

TRANSCRIPT

PANEL THREE

THE ROLE OF RISK ANALYSIS IN THE APPLICATION OF INTERNATIONAL LAW TO NUCLEAR WEAPONS USE

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Speakers: Prof. Jeffrey Biller,² Dr. Eirini Giorgou,³ Prof. David Koplow,⁴ Dr. Hans Liwång⁵

This is a transcript of Panel Three 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:

Welcome back. This panel addresses “The Role of Risk Analysis in the Application of International Law to Nuclear Weapons Use.” Essentially, we’ll be examining how, in applying the rules of the law of armed conflict (LOAC) to potential uses of nuclear weapons, we should “value” various levels of probability of unlawful effects, how such probabilities fit into the analysis, as we assess the potential lawfulness of a nuclear weapons use under consideration.

When I did the first edition of my book, *Nuclear Weapons and International Law in the Post Cold War World*, in 2000, I had addressed this topic broadly, but didn't cover it in depth. When I started working on the second edition, *Nuclear Weapons and International Law: Existential Risks of Nuclear War and Deterrence through a Legal Lens*, which I finished recently, I realized that this topic, which seems centrally important to assessing the lawfulness of potential nuclear weapons uses, has not been recognized, let alone addressed or analyzed, in statements by the government or the military on in the literature generally, neither by proponents or opponents of the contemporary nuclear weapons regime.

As we heard in the first panel today, a substantial body of work has been done in assessing the effects of nuclear weapons. What hasn't been looked at, and what we'll talk about on this panel, is the legal side of this issue—how we assess the lawfulness of foreseeable, non-speculative potential effects of nuclear weapons use.

The topic's importance comes from the fact that the effects of these weapons are potentially so extreme that we don't want a war crimes trial later. We want, whatever the law is, and we heard that everybody doesn't agree on exactly where you draw the lines, and Professor

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Hathaway, at the end of her keynote, said maybe, and I guess this was something David Koplow was saying, maybe we should do more to try to define this body of law with more clarity, but when we go to apply it as to nuclear weapons, we certainly hope we're going to be doing it in advance of use, and obviously, at that point in time, all we can know are probabilities and likelihoods as to what we think the consequences might be.

So, we are right back where we were, in that perhaps somewhat unsatisfying discussion at the end of the earlier panel, where we all weighed in on what we do with different levels of probability. There are various levels of probability in essentially any situation, and there are some risks that we identified as sort of “known unknowns.” We know that there is going to be a fallout. We know at a certain level, if there is a ground burst of a nuclear weapon, where there's a potential to throw up a lot of dirt and smoke, we can precipitate a nuclear winter effect, but at what point does that happen? The scientists can estimate and model effects, but, as we heard this morning, there are limits on our ability to do this.

So, what do we do about this? How do we look at the various potential effects of nuclear weapon strikes that Alan Robock and James Scouras told us about, if we're lawyers who have a responsibility to advise civilian and military decision-makers on whether nuclear strikes that they're thinking about doing are lawful or not?

When I was looking at this issue, I found a substantial amount of material on the question of how we do risk analysis in the context of conventional weapons. There is, as I alluded to earlier, a [Joint Chiefs of Staff manual](#) on that. It's really quite interesting, but there's very little on how you do this in the context of nuclear weapons, which makes us very fortunate that we have the panel that we have.

You've met Professor Jeffrey Biller from the United States Air Force Academy, who has a deep background in this field.

Please meet Dr. Eirini Giorgou, Legal Advisor to the International Committee of the Red Cross (ICRC) on nuclear weapons. As we'll hear, the ICRC and Dr. Giorgou have been thinking about this area of risk analysis and nuclear weapons. Previously, Dr. Giorgou worked in this area in numerous respects: the ICRC's arms and conduct of hostilities unit, and she was in the unit for relations with arms carriers, and she's had other responsibility as to disarmament, so her background and experience are right on point for this discussion.

Professor Koplow, as we've met and heard, has been in the Department of Defense and has taught in this area at Georgetown for some time and has an extraordinary background in the area. Professor Koplow has served as Special Counsel for Arms Control to the General Counsel of the Department of Defense, as Deputy General Counsel for International Affairs at the Department of Defense; and as Attorney-Advisor and Special Assistant to the Director of the U.S. Arms Control and Disarmament Agency.

And welcome to Hans Liwång, Associate Professor at the Swedish Defense University. Professor Liwång has co-authored [one of the few articles](#) in the literature on the subject of risk analysis and military decision-making [Hans Liwång, Marika Ericson, Martin Bang, “An Examination of the Implementation of Risk Based Approaches” in *Military Operations*], and has

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thought deeply about the subject. We're fortunate to have Professor Liwång's perspective and thoughts on these matters.

So here we are. Our plan is to start out by defining what "risk analysis" is and understanding how it is used by the military in making operational decisions as to whether it's a good idea to undertake a particular military operation or strike. And then we'll look at the role of risk analysis in conducting the legal analysis as to the lawfulness of a military operation or strike being considered: what does it look like in terms of whether this operation or strike will comply with the rules of distinction or proportionality or necessity, or be a lawful potential reprisal.

Dr. Giorgou, could you start us out and define the area – what is risk analysis? And then Professor Liwång, could you give us your perspective because you've thought about this and have done a paper which we've circulated on the topic?

What Is Risk Analysis?

DR. EIRINI GIORGOU:

[Remarks omitted.]

PROF. CHARLES MOXLEY:

Thank you, and we'll have to come back to those last two questions, because they're big ones. What do we do with uncertainty, and at what point do we consider or not consider foreseeable risks. Dr. Liwång, I know you've thought a lot, and we had a prep session maybe a week ago, and you wrote something in the interim which was very interesting.

DR. HANS LIWANG:

Yes, thank you for having me. So today most armed forces have formalized processes for risk management, and that includes both risk analysis, which is putting a number to the risk, and risk assessment, which is about making decisions based on that. So, risk management aims to identify hazards and threats and describe the expected likelihood of different consequences, and we heard it already today. However, there is also the development that understanding, describing, and dealing with uncertainty, and especially knowledge uncertainty about the things that we don't know, are also central parts to be considered in the risk management aspect. So, it's not as easy to just say risk assessment is an equation of consequence and likelihood. You also need to consider the knowledge uncertainty that you have in many different types of problems.

In military organizations, there are a set of military risk management rules. They are not rules in a legal sense, but they talk about how risk management should be integrated into decision-making at all levels. They also say that risk should be weighed against the potential gain that you can have for different actions. So, there is a risk management tradition in most armed forces. However, the complexity of the problems that this tradition deals with is typically very limited, so the types of problems are very specific. And when we talk about nuclear weapons, as we heard today, this limitation is a challenge. In order to reach quality in the risk assessment, you need to limit the risk problem, but at the same time, you need to capture all the important

aspects, and this is the real challenge. You need to limit it, but at the same time, you need to capture the things that are really important.

There, we have seen a development in risk management internationally, in terms of terrorist actions and cyber threats. We've seen the development on how to develop risk management in these areas. I haven't seen the same development in regards to nuclear weapons, and I think that is evident today as well, that we haven't really discussed these topics in a way that we really can put words to the problems here. Risk management and risk assessment cannot really be limited by the aspects that are covered by law, they need to be limited to the aspects that are relevant in reality, and if we would limit risk analysis in general to the aspects that the law says, then we would have holes in the risk assessment that we need to cover. So typically, risk management is a wider term and covers many more things than the legal aspects.

I heard today that you said, well, the legal aspect is not covering probabilities lower than 20% but typically in risk management, 20% is something very likely. We talk often about something that's much less likely but still very important, in order to understand the risk and the risk picture. So here we have a completely different set of decision-making, in terms of risk in general and also in military risk, compared to the legal aspects that are more limited. That is at least my starting point, from my perspective as not a lawyer but a risk management researcher, so thank you.

PROF. CHARLES MOXLEY:

Thank you, Professor Liwång. Jeff, you are the guy on the spot, right? I mean, you deal with this type of analysis. You teach it, you've been in JAG, so you were advising military people about things of this nature. How should we think about this area generally, but then particularly with nuclear weapons?

PROF. JEFFREY BILLER:

Yeah, thank you. Clearly, there are a lot of different areas where you could apply risk analysis: risk analysis in terms of going from a conventional to a nuclear conflict and risk analysis in terms of widening a nuclear conflict, but I think perhaps where I might have the most to offer in this is how would we do risk analysis in terms of that "use" question. If we want to actually use, within the context of existing armed conflict, nuclear weapons, how would we analyze risk in that situation? I'll focus what I have to say here on that aspect of it, recognizing that there are many other aspects.

I like going in a later panel in a conference like this, because you start to see the themes that are being developed throughout, and I think the theme that I've recognized so far is that uncertainty question. We have so many gaps in our knowledge set, especially if you go back to that first panel, and the discussion of all the areas that "hey, we need further study in this." Whether it's further study in the understanding of Russian nuclear doctrine, whether it's further understanding in the effects of nuclear weapons, we have a lot of gaps in our knowledge. Those

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gaps certainly are going to come into play in a major way when we're doing risk analysis because there's just certain things that we don't have an adequate understanding of yet.

So, where would it come up in kind of a targeting cycle? I think there's multiple places. There's aspects of targeting law that are more of a binary decision, whether something is clearly legal or clearly not. It's a yes or a no. For example, if we look at the area of distinction, are you using a weapon that's capable of distinction? That's a yes or no question. Maybe there's some debate on that, but generally that's how it's considered. Are you directing that weapon against a valid military objective? That's a yes or a no question. And I personally don't think yes or no questions are the best area to look at risk analysis, because risk is generally a sliding scale.

But there is an area, and that's come up already in our discussions quite a bit, and that's the question of proportionality. Because in proportionality, you have two separate factors that you're weighing and analyzing, and both of those you're analyzing on a sliding scale. There's the question of military advantage: "What do I hope to gain through this particular strike?" and that can be a lot or a little. The commander makes that estimate on a good faith basis. In fact, the standards that we use for these decisions are generally good faith basis, information available at the time, in light of the circumstances ruling at the time. So, it's very contextual. I think that's important to remember because a lot of our discussions so far have been theoretical, but all of these decisions are going to be made in a certain context, and that context matters, particularly when we're talking about use. Maybe not so much on a *per se* type of question. Are nuclear weapons legal *per se*? That's not as contextual, but when we talk about use, it's very contextual. So we have military advantage, then we also have: "What's the incidental harm that's going to be caused to civilians?" and that's also a sliding scale. It could be quite a bit, or it could be not a lot. So, I think when we look at our two risk-analysis factors that have been raised already, the likelihood of the event occurring and the magnitude of the event, we can apply both of those factors to each one of those factors that weigh into a proportionality decision.

So, let's do a risk analysis on military advantage. What is the risk? Because theoretically, I think if we're going to be using nuclear weapons, we are probably expecting a great amount of military advantage from that use. You would not use a nuclear weapon for a small amount of military advantage. That would not make a lot of sense just in terms of military operations. So what is the risk that you're not going to achieve what it is that you want to achieve through the use of that weapon? I think there's a lot that we don't know there because we have almost no case studies. What's our one case study for nuclear weapons? Well, that was their use in World War II, where the party using the nuclear weapon was the only party with the weapon. It's highly unlikely that, in any future use of nuclear weapons, the other party is not going to have the weapons, so we don't really know, in terms of a historical study, what the result is going to be. If one party chooses, even if it's with the low yield tactical battlefield weapon in an isolated area (there's been discussions of nuclear depth charges or torpedoes), we don't really know how other states are going to react, with the other states party if they have nuclear weapons to that use, so we might expect that use of that nuclear weapon might bring an end to the conflict, but in fact there's a risk that it's also going to broaden the conflict and take it from a conventional conflict to

a nuclear conflict. So there's a great amount of risk, and there's a great amount of unknowns there. Maybe that gets back towards our trying to understand and have more dialogue with other nuclear weapons countries about situations in which they would use nuclear weapons or when they would escalate through the use of nuclear weapons, because there's just simply a lot of unknown there. I know it was mentioned earlier that China has been incredibly reluctant to engage. I'm at least somewhat heartened to see, just recently, that we have begun engagements with China, and hopefully, we can work towards greater knowledge.

Similarly, on the incidental harms category, as many of our previous panelists mentioned, there's a great amount we don't know about what will occur if we use particularly the larger more strategic weapons from a number of factors: whether they be environmental or the effect on humans, what those effects would be. So there's a great amount of risk there. I know that the United States has tried to maintain some amount of strategic ambiguity, and so therefore there may have been a reluctance to try and understand all the potential effects of nuclear weapons, but I think from a risk analysis standpoint, we need to have the greatest understanding that we can. Because until we have a better idea of what the foreseeability would be of those different types of harm occurring, and what the magnitude of those harms would be, it's very difficult to do a risk analysis assessment in that particular context.

So, if I can close with a comment, if we're trying to do risk analysis in the context of proportionality, which is where I think it makes the most sense to me, my research indicates that most decision-makers or lawyers in this area would tend towards, not exclusively, proportionality. I think the number one thing that we can do to better be able to do risk analysis is to try and fill in those gaps of knowledge that exist. It seems to be, from what I gather from all the other panels, that they're not insignificant gaps. These are things that are major gaps, and things that, in many cases, we could endeavor to close those gaps at least somewhat, but perhaps have been reluctant to do so far. So I'll end my comments on that question right there.

PROF. CHARLES MOXLEY:

Thank you. It's not by chance that Professor Koplow is going last here. We refer to him on these panels as a utility infielder, or the guy who can come in and address any part of it. David has been thinking about these issues and writing about them for quite a while. By the way, I wanted to say, as part of this, I went and read people's bios, and I have to admit that I'm always particularly in awe when I meet somebody who was a Rhodes Scholar, so we have a Rhode Scholar here and there's a certain amount of awe, so thank you.

PROF. DAVID KOPLOW:

I'm glad it inspires awe; if only my kids were halfway impressed. I would also say the notion of a "utility infielder" is somebody whose batting average is about .225 and who can't break into the starting lineup, so I'm happy to be here hitting clean-up on this panel. And I wanted to start, Charlie, by thanking you and commending you and the other organizers for putting this subject of risk analysis on the program for this conference, because I think it's

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frankly an understudied and underappreciated area of this conversation, and not many people have thought hard about it. Charlie, your book is one of the very few places that addresses this topic in the depth that it deserves. I think for many people it's been sort of pushed to the back burner, just because it's so difficult to think rigorously about probabilities and the array of possible consequences. People are just not good at thinking carefully about events that have a low probability of occurrence but a very high consequence if they do occur. People are not very good about thinking about situations where there's an array of possible outcomes, where there might be a dozen different possible scenarios, and you have to figure a probability and a value attached to each of those. It's just a tough thing to do.

For me, the analogy here is to Schrodinger's cat, where in the scenario, there's a cat in an opaque box, and you don't know from the outside whether the cat is alive or dead, and therefore you have to act as if it is simultaneously both alive and dead. For me, what we've got is Schrodinger's nuclear weapons, where there's the possibility of a use, and you don't know at the outset what the effects are going to be. Perhaps the result of the application of nuclear force will turn out to be what you'd hope for, accomplishing a military objective with minimal harm to civilians and civilian objects, but there's also an array of other possibilities as well, and all of those have to be taken into account. Therefore, when you're confronted with Schrodinger's nuke, you've got a tough intellectual task of parceling out the alternatives and then weighing all the possible outcomes and all the possible probabilities associated with those outcomes. I think that's something that people have a very hard time doing.

I'd also say that you have to assess the probabilities on both sides of the use of a nuclear weapon, both in terms of the anticipated military gain, and in terms of the expected harm to civilians and civilian objects. In both cases there's uncertainty as to whether the weapon will achieve its desired goal, or partially achieve it, or achieve it 20%, and the uncertainty as to whether the array of harms inflicted upon non-belligerents is as bad as it might be, or half as bad, or 20% as bad. The task, I think, is to assess all those probabilities in a way that human beings generally have a very hard time doing. So I'm glad that you put this task before this group.

How Should We Be Thinking About the Known Unknowns?

PROF. CHARLES MOXLEY:

There are so many questions here to get started on, but let me ask kind of a broad one and put it out there. When I was trying to think how you do this, and again I don't have the within-the-military or within-the-government experience, so Jeff, David, you all may have a completely different and broader perspective. As I imagine it, a commander is thinking of a nuclear strike and, as I've imagined it, they look at it and tell us, as the legal advisors, "We think this is the right thing to do. It's a really important military objective, a really serious big deal, as was mentioned, or we wouldn't be even thinking about using these weapons." The military people tell us, "We think it's a good clean situation. We think it's more likely than not, it's 55-60%, that, with this nuclear strike, we'll have a good clean military strike on a military target, with little impact on civilians."

Wouldn't it be our job to say, "What's the risk that it hits this town that's 5 miles away, and this smaller city that's 20 miles away, and this huge urban area that's 80 miles away?" And the commander would probably say, "That's not going to happen, and wouldn't our job be to say, but what if it happens, give us some sense of its likelihood?"

So what do we do if they start telling us that there's, say, a 15% chance the strike or its effects will hit or reach the nearby town, a 12% chance of it so impacting the nearby city, and there's, pick a number, a 5% or 1% chance of its hitting or its effects reaching the big urban area and you'd have millions of casualties. What do we do with that? These are unknown, but they're known unknowns. These are things that somebody's going to be responsible to put a number on, and we're going to be responsible, if we're in the room, as legal advisors, to give a view on. How should we think about such a range of probabilities? How should we value them in making the legal analysis?

DR. HANS LIWANG:

I try to start an answer at least because even this condensed operational question that Professor Jeff Biller states, where we compare risks, is not that easy. If you talk about different types of consequences, yet again we have problems comparing them. Also, if we start talking about these specific numbers of probability and consequences, there's a great risk that doing so will lead us to be precisely wrong by putting numbers to things that we can put numbers to and ignoring the things that we cannot really deal with. There is an old U.S. saying from system analysis that it's better to be roughly right than precisely wrong [Carveth Read in *Logic Deductive and Inductive*]. If we try to start looking at these fast, precise answers, comparing this to that in numbers, we will probably be precisely wrong rather than roughly right. Then the question is, does this really help us at all? Then, of course, we probably should do something else instead.

PROF. CHARLES MOXLEY:

This, in a way, is a point you made in the earlier panel, David. Where you said, 'How do we do this?' But we don't have any choice. I mean, we could be called on a jury tomorrow and have to decide whether a criminal defendant was reckless, what their mental state was, or whether in a traffic accident somebody was negligent.

Isn't the question twofold? Is it relevant as a matter of law that you have a 5% or a 1% chance of millions of casualties as a possibility? And if it's potentially relevant, is it incumbent upon the decision-makers, the commanders, and the lawyers to pick a number and give it our best shot? Or do we just let these things go in terms of the legal side of things?

PROF. DAVID KOPLOW:

So, the answers are yes and yes. Of course, it's legally relevant, and of course, you've got to do the best you can in making those decisions. I would also say that when it comes to the use of nuclear weapons, it's not a military commander, it's going to be the President of the U.S. who

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is making that judgment. The day-to-day analysis could describe an array of possible scenarios that might ultimately be put up for presidential decision. In constructing those scenarios, the operators, the technical people, and the lawyers are going to have to do exactly this kind of calculation of assessing all the possible outcomes. It's very complicated. For example, perhaps there is a 2% chance that we'll have this outcome, there's an 18% chance we'll have that outcome, there's a 55% chance we'll have this other outcome. You have to factor all that in constructing a plausible scenario, knowing that the circumstances might change the day before the weapon is actually to be used and that there may be very little time to redo the calculations when the moment is upon us. Therefore, it's again a very demanding challenge to make rational decisions here, but that has to be the legal task.

PROF. CHARLES MOXLEY:

Dr. Giorgou?

DR. EIRINI GIORGOU:

[Remarks omitted.]

Legal Significance of Uncontrollability of Effects

PROF. CHARLES MOXLEY:

You've identified two of the points that are central on our discussion list for this panel: First is the question of the legal significance of a characterization that at least some of the effects of nuclear weapons are not controllable.

We said at the outset of this conference that a purpose in getting people together, and Professor Biller has made the point – he had made it before we started in one of our prep sessions and then I think he said it this morning – that concern about nuclear weapons has come to the front burner again and perhaps we all need to start paying more attention to it.

This issue of whether the uncontrollability or unregulated nature of the effects of nuclear weapons is a basis for unlawfulness—it turns out that this is an area of disagreement, because some of us think it is and some of us think it isn't. So obviously, we need more work there.

Level of Certainty Necessary for Green-lighting a Nuclear Strike

The second point you raised is one I think Professor Koplow addressed, and it's one that Professor Biller and I have been talking about. We all know that, in the context of conventional weapons, we kind of bend over backwards for the military, right? Because they're in this horrible position of warfare and they have to make decisions fast and often on incomplete knowledge, we basically take the position that they should exercise their best judgment, based on the information available to them. If practicable, they should make the phone call or seek additional information, but we don't impose a heavy duty of investigation or inquiry on them.

So, the question is, "Is it different with nuclear weapons?" Is it enough for the legal advisor or the military to say, "I don't know what's really going to happen here. It's hard to

quantify these things. As far as I know, it will be a good clean hit.” Can we stop there? Is that good enough? Or, as we've heard Dr. Giorgou tell us, “Is it the case that that's not enough?” Particularly where we have such higher risks, do we have a heightened duty of inquiry?

Specifically, can we green-light the nuclear strike if we don't have sufficient facts as to the likely consequences of the strike to provide a good faith legal opinion that it will be lawful? Isn't that the question, “Can we use nuclear weapons when there are gaps in our knowledge, uncertainties as to whether potential consequences of the weapons use will be unlawful?” So, what's the answer? Jeff and David, what's the basis as to the level of knowledge or not that a commander or lawyer has to have to be able to give the green light to a strike with nukes?

PROF. JEFFREY BILLER:

I mean, in general, the answer is not certainty, right? You don't have to know for certainty, and that's just the general answer for this. If a commander is given a weapon and told that that weapon is going to act in a certain way 99% of the time, and it doesn't act that way that one time, that's not enough, to say that that was an illegal activity that you just undertook. However, the scale of harm is potentially much larger.

So, the question would be, “What would be the standard by which you would judge them afterwards.” And I think the standard is whether they acted reasonably. And usually, can they explain the decision by which they made the decision? Can you explain it, and when you explain it, is that reasonable? So, I think whether it be the commander or the president making the decision, or let's say God forbid, the chain of command is interrupted, and it's a general officer in an Airborne command post making the decision, what they're going to do is take in all the available information that they have to them. You will have meteorologists, you will have experts on potential effects of nuclear weapons who are all going to be feeding information to that commander or that president, or whoever it is, who is then going to make the call. And the after-the-fact question of how do you judge that person is, “Did they act reasonably? Can they explain through, if part of that explanation is, well, in reality, we had no idea what the effects were going to be of this weapon?” Then that doesn't sound very reasonable, does it? But if the explanation is: “I had experts, qualified, highly qualified experts who were telling me that based upon every model that they've had and they've run, and that they know, these are what we expect to happen.” Can we be 100% certain in that? Absolutely not. And I don't think you can point to a number to that. Do they have to be 90% certain, 95%? It's a reasonableness standard, which is something that lawyers are generally fairly comfortable with, even while recognizing it's an imperfect standard. But I think that's the best that the law has come up with to this point, is to say, can you explain it, and when you explain it, was it reasonable? And it sounds very simplistic, but we don't have a lot of special standards for nuclear weapons right now. We just have a general standard, and then we have to do the best that we can to apply it to something that is extraordinarily difficult.

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Professor Koplow?

PROF. DAVID KOPLOW:

I was hoping that in this panel we'd be able to generate more clash of opposing ideas, but unfortunately, I agree with just about everything that Jeff just said. The fact is that we are stuck in an environment where there are not going to be very many bright line rules, and that's just the nature of human interactions and law in particular.

The ICRC is not the only one who says that it is possible that one bright line is that nuclear weapons can never be used lawfully. That's a very plausible interpretation. But if you step away from that, then nuclear weapons are just like everything else, where the guidepost is the mushy standard of reasonableness. The law of armed conflict uses mushy terms like that repeatedly. There are so many places where the rules talk about what is feasible to do under the circumstances. "Feasible" is one of those marvelously opaque words that's chosen precisely because you can't pin it down. You have to make the best judgment you can under the circumstances, and it's a judgment based on what the decision maker knew or could have known or could have found out at the time, rather than based on hindsight assessing what actually happened. For me, that's not quite bending over backwards, as Charlie says it. To me, that's just the test for the reasonableness of the decision maker: what did that person know at that time, what could they have found out, what additional resources might have been available to them under the circumstances they were in, the pressures of time, and the urgency of the battle. That's the best we can do.

PROF. JEFFREY BILLER:

But respond to that really quickly, one other quick note. If proportionality was the test that you were running, the ICRC has said that when it comes to issues of proportionality, a fairly broad margin of judgment must be afforded to the decision maker in that situation, understanding just how contextual the decision is. And when you look at standards that they've used in international criminal law for violations of proportionality, they go beyond just the excessive test, right? Was the incidental harm excessive to the military advantage? They go to a clearly excessive test and they raise it to an even higher level for criminal law standards. And so, I think what that represents is a large, broad-based agreement that these are hard decisions.

PROF. DAVID KOPLOW:

If the rule is that *per se* nuclear weapons cannot be used lawfully, then it's easy.

DR. HANS LIWANG:

In risk assessment, it's often talked about how, or what do we need in order to make good decisions? And what they talk about then is a lot of shared risk understanding, meaning that the analyst, the decision maker, the lawyer, they all have some kind of agreement on what risks are,

how they work, what the problems are, and what we try to achieve, and of course, how to prepare for these kinds of situations.

To put yourself, or put this team, or put all these people in all these kinds of different possible situations, the specific situations, not on a general level, is one of the problems today. We talk about this on a too general level, and on that level, it's really hard to grasp all the challenges. But on the specific, different situations and trying together to see different viewpoints before you need to make this decision in reality. And of course, this conference is a way of doing that, but there are many other ways that the different commanders need to work on, the President's prerogative as well. But in these kinds of situations, in order to create this shared risk awareness, then we have some likelihood of making good decisions in these situations. And then we need to go into these specifics that probably will paint a bit harder lines or more bright shining lines for us. And I think that it's clear that we need those kinds of decisions that are also broader than the legal discussions, because this is not just a legal, even though it is, even this conference, it's a legal conference, but in general, these decisions are much bigger than legal aspects. But I agree with you, there is a probability that this could be considered to be unlawful weapons in general, but we need to go into the details of these situations deeper to get a broader understanding of these different situations.

PROF. CHARLES MOXLEY:

I understand the point, and I guess David, you made it in the earlier panel. You emphasized how hard it is to make these judgments. But the part of it, and what drives me to where Dr. Giorgou is, is the sense that, if you're talking about a really bad effect, the burden becomes very, very high to avoid it.

If we take what Alan Robock told us today, just start with that, to the effect that, if we get into a serious nuclear exchange between the U.S. and Russia, we're talking potentially some five billion deaths.

There's an evaluation issue here, but, at some point, we're beyond the pale. Maybe we see it differently, as to where the pale is, but aren't there limits on legally permissible levels of risks we can take of even low probability high impact consequences? What was the phrase that was used in the public statement by the heads of state recently—that it's inadmissible to use nuclear weapons?

PROF. DAVID KOPLOW:

Yes, anytime you're doing a cost-benefit calculation, if one of the possible outcomes has a negative value of infinity, then it doesn't have to have a very high probability of occurrence in order to swamp all the rest of the arithmetic. I think that is absolutely the scenario that we would be contemplating with large-scale uses of nuclear weapons, as the [ICJ Advisory Opinion](#) [on the Legality of the Threat or Use of Nuclear Weapons] said. It's more complicated, it's more difficult, when you contemplate other kinds of scenarios where the negative value may be enormously high but not quite infinity.

So, Where Do We Draw the Line?

PROF. CHARLES MOXLEY:

If that's the case, then the obvious question is, where do we draw the line? I mean, here's a quote, and I remembered this from when I read the ICJ decision. I went back and found it last night. You all may remember that the U.S. judge on the ICJ at the time of the Advisory Opinion was Stephen M. Schwebel, and he generally came out supportive of nuclear weapons, but he focused on what he saw as the potential lawfulness of using a low-yield nuclear weapons against a remote target at sea.

We talked earlier about the fact that the lawfulness of particular weapon uses should be assessed in the context of their normal anticipated uses, not aberrational hypothetical uses.

So, here's what [Schwebel said](#), after saying, okay, it may be lawful, or, he thought, it would be lawful to use a low-yield nuclear weapon against a remote ship at sea or perhaps against a remote troop concentration in a very remote area: "It cannot be accepted that the use of nuclear weapons on a scale which would—or could—result in the deaths of many millions in indiscriminate inferno and by far-reaching fallout, have profoundly pernicious effects in space and time, and render uninhabitable much of the earth, could be lawful."

So, he's drawing the line there: You can't risk killing millions of people with a nuclear strike. The question is whether, in a way, we agree with that, and how it fits, if it does, into a risk analysis matrix.

PROF. JEFFREY BILLER:

Well, I think as a very technical matter, there's no such thing as *per se* disproportionate attacks because the factors considered are sliding scales. Now, having said that, if you give me the incidental harm at five billion, I'm going to say, I don't think there's any military advantage that could ever, even theoretically qualify? And I think that's pretty obvious. But that's why these things are all contextual.

Yes, we should think about the worst-case scenarios and understand them and recognize them, but I don't think that means that it's always going to be the worst-case scenario. If it's not *per se* prohibited, which, depending on how you read the ICJ Advisory Opinion, they said there is no *per se* prohibition under international law, then it becomes an all-contextual use-based analysis. We have to analyze it in the context in which they're used, and there are an infinite variety of potential contexts in which they could be deployed. So, I think the only thing you can really do is to try and lay out the principles by which we would evaluate that and make that decision. But I think it's awfully hard to, or maybe not as helpful to always jump towards the worst-case scenario and say, well, listen, a possibility is complete nuclear fallout, and so therefore, *per se*, they should not be used. Just from a legal perspective, I don't think that's the helpful answer as we try and work through the issues.

PROF. DAVID KOPLOW:

For me, the next step is that if creative minds on the ICJ, Judge Schwebel or others, are able to come up with scenarios where a small number of very small nuclear weapons is used in a remote location where it might be valuable, that still does not provide a general justification for the entire nuclear arsenal. That is, if what you've been able to justify is a small number of small nuclear weapons used in a particular scenario, then you shouldn't have large numbers of large nuclear weapons and a doctrine for using them in very different scenarios. There has to be a connection between what you've been able to legally justify and what your arsenal consists of, and that's where I think the ICJ logic breaks down.

DR. EIRINI GIORGOU:

[Remarks omitted.]

PROF. CHARLES MOXLEY:

I think you are going back to the U.S. defense before the ICJ on the lawfulness of nuclear weapons; [the U.S. lawyers rejected an argument](#) of indiscriminate or disproportionate use of nuclear weapons because they argued that the U.S. can lawfully use low-yield nuclear weapons against remote targets. That was the [issue framed before the court](#) "Is the threat or use of nuclear weapons in any circumstance permitted under international law?" But obviously, there has been work done in subsequent years and studies on the effects of radiation on the oceans and on ships in the oceans, and many say even low-yield nuclear weapons are unlawful.

Nuclear Response and Escalation:

PROF. CHARLES MOXLEY:

A central issue to discuss is nuclear response and escalation, because in a way, even if you are talking about a higher yield nuclear weapons use, and certainly when talking about a lower-yield use, there is the question of whether one can say it's legitimate, legally, to just look at the effects of the one nuclear strike being considered. The question is whether, in assessing the lawfulness of the initial strike, one must also consider the potential effects of the potential responsive counter-strike and escalatory strike?

Specifically, is it correct for lawyers to say that responsive counter-strikes and escalation would be the subject of superseding and intervening cause? That's the view of many lawyers and the view that the DOD [Law of War Manual](#) takes

But is it different in this context of nuclear weapons because we know so much? There is so much knowledge and intelligence by Russia and U.S. and other countries as to how they would respond to a nuclear strike. If you have such a level of knowledge as to the likelihood of a nuclear response, does that likelihood become part of the legal analysis as to the lawfulness of the initial strike?

DR. HANS LIWANG:

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I would like to start because there is a difference. If you talk about escalation in terms of traditional weapons in a conflict, where we have seen similar attacks many times, there is of course always a fear of escalation and it's not that great. But the first use of nuclear weapons in a conflict. and the probability of escalation, and how that works is completely different from the hundredth use of a conventional weapon in another conflict. So in typical situations, we don't look at escalation because it is a speculative effect, but in the first use of a nuclear weapon, is it really speculative to say that it will have a big change on the conflict? We say that we don't typically look at escalation, but maybe when we first use nuclear weapons, then escalation is not speculation. It is probably that it will change the conflict, so we cannot push it aside. This time we need to look at escalation.

PROF. DAVID KOPLOW:

Here is one scenario that would provide the boundary test for that. Go back to *Dr. Strangelove* and suppose that you knew that your adversary had installed a doomsday machine, which would automatically blow up the world if we used nuclear weapons against them. Building a doomsday machine would be a violation of international law, but if you knew that the other side had done that, so there was not an intervening choice but an automatic mechanism, then that has to be taken into account in your decision-making. Ordinarily, I am sympathetic to the idea that, when I have to assess the entire array of expected outcomes, that should include all the physical manifestations of blast, heat, and EMP, etc., but I should not be responsible for what the other side might elect to do in response to my actions. In first year torts courses, we talk about an intervening tortfeasor. If some other actor is making separate judgments, I am not responsible for that, even if I can anticipate and foresee that it might happen. If they make an independent judgment, that's on them. But if the independent judgment has become automatic through AI or something else, I think that becomes a harder case.

PROF. JEFFREY BILLER:

First, I'd like to say congratulations to David for being the first one to raise *Dr. Strangelove*, my personal favorite movie. I'd like to go back to something Richard said before that I firmly believe in, and that's why we don't have lawyers making decisions, especially in the military context. It is the Commander that makes the decision because, again, the law piece is one of many pieces, and lawyers are very much trained into the "legal/not legal" realm and we can provide legal risk, we can say: "Here is how I think this will be viewed, and there are some gray areas that we have to contend with." But it is the commander that is taking into account the myriad factors, and if one of those factors is a doomsday machine, it's not really a legal question. It's a "Ok you could do this, and I could justify it under international law, but do you really want to go there and is that really the right place to go?" and I think there would be a thousand other voices saying "I'm not sure that is something we ought to do." Part of being a lawyer is recognizing the bounds of the law and what we do, how it's helpful, where to interject, and where not to interject. When you talk about risk escalation, Charlie talked about this before. If

I'm in a bar fight and the law says I can use a knife at this point, am I responsible if I know that my use of a knife is going to lead to the other guy's use of a gun? I know that, it's probably pretty stupid for me to bring the knife out if I know he is going to use the gun, but am I responsible for the subsequent use of the gun? No. If I'm acting lawfully, that is how I am going to be judged. But that is only one factor to consider when making a decision.

I think it is a little bit dangerous to try to bleed the law out into non-law areas, to not recognize that we are not the only voice in the room. There will be other voices in the room, and those voices will be better able to talk about things like that. They are going to be more of an expert in that particular area. They will have probably studied more issues like doctrine and nuclear strategy than the lawyer has, and they will better be able to answer that question. You're always worried about mission creep, at least in the military we are, and so you want to be careful with the lawyer too about mission creep. Like are you trying to pull things into the law that aren't the law?

PROF. CHARLES MOXLEY:

What do you think, Eirini? Is it beyond law or is the law still in play here?

DR. EIRINI GIORGOU:

[Remarks omitted.]

PROF. CHARLES MOXLEY:

Would that same logic apply to the application of the principle of proportionality, which is a balance against military benefit and even necessity which is also a balance concerning military benefit. If you think there is no military benefit here because of the counter attack, would you take your argument of your reprisal point that far?

DR. EIRINI GIORGOU:

[Remarks omitted.]

PROF. DAVID KOPLOW:

I want to pick up on a point that you just referred to on the military gains side. We have spent most of our time today talking about the risk on the harm side, where you have to assess the probability of bad outcomes, and we spoke about how hard and complicated that can be. The same kind of calculation should be done on the military benefits side of the equation as well. We cannot just assume that the use of a nuclear weapon or any other weapon will automatically 100% meet the commander's objectives in harming the adversary and accomplishing a military mission. Instead, you need to do the same kind of calculation there. Sometimes, on the operational side, this is referred to as the principle of economy of force, meaning that you would not devote weapons uselessly, or drop bombs where you will not accomplish an effect on the intended target. The same kind of assessment should apply to nuclear weapons as well. So you

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must assess, for example, that there is a 10% chance that my use of nuclear weapons will affect the target in a devastating way, a 20% chance it will damage the target, 20% it will miss the target altogether, etc. You have to do the same kind of calculation on the military advantage side as you do on the civilian harm side. And it's equally difficult on both sides.

PROF. CHARLES MOXLEY:

Do you have a sense, Jeff, of whether this happens?

PROF. JEFFREY BILLER:

I think this raises the specter of one of the major debates in international humanitarian law on this question of military advantage. How remote, or what type of military advantage? Can it be strategic? Can it be the big picture? Can it be immediate? What is the time factor? This is one of those areas where I would say identifying gaps, as we do the analysis on the legal side, I would say a gap that should be further emphasized is to further understand what type of military advantage qualifies. The U.S. takes a more expanded view on what sort of military advantage would qualify. They say strategic advantage can qualify, there is no requirement that the advantage must be immediate, It can't be speculative. It can't be hypothetical, but that's different from saying it has to be immediate.

I do not know if we need an expanded debate on military advantage, but in my opinion, one area that could move the ball forward in making better evaluation on risk is coming to a better understanding, especially in the military context, of what sort of military advantage could be gained. And this goes back to part of the problem, which is our lack of case studies. We can't go back and say, "We've had 150 uses of nuclear weapons, and here is what we hoped they would accomplish, did it happen or not?" We have one situation where we used nuclear weapons, and it ended the war, but at the time we were the only country that had nuclear weapons, Japan did not have nuclear weapons. So would the same thing happen if it were the U.S. and Russia? We don't know, and that greatly expands our risk because we have a gap in our knowledge.

PROF. CHARLES MOXLEY:

We have identified that we are coming into a fresh area where not that much work has been done. So what is your bottom line on where we are and what we need to do, Hans?

DR. HANS LIWANG:

We need risk assessments and management to complement the legal component, but typical risk assessment is not equipped for this in its current state to address nuclear weapons. There is a need to look into different types of case studies to be better at this type of risk assessment, and hopefully, that will also help the legal assessment. But risk assessment needs to do it for itself as well. So risk management needs to be better, especially for nuclear weapons, if we want to provide support for these types of decisions.

DR. EIRINI GIORGOU:

[Remarks omitted.]

PROF. DAVID KOPLOW:

I want to close by noting that the title of this conference is “Nuclear Weapons & International Law in Light of the Russian Invasion of Ukraine,” so I want to express a point about Ukraine specifically. Because that context demonstrates that there cannot be any lawful use of any nuclear weapon in, at, or around Ukraine. What we have discussed today is that the military gain of such an attack would be remote, and the consequences would be so horrible, widespread, and long-lasting, that the case-by-case specific analysis has to come out that nuclear weapons could not be used in Ukraine.

PROF. JEFFREY BILLER:

I just want to reemphasize how many areas were discussed, where major knowledge gaps were identified. And when we think about risk in terms of the legal analysis, when you have those gaps, it is very risky to make those legal calculations about military advantage and incidental harm, because of what we do not know. So getting a legal call right is extremely risky because of the gaps in knowledge. We need to keep doing the hard work of understanding better, so we can make better decisions. If the time does come and a lawyer is asked, I would hope they have the best information available, on the legal side, what they think the answer is as it relates to those questions.

PROF. CHARLES MOXLEY:

I guess we end with questions, and I guess it’s inevitable, as we start to look at an area that hasn’t been much focused about, in a context that has become unfortunately “front burner” again. Thank you all for this wonderful discussion. We are adjourned, and we are back at 3 with the deterrence panel.