The president’s NASA budget slashes programs and cancels a powerful rocket upgrade

The president’s budget request for NASA maintains the administration’s focus on sending astronauts back to the Moon within the next decade, and it gives the space agency $21 billion for fiscal year 2020. But while that top-line budget is a slight increase from what the president requested for NASA last year, it’s ultimately a decrease from the $21.5 billion the agency actually received in 2019.

Despite that, NASA is touting the request as good for the agency, claiming it’s on target to send humans to the Moon by 2028. “I am very happy to tell you that NASA’s budget request from the president of United States is strong,” NASA administrator Jim Bridenstine said during a speech today. “And we have strong bipartisan support and both chambers of Congress.”

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The request is short on details. However, the White House’s request contains a few major changes that could have significant impacts on how NASA crafts its lunar return in the years ahead and how the commercial space industry will be involved in the process. Here are the biggest takeaways from the request below:

Space Launch System

Perhaps the biggest change the request would make revolves around NASA’s Space Launch System, or SLS, a massive new vehicle that’s meant to take people to the Moon in the 2020s. The request effectively cancels the development of a more

powerful version of the SLS. If the proposal is approved by Congress, that means NASA would focus on building a less powerful version of the rocket. It’s a decision that could bolster critics of the SLS who argue that commercial rockets could be a better option than the delayed and over budget NASA rocket.

For the last decade, NASA has been developing the SLS along with a crewed capsule called Orion, that would, together, send astronauts into deep space. The space agency planned to create two versions of the SLS rocket: the Block 1 and the Block 1B. The Block 1, which is supposed to make its first flight in the early 2020s, will be a beast of a rocket, capable of taking 209,000 pounds (95 metric tons) into low Earth orbit. That’s more than any current rocket can provide.

NASA’s design for the different SLS blocks.
Image: NASA

However, the Block 1B would take things up a notch. That version of the SLS calls for the rocket to have a powerful upper half, known as the Exploration Upper Stage, or EUS. If built as designed, that upper stage would allow the SLS to put 287,000 pounds (130 metric tons) into low Earth orbit, which is way higher than the capability of the Saturn V rocket that sent the Apollo astronauts to the Moon. NASA touted the Block 1B as a rocket that could carry a significant amount of cargo as well as crews at the same time.

It was this impressive capability that supporters of the SLS often touted. During a roundtable with journalists last summer, Bridenstine espoused the need for the SLS, arguing that no other commercial rocket could deliver what the future Block 1B SLS would. “There are some areas where we don’t have a mature commercial capability yet, and if that’s the case, it’s my view that NASA needs to provide the government

backbone to get us where we need to go," Bridenstine said during the roundtable. "So when it comes to deep space exploration … that's a capability right now that nobody else has. And so we want to deliver it."

"We need the SLS, and we need the Orion crew capsule."
But the administration now wants to defer funding this upgrade until the late 2020s so that NASA can solely focus on the Block 1. That way, the agency can ensure that the vehicle is reliable and able to fly at least once a year. However, the Block 1 isn't *that* much more capable than other vehicles that are currently available or those that are currently in development. SpaceX's Falcon Heavy rocket, which flew for the first time last year, is able to put 140,700 pounds (63.8 metric tons) into low Earth orbit. Blue Origin's New Glenn, which is supposed to fly in the years ahead, will supposedly be capable of putting 99,000 pounds (45 metric tons) into the same region of space. Neither are as capable as the SLS, but they aren't that far behind.

The Block 1B's capability was the biggest argument *for* the SLS, considering that the rocket has been consistently delayed and over budget. Originally, the SLS was supposed to fly for the first time as early as 2017, but its first test flight has been pushed back to 2020. And even that date is no longer certain. NASA officials say they are now "reassessing" that launch date, according to *Space News*, and even today's budget request says that the SLS will launch for the first time in the early 2020s. Additionally, the SLS is estimated to cost about $1 billion a year to operate when it is finished. That's about $1 billion per launch, since the rocket is slated to fly only once a year. Compared to the Falcon Heavy, which starts at $90 million, it's a bit steep.

However, Bridenstine doesn't see it that way, maintaining that there is still a place for the giant, expensive rocket at NASA. "We need the SLS, and we need the Orion crew capsule," he said in his speech today.

Going commercial

There are a lot of opportunities and potential contracts to be awarded in the years ahead, especially for any companies looking to capitalize on NASA's plans to return to the Moon.

As part of its human spaceflight initiatives, NASA wants to build a space station in orbit around the Moon called the Gateway, which would serve as a waypoint for astronauts who are traveling to and from the lunar surface. Similar to the construction of the International Space Station, NASA hopes to build the Gateway in pieces by launching one module up at a time and connecting them together. NASA is aiming to launch the first piece of the Gateway containing the solar panels and propulsion on a commercial vehicle. But the rest of the pieces didn't have designated rockets just yet.

An artistic rendering of NASA's proposed Gateway space station.
Image: NASA

The administration is clarifying that it wants the commercial space industry to do a lot of that heavy lifting. The request notes that pieces of the Gateway, which will be provided by various international partners, should be "launched on competitively procured vehicles," while astronaut crews will launch on the SLS inside the Orion crew capsule. Thanks to the SLS's high cost, that means that the SLS would really only be reserved for human spaceflight missions.

Meanwhile, the administration says it supports NASA's plans to have commercial space companies compete to build large lunar landers that are capable of taking humans to the lunar surface. And the administration also wants NASA's mission to Jupiter's moon Europa to launch on a commercial vehicle. In 2015, Congress mandated that this mission, called Europa

Clipper, must launch on the SLS, but the administration says using a commercial rocket "would save over $700 million, allowing multiple new activities to be funded across the agency." The administration has tried to eliminate the SLS mandate before, but it has been unsuccessful.

Cancellations and cuts

With this request, NASA's usual targets are facing cancellation. Once again, the administration is proposing to cut NASA's WFIRST mission, which would send a giant telescope into space to search of planets outside our Solar System and dark energy. The administration called for its cancellation last year, though Congress ultimately saved the project with the budget for 2019. Now, the request wants to zero it out again, arguing that NASA needs to focus on completing the James Webb Space Telescope – another giant space observatory that was supposed to launch this year but has been delayed and over budget.

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The request also calls for the cancellation of NASA's Office of STEM Engagement, which spearheads the agency's education outreach initiatives. This has been a target of the president's budget request for the last two years, a decision that has been heavily criticized. And the budget wants to cancel two Earth science missions, PACE and CLARREO-Pathfinder, which were also up for cancellation previous requests.

Meanwhile, most of NASA's programs would receive less than they got for fiscal year 2019. Both SLS and Orion would receive cuts in funding, as would nearly all of the agency's science programs. If enacted, NASA would lose about $481 million from what it received for 2019 – a decrease of about 2.2 percent.

Of course, today's request isn't a done deal. This budget is

just the beginning of the nearly year-long discussion in Congress that will culminate in the final budget for NASA and other government agencies for fiscal year 2020. Congress has reversed many of the cuts and cancellations proposed by the administration in the last couple of years. So it remains to be seen how many of these changes survive the budget discussion process.

https://www.theverge.com/2019/3/11/18259747/nasa-trump-budget-request-fy-2020-sls-block-1b-europa