



NASA's Mars Sample Return: Exploring Two Novel Architectures

Description

In Orlando, Florida, NASA has announced plans to study two different approaches for bringing back samples from Mars. These approaches involve leveraging existing Mars mission technologies and exploring new commercial vehicles. The goal is to return samples collected by the Perseverance rover to Earth by 2035.

The key difference between the two options lies in the delivery of a redesigned sample retrieval lander to the Martian surface. One option utilizes the "sky crane" technology developed by the Jet Propulsion Laboratory, while the other employs a commercially provided "heavy lander." Both options aim to launch the samples into orbit using a Mars Ascent Vehicle (MAV) and retrieve them with a European spacecraft, the Earth Return Orbiter.

The first option, estimated to cost between \$6.6 billion and \$7.7 billion, builds upon JPL's sky crane technology. The second option, with projected costs of \$5.8 billion to \$7.1 billion, involves a commercially provided solution.

Both options feature a redesigned sample retrieval landing platform powered by a radioisotope thermoelectric generator (RTG) for improved operation in Martian conditions. The platform includes a new sample loading system to maintain planetary protection standards.

NASA plans to refine these architectures by mid-2026, with the goal of launching ESA's orbiter in 2030 and the sample retrieval lander in 2031. The ability to bring samples back sooner depends on funding from Congress.

These plans aim to ensure that NASA's Mars Sample Return effort remains competitive with other missions, such as a Chinese sample return mission slated for 2028. While acknowledging these challenges, NASA remains committed to advancing our understanding of Mars and the potential for life beyond Earth.

Budgets and schedules

NASA is currently seeking at least \$300 million in the 2025 appropriations bill to move forward with these plans. The timeline for returning samples from Mars could range from 2035 to 2039, contingent on funding availability. NASA Administrator Bill Nelson stressed the importance of continued investment in this groundbreaking mission.

As the space agency navigates these complex decisions, it remains dedicated to unlocking the mysteries of Mars and expanding humanity's knowledge of our universe.

Vocabulary List:



1. **Approaches** /ə'prəʊ.tʃɪz/ (noun): Methods or ways of doing something.
2. **Retrieval** /rɪ'triː.vəl/ (noun): The act of getting something back.
3. **Commercially** /kə'mɜːr.ʃəl.i/ (adverb): In a way that is related to commerce or trade.
4. **Generator** /'dʒen.ə.reɪ.tər/ (noun): A machine that converts one form of energy into another.
5. **Contingent** /kən'tɪn.dʒənt/ (adjective): Dependent on something else that might happen.
6. **Investment** /ɪn'vest.mənt/ (noun): The action or process of investing money for profit.

Vocabulary quizzes

Multiple Choice (Select the Correct answer for each question.)

1. Which word best describes a scenario involving a sudden and widespread disaster?
Option: A) Meticulously
Option: B) Catastrophic
Option: C) Variance
Option: D) Rejuvenation
2. What term refers to differences or inequalities?
Option: A) Disparities
Option: B) Contamination
Option: C) Projections
Option: D) Intensified
3. Which term signifies something dependent on certain conditions or events?
Option: A) Generator
Option: B) Contingent
Option: C) Capabilities
Option: D) Entropy
4. What word describes an ability to understand or know something without conscious reasoning?
Option: A) Approach
Option: B) Irreversible
Option: C) Intuitive
Option: D) Cognitive
5. Which term characterizes a machine or device that produces power?
Option: A) Commercially
Option: B) Sophistication
Option: C) Seamless
Option: D) Generator



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6. What concept refers to the belief that one has a right to something?
- Option: A) Investment
Option: B) Anticipation
Option: C) Entitlement
Option: D) Disparity
7. Which term signifies a drastic change or a complete overhaul of a system?
- Option: A) Multitude
Option: B) Revolutionize
Option: C) Retrieval
Option: D) Variance
8. What word best describes a process that occurs without any interruption or gaps?
- Option: A) Projection
Option: B) Seamless
Option: C) Approaches
Option: D) Resurgence
9. What term refers to the potential to achieve something or perform a certain task?
- Option: A) Capabilities
Option: B) Commercially
Option: C) Disparity
Option: D) Anticipation
10. What term refers to allocating resources in the expectation of a positive return in the future?
- Option: A) Contamination
Option: B) Investment
Option: C) Disparities
Option: D) Catastrophic

Gap-Fill (Fill in the blanks with the correct word from the vocabulary list.)

11. _____ refer to differences or inequalities.
12. The _____ of the storm caused significant damage to the coastal area.
13. The system showed signs of increasing _____ leading to disorder.
14. The river was polluted due to industrial _____.
15. The technological advancements _____ the way we communicate.



16. The _____ abilities of the child were far beyond his age.
17. The team _____ a tough match against the defending champions.
18. The _____ of the design impressed the critics.
19. The event attracted a _____ of people from different backgrounds.
20. The new software system _____ well with existing platforms.

Matching Sentences (Match each definition to the correct word from the vocabulary list.)

21. The artist painted every detail of the portrait showcasing his attention to perfection.
22. The internship provided valuable hands-on experience and to real-world scenarios.
23. The financial analyst presented optimistic for the company's growth in the coming years.
24. The decision to shut down the factory was deemed leading to job losses for many.
25. Various were considered to tackle the ongoing issue of pollution in the city.
26. The promise of easy money turned out to be just an scheme leaving many in financial ruin.
27. Following a period of decline the cultural movement experienced a remarkable .
28. The spa offered a range of treatments for relaxation and promoting overall well-being.
29. Understanding the fundamental of physics is crucial for advancements in the field.
30. The growing economic between the rich and the poor sparked social unrest.

Answer

Multiple Choice: 1. B) Catastrophic 2. A) Disparities 3. B) Contingent 4. C) Intuitive 5. D) Generator
6. C) Entitlement 7. B) Revolutionize 8. B) Seamless 9. A) Capabilities 10. B) Investment

Gap-Fill: 11. Disparities 12. intensity 13. entropic 14. contamination 15. revolutionized 16. cognitive
17. anticipated 18. sophistication 19. multitude 20. integrated

Matching sentence: 1. Meticulously 2. Exposure 3. Projections 4. Irreversible 5. Approaches 6. Illusory
7. Resurgence 8. Rejuvenation 9. Concept 10. Disparity



CATEGORY

1. Sci/Tech - LEVEL6

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