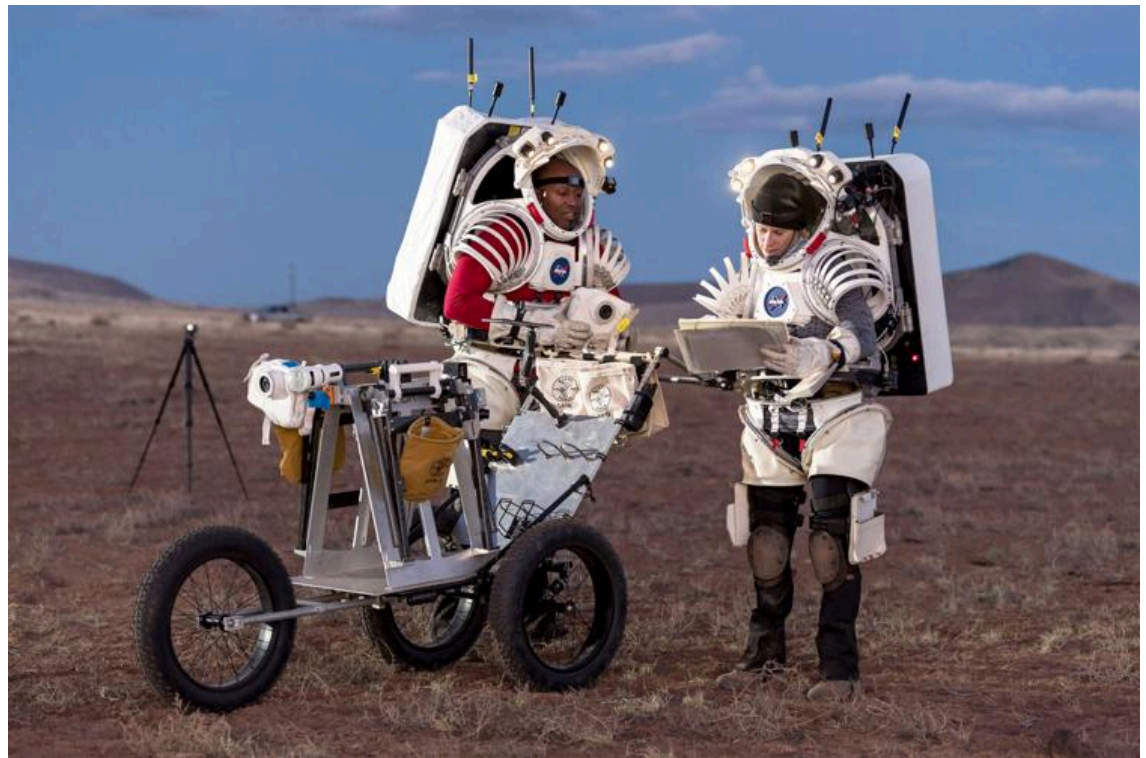


Rehearsal on the range: Astronauts train north of Flagstaff in mock missions

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NASA astronauts Andre Douglas, left, and Kate Rubins review procedures during a nighttime simulated moonwalk in the San Francisco Volcanic Field. NASA/Josh Valcarcel, courtesy

Northern Arizona took the role of the moon recently as the National Aeronautics and Space Administration (NASA) conducted field tests and a mock moon mission.

The effort comes as the space agency continues to prepare for its Artemis missions, which plan to return American boots to the moon for the first time since 1972, and lay the groundwork for future missions to Mars.

And just like the original Apollo missions, NASA is again using the volcanic landscapes of northern Arizona, specifically areas of Babbitt Ranches, to test equipment and the astronauts themselves.

“It’s one of the only times that I’ve seen us be able to do a full, end-to-end testing of our [mission]. So we started our lander, we stepped foot on the surface of the moon and we go do our full spacewalk, or our full EVA: collecting geology samples,

talking to Houston, talking to mission control, and working with the real tools and the suit simulators in the field,” astronaut Kate Rubins said. “We’ve had a ton of fun. We’ve gotten a lot of data, and we are definitely ready for our next steps in our next mission.”



Babbitt Ranches President Billy Cordasco, center, speaks with NASA astronauts Andre Douglas, left, and Kate Rubins, right, in front of a giant inflatable moon Saturday afternoon following a press conference at the USGS building in Flagstaff.
Jake Bacon, Arizona Daily Sun

Last weekend, the rooms of the U.S. Geological Survey were buzzing with activity as scientists and engineers with NASA’s Joint EVA and Human Surface Mobility Test Team (JETT) showed off equipment and spoke to the press about the mock mission.



Flagstaff Mayor Becky Daggett sits between Babbitt Ranches President Billy Cordasco and NASA astronauts Kate Rubins and Andre Douglas Saturday during a press conference at the USGS, where NASA scientists talked about training at Babbitt Ranches for the Artemis moon missions.

Jake Bacon, Arizona Daily Sun

“It’s events like this that really make me happy to be the mayor of Flagstaff, because this is so cool,” Mayor Becky Daggett said. “We’re thrilled to have NASA astronauts, engineers, technicians, and support crews back in Flagstaff training and testing equipment for the upcoming Artemis mission.”

As Rubins, astronaut Andre Douglas, mission manager Dave Cohen and the gathered crowd looked on, NASA exploration geologist Angela Garcia demonstrated the mock 95-pound suit the astronauts have been using during the tests, equipped with bags to collect rock samples.



A NASA exploration geologist Angela Garcia demonstrates a simulation of doing geology on the surface of the moon while wearing a simulated space suit during a NASA press conference Saturday afternoon at the USGS.

Jake Bacon, Arizona Daily Sun

Looking more like an exoskeleton than a real space suit, it is a far cry from the 300-pound suit that may be used on the moon. But given Earth's gravity, it is actually heavier than how the real one will feel. And it contains much of the technology they hope to test, including a live helmet feed to mission control back in Houston, a tool belt with sample bags and moon hammer, and navigational systems.

Testing methods such as their communications procedures and navigational systems is where the mock missions in Flagstaff can be really valuable, Cohen said.

“So that's what we're really out here testing, all those various systems, and putting it all together for this field test. It's one of the only places on the planet where you can really put this together,” he said. “We have a big team with us. Our team for JETT 5 is well over 100 people; only about half of us are here. We have our field team here really pulling out the moonwalk portion.”

Back in Houston, the other half of the team is acting as their flight control for the mission.

“We're interacting with them, so a big part of what we're testing is actually happening back in Houston,” Cohen said.

In addition to testing those systems, the mock mission also comes as the astronauts begin learning about geology in preparation for the Artemis missions.

That geology makes the areas around Flagstaff a good fit for their mock moon missions. The more than 600 volcanoes and cinder cones that make up the San Francisco Volcanic Field are a pretty good substitute for the craters of the moon, according to Douglas.



A curious cow watches as NASA astronauts Andre Douglas and Kate Rubins perform a simulated moonwalk in the San Francisco Volcanic Field on May 14.
NASA/Josh Valcarcel, courtesy

In addition to northern Arizona, Douglas said, they have also taken trips to New Mexico, and will likely visit Iceland as well.

During these field tests, Rubins said the importance of simply describing what they are seeing to their colleagues “on the ground” in Houston has become clear.

While Houston can see some things through the live video feed and through the photos they can take, Rubins said a lot of the data they will collect could come in the form of visual descriptions of the geology and landscape of the moon.

“For me, one of the really important pieces of that data that I didn’t know was totally clear before I came out here was how important our geologic descriptions are,” Rubins said. “So we’re walking along, and we’re kind of describing the landscape, and then maybe finding a sample and holding it up to the camera. But really the data that they’re getting is a lot from our description of what we’re seeing and what we’re getting in terms of the samples.”

And that’s the kind of lesson they simply wouldn’t have learned without conducting a field test in Flagstaff, Rubins said.

“It’s something that we can’t practice back at Johnson Space Center. We have an underwater pool where we have a little rock yard with some fake rocks in it. But you can’t give a real geology description of a lava flow coming out of a volcano and meeting some sedimentary rocks until you’re out here. So that’s one of the critical reasons that we’re out here in the field in a place like Flagstaff -- which has such interesting geology -- so we can train,” she said.



NASA astronaut Andre Douglas takes a picture of the lunar-like landscape during a simulated moonwalk in the San Francisco Volcanic Field on May 13.

NASA/Josh Valcarcel, courtesy

Long history and full future

Babbitt Ranches President Billy Cordasco said the conditions for NASA to use their land haven't changed much since his grandfather first gave NASA permission in the 1960s.

“He had just one request: ‘Don't let the cattle out, and please be sure to close the gates behind you.’ Like my granddad, on behalf of the Babbitt Ranches community, I only have one request -- or hope, really. That we as humans carry the land-use ethic that we, along with the USGS, Coconino County, and NASA, promote on Babbitt Ranches to the other worlds,” Cordasco said.

At that time, NASA conducted extensive testing of equipment and procedures in preparation for the Apollo missions on Babbitt Ranches lands, including its lunar rover.

In addition to the weeklong field test this month, the JETT team also conducted northern Arizona field tests in 2022.

Douglas said that in his view, Flagstaff will continue to provide an invaluable testing ground as they look to later Artemis missions that plan to introduce modern lunar rovers.

“Artemis 5 is where we're looking to use the rover; Artemis 7 is where we're looking to use a pressurized rover,” Douglas said. “Just think about if we had the ability to have a local mockup with us while we're doing this, and trying to figure out the concept of operations of, how far does it take us to drive from point A to point B? And how do things look when we're vibrating on the lunar surface? We can, maybe, do all of that here, and have a pretty good analog to enhance the other components of Artemis that are coming online in a few years.”



Babbitt Ranches President Billy Cordasco listens to a question during a NASA press conference Saturday afternoon at the USGS. NASA spent a week training for the Artemis manned missions to the moon on the San Francisco Volcanic Field at Babbitt Ranches recently.

Jake Bacon, Arizona Daily Sun

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