GIVEN THE CURRENT AND FUTURE OPERATIONAL ENVIRONMENT, ALLIANCE LEADERS WILL HAVE TO APPLY SUFFICIENT RESOURCES AND FOCUSED ATTENTION ON WARFARE DEVELOPMENT TO ENSURE NATO REMAINS RELEVANT AND READY TO SUCCESSFULLY PREVAIL AGAINST ALL POTENTIAL ADVERSARIES AND THREATS.
NATO WARFARE DEVELOPMENT

"Knowledge is far from achievement; but the leap does not start from ignorance; quite on the contrary, from knowledge."

General Karl Wilhelm von Willisen, as quoted by Marshal of France Ferdinand Foch in
The Principles of War, 1903

HE 33RD ISSUE of The Three Swords Magazine included a seminal article on warfare development, underlining its critical relevance to the Alliance. Since the publication of this article, the Alliance conducted TRIDENT JUNCTURE 2018, representing the largest combination of live fire and command post exercises since the end of the Cold War. The Alliance intends to further expand its level of ambition with the TRIDENT JUPITER series of strategic and operational-level exercises, yielding numerous relevant insights on NATO Warfare Development. Building upon the aforementioned article, this article revisits the relevance of warfare development, the potential pitfalls in the process, and methods to successfully translate experimentation and recommendations into doctrine and standard operating procedures, based upon lessons identified from the latest exercises and operations.

To successfully prevail in wars and conflicts, it is imperative to understand the historical context and evolution of the operational environment. Additionally, new threats observed in recent conflicts (such as hybrid and cyber), as well as the re-emergence of peer-to-peer adversaries, cause our security environment to steadily grow more complex and require focused warfare development thinking.

Warfare development is a critical, existential requirement for NATO.

"The rate of change is not going to slow down anytime soon. If anything, competition in most industries will probably speed up even more in the next few decades." – John P. Kotter, Professor of Leadership, Harvard Business School

Although warfare development has no officially agreed definition, a NATO working definition might include: "warfare development represents the synthesis of operational-level analysis, lessons identified through observation and coaching of exercises, doctrinal and technological developments, and capability integration and experimentation in all domains to ensure the Alliance remains relevant in current and future operational environments."

Therefore, “to keep the military edge and prevail in future operations, NATO forces must continually evolve, adapt, and innovate while remaining credible, networked, aware, agile and resilient.” As von Clausewitz put it, “war (...) is an act of violence to compel our opponent to fulfill our will.” It is, in essence, a duel at a larger scale. The ever-lasting competition to ensure that one nation or alliance can successfully demonstrate its ability to defeat potential adversaries rests upon a permanent effort to understand and dominate current and prospective domains capable of ensuring relative superiority. For example, five “military revolutions” impacting the very framework of war have been classically identified in the Western world as:

- The advent of the modern nation-state, enabling the creation of large-scale disciplined armies in the seventeenth century;
- The French Revolution of the eighteenth century merging mass politics and warfare;
- The industrial revolution of the nineteenth century, enabling the rapid equipage and movement of military forces;
- The First World War, which combined previous military revolutions and set the patterns of modern warfare;
The advent of nuclear weapons which prevented large-scale conventional war in Europe but encouraged ways to bypass the nuclear threshold through guerilla warfare and the use of proxies.

For each of these revolutions, a pattern has been set, which is sometimes referred to as "punctuated equilibrium" involving periods of violent change followed by periods of relative calm in which armies adapted to major changes in their environment. The misconception is to assume that warfare does not advance during times of equilibrium. On the contrary, it advances in anticipation of the next "violent change", thereby placing a premium on warfare development efforts.

**The Advent of the Era of "Increased Variability"**

If warfare development is increasingly necessary, it is also difficult and fraught with risk. The cumulative effects of globalization, near-instantaneous information flow, the acceleration of technological development, and the merging relationship between man and machine combine to create a new and permanently changing security environment. This fluid environment blurs clear, legal delineation between peace, crisis, and war.

More than 50 years ago, General André Beaufre predicted an era of "increased variability" when "shaping would take over execution". Using a metaphor to describe this era and the importance of investing in warfare development and rigorous prospective analysis, he compared the analysts of that era to a surgeon who would "operate on a patient in a state of permanent and rapid growth, with no clear understanding of the anatomical topography, on a moving operating table, and with instruments ordered at least five years in advance."

**Warfare development is both difficult and risky.**

Decision-makers and defence analysts understand the importance of warfare development in maintaining the edge of an alliance system against different threats and potential adversaries. Yet, military history is full of examples of failure to assess trends in developing concepts, technology and defence systems.

Warfare development is about managing change in organizations, doctrine, and equipment. Change is inherently difficult. Even with positive intent, a myriad of elements can create roadblocks leading to friction in the change process, such as the lack of resources, interoperability, and parochial interests.

The technological, economic, and psychological aspects of collective defence can unduly influence expectations. The fallacy of a "silver bullet" tends to be ever more present as swift changes in technology increase the risk of misjudging the progression of a technological evolution, which can result in overconfident nations and alliances and/or investment in technologies that rapidly become obsolete.

However, sound warfare development is not so much about fielding new technology as it is about ensuring a new concept and/or capability is consistently integrated across the doctrine, organization, training, leadership development, materiel, personnel, and facilities (DOTLMPF) spectrum. Integration remains a difficult task for a national defence system, as the different factors involved rarely...
conform to the same constraints, budgeting cycles, and chains of command. As an example, the equipment procurement cycle rarely matches the defence human resources cycle. The highly political nature of national defence decisions adds to the difficulty of maintaining consistency in the implementation of change. Administrations change hands and new political powers with different agendas or areas of interest can alter or derail warfare development execution. This leads to the obvious conclusion that what is true for individual nations represents an even more daunting task for an Alliance such as NATO, the strength of which depends on interoperability, but where capability and decision cycles can vary greatly from nation to nation.

Inherent risk exists as flawed or inconsistent warfare development efforts can yield catastrophic consequences.

The implementation of warfare development changes across different domains can prove risky in three fundamental ways: (1) the risk of overlooking necessary change; (2) the risk of overestimating change; (3) the risk of misunderstanding the ever-evolving nature of warfare.

Nowadays, most armed forces focus on the risk of overlooking a critical or "disruptive" technological or organizational change that would quickly render defence systems obsolete and create gaps in defence organizations. For example, the advent of the precision guided munitions in conjunction with expanded reconnaissance capabilities within the Alliance over the last decade of the Cold War dealt a serious blow to the Warsaw Pact.

As we contemplate the future, maintaining freedom of action in the Space and Cyber domains, retaining the lead in the development of man/machine interface, the exploitation of Artificial Intelligence advances, and new methods to achieve superiority in the information environment represent areas with an extreme risk to overlook critical change.

Conversely, the risk of exaggerating benefits from change, failure to understand the context and applicability of change, and underestimation of contributing factors to war poses an equally dangerous threat to the consistency of defence concepts. Therefore, the goal of decisively "lifting the fog of war" through technological superiority of Western militaries largely ignored the fundamental nature of the conflicts that have been prosecuted over the last two decades.

Furthermore, the basic evolutionary nature of warfare represents the primary obstacle to warfare development as modeled by Edward Luttwak: "In war, one deals with an opponent who reacts. War is most emphatically not like building a bridge over a treacherous river. Dangerous as that latter enterprise might be, a river does not consciously devise novel means to wash away abutments, drown construction workers, and generally thwart the engineer."10

Given the difficulties and risks previously mentioned, warfare development might appear an exercise in futility or wishful thinking at the Alliance level. However, ensuring that warfare development optimizes deliberate and pragmatic approaches has proven its value.

Success in warfare development requires a pragmatic approach to achieve measurable results. The JWC represents a unique asset to create, analyze, and implement warfare development products.

"I can't see any exercise without any experimentation (...) TRIDENT JUNCTURE was our first step forward. Failure [now] is not as expensive as to realize later. That's our approach."10 — Admiral Manfred Nielson, German Navy, Deputy Supreme Allied Commander Transformation.

A symbiotic relationship exists between exercises and warfare development. Large-scale
strategic/operational-level exercises enable the Alliance and participating Nations to evaluate new concepts. Additionally, these same exercises provide a mechanism to test the integration and interoperability of technology and organizational changes in the face of the most likely and most dangerous threats. Exercises also represent a unique way to infuse new mindsets, organizations and concepts into headquarters and forces, without the need for real-world combat operations. Fostering the symbiotic relationship between training exercises and warfare development requires a deliberate effort to resource an organization with the unique capability of creating a suitable training environment, such as the Joint Warfare Centre (JWC) in Stavanger, Norway.

Successful warfare development integration rests upon balancing doctrinal analysis, concept experimentation, and close support from NATO Command and Force Structures. That integration relies upon three requirements. First, it supposes a firm grasp of current doctrine and best practices, which serves as the baseline for assessing any future development. From one headquarters to next, efforts to ensure standardization and interoperability through the mastery of doctrine and best practices are eroded by personnel turn-over, frequent reorganization, and shifting primary duties. However, the frequency and consistency of exercises mitigate this erosion.

Second, warfare development requires a suitable mindset across the entire chain of command, similar to that of an explorer, accepting, and at times, even welcoming failure as a means of discovery. This can often create tension because of the heavy emphasis placed on validating the readiness of headquarters and subordinate units.

Finally, there is a need to tailor warfare development expectations to the needs and characteristics of a given Training Audience. Experimentation has its own biases and proves difficult at times to separate objective results of
experimentation and subjective factors related to the operational environment and the audience participation in the experiment.

Exercises provide the ideal venue to translate warfare development items into reality. They provide a series of realistic challenges and the opportunity to experiment without the risks associated with real-world combat, as exemplified in the Command Post Exercise (CPX) portion of TRIDENT JUNCTURE 2018. The significant level of ambition associated with this exercise and the commitment of diverse Training Audiences enabled an in-depth study of the challenges posed by Joint Campaign Synchronization across the strategic, operational and tactical levels. In the same vein, Space support challenges were successfully studied through experimentation that enabled the Space domain to reach a sufficient level of maturity to become a discipline in its own right, while sensitizing the Training Audience to the importance of maintaining freedom of action in that operational domain.

As the Alliance is planning increasingly higher levels of ambition over the next series of Command Post Exercises with the TRIDENT JUPITER Series, the relevance of warfare development products depends heavily on the ability to create a "controlled" environment for warfare development efforts. This requires the early and deliberate integration of prospective experiments with a clear view of intended purpose, which is necessary to ensure all stakeholders are sensitized to the "learning organization" process involved in a major exercise. In turn, if one considers that warfare development is an essential element of major training exercises, this requires the clarification and strengthening of the role of JWC Training Team, focused on creating the required conditions for testing and integrating new capabilities in the NATO Command and Force Structures, in close coordination with the Training Audiences.

**Conclusion**

In an era of increased variability, warfare development is a major goal for the Alliance and directly affects the ability of NATO to optimize change and successfully face current and future threats. Understanding the challenges, risks, and opportunities offered by warfare development across different domains will continue to represent a necessary condition as the Alliance adapts. Specifically, this adaptation relies on the use of sufficient resources, coherent structures, and adequate processes during major exercises. The Joint Warfare Centre is a single organization that engages every NATO Command and Force Structure headquarters and unit throughout NATO. No greater tool exists to ensure consistency and interoperability across the Alliance. It provides the venue to administer and implement NATO Warfare Development as well as experiment with future concepts.

**ENDNOTES**


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