SPACEX

Space Exploration Technologies

Demo 2 Launch
March 19, 2007

Mission Statement

Demo-2 is the second flight of the Falcon 1 launch vehicle developed by Space Exploration Technologies in El Segundo, and is scheduled for launch first quarter FY07. The customer for this mission is Defense Advanced Research Projects Agency (DARPA) under the DARPA/USAF Falcon program. The Falcon program has a focus on low-cost, responsive spacelift capability.

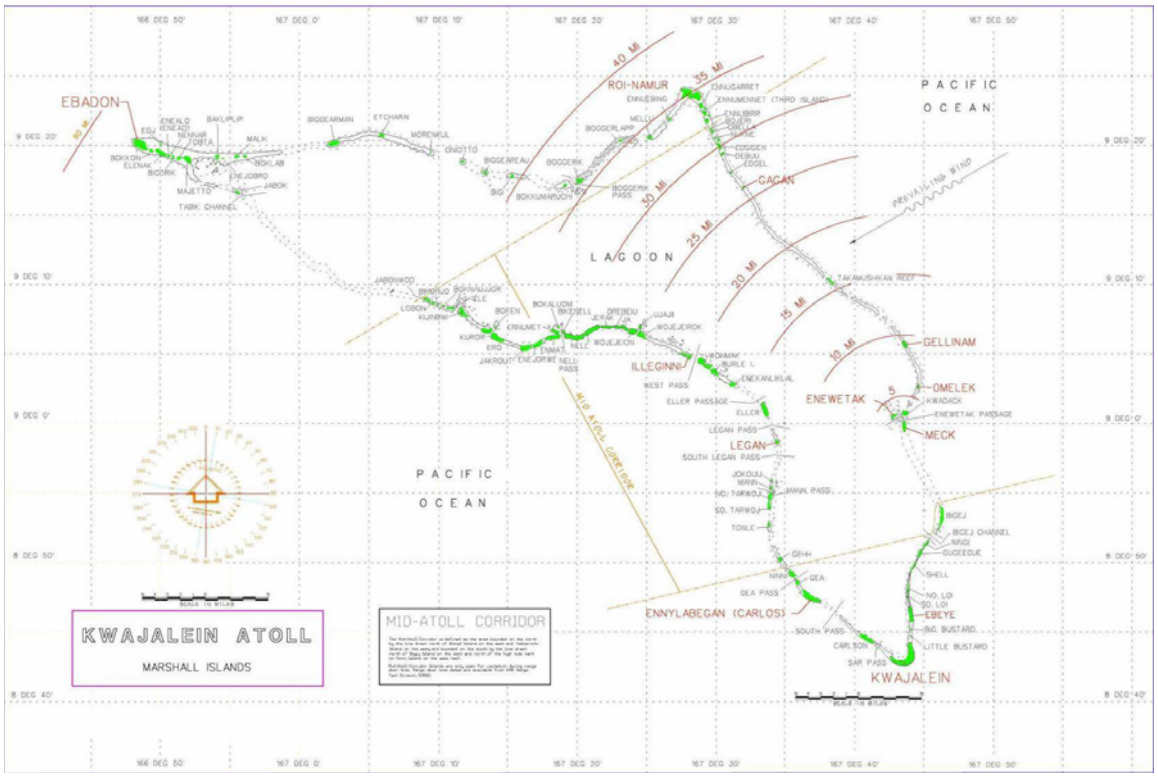
On this mission, dubbed the Demo-2 mission, the vehicle will carry ~50 kg of experiments and associated hardware from the launch site at Omelek into a 685 km circular orbit with 9° inclination. The payload consists of the Autonomous Flight Safety System (AFSS) and the Low Cost Tracking and Data Relay Satellite System (TDRSS) Transmitter (LCT2), developed by National Aeronautics and Space Administration (NASA) and the mechanical adapter hardware required to interface the payload with the launch vehicle. The AFSS and LCT2 payloads are not deployed, but there will be a separation demonstration of an inert payload immediately after second stage 1st burn main engine shutdown.

The primary DARPA objective for this mission is to gather flight data on the Falcon 1 launch vehicle and supporting systems. A secondary objective is to separate a payload into LEO, to place the second stage into the planned final orbit, and demonstratiing AFSS using the LCT2 for telemetering data back to Kwajalein and to Wallops Flight Facility. The AFSS and LCT2 represent early steps in providing low-cost space-based range services for communications, tracking, and on-board autonomous flight termination. The AFSS is operating in a shadow mode for this mission.

Mission Parameters

Parameter	Demo Flight
Perigee (km) (Initial)	330
Apogee (km)	685
Inclination (deg)	9
Launch Azimuth (deg)	90.147
Period (min)	94.8
Stage 1 Burn Duration (sec)	168.34
Stage 2 Burn Duration (sec)	415.20
Time of SECO 1 (sec)	588.53
Dogleg	No
Visibility at SECO 1	Yes
Payload Mass (lbm)	90
Deployed Mass (lbm)	4.55
Liftoff Weight (lbm)	60695.8
Stage 1 Burnout Thrust (lbf)	77061.4
Stage 2 Burnout Thrust (lbf)	6550

Mission Location: The Island of Omelek on the Kwajalein Atoll

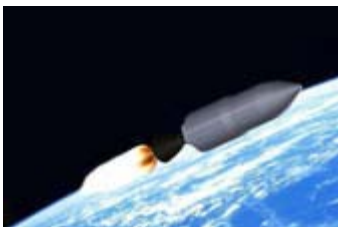


Mission Burn Sequence and Timing

Stage 1 Ignition and Liftoff
T (Time from liftoff) = 0
H (Altitude) = 0
V (Speed earth inertial) = 0.46 km/s

Stage 1 Burnout
Stage Separation
T = 160 s
H = 75 km
V = 2.6 km/s

Stage 2
Ignition
T = 165 s
H = 82 km
V = 2.60 km/s



Fairing Separation
T = 185 s
H = 108 km
V = 2.61 km/s

Stage 2 Burnout
T = 565 s
H = 330 km
V = 7.3 km/s

Payload Deployment
T = 575 s
H = 330 km
V = 7.3 km/s