

# The Roof Raiser White Paper

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**Prepared by:**

The Roof Raiser - Team 41

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# Introduction



## Scope

With the rise of overlanding and car camping, the demand for rooftop tents has increased. However, their weight and size present significant challenges for safe installation and removal.



## The Problem

Rooftop tents and heavy roof top accessories are challenging to load and secure on vehicles, often requiring two or more people. This project aims to design a device that allows a single person to safely and efficiently load and secure these items onto a vehicle.



## Our Solution

The Roof Raiser is an innovative lift-assist system that enables one person to safely and efficiently mount and dismount rooftop tents weighing 100–250 pounds. The Roof Raiser system seamlessly interfaces between a vehicle and a rooftop tent. It is designed to remain installed at the user's discretion and offers a service life of up to ten years. The Roof Raiser is compatible with a wide range of car models, ensuring accessibility across the market.

# Market Analysis



## Current Market Landscape

The rooftop tent market has exploded as more people across the world are transitioning to nomadic lifestyles. COVID was a catalyst in getting people outdoors and rooftop tents improved convenience.



## Target Audience

Our target audience includes weekend warrior, outdoor enthusiasts and passionate adventures. Anyone who needs to get something big or heavy on their vehicle roof.



## Market Potential

The global vehicle car rack market is projected to reach \$3.39 billion by 2028, driven by the solid CAGR of 6.49% and the rise of popularity in the Asia Pacific segment accounting for 34.6% of the global share.

## Background

### Explanation of the Technology

Enables individuals to effortlessly lift, secure, and remove rooftop accessories independently.

### How It Works

The Roof Raiser utilizes a winch that hoists a platform that the rooftop accessory attaches to over two detachable ramp legs. A locking mechanism prevents the platform from moving when on the top.

### Technical Specifications

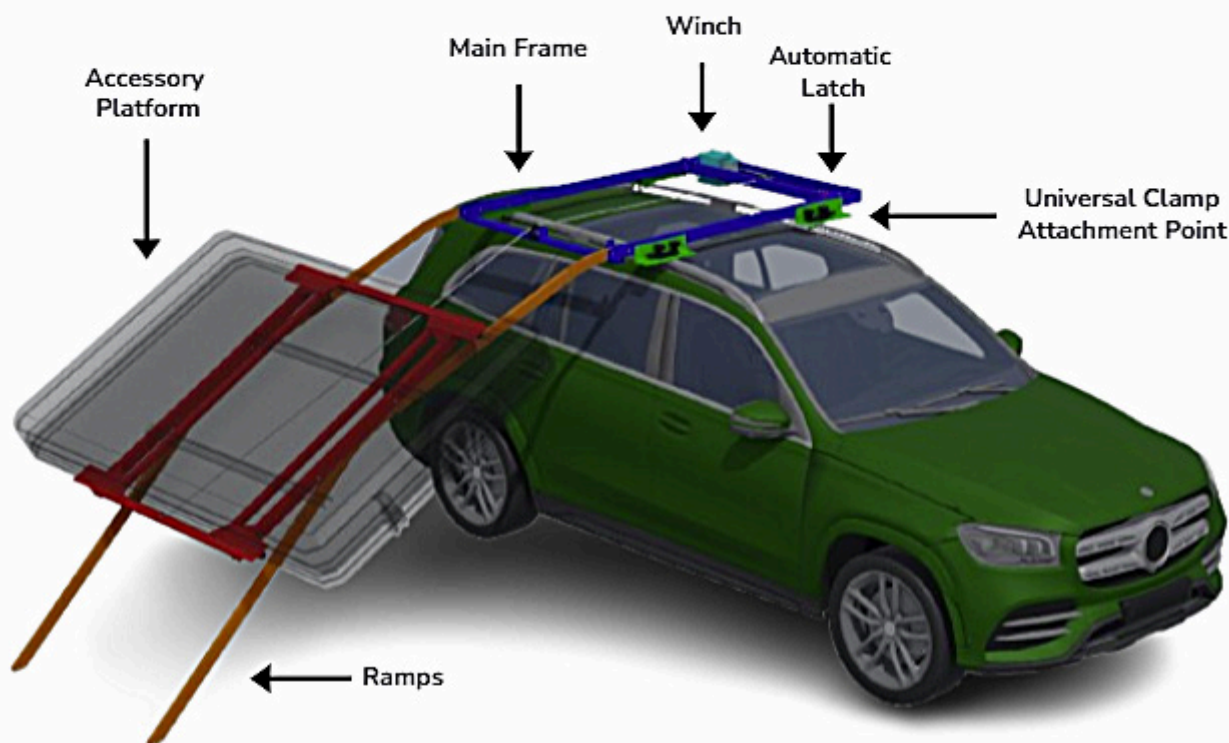
Overall Weight: 80 lbs.  
Load Capacity: 300 lbs

Dimensions: 48" X 64" X 8"  
6061 aluminum

2 Person Install  
1 Person Operation



# Overview



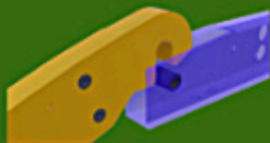
## Winch & Latch

- Electric drill powered
- Does not backdrive
- Backup hand crank



## Ramps

- Compatible with different vehicle types & heights
- Rounded corners allow for easy transitions
- Each ramp removable & stowable
- Separates into 2 pieces
- Only 18 pounds



## Platform

- Caster wheels assist with rolling on ground
- Compatible with bike racks, tents, & more
- Easy install of accessories
- Permanently attached to accessories



# Testing

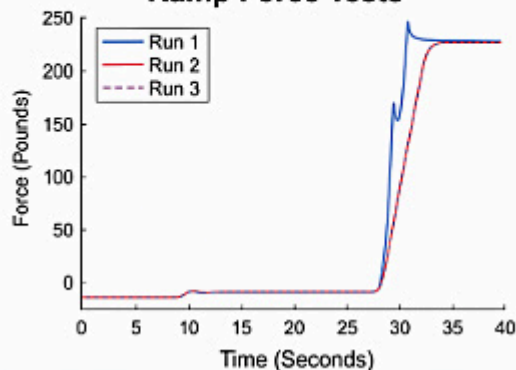


## Small Scale Testing

To make our large project more accessible, the team made a 1/10 scale model of the Roof Raiser. The model helped drive design decisions and allowed our director and client to inspect the system without a vehicle.



## Ramp Force Tests



## Material Testing

After completing a mechanics of solids analysis, the team tested critical components through various methods. The ramp leg hooks were loaded to 400 pounds each in a Universal Testing Machine (UTM), showing no plastic deformation and confirming their structural integrity. The aluminum tube sections were tested with sandbags, and although deflection was greater than predicted, it remained within acceptable limits and did not impact the Roof Raiser's performance.

## On Vehicle Tests

The team conducted repeated installations and operations of the Roof Raiser on a vehicle, progressively increasing the load. Minor design modifications were made during this phase to enhance the system's strength and stability. We successfully lifted a team member's rooftop tent from the ground to the vehicle's roof. Additionally, users of varying physical abilities operated the system to confirm its accessibility.





# The Path



August 2024	December 2024	February 2025	April 2025
Team formation and project ideation began	Prototype design and manufacturing plan solidified	Manufacturing and testing began	Full scale prototype finished and presented at Expo

## Team



### Founding Team



**Chris Wachuta**  
CEO



**Jake Termin**  
CFO



**Boston Abrams**  
COO



**Dax Lukianow**  
CPO



**Nathanael Lee**  
CINO



**Vincent Tang**  
CTO

# Advantages & Benefits



## Single-Person Operation

The Roof Raiser enables one person to mount and dismount equipment, weighing up to 300 lbs, onto the roof of a car.

## Quick and Effortless Lifting

Manual or drill-powered winch system makes lifting smooth and controlled.

## Enhanced Safety

Platform automatically locks into place when fully raised.

## Universal Compatibility

Designed to fit most standard roof racks and rooftop accessory bases.

## Time-Saving Setup and Removal

Cuts rooftop accessory install/removal time from 30+ minutes to just under a few minutes. No tools or extra help needed.

## Expandable Application

Works for more than just rooftop tents: Ski boxes, bike carriers, kayaks, storage bins

## Conclusion

### Summary of Key Points

In summary, The Roof Raiser was designed, engineered and fabricated to the utmost quality. There is a clear demonstrated need for this product and a large market that will facilitate a successful growing business. IP is the next step in this process and licensing is an option as an exit strategy. The future of the Roof Raiser's could be manufacturing and designing all types of rooftop accessories becoming a brand leader in the car rack market.

### Contact Us



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## Acknowledgements

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