

November 7, 2020 Ray Padgett | raypadgett@shorefire.com
Mark Satlof | msatlof@shorefire.com T: 718.522.7171

A U.S.-China Space Race is Good for Humanity

Guests:

For the Motion: Bidushi Bhattacharya, Avi Loeb
Against the Motion: Michio Kaku, Raji Rajagopalan
Moderator: John Donovan

AUDIENCE RESULTS

Before the debate:

47% FOR

33% AGAINST

20% UNDECIDED

After the debate:

45% FOR

51% AGAINST

4% UNDECIDED

Start Time: 00:00:00

John Donovan:

Commercial rocket ships, a lunar outpost, expeditions to Venus and Mars. The second golden age of space is upon us.

Avi Loeb:

Space is that ultimate frontier.

John Donovan:

Dozens of nations are looking to the stars, but one in particular is gaining ground on what has been U.S. preeminence. Before 2003, China had yet to put a human in space. A lot has changed. A potential trillion-dollar market is now up for grabs, and Beijing's ambitions are growing.

Raji Rajagopalan:

We should be very afraid of a U.S.-China space competition and its consequences for all of us.

John Donovan:

As are those of private entrepreneurs.

Bidushi Bhattacharya:

Just like we have Facebook and Google now, the powerhouses in the future are going to be huge space companies.

John Donovan:

Perhaps a new space race will kick start what JFK once called "the best of our energies and skills." But there are dangers; competition between great powers could unleash new military posturing with grave consequences.

00:01:00

Michio Kaku:

It'll escalate, of course, to a potential nuclear confrontation.

John Donovan:

So, is a U.S.-China space race good for humanity?

John Donovan:

Join us for That's Debatable, presented by Bloomberg and Intelligence Squared.

From Washington, D.C., I'm John Donovan, your host and moderator. Welcome to That's Debatable, an interactive series on today's most pressing issues. We have four space luminaries to debate this resolution, "Is a U.S.-China space race good for humanity?" They take questions from me and our global audience, which votes to choose the winner.

The team arguing against, Michio Kaku, a bestselling author, theoretical physicist, and a co-founder of String Field Theory. And Raji Rajagopalan, a distinguished fellow and head of the Nuclear and Space Policy Initiative at the Observer Research Foundation, one of India's leading think tanks.

00:02:03

Their opponents, Avi Loeb, a physicist who was the longest serving astronomy chair at Harvard. And Bidushi Bhattacharya, a former NASA scientist turned entrepreneur; she oversees global businesses and space education, and startup incubation.

Let's go to their opening statements.

Bidushi Bhattacharya:

The development of outer space is inevitable, not just in the United States and China, but in nations that have a per capita GDP that's just three percent that of the U.S., they are becoming space leaders. This is not just governments around the world, it's also private companies and startups. The price tag for space tech has dropped by a factor of up to 10,000. Access to outer space is indeed democratized. Space-based goods and services are exponentially growing, and it's a global sector. Let's figure out how to cooperatively manage its development. A cooperative alliance that pulls expertise from around the

world would allow the United States to access goods and services that we cannot access because we just work on this alone.

00:03:08

Let's be clear about this, space is democratized and exponential change is inevitable. Would a U.S.-China space race be good for humanity or would it necessarily lead to the rapid misallocation of resources for possible militarization of space? I don't think the latter will happen.

Raji Rajagopalan:

I believe any space race will very quickly move into military competition, and U.S.-China space competition will now -- will be no different. Second point, I think the U.S.-China space race cannot be limited to just the two players. This will spread; this will have cascading effects. Third point, which is we are already facing serious problems in space. Space is crowded, congested, and with the space race, it's already contested as well. And the usable areas in outer space is fairly limited, and we need, therefore, restraint in our activities, the kind of activities that we engage in.

00:04:07

This means we also need to bring about multilateral governance, global rules, global rules of the road, global agreements. But this would require, first and foremost, multilateral negotiations and the key negotiating body, the Conference on Disarmament, based in Geneva, has been stalemated for more than two decades. In fact, the last negotiations happened in 1996. And I think, even though we do have a few treaties in place, we need updating some of the existing measures, such as the Outer Space Treaty of 1967.

We need to change the rules of the road for global governance. Otherwise, we will be essentially making space sustainability a serious threat in the coming years.

Avi Loeb:

In general, competition is good, both for science, technology, and humanity, more generally. Now, the competition between nations started in the oceans.

00:05:02

Imagine forbidding ships to leave Europe in fear of the use of ships for military purposes. Where would we be today? The other point to keep in mind is that it's impossible to enforce space laws, especially in the private sector, since the private sector is outside the boundary of countries. Space is the ultimate frontier, and it's also important for national security.

We cannot assume cooperation by other nations, and we must protect our national interests. There is a strategic advantage operating from space for surveillance satellites,

warning systems for ballistic missiles, monitoring and cleaning up space debris, and monitoring existential risks such as climate change, pollution, or weather patterns.

00:05:59

Anyone arguing against competition signals an inferiority complex, and I do believe that the U.S. and its partners will and should win the competition as we did with the Soviet Union. And, obviously, there are concerns, but we should move forward with our aspirations.

Michio Kaku:

I'm a professor of theoretical physics, but I also realize that physics can be used for peace as well as warfare. We're talking about the fact that our missiles travel at 18,000 miles per hour. Within a matter of minutes, you can knock off the enemy's satellites, communication systems, power systems, and create havoc and paralyze and blind the enemy, which gives incentive for a first strike. Because if you strike first, you can bind the enemy; if you strike second, you may not survive to strike second. Second of all, it'll escalate, of course, to a potential nuclear confrontation. But there's a wild card; the wild card is the electromagnetic pulse.

00:07:06

Back in the 1960s, the United States sent a Thor missile over the Pacific, detonated a hydrogen bomb in outer space, and was shocked at the electromagnetic pulse which paralyzed communications between San Francisco and Tokyo, set off burglar alarms all over Hawaii. A small country like North Korea, being outgunned, can shoot a warhead over Kansas and potentially knock out a good fraction of our satellites and power systems in the United States. That's the great equalizer.

And who's the most vulnerable if it goes to a first strike? We are. Over 50 percent of the satellites in orbit are tied to the U.S. military or the U.S. economy. And remember, a new arms race is brewing now. Hypersonic weapons, that's the name of the next round of competition. Destabilizing weapons that are maneuverable, that travel up to 20 times the speed of sound.

00:08:07

Let's not be naive. The Russians are working on it; the Chinese are working on it; we are working on hypersonic drone vehicles, and a whole new arms race could start. So, the window of opportunity is now. Now is the time for a treaty, before hypersonic weapons destroy our chance for a peace in outer space.

John Donvan:

Those are the opening statements, and here's how we determine the winner. Our audience voted on this motion, 47 percent were for it, 33 percent against, 20 percent

undecided. They will vote again after the debate, and the team that sways the most votes from one side to the other is our winner.

That wraps up round one. Coming up next, A.I. technology breaks down what matters most in our debate, "Is a U.S.-China space race good for humanity?"

00:09:12

Welcome back to That's Debatable, presented by Bloomberg and Intelligence Squared. The motion, "Is a U.S.-China space race good for humanity?" We now bring in our global audience; people around the world weighed in on this debate, and we turned to IBM Watson to understand what matters most. Here's how the artificial intelligence works.

First, people around the world submit their arguments online, then the A.I. assesses the quality of the arguments, filtering out any irrelevant submissions and sorting the remaining arguments into "for" and "against". Next, the technology identifies the recurring key points, ranking them based on their quality and their frequency. Finally, the A.I. creates a coherent narrative of the strongest and most prevalent points for both sides of the debate.

00:10:03

And now we get to hear it, a selection of the key points and arguments that our global audience, thousands of people around the world, thought were the most important on this topic. So, let's get to that.

A.I. Speaker:

Hello, the following analysis used A.I. models to identify the critical key points made by each side on the motion, "A U.S.-China space race is good for humanity;" 48 percent support a U.S.-China space race, with 41 percent of those arguing that a rivalry between the East and the West boosts innovation and scientific advancement.

Another key point for the motion was that a U.S.-China space race would demonstrate how competition can expand knowledge and drive international cooperation. One argument was that sustaining life outside of Earth offers a new chance to change social constructs and forms of cooperation. People also think a space race helps drive technology, jobs, and hope.

The remaining 52 percent were against the motion, with 14 percent of submissions arguing that a U.S.-China space race will have serious negative consequences.

00:11:05

One argument said increasing competition and division between rivals will not benefit humanity as a whole, but rather serve to divide us. Another key point against the motion

was that it will be a waste of precious resources, and the global space spending spree between the U.S. and China would waste money that could be used more constructively.

People also said that space colonization may worsen environmental degradation; the constant launching of missiles produces a large amount of harmful exhaust gases that contribute even more to climate change. While it would surely spur innovation, it would also distract us from more important races such as the one to save our climate. Please visit the website to see more results. Good luck to the human debaters here on Earth.

John Donovan:

So, it's interesting that the global audience brought up some arguments that none of the four of you have brought up.

00:12:00

So, Avi, what about the argument that a space competition in and of itself would exaggerate the spending for its own sake, particularly if it moved towards militarization and that -- and that, by itself, competition would skew the allocation of resources in a way that would not be good for humanity?

Avi Loeb:

What we miss in this context, is the fact that space is three-dimensional. We live on a two-dimensional surface, the surface of the earth, and we tend to think that all applications will be related to the surface, that there would be missiles coming from one nation going to another. But in fact, you know, what we are discussing these days is going to the moon to establish a sustainable base. That's what the NASA Artemis program by 2024, to get there and establish a base, and then eventually go to Mars and perhaps beyond, because there is a lot to space [laughs] beyond the limits of our immediate environment.

00:13:02

And so, of course, there is the immediate environment and the risks for wars and so forth, but the way I see space is the third dimension. We have to discuss that and the technology to reach to the third dimension and the resources that we may find there. The sun will burn out and, in fact, within less than a billion years, all the oceans on Earth will be boiled off. So, we will have to go to space, it's inevitable, and we better start now.

It's possible that are other civilizations that already did that, and we are -- if we are stuck on this two-dimensional surface and worry about fighting with each other, that's a very narrow-minded view of this three-dimensional volume that we can explore.

John Donovan:

Okay, let me take that to Raji. So, I heard Avi saying, and I'm guessing everybody here agrees that there's great potential and space to find and discover resources and potentially to justify the costs that would go into that.

00:14:02

But, Raji, I think I heard Avi also saying that your note of caution on competition would have a rollover effect of suppressing the degree to which people want to work in space and explore in space and extend in space. What about that?

Raji Rajagopalan:

No, I do not believe that is the case. Because if you look at the number of space enterprises that are coming up, today space is no more just -- it consists of state actors. You have a number of private sector players, commercial actors, and not -- this was typically a Western phenomenon, but this has changed in the last few years. Asia, it is changing in a big way. China has more than a hundred startups -- space startup companies. India, again, it's changing. So, the number of space actors are also kind of diversifying, and technological spinoff benefits from these kind of companies doing different things, I think that's enormous, and I think that's hugely beneficial.

00:14:58

But at the same time, I do not believe that new technologies that are coming up, essentially from China or Russia or even the U.S., in that sense, is necessarily towards peaceful applications of space. That are more destructive ways. Just a couple of months ago, you had the Russians -- Russia actually injecting -- coming up with a new projectile out in space. So that was, in a sense, a first case of space weapon being tested there. So, in a sense, I think the destructive aspects of new technologies are far more dominant today, to me, but especially among the three key players, Russia, U.S., and China. So, I think that that brings in more of destabilizing aspects of outer space exploration than the positive aspects to me.

John Donovan:

All right, thank you, Raji --

Avi Loeb:

Raji, you are basically make --

John Donovan:

-- submitted. Oh go -- you go ahead. I'd like to hear the response.

00:15:53

Avi Loeb:

Yeah, I just wanted to say that I rest my case. Raji is making my point that, you know, if the other countries make statements about ambitions for using space in ways that we don't want them to use it for, we have no choice. We basically have to be superior in terms of our technologies, such that we can enforce our set of values of using space for scientific and technological advances.

Raji Rajagopalan:

But at the same time, the unbridled competition is what is the problem.

John Donovan:

Coming up, the real risk of so-called unbridled competition in space.

Michio Kaku:

A nation like India, China, they're going to go nuclear because they know they're outgunned, and their ace in the hole is the EMP and nuclear weapons. If it goes to a war, it's going to go nuclear very fast.

00:17:00

John Donovan:

We have a question from Eljuan Lobo-Perez [spelled phonetically], that's been submitted during the course of the debate, who asks, "Why do proponents of cooperation think that the Chinese will abide with any rules set down for genuine cooperation?" Michio, I think that question goes, you know, directly at your thesis. So, the question is, "Why would anybody expect the Chinese to play nice?"

Michio Kaku:

Well, first of all, nations work in their own national interests. Let's not be naive about this. We can dismiss all the highfalutin platitudes about peace and justice, stuff like that. But the bottom line is nations work in their own interests. We pay generals to win wars, we don't pay generals to lose wars. So, we have to craft a treaty that looks at the interests of each nation. So, why was it that President Ronald Reagan signed one of the greatest arms control treaties in history between the Soviet Union and the United States? Because it was in their interests.

00:18:00

And the same thing here; the Chinese will realize that they're outgunned, that if it does come to a war, they're going to suffer a lot, we'll suffer more, of course, but they, too, will suffer with their economy, and that it is in their national interest to sign a treaty. And we have to have ways to enforce that treaty and penalties if they violate the treaty. That's how we did it during the Cold War, when there was a lot more at stake than what is at stake now, and I think that nations work in their own interests, and their interests should be peace, the peaceful exploration of outer space, rather than an arms race that no one's going to win and we are the losers.

Avi Loeb:

But Michio is missing a major point --

John Donovan:

-- your partner. Well, I was going to bring it to Bidushi. And I was going -- but I was going to cite you, Avi. Bidushi, Avi, in his opening, has said that the U.S. would win in a confrontation, and Michio was saying, well, the Chinese --

00:18:58

Michio Kaku:

I think that's a fantasy --

John Donovan:

-- know that, and --

00:19:01

Michio Kaku:

-- that's a fantasy to believe that you can win in a war that goes nuclear very, very soon. And a nation like India, China, they're going to go nuclear because they know they're outgunned, and their ace in the hole is the EMP and nuclear weapons. If it goes to a war, it's going to go nuclear very fast.

Avi Loeb:

But, Michio, you are missing a crucial point --

[talking simultaneously]

John Donovan:

No. No. Because I've asked Bidushi to come in, and then I'll come to you. Thank you for respecting. Go, Bidushi.

Bidushi Bhattacharya:

Yes, thanks. I think we're missing the point. We're looking at warfare in a very traditional way; you have to talk about soft power. And, Michio, you mentioned having treaties that are in the interests of everybody. So, think about space tech and China. Let me try to tie NASA together with China for you. China has really bad issues with pollution right now. Yesterday, NASA landed on an asteroid, and scooped up material to bring back here to Earth. How can that be applied? It can be applied in mining, for instance.

00:20:01

The asteroids out there contain all the material that we currently mine here on Earth. So, if we continue to develop space technology, we would alleviate pollution associated with mining here on Earth, not just for the U.S., but also for China, also India, and whatever other country you want to talk about. So, if we can find that sweet spot where everybody benefits, I think those benefits will override the choking pollution or whatever other climate related issues that you're talking about right now, and that involves soft power.

Michio Kaku:

Well, I think I think you raise an interesting point. We want a win-win situation, not a lose-lose situation. If it goes to war, it's lose-lose with we as the biggest loser. There's a win-win situation where we sign a treaty that regulates the arms race, that sets guide rules and penalties if you violate them, and seals into stone, in some sense, our superiority in certain aspects of missile technology. That would be a win-win situation, because in everyone's interest to manage the arms race, rather than let it spiral out of control.

00:21:03

Bidushi Bhattacharya:

Yeah, I think that's right, but you have to throw --

[talking simultaneously]

John Donvan:

I want to bring in Avi on this because I cut you off before. So, Avi, jump on it, please.

Avi Loeb:

Yes. So, I think Michio is missing a crucial point, and that is the private sector. It's not a frontier that is pursued only by nations. It's pursued by the private sector. And we know about SpaceX and Blue Origin's interest in going to Mars. And any treaty you sign among nations does not need to be satisfied by the private sector, because the private sector has its own commercial interests. And, therefore, I would argue that they --

Michio Kaku:

The private sector has to obey laws. They have to obey laws--

Avi Loeb:

I would argue --

Michio Kaku:

The laws say that private enterprise has to obey certain ground rules. If they don't, they go to jail. That's called American justice--

Avi Loeb:

No, no, that's within the border of the --

Michio Kaku:

Private companies have to obey national laws or else you go to jail --

00:22:02

Avi Loeb:

Not in space. Not in space --

Michio Kaku:

That's the foundation of our American judicial system.

Avi Loeb:

But there is no space --

[talking simultaneously]

John Donovan:

Raji, you've been very --

Avi Loeb:

But, can I -- can I finish --

John Donovan:

Raji, you've been very patient and you're politely raising your hand, so I want to bring you into the conversation. Raji, please jump in.

Raji Rajagopalan:

Yeah, of course, absolutely. Thank you. I think the commercialization of actors in space is a very relevant point. You have SpaceX, you have Blue Origin, and so on and so forth. But, if you look at the space commercial actors in China, they are not free -- there is no free market out there. There is no market competition that is taking place. They are -- they have a mercantilist approach. They are run, driven, and managed completely by the state. So, that's point number one.

Second, the private sector is also bound by the -- bound by the laws that are signed by a particular nation. So, if the SpaceX is going to launch something, they are bound by the laws that the U.S. has signed onto. So, there are national -- there are international treaties and regimes that govern even the outer space activities by the private sector, so it cannot be that private sector can do anything that they feel like.

00:23:04

It's not a free for all game out there. I think that's a huge difference that one has to -- be kept in mind.

John Donovan:

Avi, are you -- you're satisfied? You -- we can move on to another topic?

Avi Loeb:

No, I'm not --

John Donovan:

I felt like you had --

Avi Loeb:

-- not at all. I do think that there is no enforcement mechanism of space laws at the moment, and I do think that the interests of the commercial sector would win the day, because there is a lot of potential benefits to space, commercial benefits, that outweigh the military benefits. And as a result, I think that space will serve the better of humanity. And so, the commercial aspects of going to space, space tourism, communication, telecom, and mining, these will outweigh the military concerns that people have, because of the global nature of the world economy right now.

00:24:02

Raji Rajagopalan:

I think this is, again, a demonstration of the kind of competitive spirit that is picking up because Space Force first came up and it received a huge amount of news headlines and so on and so forth, but that's because Trump has done it. But this is to say that this is only a response to what the Chinese and the Russians have already done.

John Donovan:

Welcome back, everybody, to That's Debatable, presented by Bloomberg and Intelligence Squared. The motion, "Is a U.S.-China space race good for humanity?" The arguments touch on business, politics, and economics.

Is it the case that, as during the Cold War, a new space race would spur scientific advancement and collaboration? Or would this new round of competition lead to the militarization of space, and put us all at risk? Since the Soviet Union's Sputnik launch in 1957, nations and private companies have jockeyed for their spot in the sky.

00:25:05

Today, it is dominated by new contenders. As competition takes off, the Trump administration established the U.S. Space Force in 2019, the first new military branch in more than 70 years. I asked our debaters, is that good or bad for humanity?

Michio Kaku:

Well, let's face it. It's basically a bureaucratic maneuver where we move a lot of desks, we move people's budgets, give people different titles. Because the Air Force already has a space division, [laughs] so does the Navy, and so we're simply ratifying something that already exists. It sounds great. Perhaps people will rally around the flag, I don't know. The point is that it does not change the dynamics of what's happening on the ground. Funding is still going in this direction; private enterprise is still moving in this direction; and I think that outer space is going to be a province for economic development. I'm all for that.

00:26:03

What I'm saying, is that that economic development should not be in the interests of weapons that go nowhere, that destabilize the situation, and can only lead to a war.

Bidushi Bhattacharya:

I would echo what Michio just said in terms of us shuffling desks around. What they've done is just taken what's already been done by the Air Force and the Navy, and turned it over to this new division. It sounds very cool; it gets people's attention. I'm not sure that it increases our assets or our capabilities in any direct way.

But I did want to address this issue of treaties and enforcement. We've been talking a lot about having treaties between countries and making sure that if you launch from a certain nation, that you follow the rules. But remember, as Avi said, space is three dimensional. Space is huge. So, what are you going to do in the next decade or so? And I know this from being in the sector for 30 years and having more startups, in particular, in the last five years.

00:27:00

In the next decade or so, we're going to have the capacity to print material from lunar regolith -- from material on the moon. And pretty soon, we're going to be launching from the moon. Who owns the moon? How do you regulate this? And, as we step further out to the asteroid belts and beyond, these rules are going to have to be regulated somehow, and there is no universal body that can reinforce this. So, we do have to take a different approach, because you can't just constrain these rules to a small bit of earth and a sort of shell of space around us. It's just not going to work in the longer run.

John Donovan:

I have a question, Raji --

Raji Rajagopalan:

Can I make a small point --

John Donovan:

-- yeah, you know, please. I would like you to do that. Go ahead.

Raji Rajagopalan:

Okay, so I just wanted to, kind of, talk to the Space Force question. And I think this is, again, a demonstration of the kind of competitive spirit that is picking up because Space Force came up, and it received a huge amount of news headlines and so on and so forth, but that's because Trump has done it. But this is to say that this is only a response to what the Chinese and the Russians have already done.

00:28:00

The PLA, for instance, that the Chinese military -- the PLA Strategic Support Force -- came about in 2012, and the Russians had done similar reorganization a few years ago, in

a sense. It's bringing about greater coordination of different resources, different inputs such as cyber, electromagnetic weapons, as well as space into one -- under one command in a sense. So, this is -- you are seeing the securitization of space in a much bigger way than we would have -- we would have really liked it to be. So, in a sense, Space Force got a lot of attention, but I think there's a lot of other activities have been going on in terms of institutional mechanism as well as coordination in other countries, such as your opponent -- such as China and Russia, and I think those need to be looked at as well.

John Donovan:

Coming up, we had it in the 1960s, but can we regain our excitement over outer space?

Avi Loeb:

We should embark on it. And of course, there are political and military concerns, but there is no way out of moving forward. That's the wave of the future, and that's what excites the public.

00:29:12

John Donovan:

Avi, we have a question from an audience member named Jonathan Spitz [spelled phonetically], and he asks, "Are the ideas of a space race and some form of peace in space mutually exclusive?"

Avi Loeb:

I don't think so. I think, in fact, going to space will encourage cooperation. We have to cooperate in terms of understanding how to live in space for longer periods of time and how to establish the habitat that we have naturally here on Earth. So, space has great benefits to science, understanding whether there is life in the universe, you know. That's a fundamental question, "Are we alone?" And so, first we need to explore the objects around us. We might find clues on Mars or whether the early liquid water that was on the surface of Mars generated life as we know it on Earth, and that's a fundamental question that interests most of the public.

00:30:10

So, just being worried about space, not exploring space because of the concerns about military uses of space is the wrong attitude. We should be brave. It's just like the next frontier. We should embark on it, and of course, there are political and military concerns, but there is no way out of moving forward. That's the wave of the future, and that's what excites the public. I think the public is looking for an excitement of the type that we had with the Apollo program. Since the '60s, we lost that sense of excitement, and science can bring that excitement back to the main street by exploring space. And so, giving up on --

[talking simultaneously]

John Donovan:

-- you were saying, Avi, I think that -- you go ahead, Michio.

00:30:57

Michio Kaku:

Okay, first of all, I'm all for exploring outer space. The dinosaurs, for example, the dinosaurs did not have a space program. That's why there are no dinosaurs here today on this debate; they got wiped out. We do have a space program, and so I'm all in favor of exploring outer space. But what could stop the exploration of space? What could stop the whole thing, is if space gets militarized, and all of a sudden, we have war zones and different areas mapped out, different nations declaring supremacy in different areas. That could ruin everything.

And I think that, in the interest of science, that we should have scientists and explorers in the forefront of exploring outer space rather than militaries. So, we have to rein in the military, and the way to do that is with treaties. And that's why I'm saying that it's worked in the past, that's why Ronald Reagan was able to pass some of the greatest arms control treaties in the history of humankind. Because he realized that, yes, ultimately, it's pointless. Ultimately, we in the United States are the biggest losers.

00:32:03

As the Chinese like to say, "never pick up a rock, only to drop it on your own feet." To drop -- to pick up the militarization of space is to ruin our space, to make it into a political football between militaries, and that is the opposite of what we scientists want. So, we scientists want an open playing field; we want to have science for the benefit of humanity, not for the benefit of some politician or some military. That's why we need a new outer space treaty.

Avi Loeb:

I completely agree with that, but let me just make one simple point, that all the military applications are concentrated on the surface of the Earth right now. And, as long as you move far enough from the surface of the Earth, then it's just science. And so, if we have our ambitions on the moon or on Mars and beyond, then I don't see any military concern to go -- of going to Mars.

00:33:04

You know, I can see commercial benefits, so that's why I have no issue with going deep into space. Of course, if you are close to the surface of the Earth, there are military applications, but going deep into space is great for science.

Michio Kaku:

But, the question is, who's going to plant the flag on the moon --

[talking simultaneously]

John Donovan:

Michio, can you hang on? I want to give --

Bidushi Bhattacharya:

Let me just jump in here.

John Donovan:

- Bidushi a chance to jump in.

Bidushi Bhattacharya:

Yeah. Yeah. Thanks, John. I just want to jump in and point out something else, which is that militaries dominate whatever frontier you're talking about because of money, right? The U.S. military has far more money than any anybody else in the country at the moment; same with any other government. That's where the cash comes from. But you're not thinking about the commercialization of space. Once the space becomes truly commercialized, those asteroids that I talked about earlier, they contain literally trillions of dollars worth of material that can be brought back here to Earth. So, the balance of power in terms of actual financing, in terms of actual outcomes for space, I think, is different now than it ever was before.

00:34:06

So, this thing with treaties and governments, I think it's an important thing to consider, but it's very limiting. You really need to think about the commercial aspects and how quickly that's growing. And, you know, just like we have Facebook and Google now, the powerhouses in the future are going to be huge space companies, not just the military.

John Donovan:

Raji, I want to just ask you a bottom line question on this. If China -- if China does not cooperate, if China goes ahead, if China -- if China goes all out to dominate space, what is the U.S. supposed to do?

Raji Rajagopalan:

I think the U.S. will have to partner with other countries, because I think the partnership is the name of the game. Partner with like-minded countries, whether it is Japan, whether it is Australia, U.K., France, India, and I think each of the like-minded countries can contribute in their own ways to strengthen the U.S. Competency, and I think overall complementary -- complement the U.S. capabilities. So, I think that's to happen. I think that we might come to that stage.

00:35:01

But, I think I also want to make one distinction between militarization of space and weaponization of space. These are very -- these are terms that are used in a very

interchangeable fashion, but militarization of space is something that has already happened.

For decades now, the militaries around the world, even the --somewhat not the topmost, top three militaries, but even the lesser number of lesser powerful militaries, are using space for a number of military space applications. So, space has become part of the military operations. There is no way about -- there is no two ways about it. But weaponization is what we need to limit, and weaponization of space is not going to happen; it's not going to be limited without global rules of the road. And, I think, even though they may be difficult, there may be difficult path to reaching some sort of an agreement, but also the enforcement or verifying these mechanisms can be difficult, can be challenging. But it -- that is not to say that you don't need rules. Because even whether it is asteroid mining or even other sort of activities, you need rules of the road.

00:36:04

John Donovan:

Let me bring in Michio, because you had your hand raised. Michio?

Michio Kaku:

Right, if we were to wait ten, twenty years, then you're right, China would be much more powerful, much -- have much more bargaining chips on the table, and it'd be much more difficult to get the Chinese to sign a treaty. Now is the time, because now their space program is still in its infancy; they're at a clear disadvantage to the United States. They would be willing to engage in some kind of treaty because it's in their interest to do so, but if we were to wait, wait for a few decades, then it's too late. We have a window of opportunity, and the same thing with hypersonic drone vehicles, that maneuver that could nullify a Star Wars system. If we wait, and then the Chinese and the Russians develop their hypersonic systems, they're not going to bargain them away; that'd be stupid; they had advantage there. So, now is the time, when these weapons systems are in their infancy, to begin the process of doing some kind of treaty.

00:37:04

Now, also, people said there is -- one benefit of the space program is asteroid mining. I agree, but asteroid mining, let's face it, is decades away. We're not talking about 30, 40 years into the future, when we may have colonies on asteroids. No, we're talking about the situation now, with militarization going on, nations testing out their different kinds of killer satellite systems. Now is the time to sign a treaty, not decades from now, when we're going to benefit from the mining of asteroids, which is in the distant future, not in the near future at all.

Bidushi Bhattacharya:

The question before you is, "Is a U.S.-China space race good for humanity?" The best way to handle this inevitable space race is to engineer it; engineer it, not just for our advantage, but for the benefit of all of humanity.

00:38:05

John Donovan:

Welcome back to That's Debatable. The motion, "Is a U.S.-China space race, good for humanity?" Now we go into round three, closing remarks from each of our debaters.

Bidushi Bhattacharya:

I hope by now you're convinced that the space sector promotes innovation, that access to it has become increasingly democratized globally, and that the sector will move inevitably at an accelerated pace in the coming years. This means you have unimaginable spinoff technologies that are soon to be coming your way. Twenty years ago, would you have imagined replacing those folded maps in your car with a map application that fits in the palm of your hands?

The question before you is, "Is a U.S.-China space race good for humanity?" The best way to handle this inevitable space race is to engineer it; engineer it, not just for our advantage, but for the benefit of all of humanity. Now, our opponents have expressed concerns that an accelerated and costly militarization of outer space may occur.

00:39:05

Let's think about their concerns, which are valid. What would happen if, for instance, a government entity or even a private party decided to wipe out the United States telecommunications network using an electromagnetic pulse? The impact of such a scenario could be mitigated if we start now. With a down-to-earth approach to space development, we would be able to face this potential catastrophe with inclusive partnerships already in place, where we would immediately be able to access global networks of telecom satellites from other countries until we got our backup systems back up in place.

Space is indeed becoming democratized. Today, startup companies can build and launch a base model of a handheld satellite known as a CubeSat. This is something that my startup company builds and works with on a regular basis. You can build and launch one of these for the cost of Ferrari, for instance. The U.S. can and should take advantage of wide-scale access to space tech, and build cooperation on a planet-wide basis. So, dear viewers, please think big, aim for the stars, and vote in favor of the premise, "A U.S.-China space race is good for humanity."

00:40:10

Raji Rajagopalan:

Let me come -- try and conclude my points with the two arguments. I think they are already having difficulties in carrying peaceful activities in outer space, and I believe the U.S.-China space race will make it much worse. I was part of the U.N. group of government experts that met in 2018, 2019 as a technical adviser, and I witnessed

firsthand the kind of difficulties, the high level of disagreements between U.S.-China on a number of these issues. And I believe this will get even more difficult, more challenging in the coming years, with the U.S.-China space race gaining more traction. We need a lot of work to get over these disagreements, to resolve these disagreements, but it's not going to get any easy if you are going to go down the path of weaponizing outer space.

00:41:01

It is harder to reach agreements because the U.S.-China competition has made the stand of each of these countries extremely harder. This brings me to the second point I want to talk -- conclude about with. This is about the consequences, John. The consequences of intentional or accidental conflict in space is very, very severe, is seriously consequential.

A day without space is actually unimaginable. The whole world will be affected by it. No hope for a vaccine, for instance. Like, for instance, the pandemic gives us a hope that we can actually develop a vaccine, but we don't have such vaccine for a disruption in space. A pandemic disruption cause looks in -- looks, actually, pale in comparison to a sort of a satellite disruption in space. This will be an unmitigated disaster, so we should be afraid.

We should be very afraid of a U.S.-China space competition and its consequences for all of us. I hope the audience will -- are convinced about the arguments that we have made, and will vote against the motion. Thank you.

00:42:04

Avi Loeb:

The space race is inevitable. The cat is already out of the bag, and the -- our best bet is that the global economy would make cooperation the general theme of the space exploration. And we should not forget that space is all about going in the third dimension. We keep thinking about militarization of space, but that's only restricted to very low latitudes above the Earth. Ultimately, space is all about going far from the Earth and exploring what is out there and all the resources that we cannot find on Earth.

Going to the moon, then to Mars and beyond, and going to asteroids. All of this offers financial and commercial benefits, and it's relatively low cost compared to nuclear weapons, for example. So, there is no way to prevent that, especially in the private sector; I mean, nations can sign whatever they want, but if there is a commercial benefit, it's hard for me to see how a space law would be enforced. Will there be a space police chasing satellites?

00:43:12

And so, I think space offers great benefits, not only in terms of the global economy, but also in terms of science. And we already see that in the context of astronomy; there are many satellites that helped us discover new secrets about the universe. Nobel Prizes in

recent years were given to such discoveries, and the future is much brighter because we can now imagine what we might be able to achieve going to the moon, going to Mars, the many important benefits.

And we can enforce the values that we believe in, that science and technology should drive us to space by being superior relative to everyone else. So, vote that space is good for humanity, please.

00:44:04

John Donovan:

You mean the U.S.-China space competition [laughs] is good for humanity.

Avi Loeb:

U.S.-China space race will promote the exploration of space, and that is good for humanity.

John Donovan:

Okay.

Michio Kaku:

I'm all in favor of the exploration of space. I'm all in favor of mining the asteroid belt. I'm all in favor of going on to Mars. But, realize what could upset the apple cart, what could upset all our dreams of one day reaching for the stars. What could upset the entire thing, is if a war breaks out, if we have a space race, billions of dollars being wasted, nations reaching for first strike capability, instability around the world. That's a horrible price to pay. And it's unnecessary, because we could have a treaty and get it both ways.

A win-win situation; on one hand peace, which is the goal of everyone on the planet Earth, or should be. And second of all, the peaceful exploration of outer space for the benefit of humanity and private enterprise.

00:45:04

And it's possible, but we have to rein in certain ambitions, that is unbridled competition in outer space just because we're number one. That's not the way we ended the arms race during the Cold War. Some of the greatest treaties ever signed in the history of humanity were done because both nations, the Soviet Union and the United States, realized that it was pointless; it was a waste of money; it endangered the health and safety of the entire planet Earth to continue an arms race of that nature.

So, I say let's vote for a win-win situation. On one hand, we want economic progress; we want the exploration of outer space. But we want it done safely for our children's sake, so that our children do not inherit a world that's been savaged by wars. And just remember, as the generals say, they always fight the last war. The next war will be short,

nasty, and brutal. Let's hope that our children don't have to face that kind of space war because we had a Pollyanna approach to unbridled competition in outer space.

00:46:17

John Donovan:

And now to the winner, our audience voted, before the debate, on whether a U.S.-China space race is good for humanity. They voted again after hearing all of the arguments, and it is the side that sways the most minds between the two votes that is declared our winner.

Here's how the voting went on the resolution, "A U.S.-China space race is good for humanity." Before the debate and polling our live audience, 47 percent agreed that the space race is good for humanity, 33 percent were in disagreement with that, 20 percent were undecided. Those are the first results. Now, again, it's going to be the difference, so listen to the difference.

00:46:56

In the second vote, the team arguing for the motion, they started with 47 percent, their second vote was 45 percent. They lost two percentage points. The team against the motion, their first vote was 33 percent, their second vote was 51 percent. The team arguing against the resolution pulled up 18 percentage points, that clearly makes them our winner. So, I want to congratulate the team arguing against the resolution that the U.S.-China space race is good for humanity, for their persuasive argument.

But really, congratulations to all four of our debaters for shedding light, for doing this with spirit and intelligence and decency and civility. Stay tuned for Bloomberg's next debate, "Don't Worry About the Deficit" in partnership with Intelligence Squared. That's coming on December 4th. I'm John Donovan. More of Bloomberg Television starts right now.

This is a rough transcript. Please excuse any errors.