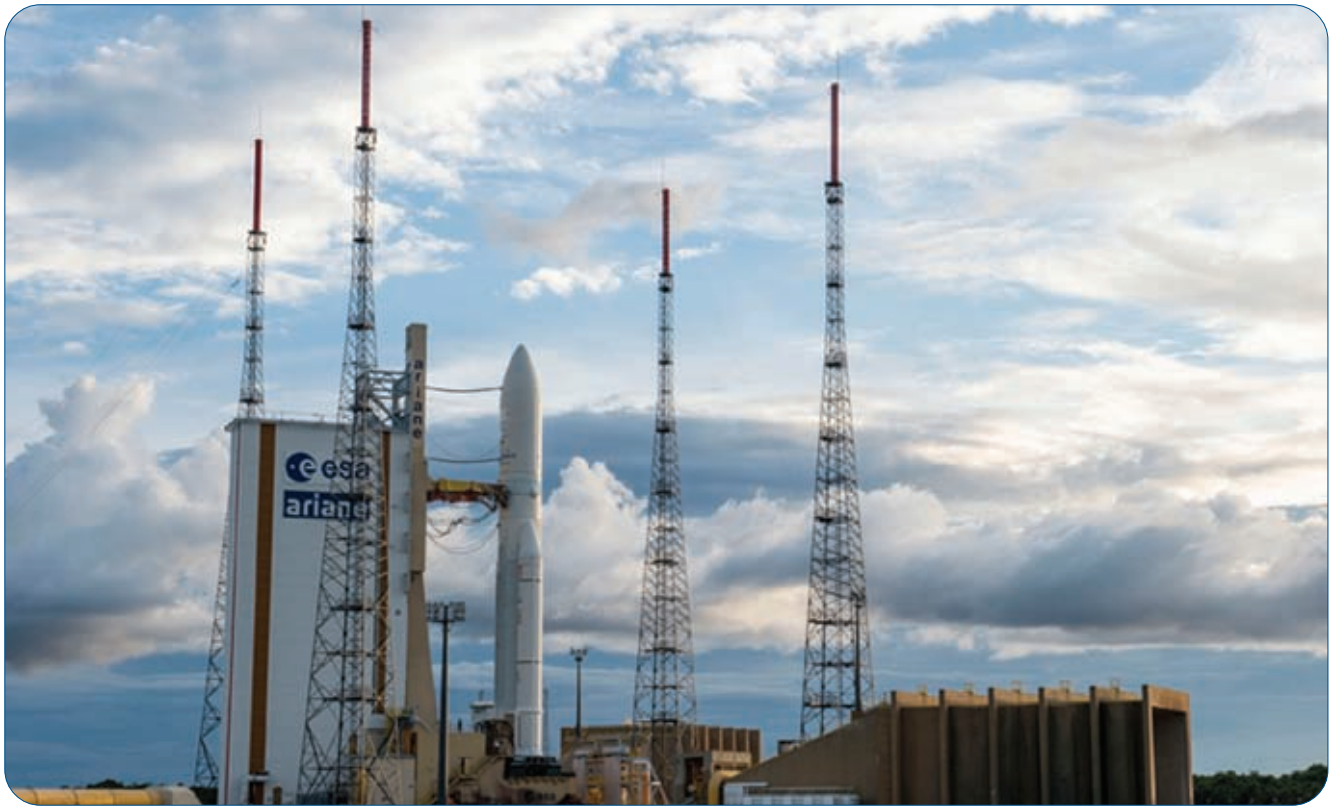


Quality of service and reliability

Arianespace was founded in 1980 as the world's first commercial launch services provider. Since then, it has launched more than 520 satellites, including telecommunications, Earth observation, navigation, science and technology demonstrations. Today, the company uses three launch vehicles; Ariane 5, Soyuz, and Vega, and performs launches from French Guiana and Kazakhstan. In 2016, Arianespace achieved 11 launches and signed 13 new launch contracts. Amy Saunders spoke with Jacques Breton, Arianespace's Senior Vice President of Sales and Business Development, to find out more about Arianespace's market assessment and plans for the future.

Question: What can you tell us about Arianespace's current capabilities, and its targets for 2017?

Jacques Breton: Last year was a good year operationally speaking, we achieved every launch that we'd planned, and we're well on track to achieve the same this year. For 2017, we have 11 launches planned, and so far, we've achieved five: Two Soyuz, five (the 4th is early September) Ariane 5, and two Vega.

What's interesting to note is that the two Soyuz launches we performed already this year were for GTO satellites. Up to now, we have used Soyuz for launching Earth observation satellites, Galileo and O3b satellites, so this is the first time that we've launched GTO satellites with Soyuz. When we introduced Soyuz, we said that if a customer has a small satellite that they want launched to GTO, we would still launch them on Ariane 5, but if there is an excess of small satellites, we perform a dedicated launch on Soyuz, because we have the capacity to ensure a timely launch. That is what we have demonstrated this year. Coming up, we have another four Ariane 5 launches planned, and two Vega.

Question: Arianespace set new payload performance records in 2016, when it twice carried payloads of more than 10,700kg into geostationary transfer orbit (GTO). Why is this important for Arianespace?

Jacques Breton: There is a continuous trend for GTO satellite operators to ask for more mass to be injected into orbit. When we launch two satellites on Ariane 5 to GTO, we usually launch a large one in the six tonne class range with a small one in the 3.5 tonne range. Those customers with the six tonne satellites are asking to increase the mass, maybe to 6.1, 6.2 tonnes, 6.3 tonnes, etc. The smaller satellite customer is also asking for the same

Jacques Breton, Arianespace's Senior Vice President of Sales and Business Development

option, 3.6, 3.7 or 3.8 tonnes. As such, we are implementing a progressive continuous performance improvement plan. We reliably launch the same vehicles again and again, and each time, we implement some small improvements to the launcher. After each launch, we check to see what's left in the vehicle in terms of performance so that we can increase the margins for the benefit of the customer. It's very important for our customers to be able to develop satellites with additional mass.

Question: In March 2017, Arianespace shareholders voted unanimously to convert the Airbus Safran Launchers subsidiary company to a simplified joint-stock company (SAS). How will this decision improve Arianespace's day-to-day operations?

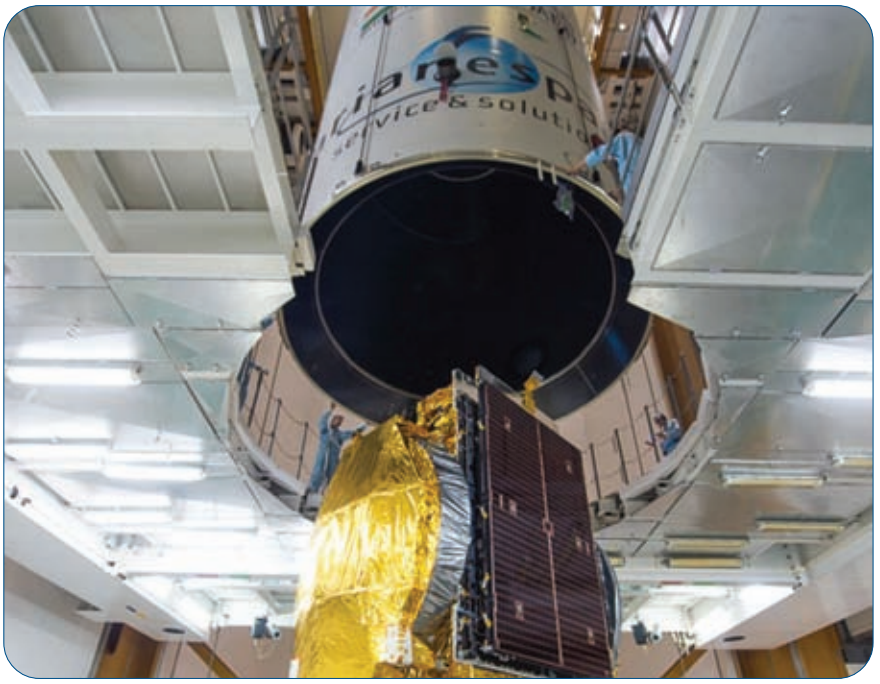
Jacques Breton: In the past couple of years, important decisions have been made in Europe. In 2014, the Ariane 6 programme was decided, and as part of this decision, we decided to give more responsibility to the industry. Therefore, the industry reorganised itself with Airbus and Safran, getting together to constitute the Airbus Safran Launchers entity, now renamed as ArianeGroup, and then they acquired the largest share in Arianespace, and we became a subsidiary company. In the period of time when Ariane 6 is being developed, this enables us to be closer to the people who make all the decisions, so we can progress more rapidly. It's also important for us to be closer to the market because we can see what the dynamics are, to be able to react to what customers are asking for.

Question: In the next few years, Arianespace plans to add the new Ariane 6 and Vega C launch vehicles to its portfolio. Can you provide an overview of the expected timeline, capabilities, and progress made over the last year?

Jacques Breton: I'm pleased to say that everything is going according to plan.

The Vega C is still planned for its maiden flight in 2019, and we're already selling the launches to customers. The programme is running well. The Vega C will have an increased performance with respect to Vega, just slightly below twice the performance in fact, for nearly the same price. It means that, in terms of competitiveness, Vega C is a major step forwards. Vega was already a great success; we have performed nine flights, all successfully, so the Vega has already met its market. With Vega C, it will be even more interesting since customers will get more performance for the same price.

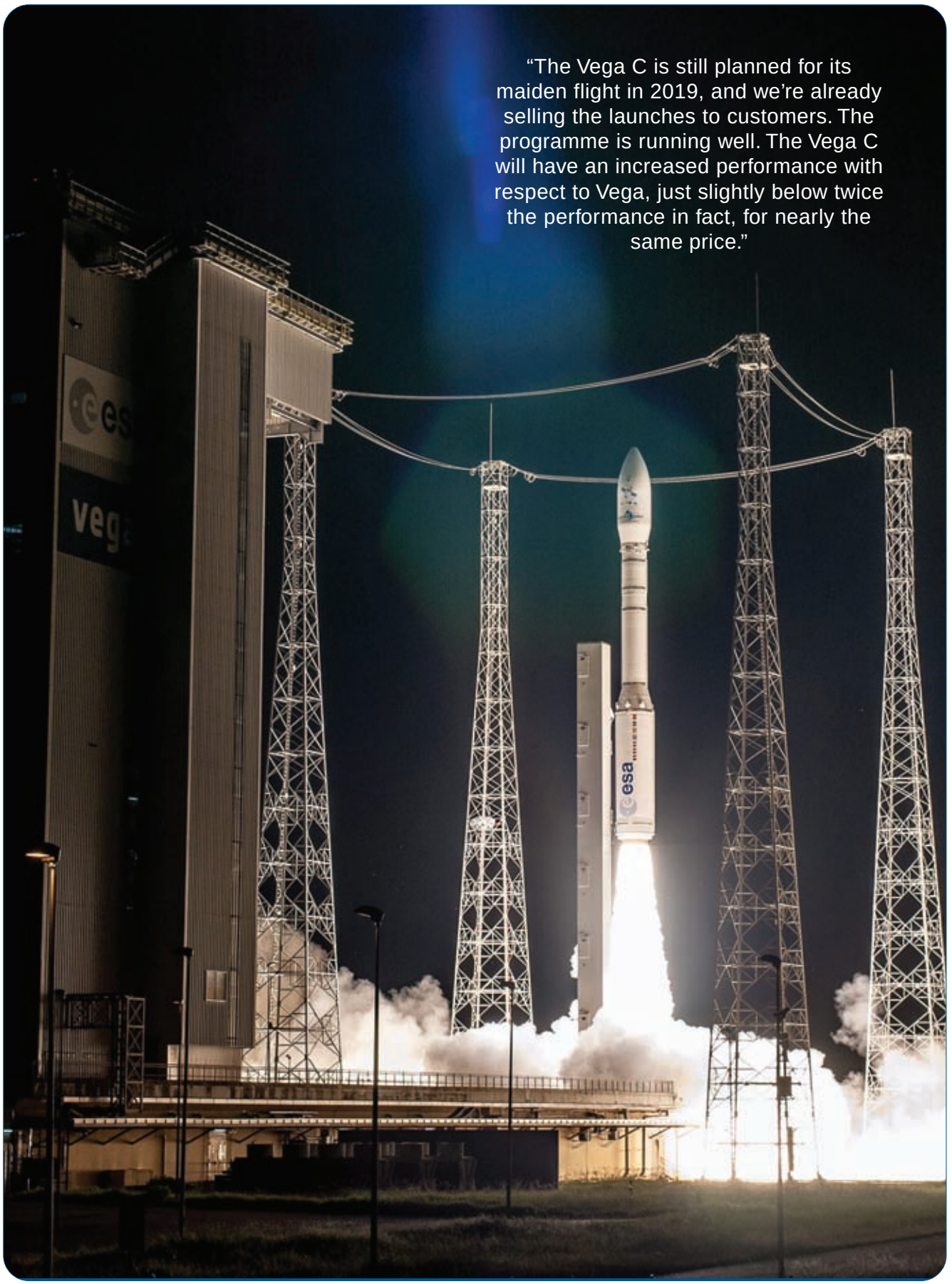
For Ariane 6, the programme has gone through several big steps since we last spoke. We're currently preparing for a major milestone, a review point, which means at the end of this year, the transition phase will be assessed by ArianeGroup and the European Space Agency, to check the conditions of introduction of this launch vehicle onto the market. We're on schedule for the first launch to take place in mid-2020. Ariane 6 is attracting a lot of interest, we've had discussions with various operators for GTO launches for classical telecommunications satellites, as well as for constellations. There will be two versions of Ariane 6; Ariane 62 and Ariane 64, and both have been adapted with constellations in mind. Ariane 62 can carry a smaller number of large satellites, while Ariane 64 can carry a very large number of smaller satellites. This will be very convenient for constellations, because rapid deployment is key.



Question: How has the market changed since you joined Arianespace in 1985?

Jacques Breton: One thing that is constant in this market is that it's in constant evolution; that's why it's so interesting, and why I've stayed so long. The landscape of the competition is always moving. We've seen a lot of other launch providers come and go, and in five years from now, who knows who they major players will be? We expect to see Blue Origin enter the market, the Japanese will have a stronger presence, and India, of course, is always progressing.

When it comes to the satellites themselves, we're at a major turning point. We've been focused on classical telecommunications satellites for a long time, but recently we've seen the arrival of electronic propulsion technology to reduce the mass. Now, there is a lot of buzz around constellations. How many will survive through to realisation?



"The Vega C is still planned for its maiden flight in 2019, and we're already selling the launches to customers. The programme is running well. The Vega C will have an increased performance with respect to Vega, just slightly below twice the performance in fact, for nearly the same price."

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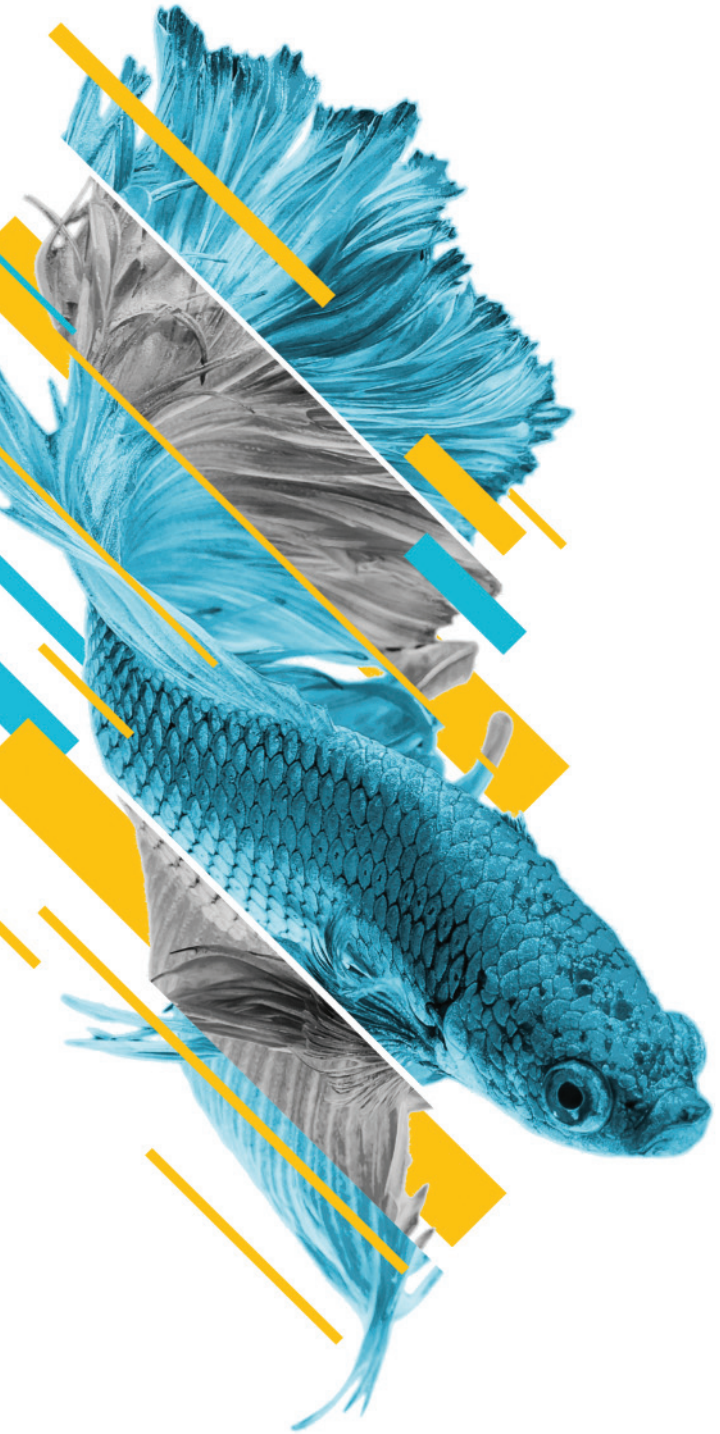

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We've launched the O3b constellation, and next year we'll be starting to launch OneWeb, and there's a lot of other constellation projects out there. It's very interesting to see that move from classical satellites towards constellations; we've got Intelsat and OneWeb, O3b and SES, SKY Perfect JSAT and Least. We see that, going forwards, there will be a mixed architecture global service provided by satellites operating in MEO, LEO and GEO.

Question: Will Arianespace be able to remain competitive in a rapidly-changing market, particularly without having any reusable launch vehicles?

Jacques Breton: I think so. When the Russians arrived on the market 20 years ago, we were told we were going to disappear, as we would not be able to withstand the competition. Then, 15 years ago, we were told the same when the Chinese came onto the market. Just like back then, we have been able to cope with the arrival of SpaceX, even though they were very well received and lowered their prices on the commercial market.

The competition really pushes us to improve our service and implement a competitiveness plan, and also reduce our prices. We're not the cheapest on the market and we never have been, nevertheless, based on our quality of service and reliability, we are launching all the time. We've been able to keep about 50 percent of the market share thanks to our outstanding reliability. In June, on Ariane 5, for example, we launched a customer who originally went to SpaceX for a low-cost launch, and finally came back to us saying that they really wanted their satellite to be launched rapidly and on time. This is the situation today.

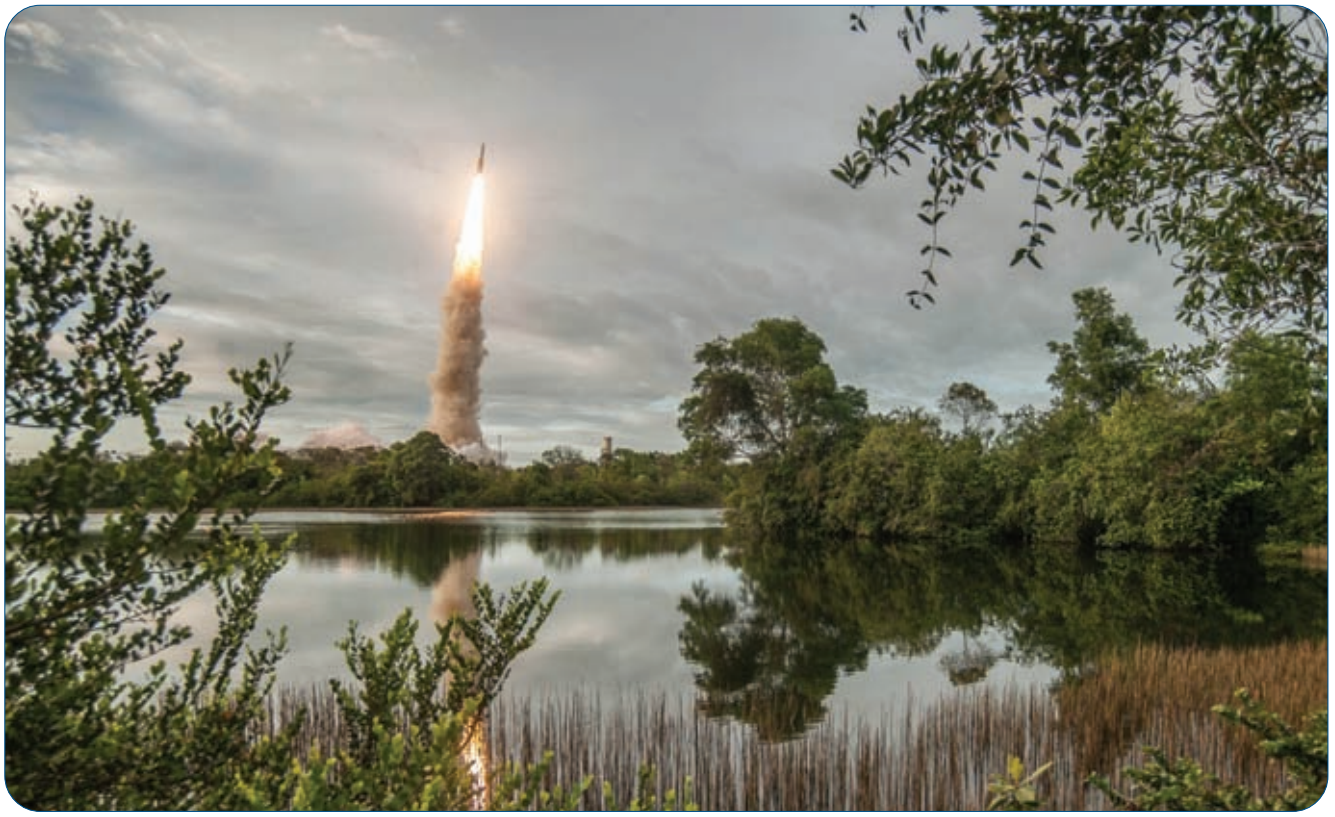
Reusability is big news today. SpaceX is moving towards reusability because they're looking at a huge number of launches each year, because they have this market in the US that we don't have, and because they intend to launch a constellation with thousands of satellites. For them, reusability is a must just to keep up. Our launch rate is more modest, and when you have such a launch rate, reusability might not be economically interesting, because when you want to reuse a stage, you need to use propellant to bring it back and you need built-in landing capabilities and so on, which means using mass that is not useful for the initial launch.

The direction we chose was to develop Ariane 6, which is a simpler launch vehicle compared to Ariane 5; it's simpler to design and to build, and therefore, less costly. We think that with Ariane 6, we'll be able to stay competitive on the market, while retaining our reliability and quality of service. Of course, we have technical activities running in parallel to look at future reusability; we're looking at the building blocks for evolution, looking at a new engine using liquid oxygen, but this will come after Ariane 6.

Question: What do you expect Arianespace to achieve in the near future?

Jacques Breton: We will continue to perform operationally as we do, we will maintain our reliability, and we will continue to launch on time as soon as the satellites are ready. We had some difficulties not long ago in French Guiana, and we've been able to recover from that very rapidly.

We're in a weak year in terms of orders, as a lot of customers are considering the best solution for the market right now; classic satellites, HTS, constellations? They're taking more time to decide and analyse the market, and delaying their investment decisions. I hope the second half of the year will be better than the first half. Competition is going to be fierce. ■



Vega lifts-off. Photo courtesy of Arianespace

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