

## Lighter engines a headache for satellite launcher Ariane

February 18 2014, by Patrick Rahir



This handout picture taken on August 29, 2013, in Kourou, in the French overseas department of Guiana, shows the Ariane 5 rocket, during its lift-off

Arianespace rockets excel at lifting the heaviest payloads into space, but a new technology allowing for lighter satellites is causing another big bang for an already fast-changing industry.



The number one commercial launch operator, Arianespace is under intense pressure from a new slate of lower-priced rivals, including US start-up Space X.

But now lighter-load electric propulsion used by satellites once in <u>space</u> is also attacking the company's hold on the business.

Also known as ion or plasma engines, in 2012 US aerospace giant Boeing was the first to commercially offer a <u>satellite</u> engine that uses electricity from solar panels for thrust.

Most satellite makers followed suit in 2013.

While the thrust is weaker than chemical propelled engines, thus taking months instead of weeks to move a satellite after its launch to its final orbit, it uses much less propellant.

This can cut a satellite's launch weight by half, allowing it to be lifted by less powerful rockets, thus lowering costs and creating an opportunity for rivals.

To counter the threat by upstart Space X and other new competitors from India and Japan, the 20 nations that are part of the European Space Agency decided in November 2012 to develop a more powerful launcher and start studies on a second one.

The first is an update of their heavy-lift rocket, the Ariane 5, and should come on line by 2018.

The Ariane 5 ME, for midlife evolution, would increase the lift capacity of what is already the biggest commercial rocket to just over 11 tonnes from 10 tonnes.



Simultaneously, at the insistence of France, they began planning for a sleeker Ariane 6 to be ready around 2020 that would be capable of launching 6 tonnes.

In order to be profitable, the Ariane 5 series must carry two heavy satellites, which can entail delays.

By cutting launch costs, the Ariane 6 makes single satellite launches financially possibile.

## Either-or, not both

But France's position has changed and is causing divisions with its ESA partners.

A report by France's national auditor released last week disclosed that Paris now wants to drop the Ariane 5 ME to keep down development costs and push forward with Ariane 6.

The alternative option of "pursuing the two programmes, according to a calendar still to be worked out ... risks a delay to Ariane 6 to a later date—towards 2025," the auditor said.

Continuing with the Ariane 5 ME is clearly the preference of Berlin, France's top partner in the ESA.

"The German position is that we should continue with the Ariane 5 ME to get it onto the market as quick as possible and reflect on what the future launcher should be," the head of Germany's DLR space agency, Johann-Dietrich Woerner, told AFP.

"It won't be possible to finance both programmes 100 percent at the same time. We still need to decide if we move forward with Ariane 6,"



he said.

While the necessity of launching two satellites is a constraint, it also reduces fixed costs, he said.

Arianespace itself feels the Ariane 5 ME is well adapted for electric propulsion satellites, the first of which Space X is scheduled to launch at the end of this year.

After conducting a market study about electronic propulsion satellites, Arianespace believes "there will be a lot of small and medium-sized satellites, and no longer the domination of big satellites that we have seen these last years," said chief executive Stephane Israel.

With a capacity to lift a payload of more than 11 tonnes, the Ariane 5 ME will prove advantageous in that it can lift multiple satellites.

"You can even put three satellites in an ME, a big one and two small ones," Israel told AFP.

And Ariane 6, also powerful enough to lift two <u>small satellites</u>, will provide an "ultra-competitive" launch offer for customers, he said.

But the question remains whether a market exists for Ariane 6 in its current form.

And if smaller satellites prevail, it will also find itself with the same disadvantage as Ariane 5 of launching in pairs.

And it will be too big for medium-sized satellites, according to France's national auditor, which will be better served by the Russian Soyuz rockets used by Arianespace for that segment.



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