Non-Kinetic Operations for Stabilizing Government

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Abstract – The United States Army uses war games to better understand the outcome of military maneuvers before formal execution. These war games seldom include the use of non-kinetic tactics and counterinsurgency doctrine. Thus, they limit viable courses of action that can be taken in support of regional stability. This study uses a regression model to model the integration of non-kinetic actions into a war game and produce a measure of stability for every action that is taken. It will allow military leadership to assess non-kinetic effects using a general model that can be applied to a broad set of regions.

Index Terms – Counterinsurgency (COIN), non-kinetic operations, PMESII, war games.

INTRODUCTION

When the United States military operates overseas, the desired end state is often economic, social, and political stabilization. This goal requires the military to address the problems that prompted the initial entry; the lack of stability or the conflict. Understanding how to properly stabilize a country or legitimize a government is vital in both the political and military realms.

Consistently, third world countries struggle with stability in government, infrastructure, and overall economic stability, which causes the country to be vulnerable and susceptible to insurgent attacks. As a result, it is important to understand that in order to form a more stable government, the people must agree and identify with the developmental process. During this stage of uncertainty, insurgency is often rampant, covering the host nation in a blanket of corruption and social unrest. The environment created by the presence of the insurgents allows them to thrive, pushing the country they invaded closer to irretrievable destruction.

Defeating the insurgency becomes a pre-requisite to establish a legitimate government in the eyes of the people and surrounding nations. Using the Counter Insurgency (COIN) tactics of the army, provided for us in the Counter Insurgency manual, more specifically the hold and build phases, we will conduct research to create a war game that focuses on the non-kinetic affects of warfare. This war game will model realistic outcomes of non-kinetic actions in unstable nations during conflicts. The following sections break down how the research is conducted in order to build a better understanding of how these insurgencies operate and are able to thrive.

LEGITIMIZING GOVERNMENT

One of the most common problems in countries with multiple pillars of instability, social, political, and economic, is a lack of government legitimacy. The most difficult aspect of this problem is demonstrating the value of the government and its institution to the population. As the population sees more value in the government, it is less likely to support insurgent forces. This process has the potential to build momentum for stability. Being able to run and maintain a respected and self-sustaining government that represents the populace is the first step to becoming a legitimate country. In other words, a country that is able to maintain order and stability within the economic, social, and political realms. This task is by no means an easy one however, by researching and creating a model to represent stability, we hope to transform this into a less daunting task.

Through research, people have attempted to find ways to solve this complex and dynamic problem. M. Stephen Weatherford [17] looks at the problem in two distinct ways. He presents a macro view of the situation then dives into the formal system properties of a government as a whole, focusing mainly on the popular views the government.

Measuring political legitimacy is a key component of determining how the populace views a government as legitimate. Weatherford’s breakdown demonstrates how to a government’s worth to the population. [17] It allows other researchers to look at the many countries they must analyze and determine the best path advertising governmental legitimacy. In order to use war gaming to model the process of legitimizing government, we must determine the variables that most significantly affect government and a population’s perception. First, a government has to ensure political transparency and a voice for all of its citizens, as well as provide effective public services. When citizens take part in government action it helps to measure political freedom and stability while effective services measure judicial and bureaucratic efficiency. These measures ensure that the government eradicates corruption. These measures also promote the health and well-being of its citizens fostering an environment for stable economic growth. [13] All of these factors, when grouped together, form a legitimate government that is recognized by the people and other nations.

COUNTER INSURGENCY

While it is not new, the United States military has formally employed a large-scale counterinsurgency strategy in support of the global war on terror and wide area security missions over the past twelve years. The primary focus of US counter insurgent (COIN) strategy is to unify efforts

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between the civilian population and the military, counter corrosion in host nations within the police and military forces, and conduct accurate vehicle identification and tracking to improve the safety of the host nation. [12] The COIN manual provides guidance on the implementation of both kinetic and non-kinetic operations to diminish an insurgency and build stability in a nation. Non-kinetic operations are those actions that do not require security forces to conduct combat missions. Examples of non-kinetic operations include a broad set of options to include infrastructure development, economic stimulus, and humanitarian aid. COIN has four phases, shaping, clearing, holding, and building. The first two phases use kinetic operations to eliminate or reduce the threat from insurgent. This is in contrast to the hold and build phases that establish and maintain a suitable level of security and partner with civil leaders in order to underpin development of critical institutions and regional capacity. Non-kinetic operations are mainly seen in these phases of COIN.

Shaping and clearing operations conducted in the beginning stages of an insurgency clear a path for the hold and build phases, and the non-kinetic operations that follow. Shaping is the manipulation of elements in the host nation to support the success of the mission. It requires that you know what influences both the insurgency and the population to have a better idea of how to accomplish the mission. For example, a few of the dynamics that shape an insurgency are the leadership, environment, ideology, and external support. [9] We can use any number of these to complete operations in the host nation successfully. Knowing the difference between the official leader and the popular leader can help gain insight on who to deal with to promote change in a nation. Additionally, knowing your environment is crucial when it comes to deciding how military units can maneuver and when it comes to deciding the safest method of conducting operations. Combat in an urban environment is conducted much differently than that of an open battlefield with little to no civilians. Immediately after in the clear phase military units, including host nation forces, conduct the operations necessary to complete the mission using the information needed to shape the environment. These operations can be range from military engagement to talks with leadership. The COIN manual suggests that there are a series of paradoxes to counterinsurgency operations that challenge the idea that more force equals more success. [9] As a result not all actions taken can involve the standard “shoot, move, and communicate” maneuvers that are used in standard force-on-force combat.

Immediately following the shape and clear phases of COIN there are the hold and build phases. In the hold phase, you have re-established a sense of stability in the nation with a formal political system and are working to ensure continued stability. Stability is found where there is an authority that can ensure its survival, which means they must hold social capital, economic power, and legal authority. [9] A leader, not favored by the majority of the population, will have a hard time leveraging social capital because they have too little favor with the people. This is grounds for discontent, protest, and subsequently renewed instability in the region. A leader must also have economic power to give incentives and disincentives based on the behavior of their people. A citizen whose government cannot pay them or support them is not likely to yield to their authority. Finally, legal authority is based on law and contract, which pulls from the beliefs of the host nation. Holding legal authority gives government a base to use military and national police as a means of securing its nation and creating order within its borders, which is a key element in stability. Once the country is under legitimate leadership, as interpreted by the population, the build phase allows for re-vamped infrastructure. This means providing essential services for the constituents and re-generating the economy that has likely suffered due to the wartime environment. [9]

COIN strategy does not support the notion that greater force always leads to greater results. Paradoxically, it accepts that there is a point at which non-kinetic operations will no longer work. The COIN manual illustrates this idea by pointing out that “the admonition ‘Sometimes, the More Force Used, the Less Effective It Is’ does not apply when the enemy is ‘coming over the barricades’”, therefore it is critical to establish a “point of no return” when non-kinetic operations will no longer be effective [12]. Using these different elements of COIN and non-kinetic operations, we will apply a more detailed analysis, ultimately creating a regression model that will provide a uniform look at the problem and provide solutions to effectively eradicate the insurgency within a host nation.

**NON-KINETIC OPERATIONS**

Almost every conflict has a combination of both kinetic and non-kinetic operations, ranging from full-scale invasions, to helping a country rebuild their schools and homes. Non-kinetic operations can be defined as the employment of non-lethal strategies and tactics with weapons that are “sub-lethal” or “weapons not intended to be lethal”. [10] LTC Cheng Hang references North Korea’s nuclear test firing as an example. He says that although it “involved physical destruction, its intended effects on the enemies were a show of strength and deterrence”. [11] He analyzes intent behind the action and the method with which it was carried out, to determine whether it could be categorized as non-kinetic. Therefore, non-kinetic warfare is dependent upon the intent of the physical action. Likewise, how the public views intent directly relates to the outcome of the conflict. This adds another key part to non-kinetic warfare, the population. The population is the vital to the success of the mission because they are the long-term sustainers of stability. [12]

By gaining the support of the population through non-kinetic activities, one increases the chances of providing sustained economic, social, and political stability. These operations center on the hold and build phases of COIN because the operational goal is to provide economic and social support to form a more stable environment. During the hold and build phases, it is important keep the
insurgency out while providing economic and social aid to the host nation. These operations to provide aid, such as building new infrastructure or improving the school and school system, are extremely important in helping the country get back on its feet and will eventually lead to a country that is able to maintain a strong and stable government.

Although non-kinetic operations are preferred over kinetic ones, mainly because there are fewer casualties involved, non-kinetic effects will only work to a certain extent. Although non-kinetic effects are much more than mere “soft power”, “the ability to get what you want through attraction rather than coercion or payments”, LTC Hang, the Head Air Warfare and Technology Office in Air Plans Department, says that, “the military instrument of power maintains a considerable role”. [11] Non-kinetic effects can only take a country so far in a conflict. One should aim to solve every conflict with non-kinetic effects because they are also deemed “non-lethal” and will result in fewer casualties. However, there is a point in every conflict where applying forces becomes ineffective, forcing a shift from non-kinetic operations to kinetic. At this point non-kinetic effects should not cease but carefully be coupled with kinetic effects to ensure future stability of the native population. The United States military non-kinetic operations include peacekeeping, humanitarian assistance and disaster relief, national integrity operations, and military contingency operations. [13] In order to be able to model non-kinetic activities and apply it to war gaming one must first gain a scope and solid understanding of non-kinetic operations. In COIN, kinetic operations alone are less successful than when they join with non-kinetic operations.

To enhance our nations operations we need to be able to conduct kinetic and non-kinetic operations at the same time. [10] For non-kinetic operations to work, aiding force needs to consult the local populace and include them as stakeholders and in some regions, a partner. This is an important step because a decision that might seem beneficial to the host nation can in fact hurt them even more.

**ANALYZING PAST OPERATIONS**

Analysis of recent COIN operations provides a base and scope for the regression model. Multiple conflicts over the past fifty years were analyzed in order to get the most accurate and useful model results.

Successful operations in Africa are of interest due to a newly unified command created in 2007, AFRICOM. AFRICOM positions the United States to work more efficiently and effectively by forming habitual relationships with key leaders and stakeholders in the region. It also develops and retains regional expertise due to the consistent area of focus. AFRICOM is collaborating with regional nations to strengthen fragile failing states and bring ungoverned areas under the control of effective democracies. [1] Gaining knowledge of these past operations provides us with data for both kinetic and non-kinetic operations. Using this information, we will be able to further develop our knowledge of successful past non-kinetic operations in hopes of improving our current and future non-kinetic operations. This research will mainly be used as we dive into the problem definition phase and as we compile the data for the model inputs.

Providing foreign aid and using non-kinetic operations has become the forefront of COIN. [16] However, these operations to combat terrorism come at a hefty price. Having sufficient funds to perform non-kinetic operations and provide foreign assistance is going to be an ongoing struggle. By looking into the costs associated with providing humanitarian aid and other non-kinetic policies, we will be able to bin the main conflicts by their common characteristics. These bins will allow the model to be used in a more general sense. By binning countries and regions, one can use information on one area to gain insight about another. This is key for the rapid insights demanded by leaders moving into a new situation.

**PMESII**

A multitude of factors outline a host nation assessment, to include measures of Politics, Military, Economic, Social systems, Infrastructure, and Information, (PMESII). PMESII characterizes “the military aspects of the operational environment as well as the influence of the population on the operational environment”. [15] These factors give the users a clear view of the key players, their policies, and how those policies have shaped the society in the area of interest.

The military aspect of PMESII refers to the capabilities of all of the armed forces in a country, both government run forces and insurgent forces. The way a government deploys its armed forces reveals a lot about the state of the country. For example, a government whose military is primarily working to resolve in-country conflicts is experiencing numerous cases of social unrest. In many modern day conflicts, governments are dealing with insurgent forces that are recognized by their citizens and pose a threat to their legitimacy.

The economic aspect addresses the influence of “trade, development, finance, policies, capabilities, and legal constraints pertaining to the production, distribution, and consumption of resources [and how they] play a significant part in the behaviors associated with economics.” A country’s economy has a direct correlation to its stability. A government that has an abundance of natural resources, a higher employment rate, and has enough money to sustain itself, is less likely to experience instability. By providing monetary assistance, one can improve the ability of life and lower the degree of unrest that occurs within its borders. The social aspect reveals the way the country’s citizens are responding to the surrounding environment. This is one of the most important factors to look at in a study of non-kinetic effects because it informs us of the outcomes of our actions. Unlike kinetic operations, where success is measured by the physical result, non-kinetic operations cause a shift in the environment that is not always tangible. It can, however, be observed in the actions that the citizens
take in the aftermath. It is an aspect that is hard to measure but holds the most importance in our study because it will help us determine what non-kinetic activities work the best for the different conflicts we are analyzing.

The next aspect of PMESII, information, describes the intelligence taken from the country and the different stakeholders within it. Information is one of the key variables in any study because it is used to gage the affects of our actions and decisions about the future. Good information is what gives us the data necessary to make our study useful for future military operations.

Finally, the infrastructure aspect “describes the basic facilities, services, and installations required for a society to function” and covers all of the technological advances and development that has occurred in the countries we are observing. It can be measured by looking at the development of the country and how technologically advanced they are relative to past years. By using PMESII we create a consistent way to categorize the conflicts we research, allowing us to analyze the results of non-kinetic operations among those that are similarly grouped. [15]

**STAKEHOLDER ANALYSIS**

*Center for Army Analysis*

The Center for Army Analysis originally emphasized a focus on the country of Mali however; recent meetings with the CAA have changed the scope to focus more on Afghanistan and Iraq. Now the CAA would like the non-kinetic effects of a war game to apply across a number of different situations. Upon another visit with CAA, it is clear that they want to focus on the last two phases of COIN, being hold and build phases. CAA wants a war gaming model that can be applied to multiple conflicts allowing them the ability to simulate possible outcomes multiple times. Ideally, they want to be able to have an algorithm that can be inputted into a computer and simulated a number of times, thus decreasing the variance in outcomes. Afghanistan is the layout of their current war gaming technique based on data from Iraq that simulates the shape and clear phases of COIN. Our algorithm will provide them with the hold and build phases of COIN to complete the process. Within these two phases, CAA wants us to incorporate elements of PMESII to help model the response of countries going through the hold and build phase. With each possible action in COIN there are unseen, non-kinetic consequences that occur. It is our job to be able to predict non-kinetic effects as closely as possible as it relates to kinetic actions taken specifically in a war gaming scenario. This algorithm needs to be dynamic and adaptable to different countries given different sets of data.

*United States Army*

When looking at the Army as a stakeholder we can analyze army doctrine to discover their wants, needs, and desires. In order to implement non-kinetic effects into the war gaming process there should be an initial set of requirements from our stakeholder to set left and right limits for our solution. This will show the limitations of the models effectiveness and allow commanders to use the results of the war game to make decisions that are more informative.

The first of these key requirements is that the solution must maximize the protection of friendly forces and minimize collateral damage. [14] This is to ensure the protection of our soldiers, as well as the local population. It also aids in ensuring a positive public opinion and a more cooperate community. The next essential requirement is the war games ability to determine when and where to apply force. [14] This is an important and complex step because introducing non-kinetic actions into a war game means that a stakeholder can consciously make choices that do not require direct military force. The final key requirement is a product that can identify coordination requirements with joint forces during the war game. [14] This is important because the host nation’s military may play just as significant role in non-kinetic operations as they would the kinetic operations. These requirements represent the needs of the CAA as a representation of the larger army and must be met to be successful.

*Afghanistan*

There are multiple stakeholders when it comes to the war in Afghanistan. The stakeholders include the Afghan public, Hamid Karzai, American public, the Taliban, NATO, and Pakistan. Each of these stakeholders’ plays a significant role in the war in Afghanistan. More information on the views and importance of each of the stakeholders are listed below. [5]

- **Afghan Public:** The Afghan citizens would like the Taliban removed because they pose a threat to the rest of the civilian population. They would like the U.S. forces removed as well however, they are scared that without the U.S. security forces they will not have adequate resources, skills, and manpower to keep the Taliban away. [5]

- **Hamid Karzai:** Hamid Karzai is the president of Afghanistan. His goal is to eventually have all foreign troops out of his country. He wants complete control over Afghanistan and has slowly begun to gain the support of the Afghan citizens. [5]

- **American Public:** The American public wants the U.S. troops to completely withdraw from Afghanistan all together. The American public is unsure what we are even fighting for and think that we should not be in Afghanistan longer than we have to be. [5]

- **The Taliban:** The Taliban first surfaced in 1994 and ruled Afghanistan from 1996-2001, enforcing strict Islamic rule. The goal of the Taliban was to “establish the most pure Islamic state in the world.” Since 2001, the Taliban have been responsible for countless murders including those of U.S. soldiers. Today, the Taliban are looking to “enforce the sharia law and Islamic government in Afghanistan, to remove foreign forces from our country.” [5]
• **NATO:** The North Atlantic Treaty Organization has the same goals as the U.S. and most of the Afghan people. They are looking to help establish a strong Afghan leadership that is able to sustain and protect itself. This would allow the U.S. to leave Afghanistan. [5]

• **Pakistan:** Pakistan is Afghanistan’s neighbor and has been looking to gain influence in Afghanistan. The Pakistani leadership has always clashed with the Afghan leadership because of the Afghanistan-India relationship. The Pakistani leadership has been known to converse with the Taliban, which leads to even more tension between Afghanistan and Pakistan. The Pakistani leadership does not seem willing to have peace talks with Afghanistan, which may lead to more conflicts. [5]

**FUNCTIONAL ANALYSIS**

War gaming helps the Army accomplish multiple tasks every day. One of these is the projection of the percentage of enemy defeated through the execution of our non-kinetic courses of action [14]. Additionally, the stakeholder should be able to clearly identify the critical events in their course of action and subsequently be able to amend its timing and location of decisive points [14]. This weighs heavily on the war games’ ability to determine second order non-kinetic effects that could have an effect on future maneuvers. For example, planning a raid in a specific district may seem like a sound decision initially but if that raid is in a district with a significant religious establishment this could stir opposition to operations in the area. Since the non-kinetic actions in any conflict are a direct result of the actions and opinions of the surrounding population, these factors must be taken into account. Likewise, the results of our war games would serve our stakeholder best if they could also help provide information on the timing of force concentration and initiation of a kinetic and non-kinetic action [14]. If a non-kinetic action solves the problem this could be the solution to a conflict in the immediate area. However, if the action is not successful, it can provide information on where our new focus should be and what level of action is required in the conflict.

**METHODOLOGY**

This model captures the interactions between measures of interest and the effect of those actions on the country conducting counter insurgency operations. Because they likely map well to important features that influence success during the holding and building phases of COIN, DIME (Diplomacy, Information, Military, and Economic) and PMESII features of the environment serve as as possible input factors to model the complexity of civil-military operations with Mean-field theory. Major Saie, from the Air Force Institute of Technology, provides a basis for this method by considering the six indices of PMESII at multiple time steps in order to estimate the rate of change of the measure of interest. Saie and fits rate of change of the stability measure to the PMESII and DIME inputs. Coefficients pertaining to the six indices are found via using least squares fit and then measured for fit using $r^2$. The estimated function allows the user to determine the effect of PMESII settings on the measure. These represent operations in Iraq that consisted of no surge, withdrawal by 2008, early surge and consistent spending. While the model is not perfect it does capture the interactions of PMESII and provides a model that can show output data for “what-if” analysis. The model is limited on how accurate the data is but it does provide commanders and staffs previously unavailable inference and may be tailored towards a specific conflict assuming sufficient data is available so as to discriminate between the results from different courses of action, treatments. [15]

Using R Studio as the statistical platform for regression models, statistical processes provided insight about data-based functions to measure stability within a given country. For any region, measures and data must be split into relevant PMESII factors for input in the model. It is possible that the data is not complete. Sparse data was filled using the mode of the set. Once the data is clean it was imperative to determine if each column was collinear to the other and upon doing this, normalized the data set to reduce that colinearity. After minimizing colinearity between the columns by eliminating pairs of data with $\rho > .20$, a Shapiro-Wilk test is applied to determine normality of the input and response data. For instance, the Afghan data tested for normality generated a p-value of 0.307, which allows the assumption of normality at 95% confidence. This in turn means that least squares regression is an acceptable methodology to model the data. In the event of data without normal behavior, general linear or general additive models would be appropriate. The Afghan data Fitted vs. Residuals plots graphically depicts success of a least squares regression mode, as the points are normally distributed around zero with a variance of approximately one. [15]

The first model that was used to fit the data was just a basic linear regression model that was regressed against a four-part proxy. This proxy consisted of data from Afghanistan that incorporated the employment ratio, accessibility to electricity, and violence, which was broken into two parts. Those two parts consisted of military and civilian deaths within Afghanistan. Each of these proxies were weighted at .5, .2, .15, and .15 respectively. A linear regression model was used because it allows us to track the rate of change in stability quarterly. This quarterly change is an easy way to show commanders on the ground, if the situation at hand given the course of action done by them, is getting better or worse.

Upon completing the first order model, further analysis was done to fit the data to follow on models that would allow for a better application of measuring a change in stability. Forward/backward regression was also performed to measure this models output against the other models to obtain the best possible option. The generalized linear model, Nedler and Wedderburn, is a model that is similar to linear regression but it allows the linear variable to be related to the response variable through a link function. [16]
The final model used was the generalized additive model created by Trevor Hastie and Robert Tibshirani. The model replaces the general linear form of regression by a sum of smooth functions called the local scoring algorithm. [17] This best option is determined by Akaike Information Criterion (AIC) to compare models against each other. AIC attempts to maximize the likelihood of a function but also penalizes it for complexity. Models with many features may have the potential to estimate with greater accuracy but may overfit. AIC is also beneficial because it allows for comparison of models that are nested as well as those that are not. [18] Table 1 shows the given model and the associated AIC score with that model. It identifies the Generalized Additive Model (GAM) as the most desirable model for the Afghanistan data.

| Model                        | AIC            |
|------------------------------|----------------|
| First Order Model            | -6457.544      |
| Quadratic Model              | Unavailable    |
| Forward/Backward Regression  | -164.6393      |
| Generalized Linear Model     | -6299.2        |
| Generalized Additive Model   | -67.84279      |

The general construct of these models is insensitive to AIC and AIC itself does not need a nested model. This allows the comparison of the different models to be done very easily with the use of R Studio.

The Generalized Additive Model produced the best results by having the AIC value closest to zero compared to the other models. This model will then be used to show the change in stability over a three month period to commanders on the ground given their selected course of action. The primary strength of this model is the ease it provides to commanders on the ground the ability to look at multiple courses of actions and determine which one is the best option given the output of the model. Currently CAA uses bootstrapped data and interpolation from one conflict to inform its wargame. While helpful, it does not well represent kinetic and non-kinetic operations.

The final aim is to employ the model in the current course of action analysis wargame at CAA. The strengths of this implementation is the fact that the player is the one controlling how they determine each factor of stability within PMESII. A clear weakness of this model specifically and any model in general is the data used to make those such models. The data in this model is difficult to collect and parsing it into each factor of PMESII can make the outcome reflect the subjective opinion of the analyst. However, from another view it can be parsed to represent the needs of the stakeholders make it very flexible and easy to fit for diverse regions in the same area of operations.

CONCLUSION

The results of the study present three clear functions that our system must seek to accomplish: (1) Projection of the rate of enemy defeat using non-kinetic effects, (2) Identification of the critical events in a given course of action and (3) Providing information on both the timing and initiation of both kinetic and non-kinetic actions. The bottom up approach of mapping individual conflicts their attributes to a larger arena is similar to creating a functional hierarchy that is meant to be read from bottom to top. It climbs to a function that well represents the task of the function, served as the statistic of interest, by proxy. While the task of building the model into the wargame is not yet complete, Saie’s methodology of mapping data through PMESII to a rate of change for a statistic of interest has promise. Further tasks also include demonstrating that the model is valid, i.e. how well it predicts within the data. That said, the model generated by this study is provided by a codified set of steps that allow a general process to inculcate local or local-like date giving commanders the insight that do not possess otherwise. This model is clearly a better choice that the limited method of bootstrapping and interpolation which is currently the standard.

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