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Comments template for Preliminary Cybersecurity Framework								Submitted by: Dr. Kofi Nyamekye Date: November 12, 2013	
#	Organization	Commentor	Type	Page	Line #	Section	Comment (Include rationale for comment)	Suggested change	
1	IABSRI	Dr. Kofi Nyamekye	T	5	208-209	2.1	The Framework Core is a list of activities and <u>not</u> outcomes. Outcomes are always the requirements (mission objectives/ tactical goals) that a particular system or organization is expected to achieve – same as Framework Profile. We first <u>must always specify outcomes</u> before we can select the appropriate	The Framework Core is a list of key activities known to manage cybersecurity risk. *Please note that the Discussion Draft Preliminary of Cybersecurity Framework, August 28, 082813, had the Framework Core, correctly discussed! Please see Page 5, Lines 171-181, Section 2.1, of that document.*	

							functions (or business processes), which when executed, will achieve the outcomes. Please see the list of references to support my rationale. Again, please note that the Framework Profile defines the outcomes. Please also see #2 discussion for details about this issue!	

2	IABSRI	Dr. Kofi Nyamekye	T	2-3	140-149	1.1	Framework Profile defines the outcomes. The Framework Profile first must come before the Framework Core. To establish the rationale behind my assertion, I have borrowed from Dr. Deitz work on Missions and Means Framework (MMF) for military planning and execution. He pioneered the MMF model at the Army Research Laboratory at Aberdeen Proving Ground, Aberdeen, Maryland. Dr. Nyamekye and other investigators have extended Dr. Deitz work for Net-Centric Ecosystem.	Switch the Framework Core and Framework Profile, so that the Framework Profile appears first, followed by the Framework Core.

							Please see the details for #2's discussion below, including the list of references to support my rationale.	

3	IABSRI	Dr. Kofi Nyamekye	T	11	412	3.2	As discussed in the previous comments Identify is part of the Framework Core. It does not define the mission objectives as noted before. My rationale is that defining mission objectives should not be confused with functions or activities to achieve the mission objectives and tactical goals.	Specify Line 412 as follows: *Step 1: **Define mission objectives**. The organization defines its mission objectives, related systems and assets, regulatory requirements and overall risk approach!*

#1: REFERENCES

Defense Modeling and Simulation Office (DMSO). 2004. "The Military Missions and Means Framework, Page 16," Tutorial, http://www.dtic.mil/ndia/2005test/mis2.pdf, (Accessed October 4, 2013).

Deitz, P., and Sheehan, J. 2006. "The Military Missions and Means Framework." Tutorial. May 9.

Deitz, P. H., Bray, B. E. and Walbert, J. N. 2013. "An Integrating Framework for Interdisciplinary Military Analyses, Figure 5, Page 13," Military Operations Research Society 80th Symposium, United States Air Force Academy: Composite Group D – Resources, Readiness, and Training," Colorado Springs, CO, June 11-14, 2012.

Sheehan, J. H., Deitz, P. H., Bray, B. E., and Harris, B. A. 2003. "The Military Missions and Means Framework, Figure 1, Page 4" *Proceedings, Interservice/Industry Training, Simulation and Education Conference*.

Nyamekye, K. 2013. "Warfighter Decision Making in Complex Endeavors: Using Purposeful Agents and Reflexive Game Theory, Figure 1, Page 8," Proceedings of 18th ICCRTS: Modeling and Simulation, Paper Number 074,

#2: MISSIONS AND MEANS FRAMEWORK (MMF) TO ILLUSTRATE FRAMEWORK PROFILE [SOURCE: Nyamekye, K. 2013. "Warfighter Decision Making in Complex Endeavors: Using Purposeful Agents and Reflexive Game Theory, Figure 1, Page 8," Proceedings of 18th ICCRTS: Modeling and Simulation, Paper Number 074, http://www.dodccrp.org/events/18th_iccrts_2013/post_conference/papers/074.pdf (Accessed October 4, 2013)].

Please note the subsequent description is the direct excerpt from the recent work of Dr. Nyamekye on Missions and Means Framework (MMF) and its extension – Multi-Threaded Missions and Framework (MTMMF) [Nyamekye 2013], a battlefield planning and execution model --, for supporting the Warfighter's Decision Making in Complex Endeavors.

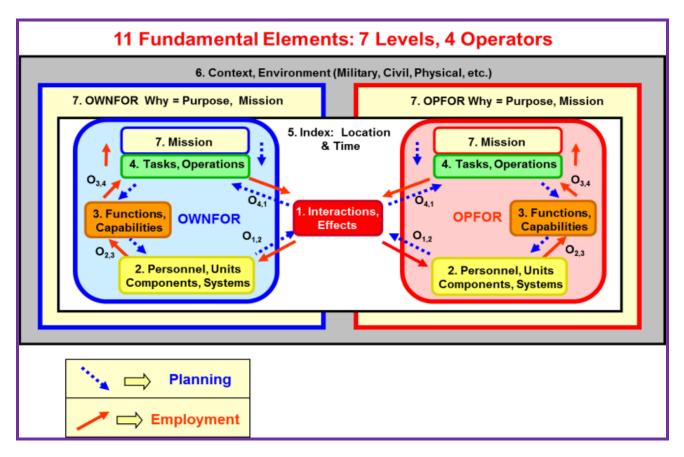**MISSIONS AND MEANS FRAMEWORK (MMF) and MTMMF**

Figure 1. The Basic MMF Model [Deitz et. al. May 2006.]

The basic MMF Model, recently proposed by Deitz et al. [Deitz et al. 2006], Figure 1, is a structure for explicitly specifying the military mission and for quantitatively evaluating the

mission utility of alternative war-fighting Doctrine, Organization, Training, Material, Leadership, Personnel, Facilities (DOTMLPF), Services and Products.
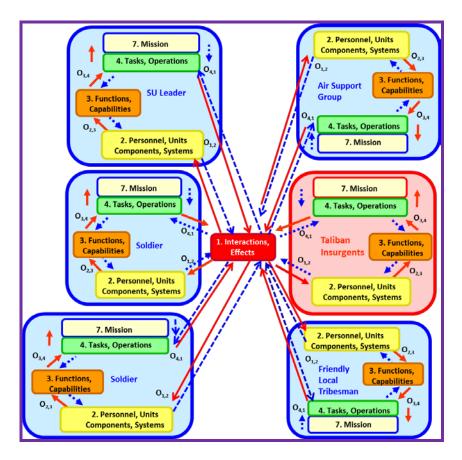

Figure 2. The MTMMF as A Generic Model for Showing Interactions among the Taliban Insurgents, Soldiers, Air Support Group, Friendly Local Tribesman, and SU Leader, In an Integrated View, On the Battlefield [Nyamekye 2011.]

Its (basic MMF model) objective is to provide a framework to help the SU leader, engineer, and comptroller specify a common understanding of military operations -- such as load planning and route selection [Nyamekye 2011] --, and information, and to provide quantitative mission assessment of alternative planning solutions. It provides a disciplined process to explicitly specify the mission (e.g., the Soldier's mission or SU mission), allocate means (course of action which each Soldier or the SU will take to pursue the mission), and assess mission accomplishment (the analysis of the course of action to determine if the Soldier or the SU has achieved mission success). Levels 5 through 7 characterize the Mission portion of the MMF, while Levels 1 through 4 are considered the Means portion of the framework. Please note that Level 7 defines the strategic mission objectives. Level 7 is part of the Framework Profile. Level 7 associates with Senior Executive Level in Figure 3 of the Preliminary Cybersecurity Framework, Page 9, Lines 318 - 320! Please also note that Level 4 defines the tactical goals. Level 4 is also part of the Framework Profile. Level 4 associates with Business/Process Level and Implementation/Operations Level, respectively in Figure 3 of the Preliminary Cybersecurity Framework, Page 9, Lines 318 - 320! Please note that Level 3 defines the Functions, which when

executed will achieve Level 4 tactical goals. Level 3 is part of the Framework Core. Level 3 will associates with Business/Process Level and Implementation/Operations Level, respectively in Figure 3 of the Preliminary Cybersecurity Framework, Page 9, Lines 318 - 320! Level 2 defines the resources needed for Level 3. Level 2 is part of the Framework Core. Level 2 associates with Business/Process Level and Implementation/Operations Level, respectively in Figure 3 of the Preliminary Cybersecurity Framework, Page 9, Lines 318 - 320! Level 1 defines execution or implementation of the plan. Level 1 associates with Framework Implementation Tiers, and Implementation/Operations Level in Figure 3 of the Preliminary Cybersecurity Framework, Page 9, Lines 318 - 320!

Level 6 which shows the Environment – Operating Environment – deserves attention with respect to uncertainty, from the Operating Environment. We will discuss it shortly. Again, the "Means", in the basic MMF, include all resources and actions which the Soldier or the SU will apply in pursuit of the Missions and the objectives. For example, the Mission tasks, such as gathering intelligence of the enemy's cover and concealment for terrain analysis, functions and capabilities (i.e. communication, movement over rough terrain, protection, sustainment) which each Soldier or the SU would need to successfully execute the Mission task(s), the resources (supplies i.e. food and water), equipment (i.e. vehicles, boots, protective vests and helmets), technology (i.e. GPS with batteries, radios, personal digital assistants (PDAs), etc.) needed to deliver the required functions and capabilities given the mission conditions and so on, are all considered part of the Means to achieve the ends associated with each Soldier or the SU's mission. Please note that SU leader must consider and incorporate Levels 7 to 1 into the decision making process -- for example load planning and route selection [Nyamekye 2011]. The "OWN FORCE" may represent each Soldier or SU as a single node in a Net-Centric Ecosystem [Nyamekye 2010] and the "OPPOSING FORCE" may represent the enemy (the Taliban insurgents). Figure 1 is specifically for a single threaded mission – only SU operations are involved.

Events in Afghanistan conclusively suggest that the SU cannot operate as a single thread. For example, in many recent missions in Afghanistan's remote areas, the SU has always requested external support – for example, air support operations -- to defeat the Taliban insurgents. Thus, we must treat the SU as part of a Multi-Threaded MMF Model [Nyamekye 2010], Figure 2, which is an extension of the single-threaded mission -- Deitz et al. basic MMF Model, Figure 1. The MTMMF represents the generic model of the interactions between the enemies, SU, logistics operations, etc. in an integrated systems-of-system (SoS), on the battlefield. The Multi-Threaded MMF Model can represent each Soldier, SU or the "support group" as a single node, and more importantly each friendly Soldier as a single node such as the friendly local tribesman in the Net-Centric Ecosystem [Nyamekye 2010]. Such an integrated view is critically important because it provides cognitive aid to the SU unit leader in understanding the sociocultural interactions among the participants and how such interactions help the SU leader to select the best plan to defeat the enemy on the battlefield. Also, the integrated view provides a much better picture of underlined intentional relationships with the SU, and the support group, when analyzing the terrain -- for example, for load planning and route selection [Nyamekye 2011].

Through Level-1 (Interactions, Effects), the SU leader could share a COP with other Soldiers in the SU, and other combat support organizations, for creating a shared situation awareness of an
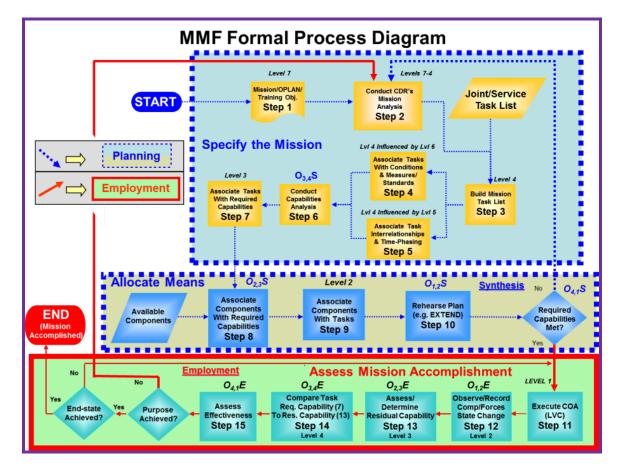
insurgent's mission, such as creating and locating an improvised explosive device (IED) in the terrain (Operating Environment) to hurt the Soldiers, on the battlefield. The details of each MTMMF level follow.

Level-7 establishes the dismounted SU's <u>Mission</u>, e.g., Dislodge the Taliban insurgents from the rural and remote areas near the Kandahar city to prevent the Taliban insurgents from moving into the city. Level-6 describes the <u>(Context, Environment)</u> for the mission, e.g., human intelligence information in textual descriptive format – unstructured data format about the Taliban insurgents' intent, the terrain data, etc. Level-6 (Operating Environment) is where uncertainty occurs – e.g., insurgents intentionally using some deceptive measure such as actually creating a wedding-type celebration scenario where some other local tribesmen shoot into the air as celebrating some wedding but the actual insurgents are in some other location. We will shortly discuss how uncertainty affects the choice or decision making of the SU.

Level-5 identifies the <u>(Index, Location & Time)</u> for the mission, e.g., the geospatial data (from inter-visibility tools) describing the location and time for the mission. Level-4 establishes SU mission <u>(Tasks, Operations)</u>, e.g., "Get the ISR sensor feeds for creating the shared situation awareness of the Taliban insurgent's intent". Level-4 also establishes the measure of performance/measure of effectiveness (MOP/MOE), for each mission task, e.g., throughput time for data transfer, overall mean time for each task, etc. Level-3 establishes the <u>capabilities and functions (set of actions)</u> that each Soldier or the SU would need to successfully perform the mission task. The SU may, for example, be given the mission task of conducting a tactical movement from a Combat Out Post to an isolated village in a critical valley. Factors such as the distance to be traveled, intervening terrain, threat of attack from insurgents, time available, and road conditions, will result in different sets of required capabilities and functions (i.e. aerial insertion versus vehicle or foot movement). Please note that the <u>capabilities and functions (set of actions)</u> are contained in the Operation Order, for each Soldier. The SU leader informally applies an abbreviated version of the Military Decision Making Process (MDMP) to develop an Operation Order which provides the task and purpose for each Soldier in the SU. The SU leader task organizes available personnel and equipment by choosing the best possible match of the capabilities and functions they deliver to the capabilities and functions required by each task. The written or verbal Operation Order is a product of this analysis. Level 2 also includes the C++ codes for the geospatial data or terrain data in the form of Services, Interface Definition Language (IDL) for exposing the Services to a middleware such as the Real-Time Innovations (RTI) Data Distribution Services (DDS). Please note that RTI DDS -- <u>middleware</u> -- permits the SU leader to send the Operation Order to each Soldier, and the support organizations, etc., through some intermittent network, in IW. Level-1 establishes the <u>(Interactions, Effects)</u> among the entities – between the Soldiers in SU, the support organizations, and between the SU, support group, and the Taliban insurgents. Level-1 represents execution of the chosen plan – e.g., load plan and route selection -- to fulfill the Level-7 Mission and anti-selfishness principle.

Consider Figure 3, which shows the detailed relationships between Level-6 (<u>Context, Environment (Operating Environment)</u>) and Level-4 (<u>Tasks, Operations</u>) and Level-3 (<u>Functions, Capabilities</u>). Please note that Figure 3 is an extension of Figure 1. For each Mission, Level-7, the SU leader must not only construct the Mission Task, Level-4, associated with the Mission, but also the SU leader must also establish the effect (<u>influence</u>, Step 4) of uncertainty from the

Environment (Operating Environment), Level-6 – Associate Tasks With Conditions & Measures/Standards, on Mission Task, Level-4. This in turn requires the new choice prediction and choice selection of Level-3 (Functions, Capabilities) – Steps 6 and 7, associated with the Mission Task, Level-4. This is how we model the effect of uncertainty (from the operating environment) and complexity on choice prediction and choice selection, in Reflexive Game Theory (RGT), *as noted before.*

Figure 3. Diagram Showing the Detailed Relationships Between Level-5 (Index, Location & Time) and Level-6 (Context, Environment) On Level-4 (Tasks, Operations) and Level-3 (Functions, Capabilities) [Deitz et. al. May 2006.]

#2: REFERENCES

Defense Modeling and Simulation Office (DMSO). 2004. "The Military Missions and Means Framework, Page 16," Tutorial, http://www.dtic.mil/ndia/2005test/mis2.pdf, (Accessed October 4, 2013).

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Interdisciplinary Military Analyses, Figure 5, Page 13," Military Operations Research Society 80th Symposium,   United States Air Force Academy: Composite Group D – Resources, Readiness, and Training," Colorado Springs, CO, June 11-14, 2012.

Sheehan, J. H., Deitz, P. H., Bray, B. E., and Harris, B. A. 2003. "The Military Missions and Means Framework, Figure 1, Page 4" *Proceedings, Interservice/Industry Training, Simulation and Education Conference*.

Nyamekye, K. 2013. "Warfighter Decision Making in Complex Endeavors: Using Purposeful Agents and Reflexive Game Theory, Figure 1, Page 8," Proceedings of 18th ICCRTS: Modeling   and   Simulation,   Paper   Number   074, http://www.dodccrp.org/events/18th_iccrts_2013/post_conference/papers/074.pdf (Accessed October 4, 2013).