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U.S. Army Chief of Staff Gen. Mark A. Milley meets with Maj. Gen. Anders Brännström, chief of the Swedish Army, during the 23rd annual Conference of European Armies, held 26–28 October 2015 in Wiesbaden, Germany. Senior land force commanders from more than thirty European partner nations, the United States, and Canada gathered to discuss the future of cooperative European security operations. The conference focused on the current security environment, how to win in a complex world, and freedom of movement throughout Europe.

On Convergence, Emergence, and Complexity

Lt. Gen. Patrick M. Hughes, U.S. Army, Retired

There are many truths, some valid for one, some for another. Things are not what they seem ... It is a lesson we must learn and relearn because we keep searching for certainty and certainty does not exist.

—Harrison Salisbury

We are inextricably linked to the global condition—physically, virtually, and spiritually. There is little we can do about the

linkage. Isolation is neither practical or feasible. There must be something more we can do about the antithetical values and reprehensible actions that may come

to our shores. We stand at the cusp of sweeping global change that will forever affect the nature of our culture and, perhaps, the fiber and character of our people.

In the contemporary national security environment, there are many complex dynamic pressures and conditions to consider and overcome. These pressures will intensify as the world becomes increasingly interconnected. The dynamics of *convergence*, the coming together of many conditions and events, and *emergence*, the development of continuing concerns and new challenges out of the entirety of the circumstances we face, give rise to a difficult collective security context.

New challenges require new solutions. Our goal must be to find new strategies to effectively deal with this problematic situation and implement whatever modifications or outright changes are required to meet future challenges. We ignore the reality of this new condition at our peril.

Challenges of the Information Environment

A large amount of information, in numerous forms, comes into our “organizational–cognitive–decision management” sphere in a constant flow of ever-changing qualities and substance. Timelines are short, geospatial interests are global, speed and tempo are rapid, and operational context is conditional and circumstantial. Intent is often hidden, and meaning is not clear. Deception is in play.

In this complex, contemporary information environment, unless we can somehow achieve selective understanding and parsing of the dynamic parts and engender complete fusion of all sources, methods, and processes of information, we are very likely to experience cognitive and operational uncertainty—and failure. We cannot hope to succeed without focused and deliberate efforts to improve our information processes, including analysis and synthesis required to achieve knowledge and understanding that can empower coherent action, out of the chaos of the information tornado.

The many interacting (converging and emerging) elements of information, including all sources, hazards, enemies, and conditions, require a much broader and more dense body of data and, at the same time, a more specific approach to building a viable national security knowledge base than we have had before.

In the past, a variety of events and actions were often viewed discretely—in the context of time, space (area), speed and tempo, topical impact, and other related

conditions. In some cases, we may not have known when intentions or events were formed or when they occurred, and their interrelationships were not apparent. Thus, our approach to dealing with them was dispersed and divergent. We may also have misperceived them or wrongly assessed them because of faulty information, time lag, dissimilarity, or even flawed preconceptions or biases. We may not have perceived any convergence. We focused on what we could cognitively manage.

Inadvertent change sometimes occurred through selective disregard of some events—either because they were assessed to be unimportant, or because they seemed less urgent than other events—and so their management was left to a later time. In some cases, events were wrongly assessed as positive and constructive and placed in a different context, not dealt with as problems or threats. The resulting effects changed the contextual perception and the substantial form of the point of convergence and resulting confluence. This change was sometimes *very* rapid and so dramatic that both the perception and the actual form or condition of those events changed as a direct result.

We sought a “logic thread” (links and connections) between and among the various forces of change and the events that were manifest of those forces, attempting to understand them and their relationships in order to better control and respond to conditions and, where possible, to preclude an event through anticipatory (predictive) action. We seldom succeeded, and we often told ourselves that we failed because of the complexity of the challenges we faced.

Convergence

The “new” premise is that, in the contemporary and anticipated future environment, there are many near-concurrent forces (intentions and events) at work that affect ambient conditions. These forces collectively converge at some political, economic, military, diplomatic, intelligence, law enforcement, public safety, security, and societal point. At this point of convergence, the collective effect, the synergy of these forces, is greater—much greater in some cases—than the mere sum of their singular effects. The figure below provides a real-world example of convergence.

Convergence is a nonlinear dynamic event, and the point of convergence is very complex and concentrated. One can postulate that the nature of the resulting

confluence of converging forces is so complex, and convergence happens so rapidly and in such a compressed way that, in order to develop strategies to meet the challenges of these occurrences, extraordinary mechanisms become vital and necessary.

At the point of convergence, a variety of changes may occur that add or subtract from the complexity of the contextually joined forces of change. When convergence occurs, there may be a tendency not to recognize the characteristics or the dynamics of change, or not to recognize the actual fact of convergence because it may not be apparent in conventional form. Thus, in order to effectively and efficiently deal with the net effect of convergence and its attendant synergy, we must have a new approach to deal with confluence, simultaneity, interrelationships, and especially with complexity, which we do not now seem to have.

Ideally, if we had such a mechanism—one that provided proper assessment and understanding using appropriate policies, tools, and processes—the resulting contextual view and insightful understanding of the convergence of forces for change would be less complicated and would provide greater clarity and focus. Without this modified view and insight, the nature of the original condition set may be so overwhelming and so confusing that the idea of developing strategies—and somehow anticipating, precluding, managing, mitigating, controlling, and responding to changes—may be unachievable or even incomprehensible.

Emergence

The construct of emergence is as important and impactful as convergence. Emergence can be thought of as the development—out of the whole of intent, capability, conditions, circumstances, events, and actions—of continued challenges or, more often, newly formed challenges (often with new characteristics) that we must contend with.

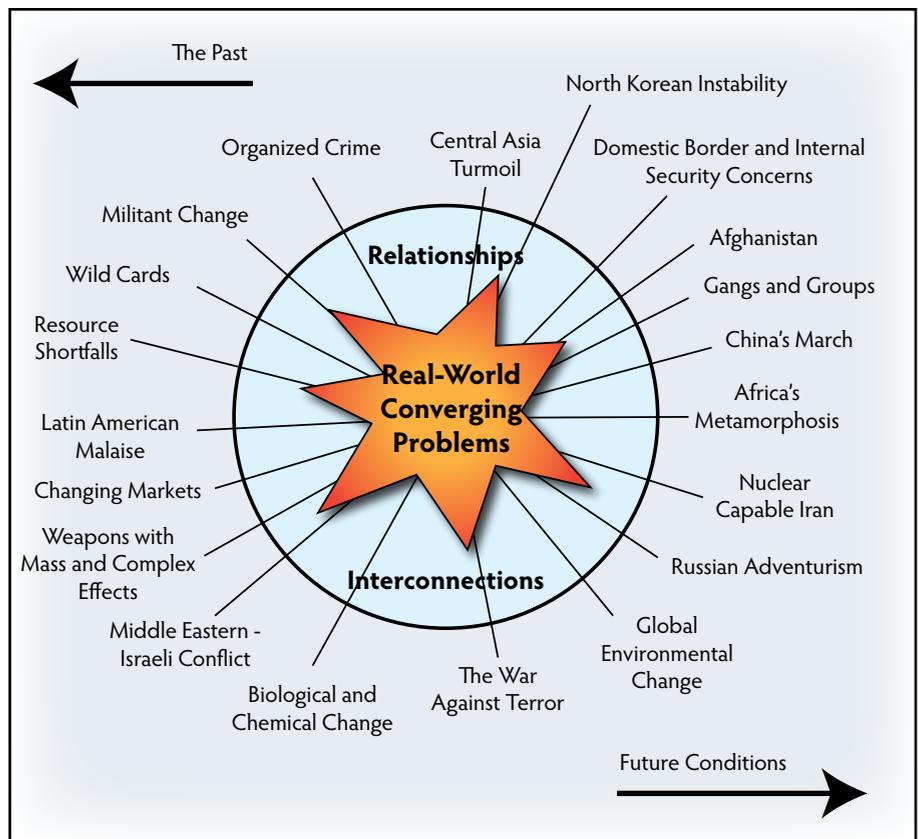


Figure. Real-World Convergence

One of the fundamental mistakes sometimes made by those who are confronted with an emerging condition is to transfer the context and the characteristics of the precondition to the new condition without considering or realizing the nature of the change that may have occurred simply through the emergence process. A lesson may be found in nature when we consider the evolution of animals from their embryonic state until they fully develop (and sometimes morph) into something quite different—although the original genus, species, or family remains the same.

The emergence of national security concerns may be very much like this—not fully recognizable or understandable if only the base information or belief is used, especially when we rely on surface observation and conventional understanding. Instead, some applied (developed) illuminating knowledge, applicable history, factual information, sensible expectations, and even imagination can in most cases predict what the evolved (emerged) condition or circumstance will look like. This is vital to insight, foresight, and anticipatory action regarding emerging challenges. If it looks like a tadpole now, it is probably going to be a frog.

Great Complexity Remains

The premise that many enemies—nation-state military as well as other applicable entities like substate actors, terrorists, or criminals—have relied upon is to create cognitive and computational dissonance (an inability to comprehend and effectively apply computational tools resulting from a complex and often misperceived or mischaracterized condition). This raises an idea or action seemingly out of the blue, frequently in an asymmetric and asynchronous nonlinear way, and sometimes confounds our best analytic efforts and clouds our perceptions. The propensity of our enemies to act in the context of surprise is one of our greatest security challenges. Its operational construct is nearly always found in emergence. We cannot hope to effectively apply the countering elements of national, state, and local capability unless we can somehow foresee the true nature of our opponents and their intentions and actions.

After achieving dynamic contextual understanding and developing knowledge—both continuous activities—we can develop a view of the forces of change and their net effect, and we can perceive their interrelationships and functional importance. If we can discern intent or accurately perceive likely courses of action, we may even be able to avoid the often-mentioned “unanticipated consequences” that have so frequently plagued us in the past. Working with and taking advantage of this newly developed knowledge and understanding should bring greater clarity and sharper focus to the imposing issues and challenges at hand. Our goals should be to reduce or see through complexity, to achieve synergy of understanding (the ability to connect and magnify the effects of points of knowledge and insight), and to develop viable responses and solutions to complex problems and conditions.

Besides using surprise, our enemies will continue to engage us using several different forms of conflict (e.g., hybrid warfare, unconventional crime, cyberwarfare and cybercrime, terrorism without traditional form, and weapons with mass and complex effects). The application of warfare and other forms of violence or crime (with national security impact) to achieve change will continue to occur, despite our best efforts to reduce it or end it. Options such as diplomacy or collegial international cooperation are worthwhile responses and hold some hope for the future. However, it is apparent that rogue groups, individuals, subnational entities, and criminals whose actions have a significant impact continue to exist, along with a few nation-states that do not share the same values

or participate in the community of nations as positive contributors to stability and peace. There is no magic antidote for this global infection. We must be prepared to fight against these enemies with appropriate force.

Any future national security challenges, no matter what form they may take, are likely to include interwoven conditions and circumstances, and new organizational structures that we may not yet fully understand. Modern communications and data processing, along with the visionary efforts of our enemies, will enable this.

It seems unlikely that even the best of people—using only their natural cognitive abilities—can achieve the knowledge base, insight, and understanding needed to reduce complexity, achieve greater clarity, and develop viable solutions to today’s complex problems. We need a set of tools, processes, and procedures, and the policies and support necessary to achieve solutions. Without them we will be overwhelmed.

Solutions

Solutions to some problems will be possible—others are likely to be persistent and insoluble. However, there are some obvious things we need that are achievable now with the right focus.

- ◆ We need better practical understanding of complexity and complex conditions. This can be accomplished by providing education and training for key personnel that will prepare them for the conditions extant and those that will develop.
- ◆ We need tools, processes, and policies that will assist with handling complex conditions and circumstances. This includes advanced computational applications and artificial intelligence that will assist the human-in-the-loop.
- ◆ We need a focused national effort to determine the right applications for the science and theory of the body of knowledge about complex systems and conditions. And, we need facilities and mechanisms to support this vital work.
- ◆ We need a future orientation that will provide us with the right focus to develop foresight to meet the next challenges. In order to achieve this precursor to success, we need the best minds and the greatest of human spirits to develop national and allied capabilities.
- ◆ As a practical matter, we will also need continuous persistent global awareness; commensurate information-gathering presence and access, analysis, synthesis,

and fusion that provides finished intelligence and actionable information; and the capability to deliver clear applicable knowledge to decision makers.

One of the key outcomes from such a consolidated and focused effort will include a revitalized national capability to design and articulate strategy, which will provide both a philosophical context and a functional guide for our responses. In the process, this could aid in the invigoration of our supporting political and public effort in a common front against our enemies and any significant or developing threats.

The Way Forward

Because the increasing speed and nature of change in the coming operational environment is indeed imposing, it is essential that we train and equip ourselves to more perceptively anticipate (foresee) strategic trends, and that we turn that knowledge and foresight into effective response strategies. We can never predict the future with certainty, but with greater, more specific effort, we can effectively anticipate possibilities and assess the probability of their occurrence. Sitting idly by, watching the future unfold and leaving our fate to others by inaction, is not an option under the high-stakes circumstances we now find ourselves in.

In order to achieve clear strategic vision, improved insight-driven planning, and appropriate actions in response to converging and emerging events, any approach should include a cadre of qualified people collaborating in a “Manhattan Project”-style effort. This cadre would share the burden of amassing and analyzing as much legally and procedurally appropriate information as possible to collectively develop means and ways to deal with anticipated or unfolding events. Our Nation can only achieve adequate understanding of how expanded areas of concern relate to each other in a thriving and ever-changing

environment by ensuring collaboration among all agencies and organizations. We should develop a common cultural and informational understanding for the purpose of planning (appropriate proportional employment) for all of the elements of national power. One of the benefits of such an approach would be to help define and strengthen our relationships with those dependable allied nations who have stood together with us in the past, to help them understand and deal with the conditions they face.

Until we approach the problems of the future with such a construct and attitude, we will continue to fall further behind in our ability to understand and estimate the future on behalf of our own strategic best interests. Our leadership and our institutions need to pay attention to the emerging future in a way that is reminiscent of, but different from, the way we have dealt with some of the greatest threats and most-dire conditions of the past—to designate the right people and resources necessary to see the way forward and to achieve strategies and an operational structure that will meet our absolute needs.

We must achieve these goals in a legal and societally acceptable way. (We have had such projects in the past—at least one of which died an early administrative death because it was perceived to be a real [or potential] threat to the constitutional rights of our citizenry.) Success will require the best minds and the partnership of legislative, judicial, and executive branch leaders as well as the best of our civilian technologists and civil rights advocates. In order to justify such an effort, we must all come to the realization that things have indeed changed over time, and we are now threatened from several vectors and points of origin by lethal threats to our way of life.

We need to deal with the challenges of great complexity, and we need motivating belief and functional capability to succeed. ■

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Notes

Epigraph. Harrison Salisbury, *Disturber of the Peace: Memoirs of a Foreign Correspondent* (London: Unwin Hyman, 1989), 233.