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REMOTE WARFARE AND SMALL WESTERN COUNTRIES

by

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Remote warfare consists of specific components interacting to maximize operational effectiveness. Many smaller Western countries opt for this model to counter threats from a distance, reduce risk, and curb financial costs, but due to their strategic culture and limited resources, these countries cannot fully employ the model. This research aims to determine the impact of remote warfare on risk and operational effectiveness for small Western countries. Systemic strategic analysis identifies that a synergy of intelligence sources and methods increases the available data to enhance the operational effectiveness and its measurement, thereby reducing judgmental biases and error and subsequently increasing strategic and political support. System dynamics modeling and simulation were used to analyze the effectiveness of two types of remote warfare support: training support and intelligence support to a local partner. The conclusion is that growing the partner's force size through training is ineffective if remote intelligence support is not provided. Intelligence support to a partner nation's force enhances its ability to find and fix the insurgent force, reducing its size and effectiveness. This research recommends shifting the focus of remote warfare support from training assistance alone to a concept that combines special operations forces with coalitions to build partner capacity and to provide a broader spectrum of support options, most importantly, more types of intelligence.

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REMOTE WARFARE AND SMALL WESTERN COUNTRIES

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ABSTRACT

Remote warfare consists of specific components interacting to maximize operational effectiveness. Many smaller Western countries opt for this model to counter threats from a distance, reduce risk, and curb financial costs, but due to their strategic culture and limited resources, these countries cannot fully employ the model. This research aims to determine the impact of remote warfare on risk and operational effectiveness for small Western countries. Systemic strategic analysis identifies that a synergy of intelligence sources and methods increases the available data to enhance the operational effectiveness and its measurement, thereby reducing judgmental biases and error and subsequently increasing strategic and political support. System dynamics modeling and simulation were used to analyze the effectiveness of two types of remote warfare support: training support and intelligence support to a local partner. The conclusion is that growing the partner's force size through training is ineffective if remote intelligence support is not provided. Intelligence support to a partner nation's force enhances its ability to find and fix the insurgent force, reducing its size and effectiveness. This research recommends shifting the focus of remote warfare support from training assistance alone to a concept that combines special operations forces with coalitions to build partner capacity and to provide a broader spectrum of support options, most importantly, more types of intelligence.

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LIST OF ACRONYMS AND ABBREVIATIONS

A&P	analysis and production
ABI	activity-based intelligence
BPC	building partner capacity
CLD	causal loop diagram
COIN	counterinsurgency
COIN	counter-insurgency
CONOP	concept of operation
EU	European Union
FF	foreign fighter
FMV	full motion video
FoA	freedom of action
FP	force protection
GEOINT	geospatial intelligence
HUMINT	human intelligence
IS	Islamic State
ISF	Iraqi security forces
MA	military assistance
MoE	measure of effectiveness
MoI	Ministry of Interior
MoP	measure of performance
NATO	North Atlantic Treaty Organization
NRF	NATO response force
OE	operational environment
OEF	Operation Enduring Freedom
OPSEC	operational security
OSINT	open-source intelligence
P&E	processing and exploitation

PMESII	political, military, economic, social, infrastructure, informational
SA	situational awareness
SIGINT	signal intelligence
SOF	special operations forces
SoSA	system of systems analysis
SOTG	special operation task group
SU	situational understanding
UN	United Nations

EXECUTIVE SUMMARY

The U.S. innovation of remote warfare appeared in the early 2000s and quickly became a central instrument in the U.S. counterterrorism toolbox, often characterized by the use of drones to counter threats at a distance. Remote warfare involves using air support—manned or unmanned—special forces, private contractors, training teams, and sharing intelligence, and is distinguished by a shift away from "boots on the ground" deployments. These light-footprint operations are intended to keep costs low by working indirectly through indigenous actors to achieve national security objectives. Such operations are best for messy, irregular conflicts against terrorist groups, insurgencies, criminal networks, and other non-state actors. In the first part of the 21st century, many Western countries have increasingly relied on remote forms of military intervention to monitor, disrupt, and contain potential threats. An increasing reliance on deployments of remote forms of military intervention by the United States and European nations in the Middle East and across Africa is frequently attributed to risk aversion.[1] Remote warfare instead focuses "on 'shaping' the international security environment through technology, flexible operations, and military-to-military partnerships."[2]

Today, remote warfare has been interpreted to imply that supporting-nation militaries no longer need to operate on the contact line.[3] Problems arise, however, when smaller Western nations cannot access the full spectrum of remote warfare features. Due to a lack of resources such as air support, Geospatial Intelligence (GEOINT), or Human Intelligence (HUMINT), these nations cannot or do not deploy even the minimum number of remote warfare features available when not operating under a coalition umbrella. These deviations from the original remote warfare model often lead to added force protection

1. Jolle Demmers and Lauren Gould. "An Assemblage Approach to Liquid Warfare: AFRICOM and the 'Hunt' for Joseph Kony." *Security Dialogue* 49, no. 5 (October 2018): 364–81. https://doi.org/10.1177/0967010618777890

2. Demmers and Gould, 364.

3. Abigail Watson and Alasdair McKay, "Remote Warfare: A Critical Introduction," *E-International Relations*, February 11, 2021, 17.

measures and increased footprints that can adversely impact a relationship with the indigenous population and a partnership with local forces. In addition, executing remote warfare while lacking adequate resources increases the Force's exposure to risk, jeopardizes mission success, or both.

While smaller Western countries' policymakers may engage their military in remote warfare, hoping to decrease the risk to their forces, their goal is to counter threats at a distance. Moreover, without the right deployed capabilities, smaller countries' SOF may have very limited freedom of action (FoA) and may be unable to measure the SOF's operational effectiveness. Hence, SOF may not receive the necessary support and funding from their governments' strategic and political levels. Against this backdrop, demonstrating how remote warfare components reduce risk, improve risk analysis, and maximize operational effectiveness can help military leadership make a case for civilian bureaucrats at the national level that remote warfare capabilities have clear cost and risk mitigation benefits when considering the type of support they want to provide local partners.

This research seeks to answer the question, "What makes the remote warfare system effective?," by analyzing the impact of remote warfare components on risk analysis and operational measures of effectiveness. Furthermore, it employs a qualitative, exploratory research methodology and pursues two research design phases. The first research design phase explores the remote warfare model and its components through systems analysis and the employment of system dynamics concepts. The second research design phase uses a system dynamics model to analyze how changes in types of support to a local partner might impact remote warfare system behavior over an extended time horizon.

During the first research design phase, systemic strategic analysis revealed that the synergy among intelligence collection disciplines increases the available data. Collecting more data allows for more effective quantitative analysis, improves risk analysis, decreases judgmental biases, and increases effectiveness measurement. Additionally, air support significantly contributes data that reduces risk to the supported nation's force conducting counterinsurgency operations.

Consequently, in the second research design phase, the study employs system dynamics modeling and simulation to analyze the effectiveness of two types of remote warfare support: training support and intelligence support to a local partner. Using insurgent force size and information availability as key measures of effectiveness, the model simulates four major ways in which the characteristics of remote warfare may impact the dynamics of a substate conflict. Finally, data from the Islamic State insurgency case is used to validate the model's fit over a simulated 36-month run and draw conclusions.

This research found that when small Western nations decide to employ remote warfare, collecting and processing more data would enhance the operational effectiveness and its measurement, thereby reducing judgmental biases and error and subsequently increasing strategic and political support. Additionally, such nations should more carefully consider the type of remote support provided to the local partner in conflict. Growing the partner's force size through training is ineffective if remote intelligence support is not provided. Intelligence support to a partner nation's force enhances its ability to find and fix the insurgent Force, reducing its size and effectiveness.

The study recommends three internal and one external strategic approach to collect more data, improve situational awareness, risk analysis, measures of effectiveness, and effectively help partner nations. In the first internal approach, small Western SOF enhance their intelligence capability. In the second internal approach, SOF and intelligence operatives work together under an inter-service umbrella. The third internal approach represents a combination of the first two approaches. Finally, the external strategic approach stresses the importance of smaller countries joining efforts in a coalition to build partner capacity and provide a broader spectrum of support options, most importantly, more types of intelligence.

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I. INTRODUCTION TO THE STRATEGIC PROBLEM AND THE STUDY DESIGN

Low-intensity conflicts should be owned by special operation forces (SOF) with other service components supporting them.[1] According to the book *Irregular Soldiers and Rebellious States,* irregular warfare aligns with Fernando Lujan's "light footprints" and Rob Newson's "MINFORCE."[2] Moreover, these notions support Colin Gray's first master claim on the economy of force: "*Special Operations can achieve significant results with limited forces."*[3]

Light-footprint operations rely "on a small number of civilian and military professionals to work patiently over many years to prevent and contain security challenges."[4] For example, militaries use these types of operations against non-state actors, insurgents, and criminal and terrorist networks.[5] While these operations aim to keep costs low, such a strategic approach includes associated risks, costs, and benefits, making it suitable for some security challenges and less for others. Lujan asserts, "In the simplest terms possible, the light footprint is fundamentally based upon working indirectly through indigenous actors to achieve national security objectives."[6] David Kilcullen also emphasizes the importance of light, indirect, least intrusive intervention in long-term, low-profile engagements wherever possible.[7]

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[1] Edward N. Luttwak, "Notes on Low-Intensity Warfare," *Parameters* 13, no. 4 (December 1983): 17.

[2] Michael P. Noonan, *Irregular Soldiers and Rebellious States: Small-Scale U.S. Interventions Abroad* (Lanham, MD: Rowman & Littlefield Publishing Group, 2021), 41; Fernando M Luján, *Light Footprints: The Future of American Military Intervention* (Washington, DC: Center for a New American Security, 2013); Rob Newson, "Adapting for the 'Other War,'" Small Wars Journal, October 18, 2013, https://smallwarsjournal.com/jrnl/art/adapting-for-the-%e2%80%9cother%e2%80%9d-war.

[3] Colin S. Gray, *Explorations in Strategy* (Westport, CT: Greenwood Press, 1996), 168.

[4] Fernando M. Luján, *Light Footprints: The Future of American Military Intervention* (Washington, DC: Center for a New American Security, 2013), 5.

[5] Luján, 5.

[6] Luján, 10.

[7] David Kilcullen, *The Accidental Guerrilla: Fighting Small Wars in the Midst of a Big One* (New York: Oxford University Press, 2009), 283.

In the final years of the George W. Bush administration, a new form of "remote warfare" was pursued that involved many of the previously cited characteristics. Since then, remote warfare has become a central instrument in the U.S. counterterrorism toolbox.[8] Being mainly characterized by the use of drones in the early stages, remote warfare aims to counter threats at a distance. Moreover, the notion of remoteness denotes that militaries no longer have to operate on the contact line.[9]

From the coalition fighting the Islamic State (IS) in Syria and Iraq to the saturation of Western light footprints in Niger, kinetic actions are choreographed and often controlled from a distance.[10] Light footprint operations often substitute for large-scale "boots on the ground" engagements. Air support, intelligence operatives, private contractors, and special operations forces training teams are features of remote warfare intended to assist local forces in conflict.[11] As a result, kinetic operations are carried out without exposing Western military personnel to the risks normally associated with armed conflict in a warzone.[12] Remote warfare instead focuses "on 'shaping' the international security environment through technology, flexible operations, and military-to-military partnerships."[13] Under this model, military outposts and operational capabilities are being built by Western countries throughout Africa to monitor, disrupt, and contain potential threats.[14]

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[8] Tom Watts and Rubrick Biegon, *Defining Remote Warfare: Security Cooperation* (London: Remote Control, 2017), 1.

[9] Abigail Watson and Alasdair McKay, "Remote Warfare: A Critical Introduction," *E-International Relations*, February 11, 2021, 17.

[10] James Rogers and Delina Goxho, "Light Footprint—Heavy Destabilising Impact in Niger: Why the Western Understanding of Remote Warfare Needs to Be Reconsidered," *International Politics*, January 11, 2022, 1–28, https://doi.org/10.1057/s41311-021-00362-9; Jolle Demmers and Lauren Gould, "The Remote Warfare Paradox: Democracies, Risk Aversion and Military Engagement," *E-International Relations*, June 20, 2020, 1.

[11] Watts and Biegon, *Defining Remote Warfare*; Jolle Demmers and Lauren Gould, "An Assemblage Approach to Liquid Warfare: AFRICOM and the 'Hunt' for Joseph Kony," *Security Dialogue* 49, no. 5 (October 2018): 364–81, https://doi.org/10.1177/0967010618777890; Watson and McKay, "Remote Warfare," 1.

[12] Demmers and Gould, "The Remote Warfare Paradox," 1.

[13] Demmers and Gould, "An Assemblage Approach to Liquid Warfare," 364.

[14] Demmers and Gould.

An increasing reliance on deployments of remote forms of military intervention by the United States and European states in the Middle East and across Africa is frequently attributed to risk aversion.[15] The U.S. innovation of remote warfare appeared in the early 2000s. After that, many other Western nations have adopted the model.[16]

Problems arise, however, when smaller Western nations cannot access the full spectrum of remote warfare features. Due to a lack of resources, such as drones, Geospatial Intelligence (GEOINT), or Human Intelligence (HUMINT), these nations cannot or do not deploy even the minimum number of remote warfare features available when not operating under a coalition umbrella. These deviations from the original remote warfare model often lead to added force protection measures and increased footprints that can adversely impact the first steps to building a successful relationship with the population and partnership with local forces. In addition, executing remote warfare while lacking adequate resources increases the force's exposure to risk, jeopardizes mission success, or both. While smaller Western countries' policymakers engage their military in remote warfare, hoping to decrease the risk to the force, their goal is still to counter threats at a distance. Without the right deployed capabilities, smaller countries' SOF may have very limited freedom of action (FoA) and consequently may not be able to measure the SOF's effectiveness. Without such measures, SOF may not receive the necessary support and funding from the strategic and political level levels of their governments.

A. STRATEGIC PROBLEM DESCRIPTION

Smaller Western countries often conduct Military Assistance (MA) operations. These operations are indirect because the countries are operating in an advisory or mentoring role with a partner nation. "MA is a broad category of measures and activities conducted by SOF that support, enable, and influence critical friendly assets."[17] Remote warfare also refers to a country's military being removed from the contact line. Recent

[15] Demmers and Gould.

[16] Watson and McKay, "Remote Warfare."

[17] NATO Standardization Office, *AJP-3.5: Allied Joint Doctrine for Special Operations*, Edition B Version 1 (Brussels: NATO Standardization Office, 2019), 7.

literature is more specific and explains that in addition to the state, the partner, and their relationship characteristics, there are additional components of MA such as the provision of supporting air assets and contributions to intelligence synergy.

As explained in this section, major Western countries opt for remote warfare to counter threats at a distance, reduce risk to the force, and limit budgetary costs. Smaller Western countries cannot do the same because they lack the same resources and capabilities. This problem mainly manifests organizationally due to the hierarchical governmental and military planning and decision-making process.

B. STRATEGIC PROBLEM BACKGROUND AND RELEVANCE

Many smaller Western countries conduct MA operations. The NATO AJP-3.5 defines MA as "*a broad category of measures and activities conducted by SOF that support, enable, and influence critical friendly assets through training, advising, mentoring, partnering, or the conduct of combined and other operations.*"[18] MA operations are often carried out to improve a partner's proficiencies to assist in achieving a specific objective. Figure 1 shows that the remote warfare spectrum is broader than the North Atlantic Treaty Organization (NATO) Military Assistance definition since the latter does not mention unilateral operations or Security Assistance measures such as arms sales or transfers and political and financial support. The demonstrated similarities are the training, advising, assisting, mentoring, and partnering activities. While MA does not specify how these activities are conducted, Abigail Watson and Alasdair McKay state that this model involves a combination of the following measures:

- Supporting local security forces, either official state forces, militias, or paramilitaries; for example, through the provision of training, equipment or both
- Special operations forces, either training or sometimes even working alongside local and national forces
- Private military and security contractors undertaking a variety of roles
- Air strikes and air support, including unmanned aerial vehicles (UAVs) or 'armed drones' and manned aircraft

[18] NATO Standardization Office, 7.

- Sharing intelligence with state and non-state partners involved in frontline combat.[19]

The use of SOF and the support of local security forces are included in the MA definition of the AJP-3.5. The use of private military and security contractors is not studied in this research due to sensitivities in Western European countries.

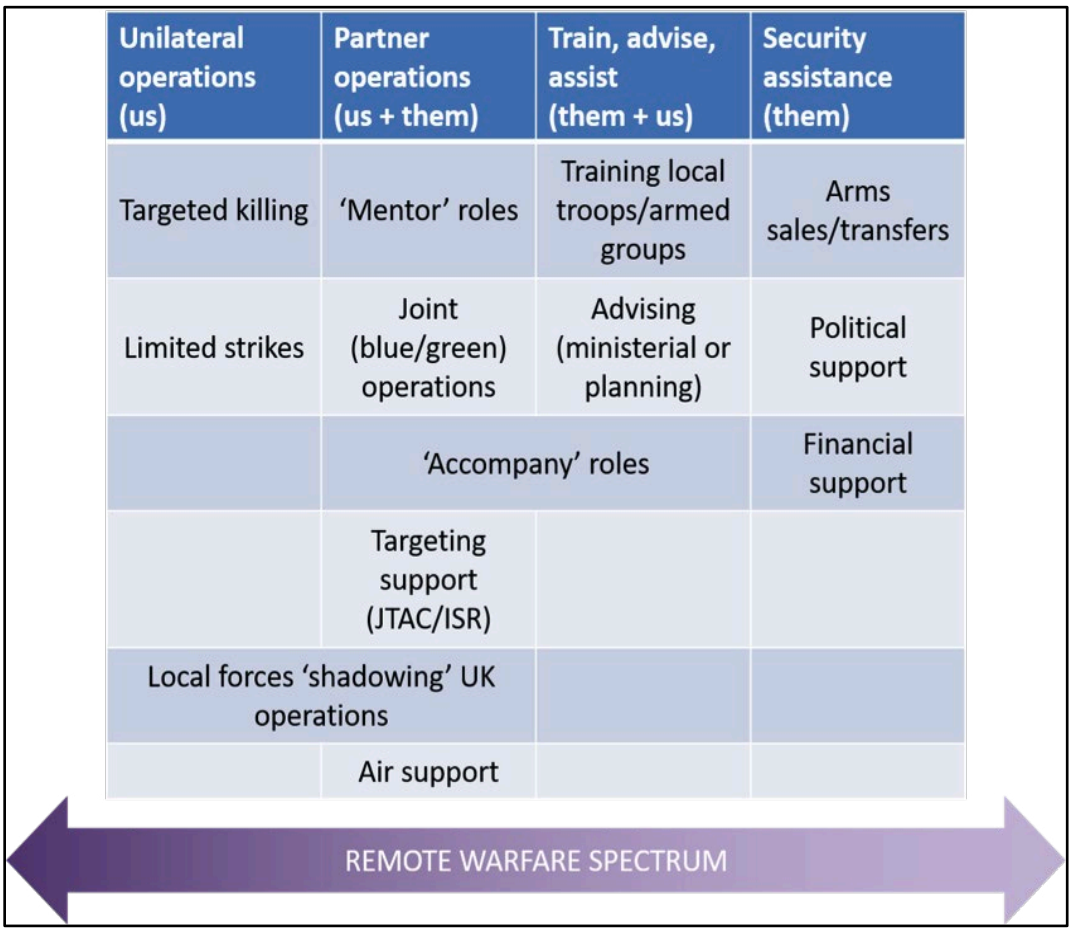

Figure 1. The Remote Warfare Spectrum[20]

[19] Watson and McKay, "Remote Warfare," 1.

[20] Source: Abigail Watson, "The Perils of Remote Warfare: Finding a Political Settlement with Counter-Terrorism in the Driving Seat," The Strategy Bridge, December 5, 2018, https://thestrategybridge.org/the-bridge/2018/12/5/the-perils-of-remote-warfare-finding-a-political-settlement-with-counter-terrorism-in-the-driving-seat.

At the national level, military leadership could make the case for civilian bureaucrats, that in addition to maximizing operational effectiveness, there are clear cost and risk mitigation benefits associated with remote warfare capabilities when considering the type of support, they want to provide local partners.

As highlighted by Watson and McKay, "smaller European states such as the Netherlands, Belgium, and Denmark have turned to remote warfare."[21] However, the employment of remote warfare is an understudied concept in smaller Western countries. Therefore, scholars emphasize the need to focus more on the conceptual foundations of remote warfare study.[22]

C. METHODOLOGY

To answer the question, "What makes the remote warfare system effective?," this thesis employs a qualitative, exploratory research methodology and pursues two research design phases: a Systemic Strategic Analysis phase and a System Dynamics Modeling phase. After these phases, recommendations are offered to address how smaller Western countries can adopt a modified remote warfare model.

1. Research Design Phase 1: Systemic Strategic Analysis to Identify the High Leverage Element

This phase explores the remote warfare model and its components through system analysis, methods, and system dynamics modeling. Following Donella Meadows and Donna Wright's theory, the first step is to define a system's purpose.[23] The remote warfare system has a dual purpose: countering threats at a distance and decreasing the risk to one's force.[24] Hence, remote warfare is a complex system influenced by a dynamic operational environment and many interrelated factors. For example, a variety of aircraft, a variety of intelligence sources, and multiple local partners are factors influencing system outcomes.

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[21] Watson and McKay, "Remote Warfare."

[22] Rubrick Biegon, Vladimir Rauta, and Tom F. A. Watts, "Remote Warfare: A Debate Worth the Buzz?," *E-International Relations*, December 15, 2021, 1–7.

[23] Donella H. Meadows and Diana Wright, *Thinking in Systems: A Primer* (London: Earthscan, 2009).

[24] Watson and McKay, "Remote Warfare."

According to John Sterman, people assign many indicators to causality, such as temporal and geographical proximity of cause and effect, to develop heuristics for making sense of system behavior.[25] In complex systems, these heuristics can create problems. This sense-making process affects strategic thinking, planning, and analysis. Underpinning system dynamics are mathematical, physical, and engineering non-linear dynamics and feedback control. Specifically, system dynamics uses cognitive and social psychology, economics, and other social sciences to model human-in-the-loop behavior and physical and technical systems.[26] Also, this approach provides a conceptual and qualitative understanding of endogenous systems. Human-driven feedback loops, for example, include free choice that is constrained by bounded rationality, a term coined by Herb Simon meaning that decisions are made based on available information that may be delayed, incomplete, incorrect, or misinterpreted.[27] Causal loop diagrams (CLD) are often used in system dynamics analysis as an early step in identifying the behavior of feedback mechanisms at work inside bounded systems and sub-systems.[28]

Systems analysis ultimately aims to identify dominant feedback components in the system's framework. The system's causal loop diagrams identify cause-and-effect relationships between primary independent and dependent variables and the potential resulting behavior of the system. Doctrinal documents, articles, and concepts of employment contribute to the identification of significant variables and their interactions. The systems analysis used in this phase of the research is intended to enhance our understanding of the cause-and-effect relationships among the remote warfare system components and their potential impact on system behavior.

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[25] John Sterman, *Business Dynamics: Systems Thinking and Modeling for a Complex World* (Boston: Irwin/McGraw-Hill, 2000), 28.

[26] Sterman, 28.

[27] Herbert A. Simon, *Reason in Human Affairs* (Stanford, CA: Stanford University Press, 1983).

[28] J. Ramon Gil-Garcia, Theresa A. Pardo, and Luis F. Luna-Reyes, eds., *Policy Analytics, Modelling, and Informatics: Innovative Tools for Solving Complex Social Problems* (Cham, Switzerland: Springer International Publishing, 2018), 124, https://doi.org/10.1007/978-3-319-61762-6.

2. Research Design Phase Two: System Dynamics Modeling[29]

Operational research and literature on the importance of information in insurgencies enable the development of equations that can quantitatively and qualitatively model a system's structure and behavior. Following Sterman's work, system dynamics modeling and simulation can be quantified by using integral calculus "in determining the rates of accumulation within a system that affect its overall behavior as a result of the feedback structures of the system."[30] In system dynamics models, stocks are accumulations or integrals of information, material, or intangible but measurable units, while flows are their rates of change or derivatives.[31] In conventional system dynamics models, stocks are portrayed as rectangles and inflows and outflows are portrayed as pipes and valves.[32] System dynamics traditionally bounds a problem and models endogenous system nonlinearities. The model is then populated with system parameters and independent and dependent variables through an iterative process of system structure definition and feedback linkages. As Porter explains, the model's validity is confirmed by comparing the actual trends that occur during a specified timeframe and the modeling results designed to mimic those patterns. After confirming the validity of the model's framework, real-world data is employed to initiate modeling simulations that cover a time horizon long enough to enable system feedback to impact behavioral outcomes.[33] A user interface in the system dynamics model provides a tool for analyzing changes in the type of support that impacts system behavior over an extended time horizon.

The research question driving this phase is: how does remote warfare influence operational effectiveness? Remote warfare most often occurs in substate conflicts where Western countries support local partners acting as counterinsurgents (COIN). The end state

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[29] Sterman, *Business Dynamics*.

[30] Norman Wayne Porter, "The Value of System Dynamics Modeling in Policy Analytics and Planning," in *Policy Analytics, Modelling, and Informatics: Innovative Tools for Solving Complex Social Problems*, ed. J. Ramon Gil-Garcia, Theresa A. Pardo, and Luis F. Luna-Reyes (Cham, Switzerland: Springer International Publishing, 2018), 125, https://doi.org/10.1007/978-3-319-61762-6.

[31] Sterman, *Business Dynamics*, 191.

[32] Sterman, 191.

[33] Porter, "The Value of System Dynamics Modeling," 125.

of counterinsurgency military operations is to defeat the insurgents militarily. While COIN Size and Find and Fix Capability are relevant variables to measure the probability of success in achieving this end state, the ultimate variable that indicates whether such operations are effective is the size of the insurgent force. In short, the more the insurgents' force size decreases, the more effective the operation is.

First, remote warfare influences the growth rate of the counterinsurgents because SOF supports local security forces by training and in some cases equipping them. Second, it increases the insurgent force's attrition due to the intelligence sharing agreement and the massive amount and diverse types of intelligence (OSINT, GEOINT, HUMINT, SIGINT) that large Western countries can provide to a smaller partner nation. They increase the partner's find-and-fix capability by expanding the information collected, analyzed, and exploited. Among intelligence professionals, it is known that using several collection methods in concert provides many benefits to the intelligence cycle. Third, advising and assisting local troops contributes to the COIN Effectiveness at Finishing Insurgents, but it would require further research to identify the right metrics to study the influence of advising and assisting. Therefore, there is no advising and assisting variable in the model. Fourth, it increases the COIN efficiency related to the kinetic air support. While data proves that kinetic air support played a critical role in defeating the Islamic State (IS) insurgency,[34] in the literature studied, remote warfare is, unfortunately, most often associated with civilian harm.[35] The model intentionally does not consider this fourth influence on conflicts due to public sensitivity in smaller Western countries. In this model, aircraft (manned and unmanned) would not participate in planned targeting. However, they

[34] Becca Wasser et al., *The Role of U.S. Airpower in Defeating ISIS* (Santa Monica, CA: RAND Corporation, 2021), https://doi.org/10.7249/RBA388-1.

[35] Utrecht University, "The Casualties of Remote Warfare," Intimacies of Remote Warfare, January 26, 2023, https://intimacies-of-remote-warfare.nl/theme/civilians; Neil Renic, "The Limits of Remote Warfare: Aligning Values with Interests," Just Security, January 18, 2023, https://www.justsecurity.org/84807/the-limits-of-remote-warfare-aligning-values-with-interests/; and Emily Knowles and Abigail Watson, *Remote Warfare: Lessons Learned from Contemporary Theatres* (London: Remote Warfare Programme, 2018).

would provide the COIN force with Full Motion Video (FMV) and "persistent surveillance" as close to around-the-clock collection as possible.[36]

[36] Mark M. Lowenthal, *Intelligence: From Secrets to Policy*, 9th ed. (Thousand Oaks, CA: CQ Press, 2023), 119.

II. STRATEGIC SYSTEMIC ANALYSIS

This chapter addresses the strategic systemic analysis that aims to identify the leveraging components of the remote warfare system. It starts by explaining the systemic nature of remote warfare that is modeled in phases 1 and 2 of the research. While the strategic context describes the external pressure on the bounded system, the mental models depict biases and other influences that lead people to make errors in judgment. The CLD displays the relationships between remote warfare components and variables such as risk to the force, risk analysis, and measures of effectiveness. The chapter ends with observations derived from the CLD.

A. THE OPERATIONAL ENVIRONMENT SYSTEM

A systems perspective includes all significant aspects of the Operational Environment (OE) that may impact the operation's success. Hence, elements (and their interrelationships) in friendly, adversary, neutral, or unaligned systems are included. Figure 2 shows the links between political, military, economic, social, infrastructural, and informational systems that are typical for joint operations.[37] Remote warfare, MA, and other indirect approaches aim to make the partner country's systems more resilient. Situational Awareness (SA) is paramount in such environments, so information and intelligence are essential. However, even though data and drones are crucial to SA, the behaviors and actions of humans are especially critical in this respect.

[37] U.S. Joint Forces Command, *Commander's Handbook for an Effects-Based Approach to Joint Operations* (Suffolk, VA: Joint Warfighting Center, 2006).

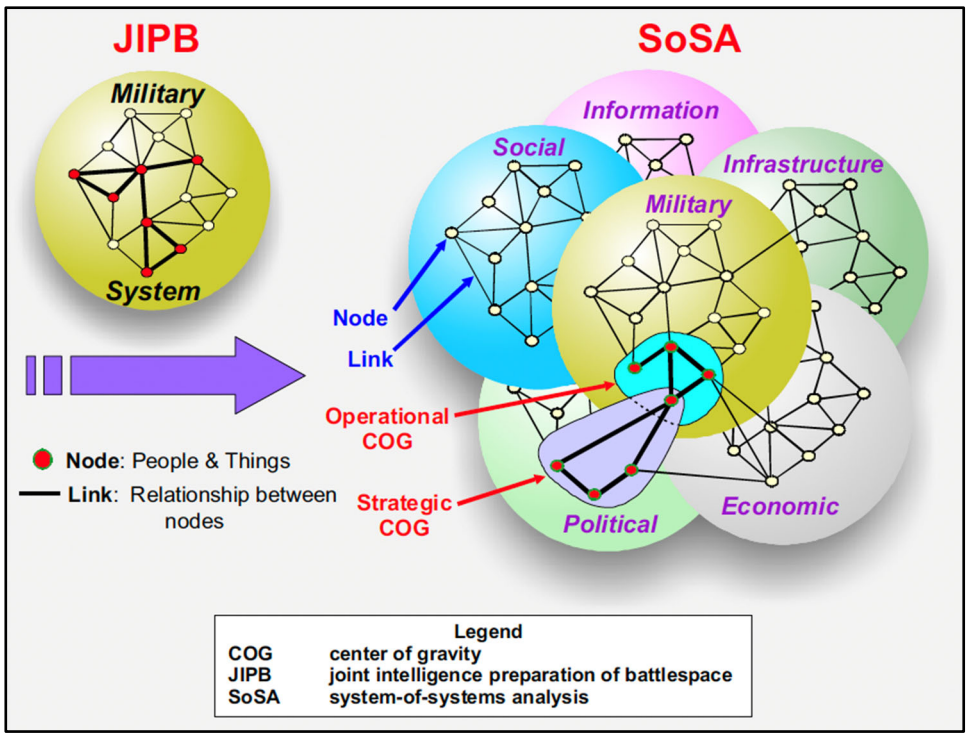

Figure 2. Systems Perspective of the Operational Environment[38]

B. THE ADVERSARY SYSTEM

A 2006 Fort Leavenworth monograph affirms that the systemic approach allows for the evaluation of an adversary's crucial functions or nodes and the connections between them. But this approach also allows for the identification of weaknesses in the adversary system. As the monograph's author continues, this system of systems approach is similar to how terrorist networks are constructed and operate.[39]

According to the monograph, SoSA categorizes system nodes as follows: political, military, economic, social, infrastructural, and information (PMESII). Figure 3 shows a system of system analysis (SoSA) diagram illustrating PMESII elements and their

[38] Source: U.S. Joint Forces Command, II–2.

[39] Michael T. Kenny, *Leveraging Operational Preparation of the Environment in the GWOT* (Fort Leavenworth, KS: Army Command and General Staff College, 2006), 23, https://doi.org/10.21236/ADA450588.

interactions. The linkages among the different elements make it possible to evaluate and exploit specific nodes and links of interest.[40]

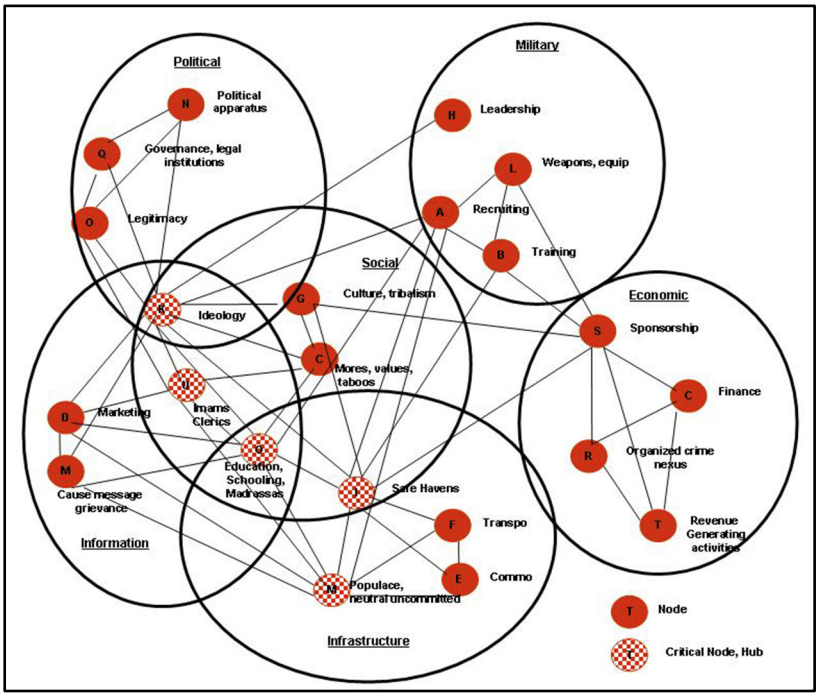

Figure 3. SoSA Diagram[41]

In conjunction with further assessments, this nodal analysis reveals the adversary's systemic vulnerabilities, "which can be exploited to attack his center(s) of gravity either directly or indirectly."[42]

C. INSURGENCY AS A SYSTEM

In their 1970s RAND report prepared for the Advanced Research Projects Agency (ARPA), Nathan Leites and Charles Wolf identified an insurgent movement as a system

[40] Kenny, 24.

[41] Source: Marc Sageman, *Understanding Terror Networks*, vol. 7 (Philadelphia: University of Pennsylvania Press, Inc, 2004), 137, https://doi.org/10.9783/9780812206791.

[42] Kenny, *Leveraging Operational Preparation*, 26.

that receives inputs that result in outputs.[43] Hence, insurgents and counterinsurgents are subsystems in general society. Both sides can attract resources, but popular support plays a central role in determining which side gains inputs and how much each side gains. For example, insurgent movements require inputs to be converted into outputs or activities. Inputs such as recruits, information, food, and shelter are associated with endogeny because they are provided by the internal environment. On the other hand, publicity, material, and initial financing, which are inputs from external sources, are exogenous. Insurgents acquire resources from the environment by relying on two different but closely linked techniques: persuasion and coercion. Insurgents' activities like sabotage, demonstrations, small- and large-scale attacks, and mobile warfare are considered outputs.

The system's view of insurgency, depicted in Figure 4, enabled Leites and Wolf to characterize four counterinsurgency methods. The first method aims at denying inputs. The second method hinders the insurgent's conversion process of inputs into outputs. The third is the destruction of insurgents' outputs or activities. The fourth method decreases the impacts of insurgents' activities on the population and the counterinsurgents. This systems approach allows for a view of the problem regarding tradeoffs between endogeny and exogeny. Specifically, the authors stressed that inputs to the insurgency systems "can be provided from an internal or external source, in combinations that may vary at different times in the same insurgency, and in different insurgencies."[44] When deconstructed, this alternative systems' view of an insurgency allows for a more effective establishment of cause-effect relationships. This approach also helps our understanding that many interactions are nonlinear and that, under certain conditions, modest payoffs can result in major changes in popular support.

[43] Nathan Constantine Leites and Charles Wolf, *Rebellion and Authority; an Analytic Essay on Insurgent Conflicts* (Chicago: Markham Pub. Co., 1970).

[44] Leites and Wolf, 39.

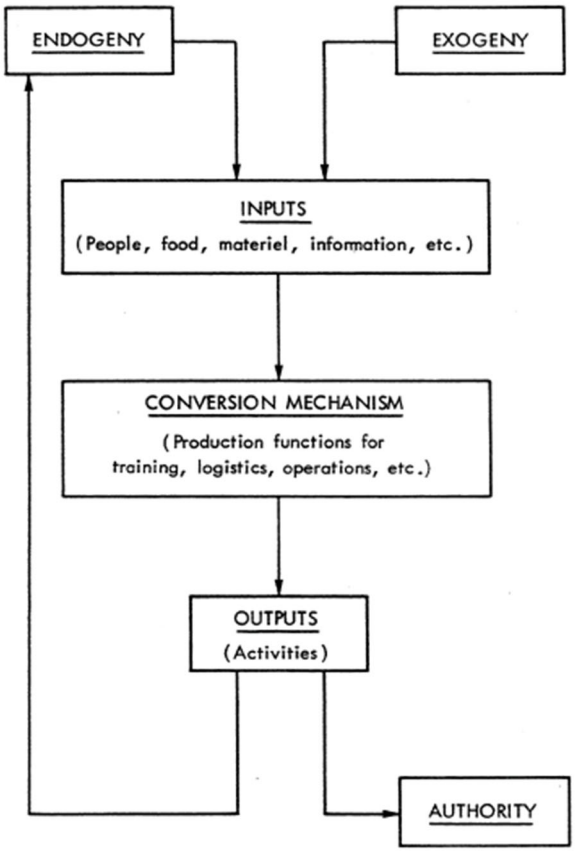

Figure 4. Insurgency as a System[45]

D. STRATEGIC CONTEXT AND EXOGENOUS VARIABLE

Determining the right metrics and Measures of Effectiveness (MOE) is a critical aspect of systems analysis and system dynamics. This is fundamental within the strategic context of risk analysis and mission success. Too often, decision-makers tend to satisfice for short-term goals rather than seeking to maximize operational effectiveness which consequently has a greater impact on strategic objectives.[46] A better understanding of a system's past behavioral trends and boundaries is a beginning for the identification of metrics and MOEs.

[45] Source: Leites and Wolf, 35.

[46] James G. March, *A Primer on Decision Making: How Decisions Happen* (Toronto: Free Press, 1994), 18.

1. Trends

There are general trends regarding remote warfare and the types of operations associated with it:

- These operations (enhancing a friendly asset) will continue to be a key feature of future conflicts.[47]
- Training, advising, assisting, and mentoring indigenous armies will increase.[48]
- Remote warfare and its future adaptations will continue to be operationally efficient while limiting risk to own-forces.

In sum, technology will continue to evolve and play a more significant role in the different forms of warfare, but the future of warfare will continue to be human-centric.

2. System Boundaries

In this research, the operating system is bounded organizationally and has one exogenous variable linked to the political level: risk aversion. This is the context in which the studied system evolves. So, when judgments and biases occur during risk appraisal, they do so by being directed more easily toward the worst-case scenario.

[47] Noonan, *Irregular Soldiers and Rebellious States*, 151.

[48] Luján, *Light Footprints*; Noonan, *Irregular Soldiers and Rebellious States*.

Figure 5. Risk Analysis and MoE System Bounded

There is no implied pejorative notion associated with the exogenous risk aversion variable since it is one of the main reasons for the remote warfare concept's birth.[49] This is a lesson learned from previous counterinsurgency failures: "the battlefield should be as far as possible from society at home."[50] Further, Andrew Mack concluded that "in every asymmetric conflict where the external power has been forced to withdraw, it has been as a consequence of internal dissent."[51] The reason why liberal democracies have not been successful in their counterinsurgency efforts is twofold. First, the educated middle class resisted the idea of making sacrifices though losses on the battlefield. Second, the same class developed an opposition to using violent and indiscriminate tactics.[52] As Gil Merom has demonstrated, there is an interdependence of "expedient and altruistic motivations,

[49] Demmers and Gould, "An Assemblage Approach to Liquid Warfare."

[50] Gil Merom, "The Age of Asocial War: Democratic Intervention and Counterinsurgency in the Twenty-First Century," *Australian Journal of International Affairs* 66, no. 3 (June 2012): 370, https://doi.org/10.1080/10357718.2012.680576.

[51] Andrew Mack, "Why Big Nations Lose Small Wars: The Politics of Asymmetric Conflict," *Cambridge University Press* 27, no. 2 (January 1975): 175–200, https://doi.org/10.2307/2009880.

[52] Merom, "The Age of Asocial War," 369.

which forms an indifference curve."[53] This curve shows a combination of tolerance levels for one's own casualties and tolerance levels for the violence inflicted on the adversary. In asymmetric conflicts, this curve serves as a victory threshold.[54]

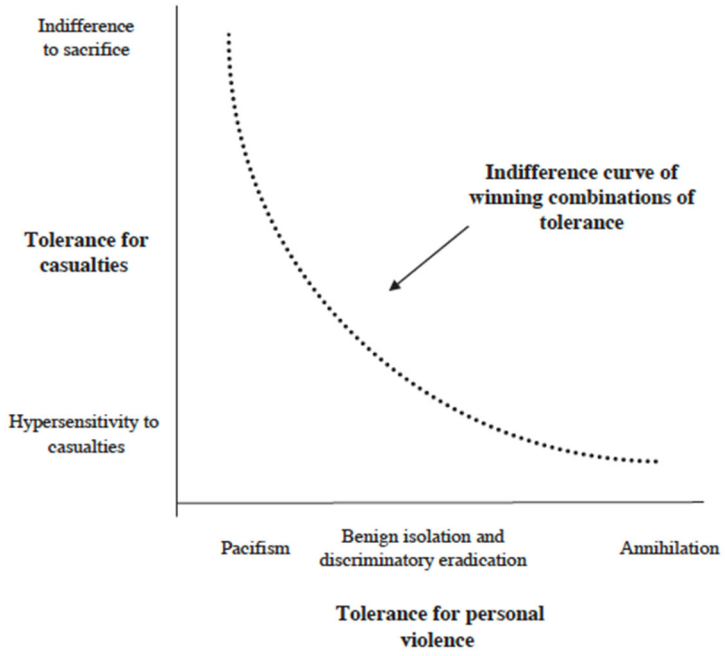

Figure 6. The Winning Balance of Tolerance[55]

Smaller Western countries do not escape this rule. For example, the Belgian political level acknowledges its risk aversion.[56] Additionally, while almost all other countries provided their partners with information related to the Coalition air war against the Islamic State, countries like Belgium, the Netherlands, and Denmark never declared the dates and locations of airstrikes.[57] The Oxford Research Group Airwars called this

[53] Merom, 369.

[54] Merom, 369.

[55] Source: Merom, 369.

[56] Kristof Moens, "Risico's en hun rol bij de hedendaagse operationele inzet van BELSOF" [Risks and their role in today's operational deployment of BELSOF] (research paper, Brussels, Royal Military Academy, 2022).

[57] Airwars, *Limited Accountability a Transparency Audit of the Coalition Air War Against So-Called Islamic State* (London: Remote Control, 2016).

behavior unaccountable, and they declared that there was a lack of transparency. On the other hand, one might see it as a way of keeping the battlefield far from home or avoiding middle-class opposition to the violence inflicted on the enemy and objection to collateral casualties when they occur. So, the exogenous variable of political and strategic risk aversion is part of something broader than the risks taken by the operators deployed. It is part of a country's strategic culture.[58] This aversion is linked to civil society: smaller Western countries' citizenry might not have the same tolerance for personal violence and for casualties as major powers' citizens do. This is also why security and defense cooperation across the European continent is so fragile.[59] Comparing the security and defense strategies of all 27 European Union (EU) member states and Turkey helps in understanding that the members have different "strategic cultures."[60] Belgian Professor Sven Biscop observed that "…deploying the army on a combat operation would be extremely difficult. Here the support for collective security and international law clashes with the structural pacifism of a country which, as a result of its own historic experience, is very much averse to war."[61]

As noted previously, strategic culture influences political decision-makers because they typically seek social validation. According to James G. March, there are two aspects of risk estimates, technical and social validity.[62] The reality of the situation at hand, which a decision-maker must assess, corresponds to technical validity. Meanwhile, risk assessments that are widely accepted and stable over time represent, to some extent, social validity. The latter indicates that lacking social support, decision-makers may face challenges in taking action. March continues, "People seem to seek not certainty of

[58] Heiko Biehl, Bastian Giegerich, and Alexandra Jonas, eds., *Strategic Cultures in Europe: Security and Defence Policies across the Continent* (Wiesbaden: Springer VS, 2013).

[59] Biehl, Giegerich, and Jonas.

[60] Biehl, Giegerich, and Jonas.

[61] Sven Biscop, "Belgium," in *Strategic Cultures in Europe: Security and Defence Policies across the Continent*, ed. Heiko Biehl, Bastian Giegerich, and Alexandra Jonas (Wiesbaden: Springer VS, 2013), 31–41.

[62] March, *A Primer on Decision Making*, 36.

knowledge but social validity."[63] That explains why a country's strategic culture and its political and strategic aversion to risk must be considered permanent constraints for smaller Western countries.

E. MENTAL MODELS

The use of system dynamics models can potentially enhance policy makers' understanding of the potential consequences stemming from accepted depictions of system structures. This may help to alleviate some of the negative impacts of policy resistance during the planning and policy development stages.[64] As Sterman has stressed, "The heuristics we use to judge causal relations lead systematically to cognitive maps that ignore feedbacks, multiple interconnections, time delays, and the other elements of dynamic complexity."[65] Thus, employing system dynamics models might be more efficient than heuristics for establishing a common narrative to improve perspective-taking and perspective-making while decreasing cognitive biases.[66]

In the context of strategy, mental models are a set of assumptions about how a particular system operates, its cause-effect relationship, its boundaries and variables, its time horizon, and how a plan will play out within these parameters. Mental models serve as a cognitive bridge between desired and actual states. The process of achieving those desired states exists within the bounds of the mental model, a process known as single-loop learning. Single-loop learning delivers feedback on established premises of objectives and the actions taken to achieve these while maintaining the current mental model. In contrast, double-loop learning provides input from the outside environment as feedback to the mental model.[67] As the mental model evolves based on feedback comparing the actual

63 March, 40.

64 Porter, "The Value of System Dynamics Modeling," 127.

65 Sterman, *Business Dynamics*, 28.

66 Porter, "The Value of System Dynamics Modeling," 127.

67 Sterman, *Business Dynamics*, 19.

state of the system to the desired state, so do the goals, resulting in new decision rules, and approaches to achieve them.[68]

F. CLD FOR REMOTE WARFARE COMPONENTS' IMPACT ON RISK APPRAISAL AND MEASURE OF EFFECTIVENESS

In system dynamics, feedback is a core concept that plays a crucial role in determining the behavior of systems. However, our mental models, which are our internal representations of how the world works, often do not accurately account for the important feedback loops that govern system dynamics. To address this discrepancy, CLDs are a popular diagramming tool used in system dynamics to help depict and analyze the structure of systems. CLDs can assist in identifying key feedback loops within a system, which in turn can help to improve our understanding of how the system operates and how it may respond to various changes.[69] This tool helps to quickly test hypotheses about the causes and the effects of system dynamics, captures mental models of individuals or groups, and can communicate the feedback relationships we believe are important or problematic in a system's behavior.

Polarity notations are used in CLDs to denote whether feedback from one variable to another is positive or negative. As Porter explains, "positive feedback indicates that as an independent, causal variable increases/decreases, a linked dependent variable increases/ decreases in effect as a result (same effect, reinforcing the change). Negative feedback indicates that as a causal variable increases/decreases, a linked dependent variable decreases/increases in effect as a result (opposite effect, balancing the change)."[70] In a CLD, when the number of link polarities (positive and negative) in a closed loop are equal they balance each other out, resulting in the loop displaying reinforcing behavior. If the number of positive and negative polarities within the loop is not equal, this leads to the loop displaying balancing behavior.[71]

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[68] Porter, "The Value of System Dynamics Modeling," 128.

[69] Sterman, *Business Dynamics*.

[70] Porter, "The Value of System Dynamics Modeling," 124.

[71] Porter, 124.

1. Components and Associated Variables

This research looks at four major constituents, or components, of remote warfare (see Chapter I, section B.). The CLD analyzes how two components – intelligence sharing and air support – influence a state's risk appraisal and operational effectiveness. The other two components – the use of SOF and the support to a local partner force – are in the variable called "Number of State and Combined State Partner Operations." Moreover, all the variables having a link with operations in this CLD relate to SOF supporting a local partner force. To share intelligence with a partner nation, as Figure 7 shows, a state must first collect data from the Operational Environment (OE), then Process and Exploit it, and finally Analyze and Produce actionable intelligence. This intelligence has two critical features: "it allows anticipation or predictions of future situations and circumstances, and it informs decisions by illuminating the differences in available courses of action (COAs)."[72] States cannot share intelligence with their partner without at least one collection asset. Therefore, the different intelligence collection disciplines and the sharing of intelligence become variables that influence intelligence synergy.

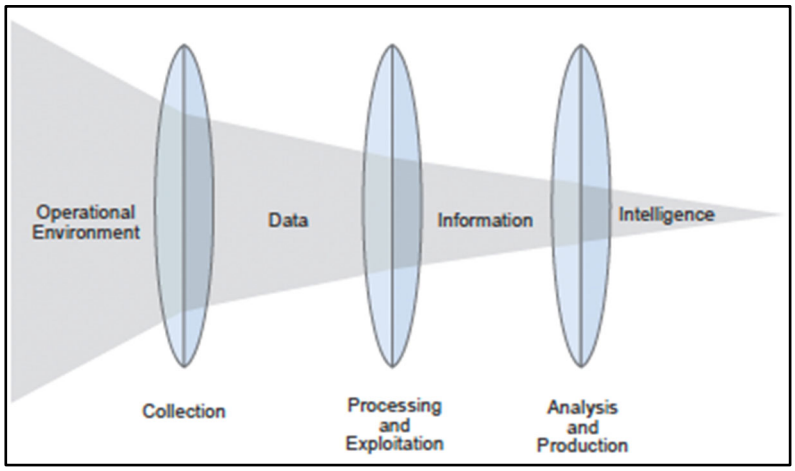

Figure 7. Relationship of Data, Information, and Intelligence[73]

[72] Joint Chiefs of Staff, *Joint Intelligence*, JP 2-0 (Washington, DC: Joint Chiefs of Staff, 2013).

[73] Source: Joint Chiefs of Staff, I–2.

As shown in Figure 8, the variable Number of Air Assets represents the air support component. In turn, two other variables are influenced by the Number of Air Assets variable: ISR Collection and Armed Overwatch Capability. Due to smaller Western countries' sensitivities associated with targeted killings by drones, the latter variable must be construed as a defensive (Force Protection) capability vice an offensive capability (Strike Operations).

2. Measurement of Effectiveness and Risk Analysis Variables

In Figure 8, the loops involving MoE and Risk Analysis are closely linked by the variable called "Number of State and Combined State Partner Operations." Quantitative and Statistical Data, after being processed, reduces uncertainty and logically improves the risk appraisal process, which leads to more State and Combined State-Partner Operations. When properly planned, an increase in the latter variable results in an increase in measurements of operational effectiveness.

The difficulties that arise in risk assessment are typically due to limitations in our understanding and knowledge of the risks rather than any inherent properties of the risks themselves. This can make risk assessment a complex and challenging task, as it requires navigating a range of uncertainties and unknowns to develop an accurate and reliable assessment of the risks involved.[74] "*Since risks are mental constructs, the quality of their explanatory power depends on the accuracy and validity of their (real) predictions."*[75] Risk assessment procedures characterize the available knowledge of complexity, remaining uncertainties, and ambiguities. Uncertainties can often only be described in qualitative terms.[76]

[74] Ortwin Renn and Peter Graham, *White Paper on Risk Governance: Towards An Integrative Approach* (Geneva: International Risk Governance Council, 2005), 29.

[75] Renn and Graham, 30.

[76] Renn and Graham, 29.

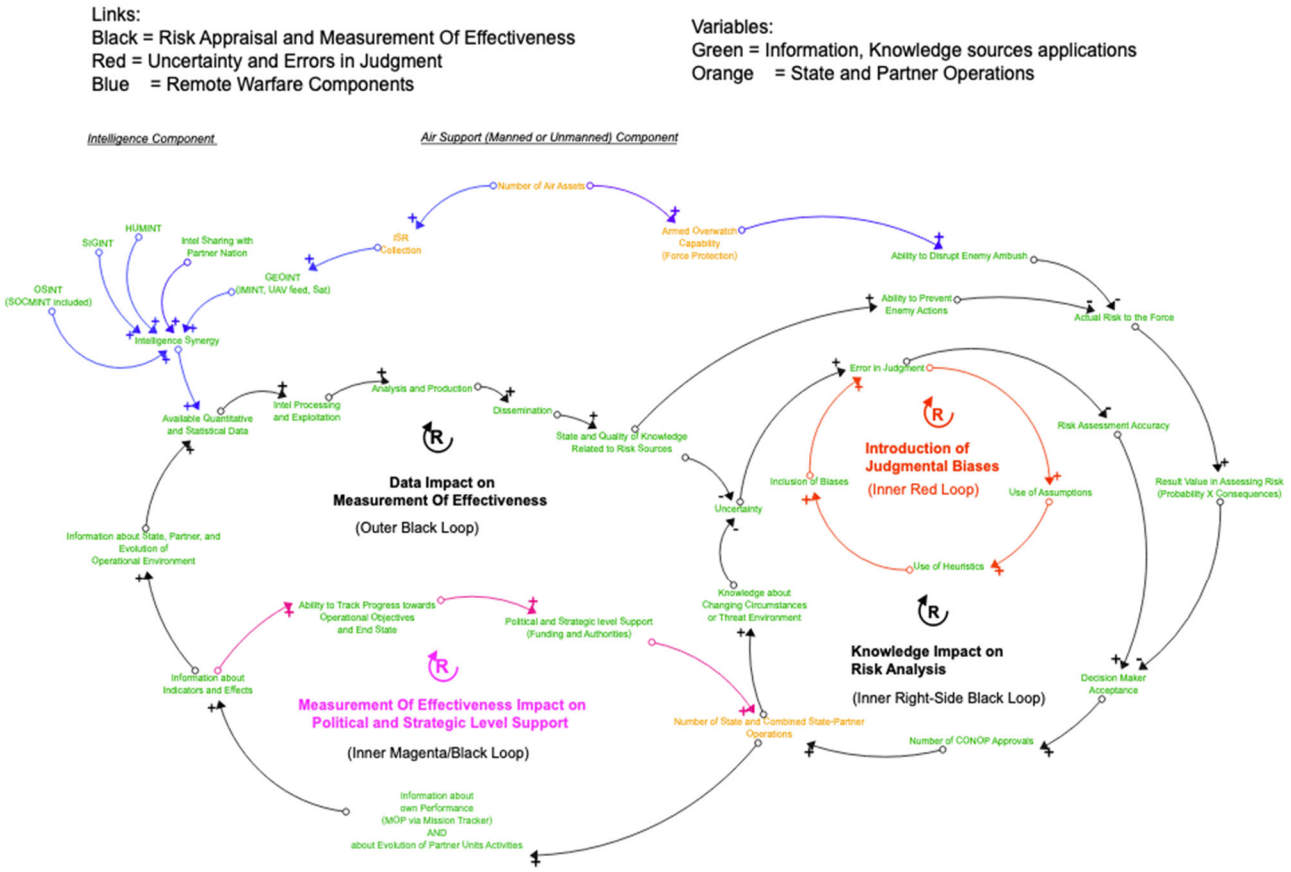

Figure 8. CLD on Remote Warfare Components' Impact on Risk Analysis and MoE.[77] A Full-Size Version of This Figure Is Available in the Appendix.

[77] Adapted from ISEE Systems, Stella Architect.

3. How to Read the CLD

The CLDs presented in this research were created using Stella Architect, Version 2.1.2.[78] Figure 8 shows how the intelligence component and the air support component influence key variables such as Available Quantitative and Statistical Data and Actual Risk to the Force. Those critical variables are part of the loops that include many other variables connected by polarities indicating the same effect or an opposite effect between independent and dependent variables. Thus, the four loops should be read in the following way.

a. Data Impact on MoE – Outer Black Loop

If Available Quantitative and Statistical Data increases, Intel Processing and Exploitation increases, which increases Analysis and Production and consequently increases Dissemination, which increases the State and Quality of Knowledge Related to Risk Sources. This last variable increases the Ability to Prevent Enemy Actions which decreases the Actual Risk to the force and subsequently decreases the Result Value in Assessing Risk. This, in turn, increases Decision Maker Acceptance, which increases the Number of CONOP Approvals as well as the Number of State and Combined State-Partner Operations and consequently increases the Information about own Performance and Evolution of Partner Units Activities. This increases Information about Indicators and Effects, along with Information about State, Partner, and Evolution of the Operational Environment, which ultimately increases the Available Quantitative and Statistical Data. In the Data Impact on MOE loop, there are two links with negative (balancing) polarities that offset each other, meaning this is a reinforcing loop. The Data Impact on MOE loop then displays reinforcing behavior.

b. Knowledge Impact on Risk Analysis – Inner Right Side Black Loop

In the Knowledge Impact on Risk Analysis loop, when Uncertainty decreases, Error in Judgement decreases, which increases Risk Assessment Accuracy. This, in turn,

[78] ISEE Systems, *Stella Architect*, version 2.1.5 (Lebanon, NH: ISEE Systems, 2022), accessed September 19, 2022.

increases Decision Maker Acceptance and the Number of CONOP Approvals, which increases the Number of State and Combined State-Partner Operations. The result increases in Knowledge about Changing Circumstances or Threat Environment ultimately decreases Uncertainty. There are two negative feedback links, so they offset each other. The Knowledge Impact on Risk Appraisal loop displays reinforcing behavior.

c. Measurement of Effectiveness Impact on Political and Strategic Level Support – Inner Magenta/Black Loop

In the Measurement of Effectiveness Impact on Political and Strategic Level Support loop, when the Number of State and Combined State-Partner Operations increases, the Information about Own Performance and Evolution of Partner Units Activities increases, which also increases Information about Indicators and Effects. Consequently, this increases Ability to Track Progress towards Operational Objectives and End State, which increases Political and Strategic level Support, as well as the Number of State and Combined State-Partner Operations. The loop is composed of positive feedback only, which means that the Measurement of Effectiveness Impact on Political and Strategic Level Support loop displays reinforcing behavior.

d. Introduction of Judgmental Biases – Inner Red Loop

In the Introduction of Judgmental Biases, when Error in Judgment decreases, the Use of Assumptions decreases, which also decreases the Use of Heuristics. This, in turn, decreases the Inclusion of Biases, which decreases Error in Judgment. The loop is composed of positive feedback only, which means that the Introduction of Judgmental Biases displays reinforcing behavior.

G. MAKING SENSE OF THE PROBLEM

The Cynefin Framework is helpful in our understanding of variables contributing to the remote warfare system's behavior and their level of complexity.[79] Figure 9 depicts the five Cynefin domains: the Known and Knowable domains of Order, the Complex and

[79] C. F. Kurtz and D. J. Snowden, "The New Dynamics of Strategy: Sense-Making in a Complex and Complicated World," *IBM Systems Journal* 42, no. 3 (2003): 462–83.

Chaos domains of Un-Order, and Disorder in the center. The domains are divided in function by the types of cause-and-effect relationships.

In the Known domain, cause-and-effect relationships are identified. In the Knowable domain, there is also a relationship between cause and effect, but it is only after thorough analysis, determining what the possibilities and combinations are, and the application of experts' judgments that those relations are found. In the complex domain, events are unpredictable because they do not repeat. For example, topics like culture or trust are never complete. It is like a network with nonlinear relationships, so a small activity in one part of the network might have a large impact on another part of the network. The chaotic domain is where no cause-and-effect relationship is perceivable.

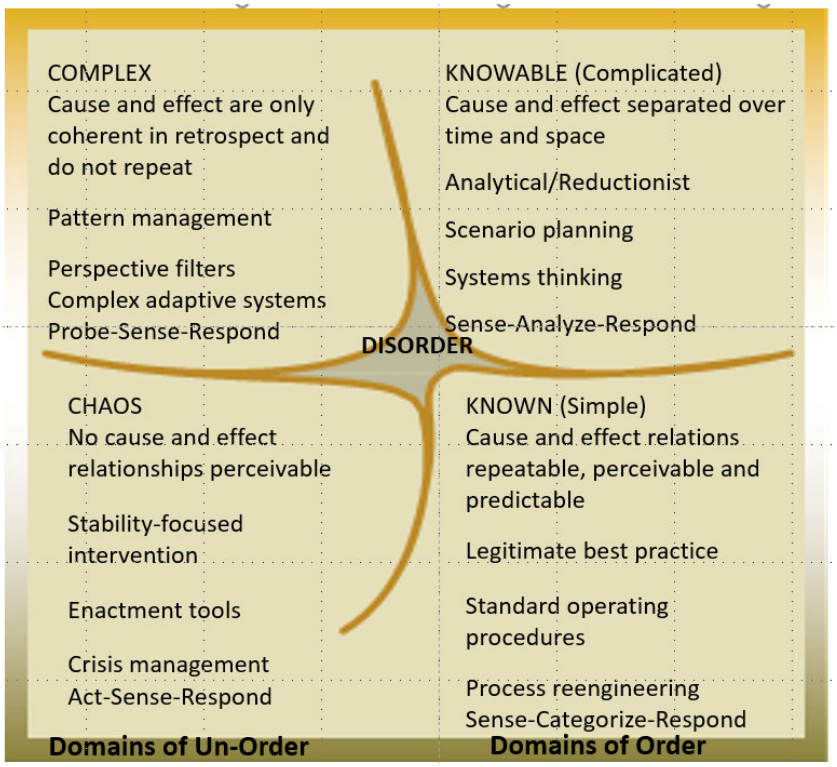

Figure 9. Cynefin Domains[80]

[80] Source: Kurtz and Snowden, 468.

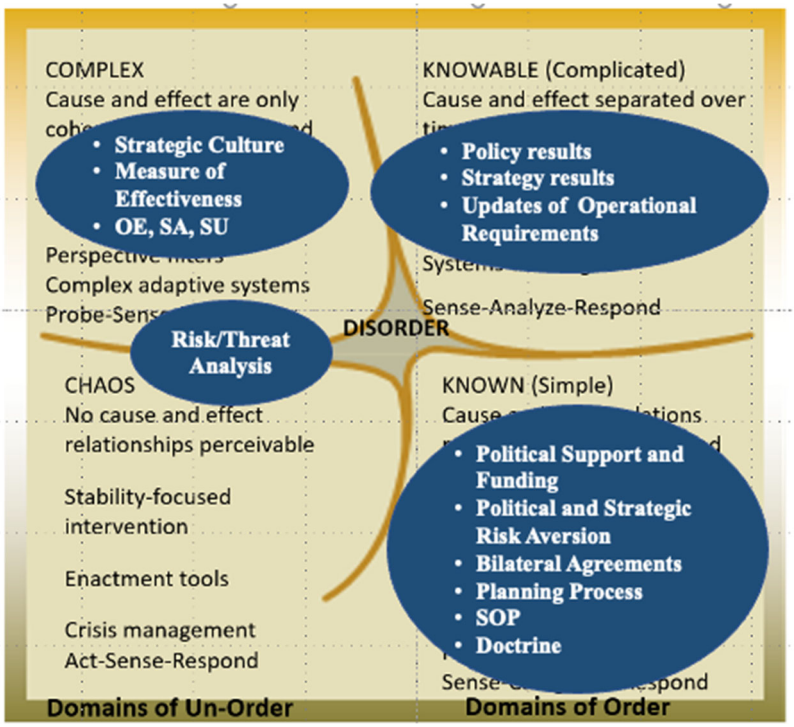

Figure 10. Variables of Interest Overlaid on the Cynefin Framework[81]

System behavior can change or be changed due to environmental factors or deliberated action. For instance, system behavior or elements of a system's behavior can move from complexity in the Domain of Unorder to Knowable in the Domain of Order and be maintained there, so it would become predictable.[82] Collecting data, quantitatively and qualitatively analyzing it, and applying the right tools are critical to effect change. By increasing the amount of timely and pertinent data and treating it accordingly, we can increase our understanding of the OE, to improve risk analysis, and refine MoE. All the factors in the ovals of Figure 10 are interconnected.

H. CHAPTER II CONCLUSIONS

When there is less empiric data, the state and quality of knowledge are poor and the level of uncertainty increases. For their risk analysis, staffs are forced to rely more on

[81] Adapted from Kurtz and Snowden, 468.

[82] Kurtz and Snowden, 465.

assumptions and heuristics, both of which may include judgmental biases.[83] Under the influence of a critical exogenous variable such as risk aversion, this may be especially evident at the strategic or political levels of government resulting in an erroneous, overly pessimistic perception of risk that leads to a decreased tempo.[84] Supporting state operational tempo is crucial for gathering information about the partner force, (that is, Measures Of Performance, or MOP), and tracking progress towards operational objectives and desired end state. Hence, a better ability to measure partner force effectiveness improves the justification for the funding of operations (if warranted by assessment).[85]

Whether for risk analysis or MoE, or both simultaneously, since the CLD demonstrates that they are interconnected, the amount of data collected, processed, and exploited is critical in modern operations. It is even more important in a risk aversion context or to demonstrate results at the political level to assure support. The CLD shows that two remote warfare components can increase the amount of data and ultimately decrease the actual risk to the force.

Air Support (manned or unmanned) might be a good candidate as a high-leverage variable for quantifiable system dynamics modeling due to its contribution to Available Quantitative and Statistical Data and its reduction in consequences of Enemy Attack (Armed Overwatch protects friendly forces). Drones, for instance, provide actionable intelligence thanks to their increased coverage and quality of surveillance.[86] The credible threat posed by drone's persistence surveillance and direct attacks degrades terrorists' and

[83] Chairman Joint Chiefs of Staff, *Joint Risk Analysis Methodology*, CJCSM 3105.01A (Washington, DC: Chairman Joint Chiefs of Staff, 2021).

[84] Amos Tversky and Daniel Kahneman, "Judgment under Uncertainty: Heuristics and Biases," *Science* 185, no. 4157 (September 27, 1974): 1124–31.

[85] Linda Robinson, Daniel Egel, and Ryan Brown, *Measuring the Effectiveness of Special Operations* (Santa Monica, CA: RAND Corporation, 2019), https://doi.org/10.7249/RR2504.

[86] Eli Berman et al., *Small Wars, Big Data: The Information Revolution in Modern Conflict* (Princeton, NJ: Princeton University Press, 2018), 312.

insurgents' security environment, makes their planning and execution of centrally directed attacks more complex, and therefore reduces their operational impact.[87]

In the literature studied, the quantity of data increasing SA is a hidden aspect of remote warfare. Another hidden subset of this vast and diverse data collection, which does not appear in the CLD, is the impact remote warfare can have on the requirements in personnel and material for data Processing and Exploitation (P&E), Analysis, and Production (A&P). The updated literature on intelligence tells us that several collection methods provide many benefits. According to Mark Lowenthal, synergy refers to the situation where one system or discipline can provide useful information or signals that can be utilized by other systems to guide their data collection efforts.[88] Typically, multiple collection methods are employed for major requirements, and these collection methods are expected to work together in a coordinated manner. The goal is to develop all-source intelligence, also referred to as fusion intelligence, which involves combining intelligence data from a number of sources whenever possible, to overcome the limitations of each individual source and take advantage of their collective strengths.[89] In recent years, there has been significant interest in the field of multi-intelligence (multi-int) fusion, which involves combining different forms of technical collection, such as imagery and signals intelligence, to improve the quality and accuracy of intelligence assessments.[90] So, as Lowenthal asserts: "*multi-int is more than single INT but less than all-source*."[91] Multiple collection sources, air support, and the personnel/material necessary for the Data P&E and A&P significantly increase a detachment's footprint. If the remote warfare model is to keep a light footprint, there needs to be a reach-back capability.

[87] Jacob N. Shapiro, *The Terrorist's Dilemma: Managing Violent Covert Organizations* (Princeton, NJ: Princeton University Press, 2013), https://doi.org/10.1515/9781400848645; Berman et al., *Small Wars, Big Data*.

[88] Mark M. Lowenthal, *Intelligence: From Secrets to Policy*, 8th ed. (Thousand Oaks, CA: CQ Press, 2020), 184.

[89] Lowenthal, 184.

[90] Lowenthal, 184.

[91] Lowenthal, 186.

Besides traditional partner-support activities (training, advising, mentoring), sharing intelligence with the partner makes SOF far more relevant and effective. Military commanders are aware that the level of force protection measures they adopt can impact the degree to which they can integrate with the local culture and successfully carry out their mission. So, there is a trade-off between ensuring the safety and security of military personnel and resources and being able to establish relationships that enable SOF to effectively work with local populations. Achieving the right balance between force protection and cultural integration is therefore a key consideration for military commanders since this can have a significant impact on the success of their operations.[92] Information is critical, and opening information channels brings success when the enemy is embedded within local-population communities. A study in Iraq made the first quantitative links between the information received and a short-term decrease in violence.[93] A cause-and-effect relationship could be drawn between the data increasing situational awareness and the decreased need for supporting nations' heavy footprints, thus creating an opportunity to lower the profile and the force protection posture. A supporting nation's low profile makes building relationships and trust with the population and local forces easier.[94] Additionally, a RAND study suggests that even if fundamental changes in a conflict's politics or international context are necessary for decisive success, small-scale military interventions "substantially improve a partner government's chance of avoiding defeat."[95]

[92] Michael P. Mahaney, *Striking a Balance: Force Protection and Military Presence, Beirut, October 1983* (Fort Leavenworth, KS: Army Command and General Staff College, 2001).

[93] Berman et al., *Small Wars, Big Data*, 320.

[94] Luján, *Light Footprints*, 9.

[95] Stephen Watts, ed., *The Uses and Limits of Small-Scale Military Interventions* (Santa Monica, CA: RAND, 2012).

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III. SYSTEMS DYNAMICS MODELING AND ANALYSIS

Remote warfare, by definition, supports a local partner. That partner is often an actor engaged in an internal conflict in which two opponents confront each other for control of the political space.[96] In those conflicts, local forces, also called counterinsurgents (or COIN), fight against a guerilla force called insurgents.[97] When a third-party state provides military support to a local partner's counterinsurgency, that state also becomes part of the COIN force. System dynamics modeling and simulation was used in this research to analyze the impact remote warfare components have in a counterinsurgency. Using force size and information availability as key MOEs, the model simulates four major ways in which the characteristics of remote warfare may impact the dynamics of a substate conflict.

This system dynamics model is intended to demonstrate the impacts of different types of remote warfare support provided by a Western country to a local partner force during an insurgency. The model evaluates the COIN Size, the Insurgents' Size, and the COIN Find and Fix Capability.

A User Interface is shown in Figure 11, and graphs of stochastic modeling outcomes are shown in Figures 29 to 36. This Insurgent Competition Size and Information System contains four interrelated elements that model the capacity for COIN to Find, Fix, and Finish Insurgents. The time horizon (simulated run) of the model is three years (36 three-month time steps). The first element represents the COIN Size. The second element represents the Insurgents' Size. The third element represents the COIN Find and Fix Capability. The fourth element represents the Levels of Intel Support.

A. USER INTERFACE

As a notional decision support tool, the Insurgent Competition Size and Information System model features an interactive User Interface (Figure 11), in which certain model

[96] Gordon H. McCormick, "Guerilla Warfare Seminar" (Lecture, Naval Postgraduate School, Monterey, CA, January 4, 2023).

[97] McCormick.

variables may be changed by the user to evaluate the impact on the system's behavioral outcomes over the run of the model.

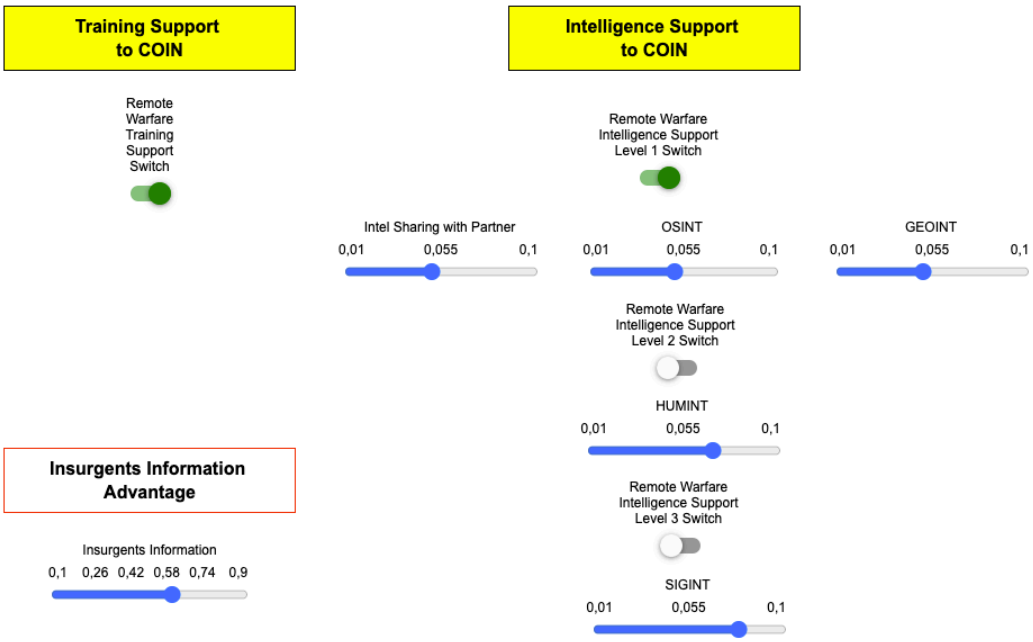


Figure 11. User Interface of Insurgent Competition Size and Information Model.

As seen in Figure 11, a switch turns on or off the Training Inflow in the COIN Size element. On the right side of the same figure, under the Intelligence Support to COIN, each INT has a slider in the interface, varying the value between 0.01 and 0.1. The assumption is that each INT can provide at least 5% accurate information and cannot provide more than 10%. While the input values may not precisely reflect the accuracy of the intelligence used in every period of counterinsurgencies, they serve as best estimates to simulate the intelligence synergy.[98] The input values of the different INTs may also be lowered on the interface (Figure 11) to simulate periods with less actionable intelligence. As shown in Figure 11, a slider is also provided so that the User can change the extent of the Insurgents Information Advantage. As shown in Figures 29 to 36, a series of graphs depict the results

[98] Lowenthal, *Intelligence*, 2023, 95.

of simulation runs depending on different scenarios. They reflect the changes made by the User Interface.

B. REMOTE WARFARE STOCK AND FLOW MODEL

This research modeled the impact of opponents' sizes and opponents' available information based on the system's dynamics. The model of the endogenous Size and Information system presented in this thesis was created using Stella Architect, Version 2.1.2.[99] Its simulation is designed with a run time of 36 months. Figure 12 shows the complete model while Figures 13 to 28 show parts of the model, the related variables, and their inputs. Figures 29 to 36 present the graphical and numerical results. To analyze the operational effectiveness of remote warfare in insurgent competitions, the model analyzes the impacts of Training Support and Intelligence Support to COIN forces and insurgent forces, respectively. To do that, the initial model illustrates the dynamics between opponents' size and available information, without external (other state) support. Then, the different supports are added, and the results in the stocks are compared to support the findings. So, the COIN and Insurgents Sizes are analyzed through these scenarios. The numbers demonstrate the degree of impact for each type of support, but most importantly, which type is the most operationally effective.

Equations define the inflows and outflows connected to three key stocks: Insurgent Size, COIN Size, and COIN Find and FIX Capability. Equations also define endogenous variables, some supported by literature and previous research on force versus information advantage in insurgents-counterinsurgents conflicts. Numerical values reflect the Islamic State in Iraq (2016) case when inserted. Sourced data from this case appears throughout the paragraphs analyzing the system dynamics.

To combat insurgencies effectively, it is crucial to have a clear understanding of the characteristics and capabilities of the opposing forces. Typically, insurgents have an information advantage, which means that they are better able to gather and disseminate information about their opponent's activities and objectives. However, they often have a

[99] ISEE Systems, *Stella Architect*, version 2.1.5 (Lebanon, NH: ISEE Systems, 2022), accessed September 19, 2022

disadvantage in terms of the size and strength of their forces compared to counterinsurgents. On the other hand, counterinsurgents typically have a force advantage, meaning that they have greater numbers and resources at their disposal. Nevertheless, they often struggle with an information disadvantage, which means that they may have limited knowledge about the insurgents' activities and objectives. Balancing these advantages and disadvantages is essential to achieving success in COIN operations.[100]

Data taken from the IS case was used to validate the model's fit over a simulated 36-month run. In brief, the IS emerged from the Iraqi insurgency as a branch of al-Qaeda. From 2002 to 2017, they evolved from being what Mao labeled a first-stage insurgency, capable of guerilla tactics and terrorist attacks, to a third-stage insurgency, capable of conventional light infantry tactics coupled with urban tactics and mobile warfare.[101] Other sources call this an evolution from a proto-insurgency to a large-scale insurgency.[102] During the second half of 2014, the U.S.-led coalition started to support the Iraqi Security Forces with training, intelligence support, and kinetic air support. In 2016, the IS caliphate was in decline before entering the nine-month battle for Mosul, which ended the caliphate in August 2017.

[100] Gordon H. McCormick and Frank Giordano, "Things Come Together: Symbolic Violence and Guerrilla Mobilisation," *Third World Quarterly* 28, no. 2 (2007): 295–320, https://doi.org/10.1080/01436590601153705; Gordon H. McCormick, Steven B. Horton, and Lauren A. Harrison, "Things Fall Apart: The Endgame Dynamics of Internal Wars," *Third World Quarterly* 28, no. 2 (2007): 321–67, https://doi.org/10.1080/01436590601153721; and Moshe Kress and Roberto Szechtman, "Why Defeating Insurgencies Is Hard: The Effect of Intelligence in Counterinsurgency Operations--A Best-Case Scenario," *Operations Research* 57, no. 3 (2009): 578–85, https://doi.org/10.1287/opre.1090.0700.

[101] Craig Whiteside, "New Masters of Revolutionary Warfare: The Islamic State Movement (2002–2016)," *Perspectives on Terrorism* 10, no. 4 (2016): 4–18.

[102] Tomáš Kaválek, "From Al-Qaeda in Iraq to Islamic State: The Story of Insurgency in Iraq and Syria in 2003–2015," *Alternatives: Turkish Journal of International Relations* 14, no. 1 (December 2015): 1, https://doi.org/10.21599/atjir.29299.

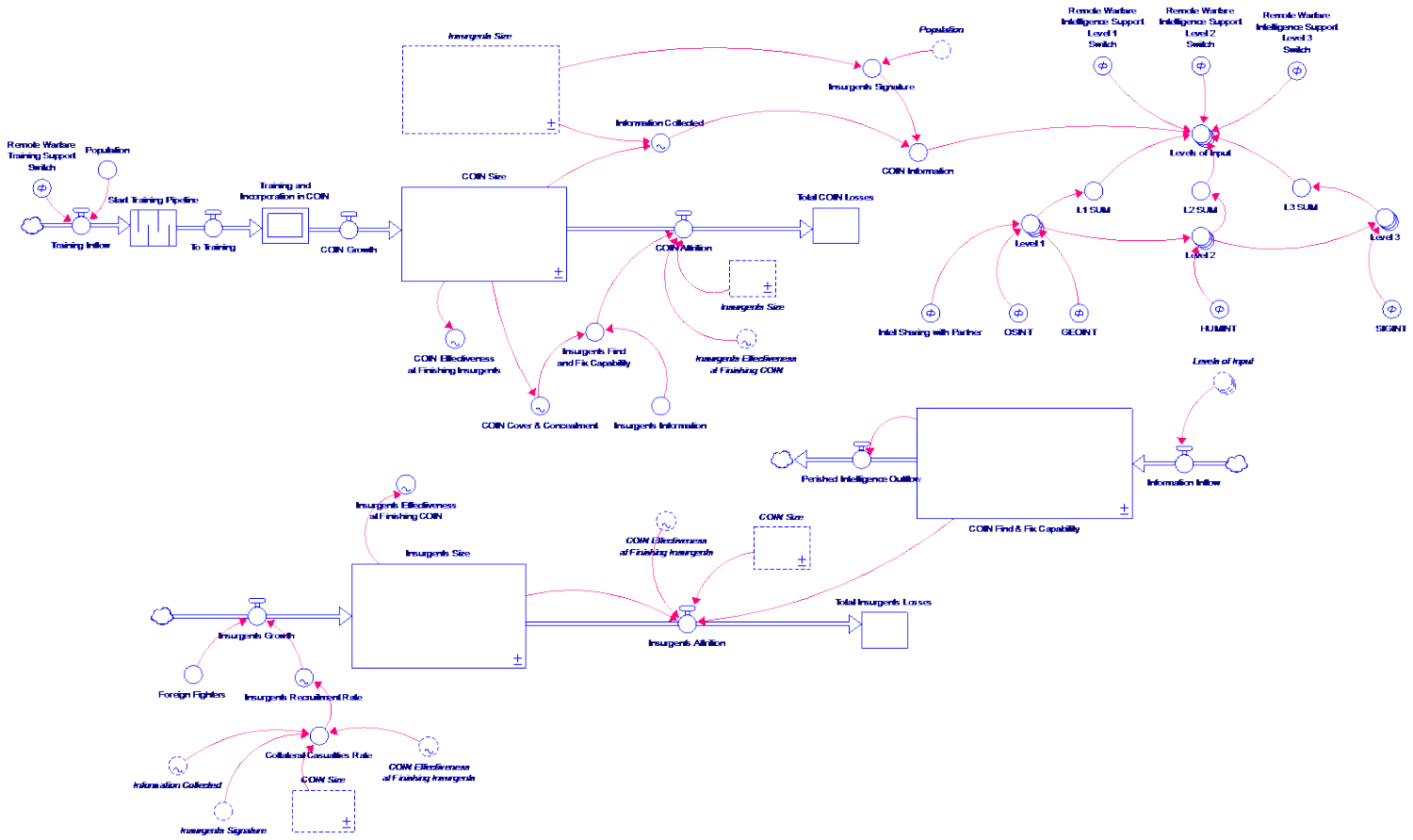


Figure 12. Complete System Dynamics Model for an Insurgent Competition Size and Information System[103]

[103] Adapted from ISEE Systems, Stella Architect.

1. Stocks, Inflows, and Outflows

The COIN Size stock and Insurgents' Size stock express the sizes of the counterinsurgency force and insurgent force, respectively. A Population converter provides the size of the general population that contributes to the Insurgent Signature, which is discussed below. The COIN Size stock in Figure 13 has a COIN Growth inflow and a COIN Attrition outflow, where COIN Attrition is defined by the following equation inspired by previous research: [104]

COIN Size = COIN Growth – Insurgent Effectiveness at Finishing COIN x Insurgent Size x Insurgents Find and Fix Capability (1)

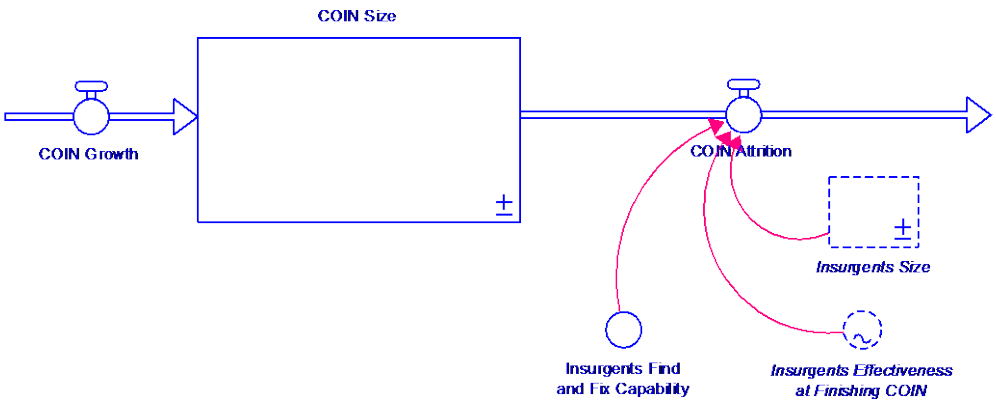


Figure 13. COIN Size Stock[105]

Following the same logic, the Insurgents' Size stock in Figure 14 has an Insurgents' Growth inflow and an Insurgents' Attrition outflow, where the following equation defines Insurgents' Attrition:[106]

[104] Kress and Szechtman, "Why Defeating Insurgencies Is Hard."

[105] Adapted from ISEE Systems, Stella Architect.

[106] Kress and Szechtman, "Why Defeating Insurgencies Is Hard."

Insurgents Attrition = COIN Effectiveness at Finishing Insurgents x COIN Size x COIN Find and Fix Capability (2)

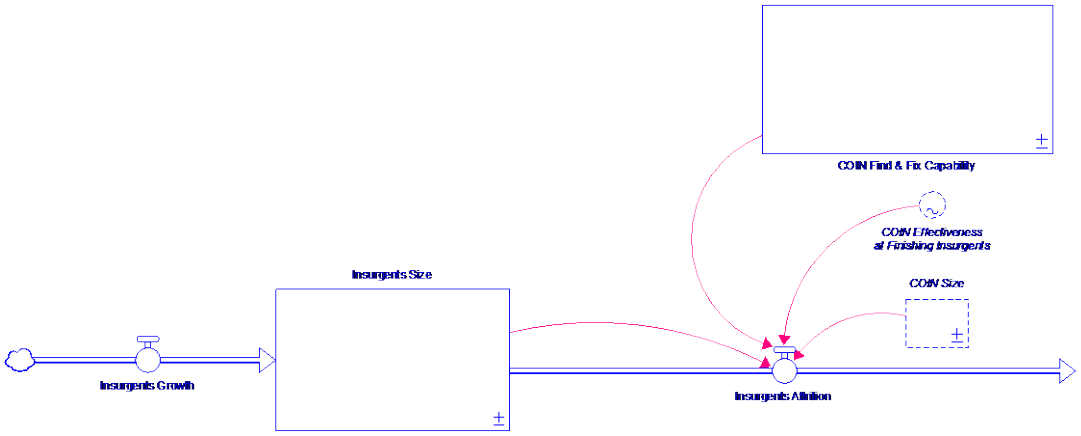


Figure 14. Insurgents' Size Stock[107]

The IS case consists of the following:

- COIN Size: The initial value of 206,000 corresponds to the Iraqi Security Forces (ISF), a term used to describe law enforcement (Ministry of Interior, or MoI) and military forces of the Republic of Iraq. The estimated ISF size in 2016 was 61,000 military and 145,000 paramilitaries (MoI), resulting in 206,000 ISF.[108] These numbers were unchanged in 2017 and 2018.

- Insurgents' Size: By using population control ratios, Daveed Gartenstein-Ross has estimated the number of fighters within the IS to have been approximately 100,000. This corresponds to the value of the Insurgents' Size used to initialize the stock.[109]

[107] Adapted from ISEE Systems, Stella Architect.

[108] Sam Gollob and Michael E. O'Hanlon, *Iraq Index: Tracking Variables of Reconstruction and Security in Post-Saddam Hussein Iraq* (Washington, DC: Brookings Institution, 2020), 11.

[109] Daveed Gartenstein-Ross, "How Many Fighters Does the Islamic State Really Have?," War on the Rocks, February 9, 2015, https://warontherocks.com/2015/02/how-many-fighters-does-the-islamic-state-really-have/.

- Population Size: The Iraqi population in 2016 was estimated to be 36,610,600.[110] The model uses 37,000,000 as a matter of simplification.

- ISF Attrition: In 2016, the attrition value for the Iraqi Security Forces (ISF), represented by COIN in the model, reached 6,100 deaths over the year.[111]

- IS Attrition: In August 2016, the United States declared that 45,000 IS fighters had been killed in the previous two years.[112] We simplify the estimates: approximately 11,000 IS fighters were removed in six months. This would mean an attrition of 22,000 per year.

Assumptions:

- Although COIN Size and Insurgents' Size may vary over time, we assume that the size of the general population remains constant throughout the model's run.

- There are no reinforcements to the COIN force before remote warfare training support is provided. So, without the Training Support Switch turned on, COIN Growth = 0.

- There is no sectarian or coercive violence; the insurgents target the COIN force only, not the population.

a. COIN Growth

COIN Growth is interrelated with training and is discussed in detail later in this chapter in sub-section 9, Training Support.

110 Gollob and O'Hanlon, *Iraq Index*, 23.

111 "United Nations in Iraq," Casualty Figures, accessed March 5, 2023, https://iraq.un.org/en.

112 "45,000 Islamic State Fighters Killed in Past Two Years: U.S. General," Firstpost, August 11, 2016, https://www.firstpost.com/world/45000-islamic-state-fighters-killed-in-past-two-years-us-general-2948676.html.

b. Insurgents' Growth

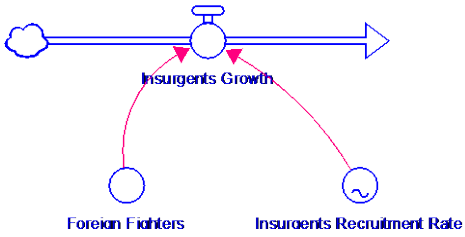


Figure 15. Insurgents Growth Inflow[113]

The Insurgents' Growth is defined by adding the Insurgents' Recruitment Rate defined in (1) and Foreign Fighters defined in (2).

(1) Insurgents' Recruitment Rate and Collateral Casualties

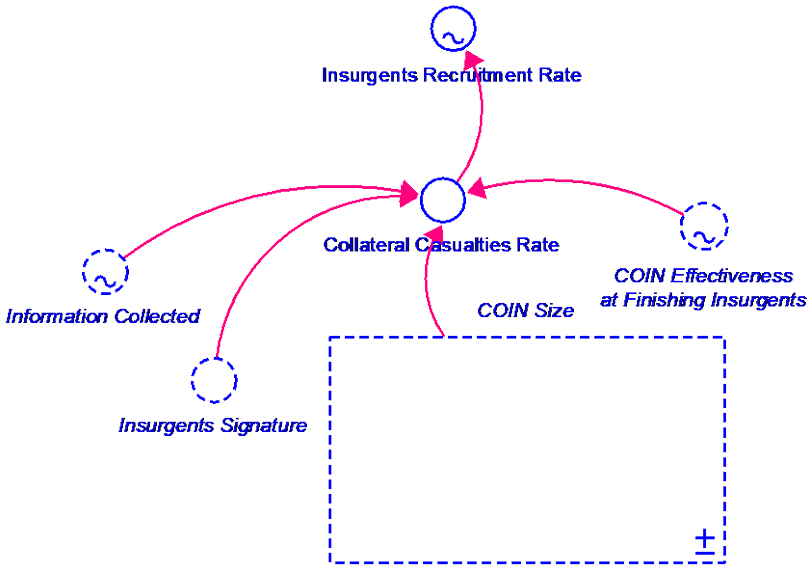


Figure 16. Insurgents' Recruitment Rate and Collateral Casualties Rate[114]

[113] Adapted from ISEE Systems, Stella Architect.

[114] Adapted from ISEE Systems, Stella Architect.

Insurgents normally do not target the general population since elements within local communities provide them an information advantage and consequently superior situational awareness on the ground. Insurgent attacks were not modeled to produce collateral damage to the population. On the other hand, without accurate information for targeting insurgents, the COIN force may cause collateral damage to the civilian population. Collateral damage subsequently boosts insurgent recruitment. Therefore, the Insurgents' Recruitment Rate is a function of the collateral casualty rate.[115]

Insurgents Recruitment Rate = f (Collateral Casualties Rate) (3)

From Equation (2), the Insurgents' Attrition equation, it follows that:

Collateral Casualties Rate = COIN Effectiveness at Finishing Insurgents x COIN Size x (1-Information Collected) x (1- Insurgents Size / Population) (4)

Alternatively, it can be expressed as:

Collateral Casualties Rate = COIN Effectiveness at Finishing Insurgents x COIN Size x Fraction of Incorrect Information x Non-Insurgents in the Population (5)

During insurgents-counterinsurgents conflict, population sentiment is driven by security.[116] People will side with the group they think would protect them best. The model shows an increase in the Recruitment Rate, a function of the Collateral Casualty Rate, on a logarithmic curve (Figure 17). However, establishing to what degree it influences the Recruitment Rate has not been empirically demonstrated.

115 Kress and Szechtman, "Why Defeating Insurgencies Is Hard."

116 Kress and Szechtman, 579; Thomas X. Hammes, "Countering Evolved Insurgent Networks," *Marine Corps Gazette* 91, no. 10 (2007): 18–26; John A. Lynn, "Patterns of Insurgency and Counterinsurgency," *Military Review* 85, no. 4 (2005): 22–27.

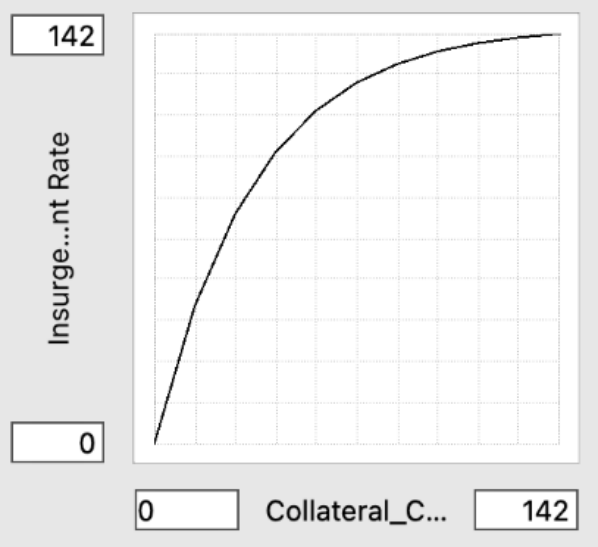


Figure 17. Insurgents Recruitment Rate Graphical Input[117]

The logarithmic function simulates a decreasing eligible population. The population eligible to join insurgents is limited in each district or village. When the male population that survives COIN attacks and is of fighting age (approx. 15 to 55 years old) joins the insurgents, the recruitment rate in that area reaches its carrying capacity.

The value on the x-axis corresponds to the monthly (annual value divided by 12) Collateral Casualties Rate attributed to the ISF in 2014[118] when they were executing operations without kinetic air support (or with very little kinetic air support at the end of 2014) from the coalition.

The y-axis limits are set with the same values to simulate a sharp increase at the beginning and slow growth at the end of the simulation run. That input assumes that there is, on average, one insurgent recruited per collateral casualty.

[117] Adapted from ISEE Systems, Stella Architect.

[118] Daniel Kenis, "Five Facts: Civilian Deaths in Iraq," LiveStories, accessed March 5, 2023, https://insight.livestories.com/s/v2/five-facts-civilian-deaths-in-iraq/4911d75d-bcef-410d-9f80-547aec168616/.

Assumptions: In this case, the Recruitment Rate is only a function of the Collateral Casualty Rate. An insurgent recruitment rate would typically be a function of multiple factors such as the number of civilians in the occupied territory and the percentage of eligible males of fighting age, the media campaign's impact on their recruitment, and a variety of intangibles. The considerable differences in IS fighters' numbers given in various sources[119] also explain why no reliable recruitment rate was found.

(2) Foreign Fighters

The Islamic State case: IS managed to attract over 40,000 foreign fighters from 130 countries before and after the caliphate declaration in 2014.[120] No research established a precise timeline for the flow of foreign fighters (FF). Most researchers estimate this inflow at 40,000 FF between 2012 and 2016.[121] In the model, the inflow is estimated at **10,000** FF per year. The yearly and monthly inflow can vary. Without reliable annual and monthly numbers, the model uses a monthly inflow that corresponds to a lognormal distribution with a mean of **850** and a standard deviation of **200**.

2. COIN Cover and Concealment and Insurgents Signature

As COIN Size increases, its degree of Cover and Concealment decreases. The model uses an exponential (increasing) function because this change in cover and concealment is a disadvantage, making the COIN force increasingly visible to insurgents. Increasing its visibility or posture means patrolling more often, patrolling with larger numbers of troops, or both. This requires increasing the size of COIN encampments or building new ones, consequently adding to the density of the presence or the footprint.

The model assumes that the COIN Cover and Concealment Converter follows an exponential curve with COIN Size varying between 150,000 and 300,000 (maximum limits

119 Gartenstein-Ross, "How Many Fighters Does the Islamic State Really Have?"

120 Anne Speckhard and Molly Ellenberg, "ISIS in Their Own Words: Recruitment History, Motivations for Joining, Travel, Experiences in ISIS, and Disillusionment over Time – Analysis of 220 In-Depth Interviews of ISIS Returnees, Defectors and Prisoners," *Journal of Strategic Security* 13, no. 1 (April 2020): 82, https://doi.org/10.5038/1944-0472.13.1.1791.

121 Mapping Militants Organizations, "The Islamic State," Standford Center for International Security and Cooperation, April 2021, https://cisac.fsi.stanford.edu/mappingmilitants/profiles/islamic-state.

of attrition and growth over the simulation's 36-month run time) on the x-axis and a COIN Cover and Concealment going between 0.1 and 0.3 on the y-axis (Figure 18).

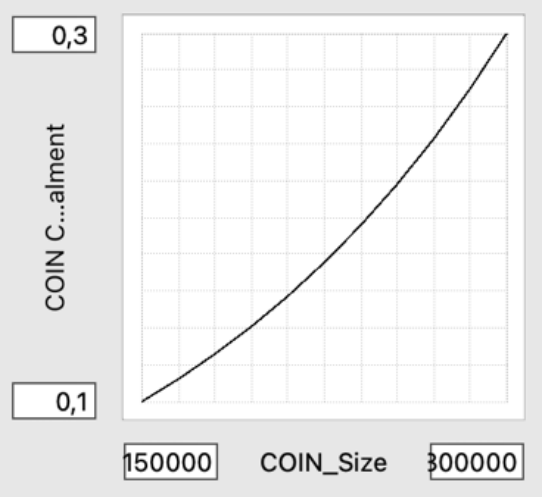


Figure 18. COIN Cover and Concealment Graphical Input[122]

In the absence of reliable intelligence, one way to estimate the strength of an insurgency is by calculating the ratio of the size of the insurgent group to the size of the population (Figure 19). This ratio can be interpreted as the probability that a randomly selected individual in the area is an insurgent.[123] This provides an estimate of the scale and scope of the insurgency, but it is important to note that this approach may not accurately capture the full complexity of the situation, particularly if the insurgency is well-hidden or has a significant support network within the population.[124]

[122] Adapted from ISEE Systems, Stella Architect.

[123] Kress and Szechtman, "Why Defeating Insurgencies Is Hard."

[124] Kress and Szechtman; McCormick, Horton, and Harrison, "Things Fall Apart."

Signature of the Insurgents = Insurgents Size / Population (6)

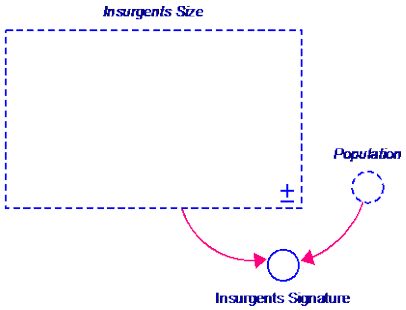


Figure 19. Insurgents Signature Converter[125]

3. Information Collected

In COIN operations, it is reasonable to assume that the level of available information level remains constant over time (Figure 20). However, if the number of insurgents is very small, the information level may become less significant as there is less activity to monitor and analyze.[126]

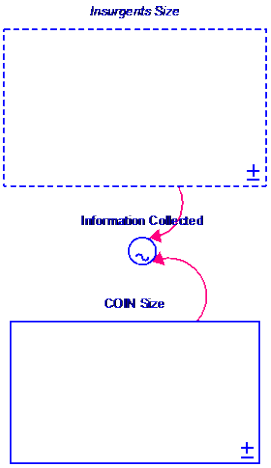


Figure 20. Information Collected Converter[127]

[125] Adapted from ISEE Systems, Stella Architect.

[126] McCormick, Horton, and Harrison, "Things Fall Apart."

[127] Adapted from ISEE Systems, Stella Architect.

Additionally, the information level may be deficient during the early stages of an insurgency when little is known about the group, or when the insurgency has been weakened and fragmented into smaller cells. The information level may also decline if the COIN force loses its information sources, making it more difficult to gather and analyze data on the insurgents' activities.[128] This is consistent with previous operations research formulating the Information Collected as a function of COIN and the Insurgents' Size.[129]

Information = Information (COIN Size, Insurgents Size) (7)

The greater the COIN Size, the greater the number of information collectors and the greater the number of people needed to analyze and process this information. The greater the Insurgents' Size, the greater their signature among the population, and the greater the likelihood of collecting information on Insurgents.

Figure 21 shows that Information Collected follows an exponential curve with COIN Size x Insurgents Size on the x-axis and Information Collected on the y-axis. The x-axis is divided by 10,000,000,000 to maintain an acceptable scale. The y-axis varies between 0.1 and 0.4 because collecting no information is not credible, and achieving more than 40% accuracy of the information collected would come unrealistically close to the accuracy of Insurgents' Information. That would not align with the premise regarding the Insurgents' Information advantage.[130]

[128] G. H. McCormick and G. Owen, "Security and Coordination in a Clandestine Organization," *Mathematical and Computer Modelling* 31, no. 6 (2000): 175–92, https://doi.org/10.1016/S0895-7177(00)00050-9; Kress and Szechtman, "Why Defeating Insurgencies Is Hard."

[129] Kress and Szechtman, "Why Defeating Insurgencies Is Hard."

[130] McCormick, Horton, and Harrison, "Things Fall Apart."

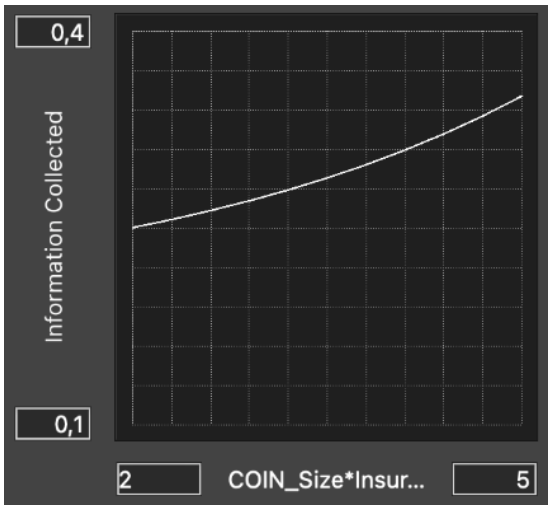


Figure 21. Information Collected – Graphical Function[131]

4. COIN Information

COIN Information expresses the level of information available to COIN forces. It may be defined as a fraction of the information reports that accurately identify insurgents' positions. A fraction of these reports is incorrect because the intelligence on which this fraction is based is inaccurate. Therefore, because the COIN force has no way to verify which reports are accurate and which are not, it attacks every target with equal ferocity.[132]

COIN Information = (Information Collected + (1- Information Collected) x Signature of the Insurgents) (8)

Assuming that the COIN force can process all the information it receives, it follows that the more Information Collected, the more COIN Information is available (Figure 22).

131 Adapted from ISEE Systems, Stella Architect.

132 Kress and Szechtman, "Why Defeating Insurgencies Is Hard."

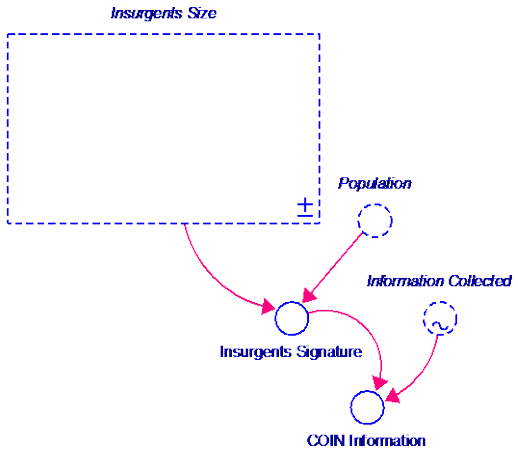


Figure 22. COIN Information Converter[133]

5. Insurgents' Information

There is no Information flow (per se) attributed to the insurgents because they operate and live among the population. All other things being equal, it is assumed that the insurgents, compared to the counterinsurgents, have more and better information.[134] At the extreme, some literature assumes that insurgents have perfect information (100%).[135] The stock and flow model initially sets the Insurgents' Information at 0.6 (60% accurate information), but a slider in the interface allows the user to set the variable value between 0.1 (10%) and 0.9 (90%). Due to their characteristics, it is natural to assume that insurgents have more information than their opponents, but counterinsurgents still apply Operational Security (OPSEC) measures. In these conflicts, some insurgents and counterinsurgents may live in the same villages, and the OPSEC might be very low, but it would be unreasonable to believe that there is no OPSEC at all. Another reason not to accept that the insurgents have perfect information is the notion of bounded rationality. Despite their best intentions and efforts, insurgents, like everyone else, are constrained by delayed,

[133] Adapted from ISEE Systems, Stella Architect.

[134] Leites and Wolf, *Rebellion and Authority*, 157.

[135] McCormick and Giordano, "Things Come Together"; McCormick, Horton, and Harrison, "Things Fall Apart."

incomplete, and imperfect information, so their actions may be perceived as less than entirely rational.[136]

6. COIN Find and Fix Capability Stock, Inflow, and Outflow

The Information Inflow depends on the Level of Input that is turned on. If no Remote Warfare Intelligence Support is activated, the only information flowing into the COIN Find and Fix Capability Stock comes from the COIN Information Converter (Figure 23). The three other Levels of Input are the Remote Warfare Intelligence Support Levels 1, 2, and 3. They are explained later in sub-section j. Intelligence Support.

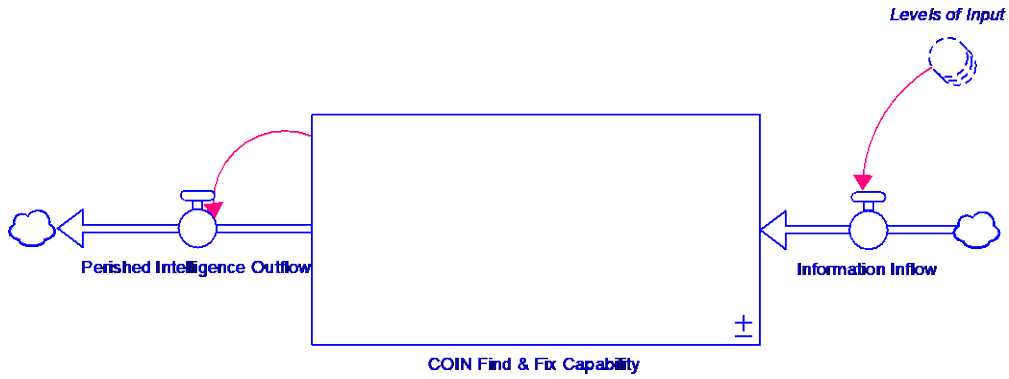


Figure 23. COIN Find and Fix Capability Stock[137]

'In this context, the Find and Fix Capability stock is simply the Information Inflow less the Perished Information Outflow. Actionable Intelligence is useful and delivered on time. The stock accumulates all the Information Inflow, and while some information is still valuable, perishable information is not. Therefore, Perished Intelligence Outflow is eliminated each prior month. So, the stock reflects the monthly value of actionable intelligence.

[136] Simon, *Reason in Human Affairs*, 19; March, *A Primer on Decision Making*, 8.

[137] Adapted from ISEE Systems, Stella Architect.

7. Insurgents' Find and Fix Capability

The Insurgents' Find and Fix Capability Converter (Figure 24) is a function of two variables. It adds COIN Cover and Concealment to Insurgents' Information.

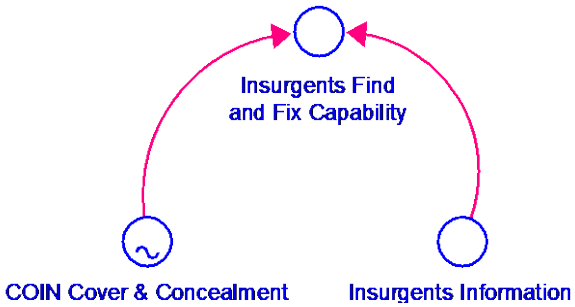


Figure 24. Insurgents' Find and Fix Capability Converter[138]

8. Effectiveness at Finishing

Most insurgent-counterinsurgent competitions last years and even decades, and some never end.[139] Insurgents' Effectiveness at Finishing COIN, and COIN Effectiveness at Finishing Insurgents are attrition coefficients that can be understood as each opponent's effectiveness at reducing the other's size (i.e., eliminating opposing troops). This coefficient should be associated with the firepower and mobility of each actor (i.e., each opposing force), not directly with its available information. The model is comprised of distinct stocks and converters dedicated to the flow of information. Both coefficients of effectiveness at finishing the other actor $\in (0\ \ 1)$ vary between 0.001 and 0.01. During the run-time of the simulation, these values serve to diminish the entire opponents' force size by 0.1 % to 1 % each time step. Insurgents' Effectiveness at Finishing COIN and COIN Effectiveness at Finishing Insurgents are modeled as a linear function linked to each Force's size. The greater the size, the greater the Finishing Capability. However, the two actors do not have the same value scale on the y-axis. Since sizes are the only dependent

[138] Adapted from ISEE Systems, Stella Architect.

[139] Noonan, *Irregular Soldiers and Rebellious States*; International Crisis Group, *Iraq: Stabilising the Contested District of Sinjar* (International Crisis Group, 2022).

variables, one force may not have the same effectiveness with 100,000 people as the other with 200,000 (Table 1). This reflects the COIN Size (Force) advantage.

Table 1. Relative Values of Effectiveness a Finishing – Function of Actors' Sizes

COIN and Insurgents' Size	100,000	200,000	300,000
Effectiveness at Finishing $\in (0\ \ 1)$	0.001	0.005	0.01

Assumptions:

- The coefficients of Effectiveness at Finishing (Figure 25 and Figure 26) are a function of the actors' respective force Size. Many other variables, however, might influence this coefficient. Air strikes and advising and assisting local troops are good examples of variables that might influence those coefficients. This model does not take these additional variables into account.
- It is assumed in the model that the individual skill level of the fighters and collective tactics, techniques, and procedures, as well as their equipment, material, and capabilities, follow the same proportional increase as their size.

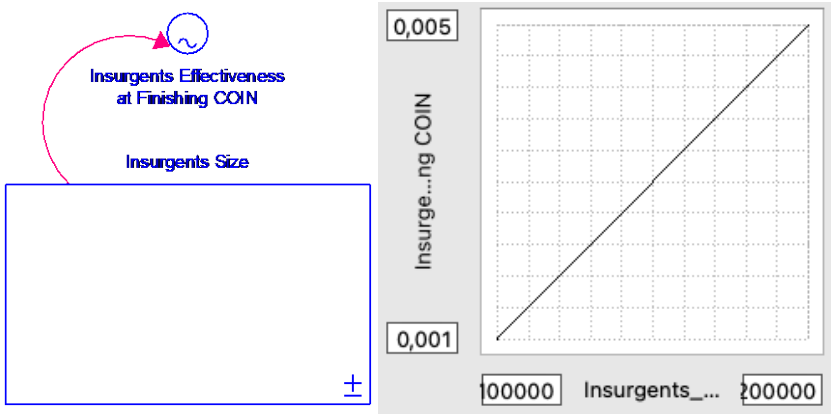


Figure 25. Insurgents' Effectiveness at Finishing COIN Converter and Graphical Input[140]

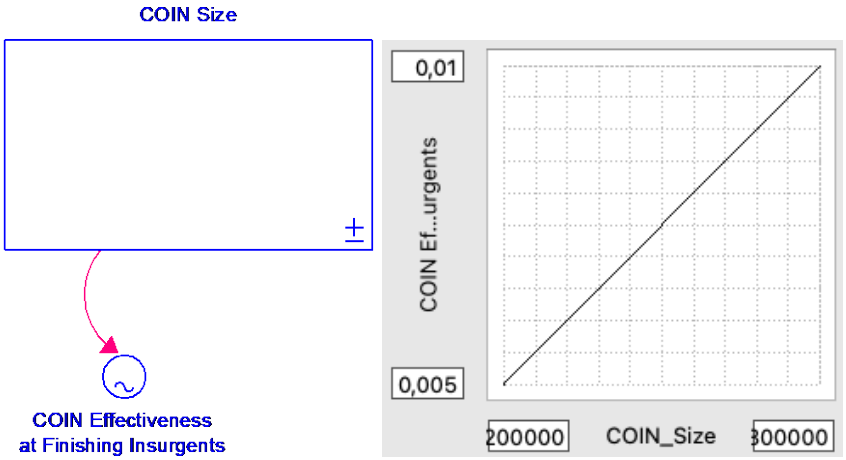


Figure 26. COIN Effectiveness at Finishing Insurgents Converter and Graphical Input[141]

9. Training Support

The Training Inflow corresponds to a percentage of the male, fighting-age population (15–55 years old).[142] Based on the success level of the training pipeline, which includes a high percentage of dropouts during training, the assumption is that

[140] Adapted from ISEE Systems, Stella Architect.

[141] Adapted from ISEE Systems, Stella Architect.

[142] Statistics Times, "Iraq Demographics 2021," Demographics of Iraq, accessed March 12, 2023, https://statisticstimes.com/demographics/country/iraq-demographics.php.

approximately 45,000 people (0.12% of the population) present themselves to begin training. This represents a monthly inflow of 3,750 potential COIN fighters. Future soldiers enter the Start Training Pipeline queue stock and flow into the Training and Incorporation in COIN oven stock (Figure 27). The oven simulates a three-month training pipeline with a "cook time" of three months and a capacity of 9,625 persons. This reflects actual data from the Iraq counter-insurgency. The growth of the ISF was attributed to an estimated **38,500** ISF trained by the coalition in 2016.[143] The training given by the coalition, depending on the assigned force (Regular Brigade, Counter Terrorism Service, or Police), lasted, on average, three months. This means **9,625** ISF came out of the training pipeline every three months.

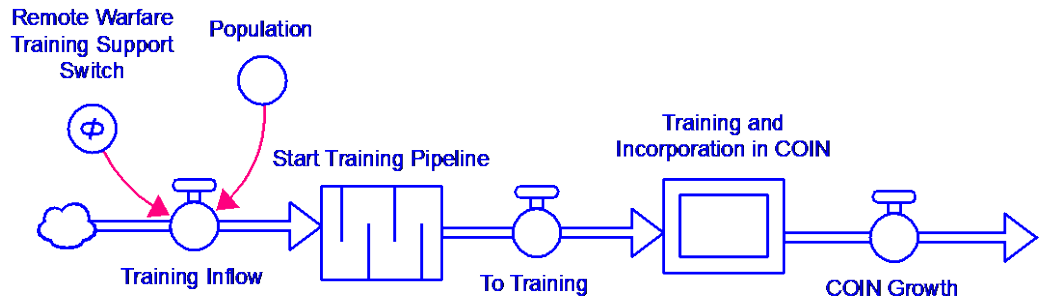


Figure 27. Training Support Inflow, Queue, and Oven[144]

10. Intelligence Support

The four different levels of intelligence (INTs) converters at the bottom of Figure 28 represent the intelligence collection disciplines employed in modern conflicts.[145] Intel Sharing with Partner(s) is one of the remote warfare characteristics and the condition sine qua non for any form of intelligence support. It also adds to a synergistic

[143] Department of State, *Country Reports on Terrorism 2016* (Washington, DC: Department of State, 2017).

[144] Adapted from ISEE Systems, Stella Architect.

[145] Lowenthal, *Intelligence*, 2023.

effect with other INTs because sharing goes both ways, allowing the COIN Information (a function of the opponents' sizes) to add to the Intelligence Support Levels.

In the model, there are three levels of support possible. First, they are grouped by the ease of sharing. For example, sharing open-source intelligence (OSINT) products, unmanned aerial vehicle (UAV) images, and geospatial intelligence (GEOINT) with a partner is often seen as the minimum and easiest remote intelligence support to provide. Therefore, they are modeled as Level 1 support. Human intelligence (HUMINT) involves more risks for the agents and the sources, so it requires more risk acceptance from the supporting nation. Therefore, HUMINT is added to Level 1 inputs to comprise Level 2 support. Finally, signal intelligence (SIGINT) is expensive and often requires a higher security classification. Therefore, SIGINT is added to the sources in Level 2, to comprise Level 3 support.

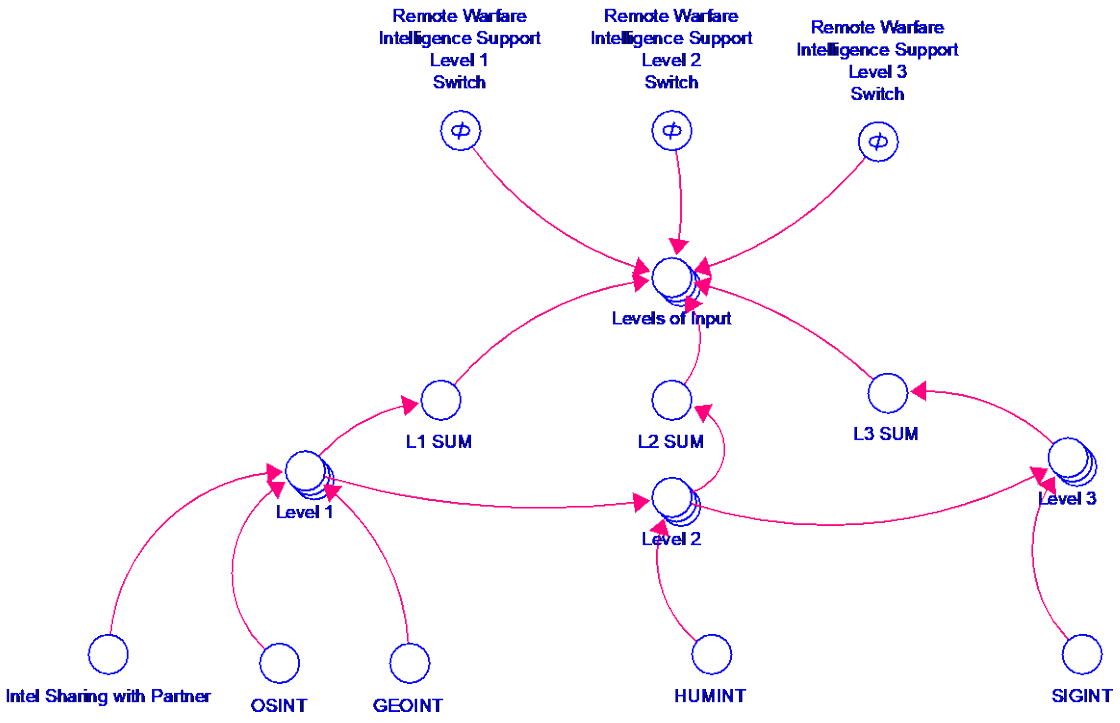


Figure 28. Levels of Intelligence Support Converters[146]

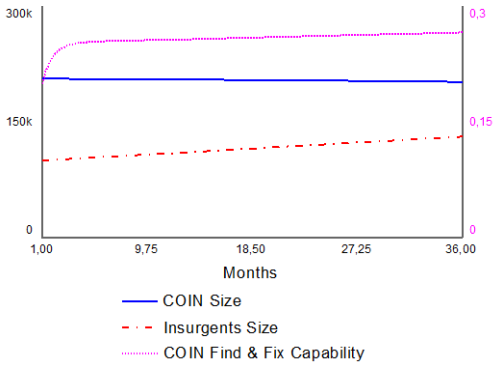
146 Adapted from ISEE Systems, Stella Architect.

C. DATA ANALYSIS

For the sake of clarity, the process of evaluating data and modeling results occurs through four scenarios. Scenario 1 does not involve any type of remote warfare support, with the COIN force fighting insurgents in a substate conflict. Scenario 2 involves Training Support, meaning that a third party's SOF participating in training activities with a local partner security force, consequently growing the COIN Size. Scenario 3 involves a third party's three alternative Levels of Intelligence Support, as described in III B. 10. Scenario 4 includes Training Support and Intelligence Support, with different variations in levels of support. The goal of the four scenario sections is to compare the behavioral outcomes of the simulation runs. Each figure is presented in three parts. The first part demonstrates a graphical outcome. The second part is a table of the first 12 months – out of 36 – adding clarity to the graph because changes in trends occur during the first 12 months. Finally, a one-blue line displays the final – 36th month of simulation run – numerical output for each studied variable, demonstrating the impacts over the extended period.

1. Scenario 1: No Support

As shown in Figure 29, there is a slow increase in COIN Find and Fix Capability, reaching 0.257 after 12 months. However, this increase is insufficient to cause an outflow of insurgents and consequently decrease the Insurgents' Size. As visible on the 36-month graph and the 12-month table, the Insurgents' Size increases while the COIN Size decreases.



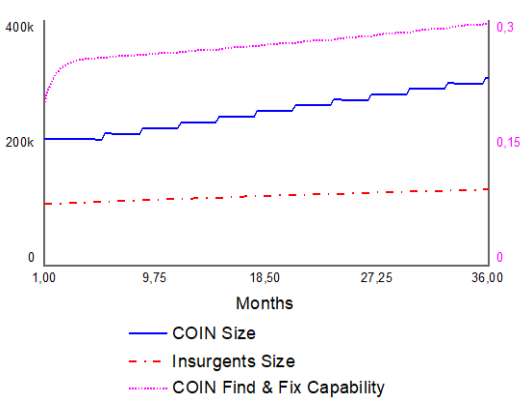
	Insurgents Size	COIN Size	COIN Find & Fix Capability
1	100k	206k	0,2
2	101k	206k	0,237
3	102k	206k	0,248
4	103k	206k	0,252
5	103k	206k	0,254
6	104k	206k	0,255
7	105k	206k	0,255
8	106k	205k	0,255
9	107k	205k	0,256
10	108k	205k	0,256
11	108k	205k	0,256
12	109k	205k	0,257
Final	125k	202k	0,263

Figure 29. Scenario 1 – No Support – Results[147]

2. Scenario 2: Training Support

The effect of the Training Support provided is visible in the COIN Size (Figure 30). The increase in COIN Find and Fix Capability is similar to that for Scenario 2. The COIN Size increase does not affect the Insurgents' Size during the first 12 months. Its impact on the Insurgents' Size is negligible and visible in the final month, going from 125,000 without support to 117,000 with support.

147 Adapted from ISEE Systems, Stella Architect.



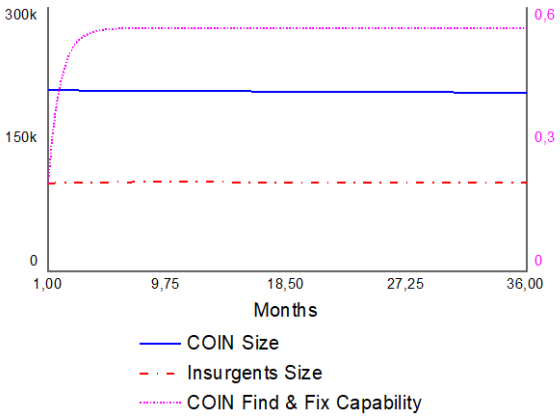
	Insurgents Size	COIN Size	COIN Find & Fix Capability
1	100k	206k	0,2
2	101k	206k	0,237
3	102k	206k	0,248
4	103k	206k	0,252
5	104k	206k	0,254
6	104k	215k	0,255
7	105k	215k	0,257
8	106k	215k	0,257
9	106k	225k	0,258
10	107k	224k	0,26
11	108k	224k	0,261
12	109k	234k	0,262
Final	117k	306k	0,29

Figure 30. Scenario 2 – Training Support – Results[148]

3. Scenario 3: Intelligence Support

As the levels of Intelligence Support increase, the COIN Find and Fix Capability increases (Figures 31 through 33). The Insurgents' Size does not increase after 36 months with Level 1 Support and decreases to 78,600 with Level 3 Support. The COIN Size slightly decreases from 206,000 to 203,000 and 204,000 over the course of the simulation.

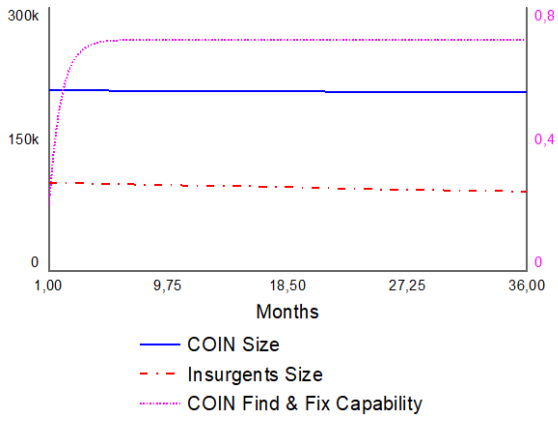
148 Adapted from ISEE Systems, Stella Architect.



	Insurgents Size	COIN Size	COIN Find & Fix Capability
1	100k	206k	0,2
2	101k	206k	0,442
3	101k	206k	0,518
4	101k	206k	0,542
5	101k	206k	0,55
6	101k	206k	0,553
7	101k	206k	0,553
8	102k	205k	0,554
9	102k	205k	0,554
10	102k	205k	0,554
11	101k	205k	0,554
12	101k	205k	0,554

Final	100k	203k	0,553

Figure 31. Scenario 3 – Intelligence Support Level 1 – Results[149]



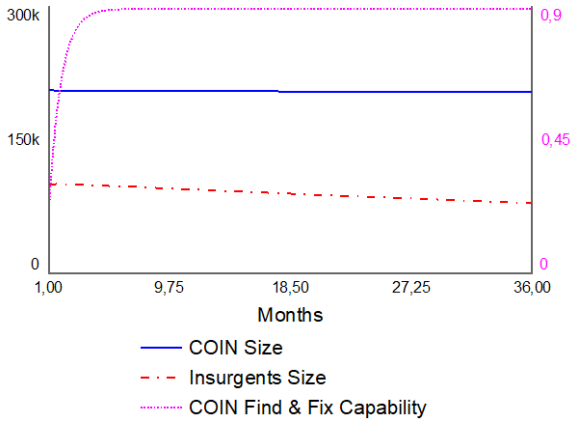
	Insurgents Size	COIN Size	COIN Find & Fix Capability
1	100k	206k	0,2
2	100k	206k	0,544
3	100k	206k	0,653
4	99,7k	206k	0,687
5	99,6k	206k	0,698
6	99,3k	206k	0,701
7	98,8k	206k	0,702
8	98,4k	205k	0,702
9	98k	205k	0,702
10	97,7k	205k	0,702
11	97,5k	205k	0,702
12	97,5k	205k	0,702

Final	90,5k	204k	0,702

Figure 32. Scenario 3 – Intelligence Support Level 2 – Results[150]

[149] Adapted from ISEE Systems, Stella Architect.

[150] Adapted from ISEE Systems, Stella Architect.



	Insurgents Size	COIN Size	COIN Find & Fix Capability
1	100k	206k	0,2
2	100k	206k	0,675
3	100k	206k	0,825
4	99,3k	206k	0,872
5	98,5k	206k	0,887
6	97,9k	206k	0,891
7	97,4k	206k	0,892
8	96,6k	205k	0,893
9	95,9k	205k	0,893
10	95,1k	205k	0,893
11	94,4k	205k	0,893
12	94k	205k	0,893

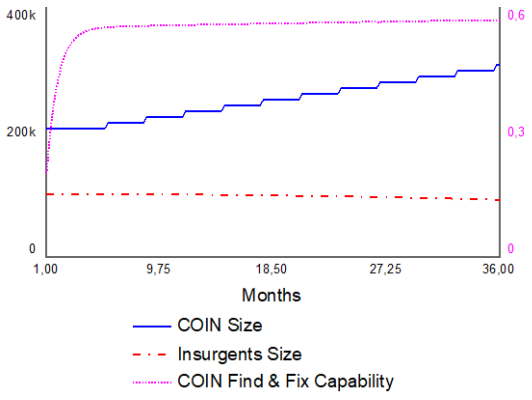
Final	78,6k	204k	0,893

Figure 33. Scenario 3 – Intelligence Support Level 3 – Results [151]

4. Scenario 4: Training Support and Intelligence Support

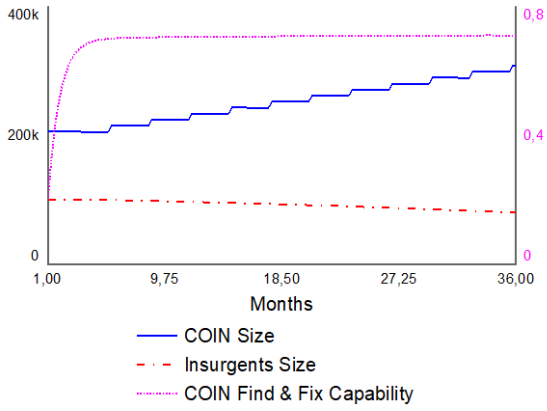
The effect of Intelligence Support is visible on the graphs for each of the three levels of support (Figures 34 through 36). Scenario 1 succeeds in decreasing Insurgents' Size. The COIN Find and Fix Capability seems vital in decreasing Insurgents' Size. The initial COIN Size does not change through any Levels of Support. By reducing size, the Insurgents' Effectiveness at Finishing COIN decreases, and the insurgents slowly lose their ability to influence COIN Attrition.

[151] Adapted from ISEE Systems, Stella Architect.



	Insurgents Size	COIN Size	COIN Find & Fix Capability
1	100k	206k	0,2
2	101k	206k	0,442
3	101k	206k	0,518
4	101k	206k	0,542
5	101k	206k	0,55
6	101k	215k	0,553
7	101k	215k	0,555
8	101k	215k	0,555
9	101k	225k	0,556
10	100k	225k	0,557
11	100k	224k	0,557
12	100k	234k	0,558
Final	90,9k	308k	0,569

Figure 34. Scenario 4 – Training and Intelligence Support Level 1 – Results[152]

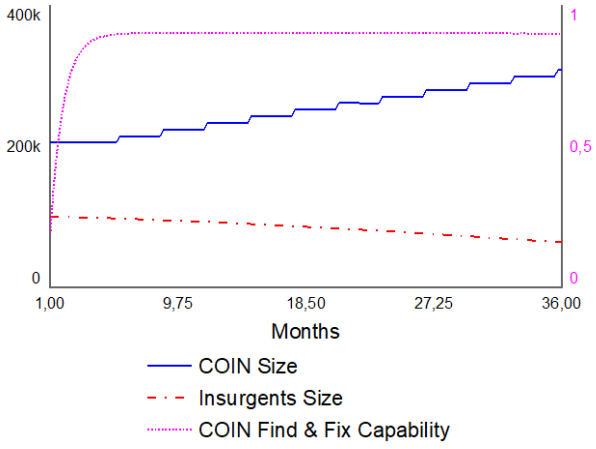


	Insurgents Size	COIN Size	COIN Find & Fix Capability
1	100k	206k	0,2
2	100k	206k	0,544
3	100k	206k	0,653
4	100k	206k	0,687
5	100k	206k	0,698
6	99,6k	215k	0,702
7	99,2k	215k	0,704
8	98,9k	215k	0,704
9	98,4k	225k	0,705
10	97,8k	225k	0,706
11	97,4k	224k	0,706
12	96,9k	234k	0,706
Final	80,2k	309k	0,711

Figure 35. Scenario 4 – Training and Intelligence Support Level 2 – Results[153]

[152] Adapted from ISEE Systems, Stella Architect.

[153] Adapted from ISEE Systems, Stella Architect.



	Insurgents Size	COIN Size	COIN Find & Fix Capability
1	100k	206k	0,2
2	100k	206k	0,681
3	99,8k	206k	0,833
4	99,3k	206k	0,881
5	98,6k	206k	0,896
6	97,8k	215k	0,901
7	97,1k	215k	0,903
8	96,2k	215k	0,903
9	95,5k	225k	0,904
10	94,5k	225k	0,904
11	93,8k	225k	0,904
12	93k	234k	0,904

Final	64,2k	309k	0,901

Figure 36. Scenario 4 – Training and Intelligence Support Level 3 – Results[154]

[154] Adapted from ISEE Systems, Stella Architect.

IV. FINDINGS

A. INFORMATION AS A FUNCTION OF FORCE SIZE AND MULTI-SOURCE INTELLIGENCE GATHERING

Many insurgent competition models measure the trade-off between information and force according to various levels of conflict or stages of insurgency.[155] One of the central assumptions of such models is that the level of information is a function of the COIN Size and the Insurgents' Size. In the remote warfare stock and flow model in this thesis, Training Support increases the COIN Size while Intelligence Support dramatically increases the information component (COIN Find and Fix Capability). This is accomplished by providing a synergistic effect of multiple intelligence activities including sharing intelligence with the partner, OSINT, GEOINT (manned and unmanned aircraft included), HUMINT, and SIGINT. So, in the remote warfare model, information remains a function of COIN Size and Insurgents' Size, but to a lesser degree than the added synergy of multi-int provided by the Remote Warfare Intelligence Support.

B. TRAINING, ADVISING, AND ASSISTING IS MORE THAN TRAINING

In addition to Intelligence Support and training, the U.S.-led coalition in Iraq provided other types of support to Iraqi forces. The coalition also advised and assisted ISF, contributing to the COIN Effectiveness at Finishing Insurgents. It is beyond the scope of this research to define the degree of such a contribution. Still, it is clear, this advice and assist role would almost certainly increase Insurgents' Attrition and decrease the Insurgents' Size, but it would also add risk for the supporting nation's troops.

C. KINETIC AIR SUPPORT AND THE ATTRITION GAP

The actual data for the Insurgents' Attrition amounts to 22,000 fighters annually.[156] Figure 36 shows 64,700 insurgents after three years of fighting. So, with Training Support

[155] Leites and Wolf, *Rebellion and Authority*, 147; McCormick, Horton, and Harrison, "Things Fall Apart"; and Kress and Szechtman, "Why Defeating Insurgencies Is Hard."

[156] AFP, "45,000 Islamic State Fighters Killed in Past Two Years."

and Intelligence Support Level 3, the model reaches an attrition average of 12,000 insurgents a year. This leaves a gap of 10,000 insurgents per year. As previously mentioned, kinetic air support is not included in the model, although it played a crucial role in defeating IS.[157] A RAND Corporation research report observes, "Over five months of operations, coalition aircrafts employed 2,025 weapons, 1,700 of which were precision-guided munitions, and air-dropped supplies and weapons to Kurdish partners on the ground." [158] These numbers give a general idea of the intensity of the kinetic air support. The model runs with COIN Effectiveness and Insurgents Effectiveness having the same scale on the y-axis. Adding kinetic air support would change this, and the scale on the y-axis of COIN Effectiveness would then have to be adapted to reflect this. There would undoubtedly be multiple effects from this addition/adaptation. First, it would significantly enhance the COIN Effectiveness Coefficient, thereby impacting the Insurgents' Attrition rate. Second, it would also increase the insurgents' Recruitment Rate because the Collateral Casualty Rate would increase, as demonstrated by the 1,300 civilian deaths attributed to the U.S.-led coalition in 2016.[159]

D. KEY FINDINGS

Based on the data analysis, this research discovered two key findings.

1. Impact of Remote Warfare on Insurgents' Size

Scenarios 3 and 4 demonstrate that Intelligence Support is the only type of support, to a lesser or a greater degree depending on the Level, able to decrease the Insurgents' Size. The main difference between the scenarios with, and those without, Intelligence Support is the capacity of the COIN force to "see" the Insurgents.

The analyses for the three Levels of Intelligence Support show the relationship between an increasing Find and Fix Capability and the decreasing Insurgents' Size. The

[157] Maarten P. Broekhof, Martijn W. M. Kitzen, and Frans P. B. Osinga, "A Tale of Two Mosuls, The Resurrection of the Iraqi Armed Forces and the Military Defeat of ISIS," *Journal of Strategic Studies* 45, no. 1 (2022): 96–118, https://doi.org/10.1080/01402390.2019.1694912.

[158] Kenis, "Five Facts."

[159] Kenis.

more the COIN force can Find and Fix the Insurgents, the more the Insurgents' Size decreases.

2. Growth in COIN Size, Limited Impact of Training Support on Insurgent Size

The analysis reveals that without external intervention in the insurgent conflict, the Insurgents' Information advantage counterbalances their Size disadvantage. So, Insurgents' Size continues to grow.

The analysis regarding the impact of Training Support is aligned with the literature because the model shows that a growing COIN Size has little to no impact on Insurgents' Size if the Insurgents are relatively invisible to COIN forces.

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V. CONCLUSIONS AND FUTURE RESEARCH RECOMMENDATIONS

A. DATA COLLECTION: AN IMPLIED MISSION OF REMOTE WARFARE

Data collection has become essential for a better understanding of the OE and the threats to deployed detachments. Many NATO nations already deploy efficient data collection systems. The following sub-sections address key advantages for smaller Western countries to do the same.

1. Improving Risk Analysis and Reducing Errors in Judgment

Robust amounts of data, when processed properly, allow for better quantitative and statistical analysis. This also improves the state of knowledge related to sources of risk and reduces errors in judgment. When constrained by a strategic culture that is averse to military interventions, political leaders need to reduce to a minimum the room left to judgmental biases in the risk analysis leading decision-makers to accept or reject concepts of operations that impact the operators' freedom of action. The best way to mitigate such constraints is by reducing uncertainty, which can be achieved by increasing the data quantity and improving its processing. One might argue that even after thorough collection and processing of the data, the acceptance of CONOPs can still fail to maintain popular support depending on the results. This should not justify poor data being processed and used by decision-makers biased by a strategic culture averse to conflicts. Quantitative and statistical analysis may provide the means to reduce judgmental biases among decision-makers.

According to Wayne P. Hughes, analysis cannot remove wartime surprises, but it may help military commanders avoid the worst errors and direct them toward better judgments, and "expert judgment alone should be augmented with simple, transparent, timely—even if incomplete—quantitative analysis."[160]

[160] Wayne P. Hughes Jr., "Research & Debate: Prediction," *Naval War College* 73, no. 1 (2020): 135.

2. Improving Measurement of Effectiveness and Strategic and Political Support

When effective data collection and processing leads to better risk analysis and a reduction in errors in judgment by decision-makers, a small country's SOF can maximize its operational freedom of action within its mandated operational and organizational boundaries, broaden its country's strategic culture, and temper political risk aversion. By maximizing freedom of action, SOF can collect more data related to their operational effectiveness. When necessary, they can adapt and improve their effectiveness. The goal is to show compelling data demonstrating SOF's operational effectiveness at the strategic and political levels to receive sufficient support and funding.

B. AIR SUPPORT IS NON-NEGOTIABLE

Air support is a high leverage factor because it can reduce the risk to the force, and it also contributes to the intelligence synergy via the GEOINT provided. Air support can mitigate enemy actions by contributing to ISR, but it can also greatly disrupt or preempt enemy actions. Air support for ground troops, even in a self-defense scenario, provides covering fire and can neutralize enemy artillery or heavy weapons. Thus, in addition to its large contribution to intelligence collection that includes FMV surveillance, air support can be critical for reducing the risk for friendly ground troops.

C. CAREFUL CONSIDERATION FOR SPECIFIC SUPPORT PROVIDED TO A PARTNER NATION

As already demonstrated, full-scale support is the most effective form of remote warfare: training, advising, and assisting support in combination with kinetic air support and Level 3 intelligence support. This broad spectrum of support is operationally effective as evidenced by its contribution to the U.S.-led coalition militarily defeating the IS insurgency in a three-year period. Full-scale support is most effective due to the range and synergy of capabilities deployed that allow not only for a high level of intelligence, knowledge, and understanding of the OE but also a high level of protection provided by dedicated air support. Unfortunately, such comprehensive support is not achievable for

countries with limited resources and risk appetites when they do not operate under a coalition umbrella.

1. Training Support's Limited Impact in Defeating Insurgencies

As this thesis has shown, growing the partner's COIN size is not useful if no other support is provided. Without proper intelligence, the COIN force cannot locate or target the insurgents. The growth of the COIN size is mainly dependent on the training support provided to increase or sustain the force and the force attrition rate.

2. Intelligence Support's High Impact in Defeating Insurgencies

The remote warfare model demonstrates the operational effectiveness of remote warfare in militarily defeating insurgencies. More importantly, it shows the high effectiveness of Intelligence Support and the relative lack of effectiveness of Training Support. When Western countries decide to support a partner nation, they should more carefully consider the type of support they will provide if they want to impact the conflict.

As shown in the key findings, intelligence support to a partner nation's force enhances its ability to find and fix the insurgent force and consequently to reduce its size. However, intelligence support, cannot completely defeat an insurgency on its own[161] A complete counterinsurgent win also involves gaining control of the political environment and addressing the underlying social and political issues that gave birth to the insurgency in the first place.[162]

Although necessary, intelligence support alone is not sufficient to defeat an insurgency. Leites and Wolf noted that the components of intelligence support involve: "(a) collecting, processing, and retrieving information; (b) communicating clearly and regularly with the population; (c) observing behavior and responses accurately and continually; and (d) relating the foregoing components to the allocation and control of

[161] Kress and Szechtman, "Why Defeating Insurgencies Is Hard."

[162] Gordon H. McCormick, "The Complete Win" (RAND-CIA Insurgency Board Quarterly Conference, February 14, 2011).

subsequent programs and action."[163] So, besides the communication (b) and adaptation (d) aspects, there is a need for intelligence gathering and processing (a) and for measuring operational effectiveness (c).

D. RECOMMENDATIONS FOR FUTURE RESEARCH

Multiple areas of future research can complement this thesis. The system dynamics model can be enhanced by including other aspects of remote warfare such as kinetic air support, information operations, and cyber warfare. It would be helpful, for instance, to research the provision of a comprehensive training, advising, and assisting support program augmented by different levels of intelligence support.

[163] Leites and Wolf, *Rebellion and Authority*, 157.

VI. RECOMMENDATIONS FOR SMALLER COUNTRIES' SOF

To ensure and sustain political support and funding in smaller Western countries, SOF needs to improve its measurement of operational effectiveness and minimize its exposure to risk. This requires the collection of, and access to, more data. Conducting an effects-based planning assessment that includes the proper metrics is an effective way to improve MoE. By defining clear and measurable metrics, it is possible to establish a baseline for determining the effectiveness of actions taken to achieve desired effects. A collection plan is crucial for ensuring that the data needed to observe and interpret the MoEs is gathered efficiently. An effects-based planning assessment that includes developing MoEs and a collection plan can help improve decision-making.[164] Thus, to increase its FoA, SOF needs a more complete operational picture, which can only be gained by collecting more data on its own operations. Therefore, to improve SA/SU and the accuracy of risk analysis, SOF needs to increase its intelligence collection sources.

Based on the findings of this research, decision-makers and SOF should recognize that Training Support as a stand-alone option should be avoided in bilateral agreements between a small Western country and a partner nation fighting insurgents. This limited support is not operationally effective because it does not help the partner find and fix the insurgents and it does not significantly diminish the size of the insurgents' forces. Intelligence support as a stand-alone option, while not ideal, would be preferable for small supporting countries with limited resources and a strategic culture that is averse to direct military interventions. In such cases, this approach is more operationally effective because it counterbalances the local partner's information disadvantage by increasing the COIN force find and fix capability, thereby significantly reducing the size of the insurgent Force. In the context of limited resources and budget, smaller Western countries should shift their policy from training to intelligence support, or both. If SOF must prioritize, it should direct its resources and efforts toward Intelligence Support instead of Training Support.

[164] Robinson, Egel, and Brown, *Measuring the Effectiveness of Special Operations*; U.S. Joint Forces Command, *Commander's Handbook for an Effects-Based Approach to Joint Operations*.

While major powers have the luxury to run a multi-source apparatus exclusively within SOF or the intelligence service, the interservice approach is necessary for smaller states to attain the multi-intelligence fusion level. The least expensive way for them to produce multi-int today is undoubtedly by combining three INTs as further explained below.

The study recommends three internal and one external strategic approach to collect more data, and thereby improve situational awareness, risk analysis, and measures of effectiveness to better support partner nations. In the first internal approach, small Western SOF enhance their intelligence capability. The second internal approach proposes that SOF and intelligence operatives work together under an inter-service umbrella. In the third approach, the country opts for a combination of the first two approaches. Finally, the external strategic approach stresses the importance of smaller countries joining efforts in a coalition to build their partner capacity and provide it with a broader spectrum of support options.

A. A LEVEL 2 INTELLIGENCE SUPPORT, MULTI-INT CONCEPT

The most cost-effective way to produce multi-source intelligence is probably by combining three intelligence sources, or INTs: human intelligence (HUMINT); geospatial intelligence (GEOINT), which includes manned and unmanned aircraft imagery and videos; and open-source intelligence (OSINT). This desirable approach can be implemented by combining SOF and intelligence operations. Coupled with an agreement to share intelligence with the supported partner nation, this concept can significantly impact the insurgent conflicts that smaller Western countries could be supporting. To illustrate the utility of this multi-int concept, some details about the different types of INT may be useful.

OSINT has transformed over the last decade. As Lauren Zabierek has observed, the growth in data volume, variety, and velocity has been exponential.[165] The internet has become a sensor. We can easily refer to the internet as multi-int because it provides access

[165] Emily Harding et al., "Sparking a Revolution in Open Source Intelligence [Transcript]," Online Event (Washington, DC: Center for Strategic and International Studies, December 3, 2021), 9, https://www.csis.org/events/sparking-revolution-open-source-intelligence.

to news, commercial satellites that can do imagery analysis, commercial signals, snippets of audio, snippets of video; and even makes judging the veracity of human-derived information possible.[166]

HUMINT provides insight into intent as well as actions. Depending on the HUMINT type (clandestine, covert, and overt) and the information required, HUMINT can take time to develop because of the sources' placement and access to information. Therefore, HUMINT in many cases is less responsive to immediate needs. It remains, however, a unique capability by providing insights into the opponent's thoughts, plans, and intentions. Human sources can sit in leadership or inner circle meetings, report on the latest enemy decisions, future locations, or patterns of life, and provide unrivaled insight into what an opponent wants.

When training, advising, and assisting a partner nation, the line between human intelligence collection and security cooperation is thin due to the trust built between partners. During these operations, SOF can help confirm or deny information collected by other sources or help identify sources that the Intelligence Service could further exploit. Even advanced technical intelligence operations often rely to a certain extent on HUMINT-derived information and cueing in denied areas, where friendly deployed sensor arrays require proximity to the target. Therefore, HUMINT is critical for intelligence and operational synergy.

GEOINT is "information about any object—natural or man-made—that can be observed or referenced to Earth and has national security implications."[167] Geospatial intelligence "consists of imagery, imagery intelligence, and geospatial information."[168] Earth observation, UAV technologies, and AI-enabled surveillance and collection have made incredible progress in the last decade. UAVs may capture long-duration, close-up full motion video (FMV). Activity-based intelligence (ABI) involves gathering intelligence

166 Harding et al., "Sparking a Revolution in Open Source Intelligence [Transcript]."

167 Lowenthal, *Intelligence*, 2023, 112.

168 Robert Hight, "Principles of Joint Operational Intelligence – Session 14: Geospatial Intelligence (GEOINT)" (Lecture, Naval Postgraduate School, Monterey, CA, February 23, 2023).

by observing behaviors that are indicative of a specific activity occurring in an area.[169] This is also referred to as "pattern of life." These observed behaviors can signal the presence of an activity or an imminent threat, that is particularly relevant. ABI can detect unusual behaviors or patterns, such as individuals emplacing Improvised Explosive Devices.[170] While aerial intelligence is the most expensive of the three INTs discussed in this research, its costs have dropped while its capacities have grown.[171] These systems enhance geospatial intelligence collection and often achieve "persistent surveillance."[172]

The combination of these three INTs can give a good sense of an opponent's capabilities and intentions. It is a multi-source concept intended to build and sustain the intelligence edge necessary for SOF and intelligence operations of smaller countries and to better inform political leadership.

B. OBJECTIVES OF THE STRATEGIC APPROACHES

I has been shown in this research that improvements in intelligence collection, fusion, and processing can improve SA, SU, and risk appraisal, and reduce risk to the force. This also contributes to better data related to operational performance and effects. The strategic approaches offered in this Section are intended to address the following objectives:

- Increasing data collection
- Processing, exploiting, analyzing, and producing intel
- Tracking performance, indicators, and effects
- Increasing SA, SU, and force protection

169 Lowenthal, *Intelligence*, 2023, 119.

170 Lowenthal, 119.

171 Jeff Giesea, "Hybrid Intelligence As A Response to Hybrid Warfare? How To Make Intelligence Collection & Verification Cheaper, Faster, and Better Using New Technologies," Small Wars Journal, February 7, 2023, https://smallwarsjournal.com/jrnl/art/hybrid-intelligence-response-hybrid-warfare.

172 Lowenthal, *Intelligence*, 2023, 119.

- Improving the risk analysis process and MoE
- Increasing the ability to help local partners find and fix insurgents

C. INTERNAL STRATEGIC APPROACHES

The collaboration level between SOF and intelligence services varies among nations large and small. The United States and other large allied and partner nations have made great progress in intelligence sharing and collaboration since 9/11.[173] However, the smaller Western countries have not followed this trend. Small countries' SOF might do well to study different strategic approaches to the collection and sharing of intelligence.

Three strategic approaches should be further studied. The first approach would consist of intelligence operatives and SOF supporting each other and pursuing the same objectives. A second approach would be to create SOF's own collection capabilities and coordinate with the intelligence teams deployed. A third approach would be a combination of the first two, ensuring the highest flexibility in terms of ways and means to reach intelligence end states. These approaches might be different in many aspects when looking at a costs and benefits analysis, but they are interconnected when it comes to gaining a better understanding of the operational environment, which should be the primary concern.

As cooperation between SOF and intelligence agencies becomes more common among the major Western powers, other Western countries should follow suit. Countries willing to follow should also advocate for a synchronized oversight that stimulates interagency integration to promote national security interests.

Increased location access, augmented numbers, shared resources, and increased mission success were among the benefits identified by a survey among USSOF and CIA operatives.[174] To ensure their SOF and partner agencies can reap these benefits, smaller

[173] David P. Oakley, *Partners or Competitors? The Evolution of the Department of Defense/Central Intelligence Agency Relationship since Desert Storm and Its Prospects for the Future:* (MacDill AFB, FL: Joint Special Operations University, 2014), https://doi.org/10.21236/ADA616472.

[174] Andrew B. Crowell, Hugo E. Flores-Diaz, and Eric B. Snyder, "Shared History, Shared Missions, Maximized Interoperability: Best Practices for USSOF and the CIA" (master's thesis, Naval Postgraduate School, 2018), https://hdl.handle.net/10945/61272.

countries should focus on three key approaches to decrease collaborative frictions: understanding each other's organizational missions and authorities; improving communication efforts through inter-service training, liaisons, and intelligence sharing; and finally, resolving "mission overlap issues through deconfliction and transparent mission planning efforts."[175]

Opponents might argue that revising legislation or attempting to persuade the political and military leadership at the strategic level of the need for a structural interservice collaboration represents a substantial effort for a minimal return on investment. However, considering criteria such as future operational trends, increased knowledge that improves risk appraisal, and the potential to optimize a state's operational impacts, the return on investment may not be minimal.

One may also argue that SOF in some nations has become proportionally too large to allow for inter- and intra-organizational partnerships or the ability to maintain the necessary secrecy within such partnerships. Looking at the success of interagency and intergovernmental partnerships among major powers is the best response to this: they may have many SOF, but only a few operators and intelligence professionals participate in interagency operations.

The old guard and skeptics may claim that there is no need for such strategic approaches because collaboration will necessarily succeed if the situation or environment compels last-minute cooperation; hence, no structural solution is required. On the contrary, this thesis advocates for strategic structural changes and methods as part of the solution for intelligence collaboration, including a substantial increase in collaborative SOF and intelligence-collecting activities to effectively plan, execute, and assess small-scale military interventions.

If no appetite is found at the senior level to implement such a collaboration, SOF must develop its own capabilities. The willingness to further develop and increase SOF intelligence professionals is critical. SOF needs to invest in the proper collection assets and

[175] Crowell, Flores-Diaz, and Snyder, 51.

the right people to process, exploit, analyze, produce, and disseminate Special Operations intelligence. Building the experience and the right capabilities to create a detailed concept and mechanism of intelligence support for Special Operations should not be underestimated.

There is an urgent need to be filled, regardless of whether the intelligence community and SOF cooperate to fill the gap or SOF creates new capabilities and fills that gap on its own. If none of these paths is taken, the relative loss of information and lack of situational awareness impacts operational outcomes. Avoiding this collaboration will only increase the risk of intelligence gaps that SOF will need to fill on its own, pushed by operational requirements, resulting in unintended mission creep. Except for fear of change, there is no sound argument today for not making this collaboration work.

D. EXTERNAL STRATEGIC APPROACH

As observed in the Remote Warfare simulation, on the one hand, intelligence support is operationally effective. Logically, counterbalancing the COIN disadvantage by providing COIN forces with actionable intelligence helps them better find and fix insurgents for operational effectiveness. On the other, something completely overlooked by the small Western European countries is the lack of effectiveness of the training support provided in helping a partner nation fight against insurgents. Here, it is important to distinguish the Building Partner Capacity (BPC) often applied by smaller Western countries from the BPC used by major powers. For example, the BPC framework applied by the United States is an operational and fiscal authority to help build a partner's capacities across the different joint functions and to implement them by supporting the partner through their Doctrine, Organization, Training, Material, Leadership, Personnel, Facilities, and Policy.[176] Few smaller countries can provide the full capacity employed by the United States, such as persistent Surveillance Drone ISR coverage, which evidently has a significant influence on the COIN coefficient of effectiveness at finishing insurgents. Due

[176] William Burke, "Security Cooperation: Constraints and Opportunities in Operationalizing Resilience and Resistance" (Lecture, Naval Postgraduate School, Monterey, CA, May 1, 2023).

to the relatively limited resources available, smaller countries mainly support Training.[177] By providing their partners only training, Western countries focus on increasing the COIN force size, but little on their coefficient of effectiveness at finishing insurgents, and not at all on their find and fix capability. Most Western countries have bilateral agreements with African countries to support them by providing training to their troops. For example, many Western countries are involved in Niger. Whether their involvement is called capacity building, providing or guaranteeing security, or contributing to military education, it is often training support or some form of it that is provided.[178] Among the European countries contributing to a find and fix capability in Niger are Germany, which is providing surveillance drones, and Denmark, which is providing intelligence units.[179] On top of the EU mission, five EU member states have bilateral agreements with Niger and support the same partner mainly with training., On the other hand, Belgian SOF coordinate the SOF activities of other countries (United States, Canada, Italy, Germany, Belgium) with Nigerien demands.[180] There is not enough unclassified data to argue whether these supporting countries are merely growing the partner COIN size or actually increasing the COIN coefficient of effectiveness at finishing insurgents. Yet, the data shows that while Western countries contribute (albeit in an unbalanced way) to different forms of train and equip missions, there is little intelligence support provided.[181]

[177] Rogers and Goxho, "Light Footprint—Heavy Destabilising Impact in Niger."

[178] Rogers and Goxho.

[179] Rogers and Goxho.

[180] Rogers and Goxho.

[181] Rogers and Goxho, 10.

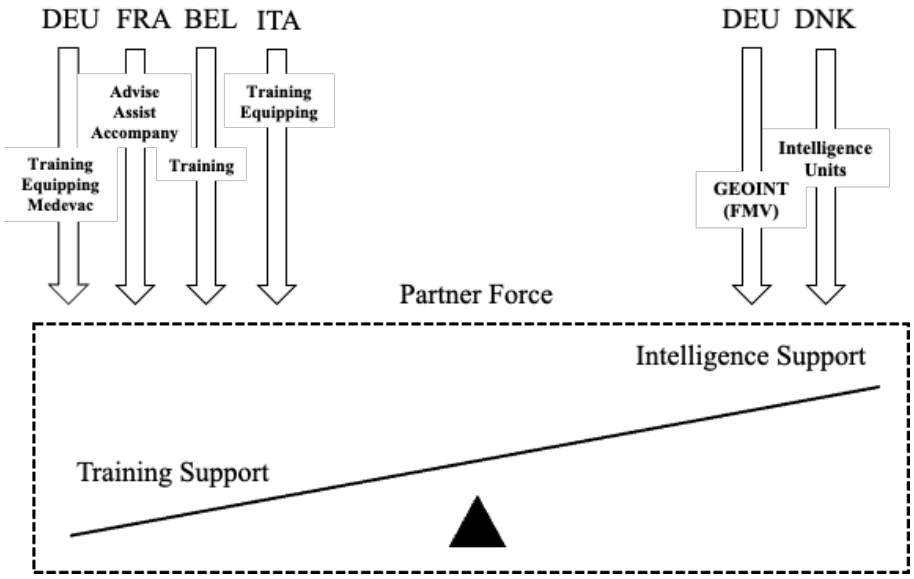

Figure 37. Multiple Bilateral Agreements with a Partner Force and the Disequilibrium between Training Support vs. Intelligence Support

The result of this imbalance is far from achieving something comparable to the U.S.-led coalition in Iraq in terms of the full spectrum of support provided. There are budget and resource constraints that the U.S.-led coalition did not face, but the main question is: are Western nations optimizing their engagement, not only bilaterally, but as a whole (e.g., as EU members)? Instead of each providing a satisficing support that meets their diplomatic/political/economic criteria—all other things being equal, they should combine their efforts under one alliance. This would be a unique coalition offering the full spectrum of support, including training, advising, and assisting, as well as complete intelligence support with OSINT, GEOINT, HUMINT, and SIGINT. A framework similar to the U.S. BPC, with its provision of complete ready-to-deploy capacities, would influence the COIN finish component and the COIN find-and-fix component.

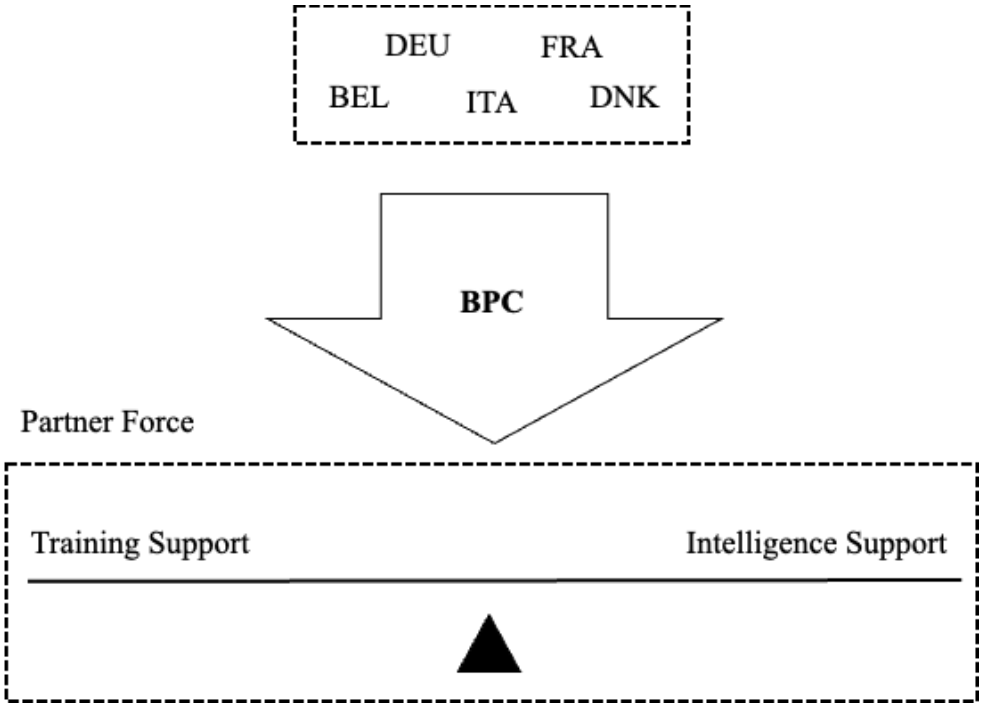

Figure 38. Streamlined BPC under a Coalition and the Equilibrium between Training Support and Intelligence Support

It is recognized here that there would be multiple challenges associated with such a coalition. An obvious challenge would be to align the operational objectives with each coalition member's own security objectives. These alignments are crucial for participation and funding. No challenge is too great to overcome, countries like Belgium and Netherlands operated under a binational Special Operations Task Group (SOTG) in Iraq during Operation Enduring Freedom (OEF). In 2018, Belgium, Netherlands, and Denmark signed a Memorandum of Understanding for the creation of a Composite Special Operations Component Command (C-SOCC) to participate in the NATO Response Force (NRF).[182]

Smaller Western countries desiring to apply the remote warfare model should consider forming coalitions to increase the number of remote warfare capabilities. Most importantly, intelligence synergy can provide supported partner nation Forces with greater

182 "Three Allies Establish Special Forces Command," NATO, June 7, 2018, http://www.nato.int/cps/en/natohq/news_155347.htm.

FoA, improved MoE, increased SA, and improved risk analysis. This streamlined intelligence and operational synergy could help the supported partner nation grow its force size, but also significantly improve its coefficient of effectiveness, and overcome an information disadvantage by finding and fixing the insurgents and reducing their force size and influence.

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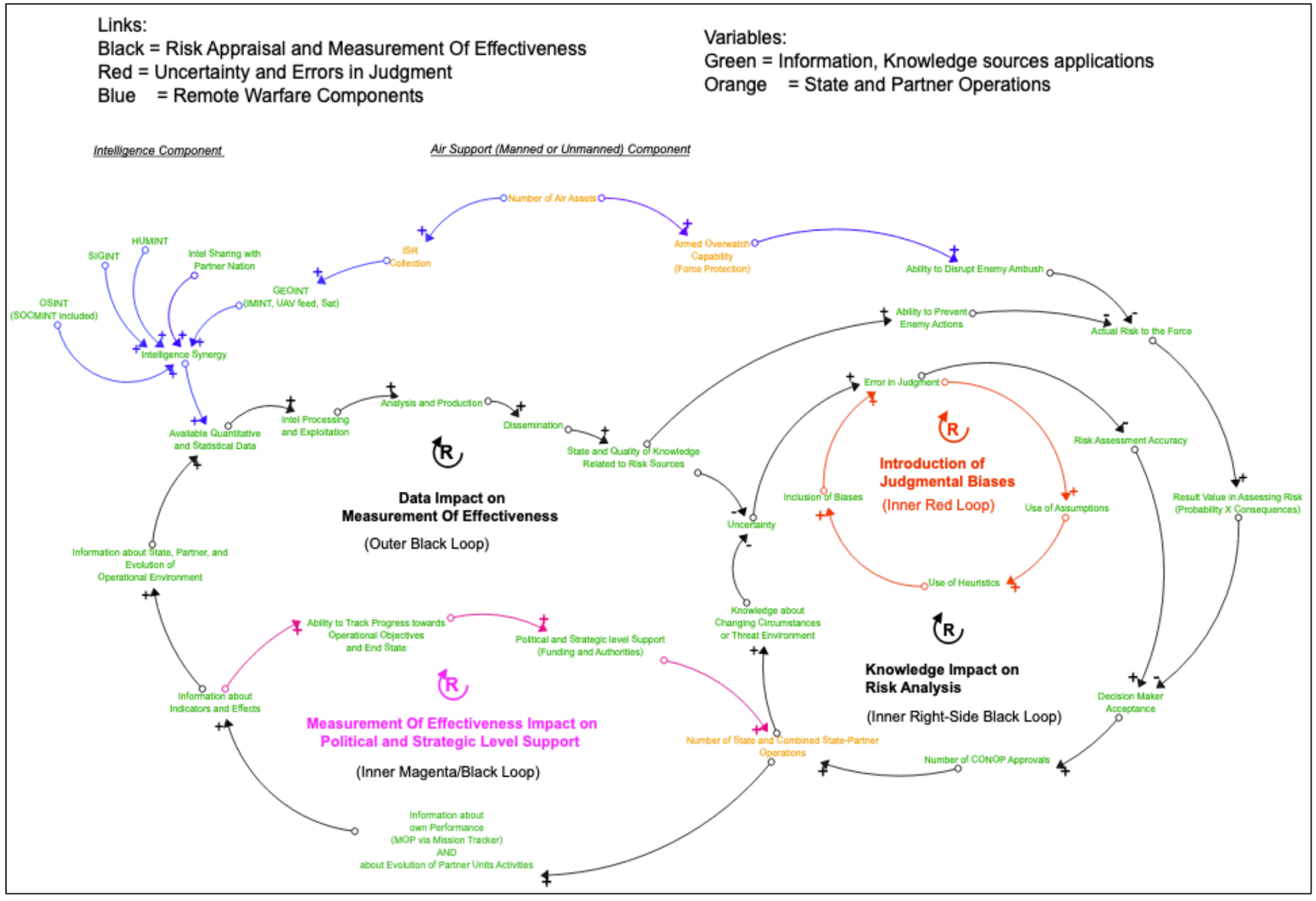
APPENDIX: CLD ON REMOTE WARFARE COMPONENTS' IMPACT ON RISK ANALYSIS AND MOE

Image an enlargment of Figure 8.



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