

The Space Idea

- What is [MAMA](#)?
 - Michigan Aerospace Manufacturers Association (lobbyers)
 - Purpose
 - Mission Statement – “Position Michigan as a **viable space state** by encouraging public-private partnerships to develop a space ecosystem that will positively affect the standard of living for all residents.”
 - Services: business development, education, networking opportunities, legislative updates, industry events
 - Wants to create new careers in space for future generations
 - Wants MI to be mid-America’s Space Harbor™ (they wrote the ™, not me!!!)
 - Based in Sterling Heights
 - They have 3 initiatives (continued on next bullet pt)
- **The Michigan Launch Initiative**
 - “is a public-private partnership dedicated to **identifying** and then **creating** three sites: [horizontal](#) and [vertical](#) launch facilities to provide low Earth orbit, or LEO, satellite launch sites. The third facility will be a [command and control center](#) to manage post-launch satellite operations”
- **The Space-Enabled Communications for Advanced Mobility, or SECAM, for commercial and government users**
 - “is drawing private, government and academic partners to develop a secured space/terrestrial mesh 5G system that will incorporate existing terrestrial 5G technology and utilize near-Earth orbit satellite 5G technology for ground, air, water and space missions”
- **The Mid-America Hypersonic Suborbital Test Range initiative (MAHSTR)**
 - “proposes Michigan be the **epicenter** of a new test range that will support hypersonic testing for materials that travel at Mach 5 and above and serve as a crucial advancement in the race to establish the U.S. as a leader in hypersonic research and defense”
 - Hypersonic technology???? T-T
- Podcast [transcript](#) about the potential Superior space launch

The opposition - [Citizens for a Safe & Clean Lake Superior](#)

- Front of the battle: Granot Loma (MAMA wants to launch by 2026)
- [The Bait & Switch](#) (catchy title)

What about currently existing spaceports?

- [FAA list](#) (USA)
- [Interactive Spaceport map](#) (World)
- Negative impacts
- Environmental concerns
 - [Alex Brown PEW article](#)
 - Sensitive habitats, public safety, and **drinking water**
 - Because space travel is getting “smaller” + more reusable - the prospects of making new sites is more attractive (is the enviro impact any smaller though?)
 - *“Environmentalists think the small rockets have a higher risk of failure, which could blast the island with debris and fuel or even cause a wildfire.”*
 - Lake Superior supplies drinking water for Marquette!
 - Also, think of the cycle that the Lakes go through to clean themselves. The bigger the lake, the longer it takes.
 - Boca Chica, TX
 - Camden Cty, GA (I used to live the cty adjacent! The region has already suffered environmentally due to cargo transports... see the capsized boat in the St Simons channel)
 - Residents voted to block cty officials from buying the land for a spaceport - who proceeded anyway. So how can regular people have our opinion be heard?

Moral component - do we belong in space?

- Super tough judgement call... I want to be there but are we ready? Shouldn't we fix things up on Earth first? (Also if humanity survives long enough to meet other intelligent life... are we really gonna call it Earth...)

History of space travel

Private vs Public space travel (Elon vs NASA)

- NASA
- SpaceX
 - Completely personal and unrelated note – you can sometimes spot SpaceX crap in the sky if you know what to look for
 - Definitely is trying to make space travel “sexy,” if you look at their website
 - Not with those space suits though. Who the hell approved that.
- Commercial Space Age
 - Space-for-earth economy
 - What is it?
 - “*Goods or services produced in space for use on earth.*”
 - Includes telecommunications, internet infrastructure, earth observation, national security, satellites, etc
 - The Granot Loma site would fall under this – one of its proposed benefits would be its role in 5G (I think, gotta check)
 - Space-for-space economy
 - **this is the sci-fi fantasy, people living in and with space
 - “*goods and services produced in space for use in space.*”
 - Ex: Mining asteroids for material to create space habitats
 - Compared to the space-for-earth economy, this one is struggling to take off
 - Harvard Business Review thinks that SpaceX is the “first stage” of the space-for-space economy
 - Welcome to the (Commercial Space Age)
 - “*In our recent research, we examined how the model of centralized, government-directed human space activity born in the 1960s has, over the last two decades, made way for a new model, in which public initiatives in space increasingly share the stage with private priorities.*”
 - This article argues that the government’s interest is in space-for-earth and the private sector is interested in space-for-space. This is untrue based on the current spaceport issue.

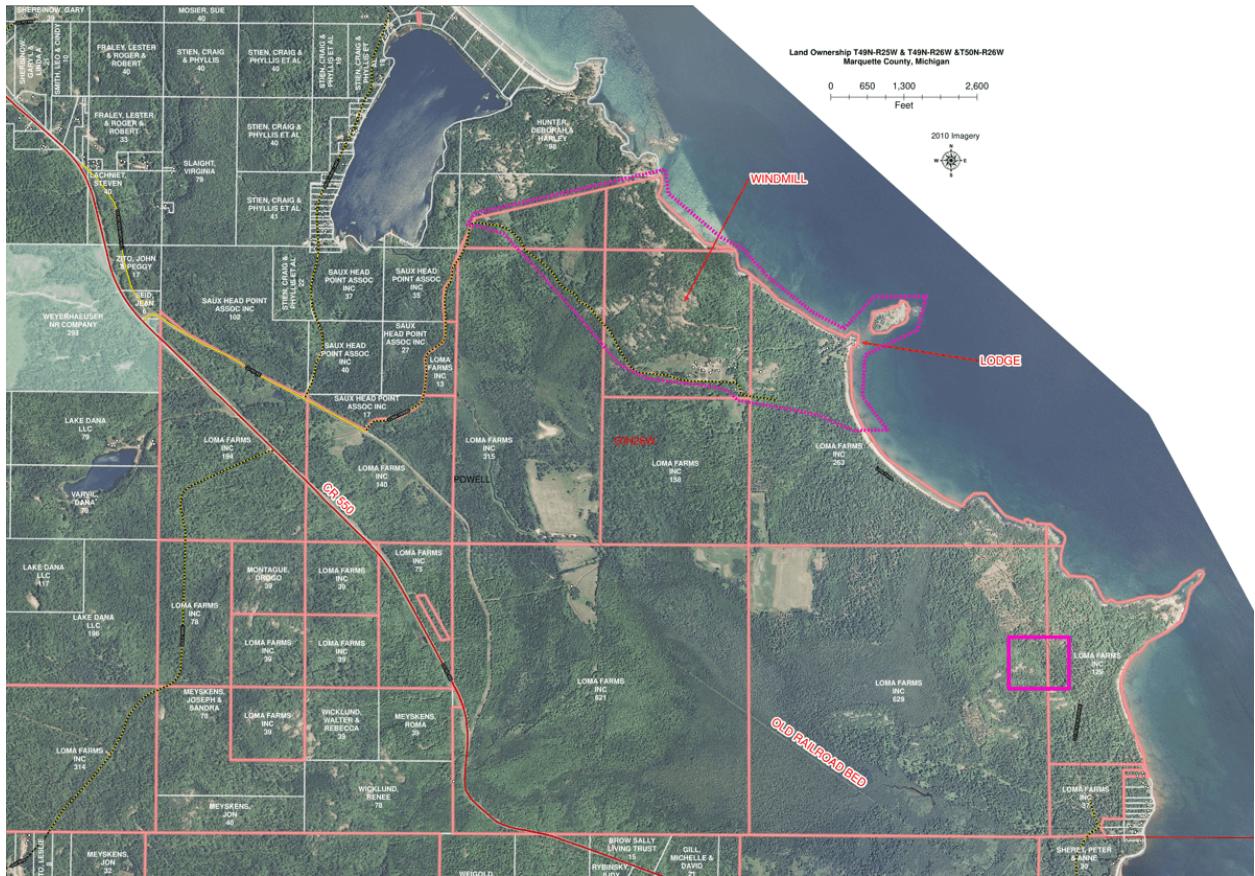
- SpaceX claims to want privatized human space travel, but is that what they're actually doing?
 - In-space manufacturing is becoming a thing

Indigenous Voices

- Whose land is Granot Loma's (and other proposed launch sites in the UP)?
 - [Native-land.ca](#)
 - Territories
 - [Očhéthi Šakówin](#)
 - [Anishinabewaki](#) ᐊᓂᔑᓇᐤ
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 - Treaties
 - Cession 261
 - Trace Granot Loma's origins

Granot Loma

- ...has the world's largest log cabin?
 - Check out the [interior](#). Why is this going to be a space launch site again? Like what is happening?
 - Owned by Tom Baldwin, who is big into the Spaceport thing
 - Who did he buy the land from?
 - He trades bonds. Ofc.
 - Granot Loma's position on the spaceport is [obvious](#) (scroll to the bottom of the page).
 - Map of location (credit to [citizensforasafeandcleanlake](#))



[The 68-page Vertical Launch Site #3 Proposal \(Granot Loma\)](#)

Why Michigan?

- [BridgeMI article](#) (contains details surrounding the space debate in Michigan and why the process as a whole has been pretty sus)
- We can produce “polar orbits” due to our position between the North Pole and the Equator – which is something that is apparently “coveted” by commercial satellite companies
- We also have a “manufacturing legacy”
- Interesting that so many people think that this is the right direction for our state when a huge chunk of Michigan’s \$\$ comes from tourism, especially in locations where the purported spaceports would be.

More Spaceport Information

- Primarily launching LEOs
- Info on [GEO vs LEO](#) + some spaceport stats
- 3300+ LEOs in orbit (2020)

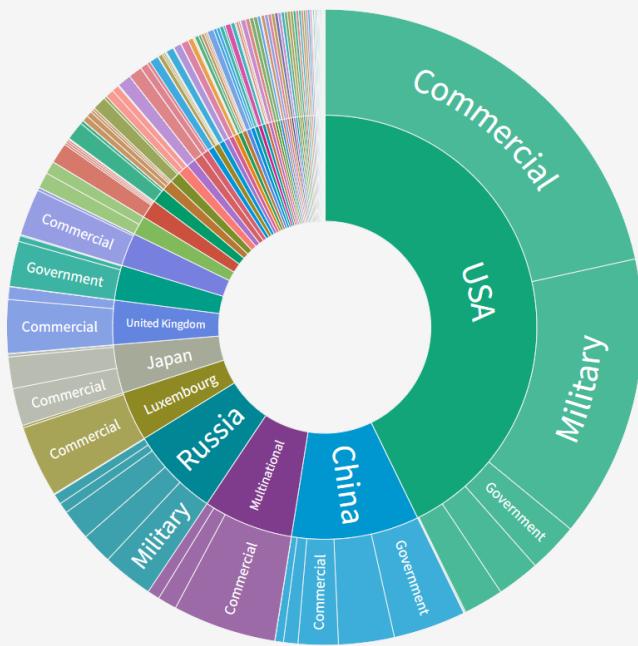
- “The fundamental question **is how the spoils of the spaceport are being shared with the local community**. If it’s a tourism-dependent area, the spaceport might be able to bring in more people, but there’s also the risk of displacement.” – Rasmus Flytkjaer

Operational satellites currently in orbit around Earth

Sized by launch mass of satellites, organised by country and use

Filter:

All



Source: [UCS Satellite Database](#)

*Use desktop or tablet for best experience exploring the data. Filter by spaceport.

For kicks - Tom Baldwin's [very chill response](#) (Exhibit A) to the Lake Superior Partnership proposal (selling Granot Loma to the Watershed), as well as a letter from a disgruntled landowner (Exhibit B), and a resolution from the Saux Head Point Owners Association (Exhibit C).

^^This makes me wonder... has this been brought to court??? Or a council meeting?

Bonus

Reference Objects (+why)

- Vertical Light Rockets (Payload Mass To 1000kg)
 - [Electron \(Rockeet Lab, NZ-USA\)](#) **launched from Virginia and Mahia NZ
 - Use for dimensional reference since it is a US-based rocket
 - *"Electron's unique Kick Stage is designed to deliver small satellites to precise and unique orbits, whether flying as dedicated or rideshare."*
 - Dimensions:
 - Height: 59 ft
 - Diameter: 3.9 ft
 - Stages: 2 + Kick stage
 - Wet mass?
 - Payload to LEO: 661 lb
 - Structure: Carbon Composite
 - Propellant: LOX/Kerosene
 - Not totally relevant but interesting
 - Facts to consider:
 - Rutherford Engine – 3D printed?!?
 - **Reusable**
 - Lol rocket lab thank u for [real photos and specs](#)
 - QR codes on the sign / object // same website as the research
 - ALT model/mockup:
 - Middle ground
 - Get people to think about a common occurrence of rocket launches
 - Is a prototype a survey you send to friends? Or a sign?
Gauging public awareness
 - Nuts & bolts crude prototype of the DIALOGUE/ENGAGEMENT itself
 - Prototype the EXPERIENCE, not the object



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- WINNING:

ELECTRON LAUNCH VEHICLE PARTS

OVERVIEW

LENGTH

18 m

DIAMETER (MAX)

1.2 m

STAGES

2 + Kick Stage

VEHICLE MASS (LIFT-OFF)

13,000 kg

MATERIAL/STRUCTURE

Carbon Fiber Composite/Monocoque

PROPELLANT

LOX/Kerosene

PAYOUT

NOMINAL PAYLOAD

200 kg / 440 lbm To 500 km SSO

FAIRING DIAMETER

1.2 m

FAIRING HEIGHT

2.5 m

FAIRING SEP SYSTEM

Pneumatic Unlocking, Springs

STAGE 2

PROPELLION

1x Rutherford Vacuum Engine

THRUST

5800 LBF Vacuum

ISP

343 Sec

INTERSTAGE

SEPARATION SYSTEM

Pneumatic Pusher

STAGE 1

PROPELLION

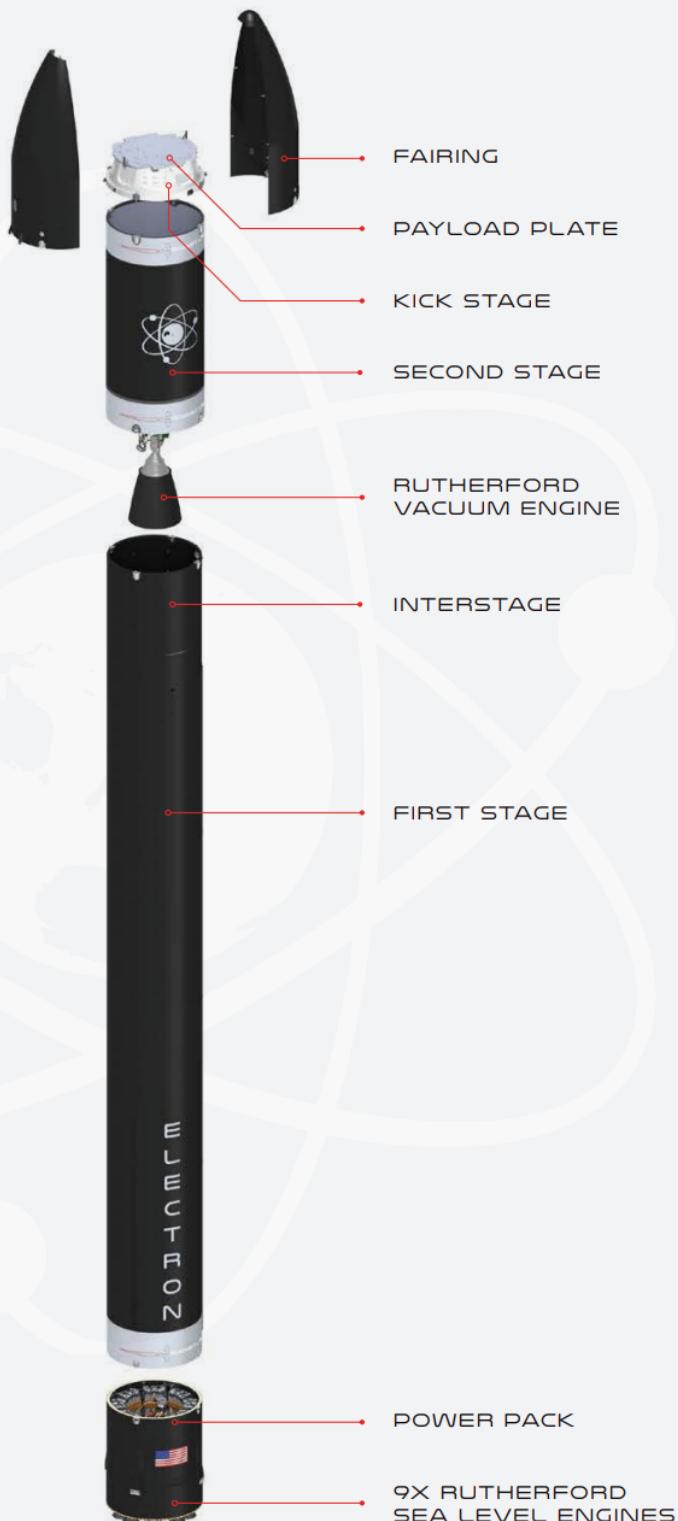
9x Rutherford Sea Level Engines

THRUST

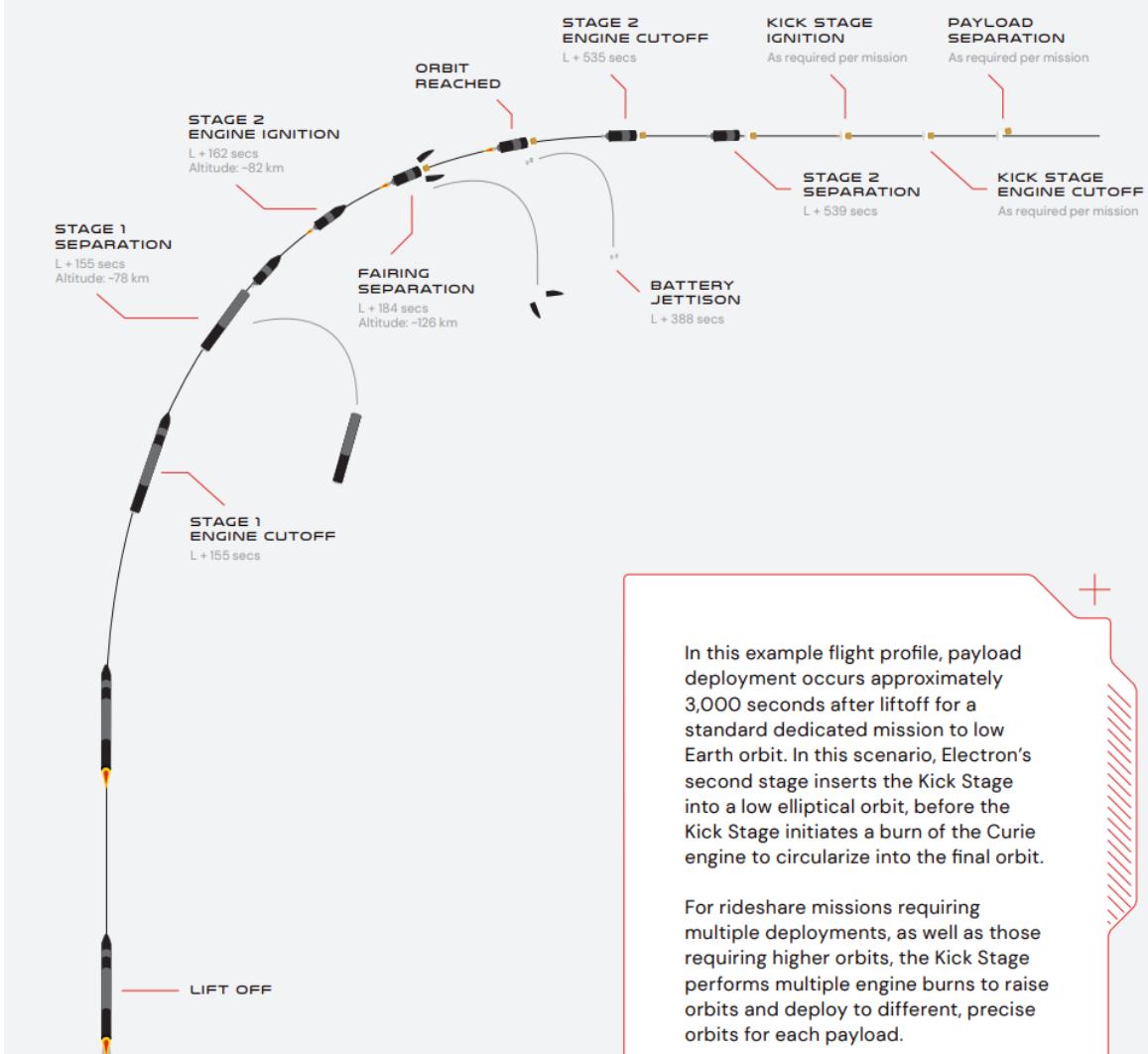
5600 LBF Sea Level (Per Engine)

ISP

311 Sec



EXAMPLE FLIGHT PROFILE

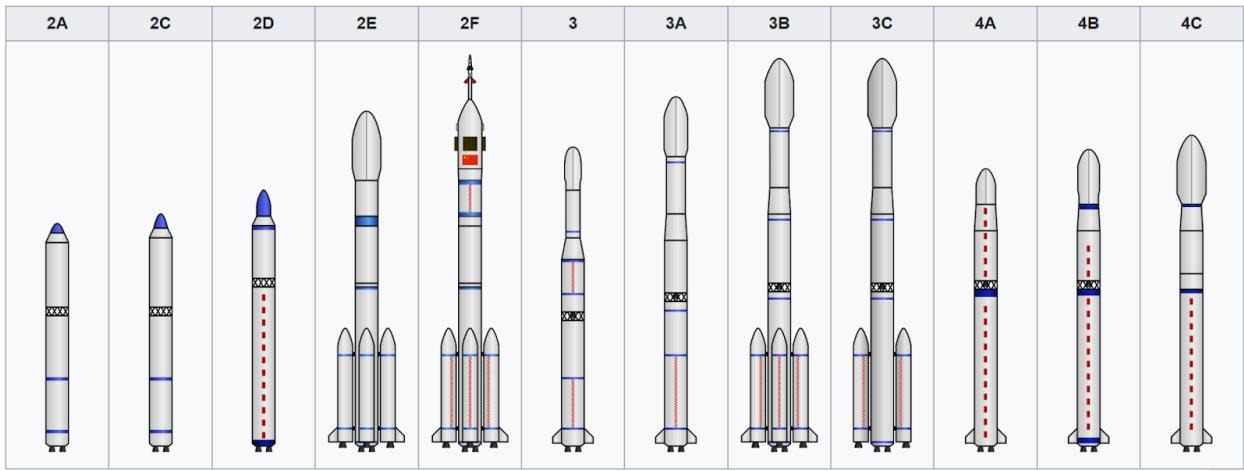


In this example flight profile, payload deployment occurs approximately 3,000 seconds after liftoff for a standard dedicated mission to low Earth orbit. In this scenario, Electron's second stage inserts the Kick Stage into a low elliptical orbit, before the Kick Stage initiates a burn of the Curie engine to circularize into the final orbit.

For rideshare missions requiring multiple deployments, as well as those requiring higher orbits, the Kick Stage performs multiple engine burns to raise orbits and deploy to different, precise orbits for each payload.

- Long March (China)

- Use for debris reference because there are clear photos/details for it
- 2A thru 4C rocket fam:



■ Key difference: long march rockets are not reusable and are not intended to disintegrate upon reentry, so this project might be stretching things a bit?

- What MAMA thinks their rockets are going to look like (use for comparison, looks a lot like the electron so I can just steal and cut those dimensions):





Debris planning:

- Types of space debris: payload, rockets, “mission-related objects”
- Debris field example (camden county):



Other environmental objects:

**creation of the site would involve clear-cutting forests and destroying wetlands