Developing Effective Priority Intelligence Requirements for Brigade Combat Teams in Large-Scale Combat Operations

by CPT David Tillman

Developing and managing tactical-level information requirements is a challenging and dynamic process that is supported by scarce, even occasionally conflicting, doctrine. This article will focus exclusively on the development of priority intelligence requirements (PIRs), which when aggregated with friendly-forces information requirements (FFIR), form the overarching commander's critical information requirements.[1]

Although PIRs are typically managed by the brigade S-2 and tasked down to the brigade information-collection (IC) manager, they are ultimately approved and owned by the brigade commander. Therefore PIR development is a commander-driven process and occurs in perpetuity. It requires a foundational understanding of both past and present doctrine, but, more importantly, it necessitates a holistic understanding of how the commander visualizes employing his/her brigade combat team (BCT) in a joint contested environment.

PIRs are best defined as information requirements pertaining to the enemy or operational environment, deemed critical to either 1) reaching a commander's decision point (DP)[2] or 2) achieving a specific desired effect.[3] This definition ultimately provides a spectrum to frame PIR-development methodology. The first part of this definition is what intelligence professionals grapple with the most – directly tying PIR to decision points at echelon.

However, the second part of the definition is often overlooked by those outside the fires and targeting community. This is where the commander's operational visualization comes into play and directly influences the types of PIR he/she considers to be most effective during that specific phase.

To support a dynamic commander in a complex operational environment, effective PIR will provide three symbiotic functions: driving the commander's DPs, supporting shaping efforts by enabling the targeting cycle and applying classical game theory.

DP tactician

On the far-left limit of the spectrum, you have commanders who prefer to employ their organization using DP tactics, which in football would be the equivalent of running an option play.[4] The commander directs the staff to develop a single robust plan consisting of multiple branches and sequels at each identified DP of the operation. The goal is to provide the commander with the greatest amount of operational flexibility while also maximizing tempo.[5]

For example, a commander may direct the brigade staff to plan an offensive operation with the desired endstate of successfully enveloping the remaining two mechanized-infantry battalions (MIBn) of 111th Brigade Tactical Group (BTG). The operational environment will influence when and where these offensive operations can occur, but so will the enemy. Factors such as the enemy's composition, capability, array and higher headquarters' desired endstate will all bear some influence on the development of the Blue Force course of action (CoA).

This first DP 1 will also serve as the first branch in the operational plan, and it will ultimately provide the commander with two distinguishable options. Each of the two options will include three tactical tasks, each of which will be executed by one infantry battalion simultaneously.

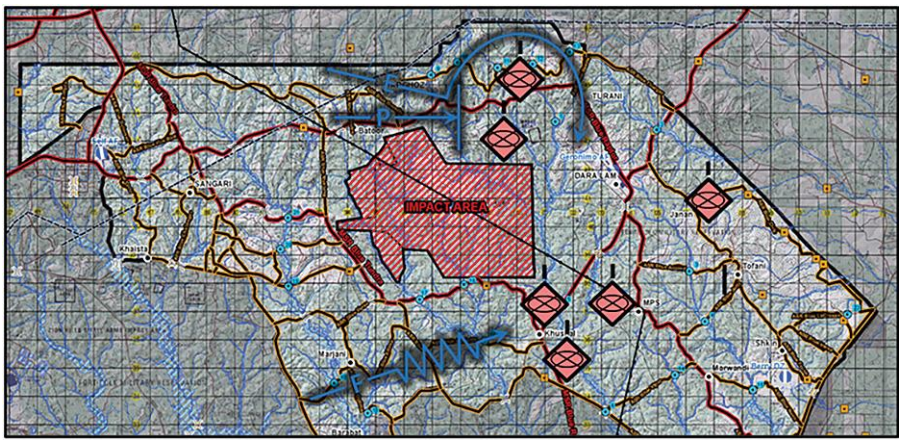

Figure 1. DP 1A. *(Graphic by author)*

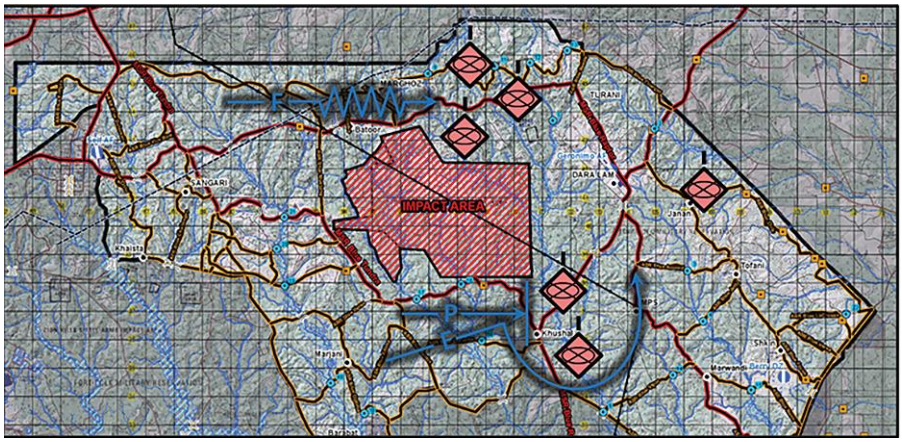

Figure 2. DP 1B. *(Graphic by author)*

The primary distinguishing feature between these two branch plans will be the designated avenue of approach (AoA) to which the main effort will be committed. DP 1A includes one infantry battalion fixing the enemy on the southern AoA while simultaneously committing one infantry battalion to conduct a penetration. Another battalion serves as the main effort to conduct an envelopment of the enemy on the northern AoA. DP 1B includes one infantry battalion fixing the enemy on the northern AoA while committing one infantry battalion to conduct a penetration, and another battalion as the main effort to conduct the envelopment on the southern AoA.

While both options are feasible, only one will be optimal based on how the supporting PIR are answered at that time.

Both proposed branch plans will require unique operational conditions, answered by PIR and FFIR, which must be met to achieve that DP. The information requirements associated specifically with the enemy and terrain will ultimately become brigade PIR.

Since weather and terrain are perpetual considerations, this example will drive DP 1 with an enemy-focused PIR. To do so, we need to have an accurate understanding of the relative combat power our BCT is able to impose on the enemy – an FFIR. Also, we must be aware of the minimum forces required to achieve each of the tactical tasks, based on the correlation of forces and means.

Classical correlation-of-force theory posits that an enemy in a deliberate defense can effectively defend against up to three times its combat power.[6] Based on the task-organization of a standard infantry BCT (IBCT), we are able to commit one infantry battalion to fix the enemy, one to penetrate the enemy's defensive positions and a third to envelop the enemy in sector.

After accounting for all the preceding information, we now know that the enemy is likely to mount a successful defense against the penetration and envelopment with any formation greater than two mechanized-infantry companies (MICs) supported by complex obstacle belts. One example of an effective PIR that supports this DP is: **Will the remnants of 111th BTG commit and retain less than or equal to two MICs to defend any single avenue of approach?**

By integrating this minimum-force requirement into PIR development, we can more precisely define the information requirements needed to achieve that commander's DP, which will allow for IC planning and synchronization. With each commander at echelon having a shared understanding of DP 1A and 1B, the brigade commander is able to call an audible (keeping in line with the earlier football example) that his subordinate commanders are then able to execute rapidly while maintaining a high operational tempo.

This concept is best illustrated using one of the most important products generated during the military decision-making process: the decision-support matrix (Table 1).

Decision point	IF (PIR)	AND (FFIR)	THEN (action)
DP 1A	Remnants of 111th BTG commit less or equal to 2x MICs to northern AoA (PIR 1)	Friendly forces retain greater than 80 percent total combat power across all formations	Fix enemy forces on southern AoA and conduct penetration and envelopment on northern AoA
DP 1B	Remnants of 111th BTG commit less than or equal to 2x MICs to southern AoA (PIR 1)	Friendly forces retain greater than 80 percent total combat power across all formations	Fix enemy forces on northern AoA and conduct penetration and envelopment on southern AoA

Table 1. Decision-support matrix for DPs 1A and 1B.

Conditions-setter

On the other end of the spectrum are commanders who prefer a more proactive shaping effort that applies center-of-gravity analysis to systematically dismantle the enemy's order of battle.[7] They tend to prefer plans that consist of a multitude of condition-based triggers and innovative efforts intended to flatten the kill chain by accelerating the sensor-to-shooter sequence.

Rather than employing collection assets to determine the composition and disposition of the enemy, they prefer employing them to target the enemy's critical capabilities via its critical vulnerabilities. This effectively allows the commander to artificially achieve the minimum-force requirements through the successful reduction in the enemy's relative combat power.

In this scenario, PIR are intended to directly enable the targeting process, shape the battlespace and set conditions for maneuver elements to rapidly seize a position of relative advantage. One such example would be taking the preceding plan and replacing DP 1 with a trigger to commit the main effort to the northern AoA. This conditions-based trigger is distinguishable from DP 1 because it is a predetermined action independent of the enemy's array of forces.

Through a deliberate-targeting process, the staff identifies the specific conditions required to meet this trigger. Rather than attempt to directly reduce the enemy's total combat power by targeting its maneuver formations, the staff recommends targeting the enemy's counter-mobility assets (mine layers, ditch-digging assets, etc.). Targeting these engineer elements would reduce the enemy's relative combat power by neutralizing assets that are deemed critical to defensive operations – the desired effects.

These desired effects account for the latter half of our definition of PIR. If successful, achieving these desired effects would deny the enemy the ability to establish a deliberate defense supported by obstacles and force the enemy to establish a hasty defense with minimal obstacles. If all other variables remain the same, the shift from a deliberate to a hasty defense consequentially reduces the minimum-force requirement from a 3:1 to 2:1 force ratio.[8]

Once the need to neutralize these critical protection assets is identified, they will be analyzed in the target working group, added to the high-payoff-target (HPTs) list and validated by the brigade commander during the target-approval board.

For a collection plan to effectively support the *decide*, *detect*, *deliver* and *assess* targeting cycle, HPTs (much like DPs) must be directly supported by PIR. An example of a PIR that supports these HPTs is: **Where will the enemy employ the predominance of its counter-mobility assets?**

In this example, the term *counter-mobility assets* in the PIR will focus collection efforts specifically on the enemy's MDK-2M (ditch-digging vehicle) and GMZ-2 (minelayer). Due to the high level of specificity, the IC matrix, which refines PIR into essential elements of information (EEI), indicators and specific information requirements, will be far more concise.[9]

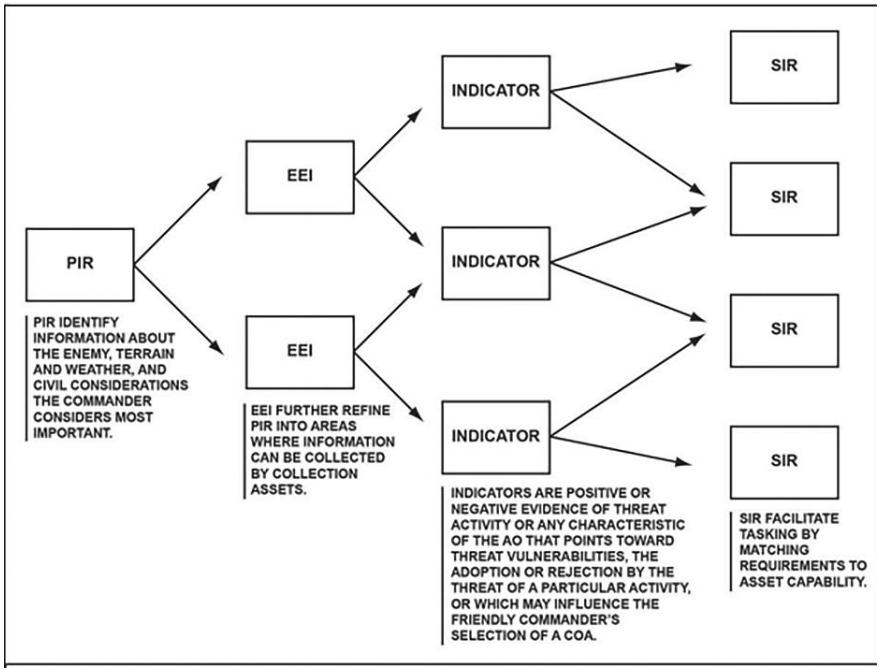

Figure 3. Relationship of specific information requirement (SIRs) to indicators to EEIs to PIR. *(Adapted from Figure 4-5, FM 3-98)*

Game theorist

The science of strategic reasoning, commonly known as classical game theory, can be traced back to the 1950s, when it was first used to study the decision-making process of rational players in a zero-sum game. Since then, history has provided us with multiple military case studies in which game theory may be applied in retrospect: the Battle of Midway,[10] Battle of Bismarck and Battle at Tannenberg[11] between Russia and Germany in 1914, to name a few.

The concept of applying game theory, in its original zero-sum form, to PIR development may seem novel, but it is far from it. Unlike current doctrine, historical doctrine incorporated this framework of strategic reasoning into PIR development.[12] A review of Army Field Manual (FM) 34-2, ***Collection Management and Synchronization Planning***, circa 1994 provides several ancillary examples of how classical game theory can be used to develop PIR.

This framework of strategic reasoning is well represented in each example of effective PIR while remaining absent in the following examples of ineffective PIR, excerpted from Appendix D of FM 34-2, that demonstrate this point.[13]

Examples of poor PIR

"Will the enemy attack? If so, where, when and in what strength?"

- This PIR is obviously not a result of staff wargaming. There are several specific criticisms we can make.
- This PIR actually contains four significantly different questions. Which of these four questions is the priority? Unless given more guidance, collection assets must decide for themselves which part of the PIR to collect against.
- It assumes the intelligence staff knows absolutely nothing about the enemy situation. Actually, they probably know more about the situation than "the enemy might attack sometime, somewhere and in some strength." Using the intelligence preparation of the battlefield process, they can provide more focused PIR than this.
- Finally, when wargaming potential friendly and enemy CoAs, the staff should find some aspects of this PIR to be irrelevant to the friendly CoA. For example, your defense may be fully capable of defeating the enemy regardless of when they actually attack. Perhaps the focus need be only where they will attack, supporting a decision on employment of the friendly reserve.

Examples of good PIR

Just as there are no standard situation templates or friendly CoAs that will serve in all situations, there is no standard set of PIRs. Good PIRs, however, have some things in common:

- They ask only one question.
- They focus on a specific fact, event or activity.
- They provide intelligence required to support a single decision. Examples: "Will the enemy use chemical agents on our reserve force before it leaves AoA Jean-Marie?" "Will the enemy defend Objective Kevin using a forward-slope defense?" "Will 43rd Division send its main attack along AoA 2?"

As you can see, all examples of good PIR are framed as "yes" or "no" questions, simplifying the information requirement into the positive or negative presence of an independent variable (similar to EEIs as defined in Figure 4-5 of FM 3-98). Initially, this approach may seem too binary for a complex operational environment, but further analysis indicates that if used correctly, it can be an effective methodology at the tactical level. This is particularly apparent when a commander is unable to obtain the critical information needed to reach a DP or achieve a desired effect.

In our preceding scenario, this would imply that the brigade's ability to answer PIR in a timely manner has been compromised by either environmental constraints or resourcing limitations. In other words, Blue Force does not have the capacity to identify the enemy's composition along both the northern and southern AoA (for DP 1) or to detect and target all remaining counter-mobility assets in the area of operations (conditions-based trigger).

To apply classical game theory to this scenario, the staff must first identity the four possible outcomes of the preceding operation. For simplicity, let us assume there is an absolute parity (1:1) in combat power at echelon between these two opposing formations. In its most basic form, each commander essentially has two options. For the Blue Force commander, the first option is to commit the main effort to the northern AoA, and the second option is to commit the main effort to the southern AoA. For the opposing-forces (OPFOR) commander, Option 1 is to commit the defensive main effort to the northern AoA, and Option 2 is to commit the defensive main effort to the southern AoA.

To calculate the probability and payoff in this zero-sum game, we must also apply a universal point system. One point will be awarded to a commander who achieves opposing minimum force with the main effort, and a second point will be awarded to a commander whose main effort is committed to an engagement area with advantageous terrain for that specific element. This scenario posits a Blue Force IBCT conducting offensive operations against two OPFOR MIBn. The severely restricted terrain in the southern AoA is ideal for the primarily dismounted Blue Force elements. Conversely, the two high-speed mobility corridors in the northern AoA are advantageous to the primarily mechanized formation of the OPFOR.

Figures 4 and 5 are graphic depictions of the four potential options, along with a payoff matrix accounting for the points earned by the commanders in each of the four outcomes.

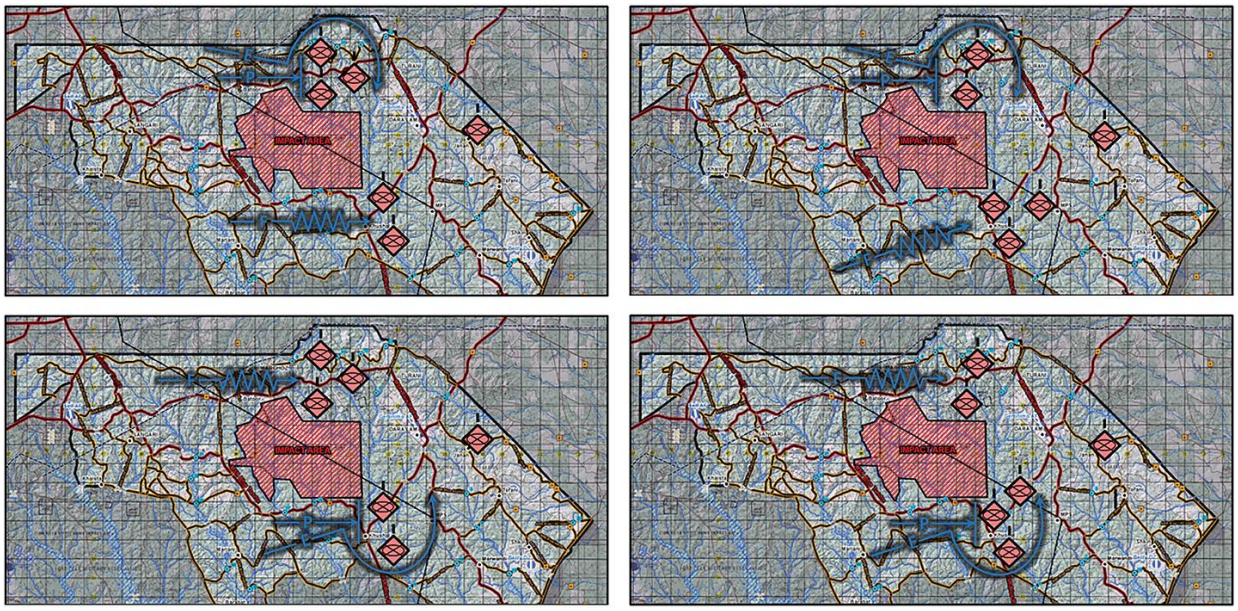

Figure 4. Four game-theory CoAs.

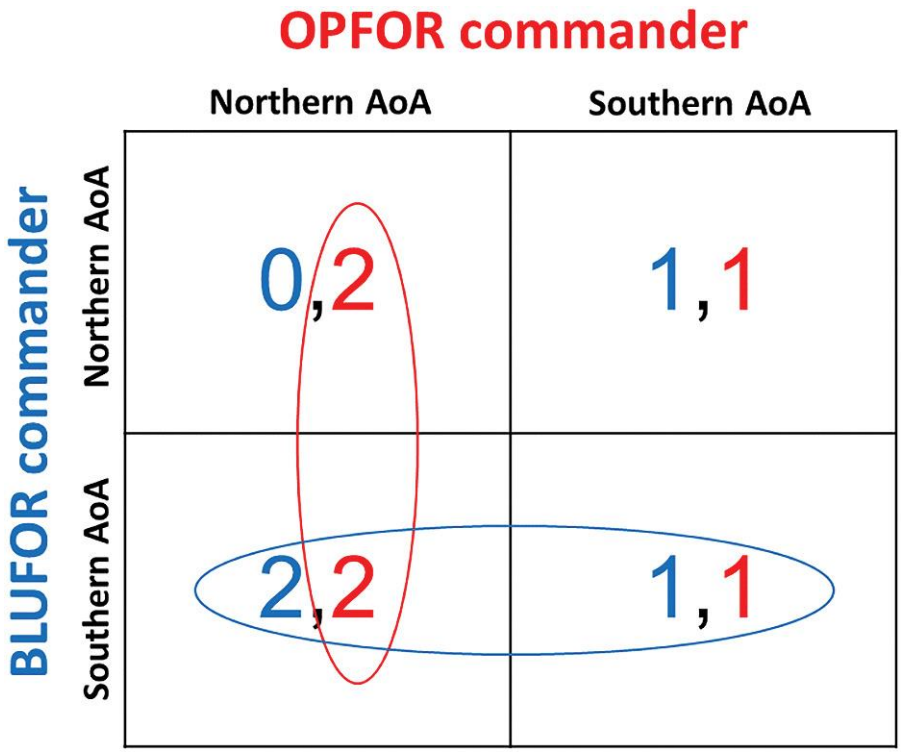

Figure 5. Scorecard for game-theory approach.

In these examples, both players have a clear dominant strategy, with an apparent Nash Equilibrium in the lower-left quadrant of the payoff matrix. The Blue Force commander's dominant strategy is to commit the main effort to the southern AoA. Using this strategy, Blue Force will certainly have advantageous terrain for a dismounted formation and will have a modest 50-percent chance of achieving the minimum-force requirement with its main effort.

The OPFOR commander's dominant strategy is to commit the defensive main effort to the northern corridor. With this strategy, the OPFOR will have both advantageous terrain and will achieve the minimum-force requirement with its main effort.

Bearing this in mind, the staff is able to determine the most favorable option to each commander, as well as how Blue Force can increase the probability of achieving minimum force with its dominant strategy.

Our final PIR will synthesize all the preceding elements (DPs, targeting and classical game theory) to support a dynamic commander's operational visualization: **Will the enemy commit two or more counter-mobility assets to the southern AoA?**

This PIR is ideal because, while it supports the BCT shaping efforts and commander's DPs, it also provides Blue Force with the highest likelihood of achieving the minimum-force requirement with its main effort. If able to neutralize the enemy's counter-mobility assets in the southern AoA, the minimum-force requirement will be effectively reduced from a 3:1 to a 2:1 ratio, which will then change the score in the lower-right quadrant of Figure 5 from "1,1" to "2,0", further improving the Blue Force commander's already dominant strategy.

Conclusion

In the preceding examples, I provided both commanders and their staffs with a framework to generate tactical-level PIR that are effective in complex operational environments. This framework is based on both past and present doctrine, as well as lessons-learned while I served as IC manager during two combat-training-center rotations.

Large-scale combat operations require commanders and staff personnel who are dynamic, fluid and integrated in their operational approach. When enacting their operational visualization, dynamic commanders are likely to present all three intellectual profiles, each at a different phase of the operation:

- Initially, the *game theorist* will seek to lessen the volume of operational variables during a time when information is limited.
- Next, the *conditions setter* will aim to reduce the enemy's ability to generate combat power while also preserving his/her own.
- Lastly, the *DP tactician* will maximize operational flexibility by planning against a degraded enemy and fewer operational variables.

To support this dynamic progression, the staff must ensure that all three symbiotic functions of effective PIR are represented throughout the planning process. In doing so, this approach will produce PIRs that are ultimately capable of mutually supporting DPs, the targeting cycle and the conceptual application of classical game theory.

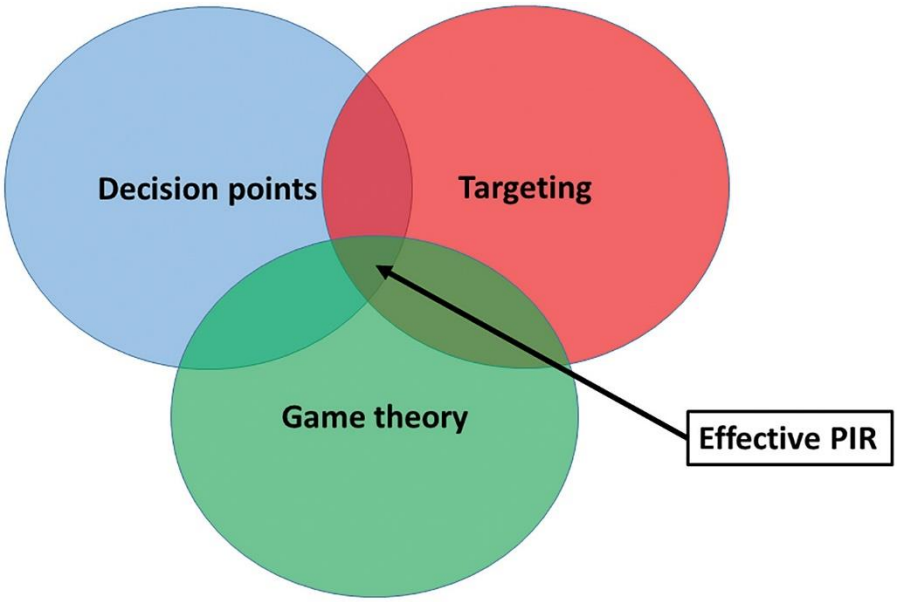

Figure 6. DPs, targeting, game-theory nexus.

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Notes

[1] FM 3-55, ***Information Collection***, 2013.
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[3] FM 2-0, ***Intelligence***, 2018.
[4] Eric Slater, "Decision-Point Tactics: Elevating Intelligence Preparation of the Battlefield in a Decisive-Action Training Environment," ***Small Wars Journal***, Sept. 30, 2015.
[5] FM 3-90-1, ***Offense and Defense***, 2013.
[6] John J. Mearsheimer, "Assessing the Conventional Balance: The 3:1 Rule and Its Critics," ***International Security 13***, No. 4 (1989), accessed Dec. 16, 2020.
[7] Dr. Joe Strange and COL Richard Iron, "Understanding Centers of Gravity and Critical Vulnerabilities," ***The Forge. Defence Journal***, 2004.
[8] Dale Spurlin and Matthew Green, "Demystifying the Correlation of Forces Calculator," ***Infantry***, January 2017.
[9] FM 3-98, ***Reconnaissance and Security Operations***, 2015.
[10] Carl H. Builder, Steven C. Bankes and Richard Nordin, "Command Concepts: a Theory Derived from the Practice of Command and Control," Santa Monica, CA: ***RAND***, 1999.
[11] William P. Fox, "Applied Game Theory to Improve Strategic and Tactical Military Decisions," ***Journal of Defense Management 6***, No. 2 (2016).
[12] FM 34-130, ***Intelligence Preparation of the Battlefield***, 1994.
[13] FM 34-2, ***Collection Management and Synchronization Planning***, 1994.

Acronym Quick-Scan

ABCT – armored brigade combat team
AO – area of operations
AoA – avenue of approach
BCT – brigade combat team
BLUFOR – Blue Forces (friendly forces)
BTG – brigade tactical group
CoA – course of action
DIA – Defense Intelligence Agency
DP – decision point
EEI – essential elements of information
FFIR – friendly forces information requirement
FM – field manual
HPT – high-payoff target
IBCT – infantry brigade combat team
IC – information collection
MIBN – mechanized-infantry battalion
MIC – mechanized-infantry company
OPFOR – opposing force
PIR – priority intelligence requirement
SIR – specific information requirement