

To the moon? Or beyond?

White House to decide human spaceflight direction

By Ed Memi

Do we want to go to Mars, a nearby asteroid or back to the moon? Or none of them? These are some of the options that Norm Augustine, a former aerospace industry executive, and his panel of fellow space industry experts, former astronauts, ex-government officials and academics have been deliberating. For the past 90 days, Augustine's committee has conducted an official Review of U.S. Human Space Flight Plans, and its report could help decide the United States' future in space.

Top White House officials will make a decision soon that will affect some 3,500 Boeing Space Exploration employees in Texas, Florida, Alabama and California. Established as an independent review by President Barack Obama in May, the Augustine committee has held public meetings near three NASA centers that support human spaceflight, and last month it presented options for the future course of U.S. space policy. The review is set against some even larger challenges: NASA faces an estimated \$70 billion shortfall for its current plan to return humans to the moon by 2020.

Some of the options presented by the committee could change plans—already well under way—for the next generation of spacecraft to return humans to the moon and journey beyond. One of those is the Ares I rocket that will launch astronauts in their Apollo-like capsule, known as Orion. Boeing is under contract with NASA to produce the Ares I upper stage, or second stage, as well as the avionics, or “brains,” of the rocket.

“Whatever their direction, there will be business that Boeing can engage in and there may be an improvement over the business opportunities that we have today,” said Joy Bryant, Boeing vice president and program manager of the International Space Station. She

said the review is something Boeing employees should embrace as part of the U.S. democratic process as well as an opportunity to highlight the value of human spaceflight.

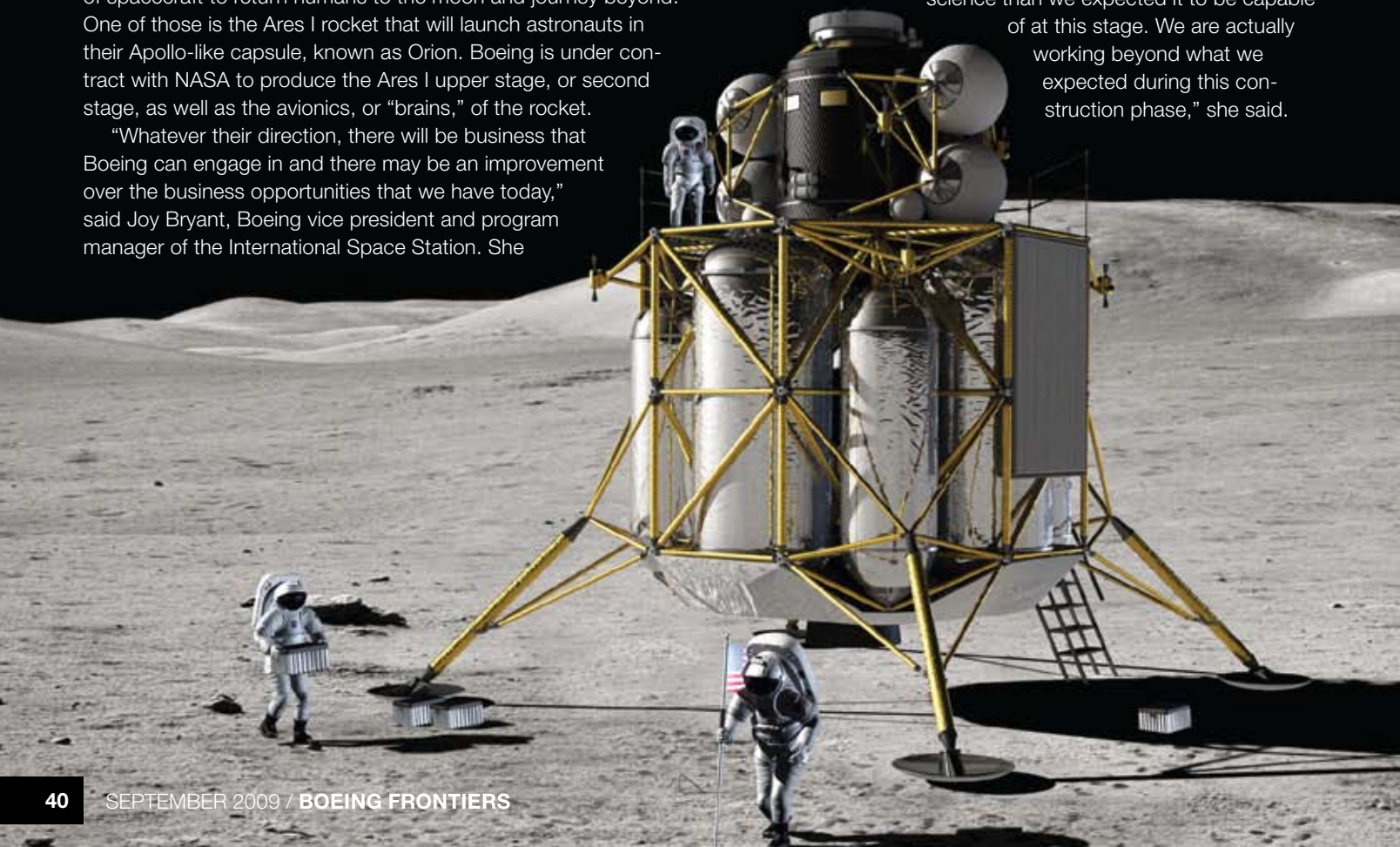
Bryant believes the investment in the station merits keeping it flying past 2016. Current plans call for the station to operate for just six years after its assembly is completed in 2010.

Boeing has just begun a space station life extension study for NASA that would take the station beyond 2016. The study is expected to take about a year to complete. “We built the space station with a certain amount of life and margin. We have to look at the structural integrity of the station and then look at whether it has been exposed to environments we did not expect,” Bryant said.

In addition to looking at the health of the structures and systems to extend the space station's life span to 2028, Bryant said, there is a need to evaluate the logistics chain that supports the station with replacement parts as they wear out and that re-supplies consumables such as oxygen, nitrogen, water and fuel.

The space station is a major engineering and operations success, according to Bryant. She believes that the current science being performed on station will yield significant results in the future. “The International Space Station is providing more

science than we expected it to be capable of at this stage. We are actually working beyond what we expected during this construction phase,” she said.



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— Keith Reiley, Boeing program manager, Altair lunar lander

NASA Administrator Charles Bolden has said the United States wants to go to Mars someday, but a mission to Mars is no easy feat. A crewed mission to the Red Planet is a challenge that will exercise technological capabilities.

“A lot of what we need to do for the lunar mission is applicable to potential Mars missions, such as launch capability, in-space transfers and using Orion for high-speed re-entry from a planetary trajectory. You have to get this capability whether you are going to the moon or Mars,” said Keith Reiley, Boeing’s program manager for the Altair lunar lander—the spacecraft that will actually land astronauts on the moon. NASA had plans to award an Altair design support contract to several companies. Boeing submitted its proposal in February,



but NASA put the contract awards on hold pending the outcome of the review.

Another key concern for future astronauts on a Mars mission is dangerous radiation. Storms of high-energy particles from the sun as well as cosmic rays from deep space could pose hazards. “Mars is a lot more difficult to reach than the moon because the trip will take a lot longer, it takes a lot more mass on orbit to accomplish and radiation protection is a big issue we will need to address.” Reiley said. “Mars has an atmosphere and is more like Earth than the moon is, but the moon is closer and a lot easier to get to.”

As a testbed for Mars, the moon provides the advantage of being only three or four days away. If there is trouble, help can arrive in less time than on the 180-day trip

to Mars. Unlike Mars, the moon has no atmosphere and little gravity, but it is a hostile environment just the same. It can be an ideal training ground for more ambitious journeys to other planets.

Likewise, the International Space Station has proven to be a good teacher about critical technology such as air revitalization and water recycling. Lessons learned on the space station can be applied to other planets. In addition, Boeing’s experience as the station’s prime contractor will be valuable when habitats and new systems are designed to sustain life on distant planets.

Regardless of whether the Obama administration’s decision is to go to the moon or Mars or someplace else, Reiley thinks NASA should be building an infrastructure that allows the nation to go beyond low Earth orbit, where the station and space shuttle currently operate. “I think going to the moon is a good thing, but it should not be our only focus. I am a big fan of opening up more commercial opportunities for businesses. There are a lot of options. We would be excited to work on any one of them with NASA.” ■

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GRAPHICS: (FAR LEFT) Astronauts work near the Altair lunar lander on the lunar surface in this NASA artist’s rendering. **NASA (ABOVE AND LEFT)** A Mars mission is depicted in this artist’s concept.

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