



Case Study: Teck Resources Limited - GenAI Maintenance Advisor

Prepared by Tyler Burton

I built a GenAI maintenance chatbot powered by real client data

Our initial requirements included the following:

- Help **diagnose a problem**
- Help outline a **maintenance procedure**
- Identify and order necessary **tools and parts**
- Identify potential **safety hazards**
- Facilitate **communication with shift supervisors**
- Help update a **maintenance log and reports**
- Interpret a **picture of a maintenance issue**





My Role

Design lead

- Research
- Ideation workshop facilitation
- UX/UI Design
- Prototyping

Team

Responsible Partner

Engagement manager

4 Data scientists

2 Developers

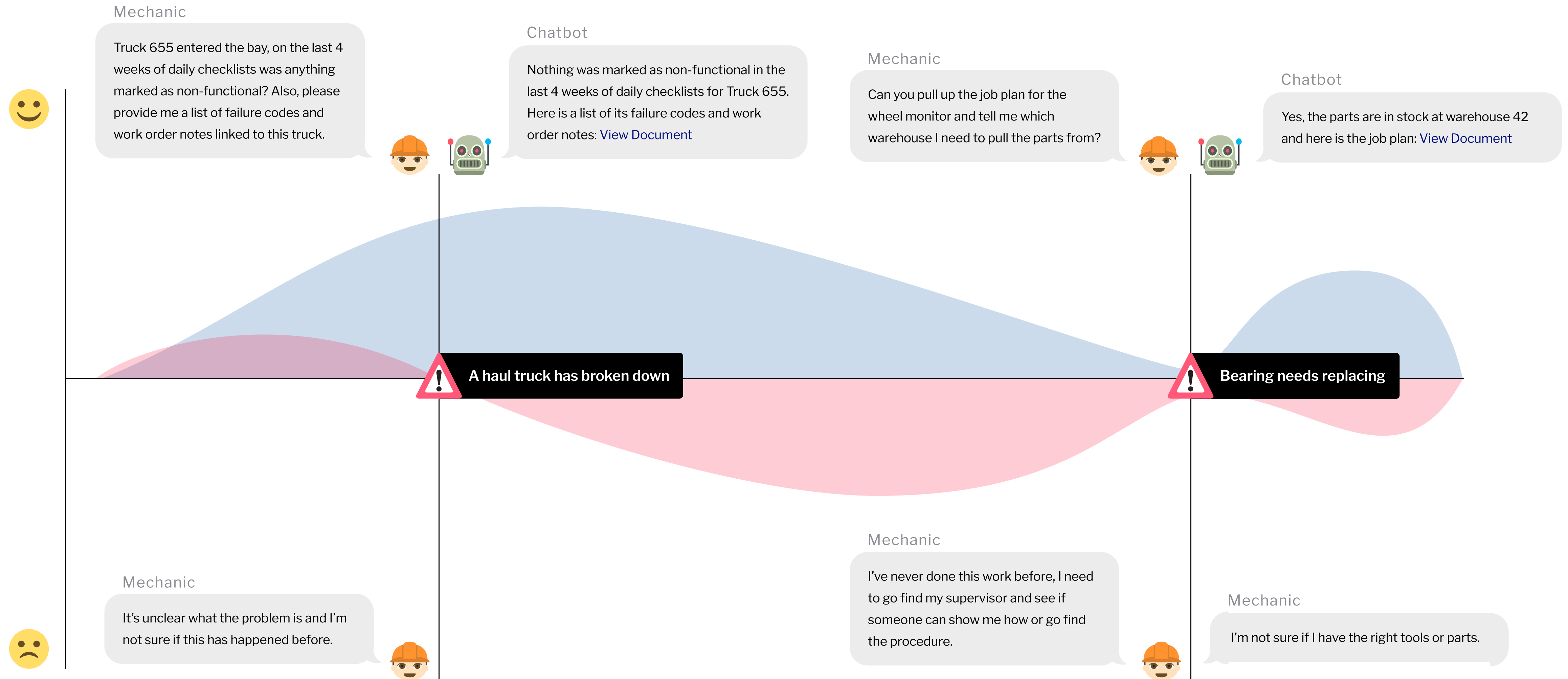
Duration

5 weeks





I created a simple journey map was based off early conversations with the client





01

Research Overview



Our client identified three different types of users that would use this tool



Greg - Maintenance Worker

- 10-year veteran of Teck, boulder mine breakdown crew
- Ensures smooth operation of heavy machinery
- Conducts routine inspections and preventive maintenance tasks
- Meticulously follows strict safety protocols to minimize downtime and prevent accidents



Jennifer - Supervisor

- Background in mechanical engineering
- Passionate problem-solver
- Instills safety and efficiency culture among team
- Dedication and leadership vital for smooth operations




Brett - Operations Personnel

- Background in industrial engineering
- Specializes in process optimization
- Thrives in high-pressure environments
- Fosters culture of teamwork and accountability



I aligned with the team on a qualitative research approach to uncover the voice of the primary persona Greg, the maintenance worker, who would be the primary user of the tool



Maintenance Worker

Greg

10 Yrs - Heavy Equipment Mechanic

Who is Greg?

Greg is a seasoned heavy equipment mechanic with over 15 years of experience, specializing in the maintenance and repair of the massive machinery vital to the operation of the copper mine he works at. Greg's passion for his craft is evident in his meticulous approach to his work. Whether he's troubleshooting an engine issue a haul truck or conducting preventative maintenance an excavator, he tackles each task with a methodical precision that ensures optimal performance and safety standards are met.

Motivations

- He finds fulfillment in understanding the inner workings of complex systems and enjoys the challenge of keeping them running smoothly.
- Pride in his workmanship and is committed to delivering the highest standards of quality and reliability in his repairs.
- Ensuring the safety of his fellow workers

Core Needs

- **Speed** - Every minute of equipment downtime translates to lost production and revenue for the mine.
- **Safety** - Meeting safety standards and protocols is a fundamental need to mitigate risks and maintain a secure work environment.
- **Collaboration** - Clear and open communication with his colleagues is vital for coordinating tasks, sharing information, and leveraging collective expertise
- **Reporting & Documentation** - A comprehensive record of maintenance activities for future reference and compliance purposes.

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Every diagnosis is a puzzle waiting to be solved. But with every challenge comes the thrill of discovery and the satisfaction of restoring order to the chaos.

Pain Points

- Time consuming and ineffective diagnostic tests
- Finding critical information in manuals and work history is arduous and time consuming
- Broken lines of communication creates delays
- Lack of contextual knowledge
- Lack of issue diagnosis
- Friction in ordering parts and the necessary tools to complete a repair
- Poor decision making assistance
- No central knowledge source, poor documentation

Round 1

9 qualitative maintenance worker interviews

Round 2

6 qualitative maintenance worker interviews, focused on validating and refining the FSJ map.

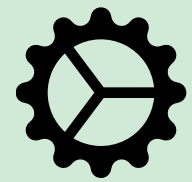


The goal of the first round of research was to understand the current experience of the maintenance crew at the mine site

- 01 What are you (maintenance worker, supervisors and operations personnel) doing during your workday?
- 02 What are your major pain points?
- 03 What technology are you currently using to do your job?
- 04 What operational and logistical tasks might be helped by a tool like this? How?
- 05 If you had a magic wand, what would you create to make your job easier?



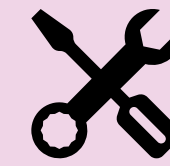
Some themes emerged during our research that led us to four opportunity areas worth exploring



Routine
Maintenance



Issue
Diagnosis



Repair
Logistics



Image
Recognition



The first round of research revealed 6 pain point themes

- 01 Tests are run to determine if equipment is indeed broken, this can be time consuming and not always effective.
- 02 Even though manuals and work history is digitized, looking for the right information can be arduous and time consuming.
- 03 It's common to not know which maintenance bays are open and available, it takes calling around to figure it out. Sometimes unclear where to send the broken equipment and repair gets delayed.
- 04 The process of ordering parts is very manual, we either go personally or send someone to go in person
- 05 It's easy to forget to update the fleet management system which causes problems downstream
- 06 No central knowledge base, if someone leaves the company process is lost



02

Journey Mapping & Ideation

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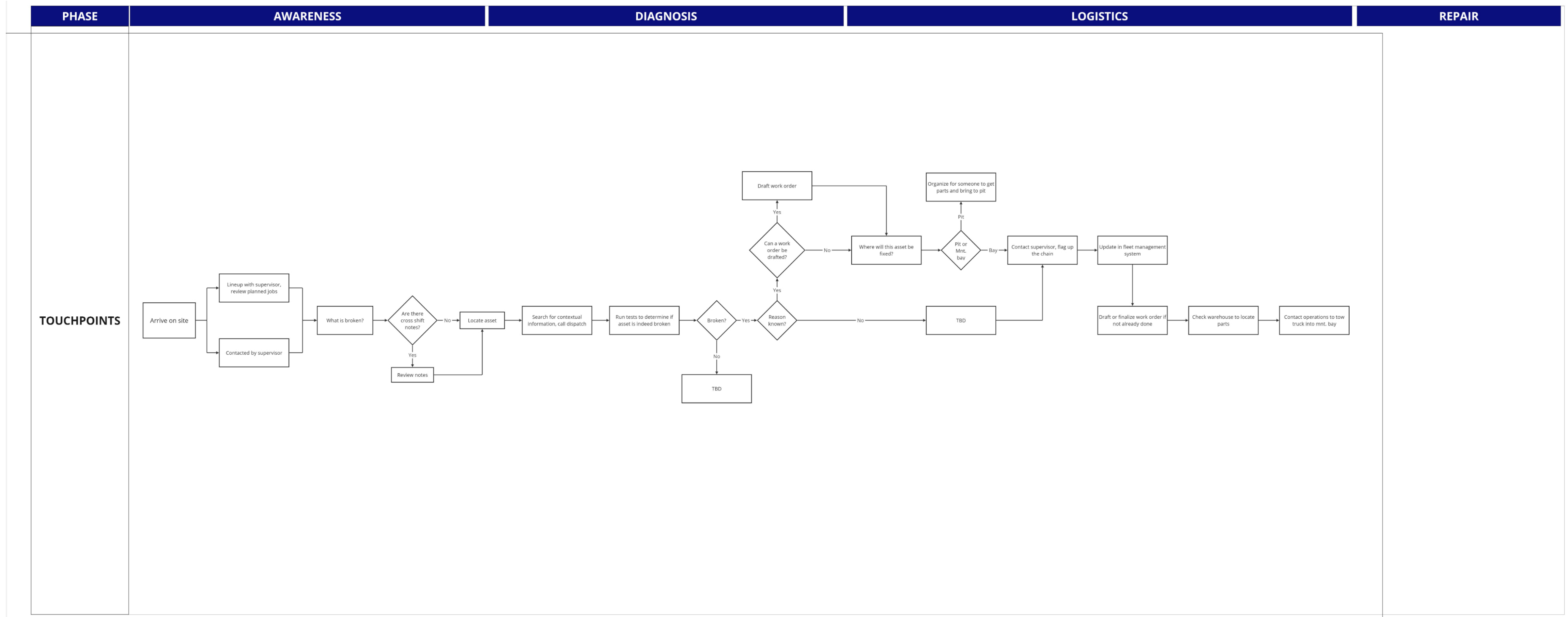
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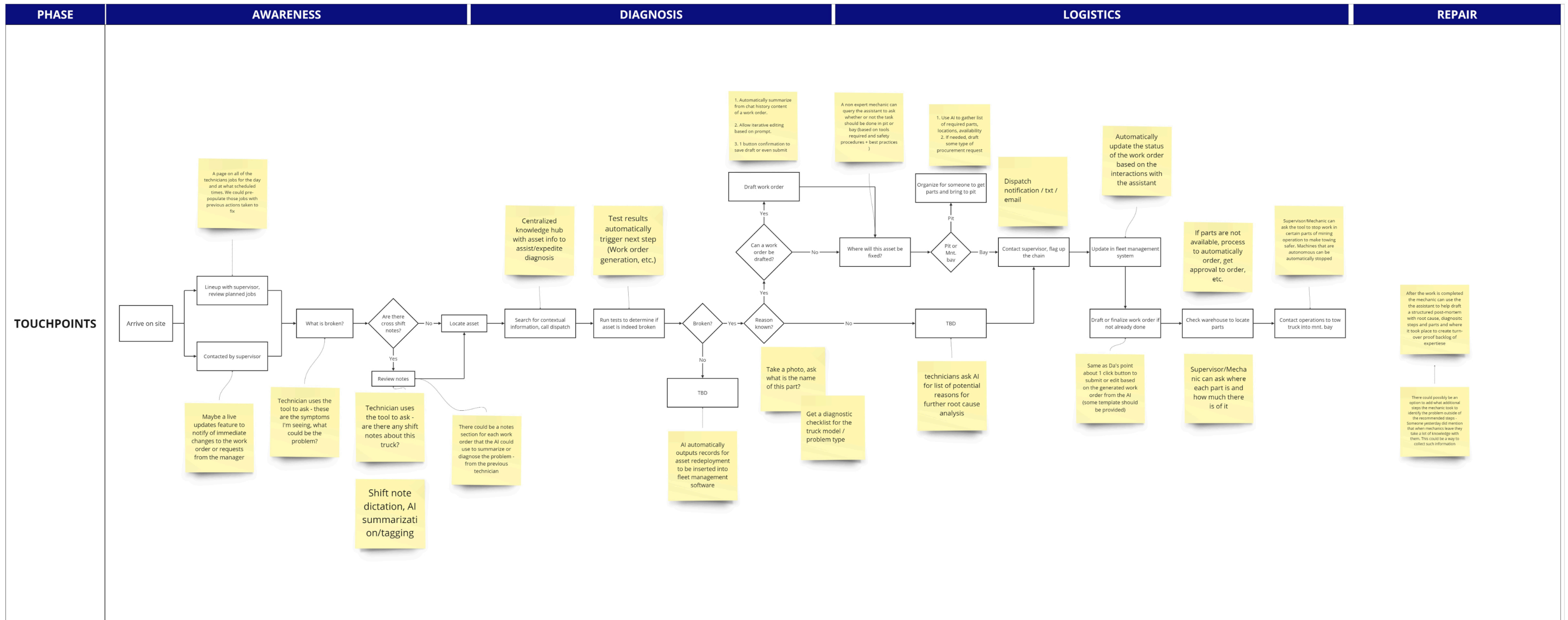


I created a simple current state journey map in Miro based off of research insights that we used as ideation session stimulus



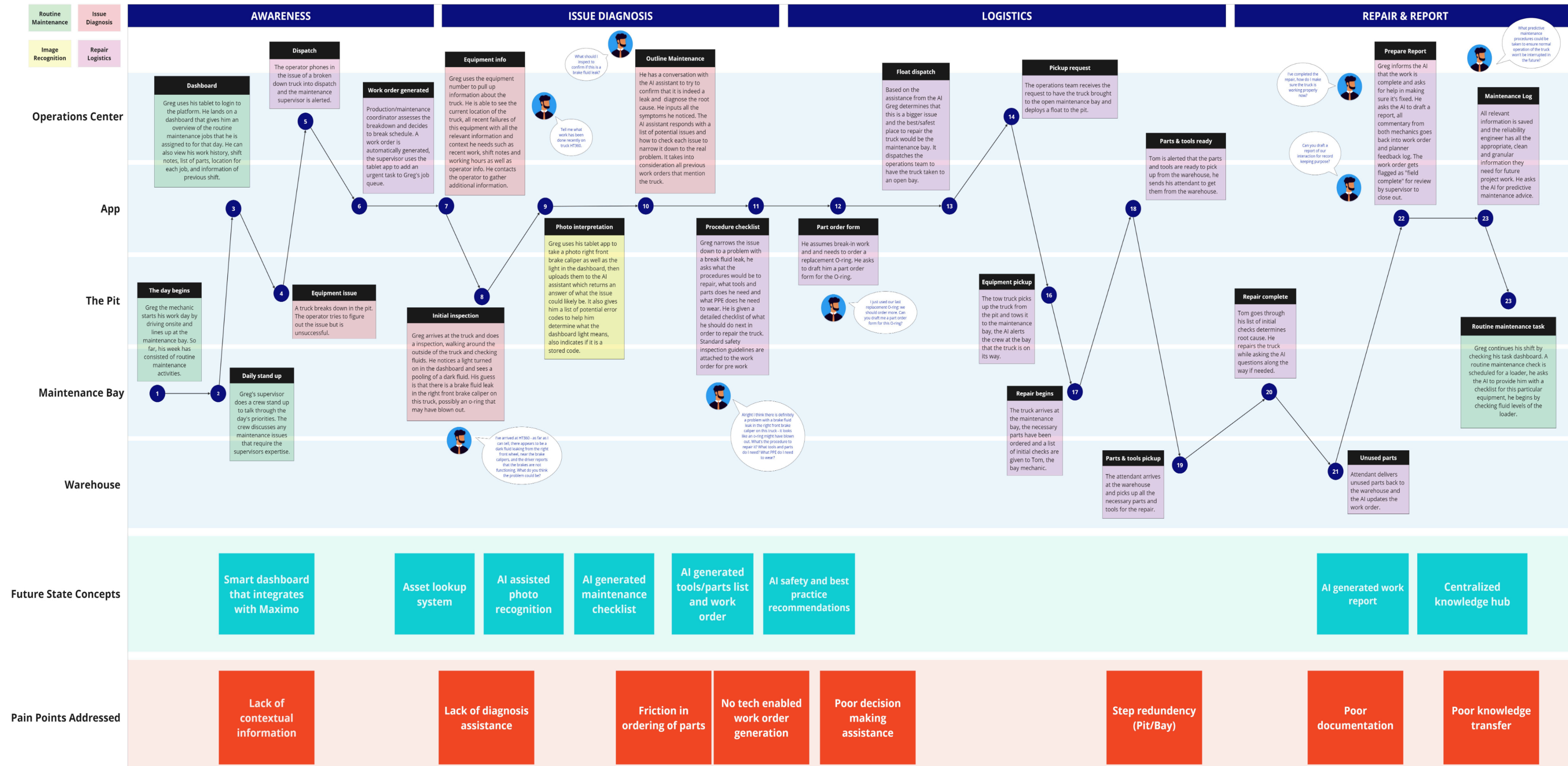


I facilitated a design thinking ideation session with our McKinsey team that consisted of one engagement manager, three data scientists and two devs



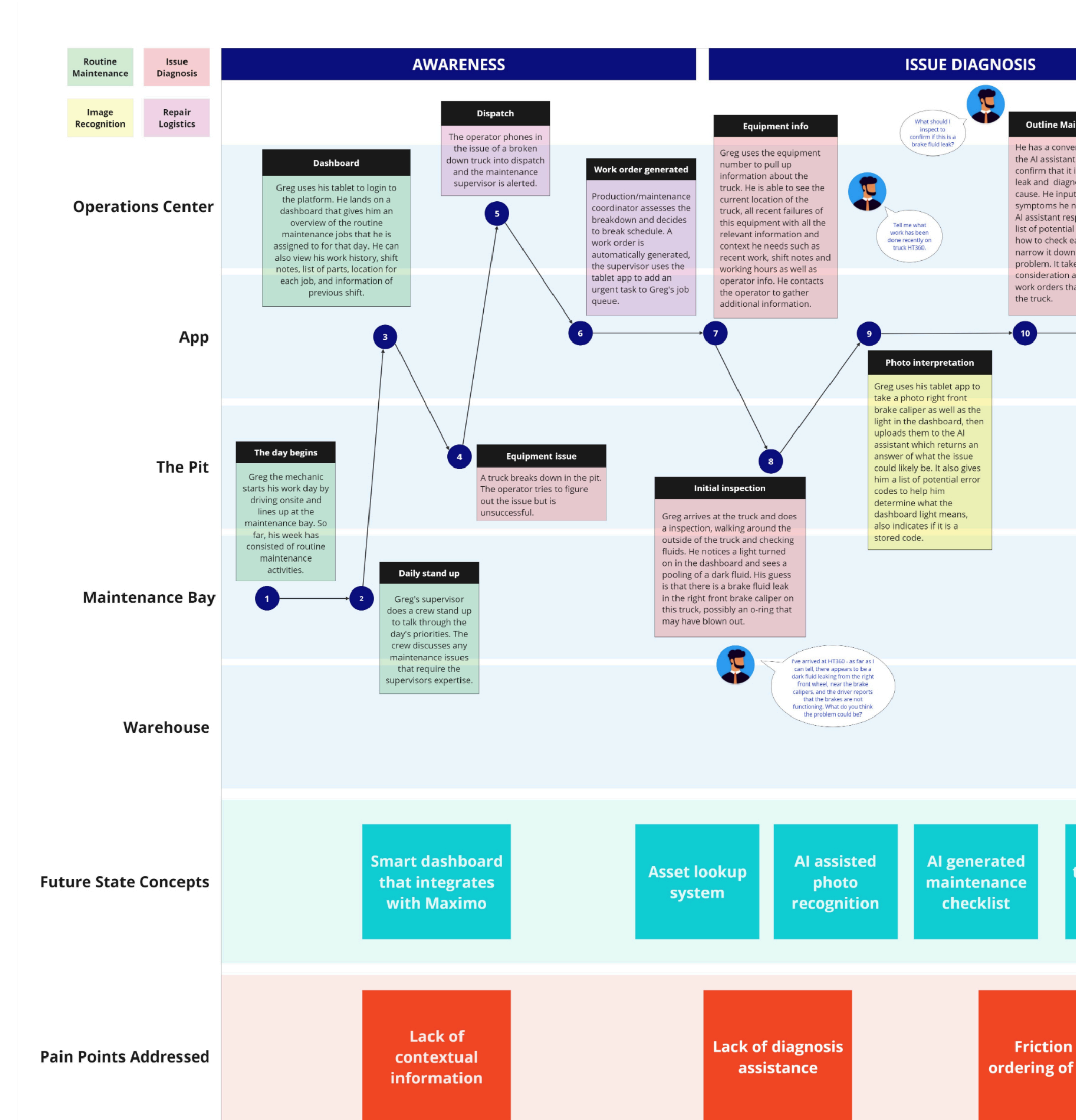


Based off insight from our research and our ideation session, I created a future state journey map that tells the story of a typical scenario at a mine in which our AI assistant would be used





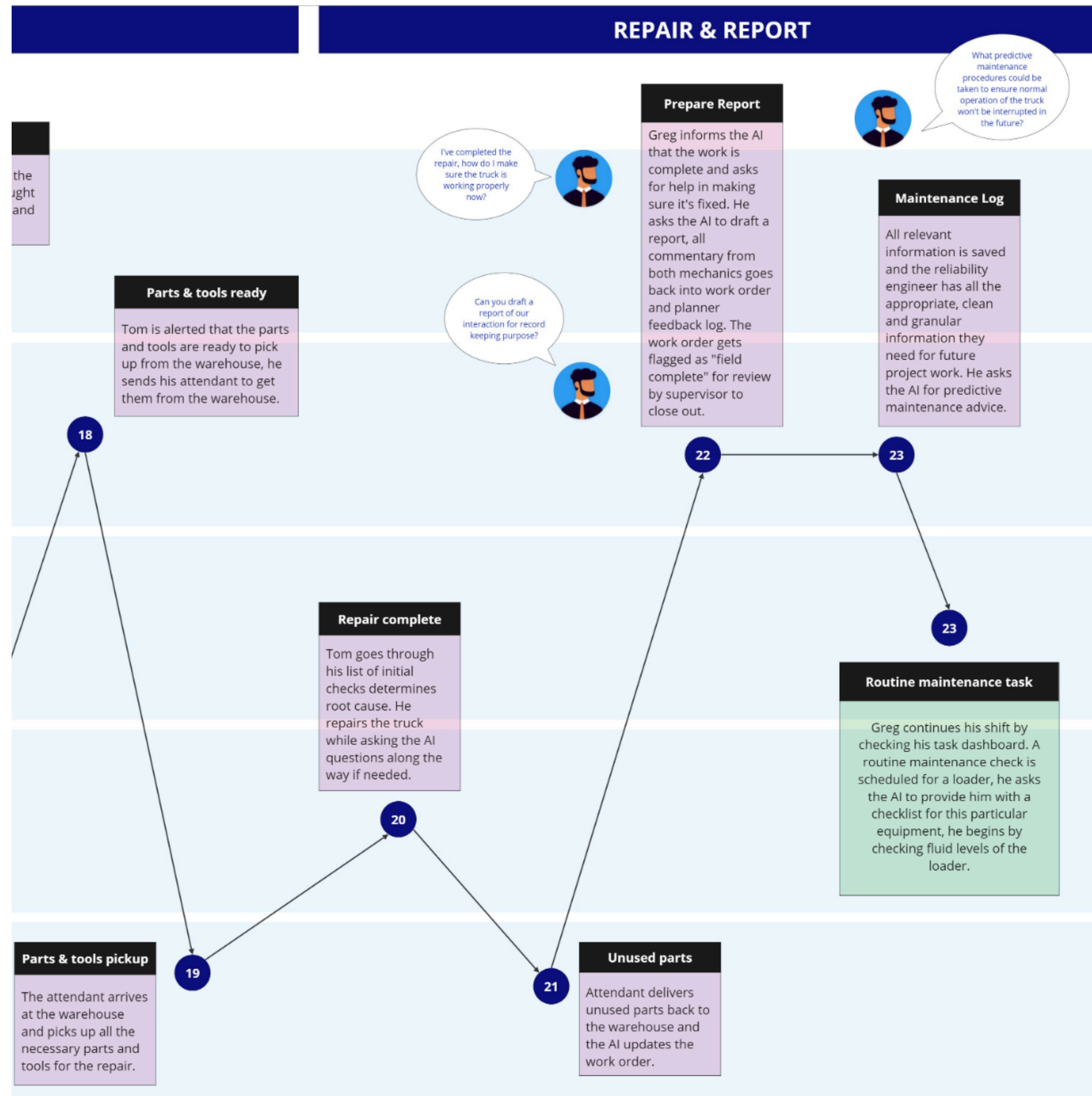
The journey starts at the maintenance bay and bounces between the operations center, the app, the mine pit and the warehouse



The top portion of the FSJ has five swim lanes that represent the location of each touchpoint along the timeline.

In the bottom two swim lanes we identified potential future state concepts and each pain point we would address.

I reviewed this artifact with a McKinsey expert in order to ensure accuracy and add polish



The McKinsey & Company expert had a wealth of experience in mining to help us create a more realistic scenario, he gave us suggestions about how we should describe each touchpoint.

Our second round of user research was solely focused on the validation of this artifact.

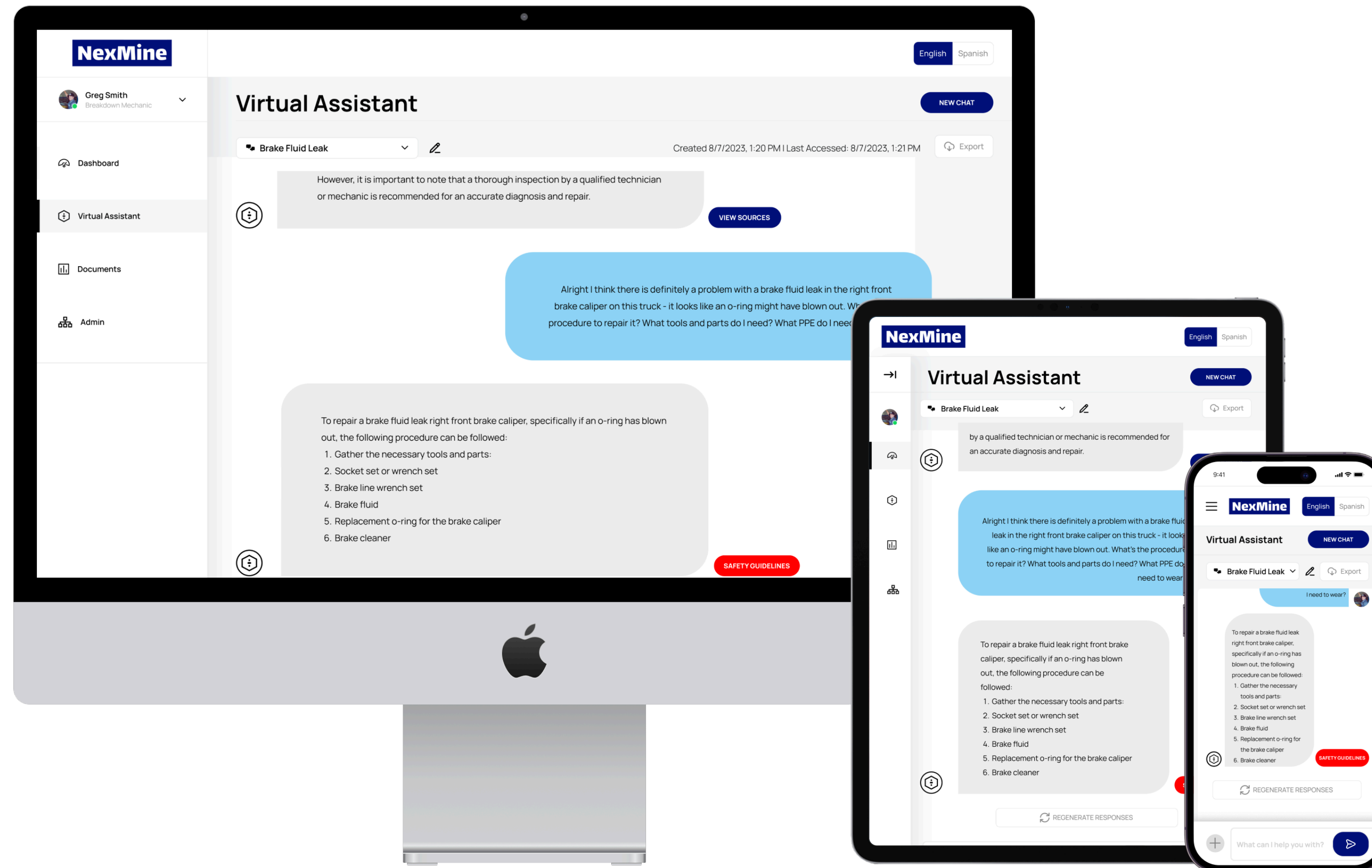


03

Design & Prototyping



The tool would be used mostly on tablet and mobile by maintenance workers as well as supervisors, operations personnel would use it on desktop

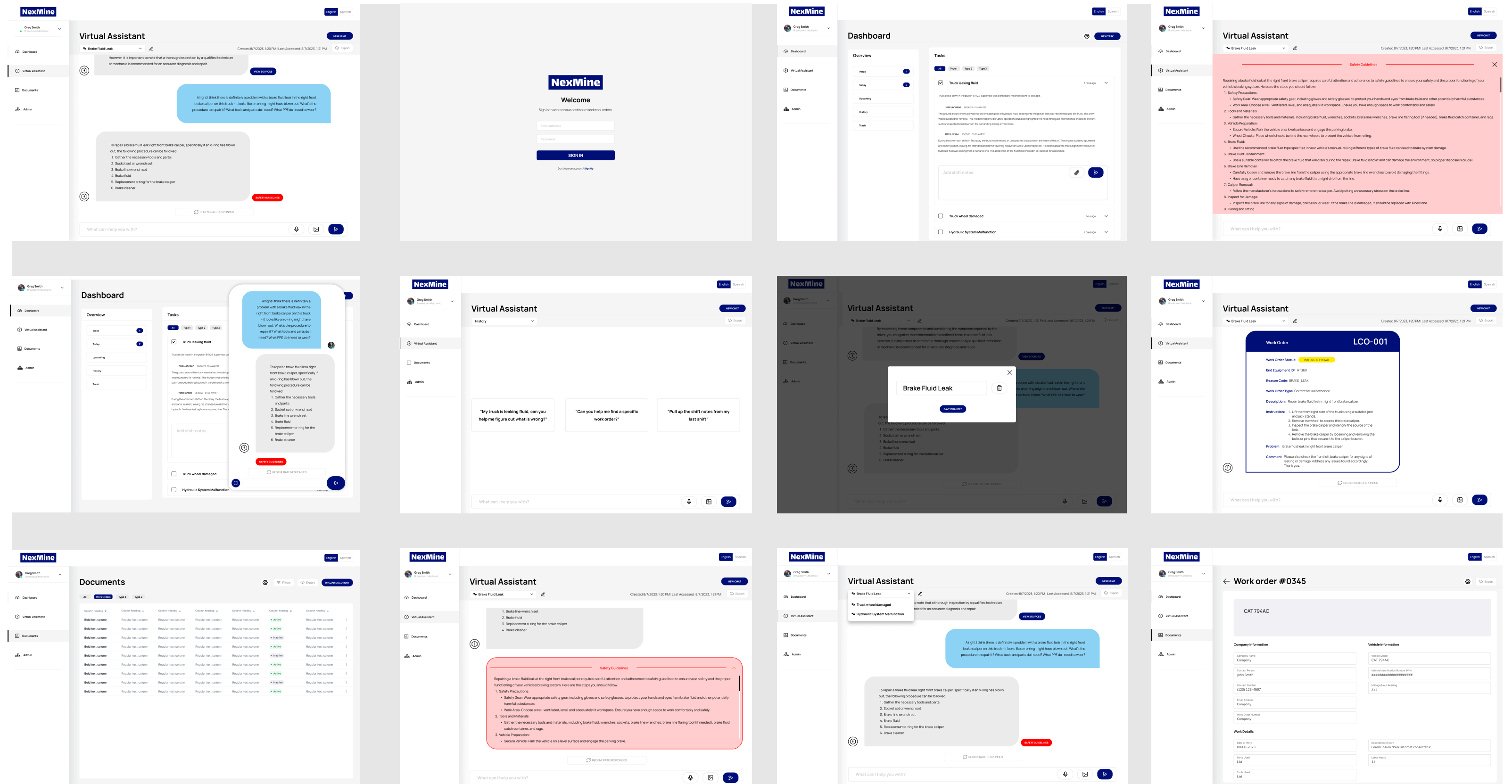


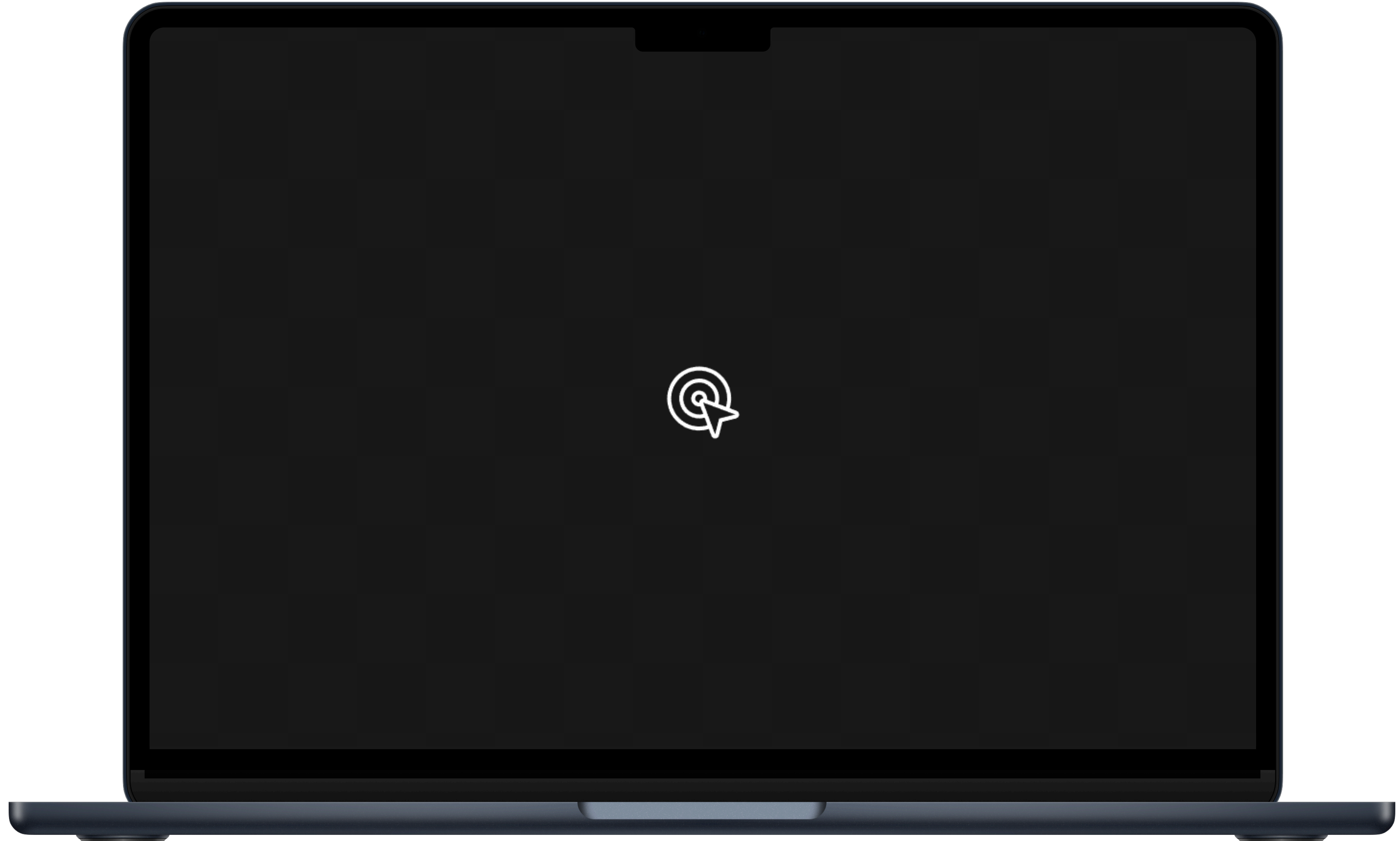


I brought our designs to life with a functional prototype that I presented to the board of directors

Core Features

- Task-centered dashboard
- Spanish language support
- Documents section
- Admin settings
- AI chat interface leveraging the ChatGPT API
- Suggested prompts
- Chat history
- Ability to export chat manuscripts
- Image recognition
- In-line safety guidelines
- In line work orders



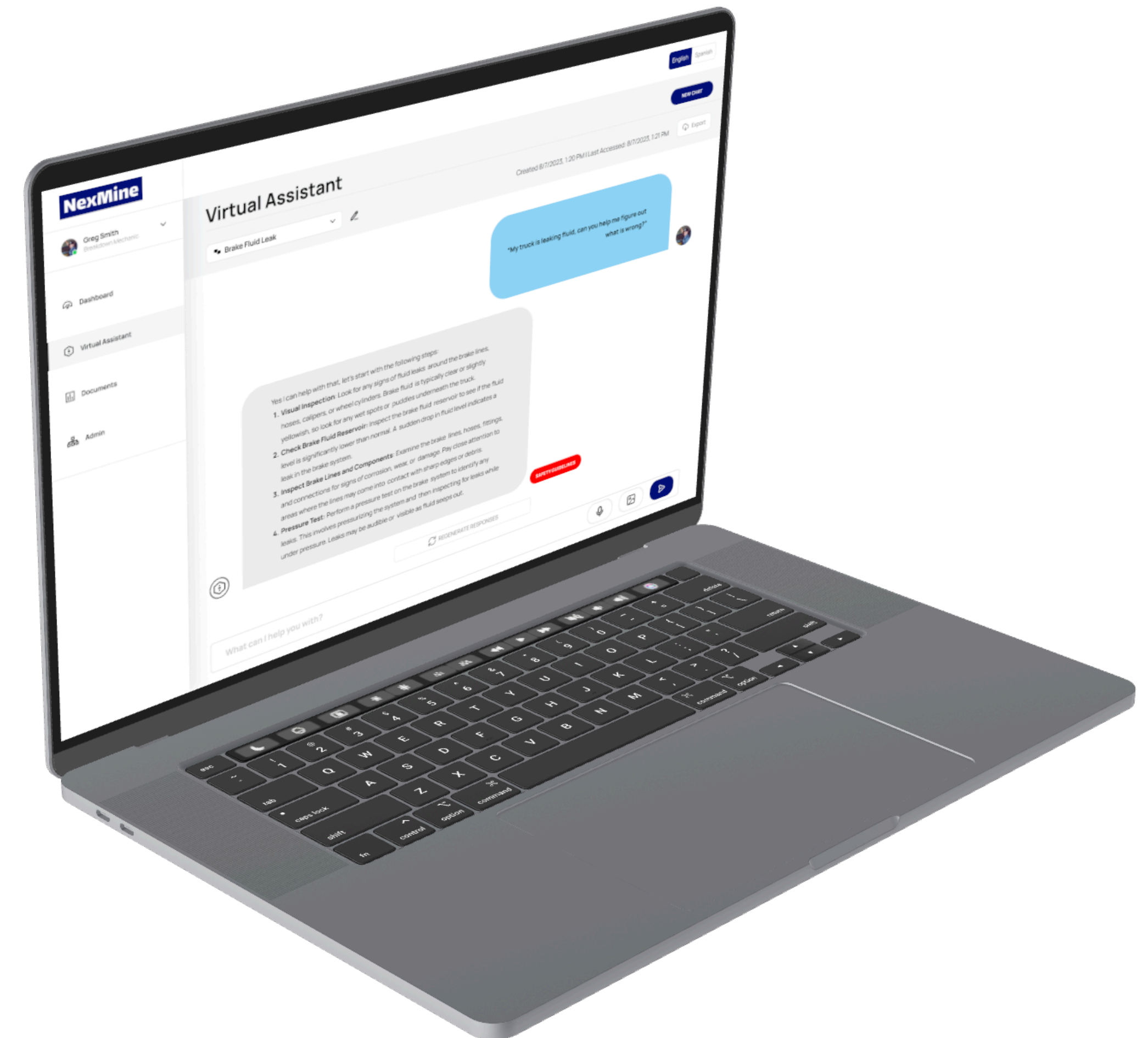


04 Impact

The prototype that I created was presented to the client's board of directors and the product was approved to be developed in the fall of 2023

Success criteria

- Test for task success rate
 - Diagnosing an issue
 - Accessing and/or generating accurate documentation
 - Image recognition
- Compare the amount of monthly maintenance issues that existed prior to the AI tool with the amount of issues after the launch of this tool
- Speed of onboarding, how much quicker can we get a new maintenance employee up to speed with the help of our AI tool





Thank You

