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the nomad

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Masters Project Studio  
Professor Alphonso Peluso  
Spring 2012

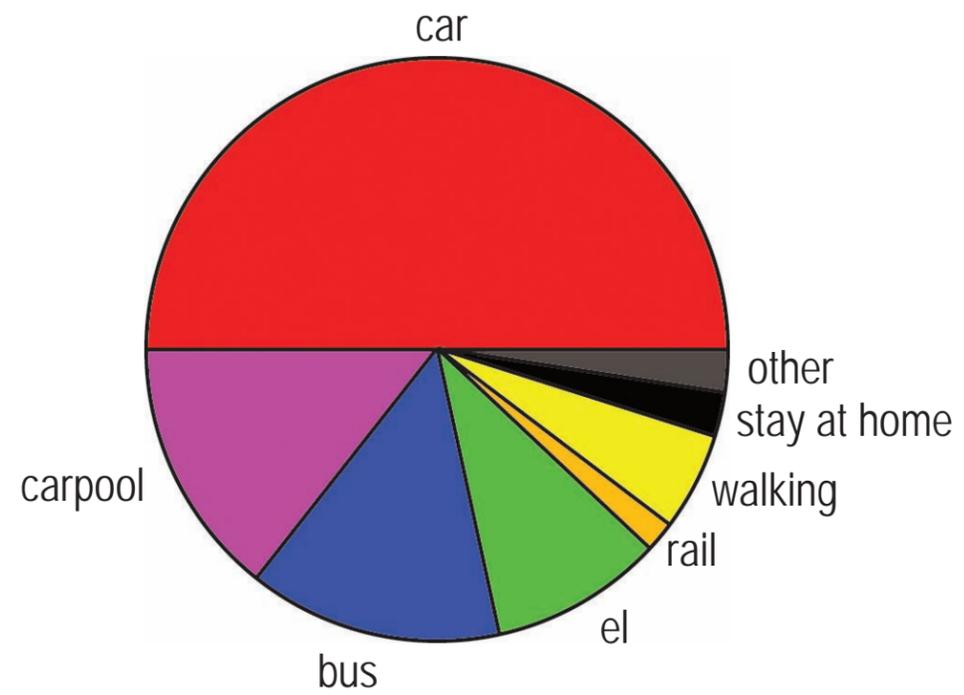
Part 1: Research



mobile apartment personal  
shelter property transit  
commute move room  
home transportation  
ownership car  
space travel housing

We live in an increasingly **mobile** world

Mode of transportation to work in Chicago, IL



4.9%

average daily population change due to commuting



In today's troublesome economy, people struggle to pay the cost of owning their home and or car. Additionally, the time and money lost in transit tends to be problematic and limiting as well.

Under the struggle, some people are even forced to live out of their vehicles, which rarely turns out well.



Guiding Principle:

Everyone has a right to a home, regardless of their daily routine.

Everyone has a right to their own personal space, and should be able to have access to it wherever they go.

This project will be a prototype for a new age mobile house.

This project will explore the boundaries of the duality of interior space.

What is the basis of a home or livable space?

How would that work in a house that is also a vehicle?



This project will be developed for an age when life puts people in constant motion. In an increasingly interurban economy, people may find themselves in transit longer than they are able to spend in their own home. To do this, the project will become an exploration of space. What is necessary for interior space? How large can an interior condition become before it encroaches on the exterior space which it is acceptable to occupy? How can an envelope transform to expand or contract the space within?

The goals of this project:

- This idea is important because it re-explores small homes before an era where they may become more essential as space becomes scarce.

  - The project will be self-contained

  - The project doesn't encroach on exterior space beyond the parking space

- This idea is important because it provides housing for people on the move.

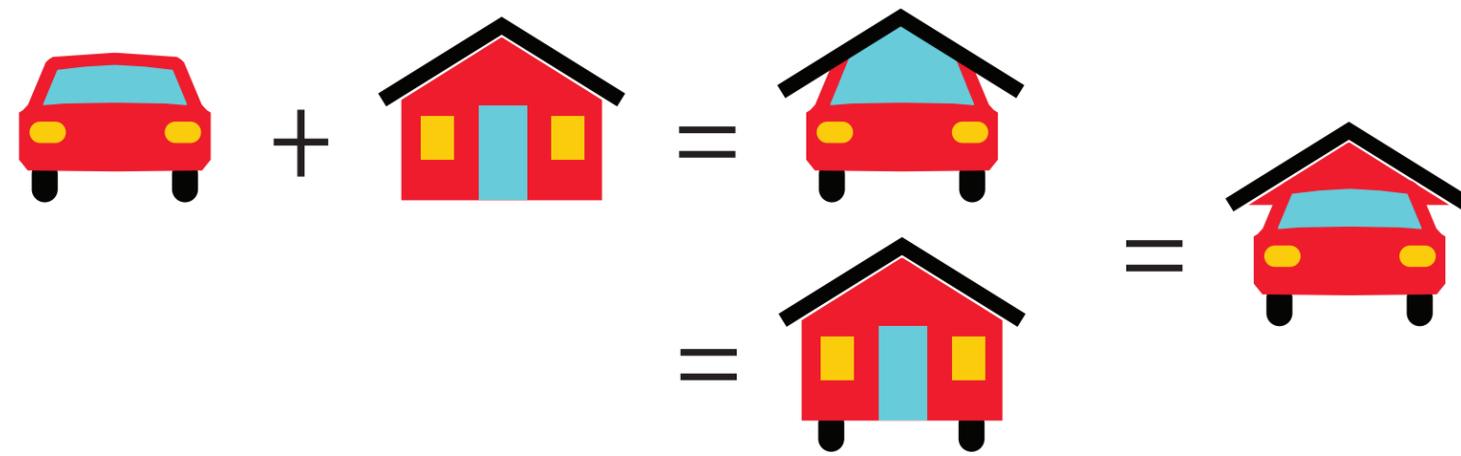
  - Not only does it provide a functional vehicle, but a residence as well.

  - A balance in visibility control from the driver's perspective as well as the resident's will be taken into account

- This idea is important because it allows an opportunity to reestablish the automobile in a changing world where sustainability concerns are at the forefront.

  - Smaller space suggests less interior conditioned space per capita, which translates to fewer resources consumed

  - Sustainable materials are used in the construction



Stakeholders in this project are:

The Home owner

Manufacturing

Towing facilities

Repair Facilities

Traffic Organization



The spectrum of possibility in design within this project begs for an exploration into what the best direction of approach would be, as well as the identity of this project in terms of architectural standing.



predominantly  
a vehicle



more like a vehicle  
than a house



somewhere  
in between



more like a house  
than a vehicle



predominantly  
a house

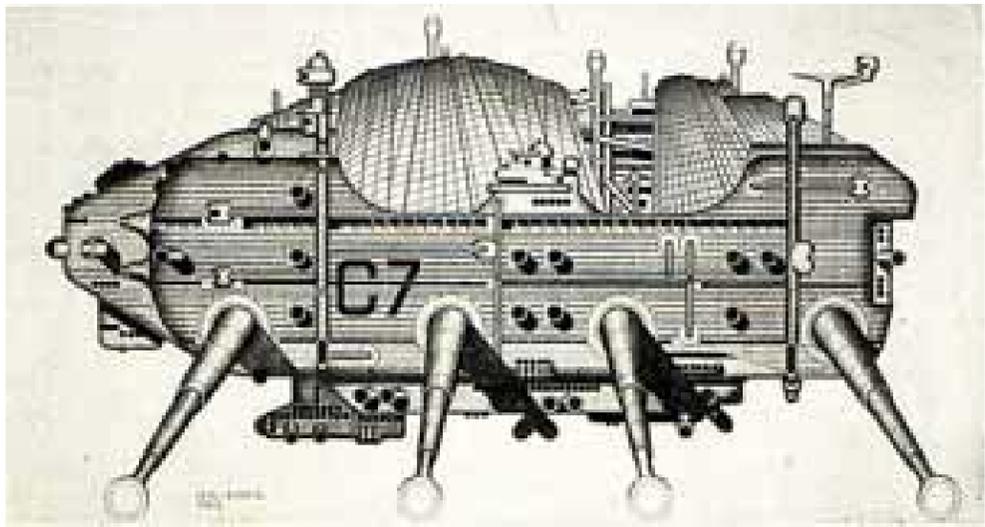
interior design of a vehicle

architecture



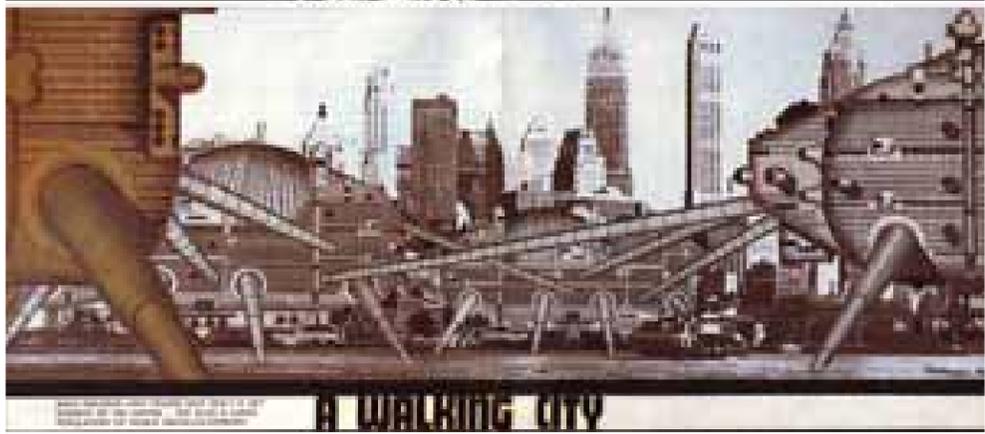
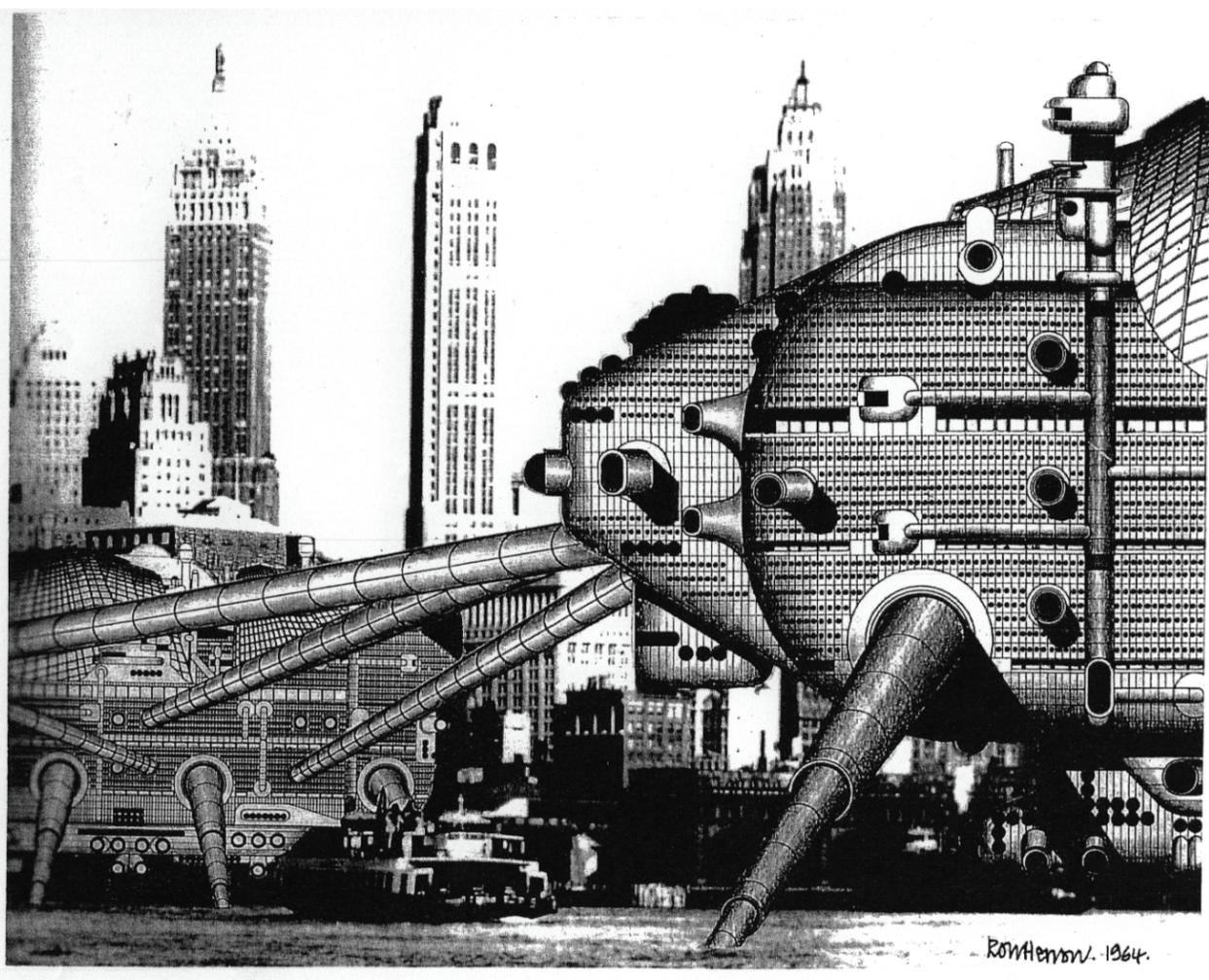
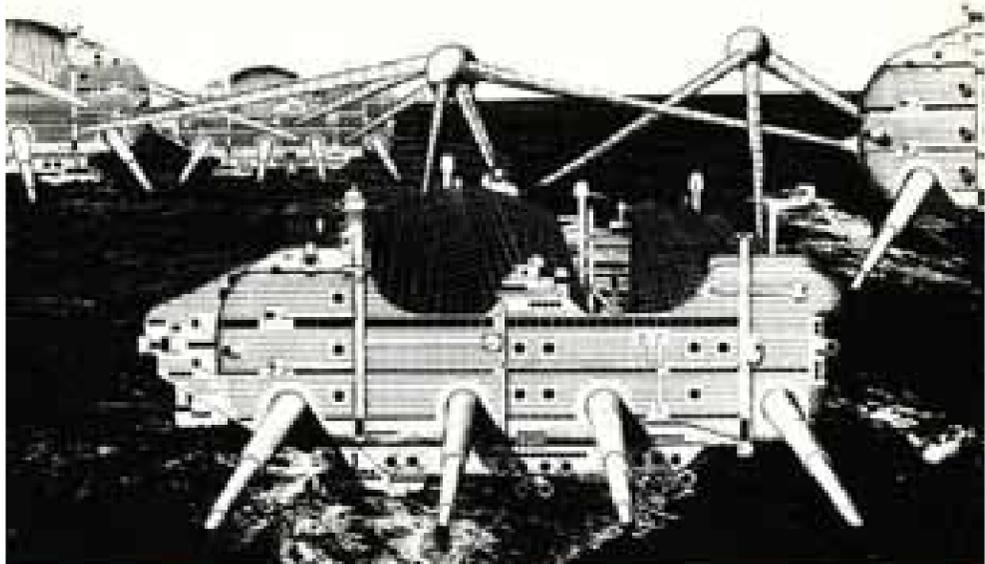
Precedents:

Since there are few examples of projects which fit this scope of design, there are many types of precedents to draw inspiration from. This spectrum of inspiration considers historical, conceptual, structural and spatial facets as well as ideas which can be taken from toys, origami, and even furniture which undergo relevant deformations which can be translated to architecture.



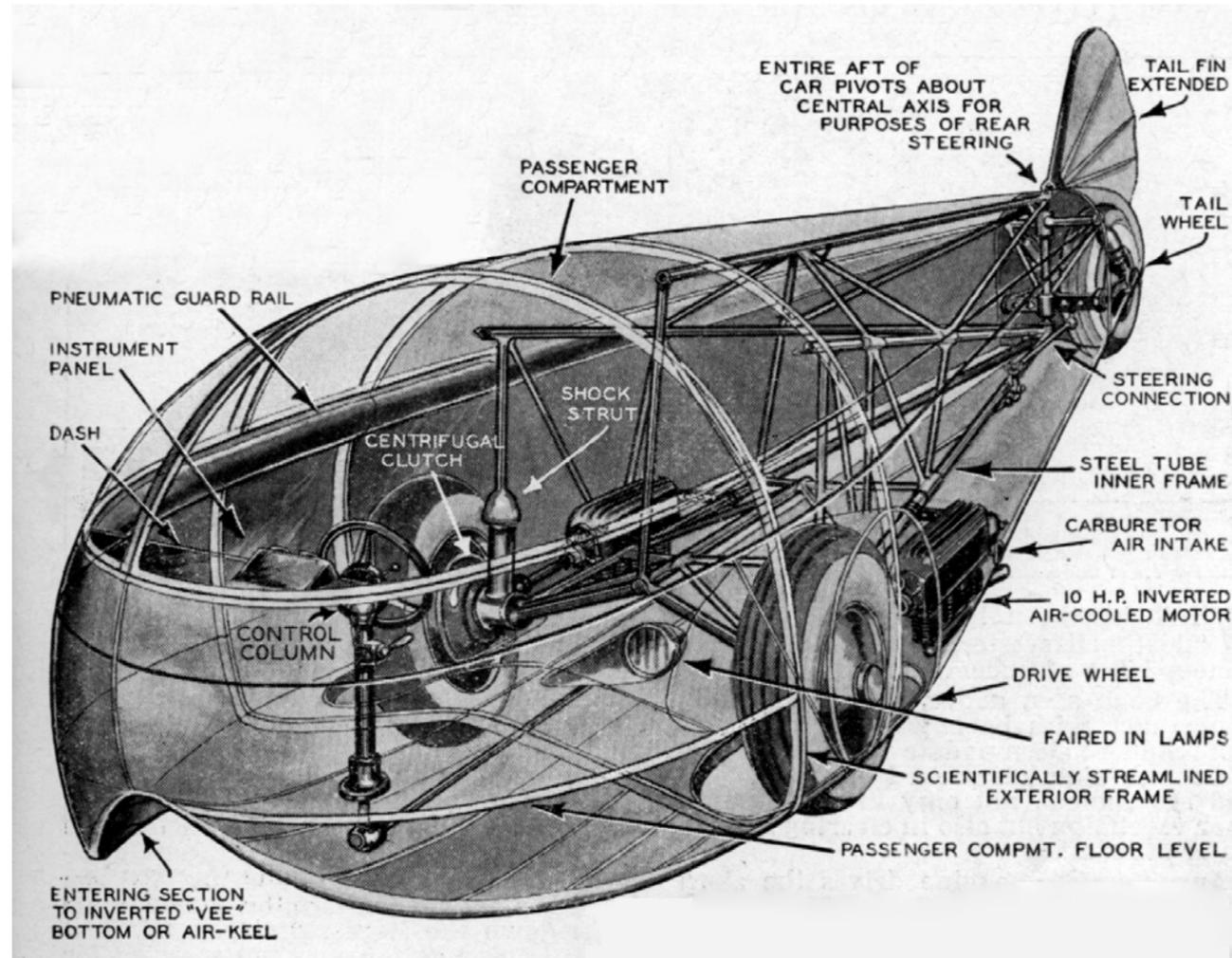
Precedents

Even as far back as the 1960's Archigram considered futuristic aspects of mobile architecture. These ideas however seemed to be reserved to science fiction as seen in the All-Terrain Armored Transport, (AT-AT) from Star Wars, or other artistic implements of science fiction and fantasy.



Inspiration can also be taken from projects which build off such ideas from science fiction and fantasy in their real life projects. These projects seem to capture the concept of the car mixing with a small-scale home or the idea of transformability

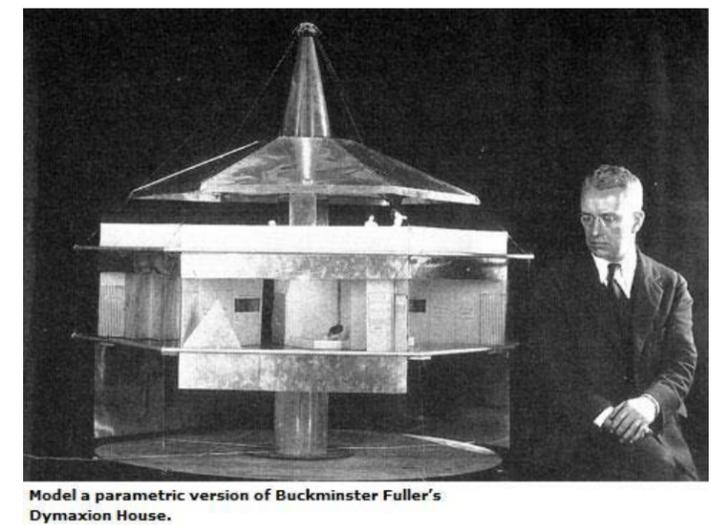
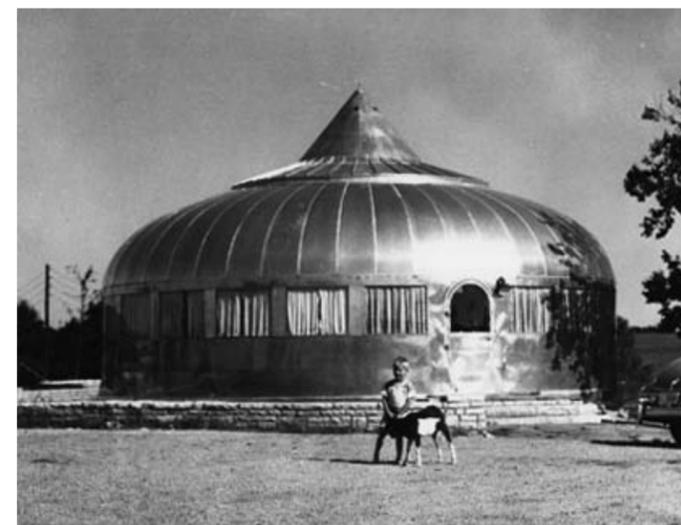
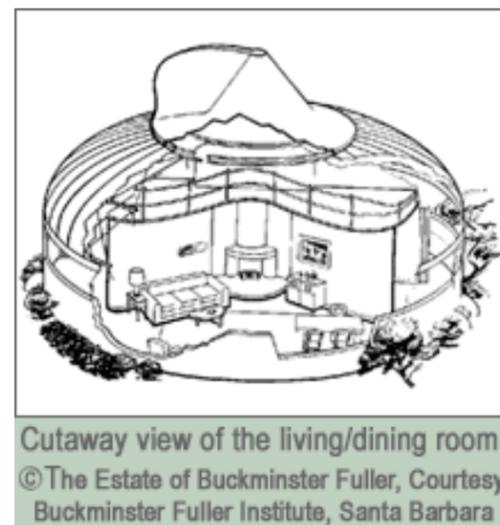


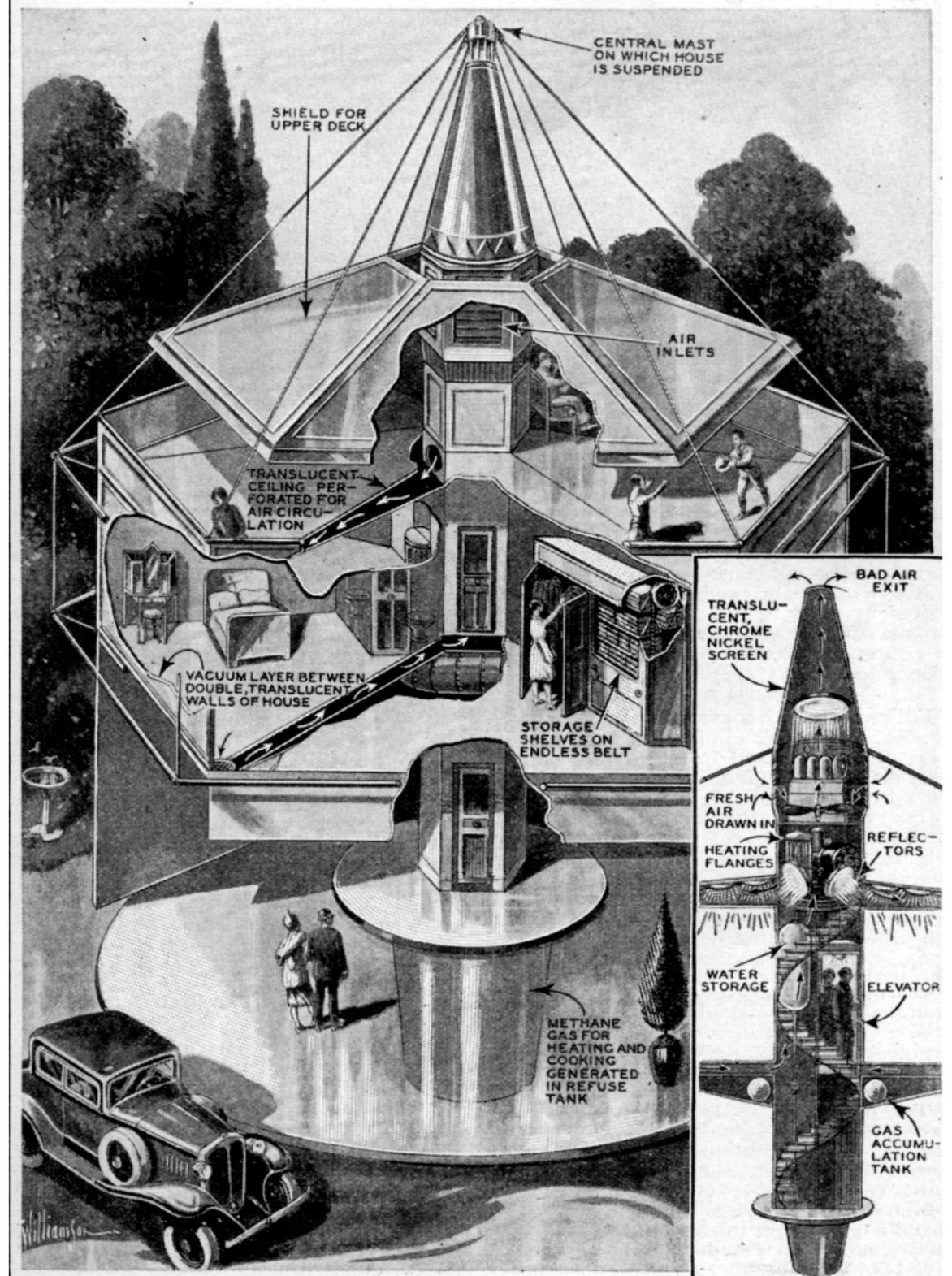
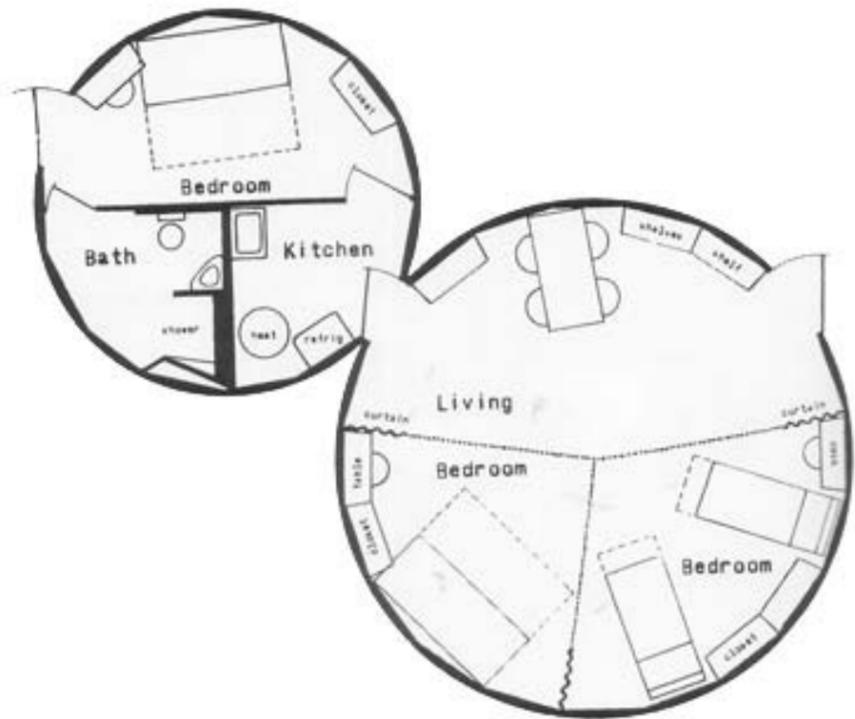
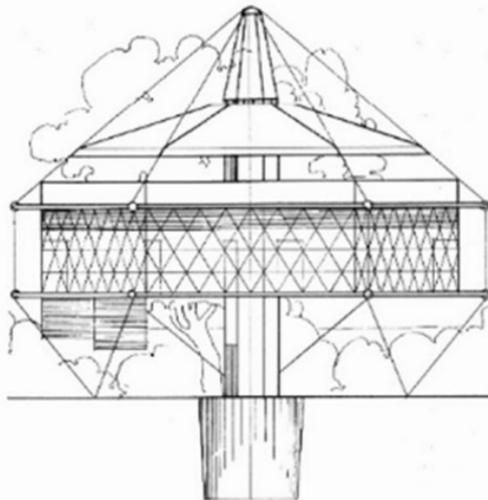
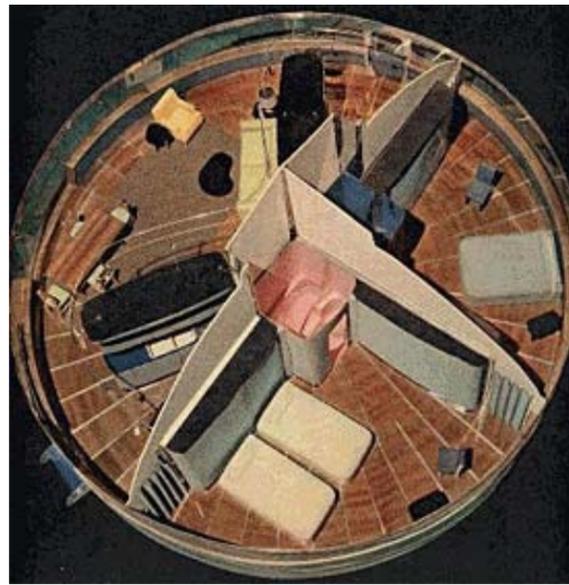
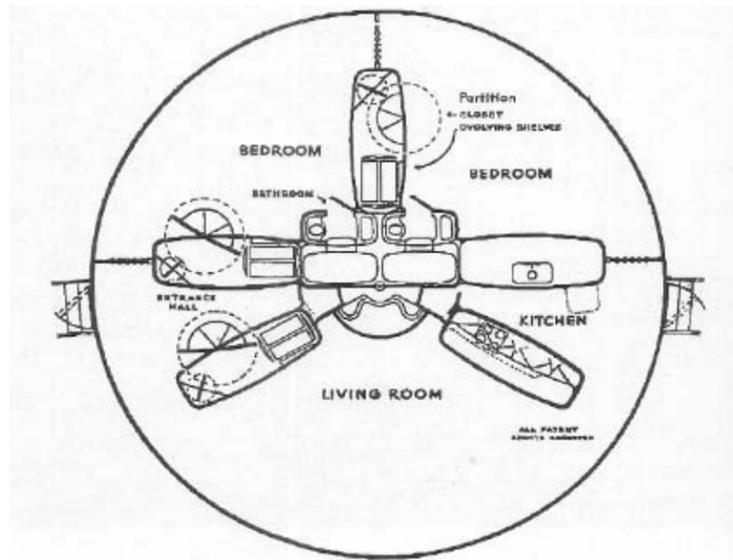


The Dymaxion house and car by Buckminster Fuller are historical precedents of systems that aimed for the future to improve conditions in society. The Dymaxion House was built in 1929 as a prototype for a prefabricated compact house and is known for its aluminum silo-like dome.

The Dymaxion car was invented in 1933, and was highly efficient for its time. It could seat 11 passengers, had a spacious interior, and could reach up to 120mph. An unfortunate accident at the world's fair however led to the prototype away from production.

These projects are relevant for their futuristic design, as well as for their spacious interiors, especially in the car which is also designed for travel.



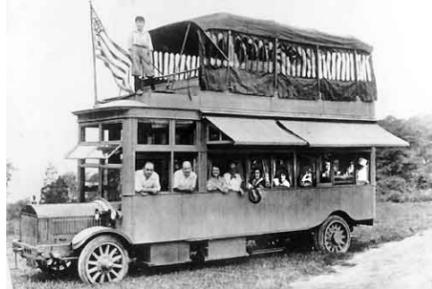




1946 Chevrolet motor home



1915 Lamsted Kampkar



1915 Conklin House-Car



1971 Starstreak motorhome



1966 Airstream



The Thompson House-Car was built in 1934 intended for trips in the African Safari. It was known for its telescoping roof. When extended it expanded the interior space of the vehicle, and when retracted it improved the efficiency output of the vehicle while driving.

This project is relevant not only as a historical precedent, but as an example of what this project aims to avoid. The transformation from the house to the car is not simply a protrusion of part of the car. There is more space within and amenities to gain from allowing more movable parts.

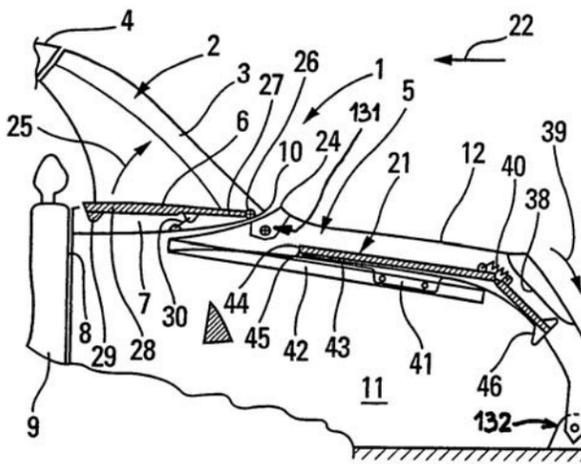
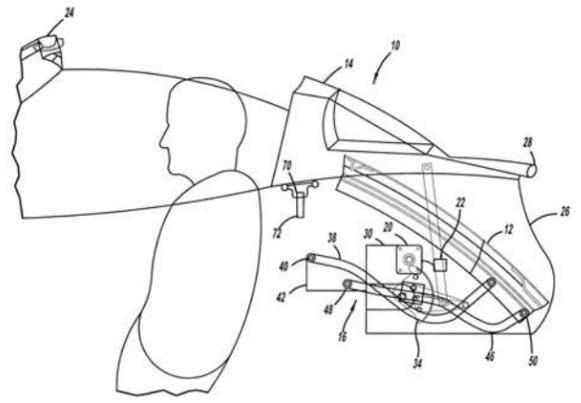
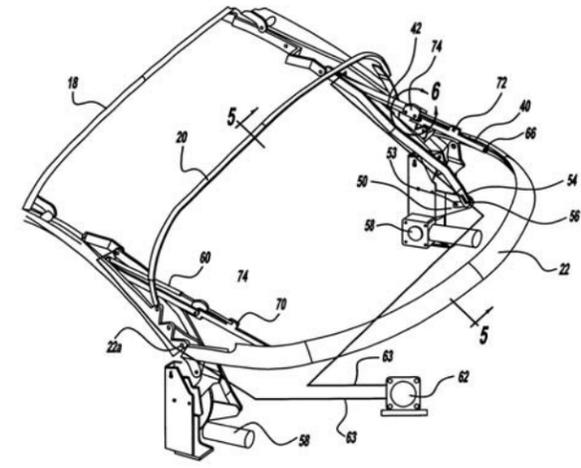




The Kevincyr Camper Cart (above) and Bike (left) are relevant precedents because they show the use of an extremely small space as a place for living. The Cart version also shows how a small space can be compact into a smaller unit for easier travel. Ideas such as these will be useful in making a house-car work similarly.

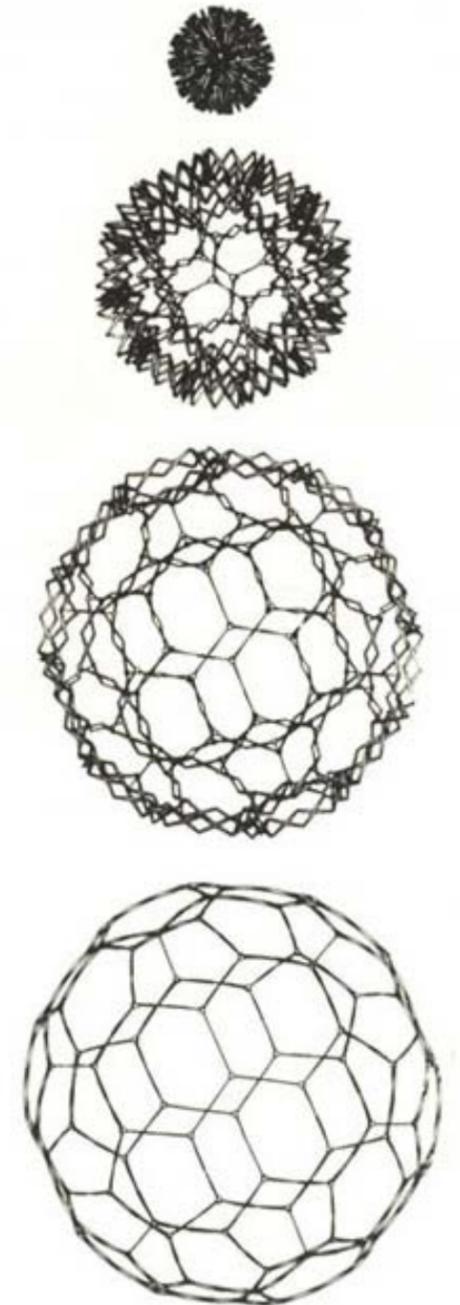
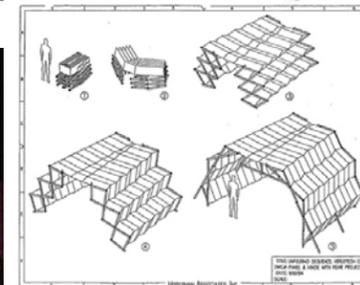
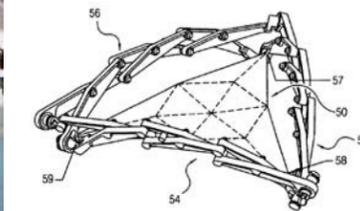
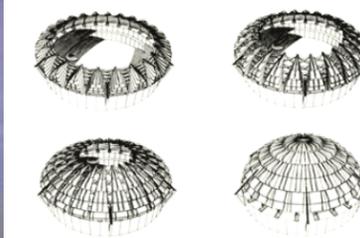
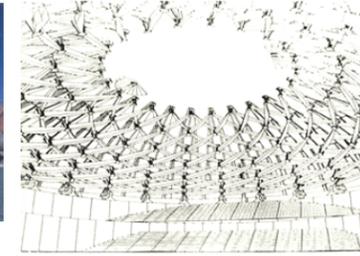
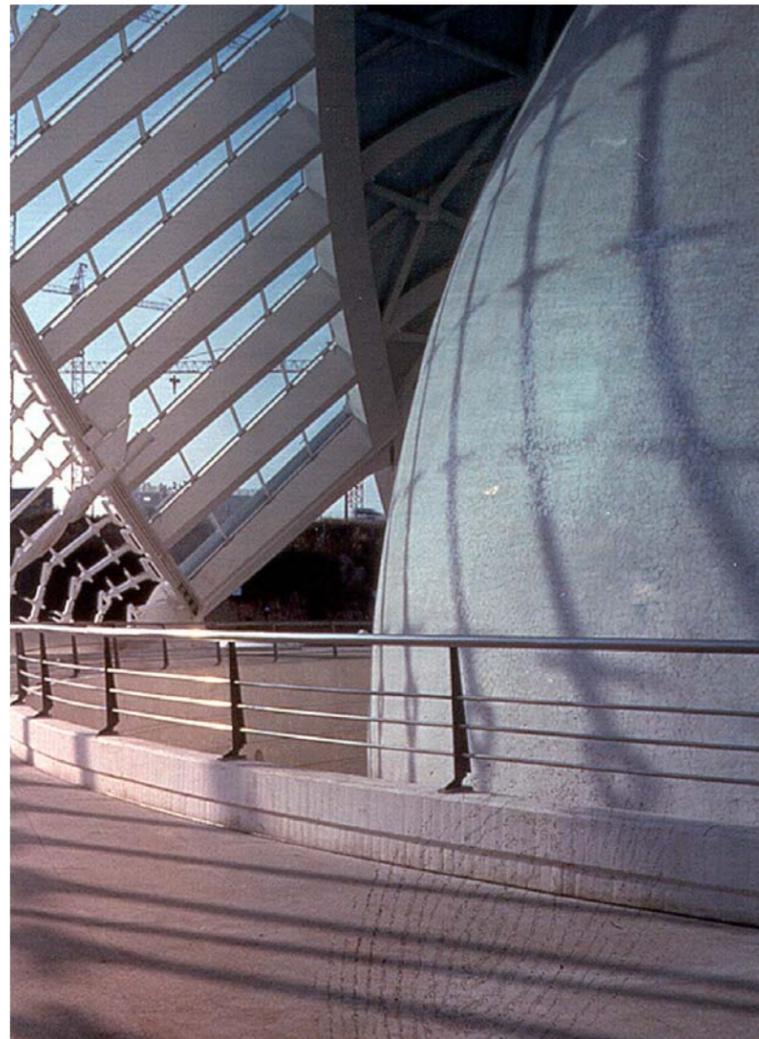
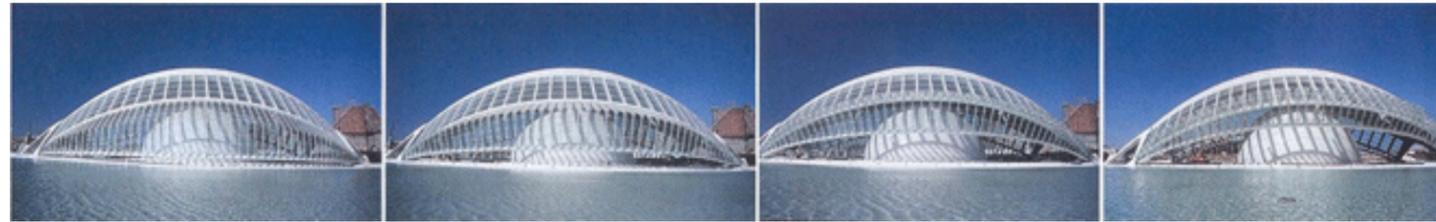
The Bufferino House-car (right) and the Mehrzeller Caravan (below) similarly illustrates the use of compact spaces in a mobile environment. The The Bufferino House-car is a compact 3-wheeled vehicle with amenities for a single person, while the is a larger space towed by a vehicle

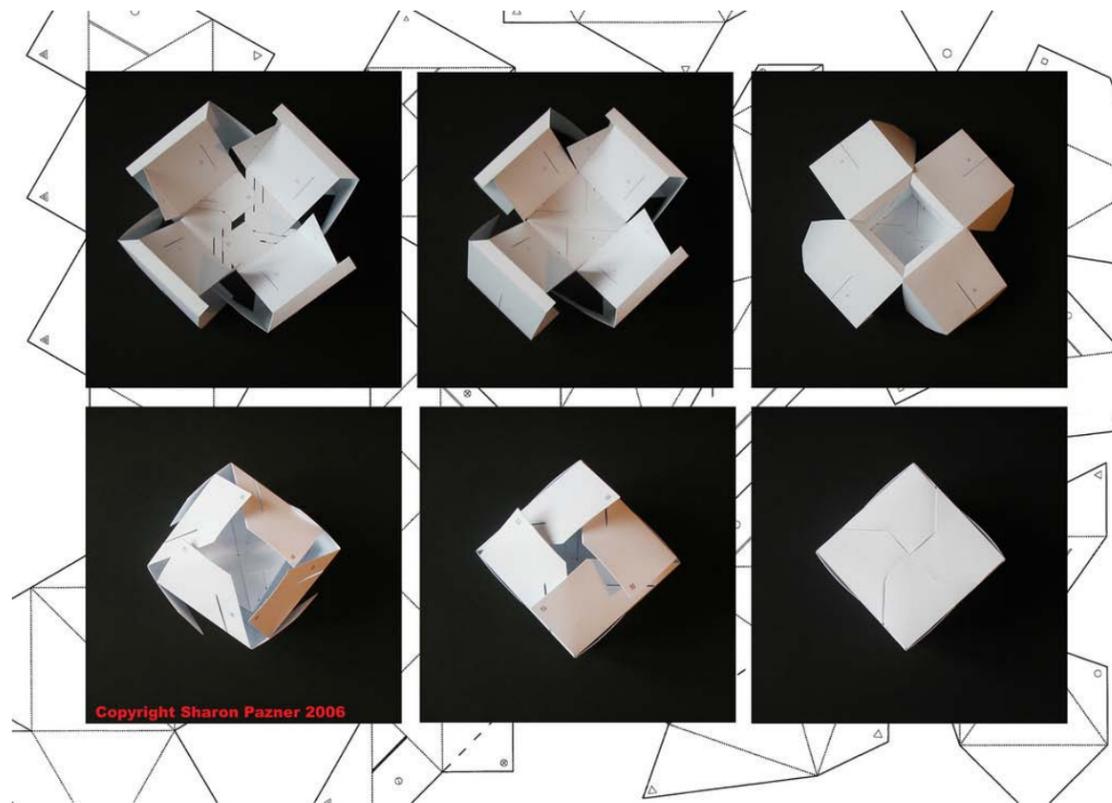




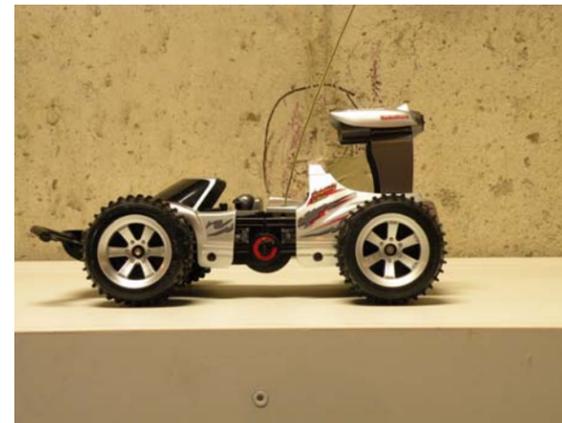
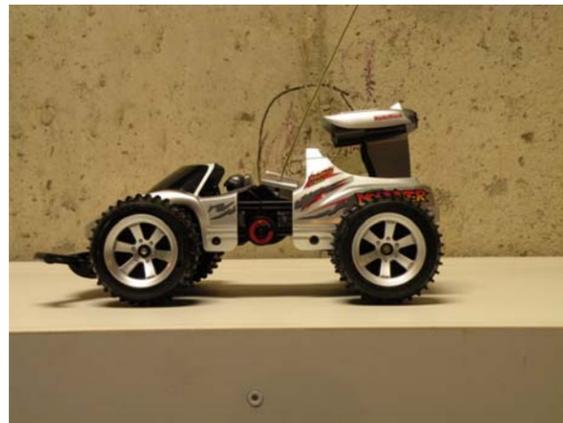
A closer look at deployable systems in architecture and the auto industry can inform the future of this project as well. From the convertible roofs of the VW EOS and the Infiniti g37(left) to BMW's morphable fabric skin car (above) we can see implementation of complex engineering to alter the surfaces.

Through the deployable structures of the 'eye lid' of Santiago Calatrava's Science center in Valencia (right) and Chuck Hoberman's movable arches and spheres (far right), there can also be a way to allow the surfaces of this house car to move and expand the interior space on a smaller scale appropriate to the car.





Where folding and transforming are important to this project, sometimes looking to the smaller scale in terms of toys and crafts can open doors to possibilities at a larger scale. From Origami (above left) to the folding of Transformers toys (above right) the manipulation of space is apparent. From other toys like the Deceiver RC Car (below left) and the Hoberman Sphere and Ball (right) an understanding of the duality through a simple shift in material via hinged surfaces also informs the possibilities of something larger.





The transformable tiny apartment of architect Gary Chang in Hong Kong displays how small spaces can be maximized through the compacting of program into moveable and multifunctional areas. He accomplished this in this project through walls set on sliding tracks running along the ceiling and floor. By shifting these spaces he is able to fit up to 24 different room layouts into his single small apartment.





The study of furniture is also useful to this project; especially dual function and folding furniture like these pieces open the possibilities of housing more than one function in an area to minimize the space. From foldable to reversible to retractable elements, they will help maximize the possibilities within the limited envelope of the car.



NO!

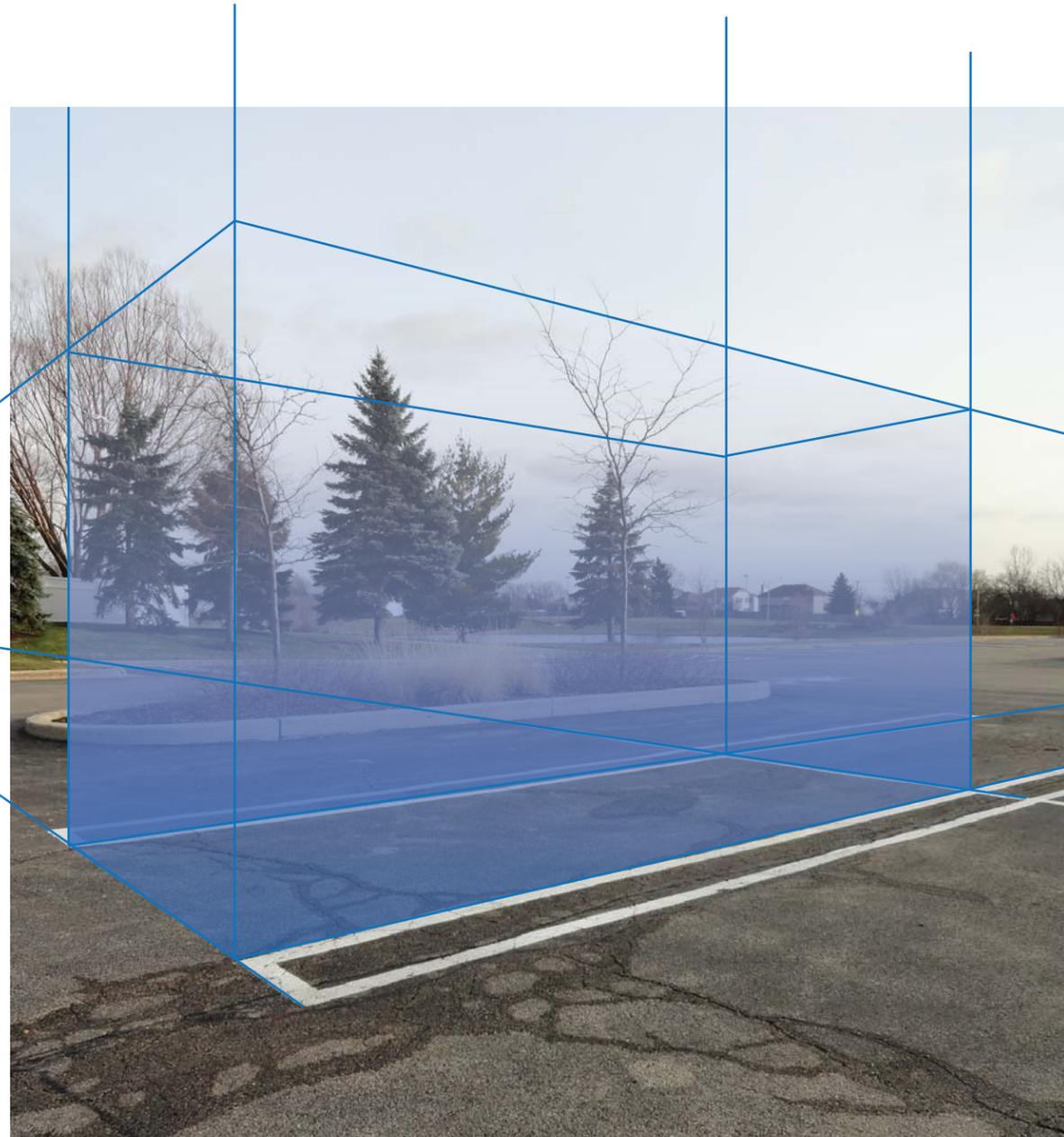




Though this project is intended to be a prototype for a mobile house, there is still the language of the existing condition to consider. This project wants to move away from the imagery of the infamous mobile homes that are in existence. Hopefully this project could provide an affordable alternative. It is also necessary to point out that this project aims to do more than just put a roof over a vehicle, or simply extrude a roof to expand the space. As this is a study of the interior as well as the exterior, a careful decision will have to be made on how the transformation will occur in order to be successful and what manner the spaces within are arranged in order to provide an efficient use of the limited space.







## Site

Since this is to be a mobile project, the site will mainly consist of wherever the house-car is driven. That said, the transformation process will be contained within the vertical volume of a parking space. This way there will be minimal traffic concern from any potential disruption the transformation process can have on the area around it.





Climate data will be important to the site information particularly because of road conditions and the effects on the surfaces of various terrain upon which this house-car may reside. Some concerns that arise are sliding and tipping. By keeping these ideas in mind, a design with a lower center of gravity will reduce the risk of tipping, as well as the resistance to wind loads. As the car is intended to be stationary while parked in the house mode, the concerns of slipping due to movement will be reduced. Explorations will be made into the temporary foundations systems that can improve the house's contact with the ground when stationary.





Chevy Silverado



Honda Element



Cadillac Escalade



Toyota Tundra

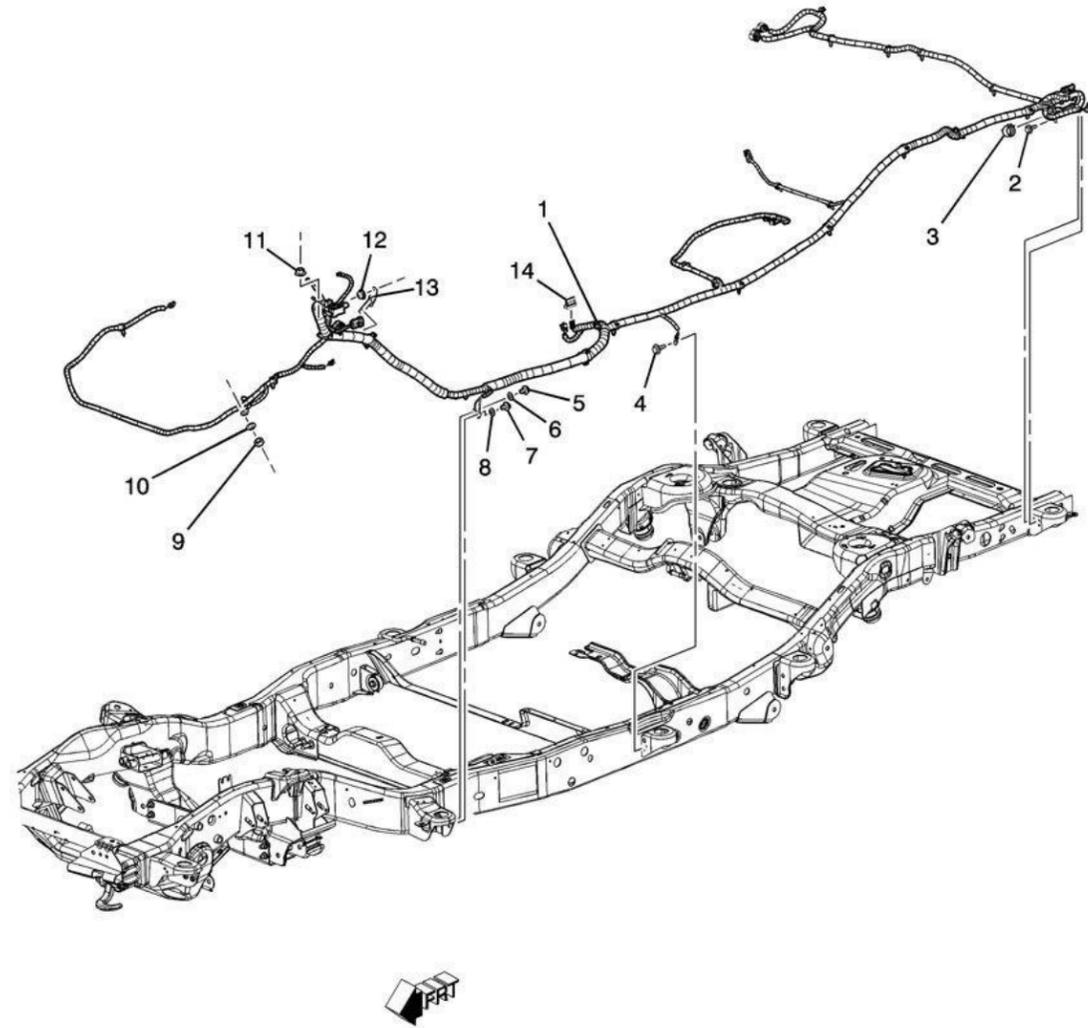


Chevy Suburban

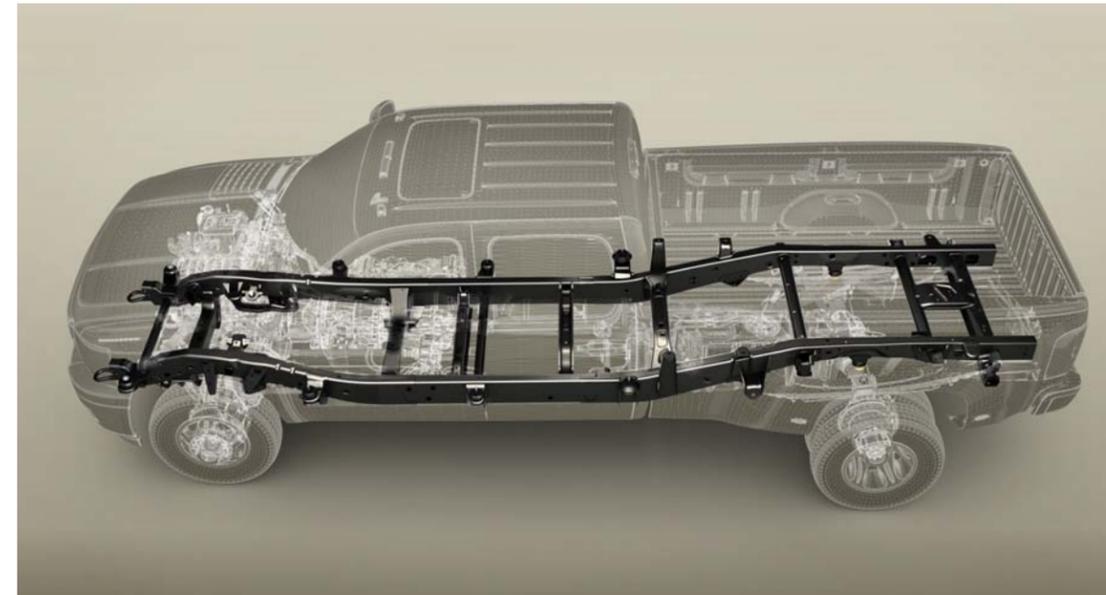


VW Van

Initial considerations of potential vehicles to use for the project were based upon criteria such as volume, space, and structure which would help the project to transform into a convincing and usable space.



The final selection of which vehicle will be appropriate will be decided based on structural and spatial criteria as well as aesthetic qualities.



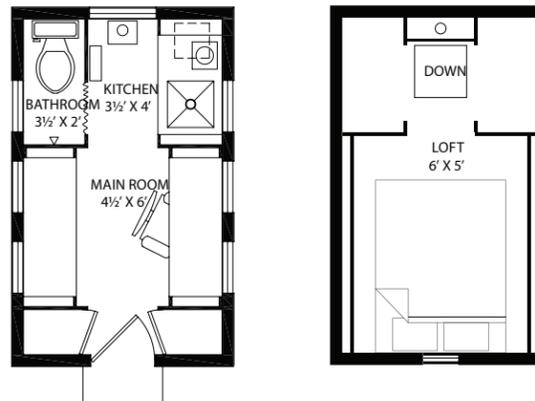
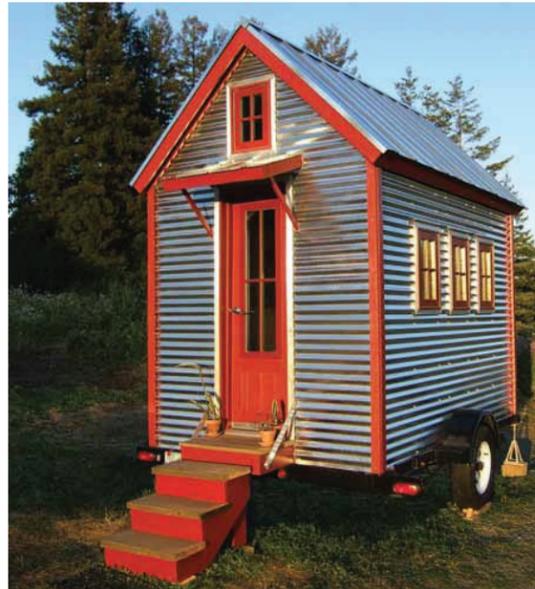
- |                                       |                             |                                |   |
|---------------------------------------|-----------------------------|--------------------------------|---|
| 1 Vent wings                          | 4 Sun-roof                  | 7 Trunk area                   | 10 Double-acting telescopic shock absorbers |
| 2 Special roof air-circulating system | 5 Glare-resistant skylights | 8 Air-cooled Volkswagen engine | 11 Torsion bar suspension                   |
| 3 Sliding windows                     | 6 Picture windows           | 9 Reduction gears              | 12 Double-insulated warm-air heating system |

The houses from the Tumbleweed Tiny House Company are compact eco-friendly houses that are relatively low in cost.

The size of these houses allows most of them to be mobile as well. These specific houses are important because they already fit with the constraints of a parking space.

Since this important scale factor of these houses are already achieved by the Tumbleweed Tiny House Company, they serve as helpful diagrams of the plan of space for what may fit within the car as it transforms in the parking space.

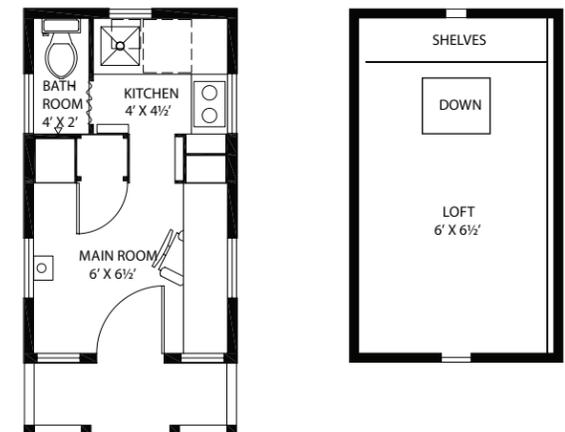
XS HOUSE



**DIMENSIONS AND COSTS**

Dimensions:	7' x 10'
Total square footage:	65
Road height:	12' 9"
Ceiling height:	6' 2"
Loft height:	3' 2"
Dry weight:	-3,000 lb
Estimated material costs:	\$16,000
Ready made costs:	\$38,997
Cost of Plans:	\$399

EPU



**DIMENSIONS AND COSTS**

Dimensions:	8' x 12'
Total square footage:	89
Road height:	13' 5"
Ceiling height:	6' 3"
Loft height:	3' 8"
Dry weight:	-4,700 lb
Estimated material costs:	\$19,950
Ready made costs:	\$45,997
Cost of Plans:	\$859

WEEBEE



**DIMENSIONS AND COSTS**

Dimensions:	8' x 14 1/2'
Total square footage:	102
Road height:	13' 5"
Ceiling height:	6' 3"
Loft height:	3' 8"
Dry weight:	-4,900 lb
Estimated material costs:	\$21,150
Ready made costs:	\$48,997
Cost of Plans:	\$859

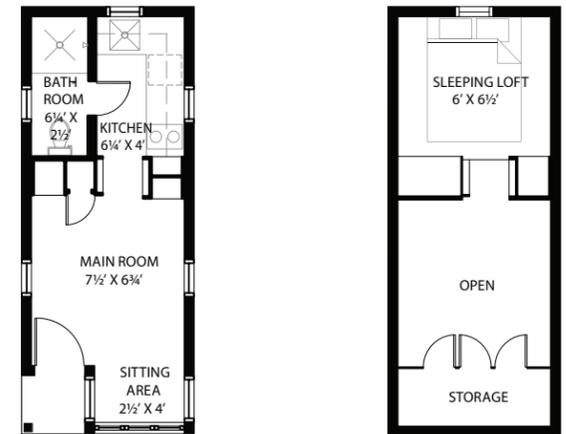
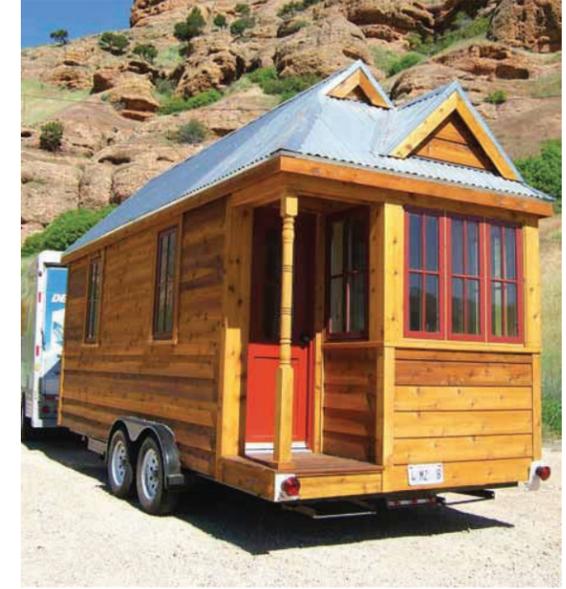
TARLETON



**DIMENSIONS AND COSTS**

Dimensions:	8' x 16'
Total square footage:	117
Road height:	13' 5"
Ceiling height:	6' 3"
Loft height:	3' 8"
Dry weight:	-5,400 lb
Estimated material costs:	\$21,250
Ready made costs:	\$49,997
Cost of Plans:	\$859

FENCL



**DIMENSIONS AND COSTS**

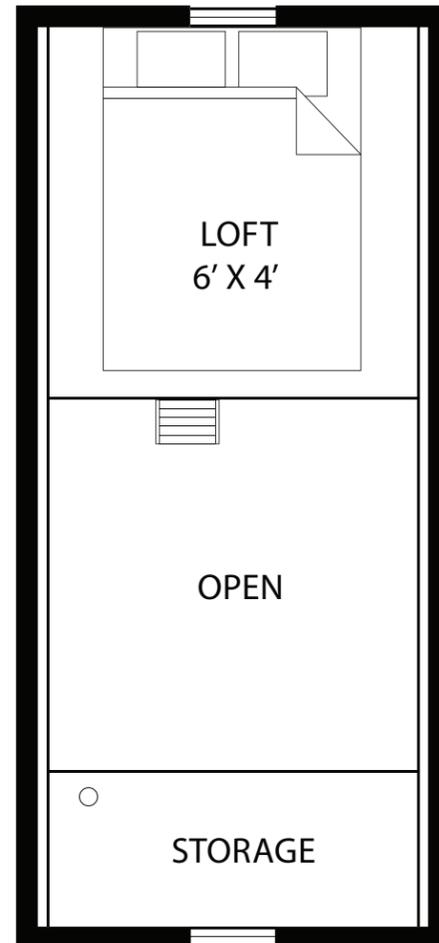
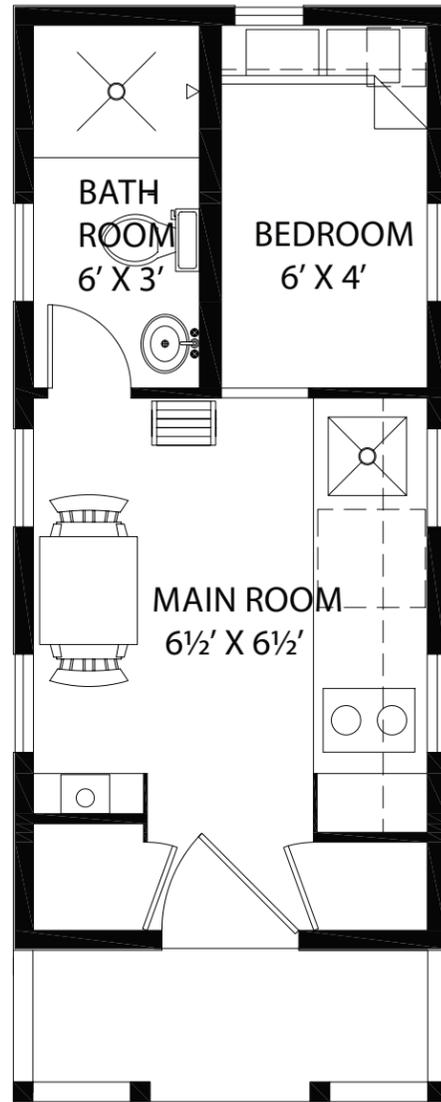
Dimensions:	8' x 18 1/2'
Total square footage:	130
Road height:	13' 5"
Ceiling height:	6' 3"
Loft height:	3' 8"
Dry weight:	-5,600 lb
Estimated material costs:	\$23,000
Ready made costs:	\$53,997
Cost of Plans:	\$859



The Lusby House by Tumbleweed Tiny House Company fits the accommodations of a small home within a compact house which can be pulled behind a vehicle. The house contains a kitchen along with two bedrooms, a bathroom and a sitting room with a significant deal of storage space.

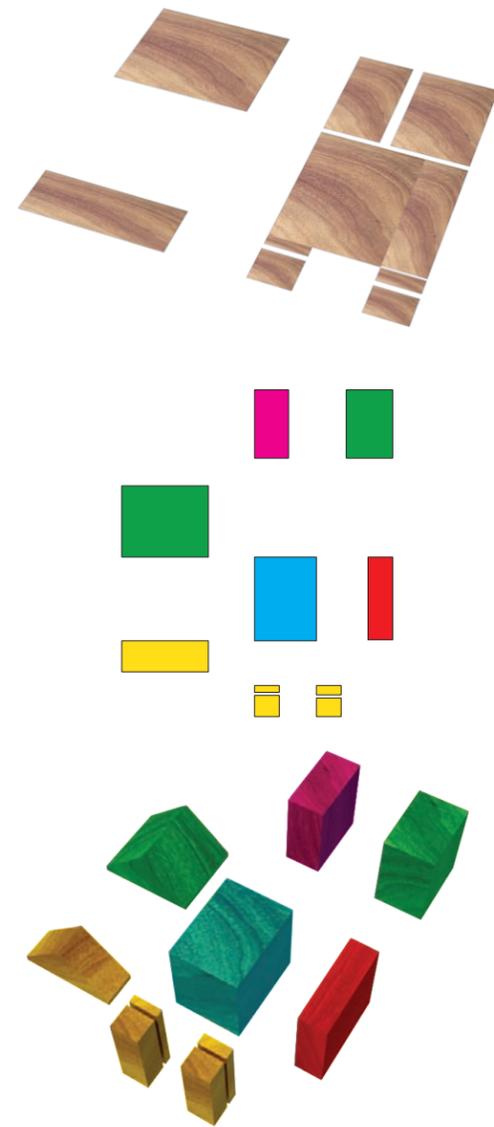
This project is significant because it displays how the accommodations of a house can comfortably fit within the constraints of a parking space. The next step in terms of relating this project to the house-car would be to explore the displacement and collapsibility of the elements to fit within an operable car.



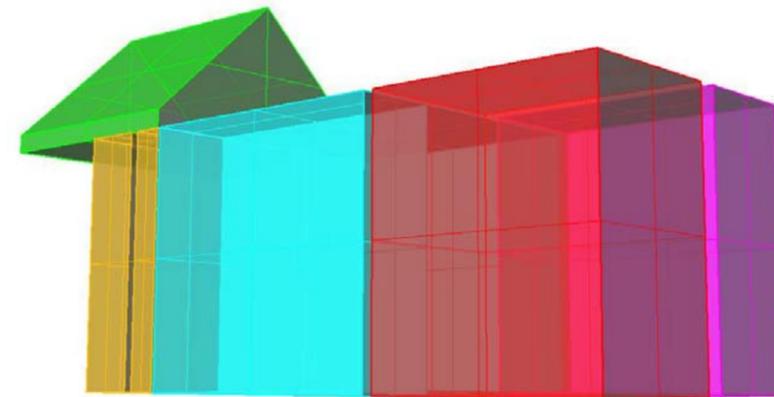
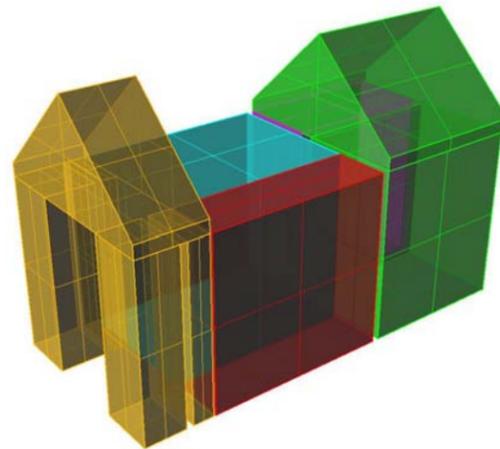


**DIMENSIONS AND COSTS**

Dimensions:	8' x 16'
Total square footage:	117
Road height:	13' 5"
Ceiling height:	6' 3"
Loft height:	3' 8"
Dry weight:	~5,400 lb
Estimated material costs:	\$21,250
Ready made costs:	\$49,997
Cost of Plans:	\$859



	Program:	Net SF	Gross SF:	128 SF
	Kitchen	13	Capacity:	1-2 poeple
	Sitting room	34		
	Bathroom	15		
	Sleeping area	61		
	Storage	26		
	Porch	16		
	MEP/utilities	4		



Since the volume of the car will be deformed in the transformation process, it is difficult at this point to denote the actual scales and dimensions of the necessary areas of the spaces which will expand within the car. The scale of the spaces will be determined by the success of the transformation design, which hinges on a final decision of which base vehicle would be appropriate for this project. Perhaps several layouts can be explored. These average dimensions were derived from a volume study of the Tumbleweed Lusby House.

# the nomad

mobile apartment personal  
shelter property transit  
commute move room  
home transportation  
ownership car  
space travel housing



Inspired by a need for personal space in a fast paced, highly mobile world, the nomad project combines the mobility and strength of a pickup truck with the convenience of a small living space.

By combining a work space, kitchen, sleeping area and bathroom, this project allows this compact space to allow for the comforts of a home to be available wherever a person can travel.

Precedents from history, origami, the automobile, furniture and even toy industries were studied to develop a transformable and deployable structure that allows the project to compact further to take up less space when being driven or simply parked.

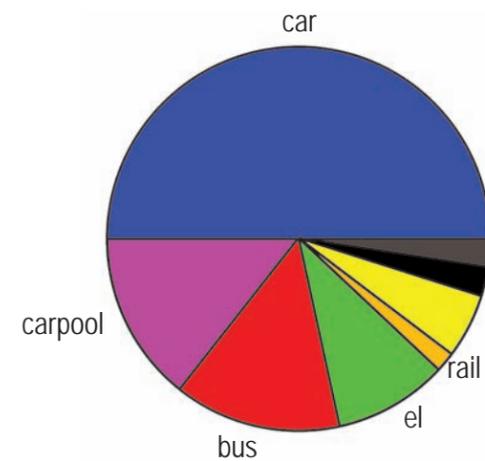
This exploration of the duality of interior space experiments with the folding of program space from a collapsible set of planes to a space which can be used in daily life.

Users of this project are intended to be traveling students, business people, scientists, or potentially campers. The idea is for the space to be usable for living in situations which address the temporary stay, and the movement to, from, and between the checkpoints of life.



While the selection of the actual point in the spectrum of this project was left to discussion, the direction of this project progressed down the middle path, maintaining aspects of the truck, as well as a small house, and allowing the transformation to occur between the two.

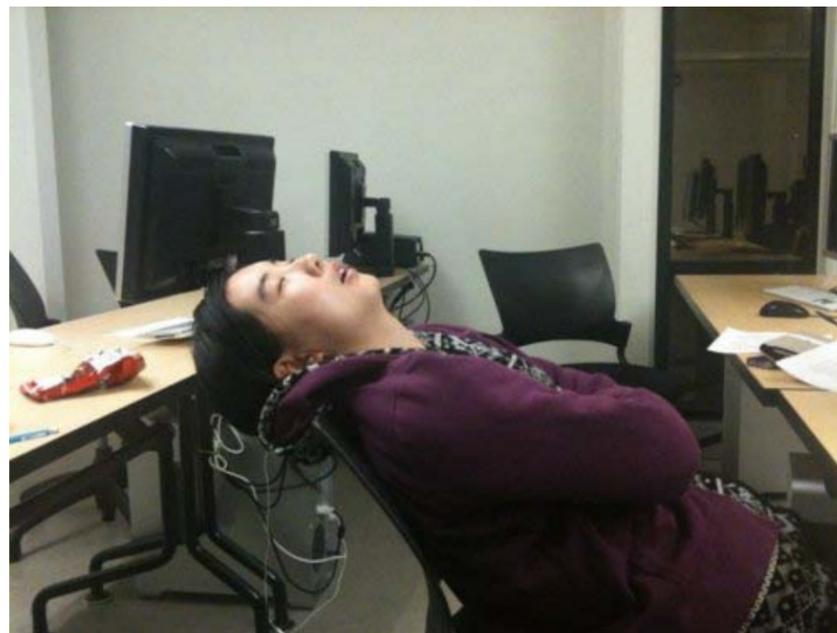
Mode of transportation to work in Chicago, IL

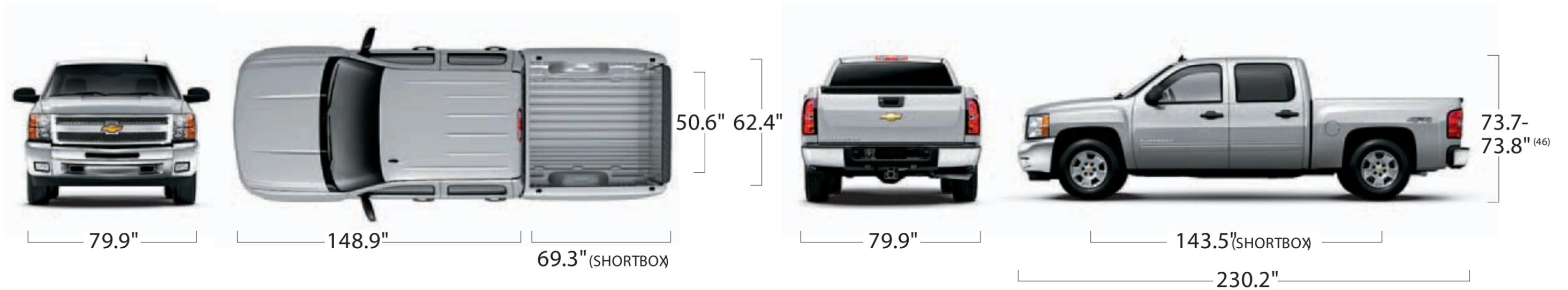


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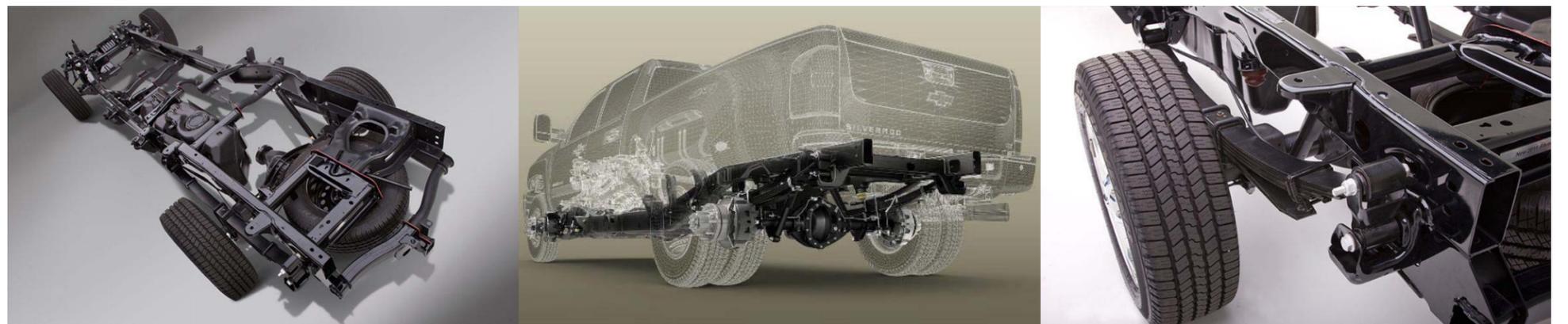
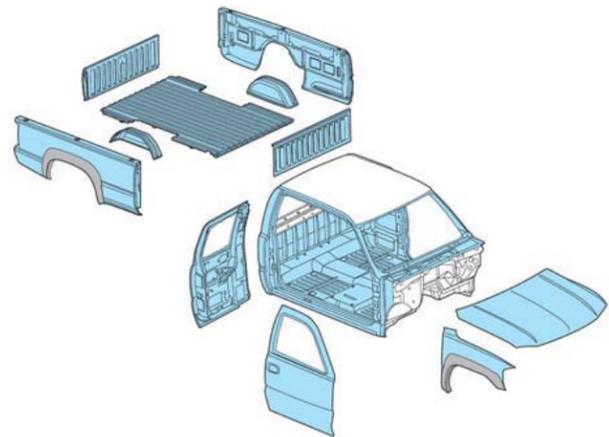
average daily population change due to commuting

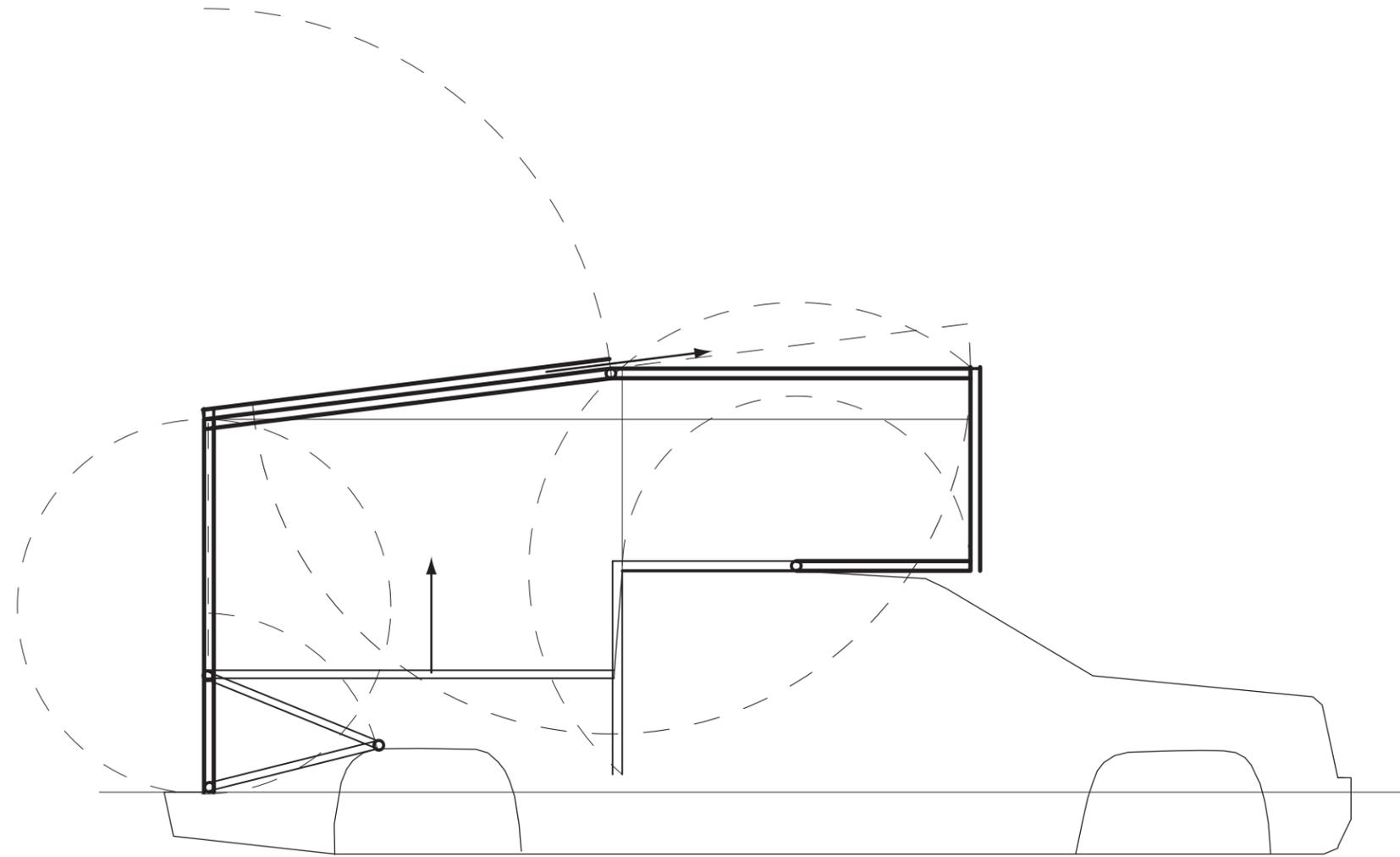
In the process of moving from the research and spatial phase to the actual fruition of the project, the theory behind the user of the project was in flux. Reconsidering the reality of the project, it seemed that this project would be less about the cost and developing an economic alternative to a car or vehicle, but rather provide a product which would appeal to multiple demographics of users. This generated the inclination of this project toward traveling students and businesspeople. While these users address a more urban context, the scope was amended to also address the 'off-road' aspects of the project as well to address remote scientists and campers.



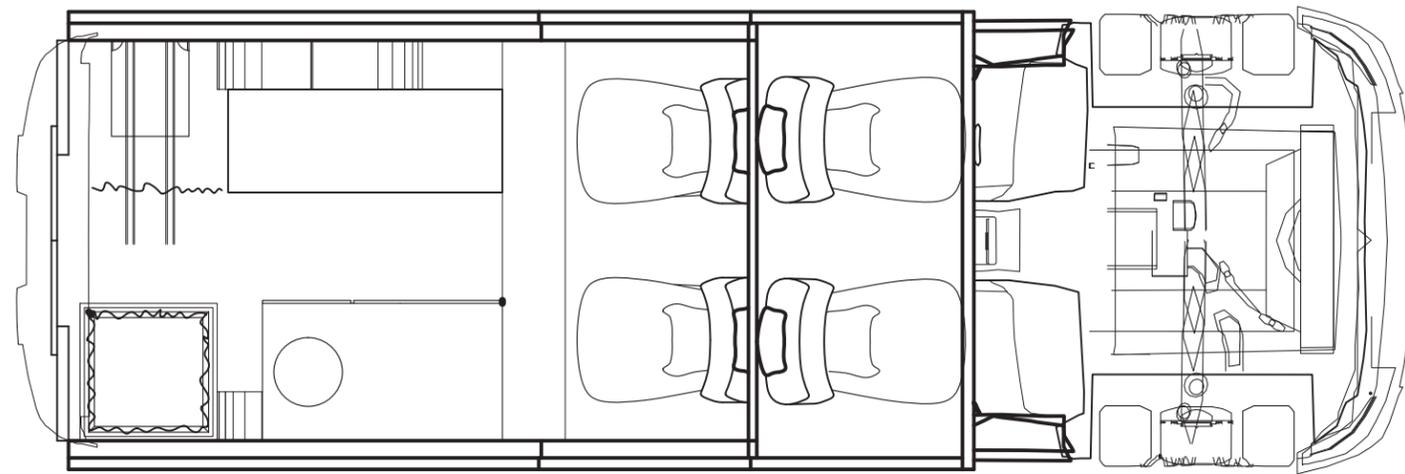


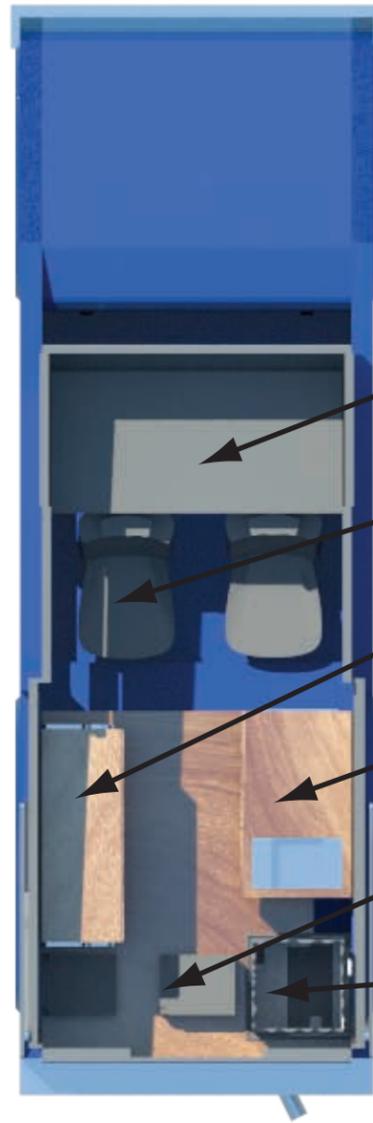
The Chevy Silverado was finally chosen on the basis of availability, as well as structure and adaptability. Since the Silverado is a common vehicle, which also shares a chassis similar to other Chevy models as well as Ford, GMC and Toyota truck profiles, it seemed appropriate to select the Silverado as a starting point for the product with the intention of allowing the product to adapt to other models in the future.





planes rotate and fold on hinges to enclose the indoor space





**Sleeping Space**

Space above cab folds out into a bed, and can fold away to allow for more head room in the seating area.

**Seating Area**

Driver and passenger chairs reverse into the back of the cab and flip to face backward into the living space.

**Cabinet**

Folds down for truck mode and opens up into a desk and storage when in house mode.

**Kitchen**

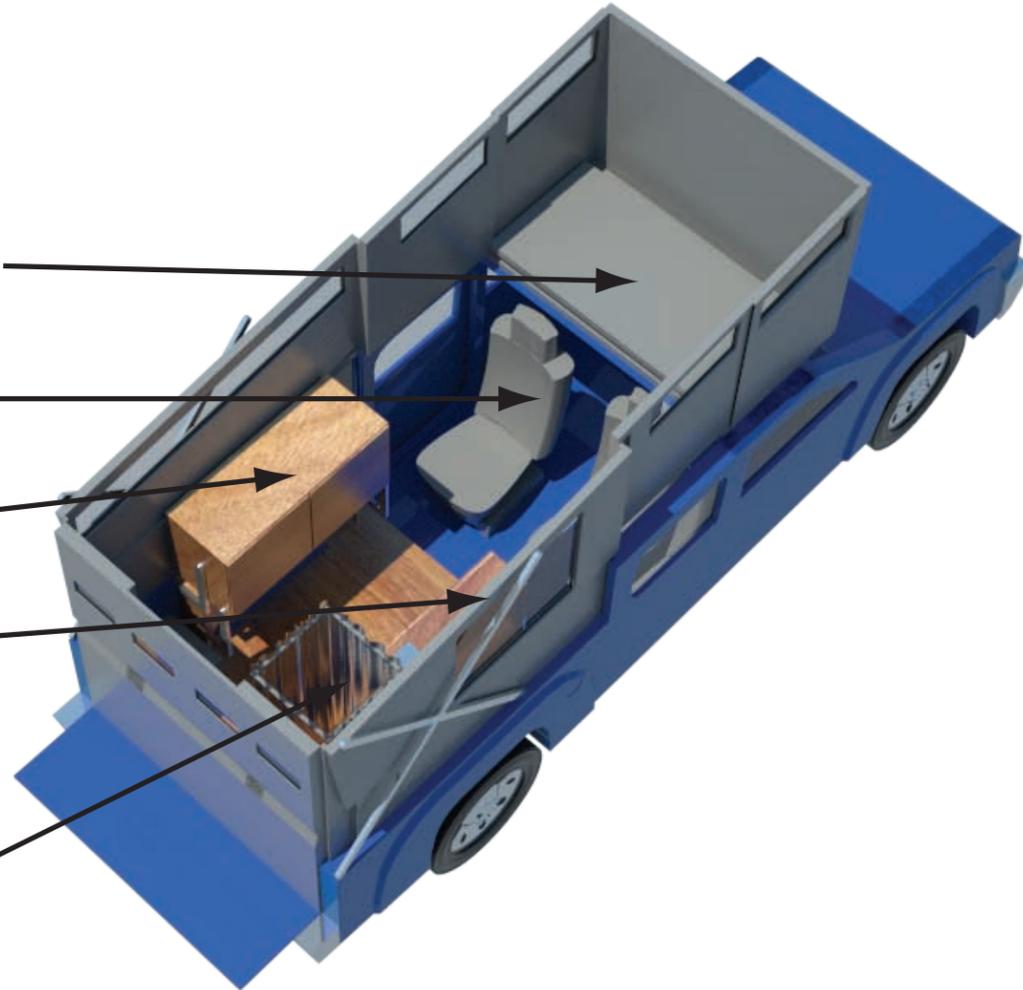
Compact into a small unit for transportation, the kitchen opens up in house mode featuring a sink, small refrigerator, small oven, and cooktop with storage and counter space.

**Portable Toilet**

Slides into the middle of the space for truck mode to avoid hinged back panels which fold down.

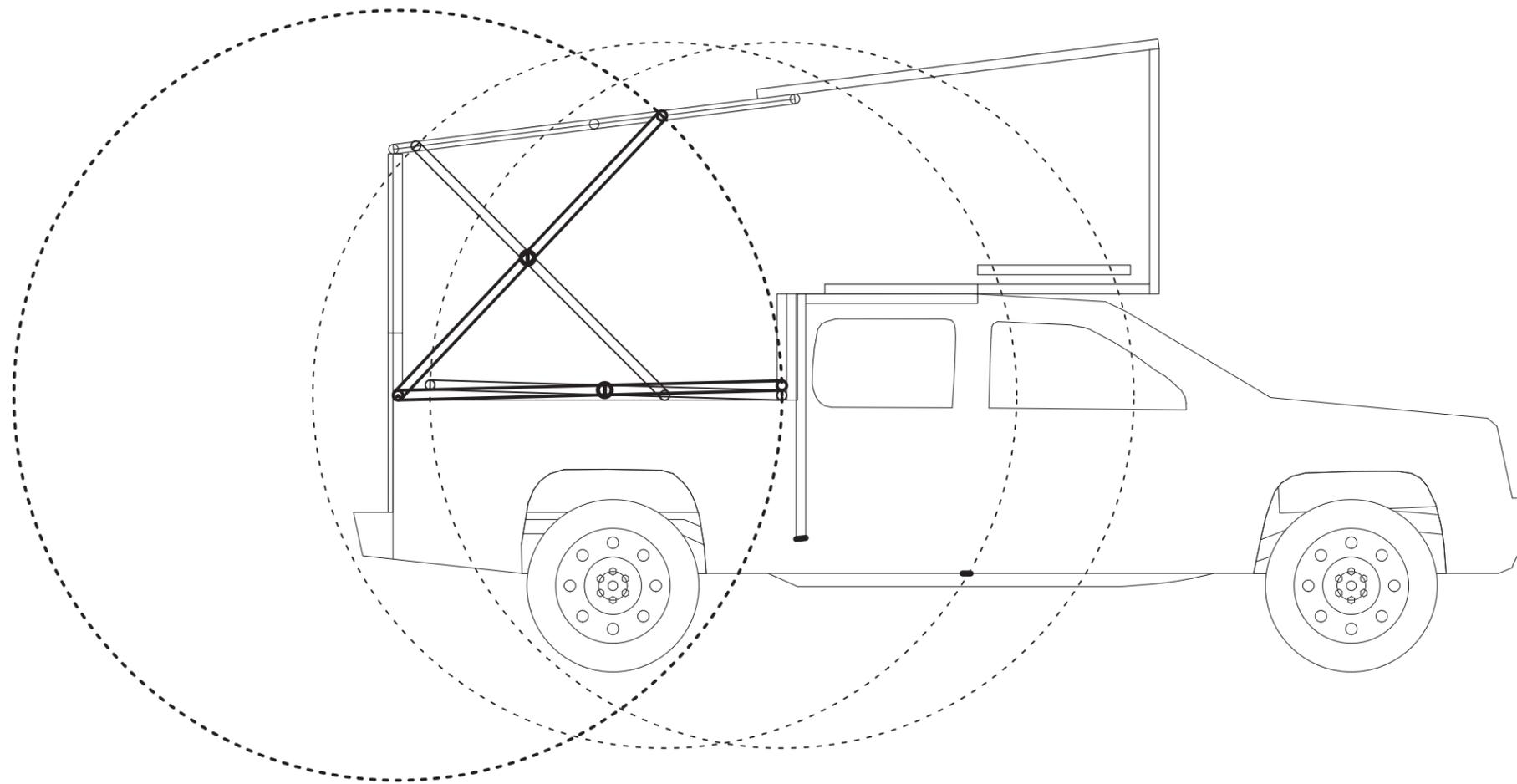
**Shower**

Opens up in house mode, and drains into waste water tank below.

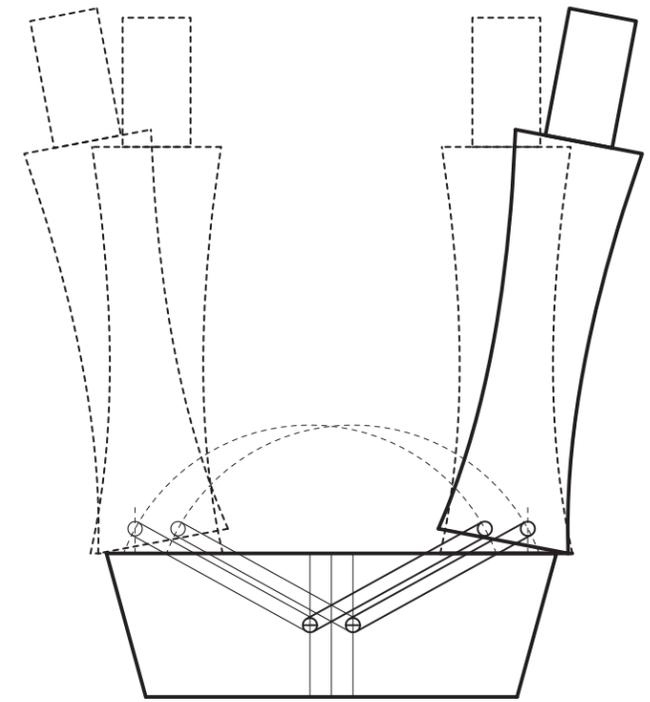
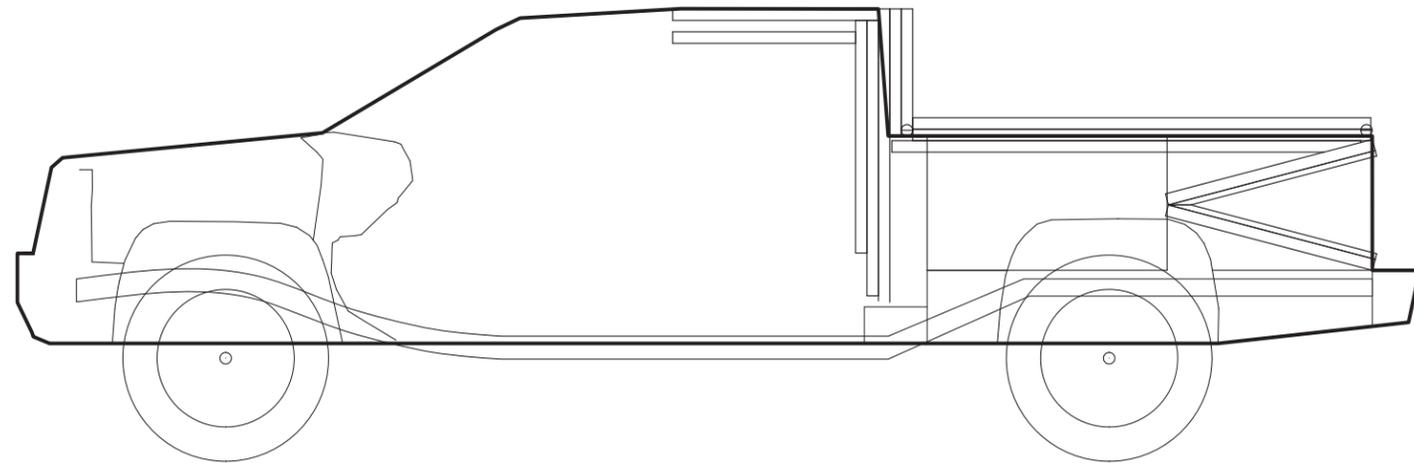
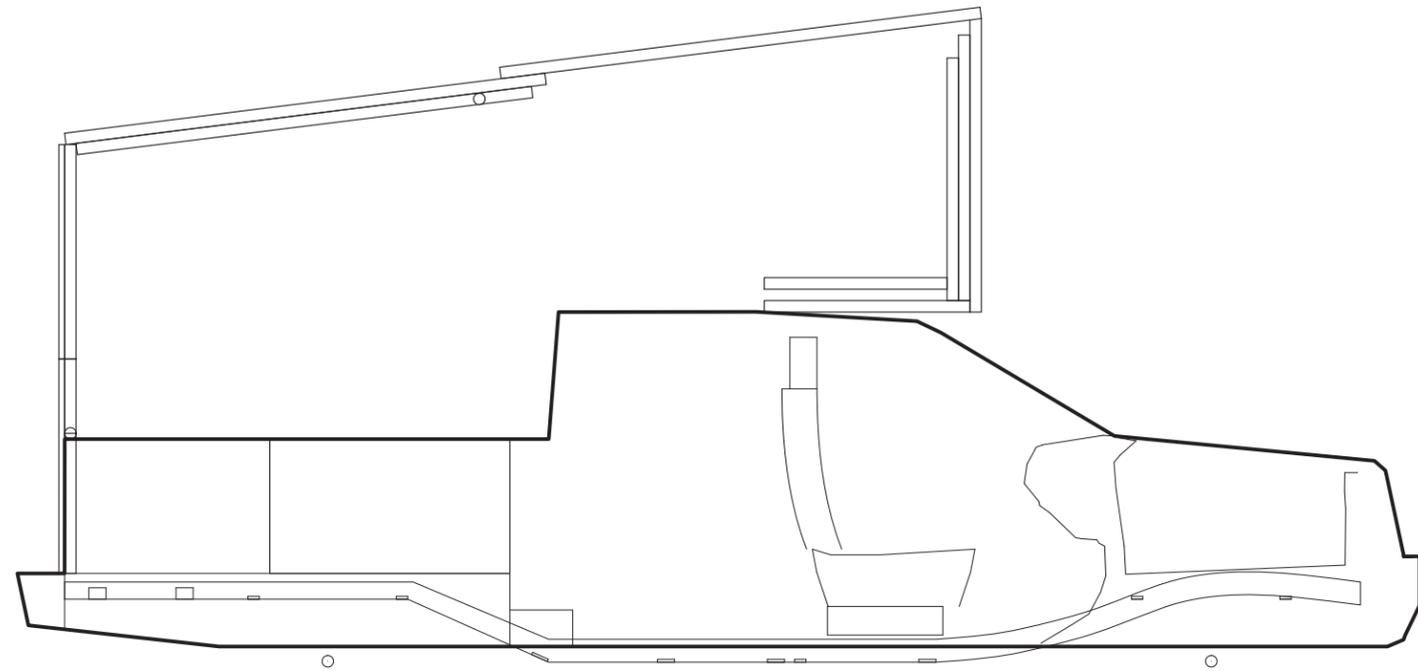








Cross structure designed to support the roof as it extends over the bed surface.

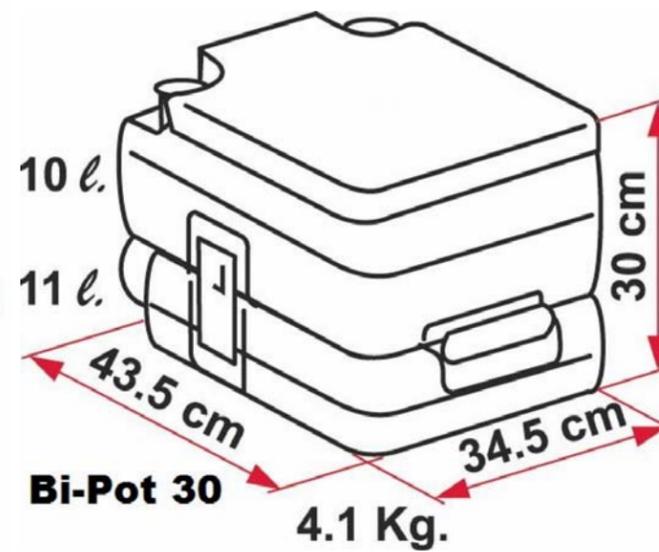
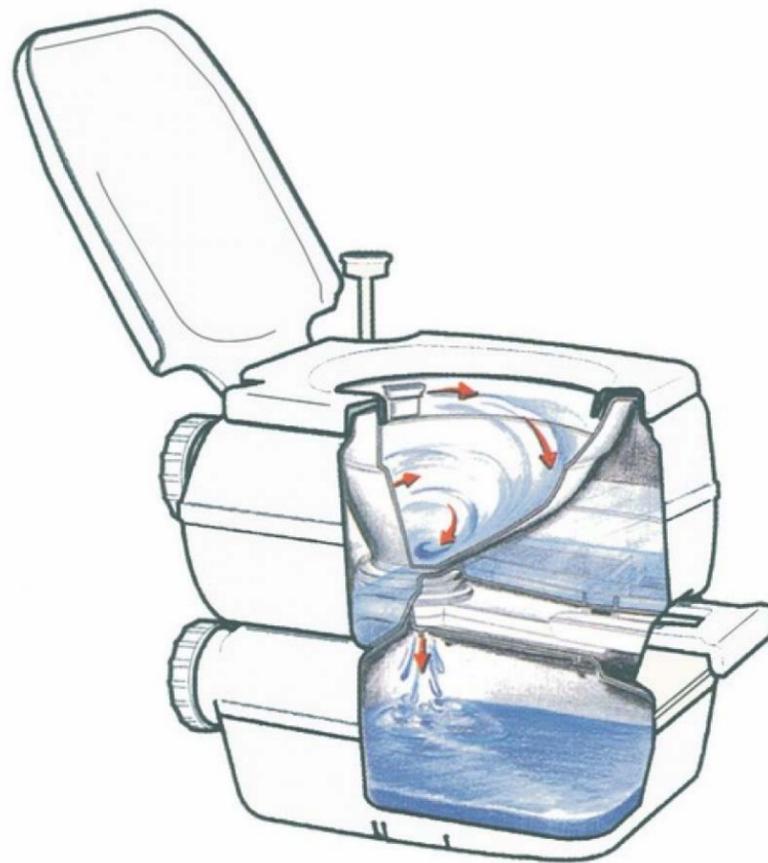
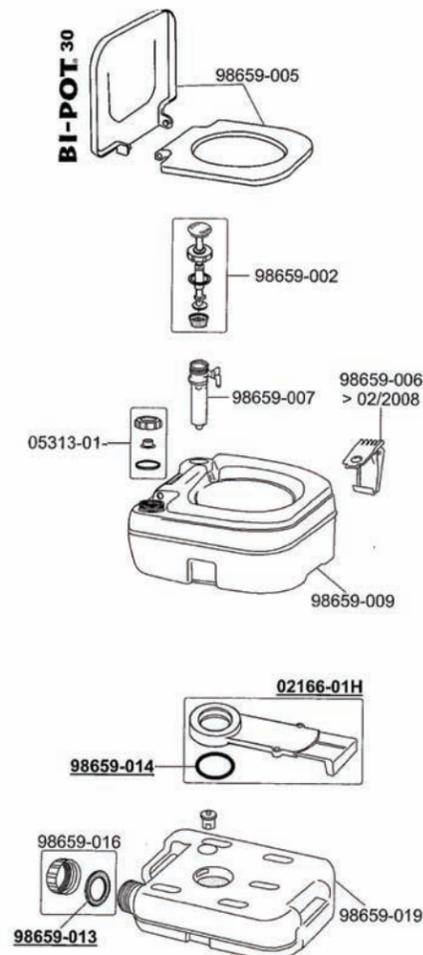


Chair backs turn over the seat to face the seat in the other direction.



Collapsible shower and portable toilet contribute to small scale household functions and allow for safe removal of waste water.

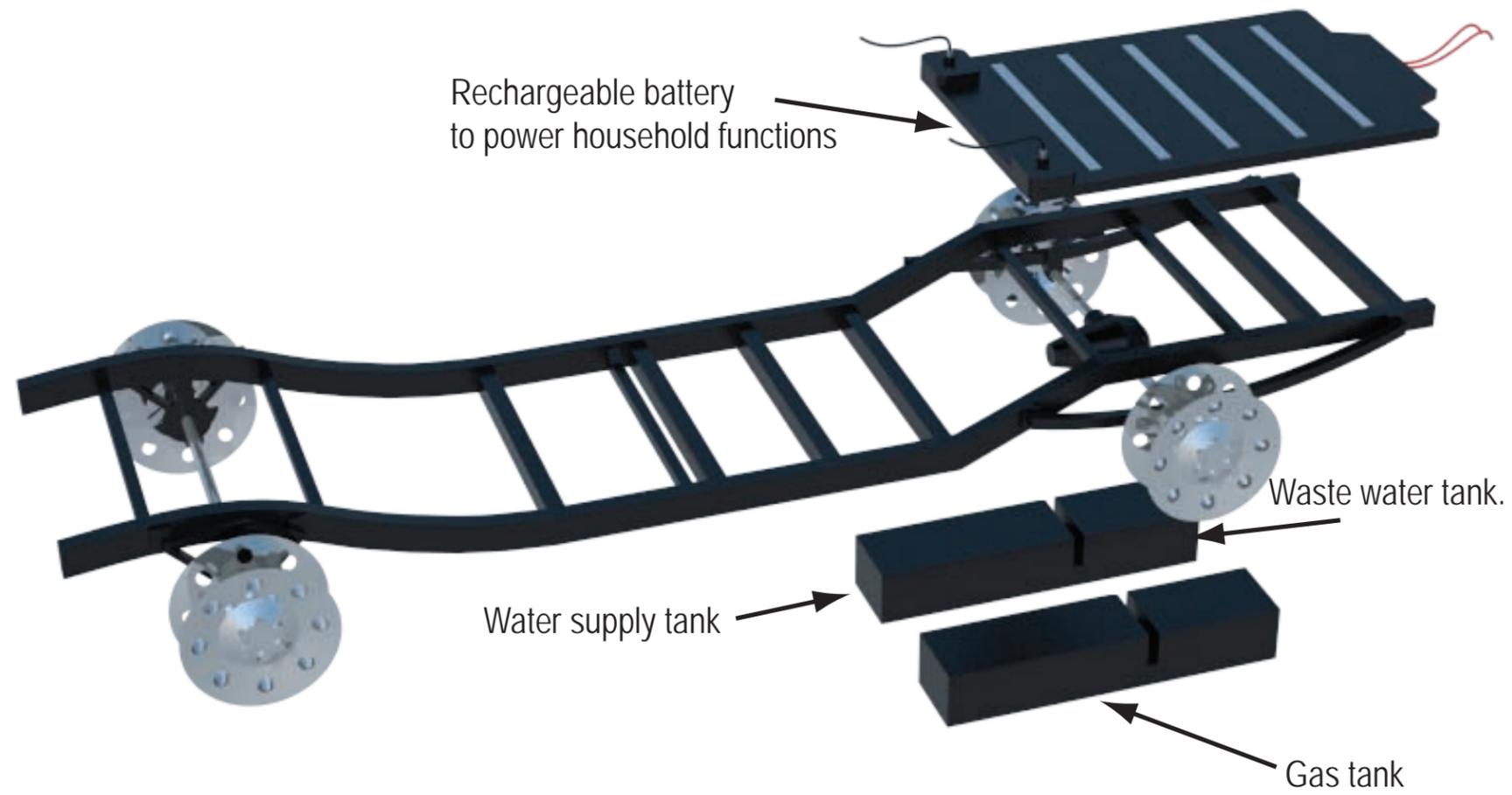


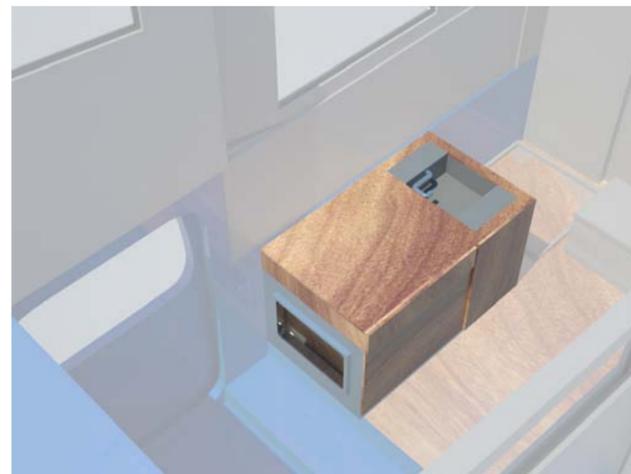


Water Calculator	
Required Data Entry	
Number Of People In Residence	1
Indoor Water Use	
Bathroom Water Use	
Daily Showers In The Residence	1
Average Shower Time In Minutes	6.3
Shower Head Flow Rate (3.8 std. 1.6 res.)	1.6
Total Weekly Baths In Residence	0
Toilet Water Use	
Average Number Of Flushes Daily Per Person	4
Gallons Per Flush (5 std. 1.6 res.)	1.6
Faucet Water Use	
Average Number Of Times Each Person Uses Faucet Daily	5
How Many Minutes Each Use	.5
Dishwashing Water Use	
How Many Times Are Dishes Washed By Hand Daily	1
How Many Minutes Each Use	5
How Many Dishwasher Loads Each Week	0
Gallons Per Dishwasher Load	0
Laundry Water Use	
How Many Loads Of Laundry Each Week	0
How Many Gallons Each Load	0
Outdoor Water Use	
Lawn Water Use	
How Many Times Is The Lawn Watered Each Week	0
For How Many Minutes Each Time	0
How Many Minutes For Other Outdoor Use Each Week	0

Calculated Results			
Bathroom			
Lawn Watering	0		
Toilets	6		
Other Outdoor Uses	0		
Faucets	8		
Laundry	0		
Dishwasher	0		
Hand Washing Dishes	15		
COMPARISON BETWEEN YOUR HOUSEHOLD AND THE DWA AVERAGE* HOUSEHOLD			
	Your House	DWA Average	
<i>Interior per capita gallons per day</i>	39	135	
<i>Exterior per capita gallons per day</i>	0	72	
	Total Per Capita Gallons Of Water Used		
	Per Day	Per Month	Per Year
Your Household	39	1186	14235
DWA Average	207	6210	75555

Small living allows for smaller usages of water.  
The water tank holds 39 gallons of water for an approximate day's use.  
The battery powers household functions and is recharged when the truck drives.

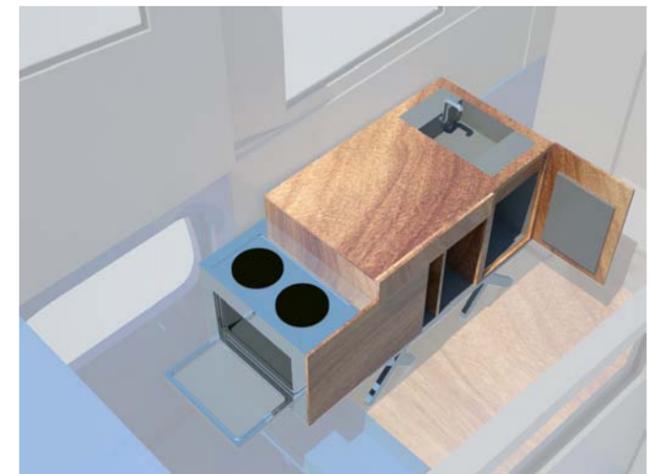




Kitchen lowered for transport



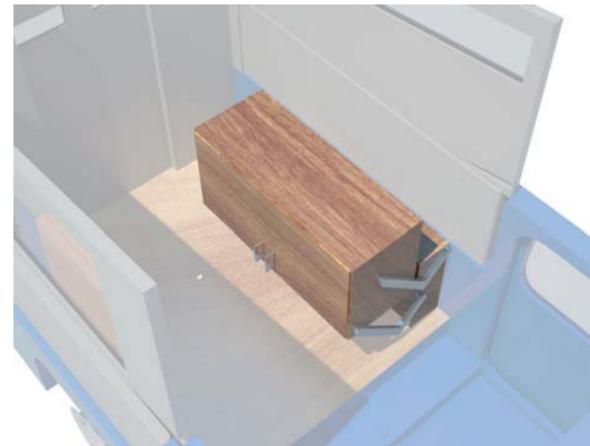
Kitchen raised to ergonomic height



Kitchen opened for multiple usages



Cabinet folded down for transport



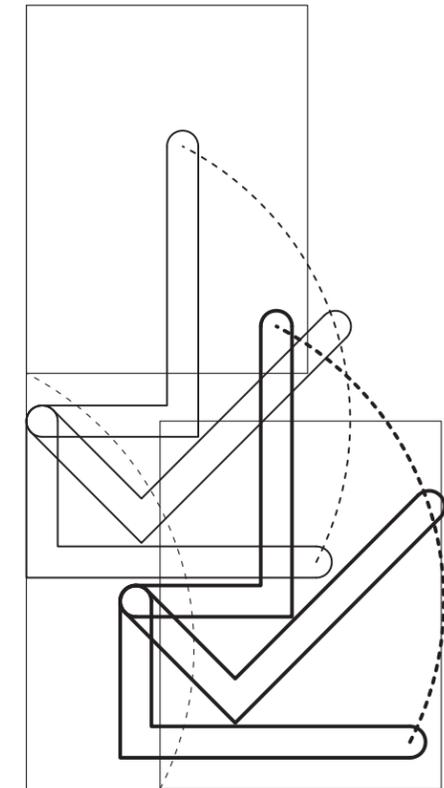
Cabinet revolves upward about pivot



Cabinet up to clear circulation path

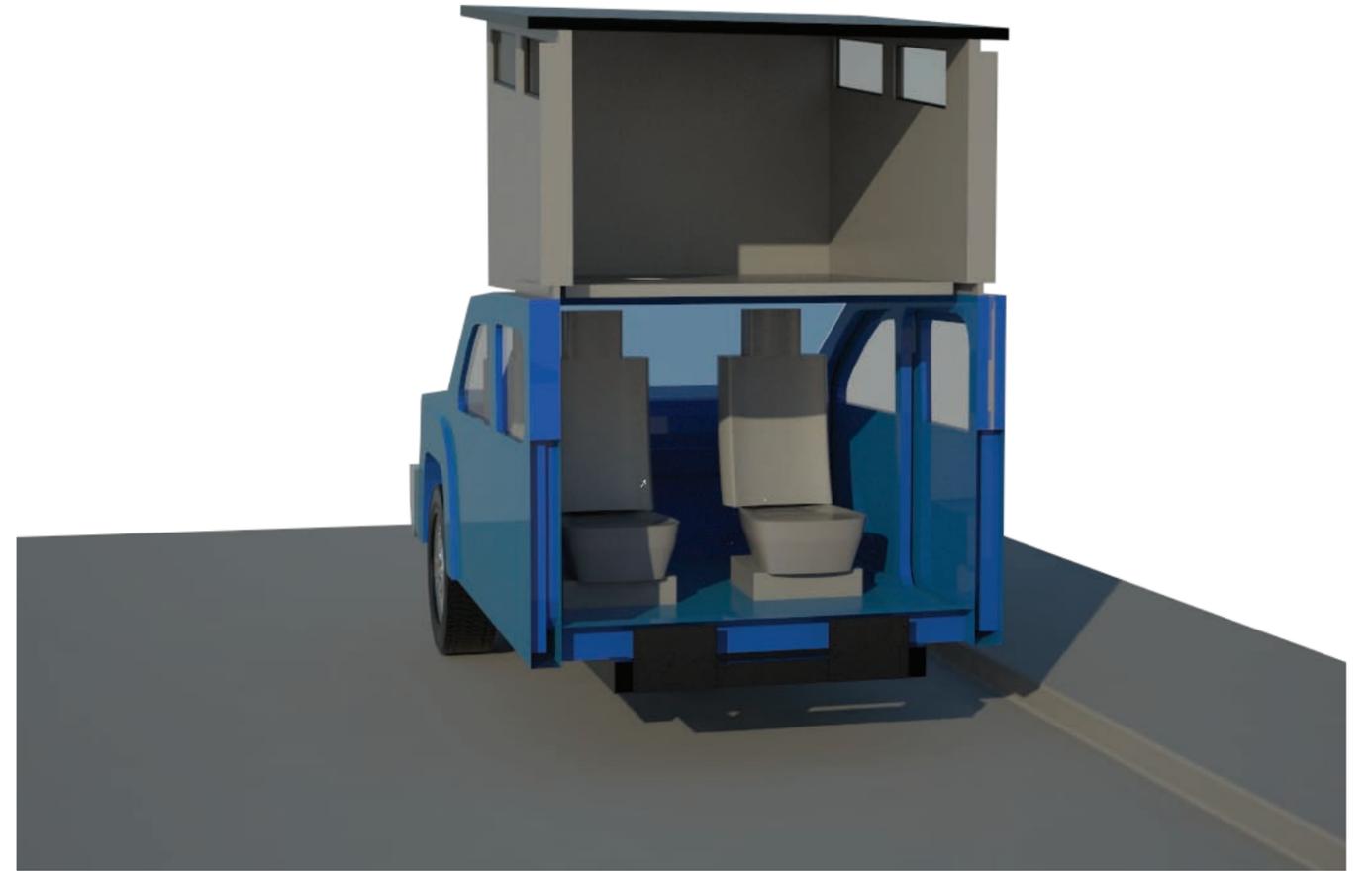
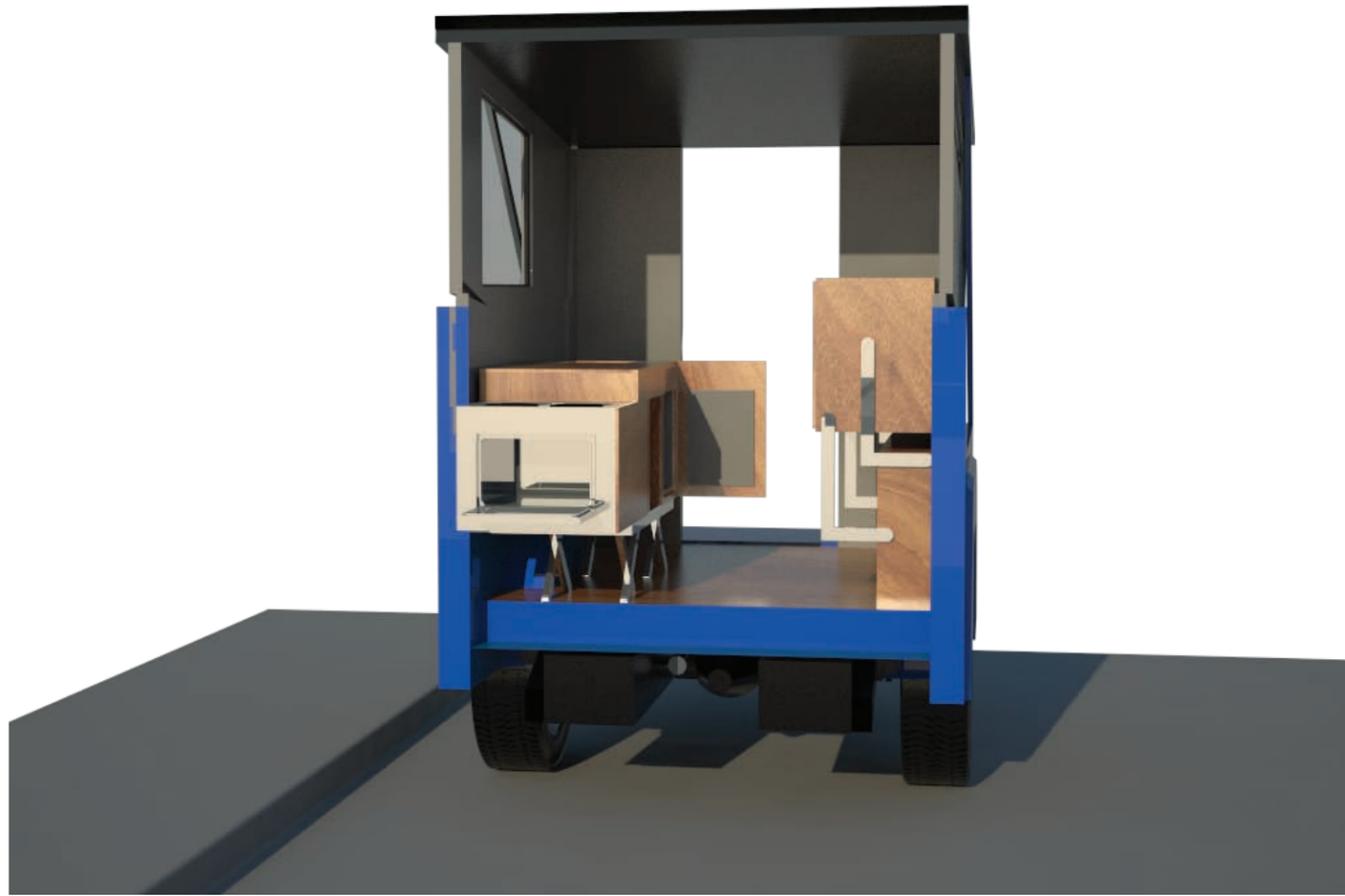


Cabinet open to reveal desk inside



Cabinet revolves upward about hinges on support arms to move into position.







Physical Model in Truck Mode



Physical Model in House Mode





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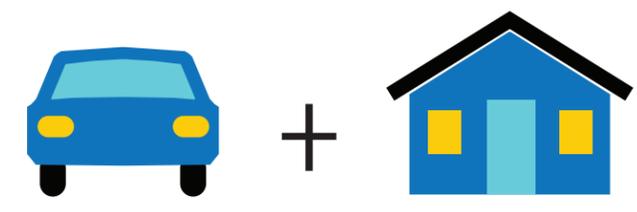
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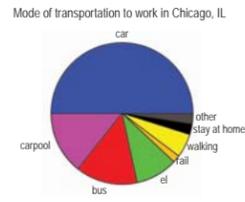
Webb, Michael. Brave New Houses: Adventures in Southern California Living. New York: Rizzoli, 2003. Print. This book shows houses, and it is useful because it is used for inspiration and to gain further insight on joinery, layout, or aesthetics.

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the **nomad**  
 apartment truck personal mobile shelter travel room transit property

Inspired by a need for personal space in a fast paced, highly mobile world, the nomad project combines the mobility and strength of a pickup truck with the convenience of a small living space. By combining a work space, kitchen, sleeping area and bathroom, this project allows this compact space to allow for the comforts of a home to be available wherever a person can travel. Precedents from history, origami, the automobile, furniture and even toy industries were studied to develop a transformable and deployable structure that allows the project to compact further to take up less space when being driven or simply parked. This exploration of the duality of interior space experiments with the folding of program space from a collapsible set of planes to a space which can be used in daily life. Users of this project are intended to be traveling students, business people, scientists, or potentially campers. The idea is for the space to be usable for living in situations which address the temporary stay, and the movement to, from, and between the checkpoints of life.



4.9%

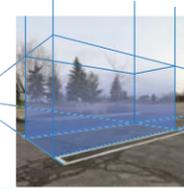
average daily population change due to commuting



Precedents

Site

Since this is to be a mobile project, the site will mainly consist of wherever the house-car is driven. That said, the transformation process will be contained within the vertical volume of a parking space. This way there will be minimal traffic concern from any potential disruption the transformation process can have on the area around it.

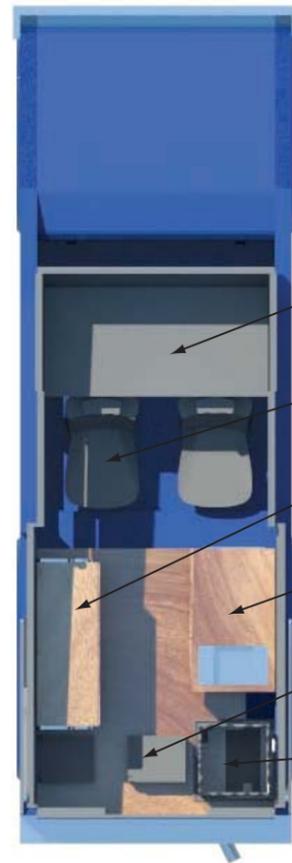
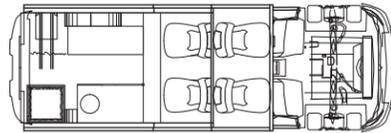
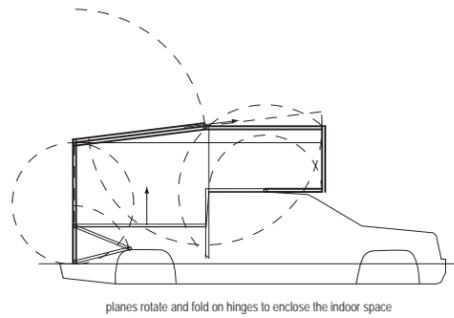


Program:	Net SF	Gross SF:	128 SF
Kitchen	13	Capacity:	1-2 people
Sitting room	34		
Bathroom	15		
Sleeping area	61		
Storage	26		
Porch	16		
MEP/Utilities	4		

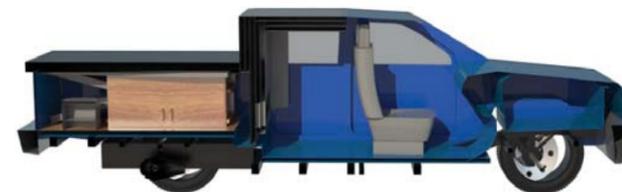
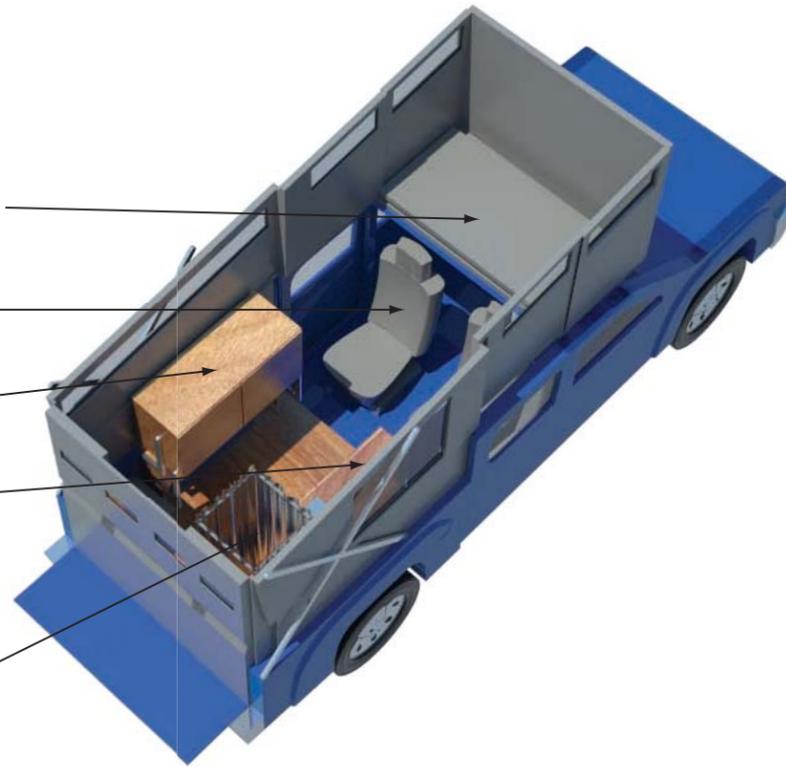


Program

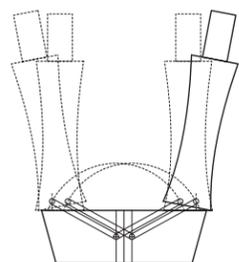
Since the volume of the car will be deformed in the transformation process, it is difficult at this point to denote the actual scales and dimensions of the necessary areas of the spaces which will expand within the car. The scale of the spaces will be determined by the success of the transformation design, which hinges on a final decision of which base vehicle would be appropriate for this project. Perhaps several layouts can be explored. These average dimensions were derived from a volume study of the Tumbleweed Lusby House.



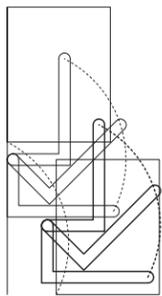
- Sleeping Space**  
Space above cab folds out into a bed, and can fold away to allow for more head room in the seating area.
- Seating Area**  
Driver and passenger chairs reverse into the back of the cab and flip to face backward into the living space.
- Cabinet**  
Folds down for truck mode and opens up into a desk and storage when in house mode.
- Kitchen**  
Compact into a small unit for transportation, the kitchen opens up in house mode featuring a sink, small refrigerator, small oven, and cooktop with storage and counter space.
- Portable Toilet**  
Slides into the middle of the space for truck mode to avoid hinged back panels which fold down.
- Shower**  
Opens up in house mode, and drains into waste water tank below.



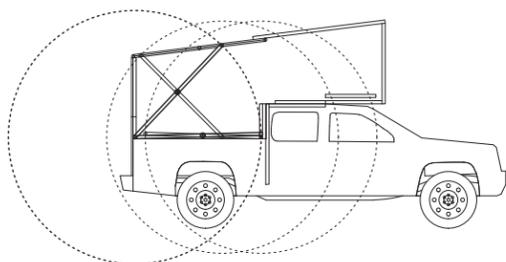
move home transportation ownership car housing commute space



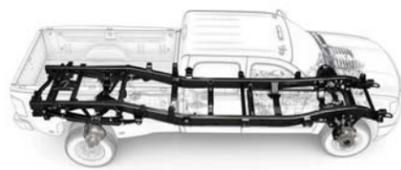
Chair backs turn over the seat to face the seat in the other direction.



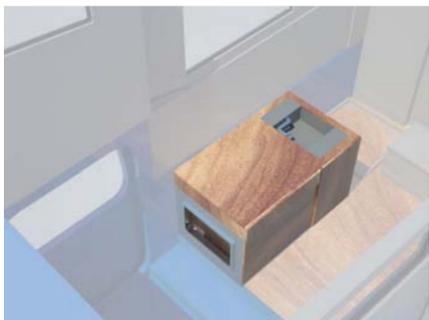
Cabinet revolves upward about hinges on support arms to move into position.



Cross structure designed to support the roof as it extends over the bed surface.



Cabinet folded down for transport



Kitchen lowered for transport



Cabinet up to clear circulation path



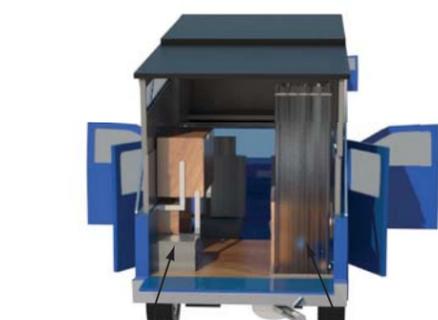
Kitchen raised to ergonomic height



Cabinet open to reveal desk inside

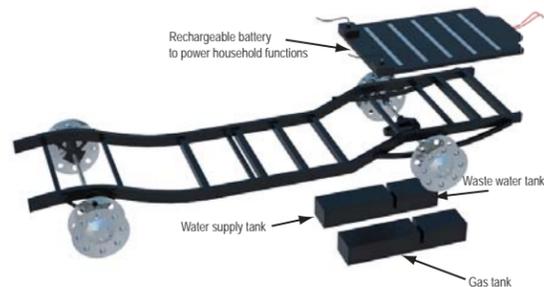


Kitchen opened for multiple usages



Collapsible shower and portable toilet contribute to small scale household functions and allow for safe removal of waste water.

Small living allows for smaller usages of water. The water tank holds 39 gallons of water for an approximate day's use. The battery powers household functions and is recharged when the truck drives.



Physical Model in Truck Mode



Physical Model in House Mode

