HUMAN CENTRED DESIGN FOR ENTERPRISE AR APPLICATIONS

threesixty

AREA
Augmented Reality for Enterprise Alliance

Sheffield, March 2019

Who we are

THREESIXTY, is a London-based consultancy specialising in **user experience for immersive technologies**.

We use research and an understanding of human interactions with technology to make VR / AR experiences intuitive and productive.

Agenda

1. What's human-centred design
2. Why it's important
3. Run through the process with example use case
4. Exercise: Prototype evaluation with a user
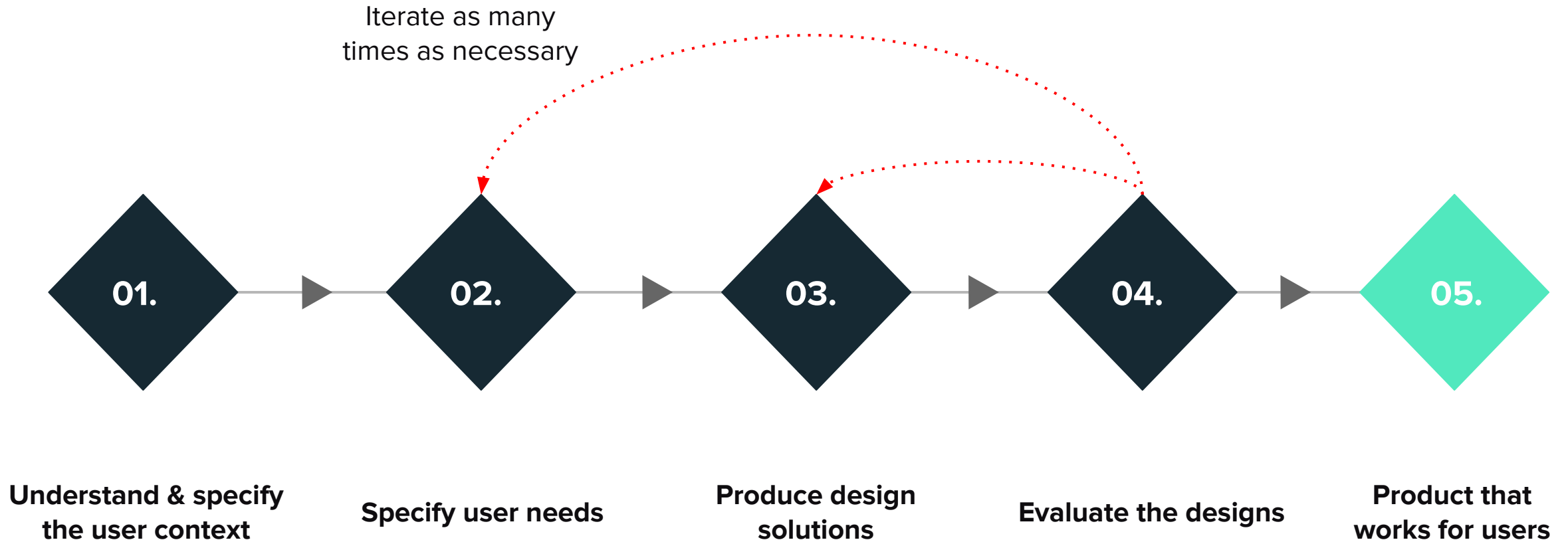5. Iterating workflow designs based on user feedback

# User Centred Design

Human-centred design

ISO 9241-210

Iterate as many
times as necessary

01.

02.

03.

04.

05.

**Understand & specify
the user context**

Specify user needs

**Produce design
solutions**

Evaluate the designs

**Product that
works for users**

Human centred design: Performance & safety

Iterate as many times as necessary

New use error identified

IEC 62366 (2015)

01. **02.** **03.** **04.** **05.** **06.**
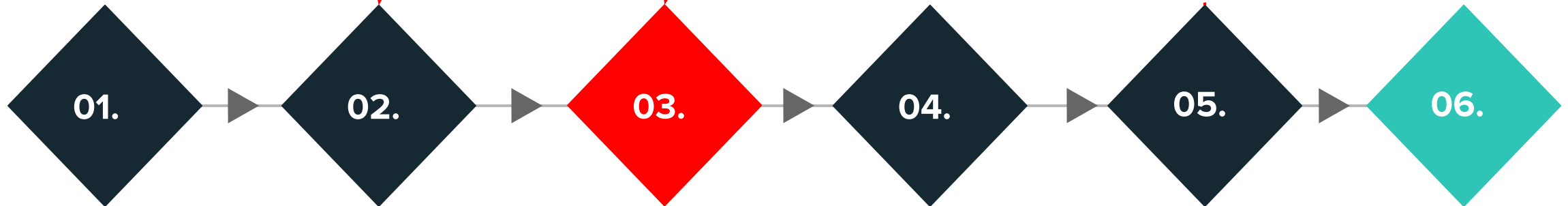
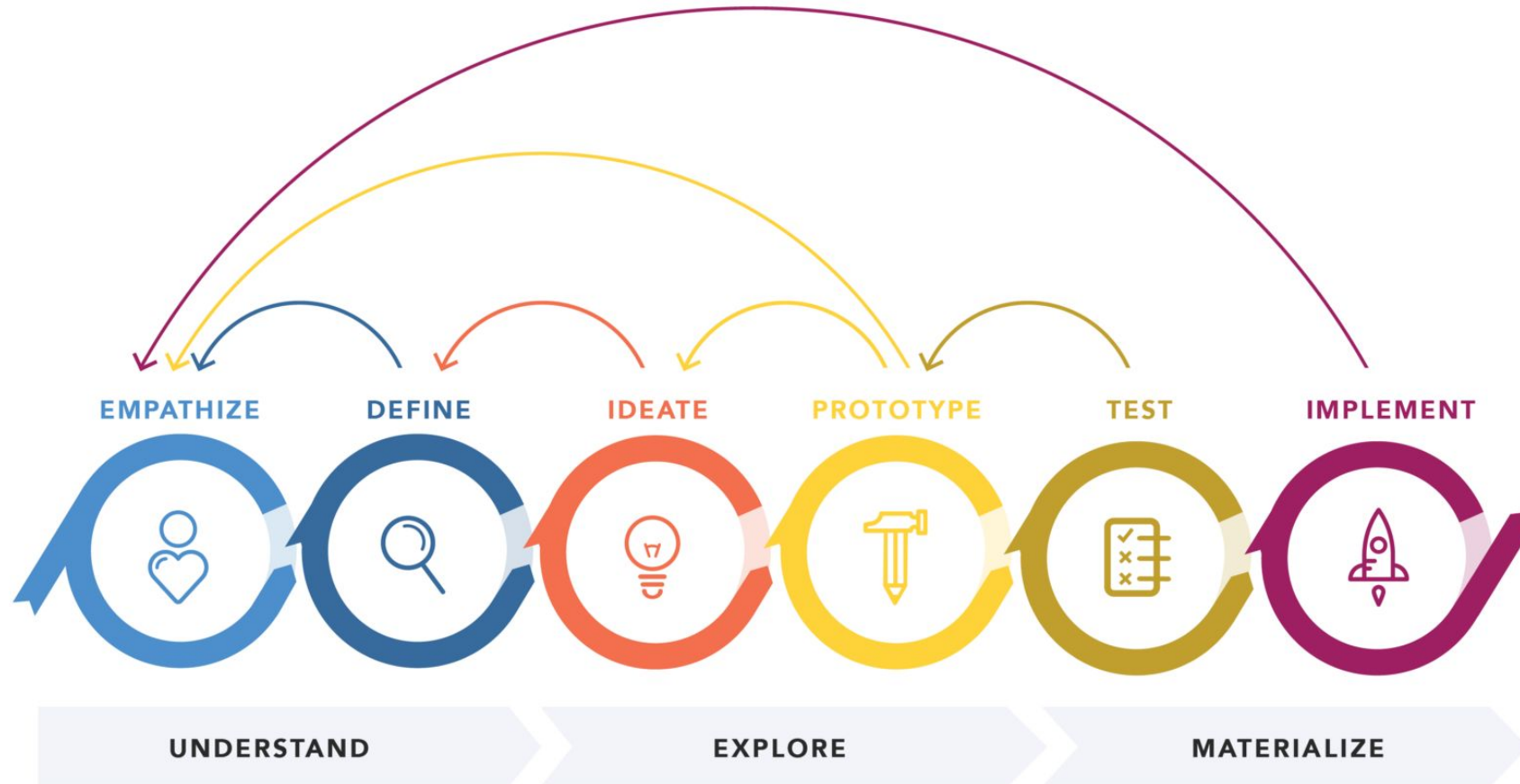**Understand & specify the user context**

Specify user needs

Conduct risk assessment

Produce design solutions

Evaluate the designs

Product that works safely for users

Design thinking

EMPATHIZE   DEFINE   IDEATE   PROTOTYPE   TEST   IMPLEMENT

UNDERSTAND   EXPLORE   MATERIALIZE

DESIGN THINKING 101 NNGROUP.COM

UK Government Standard

GOV.UK Service Manual

Search

BETA Complete our quick 5-question survey to help us improve our content.

Service manual > Digital Service Standard

Digital Service Standard

The Digital Service Standard is a set of 18 criteria to help government create and run good digital services.

All public facing transactional services must meet the standard. It's used by departments and the Government Digital Service to check whether a service is good enough for public use.

1. **Understand user needs**

   Understand user needs. Research to develop a deep knowledge of who the service users are and what that means for the design of the service.

   Read more about point 1

2. **Do ongoing user research**

   Put a plan in place for ongoing user research and usability testing to continuously seek feedback from users to improve the service.

Get notifications

When any points in the Digital Service Standard are updated
✉ email

All UK government digital services must follow a user centred design process.

It is also being applied to internal software and systems, where it's believed that significant cost savings from technology can only be realised if the software is aligned to the way work is done.

Why is UCD important?

Proven benefits of UCD

Less development costs

- Less development waste
- Reduced post launch fixes

Faster transition

- Lower training costs
- Lower support costs
- Higher adoption & lower churn

Improved workforce performance

- Improved worker satisfaction
- Increased productivity and efficiency
- Reduced errors
- Improved quality of outcomes
- Improved safety

ROI case studies

User adoption undermines IT projects

"Out of IT projects that fail, **70%** do so due to lack of user adoption

Forrester Research (2008)

FORRESTER®

Reduced support costs

"**90%** reduction in support costs from usability improvement

Strategic data consulting special report (2009)

McAfee™ | Safe Family

ROI case studies

Improved KPIs

"**83%** average increase in KPIs due to following a UCD process

Jakob Nielsen (2008)

NN/g
Nielsen Norman Group

Improved employee performance

"**300%** increased productivity, **55%** reduced training time from ERP redesign

Enterprise Software: Why the User Experience Matters, Wall Street Journal (2012)
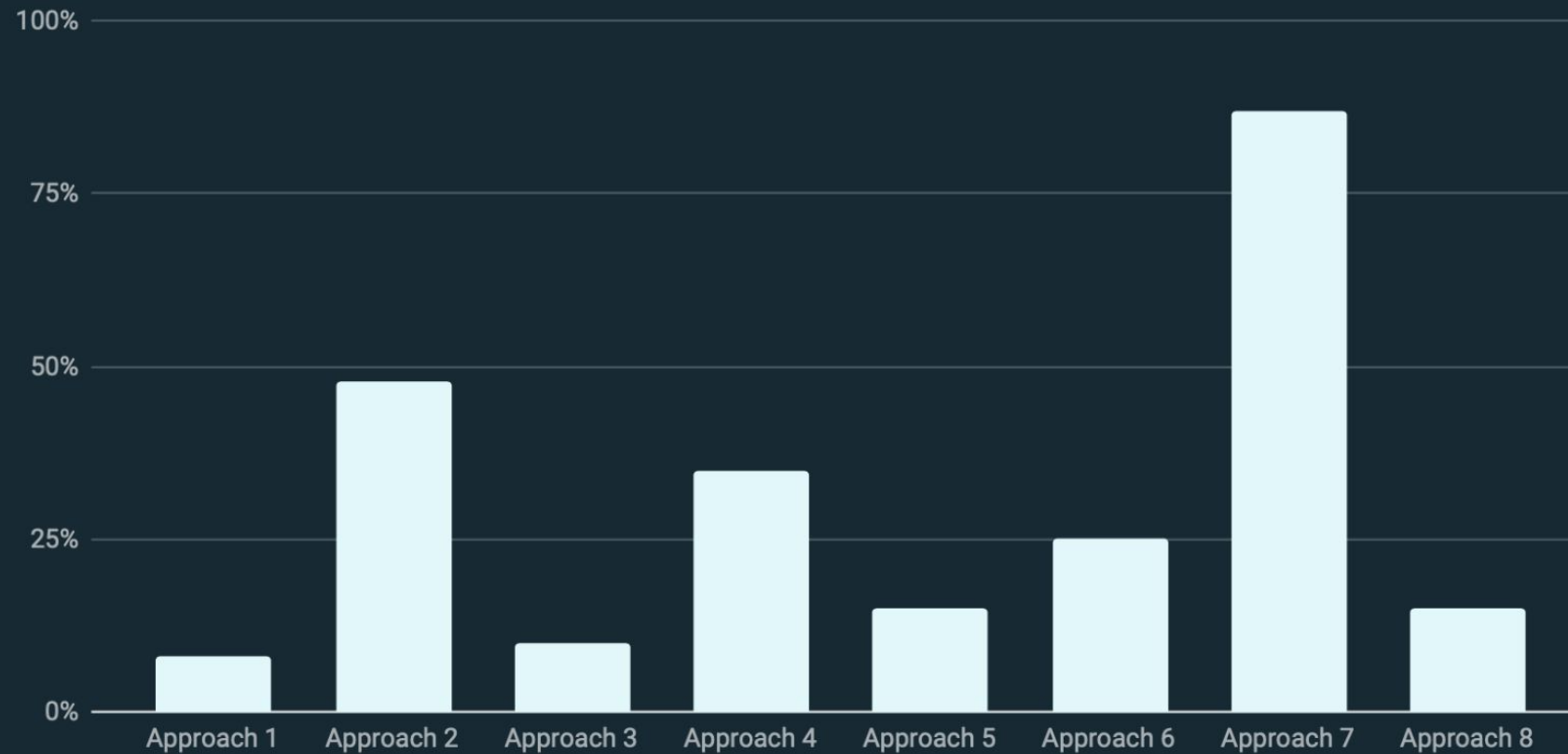
Deloitte.

Poor UX impacts adoption of new technology

"*Just as in the last survey, respondents said that user experience was the top obstacle for mass adoption of both AR and VR.*

2018 Augmented & Virtual Reality Survey, Perkins Coie

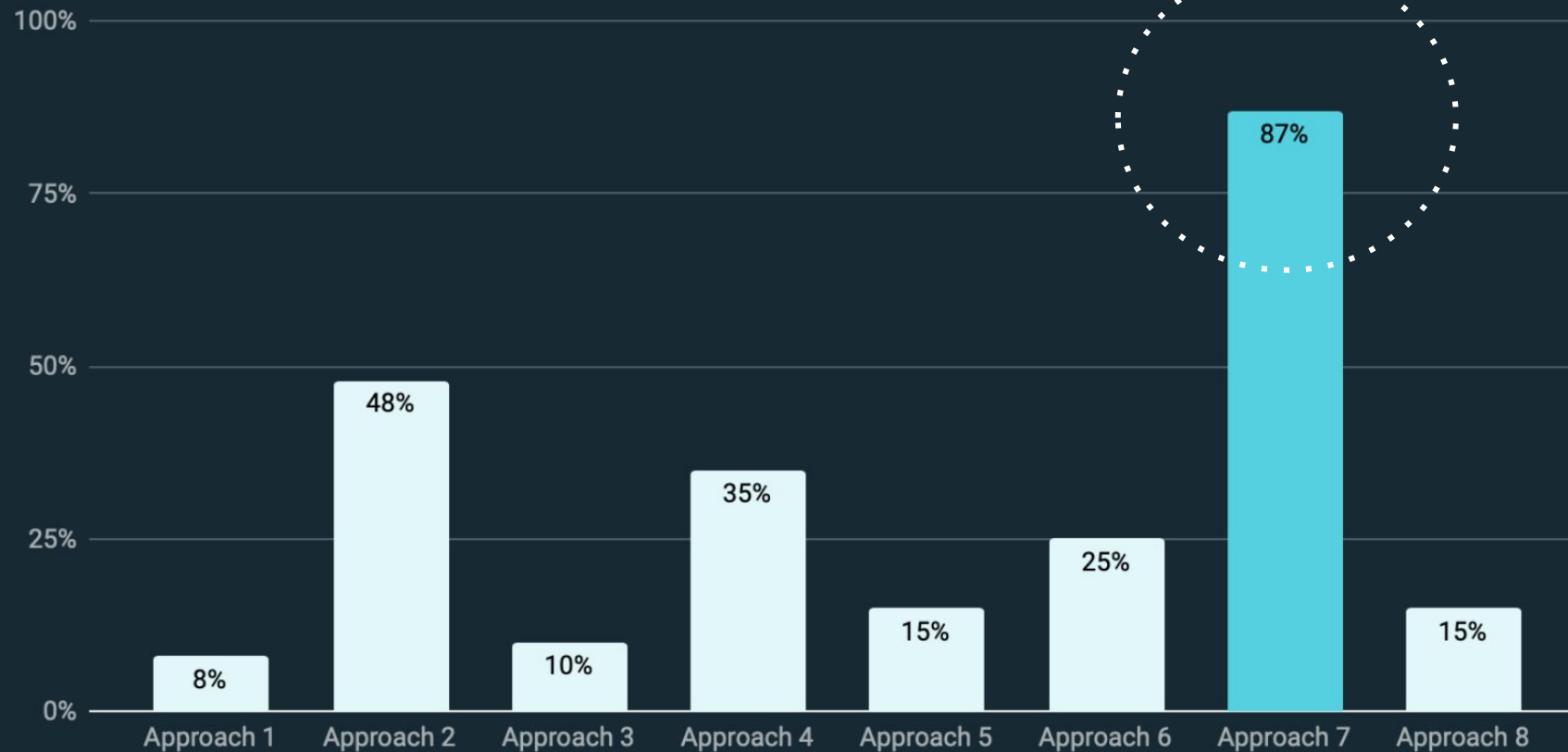# Find your ROI

KPIs for alternative design solutions

There are multitudes of variables and decisions when designing an AR solution

Find your ROI

KPIs for alternative design solutions

UCD is about finding the optimal design solution for a given set of objectives and KPIs

Let's go through the process

First, here's a use case

Meet Pipe Corp

Pipe Corp

Pipe Corp has industrial technicians working on **water and gas piping**.

Work across **multiple sites**, depending on operations and needs of the enterprise.

Need to **open and close valves** in time critical scenarios to maximise system output and minimise delays and downtime.

Human error is a common issue and can be costly or even dangerous, depending on which valves are incorrectly operated and which moment.

Let's consider this use case:
Closing a valve

Closing a valve

| Going to the correct area or site location | Identify the correct valve | Perform the correct valve operation (open or close) | Confirm the status change |
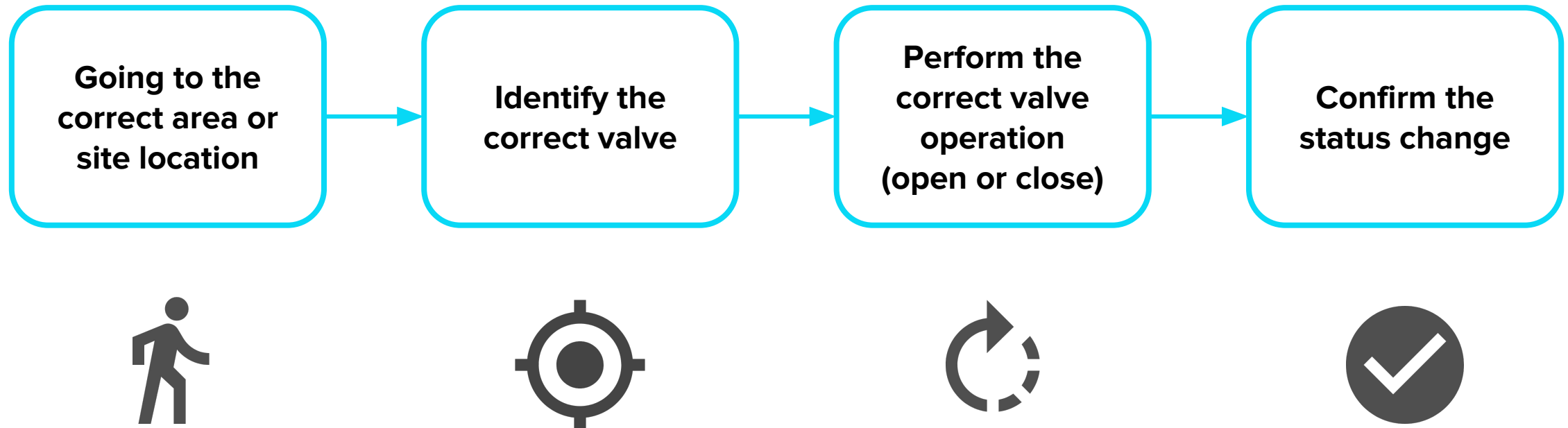
For this example, Pipe Corp want to develop an AR solution to help improve **efficiency** and reduce **human error**

THEIR TARGET KPI

Percentage of valve operations completed within **10** minutes

Currently **15%**

Let's go through the steps

STEP 1

Understand your users

That means understand their **workflows** and **tasks**

Task Analysis

Task analysis for: Close pressure valve

MAIN STEPS	1. Select next task	2. Go to location	3. Identify correct valve

DETAILED STEPS	1.1 View task list → 1.2 Identify next task → 1.3 Select next task → 1.4 Confirm & start task	2.1 Check valve location → 2.2 Walk to location → 2.3 Confirm location correct	3.1 Look at valve → 3.2 Find it's reference code → 3.3 Check code against task description → 3.4 Confirm code matches

SUB-TASKS

2.1.1 Retrieve map of site → 2.1.2 Find location on map → 2.1.3 Mark and confirm location

3.3.1 See they don't match → 3.3.2 Look for another valve

RISK ANALYSIS

Technicians may pick a sub-optimal task to do next. Incorrect task sequence can case delays

Technicians take on tasks that have incomplete dependencies. This can cause risks if they are not alerted

Technicians have been known to go to an incorrect location or stop to work on the wrong installation. High risk.

Working on the wrong valve in an uncontrolled and unplanned way can have disastrous consequences

Today the te it. En can system

USER PAIN-POINTS

Currently workers need to find their supervisor or return to office to report completed tasks and pick up new tasks

Technicians need to check site maps or request a guide to take them to the correct location. A lot of time is lost.

Many installations have numerous similar valves, and identifying the correct one can take some time

Technicians today need to write down or remember the ID of the valve or other references. They may need to carry paper or refer to a hand held device

Today, reference codes get worn down quickly and can be hard to read.

Once the correct valve is identified, it's easy to lose track or get mixed up. Technicians tie ribbons or otherwise mark them.

OPPORTUNITIES

Allocated and ready jobs can be deployed directly to task list on AR device

Indicate recommended or mandated next task based on supervisor ranking

Update list based on progress of dependant tasks. Warm or block worker if a dependency risk is detected

Potentially allow users to access a site map showing current location and target location

Users could receive a notification when they arrive at the correct location or they can scan a location marker to receive feedback if it's the desired location

Install new valve marker IDs so that AR camera can recognise a specific valve and provide task related feedback to technician

AR removes the need to carry paper references as all component IDs can be available at all times in the task instructions

Need to allow user to 'lock' a recognised valve so info panel and indicator does not switch to other valves or markers

If an incorrect valve is scanned, it would be useful to have a persistent overlay feedback to prevent the user scanning it again

LINK

KEY POINT

We need to understand the work from the worker's experience of doing it, not from corporate manuals of how it should be done.

Capture user needs and requirements

Capture and document the user needs and requirements to feed into the AR solution design process

Pain point

Technician accidentally opens a valve instead of closing as it **was already closed**

Metric

% of cases with incorrect valve operation

11%

User need

Technician needs to be able to easily see the status a valve: open or closed.

Linked to step **3.5**

User requirements logs

Ref	Task step	Sub step	User type	Requirement	Potential solution	Headline stats	Technician satisfaction	Target KPI	Known performance issues	Priority	Tech feasibility
1	1.0 Select next task	1.1	Technician	Needs to see list of available tasks that are allocated to them	Available task list feature from AR device menu	**20%** technician time wasted	**-2**	Improve productivity of technicians: ↑No. of tasks completed ↑No. valves opened within 10 minute targets	Today around 20% of a technician's time is spent returning to the office to pick up their next task.	❶	☑
2	1.0 Select next task	1.2 1.3	Technician	Needs to understand which task is top priroty to start next	Visually indicate top priority task selected by supervisor or system. Ability for supervisor to block other tasks until top one is completed.	**14 hrs**/ week delays	**4.2**	Reduce inefficiencies due to suboptimal task ordering: ↑No. of tasks completed ↑No. valves opened within 10 minute targets ↓Delay duration waiting for dependent tasks to be completed	We've estimates that there are 14 hours of delay a week caused by tasks being performed ina suboptimal order, causing delays and bottlenecks.	❷	☑
3	1.0 Select next task	1.1	Technician	Need to be able to access new tasks without needing to always return to office, particularly as next task might be near to where they already are	Available task list feature from AR device menu	**20%** technician time wasted	**-2**	Improve productivity of technicians: ↑No. of tasks completed ↑No. valves opened within 10 minute targets ↓Time spent in between tasks (travelling and time spent in office)	Today around 20% of a technician's time is spent returning to the office to pick up their next task.	❶	☑
4	1.0 Select next task	1.2	Supervisor	Needs to be able to set priorities and dependencies for tasks in the task list	Admin mode for task list where supervisor can set next task to be done		**3**	Reduce inefficiencies due to suboptimal task ordering: ↑No. of tasks completed ↑No. valves opened within 10 minute targets ↓Delay duration waiting for dependent tasks to be completed		③	☑
5	1.0 Select next task	1.2	Supervisor	Needs to be able to assign specific tasks to specific technicians	Admin can allocate a task to specific technician	**14 hrs**/ week delays	**3**	↑No. of tasks completed ↑No. valves opened within 10 minute targets	We could reduce the 14 hours a week of delays and inefficiencies by ensuring technicians in close proximity or with specific skills are allocated to particular jobs.	❷	☑

LINK

Pain-points = inefficiencies

Step	Step name	Painpoint	Severity	Solution	KPI	AR
1.1	View task list	Currently workers need to find their supervisor or return to office to report completed tasks and pick up new tasks	M	AR will remove the need to return to base each time	**20%** time saved	☑
2.1	Check valve location	Technicians need to check site maps or request a guide to take them to the correct location. A lot of time is lost.	M	AR should eventually replace maps, but not in V1. Technician still need to know where they are going, but system can provide feedback they are in correct location once they arrive.	**45 mins** a day saved	☑
3.1	Look at valve	Many installations have numerous similar valves, and identifying the correct one can take some time	H	AR should allow technician to quickly differentiate correct and incorrect valve by looking at the valve code	More valves opened within **target time** **97 hrs** a week of delays reduced **21** Type 8 critical incidents avoided each month	☑
3.3	Check code against task instruction	Technicians today need to write down or remember the ID of the valve or other references. They may need to carry paper or refer to a hand held device	M	AR overlays will solve this issue as the ID of the valve will be displayed and automatically checked against the task instructions	**21** Type 8 critical incidents avoided each month	☑
3.2	Find valve reference code	Today, reference codes get worn down quickly and can be hard to read.	H	AR solution will mean these codes are obsolete. However we need to ensure the valve markets do not get worn down or that the system can recognise a valve accurately without the need for markers	Reduce valve identification time to below **17 mins**	☑
3.2	Find valve reference code	Once the correct valve is identified, it's easy to lose track or get mixed up. Technicians tie ribbons or otherwise mark them.	H	This can potentially still happen, however it's suggested that once the correct valve is identified the AR overlay is persistent, guiding the user back to it if they need to turn away briefly	Reduce valve identification time to below **17 mins**	☑

Include risk assessment

Step	Step name	Risk	Risk level	Solution	Fixed by AR	Introduced by AR
1.2	Identify next task	Technicians may pick a sub-optimal task to do next. Incorrect task sequence can case delays	H	Admin feature for supervisor allows prioritisation of critical tasks. Technicians see priority tasks and can even be locked into selecting them.		
1.3	Select next task	Technicians take on tasks that have incomplete dependencies. This can cause risks if they are not alerted	M	Supervisor can send alerts to all technicians working on tasks with incomplete dependencies. Technicians would see a message that they should hold off and not complete their task until further notification. This could be baked into admin features, where the supervisor blocks tasks from progressing if there is a danger.		
2.1	Walk to location	Technicians have been known to go to an incorrect location or stop to work on the wrong installation. High risk.	H	Require technicians to scan and confirm location marker before they can continue with the task. The next task step is not displayed until location is verified as correct. The system checks against task details (which must specify the location) and provides the AR user with feedback.	☑	
3.1 3.2	Look for valve reference code	AR could create a risk by reducing user's situational awareness of hazards, obscuring their vision or distracting them.	unknown	UI design needs to minimise obstructed view. Safety alarms need to appear in the AR screen if triggered Include safety warnings for tasks with safety risks Inform user when approaching hazardous zones		☑
3.3	Check code against task description	Working on the wrong valve in an uncontrolled and unplanned way can have disastrous consequences	H	Technician needs to scan valve marker and confirm it's the correct valve before they can continue. The supervisor needs to ensure the correct valve information is entered into the task details.	☑	
3.6	Confirm status OPEN	Today, this is assessed by the technician inspecting it. Errors are common and can cause damage to the system	M	The AR solution will display the latest known status of the valve based on sensor readings	☑	
3.6	Confirm status OPEN	We currently experience an up to 30 sec delay on status change updates so there is a risk the status shown is expired	M	Users should be prompted to wait 30 seconds to check status is valid		☑
4.1.2	Find valve code details page	This step is very involving and technicians lose situational awareness and are at risk to unexpected events	M	This risk is solved by the AR as technicians no longer need to spend time looking through technical manuals on site	☑	
4.3	Perform action to CLOSE	Performing the opposite or incorrect action can in certain circumstances cause a critical risk or system damage	H	The AR will overlay the correct information, reducing user error and therefore reducing the risks associated with this step	☑	

STEP 3

Design based on data and insights

Create a workflow design based on the data you've gathered during your research and that supports your KPIs

Design for performance

Requirement:
Needs to be able to find the correct valve quickly.

CLOSE operation needs to be completed within **10 min** window.
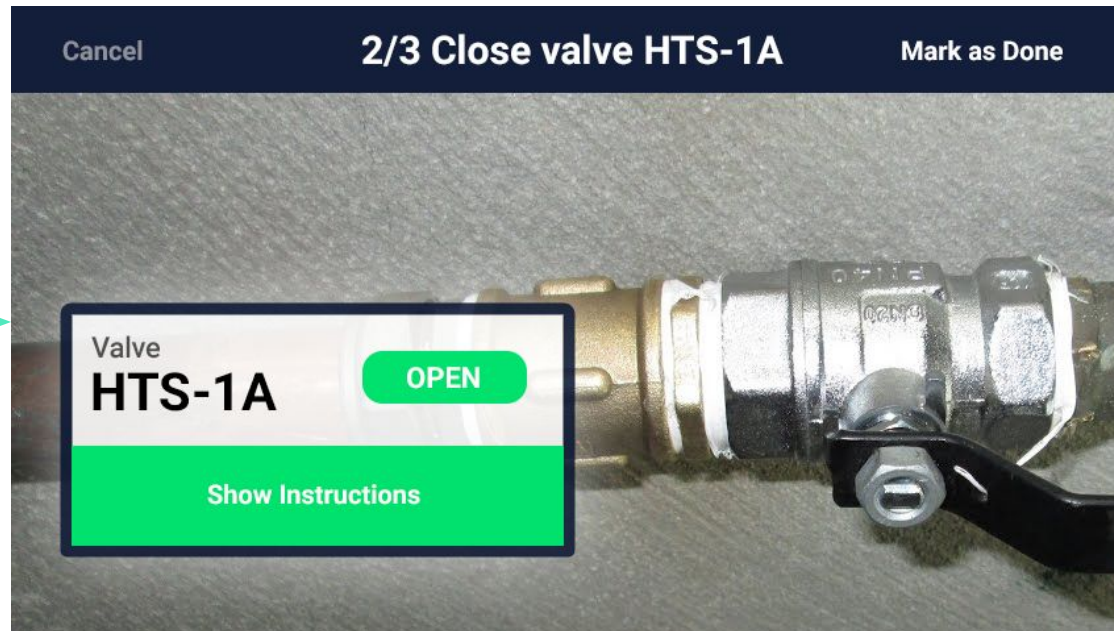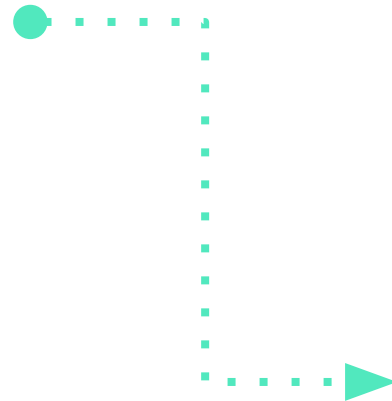
Current Satisfaction:

-4.9 /5

Current Business KPIs:

17mins

Mean time to ID correct valve

Overlay all feedback and instructions
Providing all task related information and valve operation instructions with the AR solution, **should eliminate reliance of manuals** and significantly reduce time to identify and confirm the correct valve.

Design for performance

Requirement (Correct valve):
Technician needs to know if a specific valve is the correct one for the task or not.

Technician needs to be 100% certain which is the correct one.

Current Satisfaction:

-4.9 /5

Current Business KPIs:

21 **Type 8** critical incidents a month

97 hrs **/month** of delays
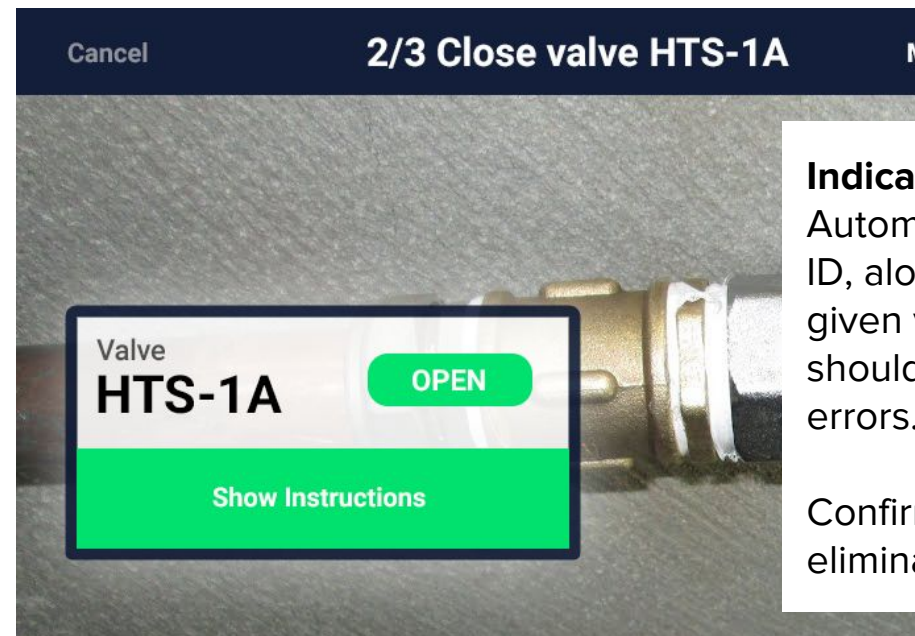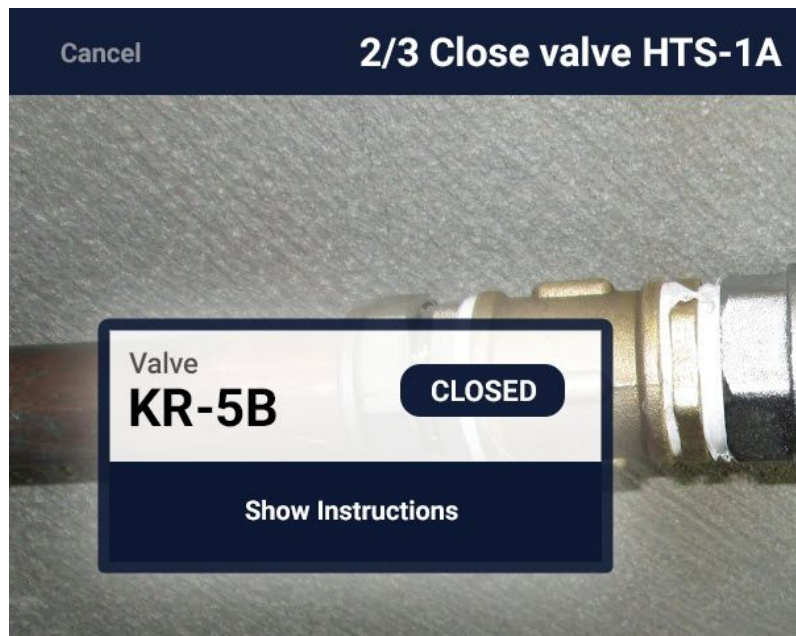
Indicate correct valve after scanning
Automatic detection and display of valve ID, along with explicit feedback whether a given valve matches task instruction should eliminate the majority of Type 8 errors.

Confirming correct location should further eliminate errors and reduce wasted time.

Design for performance

Target KPIs
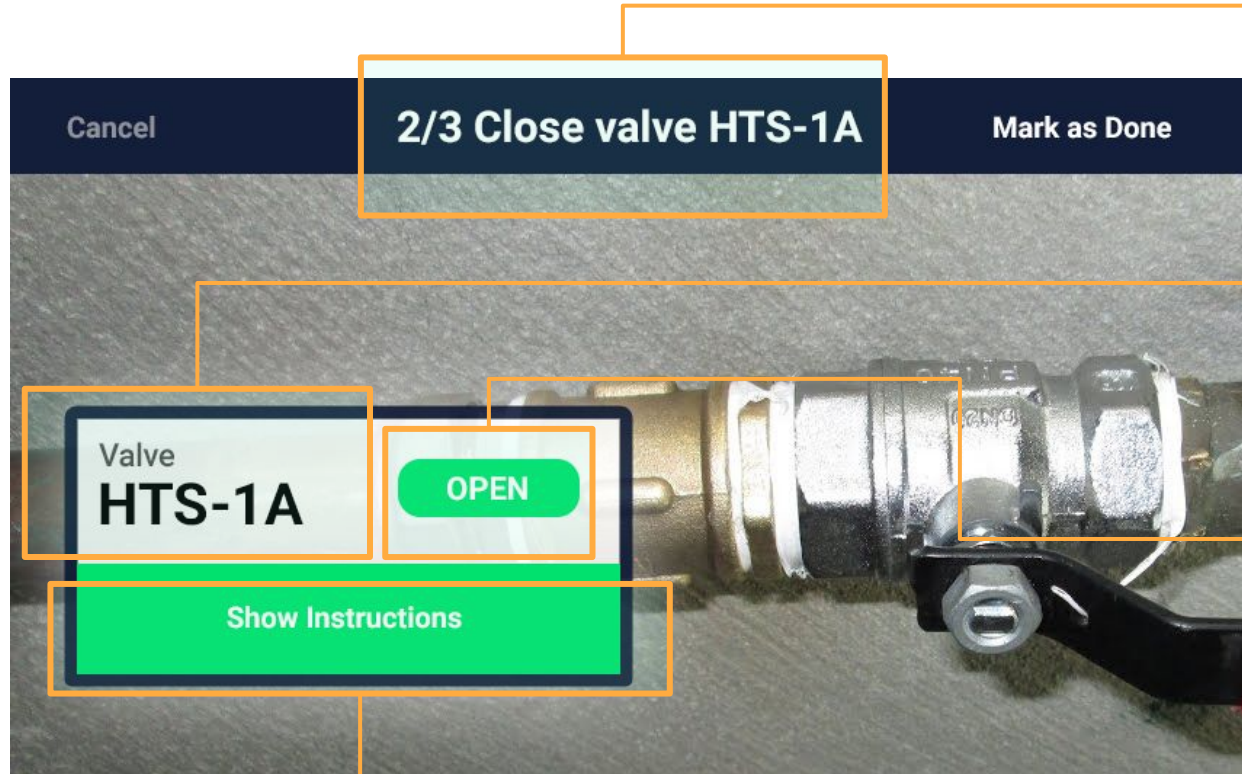
Key task info always visible at a glance.

16 mins mean time to ID correct valve

Valve ID shown on scan. Users will not trust system to auto match, so we need to show it.

21 monthly type 8 critical errors

Current status of valve always shown to avoid errors

11% incidence of incorrect operation

Access instructions for closing valve. Note this green bar serves as a positive confirmation that it's the target valve.

16 mins mean time to ID correct valve

Storyboard

% valve operations completed within

10 mins

Currently only **15%**

1.0 Select next task

User can scan any valve to view contextual information, even if no active task

Valve info box reveals valve ID and latest status and sensor information about the valve as an overlay.

User says [VIEW TASKS] to open the task menu
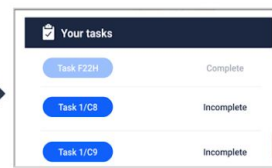
Available tasks allocated to user are shown along with status
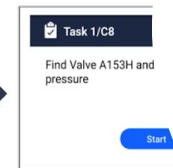
User selects a task and instructions. They say [S start task mode and let the know the task is underway

Audio feedback when valve scanned and recognised

Audio feedback voice command recognised and actioned. Negative audio feedback if command not recognised

Audio feedback task selected or any voice command received and actioned

3.0 Identify correct valve

4.0 CLOSE valve

User scans valves at location to find the correct one.

In task mode the info box is simplified to just what is needed. The user can access the instructions at any point.

The overlay will show the user how to perform the CLOSE operation on that specific valve
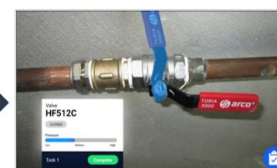
An animation shows how the valve needs to be turned,

Upon completion the user can run a status check to see if the valve status is CLOSED

Audio feedback when valve scanned and recognised

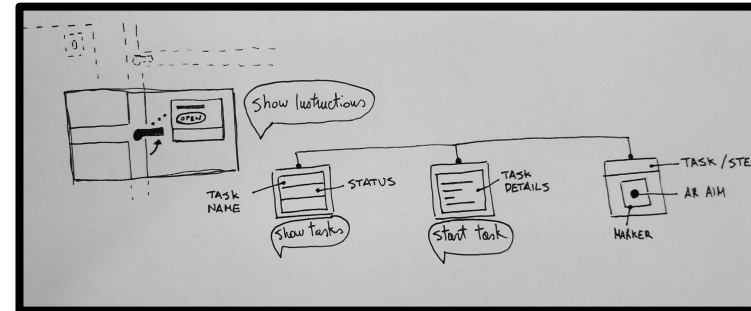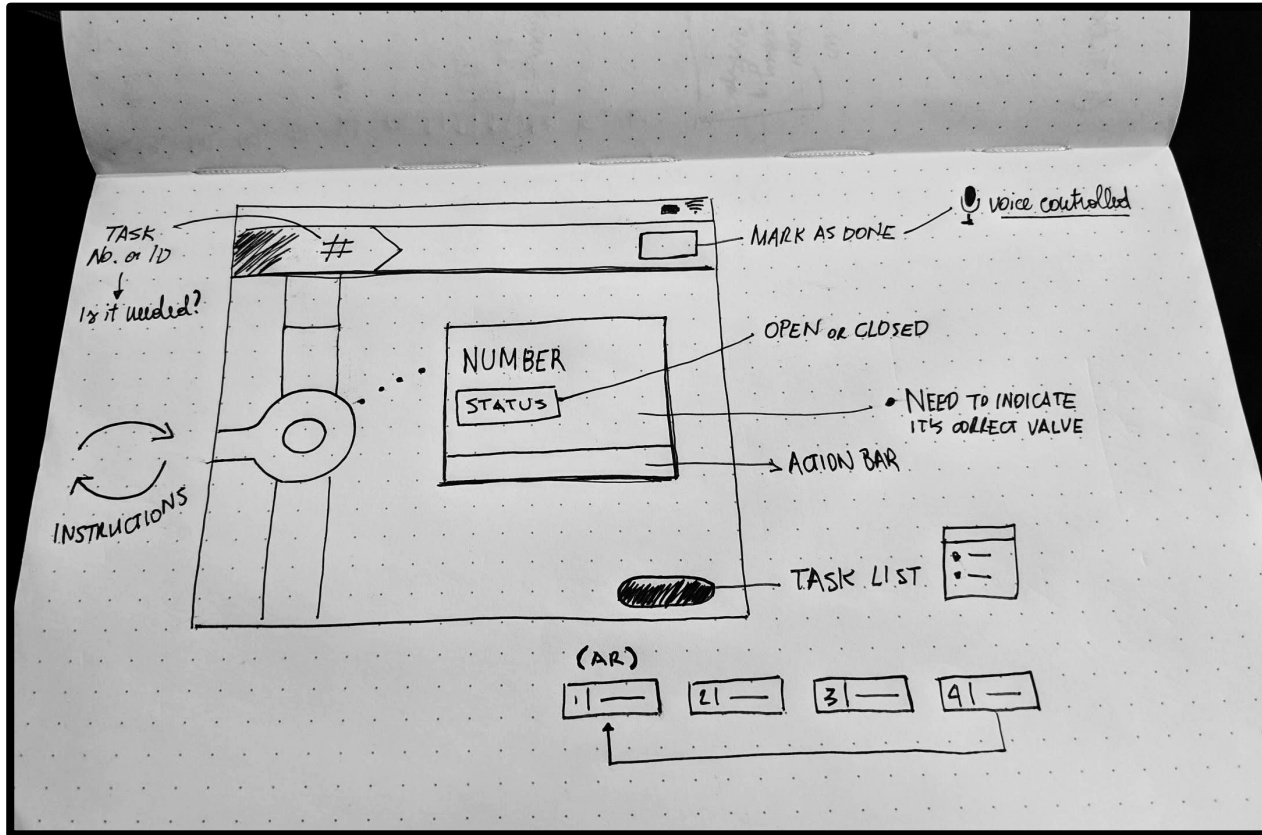Positive audio feedback when status updates and task is completed.

Prototype early and test with users

Create a prototype that can be changed and iterated at a low cost. Then test it with users as many times as you need.
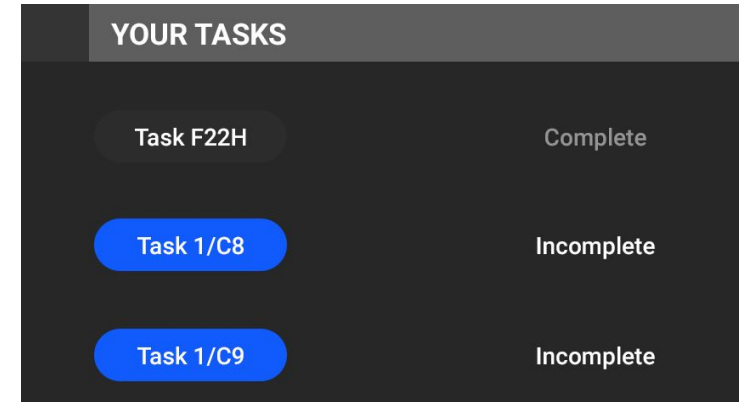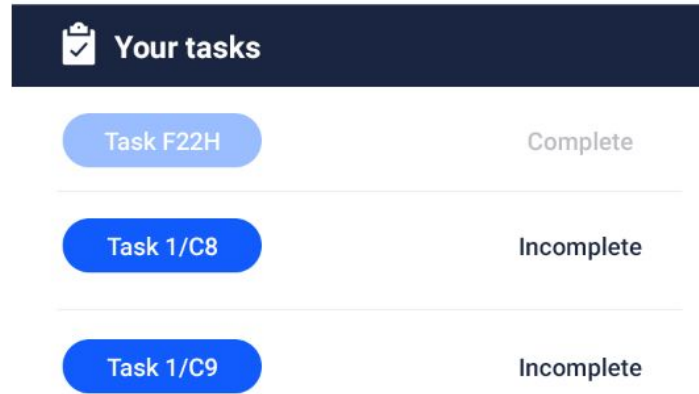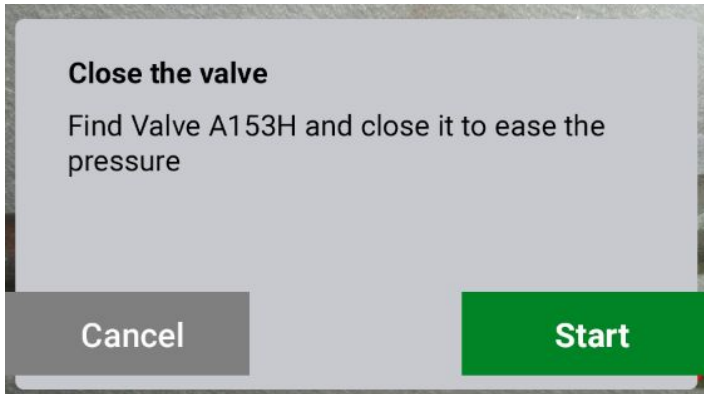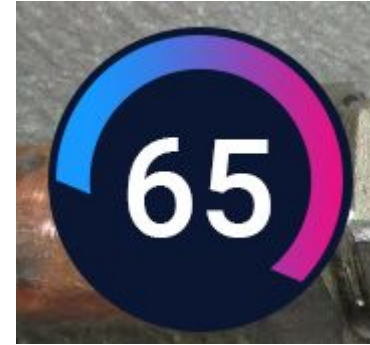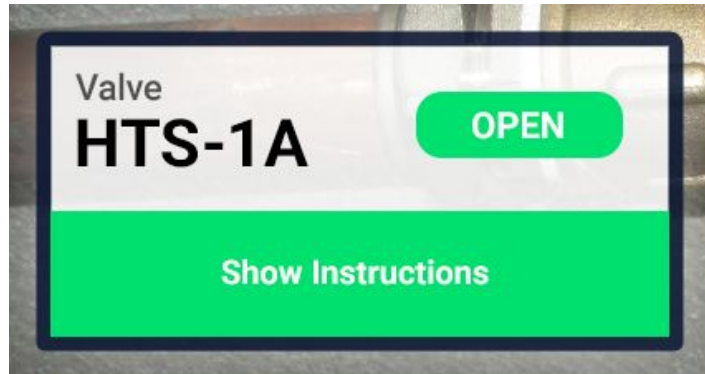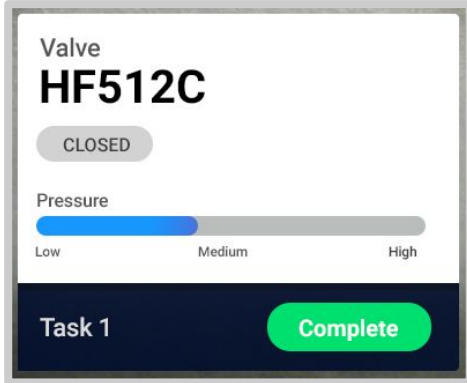
Sketching
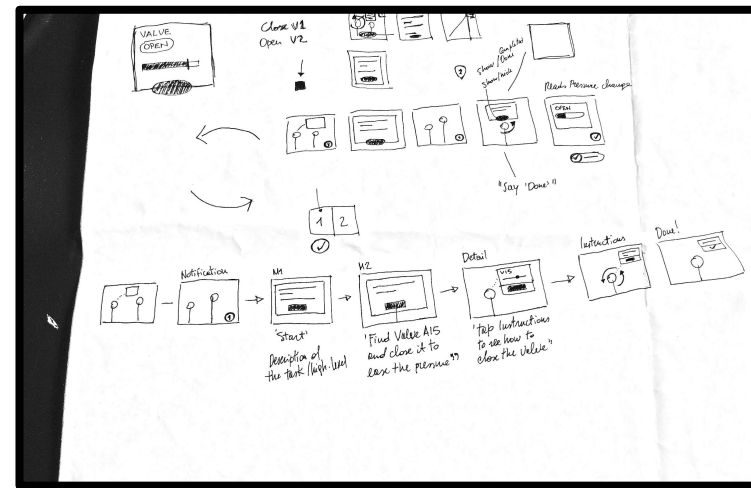
Quick and low effort. Hard to get a sense of space and proportions

UI mock-ups

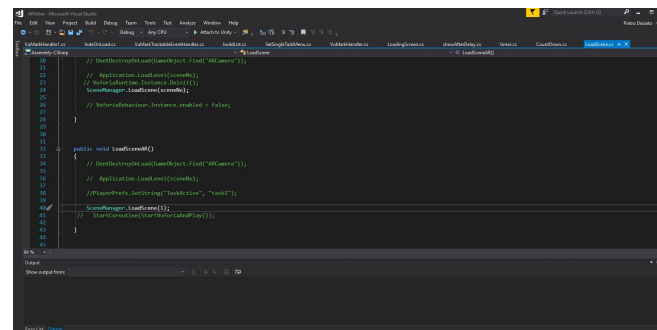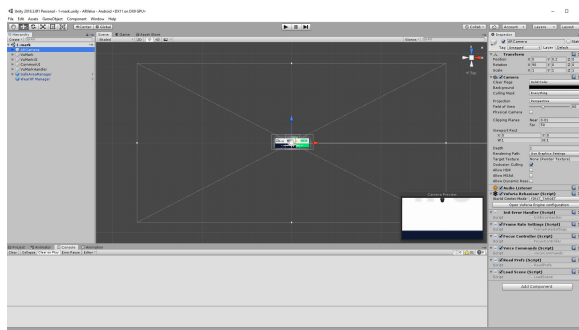Still very flexible and low cost. Images can usually be uploaded onto the device

Interactive prototypes

High effort

Can be code-based
(Unity/Unreal/Vuforia/WebXR,
Procedure platforms)

Quality and accuracy of the
user feedback

KEY POINT

Only include enough detail in the prototype to evaluate if the design solves the problem

Usability evaluation

We want to know if users can actually do the specific things that are critical to the applications success.

ISO definition of usability

The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use.

Create prototype and test script

Design goal	Prototype scenario	Desired behaviour in testing	Metrics recorded	Ultimate objective
⬇ Operate wrong valve error ⬇ Time to ID correct valve	Scenario with multiple valves, one is correct. Info in UI to differentiate.	User ignores wrong valves. Only proceeds on correct one.	Error rate Time to find correct valve	⬇**17** mins ⬇**21** errors/month ⬇**97** hrs delay ⬆**-4.4** sat score
⬇ Wrong operation (valve already closed)	Scenario where correct valve status is CLOSED	User stops and does not operate valve	Error rate	⬇**11%** incidence
⬇ Wrong operation (turn wrong way)	Scenario with valve that can turn 2 ways (e.g. half open) Show overlay guide.	User turns valve the correct way	Error rate	⬇**11%** incidence

Let's quickly do a LIVE test

Volunteer user: "Please show me how you would complete the next task in your task list."

Everyone else: Record your observations!

STEP 4

Record your findings

Findings log

PIPE CORP: Close valve (round 1)

Product Team analysis

Severity analysis

Ref	Category	Area	Description	Comments and solutions	Severity	Will it be fixed	combined	Severity persistence	impact	frequency	User Number 1	2	3	4	5	6	7	8
CV1	2.0 Go to location	Missing feature	Technicians indicated they really need the location checking feature included asap. They report frequent navigating to the wrong area and at times may even try to operate the worng valve. The issue is that technicians work across a number of sites, some of which are quite lareg. They do not know the area and valve names off by heart so they need to figure out where they are going. This slows down their task efficiency, particularly if they go to the wrong location. Another issue is that many of the installations, pipes and valves look very similar, and there is also a degree of staff turnover.	There needs to be a way for technicians to check if the location they have gone to is correct or not. There needs to be a way for supervisors to add specific location codes to the task. Ideally there should be some guide og map or wayfinding system to guide the user to take the most efficient and safe route.	Unmet need		7.7	3	3	1.7	1	1	1	1	1			
CV2	3.0 Identify correct valve	3.3.1 Valves don't match	Technicians often end up re-scanning the same valves in sceanrios where there are many valves. It's hard to keep count which ones are checked and which are not. Some tie coloured laces onto valves as a workaround. This can make the task less efficient and frustrates the technician. It also increases the risk that they operate the incorrect valve.	There needs to be a persistent overlay marker to indicate incorrect valves that have been scanned	HIGH		7.3	3	3	1.3	1	1	1	1	1			
CV3	3.0 Identify correct valve	3.4 Confirm code matches	Once the correct valve has been identified the technicians may look away or move around and lose track of the correct valve. They sometimes tie laces on the valve as a reminder. They need to re-scan the valves again, losing time.	Technicians want the correct valve to be locked and persistent. When the valve matches the task it should receive 'locked' status, until the user switches off task mode.	MEDIUM		4.8	2	2	0.8			1				1	
CV4	3.0 Identify correct valve	3.5 Check current status	Some technicians mistake the status indicator for a voice command prompt and say 'OPEN'. Others are confused as they expect the command to be CLOSE. It's not clear if it's the status or the available action.	Users will likely learn the correct meaning after a few attempts, however to reduce training time a different visual design should be applied that is less button like: - Don't use a button shape - Don't use a fill if voice command widgets have a fill colour - Add the label 'Status' next to it - Consider a switch that showns OPEN and CLOSED with closed greyed out or similar.	MEDIUM		5.0	1	1	3.0	1	1	1	1	1	1	1	
CV5	3.0 Identify correct valve	3.1 Look at a valve	Technicians do not need to immediately see pressure information. The key task is to easily identify the correct valve. Showing other information just clutters the FOV.	When in task mode, and whilst searching for the correct valve, only show the valve reference and it's status and any other visual cues to emphasise if it matches the task or not. Provide a link to view more information about the valve and any sensors data. The pressure feedback would be more useful when the valve is being operated and as feedback that the status has changed.	MEDIUM		5.7	3	1	1.7	1	1	1	1	1			
CV6	3.0 Identify correct valve	3.1 Look at a valve	Visually indicate when the camera has started to scan a code. Currently it's not clear if the camera has recognised anything in the FOV until the info box pops up. Technicians become impatient if nothing happens and move their heads to look at other valves.	A visual cursor and a timer showing the scan attemp can help to inform the user to keep still until the code scan is complete. This feedback helps to user understand what the system is doing.	HIGH		7.3	3	3	1.3	1		1			1	1	
CV7	3.0 Identify correct valve	3.3 Check code against task description	The font needs to be larger as the information is difficult to read on the small screen of the Realwear device	Increase the font size	MEDIUM		5.3	3	2	0.3		1						
CV8	3.0 Identify correct valve	3.3 Check code against task description	Currently the information appears encapsulated in one rectangular box. Technicians would prefer the box to be removed and just the key info to be available as an overla, but without the 'chrome'. This is to reduce the obstruction in the FOV.	Consider this appraoch in V2	MEDIUM		4.5	2	1	1.5	1	1			1		1	
CV9	3.0 Identify correct valve	3.3 Check code against task description	Technicians prefer to see the ID code explicitly even if the AR app can check it against the task instructions. They would not trust a fully automated system without first seeing its accuracy. This is also important as occasionally the supervisors specifiy the wrong valve in the instructions.	Retain the valve ID code so technicians can check and verify it. The UI should still indicate visually if the system believes it does or doesn't match the task as this will speed up decision making and reduce potential errors.	HIGH		7.0	3	2	2.0	1	1		1	1	1		

Findings log

PIPE CORP: Close valve (round 1)

Findings log					
Ref	**Category**	**Area**	**Description**	**Comments and solutions**	**Severity**
CV1	2.0 Go to location	Missing feature	Technicians indicated they really need the location checking feature included asap. They report frequent navigating to the wrong area and at times may even try to operate the worng valve. The issue is that technicians work across a number of sites, some of which are quite lareg. They do not know the area and valve names off by heart so they need to figure out where they are going. This slows down their task efficiency, particularly if they go to the wrong location. Another issue is that many of the installations, pipes and valves look very similar, and there is also a degree of staff turnover.	There needs to be a way for technicians to check if the location they have gone to is correct or not. There needs to be a way for supervisors to add specific location codes to the task. Ideally there should be some guide og map or wayfinding system to guide the user to take the most efficient and safe route.	**Unmet need**
CV2	3.0 Identify correct valve	3.3.1 Valves don't match	Technicians often end up re-scanning the same valves in sceanrios where there are many valves. It's hard to keep count which ones are checked and which are not. Some tie coloured laces onto valves as a workaround. This can make the task less efficient and frustrates the technician. It also increases the risk that they operate the incorrect valve.	There needs to be a persistent overlay marker to indicate incorrect valves that have been scanned	**HIGH**
CV3	3.0 Identify correct valve	3.4 Confirm code matches	Once the correct valve has been identified the technicians may look away or move around and lose track of the correct valve. They sometimes tie laces on the valve as a reminder. They need to re-scan the valves again, losing time.	Technicians want the correct valve to be locked and persistent. When the valve matches the task it should receive 'locked' status, until the user switches off task mode.	**MEDIUM**
CV4	3.0 Identify correct valve	3.5 Check current status	Some technicians mistake the status indicator for a voice command prompt and say 'OPEN'. Others are confused as they expect the command to be CLOSE. It's not clear if it's the status or the available action.	Users will likely learn the correct meaning after a few attempts, however to reduce training time a different visual design should be applied that is less button like: - Don't use a button shape - Don't use a fill if voice command widgets have a fill colour - Add the label 'Status' next to it - Consider a switch that showns OPEN and CLOSED with closed greyed out or similar.	**MEDIUM**

LINK

Findings log

Severity analysis

Severity	combined	persistence	impact	frequency	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Unmet need	7.7	3	3	1.7	1	1	1	1	1						1	1	1	1	1			
HIGH	7.3	3	3	1.3	1	1		1	1						1	1		1	1			
MEDIUM	4.8	2	2	0.8			1					1		1			1					1
MEDIUM	5.0	1	1	3.0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MEDIUM	5.7	3	1	1.7	1	1	1	1	1						1	1	1	1	1			
HIGH	7.3	3	3	1.3	1			1			1	1			1			1			1	1

Product Team analysis

Will it be fixed	what will be done	when will it be done	who's going to do it

Key issues selected for V2

1. Technicians need support to confirm **correct location** to avoid wasted time

2. Need to indicate **when camera has commenced scanning** as users turn away if no visible feedback

3. Once correct valve identified, users often **turn the head away from the target** and lose the information

4. Status feedback isn't clear. It needs to be further differentiated from the appearance of voice command prompts.

5. After closing, need to explicitly prompt users to wait **30 seconds** for status change

STEP 4

Iterate the design

Examples of design changes

Problem

Users often turn the head away from the target and lose the information
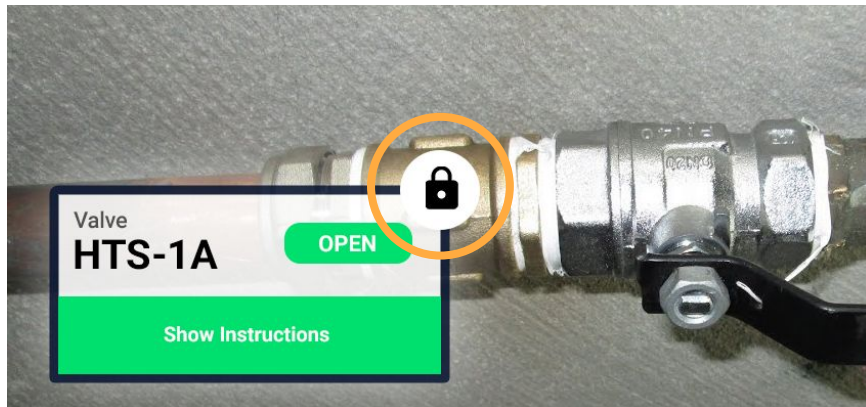
Design solution

When in task mode, the card is locked so that it's always visible to the user

Examples of design changes
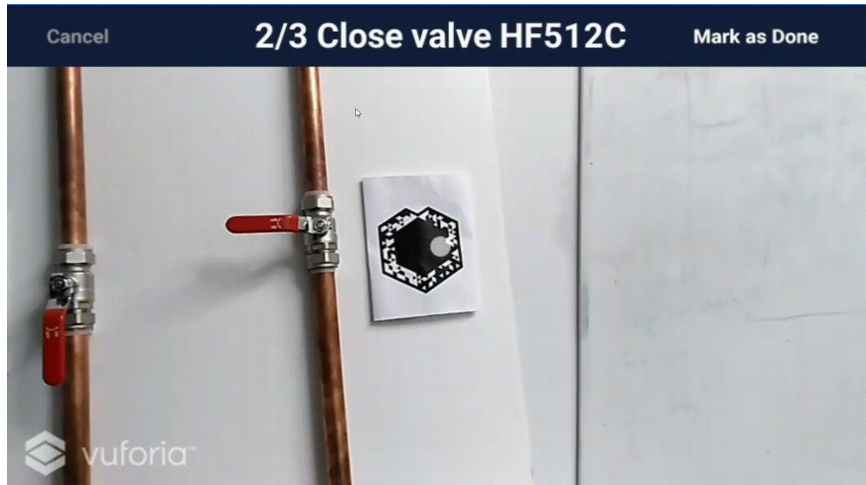
Problem

Need to explicitly prompt users to wait up to 30 seconds for status change
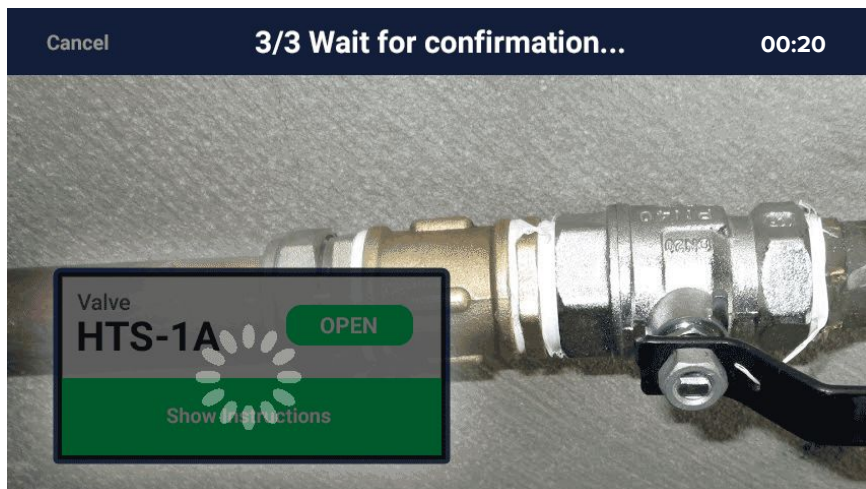
Design solution

Added a timer to help user track time and take action is there's no feedback after 30 seconds.

Thank you

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STEP 4

Measure post-launch

Continue to measure your KPIs during a pilot and post launch

Output

Legend: Current, AR

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10
Current	20	20	20	20	20	20	21	20	20	20
AR	10	13	11	15	17	16	20	19		

Quality

Error 1	Error 2	QA
2.1% ↑ (4.3%)	**5.2%** ↑ (6.1%)	**95%** ↑ (91%)

Desirability

Adoption	Satisfaction	FLOW rate
90% ↓	**87%** ↑	**62%** ↑
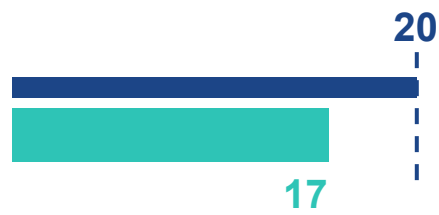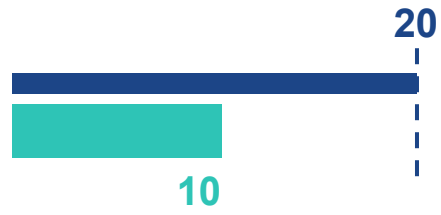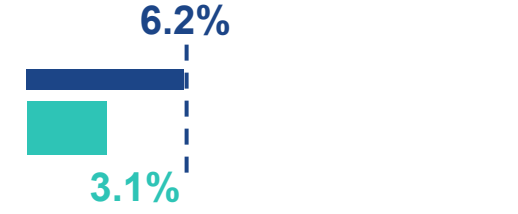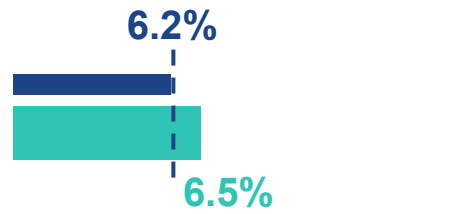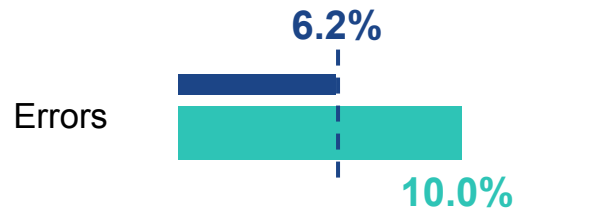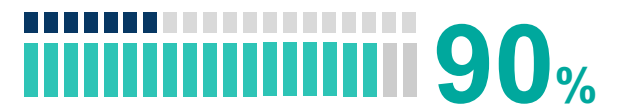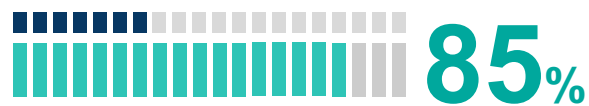
Medical Devices Directive 93/42/EC (MDD)

Three EU directives stress that medical devices meet certain essential human factors and safety requirements....

"Reducing, as far as possible, the risk of use error due to the ergonomic features of the device and the environment* in which the device is intended to be used."

* this includes hardware, software, labelling and other user interface features (including video, mobile apps, etc)