19 with M430	HEDP
										XM320	
										AGL with HEI or HEDP	HEI
										ONTSIRP	HEDP
										Extended Range Low Pressure" (ERLP) 40×51mm	HEDP
2033	RD							40mm	HEAT	AGL with shaped charge ammo	HEAT
								<25mm Cannon		**Fast-firing, automatic guns**	
2034	RD		RB					20mm	AP	Opfor 20-23mm	APDS
2035	RD		RB					20mm	APimp	On-board mounted MG	APDS
										Mk 149 CIWS, Mk 244 CIWS	APHE
										PGU-2/B SAPHE	APHEI

Ammo Type No.	Simulation Characteristics							Caliber or Weapon	UCATT Ammo Type	Description	Real Ammo Type
	RD	RT	RB	RA	RU	FF	SS				
										PGU-28A/B SAPHEI M53 API, M601 API-T, M775 API-T	API
								23mm		ZSU 23-4	API
										ZSU 23-4, SABOT	SABOT
2036	RD		RB	RA				20mm	HEMP	On-board mounted MG 20/41 Slbrhpgr 95 (Pbv302, Ptgb203)	HE, HEI, HEMP
										M56 HEI, M56A3 HE/I	HEI
										M210 HEI, M242 HEI-T	HEI
										M940 MPT-SD	MPI
								23mm		SIRP ZSU 23-4, HEAT	HEMP, HEAT
								25-29mm Cannon		**Fast-firing, automatic guns**	
2037	RD		RB					25mm	AP	Opfor 25-29mm	APDS
2038	RD		RB					25mm	APimp	YPR AP YPR AP 163-3	AP
										XM1049	
										M791 APDS-T, M919 APDS-T	APDS
										PGU-20/U API	APHEI
2039	RD			RA				25mm	KETF	ABM-KETF direct detonation, fly by or air burst	ABM-KETF
2040	RD		RB	RA				25mm	HEMP		HEMP
										M792 HEI-T, MK210 HEI-T	HEI
										PGU-22 HE-I, PGU-25 HE-I,	HEI
										PGU-32/U, SAPHEI, PGU-38/U HE-I	HEI
								30-34mm Cannon		**Fast-firing, automatic guns**	
2041	RD		RB					30mm	AP	BMP-2 PS Opfor APC 2 AP	APDS APFSDS APEP
										PGU-14/B API	API
2042	RD		RB					30mm	APimp	Ulan KE CV9030 APFSDS-T Bluefor APEP and APDS	APDS APFSDS APEP
2043	RD			RA				30mm	KETF	ABM-KETF direct detonation, fly by or air burst	ABM-KETF
2044	RD		RB	RA				30mm	HEMP	BMP-2 SIRP Opfor APC HE	HEMP

Ammo Type No.	Simulation Characteristics							Caliber or Weapon	UCATT Ammo Type	Description	Real Ammo Type
	RD	RT	RB	RA	RU	FF	SS				
2045	RD		RB	RA				30mm	HEMPimp	Ulan MZ CV9030 MPLD-T and MP-T Bluefor HE	HE MP MPLD
								35-39mm Cannon		**Fast-firing, automatic guns**	
2046	RD							35mm	AP	On-board mounted MG ALIK	AP
2047	RD			RA				35mm	KETF	ABM-KETF direct detonation, fly by or air burst	ABM-KETF
2048	RD			RA				35mm	HEMP	On-board mounted MG SIRP	HEI, HEMP
2049	RD							35mm	HEMPdd	Delayed detonation	HEMP
								40mm Cannon		**Fast-firing, automatic guns**	
2050	RD							40mm	AP	CV90	AP
2051	RD			RA				40mm	KETF	ABM-KETF direct detonation, fly by or air burst	ABM-KETF
2052	RD							40mm	HEAT	PSGR	HEAT
2053	RD							40mm	HEMP	CV90 SGR	HE
								40x46mm		M406HE, M381HE, M386HE, M441HE	
								40x53mm		M383 HE, M384 HE	
				RA				40mm	HEMPair	Air burst CV90 KSGR CV90 KSGR 3P	HEMP
										M397 Air burst, M397A1 Air burst	
										MK285	PPHE
										XM1060 Thermobaric Round	THBAR
2054									HEMPdd	Delayed detonation	HEMP
								<76mm AT Gun **RPG, RCL**		**RPG: Rocket Propelled Grenade** **RCL: Recoilless Rifle**	
2055	RD			RA				40mm	HE	RPG-7 with OG-7V	HE
								73mm		OPFOR APC HE	
								75mm		Type 69	
2056	RD				RU			66mm	HEAT	M72 LAW	HEAT
								64mm		RPG-18	
								73mm		RPG-22, RPG-26	
										OPFOR APC 73mm HEAT	
								77-94mm AT Gun **RPG, RCL**		**RPG: Rocket Propelled Grenade** **RCL: Recoilless Rifle**	

Ammo Type No.	Simulation Characteristics							Caliber or Weapon	UCATT Ammo Type	Description	Real Ammo Type
	RD	RT	RB	RA	RU	FF	SS				
2057	RD							84mm RPG, RCL	HE	84mm Carl Gustaf direct impact CG84 with HE441B and HE441D HE PAR 66/79 AUF	HE
								92mm		Type 69	HE-FRAG
				RA				84mm RPG, RCL	HEair	84mm Carl Gustaf air burst CG84 with HE441B and HE441D PAR 66/79 HOCH SGR 84 time fused Also, as ammo no. 36	HE
2058	RD				RU			84mm	HEAT 1	84mm Carl Gustaf CG84 with HEAT 551C CG84 with HEDP 502 (HEAT role) PzF3 LGS, HL PAR 66/79 84/48 SLPSGR 75, Psk84 Also, as ammo no. 31	HEAT
								83mm		SMAW HEAA Rockeye, SMAW	
								84mm		AT4, M136 AT4 HEAT, AT4CS	
								85mm		RPG-7 with PG7V	
								85mm		Type 69-1	
								90mm		Matador (PZF-90) MP HEAT Role Matador (PZF-90) MP HESH Role	
								90mm RPG, RCL		M371E1 HEAT	
								94mm RPG, RCL		LAW80	
								94mm		Type 69-II, Type 69-III (RPG)	
2059	RD				RU			84mm	HEAT 2	CG84 HEAT 751	HEAT
								93mm		RPG-7 with PG7VL	
							SS			Against one-way targets	
2060	RD			RA				84mm	ADM	CG84 ADM 401 (Area Defense Munition)	ADM
2061	RD							84mm	HEMP	Tandem warhead CG84 MT 756 (Multi Target, behind wall) AT4 AST (delayed detonation)	AST
2062	RD							84mm	HEMP	CG84 HEDP 502 (delayed detonation) AT4 AST (mouse hole role)	AST
								90mm		Matador (PZF-90) WB (Wall Breaching) PzF90 (delayed detonation)	

Ammo Type No.	Simulation Characteristics							Caliber or Weapon	UCATT Ammo Type	Description	Real Ammo Type
	RD	RT	RB	RA	RU	FF	SS				
2063	RD							84mm	HEMP	CG84 ASM 509 (Anti-Structure Munition) Direct impact role	ASM
								90mm		Matador (PZF-90) AS (Anti-Structure Munition) Direct impact role	
2064	RD							84mm	HEMPdd	CG84 ASM 509 (Anti-Structure Munition) Delayed detonation role	ASM
								90mm		Matador (PZF-90) AS (Anti-Structure Munition) Delayed detonation role	
								95-109mm AT Gun RPG, RCL		**RPG: Rocket Propelled Grenade RCL: Recoilless Rifle**	
2065	RD			RA				105mm	HE		HE
								107mm		OF-883A	HE-FRAG
2066	RD				RU			105mm	HEAT	RPG-7 with PG-7VR	HEAT
										RPG-27	
										RPG-29 with PG-29V	
								107mm		BK-883	
2067	RD							105mm	HEMP	Multi-Purpose Munition	HEMP
2068	RD							105mm	HE BB	RPG-7 with TBG-7V	THBAR
										RPG-29 with TBG-29V	
										RPG-27 with RShG-1	
								≥110mm AT Gun RPG, RCL		**RPG: Rocket Propelled Grenade RCL: Recoilless Rifle**	
2069	RD			RA				110mm	HE	PzF3 HE and HEI	HE HEI
2070	RD				RU			110-112mm	HEAT	PzF3 shaped charge PzF3 HEAT 112mm APILAS, RSKSKO	HEAT
2071	RD							110mm	HEMP	Multi-Purpose Munition	HEMP
2072	RD							110mm	HE BB	PzF3 Bunker Buster (delayed detonation)	HE

Ammo Type No.	Simulation Characteristics							Caliber or Weapon	UCATT Ammo Type	Description	Real Ammo Type
	RD	RT	RB	RA	RU	FF	SS				
								≤76mm Gun Tank, IFV and APC		**57, 73, 76mm IFV: Infantry Fighting Vehicle APC: Armored Personnel Carrier**	
2073	RD							73mm	AP		AP APC APFSDS
2074	RD							73mm	HE		HE
2075	RD							73mm	HEAT		HEAT
								77-94mm Gun Tank, IFV and APC		**82, 84, 85, 90mm**	
2076	RD							90mm	AP	M77 AP-T, M318 AP-T, M318A1 AP-T	AP
										M332A1 HVAP-T	HVAP-T
										M82 APC-T	APC-T
										M690 APFSDS	APFSDS
2077	RD			RA				90mm	HE	M71 HE, M71A1 HE-T	HE
2078	RD							90mm	HEAT	M348A1 HEAT, M431 HEAT-T	HEAT
										M691 HESH-T, M692 HESH-TP	HESH
2079	RD							90mm	HEMP		HEMP
								95-103mm Gun Tank, IFV and APC		**100mm**	
2080	RD							100mm	AP	3UBM10	APFSDS
										UBR-412B, BR-412B, JPSV, PSV	APHE
										UBM-2, UBM-8	APFSDS
										UBM-6	HVAPDS
2081	RD			RA				100mm	HE	Opfor APC HE	HE
										3UOF10, 3UOF11	HE-FRAG
										UOF-3, UOF-412, UO-415	
2082	RD							100mm	HEAT	3BK-5M, 3UBK9, 3BK16M, 3BK17M	HEAT
										BK3, BK5, JPRSV, M69	
										Type 73, UBK-412R	HEAT-T
										UBK-2, UBK-4, UBK-4M, UBK-9M	HEAT
								104-109mm Gun Tank, IFV and APC		**105, 106**	
2083	RD							105mm	AP	M724A1	TPDS
										M392 APDS-T, M728 APDS-T	APDS
										JaPzK APFSDS	

Ammo Type No.	Simulation Characteristics							Caliber or Weapon	UCATT Ammo Type	Description	Real Ammo Type
	RD	RT	RB	RA	RU	FF	SS				
										APDS-T	
2084	RD							105mm	APimp	APFSDS-T	APFSDS
										M735 APFSDS-T, M774 APFSDS-T	
										M833 APFSDS-T, M900 APFSDS-T	
										FP105, Olin 105	
2085	RD							105mm	HE	M494 APERS-T	HE
										M393A3, M546	
				RA					HEair	APAM	
2086	RD							105mm	HEcani	M1040 Canister	Canister
				RA						Using the 3D detonation model, detonating when directly leaving the gun muzzle	
2087	RD							105mm	HEMPdd	Delayed detonation	HEMP
2088	RD							105mm	HEAT	JaPzK L-HL Leopard 1 HEAT-T	HEAT
										Leopard 1 HEP-T	HEP-T
										M456 HEAT-T, M662 HEAT-T	HEAT-T
										XM815 HEAT-MP	HEAT-MP
										M393A2	HEP
										MRM	MRM-CE
2089	RD							105mm	HEMP		HEMP
								110-116mm Tank, IFV and APC		**115mm**	
2090	RD							115mm	AP	OPFOR MBT FSAPDS	APDS
										UBM-3, UBM-9	APFSDS-T
										UBM-5	HV APFSDS-T
2091	RD			RA				115mm	HE	OPFOR, MBT HE	HE
										3UOF-37, UOF-37, UOF-6	HE-FRAG
2092	RD							115mm	HEAT	OPFOR MBT HEAT	HEAT
										UBK-3, UBK-3M	HEAT-T
								117-122mm Tank, IFV and APC		**120, 122mm**	
2093	RD							120mm	AP	Leopard 1APDS Strv 121 AP	APDS
2094	RD							120mm	APimp	M829A1/A2/E3 APFSDS-T Leopard 2 APFSDS-T Challenger APFSDS	APFSDS

Ammo Type No.	Simulation Characteristics							Caliber or Weapon	UCATT Ammo Type	Description	Real Ammo Type
	RD	RT	RB	RA	RU	FF	SS				
										Strv122 AP	
										DM63A1KE, DM53A1KE	
										DM43A1KE, DM33A1KE	
										Advanced Tungsten KE Cartridge	
2095		RT						120mm	APtop	XM943 STAFF, top attack	STAFF
2096	RD							120mm	HEcani	M1028	Canister
				RA						M1028 Using the 3D detonation model detonating when directly leaving the gun muzzle	
2097	RD							120mm	HE	Leopard HE AMOS Strv 121 and Sgr	HE
										M908	HEORT
										M933, M934	HEMO
										DM12A2MP, M337	HEMP
				RA					HEair	Air burst	ABM
							SS		HE	Vehicles HE	HE
2098	RD							120mm	HEMPdd	Delayed detonation	HEMP
2099	RD							120mm	HEAT	M830A1 HEAT Leopard 2 HEAT	HEAT
										Challenger HESH	HESH
										MRM	MRM-CE
2100	RD							120mm	HEMP	Leopard HEMP	HEMP
								≥125mm Tank, IFV and APC		**125mm**	
2101	RD							125mm	AP	T-90 APFSDS OPFOR MBT 125mm FSAPDS	APDS
										BR-471B	APHE
										VBR-472	APC-T
2102		RT						125mm	APtop	Top attack	AP

Ammo Type No.	Simulation Characteristics							Caliber or Weapon	UCATT Ammo Type	Description	Real Ammo Type
	RD	RT	RB	RA	RU	FF	SS				
2103	RD							125mm	HE	T-90 HE OPFOR MBT 125mm HE	HE
										Type 83	DPICM
										OF-1, M76, Type 54	HE-FRAG
										OF-56, OF-56-1, Type 462	
										OF-462, OF-471N, OF-472	
				RA					HEair	Air burst	HE
2104	RD							125mm	HEAT	OPFOR MBT HEAT	HEAT
										BK-9, BP-463	
										BK-6M, BK-13, BK463UM, 3UBK-9	HEAT-FS
								≤94mm Mortar, Field Gun, and Art. Rockets		**50, 51, 52, 70, 76, 60, 81, 82, 88mm**	
2105	RD							70mm	HE	Type 71	HE
										Artillery Rocket FZ LAU-97: FZ-71	HE-FRAG
										Artillery Rocket FZ LAU-97: FZ-85	PFHE
										Artillery Rocket Hydra 70: M151	
								80mm		SGR80, GA	HE
								105mm		M915, 105mm	DPICM
										M916, 105mm	
				RA				70mm	HEair		HE
										Artillery Rocket FZ LAU-97: FZ-100	Cargo
										Artillery Rocket Hydra 70: M151 - time fused	HE
										Art. Rocket Hydra70: M261 - remote fused	MPSM HE
										Art. Rocket Hydra 70: M255 - remote fused	HE
2106	RD							70mm	HEAT		HEAT
										Artillery Rocket FZ LAU-97: FZ-49	AP
										Artillery Rocket FZ LAU-97: FZ-58	HEAP
								73mm		73mm 2.75inch Rocket	HEAT

Ammo Type No.	Simulation Characteristics							Caliber or Weapon	UCATT Ammo Type	Description	Real Ammo Type
	RD	RT	RB	RA	RU	FF	SS				
								95-149mm Artillery, Mortar, Field Gun, Artillery Rocket		**100, 105, 107, 120, 122, 130mm**	
2107	RD							100mm	HE	Type 71	HE
								105mm		M915, M916	DPICM
								107mm		Type 63 rocket	HE
								122mm		122mm ARTY DF	
								120mm		AMOS SGR120/GA 120mm (GRK)	
								120mm		OGR 120 PR	DPICM
								122mm		Firos 25/30 rocket	HE
								130mm		M46	APHE
								130mm		BR-482B	APHE-T
								130mm		Type 59, M79, OF33	HE
								130mm		OF-482M	HE-FRAG
								130mm		HE-482M	HE
				RA				122mm	HEair	Air burst	HE
2108	RD							120mm	HEAT	Psgr 120mm STRIX (GRK)	HEAT
								122mm		Firos 25/30 rocket	
2109	RD							130mm	THBAR	M79BB	THBAR
								≥150mm Artillery, Mortar, Field Gun		**152, 155, 160, 165, 175, 180, 203, 240, 305mm**	
2110	RD							152, 155mm	HE	152mm 155mm	HE
								155mm		M483A1, M864, Type 66	DPICM
										M107, M549A1, M795, M795E1, M864	HE
										SIRP SGR 155A (Haubits 77)	
								160mm		F-853A, F-853U	
								180mm		G-572	
								203mm		G-620	
								240mm		F864	
								280mm		675	
								305mm		724	
				RA				155mm	HEair	SGR 155Z (Haubits77)	
2111	RD								THBAR		THBAR

Ammo Type No.	Simulation Characteristics							Caliber or Weapon	UCATT Ammo Type	Description	Real Ammo Type
	RD	RT	RB	RA	RU	FF	SS				
								Anti-tank Missile, Russia			
2112	RD				RU			AT-4, Spigot 9M111, “Fagot” AT-5, Spandrel 9M113, “Konkurs”	HEAT	BMP, BMD, BRDM, manpack mounts; can be fired from AT-5 launchers 9M113, BMP, BMD, BRDM, manpack mounts; can be fired from AT-4 launchers BMP-2, PST082 OPFOR APC ATGW	HEAT
2113	RD				RU			AT-9, Spiral-2 9M120, "Ataka"	HE BB		HE BB
2114	RD				RU			AT-8, Songsterd 9M112, "Ataka" AT-9, Spiral-2 9M120, "Ataka"	HEAT	125mm gun launched; T-64B and early T-80 HAVOC, HOKUM, HIND E/F launchers	HEAT
2115	RD				RU			AT-10, Stabber 9M117, “Bastion” AT-10, Stabber 9M117M, “Kan” AT-10, Stabber 9M117M1, “Arkan”	HEAT	100 and 115mm gun launched; T-55, T-62, MT-12, and BMP-3 100 and 115mm gun launched; T-55, T-62, MT-12, and BMP-3 100 and 115mm gun launched; T-55, T-62, MT-12, and BMP-3 OPFOR APC ATGW	HEAT
2116	RD				RU			AT-11, Sniper 9M119, “Svir” 9M119M, “Refleks”	HEAT	125mm gun launched; T-72, T-80, T-84, T-90 OPFOR MBT ATGW	HEAT
2117	RD				RU			AT-12 9M117 AT-12, Swinger 9M117M, “Sheksna” AT-12, Swinger 9M117M1, “Sheksna”	HEAT	Uses the same missile as the AT-10 115mm gun launched; T-62 Uses the same missile as the AT-10 115mm gun launched; T-62 Uses the same missile as the AT-10 115mm gun launched; T-62 OPFOR MBT ATGW	HEAT
2118	RD				RU			AT-13, Saxhorn-2 9M131, "Metis-M" AT-14, Spriggan 9M133, "Kornet" AT-15, Springer 9M123, "Kriz-antema"	HEAT	METIS-M: 9K115-2 152mm. Tripod or vehicle-mounted; thermal viewer effective to 3500m 150mm	HEAT

Ammo Type No.	Simulation Characteristics							Caliber or Weapon	UCATT Ammo Type	Description	Real Ammo Type
	RD	RT	RB	RA	RU	FF	SS				
2119	RD				RU			AT-13, Saxhorn-2 9M131F, "Metis-M"	HE BB		HE BB
								AT-14, Spriggan 9M133F, "Kornet"			
								AT-15, Springer 9M123F, "Kriz-antema"			
								AT-16, Scallion, "Vikhr"		Air to ground system	
2120	RD				RU			AT-16, Scallion, "Vikhr"	HEAT	Air to ground system	HEAT
2121	RD				RU			AT-16	HE		HE
				RA					HEair	Time fused direct detonation	
2122	RD							SA-14, Gremlin 9M36, “Strela-3”	HE		HE
								SA-16, Gimlet 9M313, “Igla-1”			
								SA-18, Grouse 9M39, “Igla-M”			
2123	RD							SA-24, Grinch 9M342, “Igla-S”	HE		HE
								Anti-tank Missile, US			
2124	RD							AGM-65	HEAT	Maverick, 57 kg hollow charge with contact fuze	HEAT
										135 kg high explosive	
2125	RD				RU			AGM-114K	HEAT	Hellfire II US, Swedish, NATO, and Israeli use	HEAT
								AGM-114N		Metal augmented charge	HEAT MAC
2126	RD				RU			AGM-114KII	HE	External blast frag sleeve	HEMP
								AGM-114M		Blast fragmentation	HE-FRAG
								AGM-114L		Longbow Hellfire	HE
2127	RD				RU			AGM-BGM-XYZ	HEAT	Joint Air to Ground Missile (JAGM)	HEAT
2128	RD				RU			AGM-BGM-XYZ	HE	Joint Air to Ground Missile (JAGM)	HE-FRAG
2129	RD				RU		SS	TOW	HEAT		HEAT
								BGM-71D		TOW 2	
								BGM-71A		Basic TOW	
								BGM-71C		ITOW	
								Predator		Direct attack	
								Troophan 2		Copy of TOW	

Ammo Type No.	Simulation Characteristics							Caliber or Weapon	UCATT Ammo Type	Description	Real Ammo Type
	RD	RT	RB	RA	RU	FF	SS				
								HJ-8E		Red Arrow 8 Copy of TOW, China	
								Baktar-Shikan, Pakistan		License production of HJ-8	
								KAM9/ TYPE 79		Like TOW, Japan	
2130	RD				RU			TOW 2A	HEAT	RB55C	HEAT
								M220/ BGM-71E			
2131	RD				RU			TOW 2A, M220/ BGM-71H	HE BB	TOW 2A Bunker Buster	HE BB
								Predator, FGM-172B SRAW-MPV		Predator. Multi-purpose variant (MPV) blast fragmentation warhead, which will convert the system into a direct attack urban assault weapon, effective against buildings and bunkers.	
2132		RT			RU			TOW 2B, M220/ BGM-71F	HEAT	TOW 2B top attack. RB55E	HEAT
								Predator FGM-172A		Top attack. UK Kestrel	
2133	RD				RU			TOW 2B air launched	HEAT	TOW 2B Aero TOW 2B RF	HEAT
2134	RD				RU			LOSAT	HEAT	Fire-and-Forget weapon system Line-Of-Sight Anti-tank weapon using Kinetic Energy Missile (KEM)	HEAT
2135	RD				RU			M47 Dragon	HEAT	Dragon, Saudi, Yugoslav, Swiss, Moroccan, Jordanian and other users	HEAT
2136	RD				RU	FF		Javelin	HEAT	Fire-and-Forget weapon system Javelin direct attack	HEAT
2137		RT			RU	FF		Javelin	HEAT	Javelin top attack. Imaging Infrared (I2R)	HEAT
2138	RD							Stinger (Fire-and-Forget) Ground to Air	HE	Stinger, GILL	HE
								Type 87		Stinger copy from Japan	
						FF				Also, as ammo no. 25 Stinger, GILL	
								Anti-tank Missile, Europe			
2139	RD				RU			HOT 1	HEAT	HOT 1, HOT Ground Several missile versions; anti-reactive armor capability	HEAT
								HOT 2			
								HOT 3			
2140	RD				RU			HOT air launched	HEAT	HOT PAH	HEAT
2141	RD				RU			MILAN 2	HEAT	Ground and vehicle mounts	HEAT

Ammo Type No.	Simulation Characteristics							Caliber or Weapon	UCATT Ammo Type	Description	Real Ammo Type
	RD	RT	RB	RA	RU	FF	SS				
2142	RD				RU			MILAN 2T	HEAT	Tandem warhead	HEAT
								MILAN 3			
								MILAN ER			
2143	RD				RU			TRIGAT MR	HEAT	PARS 3 MR	HEAT
2144	RD				RU			TRIGAT LR, MELLS	HEAT	Direct attack MELLS - direct	HEAT
2145		RT			RU			TRIGAT LR, MELLS	HEAT	Top attack	HEAT
						FF			HEAT	Also, as ammo no.30 PARS LR, MELLS	
2146	RD				RU			NLAW	HEAT	Fire-and-Forget weapon system NLAW direct attack RB57 direct attack, origin Sweden ShoRats, NBTPsk, Pskott2000	HEAT
2147		RT			RU			NLAW	HEAT	NLAW top attack RB57 top attack, origin Sweden ShoRats, NBTPsk, Pskott2000	HEAT
2148	RD				RU			ERYX	HEAT	Origin France HE Caliber 137mm SM-137	HEAT
2149	RD				RU			Brimstone	HEAT	Single and multiple launch, origin UK	HEAT
2150	RD				RU			Bill 1. Direct attack	HEAT		HEAT
2151		RT			RU			Bill 1. Top attack	HEAT	Proximity and top attack mode. Also, as ammo no. 34. Origin Sweden	HEAT
2152	RD				RU			Bill 2. Direct attack	HEAT		HEAT
2153		RT			RU			Bill 2. Top attack	HEAT	Also, as ammo no. 35. Origin Sweden	HEAT
2154	RD				RU			Bill 1 and Bill 2. Soft Target	HEAT	Also, as ammo no. 38. Origin Sweden	HEAT
2155	RD							RBS-70	HE	RBS-70 MK0. Origin Sweden	HE
										RBS-70 MK1. Origin Sweden	
2156	RD				RU			RBS-70	HEAT	RB90 MK2. Origin Sweden	HEAT
2157	RD				RU			RBS-70	HEAT	Direct attack BOLIDE ITO2005. Origin Sweden	HEAT
2158		RT			RU			RBS-70	HEAT	Top attack BOLIDE. Origin Sweden	HEAT

Ammo Type No.	Simulation Characteristics							Caliber or Weapon	UCATT Ammo Type	Description	Real Ammo Type
	RD	RT	RB	RA	RU	FF	SS				
								Anti-tank Missile, International			
2159	RD				RU			SPIKE-SR Direct attack	HEAT	Short Range	HEAT
2160	RD				RU	FF		SPIKE-MR Low Trajectory	HEAT	Medium Range GILL Low Trajectory AKERON MR Low Trajectory	HEAT
2161	RD				RU	FF		SPIKE-MR High Trajectory	HEAT	Medium Range GILL High Trajectory AKERON MR High Trajectory	HEAT
2162	RD				RU			SPIKE-LR Direct attack	HEAT	Long Range Also, as ammo no. 13	HEAT
2163		RT			RU			SPIKE-LR Top attack	HEAT	Long Range	HEAT
						FF			HEAT	Also, as ammo no. 30	
2164	RD				RU			SPIKE-ER	HEAT	Extra Long Range. NTD Dandy	HEAT
2165	RD							Mokopa	HEAT	Origin S. Africa	HEAT
								Ingwe		Origin S. Africa	
								Non-Lethal **Less Lethal**		**As for example tear gas shells, bean bags, stun rounds and rubber projectiles.**	
2166	RD							Ammo with no effect	NLETH	Ammo with no effect	NLETH
2167	RD							≤76mm	NLETH		NLETH
								40mm Grenade		M385, M918, M203, Mk19, XM320	
								40mm		M1006 Sponge Round (Point), M651 CS	
								40mm		M1029 Crowd Dispersal Cartridge	
2168	RD							77-109mm	NLETH	Stun Cartridge	NLETH
								105mm			
2169	RD							≥110mm	NLETH	Stun Cartridge	NLETH
								120mm			
								Horizontal Effects Weapon **Improvised Explosive Device**			
2170	RD							IED light TNT <5kg	HE	As for example improvised shrapnel packed together with several dynamite cartridges.	HE
								Booby-trap			
								Suicide Bomber			
				RA				IED light TNT <5kg		Using the 3D detonation model	
2171	RD							IED medium, TNT 5-20kg	HE	E.g., 120mm HE shells armed as an IED	HE
				RA						Using the 3D detonation model	
2172	RD							IED heavy, TNT 20-100kg	HE		HE

Ammo Type No.	Simulation Characteristics							Caliber or Weapon	UCATT Ammo Type	Description	Real Ammo Type
	RD	RT	RB	RA	RU	FF	SS				
				RA						Using the 3D detonation model	
2173	RD							Truck bomb, TNT >100kg	HE		HE
				RA						Using the 3D detonation model	
2174	RD							HEW Off-Route Anti-tank	HEAT	DM-12 PARM M24 mine	HEAT
								Hand grenade			
2175	RD							100g TNT equivalent	HE	Fragmentation grenade	FRAG
								M67			
								F1		USSR Limonka	
				RA				100g TNT equivalent		Using the 3D detonation model	
2176	RD							250g TNT equivalent	APERS	Concussion grenade	Concussion
								MK3A2		MK3A2	
				RA				250g TNT equivalent		Using the 3D detonation model	
2177	RD							M84	NLETH	Stun grenade	Stun
								Engagement Alert		**To inform the target about an engagement**	
2178	RD							Laser Range Fire	NLETH	A LRF is made against the target	
2179	RD							Laser Designator	NLETH	A Laser designation is done against the target	
2180	RD							Laser Beam Rider	NLETH	A Laser beam riding missile is engaging the target	
2181	RD							IFF A	NLETH	Identification Friend or Foe. IFF is done by A (Bluefor)	
2182	RD							IFF B	NLETH	IFF is done against the target by B (Opfor)	
	RD							IFF answer		Answer to a friendly IFF Not simulated	
2183	RD							Munition Flame	NLETH	Simulate the fact that the target may visually recognize that a weapon is fired against the target	
								Short-Time Scanning		**Primary dedicated Short-Time Scanning simulation. May still be used also in Real-Time simulation**	
2184	RD						SS	Near Miss ≤8.6mm	NMISS	5.56, 7.62mm Cal 0.223, 0.30	
2185	RD						SS	Near Miss >8.6mm	NMISS	12.7, 14.5, 20, 30, 35, 40mm	
2186	RD						SS	Universal Kill	Kill	Universal Kill	
2187	RD						SS	Helmet off Kill	Kill	Punishing soldiers with helmet taken off	
								Additional		**Additional Simulated Functions**	
2188	RD							RF SAM	HE	RF Surface to Air Missile	HE
2189	RD							Secondary Effects Kill	Kill	As for example shrapnel from a tank hit	

Ammo Type No.	Simulation Characteristics							Caliber or Weapon	UCATT Ammo Type	Description	Real Ammo Type
	RD	RT	RB	RA	RU	FF	SS				
2190	RD							Flame-thrower	Kill		
								Main Gun Danger Zones			
2191	RD							Short Range Main Gun Danger Zone	Kill	As for example lethality caused by petals or gun overpressure when standing typically up to 200m in front of a tank gun	
				RA						Using the 3D detonation model	
2192	RD							Remote Range Main Gun Danger Zone	Kill	As for example lethality caused by petals when standing typically 200-1000m in front of a tank gun	
								Engagement Alert, continued			
2193	RD							Laser Designator abort		Terminate munition which is tracking a laser designator	
								Spare ammo numbers			
2194 to 2280	N.A.							Spare ammo types			

NOTE- M19. Although M19 is an anti-tank mine, for simulation purposes a specific long range anti-personnel code is required to give the possibility of adjusting the Laser effect radius and vulnerability. Used on its own, it simulates a larger type of anti-personnel mine.

NOTE- M100. Although M100 is an anti-tank mine, for simulation purposes a specific long range anti-personnel code is required to give the possibility of adjusting the Laser effect radius and vulnerability. Used on its own, it simulates a larger type of anti-personnel mine.

B5.0 UMPIRE CONTROL-GUN TABLES

There are two "Umpire Command Number" Types tabled separately.

- Umpire Control-Gun
- Umpire Minefield

The "Umpire Command Number" (UCN) is encoded from the "Umpire Identification Code" (UIC) and the "Umpire Command Codes" (UC1 and UC2).

B5.1 Umpire Control-Gun

The exercise area umpire, observer/controller or other personnel may have an umpire control-gun transmitter to perform actions on players on the exercise area.

UIC=1 corresponding to 2360 PIU and UCN = UC1 = UC2.

Umpire Control-Gun commands are interpreted or neglected as indicated by the text marks in the columns representing the following simulator system types:

- Man Worn. Typically a solider with man worn target system
- Vehicle. Typically a vehicle like a tank or an armored personnel carrier with a weapon system

There are two Umpire Control-Gun command categories.

- P – Player Control: Changes the tactical status of the simulator system
- C – Configuration Control: Supervises the simulator configuration or functionality The "Umpire Command Numbers" (UCN) are encoded as follows:

Table B- 11 Umpire Control-Gun Code, Encoding Tables

UCN	PI1 PIU	PI2 PIU	Man worn	Vehicle*	Category	Comments
1	1913	2109	X	X	C	Test
2	1916	2112	X	X	P	Kill
3	*1919*	*2115*	*X*	*X*	*P*	*Wounded / Damaged medium.* *National unique for the German Army. Not to be used.*
4	1922	2118	X	X	P	Reset. Default ammo quantity given. Clean from contamination
5	1925	2121		X	P	Weapon kill , where the result is a firepower kill applied only to secondary weapons for example: Remote weapon station damage but not destroy Main weapon only: Weapon or missile destroy Main and secondary weapon: Secondary weapon destroy Tank: Run out of ammo storage
6	1928	2124		X	P	Hit no effect
7	1931	2127		X	P	Weapon kill visual, where the result is firepower kill of the primary weapon for example: Remote weapon station destroy Main weapon only: Weapon or missile destroy Main and secondary weapon: Main weapon destroy Tank: Main weapon destroy
8	1934	2130	X		P	Medical treatment activated. Wound stable
9	1937	2133	X	X	P	Tampering (Cheat) kill/destroy
10	*1940*	*2136*	*X*		*C*	*Configuration with helmet (man worn target). National unique for the German Army. Not to be used*
11	1943	2139		X	P	Mobility kill
12	1946	2142		X	P	Mobility kill visual
13	1949	2145	X	X	P	Exercise pause. All simulator functionality is disabled. Reset or Reactivate leaves this mode.
14	1952	2148	*X*		*P*	*Wounded slightly. Wounded but can still walk National unique for the German Army. Not to be used*
				X	P	Radio communication destroy
15	*1955*	*2151*	*X*	*X*	*P*	*Wounded seriously / Heavy damage.* *National unique for the German Army. Not to be used*
16	*1958*	*2154*	*X*		*C*	*Configuration without helmet (man worn target) National unique for the German Army. Not to be used*

UCN	PI1	PI2	Man worn	Vehicle*	Category	Comments
17	1961	2157	X		C	*Configuration* with ballistic protective vest on (man worn target).*National unique and not to be used*
18	1964	2160	X	X	P	Reactivate. Remaining ammo quantity given
19	1967	2163	X	X	P	Near miss. Target is under fire without being hit
20	1970	2166	X	X	P	Dug in set. Resulting in increased level of protection.
21	1973	2169	X	X	P	Dug in reset. The target system shall not any longer have the increased level of protection.
22	1976	2172	X		P	Wounded but can still walk
23	1979	2175	X		P	Wounded shall sit or lie down
24	1982	2178	X		P	Wounded shall lie down
25	1985	2181	X		P	Wounded
26	1988	2184	X		P	Medical reset. Healed by medical treatment and ready for combat. Remaining ammo quantity given. Clean from contamination.
27	1991	2187		X	P	Turret stabilization destroy
28	1994	2190		X	C	Selection (toggle) of target simulator characteristics like target application type, protection level and vulnerability level
29	1997	2193		X	P	Sight destroy
30	2000	2196	X	X	P	Contaminate, e.g., nuclear, biological or chemical
31	2003	2199	X	X	P	Clean from contamination
32	2006	2202	X		P	Prisoner Set
33	2009	2205	X		P	Prisoner Reset
34	2012	2208	X	X	P	Reset Tampering (Cheat) state
35	2015	2211	X		P	Medical treatment de-activated. Wound unstable / continues.
36	2018	2214	X	X	P	Generic Mine Kill
37	2021	2217	X	X	P	Generic Artillery Kill
38	2024	2220				Spare
39	2027	2223	X		P	Rearm health equipment
40	2030	2226	X	X	C	Log buffer reset; clear event log
41	2033	2229	X	X	P	Time mark / book mark in the event log
42	2036	2232	X	X	C	Controller access. In case locked simulator functionally can be unlocked for controller access.
43	2039	2235	X	X	P	Target lifter down
44	2042	2238	X	X	P	Target lifter up
45	2045	2241	X	X	C	**Stand by**. Power save mode. The Reset commands are then used to leave this power saving mode.

UCN	PI1	PI2	Man worn	Vehicle*	Category	Comments
46	2048	2244	X	X	C	Emergency stop
47	2051	2247	X		C	**Non-active Mode**. Truce mode. The man worn system cannot fire simulated weapons and is unaffected by simulated weapon engagements. Can be used on man worn systems, e.g., worn by observers and spectators instrumented for tracking but not vulnerable to engagements.
48	2054	2250	X		C	Ballistic protective vest on
49	2057	2253	X		C	Ballistic protective vest off
50	2060	2256	X	X	C	**Simulation Mode:** Blue Force Tracking (simulator configuration)
51	2063	2259	X	X	C	**Simulation Mode:** Exercise Mode (simulator configuration)
52	2066	2262	X	X	C	Reserved**: Player Identity Code Mode:** Regular Player Identity
53	2069	2265	X	X	C	Reserved**: Player Identity Code Mode:** Joint Exercise Player Identity, assigning to a different Player Identity
54	2072	2268	X	X	C	Reserved**: Player Identity Code Mode:** Joint Exercise System Identity
55	2075	2271				Reserved
56	2078	2274				Reserved
57	2081	2277				Reserved
58	2084	2280				Reserved
59	2087	2283	X	X	P	NBC Protection on
60	2090	2286	X	X	P	NBC Protection off
61	2093	2289	X		C	Activate “international fight mode”
62	2096	2292	X		C	Deactivate “international fight mode”
63	2099	2295	X		C	Activate “flight mode”
64	2102	2298	X		C	Deactivate “flight mode”

*NOTE 1-Umpire commands shall only be implemented on vehicle target simulators where the command characteristics are applicable (i.e., that the target simulator vehicle has weapon(s), sight(s), etc.).

B5.2 Umpire Minefield Area

The Umpire Minefield Code Type is used to define a minefield area using an umpire control-gun. Umpire Command Numbers (UCN's) are encoded as follows:

Table B- 12 Umpire Control-Gun Code, Umpire Minefield Area Encoding Tables

UCN	UC1	UC2	PI1 PIU	UIC=3 PIU	PI2 PIU	Comments
101	41	34	2033	2366	2208	Clear all minefield area corners
102	41	35	2033	2366	2211	Finished. All corners are positioned and the minefield area is ready
103	41	36	2033	2366	2214	Minefield area position report from corner 1
104	41	37	2033	2366	2217	Minefield area position report from corner 2
105	41	38	2033	2366	2220	Minefield area position report from corner 3
106	42	34	2036	2366	2208	Minefield area position report from corner 4
107	42	35	2036	2366	2211	Minefield area position report from corner 5
108	42	36	2036	2366	2214	Minefield area position report from corner 6
109	42	37	2036	2366	2217	Minefield area position report from corner 7
110	42	38	2036	2366	2220	Minefield area position report from corner 8

Appendix C
Area Weapons Effect Simulation (AWES) Engagement Number Tables

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C1.0 INTRODUCTION

This "Engagement Number Tables" document is based on existing AWES simulated engagements as advised by training community and supporting public domain information. The objective was to achieve a baseline that allows for future growth as well as the introduction of new weapon & munition types without interfering with interoperability.

C2.0 REFERENCES

This document refers to the following NATO Standardization Agreements (STANAG's) published by the NATO Standardization Agency.

STANAG	Edition	Date	Description
2280	1	18th December 2008	Design threat levels and handover procedures for temporary protective structures
4569	2	18th December 2012	Protection levels for occupants of armored vehicles

STANAG 4569 Edition 2 describes protection levels for occupants of armored vehicles against blast anti-tank mine and grenade threats. Part of the document is summarized and illustrated in the below table.

Protection Level	Blast AT-mine explosion threat	Explosive mass
4a	Under wheel or track	10 kg
4b	Under the belly	
3a	Under wheel or track	8 kg
3b	Under the belly	
2a	Under wheel or track	6 kg
2b	Under the belly	
	Minor grenade and other minor threats	
1	Hand grenades, unexploded artillery fragmenting submunitions, and other small anti-personnel explosive devices detonated anywhere under the vehicle	

STANAG 2280 describes class D and E engagement threat levels, part of which is summarized and illustrated in the table below.

Class / Threat Level	D		E	
	Small / Personnel-borne IED's	TNT, kg	IED's	TNT, kg
5	Bag / Suitcase	20	Heavy truck / similar	>4000
4	Body-borne device	9 fragments	Medium truck	4000
3	Large briefcase	9	Van	1500
2	Package	1.5	Passenger vehicle	400
1	Letter bomb	0.125	Motorbike	50

C3.0 ENGAGEMENT ACRONYMS

Acronym	Description	Note
ADAM	Area Denial Artillery Munitions	Bursts into sub-munitions of Anti-Personnel mines
AP	Armor-Piercing	
APERS	Anti-Personnel	
AP-ICM	Anti-Personnel Improved Conventional Munitions	Bursts into sub-munitions
AT	Anti-Tank	
CAS	Close Air Support	Fixed- or rotary-wing aircraft engagement against hostile targets positioned close to friendly forces.
CLGP	Cannon-Launched Guided Projectile	As e.g., Laser guided
CRV-7	Canadian Rocket Vehicle 7	70 mm ground attack rocket. Has become the de-facto standard for Western-aligned forces.
DPICM	Dual-Purpose Improved Conventional Munitions	Bursts into sub-munitions
DPICM-BB	DPICM, Base-Burn or Base-Bleed	Enhanced range without introducing the inherent in-accuracy of rocket-assistance motors
EFP	Explosively Formed Penetrator	
FASCAM	FAmily of SCAtterable Mines	
FRAG	Fragmentation	

Acronym	Description	Note
GBU	Guided Bomb Unit	
GMLRS	Guided Multiple Launch Rocket System	
HE	High-Explosive	
HEAT	High-Explosive Anti-Tank	
HE RAP	High Explosive Rocket Assisted Projectile	
HEW	Horizontal Effects Weapon	
IED	Improvised Explosive Device	
IUC	Interoperability User Community	
JAGM	Joint Air-to-Ground Missile	A U.S. military missile program to replace the current air-to-surface TOW, Hellfire and Maverick missiles.
JDAM	Joint Direct Attack Munitions	Guided by an inertial guidance system and a GPS receiver. JDAM was developed by the US Air Force and US Navy, hence the "joint" in JDAM. Laser designators are being fitted to some JDAMs.
MAPAM	Mortar, Anti-Personnel, Anti- Materiel	Mortar 60 and 81mm ammo
MLRS	Multiple Launch Rocket System	One M270 MLRS launcher firing twelve rockets can completely cover one square km with submunitions. For this reason, the MLRS is sometimes referred to as the "Grid Square Removal Service" as military metric maps are typically divided up into one km grids.
MPSM HE	Multi-Purpose Sub-Munitions High-Explosive	Against personnel, materiel, armor, and helicopters
RAAM	Remote Anti-Armor Mine	Bursts into sub-munitions of Anti-Armor mines
RHA	Rolled Homogeneous Armor	
SADAM	Sense and Destroy ARMor	Self-seeking grenade searching for target
SFM	Sensor Fused Munitions	
TNTe	Trinitrotoluene equivalent	The explosive yield of TNT is considered a standard strength measure of bombs and other explosives

C4.0 AWES ENGAGEMENT SIMULATION STRUCTURE

AWES (Area Weapons Effect Simulation) engagements are executed at EXCON resulting in radio commands transmitted to the target simulators. The AWES typically includes the following engagement types:

- Indirect Fire Simulation and Indirect Fire Field Simulation Engaging at a defined geographical position
    - Artillery, mortar, and bombs
    - Multiple Launch Rocket System (MLRS)
    - Close Air Support (CAS). Air to ground engagements such as fighter ground attack or rotary wing launched weapons
    - Counter defilade simulated engagement primary aim is opponent suppression
    - Horizontal Effects Weapon Simulation
        - Directional mines (Claymore)
        - Improvised Explosive Device (IED)
        - HEW Off-Route Anti-Tank
- Specific Player Engagement
    - ExCon Control Group
    - Self-seeking Grenade Engagement
- Mine Simulation and Minefield Simulation
    - Mine and minefields
    - Mine and minefield breaching
- CBRN Simulation
    - Chemical, Biological, Radiological, and nuclear weapons
- Obstacle Simulation
    - Obstacles
    - Out of training area borders
- Flare Illumination Simulation

C5.0 ENGAGEMENT NUMBERING SUMMARY

Weapon effect simulation in Ground Live training can occur through multiple interface media. The AWES ammunition types of Section Appendix C complement those listed in Appendix B for direct fire weapon systems. AWES ammunition number assignments herein commence at 24000 deconflicting with direct fire ammunition assignments (refer Tables B-5).

C6.0 GRANDPARENT-PARENT-CHILD RELATIONSHIP

Grandparent, parent, and child ammunition numbers methodology allows for ammunition types to be broadly categorized (e.g., grandparent) and as appropriate further detail is partitioned in parent and child sub-sets. Grandparent allows a baseline weapon effect simulation, whereas parent & child allow greater definition of munition type, and in turn simulated weapon effect.

As the two examples below it is possible to fine tune the vulnerability data or for specific training purposes alter the grandparent or parent ammo vulnerability data using child ammo numbers.

a) Fine tuning example: to differentiate standard 120-122mm MLRS and 122mm BM-21 Grad ammunitions a child ammo number is defined for the 122mm BM-21 Grad. Target simulators where the child ammo number adds fidelity will have their vulnerability descriptions updated.
b) Training purpose example: for specific training purposes it may be required to reduce the lethality of selected types of AWES engagements. In this case select the child ammo numbers for the respective AWES engagements and those Target simulators where the weapon child ammo numbers add fidelity will have their vulnerability descriptions updated.

C6.1 Vulnerability Heritage Mechanism

Grandparent-Parent-Child methodology allows defined algorithm for the interpretation of a Parent or Child code that may be sent to a simulator yet not supported by that simulator. In this case an

unsupported Child ammunition will escalate to its Parent, and an unsupported Parent ammunition will escalate to its Grandparent, as they are assumed having similar vulnerability data.

When a parent ammo number is not noted in a target simulator vulnerability description there is always a grandparent ammo number that is used to evaluate the vulnerability for the parent ammo number, as they have associated vulnerability data. It is up to the target simulator application engineer to carefully define the ammo vulnerability data and maintain full operative heritage mechanism.

Grandparent Types are separated by 100 potential entries. Parent Types are listed under a Grandparent and are separated by 10 potential entries. Child ammunition types are listed under a Parent, to a maximum of 9 unique entries per Parent. Where a Child, Parent, Grandparent is unsupported, escalation is first applied to a supported Parent or Grandparent else a default configuration is adopted.

C6.2 Engagement Heritage Types (EHT)

The following tabled acronyms are used in engagement numbering tables when referencing to Engagement Heritage Type (EHT) as described in the figure in Section C8.0.

Acronym	Engagement Heritage Type (EHT)
GP	Grandparent
P	Parent
C	Child

C7.0 ENGAGEMENT GROUP TABLES

Engagement group tables below provide an overview of the selected simulated "Engagement Types" for each type of engagement (ammunition). The engagement numbering is derived in the following Section from the engagement group tables.

C7.1 Indirect Fire

The indirect fire group engages at a defined geographical position.

Mortar		Engagement Type
Mortar Ballistic Mortar Guided		
mm	Example, mm	
40	40	High Explosive (HE) point detonating HE proximity fuze/air burst
60	60, 70	High Explosive (HE) point detonating HE proximity fuze/air burst
81	76, 80, 81, 82, 88, 100	High Explosive (HE) point detonating HE delayed HE proximity fuze / air burst HE guided Smoke
105	105, 107	High Explosive (HE) point detonating HE delayed HE proximity fuze / air burst HE guided Smoke Bomblets / DPICM
120	120, 122, 130	
155	152, 153, 155, 160, 165, 175	High Explosive (HE) point detonating HE delayed HE proximity fuze / air burst HE guided HE low yield (less explosives) Smoke White Phosphor (WP) proximity fuze / air burst Bomblets / DPICM
200	180, 203, 227, 240	High Explosive (HE) point detonating HE proximity fuze / air burst Smoke Bomblets / DPICM Thermobaric

Artillery		**Engagement Type**
Artillery Ballistic Artillery Guided		
mm	Example, mm	
105	105, 107	High Explosive (HE) point detonating HE delayed HE proximity fuze / air burst HE guided Smoke Bomblets / Dual-Purpose Improved Conventional Munition (DPICM)
120	120, 122, 130	
155	152, 153, 155, 160, 165, 175	High Explosive (HE) point detonating HE delayed HE proximity fuze / air burst HE guided HE low yield (less explosives) Smoke White Phosphor (WP) proximity fuze / air burst Bomblets / DPICM
200	180, 203, 227, 240	High Explosive (HE) point detonating HE proximity fuze / air burst Smoke Bomblets / DPICM Thermobaric
300	300, 305	

Artillery Rockets		**Engagement Type**
MLRS Rocket MLRS Rocket Guided		
mm	Example, mm	
120	120, 122, 130, 152, 155, 160, 165, 175	High Explosive (HE) Bomblets / DPICM
200	180, 203, 227, 240	
300	300, 305	

Bombs		**Engagement Type**
Bomb, Free Fall or Guided		
lbs. (total)	Example, lbs. (warhead)	
500	200	General-purpose bomb Bomblets / DPICM
1000	445, 500	
2000	945, 1000	General-purpose bomb
5000	2500	
20000	10000	

Cruise Missile		
lbs. (warhead)	Example, lbs. (warhead)	
500	488, 500, 660, 705	Conventional
1000	1000	
2000	2000, 3000	
5000	5000	

Close Air Support		**Engagement Type**
Close Air Support Ballistic		
mm	Example, mm	
7.62	5.56, 7.62	Ball / Armor-Piercing
12.7	12.7, 14.5	
20	20, 23	Armor-Piercing High Explosive Multi-Purpose (HEMP)
25	25, 27	
30	30, 35, 37	Armor-Piercing HEMP HEMP proximity fuze/air burst
40	40	
70	50, 51, 52, 60, 70, 76	Armor-Piercing HEMP HEMP proximity fuze/air burst HE submunitions
105	105, 120	High Explosive (HE) point detonating HE proximity fuze / air burst
Close Air Support Air delivered anti-armor missiles Ground-to-ground engaging anti-armor missiles		
Maverick, AGM-65		High-Explosive Anti-Tank (HEAT)
TOW 2B air launched and ground-to-ground		
JAGM air-to-ground and ground-to-ground		
HOT air launched and ground-to-ground		
STINGER air launched and ground-to-ground		
Hellfire, AGM-114K, HEAT		
Hellfire, AGM-114M, HE-FRAG		High Explosive (HE)
Griffin, AGM-176, Blast-fragmentation		

Counter Defilade		Engagement Type
Assault Rifle, Machine Gun, and Coax		
mm	Example, mm	
7.62	5.56, 7.62	Ball / Armor-Piercing
Heavy Machine Gun and Coax		
mm	Example, mm	
12.7	12.7, 14.5	Ball / Armor-Piercing
Grenade Rifle		
mm	Example, mm	
25	20, 25	High Explosive (HE) / High Explosive Dual Purpose (HEDP)
40	40	HE / HEDP HE / HEDP proximity fuze / air burst
Cannon		
mm	Example, mm	
25	20, 23, 25, 27, 30	AP/KETF/HE
40	35, 37, 40, 50, 51, 52	AP/KETF/HE

Vehicle Counter Measure Protection		Engagement Type
Vehicle fixed mounted grenade launcher tubes		
mm	Example, mm	
81	30, 40, 76, 80, 81	Shrapnel grenade

C7.2 Mine or Minefield

Mine or Minefield Engagement Group		Engagement Type
Anti-Personnel		
TNT_e Class, kg	Example, TNT_e, kg	
0.02	0.008	Blast
0.2	0.03, 0.05, 0.07, 0.09, 0.10, 0.20, 0.30	
0.2	0.10, 0.32, 0.42, 0.50, 0.60	Fragmentation, bounding
0.2	0.07, 0.08, 0.10, 0.18, 0.20, 0.40	Fragmentation, e.g., stake mounted
2	2.6	
Anti-Personnel		Scatterable
TNT_e Class, kg	Example, TNT_e, kg	
0.02	0.02	Blast
0.02	0.02	Fragmentation, bounding
0.2	0.05, 0.14, 0.25	Fragmentation Blast
Anti-Tank		
TNT_e Class, kg	Example, TNT_e, kg	
2	4.5	STANAG* 4569 Protection Level 1 to Level 2 (6kg) STANAG* 2280 Threat Level D2
7	7.5	STANAG* 4569 Protection Level 2 (6kg) to Level 3 (8kg)
9	9.5	STANAG* 4569 Protection Level 3 (8kg) to Level 4 (10kg), STANAG* 2280 Threat Level D3-D4
20		Mine with external added TNT STANAG* 4569 more than Protection Level 4 (10kg) STANAG* 2280 Threat Level D5

Anti-Tank		
TNT_e Class, kg	Example, TNT_e, kg	
1	0.6	Scatterable Blast
4	2.5, 4	Shaped charge, Explosively Formed Projectile (EFP)
Directional (Horizontal Effects)		
TNT_e Class, kg	Example, TNT_e, kg	
1	0.7	Forward fragmentation Backwards/sidewards blast/splinter
2	2	
10	12	
2	1.4, 1.9	High Explosive Anti-Tank (HEAT), shaped charge
2	1.5	Shaped charge, Explosively Formed Projectile (EFP)
10	9.6	
Improvised Explosive Device		
TNT_e Class, kg	Example, TNT_e, kg	
2		STANAG* 4569 Protection Level 1 to Level 2 (6kg) STANAG* 2280 Threat Level D2
7		STANAG* 4569 Protection Level 2 (6kg) to Level 3 (8kg)
9		STANAG* 4569 Protection Level 3 (8kg) to Level 4 (10kg) STANAG* 2280 Threat Level D3-D4
20		STANAG* 4569 more than Protection Level 4 (10kg) STANAG* 2280 Threat Level D5
50		STANAG* 2280 Threat Level E1
400		STANAG* 2280 Threat Level E2

Note *: See section C2.0 for details.

C7.3 Obstacle

The obstacle simulation is executed at the exercise control center and then the obstacle areas are distributed to the players.

Obstacle Group	Engagement Type
Obstacle Area Type	
Area Control	Out of training area bounds
Obstacle	Vehicle obstacle Personnel obstacle Vehicle and personnel obstacle

C7.4 Flare Illumination

The flare illumination simulation is executed at the exercise control center and then the illumination areas are distributed to the players.

Flare Illumination Group	Engagement Type
Flare Illumination Area Type	
Flare illumination	Vehicles Personnel Vehicles and personnel

C7.5 CBRN

The CBRN simulation is executed at the exercise control center and then the CBRN engagement areas are distributed to the players.

Group	Engagement Type	
Engagement Area Type	**Persistent or Non-persistent**	**Description**
Chemical hazard	Persistent	Any chemical hazard
	Non-persistent	
	Non-persistent	Tear agent
	Persistent	Blister agent
	Non-persistent	
	Persistent	Nerve agent
	Non-persistent	
	Persistent	Blood agent
	Non-persistent	
	Persistent	Choking agent

Group	Engagement Type	
Engagement Area Type	**Persistent or Non-persistent**	**Description**
	Non-persistent	
	Persistent	Incapacitating agent
	Non-persistent	
Biological hazard	Persistent	Any biological hazard
	Non-persistent	
Radiological and Nuclear hazard	Persistent	Radiological hazard
	Non-persistent	
	Persistent	Nuclear hazard
	Non-persistent	

C7.6 Specific Player Engagement

AWES specific Player Engagement simulation is executed at EXCON and includes two sub-groups:

- ExCon Control Command
- Target Self-Seeking Grenade

The "EXCON Control" sub-group includes the following EXCON control commands.

ExCon Control	Engagement Type
Commands	
Engagement Hit No Effect	EXCON Control
Engagement Kill	
Engagement Near Miss	

The EXCON Control Commands are primary used to simulate pop-up targets capability of virtual shoot back, as an alternate to laser simulated shoot back.

For the "Target Self-Seeking Grenade" sub-group the ExCon software determines (pinpoints by using player ID) within a pre-defined engagement area one or two (in case the shell includes double warheads) targets with appropriate (such as vehicles) characteristics.

Target Self-Seeking Grenade		Engagement Type
Mortar Self- Seeking		
mm	Example, mm	
105	105, 107	Anti-Armor Ground impact (typically when missing the intended target)
120	120, 122, 130	
155	152, 155, 160, 165, 175	
200	180, 203, 227, 240, 300, 305	
Artillery Self- Seeking		
mm	Example, mm	
105	105, 107	Anti-Armor Ground impact (typically when missing the intended target)
120	120, 122, 130	
155	152, 155, 160, 165, 175	
200	180, 203, 227, 240, 300, 305	

C8.0 AWES ENGAGEMENT NUMBER TABLES

The following sub-sections tabulate engagement number order of occurrence is aligned with 'Engagement Group Tables' and 'Engagement Type' order of occurrence. Presentation in this manner ensures no missing 'Engagement Type' for each engagement caliber.

C8.1 Indirect Fire

The indirect fire engagement group simulates different types of engagements (ammunitions) delivered from virtual (e.g., mortar, artillery, or close air support fire types). The indirect fire group engages at a defined geographical position. The engagement number list is defined as tabulated below.

EHT	UCATT NO	Description	Interoperability Comments / Examples
		Artillery Ballistic and Artillery Guided	
GP	24000	105mm, High Explosive (HE) point detonating / unguided	Generic 105mm Artillary Round GB: Artillery 105mm HE Ground Burst US: M1 and M760 HE US: M548, M913, and M927 HE RAP
P	24010	105mm, HE delayed	
P	24020	105mm, HE proximity fuze/air burst	GB: Artillery 105mm HE Air Burst
P	24030	105mm, HE guided	
C	24031	105mm, self-seeking ground impact	Typically missing the intended target
C	24032	105mm, target self-seeking	
P	24040	105mm, Bomblets/DPICM	US: M915 DPICM, M916 DPICM
P	24050	105mm, Thermobaric	
P	24060	105mm, Smoke	
GP	24100	120mm / 122mm, High Explosive (HE) point detonating / Unguided	Generic 120mm Artillary Round FI: Artillery 122mm H63 (D-30) NO: Artillery 105-122mm, HE
P	24110	120mm, High Explosive (HE) delayed	
P	24120	120mm, HE proximity fuze/air burst	NO: Artillery 105-122mm, proximity
P	24130	120mm, HE guided	
C	24131	120mm self-seeking ground impact	Typically missing the intended target
C	24132	120mm target self-seeking	
P	24140	120mm, Bomblets/DPICM	NO: Artillery 105-122mm, bomblets
P	24150	120mm, Thermobaric	
P	24160	120mm, Smoke	NO: Artillery 105-122mm, smoke
GP	24200	122mm, High Explosive (HE) point detonating / Unguided	Generic 122mm Artillary Round
P	24210	122mm, High Explosive (HE) delayed	
P	24220	122mm, HE proximity fuze/air burst	
P	24230	122mm, HE guided	

EHT	UCATT NO	Description	Interoperability Comments / Examples
		Artillery Ballistic and Artillery Guided	
C	24231	122mm, Laser Guided (LG)	
P	24240	122mm, Bomblets/DPICM	
P	24250	122mm, Therombaric	
P	24260	122mm, Smoke	
GP	24300	152mm / 155mm High Explosive (HE) Point Detonating / Unguided	NL: Artillery M-109 155mm HE FI: Artillery 152mm 2S-19 FI: Artillery 155K83 NO: Artillery 152-155mm, HE AT: Artillery M-109 155mm HE DE: Artillery 155mm, ground detonation SE: 152-155mm/sgr/Art SE1: Sgr 155mm Anslagsrör (Haub 77 & Bkan) SE2: Artillery, 152-155mm HE, APERS GB: Artillery 155mm HE Ground Burst US: M107 and M795 HE US: M549 HERAP, M549A1 HERAP
C	24301	155mm HE low yield (less explosive)	
C	24302	152mm High Explosive (HE) Point Detonating / Unguided	
C	24303	155mm, High Explosive (HE) Point Detonation / Unguided	
C	24304	152mm, (AT/AP)	
P	24310	152mm, High Explosive (HE) delayed	
C	24311	155mm, High Explosive (HE) delayed	
P	24320	152mm, HE proximity fuze/air burst	
C	24321	155mm High Explosive (HE) proximity fuze / air burst	NL: Artillery SFM NO: Artillery 152-155mm, proximity NO: Artillery 155mm HE time+smoke AT: Artillery SFM, 155mm air burst DE: Artillery 155mm HE/air burst SE: 152-155mm/zonarsgr/Art/luftbrisad SE1: Sgr 155mm Zonör (Haub 77 & Bkan) SE2: Artillery, 152-155mm HE, proximity/air burst, APERS GB: Artillery 155mm HE Air Burst
P	24330	152mm, HE guided	
C	24331	152mm, Laser Guided (LG)	
C	24332	155mm, HE guided	NO: Artillery 152-155 mm, smart
C	24333	155mm, self-seeking ground impact	Typically missing the intended target SE: BONUS Ground impact
C	24334	155mm, self-seeking ground impact	Typically missing the intended target SE: EXCALIBUR Ground impact

EHT	UCATT NO	Description	Interoperability Comments / Examples
		Artillery Ballistic and Artillery Guided	
C	24335	155mm, self-seeking	NO: Artillery 152-155 mm, guided (BONUS) NO: Artillery 152-155 mm, guided (Excalibur) DE: Artillery SM Art, self seeking US: Copperhead M712, HEAT CLGP SMArt155 (DM702), self-seeking double Anti-armour Excalibur M982, SADARM double Anti-armour BONUS, SADARM double Anti-armour Krasnopol HEFRAG, Laser guided SE: Artillery 152-155 mm, guided (BONUS)
C	24336	155mm, target self-seeking	SE Excalibur HE
C	24337	155mm, target self-seeking	SE Excalibur IMP
C	24338	155mm, target self-seeking	SE Excalibur AIR
P	24340	152mm, Bomblets/DPICM	
C	24341	155 mm bomblets / DPICM, Dual-Purpose Improved Conventional Munitions	155 mm SMArt NL: Artillery M-109 155mm DP-ICM NO: Artillery 152-155 mm, bomblets AT: Artillery M-109 155mm DP-ICM DE: Artillery 155mm Bomblet SE: 152-155mm/zon,öb,ib,tid,arsgr/Art SE2: Artillery, 152-155 mm bomblets / DPICM US: M483A1 DPICM, M864 DPICM-BB US: M982 Excalibur, bomblets/DPICM (65) SE: 152-155mm/zon,öb,ib,tid,arsgr/Art
P	24350	152mm, Thermobaric	
P	24360	152mm, Smoke	
C	24361	155mm, Smoke	NO: Artillery 152-155mm, smoke NO: Artillery 155mm HE time+smoke DE: Artillery 155mm smoke
P	24370	155mm, White Phosphor (WP) proximity fuze/air burst	
GP	24400	200mm / 203mm, High Explosive (HE) Point Detonating / Unguided	NO old: Artillery 203mm, normal
P	24410	200mm, High Explosive (HE) Delayed	
P	24420	200mm, HE proximity fuze/air burst	NO old: Artillery 203mm, proximity
P	24430	200mm, HE, guided	
C	24431	200mm, self-seeking ground impact	Typically missing the intended target
C	24432	200mm, target self-seeking	
P	24440	200mm, Bomblets/DPICM	NO old: Artillery 203 mm, bomblets
P	24450	200mm, Thermobaric	
P	24460	200mm, Smoke	
P	24470	200mm, Phosphor	NO old: Artillery 203mm, phosphor
GP	24500	300mm, HE, point detonating	
P	24510	300mm, HE, Delayed	
P	24520	300mm, HE proximity fuze/air burst	
P	24530	300mm, HE, guided	

EHT	UCATT NO	Description	Interoperability Comments / Examples
		Artillery Ballistic and Artillery Guided	
P	24540	300mm, Bomblets/DPICM	
P	24550	300mm, Thermobaric	
P	24560	300mm, Smoke	
		Mortar Ballistic and Mortar Guided	
GP	24600	40mm, HE, Point Detonation / Unguided	US: 40mm mortar
P	24610	40mm, HE, Delay	
P	24620	40mm, HE proximity fuze/air burst	US: 40mm mortar
P	24630	40mm, HE, guided	
P	24640	40mm, Thermobaric	
P	24650	40mm, Smoke	
GP	24700	60mm, High Explosive (HE)	GB: Mortar 60mm HE Ground Burst US: M49A4 and M49A5 HE US: M720 and M720A1 HE US: M768 and M888 HE point detonating
P	24710	60mm, HE, Delayed	
P	24720	60mm, HE proximity fuze/air burst	US: M720 and M720A1 HE
P	24730	60mm, HE, guided	
P	24740	60mm, Thermobaric	
P	24750	60mm, Smoke	
GP	24800	81 mm HE point detonating / unguided	NL: Mortar 81mm FI: Mortar 81KRH NO: Mortar 81-107mm, HE NO: Mortar 81mm mortar, HE normal+smoke AT: Mortar 81mm DE: Mortar 81mm, ground detonation SE: 81-107mm/sgr/Grk SE1: Sgr 80mm Anslagsrör (GRK) SE2: 81 mm HE, APERS GB: Mortar 81mm HE Ground Burst US: M821A1 and M821A2 HE US: M889A1 HE point detonating US: M374 and M374A2 HE
P	24810	81mm, High Explosive (HE) delayed	
P	24820	81mm, HE proximity fuze/air burst	NO: Mortar 81-107mm, proximity NO: Mortar 81mm mortar, HE time+smoke US: M821A2 HE
P	24830	81mm, HE guided	
P	24840	81mm, Bomblets/DPICM	
P	24850	81mm, Thermobaric	
P	24860	81mm, Smoke	NO: Mortar 81-107mm, smoke NO: Mortar 81mm mortar, HE time+smoke NO: Mortar 81mm mortar, HE normal+smoke
GP	24900	105mm, High Explosive (HE) point detonating	

EHT	UCATT NO	Description	Interoperability Comments / Examples
		Mortar Ballistic and Mortar Guided	
P	24910	105mm, HE delayed	
P	24920	105mm, HE proximity fuze/air burst	
P	24930	105mm, HE guided	
C	24931	105mm, self-seeking ground impact	Typically missing the intended target
C	24932	105mm, target self-seeking	
P	24940	105mm, Bomblets/DPICM	
P	24950	105mm, Thermobaric	
P	24960	105mm, Smoke	
GP	25000	120mm High Explosive (HE) point detonating	NL: Mortar 120mm FI: Mortar 120KRH FI: Mortar 120AMOS FI: Mortar 120mm 2S23 NO: Mortar 120mm, HE NO: Mortar 120 mm, HE normal+smoke AT: Mortar 120mm SE: 120mm/sgr/Grk SE1: Sgr 120mm Anslagsrör (GRK) SE2: Mortar 120-122mm HE, APERS US: M933 HE point detonating US: M934 HE
P	25010	120mm, High Explosive (HE) delayed	
P	25020	120mm, HE proximity fuze/air burst	NO: Mortar 120mm, proximity NO: Mortar 120 mm, HE time+smoke DE: Mortar 120mm, air detonation US: M934 HE
P	25030	120mm, HE guided	NO: Mortar 120mm, smart
C	25031	120mm self-seeking ground impact	Typically missing the intended target
C	25032	120mm target self-seeking	SE1: Psgr 120mm STRIX (GRK)
P	25040	120mm, Bomblets/DPICM	
P	25050	120mm, Thermobaric	
P	25060	120mm, Smoke	NO: Mortar 120mm, smoke NO: Mortar 120 mm, HE time+smoke NO: Mortar 120 mm, HE normal+smoke
GP	25100	155mm High Explosive (HE) point detonating	
C	25101	155mm HE low yield (less explosive)	
P	25110	155mm, HE delayed	
P	25120	155mm HE proximity fuze / air burst	
P	25130	155mm, HE guided	
C	25131	155mm, self-seeking ground impact	Typically missing the intended target
C	25132	155mm, target self-seeking	
P	25140	155 mm bomblets / DPICM	
P	25150	155mm, Thermobaric	

EHT	UCATT NO	Description	Interoperability Comments / Examples
		Mortar Ballistic and Mortar Guided	
P	25160	155mm, Smoke	
P	25170	155mm, White Phosphor (WP) proximity fuze / air burst	
GP	25200	200mm, HE point detonating / unguided	NO old: Mortar 180-240mm, normal
P	25210	200mm, HE delayed	
P	25220	200mm, HE proximity fuze/air burst	NO old: Mortar 180-240mm, proximity
P	25230	200mm, HE, guided	
C	25231	200mm, self-seeking ground impact	Typically missing the intended target
C	25232	200mm, target self-seeking	
P	25240	200mm, Bomblets/DPICM	
P	25250	200mm, Thermobaric	
P	25260	200mm, Smoke	
		Vehicle Counter Measure Protection Vehicle fixed mounted grenade launcher tubes	
GP	25300	66 / 76 / 81mm, shrapnel grenade, point detonating / unguided	
P	25310	66mm, shrapnel grenade, point detonating / unguided	
P	25320	76mm, shrapnel grenade, point detonating / unguided	
P	25330	81mm, shrapnel grenade, point detonating / unguided	
		Counter Defilade	
GP	25400	7.62 / 12.7 Machine Gun (counter defilade)	
P	25410	7.62mm Ball / AP	
P	25420	12.7mm Ball / AP	
GP	25500	25 - 40mm Grenade, HE/HEDP, point detonating (counter defilade)	
C	25501	25mm Grenade, HE/HEDP	
C	25502	25mm/30mm canon, AP, point detonation (counter defilade)	25mm Cannon, AP/KETF/HE 30mm Cannon, ABM/KETF
C	25503	40mm Grenade, HE/HEDP	GB: Artillery 30mm/40mm Round
P	25510	25 - 40mm Grenade, HE/HEDP, delay (counter defilade)	
C	25511	30mm canon, HE, delayed	
P	25520	25 - 40mm Grenade, HE/HEDP, proximity / airburst (counter defilade)	
C	25521	30mm canon, HE, Air Burst	ABM
C	25522	40mm Grenade, HE/HEDP proximity fuze/air burst	

EHT	UCATT NO	Description	Interoperability Comments / Examples
		Counter Defilade	
P	25530	25 - 40mm Grenade, HE/HEDP, guided (counter defilade)	
C	25531	30mm canon, AP, guided	
GP	25600	40mm Cannon, HE, point detonation / unguided	40mm Cannon, AP/KETF/HE
P	25610	40mm canon, HE, delayed	
P	25620	40mm canon, HE, Air Burst	
P	25630	40mm canon, AP, guided	
		Multiple Launch Rocket Systems MLRS Rocket and MLRS Rocket Guided	
GP	25700	120mm MLRS, High Explosive Multiple Launch Rocket System , unguided	HE, impact detonation (SE: 120-122mm/sgr/Rakart/ögonbbrisad) NL: Artillery MLRS FI: Artillery 122RAKH76 AT: Artillery MLRS SE2: 120-122 mm MLRS, APERS
P	25710	120mm, Bomblets/DPICM	NO old: Art.Rocket, MLRS, bomblet NO old: Art.Rocket, MLRS, smart NO old: Art.Rocket, 122mm Grad, bomblets GB: Artillery GMLRS
GP	25800	200mm, High Explosive (HE), unguided	NO: Artillery 200-270mm rocket artillery, HE
P	25810	200mm, Bomblets/DPICM	NO: Artillery 200-270 mm, rocket artillery,bomblets NO: Artillery 200-270 mm, rocket artillery, smart
GP	25900	300mm, High Explosive (HE), unguided	NO: Artillery ≥300mm, rocket artillery, normal
P	25910	300mm, Bomblets/DPICM	NO: Artillery ≥300mm, rocket artillery,bomblets
		Close Air Support (CAS), Ballistic	
GP	26000	7.62 / 12.7 Machine Gun (counter defilade)	
P	26010	7.62mm Ball / AP	
P	26020	12.7mm, Ball / AP	NO: CAS, 12.7mm HMG, air delivered
GP	26100	20mm cannon AP	NO: CAS, 20 mm cannon AP, air delivered
P	26110	20mm cannon, Delayed (HEMP)	NO: CAS, 20 mm cannon, air delivered GB: CAS Automatic 20mm Cannon
GP	26200	25mm cannon AP	NO: CAS, 25mm cannon AP, air delivered
P	26210	25mm cannon, delayed, (HEMP)	NO: CAS, 25mm cannon, air delivered
GP	26300	30mm cannon AP	NO: CAS, 30mm cannon AP, air delivered SE: CAS, 27mm cannon AP, air delivered
P	26310	30mm cannon, Delayed (HEMP)	NO: CAS BoF, 30mm cannon, air delivered GB: CAS Automatic 30mm Cannon SE: CAS, 27mm cannon HEMP, air delivered
P	26320	30mm cannon, HEMP proximity fuze/air burst	
GP	26400	40mm cannon AP	
P	26410	40mm cannon, delayed (HEMP)	GB: CAS Automatic 40mm Cannon

EHT	UCATT NO	Description	Interoperability Comments / Examples
		Close Air Support (CAS), Ballistic	
P	26420	40mm cannon, HEMP proximity fuze/air burst	
GP	26500	70mm rocket, AP	GB: CAS Automatic CRV-7, HE and AP warheads US: M247 MP
P	26510	70mm rocket, delayed (HEMP)	NO: CAS, 40-70 mm rocket pod, air delivered GB: CAS Automatic CRV-7, HE and AP warheads US: M151 HE US: M255A1 flechette
P	26520	70mm rocket, HEMP proximity fuze/air burst	
P	26530	70mm, HE, Guided	
P	26540	70mm, HE, Bomblet / DPICM	
C	26541	70mm rocket, MPSM HE submunitions	US: M261 MPSM HE
GP	26600	105mm, High Explosive (HE) point detonating	AC-130 Spectre, gunship
P	26610	105mm, HE, delayed	
P	26620	105mm, HE proximity fuze / air burst	AC-130 Spectre, gunship
		Close Air Support (CAS), Air delivered anti-armour missiles Ground-to-ground engaging anti-armour missiles	
GP	26700	Air-to-Ground Missile, HE, Point Detonation	Air-launched BGM-71 TOW, AGM-114 Hellfire, AGM-65 Maverick, JAGM missile. Implicitly includes guidance (SAL, SACLOS, etc).
C	26701	Maverik E/F/G/H/J/K, AGM-65 Penetrating blast-fragmentation, 136kg	NO old: Artillery, AGM-65, air delivered GB: CAS Grenade MAVERICK
C	26702	Hellfire, AGM-114K, HEAT	SE: RBS17 HEAT
C	26703	Hellfire, AGM-114M, HE-FRAG	NO: Guided missile, air or ground delivered (Hellfire AGM-114) GB: CAS Grenade HELLFIRE SE: RBS 17 HE-FRAG
C	26704	Griffin, AGM176 Blast-fragmentation, 5.9kg	
C	26705	TOW 2B air launched	
C	26706	HOT air launched	
C	26707	MK 24	Zuni 5-inch Folding-Fin Aircraft Rocket (FFAR; 48lb; fragmentation)
P	26710	Air-to-Ground Missile, HE, Delay	
P	26720	Air-to-Ground Missile, HE, Prox	
P	26730	Air-to-Ground Missile, HE, Guided	
C	26731	Hellfire, AGM-114L Anti-Tank, Guided (MMW)	
C	26732	JAGM air-to-ground	
C	26733	PARS 3-LR air launched	PARS 3 LR / TRIGAT-LR / AC 3G
P	26740	Air-to-Ground Missile, HE, Bomblets / DPICM	

EHT	UCATT NO	Description	Interoperability Comments / Examples
		Close Air Support (CAS), Air delivered anti-armour missiles Ground-to-ground engaging anti-armour missiles	
C	26741	Air-to-Ground Missile, Thermobaric	
C	26742	AGM-114N Hellfire (MAC)	
GP	26800	Ground-to-Ground Missile, HE, Point Detonation	Ground-launched BGM-71 TOW, AGM-114 Hellfire, AGM-65 Maverick, JAGM missile. Implicitly includes guidance (SAL, SACLOS, etc).
C	26801	TOW 2B ground-to-ground	
C	26802	JAGM ground-to-ground	
C	26803	HOT ground-to-ground	
		Artillery target self-seeking grenade, ground impact Bomb Free Fall or Guided	Typically missing the intended target
GP	26900	Bomb 250lbs (110kg) Small Caliber Bomb, Point Detonation / Unguided	
P	26910	Bomb 250lbs (110kg) , Delay	
P	26920	Bomb 250lbs (110kg) , Prox	Airburst
P	26930	Bomb 250lbs (110kg) , Guided	SE: Bomb 110kg (GBU39)
P	26940	Bomb 250lbs (110kg) , Bomblets / DPICM	
GP	27000	Bomb 500lbs (227kg) General-purpose bomb, point detonation / unguided	NL: Bomb 500lb NO: Conventional bomb, air delivered GB: CAS Grenade Bomb 500lb-Free Fall US: Mk82
P	27010	Bomb 500lbs (227kg) General-purpose bomb, delay	
P	27020	Bomb 500lbs (227kg) General-purpose bomb, Prox	Airburst
P	27030	Bomb 500lbs (227kg) General-purpose bomb, guided	NO: GP-bomb, 500 lbs, guided (GBU-12) SE: Bomb 227 kg (GBU49)
C	27031	Bomb 500lbs (227kg) General-purpose bomb, guided	Note:CBU100 Cluster Bomb, Mk-20 Rockeye
P	27040	Bomb 500lbs (227kg) Bomblets/DPICM	
C	27041	Bomb 500lbs (227kg) General-purpose bomb, bomblets / DPICM	NO old: Bomb, Mk-20, Rockeye
P	27050	Bomb 500lbs (227kg) General-purpose bomb, Thermobaric	
GP	27100	Bomb 1000lbs (454kg) General-purpose bomb, point detonation / unguided	
C	27101	Bomb 1000lbs (454kg) General-purpose bomb, point detonation / unguided	NL: Bomb 1000lb NO: Bomb, GP-bomb, 1000 lb, unguided (MK-83) SE: Bomb 500kg SE: Fragmentation bomb 500kg FI: Air Strike FA
P	27110	Bomb 1000lbs (454kg), Delay	

EHT	UCATT NO	Description Artillery target self-seeking grenade, ground impact Bomb Free Fall or Guided	Interoperability Comments / Examples Typically missing the intended target
P	27120	Bomb 1000lbs (454kg), Prox / Airbust	
P	27130	Bomb 1000lbs (454kg), Guided	NO: GP-bomb, 1000 lbs, guided (GBU-16) GB: CAS Grenade Bomb 1000lb-PAVEWAY III
P	27140	Bomb 1000lbs (454kg), Bomblets / DPICM	NL: Bomb Cluster FI: Air Strike FA NO: Cluster bomb, air delivered SE: Fragmentation bomb 500kg SE1: Bombkapsel typ 1 och 2
P	27150	Bomb 1000lbs (454kg), Thermobaric	
GP	27200	Bomb 2000lbs (908kg) General-purpose bomb, point detonation / unguided	NL: Bomb 2000lb NO: Bomb, GP-bomb, 2000 lb, unguided (MK-84) NO: GP-bomb, 2000 lbs, guided (GBU10/24) GB: CAS Grenade Bomb 2000lb-PAVEWAY III Enhanced SE: Bomb 1000kg
P	27210	Bomb 2000lbs (908kg), Delay	
P	27220	Bomb 2000lbs (908kg), Prox / Airburst	
P	27230	Bomb 2000lbs (908kg) General-purpose bomb, guided	NL: Bomb 2000lb NO: Bomb, GP-bomb, 2000 lb, unguided (MK-84) NO: GP-bomb, 2000 lbs, guided (GBU10/24) GB: CAS Grenade Bomb 2000lb-PAVEWAY III Enhanced SE: Bomb 1000kg
GP	27300	Bomb 5000lbs (2270kg) General-purpose bomb, point detonation, unguided	
P	27310	Bomb 5000lbs (2270kg) , Delay	
P	27320	Bomb 5000lbs (2270kg) , Prox /Airburst	
P	27330	Bomb 5000lbs (2270kg) General-purpose bomb, guided	NO: GP-bomb, 5000 lbs, guided (GBU-28)
P	27340	Bomb 5000lbs (2270kg) Bomblets / DPICM	
GP	27400	Bomb 20000lbs (9080kg) General-purpose bomb, point detonation, unguided	
P	27410	Bomb 5000lbs (2270kg) , Delay	
P	27420	Bomb 20000lbs (9080kg), airburst	
C	27421	Bomb 20000lbs (9080kg) General-purpose bomb	Massive Ordnance Air Blast Bomb (MOAB) GBU-43/B
P	27430	Bomb 20000lbs (9080kg), guided	

EHT	UCATT NO	Description	Interoperability Comments / Examples
		Cruise Missile	
GP	27500	Cruise missile 500lbs (227kg) Conventional	AGM-84 Standoff Land Attack Missile (SLAM) Harpoon, 488lbs AS-13 'Kingbolt', 320kg BrahMos, 300kg
GP	27600	Cruise missile 1000lbs (454kg) Conventional	Tomahawk 1000lbs, conventional Tomahawk 1000lbs, with BLU-97/B (Bomblets) AGM-158, JASSM, 450kg TAURUS KEPD 350, 500kg
GP	27700	Cruise missile 2000lbs (908kg) Conventional	
GP	27800	Cruise missile 5000lbs (2270kg) Conventional	
	27801	Naval Gun Fire	
GP	27900	Naval Gun Fire, 100mm and less	
P	27910	76mm	
P	27920	100mm	
GP	28000	Naval Gun Fire, greater than 100mm	
P	28010	127 mm	
P	28020	155 mm	

C8.2 Minefield or Mine

The engagement number list is defined as follows:

EHT		**Description**	**Interoperability Comments**
		Anti-Personnel Bounding Fragmentation	
GP	29000	Anti-Personnel Bounding Fragmentation	
P	29010	Anti-Personnel Bounding Fragmentation; for example: M16A2 OZM-72 PROM-1 V-69 PP Mi-Sr Type 69	NO: Anti-Personnel frag. M16 NL: Mine Anti-Personnel AT: Anti-Personnel Smi DE: Mine Anti-Personnel (dig in) SE2: Anti-Personnel Claymore Mine (SE: FÖRSVARSLADDN 21-22) GB: Anti-Personnel Mine US: M16A2

EHT		Description	Interoperability Comments
		Anti-Personnel Blast	
GP	29100	Anti-Personnel, Blast, less than 0.2kg TNT	
P	29110	DM-11 (LI-11, Truppmina 10) FMK-1 GLD-112 GYATA-64 M35 Mi AP DV 59, M-59 NR 409 (MAPS, M/411) PMN (Type 58 blast) PMN-2 PMN-4 PMN PMA-2 M14 (APMN M14) MD-82B TS-50 Type72, 72B, 72C	FI: Anti-Personnel Pressure FI: Anti-Tank+Anti-Personnel combination NO: PMN-2 APERS mine, blast mine
P	29120	M25-A Type 67-A C3A1/A2	
		Anti-Personnel Stake Mounted Fragmentation	
GP	29200	Anti-Personnel Stake Mounted Fragmentation	
P	29210	M3 MBV-78A2 NR-413 (M421) NO-MZ 2B P-25 PM-43 (PM-68) PMR-1, PMR-2, PMR-2A, PMR-3, PMR-4 POMZ-2 (MBV-78A1, MM1, Type 58 frag) POMZ-2M (Model 15, Type 59) Splittermina m/48	NO old: POM-Z APERS mine, Fragmentation mine NO old: PMR APERS mine NO: Light Anti-Personnel mine DE: Mine Anti-Personnel (above surface) SE1: Sgr Truppmina (tex splittermina 48)
P	29220	M178	
		Anti-Personnel Scatterable Blast	
GP	29300	Anti-Personnel Scatterable Blast	
P	29310	M67/M72 PFM-1 MAUS, MAUS-1	NO: FASCAM APERS mine, Artillery delivered minefield (ADAM) NO old: PFM-1 and PFM-1/s APERS mine

EHT		Description	Interoperability Comments
		Anti-Personnel Scatterable Fragmentation	
GP	29400	Anti-Personnel Scatterable Fragmentation	
P	29410	SAPEM POM-2s POMD-1	NO old: POM-2s APERS mine FI: Anti-Personnel Scatter FI: Anti-Tank+Anti-Personnel Scatter combination
		Anti-Personnel Scatterable Bounding Fragmentation	
GP	29500	Anti-Personnel Scatterable Bounding Fragmentation	
P	29510	155mm M692/M731 ADAM with 36 M67/M72 mines	US: M692 and M731 ADAM
		Anti-Tank Blast	
GP	29600	Anti-Tank Blast	
P	29610	STANAG 4569 Protection Level 3 to Level 4 STANAG 2280 Threat Level D3-D4 M15 PzMi Strvmina 5	NO: Heavy Anti-Tank mine (M15) NL: Mine Anti-Tank FI: Anti-Tank Pressure FI: Anti-Tank+Anti-Personnel combination AT: Anti-Tank PzMi DE: Anti-Tank mine (dig in) Antivehicle Mine (SE: STRVMINA 5 T15) SE1: Strvmina tryckutlöst (Strvmina 5) SE2: Anti-Tank GB: Anti-Tank Mine
P	29620	STANAG 4569 Protection Level 1 to Level 2 STANAG* 2280 Threat Level D2 M6A2	NO old: M6A2 Anti-Tank NO: Light Anti-Tank mine SE: PTM 25 PL2
P	29630	STANAG* 4569 Protection Level 2 to Level 3 TM-62 Strvmina m/52 and m52/B	NO old: TM-62 Anti-Tank mine SE: PTM 25 PL3
P	29640	Mine with external added TNT STANAG* 4569 more than Protection Level 4 STANAG* 2280 Threat Level D5	SE: PTM 25 PL4
C	29641	SE: Strvmina 5 T16 FBV	SE: Strvmina 5 T16 FBV

EHT		**Description**	**Interoperability Comments**
		Anti-Tank Shaped Charge Explosively Formed Projectile (EFP)	
GP	29700	Anti-Tank Shaped Charge Explosively Formed Projectile (EFP)	
P	29710	TM-72 HPD-1, HPD-2, HPD-F2, HPD-3 FFV028, Stridsvagnsmina 6	NO old: TM-72 Anti-Tank mine NO: Shaped charge Anti-Tank mine NO: HPD-F2 Anti-Tank mine FI: Anti-Tank Shaped charge SE1: Strvmina fullbreddsutlöst (Strvmina 6)
		Anti-Tank Scatterable Blast	
GP	29800	Anti-Tank Scatterable Blast	
P	29810	AT-2 RAAM	NO: FASCAM Anti-Tank mine, Artillery delivered minefield (RAAM) FI: Anti-Tank Scatter FI: Anti-Tank+Anti-Personnel Scatter combination DE: Anti-Tank Scatter US: M718 and M741 155mm RAAM with nine M73/M70 mines
		Directional (Horizontal Effects) Fragmentation, Forward	
GP	29900	Directional (Horizontal Effects) Fragmentation, Forward	
P	29910	MON 50 DM-51	NO: MON 50 APERS mine, Sector charge FI: M19 Anti-Tank SE1: Truppmina 12 (LI-12) Försvarsladdning 21, Fordonsmina 12 US: M18A1 Claymore
P	29920	MON 100	NO: MON 100 APERS mine, Sector charge FI: M100 Anti-Tank
P	29930	MON 200 Fordonsmina 13	SE: Fordonsmina 13
		Directional (Horizontal Effects) Fragmentation, Backwards/sidewards blast/splinter	
GP	30000	Directional (Horizontal Effects) Fragmentation, Backwards/sidewards blast/splinter	
P	30010	MON 50 DM-51	
P	30020	MON 100	
P	30030	MON 200 Fordonsmina 13	SE: Fordonsmina 13 R

EHT		**Description**	**Interoperability Comments**
		Directional (Horizontal Effects) Shaped Charge, Explosively Formed Projectile (EFP)	
GP	30100	Directional (Horizontal Effects) Shaped Charge, Explosively Formed Projectile (EFP)	
P	30110	TM-83 Fordonsmina 14	SE1: Psgr MINA Sidverkande (Strvmina / Psk), Fordonsmina 14
P	30120	TM-83	NO: TM-83 Anti-Tank mine, Off route, IR sensor
		Directional (Horizontal Effects) HEAT, shaped charge	
GP	30200	Directional (Horizontal Effects) HEAT, shaped charge	
P	30210	ARGES DM-12 PARM 1 PARM 2	NO: ARGES Anti-Tank mine, Off route IR sensor
		Improvised Explosive Device (IED)	
GP	30300	IED, Small	
P	30310	STANAG 4569 Protection Level 1 to Level 2 STANAG 2280 Threat Level D2	SE: IED S
P	30320	STANAG 4569 Protection Level 2 to Level 3	
GP	30400	IED, Medium	
P	30410	STANAG 4569 Protection Level 3 to Level 4 STANAG 2280 Threat Level D3-D4	SE: IED M
P	30420	STANAG 4569 more than Protection Level 4 STANAG 2280 Threat Level D5	
GP	30500	IED, Large	
P	30510	STANAG 2280 Threat Level E1	SE: IED L
P	30520	STANAG 2280 Threat Level E2	

C8.3 Obstacle

The engagement number list is defined as follows:

EHT	NO	Description	Interoperability Comments
GP	30600	Out of training area bounds	NL: Obstacle Out of Bounds FI/NO/AT/SE2/GB: Out of Bounds Obstacle
GP	30700	Obstacle, Generic insurmountable to vehicle or personnel	
P	30710	Not possible to pass by vehicles, possible by foot	NL: Obstacle Surmountable NO: Partially Surmountable Obstacle FI/AT/SE2: Vehicle Obstacle GB: Surmountable Obstacle
P	30720	Not possible to pass for neither vehicles nor personnel	NL/SE2: Obstacle Insurmountable NO/GB: Insurmountable Obstacle
P	30730	Not possible to pass by foot, possible by vehicle	NO/FI/AT/SE2: Infantry Obstacle

C8.4 Flare Illumination

The engagement number list is defined as follows:

EHT	NO	Description	Interoperability Comments
GP	31000	Flare illuminated, all players (vehicles and personnel)	SE: illuminated, all players
P	31010	Flare illuminated vehicles	SE: illuminated vehicles
P	31020	Flare illuminated personnel	SE: Flare illuminated personnel

C8.5 CBRN (NC)

The AWES CBRN simulation typically includes the following engagement types.

- Chemical
- Biological
- Radiological and Nuclear

The engagement number list is defined as follows:

EHT	NO	Chemical	Interoperability Comments
GP	31200	Chemical Warfare Agent, Persistent	
p	31210	Chemical, Persistent	NL: Chemical SE: Chemical, Persistent SE1: Chemical warfare agent FI/NO/AT/SE2/GB: Chemical, Persistent
p	31220	Blister agent, mustard gas, Persistent	
p	31230	Nerve agent, sarin, Persistent	
p	31240	Blood agent, arsine, Persistent	
p	31250	Choking agent, chlorine, Persistent	
p	31260	Incapacitating agent, agent 15, Persistent	
GP	31300	Chemical Warfare Agent, Non-persistent	
p	31310	Chemical, *Wind drifting	SE: Chemical, Wind drifting FI/NO/AT/SE2/GB: Chemical, Wind drifting
p	31320	Tear agent, Non-persistent	
p	31330	Blister agent, mustard gas, Non-persistent	
p	31340	Nerve agent, sarin, Non-persistent	
p	31350	Blood agent, arsine, Non-persistent	
p	31360	Choking agent, chlorine, Non-persistent	
p	31370	Incapacitating agent, agent 15, Non-persistent	
GP	31400	Toxic Industrial Chemical (TIC), Persistent	
GP	31500	Toxic Industrial Chemical (TIC), Non-persistent	

		Biological	
GP	31600	Biological Hazard, Persistent	
P	31610	Biological Persistent	SE: Biological persistent
P	31620	Bacterium, Persistent	
P	31630	Virus Persistent	
GP	31700	Biological Hazard, Non-persistent	
P	31710	Biological, Non-persistent	SE: Biological wind drifting
P	31720	Bacterium, Non-persistent	
P	31730	Virus, Non-persistent	
		Radiological and Nuclear	
GP	31800	Nuclear, Persistent	
P	31810	Nuclear, Persistent	NO/SE2: Nuclear, Persistent SE1: Nuclear contaminated area
P	31820	Radiological, Persistent	SE: Radiological persistent
GP	31900	Nuclear, Non-persistent	
P	31910	Nuclear. Non-persistent	Nuclear, Wind drifting
P	31920	Radiological, Non-persistent	SE: Radiological wind drifting

Note *. “Wind drifting” simulation is conducted by EXCON and is determining how the contaminated area is geo-graphically moving.

Note **. “Persistent” relates to lethality / aggressiveness constant by time. “Non-persistent” relates to lethality / aggressiveness declining by time.

Note ***. Radiological versus Nuclear

- Nuclear contamination primary refers to the remaining contamination when a nuclear (e.g., fission only or fission and fusion) bomb was detonated.
- Radiological contamination primary refers to hazardous radioactive material as for example spent nuclear fuel originating from a nuclear power plant. It can be spread by for example detonating a conventional bomb.
- From a player simulated vulnerability point of view nuclear and radiological contamination shall be considered as similar.

C8.6 Specific Player Engagement Simulation

AWES Specific Player Engagement simulation is executed at the EXCON. This engagement simulation group includes two sub-groups:

- EXCON Control Command
- Target Self-Seeking Grenade

The engagement number list is defined as follows:

EHT	NO	ExCon Control Command	Interoperability Comments
GP	32000	Engagement Hit No Effect	NL/SE2: Ammunition Hit GB: Hit
GP	32100	Engagement Kill	NL/SE2: Ammunition Kill GB: Kill
GP	32200	Engagement Near Miss	NL/SE2: Ammunition Near Miss GB: Near Miss
GP	32300	Wounded while associated to vehicle	AT: Injured while associated to vehicle

Appendix D

Instrumentation System – Tactical Engagement Simulation System (IS-TESS) Enumerations

Live Instrumentation System / TESS Interoperability Enumerations

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D1.0 INTRODUCTION

D1.1 Purpose

This Appendix specifies the numerical values and associated definitions for those fields that are identified as enumerations in one or more Simulation Interoperability Standards Organization (SISO) standards concerned primarily with interfaces and interoperability between coalition partner Live training systems, specifically UCATT Instrumentation Systems and Tactical Engagement Simulation Systems (TESS).

D1.2 Scope

This Appendix applies to enumerations that might occur in SISO standards [5,6] concerned with interfaces and interoperability between UCATT Instrumentation Systems and Tactical Engagement Simulation Systems.

D1.3 Objectives

The objective for this Appendix is to define a consistent repository for enumerations for distributed live simulation information exchange between Live instrumentation systems and TESS. The enumerations here pertain to simulation based Live training defined in by UCATT architecture and interface documents [3, 5, 6].

Enumerations defined in this Appendix are complimentary to those of SISO-REF-010, Reference for Enumerations for Simulation Interoperability [1], albeit here in context of the Live training environment the enumerations (i) are succinctly defined noting typical Live training communication over low data rate wireless networks, and (ii) support Live training specific association, technical status, and similar functionality. This document can be deprecated when enumerations defined herein are added to SISO-REF-010, Reference for Enumerations for Simulation Interoperability [1].

D1.4 Intended Audience

The primary audience for this Appendix is the portion of the Live Training community (whether in Industry, Government, or Academia) who acquire and/or supply and/or utilize Instrumentation Systems for simulation-based Live training; Player Units for such instrumentation systems, and/or TESS that need to operate in environments such as UCATT. Other related communities of interest, although not the intended primary audience, are encouraged to leverage the standard described here for use in their domains.

D2.0 REFERENCES

SISO documents listed below were used in generating the policies and procedures defined herein. When the following documents are superseded by an approved revision and that causes a conflict with this document, the revision of the below-referenced documents shall supersede this document. These documents are available by through the SISO web site at https://www.sisostandards.org/.

#	Document Number	Title	Date (MM/DD/YYYY)
1.	SISO-REF-010-2022	Reference for Enumerations for Simulations Interoperability	04/17/2022
2.	SISO-GUIDE-003-00-2016	Guide for UCATT Live Simulation Standards and Architecture	09/05/2016
3.	SISO-STD-016-00-2016	Standard for UCATT Laser Engagement Interface, Version 1.0	05/09/2016
4.	SISO-REF-059-00-2015	Reference for UCATT Ammunition Table, Version 1.0	07/29/2015
5.	SISO-STD-022-00-XXXX	U-NITE Standard for UCATT – Networking Instrumentation & TESS Equipment	To be released
6.	SISO-REF-078-00-XXXX	Reference for UCATT Country / Contractor Specific Player Unit-TESS Message Definitions	To be released
7.	PMT 90-S002M	MILES Communication Code (MCC) Standard	02/08/2011

D3.0 DEFINITIONS, ACRONYMS AND ABBREVIATIONS

D3.1 Definitions

Term	Definition
Instrumentation System (IS)	Communications infrastructure between TESS instrumented entities (personnel, vehicles, etc.) in a live training exercise and a remote Exercise Control.
Live	A training exercise involving real people operating real systems.
Platform	A vehicle, aircraft, or structure. Examples include Truck, Armored Vehicle, Rotary Wing aircraft, Unmanned Aerial System, Unmanned Ground Vehicle, Towed Artillery, Mortars, etc.
Player Unit (PU)	Element of an Instrumentation System that interfaces to a (soldier, vehicle, etc.) platform's TESS.
Tactical Engagement Simulation System (TESS)	A term referring to anyone, or, collectively, all the tactical engagement simulation systems that an IS can interface.

D3.2 Acronyms and Abbreviations

The following table defines acronyms and abbreviations used herein. Note that unique military (infantry, weapon, vehicle, munition, etc.) platform and similar acronyms are not defined here, as they are commonly known in military community and/or defined from publicly available materials.

Acronym/Abbr	Definition
AAR	After Action Review
Ammo	Ammunition Abbr.
ATWESS	Anti-Tank Weapon Effect Simulation System
BDA	Battle Damage Assessment
BIT	Built In Test
CA	Casualty Assessment
CBRN	Chemical Biological Radiological Nuclear
DEFL	Deflection
DIFCUE	Direct/Indirect Fire Cue (i.e., hit pyrotechnic signature)
EL	Elevation
EXCON	Exercise Control
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
HEX	Hexadecimal
IED	Improved Exploding Device
ID	Identification
IS	Instrumentation System
LSB	Least Significant Byte
macPANId	Media Access Control Personal Area Network Identification
MCC	MILES Communication Code
MES	Mine Effects Simulation
MGSS	Main Gun Signature System (i.e., firing pyrotechnic signature)
MILES	Multiple Integrated Laser Engagement System
MSB	Most Significant Byte
N/A	Not Applicable
NBC	Nuclear Biological Chemical
PAN	Personal Area Network
PER	Packet Error Rate
PPE	Personal Protection Equipment
PU	Player Unit, as an element of the IS which directly interfaces to a TESS system
RCD	Radio Control Device

Acronym/Abbr	Definition
RF	Radio Frequency
RGSS	Range Gunnery Signature Simulator (i.e., hit pyrotechnic signature)
RSSI	Received Signal Strength Indicator
SISO	Simulation Interoperability Standards Organization
TESS	Tactical Engagement Simulation System
TRP	Target Reference Point
TSPI	Time, Space, Position Information
UCATT	Urban Combat Advanced Training Technologies
UCN	Umpire Control Number
UI	User Interface
U-LEIS	UCATT Laser Engagement Interface Standard
U-NITE	UCATT – Networking Instrumentation & TESS Equipment
VDD	Vehicle Detection Device
WESS	Weapon Effect Simulation System

D4.0 GENERAL ENUMERATIONS

D4.1 AdminEventCode

This enumeration defines the event code values for Administrative EXCON commands from the IS to the TESS. The literals and corresponding values of this 16-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Notes
0x0000 – 0x3fff	Refer Umpire Control Number (UCN) [3]	Laser Code Umpire Control Numbers. While a subset is defined in the Standard [3] the data size is for all potential UCNs.
0x4000 – 0x5fff	Spare	
0x6000	Medium Damage	Vehicle medium damage outcome
0x6001	Heavy Damage	Vehicle heavy damage outcome
0x6002 – 0x7fff	Spare	
0x8000	BIT	The IS commands the TESS to perform BIT. The single data byte contains the results of the IS self-test. The results of the TESS BIT are displayed at the TESS together with the IS BIT results. The TESS generates BIT Event Reports.
0x8001 – 0xffff	Spare	

D4.2 Alarm ID

This enumeration is used to indicate the Alarm that has been or will be issued. The literals and corresponding values of this 8-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Notes
0x00	Alarm	
0x01	Geo-fence Boundary	Geographical boundary crossed

D4.3 AlarmState

This enumeration is used to indicate the state of a particular Alarm that has been or will be issued. The literals and corresponding values of this 8-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Notes
0x00	Active	
0x01	Acknowledged	
0x02	Cleared	

D4.4 AlarmType

This enumeration is used to indicate the type of a given alarm (e.g., General Alarm, Safety Alarm, etc.) The literals and corresponding values of this 8-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Notes
0x00	Alert	
0x01	General Alarm	
0x02	Safety Alarm	

D4.5 AmmoType

This (legacy) enumeration defines the values used to indicate the type of ammunition associated with a weapon or engagement [7]. It is the set of ammo types (i.e., ammo factors) defined in MILES Communication Code (MCC) Standard PMT 90-S002M 7]. The literals and corresponding values of this 8-bit enumeration are defined in the table below.

Value (Hex)	Definition	Notes
0x00	Ammo Type A & E	None
0x01	Ammo Type B & F	None
0x02	Ammo Type C & G	None
0x03	Ammo Type D & H	None
0x04	Ammo Type I & M	None
0x05	Ammo Type J & N	None
0x06	Ammo Type K & O	None
0x07	Ammo Type L & P	None

D4.6 AmmoType_TOW

This (legacy) enumeration identifies the types of Ammo associated with TOW weapon [7]]. The literals and corresponding values of this 8-bit enumeration are defined in the table directly below. Enumerations are ammo types (i.e., ammo factors) defined in MILES Communication Code (MCC) Standard PMT 90-S002M [7].

Value (Hex)	Definition	Notes
0x00	Ammo Type A	None
0x01	Ammo Type B	None
0x02	Ammo Type C	None
0x03	Ammo Type D	None

D4.7 AntiArmourSystemType

This (legacy) enumeration defines missile system (e.g., TOW) types that can be specified in applicable contexts [7]. The literals and corresponding values of this 32-bit bit flags are defined in the table directly below.

Value (Hex)	Description	Notes
0x00000001	Regular	TOW Missile; clear for Regular and set for Protected.
0x00000002 – 0x80000000	Spare	

D4.8 BIT_Status-EquipmentGenericBITResult

This enumeration defines the various Built In Test (BIT) flags used to representation the BIT Status of any TESS, IS generic equipment item. The literals and corresponding values of this 32-bit enumeration are defined in the table directly below. The enumeration allows for a summary level BIT Pass, BIT Fail or a higher fidelity definition of BIT failure where the specific failed module is reported. If higher fidelity information is passed, then only those bit(s) are set, and BIT Fail (summary level) is not required to be set.

Value (Hex)	Description	Notes
0x00000000	BIT Pass	Overall BIT Pass
0x00000001	BIT Fail	BIT fail, for use when no further definition is available
0x00000002	BIT In Progress	BIT requested, being actioned and result unavailable.
0x00000004	Main Controller Failure	
0x00000008	Secondary Controller Failure	
0x00000010	Secondary Module Failure	
0x00000020	TESS-PU Message Error	Received Unknown Msg
0x00000040	Laser Transmitter Failure	
0x00000080	Laser Receiver Failure	
0x00000100	IR Transmitter Failure	
0x00000200	IR Receive Failure	
0x00000400	Short Range Radio Transmitter Failure	

0x00000800	Short Range Radio Receiver Failure	
0x00001000	IS Radio Transmitter Failure	
0x00002000	IS Radio Receiver Failure	
0x00004000	PAN Radio Transmitter Failure	
0x00008000	PAN Radio Receiver Failure	
0x00010000	TESS-PU Transmitter Failure	
0x00020000	TESS-PU Receiver Failure	
0x00040000	Audio Input Failure	
0x00080000	Spare	
0x00100000	Temperature Failure	
0x00200000	Power Supply Voltage Failure	
0x00400000	Battery Failure	
0x00800000	Battery Low	
0x01000000	GNSS Failure	
0x02000000	Spare	
0x04000000	Spare	
0x08000000	Spare	
0x10000000	User Audio Effect Failure	
0x20000000	User Interface Input Failure	
0x40000000	User Interface Visual Effect Failure	
0x80000000	User Interface Display Failure	

Note:

A “1” in a bit position indicates the corresponding unit failed.

D4.9 BodyPart

This enumeration is used to indicate the parts of a human's body. The literals and corresponding values of this 8-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Notes
0x00	No Body Part	
0x01	Head	
0x02	Chest	
0x03	Torso	
0x04	Abdomen	
0x05	Left Arm	
0x06	Right Arm	
0x07	Left Leg	

Value (Hex)	Description	Notes
0x08	Right Leg	
0x09	Neck	
0x0A	Back	
0x0B	Pelvis	

D4.10 CasualtyDamageState

This enumeration represents a summary set of Kill values used in certain contexts to express the overall Casualty | Damage State of a Live Training participant (e.g., vehicle, personnel) as the result of a tactical engagement. The literals and corresponding values of this 4-bit enumeration are defined in the table directly below. If used as an 8-bit enumeration, then the upper 4 bits are set to 0x0.

Additionally, TES_EntityOperationalStatus enumerations provide a more expansive list.

Value (Hex)	Description	Notes
0x00	Nominal	
0x1– 0x7 assigned to non-personnel platforms		
0x1	Catastrophic / Total Kill	
0x2	Mobility Kill	
0x3	Firepower Kill	
0x4	Mobility Firepower Kill	
0x5	Communications Kill	
0x6 – 0x7	Spare	
0x8 – 0xf assigned to Personnel		
0x8	Minor Injury	
0x9	Intermediate Injury	
0xa	Major Injury	
0xb	Stunned (Freeze) Commenced	Weapon usage disabled.
0xc	Stunned (Freeze) Concluded	Weapon usage enabled.
0xd	Contaminated	
0xe – 0xf	**Spare**	

D4.11 CBRNDecontaminationType

This enumeration defines the various classes of CBRN decontamination that will be applied to personnel, vehicle, and infrastructure platforms.

The literals and corresponding values of this 8-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Notes
0x00	SelfDecontamination	Individual (self) decontamination
0x01	PeerDecontamination	Individual & Peer decontamination
0x02	AidedDecontamination	Example – vehicle washing, personnel showers

D4.12 CBRNDetectionType

This enumeration defines the various classes of CBRN detection & identification that will be applied to personnel and vehicle platforms plus detectors independent of those platforms.

The literals and corresponding values of this 8-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Notes
0x00	Tier1 Detector	Issued to (individual) personnel.
0x01	Tier2 Detector	Selectively issued to (unit aggregated) personnel, i.e., specialist
0x02	Area Detector	Free-standing detector

D4.13 CBRNPPEType

This enumeration defines the various classes of CBRN detection & identification that will be applied to personnel and vehicle platforms.

The literals and corresponding values of this 8-bit enumeration are defined in the table directly below. Enumeration is defined as bit fields, which allow multiple to be selected, i.e., soldier could be fitted with just mask or mask, gloves, boots, and suit.

Value (Hex)	Description	Notes
0x00	No Protective Equipment	Nothing fitted.
0x01	Protective Equipment, Mask	Soldier’s Mask
0x02	Protective Equipment, Gloves	Soldier’s Gloves
0x04	Protective Equipment, Boots	Soldier’s Boots
0x08	Protective Equipment, Body Suit	Soldier’s Suit
0x10	Protective Equipment, Breach Sensor	Vehicle’s breech sensor
0x20	Protective Equipment, Hatch Sensor	Vehicle’s hatch open
0x40 0x80	Spare Spare	Set to 0 Set to 0

D4.14 ChargeType

This enumeration defines the several types of charge that will or have been placed in inventory and used to fire a round.

Note: Doctrine states that the charge terminology used when firing weapons differs from terminology used in inventory management. Entities (e.g., TESS components such as Live PAN entities) that adjust inventory

based on weapon usage need to support a mapping between the two terminologies based on weapon type. The literals and corresponding values of this 8-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Notes
0x00	Unknown	
0x01	M231 (MACS)	
0x02	M232 (MACS)	
0x03	M3A1 (Green Bag)	
0x04	M4A2 (White Bag)	
0x05	M119A2 (Red Bag)	
0x06	M203A1	
0x07	M235 (Propellant Charge)	
0x08	M220 (Propellant Charge)	
0x09	M234 (Propellant Charge)	

D4.15 ClientClass

This enumeration defines the values used to indicate various core classes used to classify primary functional categories of client components/devices. The literals and corresponding values of this 7-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Notes
0x00	Unknown	The core device class type is unknown or not initialized.
0x01	Laser Transmitter	A device with the main purpose of emitting laser hit words.
0x02	Laser Receiver	A device with the main purpose of receiving laser hit words.
0x03	Surrogate Weapon	A device which is meant to be representative of another weapon
0x04	Visual Kill Indicator	A device which is used to produce visual non-pyrotechnic effects
0x05	Audio Effects Generator	A device which is used mainly to produce audio effects
0x06	Pyro-Hazardous Effects Generator	A device which provides pyrotechnic or some other hazardous effect
0x07	Haptic Effects Generator	
0x08	Location	A device which produces location data such as GPS
0x09	Localization	A device used to determine localization such as proximity or entrance/exit of a defined area such as a room or vehicle

Value (Hex)	Description	Notes
0x0A	Orientation	A device which provides the orientation of the device in a relative frame
0x0B	User Interface	A device which provides a command-and-control interface for the user
0x0C	Command / Control	A device which provides a command-and-control interface for the user
0x0D	Forward Observer Interface	A device which provides forward observer interface functions to the user
0x0E	Medical	A device which is mainly used to provide a simulated medical status and treatment interaction interface
0x0F	Serial Interface	A device with the main purpose of acting as a interface translator for a serial interface
0x10	Relay	A device that acts as a pass-through to get message packets to and from nodes that out of reach of the server.
0x11	Weapons Effects Signature Simulator	
0x12	Lifeform	
0x13	Power Supply	A device which provides clean power to one or more TESS components
0x14	Instrumentation System	None
0x15	Fire Control Interface	A device which serves as a primary interface to vehicle fire control systems.
0x16	TESS Master Controller	A device which serves as a master controller.
0x17 to 0x7D	(Unused)	
0x7E	Composite	
0x7F	(Unused) 0x7F	

D4.16 ClientDevicePowerType

There are two types of Client devices, “low-power” and “powered” devices. Low-power devices only stay in receive mode for a brief period after transmitting a message. On the other hand, Powered Client devices stay in receive mode unless they are transmitting a message. A Server may send a message (command) to a Powered Client at any time. The literals and corresponding values of this 1-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Notes
0x0	Low power	
0x1	Powered	

D4.17 DeviceType

This special enumeration defines the values used to indicate various TESS component device types necessary or useful for TESS set-up, operational/exercise monitoring, and AAR. As such, it complements related type definitions, such as ClientClass, by providing more detail and including all major TESS component types (e.g., Master Controller); not just PAN Client types. Finally, this "enumeration" is special in that its most significant bit (Bit 7) is set to 1 if the corresponding device is optional, and 0 if the device is required. The enumerated values are stored in the lower 7 bits (Bits 6 through 0). The literals and corresponding values of this 8-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Notes
0x00	Unknown	The core device type is unknown or not initialized.
0x01	TESS Master Controller	“TESS” interface to PU
0x02	Audio Cue Device	
0x03	RF Repeater	e.g., such as a Serial Module RF Interface (SMRFI)
0x04	Optical Room Indicator	e.g., such as an Enhanced Room Association Device (ERAD)
0x05	Protective Equipment, Breach Sensor	
0x06	Protective Equipment, Hatch Sensor	
0x07	Protective Equipment, Mask	
0x08	Protective Equipment, Gloves	
0x09	Protective Equipment, Boots	
0x0A	Protective Equipment, Body Suit	
0x0B	Surrogate Round, Mortar	
0x0C	Surrogate Round, Artillery	
0x0D	Surrogate Round, Grenade	
0x0E	Collateral Damage Module	
0x0F	Medium Range Laser Transmitter, 50 Cal	e.g., M2

Value (Hex)	Description	Notes
0x10	Medium Range Laser Transmitter, 7.62	e.g., M240
0x11	Medium Range Laser Transmitter, 5.56	e.g., M249
0x12	Long Range Laser Transmitter, LRLT	
0x13	UI Device, Crew Interface Module (CIM)	
0x14	UI Device, Forward Observer	
0x15	UI Device, Loader Display	
0x16	UI Device, Weapon	
0x17	Weapon Interface, Trigger	
0x18	WESS, Flash	
0x19	Kill Indicator (KI)	
0x1A	Pyrotechnic Device, Main Gun Firing	e.g., MGSS, firing indication
0x1B	Pyrotechnic Device, Vehicle Target	e.g., DIFCUE, Hit indication
0x1C	Pyrotechnic Device, Range Target	e.g., RGSS
0x1D	Pyrotechnic Device, Fire Marker Unit	
0x1E	Pyrotechnic Device, IED Simulator	
0x1F	Weapon Interface, Fire Control	
0x20	Laser Detector, Dismount, Halo	
0x21	Laser Detector, Dismount, Harness	
0x22	Laser Detector, Dismount, Chest	
0x23	Laser Detector, Dismount, Back	
0x24	Laser Detector, Dismount, Lower Leg	
0x25	Laser Detector, Dismount, Arm	
0x26	Laser Detector, Front	(Vehicle) front detector
0x27	Laser Detector, Left	(Vehicle) left detector
0x28	Laser Detector, Top	(Vehicle) top detector
0x29	Laser Detector, Right	(Vehicle) right detector
0x2A	Laser Detector, Rear	(Vehicle) rear detector
0x2B	Orientation Sensor, Other	Any orientation sensor not otherwise specified elsewhere
0x2C	Orientation Sensor, DEFL	Deflection (azimuthal angle)
0x2D	Orientation Sensor, EL	Elevation
0x2E	Haptic Effects Device	

Value (Hex)	Description	Notes
0x2F	Mounted Soldier	
0x30	Power Supply, Common	
0x31	Medical Treatment Device, Tourniquet	
0x32	Medical Treatment Device, Chest Decompression Needle	
0x33	Medical Treatment Device, Nasal Airway Clearing Tool	Nasopharyngeal Airway is the technical name
0x34	UI Device, Dismount Interface Module	
0x35	Crew Kill Module	
0x36	Instrumentation System	
0x37	Canister Laser Transmitter	
0x38	Location	
0x39	Pyrotechnic Device, ATWESS	
0x3a	Missile Simulator	Devices that simulate missile launches, such as a Stryker ATGM TOW Laser Device.
0x3b	CBRN Detection, Chemical	
0x3c	CBRN Detection, Biological	
0x3d	CBRN Detection, Radiological	
0x3e	CBRN Detection, Nuclear	
0x3f	CBRN Decontamination, Personnel	
0x40	CBRN Decontamination, Vehicle	
0x41	CBRN Decontamination, Site	
0x42	IED Jammer, Personnel borne	
0x43	IED Jammer, Vehicle borne	

D4.18 DirectionFacing

This enumeration identifies the Direction Facing of an entity or formation. The literals and corresponding values of this 4-bit enumeration are defined in the table directly below. If used as an 8-bit enumeration the upper 4-bits are set to 0x0.

Value (Hex)	Description	Notes
0x0	North	
0x1	Northeast	
0x2	East	
0x3	Southeast	
0x4	South	
0x5	Southwest	
0x6	West	
0x7	Northwest	

D4.19 EventCode

This enumeration indicates the various event codes associated with events that occur within, among, or between TES-equipped entities and the IS in a Live Training exercise.

Refer the Notes column of each Event Code value for applicable primary event sub codes (Event Subcode 1) and secondary event sub codes (Event Subcode 2), if any. Unless otherwise noted below for a particular Event Code, both the primary and secondary event sub codes are N/A and therefore should be set to 0x00 when sending and ignored when receiving. The literals and corresponding values of this 8-bit enumeration are defined in the table directly below.

Value (Hex)	Event Code Name	Notes
0x00	Vehicle Initialize	TESS was initialized via a SetEntity Type message
0x01	Time/Sync Rollover	TESS received Set Time message or time base rolled over.
0x02	Target Pyrotechnic Indication (DIFCUE) On	
0x03	Target Pyrotechnic Indication (DIFCUE) Off	
0x04	Vehicle Power On	Vehicle power turned on.
0x05	Vehicle Power Off	Vehicle power turned off.
0x06	CBRN System Off	CBRN system shut off.
0x07	CBRN Blower On	CBRN blower turned on.
0x08	CBRN Pressure On	CBRN pressure system enabled.
0x09	CBRN Error	CBRN operator error detected.
0x10	Mic A Operator Error	Microphone keying operator error detected
0x11	Mic A On	Microphone enabled
0x12	Mic A Off	Microphone enabled

Value (Hex)	Event Code Name	Notes
0x13	Mic A Sys Error	Microphone monitoring system error detected.
0x14	Mic B Operator Error	Microphone keying operator error detected
0x15	Mic B On	Microphone enabled
0x16	Mic B Off	Microphone enabled
0x17	Mic B Sys Error	Microphone monitoring system error detected.
0x18	Chemical Detector Enabled	
0x19	Chemical Detector Disabled	
0x20	Biological Detector Enabled	
0x21	Biological Detector Disabled	
0x22	Radiological Detector Enabled	
0x23	Radiological Detector Disabled	
0x24	CBRN PPE Enabled	Personnel suit and similar fitted; respirator defined separately (refer CBRNPPEType).
0x25	CBRN PPE Disabled	
0x26	CBRN Respirator Enabled	Personnel usage of gas mask and similar
0x27	CBRN Respirator Disabled	
0x28	Chemical Decontamination Enabled	
0x29	Chemical Decontamination Disabled	
0x30	Biological Decontamination Enabled	
0x31	Biological Decontamination Disabled	
0x32	Radiological Decontamination Enabled	
0x33	Radiological Decontamination Disabled	
0x34	IED Jammer Enabled	
0x35	IED Jammer Disabled	
0x36	IED Detection Enabled	
0x37	IED Detection Disabled	
0x38	Room Illuminator	TESS detected presence or loss of a Room Illuminator.
0x39	Control Mode On	TESS has entered Administrative (Manipulative) Mode.

Value (Hex)	Event Code Name	Notes
0x40	Control Mode Off	TESS taken out of Administrative Mode.
0x41	TESS Configuration Type Mismatch	Selected TESS entity type (e.g., MBT) is not able to be simulated with current TESS system | physical simulator elements as configured.
0x42	TESS Configuration Type Match	Previous mismatch error rectified and selected TESS entity type (e.g., MBT) is now able to be simulated with the current TESS system | physical simulator elements as configured.
0x43	IS PU Timeout	
0x44	Associated Device, Added	
0x45	Associated Device, Removed	
0x46	BIT Report	
0x47	Status Report	
0x48	Battery Report	
0x49	BIT Initiated	
0x50	BIT Pass	
0x51	BIT Complete (Power-on or commanded BIT)	
0x52	Set Player ID	
0x53	System Ready	
0x54	Ammo Replenishment	
0x55	Player ID Learned	
0x56	Weapon Dropped	
0x57-0xfd	Spare	
0xfe	Ignore Event	Placeholder for un-translated messages.
0xff	NULLTYPE	

D4.20 FireMissionIcon

This enumeration is used to specify the Fire Mission Icon to be created and/or displayed in association with some field or message referencing a Fire Mission. The literals and corresponding values of this 8-bit enumeration are defined as those of “TopologyMapICON” in Section 0.

D4.21 FireMissionState

This enumeration is used to indicate the state of a particular Fire Mission (e.g., Started, End of Mission, etc.) The literals and corresponding values of this 8-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Notes
0x00	N/A	
0x01	Mission Started	
0x02	Mission Underway	
0x03	Mission Ended (End of Mission)	

D4.22 FireMissionType

This enumeration is used to indicate the type of a particular Fire Mission (e.g., Adjust Fire, Suppression, etc.) The literals and corresponding values of this 8-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Notes
0x00	N/A	
0x01	Adjust Fire	
0x02	Fire for Effect	
0x03	Immediate Suppression	
0x04	Suppression	
0x05	Register Target Reference Point (TRP)	

D4.23 FiringResult

This enumeration is used to indicate attributes of a direct fire weapon simulation effect. The literals and corresponding values of this 16-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Notes
0x00	N/A	
0x01	Engagement Pairing	E1-I2 target detection (i.e., U-LEIS real-time code sequence where retro-reflection & subsequent firing data communicated).
0x02	Maximum Range Reached	No engagement (i.e., U-LEIS real-time code, but no valid target retro-reflection was received)
0x03	Guidance Lock-Fail	Weapon lock failed (i.e., simulated guidance algorithm failure results in no engagement)

D4.24 ForceAffiliation

This enumeration defines the values used to indicate the Force affiliation of a given player or entity in a training exercise. The literals and corresponding values of this 4-bit enumeration are defined in the table directly below. If used as an 8-bit enumeration, then the upper 4 bits are set to 0x0.

Value (Hex)	Description	Notes
0x0	Neutral	
0x1	OPFOR	
0x2	BLUFOR	

D4.25 FormationType

This enumeration defines the values used to indicate the type of formation currently in use by a given military unit. The literals and corresponding values of this 4-bit enumeration are defined in the table directly below. If used as an 8-bit enumeration, then the upper 4 bits are set to 0x0.

Value (Hex)	Description	Notes
0x0	Unknown	
0x1	Single Entity	
0x2	Line of 2 Entities (tight formation)	
0x3	Line of 3 Entities	
0x4	Line of 4 Entities	
0x5	Column of 2 Entities	
0x6	Column of 3 Entities	
0x7	Column of 4 Entities	
0x8	Wedge of 3 Entities	
0x9	Diamond of 4 Entities	
0xA	Wedge of 6 Entities	
0xB	5 Entities Evenly Distributed	
0xC	6 Entities Evenly Distributed	
0xD	7 Entities Evenly Distributed	
0xE	8 Entities Evenly Distributed	
0xF	9 Entities Evenly Distributed	

D4.26 FuzeSettings

The fuze setting is defined as the action or behavior of the fuze at detonation. A fuze type (as defined in the FuzeType section of this document) may support multiple fuze settings. The literals and corresponding values of this 8-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Notes
0x00	None	
0x01	SQ (Super Quick)	
0x02	DLY (Delay)	
0x03	NSB (Near Surface Burst)	
0x04	VT (Variable Time	
0x05	PRX (Proximity)	
0x06 to 0x0F	(Reserved)	
0x10	Time	

D4.27 FuzeType

A fuze type is defined as the physical fuze that is attached to the projectile being fired. It does not specify the “action” of the fuze (see FuzeSettings section), but the military nomenclature of the fuze being used. The literals and corresponding values of this 16-bit enumeration are defined in the table directly below.

Value (Dec)	Description	Notes
0x0000	None	
0x0001	(Generic) Point Fuse	Default Point
0x0002	(Generic) Time Fuse	Default Time
0x0003	(Generic) Impact Fuse	Default Impact
0x0004	(Generic) Proximity Fuse	Default Proximity
0x0005	M745 Point Detonating	
0x0006	M935 Point Detonating	
0x0007	M734 Multi-option	
0x0008	M734A1 Multi-option	
0x0009	M557 Point Detonating	
0x000A	M739 Point Detonating	
0x000B	M582 Mechanical Time Super Quick	
0x000C	M782 Multi Option	
0x000D	M732 Variable Time	
0x000E	M762 Electronic Time	
0x000F	M767 Electronic Time	

Value (Dec)	Description	Notes
0x0010	M783 Point Detonating/Delay	
0x0011	M548 Mechanical Time Super Quick	
0x0012	M565 Mechanical Time	
0x0013	M577A1 Mechanical Time Super Quick	

D4.28 HitIndication

This enumeration is used to indicate incremental tactical status changes resulting from a sustained hit. Separately TES_EntityOperationalStatus provides cumulative tactical status. The literals and corresponding values of this 8-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Notes
0x00	Spare	Use ‘Hit without Effect’ for no-damage outcome.
0x01	Communications Kill / Light damage, Wounded walking	
0x02	Medium, Wounded sit or lie; Turret stab destroy	
0x03	Heavy, Wounded lie; Sight destroys	
0x04	Mobility Kill / Incapacitated	
0x05	Mobility Kill Visual	
0x06	Firepower Kill / Injured	
0x07	Firepower Kill Visual	
0x08	Payload Kill	
0x09	Contamination Chemical	
0x0A	Contamination Biological	
0x0B	Contamination Nuclear	
0x0C	Spare	
0x0D	Spare	
0x0E	Spare	
0x0F	Spare	
0x10	Catastrophic Kill	
0x11	Tampering/Cheat Kill	
0x12	Paused	
0x13	Stunned (Freeze)	
0x14	C4ISR Kill	
0x15	Tampering Kill	

Value (Hex)	Description	Notes
0x16	Administrative Kill	
0x17	Near Miss	
0x18	Miss	
0x19	Hit without Effect	
0x1A – 0xFE	Spare	
0xFF	Ignore	HitIndication is not used

Ignore (0xff) used where a casualty / damage assessment algorithm does to provide an incremental outcome solely due to this sustained hit, and instead cumulative TES_EntityOperationalStatus reports tactical status.

D4.29 HitLocation

This enumeration is used to indicate where a Hit occurred. The literals and corresponding values of this 8-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Notes
0x00	Undefined	
0x01	Top	Example of target's (e.g.) vehicle top surface
0x02	Side	Example of target's (e.g., vehicle) sides. In Hit Report Aspect Angle and Hit Location define specific side (e.g., front, left, back, right).
0x03	Underside	Example of target's (e.g.) vehicle underside surface

D4.30 HostType

This (legacy) enumeration defines the values used indicate the kind of platform hosting the TESS equipment [6]. The literals and corresponding values of this 8-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Notes
Bit 0 - 6		
0x00	Vehicle has no weapons	
0x01	M1/M60 Single Shot	
0x02	M2/M3 Single Shot	
0x03	M551 Single Shot	
0x04	(Reserved)	
0x05	IRSAM	
0x06	RFSAM	
0x07	Avenger	
0x08	ASET4 Boresight	

Value (Hex)	Description	Notes
0x09	BSFV-E	
0x0A	M2/M3 Rapid Fire	
0x0B	M551 Rapid Fire	
0x0C	(Reserved)	
0x0D	AAA Rapid Fire	
0x0E	(Reserved)	
0x0F	BMP II	
0x10 to 0x40	(Reserved)	
Bit 7		
0x80	Reserved	

D4.31 IconActiveInactiveIndicator

This enumeration defines the values used to indicate whether an Icon associated with an applicable message or data field is Active or Inactive. The literals and corresponding values of this 8-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Notes
0x00	N/A	
0x01	Inactive	
0x02	Active	

D4.32 IconState

Icons are used for displaying things like Fire Mission Targets. This enumeration defines the various states in which a Fire Mission Icon can be placed. The literals and corresponding values of this 8-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Notes
0x00	N/A	
0x01	Icon resides on map	
0x02	Icon is deleted	
0x03	Delete all icons from tablet	

D4.33 IEDJammerType

IED jammer types (classes) are defined below, for reporting of the usage. The literals and corresponding values of this 8-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Notes
0x00	No Jammer	
0x01	Mobile Jammer	Personnel carried
0x02	Vehicle Jammer	Vehicle borne; smaller effect radius.
0x03	Vehicle Convoy Jammer	Vehicle borne, larger effect radius

IED jammer types (classes) are defined below, for reporting of the usage. The literals and corresponding values of this 8-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Notes
0x00	No Detector	
0x01	Personnel IED Detector	Personnel carried
0x02	Personnel Mine Clearer	Personnel carried, more specific implementation
0x03	Canine IED Detection	
0x04	Vehicle IED Detector	Vehicle borne

D4.34 ISStatus

This bit mask enumeration is used to represent the overall status of a TES-equipped entity's connection to the Instrumentation System (IS). It is constructed by OR'ing together the following data bits. The literals and corresponding values of this 8-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Notes
0x01	(Unused)	
0x02	IS/EXCON Link Receive OK	
0x04	IS/EXCON Link Transmit OK	
0x08	GNSS Tracking OK	
0x10	(Unused)	
0x20	(Unused)	
0x40	(Unused)	
0x80	(Unused)	

Note: A bit will be set to ‘1’ if the status is OK.

D4.35 MedicalTreatmentType

This enumeration defines the values used to indicate Medical Treatment applied to a Lifeform. The literals and corresponding values of this 8-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Notes
0x00	No Treatment Applied	N/A field
0x01	Apply Tourniquet	
0x02	Chest Decompression Needle / pneumothorax decompression	
0x04	Nasal Airway Clearing Tool / nasopharyngeal (NP) airway	
0x05	Open airway	
0x06	Position correctly	
0x07	Reassure wounded	
0x08	Apply pressure dressing	
0x09	Apply airtight dressing	
0x0a	Apply protective dressing	
0x0b	Splint limb	
0x0c	Immobilize spine	
0x0d	Patch wounded eye	
0x0e	Patch good eye	
0x0f	Apply artificial respiration	
0x10	Apply Cardio-Pulmonary Resuscitation (CPR)	
0x11	Remove fragment	
0x12	Apply oral airway	
0x13	Apply O2 mask	
0x14	Apply ventilation	
0x15	Apply traction	
0x16	Apply moist dressing	
0x17	Defibrillate	
0x18	Apply IV	
0x19	Administer morphine	
0x20	Administer antibiotic	

D4.36 WeaponCode

This enumeration defines the values used to indicate the weapon codes. The literals and corresponding values of this 16-bit enumeration are defined for direct and indirect fire weapons. Tabulated below are cross-reference of the U-LEIS Ammunition Code reference (Section 5; [4]) and those of PMT-90 Multiple Integrated Laser Engagement System communication codes.

U-LEIS Value (Dec)	PMT-90 Value (Hex)	Description	Notes
2186	0x00	Universal Kill	Universal Kill (Controller Gun), Continuous 00 for weapon bore sighting
2124	0x01	Missile: Maverick (various Aircraft), AGES Hellfire, TWGSS TOW	
2125	0x02	Missile: Hellfire	Missile: Hellfire (AH64, AH58)
2114	0x03	Missile: AT-3 Sagger	BMP1, BRDM-1, HIND-D, Man, AT-8 Songster (T-80)
2105	0x04	Mortar: 60mm (Man), 81mm, 107mm (4.2 in.), 120mm, 160mm, 240mm (Various GV, Man)	
(2035)	0x05	Mine: M15 Track Cutter	Gun AA: 23m (Radar Mode) (ASETIV)
--	0x06	Weapon X	
2129	0x07	Missile: TOW ATGW (M2, M3, AH6, AH64, AH1S, LAV-25, M113, M901, HMMWV, Man)	Shillelagh (M551), AT4 Spigot (Man), MILES I: AT-5 Spandrel ATGW (BMP2, BRDM, Hind-D), AT6 Spiral ATGW (HIND-D) AT-8 Songster (T-80), Predator TOW IIB
2112	0x08	Missile ATGW: M47 Dragon (Man)	AT-5 Spandrel (BMP2, BMP2C, GRDM2, HIND-E) Rocket AT: RPG-16 (Man), NTC BRDM-2
2134	0x09	Flame Thrower: M202 (Man), JAVELIN	
2101	0x0A	Mine: M21 AT (man)	Main Gun: 125mm (T72, T80)
--	0x0B	Mine: M81A1 Claymore AP (Man), M16	
2084	0x0C	Main Gun: 105mm (M1, M60 variants)	
2110	0x0D	Howitzer: 152mm (M1973), 122mm (M1974), 155mm (M109), 100mm (M1944)	Rocket: 122mm BM21 (truck)
2105	0x0E	Rocket: 2.75in (AH-64, AH-1S), 57mm Rocket (HIND-D, HIND-E)	Main Gun: 73mm (BMP1)

U-LEIS Value (Dec)	PMT-90 Value (Hex)	Description	Notes
2056	0x0F	Rocket: 66 mm M72 LAW (Man), 70mm Viper (Man), AT-4	
2094	0x10	Main Gun: 120mm (M1A1, M1A2 Tank)	
2076	0x11	Rifle (Recoilless): 90mm (Man)	
2110	0x12	Howitzer: 203mm (8-inch) (M110A2), 105mm (M102, M108), 122 mm, 155mm (M109A2, M198)	
2167	0x13	Grenade: 40mm Mark 19 AGS, 40mm M203 Grenade (HMMWV, Man)	
2058	0x14	Bomb, Cluster: Rockeye (Various Aircraft), SMAW	
2045	0x15	Gun: 30mm GAU-8 Avenger (Various Aircraft), AH-64	
2035	0x16	Gun, AA: 23mm (ZSU-23/4 or ASET IV in Visual Mode)	Main Gun: 25mm (M2A2, M3A2, LAV-25)
2035	0x17	Gun, AA: 20mm Vulcan (M163, M167, AH-1S)	Main Gun: 30mm (BMP2, BMP2C, HIND-D)
2015	0x18	Machine Gun .50 cal (12.7mm): M2, M85, etc. (Various GV, RW, Man)	
2112	0x19	Missile (SAM): Chaparral (M548, M730), SA-9 Gaskin (BRDM-2 Chassis)	SA-13 Gopher (BRDM-2 Chassis), Stinger (AH-58, OH-58D), ASET IV
2138	0x1A	Missile (SAM): Stinger (AH-58, OH-58D, HMMWV, Man)	SA-9 Gaskin (ASETIV RF/IR), SA-13 Gopher (ASETIV)
2010	0x1B	Rifle: .22 cal (5.56mm) M16*	Machine Gun .30 cal (7.62mm): M60, M240, Coax, etc. (Various GV, Man) Missile: Hellfire, AT-3 Sagger, TOW, Shillelagh, AT-5 Spandrel, AT-6 Spiral, AT-8 Songster, M47 Dragon.
(2185)	0x1C	Heavy Miss: 105mm, 152mm, 73mm, Viper (LAW) etc.	
59	0x1D	Light Miss: Rifle, Machine Gun, 20mm, etc.	
--	0x1E	Optical Resurrect (Controller Gun), Light spare miss, Reset for aircraft systems	
65	0x1F	Heavy Spare Miss	

U-LEIS Value (Dec)	PMT-90 Value (Hex)	Description	Notes
--	0x20	IFS Actuation	
2122	0x21	Missile (SAM): SA-14 Gremlin (Man)	
2036	0x22	Gun AA: 23mm (ZSU-23/4 Radar Mode)	
--	0x23	Controller gun/Utility code assessment	
--	0x24	Optical Reset (Smart Controller Gun), Resurrect for aircraft systems	

D4.37 MissionPhase

Related to Fire Mission state, this enumeration indicates the phase of a Fire Mission. The literals and corresponding values of this 8-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Notes
0x00	N/A	
0x01	Adjust Fire	
0x02	Fire for Effect	
0x03	Repeat Fire for Effect	

D4.38 MunitionStatusResultCode

This enumeration defines the result of the weapon fire event (i.e., the status of the round being fired from the weapon.) The literals and corresponding values of this 8-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Notes
0x00	Nominal	
0x01	Munition Unarmed	

D4.39 OrientationStatusType

This enumeration defines status of geometric-pairing data fields;

Bit 0 – indicates if a Heading parameter is magnetic north or true north.

Spare Bits default to 0

Value (Hex)	Description	Notes
0x0000	TrueNorth	Bit 0 - Heading is True North
0x0001	MagneticNorth	Bit 0 - Heading is Magnetic North.
0x0002 – 0x0800	Spare	Default to 0.
0x1000	(Mortar) Alternate Deflection Reference Angle	0 = Primary Deflection Reference Angle 1 = Alternate Deflection Reference Angle

Value (Hex)	Description	Notes
0x2000	(Mortar) Contingent Deflection Reference Angle	0 = Primary Deflection Reference Angle 1 = Contingent Deflection Reference Angle
0x4000	(Mortar) Emergency Deflection Reference Angle	0 = Primary Deflection Reference Angle 1 = Emergency Deflection Reference Angle
0x8000	(Mortar) Active Deflection Reference Angle	0 = Primary Deflection Reference Angle 1 = Active Deflection Reference Angle

D4.40 ParameterID

This enumeration defines the IDs corresponding to each configuration state parameter applicable to a device in a player's set of TESS equipment. The literals and corresponding values of this 8-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Parameter Size (bytes)	Notes
0x00	Unknown	1	
0x01	Client Device Type	1	Refer Section 0
0x02	tActiveHibernate (Milliseconds)	4	
0x03	tInactiveHibernate (Milliseconds)	4	
0x04	tverify (Milliseconds)	2	
0x05	Battery Low %	2	
0x06	Battery Critical %	2	
0x07	Receive PER Threshold %	2	
0x08	Transmit PER Threshold %	2	
0x09	RSSI Threshold for establishing Association	1	
0x0A	RSSI Threshold for Maintaining Association	1	
0x0B	Radio Transmit Power Level	1	
0x0C	Device Address	4	
0x0D	Server Channel	1	
0x0E	Serial Number	4	
0x0F	macPANId	8	
0x10	TESS_ControlFlags (refer Section D4.49)	8	
0x11 to 0xFF	(Unused)	--	

D4.41 PayloadHdrVersionID

This enumeration defines the values used to indicate the Revision of the variable payload message set defined in Reference [5]. Note that the numeric value of the revision matches the position of the corresponding letter in the alphabet, i.e., Revision D = 0x04, E = 0x05, F = 0x06, etc. Also note that letters such as capital I and O are omitted to prevent confusion with the numbers they resemble; their values are therefore reserved. The literals and corresponding values of this 8-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Notes
0x00 to 0x03	(Reserved)	
0x04	Revision D	
0x05	Revision E	
0x06	Revision F	
0x07	Revision G	
0x08	Revision H	
0x09	(Reserved)	
0x0A	Revision J	
0x0B	Revision K	
0x0C	Revision L	
0x0D	Revision M	
0x0E	Revision N	
0x0F	(Reserved)	
0x10	Revision P	
0x11	Revision Q	
0x12	Revision R	
0x13	Revision S	
0x14	Revision T	
0x15	Revision U	
0x16	Revision V	
0x17	Revision W	
0x18	Revision X	
0x19	Revision Y	
0x1A	Revision Z	

D4.42 PriorityLevel

This enumeration contains flags to communicate requests to a radio regarding the treatment of the payload contained in a message based on Priority Level. The literals and corresponding values of this 2-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Notes
0x00	Undefined priority	
0x01	Low Priority (Recovery Payload Messages, other)	
0x02	Normal Priority (TSPI, BIT, Status Payload Messages)	
0x03	High Priority (Event Report type Payload Messages)	

D4.43 QualityOfService

This enumeration defines various degrees of Quality of Service for message communication. Quality of Service is typically used to communicate requests to a communications device (e.g., radio) regarding the delivery of a message. The literals and corresponding values of this 2-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Notes
0x00	Undefined	
0x01	Unacknowledged (no retries by IS)	
0x02	Best Effort (unacknowledged with limited IS retries)	
0x03	Guaranteed Delivery (IS constantly retries until acknowledgement is received)	

D4.44 ResupplyType

This enumeration identifies all the values used to indicate the type of a weapon resupply. The literals and corresponding values of this 8-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Notes
0x00	Set Current Levels to Message	If munition counts, fuze counts, and charge counts are zero, then set current levels to base levels.
0x01	Set Base Levels	
0x02	Adjust Current Levels	

D4.45 StatusType

This enumeration defines the values used to indicate if whether a corresponding device association status is an association or a disassociation. The literals and corresponding values of this 8-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Notes
0x00	Disassociation	
0x01	Association	

D4.46 SystemCableActualPlatformType

This (legacy) enumeration defines the values representing the code for the actual platform type being used for a given TES-equipped entity [6]. The literals and corresponding values of this 8-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Notes
0x00	M1TANK	
0x01	M1A1	
0x02	M60A1/3	
0x03	M2/M3	
0x04	T72/T80	
0x05	BMP	
0x06	BMP II	
0x07	M113	
0x08	UDS	
0x09	M901	
0x0A	C3 (ASET4)	
0x0B	IRSAM (ASET4)	
0x0C	RFSAM (ASET4)	
0x0D	Avenger (Air Defense)	
0x0E	BSFV-E (Air Defense)	
0x0F	AAA (ASET 4)	
0x10 to 0xFF	(Unused)	

D4.47 TargetLocationMethod

This enumeration defines the values used to indicate the method of target location used with a given Fire Mission Type. The literals and corresponding values of this 8-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Notes
0x00	N/A	
0x01	Grid	
0x02	Shift from Known Point	
0x03	Polar	

D4.48 TargetType

This enumeration is used to indicate one of several types of targets (e.g., Personnel, Air Defense Artillery, vehicle, etc.) The literals and corresponding values of this 8-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Notes
0x00	Spare	
0x01	Air Defense Artillery	
0x02	Armor	
0x03	Artillery	
0x04	Personnel	
0x05	Vehicle	
0x06	TRP	

D4.49 TES_ControlFlags

This bit mask enumeration defines specific operation instructions for TESS configuration. The literals and corresponding values of this 64-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Notes
0x0000000000000001	Personnel Body Armor	Set when Body Armor worn
0x0000000000000002	Personnel CBRN PPE Suit	Set when CBRN Suit worn
0x0000000000000004	Personnel CBRN Gas Mask	Set when Gas Mask is used
0x0000000000000008	Platform (infantry, vehicle) Dug In	Set when platform is dug in.
0x0000000000000010	Infantry Prisoner	Set when person is a prisoner
0x0000000000000020	Camouflaged	Set when vehicle is camouflaged.
0x0000000000000040	Burning	Set when vehicle, building is burning.
0x0000000000000080	Reinforced	Set when building is reinforced
Spare		
0x0000000000000080 to 0x0000800000000000		Set to ‘0’ by default.

Value (Hex)	Description	Notes
Legacy System Configuration		
0x0001000000000000	Disable the Hull to Turret Interface feature	If disabled, vulnerability assessment assumes turret facing forward.
0x0002000000000000	Ignore MES message processing	Mine Effects Simulation (MES)
0x0004000000000000	Disable the RCD capability	(US Legacy System Specific: Note that by default, the VDD powers on with the RCD capability off and therefore this flag should be set to 1 to preserve that condition.)
0x0008000000000000	Main Gun WESS Absent (Note 1)	Main Gun Weapon Effect Simulation System (WESS) not fitted.
0x0010000000000000	Main Gun WESS Present (Note 1)	Main Gun Weapon Effect Simulation System (WESS) fitted (e.g., Main Gun Signature System [MGSS])
0x0020000000000000	Flash WESS (Note 1)	Main Gun visual Flash WESS fitted.
0x0040000000000000	Main Gun Coax WESS	Clear if Dry Fire; Set if Blank Fire.
0x0080000000000000	Missile ATWESS (Note 1)	Clear if Dry Fire; Set for Missile firing simulated with Anti-Tank Weapon Effect Signature (ATWESS).
0x0100000000000000	Hit Signature Effect (Note 1)	Example Hit Signature is Direct Indirect Fire Cue (DIFCUE) WESS. Clear if Hit Signature Effect off. Set if Hit Signature Effect On.
Spare		
0x0200000000000000 to 0x0800000000000000		Set to ‘0’ by default.
Laser code selection		
0x1000000000000000	Vendor Specific Code	Vendor Specific Code
0x2000000000000000	PMT-90 (MILES)	
0x4000000000000000	U-LEIS (Non-alternating Real-Timecodes)	U-LEIS, where Real-Timecodes are non-alternating (as appropriate) [3]
0x8000000000000000	U-LEIS (Alternating Real-Timecodes)	U-LEIS, where Real-Timecodes are alternating (as appropriate) [3]

*All unused bits are always zero.

Note 1: Selected bits enable/disable Weapon Effect Simulation System (WESS) capability. In cases where program | vendor safety constraints do not allow this level of control; the respective message is processed and in the TESS the command not actioned.

D4.50 TES_EntityOperationalStatus

This bit mask enumeration defines the values used to indicate one or more corresponding health status of the TES Entity represented by the TESS. This health status may change because of Battle Damage Assessment (BDA) or Casualty Assessment (CA). The literals and corresponding values of this 32-bit enumeration are defined in the table directly below.

CasualtyDamageState is a separate 4bit summary of personnel and vehicle status, whereas this TES_EntityOperationalStatus offers more fidelity and multiple simultaneous states.

Value (Hex)	Description*	Notes
0x00000000	No Damage / Healthy	All bits cleared
0x00000001	Communications Kill / Light damage, Wounded walking	
0x00000002	Medium, Wounded sit or lie; Turret stab destroy	Soldier: Medium Wound, resulting in sitting or prone posture Combat Vehicle: turret stabilization destroyed
0x00000004	Heavy, Wounded lie; Sight destroy	Soldier: Heavy Wound, resulting in prone posture Combat Vehicle: sight destroyed
0x00000008	Mobility Kill / Incapacitated	Incapacitated is used for dismounts; otherwise, Mobility Kill, where effect is less visually obvious at distance; a vehicle signature system is not operated as little visual effect.
0x00000010	Mobility Kill Visual	Mobility Kill is visually obvious at distance; a vehicle signature system is operated to demonstrate visual effect.
0x00000020	Firepower Kill / Injured	Injured is used for dismounts; otherwise, this mean Firepower Kill where effect is less visually obvious at distance; a vehicle signature system is not operated as little visual effect.
0x00000040	Firepower Kill Visual	Firepower Kill is visually obvious at distance; a vehicle signature system is operated to demonstrate visual effect.
0x00000080	Payload Kill	Destruction of vehicle’s cargo
0x00000100	Contamination Chemical	
0x00000200	Contamination Biological	
0x00000400	Contamination Nuclear	
0x00000800	Spare	
0x00001000	Spare	
0x00002000	Spare	
0x00004000	Spare	

Value (Hex)	Description*	Notes
0x00008000	Catastrophic Kill	
0x00010000	Tampering/Cheat Kill	
0x00020000	Paused	
0x00040000	Stunned (Freeze)	Set – Soldier is stunned; i.e. weapon usage disabled. Clear – Soldier has their normal capabilities.
0x00080000	C4ISR Kill	C4I functionality not available
0x00100000	Tampering Kill	Automatic kill when soldier/crew violates certain conditions
0x00200000	Administrative Kill	Kill by Instructor or EXCON
0x00400000	Near Miss	
0x00800000	Miss	
0x01000000	Hit without Effect	Hit sustained, not effect.
0x02000000 - 0x80000000	Spare	Default state is clear (0).

* A “1” in a bit position indicates the corresponding health status attribute is true.

D4.51 TES_EntityType

This enumeration defines the set of values used to identify the various kinds of TES Entity configurations, including vehicles, weapon system platforms, dismounts, and other platforms.

The literals and corresponding values of this TES_EntityType 16-bit enumeration comprising:

a) Bit 15,14, defining Entity Type affiliation to Friendly, Opposing Force.
b) Entity Types as defined in the table directly below.

Value (Hex)	Description	Notes
Entity Type Definitions		
Personnel		
Personnel		
0x0000	Soldier (no weapon)	
0x0001	Soldier (weapon)	
0x0002	Civilian #1 (no weapon)	
0x0003	Civilian #1 (weapon)	
0x0004	Civilian #2 (no weapon)	
0x0005	Civilian #2 (weapon)	
0x0006	Referee Staff (B)	
0x0007	Referee Staff (V)	
Value (Hex)	**Description**	**Notes**
Main Battle Tank		
0x0120	ITS, heavy armor	
0x0121	Armored Tank	
0x0122	Tank 105mm	
0x0123	Tank 120mm	
0x0124	Tank 125mm	
0x0125	Tank 152mm	
0x0126	Leopard 1T Volkan	
0x0127	Leopard 1A5	
0x0128	Leopard 2A0	
0x0129	Leopard 2A1	
0x012A	Leopard 2A2	
0x012B	Leopard 2A3	
0x012C	Leopard 2A4	Leopard 2A4TR
0x012D	Leopard 2A5	Leopard 2A5A1 DK Leopard 2A5A2 DK
0x012E	Leopard Stridsvagn 122	
0x012F	Leopard 2A6	
0x0130	Leopard 2A7	
0x0131	M1-105 Abrams	
0x0132	M1-120 Abrams	M1A1, M1A2
0x0133	M1-120 df	M1A1 df, M1A2 df
0x0134	M1A1 AIM	

Value (Hex)	Description	Notes
0x0135	M1A1 AIM SA	
0x0136	M1A2 SEP	
0x0137	Mobile Protected Firepower (Griffin II light tank)	
0x0138	M60A1	
0x0139	Chieftain	
0x013A	FV4034 Challenger 2	
0x013B	T-54	
0x013C	T-55	
0x013D	T-62	
0x013E	T-72	
0x013F	T-80	
0x0140	T-84	
0x0141	T-90	
0x0142	T13 Armada	
0x0143	T14 Armada	
0x0144	M551 (BMP2C)	
0x0145	Leclerc	
0x0146	Leclerc XLR	
Value (Hex)	**Description**	**Notes**
Armored Fighting Vehicle		
0x0200	ITS, medium armor	
0x0201	IFV 20mm	
0x0202	IFV 25mm	
0x0203	BMP-I	BMP-I (i.e., BMP-1), BMD-1, BMD-2
0x0204	BMP-II	BMP-II (i.e., BMP-2)
0x0205	BMP-III	BMP-3 BMP-3K Command
0x0206	BMP-T Fire Support Vehicle	
0x0207	BMD IFV, Tracked	BMD-4
0x0208	M2A2	M2A2
0x0209	M2A2 ODS SA	
0x020A	M2A2 ODS SA BFIST	
0x020B	M2A3	
0x020C	M3A2	M3A2

Value (Hex)	Description	Notes
0x020D	M3A3	
0x020E	CV9030	
0x020F	CV9035 Mk III	
0x0210	CV9040C	
0x0216	Stryker ICV	M1126 ICV
0x0217	Stryker ATGM	M1134 ATGM
0x0218	Stryker	M1127 RV
0x0219	Stryker MGS	M1128 MGS
0x021A	Stryker MC	M1129 MC
0x021B	Stryker CV	M1130 CV
0x021C	Stryker FSV	M1131 FS
0x021D	Stryker ESV	M1132 ESV
0x021E	Stryker MEV	M1133 MEV
0x021F	Stryker NBC RV	M1135 NBC RV
0x0220	Stryker 30mm Dragoon	
0x0221	Stryker CROWS J	
0x0222	LAV-25	
0x0223	LAV-AT (Anti-Tank)	
0x0224	LAV-25 Reconnaissance	
0x0225	LAV-A Ambulance	
0x0226	LAV-C Command	
0x0227	LAV-F Fitter	
0x0228	LAV-L	
0x0229	LAV-M Mortar	
0x022A	LAV-PC Personnel Carrier	
0x022B	LAV-R Recovery	
0x022C	LAV-S Surveillance	
0x022D	LAV-EWA3 (Mobile Electronic Warfare Support System)	
0x022E	Boxer Ambulance	
0x022F	Boxer Armored Fighting Vehicle	GTK Boxer
0x0230	GTK Boxer FüFz	GTK Boxer (Gepanzertes Transport-Kraftfahrzeug; armored transport vehicle), FLW 200 RWS

Value (Hex)	Description	Notes
0x0231	Boxer Command Post	
0x0232	Boxer CRV	
0x0233	Boxer Surveillance	
0x0234	Rosomak M1 w/30mm Turret	
0x0235	Rosomak RAK 120mm Mortar	
0x0236	Rosomak S ATGM	
0x0237	Marder 1A3	
0x0238	Warrior	FV510 Infantry Section Vehicle FV511 Infantry Combat Vehicle FV512 Mechanized Combat Repair Vehicle FV513 Mechanized Recovery Vehicle FV514 Mechanized Artillery Observation Vehicle FV515 Battery Command Vehicle.
0x0239	Antitank Gun-Medium (TOW)	
0x023A	Op Antitank Gun-Medium (TOW)	
0x023B	M901 ITV (Improved TOW Vehicle)	
0x023C	Wiesel TOW	
0x023D	Puma IFV, 30mm	SPz Puma (DE)
0x023E	Véhicule Blindé de Combat d'Infanterie (VBCI VCI, AFV (25mm canon, 7.62mm)	VCI (CN25)
0x023F	Véhicule Blindé de Combat d'Infanterie (VBCI VPC), Command Post (12.7mm)	VPC (12,7)
Infantry Combat Vehicle		
0x0300	ICV df	
0x0301	Armored Protected Ground Vehicle	
0x0302	Armored Personnel Carrier	Personnel Carrier-Armored
0x0303	Armored Fighting Vehicle Command and Control (C2)	M4 - Command & Control Vehicle (C2V)
0x0304	Armored Combat Service Support (CSS) Vehicle	
0x0305	M113	M113A1, M113A2, M113A3
0x0306	M113, Artillery forward observer vehicle	BeobPzArt M113 (DE)

Value (Hex)	Description	Notes
0x0307	M113, Signals and command	FüFuPz M113 (DE)
0x0308	M113, Ambulance	KrKw M113 (DE)
0x0309	M113, Mortar, 120mm	Mörser M113 (DE)
0x030A	M577- Command Post Carrier (M113)	
0x030B	M548 – Tracked Cargo Carrier (M113)	
0x030C	M1064 - Heavy Mortar Carrier (120 mm Mortar)	
0x030D	Armored Multi-Purpose Vehicle (AMPV) – General Purpose Vehicle (GPV)	XM1283
0x030E	Armored Multi-Purpose Vehicle (AMPV) – Medical Evacuation Vehicle (MEV)	XM1284
0x030F	Armored Multi-Purpose Vehicle (AMPV) – Medical Treatment Vehicle (MTV)	XM1285
0x0310	Armored Multi-Purpose Vehicle (AMPV) – Mission Command (MCmd)	XM1286
0x0311	Armored Multi-Purpose Vehicle (AMPV) – Mortar Carrier Vehicle (MCV)	XM1287
0x0312	AAVP-7A1 (Personnel)	
0x0313	AAVC-7A1 (Command)	
0x0314	BOV APC	
0x0315	C3 Vehicle	
0x0316	ASV M1117 Armored Security Vehicle	
0x0317	BTR - Wheeled APC	BTR-60, BTR-70, BTR-80, BTR-90
0x0318	MT-LB - Light, Armored, Multi-purpose APC	
0x0319	Fuchs 6x6 Amphibious armored personnel carrier	TPz Fuchs (Jäger) (DE)
0x031A	Fuchs 6x6 Amphibious APC, 1A8	Fuchs 1A8 (DE)
0x031B	Tracked Amphibious IFV, mobile forward artillery observation post	VOA AMX 10 P
0x031C	4x4 artillery observation vehicle	VAB-OBS
0x031D	4x4 Armored Personnel Carrier	AMX 10 P (rang) AMX 10P Valorisé
0x031E	4x4, Anti-Tank (Eryx)	AMX 10 P Éryx
0x031F	4x4, Command	AMX 10 PC-Cne
0x0320	4x4, Anti-Tank (MILAN)	AMX 10 P Milan
0x0321	4x4, 20mm canon	VAB T20/13 (V CN20) VAB T20/13 Valorisé

Value (Hex)	Description	Notes
0x0322	4x4, 12.7mm	VAB P 12,7 (rang) VAB 12,7 Valorisé VAB TOP S2 VAB TOP ULTIMA
0x0323	4x4, Anti-Tank (ERYX, 12.7mm)	VAB ÉRYX 12,7
0x0324	4x4, Anti-Tank (MILAN, 7.62mm)	VAB Milan 7,62
0x0325	4x4, Command, 12.7mm	VAB ÉRYX 12,7
0x0326	4x4, regimental C4ISTAR, 12.7mm	VAB PC SIR 12,7
0x0327	4x4, Command, 12.7mm	VAB GéN 12,7 ‘Groupe’
0x0328	4x4, Command, 7.62mm	VAB GéN 7,62 ‘Chef de section’
0x0329	4x4, 7.62mm	SERVAL T1 7.62mm SERVAL T2 7.62mm
0x032A	4x4, armored, 7.62mm	SERVAL T1 7.62mm blindé SERVAL T2 7.62mm blindé
0x032B	4x4, 12.7mm	SERVAL T1 12.7mm
0x032C	4x4, armored, 12.7mm	SERVAL T1 12.7mm blindé
0x032D	6x6 APC	GRIFFON T2
0x032E	6x6 APC, Armored	GRIFFON T2 BLINDE
0x032F	6x6, APC, RWS 7.62mm	GRIFFON T1 762
0x0330	6x6, APC, Armored, RWS 7.62mm	GRIFFON T1 762 Blindé
0x0331	6x6, APC, RWS 12.7mm	VBMR (Véhicule Blindé Multi-Rôle) Griffon T1 12.7mm
0x0332	6x6, APC, Armored, RWS 12.7mm	GRIFFON T1 12.7mm BLINDE
0x0333	6x6, Reconnaissance and Combat Vehicle	EBRC Jaguar (France)
0x0334	6x6, Armored Reconnaissance and Combat Vehicle	EBRC JAGUAR Blindé

Value (Hex)	Description	Notes
Artillery (Guns, Howitzer)		
0x0400	Self-Propelled Artillery	
0x0401	M40 Recoilless Rifle	
0x0402	Howitzer	
0x0403	Howitzer-Light	
0x0404	Ultra-Lightweight Howitzer (UFH) 155 mm	M777A2
0x0405	Lightweight Howitzer 105 mm	M119A1
0x0406	Lightweight Howitzer 105 mm	M119A2
0x0407	Lightweight Howitzer 105 mm	M119A3
0x0408	Howitzer-Medium Self-Propelled	
0x0409	M109A6 Howitzer	
0x040A	M1974 (2S1 Gvozdika 122-mm Howitzer)	
0x040B	M992A2 – Field Artillery Ammunition Supply Vehicle (FAASV)	
0x040C	M7 Bradley Fire Support Team (B-FIST)	M7A3 B-FIST
0x040D	Mortar Heavy	
0x040E	Op Mortar Heavy	
0x040F	2A45M – Sprut Anti-Tank Guns, towed	
0x0410	SA29 – Anti-Tank Gun, 100mm, towed	
0x0411	2S23 – Nona-SVK Self Propelled Gun, 120mm	
0x0412	2S9 – Nona SPH, 120mm	
0x0413	2S3 Akatsiya self-propelled 152-mm Gun	
0x0414	Panzerhaubitze 2000 (PzH 2000), 155 mm SPH	
0x0415	Tank Destroyer MiW Skorpion	MiW Skorpion (DE)
0x0416	Wheeled Tank Destroyer	AMX 10RC (France)
0x0417	ERC-90, 6x6, 90mm gun	ERC-90 (France)
Value (Hex)	**Description**	**Notes**
Rocket Systems (Surface)		
0x0500	Multiple Rocket Launcher	
0x0501	Op Multiple Rocket Launcher	
0x0502	M270A1 – Multiple Launch Rocket System (MLRS)	
0x0503	M142 – High Mobility Artillery Rocket System (HIMARS)	
0x0504	BM21 – Multiple Rocket Launcher (MRL)	

Value (Hex)	Description	Notes
Surface to Air (Missiles)		
0x0600	Surface to Air Short range	
0x0601	SA-13 – Short-Range, Low Altitude Surface-to-Air (SAM) Transport System	
0x0602	Self-Propelled VSHORAD Gun/Missile System	
0x0603	Surface to Air Medium range	
0x0604	SA 15 – Low to Medium Altitude Surface-to-Air (SAM) Transport System	
0x0605	Missile Launcher – Surface-to-Air (SAM)	
0x0606	M6 – Bradley Linebacker	Bradley Stinger Fighting Vehicle (BSFV-E)
0x0607	AVENGER Air Defense System	
0x0608	Rapier SAM System	
0x0609	RF SAM	
0x060A	RF SAM2	
0x060B	IR SAM	
0x060C	IR SAM2	
0x060D	Patriot Surface-to-Air Missile (SAM) System	MIM-104
0x060E	HQ-16 SAM System	HQ-16, HQ-17
0x060F	FlaRakWaTrgt Ozelot	LeFlaSys Light Mechanized Short-Range Air Defense System – Ozelot Air Defense Missile Carrier on Wiesel 2 Chassis
0x0610	Wiesel AFF	AFF Wiesel Platoon Command Post and Radar Vehicle
Value (Hex)	**Description**	**Notes**
Surface to Air (Guns)		
0x0700	Anti-Aircraft Guns	
0x0701	AAA	
0x0702	AAA2	
0x0703	ZSU-23 – Soviet Anti-Aircraft Gun	
0x0704	2S6M – Tunguska Anti-Aircraft Artillery	
0x0705	Leopard 2A4 Marksman	

Value (Hex)	Description	Notes
Trucks		
0x0800	Truck, 4x6	CBH 320 tip-truck (France)
0x0801	Truck, 6 x 6	GBC 8KT CCT 5 m3
0x0802	TRK M939, 5-ton 6x6 truck	M393/A1/A2, M923, M925, M927, M928, M930, M931, M932, M935, M936
0x0803	HET	Tractor M1070 & Trailer M1000, Tractor M911 & Trailer M747
0x0804	Family of Medium Tactical Vehicles (FMTV)	M1079Cgo, M1079ShopTrk, M1081CgoLVAD, M1083PLTrk, M1084PLwMHF, M1085LWBxBed, M1086LWBwMHF, M1087ExpVAN, M1088Tractor, M1089Whr, M1090DumpTrk, M1091FuelTrk, M1093CgoLVAD, MG1094DmpLVAD
0x0805	HEMTT	M978Tanker, M983Tractor, M984Wrecker, M977Cgo
0x0806	M35, 2.5ton 6x6 cargo truck	
0x0807	Star 266	
0x0808	USMC Medium Tactical Vehicle Replacement (MTVR)	
0x0809	M870 MTVR Trailer	
0x080A	Fuel Truck	GBC 180 CCT (France)
0x080B	Heavy Logistics Vehicle Wheeled (HLVW)	
0x080C	Medium Support Vehicle System (MSVS)	
0x080D	M-915 Truck tractor unit	
0x080E	Palletized Load System (PLS)	
0x080F	M1076 Palletized Load System Trailer (PLST)	
0x0810	M172A1 Trailer	
0x0811	M1095 Cargo Trailer	

Value (Hex)	Description	Notes
0x0812	M1082 2.5 Ton Trailer	
0x0813	M747 Trailer	
0x0814	Fuel trailer	
0x0815	Protected truck, 5 tonne	GTF ZLK 5t ZETROS (DE)
0x0816	Protected truck, 8x8, 15 tonne Iveco GTF	Iveco GTF (ZLK 15t) Trakker (DE) PPT (Le porteur polyvalent terrestre)
0x0817	Truck, civilian, light, 4 x 2	TRUCK DB ATEGO (DE) TRUCK DB AXOR (DE) Truck IVECO 140E / 150E (DE)
0x0818	Truck, medium, light, 4 x 2	TRUCK MAN TGA / TGM
0x0819	Truck, 4x4, 2.3tonne, covered	TRM 2000 PRB (Bâché)
0x081A	Truck 4 x 4, Command	GBC 180 Torpédo
0x081B	Truck, 6 x 6, 4 tonne	GBC 180 PRB (STANDARD)
0x081C	Truck, 6 x 6, 4 tonne	GBC 8KT PRB (STANDARD)
0x081D	Truck, 6 x 6, 10 tonne, flat deck	TRM 10000 ACH
0x081E	Truck, 6 x 6, 10 tonne, covered	TRM 10000 PRB (bâché)
Value (Hex)	**Description**	**Notes**
Tactical Vehicle		
0x0900	ITS, no armor	
0x0901	Reconnaissance Vehicle (RV)	
0x0902	OPFOR - Surrogate Wheel Vehicle (OSWV)	
0x0903	HMMWV	

Value (Hex)	Description	Notes
0x0904	HMMWV Basic Armor	M56SmkGen, M998/M1038, M1035Ambul, M1037Shltr, M1042Shltr, M1069w105Gun, M1097Cgo, M113ExpCgo, M1123Cgo, TUAS GCS
0x0905	HMMWV Armored	M1043Carrier, M1044Carrier, M1054TowCarr, M1114Carrier, M1116Cgo, M1145FACCarr, M1151Carr, M1152ExtCgo
0x0906	Bushmaster Protected Mobility Vehicle	Ambulance, Command, Direct Fire Weapons, Engineer, EW, GMV, ISTAR, Mortar
0x0907	Joint Light Tactical Vehicle - Heavy Guns Carrier	M1278 JLTV-HGC
0x0908	Joint Light Tactical Vehicle - Utility	M1279 JLTV-UTL
0x0909	Joint Light Tactical Vehicle - General Purpose	M1280 JLTV-GP
0x090A	Joint Light Tactical Vehicle – Close Combat Weapons Carrier	M1281 JLTV-CCWC
0x090B	M707 Knight Land Based Target Acquisition System	
0x090C	BRDM, 4x4 Amphibious	BRDM-2 w/ AT-5 BRDM-2 w/14.5mm
0x090D	ATF Dingo 1 armored infantry mobility vehicle	
0x090E	ATF Dingo 2 armored infantry mobility vehicle	GFF Dingo 2 (DE)
0x090F	Hawkei Protected Mobility Vehicle - Light 4x4	
0x0910	Petit Véhicule Protégé (PVP; small, protected vehicle"), 4x4, light, armored	
0x0911	BV206 tracked articulated, all-terrain carrier	Bronco ATTC BV 206 S aktiv
0x0912	BvS 10	Véhicule à Haute Mobilité (VHM; France) VHM TOP

Value (Hex)	Description	Notes
0x0913	MRAP All-Terrain Vehicle (M-ATV)	
0x0914	MRAP CAT I	Maxxpro M1224, Maxxpro+M1234, DashM1235, AbulM1234A1, MEAP M1224A1, CaimanM1220, Caiman+M1230, Cougar A1, Cougar A2, CougarISS A1, CougarISS A2, Cgr HEV 4WD, Cgr HEV 6WD, JERRV 4WD, JERRV 6WD, RG33 M1238, PG33+M1238A1, RG31A3 M1236
0x0915	MRAP CAT II	RG33L M1232, RG33L+ M1237, AUV M1239, HAGA M1233, HAGA+M1237A1, Cougar A1, Cougar A2, CougarISS A1, CougarISS A2, Cougar MEAP, RG31A2 M1221, M1221A2
0x0916	MRAP CAT III	BuffaloMK2, BuffaloMK3
0x0917	LGS Fennek (4x4)	SpähWg Fennek (DE)
0x0918	VBL 7,62	Panhard Véhicule Blindé Léger (VBL; "Light armored vehicle")
0x0919	VBL 7,62 / ÉRYX	
0x091A	VBL Milan	
0x091B	VBL 12,7	
0x091C	VB2L, Command, 7.62 machine gun	VB2L (7,62)
0x091D	VB2L, Command, 12.7 machine gun	VB2L (12,7)
0x091E	4x4, unarmored off-road vehicle	Land Rover Peugeot P4
0x091F	4x4, unarmored off-road vehicle, communications	Peugeot P4 Radio
0x0920	4x4, unarmored off-road vehicle, Anti-Tank	Peugeot P4 MILAN
0x0921	Infantry Squad Vehicle (ISV)	M1301

Value (Hex)	Description	Notes
Engineering and Recovery Vehicles		
0x0A00	Engineering / Support Vehicle	
0x0A01	Recovery Vehicles – Light	
0x0A02	M578 – Light Recovery Vehicle	
0x0A04	Recovery Vehicles – Medium	
0x0A05	M88 Heavy Recovery	M88A1, M88A2
0x0a06	Bergepanzer BPz3 Büffel (Gr. Buffalo) ARV	
0x0A07	Bergepanzer Leopard (Leo 1) Recovery Vehicle	BPz LEO1 (DE)
0x0A08	Pionierpanzer 2A1 Dachs / Pioneer Tank Badger	PiPz Dachs (DE)
0x0A09	AMX Heavy Recovery	AMX-30D
0x0A0A	DCL Heavy Recovery	Leclerc Char de dépannage DNG/DCL
0x0A60	Loader	MW24C MPG (France)
0x0A61	High Mobility Engineer Excavator (HMEE)	
0x0A62	FLU419 Unimog Loader	
0x0A63	Combat Engineer Vehicle	M728 EBG (L'engin blindé du 154enie) (France) EBG Valorisé
0x0A64	AEV 3 Kodiak (armored engineering vehicle)	
0x0A65	Engineer Vehicle Earthmover	
0x0A66	M9 Armored Combat Earthmover (M9ACE)	
0x0A67	Engineer Vehicle Mine Clearing Vehicle Trailer Mounted	
0x0A68	Engineer Vehicle Dozer	D5, D7, D9
0x0A69	621G ASWDS (Airborne Scraper and Water Distributor System)	
0x0A6A	Motor Grader, Military	Caterpillar M130G
0x0A6B	4x4, Truck, Drill (auger, hammer)	MFRD (France)
0x0A6C	EMAD (engine multifonction aide au déploiement), wheeled multi-function	
0x0A90	M200A1 MICLIC (Mine Clearing Line Charge)	
0x0A91	Keiler mine flail (M48)	MiRPz Keiler (DE)

Value (Hex)	Description	Notes
0x0A92	M1150 Assault Breacher Vehicle (ABV)	
0x0A93	Mine Burial, Vehicle	Enfouisseur de mines
0x0A94	Mine Dispenser, Vehicle	Disperseur de mines
0x0AB0	M93A1 (NBCRS)	
0x0AB1	"Fuchs" NBC reconnaissance vehicle	ABC SpürPz Fuchs
0x0AD1	Light Mobile Crane, 4x4, (10 tonne)	FzKran FKL, Liebherr Fahrzeugkran Leicht (FKL) (DE)
0x0AD2	Medium Mobile Crane, 6 x 6, (20 tonne)	FzKran FKM (Fahrzeugkran Mittel) (DE) CLD TRM 10000
Value (Hex)	**Description**	**Notes**
Armored Vehicle Launch Bridge		
0x0B00	AVLB	
0x0B01	Engineer Vehicle Bridge, wheeled	
0x0B02	M104 Wolverine Heavy Assault Bridge (AVLB)	
0x0B03	Joint Bridge Vehicle (JBV)	
0x0B04	Panzerschnellbrücke 2 AVLB	
0x0B05	Leopard 1 Armored Vehicle-Launched Bridge (AVLB)	BrLPz Biber (DE)
0x0B06	Leopard 2 Armored Vehicle-Launched Bridge (AVLB)	Panzerschnellbrücke 2 / Leguan (DE)
0x0B07	Engineer Vehicle Bridge, wheeled	SPRAT (Systeme de Pose Rapide de Traveres) PTA 2 modular assault bridge (France)
Civilian Vehicles		
0x0C00	Civilian Vehicle, Small	Car, Van
0x0C01	Civilian Vehicle	
0x0C02	Medical Vehicle	
0x0C03	Utility Vehicle Cargo, Small	
0x0C04	Utility Vehicle Cargo, Medium	VT4 NP (France; Ford Everest)
0x0C05	Utility Vehicle Cargo, Heavy or Personnel Carrier	
0x0C06	Utility Vehicle Semi (Tractor Trailer)	

Value (Hex)	Description	Notes
0x0C07	Utility Vehicle Cross-Country	
0x0C08	Utility Vehicle Cross-Country Amphibious	
0x0C09	Op Utility Vehicle Cross-Country	
Infrastructure		
0x0D00	Bridge	
0x0D01	Military base/facility	
0x0D02	Light - Adobe Building	
0x0D03	Light - Clay Building	
0x0D04	Medium - Brick Bunker/Building	
0x0D05	Medium - Wood Bunker/Building	
0x0D06	Fortified - 1m Thick Concrete	
0x0D07	Heavy - Cement Bridge	
0x0D08	Heavy - Cinder Block Bunker/Building	
0x0D09	Heavy - Steel Bridge	
0x0D0A	Building (Plywood)	
Air Platforms		
0x0E00	Helicopter, Transport	
0x0E01	Helicopter, Attack	
0x0E02	UAV, Small	
0x0E03	UAV, Medium	
0x0E04	UAV, Large	
0x0E05	UAV, Large, Armed	
Maritime Platforms		
0x0F00	Rigid Hull Inflatable Boat (RHI)	
ISR		
0x1000	Target Reference Point	
SPARE – all indices in range 0x0000 – 0x3fff not assigned in this table above are Spare.		
0x4000-0xFFFF	Force Affiliation, defined in two Bits.	Bit 15,14 define force affiliation.
0x4000	If set, then Bit 15 defines Force Affiliation If clear, then Bit 15 is undefined (set to clear)	Bit 14
0x8000	If clear, then Friendly Force If set, then Opposing Force	Bit 15

D4.52 TopologyMapIcon

This enumeration is used to specify a particular kind of Topology Map Icon (e.g., Target Marker, Pre-planned target, etc.) The literals and corresponding values of this 8-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Notes
0x00	N/A	
0x01	Target Marker	
0x02	Target Reference Point (TRP)	
0x03	Preplanned Target	
0x04	Forward Observer	

D4.53 TOW_ID

This (legacy) enumeration identifies the sets associated with TOW weapon platform [6]. The literals and corresponding values of this 8-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Notes
0x00	Set 1	
0x01	Set 2	

D4.54 TRP_RegistrationState

This enumeration defines the various states of Target Reference Point (TRP) registration (e.g., whether it is successful, unsuccessful, etc.) The literals and corresponding values of this 8-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Notes
0x00	N/A	
0x01	TRP Registration successful	
0x02	TRP Registration not successful	

D4.55 TypeOfFix

This enumeration identifies the type associated with a Fix from a Navigation unit. The literals and corresponding values of this 8-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Notes
0x00	No Solution	
0x01	2D position fix	
0x02	3D position fix	
0x03	3D position fix, differential	Position fix, differentially corrected.
0x04	3D position fix, satellite based augmented	Position fix, SBAS
0x05	3D position fix, real time kinematic	Position fix, RTK
0x06	Non-differential-precise	
0x07 to 0xFF	(Unused)	

D4.56 WeaponIndex

This enumeration defines the values used to indicate the weapon index in messages or data structures used to set or get weapon data associated with a vehicle or other applicable weapon platform. The literals and corresponding values of this 4-bit enumeration are defined in the table directly below. If expressed as an 8-bit enumeration, then the upper 4 bits are set to 0x0.

Value (Hex)	Description	Notes
0x0	Main Gun	Tank Main Gun; Gun (Howitzer, Light Gun)
0x1	Missile	Example: Vehicle ATGM; Soldier Anti-Armor missile
0x2	Coax	
0x3	Coax #2	
0x4	Cannon	
0x5	SAT	Example: Soldier's primary weapon (infantry rifle, machine gun)
0x6	Weapon #2	Example: Soldier's secondary weapon (e.g., Pistol)
0x7	Grenade Launcher	Example: Soldier's Underslung Grenade Launcher; Vehicle Automatic Grenade Launcher
0x8	Grenade	Example: Soldier's Hand Grenade.
0x9	Mortar	Example: Soldier's Mortar; Mortar Carrier

Where there are multiples of the same weapon instance (e.g., Coax) then the enumerations are defined in terms from lower to higher 'Value (Hex)' based on:

(a) Higher caliber platform first (e.g., Abrams TUSK kit platform 0x02 Coax as 50 Cal TUSK and 0x03 Coax #2 as 7.62 coax)
(b) Higher rank User first (e.g., Abrams Commander 50 Cal as 0x02 Coax and 7.62mm Loader as 0x03 Coax #2)
(c) Clockwise about vehicle, starting forward facing on centerline of vehicle (e.g., BMP-3's two bow machine guns).

D4.57 WoundSeverity

This enumeration is used to indicate the severity of a particular dismount's wound(s). The literals and corresponding values of this 8-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Notes
0x00	No Severity	
0x01	Low	
0x02	Medium	
0x03	High	
0x04	Killed In Action	

D4.58 WoundType

This enumeration is used to indicate the type or nature of a particular dismount's wound(s) (e.g., Shrapnel, Gunshot, etc.) The literals and corresponding values of this 8-bit enumeration are defined in the table directly below.

Value (Hex)	Description	Notes
0x00	Unknown	
0x01	Gunshot	
0x02	Amputation / Dismembered	
0x03	Shrapnel	
0x04	Laceration	
0x05	Burn	
0x06	Hearing Loss	
0x07	Dislocation/Rupture/Tear	
0x08	Fracture	
0x09	Head Trauma	
0x0A	Headache Nausea	
0x0B	Suffocation	
0x0C	Massive Trauma	
0x0D	Spinal Injury	
0x0E	Contusion/Abrasion	
0x0F	Sucking Chest Wound	
0x10	Bleeding	
0x11	Fracture	
0x12	Blast	
0xFF	No Wound	