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I will start with you, Madame Minister, can you explain to us why the United Arab Emirates are so involved in space activities? What difference will it make in the next 50 years whether you are involved in these costly activities or not, like most countries of your size?

Sarah Al Amiri

Good afternoon, everyone. It is a pleasure being here with you, so thank you for the invitation and it is a pleasure to meet you for the first time, Philippe, as leaders of the space activities in our respective nations.

When we first advanced into the space sector, it had been an historic development for the UAE over the course of the last 24 years. We were users of space technology and then in 2006 we transitioned into developers of such technologies, the purpose of the shift was to use space as a means to diversify our economy. Without a solid base in science and technology, diversifying any economy today will be challenging. What better and more challenging sector can you use to expedite the development of your technological capabilities in a short amount of time? That is why the space sector was used from the start. We are talking about 24 years of development in the space sector where we went from users of space technologies to developers of small satellite systems and planetary exploration missions. As we progress forward, we now look at the important factors that the space sector will play in our country's future and that is the development of a private sector in space that adds on to our economy and plays an amazing ripple effect into other sectors that utilize technologies. Today, we sit at a turning point where we have engineering capabilities to design and develop complex engineering systems. For example, you require complex engineering systems to upgrade your existing industries. You require some skillsets that are available in the space sector not only to develop your own space and technology capabilities in the private sector, but you are also able to deploy it across other strategic sectors that requires those technological advancements.

When we talk about the next 50 years for the UAE, we are talking about an increase in the role of the private sector in the space industry. We come at an amazing time where the private sector is getting more and more traction and can push forward and it is the right time to enter certain markets. As we move forward, the role of the government of the UAE in the space sector is to develop the capabilities of the private sector, to transfer the knowledge and knowhow and allow a lot of the capabilities developed over the course of the last 20 years to start transitioning into the private sector. The private sector also requires a second primary

component, demand. You need to start creating demand, so what we are doing with our future programs is to create business and provide contracts to the private sector so that it is able to flourish. You are providing capabilities. You are ensuring that you have demand so that other sectors are taking on the products and services coming in from the space sector. You are upskilling your existing private sector by ensuring they have access to contracts that allow them to deliver at higher and higher standards. To bring all of that together, you need to ensure that you are continuously challenging yourself and moving forward. The mechanism by which you challenge yourself is by bringing in exploration missions.

That is the play on the private sector. Then you talk about the ripple effect, and if I go back a step, we said that the primary objective is to develop our science and technology capabilities. Space is quite aspirational. Living in a country that has sent a spacecraft to Mars is quite different than living in a country that has not done it. You have opened up immense opportunities and we lived through that this year. We saw conversations changing entire households in February of this year. We started with skepticism about whether or not we were going to get to Mars, come February every single age group and every single household in this country was talking about the technical and scientific challenges of getting to Mars. That is a big conversation changer for you to be able to get scientific explanations and objectives across and have the entire public rooting for it. For me, that was a monumental shift in creating the future generation that will then capture on the development of the future sectors because a window of opportunity was opened. I was saying earlier that this window of opportunity never existed for me. I never dared to say that I would work in the space sector one day, let alone work on a mission to Mars. This is not something that I thought was possible for myself or anyone in my generation. Today, my children have grown up in a world where this is okay, it is normal. They lived through an astronaut being put into space and science being something normal that you can go into and study. They lived through sending a spacecraft to Mars when you knew that there was only a 50% chance of success.

That gets me to my last point, which is that it creates a nice driver, especially for nations that are advancing into technology. Technology is very risky, regardless of what stream you are working on. Of course, space is on another level when it comes to risk. You change and transform an entire mechanism of thinking by using the space sector where we have increased our appetite for risk. I have experienced this in my daily job. I can now propose things that are quite risky and probably get approval on them because we have a better understanding of how to mitigate risk and develop a mechanism by which you develop programs and projects and can get the maximum impact out of them. That general understanding and balance between risk taking, appetite for failure and what it means for success, is what is needed during any transition of any nation that is going from a current economy based on natural resources, to an economy based on knowledge, knowhow and experience; an economy where risk is an inherent part of the DNA of what you are doing.

Those are several of the factors why the UAE has gone into space and will continue to invest in space over the course of the next decade or two, to ensure that we have a very robust and organically developed science and technology sector in the country.

Thierry de Montbrial

Thank you very much. Your approach implicitly means that you cannot achieve technological excellence without the space dimension. After all, you could specialize or invest in various dimensions of technology but not necessarily in space activities. My understanding of your approach is that, for you, to be at the forefront of understanding the implications of technology means that the space dimension is essential. That is a statement and a question at the same time. The other thing that I want to ask you is, where do you draw the line between reality and dreams? I am thinking of Mars in particular.

Sarah Al Amiri

The answer to your first question is that you can go about developing a science and technology sector in your country and there are different mechanisms. What the space dimension brings in is the speed at which you can develop capabilities. If you take developing a spacecraft, such as a mission to Mars, you get scientists who define the requirements, so you start making opportunities for scientists to work on such areas. Then you also marry that with almost every field of engineering from computer scientists and engineers, like the two of us here, to mechanical engineers, specialists in thermal systems, electronics, etc. You are able to touch on multiple disciplines of engineering and use a new mechanism to do it. The space dimension adds speed of development into it, which I think nations need to take into consideration, especially if they do not have a lot of time to transition and transform. That is where that decision comes in.

Where do you draw the line between science fiction and a dream and going to Mars, for instance? I think that when we announced it in 2014, that maybe our approach seemed unreal. When I had conversations with people off the record up to this year they thought it was unreal and they classified it as science fiction. It is the methodology you take in designing and developing those missions that moves them from the realm of science fiction to the realm of possibilities. The approach we took in the development of this mission and the direction that was given was a very well calculated one, it enabled us to get to the point we are at today. That is how you manage the design and development of this mission; the budget considerations, the time considerations, the technical challenges; all these different factors that you surround this mission with. Then we went down the dimension of working with a knowledge transfer partner to develop this and we worked together as one team. This is the mechanism we have used several times and I myself take a lot of this into my portfolio in advanced technology. The question for us in the Ministry for Industry and Advanced Technologies is how to elevate your existing sectors by infusing technology, and there are a lot of those learnings you can actually take there, and how you create new sectors based on technology within your economy. For us, the space program has touched on a lot of mechanisms to be able to do that.

Thierry de Montbrial

I hope that if we come back here for another edition of the WPC, maybe we can have a panel with the Minister of Advanced Technologies and the Minister of Tourism to talk about developing tourism on Mars.

Sarah Al Amiri



Would you not classify that as science fiction?

Thierry de Montbrial

We will see.