OneSAF: A Next Generation Simulation Modeling the Contemporary Operating Environment

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ABSTRACT: The world has changed since the days when most of today's entity-level simulations were initially being developed. Incidents of terrorism and criminal activities dominate the daily news. While threats from traditional military opposing forces remain relevant, the U.S. Army must prepare for a contemporary threat that is less predictable and not based on the fighting doctrine of any particular country. As the U.S. military must be flexible and adaptive, so too must the simulations that drive training, experimentation, mission rehearsal, and course of action analysis. The U.S. Army's OneSAF Objective System (OOS) is uniquely suited to provide the contemporary operating environment (COE) with the necessary flexibility. While distributed with a robust set of COE entities and behaviors, the OOS will be fielded with a set of GUI tools that allows the user to create unique entities, units, and behaviors. In addition, the OOS will provide for a minimum of 25 unique sides operating with asymmetric relationships. This paper discusses the planned COE capabilities, implementation of sides and forces, plus the OOS composition toolkit. The paper also describes PM OneSAF's involvement with the modeling and simulation community, such as the Training and Doctrine Command (TRADOC) Assistant Deputy Chief of Staff for Intelligence (ADCSINT) Threat Support Directorate and the Urban Operations Functional Area Collaborative Team (UO FACT), to develop appropriate simulated behaviors and create the synthetic natural environment in which they will run.

1 Introduction

The contemporary operating environment (COE) is the environment in which our soldiers are fighting today. It involves civilians (non-combatants, contractors, and non-governmental organizations) on the battlefield, pick-up trucks armed with machine guns and rocket launchers, roadside bombs, using children as weapons, enemies shielding themselves behind pregnant women and within historic or religions sites, and an absence of clear battle lines. While engaged in combat operations, U.S. forces find themselves simultaneously conducting peace keeping and humanitarian assistance. To respond effectively, the U.S. military must be flexible and adaptive. Therefore, the tools that enable such a force must include training aids, devices, simulators, and simulations that support experimentation, mission rehearsal and mission planning, course of action analysis and development. These tools must reflect the lethal, unpredictable, ambiguous and asymmetric environment our soldiers are fighting in today and expect to fight in the future.

The U.S. Army's OneSAF Objective System (OOS) is uniquely suited to provide the contemporary operating environment (COE) with the necessary flexibility. OOS was designed with user tailorability in mind through the use of an open architecture, open

source methodology and a robust set of GUI tools that allows the user to create unique entities, units, and behaviors.

Though the simulation can be modified by users, often without writing or recompiling the software, OOS will be fielded with a robust set of COE entities, units, and behaviors. OOS represents the first time that many of these behaviors have been simulated before. In addition, OOS will provide for a minimum of 25 unique sides operating with asymmetric relationships.

This paper discusses the planned COE capabilities, implementation of sides and forces, plus the OOS composition toolkit. The paper also describes PM OneSAF's involvement with the modeling and simulation community, such as the Training and Doctrine Command (TRADOC) Assistant Deputy Chief of Staff for Intelligence (DCSINT) Threat Support Directorate and the Urban Operations Functional Area Collaborative Team (OU FACT), to develop appropriate simulated behaviors and create the synthetic natural environment in which they will run.

2 Primer on the COE

There is substantial discussion today in many forums concerning the asymmetric challenges that reflects change in the Operational Environment (OE) (see figures 1and 2). The OE is the composite circumstances, conditions, and influences that affect military planning, operations, and decision-making. The "contemporary" OE (COE) includes those circumstances, conditions, and influences extant today and for the foreseeable future.

The more symmetric Cold War constructs, that posed risk to the US, have morphed into asymmetric conflict constructs. They are characterized by widely differing arrays of conventional and paramilitary forces. Some of these forces respond to state authority, while others fight against the state. Still others effect transnational insurgency (e.g., Al Qaeda) or operate criminal enterprises.

These forces may work together as an amorphous alliance and typically have extra-state sponsors/patrons (some may be political, commercial or both, e.g., Abdul Qadeer Khan's nuclear black market efforts). In many cases, they will respond to culturally driven objectives that dovetail together for a time, disconnect and dovetail again. They may have access to sophisticated lethal and non-lethal niche technologies—including weapons of mass destruction (WMD). They will use multiple and redundant information systems; operate in the midst of noncombatants (many of whom provide passive

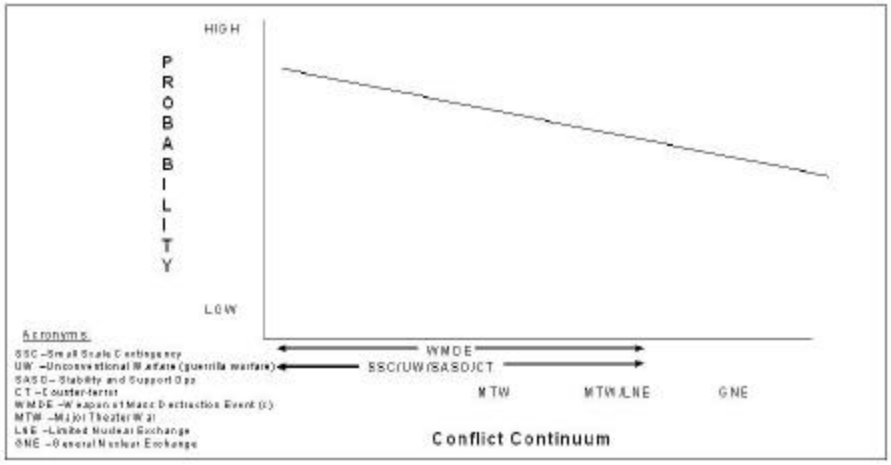


Figure 1. COE Conflict Continuum Probability.

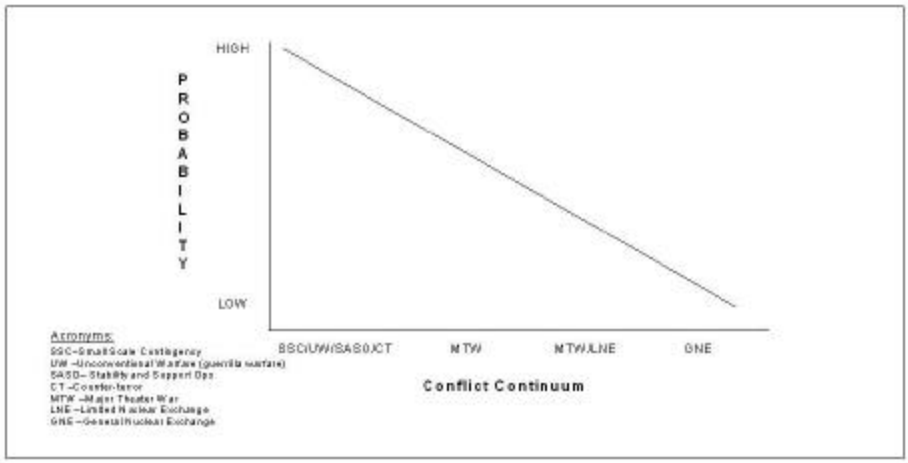


Figure 2. Cold War OE Conflict Continuum.

and active support), and they will likely stage from an urban environment.

General Krulak (former Commandant of the US Marine Corps) captured the essence of our challenge.

"In one moment in time, our service members will be feeding and clothing displaced refugees—providing humanitarian assistance. In the next moment, they will be holding warring tribes apart—conducting peacekeeping operations. Finally, they will be fighting a highly lethal mid-intensity battle. All on the same day, all within three city blocks—It will be what we call the "Three Block War."

These changes have enormous implications for strategic, operational, and tactical warfighting. The preeminent concern is that multi-polar, amorphous, and adaptive forces now pose the major threat to US regional security interests and an ever-increasing threat to the United States itself (see figure 3 and 4).

The geographic distance between the United States and second or third tier belligerents may no longer provide adequate protection to prepare for combat. Neither can we expect to deploy to a region unchallenged. There are few sanctuaries. All of these factors coalesce into the COE and the COE, in turn, drives training.

We express the COE as eleven variables to provide a training and education context. These variables inform training strategies, correspond to warfighting echelon (e.g., tactical, operational, and strategic), and span all training domains (e.g., live, virtual, and constructive (LVC)). The variables represent distinct considerations that are relevant to each warfighting echelon and training domain. All variables have some impact at each warfighting echelon; some have enormous impact at each echelon (e.g., physical environment, military capabilities, and time). Figure 5 shows the relationship of these COE variables.

Most variables however, have varied effect by echelon and training domain—ultimately informing military capabilities. For example, the nature of the state may have considerable impact in Joint Task Force (JTF) planning/execution within an interagency and coalition context. On the other hand, it may be a marginal consideration for brigade-level planning/battle (see Table 1).

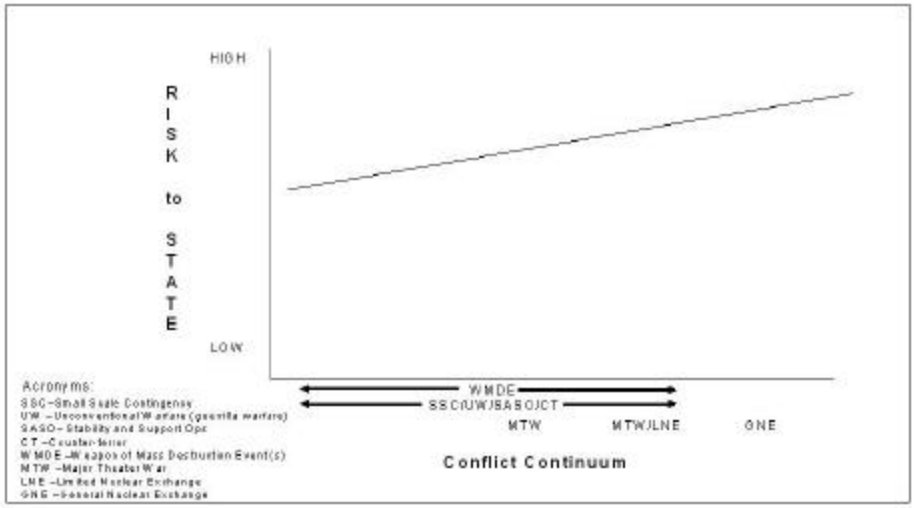


Figure 3. COE Risk To State.

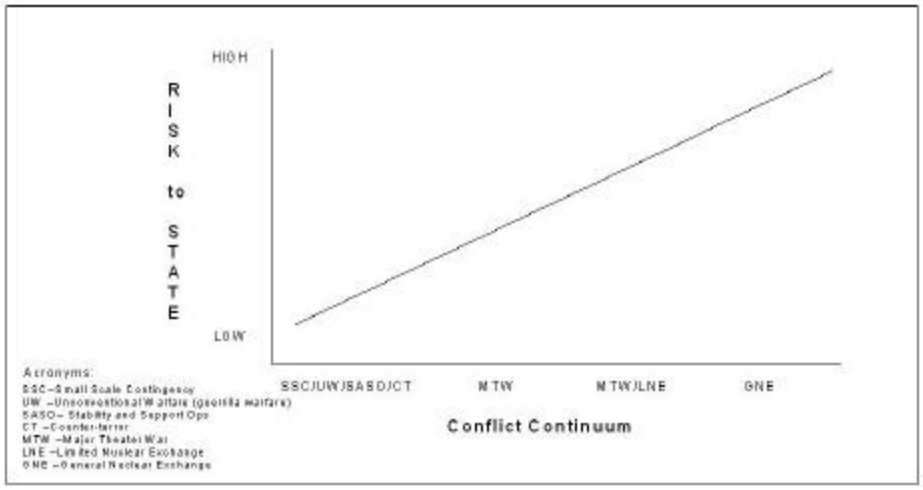


Figure 4. Cold War Risk To State.

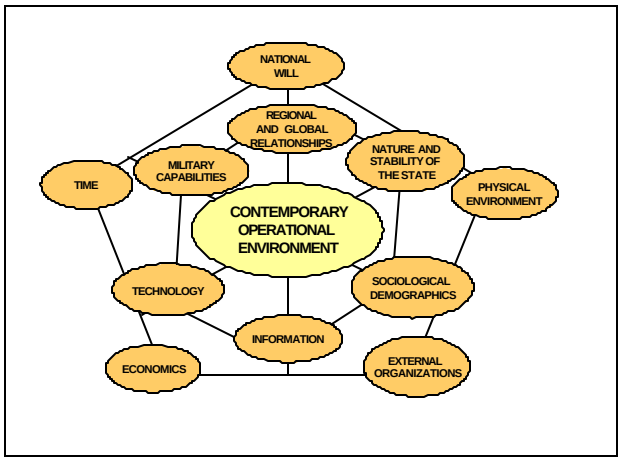


Figure 1. COE Variables.

Each variable is color coded in the Table 1 to show the resolution/fidelity required to accomplish satisfactory training (i.e., COE compliance). The blank cells at the division, corps, and JTF show there is no live or virtual training at echelons above brigade. Constructive simulations are the primary training vehicles. That notwithstanding, virtual tools may replicate certain capabilities (e.g., UAV streaming information to a ground station) incorporated at echelons at, or above, division.

The following definitions explain the color code crosswalk to modeling fidelity underpinning behavioral, physical, equipment, and organizational models:

- Essential -- requires high resolution; is an explicitly modeled variable
- Required -- requires medium resolution; is an explicitly modeled variable
- Informs -- requires medium or low resolution; is an explicitly or implicitly modeled
- Marginal -- requires low resolution; is an implicit model

OOS is a constructive simulation portraying brigade and below battle; therefore, while OOS corresponds to all variables, five of the eleven require explicit high or medium resolution models, as shown in Table 2.

Table 1. COE Crosswalk To Training

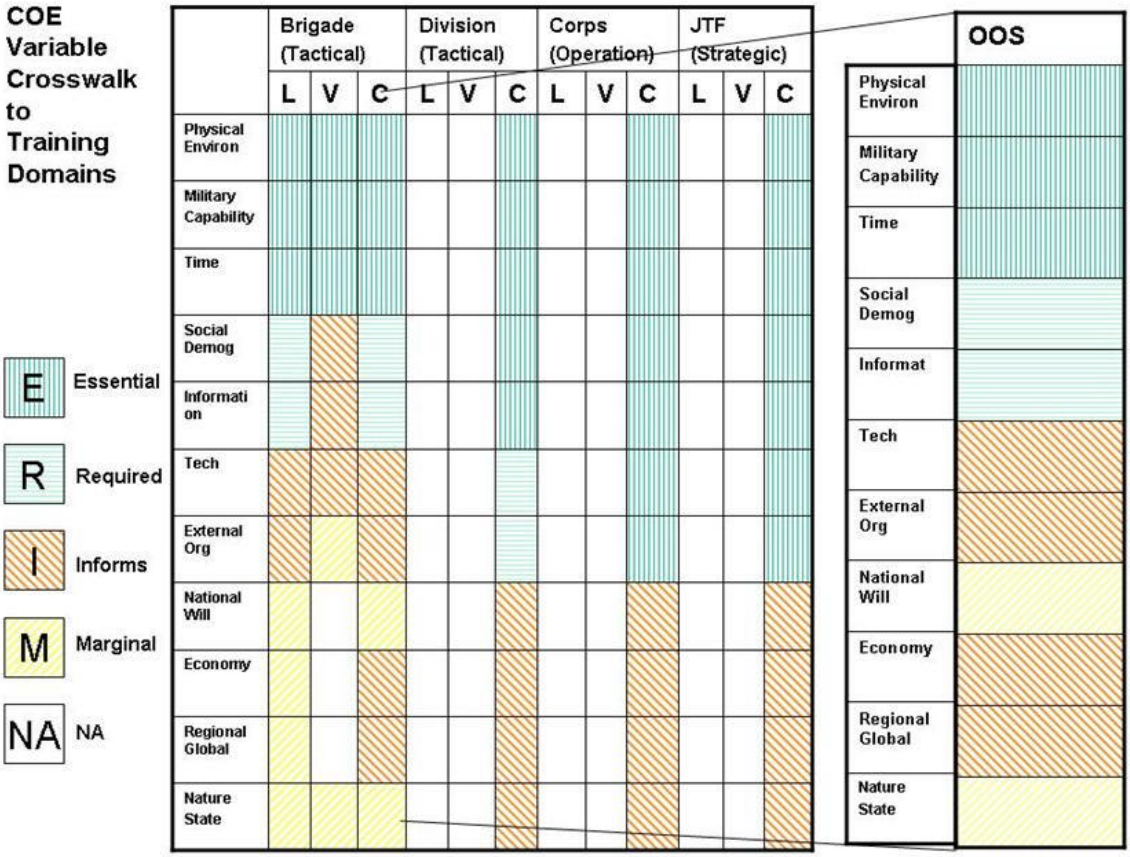
COE Variable Crosswalk to Training Domains	Brigade (Tactical)			Division (Tactical)			Corps (Operation)			JTF (Strategic)		
	L	V	C	L	V	C	L	V	C	L	V	C
Physical Environ	E	E	E			E			E			E
Military Capability	E	E	E			E			E			E
Time	E	E	E			E			E			E
Social Demog	E	R	E			E			E			E
Information	E	R	E			E			E			E
Tech	R	R	R			E			E			E
External Org	R	I	R			E			E			E
National Will	I		I			M			M			I
Economy	I		M			M			M			M
Regional Global	I		M			M			M			M
Nature State	I	I	I			M			M			M

E Essential
R Required
I Informs
M Marginal
NA NA

Unfortunately, quantifying significant aspects of the COE is a difficult prospect because the COE is inherently qualitative. An example of dynamic side changes within a tactical shielding context and rationalized by effects follows.

Dynamic side change of noncombatants and combatants requires metrics be derived from non-existent data. Therefore a "what is reasonable" approach in collaboration with subject matter experts (SME) is the heart of the Knowledge Acquisition / Knowledge Engineering (KA/KE) process. Tactical shielding, where irregular forces (or even regular forces) infiltrate and attack from within no fire areas (e.g., hospitals, schools, places of worship) stress or nullify normal rules of engagement. The number of indirect fire and direct fire impacts within the shielded areas rationalize side change.

Table 2. COE Crosswalk to OOS.



Insurgent and regular forces may use terrain as a weapon (e.g., dropping a building/barracks on its residents, causing chemical or hazardous waste spills, or poisoning the water supply). A robust, well-trained tactical force may avoid the directly resulting hazards, but how are the second- and third-order effects measured? These effects impact the staff estimate process, tactical movement, and battle plans. They require a commander to overcome unexpected humanitarian challenges in the midst of combat operations. Defining the appropriate metrics is an enormous challenge and the "what is reasonable approach" is used to determine what to model. Here too the data is subjective.

Our principal challenge to integrating the COE into OOS is translating a qualitative and asymmetric operational context into multiple quantitative constructs. For this reason, ADCSINT-Threat SMEs continue working closely with the OOS development team to provide robust COE behaviors and effects.

3 Incorporating the COE into a Combat Simulation

3.1 Seemingly Contradictory Requirements

OOS is unique among combat simulations in that is has been designed for use across many domains. The analysis domain has two major users: 1) Advanced Concepts, and Requirements (ACR) and 2) Research, Development, and Acquisition (RDA). The other major customer of OOS is the Training, Exercises, and Military Operations (TEMO) domain.

The TEMO community is generally interested in exercises with many entities that have just enough resolution to stimulate real-world battle command systems. TEMO has a number of use cases for higher-resolution entities, including the stimulation of virtual simulators. The ACR and RDA communities are generally more interested in

resolution so that they can collect detailed data for post-exercise analysis.

The OOS Team was able to build a simulation to meet these disparate requirements by building a modular architecture, supporting multiple levels of resolution. This allows the users to "dial up" the level of resolution where it is needed. Regardless of the level of resolution, however, all three domains have an immediate need to be able to represent the COE in multiple levels of resolution. In order to develop validated representations of the COE, Team OneSAF has been working with a number of external agencies.

3.2 Engaging with Subject Matter Experts

Recognizing that the program office is not the subject matter expert (SME) in the COE, the program office has sought the assistance of organizations designated by the Army as authoritative. These organizations include:

- Training and Doctrine Command (TRADOC) Assistant Deputy Chief of Staff for Intelligence Threats Office (ADCSINT Threats),
- Urban Operations Functional Area Collaborative Team (UO FACT), and
- Research Development and Engineering Command (RDECOM).

Each of these organizations brings a different perspective and set of skills to modeling the COE in OOS.

3.2.1 TRADOC ADCSINT Threats

ADCSINT Threats has a variety of missions. The ones germane to this discussion are:

- Provide and approve/validate all threat portrayal in the context of an Operational Environment (OE) for studies, training, modeling, and simulations for TRADOC,
- Assess regional military and security issues as they apply to developments and training of Army and Joint Forces,
- Develop and approve threat portrayal for all testing of Army materiel,
- Create the threat model for training Army forces in an OE, including authoring OPFOR Field Manuals, and
- Accredit OPFOR forces in application of that model.

The TRADOC DCSINT and the director of the TRADOC Analysis Centers (TRAC) allocated resources to provide ADCSINT Threats personnel to participate in the knowledge acquisition (KA) development, validation, and verification of OPFOR representations in the COE within OOS. ADCSINT Threats personnel work with the OOS conceptual modelers, systems engineers, and KA team to develop architecturally consistent and validated COE representations. They then participate in the verification of those COE behaviors through user testing. The ADCSINT Threats personnel coordinate their activities with the Center for Army Lessons Learned (CALL) and the Joint Readiness Training Center. ADCSINT has been a great asset for ensuring the threat representations are as accurate as possible and based on current lessons learned from the field.

3.2.2 UO FACT

The purpose of the UO FACT is to direct the Army's modeling research pertaining to urban operations (UO). The mission of the UO FACT is to facilitate UO modeling and simulation (M&S) by developing, publishing, and distributing a plan of research that highlights Army M&S priorities as they pertain to urban operations. Coordinated and coherent Army research for urban operations M&S will reside in three main areas: physical models, behaviors, and terrain. The UO FACT maintains a prioritized list of research topics and coordinates all Army modeling and simulation efforts related to urban operations. [ref: https://www.moutfact.army.mil/] The OneSAF team keeps an open line of communication with the UO FACT to facilitate technology transfer from the technology base to OOS.

The UO FACT sponsors a number of research efforts each fiscal year. Three that are nearing maturity for integration into OOS are the Structure Weapons Effects (SWE) API, the Standard Mobility API, and RF propagation in an urban environment. The SWE API will allow OOS to more realistically simulate building rubbling. The Standard Mobility API will allow OOS to model entity movement (both urban and non-urban movement) in a manner that is consistent with other simulations also using the standard API. Modeling radio propagation in urban environments is typically expensive. The UO FACT effort in this area will allow OOS to better model communications networks in urban environments.

3.2.3 RDECOM

RDECOM is a technology base organization focused on integrating emerging technologies and transitioning them to programs as quickly as possible to get them into the hands of soldiers. The OneSAF program has worked closely with a number of RDECOM projects to transition the technology into OneSAF Testbed Baseline (OTB) and OOS.

The OneSAF program office has been involved in supporting a number of RDECOM initiatives. Several of those initiatives are directly related to representing the COE in simulation. RDECOM produced a variant of OTB with enhanced dismounted infantry capabilities, known as DI SAF. The infantry enhancements to OTB have now been re-integrated into the main OTB baseline, beginning with version 2.0. More importantly, DI SAF has informed the ongoing development of OOS.

Joint Forces Command (JFCOM) has sponsored research on crowd modeling being conducted by RDECOM. This work is being implemented in Joint SAF (which shares the same ModSAF ancestry as OTB). The OneSAF program office trained one of the researchers on this effort in the OOS knowledge acquisition (KA) processes. The intent of the principal investigator on this effort is to be able to rapidly re-implement these crowd behaviors as OOS nears fielding. The researchers are also developing what they refer to as "occupational behaviors" into OOS. These occupational behaviors are intended to round out the urban battle space with unique entities, such as taxi drivers, hotel clerks, and sellers in street markets. It is unclear whether these behaviors will be integrated into the OOS v. 1.0 baseline, but they will certainly be integrated into the baseline at some point.

3.2.4 SAIC Internal Research and Development

Responding to a challenge by a general officer in JFCOM that current simulations are too difficult to modify, (Science Applications International Corporation) SAIC asserted that OOS was specifically designed for rapid enhancement by users. To back up this assertion, SAIC assembled a small team and gave them two months to implement some crowd modeling in OOS. Two of the developers had no previous knowledge of OOS. In two months, this team was able to use all the OOS design paradigms to implement the following interesting behaviors:

- A bomb going off in a crowded area. Those near the bomb run away. Those far from the blast run toward the blast.
- A crowd gathering to receive food and water supplies.
- Bus routes with non-combatants getting on and off the bus at certain stops.
- Idle crowd behaviors in which civilians window shop, move from place to place, follow roads and/or sidewalks, etc.

This work will be incorporated into the main OOS baseline before OOS is fielded.

3.2.5 Base Program Execution Enhanced by FCS Support

Responding to the current environment in which soldiers find themselves, the OneSAF program office worked with the TRADOC proponent (a.k.a., Combat Developer) to modify program requirements. The representation of conventional force formations and behaviors was pushed into the pre-planned product improvement (P3I) phase of development so that developers could add COE representations prior to fielding. Most of these COE representations are described in OPFOR FM 7-100 series manuals, and the implementation of some of these in OOS is discussed in Section 4.

The Future Combat System (FCS) program is interested in using OOS, when it matures, for FCS experimentation and analysis. Consequently, the FCS program has funded the inclusion of FCS-specific representations in OOS. In addition, they have supported additional efforts to model the COE in OOS. Some of these representations will be described in Section 4 as well.

4 OOS Capabilities Supporting COE

Supporting the Contemporary Operating Environment requires today's simulations to not only provide a unique set of units, behaviors, physical effects, and supporting environment, but also exhibit a high degree of flexibility to change as the nature of COE changes. By its very nature, asymmetric warfare exploits the weakness of opponents and continually changes to remain effective. Models and simulations must keep pace in order to provide timely and relevant training and analysis. The remainder of this section will discuss OOS capabilities supporting the COE. OOS provides leap-ahead capabilities through the supported

environment, modeling capabilities, and the composable product line architectural framework (PLAF).

4.1 Sides and Forces

Recent experiences in Afghanistan and Iraq has clearly shown the complexity for soldiers to understand and react to who might be friendly and who might be a threat. In the past, identification of friend or foe may have been as simple as recognizing a uniform or identifying the type of tank seen through sensors. Conflicts in the COE involve many different sides and forces, where several sides and their affiliated forces may agree on the enemy, but cannot agree on how they view other sides. Regularly, new events occur and new information is available, that cause relationships between these sides to change.

To support training and analysis, the OOS provides for multiple-sided engagements with changing relationships across the full range of military operations. During both planning and execution, the OOS provides the capability to:

- Create and remove sides
- Modify the relationships between sides
- Create and remove forces under sides
- Create units under sides or forces
- Change the side a unit or force belongs
- Create at least 25 sides[1]

OOS tools provide the capability to create, delete, modify and view the forces, sides, relationships, and structure. In addition, the tools support the ability for the user to assign units and entities to forces and sides. Sides and forces are modified both during planning where the sides, forces, structure, and relationships are defined within a military or simulation scenario and also during simulation execution where modifications are injected directly into the ongoing run-time simulation database. Symbology will be displayed in accordance with MIL-STD-2525B.

The distinction of relationship between sides between the traditional battlefield and the COE is significant. Traditionally, two sides viewed each other in the same way; friendly, hostile or neutral. The COE now changes those views. As an example, a given conflict may involve the following sides:

Side 1 – Coalition Forces
Side 2 – Urban Residence
Side 3 – External Forces
Side 4 – Para-military

Table 3 shows notional relationships between these sides. Note that Side 3 external forces *view* Side 4 Para-military as neutral, whereas the Para-military view the external forces as hostile. If these two groups were to meet on the battlefield, the external forces would be taken unaware when fired upon by the Para-military.

Table 3. From/To Sides Relationships Example.

	Side 1	Side 2	Side 3	Side 4
Side 1	Friendly	Friendly	Hostile	Friendly
Side 2	Friendly	Friendly	Neutral	Friendly
Side 3	Hostile	Hostile	Friendly	Neutral
Side 4	Friendly	Hostile	Hostile	Friendly

A significant capability planned for OOS is the ability to change side and force information during simulation runtime. The user will be able to change the side or force for which a unit or entity is associated. The ability to change a unit or entity's force or side will also be available for behavior models to support specific behaviors/orders that support defections. What this means is that the OOS modeling infrastructure will allow the creation of behaviors that may automatically change a side relationship. For example, the urban residence that has been viewed as friendly or at least neutral can become hostile when an event occurs, such as the destruction of a religious or cultural symbol.

4.2 Key Units, Behaviors & Supporting Physical Effects

Team OneSAF has worked closely with representatives of the ADCSINT TSD to further develop the COE in OOS. As Subject Matter Experts, they have provided, and continue to provide, valuable COE information regarding military capabilities, physical environment, information, and social demographics. This information is being provided in the form of Knowledge Acquisition (KA) documentation. Not all of the KA will be

[1] The OOS Operational Requirements Document (ORD) requires the capability to support at least 25 sides. However, OOS services provide no restrictions on the number of sides and forces that can be created.

implemented as entity, unit, or physical models by the OOS Full Operational Capability (FOC) milestone in September 2005. The remaining KA will be implemented as part of Pre-Planned Product Improvements (P3I). The planned COE-related capabilities available for FOC are shown below.

- Improvised Explosive Devices (IED)
- Ambush
- Raid
- Wall/Building penetration
- Improvised Obstacles
- Improvised weapons
- Technicals
- Decoys
- Migration
- Riots
- Tactical shielding
- Infiltration (Al-Qaeda template)
- Mouse holes
- Dynamic Side Change
- Sniper Employment
- Reduced Profile shooting
- Indirect Fire as Direct Fire weapon
- Control Mines
- Detect VBIED

The planned COE-related capabilities to be developed during P3I are shown below.

- Shielding Tactics (additional variant)
- Caches
- Improvised Weapons (additional variant)
- Attack from Civilian Vehicle (technicals) (additional variant)
- Environmental Hazards & Obstacles
- Field Fortifications
- Expedient Breach (additional variant)
- Expedient Obstacles
- Infiltration (additional variant)
- Weather Effects
- Mass Migration (additional variant)
- Stand off attack
- Info Ops and PSYOPS
- Battle Command and C2
- Spalling
- Decoys (additional variant)
- Terrain as a weapon
- NBC Operations
- Emplace Roadblock

4.3 Enhanced Environment Representation

The OOS provides a wide range of enhanced terrain features that will be useful in supporting COE scenarios. Some of these features include the following:

- Multi-resolution terrain databases
- Entity reasoning and movement planning in an urban environment
- Ray-trace Line-Of-Sight through terrain, features, and building apertures
- Multi-resolution NBC, Smoke, and Obscurants
- Support for subterranean structures

The urban environment in OOS is also enhanced through the ability to conduct operations in and around Ultra High Resolution Building (UHRBs). Some features of UHRBs include:

- Advanced features: anteroom, atrium, balcony, closet, elevator shaft, escalator, hallway, fire escape, ramp, stair, ventilation duct/shaft
- Apertures: breach hole, door, skylight, trapdoor, ventilation opening, loophole
- Enhanced attribution: length, width, height, lighting characterization, railing type, aperture state, interior wall construction, floor construction, exterior wall construction
- Enhanced route planning within building to include routes through apertures
- Ray-traced line of sigh through apertures
- Bullets passing through walls
- Underground structures
- Building damage and rubble of building
- UHRB editor

4.4 Composability Toolset

The ability for a simulation to allow for the rapid and easy creation of new and unique entities, units, and associated behaviors is critical to support COE training and analysis. OneSAF is providing a toolset that allows users to independently create new OOS battlespace compositions. The tools use Graphical User Interfaces and support processes to remove, to a large extent, the dependency on software experts to develop new unit, entity, and behavior model compositions. The composition tools use and build on existing primitive and composite models to develop new and unique entities (e.g., individual combatants, helicopters, tanks, sensors, weapons,

etc.), units (e.g., organizations of entities that behave according to certain sets of rules or doctrine), and behaviors (e.g., move tactically, defend position, etc.) that are associated with units and entities. The construction of these models may include model components that vary across a range of physical and behavioral fidelity (e.g., low, medium, and high). The following list describes each of the model composition tools.

Entity composition is handled by the **Entity Composer Tool**. Figure 6 shows the Entity Composer Graphical User Interface (GUI) as of build 18 of the OOS softtware. The composer provides the user with a drag-and-drop capability to develop new OOS entities. For example, a user might need to create an entity model of a terrorist suicide bomber. The basic idea is to attach the appropriate physical models (mobility, vulnerability) to a platform (body or hull) and then associated specific weapons, sensors, and communications devices to that platform. Once saved, the entity can be modified and associated within a unit structure and have behaviors allocated to it. The tool supports the ability to create representations of existing equipment as well as to create experimental entities.

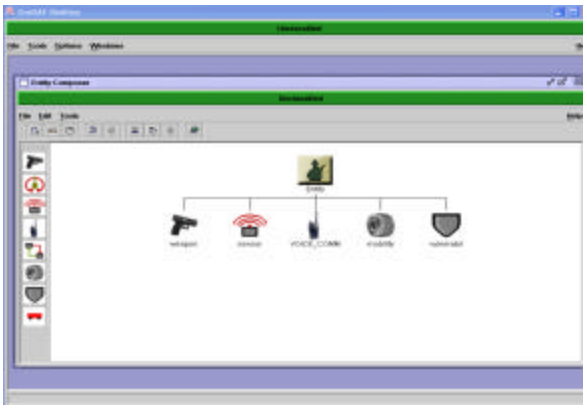


Figure 6: Entity Composer

Unit Composition is supported with the **Unit Composer Tool**. Figure 7 shows the Unit Composer GUI as of build 18 of the OOS software. This tool allows entities to be combined to form asymmetrical friendly, enemy, and neutral type organizations. A possible user of this tool would be the creation of a terrorist cell. Both doctrinally correct organizations and new organizations can be developed to support experimentation and concept development efforts.

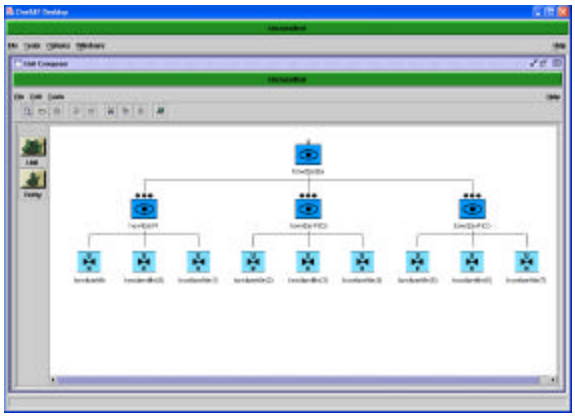


Figure 7: Unit Composer

The **Behavior Composer Tool** allows users to create new behavioral representations that are then associated with units and entities. For example, once a suicide car bomber entity is created, there would need to be an associated model that would dictate how it might behave when approaching a particular target, such as a military checkpoint. Figure 8 shows the behavior composer. This tool allows the creation and/or modification of behaviors that entities and units will use to guide their interactions within the simulation. At the top level the behavior composer allows parallel and sequential process flows to be defined. It also support continuous processes that act as background tasks such as “look for enemies” and tasks that are triggered by specific events such as “find cover when fired upon.”

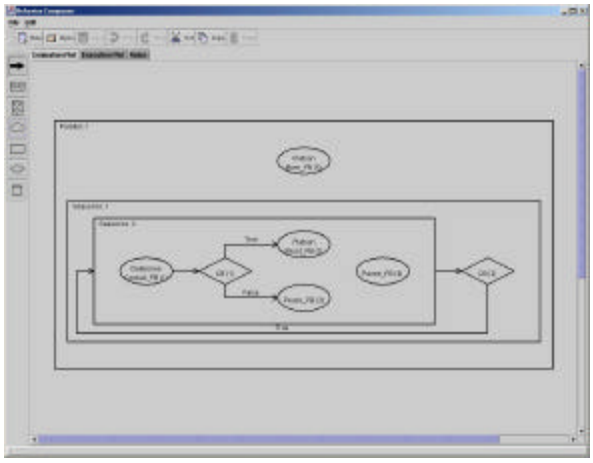


Figure 8: Behavior Composer

These composition tools intend to provide users the ability to extend, enhance, and share OneSAF models without direct interaction and/or support from the OneSAF software developer or the OneSAF Project

Management organizations. In many cases this extension of OOS can be done without writing any software or recompiling the source code.

5 Conclusions

The recent conflicts in Iraq confirm the enormous impact for strategic, operational, and tactical warfighting. Today's military simulations have focused on traditional combat and combat support elements; however, there is a growing need to implement units, behaviors, and effects to account for a more flexible and adaptive threat. This threat uses tactics that are unpredictable, ambiguous, asymmetric, and highly lethal. Unless military simulations develop accurate representations of the threat, they risk becoming irrelevant in support of training and analysis. Team OneSAF is working with subject matter experts throughout the army to develop a robust set of COE units and behaviors operating within a high resolution environment for the OOS. The OOS open architecture is being developed with a high degree of composability and extensibility to enable the software to flex and evolve, just as COE most certainly will. Since OOS will be released with source code, the modeling and simulation community will not only be able to apply the COE capabilities but to extend them as well.

6 References

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