



## Summit for Space Sustainability June 23, 2021

### Panel 4: It's Not a Race: A Cross-Sector Discussion of Competition in Space

Introduction by Krystal Azelton, Director of Space Applications Programs and Summit for Space Sustainability Chair

*Spotlight Talk Speaker:* Aaron Bateman, PhD candidate, Johns Hopkins University

Moderator: Daniel Porras, SWF Director of Strategic Partnerships and Communications

Panelists:

- Aarti Holla-Maini, Secretary General, EMEA Satellite Operators Association
- Claudio Leopoldino, Head of Disarmament and Sensitive Technologies Division, Ministry of Foreign Affairs - Brazil
- Chelsea Robinson, Chief Operating Officer, Open Lunar Foundation
- Riqiang Wu, Associate Professor, Renmin University of China

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**Krystal:** I hope you all found that introduction to the Space Sustainability Rating helpful. As you can imagine, it's a project that we here at Secure World Foundation are very interested in and active in. If it is of interest to you, please reach out to the team.

For today's housekeeping notes, I just want to remind everyone that every panel will have time set aside for various audience interventions including polls, and question and answer. Just click on the link below your live stream feed, or go to menti.com and enter the code below, and you can participate in the first poll of our day right now.

We've also made a small adjustment to today's agenda. Instead of Victoria Samson, the director of the DC office, my colleague Daniel Porras will be stepping in as moderator of our first panel. I'd like to go ahead and kick that panel off with a spotlight talk by Aaron Bateman.

**Aaron Bateman:** There is much talk at present about space having become militarized and/or weaponized in the past few years. There's a growing narrative about an emerging space arms race.

These ideas overlook the reality that space has been militarized from the beginning of the space age, and that both the United States and the Soviet Union developed and tested anti-satellite weapons during the Cold War.

Examining military space competition during the Cold War reveals that US policy on anti-satellite weapons was influenced by a broad range of US National Security considerations,

especially divergent presidential views on arms control and different presidential perspectives on the proper military uses of outer space.

In the late 1950s and 1960s, American presidents exercised restraint in the development of weapons that could be used to destroy satellites out of fear that even the existence of such capabilities would provoke the Soviet Union to act aggressively against US reconnaissance satellites.

By the late 1960s, intelligence satellites were the single largest source of US intelligence on the Soviet Union, and preserving the ability to conduct reconnaissance from space was an overriding objective of the US government.

Despite this emphasis on restraint, the United States did conduct the world's first anti-satellite weapons test in 1959. It did deploy a nuclear anti-satellite weapon system in the Pacific in the 1960s. The latter was however a limited capability. It was designed to defend against orbital nuclear weapons and was quickly moved into a mothballed status.

US government commission studies from this period concluded that the United States was more dependent on satellites than the USSR, especially for reconnaissance and that US anti-satellite weapons would be a very limited deterrent value.

Additionally, the United States had learned during the 1950s and 1960s that using nuclear anti-satellite weapons would not only produce harmful environmental effects but would also inadvertently destroy American and allied satellites as well.

US officials had concluded therefore that anti-satellite weapons were a very limited military utility. These early efforts did nevertheless provide the Soviet Union justification to move forward with its own anti-satellite weapons program.

By the early 1970s, US intelligence had learned that the Soviet Union was testing a co-orbital anti-satellite capability. President Richard Nixon did not however want to pursue a similar capability out of fear that it would undermine ongoing arms control negotiations.

Satellites were identified as the primary means for verifying SALT I in the 1972 ABM Treaty. The latter precluded the development of new land, sea, air, and space-based missile defenses. The interpretation of this treaty would be especially contentious in the 1980s when Ronald Reagan sought to develop space-based missile defense.

The 1970s was a time of transformation in both American thinking about space and the military uses of space by the United States and the Soviet Union. Both countries had begun to use reconnaissance satellites to support tactical military forces.

Consequently, because of Soviet space-based naval tracking capabilities, along with Moscow's anti-satellite program, the White House commissioned a panel that had concluded that it was "no longer tenable to think of space as a sanctuary."

Notably, detente between the superpowers was breaking down and President Gerald Ford authorized the development of a new US anti-satellite weapons program, not to match the Soviet capability but rather to be able to hold Soviet space reconnaissance systems at risk.

Additionally, the Ford administration maintained that verification of an arms control agreement constraining anti-satellite weapons would be especially problematic. President Jimmy Carter sought to push forward with a new arms control agreement in the form of SALT II and wanted to prevent an arms competition in space.

He believed that controls on anti-satellite weapons were essential because he saw them as being a very limited military utility.. He also saw them as a direct threat to the arms control regime his administration was pursuing.

The US and the USSR were making progress in anti-satellite weapons talks until the Soviet invasion of Afghanistan in 1979 that significantly derailed the strategic arms dialogue. Notably, unlike Ford, Carter believed that verification of an arms treaty limiting anti-satellite weapons was indeed possible.

Oftentimes, alleged problems surrounding verification were used during the Cold War as a political argument against arms control. With any arms control agreement, verification mechanisms cannot be properly evaluated until the parties involved determine what they specifically want to limit.

President Ronald Reagan pursued the most overtly militarized space agenda of any Cold War president. His 1982 space policy stated that the Soviets had initiated a campaign to capture the high ground of space. He pushed forward with an air-launched, anti-satellite capability which he said would deter the Soviets from using their own anti-satellite weapon systems.

The deterrence argument was not compelling due to the asymmetry in Soviet-American space capabilities. In particular, the United States was still more dependent on space systems than the USSR.

In 1983, Reagan announced the Strategic Defense Initiative, which was a missile defense program to develop land, air, and space-based missile defense interceptors. Because limits on anti-satellite weapons would have constrained the development of SDI, Reagan rejected any proposal for limits on anti-satellite weapons. The administration used verification issues as a primary argument against constraints on anti-satellite weapons.

Recently declassified US documents revealed that neither the President nor the Joint Chiefs believed that the US anti-satellite weapons program was especially useful, but they had concluded that it had to be preserved to move forward with the administration's missile defense agenda.

The US conducted a debris-producing test of its air-launched anti-satellite weapons capability in 1985, but Congress prohibited further such tests. The program was ultimately canceled due to technical difficulties.

We also find from the archival record in allied countries, to include the United Kingdom, France, and West Germany, that many senior defense officials and diplomatic personnel believed that space arms competition could be constrained through arms control and that doing so was in the interest of the entire transatlantic alliance.

Cold War military space activities can be best defined as a competition that ebbed and flowed based on geopolitical circumstances at specific points in time. Additionally, space security was inextricably linked with arms control and missile defense, especially in the 1980s.

Rather than viewing the present situation as an unstoppable race, we must recognize that it is driven by a wide variety of geopolitical factors that are contingent and therefore subject to change. Characterizing the Cold War and present space security situations as a race can lead to reductive policy positions that waste precious resources and lead to further instability.

**Daniel Porras:** Hello, everyone. My name is Daniel Porras. I am filling in for my colleague, Ms. Victoria Samson, who can't be with us today. I'm the director of Strategic Partnerships and Communications at Secure World Foundation. I'm very excited to be moderating this panel today, "It's Not a Race -- A Cross-Sector Discussion of Competition in Space."

As an increasing number of countries develop counter-space capabilities and geopolitical rivals seek to position their space programs as drivers of economic growth, diplomatic leverage, and security advantage, there's an emerging narrative that there is a new space race underway.

This is evocative of the Cold War's US-Soviet competition and suggests a winner-take-all struggle for future domination of space. Is this too simplistic approach? If there is a race, to where and to what end?

Is it better to frame it as a long-term competition driven by national, regional, and geopolitical goals? Is there still room for cooperation and collaboration? Is there such a thing as healthy competition in space? If so, how do we achieve it? I don't take credit for any of that. Those are the words of my colleague Victoria. Thank you for that.

Before we start to try and answer these great questions, I'd love to hear from you, the audience. What do you think about this? Please click on the link below. I think it's down there. There's a link below the video that says, "Poll Q&A," or you can go to [www.menti.com](http://www.menti.com) and enter the code 92149679. That's 92149679.

Either way, that'll take you to a poll where you can tell us, in one word -- one word only -- what kinds of competition are happening in or over outer space? While you're filling that out, I will briefly introduce our panel of experts. More complete bios are available on the conference website, of course. That's [swfsummit.org](http://swfsummit.org).

In alphabetical order, here we go. First, an old friend, Ms. Aarti Holla-Maini. She's the secretary general of the European Satellite Operators Association. Aarti has been the secretary general of the SOA since 2004 and has 23 years of experience in the aerospace industry. She doesn't look a day over, but she certainly knows her stuff.

Claudio Leopoldino, head of Disarmament and Sensitive Technologies Division, ministry of Foreign Affairs for Brazil. Claudio has been a career diplomat of the Brazilian Foreign Service since 2003. During which time, he served in the delegation of Brazil at the UN amongst other postings.

Next, we have Chelsea Robinson. She's chief operating officer at the Open Lunar Foundation. Chelsea has been leading Open Lunar for three years where they work to catalyze a peaceful cooperative lunar settlement on the Moon driven by the best human values as a truly international effort.

Finally, Mr. Riqiang Wu, associate professor at Renmin University of China. Riqiang received his PhD in Political Science from Tsinghua University of China in 2012. Prior to that, he worked for six years at the China Aerospace Science and Industry Corporation as a missile engineer. Truly, a panel of experts, a murderers' row as they say in baseball.

Let's start this conversation. Riqiang, to you first. Sir, China is one of the major players that is always mentioned when we talk about the space race, broad overview of China's perspective on the great power competition and the priorities for Chinese international security goals.

**Riqiang Wu:** Thank you for the invitation. It's my great honor and pleasure to be here. Actually, the great power competition is an American term, not a China's term. China's term is so-called a new type of great power relations.

This kind of two terms has difference. I think their difference is their focus. They have different focus. The American term, the great power competition, of course, it's about competition.

Although the secretary of state, Blinken said our relations with China will be competitive when it should be collaborative, when it can be an adversarial, when it must be. Overall, after now, the Biden administration's China policy is a dominant paradigm. It's a real competition.

From Chinese perspective, it seems that there's not much difference between Biden and the Trump administration. Of course, there's different style about the reality. For China's policy, there's also called a new type of great power relations. It's about cooperation. It focus on cooperation. The new type of great power relations is about non-conflict, non-confrontation, mutual respect, and leading cooperation.

We believe that China and the United States face a lot of common problems such as diversity of race, and climate change, and nuclear proliferation, and we need to work more together to solve those problems.

As China's capabilities rise, naturally, there will be some degree of competition. We realize that, but we hope that the competition would be healthy. It should not be a zero-sum competition, and both sides will try to avoid a conflict.

**Daniel:** That's really encouraging in a very encouraging position. We just have to figure out how to make sure that we're all getting the same messages. Claudio, how does Brazil view this notion

of competition in space, and what role can emerging space actors play in ensuring that space is accessible to all over the long term?

**Claudio Leopoldino:** Thank you. Thank you very much, Daniel. It's a pleasure to be here. From our side, our perspective, competition in space is basically a reflection of [indecipherable 45:04]. Space has become to all of our society. Their space infrastructure is a critical infrastructure, and the functioning of our societies depends on them and not just for spacefaring nations but the whole nations.

This is the reason why, for Brazil and for any nation spacefaring or not, any conflict in space, even have a very limited scope would have catastrophic risks for the sustainable use of [indecipherable 45:35] for peaceful purposes.

For Brazil, these offensive capabilities that have been developed progressively, this is not a recent trend. Our keynote speaker has made it clear, but this trend has intensified in recent years. They do present a clear and present risk.

Unlike cyberspace, there's a little incentive in our perspective to initiate the conflict in outer space. There's little to be gained and a lot we lost.

However, the fact that space infrastructure is so critical for military applications, and this coupled with the fact that it's very difficult to ascertain intent and to verify capabilities, these two factors may create the conditions in which miscalculation and misperception might reach escalation and crisis in future.

Brazil is a developing country that has a wide range of space capabilities and plans to significantly increase those capabilities in the future. It's in our utmost interest that the space remains peaceful, stable, safe, and accessible for all nations.

We believe that emerging space actors such as Brazil can and should play a key role in advancing the goal of preventing conflict in space. We are ideally placed to act as honest brokers among the major space powers and between those in space without spacing these capabilities.

We are not perceived as threatening. I do believe that no one believes that middle powers in space have a hidden agenda when it comes to offensive plans, but we have enough technical knowledge and skin in the game to participate in business, trying to play precisely that role as an active participant in multilateral discussions on this topic in New York, Vienna, and Geneva.

We have played a key role in particular in the GGE. Also, Brazil chaired the GGE on PAROS that recently concluded, however without a consensus report. We'll talk more about this later. We have chaired the 67th session of COPUOS where the 21 guidelines for long-term sustainability about the space of activity activities were formally adopted.

**Daniel:** Thank you for that, and thank you also for bringing up the role that Brazil has played in particular in the discussions on arms control. I had the pleasure of working with Ambassador Patriota from Brazil, who was the chair of the GGE of PAROS.

Like you said, despite the fact that it was not successful, the work that he did and the way that Brazil was able to bridge a lot of the divides that currently exists in this issue was brilliantly handled.

Switching over, Aarti, to you. Again, apologies, I want to introduce you. You're right. It's not the European Satellite Operator's Association, the EMEA. Sorry for that.

Aarti, how does the space competition affect the commercial sector? What are the priorities for the security and stability of outer space, in particular, for those countries that we regularly see included in this narrative about a space race and space competition?

**Aarti:** Thank you. Thanks, Daniel. Thanks for inviting me to be here on behalf of ESOA and our members. Operators typically thrive in a competitive environment, but now it does very much feel like there's a new space race going on. It has an upside but a very serious downside too.

The upside is on the one hand innovation, whether it's on the launch side with drastic cost and other innovations like reusable launchers, which are more efficient and maybe even greener, but also innovations in the space and ground segments in response to the realization that, in fact, satellite is an important player in tomorrow's data-driven economy.

It will address potential mass markets like moving vehicles or even mobile devices.

The downside, however, is what we all know: the increase in traffic and space and all the threats that that brings with it. It's not like a car crash where you can clean it up, and life can continue as normal for everybody else.

In space, everyone is affected. If the Kessler effect is ever triggered, then suddenly, future reliance on space services, which today underpin the normal functioning of society in a way that I think most people have no idea about, could come to a grinding halt.

The risks definitely [inaudible 49:59] they were a decade or two ago. Back then, it was high impact but low likelihood. Now, we're looking at high impact, high dependency, and increasing likelihood. I think another downside is that the sense of purpose is being lost. For me, ultimately, the value of any technological advancement has got to be the value that it brings to people on Earth.

If we think about the race to put the first man on the Moon, for instance, it was a genuine technological feat that was worth going for, and the technological development that was necessary paved the way for space exploration that brought a greater insight into the origins of the universe, etc.

Now, we have to ask ourselves, "Is mankind really at the center of what's happening now, or is it more about geopolitics?" The consequences of which are not only increasing risks in space but also affecting other communities like astronomers.

LEO broadband is certainly a worthy cause and potentially a commercial opportunity, but I'm not sure that every region really needs its own system, especially when any single business plan would typically require a global market.

From my perspective, I think it's a shame that there isn't a greater sense of cooperation and trust rather than competition. That's why the plethora of announced LEO systems have both a commercial and a political element. Just like before, the new systems require both private and public stakeholders in order to be sustainable.

The commercial space sector finds itself in a bit of a predicament with all this going on. On the one hand, making the business case for LEO broadband systems has, and still is, a troublesome one. But the ship is sailing. If I can use a metaphor, the more operators that weigh in, the more difficult that ship is going to be to turn.

Whether it's with private or public support, operators are increasingly jumping on board not knowing the destination, but they don't want to miss out on the ride. It's a bit like the gold rush that was as much about the adventure as it was about potential wealth creation. Sometimes, I get the feeling that the race to space is quite similar.

What I can tell you is that our members take this both the opportunities and the threats very seriously, and I believe nearly all of them participate actively in some kind of space traffic management system, whether it's through the Space Data Association or the EUSST initiative, or another one.

Our members are concerned not only about space traffic management but also about ensuring a fair commercial playing field where competition can thrive with the assistance of government but without skewing the market. Thank you.

**Daniel:** There was a lot there, Aarti. We'll be looking at it. Thank you also for driving home that same point that we heard yesterday in the spotlight talk about the LEO constellations, and that soft power seems to really be a driver for the demand even though there may or may not be a lot of utility for so many systems. That is another very important component to keep in mind.

Chelsea, moving to you to one of the headlines that we often see around space competition and space race, the Moon. Is the Moon becoming a flash point for competition in space? If so, how can the international community work to support policy and partnerships that actually promote and facilitate lunar efforts?

**Chelsea Robinson:** Thank you, Daniel. Thanks to everyone who's here today. It's fantastic to see everyone on this great topic. The Moon is where we will have our first interactions between all of these different stakeholders, governmental and commercial, in deep space, so beyond low-Earth orbit.

That means it will become the immediate focus for the development of questions and answers regarding competition and collaboration outside of that LEO environment. To your point, there



are many things that we can do to make this a more collaborative and healthily competitive ecosystem.

I'll just mention a couple. First of all, there's a difference between toxic competition and noble competition. Noble competition strives for that win-win whilst avoiding monopoly. This kind of economic policy is what we really need to be looking at for space now.

We can't assume that that first-come-first-serve basis approach would be correct. There does need to be some guidance, not too heavy-handed but some guidance. The key word here, if anyone's interested in these ideas, is noble competition. Have a look at that. See what you think.

Secondly, going back to what was being discussed about the commercial industry. In industry, we do see many competitors on the Moon already. They are making duplicate forms of technology.

A lot of them are building subsystems which are not going to necessarily create competitive advantage for their work, or for any one country or company. Really, a lot of those subsystems or components could be better off built together or built in some way that is more standardized.

In the lunar community, we could be sharing radio systems, comms protocols, location determination. Any raise-all-boats group of technology projects, lunar operators could be funding collective efforts on. This concept is a collective invention. This has been widely used in solar-powered cars. The space industry could benefit from that approach too.

Just quickly, all this investment that's going into getting us to the Moon right now. We were talking before about being driven by humanity and humanity's purpose, and the shift to geopolitics. It's also being driven by investment. The private investors are investing in the predication that lunar resources will be able to be extracted, bought, sold, traded, and used.

Having clear guidelines and policy from the COPUOS and also bottom-up, from these companies themselves, as to what the right guidelines would be to build balanced policy on resources will help prevent monopoly as well as prevent failed investments. Again, that will promote that healthy competition aspect.

I'd love to talk more about the US and China. Just very briefly, science is a fantastic bridging opportunity. Science doesn't require the sharing of technical plans or trade secrets in order to share that data. Just having more and more normalization of sharing scientific information is a great way to start off that relationship when it comes to the Moon.

**Daniel:** Chelsea, I understood that there was a big development on lunar resources in the recent legal subcommittee of COPUOS. Can you give us an update a little bit on what happened?

**Chelsea:** Very briefly, the legal subcommittee of COPUOS met for two weeks in early June. The outcome was to create a working group with a mandate to develop some understanding between the COPUOS membership and different stakeholders of what the right kinds of resource regimes or resource guidelines might be for the future of lunar resources.

It's very much a starting point, but it is a fantastic starting point. We're very excited to see that happen.

**Daniel:** Excellent. Before we go to the next round of questions, I'd like to call up the results of our poll. What do you, the audience, think competition is in or over space? Aha! Commercial, that's surprising, but I think it's also quite telling and maybe quite hopeful as well.

Good to see prestige there. Of course, we do know that typically, when a lot of countries are engaging in some of these missions, they love to tout it as national prestige. Certainly, that goes a long way.

Military seems to be the next one. That's certainly taking us into another direction that could be stabilizing or destabilizing for the long-term sustainability of outer space. Certainly, we'll see. There's some really fascinating terms in there. We'll probably have some additional time to explore that later on.

I do just want to highlight that “commercial” is very surprising. I've been doing a lot of the questioning here, but I still have a few more questions. Then we'll soon get to the audience. Audience, please click on the link below, just down there, and go to menti.com. Remember, the code is 92149679 so that you can ask questions.

Next set of questions real quick for me. Claudio, back to you, sir. Multi-lateral discussions on space security are expanding to include the establishing of norms of behavior and responsible uses of outer space.

Of course, we've got the UN Resolution 75/36 that the UK put forward to address challenges in outer space through norms and principles. How do these norms meet governance questions raised by the increased competition in space? What can these norms do to help us address these competitive issues?

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**Claudio:** ...perspective. We've always been since time immemorial, supporting the commencement of negotiations of a legally binding instrument that would complement and expand the obligations established by the 1967 Outer Space Treaty.

However, for many decades now, at least since the 1980s, these discussions have been basically leading nowhere. Modalities for negotiation of a legally binding commitment on Paris have repeatedly stalled, be it in the Conference on Disarmament, the CD, and/or the wider framework of the UN.

As I said before, the best shot we have in recent memory has been the GGE. That was established by the group of governmental experts. Sorry for the acronyms. That has been established by the UN General Assembly, and that concluded in 2019. We have the honor to chair through ambassador Patriota that you have already mentioned that are very skilled [indecipherable 60:36]

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This GGE was tasked with coming up with the basic elements that should guide negotiations of a new treaty on the matter. We have extremely productive discussions in this GGE, which were condensed into a very substantive and balanced draft report, but at the last minute, it became apparent that the consensus can be reached on the adoption of this text.

We believe that this result was not due to any shortcomings of the draft report itself. It has been generally recognized as a very, very coherent and sound basis for future discussions by everyone. This was due in our perception to the general political environments in which the group was operating, which was marred by a lack of confidence in usual basic mutual trust among key space actors.

At the GGE, likewise, the discussions on PAROS, on the prevention of an arms race in outer space, have been paralyzed since 2018. It's against this background that Brazil, despite always having supported a legally binding treaty on the prevention of an arms race in outer space., we decided to support a different approach.

Given the impossibility of adopting a mandate for negotiations, we believed that the international community cannot afford to wait for the ideal political conditions to materialize. Things are progressing very fast, and we basically might lose the train of history if we decide to do so.

This is why Brazil has opted for supporting a grant over development of nuance, rules, and principles based on political commitments, which could be described as a bottom-up approach. We decided to support the resolution that you mentioned, 75/36. That was tabled by the UK last year.

We do expect that these discussions will contribute to the adoption in the short to medium term of political commitments of a coherent body of political commitments that will build upon the existing transparency and confidence-building measures that has been adopted in the context of the UN and that these commitments hopefully will pay the way for formal lawmaking efforts in the future.

**Daniel:** That's a really interesting shift that we've been seeing that you've just described also. For years, we heard that legally binding instruments were a non-starter, but more and more, we're hearing this position that, "Well, let's start with some political agreements first, and then see if we can build up to something more sustainable."

I also recommend that everyone go and check out the submissions to UN 75/36. I believe there were 18 states that submitted along with some academic institutions, if you just want to get a sense of where a number of countries are thinking a lot on these issues.

Aarti, back to you, and this is always a difficult blend of topics. From the commercial perspective, what is more destabilizing the proliferation of counter space capabilities or a lack of rules of the road for space actors and why?

**Aarti Holla-Maini:** Sure. Proliferation of weapons in space is, by its very nature, destabilizing obviously, but that's a different question to what the biggest threat is to space sustainability. I

think that the real threat to sustainability is the lack of real space environment impact assessments of systems before they're deployed.

It feels a lot like climate change. We can see the threat. We understand the threat from a theoretical perspective, but we don't actually do anything about it until it's too late. We should not fool ourselves that technology like debris removal technology is going to solve the problem because technology takes time to develop.

Just like carbon capture, debris removal technology is always going to be five or more years away from being done at scale. In the meantime, thousands of more satellites will have been launched to make the situation even worse.

Indeed, without rules of the road in place, the satellites themselves almost become the weapons to fear the most, if you will. We need rules related to space, but they require international consensus, and it takes time. Some of the key voices who need to agree have got obvious industrial interests to protect.

I'm sure we all read about how the G7 committed to the safe and sustainable use of space. It's all well and good that this gets onto the G7's agenda, but they cannot deny the [indecipherable 65:07] of broadband. The geopolitical significance of which appears far more important than safe space.

This isn't a game. It's real life. As I said before, society at large really relies on space services in a way that most people...I hope this isn't too politically incorrect, but I'm beginning to think that even world leaders just realized because nothing has gone dramatically wrong yet.

From the private operators' perspectives, rules of the road are not just about physical space. They are also about preventing interference between non-GSO and GSO systems. This is something that our members really care about.

The fact that some rules that NGSOs need to comply with date back to the days of Teledesic's, Celeste's, SkyBridge. At that time, Teledesic's 840 satellite proposal was already an unimaginable number of satellites. I'm sure some of the people watching remember that.

Those rules were not designed to protect today's GSO satellite systems. They are incomplete as far as they do go. It's unclear if and how today's NGSOs systems can actually comply with those rules.

We have a situation now where regulators are looking to the ITU for guidance, but the ITU doesn't know how to move it forward either. Meanwhile, the satellites keep launching based on rules that are blatantly out of date and need to be revised to reflect the realities of today's networks and systems.

**Daniel:** It sends a very strong message that the industry itself is asking to get more clear guidance and regulations. Of course, this is going to be important for providing legal certainty,

safety, and of course, hopefully, the long-term sustainability of all these activities we benefit from.

Riqiang, coming back to you, sir, and coming back to China. What are China's views on crisis escalation and deterrence? This is one of the big topics that we consistently talk about when referring to counter-space capabilities. Does China see arms control in multilateral negotiations as a way to shore up its own national security, or perhaps does it see it more as an effort to constrain China?

**Riqiang:** I would like to talk about nuclear deterrence. My work focuses on nuclear stuff. In the nuclear taboo, it plays a very important role though in China's nuclear deterrence [indecipherable 67:42] . Also, as Mao Zedong said, nuclear weapons are paper tigers. In China, we believe physical use of nuclear weapons is unlikely. More realistic threat is nuclear blackmail.

Based on that philosophy, in China, Chinese scholars, generally speaking, are less concerned with nuclear escalation than American scholars because these are simple. Nuclear weapons are paper tigers. Nuclear use are unlikely. I'm not saying we are not concerned. We are less concerned.

Regarding China's attitude towards Americans, definitely, China's arms control and multilateral negotiations are a way to shore up its national security. I'm not saying that China is ready to do arms control and multilateral negotiations in space or nuclear domain. I will say that China has some experience in multilateral arms control negotiations, such as CTBT.

We do not have such experience as US-Russia bilateral nuclear arms control. Currently, both China military and the government realized that sooner or later we are going to engage in some arms control dialogue or negotiations. We are trying to learn how to do that. For scholars like me, we are trying to educate our government and the military to learn how to do that.

**Daniel:** Interesting. One doesn't ordinarily think of something like that as just the historical experience with something like multilateralism, but I hope that that is something that continues to develop and that we see more. Chelsea, back to you and the Moon.

The United States has proposed the Artemis Accords to establish shared principles to shape the governance of civil exploration and use of space, which seems particularly relevant to lunar activities. Now, Russia and China have proposed their own International Lunar Research Station and have invited others to participate in that. We seem to have competing efforts here.

How do these two efforts relate to each other? Are they complementary? Are they competitive, or is it something in between?

**Chelsea:** Thanks. This goes back to what you were saying about legally binding instruments being created after political instruments. For anyone new to the Artemis Accords, this is a non-binding political instrument between the United States and any countries that are working with them on their Artemis Program to go to the Moon.

It adds detail to some of the gray areas of the Outer Space Treaty and pushes that work forward. The Russia and China MoU that you're referring to, this was a similar agreement but towards a program of work to create a research station.

Similarly, China and Russia have both said that they're not opposed to the US coming and participating in that project and finding a way to be part of that agreement as well. As a counter example, when the US approached Russia to sign the Artemis Accords, Russia refused. Because that's not my word, but I could speak drawing from the voices of those who are closer to that.

Dr. Vilenskaya, who some will know, previously at Roscosmos, explained recently at a Moon dialogue that this was because Russia felt a lack of respect from the United States in the way that they approached Russia.

Then from a Chinese angle, Dr. Jinyuan Su from Wuhan University and also a Chinese COPUOS delegate said that the China-US relationship would require a lot more trust to have been developed before some practical steps were taken to work together.

I think we all know that trust is a very slow process. Of course, it's even harder when damaging statements have been made. Nation state-level laws and political comments have been made that will generate mistrust and animosity.

We, as a community here today, all of the panelists, everyone in the room with us, anyone watching this video afterwards, it's our responsibility to foster a story of cooperation.

From our standpoint, let's stop writing news about tension. Let's start writing news about how bad this is going to go. Let's start writing news about every indication of bridge building in every little opportunity that we see for the development of mutual respect.

Because the long story short is that the technology folks, scientists, engineers, those who are hands on in the labs in all of these nations want to work together, and they want to just get on with it. The opportunity is to foster that same sense of purpose within our political community. Thanks.

**Daniel:** Once again, we find that as technologically advanced as we think lunar exploration is going to be, deep down, a lot of the issues that we're dealing with are just very simple human issues, very basic things about hurt feelings sometimes and just lack of respect and mistrust.

I think we can also say that if there is such a thing as a space race, if there is competition, it's really just reflective of how we see one another down here on Earth. Very difficult to dissociate the two.

Let's open it up to the audience. We've got some great questions here. I'm going to pick out a couple. We won't be able to get to all of them, I'm sure. Let's start here. Excuse me, if I rephrase some of these a little bit.

Over the last 40 years, we've certainly seen that there has been polarization among UN member states, amongst the international community, in terms of how we should be approaching space regulations. There are new countries that are becoming space actors.

How can we prevent some of these countries from just joining one or the other side? Is there a way that we can try to break down some of these divisions and these gaps in terms of how we see space cooperation? Claudio, that one might go to you first.

**Claudio:** I do believe that this is an urgent matter. We should not see space as a divided camp. Middle powers, so to speak -- middle space powers, emerging space powers -- have a key role to play in this regard, and the private sector as well, nurturing and fostering a more cooperative stance. The points made by Aarti and by Chelsea speak volumes about that.

It's not just a responsibility of states. Private sector NGOs have a key role to play in shaping this narrative as well. There's good perspectives for that. Rulemaking will be a crucial aspect of it because without the basic rules for the road, it will be very difficult to ensure that there's a framework for cooperation, but I'm optimistic.

I was a little skeptical in the beginning of this process that we've seen in the first committee UN GA last year, but the responses that we have received, the ones you mentioned, to the request for national positions on responsible state behavior, at least to my mind, point to a promising way for this process in the future.

**Daniel:** Riqiang, let me also put that to you as well. We've seen, for example, there are efforts by China to use soft power to try and pull greater or more partners around the world. They're certainly doing this in a number of industries. Space is one of them.

Do you see that there's a bit of a competition right now for new space actors or for up-and-coming countries to try and pick sides, or is there a different dynamic going on?

**Riqiang:** Hopefully not. I would frame China's behavior as a result of Americans refusing to cooperate with China. With my dialogue with Chinese space people, they are all eager to cooperate with other countries, especially the United States. Because of that domestic law, China cannot cooperate with the United States.

That's why China said, "OK, we have to do everything by ourselves. While we are doing that, we are open for everybody." I hope this kind of cooperation could encourage general cooperation for all countries rather than to build a divided domain. Hopefully, [indecipherable 77:04] .

**Daniel:** Hopefully, the United States and China will find some area that they can cooperate on and just start making small steps towards building some trust. Aarti, Claudio already touched on this, but there's a question here on it as well about the commercial sector.

What can the commercial side contribute to these dialogues around competition, particularly on the security side of things? Certainly, the UN has been asking for input from the commercial sector. How can industry join these conversations, especially at the multilateral level?

**Aarti:** First of all, I think they need to be invited to participate in them. There's always this perception that industry with a vested interest, the commercial interests, that really care about the greater good, that's not true obviously because the operators are the ones who have made the largely private investments and often huge private investments into the assets in space.

They are very serious about this, and they are very genuine in their desire to protect those assets. Therefore, the contributions that they will bring to this dialogue are extremely valuable. They're the ones with the firsthand experience of how to manage assets in space, how to exchange data, and how to do that in a confidential and secure way.

You find even competing operators are working very, very closely together because they do succeed and even corporate interests at the door when it comes to talking about something, which is essentially the greater good.

In this particular dialogue, you make me think of the World Radio Conference which is the ITU event where spectrum is decided, who can use which spectrum, and so on. Spectrum is often referred to as a global commons.

We do the same about space, but yet in the spectrum field, we can still manage to have a global consensus building process, which comes up with a fixed outcome every four years and which updates a treaty every four years. If space is a global commons, why don't we do that in space as well? The private sector, it would be [inaudible 79:29] .

**Daniel:** Chelsea, same question to you. What can industry provide to the multilateral discussion on lunar resources and in-situ space resource utilization?

**Chelsea:** Any operator community is going to know their work better than any regulator for the most part. I think what would just be so fantastic to see more of these companies dedicating the time and energy to formulating their opinions on some of these issues.

For some of these companies in the lunar community, I do understand that it is very pressing and challenging to dedicate time to policy development thought processes in addition to getting to the Moon.

Obviously, that's a hard enough challenge, but I do think that if there was a little bit more fostering in some proactive position development, then that would allow them to come to the table with a bit more power and strength of that narrative that they want to see put forward.

We do have some very prominent voices in the investment community and in the private community of the lunar transit groups that exist, but a lot of times, it's an oversimplified set of narratives that we're hearing rather than in the nuance.

Aarti's point about the commons that you're referring to in regards to the ITU, that same type of leadership could be coming also from some of these lunar actors in concert as well.



I think one of the challenges is that there is quite a big difference between some of these larger transport companies like the SpaceX as in the blue origins and some of the slightly smaller transport companies in commercial lunar payloads groups such as Astrobotic, Intuitive Machines and all those good teams, and iSpace and whatnot.

Because of the difference in the sizes of organizations, they also just operate very differently. What would also be great to see is a little bit more of an equal playing field approach to some of those conversations between them.

It'd be great to see more transparency and more outreach from one company to another about opportunities to formulate opinions together. Those are just a couple of examples.

**Daniel:** Another great question from the audience. Claudio, maybe you can help with this one. At the United Nations where we're often asking like, "OK. How do we get industry involved? The industry they're doing so many activities in space, and we clearly need their input." What input do we need? What does the United Nations need to hear from industry?

**Claudio:** I believe that there's more opportunity to do so when it comes to COPUOS, which deals with the peaceful applications of outer space, and it's more receptive to that kind of input. The GGE under the arms control side, there's been little to no input in that respect.

The GGE is not the particularly suitable body for that kind of interaction. But as I said, I think that one asks what possible shape that could happen in the GGE is almost too mind-boggling to consider it. In this new process that we are witnessing, the one that was initiated by last year's resolution proposed by the UK, I think that all options are on the table.

It's still very unclear what shape those discussions could take. At least from our perspective, the ideal setting for this would be an open-ended working group along the lines of similar initiatives that have been undertaken in the past by the General Assembly, open to the participation of all the member states because this is an issue that does not concern only spacefaring nations -- it concerns the entirety of the UN membership -- and with appropriate mechanisms to ensure that private sector, NGOs, and academia can meaningfully contribute.

A model for this can be sought, not necessarily the be-all and end-all but at least a baseline for how to move forward in this respect. That would be the open-ended working group that has just been concluded on cyberspace on cyber securities, in which there was a mandate for these actors to be heard and to present their views.

It was not optimal in our perspective, but at least there was an opening for that to happen. It has been extremely important in that respect. The private sector, academia, and industry play a similar role in the case of outer space. They are key actors. In the beginning of the space race, states were basically the Alpha and Omega, but now it's increasingly not the case anymore.

Any negotiating or a discussion forum that emanates from this new process will have to take this reality into account.

**Daniel:** You heard it here first folks. We're looking for an open-ended working group. That would be a very interesting next step in particular because one of the things that at the United Nations that we're starting to hear a lot from member states was that GGE seemed very closed-off and the consensus makes it very difficult.

Maybe, an open-ended working group provides more transparency and makes it easier for other states who are skeptical about the process to feel a sense of ownership.

Riqiang, there's a very interesting question here that I would like to throw it to you. Somebody is discussing the history of space exploration and the differences between the US narrative and the Russian narrative. Likewise, I'm sure there's a very different narrative from the Chinese perspective.

We often hear these very conflicting stories about who's the good guy, who's the bad guy, who are the good actors in space, who are the ones that are creating threats? How do we bring these narratives together and actually try to come up with how do we reconcile these different stories so that we can get something that is closer to a shared story?

**Riqiang:** That's a good question. I'll try to answer. It's natural that people prefer to believe that I'm good guys and other countries are bad guys, and people shouldn't know I'm good guys. If you don't know I'm good, guys, you are doing something bad. Something like that.

You can say this kind of narratives in almost all the domains. For the space domain, when we look at American's policy, when American justify its development of space weapons or the building of the Space Force, as they say, they usually say that because Russia and China are doing something bad, we need to defend ourselves.

Actually, if you put it from China's perspective, actually America is doing a lot and much better and much more work. I think academia tries to put them together. Everybody has their own country and has their own bias.

All we can do is maybe we can put effort and put scholars from different countries, and they could bring in different perspectives. Maybe we disagree with each other, but together we could build a different perspective, more neutral maybe.

**Daniel:** I'd like to open that question to the rest of you as well. Do any of y'all have thoughts on how we might try to change this competitive narrative to stop talking about, "Oh, well someone's trying to dominate space, or someone's trying to gain ground."? Is there a way that we can open up this language to more cooperative and less confrontational language?

**Chelsea:** I have a couple of comments on that really briefly. I just want to repeat and endorse what you said, Riqiang, about utilizing scholar relationships as a bridge-building function. I think that's a fantastic point, and I agree with it completely.

I also think what Claudio has been saying about middle powers is really important as well and some of those smaller nation states in regards to the countries that are just finding their feet within space.

The New Zealands and some of the amazing new missions we're seeing out of the United Arab Emirates, some of the policy-making leadership from Luxembourg, these smaller countries could offer such an interesting platform for a different kind of power as we develop new forums for those collaborative discussions to take place.

I'd really encourage anyone involved in those countries to just utilize the strength of whether it'd be middle powers, emerging state powers, emerging space powers, etc. to lean into that as a convening force. Oh, he's gone.

Also, to come together around the idea that power and politics doesn't look the same as it used to. It's not a zero-sum game. I think that's been said before today as well, but just to say that, "Look, it's not about whose policy is the best. It's not about whose accords are the ones that should rule them all. It's not about whose interpretation of the OST is the right one."

It's really about this more distributed development of not even necessarily consensus but some degree of alignment, some degree of just saying, "Let's come together and figure out where do we agree, where do we disagree," develop some initial nuggets of a starting point for each of these topics.

In the Open Lunar Foundation, we're really interested in emphasizing the fact that on Earth, we do not have monolithic agreements and consensus on everything. We also don't need to do that in space in every case. We don't always have to drag it into the arena of consensus versus conflict. Those are not the only two versions of the world, consensus versus conflict.

There are so many different ways to come together in an interesting combined set of regimes that complement each other and reinforce each other. We need to get creative in that regard and stop seeing the Moon, in particular, as this monolithic rock in the sky but actually a really complex system. That's my wrap-up. Thanks for having me.

**Daniel:** That was perfect. Actually, that leads us into a great question for final thoughts as we are running out of time here pretty soon. Is there such a thing as healthy competition in space? If so, how do we achieve it? You said before, Chelsea, of course, that there is this idea of noble competition. Can we do this in space? Is there enough space for everyone?

**Chelsea:** I'll just...

**Daniel:** Aarti, let's start with you.

**Chelsea:** Oh, yeah.

**Daniel:** Or Chelsea. Yes, please go ahead.

**Chelsea:** I was just going to say I highly encourage folks to learn about anti-monopoly law and the fact that that has been implemented only within nation state boundaries, so we don't actually have international de-monopolization techniques, but I think there's going to be a critical and very interesting thing that we're going to have to embark upon.

As our globalization becomes as significant and interconnected as it is, we're going to need new tools for that, so I would definitely recommend checking out noble competition concepts but also thinking about the future how are we going to de-monopolize massive international companies without the jurisdiction powers that we might have right now.

**Claudio:** I do agree, and I think that the reference to competition, I don't think it's necessarily the best one. I think we have spaces of finite resource in all respects. Of course, this is a potent driver for competition, but at the same time, there's infinite opportunities for cooperation and for a rational use of those finite resources.

We have a very good and sound basis for this, legal-wise, the Outer Space Treaty. There has been a paralysis in the development of this legal framework in the past few decades, but there's reason for hope. The adoption of the Long-Term Sustainability Guidelines by COPUOS in 2019 is a very important step forward.

I do think that a similar breakthrough must happen also on the international security side of it. Even though the conditions are still a little tricky, I think that the recent examples of...I like to use it as a benchmark because the situation is somewhat similar even if the subject-matter is not cyberspace.

Situation in 2018 was extremely difficult as well. We had two different bodies established by the UNGA with competing mandates. However, despite all those challenging circumstances, both bodies, the GGE and the OEWG on cyberspace, have been able to adopt consistent reports earlier this year.

I do believe that the same can happen in outer space, if there is enough goodwill and commitments by all space actors, be the major spacefaring nations, middle space powers, and non-spacefaring nations, which have a lot of gain or lose from the discussions.

**Daniel:** Great. Aarti, what do you think?

**Aarti:** I think that healthy commercial competition in space requires a level of playing field, and [inaudible 94:31] becomes a chess game where policymakers aren't just enablers. They're actually trying to play as well. That means that suddenly the playing field may not be level anymore, and the regulatory framework might then get skewed.

It shouldn't be a gold-rush land grab, especially when the stakes are so high in terms of both the investments and risks. As I said, the value of technological advancement has got to be in the value it brings to people on Earth. The users got to be at the center of the equation.

Right now, we have Starlink. We're receiving US government support. We have Amazon getting involved with cloud services, China planning a system for its belt and road initiative. The EU is pushing the system because the US and China have got one, and they can't be left behind, and then Russia obviously with its VERA program.

Who's going to be next? India. These are all unsustainable land grabs where the user is completely incidental to the discussion. It's nice to talk about safe space amongst the top guns but no meaningful and open discussion about the cumulative consequences of these initiatives, and whether there isn't a better way of achieving what the world really needs. I think that would be a healthy discussion to have.

**Daniel:** Absolutely. Thank you. Riqiang, sir, we give you the last word.

**Riqiang:** Thank you. Definitely, yes, we can have healthy competition in these ways. First, we don't forget cooperation. Second, we have a good rule of law. That's all.

**Daniel:** Perfect. What a closing, short and sweet. Thank you, everyone. I want to thank my panelists. This was a fascinating conversation. I've got lots of notes to take away, and I'm sure we'll be discussing this.

If any of your friends miss this panel, don't forget to tell them that the entire event has been recorded and will be available soon. I know they're going to want to listen to this one.

Finally, I'm delighted to introduce our first keynote address for the day, Tory Bruno, CEO of United Launch Alliance in a conversation with the Atlantic's Marina Koren. Folks, there aren't going to be any questions for this interview. We're going to let Marina do that.

Again, thank you very much everyone for joining us. We're delighted to have been able to have this conversation, and I hand it back to our producers. Take it away.

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