WCY AISLE WHEELCHAIR

Design for All Disable people in the most of the environment.

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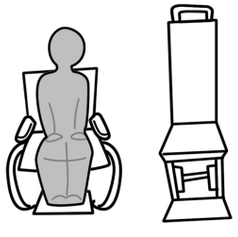
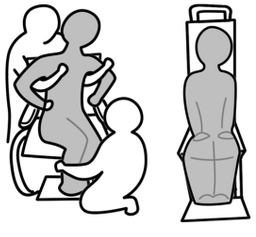
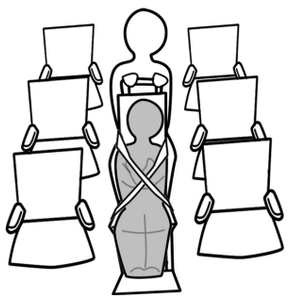
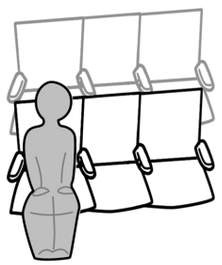
CSULB Spring 2018









- First row of an airplane's arm can not be lifted. Stakeholders had to lifted the passenger.

THE PROBLEM I SAW IN AN AIRPLANE:

I saw three guys lift a man then put him in aisle wheelchair. It's a difficult time for all of them. After they out of the gate, the pushers need put him in a regular wheelchair. The passage was not that big but heavy enough. His pants was on the half of his ass, they didn't help him wear well although flight attendance tried to ask them to help him.
I understand it is hard for all of them.

I decide to design an aisle wheel-
chair to solve the following problems:

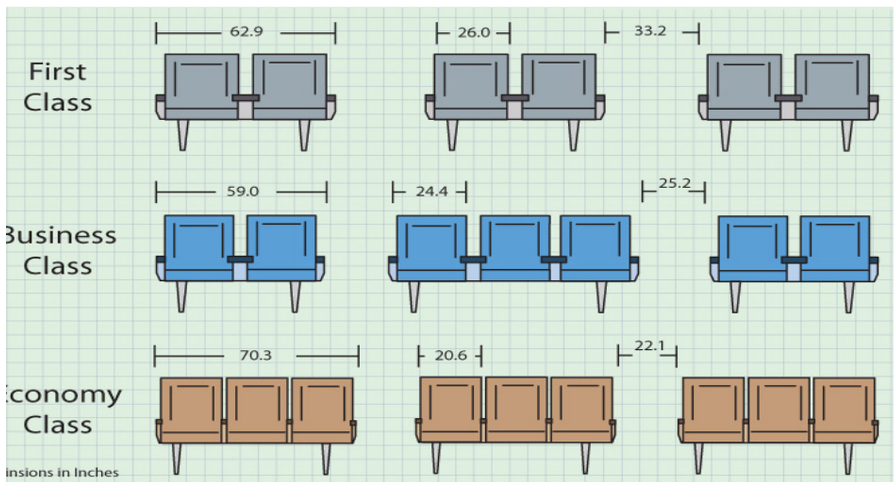
HUMAN CONSUMPTION

BAD USER EXPERIENCES

USER ENVIRONMENT:

Airplane bridge.
Airport check-in counter.
Inside airplane.
TSA check point.
Gate.

After the environment research in the LAX airport, I figure out that inside of airplane is the most difficult place to transfer disabled people.
Space is a big problem for them.



USER EXPERIENCE/ INTERVIEW:

Jan. 24(Wed.)
We visited Mobul store at 2153 N. Bellflower Blvd. Long Beach. CA 90815 (https://www.mobulstore.com/)
We got an awsome presentation from The Founder and CEO Mr. Wayne Slavitt. He introduced many mobul devices and customers preference.
1. Elder people afraid to fall
2. Bathroom is a dangerous place
3. Bed rail is important
4. Daughter & daughter in law looking for solutions
5. Adjustable chair/bed is expensive

Jan. 31(Wed.)
After comparing mobility devices, I decided to do airport aisle wheelchair because I remind one story what I saw in the Los Angeles International Airport. And it gives me the power to develop it better. So I did interview around my aisle chair idea.
1.system: TSA, manufactory, check-in...
2. Stakeholder: Airline representative, family, elder, wheelchair pusher, people who sit next to he/she...
3. Environment: Chaos gate, Crowed TSA check-point, narrow airplane aisle...
4. Goal: next 10 years use, mobility problem people, improve people feeling.
5. Material: Plastic or metal.

Feb.05(Mon.)
Another interview to understand what elders want. And I asked them that any best way to transfer people. They recommend slip board.
1. Not so medical looking
2. A harder chair is easier to stand up than a big sofa
3. Simple/Easy to understand is good
4. Contract color
5. Like to be independent

Feb.17(Sat.)
I was doing more interview and research during the last week, and I was focused on the WHY and pain point. Why people like that design, why they like a regular wheelchair?I compare different wheelchairs and try to find benefit for my design. I did the presentation about aisle chairs initial ideas after I combine all questions I got from the interviewers.

Feb.18(Sun.)
I tried aisle wheelchair at LAX, and I did airplane seat information and competition research.

PAIN POINTS

Some wheelchairs not good at climb little bump.
We don't do distance travel, it is difficult for us now.
I like to be independent.
I don't like hospital feeling design.
I don't want to bother other people too much and waste their time.
I can't stand up when I am on a soft sofa.
I can walk, but walk slow have a balance problem, so I fall a lot.
It hit my car a lot when I lift it to a trunk.
Put wheelchair in passenger seat back is easy, but the size is not that good for some wheelchairs.

COMPETITION

	 Drive Medical ightweight Aluminum Transport Wheelchair	 AisleMaster Foldable Aisle Transfer Chair	 Aislemaster Unfoldable Boarding Wheelchair	 EZ Lite Cruiser ® Standard Model	 Lightweight Deluxe Folding Transport Travel Wheelchair in a Bag with Handbrakes ECTR04
FOLDABLE	O	O	X	O	O
STRONG	X	O	O	O	X
LIGHT WEIGHT	O	X	X	X	O
DIMENSION	31"L x 10" W x 23.5"H 4.22LBS	32" L x 16" W x 47" H FOLDED 47"L x 16" W x 17"H 36LBS	32" L x 16" W x 48" H 40LBS	31.5" L x 22.4" W x 33.1" H 28.5" x 22.4" x 12.25 44LBS WITHOUT BATTERY	39" L x 22" W x 37" H (31" Lx11" Wx14" H) 25LBS
MATERIAL	ALUMINUM	ASB PLASTICS		LIGHTWEIGHT ALUMINU ALLOY	
PRICE	$ 84.99	$ 2280.86	$ 2695.00	$ 2195.00	$ 169.99

LIGHT WEIGHT

NOT PORTABLE

PORTABLE

HEAVY

INSIGHT/IMPRTANT POINT

SPACE

I can lift it, but it is not fit the space.

WEIGHT

It is too heavy to be lifted.

TRANSFER

I want to be indepen-dent, I do not like other people looking at me.

OPPORTUNITY

Make the product more lightweight.
Transfer passenger easier.
Save space when we storage it.

“Last of all, plastic is cheap to produce when compared to aluminum.
Summary:
1. Plastics can be molded into various shapes.
2. Weather conditions have no impact on plastic. On the other hand, weather conditions can have some impact on aluminum.
3. No additional materials are needed to strengthen aluminum. On the contrary, plastic is made strong by fusing it with glass or steel.
4. Aluminum is a good conductor of electricity, whereas plastics are not.
5. When compared to plastic, aluminum is more durable and has more tensile strength.
6. It is easy to recycle aluminum, whereas plastic is hard to recycle.
7. It is very hard to get rid of plastics; it does not degrade or decompose.”
Read more: Difference Between Aluminum and Plastic | Difference Between http://www.differencebetween.net/object/difference-between-aluminum-and-plastic/#ixzz58XeHtBPe

MATERIAL RESEARCH:

Light weight material: aluminium, magnesium ally plastic, high-strength alloy steel and...
High-sgrength steel, lw-density lightweight material is the most important way to lose weight.

ABS has an average tensile strength of about 5500 psi, while polypropylene has an average tensile strength of about 4000 psi. ABS is also harder and lighter. So it’s fairly obvious that ABS is, pound for pound, the stronger material.
ABS can be nearly twice the price of PP for only about a 38% increase in strength.
Finally, and most importantly, the chair’s shape and construction have a huge impact on the chair’s quality. An efficiently shaped part made of PP will do a much better job at holding loads than a poorly designed part made of ABS.
(https://www.quora.com/Which-plastic-material-is-more-durable-as-a-chair-ABS-or-polypropylene)

“One of the major differences that can be seen between plastics and aluminum is that the former can be molded into various shapes. Another advantage of plastics is that it does not rot; changing weather conditions has no impact on plastic. On the other hand, weather conditions can have some impact on aluminum. This means that plastic products have a longer life than aluminum products.... When comparing the strength of the two materials, aluminum is stronger than plastic..... One more difference that can be seen is that aluminum is a good conductor of electricity, whereas plastics are not. When compared to plastic, aluminum is more durable. Aluminum also has more tensile strength,which makes it good for making parts of trains and planes

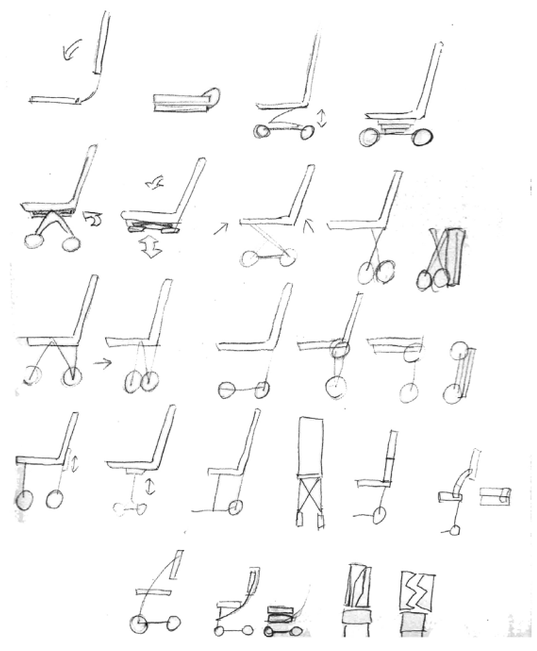
Read more: Difference Between Aluminum and Plastic | Difference Between http://www.differencebetween.net/object/difference-between-aluminum-and-plastic/#ixzz58Xe4tNjX

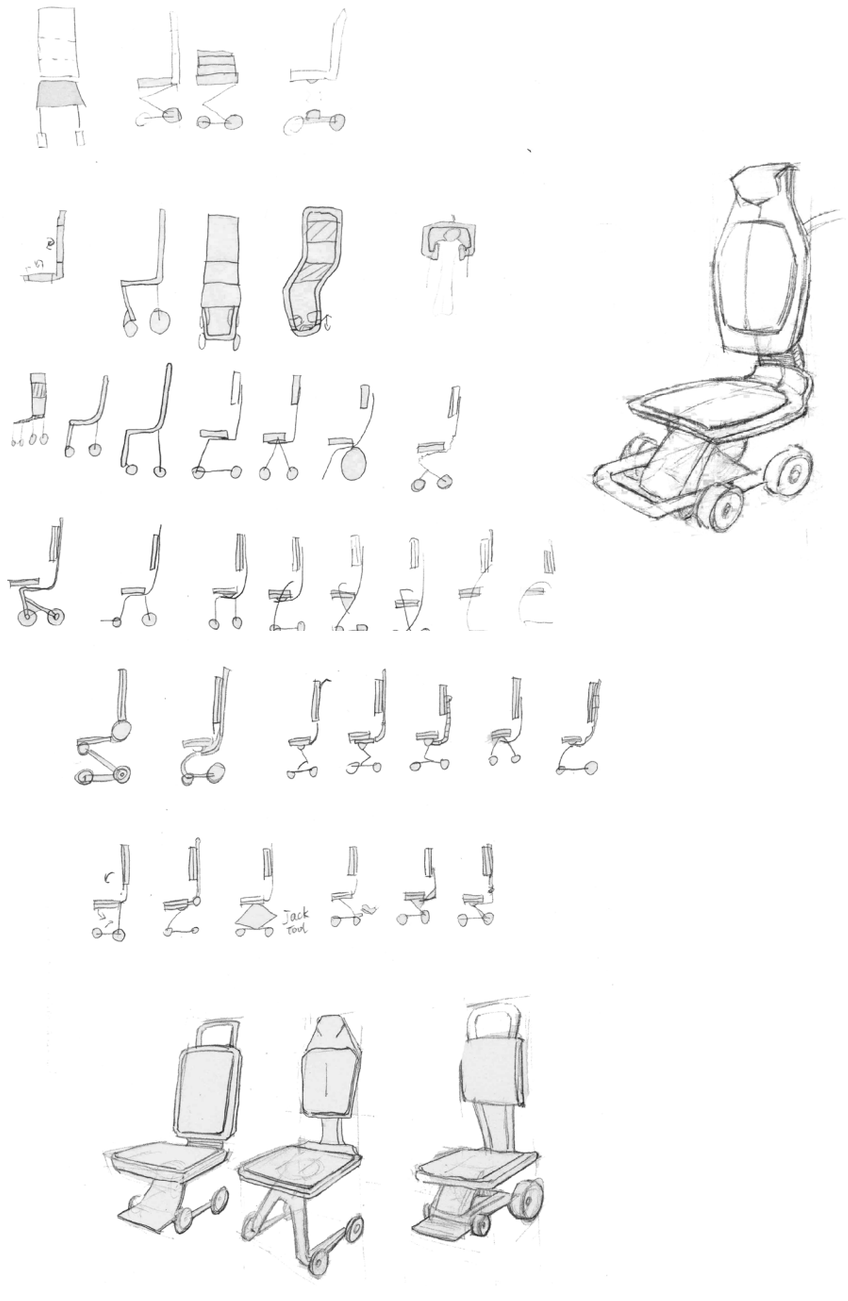
Feb.19(Mon)
My first initial idea is put lock the wheelchair in the airplane, so people don't need to transfer people in the airplane; the Second idea is use "convey" to assist stakeholder to transfer people. Audiences recommend a slip board but look like they didn't really think it works.

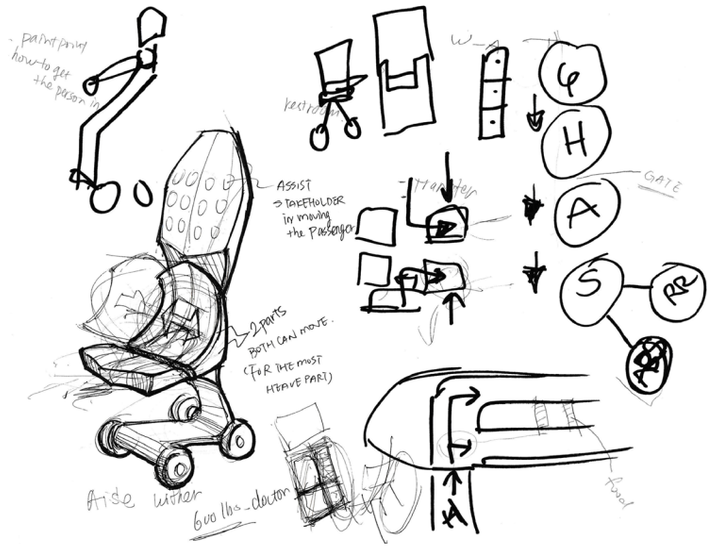
I still couldn't decide what kind of base show I use. I hope I could make it looks modern, but I was worried about if the shape can make it stay stronger. But I got ideas during the talk with professor Wesley, I thought I could use car jack as an initial idea for my base. I am so happy with it. Then I did more sketches and started to do Solidworks file and some graphic introduction.

Feb.21(Wed.)
I tried to put all my stuff organized and complete, then I draw more sketches for the chair since the last presentation. Professor Wesley gave me helpful advice about the movable part. Then I focused my moving part to the upper leg and I was focused on the material in the rest of the week.

IDEATIONS







WORLD + CARE + YOU

WCY WCH

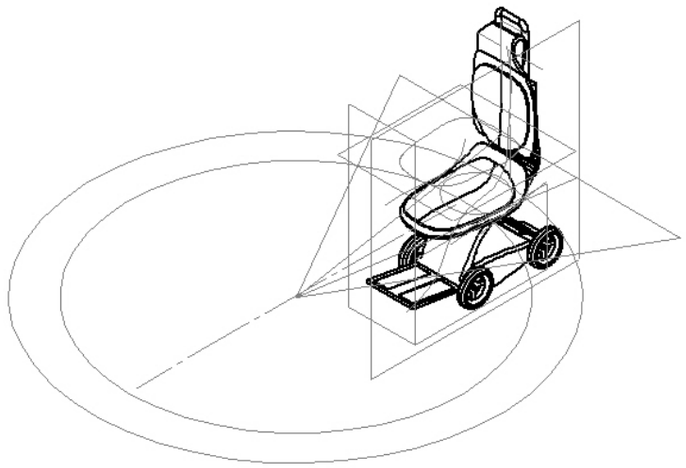
DESCRIPTION

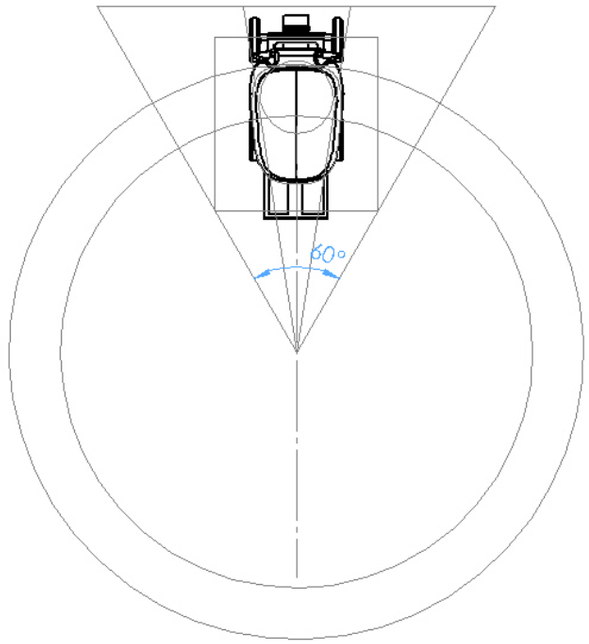
I did many interviews with elders, disabled people, and stakeholders from the LAX airport(I am working at LAX). I was focused on the aisle wheel-chair for passengers. But it can be used in many different environments due to its benefits such as narrow width and foldable benefit.The seating area can be rotated and the top seat pad can slide to the side and con-nect to the aim place. It also can be folded as a suitcase and carried with people during traveling. It can bring more convenience to disable people, and it helps stakeholders a lot.

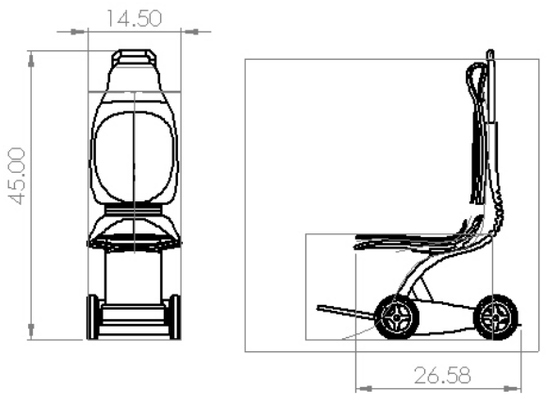
When a stakeholder transfers a passenger, he/she needs to rotate the seat base first and then pushes the top seat pad. After that, he/she needs to connect the top seat pad to the passenger's seat. The final seat is the secondary support. For example, when we transfer passengers from the wheelchair, we connect the wheelchair's top pad to the seat. The second seat becomes a secondary support of the seat pad. The seat pad plays a role as a bridge or a transfer board.

Passengers don't have to leave the support seat during the transfer pro-cess. So they don't have to be lifted up. The solution saves stakeholder's energy, and offer a better experience to the passenger.

Only one stakeholder applied when we use this aisle wheelchair, and the user doesn't have to leave any support. The movable seat pad can con-nect to the final destination, so the user can be transferred by push and slid to the final seat easier.





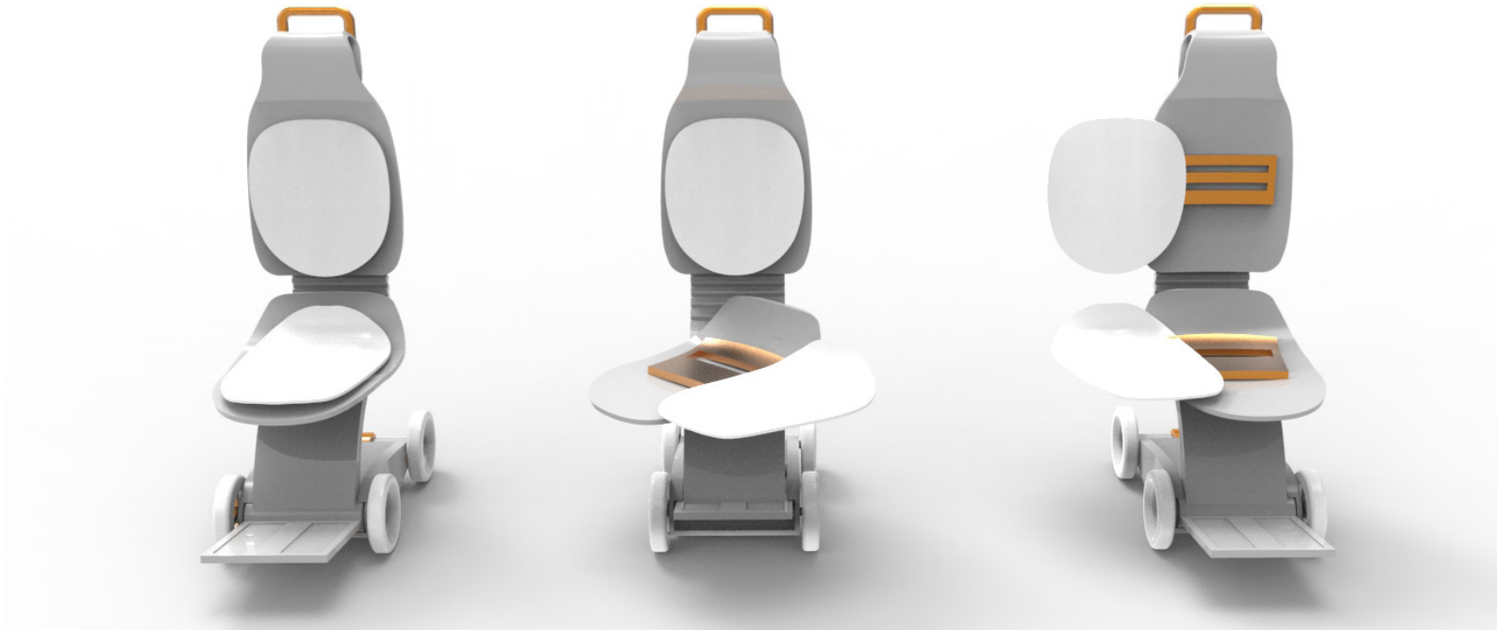


- Removabe seat pad is over an rail. The rail is part of an circle. So it is easier to move the removble pad.

MATERIAL: ABS plastics. This hardy material resists fire, chemicals, and physical impact, and meets the fire requirements established by the Federal Aviation Regulations (FAR)

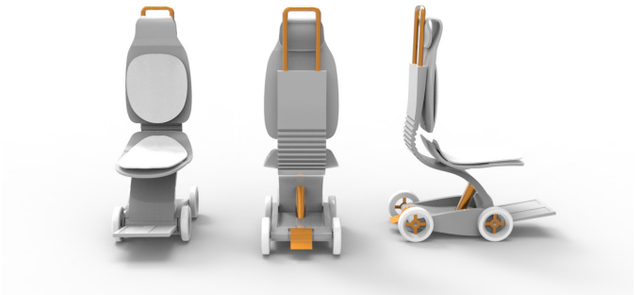
DIMENSION: 30''X 14.5''X 45''
(WHEN FOLDED 14.5''X12.5''X 18'')
WEIGHT: 30LBS
FEATURE: Foldable, Compact
Safety belt
Highly maneuverable, narrow wheelchair
Fits narrow aisles and confined spaces
Telescoping lifting handles
Adjustable padded seat, back, and head-rest
300LBS WEIGHT CAPACITY
(meets all ADA and Air Carrier Access Act requirements)

3D Modeling



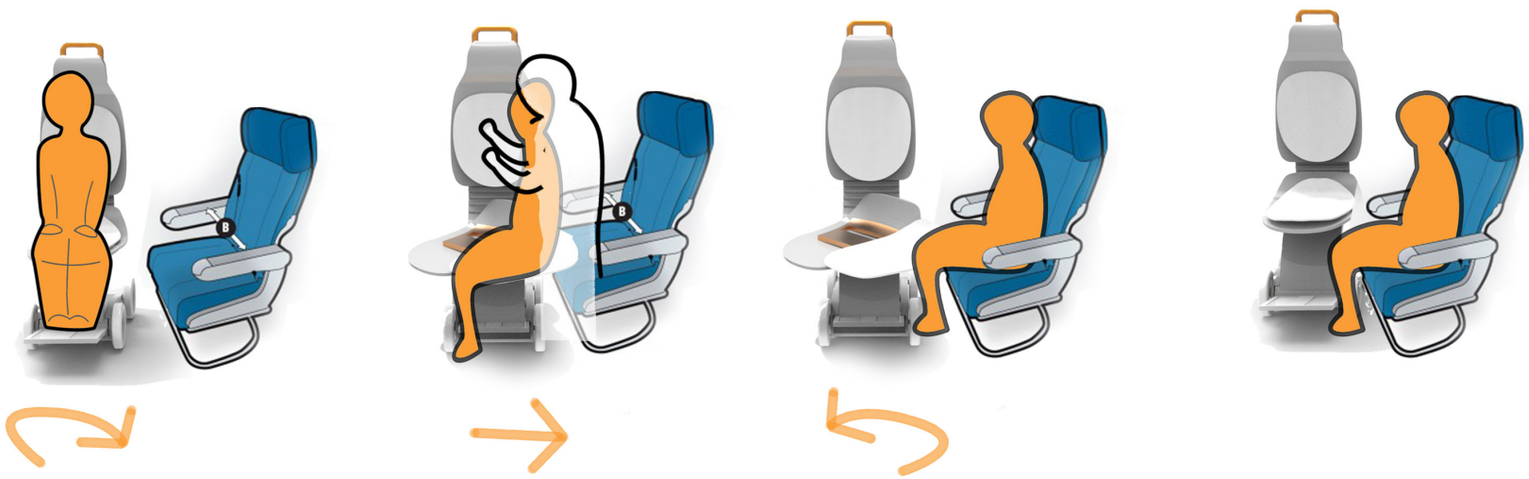
- Under the seat area, the seat base are connected to a rotated holder. So the whole seat area can move to either right or left.

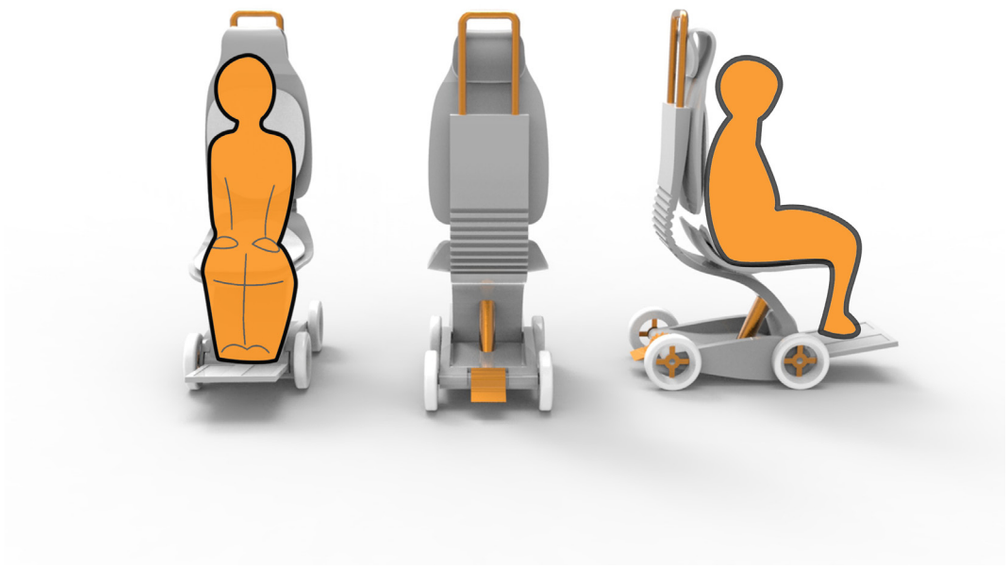
- Both back pad and seat pad can slid to the side.



The aisle chair is foldable and can be folded as an suitcase size.
Most of aisle wheelchair can not be folded, this chair is more convinence.

EXPLAINATION





Moving the seat base first, and then moving the seat pad.

Only one stakeholder applied, and the user don’t have to leave support seat.

The movable seat pad can connected to the final destination, so the user can be transfer by push and slid to the final seat easier.

OTHER BUSINESS OPPORTUNITY

HOSPITAL

STREET

CSULB-DESN 331B
Student: Puyi Liu
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Spring 2018