A GRAY ZONE CHALLENGE: INTENT AND MILITARY RESPONSE

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Abstract

Mapping political, security, societal and economic trends to the decision calculus of key regional and (as applicable) non-state actors has been used to gain insights into the behaviors of actors conducting multiinstrument operations in the "gray zone" between peace and conflict. Timed Influence Net (TIN) models have been used to identify potential sources of strategic risk, and serve as the foundation for a planning framework designed for use by operational planning teams to support operational and engagement planning by Combatant Commands and their components. Computational experiments were performed using the TIN models. The computational experiments focused on gray zone actor perceptions of the decision calculus to counter the effects of gray zone activities.

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1. Introduction

This paper discusses the use of escalation control principles and deterrence theory to reduce risk from gray zone activities. The "Gray Zone" has been notionally defined as an adversary's purposeful use of single or multiple elements of power to achieve security objectives by way of activities that are ambiguous, cloud attribution and exceed the threshold of ordinary peacetime competition yet fall below the level of militarized threats to a state's security interests. These activities threaten targeted entities (states, alliances) by challenging, undermining, or violating international customs, norms, or laws. An alternative definition is that the gray zone is the purposeful application of multiple elements of power—information, economic, military, political—to achieve objectives in ways that exceed the threshold for normal competition yet fall below the level of major interstate war. The purpose of gray zone conflict is to avoid major power war and costly penalties, hinder an effective response by intentionally blurring peacetime and wartime operations, and control escalation.

We have adapted a commonly used deterrence definition to examine the decision calculus of Actor 'X" regarding Action 'Y' under Condition 'Z' leveraging earlier work (Elder et al., 2015). The actors of interest in this definition have been identified, and the condition of interest can be generally described as an environment characterized by the conduct of gray zone activities. It is a commonly accepted assumption that the home country and its partners (the targets of the gray zone actor) would want to deter gray zone activities. In this work, we assume instead that it is important to identify the strategic actions or behaviors (vital interests) that pose a risk to the home country and its partners and then examine how the gray zone activities contribute to the strategic actions or behaviors that need to be deterred. This argues the need to put the gray zone activities in a strategic context, recognizing that the concern for home country and partner decision makers is that the gray zone activities may collectively lead to an undesirable behavior.

A key issue in deterring gray zone operations is identifying the real intent of the gray zone actor. Often, the actor deliberately introduces ambiguity regarding his intent. Ambiguity and intent are discussed in Section 2. One of the ways that has proven effective in the past to understand other actors is through narrative analysis. This study was informed by a framework developed by Cobb et al. (2013). In general, the approach analyzes the other actor's narrative in the context of an action or behavior to be deterred, and then examines the utility of home country and partner actions in terms of how they either reinforce or counter the narrative. Where insights into an actor's doctrine exists, this information can help to put the narrative into context. Examples include the Gerasimov Doctrine (Russia) and publications on China's "Three Warfares."

This approach to deterrence goes beyond just punishment in response to an action. Instead, it adapts the US Department of Defense Deterrence Operations Joint Operating Concept (DO-JOC) to assess the decision calculus surrounding a strategic activity and then considers influence levers to include: impose punishment, deny benefits of action, reduce cost of not taking action, provide benefits for not taking action, and shift action leverage point in favor of inaction (See section 3). It is important to recognize that actions to deter are situation dependent, and that there are situations where it may be in a state (or other actor's) "national" interest for actions to be executed. This is why the cost-benefit analysis of not acting is a critical element of the decision calculus analysis and is a key area where escalation control principles can provide useful insights.

With the actor and environment established, the next step is to define for each specific actor the potential goals or objectives that the home country wants to deter. Planners will then have all components of the deterrence definition (Section 3) and can then focus on identifying the causal influences contributing (or opposing) the conduct of actions or behaviors that would affect these identified vital home country strategic interests. Examples of strategic interest to deter include occupation of partner territory, creation

of humanitarian crises, conflicts that could lead to use of weapons of mass destruction (WMD), or proliferation of technologies that could put WMD in the hands of unstable actors. These strategic interests are not all inclusive, and will vary by international actor.

The next step is to examine those actions from a cause-effect perspective and to identify potential home country responses from an escalation perspective to set the stage for modeling the shaping, engagement, and response activities that should be considered to reduce the risk of the adverse strategic action or behavior occurring. This can be modeled using a Timed Influence Net (Ref) as described in Section 4.

The focal points of this work were (1) the applicability of escalation principles to gray zone actions, (2) the potential utility of non-military instruments of power to counter gray zone activities or increase partner capacity to counter gray zone activity; (3) opportunities to sensitize or counter efforts to desensitize home country and international communities to gray zone activities, (4) potential to reduce ambiguity by contrasting messages and actions to discern objectives, and (5) command and control of non-military elements of power by gray zone actors. While the specific analysis effort was based on gaining an understanding of the decision calculus used by Russia and other relevant international actors relative to actions and behaviors that would be considered adverse by the United States, NATO, and other U.S. partner nations, the description and applicability of the approach is much more general and has been described as such. Finally, conclusions and recommendations are given in Section 5.

2. On Ambiguity and Intent

Ambiguity is defined as the quality of being open to more than one interpretation (Oxford Dictionary) or as a situation or statement that is unclear because it can be understood in more than one way (Cambridge dictionary). In gray zone operations one has to deal with incomplete and often deliberately misleading data at any instant of time. Consequently, ambiguity arises. Ambiguity in the gray zone context means that there can be alternative interpretations regarding what the data represent. It is not a question of uncertainty modeled by probabilities. The explicit consideration of ambiguity helps to nuance some of the gray zone issues.

However, it is intent, not the means that primarily distinguishes gray zone conflicts from other types of conflict. When the general definition of intent is the expression of one's intention or purpose, the military definition is a statement by the commander that succinctly describes what constitutes success for an operation and includes the operation's purpose and the conditions that define the end state. Depending on the intent, one may want the effect of the Gray Zone operations to be observable or the operation to be unobserved/clandestine and not relatable to the effect.

Let us consider two different situations: operations against a financial institution and operations against a government agency. Then the question arises: Why would one target a financial institution or why would one target a government agency? What would the intent be in each case? For the financial institution, one can conjecture that a profit motive would reign high (intent: financial gain); other motives may be to disrupt the markets of the target state, or to undermine a competitor. For the government agency, the intent may be: espionage; terrorism; profit (selling of sensitive the data); bragging rights; or even revenge. Consequently, ambiguity in the intent is one of the more challenging attributes of gray zone operations.

3. Decision Calculus and Escalation Control

3.1 Decision Calculus

In the past, operational planning has focused primarily on developing concepts to defeat a potential adversary militarily. However, such an approach does not always satisfy political requirements. An alternative approach to influence the decision calculus of key regional actors was developed by the US Department of Defense based on the Deterrence Operations Joint Ops Concept (DO-JOC, 2006). The concept which underlies this approach was named the Decision Calculus Construct (Fig. 1).



Adapted from Deterrence Operations Joint Operations Concept (DO-JOC)

Fig. 1: Decision Calculus Construct with Influence Levers

Figure 1 depicts a balance between two activities: Conduct (Adverse) Action and Exercise Restraint (from taking Adverse Action). It is assumed that a home country's Commander's intent is to shift the balance towards Restraint (from Adverse Actions) on the part of all the regional actors who are conducting gray zone operations against the home country or its partners.

The five influence vectors reflect the perceptions of the actor performing the decision calculus. On the Conduct Action side of the balance are two opposing influences — Benefit of Action and Cost of Action. This is the traditional understanding of deterrence which stressed *imposing cost* (in response to an action) and *denying benefit* of action as a means of deterring adverse behaviors. On the Restraint side of the balance are two influences - *cost of restraint* and *benefit of restraint* (not conducting the adverse activity). A potential perceived cost of restraint is that a government will lose power or face domestically, with partners, or with competitors. Potential benefits could come from the international community or regional actors in the form of economic, political, or social advantages derived from the exercise of restraint.

The fifth, and perhaps most overlooked influence vector, is the Regional Actor's perception of the competitor's decision calculus. The Regional Actor's perception can tilt the balance toward Action (such as to gain advantage by acting first), or toward Restraint (when the competitor's likely proactive course of action is less onerous as the likely response course of action).

The DO-JOC posits that an actor must make cost-benefit decisions to either conduct an adverse action or exercise restraint. The central idea is to decisively influence the adversary's decision-making calculus in order to prevent hostile actions against home country vital interests. This is the objective of joint operations designed to achieve deterrence. For purposes of this study, the central idea is to influence actor behaviors to support strategic geopolitical interests of the home country and its partners. The specific behaviors examined during this study were Russian incursions into neighboring countries due to escalation of tensions between those countries' governments and populations sympathetic to Russia, proliferation of weapons of mass destruction to Russian clients, and strategic miscalculation leading to nuclear weapon use.

Understanding how these factors are interrelated is critically important to determining how best to influence the decision-making calculus of adversaries. Success is not solely a function of whether adversaries perceive the costs of a given course of action (COA) as outweighing the benefits. Rather, adversaries weigh the perceived benefits and costs of a given course of action in the context of their perceived consequences of restraint or inaction. For example, deterrence can fail even when adversaries perceive the costs of acting as outweighing the benefits of acting if they believe the costs of inaction are even greater.

Joint military operations and activities traditionally contribute to the objective of deterrence by affecting the adversary's decision calculus elements in three ways: Deny benefits, impose costs, and encourage

restraint. However, military capabilities can also enable other US and partner instruments of power to be more effective. This is called "Unified Action" of which "Whole of Government" operations are a subset. Direct military means include force projection, active and passive defenses, global strike (nuclear, conventional, and non-kinetic), and strategic communication, i.e., the alignment of actions with intended message. This is often confused with communication strategy. Enabling means include global situational awareness, command and control, forward presence, security cooperation and military integration and interoperability, and assessment, metrics, and experimentation. Additionally, military planners can be of great assistance to other parts of government by helping them analyze the mission, develop and assess courses of action, and model effects of actions.

The perceived benefits and costs of a given Course of Action (COA) to either conduct an adverse behavior (relative to another actor's perception) or to exercise restraint have two essential elements that influence adversary decision-making. First, each benefit and cost has some relative value to the adversary, (i.e., how much does he perceive he will gain by reaping a given benefit or how much does he perceive he will lose by incurring a particular cost). Second, each benefit and cost has a relative probability estimate associated with it in the mind of the adversary; i.e., how likely does he believe it is that he will reap a given benefit or incur a particular cost by acting or not acting.

One additional factor profoundly influences an adversary's decision calculus: his risk-taking propensity. An adversary's risk-taking propensity affects the relationship between values and probabilities of benefits and costs when in the process of reaching a decision. Risk-averse adversaries will see very low probability but severe costs as a powerful deterrent, while risk acceptant adversaries will discount costs in their pursuit of significant gains.

Finally, an actor's decision calculus may be influenced by his perception of the other actors' decision calculus and the time he believes is available to reach a decision. It is important to note that perceptions are more important to an actor's decision calculus than the actual facts underlying these perceptions. Therefore, the conceptual model assumes that stability increases when the actors assess that each other's decision calculus will favor restraint over adverse action.

3.2 Escalation Management Principles

Gray Zone Actor escalation indications were developed by applying escalation principles originally developed for use in evaluating strategic deterrence operations. The following seven principles were extracted and adapted from a draft presentation on "Escalation Management Principles" by Pollack and Boyd (2011).

- 1. Select initial attacks with care (Initiation): A gradual transition from crisis to war is more likely to lead to uncontrolled escalation than a clear and distinct transition from crisis to war.
- 2. Exercise restraint, or expect reprisals (Restraint): All else being equal, the availability of greater conventional combat power in theater by one side will reduce the chance that the other side will initiate war.
- 3. Maintain availability of conventional forces (Readiness): All else being equal, the availability of greater combat power by one side will reduce the chance that the other side will initiate war as well as reduce the chance of uncontrolled escalation.
- 4. Select distinct, easily recognized thresholds (Salience): Limitations on warfare that are quantitative (matters of degree) are more likely to lead to uncontrolled escalation than limitations on warfare that are qualitative (either/or).
- 5. Undercut the adversary's resolve (Resolve): An actor is more likely to achieve its goals if its adversary perceives that the actor is more interested in the outcome and perceives itself as facing higher costs of war.

- 6. Consider how actions shape the adversary's expectations (Expectations): Actions that lead to achievement of limited objectives, particularly if more closely related to previous actions are less likely to lead to undesired consequences or uncontrolled escalation.
- 7. Maintain central decision-makers' ability to carry out different COAs (Flexibility): Survivable decision-making and C2 arrangements are less likely to lead to undesired consequences or uncontrolled escalation

4. Technical Approach and Timed Influence Net Modeling

4.1 Technical Approach

To address and analyze gray zone operations and their deterrence, analytical workflows were developed based on the use of Timed Influence Net models. These models characterize the decision calculus of selected gray zone actors and inform combatant commander and component planning efforts to develop strategies for their area(s) of responsibility. The approach is described in Fig. 2.



Fig. 2: Schematic depicting the approach for analyzing gray zone operations

Two challenges were addressed using this approach: (a) the need to understand how actions taken by the military or other elements of national power may affect the behavior of a society that includes an adversary and non-adversarial elements, and (b) the need to be able to capture and document data and knowledge about the cultural landscape of an area of operations that can be used to support the understanding of the key issues, beliefs, and reasoning concepts of the local culture so that individuals that are new to the region can quickly assimilate this knowledge and understanding.

The first challenge relates to capabilities that enable the analysis needed to conduct focused effects based planning and effects based operations. Models to support effects based operations developed to date relate actions to effects on the adversary (Zakem et al., 2015). Such models can be quite effective in informing the comparison of alternative courses of action provided the relationships between potential actions and the effects are well understood. This depends on the ability to model an adversary's intent and his reactions and identifying his vulnerable points of influence. But as the nature of the home country's military operations goes well beyond the traditional major combat operations, there is the need to anticipate the effects of actions not only on the adversary (GZA), but also on the local population which may support or oppose that adversary. Such support may depend in part on the actions taken by the home country.

The second challenge involves the need for new personnel to rapidly assimilate the local knowledge needed to analyze the local situation and to analyze and formulate the effects based plans and operations.

Data about a culture exists in many forms and from many sources including historical reference documents, observations and reports by intelligence analysts, and unclassified (and unverified) sources such as the internet. The data is often incomplete and partially incorrect and includes contradictions and inconsistencies. Analysts, particularly those new to an area of operation who are responsible for formulating courses of action, are hard pressed to quickly develop the necessary understanding of the cultural factors that will affect the behavior of the adversary and the society in which it is embedded.

4.2 Timed Influence Nets

Several modeling techniques are used to relate actions to effects. With respect to effects on physical systems, engineering or physics based models have been developed that can predict the impact of various actions on systems and assess their vulnerabilities. When it comes to the cognitive belief and reasoning domain, engineering models are much less appropriate. The purpose of affecting the physical systems is to convince the leadership of an adversary to change its behavior, that is, to make decisions that it would not otherwise make. However, when an adversary in imbedded within a culture and depends upon elements of that culture for support, the effects of physical actions may influence not only the adversary, but the individuals and organizations within the culture that can choose to support, be neutral, or oppose the adversary and the cultural environment in which the adversary operates. Because of the subjective nature of belief and reasoning, probabilistic modeling techniques such as Bayesian Nets and their influence net cousin have been applied to these types of problems. Models created using these techniques can relate actions to effects through probabilistic cause and effect relationships. Such probabilistic modeling techniques can be used to analyze how the actions affect the decision calculus of the adversary.

Influence Nets (IN) and their Timed Influence Nets (TIN) extension are abstractions of Probabilistic Belief Nets also called Bayesian Networks (BN) (Wagenhals et al., 2000, Wagenhals and Levis, 2001). BNs and TINs use a graph theoretic representation that shows the relationships between random variables. Influence Nets are directed acyclic Graphs where nodes in the graph represent random variables, while the edges between pairs of variables represent causal relationships. A key differences between Bayesian Networks and INs and TINs is that the letter two use CAST Logic (Wagenhals et al., 2001, Haider and Levis, 2005) a variant of Noisy-OR (Haider et al., 2006, Wagenhals and Levis, 2007), as a knowledge acquisition interface for eliciting conditional probability tables. The modeling of the causal relationships in TINs is accomplished by creating a series of cause and effect relationships between some desired effects and the set of actions that might impact their occurrence in the form of an acyclic graph. The actionable events in a TIN are drawn as root nodes (nodes without incoming edges). Generally, desired effects, or objectives the decision maker is interested in, are modeled as leaf nodes (nodes without outgoing edges). In some cases, internal nodes are also effects of interest. Typically, the root nodes are drawn as rectangles while the non-root nodes are drawn as rounded rectangles. Figure 3 shows a partially specified TIN. Nodes B and E represent the actionable events (root nodes) while node C represents the objective node (leaf node). The directed edge with an arrowhead between two nodes shows the parent node promoting the chances of a child node being true, while the roundhead edge shows the parent node inhibiting the chances of a child node being true. In Figure 3, there is a triplet associated with each link. The triplet is defined a (h, g, t). Parameter h is the influence that a parent node will have on the child node, if the parent node is TRUE. Parameter **g** is the influence the parent node will have on the child node if the parent node is FALSE. The third parameter, t, indicates the time delay associated with this link. For instance, event B, in Fig. 3, influences the occurrence of event A after 5 time units.



Fig 3: An Example Timed Influence Net (TIN).

The purpose of building a TIN is to evaluate and compare the performance of alternative courses of actions. The impact of a selected course of action on the desired effects is analyzed with the help of a probability profile. Consider the TIN shown in Fig. 3. Suppose the following input scenario is decided: actions B and E are taken at times 1 and 7, respectively. Because of the propagation delay associated with each arc, the influences of these actions impact event C over a period of time. As a result, the probability of C changes at different time instants. A probability profile draws these probabilities against the corresponding time line. The probability profile of event C is shown in Fig. 4.



Fig 4: Probability Profile for Node C

To construct and use a TIN to support the determination of courses of action to deter gray zone operation by an adversary, the following process has been defined.

- 1. Determine the set of desired and undesired effects expressing each as declarative statement that can be either true or false. For each effect, define one or more observable indicators that the effect has or has not occurred.
- 2. Build an IN that links, through cause and effect relationships, potential actions to the desired and undesired effects. Note that this may require defining additional intermediate effects and their indicators.
- 3. Use the IN to compare different sets of actions in terms of the probability of achieving the desired effects and not causing the undesired effects.
- 4. Transform the IN to a TIN by incorporating temporal information about the time the potential actions will occur and the delays associated with each of the arcs and nodes.
- 5. Use the TIN to experiment with different timings for the actions to identify the "best" COA based on the probability profiles that each candidate generates. Determine the time windows when observation assets may be able to observe key indicators so that assessment of progress can be made during COA execution.
- 6. Create a detailed execution plan to use the resources needed to carry out the COA and collect the information on the indicators.

- 7. Use the indicator data to assess progress toward achieving the desired effects.
- 8. Repeat steps 2 (or in some cases 1) through 7 as new understanding of the situation is obtained.

To analyze the TIN (Step 5), the analyst selects the nodes that represent the effects of interest and generates probability profiles for these nodes. The probability profiles for different courses of action can then be compared.

4.3 An Illustrative Example

One scenario that was of particular interest was a situation where a gray zone actor would shift from competition short of armed conflict to a more aggressive stance where occupation of a competitor's territory came under consideration. The specific scenario was one in which a large percentage of the targeted country's population was of the same ethnicity as the gray zone actor, and a perception existed among the gray zone actor's population that this ethnic minority was not being treated properly by the targeted country. The gray zone actor in the scenario possesses a much more powerful military capability and is significantly larger than the targeted country in economic terms. On the other hand, the target country does enjoy a favorable relationship with the European Union and the US. A Timed Influence Net model (Fig. 5) was developed using the software application Pythia (Levis, 2014) to examine the factors that would be involved in the decision calculus of the gray zone actor, postulate how the gray zone actor might set the conditions for taking military action, and consider opportunities for the country targeted for occupation or its allies to influence the gray zone actor's decision calculus.



Fig. 5: The TIN model for the example scenario

Although there could be many factors involved in the gray zone actor's decision calculus relative to the decision to occupy territory of another country, seven primary factors using the decision calculus framework were identified. These factors are:

- International political opposition;
- Gray zone actor domestic population opposition;
- The ratio of the gray zone actor force to target country force;
- The ability to contain external forces from supporting the target country;
- The impact of the potential economic response to the occupation;
- The gray zone actor's perception of the need to occupy the targeted country to counter threats to national interests; and
- The gray zone actor's perception that the window of opportunity to conduct the invasion was closing.

Numerous variations of unopposed and opposed courses of action were considered, but only two will be highlighted here. In the first course of action (unopposed), the gray zone actor is able to establish a positive balance of power both militarily and politically with very little tangible opposition from the countries allied to the targeted country. By the time the target country's allies realize that adverse action on the part of the gray zone actor is imminent, it is too late to prevent the occupation from taking place. This is depicted graphically in Fig. 6. In the second course of action (opposed), also in Fig. 6, once it becomes clear to the target country and its partners that the gray zone actor perceives the need to counter a threat to its interests from the targeted country, the targeted country and its partners implement a strategy of political, economic, and military actions to influence the gray zone actor's decision calculus to adapt a more acceptable behavior to the international community. The comparison figure illustrates the difference in the invasion decision calculus when the gray zone actor's actions are unopposed versus a course of action where the gray zone actor's actions are opposed by the target country's partners.



Fig. 6: Probability of Gray Zone Actor achieving the occupation goal when opposed and when not opposed by target country's allies

Figures 7 and 8 depict the probability profiles of the unopposed and opposed course of actions in more detail and illustrate the impact of the primary factors on the decision calculus of the gray zone actor.



Fig. 7: Unopposed Occupation

Fig. 8: Opposed Occupation

4.4 The Deterrence Workflow

Since the purpose of this work is to arm planners with a framework they can use for planning home country and partner activities to deter actions or behaviors adverse to home country interests, the overall approach for assessing potential home country and partner actions relative to competitors from an escalation perspective is shown in Fig. 9. This approach serves as a tool to provide insights into the freedom of maneuver available to each actor, and identify capabilities a home country needs to counter its own gray zone challenges capability gaps.



Fig. 9: Operationalizing Deterrence Workflow

6. Conclusions

While the original focus was on gray zone activities, it was useful to address the gray zone activities of all actors that are involved competition short of armed conflict or possible precursors for military action. For this reason, it was useful to reduce ambiguity by assessing the actions and messages of the gray zone actor in the context of the competing interests between the gray zone actor and the gray zone target country and its partners. Assessing the gray zone activities in the context of strategic competition provided insights into the objectives of the gray zone actor relative to the target country.

Applying escalation principles to gray zone actions provided insights into the gray zone actor's strategy to influence the potential response from the gray zone target's partners. For example, escalating the competition slowly leads over time to a shift in the baseline of activities the gray zone partners accept as "normal" competition. This is an application of the initiation and salience principles. Analysis from experiments conducted using the Timed Influence Net models suggests that a gray zone actor can position itself to achieve its objectives with little opposition through application of the escalation principles of readiness and resolve.

Although the decision calculus framework did not seem effective as a means to counter individual gray zone activities, largely because it is difficult to deter a behavior that is considered normal competition, it can be an effective means to counter the ultimate objective that the gray zone activity is intended to support. We found the decision calculus framework to be useful operationally as a means to examine opportunities to restore or maintain stability in the face of gray zone actor activity which could lead to detrimental outcomes from the perspective of the home country.

The decision calculus framework can also be used to counter efforts to desensitize home country and international communities to the gray zone activities. A home country wants the gray zone actor to perceive that the home country and partners will understand the intended effect of a gray zone action when that effect is adverse to its interests. They also want the gray zone actor to expect them to respond to the gray zone activities either by denying the benefits of the action or imposing an unacceptable cost. On the other hand, a gray zone actor perceives that the home country is most likely to avoid escalating the situation and pursue a "least cost" solution both economically and politically, particularly if the gray zone actor is successful in maintaining ambiguity regarding the intended effects of the actions. The decision calculus framework can be used to (1) understand the gray zone actor's efforts to limit the host nation's response flexibility; (2) develop host nation strategies to limit the gray zone actor's options, (3) promote the benefits of deescalation, and (4) identify other influence levers such as relevant costs the host nation can impose.

Finally, gray zone actors must often find means to influence the actions of non-military elements of power that are not under their direct control. This requires the ability to control the information that its citizens and partners receive. Since many gray zone actor governments control the media and access to social media, gray zone activity command and control can be difficult for a gray zone target country or its partners to counter. For this reason, a host nation will likely find it more effective to counter the gray zone actor's objectives and overall strategy rather than attempt to counter individual activities. In this way, traditional counter command and control strategies can be exercised.

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