Techtopia with Chitra Ragavan

Episode 17: Rob Strayer

Chitra Ragavan:

The world's wireless systems are going through a major technology transformation through 5th-generation cellular networks, known as 5G for short. In addition to lightening-speed downloads for your smartphones and faster speeds for your favorite streaming videos, 5G is expected to help the growth and adoption of other cutting-edge technologies like connected cars, drones, industrial robots, AR, VR, medicine, and next-gen supply chains. Indeed, the power and potential of 5G and its role in giving the United States a competitive edge is such that it is a national security asset, one that the US government is aggressively moving to protect from security vulnerabilities and cyber attacks, especially from 5G rival and geopolitical nemesis, China, while pushing our allies to do the same.

Chitra Ragavan:

Hello, everyone. I'm Chitra Ragavan and this is Techtopia. Here to talk about what the US government is doing to protect global 5G technology is Rob Strayer. He's a former US State Department Ambassador and Deputy Assistant Secretary of State. Strayer is now a technology executive at the Information Technology Industry Council representing 80 of the most innovative tech companies and markets around the globe. While at the State Department, he led the development of US foreign policy on a wide range of technology policy issues, including privacy, data protection, artificial intelligence, technical standards, cybersecurity, and 5G supply chain security. He also led the negotiations with foreign governments about these issues. Rob, welcome to Techtopia.

Rob Strayer:

Pleasure to be with you.

Chitra Ragavan:

For those of us who are not entirely familiar with the power and potential of 5G, what are these 5G networks and why are they so transformative?

Rob Strayer:

5G is the natural evolution from what had been earlier generations of 2G, 3G, and 4G, each of which had expanded capabilities for wireless telecommunications. With 5G, we're seeing, as you said in the opening, increased amount of throughput of data in the network but also something called ultra liability and low latency, that is, the time it takes for a device to connect to the network and then receive information back from the network. So we all think of that typically on our desktops as the time it takes to receive

information from an internet website. A huge transformation in 5G will be that, whereas in 4G and earlier generations, we thought of it as the ability to text on our phones, or in 4G, the killer app was the ability to download internet webpages onto our smartphone devices. With 5G, it will be much more about the ability for machines and other devices to connect directly with each other without coming to our personal 5G wireless device. There'll be all kinds of other internet of things devices being connected on these 5G networks.

Chitra Ragavan:

And it's fascinating. I was reading that these technical ground rules that define how cellular networks work and how computer chips and radio signals handle and exchange data, I guess a lot of these telecom companies come together and agree on these rules every 10 years. So it is a pretty big deal, isn't it?

Rob Strayer:

Yeah, it almost occurred on a regular basis every 10 years. There's a massive amount of effort that goes into setting these standards. There's something called the 3rd Generation Partnership Project, which the 3rd Generation name was actually set up for 3G, but that same consortium of standards bodies that are representing both governments and private sector entities ranging from telecom operators, think about the carriers, but also the equipment makers for all parts of the network are all involved in the establishment of these standards. So we now have standards for 5G, and eventually we'll have in probably less than a decade, standards for 6G.

Chitra Ragavan:

And the US government auctioned off the wireless spectrum to make this happen. It's auctioned it off to companies like Verizon and AT&T and other telecom companies to make this happen. So where are we in the proliferation of 5G in the US to date, and what has been the impact?

Rob Strayer:

Just focusing first on the importance of spectrum. Spectrum really does enable telecommunications devices and additional devices to be on networks, more data to be transmitted. Even as it becomes more efficient through devices and standards to transmit that data, you do need the spectrum, which is a scarce asset, that is, it can only be used for one purpose at one time. So the United States and other countries as well have been auctioning off spectrum. Many folks think of spectrum in roughly three general categories, one being low-band, mid-band and high-band spectrum, which is the frequency category for that different spectrum.

Rob Strayer:

In 5G especially, the US has focused on putting millimeter wave or that high-frequency spectrum into the hands of operators. That high-frequency spectrum can carry the most amount of data. It's also been very important to see more of this mid-band spectrum that you put out for the operators. That mid-band sits at the sweet spot of having wide

penetration, that is, the distance that it can travel, as well as being able to carry a good amount of data in each frequency band, but maybe not as much as they would in the millimeter wave bands.

Rob Strayer:

As far as their deployments, the major telecom operators in the United States are in the process of deploying. They've all hit dozens of cities with 5G-ready baseband units, that is, the towers and the infrastructure that's on them, to transmit 5G frequency to wireless devices, including our handheld devices that in many cases now are able to receive that millimeter wave or special frequency bands that are associated with 5G.

Rob Strayer:

So the rollout is continuing in the US, and it's going to continue for several years more. But as I said earlier, it's going to be important not just for handheld and consumer devices that we traditionally think of as part of wireless telecommunications, but for those communications through 5G to reach other purposes, for example, robotic manufacturing or autonomous vehicles to be reached directly through these networks.

Chitra Ragavan:

And you mentioned other countries. It's amazing. This is not just a US phenomenon, right? This is a global technology transformation with all these countries rolling out this technology. It's fascinating. And you've been in the forefront of watching that evolve. Tell us what that's been like.

Rob Strayer:

Yeah. I had a remarkable opportunity while I was at the State Department to be part of discussions with other countries about the promise of 5G, its great transformative potential. As they all seek to gain economically, there'll be tremendous amounts of economic growth based on 5G because 5G is not just about empowering telecommunications companies and that particular sector, but all sorts of other companies in different sectors ranging from healthcare to transportation to education will be enabled, and we'll be able to do more and therefore produce more economic growth based on having and integrating 5G technology into their current technology suites of applications that they're using in their particular sectors.

Rob Strayer:

So it was real great to be able to talk to leaders and officials in countries as well as private sector leaders around the world about the promise of 5G and to collaborate and bring together them in many cases with people from our Federal Communications Commission or with our National Telecommunications and Information Administration, NTIA, that's at the Commerce Department to collaborate and plan together on these policies that will enable a rapid rollout of 5G and one that's also secure.

Chitra Ragavan:

And you were until recently the US government's top cyber diplomat. What do you see as the big threats to our 5G infrastructure and national security in terms of the top issues that kept you up at night?

Rob Strayer:

Yeah. Well, most fundamentally, because 5G will empower so many new uses in various sectors of the economy, it really makes it a foundational part of our critical infrastructure. So if you're having healthcare rely on 5G, the provision of electricity live on 5G or empowering what are known as smart cities that have everything from energy to various applications in homes are rolling out 5G, if one could disrupt that or cause that not to work in the way that it appears to be working, that could have a very damaging effect on our society and disrupt it. So in the more technical sense is what we refer to as having the availability, confidentiality, and consistency of these networks.

Chitra Ragavan:

And why is China viewed as such a threat to US 5G security and competitiveness in particular?

Rob Strayer:

Well, the fundamental issue for the US government with Chinese technology in this area that's empowering critical infrastructure is its national security law and other legal mechanisms within China that are not susceptible to transparency and due process through an independent judiciary. And that allows the authoritarian government in China to make commands on what are nominally private sector entities to pick actions that are not going to be in the interests of the public or nations outside of China, again, without transparency or due process. That could mean there could be compromises to software. So much of 5G is not just about hardware but the software that it runs on, the code which needs to be frequently updated to patch even nominally innocent security issues with the software could be manipulated or there could be intentional additions of flaws in that software over time. So it's really important to have trustworthy companies in a trustworthy relationship with a government that's involved in 5G technology.

Chitra Ragavan:

So the Trump administration had embarked on a really big campaign to improve security communication standards, and a large part of that campaign on the home front and globally involved banning Huawei, the Chinese telecom giant, and of course, ZTE corporation and other Chinese companies from its 5G platforms. What were some of those measures, and have they worked?

Rob Strayer:

So the US government did undertake a campaign domestically to protect its telecommunications infrastructure. That was largely led by the Federal Communications Commission. It initially prohibited the use of what is called a universal service fund. That is public money that's set up to help subsidize the rollout of telecommunications to rural or underserved areas. It prohibited that to be used for untrustworthy telecom vendors for

5G. It's subsequently now undertaken a proceeding to look at whether any telecommunications provisioning of any type of equipment used by the public in the United States should be able to include untrustworthy vendors.

Chitra Ragavan:

And on the international front too, the US government has been convincing our allies not to use equipment from Huawei or ZTE. And there were mixed results at first, right? What were some of the obstacles to that persuasion campaign?

Rob Strayer:

Yeah. That was what I was fundamentally involved in while I was at the State Department. We started a campaign in 2018 to start educating our partners about the fundamental importance of 5G and that it needed to be secure in ways that they may have had not considered previously. At first, there were issues with our concerns in some cases raised about the low price coming from some of the Chinese vendors that had been considered to be lower than the equipment coming from the two dominant Nordic vendors, which are Sweden's Ericsson and Finland's Nokia. We've also recently seen that Samsung has emerged on the market as a major 5G player, providing us aggregated network for the radio portion of 5G. So many countries and operators were reluctant to go what they perceived to be with something that was more expensive than the very low cost that they could get from the Chinese vendors.

Rob Strayer:

In addition to the actual price of the equipment, there was the financing issue. In many cases, there were very low-interest loans provided to help facilitate the sales of the telecom equipment. Often, the equipment is a major capital expenditure for telecom operators. Therefore, if you've can prolong even the beginning of payments on a loan or achieve very low-interest-rate loans on that equipment, it can provide a major advantage to a vendor that has access to way below market financing.

Chitra Ragavan:

But last June, I guess, Britain said it would bar Huawei and ZTE from its 5G wireless networks. And it seems to be part of this gradual but steady global push away from Chinese equipment. And it was considered a pretty big loss for China. What were some of the factors that went into Britain's decision and what did that mean for the US in terms of its campaign to convince other countries to listen to its advice not to go with the Chinese companies.

Rob Strayer:

So through our diplomatic efforts that begun, as I mentioned earlier, in around 2018 and accelerated into 2019, the United States undertook a campaign to educate partners about the security risks about the true cost of ownership, about the availability of other finance mechanisms to help equal and level the playing field for using trusted vendors or technology. An important development occurred. It really was a combination of many efforts, but the capstone of it was in January of 2020 when the European Union, after

almost a year of review, when coming up with its own assessment tools for 5G, came up with something called the European Union's 5G Toolbox. And within that review process, it established that there of course needs to be very technical measures for protecting 5G technology, but also something known as non-technical or strategic measures to protect the technology and the availability for both businesses and consumers to trusted communications.

Rob Strayer:

And as a subset of that non-technical analysis, European Union said there's something known as high-risk vendors, and these high-risk vendors should not have access to sensitive or provide the sensitive parts of 5G networks. And they had a further way to define what are high-risk vendors, including vendors that have non-transparent ownership mechanisms, that have a history of unethical practices, and importantly, vendors that might be under the undue influence of a third party, a third nation where there are not democratic checks and balances on that government's authority over that vendor. And of course, that would apply in the circumstances of China and Chinese vendors.

Rob Strayer:

So that important development in January, 2020 and its implementation through the member states in the subsequent months. And then as you mentioned, while they United Kingdom was leaving the European Union, it adopted, I think, a largely similar understanding of having to pay attention to the non-technical risk factors led to its decision in the summer of 2022 to ban Huawei equipment from its networks that are previously banned ZTE.

Chitra Ragavan:

And it's not just the UK, I guess. The five I's, the most influential intelligence community, our allies, Britain, the US, Canada, Australia, New Zealand now, all of them have excluded Chinese companies from their 5G networks. That seems to be a pretty big diplomatic win for the United States and could possibly affect how other countries are implementing their 5G technologies, right? The rest of Europe?

Rob Strayer:

Absolutely. I think there are, if you will, de jure, that is, legal statement by some governments about the steps they're taking to prohibit certain technology, but other ones have a more of a defacto approach because they apply very rigorous standards. In some cases, applying those European Union 5G Toolbox standards to its telecom operators through various regulations, causing there to be a defacto prohibition on untrusted vendors. So there is, I think, a groundswell of change that's occurred in the last two years, awareness of the risk and actions by government, but also a lot of the telecom operators themselves independently deciding that they need to take steps to secure their networks in ways that they had not before.

Chitra Ragavan:

But if you take all of these countries, right, that still represents half the global market, right? So China is so dominant and controls almost half the market. So how does that figure in terms of the math of it and being able to secure these critical infrastructures?

Rob Strayer:

That's a very good point. It is the countries that we've been talking about that are moving most quickly to deploy 5G in their domestic markets. The rest of the world is looking at improving their 3G and 4G networks, and then eventually having 5G networks. That will be an important area of focus, policy focus, and diplomatic focus for the United States and other countries in the coming years.

Rob Strayer:

In those markets in particular, price will be a very influential factor in the telecom operators' decisions, in part because price is so much more important to the ability of consumers to even have a wireless device in many of those developing markets. For that reason, the financing is going to be really important. The United States has made steps to make its financing available, in partnership sometimes with other countries through what is called the Export-Import Bank or the Development Finance Corporation, which is two financing institutions that are funded by the US government in order to help allow US exports to have an advantage or at least a fair playing field in various developing world markets.

Chitra Ragavan:

I've read this fascinating story in may about this US-backed consortium that beat China in this multibillion-dollar telecom auction in Ethiopia to build its 5G network. And this consortium and this US government had actually set up a whole, I guess, financing agency to help finance some of these Ethiopia to actually be able to pay for the more expensive technology, non-Chinese technology. And it just seemed like a really interesting look at how this is all playing out. Tell us a little bit about that story and what the consortium was, what this financing agency was that was set up and how it all worked out.

Rob Strayer:

Each of these cases in developing world markets might be a little different, but in this one in particular, in Ethiopia, there was a tender, that is, an offer by the government for a particular segment of spectrum and the ability for the winning bidder to then deploy a network using that spectrum. The US, along with other countries and private sector entities, put a bid together. The US financing agency here was the Development Finance Corporation, which is used to fund projects in the developing world that help expand infrastructure and can be used for other purposes as well. They worked with the United Kingdom-headquartered company Vodafone to put a bid together and as well as number of other entities that were also part of the proposal because they [inaudible 00:21:51] equipment to it. But that is the Development Finance Corporation. And putting forward the ability to borrow $500 million for this consortium to establish the equipment and develop the deployment of a network.

Rob Strayer:

So it was a first of its kind exercise of such a large amount of money by a US taxpayer-funded financial institution to help win one of these contracts or tender offers in a developing world country. There's been other work to establish limited parts of networks or to provide some information technology in the past, but this was a major undertaking for the United States to work with these partners. And it's worth mentioning too that in any one of these networks, although Vodafone is United Kingdom-headquartered and is the operator, the equipment that goes into a 5G or 4G or even 3G network is dominated largely by US-based technology, from the routing of provided by companies like Juniper or Cisco to the companies that provide the semi-conductors to a wide variety of other companies that are involved in the design of the software that goes into these systems.

Chitra Ragavan:

It was interesting that in this case in Ethiopia, that the loser was a South African bidder MTN Group, which was backed by a Chinese investor. So you see this geopolitical drama unfolding around this whole 5G infrastructure story. It's really interesting.

Rob Strayer:

Yeah. It certainly is. It certainly is a global play because in technology, you need scale. So the companies that come together to provide these tender offers to build networks can't do it just for one country. It can't just be an indigenously created for that one market. They need the scale of having hundreds of millions, if not billions, potentially of users to help pay for the costs of the research and development and manufacturing of the most cutting-edge of equipment. So that necessarily means that when you look at even one country like Ethiopia, you're going to have a consortium of equipment players, of finance companies, of operators that are global in nature.

Chitra Ragavan:

I mean, The US is going to have to continue to be nimble in this area, right? I mean, I think this whole 5G story on its own is incredibly important, but even symbolically, you've seen on your own as a diplomat, and I've been reading, and others have been reading about how China and Russia and even Middle Eastern countries are moving into offering all these low-interest loans. And all this money is being poured into Africa and Latin America in order to build that new layer of influence in these regions. And so I guess the US is going to have to be really alert to more of these types of deals that may be taking place that could shift that geopolitical influence, right?

Rob Strayer:

Absolutely. And if you look at helping provide financing versus providing direct grants, the financing will be repaid at some point and at a sometimes slightly concessionary interest rate. But at the end of the day, if it's repaid and it's at an interest rate that's at least equal to what the US government is paying on its debt on its treasuries, then the US taxpayers are held harmless at zero cost, whereas large grants to buy infrastructure would be expended and not repaid to the taxpayer. So the US can be nimble on how it

looks in the world and try to find these deals, work with private sector entities, and help provide trusted, secure technology to countries around the world.

Chitra Ragavan:

In all of your travels, as you were doing all of these negotiations and having these conversations with all these countries, other than this Ethiopian story, are there any other stories that come to mind for you that for you represents both the challenges and the opportunities here?

Rob Strayer:

Well, I would just say that in the couple of years that we had discussions with countries, it took some time for telecom operators in some cases to fully understand the risk that they might be bringing into their networks from having untrusted vendors. So that iterative dialogue between the United States and the other governments, and then their governments and their private sector, played out over many months, if not years. And that I think is still continuing, especially in the developing world. So it's a long-term process. I don't have a great example of something culminating in the kind of decision that happened in Ethiopia, but I anticipate there'll be more of those on a smaller scale basis where there might be upgrades to networks that are not as sweeping as the availability of a whole spectrum band for an entirely new network.

Chitra Ragavan:

Other than 5G, 5G is just an example of this incredible global technology revolution that's taking place. You've seen it as a former ambassador. I see it in my day-to-day work in the technology space. How is the US government and State Department, other agencies, how are they gearing up for this technology revolution in terms of staffing and education and resources? Because as you know, things are changing virtually every day in the realm of technology and particularly cybersecurity. It seems like it's going to require this massive transformation in the US government in terms of personnel and expertise and focus. I mean, how's the government doing?

Rob Strayer:

That's a tremendous insight. Absolutely. They need the folks that have those skills that can understand technology policy, especially as you look at the geopolitics behind this. The data that's created from any type of technology, not just 5G, is going to be something that's more and more important for the national interest of the United States and for the national interests of other countries. It's going to be present in discussions about national security. It's going to be just present in discussions about economic success. And it will be very important to discussions about trade and trade agreements. There's been recently in just the last few weeks more discussion that even if the United States doesn't join something like the Comprehensive Trans-Pacific Partnership, that you could still do an agreement that's broad with the number of Asian countries about digital partnership and digital cooperations and setting rules about free flows of data, about the deployment of technology across borders, and about artificial intelligence.

Rob Strayer:

So that will be an area that you need skilled diplomats, skilled technical people, people who will understand incentive structures, the need for scale, the way that technology is designed, developed, and manufactured across borders. That's just going to be a really important part to the government, helping the private sector in the partnership arrangement achieve success. So I completely agree with that insight that the United States needs to continue to move that direction. I will say that's something that's begun. I know that the State Department is looking at creating a cyber and emerging technologies bureau that is the functional level that have these bureaus that work on policy. Other parts of the government are looking at building more robust entities to look at things like semiconductor and providing semiconductor grants. So it will be really a growth area for the government to be able to partner with the private sector on these important international issues.

Chitra Ragavan:

A lot of the energy will have to come from younger engineers, younger generation of talent coming into the US government. I mean, technology is moving at lightning speed, and all governments move incredibly slowly. And there's such a demand for talented engineers in Silicon valley that it's... How do you compete with the kinds of salaries and perks and all of these things that the tech sector can offer talented engineers? I mean, how do you attract top talent to the US government to help it keep up with and combat these incredible threats that we're confronting daily?

Rob Strayer:

Yeah. That's a great point. It is a tremendous challenge there's no easy answer to. I think the first level is just thinking about the supply of, as you said, engineers, and those that are conversant in technology. That is how does the government and the private sector can work together on the education side, everywhere from the K-12, on STEM education, and then into universities about producing more talented individuals in the sector, because that will benefit the private sector, of course, but also the additional of individuals that are skilled in this area will make them available for the government. Government will probably never be able to pay the same amount as the private sector or provide the same level of overall compensation, but there is the mission of working for the United States that hopefully appeals to young people in the future. And as we increase the pool of people that are in this space, that hopefully there's a certain percentage that will want to still go and work in the government on this, at least for some period of time in their careers.

Chitra Ragavan:

Going back to the 5G issue, where is the Biden administration and its stance on 5G and its negotiations with countries compared to the Trump administration both in the level of importance it's attaching to this issue and the way in which it's conducting those conversations?

Rob Strayer:

It appears that the Biden administration is carrying forward in a similar manner as the Trump administration had on 5G policy. It's made it an important part of the summit, for example, with Japan and with South Korea in recent months. There were outcomes of working together on 5G in both the statements that culminated at the conclusion of both the Moon summits and the Abe summits. So I think there's a strong indication that it's at the highest levels of the National Security Council, National Economic Council in the Biden administration to focus on 5G and technology policy. So I think there's a great degree of continuity.

Chitra Ragavan:

Do you have any closing thoughts on where you see 5G heading in terms of adoption and speed and global cooperation on some of these big, big security issues in coming months and years?

Rob Strayer:

Yeah. I think that we're going to see the continued deployment of these networks, which initially will be things that we see showing up on our phones is the ability to have the level of 5G transmissions and the bandwidth and low latency. But the real challenge of the next few years will be for countries to work together to partner together with the best of their technology, produce the amazing use cases for 5G. Again, talking about how it can be used for remote healthcare, how it can use for autonomous transportation, whether in the form of individual vehicles or moving people through seaports and airports, or the ability to use the technology for all kinds of logistical controls and ways that will make all forms of the economy more efficient and more productive.

Rob Strayer:

So those applications are the next stage of focus for 5G. It's really the things that will be enabled when they talk about the internet of things environment. The transition from say a 4G network might've meant that there were thousands of devices connected per square mile. With 5G, it will be millions of devices that could be connected per square mile. That means there could be sensors on all kinds of things and on people as well. So the future is very bright for the potential to see 5G empowering so many more applications than we've even dreamed about today.

Chitra Ragavan:

That's amazing. Rob, thank you so much for joining me on Techtopia and for this fascinating conversation.

Rob Strayer:

It's been a great pleasure to be with you. Thanks again for having me.

Chitra Ragavan:

Rob Strayer is a former US State Department Ambassador and Deputy Assistant Secretary of State. He is now a technology executive at the Information Technology Industry Council, representing 80 of the most innovative tech companies and markets

around the globe. While at the State Department, Strayer led the development of US foreign policy on a wide range of technology policy issues, including privacy, data protection, artificial intelligence, technical standards, cybersecurity, and 5G supply chain security. He also led the negotiations with foreign governments about these issues. This is Techtopia. I'm Chitra Ragavan.