



Event Transcript  
**Exploring Insights from Emerging Space Agencies**  
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Virtual Event

**Speakers:**

Renata Knittel Kommel, George Washington University's Space Policy Institute  
Ashley Peter, George Washington University's Space Policy Institute  
Luc Riesbeck, George Washington University's Space Policy Institute

**Moderator:** Victoria Samson, Washington Office Director, SWF

**Victoria Samson:** Hello, everyone. My name is Victoria Samson. I'm the Washington Office Director of the Secure World Foundation. I'd like to welcome you to our webinar. We're really excited about to have discussion today with three very informational edge experts on the issue, "Exploring Insights from Emerging Space Agencies."

Before we get started, for those of you who aren't familiar with my organization, the Secure World Foundation is a private operating foundation that focuses on the long-term sustainable use of outer space.

Our vision is to secure sustainable and peaceful use of outer space that contributes to global stability on Earth. Our mission is we work with various stakeholders in the space industry, governments industry, international organizations, and civil society to develop and promote ideas and best practices that can lead to the long-term sustainable use of outer space.

We are dedicated to the establishment of effective and efficient governance of outer space and improvement of space operations in Earth orbit.

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Before we go to hand over to panelists -- I know we have just a short time together, so we'll make sure we get plenty of time for them to share their insights -- I want to talk a little bit of formatting for this event. You see in the slide it says, "How to ask questions."

First of all, find the Q&A button and click it. Second of all, look and see if anyone's asked your question already. If not, go ahead. Be succinct. That's it. We ask that you keep questions in the Q&A portion and not in the chat. The panelists will not be answering any questions in the chat.

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We're really excited that we have a live closed captioner here with us working today. This slide talks about how to show closed captions. First, find the Closed Caption button and click on it. Step two, click Show subtitle and that should do the trick.

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With that, I'd like to turn it over to our speakers. Our first one is Renata. Renata, please. Our speakers will be doing a quick introduction for themselves.

**Renata Knittel Kommel:** Hi, everyone. My name is Renata Knittel Kommel. I'm a graduate of the Space Policy Institute of George Washington University. I'm also a program analyst at A3 Technology where I support the FAA NextGen Program.

**Ashley Peter:** Hi, everyone. My name is Ashley Peter. I just got my master's in Space Policy from GW as well. I currently work for NASA headquarters in the Artemis program for deep-space human exploration. I have a bachelor's in Earth Atmospheric and Planetary Sciences from MIT.

**Luc Riesbeck:** Hi, my name is Luc Riesbeck. I'm also recent graduate of the Space Policy Program at the Space Policy Institute at GW. I currently work at Astroscale US as a policy research analyst. My bachelor's was from NYU Shanghai in Social Science.

[pause]

**Victoria:** With that, I think our first speaker is going to be Luc.

**Luc:** That's right. We're going to go ahead and get started here. Thank you so much, Victoria, and huge thanks to Secure World Foundation for hosting us and the Aerospace Security Project at CSIS for publishing our report.

Today we're going to talk about national civil space agencies. National space agencies are governmental bodies that are specialized in activities relating to the peaceful uses of outer space. There's no single universal model for developing a space agency. In fact, as the space sector has evolved, so has space agency's role within it.

The first space agencies were designed for a time where there were only a few governments that were participating in space activities. They were primarily developed around rationales like national prestige, early-space scientific research and technology development, geopolitical influence, and the proposal and execution of the very first national-level space policies.

Today, 60 years later, we see a vastly, vastly different picture. Technological developments in areas such as computing power have reduced the costs and lowered the barriers of entry to space for a whole new range of non-traditional space actors. With it, an entirely commercially-driven space economy has expanded, particularly within the last decade.

These kinds of missions and new players are able to take on so many diversified new types of missions. In short, nations at the governmental level don't really need national space agencies anymore to benefit from space-based data. They can buy it openly on the commercial market.

You'd think that that would lead to less space agencies being formed, but in fact, we've seen the opposite. 16 new national space agencies have been established in the last five years alone.

That brings us to our research questions. As Capstone students with the Space Policy Institute this past year, we were really fascinated by this pattern, and we wanted to investigate why and how this is happening.

Our first research question examined the motivations, benefits, and challenges of investing in a national level space agency, as well as how these new entrants are characterizing this economy that is so vastly different from what it originally was.

Our second research question asked given what we already know about this wide commercial availability of space data today, what kinds of activities specifically are these emerging space nations planning that they view as necessitating a space agency to accomplish?

In other words, what's the function of a modern space agency? Why would you bother creating one when you can let a company do much of the same types of work for you?

To answer these questions, we partnered in September of last year with the UN Office of Outer Space Affairs, the Secure World Foundation, the CSIS Aerospace Security Project, and NASA's Office of International and Interagency Relations, to build out our research plan.

Of course, this was pre-COVID so we had very grand plans of what we were going to do. We chose to structure our study into two parts. The first is a general assessment, which is an open source evaluation of all those emerging space nations stood up within the last five years, 2014 to 2019, within that chosen research period.

The second part was consisting of two case studies of agencies that had been formed within that period, where we could conduct interviews with them and get a more in-depth understanding of how and why they're working the way they do.

For the case studies portion, we decided that the two nations should meet a couple of basic criteria in order to merit that further deep dive.

Those are that they should have different focuses for their space agencies. They should be in different geographical regions, and they should each have some form of publicly-demonstrated record of ongoing investment in the program that they've set up.

Using those criteria, we ended up selecting the Luxembourg Space Agency and the United Arab Emirates Space Agency for our case studies. In the process of our GW Capstone Program, we carefully formulated questions for IRB-approved interviews with representatives from those agencies.

We were able to [laughs] travel to Luxembourg in the first week of March of 2020, to conduct our interviews with them back [laughs] when we were pretty blissfully unaware of everything that was to come.

For the UAE Space Agency, we ended up performing our interviews remotely, and we still had very, very productive interviews with them.

That's a little introduction to our research. I'll now pass the mic over to my colleague, Renata who's going to start getting into our findings.

**Renata:** Hi. As Luc mentioned, our main research question was why are nations creating civil space agencies in today's context? To find the answer, we can move to the next slide. We researched the main rationales of all the 16 space agencies that were formed between 2014 and 2019.

As you can see here, those were established by Bahrain, Paraguay, Poland, UAE, New Zealand, Kenya, African Union, Australia, Greece, Luxembourg, Saudi Arabia, Zimbabwe, Egypt, Philippines, Portugal, and Turkey. As you can see in the map also, most of them were either in Europe or the Middle East or Africa.

There are two countries also that announced plans to create space agencies since then, but we haven't included them in the report. Overall, we found that the main rationale for creating a space agency in the last six years was to promote economic development and harness the benefits of space.

Unlike space agencies in the past which were mostly focused on space exploration and national prestige, most countries today are creating space agencies for these more economic reasons.

To organize our findings, we identified six broad categories of reasons why countries are creating space agencies. These were first to grow the economy. Second, to improve socio-economic benefits. The third one was coordinating space activities across different sectors.

The fourth one was centralizing space activities in one single agency. The fifth one was geopolitical reasons like national security and prestige, and the sixth one was to develop a regulatory framework for space activities.

You can find more details about each of these rationales and each of the space agencies in our report. In summary, as you can see in the charts, the most common rationale for establishing a space agency in the last six years was economic, meaning to boost the domestic space sector to foster economic growth.

That was followed by socio-economic reasons, meaning to improve domestic welfare by using space applications for benefits on Earth. In fact, economic and socio-economic reasons played a big role in the establishment of 14 out of the 16 space agencies created in the last six years.

While at the same time, geopolitical reasons which were so critical in the past, were only central to five of these space agencies. That was a very important finding of our report -- this shift in rationale.

Next slide. We also looked at the main roles assigned to each of these space agencies. We found that they were mostly centered around the management of space activities rather than their execution. Meaning that unlike traditional space agencies, they weren't tasked with developing their own scientific missions or hardware.

Instead, they were tasked with providing services to support the private sector, including the development of strategies and policies, regulatory frameworks, coordination mechanisms, international representation, and cooperation with other space nations.

Next slide. In conclusion, we found that emerging space nations have been more commercially driven in both their rationales and roles. Not only they're trying to promote private space activities, but they're also in a way a consequence of these activities.

That's because the emergence of a private space sector has made it possible for smaller and developing nations to get involved in space and to harness the benefits of space without meeting the astronomical budgets of the past.

With that in mind, we'll move to our first case study, which is the Luxembourg Space Agency, also known as the LSA. We can move. Yes. Two more.

The LSA was created in September of 2018, with the main goal of promoting the development of the national space industry. Like most space agencies created recently, as we've seen, the LSA was not intended to have its own scientific missions or spacecraft.

Instead, it was created as an organization housed under the ministry of the economy to foster an environment that's attractive for new space businesses. That includes workforce development through education and research opportunities, regulatory guidance, and financing mechanisms.

Next slide. What led Luxembourg to create a space agency? The LSA was a result of a wider effort by the government of Luxembourg to diversify the national economy.

That's because historically, the Luxembourg economy has been over reliant on one sector of the economy at a time. Initially, there was the steel industry, but that collapsed with the economic crisis of the mid-70s and was substituted by the financial sector, which today accounts to about a third of Luxembourg's economy.

Recognizing that the financial sector may also lose its strength, and that its dependence makes less Luxembourg vulnerable to external shocks, the government started looking at what could be the next big thing for Luxembourg to expand the national portfolio of economic activities.

These efforts started taking a new shape in 2012 when Mr. Etienne Schneider became the Minister of Economy in Luxembourg. He realized that Luxembourg was looking at essentially the same economic opportunities as almost every other European country.

He thought that they would be more successful if they found a new niche, something innovative that no one else was focusing on yet. After a meeting with Dr. Pete Worden, who was the director of NASA Ames at the time, he became convinced that this new thing for Luxembourg could be the commercial utilization of space resources.

In 2016, Luxembourg announced the space resources initiative, and in 2017, they adopted a new law on the exploration of space resources. Because Luxembourg was a pioneer in that, second only to the US, it brought a lot of attention to the Luxembourg space sector.

It also attracted a lot of new space companies that were more interested in this less traditional approach.

Next slide. This made sense in Luxembourg, in part because it was already involved in the space sector through the European Space Agency and SES, but still it was a very bold move.

It was possible for two main reasons that are specific to Luxembourg. First, Luxembourg is a very wealthy nation, so it could afford to take such risks, and they could also wait. It didn't necessarily need to see financial returns in the near term.

Second, because Luxembourg is a very small country with a very small bureaucracy, so it was possible for one person to have this initiative and make it happen in such a short amount of time before more established space agencies could catch up.

At this point, the space resources initiative was being led by the Ministry of Economies Department of Space Affairs. Why did they need this? Why did they decide that they needed a space agency instead? Our report, our findings indicate four main reasons for a space agency.

The first one was to group and coordinate all the aspects needed for a robust commercial space sector into one place, including cooperation, regulatory guidance, opportunities for research and development, and especially in Luxembourg, financing mechanisms. Either way, it was to create a one-stop shop for commercial space companies operating in Luxembourg.

The second reason was to provide more freedom and flexibility for government officials that were signing contracts and granting investments to space companies. The idea was that an agency would be less constrained by rules than a department in the ministry.

The third reason was to increase the visibility of the space sector of Luxembourg. The fourth reason was to show that the government was serious and committed to this effort, and that the effort would continue even after the people in charge left office.

The next slide. In conclusion, we identify the three main lessons learned that helped inform our recommendations. First, Luxembourg decided that it needed to diversify its economy, and then it decided that a space agency could help with that goal. The purpose of the agency was determined before its creation. We found that to be very important.

The second reason was that the government recognize that they'd be more successful if they found a gap that they could fill, instead of doing the same things that other more established space nations were already doing. They looked for an emerging niche in which they could excel and differentiate themselves. Instead of trying to do everything and compete, they chose to specialize and cooperate.

They fill in one gap and they collaborate with other countries that are filling other gaps. When selecting their niche, they also made sure to choose something in which they had a competitive advantage in.

For example, the small bureaucracy was critical for the agility that's needed to be a first mover in a new field like this. The expertise in the financial sector was also important for providing opportunities for new funds and the development of a new industry.

That doesn't mean that Luxembourg is only focused on space resources. In the last two years, it also expanded its focus to other types of space activities. Space resources is still their flagship initiative, and it's what the agency strategy was based on.

Finally, we also found that unlike most traditional space agencies, Luxembourg has been willing to tolerate a significant amount of risk, particularly by investing in early-stage companies in a still improvement segment of the economy.

With that, we'll move to our second case study where Ashley will talk about the UAE space sector.

**Ashley:** Thanks, Renata. We go to the next slide. The UAE Space Agency was established in August of 2014 as a government authority that oversees and facilitates the nation's space activities.

Its main goals include developing a world-class national space sector, promoting scientific research and innovation in space science and technology, attracting and developing young Emiratis to enter the STEM field, and building and enhancing international cooperation.

Next slide. The question is why did the UAE choose to create a space agency? First and foremost, the UAE deliberately waited for the right time, meaning there was a clear need for them to officially establish a national space agency.

Tracing back to the earlier rationales that Renata mentioned in the general assessment, the UAE established its space agency for economic, geopolitical, centralization and coordination, and regulatory reasons.

Next slide. In developing their own regulatory framework and policies, the UAE consulted in other established agencies around the world to benchmark their best practices and lessons learned. Even though they found that there wasn't a one-size-fits-all approach, the UAE did find that being a facilitator rather than a producer of regulations fit them best.

They opted for a light, agile regulatory model, meaning that they would only establish regulations that were absolutely necessary for their space sector to avoid hindering growth and innovation by overregulation.

The UAE also sought to make their regulations technology neutral, meaning that their policies would not be dependent on currently available technologies and instead would be flexible to future innovation. In general, both of these regulatory aspects have made the UAE an attractive environment for businesses to conduct their space activities in.

Next slide. In assessing the UAE Space Agency, it's important to highlight some unique features of the UAE as a country itself. First, the UAE already had a very well-developed space sector prior to the establishment of its space agency.

The private, public, and academic sectors had been actively engaged in space activities since the late 1990s, so a centralized space agency was a natural next step to facilitate that growing space sector.

The UAE is also unique in its political structure, with seven local governments, or Emirates, each with a high degree of autonomy. Facilitated coordination between these local governments is particularly crucial with this structure.

Lastly, the UAE space sector has received strong political and financial support. As a constitutional monarchy, the UAE government has had the unique ability to offer the space sector sustained support since they don't follow a cyclical political term model.

Resulting in the continuity of funding for major space programs over an extended period of time while allowing the government to take on more risk, similar to the case of Luxembourg.

Moreover, the UAE Space Agency has been given the power to exercise all steps necessary to achieve the nation's space sector goals, allowing decisions to be made more quickly than other nations in the global space community.

Next slide. Based on these experiences from UAE, in setting up their space agency, there are several key takeaways that could be applied to other nations. First off, the UAE identified a clear need for creating its space agency and did not create one for the sake of doing it, similar to Luxembourg.

They deliberately made regulations agile, scalable, and technology neutral in a progressive way that has proven attractive for space companies to operate in, and that has also been designed to stand the test of time and innovation.

The UAE also filled gaps, like Luxembourg did, in the larger global space sector, and chose to specialize in areas that play to their overall strengths, like human spaceflight and Mars exploration with their recent launch of the Hope probe.

Lastly, the UAE has been successful in gaining strong federal backing and interest for space activities, which has greatly benefited the effectiveness and the overall efficiency of their space agency.

Next slide. Based on our general assessment in case studies, we wanted to offer recommendations for both emerging space stations or those newer to space activities, and for established nations or more traditional agencies. I'll start first with the emerging space nations.

We recommend that for these nations, they determine the core purposes of their space agencies before taking any further steps, such as developing any regulations. Next, nations could find it beneficial to design their regulatory frameworks to be agile and technology neutral, which would increase the flexibility and applicability of their policies over time.

Further, by taking a lighter approach to regulation, acting as a facilitator, nations can create an enticing environment for commercial space activities and stimulate their economies while doing so.

Third, nations should identify gaps in the global space industry and specialize in their existing capabilities to fill those gaps rather than generalizing in multiple areas. This would allow nations to carve out niches that they can excel in within the larger space industry for stronger collaboration and potential financial opportunities.

We also definitely encourage nations to follow international best practices related to the use of space, considering the options to sign and ratify existing international treaties where applicable, and participating in conversations on space cooperation.

Fifth, emerging space stations should work with established more traditional agencies to learn from their experiences, but they should avoid becoming overly risk-averse themselves. Lastly, nations should collaborate internationally and across their own domestic space sectors to maximize returns on the utilization of space data and applications.

Countries should continue to share best practices and promote transparency of space activities through the general knowledge exchange.

Next I'll pass it back to Luc to cover recommendations for established space stations.

[silence]



**Luc:** Thank you very much. Our first recommendation for the more established space nations who are interested in collaborating with these emerging space stations is essentially to use your strengths wisely.

We recommend that you engage in capacity building with emerging space nations, especially with regards to helping them create the regulatory frameworks within their own nations. That's where we found emerging space stations may have the least direct experience.

With that said, a big takeaway here is that established space stations should recognize that these new agencies will not look like a traditional space agency.

As you engage, keep an open mind and consciously foster a spirit of partnership and that bilateral knowledge exchange rather than seeing those interactions as a strictly teacher-student dynamic in your discussions. Essentially, be receptive to learning a lot from them in turn.

As you get to know their ways of participating in space activities and the goals that they have within their own countries, consider opening investigations for how their new methods, cooperation with commercial space industry, and other ways of going about space activities might be incorporated into your own agency's organizational structure and how they could benefit you.

Our second recommendation is to essentially act as a good role model for emerging space nations as they begin to develop their own influence, especially over the space environment itself. Abide by international treaties.

Engage with commercial industry and new players to develop best practices and norms of responsible behavior for new types of activities and new types of missions as they continue to expand. Be proactive by modeling the types of transparent, responsible behavior and space that you wish to see.

In particular, prioritize sustainable practices that help to preserve the space environment in your own operations, such as mitigating the creation of space debris, planetary protection, transparency in space domain awareness, data sharing. Sustain engagement in multilateral policymaking and legal fora such as the UN COPUOS, Committee on the Peaceful Uses of Outer Space.

That wraps up the presentation portion of this webinar. Thank you so much for your attention, and I'll let Victoria kick off the Q&A portion.

**Victoria:** Great. Thank you guys. Before we get started into the Q&A, we've got some questions on the chat about whether this PowerPoint we made available. I'd like to say yes, this event is being recorded. There will be a transcript. The transcript, the video, and the PowerPoint will all be on Secure World's event page for this.

I also included the event page in the chat as well. You can always find it from our home page as well. Of course, since this event is being recorded -- this is probably obvious, but I'd like to make it clear. This event is on the record. Media have been invited, so just consider yourself warned.

Then also the paper itself, there's a link to it on our website from our event page for this. It's held at a landing page at our good friends at CSIS's Aerospace Project. You can read the paper there if you want to dig down more into it.

Before we get started with the questions from the audience, I do have a few questions of my own for our speakers. That was actually Luc's last point that really brought up the idea of role models and what was mentioned about the idea of recommending to the emerging space actors it's needed to follow good behavior.

To our panelists, did you all ever get a sense when speaking to emerging space agencies and people when doing your research on this issue that there was concern that best practices and norms of behavior would either raise the barrier of access to space, so it'd be hard for them to get into space, or it was being used as a tool to keep them from space?

Did you ever hear anything about concerns about that or worries about that? Who wants to take first crack at that one? Luc.

**Luc:** Thank you. I've definitely seen discussions of that kind of concern, particularly in those multilateral fora, such as the UN COPUOS. There can be a perception of a bit of a first-mover advantage when it comes to space activities.

I think what our research showed more than anything was that there are definitely ways to be creative in these new types of space missions and ways of using space data in a sustainable way and in a responsible way.

While there may be specific barriers on things like the creation of debris that maybe require a little more technical due diligence compared to other types of activities, we think that there are still ways of doing that in a way that is not too prohibitively cost-effective.

We found a lot of new space agencies we're cooperating with established space agencies already to go over those types of conversations. Emerging space stations have been very active in those kinds of discussions in multilateral fora as well. It's a bit of a concern.

Also, if you're curious about how space is being used in those particular nation-specific applications, I also wanted to make sure that we shouted out Danielle Wood's research with the space-enabled lab at MIT. They have a lot of interesting insight into new applications for space data in developing nations and developing economies.

**Renata:** I would also like to point out that when we were talking to the Luxembourg Space Agency, we didn't have [indecipherable 33:46] in that conversation with the other space agencies from the general assessment. Our interviews from Luxembourg reflected that they have a significant concern about the ethics in their space activities.

They told us about how they hired one...The Space Agency is very small. It's under 20 staff members, but they hire the person who will be responsible for focusing on the ethics of space exploration. That's a significant concern of theirs.

When we asked how does that reflect in the current regulations, they said it's a little too early to tell. They're working now still on a draft for a general space law.

That's the concern moving forward. By ethics, that includes being responsible in space, preventing space debris, and preventing making same mistakes as they made on Earth, distributing the benefits and all that.

**Victoria:** Thank you. One other question before we open it up maybe to a broader discussion because I could just sit here all day asking you questions, I think. It's such a fascinating paper you guys wrote.

I'm curious. The two countries you picked for your deep dives were -- let's face it -- wealthy countries. You guys looked a whole other slew of other countries as well, some considerably less wealthy.

Did you find any differences between the wealthy and the non-wealthy countries that you saw in any patterns that emerged in terms of what were their incentives for creating a space agency? What were their goals for the space agency? How do they go about doing that? Who'd like to answer that question?

**Ashley:** I can start off. One other country that comes to mind is Paraguay. In Latin America, they are one of the only countries that do not have their own satellites. One motivation for creating their space agency was that they wanted to be able to create their own satellite capabilities rather than paying and outsourcing that.

It's really an economic driver, you could argue with socio-economic too in terms of how they're using their satellite capabilities. It was interesting in the way that they went about establishing their space agency. They were very deliberate, in the way that we saw UAE and Luxembourg too, where they had to identify that need before they created that space agency.

In fact, they had a very drawn-out timeline where they created a working group to deliberate and understand what that process would even look like before they started it. Even though they are technically a less wealthy country than UAE or Luxembourg, we did see very similar timelines and overall processes used in that country.

**Victoria:** Thank you. Renata, did you want to add to that?

**Renata:** Yes. I would say that in terms of the rationale, we noticed that it's also a regional divide. The European countries in general, all of them had economic rationales for establishing a space agency, while developing countries, especially the countries in Africa, had a socio-economic rationale.

The difference is mainly that, as I said in the presentation, the idea was to invest in space companies to boost the economy, the GDP. The socio-economic rationales was thinking more of how we can use space applications for solving problems that these countries have already on Earth. Socio-economic rationale was very strong for developing nations.

We also saw in our research that there was a lot more resistance in developing countries for creating a space agency. They had to do more of a political effort than trying to convince the population that that was an important thing to do while there were so many other problems to be solved.

I think that connects a little bit with the socio-economic rationale. It's like they had to explain to the population that this was going to help with all these problems, that it wasn't completely dissociated from these problems. That's another difference between the two.

**Victoria:** They had to sell it to their population?

**Renata:** Yeah. Sorry, I will also point out that although Poland had an economic rationale like the other European agencies, we also found in the research that there was a lot of resentment from the space industry, that they weren't moving as fast with their space agency.

They established it, but not much was moving as expected in the timeline because a lot of people said that the necessary investments weren't being made. In comparison to other agencies, their percentage of the funds they were receiving were very small, so they were saying that there wasn't enough to move forward with the missions of the space agency.

I guess you can say that's maybe one of the least wealthy countries within the European region that we researched. That was another thing we found.

**Victoria:** Thank you. I'm looking at some of the questions. We're getting a lot coming in and that's fantastic. We encourage the audience to keep submitting questions. We're trying to get through as many as we can in the next few minutes.

George Lua asked, "Would you recommend any non-spacefaring nation to create their own space agency or would you recommend engaging in space activities first, and then create an agency? In your opinion, having done this assessment, what is the best pattern of behavior or series of events that you'd recommend here?"

**Luc:** I'll take that. Thank you. I think it depends.

One of the main findings that we've found across all of these agencies, but particularly for our two case study nations, is that having a foundational concept in mind for what you want your space agency to accomplish, something even as simple as a first 100 days, one-year plan to a two-year plan, five-year plan, is really, really beneficial in helping the investments that is needed to start up a space agency, stretch and last, and give you an initial return.

There's a bit of a hesitancy to jump in and say space agency is right for every nation. What I would recommend is there are a couple of space agencies that we saw take on a little bit of a role as sort of a initial partner of established legacy space agencies that had long heritage and a long history of space activities of all kinds, and participate in a few early missions.

For example, the Philippines worked with universities in Japan to develop their first couple of CubeSats. They were the first emergence of that cooperation. Then from there, they went on to establish that space agency and get a better sense of what they might be using space assets and space data for.

Initial collaborations and discussions with both commercial space and with other established space stations can help emerging space nations who want to start up a space agency to understand where they can fill a niche, and where they can specialize, and where they can collaborate and learn from others.

I think having a core idea in mind before starting a space agency is very important.

**Victoria:** Great. Renata?

**Renata:** I would definitely agree with what Luc said. That's one of our main recommendations. First, to define what your country needs, to then create a space agency based on those already existing needs, not create a space agency and then figure out what it can do.

Also, thinking back on what Luc was saying, I'd like to highlight the case of Space for All, which is an initiative from UNOOSA in which countries who are thinking about getting involved in space can cooperate with more established space nations through this triangular cooperation mechanisms.

One of our case studies that that specific program was very important, and that was Kenya. They started their space activities mostly through...They got selected from the Space for All Initiative for a collaboration between one of their universities and Japan. Japan used their KiboCUBE module to launch one of their satellites.

That, together with other things, ended up launching the initiative to create a space agency, in part because to collaborate with the UN, they had to follow some of the UN regulations. They had to register the space object and they figured out that to comply with the regulatory requests and all that, they would benefit from a space agency. It is case by case.

Also, from one of our interviews with Luxembourg, we talked to them about the different possibilities outside of creating a space agency. At first, they weren't sure if they needed a space agency to accomplish what they needed to accomplish. They were thinking of maybe other types of organizations.

Eventually, they decided that a space agency would be better, but they're still considering more independent frameworks like a foundation, for example, in which they could get funding from the private sector that would give them more flexibility.

In that sense, Portugal Space is also an interesting example. It's a space agency, but it is a private non-profit entity, so they also receive funding from private entities. It's a mix of public and private sector [indecipherable 44:31] to be very interesting. It depends.

From what we heard from them, if your mission is mostly centered around research, education, maybe space exploration and all that, it would make sense for sure to have a space agency. If it is more economic, maybe there are other types of organizations that are being creatively developed that might substitute it in the future.

**Victoria:** Thank you. Just got a question in from Terese Jones saying, "Exciting breaking news that Chairman Wicker just introduced a bill to fund commerce to do SSA. This has been a long time in coming since an SPD3 was announced in June of 2018. Finally going to see some money for it."

Her question is this, "How have other countries been treating SSA in terms of defense agencies, space agencies, other agencies? Are they even thinking about SSA at this point or is that something that's seen as further down the line?" Any of you guys want to take that?

**Ashley:** I can answer it from the context of the UAE. I know in general, space sustainability is a huge focus for UAE. In fact, they were the first nation to require that their space sector comply with the voluntary long term sustainability guidelines. They took a lot of pride in that sense that they are really trying to prioritize sustainability.

However, in terms of specifics in their SSA, I think they're still developing it, and we'll learn more, but that was a big focus when we interviewed them at the get-go.

**Luc:** Yeah, thank you. Another thing I'll say on the SSA front is that there is definitely apprehension among some space agencies -- not limited to space agencies, other space organizations that are military in nature, for example -- there can be some apprehension about transparent sharing of SSA data, because there's a lot of trust that has to go into that process.

In formulating our recommendations, when we mentioned that we wanted to encourage the sharing of space domain awareness data, we were also thinking of the commercial SSA and SDA organizations and multilateral groups that are forming as well because it's no longer just governments that can track objects in space.

Because of that, there's an interesting question of different data types, different methods of collecting and measuring objects in space, their location, their velocity, all of these things are kind of hitting a point right now where folks are cross-checking each other and trying to validate each other's information.

In our view, that open exchange of open-source data as much as possible within the bounds of safe operations, that's important, and it helps to increase those transparency and confidence-building measures that we see in other areas of space, and really other areas of international relations as well, not limited to space.

**Victoria:** Thank you. OK, there's a question from Secure World alumni Josh Wolny, saying, [laughs] both of your deep dive countries, Luxembourg and the UAE, have joined the Artemis accords. Of course, the Artemis program is the idea that the United States wants to get the first American woman and men on the moon by 2024.

The Artemis accords talk about best practices and what sort of responsible behavior NASA is hoping anyone who wants to go to the moon or do work on the moon will follow as well. It's a series of bilateral agreements that were just announced earlier this year. Luxembourg and the UAE both joined the Artemis accord. This official announcement of partners was made last week.

Do you think being a new space agency makes joining the accords more or less likely? Does that give you more flexibility for trying new things or have you...? I see you all cocking your heads thinking. Who would like to answer this one?

**Luc:** I think I might want to give Ashley the first bit just as an Artemis person.

**Victoria:** [laughs] . Are you [indecipherable 48:58] or Artemis Ashley?

**Ashley:** I'm not speaking on behalf of Artemis but just my personal opinion. I think it is very interesting that both Luxembourg and UAE signed the Artemis accords, along with Japan and several other more established countries. I think it's interesting that NASA is also leaving the door open for other countries to join.

I don't think that this precludes any new space agencies from signing, but I think this does open the doors and they have been very open to allowing more agencies to sign up. I'm just curious to see who else will sign. It's been interesting to see who has chosen to so far.

**Luc:** I think I might have seen an article yesterday that Brazil is considering signing the accords as well. Really, this is another one of those opportunities for established and emerging space nations to come together across lots of different methods, lots of different fora.

It doesn't have to be an international agreement, but talking to each other, engaging on a consistent and regular level, and building these norms of behavior that foster responsible and long term use of space. I would say anything that involves that international cooperation is a good thing in my book.

**Ashley:** I do actually want to jump in and say, going back to our recommendations about filling gaps and identifying niches, I think that, for example, Luxembourg and UAE have done that very well and that's why they feel confident enough to engage in these Artemis accords and feel like they can contribute something to NASA's broader vision.

I think as these new space agencies start identifying those niches and gaps, we'll see more of them engaging in these accords.

**Victoria:** Renata, did you want to add to that?

**Renata:** Yeah. Well, I think they have mostly said everything, but I would like to stress the cooperation part of it because we did find that for emerging space agencies, cooperation was a big part of it. They're very new, but most of them, if not already had very strong MOU's and other types of bilateral agreements in place.

I would think that they would be very interested, and we've heard from some that they would be very interested in contributing to Artemis if there is a way in which they can contribute. Also the fact that they're new, most of them are still pretty small, which I think does give them more flexibility to make these decisions.

There's less of a background constraining them, so my guess would be that yes, it is more likely that they will be able to join in in a shorter term.

**Victoria:** I think...I'm sorry. Go ahead, Luc.

**Luc:** No, just as a quick follow on to that comment about these newer space agencies having little more flexibility. I want to also note too, that for some of these space agencies, their nation, it wasn't necessarily the first time they'd ever participated in space activities, right?

If you look at countries like the Philippines and Australia, for example, both of them have had commercial space activities. Australia has a couple of space situational awareness radars that is part of the network that the US government runs. They've been very active in space activities, just never under the formal sort of bureaucracy of a specific National Space Agency.

Not every emerging space agency is necessarily brand new. To reference the Philippines again, I think that some of those newer activities that weren't just necessarily the old commercial satellites and things like that, for things like telecommunications that were developed in decades prior; some of those newer activities were taking advantage of the types of partnerships that you can do with a space agency.

They weren't necessarily that country's first foray into space activities at all. Establishing a space agency gives you a little bit of credibility, and it gives you a lot of flexibility depending on who you choose to partner with and why.

**Victoria:** Thanks for mentioning that, Renata.

**Ashley:** All right. Can I compliment just one thing about Luxembourg? [laughs] I was just thinking that it was an interesting challenge that they pointed out in their space agency, economically focused way of establishing. For them, when it comes to space missions like Artemis, they found that it is a little bit harder to determine these collaborations.

They have been talking to a lot of countries and they have been putting in place agreements, but moving forward with these agreements, it's a little challenging because they are focusing on the private sector. They don't have full control of their activities. As NASA, for example, does, or other partners like JAXA.

They depend on what their industry decides to do. They can't just make an agreement and say we're going to invest in this, and we're going to put this mission forward. That gives them a little bit less flexibility also to get involved in a mission like Artemis.

**Victoria:** We have time for one or two last question. We're getting close to the hour. One question that I thought was interesting is, again, it [indecipherable 54:57] an idea of flexibility.

Isaac Hollis asked, "From a New Zealand perspective, we see small space agencies as being an advantage. We find that the cutting edge of the space sector often face regulatory and policy barriers rather than financial ones."

His question is this, "What did you find in terms of how the smaller space agencies might have approached regulatory change differently than larger space nations?" Which one of you guys would like to answer that one?

**Ashley:** Honestly, I think it varied so much from country to country. There's nothing that necessarily...

Because of the geographical differences, the differences between nations in terms of their existing economic background, their existing science and technology workforce, and the types of ways they've utilized space data in the past, it would vary so widely that there isn't really much that stood out to us as necessarily connecting all the smaller agencies and all of the larger agencies.

I don't know if there was anything that particularly stood out. Maybe one of my fellow authors can speak to that, if you noticed anything.

**Luc:** Space agencies are becoming very, very unique to each nation. They're not a cookie-cutter formula anymore, and you don't necessarily have to have space hardware to be a space agency anymore. It depends on the individual country's own goals and what their rationale is for starting an agency in the first place.

**Victoria:** Just like every country is different, the rationales can be different as well, [indecipherable 56:48] .



**Luc:** We had a hard time narrowing down all the different rationales into those broad categories. They seem broad for a reason. It's because some nations are explicitly focused on, for example, using space satellites to boost their agricultural sector.

That doesn't necessarily mean that that's worth putting in as a...For the sake of our data and communicating those core ideas, we grouped them into those broader categories for our report.

**Victoria:** Thank you. We only have a couple minutes left and I'm sensitive that Zoom fatigue is a thing. We don't want to too much over the hour.

Since our panelists are all recent graduates of GW's Space Policy Institute, I was wondering if you three, or if you want to mention your fourth co-author, have any thoughts or a quick takeaway about your experience at SPI or anything like that you'd like to have maybe prospective students hear. What would you like to share in the two minutes we have left?

**Ashley:** I can go first. Our fourth author, Mackenzie Puig-Hall, unfortunately, was unable to join us today, but we did want to recognize that she also was part of our team and part of this research effort.

In general, throughout our time at SPI, I believe that we all agree that this Capstone project was a very enriching experience. It gave us the opportunity to collaborate with clients who we are very grateful to have been part of contributing value and research to their organizations.

This Capstone Program allowed us to have the freedom and flexibility to define our research question, to collaborate with our clients and narrow down the scope. Then, even nicer, GW gave us travel funding to go to these different areas and conduct research firsthand.

Unfortunately, two of us weren't able to capitalize on that. However, it was a great experience to be able to do that research firsthand. Actually, have a finished product that we can share with you all that we can showcase on CSIS website and also have this webinar with Secure World.

It's been an incredible opportunity for us to contribute to the larger space academic community through the Capstone Program.

**Victoria:** Other thoughts? Luc, Renata, do you guys have any quick last thoughts?

**Luc:** It's very well put, Ashley. The one other thing I'll point out about SPI in our last minute here is that they have a very well-established network of alumni. If you're considering the Space Policy Institute and you're interested in learning more about the program itself, feel free to reach out to us, and we can be happy to talk more about program.

**Renata:** I think my colleagues already said everything. I would just summarize it by saying that the Capstone Program was a great opportunity to combine everything we learned at SPI during those two years of the program.

We started the Capstone Program one year in advance. I'm very proud of everything we were able to put together in this one academic year.

I thank them for giving us the opportunities for cooperation, the framework for conducting a research of such a large scope, the financial support, and their guidance through the IRB process to make sure

our research was done in a responsible and ethical manner. It's a great way to conclude that our graduate degree.

**Victoria:** Wonderful. I'm so glad to hear that. Thank you all so much for sharing your insights.

I do feel obligated. Since this is Secure World event talking about emerging space nations, Secure World has a handbook for new actors in space. It is available on our website. That doesn't focus on emerging nations specifically or agencies, but it does tie into the conversation.

We talked about so you want to have your own [indecipherable 61:08] . What are the things you need to know? We talked about the international legal regime. We talked about what regulatory decisions you need to make at the domestic level. We talked about best practices at the technical level. It's available on our website at [swfound.org/handbook](http://swfound.org/handbook).

As well, we have people from all over the world in the audience today, which is fantastic. Some of you are from the countries that were discussed in this paper. If you have any insights or thoughts you'd like to share with the authors, you can always do it through me.

My contact information is available on Secure World's website. Again, my name is Victoria Samson. If you want to get in touch with the authors, I'm happy to send on your information.

With that, please join me in thanking our speakers. A virtual round of applause. Thank you guys so much. We appreciate everyone and the audience's time. As I said before, the paper itself is linked to on our event page to the CSIS website. The video, the PowerPoint, and a transcript eventually will be on our website as well.

We continue the conversation. We look forward to seeing you at future Secure World events. Thank you very much. Have a great day. Goodbye.

**Ashley:** Thank you, Victoria.

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