

Interview with Dr. Saadia M. Pekkanen, Job and Gertrud Tamaki Professor at the Henry M. Jackson School of International Studies and Adjunct Professor at the School of Law, University of Washington

The US-Japan Space Alliance — the Most Critical Bilateral Relationship for Peace & Prosperity

By Japan SPOTLIGHT

When we talk about national security today, space security is critical to ensuring peace, as the number of nations participating in space development is increasing and no national territory is defined in space. In light of the intensified competition among nations and space business firms, how can this important domain be managed by rules or international cooperation? How will the US-Japan alliance, the most important bilateral relationship in the world in terms of security and economic prosperity, work well to achieve this purpose? The Maureen and Mike Mansfield Foundation, which fosters US-Japan friendship among academics, business people and politicians in both countries, organized the US-Japan Space Forum in 2014. The details of this forum are presented by Ryan Shaffer, the foundation's director of programs, in another article in this issue. Here we introduce an interview by e-mail with Professor Saadia Pekkanen of the Henry M. Jackson School of International Studies at the University of Washington, who is co-chair of the US-Japan Space Forum. She is an expert on outer space security, law and policy as well as on international relations involving Japan and Asia. She is also a contributor to *Forbes* on the space industry.

(Responses received May 21, 2018)

Introduction

JS: Could you please briefly introduce us to your work on space in security and industry and also US-Japan relations in space collaboration?

Pekkanen: I work at the intersection of international relations and international law, specializing in the economic, legal, and security implications of the space industry worldwide. My specific regional focus is on Japan's foreign affairs, and given my broader interests I have followed very closely the trajectories of the country's space law and policy over the postwar period. Japan is one of the world's top space powers around today, and the changing aspects of its commercial and national security space directions deserve close attention. For the United States, Japan is an ideal partner for space collaboration along multiple dimensions as human economic activity begins to extend beyond the planet, and as a range of natural and deliberate dangers in space threaten the promise of those ventures. Over the past four years, I have had the tremendous honor of co-chairing the US-Japan Space



Dr. Saadia M. Pekkanen

Forum, under the auspices of the Maureen and Mike Mansfield Foundation. I have learned an enormous amount from the diverse perspectives of the forum's stakeholders, as they come from government, business, and academia. We have become a great transpacific community to learn from, and to build consensus views on outer space affairs and the possibilities of collaboration between our two countries.

Space as a Venue for Business

JS: How do you estimate the potential of the space industry and business in the future?

Pekkanen: The global space economy today is estimated to be around \$330 billion. There are projections that it will go beyond \$1 trillion by the 2040s. This is all thrilling and exciting for sure. But I think nobody can be quite sure of where the industry and business will actually head, or which private and public competitors will rise to the top in the years ahead. Right now, it is a very fluid situation, and I would say we are all somewhere near the starting line.

JS: What will be the main impact of space development on the existing industry? Do you think space will become one of the most promising venues for ventures and entrepreneurs?

Pekkanen: We usually think of the space industry in terms of rockets, spacecraft, satellites, and so on. But we have to begin rethinking what we know about them, and how we connect them to other policy trajectories among the world powers today. Reusable rockets are one development that we have to keep an eye on because of innovative players like SpaceX and Blue Origin in the US that are backed by billionaires. In Japan, we also see a similar phenomenon, such as Interstellar Technologies developing the country's first completely private rocket. This too has the backing of a Japanese billionaire. The more important point is that the high-profile nature of the billionaire rockets masks the way that reusable launch capability is critical not just for civilian or commercial markets but also national security space architectures. Another entrepreneurial trend that is worth marking is one that connects space assets like small satellites to big data and machine learning. If things stay the course, this trajectory promises to transform how we map, see, and strategize about human activities across civilian, commercial, and military domains on Earth.

JS: How do you view intensified competition in the future space business, in particular possible rivalries among nations?

Pekkanen: Countries are already competing in the space game, but expectations about the competition have shifted with the commercialization of the space industry. However, I think governments are going to be critical shapers of the ecosystem for the new space industry. And today, both in the developed and developing world, governments are still figuring out how to position their countries in the emerging space-based economy. I think one important aspect of the intensified competition for governments is going to come in securing human talent worldwide for creating next-generation space products and services. Governments are going to have to step up their efforts to shape the development of a space workforce that can then use such products and services in whatever domain they happen to be employed in. Shaping and sustaining a space workforce is going to be a challenge for established powers like Japan, China, India, Europe and the US, but also others who might want to get in the game such as the UAE. It will also be important for public-private efforts to advance the frontiers of space both in the commercial and military domains in the long run.

Space Start-Ups

JS: There are a number of distinguished US start-ups in Silicon Valley. How do you think they will contribute to future space development? Do you

think the so-called Silicon Valley model (interdependency among business, science, law firms or the public sector) would work as well in the space industry as it did in IT?

Pekkanen: Frankly, it is too early to say anything about any one space start-up, as we have yet to get concrete results on profitability of the many space ventures around us, whether in or out of the US. I think the so-called Silicon Valley model is good at drawing attention and funding to certain configurations of technologies for sure — and this is certainly important — but we need to be careful about painting too rosy a picture of its causal impact on business outcomes in the long run in any industry. There are surely variations in terms of business successes and failures, booms and busts, even in the IT field with which the model is so often associated. So I expect that we will probably see the same nuanced patterns in a wide variety of space products and services in the years ahead, whether in the US or abroad.

JS: How do you estimate the potential of Japanese start-ups in the space industry? Are they still in the stage of infancy?

Pekkanen: Today we talk about a space-based economy, with all eyes on the commercial players. If we are really looking at only the business of space, then many if not most of the up and coming commercial ventures will be subject to market pressures and realities in situations where returns on investment may be stretched out over time with a lot of uncertainty. So this is an important thing to remember as we think about the continued funding and resources from the Silicon Valley model that we just discussed. Nobody quite knows how things will work out when, for example, you are talking about commercializing asteroid mining or orbital debris cleanup or the general public going up and down as space tourists. Nobody quite knows also the size of the eventual market, if any. And nobody knows quite how long it will all take. So I would say that Japanese start-ups are in the same place as all other competitors in the world. They are lining up like a lot of other players at the starting line in what promises to be a long new space race. What kinds of space technology products and services will stand or fall over time, and who will have staying power in the competition ahead remains to be seen. Meanwhile, Japanese companies can draw on the country's long-standing industrial strengths — such as electronic miniaturization and robotics — that should not be underestimated and that will be critical for advancing space technology frontiers in new ways and perhaps in the context of cross-border collaborations.

Driving Force & Impediments to Space Industry

JS: Could you explain in detail about what you mentioned in one of your *Forbes* articles, “Five factors that will shape the space industry over the next five years”? What do you think will drive the development of space business and what do you think will be possible impediments to development?

Pekkanen: To be honest, I think these kinds of headlines do not do justice to the complexities of the space realities around us today. At the moment, I can pinpoint a few things that are going to be critical for the space economy in the years ahead. One of the most important aspects is the leadership of the new space companies, and the ways the new generation of CEOs are plugging their companies into a diverse global talent pool and workforce in order to better position themselves in the upcoming competition. This was one of the first things that struck me when I began to take a look at the composition of the new space companies in Japan. A second important factor that will contribute to the rise and spread of new space ventures is the legal and regulatory ecosystem. This is not only critical for stabilizing expectations today for both established and newer space companies, but also serving as a signal of government interest in facilitating the progress of the future space economy. Finally, we do have to worry about impediments. To my mind, as offensive counterspace realities come to the fore with alarming frequency, the single biggest danger to all the commercial ventures is the possibility of a space conflict.

JS: In particular, on space start-ups, what do you think will be necessary to promote their activities as government policies, regulatory frameworks or subsidies?

Pekkanen: Governments and their actions of course are not the only things that will shape outcomes in the space economy. But as I have been saying, I think governments will remain important players, either as buyers or backers, as the space economy takes shape. This is especially important in the context of the Asian space competition, with different traditions and cultures of government-business interactions. Take India, for example. The government-backed Polar Satellite Launch Vehicle (PSLV) launched 104 small satellites in one go in February 2017, and 31 satellites again in January 2018. Governments can also give significant backing through setting legal and regulatory expectations, and a number of them have established national laws and acts to foster the competitiveness of their space industries. In Japan, for example, the Japanese government’s new law related to space activities is already bearing fruit in very interesting ways. Consider the recent moves that are bringing together the different competencies of Canon Electric, IHI Aerospace, Shimizu Corporation, and the Development Bank of Japan to construct the country’s first private launch site, possibly in

Wakayama Prefecture by 2021.

Future Development of US-Japan Collaboration in Space

JS: How do you see the future development of US-Japan collaboration in space? Do you think it will be strengthened for security reasons?

Pekkanen: I mentioned the US-Japan Space Forum earlier, and how it has had a huge impact on opening my mind to many possible paths forward for the US and Japan as allies in space. If I could bring in the famous saying by Ambassador Mansfield in which he emphasized the importance also of economic and security linkages, I would say that today the US-Japan *space* alliance is the most important bilateral relationship out there, bar none. There have been a number of steady moves on the part of both countries to deepen their cooperation, especially if you think about the fact that space assets from the ground to the various orbits represent the critical infrastructure for war strategists and fighters back on Earth. Needless to say, the future of the space economy depends on this reality as well. In 2011, the US and Japan issued a joint statement, stating their interest in the protection of and access to space. So both sides need to devote resources to and work on solidifying a united and seamless front. Ensuring space security means preparing for peace.

JS: If you do not mind, could you tell us about your future projects, in research or mediation, between business and public policy or academia?

Pekkanen: Right now I am fortunate to have a two-year project funded by the Center for Global Partnership (CGP), focusing on new frontiers in space security and mapping new space strategies for Japan and the US. My collaborators on this project are John Mittleman, from the US Naval Research Lab; Setsuko Aoki, professor at Keio University Law School and vice director of the Center for Space Law at Keio; and Hiroshi Yamakawa, from Kyoto University, who has just become president of JAXA. We are a highly interdisciplinary team with backgrounds in engineering, political science, law and policy, which of course makes our work stronger but also more challenging to manage. So I am doing the systems integration on this project, so to speak! I am deeply honored to work with and learn from researchers and policymakers of their caliber. Together we are doing our bit to advance scholarship and policy outreach in various trajectories in the emerging space frontier, focusing at present on small satellites and big data in the maritime domain.

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Formatted by Naoyuki Haraoka, editor-in-chief of *Japan SPOTLIGHT* & executive managing director of the Japan Economic Foundation (JEF).