SpaceX • Falcon 9 • Test Flight 1
Press Kit

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Falcon 9 Test Flight 1 Media Contact

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Falcon 9 Test Flight 1 | Launch Date

Falcon 9 is on the pad at the SpaceX launch site, Space Launch Complex 40, on Cape Canaveral Air Force Station, Florida, where it is undergoing final checkouts for its inaugural flight.

The first test launch attempt is currently scheduled for Friday 4 June, 2010, with a second day on Saturday 5 June, 2010.

On both days, the launch window opens at 11:00 AM Eastern / 8:00 AM Pacific / 1500 UTC, and lasts for four hours.

SpaceX will provide real-time updates and information via the **SpaceX.com** website.

Webcast Information

The SpaceX Falcon 9 Flight 1 test launch will be webcast live from our Cape Canaveral, Florida launch facilities, with commentary from SpaceX corporate headquarters in Hawthorne, California. The webcast will be available live via a link at the SpaceX home page: **SpaceX.com**

The webcast will begin approximately 20 minutes prior to the opening of the daily launch window, at 10:40 a.m. Eastern / 7:40 a.m. Pacific / 1440 UTC.

During the webcast, the SpaceX host will provide information specific to Falcon 9 Flight 1, an overview of the Falcon 9 launch vehicle and commentary on the launch and flight sequences.

High Resolution Photo and Video Content

As soon as available after launch, images and video content from Falcon 9 Test Flight 1 will be posted for download at:

<**https://send.spacex.com/bds/Login.do?id=A042565651&p1=x3j07shsbfdghghgclgffbi20**>

Additionally, content from all SpaceX flights, including selected high resolution photos can be downloaded directly from the SpaceX website:

SpaceX.com/photo_gallery.php and **SpaceX.com/multimedia/videos.php**

Media Questions

All media queries should be addressed to: Emily Shanklin, Director, Marketing and Communications, SpaceX (**media@SpaceX.com**).

Additional Information

For general information on SpaceX and our product portfolio, please visit **SpaceX.com** or contact **Media@SpaceX.com**.

Falcon 9 Test Flight 1 | Overview

The Falcon 9 is an all-new vehicle, designed and developed in the 21st Century, and launching from a completely remodeled launch site. With this launch attempt SpaceX seeks to demonstrate the complete Falcon 9 system, which includes all of the ground operations, range and launch support systems, as well as the Falcon 9 rocket itself.

Falcon 9 Test Flight 1 Payload | Dragon Spacecraft Qualification Unit

On this initial test flight, the Falcon 9 will be carrying a Dragon spacecraft qualification unit, gathering valuable aerodynamic and performance data for the Falcon 9 configuration that will fly on the following Commercial Orbital Transportation Services (COTS) and Commercial Resupply Services (CRS) missions for NASA.

The Dragon on this demonstration flight is structurally and aerodynamically equivalent to a fully operational Dragon spacecraft. However, it lacks some elements such as heat shield, thrusters and a recovery system, so it is on a one-way mission and will not be recovered.

Falcon 9 Test Flight 1 Launch Site | Space Launch Complex 40, Cape Canaveral Air Force Station

The Falcon 9 launch site at Space Launch Complex 40 (SLC-40), on Cape Canaveral Air Force Station (CCAFS), is located on the Atlantic coast of Florida, approximately 5.5 km (3.5 miles) southeast of NASA's space shuttle launch site.

View looking west, showing SpaceX's Space Launch Complex 40 launch site, Cape Canaveral Air Force Station, with the Falcon 9 Flight 1 vehicle on the launch pad at the center.

Starting in 1965, SLC-40 saw the launch of a total of 55 Titan III and Titan IV rockets, including the 1997 launch of NASA's Cassini spacecraft, now orbiting Saturn. The Titan rockets were among the largest vehicles in the US fleet – second only to the giant Saturn V moon rocket.

The last Titan IV launch from SLC-40 occurred in April of 2005, and in November of 2007 SpaceX received permission to begin upgrading and renovating the complex for Falcon 9 launches.

During flight preparations and launch, SpaceX employs the extensive range safety, tracking, telemetry and other services provided by CCAFS.

Falcon 9 Test Flight 1 | Mission Timeline

Target Orbit: 250 km circular, 34.5 degrees inclination

Major Events	T+secs	T+hh:mm:ss	Comments
Liftoff	0	0:00:00	Vehicle is released from launch mount
Max-Q	76	0:01:16	Vehicle experiences maximum dynamic pressure
First stage shut down	174	0:02:54	Main Engine Cut Off (MECO)
Stage separation	176	0:02:56	Stages separate and are pushed apart
2nd stage ignition	179	0:02:59	Merlin Vacuum engine ignition
2nd stage shut down	476	0:09:38	2nd Stage Engine Cut Off (SECO)

Times above are based on a sample Falcon 9 mission flight time line, and actual timing will vary with specific mission requirements.

Falcon 9 Test Flight 1 | Mission Objectives

The success of the inaugural Falcon 9 flight will be measured as a percentage of how many flight milestones SpaceX is able to complete during this first launch attempt. It is important to note that since this is a test launch, SpaceX's primary goal is to collect as much data as possible.

It would be a great day if we reach orbital velocity, but still a good day if the first stage functions correctly, even if the second stage malfunctions. It would be a bad day if something happens on the launch pad itself and we're not able to gain any flight data.

On a bad day, it will be disappointing, but one launch does not make or break SpaceX as a company, nor commercial spaceflight as an industry. The Atlas rocket only succeeded on its 13th flight, and today it is the most reliable vehicle in the American fleet. Regardless of the outcome, this first launch attempt represents a key milestone for both SpaceX and the commercial spaceflight industry.

Falcon 9 is a two-stage, liquid oxygen and rocket grade kerosene (RP-1) powered launch vehicle. It is designed from the ground up by SpaceX for cost efficient and reliable transport of satellites to low Earth orbit, geosynchronous transfer orbit, and for sending SpaceX's Dragon spacecraft to orbiting destinations such as the International Space Station.

Length:	**47 meters**	(157 feet)
Width:	**3.6 meters**	(12 feet)
Mass:	**333,400 kg**	(735,000 pounds)

First Stage

The Falcon 9 tank walls and domes are made from aluminum lithium alloy. SpaceX uses an all friction stir welded tank, the highest strength and most reliable welding technique available.

Nine SpaceX Merlin 1C regeneratively cooled engines powers the Falcon 9 first stage. After ignition of the first stage engines, the Falcon is held down and not released for flight until all propulsion and vehicle systems are confirmed to be operating nominally.

Like Falcon 1, the interstage, which connects the upper and lower stage for Falcon 9, is a carbon fiber aluminum core composite structure. The separation system is a larger version of the pneumatic pushers used on Falcon 1.

Second Stage

The second stage tank of Falcon 9 is simply a shorter version of the first stage tank and uses most of the same tooling, material and manufacturing techniques. This results in significant cost savings in vehicle production.

A single Merlin Vacuum engine powers the Falcon 9 upper stage with an expansion ratio of 117:1 and a nominal burn time of 345 seconds.

SpaceX Merlin 1C Regeneratively Cooled Engine

The first stage engines, called Merlin, were developed internally at SpaceX, but draws upon a long heritage of space proven engines. The pintle style injector at the heart of Merlin was first used in the Apollo Moon program for the lunar module landing engine, one of the most critical phases of the mission.

Propellant is fed via a single shaft, dual impeller turbo-pump operating on a gas generator cycle. The turbo-pump also provides the high pressure kerosene for the hydraulic actuators, which then recycles into the low pressure inlet. This eliminates the need for a separate hydraulic power system and means that thrust vector control failure by running out of hydraulic fluid is not possible. A third use of the turbo-pump is to provide roll control by actuating the turbine exhaust nozzle (on the second stage engine).

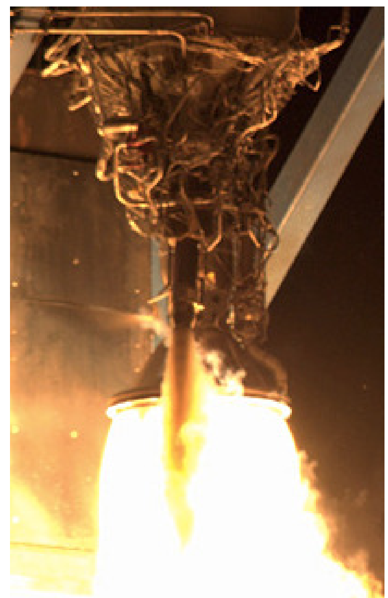
Combining the above three functions into one device that is verified as functioning before the vehicle is allowed to lift off means a significant improvement in system level reliability.

Sea Level Thrust:	**556 kN**	(125,000 lbf)
Vacuum Thrust:	**617 kN**	(138,000 lbf)
Sea Level Isp:	**275 s**	
Vacuum Isp:	**304 s**	

With a vacuum specific impulse of 304s, Merlin is the highest performance gas generator cycle kerosene engine ever built, exceeding the Boeing Delta II main engine, the Lockheed Atlas II main engine and is on par with the Saturn V F-1.

SpaceX Merlin Vacuum Regeneratively & Radiatively Cooled Engine

Based on the Merlin 1C engine, the Merlin Vacuum engine uses a regeneratively cooled combustion chamber with a larger exhaust section, as well as much larger radiatively cooled expansion nozzle, in order to maximize performance in the vacuum of space. The Merlin Vacuum engine provides the final push that delivers customer spacecraft into their desired orbits. With a vacuum Isp of 342 seconds, the Merlin Vacuum engine sets a new standard for American hydrocarbon engine performance in space.



Vacuum Thrust:	**411 kN**	(92,500 lbf)
Vacuum Isp:	**342 s**	

A redundant ignition system ensures the engine can shut down and restart multiple times. The engine can also operate at a reduced thrust to achieve optimum performance.

Dragon is a free-flying, reusable spacecraft being developed by SpaceX under NASA's Commercial Orbital Transportation Services (COTS) program. Initiated internally by SpaceX in 2005, the Dragon spacecraft is made up of a pressurized capsule and unpressurized trunk used for Earth to LEO transport of pressurized cargo, unpressurized cargo, and/or crew members.

The Dragon spacecraft is comprised of 3 main elements: the Nosecone, which protects the vessel and the docking adaptor during ascent; the Spacecraft, which houses the crew and/or pressurized cargo as well as the service section containing avionics, the RCS system, parachutes, and other support infrastructure; and the Trunk, which provides for the stowage of unpressurized cargo and will support Dragon's solar arrays and thermal radiators.

Dragon Highlights:

- Fully autonomous rendezvous and docking with manual override capability in crewed configuration
- 6,000 kg (13,228 lbs) payload up-mass to LEO; 3,000 kg (6,614 lbs) payload down-mass
- Payload Volume: 10 m3 (245 ft3) pressurized, 14 m3 (490 ft3) unpressurized
- Supports up to 7 passengers in Crew configuration
- Two-fault tolerant avionics system with extensive heritage
- Reaction control system with 18 MMH/NTO thrusters designed and built in-house; these thrusters are used for both attitude control and orbital maneuvering
- 1290 kg of propellant supports a safe mission profile from sub-orbital insertion to ISS rendezvous to reentry
- Integral common berthing mechanism, with LIDS or APAS support if required
- Designed for water landing under parachute for ocean recovery
- Lifting re-entry for landing precision & low-g's
- Ablative, high-performance heat shield and sidewall thermal protection

In 2006, SpaceX was named a winner under NASA's Commercial Orbital Transportation Services (COTS) competition. The COTS program is a firm-fixed-price agreement utilizing a pay for performance model, in which SpaceX is only paid upon the successful completion of performance milestones. This dramatically reduces NASA's exposure to risk and incentivizes commercial providers to keep development costs as low as possible.

In December 2008, NASA announced the selection of SpaceX's Falcon 9 launch vehicle and Dragon spacecraft to resupply the International Space Station (ISS) when the Space Shuttle retires. The $1.6 billion contract represents a minimum of 12 flights, with an option to order additional missions for a cumulative total contract value of up to $3.1 billion.

To ensure a rapid transition from cargo to crew capability, the cargo and crew configurations of Dragon are almost identical, with the exception of the crew escape system, the life support system and onboard controls that allow the crew to take over control from the flight computer when needed. This focus on commonality minimizes the design effort and simplifies the human rating process, allowing systems critical to Dragon crew safety and ISS safety to be fully tested on uncrewed demonstration flights.

SpaceX | Summary

SpaceX is developing a family of launch vehicles and spacecraft intended to increase the reliability and reduce the cost of both manned and unmanned space transportation, ultimately by a factor of ten. With the Falcon 1 and Falcon 9 vehicles, SpaceX offers highly reliable/cost-efficient launch capabilities for spacecraft insertion into any orbital altitude and inclination. Starting in 2010, SpaceX's Dragon spacecraft will provide Earth-to-LEO transport of pressurized and unpressurized cargo, including resupply to the International Space Station.

Founded in 2002, SpaceX is a private company owned by management and employees, with minority investments from Founders Fund and Draper Fisher Jurvetson.

The SpaceX team now numbers more than 1,000, with corporate headquarters in Hawthorne, California. For more information, please visit the company's web site at **SpaceX.com**.

SpaceX | Elon Musk – CEO and CTO

Elon Musk is the chief executive officer and chief technology officer SpaceX, which develops rockets and spacecraft for missions to Earth orbit and beyond. Musk served as chief engineer for Falcon 1, the first privately developed liquid fuel rocket to reach orbit, as well as Falcon 9 and the Dragon spacecraft. In 2008, SpaceX won the NASA contract to replace the cargo transport function of the Space Shuttle with Falcon 9 and Dragon. President Obama and NASA Administrator Bolden decided in 2010 to outsource astronaut transport to the commercial sector. F9/Dragon is considered by many to be the leading system for that role.

Musk’s other primary activity is serving as CEO and Product Architect of Tesla Motors, where he has overseen product development and design from the beginning, including the all electric Tesla Roadster and Model S sedan. Musk is also the non-executive chairman of SolarCity, the leading provider of solar power systems in California.

Prior to SpaceX, Musk co-founded PayPal, the world's leading Internet payment system, and served as the company's Chairman and CEO. Before PayPal, Musk co-founded Zip2, a provider of Internet software to the media industry.

In 2007, Musk was recognized for his work by Research and Development Magazine’s, receiving their Innovator of the Year Award. He received the 2007/2008 American Institute of Aeronautics and Astronautics award for the greatest contribution to the field of space transportation. In 2008, Musk was named as one of the 75 most influential people of the 21st century by Esquire magazine and received the Aviation Week 2008 Laureate for the most significant achievement worldwide in the space industry. In 2009, the National Space Society awarded Musk their Von Braun Trophy, given for leadership of the most significant achievement in space. Most recently in 2010, Musk was recognized as a Living Legend in Aviation by the Kitty Hawk Foundation for creating the Falcon 9 rocket and Dragon spacecraft.

He has a physics degree from the University of Pennsylvania, a business degree from Wharton and currently serves as a member of the Stanford University Engineering Advisory Board.

SpaceX | Gwynne Shotwell – President

Ms. Shotwell joined SpaceX in 2002 as Vice President of Business Development, developing SpaceX's customer base and managing strategic relations. As President, Ms. Shotwell's responsibilities include providing strategic direction to support company growth and development, as well as management of day-to-day operations at SpaceX. Her experience prior to SpaceX includes over ten years at the Aerospace Corporation where she held positions of increasing responsibility in Space Systems Engineering and Technology and Project Management. Highlights include promotion to Chief Engineer of an MLV-class Satellite program, managing a landmark study for the Federal Aviation Administration's on Commercial Space Transportation, and completing an extensive space policy analysis for NASA's future investment in space transportation. After Aerospace Corporation, Ms. Shotwell was recruited to be manager of the Space Systems Division at Microcosm, where she served on the Executive committee and directed corporate business development.

Ms. Shotwell received her Bachelor's and Master's Degree from Northwestern University in Mechanical Engineering and Applied Mathematics. She was elected statewide to the Board of Directors, California Space Authority and serves on its Executive committee. She has also served as an officer of the Space Systems Technical Committee and the local Chapter of the AIAA. She has authored papers in a wide variety of areas including standardizing spacecraft/payload interfaces, conceptual small spacecraft design, infrared signature target modeling, Space Shuttle integration, and reentry vehicle operational risks.

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