

Written Evidence for the Defence Select Committee Enquiry on 'UK, US and NATO' by Brett Thomas¹

With a general focus on the topic: 'How will the UK's journey to becoming an 'information-led' force impact its ability to operate and fight alongside a) the US and b) other NATO Allies both in terms of the UK's potential capability gaps during the transition and the potential impact on interoperability should individual Allies adopt such a transition at differing timescales?'

Summary:

This Response ultimately addresses five broad themes: Strategic Theory, Capabilities, Command & Control: Information, Command & Control: Technicalities, Readiness & Wargaming. To assure validity across the evidence given, this report utilises many secondary sources from the likes of the late Strategic Theorist Colin Gray, to many well-established figures providing commentary in the current defence space. The analysis provides commentary relating to the question directly, as well as making a few points relating to the essential greater context.

Strategic Context:

1.1. First and foremost, those who ultimately decide upon matters of the defence of the realm must appreciate², for often they do not³, the core differentiation between the 'Nature' and 'Character' of War, as well as its most critical elements.

1.1.1. The Nature of War: "War is not merely an act of policy but a true political instrument, a continuation of political intercourse, carried on

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² C. Clausewitz, *On War*, Edited by M. Howard & P. Paret. (United Kingdom: Everyman's Library, 1993). p.744

³ C. Gray, *Fighting Talk: Forty Maxims on War, Peace and Strategy*. (United States: Potomac Books Inc., 2009), p.36

with other means⁴.” – This nature is eternally valid: it has been, it is, and always shall be.

1.1.2. The Character of War broadly relates to the contexts and environments we fight in, the ‘grammar’ of war⁵ so to speak. This character is variable, taking many violent forms and shapes throughout history and into the future.

1.2. “The political object is the goal, war is the means of reaching it⁶”. Whether it be through ‘fight’ or ‘operate’, the use of force is, whether appreciated or not, directed to political purpose. Conflict has an enduring nature, yet an ever-variable character⁷.

1.2.1. “There is an essential unity to all strategic experience in all periods of history because nothing vital to the nature and function of war and strategy changes.⁸”

1.3. To connect politics at the highest level with the tools available, the military instrument but one amongst them, strategy must be performed: “The direction and use made of means by chosen ways in order to achieve desired ends⁹”. Strategy is often imperfectly understood, and even more imperfectly used, but it is critical to ensuring our actions and sacrifices produce meaningful effect¹⁰

1.4. The function of strategy must ultimately be ‘done’: It serves a ‘bridging’ purpose, between policy/politics, across to its instruments and real-world actions¹¹. This bridge must be ably held at all times, for “there is no natural harmony among policymaking, strategic direction, and operational field

⁴ C. Clausewitz, *On War*, p.116

⁵ C. Clausewitz, *On War*, p.851

⁶ C. Clausewitz, *On War*, p.99

⁷ C. Gray, *The Strategy Bridge: Theory for Practice*. (United States: Oxford University Press, 2010). p.42

⁸ C. Gray, *Modern Strategy*. (Oxford: Oxford University Press, 1999). p.1

⁹ C. Gray, *The Strategy Bridge: Theory for Practice*, p.18

¹⁰ C. Gray, *Fighting Talk: Forty Maxims on War, Peace and Strategy*, p.48

¹¹ C. Gray, *The Strategy Bridge: Theory for Practice*, pp.29-30

command.¹² If we do not genuinely do this, we invite disaster¹³. Indeed, this has been clear in the past decade; the conflicts in Iraq & Afghanistan where we saw our: “use of force... struggling to establish a viable peace¹⁴”.

1.5. If we are to appropriately progress in our journey towards an ‘Information-Led Force’, it’s character and activity must be governed strategically. This must be managed by a genuinely active process that remembers technology is of ‘permanent significance’, but is just one part of strategy and war¹⁵.

1.6. We cannot repeat the failures of the past¹⁶; with no effective leadership on strategic matters¹⁷, or ‘strategy’ being mostly relegated to neglected documentation, referred to only when expedient¹⁸.

1.6.1. Indeed, all our work to forge an ‘Information-led’ force will not yield better political results, without this higher understanding¹⁹.

Core Capabilities:

2.1. Many Information-Age developments that alter the character of warfare warrant significant consideration, along with an appropriate shift in perceptions. But we must be wary to declare certain capabilities ‘obsolete’, when rather there is simply a further evolution in how certain tools could be utilised.

2.2. As a bedrock to interoperability, we must retain a credible warfighting capability. Serious thought on military organisation must be made to avoid

¹² C. Gray, *The Strategy Bridge: Theory for Practice*, p.127

¹³ M. Knox, ‘Conclusions, Continuity and Revolution in the making of Strategy’ in, W. Murray, M. Knox & A. Bernstein, eds., *The Making of Strategy: Rulers, States and War*. (Cambridge: Cambridge University Press, 1994). pp.614-645

¹⁴ B. Heuser, *The Evolution of Strategy: Thinking War from Antiquity to the Present*. (Cambridge: Cambridge University Press, 2010). p.486

¹⁵ C. Gray, *Modern Strategy*, p.37

¹⁶ Public Administration Committee, *Who does UK National Strategy?*. (2010). HC 435. Available Online: <http://www.publications.parliament.uk/pa/cm201011/cmselect/cmpubadm/435/435.pdf> [Accessed 30/09/21]. p.26

¹⁷ S. Jermy, *Strategy for Action: Using Force Wisely in the 21st century*. (United Kingdom: Knightstone Publishing Ltd, 2011). p.4

¹⁸ L. Freedman, *Strategy: A history*. (New York: Oxford University Press, 2013). pp.610-611

¹⁹ C. Gray, *Another Bloody Century: Future Warfare*. (United Kingdom: Weidenfield & Nicolson, 2005), p.17

the compromising of our ability to achieve ambitions and objectives, through insufficient capability²⁰. A strong core is essential to enable closer-cooperation and integration of our armed forces with that of our allies. It has always been true that we need not just high-performing capabilities, but enough of it to be militarily effective²¹.

2.3. Deliberation on Warfighting capability also cannot be made ignorant of the fact the modern battlefield will be incredibly lethal and fast-moving. The assertion that people are our most precious commodity²² is as morally right as it is strategically correct²³.

2.4. Therefore, we should genuinely question if we wish to risk a steep price in lives, to test if our underlying assumptions on the conduct of battle are warranted, that we can: “trade reduced physical protection for increased mobility²⁴” and avoid additional harm. That “lack of protection means they will likely fare worse since there are more kinds of munitions that are lighter and easier to employ that can kill them.²⁵” is a concern. Agility is a virtue, but there will be times when toughness is just as, if not more, crucial. We can increase the complexity by which we exploit information, but the results will ultimately be decided upon the battlefield in the face of the enemy.

2.4.1. Indeed, we should robustly question our assumptions, as well as the utility of our ways and means, on a continual basis²⁶. To invite allied perspectives and points of view may grant us insight unburdened by an immersion in our national defence culture.

²⁰ The Iraq Enquiry, *The Report of the Iraq Inquiry: Executive Summary*. (2016). HC 264. Available Online: https://webarchive.nationalarchives.gov.uk/ukgwa/20171123123237/http://www.iraqinquiry.org.uk/media/247921/the-report-of-the-iraq-inquiry_executive-summary.pdf [Accessed 30/09/21]. p.110

²¹ C. Gray, *Perspectives On Strategy*. (Oxford: Oxford University Press, 2013). p.171

²² Ministry of Defence, *Defence In A Competitive Age*, (2021). CP 411. Available Online: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/974661/CP411_-_Defence_Command_Plan.pdf [Accessed 30/09/21]. p.3

²³ C. Gray, *Fighting Talk: Forty Maxims on War, Peace and Strategy*, pp.93-97

²⁴ Ministry of Defence, *Integrated Operating Concept 2025*, (2021). Available Online: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1014659/Integrated_Operating_Concept_2025.pdf [Accessed 30/09/21]. p.17

²⁵ J. Watling, *The Key to Armenia's Tank Losses: The Sensors, Not the Shooters*, (2020). Available Online: <https://rusi.org/explore-our-research/publications/rusi-defence-systems/key-armenias-tank-losses-sensors-not-shooters> [Accessed 30/09/21].

²⁶ R. Johnson, 'The Changing Character of War', *The RUSI Journal*, 162, 1, (2017). p.9

- 2.5. Heavy, armoured forces, reinforced by greater fire support than we currently possess²⁷ will remain critical in many battlefield scenarios and remain a bedrock of credible warfighting capability. There are many, relatively new tactical challenges that rightly should be considered, but heavy combined arms is not obsolete simply by the presence of these challenges²⁸.
- 2.6. It is highly probable, near-certain in cases of peer-conflict, that we will be but one force amongst allies. As both a leading power within NATO, and a ‘Middle-Power’ on the world stage²⁹, we have a key responsibility to be ‘interoperable’.
- 2.6.1. This interoperability will likely scale ‘upwards’ when joining U.S.-led efforts, and ‘downwards’ if integrating smaller allied contributions into our own force structures.
- 2.7. Particularly in Expeditionary scenarios, it may be wise to integrate allied contributions into our own Brigade Combat Teams. This is key to enabling smaller allied contributions as well as alleviating potential capability gaps. This will however take much groundwork to establish as a practice, but active efforts in this regard will be well-justified.
- 2.7.1. We should fully explore these force-integration potentialities with our allies. Efforts are down on paper, particularly with regard to North European Allies in regards to the UK Joint Expeditionary Force³⁰ but they must require firmer commitment and practical steps to solidify³¹.

²⁷ H. Foster, *Exercise Illustrates NATO’s Long-Range Fires Problem*, (2019). Available Online: <https://www.nationaldefensemagazine.org/articles/2019/1/4/exercise-illustrates-natos-long-range-fires-problem> [Accessed 30/09/21].

²⁸ J. Watling, *The Key to Armenia’s Tank Losses: The Sensors, Not the Shooters*. (Link Previous)

²⁹ R. Evans, *Britain’s New Strategic Outlook: The View From Washington*, (2021). Available Online: <https://warontherocks.com/2021/04/britains-new-strategic-outlook-the-view-from-washington/> [Accessed 30/09/21].

³⁰ Ministry of Defence, *Defence In A Competitive Age*, p.19, 29, 69.

³¹ W. Jessett, *The UK’s Integrated Review: How Does It Stack Up?*, (2021). Available Online: <https://rusi.org/explore-our-research/publications/commentary/uks-integrated-review-how-does-it-stack> [Accessed 30/09/21].

Command & Control: Information in War

- 3.1. A focus on “Information Dominance” is not a new concept, the U.S. in particular³², but China³³ and Russia³⁴ too are already very aware and active in their efforts to manage and master the fight for information. Indeed, information has always been important in warfare³⁵, and this new approach is not revolutionary: “In spite of many technological developments, history and data suggest that we are probably in an evolutionary rather than revolutionary period³⁶”.
- 3.2. “Well, what happens if right from the beginning that information is not available?³⁷”. An ‘information-led’ approach will be heavily compromised within such an environment, but such a gap to how we wish to wage war and how we must hold historical precedent³⁸, and has always been strategically likely³⁹.
- 3.3. The ‘Fog of War’, certainly to the degree of denying certainty in action, is inevitable. Clausewitz himself wrote that friction is an enduring element of warfare⁴⁰, that: “War is the realm of uncertainty.⁴¹”. One should be cautious about relying upon an all-knowing information picture to unlock optimal military effectiveness, lest one: “be unable to deal with the reality of warfare when it shows up, shrouded in smoke, beset by friction, and showered in uncertainty.⁴²”

³² Congressional Research Service (U.S.), *Joint All-Domain Command and Control (JADC2)*, (2021). Available Online: <https://crsreports.congress.gov/product/pdf/IF/IF11493> [Accessed 30/09/21]. pp.1-3

³³ E. J. Burke, K. Gunness, C. A. Cooper III, M. Cozad (RAND Corporation). *People's Liberation Army Operational Concepts*, (2020). Available Online: https://www.rand.org/pubs/research_reports/RRA394-1.html [Accessed 30/09/21]. p.5

³⁴ K. Giles (NATO Defence College), *Handbook of Russian Information Warfare*, (2016). Available Online: https://css.ethz.ch/content/dam/ethz/special-interest/gess/cis/center-for-security-studies/resources/docs/NDC%20fm_9.pdf [Accessed 30/09/21]. p.3

³⁵ C. Gray, *Modern Strategy*, p.254

³⁶ P. L. Hickman, *The Future Of Warfare Will Continue To Be Human*, (2020). Available Online: <https://warontherocks.com/2020/05/the-future-of-warfare-will-continue-to-be-human/> [Accessed 30/09/21].

³⁷ B. Tingley, *Joint Chiefs Seek A New Warfighting Paradigm After Devastating Losses In Classified Wargames*, (2021). Available Online: <https://www.thedrive.com/the-war-zone/41712/joint-chiefs-seek-a-new-warfighting-paradigm-after-devastating-losses-in-classified-wargames> [Accessed 30/09/21].

³⁸ John Terraine, 'The Substance of the War', in Hugh Cecil and Peter H. Liddle (eds.), *Facing Armageddon: The First World War Experienced* (London, 1996), p.14., Comment by Lord Kitchener

³⁹ C. Gray, *Perspectives On Strategy*, p.162

⁴⁰ C. Clausewitz, *On War*, p.155

⁴¹ Ibid, p.135

⁴² M. Pietrucha, *Living With Fog And Friction: The Fallacy Of Information Superiority*, (2016). Available

3.4. In a peer-conflict, degradation and destruction of our command infrastructure and networks will occur⁴³. The rapid, perhaps even pre-emptive destruction and damaging⁴⁴ of our information and command systems: “is at the core of Chinese and Russian military approach to deterring, delaying, or defeating [U.S. Military Operations].⁴⁵”. Any technological system that enables our ability to be an ‘information-led’ force will be targeted in a peer-conflict scenario. Anything that gathers, stores, transmits or processes data will be determinedly attacked⁴⁶.

3.4.1. For the sake of resilience, more ‘mundane’ ‘human’ interoperability measures should be maintained⁴⁷ for scenarios such as above – attached translators, staff liaisons to allies, joint-training and exercises etc. – rather than being fully transferred to highly technological solutions.

3.5. Without thorough attention to resilience and redundant capability, we could face a conflict where our ‘Digital Spine’ is fractured, or perhaps even fully broken: “China and Russia have spent decades developing capabilities and operational concepts to disrupt U.S. information and command systems in space, cyberspace and the electromagnetic spectrum⁴⁸”. If we are to follow a JADC2 (Joint All-Domain Command and Control⁴⁹) centralised model, as potentially indicated⁵⁰, we do run the risk that the same effects will wholly apply to us.

Online: <https://warontherocks.com/2016/01/living-with-fog-and-friction-the-fallacy-of-information-superiority/> [Accessed 30/09/21].

⁴³ C. Dougherty, *Confronting Chaos: A New Concept For Information Advantage*, (2021). Available Online: <https://warontherocks.com/2021/09/confronting-chaos-a-new-concept-for-information-advantage/> [Accessed 30/09/21].

⁴⁴ C. Dougherty (CNAS), *More than Half the Battle: Information and Command in a New American Way of War*, (2021). Available Online: <https://s3.amazonaws.com/files.cnas.org/CNAS+Report+Command+and+Info-2021.pdf> [Accessed 30/09/21]. p.4

⁴⁵ Ibid

⁴⁶ C. Dougherty, *Confronting Chaos: A New Concept For Information Advantage*. (Link Previous)

⁴⁷ P. O’Neill (RUSI), *Conference Report: Strategic Command Conference 2021*, (2021). Available Online: <https://static.rusi.org/StratCom.pdf> [Accessed 30/09/21]. p.3

⁴⁸ C. Dougherty, *The Pentagon needs a plan to get punched in the mouth*, (2021). Available Online: <https://www.c4isrnet.com/thought-leadership/2021/05/20/the-pentagon-needs-a-plan-to-get-punched-in-the-mouth/> [Accessed 30/09/21].

⁴⁹ Congressional Research Service (U.S.), *Joint All-Domain Command and Control (JADC2)*, (Link Previous).

p.1

⁵⁰ Ministry of Defence, *Defence In A Competitive Age*, p.44

3.6. In the face of clearly highlighted capabilities meant to degrade a ‘Information-led’ approach, a decentralised approach to command and control may be called for. Tactical autonomy on levels we may be unused to may be called for to avoid a disastrous breakdown in our military effectiveness. A system utilising: “Dense and small-node networks... the least vulnerable to attack and least likely to create cascading effects when compromised⁵¹”. The technology is possible, but the military culture of enabling tactical and operational autonomy must be fostered too.

3.6.1. Many of our allies that we would likely fight alongside already have some familiarity with this model, also known as ‘Mission-Command⁵²’. The Germans regard it as *Auftragstaktik*⁵³, the Scandinavian forces under UNPROFOR in Bosnia had experience with it⁵⁴. Collaboration with our allies in this endeavour would be very valuable.

3.7. We will no doubt face an incredibly “Loud and crowded information environment⁵⁵”. One in which we risk confusion, delay, or even information paralysis⁵⁶. This could occur through, or in addition to, insufficient capability to analyse data.

3.8. Alongside a decentralised approach, a system that is ‘right enough’ rather than almost ‘100% correct’, should be our focus: “Effectively using information in warfare now requires not just the creation of large datasets, but

⁵¹ J. Schneider, & J. Macdonald, *The Information Technology Counter-Revolution: Cheap, Disposable, and Decentralised*, (2021). Available Online: <https://warontherocks.com/2021/07/the-information-technology-counter-revolution-cheap-disposable-and-decentralized/> [Accessed 30/09/21].

⁵² B. A. Friedman, & O. A. Garard, *Clarifying Command: Keeping Up With The (John Paul) Joneses*, (2020). Available Online: <https://warontherocks.com/2020/04/clarifying-command-keeping-up-with-the-john-paul-joneses/> [Accessed 30/09/21].

⁵³ W. Widder, *Auftragstaktik and Innere Führung: Trademarks of German Leadership*, (2002). Available Online: <https://web.archive.org/web/20070612045335/http://usacac.leavenworth.army.mil/CAC/milreview/English/SepOct02/SepOct02/widder.pdf> [Accessed 30/09/21].

⁵⁴ T. Ingesson, *Trigger-Happy, Autonomous, and Disobedient: Nordbat 2 and Mission Command in Bosnia*, (2017). Available Online: <https://thestrategybridge.org/the-bridge/2017/9/20/trigger-happy-autonomous-and-disobedient-nordbat-2-and-mission-command-in-bosnia> [Accessed 30/09/21].

⁵⁵ R. Hersman, *Wormhole Escalation in the New Nuclear Age*, (2020). Available Online: <https://repositories.lib.utexas.edu/handle/2152/83221> [Accessed 30/09/21].

⁵⁶ Ibid

the ability to interrogate them and make decisions in the face of uncertainty.⁵⁷
” We must be concerned not so much with the entire capture of information flows, but with “the decision-making process and the links to effective action.⁵⁸
”

3.8.1. This point can apply to the highest levels of political decision-making. We should consider if a ‘Digital Backbone’ truly will deliver “faster, better decisions⁵⁹”. Whether it be through highly-educated planners or AI optimisations, will those in charge truly liaise and come to terms with the information?

Command & Control: Technicalities

5.1. “Fine-sounding concepts alone achieve nothing.⁶⁰”. We must ensure the proper development of concept into doctrine, likely with joint development of such with representation from across the domains. Only then, can we truly practice an ‘information-led’ approach. This process must be unclouded by bureaucratic sentiment, wishful thinking by decisionmakers⁶¹ or undue financial concern⁶².

5.1.1. If we can speedily develop a ‘right-enough’ approach, we can refine it with the help of our allies, and in-turn, assist allies who may be on later timescales.

5.2. We are likely entering a period where ‘Multi-Domain Command & Control’ (MDC2), enabled by AI/ML (Artificial-Intelligence / Machine-Learning), could become a character-changing innovation in warfare.

⁵⁷ J. Schneider, & J. Macdonald, *The Information Technology Counter-Revolution: Cheap, Disposable, and Decentralised*. (Link Previous)

⁵⁸ M. Pietrucha, *Living With Fog And Friction: The Fallacy Of Information Superiority*. (Link Previous)

⁵⁹ Ministry of Defence, *Defence In A Competitive Age*, p.44

⁶⁰ C. Gray, *Perspectives On Strategy*, p.10

⁶¹ R. H. Scales, *Forecasting The Future Of Warfare*, (2018). Available Online: <https://warontherocks.com/2018/04/forecasting-the-future-of-warfare/> [Accessed 30/09/21].

⁶² Defence Academy of the United Kingdom, *Getting Strategy Right (Enough)*, (2017). Available Online: <https://nebula.wsimg.com/68287520fb0f33e0aad004ced7281f33?AccessKeyId=5F5B89AA45A3D66BEBBD&disposition=0&alloworigin=1> [Accessed 30/09/21]. p.8

5.2.1. As a ‘Middle Power’ and leading member of NATO, we have a key opportunity to encourage jointness in these development processes alongside our allies, to enable common elements that will greatly improve our interoperability in the future.

5.3. If we wish for truly joint elements in command and control – across domains, and across allies - development and procurement processes must be interlinked. “The major elements in a modernized OA [Operational Assessment] process are automated information processing, analysis that includes forecasting (e.g., leveraging NLP [Natural Language Processing – Recognition & Translation], assessment (e.g., using expert systems), a joint all-domain operational picture, and automatic assessment reporting⁶³”. A synergistic approach to the development of these capabilities must be a priority.

5.3.1. A key challenge in MDC2 will be the harmonisation of domain battle ‘rhythms’ and speeds, AI/ML will no doubt assist in this endeavour⁶⁴.

5.3.2. Our own preliminary programmes, namely MORPHEUS, LE-TacCIS, THEIA and so on mustn’t just be developed at the same time, but fully co-ordinate and communicate with each other. They are crucial in cultivating an ecosystem that would enable future developments in AI/ML.

5.4. All manner of AI/ML assisted command and control innovations will occur. Due to the vast technical challenges involved, it may be wise to align ourselves to underway efforts in the U.S, or lead the way with included partners. Joint-development could ensure interoperability standards are met, and duplication of effort amongst allies avoided.

⁶³ S. Lingel, et al (RAND), *Joint All-Domain Command and Control for Modern Warfare: An Analytic Framework for Identifying and Developing Artificial Intelligence Applications*, (2020). Available Online: https://www.rand.org/pubs/research_reports/RR4408z1.html [Accessed 30/09/21]. p.32

⁶⁴ Ibid, p.34

5.5. Algorithms are a current area where: “Almost all algorithm development is currently driven by commercial demands and academic interests, whereas the needs of the military will likely require more complex algorithms, larger amounts of data, and user expertise.⁶⁵”. A greater military role in algorithm development must be sought, acting alongside but not outmatched by private actors.

5.5.1. With our newly founded National Cyber Force, alongside DSTL, we are uniquely poised to lead allied cyber efforts in general, and in particular, encourage jointery and lead efforts in military algorithm development.

5.6. Standards – “Defining technical specifications, requirements, guidelines or characteristics⁶⁶” - are critical to ensuring interoperability of our ‘information-led’ force: “[That] increasingly capable technologies developed in different countries, in different years and by companies operating in different industries can work together and interact efficiently is, to a significant extent, a product of standards⁶⁷”. They are quite literally “the backbone of interoperability⁶⁸”.

5.6.1. We must take a leadership role in influencing standards if we are secure significant technological interoperability with our allies.

5.7. With equal standards, even with different national procurement processes, we could ensure much technological interoperability between allied forces. With a genuine dialogue between allied defence departments to ensure standards are matched, backed up by joint exercises to work out initial issues, we could ensure close synergy with other national forces we’d likely be fighting

⁶⁵ S. Lingel, et al (RAND), *Joint All-Domain Command and Control for Modern Warfare: An Analytic Framework for Identifying and Developing Artificial Intelligence Applications*, p.23

⁶⁶ National Institute of Standards and Technology, *US leadership in AI: a plan for federal engagement in developing technical standards and related tools*. Prepared in response to Executive Order 13859, (Washington, DC: US Department of Commerce, 2019.)

⁶⁷ A. Gilli, “*Nato-Mation*”: *Strategies for Leading in the Age of Artificial Intelligence*, (2020). Available Online: <https://www.ndc.nato.int/download/downloads.php?icode=671> [Accessed 30/09/21]. p.81

⁶⁸ Ibid

alongside. If programmes such as F-35 can achieve this standard⁶⁹, other, less-complex platforms could do so too⁷⁰.

5.7.1. Of note, shared technical standards need not necessitate identical doctrinal employment of the technology. Our allies are militarily and culturally diverse with differing perspectives and methodologies, complete standardisation should not be the core goal⁷¹.

Readiness & Wargaming

6.1. “To simultaneously integrate battlefield activities from separate services against high-value enemy targets... requires a degree of interdependence, coordination, and cooperation seldom seen in modern military history⁷²”. To truly evolve how we fight and operate will take time, effort and resourcing. Though now, at the start of the process, we have the unique opportunity to plan appropriately, and facilitate cooperation and collaboration at scale.

6.2. “An industrial-era military that employs information technology is not the same as an information-age military⁷³”. And a force that simply communicates or plans, rather than fully immersing allies in a unified command and control system, is not significantly interoperable.

6.3. Proactive Wargaming and Exercises are critical to establishing a credible evolution of our forces, to implementing MDC2, and to reinforcing and

⁶⁹ F-35 Joint Program Office Public Affairs, *F-35 Joint Strike Fighter Demonstrates Enhanced Interoperability with Initial Coalition Mission Data (CMDx) Flight Tests*, (2020). Available Online: <https://www.dvidshub.net/news/376510/f-35-joint-strike-fighter-demonstrates-enhanced-interoperability-with-initial-coalition-mission-data-cmdx-flight-tests> [Accessed 30/09/21].

⁷⁰ R. Sisk, *US and NATO Radios Can't Talk to Each Other. The Air Force Wants to Change That*, (2019). Available Online: <https://www.military.com/daily-news/2019/04/26/us-and-nato-radios-cant-talk-each-other-air-force-wants-change.html> [Accessed 30/09/21].

⁷¹ J. Verhaeghe, *Is NATO Land Operations Doctrine Aiming Too High?*, (2021). Available Online: <https://warontherocks.com/2021/08/is-nato-land-operations-doctrine-aiming-too-high/> [Accessed 30/09/21].

⁷² T. Greenwood, & P. Savage, *In Search Of A 21st-Century Joint Warfighting Concept*, (2019). Available Online: <https://warontherocks.com/2019/09/in-search-of-a-21st-century-joint-warfighting-concept/> [Accessed 30/09/21].

⁷³ B. A. Friedman, & O. A. Garard, *Technology-Enabled Mission Command*, (2020). Available Online: <https://warontherocks.com/2020/04/technology-enabled-mission-command-keeping-up-with-the-john-paul-joneses/> [Accessed 30/09/21].

highlighting standards, practices and understanding of significant interoperability amongst allies.

6.4. To provide an effective development process of new ‘Information-Led’ doctrine (notably including MDC2) and approaches, we must do so via iterative understanding and practices⁷⁴. This could well take the following form⁷⁵:

- Identification of Issue(s) / Testing Objectives
- Multi-Domain Exercises/Wargames undertaken
- Findings Analysis – Applicable to interactions with data & information, command and control processes, effectiveness of algorithms etc.
- Implementation of Improvements & Refinements
- Repeat

6.5. The process cannot be done on paper, it requires thorough experimentation to get right. “This [Interdependence, Coordination, Cooperation] can only be realized through an aggressive combatant command-level exercise program that requires joint force headquarters (in concert with service component headquarters and service-provided forces) to collectively engage in realistic and recurring multidomain-focused training exercises at scale.⁷⁶”

6.6. The adoption of a particular American measure, the “All-domain control teams, comprising a mix of command and control professionals from the different military services⁷⁷” may be a wise idea. When utilised in exercises going forward⁷⁸, they are a key measure at both the operational and tactical level that could facilitate MDC2 development, providing the bedrock for allied integration efforts.

⁷⁴ S. Lingel, et al (RAND), *Joint All-Domain Command and Control for Modern Warfare: An Analytic Framework for Identifying and Developing Artificial Intelligence Applications*. For More Information, see section: Convergence Across C2 Construct, Data, and Algorithms, pp.54-56

⁷⁵ Ibid

⁷⁶ T. Greenwood, & P. Savage, *In Search Of A 21st-Century Joint Warfighting Concept*, (Link Previous)

⁷⁷ L. Cowie, et al, *To Build Joint Command and Control, First Break Joint Command And Control*, (2021). Available Online: <https://warontherocks.com/2021/07/to-build-joint-command-and-control-first-break-joint-command-and-control/> [Accessed 30/09/21].

⁷⁸ Ibid

6.7. Immersing allied liaisons and inviting allies to participate in multi-national wargames will establish practices and reinforce cohesion that will be invaluable in times of conflict. We should lead efforts within NATO to encourage allies to partake in joint-exercises, as well as exercise our own initiative in hosting multilateral exercises directly intertwined with our defensive efforts – such as the UK Joint Expeditionary Force, Heavy Brigade Combat Teams – involving action across domains, at different levels of the conflict spectrum.

Recommendations:

- **Promote Strategic understanding at the highest levels.**
- **Consistently question core assumptions about the contemporary character of conflict and what it means for us.**
- **Ensure genuine resilience in force structures and technological innovations.**
- **Consider decentralised Command & Control methods.**
- **Facilitate greater allied integration and attachment into British force structures.**
- **Pursue joint-efforts for MDC2 development.**
- **Take a leading role in promoting joint-efforts for AI, Algorithm Development and Common Technical Standards across NATO.**
- **Escalate the scale and speed of Wargames & Exercises, pursue as comprehensive an allied involvement within them as possible.**