INTERNATIONAL ARMOURED VEHICLES

Warfighting at Machine Speed: Insights from Task Force Maven's Colonel Arnel David



Defence iQ

In this exclusive Defence iQ interview, Colonel Arnel David, Director of Task Force Maven at NATO SHAPE, discusses how evolving threats, AI-enabled capabilities, and a new culture of prototyping are reshaping the future of armoured warfare. Colonel David explores the Alliance's push toward digital interoperability, the human–machine relationship, and the operational concepts that will define decision-making on tomorrow's battlefield.



Colonel Arnel David
Director, Task Force Maven
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Arnel David is a colonel in the United States Army who serves as the director of Task Force Maven, a specialized directorate focused on the digital transformation of Allied Command Operations. Prior to this role, he served as the director of the Strategic Initiatives Group in the Supreme Headquarters Allied Powers Europe (SHAPE). He is an army strategist, with multiple tours of duty in conventional and special operations units where he deployed to the Middle East, Central Asia, and Pacific. Arnel David is a military graduate and commissioned officer from Valley Forge Military Academy & College. He has a B.A. in international relations from the University of North Florida and an M.A. in international studies from the University of Oklahoma. He completed a master of arts & science from the Command and General Staff College's Local Dynamics of War Scholar Program. He completed an artificial intelligence programme from the Saïd Business School at the University of Oxford and is a PhD candidate at King's College London. He is a distinguished graduate of the Joint Advanced Warfighting School (JAWS) and National Defense University (NDU) scholar, awarded a military master of art and science in joint campaign planning and strategy. David is the founder of Fight Club International, a professional gaming network committed to improving warfighting excellence through the power of gaming, simulations and artificial intelligence.



You've had a diverse career across operational, strategic, and innovation-focused roles. To start us off, what experiences have most influenced the way you approach modern warfare and technological transformation today?

My approach has been most fundamentally shaped by two main experiences: the unrelenting speed of crisis and the pivotal importance of judgment.

1. **Speed of Crisis:** My operational experience has taught me that time compression is the critical variable in 21st-century conflict. Peer competitors can force decision cycles faster than our current processes allow. This stress on institutions and the human decision-maker has led me to champion digital transformation as a necessity for survival, not merely an efficiency measure. We must create what I've termed a modern-day "system of expedients" to maintain sound military judgment at an operationally relevant speed.
2. **The Art of Command:** Technology alone is never the answer. I've seen that the most sophisticated systems fail without the right doctrine, culture, and, most importantly, human judgment. My focus is on how technology, particularly AI and wargaming, can cultivate and accelerate intuition in senior leaders, allowing them to remain the decisive factor while offloading some of the risk and work to machines. This realization—that the human-machine nexus is key to victory—is what drives my work every day.

Task Force Maven sits at the centre of NATO's digital transformation efforts. From your perspective, what problem was Maven originally created to solve, and how has that mission evolved since the early days of Project Maven?

We acquired the Maven Smart System to solve a singular problem for the Alliance: how to rapidly integrate commercially available, battle-proven AI capability into Allied Command Operations (ACO) to accelerate the decision-making cycle and improve the efficacy of multidomain operations.

Now, we are placing more focus on multinational integration and interoperability. The evolution involves ensuring that this capability is not just powerful for a single nation, but that it works seamlessly across our 32 member states' forces, systems, and differing digital maturities. It's about proliferating a common AI-enabled operating picture to create true combat power for the Alliance. We have to get into the cloud to hyperscale.

AI systems depend heavily on high-quality, well-labelled data. How is Maven approaching data preparation and curation across Allied Command Operations to ensure these tools can be trusted in real-world environments?

To capitalize on AI applications, an ontology and lineage for data is needed. AI applications don't understand context or meaning; they understand structure. A data ontology provides the machine with a common language and framework for defining concepts, their attributes, and their relationships (e.g., classifying a 'jet' as an 'air platform' with specific 'weapon systems'). Without this shared structure, an AI model trained on one system's terminology wouldn't be able to integrate data from another. MSS establishes this common schema across NATO systems, unlocking the possibility of interoperable AI applications. This interoperability and trust are paramount in a warfighting context.

The data lineage we are building is the audit trail that traces every piece of information—where it originated, how it was processed, when it was modified, and by which application. For AI, this is vital for validation and debugging. It allows human analysts and commanders to validate the source and quality of the data feeding an AI recommendation, fulfilling the moral and operational imperative of being able to explain any decision.

In essence, MSS acts as the digital integrator of the Alliance's information—it breaks down the barriers between systems by creating a unified understanding of what every data point means and an indisputable record of where it came from. This foundational work is what ultimately allows AI to operate at machine speed with the trust and reliability necessary for command at all levels.

Human–machine teaming is becoming a major theme in defence modernisation. What does effective collaboration between operators and algorithms look like for land and armoured forces on the ground?

For land and armoured forces, effective human-machine teaming is all about offloading risk and workload to the machine while preserving the commander's cognitive freedom and lethal authority.

The Digital Staff Officer: Collaboration looks like an AI acting as a **"Digital Staff Officer"** that operates at machine speed. For an armoured Task Force Commander, this means the algorithm rapidly fusing data from diverse sources—sensors, ISR, logistics—to present multiple, pre-vetted options for courses of action, along with their predicted second- and third-order effects. The AI doesn't make the decision; it dramatically compresses the time needed for the human to make a well-informed decision.

Autonomous Assistants for Survivability: On the ground, it involves uncrewed ground and air systems acting as a persistent sensor or screen, ahead of the manned formation. They would use AI to navigate, detect threats (like drones or deep minefields), and even conduct limited counter-action, allowing the human in the vehicle to focus on maneuver, command, and the final lethal decision. The trust is built when the system is reliable, explainable, and accountable, always maintaining the human in the loop for lethal engagement. We have these “hunter-killer” platoons in the U.S. Army now working on these concepts.

With AI advancing so quickly across the commercial sector, what should defence organisations prioritise when selecting industry partners for data-driven, AI-enabled, or autonomous capabilities?

The priority must shift from simply acquiring hardware to acquiring software, data platforms, and a shared culture of rapid iteration. We must prioritize partners based on three key criteria:

1. **Platform & Architecture:** Does the partner offer a data-centric, open architecture that can easily integrate with legacy systems and, crucially, with the diverse national systems of the Alliance? We cannot afford proprietary silos. We need a platform that treats data as a shared asset and enables immediate interoperability.
2. **Battle-Proven and Iterative Approach:** We must prioritize companies that have already demonstrated the ability to rapidly iterate their software in active, complex operating environments. The traditional defense acquisition model is too slow. We are trying to embody a "prototyping warfare" mindset—working with partners who can deliver a Minimum Viable Product quickly and then refine it based on direct user feedback from exercises and operations.
3. **Trustworthiness and Values:** The partner must be ethically aligned with NATO's principles. This includes a commitment to the responsible use of AI, clear standards for data governance, and a willingness to be transparent about how the algorithms work. Trust in the technology is inextricably linked to trust in the partner who built it.



NATO nations vary widely in digital maturity. What are the biggest barriers to achieving interoperable, Alliance-wide AI solutions, and how is Maven helping to close those gaps?

The single biggest barrier is not a technical one; it's a cultural and bureaucratic one. It's the challenge of achieving data interoperability at scale across 32 sovereign nations, each with different legacy systems, classification regimes, and data standards. What I've encountered and learned is that we (NATO and Europe) tend to over-engineer policies and over-regulate our ability to access and scale tech.

1. **Prototyping as a Standard:** We don't wait for a STANAG (Standardization Agreement) to be signed before we test. We experiment and test to demonstrate the value of interoperability in a live exercise setting. By proving that a common digital platform dramatically increases lethality and survivability, we create an urgent operational pull for standardization, rather than a bureaucratic push.

2. **Common Platform Adoption:** The deployment of the Maven Smart System across NATO SHAPE and ACO provides a common, instantly interoperable data fabric and AI toolset. This creates a de facto standard, allowing nations to connect their existing intelligence and operational systems into a single, shared digital environment. With full accreditation nearly complete, this will enable software changes for additional integrations at speed, avoiding the need to go through accreditation hurdles over and over again.

3. **Skills and Talent:** We are addressing the skills gap by creating opportunities for Allied personnel to train on and contribute to this shared system, creating a common culture of digital expertise across the Alliance. In a short time, we have created hundreds of builders on our platform already.



Looking ahead, what emerging technologies or operational concepts do you think will have the greatest impact on how armoured forces fight and make decisions in the future battlespace?

The two technologies that will have the greatest impact on armoured forces are the AI-enabled Digital Backbone and Low-Cost Autonomous/Uncrewed Systems.

1. **The Digital Backbone (Network-Enabled Capability):** This is the game-changer. It's the ability to network every platform—tanks, APCs, dismounted troops, and sensors—onto a secure, AI-managed data fabric and kill web. This will move armoured warfare from sequential, stove-piped operations to simultaneous, hyper-distributed operations, where the sensor is instantaneously connected to the best effector, regardless of its platform or nationality. It will make the entire formation, from a single tank to a division, a single, highly adaptable system.

2. **Autonomous/Uncrewed Systems (Loyal Wingman/Scout):** The proliferation of low-cost, expendable uncrewed ground and aerial systems will fundamentally alter the risk calculus. These systems, working in coordinated, AI-driven swarms, will be essential for persistent scouting, screening, and pre-contact target degradation in the unmanned zone. They will allow manned armoured formations to maintain standoff, reduce exposure to enemy fires, and preserve combat mass for the decisive maneuver.

Finally, as we look toward the International Armoured Vehicles Conference, what discussions or themes are you most looking forward to engaging with the global armoured community on?

I am most looking forward to two key areas of discussion that bridge technology with combat effectiveness:

1. **The Path to Digital Interoperability.** I want to engage with our partners on how we can accelerate access of the Maven Smart System to the tactical edge. What does the network architecture need to look like.

2. **Prototypes, Not Programs:** My second theme is challenging the community to embrace "Prototype Warfare" as the primary mechanism for capability development. I am eager to discuss how we can move away from decades-long, bespoke procurement programs and instead institutionalize the urgency and agility of wartime adaptation—rapidly testing, fielding, and iterating low-cost, high-impact capabilities that close the critical capability gaps today.



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