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Angara Launch Troubles Reflect Russia's Struggling Space Industry

By Matthew Bodner

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The history of the Angara rocket, which has spent nearly 20 years in development, in many ways reflects the troubles of the Russian space industry since 1991.

Russia's new Angara rocket will not fly any time soon, as engineers continue to work on making sure the vehicle is in full working order following Friday's aborted launch, Deputy Prime Minister Dmitry Rogozin said Tuesday.

"The next launch will not, of course, be in the coming days. I think that it will take weeks before the Angara booster will be returned to the launch complex," Rogozin told journalists touring the construction site of Russia's Vostochny Cosmodrome, which will be the rocket's main launch site once it is finished in 2017.

Russia's reputation as a big-hitter in the sphere of technology rests on the fate of Angara — the first new rocket designed by the Russian space industry in more than 20 years.

To highlight the rocket's importance, the media was gathered en masse for Friday's attempt — breaking a decades-long tradition of testing new rockets out of the public eye.

A few minutes before Angara was schedule to take off, the state-run Rossia 24 television channel cut to a command center located somewhere in the Kremlin. The room was occupied by a single man who was watching the launch from afar — President Vladimir Putin.

When Angara's computer's detected a drop in oxidizer pressure — forcing the launch to be aborted just 19 seconds before liftoff — Putin consoled Defense Minister Sergei Shoigu and gave permission and ordered space officials to take their time to ensure the vehicle is truly ready for launch.

> A lone man in a big room watching #Angara's aborted launch attempt! Guess who? pic.twitter.com/aUG6OTeXno
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> — Anatoly Zak (@RussianSpaceWeb) 27 июня 2014

Putin watching the aborted Angara launch from a control room in the Kremlin on Friday.

However, in the wake of Friday's failure, official statements from Russian space and government officials concerning its causes have been scant, and Saturday passed without a second launch attempt being made.

Unidentified industry sources have said that a valve used to vent excess pressure from the liquid oxygen tank was "poorly sealed," hence the botched launch.

NPO Energomash, the maker of the Angara's RD-191 engine, passed the buck on Tuesday, saying in a statement that the liquid oxygen tank, which feeds oxidizer into the engine, is not part of their design.

Rogozin, who oversees the Russian space and defense industries, broke the official silence on Tuesday, telling the Angara project's detractors that they need to gain some perspective: "It has new engines, a new control system, and therefore it needs testing to polish it all off. It is necessary not to rush the work. It is not worth the risk. This rocket has been a long time in the making. She will fly, of course, but [we must] allow testing to be carried out. The launch was delayed as a failure was detected. The failure was detected by the system itself."

An unidentified space industry official said Tuesday that not even the chief designer knows when the new launch date will be, Interfax reported. The official went on to lambast the "technically illiterate" Russian media for using the incident as an excuse to once again decry the death of Russian space exploration — a favorite pastime of Russian space industry commentators since 1991.

Yury Karash, a space policy expert at the Russian Academy of Cosmonautics, told The Moscow Times on Tuesday that Angara's launch delays should not be overly dramatized, since everything about Angara is new and that "too much is at stake with this launch" to rush

the process.

"[Angara] is supposed to replace the venerable, quite robust, but also quite poisonous Proton launch vehicle. Fifty years ago, when it was designed and put into service ... people didn't really care about the environment. Now they do," Karash said.

The Federal Space Agency, or Roscosmos, launches the Proton rocket from the Baikonur Cosmodrome in Kazakhstan. The poisonous fuel used by the rocket has been a source of tension between Moscow and Almaty, as a recent string of Proton launch failures since 2010 has polluted the Kazakh countryside.

But environmentally conscious rocketry is not the only reason that Angara is an important project for Russia.

Make or Break

The history of the Angara rocket, which has spent nearly 20 years in development, in many ways reflects the troubles of the Russian space industry since 1991. Unsteady funding, industrial decay and a brain drain have forced the industry to temper its ambitions instead of acting as the driving force of innovation in the field.

Angara hit the drawing boards in 1995 as an ambitious, partially reusable family of rockets that can take light, medium and heavy payloads into orbit. The plan envisioned giving the Angara wings that would allow it to fly back to the cosmodrome like an airplane once it had used up most of its fuel. It would then be serviced and reused for later flights.

Reusability is the holy grail for a space industry that has only survived by learning to be frugal. Even so, it was clear by 2000 that the "flyback booster" idea was simply untenable, and the Khrunichev Space Center, which builds the Angara and Proton rockets, opted to roll back to a classic booster design — a missile.

Even in its more modest form, Angara quickly became a vital project for the Russian space industry.

"With the successful launch of Angara, Russia will prove that it may not just endlessly operate old Soviet technology, but can design and develop its own technology — Russian technology — and successfully put it in service," said Karash.

Furthermore, the heavy version of Angara, which one space industry source recently said would be tested by the end of December, is Russia's only hope of keeping up with the U.S. and Chinese space programs, as both nations are developing heavy boosters.

"I think that Russia has no choice [but to develop the Angara heavy] if it really wants to go beyond low Earth orbit or into deep space. And I am talking not only about launching automatic spacecraft beyond the Moon's orbit, but about human space exploration. If Russia is serious about this, it has no choice but to develop the Angara heavy rocket," Karash said.

Commercial Competition

Proton rockets generated huge sums of money in the 1990s, when Russia flooded the market

with launch services for commercial satellites.

Today, Proton launches are sold by International Launch Services, a Virginia-based subsidiary of the Khrunichev Space Center.

Rachel Villain, a space industry analyst with Euroconsult, said in an e-mail that International Launch Services has sold 30 percent of the global satellite launches over the past decade. In total, companies selling launches of Russian rockets bring in $800 million to $1 billion annually, making commercial applications an important revenue source for Russian space companies.

The version of Angara that was set to fly on Friday, the Angara 1.2PP, is a medium class booster that will replace the Soyuz and Proton rockets for commercial and government satellite launches, said Pavel Luzin, a space policy expert at the Institute of World Economics and International Relations.

"There are now serious questions about how Angara can be commercially viable," Luzin said, as production of the Proton rocket is set to be phased out.

"When Proton was commercialized in the early 1990s, no one thought about the cost of its development — this was not possible with technology created in the U.S.S.R.," said Luzin. Instead, the only concern was the cost of producing each vehicle — the development work had been done long ago.

It is not clear how much has been spent on the research and development work for Angara. "I tried some time ago to calculate how much the development has cost over the past 30 years, but I couldn't do it — there isn't enough public information," Luzin said.

According to Luzin, it is clear that even if Angara rockets are produced at the same rate as Proton rockets, regardless of development costs, they will be more expensive than Proton. This raises questions about the viability of its commercial role, as the past few years have seen the emergence of new commercial launch providers such as the California-based SpaceX, a development that has driven down launch costs.

See also:

Angara Rocket Launch Postponed Again

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