



The Statistical Irrelevance of American SIGACT Data: Iraq Surge Analysis Reveals Reality

by Joshua Thiel

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Maneuver warfare at its core is a mechanistic endeavor and fits with a corresponding necessity of top-down hierarchies. Conversely, counterinsurgency is a more ambiguous environment that varies in its complexity and context; it is the chess match of war. It is different in every locale and can cover the entire spectrum of war simultaneously. Consequently, counterinsurgency is difficult to put on a bumper sticker, to trademark as a catch phrase, or sell to a population and their representatives. In 2006 the United States (U.S.) public's perception of success or failure of the Iraqi counterinsurgency strategy was concentrated around the concept of massing combat power in time and space, often called the "The Surge." The term, "The Surge," condensed a new counterinsurgency strategy into a simple and quantifiable slogan for the sound bite culture surrounding current affairs in the modern world. Unfortunately, counterinsurgency is more complex than "add more and then you win."

With violence in Iraq rapidly escalating in 2005-2006, the political environment became hyper partisan; Washington officially wanted a new strategy to accompany a surge of troops fraught with political risk.^{2,3} The number of battalions in Iraq began rising in the summer of 2006.⁴ By 11 December 2006, President Bush formalized his decision to surge in Iraq and support in the political arena was solidified when he announced the appointment of a new commander in Iraq.⁵ General David Petraeus, the man who had written the Army's most recent take on counterinsurgency in FM 3-24, fit the bill and was appointed as Commander of Multinational Coalition Force-Iraq in January of 2007.

Petraeus brought the "Petraeus Doctrine" to the conflict. His doctrine included the concepts of: increased base dispersion, increased local national partnering at the tactical and operational level, hostile party reconciliation, co-option of the Sunni population, local defense initiatives such as Sons of Iraq, and an increase of civil-military operations to name a few.^{6,7,8} However, due to the clearly quantifiable nature of troop numbers and United States citizenry's concern for its soldiers, this comprehensive change in strategy was dubbed "The Surge." The

¹ Special Thanks to Will Marm and Joyce Hogan. MAJ Marm was a co-developer in the ArcGIS database and production of the first generation map products used in this analysis. Joyce served as the geospatial editor on this project. Her expertise in ArcGIS was instrumental in the study.

² Marc Sandalow, "Election 2006: America's referendum on war," *San Francisco Chronicle*, November 5, 2006.

³ "Bush shakes up war team; Dems chiefs oppose surge," *USATODAY*, January 5, 2007.

⁴ Wesley Morgan, Iraq Order of Battle, Institute for the Study of War, 2010. www.understandingwar.org Retrieved March 11, 2011.

⁵ "Bush briefed by State Dept. officials on Iraq," *CNN*, December 12, 2006.

⁶ Oliver Read, "New U.S. Counterinsurgency Tactics Face Challenges Ahead," *Online News Hour*, January 26, 2007.

⁷ "U.S. Uses Sunnis to Patrol Streets," *USAToday*, August 20, 2007.

⁸ "U.S. Bribe Insurgents to Fight Al-Qaeda," *MarketWatch*, September 9, 2007.

title has caused policy-makers, defense professionals, and citizens to associate counterinsurgency success with troop numbers rather than policies, such as those in the “Petraeus Doctrine,” that begin to address the root causes of insurgency.

The following study summarizes the findings of a statistical and geospatial study that demonstrate the absence of a strong connection between troop increases and increased security in Iraq. The report compares troops and security year by year, accounts for lag time, charts changes, and presents a low correlation of .14 between troop increases and increased security in Iraq from 2006-2008. This low correlation empirically proves that “other variables” such as those in the “Petraeus Doctrine” or environmental conditions have a far greater effect on counterinsurgency success than troop surges. “The Surge” strategy involved a troop increase and a myriad of policy variables, isolating one significant variable or adding all significant variables to one study is implausible. This study does not seek to identify the key variable responsible for improved security in 2007; rather, it seeks to rule out troops as the significant variable; therein reducing its blanket application to future counterinsurgencies. The study concludes with a discussion on the effect of the perception that “surges solve insurgencies” and the consequent implications for Afghanistan.

Defining the Variables

Evaluating the correlation between security and troop levels is more complex than simply comparing troop numbers to insurgent attacks. The methodology in this study involved identifying a time period, identifying variables to test the hypothesis, the selection of provinces as geospatial areas for evaluating changes, and analysis of results.

Key Variables

The study sought to isolate and compare security and troop numbers. The concepts transformed into two variables: significant kinetic events, referred to henceforth as SIGACTs, and battalions. SIGACTs were defined as significant kinetic events reported to or involving coalition forces. The SIGACT data does not include all Iraqi on Iraqi strife. The 2006 - 2008 SIGACT data was readily available from the United States Army Corps of Engineers.⁹

Troop data was available from the Institute for the Study of War, *Iraq Order of Battle* project. This document enabled the identification of battalions per province for each year from 2006-2008.¹⁰ The data did not include Special Operations Battalions, Iraqi Security Forces, or Civilian Security Forces, such as the Sons of Iraq or the Concerned Local Citizens.

Time

The time period selected for this study was 2006 to 2008. The year 2006 was selected as the initial frame of reference because troop increases and the “Petraeus Doctrine” had not yet been implemented; 2006 was the snapshot of the original strategy. Troops do not instantly deploy and policies don’t change instantaneously; thus, the time frame for analysis was extended

⁹ The data from years 2006 and 2007 was obtained from the historical database of projects from the DA3600 course files (Gorkowski, 2009). Noting in his references, CPT Gorkowski had contacted the U.S. Army Corps of Engineers [USACE]; contact was reestablished with Mr. Joseph Harrison, USACE GRD. Mr. Harrison still had access to the USACE data and he provided all requested 2008 SIGACT data.

¹⁰ Wesley Morgan, *Iraq Order of Battle*, Institute for the Study of War, 2010. www.understandingwar.org Retrieved March 11, 2011.

to 2008 to allow troops and policy changes to take effect. The foundation of the study involved the creation of two time periods, 2006-2007 and 2007-2008. The troop levels and SIGACTs were calculated for each year by province. SIGACT percentage changes, increases or decreases, were calculated for each time period based on changes from the previous year.¹¹

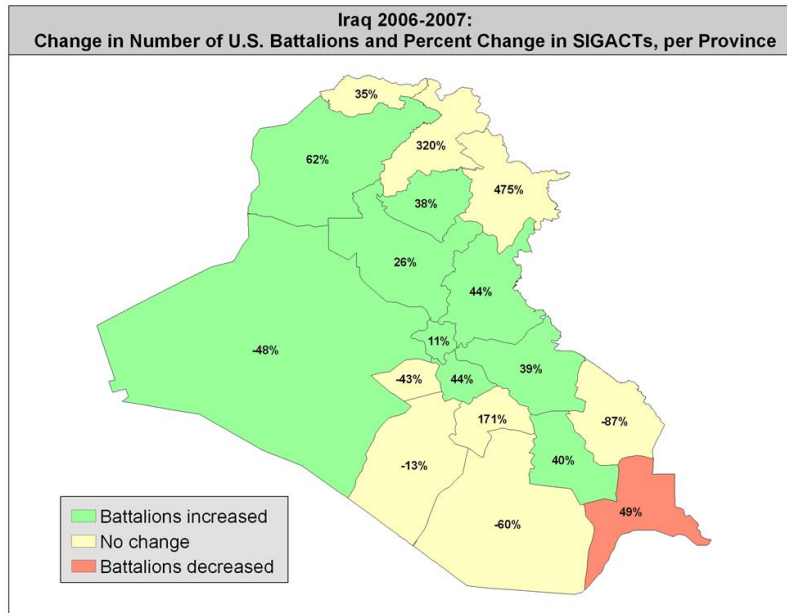
Analysis

A direct comparison between SIGACTs and troops could indicate a causal relationship regardless of other possible variables. Critics would then argue that correlation of these two variables is irrelevant because of the multitude of other variables affecting security. However, if the comparison shows a low correlation, massive troop increases can be ruled out as the key component in the transition of momentum in Iraq. The following section includes a variety of comparisons, including: 2006-2007 analysis, 2007-2008 analysis, existence of Operational Time Lag, 2006-2007 Battalion strength versus 2007-2008 SIGACT change analysis, Trend Analysis, and review of the correlation statistic.

Year by Year Comparison

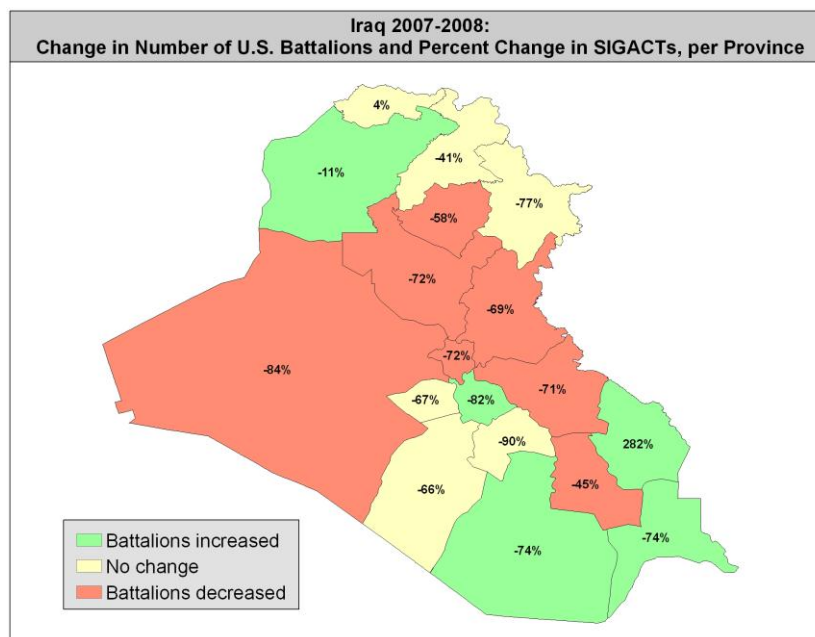
Map 1, Iraq circa 2006-2007, displays a counter intuitive trend in which an increase in the amount of security forces corresponds with an increase in SIGACTs. Eight of the nine provinces infused with additional troops experienced an increase in SIGACTs. The immediate instinctive inference is that adding security forces decreases security. Common responses to this situation yield two plausible hypotheses. If insurgents were already in areas, adding troops unavoidably resulted in clashing and an increase in reported SIGACTs. The second theory is that adding troops, particularly foreign troops, sparked the population to join or create an insurgency to expel foreign Coalitions Forces. However, analysis of all provinces dispels either hypothesis. In the larger context of all 18 Iraqi provinces, 13 of the 18 provinces experienced an increase in SIGACTs. Thus, despite the apparent correlation between increasing troops and increasing SIGACTs, in actuality, SIGACTs were increasing country-wide, regardless of troop levels. Map 1 visually depicts these changes and the inconsistent relationship between troops and SIGACTs.

¹¹ The percentage increase or decrease of SIGACTS was found with the equation $[((Year B - Year A) / Year A) * 100]$.



Map One

Map 2, Iraq circa 2007-2008, also unveils a counter intuitive trend, though a polar opposite phenomena; troop decreases coincided with SIGACT decreases. In all seven provinces with troop decreases, SIGACTs went down. However once again, a country-wide phenomenon was present: 14 of 18 provinces experienced a reduction in SIGACTs.¹²



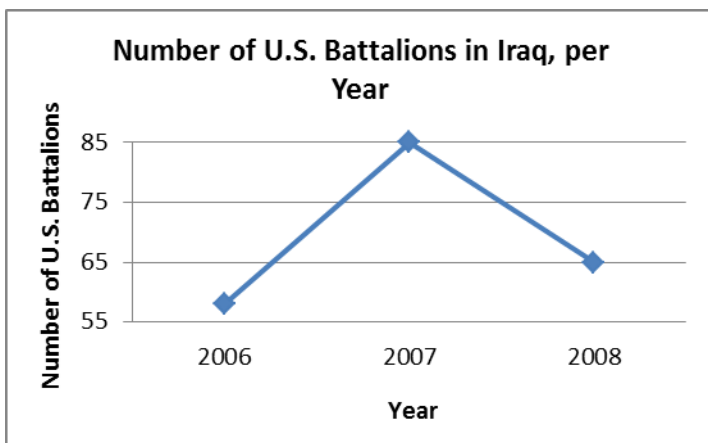
Map Two

¹² Maysan Province, in Southeastern Iraq, is an anomaly with a percentage increase of 282% SIGACTs; a percentage which is strikingly higher than all other provinces in Iraq. While the reason for this outlier is unknown, the specific cause was not the focus of this research. The hypothesized reason covered in the preparation of this study postulates that the massive increase was due to an exponential increase in reports resulting from an increase of units in that area.

These two maps, representing a year by year analysis, indicate a positive correlation between increasing troops and increasing SIGACTs, or decreased security. This trend is exactly opposite of expectations. The results support the thesis by indicating that additional troops are not the essential component for improved security; however, the results are counter intuitive to a degree that demands reexamination of the data comparison and other analysis opportunities.

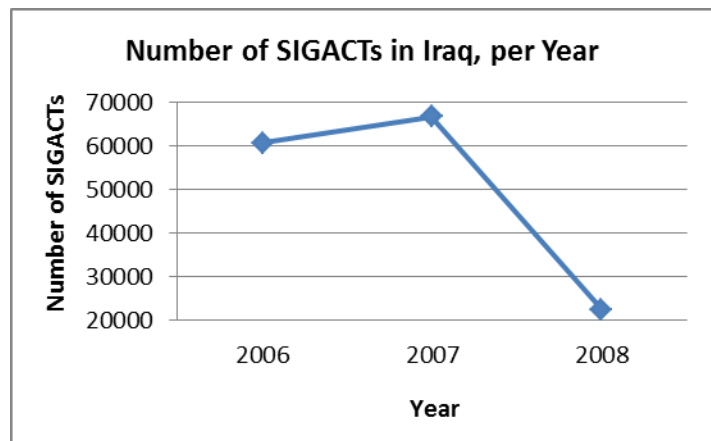
Lag Time

Though independent year to year analysis supported the thesis, the results indicated that further manipulation of the data was required to accurately represent the possible relationship between troops and SIGACTs. Thus, an additional analysis was created to examine the dynamic of time. A hypothesis was developed that the effect of new policies and additional troops takes time, which is henceforth referred to as “lag time.”



Troop increases, beginning in late 2006, represent the change in strategy as a whole. A myriad of variables influence the effectiveness of troops surging to various areas. Factors such as adjustments to new operational areas, staggered intervals, and tactical decisions all influence the effect of surging troops. These situational variables influence when a surging battalion actually makes a difference on the ground in terms of security.¹³

Similar to the build-up of troops, implementation of policy and operational changes require time. As troops slowly flow into country and build towards peak strength, the implementation of policies and efficiency of those troops builds, eventually peaking as well. The maximum number of troops represents the time when all “Surge” policies and troops were achieving an effect. A side by side comparison of troops and SIGACTs across the time period indicates a lag time between cause and effect. The difference between the troop strength peak and SIGACT bottom indicates a period of six months to a year before the effects of the new strategy, both policies and troops, causes a significant decrease in

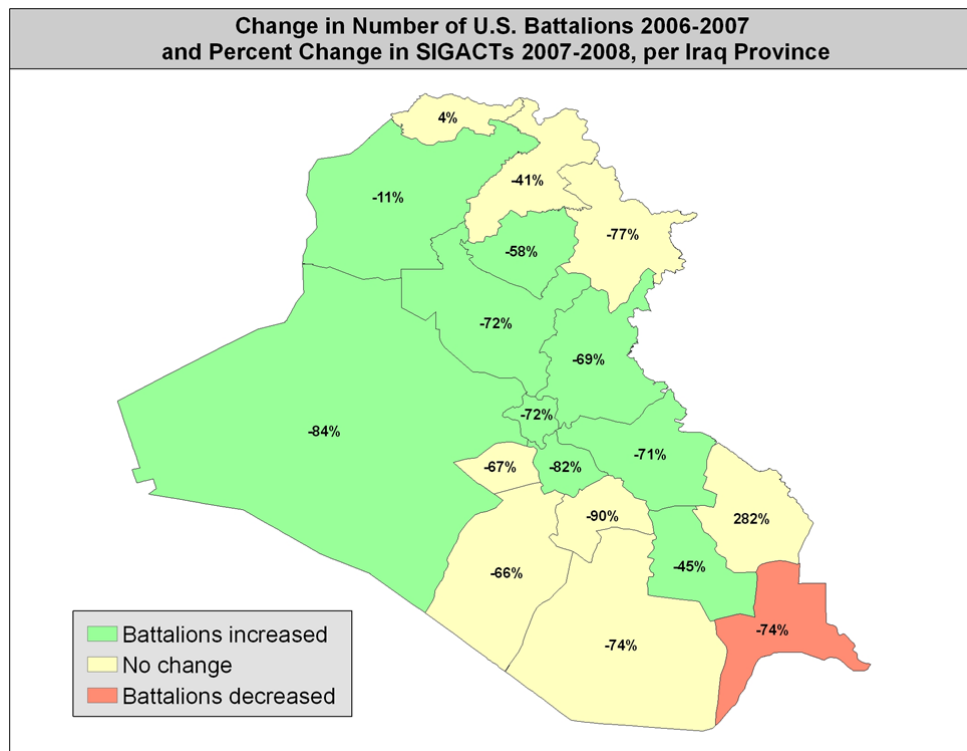


¹³ Two methods were considered as a means to calculate “lag time.” First, a qualitative study using a survey was considered. However, the subjectivity of the responses and professional biases appeared too prevalent in such an evaluation. The second method, and one used to create the time charts, involved comparing the variables in time to identify a trend or significant transition points.

SIGACTs; this period of cause to effect was the operational lag time of the “The Surge” and the “Petraeus Doctrine.”

Accounting for Lag

The possible existence of operational lag time necessitated a new examination of the provincial level comparison of troop levels and SIGACTs. Determination of the lag period of six to twelve months prompted a comparison between the troop changes from 2006 to 2007 to SIGACT changes from 2007 to 2008, Map 3. The comparison shows that the security situation improved in 16 of the 18 provinces despite an increase, stable level, or decrease in the number of battalions. Echoing the earlier two maps, a comparison accounting for lag time still shows little consistency between troop levels and security. Ultimately, Map 3 clearly shows that security was increasing in 2007 on a country-wide basis independent of troop levels. Another variable or set of variables appears to have affected the entire nation.

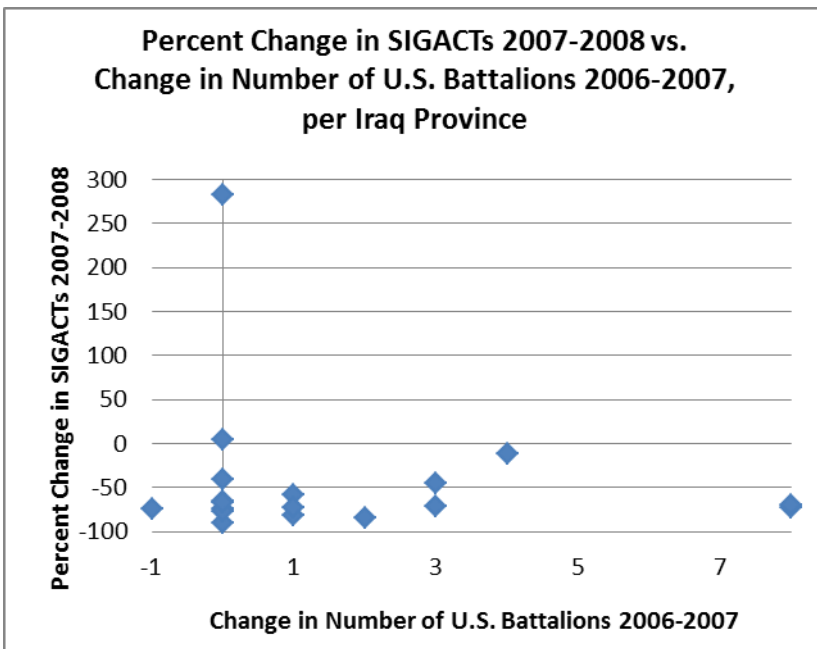


Map Three

Trends and Correlation

The X-Y scatter plots provide an alternate visual representation of the data. The X-Y scatter chart shows 18 points, one per province, depicting percent change in SIGACTs along the y-axis and change in number of battalions along the x-axis. If there was a significant cause-and-effect relationship between troops and SIGACTs, a clustering of points would exist around specific numbers of battalions and specific percent changes in SIGACTs; or the points would

align themselves in a linear sloping manner indicating a rate of change - add one battalion and percent change in SIGACTs which decreases by some percent. No significant or consistent rate exists. The X-Y scatter chart shows the points clustered in a generally horizontal linear pattern, with one outlier. The pattern demonstrates that SIGACTs were dropping with little correspondence to increases or decreases in battalions.



Correlation is the statistical representation of the data. Correlation provides a single number indicating the degree of a cause-and-effect relationship. A correlation of 1 indicates that two variables are completely related; thus if one variable changes the other changes in a proportional amount 100% time of the time. Such correlation is ideal for counterinsurgency planning; adding x number of troops would drop SIGACTs to zero. In the other extreme, a correlation of zero indicates that adding troops may or may not decrease SIGACTs; the variables are mutually independent. The correlation for this data is 0.14. In statistical terms, this is a low level of correlation that does not support predictive analysis. Unfortunately for counterinsurgency planners, a low level of correlation does not allow for the predictable use of battalions to improve security.

Counter Arguments

Foremost, troops are needed to achieve a threshold of security to insulate the population and hunt insurgents in a counter insurgency campaign. This research does not call for a zero troop level. A recent macro level analysis on counterinsurgency troop ratios, *COIN Manpower Ratios: Debunking the 10 to 1 Ratio and Surges*, uses historical data to support an appropriate troop ratio of 3-4 to 1.¹⁴ In the majority of cases in that study, if the counter insurgents had at least a 3 to 1 troop ratio, the policies and tactics would determine the outcome rather than force numbers. In some regards, this Iraqi surge analysis is a micro level case study which reinforces the macro level analysis of the *COIN Manpower Ratios* study. This study suggests that surging troops over the 3 to 1 force ratio has little effect on the success of a counterinsurgency.

Many of the unavoidable critiques of this analysis are actually excellent opportunities for further research. First, it is possible that SIGACTs went down due to better security operations in adjacent provinces. A follow-on study could attempt to correlate troop increases in key

¹⁴ Josh Thiel, "COIN Manpower Ratios: Debunking the 10 to 1 Ratio and Surges," *Small Wars Journal*, January 15, 2011. Available at <http://smallwarsjournal.com/blog/2011/01/coin-manpower-ratios-debunking/> Accessed on 12 April 2011.

provinces to improved security in adjacent provinces. Such research could follow the theoretical counterinsurgency gaming model presented in Scott Boorman's book, *The Protracted Game*.¹⁵ A second major opportunity for research involves the pursuit of SIGACT data beyond that reported to Coalition Forces. While the scope of this research did not seek out or include SIGACT data outside of the Coalition reports, Iraqi security force data and field surveys may reveal additional insights. Lastly, there is no account of Iraqi Security Forces (ISF). ISF grew substantially from 2006-2008 and may or may not have provided substantive security in specific provinces. Furthermore, the quality and operational tempo of ISF remain complex variables to quantify and standardize.

If conventional maneuver warfare operates in the fog of war, counterinsurgency operates at night with no ambient light. Any study on counterinsurgency will require scope and assumptions. This study is no exception, but has hopefully provided insight into the relationship, or non-relationship, between troop surges and counterinsurgency success.

Conclusion

The study suggests that other critical variables and policies associated with the strategic shift to the "Petraeus Doctrine" were a large factor in counterinsurgency success in Iraq. Through geospatial and statistical analysis, this study presents a case that the massive improvement in the security situation in Iraq in 2007, represented in SIGACTs, was largely independent of "the Surge" in U.S. expeditionary security forces of 2006 and early 2007. The statistical evidence presented herein shows an insignificant correlation between SIGACTs and the number of battalions deployed to a province; more troops did not directly decrease SIGACTs. Thus, this study allows counterinsurgent planners and policy-makers to put aside massive troop surges as the essential ingredient in stemming an insurgency. Rather, the reduced significance of troop surges suggests that intangibles are the cornerstone of counterinsurgent victory; intangibles such as: coalition policies, enemy strategy, and neighboring country assistance. In the end, this study proved that these intangible factors affect security more than the number of deployed coalition battalions. While intangibles may not provide a seemingly clear path, equation, or price tag for victory, acknowledgement of the value of intangibles may avoid costly troop surges. Such economy of force is invaluable at a time when the U.S. is still engaged in Iraq and Afghanistan with possible looming commitments in Libya and the Horn of Africa to name a few locations.

Another significant question derived from the research is the calculation of "lag time" in Afghanistan conflict. The Iraq study illuminated the possibility that a lag existed between the addition of new policies and an actual change in security. In the context of Afghanistan, a surge and shift to Village Stability Operations (VSO) is occurring; but if security or other metrics fail to demonstrate an immediate improvement, then the political will to remain in the conflict may dissipate. This study indicates that the effect of the policy changes that occurred after Petraeus shifted from Commander, Central Command to International Security Assistance Force (ISAF) Commander did not fully develop until 6 to 12 months after the changes were fully implemented; with those changes still in the implementation process, policy-makers should revisit the evaluation or pullout date for operations in Afghanistan.

¹⁵ Scott Boorman, *The Protracted Game: the Wei-Chi Interpretation of Maoist Revolutionary Strategy* (Oxford: Oxford University Press, 1969).

Mainstream media and simplistic operational planners have promoted the false idea that there is an overwhelming correlation between more troops and more security. However, mass plus men plus money do not always equal success. Unfortunately, “the Surge” slogan supplanted comprehensive initiatives of the “Petraeus Doctrine.” The catastrophe of the mis-association rests in the future application of surges as a strategy to win counterinsurgencies; of immediate concern is how this perception affects the conflict in Afghanistan. As troops were surged to Afghanistan in 2010, once again Petraeus began influencing the operations. Due to the initial success of Village Stability Operations in the fall of 2010, these operations are rapidly expanding and may bear the brunt of Taliban offenses and attrit their numbers during the summer campaign season of 2011. If the tide does change in Afghanistan in 2011, will the victor once again write the history by touting the Afghanistan troop surge of 2010-2011 rather than the decisive operational changes; therein leading future counterinsurgency practioners further astray?

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