PANEL ONE

OVERVIEW: NUCLEAR WEAPONS RISKS, CONSEQUENCES AND RESPONSES

Moderator: Professor Charles J. Moxley, Jr.[+]

Speakers: Professor Osamu Arakaki;[*] *Hans M. Kristensen;*[**] *Professor Scott Sagan*[***]

CHARLES MOXLEY:

For panel one, we have Professor Arakaki, Scott Sagan and Hans M. Kristensen. Ambassador Jenkins will not be joining us today.

Carra, can you show us the first panel? Let me start by introducing Professor Osamu Arakaki. We're very fortunate to have Prof Arakaki joining us. He is Professor of Law at the International Christian University in Japan, sometimes referred to as ICU.

The ICU and the international section of the New York State Bar have worked together on many other programs. The international section of the State Bar is truly international and Ed will tell you more about it as the day goes on.

Ed was part of a program in Japan about a year ago and worked with Professor Arakaki then. Although there are many areas that Professor Arakaki could address, he has agreed to focus on, as an opening, the issue of understanding the risks and consequences of nuclear weapons and the painful subject of Hiroshima and Nagasaki.

An element of the harm caused by these weapons is not just the destruction that took place when they were used, but the fact that it continues in the health and genetic lines of people in Japan. To the present day, there are untold numbers of people still suffering from the effects of those atomic bombings.

+ Professor (Adj.), Fordham Law School; Chair, Moxley ADR LLC

* Professor of Law, International Cristian University, Japan.

** Director, Nuclear Information Project, Federation of American Scientists.

*** Caroline S. G. Munro Professor of Political Science, Stanford University, and Senior Fellow, Freeman Spogli Institute of International Studies.

Professor Arakaki, it's a somber note, but thank you, sir, for being here. We all need to hear what you're going to tell us.

OSAMU ARAKAKI:

Thank you very much for your kind introduction. Good morning, New York. I want to express my gratitude towards the New York State Bar Association, especially Professor Charlie Moxley, who is a moderator of this session and Mr. Edward Lenci, and organizers for giving me an invaluable opportunity to speak at this panel.

Firstly, I will describe some scenes from Hiroshima and Nagasaki when the atomic bombs were dropped. Secondly, I will draw an overview of Japan's attitude towards nuclear weapons. Lastly and briefly, I will touch upon the aspect of international law that is the key concept of this conference.

I'm impressed by this statement released by Joe Biden on the 75th anniversary of the dropping of the atomic bomb on Hiroshima. Biden said, "I will work to bring us closer to a world without nuclear weapons so that the horrors of Hiroshima and Nagasaki are never repeated." Indeed, two bombs over Japan brought horrors. The bomb dropped on the City of Hiroshima on the morning of 6th August 1945, killed presumably 140,000 civilians and nobody knows the accurate number. Another dropped on the City of Nagasaki three days later killed more than 70,000 people.

In Hiroshima, a girl named Mitsuko was 13 years old. Standing 1.3 kilometers from ground zero, she saw a picture of hell. A young woman held a baby in her arms, but the baby looked like charcoal. The woman madly screamed, "What happened to my baby? Wake up, wake up!" Mitsuko still cries when she remembers that she could do nothing for this woman and baby.

Tsukasa was a 15-year-old boy in Nagasaki. He worked in a factory located 1.3 kilometers from the ground zero. Tsukasa remembers the moment of the explosion. He saw flashes of light, silver, orange, blue, and purple across the sky and he felt the air vibrating. Then, the roof and windows were all blown out in one motion. He found a colleague who was seriously injured. His face, his body, had no trace of human form, and he looked like just a monster. Surprisingly, he did not lose consciousness immediately

and said to Tsukasa, "I got a slight injury, didn't I?" Tsukasa was not able to answer honestly.

Even after the rapid reconstruction of these cities, people who survived the immediate explosion kept suffering from serious illness for throughout their lifetime. These illnesses include keloid disease, leukemia, cancer, and so on. These people are known as *hibakusha*.

Despite the tragedy that civilians experienced, Japan has been in a step-by-step approach to nuclear weapons, which seems ambivalent in the eyes of outsiders, and even insiders. The first argument is directly related to security. On one hand, Japan as the only state to have suffered atomic bombing showed the positive attitude to promote the elimination of nuclear weapons. For example, the Japanese government keeps submitting drafts of anti-nuclear resolutions to the United Nations. This has been going on for more than a quarter of a century. On the other hand, it is often explained that Japan has been under the U.S. nuclear umbrella. That is the security assurance. Following the key security provider that is the U.S., which opposed the Treaty on the Prohibition of Nuclear Weapons, TPNW, Japan has not joined it. Japan has considered that the U.S. involvement in the region is significant due to the military growth of China and North Korea.

The second argument is about Japan's policy on nuclear energy. In the 1950s, Japan established the policy to depend on nuclear energy. Japan was keen to secure the energy resources. At the same time, the policy was framed in the context of the U.S. strategy of peaceful uses of nuclear energy that was envisioned by the U.S. President Eisenhower at the United Nations General Assembly in 1953 on Atoms for Peace.

Japanese policy on nuclear energy is inevitably linked to security. The core of the policy includes the "nuclear fuel cycle" that large amounts of plutonium extracted from the fuel of the nuclear power plants is recycled. Plutonium is strictly managed internationally because it can be used to produce nuclear weapons. But Japan has been treated exceptionally, because the motivation derived from the Cold War was based on concerns over the Eastern bloc. As a result, the record of this year shows that Japan's plutonium stockpile is 45.5 tons, which is presumably sufficient to make plutonium-oriented weapons.

This situation has raised international concerns. The U.S. emphasized the risk of nuclear terrorism in the event other states copy Japan's approach in the way and use it as an excuse to process plutonium. Neighboring states like China would be suspicious about Japan when the specific group would like to show off an option that Japan is ready to arm itself with the nuclear weapons anytime if necessary. This group considers that the option would work as a deterrent.

Understanding some such threat, but I believe that any policies of any states including Japan should not be isolated from development in international law.

The ICJ's advisory opinion in 1996 on the legality of the threat or use of nuclear weapons was a breakthrough. TPNW was adopted in 2017, and last month, this treaty witnessed the historical moment when it satisfied the required 50 state parties for its entry into force.

Policymakers in any states should not ignore the development of international law which gradually curtails the scope of legality of nuclear weapons. It is prominent that civil societies play an important role in changing the international law. They have attempted to transform ideas towards nuclear weapons from security to humanitarian principles. Given their impact on and contribution to the change of international norms, in a sense, they are participants partially in the law-making process.

What Joe Biden called "horrors of Hiroshima and Nagasaki" is not simply the past event of 75 years ago. It is also a real chance of fear that the tragedy would be repeated in any parts or even the whole of this globe anytime in the future unless we are determined to move. Everyone knows it is not easy, because we have to deal with many complex political factors in reality. However, in terms of philosophical standpoint, I trust that viewpoint not dividing friends and enemies will be the key to pave the way for our common future. Without it, strategic policy would be defective.

Finally, unless there were such a philosophical viewpoint soon after Hiroshima and Nagasaki, I would not be here today. The establishment of International Christian University, ICU, where I belong, was triggered by the tragedy of Hiroshima and Nagasaki. Soon after the Second World War, John MacLean, a Reverend of a Presbyterian Church in Virginia preached a sermon on word "Love Thy Neighbor," and he expressed repentance for the atomic

bombing and called for the Japanese, "yesterday's enemy," to raise funds to establish a university in Japan. Immediately, the Federal Council of Churches in North America responded to his calling and started fund-raising. ICU was finally established four years after the atomic bombing. And now, this history brings me here.

I believe that this panel and this conference will be a part of the process to seek for our common future.

Thank you very much.

CHARLES MOXLEY:

Thank you very much, Dr. Arakaki. It's very sobering. I think what we're going to hear in this panel is that, while at the time of Hiroshima and Nagasaki, there were just several atomic bombs, we now have nuclear weapons that exist in much greater numbers. Their possession is spread through many more countries.

The risks are even much graver from potential multiple uses of these weapons. We're going to launch into this part of the discussion now.

Let me introduce Hans Kristensen. I can tell you, as somebody who's been writing in this area for a very long time, that, if one wants to know the facts about nuclear weapons and the policies that relate to them, there's no more authoritative source than Hans Kristensen. If you just Google nuclear weapons numbers, you will see what I mean.

As I'm working on the second edition of my book, which as Dean Feerick mentioned, came out initially in 2000, unfortunately I have to keep updating the numbers, just to keep up with Hans, frankly. He makes very frequent updates to the numbers and other information regarding the world's nuclear stockpiles, and nuclear policies.

Hans is director of the Nuclear Information Project, the Federation of American Scientists, and is going to advise us on the actual realities. How many weapons currently exist? What countries have them? What are the policies that appear to affect whether a state will or will not use these weapons in exigent circumstances?

Professor Scott Sagan, who is the Caroline S.G. Munro Professor of Political Science at Stanford University and a Senior Fellow at the Freeman Spogli Institute for International Studies, is

also a towering figure in this area. One need only to Google Professor Scott Sagan and see his extraordinary work.

We've had preparatory discussions and frankly, each of these speakers could speak all day about the subjects they will be talking to us about. I think Professor Sagan is particularly interested today in talking about the risks. We're going to learn about the weapons and the policies from Hans Kristensen. Then, I think Scott is going to tell us more about the questions "how does this play out?" and "what are the risks that have come up?"

I should mention that the risks associated with nuclear weapons are not limited to intentional uses of such weapons, should a country decide to use them. There's also a huge area of risk that arise from unintended uses of nuclear weapons, whether because of human error or equipment failure, or, increasingly, from cyber intrusion, not to mention potential use by terrorists.

There is a robust literature on the topic of risk. I invite the participants in this conference to look not only at the considerable number of interesting reading materials that the State Bar has gathered from the speakers and others and made available to you, but also to explore the literature that can be found online.

Interestingly, there is a lot of information out there about nuclear weapons and nuclear weapons policy, all of which affect the law. But there is much less discussion of what the law is, that affects these weapons. That has not been at the front of the public policy portfolio. Addressing that gap in the discussion is one of the purposes of this conference.

There is a view among many people taking an interest in this area that the risk of unintended nuclear weapons use – resulting from human or equipment failure, or cyber intrusion – may be as great as, or perhaps, greater than the risk of intentional use.

As we'll hear, there are many thousands of these weapons, and security over them isn't always as good as it needs to be. We all know about potential advantages of offensive strikes in overcoming defenses in so many circumstances. Offensive strikes can destroy nuclear weapons like other targets. There are huge risks of volatility and escalation.

I'm going to stop here and turn it over to you, Hans, and ask you, if you would please brief us, in the way you've done for so many years, on the facts and policies we need to know to get oriented as to nuclear weapons risks?

HANS KRISTENSEN:

Thanks very much for that introduction and for the invitation and opportunity to speak here. Like you said, I've been working on this for a long time and that's obviously the sad part of the story that it's still necessary to spend all this time on these issues, but here we are.

I'm going to share my screen ….

What I intend to do here is to give you a brief overview of the status of nuclear forces, the history. I'm not going to obviously dwell too much on it, but there's some important lessons learned looking at how far we've come.

I'm going to talk about national arsenals and the modernization programs that are underway. I do not have nearly enough time to dive into each nuclear weapon state. What I've done here is produced a lot of slides with all the details. Not that I'm going to use them all, but so that the conference can use it as a reference material after the fact.

Then, I'll of course share these slides. I'll skip through several of the slides and you'll have to bear with me on that to get to some of the major issues. I'll talk about the doctrines and strategies because they're in significant development right now. I'll touch on issues regarding the yields of weapons and how it relates to collateral damage, and perceptions of use and usability.

Then of course, I'll give you some snapshots of how the nuclear arm states are operating the nuclear forces under what's been termed a great power competition, which is significantly shaping not just the modernization programs, but also the way that the nuclear forces are operated in these years, and end on some conclusions, obviously.

As you can see from these graphs, we've made enormous progress compared to the Cold War in terms of reducing numbers of weapons. Total inventories peaked around 70,000 at some point in the mid late '80s. The way the countries modernized and built their forces varied significantly, depending on strategies, tradition, leadership, what have you.

Today, we estimate that there is an order of 13,000 plus nuclear weapons on the planet of which about 9,300 or so are in what you can call the military stockpiles. Those are inventories

that the militaries have possession of that are intended to arm actually deployed warheads or launchers.

You also see from the graph to the right that countries go about nuclear deterrence and nuclear requirements in very different ways. The United States and Russia stand out as particular cases. There's no other country on the planet that thinks they need more than a few hundred nuclear weapons for deterrence, but because of histories, tradition, certainly the way that the Cold War shaped arsenals and strategies, the United States and Russia still have enormously larger nuclear weapons inventories than any other countries in the world. If you look at the trend, yes, we've made a lot of progress, but the pace of reductions has slowed. Everyone is modernizing.

This is not just a question of making the weapons last longer. They're also introducing new types and increasing the role and the rhetoric, and the reaffirmation about the importance of nuclear weapons. These modernization programs all have one thing in common, which is for these countries to be able to retain nuclear weapons indefinitely.

The trend is that the countries that until recently have been decreasing their inventories include the United States, Britain, and Russia. But they're now rumors or claims that Russia is growing its arsenal again. (Britain has recently announced its intention to increase again.) Countries we've known for a long time of doing so (increasing) is China, Pakistan, India, and of course, North Korea. Then you have countries that are somewhat steady like France and Israel.

There is a tendency to compare it with the Cold War, but that is a flawed comparison. In my view, there's no comparison between the arsenals of the 1950s and what we have today. Just a few details, in those days in the 1950s, there were overwhelmingly tactical nuclear weapons.

Today, they are overwhelmingly strategic. The arsenals in the '50s were inaccurate and generally had large yields. Today, you still have large yields around, but they're less so, and the weapons are much more accurate, and you have more emphasis on lower yield weapons operation and increasingly so in this new phase we're in now.

And of course, there were no arms treaties in those days. We had to go through all this crazy build up before that triggered an

interest in arms control or a necessity for arms control treaties. And at the lower end, you can see the last remaining nuclear limitation treaty. The New START is effectively curbing the strategic arsenals of the United States and Russia. And of course we are hoping that it'll be extended for five years, once Trump is out of the way.

So I think people should stop comparing it with the Cold War. And government officials when they say, "Oh, we've made a lot of progress because look, we have much less than we had during the Cold War." That's not the interesting part anymore. The interesting part is what is the role of nuclear weapons today? How do they plan for these force structures to evolve over the next 20, 30 years? That is the issue people should be comparing with, if you will.

I'll just briefly mention some U.S. and Russian, a little China headlines here, but otherwise move on to strategies and other issues. Basically the U.S. is down to about 3,800. An enormous drop from the Cold War. But the force structures are still structured in the traditional way, by a triad backed up by tactical fighter wings.

But it's also interesting that less than half of the stockpile is actually deployed; most weapons are in storage. But of the weapons that are out there, somewhere in the order of 900 or so are on alert. And that means the ICBMs are ready to fire on short notice. And about five of the ballistic missile submarines that are in sort of hard alert postures in deployment areas. But of course, submarines can be very quickly brought to alert status, the rest of the submarines. So this posture assumes a significant upload of nuclear weapons in a crisis. Most immediately on bombers, but of course, later on in submarines and eventually also on ICBMs.

Now we have a trend here with new low yield warheads that are in development. Sort of a rebirth to some extent of the idea of tactical nuclear weapons. Much less emphasis than during the Cold War and there are significant differences. But it's a significant departure from just a few years ago. And we also see a significant development in the operational plans. And you can see a snapshot of the modernization program. It is comprehensive. It is everything, including infrastructure. And we're talking about trillions of dollars over the next, the estimates vary, over the next three decades.

So the United States continues to reduce its arsenal, but it's increasing the types and capabilities of the weapons that are in the

arsenal. Russia has a larger arsenal, and it's also structured differently. Of course, strategic forces are very much structured like the United States, but it has a much larger inventory of nonstrategic nuclear weapons. That is not because of a new idea that Russia has, that these are suddenly important. It has had many more tactical nuclear weapons than the United States for the past 30 years. The U.S. military has been aware of that. That hasn't raised concern or particular concern. About a thousand of the Russian warheads are on alert mainly on ICBMs, but of course also subs.

Russia has less upload capacity (than the United States). It tends to load its deployed forces with more warheads under normal circumstances than does the United States. But it's changing and it's building more capacity. And the U.S. intelligence community projects that this stock-pile is going to increase significantly, as they say, over the next decade, mainly because of the way they count tactical nuclear weapons. We can get back to that in the discussion. And as you can see here, a significant modernization program as well. And of course, the most interesting part is probably the lower part of the tactical nuclear weapons; a significant modernization program across the board.

China, of course, is in the middle of a significant modernization, both in terms of launchers, but also in terms of the increase that is expected of the weapons they have in their stockpile. The U.S. intelligence community has predicted many increases of Chinese arsenal over the years that did not come true. So we'll see how it goes with this one. But it's pretty significant and also broadening now to a formal role of bombers in a nuclear strike mission.

And here you can see some projections from the past about U.S. intelligence. This is the DIA, a defense intelligence agency that has made protections over the years about Chinese nuclear arsenal developments. And they've all proven to be wrong, at least these in the public domain. But now we're getting a new one. The last one you can see, and that would imply some kind of 400 to 500, even 600 depending on who you believe. Our estimate of China's nuclear stockpile is higher than that of the Department of Defense because as far as we can tell the Department of Defense only counted operational weapons. So we can get to back to that in discussion if we need to.

Let me skip over all these other countries, there's just not enough time to do it, but you can see these overviews in the slides later if you want to. I'll move on to doctrines and strategies and how much is needed and how. And of course here, I just want to start by saying there's a significant difference in how the public talks about nuclear needs and requirements and how the military planners talk about it.

Generally speaking in the public, we say, "How much do you need to scare an adversary? How much do you need to deter from initiating nuclear use?" Of course, that's also the starting point for military planners, but the vast majority of the requirement for military planner comes from what happens when deterrence fails, in that phase after. That is where the war plans kick in. That is when you need to be able to hold at risk and take out different weapons categories and what have you. That leads to very different assessments about how much you need and for what purpose. For the United States, of course, it has issued declaratory policies of what its nuclear policy is and how it would respond. General terms, of course, what it would do and wouldn't do, over the years. And so that's a big help in trying to discuss and understand what it's up to and what would happen.

But of course, in terms of this particular briefing, for this particular meeting, it's also interesting that the United States has very strong legal requirements; the nuclear strike plans have to abide by international law. You can debate from now until whenever, whether that is possible or to what extent it's possible. But it's very clear that this is a requirement in the planning. And we can get back to the details of this and what it means, of course, but it's explicitly stated. It has explicitly stated that it does not target civilian populations or civilian objects. But as we all know, many civilians live around or nearby, targets that would potentially be targeted.

So this page of information overkill is to give you a snapshot of how U.S. strategic nuclear war planning evolves. What are the elements of it, how it has evolved. So you can see to the left you have White House guidance, you have OSD guidance, and you have Joint Chiefs of Staff guidance. You have the STRATCOM planning. You have the different plans, what they're called, you have features of the plans. And on the top bar, you can see the different versions of these plans that have been introduced over the years. We are

now in the last plan there to the right. That's called operations plan 8010-12.

Originally it was put into effect in 2012, and it's been updated several times since then. I'll get back to what that is. But down below, you can see how the objective of the plan has changed over the years. In the Cold War, it used to be almost entirely focused on deterring the Soviet Union and winning World War III. With the end of the Cold War, they made it more flexible, broadened it to other categories, even other categories of threats and made it more flexible. And so, this is a never-ending evolution, but it's important to understand that this is not the Cold War strategic war plan. It is a much more flexible and broader plan that incorporates all elements of national power.

One of the important development or changes that happened was this broadening after the end of the Cold War of strategic planning to regional adversaries. That's not to say we haven't planned nuclear attacks against regional adversaries before, but STRATCOM adopted this and brought it in, in a different way. This is from a briefing slide from when they were beginning to build the type of plan we have today. This was an earlier version of it that was called OPLAN 8044. And of course, you can see all the names of the countries are deleted and the details, but the pictures were left in the slide and you can then identify the different countries from that. But that's to say that the plan has evolved into a much more dynamic and complex plan to take on a broader range of scenarios and adversaries.

Who are those adversaries? Well, Russia is still in there. And so is China. We also estimate that, of course, Iran is in there. And of course, North Korea. Syria used to be in there. It's a little unclear, it probably dropped off the list after what's happened in Syria, I would expect. And then there's some kind of a 9/11 type scenario. Not that they would nuke terrorists or anything like that, but this relates to the policy of holding those that supply weapons of mass destruction to terrorist organizations. Hold them accountable.

It's not just nuclear. It also includes conventional. You can see at the top nuclear force employment plans and then something else that they don't want to talk about, or at least didn't want at that time.

The objective of course is to deter, like I mentioned earlier on, deter so that nuclear weapons and WMD are not used. But once

that fails, if that fails, you have to kick in with this variety of strike plans to hold categories of targets at risk. Take them out in certain ways or influence the perception of the adversary leadership, how they're being threatened and what would happen next, et cetera, et cetera. So this OPLAN 8010-12 has really evolved into sort of a very broad effort to try to influence. And it includes not only nuclear, but also conventional. And we see that exercised again and again. And the guidance is what the military translates into Xs on the map: the cross hairs. Where they're going to apply nuclear effects.

You have heard a lot about complaints about Russia's "escalate to deescalate" strategy from U.S. officials. But of course, the U.S. also has an escalate to deescalate strategy. It may not look exactly the same, but it's very much built on the same principle that you turn up the heat in response to something. And then you compel the adversary to back down. And you deescalate the scenario and you restore deterrence, so to speak, on conditions that are favorable to the United States and its allies. And you can go into Russian doctrine and you can see pretty much the same kind of descriptions.

Now, like I said, Russia has been criticized heavily for having an "escalate to deescalate" strategy. The assumption is that they're more willing to use nuclear weapons today than they were, say, 10 years ago. This is being disputed by independent analysts. But we can get back to that. Here are just the main components of Russia's nuclear use strategy.

To the left is what it says in the military doctrine. Two scenarios. One, if Russia is attacked by weapons of mass destruction or that its allies are. And the other is in response to aggression against the Russian Federation with conventional weapons that is so successful that it threatens the existence of the state. Then they resort to nuclear weapons. That's not very different from what our nuclear strategy issue says.

To the right you see a couple of extra points that were raised by the last decree issued by Putin here in 2020. Which also relates to the possible use of nuclear weapons if there's detection of a launch of a ballistic missile attack against Russia or its allies. Detection of a launch. It's probably not something that changes very much in the Russian plans, but it's an explicit one they offered now. And then of course there's enemy influence of the critical infrastructures that would be needed for Russia to retaliate.

So that's like undermining facilities through, for example, cyber-attacks against command-and-control facilities so they would not be able to respond. Or space assets, warning satellites, and communication satellites. So those are sort of new details about it, but probably not something that changes the actual objectives and the way things would happen.

And here we can see what the United States has said about the Russians and their strategy. Very focused in the nuclear posture review about this "escalate to deescalate" strategy. And the notion here is that Russia would somehow not be deterred from using nuclear weapons. When they look at the U.S. arsenal, they would say, "Aha, the Americans don't have very many low yield weapons or of certain types, and therefore we can get away with using nuclear weapons first, early on, so that the United States and NATO would not even bother getting into the fight or increasing the fight."

And you can see John Hyten, former STRATCOM commander to the top saying, "I've looked at it; it's actually not escalate to deescalate." He said, "It's escalate to win." God forbid. We also have escalate to win. All countries that have nuclear weapons don't want to lose. But they make a lot of fuss about this. And you saw Paul Selva, Vice Chairman of Joint Chiefs of Staff even said, "They believe they can get away with striking us with a low yield weapon." There's no evidence, of course, of that in the public domain, nor is there any evidence in the public domain that Russians' respond strategy or decision strategy has anything to do with what yield a U.S. nuclear weapon has. They see nuclear weapons as nuclear weapons, and it's about the size and where the attack is coming, et cetera, et cetera.

Yields are very important on the list because they relate to collateral damage and the perception of damage and the seriousness of the attack. Of course, a single nuclear weapon can destroy a city. A very limited attack could make large areas uninhabitable.

To the right top, you can see a simulation of the radioactive fallout from a nuclear weapons attack against ground burst attacks. And we're talking about a couple hundred kilotons against all the nuclear bases that have nuclear weapons or nuclear weapons facilities in the west, in Western Europe. And then a number of storage facilities in Russia. So you can get an impression of the spread of radioactive fallout, even from a very limited attack.

Down to the right you have a simulation of the fallout from a Russian attack on all U.S. ICBMs in those three missile areas. Large parts of the Midwest would be uninhabitable.

Down to the left you have a scenario simulating a nuclear attack against the Russian missile defense system around Moscow, based on what the plan was in the late-1990s. And of course, this is not a target on Moscow. This is not an attack on Moscow. This is an attack on military facilities in and around Moscow. So this is not an attack against civilians, but as you can see, the civilians are right in there. So this is an example of how it's sort of an illusion to talk about that if you don't have counterforce strategy, then you necessarily have city busting, and the other way around. So of course, once you turn up the heat in a crisis, you can have significant climatic effects regionally and in a larger scenario, globally, that could lead also to nuclear winter scenarios.

Even in small scenarios here, you have an estimate of what the casualties would be if just Indian and Pakistan unleash their arsenals against each other. Again, depending on the number of targets, you can see the reason they're very different is because the Indian cities are bigger, and they tend to be in areas where there is more material that can burn and there's greater density. On the right, you have Pakistani casualties, but we're talking about tens of millions here just for these relatively small arsenals.

Here's the scenario, this is from a study a few years ago, this is the effect of a single U.S. ballistic missile submarine attack loaded to the maximum with high yield W88 warheads. That's not how they actually load them, but it illustrates the enormous capability of just a single nuclear weapons platform. We have 14 of these guys and every time a U.S. ballistic missile submarine deploys at sea, it is the world's sixth largest nuclear power. It carries more explosive power than all the weapons that were dropped during World War II, including the nuclear bombs. These are fast capabilities. Significant military overkill. But these are being justified today. There is an upswing in the justification for modernizing and retaining significant arsenals of nuclear weapons.

This also relates to tactical. Yield, of course, is very important. I just want to warn here that low yield doesn't necessarily mean tactical. Just like high yield doesn't necessarily mean strategic. There's a great overlap between the two. But military planners these days are very interested in accuracy and lower yield. And the

reason of course is that it reduces collateral damage. It makes it less damaging for troops that might have to operate in an area or allied countries. But this is a particular strategy to try to make weapons more usable: reduce the collateral damage of it. But as you can see here, there's a lot of overlap between the two. Many tactical bombs also have high yield. Many strategic bombs have low yield. So it's not one or the other and there is a tendency to sort of say, "Oh, something is tactical, therefore it has to be low yield," et cetera.

The United States right now is emphasizing, we're reemphasizing, the importance of new tactical nuclear weapons or tactical-like nuclear weapons with low yield warheads. And the first to be deployed is this W76-2 low yield Trident warhead. It is on a strategic platform, on a strategic missile, but it's being sold as a tactical weapon in response to an early and limited Russian use of tactical nuclear weapons. So this is an interesting new development to follow. How to use and what are the implications of using, fast, prompt, strategic nuclear weapons in an early phase sort of tactical nuclear attack scenario. Now, this doesn't mean that the United States doesn't have other low yield nuclear weapons. It has about a thousand other forms of weapons, cruise missiles and gravity bombs that have low yield options like we touched upon before.

Oh, and by the way, this weapon has just been deployed here in the late 2019. And, now, this new emphasis with this W76-2, the need for a low yield strategic war is kind of silly, because like I mentioned, we have lots of nuclear weapons with low yield and we've had them for decades. And so on the right, you can see sort of an attempt to show the entire stockpile, what portion of weapons with low yield make up that stockpile and what that tiny portion of the W76-2 makes up that inventory. So the total arsenal, nah, Russia wouldn't be deterred by that. The inventory of low yield nuclear weapons, nah, Russia wouldn't be deterred by that. But this little weapon over here on that right side, that makes the difference. It's really a very ridiculous and silly form of argument, but it's living well right now under these circumstances.

Of course, for the war fighter, it's real. Lower yield means less radioactive fallout. Here, you can see some simulations of fallout from a ground burst attack on a Russian nuclear weapon storage site in the Kaliningrad region. It's a significant difference. In the top

one with the normal size W76 radioactive fallout would reach Kaliningrad, the city of Kaliningrad. With the little one, it wouldn't. There would still be significant local damage, et cetera, but the casualties are very different.

This makes it attractive as a new nuclear weapon. And this is not an accident. Military officials have spoken clearly that there's an emphasis on trying to introduce accuracy and low yield in the stockpile to make more usable options available to the President. Military officials have talked about this on the right: how that changes the perception of what a military advisor would advise to the President in a crisis. It's not inconceivable that this has an effect on how early you could hear a recommendation to cross the threshold.

I will end on some examples from great power competition effects. We're seeing some really dramatic developments these years, most obviously captured by this notion here that the Cold War thaw is over and that the United States and Russia and China now have what's been coined "Great Power Competition." The way the institutions and the military interpret that language is that we are now back to the real business. Everybody is translating this into action, whether it's in doctrine, programs, weapons systems, operations. This is a very dynamic development that is in full flux right now.

We have also seen how rhetoric about nuclear weapons is increasing. The salience of nuclear weapons, the importance they serve, et cetera. So here's some examples of how operations are changing. Bomber operations are very visible, and they have changed significantly over the last five years. We now see strategic bomber operations being integrated in the nuclear mission more directly in support of regional commands.

So for example, there's an entire new war plan, new strategic plan for Europe, not just nuclear, but conventional. But the strategic nuclear bomber mission is being incorporated more directly and with greater emphasis in support of that plan. So we are now seeing these bombers going, not just to Europe to show the flag once in a while, but in increasingly offensive forward operations. Two areas where we just didn't operate nuclear bombers just a few years ago. They go right up across the Northern Norwegian coast, deep into the Barents Sea, further into the waters north of Russia, to trigger Russian air defense systems and see how

they respond, et cetera. We see it in the Pacific where they're now beginning to operate all the way into the Sea of Okhotsk, where they haven't gone for a long time. We see it with ballistic missile submarine visits to bases, whether they be in the Pacific or in the Atlantic to show the flag of the strategic submarine force.

Russia, of course, is doing its part of it. It has nuclear strike bomb operations that fly into the North Sea and the North Atlantic. We see the same kind of operations in the Pacific. Very aggressive operations with dual-capable fighter aircraft. For example, here's a picture of a couple years ago, a super low-level over-flight over a U.S. destroyer in the Baltic. A reckless operation, basically, but it's part of the language that's now being used. A couple of Backfires that conducted a simulated nuclear strike on Stockholm a few years ago. So this is happening all over the place. And I haven't even talked about ground-based operations and exercises these days.

We're also seeing changes in China. How they've started to operate their forces further away from China, closer to and around Japan, even out toward Guam. Clear messaging here. And of course we see a land grab or a sea grab in the South China Sea with illegal construction of islands in international waters. And they're of course building a force that is much more capable than they had two decades ago.

So in sum and conclusions, enormous reductions from the Cold War. That's the good news. But the reductions have slowed and we're now seeing an uptick in some places. We also see increasing nuclear weapons in some countries, like I mentioned, possibly Russia, but certainly China, India, Pakistan, North Korea. We are seeing a very broad and universal modernization of the arsenals with the intention to keep significant nuclear forces for the indefinite future.

So the sort of NPT Article VI notion here that things are moving toward deep cuts and eventual elimination. It's not happening. Not right now. And then of course, we had the revival of the strategic competition with all that means for rhetoric, policies, exercises, weapon systems, et cetera, et cetera. So it's really a return not to the Cold War, which was a different beast. It is a return to a new form of strategic rivalry that looks different, but it has some of the same components. We are luckily not yet in a nuclear arms race in terms of numbers. That's not what's going

on. It's more of a technological arms race or competition between these countries.

And then we see, which worries me, an increased focus on non-strategic nuclear weapons. Both in terms of the numbers and types you have, how they work, what the role of nonstrategic is in military strategy, and the emphasis of rhetoric about scenarios that involve early use of nuclear weapons. So with this, I'll just complete and pass it on to Scott. Thank you.

CHARLES MOXLEY:

Thank you very much, Hans. This is certainly an alarming presentation. If you could please take another few minutes, before we move on and talk with Scott, I would like ask a few broad questions. Hans, part of my job here is to develop a foundation for the later panels that will focus on the law relevant to nuclear weapons. And the law turns largely on the consequences of the weapons used. To that end, let me just ask you several broad questions, and ask if you would take a quick stab at them, though I know they need much more time to be covered fully.

One is the issue of the effects of nuclear weapons. We all know, and you alluded to a number of these in your presentation, that the immediate effects of nuclear weapons are the direct explosion and the heat. There are these immediate effects, as well as "immediate" or "prompt" radiation, which occurs at the time of the explosion, but largely dissipates along with the explosion, as I understand it.

But there are a number of other effects that continue beyond the actual event of the explosion. There is, as you explained, the radioactive fallout effects, and the electromagnetic pulse effects in the case of a high-altitude explosions, which can affect electronic equipment across broad areas of the world. There is also the possibility of nuclear winter. Then, you have the potential for a nuclear response from the target of the initial attack and of resulting nuclear escalation. There are different policies also affecting any of these scenarios.

Just broadly, from your perspective as to all of this, to what extent, if at all, are these other effects – such as the radioactive fallout, the electromagnetic pulses, the potential for nuclear winter, nuclear retaliation, and escalation – controllable by a state using nuclear weapons?

HANS KRISTENSEN:

Well, so at the operational level, they're controllable from the user's perspective. The point is you can set your height of burst differently so that you reduce very significantly the amount of radioactive fallout from an attack. That's a means of doing that. You can do that. You can also develop your weapon so that they have lower yields. Some of that we see these days with a deliberate attempt to try to reduce the radioactive fallout. You can do that as a war fighter. The question is whether that matters once the show gets going - whether countries would constrain themself in any meaningful way that would have an impact.

As I mentioned in my slides, there is a legal requirement for those, at least in the United States, planning the nuclear strike plans that they cannot target civilians explicitly or civilian facilities explicitly. That's an intent to, I presume, limit those effects. It's a complete illusion to imagine that once a broader nuclear scenario unfolds, that you can control these things at all.

I haven't heard people make an interesting argument about that, but it is something that, at least in the planning outset in the United States, at least they're trying to do. We don't know anything about, or very little about, what they're doing in other countries; how does that affect their planning, if at all?

This is very much one of those, "We have some information. We can speculate about it." Really, I wouldn't put my trust in any redeeming circumstances if this were about to happen.

CHARLES MOXLEY:

One other big question that comes in this context is the respective role of conventional weapons. We hear a lot about the exponential revolution in conventional weapons. There's prompt strike, there's the very high yield conventional weapons, with yields of 30,000 tons or something in that range? They've been called "the mother of all bombs" and "the father of all bombs."

To what extent, if you can estimate, is it likely the U.S. could address potential objectives with conventional weapons? That is, goals other than trying to scare people as a deterrence strategy; goals like destroying military targets or targets that it would face in the unfortunate event of a war?

To what extent can we the U.S. do that? I realize the answer may be different for other countries without our conventional weapons capabilities?

HANS KRISTENSEN:

Significantly so, and we are doing it and have been doing it for a long time. For example, the Navy started phasing out several categories of nonstrategic nuclear weapons all the way back in the '80s and replace them with conventional. Nuclear was no longer needed for the mission. You could do it with conventional.

Later on, the Army has been completely denuclearized. There are lots of missions where nuclear has just fallen away. I have heard a former U.S. STRATCOM commander suggest that perhaps 30% of the targets or aim points in the strategic war plan could be, if not necessarily taken care of, certainly held at risk with conventional.

I would also just mention that, I think it was 2012 and it has been repeated since, the Joint Chiefs of Staff concluded that the United States could actually do with up to one third less deployed nuclear weapons than it has under the New START Treaty and still meet its military objectives.

What we're seeing now, for example, is the Bomber Force is being equipped with a conventional long-range strike capability that is beyond anything we've had before. Yes, we've had some conventional long-range cruise missile that we called CALCM. They've been phased out.

It's now being replaced with the JASSM, a very advanced long-range system, very accurate, very efficient, going on all the bombers, going on a broad range of tactical fighters as well as being deployed on, introduced into the Navy as an anti-ship missile as well. Those missiles are now a standard part of STRATCOM strategic nuclear exercises.

We've just had a Global Thunder exercise last month. They released photos of those missiles being loaded into the bombers during that exercise. This is real. This is happening.

CHARLES MOXLEY:

Thank you, Hans. Professor Sagan?

SCOTT SAGAN:

It's appropriate that I'm following on Dr. Kristensen and Professor Arakaki because I'm going to try to touch on a number of themes that I hope will come up throughout the sessions today.

The lawyers and political scientists who write on these subjects and think about these subjects really have to take into account three revolutionary differences between the way we thought about this problem during the Cold War and the way we need to think about it today. I will be summarizing my article, co-authored with Allen Weiner from the Stanford Law School, which was published in the Spring 2021 issue of *International Security*.[1]

The first has been alluded to already, which is that the threats the United States faces are quite different. We used to worry about whether we can have a no-first-use policy because the Soviet Union claimed it did. We were worried about our policy of using nuclear weapons first to potentially deter or to respond to a large scale Warsaw Pact invasion.

Today, we face adversaries who are worried about our conventional capabilities and have a first-use policy, escalate to deescalate, as Dr. Kristensen suggested. That means we have to think about how we respond to limited uses. Moreover, we face both an adversary that has an enormously large arsenal, Russia, and one that has a very small arsenal, North Korea. Our planning has to be different and our thinking about this has to be very different because we have different kinds of scenarios.

Second, there has been an accuracy revolution and a low-yield revolution. During the height of the Cold War in 1960, we deployed our first A1 summary launch ballistic missile. It had a circle error probable of 5,900 feet. It carried a 600-kiloton nuclear warhead. What that means is that half the time that massive thermonuclear weapon would've detonated over one point miles away from the intended target. Back then, American nuclear weapons were indiscriminate.

That didn't bother the U.S. because Admiral Arleigh Burke, for example, said the ability to destroy major cities was what we wanted to have. Contrast that to some of the low-yield weapons that Dr. Kristensen has talked about. The B61 Mod 12 reportedly

1. Scott D. Sagan & Allen S. Weiner, *The Rule of Law and the Role of Strategy in U.S. Nuclear Doctrine*, 45 INT'L SEC. 126 (2021).

has reduced yield to 2% of the atomic bomb that destroyed Hiroshima.

It would generate far less radioactive fallout depending on how it's used and could fall with an estimated 30 meters of the intended target. What that means is that even though there's a debate about whether this is a good thing or a bad thing, whether this will lower the threshold or make deterrence more robust because it would enable us to respond with a more legal response, we have to take that those basic facts aren't in dispute.

Lastly, and I think this is so important for the lawyers to understand here, is that, as has been mentioned, the Laws of Armed Conflict now are robustly discussed in all war planning in the United States.

The JAG Corps, which had, I think 20 individuals in it at the end of the Civil War, is today the largest law firm in the country. It is very surprising, I must say, that you're having this meeting without a single JAG, as far as I can tell, explaining how they go about thinking about this. The plans that Dr. Kristensen has outlined have been vetted through a legal process.

I happen to think that part of that legal process is not very well done, but part of it I think is, and it behooves us as people on the outside to interact to the degree possible with people on the inside, including the lawyers, not just the STRATCOM commanders, but including the lawyers.

General Robert Kehler, the former commander of STRATCOM, has said that the guidance that was mentioned earlier led the command to develop nuclear, I'm quoting here, "Tactics and techniques to minimize collateral effects and to expand non-nuclear strike alternatives." What are those?

One thing that I've put on onto the syllabi, and I encourage people to take a look at it if you can, is an effort to try to think about what this would mean about a scenario that we know a lot about, which is the bombing of Hiroshima and Nagasaki. Would the Laws of Armed Conflict as properly understood make what we did in 1945 illegal today?

Allen Weiner and I have the lead article on the 75th Anniversary of the *Bulletin of the Atomic Scientists*[2] that argues that

2. Katherine E. McKinney, Scott D. Sagan, & Allen S. Weiner, *Why the Atomic Bombing of Hiroshima Would Be Illegal Today*, 76 BULL. ATOMIC SCIENTISTS 157 (2020).

yes, it would be illegal today. This gets back to Professor Arakaki's talk. In 1945, we had two committees that looked at what to do about the bomb.

The targeting committee, mostly people from Los Alamos, and they said we should drop the bomb on Kyoto first and second in the center of Hiroshima. Third, we're going to drop the third one, which was going to be ready in mid-August, on the next city down. What the next higher level committee, the interim committee was headed by Secretary of War, Henry Stimson, who had been appalled by the incendiary bombing.

He had not been able to stop it but was a person who really believed in what today we would call the Laws of Armed Conflict. He thought that this was tragic what we were doing. Therefore, he brought together an interim committee to say, "Let's not drop the bomb on Kyoto." He asked President Truman not to do that and instead drop the bomb on military industrial targets in Hiroshima, and the surrounding workers' homes, instead. Truman agreed he wouldn't drop it on Kyoto.

I think even the interim committee, nevertheless, wanted to kill lots and lots of Japanese civilians. If you look at the principle of distinction, if you tried to think about that today, even in that kind of scenario, I believe a good JAG lawyer would say, "Sir, this is illegal. One, you may say you're trying to destroy just a military industrial target, but if you're actually going after the workers' homes and the workers nearby, that's a violation of the principle of distinction."

"Second, even though the military target, a factory might be a legitimate target today, in terms of the principle of proportionality, it was such a low importance target that killing lots of innocent people in order to destroy that target would be considered disproportionate today."

"Lastly, under this principle of precaution, the additional protocols, additional aspect of this, you must use the lowest yield weapon to destroy a target, to try to have all feasible precautions to protect civilians." Even if it's a legitimate target, even if it could justify under proportionality, which I don't think would be the case in that scenario.

Even if it could, you still have to take extra precautions, which means using a lower yield weapon or a conventional weapon, if it can't be done. I would think under the 1945 scenario, if this was

the case, that a senior commander or a JAG lawyer would have to say, "Sir, this proposed attack is illegal."

I just wanted to conclude, since you mentioned the risk of accidents, by giving the audience a sense of what could go wrong here. Even if you had legal plans, I asked you to go back to the summer of 2017, and then the early winter of 2018, when we were threatening back and forth between the United States and North Korea.

We had this incident in early 2018 in Hawaii, where an operator called out that there was a warning, that there was an incoming missile coming into Hawaii, trying to hit Pearl Harbor. Many people panicked. Some people did the right thing, which is stay home, get into the basement if you have one.

Others went outside to see what was going on and were deeply worried. It turns out it was a false warning. We didn't panic in Omaha or at NORAD headquarters, or in the Pentagon for three reasons. One, we have redundant sensors that all said that, "No, there's no attack coming." Two, we had professional personnel who said, "We need to admit that we made a mistake."

They did quite very early on. Third, we really didn't think that North Korea was about to attack Hawaii in a first strike.

Imagine that incident occurring in North Korea instead of in the United States. First, they don't have redundant sensors and if one of their primitive radars reported that the United States attack was starting, they would have an incentive to try to preempt everything else, to try to launch as much as they could.

Second, they don't have professional military people often because you don't get fired or demoted if you make a mistake in North Korea; you can get killed. They have yes men and the people who would deny that they made a mistake. Third, Kim Jong-un did think the United States was about to attack North Korea. Why? Because President Trump kept threatening to attack North Korea.

That was part of our policy. I think that the nuclear weapons that we have built create an inherent danger and that the laws have both put extra constraints on but they've also encouraged the U.S. Military to build lower yield weapons, which are more lawful, but also create other kinds of risks. I think we're in a new era of thinking about this.

I strongly support the effort that you are making to bring law and political science and scientists and engineers together to think

through the implications of a world that we're walking into that is very dangerous. Not just despite some of the questions of the law, but also because the law has encouraged some of these activities that may have counterproductive effects.

CHARLES MOXLEY:

Scott, could I ask you a question about the nuclear strategies such as deterrence, which you and Hans Kristensen both talked about? I think Hans said 900 of the U.S. missiles are on high alert and some thousand of the Russian missiles are on high alert. Talking about risk, do you have a sense as to the likelihood of escalation in the event of a nuclear strike? Let's put aside the question of what happens when an event looks like an incoming strike that isn't one. If, God forbid we were to get in into an actual nuclear strike by either the U.S. or Russia against the other, how likely do you think it is that things will spiral further?

What do you think is the likelihood that there'll be a response of a nuclear nature and an escalation, just based on the reality of this world as you see it?

SCOTT SAGAN:

Anyone who tells you that they can put a percentage estimate on the likelihood I think is making things up. We don't know. It's a world that we've never entered. What we do know is that we occasionally in the United States Government have exercises and play war games to try to figure out how would humans react in these kinds of situations.

In Fred Kaplan's superb book, *The Bomb*, he reports on a series of war games done inside the Obama administration in 2016, the last year of the second term. The principles and the deputies both met and discussed the following scenario in a war game. What if there's a conventional conflict between Russian forces going into the Baltics and NATO forces?

The Russians, following this principle of escalate to deescalate, try to stop the war by having one nuclear weapon go off and launching it against a NATO base. According to Kaplan, when the deputies met, they actually said, "Let's not respond with a nuclear weapon. Let's respond conventionally, attacking the base from which the Russian nuclear strike had originated, and take the

high road, and tell the Russians we can fight this conventionally and not escalate with nuclear weapons."

When the principals met, however, they took a different position. They wanted to respond under the colloquial use of the term proportionality, not the legal sense of the term proportionality. They wanted to respond with nuclear weapons to remind the Russians that escalation will be met with a similar kind of weapon.

Yet it was pointed out to them that if you do that against a Russian military base, still following the Laws of Armed Conflict, the Russians would view that as an attack by the United States on Russia and their doctrine would require them to respond against the United States, not just against the NATO base.

Therefore, according to Kaplan, the principals decided to use three nuclear weapons on military targets inside Belarus, even though Belarus had not been involved in the initial attack. Now, that shows to me two things. One, it shows to me that you should have JAG lawyers in the room all the time to remind people about the Laws of Armed Conflict, even when high level people who are not trained in these issues discuss it.

They think in different ways than I believe they should have in that case. Second, this event suggests to me that, because of our conventional capabilities, we should follow the principles of precaution for legal reasons, but also for strategic, common sense reasons, emphasize conventional responses, even in retaliation to a nuclear use. That's a controversial position, but I think it's the right one.

CHARLES MOXLEY:

Let me ask you, Scott, and again, I ask this in order to get the information for the law panel later in the program, when we look at the landscape of facts and policies to which the law would apply. You are the experts on the facts and the policies whom we look to for this information. Let's consider low-yield nuclear weapons. We've heard that they are no longer the tactical weapons of the Cold War, that they are more complex and nuanced than that. What can you tell us about whether contemporary low-yield nuclear weapons emit radiation or do so in a controllable way? This may in part be a rhetorical question. Every nuclear explosion emits

radiation and of course we know that radiation is in some ways related to yield.

Is my understanding correct that low-yield nuclear weapons will produce radiation and there'll be a potential for the radiation to spread? But my main question is, what are the risk factors associated with this type of weapons, with respect to spread of radiation?

SCOTT SAGAN:

Well, from a low-yield weapon, depending on whether it's a ground burst or an air burst, it could have significantly less collateral damage from radiation. The collateral damage would have to come from nearby sources. That depends on where the targets are. Against some Russian military bases, near cities, even a low-yield weapon would produce some collateral damage. But against other targets, the collateral damage might be significantly reduced.

Against North Korea, for example, Ankit Panda's book, *Kim Jong Un and the Bomb*, he reports on a U.S. war plan that he was told about, in which the plan was to use 20 D5 missiles against 20 suspected North Korean missile sites located in rural parts of North Korea. The idea was that if we have evidence that a North Korean attack is imminent and unavoidable, or that it has started, and the initial wave has come, we're going to go after those targets.

The debate within the STRATCOM, according to Panda's book, was twofold. One was whether the collateral damage would be disproportionate. My understanding is that people said no, because those high-yield or medium yield North Korean weapons are targeted against American cities and South Korean cities because they don't have an alternative because their missiles are so less accurate.

On proportionality grounds, this might be proportionate even if there was significant collateral damage. Second, the debate then was, well, if that's the case, shouldn't we still under the principle of precaution use conventional weapons again? This is where I think a hidden factor comes into play.

You saw in one of Hans Kristensen's slides, the NPR's comment about, "Well, we will do this consistent with military objectives." Military objectives include a damage expectancy estimate. "What is the requirement", I put in quotes around it "for

how confident you have to be that you can destroy that target?" The military is given a figure often.

You could have to have 95% probability or 80% probability, or 70% probability. Then, they calculate this out and this is where I think civilians need to get more deeply involved, and where our legal analysis needs to get involved. Lawyers are trained in this area, because of tort law, to think about how to think about probabilities and responsibilities in this area.

If you think you have to have 100% effectiveness, then I think a conservative JAG lawyer is going to say, "We're going to have to put big weapons on it." If you say you have to have an 80% or 70% probability of destruction, then actually you can relax a little bit and put a conventional weapon against it. That's a challenge for civilians to place on the military.

CHARLES MOXLEY:

Thank you, Scott. We're running out of time. There are a couple questions from the audience …. This is a question from Nicolas. He asks, "Is this talk of elimination, abolition, would it be possible? Could we even do it really?"

SCOTT SAGAN:

Yeah, physically we could. The question would be, if you did it without verification, I think that the probability of using nuclear weapons would go up if there was ever a war. I think if you did this appropriately with strong verification, then I think it is feasible and could be done. To me, I thought the Obama approach to say, "This is my goal," was the right approach.

That was after all following the law since Article VI is in a treaty that we signed and ratified, and we said that we would work in good faith. Work in good faith doesn't mean that you have to get there tomorrow, but it does mean that you have to take seriously your responsibilities. Part of that is to have a step-by-step approach to get fewer weapons.

Partly it's to reduce the role of nuclear weapons and partly it's to work on better verification schemes, and to develop that technology so that we could actually get to low numbers without what scholars sometimes call the instability of low numbers. I think it's possible, but we're not close yet.

CHARLES MOXLEY:

Thank you, Scott.

SCOTT SAGAN:

Thank you. I look forward to seeing sessions later on.

CHARLES MOXLEY:

Let me turn to you, Hans. Could you take this question from Peter Davidse, which I think you've sort of answered, but maybe pull it together in a brief summary. Peter asked, "Could you give us a rough relationship, a statement of the U.S.'s strategic versus its low yield nuclear weapons?" You've explained that the low-yield weapons are not really strictly tactical anymore, but just explain what the constellation of the numbers are in the U.S. arsenal, and what the breakup is, in terms of high-yield and low-yield weapons.

HANS KRISTENSEN:

Yes. Overwhelmingly, its strategic forces focused on the triad launchers. In terms of warheads, we estimate that the number of tactical warheads in the U.S. arsenal is down to less than 300. It's probably about 250, 230, something like that. And they're only earmarked for use by fighter jets. So some are in Europe, of course, a 100 to 150 warheads on Europe. And some are for use by allied forces as well. But the vast majority is strategic.

And getting back to this issue about conventional versus nuclear, that this is partly a consequence of this, you could call it revolution in military planning where nuclear requirements just fell away and conventional forces became good enough that you could achieve your military objectives without resorting to nuclear. So that's a good development. That's why it's double sad, if you will, that we are now seeing somewhat of a swing back into the muddy waters of trying to argue for non-strategic nuclear weapon types of capabilities. Certainly for weapons use scenarios in tactical nuclear weapons scenarios.

CHARLES MOXLEY:

Just one final question. If I understood correctly, I think you said it was the military view that, if they looked at the targets in the

U.S. plans, that they believed they could address about a third of the targets with conventional weapons. I just wanted to ask your view on this. I've seen estimates suggesting that the general view initially was that "we'd use low-yield for hardened and deeply buried targets," but that that approach proved unsuccessful, as I understand it, because you can't really penetrate the ground with the lower yields; you need to go to high yields.

And so, my sense has been that conventional weapons, because of the precise accuracy that you talked about, could be enough to destroy targets in a very high percent of cases, but I don't know if that perception is correct.

HANS KRISTENSEN:

Well, yeah, it comes back to what Dr. Sagan said about the requirements for how reliable your war plan should be in terms of your kill probability. And again, if that is a very high number, you might want to resort to nuclear. Certain targets, certainly underground in some set areas. Area targets are also important nuclear targets, just because you need to expend a lot more conventional weapons onto a base in order to take the entire base out. Or you can do it the smart way: you just take out one or two aim points, and that makes the base impossible to operate.

So there are ways to doing this with conventional, but I just want to, if you go with Google Earth today, go and look at some of the Russian ICBM silos that are being upgraded in the Kozelsk missile field southwest of Moscow. You will notice that these new sites, the structure now includes advanced air defense systems. It didn't use to have that before. Now, the reason they do now is because they're expecting non-nuclear systems would go in, whether they're cruise missiles or drones, and try to incapacitate the silo. So this is happening.

CHARLES MOXLEY:

Thank you Hans. We now turn to Ariana Smith from the Lawyers Committee for Nuclear Policy. Ariana is going to introduce the Honorable Izumi Nakamitsu, the UN Under-Secretary-General and High Representative for Disarmament Affairs, for the keynote address. I thank the members of this latest panel.