



Christian Espinoza

Crew Dragon/In-Flight Abort Safety Test

The in-flight abort procedure tests the Falcon 9's ability to eject astronauts in the event of a malfunction/anomaly.

The lives of astronauts supersede the importance of any mission to both NASA and SpaceX. This test was a key milestone for SpaceX's mission to eventually get humans to Mars.

By the end of this microlearning course, you will be able to:


- Summarize the SpaceX In-flight abort test.
- Connect key steps of the test to its respective phase(s).
- Identify the anatomy of a SpaceX Launch.

Click the "Start Course" button to begin.

☰ Overview

☰ Crew Dragon Capsule In-flight Abort Procedure

ASSESSMENT

 Post Assessment(Optional)

 References

Overview

 Christian Espinoza

Test Overview

Crew Dragon In-Flight Abort Test (officially SpaceX In-Flight Abort Test) was a test of the **Crew Dragon** abort system. The test was conducted on **19 January 2020**.- It involved the launch of a **Falcon 9** from **Launch Complex 39A** on a suborbital trajectory, followed by an inflight abort of **Crew Dragon** at **Max Q(Maximum Aerodynamic Pressure)**.



NASA astronauts Doug Hurley and Bob Behnken, who flew a 63-day mission with SpaceX's Crew Dragon vehicle, are the first people the company ever launched to orbit and returned to Earth. SpaceX; Business Insider

CONTINUE

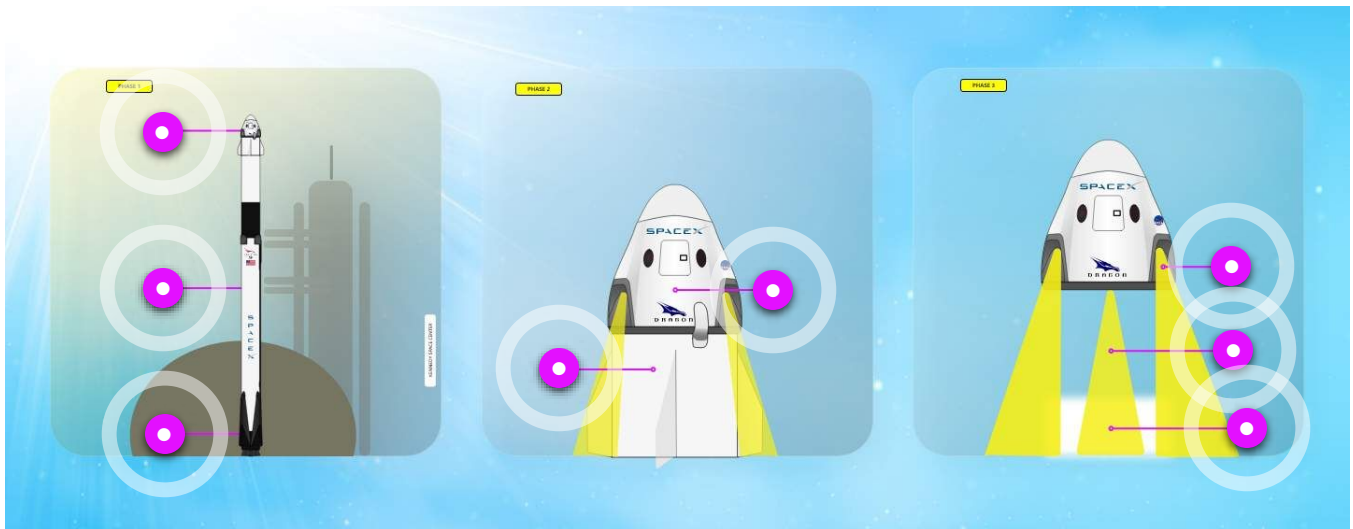
Crew Dragon Capsule In-flight Abort Procedure

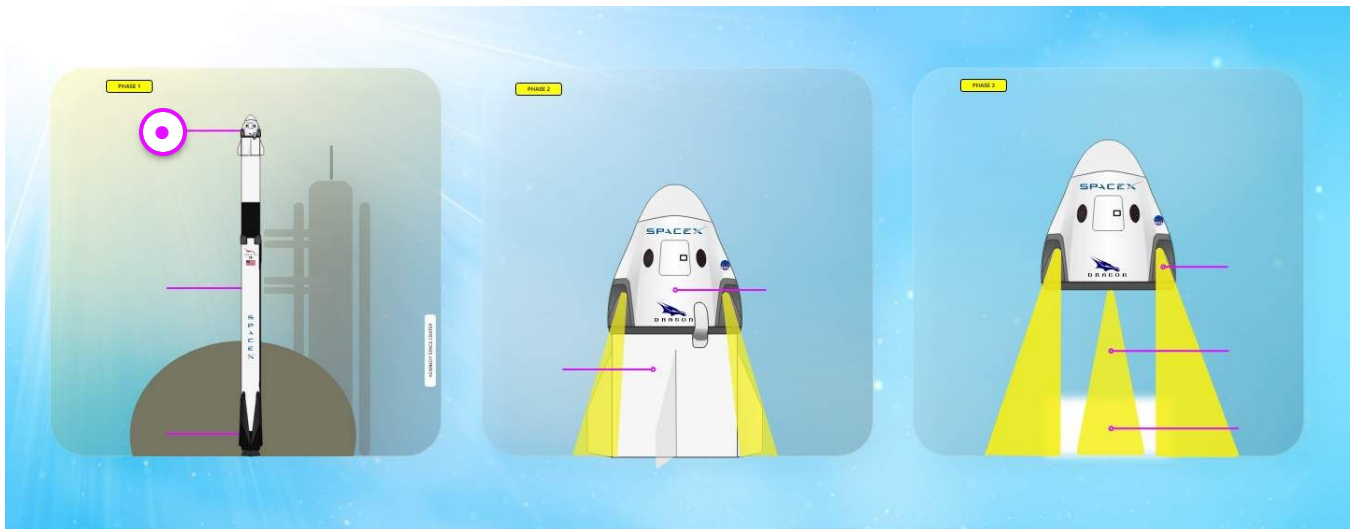
CE Christian Espinoza

In-flight Abort Procedure

The following graphic details important elements of the In-flight Abort Procedure.

Click on the icons to learn more.

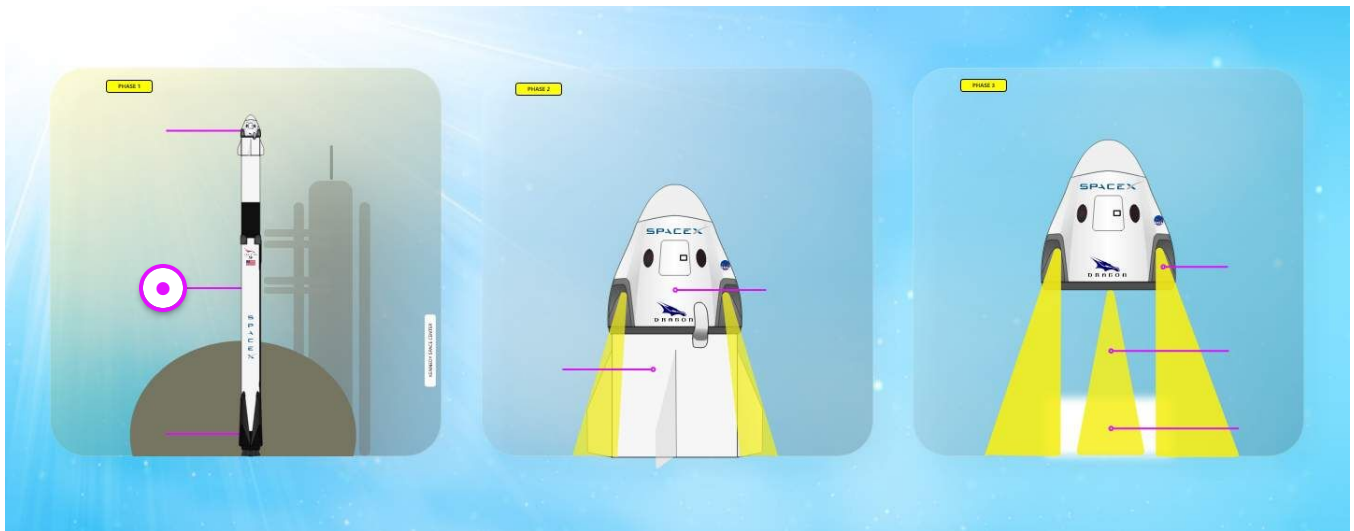




CREW DRAGON CAPSULE

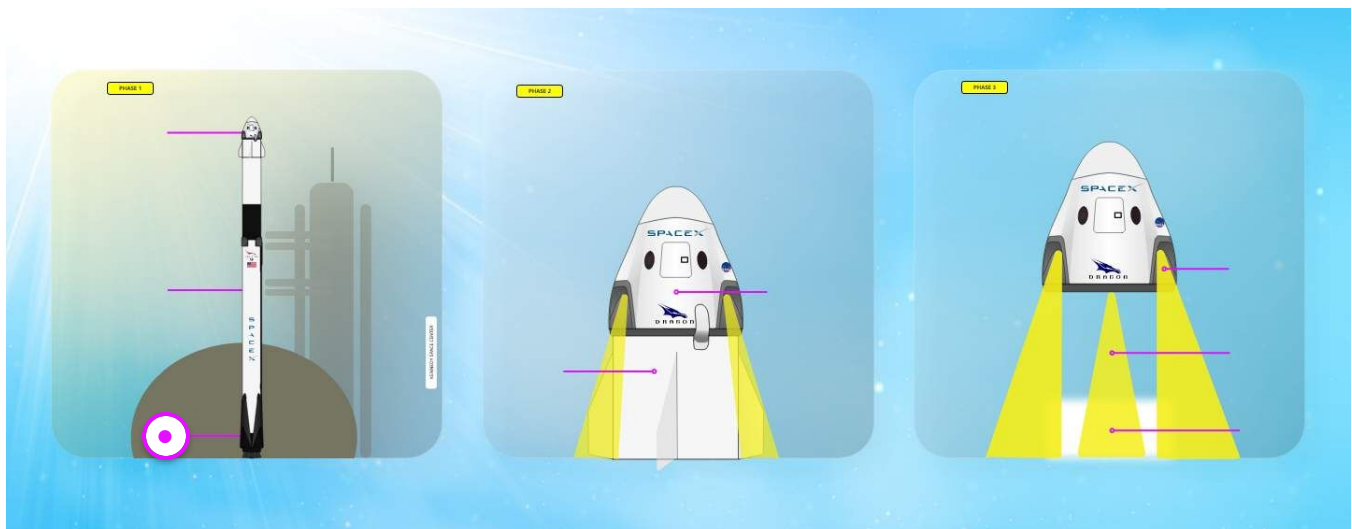
The Dragon spacecraft is capable of carrying up to **7 passengers** to and from Earth orbit, and beyond.

It is the only spacecraft currently flying that is capable of returning significant amounts of cargo to Earth, and is the first private spacecraft to take humans to the space station.



FALCON 9

Falcon 9 is the world's first orbital class reusable rocket. Reusability allows SpaceX to re-fly the most expensive parts of the rocket, which in turn drives down the cost of space access.



MERLIN ENGINES

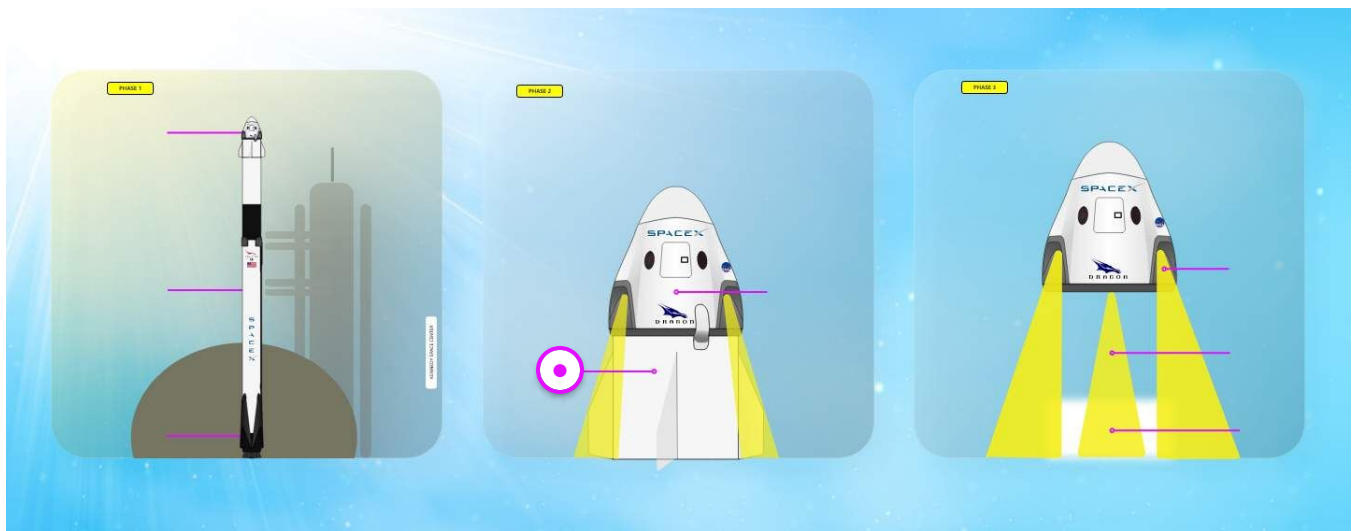
Merlin is a family of rocket engines developed by SpaceX for use on its Falcon 1, Falcon 9 and Falcon Heavy launch vehicles.

Merlin engines use a rocket grade kerosene (**RP-1**) and liquid oxygen as rocket propellants in a gas-generator power cycle. The Merlin engine was originally designed for recovery and reuse.

Aluminum-lithium alloy tanks fuel the nine Merlin engines with liquid oxygen and rocket-grade kerosene propellant, generating more than 1.7 million pounds of thrust.

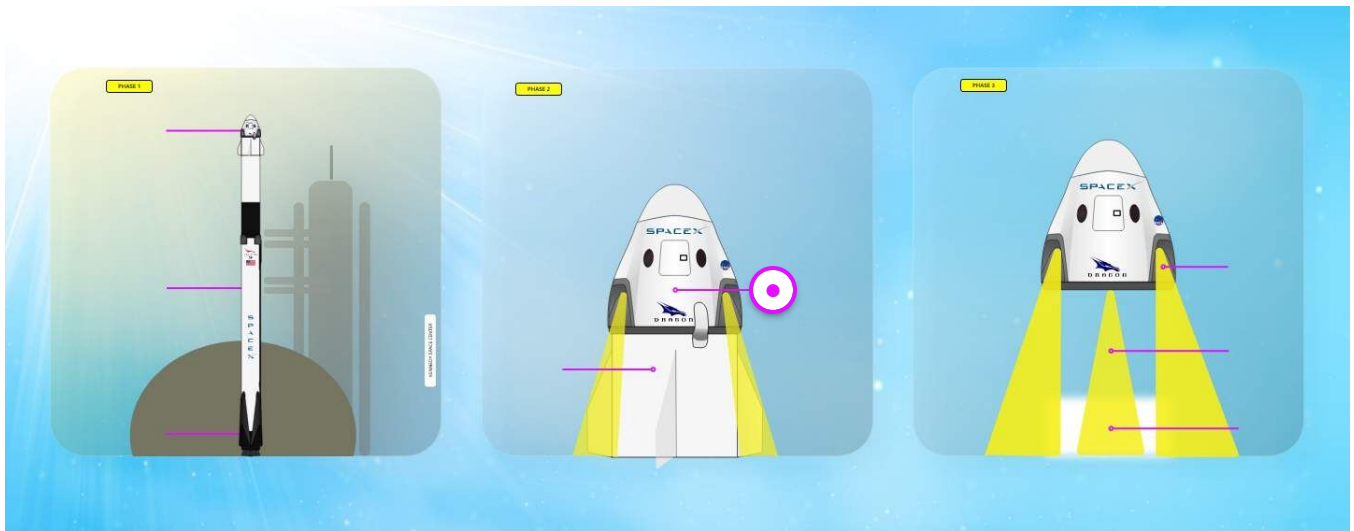
Fuel Type: **LOX / RP-1**

Thrust: 845 kN / 190,000 lbf



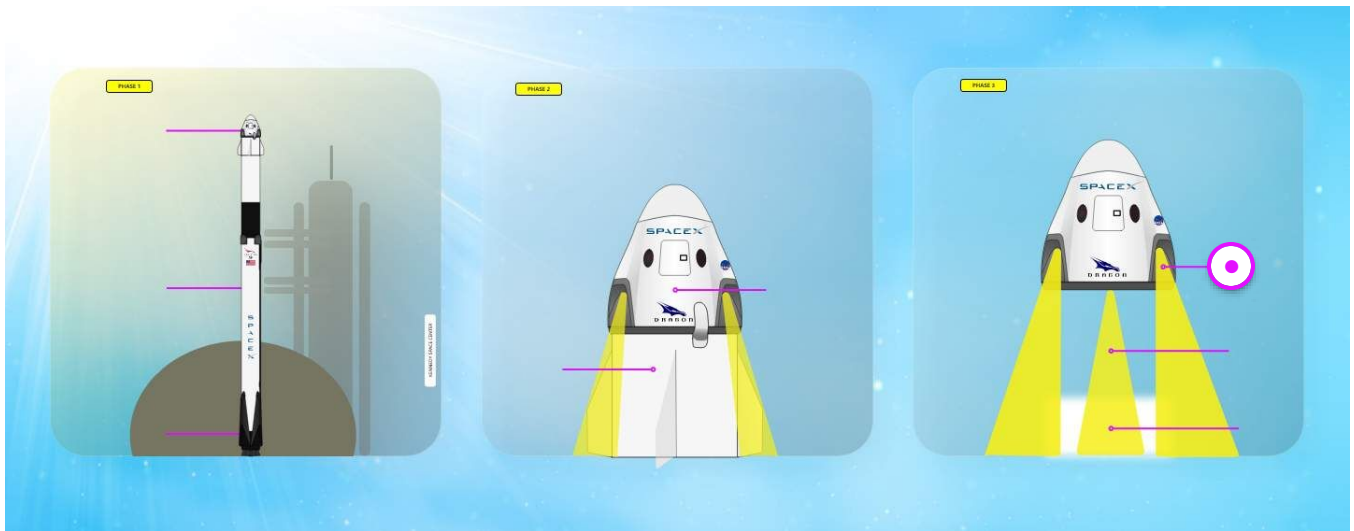
M.E.C.O (Main Engine Cutoff)

Main engine shuts off shortly after escaping **Max Q** (Maximum Aerodynamic Pressure).



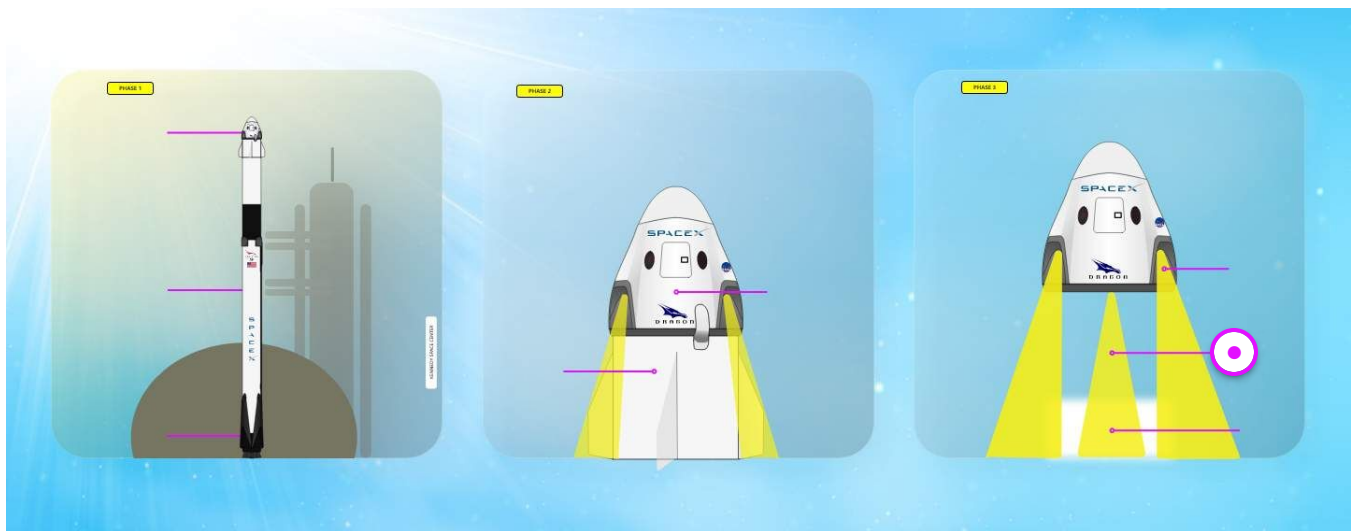
SUPERDRACO THRUSTER FIRE

The **SuperDraco** thrusters fire and initiate the dragon launch escape sequence.



SUPERDRACO BURN

The **SuperDraco** thrusters burn at max capacity to ensure a safe distance between the capsule and the lower Falcon 9 stages.

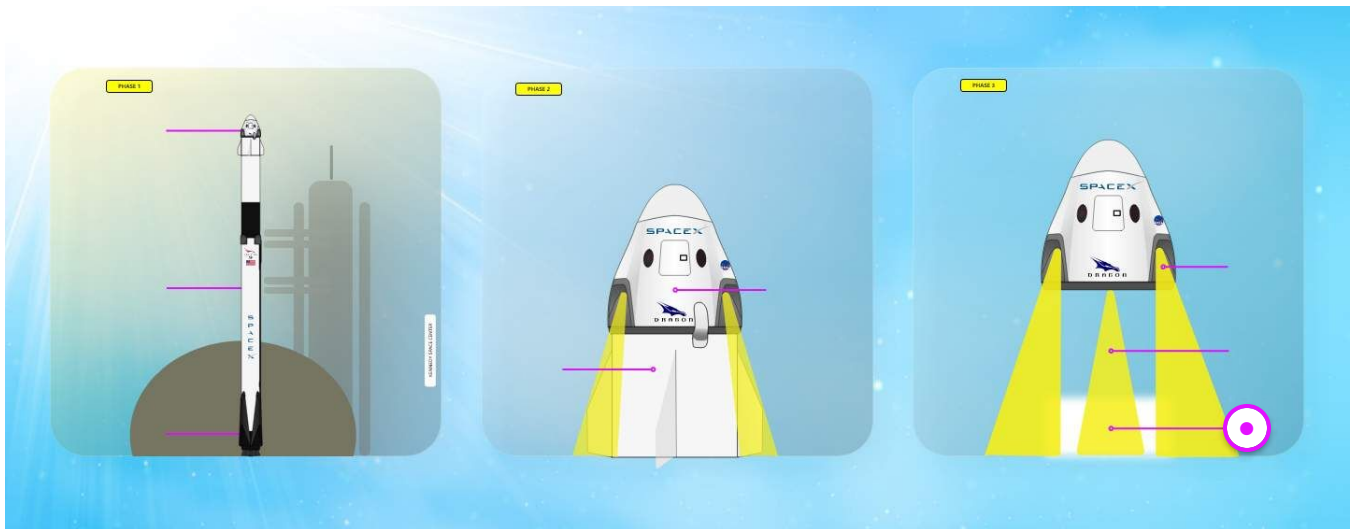


DRAGON SEPARATION

The **Dragon Capsule** separates from the Falcon 9 and deploys its parachutes shortly after.

The Dragon Capsule descends back to earth bringing the astronauts back home safely.

Note: The test flight does not use real astronauts.

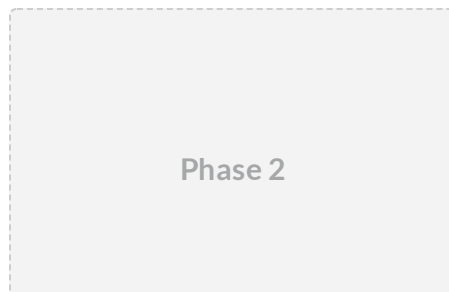



FALCON BREAKUP

The Falcon 9 self destructs after separation to simulate a real catastrophic anomaly.



Merlin engines generate more than 1.7 million pounds of thrust.





Main Engine Cutoff occurs shortly after escaping Max Q.

Phase 3

The Dragon Capsule descends back to earth.

CONTINUE

Lesson 3 of 4

Post Assessment(Optional)

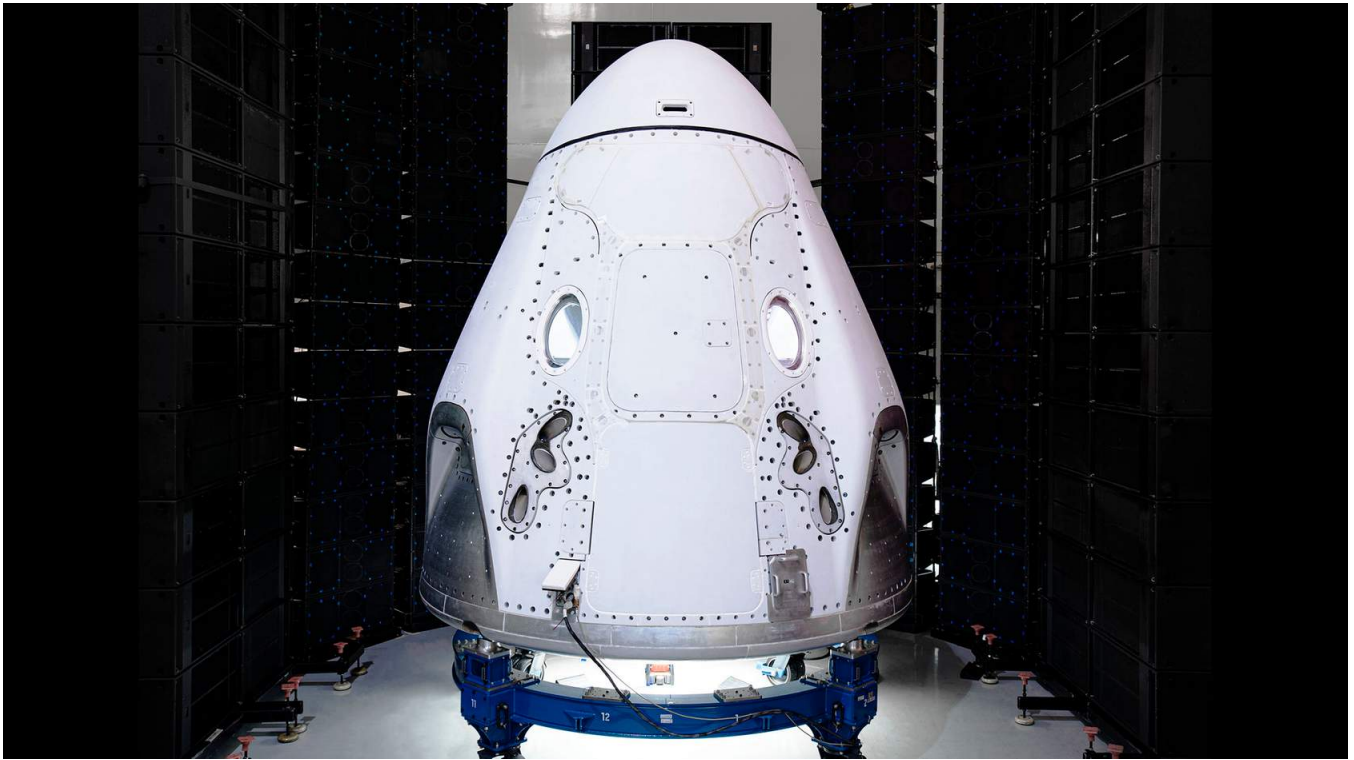
 Christian Espinoza

Test your knowledge of Crew Dragon/In-Flight Abort Safety

Question

01/04

How many passengers can the Crew Dragon Capsule hold?



2

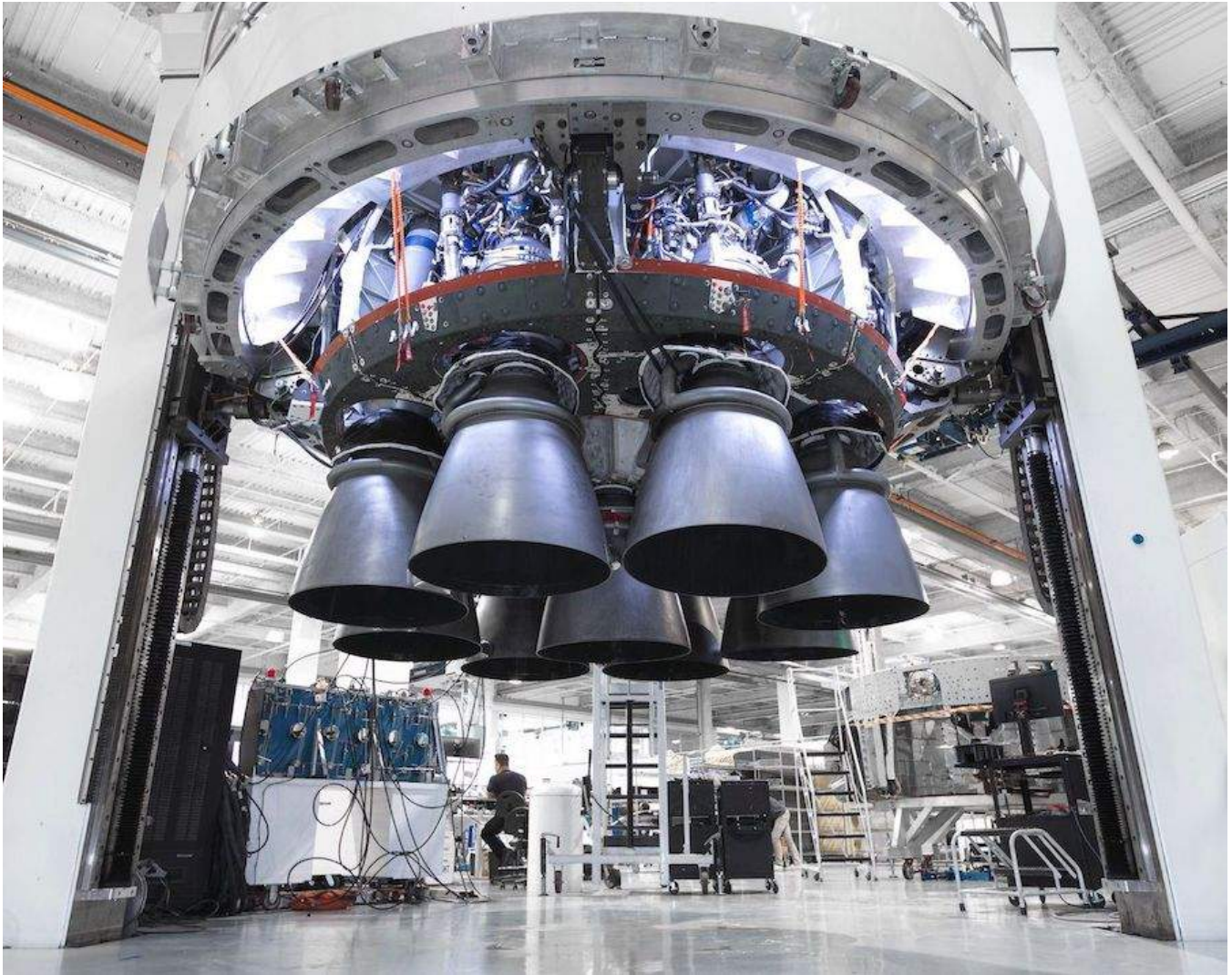
5

7

Question

02/04

What fuel type do the Merlin Engines use?



- LOX / RP-1
- Alcohol
- Liquid Hydrogen



Diesel

Question

03/04

M.E.C.O is an acronym for:

Type your answer here

Question

04/04

Match each term with its corresponding word.



≡ Super

Maximum Aerodynamic Pressure

≡ Falcon

9

≡ Max Q

Draco

References

 Christian Espinoza

References

SpaceX. 2016. Company. [online] Available at: <<http://www.spacex.com/about>> [Accessed 15 November 2016].