

DÉBAT

Thierry de Montbrial, fondateur et président de l'Ifrri et de la WPC

We have a bit of time and I think Karl Kaiser, who is German and American, but I would say 70% German and 30% American, wants to say something.

Karl Kaiser, associé principal du projet sur l'Europe et la relation transatlantique du Belfer Center for Science and International Affairs, Harvard

Listening to the two of you, I am struck by a possible interesting peril. As we all remember and Ifrri and other European institutes did studies on this in the seventies and eighties, in the beginning France was the clear leading space power in Europe, far ahead of the others. It pulled the others along and I still remember when the French had to put a lot of pressure and persuade the Germans to make them move into this area because only by being a group do you have sufficient resources because these things are very expensive to do. There is also a political motive behind them as we all know.

Madame Minister, it seems to me that you might possibly be going the way that France once did. Could you be the leader of a future coalition of partners, maybe in the region, so that you can gather the resources to do more, as well as doing it nationally? Do you see a possibility that like Europe, you might move to an area that is not just civil but possibly for other uses? For example, Europe is doing observation satellites, which can be used for civil services, but also to check arms control agreements and possibly even military purposes.

Sarah Al Amiri, ministre d'État aux Technologies avancées, présidente de l'Agence spatiale des Émirats arabes unis

On the first question with regards to collaboration within the region, as you said, space is really expensive. Philippe mentioned constellations of communications satellites as a paradigm shift, so we have reached a point where any program is riskier and therefore more costly in some instances. You are creating paradigm shifts in sectors, so the earth observation sector of imaging earth in various wavelengths has been transformed over the course of the last 10 years. The next 10 years will see a full transformation of communications systems and I think navigation will come in some time in the next decade. You are talking about entire paradigm shifts that require you to reinvest in infrastructure, development methodologies, etc. It is natural for coalitions to be formed because, as you say, you need to offset risk and you need various resources to create the right impact you will have. It is a natural progression for a region to move towards working, and it is not about force, it is about the mutual benefit. That is what happened in Europe, it is mutual benefit that pushes this development forward. There

will be competition but it will be healthy competition to further advancement in development. That is on the cooperation front.

When you are talking about utilizing space systems, yes, there are civilian uses of space; space started as a military endeavor. What we are looking at the moment is economic drive and economic development for the UAE's purposes and that is where a lot of resources and investment is going. Do countries have various uses for space? Yes, that is normal, natural and everyone does it. The primary purpose for the space sector in the UAE will remain economic development.

Thierry de Montbrial

I will take three questions together and I will start with Fareed Yasseen.

Fareed Yasseen, ambassadeur d'Irak aux États-Unis

I have a very biased question, as I used to be a scientist. Money for science is scarce, people are fighting for it and there is competition. There are areas that are very trendy, like space exploration, particle physics, which you mentioned, and quantum computing but the topic I want to mention here is fusion. Why? We are all under the threat of climate change and one of the silver bullets that is being talked about as a solution to the energy problem is fusion. Europe is very active and I am sure you face some competition from people involved in fusion for the funds you get and in fact, ITER, the new international reactor is being built in Cadarache, France. My question is, are you being affected by this new focus on funding towards addressing climate change? My second question is about the involvement of the private sector. Most of the projects involving fusion are publicly funded but now in the United States, Canada and the UK, we are seeing private investors building Tokamaks or equivalent machines at a much lower cost in the hope of finding, a quicker, cheaper, silver bullet. Is there a similar project in France or elsewhere in Europe and if there is not, why?

Serge Sur, agrégé de droit public, professeur émérite de droit public à l'Université Panthéon-Assas

Nous avons surtout parlé des aspects technologiques, économiques et scientifiques de l'utilisation de l'espace et il est évident que ce sont des aspects dominants qui sont compliqués par la multiplication du nombre des acteurs spatiaux. D'ailleurs, cette multiplication encourage la coopération, tout au moins pour ce qui est des activités pacifiques et civiles, lesquelles sont aujourd'hui dominantes. Cependant, je me souviens que lorsque j'étais aux Nations Unies, la grande question de l'espace portait sur la course aux armements et l'*arms control* à laquelle faisait allusion Karl Kaiser. L'IDS était le grand débat à ce sujet. Aujourd'hui, je crois que les actions militaires n'ont pas diminué et le spatial reste toujours déterminant pour les communications, la surveillance, les opérations militaires et la dissuasion nucléaire. Le traité de 1967 reste aujourd'hui la charte de l'espace et il contient certains principes simples qui ont été respectés jusqu'à présent. La question que je pose aux experts c'est si ce traité est aujourd'hui suffisant. Il est essentiellement consacré aux questions militaires, il est très précis en ce qui concerne la non-prolifération des armes dans l'espace, et même l'interdiction de placer des armes de destruction massive dans l'espace, mais il est très elliptique sur le reste. Ce traité est-il aujourd'hui suffisant pour les utilisateurs ou demande-il à

être transformé ? Il a en effet été conclu entre les États-Unis et l'URSS et il est possible qu'il ne réponde plus aux besoins des utilisations actuelles. Je serais très heureux d'avoir le point des panélistes sur cette question.

Daniel Andler, professeur émérite de Sorbonne Université, membre de l'Académie française des sciences morales et politiques

I will be brief because the two previous speakers had excellent questions. First, I am not entirely reassured by the fact that right now non-military activities seem to predominate. I wonder if when push comes to shove, the military will not take hold of the field and make it go in the direction it wants. My second question is about cluttering and I have heard there is a big problem with satellites cluttering up space; how will that problem be solved? Third, it is a bit to do with the fact that there are limited resources in science. I was wondering, especially if Philippe Baptiste, thought we had the right sort of young inventive engineers and scientists to really fuel progress in the space field or whether we should think about new ways of training our young engineers and scientists.

Thierry de Montbrial

Thank you. I would like to give Madam Minister the last word, so I will go first to Philippe.

Philippe Baptiste, président-directeur général du Centre national d'études spatiales (CNES)

Merci beaucoup, chacune des questions mériterait un long débat mais voici quelques éléments.

Do we feel that there is competition over funding resources between a research program on fusion, for example and space? I would say that the answer is no, not directly. I would say that usually the countries that invest the most in one program also invest the most in the other because those are basically the countries that believe in technology and that it can really change the world. I am not really worried about competition over funding because it really goes in the same direction.

Just perhaps a word on the militarization of space. This is a big issue and the question is very wide, so I would just like to focus on launchers, which are only a subset. Today, there are something like 250 companies worldwide, startups and larger ones, that want to develop a mini launcher. A mini launcher is really very close to a ballistic missile so the question of proliferation and how you manage this technology is there. Of course, the rules are the same and all big countries will do their best to monitor what happens and prevent some kind of technology loss to avoid launchers being used for the wrong things. The question will still remain because when you have so many actors developing technologies all over the world, then it will be really key.

I will go very fast because we are short of time, but the question of debris and managing pollution in space is a key one, especially in low earth orbit. That orbit is very close to earth and there has been an incredible increase in the number of satellites there. It is an exponential law, it grows very fast and we will be in trouble. The question is not whether or not we will be in trouble, the question is when and trouble meaning collisions. Collisions mean that



you have much more debris leading to even worse collisions. The question is how we regulate space and this has to be discussed. I think we have limited choices, we have to think about that and we cannot just rely on the goodwill of private actors. There has to be some kind of worldwide strategy on this question.

Finally, to answer the question on private investors, I would like to reformulate it. Basically the question was about where they are in Europe but I would say that we have a limited number of billionaires who invest in space, at least in France. I am afraid I do not know any of them right now, but I hope they will turn up soon. We still have a lot of companies that invest in space and I am not just talking about Airbus and Thales, which are giants and key players in space, but there are also new ones. For example, I will mention Kineis, a young company that manufactures small satellites for a variety of different uses, especially IoT. It is very young and dynamic, with very low prices, so I am pretty sure it will soon be very successful. There are a lot of them but I believe that we have to put much more effort into this new space sector, because it will really boost space technology throughout society, as well as creating huge economic growth, so we will invest.

Sara Al Amiri

If I am correct, the three questions were across three different strains. One of them was regarding the militarization of space and proliferation. That is about each actor being responsible for what we have all signed up to. There will be more up and coming companies around the world, as Philippe mentioned, and it is about how local regulations reflect the intentions of a country in terms of proliferation in space.

On the question of the private sector, which I think was specific to Europe, but for the private sector itself, what we have seen is that it gives us new innovations. These companies are up and starting and they develop things that are different from those typically developed in agencies that have been around for 40 or 50 years. As innovative as it is, there is a very doctrinal approach to the mechanisms of design and development for space, especially in larger institutions, with a lot of it inherited from failed missions. Some entities are following policies and procedures from failed missions in the seventies, for example. When you get new entrants into space, be it countries or companies, they do not have that baggage and they can start on a fresh page, and so they can innovate in development. There needs to be a nice balance between the two. I know there is a big hype in investment, parts of it are hype and parts are real and what we need to see as space agencies is that the sustainability of real investment is ensured that it will carry through over the course of the next decade. That is how we can develop new mechanisms of retraining engineers and thinking in terms of space systems development.

We can find better products and services coming to space and we can find a solution to the clutter we have in low earth orbit. What we can bring to the table today is discussions on a policy front and an international policy front. The real innovation will come in ensuring that we are accessing space, finding out early about collision but more importantly understanding better how space can be decluttered in a low-cost manner. That is an innovation that will come from the private sector; I think we have concepts but no real solutions as yet.

I hope I answered the three questions, but that is what I thought.

**Thierry de Montbrial**

Thank you very much for this very interesting and stimulating discussion. I can assure you that the issues of technology, and space in particular, will play an increasing role in this World Policy Conference, but that includes the word policy. It seems to me that we are at the beginning of a collective reflection on how policy should be approached. We have spoken a lot in other sessions on the idea of flexible alliances and cooperation, in a world that we, the middle powers, want to remain as open as possible, but I would like to say reasonably open. There is a lot of work to do to become more operational in these extremely exciting fields.

For myself, I can tell you that I am not a candidate for a trip to the extra-atmosphere and would not be even if I was a billionaire and even less a candidate for Mars. When the day comes, I will be elsewhere. Thank you.