

ROCKET LAB USA 2019

MAKE IT RAIN PRESS KIT

JUNE 2019



LAUNCHING ON ELECTRON VEHICLE
SEVEN: 'MAKE IT RAIN'





ROCKET LAB PRESS KIT

'MAKE IT RAIN' 2019

LAUNCH INFORMATION

LAUNCH WINDOW

27 JUNE - 10 JULY, 2019 NZST
(27 JUNE - 10 JULY, 2019 UTC)

DAILY LAUNCH TIMING

16:30 NZST - 18:30 NZST
(04:30 - 06:30 UTC)

LAUNCH SITE

LAUNCH COMPLEX 1
MAHIA PENINSULA, NZ

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

For information on launch day visit www.rocketlabusa.com/missions/next-mission and follow Rocket Lab on Twitter @RocketLab.

MISSION OVERVIEW

The Make It Rain mission is Rocket Lab's seventh Electron launch overall and the company's third for 2019.

The rideshare mission, procured by Spaceflight, will see multiple small satellites lofted to a 450km x 450km orbit on Electron from Rocket Lab Launch Complex 1 on New Zealand's Māhia Peninsula.

After lift-off and first stage separation, Electron's second stage will be used to take the payloads to an elliptical orbit, where Electron's Kick Stage will separate. The Kick Stage's Curie engine will then ignite and propel the Kick Stage and payloads to a circular orbit for precise deployment. Following payload deployment, the Kick Stage is capable of reigniting its engine to perform a deorbit maneuver. This helps the Kick Stage to be pulled into the Earth's atmosphere faster, leaving no debris in orbit.



ELECTRON ARRIVES AT LC-1 IN PREPARATION FOR THE MAKE IT RAIN MISSION | June 2019



MAKE IT RAIN FAIRING | June 2019



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PAYLOADS

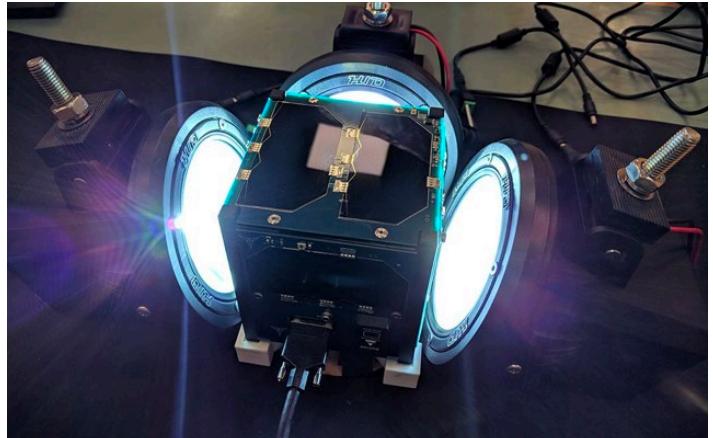
The Make It Rain mission will loft seven satellites, including BlackSky's Global-3 microsat, two U.S. Special Operations Command (SOCOM) Prometheus satellites and Melbourne Space Program's ACRUX-1 CubeSat. The total mission payload mass is 80 kg.

The largest spacecraft on the mission is BlackSky Global-3, a microsatellite developed, designed, and manufactured by BlackSky, a leading provider of geospatial intelligence, satellite imaging, and global monitoring services.

This mission will take the total number of satellites deployed to orbit by Rocket Lab to 35.



● BLACKSKY GLOBAL-3 INTEGRATED TO THE KICKSTAGE | June 2019



● THE ACRUX-1 CUBESAT | June 2019



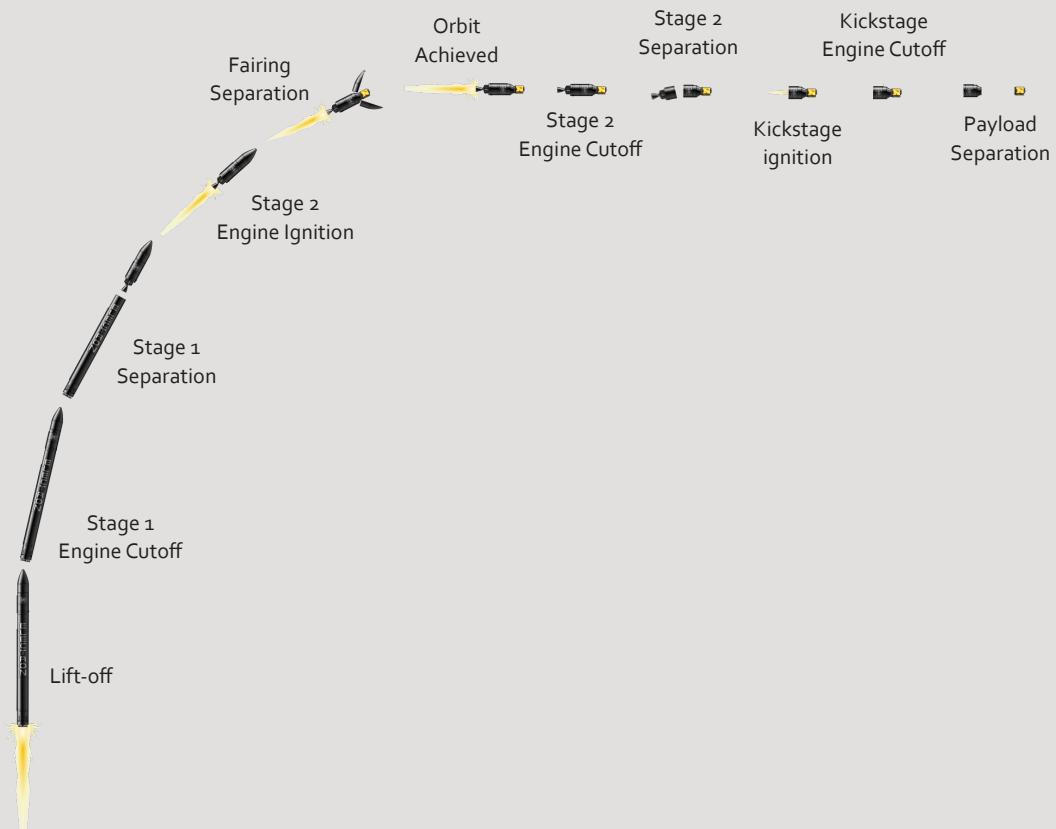
● SPACEFLIGHT & ROCKET LAB INTEGRATION TEAMS | June 2019



● ELECTRON'S FAIRING IN THE LC-1 CLEANROOMS | June 2019

TIMELINE OF EVENTS

EVENT	
-06:00:00	Road to the launch site closed
-04:00:00	Electron lifted to vertical position and filled with fuel
-02:30:00	Launch pad personnel exit area in preparation for 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	The Launch Director conducts a go/no-go poll of launch operators to confirm Electron is ready for launch
-00:02:00	Autosequence commences and Electron's on-board computers initiate the launch sequence
-00:00:02	Ignition of the nine Rutherford engines powering Electron's first stage
00:00:00	Lift-off – Electron climbs from the launch pad
+00:02:34	Main engines (Stage 1) cut off
+00:02:40	Stage 1 of Electron separates
+00:02:44	The vacuum Rutherford engine on Stage 2 ignites
+00:03:05	Electron's fairing separates
+00:08:52	Electron reaches orbit
+00:08:55	Stage 2 engine cuts off
+00:08:59	Stage 2 of Electron separates from the Kick Stage
+00:50:27	Kick Stage's Curie engine ignites
+00:51:11	Curie engine powering Kick Stage cuts off
+00:53:26	All payloads separated from launch vehicle





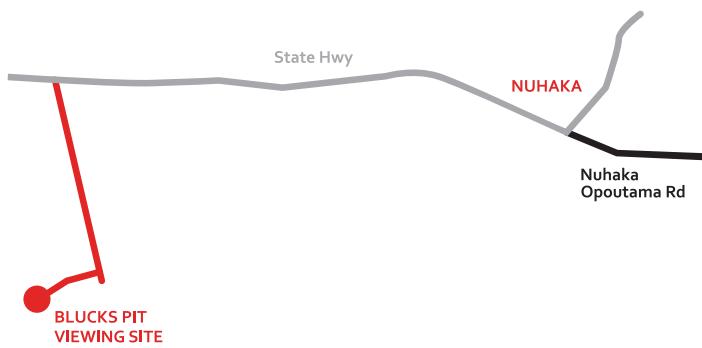
ROCKET LAB PRESS KIT

'MAKE IT RAIN' 2019

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



LAUNCH VIEWING AREAS DISTANCE FROM ROCKET LAB LC-1

As Rocket Lab's top priority during the test launch is public safety, there are safety zones in place during a launch and no access will be permitted to Onenui Station where Launch Complex 1 is located.

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.



ROCKET LAB'S LIVESTREAM OF 'STP-27RD' MISSION | March, 2019

LAUNCH FOOTAGE AND IMAGES

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

Images and footage of previous Rocket Lab launches can also be found at that link.

SOCIAL MEDIA

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

@RocketLabUSA @RocketLab

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'MAKE IT RAIN' 2019

ABOUT ROCKET LAB

We open access to space to improve life on Earth

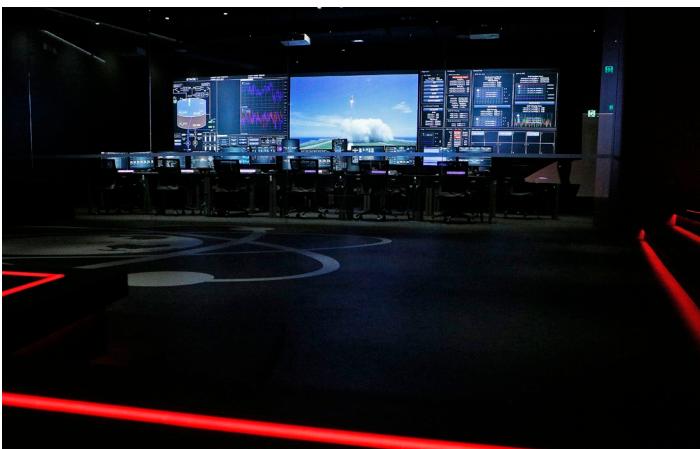
The wait is over. Frequent and reliable launch for small satellites is here with the Electron launch vehicle. With five successful orbital missions complete and 28 satellites launched to orbit since January 2018, Rocket Lab is the global leader in dedicated small satellite launch. We're connecting the ideas of the future to space, and we're doing it now.

We are in an exciting new era of small satellite technology - one that's making life on Earth better. Small satellites keep us connected, provide security, help us monitor resources and environmental change, and they enable us to explore new and exciting science that benefits us all.

We believe getting these satellites to space should be simple, seamless and tailored to each mission - from idea to orbit.

Since the Electron launch vehicle was first conceived in 2013, every detail of the Rocket Lab launch experience has been designed to provide small satellites with rapid, reliable, and affordable access to space. Innovation is at the core of the Electron launch vehicle, just as it's at the core of the revolutionary small satellites we're launching to orbit. We've designed Electron to be built and launched with unprecedented frequency, while providing the smoothest ride and most precise deployment to orbit.

Led by founder and Chief Executive Peter Beck, Rocket Lab has grown to a global team of 500 highly-skilled engineers and technicians. Headquartered in Huntington Beach, California, Rocket Lab is a privately funded company with investors including Khosla Ventures, DCVC (Data Collective, Bessemer Venture Partners, Future Fund, Greenspring Associates, ACC, K1W1, Promus Ventures and Lockheed Martin.



ROCKET LAB MISSION CONTROL | October, 2018



● ELECTRON AT ROCKET LAB LAUNCH COMPLEX 1 | Māhia Peninsula, 2017

ABOUT LAUNCH COMPLEX-1

Electron is launched from Rocket Lab Launch Complex 1, the world's only private orbital launch range. Located in Māhia, New Zealand, and licensed to launch up to 120 times per year, Rocket Lab can accommodate an unprecedented launch cadence and reach orbital inclinations from sun-synchronous through to 39 degrees from a single site. Rocket Lab is also developing a second launch site to provide unmatched schedule and launch location freedom. Launch Complex 2 is being built at the Mid-Atlantic Regional Spaceport in Wallops Flight Facility, Virginia, USA.



● LIFT OFF OF THE ELANA-19 MISSION FOR NASA FROM ROCKET LAB LAUNCH COMPLEX 1 | December, 2018 | Image credit: Trevor Mahlmann

ABOUT RUTHERFORD ENGINE

Rutherford is a state of the art oxygen and kerosene pump fed engine specifically designed from scratch for Electron, using an entirely new propulsion cycle. A unique feature of Rutherford is the high-performance electric propellant pumps which reduce mass and replace hardware with software.

Rutherford is the first engine of its kind to use 3D printing for all primary components. These features are world firsts for a high-performance liquid rocket engine with propellants that are fed by electric turbopumps. The production-focused design allows Electron launch vehicles to be built and satellites launched at an unprecedented frequency.



● RUTHERFORD ENGINE TEST | New Zealand, 2016

RUTHERFORD IS A STATE OF THE ART OXYGEN AND KEROSENE PUMP FED ENGINE SPECIFICALLY DESIGNED FROM SCRATCH FOR ELECTRON, USING AN ENTIRELY NEW PROPULSION CYCLE.

Z
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NOMINAL PAYLOAD
150KG

STAGES
2

HEIGHT
18M

NOMINAL SUN-SYNC. ORBIT
500KM

DIAMETER
1.2M



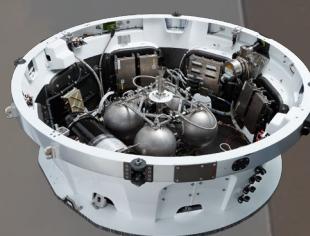
DEDICATED

Electron can deliver your payload when and where required.



RIDESHARE

Fly with other payloads at commercially competitive prices.



OPTIONAL KICK STAGE

Rocket Lab's Kick Stage can execute multiple burns to place numerous payloads into different, circularized orbits. It opens up significantly more orbital options, particularly for rideshare customers that have traditionally been limited to the primary payload's designated orbit. Powered by Rocket Lab's 3D printed Curie engine, the Kick Stage is capable of 120N of thrust and multiple burns.

Electron is an entirely carbon-composite vehicle powered by Rocket Lab's 3D-printed, electric turbo-pump fed Rutherford engines. Electron is capable of delivering nominal payloads of 150 kg to a 500 km sun-synchronous orbit – the target range for the high growth constellation-satellite market.

THE ROCKET LAB KICK STAGE

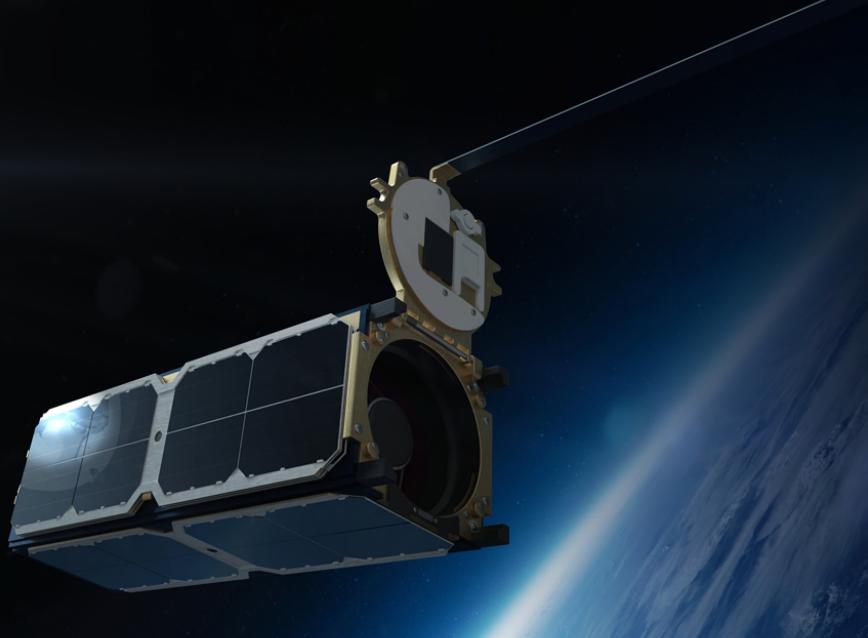
RESPONSIBLE ORBITAL DEPLOYMENT

As the small satellite industry experiences rapid growth, we're determined to be part of the solution for sustainability and the reduction of orbital debris in space. Traditional methods of deploying satellites can leave large rocket stages in orbit, contributing to the global issue of space junk. We know there's a better way.

The Rocket Lab Kick Stage is designed to deliver small satellites to precise orbits, before deorbiting itself to leave no part of the rocket in space.

Powered by the Curie engine, named after physicist and chemist Marie Curie, the Kick Stage is a nimble but powerful extra stage on Electron designed to circularize payload orbits. It employs a cold gas reaction control system to precisely point itself and deploy satellites to independent yet highly precise orbits, and also eliminate the risk of recontact with other spacecraft during deployment.

After all payloads are deployed, the Kick Stage can reorient itself and reignite the Curie engine one last time to perform a deorbit maneuver. This drastically lowers the Kick Stage's orbit, enabling it to re-enter the atmosphere and burn up without a trace.



• 'ELANA-19' PAYLOAD INTEGRATION ON THE KICK STAGE | 2018

BY DOING THIS WE LEAVE NOTHING IN ORBIT BUT OUR CUSTOMERS' SATELLITES - THE WAY IT SHOULD BE.



• PAYLOADS ON THE KICK STAGE ON MISSION 'IT'S BUSINESS TIME' | Space, 2018



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CONNECT WITH US

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