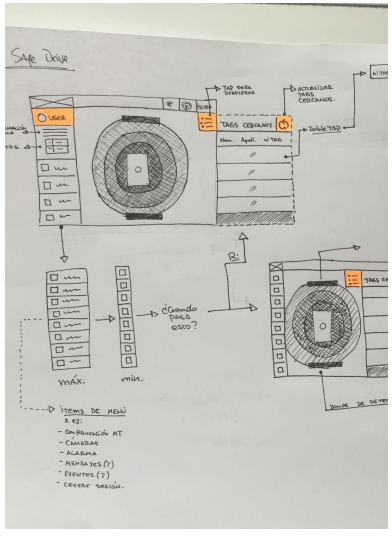
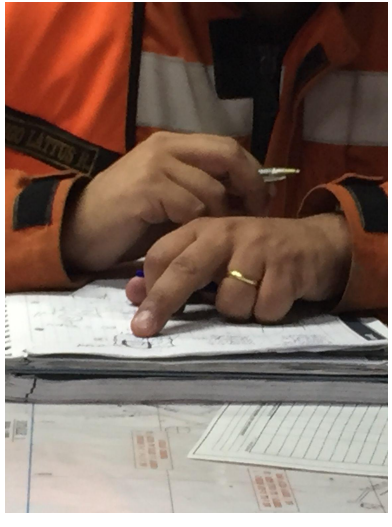
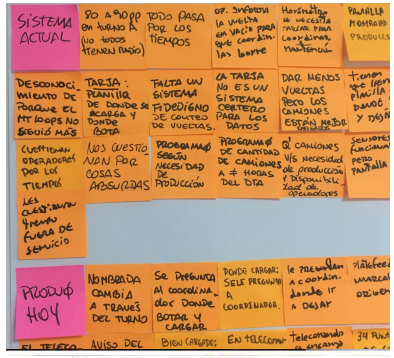
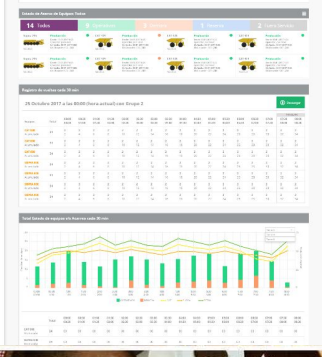
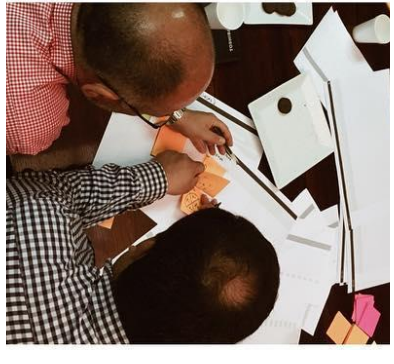










UX Case of Study

Mining Industry

Catalina Vásquez / 2015-2017

Context

Chile, mining industry

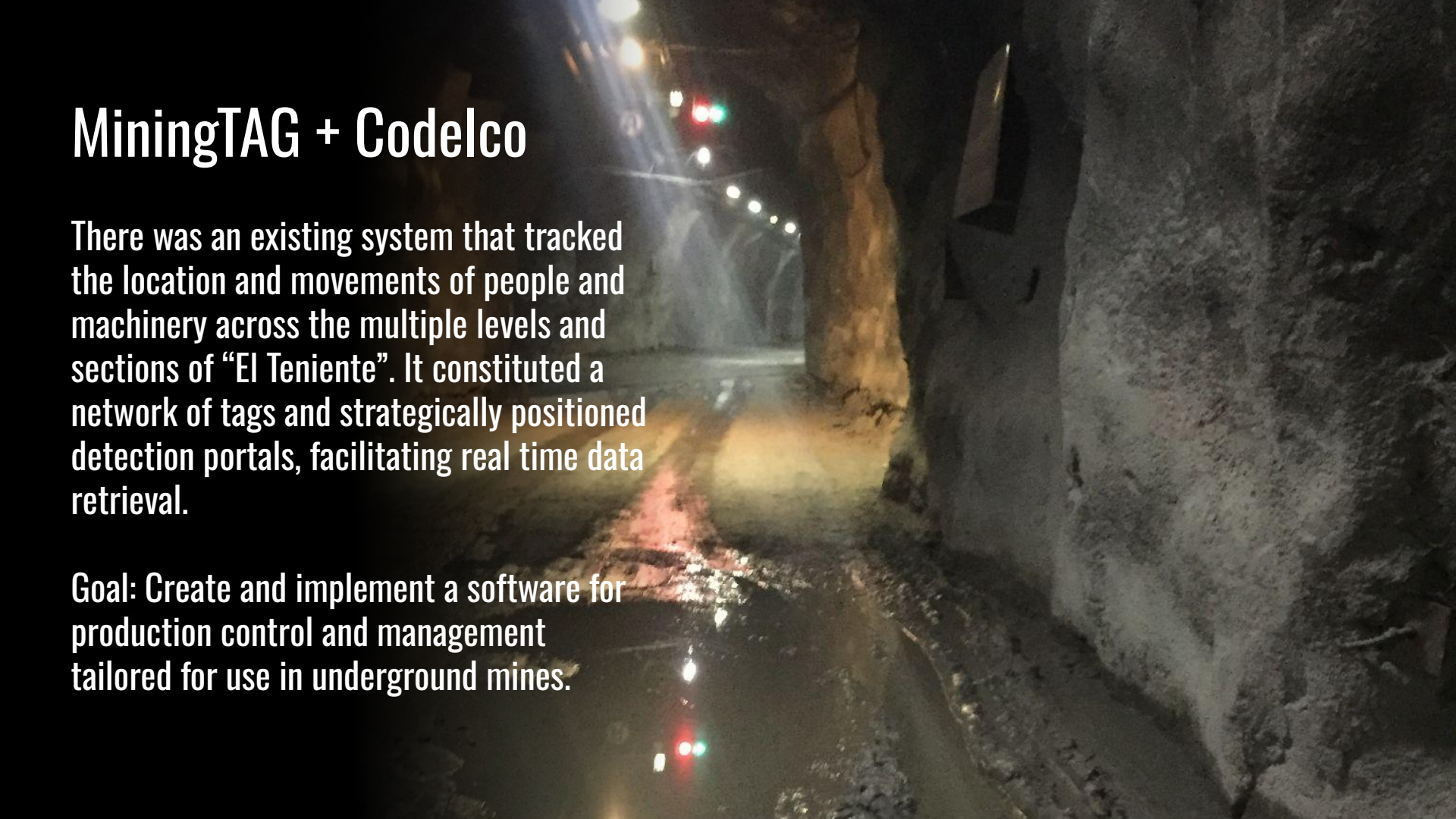
15% Gross Domestic Product.
60% of the country's total exports.

"El Teniente", near the city of Rancagua, is one of the world's largest underground mines, with over 2,000 km of tunnels expanding daily at an altitude of 2,300 meters in the mountains.

MiningTAG + Codelco

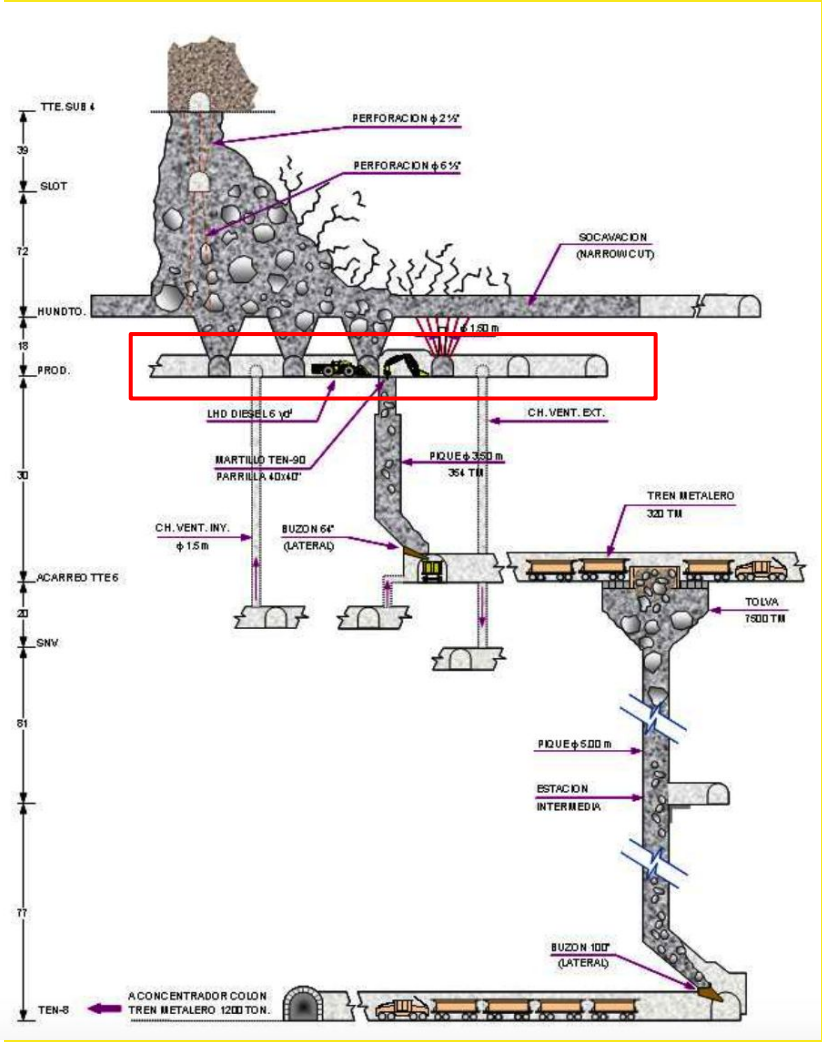
There was an existing system that tracked the location and movements of people and machinery across the multiple levels and sections of “El Teniente”. It constituted a network of tags and strategically positioned detection portals, facilitating real time data retrieval.

Goal: Create and implement a software for production control and management tailored for use in underground mines.



Initial data gathering

Tags and portals were implemented in each “zanja” and “pique” to track the machine movements and how many loops they were doing per shift.



My Role

- Worked across both Innovation and Development teams
- Led user-centered research (onsite visits, interviews, surveys) to uncover needs and build role-based user stories
- Created low-fidelity mockups to iterate early with users and clients
- Designed high-fidelity mockups to refine solutions and enhance human-machine interaction
- Helped bridge research insights into polished, user-focused product experiences

Onsite discovery

Who is the user of the info?
What info they need?
Is there more people using the info?
Which info each role needs?
What are their goals? pains?
Are there particular mine conditions that might influence the way users interact with the system?

...


Nivel
Observaciones
OP 25
OP 26
OP 27
OP 28
OP 40
OP 29/31
TH 602.
Supervisor user context.

Supervisor needs.

See numbers
Total mineral extraction and loops, number of workers per shift (active, on lunch, inactive, etc).

Real time information
Updated operator work progress in order to make mine-business decisions.

Efficient communication
Communicate last minute changes or emergencies to all the people in the production/extraction zone.

Operator user context.

Operator needs

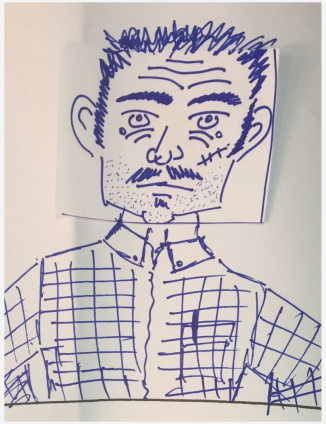
Safety in production areas
As underground mine conditions change everyday, many dangerous events could happen and safety is always their number one priority.

Review work in progress
Operators are often paid by goals (salary and bonuses) per shift so they need to keep track on their daily progress.

Updated work schedule
Review current work schedule for the shift and the possible changes that might occur while they are working.

Real-time communication
Prompt assistance with software/hardware issues, emergencies, or supervisor-endorsed relocation suggestions during shifts.

Back to the office



Profile

Arnoldo Gómez is a mechanical supervisor of 58 years old. He started working at the age of 18. They called him "guarén" by then. His father also worked in the mine all his life.

Arnoldo has 40 years of experience and commonly takes the night shifts. He is tired of the routine. Because of his complicated schedule, he got divorced. He has two children studying engineering in the university. He doesn't have time to bond outside the mine as he spends his spare time resting.

Name	Arnoldo Gómez
Age	58 years
Position/Job	Mine Supervisor
Salary	$600.000 CLP + bonuses (around 760 USD monthly)
Shift	7×7 (7 working days + 7 free days)
Location	Rancagua, Chile
Education	Technical high school

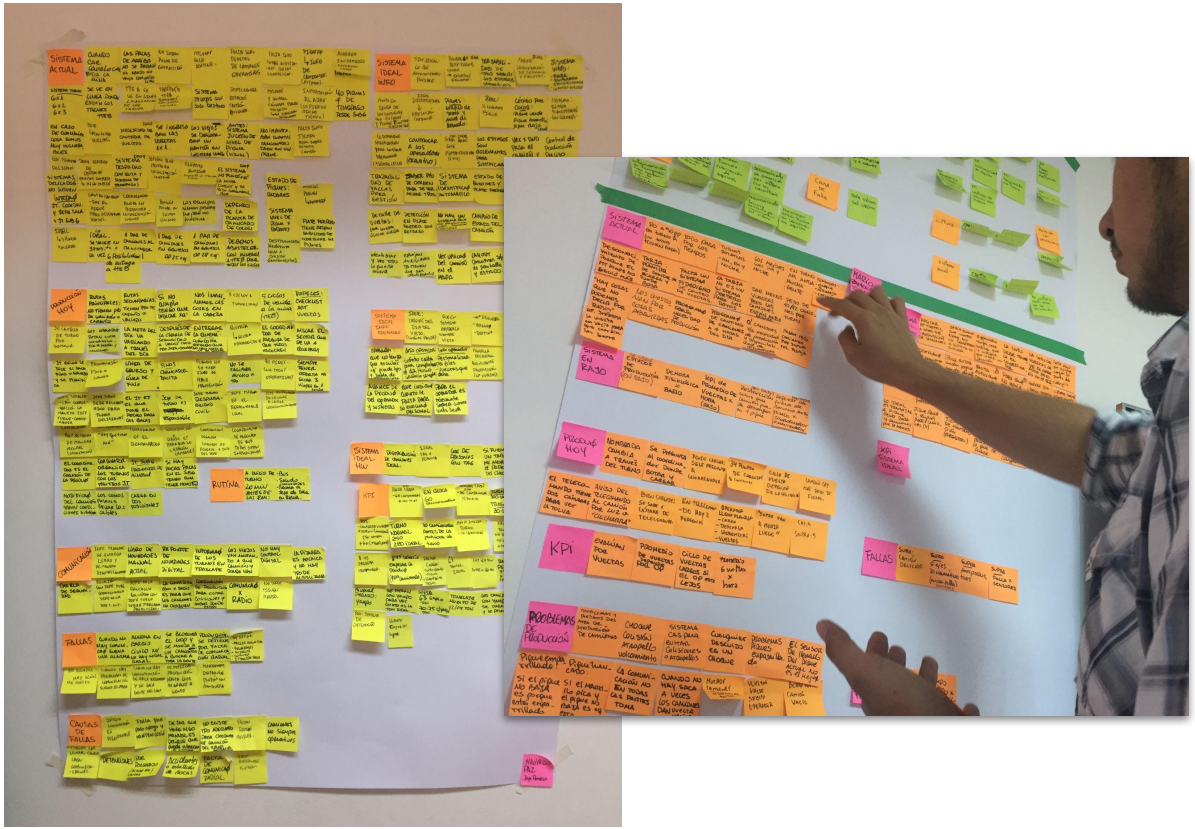
Pains

- Not knowing the real operators progress in the production area.
- Not being able to communicate in case of emergency.
- Fears that the system is not reliable enough.
- Don't want to feel controlled by a system; he wants it to let him do his job without interfering.
- Does not want to get to the end of the shift without the shift goals met.
- Not building trust with the people under his charge.
- Missing important family dates due to working long shifts.

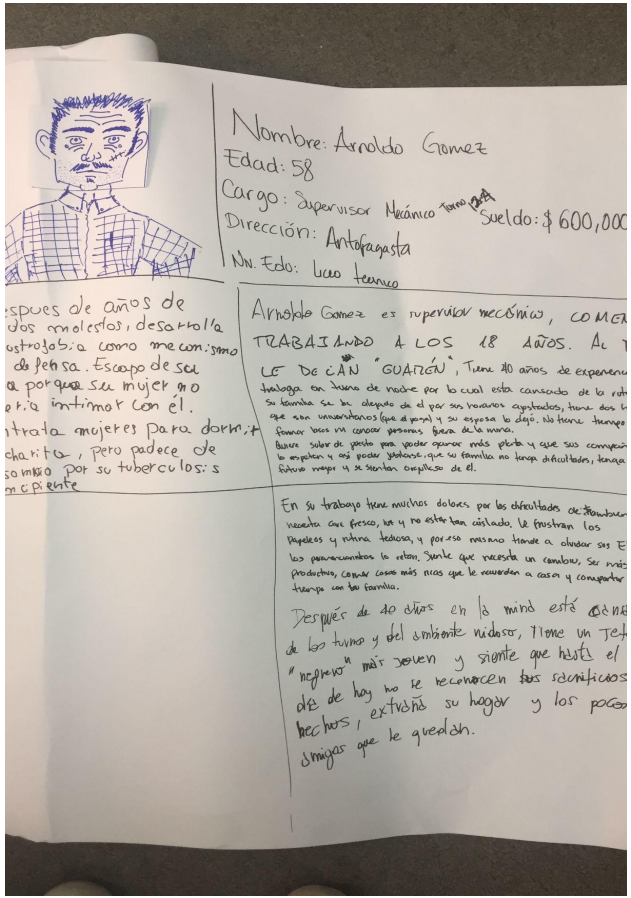
Goals

- Wants to fulfill the daily goals for his job schedule so everyone in his shift can be paid properly and in time.
- Wants to be safe inside the mine and, in case of emergency, take all the people in his charge out safely.
- Wants to communicate with his boss and operators under his supervision in real time in case of emergency.
- Longs for a production bonus so he can make extra money.
- Wants that the operators he supervises respect and trust him.
- Wants to be seen as an example of good work (recognition).
- Wants his younger boss to respect his experience, even if he does not have formal studies.
- Wants his family to be proud of him.

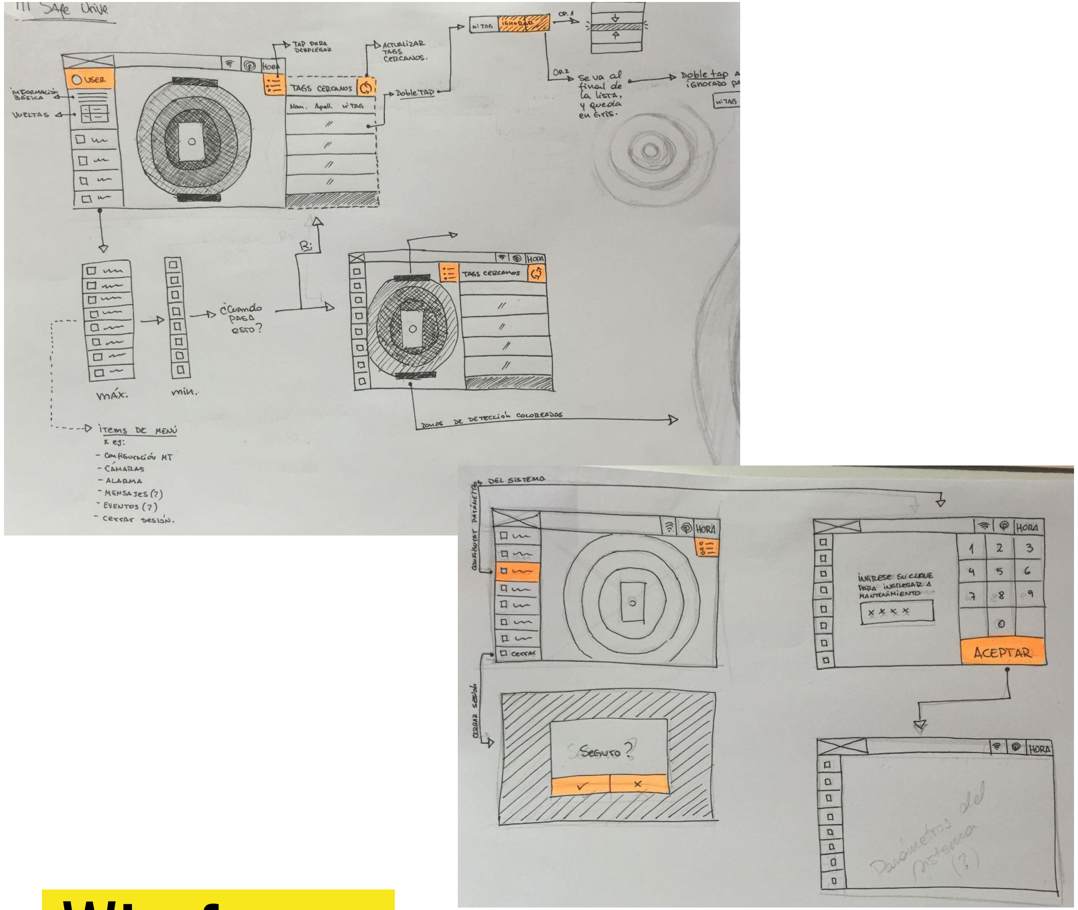
Some empathy tools: Value proposition canvas and User personas

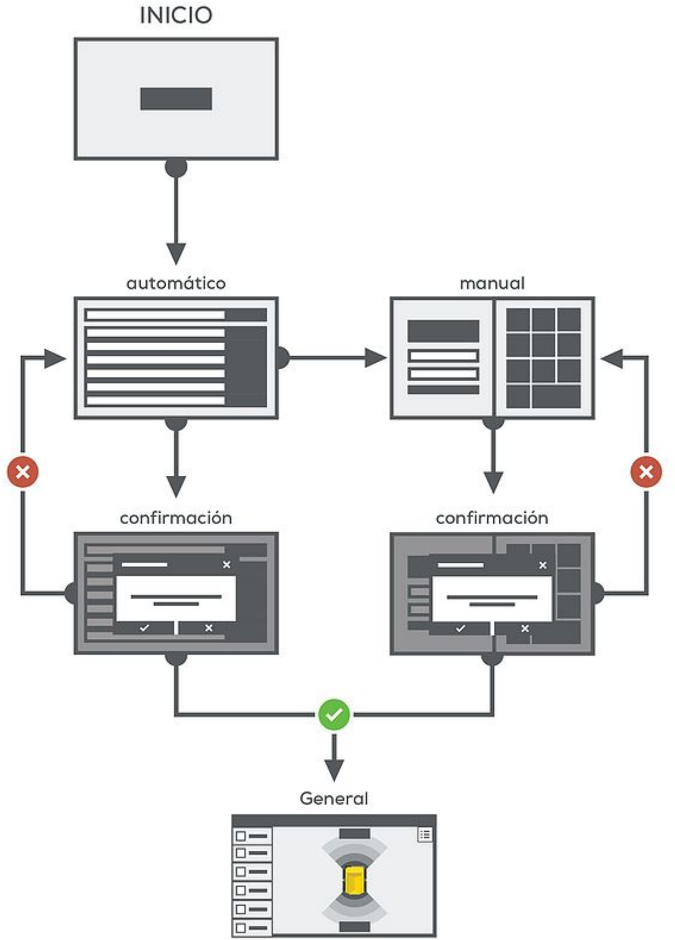


Affinity Mapping / Categorization of information

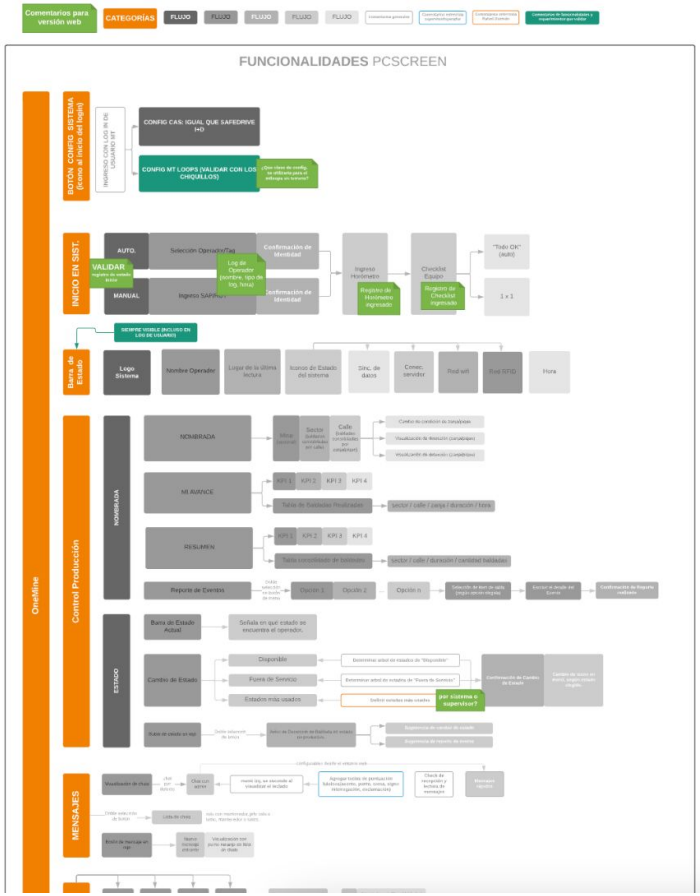


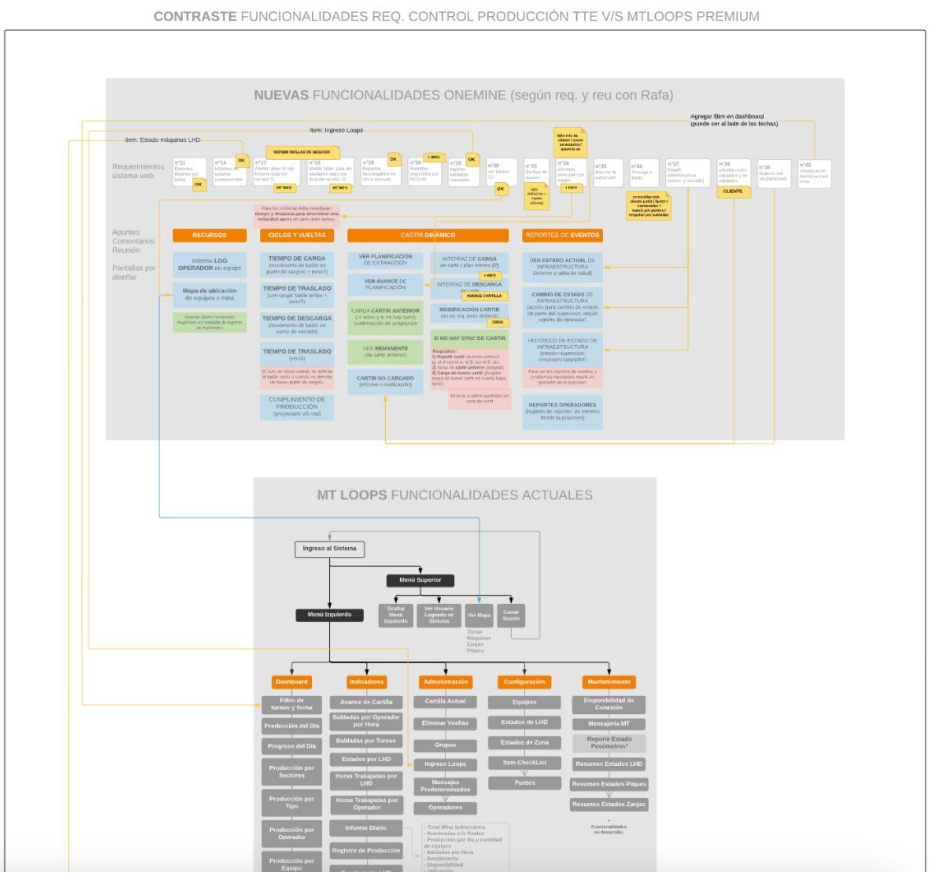
User Journeys (per role) / Personas


TAGS CERCANOS
Doble TAP
máx.
min.
¿Cuando pasa esto?
items de menú
HORA
ACEPTAR
Seguro ?

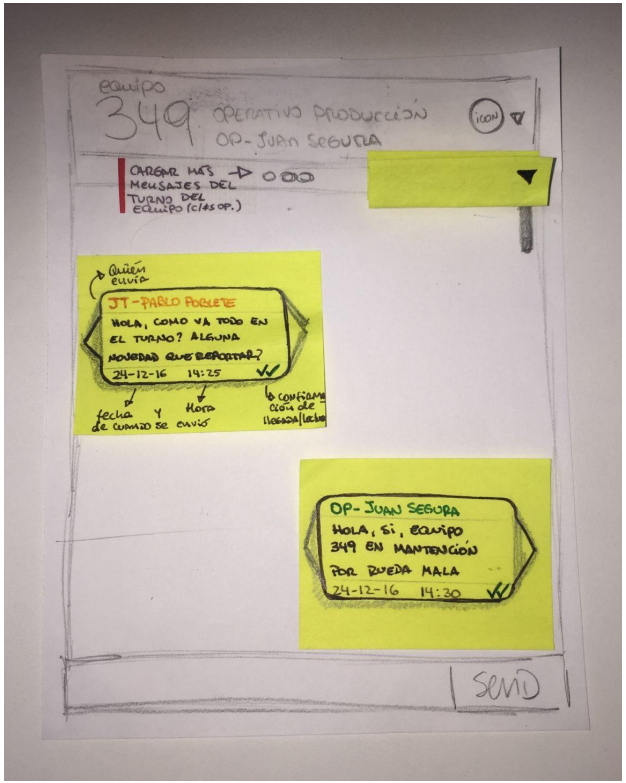

INICIO
automático
manual
confirmación
confirmación
General

Wireframes



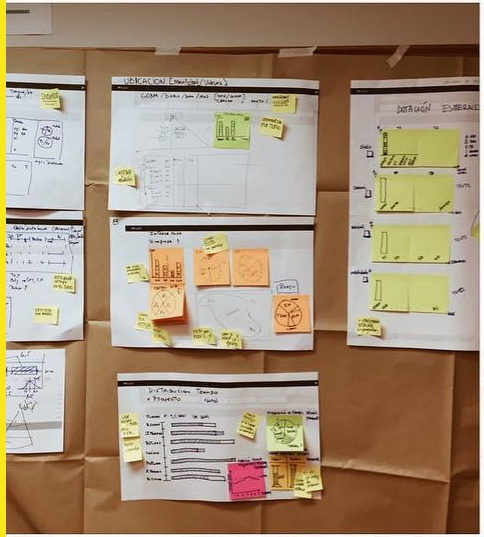


Multiplatform Information Architecture



Collaborating with developers using low-fidelity wireframes and mockups in order to check feasibility of UI design implementation.

Iteration process with Codelco *(client)*



The result:

“OneMine”

Module based software: reliable real time safety.

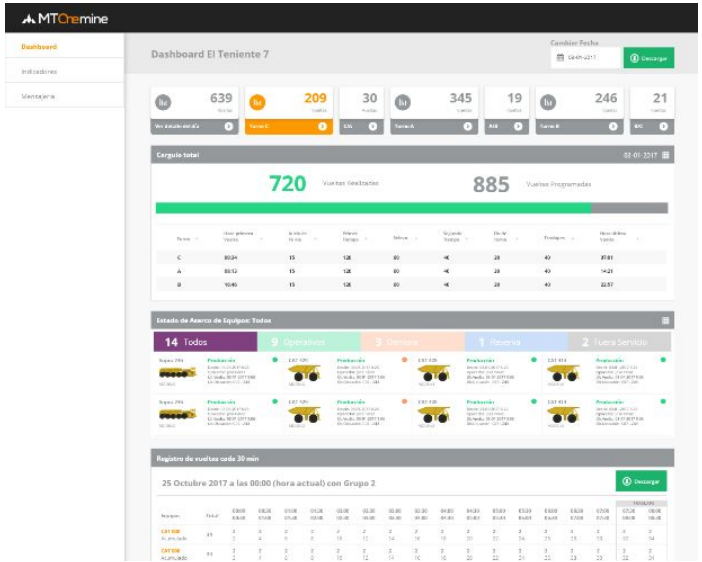
Production Visibility /Presence Detection / In-mine Navigation / Shift Management

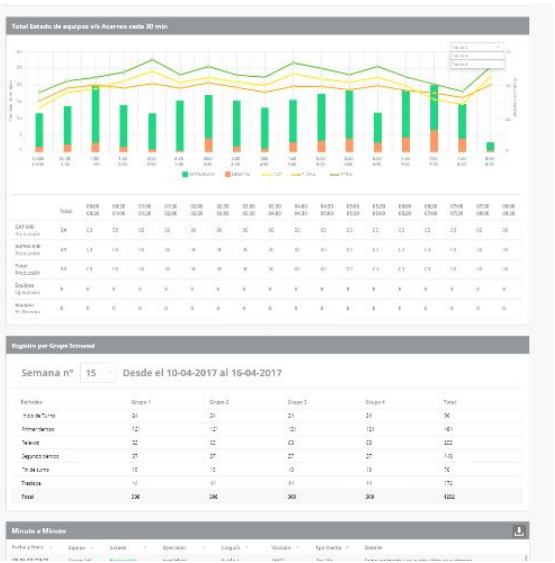
*first iteration screens

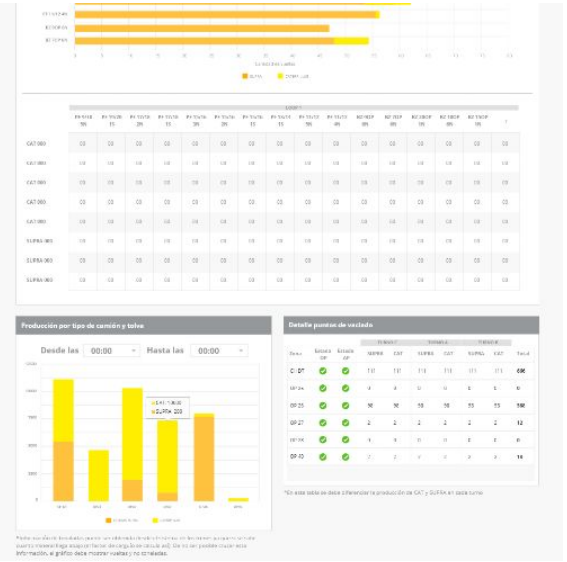
The right information per user role

Maintenance / IT Support / Supervisors / Mine Managers / General Management

*second iteration screens







Tracked data based on each area production needs

Scoops, trucks, small vehicles, contractor buses and their people...

RESULTS

Operation improvements

40%

Increased productivity

by tracking daily operations and optimizing the current tag related data available.

RESULTS

Improved collab and positive cultural change

- Users felt ownership with the system from the beginning and cared about its performance.
- Continuous improvements to the system (support team and feedback sessions with users).
- Trips to find latent enhancement opportunities and potential new features/modules.

Thank you