The Hairball that Stabilized Iraq: Modeling FM 3-24
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In December 2005, an Army-Marine Corps writing team began revising the existing Army field manual on Counterinsurgency. Guided by LTG David Petraeus and LTG James Mattis, the group strived to balance the lessons of the past with contemporary insights and future projections. Early in the process the team wrestled with the overall approach to be taken. One option was an enemy-centric approach that would emphasize the elimination of opposing combatants as the key to long term success. Realizing that such activities were an important element of any COIN strategy, the team decided that persistent success could only come from a population-centric approach which aimed to gain the support of the people for the counterinsurgent. From that decision flowed a broad comprehensive doctrine emphasizing a whole range of activities beyond just security, involving a set of intertwined and supporting Logical Lines of Operation.

Over the past few years, the Warfighting Analysis Division on the Joint Staff has been expanding its portfolio of techniques and tools that can provide value in the study of Irregular Warfare (IW). To aid in the development of these tools and to make analytic progress in the critical IW area of Counterinsurgency (COIN), a J8 team developed a System Dynamics model of the product of the effort described above, the December 2006 Army and Marine Corps publication <u>Counterinsurgency</u>[1]. The model developed serves as a framework and *mental model* that succinctly codifies FM 3-24's concepts, theories, and doctrine. More importantly, it shows the behavioral structure and feedback mechanisms described in the manual's chapters. This model expands and improves upon FM 3-24's original metaphor of COIN as a multi-stranded rope of LLOs.

The team's goal was to develop a model that would be validated and scoped to the manual, and aid planners and strategists in understanding the implications of decisions made in the complex and dynamic world of counterinsurgency. They also hoped to offer planners an interactive version of the manual that could answer the "what if?" questions that are at the heart of any effort to plan a counterinsurgency campaign.

The intent was to demonstrate how modeling could be used to better understand what the authors of the manual, many of whom had extensive work in the area of COIN and IW, thought about a COIN campaign. In the process, the J8 team hoped to generate a framework and methodology that would move efforts forward in the modeling of IW.

System Dynamics is a modeling approach developed at the Massachusetts Institute of Technology (MIT). Historically it has been used to model complex, multi-disciplinary issues in business and social science applications. Several universities and consulting companies are using System Dynamics in a wide variety of applications currently, and there has been a recent upsurge in studying its usefulness in the analysis of non-traditional DoD applications.

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1 <u>Counterinsurgency</u>, jointly published by the Army (Field Manual, FM-3-24) and the Marine Corps (Marine Corps Warfighting Publication 3-33.5)

The human mind tends to look for clear linear relationships; we like solutions that are close to the problem in time and space and make sense when we think about it quickly. Unfortunately, those simple solutions are usually wrong and result in what System Dynamics terms "policy resistance", which is a nice way of saying that the solution didn't work because it was oversimplified, and treated a complex system as if it were a simple one.

In his seminal text[2] on System Dynamics, Dr John D. Sterman, has said that we are frequently surprised by "unanticipated side effects" when, in reality, two types of things happen when we act on a complex system: the things we wanted to happen (and so we take credit for them), and the things we didn't see coming, which we call "unanticipated side effects" and claim that there was no way they could have been predicted. System Dynamics can help us see that cause and effect are not always closely tied together and that unintended consequences are a result of the non-intuitive feedback loops that we didn't even realize were present in the system.

Examples of these consequences are everywhere in the history of policy decisions. Many times they are dismissed as 20/20 hindsight when, in fact, an inaccurate or incomplete *mental model* was used to form the policy decision that led to those consequences. In fact, cycles of actions and reactions that seem to create sweeping pendulums of output are a very natural and frequent occurrence in complex systems, and our inability to intuit our way out of them is one of the reasons that System Dynamics can be so useful.

Most importantly, we often can't start to discuss a solution to a complex problem until we can communicate about it and make sure that we have a common *mental model* of what is going on. System Dynamics can help us to build that common mental model and a framework that enables productive communication. Most of the things that concern people are entities that accumulate or dissipate over time. System Dynamics uses a language of *stocks, flows,* and *feedback loops* to describe this type of behavior.

The J8 effort to develop this common picture begins with a representation of the population of a host nation, depicted as three *stocks* of people, binned according to whether they support the insurgency, are neutral, or support the host nation government (Figure 1). It is also important to point out that this structure makes a couple of assumptions; first that there is an ongoing insurgency, and second, that there exists some level of host nation government that we are seeking to support. These assumptions may seem obvious given that this doctrine is designed for the planning and execution of Counterinsurgency, but they are critical nonetheless and may limit the utility of the model, or the manual for that matter, if it is employed where those conditions don't exist.

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2   Sterman JD. 2000. *Business Dymanics: Systems Thinking and Modeling for a Complex World.* Irwin McGraw-Hill: Boston Massachusetts.

Figure 1

Overall, COIN operations need to be designed to accomplish two tasks. You need to try to move the people in the bins to the right while stopping the flow of people to the left. In other words, you need hostile and neutral individuals to become supportive while retaining supportive individuals.

It's important to emphasize that the host nation, like all societies, possesses a potential fractiousness, which represents the tendency to fracture along seams of cultural lines, or religious identity, or some other group affiliation when under stress. This potential may mean that certain courses of action will be present that either reinforce or widen seams as appropriate. Correctly identifying this potential in the planning stages is critical to the success of the counterinsurgency.

The initiation of coalition funding for development starts to create economic investment, and economic development should follow (Figure 2). What we see here is the first of what will become many feedback loops. This one seems pretty intuitive, but others are a little less obvious. In fact, it's those less obvious ones that can end up producing our leverage. Improvement in the host nation's economy should lead to more economic investment, further strengthening the economy and starting to influence movement from the insurgent and neutral groups toward the supportive group.
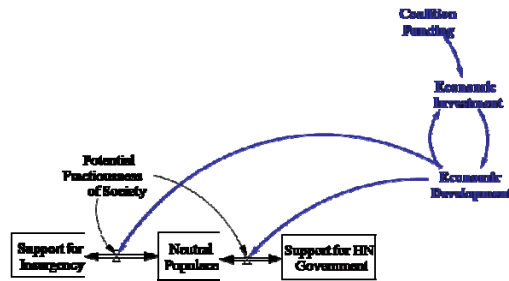
Figure 2

The presence of coalition funding also serves to significantly impact the restoration of essential services throughout the host nation (Figure 3). The intent of this activity is that improvements in the provision of essential services will influence movement from the insurgent and neutral groups toward the supportive group. It's important to note that this will take some time. This needs to be kept in mind since system delays are one of the things that have great impact on the output. We cannot be impatient and expect results too soon. If we continue increasing the input when we don't see any output, we are likely to cause the system to overshoot and crash by the time the delays all catch up.

A critical element to realize in using essential services as a tool for leverage is that we are not measuring the actual level of services provided as the key indicator of our influence on people, we are dealing with their satisfaction with those services. Satisfaction is directly related to expectations. Consequently, expectations management is an enormous issue. Digging wells for people that don't need wells doesn't help counterinsurgents; and giving a generator to someone who doesn't own anything requiring electricity is similarly useless.
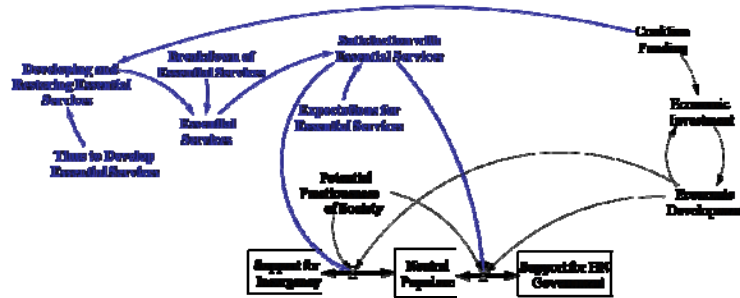
Figure 3

The presence of expectations and their management, means that we need to introduce psychological operations effectiveness to the model (Figure 4). In using the term psychological operations, we realize that this term has a lot of unintended meanings and inferences. For the purpose of this model, we are using it in the strict sense of the Joint Publication 1-02 definition; "planned operations to convey selected information and indicators to foreign audiences to influence their emotions, motives, objective reasoning, and ultimately the behavior of foreign governments, organizations, groups, and individuals." This has been termed "The Message" in other models and that's really what we are trying to represent.
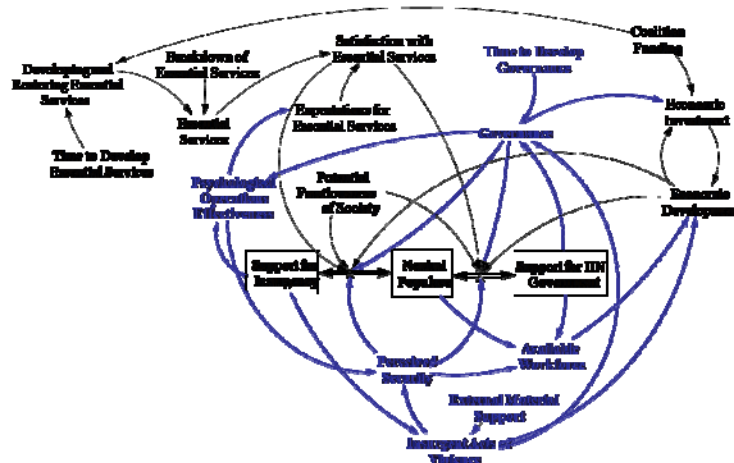
Figure 4

The addition of a psychological operations effectiveness component allows us to start to talk about the need for improvements to governance on the part of the host nation. Actions truly speak louder than words, and we need to do all that we can to assist the host nation with improvements to good governance. A government that is established, recognized, and maintains a secure environment is in a position to send a positive, credible message of success to the populace as well as provide an environment that enhances stable employment of the workforce.

Good governance also begins to drive economic development, since you aren't going to get the foreign investment needed without the proper governance in place. Corporations have to feel that their investments are secure or they will not make them. Additionally, the population needs to feel secure enough to leave their homes and families unprotected in order to begin to create the workforce necessary to sustain the economic development. Since security is such a big issue in this component, acts of violence are introduced here, along with the possibility that there is external material support to the insurgency. Keep in mind that this is not to say that these acts of violence haven't been present from the beginning, just that we are now adding them to the diagram since security has been considered. All of the elements present in the final diagram are present all along; the action of building the diagram is only to enhance understanding, not to suggest a time phasing of events.

It is important to note here that almost everything on the diagram at this point falls under the elements of national power other than military…this is the D. I. _. E. piece (no M) and there other organizations in (and out of) the government that are better suited than the military to handle them. These are tasks that ideally DoD should not have to be doing. The COIN manual supports this view, but also acknowledges that those who are responsible for wielding the other elements of national power may not be present

initially. As a result the military commander may have to figure out how to exercise them all. D, I, and E can't be neglected until security is sufficient to bring them in; the efforts are too interconnected and interdependent.

Now we introduce the M piece to make the "whole of government" DIME picture complete (Figure 5). The military is introduced via the coalition force density, part of this goes to host nation security force development which then adds to total force density to address the security condition.
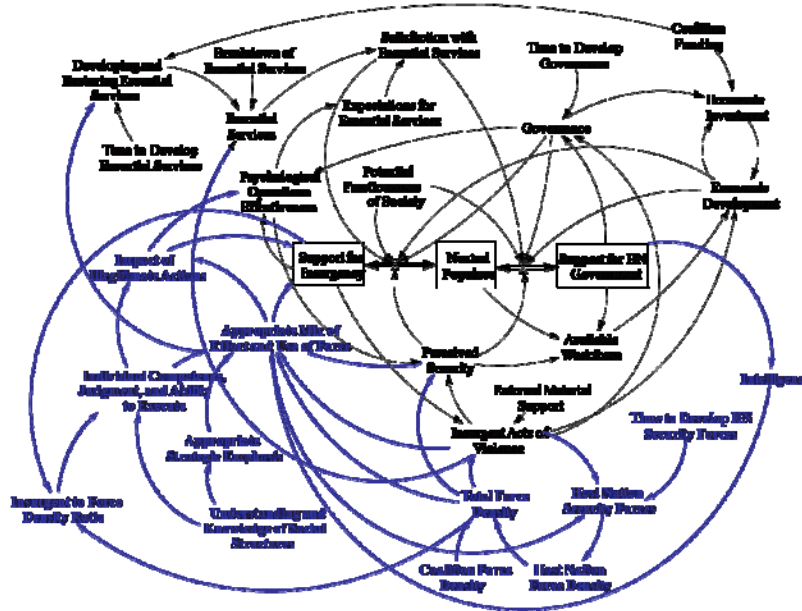

Figure 5

The coalition makes its presence known primarily through an appropriate mix of effort and use of force. This use of force must be guided by both the appropriate strategic emphasis on the part of the leadership and by the individual competence, judgment, and ability to execute on the part of each and every individual, sometimes called the "strategic corporal", as they interact with the host nation population. Both the leadership and the individuals must be guided by an understanding and knowledge of social structures and cultural norms present in the host nation.   Decisions about interactions with the host nation have to be informed by cultural knowledge. A population that is stigmatized about tanks or airplanes may not feel secure when surrounded or protected by them, even if we as the security provider realize that those are the very things essential for success. In the security effort more than any other, we need to acknowledge that perceptions are reality, and must be considered in all our evaluations.

The other thing to note on this figure is that this appropriate mix of effort needs to be driven by the presence of intelligence and information. Much more will be said on this piece later, but for now let us consider that what is represented by the line leading from intelligence to action could be described by the term *operational acuity*. Operational Acuity is the ability of the commander to process all of the available information,

determine the best course of action, execute it, and then continue to iterate this process constantly as new information is received. It is this critical skill that enables the COIN force to act as a learning organization, and could be considered the primary key to success.

We now have a framework from which to begin any discussion of COIN. This is the common picture; the single *sheet of music* necessary for a discussion free from the confusion caused by different mental models among the participants. It should come as no surprise to anyone who has actually read the FM 3-24 that the recommended Logical Lines of Operations (LLOs) from FM 3-24 are embedded deeply within the diagram. Each supports the primary mission of influencing the population to support the host nation government, and each figures heavily in the success of the others. They are elements of what has proven to be a dynamic and complex inter-related set of systems, and they are the task sets that a commander should be executing to achieve success in a COIN effort (Figure 6). This diagram that has been affectionately referred to as the "hairball diagram" amongst those who work with it.
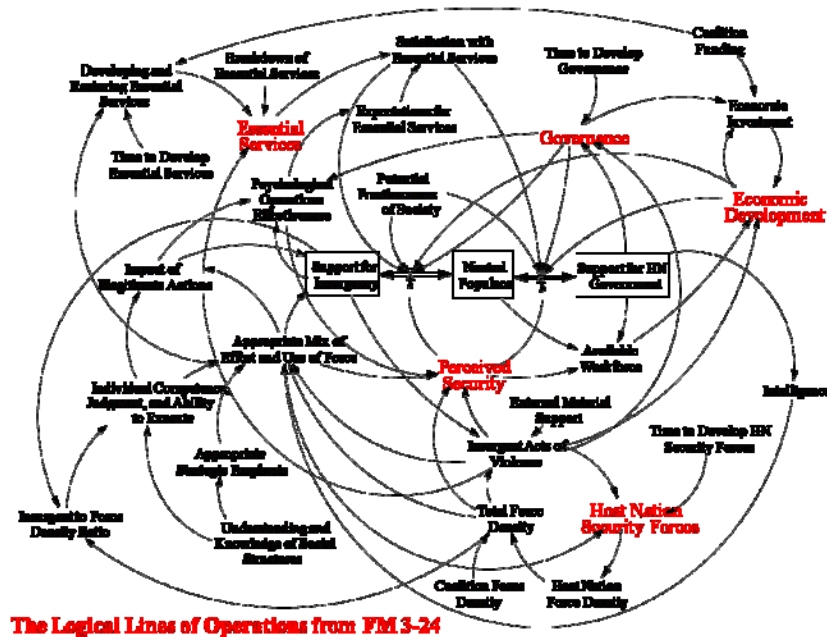
Figure 6

Another important element to point out is the line that connects appropriate mix of effort and use of force to the stock representing insurgent support. This line represents the *hunt, kill or capture* line or the *find, fix and finish* function. That line is the part that nobody but the military can do and that we train so extensively to do well. It is also the line that typically represents the greatest potential for the loss of life when conducting a COIN campaign, so it is a very significant line. But, it is critical to realize how much else is going on in a COIN campaign. That line is just one small piece in a very large effort, and yet there are people whose mental model of counterinsurgency consists almost entirely of that line. In fact, one way to communicate the logic behind the *surge* using this

framework is to consider that the addition of 30,000 troops was not an effort to add 30,000 people to the conduct of that one line; but rather that the conduct of a comprehensive COIN strategy required an additional 30,000 troops in order to have sufficient manpower to do all of the lines.

Another thing that needs to be emphasized is the overarching importance of Information Operations on the effectiveness of the campaign. FM 3-24 uses the analogy of a *sleeve* of Information Operations around the 5-stranded rope of the LLOs. With the Systems Thinking approach, the importance of information is captured within the diagram. It might be tempting to look at the diagram and think that the intelligence element (our way of representing the accumulation of available information) is not very important since it only has one input and one output, but an analysis of the model shows that there are 272 separate feedback loops that include this element of the information campaign. Of these 272, we'll highlight two of them
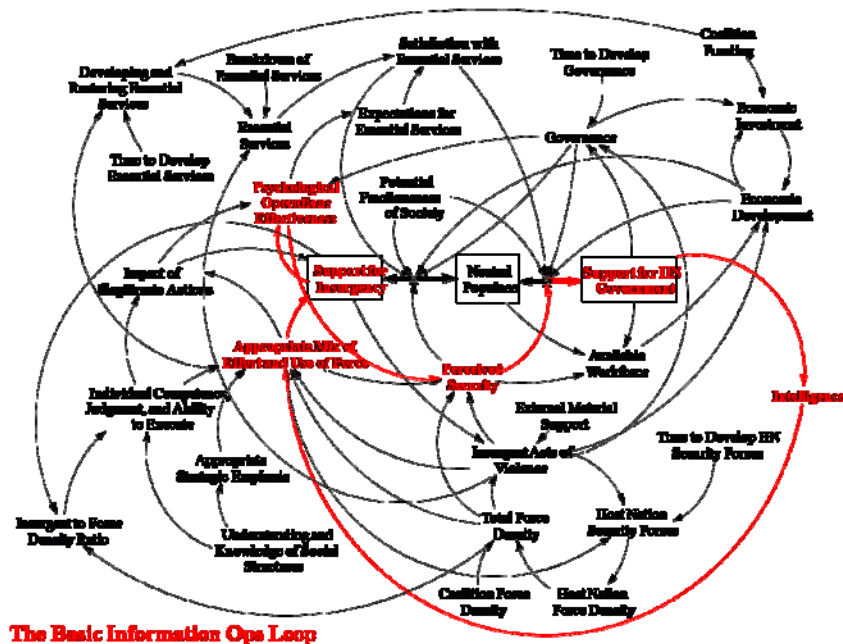
Figure 7

The first of the two is one that we've called the Basic Information Ops Loop. This is the fairly intuitive loop that people likely picture when describing the effect of intelligence on operations.

In this loop, an element of intelligence drives the appropriate mix of effort and use of force. As this improves, the support for insurgency is driven down, resulting in an increase in psychological operations effectiveness. Better psychological operations improve the population's perceived security and, in turn, raise the level of support for the host nation government. More support for the government feeds back on itself as a reinforcing loop in that more information is now being provided.

There is another interesting feedback loop that serves to emphasize the level of inter-connections that exist in this complex feedback process. This one we call the Comprehensive Information Loop. (Figure 8)

Figure 8

Starting at intelligence, it is possible to trace a piece of information as it feeds the appropriate mix of effort to drive a decision to commit troops to the training of the host nation security force. More members of the host nation security force feeds an increase in total force density and results in more perceived security. More security results in people able to join the workforce and feed the economic development. A better economy helps move people to the right in the stocks and leads to a reduction in violence as you drain support from the insurgency. A reduction in violence helps governance grow free from the violence of sabotage or assassination and this helps *the message* that a psychological operation is trying to get across. This helps better meet and manage expectations to provide satisfaction with essential services. More satisfaction with essential services results in more support for the host nation government and the ensuing reinforcing feedback that increases intelligence and information.

This comprehensive feedback loop serves to illustrate that intelligence is truly integral to the success of a COIN operation in that this one piece of information has made its way through all five LLOs and permeates literally every aspect of what the commander is attempting to accomplish. It is not just important; it is a critical necessity to accomplish the mission.

Much of the value in applying a systems thinking process to COIN operations can be achieved by using the diagram to guide planning sessions, operational discussions, or basic tabletop thinking. The *common sheet of music* so useful in communicating any

complex dynamic problem has been attained. As this model has been briefed to many organizations over the past few months, this diagram itself has been of great interest to war fighters. The fact that the J8 team continued to develop a running model is intriguing to analysts, but only slightly interesting to the war fighter. The thing that they find useful is this framework.

In recent reports regarding events from Iraq and Afghanistan, the work that our forces are doing to develop governance, support economic development, enhance perceived security, build essential services and train host nation security forces is mentioned along with the fact that the efforts are reducing the amount of combat operations, curbing insurgent attacks, and increasing stability across the nation. Additionally, those reports have addressed the value of knowledge of social structures and cultural awareness, the ability to reduce potential fractiousness, and the impact of appropriate strategic emphasis and a reduction in illegitimate actions. Using the framework provided by the model as a lens through which to view these events can lead to a clear conclusion; much of the credit for successful operations and the progress that is being made can being given to the doctrine and to those who execute it properly. The "hairball" appears to be working.

With that said, recent observations from Iraq suggest other possibilities to revise the model. Some of "The Awakening" in Anbar Province was generated by mistakes made by Al-Qaeda. Many Iraqis have become tired of violence after many years of war, making them less likely to support militias or insurgents who threaten stability. Perhaps these factors could be additional inputs to the model. Some critics of the new doctrine would argue for a complete reworking of the model to emphasize the enemy-centric approach, where the primary stock would be enemy combatants. That would require considerable redrawing of the hairball. So there is still room for a lot of original thinking in the application of this or similar models. But this type of framework development has the potential to add value to any new doctrine, policy or campaign planning endeavor.