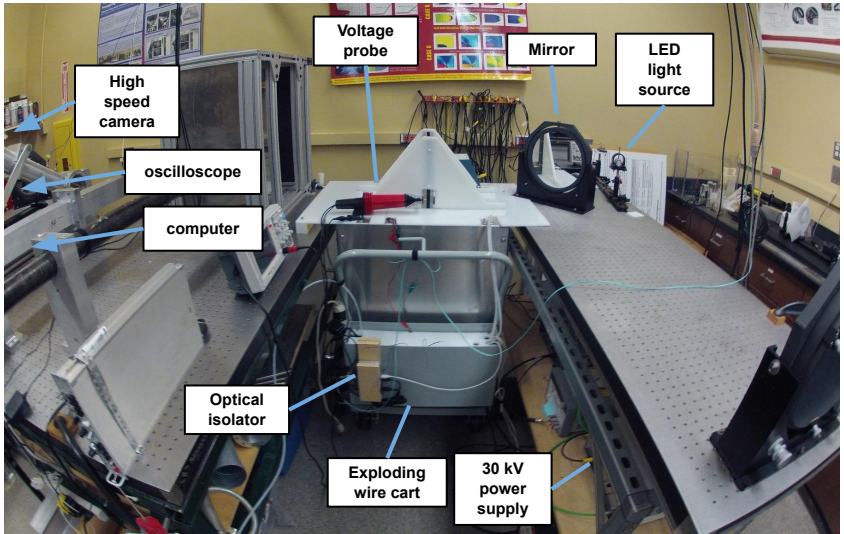
JACK GROSS

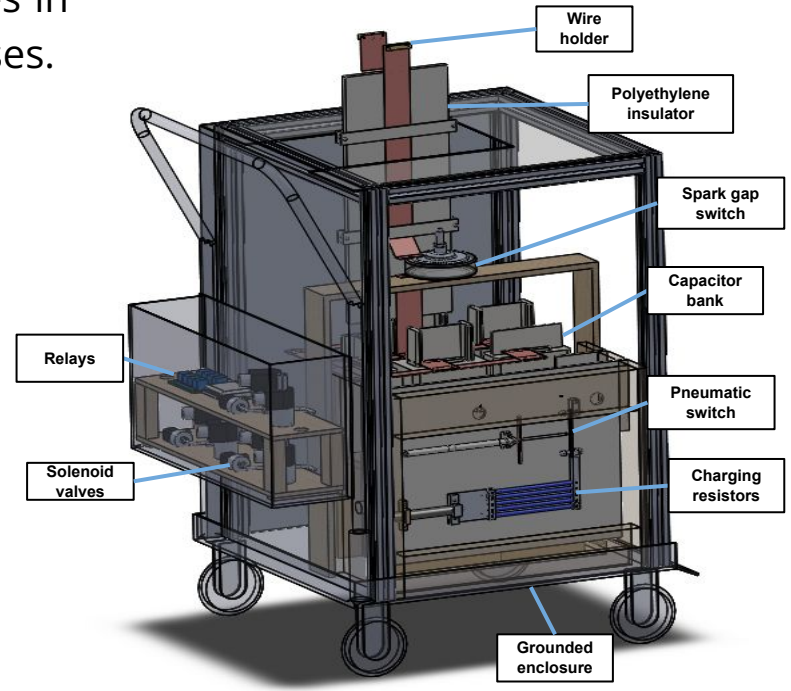
PORTFOLIO

Jan 2024

Exploding wire system

While getting my Masters at USC I worked as a graduate research assistant. One of my projects was an exploding wire system. Working alone, I built a system that could generate small scale blast waves in the lab by vaporizing wires using large current pulses.





Portable fuel manifold platform

At SpaceX I worked on many small and medium sized projects to improve speed, safety, and quality in the engine and thrust structure department.

While its not possible to show most of my projects, one project that appeared in a publicly released photo was a lightweight platform that could be quickly clamped onto the fuel manifold of the center engine to provide a safe no slip standing surface for technicians working in the thrust structure.

Octovator platform

I designed this platform.
To be clear, I did not design the ring that the platform sits on, and I did not design the columns and mechanisms that raise the ring.

The lights illuminating the engine bays are part of the platform.

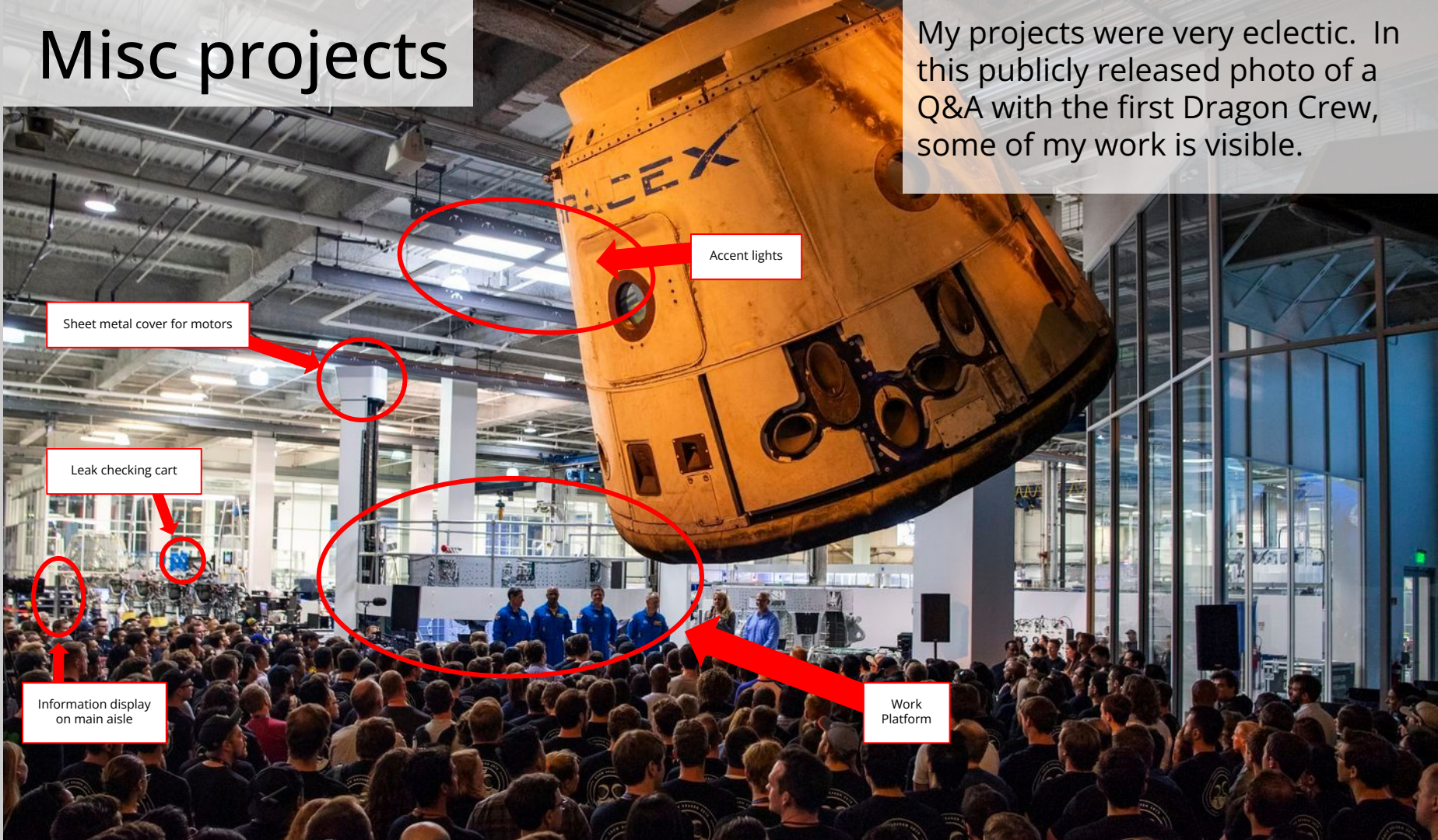
The black and white color scheme of the factory was one aspect of a project of mine. Elon wanted the look of the factory to be upgraded.

Some items in the area were replaced, while other were modified with better lighting, new paint, or cosmetic sheet metal covers.

The actual work was performed by the facilities department, the technicians, and myself. Due to my involvement, I wrote an article for the internal company newsletter covering the color scheme change.

Misc projects

My projects were very eclectic. In this publicly released photo of a Q&A with the first Dragon Crew, some of my work is visible.



1st Stage fluid systems

While at Firefly Aerospace I was the responsible engineer for the first stage fluid systems. I was responsible for sizing and routing all non propellant plumbing on the first stage, and supporting it through fabrication and testing.

This included:

- Tank pressurization
- Tank venting
- Thrust vector control hydraulic fluid
- Geystering suppression
- Turbine spin start
- Hypergolic ignition fluid

This is the best publicly available photo containing some of the things I designed at Firefly.

This was taken during first stage testing and shows the aft end of the rocket with covers removed.

Rear seat storage

As a member of the Prototypes and Special Projects team at Rivian, I worked on a large number of extremely diverse projects.

While most projects were internal and thus no images are publicly available, this rear seat storage system was shown in a youtube video.

The storage system features off the shelf modular toolboxes that lock to each other, and to a custom frame. The seat back features a pegboard. The entire system is redundantly restrained by a custom tarp that can contain all tools in the event of a crash even up to 5g's.

RIVIAN

Camp kitchen mockups

The R1S camp kitchen was never released. This diagram is taken from a patent filed for it.

While at Rivian, extensive work was performed to explore designs for a portable kitchen for the R1S. While a portable kitchen was originally sold for the R1T pickup truck, the kitchen for the R1S was never moved to production.

On this project I designed and fabricated multiple mockups of the kitchen for ergonomic testing. These mockups recreated all the moving parts of the system. They were fabricated using aluminum, plywood, and 3d printed parts, and were lightweight enough to be quickly installed and removed from test vehicles.

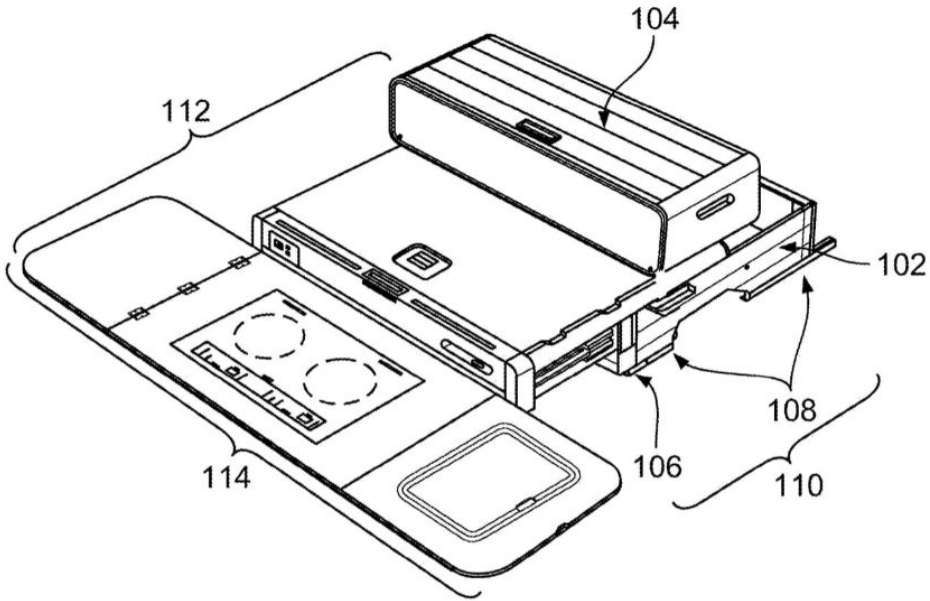


FIG. 1

RIVIAN

Flipover tool for Orion Main Engine

At my current position at Aerojet Rocketdyne, I design flight hardware on the Orion Main Engine Thrust Chamber Assembly, and for the Next Generation Radioisotope Thermoelectric Generator.

In addition to flight parts, I also design some tooling as well. One tool I designed was a flipping tool used to invert the engine for vibration testing. The tool is attached to an a frame crane, and works in a room with no bridge crane and low ceiling clearance.

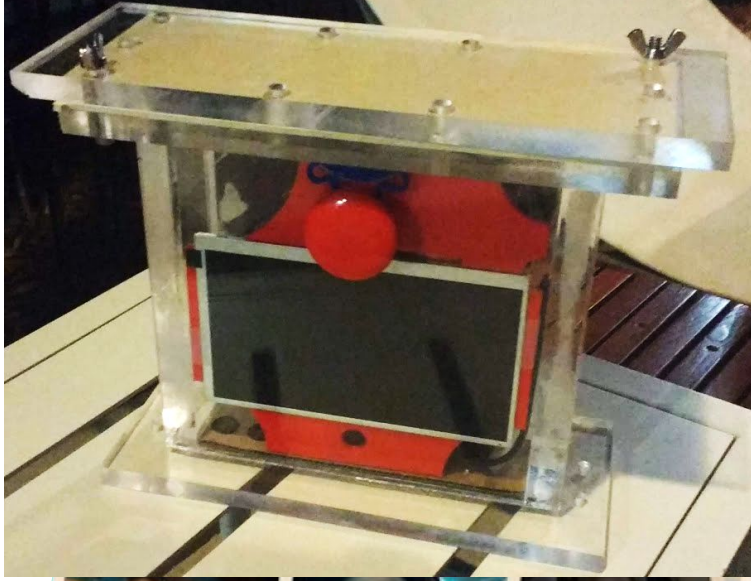
PERSONAL PROJECTS

Underwater photobooth

The goal of this project was to create a photobooth for a pool party that could be used underwater.

The photobooth was made using a raspberry pi. A single button was used to trigger the camera, which would result in a countdown, followed by a series of four photos.

The photos would automatically be arranged into a 2x2 array, which was then wirelessly transferred to a nearby phone next to the pool where users could send the collage to themselves. An onboard battery allowed for five hours of operation.

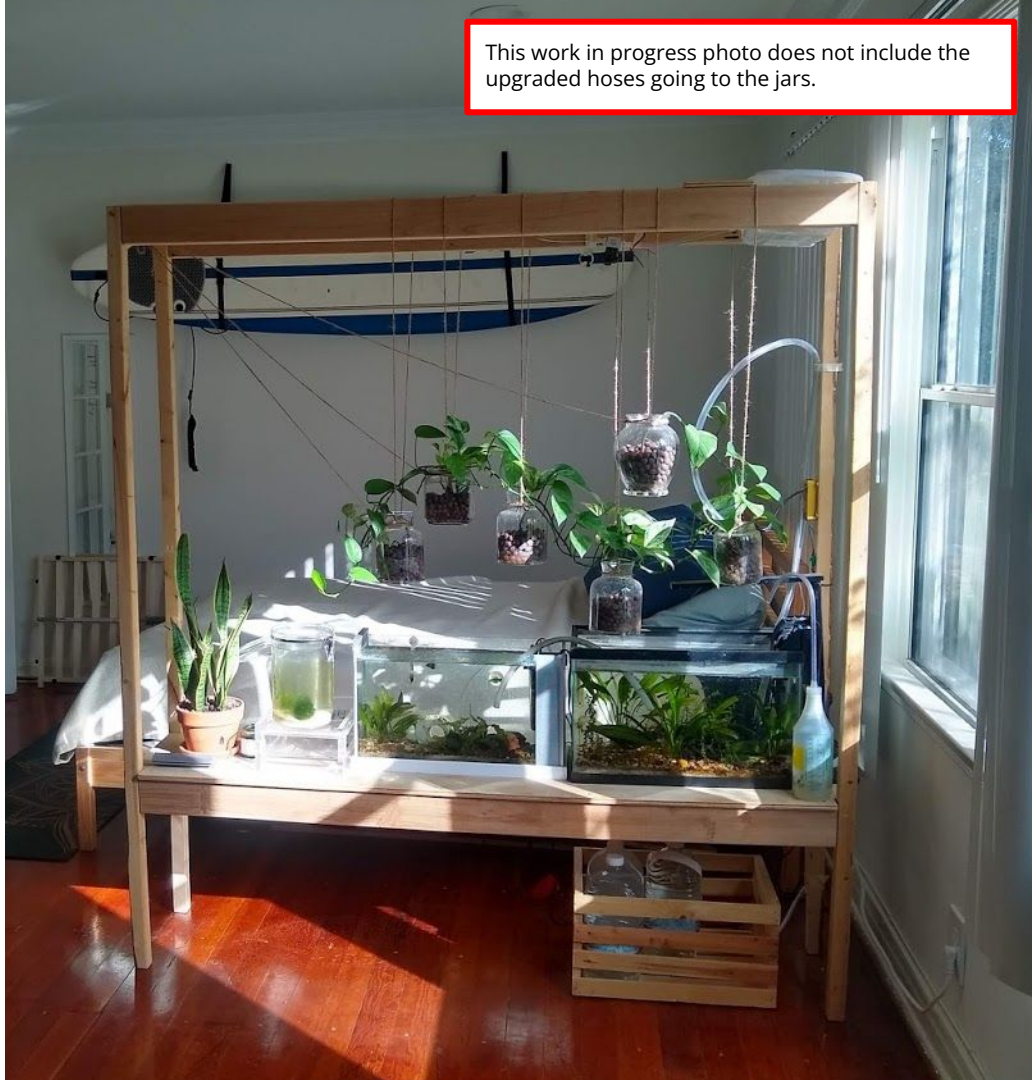


PERSONAL PROJECTS

Aquaponics system

The goal of this project was to experiment with automation for plant and aquarium care, as well as sustainability.

Aquarium tanks were linked together with a siphon, and a pump was used to automatically water plants in hanging jars that drained excess water back into the tanks. The fish and snails consumed live plants and biofilm respectively. Fish waste was consumed by aquatic and dry plants.



PERSONAL PROJECTS

Rocket Dashboard

This toy was made as a gift for a niece who was four at the time. It was conceived as a busyboard themed with buttons and switches that could be used to roleplay piloting a futuristic vehicle such as a spaceship.

An interactive screen with a rudimentary interface was added to enhance the experience. The enclosure was modeled in Fusion 360 and 3d printed. The dashboard runs on a raspberry pi.

PERSONAL PROJECTS

Robot

This project was an opportunity to experiment with robotics and computer vision. It was made using spare parts found at a local makerspace or donated from other members.

The robot ran ROS on a Jetson Nano computer. The chassis was a Roomba. The vision system was a Microsoft Kinect, and the display was an Amazon Fire tablet.

The robot was able to be controlled by a remote control over wifi, and could recognize objects using openCV.