OPERATIONAL DESIGN FUNDAMENTALS

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As an element of strategy, operational design is defined as "the conception and construction of the framework that underpins a campaign or major operation plan, and its subsequent execution" (Joint Publication [JP] 5-0, *Joint Operation Planning*). Operational design helps establish a logically consistent structure from which to understand an operation's aims and, broadly, the methods and means to be used in obtaining them. In other terms, design provides a necessary "front end" to the formal planning processes described in JP 5-0 and elsewhere in this volume. The "process" of determining the overall focus of an operation—of deciding on the end state, objectives, desired effects, and so on, has been largely a matter of art throughout most of military history. Understanding certain aspects of problem solving can make portions of the commander's art more systematic, although it will never make them "scientific"—in the sense of making them prescriptive and predictable. Approaching operational design deliberately, however, can provide a foundation that facilitates decision-making by creating a structure linking decision analysis to emerging opportunities. Creating such a linkage can substantially reduce the risks associated with an operation and increase the utility of a plan following first contact with an adversary.

> **Design**
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> ***Design does not replace planning, but planning is incomplete without design.*** *The balance between the two varies from operation to operation as well as within each operation. Design helps the commander provide enough structure to an ill-structured problem so that planning can lead to effective action toward strategic objectives* [emphasis in original].
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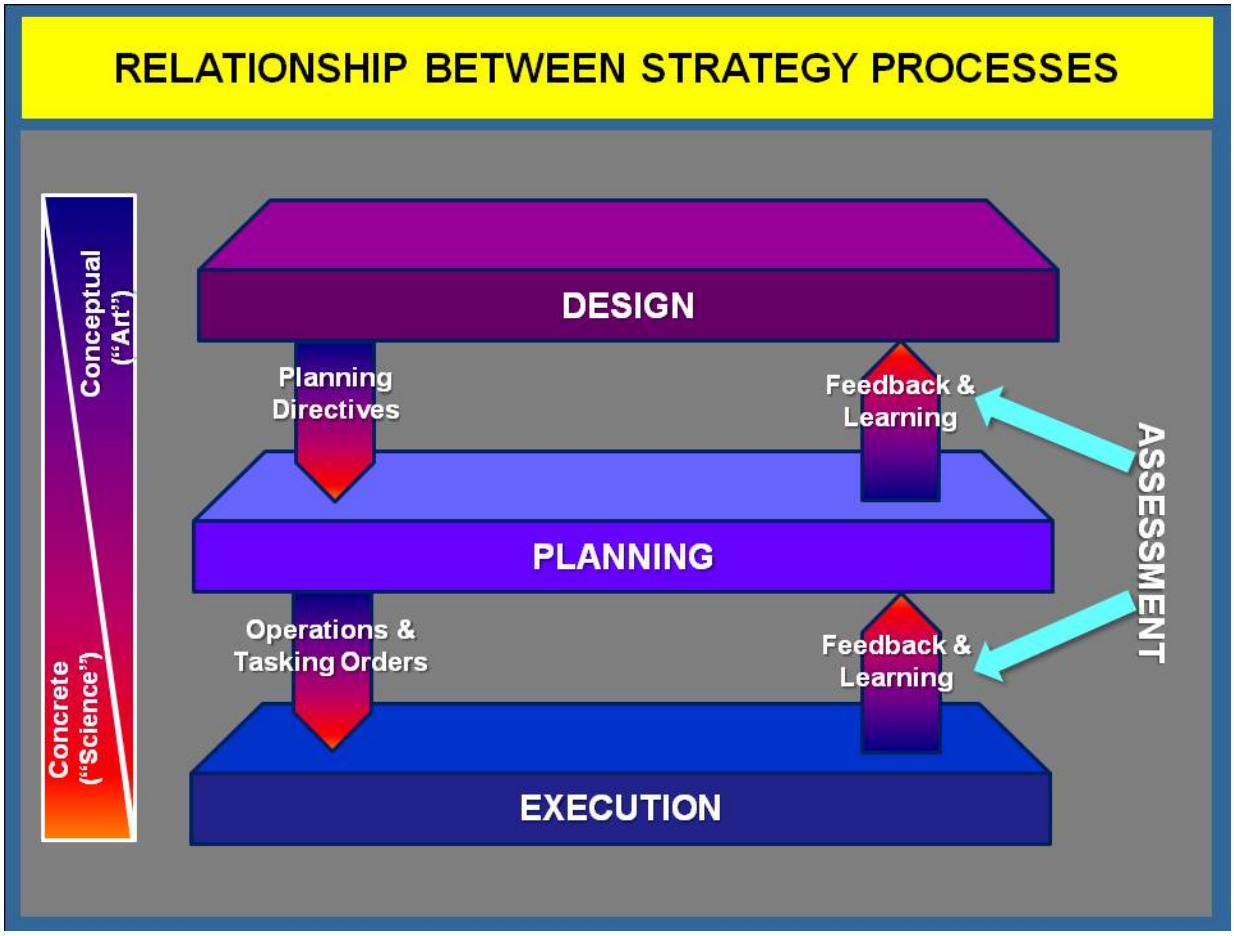
> —General James Mattis
> Former Commander, US Joint Forces Command
> *Vision for a Joint Approach to Operational Design*,
> 6 October 2009

Design consists of three closely interrelated activities, which collectively allow commanders and their staffs to understand and visualize an operation's purpose. These activities are *framing the operational environment, framing the problem,* and *developing the operational approach.* (Further discussion on these processes can be found in *Methods of Operational Design*, further along in this volume.) Design helps formulate an operational approach and the commander's initial statements of mission and intent, which in turn feed the process of course of action (COA) analysis and selection, which feeds the creation of detailed plans and assessment criteria. Plans are then executed by accomplishing tasks at the tactical level. The results are assessed and operations are adapted based on that assessment, providing input to strategy revision. Design is thus cyclic and iterative, like many other aspects of planning in general.

Operational design is the job of commanders with the support of their strategists and staffs. Planning and design are closely interrelated, since planners take the commander's overarching design concept and intent to create detailed COAs, plans, and orders for operations. Planning and design make it possible to convert broad guidance from national leadership and senior commanders and turn it into discrete tasks at the tactical level. The figure, "Relationship between Strategy Processes," illustrates these relationships.



Relationship Between Strategy Processes

Design can aid creation of formal planning products as part of deliberate and crisis action planning (CAP). The joint operation planning process (JOPP) activities and products are generally the basis for concurrent joint operation planning process for air (JOPPA) activities, which result in the JFACC's joint air operations plan (JAOP) and the commander, Air Force forces' (COMAFFOR's) component plan. The JAOP and component plans provide operational guidance until the battle rhythm is initiated, at which point strategy guidance is provided through the air operations directive (AOD). The cycle proceeds through execution to feed the reiteration of strategy formulation based on the results of the continuous process of assessment. The first steps of the JOPP and JOPPA reiterate and re-examine the products of operational design, such as the commander's mission and intent statement. The intermediate planning steps, involving the JOPP, JOPPA, JAOP, and AOD, are discussed in greater detail elsewhere in this annex.

Design work done by commanders and strategists can be likened to that of an architect in a building project, working directly with the project's "sponsors" (the clients in this illustration; national leadership in a military operation) and the engineers who help realize specific aspects of the architect's design. The engineers are the higher-level planners who accomplish the JOPPA and produce the JAOP and AODs. Tactical planners and controllers (those who produce and execute the air tasking order [ATO]) are like the artisans who create specific details of the plan. **Tactical plans tend to solve *well-structured problems***, where tactics and techniques yield one (or a very few) indisputably correct solutions to objective, empirical problems (like the best ordnance to use on a particular target). **Operational plans tend to solve *medium-structured problems***, where doctrine suggests courses of action that have clear objectives and end state, but may have a number of possible correct solutions (like the best way to win a specific battle). **Commanders and strategists, however, usually deal with *ill-structured problems*[1]**, which are far more complex and which possess the following characteristics:

- **They cannot be definitively formulated—**The information needed to understand the problem depends very much on how the problem is defined (framed). Such problems rarely have a single cause and stakeholders usually see relationships between causes and their importance differently, just as the North Vietnamese leadership saw the war they were fighting in very different terms than did US national leadership.

- **Each problem is unique and novel, as is every solution—**Doctrine and historical understanding may suggest COAs for similar circumstances, but each problem is subtly and significantly different, as are the potential solutions: Spain from 1808-12 was not Iraq in the twenties, which was not Malaysia in the fifties, which was not Iraq in the twenty-first century, despite similarities among these conflicts.

- **They have no "stopping rule"—**It is impossible to say when the problem has been "solved" conclusively and one "solution set" usually leads to another set of problems to be solved. In Europe at the end of World War II, collapse of the Nazi regime set in motion a communist conquest of Eastern Europe and required the Marshall Plan and Truman Doctrine to rebuild and protect countries remaining in the Western sphere.

- **There is no fixed set of solutions; there is no "right or wrong," only "better or worse"—**Each ill-structured problem requires a one-of-a-kind solution, and that solution often has no objective measure of success that stakeholders agree upon. "Success" often devolves into the best better-worse compromise possible among stakeholders.

- **One cannot understand such a problem without proposing a solution—** Understanding entails conceiving a solution. For example, if a regional insurgency is conceived as a result of poor governance, this yields both a different problem and a different potential solution set than if the problem is conceived of as a failure of local governance and security. Proposed solutions do not have to be fully "fleshed out," encompassing all the elements of operational design, but the framework used to conceive the problem points in the direction of a solution or set of solutions.

[1] Sometimes also referred to as "wicked problems" in planning literature, especially older material.

- **They are always interactively complex—**All actors in a given environment have great freedom of action and their interaction is non-linear, so very minor actions can create disproportionately great effects, but the same action performed at a later time may produce a very different result. In 1942, Lieutenant Colonel Jimmy Doolittle and his raiders executed a small attack against Japan that had psychological effects well out of proportion to the damage done, but massive conventional aerial attacks later in the war, including the devastation of Tokyo, after the Japanese had adapted to the reality of bombing, did not have a comparable effect on the Japanese war effort.

The interaction of complex adaptive systems almost always yields ill-structured problems. Warfighters are problem-solvers by nature, but most have been trained to solve either well- or medium-structured problems. With ill-structured problems, however, there is often disagreement even concerning the desired end state or the basic parameters that define the problem to be solved.

Design is a methodology for applying critical and creative thinking to understand, visualize, and define complex, ill-structured problems and develop approaches to solve them. Design requires the right people and the right command climate in order to succeed. Design is not a mechanistic, "checklist," or institutionally-entrenched activity and it cannot be accomplished by any one person, although the commander drives the process and plays a central role. To succeed, the organization practicing design should have a climate that encourages open, honest dialogue and exchange of ideas.

Design requires close interaction among an organization's commander, staff, the commanders and staffs of higher and lower echelons, as well as supporting commanders and their staffs. It is through interchange between different levels that shared understanding and common vision can be achieved. Leaders and staffs at higher echelons may have clear strategic understanding of the problem; those at lower levels may better understand local circumstances. Bridging these perspectives is crucial to achieving a common vision, which enables unity of effort.

Joint functional and Service components need to be involved at various levels in the initial planning stages of joint strategy development. In some cases, however, the joint force air component commander (JFACC) and key air operations center planners may need to volunteer to be included early in the joint force commander's (JFC's) design process. In such cases, **joint integration requires that a sufficient number of trained Airmen be included on the JFC planning staff**. The air component liaisons, if established, can help make the JFACC aware of pending or ongoing design and planning efforts, but it is also the JFC's responsibility to actively seek airpower expertise. Each theater or joint task force operation will likely be different, and prior coordination is required on how overall joint strategy development may occur and how airpower should be included in that effort. Theater-level design and planning exercises are vital to ensure proper integration when operations commence.