

## Project Description

A cloud technology based interdisciplinary collaboration between a globally distributed team of design engineers and automotive designers, focused on developing a new automotive space for aging adults.

The goal of TOCA Design (Tata Motors | Olin College | Coventry University | Autodesk) was to bring autonomous vehicles to a group traditionally underserved by the tech sector, aging adults. This distributed project was a radical collaboration between students from Olin College of Engineering and Coventry University's Automotive Design program, who worked as one team to bring insights into the public eye. The team used Autodesk's cloud based design and CAD tools - including Fusion 360 - to facilitate collaboration and document the insights, learnings, and processes along the way to help industry and academia learn from this experience.



## Meet Val

Val is an 82 year old retiree who has an extremely active social life. She is constantly going to social events and taking trips with her friends. When she's not making a social call, she can usually be found running errands or entertaining her great-grandchild, Mickey.

Though she loves all her activities, she has been finding it harder to get around lately. Her eyesight has been gradually getting worse, and she fears that it will soon be unsafe for her to drive. Her arthritis has also been acting up so she's been relying on her walker more often, which makes the act of just getting into her car difficult. Val worries that her fading eyesight and mobility will put a stop to her social lifestyle and isolate her from the people she loves.



## Val Today

Val planned a picnic for a summer afternoon, and invited a few friends. However, she was all out of picnic supplies at home, so needed to stop for groceries on the way. Her car-less friend Larry also asked for a ride, as he didn't live far out of her way. With her great-grandson Mickey in tow, Val hops in the car and heads to the store. After purchasing the food, she is able to easily load her bags into the luggage compartment with the assist feature doing a lot of the work. Val and Mickey get back in the car, and instruct it to head to Larry's house. Because of Val's deteriorating eyesight, she sometimes has trouble reading small screens, so the voice control function is very helpful.

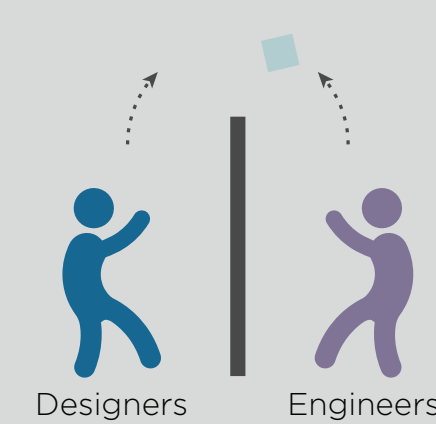
With Larry in the car, the criss-cross seating configuration makes conversation easy and engaging without the need for rotating one's head or body. During the ride, Mickey's happy listening in to the conversation from a secondary seat.

After a quick and pleasant drive to the park, the crew unloads and enjoys their meal in the sun without the stress of needing help anytime that day.

## Scope

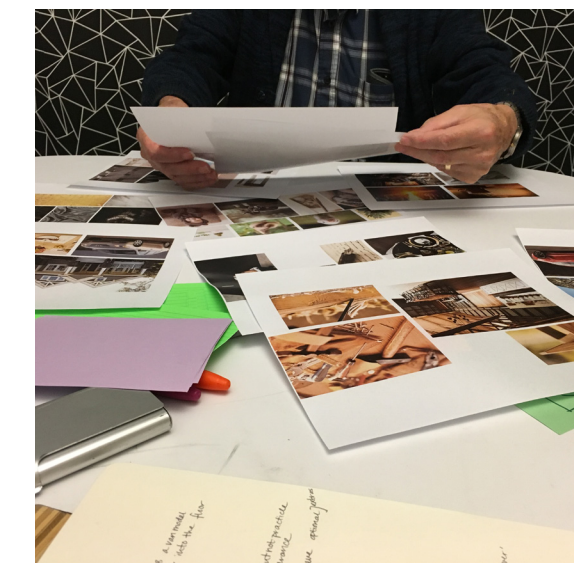
### Breaking Down the Wall

- Engineers and Designers have a history of bad communication, we call this 'the wall'
- TOCA was dedicated to making communication between designers and engineers seamless
- Coventry and Olin merged processes and created a new workflow to enhance efficiency
- Through the year, the model was adapted to suit our needs

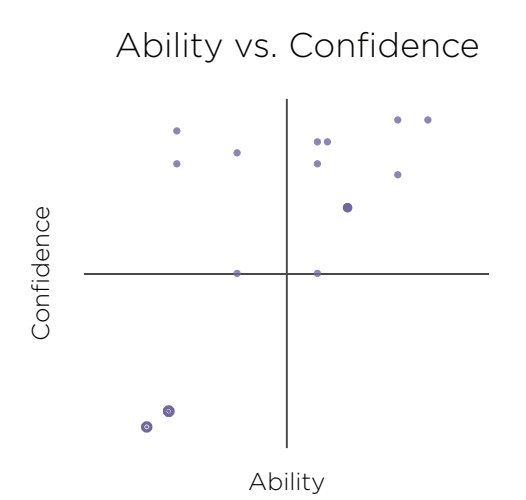


Team formation  
Defining the project  
Creating the process

## Study

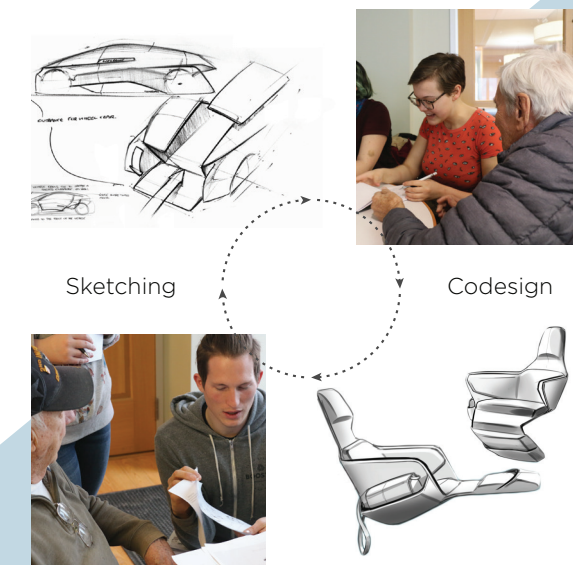


### Codesigns



### Frameworks

User interviews  
Co-designs  
Persona creation



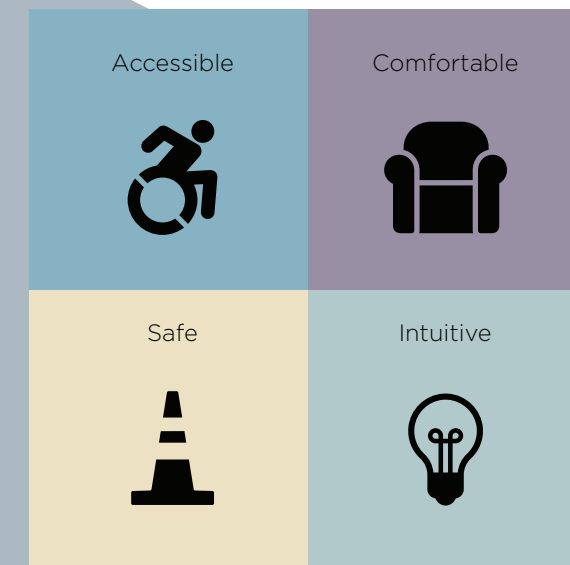
### The Cycle

Independence	Maintaining the individual's lifestyle without depending excessively on others
Practicality	Having a vehicle that has all of the necessary components without being bulky
Comfort	Engaging with an environment that provides an enjoyable experience
Intelligence	Having a vehicle that adapts to and anticipates the individual's needs without being technologically intrusive
Predictability	Interacting with a vehicle that does what is expected of it
Safety	Having an indicator on the vehicle that assures that safety precautions are engaged
Trust	Knowing that the vehicle is under control and won't cause harm to users

### Insights



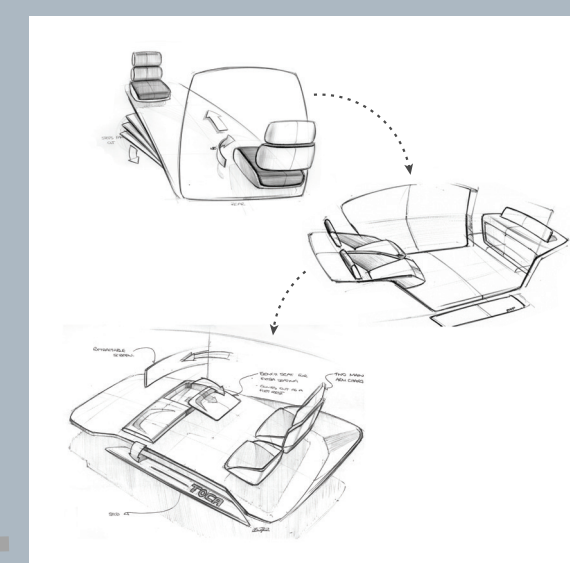
### Personas



### Key Design Considerations



### Final Design Directions



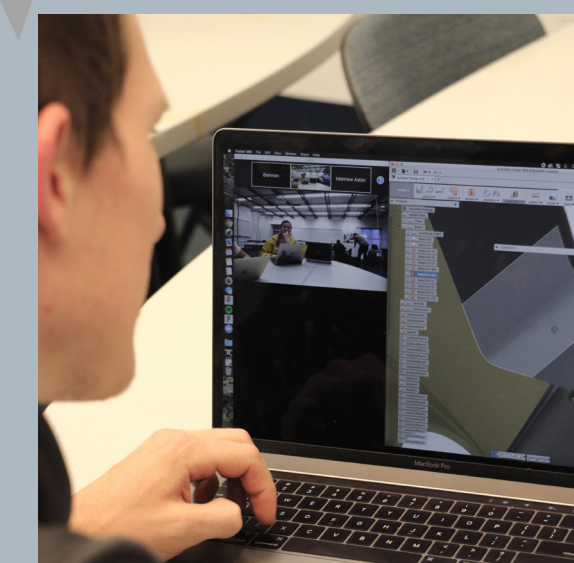
### Feedback-Based Iteration

Value analysis  
Design considerations  
Idea iteration  
Initial concept development

## Synthesize



### Subteams



### Cloud-Based Collaboration

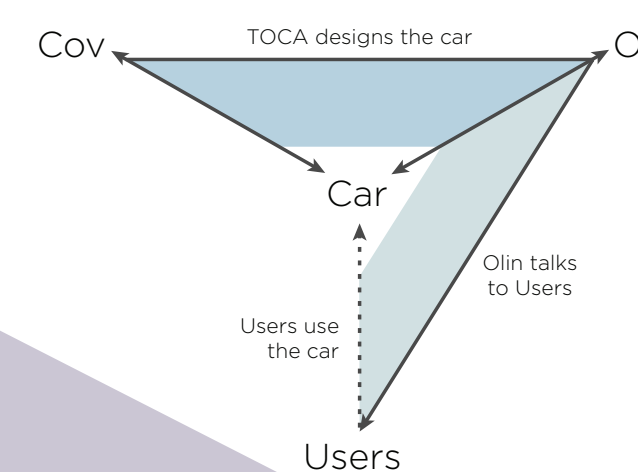
## Send

### The Decision

- A pivotal design review in March was the basis for the team to choose a final direction
- The decisions were made through the combination of Olin's user-centered design perspective and Coventry's automotive design expertise

### Decision Matrix

- A weighted objectives table was used for key decision-making moments
- Leveraged themes extrapolated from the previous four concepts
- Provided more objective feedback than discussion

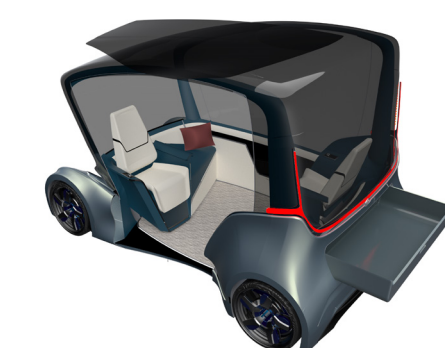


	Freedom	Companion	Social	Innovative
Height	2	2	1	2
Large Doorways	2	2	1	2
Adaptable Suspension	2	2	0	2
Ramp	1	2	1	0
Lift	2	1	0	1

Final design direction  
Project communication

### Ingress and Egress

- Large doorway eliminates the need to bend and twist
- Vehicle lowers to ground level to decrease step up
- Door lifts over roof of the car to prevent injury



### Seating

- Criss-cross seating enables social interaction and provides ample leg room
- Secondary seating increases vehicle capacity and folds away for additional storage



### User Interface

- Voice control is the primary user interface for seamless interaction
- Large buttons and knobs are present for tactile control and more accessible interface
- Secondary screen is available for minute adjustments



### Size

- Tall seating area designed to eliminate users' need to slouch while in the vehicle



uncertainty