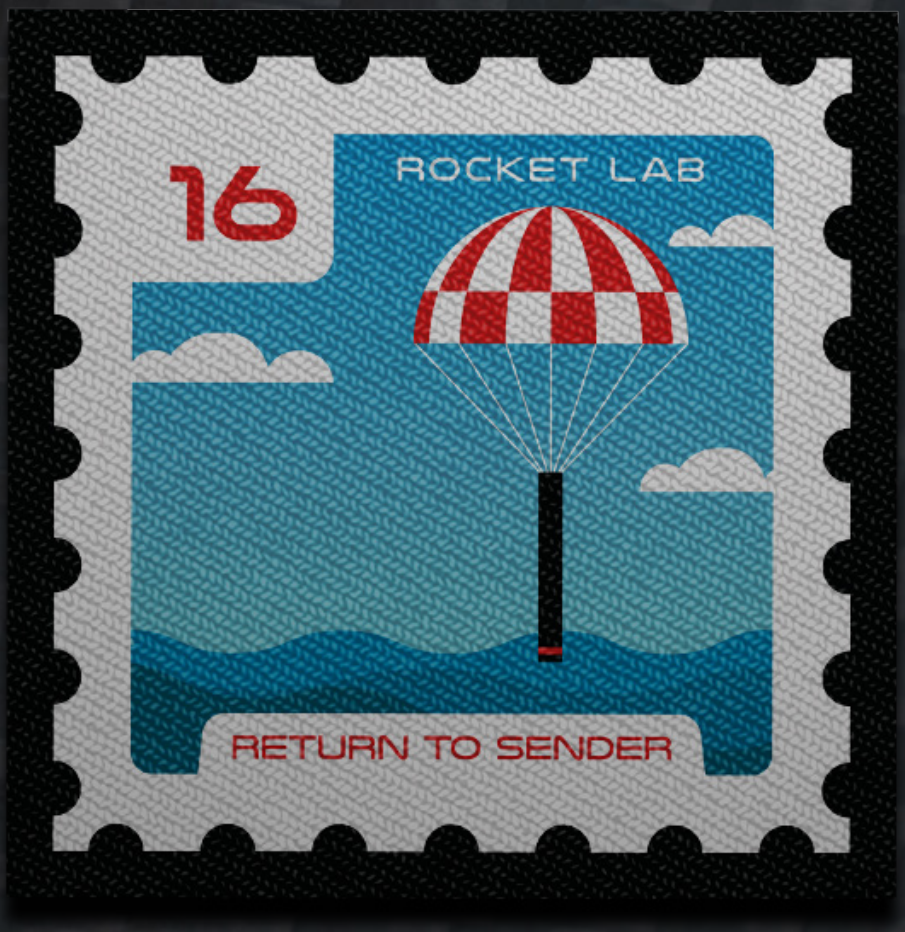
ROCKET LAB USA 2020

RETURN TO SENDER PRESS KIT NOVEMBER 2020

LAUNCHING ON ELECTRON VEHICLE SIXTEEN: 'RETURN TO SENDER'



ROCKET·LAB

ROCKET LAB PRESS KIT
'RETURN TO SENDER' 2020

LAUNCH INFORMATION

ELECTRON ON THE PAD FOR THE 'RETURN TO SENDER' MISSION | October 2020

LAUNCH WINDOW
16–30 NOVEMBER 2020

LAUNCH SITE
LAUNCH COMPLEX 1
MAHIA PENINSULA, NZ

DAILY LAUNCH OPPORTUNITY
NZT: 14:44–17:34
UTC: 01:44–04:34

PT: 17:44–20:34
ET: 20:44–23:34

Watch the live launch webcast: **www.rocketlabusa.com/live-stream**

For information on launch day visit: **www.rocketlabusa.com/next-mission/**

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@RocketLab www.facebook.com/RocketLabUSA/

MISSION OVERVIEW

'Return to Sender' will deploy 30 satellites to a 500km circular low Earth orbit for several small satellite operators.

The mission will be Rocket Lab's 16th launch overall and sixth mission of 2020.

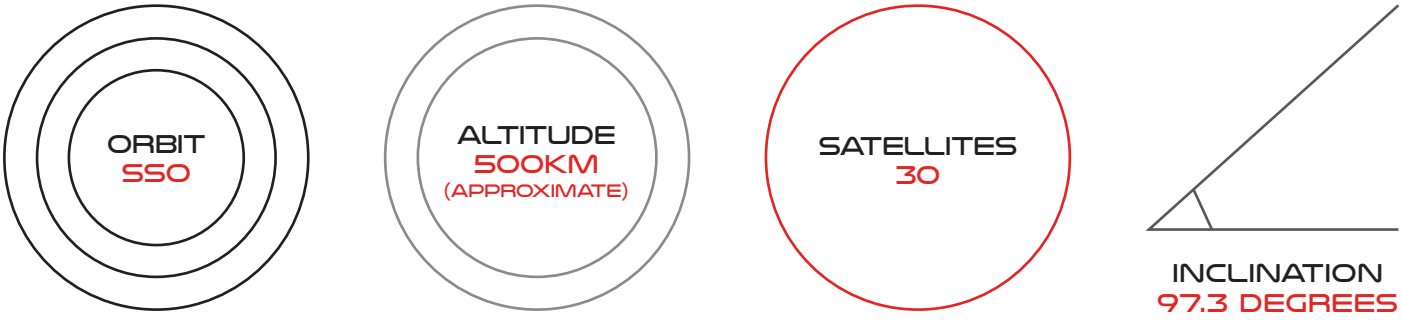
For the first time, Rocket Lab will also attempt to bring Electron's first stage back from space under a parachute for a water landing. This major milestone is the next step in Rocket Lab's plan to make Electron a reusable launch vehicle.

Rocket Lab aims to retrieve the stage from this mission for inspection and analysis to inform future recovery missions.

DONATE TO CHARITY

Valve's Gabe Newell, will be donating one dollar to the Paediatric Intensive Care Unit at Starship children's hospital for every person who watches the launch online at **www.rocketlabusa.com/live-stream** and **www.twitch.tv/RocketLabUSA**

TARGET ORBIT INFORMATION



PAYLOADS ONBOARD RETURN TO SENDER

TriSept Corporation
Integrity Expertise Innovation

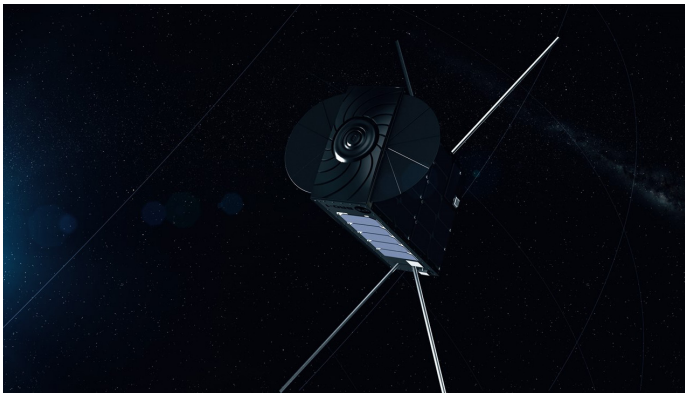
Payload: DRAGRACER
Organization: TriSept

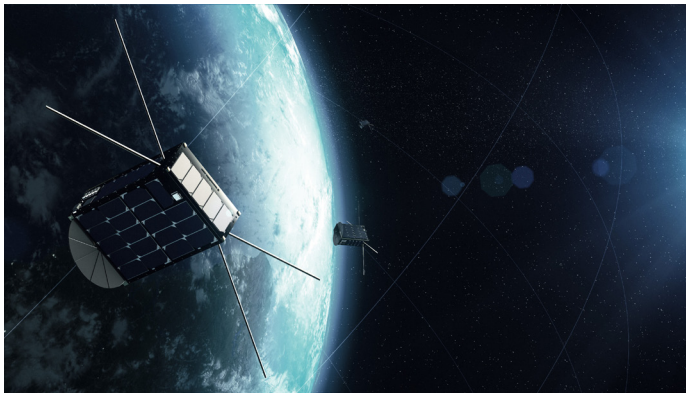
The DRAGRACER mission will test the effectiveness of new tether technologies designed to accelerate spacecraft reentry and reduce orbital debris at the conclusion of space missions. TriSept has completed the integration of a pair of qualified Millennium Space Systems 6U small satellites, one featuring the tether drag device and one without. The controlled spacecraft should deorbit in approximately 45 days, while the second spacecraft is expected to remain in orbit for seven to nine years, according to Tethers Unlimited, developer of the 70-meter-long (230 feet) Terminator Tape aboard the control satellite.

unseenlabs
— THE BRIGHT SIGHT

Payload: BRO-2 and BRO-3
Organization: Unseenlabs

BRO-2 and BRO-3 are the second and third satellites in French company Unseenlabs' planned constellation of about 20 satellites dedicated to maritime surveillance. The first BRO satellite was launched to orbit by Rocket Lab in August 2019. Unseenlabs' constellation enables improved monitoring of activities at sea, such as illegal fishing and anti-environmental behavior. Thanks to a unique proprietary technology, the BRO satellites are the first to be able to independently and precisely locate and fingerprint Radio Frequency (RF) emitters all around the globe, day or night, in any weather condition, and without requiring any special embarked tracking device. With three satellites in orbit, Unseenlabs' clients can now benefit from the shortest revisit time available on the satellite RF geolocation market.

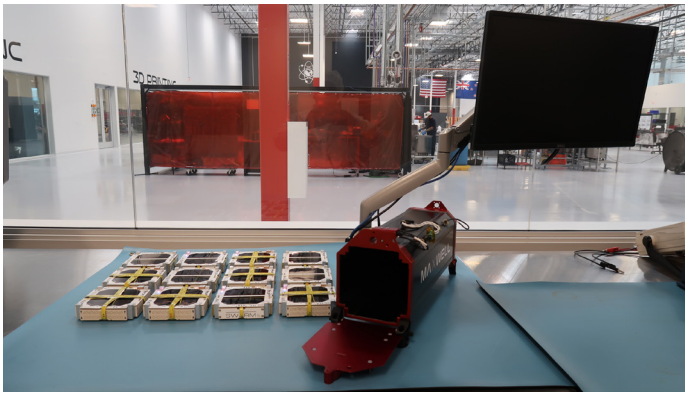




SWARM

Payload: Spacebees
Organization: Swarm Technologies

Swarm will launch the latest 24 1/4U SpaceBEE satellites to continue building out its planned constellation of 150 satellites to provide affordable satellite communications services to IoT devices in remote regions around the world. Swarm's uniquely small satellites enable the company to provide network services and user hardware at the industry's lowest cost and deliver maximum value to customers across a range of industries including maritime shipping, agriculture, energy, and ground transportation. The SpaceBEES will be integrated into two of Rocket Lab's 12U Maxwell CubeSat dispensers for orbital deployment.



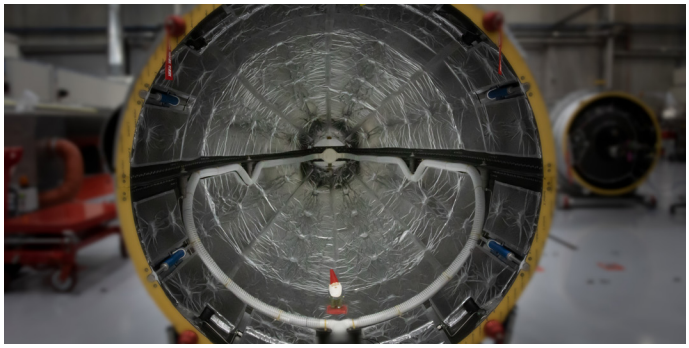
THE UNIVERSITY OF AUCKLAND
Te Whare Wānanga o Tāmaki Makaurau
NEW ZEALAND

Payload: APSS-1
Organization: Auckland Programme for Space Systems, The University of Auckland

The student-built Waka Āmiorangi Aotearoa APSS-1 satellite is designed to monitor electrical activity in Earth's upper atmosphere to test whether ionospheric disturbances can predict earthquakes. The data from this mission will deliver deeper knowledge of these hard-to-access altitudes and drive understanding of how phenomena such as solar wind and geophysical events affect this atmospheric region.

Mass Simulator: Gnome Chompski
Organization: Gabe Newell (Valve Software)

Manufactured with support from multi-award-winning design studio Weta Workshop, the unique space component is additively manufactured from titanium and printed in the shape of Half-Life gaming icon Gnome Chompski. The mission serves as an homage to the innovation and creativity of gamers worldwide, and also aims to test and qualify a novel 3D printing technique that could be employed for future spacecraft components. The 150 mm gnome will remain attached to Electron's Kick Stage and will de-orbit with it when the stage burns up on re-entry to the Earth's atmosphere.



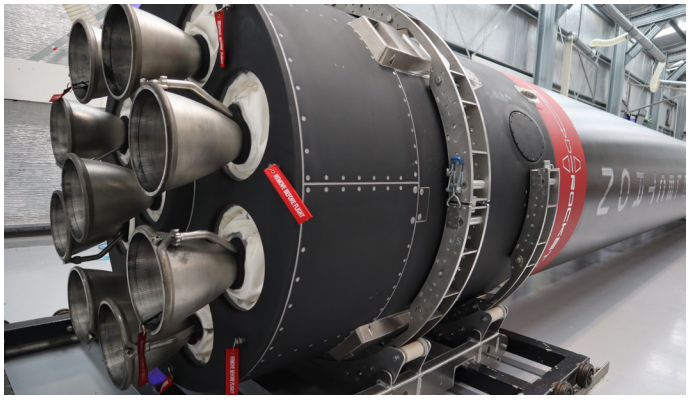
MAKING ELECTRON A REUSABLE ROCKET

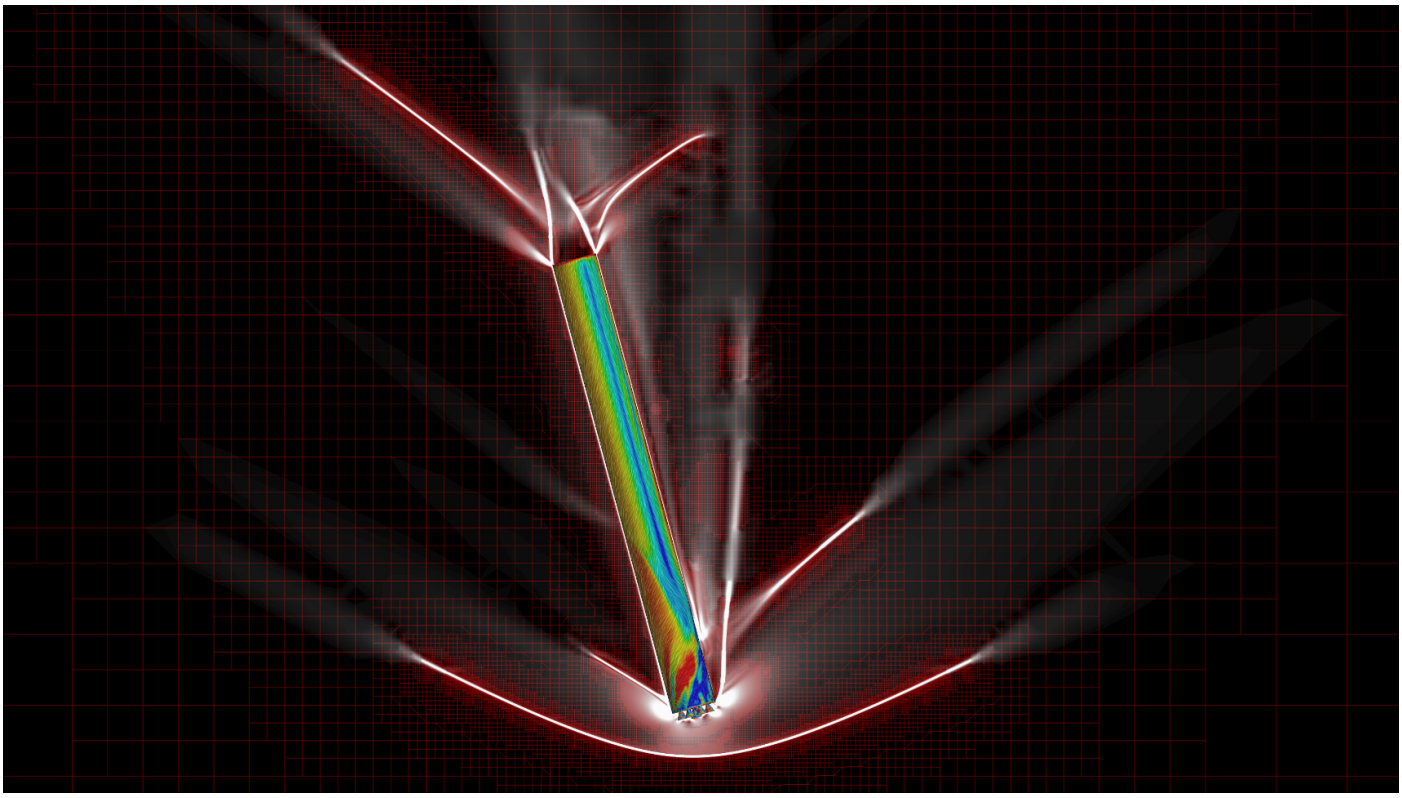
LAUNCH FAST, LAUNCH OFTEN

The Return to Sender mission aims to do just that, return Electron's first stage back to Earth after launch. It's the next major milestone in our plan to make Electron a reusable launch vehicle. Here's how it will happen:

- At two and a half minutes after launch, at an altitude of ~80 km, Electron's first and second stages will separate, and the second stage will continue on to orbit for payload deployment.
- With the engines shut down, the Electron's first stage will coast to apogee.
- During the coast, a reaction control system will re-orient the first stage 180-degrees; this will put the stage on the ideal angle for re-entry, enabling it to survive incredible heat and pressure during its descent back to Earth.
- After decelerating to <Mach 2, a drogue parachute will be deployed to increase drag and to stabilize the stage as it descends.
- During the last couple of kilometres, a large main parachute will then be deployed to further slow the stage and enable a soft water landing.
- Rocket Lab's vessel will rendezvous with the stage after splashdown and retrieve it for transport back to Rocket Lab's production complex for inspection.

While this mission will see Electron undertake a soft water landing, Rocket Lab plans to recover stages from future missions by capturing the boosters mid-air with a helicopter.
Rocket Lab has carried out extensive successful testing of this mid-air capture technique, which can be viewed here: https://youtu.be/N3CWGDhkmbs





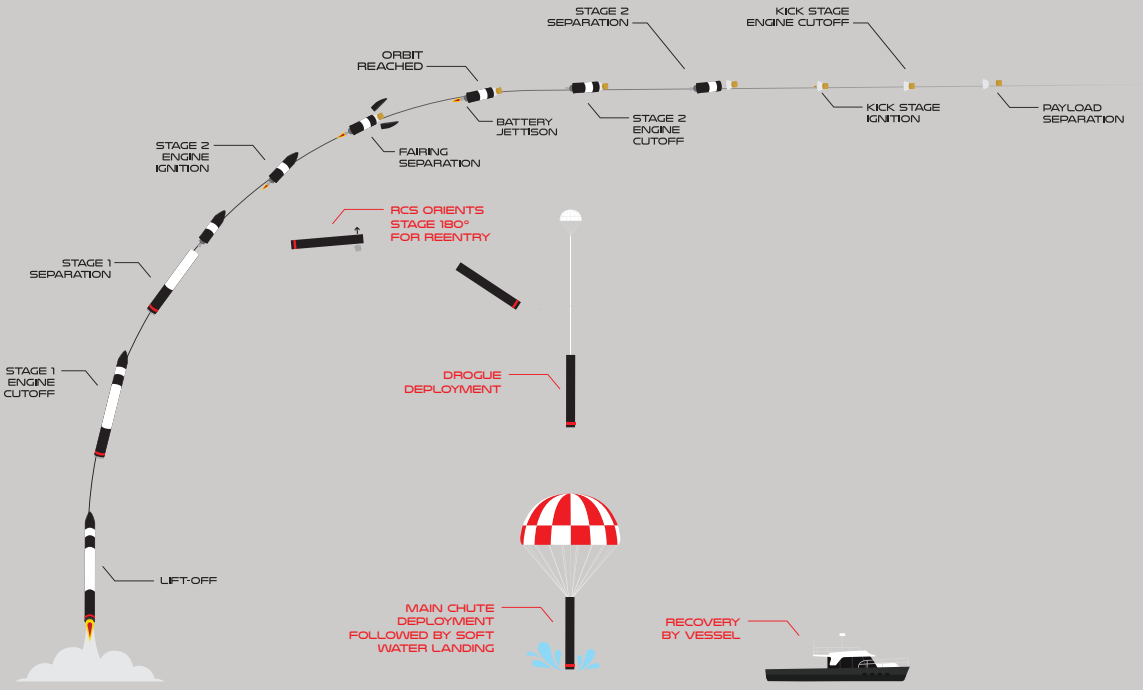
RECOVERY FOOTAGE

A camera on stage 1 will attempt to document the re-entry view. This view will be available during the launch webcast until approximately 30 km altitude, when the stage goes over the horizon and telemetry will hand-off to the recovery vessel for local monitoring.

TIMELINE OF LAUNCH EVENTS

HOURS:MINUTES:SECONDS FROM LIFT-OFF

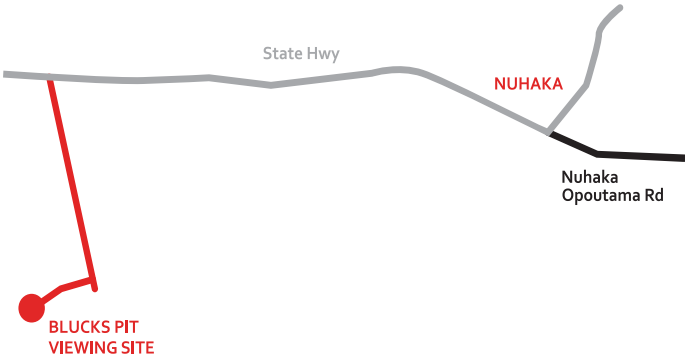
	EVENT
-06:00:00	Recovery vessel on station & weather check
-04:00:00	Road to the launch site closed
-04:00:00	Electron is raised vertical, fueling begins
-02:30:00	Launch pad personnel exit area ahead of launch
-02:00:00	Electron filled with liquid oxygen (LOX)
-02:00:00	Safety zones are activated for designated marine space
-00:30:00	Safety zones are 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
+00:02:33	Main Engine Cut Off (MECO) on Electron's first stage
+00:02:36	Stage 1 separation
+00:02:39	Electron's Stage 2 Rutherford engine ignites
+00:03:15	Fairing separation
+00:06:08	Battery hot-swap
+00:07:38	Stage 1 drogue deployed
+00:08:44	Stage 1 main parachute deployed
+00:08:46	Stage 2 reaches orbit
+00:08:54	Stage 2 separation from Kick Stage
+00:12:48	Stage 1 splashdown. Recovery vessel commences stage retrieval and transport back to Rocket Lab facility.
+00:49:38	The Curie engine on the Kick Stage ignites
+00:51:08	Curie engine cuts off
~+00:60:00	Payloads deployed



VIEWING A LAUNCH

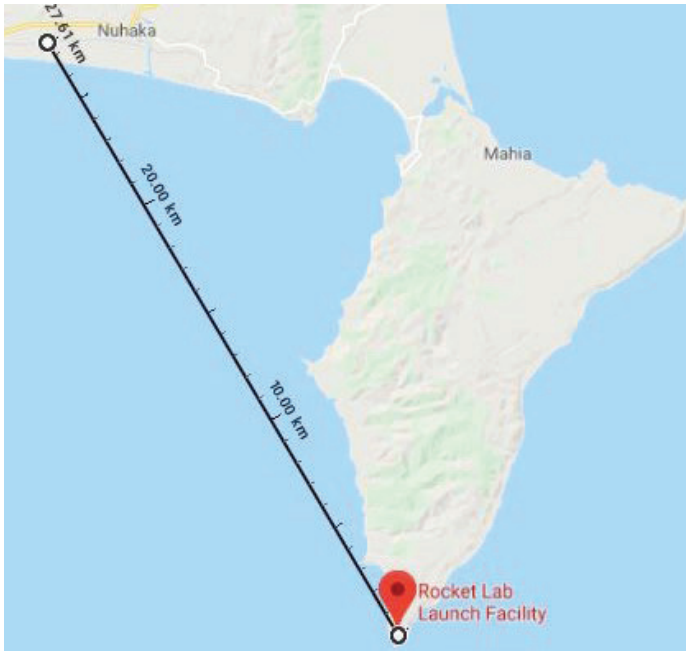
VIEWING IN PERSON

Wairoa District Council has allocated a rocket launch viewing area for the public near Nuhaka, accessible via Blucks Pit Road. Visit www.visitwairoa.co.nz/welcome-to-wairoa/space-coast-new-zealand/ for more information. Scrubs and postponements are likely during launch windows, so visitors to the Blucks Pit viewing site should anticipate multiple postponements, sometimes across several days.



LC-1 LAUNCH VIEWING AREA | Blucks Pit Road, near Nuhaka

ROCKET LAB'S LIVESTREAM OF 'IN FOCUS' MISSION | October, 2020



LAUNCH VIEWING AREAS DISTANCE FROM ROCKET LAB LC-1

LIVESTREAM

The best way to view a launch is via Rocket Lab's live video webcast. This offers the best views of launch and includes helpful commentary about the launch process. A livestream will be made available approximately 15-20 minutes prior to a launch attempt. Rocket lab will post links to the webcast when live via Facebook and Twitter. The livestream is viewable at www.rocketlabusa.com/live-stream and Rocket Lab's YouTube channel.

LAUNCH FOOTAGE AND IMAGES

Images and footage of the 'Return to Sender' launch will be available shortly after a successful mission at www.rocketlabusa.com/news/updates/link-to-rocket-lab-imagery-and-video.

SOCIAL MEDIA

For real time updates on the launch follow the Rocket Lab Twitter page @RocketLab

@RocketLabUSA @RocketLab

CONTACTS

PRESS

rocketlabusa.com/news media@rocketlabusa.com

ELECTRON

OVERALL

LENGTH
18M

DIAMETER (MAX)
1.2M

STAGES
2 + KICK STAGE

VEHICLE MASS (LIFTOFF)
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

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