

Defense Innovation and the Future of Transatlantic Strategic Superiority: A British Perspective

By Trevor Taylor

The Defense Innovation Initiative — also referred to as the Third Offset Strategy — was announced in November 2014, aiming to “identify and invest in innovative ways to sustain and advance U.S. military dominance for the 21st century.” To address the erosion of U.S. technological superiority and conventional deterrence, the U.S. Department of Defense announced an ambitious innovation-based program to offset the competition particularly from states in a long-term perspective. The assessments that served as the basis for this strategy — the rapid modernization of China’s defense, emerging Russian ambitions and capabilities, the need to foster exchanges between public and commercial actors in defense innovation, and the general spread of precision munitions and guided weapon systems — have remained relevant after the 2016 elections, and U.S. allies must consider how this initiative may affect their military cooperation in the long run. This analysis is part of a series of responses to the initiative from U.S. allies.

The British political situation in late 2017 is in an unusual state of upset. Arguments within political parties are commonplace, as are differences among ministers, but the current situation is abnormal. With the Brexit issue at center stage, the major British political parties are both internally divided on the fundamentals of the country’s economic, political, and thus by implication security future. On the other hand, the defense and security community, inside and outside government, appear relatively united: To a greater or lesser extent they accept that the U.K. will leave the EU, and would prefer the minimum economic, political, and security disruption. Furthermore, whatever the political chaos of the day, external security threats require constant attention and long-term planning must continue — and it is. Emphasis on innovation has been a key component of U.K. defense planning for some years, arguably to the launch of the capability-based approach to requirements in the Smart Procurement Initiative of 1998, but with the new U.S. Defense Innovation initiative, the pressure has increased. London is keenly aware that it cannot fall behind ever more powerful and forceful adversaries, and will need more than ever to keep pace with allies as it prepares to exit the EU. Key features of the U.K. approach to innovation are the provision of (modest) state funding, a readiness to see government working with industry, and faith in the innovative capacities of small and medium-sized enterprises (SMEs).

Reaction to the U.S. Third Offset Strategy

Behind the Third Offset Strategy (TOS) is Washington’s diagnosis that Western capabilities face fundamentally novel threats that require a robust investment and



renewal of forces and tools. This assessment is taken seriously and implicitly accepted in the U.K., though there has been little public attention on the matter.

Within the defense community, however, the TOS announcement generated some concerns that a step-level change in U.S. capabilities would make it either difficult, expensive, or impossible for the U.K. to maintain the necessary interoperability to preserve its ambition to be able to deploy British forces alongside those of the United States on day one of a major state on state operation. Concerns about falling behind and out of step are, however, slightly mitigated by a series of separate procurement decisions to buy major equipment from the United States. This has been an increasing feature of British acquisition since 2003, when it was associated with the changing needs and thus urgent operational requirements of the campaigns in Iraq and Afghanistan. Purchases from the United States continued with the post-2014 commitments to the Protector (Reaper-based unmanned combat aerial vehicle), the Apache E model, the P-8A, and of course the F-35B — the U.K. relies on U.S. technology for virtually all airborne intelligence, surveillance, and reconnaissance (ISR) assets except the Thales Watchkeeper. Nonetheless, procurement is not enough and the TOS certainly influenced London's decision to maintain, and perhaps increase, its public commitment to innovation broadly defined.

The U.K. research innovation efforts detailed below could thus be interpreted as an insurance policy, aimed at leading to the U.K. having some valued niche technologies. These technologies could then secure its commercially valued access into essentially U.S. programs, which was broadly the case with the F-35.

Political developments in Washington, DC since 2014 could have changed calculations in the U.K., but at least in the field of defense, they have had only modest effect. No one can ignore the potential significance of the transatlantic relationship of a U.S. president who in the past has made U.S. support for NATO conditional on Europeans spending more. The public in Britain, too, is concerned about potential U.S. behavior, especially with regard to North Korea and Iran. But this has not fundamentally changed

calculations within the British defense and security community on the importance of trying to respond to U.S. capability developments.

Though the U.K. has a long history of a collaborative (some would say dependent) relationship with the U.S. for some capabilities, London is also serious about working more closely with Europeans. This has been the consistent position from the U.K. security and defense establishment and has been underlined since the referendum result in 2016.¹ However, the U.K. regards national specialization in defense in Europe as a matter for each government and the U.K. is not yet ready for detailed commitments in this domain.

As for Britain's defense industry, its capacity to influence debate is issue-dependent but in general remains modest. British governments have not consistently applied a defense industrial strategy except in the niche areas of nuclear forces and complex weapons, and in general have stood by when British firms have either gone out of business or been bought by overseas firms. BAE Systems is a very large enterprise and by far the dominant U.K. defense firm, but the defense firms immediately below in terms of U.K. employees are foreign-owned.



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Insofar as they seek to influence government, firms use their individual resources as well as operate through the two central industrial associations, Aerospace, Defence, and Security (ADS)² and NDI which is the defense arm of EEF, “the manufacturers’ organization.”³

1 Government of the United Kingdom, “Foreign Policy, Defence, and Development: A Future Partnership Paper,” September 12, 2017; Patrick Wintour, “U.K. Offers to Maintain Security and Defense Cooperation with the EU,” *Guardian*, September 12, 2015.

2 See Aerospace Defence Security Space, <https://www.adsgroup.org.uk>.

3 See NDI, <https://www.eef.org.uk/ndi>.

Defining the Challenges

Threat Perceptions: The Political Setting

The U.K. since 2008 has generated national security and defense documents that spell out the official perceptions of threats to U.K. security as a whole. After the Labour Government's National Security Strategy of 2008 came the Conservative-Liberal Democrat's Strategic Defence and Security Review (SDSR) of 2010. This was in turn succeeded by the Conservative Government's 2015 National Security Strategy and Strategic Defence and Security Review (NSSDSR) document. The intention was to publish such documents every five years, reflecting the lives of (most) parliaments. However, changing international and national circumstances, including the changed U.K. financial position, led to pressures for an update to the 2015 document, (a National Security and Capability Review) in 2017.

In terms of security threats arising from human animosity (as opposed to challenges more closely associated with nature such as epidemic diseases and "natural" disasters) there is unanimity about the challenges posed by Islamic fundamentalism and terrorism. How best to deal with them is tricky but clearly, they constitute an important challenge.

The U.S. Third Offset Strategy is based on the perception of an erosion of U.S. conventional deterrence vis-à-vis potential competitors such as China, Russia, Iran, and North Korea, and from the need to find a technological answer to the spread of precision munitions around the globe. British threat perception shares many of these concerns, but remains more ambivalent toward China.

Since the invasion of Ukraine in 2014, accompanied by Russian efforts in the information and cyber domain, Russia has had once again to be regarded as a threat by London, particularly to NATO Allies and to the credibility of the Alliance. There is awareness of the need once more to deter Russia, although the door has been left open for return to a more cooperative agenda. Reflecting the limited size and capability of Russia's armed forces, the perceived threat is not of a Russian invasion of the whole of Western Europe, as was the case in the Cold War, but of Russian aspirations

to intimidate vulnerable NATO Allies, most obviously the Baltic states, and even to take over limited areas of NATO territory. In addition, attention has to be paid to Russian disruption efforts in cyberspace. In terms of Russia's threat to the Baltics, the British government is relying on the presence of NATO air and land forces, with the U.K. making a significant contribution to discourage any Russian use of armed force. Privately the army is digesting the implications of Russian deep strike capabilities, the problems for the location and role of headquarters, and the need for constant movement of units and logistics, but as yet there is not the same open debate as in the United States.

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Moreover, in 2017 the U.K. celebrated the arrival of its long-awaited aircraft carriers, the possibility that they could be attacked by large volleys of long-range anti-ship missiles.

In regard to Iran, capabilities represent a potential threat to U.K. capabilities in the Gulf, including the Bahrain base, there is preference to keep the Iranian nuclear deal and to cope with Iran's activities in other ways.

Finally, China is presented in the 2015 NSSDR as a strategic partner with minimal attention paid to its claims in the East and South China Seas. Like other European states, the U.K. is concerned with promoting British exports to China and Chinese investment in the U.K. However, a hint of change, or perhaps of U.K. enthusiasm to support the United States, was the announcement in 2017 that the Royal Navy would send a warship to East Asia to take part in "freedom of navigation" exercises.

The value of cooperation with China has clearly been enhanced by developments in North Korea. There is awareness that the advancing nuclear weapon and missile capabilities of North Korea mean that Pyongyang is developing the capacity to hit Western Europe including the U.K., although the scenarios under which North Korea might opt to take this step

are not easy to write. However, the North Korean activities clearly help to justify the U.K. nuclear deterrent. The more pressing issue concerns the U.S. responses to North Korean aspirations and activities and the potential consequences of war in the area.

Technological and Military Shortcomings

The British government is reluctant to acknowledge the increasing vulnerability of some of its major platforms publicly, not least surface ships and large aircraft. After a very significant gestation period dating back to 1998, it is only now in the late stages of bringing into service its two new aircraft carriers.

Nonetheless, there is full awareness of some key elements: Russian and Chinese advances in anti-air missile technology in terms of range; Chinese progress with anti-surface ship weaponry, again speed and range; Russian advances in heavy indirect fire that will put large fixed land headquarters at risk and require dispersal and regular movement by Western land forces; Russian underwater capabilities especially relevant in and around the Baltics; and Russian and Chinese potential to disrupt the military uses of space by Western countries for surveillance, communication, navigation, and intelligence gathering. Finally, Russian, Chinese, and North Korean activities and aspirations in the cyber domain are accepted challenges that are currently dealt with on a daily basis.⁴ In short, many British large platforms and immobile installations lack protection in the light of the advances of potential adversaries who have been seeking to deny safe access to regions adjacent to their territory. The U.K. is clearly no worse off in this regard than other European allies.

The U.K. Stance on Defense Innovation

For the U.K., defense innovation is a necessary response not only to identifiable future threats and adversaries' advances, but also to the innovation of partners and the support for its national defense industry. There is no doubt that the stress on innovation in defense has increased since 2014, although it is difficult to say just how much this is due to American thinking. Other contributing factors have been the

4 See John Louth, Trevor Taylor, and Andrew Tyler, "Defence Innovation and the U.K.: Responding to the Risks Identified by the US Third Offset Strategy," RUSI, July 11, 2017.

rising costs associated with established defense equipment and the faith in the U.K. potential for innovation on which some Brexiters rely for a prospect of economic success after 2019.

In September 2016, the U.K. Ministry of Defence announced its new Defence Innovation Initiative (DII).⁵ The government information release announcing the initiative summarized several strands of thought involved, including the importance of commercial-origin technology.⁶

A key element of guidance was the seven-point list of generic defense challenges where innovation was expected to contribute:

- Project military power against sophisticated adversaries, responding to the global proliferation of advanced capabilities aimed at reducing our reach, with innovative ways of developing, operating, and sustaining our Armed Forces.
- Deliver non-traditional and novel ways to have effect beyond traditional weapons systems against sophisticated adversaries, allowing U.K. defense enterprise to continue to offer a versatile range of options to decision makers into the future.
- Understand and take effective decisions in the information age, ensuring defense leaders have access to the best information possible to inform understanding of critical issues and enable decision-making that outpaces our adversaries.

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5 U.K. Ministry of Defence, "Advantage Through Innovation: Defence Innovation Initiative," London, November 2016; Speech by Secretary of State Michael Fallon, "Defence Innovation Initiative" September 16, 2016.

6 "Advances in technology hold enormous potential for the United Kingdom's security and prosperity whilst also posing risks as they become available to adversaries who may seek to use them against us. The global landscape has shifted with the private sector driving today's rapid pace of technological, social, and cultural change. Innovation is therefore important to maintaining our military advantage into the future. We must adapt to stay ahead and achieve our goal of maintaining strategic edge." Government of the United Kingdom, announcing the "Advantage Through Innovation Paper," September 2016.

- Adapt with agility to anticipated changes in the strategic environment, setting the organization up to better recognize the need for strategic change and exploit opportunities to respond with greater speed.
- Maintain robust strategic deterrence into the future.
- Optimize the future workforce to meet anticipated needs, finding sustainable and effective approaches to deliver the resource and skills Defence needs in the coming decades.
- Influence potential adversary choices on terms favorable to the United Kingdom, developing competitive strategies and leveraging the U.K.'s comparative advantages to dissuade adversaries from acting against U.K. interests.

Specifically as to *how* innovation should be driven, London has long believed that SMEs are a key source of valued innovation and agility. The Ministry of Defence has thus developed instruments to encourage SMEs to get involved in with defense. One such instrument is the Centre for Defence Enterprise (CDE), which was set up under the Labour Governments of pre-2010. The CDE's role was to provide small grants to SMEs to enable them to conduct specific pieces of innovative research. Because its activities were considered so successful, they have been continued, albeit with a different badge: the Defence and Security Accelerator scheme.⁷

Also reflecting a desire for novel solutions, the Ministry of Defence created Niteworks, a not for profit organization dating back to the pre-2010 Labour administrations where government and industry provided a few full-time people but that was largely staffed by consultants from industry assembled to work together on defined defense challenges. There are more than 170 organizations involved including Ministry of Defence, major defense contractors, SMEs, tech specialists, consultants, and academic institutions.⁸ Niteworks has survived and

indeed increased the scale of its activities since the Conservative Party became the dominant party in government in 2010 and then the sole party in 2015.

To support innovation, but more widely to strengthen British defense industrial performance, governments since 2010 have emphasized industry-government cooperation as the way forward. Thus, Defence Growth Partnership has supplemented Niteworks with its numerous sub-groups including the Defence Solutions Centre.⁹

The financial center of the U.K. approach to defense innovation is a Defence Innovation Fund that should add up to £800 million over the decade from 2016. This was to be new money in addition to the floor on defense research spending set at 1.2 percent of the defense budget after 2010. Organizationally, the DII continued some existing arrangements, laid considerable stress on government and industry working together, emphasized the potential of SMEs to address key issues, and introduced some novel elements. Thus, the 2016 DII endorsed the Dual Use Technology Exploitation Programme, whose role is notably to “identify the best technologies from adjacent defense and civil sectors and ensuring they are put to dual-use through the DUTE community” and “bring together public and private investors seeking to draw on the very best emerging technologies from both sectors.”¹⁰ The program was officially established in September 2015, with a confirmed Industry and Government fund of £10.3 million.

Aside from the extra money, the DII also increased the significance of the role of chief scientific advisor in the ministry,¹¹ and signalled that the defense sector was ready for the risks of failure and the disruption that a stress on innovation implied.¹²

7 Government of the United Kingdom, “Defence and Security Accelerator: Terms and Conditions and Contract Guidance,” December 8, 2016.

8 See Niteworks, <http://www.niteworks.net>.

9 See Defence Growth Partnership, <http://www.defencegrowthpartnership.co.uk>.

10 See Dual-Use Technology Exploitation, “About,” <http://www.dute.co.uk/about-dute>.

11 Government of the United Kingdom, “Defence Innovation Information,” updated August 10, 2017.

12 “We will be open to risk, I will reward people who are inquisitive, who embrace change, and who are prepared take the fight kind of risks.” Secretary of State Michael Fallon, “Defence Innovation Initiative,” Speech, September 16, 2016.

The ministry's aspiration was to create a culture across defense that was "innovative by instinct."¹³ In February 2017, it also announced the creation and initial membership of a Defence Innovation Advisory Panel, using people with backgrounds in areas marked by rapid innovation, including motor racing.¹⁴

Who Are the Innovators?

Innovation is widely seen as desirable, even necessary, across all government departments. It would be difficult to focus on the precise numbers of people working on it, since in principle it should permeate the culture of government bodies including in the defense sector. The importance of innovation is manifest at exhibitions such as the International Air Tattoo at Fairford, the Farnborough International Air Show, and the Defence and Security Exhibition International (DSEI) with their specialist innovation areas.

Individual commands in the U.K. armed forces have embraced the theme of innovation, and there is particular interest in the potential for rapid innovation activities championed by the Strategic Capabilities Office (SCO) in the United States.

The army is actively searching for novel technologies, including robots, and experimenting with them in small scale exercises relevant to dismounted close combat. The multi-phase Army Warfighting Experiment 17 has been examining industrial offerings, often involving relatively low-cost and simple items such as novel ladders, stretchers, and a hoist system for easier and faster evacuation of wounded personnel from armored vehicles.

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The army has also set up a Strike Experimentation Group to work out how the British Army can generate two-strike brigades useful for large-scale war fighting and yet able to move along roads for long distances. The army has been concerned with novel ways of conducting urban operations since well before the TOS.¹⁵

The Navy established an Unmanned Warrior program to explore its future use of airborne, surface, and underwater vehicles. Unmanned Warrior 2016 involved demonstrations of over 50 systems off the British coast from 40 companies and international allies.¹⁶ In 2017, exercise Information Warrior, as the name indicated, focused on the exploitation and protection of information.¹⁷ The Navy is also leading with the development of laser weapons.

Finally, the Defence Equipment and Support organization, which spends over 40 percent of the defense budget through contracting, has published an Innovation Strategy document that is largely focused on the organization can better facilitate the rapid introduction of technology developments into the Ministry of Defence. Its document includes six principles to assist this end:

- Help customers to shape and de-risk requirements through experimentation and pre-concept services that optimize pan-domain coherence, through life.
- Actively engage with and shape the Defence Enterprise nationally and internationally to align opportunities for innovation, and contribute to wider objectives for innovation, prosperity, and exports.
- Anticipate change through life and plan for flexibility, innovation, and capability upgrade through technology insertion.

¹³ Ministry of Defence, "Advantage Through Innovation: the Defence Innovation Initiative," London, November 2016, p.4.

¹⁴ Government of the United Kingdom, Secretary of Defence Sir Michael Fallon, "Defence Secretary Announced World Class Innovation Panel," Speech, February 27, 2017.

¹⁵ Government of the United Kingdom, "Army Conducts Largest Ever Virtual Battlefield Simulation Experiment," January 31, 2013.

¹⁶ U.K. Ministry of Defence, Royal Navy, "Unmanned Warrior."

¹⁷ U.K. Ministry of Defence, Royal Navy, "Information Warrior 2017."

- Identify and manage cross-cutting technical opportunities and threats appropriately across the Defence Equipment and Support portfolio delivery.
- Look for innovative ideas from any appropriate sources, and create conditions for innovation by supporting enablers and tackling barriers across all functions.
- Value and support innovation and responsible risk — and opportunity management by suitably qualified and experienced professionals.¹⁸

The innovation agenda is not only a military matter, but is within a context in which the Ministry of Defence has extensive links with other government departments dealing with wider security questions and the U.K.'s "prosperity agenda" to which the Ministry of Defence is formally committed to contribute. At the top of the heap is the Cabinet Office with its sub-Committee the National Security Council whose secretary is the prime minister's national security advisor.

On the important cyber front, the government has established the National Cyber Security Centre within the Government Communications Headquarters (GCHQ) to lead across government and indeed society as a whole.¹⁹ It is the formal source of guidance and direction for all government departments. GCHQ's "home department" is the Foreign and Commonwealth Office, but it has close links with Ministry of Defence.

And given the centrality of technology in defense innovation, and the relevance of much commercial technology for defense, the ministry responsible for industry is particularly relevant. As a consequence of the Brexit vote, a separate Department for International Trade was set up and the previous Department for Business, Innovation Skills was re-organized in July 2016 to become the Department for Business, Energy, and Industrial Strategy. In a January 2017 Green Paper for comment authors argued that "we must become a more innovative economy and do more to

commercialize our world leading science base to drive growth across the U.K."²⁰ In 2013, the government had identified "Eight Great Technologies" in which the U.K. had the foundation for global role (Synthetic Biology, Robotics, and Automotive Systems, Satellites, Big Data, Energy Storage, Advanced Materials, Agri-science, and Regenerative Medicine).²¹ The 2017 document included potential areas for funded innovation challenge exercises, many of which are obviously relevant for the security sector, including:

- Smart, flexible, and clean energy technologies (such as storage, including batteries, and demand response)
- Robotics and artificial intelligence (including connected and autonomous vehicles and drones)
- Satellites and space technologies
- Leading-edge healthcare and medicine
- Manufacturing processes and materials of the future
- Bioscience and biotechnology
- Quantum technologies
- Transformative digital technologies, including supercomputing, advanced modelling, and 5G mobile network technology

However, if spending was to be used as an indicator, the amounts involved in defense innovation are quite small. Even once it builds up, the Defence Innovation fund will total only £800 million in a decade (if it is not derailed by other financial pressures). Defence has allowed research spending to fall significantly since the end of the Cold War until a floor of 1.2 percent of the defense budget (around \$450 million) was introduced after 2010. EDA data show that U.K. defense research and technology spending is around the same as that of Germany and significantly less than that of France.²² The government is of course hoping

¹⁸ U.K. Ministry of Defence, "Defence Equipment and Support Innovation Strategy," October 2016.

¹⁹ See National Cyber Security Centre, <https://www.ncsc.gov.uk>.

²⁰ Government of the United Kingdom, "Building Our Industrial Strategy," Green Paper, February 2017.

²¹ Government of the United Kingdom, "Eight Great Technologies," Industrial Strategy.

²² National Defence Data 2013–2014 and 2015 (est.) of the 27 EDA Member States.

to harness commercially funded advances from the civil world for defense applications. A further concerning element is the over-commitment and lack of unallocated funds in the U.K. Defence Equipment Plan, which will make it hard to restore the drastic falls in (capitalized) development spending that have taken place, not least in this millennium. Research spending in real terms in 2014–15 was just 75 percent of its 2001–02 figures while development spending was just 44 percent of the 2001–02 level.²³

Future of Cooperation

Certainly since 1998 the established British stance has been to encourage the exploitation of technology advances for defense purposes, although it has not argued for the kind of step-level set of changes that are a mark of the U.S. Third Offset Strategy. Aware of the advances in capability of potential peer adversaries, in response to the U.S. initiative, the U.K. has reinforced its commitment to innovation and to the working together of government and the private sector that it sees as crucial.

However, cash constraints, especially since the financial crisis after 2008 and then the devaluation of the pound following the Brexit vote, have been strong and have particularly affected money for development. These constraints have been reinforced by the commitments made by the U.K. to buy a range of U.S. systems “off-the-shelf” and by the increasing costs associated with the replacement of the U.K.’s fleet of nuclear submarines.

Looking forward, the U.K. has made clear that its impending exit from the EU has not moderated its enthusiasm for European defense cooperation both in capability generation and operational activities. However, the feasibility of such cooperation depends on the identification of useful programs, the availability of funds, and the readiness of partners to work with the U.K. There is no certainty about any of these factors.

²³ Trevor Taylor, “Supplementary Written Evidence to the House of Commons Defence Committee,” 2017.

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About the Author

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This draft is based on publicly-available information analysed through the lens of the author’s knowledge of British defence policy and management. However, that experience points to the existence of great uncertainty, including the possibility that ill-will arising in the Brexit negotiations could disrupt the security space.

About the Transatlantic Security Project

GMF’s Transatlantic Strategic Superiority in the 21st Century project aims to study key transatlantic perspectives on defense innovation and its implications for defense cooperation in the 21st century. The project, led by GMF’s Paris office in partnership with Airbus, addresses the strategic and industrial aspects of defense innovation in the United States, France, Germany, and the United Kingdom, and fosters transatlantic dialogue on such issues.

About GMF

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