

International Law and Military Space Activities

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Brian Weeden: Thank you for coming. Hopefully, we're going to have a very interesting discussion today about a topic that may seem a bit boring to start. Our goal here today is to make it not so boring and actually make it interesting.

Before we begin, for those of us who are not familiar with Secure World Foundation, we are an endowed, private operating foundation dedicated to the long-term sustainability of space activities and the use of space for benefits on Earth.

I'd also like to give a thank you to Robert Baxter. He's the President of the Military Law Society here at GWU. They're a student organization that's part of the law school and they're helping us co-sponsor this event. Also, a reminder that today's discussion is on the record.

The topic for today's discussions is how international law applies or doesn't apply to military activities in space. There's a myth going around that there is no law in space. You can basically do whatever you want. In reality, there's actually quite a bit of international law that applies all over them, where we have human activities.

What's true is that to date, there's not been a lot of definition on how some of the existing international law applies or doesn't apply to specific activities in space. Military activities are part of that.

The speakers are going to go through an overview of what bodies of international law apply to military activities and how some of the challenges have been tackled at other domains such as drones, autonomous weapon systems, and cyber. Then, we're going to talk about what the issues are in the space world and how we might try and take some steps towards improving the situation.

The reason that we're bringing this up is that there are a number of initiatives going on at the moment, national, bilateral, and multinational. Discussing space security, space safety, space sustainability. In several of them, the issues such as what is the definition of self-defense have come up and emerged as a sticking point.

We think that it's about time to try and have a more international discussion of what some of these issues are to try and perhaps at some point in the future come to resolution. The goal for today is not to actually solve this entire problem but more to establish some foundational concepts.

When you first came in, you were given a couple of handouts. They're all in today's discussion. The first one talks about the spectrum of law from peace to armed conflict. The other one shows

some examples of in the real world of cyber. They will be referred by a couple of the speakers during the course of the events.

I'll just briefly introduce the speakers. You guys all have their full bios. To my left is Wing Commander Duncan Blake from the Royal Australian Air Force. Next to him Mr. Gary Brown who's currently head of communications here in Washington with the International Committee of the Red Cross. He's an expert in cyber law.

Next to him is Dr. Cassandra Steer, executive director of the Air and Space Law Center, McGill University in Montreal. Finally but definitely not the least is Dr. Peter Hays who's an adjunct professor here at GW University.

With that, I'll give the floor over to the first speaker, Duncan, who's going to give us introduction to the topic and a little bit, I believe, on autonomous systems.

Duncan Blake: Thank you. As Brian said, I'm a member of the Royal Australian Air Force. I have to start with a disclaimer. I have to say the conclusions in my personal capacity are not intended and should not be thought to represent official ideas or any agency of the government of Australia or not is publicly available information.

Got that out of the way. You have legal framework graphically represented on the handout in front of you. That is as applicable in the land, sea, air, space, or cyber domains. State activities leading up to and during war that have been conducted on land are relatively easy to characterize by reference to legal concepts within that framework.

It's not been as easy to characterize those activities in other domains. This is especially true in respect to the application of the law of armed conflict to law act which is the *lex specialis*, a Latin phrase indicating that it is the body of law specifically applying in given circumstances.

In this case, armed conflict, and which displaces other laws that would normally be applicable to the extent when it consists any inconsistency.

Manuals of international law in various domains have made a very substantial contribution to clarifying the application of law act. Before we go any further, it is important to give a brief introduction to the background of these manuals.

From the mid-19th century to early 20th century which is a very formative period for this area of law, there were many attempts to bring states to consensus on new instruments to expand the application of law act.

Then, as still the case now, states weary of anything that appeared to limit their military options and capabilities, weary of apparent arms control instruments.

However, one particular individual, Gustave Moynier, one of the founders of the Red Cross Movement and of the Institute of International Law, realized that the challenges of developing new law about technical aspects of weapons need not stand in the way of clarifying existing law about behavior in the context of armed conflict. Now two distinctions need to be emphasized.

The first is the distinction between developing new law and clarifying existing law, and the second is the distinction between regulating technical aspects of weapons versus defining lawful and unlawful behavior. Gustave Moynier proposed and led a gathering of international legal experts to draft a manual clarifying the application of the existing law act to the conduct of warfare.

In 1880, a group of international legal experts drafted the Oxford manual in relation to the laws of war on land. He led another group in 1913 to draft a second Oxford manual in relation to the laws of naval warfare.

Given the status of the international legal experts, their independence from parochial interests of states, and their rigorous adherence to clarifying the existing law rather than seeking to progressively develop the law, these manuals had a big impact on compliance with the existing law.

They were successful in their expressed primary objective for providing commands with a practical aid for the exercise of distributed command and control, especially in the context of a revolution towards maneuver warfare.

Nevertheless, that approach was not repeated until the San Remo Institute of Humanitarian Law, initiated in effort in 1988 to produce a new manual of international law applicable to armed conflict at sea.

Again, the primary audience has been commanders, especially naval commanders, and you only need to ask a few of them to assure yourself that the San Remo manual is very well known. The San Remo manual has also been very influential among legal experts and in courts and tribunals. Thus, in both respects, it's been a big success.

In 2006, an academic centered at Harvard University initiated a project to draft a similar manual, known as the manual of international law applicable to air and missile warfare, but also known as the Harvard manual, and I'll make some reference to the Harvard manual.

In late 2009, a group of international legal experts was brought together at the NATO Cooperative Cyber Defense Center of Excellence in Tallinn, Estonia, to discuss the legal framework applicable to hostilities in the cyber domain. They immediately rejected the need for development of new law and proposed instead to draft a manual of international law applicable to cyber warfare.

The Tallinn manual was completed in 2013, and Colonel, retired, Gary Brown, he's very qualified to talk about it.

Back to the handout in front of you. There is a spectrum of activity and behavior from peace to armed conflict, and there is a legal regime for peace and a legal regime for armed conflict. Peace is the usual preferred state of affairs. Conflict is an aberration from that state of affairs and is a legal term of art.

It encompasses jus ad bellum, the law about the resort to force by states. Armed conflict also encompasses jus in bello, or the law about how individual soldiers, sailors, and airmen conduct themselves in conflict.

It's also known as law act, international humanitarian law, and the law of war. There are slight distinctions between those three terms depending on the context in which they're used, but we don't need to go into that right now.

Where the legal regime for peace ends and the legal regime for armed conflict starts is uncertain. Within each of the regimes they are stratified by references to legal concepts that can be grouped as either actions by an initiating state, on the left on your handout, or reactions by a responding state, on the right on your handout.

The handout is a simplification of the relationship between concepts, and I've attempted to provide a graphical aid to understanding, but the legal concepts do not necessarily map out as neatly as the handout might suggest.

The first state may behave in a way that is unfriendly but not unlawful, and the other state may respond by conveying its displeasure including in a formal diplomatic note known as a [inaudible 10:38]. Flying along the edge of another state's national airspace and collecting signals intelligence is unfriendly but not unlawful.

Alternatively, the other states may engage in what diplomats call retortion. That is, unfriendly actions of their own that are nevertheless still compatible with all of the international obligations owed by that state.

For example, using an aircraft to broadcast propaganda to fishing boats in the exclusive economic zone of another state is certainly unfriendly and may or may not be a breach of the state's international obligations, depending on what treaties it has ratified and the frequencies that it uses.

Actions by the first state that may be characterized as internationally wrongful acts involve a breach of an obligation owed by a state regardless of the source of the obligation, so it could be a breach of a treaty obligation, or a rule of customary international law, or an interference with a state's sovereign rights. The last one requires a bit more of an explanation.

By virtue of its sovereignty, a state may provide for its own well-being and development free from domination of other states, provided it does not itself impair or violate the legitimate rights of other states, or to put it another way, a state is free to do whatever it wants provided it doesn't interfere with other states.

Anything that takes away this freedom is an interference with a state's sovereign rights. For example, a state is free to fly along the high city side of another state's international airspace, and even free to spy on other states from that position. Rule 119 of the Harvard manual talks about espionage specifically in the context of armed conflict, and you can have a look at that if you want to know more.

If the aircraft is prevented from seeing anything useful, because of camouflage or because lots of very bright lights were turned on, drowning out the picture, then too bad. It is not being prevented from doing something it is free to do. There is no right to useful intelligence generally, and there's an exception to that, and we can talk about that if we have time.

In order to be characterized as unlawful, the interference must be so forcible that it effectively deprives that state of any real choice in the matter. Economic and political coercion does not amount to unlawful interference.

An aircraft flying along the edge of the national airspace of another state that jams propaganda broadcasts within that state thereby violates the sovereignty of that other state. A state is free to broadcast what it likes within its own borders.

If a state commits an internationally wrongful act, the other state will have a right of action in an international legal tribunal. This could include the International Court of Justice at The Hague or specialized tribunals such as the International Tribunal for the Law of the Sea.

Which sounds like a very civilized and ideal way of responding to an internationally wrongful act, but it can take years to get a matter before such a tribunal, and then still more years for the parties to argue the matter, and then many months for the tribunal to make a decision.

That is supposing that both states are subject to jurisdiction on the tribunal and that both states accept the decision. Even in that case, there is often little that can be done to enforce decisions of the tribunal if the decisions are regarded as legally binding and enforceable on the parties in any event.

Given these many limitations, the majority of international disputes are not settled before international legal tribunals but by other means. In response to an internationally wrongful act, a state may also, of course, take protective measures. That is, actions that only have an impact on themselves.

Thus, if a military aircraft keeps getting blocked in international airspace in spite of its freedom of navigation, the state could choose to use a stealth aircraft instead to avoid detection. The right to take protective measures seems obvious but it is worth stating because the question does sometimes come up.

The other state may take countermeasures in response to an internationally wrongful act. This is a legal term of art not to be confused with the way in which the military uses the term "countermeasures," as in "electronic countermeasures."

In a legal sense, "countermeasures" means that the other state may lawfully decide to stop performing an international obligation owed to the first state on the basis that doing so will induce the first state to stop its internationally wrongful act.

There are a number of criteria for the lawfulness of countermeasures. They must be directed at the wrongdoing state. You can't direct them at third states. There must be prior demand to cease and a genuine offer to negotiate, but in the meantime you can take actions to protect yourself.

The countermeasure must be commensurate with or proportional to the original wrongdoing. The countermeasure cannot involve the use of force, and that leaves some discretion about the best course of action in the circumstances.

For example, some responses to the interception and turn back of the state aircraft would be lawful countermeasures, and some responses would be unlawful. It would not be a lawful countermeasure to create a large exclusion zone around the state aircraft such that it interferes with the freedom of the navigation of third states.

It would not be a lawful countermeasure to shoot down the intercepting aircraft because a countermeasure cannot involve a use of force. Although shooting down the intercepting aircraft might be lawful in other circumstances depending on the nature of the threat posed by the intercepting aircraft, and I will say more about that later.

It might be considered disproportionate to block all scheduled and nonscheduled civil and other flights from the intercepting state into the intercepted state. However, it would probably be a lawful countermeasure to disallow scheduled civil flights from the intercepting state to selected airports in the intercepted state.

Notwithstanding the existence of a bilateral treaty between the two states allowing for access.

There is another response to an internationally wrongful act that would itself amount to an internationally wrongful act but which is excused in the circumstances, and that is distress. Distress describes the right of a state's agent to take reasonable measures in a situation of peril to save their lives or the lives of other persons entrusted to their care.

I won't go into this in more detail for the purposes of time, but the classic example is when a US EP-3 aircraft was damaged in interception involving a Chinese aircraft in international airspace on the first of April 2001, and the EP-3 crossed into Chinese airspace and landed on Hainan Island without consent.

Some actions may be more than an internationally wrongful act and may also amount to a threat or use of force. Article 2 (4) of the Charter of the United Nations says that all members shall refrain in their international relations from the threat or use of force against the territorial integrity or political independence of any state or in any other manner inconsistent with the purposes of the United Nations.

Force is generally thought to involve armed force violence and kinetic effects. The ICJ in the Oil Platforms case said that it's more than a border skirmish but could be less than an armed attack, the implication being that there are some uses of force that do not give rise to a right to take action in national self-defense.

The US took the contrary position in that case that any use of force would give rise to a right to respond in national self-defense.

The political issue at stake is that if you set the threshold too low, then conflicts are starting in circumstances where they perhaps don't need to. If it's set too high, then you've got an unreasonable expectation of states restraining themselves.

Not all activities are clear, conventional acts of violence. The ICJ in the Nicaragua case said that it was a matter of scale and effects, and that concept has been expanded upon a number of criteria suggested, specifically severity, immediacy, directness, invasiveness, measurability of the effects, military character, state involvement, and presumptive legality.

Consider a remotely-piloted aerial system that's conducted daily surveillance along a land border. The other state is aware of these surveillance flights and knows that the RPAS has no weapons on board. If one day the RPAS happens to slightly drift into the national airspace of another state, it would be difficult to argue that that amounted to a use of force.

Consider, in contrast, four armed fighter jets off an aircraft carrier sitting 30 nautical miles off the state's coast that turn abruptly and cross into the state's national airspace at right angles, fly almost all the way to the coast, and then immediately return to the aircraft carrier without doing anything.

It would be easy to make the argument that such an activity amounts to a threat of force, but it may be difficult to make the case that it amounts to an armed attack.

Often it will depend on the circumstances in the consideration of the factors that I mentioned previously. Generally there's no right to react with force in response to an initial action that amounts to a threat of force. There are three exceptions.

The first is where it also arises to a level of an armed attack. The second is controversial, and I'm not actually going to go into it now for purposes of time, and the third is the doctrine of necessity. Necessity is the right of a state to take reasonable measures to safeguard an essential interest of the state against a grave and imminent peril.

An example might be where a large surveillance remotely-piloted aerial system, with no weapons on board, flies into another state's territory, an over-populated area. It is shadowed by a fighter aircraft, and when the RPAS suffers a malfunction that puts it on a flight path towards a school, the fighter aircraft destroys the RPAS at a time that would cause the wreckage to fall in a sparsely-populated area.

Sometimes the application of the doctrine of necessity can be very close to the right of national self-defense, and that's set out in article 51 of the charter. If the state suffers an actual armed attack, or anticipates an armed attack, then that state has a right to take action to defend itself and to call upon other states to assist.

An actual armed attack is straightforward. Anticipatory self-defense is more difficult and it implies where the necessity of self-defense is instant, overwhelming, leaving no choice of means and no moment for deliberation. Preemptive or preventive actions cannot be justified as anticipatory self-defense.

The threshold for an armed attack is high, and you look at the same sort of factors that I discussed previously, and the response needs to be necessary and proportional.

Article 51 contemplates the state may act in national self-defense until the security council has taken measures necessary to maintain international peace and security.

In the first place, that would be measures not involving the use of armed force, which could be complete or partial interruption of economic relations, of rails, sea, air, postal, telegraphic, radio, or other means of communication, and the severance of diplomatic relations, and if that doesn't work, then authorizing actions by air, sea, or land forces.

The constraints that come from a UN security council or as resolution are found in the first in the resolution itself. So even if you get a resolution that uses the magic words "all necessary measures," that's not carte blanche. You have to look at the resolution to determine what "necessary" means, because "necessary" is a relative word. Necessary to what end?

It's not just a matter of the resolution itself either. Because there's a lot of intersecting law, and the job of legal advisors to the armed forces becomes very, very complex. When you're trying to deal with the intersection of a security council resolution, host nation law, domestic law, law of armed conflict, laws specific to a domain, and so on.

Once we're in a position of responding to an actual or anticipated armed attack, or in circumstances where there's a resolution, then we're undoubtedly in a situation where there's an armed conflict and the law of armed conflict.

Exactly where that point is can be difficult, but once it does apply then it prohibits attacks on civilians, and civilian objects, and people, and objects with special protection such as hospitals, even if there are enemy wounded inside. However, there are circumstances where such persons and objects may lose their protection, such as where they directly participate in hostilities or a use for military purposes.

It prohibits attacks that would cause excessive collateral damage. It prohibits weapons, means, and methods of warfare that would cause widespread, long-term, and severe damage to the natural environment. It prohibits states from using civilians and civilian objects as shields. The Harvard manual explains the application of those and many other principles of LOAC to air and missile warfare in detail.

That's sufficient for now as an introduction for the other three speakers. There's not sufficient time to talk about aggression and the crime of aggression, although it's on your handout, but please ask at the end if you're curious about that, and thanks for your time, and I look forward to your questions later.

Brian: Thank you, Duncan. We're now going to turn to Mr. Gary Brown who's going to talk about how some of this has panned out in the cyber world, and his experience in putting together the Tallinn manual. Gary.

Gary Brown: Thanks a lot. I thought maybe they had arranged us intentionally to go military guys down here and then the professors up there, but Duncan, you set the bar really high.

[laughter]

Gary: Everybody, cut me a break here. I'm the dumb cyber guy in the middle. I really don't know anything about space law, so you tell me how cyber is analogous to space and I'll listen

intently. What I can do is tell you a little bit about the development of cyber law and where we are there.

I'll break it up into three parts, and then I have one bonus segment if I get through the first three fast enough.

I'll talk a little bit about the Tallinn manual first, and then a little bit about what constitutes cyber warfare, something about the law that applies once you're in armed conflict, and then a secret bonus issue last.

This is the Tallinn manual that we've been referencing a little bit already. This was the work of a long time and a lot of smart people, and I was fortunate enough to be there watching smart people at work. I think it's been quite valuable, and it's been talked about a lot in the international community for a good reason.

First of all, it really...and we knew this when we talked about it in Tallinn. It really doesn't have a lot to do with the activity that's going on in cyberspace right now because we very intentionally made it focus on war, cyber warfare, and not just cyber operations, so there are a lot...

Most of the things that happen now fall far below the level of anything that we would characterize as armed conflict so none of that is covered in this manual. This manual talks about the stuff above the line.

The idea was, "Hey, let's get the easy part on paper and then we can talk about the hard part later," so this was the focus of the manual. The reason I think it's gotten a lot of attention, it's just a bunch of scholars putting together a book. It doesn't represent the opinion of any nation or any bigger organization.

It's just a scholarly manual, but I think the reason it's gotten a lot of attention is we really are hungry for law in cyberspace. I guess this is much like space. Some people have argued that there is no law in cyberspace, and maybe they're right, but what we have is a lack of treaty law.

We have a lack of agreement among states about what should be normative behavior in cyberspace, what should be appropriate or inappropriate in cyberspace, and, most importantly, we have a lack of national practice that we could look to, to develop customary international law.

The reason we have a lack of national practice is, of course, that activities undertaken by states. Which is where we get customary law, from the actions of states, not from individual actors, the actions of states in cyberspace are secret. Nobody owns up.

Even when it's printed in the "New York Times," attributed to certain states when activities happen, still states don't own up to what they did. So there's been almost nothing that's been officially attributed to a state, so we have a real hard time developing customary law in this area.

As a result, the Tallinn manual really filled a void, because we didn't have any law, so people are looking at it to at least a reasoned opinion about what the law ought to be. Now, how useful that is going forward, I don't know. Because, as I said, most of the activity that's happening is below the level that the Tallinn manual covers, but again, it's a start, I think. It is a start.

The next thing I'll talk about a little bit is how we get to war in cyberspace. This is a tough issue. Sometimes it's easy. If you already have an armed conflict going on, which, unfortunately, there are many of them generally at any given time, it's understood, and I think rightly understood, that cyber activities will be part of the tactics that are used inside armed conflict.

Of course, there isn't really any conversation, or any discussions or disagreement, about the fact that LOAC, the law of armed conflict, would apply to those activities. You're inside an armed conflict. Anything you do, if you drop a bomb, the law of armed conflict applies. If you employ cyber methodology, the law of armed conflict applies.

That's fairly easy and fairly straightforward. The problem is we don't always know, when we get to armed conflict, if there isn't a kinetic, preexisting armed conflict.

One of the big questions that plagues us, I think, is the danger that, since we don't know where the line is, there might be an unintentional escalation or an unintentional cyber warfare that could result down the road when somebody was just trying to do something at a much lower level.

But it ended up being interpreted by their adversary as something much higher that results in real armed conflict, in a kinetic armed conflict.

In this regard, we have problems with both. Of course, the attribution part makes it a problem when we're trying to figure out if something is an international armed conflict, an armed conflict between two nation states.

Even more difficult is determining whether or not something would constitute a non-international armed conflict, which would be an armed conflict between a nation state on one side and an organized armed group on the other side.

The international law in this area is that organized armed group, that non-state armed group, has to have a certain level. We're not exactly sure where it is but we know it when we see it, a certain level of organization before they can qualify.

And there has to be a certain level of intensity of the violence in the armed conflict, and you can already see the problems when trying to apply that in cyberspace.

What kind of organization do we have? Generally speaking, cyber actors are loosely organized across the Internet, which is a wonderful, wonderful communications platform for armed groups, and they can organize loosely, maybe not even meet in person but coordinate their activities.

Does that qualify as an organized armed group? Not under the traditional way of looking at it, it doesn't, but maybe it will in the future.

What about the intensity of violence? What kind of violence results from cyber warfare? I don't know. Sometimes there can be consequences that result from cyber activities, but many times we just think about things happening electronically are entirely contained within cyberspace. It's difficult to lay a violence definition on most of those things.

That can be quite difficult just to get to that level. Of course, we have the overarching problem, which is one, I think, also, you have in space, of the attribution or non-attribution of activities in

cyberspace, generally. If an activity happens, we're not quite sure whether it came from a state. We don't know whether it came from an individual.

Maybe you've seen some of the reports, if you're into cyberspace activities, from companies like Mandiant, who have reported back in very great detail about the origin of certain cyber events.

Traced them all the way back to the computer and had taken pictures with the web cam on the computers. And given the home address, and the girlfriend, and everything else of the people who were responsible for these activities. Some of whom, as it turned out, happened to be in the Chinese army.

What does that tell you? It tells you that you found a person that does an activity. It doesn't necessarily, in every case, tell you what organization is behind the activity, it just tells you the individual. It doesn't necessarily tell you what the organization's motivation was. Not even that. We're not quite sure whether we're going to get into armed conflict.

The third point is once we're inside an armed conflict, there are big issues, too. I picked a couple of my favorite to talk about. There are many, many more. I'm happy to talk about whichever ones you would happen to want to talk about. One of them is just the definition of an attack inside armed conflict.

We're in an armed conflict. Now we're trying to decide does this cyber activity constitute an attack or not? Most of the time, in the kinetic world, when we think about bombs and bullets. We're pretty clear on what constitutes an attack. In the cyber world, not so easy.

The way we chose, in the Tallinn Manual and the working definition we used when I was at Cyber Command, focused on the reasonable expectation of injury or death, damage or destruction. Some of those things. We're looking at kinetic results to get to the definition of attack, for the most part.

The big debate that resulted in Tallinn from this was the idea that, perhaps, if we interfere with the functionality of a system, maybe that should qualify as an attack, too. This is unique to cyber. We don't normally think of just interfering with functionality as being an attack or a violent activity, but if we just make something not work, maybe that could be an attack.

Is that true? I don't know if it's true or not. It gets to be very difficult. One of the examples I've put on this chart, which is my pretty chart, two pretty charts here, actually, is the Sony hack, which most of you have heard about.

Most of the smart, unclassified people that I talk to about the Sony hack told me that what it essentially consisted of was going into hard drives on the Sony system and disrupting or destroying the master boot record on hard drives. If you're a computer guy, you know what that means.

If you're not, I can tell you it's essentially the same as being in a file room with a billion files in it that aren't filed in any particular order. You have this piece of paper that tells you where all the files are, and somebody tore your piece of paper up. Now, all your files are still there. Nothing's been destroyed other than this index. You can't really find anything.

You can probably reconstruct the master boot record with a deep forensic analysis, if you have the time and the money to do that. For the most part, it's not really worth it, because you've also got somebody inside your system. Who knows if they're still going to be sitting there when you're finished reconstructing the master boot record.

Is that an attack? What was destroyed? Your stuff's still there. It's all still there. All the ones and zeros still reside on the drive, you just can't find anything. I don't know. They're hard questions. Difficult. I think not quite the same as they are in the kinetic world.

Quickly, one of the things I'll talk about is cyber disruption in general. That is having very specific effects on people's lives, in their everyday lives, without anything being destroyed.

You can think of things like if the train-switching system were disrupted, not to make trains crash but to make it so we don't trust the reliability of the switching system. We have to stop all rail traffic in the United States because we're not sure if they'll crash, so let's stop all the rail traffic.

What if the ports of Baltimore, Long Beach, and Galveston somebody got into the computer system that had the manifests of all the container ships coming in and shuffled all the manifests so we had to physically crack open every container on the ships and find out what was inside before they were dispatched from the port?

What do you think that would do to people's lives here in the United States? Again, nothing destroyed, things just moved around. Those disruptive actions are difficult to characterize under traditional, international humanitarian law. Not so easy. I only want to take another minute or two.

The second issue that I'll talk about is, once you're inside an armed conflict is the difficulty of deciding what the means and methods of cyber warfare are. Generally considered to be pretty easy in kinetic warfare but in cyber quite difficult. When you think about it, what exactly do you point to when you think about a cyber attack?

If somebody's taking an aggressive cyber action, what is it you're going to point to to review for compliance with the law? Is it the computer? Is it the keyboard? Is it the hard drive? Is it the network itself? Is it the Internet? What is it exactly that constitutes the weapon?

The reason this is particularly difficult in cyber is that many activities undertaken by criminals and hackers and anybody else that undertakes this kind of nefarious activity is something you might broadly refer to as command-line tactics. We gain unauthorized access to a network or a system. Now you're logged on as administrator.

Someone is logged on as administrator to your system, and now they own your system. They can do whatever they want with it. They can read your mail, delete your mail, copy your mail, change your mail, or delete all your files. In some cases, even physically destroy your machine. Is the fact that they're physically resonating on the machine, first of all, is that an attack in itself?

If not, which thing is it that they're using that constitutes a weapon? Which thing? Is it their fingers? I don't know. It's difficult to fit in this traditional framework. I don't really have time,

but I'm going to tell you the bonus issue anyway, just very quickly. One of the hardest things to deal with in the law of cyber warfare is distinguishing between espionage and military activity.

Very, very challenging. For instance, the US Air Force, my former service, took the easy way out, which is just saying, "Here's the definition of attack. All these things are attacks, unless it's done for espionage purposes." That, to me, is the easy and not very effective way out because, of course, the person on the other end of the activity has no idea what your intention is behind doing it.

I don't know that anybody has a better definition that's been able to distinguish those two. I think it's a conversation we need to have. Thank you.

Brian: Thank you very much. Now we're going to move on to Dr. Steer, who's going to talk about some of the challenges we face in the space world.

Cassandra Steer: It's been mentioned a couple of times, people question whether there is even any law in space. I don't know how many space law specialists...How many people here are familiar with space law as a specific background? Great. There are some people here to back me up. There is actually law in space.

I'm going to give a brief introduction to the general principles of what applies in space law. Then, talk about the militarization of space, which is very controversial, and to what extent the law of armed conflict or law act does or doesn't apply, to what extent we know whether it applies.

Finally, a manual on the application of international law to be like, "Gee, activities in outer space might contribute." The basic principles of space law, relating to military activities, in particular. We have, in 1963, the UN already sat down soon after Sputnik was launched. There were already activities in space.

The UN sat down and came up with some general principles governing any activities of states in the exploration and use of outer space. These principles led to the 1967 Outer Space Treaty, which is our core treaty when it comes to what's our basic public international law specifically in the environment of space.

You could say that the object and purpose of that treaty is to maintain the peaceful exploration and use of outer space. It was to prevent an arms race, essentially. If you look at the time, within which this was the beginning of the Cold War, it was to prevent an arms race in outer space. To ensure the freedom of access by all states to the use and exploration of space.

Also, there were a lot of ideals already stated in that treaty saying any kind of scientific information that one state should gather should be made available to all states. It's about a collaborative, cooperative environment. The UN Committee on Peaceful Uses of Outer Space...and, yes, that's a thing, as is the UN Office of Outer Space Affairs. People don't believe me, but it exists.

We had the general principles, we had a few treaties governing outer space, but after a certain short burst of treaty making it came to deadlock. The Committee on Peaceful Uses of Outer

Space has attempted, over time, to keep developing that law, particularly as our technology develops, as has the CD and the UN. It's been deadlocked for several years for political reasons.

We've had repeated General Assembly resolutions over several decades called the PAROS Resolutions, or the Prevention of Arms Race in Outer Space. As we know, General Assembly resolutions are non-binding. They're aspirational. They're an expression of what we all generally agree to, but they're non-binding.

What do we have in terms of binding law? Article I of the Outer Space Treaty lays down, as I mentioned, the freedom of use and exploration of outer space for all states for the benefits and in the interests of all countries, irrespective of their degree of economic or scientific development. Also, the attempt to include non-space-faring nations, and shall be the providence of all mankind,

Meaning, as is laid down in Article II of the Outer Space Treaty, specifically, space can't be claimed as any state's territory. It's not possible to appropriate space since it's non-territorial, and a lot of people make the analogy to the high seas. Nobody can claim that as their property. It's the providence of all of humankind, which also means we all have to take care of it.

Article III says all of that exploration and free use that we all have has to be done in accordance with international law. That includes the charter of the United Nations. It, therefore, includes UN Article 2 (4), at jus cogens against any use of force.

It's stated in Article III it must be in the interest of maintaining international peace and security and promoting international cooperation and understanding. It's all against an arms race, against having space become a new battlefield, which was already foreseeable.

Article IV of the Outer Space Treaty specifies that it's a prohibition of weaponization and, specifically, nuclear weapons or weapons of mass destruction. We cannot place them in orbit. We cannot station them on any celestial bodies, which includes the moon, planets, things floating around up there or in any other manner.

They're trying to be as broad as possible. The question remains, what amounts to a weapon of mass destruction? Could we have smart weapons, which aren't weapons of mass destruction, which might fall through a loophole there and suddenly be acceptable in outer space?

Article VI of the Outer Space Treaty states that all states are responsible for their activities in outer space, including the activities of non-state actors for which they're responsible.

Article IX of the Outer Space Treaty gives a fairly weak obligation, although it's the one that people tend to reach to the most often, that all activities have to be executed with due regard for the corresponding interests of other states.

If a state believes that the space activities of another state would cause potentially harmful interference with activities in the peaceful exploration and use of outer space, it can request consultation. There's an obligation, but it's a weak obligation under Article IX.

Space law is a part of public international law. Everything that we know in public international law, everything we know about the law of armed conflict generally applies. As Duncan has

mentioned, we have Article 2 (4) in the UN charter and all of the jus cogens. We have the possibility.

The only two exceptions to Article 2 (4), of course, are self-defense, Article 51, or if the Security Council allows it under a resolution for the collective self-defense. The law of armed conflict or international humanitarian law applies, in general, but we still have questions about how that applies specifically to the space environment.

You can think, also, about environment law, particularly if you think about the kind of targeting that might take place in space when you're talking about satellites. As soon as you destroy something in outer space, the kind of space debris that gets created is incredibly hazardous. I'm sure most people here have seen the film "Gravity".

One of the things I liked about that film is the whole premise is it's not big, scary aliens coming to get us that are our greatest threat in our near-space environment, it's the junk that we've created out there. I'll talk a little bit more about the militarization of outer space, which is a controversial term.

Really, we should be talking about the weaponization of outer space, because that is what is prohibited. That's very clear. Military technology has always been involved in our exploration of outer space, and the use of space as a strategic domain for conflict or defense here on Earth.

I mentioned in Article III the underlying, core principle that our exploration and use of outer space has to be for peaceful purposes. There's been a debate for quite some time whether that excludes military use in total or only aggressive purposes. Can we have military technology up there that's not doing aggressive things?

One example might be monitoring another state as to whether or not they are developing a nuclear arms project. It could be for defensive or monitoring or, in fact, peaceful purposes but using military technology. If you think, also, about GPS, I've had to use Google Maps to find my way here to the university.

GPS was a military technology originally, and it's been expanded for civilian use. By comparison, the Russian GLONASS system and the European Galileo system and, I believe, also, the Chinese system were originally civilian, but the technology started out as military technology.

The prevention of the space arms race was very much underlying the beginning of our space law treaties, but what about today? We're not thinking just about the Reagan era notion of Star Wars, where he talked about having a huge system of satellites and shields, the Strategic Defense Initiative.

At the time, the technology wasn't sufficient to create something like that, and it was also criticized as creating a new arms race. If you think about the way wars are fought... "Here on Earth" sounds like such a funny way to say it, as if we're fighting them on other planets.

Terrestrial warfare is already, I wouldn't say governed, but there's a lot of military technology that has an extremely important part in how intelligence is gathered, for instance. I know some people talk about Operation Desert Storm in the first Iraq War as being the first space war.

It's the first time space technology and satellite technology was such an integral part of being able to exercise the operation and take strategic decisions. The biggest question, which takes me to my next topic, is this idea of dual-use technologies. I mentioned GPS started out as military technology and became civilian.

What we also have today is it costs a lot of money to put things up in space. There's a lot of shared payloads. There's a lot of dual use. There are a lot of satellites up there that are used both for military intelligence gathering or monitoring and for you and I using our mobile phones, both on the one satellite.

This creates questions as to what is the nature or use of that object? Can it be seen as a military object? Can it be targeted or not? If we're thinking about to what extent international humanitarian law, the law of armed conflict, does or doesn't apply to, space or, more to the point, to what extent do we know that it applies, what are the questions we still have to answer?

The Outer Space Treaty and the other treaties applying to outer space are *lex specialis*, as, has already been mentioned, so is the law of armed conflict. What happens if the two of those counter each other in either way? Which one prevails? It's one of the biggest questions we have to consider.

Another problem is that it's not just new methods and means. There's a big crossover with cyber warfare. Again, because most of the technology is satellite technology, when we think about targeting a satellite, it's going to be done through cyber technology. There's a lot of crossover with the questions that has been dealt with in the Tallinn Manual that also applies to space.

We have another question about territoriality. As I mentioned, no one can appropriate space. This was very much a hypothetical that came up a couple of weeks ago. I'd be very curious to see what a military expert would say about this. In air space, it's not a claim of territory but it's an air defense identification zone.

Beyond your exclusive economic zone, you can say, "We want to extend another couple of hundred kilometers. We want to say it's not our territory, but if anyone flies through that zone, we want you to identify who you are and what your purposes are because there's a risk you may fly into our territory."

It's not a territorial claim, but it's an extension of a defense zone. There's been contentions around whether these zones can overlap each other. I'm curious whether we could think about the analogy of extending that upwards. Air space.

A state has exclusive territory over its air space up to we don't really know where, because we don't really know where air space ends and outer space begins. It's another question that plagues these smart professors who still haven't been able to work it out.

Would it be possible for a state to extend not its territoriality but its defense zone further up into outer space and say, "If you fly through this zone we want you to identify yourself." Problem is that then comes into contention with the freedom of use of outer space. Everyone has the right to freely explore outer space.

If you're suddenly claiming that I have to identify myself as I fly through a certain area that isn't your territory, it could become quite complex. We're not only thinking about it in terms of war in space. It sounds a little bit futuristic. There's three domains you could think of. The first is from space to Earth.

As I said, Operation Desert Storm, they've been using satellite technology for intelligence gathering and monitoring for quite some time. Space assets to contribute to or take part in terrestrial warfare. The second is Earth-to-space assets.

When we start thinking about the possibility of targeting a belligerent party satellite and then the problem we have of dual-use satellites and identifying whether this is a military objects or not. Cyber warfare. Also, possibly, just jamming the signal.

It wouldn't have to lead to destruction of a space asset, it could just be jamming the signals so that our enemy party can't receive the information that they're trying to get from that satellite. Then you can think about space-to-space, which is probably a little bit more futuristic, at the moment, but it may not be too far off.

When you think about using satellites as weapons against each other or just with the purpose, again, interfering with each other. In 2014, Russia launched an object. It didn't announce the launch. It didn't register. We don't know whether it was a satellite. People started to think it was just some kind of experiment.

Then, the satellites started to make some very interesting maneuvers, moving towards other satellites. It could also have been a really great step forward in terms of being able to do on the board serving and fixing a satellite or extending its life by sending this robot out. There was also speculation that it may have been a weapon test, which is [inaudible 53:00] .

I mentioned given the technologies at some [inaudible 53:06] cyber warfare and the questions arise again in the space domain, what amounts do we use a force if you're talking about jamming or interfering the signal, is that use of force? What would then be the acceptable countermeasures for something like that? Are we just going to end jamming each other's satellites continuing...?

As many of you know, one of the core principles of all armed conflicts is the principle of distinction. We have to be able to distinguish between military objects and protected objects, as Duncan mention, like hospital or school. But also protected persons as opposed to military personnel although it's directly participating facilities.

When we think about astronauts, for instance the astronauts on the International Space Station, astronauts are non-combatant of the Outer Space Treaty, dedicated as envoys of humankind. They have a special protection. We've all need to look after them. It's also the astronaut agreement.

If a Russian astronaut lands on US territory the US is obliged to help them out and return them to Russia. But what happens to the status of these astronauts if their two countries suddenly enter into conflict? Are they still envoys of humankind? A lot of these astronauts tend to be military personnel. Do they suddenly become military objects? Do they retain a certain protection? Which *lex specialis* applies?

What happens if an astronaut is not a military personnel? We have more and more people paying for their own route to the ISS, but we also have scientists taking part in these expeditions.

What if they're not military personnel but they're involved in the use of space technologies? How do we know what stage they are or aren't directly participating in hostilities and when their status might change?

I mentioned already dual use satellites. I think this is one of the biggest questions that has to be answered when looking at targeting. A military object is defined, if I use the word and if the addition protocol IP-1 according to its nature, location, purpose, or use.

Their location in outer space is not in anybody's territory. The use and the purpose may be very difficult to identify when we have these dual use satellites. It becomes very difficult to identify what is or isn't a military target. The same again with rockets and launch vehicles.

Essentially, every single launch vehicle sending satellites up into space is a missile. It's very difficult to verify what its purpose is when it's launching. It may just be launching a little cube sat that some university has developed for scientific purposes. It may also be carrying another payload that we can't verify.

Another big question is the balance of military necessity and collateral damage. These are the biggest questions in the law of armed conflict. When you think about targeting a satellite, and I mentioned the dual use, so maybe the same satellite that I used to help me with my GPS to find the university today, also has transponders on it that's being used for military purposes.

If it were determined that it was a military object, and that it was OK to target it, and that I'm talking more than just jamming the signal but possibly destroying the satellite. What happens in terms of collateral damage, if our communications were wiped out?

I know we've had a conference not long ago that was called "Without Satellites for a Day." Just imagine without them. We are so dependent on space technology. People don't really realize it, but our GPS communications are also used, for instance, for civil aviation. So the plane knows where it's going and where to land, all your Internet communications, your phone communications.

It's not just a matter of Facebook. There's actually some very serious technology that's dependent that, if that were to be interrupted even just temporarily, the collateral damage could be immense. So it's very hard to balance out whether that is a serious military objective or not. Sorry about that, fulfills military necessity or not. Is it even foreseeable what the collateral damage could be?

Then, again, as we think of the problem of space degree, if you are talking about kinetic weapons, or destroying a satellite or another space asset, the problem of space degree and the

kind of extended greater risk for collision, I mentioned the film "Gravity," but there's something like a hundred potential collisions a day.

We have 1,200 satellites up there, plus all the other space junk. If you were to destroy satellites, satellites then create more space junk. The environmental collateral damage would also be immense.

Just briefly, how would a manual contribute to all of this? Well, Duncan's already mentioned the history of the manuals that we have, the San Remo manual, the Oxford manual historically, the Tallinn manual.

These manuals are actually on the desks of military commanders when they're asking the questions in times of conflict. I don't know if the Tallinn manual has been actively used thus far, but these manuals are important documents put together by the people with the inside knowledge.

We also need internationally relevant domestic laws, so one way of going about this might be that national militaries come up with their own manuals to deal with these issues, but then you have a potential for different interpretations crossing over legal regimes.

A subjective interpretation as to when it might be treated, which was what we had in the pre-World War II, classical law of armed conflict.

An international manual, recognized manual, would also avoid the problem of legal black holes, as I like to call them, which is where the state says, "Well, it's a state of emergency. We don't have to apply the law of armed combat the way that it otherwise would apply." Having an international recognized manual would avoid this potential problem.

There's also a need for particular rules rather than just general principles, so we can't just rely on something like The Martens Clause, which was originally in the Hague Convention of 1907. It was also included in the additional protocols. In cases not covered by the law in force, the human person remains under the protection of the principles of humanity and the dictates of the public conscious.

The point was that you can't foresee all of the technology that humanity's going to develop. We need a clause that says, "Well, there's a general human standard that applies," but I'm not convinced that's enough when we're talking about the specific technology and the specific environment, which is very different from anything we've dealt with in land, air, or sea warfare.

We also need more clarity because there's an increasing number of non-state actors taking part in our space activities, sharing launches with the government military, dual use of technology that I mentioned. But also government and military outsourcing some of their technology. We all know Space-X is sending people up to the International Space Station.

There's more and more of these non-state actors involved. How does the law of armed conflict apply to their participation should a conflict begin between states.

Then there's the question, are we developing the law, updating the law, or are we restating the law? I think this is probably something we can discuss a little bit further in time when we have questions.

Essentially, the reason we need a manual is that it's about regulating and restraining the ways in which space is used in conflict, regulating and restraining military activities in space. The ways of death of the law of armed conflict is to regulate and minimize the impact of human conflict. And this needs to be considered carefully, and I would argue urgently, when it comes to the next battlefield.

Brian: Thank you very much. Last, but certainly not least, is Pete Hays, and he's going to talk a little bit about how clarifying some of this might be useful from a strategic context.

Peter Hays: Well, thanks very much, Brian. It's a great pleasure to be with you and I appreciate this opportunity. I'd like to thank the Secure World Foundation, and GWU, and Duncan. And all of you for coming out to this. I need to also just reiterate that I'm also those same kind of restrictions, so these are personal comments only and they don't reflect anyone's official position about anything.

[laughter]

Peter: Yeah. Of course. I would like to start with just the disclaimer that I am not a space lawyer, I don't play one on TV. So I probably have a quite different interpretation of some of the things that have been previously discussed, and I'd like to go back to my interpretation of the Outer Space Treaty based on what I see as the negotiating history as well as a subsequent practice of the party.

I think there was some thought to the idea that we wanted to have constraints on a potential arms race in space that led to the outer space treaty, but I would submit it was much more about, in that time area, decolonization ideas that were very widely shared among the states in the UN, and they wanted to ensure that the ills of colonization would not be extended to outer space.

That's really the primary purpose behind the treaty as I see it, and I think when it...as Professor Steer mentioned, you had a lot of rapid growth in space law in about the 10 years from the opening of the Space Age, and subsequent to that there's been very, very little.

I would submit that that's because the major space actors reached the limits of what they were willing to agree to at the time of the outer space treaty. They enshrined that into international law, and it's no accident, comrades, that we haven't gotten very far past that.

What exactly does the outer space treaty say about space weaponization? It does not say that you cannot weaponize space. It says you cannot have nuclear weapons in earth orbit, outer space, or on celestial bodies.

As the authoritative source for that, I submit to you that when Dean Rusk testified in the United States Senate, when they were doing advice and consent to ratification of the treaty, he said that this treaty does not preclude the development of anti-satellite weapons should those become necessary in the future.

The United States had already developed anti-satellite weapons starting in 1958, so he was just merely stating a fact. There's nothing about satellite weapons in the treaty, and again, in my judgment in terms of the negotiating record and the subsequent practice of the parties, there's really nothing about that kind of weaponization in space.

I would also highlight, as Professor Steer did, that weapons of mass destruction are not defined in the treaty. What is and isn't a mass destruction weapon is up to the space lawyers [inaudible 64:00] .

I would also tell you that the Soviet Union has tested their co-orbital ASAT system 20 times, at least. The United States tested many anti-satellite weapons. No one objected, to the best of my knowledge, to those events under the terms of the Outer Space Treaty because they could not. It doesn't prohibit those kinds of things. That's a very significant point of international law here.

We might like that the treaty banned all these kinds of things. We might think that that's a better way to approach things going forward in the future, but in point of fact, it does not. Again, the practice of the parties is very important in this regard because they clearly interpreted that they could those kinds of things and not be in violation of the treaty.

I would also submit to you that when states are really serious about having better defined and enforced mechanisms with respect to how the treaty will be implemented. They put in place something like the Standing Consultative Commission of the Anti-Ballistic Missile Treaty or the Joint Inspection and Compliance Commission of the START I Treaty...

Those kinds of things, which are specifically intended to interpret what the obligations under the treaty are and to get the parties on board with those kinds of obligations. The Outer Space Treaty has Zip-a-Dee-Doo-Dah with respect to that. None.

That's a very significant point of departure as well. If the parties were really serious about having those kinds of things in place, they would have put something in place.

Or in these many years subsequent to the treaty, they would have said, "All this prior notification stuff and responsibilities for continuing supervision of all the activities of our licensees in space, that requires some kind of standing body to interpret all this stuff and make sure that the signatories are all in compliance with the terms of the treaty." That is also instructive to me.

Again, in my humble opinion, we've reached the limits in international law, in terms of what major space actors are willing to sign up to in terms of treaty law. Customary international law is also important, as my fellow panelists have talked about. Again, the practice of the parties is pretty important.

I note that none, at least to the best of my knowledge...I know there are a lot of State Department's people here. You can correct me if I'm wrong. I don't know of anyone that objected to, let's say, the 2007 Chinese anti-satellite test in terms of that somehow violating the Outer Space Treaty.

Obviously, the Chinese didn't do any prior consultations. It seems to me that adding 25 percent to the amount of debris in low Earth orbit might cause some kind of harmful interference with

others, but it wasn't objected to on the grounds of somehow violating the treaty. I think that ought to be instructive to us as well.

That just forms a pretty significant impediment, in my judgment, in terms of where we're going with specific law. I'd like to just highlight a couple other things that were brought up by my panelists. I am going to yield a lot of my time back because I'm very curious about your questions.

Duncan talked about peace being the normal state of affairs. That's another thing that I wish were true, but our friends in the Kremlin seem to have other ideas about that. In fact, they've come up with this idea of hybrid warfare. The primary purpose of hybrid warfare is to blur the lines between peace and war so that many activities can be undertaken.

It's not very clear to many of the observers what exactly is going on. Maybe there are terrorist activities going on. Maybe there are unconventional warfare activities going on. Maybe conventional warfare activities with volunteers instead of regular forces, et cetera, et cetera.

When we look at major space power actors who have these kinds of doctrines in operation terrestrially, it doesn't give me great optimism when I think about how those might be applied in space, especially in the context of all the issues with dual-use systems and problems with attribution that have already been raised.

It's difficult enough when people are really interested in being transparent and providing as much information as possible about their space operations because space is big. It's hard to track all this stuff. Smaller and smaller things can have more and more ability to do more and more things.

When I overlay that with this idea that I now want to practice hybrid warfare and fuzz up the line between peace and war, I think that's going to be very, very difficult. I don't want to misconstrue my concepts.

I wish everyone in this room, and others, the best of luck in producing these space law advancements. I really, truly believe they are needed, but I just want to highlight that in my judgment, it's going to be exceptionally difficult.

The final thing I'll just raise is that many of you have probably read Clay Moltz's book, "The Politics of Space Security: Strategic Restraint and the Pursuit of National Interests." I think that's a brilliant book.

It does a great job of talking about how the superpowers during the space age did environmental learning and understood that lighting off nuclear weapons in space was harmful to people in space. More and more debris was less and less useful to folks. I agree with all that.

I think Clay runs history forwards and backwards. I don't think the concerns that we have about those things today were as big a concern at the time those things were happening, but I would just ask you to consider whether in fact this strategic restraint on the part of the United States is having the intended effect.

It would be great if all other major space actors were practicing a lot of restraint in what they are capable of doing, as the United States has been doing for decades, but I don't see much evidence of that.

In the context of the interpretation of the Outer Space Treaty that I just gave you and the lack of other international law instruments to at least slow down this kind of thing, I think it's incumbent on us to rethink whether this is a useful approach.

I would submit to you that when we don't have any kind of legal restraints, when our practice of strategic restraint has not been reciprocated by our primary adversaries, it's time to think about doing this another way.

During the Cold War, as you're probably familiar, the United States during several occasions pursued what is known as a two-track arms control approach. Probably the most famous example of that was with intermediate-range nuclear forces, INF forces, so-called. I had the pleasure of delivering many of those warheads to Europe when I was back in the Air Force.

Anyway, what the United States said is, "We're either going to reach an agreement on these things, or we're going to deploy them. It's your choice." The Soviet Union had already deployed SS-20s into Europe, that was a proximate cause for the ground launch cruise missiles and Persian 2 missiles that the United States deployed in Europe.

That actually wasn't successful. We don't have a specific treaty with respect to space, in that regard. We did get an INF treaty, so that was very important. It was also the first one where we had on-site inspections, and not just national technical means.

As long as I brought up technical means, I meant to mention this earlier, but some people made the case that, because under the terms of the Ballistic Missile Treaty of 1972, and I forget which article that is.

But it talks about how you're not supposed to interfere with national technical means, euphemism for spy satellites, first introduced in that treaty. That somehow extends to all other space stuff, and you can't do that, it's bad. I would submit to you that, first of all, being withdrawn from that treaty, as you know, that treaty language has been reiterated in other treaties.

But if you go back and look at the actual language, it's very carefully crafted. It says that you're not supposed to interfere with national technical means when they are verifying compliance with the terms of this agreement. So my question to you is, how does one know whatever this space object is, is verifying compliance with whatever it is that they're supposed to be doing.

So, extending that kind of thin protection over all other space objects would be an extremely thin read, in my opinion. I'm going to shut that off there, and look forward to your questions, thank you.

Brian: Thank you very much. So, in the time we have left, I'm going to open up for questions and answers. I will ask that you wait for the microphone to come around, and please state your name and affiliation when you are giving your question. So, look behind you.

Rob Rainey: Do I go to the mic?

Brian: Nope, the mic's coming to you.

Rob Rainey: Thank you, I'm Rob Rainey from the headquarters Air Force, working international law. A couple of you mentioned the notion of *lex specialis*, and the principle that that entails, particularly Dr. Steer and Duncan. I wanted to see what you think of this. To the extent that we could articulate a conflict between outer space law and the long armed conflict. Maybe envoys of mankind is a good one.

You mentioned that as a possible example, but even there, I don't think the Outer Space Treaty or the rescue and return agreement, one, uses the term astronaut or cosmonaut. I think it's, "space craft personnel," which isn't defined. So, what is that? Just space objects, outer space, there's so many undefined terms.

To the extent we could find a real conflict, don't you think it more likely that the US and other major space actors would try to interpret international legal rights and obligations in such a way that they are consistent, rather than inconsistent, and therefore create a conflict and a need to invoke the *lex specialis* principle in cyber as well, and whatever law may govern that domain, if it is even a domain.

Duncan: Thanks for the question. A very good question. The *lex specialis*, of course, only applies to the extent of any consistency, which I think is what your point is. If you can find consistency, then why not find consistency? We would prefer to do that. I think the Outer Space Treaty does actually use, "astronaut," but all of the other treaties use, "space craft personnel."

I think it may be possible to argue that there is consistency between astronauts being envoys of mankind, and the application of the law of armed conflict, but that's part of the reason we need to clarify these sorts. You can imagine circumstances where they are given a special status in international law.

And I think it would be relatively easy to argue that, notwithstanding that they might be from the military originally. While they are astronauts, they're civilian personnel, and therefore protected. I think that's all I'll say on that, and pass it over to others.

Cassandra: I have to say I agree absolutely. Inconsistency doesn't necessarily mean conflict between the terminology. The point is more, indeed, to raise where there is lack of clarity. I think that's one of the reasons we need manuals. The questions come up, we don't quite know what exactly happens to those undefined terms.

I agree totally, more often than not you can find harmony within there rather than conflict, rather than trying to decide which of the two prevails. It requires clarity because there isn't clarity at the moment.

Linda Billings: Linda Billings, I'm a consultant of the Near Earth Object Observation Program, and I have a question about planetary defense and options for deflecting or destroying asteroids on an impact course with Earth. What sort of legal regime would apply? I'm going to make this US only, just to keep it simple. It isn't simple.

If the US decided to launch a nuclear weapon, which of course we now call nuclear devices, a repurposed nuclear weapon on a rocket, from a launch pad in United States, to deflect or destroy an asteroid. This would be in deep space, of course, on an impact course with Earth.

What kind of legal regime would apply, and what kinds of issues could you foresee coming up, particularly with non-US actors? Would the legal regime and the issues raised be different if the mission were a civilian mission, say NASA, or a military mission, say DoD?

Duncan: Another great question, I'm glad that it's been asked. It would very definitely give rise to questions about the application of doctrine of necessity in international law. It seems to have fit squarely within it the criteria that there is a grave and imminent peril threatening a central interest of the state, the only way for the state to safeguard against it.

But it can't seriously impair an essential interest of another state to which an obligation is owed.

It can't be invoked if the international obligation in question excludes at all the state has contributed to the situation of necessity. It seems to me that it fit squarely within it. There is, you hear the phrase, "American exceptionalism" and it's a little bit uncomfortable being an Australian and raising this phrase in this forum.

But if ever there was a case for American exceptionalism, then something like this seems to fit well within it. Frankly, there's not a lot of others that would be able to do something about an asteroid headed towards this planet.

Now of course, there would be differences in the international community about the means used to do something about the asteroid, but I think it unlikely that anybody but the United States could do something about it.

Cassandra: I have to ask, what would the difference be if it weren't military or a civilian operation? As I said, Article VI of the Outer Space Treaty said that states are responsible for all national activities, even if it is a non-state activity by organizations which is under the control or jurisdiction of that state. So, you just apply the state responsibility, as we know it to be in public international law.

Which would mean, you'd have to fulfill these questions of necessity. This year, actually just this weekend past, the Manfred Lachs space corps competition took place here in DC, the North American round. The problem that the students had to deal with was exactly what I'm just describing, so perhaps you can speak to some of the students about this, and the solutions they can work with.

The majority of them argued exactly this, that you would have to fulfill the requirements of necessity. You would have to look at attribution if it weren't actually a military operation. I think the point is, as I said, nuclear weapons.

There was something else I wanted to say. In terms of the legal regime applicable, the ICJ, the International Court of Justice has also sent in an advisory opinion about the legality of nuclear weapons.

Though they are illegal, because they are by definition weapons of mass destruction, there may be an exception if it's a case of total emergency self-defense. You could imagine that this scenario might fall under that.

Gary: I want to just add to that, not as a lawyer, but as somebody who knows a bit about the technology. I think you can make a distinction between a nuclear weapon and the nuclear explosive device.

Just like you can make a distinction between 1,000 pounds of dynamite used for a mining expedition and 1,000 pounds of high explosives packaged into a bomb with a casing designed to focus and create shrapnel.

A weapon is something designed to have a specific effect in a specific military context. And a nuclear weapon would have to be significantly re-engineered in most cases to reflect the kind of use in cases that you're talking about. I think that would raise a very interesting question, is it still a nuclear weapon or not? Or does it fall under this new category of a nuclear explosive device?

Victoria Samson: Victoria Samson, Secure World Foundation. I have one question for the space people, and one for the cyber guy. Space people, I'm relatively new to this issue in terms of the legal aspects of this, but one of the things I'm hearing more and more often is the idea that with the 50th anniversary of the Outer Space Treaty coming up, now is a great time to start looking back at it.

My concern, and I'm going to repeat on this, I think issues that weren't brought up the first time around weren't done for a reason, and by starting to discuss them you're opening up a can of worms. Maybe I'm wrong, I'm looking for your opinions on that. Because we are saying it specifically with regards to the concept of defining self defense in space, we're looking at it.

And then, in terms of cyber, I was really interested to hear about escalation leading to kinetic conflicts, because for space, that's one of the big issues we look at. How do we send the proper message so that the escalation doesn't happen, at least not without intent. I'm curious to know, has cyber solved that issue? Thank you.

Duncan: Do you want to go first? It might be a simple answer.

Gary: Yeah, sure. Cyber solved all these questions. [laughter] All the answers. There's been talk about having a hotline, for instance, just to keep communications going in that kind of thing. The United States answered to it.

In 2011, in its international strategy for cyberspace, the US said, to paraphrase, some things in cyber, we're not going to tell you what, we're going to consider aggressive acts and we will respond to like any other aggressive act against us.

So, that's been the clearest statement from any country about escalation, or what we would consider an aggressive act in cyberspace. Not especially useful, although obviously the US engaging in some strategic ambiguity there wasn't that they didn't know they were being unclear. It was that you don't want to necessarily show your entire hand to your potential adversaries.

So no, we don't have a lot of answers yet, and certainly on so we define what an attack is, or the use of force is, what an armed attack is in cyber, I think you're not going to have a clarity on that issue.

Cassandra: Are we opening up another can of worms? I mean, yes, but it needs to be opened up, and I think part of the problem is I'm not convinced that we're going to get states to sit down and create an arms race treaty 2.0, or update it, or create a new treaty.

There's a reason, though, that there's been that deadlock also within the UN community for peaceful uses of outer space, is that states are being unwilling around certain issues to bind themselves to hard law, which is why...this is especially about whether soft law is law, but sometimes...the draft articles on state responsibility might be one really good example.

Sometimes it works more effectively not to push to have it become a treaty. The draft articles on state responsibility were drafted carefully over a couple of decades by the International Law Commission, and the content particularly of those articles is harder than what states would agree to if they were to come to the table together, and yet it's become recognized as customary international law.

The International Court of Justice has referred to them many times. Just a few weeks ago, they've actually stated that the entire draft articles are now recognized as customary law and not just certain articles.

There may be some ways of developing these issues, particularly when it comes to using space as a battlefield and what do we do with law of armed conflict. We're not dependent on treaties. We also have customary law, which is hard law, and then we also have soft law, and we also have things like...

It's stated here on the cover of the Tallinn manual, prepared by the international group of experts that was put together under the umbrella of the name Cyber Defence...let me see...Center of Excellence. [laughs] "Under NATO," I wanted to say, but it's not a NATO exercise. It's an international exercise.

There are international experts involved, military experts, public international experts, law of armed conflict experts, and these are the kinds of people we need to get sitting at a table to state the law in a manual that military commanders can then go and use to then form state practice to form customary law over time. It's a different way of forming the law.

Trying to get the states together now, in the next few years, to create another treaty is unlikely. Perhaps you want to add something.

Peter: Yeah. That is one of the 64 million dollar questions in terms of whether it would be better to try that approach. Or more of this bottom-up approach that most of the major space [inaudible 87:29] actors have been pursuing subsequent to the Outer Space Treaty.

In my judgment, the number one thing that really isn't effectively addressed in the Outer Space Treaty isn't even so much the security issues as the commercial issues of space, and in that

regard, maybe there are some useful precedents with respect to letting commercial actors into the International Telecommunications Union as well as the [inaudible 87:58] .

I would say that it would be useful if there was an attempt to do this this top-down approach in conjunction with the 50th anniversary, or whenever, if those kinds of commercial actors could be explicitly brought into the regime, because I think, more and more, they have the majority of activity.

What they do is really, really important in having a regulatory regime that everyone could agree to with respect to their activities is critically important, and for those of us who would like to see a lot more deep space commercial operations, I would submit that that's critically important.

Because, right now, there isn't a guarantee of any kind of reward commensurate with the risk undertaken by those parties, so no one's willing to entertain those kind of risks unless there's better assurance that they're going to get some kind of payout if in fact there is a payout.

Gary: Can I re-attack the last one?

Brian: Yeah. That's fine. Yeah.

Gary: Maybe this is sort of the new normal in the development of international law because I'm hearing a lot of parallels with the lack of development of law in cyber warfare as well. There really isn't any serious discussion about a treaty, an international treaty, happening with cyber warfare. We can't even agree on domestic law in cyberspace, so it's really going to be difficult to get countries together.

The most interesting work now is being done on what's being called cyber norms. I'm not sure they meet the definition of what I would've called norms five years ago, but they're aspirations, essentially, because, let's face it, we have norms in cyber space. We just don't like them because it's, "Do whatever you can get away with," right?

That's what people have been doing since the beginning of the Internet, so that's what people continue to do, but we're trying to establish some polite behavior, and some standards of polite behavior, in cyberspace. Interested work being done there internationally, so maybe that's the way it'll go and maybe something similar will happen in space as well.

Duncan: On the question of a hierarchy of norms or rules in international law, if you have states sign up to a treaty, then that has a high level of value. Quite a lot of strength, quite a lot of cachet if you like, but then there is measures short of that, such as getting a group of international legal experts together.

One of the measures of success of something like that is, "Is it actually used practically?" The San Remo manual of international law applicable to armed conflicts at sea, as I say, to my knowledge, any naval warfare officer knows of the San Remo manual.

It's not a treaty document, but the practical effect is quite strong, and it's part of what has sometimes been called the secret life of international law. It's a good phrase that I like.

The other thing about the levels of international law below treaty level is there can be some cynicism about any international law, but if you don't have international law on your side, then you risk not having domestic support and having the wrong message going throughout the Twittersphere.

You risk not being able to get the hosting basis in other states when you're trying to form a military coalition, you risk not being able to get the military coalition that you want, you risk not being able to get the resolution that you want with the UN security council.

And you risk no support from other members of the international community in being able to support other diplomatic measures like sanctions and those sorts of things.

Perhaps the most significant thing is that until you have norms, until you say, "You can't do this," then you can't point to another state and say, "You've crossed a threshold and now we have a right to do something about it." If there are no norms, you just can't do that.

Richard Easton: Richard Easton, independent scholar. I wanted to make a comment about GPS. Points been making that it started out as a military system, which is a common misconception.

GPS from the very beginning, the Block I satellites had civilian signal as well as military. And Professor Richard Langley, who writes a column for "GPS World," made the comment that in 1982, he was using the civilian signal, so that was a year before the Korean airliner was shot down.

It's a common misconception that Reagan opened up GPS for civilian applications, but that's not correct. In the very beginning, it had a civilian signal. The problem is only the Department of Defense was willing to fund it, so that may be where the misconception comes from.

The predecessor system, TRANSIT, quickly had civilian applications.

Jim Armor: Jim Armor with Orbital ATK, but long-time Air Force member, and it's taken me a while to get out of the national security mindset and into the commercial world, but now very interested in satellite servicing, and the longer-term aspirate mining, and other logistics that you find in space.

I don't really have a well-formed question, but an observation as we've worked some of these advanced commercial projects is that what we're really looking for is stability that we can work within. We don't really care, in a lot of ways, what the rules are as long as there's rules, and we have found a great deal of success working within the US domestic framework.

State department, ITU, FAA, FCC, all of those frameworks have been flexible enough to deal with the new kinds of businesses we're bringing forward, and I think we're sort of looking for the US government then to turn into the international domain, and then set the norms that we're working on at a global level. That's sort of "Hope Springs Eternal."

I mean, I'm not sure how it's going to work out, but I would be afraid to get commercial entities involved in the international forums because they are very focused on their own interests, and

those can drive less than humanitarian objectives, which I would hope the larger goals would attain.

I guess my question might be, we've had some success in Law of the Seas, and I don't hear too much discussion about that kind of an approach for the space domain, and I'm just surprised by that. Maybe it's ongoing and I haven't seen it, but I would be interested in comments to any of the comments that I made. Thanks.

Duncan: Addressing the question about the Law of the Sea first, it's an analogy that is often made in the space domain. Cassandra and I, we just did a conference last week where there was some suggestion that the concept of a contiguous sign, which is part of the Law of the Sea, could be extended into outer space.

That has all sorts of challenges around it, but perhaps it's useful. It would be a long time before we saw anything about that.

In terms of commercial involvement in the space domain, and particularly the strategic and security aspects of the space domain, it was something that I discussed specifically at this conference last week, and there are three Cs that I'm sure many of the space community would've heard about, that space is becoming more congested, contested, and competitive.

I suggest that there are four Rs that should be the response to that, and that is that space needs to become more regulated, more resilient, more redundant, and there needs to be repercussions in outer space. And commercial entities could contribute to every one of those. The challenge, though, would be to contribute to one of those without undermining another.

Gary: Unsolicited, I realize, but I'll talk about the way the Law of the Sea analogy has been applied in cyberspace. People try to apply it all the time. We hear about it all the time in cyber. I think when you think about...

Because mostly when we're thinking, we like to develop a high seas principle, where people can undertake activities where they don't both other people and that kind of thing is a big part of it.

The way we developed the high seas was first we defined territorial sovereignty, and we defined the sovereignty among all the sea coasts, and whatever's not sovereign territory, it's high seas, so the first thing you need to do is define where your territorial sovereignty is.

In cyberspace, people talk about this, and I think about...maybe somebody will correct me on being wrong all these years, but I think, traditionally, we talk about the Law of the Sea starting with a three-mile-wide territorial sea because why?

Brian: Cannons, right?

Gary: Yeah. It's the range of shore-based cannons, they say, so it's as far as you can protect your sovereignty. You can fire three miles and that's how far it extends. The analogy I offer in cyber to people is, "Your cyber sovereignty extends just as far as you can protect it."

That's not much, maybe not any, so I don't know. It even brings into question the entire idea of having any kind of sovereignty in cyberspace, or whether or not it has any characteristics in common with mapping your territorial sovereignty.

So it's a different question, but the same analogy applies to everybody who loves the Law of the Sea. It's a great body of law, and we'd love to see it apply, I'm sure, to space as well as cyber.

Peter: That was a great question, sir, and it's very difficult to struggle with the best approaches to this, but I would just submit that, to me, the common heritage of mankind provisions in the Law of the Sea Treaty are the biggest distinction between that and the Outer Space Treaty.

The Outer Space Treaty has elements of that, but that term of art hadn't emerged at the time of that treaty, and that has a lot to do with how you're going to divvy up any wealth generated in space. Under common heritage of mankind, everyone has equal rights to that, whether they assumed any risk in its development or not.

That makes sense for a lot of things maybe that don't require so much effort to develop, but I think space does require a lot of developments, or a lot of effort to develop, and I see those kind of structures as an impediment to doing more commercial development in space.

Because, as I mentioned, I would like to see the people taking the risk getting the biggest potential benefits, and that would be not the case under common heritage.

The other thing I'll just mention is the Seabed Authority to do all of this stuff, a lot of [inaudible 100:41], to the best of my knowledge, they haven't really done anything, so it's all kind of theoretical in that domain as well.

Perhaps as that matures, and you get some more test cases on how that's really going to be developed, and who gets what, when, where, and how, then those things could be applied to space.

Rob Bradley: I'm Rob Bradley for NASA, following up on General Armor's question, also long-term air force. Professor Steer, article 6 that you mentioned requires the states to oversee, or approve and continuously monitor, the activities of governments and non-government. That's good in international law but what about domestic law to regulate that sort of thing? There really isn't any, right?

Cassandra: The perfect legal answer to any question like that is, "It depends."

[laughter]

Cassandra: Actually, in the US, there is a great deal of regulation. The US has more domestic law or governing space activities than any other state, and for the most part...because originally it was only states who had the wherewithal to enter these space activities. That's why that language is in the Outer Space Treaty.

It wasn't foreseen that commercial actors would certainly become the ones with the wherewithal and the technology, but for the most part, states...and it does depend. India, for instance, has almost no regulation, and is becoming a very successful spacefaring nation.

But where that regulation is there, states complied with their obligation on the outer space treaty, and the organizations and commercial entities within that state comply with their national regulations, so there's an immense amount of licensing regulation that goes on if you want to procure a satellite, finance a satellite, launch a satellite.

Where's the risk for the insurance, risk of what happens if that satellite fails at launch, what happens if it crashes into another satellite, regulating the orbital slot, regulating the frequency...

Rob Bradley: Specifically mining and satellite servicing. Those are [inaudible 102:58] ...

Cassandra: Right, and I agree, so that still needs to be developed. I had a point I wanted to mention before as well. This is something that I think will happen more and more first at a state level and then at international.

In the Outer Space Treaty, there is actually the notion of the province of all mankind, which may or may not have been with the same mindset of the heritage of all mankind and the Law of the Sea, but I think that is going to be one of our greater challenges.

The FAA has just said, "We will license a company that wants to land on the moon and give you exclusive rights to that area that you're going to land on," even though the FAA or the US can't claim territory over the moon, so there's an interesting clash between regimes.

I think it will start national and then go up to international. Because states, essentially, whether it be under the Outer Space Treaty, or under principles of state responsibility, in public, international or in general, recognize their responsibility.

Brian: Just to clarify that last point, the actual FAA response has not been published, which is why it's hard to figure it out.

But the best we can tell, what they said was the FAA will basically protect that company from interference with its activities by other FAA-licensed entities. Which is totally within its power to do, but the question, "What does that mean to non-FAA licensed entities of other nations?" that's totally up for grabs.

[crosstalk]

Brian: Yeah. Exactly. We have one more...Chris?

Chris Johnson: Hi. Chris Johnson of Secure World. I know that we are trying to wrap it up so I won't [inaudible 104:40]. I'll try to keep it brief, but legal scholars and practitioners usually make two categories of statements. They can make positive statements and normative statements.

Positive statements merely find the law and report the content of the law, black letter law custom practice. They may also make normative statements of what the law should be, what the content of the law should be. "Lege ferenda" is what the phrase is.

When we look at existing domains for military activities, these traditional manuals, it seems that those, there's a lot of activity and phenomena that they can derive positivist statements from.

Moving into more speculative areas, cyber and outer space, my concern is that we might be making more normative recommendations.

Is that something that was...how is this balanced for cyber. And how could it possibly be balanced in the future as we consider what is the definition of self-defense in space and what's the law of armed conflict for outer space? Thanks to the panel.

Gary: We're really cautious, and I think pretty successful, at only talking about the *lex lata*. We really did try to discuss the law as it is now and not the law as we think it ought to be or as it might be.

Some of the different ideas of the application of existing law, the disagreements are reflected in the commentary, but it's always spelled out, I think. This project very specifically was trying to apply applicable law, leaving the difficult part of deciding what the law ought to be in the future to somebody else.

Duncan: I guess the only thing I would say is, I think a similar approach would be good for many of international law applicable to military uses of outer space if one came to exist. But there is room for some discourse if you like, about *lex ferenda*, the law as it should be, and whether that takes place in the context of international legal experts getting together or not, I'm not sure.

Just so long as those legal experts are absolutely clear about when they're talking about the law as it is, versus what they think the law should be.

[background conversation]

Cassandra: Just checking whether [inaudible 107:11] unclassified information.

[laughter]

Cassandra: McGill's Institute of Air and Space Law, actually, with a great deal of Duncan's expert input has made applications to get funding to develop a manual on the application of international law of military uses of outer space.

The hope would be that it would be along the same lines as the San Remo and Tallinn manual. The kinds of people involved in that would be, as I mentioned before, you have to have a military experts, you have the public international law experts.

I don't think it's a foreign where, someone asked me why it's a US President as commander in chief they are not representing the commander in chief of state. So the head of a state on a group like that. My answer was, "Because we're not writing a treaty."

It's not about representing state will, because treaties are as much an expression of political will, and stay out of law creation. But what they do in the first case a clarification of the law, we call it a restatement.

I agree totally with Duncan that it's a little more aligned with what the International Law Commission does. Their mandate is to clarify and progressively develop international law. They've been hesitant to progressively develop, but they've been explicit when they've done so.

This is not an international law convention coming together, but it's a body of experts who have the insight and the wherewithal to develop and state the law, and clarify the law, where, as we spoke about, where there are inconsistencies or lack of clarity in the different *lex specialis* that apply.

There may be questions raised about where it could go, but I think that at this stage they wouldn't be saying that it's up to us to develop the law.

Brian: With that, I'd like to thank everyone for coming, and please join me in thanking our speakers.

[applause]