



JEAN-YVES LE GALL

President of CNES, President of the International Astronautical Federation, Chair of the Council of the European Space Agency

Jim HOAGLAND

I would like to now introduce Jean-Yves Le Gall, President of CNES, President of the International Astronautical Federation and Chair of the Council of the European Space Agency. He clearly knows a lot about what is going on out there. Jean-Yves.

Jean-Yves LE GALL

Okay, thank you Jim, and thank you François for your very inspiring talk. I would like to say a few words, because you said that on the smartphone you have GPS, but now we have Galileo because you probably remember that three or four years ago, when I came here I explained that we used to say that Galileo will be the European GPS, and today, I can tell you, we crossed one billion users of Galileo, and we are in a world where when we speak about GPS in two years, we will say that this is the US Galileo, because of the huge accuracy of our system. This is just a point on which I wanted to insist. Thank you.

Now, it is a nice transition with the space industry, because when we speak about today's topic, I think that space is a good example. The space industry is probably one of the youngest industries, but in spite of that, we have to face many challenges, and the first one is the pace of technological change driving our industry. I just wanted to take an example. The first modern rocket lifted off from Peenemünde in Germany in 1942, and just 27 years later, in 1969, Neil Armstrong walked on the Moon. As a matter of fact, we are going to celebrate this human landing next week in DC with Vice President Pence.

If you put that on, for instance, airlines, it means that the first Airbus A380 would have landed here in Marrakesh in 1917. It is unbelievable, because 1917, because it would be a very short period between the first flight of an aircraft and the A380. This is exactly what happened in space.

However, it is just apparent because this apparent overnight success is in fact the result of many, many years of engineering efforts. Today, a lot of people speak about SpaceX and reusable launchers, but SpaceX and reusable launchers rely upon the Merlin engine, which had been developed by NASA 30 years ago. If there is just a message taking the point of François on the smartphone, today, all of us use smartphones, but we have to remember that they are built of a heritage that is already more than 10 years old. This is the first point.

The second point, it is our second challenge, the fourth industrial revolution. This fourth industrial revolution applies of course to digitalisation and globalisation. Digitalisation means that there is a miniaturization of satellites and that the cost of access to space decreases very, very strongly. Globalisation means that more and more people, everywhere in the world, now have a space programme. We are moving from a situation where, 10 years ago, we had just 10 space agencies, to a situation where we have now 60 space agencies. It is clear that in this expanding world, access to space is becoming ever easier. This is a point also which is very, very important. Space in the past was just for an elite, now it is almost for everybody.

The third point is what I used to call the new post-truth media era, because today, science value is no longer realistic, but we are told many, many things which are sometimes not very credible. For instance, people explain in the US, at the highest level that a woman will be walking on the Moon again in 2024, and a man on Mars 10 years later. I can tell you that it is not the truth. Unfortunately, one of my colleagues from NASA said the same. He has been fired

immediately. However, the reality is that it will take time to go back to the Moon, and I do not even speak about Mars because it will be nobody knows when. Even if some people explained it is for the next years.

You see that we have these three challenges: technology, industrial revolution and the post-truth media era. There is another point on which I want to insist, and there will be a session dedicated to that a little bit later, which is about what is related to climate change. For climate change, space is very, very important, because out of the 50 essential climate variables which are defined to measure the climate, 26, which are more than half, can be observed just from space and with satellites. France plays a leading role in this field. There was the Paris Agreement in 2015 under the leadership of Laurent Fabius. We will be there later on. We have the One Planet Summit of President Emmanuel Macron, but it is clear that it is a point which is very, very important.

To conclude, I would just like to remind you, you probably saw this picture which has been taken on 24 December 1968 by the astronauts of Apollo 8 circling the moon, and we saw for the first time an Earth rise taken from the Moon. In this image, we have two messages. The first one, it is space, it is technology, but the second one, it is the point that we have the fragility of our world, a little blue dot which is totally alone in the vastness of space, and once again, it is a major challenge we have in front of us.