Rocket Report: A huge step back for Stratolaunch, a toppling Starship

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Welcome to Edition 1.34 of the Rocket Report! It’s a sad week for new space, as just three months after the passing of Paul Allen—who shared the vision of low-cost access to space—Stratolaunch has abandoned its plans to build a line of rockets for its large aircraft. In somewhat happier news, both Virgin Galactic and Blue Origin appear to be getting closer to commercial space tourism.

As always, we welcome reader submissions, and if you don’t want to miss an issue, please subscribe using the box below (the form will not appear on AMP-enabled versions of the site). Each report will include information on small-, medium-, and heavy-lift rockets as well as a quick look ahead at the next three launches on the calendar.

Stratolaunch abandons rocket development. After it had already completed successful tests of a pre-burner, Stratolaunch will discontinue its programs to develop a new type of rocket

engine and a new line of rockets, Geek Wire reports. “Stratolaunch is ending the development of [its] family of launch vehicles and rocket engine. We are streamlining operations [and] focusing on the aircraft and our ability to support a demonstration launch of the Northrop Grumman Pegasus XL air-launch vehicle,” the company said.

A rather stunning turn of events … This development comes just three months after founder Paul Allen’s death. The company says its huge, 385-foot-wide aircraft will still make its first test flights this year and that Stratolaunch will press ahead with air-launching the Pegasus rocket. But it is almost impossible for us to see how this becomes a commercially competitive alternative to existing or under-development small-satellite launchers. This was a sad day for new space. (submitted by Unrulycow and Ken the Bin)

Commercial flights for Virgin could begin in mid-2019. In an interview on *CBS This Morning*, Virgin Galactic founder Richard Branson said, “I will hope to go up in the middle of this year myself… We’ve got another test flight in a handful of weeks taking place from Mojave, then we’ll have another one a few weeks later, then another one. And then, we move everything to New Mexico, where we have a beautiful spaceport.”

No official word from the company yet … Virgin Galactic executives have been more circumspect about the number of test flights and their schedule, *SpaceNews* reports. George Whitesides, chief executive of Virgin Galactic, said after last month’s test flight only that “not a huge number” of test flights are planned before beginning commercial operations at Spaceport America in New Mexico. (submitted by Ken the Bin)

Shutdown holding up small launch companies. The partial government shutdown is hindering activities of a number of companies and organizations that work with, need information from, or require approvals from affected federal agencies, including launch licenses, according to *SpaceNews*. Exos

Aerospace has already delayed a launch, and Vector and Rocket Lab are also concerned about future launch licenses due to shuttered regulatory agencies.

Electron's next launch … Rocket Lab must still get FAA approval for its next scheduled launch in late February. "We're hoping that the government will open up again soon," Peter Beck, Rocket Lab's chief, told the publication. "We need a new license for this launch, since we're going to an entirely new trajectory, and that always requires a new launch license." He added that DARPA was trying to assist in getting that license approved. (submitted by Unrulycow)

New Shepard flies for the first time in six months. The 10th flight of the launch system served a dual purpose. It provided additional test data for the launch system as Blue Origin moves closer to crewed flights, and the launch allowed the company to fly eight NASA-sponsored research and technology payloads into space through NASA's Flight Opportunities program.

Targeting end of year … During the webcast, Blue Origin's head of sales, Ariane Cornell, said the company was "aiming" to conduct human flights onboard New Shepard before the end of 2019, but she also stressed that Blue Origin would not compromise on safety to meet any arbitrary dates. The booster to be used for the first human test has already been shipped to the West Texas launch site, but the crew-carrying capsule remains in Washington.

SpinLaunch signs deal with Spaceport America. Spaceport America has announced that SpinLaunch has signed a lease to conduct tests at the facility in southern New Mexico and that the company will invest up to $7 million in facilities there, Parabolic Arc reports. The company considered several locations for the test site, but the New Mexico-based site provided the best mix of affordability and location.

A novel approach … SpinLaunch is developing a kinetic-energy launch system that would spin in a circle at up to 5,000 miles per hour before it is released to fly to space. The system would not use any propellants, and the company has reportedly raised $40 million in venture-capital funding. We're intrigued but will remain skeptical until we see some test flights. (submitted by Ken the Bin)

Next ISS crew launch may slip. This year's first crewed launch of the Soyuz vehicle may be postponed to early April, Roscosmos chief Dmitry Rogozin has said, according to TASS. This launch was originally scheduled for March 1. Rogozin said Russia is working with NASA to set an appropriate date for the launch of Nick Hague, Christina Koch, and Aleksey Ovchinin.

A scheduling issue … The delay stems partly from Russia's desire to fly an astronaut from the United Arab Emirates named Hazza Al Mansouri later this year. He is to potentially return on this vehicle, and Roscosmos is seeking to balance out the stays of the NASA astronauts on the station. There appear to be no technical issues with the Soyuz rocket and spacecraft for this mission, however.

Ariane 6 contract held up. European launch provider Arianespace says that, in order to sign a manufacturing contract for the first 14 next-generation Ariane 6 rockets, it first needs European governmental organizations to buy at least four more Ariane 6 missions for the 2020 to 2023 period, *SpaceNews* reports. The company had anticipated signing a manufacturing contract with ArianeGroup in the second part of 2018 to begin production beyond the first rocket.

Not a great sign … "We are confident it will happen," said CEO Stéphane Israël of the remaining government missions. "But it is not done yet. We are working in this direction. It is now

quite urgent because industry has anticipated the manufacturing of these first launchers, but now we need these institutional contracts to fully contractualize the first Ariane 6s." Needless to say, this is not a great situation for a new booster to find itself in. If European countries are balking at flying on the Ariane 6, what will commercial customers do? (submitted by Ken the Bin)

Russian chief criticized for commercial launch decline. The prime minister of Russia, Dmitry Medvedev, told Roscosmos head Dmitry Rogozin on Wednesday to talk less and work more. Part of the criticism stemmed from Russia's declining commercial launch industry. "We must not forget that spaceflight is a huge marketplace where real competition exists, so we need to work seriously in order to remain in the market," Medvedev said. "Our rocket and space industry can and must become a commercial success in today's conditions. We are, for the time being, far from it."

From the top to number three … As recently as 2015, Russia was the clear leader in global space launches. But since then, both China and the United States, with its burgeoning commercial industry, pulled even. The situation worsened in 2018, when Russia launched just 20 orbital rockets. In doing so, Russia fell to a distant third place behind China (39 launches) and the United States (27).

Starship toppled by high winds, tests delayed. "SpaceX's Starship Hopper prototype, recently completed at the Boca Chica launch site and awaiting test flights, was toppled by strong winds associated with a cold front that blew through the Rio Grande Valley Tuesday night and early Wednesday morning. The upper section of the rocket sustained heavy damage after being blown over," *The Brownsville Herald*

reported.

A short delay … On Twitter, SpaceX founder Elon Musk said the damage would necessitate a few weeks of repairs. The company has been building the test vehicle in an open-air pavilion at its South Texas launch site. It is not exactly rare for strong winter cold fronts to bring wind gusts of about 50mph, which the Brownsville area experienced this week. (submitted by Ken the Bin)

Angara launchpads delayed up to two years. The next phase of Russia's new Vostochny launch complex was to include a new pad for the large Angara rocket. The Angara-5M booster, intended to replace the Proton rocket, needs facilities to process large commercial satellites in order to compete with other large rockets. Russia had hoped to complete these facilities by 2021, but that will not be possible, Russian Space Web reports.

No earlier than 2023 … "Let's not have any illusions; nobody will be able to build (the Angara pad) by 2021," said Deputy Prime Minister Yuri Borisov, who oversees space and defense. "Today, due to the juggling of prime contractors, the deadline is beyond 2021. But it (has to be) no later than 2023, because otherwise, it would be de-synchronized with the development of the rocket, which would be ready but no place to launch from." Needless to say, the Angara-5M will be entering a crowded competition in 2023 for launchers.

What is up with the Delta IV Heavy rocket fireball? With clear skies and an up-close view, the fireball that briefly engulfs the lower part of the Delta IV Heavy's three boosters was plainly visible just before Saturday's launch of the NROL-71 mission from Vandenberg Air Force Base.

So what gives? … The fireball phenomenon manifests on the Delta IV Heavy rocket not just because of design differences between the RS-68 and the Shuttle main engines but also

because the RS-68 fuel valve is open longer before the oxidizer starts flowing. Essentially, at engine startup, only liquid hydrogen is running through the engine, because it is less chemically active than oxygen. This hydrogen flows out of the engine, and because hydrogen is very light compared to ambient air, it rises up the outside of the rocket. When the liquid oxygen flow begins, the hydrogen is ignited into a fireball. It offers a rather arresting view.

Next three launches

Feb. 5: Ariane 5 | HellasSat 4/SaudiGeoSat 1 and GSAT-11 | Kourou, French Guiana | 21:01 UTC

Feb. 16: Falcon 9 | Demo-1 mission | Kennedy Space Center, Florida | 13:15 UTC

Feb. 21: Soyuz | EgyptSat-A | Baikonur, Kazakhstan | 16:47 UTC

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