Dutch crew chief with 322nd Squadron (left) looks over flight records with U.S. Air Force Exchange Pilot at Leeuwarden Air Base, Netherlands, during NATO air forces' Frisian Flag training exercise, March 27, 2017 (U.S. Air Force/Brian Ferguson)

Geographic Component Network Analysis

A Methodology for Deliberately Targeting a Hybrid Adversary

By Chance A. Smith and Steve W. Rust

Captain Chance A. Smith, USAF, is the Chief of Intelligence Strategy in the 612th Combined Air Operations Center at Davis-Monthan Air Force Base, Arizona. Steve W. Rust, Department of the Air Force, is a Targeting Analyst in the 36th Intelligence Squadron at Langley Air Force Base, Virginia.

In late September 2014, nearly 3 months to the day after the so-called Islamic State (IS) declared the establishment of its caliphate, President Barack Obama noted that IS represented a hybrid threat, calling the group "a terror network with territorial ambitions and some of the strategy and tactics of an army."[1] Since then, copious pages of academic publications have been devoted to analyses of the group's organizational structure, ideological appeal, centers of gravity, and holistic strategies to counter its rapid progress in securing and governing vast swaths of territory in Iraq and Syria. Curiously, this discussion has included little regarding the proper method to

systematically analyze and deliberately target IS entities at the operational and tactical levels of war.

Targeting, a fundamental task of the joint fires function, is best conducted through the use of systematic analysis to determine logical networks of targets that are of high value to the adversary commander.[2] A well-developed targeting strategy is a vital component of any successful military campaign. Unfortunately, the hybrid blend of quasi-state and insurgent group that defines IS, coupled with a perceived demand from senior political and military leaders for more targetable entities, has fostered an accelerated, "dyliberate" targeting process in Operation *Inherent Resolve* (OIR) and resulted in a lack of systematic analysis focused on adversary centers of gravity. The term *dyliberate targeting* refers to a hybrid of the deliberate targeting cycle and dynamic targeting operations. This current process promotes the submission of single facility targets with reporting of IS activity, resulting in scattered, nonsequential kinetic strikes on whichever targets are approved to the joint target list. This type of strategy precludes the development or employment of measures of effectiveness (MOEs), vital indicators of a military's progress in having an intended effect against an adversary.[3] Additionally, this whack-a-mole approach to target development and approval results in strikes that occur often before adversary networks or their significance are fully understood, resulting in their incomplete disruption and allowing the adversary to reconstitute its undisturbed capabilities in short order and within close geographic proximity to previous strikes.

Hybrid warfare is not a new occurrence in military history. However, each hybrid threat exhibits itself uniquely. As such, we must seek novel ways to systematically analyze and target the various hybrid adversaries we face on the battlefield. In the case of IS, implementation and structured application of an analytic methodology focused on defining the group's component systems within a geographically bounded area will prove instrumental in the development and employment of a targeting strategy

that more fully characterizes the adversary's military networks, degrades their operational centers of gravity, and aids in achieving the joint force commander's objectives in a more efficient, doctrinally sound manner. This method, which we refer to as *geographic component network analysis* (GCNA), incorporates the structure and terminology of both the target system analysis (TSA) and counterterrorism analytic framework (CTAF) models, but narrows the scope of analysis to a more manageable and meaningful defined geographic area. This in turn shrinks the timeline necessary to develop an operationally relevant analytic understanding of the adversary from months (typically associated with a traditional TSA) to weeks. Furthermore, it incorporates an inductive analytical approach that is more conducive to understanding an adaptive, cell-like adversary than traditional deductive approaches.

Challenges and Necessity of Hybrid Network Analysis

Early airpower advocate and Italian general Giulio Douhet noted in 1921 that "the choice of enemy targets . . . is the most delicate operation of aerial warfare."[4] Starting in World War I, military planners and strategists began developing and employing methodologies to target adversary centers of gravity to achieve strategic, operational, and tactical objectives. These methodologies were contingent upon in-depth preconflict planning efforts designed to formulate an understanding of a state adversary's capabilities and vulnerabilities and were employed with varying levels of success throughout the Gulf War.[5]

A post-9/11 paradigm shift in targeting strategy was ushered in with U.S. involvement in counterinsurgency campaigns in Afghanistan and Iraq. The deliberate targeting methodologies used in previous conflicts lacked utility against the nonstate, asymmetric threats posed by the Taliban and al Qaeda in Iraq, among others. The success of efforts to target these adversaries was largely contingent upon a time-constrained, tightly managed dynamic targeting cycle aimed

at eliminating targets as soon as they were discovered on the battlefield. The dynamic targeting cycle perfected during these conflicts allowed for pinpoint lethal strikes to occur in a rapid manner against time-sensitive targets. Strikes occurred daily, all across the area of operations and in high numbers.

Though this type of targeting strategy would ultimately prove effective in aiding efforts to disrupt insurgent networks, it had a secondary effect of conditioning military leaders to think of targeting as a process that occurred in a matter of hours or days instead of weeks or months. It created an unrealistic expectation of the number of targets necessary to degrade an adversary under a more traditional, deliberate targeting approach. Even so, a distinction existed between the deliberate and dynamic targeting cycles and which cycle should predominantly be used to counter both the state and the nonstate actor, respectively. The hybrid nature of IS as a vast insurgent group with state-like qualities has blurred this distinction and, in the process, confounded attempts to analyze, understand, and target the group in a systematic fashion.

The flexible and adaptive structure of IS, which allows it to rapidly toggle efforts among offensive, defensive, and sustainment operations in geographically defined areas it controls or seeks to control, is a distinct hybrid characteristic of the group.[6] An ability to create a governance component to enforce order and maximize influence in IS territory is both representative of the group's adaptability and also a clear sign that IS is something more than a textbook insurgency.[7] It is precisely this hybrid characteristic— "the combined ability to wage war and build state capacity"[8]—that enables the core strength of IS and distinguishes it from many other insurgent organizations. Ultimately, any effective targeting strategy designed to counter IS must be informed by an understanding of how it fits the profile of a hybrid threat, and the framework used to analyze the adversary must account for both its state and nonstate characteristics.[9]

Current targeting doctrine provides two primary analytic frameworks for

performing systematic analysis of an adversary: TSA and CTAF.[10] Unfortunately, neither of these frameworks is designed for exclusive use against a hybrid adversary. The CTAF model is informative inasmuch as the nine target systems it provides are all applicable to understanding the flexible, adaptive networks IS presents at the operational level in the towns it occupies and exerts governance over. It is important to note, however, that there is no consensus on the target systems that the CTAF model identifies for nonstate actors. Additionally, it fails to provide a clear scope for the geographic area it should be applied to, which is an important consideration for a hybrid adversary capable of governing numerous cities with unique command structures and operational footprints in each area of control.

Likewise, the more traditional TSA framework is too broad in its scope to be particularly informative at the operational level of warfare against an adaptive hybrid adversary. Admittedly, TSA has proved successful in the counter-IS campaign as a method of systematically analyzing and targeting the group's oil infrastructure, resulting in huge losses in its annual revenue.[11] The efficacy of TSA in this example stemmed from its application against a closed system aligned along function instead of geography. IS oil operations maintain a consistent structure across the group's area of control. Additionally, it is nearly impossible to present an adaptive, flexible posture in one's petroleum industry; bulky, cumbersome oil machinery cannot be quickly shuttled from location to location in the same way that small arms or improvised explosive device components can. Thus, intelligence analysts and targeteers were able to perform deliberate analysis against a fixed system without time constraint to select the highest value oil targets and eliminate them accordingly.

As seen in the example above, traditional TSA can be extremely effective in degrading the traditional target systems under a hybrid enemy's control with the aid of deductive analysis. However, this methodology lacks broad applicability against the majority of open, adaptive networks that IS employs in the major strongholds it occupies across Iraq and Syria. TSA, reliant upon deductive analysis to reach its conclusions, requires a predetermined understanding of the adversary's military framework. The adaptive modus operandi of IS largely negates the utility of this analytic framework. Its command structures are established yet flexible. Governance, revenue, and weapons facilities are often established in former civilian or government facilities in an unpredictable manner to benefit from their protected status. Most important, the component systems these facilities comprise vary in their configuration among IS strongholds. Performing a traditional TSA of the IS command, control, communications, computers, and intelligence system will aid a planner's strategic understanding of the adversary but will likely have limited utility in understanding criticality or vulnerability of individual targets in a specific town or province under the group's control. Similarly, understanding how IS operates at a city level generally will prove inadequate, since the adversary presents a different footprint in each area it occupies. Instead, separate analyses should be focused on each major stronghold IS possesses, with the intent being to understand the critical capabilities, requirements, and vulnerabilities of the predominant component systems that exist in each geographic area. It is precisely this understanding that GCNA seeks to enable.

GCNA: The Process

As with the joint targeting cycle as a whole, the process of GCNA hinges on understanding the commander's objectives for a given operation. It is critical that these objectives are clearly defined and understood by the components developing GCNA and performing intermediate target development. Joint Publication 3-60, *Joint Targeting*, makes it clear that "objectives are the basis for developing the desired effects and scope of target development."[12] After these objectives have been conveyed, the intelligence analysts and targeteers who will conduct deliberate analysis need to begin a robust dialogue with authorities at the intelligence, operations, and strategy divisions (at a minimum) within their respective component or at the joint force to ensure a tight synchronization between the directorates and promote unity of effort. Additionally, an output of this discussion should be a clear understanding on the part of the targeteer on which geographic areas and component systems to focus targeting efforts.

As the name implies, defining the bounds of the geographic area in which to analyze the adversary is a critical step in conducting GCNA. In our experience, focusing one's analytic efforts at the city level has been most effective against the Islamic State. In the case of analyzing IS, individual GCNA efforts focused on al Qaim, Rutba, al Ubaidi, al Shirqat, and Baa'j all yielded some measure of success in being able to discern distinct adversary networks. Widening the scope and focusing on Anbar or Ninewah provinces instead would likely not have yielded the same degree of analytical insight due to the different operational footprints of the adversary within each city.

Once the geographic bounds of analysis have been determined, formulating an understanding of the adversary and the battlespace they occupy should then follow. GCNA analysts should scour available intelligence products, including dynamic threat assessments, joint intelligence preparation of the operating environment, and any available TSA. GCNA, with its focus on breaking down an adversary into discrete geographic component systems, must still be informed by a strategic understanding of the adversary and its target systems across the entire area of operations. It is vital when delivering a network of targets to senior planners, intelligence directors, and validation authorities that the significance of a given geographic component system can be understood in the strategic context of the adversary's military operations. Civilian, historic, and geographic context is also vital at this stage. Understanding the preexisting civilian infrastructure in an area and its historical, cultural, or religious value are all factors in understanding how the

Airman assigned to 72nd Expeditionary Air Support Operations Squadron, deployed in support of Combined Joint Task Force–Operation *Inherent Resolve*, scans for Islamic State fighting positions near Al Tarab, Iraq, March 17, 2017 (U.S. Army/Jason Hull)

adversary is likely to utilize the geography and how certain areas provide strategic value. For the targeteer developing entities to the intermediate level, the value of such analysis is inestimable.

A thorough survey of the current intelligence pertaining to the adversary in the chosen geographic focus should occur once the GCNA analyst has attained a strategic understanding of the adversary. This is a time-consuming step in the process of deliberate analysis, but it is necessary due to the dynamic nature of the adversary. Fortunately, advances in the assimilation and tagging of intelligence reporting in databases available to the military intelligence analyst have increased both the speed of data retrieval and the discoverability of available intelligence reporting. Additionally, the ability to visualize reporting through an array of geospatial and temporal tools provides analysts with near-instant geographic and chronological context of adversary

activity. The scalable geographic scope of GCNA makes it well suited for use with the activity-based intelligence tradecraft alluded to above. By focusing on discrete geographic areas and defined component systems, analysts are able to filter the data related to their particular analytic inquiry down to a more understandable level. This all-source intelligence deep dive will provide context on how the adversary organizes itself and operates within the given focus area. Perhaps most importantly, a review of available current intelligence will allow analysts to identify gaps, thus enabling the refinement of priority intelligence requirements and submission of collection requirements to more fully understand adversary networks.

As the relation between individual targets becomes clearer and the network is more fully discerned, the analyst can begin to craft network description remarks that will allow for an

understanding of the broader component system. It is the underlying analysis and not the format of these remarks that is important, since the intent is to inform target validation authorities of the significance of the network and the individual targets that it comprises. Once a network becomes clear and has been characterized and summarized, targetable entities with associated reporting of adversary activity should begin to emerge. In this sense, the process begins to resemble the dynamic targeting process; an analyst discovers what he or she believes to be an adversary point of interest, seeks out additional intelligence to more fully characterize the target, and submits the target to the joint force for validation as a lawful military target. But because the entity can be tied to other entities as part of a larger network due to the GCNA process, the analyst can now effectively assess its significance to the adversary and anticipate how its neutralization will

RQ-4 Global Hawk descends during landing after completing sortie in support of Operation *Inherent Resolve* at undisclosed location in Southwest Asia, February 20, 2017 (U.S. Air Force/Tyler Woodward)

affect the system as a whole. It is this trait that aligns GCNA with the deliberate targeting process and is the type of analysis that lies at the heart of deliberate target development. Ultimately, target development nominations for all entities related to the identified component system in the given geographic area, along with the analysis related to the characterization of the larger network, can be packaged together and delivered to the target validation authority.

The format in which this analysis is delivered is largely irrelevant; various components and joint forces will have differing requirements for how network and entity characterizations should be conveyed. What is important, however, is that there now exists a body of analysis characterizing a network and its associated entities that conveys the function and significance of the network and that the process to attain said results is scalable

and repeatable in future iterations. Furthermore, the analytic baseline of adversary capabilities established through this process will enable both the creation and validation of MOEs, which in turn will contribute to more effective overall campaign assessment.

Strengths and Operational Considerations

There are five primary benefits that can be gained from applying GCNA against a hybrid adversary with an operational objective of gaining and defending territory.

Focuses on the Adversary's Operational Objective of Controlling Territory. Targeting an adversary's center of gravity will always be a daunting proposition. To effectively do so, we should seek to first understand our enemy's objectives and then formulate our analytic methodology and targeting strategy

in a manner to most effectively define and disrupt their capability to achieve it. In the case of IS, the actions and public declarations of key leaders make it clear that the group's strategic objective is the establishment of a vast "Islamic" caliphate. This objective is a central tenet of the group's ideology, a philosophy that can only be actualized by securing territory. At the operational level, IS must be able to expand the caliphate through the seizure and governance of territory to further its strategic objective and ensure the continued legitimacy of the caliphate. Stated concisely, its operational objective is to gain and control territory. IS fighters, then, represent the group's operational center of gravity insofar as they enable the acquisition and continued control of territory; the security and governance functions these personnel provide in geographically defined areas of control are a critical requirement for the

group to meet its operational objectives. This assertion is supported by the work of Daniel Smith, Kelley Jeter, and Odin Westgaard, who also cited the group's ability to control territory and people as "the decisive operational objective that defines the caliphate."[13] The cycle of expansion and defense of the caliphate are critical to its legitimacy. As Jessica Lewis points out, IS "must be able to defend the territory within the Islamic Caliphate, like a modern state, or it is vulnerable to counter-argumentation that its control is insufficient to support its political aims."[14] Again we see the importance of analyzing the most prominent component systems in the various geographic strongholds IS occupies to determine the best way to deny its ability to achieve the operational objective of gaining and maintaining control of territory.

Aids in Satisfying the Competing Demands for More and Better Targets. It is our position that a decade-plus of consistent dynamic targeting operations in the *Enduring Freedom* and *Iraqi Freedom* campaigns have created an unrealistic expectation in the minds of senior political and military leaders regarding both the speed at which a deliberate targeting cycle should occur and the number of targets necessary to have a decisive effect on the adversary. All too often, the question asked in any one of the innumerable counter-IS targeting synchronization meetings is, "How many targets will we have in [insert IS-controlled area] by [insert date]?" instead of, "What is the critical capability we are trying to degrade in this operation?" or "What effect do we intend to have on the adversary's warfighting capabilities?" This idea is encapsulated in a statement from Lieutenant General Robert Otto, USAF (Ret.), who served as the director of Air Force Intelligence during a portion of the U.S. involvement in OIR. Commenting on the coalition's ability to target IS, General Otto gave the effort a grade of 5 out of 10, claiming that the problem did not lie in "not having enough fighter jets to drop bombs," but instead could be traced to not "having enough legitimate targets to strike that can put [IS] on their heels."[15] This desire for more

targets almost certainly stems from the operational directive of coalition military leadership to conduct persistent strikes against IS targets across the area of operations. As an OIR spokesman noted in January 2016, the intent of the coalition is to "keep pressure on [IS] all the time, everywhere."
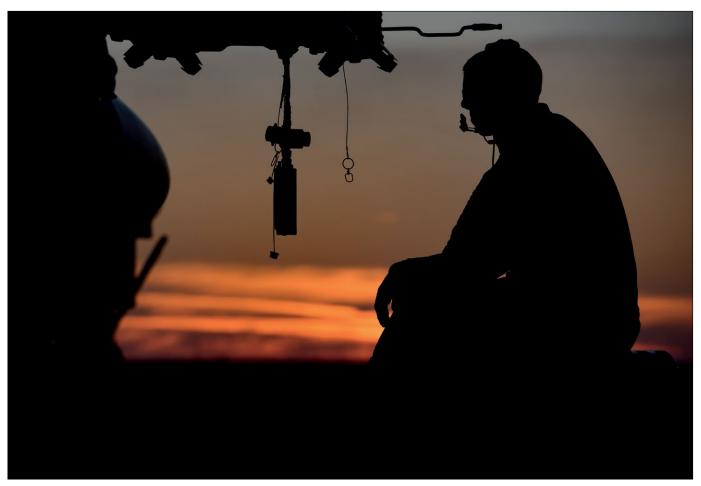
This strategy of persistent strikes almost certainly "forces [the enemy] to have to make very difficult decisions" about where to direct efforts. Viewed this way, it is an understandable strategy to keep the enemy in a perpetual state of adaptation and incapable of planning for sophisticated conventional attacks. Additionally, it is an executable strategy in the permissive environment in which our coalition air assets operate that does not require exquisite mission planning to fly sorties. However, it must be acknowledged that consistent strikes on single IS targets complicate the ability of coalition intelligence analysts to perform systematic analysis and form a holistic picture of the adversary's structure and capabilities, since a strike on a single target will invariably affect the system as a whole. We refer to this process of affecting targets in this piecemeal fashion versus developing targets as systems or networks and striking them in close succession as *dyliberate targeting*, since it utilizes the process of the deliberate targeting cycle to approve and engage single targets in a manner much more consistent with dynamic targeting operations.

The consistent demand for more targets is not likely to ebb any time soon. Therefore, any analytic model to understand the networks of an adaptive hybrid adversary must be able to satiate the desire for more targets while also providing the necessary level of analysis to determine the most lucrative targets. In essence, any model must provide both a high quantity and high quality of targets. GCNA satisfies both these demands.

Decreases the Time Necessary to Form a Coherent Understanding of Adversary Networks. Timelines to generate a typical target system analysis product generally range from 8 to 12 months. By scoping the focus down to the component system level in a distinct geographic area, GCNA

limits the land mass and corresponding nodal linkages an analyst must examine. Consequently, the time necessary to gain a comprehensive understanding of the adversary in that area shrinks. Timelines to conduct GCNA ranged between 2 weeks and 1 month when conducted by the Langley Target Development Cell, an organization developing targeting nomination on behalf of the air component in support of Combined Joint Task Force– OIR. To cite a specific example, GCNA conducted on an IS-controlled town in western Iraq in the summer of 2016 took just under 1 month. During that time, analysts were able to uncover a linked network of 11 targetable entities, articulate the military capability the network provided to the adversary, and prepare the individual target nominations for validation and approval. This experience illustrates that a shorter timeline ensures the analytic process is more adaptable to the hybrid nature of the adversary and is more conducive to producing targets at the pace of the dyliberate targeting process. GCNA integrates timeliness of analysis and depth of content to generate a methodology that is content-focused with punctuality in mind. Consequently, it incorporates many of the benefits from both time-dominant fusion and content-dominant analysis in an effort to rapidly meet "the need for the deep content required to help generate a rich contextual understanding of the environment."[16]

Enables the Assembly of Intelligence Data into a Useful Intelligence Product for Targeteers. Specifically, when intelligence data are gathered through structured observation management and activity-based intelligence processes, targeteers benefit. The Department of Defense has recently made huge strides in its ability to provide services that enable the visualization of big data to the operational warfighter.[17] There is a vast amount of intelligence data, spanning the spectrum of intelligence disciplines, that pertain to IS. Data without any analytic rigor applied, however, remain just that— data. GCNA offers a scalable framework to incorporate the massive amount of data available to today's Intelligence Community at a level that is much more

Airman with 407th Expeditionary Maintenance Squadron tests functionality of weapons rack releasing system of F-16 Fighting Falcon in support of Operation *Inherent Resolve*, February 4, 2017 (U.S. Air Force/Benjamin Wilson)

manageable to a small team of intelligence analysts or targeteers.

Aids in Maximizing Coalition ISR Capabilities. The platforms and personnel used to collect, process, exploit, and disseminate intelligence data used by joint and coalition forces are not infinite. Like any finite resource, great care should be taken in determining how to utilize precious intelligence, surveillance, and reconnaissance (ISR) collection and processing, exploitation, and dissemination capabilities. There is simply not enough capacity to devote ISR resources to every point with reporting of adversary activity, nor would it be advisable to do so. This peanut butter–spread approach to ISR allocation will only yield an incomplete understanding of all entities we collect on and perpetuate the ongoing struggle to secure overtaxed assets. A prioritized collection strategy and systematic analysis of the adversary are necessary to

determine which targets possess the most significance and therefore require further deliberate development and consistent ISR coverage.

There are also two operational considerations that leaders and analysts must keep in mind when employing GCNA.

Requires Patience. Even though the time commitment associated with conducting GCNA is significantly less than that of performing traditional TSA, time and deliberate analysis are both still required. Leaders must be cognizant of this planning factor and afford their personnel the tactical patience to act accordingly, while intelligence analysts and targeteers must resist the pressure to submit target development nominations that result from hurried or incomplete analysis.

Necessitates Close Coordination Between Strategy, Plans, Intelligence, and Operations Elements. This applies to all deliberate targeting processes, not

simply effective employment of GCNA. Military strategists and planners must ensure they are providing intelligence and operations personnel with adequate time and proper signaling to conduct deliberate analysis and target development. Similarly, intelligence analysts and targeteers must ensure their efforts are consistent with guidance and satisfy the commander's objectives. Finally, operators must affect the entities identified by targeteers in a deliberate manner that is synchronized with the operations of a ground force capable of seizing IS-controlled areas after its defenses have been weakened through the deliberate targeting process.

Conclusion

Coming on the heels of over a decade of mostly dynamic targeting operations, the counter-IS campaign has enabled the U.S. military to reacquaint

itself with a more traditional deliberate targeting cycle. Viewed this way, one could be tempted to view IS as a mere *transitory* adversary, bridging the gap between conflicts dominated by dynamic and deliberate targeting operations and allowing the U.S. warfighter to again become well versed in the lexicon and processes of deliberate target development in preparation for a potential conflict versus a peer or near-peer competitor. While this latter scenario would certainly be the most dangerous course of action for U.S. military operations, a more likely scenario is that America's military will face a hybrid, IS-like adversary again before engaging in conflict with a more sophisticated conventional military force. Consequently, intelligence analysts, strategists, and operations planners must develop cognizance of the characteristics of hybrid adversaries if they are to prove effective in developing targeting strategies to defeat them.

As the nature of the adversaries the U.S. military engages on the battlefield changes, so must our thinking on how to systematically analyze and degrade their centers of gravity. Admittedly, there is nothing revolutionary described in the concepts discussed above. Our aim is merely to adhere to a doctrinally sound targeting framework while slightly modifying the scope and application of traditional target system analysis in a manner that is more conducive to understanding and targeting a hybrid adversary. GCNA enables more rapid analysis of a hybrid enemy in a focused, systematic manner to degrade the adversary's capability to effectively govern and project combat power from defined territorial strongholds. The ultimate strength of the GCNA model is its simultaneous appeal to the idealist's need for a strategy grounded in doctrine and the realist's desire to satisfy leadership's desire for more targets. The small scope of GCNA is a pragmatic solution intended to satisfy these competing demands. Far from theoretical, this tested model greatly shrinks the timeline typically attributed to traditional target system analysis from a period of months to weeks, enabling the rapid generation of targetable entities for submission into the joint targeting process. **JFQ**

Notes

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