



# Managing Nuclear Multipolarity: A Multilateral Missile Test Pre-Notification Agreement

Frank O'Donnell

To cite this article: Frank O'Donnell (2020) Managing Nuclear Multipolarity: A Multilateral Missile Test Pre-Notification Agreement, *The Washington Quarterly*, 43:3, 177-196, DOI: [10.1080/0163660X.2020.1810419](https://doi.org/10.1080/0163660X.2020.1810419)

To link to this article: <https://doi.org/10.1080/0163660X.2020.1810419>



Published online: 15 Sep 2020.



Submit your article to this journal [↗](#)



View related articles [↗](#)




View Crossmark data [↗](#)

# Managing Nuclear Multipolarity: A Multilateral Missile Test Pre-Notification Agreement

The threat of nuclear war appears to be growing as we enter the third decade of the 21st century. Washington and Moscow, which together hold over 90 percent of the world's nuclear weapons, are gradually discarding the international agreements designed to structurally reduce and limit their nuclear force postures.<sup>1</sup> The recent US withdrawal from the bilateral 1987 Intermediate-Range Nuclear Forces (INF) Treaty, following Russian violations, now permits these states to begin constructing and fielding previously banned ground-launched ballistic and cruise missiles with ranges between 500 and 5,500 kilometers.<sup>2</sup>

It appears unlikely while Trump is in office in 2020 that Washington and Moscow will agree to the single five-year extension of their 2010 bilateral New Strategic Arms Reduction Treaty (New START) before its expiry in February 2021. This outcome will leave all US and Russian nuclear forces without legal limits to nuclear arsenal growth and diversification.<sup>3</sup> As there are no similar

---

Frank O'Donnell was a postdoctoral fellow in the National Security Affairs Department at the US Naval War College while conducting his research for this article and is now a postdoctoral scholar at the Fletcher School at Tufts University. He can be reached at frank11285@gmail.com or followed on Twitter @frank11285. This article is an expanded version of his work entitled "Launch an Expanded Missile Flight-Test Notification Regime," published in *Off Ramps from Confrontation in Southern Asia*, eds. Michael Krepon, Travis Wheeler, and Liv Dowling (Washington, DC: Stimson Center, May 2019). The author would like to thank Michael Krepon for his encouragement and the Stimson Center, the Stanton Foundation, and the Belfer School for Science and International Affairs at Harvard University for their funding. The author's opinions expressed in this article are his alone and are not necessarily those of the US Department of Defense or its components.  <http://orcid.org/0000-0001-7832-1697>

---

© 2020 The Elliott School of International Affairs  
*The Washington Quarterly* • 43:3 pp. 177–196  
<https://doi.org/10.1080/0163660X.2020.1810419>

limits agreed upon between any of the seven other nuclear-armed states, the lack of extension opens the possibility of intensifying global vertical nuclear proliferation.

The dangers of a nuclear arms race are magnified by the simultaneous erosion of the norm of nuclear non-use, especially if we extend our focus to the three nuclear states—China, India, and Pakistan—that, along with the United States, are part of the “strategic chain” of interactive deterrence relationships in Asia.<sup>4</sup> These states are diversifying their nuclear delivery platforms, while either explicitly elevating the role of nuclear weapons in their national defense or generating ambiguity around their nuclear thresholds.

Emerging technological developments further elevate contemporary nuclear risks. The growing sophistication and destructive capability of precision-guided munitions create feasible conventional counterforce options for military planners.<sup>5</sup> Cyberattacks on nuclear command, control, and communications (NC3) systems threaten to incapacitate strategic warning and strike systems, with US defense officials publicly alluding to their development of such specialized cyber tools.<sup>6</sup> Attacking rival dual-use defense cyber systems forms a new avenue for inadvertent escalation, which highlights that co-location of conventional and nuclear military systems means that attacks on the former may be viewed by the adversary as those on the latter, prompting unintended nuclear escalation.<sup>7</sup>

In this context, greater transparency among nuclear adversaries regarding their

**Functional arms control seeks to reduce instabilities that could lead to war through misperception.**

strategic posturing becomes a critical objective to reduce the risk of war from misperception. However, the breakdown of the US-Russia arms control architecture threatens to reverse the gains made in this area, including pre-notification of missile movements and, more significantly, flight-tests. These protocols serve as important measures of *functional* arms control, which seeks to reduce or eliminate “specified military instabilities that could be alleviated through agreement” or that could lead to war through misperception if left unaddressed.<sup>8</sup>

*Structural* arms control, on the other hand, targets “agreed structural changes in existing force relations”<sup>9</sup>—such as a treaty to limit or ban specific nuclear warheads and delivery vehicles.

Put differently, the first form of arms control intends to reduce the dangers arising from the *practices* of nuclear forces, while the second targets those from their *structures* including size, composition, and locations. Both are needed to reduce the risk of war. However, the challenges posed by the structural force asymmetries in post-Cold War conditions of nuclear multipolarity privilege functional

approaches as more achievable in this context. Functional lines of effort will also help lay the necessary confidence-building groundwork for potential future structural agreements.

The ideal approach, encompassing both functional and structural arms control, would be for the United States and Russia to rejoin the INF Treaty, extend New START, and launch intensive diplomatic efforts to reverse the global trend of vertical nuclear proliferation in an age of nuclear multipolarity. Moreover, these initiatives could include new agreements that address some of the escalatory dangers posed by emerging technologies. A cyber non-attack agreement on nuclear systems model has been proposed by Alexandra Bell, a former US State Department senior arms control adviser, and Andrew Futter, a professor at the University of Leicester.<sup>10</sup> A US unilateral cyber non-attack pledge on nuclear systems has also been promoted by Jacquelyn Schneider, a Hoover Fellow at Stanford University.<sup>11</sup>

However, the Trump administration's record of withdrawing from the multilateral Iran Joint Comprehensive Plan of Action (JCPOA) and INF Treaty does not provide confidence that it will adopt this approach. The 2017 National Security Strategy and senior administration official remarks indicate deep skepticism in even the inherent worth of arms control as a means of enhancing US security.<sup>12</sup> If new structural arms control efforts—even those simply returning arrangements to the pre-2017 status quo—are likely out of sight, then we must turn our attention to functional initiatives. Among these, developing a multilateral missile flight-test pre-notification system is an effective potential measure.

This article will briefly survey the contemporary approaches of five states toward nuclear force development and arms control. These five states are the United States and Russia, possessors of the majority of the world's nuclear forces and the global leaders in establishing bilateral arms control infrastructure arrangements that can be revived, as well as China, Pakistan, and India, which are major Asian nuclear powers that are part of the interactive strategic nuclear chain with the United States. I argue that new structural bilateral or multilateral agreements appear unlikely across these five states, though they share similarities in their adherences to varying functional forms of missile flight-test pre-notification protocols.

Next, this article will highlight existing pre-notification agreements and how a unified, single multilateral protocol based on these agreements would help reduce the risks of strategic planning and decision-making based upon misperception of adversary missile activities, while building the political and inter-bureaucratic trust necessary for future structural arms control initiatives. It will then address possible failing points of this protocol, concluding with a broader look at the likelihood of adopting such an agreement.

## Contemporary Nuclear Force Development and Arms Control

The widely varying arsenal sizes and postures of five nuclear states underline the problem of pursuing a structural nuclear arms control agreement among them.

**The five different nuclear arsenals underline the difficulties of pursuing structural arms control.**

While the effective and underappreciated record of asymmetrical structural arms control accords means this eventuality is not impossible, the evident demand for larger and more diversified arsenals across these five states further motivate against this outcome.<sup>13</sup> Understanding the current nuclear approaches of each of these states helps illuminate the difficulties of pursuing structural arms control initiatives.

### United States

The Trump administration is probably the US administration most committed to pursuing nuclear superiority and eschewing arms control ideas since the Reagan administration in its first term. Its FY2021 budget request tellingly prioritizes nuclear over conventional force capability development.<sup>14</sup> Following the 2018 Nuclear Posture Review, this nuclear prioritization includes developing and fielding new submarine-launched ballistic missile (SLBM) low-yield warheads and new nuclear submarine-launched cruise missiles (SLCMs). The US Department of Defense justifies these expenses by arguing that these new platforms will more directly deter Chinese and Russian policymakers from considering limited nuclear use against US forces.<sup>15</sup> A 2019 US joint force doctrine advises geographic combatant commanders to select potential nuclear targets and strike options as part of their theater campaign planning.<sup>16</sup> The doctrine also calls for US military training to deliver a force mentally and physically prepared “to operate in a post-nuclear detonation radiological environment” and “nuclear battlefield.”<sup>17</sup>

The administration’s general approach toward existing and future arms control and confidence-building measure opportunities is in line with this drive for nuclear superiority. New START now stands as the last accord preventing a widescale Russian nuclear buildup and preserving important US insights into the movement, deployment, and flight-tests of Moscow’s nuclear forces. Failure to renew the treaty by its February 2021 deadline will mean that Russia is no longer inhibited by its stockpile and weapon deployment limits, and the United States will have to rely upon national technical means (including Open Skies Treaty surveillance aircraft overflights) to monitor and assess its nuclear developments. This shift to largely satellite-based observation will reduce the accuracy of US strategic assessments of Russian nuclear forces, as impressed by the chief of US Strategic

Command in February 2019: “we have very good intelligence capabilities, but there is really nothing that can replace the eyes-on/hands-on ability to look at something. And we have to do that.”<sup>18</sup>

Nevertheless, the Trump administration is refraining from extending New START. It is instead publicly pressuring China to join a replacement tripartite agreement that would impose some form of cap on the Chinese arsenal, despite the fact that China’s collection of 290 warheads is far smaller than that of either the 5,800 that the United States holds, or the 6,370 in the Russian stockpile.<sup>19</sup> The agreement will also vaguely bring the nonstrategic weapons, nuclear-powered and nuclear-armed cruise missile, and nuclear-armed underwater unmanned vehicle (UUV) projects of Russia within its scope, as well as “the full range of China’s diverse and expanding nuclear arsenal,” including delivery vehicles that could be potentially dual-use.<sup>20</sup> Moreover, all three parties would now be subject to a more expanded verification system than New START currently provides. However, Ambassador Marshall Billingslea, the US special envoy for arms control, has not detailed the desired US requirements for this new system nor any specific shortcoming of the existing New START verification protocols.<sup>21</sup>

This lack of US specificity as of summer 2020 toward negotiating such an ambitious accord combines with Trump administration rhetoric inviting US observers to blame China for lack of progress toward its execution.<sup>22</sup> It is reasonable to conclude that the administration is planning to use China’s failure to engage with these vague overtures as its excuse for exiting New START, thus removing the last limit on building toward US nuclear superiority. Billingslea has remarked that the United States is “willing to contemplate an extension of that agreement [New START] but only under select circumstances,” with full Chinese participation in the US replacement agreement as one of his named conditions.<sup>23</sup> This agreement would indeed follow a pattern in recent US arms control practices, such as when it blamed Russian INF treaty violations for withdrawing. However, the United States was incentivized to exit the INF so it could begin building conventional cruise missiles to reduce the risk of regional Chinese missile barrages that could eradicate its East Asian forces and bases as far out as Guam.<sup>24</sup>

## Russia

High-level Russian military doctrine continues to affirm that nuclear use will be reserved for worst-case scenarios and precludes limited nuclear wars.<sup>25</sup> Nevertheless, naval doctrines signed by Putin permit limited nuclear use to gain advantage in a conventional conflict—an opinion shared in remarks by multiple Russian officials.<sup>26</sup> Recent military exercises have involved nuclear use to prevail against an adversary fighting conventionally.<sup>27</sup> New delivery vehicles have even been

characterized by external analysts as potentially intended to “caus[e] terror.”<sup>28</sup> The “Poseidon” UUV is designed to “navigate autonomously with a maximum speed of 107 knots and detonate near an enemy coastal city, generating a tsunami wave.”<sup>29</sup> Russia is also reportedly developing a similar “Skyfall” nuclear-powered and nuclear-armed cruise missile.<sup>30</sup> Its decision to develop and field a ground-launched cruise missile (GLCM) system in violation of the INF Treaty, and the refusal of the Trump administration to continue dialogue with Moscow on this matter, led to the US withdrawal from the treaty.<sup>31</sup>

There are signs that these Russian force developments—including, potentially, its INF-violating GLCM program—are also partly motivated by quiet concerns about Beijing’s growing missile forces.<sup>32</sup> Russian strategists have concluded that a large, tout-azimuths cruise missile force is necessary to conventionally deter both China and the United States.<sup>33</sup> Russian diplomatic messaging to Washington in the early part of the last decade urged that the two powers engage China on a prospective multilateral nuclear arms control agreement. Moscow has now shifted to urging Washington to agree to a straight bilateral extension of New START. However, Russia is also likely comfortable with allowing the United States to now take the public lead on pressuring China toward entering arms control talks, as well as the blame should these talks and New START both collapse.<sup>34</sup>

### China

Of the states surveyed in this article, China appears to have shifted the least from its previous doctrine and posture in recent years. Chinese officials and experts are concerned by what they see as US efforts to attain nuclear superiority against it, rather than mutually assured destruction based upon accepting

**C**hina appears to have shifted the least from its previous doctrine and posture in recent years.

nuclear vulnerability.<sup>35</sup> China has repeatedly urged the United States to accept a bilateral no-first-use (NFU) agreement, with Washington’s refusal seen within Beijing as proof of these US strategic intentions for nuclear superiority. In turn, it has rejected the aforementioned US public calls for it to enter into New START or the vague US-led multilateral nuclear arms control talks, arguing that these dialogues will not be appropriate until US and Russian forces are reduced to near-Chinese levels.<sup>36</sup>

Beijing has continually reiterated its NFU pledge, and external experts have not found evidence that it has restarted fissile material production since ending it in the 1980s.<sup>37</sup> Chinese officials and experts discount the real possibility of a

limited nuclear war with the United States, believing instead that any nuclear use will lead to uncontrollable escalation.<sup>38</sup> These assumptions reduce the political and technical demand for nuclear war-fighting options within China's nuclear modernization program.<sup>39</sup>

Still, Beijing permits a certain degree of public strategic debate regarding the NFU pledge to ensure a level of ambiguity, a practice that it thinks will strengthen its overall deterrence.<sup>40</sup> Moreover, a modernization program is still taking place. China is fielding a nuclear-armed submarine force and developing a strategic bomber.<sup>41</sup> It conducted over 100 missile flight-tests in 2019, and its strategic practices are generating anxieties among other nuclear-weapon states.<sup>42</sup>

For example, China's conventional missile advantage is also partly driving discussion among Indian strategists around revising its nuclear doctrine and force to deliver a larger, more destructive force with a lower threshold of use.<sup>43</sup> Simultaneously, Beijing's refusal to recognize India as a nuclear-weapons state currently prohibits it from initiating nuclear strategic dialogue with India. This policy stems from a broader Chinese refusal to recognize India as a great-power peer.<sup>44</sup> This missed opportunity to clarify potential misperceptions about mutual strategic intentions elevates the risk of each state organizing its defense posture against the other around worse-case assumptions about these adversary intentions.

Indeed, the 2020 India-China Ladakh border crisis has led to the deployment of INS *Arihant*, India's sole SSBN, into the Indian Ocean to "send a message" to China.<sup>45</sup> A former chief of the China-facing Indian Army Northern and Central Commands has also forecast that additional Chinese offensives in this crisis would compel New Delhi to "resort to nuclear brinkmanship to safeguard its sovereignty and territorial integrity."<sup>46</sup> This risk could threaten cascading strategic chain security dilemma effects, with India building an aggressive assessment of China's nuclear forces and strategic intentions into its own force planning, and Pakistan then following suit in response to India.<sup>47</sup>

## Pakistan

Pakistan's nuclear force is currently estimated to constitute around 150 nuclear warheads as of 2018, and it is continuing to grow and diversify as China continues to provide technical assistance to its nuclear weapons program.<sup>48</sup> Rawalpindi is planning a naval nuclear force, and China has arranged the sale of 8 Type-041 submarines to Pakistan, some of which are highly likely to serve as platforms in this force.<sup>49</sup> Pakistan emphasizes its development of ballistic missile defense (BMD)-evading nuclear cruise missiles and *Nasr* tactical nuclear weapons in official statements.<sup>50</sup> It is further developing multiple independently targetable reentry vehicle (MIRV) technology.<sup>51</sup>



Pakistan continues to exercise a first-use policy. This policy was recently underlined in an address by Khalid Kidwai, an Advisor to Pakistan's nuclear National Command Authority and former head of its Strategic Plans Division nuclear weapons complex, at an International Institute for Strategic Studies public event. Kidwai clarified that its general military operational policy is now one titled Quid-Pro-Quo-Plus. Upon suffering a conventional attack from India, Pakistan will respond by immediately escalating to the next rung on the ladder.<sup>52</sup>

## India

India's nuclear arsenal is estimated at around 150 nuclear warheads as of 2020, and it conducted the first operational deployment of the *Arihant*, the first boat in its indigenous SSBN fleet, in November 2018.<sup>53</sup> It has fielded *Agni-III* and *Agni-V* ballistic missiles, both able to reach Chinese east coast targets. New Delhi is also working on developing an even further-reaching *Agni-VI* missile, MIRV technology, and nuclear-armed cruise missiles.<sup>54</sup>

Indian messaging emphasizes that it continues to adhere to a force posturing concept of "credible minimum deterrence," defined as maintaining a small, survivable nuclear force at low readiness in peacetime, which poses a credible risk of nuclear retaliation to adversaries but does not guarantee it.<sup>55</sup> However, a senior Indian official has rejected the notion that this concept should impose any restraint on Indian force posture, remarking that "there is no fixity to India's (nuclear) capabilities. Capabilities are determined by our assessment of our security requirements and the security environment at a given time."<sup>56</sup>

India's Defence Minister, Rajnath Singh, suggested in August 2019 that India's NFU doctrine was now moving toward one of greater ambiguity. In public remarks, he referred to NFU only in the past tense and followed this deliberate phrasing with "What happens in [the] future depends on the circumstances."<sup>57</sup> This statement is the latest and most authoritative senior policymaker contribution to a growing debate among Indian officials and its strategic community about retaining India's NFU pledge or moving toward an Israel-type doctrine of nuclear ambiguity and posture of flexible response. In the meantime, Indian officials continue to evince interest in conventional counterforce missions and in acquiring the necessary capabilities to execute them.<sup>58</sup>

## Functional, not Structural, Options

Given the asymmetries, role of, and concerns about, nuclear weapons in all five of these states, a structural nuclear arms accord focusing on numbers of warheads or missiles is realistically a dead-end for the foreseeable multipolar future. Instead, this article proposes that these five national capitals and their strategic policy communities focus on developing an important functional arms control proposal—one

that each state already practices on a more limited basis: the important transparency and confidence-building measure of prior notifications of missile flight-tests.

### Existing Flight-Test Treaties and Agreements

The consequences of the United States and Russia fielding previously INF-banned ballistic and cruise missiles attracts much of the policy discourse around the treaty. However, it is important to note that the treaty laid the foundation to establish functional nuclear transparency measures. It banned possession, production, and flight-testing of ground-launched ballistic and cruise missiles with a range between 500 km and 5,500 km, with on-site verification protocols.<sup>59</sup>

Building upon this foundation, a 1988 agreement committed Russia and the United States to pre-notify each other of all inter-continental ballistic missile (ICBM) and submarine-launched ballistic missile (SLBM) launches. This arrangement was then incorporated into the 1991 START, which required at least 24 hours' notice of a four-day window within which flight-tests will be conducted, with associated demarcation of the test area.<sup>60</sup>

New START incorporated this 1988 agreement text for pre-notification of all ICBM and SLBM launches.<sup>61</sup> While important to ensure crisis stability through prior warning of missile tests, New START still lacks pre-launch notifications in significant missile categories that have been exacerbated by those lost with the INF. At present, these notification gaps include air-, ground-, and sea-based cruise missiles, as well as ballistic missiles with a range of up to 5,500 km. If New START is permitted to expire, these missile flight-test pre-notifications will also cease, elevating the risk of accidental escalation as both nuclear rivals continue to develop and test new missile platforms while reducing—or even eliminating—the other's prior warning about these actions.

**If New START is permitted to expire, these missile flight-test pre-notifications will also cease.**

Absent a dedicated effort to retain these protocols, both states will resort to relying upon national technical means (NTMs)—primarily satellite-based monitoring—to obtain prior warning. Because New START also prohibits rival interference with NTMs, they are not an effective replacement system for pre-notification protocols. A recent report notes that in this scenario, NTM systems will face greater collection demands and the new risk of adversary interference with their operation. The report observes that China and India could follow suit with US and Russian behavior in this regard, elevating nuclear risk more generally.<sup>62</sup>

While India and Pakistan have not agreed to arms control measures as far-reaching in ambition and verification arrangements as the INF treaty or START, their strategic competition is not entirely unregulated. Notable initiatives include a 2007 agreement on immediate notification of nuclear accidents; a 1991 accord to notify each other, and limit the geographic space, of major military exercises; a 1988 agreement to refrain from attacking nuclear installations, involving an annual exchange of details of designated facilities; and a 2005 arrangement on pre-notification of ballistic missile flight-tests.<sup>63</sup>

Under this 2005 India-Pakistan missile launch accord, Islamabad and New Delhi have committed to inform each other of a planned five-day period within which a ballistic missile test will take place, with three days' notice of the initiation of this window. The notification includes a warning of the air and naval areas to be affected by the test. India and Pakistan have also pledged that missiles will not overfly the international border and/or Line of Control, that their trajectories will remain at least 40 km away from these boundaries, and that they will similarly land at least 75 km away.<sup>64</sup>

However, the 2005 India-Pakistan agreement, like the others, has its own gaps. First, it entirely omits notifications of cruise missile flight-tests, leaving dangers of misinterpretation of cruise missile launches and deployments unaddressed. Second, the accord permits multiple launches within the notified window. Third, China is absent from the agreement, despite planning "arguably the world's most missile-centric approach to warfare today."<sup>65</sup> This absence means that a risk of adversary worst-case assumptions regarding Chinese nuclear intentions and capabilities remains unmitigated.

Moreover, these isolated commitments have not yet led to further-reaching arms control or stabilization initiatives, including prospective nuclear force and infrastructural reductions. As India's nuclear force serves to deter China as well as Pakistan, India has rejected Pakistan's proposals for bilateral arms control agreements.<sup>66</sup> China has not participated in the above mechanisms.<sup>67</sup> To attenuate the intensity of the nuclear and missile rivalry within the strategic chain, a greater Chinese commitment to confidence-building and nuclear risk-reduction initiatives is needed.

## **A Multilateral Pre-Notification Agreement**

---

A multilateral pre-notification of missile flight-tests would be one useful way to proceed both as a confidence-building measure among the five states and as the first step toward more ambitious control accords. This agreement would form a viable means to draw China into the nuclear risk-reduction measures, which are increasingly needed in this global intensifying nuclear competition. Moreover, it

would serve as a foundation for functional arms control in a potentially post-New START era of multipolar nuclear competition.

Under the agreement proposed here, the India-Pakistan, China-Russia, and US-Russia agreements would be combined, expanded, and unified. First, all five member states would commit to pre-notify each other of any ballistic flight-test, regardless of range, at least 72 hours before the commencement of the launch window. Second, similar notifications would be required for cruise missiles, as a growing element of the nuclear-armed or nuclear-capable forces of all five states. Third, only one missile would be permitted to be launched per test window, helping to curtail the scale of missile testing, including testing on a scale that could be misinterpreted as war preparations or war-fighting. Multiple missile launches could simulate major nuclear or conventional strikes, including the emerging concern of conventional missile attacks upon nuclear forces, command and population centers, and other significant strategic targets. Fourth, in addition to providing notification of the test area, states would also ban missile tests that overfly the land borders of fellow members and prohibit trajectories and impact zones from entering areas within an agreed minimum distance from these boundaries. This distance could be initially extended to 100 km for both the flight path and landing zone, further reducing missile threat perceptions and risks of misinterpretation of a launch.

**The India-Pakistan, China-Russia, and US-Russia agreements could be combined, expanded, and unified.**

The aegis of these reporting requirements could also encompass several emerging and non-nuclear technologies that can impinge upon nuclear threat perceptions. Hypersonic glide vehicles are currently launched either atop a ballistic missile or as a form of air-launched cruise missile (ALCM), meaning flight-tests of this emerging technology would count under the language of this initiative.<sup>68</sup> The US Conventional Prompt Global Strike system, of concern to China and Russia, is similarly composed of ballistic and cruise missile weapons.<sup>69</sup>

The kinetic elements of BMD programs also utilize ballistic missile interceptors. With the exception of Pakistan, each of these states is developing or fielding BMD systems. Rawalpindi is also actively discussing launching its own program.<sup>70</sup> The improved mutual monitoring of BMD flight-tests would also give these rivals a more accurate insight into the capabilities and intentions regarding these technologies. This insight would reduce the risk of arsenal expansions and increased MIRVing of nuclear forces based upon an exaggerated assessment of rival BMD abilities.

Finally, New START language prohibiting interference with NTM would be incorporated into this agreement. This would reduce the burden, and related risk of missing significant missile or nuclear developments, on NTM if they are

no longer the sole mechanism for states to monitor and evaluate rival strategic programs. Moreover, it would avert the potential trajectory of interference with NTM becoming a new global norm if New START is allowed to expire. Such an outcome would further heighten the risk of miscalculation in a crisis.

Implementing this agreement would deliver multiple benefits for global nuclear security. Given the increasing pace of ballistic and cruise missile developments, pre-notification protocols could lessen the risk of destabilizing surprises of unanticipated missile activities and reduce dangers of worst-case assessments—including misperceptions of preparations for a nuclear attack. Conversely, missile launches that have not been pre-notified could provide reason to adopt defensive measures. Restrictions on multiple missile launches within a single test window could be especially valuable.

Other side benefits could result from strengthening, expanding, and harmonizing the discrete India-Pakistan, US-Russia, and Russia-China notification initiatives. The presently moribund US-Russia Joint Data Exchange Center proposal, involving establishment of a military hub to share real-time information regarding bilateral or third-party missile launches, could be rejuvenated as an addition to this multilateral notification system. The level of missile data provided could also be broadened. Members could begin to share telemetric data of flight-tests and permit a limited annual number of test observations—even if only on a selective basis. Although not all of these states are members of the Hague Code of Conduct against Ballistic Missile Proliferation, they could still adopt its provision of providing annual lists of ballistic missile tests and policies.<sup>71</sup> Finally, the parties could agree to cap their annual number of flight-tests.

The experience of negotiating such an agreement and regularizing information exchanges throughout periods of both peace and tension could serve to build trust among participants. If all participants could establish sufficient confidence in the value and integrity of notification data provided, other transparency, confidence-building, and nuclear risk-reduction measures might follow to deepen this regime. These measures could eventually include dialogues toward the regulation of cyber and other non-kinetic interference with nuclear systems, as well as nuclear-armed drones such as Russia's Poseidon. As trust deepens, these interactions could also potentially turn toward asymmetric multilateral structural arms control proposals, which recognize and accept the variation in nuclear force constitutions and sizes among these five states.

### **Addressing Potential Failures to Launch**

---

Three significant obstacles—the policy attitudes of China, North Korea, and Iran—present themselves when considering this initiative. The partial reliance on secrecy for the survivability of the Chinese arsenal often leads its diplomats to

reject joining nuclear transparency and confidence-building measures.<sup>72</sup> However, it is worth noting that China has agreed to a bilateral accord with Moscow on pre-launch notifications. Beijing and Moscow have committed only to inform each other of flight-tests of ballistic missiles with a 2,000 km-plus range and a trajectory approaching their border.<sup>73</sup> This singular commitment highlights that the Chinese opposition to joining such regimes is not as firm as is often assumed by policy analysts.<sup>74</sup>

Also, states that remained outside the regime would face the risk of being left to rely upon their NTM alone for understanding adversary nuclear and missile programs. These states would also not benefit from the general trust-building benefits of regular data-sharing within the regime over time.

I do not recommend that Pyongyang nor Tehran be immediately invited to join this initiative. In the protocol's implicit recognition of member states as globally significant nuclear-weapon states, or those with advanced missile technologies, these states will likely seek entry as confirmation of this status for itself. This diplomatic gift can be utilized for leverage in pressuring these states toward reductions in its nuclear and missile programs. Offering entry to North Korea or Iran in return for reaching a major milestone in this regard—and withdrawing it upon backsliding—would ensure this initiative generated a new carrot for the United States to employ.<sup>75</sup> The inextricable political and military linkage of the Iranian nuclear and missile program to that of Israel, and regional security risks of admitting one but not the other, means that Israel should not be admitted until satisfactory conditions have first been determined for that of Iran.<sup>76</sup>

The protocol could also eventually be extended to include other important nuclear and missile powers such as France, Japan, South Korea, and the UK. However, it is crucial not to understate the immediate challenge of persuading Russia and the strategic chain states of China, India, and Pakistan to join this initiative as the first objective in securing its implementation. States should focus their diplomatic energy and attention on these national capitals and alleviating their survivability concerns as discussed above.

**C**hinese opposition to joining such regimes is not as firm as is often assumed by policy analysts.

### **Shifting, Not Just Saving, Arms Control**

The United States, Russia, China, India, and Pakistan are entering a new decade of an intensifying and interactive nuclear competition. This competition is also occurring against the gradual erosion of most of the previous international agreements limiting vertical nuclear proliferation. The seeming collapse of the treaty-

based structural arms control accords means that generating nuclear risk-reduction and confidence-building measures to avert the dangers of accidental or inadvertent escalation will require creativity. These efforts are needed to avoid the prospect of strategic force planning based upon worst-case and inaccurate assessments of rival nuclear and missile programs.

Negotiating a new multilateral structural arms control agreement—even on the limited level of the trilateral agreement currently proposed by the Trump administration—would require acceptance by all parties of asymmetric force caps or bans among them. It would also raise acute verification challenges for China, which relies upon deception and mobility for force survivability. There is little sign of the trust and good-faith engagement among Washington, Moscow, and Beijing necessary for the success of this structural initiative.

By contrast, focusing on functional arms control measures offers a more politically viable route to encouraging global strategic stability, while serving as a foundation for potential later arms control agreements. The proposed creation of a unified five-state missile flight-test pre-notification regime, while serving as an inventive and feasible new nuclear confidence-building and risk-reduction measure in its own right, could begin to generate the necessary conditions for more ambitious developments.

Negotiating such an agreement would be a worthy priority in the five states' diplomatic engagements. This step could help unlock a longer-term process of more meaningful steps for sustainable war avoidance and stability. The rising strategic tensions, mutual mistrust, and expanding nuclear forces of these five states render this agreement both a higher priority in this multipolar nuclear world and a necessary foundation for the structural efforts that worked more easily in a bipolar one.

## Notes

---

1. Ploughshares Fund, "World Nuclear Weapons Stockpile," March 9, 2020, <https://www.ploughshares.org/world-nuclear-stockpile-report>.
2. C. Todd Lopez, "U.S. Withdraws from Intermediate-Range Nuclear Forces Treaty," US Department of Defense, August 2, 2019, <https://www.defense.gov/Explore/News/Article/Article/1924779/us-withdraws-from-intermediate-range-nuclear-forces-treaty/>. For the full text and associated memoranda of the INF Treaty, see "Intermediate-Range Nuclear Forces (INF) Texts," Federation of American Scientists, April 15, 1998, <https://fas.org/nuke/control/inf/text/index.html>.
3. Pranay Vaddi, "Bringing Russia's New Nuclear Weapons into New START," *Lawfare*, August 13, 2019, <https://www.lawfareblog.com/bringing-russias-new-nuclear-weapons-new-start>.

4. Robert Einhorn and W.P.S. Sidhu, eds., *The Strategic Chain: Linking Pakistan, India, China, and the United States* (Washington, DC: Brookings Institution, March 2017), [https://www.brookings.edu/wp-content/uploads/2017/03/acnpi\\_201703\\_strategic\\_chain.pdf](https://www.brookings.edu/wp-content/uploads/2017/03/acnpi_201703_strategic_chain.pdf).
5. Keir A. Lieber and Daryl G. Press, "The New Era of Counterforce: Technological Change and the Future of Nuclear Deterrence," *International Security* 41, no. 4 (2017): 9–49, [https://doi.org/10.1162/ISEC\\_a\\_00273](https://doi.org/10.1162/ISEC_a_00273).
6. Dave Majumdar, "Here Is Why the US Military Is Not in Panic Mode over China's Carrier-Killer Missiles," *National Interest*, June 20, 2016, <https://nationalinterest.org/blog/the-buzz/here-why-the-us-military-not-panic-mode-over-chinas-carrier-16651>; Sydney J. Freedberg Jr., "Glimpse inside Air-Sea Battle: Nukes, Cyber at Its Heart," *Breaking Defense*, July 9, 2013, <https://breakingdefense.com/2013/07/glimpse-inside-air-sea-battle-nukes-cyber-at-its-heart/>.
7. James M. Acton, "Escalation through Entanglement: How the Vulnerability of Command-and-Control Systems Raises the Risks of an Inadvertent Nuclear War," *International Security* 43, no. 1 (2018): 56–99, [https://doi.org/10.1162/isec\\_a\\_00320](https://doi.org/10.1162/isec_a_00320).
8. Uwe Nerlich, "Conventional Arms Control in Europe: The Objectives," in Uwe Nerlich and James A. Thomson, eds., *Conventional Arms Control and the Security of Europe* (Boulder, CO: RAND Corporation and Westview Press, 1988), 195.
9. Nerlich, "Conventional Arms Control in Europe," 195.
10. Alexandra Bell and Andrew Futter, "Reports of the Death of Arms Control Have Been Greatly Exaggerated," *War on the Rocks*, October 4, 2018, <https://warontherocks.com/2018/10/reports-of-the-death-of-arms-control-have-been-greatly-exaggerated/>.
11. Jacquelyn Schneider, "A Strategic Cyber No-First-Use Policy? Addressing the US Cyber Strategy Problem," *Washington Quarterly* 43, no. 2 (2020), 159–75, <https://doi.org/10.1080/0163660X.2020.1770970>.
12. Christopher Ashley Ford, "The Politics of Arms Control: Getting beyond Post-Cold War Pathologies and Finding Security in a Competitive Environment," U.S. Department of State, February 11, 2020, <https://www.state.gov/the-psycho-politics-of-arms-control/>; Donald J. Trump, *National Security Strategy* (Washington, DC: The White House, December 2017), 31, <https://www.whitehouse.gov/wp-content/uploads/2017/12/NSS-Final-12-18-2017-0905.pdf>.
13. Heather Williams, "Asymmetric Arms Control and Strategic Stability: Scenarios for Limiting Hypersonic Glide Vehicles," *Journal of Strategic Studies* 42, no. 6 (2019), 789–813, <https://doi.org/10.1080/01402390.2019.1627521>.
14. Marcus Weisgerber, "DOD's 2021 Budget Would Trim Arsenal, Shift Funds to Arms Development," *Defense One*, February 10, 2020, <https://www.defenseone.com/politics/2020/02/dods-2021-budget-would-retire-old-weapons-buy-new-ones-eventually/162997/>.
15. US Department of Defense, *Nuclear Posture Review 2018* (Washington, DC: Office of the Secretary of Defense, February 2018), xii, <https://media.defense.gov/2018/Feb/02/2001872886/-1/-1/1/2018-NUCLEAR-POSTURE-REVIEW-FINAL-REPORT.PDF>.
16. US Joint Chiefs of Staff, *Joint Publication 3-72: Nuclear Operations* (Washington, DC: US Joint Chiefs of Staff, June 11, 2019), viii, III-2–III-4, [https://fas.org/irp/doddir/dod/jp3\\_72.pdf](https://fas.org/irp/doddir/dod/jp3_72.pdf).
17. US Joint Chiefs of Staff, *Joint Publication 3-72*, x.
18. Frank G. Klotz, *The Military Case for Extending the New START Agreement* (Santa Monica, CA: RAND Corporation, February 2020), 11–12, [https://www.rand.org/content/dam/rand/pubs/perspectives/PE300/PE350/RAND\\_PE350.pdf](https://www.rand.org/content/dam/rand/pubs/perspectives/PE300/PE350/RAND_PE350.pdf).



19. "Briefing with Senior State Department Official on the New START," US Department of State, March 9, 2020, <https://www.state.gov/briefing-with-senior-state-department-official-on-the-new-start/>; Hans M. Kristensen and Matt Korda, "United States Nuclear Forces, 2020," *Bulletin of the Atomic Scientists* 76, no. 1 (2020), 47, <https://doi.org/10.1080/00963402.2019.1701286>; Hans M. Kristensen and Matt Korda, "Chinese Nuclear Forces, 2019," *Bulletin of the Atomic Scientists* 75, no. 4 (2019), 172, <https://doi.org/10.1080/00963402.2019.1628511>; Hans M. Kristensen and Matt Korda, "Russian Nuclear Forces, 2020," *Bulletin of the Atomic Scientists* 76, no. 2 (2020), 102, <https://doi.org/10.1080/00963402.2020.1728985>.
20. "Briefing with Senior State Department Official."
21. Kingston Reif and Shannon Bugos, "No Progress toward Extending New START," *Arms Control Today* 50 (July/August 2020), <https://www.armscontrol.org/act/2020-07/news/progress-toward-extending-new-start>; Steven Pifer, "Unattainable Conditions for New START Extension?" *Order from Chaos* (blog), Brookings, July 1, 2020, <https://www.brookings.edu/blog/order-from-chaos/2020/07/01/unattainable-conditions-for-new-start-extension/>.
22. "Briefing with Senior State Department Official."
23. Reif and Bugos, "No Progress."
24. David Lague, "Special Report: U.S. Rearms to Nullify China's Missile Supremacy," *Reuters*, May 6, 2020, <https://www.reuters.com/article/us-usa-china-missiles-specialreport-us/special-report-u-s-rearms-to-nullify-chinas-missile-supremacy-idUSKBN2211EQ>; Eric Heginbotham et al, *The U.S.-China Military Scorecard: Forces, Geography, and the Evolving Balance of Power, 1996–2017* (Santa Monica, CA: RAND Corporation, 2015), 51, [https://www.rand.org/content/dam/rand/pubs/research\\_reports/RR300/RR392/RAND\\_RR392.pdf](https://www.rand.org/content/dam/rand/pubs/research_reports/RR300/RR392/RAND_RR392.pdf).
25. Amy F. Woolf, *Russia's Nuclear Weapons: Doctrine, Forces, and Modernization* (Washington DC: US Congressional Research Service, July 20, 2020), 4–5, 35–36, <https://fas.org/sgp/crs/nuke/R45861.pdf>.
26. Olga Oliker, "Moscow's Nuclear Enigma: What Is Russia's Arsenal Really For?," *Foreign Affairs* 97, no. 6 (2018), <https://www.foreignaffairs.com/articles/russian-federation/2018-10-15/moscows-nuclear-enigma>; Katarzyna Zysk, "Escalation and Nuclear Weapons in Russia's Military Strategy," *RUSI Journal* 163, no. 2 (2018): 4–15, <https://doi.org/10.1080/03071847.2018.1469267>; Hans M. Kristensen and Matt Korda, "Russian Nuclear Forces, 2019," *Bulletin of the Atomic Scientists* 75, no. 2 (2019), 75–76, <https://doi.org/10.1080/00963402.2019.1580891>.
27. Zysk, "Escalation and Nuclear Weapons," 8–10.
28. Kristensen and Korda, "Russian Nuclear Forces, 2019," 76.
29. Matteo Natalucci, "Russia Completes Testing of 'Poseidon' Thermonuclear Torpedo," *Janes*, February 19, 2019, <https://www.janes.com/defence-news/news-detail/russia-completes-testing-of-poseidon-thermonuclear-torpedo>.
30. US Senate Committee on Armed Services, *Statement of Charles A. Richard, Commander, United States Strategic Command* (Washington, DC: US Senate Committee on Armed Services, February 13, 2020), 5, [https://www.armed-services.senate.gov/imo/media/doc/Richard\\_02-13-20.pdf](https://www.armed-services.senate.gov/imo/media/doc/Richard_02-13-20.pdf).
31. North Atlantic Council, "Statement on Russia's Failure to Comply with the Intermediate-Range Nuclear Forces (INF) Treaty," NATO, February 1, 2019, [https://www.nato.int/cps/en/natohq/news\\_162996.htm](https://www.nato.int/cps/en/natohq/news_162996.htm).

32. Alexander D. Chekov et al, "War of the Future: A View from Russia," *Survival* 61, no. 6 (2019), 39, <https://doi.org/10.1080/00396338.2019.1688563>.
33. Chekov et al, "War of the Future," 39.
34. Steven Pifer, "Russia's Shifting Views of Multilateral Nuclear Arms Control with China," *Order from Chaos* (blog), Brookings, February 19, 2020, <https://www.brookings.edu/blog/order-from-chaos/2020/02/19/russias-shifting-views-of-multilateral-nuclear-arms-control-with-china/>.
35. Author interviews with Chinese officials and experts, Beijing, January–February 2018.
36. Wu Riqiang, "Trilateral Arms Control Initiative: A Chinese Perspective," *Bulletin of the Atomic Scientists*, September 4, 2019, <https://thebulletin.org/2019/09/trilateral-arms-control-initiative-a-chinese-perspective/>.
37. State Council Information Office of the People's Republic of China, "China's National Defense in the New Era," Xinhua, July 24, 2019, section II, [http://www.xinhuanet.com/english/2019-07/24/c\\_138253389.htm](http://www.xinhuanet.com/english/2019-07/24/c_138253389.htm); Hui Zhang, *China's Fissile Material Production and Stockpile* (Princeton, NJ: International Panel on Fissile Materials, 2017), 2–3, <http://fissilematerials.org/library/rr17.pdf>; Gregory Kulacki, *China's Nuclear Arsenal: Status and Evolution* (Cambridge, MA: Union of Concerned Scientists, May 2011), 1, <http://www.ieim.uqam.ca/IMG/pdf/ucs-chinese-nuclear-modernization.pdf>.
38. Fiona S. Cunningham and M. Taylor Fravel, "Dangerous Confidence? Chinese Views on Nuclear Escalation," *International Security* 44, no. 2 (2019), 61–109, [https://doi.org/10.1162/isec\\_a\\_00359](https://doi.org/10.1162/isec_a_00359).
39. Author interviews with Chinese officials and experts, Beijing, January–February 2018.
40. Fiona S. Cunningham and M. Taylor Fravel, "Assuring Assured Retaliation: China's Nuclear Posture and U.S.-China Strategic Stability," *International Security* 40 no. 2 (Fall 2015), 24–25, [https://doi.org/10.1162/ISEC\\_a\\_00215](https://doi.org/10.1162/ISEC_a_00215).
41. Hans M. Kristensen and Matt Korda, "Chinese Nuclear Forces, 2019," *Bulletin of the Atomic Scientists* 75, no. 4 (2019), 172, 175–76, <https://doi.org/10.1080/00963402.2019.1628511>.
42. Kyodo News, "China Steps Up Training and Development, Firing Over 100 Missiles in 2019—Far More Than U.S.," *Japan Times*, March 1, 2020, <https://www.japantimes.co.jp/news/2020/03/01/asia-pacific/china-missiles/>.
43. B.S. Nagal, "India's Nuclear Doctrine and Strategy," in A.K. Singh and B.S. Nagal, eds., *Military Strategy for India in the 21st Century* (New Delhi: Centre for Land Warfare Studies and KW Publishers, 2019), 195–224.
44. Author interview with Chinese scholar, Beijing, January 29, 2018.
45. Snehes Alex Philip, "Navy Deploys Large Number of Ships in Indian Ocean to Send Clear 'Message' to China," *The Print*, July 28, 2020, <https://theprint.in/defence/navy-deploys-almost-all-operational-ships-in-indian-ocean-to-send-clear-message-to-china/469833/>; Snehes Alex Philip, "India Prepares for 'Collusive' Threat from China & Pakistan, Rajnath Asks Forces to be Ready," *The Print*, July 22, 2020, <https://theprint.in/defence/india-prepares-for-collusive-threat-from-china-pakistan-rajnath-asks-forces-to-be-ready/466071/>.
46. H.S. Panag, "India has Two Options with Stubborn China. The Better One Involves Taking the Battle to Them," *The Print*, July 23, 2020, <https://theprint.in/opinion/india-has-two-options-with-stubborn-china-the-better-one-involves-taking-the-battle-to-them/466239/>.

47. Frank O'Donnell and Yogesh Joshi, *India and Nuclear Asia: Forces, Doctrine, and Dangers* (Washington, DC: Georgetown University Press, 2018), 110–12.
48. Hans M. Kristensen, Robert S. Norris, and Julia Diamond, "Pakistani Nuclear Forces, 2018," *Bulletin of the Atomic Scientists* 74, no. 5 (2018), 348, <https://doi.org/10.1080/00963402.2018.1507796>.
49. Usman Ansari, "Pakistani Naval Modernization Appears Stalled," *Defense News*, January 15, 2016, <https://www.defensenews.com/global/asia-pacific/2016/01/15/pakistani-naval-modernization-appears-stalled/>; Mehreen Zahra-Malik et al., "Pakistan PM Approves Deal to Buy Eight Chinese Submarines," *Reuters*, April 2, 2015, <https://www.reuters.com/article/us-china-pakistan/pakistan-pm-approves-deal-to-buy-eight-chinese-submarines-official-idUSKBN0MT05M20150402>.
50. Muhammed Anis, "No First Use of N-Weapons Not Policy: DG ISPR," *News International*, September 5, 2019, <https://www.thenews.com.pk/print/522403-no-first-use-of-n-weapons-not-policy-dg-ispr>; O'Donnell and Joshi, *India and Nuclear Asia*, 51–80.
51. Kristensen, Norris, and Diamond, "Pakistani Nuclear Forces," 349, 353–54.
52. Khalid Kidwai et al., "Keynote Address and Discussion Session," International Institute for Strategic Studies, February 6, 2020, 8–9, 18–19, 22–23, <https://www.iiss.org/-/media/files/events/2020/transcript-of-It-general-kidwais-keynote-address-as-delivered—iiss-ciss-workshop-6feb20.pdf?la=en&hash=4EB4E4D0D7BFA4A0551AF178BA23357929BD42E5>.
53. Hans M. Kristensen and Matt Korda, "Indian Nuclear Forces, 2020," *Bulletin of the Atomic Scientists* 76, no. 4 (2020), 218, 222, <https://doi.org/10.1080/00963402.2020.1778378>; Sandeep Unnithan, "INS Arihant Returned Yesterday from 20-Day Deterrent Patrol," *India Today*, November 5, 2018, <https://www.indiatoday.in/india/story/ins-arihant-returned-yesterday-from-20-day-deterrent-patrol-1383188-2018-11-05>.
54. Kristensen and Korda, "Indian Nuclear Forces."
55. Frank O'Donnell and Debalina Ghoshal, "Managing Indian Deterrence: Pressures on Credible Minimum Deterrence and Nuclear Policy Options," *Nonproliferation Review* 25, no. 5–6 (2018), 419–20, <https://doi.org/10.1080/10736700.2019.1565187>.
56. Author correspondence with senior Indian official, June 3, 2015.
57. Government of India, "Raksha Mantri Shri Rajnath Singh Pays Homage to Former Prime Minister Atal Bihari Vajpayee in Pokhran on His First Death Anniversary," Ministry of Defense Press Information Bureau, August 16, 2019, <https://pib.gov.in/Pressreleaseshare.aspx?PRID=1582158>.
58. Christopher Clary and Vipin Narang, "India's Counterforce Temptations: Strategic Dilemmas, Doctrine, and Capabilities," *International Security* 43, no. 3 (2019), 7–52, [https://doi.org/10.1162/ISEC\\_a\\_00340](https://doi.org/10.1162/ISEC_a_00340); O'Donnell and Ghoshal, "Managing Indian Deterrence," 419–36.
59. "Intermediate-Range Nuclear Forces (INF) Texts."
60. For the text and associated protocols and memoranda of the 1991 START treaty, see "START-1 Strategic Arms Reduction Talks," Federation of American Scientists, December 23, 1998, <https://fas.org/nuke/control/start1/text/index.html>. For the text of the 1988 missile launch pre-notification agreement, see US Department of State, *Agreement between the United States of America and the Union of Soviet Socialist Republics on Notifications of Launches of Intercontinental Ballistic Missiles and Submarine-Launched Ballistic Missiles (Ballistic Missile Launch Notification Agreement)* (Moscow: Bureau of Arms Control, Verification, and Compliance, May 31, 1988, <https://2009-2017.state.gov/t/avc/trty/187150.htm>).

61. US Department of Defense, *Protocol to New START Treaty, Part Four – Notifications*, February 5, 2011, sec. IV, <https://www.acq.osd.mil/tc/nst/protocol/NSTprotocolPartFour.htm>.
62. Michael P. Gleason and Luc H. Riesbeck, *Noninterference with National Technical Means: The Status Quo Will Not Survive* (El Segundo, CA: Aerospace Corporation, 2020), 7–9, [https://aerospace.org/sites/default/files/2020-01/Gleason\\_NTM\\_20200114.pdf](https://aerospace.org/sites/default/files/2020-01/Gleason_NTM_20200114.pdf).
63. Government of the Republic of India and Government of the Islamic Republic of Pakistan, *Agreement on Reducing the Risk from Accidents Relating to Nuclear Weapons*, February 21, 2007, <https://www.stimson.org/agreement-on-reducing-the-risk-from-accidents-relating-to-nuclear-weap>; Government of the Republic of India and Government of the Islamic Republic of Pakistan, *Agreement on Pre-Notification of Flight Testing of Ballistic Missiles*, October 3, 2005, <http://mea.gov.in/Portal/LegalTreatiesDoc/PA05B0591.pdf>; Government of the Republic of India and Government of the Islamic Republic of Pakistan, *Agreement on the Prohibition of Attack Against Nuclear Installations and Facilities*, December 31, 1988, [https://media.nti.org/documents/india\\_pakistan\\_non\\_attack\\_agreement.pdf](https://media.nti.org/documents/india_pakistan_non_attack_agreement.pdf); Government of the Republic of India and Government of the Islamic Republic of Pakistan, *Agreement on Advance Notice on Military Exercises, Manoeuvres and Troop Movements*, April 6, 1991, <https://treaties.un.org/doc/publication/unts/volume%201843/volume-1843-i-31420-english.pdf>.
64. India and Pakistan, *Agreement on Pre-Notification of Flight Testing of Ballistic Missiles*.
65. Andrew S. Erickson, Abraham M. Denmark, and Gabriel Collins, “Beijing’s ‘Starter Carrier’ and Future Steps,” *Naval War College Review* 65, no. 1 (Winter 2012), 41–42, <https://digital-commons.usnwc.edu/cgi/viewcontent.cgi?article=1446&context=nwc-review>.
66. Zafar Nawaz Jaspal, *Arms Control: Risk Reduction Measures Between India and Pakistan* (Bradford, UK: South Asian Strategic Stability Unit, University of Bradford, June 2005), 8, <https://www.files.ethz.ch/isn/99910/RP%20No%2001.pdf>.
67. Tong Zhao, “The Time is Ripe for a China-India Nuclear Dialogue,” Carnegie-Tsinghua Center for Global Policy, March 17, 2016, <https://carnegietsinghua.org/2016/03/17/time-is-ripe-for-china-india-nuclear-dialogue-pub-64283>.
68. Kelley M. Saylor, *Hypersonic Weapons: Background and Issues for Congress* (Washington, DC: Congressional Research Service, March 17, 2020), <https://fas.org/sgp/crs/weapons/R45811.pdf>.
69. Amy F. Woolf, *Conventional Prompt Global Strike and Long-Range Ballistic Missiles: Background and Issues* (Washington, DC: Congressional Research Service, February 14, 2020), 10–23, <https://fas.org/sgp/crs/nuke/R41464.pdf>; M. Elaine Bunn and Vincent A. Manzo, “Conventional Prompt Global Strike: Strategic Asset or Unusable Liability?,” *Strategic Forum* (Institute for National Strategic Studies), no. 263 (February 2011), 19–20, <https://ndupress.ndu.edu/Portals/68/Documents/stratforum/SF-263.pdf>.
70. Zafar Nawaz Jaspal, “Countering Indian Ballistic Missile Defense & Strategic Stability in South Asia,” *Margalla Papers* 22 (2018), 16–17, [https://ndu.edu.pk/issra/issra\\_pub/articles/margalla-paper/Margalla-Papers-2018/02-Countering-Indian-BMD.pdf](https://ndu.edu.pk/issra/issra_pub/articles/margalla-paper/Margalla-Papers-2018/02-Countering-Indian-BMD.pdf).
71. “The Hague Code of Conduct against Ballistic Missile Proliferation,” Hague Code of Conduct (website), last updated February 2020, <https://www.hcoc.at/>.
72. Andrea Berger, *The P5 Nuclear Dialogue: Five Years On* (London: Royal United Services Institute, 2014), 11–12, [https://rusi.org/sites/default/files/201407\\_op\\_the\\_p5\\_nuclear\\_dialogue.pdf](https://rusi.org/sites/default/files/201407_op_the_p5_nuclear_dialogue.pdf); Gregory Kulacki, “Chickens Talking with Ducks: The U.S.-Chinese Nuclear Dialogue,” *Arms Control Today*, October 2011, [https://www.armscontrol.org/act/2011\\_10/U.S.\\_Chinese\\_Nuclear\\_Dialogue](https://www.armscontrol.org/act/2011_10/U.S._Chinese_Nuclear_Dialogue).

73. Pavel Podvig, "Russia and China to Exchange Launch Notifications," October 21, 2010, [http://russianforces.org/blog/2010/10/russia\\_and\\_china\\_to\\_exchange\\_1.shtml](http://russianforces.org/blog/2010/10/russia_and_china_to_exchange_1.shtml); Luke Champlin, "China, Russia Agree on Launch Notification," *Arms Control Today*, November 2009, [https://www.armscontrol.org/act/2009\\_11/ChinaRussia](https://www.armscontrol.org/act/2009_11/ChinaRussia).
74. Li Bin, "Appendix 3A. China and Nuclear Transparency," in *Transparency in Nuclear Warheads and Materials: The Political and Technical Dimensions*, ed. Nicholas Zarimpas (Oxford: Stockholm International Peace Research Institute and Oxford University Press, 2003), 50–57, <https://www.sipri.org/sites/default/files/files/books/SIPRI03Zarimpas/SIPRI03Zarimpas.pdf>.
75. Duyeon Kim, *Negotiating toward a Denuclearization-Peace Roadmap on the Korean Peninsula* (Washington, DC: Center for a New American Security, June 27, 2019), <https://s3.amazonaws.com/files.cnas.org/documents/CNAS-Report-Denuclearization-final-1.pdf?mtime=20190627094531>.
76. Gawdat Bahgat, "A Mideast Nuclear-Weapons-Free Zone: Pie in the Sky," *Middle East Policy* 22, no. 3 (Fall 2015), <https://mepc.org/mideast-nuclear-weapons-free-zone-pie-sky>; Julian Borger, "The Truth about Israel's Secret Nuclear Arsenal," *The Guardian*, January 15, 2014, <https://www.theguardian.com/world/2014/jan/15/truth-israels-secret-nuclear-arsenal>.