



Americans Choose Ocean Landings for Spacecraft, Russians Opt for Solid Ground

Description

On April 10, NASA's Artemis II mission saw the Orion spacecraft safely splash down off the coast of San Diego. However, it did not land directly on land, which would have been preferable. Ocean landings present challenges, like dealing with large waves and the need for U.S. Navy vessels to retrieve astronauts by helicopter. A land landing would be easier, allowing for quicker transport by truck. However, NASA's technical choices meant that ocean splashdowns were necessary, despite their complexity.

Returning spacecraft come back to Earth at very high speeds. The Orion spacecraft, for example, reached Mach 35. Using parachutes alone slows the craft down only so much, and it still hit the water at 20 mph. Thus, NASA has opted for ocean landings to cushion the return.

The Russian spacecraft Soyuz, on the other hand, lands on solid ground using a different method. After using parachutes, it fires retrorockets just before touchdown to reduce speed to around 3 mph.

Although this Russian method has its benefits, it also has drawbacks, such as limited crew capacity. NASA and companies like Boeing are now exploring new technologies to improve land landings. Boeing's Starliner plans to use inflatable bags for a softer landing, enhancing safety and retrieval efficiency. In September 2024, a Starliner successfully landed in New Mexico, marking progress in this area.

Vocabulary List:

1. **parachutes** //ˈpærəˌʃuːts// (noun): fabric devices that slow a person or object
2. **retrieve** //rɪˈtriːv// (verb): get something back after it was lost
3. **retrorockets** //ˈriːtrɒʊˌrɒkɪts// (noun): small rockets fired backward to slow something
4. **touchdown** //ˈtʌtˌdaʊn// (noun): the moment something touches the ground
5. **capacity** //kəˈpæsəti// (noun): the number of people something can hold
6. **inflatable** //ɪnˈfleɪtəbəl// (adjective): can be filled with air to become soft

Comprehension Questions

Multiple Choice



1. What was the mission of the Orion spacecraft that splashed down off the coast of San Diego?

- Option: Artemis I
- Option: Artemis II
- Option: Apollo 11
- Option: Gemini IV

2. What speed did the Orion spacecraft reach during its return to Earth?

- Option: Mach 25
- Option: Mach 30
- Option: Mach 35
- Option: Mach 40

3. What method does the Soyuz spacecraft use for landing?

- Option: Ocean splashdown
- Option: Solid ground landing
- Option: Airbag landing
- Option: Water landing

4. Which spacecraft is Boeing working on to improve landing safety?

- Option: Orion
- Option: Apollo
- Option: Starliner
- Option: Space Shuttle

5. What is one of the challenges of ocean landings for the Orion spacecraft?

- Option: Dealing with personnel retrieval
- Option: Limited crew capacity
- Option: High landing speeds
- Option: Parachute failure

6. Which feature is Boeing's Starliner planning to use for a softer landing?

- Option: Retrorockets
- Option: Inflatable bags
- Option: Parachutes
- Option: Water landing

True-False



7. The Orion spacecraft landed directly on land during the Artemis II mission.
8. NASA has chosen ocean splashdowns for their technical choices.
9. The Soyuz spacecraft lands at a speed of around 10 mph.
10. Boeing's Starliner aims to enhance safety through inflatable landing bags.
11. Ocean landings simplify the retrieval of astronauts compared to land landings.
12. The Orion spacecraft hits the water at 20 mph during splashdown.

Gap-Fill

13. The Orion spacecraft reached Mach 35, making it one of the fastest returning spacecraft, while the Soyuz reduces speed to around _____ mph.
14. NASA has decided that ocean splashdowns are necessary despite their _____ complexities.
15. A land landing would allow for quicker transport by _____ .
16. Boeing's Starliner successfully landed in _____ in September 2024.
17. The need for U.S. Navy vessels to retrieve astronauts arises from the challenges of _____ landings.
18. After using parachutes, the Soyuz spacecraft fires _____ just before touchdown.

Answer

Multiple Choice: 1. Artemis II 2. Mach 35 3. Solid ground landing 4. Starliner 5. Dealing with personnel retrieval 6. Inflatable bags

True-False: 7. False 8. True 9. False 10. True 11. False 12. True

Gap-Fill: 13. 3 14. technical 15. truck 16. New Mexico 17. ocean 18. retrorockets

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