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# EVALUATING THE INTERSECTION OF TECHNOLOGY AND NUCLEAR ESCALATION IN SOUTH ASIA

Chen Kaimin<sup>1</sup>

There are range of factors that are shaping nuclear issues in South Asia. Among these, India and Pakistan remain outside the Treaty on the Non-proliferation of Nuclear Weapons and the Comprehensive Nuclear-Test-Ban Treaty. Further, their religious conflicts, ethnic disputes, military confrontations and territorial disputes remain fierce and acute. The confluence of these factors means that when a crisis occurs, India and Pakistan are more likely to misjudge the situation due to poor communication, or to even face the use of tactical nuclear weapons. This essay examines the convergence of technology and nuclear escalation. It concludes by offering some conclusions about external powers that are often involved in the technological procurement and their both stabilising and destabilising impacts on South Asia.

Key Words: nuclear escalation, Treaty on the Non-proliferation of Nuclear Weapons, Comprehensive Nuclear Test Ban Treaty, South Asia

## Introduction

There are range of factors that are shaping nuclear issues in South Asia. At present, India and Pakistan have neither acceded to the Treaty on the Non-proliferation of Nuclear Weapons (NPT), nor signed the Comprehensive Nuclear Test Ban Treaty (CTBT). As a result, the possibility of future nuclear tests cannot be ruled out. Further, both countries are beset by an antagonistic security structure that has led to symmetrical nuclear proliferation, with nuclear tests carried out in succession by both countries in 1998.<sup>1</sup> As of

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2021, India is estimated to have produced enough military plutonium for 160 nuclear warheads, while the estimates for Pakistan are roughly at 165 nuclear warheads with the potential to grow to around 200 by 2025.<sup>2</sup> Pakistan is forced to spend a disproportionately larger share of its gross domestic product (GDP) on defense to achieve strategic parity with India.<sup>3</sup>

In determining some of the factors contributing to this security dilemma, Pakistan's decades-long conflict and rivalry with India continues amid international concerns about a possible war between the two nuclear-armed powers.<sup>4</sup> Both countries have fought four wars since 1948 and three of them were over Kashmir.<sup>5</sup> These decades of conflict over not just territory, but also ideology, religion and power, have further fuelled the nuclear race between the two countries.<sup>6</sup> As this nuclear dynamic has evolved, Pakistan has come to predicate its nuclear forces on ambiguity, uncertainty, risk and flexibility to maintain a posture of first use against India.<sup>7</sup> Faced with India's larger scale conventional arsenal and the threat of an overwhelming conventional attack, Pakistan may be forced to use nuclear weapons.<sup>8</sup> Thus, while Pakistan may have adopted credible minimum deterrence as its nuclear doctrine, due to the limitations of its resource base and the costs of an arms race, it maintains a strong reliance upon nuclear weapons for its security and survival.<sup>9</sup>

By contrast, India pledged not to be the first to use nuclear weapons in 2003 under its no-first-use (NFU) posture. Despite this pledge, in 2019 India's defense minister Rajnath Singh stated in 2019 that India's long-standing NFU principle may change 'depending on the situation', illustrating its own form of ambiguity.<sup>10</sup> Such shifts are not defined solely by India's deterrent relationship with Pakistan, even if it is the primary dynamic. Instead, India's development of nuclear weapons also has aims that include its international status as a great power, as well as its future strategic relationship with China. In both cases, the range of all new Agni missiles shows that their main target lies well beyond Pakistan.<sup>11</sup> Nevertheless, the lack of a consistent dialogue between India and Pakistan on nuclear weapons remains a major impediment, despite the efforts of countries like the United States to ease the nuclear tension between the two countries.<sup>12</sup> Facing this range of factors, this essay will evaluate how technology and nuclear escalation are intersecting in South Asia under these conditions.

### **Deterrence Fragility**

The confluence of the above factors means that when a crisis occurs, India and Pakistan are more likely to misjudge the situation due to poor communication or to even escalate to nuclear weapons use. Given the close geographic proximity of both countries, some have suggested that if India concretizes the change to its NFU policy, Pakistan may take this as a signal that India could pre-emptively strike Pakistan's nuclear installations,

prompting the latter to consider using all of its nuclear weapons first.<sup>13</sup> This dynamic belies an inherent fragility in the nuclear deterrence between the two countries. This is due to three unique characteristics.

First, the territorial dispute between India and Pakistan could be labelled as a zero-sum game. It is almost impossible to negotiate disputes that infringe on territorial sovereign interests. Pakistan and India have been sworn enemies since their independence from British rule. There have been more than four full-scale armed conflicts between them, numerous minor border conflicts and cross-border violations of the ceasefire. Their relationship is often on the brink of nuclear war.<sup>14</sup> In view of the long-standing hostility between the two countries, the possibility of a sudden escalation of the border issue cannot be ruled out. In addition, such sudden or accidental conflicts may lead to the intentional and unintentional use of nuclear weapons.

Second, India and Pakistan have a long border. Therefore, if there is a conflict between the two sides, the decision-maker's time and space buffer is very short. If deterrence fails, one of the two countries may make an unreasonable decision on the use of nuclear weapons. Third, India and Pakistan still lack effective command, control, communications, strategic early warning systems and intelligence systems (C3ISR), which further exacerbates the possibility of accidental use of nuclear weapons. There is a general lack of complex C3ISR, battle damage assessment and automated mission planning capabilities required to support effective nuclear operations by all parties.<sup>15</sup> Examples include claims that both sides are seeking 'weapons on aircraft or missiles capable of striking with as little as three minutes warning' and that India or Pakistan might opt to pursue Launch on Warning (LOW).<sup>16</sup>

### Technology Comparisons

At sea, the Indian Navy has always played a maritime leadership role in the Indian Ocean region because of its multifaceted capabilities and active presence in the region.<sup>17</sup> India's first indigenous nuclear-powered ballistic missile submarine (SSBN), the INS Arihant, was commissioned in August 2016, and with its first deterrence patrol some Indian analysts have declared that India's nuclear triad is complete.<sup>18</sup> A second SSBN, the INS Arighat will be followed by two more SSBNs, temporarily designated S4.<sup>19</sup> To arm these platforms, India has developed K-15 and the K-4 submarine-launched ballistic missiles (SLBMs).<sup>20</sup> Combined with the launch of its aircraft carriers, INS Viraat, INS Vikrant and INS Vishal, India can optimize its military scale and combat effectiveness.<sup>21</sup> Compared with Pakistan, India has an absolute advantage in maritime power.

Nevertheless, Pakistan is developing develops nuclear forces to counter India's strategic triad and to ensure its second-strike capability.<sup>22</sup> Among these, Pakistan continues to develop and has tested the Babur-III nuclear-capable submarine-launched cruise mis-

sile (SLCM).<sup>23</sup> This short-range system may be deployed on three Chai Agosta-class active submarines of the Pakistani Navy. While lacking in nuclear-powered submarines that could provide a stronger second-strike capability, this advance in SLCMs carries the potential of escalation in the maritime environment whether used or destroyed by the adversary in a crisis.<sup>24</sup> Pakistan also appears to be developing a variant of the Babur cruise missile, called Harbah, which has been described as a surface-to-surface anti-ship missile with ground attack capability.<sup>25</sup> Moreover, Pakistan is seeking to expand its fleet with an order reportedly of eight conventional powered submarines from China, with the first submarine expected to be delivered in 2022. Still, there are limits to Pakistan's minimum deterrence, particularly in terms of its sea-based systems that remain difficult to conceal and not well suited to second-strike capability.

On land, India has a series of platforms that can be used for nuclear warhead delivery, namely Prithvi and Agni ballistic missiles, as well as multifunctional Brahmos medium-range ramjet supersonic cruise missiles. India is also developing Nirbhay as the first self-designed and developed long-range subsonic cruise missile.<sup>26</sup> Among these platforms, India's Agni series ballistic missiles are the pillar of India's land-based nuclear deterrence capability. It is reported that the Agni-III medium range ballistic missile can cover the whole territory of Pakistan and constitute a deterrent to its surrounding areas.<sup>27</sup> The future deployment of medium and long-range missiles will provide a variety of strike options against Pakistan and China. It is reported that India has also successfully tested its Agni-IV intermediate-range ballistic missile (IRBM) and Agni-V IRBM, yet it is the Agni-VI that is anticipated to push India into intercontinental reach, offering it targets much farther afield than Pakistan.<sup>28</sup> Such ambitions show that India is not satisfied with limiting its strategic deterrence to Pakistan, leading other countries to be concerned about this future deterrent potential.

For Pakistan, its land-based nuclear missiles are likely to remain the mainstay of its nuclear forces. Pakistan currently has an estimated six operational land-based nuclear ballistic missiles, namely the short-range Abdali/Hatf-2, Ghaznavi/Hatf-III, Shaheen-I/Hatf-IV and Nasr/Hatf-IV, as well as the medium-range Ghauri/Hatf-V and Shaheen-II/Hatf-VI. Three other nuclear-capable ballistic missiles are under development, with the medium-range Shaheen-IA, Shaheen-III, and the Ababeel, which is reportedly equipped with multiple independently targetable re-entry vehicles.<sup>29</sup> Of particular note, Pakistan's short-range Nasr is for sub-strategic scenarios and carries nuclear warheads to deter evolving threats, including India's so-called cold start doctrine.<sup>30</sup> The Shaheen-III is reportedly sufficient to target all of mainland India from launch positions south of Islamabad, derived as some suggest by a need to be able to target the Nicobar and Andaman Islands, which are developed as strategic bases and where 'India might think of putting its weapons.'<sup>31</sup> Pakistan is also developing an enhanced version of the Babur known as the Babur-II or Babur-IB ground-launched cruise missile (GLCM), which like its maritime variant has the potential for escalation.<sup>32</sup>

### Technology and escalation

When evaluating the impact of technologies on nuclear escalation, it is important to start with the motivations behind these trends. The purpose of India's development of nuclear weapons is primarily based on its pursuit of major power status and maintenance of its national security. India has long believed that the possession of nuclear weapons can alleviate its dependence on the Union of the Soviet Socialist Republics (USSR) and later Russia and change the attitude of the United States towards India. India's nuclear strategy, traditionally focused on Pakistan, however, now appears to place a greater emphasis on China.<sup>33</sup>

While India's nuclear arsenal is maintained at a scale sufficient to maintain minimum credible deterrence and it continues to maintain its NFU posture, India is likely to be the first country to launch a nuclear attack during a military crisis. The development and deployment of nuclear warheads matched with missiles will create a material basis for the first use of nuclear weapons and pose the risk of accidental or unintentional nuclear war.<sup>34</sup> Moreover, India has the foundation to expand its nuclear arsenal, since the US-India nuclear agreement precluded international safeguards on its nuclear power plants and India's reprocessing facilities are being upgraded.<sup>35</sup>

In response, Pakistan's development of nuclear weapons and response to the military threat from India is only likely to accelerate.<sup>36</sup> Further, it will be reinforced by India's growing conventional military advantage, which forces Pakistan to rely on nuclear weapons for recalibration. Pakistan continues to grow its nuclear arsenal with more warheads, more delivery systems, and a growing fissile materials production industry. Further, it has a mature and diversified fissile material production complex that is currently expanding. It is estimated that Pakistan has three uranium enrichment plants and four heavy-water plutonium production reactors.<sup>37</sup> Infrastructure upgrades include a fourth plutonium production reactor and upgrades to uranium enrichment and spent fuel reprocessing facilities.<sup>38</sup> In 2021, Pakistan's Prime Minister, Imran Khan, stated that Pakistan's nuclear arsenal is to simply to protect the country as a deterrent.<sup>39</sup> Yet this arsenal is likely to expand much further, as Pakistan has four plutonium production reactors and an expanding uranium enrichment infrastructure.<sup>40</sup>

Beyond numeric competition with India, Pakistan's tactical nuclear weapons that include the Nasr/Hatf-IV short-range ballistic missile (SRBM) suggest that the calculations of deterrence in Pakistan are still very much predicated on first strike. The weapon appears intended for potential sub-strategic use in the early phases of a military conflict, a development that could lower the nuclear threshold in a Pakistan-India conflict and potentially reduce nuclear warning and crisis decision-making to a matter of minutes.<sup>41</sup> With the introduction of full spectrum deterrence and Pakistan's refusal to commit to NFU, it is likely to continue to pursue flexible response under full spectrum deterrence, with its expansion of low-yield systems in particular carrying escalation risks.<sup>42</sup> The

introduction of tactical nuclear weapons not only adversely impacts bilateral relations between India and Pakistan, it also undermines regional security and stability. There is always a chance that such developments as the introduction of tactical nuclear weapons will lead to escalation that will be difficult to control. Further, Pakistan's growing nuclear arsenal could lead to warhead management and command and control problems if the crisis occurs.<sup>43</sup>

However, Pakistan is not alone with such challenges. While it may appear that India's technological advances are ahead of Pakistan, its strategic nuclear triad has greater symbolic significance than actual effect. Among these deficiencies, India faces issues of insufficient quantity and range, as well as questionable reliability. India is also lacking in terms of its command-and-control systems. Furthermore, India's long-term failure to formulate a coherent and systematic national strategic and nuclear posture has led to uncertainty and arbitrariness in India's development and deployment of nuclear weapons, which may exacerbate the threats that India faces.

This ambiguity suggests that India will not always be able to 'play the nuclear weapon card' when faced with unexpected crises. Furthermore, India and Pakistan remain outside of the Treaty on the Non-proliferation of Nuclear Weapons (NPT) and the Comprehensive Nuclear-Test-Ban Treaty (CTBT) and have even obstructed the negotiation of a Fissile Material Cut-off Treaty (FMCT). The technological advances of both countries combined with their position outside of nuclear arms control mechanisms suggests that there is always a chance that such developments as the introduction of tactical nuclear weapons will lead to escalation that will be difficult to control.

## Conclusion

Facing the potential for escalation, external powers that are often involved in regional technological procurement, which both stabilizes and destabilizes South Asia, may be able to play a positive role. US economic and military assistance played a key role in Pakistan's ability to resist India in the first two decades.<sup>44</sup> Throughout, Pakistan successfully managed its relations with the United States. It was an ally in the war on terror and later a front-line partner.<sup>45</sup> However, Pakistan believes that the support of the United States is temporary and may change, so it is not a permanent factor for its security.<sup>46</sup> As just one example, the United States disqualified Pakistan as a major non-North Atlantic Treaty Organization ally in 2019.<sup>47</sup> In recent years, the relationship between the United States and Pakistan has been further declining, especially after US troops withdrew from Afghanistan in 2021.

By contrast, relations between the United States and India have been on the ascent. Among the pivotal developments in this relationship was the US-India strategic partnership, combined with their nuclear agreement, both of which posed a challenge to Pakistan.<sup>48</sup> Because the United States seeks to compete with India against China, it has



lifted sanctions, including the technology export ban on Indian defense and aerospace companies in 2011. Further, the United States granted India STA-1 status in 2018, paving the way to sell high-tech weapons to India.<sup>49</sup> India wants to rely on US technology to develop its own military industry. However, the shifting US approach towards India and Pakistan make it difficult for it to serve as an honest broker.

Throughout these trends, China has sought to balance between India and Pakistan to ensure peace and stability in South Asia. As a common neighbour of both countries, China has fostered channels of communication between the two countries, while advocating the exercise of restraint and the strengthening of dialogue. To this end, China has sought to recalibrate negative precedents from US efforts to promote India's accession to the Nuclear Suppliers Group (NSG) without that of Pakistan, seeking to build consensus among member states on common accession standards for non-NPT signatory states. China has always tried to maintain a neutral and balanced position in the tensions between India and Pakistan and is alert to third-party factors that increase the risk of conflict.

Further, China has played a constructive role in promoting dialogue and cooperation between India and Pakistan with the recognition that both are important countries in South Asia. China hopes that the two countries can maintain friendly and cooperative relations and properly resolve their problems through dialogue and consultation. China's nuclear energy cooperation with Pakistan has long been based on the understanding that the latter's peaceful nuclear program is a basic necessity for its maintenance of its own security. As this relationship has evolved, cooperation between China and Pakistan has become no longer primarily vested in the security field, but rather in the civil fields of nuclear energy and commercial development under the supervision and guarantee of the International Atomic Energy Agency. Both countries still maintain their NFU commitments and their respective development of strategic nuclear triads maintains this stability.

Finally, in its efforts to promote peace, China has sought to promote the non-expansion of crisis situations between India and Pakistan and the maintenance of regional stability. China and Pakistan maintain their all-weather strategic cooperative partnership, both countries have been actively building the China-Pakistan Economic Corridor with high quality and deepening mutually beneficial cooperation in various fields.<sup>50</sup> Yet in the current international environment, the stability of China-India relations is also of crucial importance to China. Recognizing the importance of facilitating stability and dialogue, China has taken the initiative under the Shanghai Cooperation Organization (SCO) to facilitate India's and Pakistan's ability to engage. Within this, the Indian Army has participated in all practical actions under the SCO framework, including the joint exercise Peace Mission and the defence ministers meeting held in 2018.<sup>51</sup> During various crises within South Asia, China has worked closely with the international commu-



nity to mitigate the damage to the international nuclear non-proliferation regime and to call for restraint from further escalation and to persuade both sides to engage in cease-fire. For example, in February 2019, after the attack in Indian controlled Kashmir, the timely communication and coordination between China, Russia and all parties played a role in cooling the situation in Kashmir.<sup>52</sup> China has always played an important role in peace and stability in South Asia.

Like China, Russia also seeks to play a positive and balanced role in the region. Russia maintains good relations with India and Pakistan. From 2014-2018, Russia exported 27 percent of its armament exports to India.<sup>53</sup> Further, in 2018, Russia and India signed a supply contract for five sets of S-400 anti-aircraft missile system, which will greatly enhance India's air defense capability.<sup>54</sup> Russia is one of the most important defense equipment suppliers in India. Both countries' military technical cooperation has evolved from a buyer seller to a framework including joint research, development and production.<sup>55</sup> During the Cold War, Russia and Pakistan were unable to establish friendly relations due to Pakistan's preference for the United States and Russia's additional preference for India. Yet in 2003, Pakistan's President Pervez Musharraf paid a state visit to Russia and bilateral relations began to improve.<sup>56</sup> By 2014, Russia lifted its arms embargo on Pakistan, paving the way for the upward trajectory of bilateral relations.<sup>57</sup>

Since the signing of the landmark defense agreement in 2014, the security partnership between Russia and Pakistan has been significantly strengthened and expanded. Joint exercises called Arab Monsoon and Druzba are further strengthening the increasingly converging military and political relations between the two countries, including trade in military equipment and training.<sup>58</sup> The Pakistan-Russia Consultative Group on Strategic Stability has further strengthened both security and defense cooperation.<sup>59</sup> Further, Russia has been making active efforts to provide a platform for India Pakistan negotiations to ease tensions between the two sides. For example, Russian President Vladimir Putin and Indian Prime Minister Narendra Modi spoke by telephone on 28 February 2019 to discuss the India-Pakistan conflict and counterterrorism. Moreover, Russian Foreign Minister Sergey Lavrov has said that Russia is ready to provide a platform for India-Pakistan negotiations through the SCO mechanism to ease and mediate the tense relations between the two nuclear powers.<sup>60</sup>

Much like China, Russia is a SCO member and has advocated for India and Pakistan to use this multilateral platform to meet and develop a more stable relationship.<sup>61</sup> It has also played constructive role in defusing tensions in South Asia and has cultivated good ties with both countries.<sup>62</sup> Russia has also opened the way for India to participate in nuclear energy cooperation with third countries. The 'Russia-India Strategic Vision' document signed in 2014 states that the two countries will study the possibility of investigating and carrying out mining technical cooperation in India and Russia and cooperate together to carry out exploration and mining activities in third countries.<sup>63</sup> Further, Russia's growing security partnership and cooperation with Pakistan indicates a desire

to maintain balance in its dealings in South Asia. In sum, recognizing the importance of maintaining strategic balance and fostering communication in South Asia, China and Russia are uniquely positioned to play a positive role.

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