

Evolving Space Policy Focus Beyond NASA: US Perspective and International Implications

Jeff Greason's speech at ISDC2022 Governors Dinner2

Summary

- Importance of rethinking space policy away from NASA [00:02](<https://www.youtube.com/watch?v=Tv9kVJvOVeo&t=2>)
- Great power competition has returned to earth [02:01](<https://www.youtube.com/watch?v=Tv9kVJvOVeo&t=121>)
- Primary motivation for expanding into new areas is not trade [06:23](<https://www.youtube.com/watch?v=Tv9kVJvOVeo&t=383>) - Migration to new areas involves survival and establishing subsistence farming or fishing. People needed investment capital like canoes and supplies for successful migrations.
- Reasons for people migrating historically [08:18](<https://www.youtube.com/watch?v=Tv9kVJvOVeo&t=498>) - People migrated to be independent, for cheaper living, and to access energy via land ownership. Cultures benefited from migration as it provided an outlet for people who couldn't be accommodated at home and reduced competition for limited resources. Real estate speculation played a role in migration, providing ownership interest in return for resources invested in expeditions.
- Policy measures are the most effective in space regulation [12:27](<https://www.youtube.com/watch?v=Tv9kVJvOVeo&t=747>)
- Asserting jurisdiction over space activities can hinder innovation and freedom [14:37](<https://www.youtube.com/watch?v=Tv9kVJvOVeo&t=877>)
- Proposed legislation for space mission authorization and registration [18:28](<https://www.youtube.com/watch?v=Tv9kVJvOVeo&t=1108>)
- Exploring the concept of political independence in space governance [20:12](<https://www.youtube.com/watch?v=Tv9kVJvOVeo&t=1212>) - The importance of property rights and jurisdiction in space activities. The potential consequences and motivations behind seeking political independence in space.
- Encourage more competition and accessibility in space endeavors [23:43](<https://www.youtube.com/watch?v=Tv9kVJvOVeo&t=1423>) - Promoting competition can lead to better outcomes and innovation in the space industry. Increasing accessibility to space activities will benefit the United States and global space exploration.
- The need for research and infrastructure in space [25:32] (<https://www.youtube.com/watch?v=Tv9kVJvOVeo&t=1532>) - ***NASA needs to prioritize scientific and biological research in space to address health and policy concerns.*** Prospecting in space needs to be prioritized to provide more value to taxpayers' money.
- Importance of technology maturity in the commercial launch industry [29:03](<https://www.youtube.com/watch?v=Tv9kVJvOVeo&t=1743>) - Companies benefitted from past investments by NACA or NASA 70 years ago. Call to action for a more expansive vision of space policy beyond NASA and Congress oversight.
- Proposing a new approach to policy-making for space exploration [31:04](<https://www.youtube.com/watch?v=Tv9kVJvOVeo&t=1864>) - The need to start fresh in creating policies for space exploration to avoid replicating history and conflicts. Opposing the idea of simply transferring Earth-based systems to space without considering new dynamics and challenges.
- Discussion on the need for timely legislative action [35:42](<https://www.youtube.com/watch?v=Tv9kVJvOVeo&t=2142>) - - Advocating for policymakers to start putting legislation together for future elections. - Emphasis on peaceful cooperation with market forces and economic norms.
- Private sector mobilization for space advancement [38:30](<https://www.youtube.com/watch?v=Tv9kVJvOVeo&t=2310>) - Starting from the minimum things that make sense for space development. The need for transformative change and the role of centralized governments.
- Highlighting the importance of strategic government functions [43:06](<https://www.youtube.com/watch?v=Tv9kVJvOVeo&t=2586>) - Advocating for proper address of higher return activities by government departments. Detailing the origins and impact of commercial human space flight regulation in the United States.
- Policy changes discussed in the appropriations committee [44:44](<https://www.youtube.com/watch?v=Tv9kVJvOVeo&t=2684>)

- It's important to cooperate in space exploration and avoid conflict

[48:47](<https://www.youtube.com/watch?v=Tv9kVJvOVeo&t=2927>) - International workers may not always be friendly, and bad actors can still exist. Instead of trying to slow down others, we should focus on speeding up our own space exploration efforts and cooperating with other nations.

- Unlawful military activities in the South China Sea

[50:50](<https://www.youtube.com/watch?v=Tv9kVJvOVeo&t=3050>)

Speech

Well, I have a strict rule that I've broken tonight, which is that I never come east of the Mississippi to wear a tie unless I'm begging for money, asking for something, or getting paid. I'm not doing any of those three things tonight, but the solemnity of the occasion seemed to call for a tie, so I decided to put one on. I discovered that in the last five years since I needed to wear one, I forgot how to do that, so that's been a relearning experience—like we're all relearning how to do a few things after the last few years.

I gave a couple of major space policy talks using ISDC as the venue in 2011 and 2012, the first of which is better known and has become somewhat infamous as the "Underpants Gnome" speech, primarily talking about NASA. I have been asked from time to time in the subsequent eleven years when I am going to do some kind of follow-up speech about NASA, and I've usually demurred because the truth is there's nothing new to say. Sadly, all of the problems called out in 2011 remain problems, and the opportunities that were called out in 2011 are mainly lost opportunities. Besides, I find the subject depressing.

However, as I thought about what to say tonight, I realized that that's okay because the schwerpunkt, the pivot of action where we need to be thinking about in space policy, has moved on from NASA in a very real way. The other things that we need to be doing are not the things that we tend to talk about very much. I will apologize to any international visitors tonight; I'm going to talk about this in terms of what the U.S. should do in space policy. Everything I say can have the serial numbers filed off, and if you wish for your country to become a great space power of the 21st century, feel free to file the serial numbers off and take it home and beat us at our game.

I expected to have to spend a long time demonstrating the thesis that great power competition has returned to Earth. I am not going to do that because you have to be blind at this point not to see that great power competition has returned to Earth. This is not unusual; this has been going on for thousands of years and will probably continue as long as human civilization endures. Those of you who grew up between about 1989 and 2015 lived in a historically unusual period where great power competition was not the dominant feature of geopolitics. You will probably not live to see those days again.

What does that mean? It means that the U.S. is going to be one of several great powers for the foreseeable future. That means we have unique advantages compared to some of the other candidates, but we also have unique limitations. Living in a world of great power competition means you just can't do everything. Some things are beyond your power. The way to become a successful great power is to recognize what you can and can't do, do the things you can, and not command the tide not to come in. Spending your energy trying to do the things you can't is futile.

The days when the United States could decide whether or not space resources and the military and strategic uses of space would become important have passed. They will be, and there's not a thing we can do about it. I hope—I happen to think that's a good thing—but good, bad, or indifferent, the United States does not have the power to prevent other nation-states from moving into space. Therefore, we should not try, because we would fail and instigate conflict in the attempt.

So what do we do? The good news is we need not make this decision blindly; we have quite a bit of history to draw on. People in the space community tend to be very technophilic; they tend to be fascinated by the newest and greatest thing. However, the movement of human beings, both economically and for purposes of living into areas where no human beings have ever managed to live before, is not a new event in human experience. I'm often told that this doesn't count because this is so much harder. Imagine yourself 70,000 years ago, having sailed across, or probably rode across, an ocean you can barely see to Australia and finding yourself in a land where you don't recognize any of the plants or animals. Everything is poisonous; you don't even have pottery—

just rocks and maybe twine. Tell me how hard it's going to be for us, with our current level of technology, to move into space.

Human beings invent new technologies and social structures to expand the human ecosystem into places where we have never been able to live before. This is the human story; it is not a new thing for us. This is just the latest chapter. Why do they do that? I've spent a fair bit of time in the last five years reading up on what we can know anthropologically and historically about moving into new areas where nobody has ever lived before. It's very different from the sometimes tragic, sometimes glorious instances where people have moved into areas that other human beings have lived before.

Leaving aside all the historical tragedies and some good news that has come out of that, it's just different. Why is it different? Because if you move to an area where people already are, the work of figuring out how to keep alive there has already been done. They know what plants to grow, the growing season, where the natural resources are, and what the weather is like. They know what to wear and they have stuff. You might trade with them or steal from them, but it's not a barren environment. Regardless of how the interaction goes, it's not starting from scratch.

Most of the human experience expanding into new areas in prehistory and some of it in history is expanding into areas where there haven't been people before. The number one myth that people believe, which I would like to posit as false, is that the primary motivation for people expanding into new areas is trade. That doesn't work. There's nothing to trade. If you move to a new area where nobody has lived before, you're lucky to stay alive for the first generation or two. You're not generating what you would call a lot of export trade. Your number one mission is to get to the point where you can do subsistence farming, fishing, or whatever it is that you do in that area.

It's fine to say that these people, the three sigma on the distribution, who have wanderlust would just want to go, but they don't just get to go. You don't go to Iceland, or you don't sail across the Pacific with your bare hands. You need stuff; you need what we would call investment capital. You need canoes, supplies. The Polynesians brought their whole ecosystem with them when they sailed across the ocean; that means pigs. Pigs are expensive in pre-agricultural cultures.

Why would anybody spend what today we would call 1.5 percent of their GDP—way more than we spend on space—to go to these places if they don't get anything back? There are a couple of enduring themes. I won't claim that they cover every case, but I've been through about twenty use cases where we can piece together why people did what they did, and I see common themes. People go because they want to be independent. I sometimes put this as it's cheaper. If you have two people who want to be king, it's cheaper to get rid of one of them than to have a civil war. Cultures have learned this; it's beneficial for the culture to have an outlet where the people who you can't afford to keep at home go.

One reason is simply that they want the land. People feel very romantically about land and ownership; I think that's a result of our long history with it. But really, if you ask what land is, land is energy. In a pre-industrial civilization, the only form of energy you have is solar energy on the land. You grow crops, feed them to the animals or the people, and they do your work. That's the only form of energy a pre-industrial culture has.

So, I'm going to recast that as access to energy being the reason why people go. They don't have enough people to feel like they're lacking opportunities; they want to go. Again, it's beneficial to the home culture to fund them to go because then they aren't competing for the limited resources at home. If they all die on the voyage, that's not our problem. The third reason, using modern vernacular, is real estate speculation. This has certainly been a theme that comes up over and over again in the post-industrial or post-technological era.

People will put up some of the resources for these expeditions because they're going to get some ownership interest—formal or informal—in pre-currency societies. It's kind of informal; they're going to get some kind of ownership interest in the resulting settlement. Dirt that is attached to a thriving community that already has farms going and trade is worth more than bare dirt on a hostile island that nobody is living on. If the settlement becomes successful, your investment becomes worth more.

We can change policy to exploit these kinds of mechanisms to make it worthwhile for private actors to invest in going forward in space. That's the American way of doing things, the Western market democracy way of

doing things. We are very bad at trying to do things by central planning. Maybe that's a good thing; maybe it's a bad thing; it's just a thing. If we try to do that as a government endeavor, it will not succeed. That's not one of our strengths.

If we want to win or be a player, we need to play to our strengths. What does "win" mean in this context? We have no desire and no need to try to dominate space. The way that people used to talk about what winning means in the grand strategy of the United States in space is that we are a sufficiently major player that we can set the norms of behavior as peaceful cooperation through market forces. We have a lot to lose and much less to gain through conflict in space. It is silly to think that that's the posture we want to be in.

Yes, there's a military component; I'm not going to spend a lot of time talking about that. There always is a military component in protecting your commerce, enforcing property rights, and doing all the things that we keep militaries to do. They're not there to go out and kill everybody else and break their stuff. I'm very glad that we're moving away from that model as the Air Force's way of thinking about whether this base ought to be done.

I often say that policy is cheap. Space, for whatever it's worth—whether wise or unwise—does not command a large portion of the U.S. national income or the U.S. federal budget, and it's unlikely to for the foreseeable future. But changing policy, writing some words on a page that have the force of law, doesn't cost anything. So, the most effective measures we can take are policy measures.

Let's talk about those forces. One of them I will recast—I talked about it as political independence or autonomy. I will recast it as extraterritoriality. What do I mean by that? Do we think that every page, however many there are, of both the U.S. Code and the Code of Federal Regulations applies to U.S. persons or companies operating in space? Does anybody think that would be a good idea?

Good, because among the various OSHA regulations, you're not allowed to expose human beings to the atmospheres we use in spacecraft as a worker. In fact, you can't go to the top of a mountain as a worker under OSHA regulations. Everything you do to employ any worker you employ is presumptively illegal under some regulation or another. You can't be on the lunar surface, whether you're in a pressure suit or not, because the radiation environment is not allowed, even for radiation workers.

If you start from the presumption that that's like being in the U.S., just forget it. We do not have the power to create that regime. If we tried to do that, some other nation or nations would raise the flag of convenience and say, "We all that space business the U.S. used to have—come here!" We are not going to make all those requirements, just as the U.S. lost its power in the merchant marine.

We are in a lucky position right now. Through a combination of good fortune and good policy, the U.S. is far ahead of the rest of the world in space transportation. This advantage enables us to do further smart things. It is not a gift from God, and it will not persist if we do stupid things. Trying to assert our jurisdiction over that would be stupid, and you would think that would go without saying, but that's essentially what we do with U.S. persons living abroad.

They're not living in U.S. territory. Guess what? We want your money anyway. We want to control how you do your capital movements anyway. Why? Because we can. Well, guess what? In space, we can't.

One thing that we could do that would be a huge and very inexpensive policy measure is to get the congressional committees that have jurisdiction—not over space, but over law—to say, "Guess what? When you're in space, you're not in U.S. territory. We don't have jurisdiction. We don't require you to renounce your U.S. citizenship and move your company out of the U.S. to get out from under U.S. jurisdiction. We would love for you to go off and do all those wonderful things. Maybe you want to gamble on your space station. Maybe you want to do other things on your space station that we find unsafe. You know what? Not our business—just pay your taxes."

Another thing we can do—I'm going to say this carefully—we need a mechanism that serves the purpose of title. If you want real estate speculation, which we very much do, you need some piece of paper that you can give the speculator that confirms they have an ownership interest in whatever you've just developed.

Now, again, I don't like to just jump in with the term "property rights" because people have very non-rational feelings about property. They think of it as a bundle of rights that almost comes down from Moses with the tablets. What property is like? A property right is the right to deny somebody from doing something somewhere. You might think about it that way, but I mean when you own a piece of property, for example, you can control whether people walk on your land.

What do you get? Well, nothing; you were able to walk on your land ahead of time. What you get is the ability to stop other people from doing something with something. We don't know what bundle of rights makes sense to do on the moon or other celestial bodies; we haven't worked that out yet. We don't have millennial practice with water rights, agriculture, grazing, or all the customary relationships that underlie what we think of as property rights.

But whatever you call it, we need something that serves the purpose of title—something you can transfer to somebody else, which means you can sell it. Let somebody be thinking, "Oh my God, we can't have property rights in space; that's national appropriation; the sky would fall."

Let me say something that we take for granted: we have geostationary communication slots. They're doled out by the ITU. Tell me that's not property. It's the right to keep anybody else from using that geostationary communication slot. The only missing ingredient to make that property is if Company A could choose to transfer their title to that spot to Company B without going back to the ITU and saying, "Mother, may I?" That's a piece of sky that people have property rights to. We could absolutely do something like that on the moon or other celestial bodies.

In fact, we came very close to doing it. I want to remind people of that in the 2015 era. We had legislation introduced that didn't quite make it out of committee, which would have resolved the jurisdiction question of how to get who in the federal government is supposed to authorize a space mission beyond launch and before reentry, if anybody.

There's some controversy about that. What the legislation proposed was to give that to the Department of Commerce, the Office of Space Commerce, and they would keep a registry. If you were going to do a space mission, you would have to register what you were going to do and where you were going to do it. You'd have to update that registry if you materially changed what you were going to do and where you were going to do it, thus providing continuing supervision and authorization as required by the Outer Space Treaty for your space activity.

The U.S. government would not allow any other U.S. party to register to do an interfering activity at the same place. They could, if not interfering uses, be fine, but you wouldn't let the second person shine up to mine the same thing in the same place or collect the same piece of sunlight in the same place. The registration would be transferable.

That does everything title needs to do. We haven't appropriated anything; we've just deconflicted users. We would have encouraged other participating market democracies, which today we might think of as the signatories of the Artemis Accords, to have their own registries, and we would agree. We would encourage the State Department to negotiate mutual recognition so we all respected each other's registries. Nobody's seized anything; nobody's claimed anything. We've just got a deconfliction mechanism that you can transfer.

That does everything title needs to do. It is absolutely consistent with the Outer Space Treaty and precedents going back for thousands of years to set up a system that does the job title does. We don't have to get mushy about property rights; it's just something—a piece of paper that gives people certain rights that you can transfer from party to party.

We could do that. I mean, we came close in 2015. Right now, everything is paralyzed, but it won't be forever. There's always the next election. The next time it's possible to move legislation in Congress, somebody should probably reintroduce this because, as some of the parties said this morning, this issue about who in the government has jurisdiction for space activities is becoming pressing as private entities start getting closer to doing things.

This is going to sound really crazy, but what about the final piece? What about independence? What about wanting to be a king in a new land? That's been a powerful motivation. You know, Eric the Red did not go off and do all the things he did because he was a nice guy.

Um, well, what do we want the future to look like? You know, that's essentially what we're deciding. We decide what policy looks like. Okay, do we want the path to political independence to involve a civil war? Or should the path to political independence be that they have to threaten to drop rocks? I don't think that's very smart.

You know, again, we do not have the power to prevent people from becoming politically independent once there are enough of them to establish a significant economy. What we do have is the opportunity to make it worth their while not to do that, to incentivize them to maintain a friendly and collegial relationship with their home countries and to operate through the mutual benefits of trade.

This is not a new problem; the United States is one of the only nations that has ever had to solve this issue. That's why we created territories. That was an opportunity for regions to engage with the federal government before they became part of it. We could arrange for something similar, which I think of as a commonwealth model, where off-world settlements wishing to engage in political autonomy or perhaps negotiate certain services they would like to be part of the federal government by agreement, while others they do not.

We should just set up a mechanism to let them do that. Again, what's the alternative? Is the alternative that no one will ever go? No, they will go. Is the alternative that nobody will ever declare independence? Tell me, do you think that Elon Musk would be deterred from declaring independence if he wanted to? What we're doing by not taking these actions is raising the price of being independent. We're raising the price of acquiring property rights and achieving extraterritoriality.

What does this mean? What are the consequences? Only billionaires in nation-states can afford it. That is the only choice we have. The choice we have is whether we wish to move forward into the future with what has been successful in the past. What has been successful in the past is lowering the price, increasing the number of actors, and giving them more competition with each other, making it more accessible for more individuals and companies to engage in these activities.

People are starting to worry, and I think rightly so, that we're heading towards a future in space where only billionaires get to play. I don't think that's smart; I don't think that benefits the United States' policy goals, and it certainly does not assist the United States in maintaining itself as a great power in the 21st century.

We know what our own national character is. Everyone looks at Elon Musk right now and thinks that's the future in space. In five years, SpaceX could be gone. I don't think it will be, but it could be. All it takes is a couple of bad decisions, a run of bad luck, or a bad break on Wall Street. It's a fragile threat to place your entire hopes on.

Our prospects have to be much better if there were more and better competition. The way to achieve that is to lower the barriers to entry. There are some smaller things that we need to do. From time to time, in this kind of great power competition, it is useful to engage in what the Navy calls "showing the flag." This means conducting presence missions, sailing the Great White Fleet, or conducting Apollo programs to land people for the peace of all mankind, so we demonstrate that we can do it and motivate others to try to do it first.

Historically, in the U.S. space era, this has been done by NASA. Maybe that's a good mission for them; maybe it's not. We need, as I mentioned, to protect commerce and keep the lanes of navigation open and free from hazardous interference. That is the function of the U.S. Space Force.

There is basic scientific research and biological research that needs to be done in space. Currently, that mission is assigned to NASA. I am sometimes frustrated by aspects of it. The idea that, 60 years into the space age, I still can't tell you how much gravity it takes to keep a person healthy is not a ringing endorsement of how we have chosen to conduct and prioritize our research. However, that could be fixed with policy changes.

There is prospecting, and I want to call that out specifically because we aren't doing it. A lot of people think that it's NASA's job, but I can assure you that NASA's Science Mission Directorate does not think that it's their job. One of the few instances on the Augustine Commission that roused me to fury was when I mentioned that I thought we should prioritize science missions that also looked at places that human beings would find

interesting. I was told that was the job of the Human Exploration Department, and if they wanted to do those missions, they should do it with their money. This is our money.

I did actually tell the person that, actually, that's the taxpayers' money, and I think getting more value for it should be part of their job. We probably need to pry that out of the hands of NASA or reorient NASA to perform that function.

We need infrastructure in space; that's been a traditional government role. I'm not sure who ought to be the Army Corps of Engineers in space, but I'm pretty sure it's not NASA because that's just not the job they're wired to do.

I will pass briefly on technology. Technology is often thought of as NASA's job, and maybe it should be; maybe it shouldn't be. What I can say is that what matters in technology is not just basic research, which NASA arguably does a pretty good job at. What really matters is technology demonstration, the pre-competitive maturation of those technologies to the point that people with business plans would say that's worth incorporating into my product.

The purpose of technology is to revolutionize it; it is to dramatically change the way you do business with revolutionary capabilities that completely change what you can and can't do. The purpose of a government organization performing government missions is to change as little as humanly possible and take as little risk as possible because they have big expensive programs that they have to promise will work, and they better not screw them up.

It is an irreconcilable conflict of interest for one agency to be both the technology demonstration agency and the mission-executing agency. So we, as a nation, have to choose which of those roles NASA should take on. I don't have a strong opinion on which one they should do, but they can't do both, and they're not doing both.

The technology maturation for technologies that are of joint government, military, and commercial interest is not being done today at all. Technologies that underpin SpaceX and Blue Origin and what my company used to do, and what every company out there in the commercial launch industry is doing today, every single one of them benefited massively from NACA or NASA investment. That was 70 years ago when most of those investments were made.

Where is the technology that has been matured and is ready for use that is going to make SpaceX obsolete? That's a harder question to answer. It's easy to make a list of what those might be; it's very hard to find any of them that have flown or have any prospect of being flown anytime soon. That tells you something is wrong.

So I want to close with a bit of a call to action. I don't see that this expansive vision of what space policy is something anybody is really working on. We all tend to think in terms of NASA and the oversight committees in Congress that have jurisdiction over NASA. That is not where the action is.

If there are people in D.C. who think that space is not their business, they're probably wrong. If there are people here who spend their time thinking about space policy, and I know some of them are, and you're thinking about it in NASA terms, you're probably missing where the boat is. NASA will do whatever NASA is going to do. What determines whether or not we open the space frontier or leave that to other nations is not in their control.

We should probably be paying more attention to where the ball is going rather than where it's been. With that, I will close and take questions.

Q&A

Question Hi, thank you for a very interesting talk. Dr. G, I'm involved in space medicine, and we talk about policy across the board. However, being in the newer generation, I have this view that Earth, up to now, is filled with nations and heavy history and a lot of blood. I feel that policy is going to have to be scratched and that we need to start anew, creating policy for space. That's where the work "democracy of space" comes from. I don't think the U.S. is the model to follow. What happens if we're on the moon and a Chinese astronaut needs to use our U.S. CT scan? Shouldn't we start from scratch? I know it's a difficult thing, but I feel like it's the easy way

out to just recreate property and insurances or whatever we know on Earth into space. I would really like to know your thoughts about this.

Answer People take a utopian view of space. Part of what's powerful in the space movement is this idea that it will be a future society that matches the ideal of what a good society would look like. My own view of history is that we will not all just get away with it. That doesn't mean we shouldn't work towards it, but my own view is that if we wish to create new forms of human society, it is both possible and desirable.

If we attempt that, most of them will not work. There is nothing special about that; most experiments within human societies do not work. Most experiments with new species do not work; that's how evolution works. So we better plan on having a lot of them, but we better give them as much growth as we can to try different forms of social organization and their own experience in the future that we've not lived in.

We cannot constrain them to live the way we think they should live because we don't know what they need to know. They know. So what we need to do is give them the freedom to try what they think is good for them. If they die out, they die out, and somebody else tries.

So that's what I'm advocating for: cut the ties. Don't force them to live under U.S. jurisdiction. Don't force them to leave the United States to be newly affiliated. Don't force them to choose our own social organization. Give them a path to migrate to autonomy so that they can pursue the things that seem good to them.

Question Hi, I have a question that's kind of very direct. In your opinion, you talk about a lot of the things that we could do for the future, and I get the general sense that collectively we can all apply pressure to bettering bodies to move in this direction. If I wanted to call my senator next week, what is the one first thing that I should tell them? Is there a bill pending? Is there something specific that I can tell them to start moving?

Answer To be honest, there isn't. The last time there was a significant effort, which was pushed over by many of the people here, was the 2015 effort. I think the time is timely, but not in this session of Congress because nothing's happening in this session. However, I would love to see people who think in policies start putting that legislation together so that after the next election—assuming that you're not able to take that long after the next election—that question would have a better answer.

Question Peaceful cooperation with market forces is essential. Most of your talk emphasizes making it easier and helping those who upgrade the crash rate just to make a point. They already have money and should be given the freedom to do things without mentioning things that don't directly relate to the norms that are important, such as not committing murder, which is generally a norm in the United States.

Answer There are other norms, and economic behavior is one of them. This happens to be the one case that's already carved out as a normal behavior in U.S. law: that you can't appropriate biological resources if you find them on any celestial body.

You don't start from everything and say, "What shall we believe?" You start from nothing and ask, "What are the minimum things that make sense for us to put in place?" I talked about the commercial forces for the simple reason that if we mobilize in the United States, the private sector is where the money is. If you want things to happen in space at a pace faster than what we are currently achieving, we have to find a way to mobilize and incentivize private interests to act.

If we don't do that, we will attempt to build an anarchic base on the moon, keeping those resources permanently untouched so that they can remain forever untouched. We will behave in the management system with our past behavior in space, which is to assume that we can decide not to do something and that nobody will do it. My whole thesis is that the days when we could just decide not to do something, assuming nobody would do it, are over.

Question You mentioned that we need space infrastructure. Sorry, you're standing right in part of the light, so it's literally looking right around here. Yes, you mentioned the space infrastructure. You also said we need something so transformative that it could displace SpaceX and, I guess, the rock technology of development. But you also said that we need to play to our strengths and that centralized governments are better at this kind of infrastructure.

Answer If people walk out of the city, that's a conversation we should have because it is a conversation we should have. Most people are not thinking about what the answer should be, so we should start putting our heads together to better answer that question.

For humorous purposes, I shorthand this in my head as the "Department of the Exterior," the department that manages to develop and maintain proper relationships and legal relationships with the people that fly the U.S. flag, which would not exist in U.S. territory because they are in the vast domains of space.

We will not create the Department of the Exterior in the next ten years because getting a cabinet-level department takes a much greater level of activity than we have right now. I would posit that the logical place for these kinds of activities to live between now and then is somewhere in the Department of Commerce. But that's my own idea.

Question We moved on from back here. Hello, Mr. Greason. How can I or others best contribute to space exploration and developing life in space?

Answer It is orders of magnitude easier to get into the industry now than it was when I couldn't do it. So there's that. If you are not a technical expert, there is a crying need for virtually every other discipline you can think of in the space industry: lawyers, marketing people, and people who can run better technical writing.

Technical writing is the norm in this industry, which is very badly needed to engage with the general public. Public relations, lobbying—you name it. Or you can go the government route. The fact that I am highly critical of some of the functions of government does not mean that they are bad; it just means that I don't think some of them are properly addressing where I think the higher return activities are.

I have tons of friends at JPL and NASA. If government service appeals to you, you can contribute as a citizen lobbyist. I have to give the same advice to the previous question: the stuff I'm talking about plants seeds that I hope will take root in your heads and the heads of all the other people here, young and old, who will start thinking about how to turn this into a real thing, which needs jurisdiction.

What kind of laws should we write? The NSS has both within it and affiliated with a lot of people who have a lot of time and trenches influencing government policy. That's one of the strengths we bring forward to you. The members can contribute to the NSS for the policy committee to get more active. There are always lots of things to do.

I will make a quick aside: the commercial human space flight regulation in the United States is rooted in a bill called the First Space Launch Amendments Act of 2004. That's what created the legal regime we have right now. It was written by four people: me, Jim Muncy, Tim Hughes, and Randall.

That came into being because one congressman wanted to help the commercial space industry. He went around to all the companies and asked what they needed. Of the 13 companies, all of them said they needed money. He said, "I'm not on the appropriations committee; I can't write checks." I said, "There's this little policy report that I want to do to make a rules change to create a big machine for humans."

Basically, he called me back the next week and told me that story, saying I was the only one who got into a policy change, and he was on the policy committee, so he could do something about that.

You know, that did not take any money; it was an all-volunteer government effort. It can be done. Policy is cheap. Everybody wants to be involved, although anyone who talks to the policy people in Congress would love to find some evidence that makes legislation that would make their name in history for the rest of time, telling voters what a wonderful job they did that did not cost any money.

There are opportunities.

We'll take one more question. All right, this one's from the governor's company.

Question First, I want to thank you personally for being on the board about their site. You guys, when you're with a team of people and everybody's pitching in, as long as that person is kind of like, "Yeah, you know what? He speaks," or people listen.

So you said something just a second ago that I thought was pretty impactful, which is when you're having a conversation on the hill and you change the conversation, you change the rules.

But I want to hear back from you. To accommodate my part being a warfighter, I think you've got to prepare for the wars to come. And people are people. I personally see the worst things people do around the world, but because I've seen that worst and I'm in this organization, I can see that there is an opportunity to create just peace. So I'm going to ask you, how can we turn that conversation around? And I know it's hard, but if I could do it, what can we do to make sure that peaceful education space happens? We deter the aggression that we know is going to be there, but we turn it into cooperation. And what would be the last thing you would want to see from us or ask us to help you with that?

Answer Great power competition is probably eternal, but great power conflict is not. The US and Japan in the 1980s were in what was clearly a great power competition, but no shot was fired. The missiles were dollars and yen. So the way I would restructure the question is rather than the fact that was taken by the question thereof, saying how can we live without competition?

Competition is healthy, competition is good, it makes everybody better. Conflict is not good, conflict is wasteful of resources number one, and has the potential to spell out a larger complex of horrific consequences we clearly want to avoid that. Okay, what's the best thing we can do to avoid that? Okay, the best thing we can do, in my view, is to go down the road that aligns with our national character.

The US has played a major role in creating an international status quo in which the primary mode of action between cooperating nations is that we buy and sell things to each other, rather than sending missiles. And the nations for whom that is not a preferred form of international workers, you know, are generally recognized as not being the friendly guys. That is normal behavior. Does it guarantee there will never be any bad actors? No, that's why we need people like you. It is completely not in the national interest of the United States to seek to dominate space. It is absolutely not in the national office of the United States to seek to prevent or even discourage other peaceful cooperating actors who wish to interact with market forces, you know, to not get into space.

And there have been times when the US did not take that question, you know, we essentially created every hospice by trying to tell the branch what they could watch. Look how that worked out for us. Okay, so the way forward is instead of trying to slow everybody else down, we want to figure out how to speed us up. Okay, and we look at the arguments of course, you know, is that us going around telling all nations, that's us taking the lead and going around to the other market democracies and other cooperating nations to establish a framework that manages and avoids conflict and ensures that our interaction takes place through our home.

So what I worry about really is the US has still, you know, we still have this feeling like all we need to do is do a crash government program and show the flag and any possible actors will deter their right. Okay, in 2015, China started building and putting military forces on our criminal islands in the South China Sea.

That is clearly unambiguously illegal under the law of the sea treaty that has now gone through the judgment and the law of the sea treaty again, and they agree that that is clearly illegal. How many divisions does the law of the sea treaty have? Zero. What effect does that have on Chinese behavior? Uh, what makes you think that China is not going to claim or make territorial planes on the moon or Mars when they get there? Seriously, which Olympia? How do we stop them in a way that we encourage all the other cooperative nations to come with us? Four knowns of behavior that peaceful collaboration and market collaboration is how we do business in space. Get out there big enough, fast enough, sooner than by the time the business powers become major players in space, we can say let's not have any business here.