

A Logical Method for CENTER-OF-GRAVITY ANALYSIS

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LARGELY DUE TO its enigmatic nature, the center of gravity (COG) determination process has always been considered more of an art than a science. But even art has rules and structures that can turn chaotic sounds into language and language into poetry. Currently, the COG determination process described in joint doctrine lacks the clear rules and structure that might rationalize, discipline, and therefore improve campaign planning. Joint doctrine only describes the COG construct and its utility to military planning. This is unfortunate because the value of this conceptual tool cannot be overstated. Joint Pub 5-0, *Joint Operational Planning*, clearly states the critical role of COG analysis: “One of the most important tasks confronting the JFC’s [joint force commander’s] staff in the operational design process is the identification of friendly and adversary COGs.”¹ It is the “most important task” because “a faulty conclusion resulting from a poor or hasty analysis can have very serious consequences, such as [impairing] the ability to achieve strategic and operational objectives at an acceptable cost.”²

This paper explores using the strategic framework of *ends, ways, and means*; a validation test; and a clear COG terminology to provide a logical and disciplined method for COG determination.³ In military planning, determining the center of gravity is too important to leave to guesswork; therefore, any technique or method that improves COG determination is certainly worth exploring. My experience as an instructor at the School of Advanced Military Studies and the U.S. Army War College, combined with recent operational experience as a strategist with U.S. Central Command and Multi-national Forces-Iraq, has convinced me that there must be a better process for determining a center of gravity than the current guess-and-debate method.

By using clear terminology with accepted definitions, and by linking COG analysis to the strategic framework, we can create rules and structure that permit the creation of art from chaos. No method, no matter how detailed, will produce truly scientific solutions to our questions about centers of gravity; however, a disciplined process that includes a validation test can help separate the kernels from the chaff and focus campaign planning efforts.

The ends, ways, and means framework sets the foundation for COG analysis. Identifying the ends and the ways they may be achieved determines the means required (although in short-term strategies or crisis planning, the means currently available may determine the ways and ends). The ways of a strategy are the essential determinants of a *critical capability*, and the means that possess that critical capability constitute the center of gravity. In other words, the ways determine the critical capability, which identifies the

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center of gravity. Linking the strategic framework (ends, ways, means) and COG analysis will greatly enhance military planning.

The Strategic Framework

Arthur F. Lykke Jr. developed the strategic framework of ends, ways, and means.⁴ For Lykke, strategy is a coherent expression of a process that identifies the ends, ways, and means designed to achieve a certain goal. Mathematically, we might express this as “Strategy = Ends + Ways + Means.” Ends are the objectives or desired outcomes of a given strategy. The term *end-state* is synonymous with ends. An end or ends comprise the goal of the strategy. Ways are actions. They are the methods and process executed to achieve the ends. More simply, they answer the question, How are you going to get to the end-state? Means are the resources required to execute the way.

Lykke cites a need to balance ends, ways, and means, which he likens to the three legs of a stool (the stool itself representing the strategy). A strategy is balanced and entails little risk if the selected way (method) is capable and has sufficient means (resources) to obtain the desired end (objective). However, if either the ways or means legs are too short (due to inadequacies), or the end leg is too long (the goals are unrealistic), the strategy is out of balance, and the risk is high. To bring the strategy back into balance, the legs must be adjusted; for example, desired ends can be scaled back to fit within the available means, or means can be increased to fully support the selected way(s). When the means are inadequate, planners must consider alternative ways. Because all of these “balancing” choices are strategic decisions, the balancing act is the heart of strategic art.

While this framework is useful for developing strategies, planners can also use it to analyze friendly and enemy plans and actions in order to determine strengths, risk, and, most importantly, the center of gravity. To do this, we require a common COG analysis terminology.

COG Terminology

The terms associated with COG analysis are *centers of gravity*, *critical capabilities*, *critical requirements*, and *critical vulnerabilities*.⁵ To avoid confusion and misunderstanding, I propose we use Dr. Joseph Strange’s definitions:

- *Centers of gravity*: primary sources of moral or physical strength, power, and resistance.
- *Critical capabilities*: primary abilities which merit a center of gravity to be identified as such in the context of a given scenario, situation, or mission.
- *Critical requirements*: essential conditions, resources, and means for a critical capability to be fully operative.
- *Critical vulnerabilities*: critical requirements or components thereof which are either deficient or vulnerable to neutralization, interdiction, or attack (moral/physical harm) in a manner that achieves decisive results. The smaller the resources and effort applied and the risk and cost, the better.⁶

Note that centers of gravity are nouns: they are tangible things that exist. Critical capabilities are verb-like: they are actions or functions that a center of gravity can perform. To execute a critical capability, the center of gravity has critical requirements. These can be either nouns or verbs. Of these critical requirements, some are vulnerable, others are not. The former are simply called *critical vulnerabilities*. Since they are a subset of critical requirements, they can be nouns or verbs.

These terms form a hierarchy. The most important is the center of gravity that can perform some critical action or capability. Second are the resources (critical requirements) or abilities the center of gravity requires to employ its critical capability. In much the same way, an automobile (center of gravity) requires fuel (critical requirement) to move (critical capability). Last in importance are those critical requirements that are vulnerable.

Linking the Strategic Framework to COG

The only accurate way to determine a center of gravity involves using systems theory and taking a holistic viewpoint; anything else is just guesswork. However, systems theory covers a lot of ground, and it is easy to get lost in a system’s networked forest of nodes and links. Lykke’s strategic framework offers not only a simple path through the system’s forest, but a shortcut as well (see figure). The framework’s three simple questions—What is the desired end-state? How can it be achieved? What resources are required?—is systems theory boiled down to its essential elements in support of COG analysis.

This is how it works, but since this is art, not science, be flexible:

- Step one: identify the desired ends. This process supports both mission analysis and effects-based planning.
- Step two: identify ways to achieve the ends, and select the one that the evidence suggests is most likely to work. Remember: ways are actions, so express them as verbs. Then select the most elemental or essential action—that selection is the critical capability. Remember also that ways are critical actions that will achieve the end-state. Ways are verbs, critical capabilities are the same verbs. Ways = critical capabilities.
- Step three: list the means required to enable and execute the way or critical capability.
- Step four: select the entity (noun) from the list of means that possesses the way or critical capability to achieve the end. This selection is the center of gravity.

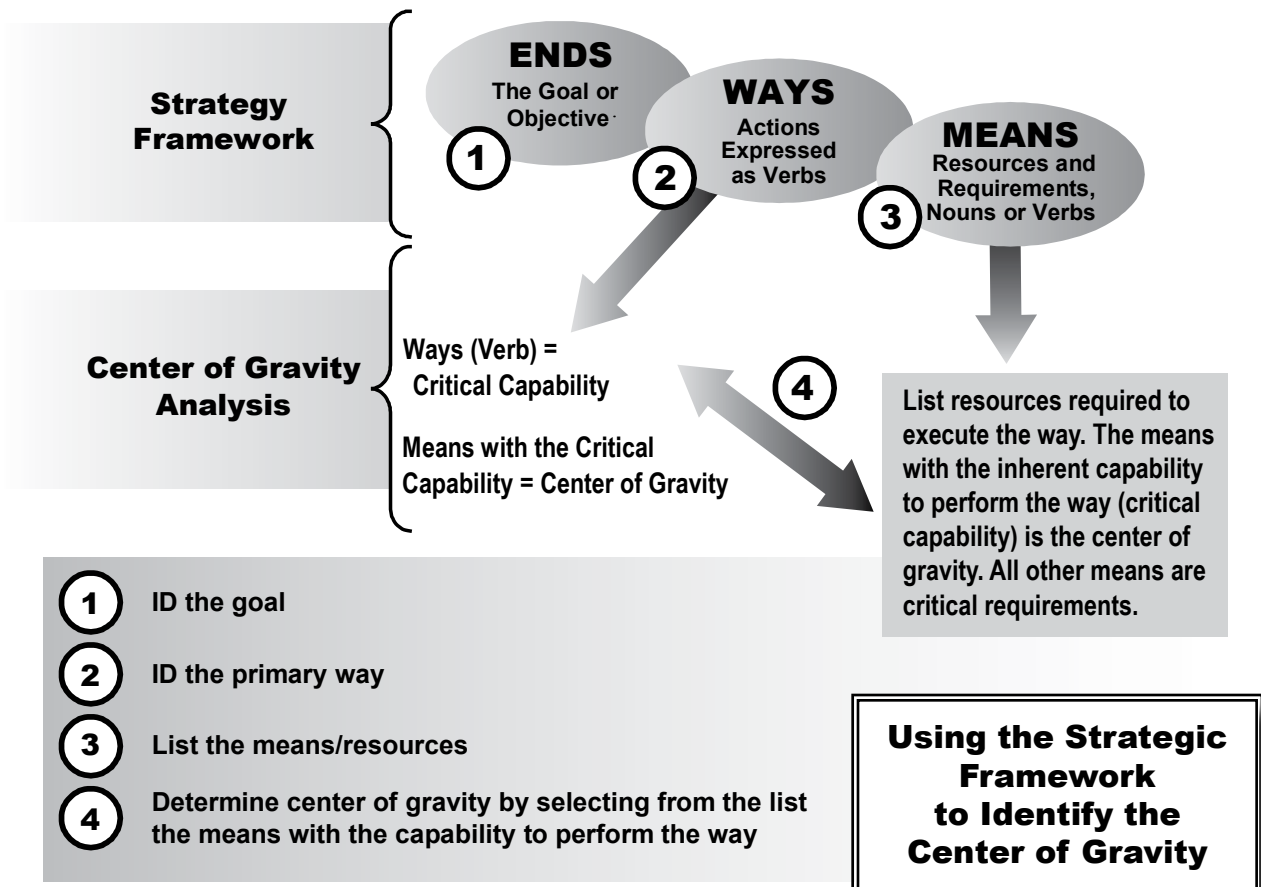
We might take the process two steps further to determine how best to attack the identified center

of gravity. In step five, we would select the critical items from those that remain on the means list. We would complete the process in step six by identifying which of the critical requirements are vulnerable. Steps four through six, by the way, are compatible with the operational net assessment process.

Validity Test: Does/Uses

The “does/uses” test can verify the aptness of the center of gravity and distinguish it from critical requirements and critical vulnerabilities. Only centers of gravity are inherently capable of achieving the specific task or purpose defined in the ways. If something executes the primary action (critical capability) that accomplishes the way, it is the center of gravity. Put another way, the system that “does” the work and is the source of power that creates the force or critical capability is the center of gravity. Or, even more simply, the center of gravity does the action and uses resources to accomplish it.

If something is used or consumed by another entity to execute the primary action (critical capability), that



something is a requirement. If something contributes to, but does not actually perform, the critical capability, it is a requirement, not a center of gravity.

Example: Madonna for President

An example of the strategic framework method in action might help illustrate how it works. Let's suppose that Madonna wants to become president of the United States. Her *end*, then, is "become president of the United States." Possible *ways* she might accomplish her end are by coup, purchase, miracle, or via election. Madonna rules out the first three because she doesn't have the *means*, that is, the military backing, sufficient funds, or faith, respectively, to accomplish those ways. She therefore makes the strategic decision to get herself elected. So the verb or action is "to elect."

Means to elect. To get elected, Madonna needs the following resources or means, to name just a few: political skills, media access, a campaign organization, funds, sufficient votes, convincing messages, and ideas. Of these means, which possesses the critical capability "to elect"? Political skills are needed, but they don't vote. Funding is certainly required, but dollars don't vote either. A popular message is a plus, but again, messages do not vote. People who vote elect; therefore, *voters are the center of gravity*. This is the "does" test. Madonna must feed the center of gravity (voters) enough critical requirements to make her share of the center of gravity bigger and stronger than her opponents'.

Voters consult her political campaign and all its elements to choose a candidate: this is the "uses" test. Because the campaign is used to corral voters, the campaign is a critical requirement. In other words, Madonna wants to attract more voters than her opponent. She will attempt to do this by improving and protecting her critical requirements (the campaign) while attacking her opponents' requirements.

Some will claim that Madonna's center of gravity is her popular message because without one she would certainly lose the election. This is not so. Remember: the center of gravity must be able to perform the way or critical capability. A popular message has no inherent ability to perform the critical capability; it is only an enabler or critical requirement that sustains (or fails to sustain) the center of gravity. (Incidentally, this bit about the message illustrates the fact that centers of gravity

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can be attacked and defeated indirectly, by weakening or destroying their critical requirements.)

Suppose again that Madonna somehow loses the election. We might surmise that if she had understood the strategic model, she could have adjusted her ends to match her means. Perhaps she could have settled for being elected president of the American Federation of Television and Radio Artists.

This simple example illustrates the overall concept of using ends, ways, and means analysis and the does/uses test to identify critical capabilities and the possessor of those capabilities. Note that the election example, simple as it was, still required some creative thinking. In an election, candidates do not possess the center of gravity (the voters); rather, they compete for a greater mass of the same center of gravity. Ultimately, the winner is he or she who succeeds in capturing the larger share of the center of gravity—and that's where creativity comes into play. It's only logical that increased situational complexity requires even more creative and flexible thinking. One demonstrates mastery of the arts of strategy and military planning by adapting frameworks and models to situations, not by forcing a situation to fit a model.

Strategic Analysis of an Insurgency

In the following example we apply the framework and COG analysis to a notional insurgency. The example starts with the insurgency's final phase and works backwards to the initial phase—after all, you have to know the destination before you can plan the route.

Final phase. The final *end-state* the insurgency seeks is to consolidate its victory by establishing a new sociopolitical order based on the movement's ideology. A way to establish (the critical capability) that order is to have the *means*, in the form of a revolutionary government, capable of establishing rule and authority. The revolutionary government is therefore the *center of gravity* for this final phase of the insurgency because it possesses the *critical capability* to establish rule and authority for the new order.

Revolutionary phase. Before you can establish a new order you must remove the existing order; thus, removal of the existing order is the end-state for the revolutionary phase. A way to remove the existing order is to force (the critical capability) its removal through a revolution. The means that possesses the critical capability to force removal would be an armed force. This armed force is the revolutionary-phase center of gravity because it alone has the critical capability to bring about the end-state.

Initiation phase. Revolutions are not spontaneous; leaders plan and ignite them when they believe the time is right. The initiation phase's end-state, then, is the start of the revolution. A way could be to provoke such a repressive or violent response from the existing authority that the masses rally to the insurgent cause. The means that possesses the critical capability to provoke would be the insurgency's militant cells; hence, they are the center of gravity in the initiation phase. Because the force required to start a revolution is much smaller than the force needed to win a revolution, the initiation and revolutionary phase centers of gravity are not the same force. A critical requirement for the initiation force is leadership with the skills to correctly decide when to start the revolution.

Conspiratorial phase. Revolutionary cells and support structures must be in place before a revolution can begin. Putting these in place is the end-state for the conspiratorial phase. The way is to build and motivate (critical capability) a force and support base. This is done through ideological indoctrination/conversion and military training and equipping. The means capable of this are insurgent cells of true believers. There are two types of such cells: those comprised of educators or ideological missionaries, and those made up of militant trainers

and organizers who form the armed wing. These pre-revolutionary cells are the center of gravity during the conspiratorial phase because they have the inherent capability to indoctrinate, motivate, and build a revolutionary force.

Altogether, this example shows that each phase's critical capabilities and the possessor of those capabilities—the center of gravity—can be derived from ends, ways, and means analysis.

Summary

Linking the strategic framework with the COG concept provides a heuristic that contributes to a focused and disciplined approach to COG determination. This linkage suggests that the ends, ways, and means framework is the start point for any COG analysis. Only by starting with the ends, ways, and means analysis first can critical capabilities (ways), critical requirements, and the center of gravity (means) be determined. It is the critical capability contained in the ways, and the means that the critical capability requires, that identify a center of gravity. The does/uses test then validates the selection. This is not a scientific method or tool that will always provide the right answer; rather, it is a logical thought process that can focus and sharpen any analysis, and that should result in a more accurate COG selection that can be defended based on logical criteria. **MR**

NOTES

1. Department of Defense (DOD), Joint Publication (JP) 5-0, *Joint Operational Planning* (Washington D.C.: U.S. Department of Defense, 10 August 2005), IV-8.

2. *Ibid.*

3. Arthur F. Lykke Jr., ed., *Military Strategy: Theory and Application* (Carlisle, PA: U.S. Army War College, 1998); Dale Eikmeier, "Center of Gravity Analysis," *Military Review* (July-August 2004): 2; and Joseph Strange, *Centers of Gravity & Critical Vulnerabilities: Building on the Clausewitzian Foundation So We Can All Speak the Same Language*, *Perspectives on Warfighting Number Four*, 2d ed. (Quantico, VA: Marine Corps Association, 1996): ix.

4. Lykke, 3.

5. Strange, ix.

6. *Ibid.* The COG terminologies employed in joint doctrine and by Clausewitz in *On War* (Howard and Paret eds., 1994, 595-596) are less useful than Strange's. See JP 5-00.1, *Joint Doctrine for Campaign Planning* (Washington, DC: DOD, January 2002), II-6, II-7; and JP 5-0, *Joint Operational Planning* (Washington, DC: DOD, December 2006), chapter IV, for joint doctrine COG terminology. Joint doctrine limits COG terminology to military forces. It also defines *critical capability* differently than Strange does. According to Strange, critical capabilities are inherent in a center of gravity. It is the "primary abilities which merit a center of gravity to be identified as such." In other words, the critical capabilities are what a center of gravity does. JP 5-00.1 states that "critical capabilities are those adversary capabilities that are considered enablers for the adversary's COG to function as such." JP 5.0 defines critical capabilities differently, saying, "Critical capabilities are those capabilities that are considered crucial enablers for a center of gravity to function as such." Together, the joint definitions imply that critical capabilities do not belong to the center of gravity; rather, they are enablers of the center of gravity in the same way that critical requirements are enablers. Due to these differences, I prefer Dr. Strange's definitions.