Defence Research and Development Canada
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A "First-cut" Concept Map

The Irregular Adversary (Insurgent)

James W. Moore

Defence R&D Canada
Technical Memorandum
DRDC Toronto TM 2011-118
December 2012

Canada

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Principal Author

Original signed by James W. Moore

James W. Moore

Defence Scientist, Socio-Cognitive Systems Section

Approved by

Original signed by Keith Stewart

Keith Stewart

Section Head, Socio-Cognitive Systems Section

Approved for release by

Original signed by Dr. Joseph V. Baranski

Dr. Joseph V. Baranski

Chair, Knowledge and Information Management Committee Acting Chief Scientist

Abstract

The Socio-Cognitive Systems (SCS) Section at Defence Research and Development Canada—Toronto (DRDC Toronto) has undertaken a Technology Investment Fund (TIF) Project entitled "A Conceptual Framework for Understanding Armed Non-state Actors (ANSAs): Strategic Roles and Operational Dynamics." The aim of this Project is to advance our understanding of (a) the *strategic roles* of ANSAs in the context of violent intergroup conflict, and (b) the *operational dynamics* of ANSAs that facilitate the performance of these roles. To assist us in this endeavour, we have constructed a Concept Map (Cmap) of an Irregular Adversary (Insurgent) [IA(I)], derived from Canadian Army doctrine on land and counterinsurgency (COIN) operations. This "first-cut" IA(I) Cmap will serve as the point of departure for the development of an ANSA Cmap that will provide a means to guide and manage our efforts to explore the intentions and behaviours of ANSAs the Army is liable to encounter in future expeditionary operations.

Résumé

La section des systèmes sociocognitifs (SCS) de Recherche et développement pour la défense Canada—Toronto (RDDC Toronto) a entrepris un projet financé par le Fonds d'investissement technologique (FIT) intitulé « *A Conceptual Framework for Understanding Armed Non-state Actors (ANSAs): Strategic Roles and Operational Dynamics* » (Cadre conceptuel pour comprendre les motivations des acteurs armés non étatiques (AANE) : rôles stratégiques et dynamique opérationnelle). Ce projet a pour but d'améliorer notre compréhension : (a) des *rôles stratégiques* des AANE dans le contexte de conflits intergroupes violents et (b) de la *dynamique opérationnelle* des AANE qui facilite l'exécution des rôles stratégiques. Afin de réaliser cet objectif, nous avons élaboré le schéma conceptuel d'un adversaire irrégulier (insurgé) [AI(I)], inspiré de la doctrine de l'Armée canadienne portant sur les opérations terrestres et de contre-insurrection (COIN). Cette première ébauche du schéma conceptuel AI(I) servira de point de départ à la création d'un schéma conceptuel des AANE, sur lequel nous nous fonderons pour explorer les intentions et les comportements des AANE avec lesquels l'Armée est susceptible de devoir composer au cours de ses prochaines opérations expéditionnaires.

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Executive summary

A "First-cut" Concept Map: The Irregular Adversary (Insurgent)

James W. Moore; DRDC Toronto TM 2011-118; Defence R&D Canada – Toronto; December 2012.

Introduction: In this Technical Memorandum, we introduce a Concept Map (Cmap) graphically representing the Canadian Army's conception of an Irregular Adversary (Insurgent) [IA(I)] as set out in two doctrinal publications, *Counter-Insurgency Operations* (DAD, 2008a) and *Land Operations* (DAD, 2008b). This "first-cut" IA(I) Cmap will serve as the point of departure for the subsequent development of a more general Armed Non-state Actor (ANSA) Cmap that will provide a means to guide and manage our efforts to explore the intentions and behaviours of one class of irregular adversaries the Army is liable to encounter in future expeditionary operations.

Results: Our task was to answer the focus question: "What is the Canadian Army's concept of an Irregular Adversary (Insurgent)?" We turned to Cmapping to help us in this endeavour. A *concept map* (Cmap) is a visual model for organizing and representing knowledge, consisting of a semi-hierarchical arrangement of concepts and propositions. The elaboration of the propositions in the IA(I) Cmap involved a careful reading of the *Land Ops* and *COIN Ops* field manuals to identify statements regarding the nature, characteristics, activities, etc., of irregular adversaries in general and insurgents in particular. These scattered statements were clustered by concept and then synthesized to form the *concept → linking phrase → concept* triples or propositions that make up the skeletal structure of the IA(I) Cmap.

The fruit of our labours—the IA(I) Cmap—is presented in Figure 1 (next page). As can be seen from the Cmap, the Army's conception of an IA(I) is quite extensive: some 79 major propositions and 78 subordinate propositions that define an IA(I). These are grouped into four major blocks that allow one to focus more easily on smaller regions of the Cmap: (a) Organizational and Contextual block, (b) Strategic Decision Making block, (c) Ideational Core block, and (d) Social Conflict block. In addition, the IA(I) Cmap incorporates 10 nested nodes, identified by heavy-black, dashed borderlines around the nodes. Clicking on a nested node icon expands the node to reveal a series of subordinate propositions related to the parent concept. This facilitates "drilling down" into the concepts, that is, temporarily displaying additional propositions describing complex, multidimensional concepts. Conversely, the facility to collapse a nested node and hide this additional information avoids the problem of congested "spaghetti diagrams" whose visual clutter confuses more than clarifies. The four block Cmaps and 10 (expanded) nested nodes along with listings of the associated major and subordinate propositions are found in Annex B of this report.

Significance: The IA(I) Cmap is not the endpoint but, rather, the jumping-off point for constructing the end product of this Project, the ANSA Cmap. This Cmap will serve as a *cognitive model*—or "primer" on one class of irregular adversary—facilitating the development of a broad knowledge base of the contemporary operating environment in support of future Army COIN and peace support campaigns in failed or failing states. Encompassing the strategic and operational as well as the structural and ideational dimensions of these actors, the ANSA Cmap

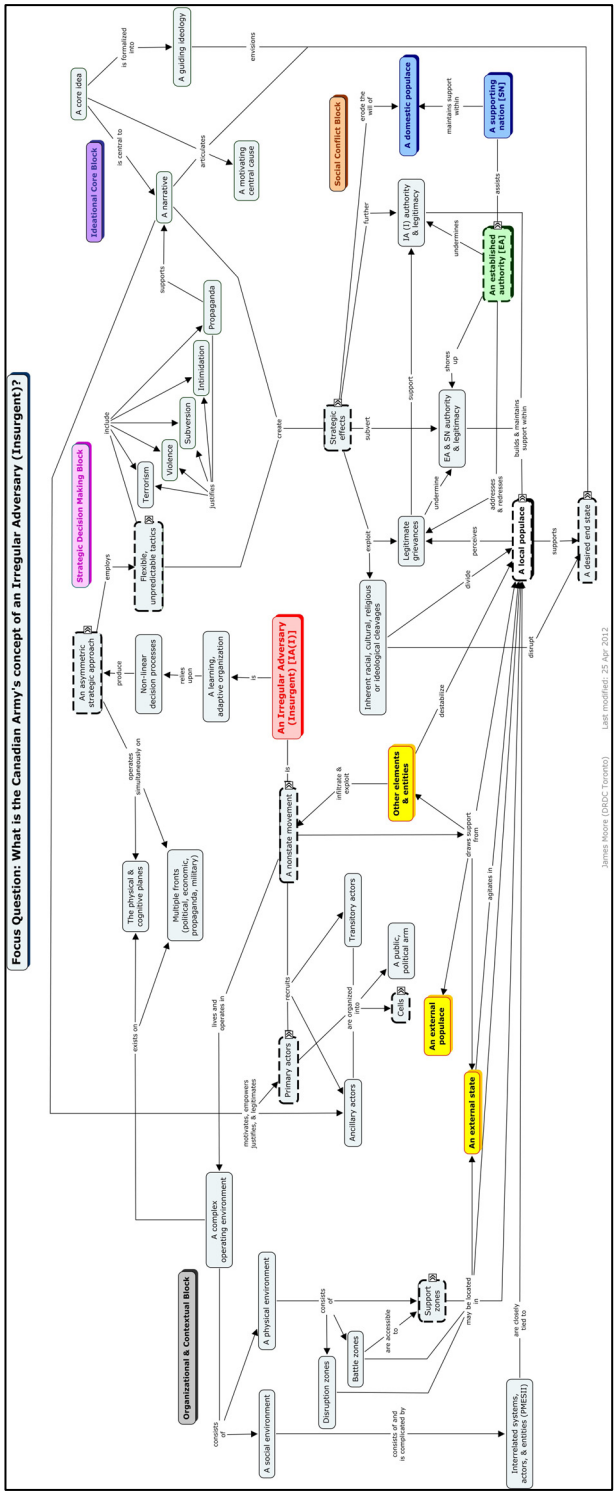

Figure 1: The Irregular Adversary (Insurgent) Concept Map.

will help the military intelligence operator give the commander a more holistic understanding of ANSAs in the context of their environment and their interactions with that environment.

But, to be useful, the Cmap must be adapted to the particulars of each individual group and its operating environment. There is no "one size fits all" model of an irregular adversary, all elements of which are equally relevant to all such groups in every conceivable circumstance. The ANSA Cmap will be, in the first instance, a generic conceptual architecture, setting out the range of key concepts and propositions that have been identified as relevant to the description and analysis of these irregular adversaries, without prejudging or predetermining the relative importance or weight that can or should be assigned to each. This, though, is just the point of departure. In its practical application, the elements of the Cmap will necessarily be tailored to the unique circumstances of the particular ANSA under scrutiny. The generic ANSA Cmap that we ultimately construct will be—and, indeed, must be—made case-specific and context-dependent.

The ANSA Cmap will also serve as a *knowledge model*, a repository for the information accumulated during the development of the knowledge base. It will contribute to a broader and deeper understanding of the psycho-social and cultural determinants of social influence at the individual, group, and societal levels—the prerequisite for effective non-kinetic influence activities. More specifically, it will assist in the production of integrated operational- and strategic-level intelligence that will inform the planning processes for the effects-based approach to operations, thereby acting as a force multiplier that will provide the Army with decisive advantage over real and potential irregular adversaries in future Army COIN and peace support campaigns in failed or failing states. The ANSA Cmap combines the strategic and operational levels of warfare within a common representational frame, thereby overcoming the "stove-piping" and compartmentalization that often obscures the emergent linkages and connections between the strategic, the operational, and the tactical levels of activity.

Future plans: Where do we go from here? On the basis of a series of studies and reports produced in earlier phases of the Project, we will refine the concepts and propositions of the IA(I) Cmap—revising (i.e., clarifying or rewording) retained propositions, removing unfounded propositions, and adding strongly grounded ones—such that we can have increased confidence from both a theoretical and empirical perspective in the overall fitness for purpose of the resulting ANSA Cmap. Having refined its skeletal structure, the task will then be to populate the ANSA Cmap, that is, to provide its propositions with substantive content. The intent here will be to create a "back-end wiki" for the Cmap. That is, a wiki page—varying in length from a short paragraph to a 2–3 page summary article, depending on the complexity of the subject matter—will be written for each proposition, providing an overview of the substance of that proposition based on the extant scientific literature. The combined Cmap/wiki format will allow for the evolution—the continual editing and updating—of text entries as further information reflecting the latest scientific thinking becomes available. It will also facilitate the interconnection by hyperlink of wiki pages within the Cmap as well as links to other textual, audio, and video resources on the Web.

Once completed, the ANSA Cmap, with its associated rules and modalities for application, must be validated to ascertain its usefulness as a practical analytical tool for civilian and military intelligence operators (the IA(I) Cmap presented here will not be tested since it is only a "way-station" enroute to the end-product ANSA Cmap). Though it is beyond the scope of this paper to delve into the particulars of the experimental design, suffice it to say that a select group of

intelligence operators will be asked to test the ANSA Cmap tool under controlled experimental conditions. How does the Cmap fare against other methods of knowledge acquisition? How well does it facilitate the desired result of the learning exercise—in this instance, increased operator understanding of the motivations, intentions, and behaviours of ANSAs—as compared to, say, an unguided search of the Internet for multimedia resources related to ANSAs (arguably the default option for many analysts absent more specific direction from colleagues or supervisors)? In other words, how effective is the Cmap as a cognitive model and knowledge model, identified above as the principal functions of the ANSA Cmap?

In conclusion, the comment above on the dynamic nature of the Cmap and its associated wiki deserves repeating. The so-called "final" version of the ANSA Cmap built from the IA(I) Cmap presented here will be final only in the sense that it is the end product of this specific Project. Cmaps—as is the knowledge upon which they are based—are not static. They will and must evolve to reflect future theoretical, experimental, and empirical advances in the social sciences. As Crandall et al. (2006) aptly put it, "it is wise to always consider Concept Maps as 'living' representations rather than finished 'things'" (p. 54). In that sense, the ANSA Cmap we will develop will always be a "work in progress."

Sommaire

A "First-cut" Concept Map: The Irregular Adversary (Insurgent)

James W. Moore ; DRDC Toronto TM 2011-118 ; R & D pour la défense Canada – Toronto; décembre 2012.

Introduction : Dans le présent document technique, nous présentons un schéma conceptuel représentant sous forme graphique la conception que se fait l'Armée canadienne d'un adversaire irrégulier (insurgé) [AI(I)]. Cette conception est énoncée dans deux publications de doctrine, soit *Opérations de contre-insurrection* (DDAT, 2008a) et *Opérations terrestres* (DDAT, 2008b). Cette première ébauche de schéma conceptuel AI(I) servira de point de départ à l'élaboration subséquente d'un schéma conceptuel plus général des acteurs armés non étatiques (AANE) sur lequel nous nous fonderons pour explorer les intentions et les comportements d'une catégorie d'adversaires irréguliers avec lesquels l'Armée est susceptible de devoir composer au cours de ses prochaines opérations expéditionnaires.

Résultats : Nous avions pour tâche de répondre à la question d'intérêt suivante : « Qu'est ce qu'un adversaire irrégulier (insurgé) selon l'Armée canadienne? » Pour y arriver, nous avons eu recours au schéma conceptuel. Le *schéma conceptuel* est un modèle visuel permettant d'organiser et de représenter les connaissances. Il est constitué de concepts et de propositions qui sont représentés selon une structure semi-hiérarchique. Les propositions énoncées dans le schéma conceptuel AI(I) ont été élaborées suite à la lecture attentive des manuels de campagne *Ops terrestres* et Ops *COIN*. La lecture de ces documents a permis de relever les énoncés concernant la nature, les caractéristiques, les activités, etc., des adversaires irréguliers en général et des insurgés en particulier. Ces énoncés repérés un peu partout dans le texte ont été regroupés par concept et synthétisés de manière à former les propositions ou les triplés *concept → phrase lien → concept* qui constituent la structure centrale du schéma conceptuel AI(I).

Le fruit de notre travail, le schéma conceptuel AI(I), est présenté à la figure 1 (page suivante). Comme vous pourrez en déduire d'après ce schéma, la conception d'un AI(I) dans l'Armée canadienne est plutôt vaste : quelque 79 propositions principales et 78 propositions subordonnées définissent un AI(I). Elles ont été regroupées dans quatre blocs principaux qui nous permettent de nous concentrer plus facilement sur les plus petites sections du schéma conceptuel : (a) le bloc organisationnel et contextuel, (b) le bloc des décisions stratégiques, (c) le bloc du noyau idéationnel et, enfin, (d) le bloc du conflit social. En outre, le schéma conceptuel AI(I) comprend 10 nœuds emboîtés, qui sont entourés d'épais cadres noirs tiretés. Lorsque l'on clique sur l'icône d'un nœud emboîté, ce dernier s'élargit pour révéler une série de propositions subordonnées liées à un concept principal. Cela permet d'explorer plus facilement les concepts « en mode descendant », c'est-à-dire que l'on a accès temporairement à d'autres propositions décrivant des concepts complexes et multidimensionnels. Inversement, comme on peut comprimer facilement un nœud imbriqué pour occulter ces renseignements additionnels, on évite ainsi le problème que posent les diagrammes « spaghetti » encombrés qui présentent un fouillis visuel qui, au lieu d'éclairer, provoque la confusion. Vous trouverez les quatre blocs et les 10 nœuds emboîtés (ouverts) ainsi que les listes des propositions principales et subordonnées connexes à l'annexe du présent rapport.

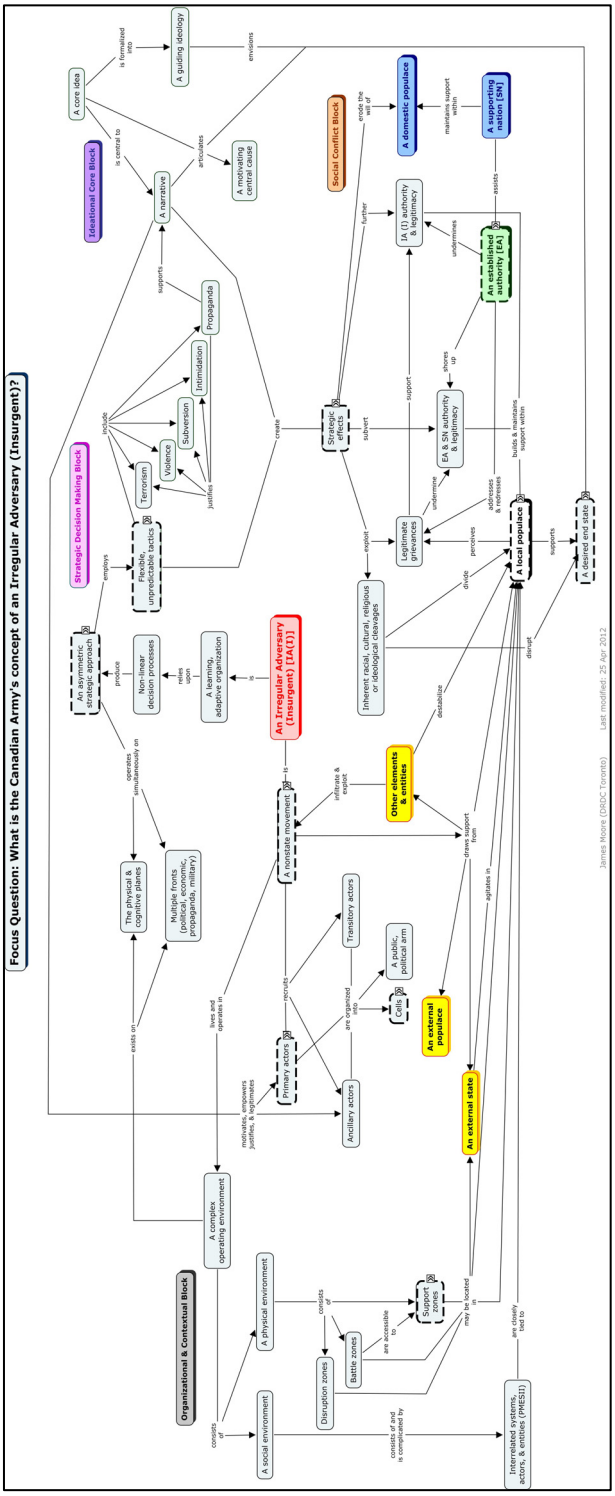

Figure 1 : Schéma conceptuel de l' adversaire irrégulier (insurgé).

Portée : Le schéma conceptuel AI(I) n'est pas le résultat, mais plutôt le point de départ en vue de la création du produit final de ce projet, soit le schéma conceptuel des AANE. Ce schéma conceptuel servira de *modèle cognitif*—ou d'« amorce » pour une catégorie d'adversaires irréguliers—facilitant l'élaboration d'une vaste base de connaissance sur le milieu opérationnel contemporain à l'appui des prochaines campagnes de COIN et de soutien de la paix menées dans les états en déroute ou en voie de déliquescence. Englobant les dimensions stratégiques et opérationnelles ainsi que les dimensions structurelles et idéationnelles de ces acteurs, le schéma conceptuel des AANE aidera le spécialiste du renseignement militaire à brosser pour le commandant un tableau plus global des AANE dans leur environnement et de leurs interactions avec cet environnement.

Cependant, pour être utile, le schéma conceptuel doit être adapté aux caractéristiques particulières de chaque groupe individuel et de son contexte opérationnel. Il n'existe pas de modèle « taille unique » d'adversaire irrégulier, dont tous les éléments sont pertinents à tous ces groupes, dans toutes les circonstances imaginables. Le schéma conceptuel des AANE sera, dans le premier cas, une architecture conceptuelle générique, illustrant l'éventail de concepts et de propositions clés considérés comme pertinents à la description et à l'analyse de ces adversaires irréguliers, sans préjuger ou prédéterminer l'importance ou le poids relatif qui peut ou qui devrait être attribué à chacun. Toutefois, cela n'est que le point de départ. Dans son application pratique, les éléments du schéma conceptuel seront nécessairement adaptés aux circonstances particulières de l'AANE étudié. Le schéma conceptuel générique des AANE que nous comptons établir sera—et, en fait, doit être—propre au cas et être fonction du contexte.

Le schéma conceptuel des AANE servira également de *modèle de la connaissance*, qui renfermera l'information accumulée pendant l'élaboration de la base de connaissance. Il contribuera à élargir et à approfondir notre compréhension des déterminants psychosociaux et culturels de l'influence sociale aux niveaux de l'individu, du groupe, et de la société—une condition préalable à la tenue d'activités d'influence non cinétiques efficaces. Plus précisément, il aidera à la production du renseignement de niveau opérationnel et stratégique intégré qui sera à la base des processus de planification de l'approche basée sur les effets qui sera adoptée dans le cadre des opérations. Ce schéma conceptuel servira ainsi de multiplicateur de force, assurant à l'Armée un avantage décisif sur ses adversaires irréguliers, réels et éventuels lors des prochaines campagnes de COIN et soutien de la paix qu'elle mènera dans des états en déroute ou en voie de déliquescence. Le schéma conceptuel des AANE combine les niveaux stratégique et opérationnel de la guerre à l'intérieur d'un cadre de représentation commun. On arrive ainsi à éviter le cloisonnement et la compartimentation qui masquent souvent les liens et connexions qui émergent entre les niveaux d'activités stratégique, opérationnel et tactique.

Recherches futures : Quelles sont les prochaines étapes? En nous inspirant d'une série d'études et de rapports produits au cours des phases antérieures du projet, nous allons peaufiner les concepts et les propositions du schéma conceptuel AI(I). Nous allons donc réviser (c.-à-d. clarifier ou reformuler) les propositions retenues, éliminer les propositions non fondées et en ajouter d'autres reposant sur des bases solides. Ainsi, nous pourrons avoir davantage confiance, d'un point de vue théorique et empirique, que le schéma conceptuel des AANE sera conforme aux besoins. Une fois que nous en aurons amélioré la structure de base, il nous restera à alimenter le schéma conceptuel des AANE, c'est-à-dire à donner du contenu concret à ses propositions. Ce à quoi l'on vise ici, c'est créer un « wiki dorsal » pour le schéma conceptuel. Une page de wiki—qui peut comporter un court paragraphe ou un article sommaire de 2 ou 3 pages, selon la

complexité de la matière—sera rédigée pour chacune des propositions, pour présenter un aperçu de la substance de la proposition en s'inspirant de la documentation scientifique existante. La combinaison schéma conceptuel et wiki facilitera l'évolution (soit la modification et la mise à jour continues) des textes à mesure que l'on obtiendra de l'information sur les plus récentes réflexions scientifiques. Cela facilitera aussi l'interconnexion par hyperlien des pages de wiki à l'intérieur du schéma conceptuel, ainsi que l'ajout de liens vers d'autres ressources texte, audio et vidéo sur le Web.

Quand il sera terminé, on procédera à la validation du schéma conceptuel des AANE, ainsi que des règles et modalités d'application qui s'y rattachent, dans le but de s'assurer qu'il sera utile en tant qu'outil d'analyse pratique pour les spécialistes du renseignement civils et militaires (le schéma conceptuel AI(I) présenté ici ne sera pas mis à l'essai étant donné qu'il ne constitue qu'une « étape » sur le chemin menant au produit final, soit le schéma conceptuel des AANE). La portée de la présente étude n'englobe pas l'examen approfondi des détails de la conception expérimentale. Cependant, nous nous contenterons de dire qu'on demandera à un petit groupe de spécialistes du renseignement de faire l'essai du schéma conceptuel des AANE dans des conditions expérimentales contrôlées. Comment le schéma conceptuel se compare-t-il aux autres méthodes d'acquisition des connaissances? Dans quelle mesure facilite-t-il l'atteinte des résultats souhaités de l'exercice d'apprentissage—dans le cas présent, permettre au spécialiste du renseignement de mieux comprendre les motivations, les intentions et les comportements des AANE—par rapport à, disons, une recherche non guidée sur Internet en vue de relever des ressources multimédias liées aux AANE (sans doute l'option par défaut d'un bon nombre d'analystes en l'absence de directives plus précises de la part des collègues ou des superviseurs)? Autrement dit, quelle est l'efficacité du schéma conceptuel en tant que modèle cognitif et modèle de la connaissance, soit les principales fonctions du schéma conceptuel des AANE énoncées ci-dessus?

En conclusion, il vaut la peine de réitérer le commentaire présenté ci-dessus concernant la nature dynamique du schéma conceptuel et du wiki qui s'y rattache. La prétendue version finale du schéma conceptuel des AANE établie à partir du schéma conceptuel AI(I) présenté ici ne sera finale uniquement dans le sens qu'elle constituera le produit final de ce projet particulier. Les schémas conceptuels—tout comme les connaissances desquelles ils s'inspirent—ne sont pas statiques. Ils vont évoluer, comme il se doit, en fonction des progrès qui seront réalisés sur le plan théorique, expérimental et empirique dans le domaine des sciences sociales. Comme l'ont bien fait valoir Crandall et al. (2006), « il est sage de toujours considérer les schémas conceptuels comme des représentations « vivantes » plutôt que des « produits finis » (p. 54). Dans ce sens, le schéma conceptuel des AANE que nous allons élaborer demeurera toujours un projet en évolution.

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Acknowledgements

This Technical Memorandum is an extensively revised version of an earlier paper presented at the 16th US-CAN Land Operations Research Symposium, held at the Aberdeen Proving Ground, MD, USA, 24–26 August 2011. The author would like to thank Dr. Natalia Derbentseva, Socio-Cognitive Systems Section, DRDC Toronto, for her critical review of previous drafts of this paper, as well as two anonymous referees who reviewed a conference paper based on this Memorandum that was subsequently accepted for presentation at the 5th International Conference on Concept Mapping (CMC2012), Valetta, Malta, 17–20 September 2012.

1 Introduction

We begin with a truism: Insurgencies are not static phenomena; they evolve as insurgents—and counterinsurgents, for that matter—adapt to changing conditions and circumstances within a complex operating environment. Likewise, our thinking about insurgencies and insurgents must evolve and progress. We cannot allow the critical concepts upon which we base our approach to counterinsurgency (COIN) operations to stagnate.

That is the motivation underlying DRDC Toronto's Technology Investment Fund (TIF) Project "A Conceptual Framework for Understanding Armed Non-state Actors (ANSAs): Strategic Roles and Operational Dynamics." The overall aim of the Project is to broaden and deepen our understanding of the *strategic roles* of ANSAs in the context of violent intergroup conflict within fragile or failing states, and, secondly, to understand the *operational dynamics* of ANSAs—that is, the organizational structures and processes in both their internal and external dimensions—that facilitate the performance of these roles, this in light of recent theoretical and empirical advances made in the social sciences and the practical experience gained on the battlefield in the past ten years of irregular warfare in Afghanistan, Iraq, and elsewhere. Broadly speaking, we seek to shed some light upon what ANSAs do and why they do it, situating their motivations, intent, and behaviours in the wider context of chronic intergroup conflict.

We do not start from "square one" in this investigation, however. The Canadian Army already has a detailed conception of an Irregular Adversary (Insurgent) [IA(I)] as set out in two doctrinal publications, *Land Operations* and *Counter-Insurgency Operations*, both produced by the Directorate of Army Doctrine and published in 2008 on the authority of the Chief of the Land Staff. We have sought to capture the Army's perspective in terms of a Concept Map (Cmap), a visual model for organizing and representing knowledge, consisting of a semi-hierarchical arrangement of concepts and propositions. This "first-cut" IA(I) Cmap will serve as the point of departure for the subsequent development of a more general ANSA Cmap that will provide a means to guide and manage our efforts to explore the intentions and behaviours of non-state adversaries the Army is liable to encounter in future expeditionary operations.

2 What is a Concept Map?

To help us in this endeavour, we have developed a "first-cut" of the IA(I) construct using a modeling technique known as concept mapping. A *concept map* (Cmap) is a graphical model for organizing and representing knowledge, "a schematic device for representing a set of concept meanings embedded in a framework of propositions" (Novak & Gowin, 1984, p. 15) (see Figure 1). Dr. Joseph Novak, then Professor of Education and Biological Sciences at Cornell University, developed the concept map in the early 1970s, originally as a data analysis tool "to translate [hundreds of] interview transcripts [on how children learn science] into a hierarchical structure of concepts and relationships between concepts (i.e., propositions)" (quoted in Daley et al., 2008, online p. 1).

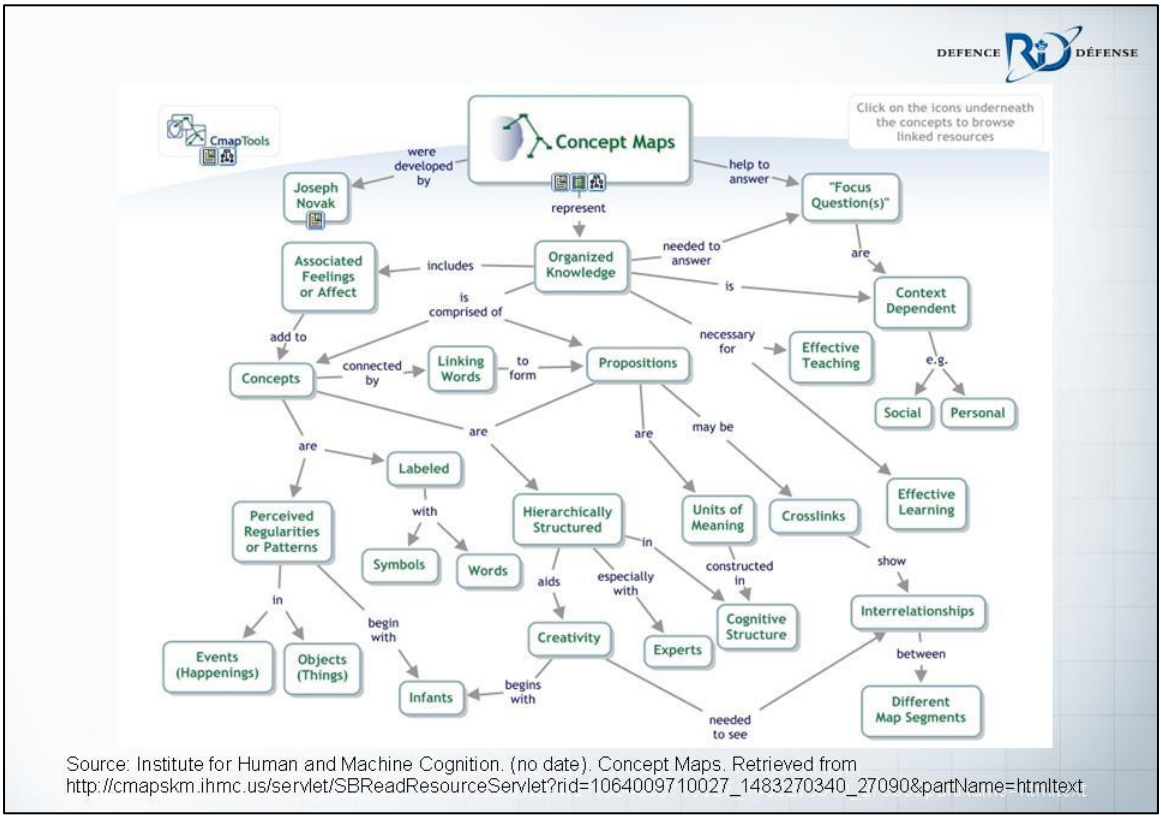


Figure 1: What is a Concept Map?

Note: Recognizing the difficulty in reading the small text in Figures embedded in the body text of this TM, they have been reproduced to larger scale in Annex A.

The Novakian Concept Map, as it has since become known, consists of a semi-hierarchical arrangement of concepts and propositions. Typically, *concepts*—the nodes in a Cmap—are perceived regularities or patterns in events or objects, designated by a verbal or symbolic label. *Propositions* specify relationships between concepts using linking words or phrases to form meaningful statements; these are also referred to as *semantic units* or *units of meaning* (Cañas et

al., 2003, p. 5). Note that the term "proposition" as used in Cmapping is not the same as "proposition" understood in the sense of a testable hypothesis of the causal relationship between two or more concepts or variables. Indeed, as the title of the Project suggests, what we hope to develop is a *framework for understanding*, setting out selected concepts and constructs deemed important in explaining the phenomenon of ANSAs. A framework is *not* a causal model, though certain components or sub-components of the framework (i.e., the propositional statements represented in the Cmap) may lend themselves to empirical testing of cause-and-effect relationships. Nor is it a theory. Rather, it is a guide to discovery, the foundation upon which theory is grounded.

The preferred propositional form is the *triple*, that is, the simple *concept → linking phrase → concept* unit (more complex statements stringing together more than two concepts are generally frowned upon). The choice of linking words is possibly the most difficult task in constructing a Cmap (Cañas, 2009). As Novak and Gowin (1984) remark, "Often there are two or three equally valid ways to link two concepts, but each will have a slightly different connotation…each proposition thus generated has a similar but not identical meaning" (p. 35). Yet, the choice of linking words and phrases—as well as concept labels—is, in itself, enlightening. The resultant Cmap makes manifest "the nuances of meaning a [Cmapper] holds for the concepts embedded in his or her map. When concept maps are conscientiously constructed, they are remarkably revealing of [the Cmapper's] cognitive organization" (Ibid.).

Each Cmap is constructed around a *focus question*, the specific query the map seeks to answer. A clear and explicit focus question keeps the Cmapping exercise on target. Different types of focus questions generate different types of Cmaps. *Static focus questions* (e.g., what is a narrative?) encourage propositions describing static relationships of inclusion, common membership, intersection, and similarity among concepts; the resulting Cmaps tend to be declarative or descriptive. Conversely, *dynamic focus questions* (e.g., what effects does a narrative have on insurgent legitimacy and authority?) generate propositions that include more dynamic relationships based on causality and correlation; the Cmaps that result tend to be more explanatory (Cañas & Novak, 2009b; Derbentseva, Safayeni, & Cañas, 2004, 2006).

The effectiveness of a Cmap as a learning tool lies, in part, in its *visuality*. Humans have a remarkable facility to recall visual images, and "Concept mapping has a potential for enlisting this human capacity for recognizing patterns in images to facilitate learning and recall" (Novak & Gowin, 1984, p. 28). This same notion underlies Kulhavy's model of text learning using organized spatial displays, such as geographic maps (Kulhavy, Stock, & Kealy, 1993; Verdi & Kulhavy, 2002). The model, based on Kulhavy's *conjoint retention theory* (Kulhavy, Lee, & Caterino, 1985) and Paivio's *dual coding theory* (Paivio, 1986), holds that visual displays facilitate a learner's acquisition, storage, and recall of information. Moreover, when used as an adjunct to text, visual displays assist the recall of textual information also referenced in the display. Information encoded both verbally and spatially (i.e., "conjointly retained") provides a dual coding advantage: learners make connections across codes (verbal and spatial), using the information in one to facilitate information retrieval in the other (for experimental studies showing this effect, see Abel & Kulhavy, 1986; Kulhavy, Stock, Verdi, Rittschof, & Savenye, 1993; Schwartz & Kulhavy, 1981). The claims of the conjoint retention hypothesis are not universally accepted, however. Griffin and Robinson (2000, 2005), for example, found no facilitative advantage of maps over lists or texts for text processing in the experiments they conducted.

Unlike other mapping techniques, such as Knowledge Maps, Conceptual Graphs, and Mind Maps, that use a mix of graphical and textual elements to represent meaning, Cmapping is grounded in sound cognitive learning theory, specifically, David Ausubel's *assimilation theory* (Ausubel, 1968; Ausubel, Novak, & Hanesian, 1978). Assimilation theory posits that new knowledge can be learned most effectively by relating it to previously existing knowledge; or, to put it somewhat differently, new concepts and propositions are *assimilated* into the learner's existing cognitive structures (Cañas et al., 2003, p. 6). Apart from its theoretical and scientific grounding, three features further set Cmapping apart from other mapping methods:

- **Expressiveness** (semantics and syntax)

  In semantic networks and associative graphs, such as Pathfinder networks (Schvaneveldt, Dearholt, & Durso, 1988) and Mind Maps (Buzan & Buzan, 1996), the lines connecting nodes are unlabeled. All the links tacitly represent a single relation—"concept X is related to concept Y"—with the length of the line indicating the associative strength or semantic relatedness of the linked concepts (Crandall, Klein, & Hoffman, 2006, p. 52).

  Other meaning diagrams incorporate labels on connectors but restrict the linking words that may be used. Sowa's (1984) Conceptual Graphs, for example, limit linking phrases to those expressing logical relations, such as "is a" and "has property." Cmaps do not impose such semantic restrictions and, consequently, have greater expressive power (Crandall et al., 2006, p. 52). They can express a wide range of subsumption-differentiation relationships:

  - causal relations (e.g., "leads to," "produces");
  - classificational relations (e.g., "includes," "is an example of");
  - nominal relations (e.g., "is known as");
  - property relations (e.g., "can be," "has defining feature," "consists of");
  - explanatory relations (e.g., "is a reason for");
  - procedure or method relations (e.g., "results in," "is done by," "is a way to do");
  - contingencies and dependencies (e.g., "requires," "often is");
  - probabilistic relations (e.g., "is more likely," "rarely is");
  - event relations (e.g., "comes before"); and
  - uncertainty or frequency relations (e.g., "is more common than") (Ibid., p. 60).

- **Shape** (or morphology)

  Meaning diagrams come in a variety of shapes or patterns. Fisher's (1990) Semantic Networks, for example, use a wagon-wheel structure, locating the primary concept in the centre of the diagram, with subordinate concepts radiating outwards from the centre like the spokes of a wheel. The hierarchical organization of a Cmap, on the other hand, embodies Ausubel's notion of *subsumption*, that is, more inclusive superordinate concepts subsume more specific subordinate concepts. Graphically, this is reflected in the placement of more general concepts in the upper branches of the Cmap "tree" while more particular concepts are distributed throughout the branches beneath. The hierarchical morphology of a Cmap is not strict, however. Cross-links among concepts (see below), for example, allow for the

explicit representation of non-hierarchical relationships. Hence, most Cmaps are more accurately described as *semi-hierarchical* (Cañas et al., 2003, p. 13; Novak & Gowin, 1984, pp. 15–16).

Nevertheless, alternative structures to the classical semi-hierarchical tree structure have been suggested. Safayeni, Derbentseva, and Cañas (2005), for example, introduced cyclic Cmaps (see Figure 2) to represent knowledge of functional or dynamic relationships between concepts, as opposed to classical Cmaps which are better suited to representing hierarchical or static knowledge. Sims-Knight et al. (2004) explored engineering students' understanding of the design process through the structure of their self-constructed concept maps, using Hart's (1998) classification scheme in which they identified four patterns in Cmap spatial layout (see Figure 2):

- web (one or two central concepts with links to at least five other nodes);
- cat's cradle or integrated (a number of nodes with at least three links);
- linear (a chain of at least 5 nodes); and
- branching (an overall integrated pattern with subsets of connected links) (Sims-Knight et al., 2004, p. 2).

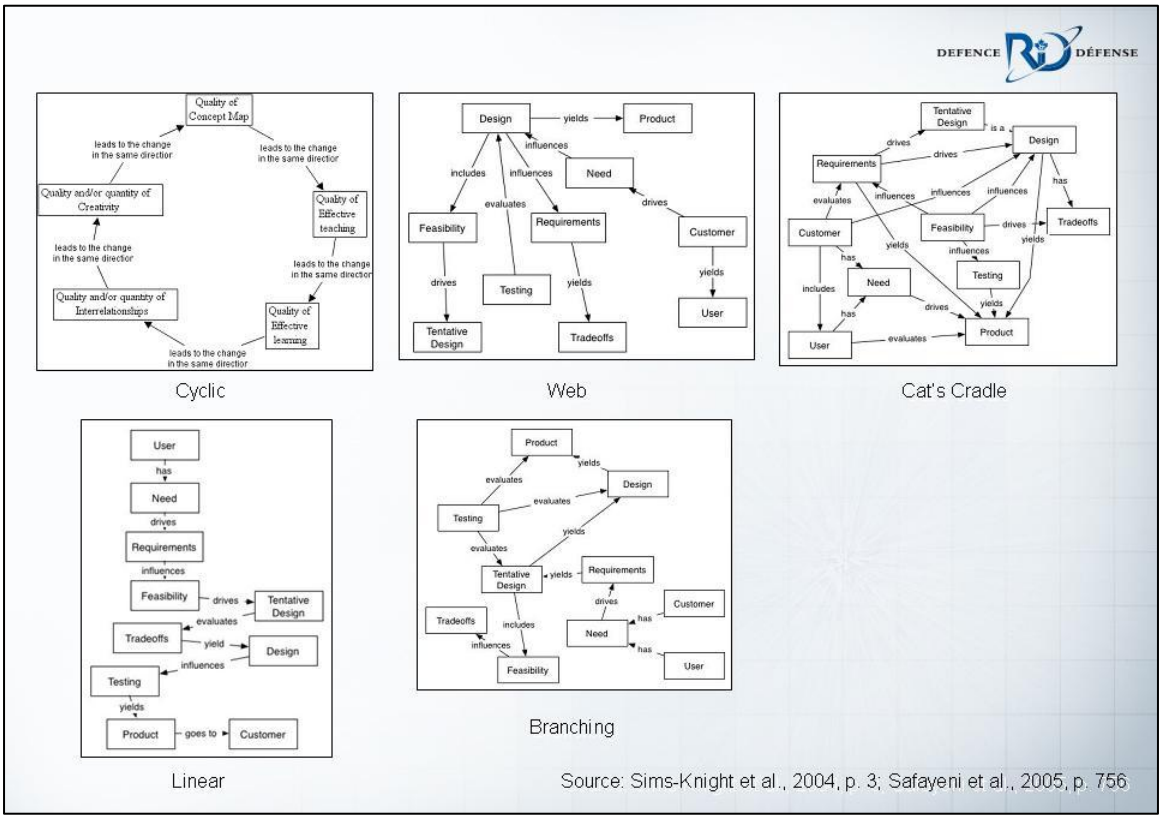


Figure 2: Patterns of Concept Maps.

- **Shape-meaning interactions**

  Crandall et al. (2006) observe that the shape of meaning diagrams interacts with their semantic and syntactic features. Mind Maps (Buzan & Buzan, 1996), for example, are severely limited in their expressive power due to the combination of their radiating shape and "impoverished semantics (unlabeled links)" (Crandall et al., 2006, p. 53). Cmaps, on the other hand, are unique among meaning diagrams in that they have *cross-links*. Cross-links highlight the interconnectedness of complex concepts residing in different clusters, regions or subdomains of the Cmap. The identification of these cross-links often represents "creative leaps on the part of the knowledge producer" (Cañas et al., 2003, p. 5) in the creation of new knowledge (see also Crandall et al., 2006, p. 53).

3 How to Construct a Cmap

There are several standard steps in the construction of a Cmap (see, for example, Cañas, Coffey, et al., 2003; Crandall et al., 2006; Novak, 1998; Novak & Cañas, 2008; Novak & Gowin, 1984) (see Figure 3):

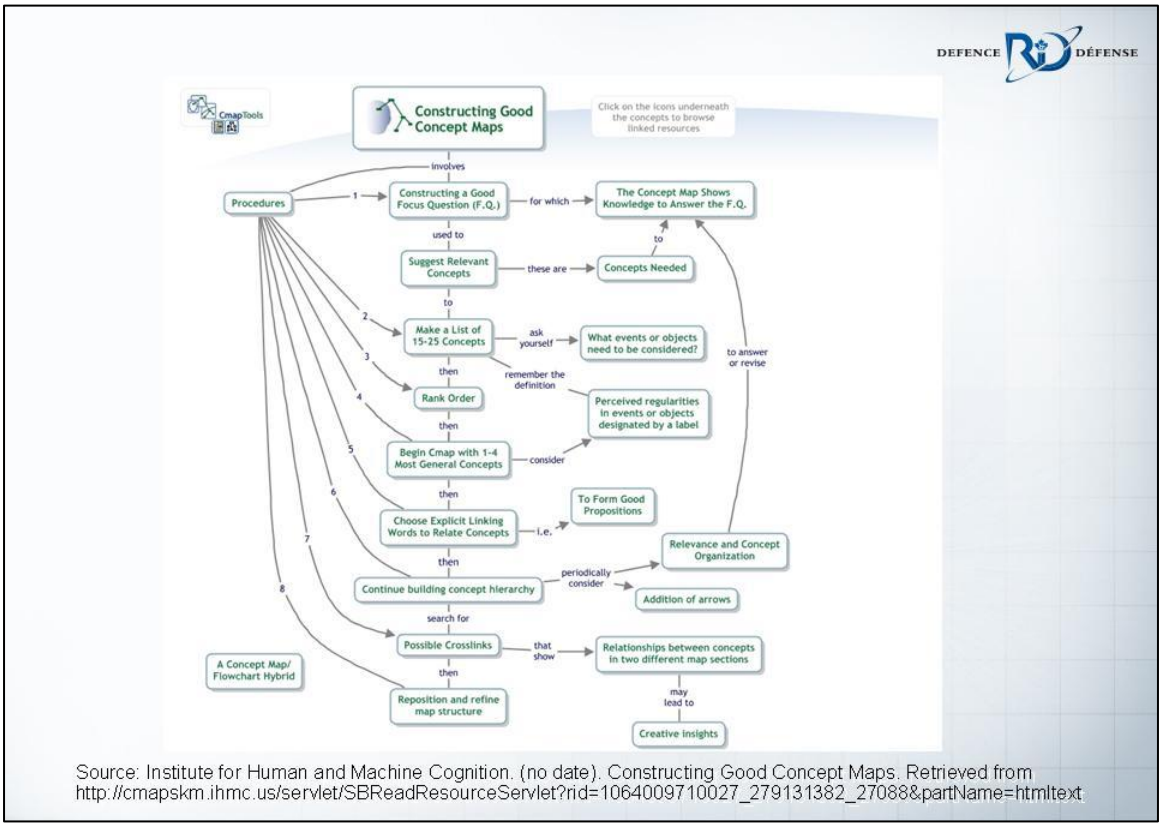


Figure 3: How to construct a Concept Map.

1. Define a clear, explicit focus question in the domain of interest.

2. Compile a *parking lot*, a rank ordering, from most to least general, of 15–25 concepts relevant to the domain of interest.

3. Arrange the concepts in a hierarchical structure in the mapping field, with the most inclusive concepts (generally no more than four) at the top, and more specific subconcepts placed under each. As a rule, no more than three or four subordinate concepts should fall under each major concept. More than this suggests that latent concepts of intermediate inclusiveness may be lurking at an intervening level of hierarchy.

4. Connect the concepts with lines (adding arrowheads, colour coding, etc., where necessary to assist in navigation along the branches), and label the lines with linking

words or phrases that explicitly set out the relationship between the concepts, to form valid and meaningful propositions.

5. Identify and label cross-links between concepts in different segments or sub-domains of the map.

6. Review the Cmap for completeness and correctness. Add, subtract, change, and/or reposition concepts as necessary to clarify and refine the overall structure. Confirm that all triples express propositions.

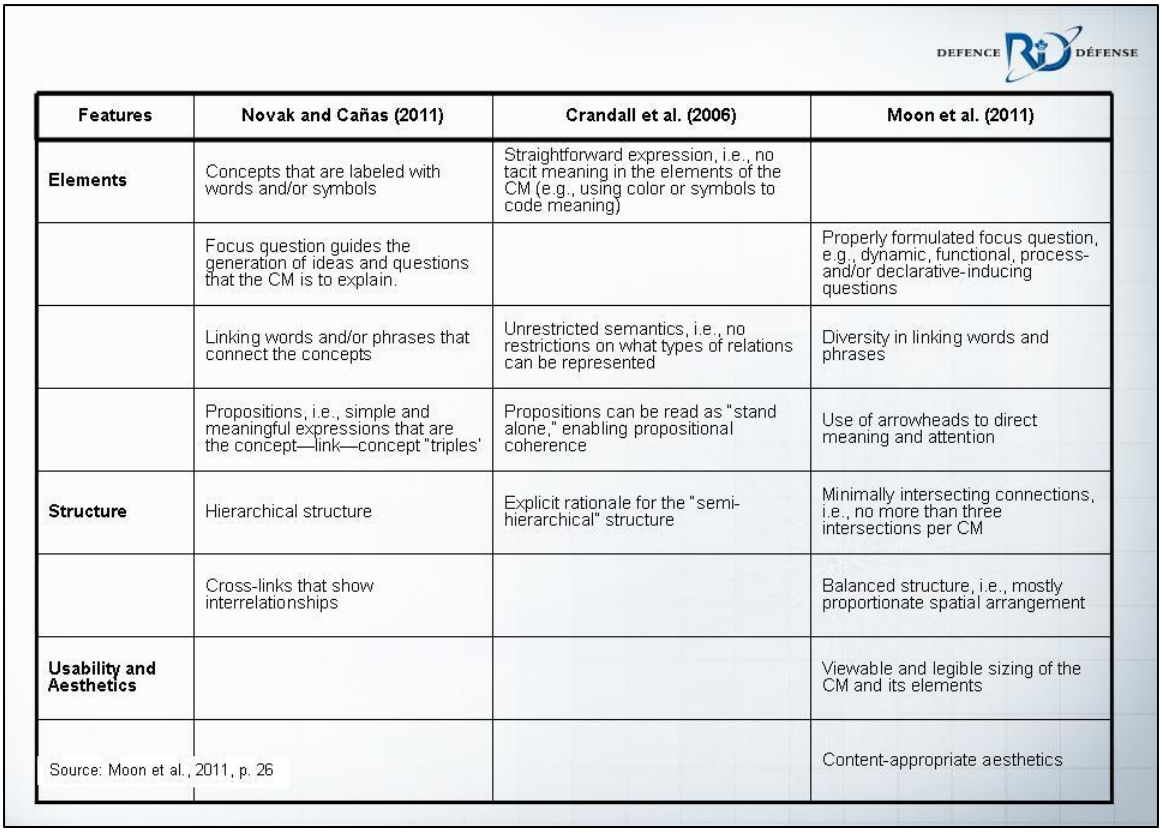
We would add an additional step to the review process:

7. Submit the Cmap for external expert review and verification.

In the process of creating a Cmap, the Cmapper may develop perceptual "blinders" as he/she becomes increasingly wedded to one spatial pattern for representing knowledge in the domain of interest. A second set of eyes can bring a fresh perspective to the Cmap and facilitate thinking outside the box. This external review may result in modifications—hopefully of benefit—to the Cmap. In their research involving the development of the human-centered computing prototype STORM-LK (System to Organize Representations in Meteorology—Local Knowledge), Hoffman, Coffey, and Ford (2000) found that external expert evaluation produced changes to approximately ten percent (on average) of the propositions in the Cmaps (p. 733). Crandall et al. (2006) attribute this finding, not so much to differences between experts over the substance of a Cmap's concepts and propositions (though they acknowledge that such disagreements cannot be completely ruled out), but, rather, to differences in wordsmithing, "a reflection of their [i.e., the experts'] differing emphases, their judgments of what is important, and the subtleties of word choice (e.g., "promotes" versus "causes")" (p. 63) (though Hoffman et al. (2000) found that "more changes were made in links (destruction and creation) than in nodes and link labels" (p. 733), suggesting substantive rather than merely semantic differences among the experts participating in their study).

4 The Features of a "Good" Cmap

What are the features of "good" Novakian Cmaps? As an example, Moon, Hoffman, Eskridge, and Coffey (2011) set out a comparison drawn from three sources in the literature (see Figure 4):



Features	Novak and Cañas (2011)	Crandall et al. (2006)	Moon et al. (2011)
Elements	Concepts that are labeled with words and/or symbols	Straightforward expression, i.e., no tacit meaning in the elements of the CM (e.g., using color or symbols to code meaning)	
	Focus question guides the generation of ideas and questions that the CM is to explain.		Properly formulated focus question, e.g., dynamic, functional, process- and/or declarative-inducing questions
	Linking words and/or phrases that connect the concepts	Unrestricted semantics, i.e., no restrictions on what types of relations can be represented	Diversity in linking words and phrases
	Propositions, i.e., simple and meaningful expressions that are the concept—link—concept "triples'	Propositions can be read as "stand alone," enabling propositional coherence	Use of arrowheads to direct meaning and attention
Structure	Hierarchical structure	Explicit rationale for the "semi-hierarchical" structure	Minimally intersecting connections, i.e., no more than three intersections per CM
	Cross-links that show interrelationships		Balanced structure, i.e., mostly proportionate spatial arrangement
Usability and Aesthetics			Viewable and legible sizing of the CM and its elements
Source: Moon et al., 2011, p. 26			Content-appropriate aesthetics

Figure 4: Features of "good" Novakian Concept Maps.

We can distill these features into six general categories:

- **Comprehensiveness**

  The Cmap should be large enough to include all key concepts and propositions needed to answer the focus question, yet not so large as to cry out for division into submaps. In practical terms, one should aim to create a Cmap that can be displayed on a typical computer monitor without vertical or horizontal scrolling: "A rich Concept Map, one containing on the order of forty concepts and forty-five or so propositions can, with skill and some finesse, be comfortably fit into the screen space." (Crandall et al., 2006, p. 66).

- **Relevance**

  The Cmap should only include relevant concepts. Given the possibility of associational thinking in the creative process, "it can happen that the mapper introduces concepts that are

of relatively low relevance to the topic at hand. Judgments must be made regarding the relevance of every concept to a particular topic" (Ibid.).

- **Granularity**

  The breadth of the concepts should be consonant with the scope or level of the question the Cmap seeks to address. The Cmapper can fall victim to two types of errors. To borrow terminology from statistics, *Type I Cmap errors* are those in which unnecessary and overly broad strategic concepts are incorporated into what are essentially tactical Cmaps, causing the Cmap to seemingly go off on a tangent (Ibid.). *Type II Cmap errors*, on the other hand, are those in which very specific and highly detailed tactical concepts are included in strategic-level Cmaps, the result often being that the Cmap user "can't see the forest for the trees."

- **Propositional Coherence**

  At the micro level, propositional coherence refers to whether each *concept → linking phrase → concept* triple can stand alone as a meaningful statement or proposition. Simultaneously, at the macro level, it refers to whether all triples that make up the Cmap can be read as propositions. As Moon et al. (2011) note, "This distinctive feature is important primarily for clarity in the Concept Map, and it also enables ease for linking in new concepts and propositions as the Concept Map expands. Moreover, it identifies "run-on" or "string" propositions as an undesirable feature" (p. 27).

We would add two other measures of "goodness" to this list. The first is *propositional sophistication*, the "flip side of the coin" to propositional coherence. Propositional sophistication refers to the quality of a proposition to express the nuances of a complex relationship. Many relationships are of such complexity that a simple *concept → linking phrase → concept* triple cannot fully capture their subtleties. They can only be appreciated in terms of multiple concepts and subsumption-differentiation relations (within reasonable limits, of course—a quintuple is probably the longest string that can be comfortably navigated in a Cmap). To arbitrarily decompose them into a series of awkwardly-connected triples trivializes the relationship and strains comprehension. It forces the Cmap user to recombine the triples in a string that provides a more natural and fluent reading of the meaning statement. While undesirable from a coherence perspective, more sophisticated "run-on" or "string" propositions may actually enhance the processing and usability of Cmaps diagramming complex relationships (this hypothesis, of course, could and should be experimentally tested).

A second measure that we would add—or, rather, draw out more explicitly—is *visual aesthetics*. The importance of visual aesthetics in computer-assisted Cmapping (using CmapTools) and in human-computer interaction more generally has been increasingly recognized. Users' needs go beyond usability and utility to encompass a broader personal experience including emotions and visual aesthetics (Moshagen & Thielsch, 2010, p. 691). Visual aesthetics is a multidimensional construct. Lavie and Tractinsky (2004) distinguish two dimensions to this construct: (a) *classic aesthetics*, referring to orderliness in design, and (b) *expressive aesthetics*, reflecting perceptions of the designers' creativity and originality (cited in Moshagen & Thielsch, 2010, p. 693). Building on this research, Moshagen and Thielsch (2010) identify twelve broad content domains describing the visual aesthetics of websites (p. 692, Table 1; see Figure 5):

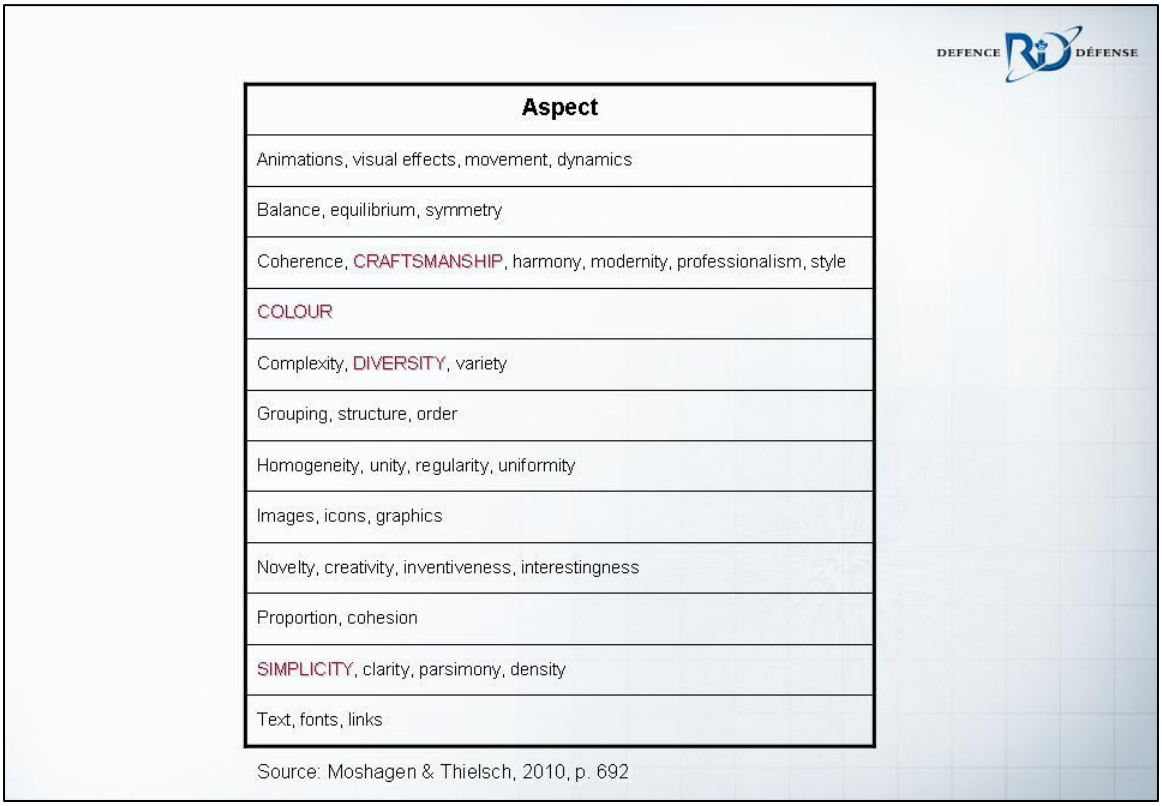


Figure 5: Aspects of visual aesthetics of websites.

Through their experimental research, they distill these content domains down to four (Ibid., p. 704):

- **Simplicity**, comprising aspects of unity, homogeneity, clarity, orderliness, and balance. Simple layouts facilitate processing and may act as a link between aesthetics and usability on a perceptual level (Lavie & Tractinsky, 2004). Along with **Diversity** (see below), simplicity has long been treated as a formal parameter of aesthetic objects in empirical aesthetics.
- **Diversity**, comprising visual complexity (also visual richness), dynamics, novelty, and creativity. This facet counteracts the low arousal resulting from simple stimulii ("simple is boring"), provoking interest and tension and, hence, enhancing positive aesthetic response.
- **Colourfulness**, involving the selection, placement, and combination of colours. It is widely agreed that colour affects aesthetic appraisal generally and human-computer interaction in particular (see Cyr, Head, & Lario, 2010).
- **Craftsmanship**, defined as "the skillful and coherent integration of all relevant design dimensions" (Moshagen & Thielsch, 2010, p. 704).

(As an aside, Moshagen and Thielsch (2010) developed a measure of perceived visual aesthetics of websites, the Visual Aesthetics of Website Inventory (VisAWI), that incorporated these four interrelated facets. In discussing the limitations of their research, they note that their investigation

focused on the perceived visual aesthetics of websites only (Ibid., p. 705). Though their findings are suggestive for Cmaps, direct investigation of the usefulness of VisAWI to assess the visual aesthetics of Cmaps might be enlightening. Experimental testing might identify content domains other than the abovementioned four that may be of greater relevance to the visual aesthetics of Cmaps.)

A cautionary note. "Good" visual aesthetics in a Cmap may paradoxically have unintended negative effects. Tractinsky, Katz, and Ikar (2000) demonstrate that visual aesthetics may produce a "halo effect" on evaluations of other properties of websites. If so, an aesthetically pleasing Cmap may lead users to exaggerate or overstate the quality of the Cmap content or attach greater certainty or weight to the information represented there. In other words, because a Cmap is "pretty," they might assume that it must be unreservedly "right."

Inevitably, there are trade-offs among these six features. For example, crafting a Cmap with greater propositional sophistication may clash with the need for simplicity in the Cmap's visual aesthetics, in the extreme resulting in a "spaghetti diagram" that overwhelms the user and detracts from the Cmap's usability [for a particularly egregious example of this, see the PowerPoint slide "Afghanistan Stability/COIN Dynamics" in Mail Foreign Service (2010)]. Essentially, it comes down to the skills and preferences of the Cmapper and his/her ability to strike a balance between the features appropriate to the domain of interest being mapped.

5 Applied Cmapping

From its deep roots in education, the application of Cmapping to problem solving in both industry and government has grown dramatically over the past twenty years. A recent survey of its many and varied applications (Moon, Hoffman, Novak, & Cañas, 2011a) set out a sampling of the range of work sectors, domains, and applications in which practitioners have effectively adopted and used this method (see Figure 6). Indeed, the authors of this survey see their book as marking a tipping point in the application and extension of Cmapping, leading them to excitedly anticipate "what is possible once the tipping point is 'tipped'" (Moon, Hoffman, Novak, & Cañas, 2011a, p. xi).

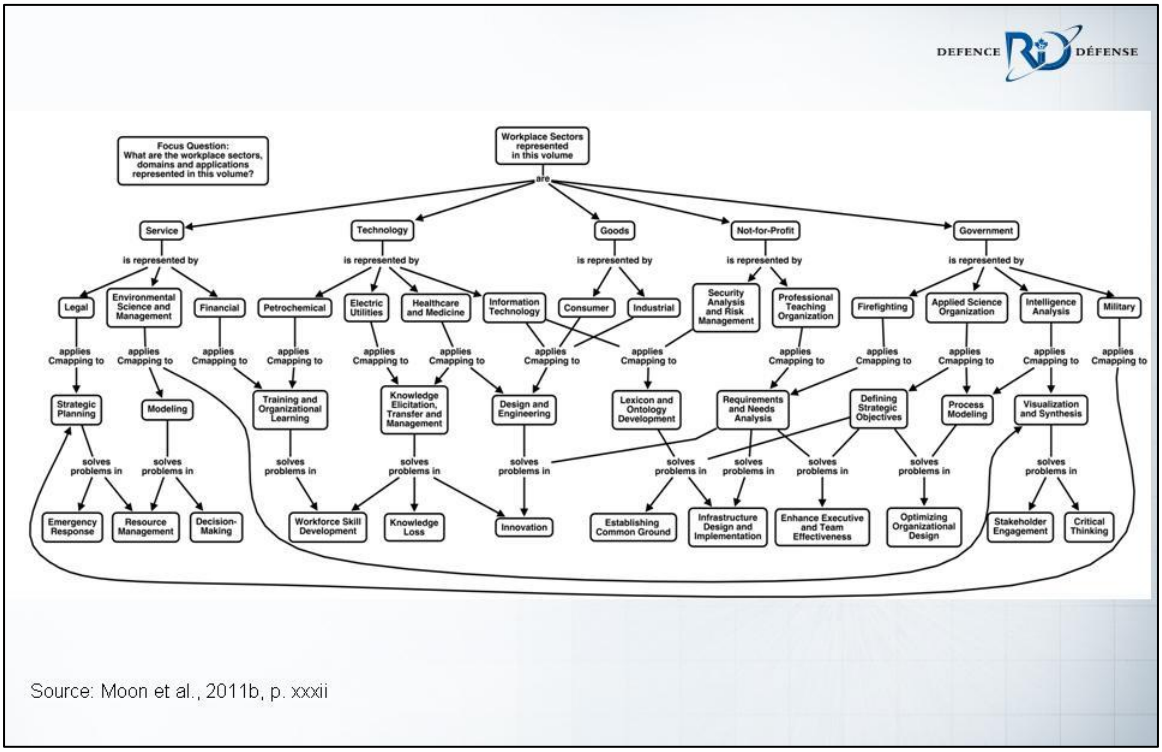


Figure 6: Workplace sectors, domains and applications of Concept Maps.

A number of authors (e.g., Cañas, Coffey, et al., 2003; Hoffman, 2008; Moon et al., 2011) have surveyed the applications of Cmapping in the US defence and security realm, and have found a range of uses (see Table 1). In fact, the US Navy, Department of Defense and NASA were instrumental in advancing the capability for practical application of this method—not only in military settings—by serving as primary sponsors for the development of the CmapTools software tool at the Institute for Human and Machine Cognition (IHMC), a non-profit research institute affiliated with the Florida University System (Moon et al., 2011b, p. xxvii). (This software toolkit—*CmapTools Knowledge Modeling Kit*—is available for free download from the Institute's website at http://cmap.ihmc.us/conceptmap.html)

Table 1: Applications in military and security settings.

Application	References
Large-scale transformation of operations	Moon et al., 2006
Tactical uses	Kaste, Heilman, & Hoffman, 2007
Expert knowledge elicitation in service of design	McNeese et al., 1990, 1993, 1995; Thorsden, 1991
Mission planning	Hoffman & Shattuck, 2006
Information visualization	Cañas et al., 2005; Moon & Hoffman, 2008; Moon et al., 2008
Shared mental models and teamwork performance	Blickensderfer et al., 1997; Cañas et al., 1998; Coffey et al., 2003
Job task analysis	Cañas et al., 2003; Dumestre, 2004
Education and training	Golas et al., 1999
Human performance modeling	Bautsch et al., 1997
Intelligence analysis	Cañas et al., 2003; McNeese & Ayoub, 2011

Source: Cañas, Coffey, et al., 2003, *passim*; Moon et al., 2011, p. xxvii.

In contrast, the application of Cmapping is still in its infancy in the Canadian Army and the wider Canadian defence and security community. One of the pioneering efforts to correct this deficiency is that of Derbentseva and Mandel (2011), two colleagues in the Socio-Cognitive Systems Section at DRDC Toronto. They launched a multi-year research project in 2008, one of the goals of which was to introduce Cmapping to the defence and security community in Canada and to examine its applications. To this end, they engaged in two main activities: they developed a Cmap knowledge model of intelligence analysis as a comprehensive resource on the topic (see Figure 7); and they hosted a workshop for Canadian intelligence professionals in February 2010 to introduce them to Cmapping and to the intelligence analysis knowledge model they had developed, as well as to elicit feedback from them on the model and Cmapping more generally (Derbentseva & Mandel, 2011, pp. 111–112).

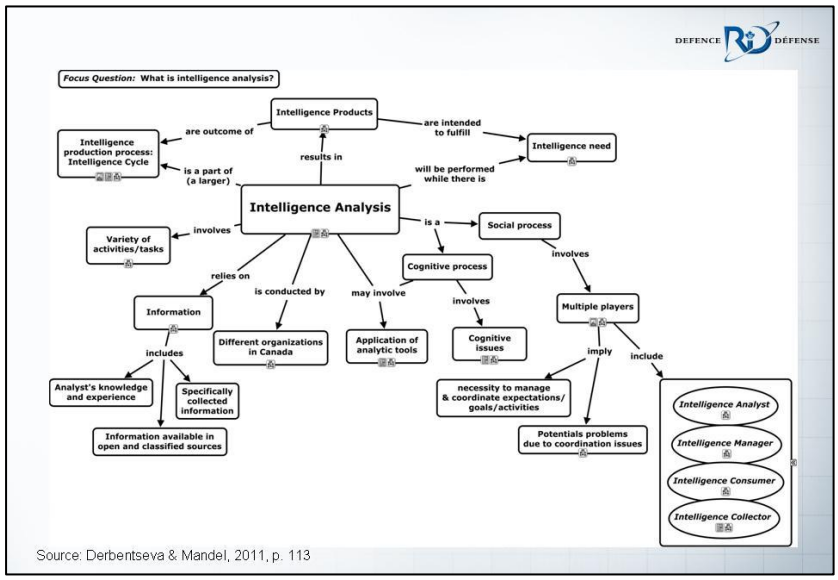


Figure 7: Concept Map knowledge model of intelligence analysis.

6 Constructing the Irregular Adversary (Insurgent) Cmap

Our own efforts in this regard have been directed toward using Cmapping to advance our understanding of Armed Non-state Actors (ANSAs). Specifically, we have constructed a Cmap to answer the focus question: "What is the Canadian Army's concept of an Irregular Adversary (Insurgent)?" As mentioned above, the Army has set out its conception in two doctrinal publications: *Counter-Insurgency Operations* (DAD, 2008a) and *Land Operations* (DAD, 2008b). In the latter, there is a combined total of 16 pages, found in one section and one annex, focusing on irregular adversaries in general. In the former, there are some 36 pages, spread across three chapters, describing the characteristics and activities of insurgents in particular. In addition, numerous references to irregular adversaries and insurgents are found scattered throughout the body texts of these field manuals. The challenge we faced was to draw together these disparate strands and create a consolidated picture of an IA(I) to serve as the starting point for our ANSA investigation. How could we distill these extensive writings down to the essentials of an IA(I), and then effectively communicate these essentials to others?

We turned to Cmapping to help us in this endeavour. The elaboration of the propositions in the IA(I) Cmap was a relatively straightforward though labour-intensive process entailing many tens of hours of doctrinal interpretation; transformation into the Cmap structure, however, proved the most challenging task, necessitating multiple iterations before arriving at the version presented below (see Figure 2). In detail, the process involved a careful reading of the *Land Ops* and *COIN Ops* field manuals to identify statements regarding the nature, characteristics, activities, etc., of irregular adversaries in general and insurgents in particular. These scattered statements were clustered by concept and then synthesized to form the *concept → linking phrase → concept* triples or propositions that make up the skeletal structure of the IA(I) Cmap.

To illustrate, we will briefly describe the construction of the Ideational Core Block, one of the four constituent blocks or interconnected spatial regions of the overarching IA(I) Cmap. First, we derived the key concepts and linking phrases for this block through a plain-meaning reading of relevant sections in the field manuals, such as the excerpts from *COIN Ops* presented in Box 1; the highlighted elements identify the concepts and relational links that were instrumental in elaborating the propositions in the bullet list below [the excerpted section(s) germane to each proposition are listed in square brackets]. From these and other relevant sections in the field manuals, we distinguished 10 key propositions that seem to capture the ideational dimension of an IA(I)—the notion that "ideas matter" when trying to understand the intentions and behaviours of irregular adversaries:

- A core idea is central to a narrative. [§118]
- A core idea articulates a motivating central cause. [§211]
- A core idea is formalized into a guiding ideology. [§118]
- A core idea articulates a desired end state. [§305]
- A narrative articulates a motivating central cause. [§211]
- A narrative creates strategic effects. [§215.3]

102. INSURGENCY
7. At the basis of an insurgency will be a narrative, a story. Central to this narrative is the idea that motivates the insurgents and is formalized into an ideology. It empowers the insurgents and lends them legitimacy and provides justification for their ends and means. (p. 1-12)

109. DEVELOPMENT OF AN INSURGENCY
4. Each insurgency will have its own set of causes, aims and desired end-state. Some insurgencies will stem from a political, social and/or religious ideology that envisions an improved (even utopian) state of affairs. (p. 1-12)

118. IDEOLOGY
1. At the basis of an insurgency is a narrative that contains an idea and founding cause for the insurgency. This core idea becomes formalized as an ideology. (p. 1-19)

211. MOTIVATING CENTRAL CAUSE
1. In most insurgencies there will be legitimate grievances that may result in a central, motivating cause to the insurgency…The cause is articulated in the motivating idea and resulting narrative…(p. 2-8)

215. NARRATIVE
1. At the basis of an insurgency is a narrative that contains an idea and founding cause for the insurgency. It motivates the primary and ancillary actors and allows the idea to be formalized as an ideology.

3. …Narratives (or stories) influence the ability to recall and understand history, motivate people to act, temper emotional reactions to events, cue certain heuristics and biases, structure problem-solving capabilities and ultimately perhaps even constitute individual identity. (p. 2-10)

305. UNDERSTAND THE COMPLEX DYNAMICS OF THE INSURGENCY, INCLUDING THE WIDER ENVIRONMENT
3. The dynamics of an insurgency may include:
…b. central idea (the narrative) of the insurgency—this may be an ideology or religious ideal that also identifies a strategic end-state…(p. 3-7)

307. SEPARATE THE INSURGENTS FROM THEIR PHYSICAL AND MORAL SOURCES OF STRENGTH
b. **Moral Separation**. …This narrative will highlight real or perceived grievances and provide a vision and strategic end-state as an alternative to the existing government or society. (p. 3-9)

Box 1: Excerpts from Counter-Insurgency Operations (DAD, 2008A)

- A narrative articulates a desired end state. [§307]
- A narrative motivates, empowers, justifies, & legitimates primary actors. [§§102, 215.1]
- A narrative motivates, empowers, justifies, & legitimates ancillary actors. [§§102, 215.1]
- A guiding ideology envisions a desired end state. [§109]

These propositions were then spatially arranged in the Ideational Core region of the IA(I) Cmap (see Figure 8), and the critical cross-links within the block and with other regions or blocks of the Cmap were drawn (a key step in Cmap construction that gives Cmapping its particular knowledge-generating power).

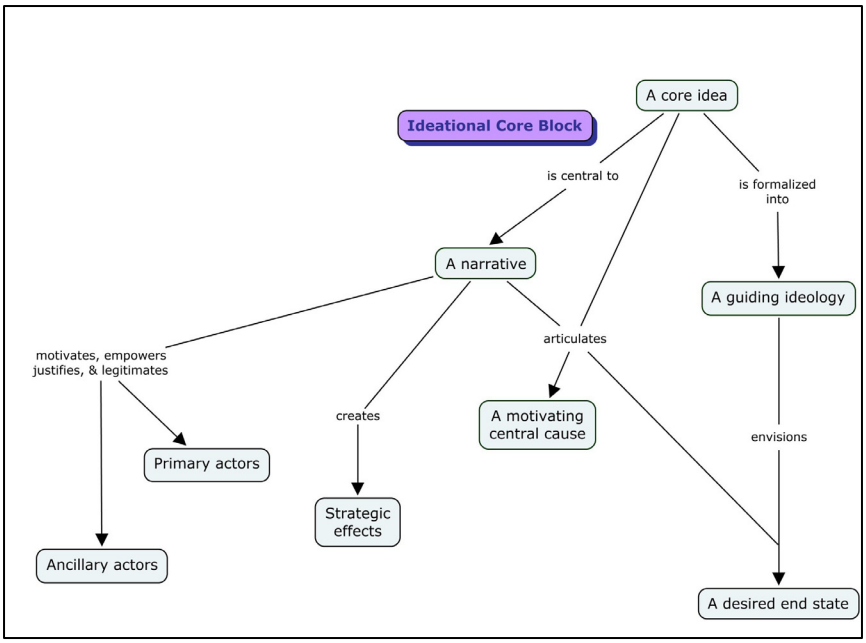


Figure 8: Ideational Core Block.

We must admit that the resulting Cmap is not "scientific" in the sense that another Cmapper independently following this construction method would precisely replicate the IA(I) Cmap presented below (see Figure 9). Undoubtedly, there would be a large measure of overlap. We are confident that our interpretation of the Army's doctrinal writings is not completely "off base," and that other defence analysts by and large would identify the same concepts and links between concepts that we have. However, the semantic expression of these essential elements—the concept labels and connecting phrases used to express the propositions—are likely to differ to some degree as discussed above (see Section 3, Step 7). Secondly, the spatial organization or arrangement of the propositions reflects our personal visual aesthetics—the mix of simplicity, diversity, colourfulness, and craftsmanship that we personally find visually appealing. This will clearly differ among Cmappers depending upon their own aesthetic tastes, though the broader Cmapping community's "best practices" will undoubtedly have an influence as well. In summary, for these semantic and aesthetic reasons, Cmap construction is inevitably idiosyncratic. No two Cmappers will ever independently create precisely the same Cmap, even when using the same reference material. In that sense, Cmap construction is as much if not more an art than a science. Indeed, it may not be too much of an exaggeration to describe a Cmap as a "work of art."

By the same token, we must take care not to overstate the "artistry" of Cmapping. The use of colour, for example, is not solely a matter of aesthetics; it is not simply a way to make a Cmap look "pretty." Colour can convey important information. In the IA(I) Cmap (see Figure 9), there are eight concept nodes corresponding to different agents or actors found in the operating environment. The area or *fill* within each of these nodes is assigned a colour indicating the *affiliation* of that agent—that is, the actor's position or stance relative to the campaign objective—as per the colour conventions in NATO military symbology. Specifically, the colour blue denotes friendly forces (in the Cmap, the two nodes *A supporting nation [SN]* and *A domestic populace*); red denotes hostile forces (*An Irregular Adversary (Insurgent) [IA(I)]*);

green denotes indigenous or host-nation authorities and forces (*An established authority [EA]*); white denotes non-combatants or a local population (*A local populace*); and yellow denotes unknown affiliation (*Other elements & entities*, *An external populace*, and *An external state*). The use of this simple colour technique, while undeniably enhancing the visual appeal of the Cmap, greatly adds to its inherent power to transmit knowledge.

The fruit of our labours—the IA(I) Cmap—is presented in Figure 9. As can be seen from the Cmap, the Army's conception of an IA(I) is quite extensive. Indeed, according to our analysis of the relevant sections in the field manuals, there are some 79 major propositions and 78 subordinate propositions that define an IA(I). These are grouped into four major blocks that allow one to focus more easily on smaller regions of the Cmap; these blocks—(a) Organizational and Contextual block, (b) Strategic Decision Making block, (c) Ideational Core block, and (d) Social Conflict block—are saved as separate Cmaps in the Project's IA(I) Cmap folder. In addition, the IA(I) Cmap incorporates 10 nested nodes, identified by heavy-black, dashed borderlines around the nodes. [A *nested node* is an inclusive "parent" concept that encloses, or *nests*, selected "child" Cmap items (i.e., concepts and linking phrases) (IHMC, no date)]. Clicking on a nested node icon expands the node to reveal a series of subordinate propositions related to the parent concept. This facilitates "drilling down" into the concepts, that is, temporarily displaying additional propositions describing complex, multidimensional concepts. Conversely, the facility to collapse a nested node and hide this additional information avoids the problem of congested "spaghetti diagrams" whose visual clutter confuses more than clarifies (recall the "Afghanistan Stability/COIN Dynamics" PowerPoint slide referred to above). The four block Cmaps and 10 nested nodes (in expanded mode) along with listings of the associated major and subordinate propositions are found in Annex B.

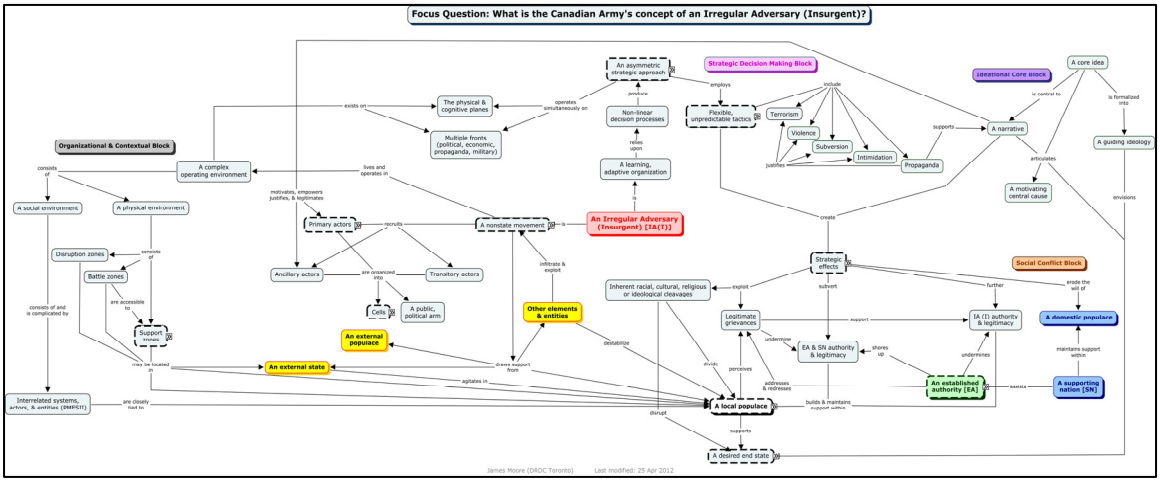


Figure 9: The Irregular Adversary (Insurgent) Concept Map.

7 Reflections on the End Product: The ANSA Cmap

The IA(I) Cmap presented here will serve as the point of departure for the development of an ANSA Cmap that will provide a means to guide and manage our efforts to explore the intentions and behaviours of ANSAs the Army is liable to encounter in future expeditionary operations. Specifically, the end-product ANSA Cmap will serve as a *cognitive model*—or "primer" on one class of irregular adversary—facilitating the development of a broad knowledge base of the contemporary operating environment in support of future Army COIN and peace support campaigns in failed or failing states. An effects-based approach to operations is predicated on a sound understanding of each actor within the battlespace, "the role they play in the environment, their aims in relation to the campaign and overall success, and the influence they have on other systems within the environment" (DAD, 2008b, p. 5-41). Key to this understanding is the development during force preparation and pre-deployment of a *broad knowledge base* of the operating environment. Drawing upon all available resources, the knowledge base provides the commander with an appreciation of the human environment in which the Army will be operating, such that he/she will know "what, who, and how to engage within the campaign to move towards the desired objectives and end state" (Ibid.).

The ANSA Cmap can play a significant role in the development of this knowledge base. Encompassing the strategic and operational as well as the structural and ideational dimensions of these actors, it will help the military intelligence operator give the commander a more holistic understanding of ANSAs in the context of their environment and their interactions with that environment. But, to be useful, the Cmap must be adapted to the particulars of each individual group and its operating environment. There is no "one size fits all" model of an ANSA, all elements of which are equally relevant to all such groups in every conceivable circumstance. The ANSA Cmap will be, in the first instance, a generic conceptual architecture, setting out the range of key concepts and propositions that have been identified as relevant to the description and analysis of these irregular adversaries, without prejudging or predetermining the relative importance or weight that can or should be assigned to each. This, though, is just the point of departure. In its practical application, the elements of the Cmap will necessarily be tailored to the unique circumstances of the particular ANSA under scrutiny. Graphically, the different weights assigned to the relationships in the Cmap can be accented using a variety of visual modalities either alone or in combination (e.g., colour and/or line weight). (The idea to use colour and line-weight modalities came out of informal discussions of the IA(I) Cmap with Canadian intelligence operators.)

To illustrate, consider the adaptation of our "first-cut" IA(I) Cmap to the specifics of two ANSAs, the Somali jihadist group al-Shabaab and the Afghan Taliban. In the *Organizational & Contextual Block* of the IA(I) Cmap, we have two major propositions: "(P17) Support zones [that is, sanctuaries, safe havens, rear bases, etc.] may be located in an external state," and "(P18) Support zones may be located in a local populace" (see Annex B). These two propositions apply in different measure to the two groups. Safe havens located in the frontier regions and provinces of Pakistan are critical to the Taliban's ongoing insurgency in Afghanistan. Sanctuaries in neighbouring countries are far less important to al-Shabaab, which controls large swaths of south-central Somalia and from which it mounts its military operations against the Transitional Federal Government (though its control is under challenge from recent Kenyan and Ethiopian military offensives into insurgent-held territory). The differential weight accorded these two propositions

for each ANSA can be represented in their respective Cmaps using a heavy-weight, red-coloured line, as in Figures 10 and 11. Using these simple line-weight and colour modalities, the generic IA(I) Cmap can be tailored to the specifics of the particular ANSA. As this example demonstrates, in practice, the generic ANSA Cmap that we ultimately construct can be—and, indeed, must be—made case-specific and context-dependent.

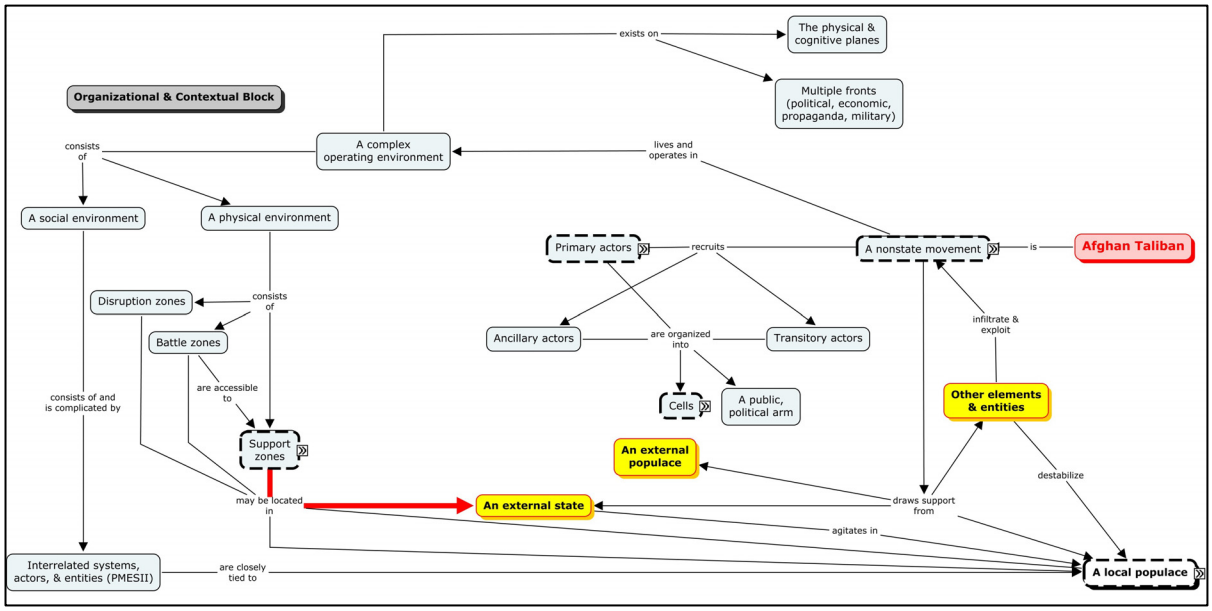


Figure 10: Afghan Taliban Concept Map.

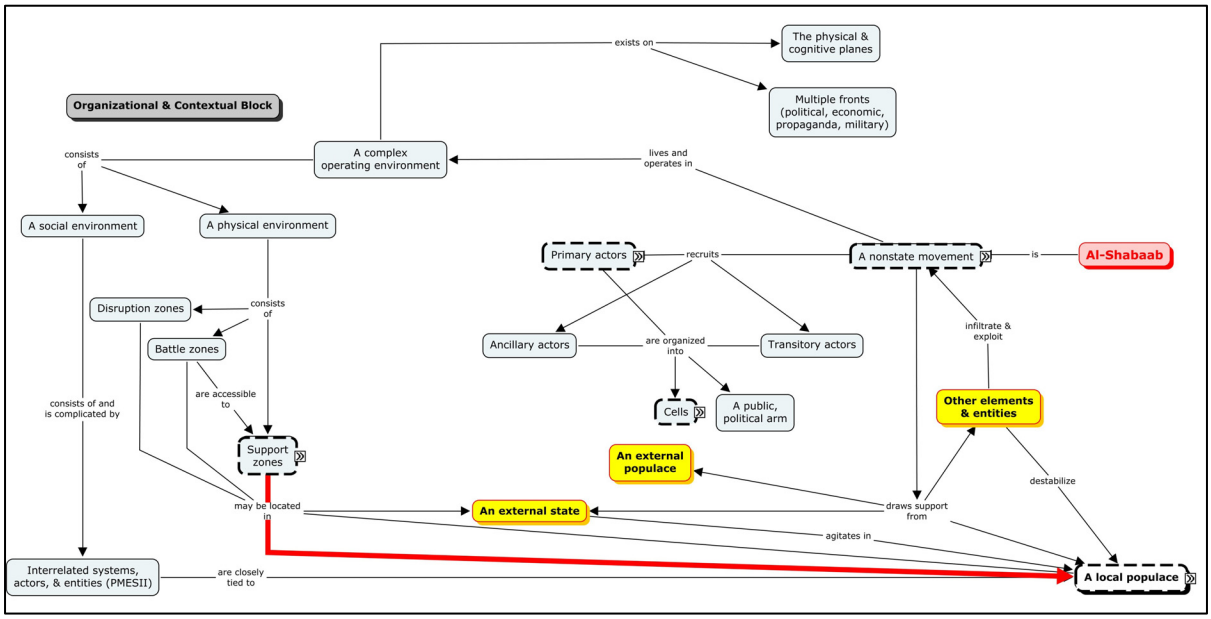


Figure 11: Al-Shabaab Concept Map.

To see where such a cognitive tool fits in the Army's Future Operational Concept space, let us situate it within one notional construct—the (former) Directorate of Future Security Analysis's (DFSA/CFD) comprehensive framework (circa 2009) (see Figure 12). This Construct sets out the interaction between the Canadian Forces' (CF) functions, environments, and condition sets, these three elements defined as:

- **Condition Set**: "The conditions are governed by the assigned missions in CFDS and form the baseline of the expectations of government."
- **Strategic Environments**: "Where elements of national power and influence can be exercised. This includes both kinetic and non-kinetic effects."
- **Strategic Functions**: "Strat def [sic] functions are the comprehensive set of discrete activities and actions necessary to mission success" (Aubin, 2009).

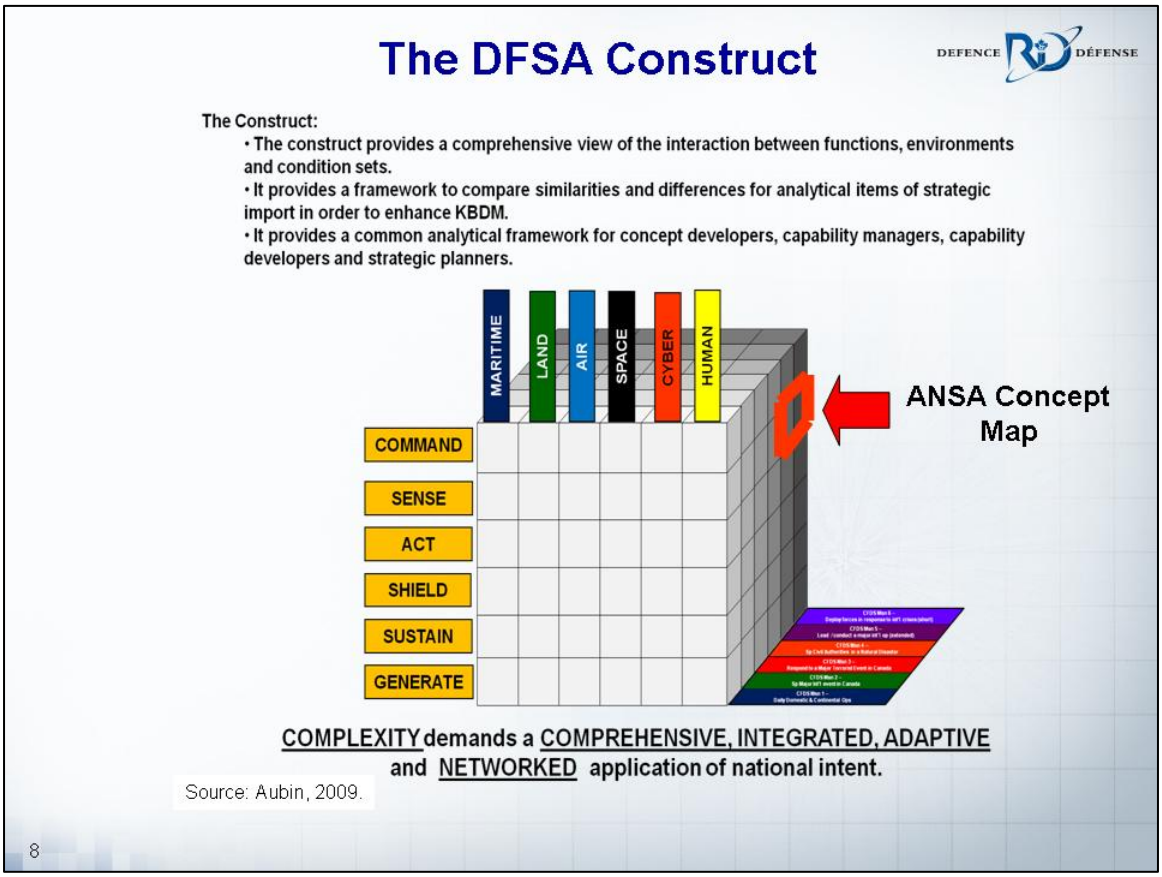


Figure 12: The DFSA construct.

Within these elements, the ANSA Cmap would be located at the junction of **Condition Sets**: CFDS Mission 5—Lead/conduct a major international operation (extended), and CFDS Mission 6—Deploy forces in response to international crises (short); **Strategic Environment**: Human; and **Strategic Function**: Sense.

To elaborate, the ANSA Cmap will contribute to a broader and deeper understanding of the psycho-social and cultural determinants of social influence at the individual, group, and societal

levels (the Human environment)—the prerequisite for effective non-kinetic influence activities. More specifically, it will assist in the production of integrated operational- and strategic-level intelligence (the Sense function) that will inform the planning processes for the effects-based approach to operations, thereby acting as a force multiplier that will provide the Army with decisive advantage over real and potential irregular adversaries in future Army COIN and peace support campaigns in failed or failing states (CFDS Missions 5 and 6).

Second, the ANSA Cmap will serve as a *knowledge model*, a repository for the information accumulated during the development of the knowledge base. A Cmap is a powerful knowledge structuring and building tool, serving as a "template or scaffold" to organize and manage the overwhelming mass of all-source information on irregular adversaries that comes across the intelligence operator's desk, and making possible the creation of powerful knowledge frameworks that permit knowledge retention and the use of this knowledge in new contexts (Novak & Cañas, 2008, p. 7). The ANSA Cmap will be used to generate and organize information concerning specific real-world adversaries in line with the concepts and propositions of the Cmap.

Further to this last point, it will support the efforts of the intelligence staffs within the Army to provide the National Command Authority and mission commanders with the strategic and combat intelligence required for the strategic and operational planning processes. The Army field manual on intelligence defines *combat intelligence* as "that intelligence concerning the adversary, weather and terrain required by a commander in the planning and conduct of combat operations (DAD, 2001, p. 6). *Strategic intelligence*, on the other hand, is "intelligence which is required for the formation of policy and military plans at national and international levels" (Ibid., p. 8). The essential differences between the two types of intelligence are ones of scope and point of view:

> Combat intelligence in a deployed command is concerned primarily with that specific military operation and is normally generated from within, whereas strategic intelligence is more intended to support defence planning at the national and international levels. Both are required to provide a complete picture of adversarial activities to a deployed command. The difference lies in their intended usage, whether the product is to be used to gain a tactical advantage or to provide an estimate as to an adversary nation's [or irregular adversary's] ability to wage war. (Ibid., p. 9)

In this Project, we have taken to heart *FM Intelligence*'s admonition on the need for both combat and strategic intelligence in order to flesh out as complete a picture of the adversary as possible. The ANSA Cmap will combine the strategic and operational levels of warfare within a common representational frame, thereby overcoming the "stove-piping" and compartmentalization that often obscures the emergent linkages and connections between the strategic, the operational, and the tactical levels of activity.

8 The Next Step: Creating the ANSA Cmap

Where do we go from here? In *Phase 3—Project Integration*, the first step will be to integrate the cumulative findings of the studies carried out in the first two phases of the Project and to refine the IA(I) Cmap in order to create the key end-product of this research endeavour: the ANSA Cmap. Specifically, we will bring together the knowledge generated from the conceptual and integrative literature review studies carried out in *Phase 1—Conceptual Development* with the results of the empirical and field investigations conducted on the Project's test case—the Somali Islamist ANSA, al-Shabaab—in *Phase 2—Framework Calibration* (see Moore, 2012a for more on these earlier phases of the Project). The following six documents and reports from these two phases will constitute the primary reference sources for transforming the IA(I) Cmap into the final ANSA Cmap:

- **Phase 1—Conceptual Development**

    1. Moore, J. (2012). *Defining the "adversary": Reflections on the NATO definition* (DRDC Toronto TR 2012–052). Toronto, ON: Defence R&D—Toronto.

    2. Moore, J. (2012). *Understanding ANSAs: Identities, roles, and strategies* (DRDC Toronto 2011–082). Toronto, ON: Defence R&D—Toronto.

    3. Salas, D., Shuffler, M., & Grossman, R. (2010). *A framework of factors influencing ANSA decision making* (DRDC Toronto CR 2010-187). Toronto, ON: Defence R&D Canada—Toronto.

    4. Taylor, D., Wohl, M., & King, M. (2010). *The psychology of violent conflict in failing states: A review of the scientific literature* (DRDC Toronto CR 2010-186). Toronto, ON: Defence R&D—Toronto.

- **Phase 2—Framework Calibration**

    5. Salas, E., Grossman, R., & Shuffler, M. (2012). Calibrating the conceptual framework of Armed Non-state Actor (ANSA) group decision making. DRDC Toronto CR 2012–054 (March 2012).

    6. Taylor, D., Wohl, M., King, M., & Kawatra, L. *The voice of young Somali Canadians: Identity, threat and the appeal of ANSA groups*. DRDC Toronto CR 2012–053 (March 2012).

Supplementing these Project studies, we will also incorporate the insights found in three comprehensive survey reports on the current state of research on terrorism and political violence more generally:

- **Survey Reports**

    7. Davis, P., & Cragin, K. (Eds.). (2009). *Social science for counterterrorism: Putting the pieces together*. Santa Monica, CA: RAND.

8. Fenstermacher, L., Kuznar, L., Rieger, T., & Speckhard, A. (Eds.). (2010). *Protecting the Homeland from international and domestic terrorism threats: Current multi-disciplinary perspectives on root causes, the role of ideology, and programs for counter-radicalization and disengagement.* Arlington, VA: Office of Secretary of Defense, Director, Defense Research & Engineering.

9. Speckhard, A. (Ed.). (2011). *Psychosocial, organizational and cultural aspects of terrorism: Final report of the NATO Human Factors and Medicine Research Task Group 140* (RTO Technical Report RTO–TR–HFM–140). Neuilly-sur-Seine Cedex, FR: Research and Technology Organisation, NATO.

On the basis of these nine studies and reports, we will refine the concepts and propositions of the IA(I) Cmap—revising (i.e., clarifying or rewording) retained propositions, removing unfounded propositions, and adding strongly grounded ones—such that we can have increased confidence from both a theoretical and empirical perspective in the overall fitness for purpose of the resulting ANSA Cmap.

Having refined its skeletal structure, the task will then be to populate the ANSA Cmap, that is, to provide its propositions with substantive content. The intent here will be to create a "back-end wiki" for the Cmap. That is, a wiki page—varying in length from a short paragraph to a 2–3 page summary article, depending on the complexity of the subject matter—will be written for each proposition, providing an overview of the substance of that proposition based on the extant scientific literature (in the first instance, the nine reference sources cited above). For example, for the proposition "An ANSA is a nonstate movement," the wiki page will provide a definition of the term *nonstate movement* as well as a general discussion of the variety of nonstate actors and their possible roles, influence, and impact in intergroup or social conflict. The combined Cmap/wiki format will allow for the evolution—the continual editing and updating—of text entries as further information reflecting the latest scientific thinking becomes available. It will also facilitate the interconnection by hyperlink of wiki pages within the Cmap as well as links from the wiki pages to other textual, audio, and video resources on the Web.

Once completed, the ANSA Cmap, with its associated rules and modalities for application, must be validated to ascertain its usefulness as a practical analytical tool for civilian and military intelligence operators (the IA(I) Cmap presented here will not be tested since it is only a "way-station" enroute to the end-product ANSA Cmap). Though it is beyond the scope of this paper to delve into the particulars of the experimental design, suffice it to say that a select group of intelligence operators will be asked to test the ANSA Cmap tool under controlled experimental conditions. How does the Cmap fare against other methods of knowledge acquisition? How well does it facilitate the desired result of the learning exercise—in this instance, increased operator understanding of the motivations, intentions, and behaviours of ANSAs—as compared to, say, an unguided search of the Internet for multimedia resources—text, pictures, audio, and video—related to ANSAs (arguably the default option for many analysts absent more specific direction from colleagues or supervisors)? In other words, how effective is the Cmap as a cognitive model and knowledge model, identified above as the principal functions of the ANSA Cmap?

In conclusion, the comment above on the dynamic nature of the Cmap and its associated wiki deserves repeating. The so-called "final" version of the ANSA Cmap built from the IA(I) Cmap presented here will be final only in the sense that it is the end product of this specific Project.

Cmaps—as is the knowledge upon which they are based—are not static. They will and must evolve to reflect future theoretical, experimental, and empirical advances in the social sciences. As Crandall et al. (2006) aptly put it, "it is wise to always consider Concept Maps as 'living' representations rather than finished 'things'" (p. 54). In that sense, the ANSA Cmap we will develop will always be a "work in progress."

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Annex A Figures (Enlarged)

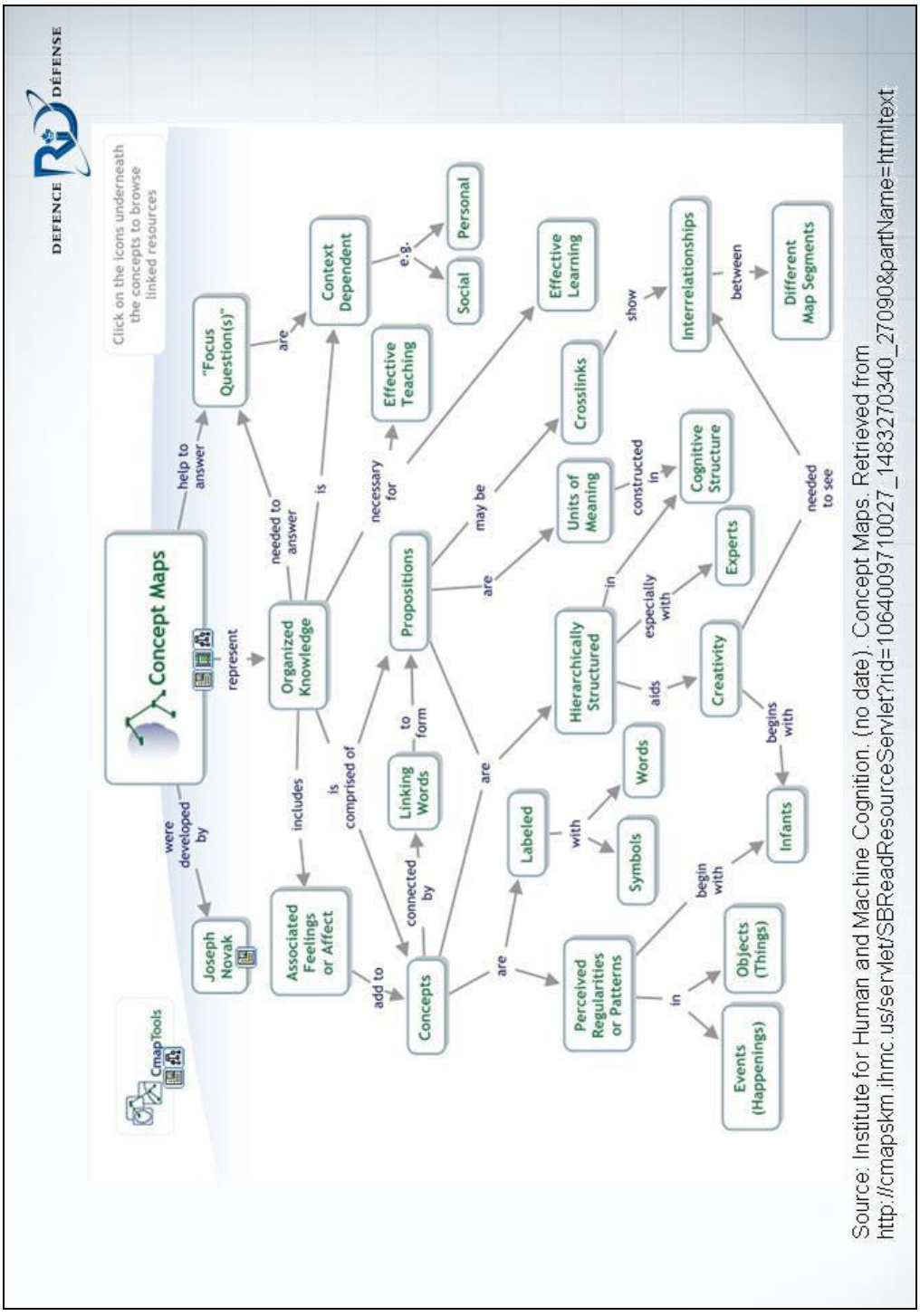

Figure 13: What is a Concept Map?

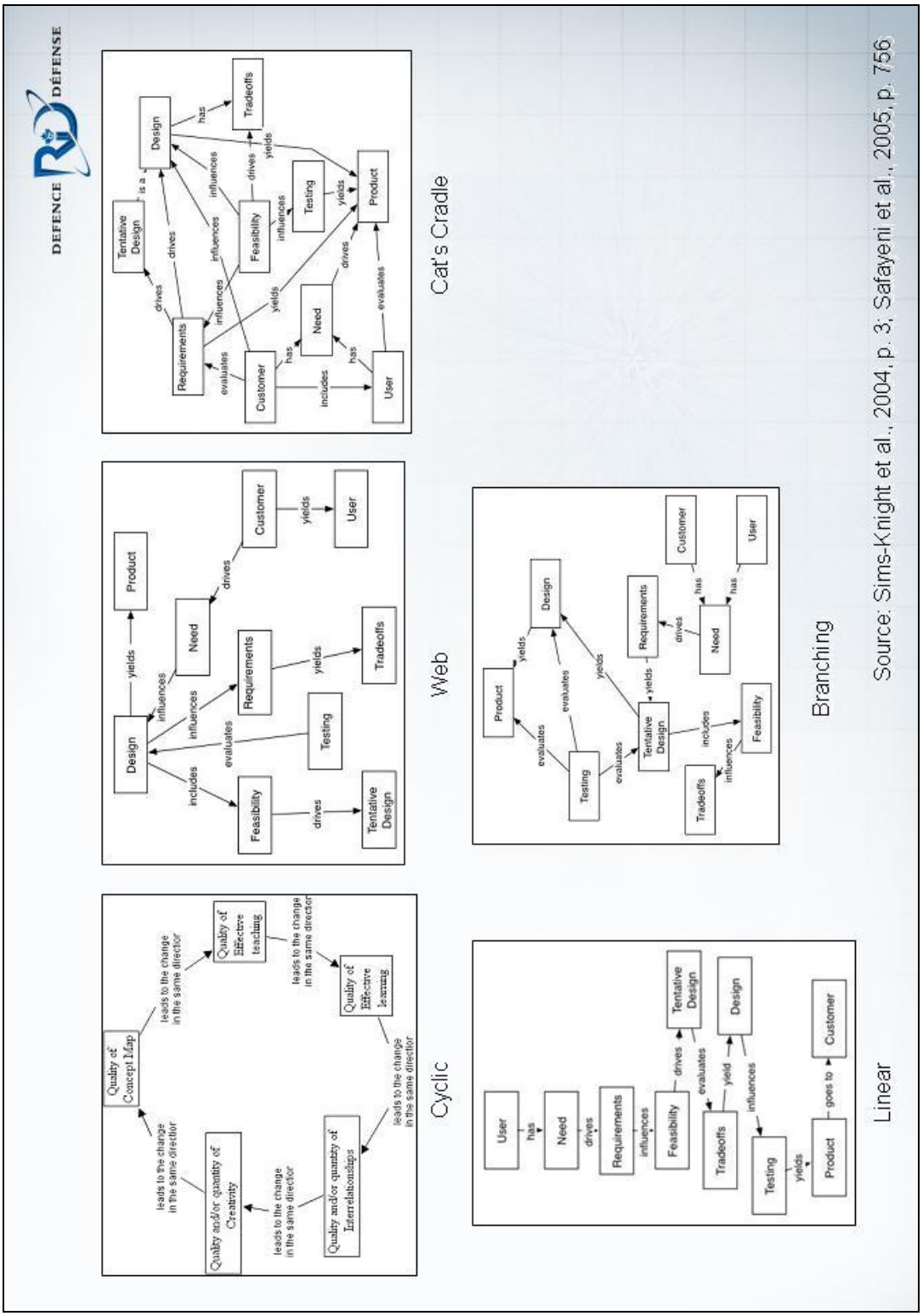

Figure 14: Patterns of Concept Maps.

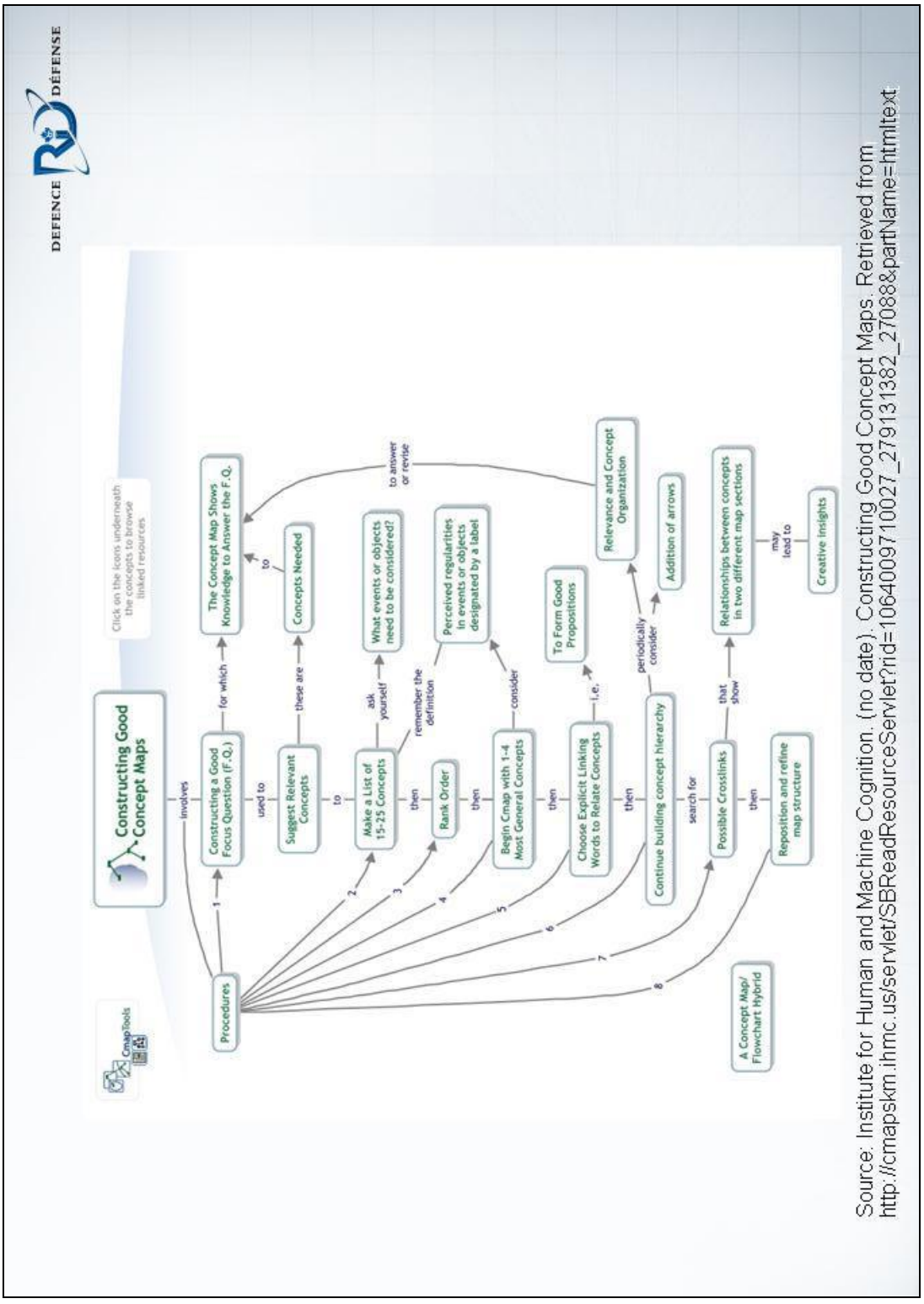

Figure 15: How to construct a Concept Map.

Features	Novak and Cañas (2011)	Crandall et al. (2006)	Moon et al. (2011)
Elements	Concepts that are labeled with words and/or symbols	Straightforward expression, i.e., no tacit meaning in the elements of the CM (e.g., using color or symbols to code meaning)	
	Focus question guides the generation of ideas and questions that the CM is to explain.		Properly formulated focus question, e.g., dynamic, functional, process- and/or declarative-inducing questions
	Linking words and/or phrases that connect the concepts	Unrestricted semantics, i.e., no restrictions on what types of relations can be represented	Diversity in linking words and phrases
	Propositions, i.e., simple and meaningful expressions that are the concept—link—concept "triples'	Propositions can be read as "stand alone," enabling propositional coherence	Use of arrowheads to direct meaning and attention
Structure	Hierarchical structure	Explicit rationale for the "semi-hierarchical" structure	Minimally intersecting connections, i.e., no more than three intersections per CM
	Cross-links that show interrelationships		Balanced structure, i.e., mostly proportionate spatial arrangement
Usability and Aesthetics			Viewable and legible sizing of the CM and its elements
			Content-appropriate aesthetics

Source: Moon et al., 2011, p. 26

Figure 16: Features of "good" Novakian Concept Maps.

Aspect
Animations, visual effects, movement, dynamics
Balance, equilibrium, symmetry
Coherence, CRAFTSMANSHIP, harmony, modernity, professionalism, style
COLOUR
Complexity, DIVERSITY, variety
Grouping, structure, order
Homogeneity, unity, regularity, uniformity
Images, icons, graphics
Novelty, creativity, inventiveness, interestingness
Proportion, cohesion
SIMPLICITY, clarity, parsimony, density
Text, fonts, links

Source: Moshagen & Thielsch, 2010, p. 692

Figure 17: Aspects of visual aesthetics of websites.

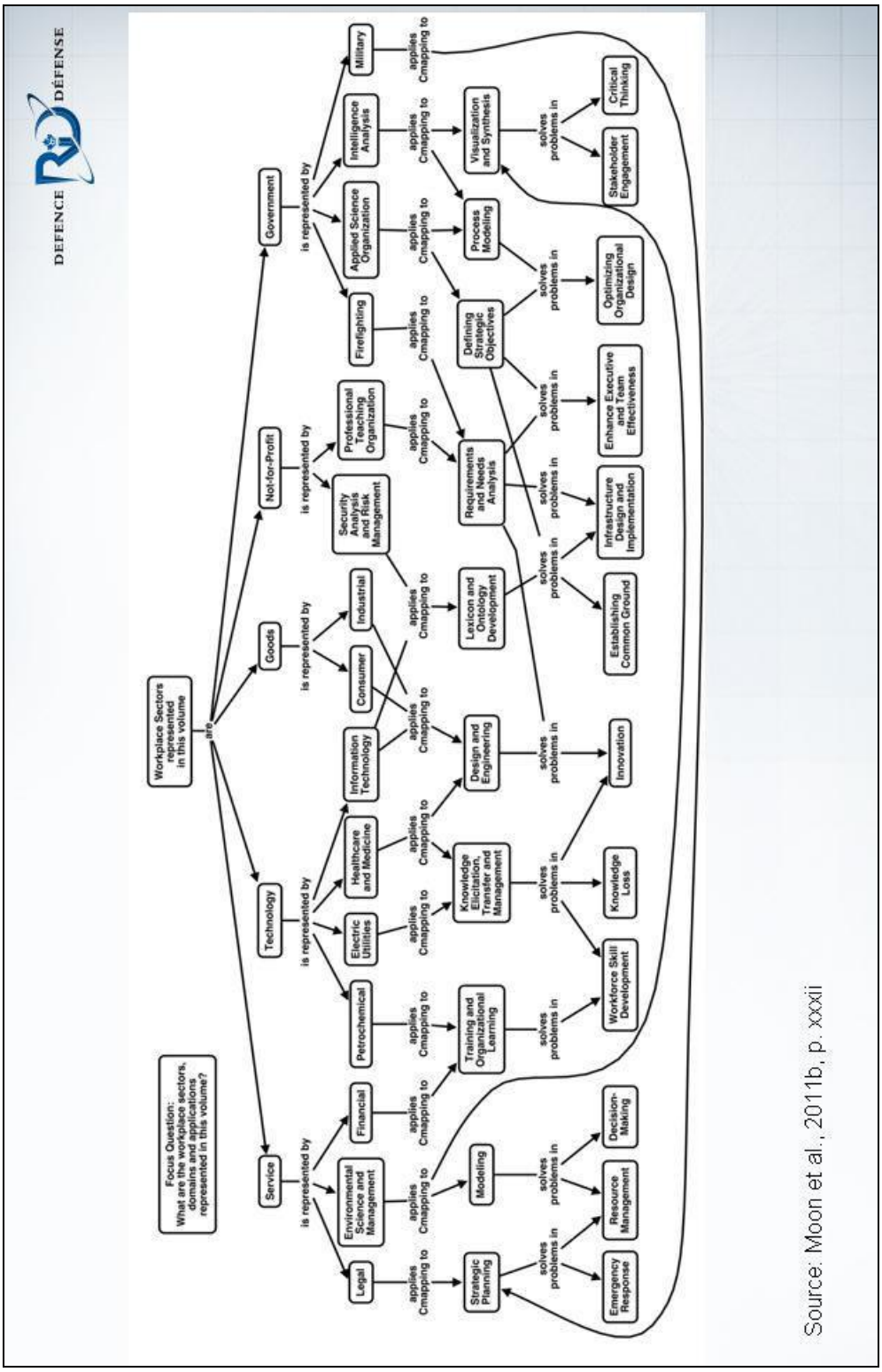

Figure 18: Workplace sectors, domains and applications of Concept Maps.

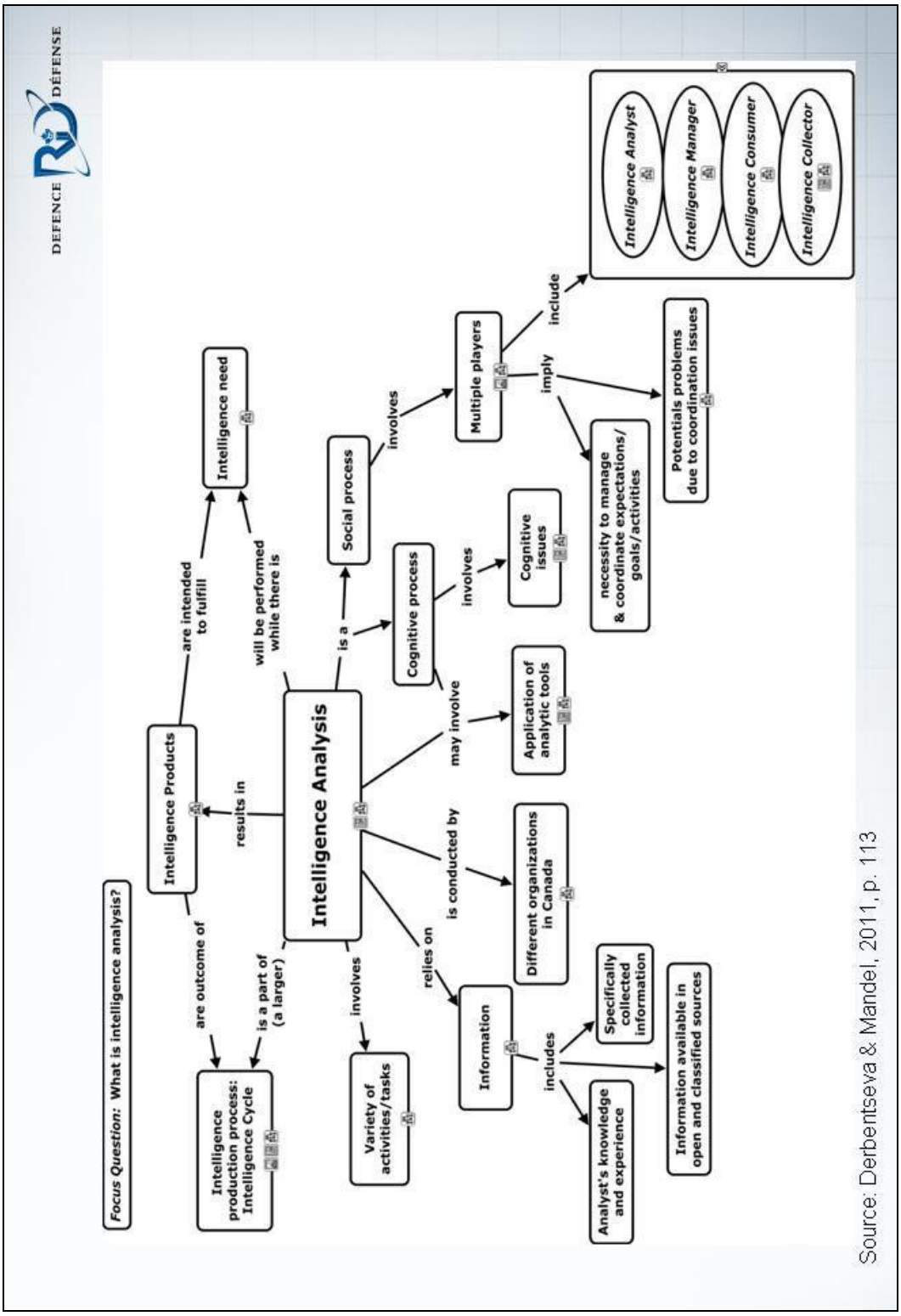

Figure 19: Concept Map knowledge model of intelligence analysis.

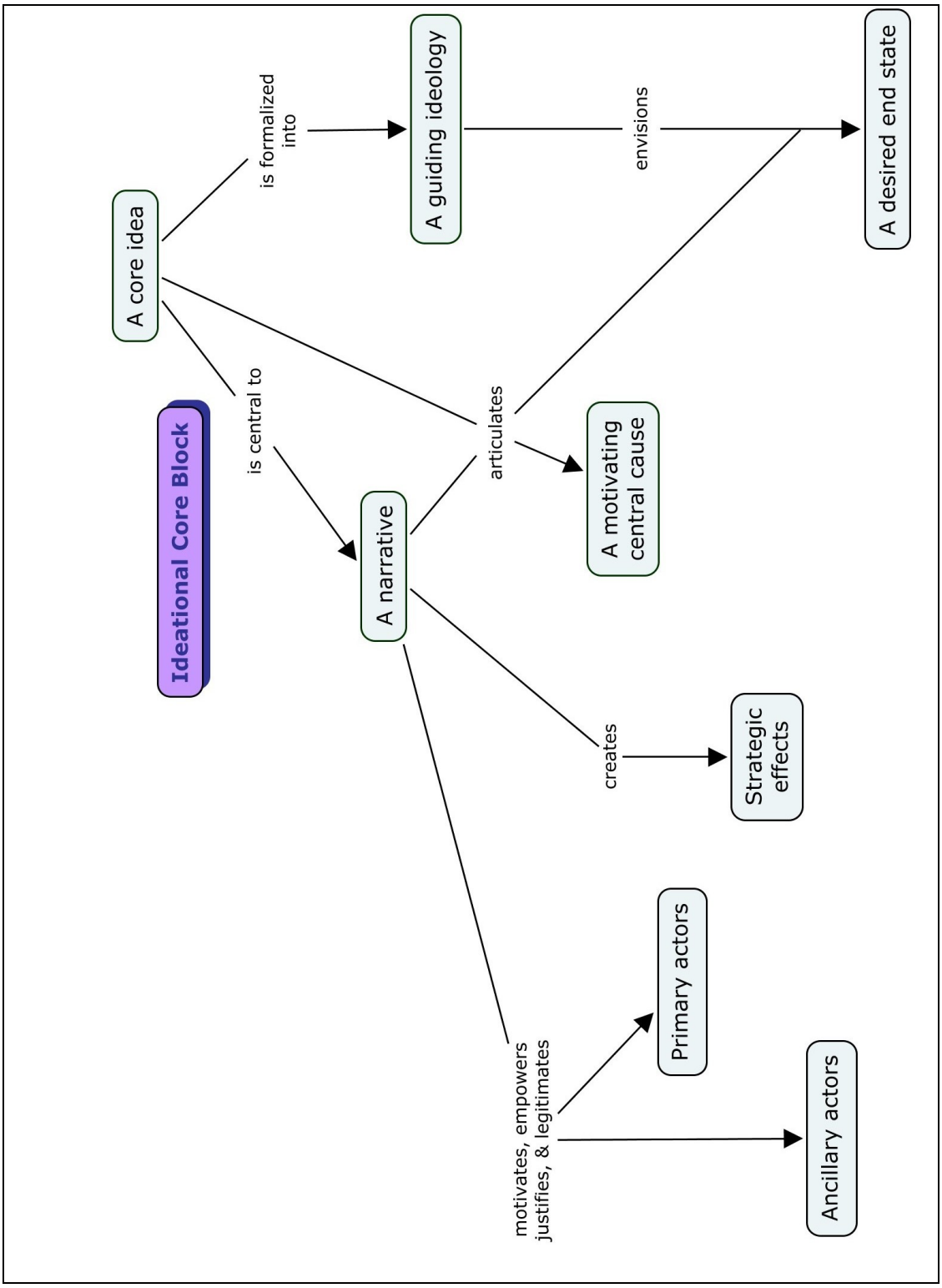

Figure 20: Ideational Core Block.

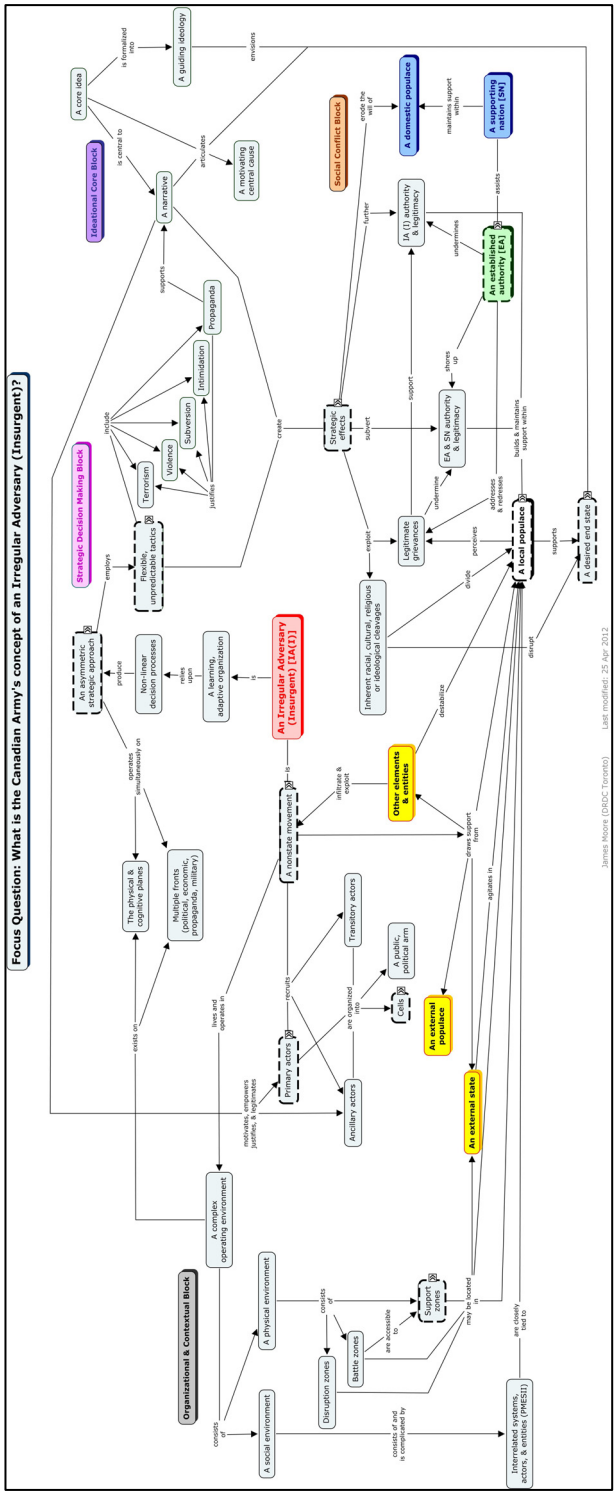

Figure 21: The Irregular Adversary (Insurgent) Concept Map.

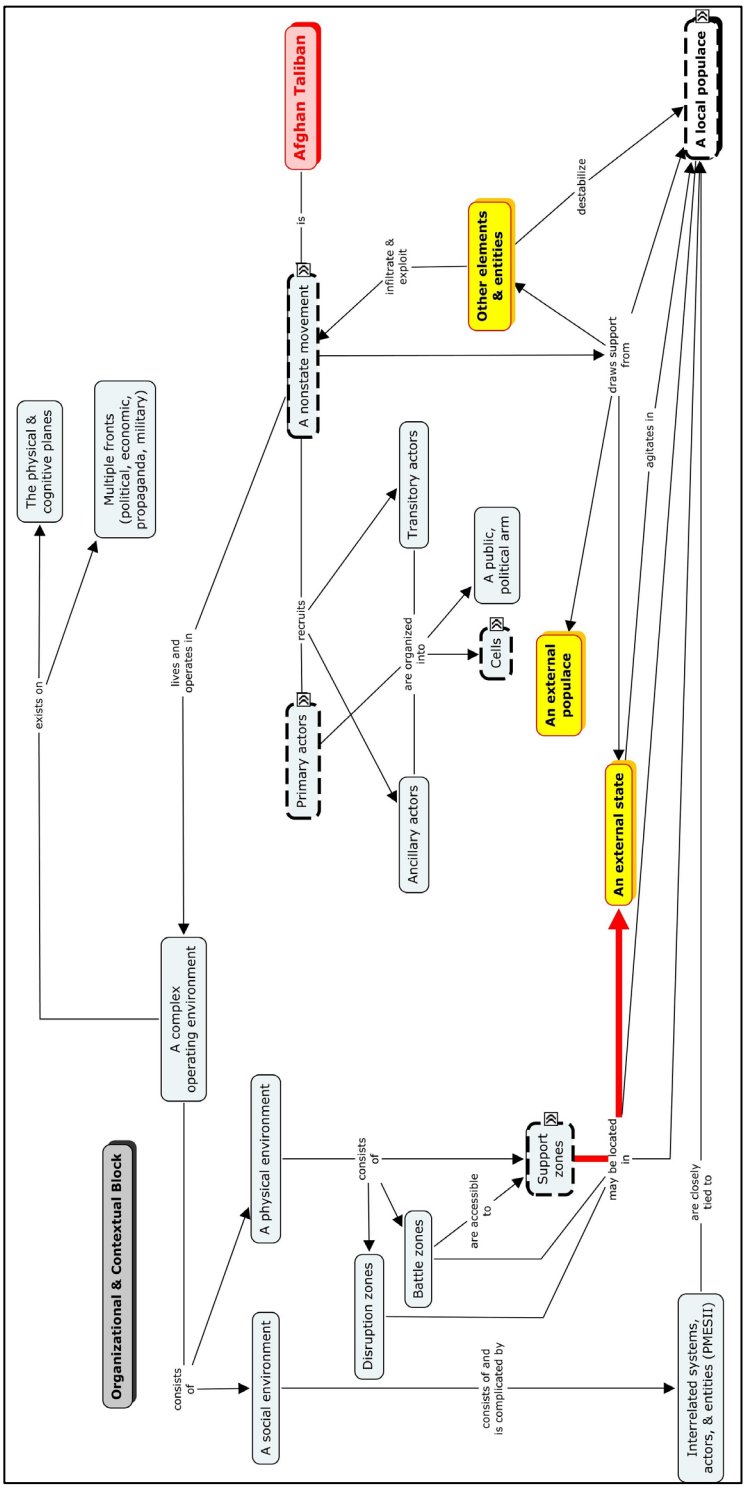

Figure 22: Afghan Taliban Concept Map.

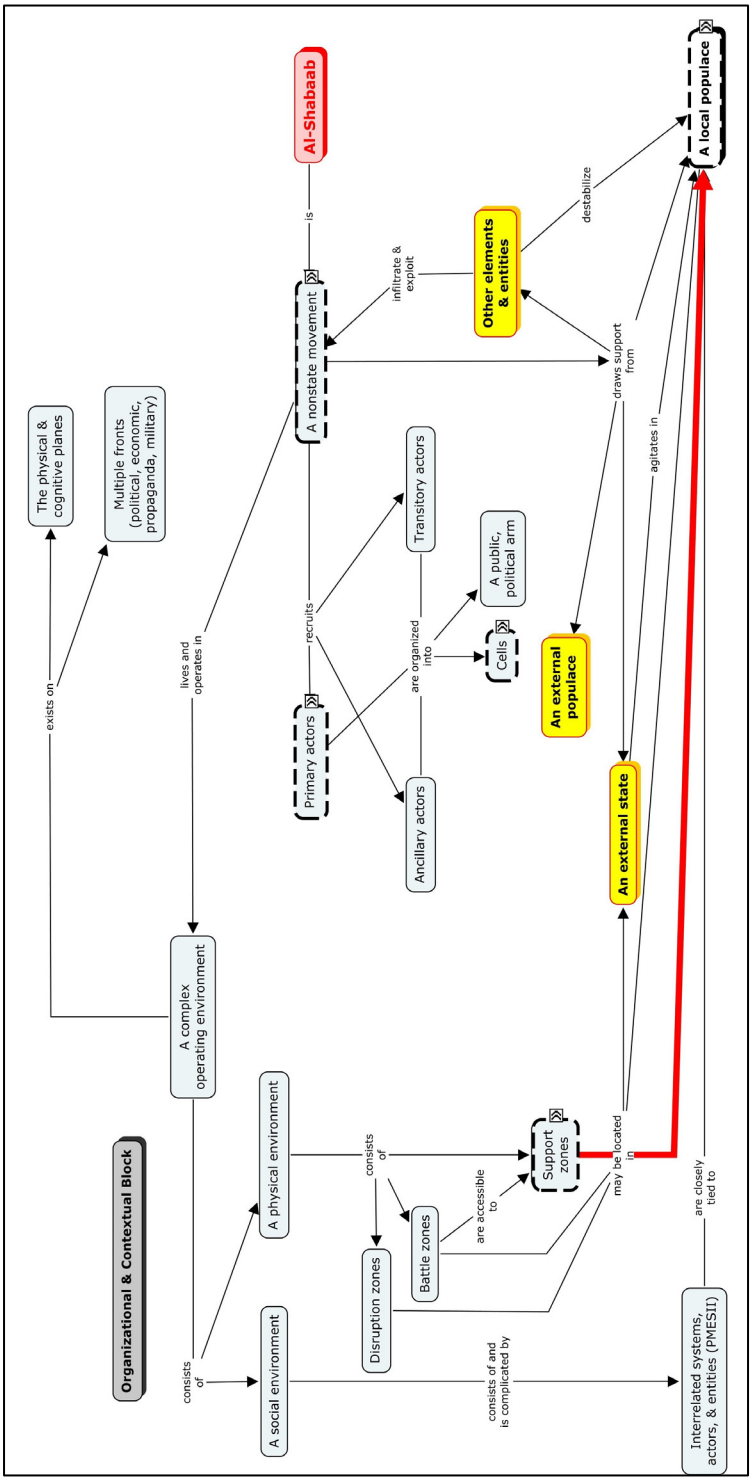

Figure 23: Al-Shabaab Concept Map.

Figure 24: The DFSA construct.

Annex B IA(I) Cmap—Blocks and Nested Nodes

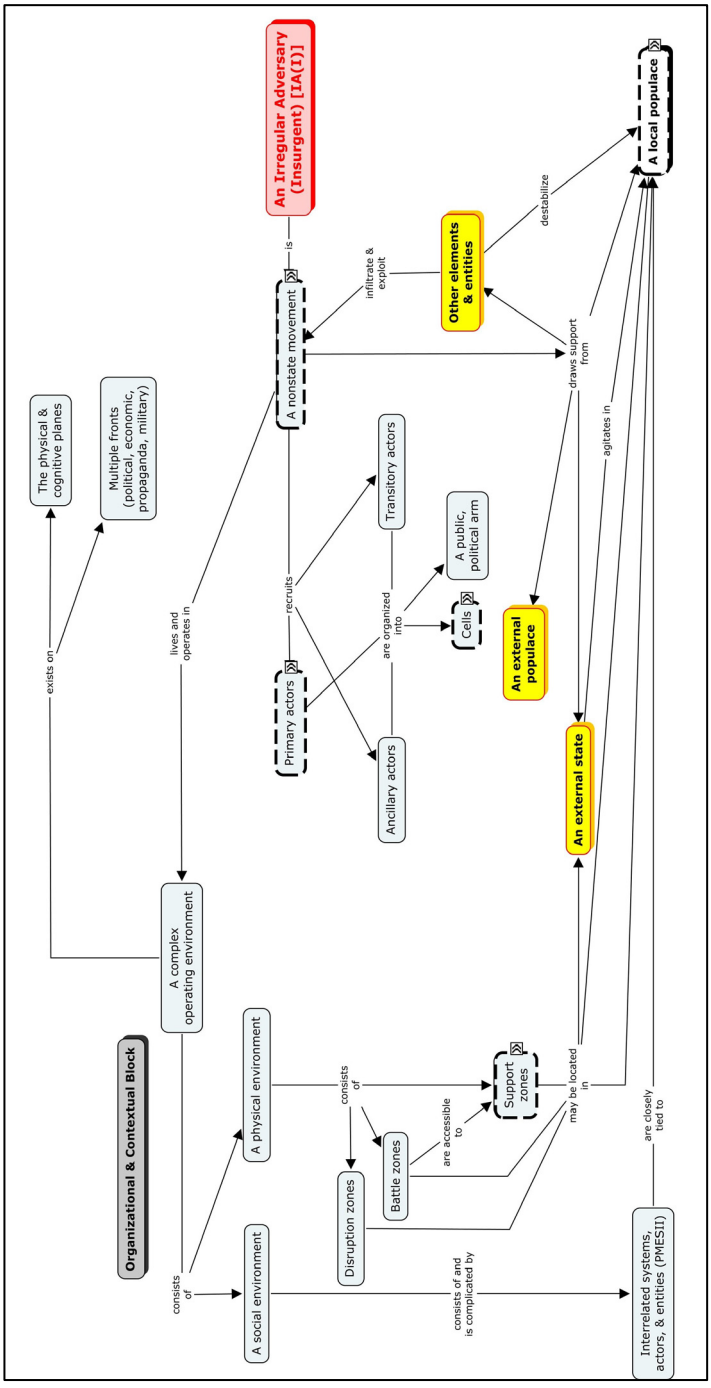

Figure 25: Organizational & Contextual Block.

Propositions (34)

P1. An Irregular Adversary (Insurgent) [IA(I)] is a nonstate movement.

P2. A nonstate movement lives and operates in a complex operating environment.

P3. A complex operating environment exists on the physical & cognitive planes.

P4. A complex operating environment exists on multiple fronts (political, economic, propaganda, military).

P5. A complex operating environment consists of a social environment.

P6. A social environment consists of and is complicated by interrelated systems, actors, & entities (PMESII).

P7. Interrelated systems, actors, & entities (PMESII) are closely tied to a local populace.

P8. A complex operating environment consists of a physical environment.

P9. A physical environment consists of disruption zones.

P10. A physical environment consists of battle zones.

P11. A physical environment consists of support zones.

P12. Disruption zones may be located in an external state.

P13. Disruption zones may be located in a local populace.

P14. Battle zones are accessible to support zones.

P15. Battle zones may be located in an external state.

P16. Battle zones may be located in a local populace.

P17. Support zones may be located in an external state.

P18. Support zones may be located in a local populace.

P19. A nonstate movement draws support from a local populace.

P20. A nonstate movement draws support from other elements & entities.

P21. Other elements & entities destabilize a local populace.

P22. Other elements & entities infiltrate & exploit a nonstate movement.

P23. A nonstate movement draws support from an external populace.

P24. A nonstate movement draws support from an external state.

P25. An external state agitates in a local populace.

P26. A nonstate movement recruits primary actors.

P27. A nonstate movement recruits ancillary actors.

P28. A nonstate movement recruits transitory actors.

P29. Primary actors are organized into cells.

P30. Ancillary actors are organized into cells.

P31. Transitory actors are organized into cells.

P32. Primary actors are organized into a public, political arm.

P33. Ancillary actors are organized into a public, political arm.

P34. Transitory actors are organized into a public, political arm.

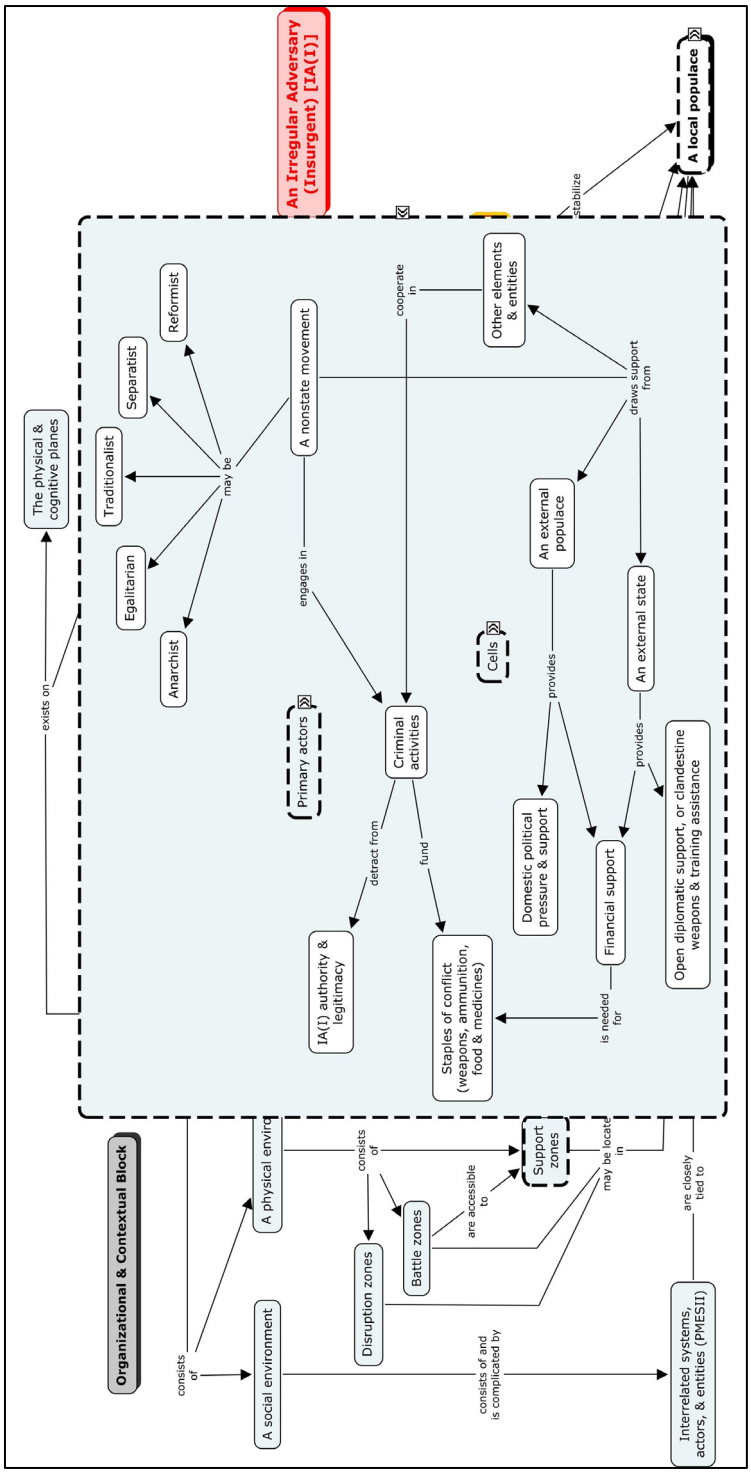

Figure 26: Nested node 1: A non-state movement.

Sub-propositions (17)

SP1. A nonstate movement may be anarchist.

SP2. A nonstate movement may be egalitarian.

SP3. A nonstate movement may be traditionalist.

SP4. A nonstate movement may be separatist.

SP5. A nonstate movement may be reformist.

SP6. A nonstate movement engages in criminal activities.

SP7. Criminal activities detract from IA(I) authority & legitimacy.

SP8. Criminal activities fund staples of conflict (weapons, ammunition, food, & medicines).

SP9. A nonstate movement draws support from other elements & entities.

SP10. Other elements & entities cooperate in criminal activities.

SP11. A nonstate movement draws support from an external populace.

SP12. An external populace provides domestic political pressure & support.

SP13. An external populace provides financial support.

SP14. A nonstate movement draws support from an external state.

SP15. An external state provides financial support.

SP16. An external state provides open diplomatic support, or clandestine weapons & training assistance.

SP17. Financial support is needed for staples of conflict (weapons, ammunition, food, & medicines).

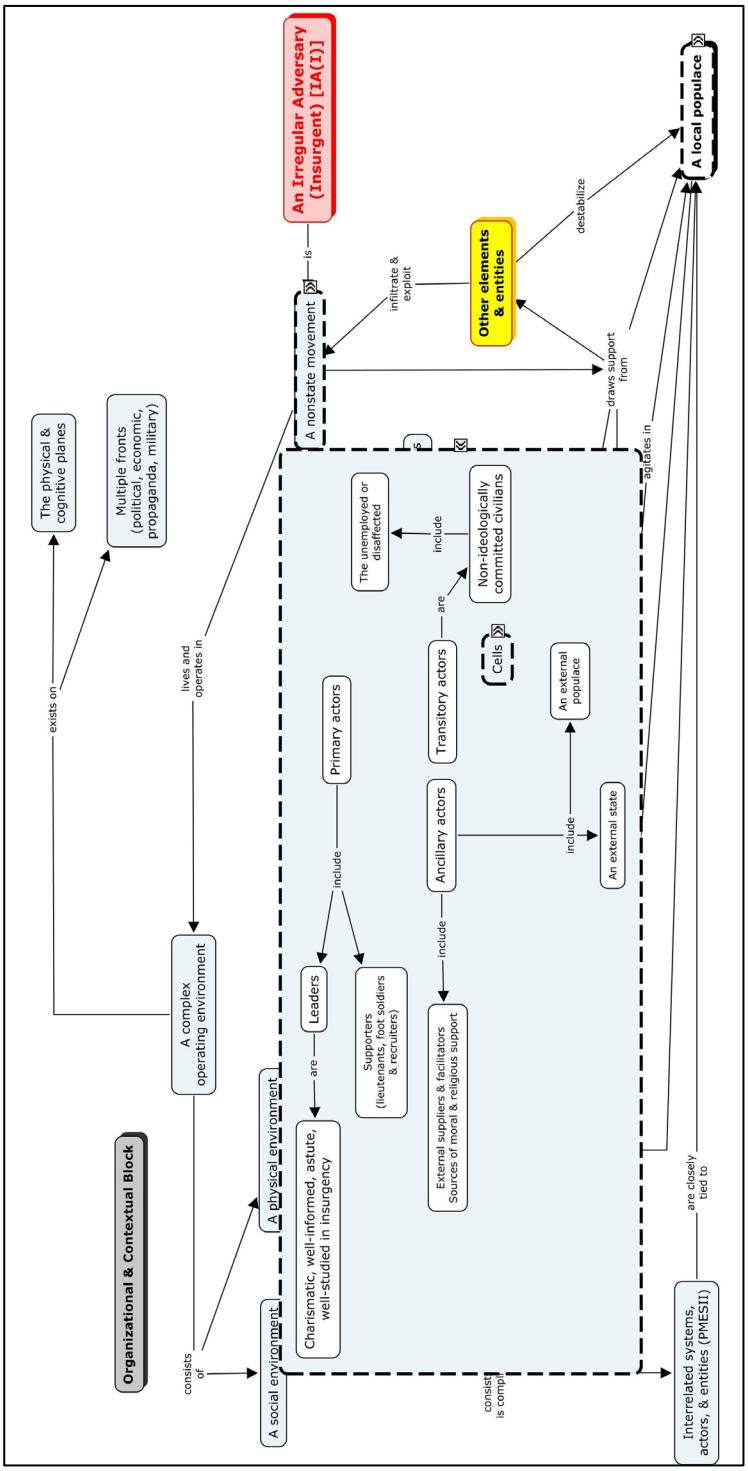

Figure 27: Nested node 2: Primary actors.

Sub-propositions (8)

SP18. Primary actors include leaders.

SP19. Primary actors include supporters (lieutenants, foot soldiers, & recruiters).

SP20. Leaders are charismatic, well-informed, astute, well-studied in insurgency.

SP21. Ancillary actors include external suppliers & facilitators, sources of moral & religious support.

SP22. Ancillary actors include an external state.

SP23. Ancillary actors include an external populace.

SP24. Transitory actors are non-ideologically committed civilians.

SP25. Non-ideologically committed civilians include the unemployed or disaffected.

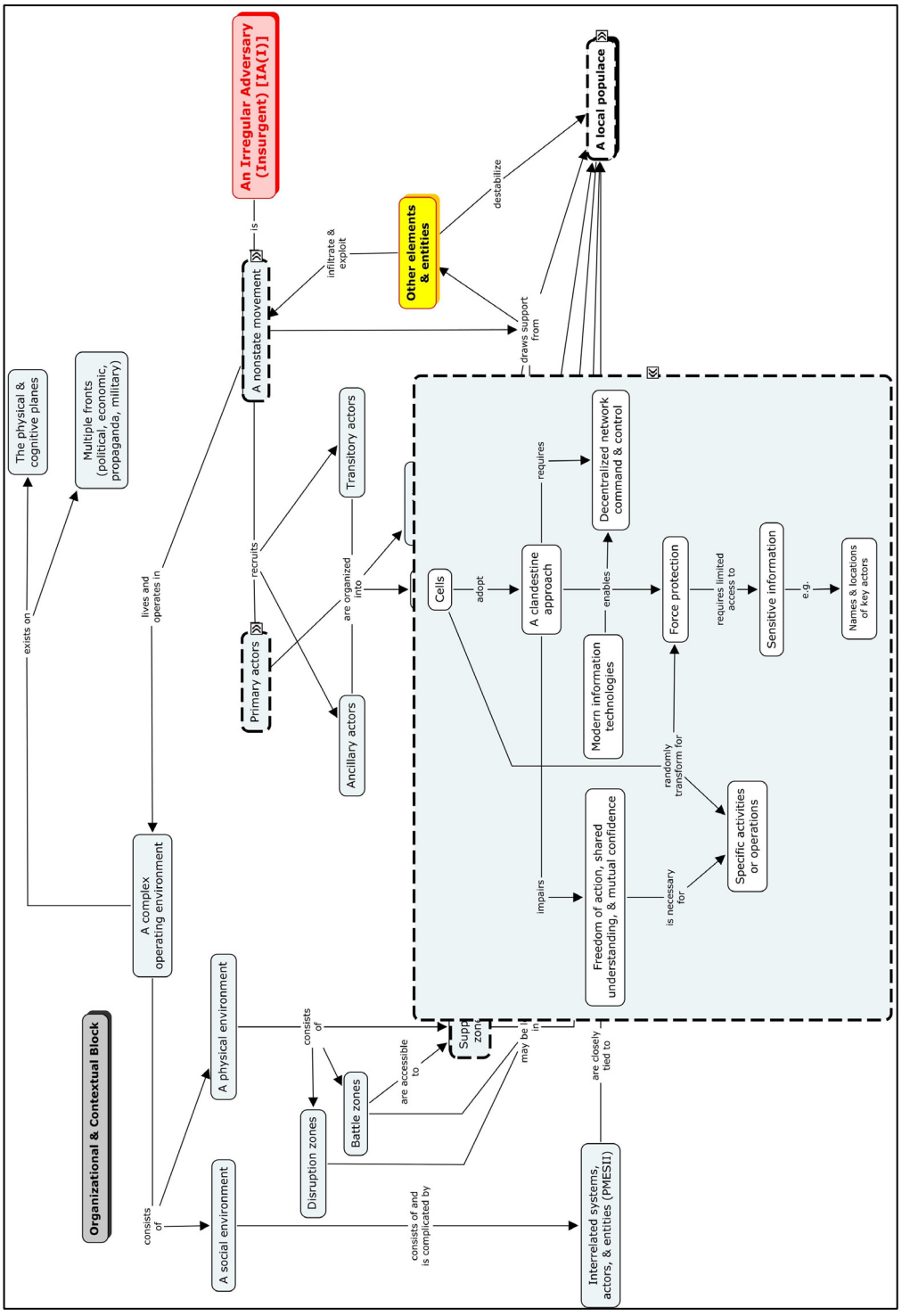

Figure 28: Nested node 3: Cells.

Sub-propositions (11)

SP26. Cells adopt a clandestine approach.

SP27. A clandestine approach impairs freedom of action, shared understanding, & mutual confidence.

SP28. A clandestine approach enables force protection.

SP29. A clandestine approach requires decentralized network command & control.

SP30. Modern information technologies enable decentralized network command & control.

SP31. Modern information technologies enable force protection.

SP32. Freedom of action, shared understanding, & mutual confidence are necessary for specific activities or operations.

SP33. Cells randomly transform for specific activities or operations.

SP34. Cells randomly transform for force protection.

SP35. Force protection requires limited access to sensitive information.

SP36. Sensitive information, e.g., names & locations of key actors.

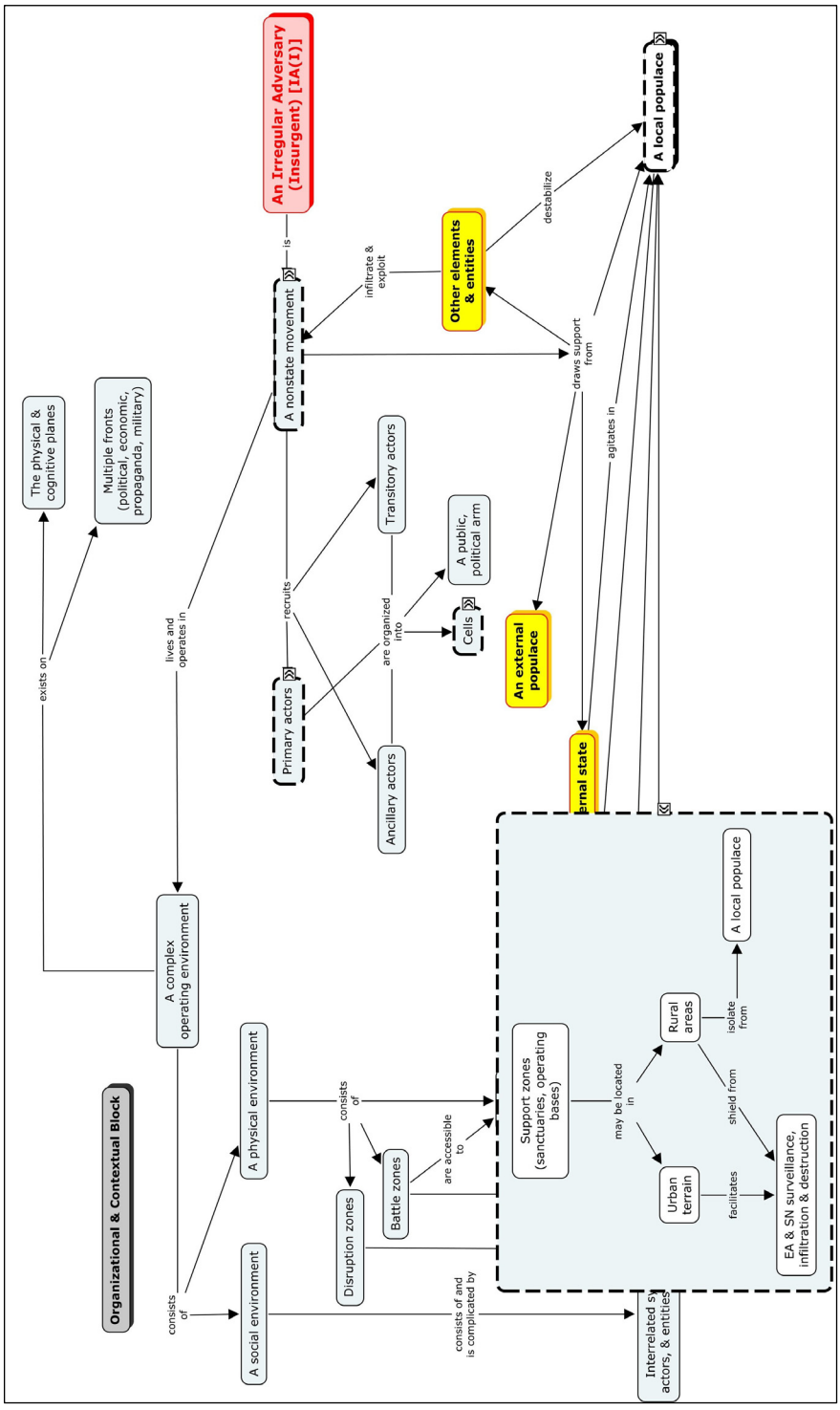

Figure 29: Nested node 4: Support zones.

Sub-propositions (5)

SP37. Support zones (sanctuaries, operating bases) may be located in urban terrain.

SP38. Support zones (sanctuaries, operating bases) may be located in rural areas.

SP39. Urban terrain facilitates EA & SN surveillance, infiltration, & destruction.

SP40. Rural areas shield from EA & SN surveillance, infiltration, & destruction.

SP41. Rural areas isolate from a local populace.

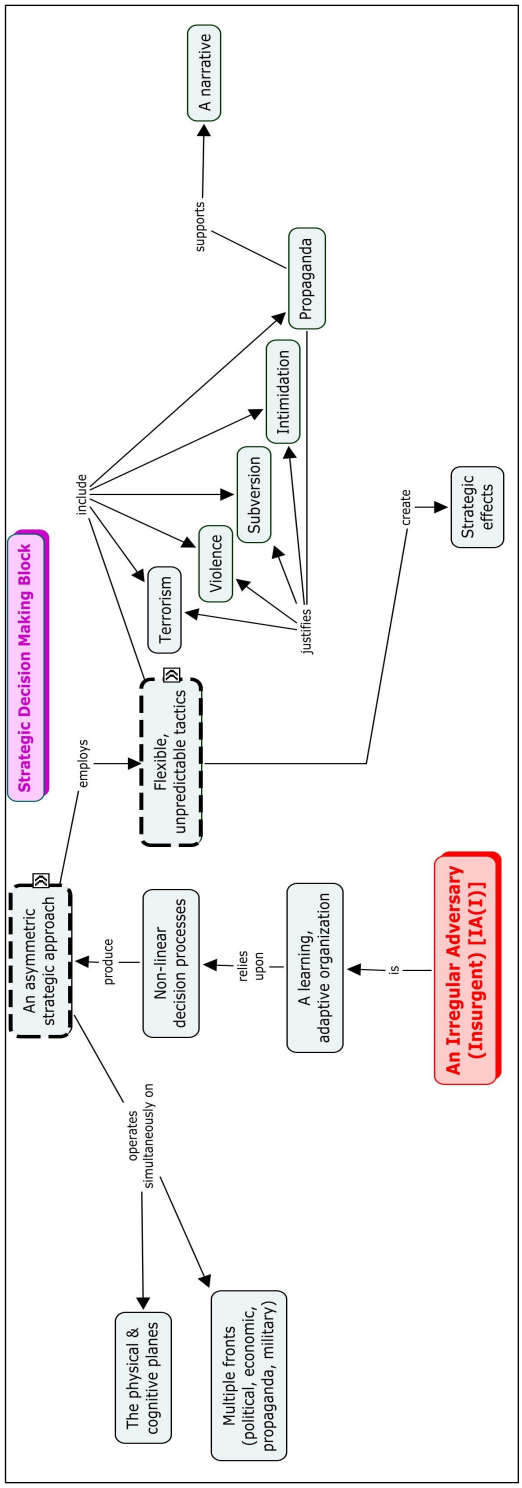

Figure 30: Strategic Decision Making Block.

Propositions (17)

P35. An Irregular Adversary (Insurgent) [IA(I)] is a learning, adaptive organization.

P36. A learning, adaptive organization relies upon non-linear decision processes.

P37. Non-linear decision processes produce an asymmetric strategic approach.

P38. An asymmetric strategic approach operates simultaneously on the physical & cognitive planes.

P39. An asymmetric strategic approach operates simultaneously on multiple fronts (political, economic, propaganda, military).

P40. An asymmetric strategic approach employs flexible, & unpredictable tactics.

P41. Flexible, unpredictable tactics create strategic effects.

P42. Flexible, unpredictable tactics include terrorism.

P43. Flexible, unpredictable tactics include violence.

P44. Flexible, unpredictable tactics include subversion.

P45. Flexible, unpredictable tactics include intimidation.

P46. Flexible, unpredictable tactics include propaganda.

P47. Propaganda justifies terrorism.

P48. Propaganda justifies violence.

P49. Propaganda justifies subversion.

P50. Propaganda justifies intimidation.

P51. Propaganda supports a narrative.

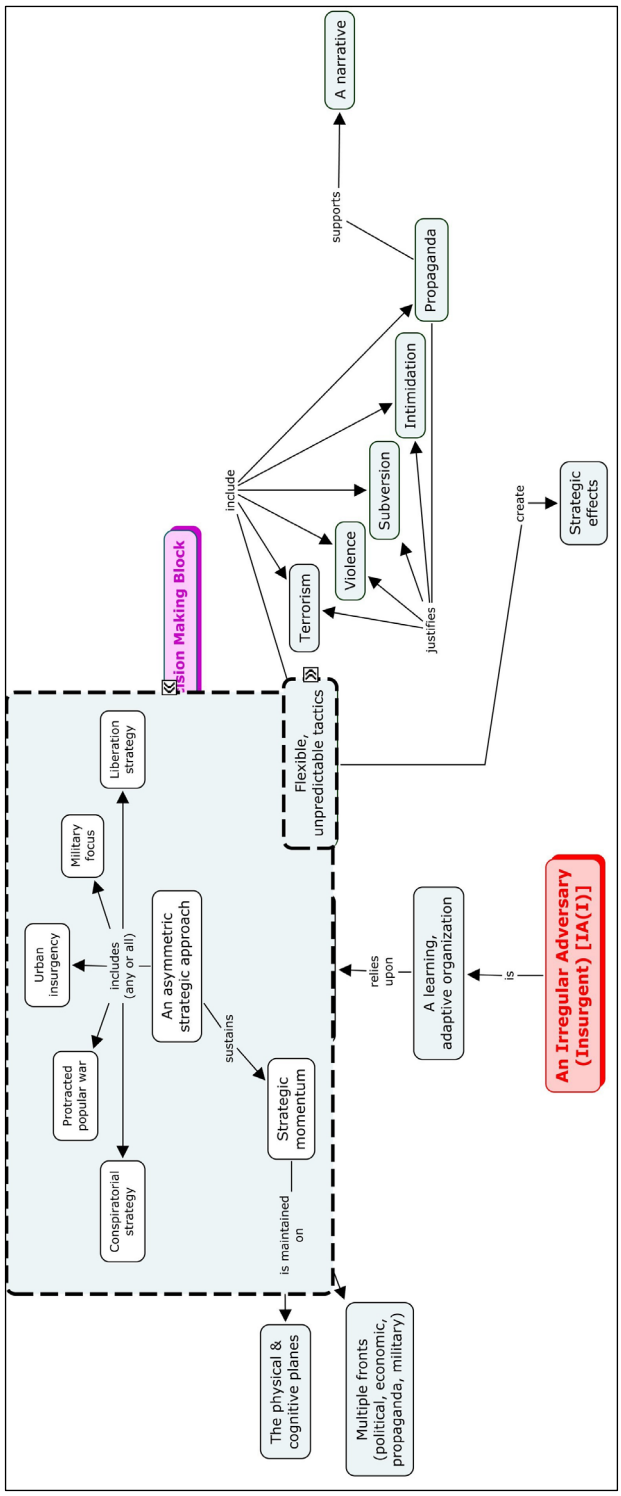

Figure 31: Nested node 5: An asymmetric strategic approach.

Sub-propositions (8)

SP42. An asymmetric strategic approach includes (any or all) conspiratorial strategy.

SP43. An asymmetric strategic approach includes (any or all) protracted popular war.

SP44. An asymmetric strategic approach includes (any or all) urban insurgency.

SP45. An asymmetric strategic approach includes (any or all) military focus.

SP46. An asymmetric strategic approach includes (any or all) liberation strategy.

SP47. An asymmetric strategic approach sustains strategic momentum.

SP48. Strategic momentum is maintained on the physical & cognitive planes.

SP49. Strategic momentum is maintained on ultiple fronts (political, economic, propaganda, military).

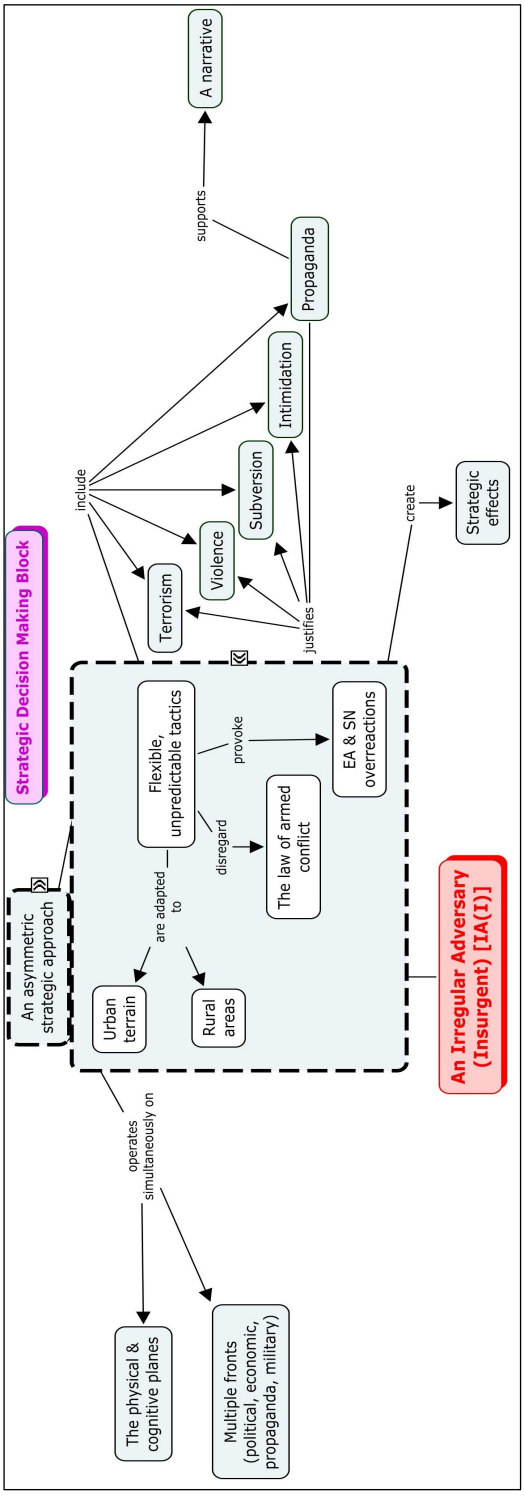

Figure 32: Nested node 6: Flexible, unpredictable tactics.

Sub-propositions (5)

SP50. Flexible, unpredictable tactics are adapted to urban terrain.

SP51. Flexible, unpredictable tactics are adapted to rural areas.

SP52. Flexible, unpredictable tactics disregard the law of armed conflict.

SP53. Flexible, unpredictable tactics provoke EA & SN overreactions.

SP54. EA & SN overreactions create strategic effects.

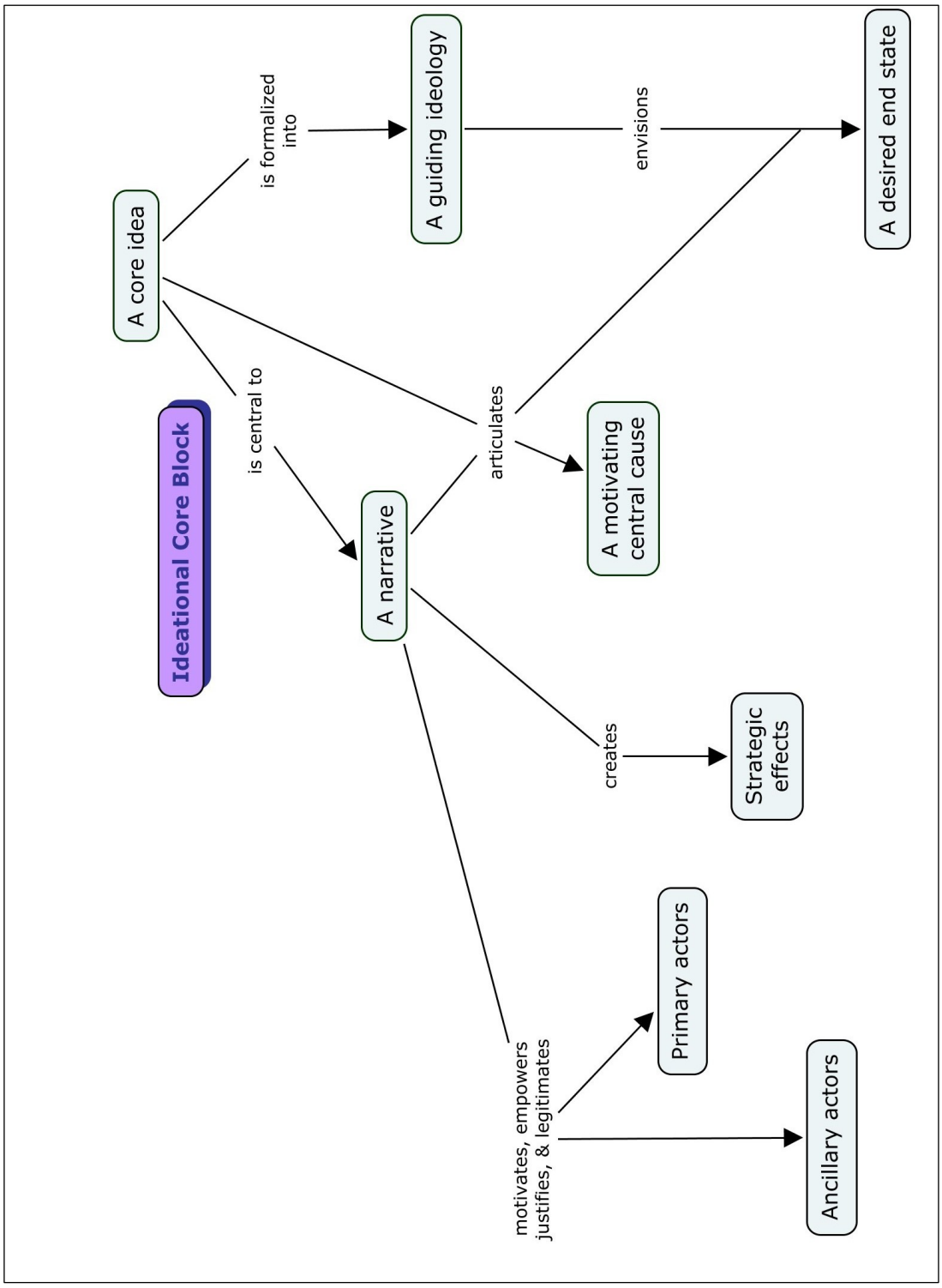

Figure 33: Ideational Core Block.

Propositions (10)

P52. A core idea is central to a narrative.

P53. A core idea articulates a motivating central cause.

P54. A core idea is formalized into a guiding ideology.

P55. A core idea articulates a desired end state.

P56. A narrative articulates a motivating central cause.

P57. A narrative creates strategic effects.

P58. A narrative articulates a desired end state.

P59. A narrative motivates, empowers, justifies, & legitimates primary actors.

P60. A narrative motivates, empowers, justifies, & legitimates ancillary actors.

P61. A guiding ideology envisions a desired end state.

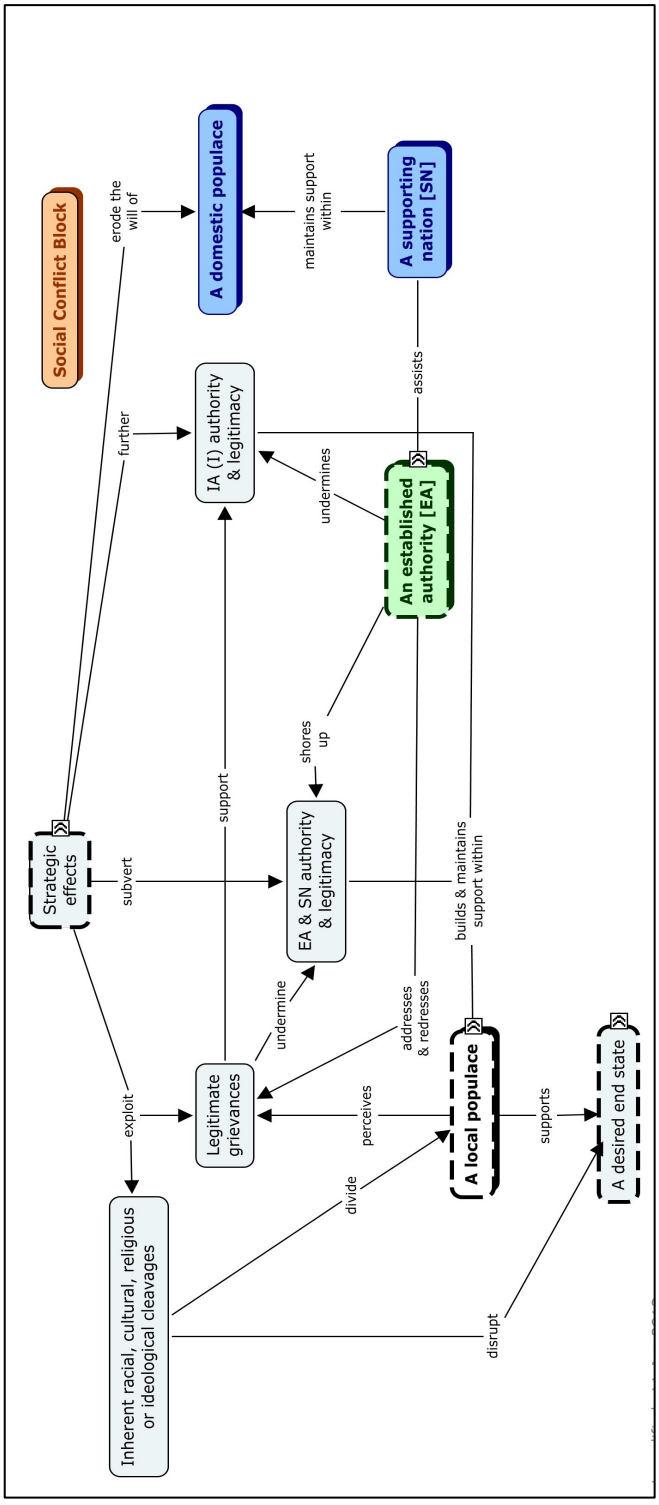

Figure 34: Social Conflict Block.

Propositions (18)

P62. Strategic effects exploit inherent racial, cultural, religious, or ideological cleavages.

P63. Strategic effects exploit legitimate grievances.

P64. Strategic effects subvert EA & SN authority & legitimacy.

P65. Strategic effects further IA (I) authority & legitimacy.

P66. Strategic effects erode the will of a domestic populace.

P67. Inherent racial, cultural, religious or ideological cleavages disrupt a desired end state.

P68. Inherent racial, cultural, religious or ideological cleavages divide a local populace.

P69. A local populace perceives legitimate grievances.

P70. Legitimate grievances undermine EA & SN authority & legitimacy.

P71. Legitimate grievances support IA (I) authority & legitimacy.

P72. An established authority [EA] addresses & redresses legitimate grievances.

P73. An established authority [EA] shores up EA & SN authority & legitimacy.

P74. An established authority [EA] undermines IA (I) authority & legitimacy.

P75. A supporting nation [SN] assists an established authority [EA].

P76. A supporting nation [SN] maintains support within a domestic populace.

P77. EA & SN authority & legitimacy builds & maintains support within a local populace.

P78. IA (I) authority & legitimacy builds & maintains support within a local populace.

P79. A local populace supports a desired end state.

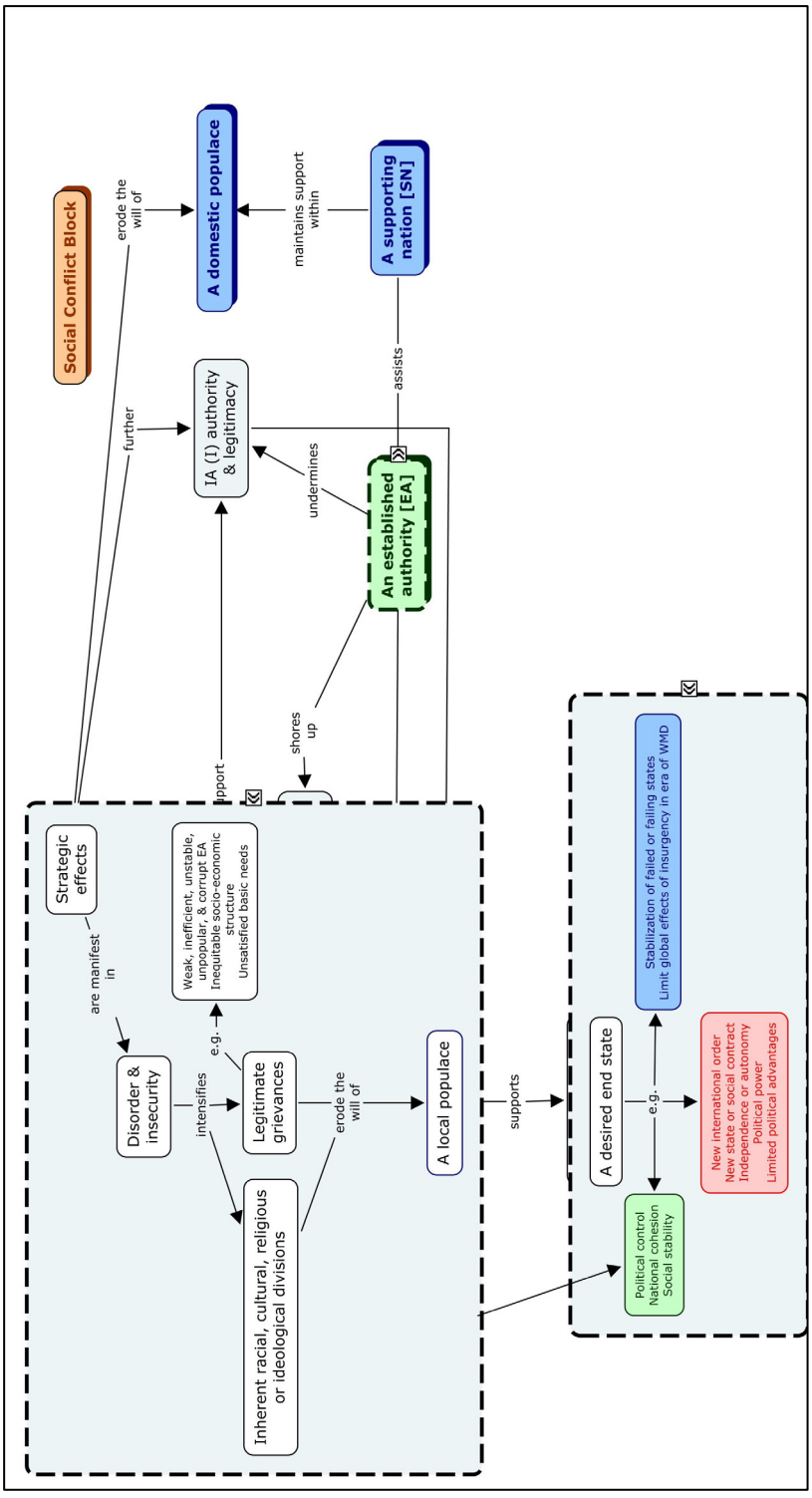

Figure 35: Nested node 7: Strategic effects; nested node 8: Desired end state.

Strategic effects sub-propositions (6)

SP55. Strategic effects are manifest in disorder & insecurity.

SP56. Disorder & insecurity intensifies inherent racial, cultural, religious, or ideological divisions.

SP57. Disorder & insecurity intensifies legitimate grievances.

SP58. Inherent racial, cultural, religious, or ideological divisions erode the will of a local populace.

SP59. Legitimate grievances erode the will of a local populace.

SP60. Legitimate grievances, e.g., weak, inefficient, unstable, unpopular, & corrupt EA; inequitable socio-economic structure; unsatisfied basic needs.

Desired end state sub-propositions (4)

SP61. A desired end state, e.g., political control, national cohesion, & social stability.

SP62. Inherent racial, cultural, religious or ideological cleavages disrupt political control, national cohesion, & social stability.

SP63. A desired end state, e.g., new international order; new state or social contract; independence or autonomy; political power; or limited political advantages.

SP64. A desired end state, e.g., stabilization of failed or failing states; limit global effects of insurgency in era of WMD.

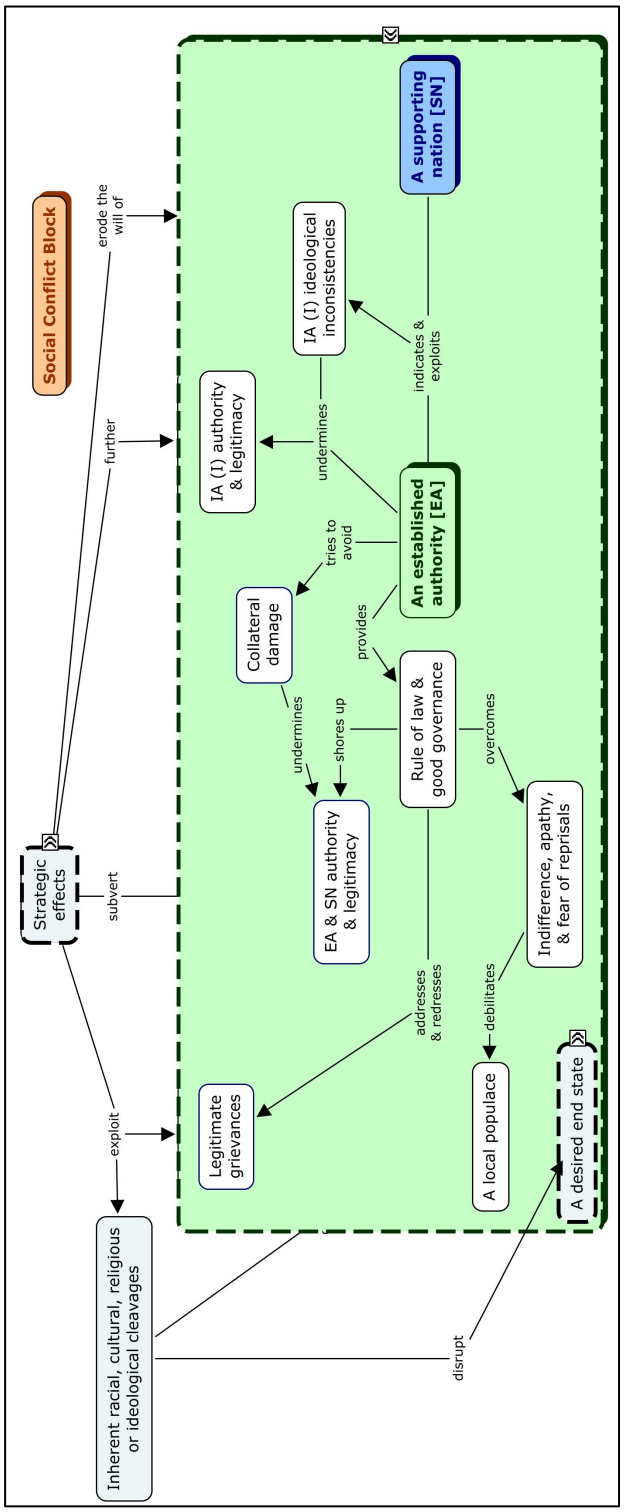

Figure 36: Nested node 8: An established authority.

Sub-propositions (11)

SP65. A supporting nation [SN] indicates & exploits IA (I) ideological inconsistencies.

SP66. An established authority [EA] indicates & exploits IA (I) ideological inconsistencies.

SP67. IA (I) ideological inconsistencies undermines IA (I) authority & legitimacy.

SP68. An established authority [EA] undermines IA (I) authority & legitimacy.

SP69. An established authority [EA] tries to avoid collateral damage.

SP70. Collateral damage undermines EA & SN authority & legitimacy.

SP71. An established authority [EA] provides rule of law & good governance.

SP72. Rule of law & good governance shores up EA & SN authority & legitimacy.

SP73. Rule of law & good governance overcomes indifference, apathy, & fear of reprisals.

SP74. Rule of law & good governance addresses & redresses legitimate grievances.

SP75. Indifference, apathy, & fear of reprisals debilitates a local populace.

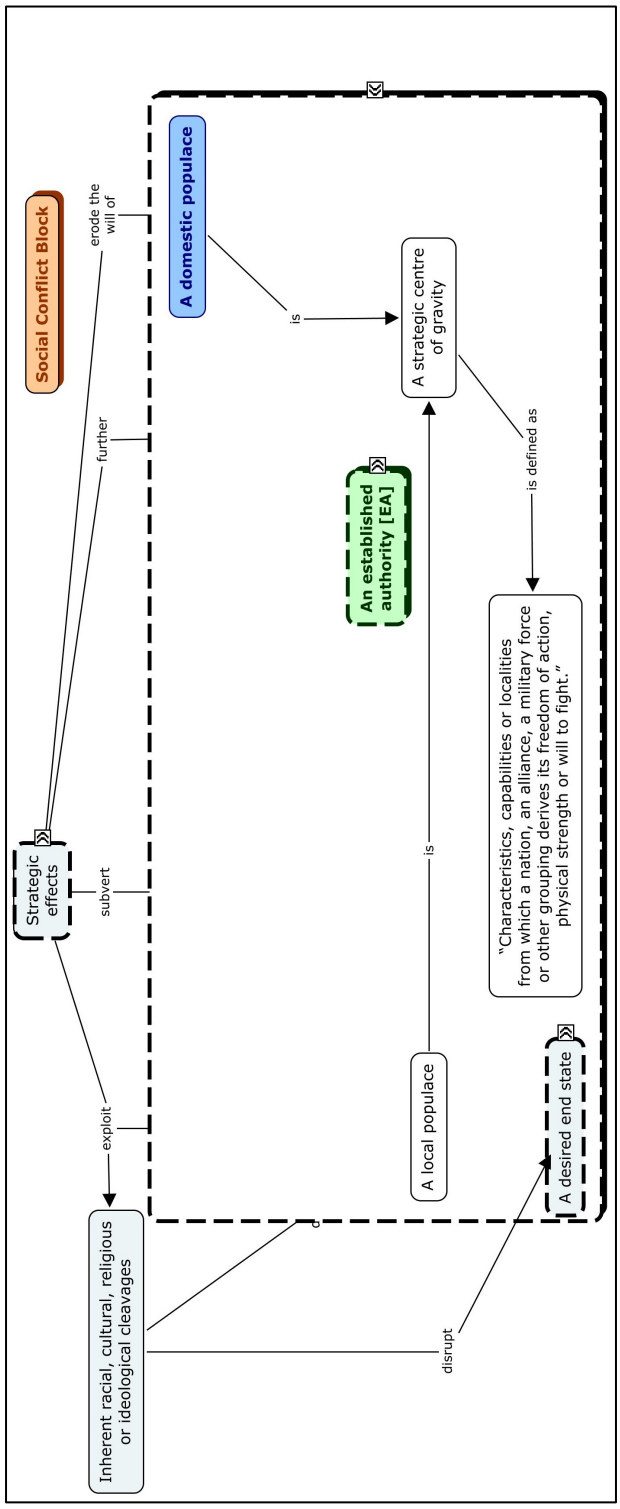

Figure 37: Nested node 10: A local populace.

Sub-propositions (3)

SP76. A local populace is a strategic centre of gravity.

SP77. A domestic populace is a strategic centre of gravity.

SP78. A strategic centre of gravity is defined as “Characteristics, capabilities or localities from which a nation, an alliance, a military force or other grouping derives its freedom of action, physical strength or will to fight” (DAD, 2008a, p. 5-11).

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A "First-cut" Concept Map: The Irregular Adversary (Insurgent)

4. AUTHORS (last name, followed by initials – ranks, titles, etc. not to be used)

Moore, J.W.

5. DATE OF PUBLICATION (Month and year of publication of document.)	6a. NO. OF PAGES (Total containing information, including Annexes, Appendices, etc.)	6b. NO. OF REFS (Total cited in document.)
December 2012	90	0

7. DESCRIPTIVE NOTES (The category of the document, e.g. technical report, technical note or memorandum. If appropriate, enter the type of report, e.g. interim, progress, summary, annual or final. Give the inclusive dates when a specific reporting period is covered.)

Technical Memorandum

8. SPONSORING ACTIVITY (The name of the department project office or laboratory sponsoring the research and development – include address.)

Defence R&D Canada – Toronto
1133 Sheppard Avenue West
P.O. Box 2000
Toronto, Ontario M3M 3B9

9a. PROJECT OR GRANT NO. (If appropriate, the applicable research and development project or grant number under which the document was written. Please specify whether project or grant.)	9b. CONTRACT NO. (If appropriate, the applicable number under which the document was written.)
10az01	

10a. ORIGINATOR'S DOCUMENT NUMBER (The official document number by which the document is identified by the originating activity. This number must be unique to this document.)	10b. OTHER DOCUMENT NO(s). (Any other numbers which may be assigned this document either by the originator or by the sponsor.)
DRDC Toronto TM 2011-118	

11. DOCUMENT AVAILABILITY (Any limitations on further dissemination of the document, other than those imposed by security classification.)

Unlimited

12. DOCUMENT ANNOUNCEMENT (Any limitation to the bibliographic announcement of this document. This will normally correspond to the Document Availability (11). However, where further distribution (beyond the audience specified in (11) is possible, a wider announcement audience may be selected.))

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The Socio-Cognitive Systems (SCS) Section at Defence Research and Development Canada—Toronto (DRDC Toronto) has undertaken a Technology Investment Fund (TIF) Project entitled "A Conceptual Framework for Understanding Armed Non-state Actors (ANSAs): Strategic Roles and Operational Dynamics." The aim of this Project is to advance our understanding of (a) the *strategic roles* of ANSAs in the context of violent intergroup conflict, and (b) the *operational dynamics* of ANSAs that facilitate the performance of these roles. To assist us in this endeavour, we have constructed a Concept Map (Cmap) of an Irregular Adversary (Insurgent) [IA(I)], derived from Canadian Army doctrine on land and counter-insurgency (COIN) operations. This "first-cut" IA(I) Cmap will serve as the point of departure for the development of an ANSA Cmap that will provide a means to guide and manage our efforts to explore the intentions and behaviours of ANSAs the Army is liable to encounter in future expeditionary operations.

La section des systèmes sociocognitifs (SCS) de Recherche et développement pour la défense Canada—Toronto (RDDC Toronto) a entrepris un projet financé par le Fonds d'investissement technologique (FIT) intitulé « *A Conceptual Framework for Understanding Armed Non-state Actors (ANSAs): Strategic Roles and Operational Dynamics* » (Cadre conceptuel pour comprendre les motivations des acteurs armés non étatiques (AANE) : rôles stratégiques et dynamique opérationnelle). Ce projet a pour but d'améliorer notre compréhension : (a) des *rôles stratégiques* des AANE dans le contexte de conflits intergroupes violents et (b) de la *dynamique opérationnelle* des AANE qui facilite l'exécution des rôles stratégiques. Afin de réaliser cet objectif, nous avons élaboré le schéma conceptuel d'un adversaire irrégulier (insurgé) [AI(I)], inspiré de la doctrine de l'Armée canadienne portant sur les opérations terrestres et de contre-insurrection (COIN). Cette première ébauche du schéma conceptuel AI(I) servira de point de départ à la création d'un schéma conceptuel des AANE, sur lequel nous nous fonderons pour explorer les intentions et les comportements des AANE avec lesquels l'Armée est susceptible de devoir composer au cours de ses prochaines opérations expéditionnaires.

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Armed Non-state Actor; Irregular Adversary (Insurgent); concept map; insurgency

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