



TRANSFORMATION TRENDS—3 FEBRUARY ISSUE

“I say transforming because transformation is less a destination and more of a journey. We have to shorten every process we have. The people at the top get it and the troops get it as well. They know things go too slow with too many people chopping on things that go through this place. It is the middle level that is the last to get it. I am encouraged that we have good support at the top and good support at the bottom. So it is kind of the middle that we are encircling right now.”

Defense Secretary Donald Rumsfeld

RAPID SPIRAL TRANSFORMATION

By John Hanley, assistant director Office of Force Transformation

Rapid spiral transformation is the process for accelerating change from today’s legacy forces to tomorrow’s forces capable of conducting information age warfare. The objective is to inject incremental improvements along parallel tracks that enable the emergence of joint transformed capabilities in years rather than decades. This entails the co-evolution of concepts, organization, procedures, technology, and training. It is part of the set of overall strategies for transforming defense.

Figure 1 illustrates how to approach strategies for an uncertain future. The mountainous region is a rugged fitness landscape with many peaks, which represent fitness for the environment. It is dynamic. The heights of the peaks change over time. Each competitor has its own landscape. The landscape that the United States armed forces occupy today dominates most others. Loosely organized adversaries, such as transnational terrorist groups, are currently a greater challenge to U.S. forces than highly organized military forces, and occasionally their landscape is higher than ours in limited areas and contexts. Since potential adversaries are striving to erode the United States’ competitive military advantage, our armed forces must transform their capabilities to sustain and enhance our edge.



Transforming Defense

...Strategies for an uncertain future

Part I: Continuous small steps

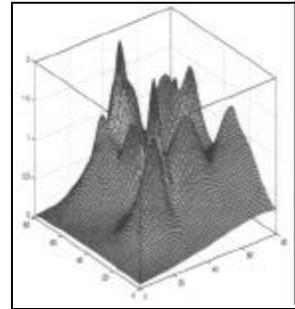
*Sustaining
Evolutionary changes
Stay on the local maximum*

Part II Many medium jumps

*Explore and expand the local region
New doctrine/organization/systems
- but within the current way of war*

Part III: A few big jumps

*Could change DOD
Change the world
Create a new game with new rules*



“If you are not making any big bets you are a fixed strategic target, and at risk.”

Figure 1

Fully understanding the fitness landscape for each potential competitor and the United States is simply not possible. We know that our efforts to shape these landscapes, though a significant factor, will not fully determine their future features. Therefore, the United States military must continually search the landscape, taking small steps to improve our current competitive position, along with medium steps and large jumps that explore terrain some distance away, allowing us to scale a higher peak and thus create a new competitive advantage. We seek a broad range of capabilities and the agility to occupy the right peak as new security challenges and opportunities emerge.

Rapid spiral development is an approach for achieving the agility that we desire. It concentrates on rapid, incremental changes to exploit improvements in technology, processes, and organization that contribute to larger jumps in concept and capabilities. Taking a large number of small-to-medium exploratory jumps, risks are low, but the payoffs quickly accumulate.

The main application of rapid spiral development is to transform joint command and control (C2) to provide:

- joint intelligence, surveillance and reconnaissance; joint fire, maneuver and sustainment needed to achieve decision superiority; deny an enemy sanctuary and conduct effects based operations.
- joint air and missile defense to protect U.S. and coalition forces and bases.



- acceleration of the speed at which joint and coalition forces can task organize, deploy, and sustain operations.

Joint tactical action should become the norm, rather than the exception. Such advances in capability represent significant jumps to enhance the competitive advantage of U.S. armed forces.

The current Department of Defense (DoD) requirements, budgeting and acquisition processes conspire to slow the fielding of new weapon systems over decades vice years. In comparison, the most competitive commercial firms today produce new products in months to at most a handful of years. Good business practice requires looking into the future to reveal trends that will affect success. However, detailed business plans rarely go beyond the next few months and undergo rapid adaptation as markets and priorities shift. Because of the time DoD takes to field major new systems, it must anticipate the security environment decades into the future as a basis for detailed planning. Were the department to have confidence in its ability to adapt rapidly in months or years to emerging security challenges and opportunities, it could dispense with the gross speculation that struggles to inform current planning efforts and allow the department overall to operate more effectively and efficiently.

DoD recently has initiated Evolutionary Acquisition and Spiral Development initiatives “to reduce our cycle time and increase speed of delivery of advanced capability to our warfighters.”¹ Evolutionary acquisition defines, develops, produces or acquires, and fields incremental blocks of hardware or software that provide a militarily useful capability defined by the user, though it may represent only a portion of capability ultimately desired. Spiral development emphasizes an interactive process among the user, tester and developer typically involving a number of linked advances in the development of each increment of capability. Air Force Instruction 63-123 further explains a process of evolutionary acquisition and spiral development. The focus of these initiatives is on delivering more capable hardware and software, while acknowledging that changes to doctrine, tactics, procedures, and organization may be sufficient to enhance capabilities to conduct a mission without involving acquisition.

An important distinction between material modernization and force transformation is that more capable hardware and software alone does not constitute transformation. One cannot look at a list of programs and say whether they are transformational independent of the concepts that will guide their use. In 1940, the French armed forces had more and better tanks and aircraft than the German army, but no concept for dealing with the Wehrmacht’s blitzkrieg strategy.

¹ Under Secretary of Defense for Acquisition Memorandum, “Evolutionary Acquisition and Spiral Development,” April 12, 2002.



Transformation requires changing rule sets regarding arrangements within organizations and among material systems. In emphasizing the rapid coevolution of the concepts, organization, procedures, and training, along with technology, spiral transformation complements the material emphasis of evolutionary acquisition and spiral development needed to transform joint and combined force capabilities. Just as coal, diamonds and graphite are all variations of carbon; different arrangements of the elements of a system can radically transform its properties.

Experimentation in exercises and operations (hereafter referred to as operational experimentation) is an underused engine for driving the spiral transformation process. Unlike concept development and experimentation that does not involve operational forces, the successes from operational experimentation advance the capabilities of participating units and staffs. They take enhanced capabilities on their next deployment or operation. Involving operating forces in experimentation as part of their training fosters innovation among a much wider portion of the forces than off-line experimentation using special units or virtual forces.

Figure 2 illustrates a simplified spiral transformation process. As shown, the process derives from DoD's transformation strategy, concepts for future operations, and the capabilities needed to execute those overarching concepts. It then identifies challenges that impede those capabilities. Experiments (exploring innovations to gain experience and improve capability) conducted in command post exercises (CPXs), field-training exercises (FTXs), and operations, explore ways to overcome the challenges that hinder achieving desired capabilities. Operational experimentation identifies deficiencies in the ability to perform specific tasks that lead to identifying solutions involving process, organization, technology, and training. *The key to achieving spiral transformation is to implement solutions in a timely manner that allows additional challenges to be addressed in the following exercise or operation.* Operational experiments also provide a venue for introducing experimental articles to take advantage of rapidly emerging technological opportunities.



Spiral Transformation Process

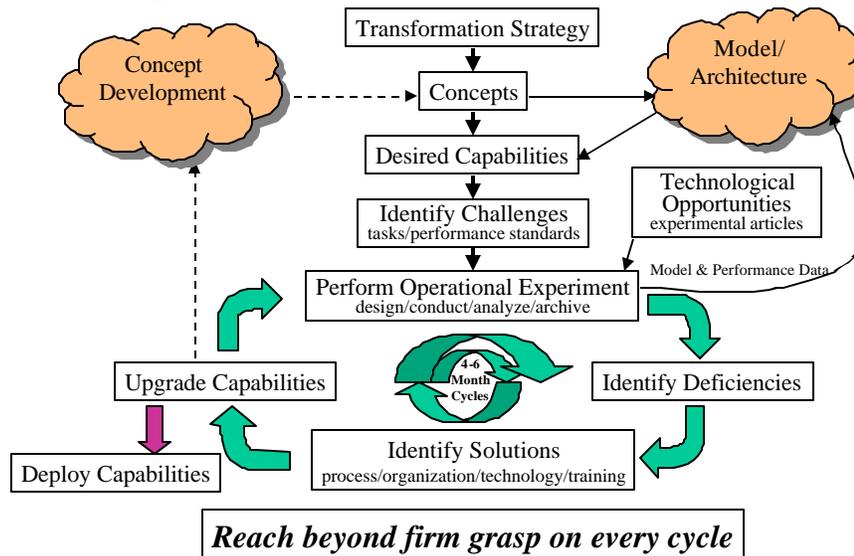


Figure 2

Operational experiments are designed to collect data on the ability to perform mission essential tasks, and the accuracy of our model/architecture that depicts how these activities are performed. Frequently, heuristic models and architectures depicting how tasks are performed (such as drawing a process chart depicting doctrine or our understanding of how a task is done) frequently do not coincide with activities in actual operations. One key to rapid improvement is to identify those innovations that produce significant increases in performing mission essential tasks and that allow the armed forces to do new tasks.

Rapid spiral transformation in capability comes from taking action to resolve deficiencies using a combination of process, organization, technology, and training solutions to upgrade capabilities in a mere few months. With upgraded capabilities, concepts evolve and the process continues forward. By reaching beyond those concepts, ideas or technologies that are easily grasped to test the bounds of our capability within each spiral cycle, the process allows rapid force transformation adapted to emerging circumstances. Involving all DoD components in operational experimentation is a way to create a learning organization that rewards innovation and regards change as an opportunity rather than a fear.



Missing Pieces

Previous successes using experimentation in a spiral transformation process include the U.S. submarine force developing antisubmarine warfare capability following World War II and recent U.S. Pacific Command Joint Task Force command and control exercises (C2Xs) to develop Joint Mission Force capabilities. A challenge for the rapid spiral development process is to employ principles of clear guidance, decentralized execution, and shared awareness that allow commanders and DoD leaders to assess the need to clarify guidance and the self-synchronization of distributed efforts.

The elements needed for successful spiral transformation include:

- Routine experimentation in exercises;
- Disciplined, rigorous exercise design, data collection, reconstruction, and objective analysis;
- Close interaction among solution developers, users, and analysts within an iterative process to ensure proposed solutions provide desired capabilities;
- Mechanisms for decentralized execution to promote interoperability and solutions that work for all commands, subject to variations required by local circumstances;
- Resources to upgrade capabilities and address additional challenges between exercises

Strengthening joint operations is the first pillar of transformation. The combatant commanders are the principal advocates for joint capabilities. Therefore, force transformation relies first on operational experimentation in joint command post and field exercises. Since the spectrum of issues involved in joint force operations exceeds the ability of any one command to address, and the issues are too important to address serially, all combatant commanders should develop and conduct robust experimentation programs—not just Joint Forces Command.²

Combatant commanders have scheduled CPXs as venues for operational experimentation. However, rarely do forces from all U.S. services (and Special Forces) train together in the field. Semiannual joint command post and semiannual joint field exercises would allow each combatant command to rapidly transform its joint C2 capabilities in ways that further DoD operational goals. Joint field exercises should certify that forces readying to deploy are ready to fight as a joint force. The forces required for field exercises need not be large, a battalion or less, using the headquarters that would serve as the component of a joint force. The principal objective being to develop capabilities required for joint tactical action, removing seams from the battlespace, and achieving “last mile” joint interoperability. Exercises conducted by



regional combatant commanders have an added advantage of routinely involving Allied and coalition partners.

The exercises are also a venue for the military services and others to introduce experimental articles, or prototypes, which allows the missions in the exercise to be accomplished in new ways. Operational experimentation such as this, taking place among all combatant commanders, results in biweekly spirals on some aspect of force transformation, yielding nearly continuous force experimentation.

Some opponents in the operating forces, who have not experimented in exercises, believe this process will interfere with training objectives. That is simply not true. When experimentation is directly linked to boosting the next phase of preferred mission capabilities, training is not adversely impacted. As Operation Enduring Freedom demonstrated, U.S. forces innovate and insert new technology to adapt to operational requirements and take advantage of emerging opportunities. Adaptation to new circumstances and technology, not merely training to some rigid, extant doctrine, should be the overall objective in all exercises. Aligning training objectives with unmet challenges to achieve desired new operational capabilities removes conflict between separate training and experimentation regimes.

The spiral transformation process involves identifying the joint mission essential tasks related to unmet capability challenges and designing experiments around those key criteria. Innovative approaches involving process, organization, and technology are encouraged and sought. Analysts identify the performance measures for the activities involved in conducting the tasks, design the experiment for the exercise and develop a data collection plan to capture process and performance information. Following the exercise, the analysis team reconstructs the activities and analyzes performance data. For decentralized execution, analysts must collaborate with their peers, sharing experimental designs and data among commands so that information can be collected and analyzed in a consistent manner across multiple exercises. This team would use, further develop and share best practices for experimentation. Interoperability would be enhanced as analysts identified differences in practices and those that work best among different combatant commands conducting similar tasks. Moreover, the analytical teams would be well positioned at combatant commands to collect the data needed to evaluate actual operations and inform transformation initiatives.

Solution developers should work closely with the combatant commands and the analysts in an iterative process. Many solutions will require creating the system interfaces needed for joint interoperability. Frequently, this involves equipping part of a joint or combined force with systems used by other components. Each exercise should involve the introduction of new capabilities to collaborate, share awareness, and operate more effectively as a joint force. Such capabilities can readily be upgraded on



semiannual cycles for the headquarters and units involved in the exercise, given sufficient funds.

The rapid spiral transformation process employs the principles of agile command and control: clear guidance (commander's intent), decentralized execution that rewards initiative, and shared awareness. The Contingency Planning Guidance; Defense Planning Guidance; Transformation Planning Guidance; and joint operational concepts provide direction from the Secretary of Defense and Chairman of the Joint Chiefs of Staff.

Decentralized execution implies that all combatant commanders experiment with defense goals and operational concepts most relevant to their individual security challenges. Joint Forces Command plays a special role developing and promoting advanced operational concepts using off-line experimentation, exploiting a collaborative experimentation environment to understand and share advances made by other combatant commanders, and supporting system interoperability.

Widely disseminating the results of operational experimentation among the combatant commands increases interoperability that allows the employment of U.S. forces in any region. Achieving this shared awareness requires a common framework for experimentation and analysis and a process that helps combatant commanders achieve joint interoperability.² Operational and system architectures, at the joint mission essential task level that actually document activities and performance in conducting tasks, could provide such a framework. An organizational effort is needed to develop this discipline, archive and evaluate the data from distributed operational experiments, and create visibility into procedural, organizational, and technological impediments to interoperability.

Finally, we need to resource opportunities, not just requirements. A rapid spiral transformation process needs resources to upgrade capabilities between semiannual experiments. Resources should be made available to combatant commanders to support transformation initiatives.³

Additional Efforts

While rapid spiral transformation, based on the experience of operational staffs and units in exercises is necessary to implement rapid force transformation, it is not

² The draft Joint C2 Operational Concept proposes a JFCOM -chaired federation of combatant commanders contributing to this objective.

³ Draft Transformation Planning Guidance calls for Transformation Initiative Funds beginning in FY 05. Alternative funds must be used if these are not made available earlier.



sufficient. Games and experiments evaluating prospective new technologies, organizations and concepts are needed to explore features of the emerging fitness landscape involving virtual capabilities and “big bets” that cannot otherwise be evaluated.

Experimental joint units that have no immediate operational responsibilities have also been suggested for evaluating larger jumps than can be achieved with units in operational cycles. The U.S. Army has used this approach to develop digital brigades and interim brigade combat teams. The main challenge is the readiness status of units involved. If units experimenting with significantly new capabilities can perform missions in ways that current forces cannot, then they are broadening the capabilities base and increasing force readiness, not degrading it. Forces that deploy on a consistent cycle have more opportunity to experiment than forces that are expected to maintain constant levels of readiness. As U.S. forces become more expeditionary, opportunities for joint experimentation following deployments should increase.

NOTE: Transformation Trends is provided as a means to highlight new and emerging issues in defense and commercial realms to key decision-makers and in no way constitutes endorsement or official recognition of any idea, concept or program.