

SPACEX

Space Exploration Technologies

MAIDEN FLIGHT



10 February 2006



SPACE X

SpaceX is developing a family of launch vehicles intended to reduce the cost and increase the reliability of access to space ultimately by a factor of ten. With the Falcon 1, Falcon 5 and Falcon 9 launch vehicles, SpaceX is able to offer light, medium and heavy lift capabilities and deliver spacecraft into any inclination and altitude, from low Earth orbit to geosynchronous orbit to planetary missions. On launch day, Falcon 1 will make history for several notable reasons:

- **It will be the first privately developed, liquid fueled rocket to reach orbit**
- **It will be the world's first all new orbital rocket in over a decade.**
- **The main engine of Falcon 1 (Merlin) will be the first all new American hydrocarbon engine for an orbital rocket to fly in 40 years and only the second new American booster engine of any kind in twenty-five years.**
- **The Falcon 1 is the only rocket flying 21st century avionics, which require a small fraction of the power and mass of other systems.**
- **It will be the world's only semi-reusable orbital rocket apart from the Shuttle.**
- **Most importantly, Falcon 1, priced at \$6.7 million, will provide the lowest cost per flight to orbit of any launch vehicle in the world, despite receiving a design reliability rating equivalent to that of the best launch vehicles currently flying in the United States.**

The maiden flight will take place from the Kwajalein Atoll of the Marshall Islands. The customer for this mission is DARPA and the Air Force. The payload will be FalconSat-2, part of the Air Force Academy's satellite program that will measure space plasma phenomena, which can adversely affect GPS and other civil and military space-based communications. The target orbit is 450 kilometers (just above the International Space Station) at an inclination of 39 degrees.

Located in El Segundo, California, the company was founded by CEO Elon Musk in June 2002. SpaceX is the third company founded by Mr. Musk. Previously he co-founded PayPal, Inc., the world's leading electronic payment system, which sold to online auction giant eBay™ for \$1.5 billion in 2002. SpaceX has a 300 acre facility in central Texas for propulsion and structural testing as well as an office in Washington D.C. SpaceX has three launch sites and approximately 160 employees.

SpaceX Customers and Launch Schedule

Customer	Launch Date	Vehicle	Departure Point
US Defense Dept (DARPA)	Q4 2005	Falcon 1	Kwajalein
US Defense Dept (OSD/NRL)	Q1 2006	Falcon 1	Vandenberg
Malaysia (ATSB)	Q2 2006	Falcon 1	Kwajalein
US Government	Q2 2007	Falcon 9	Kwajalein
Bigelow Aerospace	Q1 2008	Falcon 9	Kwajalein
SpaceDev	Q2 2008	Falcon 1	Vandenberg
MDA Corp.	Q3 2008	Falcon 1	Vandenberg
Swedish Space Corp.	Q4 2008	Falcon 1	Vandenberg
US Air Force	\$100 million contract thru 2010	Falcon 1	TBD

LAUNCH SITE: REAGAN TEST SITE AT KWAJALEIN ATOLL

With more than 40 years of experience in successful ballistic missile testing and space operations support, the Ronald Reagan Ballistic Missile Defense Test Site at Kwajalein Atoll (RTS) serves a vital role in research, development, test, and evaluation for America's defense and space programs. The more than 100 islands of the U.S. Army Kwajalein Atoll, located in the Republic of the Marshall Islands, form the world's largest lagoon. This feature, coupled with its isolated location and specialized state-of-the-art data-gathering devices, makes RTS uniquely qualified for effective live testing of missiles of all ranges. As the cornerstone of the Pacific Range, RTS provides for rigorous live testing of both offensive and defensive missiles. For example, intercontinental ballistic missiles can be launched into the Kwajalein lagoon from various locations within the continental United States and intermediate- and short-range missiles from various Pacific island locations.

RTS is operated by a government/contractor team which includes military personnel, government civilians, technical support contractors, and scientists from the Massachusetts Institute of Technology's Lincoln Laboratory.

Space Operations

RTS supports the U.S. Army space mission, the U.S. Air Force, National Aeronautics and Space Administration space transportation system operations and experiments, and Department of Defense and commercial satellite launches. As part of the U.S. Army Space and Missile Defense Command's support to the U.S. Strategic Command, RTS conducts space-object identification and provides orbital information on new foreign launches. RTS' ALTAIR and TRADEX radars are two of four radars supporting deep space and near earth satellite observations for the Space Surveillance Network and the only two with an equatorial location. Both provide data on more than 42,000 tracks per year.

Millimeter wave (MMW) and ALCOR radars provide high-resolution, near-real-time images of space objects.

RTS also offers launch capability for strategic interceptors that destroy their targets in space, smaller multi-stage scientific rockets that make measurements within the atmosphere, and all types of theater-range missiles. RTS' integrated command and control center provides technical range support with its secure fiber optic network and offers the range user calibration, range timing, meteorology, flight and ground safety, logistics, and data reduction and analysis services.

The Reagan Test Site continues to be a vital national interest and a critical part of the Pacific test bed.



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CUSTOMER: DARPA AND U.S. AIR FORCE

The Defense Advanced Research Projects Agency (DARPA) is the central research and development organization for the Department of Defense (DoD). It manages and directs selected basic and applied research and development projects for DoD, and pursues research and technology where risk and payoff are both very high and where success may provide dramatic advances for traditional military roles and missions.

Statements from Dr. Steve Walker, DARPA Mission Director and Falcon Program Manager:

"DARPA invented the internet, stealth technology, and unmanned aerial vehicles, and we are excited about working with a small, commercial company to invent affordable and responsive space launch. DARPA understands that there is technical risk in the first flight of a commercially-developed small launch vehicle, but that's what we are about - assuming some technical risks in order to take the technology excuses off the table and transition revolutionary technical capabilities to the warfighter, in this case the Air Force Space Command.

We have teamed with SpaceX to prove this country can launch spacecraft in an affordable and responsive way. This is good for the American taxpayer and for the American warfighter. Over the past two years, DARPA has worked with SpaceX and the Reagan Test Site to prepare for this launch. The Reagan Test Site has been outstanding to work with and assures us this will be a safe launch. SpaceX recently completed engine acceptance and qualification testing, and a Limited Mission Risk Assessment (LMRA) by the Air Force Detachment 12 Rocket Space Launch Program concluded that there were "no show stoppers" on the launch vehicle side. After reviewing the RTS range safety status, SpaceX vehicle status, and the LMRA results, I gave the "green light" to proceed to launch on November 26.

On November 26, our team was disappointed that a second attempt could not be made due to a LOX shortage, but we feel that a complete wet dress rehearsal has now been accomplished and that the likelihood of a successful launch in the near future has increased. We are pulling for this young company to succeed and continue to be impressed with their work ethic and problem solving abilities. Finally, we commend the Reagan Test Site for all they have done in working with SpaceX to get to this point."

PAYLOAD: FalconSAT-2

Mission

Air Force Academy satellites are a key part of the Academy's Space Systems Research Center, and give cadets hands-on experience with space systems technology-they "learn space by doing space". The FalconSAT portion of this program tasks a multi-disciplinary team of cadets to put theory into practice by designing, building, testing, troubleshooting, and delivering a small satellite for launch into lower earth orbit. They then will operate the satellite from the Air Force Academy's satellite ground station.

Feature

This satellite carries one scientific experiment which is created by the Academy's Department of Physics, and supports Department of Defense research and development initiatives. Each succeeding year's cadre of cadets builds one of three models of each satellite. These are the structural engineering model, the qualification model and the flight mode. Each satellite in the FalconSAT series takes 3 years to complete, from design to deliver. The FalconSAT course is a two-semester multidisciplinary capstone course which is managed by the Academy's Department of Astronautical Engineering, and is one of the nation's only undergraduate satellite construction program.

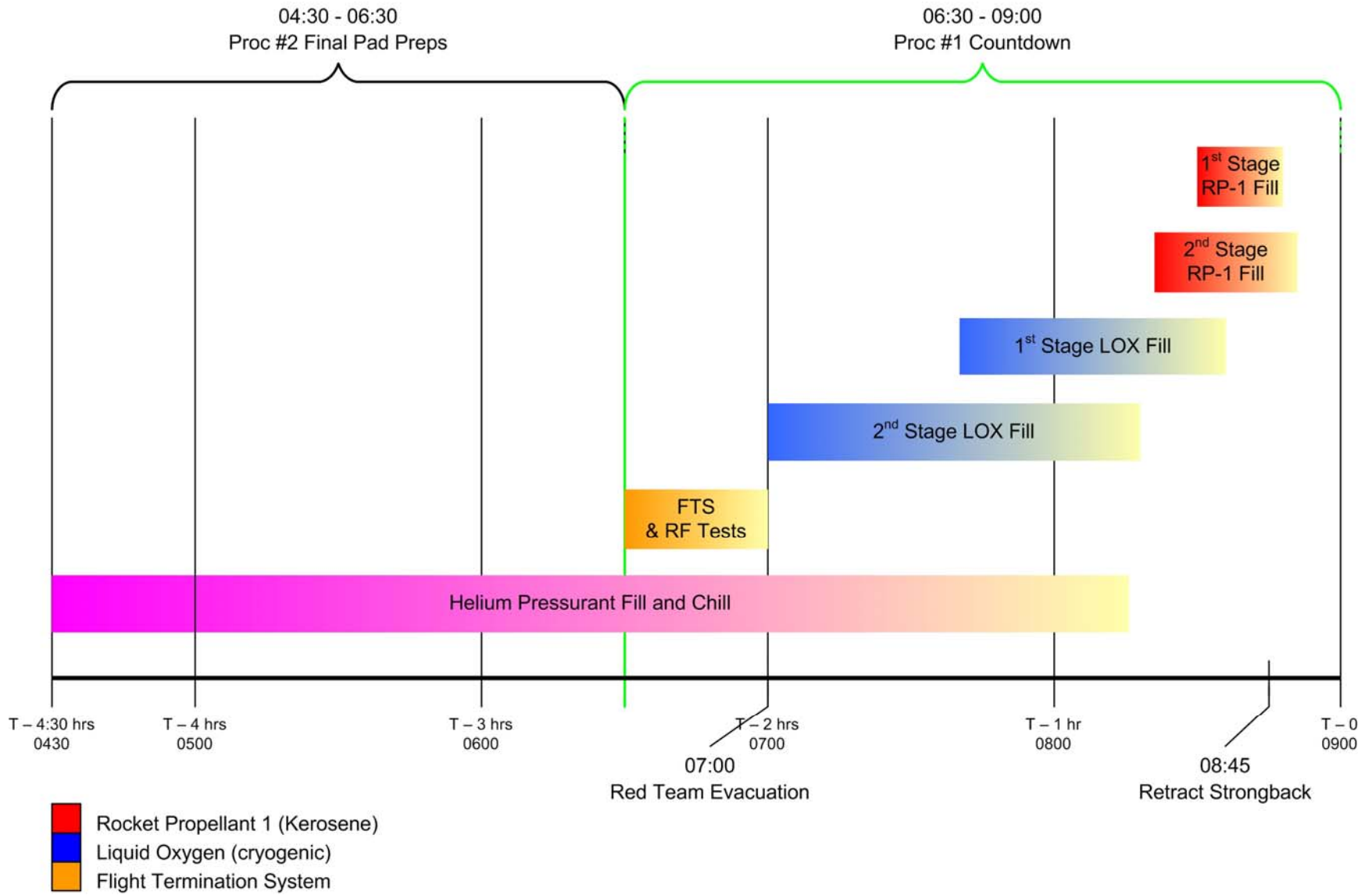
Background

The Academy instituted its small satellite program in 1993 to further motivate cadets toward space by providing hands-on satellite development and operational experience. The program achieved its first launch in 1997 with the FalconGold satellite. The Academy's next space mission, FalconSAT-1, was launched in January 2000. FalconSAT-2 started in 2000 by first incorporating commercial off-the-shelf power, communications and data-handling components. These critical components freed cadets and faculty to focus on scientific experiments, structure and altitude control development, software, integration, and testing. FalconSAT-2's payload is the Miniature Electro-Static Analyzer. This space environment experiment was created by the Academy Physics Department and investigates how ionospheric plasma depletions affect the Global Positioning System and other space-based communication signals. Cadets briefed this experiment to the DoD Space Experiments Review Board in November 2000 where it was given an impressive 21 out of 34 ranking among all space experiments DoD-wide. FalconSAT-2 was slated to launch aboard a space shuttle in 2003 but was shelved after the destruction of the Columbia. Through the Defense Advanced Research Projects Agency, FalconSAT-2 is now slated for a late 2005 launch on a Space Exploration Technologies Corporation Falcon I rocket.

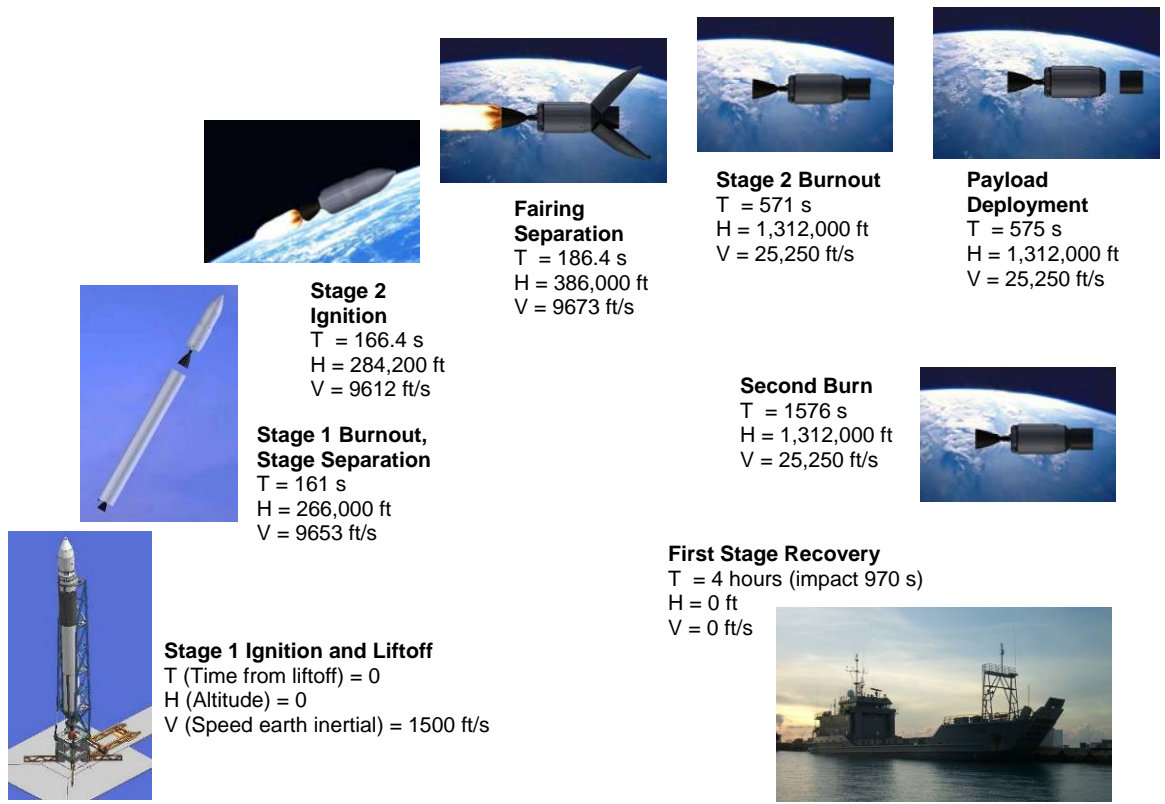
<p>Primary mission: Investigate how ionospheric plasma depletions affect Global Positioning System and other space-based communication signals Weight: 43 pounds (19.5 kilograms) Orbit altitude: 450 kilometers Orbit inclination: 39 degrees Power plant: Commercial and USAFA-built solar panels, commercial batteries</p>	<p>Size: 12.5 inch (32cm) cube Payload: Mini Electro-Static Analyzer Launch Vehicle: Falcon I Rocket (Space Exploration Technologies Corporation) Ground Control Station: U.S. Air Force Academy Date Deployed: 2005 Program Cost: \$750,000</p>
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Point of Contact: U.S. Air Force Academy Public Affairs Directorate, DSN 333-7731/7593 or (719) 333-7731/7593.

COUNTDOWN TIMELINE



MISSION TIMELINE



LAUNCH TEAM

MD	Mission Director
MDA	Mission Director Advisor
MM	SpaceX Mission Manager
MTD	Mission Tech Director
RCO	Range Control Officer
ROS	Range Ops Supervisor
CEO	Chief Executive Officer
LC	Launch Conductor
LCR	Launch Controller
LD	Launch Director
PD	Payload Station
PROP0	Propulsion 0
PROP1	Propulsion 1
PROP2	Propulsion 2
AVI	Avionics
GNC	Guidance, Navigation and Control
GSO	Ground Safety Officer
FTSO	Flight Termination Safety Officer
GM1	Govt Mission Support
PAD ENG	Pad Test Conductor
PROP3	Propulsion 3
PS	Pad Safety
GMM	Govt Mission Manager
LVSM	DARPA Launch Vehicle Single Mgr
GM2	Govt Mission Support
GM3	Govt Mission Support

	KMCC (Kwaj Bldg 1010)
	SpaceX Command Center (Kwaj Bldg 1500)
	Omelek Red Team (Meck)
	SpaceX Overflow (Kwaj Bldg 1500)

SpaceX Control Room







