



Canadian Defence Policy

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January 18, 2018

BMD: Cooperative Protection or Strategic Instability

It's hard to believe, but less than a decade ago, academics, policy analysts, and even officials were exploring US-NATO-Russia cooperation on ballistic missile defence¹ – begging the question: why is that no longer considered an appropriate subject for polite company? Missile defence cooperation is still happening, of course, but it's between Russia and China on one side and among the US and its friends and allies on the other. Unless, however, missile defence is pulled back from its current competitive dynamic to one of east-west accommodation and cooperation, nuclear tensions, and arsenals, will only grow. Canada has joined the competitive fray in Europe through NATO, but, to its credit, continues to resist direct involvement in the strategic North American version of ballistic missile defence.

Unilateral strategic-range ballistic missile defence (BMD) erodes strategic stability to the extent that it is seen to challenge an adversary's strategic deterrent. Notably, Russia and China are not amenable to the view that the intense and costly western pursuit of ballistic missile defence (an American obsession buttressed by a rare case of Washington bipartisanship) is aimed simply at the North Korean nuclear threat, or at future Iranian or other "rogue" nuclear threats. American-led, multi-layered missile defence pursuits, the Russians and the Chinese suspect, are ultimately intended to undermine the credibility and effectiveness of their nuclear deterrent forces.

And the more the Americans try to perfect their still faltering BMD technologies, the more their adversaries are inclined to fear missile defence as credible (if not yet, then possibly in the future), inclining them to retain and potentially expand their offensive arsenals. It is an obsession/suspicion dynamic that is decidedly not conducive to mutual nuclear arms reductions.

Avoiding this defence/offence arms race will require either the revival of an ABM-type² treaty of mutual forbearance, or recovery of the decades-old notion of cooperative missile defence (even Ronald Reagan fleetingly proposed sharing missile defence technology with the Soviet Union³). That would mean the serious exploration of joint programs with the objective of protecting any vulnerable populations from isolated, very low volume, long- and medium-range missile attacks – with accompanying guarantees that such systems would have no consequential capacity against even drastically reduced arsenals of the major powers.

When BMD cooperation seemed possible

In 2010 NATO and Russia agreed to explore cooperating on missile defence in Europe. The Lisbon NATO Summit that year included a meeting of the NATO-Russia Council (NRC) which agreed on "a comprehensive Joint Analysis of the future framework for missile defence cooperation." They promised to review the results at the 2011 meeting of NRC Defence Ministers."⁴ After the Summit, then Russian President Dmitry Medvedev, had it about right: "We will either come to terms on missile defense and form a full-fledged joint mechanism of cooperation or ... we will plunge into a new arms race and have to think of deploying new strike means, and it's obvious that this scenario will be very hard."⁵

The promise of 2010 was compelling. The Brookings Institution's Steven Pifer, among others, argued that cooperative BMD would facilitate further arsenal reductions, enhance protections for Europe, including European Russia, and, by making NATO and Russia allies in protecting Europe, it would fundamentally change the East-West strategic relationship.⁶ But it wasn't to be. Russia wanted a "legal guarantee" that US missile defence would not be directed against Russian strategic nuclear forces, and there was no way the American Congress would give it – it would compromise American sovereignty, they argued.

Advocates of cooperation nevertheless continued to counsel greater transparency and confidence building – the sharing of technical information on defensive and offensive capabilities, sharing information on planning and programmatic developments, exchanging observers during tests and joint exercises, and exploring a jointly managed NATO-Russia centre for monitoring missile launches worldwide. A 2012 study by the Carnegie Endowment for International Peace saw such jointly staffed centres as "integrating data and forming a comprehensive picture of potential dangers as well as coordinating responses to real missile threats."⁷ In 2013 the Obama Administration proposed a legally binding agreement on transparency, including sufficient exchange of information to confirm that missile defence programs on either side would not present a threat to each other's defense forces.⁸

In 2012 the German Institute for International and Security Affairs also counselled cooperation on missile defence, beginning with transparency and information sharing measures. The study concluded that, in the long run, "NATO-based missile defense can only strengthen European security *if Russia is on board*"⁹ (emphasis added). That remains true, and it applies equally to the North American version of missile defence intended to respond to the North Korean threat, and to China as well. These and other similar proposals put forward in and around 2010 all focused on the need to switch from competitive to cooperative approaches in missile defence.

The continuing competition

At the start of this past holiday season, however, it was the competitive, not the cooperative, approach that was on full display. President Donald Trump signed into law a short-term government funding bill (actually, it was a missile defence bill to which were added provisions to keep the US Government funded and the lights on over the holidays), which handed the US missile defence agency another \$4 billion to spend on what the bill called "missile defeat and defense enhancements."¹⁰ The President explained the new funding in quintessentially Trumpian terms:

"We are ordering \$4 billion worth of missile defense equipment and missiles. Very important. Top of the line. Best in the world. We make the best military product in the world, and nobody is even close."¹¹

The focus of these latest "enhancements" is the ground-based, mid-course interception version of BMD – the system centered in Alaska, and the one Canada has to date declined to join. The bill authorized adding 20 mid-course interceptors to the 40 now deployed in underground silos at Ft. Greely in Alaska (another four are deployed at Vandenberg Air Force Base in California). It also adds two billion-dollar radar installations and more satellites to help guide the interceptors' non-explosive warheads, or "kill vehicles," into the paths of attacking nuclear warheads¹² – a feat that testing has so far shown to be rather elusive, interceptions failing as often as not.¹³

While the US President was signing his “top of the line” bill, Russia and China were also making grand claims for their joint missile defence efforts, having just concluded a four-day joint military drill on planning, command, and firepower coordination in theatre and mid-range air and missile defence. The spin put out by the Chinese Ministry of Defence hailed unspecified “breakthroughs” and called the exercises “a pragmatic gesture of important mutual understanding in terms of bolstering Russian-Chinese cooperation in air defence.” Russia’s Defence Ministry said the purpose of the drill was to test command and control mechanisms and joint responses to “accidental and inflammatory strikes of ballistic missiles.”¹⁴

The joint missile defence exercises held this last December by the US, Japan, and South Korea, did not ease Russian-Chinese opposition to American-led BMD, especially to regional systems with American radars capable of reaching into their territories.¹⁵ Western BMD developments continue to grate on both Russia and China and they will continue to muster both the political will and military options to push back. In 2016, the Russian media agency Sputnik reported on the possibility of Russia and China developing a “unified missile defense system for the Shanghai Cooperation Organization” (SCO)¹⁶ – comparing it to US-NATO BMD deployments in Eastern Europe and to the US deployment in South Korea.¹⁷

In the meantime, the US Congress remains oblivious to the strategic uncertainty generated by its enthusiasm for unilateral BMD. It has mandated the Pentagon to explore construction of an additional interceptor site, this one in the mid-western or eastern US¹⁸ – even though the Pentagon has not been asking for it. The 2018 budget also, among other BMD measures, mandates the MDA to explore space-based laser weapons for intercepting attacking warheads,¹⁹ funds a redesigned kill vehicle and explorations toward a Multi-Object Kill Vehicle (meaning multiple kill vehicles would be placed on a single missile to allow intercepting multiple oncoming warheads, or decoys), and proposes efforts towards a boost phase intercept capacity (options are said to include air-to-air missiles from fighter aircraft or drones, and lasers mounted on drones).²⁰

In November 2017 the US Congress put forward a \$700 billion defense budget,²¹ which includes \$12.3 billion for the Missile Defence Agency,²² a substantial increase in funding levels from the Obama Administration, and even higher than the top spending under the George W. Bush Administration – although, actual funding is likely to drop when Congress gets around to formal authorizations, since it will have to address the defence spending limits imposed by the sequestration mechanism imposed during the Obama years.²³

Still little confidence in the mid-course interceptors

The mid-course interception, US-based, BMD system is all about North Korea. The Alaska-based interceptors have a single focus, and that is to destroy any oncoming North Korean warheads while they are still in outer space and headed for targets in the continental US. The US President has claimed that intercepts are successful in 97 percent of tries,²⁴ and while that claim is universally rejected, a leaked draft of the Trump Administration’s nuclear posture review also sets an optimistic, though somewhat qualified, tone. In the context of North Korea, it says “...the United States and allies have defensive and offensive capabilities to intercept and otherwise defeat North Korea’s missile capabilities, and thereby limit or preclude North Korea’s ability to conduct effective missile strikes.”²⁵ The qualifier being that it could “limit” a North Korean attack, without saying by how much. The Pentagon’s claims have been more modest. As summarized by the Washington Arms Control Association, the Pentagon says “existing U.S. missile defenses have a ‘demonstrated capability’ to defend the U.S. homeland against a small number of simple, intercontinental ballistic missile (ICBM) threats that employ ‘simple countermeasures’.”²⁶ The Union of Concerned Scientists showed in its comprehensive 2016 study that even that claim is too optimistic. Following a detailed examination of the evidence, the USC concludes that, “despite more than a decade of development and a bill of \$40 billion, the [ground-based mid-course interception] system is simply unable to protect the US public, and it is not on a credible path to be able to do so.”²⁷

The US Government Accountability Office reported to Congress in 2017 that “...testing revealed that the BMDS level capabilities delivered *will not likely provide robust defense as planned*” (emphasis added).²⁸ Multiple studies and experts in fact point out that relatively simple offensive measures available, even to modest powers like North Korea, will always be at an advantage over defence systems – notably, by adding more offensive missiles, and more warheads and decoys aboard each offensive missile.

The doubts about the mid-course BMD system extend across the whole gamut of missile defence manifestations. Even the most successful element of BMD, the Patriot short-range terminal defence system, turns out to have recently failed to intercept a Yemeni Houthi missile attack on Saudi Arabia, despite initial claims of success. President Trump boasted that the American Patriot system “knocked the missile out of the air. That’s how good we are.”²⁹ But a detailed analysis by the New York Times indicates the system failed:

“Evidence analyzed by a research team of missile experts appears to show the missile’s warhead flew unimpeded over Saudi defenses and nearly hit its target, Riyadh’s airport. The warhead detonated so close to the domestic terminal that customers jumped out of their seats.”³⁰

It’s not the first time that Patriot missile defence operations were hailed as a major success, only to be later found to have failed. “During the first Gulf War,” the New York Times reports, “the United States claimed a near-perfect record in shooting down Iraqi variants of the Scud. Subsequent analyses found that nearly all the interceptions had failed.”³¹

And yet it persists

At least in part, BMD remains politically tempting because it allows authorities to claim that they are at least “doing something” in the face of an emerging and frightening new nuclear threat. But a big part of the attraction is rather more mundane – jobs.

BMD promises huge spending. A major factor in the push to install a field of interceptors in the central or eastern United States is the effort to spread the economic benefits, and thus to spread political support for the system. In communities surrounding Fort Drum, for example, a US military base in north-west New York, the enthusiasm for BMD currently runs high. The region lags economically behind the rest of the country and a multi-billion-dollar missile base promises construction jobs and whole lot of other spin-offs. As Los Angeles Times journalist David Willman put it after interviewing local municipal and business leaders, “the issue is not whether BMD works. The issue is jobs.”³²

The communities around the three possible sites – in Ohio, Michigan, or New York state – “are competing furiously for the prize and the economic stimulus it would deliver.” Bipartisan coalitions in Congress are promoting their respective regions, a “spectacle [that] shows how economic considerations, as much as strategic military ones, can keep money flowing to flawed defense programs.”³³

While Pentagon and Missile Defense Agency officials have said they don’t believe a new field of interceptors is necessary, and that they prefer spending the money on improving the existing system, Congress has joined with major military contractors to promote expansion. California Democratic Representative John Garamendi is unequivocal in admitting the mid-course interception system “will not work,” while still acknowledging that “the momentum of the fear, the momentum of the investments, the momentum of the industry” keep pushing it forward. Of the politicians, he says, “we represent the interests of our district. So if the district is building rockets that don’t work, and the jobs are at stake, what’s a representative to do?”³⁴

Canadian support for joining this American-based element of ballistic missile defence similarly survives quite apart from any practical assessment of the system's actual capacity. Here, the issue isn't jobs, it's NORAD and Canada/US defence relations. A 2015 paper out of the University of Ottawa, authored by academics and some former officials and politicians, urged Canada to join the BMD operation and try to persuade the US to shift the system's command and control to NORAD, the North American Aerospace Defence Agreement. The paper argued that "Canada's continued abstention from continental missile defence undermines NORAD's continued role as a bi-national aerospace defence command," but that locating "the continent's missile defence command and control within NORAD" would strengthen NORAD's "status as North America's joint regime for aerospace defence well into the future"³⁵ – assuming the Americans would be interested in basing such a defence system within a bilateral command. The effectiveness of the system relative to its costs, financial and political, was not addressed.

The Canadian Senate, in a 2014 report, was also concerned about the impact that Canada's absence from North American BMD might have on NORAD, arguing that participation in BMD would be consistent with the Canada/US air defence cooperation:

"In an attack on North America using a plane, a fighter jet or a cruise missile, the committee was told that Canada is a full and equal partner in a seamless command structure within NORAD to defend our region. If that attack was from a ballistic missile, Canada is not a participant."³⁶

Except that the Senator declined to mention that if there was an attack by a ship or submarine it would not be a seamless bi-national response, since NORAD does not cover maritime defence (only warning). In other words, Canada and the US have a joint air defence command, but definitely not a joint or "seamless" defence command structure overall. The Committee did acknowledge questions related to the BMD test performance record, but those are clearly regarded as secondary issues.

The public consultation backgrounder for the 2017 Defence Policy Review asks whether the earlier decision against joining BMD should be revisited "given changing technologies and threats," and whether BMD participation would "offer an avenue for greater continental cooperation." The backgrounder, to its credit, also asked whether there might be "more effective" ways to "protect the North American continent?"³⁷

The inescapable irony of missile defence

There is a destabilizing irony at the core of regional and strategic missile defence efforts in a conflicted, competitive environment. The more effective the defence is (or is perceived to be), the greater the incentives for adversaries to add offensive firepower and thus heighten the threat. And when it comes to missiles, no defence system can come close to offering comprehensive protection, so adversaries tend to be confident that simple expansion of their arsenals of attack missiles will overcome any defence that is mounted – knowing also that expanding offensive firepower will always be much less costly than attempts to improve defence systems. In fact, the defence/offense race is already on.³⁸ While President Trump was signing his Christmas legislation to try to beef up missile defence systems, Russia was testing a Topol strategic missile for the explicit purpose, the news agency TASS reported, of developing technologies for "overcoming anti-ballistic missile defence."³⁹

There is an added complication in the case of the Alaska-based interception system focused on missiles coming from North Korea to the United States. Especially for missiles targeted on the central or eastern United States, any interception would have to be carried out in outer space over Russian territory. Without any cooperation or coordination or pre-notification, how would the Russians be expected to react to an American launch of a long-range ballistic missile over Russian territory?

If missile defence is not about to be abandoned, steps should at least be taken to prevent it from destabilizing the strategic environment and making the entire planet more, not less, vulnerable. So the Union of Concerned Scientists, in a key recommendation, revisits the BMD cooperation proposals of a decade ago by urging the US to “work with China and Russia to ensure that development of a strategic missile defense system does not interfere with progress on strategic issues important to all three countries.”⁴⁰

If nuclear disarmament progress is to stand a chance, it is essential that the major nuclear powers find ways of defusing their dispute over missile defence. Cooperation, argues the Brookings Institution’s Steven Pifer, “would not only remove a problem issue from the US-Russian agenda, but it well may be a requirement if the next US administration wishes to pursue further nuclear arms reduction with Moscow.”⁴¹ Indeed, any future agreement on further strategic reductions will most certainly have to include an agreement on missile defence, and Canada should be encouraging all the relevant parties to focus on shared programs for mutual protection rather than the pursuit of competitive advantage.

Notes

¹ For example:

Steven Pifer, “NATO-Russia Missile Defense: Compromise is possible,” The Brookings Institution, 28 December 2012.

Dimitri Trenin, James Collins, “The Game Changer: Cooperative Missile Defense,” Carnegie Endowment for International Peace, 29 November 2012.

Michael Paul, “Missile Defense: Problems and Opportunities in NATO-Russia Relations,” Stiftung Wissenschaft und Politik, SWP Comments, July 2012.

Susan Cornwell, “Missile defense cooperation could be ‘game-changer’ for US, Russia: report,” Reuters, 04 February 2012.

Igor Ivanov, Wolfgang Ischinger, Sam Nunn, “Missile Defense: Toward a New Paradigm,” Euro-Atlantic Security Initiative Working Group Paper, 03 February 2012. <http://carnegieendowment.org>

And a decade earlier:

Pavel Podvig, “US-Russian Cooperation in Missile Defense: Is it Really Possible?” Center for Arms Control Studies, November 2003.

² The ABM Treaty (Anti-Ballistic Missile Treaty) limited the US and the Soviet Union to two point-defence installations each (the national capital and one ICBM field). The US announced its withdrawal from the Treaty in 2001.

³ Mark W. Davis, “Reagan's Real Reason for SDI,” *Policy Review*, Hoover Institution, 01 October 2000. <https://www.hoover.org/research/reagans-real-reason-sdi>

⁴ Steven A. Hildreth and Carl Ek, “Missile Defense and NATO’s Lisbon Summit,” Congressional Research Service Report R41549, 11 January 2011. www.crs.gov

⁵ CRS Report, 11 January 2011.

⁶ Steven Pifer, “NATO-Russia Missile Defense: Compromise is Possible,” The Brookings Institution, 28 December 2012. <https://www.brookings.edu>

⁷ Dimitri Trenin, James Collins, 29 November 2012.

⁸ Tom Z. Collina, "Russia, U.S. Trade Missile Defense Offers," Arms Control Today, 03 June 13, <https://www.armscontrol.org/print/5795>

⁹ Michael Paul, July 2012.

¹⁰ H.R. 1370. <https://www.congress.gov/bill/115th-congress/house-bill/1370/text>

¹¹ "Trump Signs Bill Adding Funds for Missile Defense," Destroyer Fixes," DOD Buzz, US Department of Defense, 22 December 2017. <https://www.military.com/dodbuzz/2017/12/22/trump-signs-bill-adding-funds-missile-defense-destroyer-fixes.html>

¹² David Willman, "Trump administration moves to boost homeland missile defense system despite multiple flaws," Los Angeles Times, 24 December 2017. <http://beta.latimes.com/politics/la-na-pol-missile-defense-flaws-20171222-story.html>

¹³ "Ballistic Missile Defense Intercept Flight Test Record," Missile Defense Agency, Fact Sheet, 30 May 2017. The table marks 10 out of 19 tries as successful, without any information of the extent to which tests simulated real-world conditions. <https://www.mda.mil>

¹⁴ Franz-Stefan Gady, "China Claims 'New Breakthroughs in Anti-Missile Cooperation' with Russia," The Diplomat, 19 December 2017. <https://thediplomat.com>

¹⁵ Franz-Stefan Gady, 19 December 2016.

¹⁶ SCO membership (http://eng.sectsco.org/about_sco/):

- the SCO comprises eight member states, namely the Republic of India, the Republic of Kazakhstan, the People's Republic of China, the Kyrgyz Republic, the Islamic Republic of Pakistan, the Russian Federation, the Republic of Tajikistan, and the Republic of Uzbekistan;
- the SCO counts four observer states, namely the Islamic Republic of Afghanistan, the Republic of Belarus, the Islamic Republic of Iran and the Republic of Mongolia;
- the SCO has six dialogue partners, namely the Republic of Azerbaijan, the Republic of Armenia, the Kingdom of Cambodia, the Federal Democratic Republic of Nepal, the Republic of Turkey, and the Democratic Socialist Republic of Sri Lanka.

¹⁷ "Answering the US and NATO: Experts Examine A Joint Missile System for China, Russia, and the Shanghai Cooperation Organization," 20 July 2016. <https://www.mondialisation.ca>

¹⁸ David Willman, 24 December 2017.

¹⁹ David Willman, 24 December 2017.

²⁰ Matthew Kroenig, "Here's What the New NDDA Means for Missile Defense," Atlantic Council, 06 December 2017. <http://www.atlanticcouncil.org/blogs/new-atlanticist/here-s-what-the-new-ndaa-means-for-missile-defense>

²¹ The 2018 US defence budgets is generally reported as \$700 billion. Spending authority is yet to come, which will determine actual amounts to be spent. The figures used here are from the Congressional Budget Office (\$689 total, with \$614 billion for the regular defence budget and \$75 billion for overseas contingencies) <https://www.cbo.gov/publication/52884>

The Arms Control Association reports the November bill authorizes a total budget of \$692 billion (\$626 billion for basic operations and \$66 billion for overseas contingencies). Kingston Reif, "Congress completes the fiscal year 2018 defense authorization act," Arms Control Association, December 2017. <https://www.armscontrol.org/taxonomy/term/90>

²² Matthew Kroenig, 06 December 2017.

²³ The bill (which is not the actual budget authorization) ignores the budgetary restrictions imposed by the sequester mechanism imposed in the Obama years, with Senator Bob Corker concluding that the authorization exceeds current budget caps by \$83 billion. Jeff Daniels, "Senate passes \$700 billion defense policy bill, backing Trump call for steep increase in military spending," CNBC.Com, 18 September 2017. <https://www.cnbc.com/2017/09/18/senate-passes-700-billion-defense-policy-bill-backing-trump-call-for-steep-increase-in-military-spending.html>

²⁴ Glenn Kessler, "Trump's claim that a U.S. interceptor can knock out ICBMs '97 percent of the time'," Fact Checker Analysis, Washington Post, 13 October 2017. https://www.washingtonpost.com/news/fact-checker/wp/2017/10/13/trumps-claim-that-u-s-interceptors-can-knock-out-icbms-97-percent-of-the-time/?utm_term=.591039ca362c

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Ashley Feinberg, "Exclusive: Here Is A Draft Of Trump's Nuclear Review. He Wants A Lot More Nukes." Huffington Post, 11 January 2018.

[http://www.huffingtonpost.ca/entry/trump-nuclear-posture-review-](http://www.huffingtonpost.ca/entry/trump-nuclear-posture-review-2018_us_5a4d4773e4b06d1621bce4c5)

²⁵ [2018_us_5a4d4773e4b06d1621bce4c5](http://www.huffingtonpost.ca/entry/trump-nuclear-posture-review-2018_us_5a4d4773e4b06d1621bce4c5)

²⁶ "U.S. Missile Defense Programs at a Glance," Fact Sheet, Arms Control Association. <https://www.armscontrol.org/factsheets/usmissiledefense>

²⁷ See the briefing in this series, "Could Trump Close the Door on Canada and BMD?" The Simons Foundation, *Disarming Arctic Security* 09 March 2017. <http://www.thesimonsfoundation.ca/highlights/could-trump-close-door-canada-and-bmd>

²⁸ "Missile Defense: Some Progress Delivering Capabilities, but Challenges with Testing Transparency and Requirements Development Need to Be Addressed," Report to Congressional Committees, United States Government Accountability Office, Report GAO-17-381, May 2017. <https://www.gao.gov/products/GAO-17-381>

²⁹ Max Fisher, Eric Schmitt, Audrey Carlsen, and Malachy Browne, "Did American Missile Defense Fail in Saudi Arabia?" New York Times, 04 December 2017. www.nytimes.com.

³⁰ Max Fisher et al, 04 December 2017.

³¹ Max Fisher et al, 04 December 2017.

³² David Willman, "The nation's missile-defense systems has serious flaws. So why is the Pentagon moving to expand it?" Los Angeles Times, 13 December 2016. www.latimes.com.

³³ David Willman, 13 December 2016.

³⁴ David Willman, 13 December 2016.

³⁵ Rob McRae, James R. Mitchell, Stuart A. Beare, Stefanie von Hlatky, and Elinor Sloan, "Canada's International Security and Defence Policy," Centre for International Policy Studies, University of Ottawa, November 2015. [Cepi-cips@uottawa.ca](http://cips@uottawa.ca)

³⁶ “Canada and Ballistic Missile Defence: Responding to the Evolving Threat,” Report of the Standing Senate Committee on National Security and Defence, June 2014.

<https://sencanada.ca/content/sen/committee/412/secd/rms/01jun14/Report-e.htm>

³⁷ Department of National Defence, Defence Policy Review: Public Consultation Paper, 2016.

<http://dgpaapp.forces.gc.ca/en/defence-policy-review/index.asp>

³⁸ Ankit Panda and Vipin Narang, “Trump’s Overconfidence in US Missile Defense Could Lead to a Deadly War With North Korea,” The Diplomat, 17 October 2017. <https://thediplomat.com>

³⁹ Sam Sholli, “Russia test-fires new ballistic missile designed to 'overcome defence systems',” UK Express, 27 December 2017. <https://www.express.co.uk/news/world/896870/russia-vladimir-putin-missile-test-uk-gavin-williamson-royal-navy>

⁴⁰ *Shielded from Oversight: The Disastrous US Approach to Strategic Missile Defence*, Union of Concerned Scientists, July 2016. WWW.ucsusa.org/ShieldedFromOversight. References to this document are shown by the page number in brackets in the text.

⁴¹ Steven Pifer, “Nuclear Arms Control Choices for the Next Administration,” Brookings Institution, Arms Control and Non-Proliferation Series, Paper 13, October 2016. <https://www.brookings.edu/>