

FIREFLY  
AEROSPACE



FLTA002 TO THE BLACK

Press Kit, September 2022

MAKING SPACE FOR EVERYONE



MISSION DETAILS

# To The Black Mission

Alpha Flight 2: To The Black is Firefly's second technology demonstration flight that will attempt to launch multiple satellites to low Earth orbit (LEO) from our launch site (SLC-2) at Vandenberg Space Force Base. Alpha will first insert into an elliptical transfer orbit, coast to apogee, and perform a circularization burn.

[VIEW LIVE STREAM](#)

## FLTA002 | TO THE BLACK

**PRIMARY LAUNCH WINDOW**

September 11, 2022

15:00-19:00 PDT

**BACKUP LAUNCH WINDOW**

September 12, 2022

15:00-19:00 PDT

**MISSION NAME**

FLTA002 | To The Black

**ROCKET**

Alpha

**LAUNCH LOCATION**

SLC-2 Vandenberg Space Force Base, USA

## TARGET ORBIT

**TOTAL PAYLOAD MASS**

Approx. 35 kg

**LAUNCH AZIMUTH**

240° CW from North

**PAYLOAD DESTINATION ALTITUDE**

300 km

**PAYLOAD DESTINATION INCLANATION**

137 deg

## VIEWING

Launch will be live streamed by **Tim Dodd, Everyday Astronaut**, starting approximately T-60 minutes



**LOCATION**

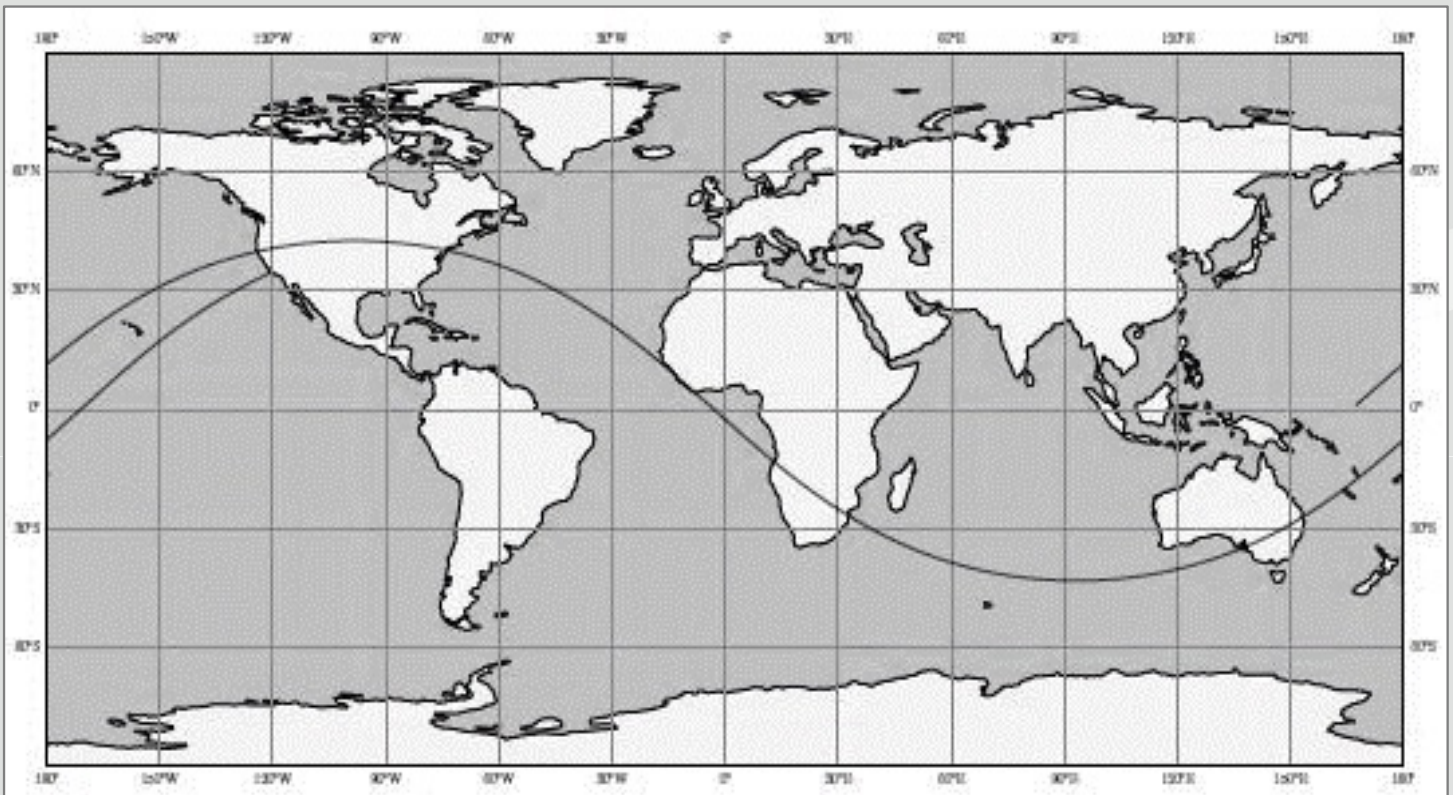
# To The Black Launch

Firefly conducts Polar and SSO launches to high inclinations from SLC-2 at Vandenberg AFB, California. Figure below shows ground track for FLTA002's retrograde orbit and launch azimuths from VAFB. Other orbit inclinations may be possible, inquire with Firefly for additional details.



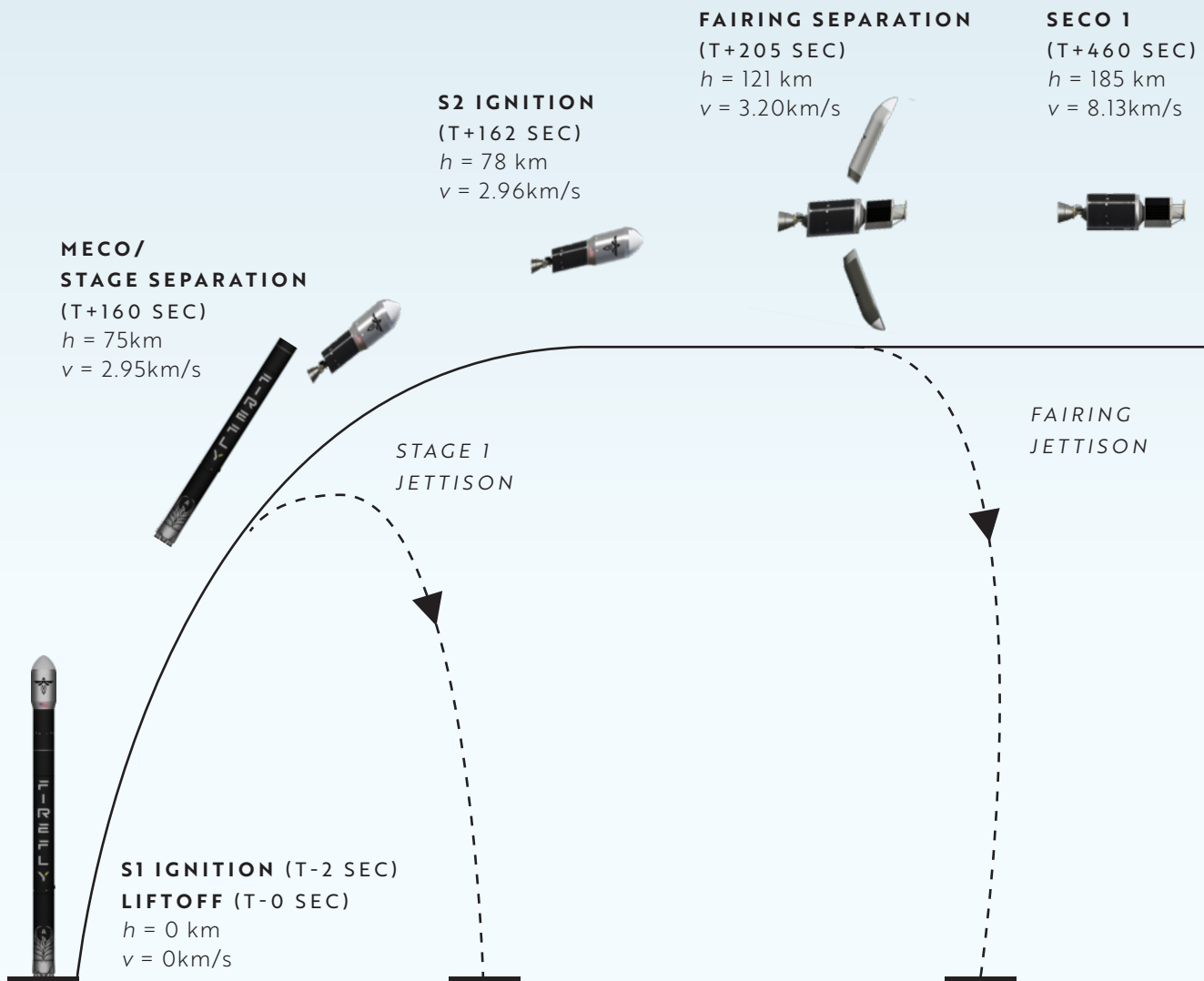
**SLC-2, Vandenberg  
Space Force Base, CA**

PACIFIC OCEAN



LAUNCH

# Ascent Phase



**ABOUT**

# ALPHA

Firefly Alpha is designed to address the needs of the burgeoning small-satellite market.

At a dedicated mission price of \$15M, Alpha combines the highest payload performance with the lowest cost per kilogram to orbit in its vehicle class.

Capable of delivering 1 metric ton to Low Earth Orbit (LEO) and 630 kg to the highly desirable 500 km Sun-Synchronous Orbit (SSO), Alpha will provide launch options for both.

**PERFORMANCE**

PAYLOAD LEO  
**1,170 KG**  
LEO 28.5°, 200 km

PAYLOAD SSO  
**745 KG**  
SSO, 500 km

**DIMENSIONS**

STAGE 1 DIAMETER  
**1.8 m**  
6 ft

STAGE 2 DIAMETER  
**1.8 m**  
6 ft

PAYLOAD FAIRING DIAMETER  
**2 m**  
6.6 ft

OVERALL LENGTH  
**29.48 m**  
95 ft

**PROPULSION  
STAGE 1**

ENGINE  
4x Reaver 1

PROPELLANT  
LOX / RP-1

PROPELLANT FEED  
Turbopump

COMBUSTORS  
4

THRUST (VAC)  
**736.1 kN**  
165,482 lbf

ISP (VAC)  
**295.6 sec**

**PROPULSION  
STAGE 2**

ENGINE  
1x Lightning 1

PROPELLANT  
LOX / RP-1

PROPELLANT FEED  
Turbopump

COMBUSTORS  
1

THRUST (VAC)  
**70.1 kN**  
15,759 lbf

ISP (VAC)  
**322 sec**



**ABOUT**

# ALPHA

**Payload Fairing**

Carbon Composite Structure  
All Pneumatic Low Shock Fairing Separation

**Payload Attach Fitting (PAF)**

38.81" Bolt Circle Interface

**Stage 2 Avionics**

Flight Computer  
S-Band Transmitters  
GPS/IMU Navigation  
Power Conditioning & Distribution Unit (PCDU)  
Data Acquisition Chassis (DAC)  
Lithium Polymer Batteries  
Flight Termination System

**Interstage**

Hot Gas Stage Separation  
Carbon Composite

**Stage 2 Lightning Engine**

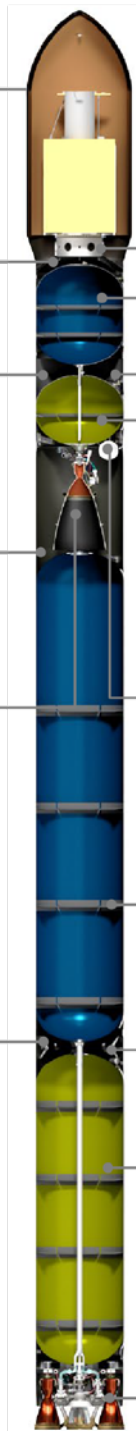
Qty Engines: 1  
Propellant: LOX/RP-1  
Thrust: 70 kN [15.7 klbf] (vac)  
Isp: 322 seconds (vac)

**Stage 1 Avionics**

Power Conditioning & Distribution Unit (PCDU)  
Data Acquisition Chassis (DAC)  
Lithium Polymer Batteries

**Alpha Launch Vehicle**

GLOW 54,120 kg [119,314 lbm]  
Height 29.48 m [96.7 ft]  
Stage 1 Dry Mass 2,895 kg [6,382 lbm]  
Stage 2 Dry Mass 909 kg [2,006 lbm]



**Standardized Secondary**

Payload Adapter  
6 Ports with 8" Bolt Circle Interface

**Stage 2 LOX Tank**

All Composite Construction  
Design MEOP 65 psi

**Stage 2 Helium Tank**

Aluminum Liner  
Design MEOP 5500 psi

**Stage 2 Fuel Tank**

All Composite Construction  
Design MEOP 55 psi

**Stage 2 Nitrogen Tank**

Aluminum Liner  
Design MEOP 5500 psi

**Stage 1 LOX Tank**

All Composite Construction  
Design MEOP 70 psi

**Stage 1 Helium Tanks**

Qty Tanks: 4  
Aluminum Liner  
Design MEOP 5500 psi

**Stage 1 Fuel Tank**

All Composite Construction  
Design MEOP 75 psi

**Stage 1 Reaver Engine**

Qty Engines: 4  
Propellant: LOX/RP1  
Thrust: 801 kN [180 klbf] (vac)  
Isp: 296 seconds (vac)

<b>Payload Segment</b>	5.21 m [17.09 ft]
<b>Stage 2</b>	[5.37 m [17.62 ft]
<b>Stage 1</b>	18.9m [62.02 ft]

DAY OF

# Launch Schedule

<b>HH:MM:SS from Lift Off</b>	<b>Events</b>
T-08:00:00	Final Pad Checkouts
T-07:00:00	Power up of Alpha
T-06:50:00	Sensor Checks
T-06:00:00	Helium Load Begins
T-05:15:00	Fuel Load Begins
T-04:30:00	Pad Clear
T-03:40:00	LOx Load Begins
T-00:20:00	Terminal Count
T-00:00:01.79	Ignition of Stage 1
<b>T+00:00:00</b>	<b>Lift Off!</b>
T+00:01:13	Maximum Aerodynamic Pressure (MaxQ)
T+00:02:37	Main Engine Cut Off (MECO)
T+00:02:40	Stage Separation
T+00:02:42	Stage 2 Ignition
T+00:03:25	Fairing Jettison
T+00:07:40	Second Engine Cut Off #1 (SECO 1)
T+00:53:37	Stage 2 Ignition #2
T+00:53:39	Second Engine Cut Off #2 (SECO 2)
T+00:59:57	Serenity Deploy
T+01:00:57	TES-15 Deploy
T+01:01:57	PICOBUS Deploy

PAYLOADS

# FLTA002 | To The Black

The payloads will be placed inside the Alpha payload fairing on top of our Space Utility Vehicle (SUV) structure.



**Organization:** Teachers in Space

**Payload Name:** Serenity

**Class:** 3U CubeSat

**Deployer:** Firefly 3U CubeSat Dispenser

**Mission:** To collect atmospheric pressure, temperature, and radiation data and make it available for the educational community while also testing the effect of radiation on block chain transactions.



**Organization:** NASA Ames Research Center

**Payload Name:** TechEdSat-15 (TES-15)

**Class:** 3U CubeSat

**Deployer:** Firefly 3U CubeSat Dispenser

**Mission:** Deploy an articulated exo-brake to test deorbit targeting through drag modulation. Other experiments include the Beacon And Memory Board Interface (BAMBI), which optimizes internal and external data transfer from the nano-sat.



**Organization:** Libre Space Foundation

**Payload Name:** PicoBus

**Class:** Pocketcube Deployer for 5 picosatellites

**Mission:** Test the worlds first fully free and open-source telecommunications constellation and demonstrate long-range telecommunications ability.



**Organization:** Teachers In Space, Girls Scouts of Austin, Jonna Ocampo

**Payload Name:** Firefly Capsule

**Class:** Capsule of Artwork

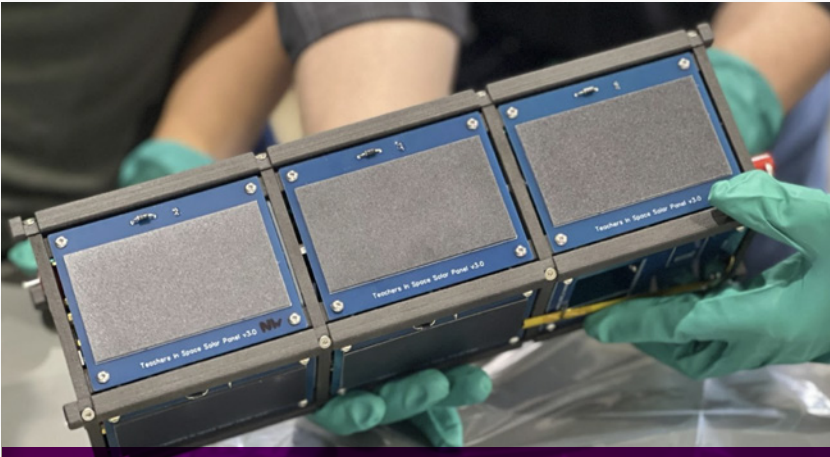
**Mission:** Raise space enthusiasm for children by flying artwork to orbit including:

- 128 Postcards from Teacher In Space made by children around the country
- Henry the Astronaut, a book by Jonna Ocampo
- Space Artwork by the Girl Scouts of Austin

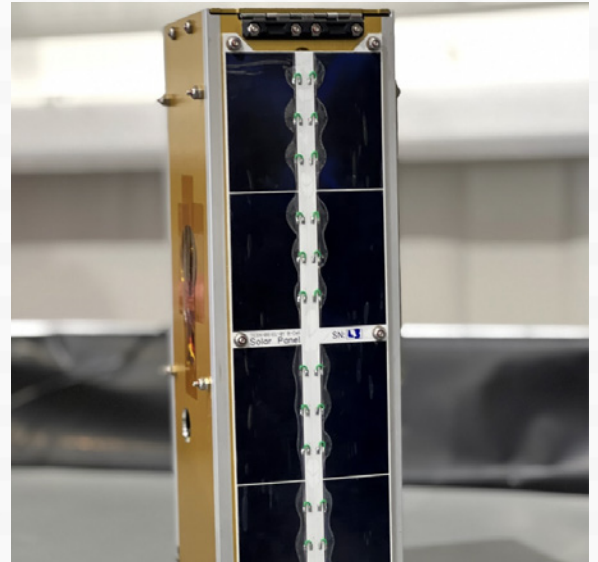


PAYLOADS

# Gallery



Teachers in Space Payload Name: Serenity



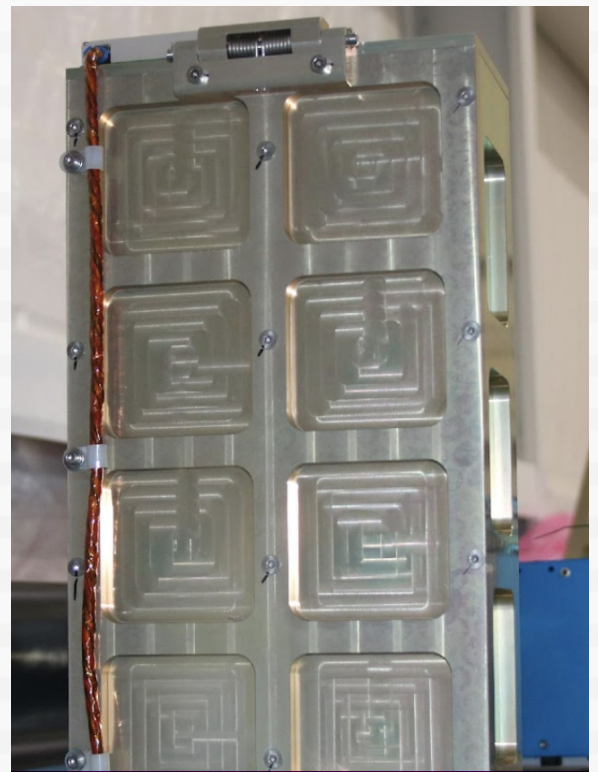
Nasa Payload Name: TechEdSat-15 (TES-15)



Teachers in Space Payload Name: Firefly Capsule



Teachers in Space Payload Name: Firefly Capsule



Libre Space Foundation Payload Name: PicoBus

## ABOUT

# Firefly Aerospace

Firefly is developing a family of launch and in-space vehicles and services that provide industry-leading affordability, convenience, and reliability. Firefly's launch vehicles utilize common technologies, manufacturing infrastructure and launch capabilities, providing LEO launch solutions for up to ten metric tons of payload at the lowest cost per kg in the small-launch class. Combined with Firefly's in-space vehicles, such as the Space Utility Vehicle and Blue Ghost Lunar Lander, Firefly provides the space industry with a single source for missions from LEO to the surface of the Moon or beyond. Firefly is headquartered in Cedar Park, TX. For more information please see: [www.fireflyspace.com](http://www.fireflyspace.com)

## LIVE STREAM LINKS

[firefly.com/alpha-flight-2-to-the-black](http://firefly.com/alpha-flight-2-to-the-black)

Webcast will be live approx. T-60 minutes

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## UPDATES

For more information on current and future missions visit:

[firefly.com/missions](http://firefly.com/missions)

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## FLTA002 TO THE BLACK

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