

# **“Nuclear South Asia: A Guide to India, Pakistan, and the Bomb”**

## **Video Transcripts**

### **Chapter 3: Nuclear Policies and Postures**

#### **3.1: “Nuclear Doctrines and Postures in South Asia”**

Reshmi Kazi:	00:09	The key tenets of India's nuclear doctrine are credible minimum deterrence, no first use policy, unilateral moratorium on nuclear testing, command and control, and a globally verified nuclear disarmament policy. The purpose of India’s nuclear doctrine is to deter nuclear threats and to dissuade an adversary planning any nuclear misadventure on India, to deter such a nuclear misadventure.
Shyam Saran:	00:45	The key tenets are that we believe in credible minimal deterrence, that is, we need to maintain a nuclear weapons and delivery capability at the minimum level necessary in order to deter nuclear threats against India. The second important tenet is that we continue to hold to our non-first use pledge, that is India will not be the first to use nuclear weapon, but will only retaliate if nuclear weapons are used against India. So it is a retaliation-only doctrine. And as a result of these two tenets, what we have to do therefore is, to put in place the kind of nuclear weapons and delivery capability which match that doctrine, which is what, essentially, we call the triad. That is we need to have a land-based missiles, we need to have air-launched missiles, and we have to have submarine-launched missiles, and the last being most important in terms of ensuring a second strike capability after you have absorbed a first strike. And that is what is precisely we are trying to put in place. And the other important aspect of the doctrine is that despite being now a nuclear weapons state, India continues to be committed to nuclear disarmament and is perhaps the only nuclear weapon state which has declared that it believes its security would be enhanced, not diminished, in a world free of nuclear weapons.
S. Paul Kapur:	02:13	There's a certain ad hoc-ism to nuclear doctrine in India. It hasn't been formulated by an official body. There was sort of a draft nuclear doctrine and then a revision to it, but the main idea behind Indian nuclear posture is that India will not use nuclear weapons first with some caveats, but the no first use policy is sort of a central element of it. And then if India does have to use nuclear weapons, it will be in a massive way designed to inflict unacceptable harm on the adversary, and the Indians hope to do this with what they call a “minimum credible deterrent.” It's not clear exactly what that means. Presumably it

means a small nuclear force. However, the Indians been moving in the direction of expanding their force and increasing their capabilities. So, it's not clear exactly where that's going. There's some talk that the Indians may rethink their current doctrine, which is essentially a binary doctrine, a massive retaliation doctrine similar to what the United States had in the 1950s. And the reason is that it doesn't afford you very many options. You either use everything you have or, or you don't do anything at all. And if you want to respond in a graduated way, in a tailored way to a less provocative situation, it's difficult to do that. So it could be that India will build some flexibility into their doctrine in the years ahead.

Vipin Narang: 03:42

India, among contemporary nuclear states, has an interesting challenge because it has to deter, with its nuclear forces, both Pakistan and China. India's doctrine – official doctrine – was adopted in 2003. And the phrase that India uses to describe its doctrine and posture is credible minimum deterrence. In my own work I've described India's posture and strategy as effectively “assured retaliation” against potential nuclear use by both, or either, China or Pakistan. And so India, since it tested nuclear weapons in 1998, has made a concerted effort to develop a secure second strike capability both on land and sea using aircraft, land-based ballistic missiles, and increasingly a sea-based capability so that it can survive a potential nuclear use against it from either China or Pakistan and have the ability to retaliate with nuclear weapons against major strategic targets in either country.

Naeem Salik: 04:49

We started with the concept of credible minimum deterrence. If you go for simply the minimum deterrence it means that you should have a capability to ride out a surprise first strike by the other side and still be able to engage a handful of targets on the other side which is going to really hurt them. Which means you can live with a relatively small arsenal. But both India and Pakistan used this credible minimum deterrence – they showed that they were not really very happy and satisfied with a minimum force level, so they wanted to add on something by bringing in credibility. So this was minimum plus on both sides, but what happens in this kind of concept that you determine a bare of minimum number of targets which are going to be really hurtful to the other side and the damage to those targets would be unacceptable to the other side, and then you work out how many weapons you would need to hit each of those targets. Two weapons, three weapons per target, maybe one weapon. The kind of delivery system you need: short range, medium range, long range; air delivery systems. So you determine the number of weapons and delivery systems accordingly, and then

that should give you a fair idea of the size of your arsenal. But there are some things which can change this: first of all, you also have to keep in mind the first strike capability of the other side. If they have a first strike capability and it can destroy 50 percent of your arsenal before it is launched, then you have to make an allowance for that. Similarly, if the other side deploys ballistic missile defenses, which can, let's say, intercept 30 to 50 percent or 60 percent of your missiles or aircraft which you have launched, then you have to add on that number.

- Zamir Akram: 06:43 The key tenet is deterrence against a much larger conventional, and a much larger nuclear or strategic, capability that is possessed by our neighbor India. It's a program that is driven by security concerns, not by concerns of prestige. We believe in credible minimum deterrence, and the evolution has been because of the evolving threat to our security from across the border. And that has led us to look at what we now call "full spectrum deterrence." That means that initially we were talking about deterrents against nuclear attacks or nuclear capabilities of the Indians, but since the Indians have moved on to a new doctrine of conventional fighting capability called Cold Start, we've had to respond to that by looking at the possibility of deterring a conventional attack in line with their Cold Start policy through a full spectrum response. So it now evolves from the spectrum of deterring a conventional attack to a nuclear attack.
- Hasan Askari Rizvi: 08:12 I think Pakistan, you know, talks about not giving a guarantee for no first use because there is a very clear disparity in conventional weapons with India. Because of that, they don't want to make the commitment. Hopefully there is no situation when Pakistan's policymakers even think of using a nuclear weapon.
- S. Paul Kapur: 08:37 Pakistanis reserve the right to use nuclear weapons first, and the threat of first use of nuclear weapons is in fact critical to their security. They have to be able to make the argument to the Indians that if India attacks Pakistan and tries to leverage its conventional military superiority against Pakistan, the Pakistanis will escalate to the nuclear level. So a first use threat is, again, central to their doctrine and to their overall security policy. They are moving in the direction of making that first use threat even more credible by acquiring a tactical nuclear weapons capability, which would integrate nuclear weapons into their conventional battlefield force structure. At some point, presumably there'll be pre-delegation of launch authority, and at that point, the likelihood that nuclear weapons get used in a conflict is fairly high, or at least that's the impression that the

Pakistanis would like to create. So, the Pakistani doctrine and posture is moving in a destabilizing direction, I think, as a result of their desire to make their first use threats more credible.

Vipin Narang: 09:46

Pakistan's nuclear posture and strategy is actually quite straightforward. Pakistan developed nuclear weapons after the 1971 war with India where it lost the territory of present-day Bangladesh. So Pakistan uses nuclear weapons essentially to deter Indian conventional attacks against it. And so Pakistan has developed what it calls, now, "full spectrum deterrence" with tactical nuclear weapons at the lower end to deter Indian conventional attacks and then an array of strategic nuclear forces to deter a potential Indian nuclear retaliation. So I've described Pakistan's nuclear strategy and posture as "asymmetric escalation," but that essentially means it threatens the first use of nuclear weapons against Indian conventional attacks, especially in the desert sector where India's conventional retaliatory power can really be brought to bear against Pakistan.

Sadia Tasleem: 10:45

Two key determinants that interact with each other in terms of affecting Pakistan's doctrinal thinking: one is, the legacy of Cold War thinking, and the other is Pakistan's threat perception, which is evolving. And I think that Pakistan's learning from the legacy of Cold War thinking deeply affects the way Pakistan addresses the challenges it perceives in terms of its national security.

### **3.2: “Sources of Doctrine and Posture in South Asia”**

Sameer Lalwani:

00:09

What factors influence the state's selection of nuclear policy? Professor Scott Sagan suggests that there are four factors that affects the state's adoption of nuclear doctrine. First, security environment, which includes external threat assessments, relative military capabilities, geographic position, and alliances. Second, domestic politics, and this includes the tendency of bureaucratic actors such as militaries to advocate for policies that reflect their preferences, advanced their prestige, and preserve their autonomy. Third, strategic culture, and this refers to the ways in which national histories, worldviews, and other socio-cultural factors such as civil military relations, shape decisionmakers' perceptions of external threats. Fourth, global norms, meaning that some states seek to align their military doctrines and emulate other organizational models from other countries, or prevailing norms in the international arena. What variables affect the state's choice of nuclear posture? International relations scholars have suggested that a state's security environment, as well as its strategic culture, are two variables that affect the selection of both doctrine as well as posture. Another theory is that of technological determinism, i.e. the development of new capabilities without regard to political motivations and strategic consequences drives posture. Some scholars contend that security factors alone do most of the work explaining doctrine. Professor Vipin Narang acknowledges that the state's security environment is the most important variable, but otherwise finds civil-military relations and financial constraints to be more important than technological determinism or strategic culture. Narang's "optimization theory" posits that state security managers ask themselves a series of questions in order to select a nuclear posture appropriate to their state's circumstances. These questions include the following: Do we face a conventionally superior adversary with the ability to conduct offensive operations across a land border? Next, do we have a nuclear-armed patron willing to intervene on our behalf if we brandish nuclear weapons? Then, what kinds of civil-military relations do we favor? And finally, are we subject to financial constraints in our posture?

Rajeswari Rajagopalan: 02:26

There are several drivers, factors, that push India in adopting a certain posture and that are determining its doctrinal approaches for India. One, of course it goes without saying that there is the nuclear triangular dynamics that come into play as India – threats in this regard, both on its east and the west, we have two nuclear neighbors, both China and Pakistan, that

determine to some extent India's policies and postures in this regard.

- S. Paul Kapur: 03:02 The drivers of proliferation in South Asia were mostly security-based in my view. India learned from its unfortunate encounter with China in 1964 that it actually had to play a realpolitik game that the founders of independent India, including Nehru, very much wanted to avoid. And after that loss to China, the Indians embarked on a nuclear weapons program, and much of the impetus for this was in fact to protect themselves against a stronger China. And they recognized that this, that nuclear weapons, offered them a shield of last resort, if you will. They were also motivated by other factors, however. Some of it was bureaucratic. The so-called "strategic enclave" played a role. The weapons testers and designers and the scientific community were an important interest group that helped push the program forward.
- Syed Azmat Hassan: 03:54 I think the most important issue, which sometimes perhaps the media does not fully take notice of, or elides over, is that nuclear Pakistan, a nuclear weapons Pakistan, acts as a deterrent to a neighbor with whom there are unresolved issues, particularly the issue of Kashmir, and whose conventional forces are five times those of Pakistan. And given the topography and the geography of the two countries, Pakistan's nightmare is that it would be sliced into two portions through an Indian attack or an Indian invasion, and this would result in the end of Pakistan. So nuclear weapons act as an insurance policy.
- S. Paul Kapur: 04:46 On the Pakistani side, security was again the number one factor. The Pakistanis have always been weak relative to India, and acutely aware of that weakness, and always been looking for a fix for that. Some sort of a shield, some sort of an equalizer.
- Michael Krepon: 05:05 There are several hallmarks to Indian strategic culture, at least as I see it. One is civilian control over the military. That's crucial. Decisions are made by civilians, and civilians are very wary of the dangers of warfare. Number two: a relaxed view about nuclear weapons. Nuclear weapons are political instruments. They're not military instruments. You don't use them to fight wars, you use them to deter. That's a very important aspect of Indian strategic culture. And as a result of the first two, when you combine the first two, you find that India has adopted a fairly relaxed posture. Like the Chinese have, more than the Pakistanis have or the United States.
- Ashley Tellis: 06:04 The main components of India's strategic culture are a long history, an old civilization, great aspirations for a place in the

world, and the struggle against the legacy of colonialism. What this means for India's nuclear weapons is Indians see nuclear weapons as a limited, but necessary, capability to protect India's independence in a competitive world.

Rasul Baksh Rais: 06:37

I would like to emphasize three elements in Pakistan's strategic culture that define its strategy and strategic outlook. The first one is that an Islamic Pakistan has to be defended at any cost against an India which seeks hegemony, which seeks domination, and which has many-fold the resources, the conventional military strength, and the power, and also a sort of political consensus within the dominant political element that have Hindutva inclinations and are Hindu nationalists and conservatives – their outlook of history and their view of creation of Pakistan does not fall in the mainstream thinking within India. That has been a concern for Pakistan and may be a concern as long as this group of politicians and parties dominates India. The second, I think, strategic element in Pakistan's culture is that it has to establish its identity and its place, and I believe that the nuclear weapons that Pakistan has developed are not only the tools of deterrence against India, hoping to prevent war and also to control escalation of conflict with India, but also a statement of achievements and a sense of deep identity of Pakistan as a regional power. I think embedded in this is the third element that also makes a statement, that Pakistan is the first [Islamic] nuclear power, a scientific as well as a political strategic achievement. Pakistan can take pride and that goes along well with Pakistan's numerical strength, touching the number of about 200 million population and its location in a region that is adjoined by three strategic areas: Central Asia, West Asia, and South Asia. So, it means both in terms of national identity, deterrence against India, and also a status and a role within the Muslim countries. And cumulatively all these elements give confidence to Pakistan as a state, as a nation, and also this capacity to survive against perceived or real Indian threat that runs deep into Pakistani psyche.

Scott Sagan: 09:39

The bureaucratic interest of the state, that is, the bureaucracies, they tend to like nuclear weapons. And the militaries in South Asia, once they acquired nuclear weapons, have tended to do what militaries everywhere do: they seek autonomy. They want larger arsenals, they want to have more authority to make decisions on their own. That's a standard operating procedure that militaries have.

Vipin Narang: 10:14

With respect to nuclear weapons, I think the bargain is similar to their [India's] general civil-military bargain, which is that there's firm civilian control. And this dates back to

independence. Prime Minister Nehru took steps to, at the time, potentially coup-proof India against the military, saw the experiences in Pakistan, and India took great measures to separate the military from political and strategic affairs. And on nuclear weapons, that has certainly been the case. The military wasn't interfaced with the scientists or the politicians until the mid-1990s. I think there are, you know, several episodes in Indian history that re-affirmed, at least in the politicians' and prime ministers' mind, about why you would want to keep the military away from strategic programs. The 1962 war, which was a watershed in civil-military relations, and I think an understudied and underappreciated event was the Brasstacks crisis in the mid-1980s, where Prime Minister Rajiv Gandhi really felt betrayed by then-Chief of Army Staff General K. Sundarji, believing that General Sundarji almost dragged India into a war over the Prime Minister's wishes. That really shaped, I think, how Prime Minister Rajiv Gandhi activated the nuclear program shortly thereafter, where he put a civil servant in charge of the weaponization process and kept the military firmly away from it. Although the military opposes these arrangements, the firm civilian control has served the Indian strategic program well in the sense that it minimizes the risk of accidents, unauthorized use, but it has come at a price in terms of operationalization, as the military took some time to reliably develop the organizational procedures and institutions to manage India's nuclear forces as the end users.

Rajeswari Rajagopalan: 12:11

There has been, sort of, scientific technocrats driving certain amount of this particular policy, and that is for the DRDO, for instance, the Defence Research and Development Organisation, has had a determining say in saying what India can do in this particular regard, in the nuclear and the delivery mechanisms in this particular regard. It's not that the political leadership has not taken note of it, but they have taken note of it and given a nod to most of their programs. It's not been an automatic process, but there has been political nodding for most of the DRDO programs in this regard. So in a sense, the technical and scientific bureaucracy has had a significant say in what they want to do in India's nuclear policies and postures in this regard. But again, the DRDO needs to be taken with – whatever statements come out of DRDO need to be taken with – a spoon of salt because there have been big claims not really matched by actual realities on the ground.

Dave Smith: 13:16

The most important component of civil-military relations in Pakistan, at least insofar as it affects the nuclear dimension, is that the army has an enormously important part. In fact, it is likely the senior partner, with the civil administration of

Pakistan playing the role of junior partner yet titular head, of the National Command Authority. I think many people question whether or not the military would be willing to accept orders from the civilian authorities in a nuclear crisis if it disagreed with those orders.

Riaz Khan:

13:58

There is the Foreign Office, which makes its input all the time. As far as I know, the Foreign Office and SPD have been collaborating very closely on many, many aspects relating to our program like, for example, even the evolution of the nuclear doctrine or the establishment of Pakistan's nuclear regulatory authority – it was basically – the structure and all that was evolved through consultations between SPD and the Foreign Office.

### **3.3: “The Nuclear Fuel Cycle”**

Toby Dalton:

00:05

The nuclear fuel cycle is effectively all of the infrastructure and chemistry, etc., that allows a country to turn uranium into energy and/or nuclear weapons. Both India and Pakistan have some limited uranium mining and concentration, and that material is fed into the weapons side of their programs. In Pakistan, initially that was done through uranium enrichment; increasingly, it seems that Pakistan is feeding that material as fuel into small reactors that then breed plutonium, that is reprocessed out of the fuel and moves into the Pakistani nuclear weapons program. India similarly has domestic uranium mining that it does, and that is converted into nuclear fuel and run through research reactors, or so-called “research reactors.” And that has, in the past, provided plutonium for the Indian nuclear weapons program. Neither state has very large amounts of uranium, and that is why both of them are seeking foreign support for their nuclear power enterprises. Pakistan has received several reactors from China that will also include fuel for those reactors that will alleviate excess demand on Pakistan's uranium resources. And similarly, India is also seeking foreign support for its nuclear power program and the reactors that will be built by Russia – and perhaps France or potentially even American firms in the future – those reactors also would come with some support for fuel. India is also importing uranium from other countries. All of that uranium and the fuel that would be in foreign-supplied reactors would be under IAEA safeguards. That's true for both countries, and so it would not be eligible, or permissible, to put that fuel through reprocessing facilities unless it's specifically allowed. And any plutonium that would result would have to be under IAEA safeguards and could not be used in the nuclear weapons program.

### **3.4: “Nuclear Warheads”**

Pervez Hoodbhoy: 00:04

Highly enriched uranium was used for the making of Pakistan's first atomic bomb, and in fact, that's the one that was tested in 1998. However, uranium weapons are heavy, and they're not so easily modified for sending, for being placed upon missiles. And so therefore, Pakistan has had a parallel track as well for plutonium-based warheads and also composite warheads, which means both plutonium as well as uranium, at Khushab, which is an area in the Punjab, a town in the Punjab. There are now four plutonium production reactors. And between them they're going to produce all the plutonium that is necessary for Pakistan's tactical nuclear weapons, as well as for those which will be placed upon its intermediate-range and long-range missiles. So, Pakistan now has two separate tracks. There's uranium, there's plutonium. And then from these you make also the composite warheads.

Toby Dalton: 01:21

In India, the reverse seems to be the case, that initially its fissile material production came predominantly through so-called “research reactors” that had been supplied and assisted under the Atoms For Peace program. And so India utilized plutonium from those reactors in its nuclear weapons. It's also possible, although there's no public evidence to suggest this, that India may have used some of the very large pressurized, heavy water reactors that otherwise produce electricity and are connected to the grid. It may also have used those to produce plutonium at one time for its nuclear weapons program. Increasingly, however, there is some evidence to suggest that India is also developing a highly enriched uranium capability. Some people believe that that will be dedicated primarily to fueling the submarines that India is building, that would utilize a highly enriched uranium fuel. But there is also some speculation that India will use highly enriched uranium for a thermonuclear weapons program. So there's a possibility that over time India, too, will have highly enriched uranium for its nuclear weapons program. So I think at this time, it's fair to say that both India and Pakistan are producing plutonium and are producing highly enriched uranium, both of which are likely to be moving as fissile material into the nuclear weapons program.

Pervez Hoodbhoy: 02:43

The fission bomb comes basically in two types. There's the uranium-based bomb and there's the plutonium-based bomb. They work on identical principles, which is that there's a heavy element, uranium or plutonium, that splits into two or more nuclei, and that releases a large amount of energy. This was the bomb that was used in Hiroshima and in Nagasaki. But

subsequently the fusion weapon was developed, or the hydrogen bomb, and basically what happens over there is that atoms of hydrogen fuse together, in which case there is a release of energy, and this is the same mechanism by which our sun produces heat and light. These hydrogen bombs can be perhaps a thousand times more powerful than fission weapons; making these is much more difficult.

### **3.5: “Strategic Delivery Vehicles”**

Travis Wheeler:	00:06	<p>Ballistic missiles can be characterized in terms of their range, fuel type, and basing mode. The United States uses four categories for missile ranges: intercontinental ballistic missiles, which have a range of 5,500 kilometers or more, intermediate-range ballistic missiles which have ranges between 3,000 and 5,500 kilometers, medium-range ballistic missiles which have ranges between 1,000 and 3,000 kilometers, and short-range ballistic missiles which have ranges up to 1,000 kilometers. An interesting historical footnote is that the range for ICBMs was set during the first strategic arms limitation talks with the Soviet Union. Fuel type is another important design feature. Most ballistic missiles are fueled with either a liquid or a solid propellant. Both types of fuel can provide extended range. Liquid fuel is more energetic than solid fuel. The drawback with liquid propellant is that it must be stored separately from missiles, extending the time it takes to prepare a missile for launch. Liquid fuel missiles are therefore more vulnerable to counterforce strikes than solid fuel missiles that are not based in silos. Solid propellant, by contrast, is much more stable, meaning that it can be manufactured into the missile itself, making solid fuel missiles more mobile, and hence survivable, than liquid fueled ones. A final missile design element is basing mode. Missiles can be based in silos, or they can be rail or road mobile. India and Pakistan use either road or rail mobile basing modes for all of their land-based ballistic missiles. Mobile missiles are difficult to locate and target, unless an adversary possesses highly accurate missiles and superior intelligence, surveillance, and reconnaissance capabilities.</p>
Travis Wheeler	2:07	<p>India and Pakistan began developing ballistic missiles and other nuclear delivery systems well before they crossed over the overt nuclear threshold in 1998. The Prithvi- II and Agni-I are short-range, road-mobile ballistic missiles suitable for targeting Pakistan. The Prithvi-II's shortcomings are its limited range and use of liquid propellant. This means that Indian missile units would have to fuel these missiles from extremely vulnerable launch sites along the Indian-Pakistani border. In this sense, the Agni-I's extended range was an important advance for the Indian missile program. The Prithvi-II and Agni-I became fully operational in the mid-2000s after extensive testing. In the last decade, India has flight tested and inducted the medium-range Agni-II, and the intermediate-range Agni-III. The Agni-II facilitated the targeting of Pakistan from more secure locations at a distance from the Indian-Pakistani border. The Agni-III brought some Chinese targets into range, albeit from vulnerable</p>

locations near the Chinese border. India flight tested the Prahaar, a solid-fuel, road-mobile ballistic missile with an estimated maximum range of 150 kilometers, in 2011 as part of an ongoing effort to upgrade the Prithvi. While it appears that New Delhi has abstained from assigning the Prahaar a nuclear mission, Pakistani analysts argue that the Prahaar could be dual-capable. That is, it could carry nuclear as well as conventional warheads. India appears to be readying the Agni-IV and the Agni-V for induction. These longer-range missiles bring Chinese targets into range from more secure locations within India. The Agni-V is expected to be the first Indian missile capable of reaching Beijing and Shanghai.

Travis Wheeler

4:00

Pakistan's deterrence requirements focus on India, although the longer-range missiles it's developing could provide additional targeting capabilities. Pakistan received assistance from China and North Korea for its early missile types, but it now has a mature technological base for missile production. Pakistan flight tested its first ballistic missile, the short range Abdali, in 1989. It then moved on to flight testing the Ghaznavi and Shaheen-I, two short-range, solid-fuel ballistic missiles in the late 1990s. Pakistan flight tested the Shaheen-II in 2004, a solid-fuel, road-mobile ballistic missile with a range of 1,500 kilometers, giving Pakistan the ability to target major Indian cities in countervalue strikes from more secure locations inside its territory. Pakistan flight tested the Shaheen-III in 2015, a road-mobile ballistic missile with an estimated range of 2,750 kilometers. Close observers note that the Shaheen-III, once operational, would allow Pakistan to reach targets deep inside Indian territory for the first time, including India's military outposts on the Andaman and Nicobar Islands. In addition, the Shaheen-III, like similar missiles in the Indian arsenal, can reach targets beyond South Asia. The shortest range ballistic missile in Pakistan's nuclear arsenal is the Nasr, which was first flight tested in 2011 and appears to have been inducted. The Nasr is intended for battlefield use and may be dual capable. The Nasr reflects Pakistan's deterrent strategy of threatening first use of nuclear weapons in order to deter India from undertaking conventional operations.

Michael Krepon:

05:58

When countries start their nuclear program, they look for ballistic missiles as the launch vehicle for their nuclear weapons. A ballistic missile goes like this, and it can go from various ranges: short range, medium range, long range. But over time, countries typically diversify their means of delivering nuclear weapons. And cruise missiles have become a preferred means to supplement ballistic missiles. Cruise missiles go like this, and they can maneuver. One of the reasons for cruise missiles is a

concern that your adversary will deploy defenses against ballistic missiles, so you can stress defenses through lots of ballistic missiles, or by using cruise missiles in addition. Further along in a nuclear competition, states consider putting more than one warhead atop their missiles, and this is called MIRVing: multiple, independently targetable re-entry vehicles. So, a single ballistic missile, if it's big enough and if it has enough thrust, throw weight, it can carry more than one warhead. During the Cold War, some missiles carried ten warheads, and they could be independently targeted at cities, or military targets, or whatever. MIRVing is a very advanced form of a nuclear competition. China has flight tested MIRVs. How much China will deploy MIRVs is unclear. The United States and the Soviet Union went haywire with MIRVs, lots of MIRVs. Will China do that? Not clear, but I think it's unlikely. But if China has MIRVs then India may decide it needs to flight test MIRVs as well. India can do this. India can use a single space launch vehicle to put ten satellites in orbit. If you can put ten satellites in orbit, you can put ten warheads on ten different targets. If India goes down this route – not clear that it will, not clear that it will go overboard – but if India goes down this route, Pakistan may as well, to a limited extent.

Travis Wheeler:

09:03

India is believed to have produced 540 kilograms of weapon-grade plutonium, which would be enough fissile material for 135 to 180 nuclear warheads. Experts estimate, however, that the country possesses perhaps 110-120 nuclear warheads, which are deliverable via aircraft, ballistic and cruise missiles, and from sea-based platforms. Pakistan is believed to have produced 3,100 kilograms of highly enriched uranium and 170 kilograms of weapon-grade plutonium. This is enough fissile material to produce between 200 and 300 warheads. Experts assess, however, that Pakistan's stockpile may consist of approximately 110-130 nuclear warheads, which are deliverable via aircraft, ballistic, and cruise missiles. Pakistan, like India, is working on a nuclear triad, i.e. the ability to deliver nuclear weapons from land, sea, and air.

### **3.6: “Assessing Nuclear Arsenals”**

Zia Mian: 00:07 Nuclear weapon states have spent large amounts of money on nuclear weapons over the years and continue to do so. The question that follows, then, is: to what extent are nuclear weapons costs sustainable, especially for relatively poor developing countries such as Pakistan or India or North Korea, for example? And one of the things that we can see is that while nuclear weapons budgets are large, and that there are large costs that are not covered by budgets, such as the health effects on workers and on the environmental contamination and the unknown costs of the decommissioning, dismantlement, and disposal of facilities and materials, what we can see is that nuclear weapon budgets in dollar amounts by and large are only a fraction of total military spending in all of these countries, including Pakistan, as was the case in the more established nuclear weapons states: the United States, Russia, Britain, France, and China. And so the sustainability of nuclear weapons spending is a subset of the larger question of the sustainability of the very large military budgets that these countries have, given the overwhelming human needs that they have to meet for their populations, which remain unmet. And so the issue is perhaps better phrased not as whether nuclear weapons budgets are sustainable, but what is the price that the people of Pakistan and India and other countries with nuclear weapons are forced to pay by their political military leaders for their military ambitions? And this is where one comes across the fundamental reality that nuclear weapons programs are fundamentally undemocratic because people are never asked, how much do you think we should spend on nuclear weapons?

Zia Mian 2:00 Estimating the number of nuclear weapons that a country may have, or may be able to make, is a very challenging problem. And the reason for that is that one way to make such an estimate is to ask, what is the total amount of nuclear weapons usable material that a country has produced and the rate at which it continues to produce it, if it does so? And that means estimating what kinds of nuclear production facilities they have and the capacities of those facilities, whether it's the nuclear plutonium production reactors that make plutonium for weapons, or the uranium enrichment plants that make highly enriched uranium, the other material that can be used to make nuclear weapons. And in both the case of plutonium and highly enriched uranium, there is uncertainty that is involved in understanding: how big is the reactor, how much power does it have, how well is it being operated, how efficiently is the plutonium recovered? And similarly, in the case of uranium

enrichment, there's the question of what kind of technology is being used, how efficient is this technology being used, and what is the total availability of the raw materials for enrichment? How much uranium does a country have access to to make into highly enriched uranium? So that gives you one set of numbers. And then another set of numbers is, how much of that material has actually been fabricated into nuclear weapons and could be used as nuclear weapons? And that is set by a different set of criteria which involve the capacity to actually fabricate nuclear weapon components, to be able to store those components, to have the ballistic missiles, and the bombs, and the cruise missiles, and the other delivery systems, which are in themselves very large, complex engineering/production challenges. And then there's the question of what kind of delivery platforms do you have? I mean, do you have enough fighters to carry your nuclear bombs? Do you have enough submarines to carry submarine-launched ballistic missiles? And do you have enough trucks if you have mobile missiles, or enough silos if you have missiles that are kept in hardened storage silos? And so all of those things are a separate set of constraints on how many nuclear weapons a country may actually have at any given time.

### **3.7: “Nuclear Substitution”**

Ahsan Butt:

00:05

So nuclear substitution is the idea that states can use their nuclear weapons – once states acquire nuclear weapons and have that capability, especially a second strike capability, that their need, or their desire, to have conventional weapons, or to match their adversaries’ conventional acquisitions, decreases over time. The basic idea is that because nuclear weapons are so overwhelmingly powerful, they essentially guarantee that territorial integrity of any state that has them in any great numbers. As a consequence, states that have that level of security and safety don't feel the pressure to match their adversaries’ conventional acquisitions tank-for-tank, missile-for-missile, gun-for-gun, bomb-for-bomb. Nuclear substitution very much relies on this idea of the offense-defense balance and how deterrence works. People like Charlie Glaser, scholars like Charlie Glaser, have talked about how nuclear weapons are very defense-dominant weapons. By that, we mean that nuclear weapons help states defend territory and security a lot more than they help states aggress against others. As a consequence, nuclear weapons essentially shift the offense-defense balance towards defense. They make it a lot easier for states to defend themselves than they make for other states to attack them. Once the offense-defense balance shifts towards the defense, states can be satisfied with their level of security and not scare or put fear into the minds of their adversaries to the same extent. And as a consequence, arms races should peter out.

Ahsan Butt

1:32

So there's really two main reasons that conventional weapons and conventional forces remain attractive to states, even when they have nuclear weapons. One of these relates to, sort of, desires, and one of these relates to constraints. So with respect to desires and preferences, we can really focus on territorial issues. When states want to change the territorial status quo, when they want to liberate other countries, or they want to liberate other territories, they need to continue to invest in conventional armaments because nuclear weapons are useless for taking aggressive actions. They're much more useful for defensive actions. So states interested in aggression, powerful states, sort of territorially-hungry states, will continue to invest in conventional armament. So that's one issue. On the flip side, there's also a constraints angle to this, which is that not all security threats are amenable to nuclear deterrence. Terrorism, small scale assaults, rapid fire assaults from other states, anything other than a large scale territorial invasion is not really deterrable by nuclear weapons. So states that face a sort of panoply of threats, security threats, need to sort of arrange their defensive forces in ways to counteract each one of those threats, rather than it's the large scale territorial invasion, which

is why states continue to invest in conventional armaments even when they're nuclear powers. So nuclear substitution has not occurred in Pakistan. So what I've argued in my research is that the logic of nuclear substitution should hold in Pakistan more than any other state, primarily because it's much weaker relative to its primary rival, which is India, and also because it has great socioeconomic needs. So one would think that once it acquires nuclear weapons, Pakistan could reduce its conventional burden and transfer some of those resources to socioeconomic wellbeing. That hasn't happened. The main reason I argue that that hasn't happened is because of Pakistan's revisionism over Kashmir. Once states desire other countries' territory, or territory controlled by other countries, states need conventional strength to sort of overturn the territorial status quo. So there's a sort of battlefield strategic imperative here that states need to continue to invest in conventional strength if they're concerned with winning other territory. There's also a domestic politics-political economy angle here, which is that thanks to Pakistan's revisionism over Kashmir, the Pakistani army has maintained a very impregnable position in domestic politics, in part fueled by that desire over Kashmir and the centrality of the Kashmir issue. As a consequence, many of the Pakistani military's, especially budgetary, outlays lay beyond sort of the purview of elected civilian such as Parliament. So alongside this battlefield strategic mechanism, there's also a domestic politics-political economy mechanism, through which Pakistan's desire for Kashmir works itself into a denial of nuclear substitution.

Ahsan Butt

4:28

So nuclear substitution definitely did not occur in India. Indian strategists did not devote a great deal of thought to what would happen strategically once they acquired nuclear weapons. The idea that they had was that nuclear expenses and conventional expenses were additive rather than complementary. So they sort of fundamentally denied the logic of nuclear substitution, and more to the point, empirically, once it became a nuclear power in the seventies, India underwent a massive military modernization program in the eighties, featuring sort of expanded tank regiments, larger forces, more investment in the air force and navy, lots of arms enforced from the West such as from Sweden, the U.S. and Britain, but also the Soviet Union. So the Indian state definitely did not undergo nuclear substitution. And this is in large part because India's security threats are not amenable to pure nuclear deterrence. India faces a lot of internal threats. India also faces the prospect of a two-front war against China and Pakistan. So India needs a flexible array of defensive options. Nuclear weapons do not satisfy its defensive requirements by themselves.

### **3.8: “Nuclear Command-and-Control (C&C) in South Asia”**

Reshmi Kazi:	00:10	The most distinguishing aspect about India's nuclear command and control structure is that it is under civilian leadership, and it has an elaborate organizational structure at the apex level. We have the Political Council, which is headed by the Prime Minister of India and also ministerial members from the Cabinet Committee on Security. Below the Political Council we have the Executive Council, which is headed by the NSA and the chiefs of the three armed services.
Ashley Tellis:	00:38	I think there are two factors that influence India's command and control more than any other: the desire to make certain that India's nuclear weapons never go off unless they are deliberately intended, and two, that India's civilian authorities maintain perpetual control over those weapons at all times.
Vipin Narang:	01:01	Like most states, there's a scientific component, and this in India comprises the Department of Atomic Energy, which generates and fabricates the fissile material for India's nuclear weapons, the Defence Research and Development Organisation, or DRDO, which has largely been responsible for developing the delivery capabilities and the non-fissile components of India's nuclear weapons and delivery systems. You have the military, which is the end user, and they've raised several missile brigades. The Arihant, which is a navy – the SSBN for the navy. All interfaced through the Strategic Force Command. The Strategic Force Command in the military is kind of unique in the sense that it's a tri-service command, but it doesn't possess any actual assets and is mostly just a coordination mechanism to activate and marry the scientists with the military end users in each of the respective services: the army, the air force, and the navy, and coordinate with the National Security Advisor in the event of movement up in India's alert levels and potential release of nuclear weapons. But the ultimate node is in the Prime Minister's office, and the National Security Advisor would be the individual that would be responsible for making decisions about any movements up India's alert levels and activity in the nuclear weapons sphere.
Zamir Akram:	02:32	We have a National Command Authority, which is chaired by the Prime Minister. It has four ministers: the Ministers of Defense, Foreign Affairs, Interior, and Finance, and it has the three service chiefs. They have the exclusive authority to decide on the use of our nuclear and strategic capabilities. The command and control structure is then serviced by the Strategic Plans Division, which is the sort of secretariat of the National

Command Authority. And the safety and security, as well as command and control, are the responsibility of the Strategic Plans Division or the SPD.

Feroz Khan: 03:24 After the 18th Amendment in 2010, the President absolved himself from the responsibility of being head of the NCA and handed that over to the Prime Minister, which actually meant a one less civilian oversight on the Pakistani National Command Authority. And that continues to be the day-to-day. So the Prime Minister of Pakistan actually is both the chairman of the Developmental Committee as well as Employment Committee. Now, bear in mind that Employment Committee is essentially, as its name derives, is meant as war decision-making to employ the nuclear weapons. But in peacetime, that is the body that decides on the policy, nuclear policy matters, including the state of weapon systems, how they are deployed, how they are stored, general diplomacy, energy policy, budgetary policies, and all that stuff, which eventually leads on to the Developmental Committee to actually execute. The difference between the Employment and Development Control Committee essentially is that the Employment Committee is more of a political-military body, and the Development Committee is a more military-scientific body which actually translates the policy decisions into execution in peacetime. So these are the two committees. Notice that in both the committees, military is a common factor, whether it is employment or it is development. So that is how the Pakistani system evolved.

Naeem Salik: 04:49 There has been a lot of speculation and misperceptions about the safety and security of Pakistan's nuclear weapons. And correspondingly, Pakistan has paid extra attention to this aspect, especially after 9/11, and a lot of investment has gone in. Just to give you an idea, once we started off with the National Command Authority and the command and control structure post-1998, the security aspect of the command and control was very limited. There used to be a brigadier, with a few dozen people, and they used to be called advisors, security, NCA. And this has expanded over the last decade into a very elaborate structure headed by two two-star generals. There is an intelligence wing, there's a security wing, and there are about 28,000 people specially trained and equipped to provide security to the nuclear storage sites, installations, and weapons storage sites, wherever they may be. They also have a rapid reaction force which can deal with any emergency anywhere in the country within half an hour.

Michael Krepon: 06:02 If you have a first use posture, as Pakistan does, there are implications for that in a crisis. First, you want to move your

nuclear assets around so that they're not sitting ducks. That applies to India too. The movement of assets also alerts everybody that this is a very serious crisis, and it ramps up crisis management efforts, especially by the United States. When you move nuclear assets and you have a first use posture, and you're dealing with very short-range systems, or indeed systems that have no range whatsoever, what we call in the West "tactical nuclear weapons." You've got to be able to put those weapons in the field, close to the forward edge of battle, and that raises all kinds of problems with nuclear safety and security. So that's a big concern. With respect to India, because the system is so weighted toward the civilians, and because the civilians are so leery of handing the weapons off to the military and providing authorization of use, there are more controls. There are more checks and balances. There's more time. There's less likelihood of accident.

- Neil Joeck: 07:40 The organization of India's decision structure excludes the military, marginalizes the military to a large degree. In a crisis, how do you draw in military concerns in order to ensure that the crisis you face does not devolve into a war that you don't want? So, the organizational structure within India is critical to ensuring the command and control is maintained and is robust. And this is a challenge for future scholars. On Pakistan's side, there is a strong command and control structure, but it's dominated by the army, in contrast to India. Because of the domination of the army, there's a tendency perhaps only to see things from that perspective. And a problem for Pakistan is that there is insufficient attention being given from the non-military perspective. There needs to be a civilian and scientific input.
- Jaganath Sankaran: 08:32 The most obvious one is command and control. TNWs, by nature, are supposed to be used in a low-control situation when the authority is given to field commanders. And then the question that immediately arises is, well, can they be trusted? Would that weapon fall into the wrong hands? So that's the other risk.
- Scott Sagan: 08:51 There's a phenomenon that I've called the "vulnerability- invulnerability paradox." The Pakistani military, knowing that they have serious problems with terrorists and jihadis in their state, do their best to keep nuclear weapons on bases, disconnected from their launch platforms, from the missiles or the planes that might be used; keep them in igloos under heavy guard. And that's what you would want to do in peacetime if your goal is to make them invulnerable from a terrorist seizure. And yet, because they're on bases and locked up, they are vulnerable to an Indian attack if there is a war. Therefore, if

there's ever a serious crisis, the Pakistani military has every incentive to move the weapons out of garrison, put them out into the field, that is sometimes literally a field – often the Pakistani roads with road-mobile missiles. Those nuclear weapons would therefore be less vulnerable to an Indian attack, but they would be more vulnerable to terrorist seizure and terrorist use. This vulnerability-invulnerably paradox is at the heart of one particular danger in India and Pakistan, the danger of terrorist seizure or inadvertent use.

Michael Krepon: 10:24

How do you deal with this situation, where one side, because of conventional disadvantages, feels the need to move assets around, and the assets need to be close to the battle or where the battle might be, and commanders in the field then, perhaps in very extreme circumstances, can take it upon themselves to do what they feel they need to do? How do you deal with it, the nuclear dangers involved here? The best way to deal with them is not to have crises, and the best way not to have crises is to make sure that the people who will prompt the crises, who will spark the crises, don't do so.

### **3.9: “Deterrence Stability in South Asia”**

- Charles Glaser: 00:09 The arms race is often thought of as an action-reaction process, where one state builds because in other state’s building. Sometimes states actually build in anticipation of other state building, and so there's a competition that takes place in this action-reaction sense. In the nuclear realm, an arms race can be the race to deploy nuclear weapons, or develop and then deploy them. It can be a competition over the size of forces, and sometimes most importantly, it can be a competition over innovation and modernization of forces. And another set of arguments about arms races is that they constrain political relations between states, which can make war more likely. So even though I might be arming to defend myself, you could see my arming as a threat to your security, and then believe that I'm more aggressive or dangerous, and as a result, crises will be more intense, and war could be more likely. Another way, a more military technical way, that arms races can be dangerous, is if states build forces out of sync. So for example, I've argued or mentioned that increases in size can be stabilizing, but if one side gets a jump on the other and builds a large force before the other side has a chance to build, it can create an advantage which may create incentives for that state to use its advantage, before the other side can catch up.
- Nina Tannenwald: 01:23 The nuclear taboo is a de facto non-use norm, but it's not simply a norm. It's also a taboo in that it has a sense of obligation attached to it. So it combines strategic self-interest with moral concern. That is, countries have a self-interest in not using nuclear weapons, that if you're in a situation of mutual assured destruction, you don't want to use nuclear weapons because you'll get that retaliatory use of nuclear weapons against you. But there's also a moral element to it. And this has to do with the excessive, massive destructive power of nuclear weapons, and the devastating damage and consequences that a use of nuclear weapons would bring. And so nuclear weapons, most uses of nuclear weapons, would violate any sense of proportionality and discrimination. And leaders have come to accept this and to understand this. And so when we look at this taboo, it's not simply a strategic interest, but it's a moral element as well. Factors that weaken the taboo are all those that make nuclear weapons seem more usable. So, technological developments that make nuclear weapons smaller, that miniaturize them, that by making them seem more ethical, also make them more usable, technological developments that erode the distinction between nuclear and conventional weapon. So that has distinction been one of the

most important measures that preserve that taboo – that distinction between nuclear and conventional. If that is eroded by either having dual-use kinds of delivery vehicles or very, very small nuclear weapons, then that undermines the taboo. A third factor is an emerging arms race. If we get an arms race, a new arms race between the U.S. and Russia and China, between India and Pakistan, where there is modernization, new kinds of technological developments, increasing emphasis on developing weapons that are usable, along with doctrines that suggest the usability of nuclear weapons. All these kinds of things undermine the restraints that we have had in place for about 70 years.

Michael Krepon: 03:55

Nuclear weapons are supposed to be weapons of peace. Everybody who has nuclear weapons says they are weapons of peace. They are supposed to deter. They are supposed to deter because these weapons have such horrific consequences if used. And this concept of deterrence by means of extreme danger can't possibly be stable. If you are deterring because you are concerned about somebody else's misbehavior, and if that's why you have nuclear weapons, then that situation is going to be inherently unstable. We don't care about nuclear deterrence between Great Britain and France. They're not going to fight a war. They don't have border issues. They don't have concerns about sub-conventional warfare. Those circumstances are not present, so it's not really a deterrent relationship even though they have weapons. But South Asia's different. The conditions for stable deterrence are absent, even with nuclear weapons on both sides in three-digit sized arsenals. Stability hasn't grown with the size of nuclear stockpiles. It never does. Security grows when relations between adversaries smooth out. When causes for warfare are remote, then the size of the arsenal doesn't matter, and indeed it becomes easier to reduce. These conditions are not in place on the Subcontinent.

Toby Dalton: 06:33

India and Pakistan have different beliefs about nuclear weapons and how they deter, such that the chances of a misperception or poor decision-making in a crisis led by misperceptions is a real possibility. I think that is backed in turn by a sense in Washington held by most thinkers on nuclear weapons that hues more towards pessimism about deterrence and the high likelihood that deterrence fails for a wide variety of reasons having to do with breakdowns in systems, human error, technical errors, the difficulty of maintaining command and control and the chain of command during crises, etc. – a lot of which were born out by the U.S. experience in the Cold War. I think in South Asia, on the other hand, you tend to find more strategic thinkers and policymakers who hue more towards

deterrence optimism, and that is that essentially the power of nuclear weapons to deter is far greater than the pessimists tend to assume, and that there doesn't need be a very high alert level or ready force posture in order to affect deterrence. And therefore the kinds of accidents or misadventures that deterrence pessimists tend to worry about tend to be discounted by deterrence optimists. So I think that difference in perceptions in the likelihood here that that people tend more to believe in deterrence pessimism is another contributing factor to the concerns about nuclear use in South Asia.

Christopher Clary: 08:11

Another major driver of instability on the Subcontinent is the inherent asymmetry of size between Pakistan and India. Pakistan is much smaller than India, and India is today, and will for the foreseeable future, have much greater conventional military capability than Pakistan will. This has pushed Pakistan toward favoring asymmetric strategies. One asymmetric strategy is supporting militant groups that target India at relatively low cost compared to conventional forces. The other asymmetric strategy is that Pakistan has used nuclear weapons to deter Indian conventional military action. But this has created a dangerous brew, where you have militant groups operating at the low end, India desiring to use conventional military force to stop those militant attacks, and Pakistan trying to use nuclear weapons to stop Indian conventional attacks. Again, we have a chain from the lowest levels of conflict to the highest levels of conflict. One final source of instability in South Asia is that India is not just trying to deter Pakistan, but India also has to deal with a much larger China next door. So steps the India takes to secure itself against China also inherently make Pakistan feel more insecure.

Scott Sagan: 09:33

The other danger that I worry about is that Pakistani doctrine calls for limited uses of nuclear weapons if India has a conventional attack inside Pakistan. Now, we don't know exactly the numbers that they would use. They probably don't know exactly the numbers that they would use, and they keep open a variety of options. But many Pakistani military authorities have talked about using nuclear weapons, perhaps even inside Pakistan along the border, to try to deter and potentially stop an Indian conventional assault on Pakistan, and would try presumably using them in small numbers, low yield, so-called tactical weapons in order to try to limit escalation. Indian military doctrine, however, says that a single use of a nuclear weapons on Indian troops, regardless of where they are, would call forth a massive retaliation against any perpetrator of such a nuclear attack. The Pakistanis say that the Indians are bluffing; "They wouldn't really do that!" The Indian

say the Pakistanis are bluffing when they talk about using nuclear weapons first; “They wouldn't really do that!” When two states in a conflict of this magnitude each believe that the other is bluffing, that's a recipe for disaster.

### **3.10: “Deterrence Credibility in South Asia”**

- Michael Krepon: 00:05 Sometimes doctrine isn't believable. The Soviet Union said, publicly on more than one occasion, that it embraced a policy of no first use. It would not be the first country to detonate a nuclear weapon. And that doctrine had some measure of believability because the Soviet Union had conventional force advantages over the United States and NATO in Central Europe, where a crisis or war might occur. But when the Soviet doctrinal texts were uncovered and read after the Cold War ended, it was clear that Soviet leaders did have first use in mind in the event of an offensive across Europe. So sometimes “no first use” is credible, sometimes that doctrinal element is not. In South Asia, India adheres to a doctrine of no first use. And as in the Cold War, that has believability because India enjoys conventional advantages, and these advantages will grow over time because it can spend more for its military than Pakistan.
- Francis Gavin: 02:16 One of the great challenges of understanding nuclear decision making is that oftentimes states and state leaders need to say things in public about their nuclear weapons and their nuclear strategies that may not necessarily match what they actually plan to do, either in terms of their deployments or their strategies. There's any number of reasons they do this. Nuclear weapons, of course, require signaling, signaling to an adversary about when and how you might use nuclear weapons in order to deter them from taking actions you don't want them to. It also requires signaling to allies that you're attempting to assure that your promises to protect them are solid and meaningful, and will be carried out if called upon. And oftentimes the rhetorical demands that are placed on a state to both deter and assure at the same time require leaders to say certain things. And there's also domestic political audiences as well, whether it's military, the scientific technological community, domestic political audiences. And sometimes the demands of being able to achieve all those objectives put the rhetorical strategy at some variance at what the actual deployed military strategy is.
- Vipin Narang: 03:38 India has to deter both Pakistan and China simultaneously. In 1999 with the draft nuclear doctrine and in 2003 with the official Indian nuclear doctrine, Indian nuclear doctrine was described as “credible minimum deterrence.” But the problem is that its deterrence requirements between China and Pakistan differ. And so what is credible towards China may not be minimal towards Pakistan. And what is minimal towards Pakistan certainly won't be credible towards China. And so India has had to try to square the circle with the development of its

capabilities, and it seems to have clearly chosen that it needs to deter, it needs to develop capabilities just certainly deter China, uh, and threaten assured retaliation against the Chinese state. And so that means that India's capabilities and evolution of its doctrine and strategy doesn't necessarily look minimal towards Pakistan. And this is driving a potential arms race between India and Pakistan because India is developing capabilities to deter China, which could theoretically be used against Pakistan, thereby driving up Pakistan's deterrence requirements. And so unwittingly India finds itself potentially in an arms race with Pakistan because of his deterrence requirements against China.

Scott Sagan: 04:49

The credibility of a threat is like beauty: it's in the eye of the beholder. So it doesn't really matter whether I think the Indian threat of massive retaliation is credible or not. What matters is whether political and military authorities in Pakistan believe it's credible. So I worry that the Indians, even if they think that they might well execute a large scale attack in retaliation to a more limited attack, even if they believe that they might do that, what matters is whether the Pakistani political and military authorities believe it. My own view is that the more reasonable, the more constrained, an attack or retaliation is, the more inherent likelihood there is that a state would actually execute it, and that lower level, more constrained attack options are more credible.

Shyam Saran: 05:51

It is also based on the conviction, which has been borne out by historical experience of East-West confrontation as well, that there is no such thing as a graduated response. That is, no matter at what level an exchange is initiated, all the studies show, all the gaming, shows that this almost inevitably goes up to the strategic exchange level. Therefore any kind of illusion that you can start off with, say, a theater weapon exchange and keep it at that, is simply not credible. So we believe that we must actually avoid a nuclear exchange at any level to be able to ensure that a nuclear war does not take place. So anyone who nurses the illusion that you know, somehow the use of theater nuclear weapons can be contained at that level, I think that is not a credible doctrine.

Manoj Joshi: 06:52

Massive retaliation has a certain connotation in a deterrence literature. The original word which was used in the draft nuclear doctrine was "punitive retaliation," and perhaps it may be a good idea for the Indian government to go back to that punitive retaliation because the spectrum then becomes more manageable at that point. Massive retaliation, as I said, has certain meaning, that means you unload everything you have on the other guy. The other problem with massive retaliation is

that, let us assume that you do adopt a “credible massive retaliation” posture. Then the adversary may well calculate that if I'm going to face massive retaliation to my tactical nuclear weapon, then why don't I begin the war with a massive attack? What is the – there is nothing in it for me to use just tactical nuclear weapons because the other guy, in any case, has promised massive retaliation.

### **3.11: “India’s ‘Cold Start’ Doctrine”**

- Jaganath Sankaran: 00:09 The basic idea is that after the Parliament attack on India by Pakistani terrorists, it was supposedly perceived that the Indian army came up with the doctrine. The idea is very simple: instead of having the army placed in the center of India, the idea was to break it up into smaller pieces and place them at the border so they can quickly respond to an attack from terrorists originating in Pakistan. But none of those things have really happened. However, India has conducted military exercises which some Pakistani scholars say is evidence to that doctrine.
- Gurmeet Kanwal: 00:49 The Cold Start Doctrine is an answer to two vexing questions that the Indian army faced during Operation Parakram. The first was how to mobilize in time before the international community came calling and cried halt to any action that India could take. And the second was how to not violate Pakistan's so-called “low nuclear threshold,” the space red lines, so to speak. The first one hasn't really been met because no cantonments have moved forward closer to the border, but the second one has been met in the sense that now pencil-sized thrusts are intended by way of offensive operations rather than a major thrust by strike calls.
- Moeed Yusuf: 01:35 Simply put, I think it's a mechanism where some of the Indian forces will be able to mobilize, to counter Pakistan's shorter lines of communication, on the Pakistani side, to mobilize in time to punish Pakistan in a very limited way through shallow incursions into Pakistani territory, and then pull back so as to avoid crossing Pakistan's nuclear red lines.
- Walter Ladwig: 01:59 It's essentially an approach that the Indian army has tried to develop to deal with the fact that it's caught in a pincher movement between Pakistan's nuclear arsenal on the one hand, and their support for terrorist groups in India on the other, and the reality that it's Indian army soldiers primarily who are dying as a result. So they're trying to create space under the nuclear umbrella in which they can use their conventional military forces to attempt to deter, or perhaps punish, the Pakistan army in particular, for its continued support and facilitation of militant attacks in India. So the idea, as it's been discussed in the open sources, is to break down India's large, three large tank-heavy strike core into smaller formations that would possibly be deployed much closer to the border. The strike core based in central India, a significant distance away from conflict zones, and these smaller formations would have the ability to quickly mobilize and undertake operations into Pakistan,

perhaps to quickly seize and hold territory that could be used in some sort of post-conflict negotiation, or to inflict some significant harm on the Pakistan army to punish it, and then withdraw rather quickly, all without penetrating or carrying out operations of large enough scale that would cross any of Pakistan's red lines.

Riaz Khan: 03:33 Cold Start is, in my view, a dangerous doctrine, because what one sees or gleans from the media and from some of these statements, it is a rapid reaction, quick reaction. If there is a terrorist incident inside India, and the Indians feel that somehow it was linked to Pakistan, the doctrine is dangerous in the sense that it conceives of a situation where through quick action, their armored forces, etc. can lob off some territory of Pakistan, and to teach Pakistan, as they say, a lesson. How should, how Pakistan respond to it, if its territory is somehow occupied in this manner?

Zamir Akram: 04:34 Well we have developed, I'm sorry, not deploying but developed, the tactical nuclear weapons systems to deter the use of Cold Start. But I must emphasize that at this time and in the foreseeable future, the idea is that these weapons would deter rather than be actually deployed on the field.

Dave Smith: 05:07 Pakistan believes that India has spent a lot of time and effort in operationalizing this doctrine. From our viewpoint, it is less clear. There are still many problems with India's transportation infrastructure that would probably not allow them to make as robust a Cold Start operation as perhaps they had originally foreseen. We do not see that India has been making the kinds of investments in force structure along the international border that would allow this to be fully operationalized. In fact, what we have seen India doing when it does make investments in additional ground structure is that it is fielding and creating mountain divisions to be more effective along the Chinese border. So Cold Start is one of those issues where it is again looked at in different ways by both sides. The Pakistanis believe it is real and have taken many of the decisions that they have made on investment in tactical nuclear weapons because of it, because they believe that India is intent on being able to fight a limited war underneath Pakistan's perceived nuclear red lines. India, on the other hand, seems to be more worried about the Chinese border than about the international border.

Walter Ladwig: 06:38 In my opinion, it still remains within the realm of an army concept or an army strategy. We have not seen the Indian air force, which would be a key partner in any kind of ground-air battle approach, buy in to the idea of close air support as a core

mission. The types of platforms the Indian air force is trying to acquire are for air-to-air combat, are for deep strike operations. These are the things, and this is the type of war that the air force wants to fight. It doesn't want to follow tanks around on the battlefield destroying enemy ground units. And likewise, we haven't seen any endorsement of Cold Start, a real buy-in into the concept, from India's political leadership. I mean, if anything, quite the opposite. There have been categorical statements from the prior government that they have not embraced it, that they do not endorse it, and no evidence that the current government takes it on board.

Ashley Tellis:

07:28

The question of whether Cold Start is supported by the leadership is difficult to answer because it implicates the question of how India conducts its own military planning. India cannot be expected to give up the options for offensive military operations. No state can. So, the real issue is not whether the India has options for military operations are not. The real issue is, what is it that happens in the Subcontinent that would cause India to implement those offensive military operations? And that comes down to the nature of the provocations and the nature of the grievances. And I think a future Indian-Pakistani dialogue must really focus on addressing those provocations and grievances if the challenges posed by Cold Start, or any other offensive military operations, are to be addressed.

### **3.12: “Tactical Nuclear Weapons (TNWs) in South Asia”**

- Sameer Lalwani: 00:09 What is a tactical nuclear weapon? A tactical nuclear weapon is a low yield nuclear device use for a tactical target on the battlefield, rather than a strategic target. The most common form described is usually a short-range missile, but there are other types of delivery systems including cruise missiles, nuclear artillery, or nuclear mines. Countries tend to develop tactical nuclear weapons in order to deter an adversary that enjoys conventional military advantages. However, they can also pose severe operational and command and control challenges. For instance, tactical nuclear weapons must be integrated into a conventional force, delegated to battlefield commanders, and then they are vulnerable to sabotage or theft once deployed.
- Hasan Askari Rizvi: 01:00 The other doctrine that caused much panic in Pakistan was what was initially described as the “Cold Start,” that there would be a swift operation and occupation of certain parts of Pakistan's smaller chunks of territory, and then bargaining. Now in response to all this, Pakistan went for a miniaturization of nuclear weapons, and saying that if you resort to any of these methods, we have the option of using these theater of war weapons.
- Jaganath Sankaran: 01:37 It's not very clear that how much of those tactical nuclear weapons, or TNWs, Pakistan has in its arsenal. We know they have tested, but we don't know how much they have incorporated that into the army, and that's worth noting. The first part of the question is that, I do think that they have, the Pakistanis have, thought about using TNWs, but, it is my belief that they do not think that would be their first response. I think that use of TNWs will occur only when they believe there is a serious breach that's been done by the Indian army against their forces, and they have no other option but to use TNWs.
- Dave Smith: 02:16 Pakistan has tactical nuclear weapons because it perceives that only such weapons can offset what it considers to be an adverse conventional military imbalance with its primary adversary, India. It sees this conventional military imbalance as growing in the years and decades to come. It sees that a much larger Indian population, economy, and other kinds of resources will be able to lead India to acquire the kinds and numbers of high-technology Western defense systems that Pakistan cannot afford, or can only afford in such small numbers that it will not represent a genuine deterrent against Indian actions that Pakistan would consider adverse to its national interests.

- Christopher Clary: 03:00 India's stated declaratory doctrine is that it will retaliate massively. Tactical nuclear weapons will, in the first use, almost certainly just kill Indian soldiers or perhaps Indian soldiers and Pakistani civilians on Pakistani territory. The escalatory step from killing Indian soldiers and Pakistani civilians on Pakistani territory to India using its nuclear weapons against, say Pakistani cities, is a huge one, and the goal of Pakistani tactical nuclear weapons is to invalidate the credibility of India's stated nuclear use doctrine. What do states want in the international system? They want to survive, but to do so with the autonomy to make choices over major policies. Tactical nuclear weapons are designed to prevent outsiders, especially India, from being able to apply coercive pressure to shape Pakistan's policy choices. They probably go some way toward achieving that end, but in doing so, they do also run an element of risk, and so you have this background risk that tactical nuclear weapons generate, that conceivably endangers their survival of the Pakistani state in order to maximize the autonomy that Pakistan has to make strategic choices.
- Dave Smith: 04:26 The first significant challenge is to develop a usable doctrine for tactical nuclear weapons. This was very difficult for the United States to do during the Cold War, even at a time where we were fielding as many as 7,000 tactical nuclear weapons in Europe. Our historical experience with tactical nuclear weapons is that we found that ultimately, they really played little role in deterring a Soviet adventurism in Europe. What really deterred the Soviet Union was not tactical nuclear weapons, but strategic nuclear weapons, which would represent a threat to the existence of the Soviet Union as a nation-state.
- Siegfried Hecker: 05:11 Tactical nuclear weapons are, just by themselves, more dangerous. And so I'm especially concerned, if those tactical nuclear weapons are introduced, and if occasion comes that one actually tries to put those in position to be used, that that's an extremely dangerous situation from a security standpoint, but then also from a nuclear safety standpoint. And it's particularly difficult to make sure that those tactical nuclear weapons, are what we call "one-point safe," and that is, that if there's an insult somewhere to the weapon, for example, if it's dropped or if it's shot at, that it doesn't essentially result in a mushroom cloud. It took us, in the United States, a lot of years to be able to figure out how you design these weapons to be one-point safe.
- Rasul Baksh Rais: 06:06 It has, in my view, certain ambiguities as well as, there can be some serious implications for strategic stability, particularly at times when relations between India and Pakistan are tense.

- Christopher Clary: 06:21 Tactical nuclear weapons for Pakistan ensure that even a limited conventional conflict will generate the risk of nuclear escalation. These tactical nuclear weapons will be out on the battlefield, and can any Indian leader be confident that his ground forces won't run into these tactical nuclear weapons batteries? Indian military forces, may be going faster than Indian leaders think they will. There is a risk that a Pakistani commander with tactical nuclear weapons will be put in a use or lose situation. And that creates an element of chance that no one can fully control. The risk of tactical nuclear weapons is not just targeted at India. In the event of a crisis where tactical nuclear weapons are moving around, policymakers in Washington will have a conniption, and they'll put tremendous pressure on New Delhi to stop doing whatever they're doing. That is an important byproduct of the nuclear risk that Pakistan is consciously trying to generate here.
- Gurmeet Kanwal: 07:24 I think the term "tactical nuclear warheads" is a misnomer. Any tactical use or battlefield use of nuclear weapons would have strategic repercussions. In fact, it would have geostrategic repercussions. Therefore, the term is a misnomer, TNWs. A better term would be "battlefield use of nuclear weapons," which, again, would lead to escalation very quickly to a strategic level. Therefore, using nuclear weapons on the battlefield is best avoided. In fact, using nuclear weapons at all is best avoided.