A NEW FRAMEWORK FOR THINKING ABOUT REGIONAL NC3?



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I. INTRODUCTION

In this essay, Vipin Narang argues that eventually "*all* states delegate—that is, cede the *ability* to use nuclear weapons, irrespective of the authority to do so—at some point. The question is *when*."

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A podcast with Vipin Narang, Peter Hayes, and Philip Reiner on a new NC3 framework is found **here**.

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II. NAPSNET SPECIAL REPORT BY VIPIN NARANG

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Summary

This paper argues that the delegative/assertive binary is conceptually important but has hamstrung our thinking of especially regional powers' NC3 by forcing them into one bin or another when it is in fact a time-dependent spectrum: *all* states delegate—that is, cede the *ability* to use nuclear weapons, irrespective of the authority to do so—at some point. The question is *when*. I outline *when* delegation may occur based on a state's nuclear strategy: during peacetime, early in a conflict, in the middle of a conflict, and at the end of a conflict. In this way, this paper explores a new—hopefully potentially fruitful—way to think about command and control and use ability in most nuclear states.

Introduction

The brain of a state's nuclear force structure is its command and control architecture and systems (NC3). Much of the proliferation and strategy literature focuses on the hardware of nuclear weapons—the actual production of warheads and delivery systems, ranges, accuracy, basing modes, payloads, MIRVs, missile defenses, and so on. But the software—the NC3 architecture that is

charged with managing command, control, and communication under potentially extreme circumstances—is often overlooked or simply assumed or inferred, since much of it is unobservable because states (thankfully) rarely emerge from their peacetime postures.

NC3 systems, however, are critical to the operational posture states adopt with respect to nuclear weapons They are essential to any employment of nuclear weapons—without a robust and hardened NC3 capable of withstanding the physical and chaotic pressures of a war in which nuclear use were even remotely plausible, a state may not have a credible deterrent. But we know little about most states' NC3 systems, especially regional powers, as it is one of the most closely guarded secrets in a state's system—and for good reason. An adversary that had penetrated or mapped a state's NC3 could render its entire nuclear force potentially impotent in a war, neutralizing it entirely (e.g. NC3 counterforce). And there is reason to believe that there is wide variation in the reliability and robustness of nuclear states' NC3—not all of them have the resources and capability to erect hardened, reliable, redundant, and robust channels like the United States. And some cannot afford to have their force fail impotent if faced with the worst. This may lead some states to have *variable* command and control postures as a crisis or conflict unfolds, with significant implications for the risk of nuclear use—advertent, inadvertent, and unauthorized.

In most cases, many states' command and control architectures are simply inferred from their broader nuclear strategies.[1] States' NC3 are categorized by two related binary choices that the literature has thus far offered: the balance of positive/negative control and assertive/delegative systems.[2] The balance of positive and negative control optimizes what Peter Feaver called the always/never problem: states need nuclear weapons to always be useable when they want them to be, and to never be used otherwise.[3] The theoretically perfect balance would be, for example, use control features that required the highest political authority to enable nuclear use at the very moment s/he decided to do so and required, and never otherwise.

But communication systems are vulnerable and transmitting codes and commands from a centralized authority at the height of the thickest fogs of war is not always practical or feasible, so negative control features were developed to delay those in possession of nuclear weapons from using them until they were removed, and then positive control ceded to the users at that point. The most commonly cited negative control device is a permissive action link (PAL) whose modern incarnation is designed to delay nuclear use by requiring a proper code, with limited tries, to arm the warhead or nuclear system—it is integral to the design of the warhead and modern versions are difficult, though not impossible, to bypass (indeed, PALs have always been acknowledged to only *delay*, not *prohibit* use). But there are a wide variety of procedural and technical negative controls available to regional powers, such as multiple personnel rules or less sophisticated use control features that can inhibit or delay unauthorized or inadvertent nuclear use. A simplified version of a state's command and control architectural choices boils down to the question: when do you choose to remove negative controls and cede the *ability* to use nuclear weapons to whoever possesses them?

In choosing their balance of positive versus negative control, states that opt to favor negative control—designing the force to fail safe absent centralized input—are classified as having *assertive* command and control architectures. States that opt for a balance that favors positive control—that the force would fail *deadly* absent centralized inputs—are largely classified as having *delegative* structures, since they would enable possessors of nuclear weapons to use them if the apex political authority were unavailable—either decapitated or if communication links were severed. For example, states that orient their nuclear strategies for assured retaliation and which have decided that they will absorb a nuclear hit before retaliating often choose to have highly assertive command and control structures that favor negative control. However, states that demand their nuclear forces to deter conventional attacks may need to favor positive control and delegate forces so that they are

useable on the battlefield, even if a national command authority were unavailable to order use, as a credible deterrent to attack.

This paper argues that the delegative/assertive binary is conceptually important but has hamstrung our thinking of especially regional powers' NC3 by forcing them into one bin or another when it is in fact a time-dependent spectrum: *all* states delegate—that is, cede the *ability* to use nuclear weapons, irrespective of the authority to do so—at some point. The question is *when*. I outline *when* delegation may occur based on a state's nuclear strategy: during peacetime, early in a conflict, in the middle of a conflict, and at the end of a conflict. In this way, this paper explores a new—hopefully potentially fruitful—way to think about command and control and use ability in most nuclear states.

All States Eventually Delegate

Some states delegate in *peacetime*. These are either states that are incredibly confident in the robustness of their negative controls and personnel procedures that they can delegate to users without significant fear of inadvertent or unauthorized use (this was the United States at least during the Cold War,[4] the British SSBN force, and probably France as well for example), *or* states that are so worried about their ability to maintain positive control in a crisis or war that they accept significant risk of inadvertent and unauthorized use during peacetime to retain use ability in war. The key to this category is that there are *two types of peacetime delegators*: the really robust NC3s and the really rickety NC3s that may not survive even the first shot. They each come with their own pathologies: the first is complacency and the cumulative risk of inadvertent or unauthorized use over time (e.g. Minot), the second is simply terrifying as the state is keyed up for nuclear use very early in a crisis because it has no confidence in its ability to retain positive control but due to perhaps the severity of the threat it faces has to posture itself to fail deadly. There are probably no states that delegate in peacetime due to the latter condition, but it is possible that Pakistan briefly went this way after it tested nuclear weapons in 1998 and during the Kargil War—there was no dedicated NC3 available to it, and it suddenly put itself in a shooting war with India.

Some states delegate *early in a crisis or conflict*. These are largely the states that are unwilling to accept a sharp increase in the risk of inadvertent/unauthorized use during peacetime even if they have rudimentary NC3 structures but which lack the confidence in their NC3 to survive attacks on their nuclear force or NC3 during a crisis or conflict. A sharp shift thus occurs early in a conflict from negative to positive control. I generally hypothesize that Pakistan and North Korea are probably currently in this category. From what we think we know about Pakistan's command and control architecture, during peacetime there is substantial centralized control and dispersion of components, but early in a crisis or war the force would be constituted and flushed out and the centralized authorities relinquish negative control by ceding use ability to the users.[5] Pakistan may believe that it cannot wait until deep in the conflict as its command and control network and forces face iterative conventional (or cyber or other) attacks from India—and cannot afford to have the force fail impotent. Early crisis delegation enhances the credibility of the battlefield threat of nuclear weapons use that Pakistan must make against Indian conventional retaliation, but it could have significant consequences for the risk of nuclear use as forces that are generally unfamiliar with nuclear operations are forced to safely manage them at the height of the psychological stresses of a conflict with a superior power that they fear could pose an existential threat to them and their state. These states are a hybrid of assertive and delegative and where I actually hypothesize most regional nuclear powers—notably Pakistan, North Korea,[6] even potentially India[7]—reside. They are highly assertive during peacetime but may experience a sharp shift in NC3 orientation *early in a conflict* and then become dangerously delegative.

Another class of states, those that I elsewhere classified as having catalytic nuclear strategies—using nuclear weapons to accelerate third party assistance in a crisis or conflict, either

by visibly operationalizing one or several nuclear weapons or by conducting a demonstration test—may delegate in the *middle of a conflict*. Delegating early in a crisis or conflict is unnecessary because the state may hope that it can stand up conventionally and obviate the need for third party assistance. But too deep in a conflict may be too late in the war to operationalize the forces if the state faces an existential threat. Therefore, the optimal time to visibly signal distress to the third party or to conduct a demonstration shot is in the middle of the war when the state is still capable of withstanding attack but fears further losses and requires either third party assistance desperately or, in the worst case, can use nuclear weapons either directly or in a test to deter the adversary from crossing existential redlines. In terms of NC3, catalytic states may not even have dedicated channels outside of their conventional command and control networks and manage nuclear weapons in such a recessed state that the military may not have had any experience with possessing them, let alone at the height of war. Indeed, the operationalization of one or several weapons or a demonstration shot may only require support units, and use-ability may actually never be ceded to the military.

For example, South Africa's explicitly catalytic nuclear strategy envisioned one of the six nuclear weapons being either inspected or tested to compel American assistance in the event of a total communist onslaught.[8] During peacetime, the arsenal was disassembled and required political, military, and scientific representatives to constitute. To execute the catalytic strategy in the middle of a conflict that South Africa feared it might lose, it would either assemble no weapons and simply invite Western representatives to take note of its existence—with an implicit threat of escalation—or test a single weapon in a demonstration shot, which would involve very tight delegation to a limited number of military personnel, if at all (maybe a Buccaneer pilot if that is how it decided to demonstrate). Israel similarly envisioned a catalytic strategy through the bulk of the Cold War and any demonstration shot or operationalization of the delivery systems—as was reportedly conducted during the height of the 1973 War—would only occur once Israel feared existential losses, but before they actually occurred.[9]

Finally, other states delegate *very late* in a conflict or war. These would be the classic asserters, those that fear—for domestic or other reasons—inadvertent or unauthorized use so much that they essentially wait until a deep conflict, even potentially post-nuclear use, to cede authority and ability to release nuclear weapons to users. Like the peacetime delegators, the asserters must have an extremely robust command and control system that could survive nuclear use against the state and then have the ability to generate the force and reliably retaliate. Since such an NC3 can never really be tested fully until the time actually comes, these states are willing to risk the force failing safe than to delegate any earlier than this deep a point in a war. Based on open source characterizations, China seems to fall in this category. In particular, China has so far designed its assured retaliation NC3 architecture to seemingly delay delegating use ability to the strategic rocket force until as late as possible, confident that it could constitute nuclear systems and release them even after sustaining a nuclear hit.[10]

The advantage of moving out of the static assertive/delegative framework (which I am also guilty of having used extensively) is that it better captures the peacetime/crisis/war dispositions of states' nuclear forces where the balance of negative and positive controls *evolves* and *shifts* creating different dynamics in each phase. It captures the fact that states have to decide *when* to generate the force and when and how to cede use ability to the end-users. The assertive/delegative framework may capture the peacetime disposition of states' nuclear forces well, but it does not provide much insight into how crises may affect a state's decision to *alter* its command and control structures as a deep crisis or war unfolds. And that those decisions are based on their confidence or lack thereof in the reliability, robustness, and redundancy in their NC3 systems.

Few states have the luxury of having the United States' sophisticated and redundant NC3. States

with new or small forces, and without the resources to erect such sophisticated NC3 architectures, may resort to physical separation of the force during peacetime, but if they ever had to constitute the force may have no choice but to cede use ability to those who possess nuclear systems since their communications systems may be incredibly unreliable or vulnerable (for example, there are rumors that North Korea originally relied on its cell network at one point for NC3, which would likely be jammed as soon as a crisis unfolded. To credibly deter an American invasion, Kim would not be irrational to cede the ability to use nuclear weapons to the end-users as and when it was actually ordered to be constituted/generated). And in the most psychologically stressful conditions imaginable, users who may not have regularly trained for such scenarios may find themselves in unfamiliar territory and suddenly possessed of nuclear weapons as they fear their states are being potentially existentially threatened. A state that may have had a very recessed peacetime posture with low risk of inadvertent and unauthorized use as suddenly shifted its posture 180 degrees and may retain no centralized control over the force if the communication nodes fail. Therefore, the idea that a state's NC3 can shift from peacetime to crisis to war, I think, gives greater insight into command and control pressures and the different risks and tradeoffs states face depending on when they choose to delegate.

The rest of this short paper walks through the framework and its advantages over the binary assertive/delegative categorization using representative regional nuclear power examples along the spectrum of peacetime to deep war delegation. I will largely focus on the regional powers, so I will only briefly mention that the United States during the Cold War was one of the few examples of a peacetime delegator (even leaving aside the tactical nuclear forces with few negative controls in Europe, until PALs were installed in the 1960s, the SSBN force was usable by the crew of the submarine even if communication from the National Command Authority were lost; the same is currently true of the British Trident force, which possesses all of the information necessary to launch nuclear weapons aboard the submarine). The threat was perceived to be severe enough that pre-delegation of the tactical nuclear weapons was believed to be necessary to deter the Soviet Union even if NC3 failed—with high confidence in the robustness of US NC3 and its personnel and procedures to inhibit unauthorized use—and similarly with the SSBN force. Nuclear weapons on airborne alert during peacetime also represented high degrees of delegation since, for much of the early Cold War, the bomber crew had the physical ability to deliver nuclear ordnance. The point being that the United States had a substantial portion of its force already generated and delegated during peacetime.

No other nuclear power, however, seems to delegate the use ability of its nuclear forces to the extent the United States did and does. Most keep their baseline level of readiness low and have an assertive-leaning command and control posture during peacetime. But the point at which they delegate in a crisis or conflict varies tremendously. The following examples illustrate the systematic variation in when nuclear states may choose to shift from assertive to delegative postures.

Early Crisis Delegator

Pakistan faces a conventionally superior nuclear armed neighbor as its primary adversary. Its nuclear force was always designed to deter an Indian conventional attack across the international border, which meant that it needed to credibly develop battlefield nuclear capabilities that it could use first from the rear edge of the theater and then use long range strategic nuclear weapons deeper in its territory (where they are more survivable) and eventually at sea, to deter Indian nuclear retaliation. This is what I have elsewhere classified as an asymmetric escalation nuclear strategy—the use of nuclear weapons first to defeat and thereby deter a conventional attack. During peacetime, the battlefield nuclear weapons (such as the Nasr batteries), the land based strategic nuclear weapons (e.g., Shaheen family of ballistic missiles), and the sea-leg of any future Pakistani

nuclear force (e.g., Agosta diesel electric submarines) can be highly assertively controlled in a demated or recessed state in garrison and storage locations.[11] The risk of a bolt-out-of-the-blue unprovoked Indian attack across the international border or nuclear attack is essentially zero. And centrally storing its nuclear forces, and keeping submarines in port and unarmed with nuclear weapons, prevents at least outside extremists (but not necessarily insider threats) from threatening the force and prevents insiders from launching nuclear weapons without authorization or accidentally. Therefore, by all accounts, the baseline stewardship of Pakistan's nuclear force is highly assertive *during peacetime*.

This state of affairs could not continue indefinitely, however, if a crisis were to spin up and the Indian Army mobilized across the international border. At this point, indications of Indian mobilization would likely trigger a shift in Pakistan's NC3 posture from assertive to at least partially delegated. The Nasr batteries would likely be mated and prepared for movement to the rear-edge of battle, and once constituted may retain few if any negative controls that *physically inhibit* the possessors of the system from firing Nasr missiles, even if they would nominally require direct authorization from Pakistan's NCA in the middle of a war. To credibly deter an Indian attack, Brig. Feroz Khan (ret.) has suggested that Pakistan must design at least this part of the force to fail deadly should its (now increasingly dedicated) communication system fail to the batteries in the field. It is possible that Nasr batteries would be held in secure locations until at least deep in the war to retain assertive control as long as possible, but it would have to be assumed that once they are flushed out, they are usable by the possessors.

It is also plausible that the strategic nuclear force on land would be prepared for use early in a crisis, though perhaps not moved out where they might be vulnerable to Indian counterforce capabilities. But, again, once generated, it is unclear what—if any—physical use controls are retained on Pakistan's systems. And certainly if Pakistan were to send any nuclear-armed submarines out on patrol, it would likely be ceding use ability to the crew.[12] Sending the submarine out early in a crisis before Indian anti-submarine warfare forces could sink her as she left one of Pakistan's two ports would enhance the chance it survives, but it would delegate use ability very early in a crisis. Waiting too long while India assembled ASW assets would risk Pakistan losing one of its more survivable platforms.

The key point is that Pakistan's NC3 orientation and posture would likely sharply shift and transform, at least with respect to a major subset of its force—the battlefield nuclear capabilities—early in a conflict in order to be useable against Indian forces in the Pakistani desert should the war quickly turn against the Pakistan military. Thus a highly assertive peacetime orientation could rapidly become a generated force with very loose centralized control as Pakistan fears its communication channels might be targeted or blocked by India (as some former Indian SFC commanders have, such as Lt Gen BS Nagal (ret) have suggested it will attempt to do[13]). To avoid the force failing impotent, Pakistan's battlefield nuclear weapons at least, once constituted, may be useable by whoever possesses the battery and become highly delegated. The same may be true as soon as any nuclear-armed submarines are flushed out. Pakistan might retain centralized use-control over the long range land-based strategic forces as long as possible but, again, fears that its NC3 nodes could be attacked by India early in a war may cause it to relinquish use-ability early in a conflict with these forces as well.

The portrait of Pakistan as a purely delegative nuclear power is, therefore, inaccurate: it may have very assertive control during peacetime as it claims to maintain. However, it then may undergo a swift—and dangerous—shift in its NC3 posture early in a crisis when it *does* become delegative. This shift alone can create risks as one is charging units that have not possessed use ability to suddenly decide if and when to launch nuclear weapons and under the chaos and stress of a war against a

state they have been trained since birth to believe is an existential threat. As a conflict unfolds then, Pakistan may not have one "redline" but ten—one for every Brigadier that has a Nasr battery under his command and, if the NCA is unreachable, needs to decide if advancing Indian forces are threatening the existence of the state. Delegating early in a conflict—perhaps when it detects Indian Army mobilization across the international border—creates ample room for inadvertent and unauthorized use during the conflict, but is a conscious risk Pakistan may take in order to ensure the usability, and thus the credibility, of especially the battlefield systems before they themselves are overrun by Indian forces and before the NCA communications to the batteries might be severed.

North Korea is likely another type of regional nuclear power—also an asymmetric escalation nuclear strategy like Pakistan—that would have to delegate early in a crisis to avoid the force failing impotent. Kim Jong Un has signaled, with the released picture of a red button on his desk, that he and he alone controls the nuclear force—during baseline levels, akin to peacetime. But given America's counterforce capabilities and the risk of a surprise attack on his force, it would not be irrational for Kim to establish procedures to very rapidly delegate use of the force or institute a dead-hand strategy because he may lose communication to the rocket force very early in a crisis or a conflict. Or at least he would have to fear that he would. With such a rickety command and control architecture, Kim would almost certainly choose to delegate early and sharply shift the disposition of the North Korean nuclear force. The risks presented above against Pakistan would only be amplified in the North Korean case, as the thick fog of war given the information environment—or lack thereof—would likely be much worse than in the Pakistani case. Again, it would not be irrational for Kim to design his NC3 to shift sharply and rapidly from assertive to delegative early in a crisis, but it does generate extreme risks of inadvertent and unauthorized use as soon as that occurs as the end-users would have to have the physical ability to launch pre-delegated at this point since Kim would have to assume that he could not give actual firing orders in the face of an American-led onslaught.

Mid-Conflict Delegators

States that might delegate in the middle of a conflict are most likely those that aim to use the threat of using nuclear weapons to elicit third party assistance—that is, the catalytic strategy. Because threatening breakout is such a serious step, it is unlikely that a catalytic state would attempt to execute the strategy with outright delegation early in a conflict, attempting to win the war without having to do so. But if the war could not be terminated by itself conventionally, and fears of existential losses emerged, a catalytic state may have to threaten to take the drastic step of operationalizing the arsenal and revealing it or testing it in order to signal to the third party power that things are potentially reaching a point of no return. The nuclear state could not wait much longer, deeper into a war, because it may not have enough time to successfully reveal or test a nuclear weapon or may lose the ability to do so if the very state were being threatened. The quintessential example of a mid-conflict delegator was Israel in the 1970s.

I, and others notably Avner Cohen, have detailed the alleged operational check that Defense Minister Moshe Dayan ordered at the height of the 1973 war as he feared Syrian armored columns crossing the Jordan River. This was supposedly designed for the United States to "take note" that Israel believed its very existence was potentially being threatened and used coercively to compel President Nixon and Henry Kissinger to resupply Israel with the conventional materiel it needed to repel Syrian and Egyptian forces. Although Kissinger denies he was coerced by this threat to breakout Israel's nuclear capabilities, there is little doubt Dayan ordered some movement that he intended for the United States to detect, and he did so in the middle of the war—not at its outset—but before it was too late for American intervention and assistance to matter. It is unclear whether anything was actually "delegated" (unlikely), but Israel and South Africa like later in the 1980s would have had to have plans to interface with at least a small number of end-users in the

scientific or military ranks in order to test the weapon underground or as an above-ground demonstration shot. There were reports that South Africa intended, in the worst case if revealing the arsenal to the United States did not elicit Washington's intervention, to fly a Buccaneer bomber with one of its six gun-type uranium glide bombs to test it. This would have been in the middle of a war presumably. One would have to hope that the pilot knew what he was doing and that the Buc was not shot down. But the basic point is that the catalytic strategy essentially requires a state to develop a rudimentary NC3 to be able to—in the middle of the war—reveal the existence or test a nuclear weapon.

Late-War Delegators

China has adopted a relatively clear assured retaliation nuclear strategy that seeks to retain assertive control of its nuclear arsenal until even after China had absorbed nuclear use against it. India similarly did so, at first, though current indicators about India's NC3 posture are more ambiguous than China's and may shift to a delegative structure earlier to preempt Pakistani strategic nuclear use. But for illustrative purposes, China is a case of a very late delegator at least through the present. China postured and stewarded its land based force for the bulk of its nuclear existence in a very recessed and centrally controlled way. Warheads were stored separately from delivery vehicles in a central storage depot—and China only had a monad of land based ballistic missiles until very recently when it developed the Type 094 SSBN, while the status of its bomber leg is still uncertain. The central storage depot "hub" services several "spoke" warhead storage sites which either maintain some warheads during peacetime, or warheads may be moved there in a deep crisis in anticipation of mating. Every movement up the alert ladder needs to evidently be approved by the Chair of the Central Military Commission. Even in a deep conflict, China may not mate warheads to delivery vehicles. Indeed, there are reports that China routinely exercises the mating and release process under "nuclearized" conditions, i.e., after China had sustained a nuclear attack. This was to signal, at least, that China's Chair would retain sole authority and ability to release nuclear weapons until the most extreme circumstances imaginable. This, of course, lends credibility to China's relatively firm No First Use policy in which it was willing to sustain a nuclear attack first before ordering retaliation—and that retaliation need only be plausibly certain, and not necessarily immediate. Even those who believe that the strictures of China's No First Use declaratory policy are not absolute have to concede that they are nonetheless very tight during even wartime conditions.

Through a variety of procedural controls, augmented by what one has to imagine is a robust NC3 to maintain communication with missile units even after sustaining a nuclear attack, Chinese leaders would evidently only delegate use ability very late in a conflict, and would likely cede that ability only with the order to launch. At no other point could the land-based missile unit physically do so.

As China goes to sea, its level of delegation may change since the SSBN most likely would carry canisterized mated systems before leaving port. However, given the vulnerability of the Type 094 SSBN due to its noisiness, it is plausible that China only sends the submarine out in a bastion model very deep in a conflict as well. It is unclear how robust and reliable the NC3 architecture is to maintain active positive and negative control with Chinese SSBNs on patrol. Nevertheless, the political signaling thus far seems to suggest that Chinese leaders have no intention of deviating from very late wartime delegation of nuclear forces, even as it moves to sea, and possibly the air. That is, China—perhaps uniquely—postures its forces and NC3 to signal that it is willing to absorb a nuclear attack before constituting its retaliatory force fully and launching nuclear weapons. It must have an NC3 that it is confident is capable of reliably operating and communicating with the units that possess the warheads as well as the delivery vehicles in such extreme circumstance. In many ways this posture requires as significant an investment in NC3 as the confident peacetime delegators (as opposed to the terrified peacetime delegators)—both confident peacetime delegators and late war

delegators are those that have the most extensive and reliable NC3 systems to be able to be confident in maintaining positive and negative control through the entire spectrum of conflict. One, for security reasons, chooses to delegate as a baseline level to deter conventional attacks; the other, for potentially civil-military (or party-military) reasons and lacking a severe conventional existential threat, chooses to delegate only at the very last possible moment. China is willing to risk the force failing safe or impotent rather than delegate use ability any earlier than a decision to actually launch.

Thus, on one end of the NC3 delegation spectrum is the United States (and UK), and on the other end is likely China. All other states seem to fall somewhere in the middle, which is a strong argument against a simple assertive/delegative dichotomy, since there are only two ideal type nuclear powers. Other states morph from assertive to delegative as a conflict evolves and unfolds and *when* they choose to do so has significant implications for their NC3 design choices and the tradeoffs and risks states make in managing their nuclear forces when it really matters: in a crisis or conflict. Broadly speaking, asymmetric escalators would delegate early in a crisis to retain positive control in the fog of conventional war, where their weapons have to be credibly usable. Catalytic states would delegate somewhat in the middle of a crisis: the stakes of threatening breakout and the risk of "crying wolf" would suggest that early delegation is unlikely, but delegating too late could close the window of opportunity to compel third party intervention. Assured retaliators—those that do not face conventional existential threats and wish to maintain centralized negative control for as long as possible, even after potentially a nuclear attack—delegate the latest in a conflict.

Each of these points of delegation presents different risks. Early delegators risk inadvertent and unauthorized use when they sharply shift from a peacetime assertive posture to a delegated one under the stress of war. This risk actually may reinforce the intended deterrent against conventional attacks: once you cross into my territory, I flush out my nuclear weapons and all bets are off. Mid-conflict delegators risk being unable to achieve their deterrent effect if they are unable to operationalize the force in time, or if the third party delays its intervention. But the risk of inadvertent or unauthorized use probably remains low with catalytic states. Assured retaliators run the risk of the force failing impotent: by delaying delegation the centralized NC3 risks being unable to constitute and launch nuclear weapons if the war has in fact degraded its NC3 to the point of it being unusable. This may undermine the credibility of their general deterrent, but minimizes the risk of inadvertent or unauthorized launch even at the height of an intense war.

Conclusion

In sum, this brief paper has tried to present an alternative NC3 framework to the dichotomous assertive/delegative distinction that has been almost exclusively used in the nuclear strategy and operations literature. In particular, it offers a spectrum of NC3 postures based on the observation that every nuclear state has to delegate at some point. It just has to decide when. It does not entirely abandon the assertive/delegative dichotomy but offers a more fine-grained and hopefully realistic portrait of how NC3 postures *change and evolve* during a conflict—leveraging the insight that nuclear postures and NC3 transforms in many cases from peacetime to crisis modes—with each carrying different tradeoffs and risks. It may be the case that those that deploy the assertive/delegative framework have long appreciated the spectrum of assertive/delegative structures. But hopefully by laying it out explicitly here, we can start thinking about NC3 postures and architectures less in a dichotomous way, but in more sophisticated ways—states may not only shift from assertive to delegative postures as a crisis or conflict evolves, but may also have variable NC3 postures for different legs of its force. For example, India may maintain assertive control over its land based missile force until the end (though it may not wait until it suffers a nuclear attack to launch preemptively), but its submarine force may be delegated as soon as it goes out to sea. So not

only may there be temporal variation in assertive/delegative postures, but spatial as well. In any case, this concept paper arose out of my own unease with deploying the assertive/delegative framework when characterizing regional power nuclear strategies in my earlier work. I believe a framework that accounts for temporal (and eventually spatial) variation—one that captures *when* a state shifts from leaning assertive to leaning delegative—offers a more useful and realistic portrait of how states themselves think about designing and implementing their NC3 structures.

III. ENDNOTES

[1] I am most guilty of this myself in Vipin Narang, *Nuclear Strategy in the Modern Era* (Princeton NJ: Princeton University Press, 2014). This brief concept paper is an extension of my long-standing uneasiness with the assertive/delegative distinction that I used in my book. Many of the cases that follow here are cited and footnoted more extensively in the book, so forgive incomplete citations in this particular draft as I go through examples.

[2] Ashton B. Carter, John D. Steinbrunner, and Charles A. Zakret, *Managing Nuclear Operations* (Washington DC: Brookings Institution Press, 1987).

[3] Peter D. Feaver, "Command and Control in Emerging Nuclear Nations," *International Security*, vol. 17, no. 3 (Winter 1992–1993), pp. 160–187; also Scott D. Sagan, *The Limits of Safety: Organizations, Accidents, and Nuclear Weapons* (Princeton: Princeton University Press, 1993); and Eric Schlosser, *Command and Control: Nuclear Weapons, the Damascus Incident, and the Illusion of Safety* (New York: Penguin, 2013).

[4] See especially Carter, Steinbrunner, and Zakret, *Managing Nuclear Operations*.

[5] See Feroz Hassan Khan, *Eating Grass: The Making of the Pakistani Bomb* (Stanford CA: Stanford University Press, 2012)

[6] See Vipin Narang and Ankit Panda, "Command and Control in North Korea: What a Nuclear Launch might Look Like," *War on the Rocks*, September 15, 2017. https://carnegieendowment.org/2017/09/15/command-and-control-in-north-korea-what-nuclear-launch-might-look-like-pub-73130; also Jeffrey Lewis, *The 2020 Commission Report on the North Korean Nuclear Attacks on the United States* (Mariner Books, 2018).

[7] On improvements and shifts in Indian NC3, see Christopher O. Clary and Vipin Narang, "India's Counterforce Temptations: Strategic Dilemmas, Doctrine, and Capabilities," *International Security*, forthcoming Winter 2018–2019.

[8] See Nic von Wielligh and Lydia von Wielligh-Stein, *The Bomb: South Africa's Nuclear Weapons Programme* (Litera Publications, 2016); Peter Liberman, "The Rise and Fall of the South African Bomb," *International Security*, vol. 26, no. 2 (Fall 2001), pp. 46–86; Narang, *Nuclear Strategy in the Modern Era*, Ch. 8.

[9] For full citations and sources on Israel's catalytic strategy, see Narang, *Nuclear Strategy in the Modern Era*, Ch. 7. Avner Cohen's entire body of work on Israel is relevant to this strategy.

[10] See Fravel and Medeiros, Fravel and Cunningham, Lewis *Minimum Means of Reprisal*, Narang Ch. 5.

[11] In addition to Khan, *Eating Grass*, see Christopher Clary, "The Future of Pakistan's Nuclear Weapons Program" in Ashley J. Tellis, Abraham Denmark, and Travis Tanner, eds., *Asia in the*

Second Nuclear Age (National Bureau of Asian Research, 2013).

[12] Christopher O. Clary and Ankit Panda, "Safer at Sea? Pakistan's Sea-Based Deterrent and Nuclear Weapons Security," *The Washington Quarterly*, vol. 40, no. 3 (October 2017), pp. 149–168.

[13] Clary and Narang, "India's Counterforce Temptations."

IV. NAUTILUS INVITES YOUR RESPONSE

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