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China's Approach to Arms Control Verification

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EXECUTIVE SUMMARY

China's consideration of verification issues affects the country's overall attitude toward arms control. Based on a comprehensive review of publicly available sources, this paper examines China's mainstream thinking and general practice on arms control verification. China's approach to arms control verification is driven by three primary factors: political incentives, technical considerations, and mutual trust. First, on the political front, China chooses its position regarding verification measures based on the country's perceived interests vis-à-vis the treaty in question. Thus, instead of displaying a consistent pattern, China's positions on verification vary over different issues and different time periods as its perceived interests and foreign policy priorities change. Additionally, the Chinese view that verification activity tends to provide an asymmetric advantage to the stronger party at the cost of the weaker party contributes to China's concern about verification posing a threat to its security interests.

Second, on the technical front, research on verification is under almost complete monopoly of government agencies whose interest in conducting verification research is determined by the government's political interest. The practical need to carry out international arms control and nonproliferation cooperation at the policy level is the most important driver of technical-level verification research. When China started to prepare for serious engagement in various international arms control negotiations in the 1980s, verification research developed rapidly due to the rising policy need. China's position on verification is also influenced by the actual and perceived asymmetry in military capabilities compared to its main security rivals. Its traditional preference for multilateral verification regimes over bilateral ones provides China with negotiation flexibility but also contributes to its lack of capacity to engage in future bilateral verification cooperation.

Third, China's top-down approach to mutual trust differs from the traditional Western approach of implementing bottom-up confidence-building measures. Whereas the West views a country's proven record in respecting arms control obligations as a way to build trust, Chinese policymakers require trust as an imperative precondition for operational-level verification cooperation. Thus, China stresses the importance that the relevant countries should first agree on a friendly political relationship. The lack of strategic trust between the United States and China is made worse by a restricted flow of information. Chinese security policy experts increasingly interpret developments in global affairs in light of preexisting distrust towards the United States.

Despite the difficult geopolitical conditions, the United States and other countries should seek to find concrete areas to start practical cooperation with China. This paper advances the following recommendations:

Organize a capacity-building program on arms control verification as part of the P5 Process

- The United States and Russia should use their rich experience and expertise in nuclear arms control verification to help build similar capacity in China, the UK, and France. Training programs or seminar series can be organized for American and Russian experts to share with their Chinese, British, and French counterparts the history and lessons of how the Cold War rivals overcame concerns about intrusive verification measures and found ways to protect legitimate military secrets through gradually establishing sophisticated verification regimes.
- It would also be useful for the United States and Russia to give detailed introductions about their national nuclear risk reduction centers.

Explore less sensitive measures of cooperation

- To overcome China's concern about military sensitivity, experts from China, the United States, and other countries can explore the use of new technologies such as virtual reality and jointly study how onsite inspections work and how to design onsite inspections in ways that address a country's specific concerns.
- The United States and China should explore the technical and political feasibility of an agreement on no cyber-attack on each other's civil nuclear facilities and start practicing information exchange steps as a way to verify compliance and build confidence.
- Carnegie scholars James Acton, Thomas Macdonald, and Pranay Vaddi also proposed a China-U.S. fissile material cutoff and transparency regime to build confidence that neither country will use its civilian nuclear facilities to produce fissile materials for weapons purposes.

ACRONYMS AND TERMS

Acronym/Term	Definition
BWC	Biological Weapons Convention
C3	Command, control, and communication
CTBT	Comprehensive Test Ban Treaty
FMCT	Fissile Material Cut-off Treaty
IAEA	International Atomic Energy Agency
IPNDV	International Partnership for Nuclear Disarmament Verification
ISR	Intelligence, surveillance, and reconnaissance
NFU	No First Use
OPCW	Organization for the Prohibition of Chemical Weapons
P5	The five nuclear weapons states
PPWT	Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Objects
TPNW	Treaty on the Prohibition of Nuclear Weapons

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1. INTRODUCTION

Despite growing international pressure on China to join substantive arms control talks, China has remained reluctant to engage. One reason is the lack of trust within the Chinese security policy community regarding arms control verification. It is not uncommon to hear Chinese experts express concern that the United States could violate an arms control agreement without being caught because it has better technological capabilities to secretly circumvent verification measures. Another common Chinese concern is that arms control verification would give the United States an opportunity to collect intelligence on the Chinese military and defense industry. These concerns contribute to the Chinese view that verification activity tends to provide an asymmetric advantage to the stronger party at the cost of the weaker party.

Further, these concerns may have contributed to China's mixed record in participating in international discussions on verification issues. For instance, China played an active role in negotiating the verification regimes of the Comprehensive Test Ban Treaty (CTBT) and Chemical Weapons Convention (CWC) and called for the negotiation of the verification protocol for the Biological Weapons Convention (BWC). On the other hand, China appears to take a relatively dismissive view about the necessity of reaching a robust verification regime for the negotiation of a treaty to ban the placement of weapons in outer space and to prohibit the use of force against outer space objects. China has not shown significant interest in studying verification issues in potential bilateral or multilateral nuclear reduction agreements and has stopped sending delegates to some major international verification initiatives such as the International Partnership for Nuclear Disarmament Verification (IPNDV).

Without proactive Chinese participation in international discussions on arms control verification issues, China's existing suspicion toward verification—among other factors—may continue dragging Beijing's feet in joining arms control negotiations. Admittedly, other factors present important obstacles to China's proactive cooperation on arms control, such as the lack of political interest and the capability asymmetry between China and its rivals. But concerns about verification are a significant contributing factor to China's overall thinking about arms control. As long as arms control talks are stalled, China would have limited opportunities to negotiate and implement arms control verification measures, reinforcing its suspicion and distrust toward verification. A better understanding about China's thinking and approach toward verification, therefore, may be useful to help find ways to break this deadlock and shed light on how the international community can better engage China on arms control cooperation.

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2. METHODOLOGY

The existing literature has not looked deeply into potential technical and political considerations that affect China's thinking and approach on verification. To address this gap, this paper is based on a comprehensive review of China's official documents, government reports, experts' analysis, conference proceedings, and publicly available records on technical research and technological development related to arms control verification. It uses these sources to analyze China's approach to verification issues in various arms control agreements. The paper devotes special attention to nuclear arms control verification but also seeks to address China's overall approach toward arms control verification in general. For the purpose of informing international policy debate, this paper acknowledges progress China has achieved but focuses on identifying challenges that may have undermined China's capacity to engage in international cooperation on arms control verification in a more proactive manner.

This paper first examines how China's approach to arms control verification is shaped by political incentives, including issues associated with traditional security thinking and a closed information environment. The paper then demonstrates how technical considerations impact China's willingness and capability to engage in verification. Finally, the paper proposes potential near-term measures to promote effective verification cooperation between China and the United States.

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3. POLITICAL INCENTIVE

Although the Chinese government has occasionally raised in passing a few high-level principles for arms control verification such as equality, justice, and common security,¹ at the practical level its approach to arms control verification seems flexible. This means China has not demonstrated a principled approach and has adopted sometimes opposite positions in accordance with different perceived interests, a tactic which is not necessarily unique to China.

3.1. Political Interest

As mentioned in the introduction, China's official attitude toward verification is much more proactive in the cases of CTBT and CWC than in the case of the Chinese-Russian joint proposal on the Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Objects (PPWT). In the latter case, China argues that verification may not be technically and economically feasible for the foreseeable future but that verification challenges should not stand in the way of negotiating a legally-binding international agreement to prevent the weaponization of outer space.² China refers to the 1967 Outer Space Treaty, as well as the majority of other "multilateral arms regulation and disarmament agreements" that do not have a verification regime, as examples of why verification is not imperative for effective arms control treaties.³ Chinese officials also argue that the unverifiability of the no first use (NFU) policy—which China adopts—does not undermine its significance.⁴

This attitude stands in contrast with China's praise of the CWC as a successful example of a multilateral arms control and nonproliferation endeavor for "having a strict verification regime"⁵ and China's insistence that the United States and Russia must conduct deep nuclear reductions "in a verifiable, irreversible, and legally-binding manner."⁶ One of the major critiques from Chinese military experts against the Treaty on the Prohibition of Nuclear Weapons (TPNW) is that the lack of a verification regime makes the treaty "poorly operable."⁷ On the issue of the Fissile Material Cut-off Treaty (FMCT), international analysts suspect that China's "cautious and reluctant" position

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- 1 "Position Paper Submitted by Chinese Government Experts to the First Session of the Un Panel of Government Experts on Verification (中国政府专家向联合国核查问题政府专家组一期会提交的立场文件)." Ministry of Foreign Affairs, January 30, 2006, https://www.fmprc.gov.cn/web/gjhdq_676201/gjhdqzz_681964/lhg_681966/zywj_681978/t309233.shtml; "Position Paper Submitted by Chinese Government Experts to the Second Phase of the Un Panel of Government Experts on Verification (中国政府专家向联合国核查问题政府专家组二期会提交的立场文件)." Ministry of Foreign Affairs, June 09, 2006, https://www.fmprc.gov.cn/web/gjhdq_676201/gjhdqzz_681964/lhg_681966/zywj_681978/t309230.shtml.
 - 2 "Verification Aspects of Paros." Ministry of Foreign Affairs, August 26, 2004, https://www.mfa.gov.cn/ce/cegv//eng/dbtyw/cjlk_1/cjzzdh/t199364.htm
 - 3 "Verification Aspects of Paros." Ministry of Foreign Affairs, August 26, 2004, https://www.mfa.gov.cn/ce/cegv//eng/dbtyw/cjlk_1/cjzzdh/t199364.htm
 - 4 "Statement by Ambassador Hu Xiaodi at the Un Seminar on Disarmament and Non-Proliferation (胡小笛大使在联合国裁军与防扩散研讨会上的发言)." Jeju Island: Ministry of Foreign Affairs, December 12-15, 2006, https://www.fmprc.gov.cn/web/wjb_673085/zzjg_673183/jks_674633/fywj_674643/t295052.shtml
 - 5 "China's Arms Control, Disarmament and Non-Proliferation Efforts (中国的军控、裁军与防扩散努力)." Beijing: China State Council Information Office, September 3, 2005.
 - 6 "Chinese Ambassador for Disarmament Fu Cong's Statement on Nuclear Weapons at the 71st Session of the Unga I Committee (中国裁军大使傅聪在第71届联大一委关于核武器问题的专题发言)." New York, October 17, 2016, http://chnun.chinamission.org.cn/tpxw/201610/t20161020_8305564.htm
 - 7 Luo, Xiaoru (罗孝如). "Why the 'Nuclear Ban Treaty' Is Unanimously Opposed ('禁核条约'因何遭一致反对)." National Defense News (中国国防报), November 5, 2018, 04.

on the treaty reflects “resistance to achieving an FMCT in the near future.”⁸ According to this view, Chinese officials highlighted the “profound disagreements” among countries on the verification and other issues “to go slow on an FMCT.”⁹

China’s evolving attitude toward negotiating a verification protocol for BWC is also revealing. Since China joined the treaty in 1984, it has supported the establishment of a verification regime for BWC, but its specific position has changed quite significantly. Both before and immediately after the failed international efforts to negotiate a verification protocol in 2001 (largely due to opposition from the George W. Bush administration of the United States), China showed considerable reservations about proposed verification measures. Its national defense white papers in 1998, 2000, and 2002 all stressed that the complexity of biological technologies demands a realistic approach toward exploring verification measures which must be fair, reasonable, and practical. These official documents also repeatedly emphasized the importance of preventing verification measures from being abused and of protecting legitimate security and commercial interests from being undermined by such measures. In 2000, Mr. Sha Zukang—then director general of the Arms Control Department of the Chinese Foreign Affairs Ministry—publicly expressed concern that if the verification measures of BWC were too strict they would weaken the effectiveness, sustainability, and universality of the treaty and harm the nonproliferation regime.¹⁰ Indeed, China “consistently advocated weaker measures” during negotiations.¹¹

For many years after the failed BWC verification protocol negotiation, China did not raise specific concerns about the lack of such a protocol in official statements and documents.¹² However, since around 2019, it has significantly strengthened public support for negotiating a verification protocol and levied criticism against the United States for blocking this effort. This criticism has coincided with the deterioration of the U.S.-China relationship. Particularly since the start of the COVID-19 pandemic, China’s public condemnation against the U.S. policy on the verification protocol has reached an unprecedented level. Amid heated international debate about the origin of the virus, senior Chinese diplomats have repeatedly suggested that domestic U.S. biological labs and labs built by America in other countries are linked to the pandemic and should be investigated.¹³ At the same

8 Gill, Bates. *China and Nuclear Arms Control: Current Positions and Future Policies*. SIPRI, 2010.

9 “Ambassador Fu Cong’s Statement on FMCT at the Informal Session of the Conference on Disarmament (傅聪大使在裁谈会非正式会议关于“禁产条约”问题的发言).” Permanent Mission of The People’s Republic of China to The United Nations Office at Geneva and Other International Organizations in Switzerland, August 11, 2015, https://www.fmprc.gov.cn/ce/cegv/chn/dbtyw/cijk_1/hdft_1/t1287803.htm

10 “Some Thoughts on Non-Proliferation Issues: Statement by Sha Zukang, Director General of the Arms Control Department of the Chinese Ministry of Foreign Affairs, at the Carnegie Symposium in the United States (关于防扩散问题的一些看法中国外交部军控司司长沙祖康在美国卡内基研讨会上的发言).” Ministry of Foreign Affairs, November 7, 2000, https://www.fmprc.gov.cn/web/gjhdq_676201/gjhdqzz_681964/lhg_683480/zyjh_683490/t4757.shtml.

11 Chevrier, Marie. “The Biological Weapons Convention: The Protocol That Almost Was.” *Verification Yearbook* (2001): 79-97.

12 “China’s Arms Control, Disarmament and Non-Proliferation Efforts (中国的军控、裁军与防扩散努力).” Beijing: China State Council Information Office, September 3, 2005; “Statement by the Chinese Delegation on the Chemical Weapons Convention and the Biological Weapons Convention at the 66th Session of the First Committee of the General Assembly (中国代表团在第66届联大一委关于《禁止化学武器公约》、《禁止生物武器公约》问题的专题发言).” New York: Ministry of Foreign Affairs, October 17, 2011. <https://www.mfa.gov.cn/ce/como/chn/yglz/ldrjh/t869584.htm>

13 “Chinese Fm Spokesperson Wang Wenbin: To Find out Whether the Covid-19 Came from a Lab Leak, No One Merits a Proper Investigation More Than the Us.” Beijing: Ministry of Foreign Affairs, August 24, 2021, <https://www.mfa.gov.cn/ce/cgsy/eng/gdxw/t1901397.htm>

time, China's diplomatic campaign blaming Washington as the only country opposing the BWC verification negotiation and advocating to relaunch the negotiation has also grown much stronger.¹⁴

At least three considerations may have influenced the evolution of China's position on BWC verification. First, China may have genuine concerns about American military biological research. Rapid breakthroughs in biological technology over the last few decades may have caused China to worry that the U.S. superior capability in this field could give Washington a unique advantage in developing secret military capabilities. China's traditional distrust toward America could have exacerbated this concern. A BWC verification regime might help contain secret U.S. military capability development to some extent. Second, China's initial concern about protecting its own commercial interest might have decreased in light of continued U.S. dominance in international biological research, leading China to recognize that it would benefit from promoting greater transparency and technological exchange. This disparity between U.S. and Chinese standings in the field of biological research entails that an invasive BWC verification regime would pose a greater potential threat to U.S. commercial interests than to China's. In other words, given the persistent U.S. opposition to negotiating a BWC verification regime to protect American commercial interests and technological advantage, China's public support and advocacy of such a negotiation would strengthen Beijing's international image. And third, as part of China's foreign policy, its arms control policy ultimately seeks to promote the country's overall foreign policy priorities. When the U.S.-China strategic rivalry escalated in recent years, it is not surprising that China's arms control policy—including its position on BWC verification—was increasingly motivated to target America and to highlight the “irresponsibility” of the United States.

These examples reveal that instead of displaying a consistent pattern, China's positions on verification vary for different international agreements and over different time periods as China's perceived interests and foreign policy priorities change. In the FMCT and other cases, as Bates Gill observes, “the strategic and political factors” “loom larger than the technical and procedural ones.”¹⁵ Generally speaking, strategic and political level considerations appear to influence China's position on verification more than technical-level factors themselves.

This is particularly the case in the Chinese system where research on verification is under almost complete monopoly of government agencies, and especially of the nuclear establishment, whose interest in conducting verification research is determined by the government's political interest. There are very few civil society actors or independent research institutes to push for research on verification technology or policy.

Despite some gradual progress in recent decades, China's relatively less enthusiastic investment into verification research, compared with the United States and some other Western countries, may be partly related to the widespread suspicion within China's security policy community toward arms control as a concept and as a practical approach to advance China's security interests. China's suspicious view toward “a world free of nuclear weapons” also means the government doesn't often have strong interest in investing in in-depth disarmament verification research.

14 "Chinese Ambassador Calls for Relaunching BWC Verification Protocol Negotiation." Beijing: CGTN, September 9, 2021, <https://news.cgtn.com/news/2021-09-09/China-calls-for-relaunching-BWC-verification-protocol-negotiation-13q6D1YUOn6/index.html>; "Chinese Delegation's Statement on Biological and Chemical Weapons at the 76th Unga First Committee (中国代表团在第76届联大一委关于生化武器问题的专题发言)." Ministry of Foreign Affairs, October 22, 2021, <https://www.mfa.gov.cn/ce/ceunl/chn/zgylhg/cjyjk/ldyw/t868740.htm>

15 Gill, Bates. *China and Nuclear Arms Control: Current Positions and Future Policies*. SIPRI, 2010.

3.2. Trust and Verification

A country's understanding about the relationship between verification and trust influences its approach toward verification. Many Western countries believe that verification is a useful way to build confidence and trust through a bottom-up approach: if a country has a proven record in respecting its arms control obligations, it will gradually win the trust of its partners. This line of thinking has a growing influence in China, but China's traditional preference of building trust through a top-down manner still dominates the mainstream thinking in its strategic community. When it comes to the issue of verification, this means China still generally believes that trust is an imperative precondition for cooperative verification. Admittedly, this view is not necessarily unique in the case of China. Soviet decisionmakers generally shared a similar view,¹⁶ as well as some American strategists.¹⁷

One important example of China's successful negotiation and implementation of verification measures is the Agreement on Mutual Reduction of Military Forces in the Border Area signed in 1997 by China, Russia, Kazakhstan, Kyrgyzstan, and Tajikistan. Since its implementation, the five countries have carried out annual mutual inspections and Chinese reporting on verification activities under the agreement has been overwhelmingly positive.¹⁸ This positive experience has led to broader and higher-level cooperation among the five countries and contributed to the establishment of the Shanghai Cooperation Organization. The success of the agreement seems at first glance to provide an example of bottom-up trust-building. However, from the Chinese perspective, improved relations with Russia and Central Asian countries since the dissolution of the Soviet Union provided the ultimate guarantee that they would agree to the inspection measures and that the implementation of mutual inspections would be smooth and trouble-free.

By the same token, when it comes to the China-India border dispute, China seems to believe that the lack of strategic trust prevents the two sides from conducting cooperative operation-level inspections to verify each other's compliance with previously agreed-upon commitments. For example, a former senior Chinese military official commented that the verification of the "line of actual control" along the disputed border is not going to be feasible as it is "beyond the current atmosphere of bilateral relations."¹⁹

The Chinese emphasis on strategic trust as a precondition of operational-level verification cooperation indicates that the relevant countries should first agree on a friendly political relationship and explicitly declare their joint determination not to treat each other as rivals or adversaries. This type of strategic trust between Washington and Beijing appears unlikely under current conditions. The serious ideological confrontation implies that American efforts to uphold its basic values like human rights and democracy are seen by Beijing as posing the gravest threat to its regime security. This strategic predicament means there are severe challenges to practice the Chinese model of top-down trust-building and to increase operation-level verification cooperation.

16 Krass, Allan. *Verification: How Much Is Enough*. London & Philadelphia: Stockholm International Peace Research Institute; Taylor & Francis, 1985, p. 161.

17 Krass, Allan. *Verification: How Much Is Enough*. London & Philadelphia: Stockholm International Peace Research Institute; Taylor & Francis, 1985, p. 167.

18 Liu, Yintang (柳银堂), Yonglin (邱永林) Qiu, and Desheng (吕德胜) Lv. "Disarmament Compliance Inspection on the Border between China, Kazakhstan, Russia and Tajikistan (中哈吉俄塔边境裁军履约视察见闻)." *PLA Daily (解放军报)*, September 8, 2018.

19 Zhang, Di (张迪). "India Can't Afford an All-out War with China. What Should We Do? (印度负担不起和中国打全面战争 我们该怎么做?)." *The Observer (观察者网)*, June 15, 2021, <https://news.sina.com.cn/c/2021-06-15/doc-ikqciyzi9655685.shtml>.

3.3. Political Distrust in a Closed Information Environment

The lack of strategic trust between the United States and China is made worse by the restricted flow of information between the two nations. In China's closed information environment, designed to systematically promote a national narrative within the society, narrowing the perception gap on factual issues at the operational level is challenging. Chinese foreign and security policy experts increasingly interpret the developments of international affairs in light of preexisting distrust shared across the Chinese society toward the United States. For instance, most Chinese experts appear to believe that the reported use of chemical weapons by the Syrian government on its own people and the reported assassination attempt by Russian secret agents on Sergei Skripal in Salisbury and against opposition leader Alexei Navalny were Western fabrications aimed to demonize the Syrian and Russian governments. The Chinese interpretations on these factual issues appear to have directly influenced the Chinese position to challenge the authority and work of the Investigation and Identification Team of the Organization for the Prohibition of Chemical Weapons (OPCW) when it comes to investigating chemical weapon use in Syria and the chemical poisoning in Salisbury.²⁰ This stands in contrast with China's previous position in the 2000s that "the important role of existing multilateral verification mechanisms such as ... the OPCW should be strengthened, not weakened or replaced,"²¹ and indicates a less trusting attitude toward the influence of Western countries on the OPCW's work in recent years. China believes that the United States and its allies took contemptible measures to serve their geopolitical interests by demonizing the Syrian and Russian governments. This reinforces Chinese experts' distrust toward the overall integrity, credibility, and strategic intent of these countries. The experts' writings and public statements about the fraudulence of the Western system and Western countries' misbehaviors in these cases then feed back into the same mainstream narrative of the Chinese society.

Over time, this self-reinforcing cycle shapes people's thinking and perspectives in a powerful way. When it comes to the issue of arms control verification, it significantly reduces the Chinese experts' interest in engaging with Western initiatives and proposals.

Some Chinese experts also believe that the United States has long politicized the issue of verification and used verification to promote political goals. For instance, they believe that during the Cold War, Washington misused arms control verification as a tool to plant its people into the Soviet system and to "open a door into the Soviet society" for the purpose of promoting "heterization" of the Soviet system.²² As China's concern about Western information infiltration and regime change grows, there may be renewed concerns about the domestic political impact of verification and transparency, including the risk that international exchanges on verification would provide opportunity for Western government agencies to "corrupt" or recruit Chinese military and security personnel. As China continues to undergo profound domestic changes, the prospect of applying certain verification concepts such as "societal verification" in China becomes increasingly unlikely.²³

20 "Russia, China Fail to Block Chemical Arms Body's New Powers." The Hague: France 24, November 20, 2018, <https://www.france24.com/en/20181120-russia-china-fail-block-chemical-arms-bodys-new-powers>

21 "Position Paper Submitted by Chinese Government Experts to the Second Phase of the UN Panel of Government Experts on Verification (中国政府专家向联合国核查问题政府专家组二期会提交的立场文件)." Ministry of Foreign Affairs, June 9, 2006, https://www.fmprc.gov.cn/web/wjw_673085/zfxgk_674865/gknrlb/tywj/zcwj/t309230.shtml

22 Liu, Zikui (刘子奎). "Verification and the Eisenhower Administration's Nuclear Test Ban Negotiations_1957-1960 (核查与艾森豪威尔政府禁止核试验谈判_1957_1960)." *Journal of East China Normal University (Humanities and Social Sciences)* (华东师范大学学报-哲学社会科学版), no. 1 (2021): 57-66.

23 Hinderstein, Corey, Andrew Newman, and Kelsey Hartigan. "Redefining Societal Verification." Washington DC: Nuclear Threat Initiative, 2014.

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4. TECHNICAL CAPACITY

In addition to issues of political will, China's position on verification is also influenced by the actual and perceived asymmetry in capabilities vis-à-vis its main security rivals. This section analyzes how China's capabilities—including its military capability and its capability to carry out verification—affect its thinking on and approach to verification.

4.1. Military Capability Asymmetry

Since the founding of the People's Republic of China in 1949, the country had long been a relatively weak military power compared with the superpowers of the time. Recognizing itself as a weak military power has popularized the belief that secrecy is imperative to protect China's legitimate national interests. China's nuclear weapon program successfully avoided external sabotage before the detonation of its first nuclear device in 1964 by maintaining a high level of secrecy. Over the past few decades, Chinese experts have pointed to China's relatively smaller nuclear arsenal compared to the United States and Russia as a key reason to maintain secrecy over the size, technological capability, and deployment status of China's nuclear arsenal. The wide-spread conviction that transparency—including transparency resulting from verification—would threaten the survivability and credibility of China's nuclear deterrent has been a major obstacle to Beijing's adoption of a more open attitude toward verification on nuclear arms control issues. Accordingly, Chinese experts argue that arms control verification measures are “not conducive to effective performance of China's nuclear deterrence” and raise “the risk of failure during crisis.”²⁴

Over time, fear of transparency has become part of the bureaucratic culture. New transparency measures appear very unpopular and unlikely unless some senior officials take exceptional efforts to push for them within the system. When the pressure for transparency comes from other countries—which is mostly the case—the concern about the intention of foreign countries and about the potential security risks becomes even more serious.

The internal classification measures and compartmentalization of the policymaking system appear to have caused interagency coordination challenges. For instance, Chinese military officials may not necessarily keep other Chinese officials updated in a timely manner regarding important Chinese military capability development and policy deliberation. Senior Chinese diplomats had publicly called for all countries to abandon the dangerous launch-on-warning posture as recently as 2019,²⁵ while the U.S. Department of Defense pointed out in 2021 that “since 2017, the PLARF has conducted exercises involving early warning of a nuclear strike and launch on warning responses.”²⁶

The stovepiping of the system could undermine Chinese diplomats' capacity to promote verification cooperation internationally.

The rapid growth of China's military capabilities has gradually reduced some concern about transparency. China has displayed more transparency about certain aspects of China's nuclear capabilities due to the recognition that limited transparency could be leveraged to demonstrate

24 Yang, Zhicheng (杨志成). "Verification Mechanism Is Not Conducive to China's Nuclear Deterrence (核查机制不利于中国核威慑)." *Ordnance Knowledge (兵器知识)*, no. 7 (2019): 1.

25 "Maintaining Global Strategic Stability, Reducing Risks of Nuclear Conflicts-- Statement by H.E. Mr. Fu Cong, Director-General of the Department of Arms Control of Mfa at the 16th Piic Beijing Seminar on International Security." Shenzhen: Ministry of Foreign Affairs, October 16, 2019, https://www.fmprc.gov.cn/mfa_eng/wjdt_665385/zyjh_665391/t1708326.shtml

26 "Annual Report to Congress: Military and Security Developments Involving the People's Republic of China." Washington DC: Office of the Secretary of Defense, 2021, p. 93.

China's power and enhance its deterrent.²⁷ Nonetheless, the policy of managed transparency must contend with increased security measures and classification regulations in response to the rise of the U.S.-China great power rivalry. As demonstrated by the state media publicly dismissing construction of missile silos as windmills and the foreign ministry denying the reported testing of an orbital hypersonic weapon system, the government is not yet ready to acknowledge capabilities under development. It is hard to imagine the country will adopt a more open view about arms control verification in the foreseeable future.

4.2. Preference for Multilateral Verification Regime

China's concern about verification posing a threat to its security interests has made China more interested in participating in multilateral verification regimes and exchanges than bilateral ones. Bilateral negotiations and agreements are too often susceptible to changes in the political relationship. Whereas in a multilateral setting, China has more opportunities to mobilize other countries to agree to or oppose certain verification measures and thus creates more maneuverability for itself. China sought a super-majority voting procedure for approving challenge inspections during the CTBT negotiation, reducing the risk that a small number of countries could launch a challenge inspection in China. For the same reason, international analysts believe that China would insist on a similar super-majority voting procedure for authorizing challenge inspections in a future FMCT negotiation.²⁸

In addition to the negotiation of verification regimes in multilateral arms control treaties, China has participated in some other multilateral verification initiatives, especially those organized by the United Nations. It contributed to the U.N. group of governmental experts on disarmament verification and to the International Atomic Energy Agency's (IAEA) work on researching and developing tools and methods for safeguards. Its growing experience in engaging on verification issues in a multilateral setting may make it more comfortable with and capable of pursuing multilateral verification cooperation in the future. On the other hand, its avoidance of bilateral verification cooperation reinforces its lack of capacity to engage in future bilateral cooperation.

There is little evidence that China's preference for multilateral arms control and/or verification regimes is a result of a principled belief in the inherent and unique value of multilateral institutions vis-à-vis bilateral ones. In cases where China enjoys obvious capability advantages, it has shown little opposition to bilateral arrangements. For example, China proposed to Taiwan in 2008 to establish military confidence-building measures and set up verification measures to ensure compliance.²⁹ According to Chinese experts, initial confidence-building measures would include military information and intelligence exchange, notification of military activities, and readjustment of China's military deployment near the Taiwan Strait. More significant measures were proposed for subsequent steps. They also proposed specific verification measures such as mutual dispatching of inspectors and establishment of "early warning stations."³⁰ This example demonstrates that China's

27 Wu, Riqiang. "How China Practices and Thinks About Nuclear Transparency." In *Understanding Chinese Nuclear Thinking*, edited by Bin Li and Tong Zhao: Carnegie Endowment for International Peace, 2016.

28 Gill, Bates. *China and Nuclear Arms Control: Current Positions and Future Policies*. SIPRI, 2010, p. 10.

29 Lee, Yuh-Feng (李毓峰). "Analysis of Prc's Promoting Cross-Strait Military and Security Mutual Trust Mechanism (中共推動兩岸軍事安全互信機制之評析)." *Review of Global Politics (全球政治評論)*, no. 34 (2011): 71-95.

30 Chen, Xiancai (陈先才). "Cross-Strait Military Mutual Trust Mechanism: Theoretical Constructs and Realization Paths (两岸军事互信机制: 理论建构与实现路径)." *Taiwan Research Journal (台湾研究集刊)* 1 (2009): 25-33.

assessment of its relative military capability is an important factor in China's attitude on verification cooperation.

By the same token, China's attitude toward the use of "national technical means" as a verification measure may be also influenced by its own capability to utilize national technical means. China had expressed strong concerns about making national technical means a legitimate verification measure, including in its official documents and in the CTBT negotiation.³¹ But as China's own intelligence, surveillance, and reconnaissance (ISR) capabilities rapidly grow, its attitude may change in the future.

4.3. Verification Research

Based on publicly available information, China has conducted relatively comprehensive technical research on verification in some areas and less research in other areas. Research on nuclear warhead certification, disassembly, and the storage and disposal of nuclear components and nuclear materials is robust. Focus areas include nuclear warhead and component authentication technology, information barrier technology, disassembly process monitoring technology, and chain-of-custody technology in storage and transportation.³² The Chinese Academy of Engineering Physics, which is responsible for designing and maintaining Chinese nuclear weapons, has published a relatively large number of journal papers, reports, and dissertations on these verification technologies, with occasional contributions from Tsinghua University, China Institute of Atomic Energy, and Chongqing University, and others.

These public records show that China has put significant effort into following and reviewing important technical verification research work conducted by other countries, including in governmental and nongovernmental institutes. Much of the Chinese research involves critically reviewing foreign work, making methodological improvements, and applying the methods or instruments to specific scenarios.³³ In some cases, their work is reportedly more advanced than other countries in certain aspects. For example, the Chinese Academy of Engineering Physics' development in 2011 of a prototype system for attribute certification of highly integrated plutonium component with information barrier was said to be the most advanced and most practical in the world at that time.³⁴

In contrast, there is very little public research about other aspects of arms control verification, such as verification methodologies and procedures for delivery vehicles of nuclear weapons or inspecting nuclear-related military facilities, like those implemented in the U.S.-Russian bilateral nuclear

31 "Working Paper Submitted Jointly by the Delegations of China and Russia to the Conference on Disarmament on "Verification for the Prevention of an Arms Race in Outer Space" (Cd/1781)." Ministry of Foreign Affairs, May 22, 2006, https://www.mfa.gov.cn/web/wj_b_673085/zzjg_673183/jks_674633/fywj_674643/t309185.shtml

32 "Implementation of the Treaty on the Non Proliferation of Nuclear Weapons, Submitted by the People's Republic of China (Npt/Conf.2015/Pc.IIi/13)." New York, 28 April: Preparatory Committee for the 2015 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons, 9 May 2014.

33 Wu, Jun (伍钧). "Numerical Simulation Study of Nuclear Warhead Detection Technology (核弹头探测技术数值模拟研究)." Chinese Academy of Engineering Physics, 2003; Zhu, Jianyu (朱剑钰), Haowei (戴昊炜) Dai, Qisong (吴其松) Wu, and Wenxiong (谢文雄) Xie. "Nuclear Component Verification Technology with Less Intrusiveness Based on Truncated Count Imaging (基于计数截断方法的低入侵性核部件成像认证技术)." *Modern Applied Physics (现代应用物理)* 9, no. 1 (2018): 19-27; 张迎增. "Compton Imaging Accuracy Influence Mechanism and Enhancement Method (康普顿成像精度影响机制与提升方法)." Chinese Academy of Engineering Physics, 2019.

34 Xiang, Yongchun (向永春). "Prototype System Development for Highly Integrated Plutonium Component Attribute Certification with Information Barrier (带信息屏障的高集成度钚部件属性认证原型系统研制)." *Annual Report on Science and Technology of Chinese Academy of Engineering Physics (中国工程物理研究院科技年报)*, no. 1 (2011): 26-28.

reduction treaties. Among policy experts, there is also little evidence that China has conducted deep or systematic research on the history of U.S.-Soviet/Russian interactions on arms control verification or sought to draw lessons from that rich history.

The practical need to carry out international arms control and nonproliferation cooperation at the policy level is the most important driver of technical-level verification research. China's verification research began in the late 1980s, when China started to prepare for serious engagement in various international arms control negotiations. Driven by the rising policy need, verification research has rapidly developed since the mid-1990s.³⁵ The establishment of the Arms Control Verification Technology Experts Group in the late 1990s was another major milestone.³⁶ However, the termination of the U.S.-China Lab-to-Lab exchange program, following the publication of the Cox Report in 1999, as well as the slowing down in international arms control progress since the early 2000s, seem to have reduced the policy motives behind the Chinese verification research. Verification research has continued to develop and deepen in many areas since then,³⁷ but it does not appear to have received the same level of priority and government attention as before. Therefore, although the technical research has become deeper and more nuanced in many cases, it appears driven more by science and technology and less by a desire to answer clear policy questions. For example, there is little syncretical research to review existing technological progress and analyze what additional research may be necessary to achieve established policy objectives.

35 Du, Xiangwan (杜祥琬). *The Scientific and Technical Basis of Nuclear Arms Control (核军备控制的科学技术基础)*. Beijing: Defense Industry Press (国防工业出版社), 1996.

36 Sun, Ying (孙颖). "A Review of Arms Control Verification Technology Research (军控核查技术研究综述)." *Annual Report on Science and Technology of Chinese Academy of Engineering Physics (1999) (中国工程物理研究院科技年报 (1999))* (1999): 295-301.

37 Liu, Cheng'an (刘成安), and Jun (伍钧) Wu. *Introduction to Nuclear Arms Control Verification Technology (核军备控制核查技术概论)*. Defense Industry Press (国防工业出版社), 2007.

5. MEASURES TO PROMOTE EFFECTIVE VERIFICATION COOPERATION WITH CHINA

The above analysis demonstrates that political will significantly influences China's attitude on verification issues. Experts of verification technologies at the Chinese Academy of Engineering Physics observed that international initiatives to promote verification cooperation, such as the International Partnership for Nuclear Disarmament Verification (IPNDV), may be useful to enhance global capacity but won't contribute directly to progress in arms control or disarmament. The latter, according to the CAEP, would require political will.³⁸ China's very flexible, rather than principled, approach toward verification also indicates the importance of political will. In addition, the above review of China's technical-level verification research shows that China does not feel its technical capacity is a constraining factor in China's arms control policy. Chinese experts would ramp up policy-oriented verification research once given clear political directives, as they did in the 1990s.

China's traditional belief in the top-down approach of trust-building has been an obstacle for arms control cooperation. But that does not mean its thinking won't change. Chinese military officials acknowledged that when China initially participated in the China-Russia-Kazakhstan-Kyrgyzstan-Tajikistan border disarmament compliance inspections in the late 1990s, "precautionary psychology" was indeed at play and both sides even carved out some "sensitive areas" from the inspections. But such concerns waned, and greater trust was forged over time. As inspectors traveled more and more in each other's countries, they developed not only interpersonal trust but increasingly favorable views about each other's country.³⁹ Similarly, although Chinese negotiators of the CWC treaty initially had concerns about CWC's inspection regime, such concerns decreased in subsequent years as many Chinese entities and companies received regular and smooth onsite inspections.⁴⁰ This example indicates that as Chinese officials gain more experience from practice, they may gradually become less dismissive of the operational-level engagement and cooperation as a trust-building measure.

Thus, despite the difficult geopolitical conditions, the United States and other countries should seek to find concrete areas to start practical cooperation. Bottom-up trust-building will only work if operational-level engagement gets started soon and is expanded over time. Confidence built during this process could gradually reduce China's traditional skepticism toward verification and might lead to greater willingness in arms control cooperation.

5.1. P5 Verification Capacity-Building

One option to start near-term cooperation is to organize a capacity-building program on arms control verification as part of the P5 Process. Since 2009, the five nuclear weapons states (P5) have

38 Zheng, Yan (郑妍), and Jun (伍钧) Wu. "Progress of the International Partnership for Nuclear Disarmament Verification (核裁军核查国际伙伴关系"倡议的进展)." In 2021 International Arms Control and Disarmament (2021国际军备控制与裁军), edited by Chijiang (李驰江) Li, 35-43. Beijing: World Knowledge Press (世界知识出版社), 2021.

39 Liu, Yintang (柳银堂), Yonglin (邱永林) Qiu, and Desheng (吕德胜) Lv. "Disarmament Compliance Inspection on the Border between China, Kazakhstan, Russia and Tajikistan (中哈吉俄塔边境裁军履约视察见闻)." PLA Daily (解放军报), September 8, 2018.

40 "4.29 International Organization for the Prohibition of Chemical Weapons Day: Working Together for a World Free of Chemical Weapons (4.29国际禁止化学武器组织日携手共创一个永无化学武器的世界)." Fujian Province Department of Industry and Information Technology (福建省工业和信息化厅), April 27, 2021, http://gxt.fujian.gov.cn/xw/jxyw/202104/t20210427_5585958.htm

been conducting various discussions on issues related to strategic stability, arms control, and disarmament through a series of regular meetings called the P5 Process. Carrying out verification capacity-building through this format may be more effective than direct U.S.-China bilateral engagement, because it would not single China out and would make China more comfortable as a participant.

Specifically, to encourage additional nuclear weapons states to join substantive nuclear arms control, the United States and Russia should use their rich experience and expertise in nuclear arms control verification to help build similar capacity in China, the UK, and France. The central goal of this effort would be to familiarize experts and officials from the three countries with the verification regimes that Washington and Moscow have worked out in their decades-long history of bilateral nuclear arms control cooperation. Washington and Moscow could give detailed introductions about the methods, technologies, and practical rules and regulations used in their verification regimes, such as those negotiated in New START and in other previous nuclear arms limitation and reduction treaties.

Other experts have already suggested that the United States and Russia can invite China to observe or participate in New START practice inspections or mock inspections.⁴¹ This proposal would be more politically acceptable to China if the UK and France receive the same invitation to jointly participate. Additionally, training programs or seminar series can be organized for American and Russian experts to share with their Chinese, British, and French counterparts the detailed history of how the two rivals managed to gradually establish sophisticated and effective verification regimes to facilitate their arms control cooperation, despite the existence of profound distrust between the two sides during the Cold War. In particular, the experience and lessons of how Moscow and Washington managed to overcome their own concern about intrusive verification measures and found ways to protect legitimate military secrets would be useful to the other nuclear weapons states. To make it a two-way discussion, China could also share its successful experiences in carrying out disarmament compliance inspections in the border area with Russia and some Central Asian countries.

It would also be useful for the United States and Russia to give detailed introductions about their national nuclear risk reduction centers. If China or other nuclear weapons states become interested in engaging in new military confidence-building measures or arms control agreements, they should also consider setting up similar national nuclear risk reduction centers. Such centers can facilitate accurate and timely transferring of information, including information necessary for verifying compliance with arms control commitments or confidence-building measures. The function of a national nuclear risk reduction center is different from and offers additional value to the existing military hotlines, like those between the United States and China. Washington and Moscow could give demonstrations about how their centers work on a daily basis and what measures they have adopted to address the often-heard concern that the other party could use the centers to deliberately provide disinformation.⁴²

41 Colby, Elbridge A., and Abraham M. Denmark. "Nuclear Weapons and U.S. -China Relations: A Way Forward—A Report of the Poni Working Group on U.S.-China Nuclear Dynamics." Washington DC: Center for Strategic and International Studies, 2013, p. 25.

42 Khan, Rafi uz Zaman. "Nuclear Risk Reduction Centers." Stimson Center, October 16, 2003.

5.2. Explore Less Sensitive Modes of Cooperation

The mainstream belief in China is that the type of intrusive onsite inspections in New START are very unlikely to be acceptable to China.⁴³ This belief may account for the lack of detailed Chinese studies about onsite inspection mechanisms. To overcome China's concern about military sensitivity, experts from China, the United States, and other countries can explore the use of new technologies such as virtual reality and jointly study how onsite inspections work and how to design onsite inspections in ways that address a country's specific concerns. As pointed out by international scholars, experts from different countries can use virtual reality to discuss, negotiate, test, and develop protocols and procedures for inspectors and host countries.⁴⁴ It can be a very helpful tool to facilitate collaboration across borders and build common ground without introducing risks to national secrets. Chinese experts seem interested in such tools,⁴⁵ which may create conditions for near-term engagement.

In addition to using new technologies to reduce sensitivity, the United States and China can start verification cooperation in less sensitive areas to gradually build confidence. A multi-year collaborative research project between Carnegie Endowment for International Peace and the Shanghai Institute for International Studies revealed the challenges facing the United States and China if they were to commit to a no cyber-attack on each other's nuclear weapon command, control, and communication (C3) systems agreement.⁴⁶ Nonetheless, the two countries can begin with a less ambitious agreement, such as exploring the technical and political feasibility of an agreement on no cyber-attack on each other's civil nuclear facilities, and start practicing information exchange steps as a way to verify compliance and build confidence. Presumably, the U.S. and China should have less difficulty agreeing on the scope of civil nuclear facilities that would fall under such a nonattack commitment. To help verify compliance, they could set up rules and procedures for voluntary information disclosure of cyber-attacks at their facilities. This disclosure could serve both as a transparency measure and as a mechanism for joint investigation of cyber-attacks believed to have come from the other country. Under such conditions, the previously proposed national nuclear risk reduction centers could play a useful role in sharing time-sensitive information about cyber-attacks on nuclear facilities. Practical experiences from negotiating and implementing these measures would help the U.S. and China think more constructively about what confidence-building measures may be feasible to reduce the concern about deliberate cyber-attack on each other's nuclear weapons C3 systems in the future, as well as how to make such measures more verifiable and thus more operable.

Carnegie scholars James Acton, Thomas Macdonald, and Pranay Vaddi also proposed a China-U.S. fissile material cutoff and transparency regime to build confidence that neither country will use its civilian nuclear enrichment and reprocessing facilities to produce fissile materials for weapons purposes.⁴⁷ Their study demonstrates that cooperative transparency and verification measures are

43 Yang, Zhicheng (杨志成). "Verification Mechanism Is Not Conducive to China's Nuclear Deterrence (核查机制不利于中国核威慑)." *Ordnance Knowledge (兵器知识)*, no. 7 (2019): 1.

44 Tucker, Morgan C. "Virtual Reality: A New Space for Developing Nuclear Arms Control." Princeton School of Public and International Affairs, September 10, 2019.

45 Wu, Zhongliang (吴忠良). "Technology and Physics of Nuclear Test Monitoring (核试验监测的技术和物理)." *Physics (物理)* 36, no. 07 (2007): 559-64.

46 Perkovich, George, Ariel (Eli) Levite, Jinghua Lyu, Chuanying Lu, Bin Li, Yang Fan, and Manshu Xu. "China-U.S. Cyber-Nuclear C3 Stability." Carnegie Endowment for International Peace and Shanghai Institutes for International Studies, April 2021.

47 Acton, James M, Thomas D MacDonald, and Pranay Vaddi. *Revamping Nuclear Arms Control: Five Near-Term Proposals*. Washington DC: Carnegie Endowment for International Peace, 2020.

feasible at relevant civilian nuclear facilities. If China seeks to reassure the United States and the rest of the international community about the growing concern that China might use such facilities for military objectives,⁴⁸ it can make useful clarification of its intention by considering the proposed fissile material cutoff and transparency regime.

⁴⁸ "Annual Report to Congress: Military and Security Developments Involving the People's Republic of China." Washington DC: Office of the Secretary of Defense, 2021.

6. CONCLUSION

Despite growing international tensions between China and the West, the United States and other countries should seek to find concrete areas to start practical cooperation on arms control verification. As long as arms control talks are stalled, China has limited opportunities to familiarize itself with arms control verification measures, reinforcing its suspicion and distrust toward verification. Political will significantly influences China's attitude on verification issues, and bottom-up trust-building will only work if operational-level engagement gets started soon and is expanded over time. As Chinese officials and experts gain more experience from practice, they may gradually become less dismissive of the operational-level engagement and cooperation as a trust-building measure. Confidence built during this process could gradually reduce China's skepticism and might lead to greater willingness in arms control cooperation.

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