THE INTERNATIONAL

C2 JOURNAL

VOLUME 4, NUMBER 1, 2010

SPECIAL ISSUE

Agility and Interoperability for 21st Century Command and Control

GUEST EDITOR

Sandeep Mulgund
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Agile Sense-Making in the Battlespace

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Agile Sense-Making in the Battlespace

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Abstract

It is intended that this article be a contribution to the current Command and Control (C2) focus on power to edge principles, and the search for agility through self-synchronization. It adopts a social constructivist approach, drawing a great deal of input from political science for its theoretical foundation. In this regard, the article recognizes the fundamental ontological shift from our previous understanding of strategic interaction based primarily on calculations from the physical domain, to modern warfare that depicts two interacting domains for strategic reference, one physical and the other cognitive (or ideational). It sees the skills of battlespace intelligence analyst as the key to sense-making agility in fighting complex conflicts. Then drawing on a constructivist understanding and examples from a complex battlespace, it will suggest three mutually supporting analytical skill-sets for further experiment and research to promote analytical agility: Network philosophy; hypotheses generation and evaluation; and iterative model generation. It suggests that developing these generic skills in our military intelligence analysts will contribute greatly to building a more agile sense-making capacity within our warfighting organizations.

Introduction

C2 research to date has seen a wide variety of theoretical traditions applied to common challenges of the modern battlespace, with a refreshing undercurrent of pragmatism facilitating the development of knowledge. For example, the mathematical functional approaches of James Moffat (2003) and the linear approaches of Thomas J. Czerwinski (1998) versus the introduction of the 6 attributes of agility derived from the cognitive sciences by David S. Alberts and Richard E. Hayes in 2003. In line with this eclectic tradition, this article introduces C2 challenges associated with a complex battlespace to *social constructivism*, with the objective of contributing to the growing C2 epistemology that examines the human capacities for promoting agile sense-making (Alberts and Hayes 2005, 27). The focus of the article is on the military sense-making processes that produce command decisions resulting in battlespace actions, specifically the role of the military intelligence (MI) analyst. Therefore a fundamental assumption of this article is that operations in war are intelligence enabled, and commander driven. With regards to established C2 research, variables such as *information*, *predominant information flows*, *information management*, and *sources of information directly*, will be engaged because the article focuses on MI analysis and planning. As a result, secondary effects on key C2 variables from existing C2 research such as *Command, Leadership, Control, Decision-making*, and *Organizational Processes*, are inevitable (Alberts and Hayes 2005, 218; NATO SAS-026 2002; NATO SAS-050 2006).

The theoretical foundation used here is based on a constructivist interpretation of the asymmetric battlespace, where complexity in the battlespace is seen as a product of the constructivist dynamic known as *intersubjectivity*, understood in its basic form as the constant interaction between the physical and cognitive domains. This understanding suggests that in order to promote sense-making agility in the battlespace, we must provide our MI analysts with more comprehensive and systematic methodological skills to better manage intersubjectivity and by doing so better manage battlespace complexity. Three analytical skill sets familiar to both the positivist and behavioral methodological traditions are identified as being useful to the management of complexity in the battlespace: Network philosophy (or system of systems thinking) to support the development of a common analytical language; iterative modeling to bridge network thinking to the intelligence cycle; and hypotheses generation and evaluation to slow the intersubjective complexity down for analysis.

A Constructivist Framework for Understanding the Asymmetric Battlespace

Symmetrical measures for strategic reference within the logic of strategic choice (Luttwak 2001, 3-50; Luttwak 1998) for parties to a conflict can no longer stand alone. The last 15 years have seen the development of war fighting environments that depict two distinct ontological[1] domains for strategic reference, one physical and the other cognitive (Nicholson 2006, 133-136). An example of this shift in strategic interaction understanding comes from the Taliban leadership themselves, where 15 years ago they defined victory by the taking of Kabul (physical dimension)—today they define victory by a cognitive term roughly translated from several Pashto words as *legitimacy* (cognitive dimension). They plan their operations to *de-legitimize* the Afghan government. Conversely, based on a two pronged strategy promoting security and development, the North Atlantic Treaty Organization (NATO) plans operations to *legitimize* the Afghan government.

The understanding of the physical and cognitive domain adopted here is much broader than that of Alberts and Hayes treatment of interoperability in the information age, and their four part environmental division into the physical, cognitive, information, and social domains (2003, 113). In this article both the cognitive and physical domain are seen within a broader context to better illustrate the value added of a constructivist philosophical position to the explanation of battlespace complexity. This understanding is not new, and can be traced to the original understandings of asymmetric warfare as being a difference of *will* (the cognitive domain) and *means* (the physical domain) that was popular in military sciences during the 1990's.

In this broader understanding, it is not difficult to imagine a physical and cognitive element to both the information and social domains presented by Alberts and Hayes. This logic can easily be exemplified

1. Understood in this article as simply the nature of reality.

at current operational levels of military planning and the political, military, economic, social, infrastructure, and information dimensions of the PMESII framework. Physical actions in any one of these dimensions have cognitive implications for environments in which they are carried out. For example, the building of a school in Kandahar in the pursuit of the desired battlespace effect of promoting the legitimacy of the central government amongst the local population who will hopefully then report more locations of improvised explosive devices (IEDs). Therefore for the purpose of introducing the constructivist philosophical stance to C2 challenges, reality is simply divided into a physical and cognitive domain.

Social constructivism as it is used here, is defined as the view that the material world shapes and is shaped by human action and interaction dependent on dynamic normative and epistemic interpretations of the material world (Adler 1997, 322; Adler 2002, 104-109). Constructivists consider interpretation as an intrinsic part of social science that stresses contingent generalizations, meaning that they do not freeze our understanding but open up the social[2] world. The issues currently focused upon, originate from the belief that reflexive knowledge (interpretation of the world) when imposed on the material reality of the world becomes knowledge for the world (see Figure 1).

Epistemologically, constructivism is well developed as the methodological bridge (Adler 1997, 318-363; Hopf 1998; Checkel 1999, 2001) between positivist and behavioral approaches; this is extremely helpful in terms of sense-making in a complex battlespace, opening the social sciences to a greater degree than ever before, for use in MI analysis and operational planning, without rejecting the material/efficiency concerns of positivists.[3] Therefore constructivist theory should be seen as complementing material/efficiency concerns to

2. A general reference to the world of social science—not to a working CCRP domain.

3. The US Marine Corps *Vision and Strategy 2025* publication articulates this quite well within a military context.

enhance our analytical capability, and not competing with positivism for ontological supremacy. Nor does constructivism constitute a universal methodological stance, and therefore is by no means challenging positivist methodological foundations. To the contrary, as constructivism is dependent on the interaction between the physical and cognitive domains, the management of the physical domain to which positivist approaches are extremely well suited remains a requirement. In this regard adopting a constructivist theoretical foundation for our understanding of complex battlespaces is well placed to incorporate both positivist and behavioralist methodologies to enhance the management of complexity in the battlespace.

Ontologically speaking it is the *intersubjective*[4] dynamic that drives the complexity in the battlespace based on the constructivist understanding that reality does not *just* depend on understanding the material—but also the ideational (Checkel 1998, 324-348; Reus-Smit 2001, 218). Therefore constructivists fundamentally accept that social facts can emerge for the purposes of analysis within a subjective context. In this article, the subjective context is defined by the role of the intelligence analyst in a complex battlespace. Academically in the field of security policy studies, concepts such as culture, identity, and norms have played a role in understanding the international environment (Katzenstein 1998, 1993) in which we have made security policy for over a decade.[5]

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4. See conventional constructivism. Ex., in Hopf's "Promise of Constructivism in International Relations Theory" (1998), IR scholars are presented with a clear theoretical outline of a brand of constructivism fully capable of instrumentally engaging foreign and security policy analysis (Wendt 1995: 72). Conventional constructivist approaches are described by Hopf, as drawing on the modernist social constructivist methodology and empirical approaches such as that of Barnett, while maintaining Adler's pragmatic realist undercurrents (Hopf 1998:181-185; Adler and Barnett 1998).

5. The 1990s saw the fastest growth of constructivist thinking in security policy analysis: Hopf 1998; Barnett 1996, 1998, 1999; Finnemore 1993, 1996, 1998, 2001; Kratochvil 1996, 1989; Klotz 1995; and Wendt 1992, 1995, 1999.

In this article, the argument is that in order to better promote analytical agility in a complex battlespace, the military intelligence analyst must develop skills to help manage intersubjectivity in their battlespace.[6] As the primary developer of knowledge for use in operational planning, they have the responsibility for understanding the multi-dimensional effects in both the cognitive and physical domains. So it stands to reason that formally recognizing the role intersubjectivity plays in a system of systems understanding will help identify and develop the techniques that best assist in managing it. The result within the context of today's battlespace should be an improved human capacity for effects analysis, and improved synchronization of kinetic and non-kinetic planning in an Area of Responsibility (AoR.) Examples presented in this article will illustrate how by acknowledging the management of intersubjectivity as the challenge, tools are identified to better integrate cognitive *facts* such as identity or norms into the intelligence cycle. Enhancing the traditional material/efficiency concerns represented in the long dominant order of battle reports (ORBATS) and the geo/mathematical analysis of collected intelligence.

6. In theoretical terms this would give them the skills to manage emerging social facts resulting from the interaction between knowledge and the material world—neither of which is fixed (Adler 1997, 327-328).

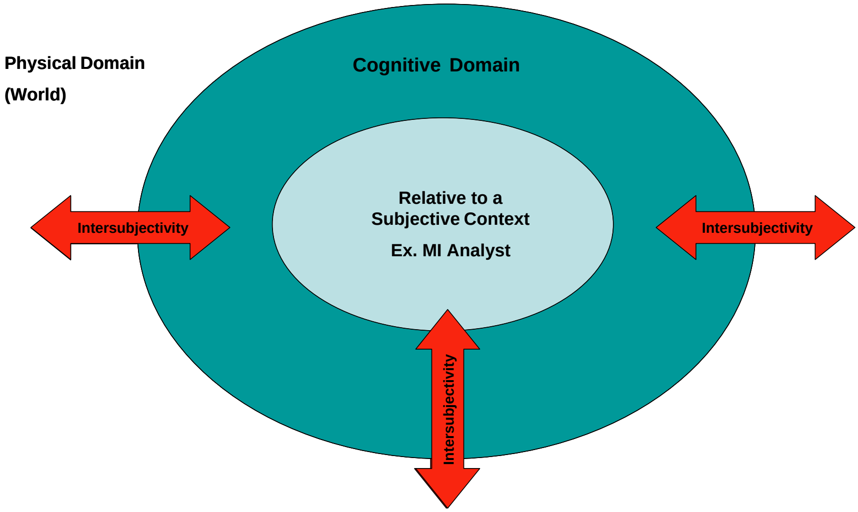

Figure 1. Constructivist Sense-Making in the Battlespace

Traditionally MI has been dominated by positivist approaches to sense-making based primarily on material/efficiency descriptions within the time and space dimensions of World War I, World War II, and the Cold War,[7] where the social-sciences were given very little place in MI (Katz 1989, xii -xv). This is not an easy shadow for MI to shake. Constructivism as a theoretical approach, like intelligence analysis as a process, does not lay claim to an objective certainty. Instead, it is in the fundamental nature of both to advocate a pragmatic approach to managing uncertainty, a characteristic also shared with C2 research in general (Johnson 1998, 1999). Civilian intelligence analysis has for some time used constructivist techniques to supplement or even direct collection processes (Goodman 2003, 3-12; Herman 2004, 125-126).[8] Profiling personalities or governments, such as assigning them an identity as a radical or moderate, has been used to help predict which norms are relevant, and

7. For example see Daniel Yergin 1977, 123; David Hallloway 1983.
8. For some of the earliest examples see Katz 1989, 137-164 and the role of social science in the Cold War.

based on those norms, predict patterns of behavior. Such techniques should not be denied to MI due the 20th century requirement of a warfighting doctrine built primarily on the numbers of missiles, tanks, and aircraft.

Furthermore, constructivism's inherent purpose is to understand the role of intersubjective interaction between the cognitive and physical domain, consequently it is naturally at ease with the current effects based approaches to operations (EBAO)[9] philosophy that informs current operational doctrine in the West. Quite simply, both are based on recognition of the cognitive and physical domains with regards to sense-making.

Existing Doctrine and Philosophy

The constructivist approach presented here currently lies within a military context defined by NATO in transition started (Rogers 1996, 22-23), and a high profile mission in Afghanistan. The development of the concepts in this article are not immune to this context, and are heavily influenced by what EBAO represents as a sense-making framework for complexity requiring both the social and physical sciences (Phister et al. 2003, 1-2; Czerwinski 1996, 21-132; Owens 1995, 35-39).

The analytical challenges of engaging this complex environment are reflected well in Tom Czerwinskis' *billiard* metaphor and the concept of *tagging* (2003, 114-115). NATO's PMESII[10] guideline attempts to do just that with the complexities of an asymmetric battlespace by dividing it up into different dimensions for strategic reference when

9. EBAO calls for an expansion and exploitation of our knowledge base to support the planning, execution, and assessment of actions in a complex battlespace defined by a physical and cognitive domain.

10. PMESII – Political, Military, Economic, Social, Information, Infrastructure domains of a battlespace and represents a system of systems approach. It can also be portrayed accurately as interacting social networks

decision-making or planning. Instead of there being just a *military* dimension, they must now consider PMESII dimensions of their battlespace (NATO Bi-Strategic Command Pre-Doctrinal Handbook 2007). By doing so it hopes to make the predictions of the non-linear interactions more manageable.

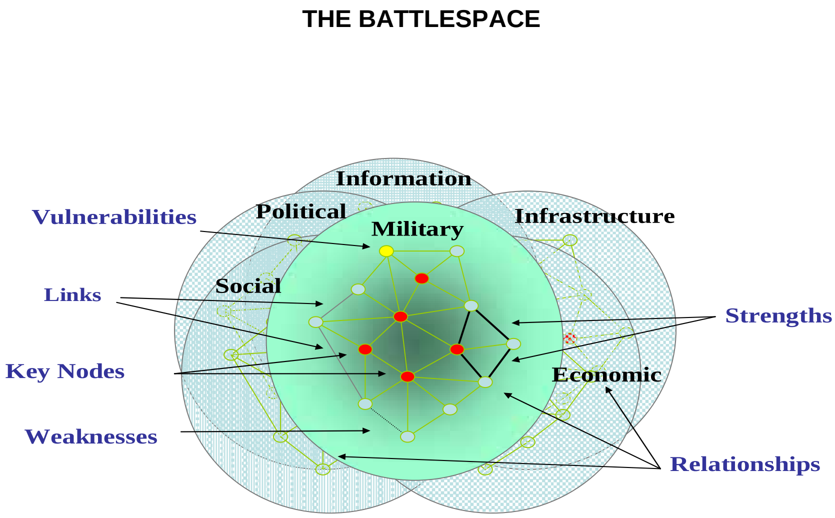

Figure 2. PMESII – A System of Systems Understanding

Expanding the Scope of MI Collection and Processing

Most intelligence cycles[11] in the military are iterative processes that reflect four stages, direction, collection, processing, and dissemination, in some way or form. The purpose of the intelligence cycle is to deal with all the available information, decide relevance, search for the missing information, process it into something even more relevant, and make it ready for distribution.

11. For generic understanding see Clark 2004, ch.1; Herman 2004, 293-296; and Mitchell 2002, 486.

Complexity in modern warfare requires more than Order of Battle styled reports (ORBATS).[12] ORBATS are one of the traditional products of basic MI output. It usually covers tracking primarily material/efficiency concerns from the military dimension such aspects of the opponent's equipment, capabilities, performance,[13] and some relatively light socio-political matters relative to leadership or logistical support.[14] For the implementation of EBAO to be effective, it must be supported by relevant (Schoffner 1993, 31-35) intelligence *collection* from non-military dimensions and an expansion of the knowledge base primarily through non-ORBAT information.[15] The nature of MI analysis has traditionally been descriptive in terms of the time and space dimensions.[16] However EBAO requires a great deal more predictive battlespace awareness (PBA)[17] for the commander and it is here the challenges lie in terms of adjusting the training of our MI analysts. In short, applying PMESII to meet the challenges of the complex battlespace within an EBAO context will require a shift from a focus on descriptive analysis to predictive analysis in terms of the nature of MI analysis (Mitchell 2002, 481-485). This has direct methodological implications for the production of estimates and analysis or the processing stage of the MI cycle. The challenge with regards to fully implementing the principles of a framework such as PMESII within the military intelligence cycle, in terms of the non-military dimensions of the battlespace, will be the key to ensuring equal dimensional representation in the planning process—and an effective application and exploitation of EBAO.

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12. Using UK Ministry of Defence (MOD) definition (1999, 1A-2).

13. For a good example of the comparative tech focus see Libicki and Johnson 1995, 48-49.

14. Military intelligence output is divided generically into basic and current intelligence—current intelligence is situational and not referential in character.

15. For example ASCOPE in US Army Field Manual 2009.

16. Phister 2003, 2. Known as Intelligence Preparation of the Battlespace (IPB), its purpose is to keep the commander aware of recent, current, and near term events in the battlespace.

17. Using US Air Force Scientific Advisory Board definition, Report SAB-TR-02-01, 2002.

The Al-Nur Exercise

In a staff exercise called AL-NUR conducted at the Royal Danish Defence College (RDDC) in Copenhagen, Denmark, staff officers ran an operational planning process (OPP) exercise to a scenario. The scenario required planning for a possible intervention into Somalia, based on given intelligence and political objectives to eliminate the regionally destabilizing effect of Islamic Fundamentalist militias. Here PMESII was introduced and applied without social science method training, or formal training in the new guidance from NATO itself. The final plan was to be reviewed by non-staff officer analysts with social science backgrounds in the non-military dimensions, as well as PMESII experts with experience from the NATO regime.

In the first operational plan (OPLAN) presented in Figure 3, there was little exploitation of the PMESII framework, as a military presence in northern Somaliland province was missing, while all kinetic activity was concentrated on Southern Somalia. This action was not fully evaluated for any negative political effects—if done it would have warned of a serious risk that Somaliland might use the opportunity to declare independence from Somalia (the provided intelligence indicated this)—a much undesired effect with regards to the strategic objectives set out for military intervention. It would also lead MI to collect primarily ORBAT type material relative to the various factions, with very little non-military dimensions such as clan mapping or infrastructure assessment.

- Establish presence in Mogadishu and expand with main effort in Southern Somalia.
- Target extremist and encourage negotiation with all other parties.
- Humanitarian relief and CIMIC coordinated with targeting.
- When SASE is established in Southern Somalia - expand success and SASE northwards.
- Deliberate approach to DDR-process.

CIMIC – Civil-Military Cooperation

SASE – Safe and Secure Encvironemt

DDR – Demobilise, Disorganise, Reintegrate

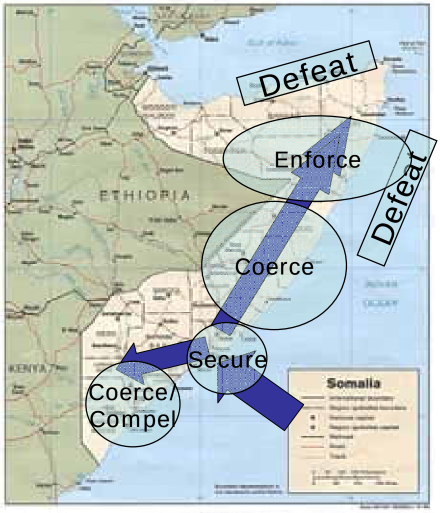

Figure 3. Proposed OPLAN (Without PMESII Training)

If the PMESII framework was applied in a systematical manner, that is, committing all kinetic planning to multi-dimensional analysis, this important fact would likely have been considered, and the direction for the MI cycle altered to support alternative course of action (COA) development.

With regards to the use of dynamic hypotheses and iterative modeling: ideally, a standing model based on PMESII and illustrating the dimensional relationships of the Somaliland independence would not only have identified the undesired effects from planned kinetic actions, it would also have helped to develop strategies to *mitigate* undesired effects vis-à-vis preferred courses of action. One example would be the use of model testing for a smaller military presence (military dimension) in Somaliland with focused economic assistance (economic and infrastructure dimensions) to the identified clans that want independence. Particularly those along their provincial border (political and social dimensions) and backed up by information operations (INFOPs) promoting the benefits of unity (information domain).

These multi-dimensional efforts might mitigate the risk of a unilateral Somaliland declaration of independence while, allowing the *majority* of military forces in the south to conduct combat operations after the OPLAN. (Multi-dimensional exploitation are represented by different colored arrows in Figure 4)

- MD1- Establish presence in Mogadishu and expand with main effort in Southern Somalia.
- MD2- Establish small military presence in Somaliland.
- P/SD1-ID Clan Structure Key Leaders in Somaliland.
- ED1- economic incentives to key leaders
- INFOD-Somaliland
- Southern Somalia - expand success and SASE northwards.

MD 1,2 – Military Dimension 1,2

P/SD1- ID- Political/Social Dimension 1 – Identification

ED1 – Economic Dimension 1

INFOD – Information Dimension

SASE – Safe and Secure Environment

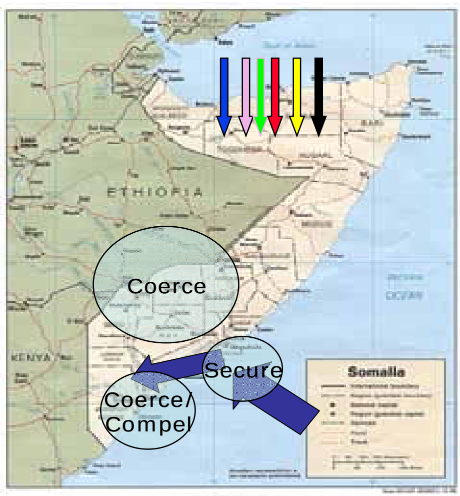

Figure 4. PMESII Mitigation of Somaliland UDI[18] threat (With PMESII training)

Skill Sets for Agile Sense-making in Complex Battlespaces

The following skill sets proposed here were identified because of their theoretical ability to help manage intersubjectivity and not whether or not they are used by positivists or behavioralists. Furthermore, they are chosen based on their application in actual intelligence analysis in the field. This list is not exhaustive and one of the driving principles should be the generic value of the tool. Furthermore,

18. Unilateral Declaration of Independence

the three tools presented here should be seen as mutually supportive and not as a procedure. Good hypotheses can lead to good networks or models, while good models and networks can help develop hypotheses.

Network Philosophy

The technological aspect of network centric warfare (NCW) is no longer the main challenge (Smith 2006, 195-238; Smith 2003), it is the human and social networks that we are now grappling with to improve our sense-making in the battlespace (Holmes-Eber and Kane 2009, 31-35.) From the perspective of a constructivist approach to managing complexity, network thinking acts as method managing and communicating a representation of the intersubjective relationships between the physical and cognitive domains in the battlespace. Usually depicted as a system of systems (such as PMESII), it slows the intersubjective dynamic down relevant to the task at hand, and enables opportunities for a more comprehensive understanding of actions and effects within the EBAO framework.

Figure 5 illustrates how network thinking can frame the intelligence cycle relevant to the Commanders intent in an AO in Afghanistan. The objective represented here is simply for the BLUE (Coalition Forces) to move more of the *undecided* WHITE population over to supporting the Government, than supported the government when they first arrived in theatre. This will require an understanding of the other actors and their objectives vis-à-vis WHITE, as well as consideration of how their own actions affect this system as a whole.[19]

19. This network model is an example of constructivism in action, where key concepts such as identities and norms, or patterns of expected behavior (Hopf 1998) are exploited in conjunction with physical actions.

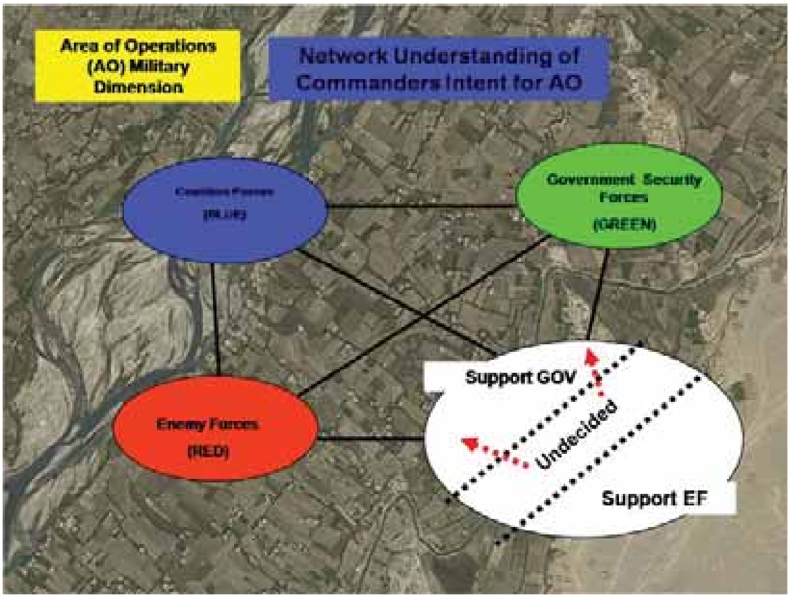

Figure 5. Network Thinking Applied, NATO

Relating planned or executed actions to this network representation helps manage the complexity of this battlespace. For example if BLUE does too much without the GREEN, they make the GREEN look weak in the eyes of the RED and WHITE. This could be counterproductive to moving the undecided WHITE in the right direction. If they do too little, the RED might force the undecided population over to their side with violence and intimidation.

Based on this network centric framework for Commanders intent in the AO, standing iterative models for the AO can be established and maintained that will assist in timely effects assessments. For example in Figure 6, a standing model representing the compounds of the AO and the political leanings of their owners, if kept up-to-date, will support the Commander in making a timely decision. This could be whether or not to risk close air support (CAS) in an engagement, vis-à-vis their objective of moving undecided support towards the government.

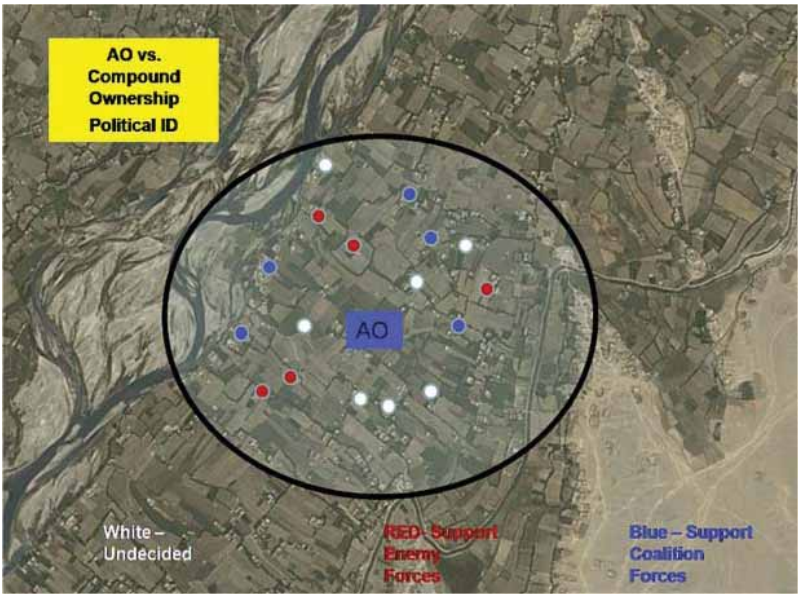

Figure 6. AO Compound ID vs. Commanders Intent

From the standpoint of the MI analyst and the intelligence cycle, a network centric understanding of the AO will contribute directly to how we determine what should be tasked, collected, processed, and disseminated. From a knowledge development standpoint, this pits our networks against the target (enemy) networks as depicted by Clarks' (2003) work with organized crime, but within the context of a complex battlespace. Determining which networks are relevant to the Commanders intent for the AO, and what can be managed (information collected, collated, and interpreted) in a timely manner by your own knowledge development network is very challenging (see Figure 7).

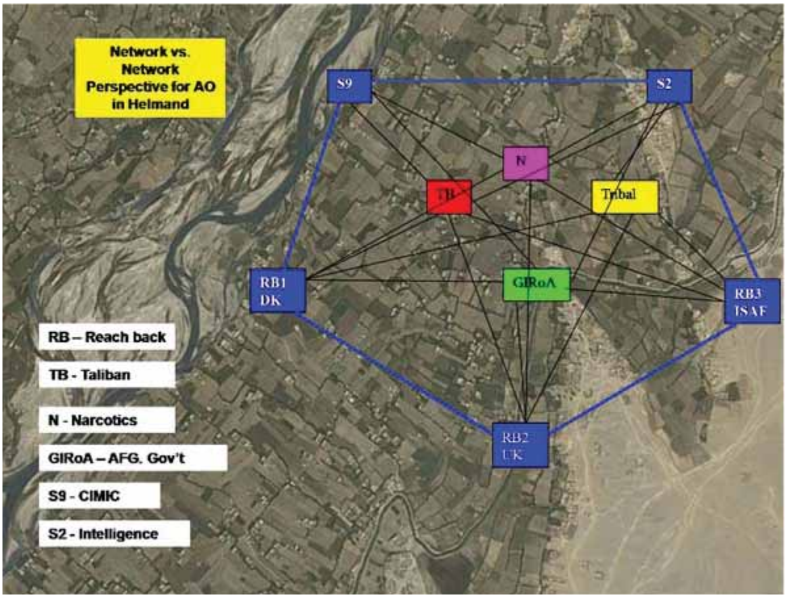

Figure 7. *Network vs. Network* Understanding for an AO in Afghanistan

Network identification is in itself an analytical art. In this case, building up an understanding of the tribal dynamics was deemed important as in this area it was determined that the tribal laws often play an important part in the local society- this might not be the case in the adjacent AO. In terms of actual practice, the implications for MI analysts will require that they develop the skills to determine what target networks are relevant to their AO, and develop the hypotheses driven iterative models to manage them.

Iterative Modeling

From a constructivist standpoint, iterative modeling converts the dynamism behind network thinking to more practical applications of managing intersubjectivity, within a *tagging* framework of inter-systemic relations such as PMESII. It is also an essential skill if we are to have any chance at maintaining timeliness in more complex battlespaces. A model can be a replication or representation of an idea, an object, or actual system (SAS-050 2007, 23.) More importantly, it often describes how a system (or network) behaves (Clark 2004, 29.) Models can be used to describe, explain, and predict. They can be used in the intelligence cycle to create baseline references and for building up databases of knowledge that can be manipulated to advantage (as in Figure 6). Specifically, the ability to systematically produce relevant mental models to increase the overall effectiveness of MI output is paramount (Mitchell 2002, 480-485; Heuer 2006, 47-105). EBAO inherently places the weight of modeling application on prediction in terms of qualifying desired and undesired effects (Smith 2006, 149-193), and the production or assessment of actions.

Figure 8 is an example of simple iterative modeling put into the Afghanistan context, depicting a local Improvised Explosive Device (IED) cell, and another network structure reflecting the local Taliban Command and Control (C2) structure or an *outer-shura*. In both models the organizational structure, process, and function are represented, and therefore are well-suited for use with MI cycle iterations. Updating the models with information, such as populating the nodes with identified persons could be one example of this, and at the same time it will help define priorities for collection activities.

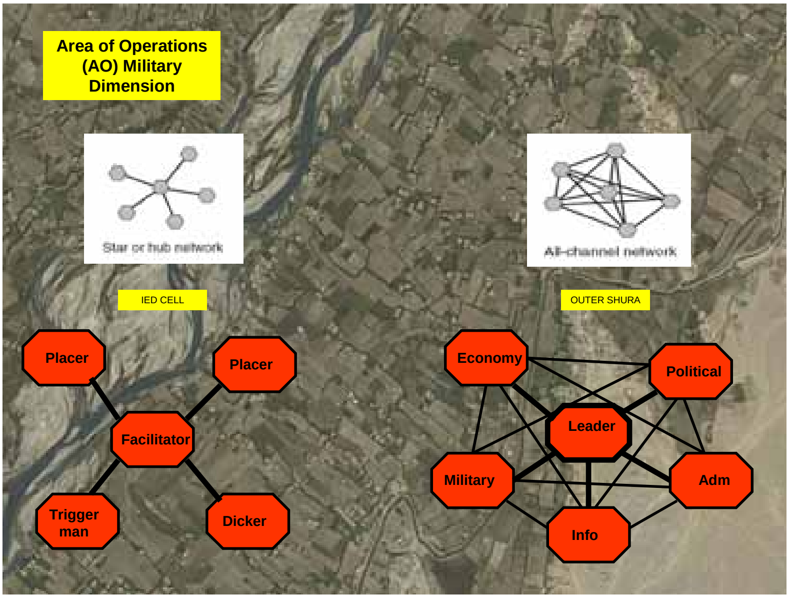

Figure 8. Basic Iterative Models in Action

Basic iterative models for an AO quickly become part of the overall systems of systems understanding through link analysis. Figure 9 illustrates how a comparative analysis of the intelligence populating the two basic iterative models in an AO, produce links between them that can be quickly represented and shared with other analysts.

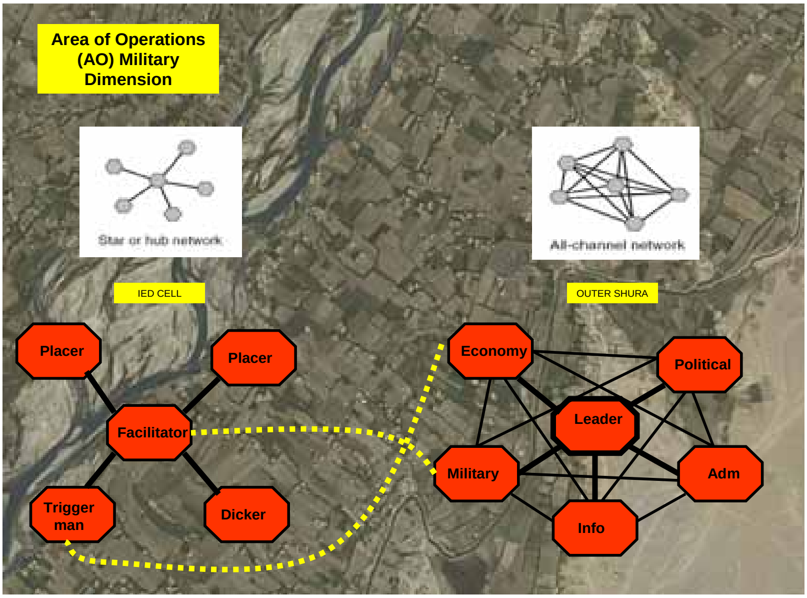

Figure 9. Basic Iterative Models and Link Analysis

Hypotheses generation and evaluation

From a constructivist perspective, hypotheses generation and evaluation are the methodological skills necessary to slow intersubjectivity down by analytically forcing different systems into dynamic relationships with other systems for analysis. Managing a system of systems framework, such as PMESII, inherently places the weight of analysis and estimates on hypotheses defined relationships, primarily between PMESII domains. Managing standing iterative models will assist in generating useful dynamic hypotheses for the AO. Figures 10 and 11 illustrate how crossing known firing positions in an AO, with known tribal divisions within the AO, can produce some useful hypotheses for use by the intelligence and operational planning cycles.

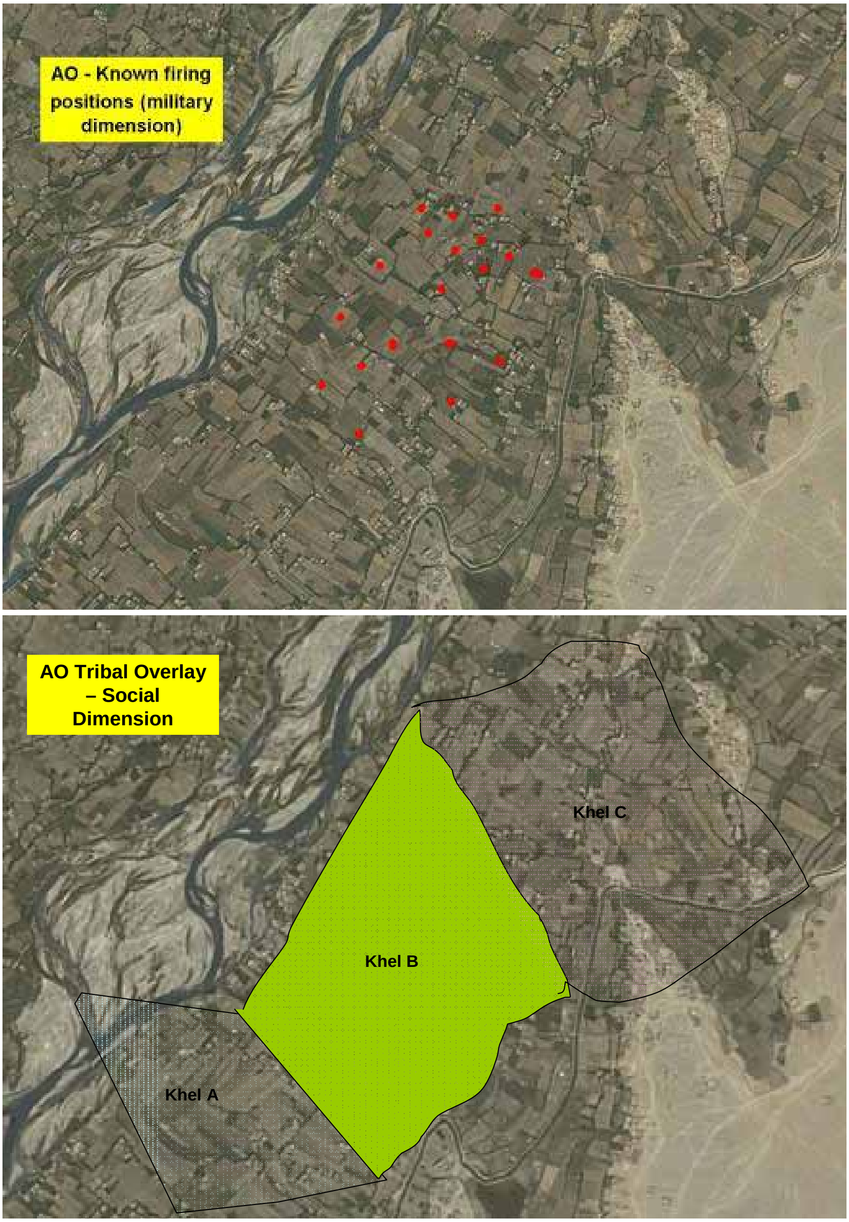

Figure 10. Known Firing Positions in AO vs. AO Tribal

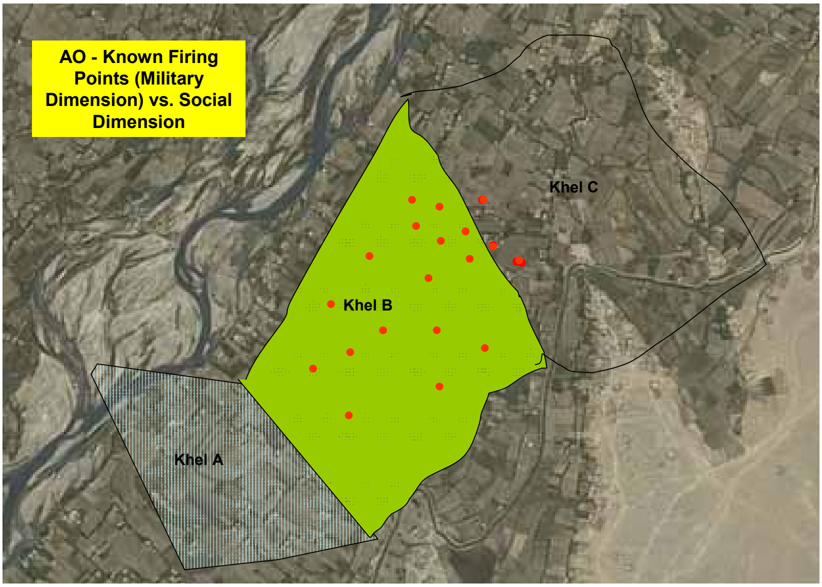

Figure 11. Military Dimension-Social Dimension Integration. Resulting dynamic hypothesis for use in the OPP for COA generation: *Members of the Khel (Clan) B are more likely to directly support the Taliban then members of Khel A, C.*

Therefore, based on this target generation and evaluation, resources can be focused on key members of Khel B's C2 structure, mutually supported by focused non-kinetic operations synchronized with psychological operations (PSYOPS.) The validity of the dynamic hypothesis can be checked with every iteration of the intelligence cycle.

Figures 12 and 13 represent the same process but with processed signals intelligence (SIGINT) analysis exploited together with the relevant tribal information for the AO. Again the *what* to put together and *how* will sometimes be the result of already existing hypotheses, such as in this case the hypothesis used by the SIGINT to relate the SIGINT hits to movement and a pattern of transport with confidence.

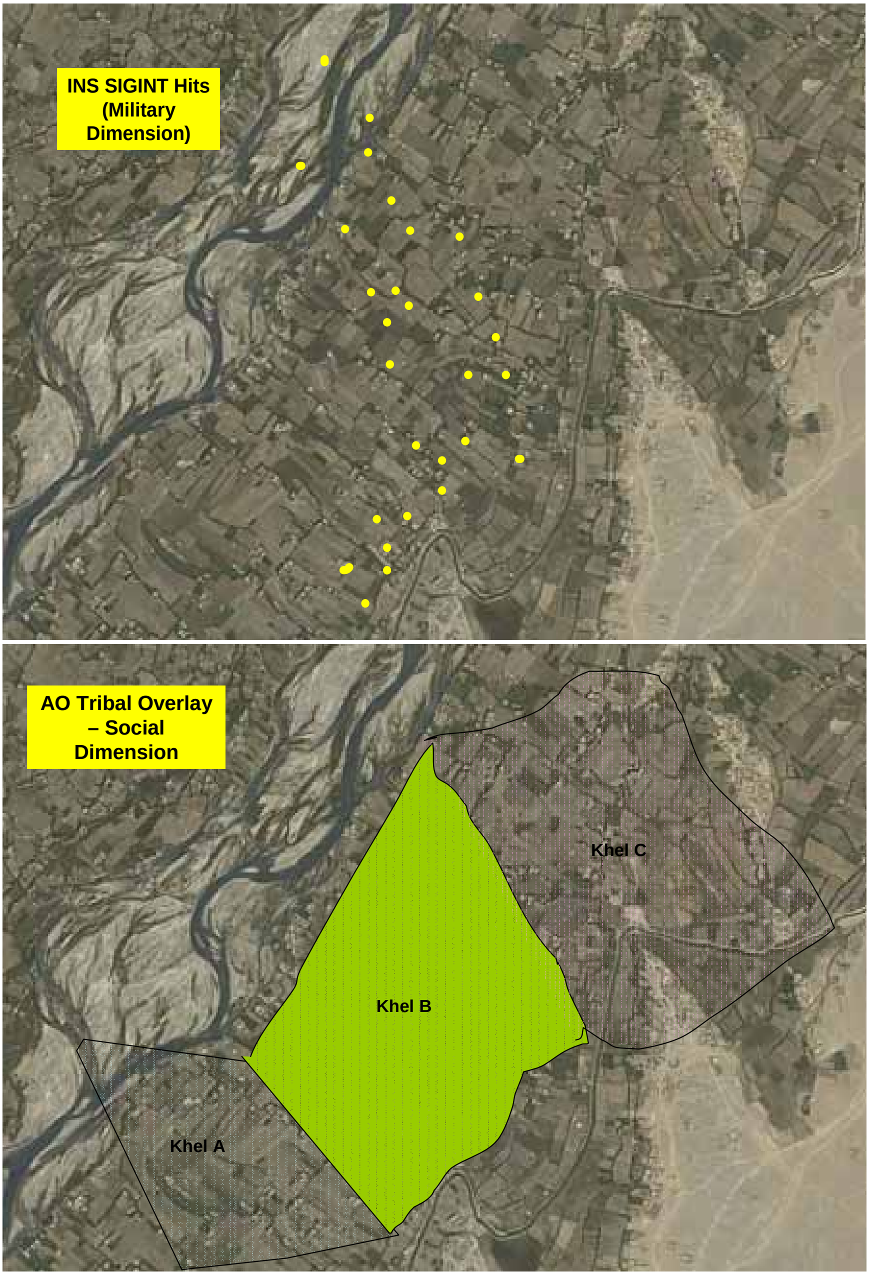

Figure 12. Analyzed SIGINT Hits vs. AO Tribal

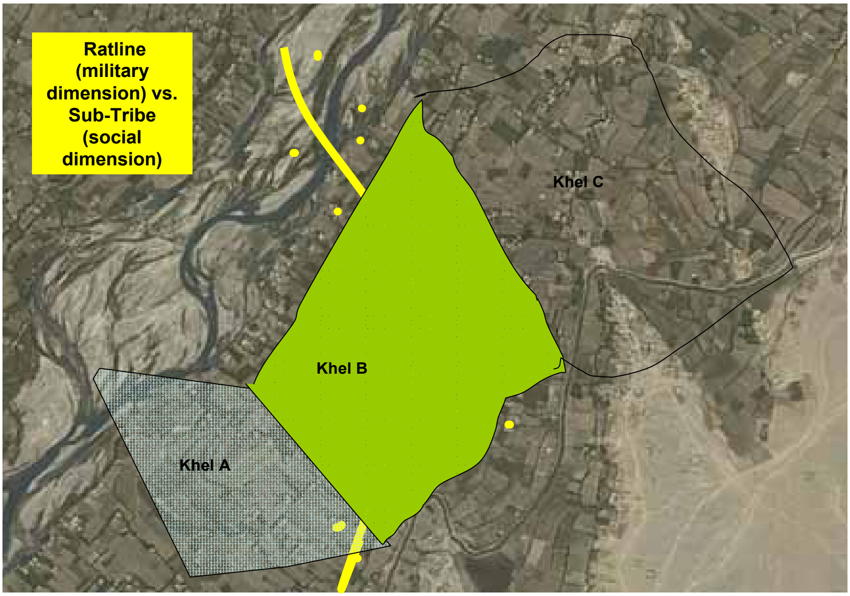

Figure 13. Military Dimension vs. Social Dimension. Resulting dynamic hypothesis for use in the OPP for COA generation: ***Members of Khel B are more likely to have knowledge of Taliban weapons caches in AO then members of Khel A, B.***

Again such a hypothesis can be validated with the intelligence cycle iteration that is already synchronized with the OPP, so COA generation and evaluation should already be harmonized.

There are methodological differences in approaches to hypothesis generation and evaluation that can have a major impact on battlespace planning. Figure 14 represents a comparative view of two different approaches to hypothesis generation, historical comparison versus situational logic that could lead to a major difference in results. In this case, using historical comparison, a hypothesis was generated that predicted the Taliban would use mountain trails to migrate to Western Pakistan for the winter, after the 2007 poppy harvest in Afghanistan. This hypothesis was based on noting the similarities of routine from previous years (i.e., 2004, 2005, and

2006) and *filling in the gaps* of uncertainty for 2007. Inevitably, alone it would drive the direction of the intelligence cycle to search for similarities to previous years to confirm the hypothesis, in the process risk missing new evidence that might have come into play in 2007—such as a change in the tempo of the Pakistan military operations in Western Pakistan. Conversely, adopting the most common approach to hypothesis generation, situational logic, more detailed evidence from the existing year, 2007 will indeed be noted, but one risks missing lessons from previous years.

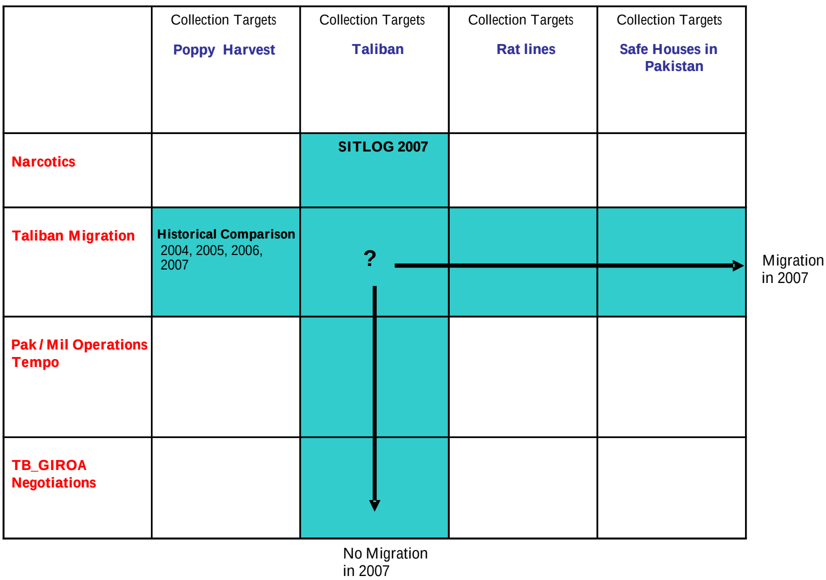

Figure 14. Historical Comparison vs. Situation Logic (Ex. Prediction of 2007 Taliban Migration)

Ideally our hypothesis generation skill set should focus on being aware of the strengths and weaknesses of different methodological approaches. If possible several approaches could be adopted simultaneously to have their individual results further validated through the intelligence cycle, and then weighted accordingly for use by decision-makers.

Conclusion

This short introduction of constructivist thinking to C2 research intended to illustrate that in order to promote sense-making agility in the battlespace, we must provide the MI analysts with more comprehensive and systematic methodological skills to better manage intersubjectivity. The three skill sets presented here were: Network philosophy (or system of systems thinking) to support the development of a common analytical language; iterative modeling to bridge network thinking to the intelligence cycle; and hypotheses generation and evaluation to slow the intersubjective complexity down for analysis. Network philosophy, iterative modeling, and hypotheses generation are three mutually supportive points of departure for further research.

Other research could focus directly on the natural harmonization of constructivist philosophy with EBAO that will provide us with an opportunity to exploit 15 years of existing security policy research (Katzenstein 1996), and adapt it for use in the battlespace. This would contribute to building a common MI analysis language that replicates the popularity of ORBATs, but for use with agile sense-making for complex battlespaces. Target network understandings for example, are not only easy to communicate to new analysts arriving in theatre, but also between the different branches of the military, various organizations or communities, and reach-back facilities. In the process we will build a common MI analytical language for complex battlespaces and common analytical tools, for promoting agile sense-making that will last well into the battlespace complexities of the 21st Century.

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