

TRANSCRIPT

PANEL ONE

FACTS AND RISKS ASSOCIATED WITH NUCLEAR WEAPONS HIGHLIGHTED BY
RUSSIA'S THREATS TO USE NUCLEAR WEAPONS IN UKRAINE

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Speakers: Alan Robock;² James Scouras;³ Dr. Shane Smith;⁴ Prof. Jeffrey Biller⁵

This is a transcript of Panel One of the 2023 conference “Nuclear Weapons and International Law: The Renewed Imperative in Light of the Ukraine War.” The speakers’ remarks have been edited for readability and clarity by the Georgetown Journal of International Law Digital Committee staff as well as by the speakers themselves.

PROF. CHARLES MOXLEY:

We are now going to move into the first panel of the day. And I can mention to all our participants that this conference, organized by a bunch of lawyers, has perhaps not surprisingly been organized in the way that lawyers think. The way we think is that whatever kind of legal issue we're dealing with, whether it's international law, commercial law, securities law, or antitrust law, the whole framework in any sphere is always made up of the facts and the law. Right? You need to know the facts, and you need to know the law, and really, they're interrelated because as you learn more about the facts, you learn what legal principles might be relevant, and as you learn more about the law, you get a refined sense of what additional facts you need to understand. In reality, in the day-to-day work of any lawyer, to my understanding, virtually anything we do involves this interplay of the facts and the law. And so that is how we have organized this conference.

We start off with the facts. A major reason for doing that is that the rules and principles of law that we'll hear about all day that govern the lawfulness of potential weapons uses in large measure, by everybody's understanding, turn on the potential effects of such potential uses.

In principle, we're doing the assessment of the lawfulness of a potential weapons use in advance of the actual use. And the U.S., we'll hear from our military colleagues, is very committed, in principle, to the law of war. The U.S. has lawyers, JAG officers, who are advising on a very routine basis on target selection, weapon selection, and things of that nature. So the specifics have to be looked at, in terms of the consequence of the action. The consequences are very important to the legal analysis. That's the focus of this first panel.

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We're going to look at nuclear weapons, the facts as to their effects, the policies that concern the potential threat and use of nuclear weapons, and the range of effects that different levels of nuclear weapons use can have. We're going to have estimates and so forth of what the effects would be. So that's the burden of this first panel, and we've spent a lot of time preparing it.

The basic approach is that our speakers, whom we'll meet in just a second, are going to tell us about these consequences. Jeff and I have worked with the speakers and will ask follow-up questions to try to elicit the factual piece that will be important for the rest of the day. Thus, in this panel we look at the facts and policies, and then in the ensuing three panels, we look at the law concerning the use and threats of use of these weapons and how to apply that law to the facts. So, we're going to start with the facts about the weapons, and then we're going to get the geopolitical and policy considerations that will go into the legal analysis.

Let me introduce our speakers. Throughout the day we'll be giving only short introductions because you have everybody's full bios that were included in the materials provided by the State Bar.

The first speaker will be Alan Robock, Distinguished Professor in the Department of Environmental Studies at Rutgers University. Those of us in the field have known Alan's work for a long time. Professor Robock's studies, with scientists from around the world, of the likely effects of uses of nuclear weapons are pivotal to our assessment of the lawfulness of such weapons uses. Professor Robock's work has contributed to two projects that were awarded the Nobel Peace Prize. You have in your materials a recent article of which Alan was one of the principal preparers, which gives an extraordinary estimate of the kind of consequences that Mary Smith, the ABA President, mentioned – that the risk in a major war could be as much as five billion –yes, five billion–deaths. We can't imagine it.

Next, we'll hear from James Scouras, Senior Scholar at Johns Hopkins University in the Applied Physics Laboratory. When I was working on the parts of my book that address the role of risk analysis in assessing potential consequences of nuclear weapons uses, I was particularly struck by Jim's writings describing the extraordinary extent to which even the Pentagon is unable to model or otherwise assess many of the potential effects of the use of such weapons.

James Scouras' work has particularly focused on uncertainties and unknowns about nuclear weapons uses. I think as Jeff and I go through the day talking with the legal panels, this will be a big part of our focus: What should the lawyers do? What should the United States and other nuclear weapons countries do? What should we, as people interested in compliance with law, be advising people as to the significance of such unknowns in analyzing the lawfulness of potential nuclear weapons uses? In putting together the factual analysis, it's mind-boggling what we don't know and can't model as to the extent of the effects of nuclear weapons and the uncertainties.

Thirdly, for this panel, we're particularly privileged to have Dr. Shane Smith, who is Director of the Institute for National Security Studies and Associate Professor in the Department

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of Political Science at the United States Air Force Academy, with thanks again to Professor Biller from the Air Force Academy for having involved Dr. Smith in this conference.

Dr. Smith has had extraordinary responsibility in real time for the kind of issues we're going to talk about today. He served in the Office of the Secretary of Defense as a Legal Adviser for U.S. Nuclear Policy in East Asia and as Senior Adviser at the Defense Threat Reduction Agency. So we'll hear from real-time experience on the geopolitical, the policies, and the risks.

So I'm going to stop talking. Alan?

ALAN ROBOCK:

[Accompanying PowerPoint slides available [here](#).]

Thank you very much for inviting me. I'd like to share my screen and give a talk about global famine after nuclear war. So, you're right, I have a big team I'm working with. This picture shows the old guys, these are the young people working with me, and we've published many journal articles on our work.

Nuclear War, Fires, and Nuclear Winters

Here's the story. Here's our beautiful planet. After a nuclear war, it might look like this, with clouds of smoke covering the Northern Hemisphere and blowing down to the Southern Hemisphere. The smoke would come from fires started by nuclear weapons targeted at cities and industrial areas. If there's enough smoke, we would get nuclear winter. It would get cold, dry, and dark on the surface. The temperatures in the summer would get below freezing and this would, of course, have a big impact on our food supply.

This idea started when Paul Crutzen and John Birks published a [paper](#) ["The Atmosphere after a Nuclear War: Twilight at Noon" in *Nuclear War: The Aftermath*] forty years ago saying there would be fires after a nuclear war. This graph shows a history of the total number of deployed nuclear warheads. There are nine countries with nuclear weapons, as Jonathan Granoff mentioned. Russia and the U.S. are the top two. There was a nuclear arms race. The number of weapons kept going up and then it went down. Why? Well, Crutzen and Birks published their paper in 1982, and then a Russian group and an American group each calculated what the climatic effects would be, and they got the same answer: that there would be a nuclear winter. Then, a year later, I published a paper, another American group published a paper, and the nuclear arms race ended.

The Soviet Union didn't end for five more years, and I think we had a role to play. As a scientist, I use models and data, but historians just ask the people who made the decisions. And, by the way, the number, even though it's been going down, is not zero. [Ronald Reagan said](#) [in a February 12, 1985, *New York Times* interview], "A great many reputable scientists are telling us that such a war could end up in no victory for anyone because we would wipe out the earth as we know it. And if you think back to...natural calamities...volcanoes – we saw the weather so changed that there was snow in July in many temperate countries. And they called it the year in which there was no summer." And [Gorbachev said](#) [in a September 7, 2000 interview with

National Public Radio and Salon], “Models made by Russian and American scientists showed that a nuclear war would result in a nuclear winter that would be extremely destructive to all life on earth; the knowledge of that was a great stimulus to us...” Scientists on both sides, Americans and Russians, were giving the same message, and that was a very important motivation for Reagan and Gorbachev to end the nuclear arms race.

During World War II, we all know about Hiroshima and Nagasaki. But that was the end of a summertime bombing campaign organized by General Curtis LeMay that started on March 10, 1945, in Tokyo where they sent incendiary bombs over many cities in Japan to burn them. They killed 800,000 civilians. The last two attacks were Hiroshima and Nagasaki. If you want to talk about the law of war and war crimes, this was it. The only difference was these last two cities only needed one bomb. In Hiroshima, a 15-kiloton bomb killed about 150,000 people. The Enola Gay was the airplane that did it. I took this picture at The Smithsonian. This is the “Little Boy” bomb, a mock-up of it, and on the left is the mushroom cloud after dropping the bomb on Hiroshima. On the right is what we call pyrocumulonimbus. This is a thunderstorm three hours after the bomb was dropped, generated by the fire. It pumped smoke up into the stratosphere and this is the smoke going up into the upper atmosphere. This is what would cause climate change. This is what one of the survivors of Hiroshima remembers: the fires. Here is what Hiroshima looked like afterward. Everything was burned. Three days later, the “Fat Man” bomb, the plutonium bomb, was dropped on Nagasaki. This is what Nagasaki looked like afterward.

How can we tell what happens? Well, we can’t really burn cities but there have been examples. In 1906 there was an earthquake in San Francisco that caused a fire. Jack London wrote about it [in “The Story of an Eyewitness” published in May 5, 1906 in *Collier's, the National Weekly*]: “...for three days and nights this lurid tower swayed in the sky, reddening the sun, darkening the day, and filling the land with smoke...I watched the vast conflagration from out on the bay. It was dead calm. Not a flicker of wind stirred. Yet from every side wind was pouring in upon the doomed city. East, west, north, and south, strong winds were blowing upon the doomed city. The heated air rising made an enormous suck. Thus did the fire of itself build its own colossal chimney through the atmosphere.” This is a clear description of a firestorm pumping smoke up. This is what San Francisco looked like afterwards.

Right now, there are about 12,500 nuclear weapons on the planet, divided among nine countries as Jonathan Granoff mentioned, and the U.S. and Russia have most of them. Some of them, these white ones, are not deployed. They are on shelves. The U.S. and Russia each have over 5,000. All the other countries have about a few hundred. Why did they only have a few hundred? How many do you need to deter an attack if you think deterrence is a valid argument?

Effect of a Potential Nuclear War Between India and Pakistan

This is a picture taken from the space station of a border between two countries. This is India and Pakistan, and these white areas are huge cities, some of which you may have never even heard of. India and Pakistan now have nuclear weapons. About sixteen years ago we decided to see, what if India and Pakistan had a nuclear war? Imagine a skirmish in Kashmir

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escalating. Each country had about 100 Hiroshima-sized weapons and so we imagined each of them using half of them. The direct effects would be horrific. Twenty-seven million people would die. It would produce more than five million tons of smoke. We decided to use a climate model to calculate what would happen. Here is a graph. On the right is the distribution of the smoke, on the left is a graph of where the smoke would be. We live down here in the troposphere where there's rain to wash particles out, but the smoke would be heated by the sun, lofted into the stratosphere up above that, last for years, and be blown around the world. I calculated what would be the effects on the climate. The blue line is the observed global warming that I spend a lot of time working on. The red is instant climate change, not gradual climate change. And the cooling would be unprecedented in recorded human history. It wouldn't be temperatures below freezing but it would have a huge impact.

And then we decided, how can we actually calculate the effects on agriculture? There were questions about whether nuclear winter was real. We used our climate model to look at 150 million tons of smoke which would be generated by a U.S.-Russia war even today. It would be much thicker smoke. And a year later, this is a change in temperature in degrees Celsius in the Northern Hemisphere summer. Temperatures would fall very quickly, and we said, "Would it really be nuclear winter?" We took a place in Ukraine, this was done fifteen years ago, and this is a graph. The black line is the minimum surface temperature, and, in the summer, it would get up to 20 degrees Celsius (68 degrees Fahrenheit) and get below freezing in the winter. But if you put smoke in, temperatures would plummet below freezing and stay below freezing for at least two years. Clearly, this is a nuclear winter.

Recently we've used a modern climate model, a different one. It gets exactly the same results. And now Pakistan and India may have several hundred more nuclear weapons. They're having sort of a mini arms race. They've tested ones that are more powerful than the Hiroshima bomb. We looked at a scenario in which India uses 100 weapons and Pakistan uses 150 weapons and the fatalities would be much worse. It would produce 15,000,000 to 37,000,000 tons of smoke. This is a table of how many people could die from the direct horrific effects: blast, fire, radioactivity. Millions of people, we all understand this. But how would this affect the food supply? This is the change of surface temperature for these different scenarios of India, Pakistan, the U.S., and Russia. This cooling would last for about five years. When there was an ice age 20,000 years ago, there were mile-thick ice sheets over North America, global temperatures were five degrees Celsius colder than normal. This would be ice-age temperatures for a few years. How would this affect agriculture? Well, it would be dark, it would be cold, and there would be less rainfall. All these things would reduce the amount of food that we could grow. There are lots of other things we haven't had time to look at yet: the ability to adapt, no fertilizer, no water supplies.

Effects of a Nuclear War on The Global Food Supply

[This paper](#) that Charlie mentioned [2022: *Global Food Insecurity and Famine from Reduced Crop, Marine Fishery and Livestock Production Due To Climate Disruption from*

Nuclear War Soot Injection], we published last year in *Nature Food*. We took each of these scenarios, we looked at every country, and we said: “What food do they grow, what do they eat, how much do they export, how much do they import?” We assumed there would be no more exporting/no trade, and that people would hoard their food – that’s one scenario. We used a crop model that was part of our climate model to calculate the major grains: corn, rice, soybeans, wheat, and grasses which some animals eat. We looked at scenarios of whether we would feed the cattle and sheep or we would eat their food. It didn’t make much difference. And this is the changes of temperatures over croplands – much more than the global average because the ocean doesn’t cool as much. This is the change in food supply. We looked at crops and we looked at fish. And for India/Pakistan, we get a 20 to 40% percent reduction in food. For the U.S./Russia case, up to 90% reduction. That is globally averaged. But then we looked at different countries.

For the India/Pakistan case, many people would starve to death because they wouldn’t be able to grow any food. We assume people would eat up all the food that’s stored, maybe a 60-day supply, and then would have to grow their own food the next year. In many places in the lower latitudes, it wouldn’t have as big an impact but in the nuclear nations – Russia, the U.S., China, Europe, it would have impacts. If the U.S. and Russia had a nuclear war, most people in the world would starve to death. They wouldn’t be able to grow food. A few countries like Australia or Argentina, which don’t have that many people and are big exporters would be okay. But if you thought refugees are a problem now, you’d have flotillas of hungry people arriving at their shores. If I then calculate how many people would die from starvation, it’s more than ten times the number of people from the direct horrific effects. A war between India and Pakistan could kill one to two billion people around the world. A U.S./Russia/NATO war could kill most of the world’s population. The law of war says you’re not allowed to use nuclear weapons if it has effects on innocent victims. The military claims we don’t know what these numbers are so we’re just going to ignore them. But we’re providing them with a calculator so they can put their secret targets in and calculate how many people would die to maybe reduce the chance of them using nuclear weapons. We haven’t yet included the effects of UV radiation, ozone changes, or more complex economic responses. We’re working on that.

Now, do you believe me? What I’ve told you is based on models. How do we test them? Well, I showed you about firestorms. It gets cold in the winter; it gets cold at night. We know that if you block out the Sun it gets cold. I’m just going to show you two analogies.

One is forest fires. We had large forest fires in Canada and Australia in 2017 and 2020. This one pumps smoke into the upper stratosphere and then it rises from 12 to 23 kilometers. We used our model to calculate how much the smoke would rise and it exactly matched the observations. This is much less smoke than what you get from nuclear war. In Australia, there was a cloud that rose 20 kilometers (12 miles) and lasted for many months.

The Tambora volcano is the volcano that Ronald Reagan mentioned that caused a year without a summer. I’ll just give you one piece of data. This is a book by Gillen [D’Arcy] Wood [in *Tambora: The Eruption That Changed the World* (2014)] and a figure from Stommel and Stommel. This is the temperature in New Haven in June. After the volcano, it got very cold in

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New Haven for a couple of years. And Wood said, “For three years following Tambora’s explosion, to be alive, almost anywhere in the world, meant to be hungry.

The conclusion is that the current nuclear arsenal can produce a nuclear winter, which can kill most of humanity. As a consequence of a U.S./Russia war, more people could die in India or China than in the U.S. and Russia, even if no bombs are dropped there. This led the rest of the world to support [a treaty](#) to prohibit nuclear weapons [Treaty on the Prohibition of Nuclear Weapons]. Half of the world’s countries have signed that treaty. The organizer behind it, the International Campaign to Abolish Nuclear Weapons, got the Nobel Peace Prize in 2017 for its work to draw attention to the catastrophic humanitarian consequences which are shown by our work and by the direct effects, and for getting the treaty passed. When Beatrice Fihn accepted the Nobel Peace Prize in 2017, she said, “The story of nuclear weapons will have an ending, and it is up to us what that ending will be. Will it be the end of nuclear weapons, or will it be the end of us? One of these things will happen. The only rational course of action is to cease living under conditions where our mutual destruction is only one impulsive tantrum away.” Remember this was back when Kim and Trump were arguing about whose button was bigger.

I don’t agree with Professor Biller’s claim that deterrence has worked. I mean we don’t know what would have happened if there hadn’t been deterrence. And all we need is one mistake, like Jonathan Granoff went through. For deterrence to work it has to be perfect; there can be no mistakes. I don’t think that’s a viable system to continue living under. I’ll just end with Carl Sagan, who is one of the people who did some of the first work on nuclear winter. People said, “Carl, don’t you want to keep the nuclear weapons? Don’t you want to keep them for deterrence?” [He said](#) [in “Nuclear War and Climatic Catastrophe: Some Policy Implications” in the Winter 1983 issue of *Foreign Affairs*]: “For myself, I would far rather have a world in which climatic catastrophe cannot happen, independent of the vicissitudes of leaders, institution, and machines. This seems to me elementary planetary hygiene, as well as elementary patriotism.” I agree. Elementary planetary hygiene means we should get rid of nuclear weapons. I hope we learn from this and keep our beautiful planet looking like this for many years to come. If you want more information, you can go to my website, <https://climate.envsci.rutgers.edu/nuclear/>. All of our papers and this PowerPoint are there. Thanks.

PROF. CHARLES MOXLEY:

Thank you, Alan. James?

JAMES SCOURAS:

[Accompanying PowerPoint slides available [here](#).]

Thank you for inviting me. I guess I’m supposed to provide a little bit of balance here and that’s my goal. I’m going to talk about nuclear risk, and would like to start by reminding us all that risk has two components: likelihood and consequences. And the important thing is the relationship between the two. The lower the consequences of nuclear use, the greater the likelihood because in the extreme, who will care? No one will notice. So when we think about

solutions for or substitutions for deterrence or how to prevent a nuclear winter and elementary planetary hygiene, we have to think of the impact of these policies on likelihood. If there's any time at the end, I have a few words to say about Ukraine.

Uncertain Consequences of Nuclear Weapon Use

This slide has much of what you need to know about consequences. First, there is great uncertainty, as Charlie mentioned, in many nuclear consequences. Now we have a history of nuclear tests with over a thousand nuclear explosions, and we've learned an awful lot about consequences, but what we've learned is focused mostly on what we were concerned with in the Cold War. We've learned a lot about blast, about damage to physical structures such as silos and buildings, and we've learned a lot about radiation and its effect on biological entities, including humans. Nevertheless, there are a lot of uncertainties because we haven't focused on some important things that were either too difficult to quantify or discovered too late in the testing program. So I will mention three of these. The first is electromagnetic pulse, which was discovered by accident in a high-altitude burst called Starfish Prime. We were surprised when 800 miles away in Hawaii, the lights started going out. Finally, we figured out there's a thing called EMP but we still don't know a lot about its effects on electronic systems.

The second is fires. We don't know a lot about how fires will start and propagate around particular targets under particular weather conditions. So this is the reason U.S. Strategic Command (STRATCOM) doesn't really include fires when it thinks about whether or not it has succeeded in its mission to create enough damage on Russia to prevent them from attacking in the first place. Fires are out of the equation because they're too uncertain. And notwithstanding the briefing we've just heard, I'm going to put nuclear winter in this category. I think we don't know enough about the initial parts of the modeling, how much fuel there is, how fires start, and how smoke and soot are lofted. Will we create a firestorm or not? I think I recall in Hiroshima there was a firestorm and in Nagasaki, there wasn't. Is a firestorm required for sufficient lofting of smoke and soot? So I would say nuclear winter falls in the category of significant uncertainty. It is interesting though that fires and EMP probably cause as much damage as the better-known effects, so these are important uncertainties.

We also don't know a lot about the consequences to infrastructures that sustain us all, or how consequences propagate to other infrastructures that are interdependent. We don't know an awful lot about that. And maybe the largest uncertainty is we don't know how nuclear war will propagate and end. So, you shouldn't think you can avoid the worst consequences by starting with a small attack and counting on luck that it remains small and doesn't propagate to global armageddon. I think the uncertainties having to do with escalation are very important and can't be ignored. And finally, the result of all this is we are not capable of doing a full spectrum consequence assessment because of these uncertainties. It's just not possible. All we can do is provide a lower bound and identify uncertainties about how that lower bound might actually be really higher.

Lugar Survey of Proliferation Threats and Responses: Uses and Abuses

I want to turn to likelihood for a minute. I think it was 2005 when Senator Lugar conducted [a survey](#) of experts in proliferation and nuclear war on the risk or likelihood of various attacks: chemical, biological, nuclear, and radiological [The Lugar Survey On Proliferation Threats and Responses]. This is one example of a question he asked: “What is the probability of an attack involving a nuclear explosion occurring somewhere in the world in the next ten years?” So opinions vary, to say the least. They really were all over the map. They span the full spectrum of zero to one hundred percent. And notice the large peak at 50%, 50-59%, these are I think the people saying I have no clue. I admire them because I think that’s the most correct answer. There are some really silly answers, such as 100%. I don’t think that passes the “giggle test” and 0% doesn’t pass the “giggle test” either. So what I’m trying to say is we have very little clue about the likelihood of a nuclear war.

Now, could we do better than the survey? This survey was poorly conducted. Senator Lugar is not an expert in expert elicitation, but I will mention that the experts chosen were really not experts in most of the questions that were asked. Some were chemical experts, some were proliferation experts, and some were nuclear experts. They all answered all the questions pretty much, so you’ve got a lot of noise in here. That’s the first problem. Let me just say they did not follow the best elicitation practice. That’s as kind as I can be. It was really kind of atrocious. And their analysis was also very poor. But it does expose that there is a range of viewpoints and we need to better understand these divergent views. What is going on here? Somebody needs to step up here and fund some quality research that can get behind what’s going on.

Even though it was really a terrible survey, it has been fairly widely cited. And we see here in this graph, the blue shades are citations that are uncritical or praising of the Lugar Survey– they just use the results to say, “29% chance in the next ten years of a nuclear attack.” And there are very few, the red shades, on the top here, that actually question the Lugar Survey. So we have another problem. In addition to shoddy research, we have routine acceptance of research without critical thinking. The Lugar Survey wasn’t peer-reviewed, but this problem exists for peer-reviewed journal articles as well. Generally, what people want to do is cherry-pick results that conform to their preconceived notions and cite the Lugar Survey. If none of the results conform to their preconceived notions, they don’t cite the Lugar Survey. I think it’s time for a more rigorous study of likelihoods as well as filling in a lot of the gaps on consequences.

Wartime Fatalities in the Nuclear Area

I want to talk about wartime fatalities in the nuclear area because it’s an argument often made about the value of nuclear weapons. The argument is that we haven’t had a major conflict since the advent of nuclear weapons, so we have saved many lives. The chart on the left [of the PowerPoint slide] was created at STRATCOM and has been reproduced in various forms, in at least two Nuclear Posture Reviews, so it’s taken seriously. It shows that after nuclear weapons were invented, wartime casualties dropped precipitously, which is a good thing.

We looked at the sources of population data and re-did the analysis right and we got a different graph. It looks a lot different than the one provided by STRATCOM. It shows a general increase, which makes sense. If there is a nuclear war it is going to be off the chart, so that trend line does not look good. It also shows that even after WWII, there were plenty of smaller wars that produced plenty of casualties that are consistent with many interwar periods. So you don't come to the conclusion that the weapons have saved lives. In my opinion, we are at risk of this trend line continuing and nuclear deterrence failing— quite the opposite conclusion. There is a lot of “shoddy” analysis in the community, and a lot of it is influential. There is not enough time, or energy, to correct it. We worked on this for a couple of years just to correct one slide.

Nuclear Winter

Regarding a nuclear winter, I am not a climate scientist, but I agree with Dr. Robock that it's potentially among the most severe consequences of nuclear war. The key word is “potentially.” I say potentially because I am almost convinced, but other credible scientists at the national labs disagree. I was at a conference a week ago where Dr. Toon suggested that the most severe uncertainties are at the beginning (i.e., the creation and lofting of the smoke) and at the end, the effects on civilization, agriculture, the ocean, etc. I agree that a lot more work is required to inform policy.

There was a lot of work done in the 80s, when nuclear winter was first suggested, a lot of which was government-funded, including by the Defense Nuclear Agency. What happened? The Cold War ended. I don't think it was the nuclear winter scientists who were most influential. Russia collapsed and the Cold War ended. All things nuclear got off everyone's radar screen. There was the impact.

Today there is an impracticality to get rid of all nuclear weapons, which is not going to happen. Government officials will just turn a deaf ear to anything else you say after you suggest that. What we need are practical solutions. I don't know what they are but I have some ideas. We don't need to be advocating for the abolition of nuclear weapons as the only solution. I do agree with Dr. Robock that we can't continue to turn a blind eye toward nuclear winter and the mere possibility of nuclear winter should be enough to spur policy action.

Ukraine

Looking back, we were all surprised and elated when the Cold War ended and the great threat of the Soviet Union dissipated. We thought we didn't have to worry about nuclear war anymore, which was all wrong, and clear now because of Ukraine. All that has transpired in the Russia-Ukraine war is understandable from a classic deterrence theory perspective.

The first thing is that war doesn't ever go the way you planned. Both sides misjudged how the invasion of Ukraine would go. Russia thought it would be quick and easy but it did not go that way. From a nuclear perspective, things were not surprising. With Russia in more desperate straits, Russia invoked nuclear threats to get the U.S. and NATO to cease or slow down their aid to Ukraine, and that worked.

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I do think there are a couple of enhancements to deterrence, one being rectifying the imbalance in non-strategic nuclear weapons that has emboldened Putin to make these nuclear threats. Were there not such an imbalance, I'm not sure he would be so cavalier about these nuclear threats. I also believe there is a deterrent advantage to credibly holding Putin and his close leadership circles at risk. The other thing is that we don't know a lot about Russia's red lines. When will push come to shove and Russia actually decide to fire off a nuke because they have had enough? We don't know. It is actually similar to the Cold War, where we spent a ton of money, in the CIA and elsewhere, to understand the inner workings of the Kremlin, but we never did a good job about that. NATO's strategy for responding to limited Russian nuclear use is worrisome. As far as I can glean from the popular press, it is basically to intervene, conventionally kick Russia out of Ukraine, and sink the Baltic fleet, all conventional. There is no reason to think that if Russia used nuclear weapons in the first place, it would not escalate its nuclear use with this NATO response.

Final Thoughts

We have had three major attempts to escape the logic of deterrence: the Baruch Plan for International Control, which fell flat on its face. We had the Strategic Defense Initiative, which was implausible from a physics and engineering point of view. And then President Obama's attempt to interject Global Zero into the dialog. To me, it seems we are stuck with nuclear deterrence, which is the worst of all possible strategies, except for all the others. Risk is inherent in deterrence. If there is no risk of global armageddon, there is no deterrence. Our challenge is to develop deterrence strategies that are first and foremost effective, then minimally risky, then ethical, and then legal, in the emerging tripolar nuclear world where China is projected to be on par with the U.S. and Russia.

In closing, here is my email if you'd like to contact me and the website where all these publications can be found. That is all, thank you.

PROF. CHARLES MOXLEY:

Thank you. Dr. Smith?

DR. SHANE SMITH:

Thank you for the invitation to speak today. I am proud to do so. First, as a government official, I need to make clear that the views I express today are my own and should not be misconstrued as representing any part of the U.S. government, including the Air Force or the Air Force Academy.

Nearly two years after Russia launched its full-scale invasion of Ukraine, there is a growing body of evidence underscoring three interrelated new realities about nuclear weapons. One, despite what we may want or wish, their salience in international politics is again on the rise. Two, the risks of them being used in conflict are growing. These risks are varied, and in many ways much more complex and challenging to calculate than they were during the Cold

War. Three, as was mentioned earlier in Ms. Smith's opening comments, the arms control treaties and norms of behavior that helped bound nuclear competition for generations appear to be fraying with no clear path to rebuild those guardrails. Let me unpack those three claims.

Russia's Use of Nuclear Threats in its War Against Ukraine

From day one, nuclear threats have featured prominently in Russia's strategy against Ukraine. In the days after launching a military campaign to annex Crimea, back in 2014, Russia conducted a nuclear exercise that was at the time the largest it had conducted since the Cold War, releasing photos with Putin at the helm, directing nuclear strikes. Russia continued to invoke nuclear threats against the U.S. and NATO throughout its military annexation. In June 2015, Russia then sought to secure its ill-gotten gains in part by proclaiming its right to station nuclear weapons in Crimea and to use them in defense of what it was illegally claiming as Russian territory.

Skip ahead to February, 2022, Russia announces a full-scale invasion of Ukraine. Putin, [in that speech](#) [February 24, 2022 Address by the President of The Russian Federation], reminded the world "that Russia remains one of the most powerful nuclear states," as if any of us really needed reminding at that time, and warned that "there should be no doubt for anyone that any potential aggressor will face defeat." Since then, Moscow has sent a near-routine barrage of nuclear signals and threats, some more ominous and overt than others. Taken together, these appear to be part of a Russian playbook many people have suspected that Russia has been developing for over two decades. It's often called "escalate to de-escalate."

This playbook involves threats of limited nuclear attacks designed to escalate its way out of a failed conventional war. Nuclear threats of limited use, mind you, not of an all-out nuclear attack that would generate a "nuclear winter" that was discussed earlier. Rather, it is designed to coerce the termination of an ongoing conventional conflict on its terms. At the core of this strategy, Russia apparently believes that there's an underlying asymmetry of stake in conflicts on its periphery that favors its interest, lends credibility to its nuclear threats, and would lead the U.S. and NATO to back down because, in its view, we lack resolve. Russia may believe that we would rather back down than tempt an all-out nuclear conflict in response to a limited nuclear strike by Russia to achieve limited aims.

We see that in its war against Ukraine, where Russia's nuclear threats are aimed at both compelling Ukraine to surrender as well as compelling Western countries to halt assistance to Kiev. The goal is to present us with the need to balance our interest in seeing Russia's military operations and campaign implode with the risks of succeeding. As Fred Iklé wrote in the 1980s in his book *All Wars Must End*, there are challenges to bringing an end to a war in which the belligerents have options to escalate. Russia has been preparing and signaling that, indeed, it would be willing to use nuclear weapons if it needs to prevent defeat in Ukraine. Former Russian President Medvedev made that very threat a few months ago, [when he said](#) [in a July 30, 2023 Telegram Post]: "If Ukraine's NATO-backed counter-offensive is successful, Russia would be forced to use a nuclear weapon." What is interesting here, to me at least, is when he says "a"

nuclear weapon. The assumption perhaps is that there would be no escalatory response from the U.S. and the West.

Moscow is rhetorically de-linking limited nuclear conflict from the risk of global nuclear winter to lend credibility to its threats – no sane leader would wish to bring about the latter. But it's not just Russia's rhetoric that puts nuclear weapons at the center of its military strategy and efforts to convey its willingness to use them. Russia has also been expanding its arsenal to provide what the head of Russia's nuclear complex once called a “nuclear scalpel” for every military problem in Europe. As Dr. Scouras mentioned a moment ago, Russia is thought to have about 2,000 so-called tactical weapons, ten times that of the U.S., in over twenty different theater delivery systems, some of which Putin has reintroduced into Belarusian territory. All the while, Russia's also been modernizing an array of strategic systems, like the Sarmat heavy ICBM, Poseidon autonomous torpedoes, nuclear-powered cruise missiles, etc.

The Salience of Nuclear Weapons in International Politics

It's not just Russia's coercive nuclear buildup and threats that reinforce the salience of nuclear weapons in international politics. It's also Ukraine's unique experience that is convincing many of a variation on an old maxim from Thucydides: Nuclear powers do what they want, non-nuclear powers suffer what they must. Recall that in 1991, Ukraine had physical control over about 1,700 former Soviet nuclear weapons that were left on its soil at the end of the Cold War. It removed those to Russia under a 1994 agreement in exchange for security assurances that Moscow has now unambiguously violated.

What are the lessons that China and North Korea are drawing from Russia's use of nuclear threats? Will they too conclude that using nuclear threats to challenge what they contend to be objectionable status quo, political, or territorial arrangements is a useful strategy? Those two countries are already building up their capabilities at a fast pace. A DOD report released about three weeks ago notes that China's dramatic nuclear expansion, in terms of quantity, quality, and diversity of weapons, is on track to exceed previous projections to about 1,500 weapons within a decade. There is also a declassified national intelligence estimate from earlier this year assessing with high confidence that North Korea's rapidly growing nuclear capability is not solely for deterrence purposes. It's part of a very dangerous coercive strategy that we continue to see evidence of. At the same time, the world's nuclear-armed or nuclear-aspiring states are learning from what Russia is doing. The non-nuclear armed states are certainly taking notes and must be wondering: “If Ukraine still had nuclear weapons, would Russia have invaded?” Many of them likely conclude: “No.”

We even see among U.S. allies such as South Korea, Japan, and Poland, growing debates and sometimes highly public calls for developing independent nuclear capabilities, in South Korea's case, or the need for stronger U.S. nuclear guarantees that include some kind of new sharing arrangement or even putting U.S. nuclear weapons on their soil. This is additional evidence that we are heading into a new nuclear era.

The Growing Risks of Nuclear Conflict

How do the risks differ from those we lived with during the Cold War? One difference is the emergence of two major nuclear competitors. In addition to Russia's seemingly full embrace of nuclear weapons as part of its national security strategy and military doctrine, China is engaging in a dramatic expansion of its nuclear arsenal. This presents the U.S. for the first time in its history with two major nuclear powers as strategic competitors and adversaries. The [2022 Nuclear Posture Review](#) (NPR) acknowledges this reality and that it will create new and unfamiliar stresses on strategic stability, deterrence, assurance, arms control, and risk reduction.

As a corollary, there are emerging U.S. nuclear policy debates about whether we need to eschew our counterforce employment guidance to maintain deterrence against two near peers with growing nuclear arsenals if we are to retain a nuclear arsenal at the same size as it is today. U.S. nuclear policy and employment guidance prohibit so-called countervalue targeting – or the targeting of cities – because they are governed by the law of armed conflict and the DOD [Law of War Manual](#) to not purposely target civilians. But debates about the requirements for deterring two nuclear peers are just beginning and will likely intensify over the years to come with implications for the size, shape, and charter of the U.S. nuclear arsenal.

The second difference is the growing overall number of nuclear-armed states. Some of them are already or are fast-becoming personalized dictatorships and there are a lot of unknowns about the quality of information and soundness of the decision-making processes in those countries. Just look at Putin's experience in Ukraine. The invasion appears to have been a severe miscalculation about Russia's military capability, Ukraine's resolve, or both. Is it possible that Putin and those under him might convince themselves that limited nuclear war is a viable option if the conflict continues to go south from them? How about the leadership in North Korea or China? Additionally, the leaders in Russia, China, North Korea, and Iran likely have different interests and thresholds for potential employment of nuclear weapons. Understanding adversary decision-making is something with which we have long struggled. These challenges are going to get more difficult, heightening the risks of miscommunication and miscalculation.

Three, many of the risks that we are seeing now are not of the “bolt out-of-the-blue” or mutual assured destruction variety. Rather, they're ones that stem from leaders all-out nuclear convincing themselves that limited nuclear options for limited objectives is a potential approach to defeating the U.S. and its allies but escape the risks of nuclear retaliation because the U.S. lacks resolve. By holding hostage U.S. and allies' population centers, they may believe they can use nuclear weapons in a limited way and essentially shock us into submission during a crisis or conflict. Those kinds of threats are seemingly manifest in Russia's case and we see them growing in the case of North Korea.

International Guardrails and Norms

Finally, the arms control agreements and other measures that were in place throughout much of the Cold War that helped manage nuclear competition among the great powers have all but disappeared. All that remains today is the [New START](#) treaty which is set to expire in

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February 2026. We don't know what will come after that but the prospects for a new agreement appear dim. In the wake of Russia's violations of the [INF treaty](#) and subsequent U.S. withdrawal, Russia's non-compliance with the existing New START, its recent withdrawal of ratification from the [Comprehensive Nuclear Test Ban Treaty](#), and flirtation with conducting new nuclear tests, it's hard to see whether there's a partner in Moscow with whom common ground can be found. Not to mention, Russia's invasion of Ukraine has all but eliminated the political space and goodwill necessary for successful talks. All of which is made more difficult by the potential optics and diplomatic contradictions the U.S. side might face in negotiating and signing an agreement with a named war criminal – President Putin.

China will also likely need to figure into any future arms control agreements. But, thus far, it has shown a complete unwillingness and lack of interest to engage in related discussions. Beijing apparently remains deeply reluctant to enter those processes.

To end, let me touch on international norms. From Russia's actual invasion of Ukraine and the bold use of nuclear threats therein to the use of chemical weapons for assassination against Sergei Skripal and Alexei Navalny, to supporting and protecting Assad and Syria from accountability over the mass use of chemical weapons against his own people, and enabling North Korea's violation of the NPT as well as its own violation of the INF, Moscow seems to have been at war with international norms for some time. We should be concerned that as we enter a new nuclear era, that it is one in which the international norms about appropriate behavior that helped constrain nuclear competition and use in the past will no longer apply.

Professor Moxley, let me turn it over to you.

PROF. CHARLES MOXLEY:

Thank you, Dr. Smith. I have to say, and I'm sure Jeff Biller would agree, that there are many follow-up questions we'd like to ask. However, since we've run out of time and we have a break and the next panel coming up, we don't have time for follow-up questions. This emphasizes the importance, Jeff, of your point of doing a follow-up. We should bring back this panel on another webinar through the State Bar, the Air Force Academy, the ABA, or any other forum we may use, and just continue the discussion because there are so many questions. So, I guess we have to move on. Jeff, is that okay with you?

PROF. JEFFREY BILLER:

Absolutely. This has set the stage well. I have a number of questions written down that would be right for some additional sessions following the conference. But there's no way we are going to get to all the questions and all the issues today, so I think you're right.