THERE AND BACK AGAIN

PRESS KIT | NET APRIL 19, 2022 UTC

Rocket Lab USA, Inc.
rocketlabusa.com

ROCKETLAB

LAUNCH INFORMATION

LAUNCH WINDOW

A 14-day launch window opens no earlier than April 19, 2022 UTC.

DAILY LAUNCH OPPORTUNITY

Target Launch Time:

Time Zone	Window Open
UTC	22:35 — 00:40
NZT	10:35 — 12:40
ET	18:35 — 20:40
PT	15:35 — 17:40

The launch timing for this mission remains the same each day, and lasts two hours and five minutes.

RECOVERY MISSION

Electron Stage-1 booster to be captured by recovery helicopter.

LAUNCH SITE

LC-1 A

Mahia, New Zealand

ORBIT

520km

Sun Synchronous

SATELLITES

34

CUSTOMER

Rideshare

MISSION OVERVIEW

ABOUT 'THERE AND BACK AGAIN'

LAUNCH COMPLEX 1
MAHIA, NEW ZEALAND

'There And Back Again' — Rocket Lab's 26th Electron launch.

The "There And Back Again" mission will see Electron deploy 34 satellites to a sun synchronous orbit for a variety of customers including Alba Orbital, Astrix Astronautics, Aurora Propulsion Technologies, E-Space, Spaceflight Inc., and Unseenlabs, and bringing the total number of satellites launched by Electron to 146.

"There And Back Again" is also a recovery mission where, for the first time, Rocket Lab will attempt a mid-air capture of Electron's first stage as it returns from space using parachutes and a helicopter.

Like previous recovery missions, Electron's first stage will undertake a series of complex maneuvers designed to enable it to survive the extreme heat and forces of atmospheric re-entry. Electron will be equipped with a heat shield to help protect the stage's nine Rutherford engines and a parachute to slow Electron down in order for Rocket Lab's customized Sikorsky S-92 helicopter to catch the stage as it returns.

Unlike previous recovery missions, "There And Back Again" is attempting to avoid an ocean splashdown. After catching the stage mid-air, the helicopter will return to the stage back to land. Upon success of this recovery, Electron will be one step closer to being the first reusable orbital small sat launcher.

MISSION OVERVIEW

PAYLOADS ONBOARD ELECTRON

albaorbital

Payload: Four pico-satellites
Organization: Alba Orbital, Scotland

The cluster of four pico-satellites includes Alba Orbital's own Unicorn-2 PocketQube satellites, as well as the TRSI-2, TRSI-3, and MyRadar-1 satellites for Alba Orbital's customers. Each small satellite carries a unique sensor designed to demonstrate innovative technologies on orbit. Unicorn-2 will be carrying an optical night-time imaging payload designed to monitor light pollution across the globe. Night-time satellite imagery, otherwise known as 'Night Lights' data, provides crucial insights into human activities. This data enables a host of applications such as tracking urbanization and socioeconomic dynamics, evaluating armed conflicts and disasters, investigating fisheries, assessing greenhouse gas emissions and energy use, and analyzing light pollution and health effects.

AURORASAT
AURORA PROPULSION TECHNOLOGIES

AURORA
PROPULSION TECHNOLOGIES

Payload: AuroraSat-1
Organization: Aurora Propulsion Technologies, Finland

AuroraSat-1 will demonstrate space junk removal technologies for small satellites, including propulsion devices and plasma brakes, that enable the sustainable use of space. The CubeSat will validate the water-based propellant and mobility control of its Resistojets that can assist CubeSats with detumbling capabilities and propulsion-based attitude control. AuroraSat-1 will also test its deployable Plasma Brakes which combine a micro-tether with charged particles in space, or ionospheric plasma, to generate significant amounts of drag to deorbit the spacecraft safely at the end of its life.

ASTRIX
ASTRONAUTICS

Payload: Copia
Organization: Astrix Astronautics, New Zealand

Copia is Atrix's flagship deployment system that improves on power restraints typically seen in small satellites. In-orbit testing with 1U solar arrays able to capture up to 200W will demonstrate the high performance of Copia's novel design.

MISSION OVERVIEW

PAYLOADS ONBOARD ELECTRON

E-SPACE

Payload: Three demonstration satellites
Organization: E-Space

E-Space's payload will consist of three demonstration satellites to validate the systems and technology for its sustainable satellite system. The satellites have small cross-sections, to decrease the risk of collision from the millions of untrackable space objects and will automatically de-orbit if any systems malfunction. Eventually, the satellites will sacrificially capture and deorbit small debris to burn up on re-entry, setting a new standard in space environmental management.

SPACEFLIGHT

Payload: Picosats
Organization: Spaceflight Inc.

Spaceflight Inc. has arranged for Rocket Lab to launch two stacks of picosatellites for an Internet of Things constellation.

unseenlabs
— THE BRIGHT SIGHT

Payload: BRO-6
Organization: Unseenlabs

BRO-6 is the sixth satellite of the Unseenlabs' constellation, dedicated to the detection of radiofrequency signals. Thanks to its technology, the French company detects any vessel at sea, even those whose cooperative beacon is turned off. The launch of BRO-6 satellite will allow Unseenlabs to improve its revisit time and deliver more customers.

UNSEENLABS
BRO-6 SATELLITE

MEET OUR RECOVERY HELICOPTER

SIKORSKY S-92

950 KM	306 KM/H	20.8 M	5.47 M
Range	Top Speed	Length	Height
7,070 KG	12,837 KG	2	1,879 KW
Weight	Max Takeoff Weight	Turboshaft Engines	Engine Power (each)

OUR FIRST MID-AIR CAPTURE ATTEMPT

MAKING ELECTRON THE WORLD'S FIRST REUSABLE SMALL LAUNCH VEHICLE

MID-AIR RECOVERY TEST
MARCH 2020

SIKORSKY FLIGHT TESTS
APRIL 2022

As the second-most frequently launched U.S. rocket, Electron has become a workhorse relied upon by the global small satellite industry.

Our recovery program aims to make Electron the first reusable small launch vehicle to enable even more frequent launch opportunities for the small sat community.

With this mission, for the first time, we're taking the next major step by attempting to capture Electron's first stage mid-air as it returns to Earth.

Rocket Lab will be attempting the catch with a customized Sikorsky S-92, a large twin engine helicopter typically used in offshore oil and gas transport and search and rescue operations.

Catching a returning rocket stage mid-air as it returns from space is a highly complex operation that demands extreme precision. Several critical milestones must align perfectly to ensure a successful capture.

PLUCKED FROM THE SKIES

MISSION PROFILE

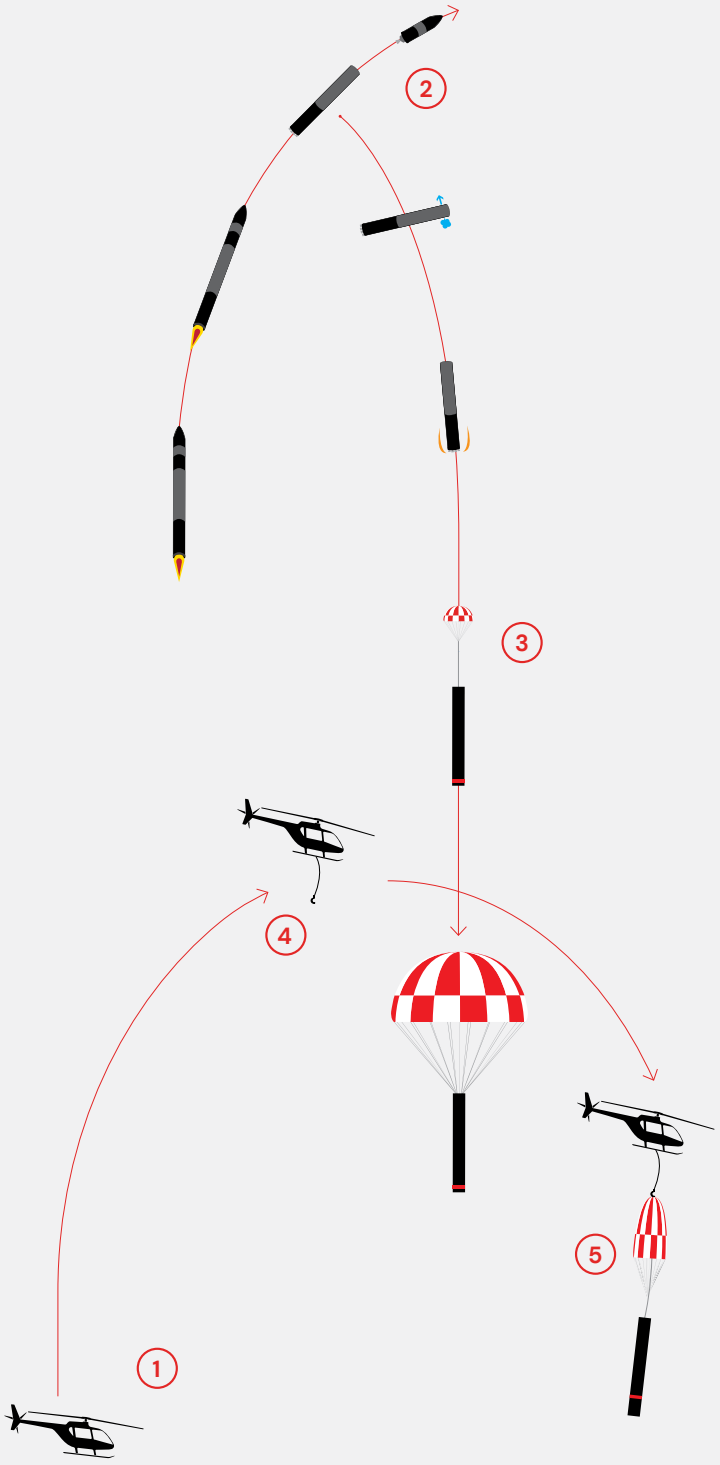
1. Approximately an hour prior to lift-off, Rocket Lab's helicopter will move into position in the capture zone, approximately 150 nautical miles off New Zealand's coast, to await launch.

2. At about two and a half minutes after lift-off, Electron's first and second stages will separate per a standard mission profile. Electron's second stage will continue on to orbit for payload deployment and Electron's first stage will begin its descent back to Earth reaching speeds of almost 8,300 km (5,150 miles) per hour. The stage will reach temperatures of around 2,400 degrees C (4,352 F) during its descent.

3. After deploying a drogue parachute at 13 km (8.3 miles) altitude (about seven and a half minutes after lift-off), the main parachute will be extracted at around 6 km (3.7 miles) altitude to dramatically slow the stage to 10 metres per second, or 36 km (22.3 miles) per hour (about eight minutes and 12 seconds after lift-off).

4. As the stage enters the capture zone, Rocket Lab's helicopter will attempt to rendezvous with the returning stage and capture the parachute line via a hook.

5. Once the stage is captured and secured, the helicopter will transport it back to land where Rocket Lab will conduct a thorough analysis of the stage and assess its suitability for reflight.



THE ROAD TO REUSABILITY

LAUNCH, CATCH, REPEAT

'There and Back Again' might be our first mid-air capture attempt, but it's far from our first recovery mission. We've conducted multiple tests of the parachute systems, helicopter operations, and even recovered three stages from the ocean on previous missions. Each one of these exercises helped to inform the upcoming mid-air capture attempt.

MID-AIR RECOVERY TESTS

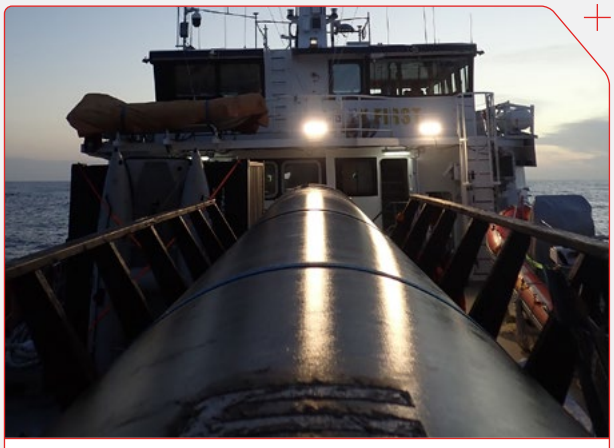
To practice our rocket catching skills, we've carried out many mid-air capture tests. These are conducted by dropping an Electron first stage test article from a helicopter, deploying the stage's parachute, and then catching the stage as it descends using a specially designed grappling hook to snag the parachute's drogue line.

Check out the test footage here:

https://youtu.be/N3CWGDhkmbs

'RUNNING OUT OF FINGERS' DECEMBER 2019

The 'Running Out Of Fingers' mission featured the first guided, full telemetry re-entry of the Electron first stage as part of the recovery program. Recovery instrumentation on-board this flight included guidance and navigation hardware, including S-band telemetry and on-board flight computer systems, to live-gather data during the first stage's atmospheric re-entry, as well as a reaction control system to orient the booster.



'RETURN TO SENDER' AND 'RUNNING OUT OF TOES' NOVEMBER 2020 & MAY 2021

During these missions, Electron's first stage was successfully brought back to Earth under a parachute. The stages completed controlled water landings before collection by a recovery vessel. These missions marked major milestones in the recovery program and informed design and operational processes for an eventual helicopter capture attempt.

VIEWING A LAUNCH ONLINE

LIVE STREAM LINKS

The livestream is viewable at:

rocketlabusa.com/live-stream

Webcast will be live approx. T-20 minutes

We will do our best to bring you live footage of recovery, it may be very limited.

LAUNCH FOOTAGE & IMAGES

Images and footage of the 'There And Back Again' launch will be available shortly after a successful mission at:

rocketlabusa.com/about-us/updates/link-to-rocket-lab-imagery-and-video

UPDATES

For information on launch day visit:

rocketlabusa.com/next-mission

FOLLOW ROCKET LAB

@RocketLab

facebook.com/RocketLabUSA

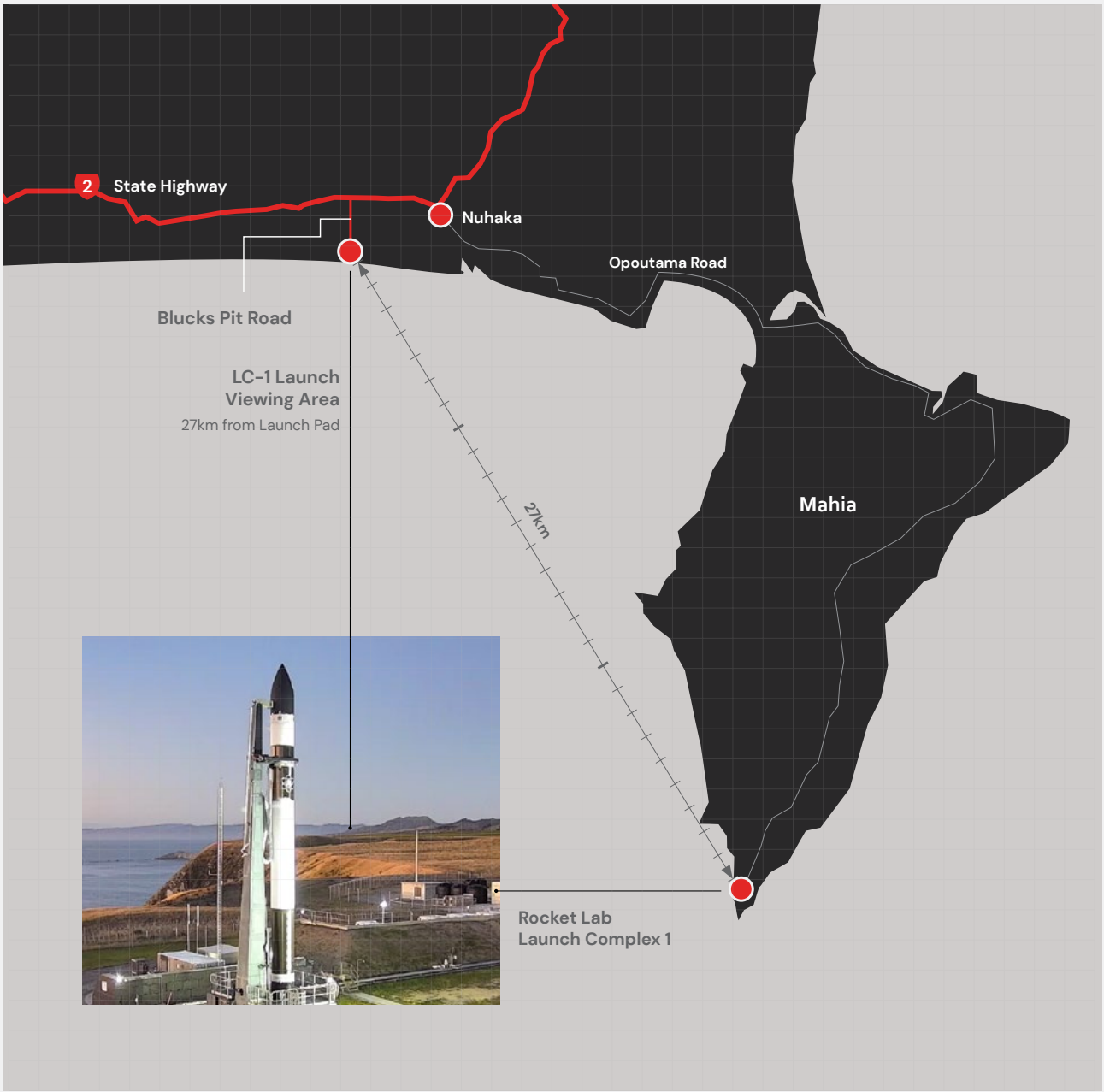
VIEWING A LAUNCH IN PERSON

LOCATION

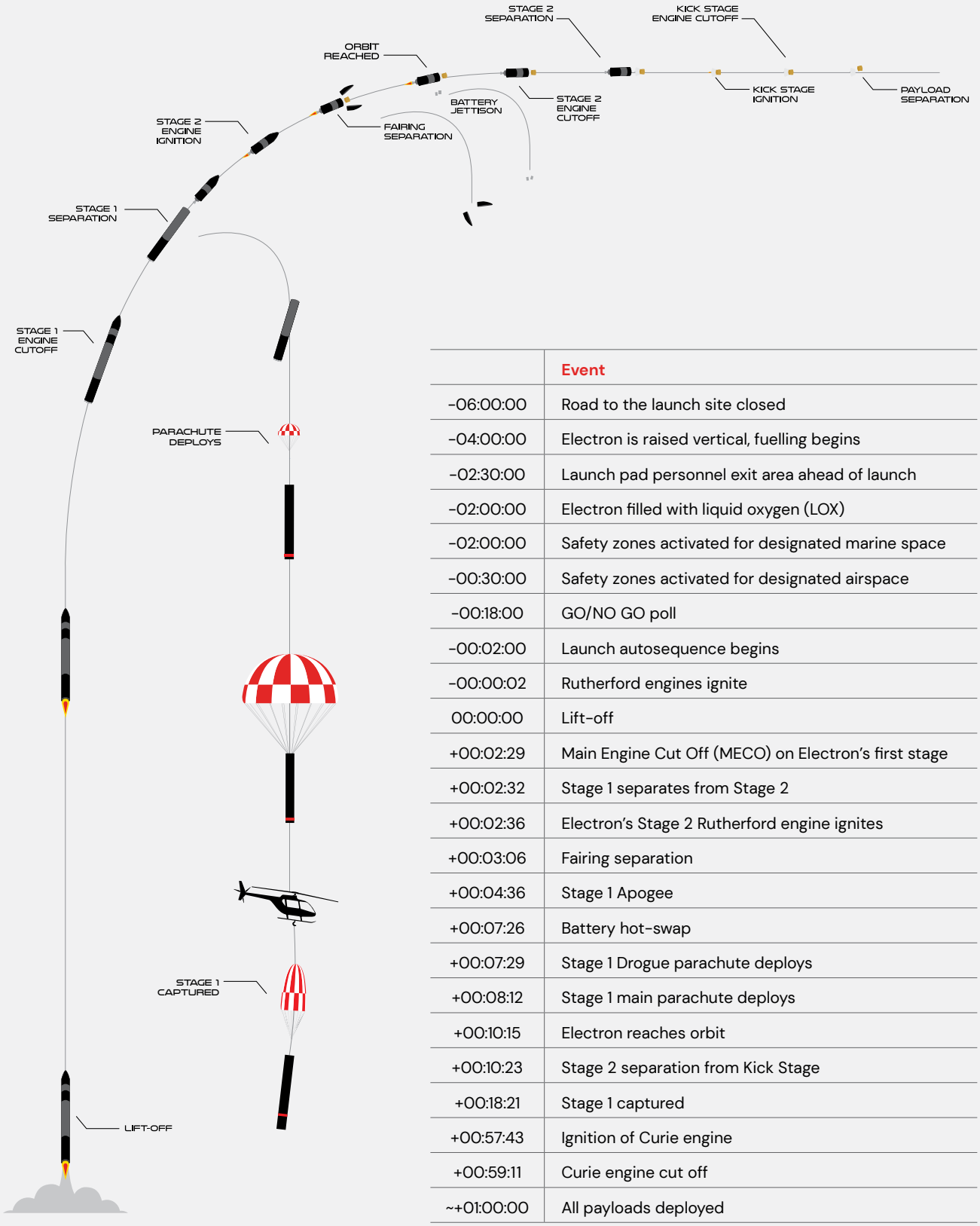
Wairoa District Council has allocated a rocket launch viewing area for the public near Nuhaka, accessible via Blucks Pit Road. Scrubs and postponements are likely during launch windows, so visitors to the Blucks Pit viewing site should anticipate multiple postponements, sometimes across several days.

MORE INFORMATION VISIT

visitwairoa.co.nz/welcome-to-wairoa/space-coast-new-zealand



TIMELINE OF LAUNCH EVENTS



	Event
-06:00:00	Road to the launch site closed
-04:00:00	Electron is raised vertical, fuelling begins
-02:30:00	Launch pad personnel exit area ahead of launch
-02:00:00	Electron filled with liquid oxygen (LOX)
-02:00:00	Safety zones activated for designated marine space
-00:30:00	Safety zones activated for designated airspace
-00:18:00	GO/NO GO poll
-00:02:00	Launch autosequence begins
-00:00:02	Rutherford engines ignite
00:00:00	Lift-off
+00:02:29	Main Engine Cut Off (MECO) on Electron's first stage
+00:02:32	Stage 1 separates from Stage 2
+00:02:36	Electron's Stage 2 Rutherford engine ignites
+00:03:06	Fairing separation
+00:04:36	Stage 1 Apogee
+00:07:26	Battery hot-swap
+00:07:29	Stage 1 Drogue parachute deploys
+00:08:12	Stage 1 main parachute deploys
+00:10:15	Electron reaches orbit
+00:10:23	Stage 2 separation from Kick Stage
+00:18:21	Stage 1 captured
+00:57:43	Ignition of Curie engine
+00:59:11	Curie engine cut off
~+01:00:00	All payloads deployed

ELECTRON LAUNCH VEHICLE

OVERALL

LENGTH
18m

DIAMETER (MAX)
1.2m

STAGES
2 + Kick Stage

VEHICLE MASS (LIFT-OFF)
13,000kg

MATERIAL/STRUCTURE
Carbon Fiber Composite/Monocoque

PROPELLANT
LOX/Kerosene

PAYLOAD

NOMINAL PAYLOAD
200kg / 440lbm To 500km SSO

FAIRING DIAMETER
1.2m

FAIRING HEIGHT
2.5m

FAIRING SEP SYSTEM
Pneumatic Unlocking, Springs

STAGE 2

PROPULSION
1x Rutherford Vacuum Engine

THRUST
5800 LBF Vacuum

ISP
343 Sec

INTERSTAGE

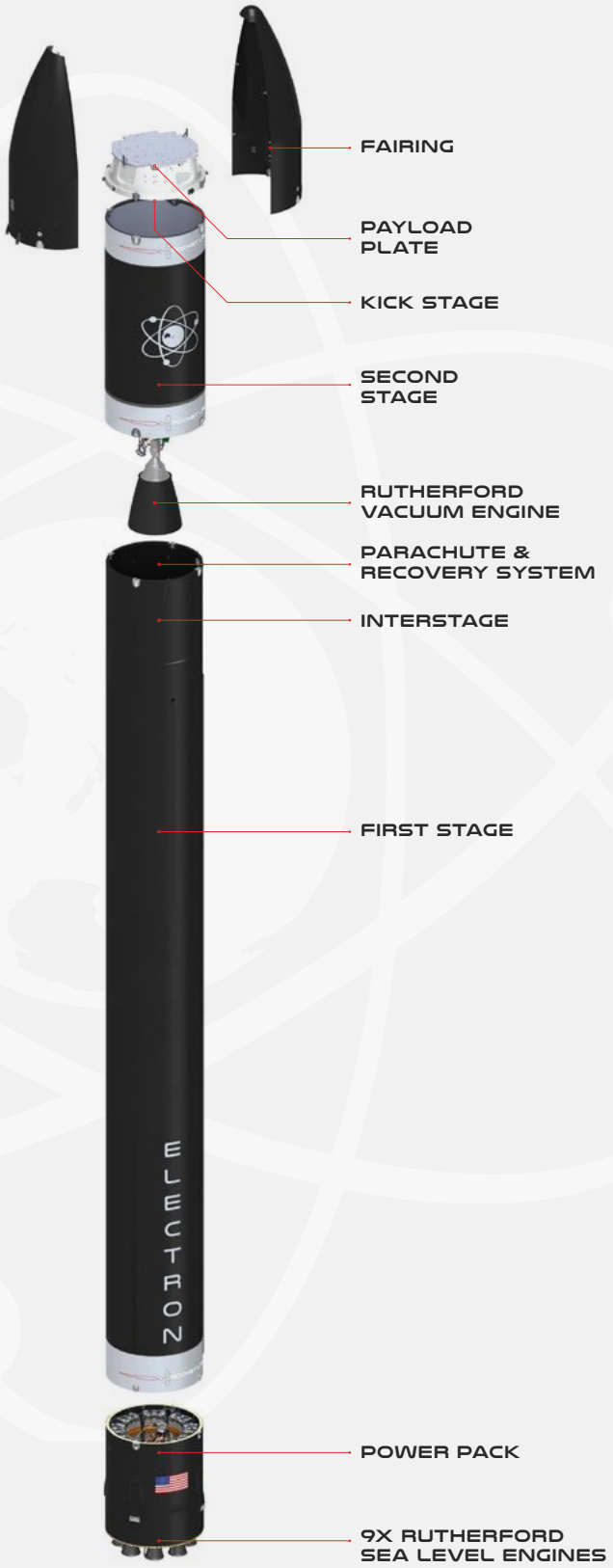
SEPARATION SYSTEM
Pneumatic Pusher

STAGE 1

PROPULSION
9x Rutherford Sea Level Engines

THRUST
5600 LBF Sea Level (Per Engine)

ISP
311 Sec



CONTACT US

rocketlabusa.com
media@rocketlabusa.com

CONNECT WITH US

@rocketlab
RocketLabUSA
facebook.com/rocketlabusa

ROCKETLAB