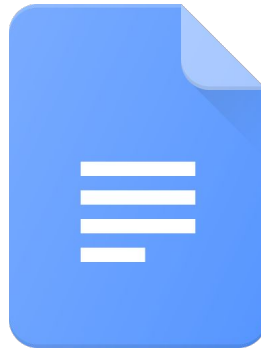# Doordash Robonav

Design Sprint

Product Manager: Siddhant Tembhurnikar

Set the stage

Set the stage for the Design Sprint by framing the problem

Initial PRD

Link your PRD

Understand

Create a shared understanding of the space, problem, and goals

How Might We

Use these digital stickies to capture your ideas. Feel free to rearrange. Colorize. Etc

How might we make the robots safer for pedestrians

How might we make the robots more secure to prevent thefts

How might we reduce number of accidents or halts taken by the robot

How might we reduce dependence on human intervention

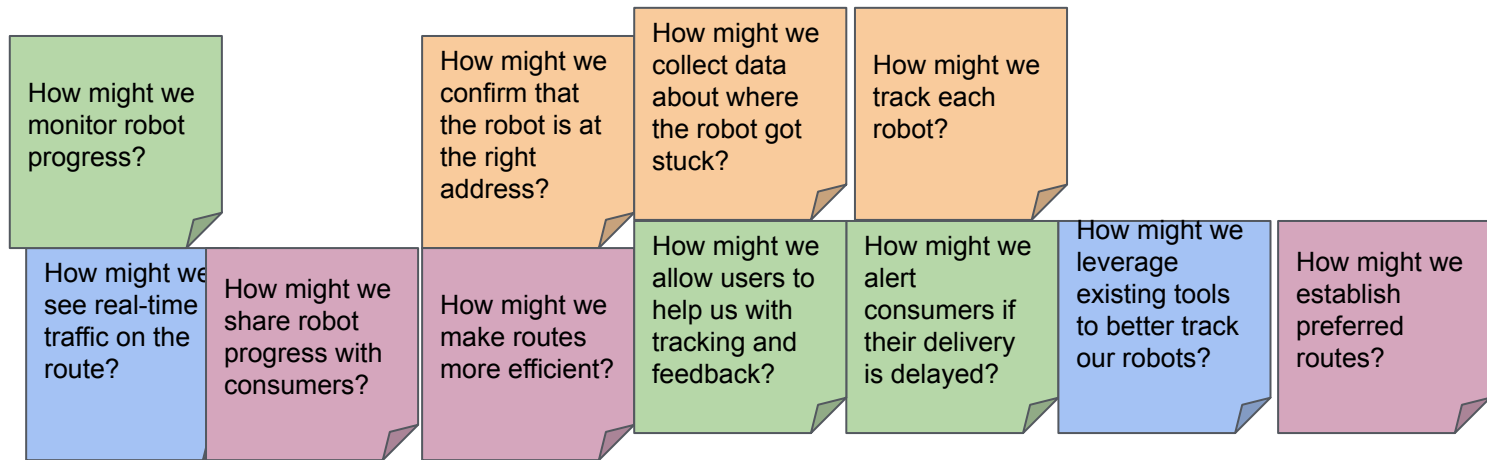How might we make the product less obtrusive in appearance and size

How might we make the robot more customer friendly

How might we reduce friction for the customer to order through robot delivery

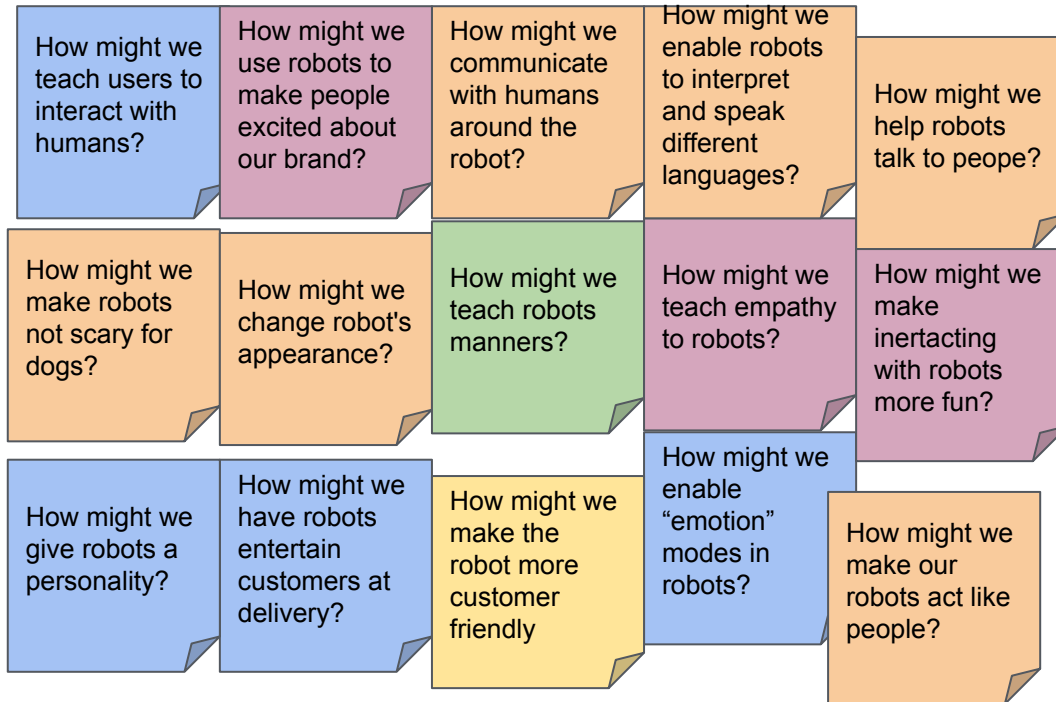How might we make our service seamless for our partner restaurants

Sorted Stickies

Cluster One: Robot Tracking

Sorted Stickies

Cluster two: Customer Friendliness

How might we teach users to interact with humans?

How might we use robots to make people excited about our brand?

How might we communicate with humans around the robot?

How might we enable robots to interpret and speak different languages?

How might we help robots talk to peope?

How might we make robots not scary for dogs?

How might we change robot's appearance?

How might we teach robots manners?

How might we teach empathy to robots?

How might we make inertacting with robots more fun?

How might we give robots a personality?

How might we have robots entertain customers at delivery?

How might we make the robot more customer friendly

How might we enable "emotion" modes in robots?

How might we make our robots act like people?

Sorted Stickies

Cluster three: Safety and security

How might we keep vermin away from the robots?

How might we keep robots odor free, even when carrying smelly food?

How might we make our robots tamperproof?

How might we teach robots to avoid trouble?

How might we move robots to a safe place before stopping?

How might we have robots signal distress when something goes wrong?

How might we make the robots safer for pedestrians

How might we make the robots more secure to prevent thefts

How might we teach robots to avoid obstacles?

How might we anticipate mechanical failures?

How might we make the product less obtrusive in appearance and size

Sorted Stickies

Cluster four: System redundancy

How might we build redundancy into our system?

How might we train our operations team on monitoring and controlling a robot?

How might we detect when a robot needs help?

How might we alert operators of need for robot intervention conveniently?

How might we ensure food gets delivered without incident?

How might we deal with accidents that might occur?

How might we get food to people quickly when the robot fails?

How might we control robots?

How might we streamline communications between operators and robots?

How might we overcome technical glitches during a delivery?

How might we handle edge case issues that may arise?

How might we mitigate accidents between robots and pedestrians?

How might we reduce number of halts taken by the robot

How might we make our service seamless for our partner restaurants

How might we reduce friction for the customer to order through robot delivery

Sorted Stickies

Cluster five: Customer service and interactions

How might we prepare robot to handle deliveries to persons with disabilities?

How might we accept tips that some customers may want to give a robot?

How might we program robots to address order cancellations?

How might we program robots to address customer returns?
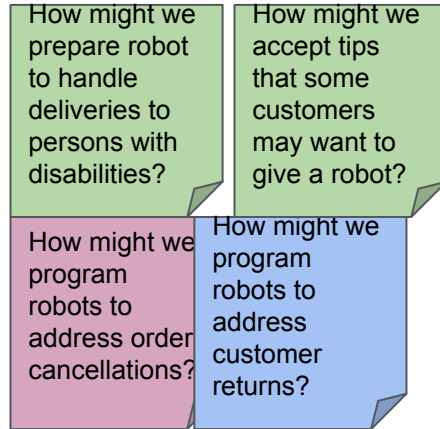
Sorted Stickies

Cluster six: Others

How might we use use greener energy to power our robots?

How might we determine the best area for launching this program?

How might we determine when to recharge robot batteries?

How might we use existing technologies?

How might we reduce dependence on human intervention

How might we enable robots enter a crowded restuarant to pickup food?

How might we Increase robot speed?

How might we create ML/AI models to help robots learn to get better overtime?

How might we enable robots to detect missing items in the order during pickup?

How might we address a sudden power outage?

How might we program robots to address delays in deliveries?

How might we allow robots to detect real-time traffic patterns?

Sprint Focus

Focus	System redundancy
Slide #	9
I selected this theme because	- Redundancy is critical to make the delivery system functional - A complete autonomous system takes time to develop and perfect, in order to ensure our customers have a seamless experience right from the launch date we need to introduce redundancy in form of human operators which will serve as backup for tasks that the robot is unable to perform on its own - Safety and security and customer concerns can also be addressed to some extent by human operators

Define

With an understanding of the problem space, create focus and align on specific outcomes for the Design Sprint

Doordash's Robonav brings the future to your doorstep

California citizens can now order food and have it magically appear on their doorstep with no human in sight. As self-driving car companies hit major regulatory and technological hurdles, self-driving robots is already a reality today. Doordash launched its Robot delivery service Robonav across 4 cities in the state of California today. With growing demand for faster delivery, hyperlocal delivery startups found themselves in a jam, thanks to ever increasing costs of last mile delivery. In such crisis Doordash turned to technology for an answer. The company came up with a new autonomous delivery system that used robots that carried deliveries from nearby restaurants to the customers doorstep. These robots equipped with 360 degree cameras and Lidar sensors make use of machine learning and Neural Networks to build a map of the neighbourhood to be able to navigate by themselves. They can travel upto a speed of 4 miles/hour and carry a weight upto 40 lbs. Their diminutive size makes sure they don't obstruct the pedestrians. Since these robots travel on the sidewalk instead of the streets they do not have to deal with traffic on the streets that a Dasher might. Doordash expects the system to bringdown delivery times by 30% on average giving you that meal hot, fresh and just in time. Doordash tested the system extensively at select locations across San Francisco and Los Angeles and received a very positive feedback from the customers. Customers in San Jose, San Francisco, Los Angeles and Oakland can order today by simply place their order through an app. The Robot travels to the restaurant to pick your meal and makes its way to your doorstep, hot, fresh and fast, almost like eating at a restaurant.
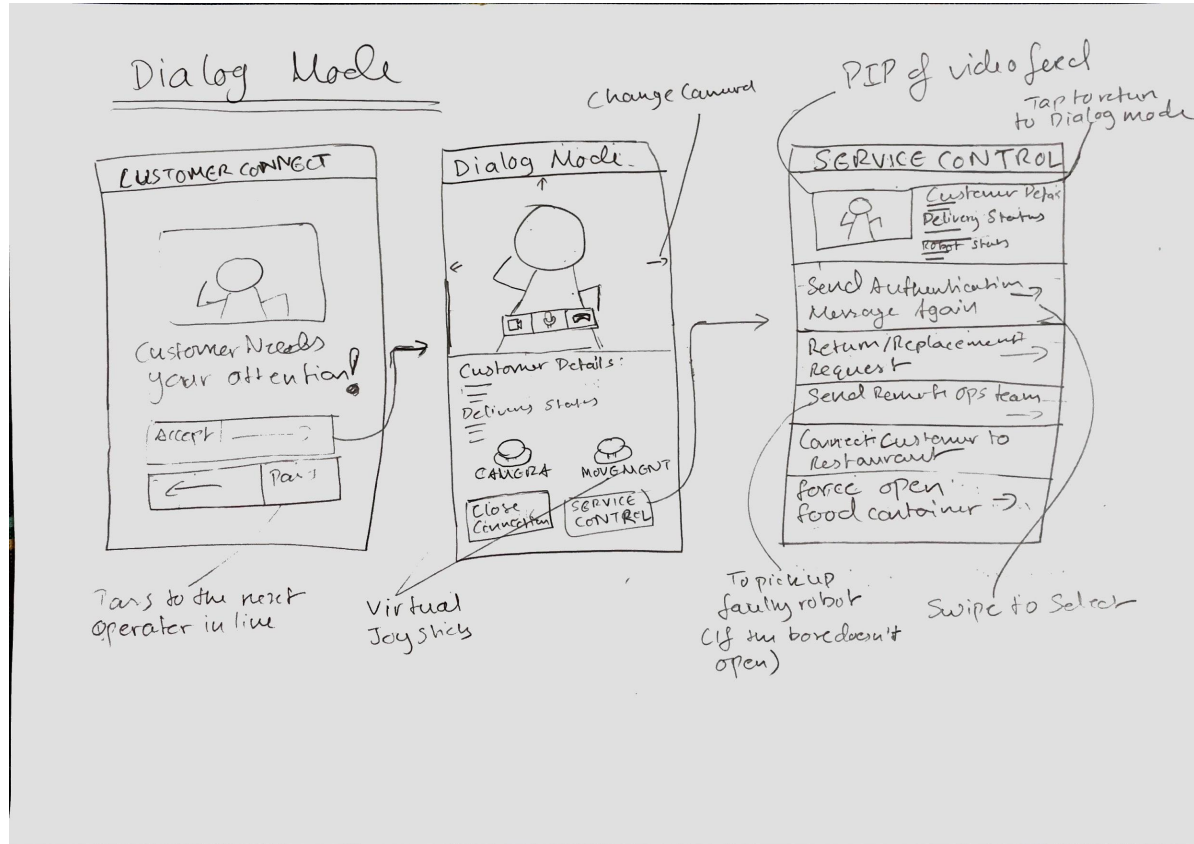
Sketch

Generate tons of ideas, then narrow them down to two in depth solution sketches
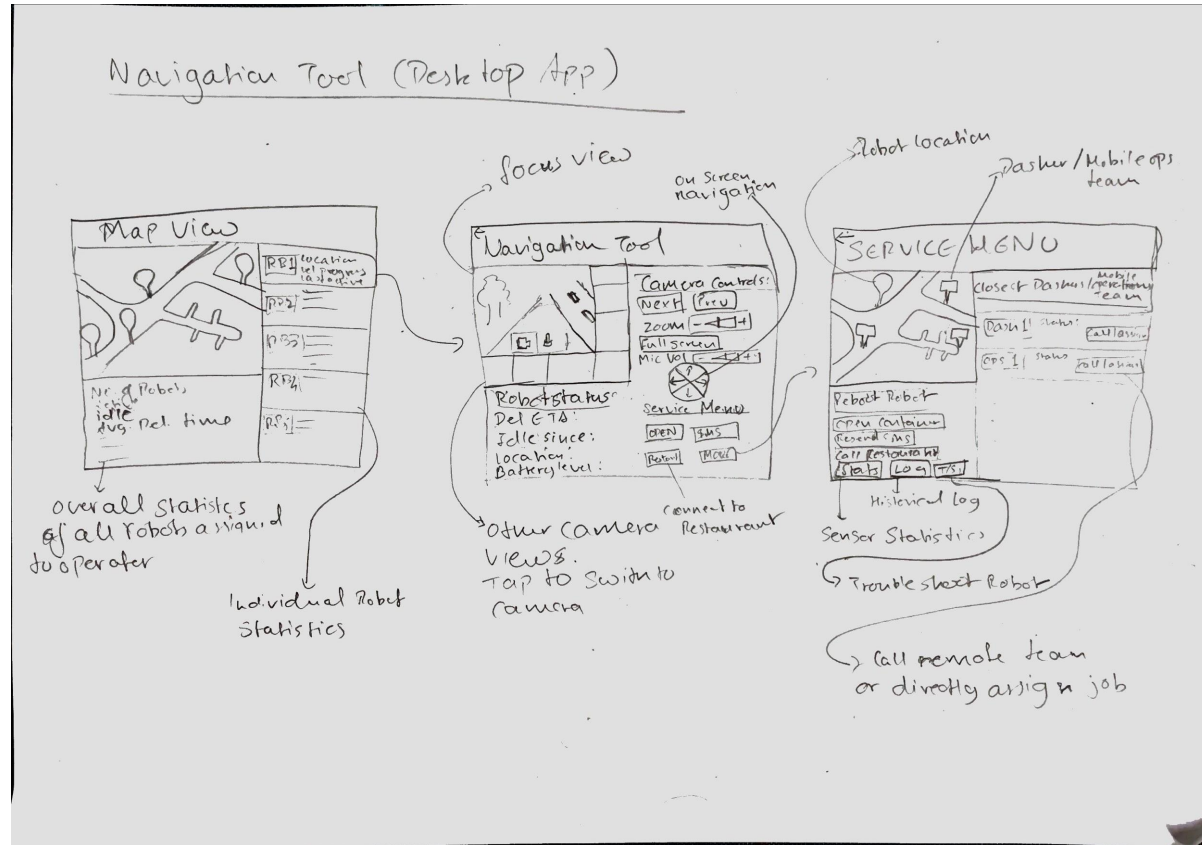
8 Sketches
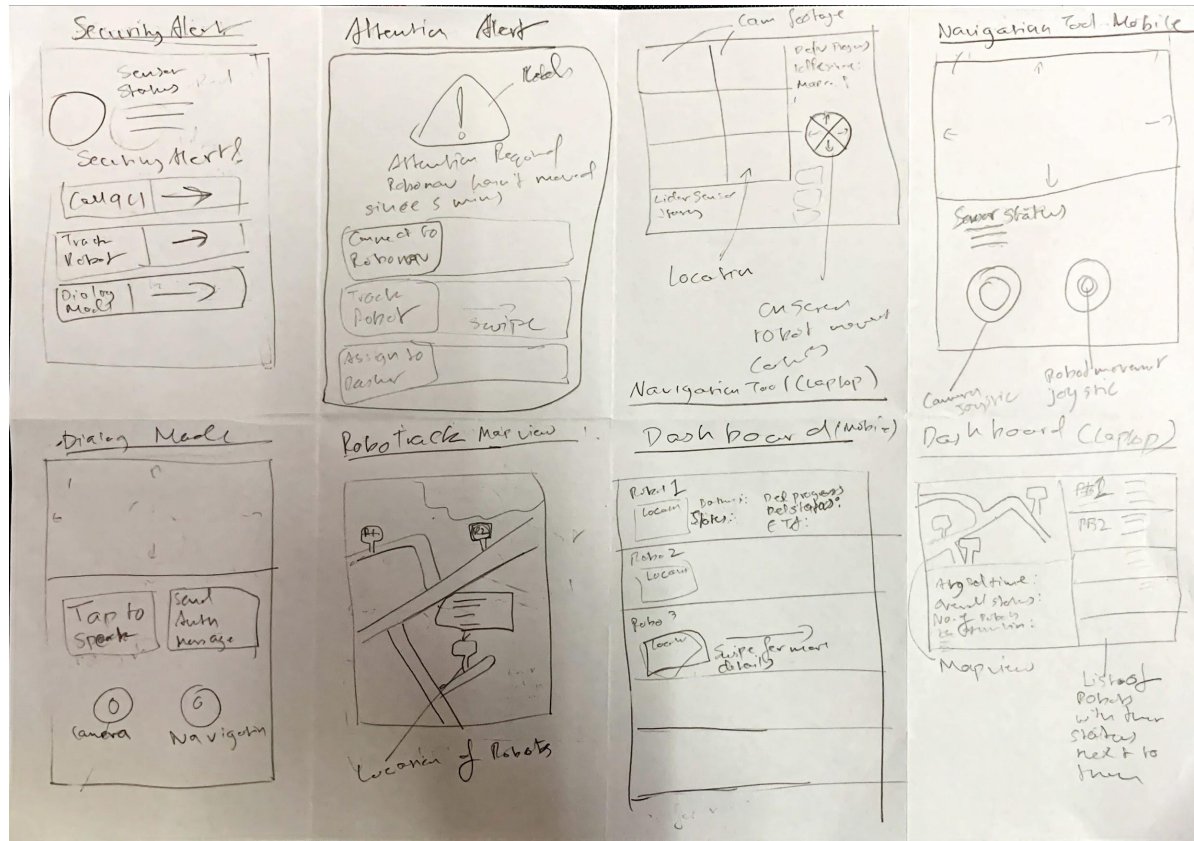
Solution Sketch 1: Dialog Mode (Mobile)

Solution Sketch 2: Navigation Tool (Desktop)

Decide

Pick the final concept that you develop into a prototype

Decision

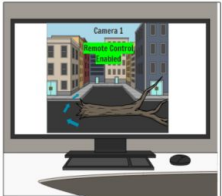| Decision	Navigation Tool (PC)
Rationale	- Most important and powerful component of the chosen theme - Provides all essential levers to monitor and control the robots in an emergency - Provides granular control over robot behaviour - Reduces accidents - Reduces costly delays and time to delivery - Allows to connect with the customer or other pedestrians in case of any grievances - Manual control also trains the Neural networks to learn to deal with situations better taking us one step closer to full autonomy
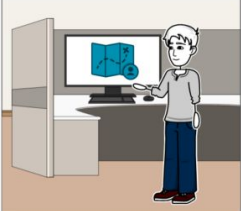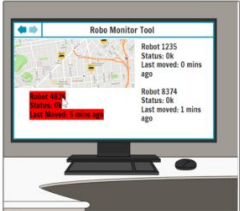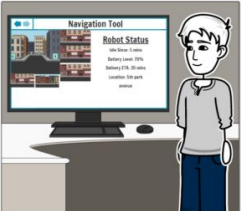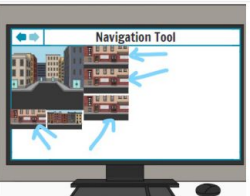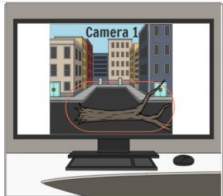
Prototype

Turn your concept into a realistic, interactive prototype that you will use to validate your assumptions and ideas

Storyboard

SCRIPT 1
Jack is part of the support team for the operations team. His job is to monitor the movement of all robots to their destination on the map.

ACTION

SCRIPT 2
He receives a ticket from the customer support team that the customer hasn't received the order they placed 15 mins before.

ACTION

SCRIPT 3
Jack opens the Remote monitoring tool and checks the status of the robots. He sees that Robot 4826 hasn't moved since 5 mins from its location and clicks on it to get more details

ACTION

SCRIPT 4
Jack opens up the navigation tool to used to control the robot remotely through the web app.

ACTION

SCRIPT 5
He checks all the cameras to see if there are any obstructions blocking the robot from moving

ACTION

SCRIPT 6
It appears that there is a small tree branch in front of the robot that the robot can't navigate around.

ACTION

SCRIPT 7
Jack requests the robot to relinquish control to him

ACTION

SCRIPT 8
He quickly takes control of the robot and maneuvers it around the obstruction using a joystick, relinquishes control and sets the robot on its way

ACTION

SCRIPT 9
The robot soon arrives at the customer's location well within the 30 mins promised and successfully delivers the order

ACTION

Prototype

|	
Description ● High level overview of the prototype ● What does it do?	The prototype is a desktop app that allows an operator to remotely monitor, locate and control any robots assigned to them
Assumptions ● Any assumptions within the prototype	● The user must be well versed with the workings of the robot ● The user controls the robot through two physical joysticks ● Dashers can be assigned jobs to pick up and deliver orders of robots that may have failed
Tasks ● What are the tasks that a user can complete in the prototype?	● Select a robot and perform remote servicing operations ● Place a call to the remote operations team ● View the status of all robots at a glance ● Place an emergency call in case of attempted theft

Link your prototype

Validate

Users will go through your prototype and provide feedback on your concept. This is also an opportunity to have an engineering feasibility discussion

Plan and recruit for research
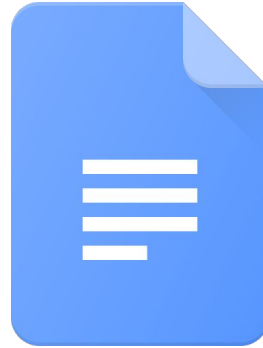
Link your
research plan

User Testing

Key Findings from Participant 1

What worked well	*Functional design* *Intuitive and easy to use* *Know where most things are after browsing through the software the first time*
Where participants got stuck	*User did not know the purpose of the 'Assign' feature* *The users thinks the software should automatically choose which remote operator is free based on their distance from the robot*
Other observations	*User did not notice some UI elements such as a red robot card indicating a problem with the robot* *User did not know the purpose of some options* *Not everything can be designed intuitively in a compact feature rich software, some level of training may be required* *Don't have order information. Can't tell where the order is coming and going.* *Call the customer option also Needed.*

User Testing

Key Findings from Participant 2

What worked well	• *Software is Easy to understand* • *The Flow is neatly organized* • *Some person who doesn't know much can easily navigate* • *Features are in the right place so*
Where participants got stuck	• *The purpose of some of the features isn't clear at first* • *But as the user got more familiar it became easier to understand*
Other observations	• *There needs to be a local area map on the navigation so that the operator knows which way to navigate* • *The design works well if the operator has a fixed number of robots to handle* • *Most elements are placed at the optimum location any more changes would make it more complicated*

Improvements

Improvement #1	*Add the emergency button on the navigation tool page*
Rationale	*If the operator notices something odd, they have to navigate away from the camera into to fill service menu to place an emergency call. It would be preferable to be able to place the call and look at the camera at the same time*
Improvement #2	*Add a local map to the navigation tool*
Rationale	*Operator needs to see which way the robot is going when he takes control which is not possible without a map. A live local area map with navigation needs to be added to the navigation tool.*

Handoff

Updated PRD

Link your PRD