



Army M109A6 Paladin howitzer with Ellenwood-based Charlie Battery, 1<sup>st</sup> Battalion, 214<sup>th</sup> Field Artillery, 648<sup>th</sup> Maneuver Enhancement Brigade, Georgia Army National Guard, observes fired artillery rounds during African Lion 2021, at Tan Tan Training Area, Morocco, June 13, 2021 (U.S. Army National Guard/R.J. Lannom, Jr.)

# Specialized Analytic and Targeting Study

## A Methodology and Approach for Conducting Faster Full-Spectrum Targeting

By Curtis E. Pinnix, Jr.

Today, levels of autonomy and cognitive weapons employment are limited more by policy than by capability.<sup>1</sup> Joint Publication

(JP) 3-60, *Joint Targeting*, prescribes targeting processes and activities; however, major gaps exist between doctrine and operational application.<sup>2</sup> JP

3-60 provides broad guidance on targeting but fails to connect its effects-based approach to the true rhythm of operations. Doctrine in fighting coalition war is sufficient, but comprehensive doctrine in preparing for war lacks focus.<sup>3</sup> In time- and resource-constrained environments, flexible and

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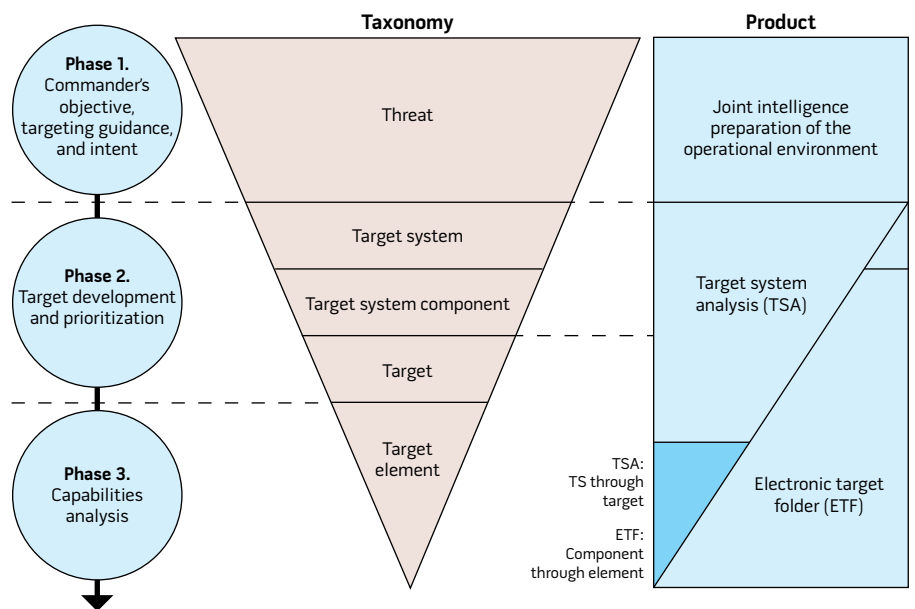
even ad hoc approaches are used to examine the target environment and achieve desired objectives. It is analogous to how consumers would rather critical information be delivered in a brief and concise format than sparsely distributed throughout a cumbersome product. The targeting model needs to evolve, and as such the integration of intelligence that feeds that model must likewise evolve.<sup>4</sup> Establishing and moving to a more agile kill-chain affords the warfighter and war planner an adaptable model that solves challenges inherent in broad spectrum, cross-domain operations.

### Background

Targeting is the fundamental task of analyzing and prioritizing foci and assigning the appropriate response to achieve desired effects.<sup>5</sup> Additionally, targeting links intelligence, plans, and operations across all levels of command and phases of operations.<sup>6</sup> In any campaign, a clearly defined and well-developed strategy is essential to synchronizing activities aimed at meeting the joint force commander's intent. The Joint Targeting Cycle discusses Target Systems Analysis (TSA) and the Counter-Terrorism Analytic Framework (CTAF) as doctrinal methodologies for systematically analyzing adversary elements. Unfortunately, neither methodology is designed to examine all target types (for example, individuals, virtual targets, financial networks). More important, traditional methodologies and products that contribute to targeting activities require substantial time and manpower. Though such products are incredibly applicable to deliberate targeting in enduring conflicts, they are rarely useful in unanticipated and time-constrained environments. For these instances, the Army, Marine Corps, and Air Force employ tactics, techniques, and procedures associated with dynamic targeting—a hybrid process built on the deliberate targeting cycle and overlaid on dynamic operations.

Dynamic targeting operations have taken on many formats over the years,

**Figure 1. Target Development Relationships**



Source: Joint Publication 3-60, *Joint Targeting* (Washington, DC: The Joint Staff, September 2018), II-6.

but there remains no standard template or output linking these operations in the greater targeting process. U.S. Special Operations Command has even coined “strike-to-develop” intelligence as a method to service targets while simultaneously developing entities of interest.<sup>7</sup> Dynamic and strike-to-develop targeting, however, fail to incorporate a total understanding of an adversary and its significance to a larger system, as their exclusive focus is on the lowest level of operations. For targeting to have maximum impact, there must be time to connect the dots of the broader network and leverage information generated through processes, which is a key weakness of dynamic targeting. Furthermore, adversary use of space and cyberspace makes executing targeting strategy significantly more difficult, as this practice complicates the intelligence picture and targeting calculus.<sup>8</sup>

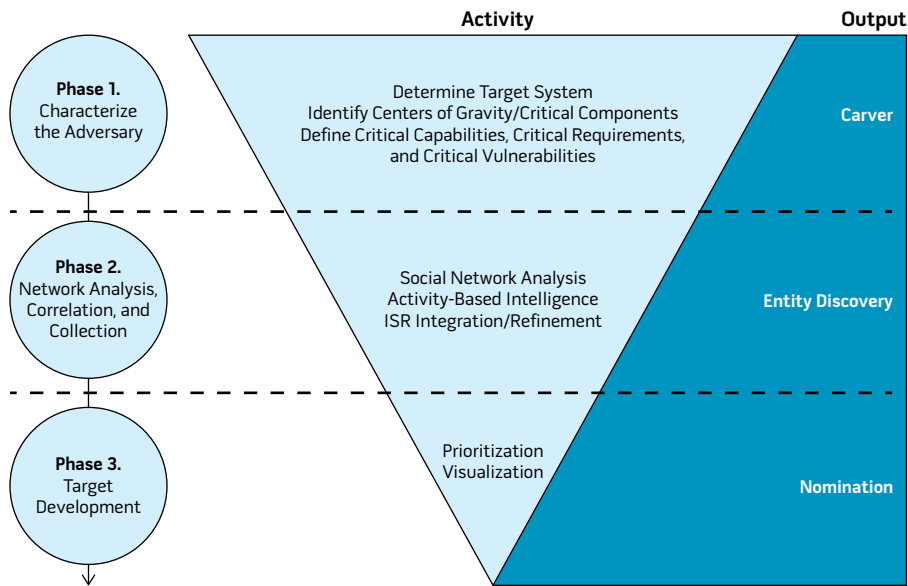
In summer 2019, the 612<sup>th</sup> Air Operations Center (AOC) was faced with unique operational challenges when analyzing a formidable adversary in its area of operations. The adversary and its smaller elements could be categorized as both state and nonstate actors and

fit multiple definitions of a *target* as prescribed in JP 3-60, but traditional targeting processes neither applied nor met the needs of operational users, specifically in terms of timeliness and presentation of information. To meet the needs of the joint force, the 612<sup>th</sup> AOC established an analytic process that systematically examined the adversary and provided analytic and targeting departure points, in turn cueing collection and target development efforts consistent with the joint force commander's objectives and intent. The end product, referred to as a Specialized Analytic and Targeting Study (SATS), was built on terminology and structure found in TSA and CTAF models but focused its analysis to yield a manageable level of actionable content on the defined adversary. Most important, the SATS drastically reduced the production timeline of TSA-standard information and provided broader understanding of the adversary.

### Necessity of a Refined Approach

First, it must be clarified that TSA is both a product and a process (see figure 1). As a process, a TSA entails identifying, describing, and evaluating

**Figure 2. Graphic Depiction of the SATS Process**



targeting efforts. The SATS maintains operational relevance as it provides TSA-like information, but on a much more abbreviated timeline. The SATS approach can be tailored, exported, and used as a standalone product or fitted into existing target development processes (see figure 2).

### SATS: The Process

Consistent with the joint targeting process writ large, the SATS is anchored to a clear understanding of the joint force commander’s intent and objectives. All analysts and components involved with SATS production must be keenly aware of those objectives. JP 3-60 explicitly states that “objectives are the basis for developing the desired effects and scope of target development.”<sup>12</sup> Once these objectives have been conveyed from the higher echelon, intelligence analysts and targeteers alike can begin a deliberate analysis of intelligence gaps and identified vulnerabilities.

Analysis for the SATS began with the development and application of a criticality-accessibility-recuperability-vulnerability-effect-recognizability (CARVER) matrix. Developed during the Vietnam War, the CARVER is the prevailing method established by U.S. special operations forces that provides a targeting framework associated with center-of-gravity analysis (see table).<sup>13</sup> More specifically, the CARVER matrix identifies targets that are most vulnerable to attack through an analytic, quantitative scoring system examining critical capabilities (CCs), critical requirements (CRs), and critical vulnerabilities (CVs). Consistent with this model, the AOC built a CARVER assessing the adversary’s centers of gravity associated with leadership, organic essentials, infrastructure, population, and fielded military as prescribed by John Warden’s “Five Rings” theory.<sup>14</sup> Though the Five Rings model has faced much criticism over the past few decades, it proved successful against a state actor when subduing Iraqi forces during the Gulf War in 1990–1991. Subject matter experts further analyzed the centers of

**Table. Sample Quantified CARVER Matrix**

Target systems	C	A	R	V	E	R	Total	Rank
Bulk electric power	5	3	3	3	5	5	24	2
Bulk petroleum	5	3	5	4	3	5	25	1
Water supply	3	5	3	5	3	3	22	3
Communication systems	3	4	2	2	3	5	19	5
Air transport	1	1	2	1	1	3	9	7
Ports and waterways	1	1	1	1	1	3	8	8
Rail transport	5	1	2	1	5	4	18	6
Road networks	1	5	5	5	1	3	20	4

the composition of an adversary target system to determine its capabilities, requirements, and vulnerabilities.<sup>9</sup> As a product, a TSA is simply the information that results from the TSA process.<sup>10</sup> Nonetheless, traditional TSA products and processes negate flexibility; they are cumbersome and manpower-intensive. Moreover, production of TSAs is limited due to the relatively small number of units doctrinally tasked with creating them.

The Intelligence Directorate for the Air Force’s Air Combat Command has stated that “the Air Force lacks codified targeting processes, systems, and enterprise-wide personnel management to successfully implement reach-back and distributed targeting operations with

the air component or larger combatant command.”<sup>11</sup> Rapidly emerging threats, evolving technologies, and existing resource constraints reinforce the need for a targeting standard that condenses production timelines and establishes targeting fundamentals. Simply put, supply in the targeting enterprise has exceeded demands of the joint force. Merging all of these points reiterates the need for a refined, innovative approach that requires fewer resources and is more operationally relevant than a TSA—and truly pertinent for both the war planner and the warfighter.

Through our efforts and analytic rigor, the SATS was identified as the optimal process and product to examine the adversary and guide analytic and

gravity to identify CCs, CRs, and CVs, all of which were captured on the CARVER.

After completing the CARVER matrix, analysts examined various databases and focused their efforts on entity discovery. Degrees of interrelation on discovered entities were examined through social network analysis and activity-based intelligence. *Social networks* are defined as “a set of entities and the relation of those entities.”<sup>15</sup> *Activity-based intelligence* is an analytic methodology that shifts the process from reporting on known targets and locations to discovering the unknown.<sup>16</sup> Practically speaking, this type of analysis can be applied to all target types, as a social network analysis highlights both entities and relationships. In the AOC application, analysts evaluated centers of gravity and discovered entities against the CARVER model, creating a list of prioritized entities vulnerable to attack. This prioritized list was published in Kessel Run—created Web-based visualization software that provided a “point-click-get” interface for consumers to quickly retrieve information on the entities of greatest importance to them. Kessel Run maintains the mission of delivering combat capabilities and revolutionizing Air Force software acquisition. Specifically, Kessel Run builds, tests, delivers, and operates cloud-based infrastructure and warfighting software applications for use by Airmen worldwide.<sup>17</sup> Employment of visualization software provided a single repository that optimized information retrieval for stakeholders and decisionmakers.

## Strengths and Operational Considerations

The greatest strength of the SATS is that the product cues both pinpoint analysis and precision targeting. Three primary benefits can be gained from applying the SATS approach against a state or nonstate adversary system or network.

***Decreases Time to Form a Clear Understanding of Adversarial Networks.*** The standard timeline to create a typical TSA is 1 to 2 years. When applied against a target system or network, the

SATS process focuses on relationships and networks, thus shrinking the time needed to gain a coherent understanding of the target system. The AOC SATS was accomplished by a team smaller than that which typically creates a TSA; team members delivered a complete network analysis of a sizable adversary in approximately 4 months. Notably, limited manpower and the truncated timeline did not negate the AOC’s ability to conduct a comprehensive, all-source examination of the target system. More important, the timeline of completion for the AOC SATS ensured the product was operationally relevant and consistent with ongoing activities of the combatant command writ large.

***Is Built on Precision and Concision.*** Although traditional TSA products are both comprehensive and precise, they are rarely concise. Not only is the textual portion of a SATS streamlined and refined, but integration of visualization software increases ease of access while minimizing information dissemination timelines. A traditional TSA requires the consumer to fully examine the extensive textual document to locate pertinent information. The SATS in total is a four-part product that consists of an executive summary, CARVER, prioritized entity list, and visualization. The SATS groups and compartmentalizes centers of gravity, CCs, CRs, and CVs, and makes information easily discoverable.

***Enables the Corroboration of Intelligence Data into Useful Products.*** Copious amounts of intelligence data are regularly collected, but they are not always processed or integrated for a variety of reasons. Data with no analytic rigor applied is simply data, not intelligence. The SATS process offers a scalable framework that accommodates integration of data and brings clarity to the intelligence picture. This intelligence cues analytic activities while simultaneously informing the targeting process. The breadth of information captured ensures that the SATS addresses all the joint, interagency, intergovernmental, and multinational considerations required to synchronize activities and achieve desired effects.<sup>18</sup>

As with any major intelligence problem, the SATS takes time and patience. Though the time required to produce a SATS is significantly shorter than that of a traditional TSA, the requirement for timely and comprehensive analysis remains. Additionally, as with all intelligence activities, a SATS cannot be adequately completed in a vacuum. Like TSAs, all SATS-associated activities must be conducted with close coordination among strategy, plans, and operational elements.<sup>19</sup> Leaders must remain cognizant of the time associated with relationship-building and information retrieval, ensuring that efforts are operationally relevant and aligned to the objectives of the higher echelon.

## Conclusion

As today’s battlespace continues to evolve, we must change how we evaluate and affect the adversary. Gaining a strategic advantage requires a refined approach to collecting and analyzing information.<sup>20</sup> Doctrine is only as effective as those implementing it, and targeting doctrine requires revision if it is to be effective against the full spectrum of targets. In the words of former Secretary of Defense James Mattis, “Doctrine is the last refuge for the unimaginative. . . it is a guide, not an intellectual strait jacket.”<sup>21</sup> JP 3-60 outlines fine details in the targeting process but specifically states that targeting is “not time-constrained.”<sup>22</sup> Therefore, new targeting processes must be developed that reflect better the operational realities faced by commanders at multiple echelons and that connect strategic doctrine such as JP 3-60 to the needs of intelligence users. The SATS, as a process, is one way to bridge this gap; it enables rapid analysis of the adversary and presents key findings in a precise and interactive format, informing all phases of the military planning construct. U.S. Southern Command’s director of intelligence Brigadier General Timothy Brown described the SATS as “remarkable” and “appropriate for the world of warfare we are in right now.” The true strength of the SATS rests in its ability to inform

Fire Controlmen assigned to USS *Preble* load rounds into Phalanx close-in weapons system in preparation for calibration test, Pacific Ocean, January 21, 2019 (U.S. Navy/Bryan Niegel)



strategists, analysts, and decisionmakers in a flexible and timely fashion. As both a process and a product, the SATS meets the competing demands of the enterprise; in application it has proved more efficient than—and equally effective as—a traditional TSA. JFQ

## Notes

<sup>1</sup> Mike Benitez, “It’s About Time: The Pressing Need to Evolve the Kill Chain,” *War on the Rocks*, May 17, 2017, available at <<https://warontherocks.com/2017/05/its-about-time-the-pressing-need-to-evolve-the-kill-chain/>>.

<sup>2</sup> Joint Publication (JP) 3-60, *Joint Targeting* (Washington, DC: The Joint Staff, January 31, 2013).

<sup>3</sup> Joe Kramer, “Joining Forces: Preparing to Fight Coalition Air War,” *Engineering*, June 2013, available at <[https://pdfs.semanticscholar.org/f6f6/889bf07ef52c65606cdebb7ff195adbc3b33.pdf?\\_ga=2.46436135.1848776532.1576334197-1190989625.1576334197](https://pdfs.semanticscholar.org/f6f6/889bf07ef52c65606cdebb7ff195adbc3b33.pdf?_ga=2.46436135.1848776532.1576334197-1190989625.1576334197)>.

<sup>4</sup> Benitez, “It’s About Time.”

<sup>5</sup> JP 3-60, I-5.

<sup>6</sup> Ibid.

<sup>7</sup> Hy S. Rothstein, “Relentless Strike: The Secret History of Joint Special Operations Command,” by Sean Naylor,” *Naval War College Review* 69, no. 3 (2016), available at <<https://digital-commons.usnwc.edu/cgi/viewcontent.cgi?article=1171&context=nwc-review>>.

<sup>8</sup> Kyle David Borne, “Targeting in Multi-Domain Operations,” *Military Review*, May–June 2019, available at <<https://www.armyupress.army.mil/Portals/7/military-review/Archives/English/MJ-19/Borne-Targeting-Multi-domain.pdf>>.

<sup>9</sup> *Student Guide* (Dam Neck, VA: Joint Targeting School, March 2017), available at <[https://www.jcs.mil/Portals/36/Documents/Doctrine/training/jts/jts\\_student-guide.pdf?ver=2017-12-29-171316-067](https://www.jcs.mil/Portals/36/Documents/Doctrine/training/jts/jts_student-guide.pdf?ver=2017-12-29-171316-067)>.

<sup>10</sup> Ibid.

<sup>11</sup> *Air Force Targeting Roadmap: Reinventing Air Force Targeting* (Washington, DC: Headquarters Department of the Air Force, September 30, 2012), available at <<https://defenseinnovationmarketplace.dtic.mil/wp-content/uploads/ndia/AirForceTargetingRoadmap13Dec12.pdf>>.

<sup>12</sup> JP 3-60, II-4.

<sup>13</sup> Bradley Greaver et al., “CARVER 2.0: Integrating the Analytical Hierarchy Process’s Multi-Attribute Decision-Making Weighting Scheme for a Center of Gravity Vulnerability Analysis for U.S. Special Operations Forces,” *Journal of Defense Modeling and Simulation: Applications, Methodology, Technology*

15, no. 1 (January 2018), 111–120, available at <<https://journals.sagepub.com/doi/full/10.1177/1548512917717054>>.

<sup>14</sup> John A. Warden III, “The Enemy as a System,” *Airpower Journal* 9, no. 1 (Spring 1995), 40–55.

<sup>15</sup> Carter T. Butts, “Social Network Analysis: A Methodological Introduction,” *Asian Journal of Social Psychology* 11, no. 1 (2008).

<sup>16</sup> Patrick Biltgen and Stephen Ryan, *Activity-Based Intelligence: Principles and Applications* (London: Artech House, 2016).

<sup>17</sup> Kessel Run, “Mission,” December 2020, available at <<https://kesselrun.af.mil/mission/>>.

<sup>18</sup> John Bilas et al., “Targeting the JIIM Way: A More Inclusive Approach,” *Joint Force Quarterly* 73 (2nd Quarter 2014), available at <<https://ndupress.ndu.edu/JFQ/Joint-Force-Quarterly-73/Article/577505/targeting-the-jiim-way-a-more-inclusive-approach/>>.

<sup>19</sup> Chance A. Smith and Steve W. Rust, “Geographic Component Network Analysis: A Methodology for Deliberately Targeting a Hybrid Adversary,” *Joint Force Quarterly* 88 (1st Quarter 2018), available at <[https://ndupress.ndu.edu/Portals/68/Documents/jfq/jfq-88/jfq-88\\_70-77\\_Smith-Rust.pdf?ver=2018-01-09-102341-647](https://ndupress.ndu.edu/Portals/68/Documents/jfq/jfq-88/jfq-88_70-77_Smith-Rust.pdf?ver=2018-01-09-102341-647)>.

<sup>20</sup> Biltgen and Ryan, *Activity-Based Intelligence*.

<sup>21</sup> Jim Mattis and Bing West, *Call Sign Chaos: Learning to Lead* (New York: Random House, 2019), 54.

<sup>22</sup> JP 3-60, II-3.

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