The Marine Corps Design Methodology

A viable approach to purposely confronting complexity

by the Staff, MAGTF Staff Training Program

The Marine Corps design methodology is used for determining the correct set of problems as well as conceiving and articulating a framework for solving them. In his November 2016 *Marine Corps Gazette* article "Stakeholder Analysis," Maj Jason Berg grapples with the practicality of Design within the MCPP (Marine Corps Planning Process). His euphemistic description of Design as "cloudy" is a fair, if not generous, critique. Existing Marine Corps doctrine is insufficient in its discussion on how to actually do Design, and MSTP and others across the Marine Corps have recognized that Design needs significant elaboration and clarification. Consequently, MSTP, as the doctrinal proponent of *MCWP 5-10, Marine Corps Planning Process*[1], has recently published the MSTP Marine Corps Design Methodology pamphlet to address the problem of insufficient doctrine directly. What follows is a summary of the points from the MSTP pamphlet. Ultimately, MSTP seeks a Marine Corps Design methodology that is practical, widely understood, and of the greatest utility to MAGTF commanders and their planning staffs. While we acknowledge this will take time, this article seeks to enable those outcomes.

Background

Design formally emerged in Marine Corps doctrine in 2009 as a response to Army and Joint Staff research that, at the time, military planning processes did not emphasize the challenges and complexities of identifying the correct set of problems as the first step of planning. Many proponents believed that the challenges being faced in Iraq with insurgencies and civil unrest could have been better understood, and possibly even avoided, if more deliberate thought was aimed at understanding the operational environment and defining the problem set. Design was proposed as a way to enhance the MCPP and satisfy these concerns.

As with any change to a long-standing tradition, there was opposition. Even today, with Design as established doctrine, commanders and their staffs either resist or simply don't understand the benefit. This failure to embrace Design is largely due to a misunderstanding of Design's role in MCPP or a belief that Design competes with, not supports, the larger planning process. This misunderstanding exists at many levels, to include the commander level, resulting in insufficient or non-existent participation by commanders in the very process they should be driving. Many suggest that it is nothing more than the former CBAE (commander's battlespace area evaluation), which itemized a step in planning where the commander took time to understand the battlespace, the enemy, and the centers of gravity. Other critics state that Design is an intuitive step in planning that does not need a definition or codification—commanders already aim to understand the problem and the environment. Therefore, why create doctrine for something that's intuitive? These same critics argue that the addition of Design within Marine Corps doctrine has only added ambiguity, complexity, and confusion to a previously straightforward and streamlined process. MSTP strongly asserts that any notion that Design somehow detracts from planning is a flawed one. Design reinforces and strengthens the planning process; it does not detract from it. Absent Design efforts, planners are left to a planning process that attempts to solve problems without identifying them first.

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The Fundamentals

Existing literature on Design describes a certain level of complexity that is required before Design should be considered. Many publications emphasize that Design applies only at the operational and strategic levels of war and rarely plays a role at the tactical level. Even tactical situations, however, require an understanding of the set of problems—not one single problem—that hinders transformation from the current state to the desired state of an operating environment. From an MEF commanding general conducting a campaign in North Korea to a platoon commander running Range 410A in ITX, the logic of Design remains the same: *Where am I now? Where do I want to be? What should the conditions look like at the end of the operation? And what are the hurdles I need to overcome to get*

there? Lower-level tactical problems may be simpler to identify than a more complicated joint operation, but the same questions still apply. The Marine Corps Design Methodology is flexible enough to add value in all of these instances (see Figure 1).

The objective of the Marine Corps Design Methodology is simple: it is a process for determining the correct set of problems and articulating a conceptual framework for solving them. Design is not detailed planning, but it is reinforced by numerous details that are uncovered as it is conducted. The Design Methodology, advanced by MSTP, consists of four distinct actions that are applied to the planning process: (1) describing the current and desired states of the operating environment, (2) defining the problem set, (3) producing an operational approach, and (4) reframing, as required, throughout both planning and execution. It is included within the first step of the MCPP (Problem Framing) to emphasize the need to execute Design early in planning, even if the scope of Design varies in each situation.

Design also feeds the operation assessment process. In this regard, Design benefits from the direct involvement of the commander, just as assessment does. These assessments are used to determine if a series of actions adhere to a given plan and whether that plan is achieving its desired conditions, effects, and objectives. Design is the catalyst for the development of these aim points. By describing a desired state, defining the problem, and producing an operational approach, these aim points are naturally developed. Moreover, operation assessment is the trigger used for reframing during execution. In other words, if a given plan is not achieving the conditions, effects, and objectives developed during Design and subsequent detailed planning, a good assessment process should realize this and signal a requirement for reframing.

Describing the Current and Desired States of the Operating Environment

The first action within Design describes the current and desired states[2] of the operational environment (see Figure 2). The current state is the sta-

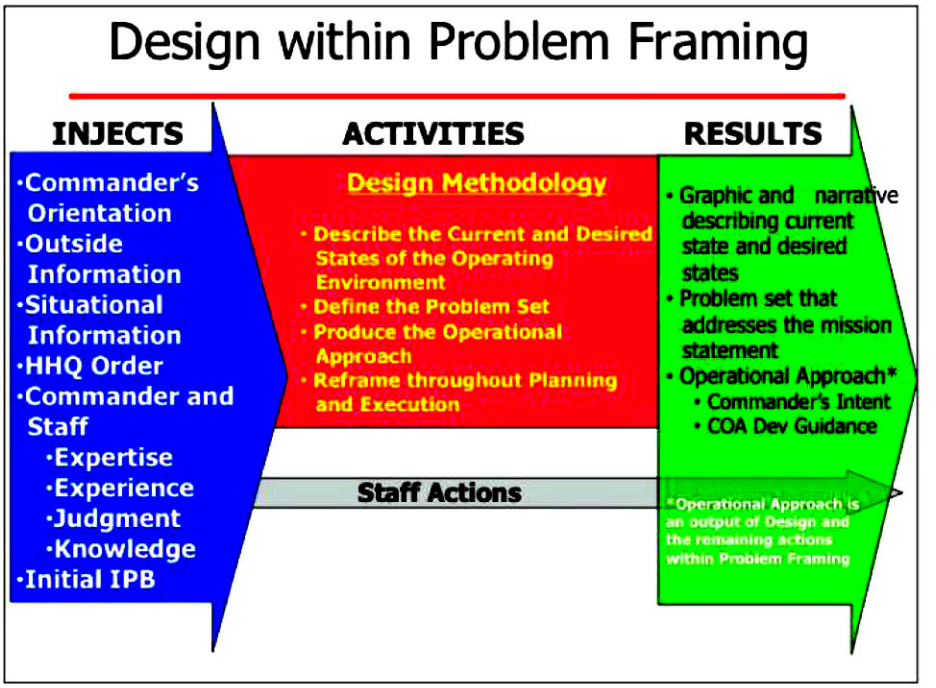

Figure 1. Design methodology process flow.

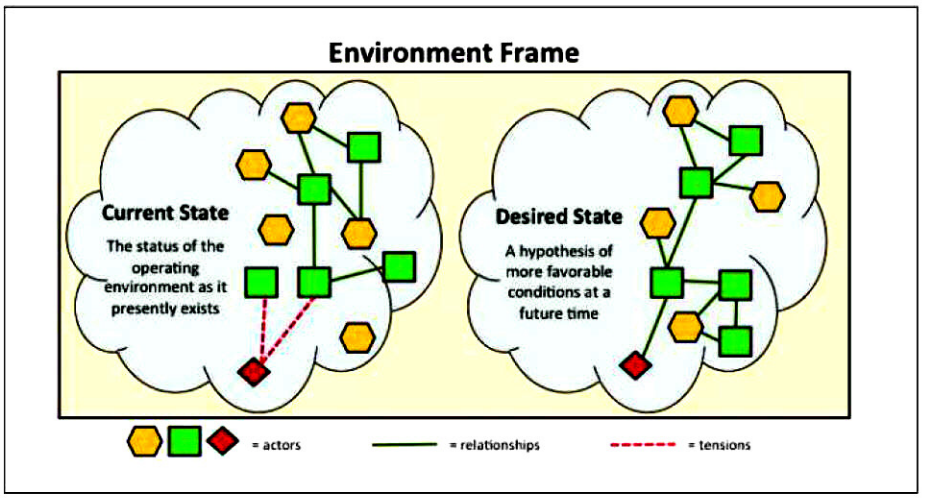

Figure 2. Current state to desired state.

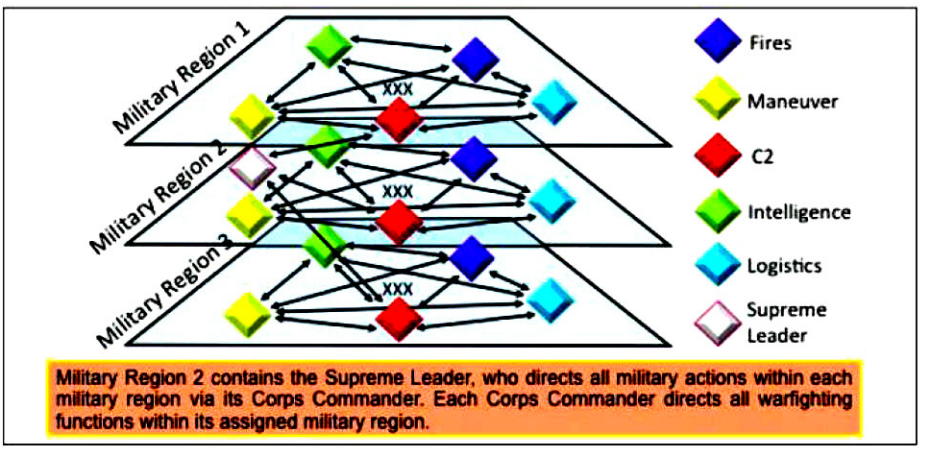

Figure 3. Example system diagram.

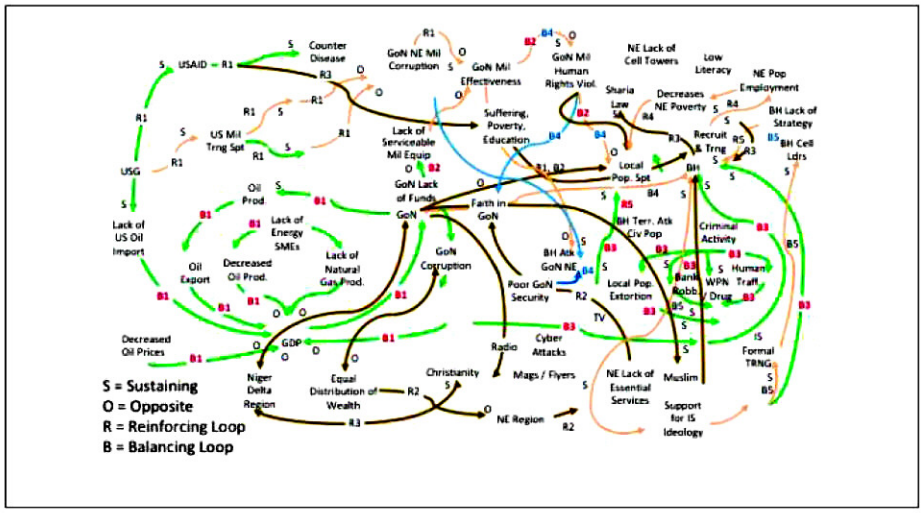

Figure 4. Causal loop example.

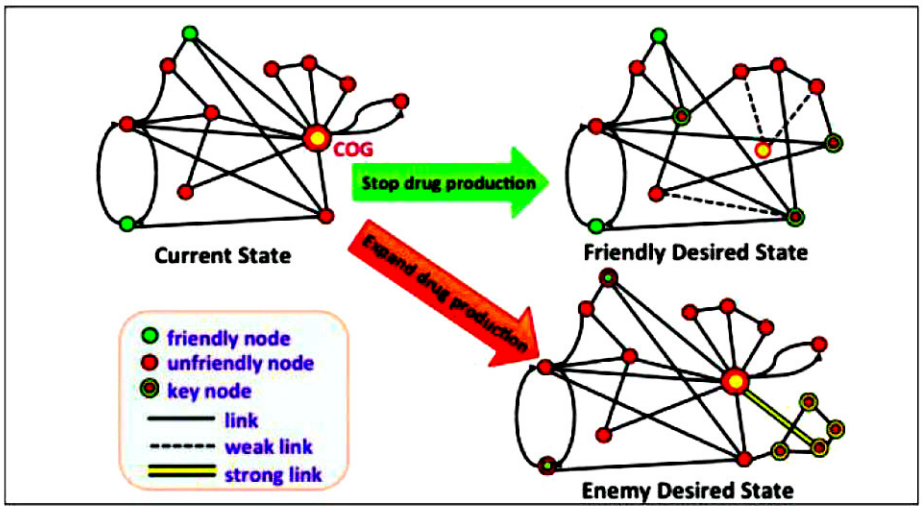

Figure 5. Enemy versus friendly desired state.

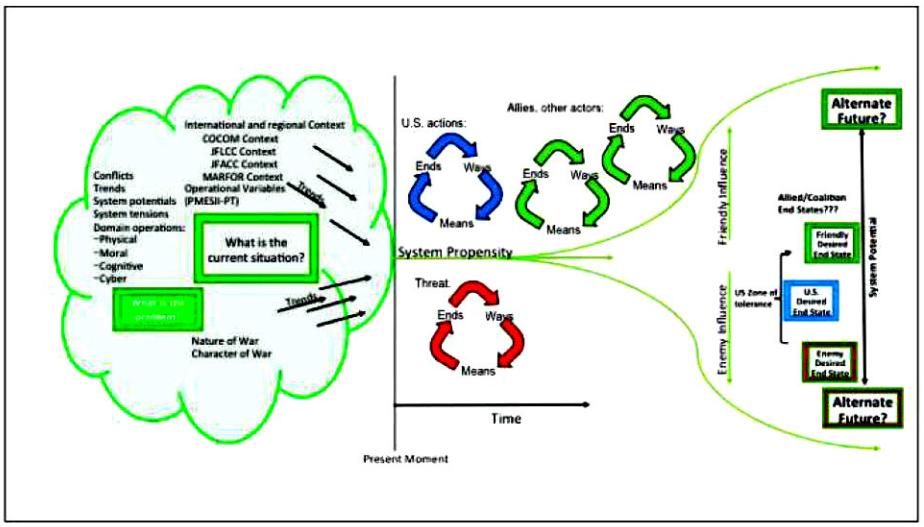

Figure 6. How an operating environment may trend into the future.

tus of the operating environment as it presently exists. The desired state is a hypothesis of more favorable conditions in the future. Some desired states might be a simple transition from one part of an operation to another. Other desired states at higher-level commands can include transition criteria that ceases hostilities altogether. Desired states within battalion- and company-level operations could be as simple as the occupation or control of terrain or the seizure of a building. In all cases, however, a variety of factors related to friendly forces, enemy forces, civil society, and infrastructure will certainly impact the feasibility of desired states.

Current and desired states are best described using a graphic and narrative. This technique enhances the understanding of the operating environment for practitioners and provides a clear, concise, and familiar way of portraying this information to a decision maker. The types of graphics and narratives used depend on the complexity of the operation. For instance, an MEF- or MEB-level operation may describe the current and desired states across the eight common operational variables—PMESII-PT (political, military, economic, social, information, infrastructure, physical, and time). Other options may be a systems diagram (see Figure 3 on previous page) or a causal diagram (see Figure 4) to describe relationships between and among a variety of factors. Major subordinate commands within a MAGTF, as well as regiment- and battalion-level commands, may find the use of the familiar mission variables—mission, enemy, terrain and weather, troops, time, and civil considerations—to be a more suitable method of describing current and desired states.

Design focuses on forward planning, and crafting a desired state leverages this forward-looking approach as opposed to its antithesis, reverse planning, which most are more comfortable with doing. Forward planning begins with the current state and considers the feasibility of a desired state. The end state provided by higher headquarters is used as a general aim point. Reverse planning begins with an often-arbitrary end state and moves backward to develop the numerous steps

to get there. Forward planning is different; it provides a projection of the future that is bounded by various aspects of the situation and the environment.

Other actors, besides the friendly force, impact an operating environment and have different desired states. They also impact forward planning efforts. For example, the enemy has a desired state that likely conflicts with the friendly force's desired state (see Figure 5 on previous page). Friendly or neutral actors may not be in opposition, but some of their desired states may be different from the friendly force's desired states. Additionally, some desired states of other actors may converge with the command's desired states, leaving a possibility of exploiting this convergence. An understanding of the difference between an alternative desired state and the friendly force's desired state may help determine the range of possible futures and system potential (see Figure 6 on previous page).

Although they are closely related, a desired state does not equate to an end state. An end state is the set of required conditions that defines the achievement of a commander's objectives and is provided by a higher authority. A desired state is a product of Design that represents a feasible set of conditions at a future time, within a zone of tolerance, that are more favorable than the current state. If the desired state determined at the conclusion of Design does not match the end state provided by higher, a conversation with the higher command should occur to rectify this difference.

Defining the Problem Set

Once the current and desired states are described, planners need to define the problem set. The problem set is a list of reasons that complicate the transition from the current state to the desired state (see Figures 7 and 8). Many MAGTF planners within the Marine Corps have resorted to the development of a "problem statement" within the first step of the MCPP. While MSTP does not challenge the utility of problem statement creation, planners often only restate the MAGTF's mission instead of highlighting the true set of problems enroute to the desired state. Often, problem statements are usually constrained to one sentence and grossly oversimplify the challenges within the operating environment. Operational environments are too complex, and an MEF or squad never has a single problem to solve anyway. In reality, many problems will be exposed. The key is to identify relevant problems associated with myriad operational variables, examine relationships among the problems, and then package that understanding into a problem set that aids the commander's thinking and informs the overall planning process.

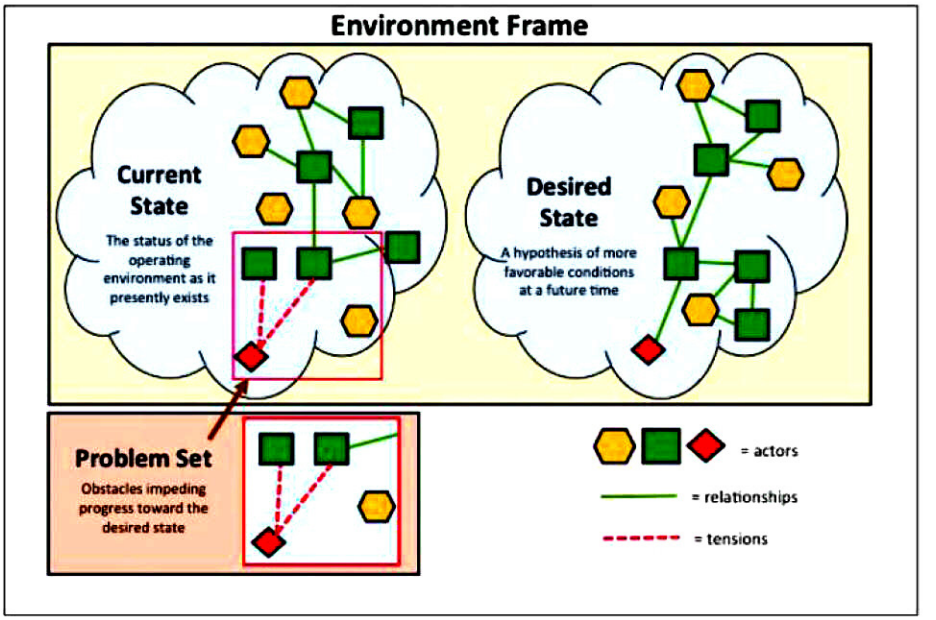

Figure 7. Problem set

Enemy has an advantage in military capabilities and is more familiar with the operating environment.

Fires	-	**Enemy artillery can range targets from outside the range of friendly counterbattery fire.**
Maneuver	-	**Enemy mechanized units can rapidly negotiate semi-restrictive terrain.**
	-	**Enemy's advanced anti-aircraft capabilities will not allow friendly air superiority.**
Logistics	-	**Enemy supply dumps staged/concealed throughout the operating area.**
	-	**Enemy has the capability to disguise convoys through the use of host nation support.**
Command & Control	-	**Enemy leadership has both HF and fiber-optic communication with corps commanders.**
	-	**Enemy has robust cyber network defenses and advanced offensive cyber capabilities.**
Intelligence	-	**Enemy is effectively using the local population to gain information on US forces.**
Force Protection	-	**Enemy has chemical weapons.**

Figure 8. Example problem set.

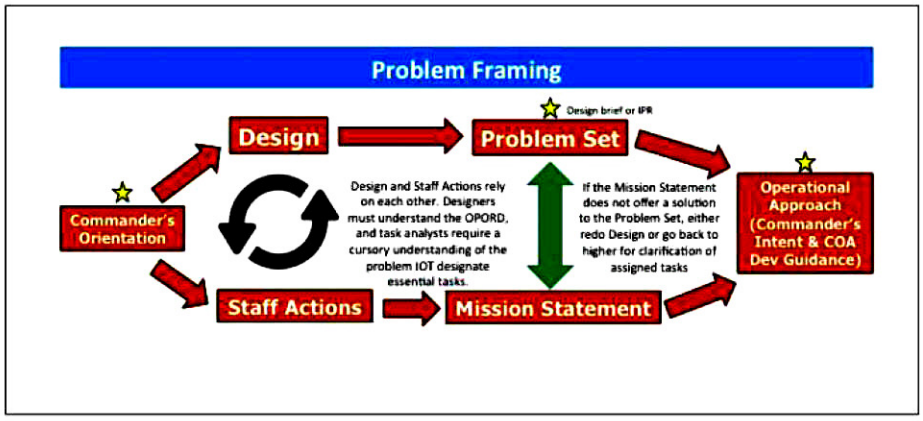

Figure 9. Problem set, mission statement, and operational approach.

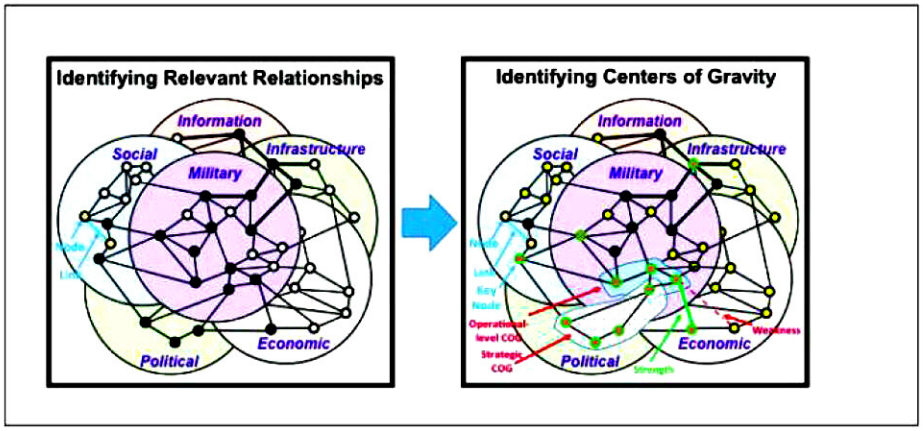

Figure 10. Design feeds center of gravity analysis.

There are two types of problems within a problem set. The first is a category of problems as they exist within the current state, or the reasons why military forces are being deployed. The second are the problems that need to be solved as the environment progresses toward the desired state. This process is iterative in nature and requires periodic review to ensure that the problem set is relevant. On higher-level staffs, the problem set should be closely tied with the assessment process.

Similar to the descriptions of the current and desired states in the previous step, the problem set can be categorized and described in a multitude of ways. MAGTF planners at some level may wish to use PMESII-PT to categorize the problem set. Planners at other levels of the MAGTF may find a categorization of problems across warfighting functions to be more convenient. Staffs within regiments, groups, battalions, and squadrons may prefer a simple brainstorming activity to itemize a list of problems that the staff instinctively knows are most relevant.

Once the problem set is defined, a brief or in-progress review should be provided to the commander on the results of Design. This event will ensure the commander's continued involvement and also help guide the remaining planning efforts. It will also allow for an early opportunity to review Design if the commander does not agree with the problem set.

Producing the Operational Approach

The next step is to apply the problem set to the overall problem framing effort and produce the operational approach. The operational approach is broad, overarching guidance that is commonly articulated as part of the commander's intent and course of action development guidance. It is the final deliverable of problem framing and requires the input and synthesis of both Design and the remaining staff actions within problem framing (see Figure 9).

The problem set and the mission statement directly feed the operational approach. Once the problem set is defined, it is compared to the mission statement developed through the remaining staff actions within problem framing. It is also evaluated against the end state provided by higher headquarters. The mission statement should provide a way to address the problem set and reach the end state. If it does not, Design should be reviewed, and the task analysis that fed the mission statement should also be reviewed. If the results remain the same, the staff should consult higher headquarters for clarification of its assigned tasks. The rigor that a staff puts into the Design effort will help provide evidence for why a given mission statement may not address the problem set or achieve the end state.

Center of gravity analysis can also be aided by Design. The relationships identified between various actors during the analysis of the current and desired states can naturally illuminate the enemy's center of gravity and paths to attacking enemy critical vulnerabilities—providing a foundation for the operational approach (see Figure 10).

Reframing throughout Planning and Execution

Reframing occurs when Design needs to be reviewed. It includes reevaluating early hypotheses, conclusions, and the approach that underpins the current plan. In reframing, the commander and the staff revise their understanding of the environment and problem. If required, they develop a new operational approach to overcome the challenges or opportunities that precipitated the need to reframe. Reasons for reframing can include:

- Changes in the original problem set.
- Significant changes in the enemy composition.
- Significant changes in the expected enemy approach.
- Significant changes in friendly capability.

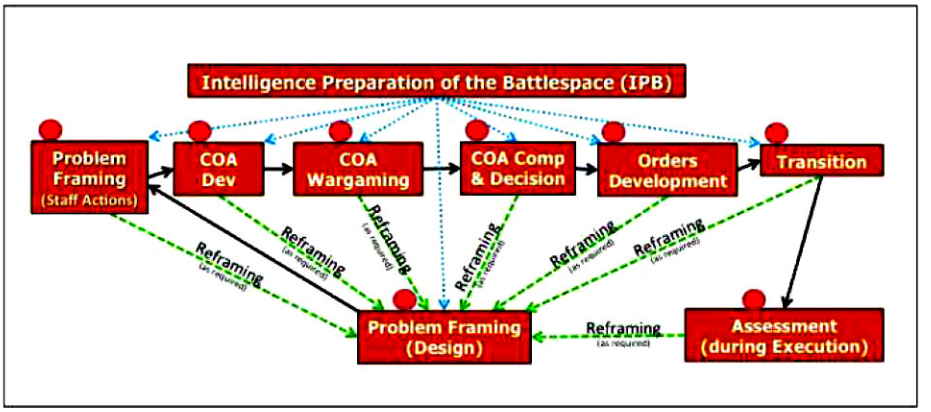

Figure 11. Reframing.

- Higher headquarters' policy changes or directives that change the desired state.
- Unexpected lack of friendly progress toward objectives.
- Shifts in international support and/or domestic will.
- Key assumptions prove to be invalid.

Note that the actions within Design exist within the first step of the MCPP—problem framing. This means that if there is a requirement to reframe, one must return to problem framing and execute the four discrete actions of Design that precede the remainder the MCPP. However, this does not mean Design is a singular effort that is finalized after the first step of planning. In reality, Design is reexamined routinely during planning and throughout mission execution when significant changes to the operating environment occur. The problem set that is derived from Design is affected when current states change or when desired states are adjusted. When this happens, Design must be reframed. Therefore, the need for reframing must be analyzed iteratively throughout planning and its omission should be a conscience decision. Notification of these changes is provided either through updates to the IPB (intelligence preparation of the battlespace) during the MCPP or through the assessment process after execution begins (see Figure 11). Once reframing begins, the MCPP must be conducted again to account for the changes in the plan. A final product may simply be a fragmentary order that is effectively transitioned to execution.

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Conclusion

Design has long been an ill-defined process within the Marine Corps that has received its fair share of questions and criticism since its doctrinal introduction in 2009. The lack of a detailed explanation of Design in existing doctrine to explain how it enhances planning and aids execution hasn't helped its cause. This article is an important step toward rectifying this problem, with the intent of promoting a clearer understanding of Design while explaining a methodology for its use within the MCPP. The cloudiness Maj Berg discussed will linger and won't magically go away after reading this article. In fact, things may appear cloudier and more questions may arise. As there is much more to Design than can fit into a single *Marine Corps Gazette* article, MSTP has embraced the role as the self-appointed institutional subject matter expert on this important topic. We have written about it, we have taught it to existing MAGTF commanders and their staffs and assessed them on it, and we have worked diligently to appreciate what Design can do for both conceptual and detailed planning. MSTP believes strongly that Design has much to offer our operational commanders and their staffs, and we remain ready to share ideas and best practices on how this important effort can facilitate victory and mission success in every clime and place.

>MSTP Notes: This article is largely sourced from the executive summary of the MSTP Pamphlet on the Marine Corps Design Methodology, which draws its content from other existing doctrinal publications. Visit the MSTP website (CAC required) at https://eis.usmc.mil. to download the Marine Corps Design Methodology pamphlet.

Notes

1. Headquarters Marine Corps, *MCWP 5-10, Marine Corps Planning Process*, (Washington, DC: 2016).

2. Desired state does not equate to an end state, although it is closely related. An end state is the set of required conditions that defines the achievement of a commander's objectives and provided by a higher authority. A desired state is a product of design that represents a feasible set of conditions at a future time, within a zone of tolerance, that are more favorable than the current state.

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