

# RD-180—OR BUST?

By Autumn A. Arnett, Associate Editor

**T**he United States' sustained access to space is in question. Heavily reliant on the Russian-made Engeromash RD-180 engine to power its launches, US military space personnel are looking for a replacement because of the tense and uncertain status of American and Russian relations.

Funds are already being appropriated for research and development of a new engine, but Gen. John E. Hyten, commander of Air Force Space Command, considers the issue to be urgent. He told reporters at the Air Force Association's Air & Space Conference in National Harbor, Md., in September that he'd like to have a US alternative to the RD-180 "yesterday."

"Every time I look at [the Atlas V], it's the most beautiful rocket that I've ever seen. It's gorgeous. Then as it lifts ... I look and I see a Russian engine on the bottom," he said. "And it just doesn't seem right. I would prefer that there not be a Russian engine on the bottom of it, but there is."

But how does the Air Force replace the Russian engine that propels the Atlas V?

There is not yet an answer, Hyten said. A wide range of experts—from the Air Force to industry—is looking for solutions. "We don't know how the restrictions are going to come out. We don't know how the relationship with Russia's going to come out. So we're looking at everything, [including] potentially moving satellites from Atlas to Delta."

One recent development in which Hyten sees potential is the recently announced partnership between United Launch Alliance and Blue Origin to develop the BE-4, a liquid oxygen/liquefied natural gas-powered engine many are hoping will replace the RD-180.

Blue Origin, headed by Amazon.com founder Jeff Bezos, has been working on research and development and risk analysis for three years. Hyten admits

he doesn't really know what that R&D amounts to, but said he is hopeful the partnership will mean a new engine on the market soon.

"Three years of development is better than starting at ground zero," Hyten said.

"If we start at ground zero to build a new engine in the hydrocarbon technology area we're five years away from production, roughly, maybe four, maybe six. The one thing you would have to do is spend the next year or two driving down the technology risk so you can actually build that."

The space chief went on to say the possibility of a natural gas-powered engine is exciting, primarily because of the "ease of acquiring, supporting, and operating" the new technology, in addition to the potential propulsion capabilities.

"That kind of technology has been exciting to me personally for a long time. ... Nobody's been able to make it real yet, not at the scale they're looking at."

Another group, Aerojet Rocketdyne and Dynetics, is engaged in a risk reduction program with NASA and would also vie for eventual launch contracts.

William A. LaPlante, assistant secretary of the Air Force for acquisition, said the field is wide open. Calling the matter of deciding on a new engine type "the \$64 million question," LaPlante said, "We deliberately kept it not restricted to a certain engine type. We'll look at solids, look at liquid hydrogen, we'll look at [liquid-oxygen]/hydrocarbon."

LaPlante said the Pentagon is operating on an "accelerated acquisition strategy" to find an engine replacement, but that looking ahead to Fiscal 2015, he would like to have established, at minimum, a plan for risk mitigation and an actual acquisition strategy. "I think one way or the other, in about a year from now, we're going to need to have in place this strategy ... so it's a pretty rapid thing that we have to do."

As it stands, the US could sustain its manifest for two years with the current supply of RD-180 engines. But a new engine could take seven or more years to be operational, making LaPlante's "\$64 million question" a "hydra-headed monster," in the words of former AFSPC Commander Gen. William L. Shelton.

"I don't think we build the world's best rocket engine," Shelton said last July. "I would love for us as a nation to regain the lead in liquid rocket propulsion."

Both LaPlante and Hyten are proponents of the United States continuing to fund research and development of a new engine type, regardless of the relationship with Russia.

"The United States should lead the world in every engine technology there is," said Hyten, who said he believes the US has achieved this in both solid and liquid-oxygen/hydrogen engine types. "But in hydrocarbon technology, the Russians have the best engine in the world. I think that we ought to have the best engine in the world, so I think we ought to have a technology program that looks into that and builds an engine to do that," he said.

LaPlante said there could be policy implications of moving forward with production of another engine, given that the delivery of the RD-180s has not been interrupted. Still, "before we even get to that point, we have to see what we can do" to assure access to space. 

**A gas generator for Aerojet Rocketdyne and Dynetics is tested at NASA's Marshall Space Flight Center, Huntsville, Ala.**

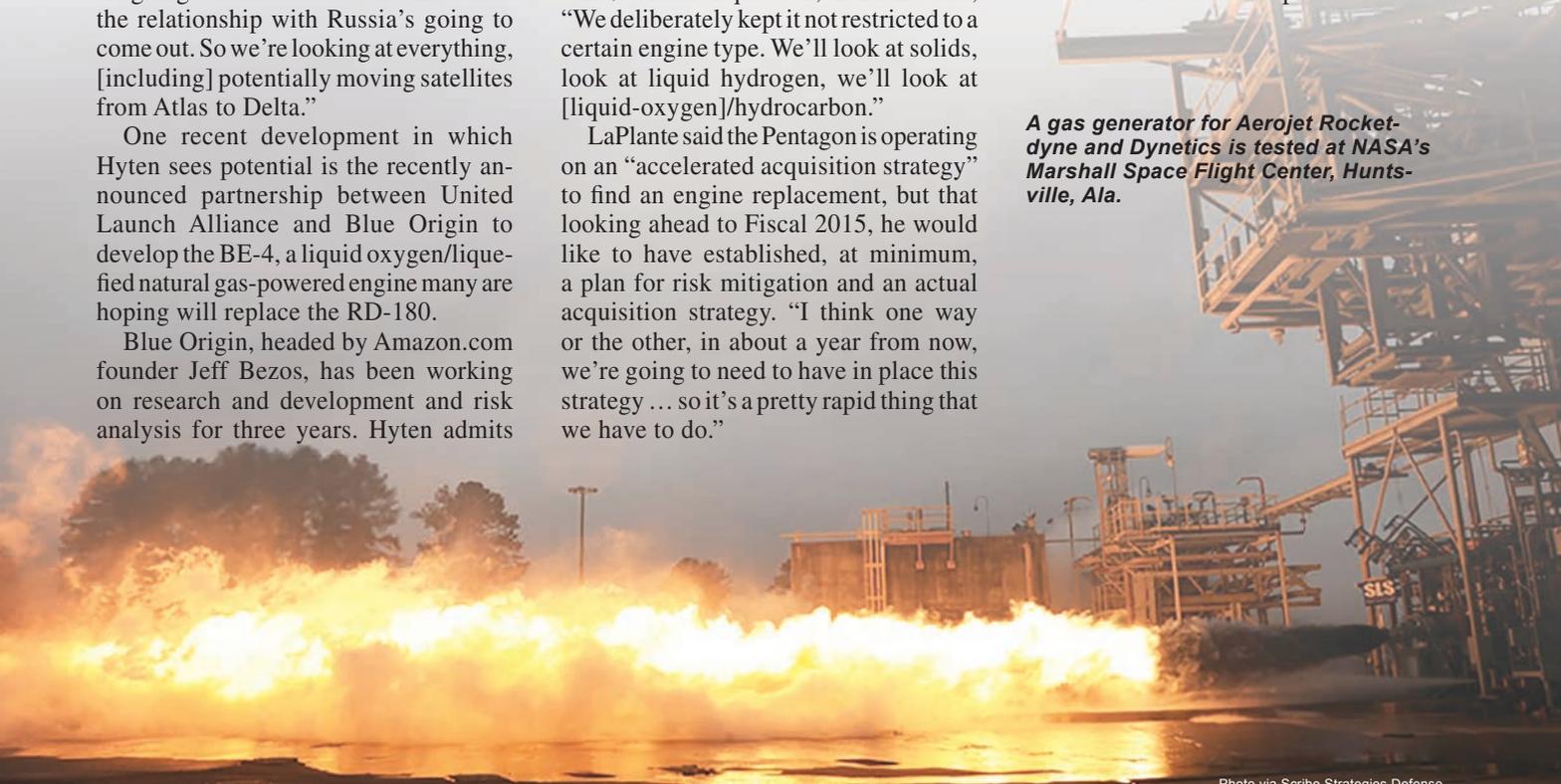


Photo via Scribe Strategies Defense