

User-Centered Robot Design



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Essential Design

www.essentialdesign.com



Understanding technologies, markets, and users

Addressing physical, digital, and service design requirements

Balancing benefits & costs, fit & timing, MVPs and platforms

Communicating in awareness, purchase/trial, and long-term use scenarios

Defining products, experiences, and brands people want

Engineering, prototyping, regulatory testing, packaging, IFUs, etc.

Delivering value (user, channel, shareholder, data, brand, etc.)

Good design considers all these factors in the development of the right solution/experience.

A mindset and set of methods/practices

1901 Abductive Reasoning: what-could-be-true logic - Charles Peirce

1953 Applied Imagination: “brainstorming”, creative thinking processes – Alex Osborn

1959 Creative Engineering: “design thinking” coined - John E. Arnold

1992 Design Thinking popularized: Rolfe Faste & David Kelley

It is:

- User-centered

- “What if...? What might we...?” oriented

- Option generating

- Prototype and experiential understanding driven

Ways to imagine, quickly prototype, and understand/experience new things

Design Value



Level 1: Design as aesthetics

form follows function - materials, color, finishes

Level 2: Design as usability

user's define form - safety, efficiency, physical and cognitive ability appropriate

Level 3: Design as process

design thinking driven - innovation practices, cross-functional integration

Level 4: Design as vision

imagining and embodying new ideas, positioning, storytelling, gaining support

Level 5: Design as strategy

user-centered research, alternate future visions/analyses, informing growth and productivity strategies, building brand value

Level 1: Design as aesthetics



Level 1: Design as aesthetics



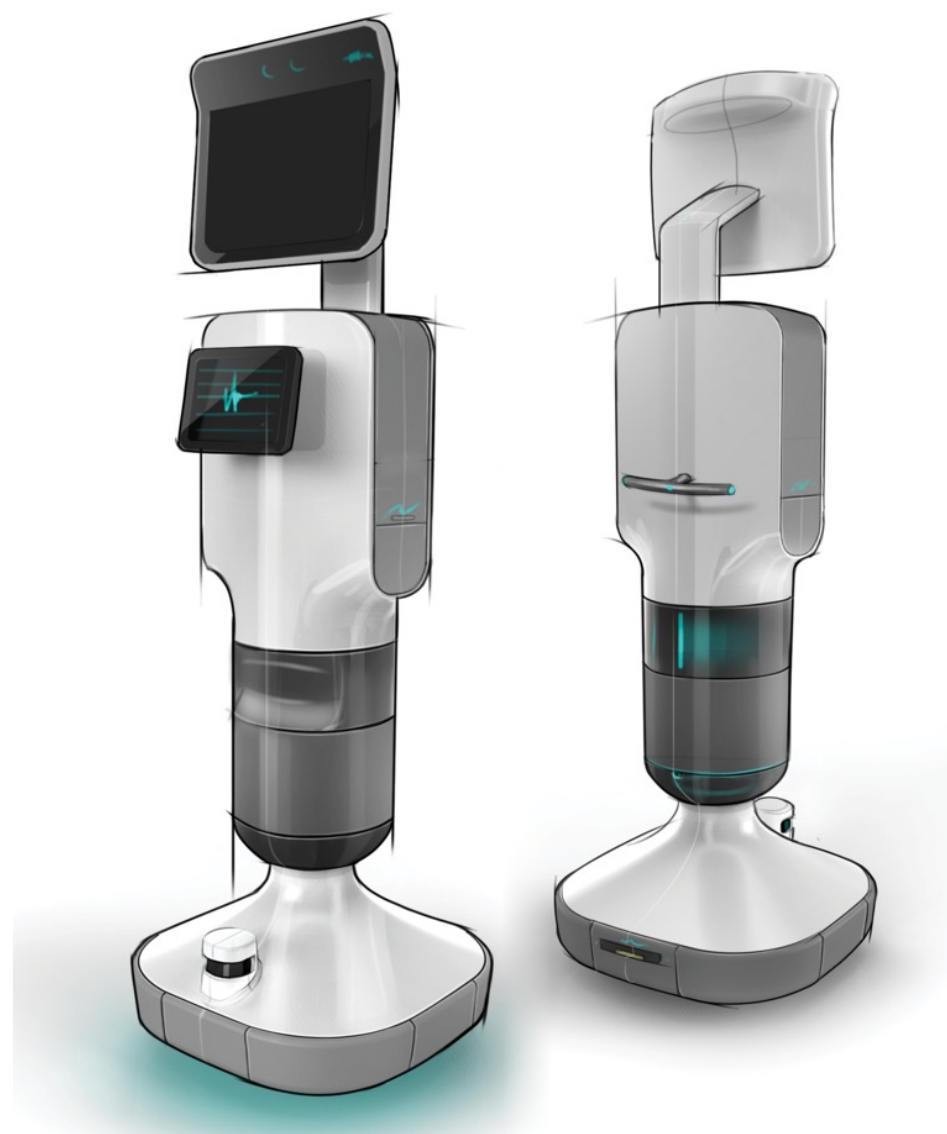
Level 1: Design as aesthetics



B.



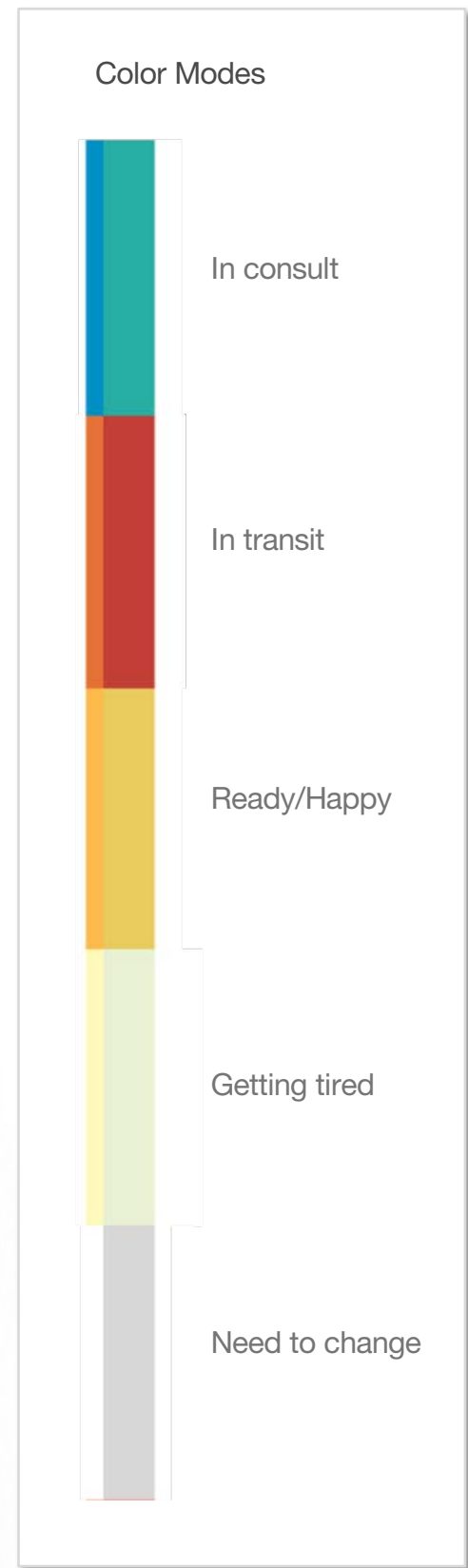
C.



E.



Level 1: Design as aesthetics



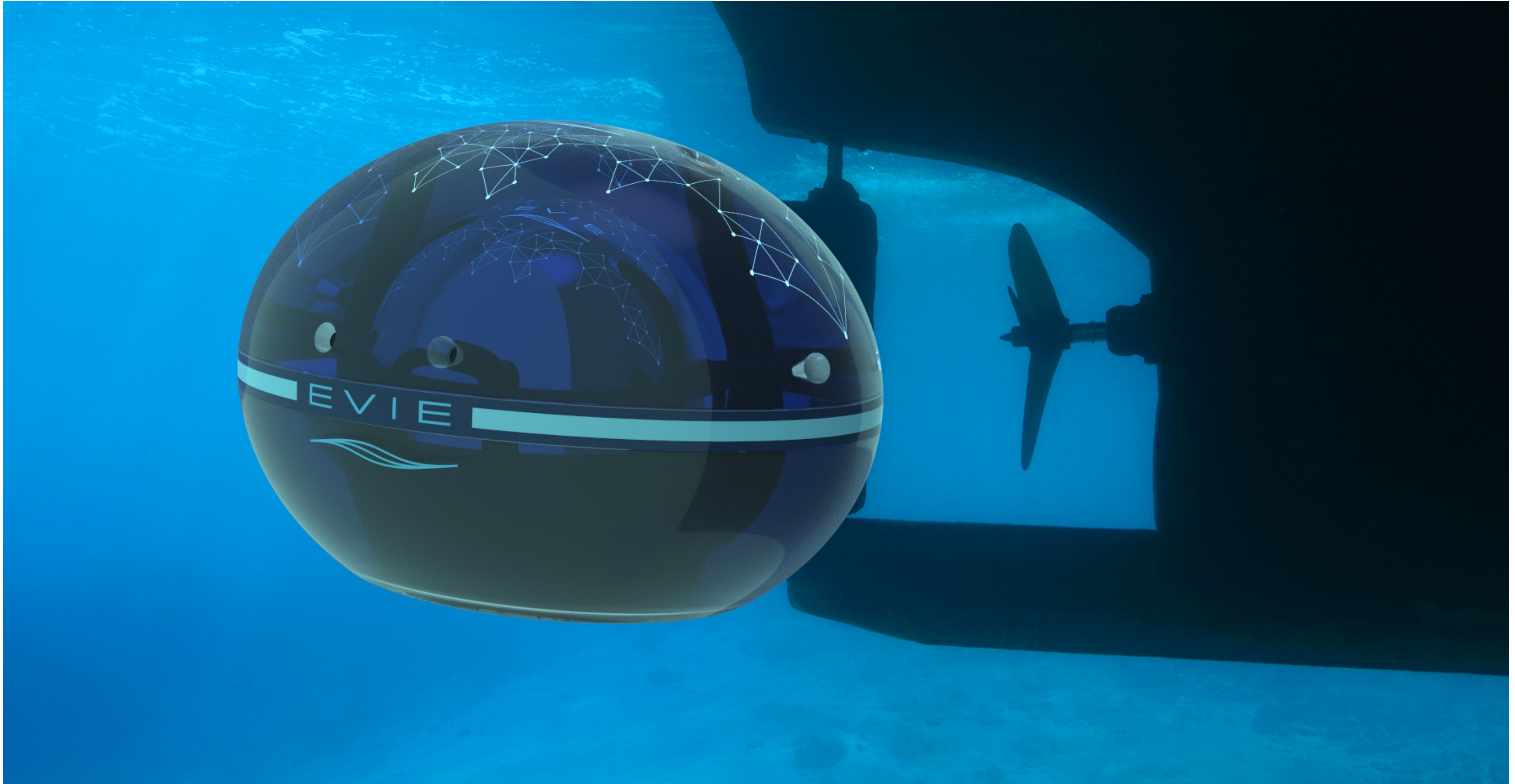
Level 1: Design as aesthetics



Level 1: Design as aesthetics



Level 1: Design as aesthetics



Level 2: Design as usability



Level 2: Design as usability



Level 2: Design as usability



01:15



Level 2: Design as usability



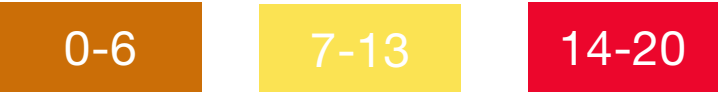
Rotating tanks create install issues

prepare to clean

error/concept	existing	A NO-ACCESS BLADDER	B OPAQUE BLADDER	C ACCESS BLADDER	D TWO TANK
difficulty seeking release [exploration, assists]	11	15	11	8	2
difficulty with release [prototype, id]	11	15	11	8	2
difficulty removing water feature	9	9	2	4	9
difficulty filling clean water [finding, id, fill dirty]	14	1	0	0	7
difficulty gauging water level [overfill, verbal]	13	6	3	1	0
difficulty closing clean port	0	0	0	0	4
difficulty aligning/reinstalling water feature	15	7	0	8	10
difficulty seeking release [exploration, assists]	0	0	0	0	0
difficulty with release [prototype, affordance]	2	0	0	0	0
difficulty removing water feature	7	2	0	0	0
difficulty emptying dirty [clean port, latches]	2	5	0	15	7
difficulty emptying dirty water causing a mess	3	0	9	14	9
difficulty closing dirty port [flap]	0	2	0	4	8
difficulty closing dirty port [latches]	0	0	6	6	0
difficulty aligning tank/reinstalling water feature	4	5	2	3	8

prepare to stow

The color represents the number of counted errors



Level 2: Design as usability

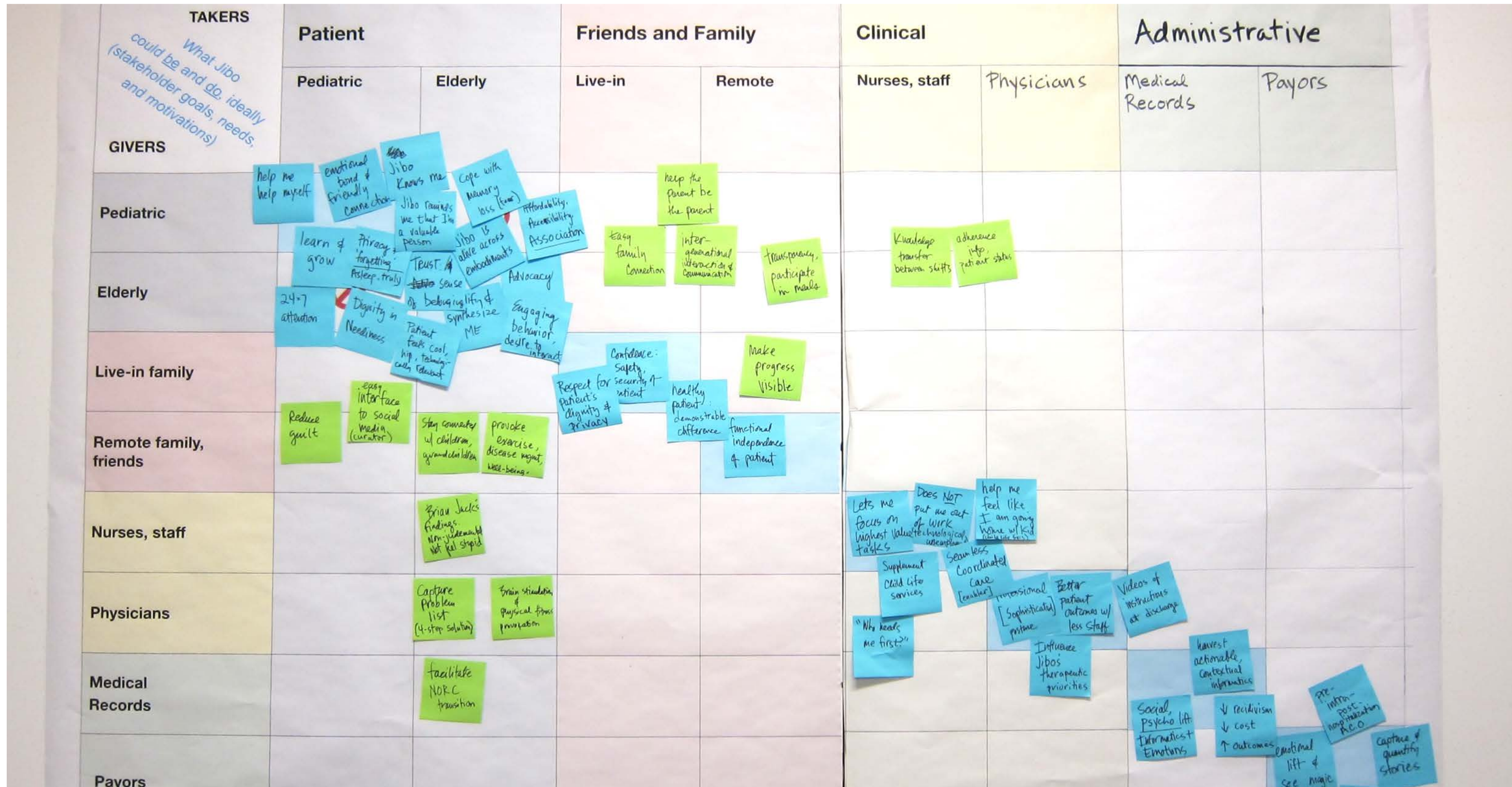


Level 3: Design as process





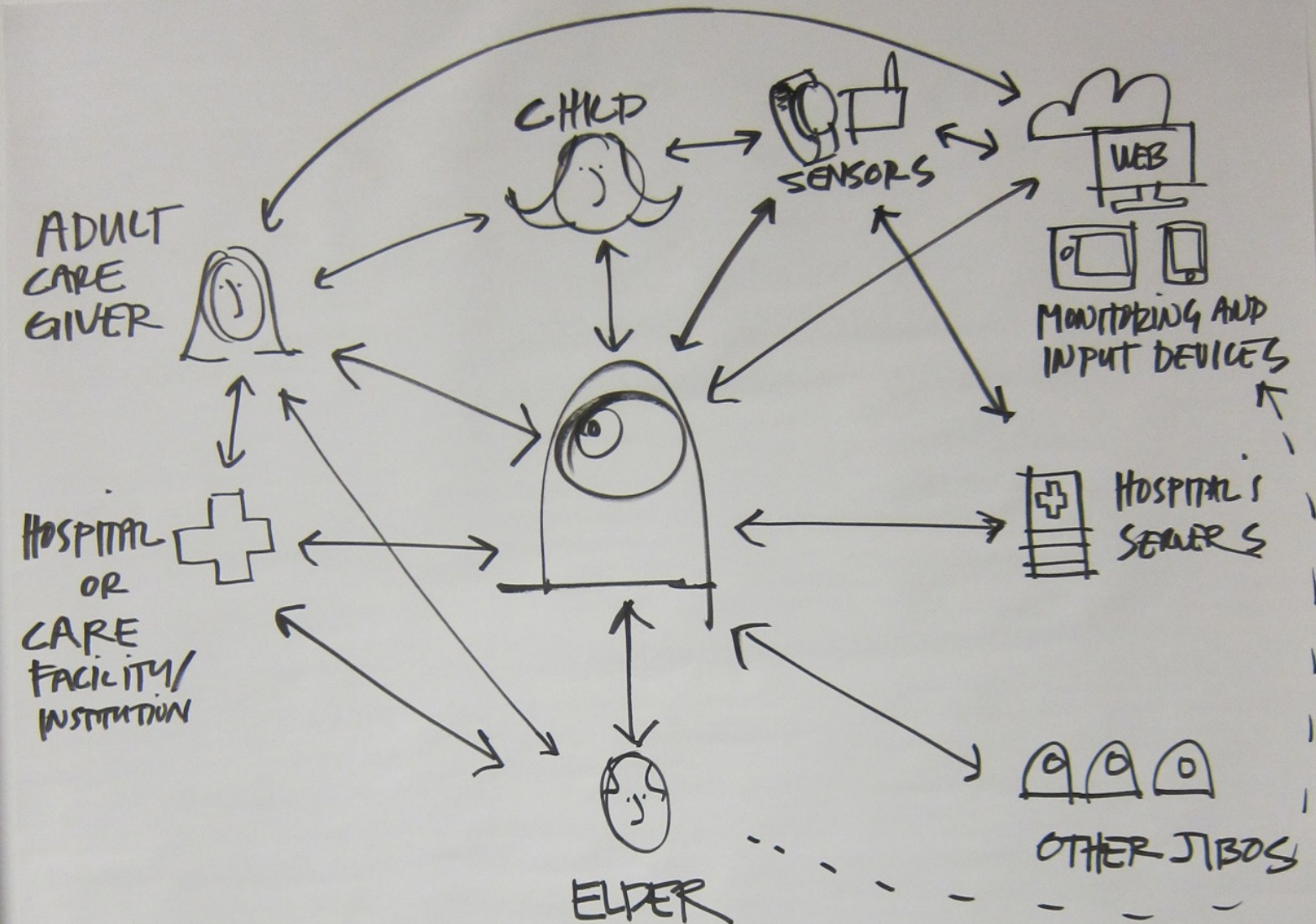
Level 3: Design as process



Level 3: Design as process

WHAT IS JIBOS RELATIONSHIP TO CONTENT?

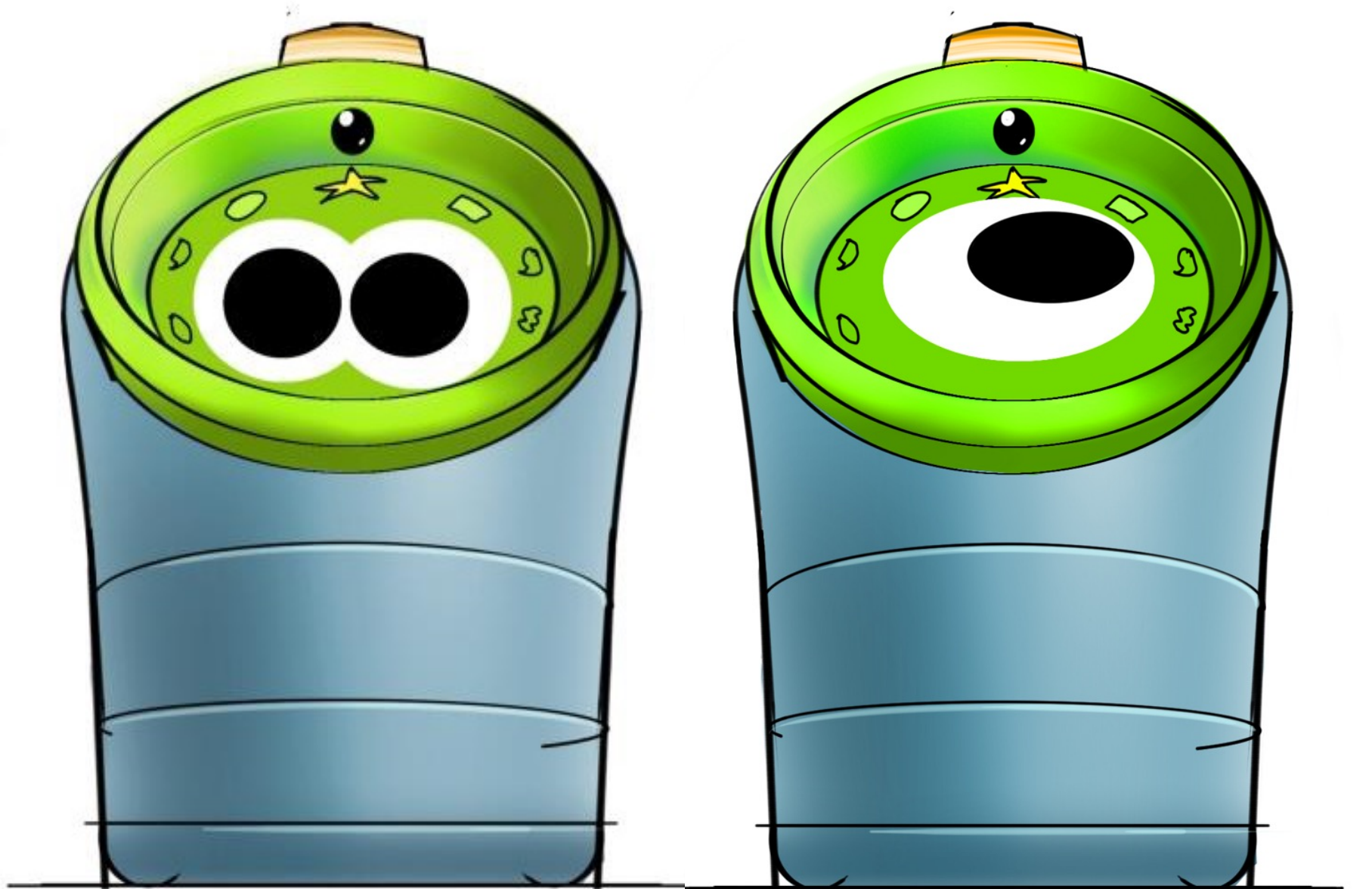
- 1) WHAT IS JIBO DOING (JOB/ROLE)?
- 2) WHAT CONTENT IS NEEDED. HOW DOES JIBO ACCESS IT?
- 3) HOW IS THAT CONTENT SHARED?
(JIBO → USER) EYE/DISPLAY/AUDIO/MC
- 4) HOW DOES THE USER INTERACT WITH THAT CONTENT/JIBO? INPUTS/CONTROLS



CONTENT EXCHANGE ECOSYSTEM

NEURO-
LINGUISTIC
PROGRAMMING
NLP

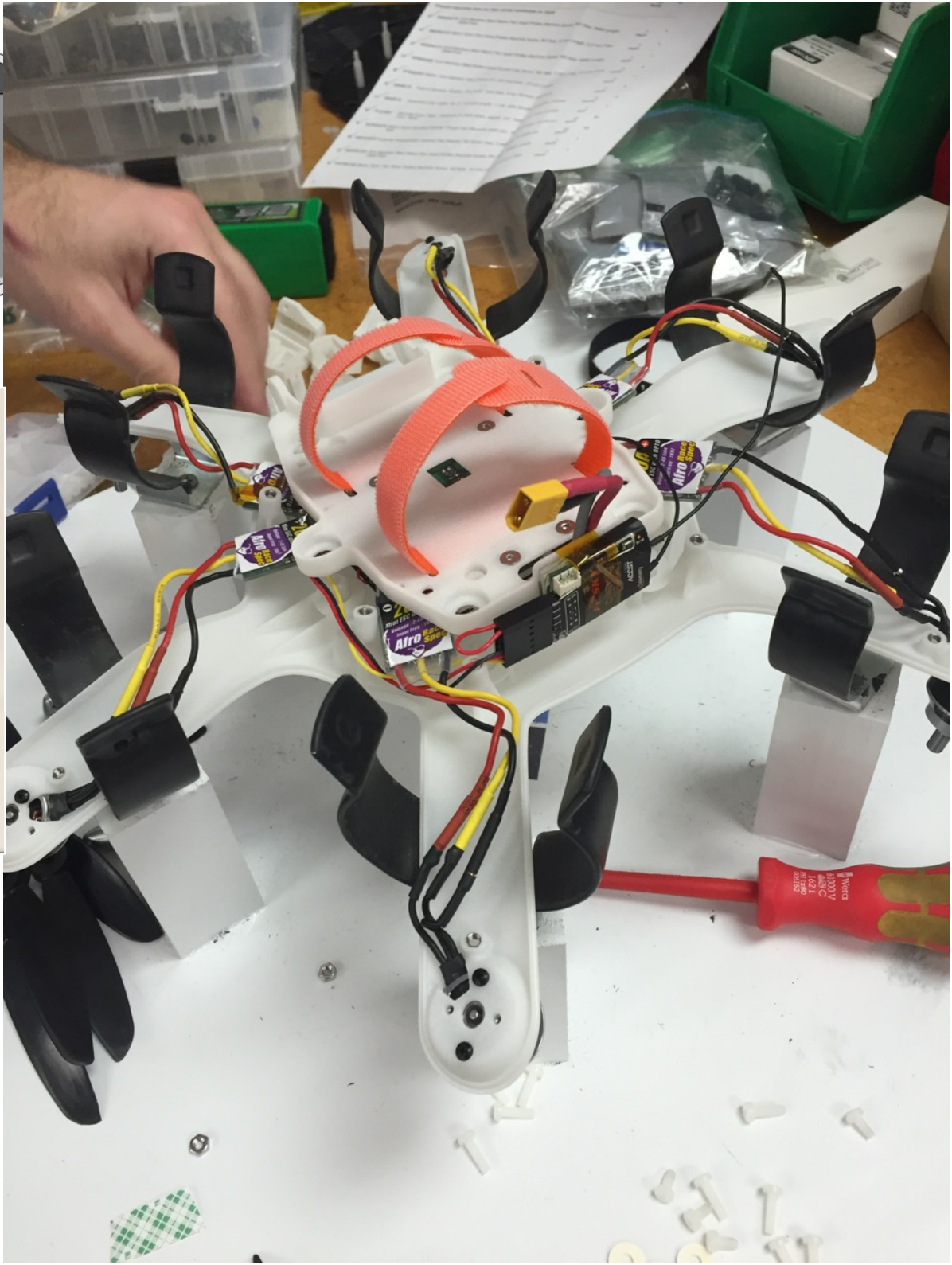
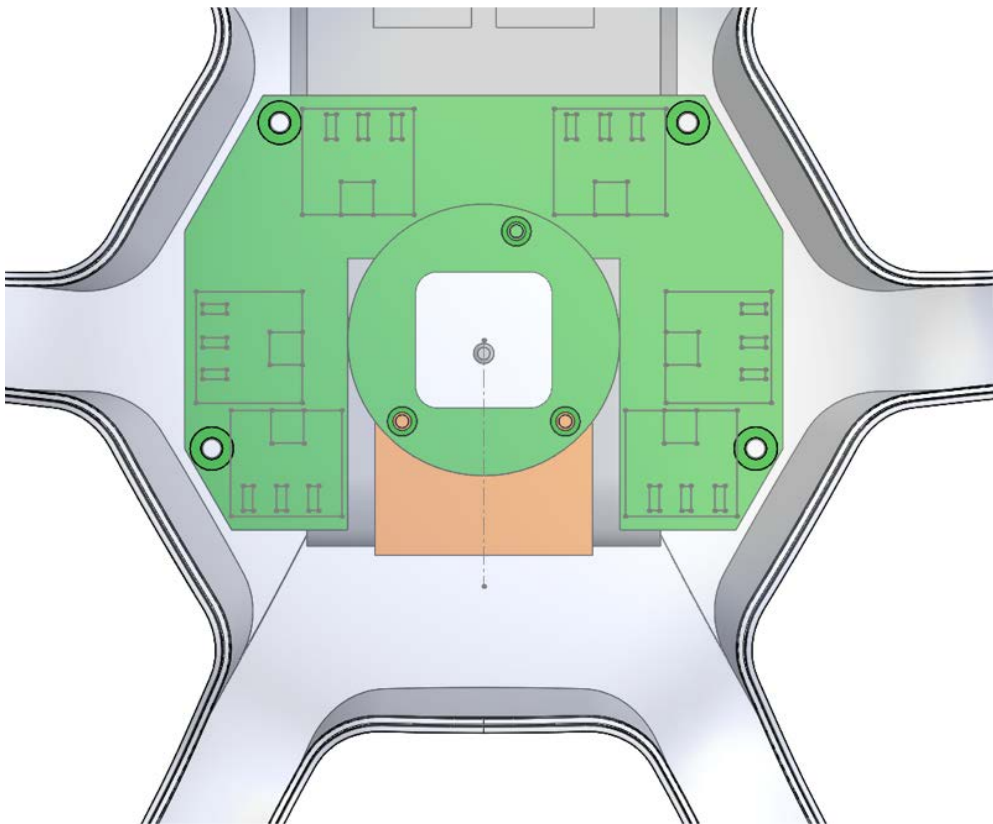
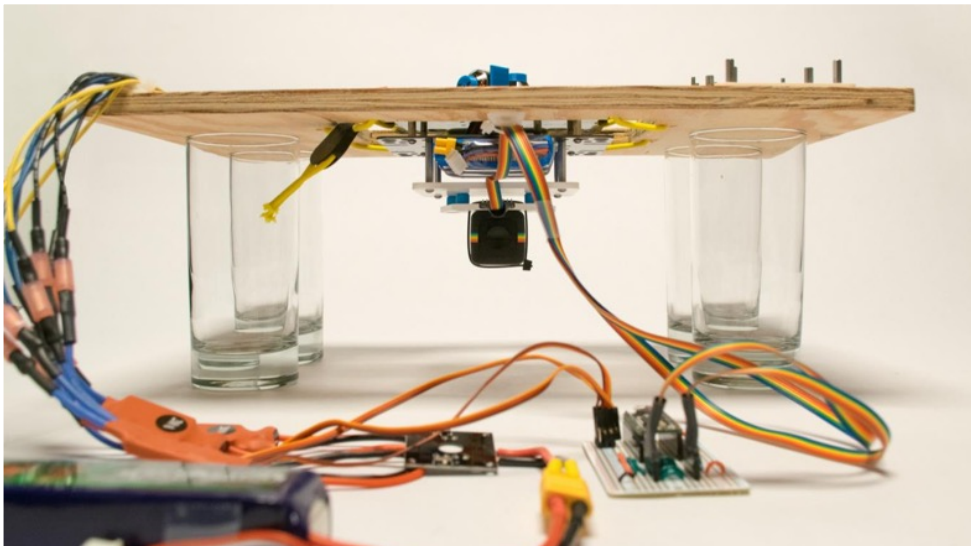
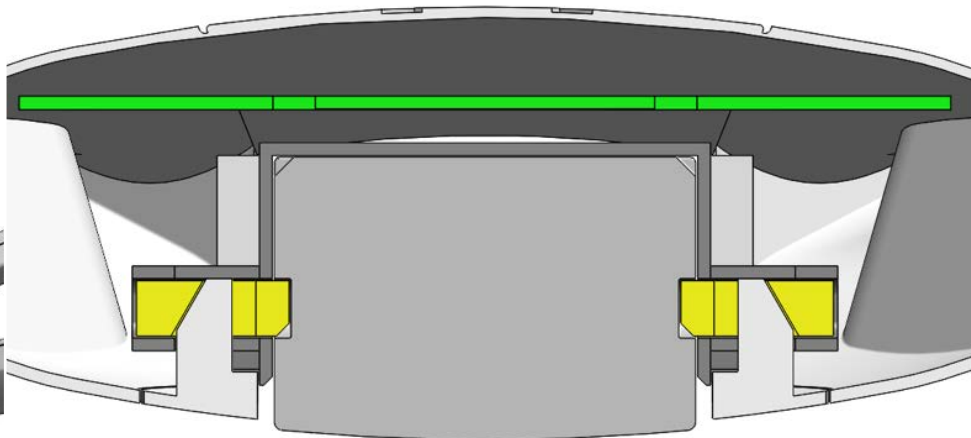
Level 3: Design as process



Level 3: Design as process



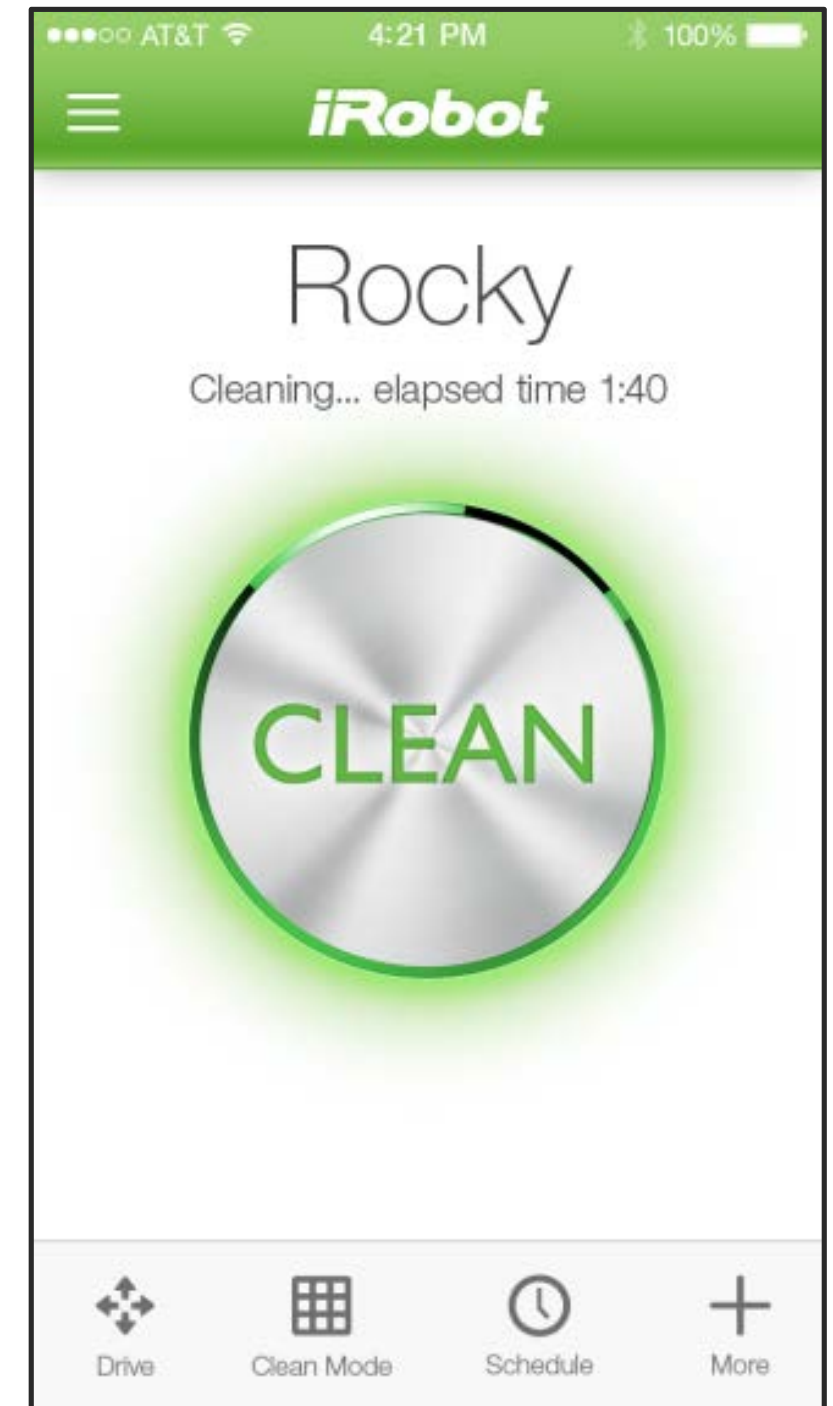
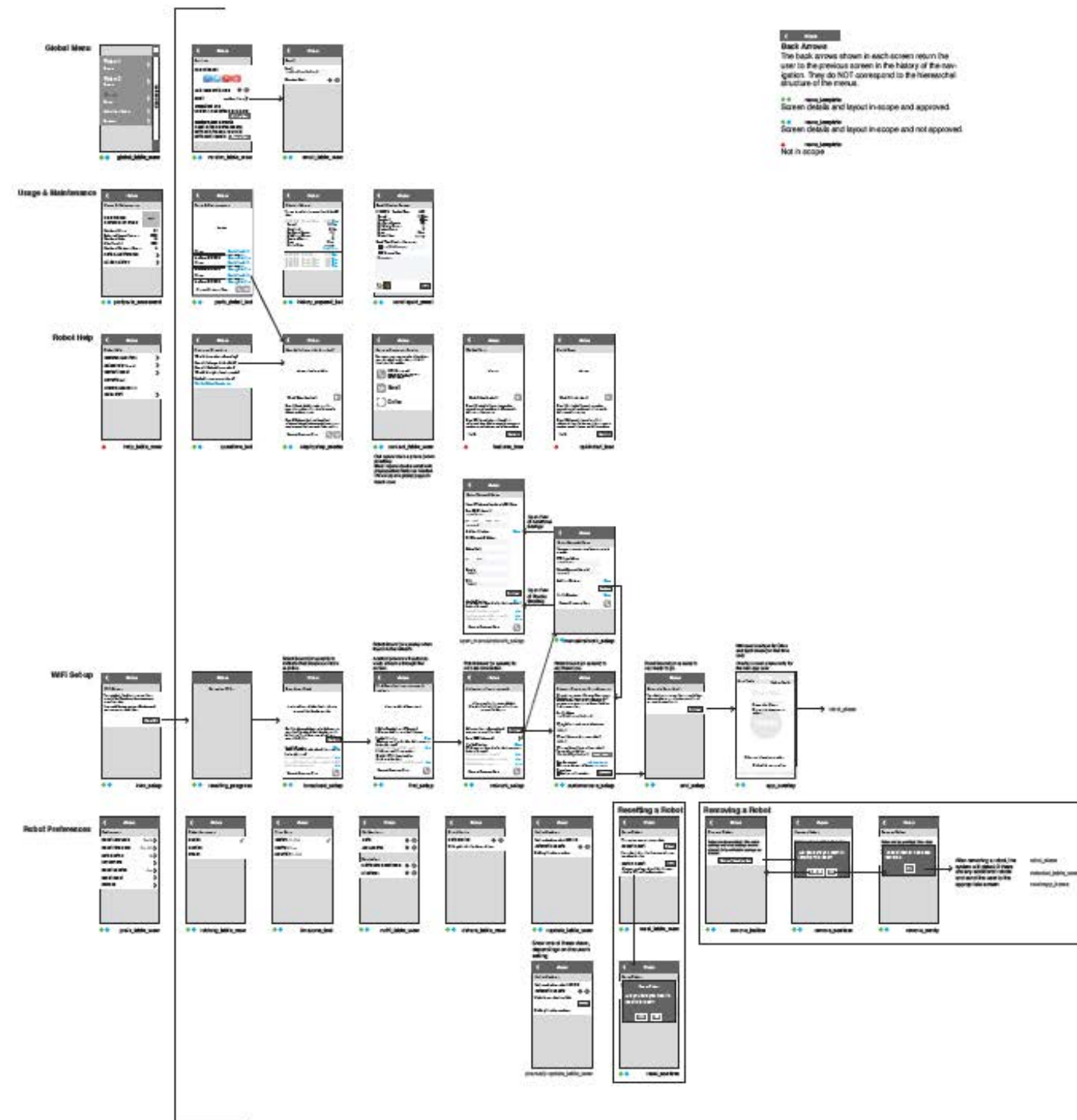
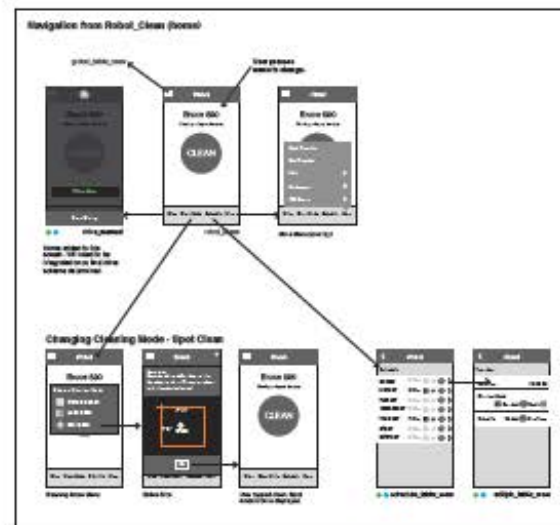
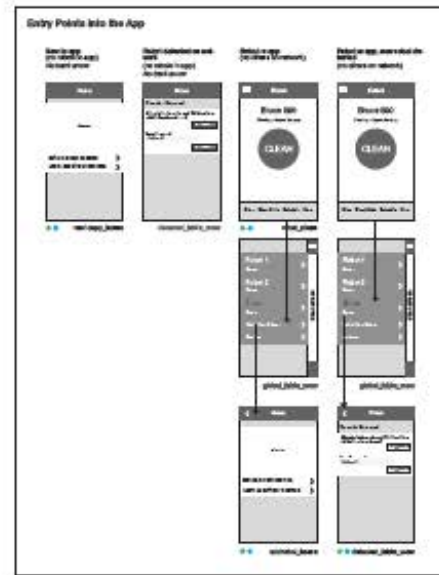
Level 3: Design as process



Level 3: Design as process



Aspen App Organization & Navigation



Level 3: Design as vision



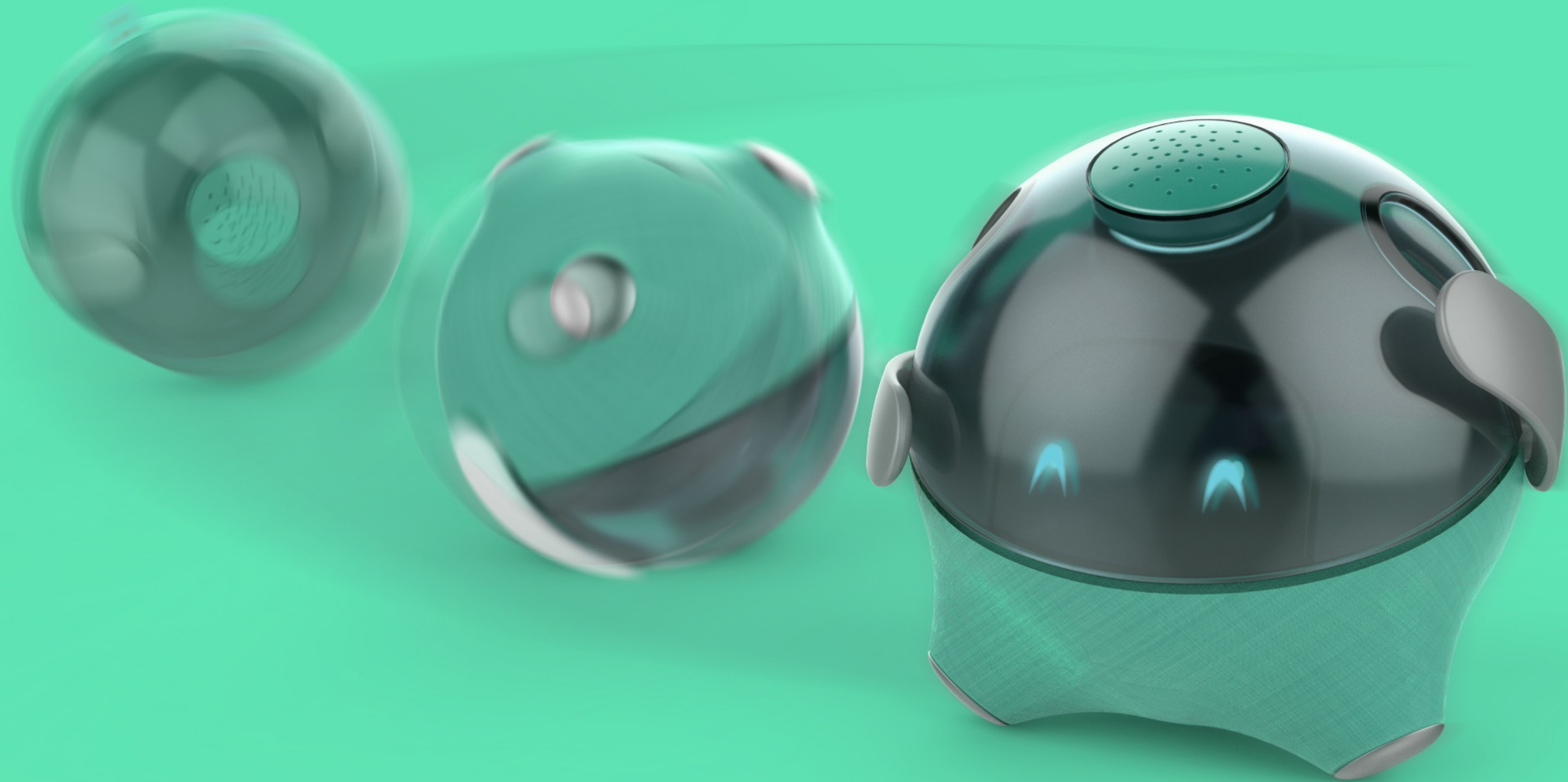
Level 4: Design as vision



Level 4: Design as vision



Level 4: Design as vision



Level 4: Design as vision



Level 5: Design as strategy



Sorry, not allowed to share

Take-aways



Really understand your user's needs and goals



Brainstorm and evaluate in a rich environment



	CORE BENEFITS				EXTENDED BENEFITS				
	Usable out of the box	Color match	Height to blend	Cracks are no longer an issue	Warranty	Guaranteed straight and flat	Finished look	Height to enhance	Wind resistance
Premium	●	●	●	●	●	●	●	●	●
Plus	●	●	●	●	○	○	○	○	○
Standard	●	●	●	●					
Value	○	○	○	○					

● High-tier solution
○ Low-tier solution

Identify all the possibilities



Who are all the possible users and what are all their possible needs/wants?

end user needs and wants

What kind of company are we trying to build, what qualities will build our reputation?

brand design

experience design

What kinds of experiences can we create for users with these technologies?

market factors

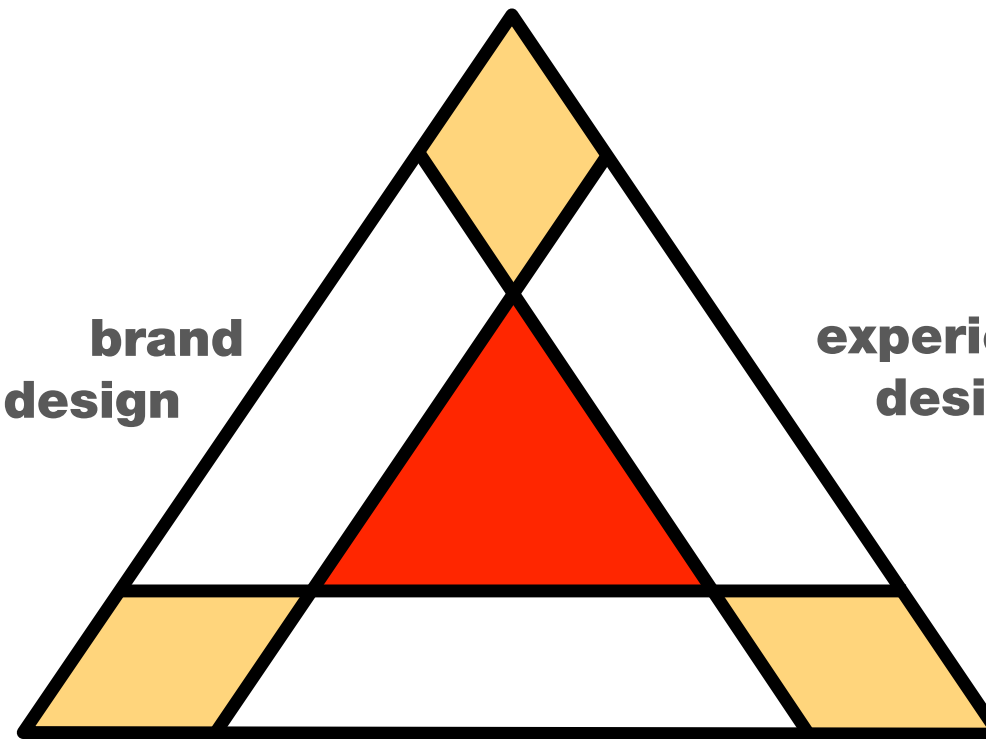
What does our company care about, what's happening competitively, what trends should we address?

feature or product design

What kinds of product or service features can technology offer in service to our business needs?

technology possibilities

What are all the possible technologies we could employ?

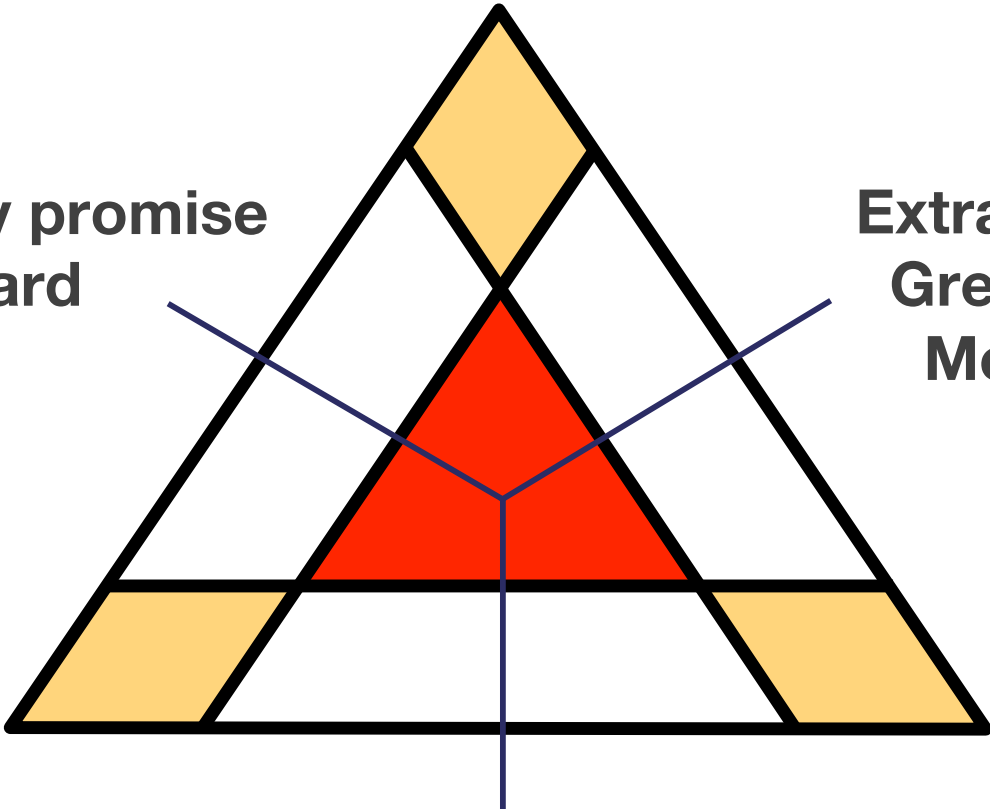


Drive toward a complete concept

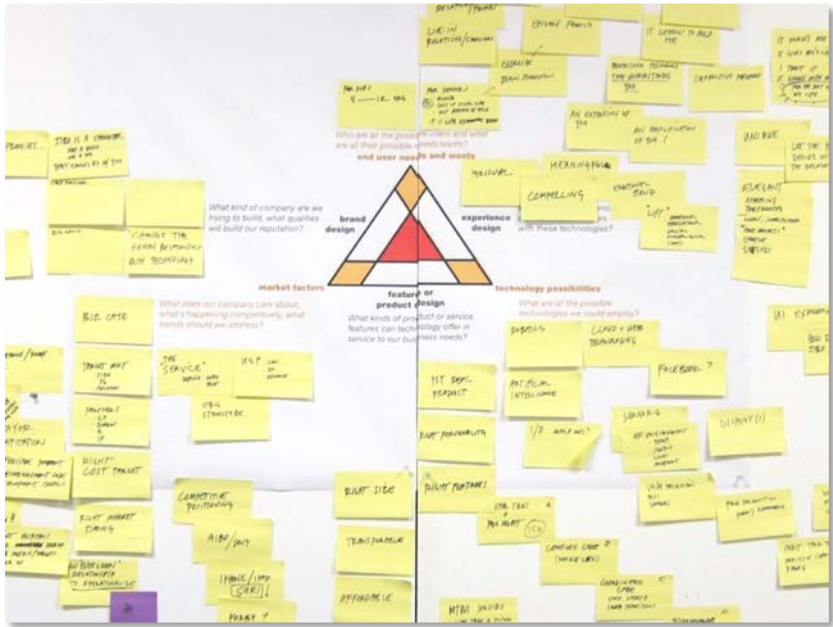


Delivers the brand/company promise
Moves the organization forward
Builds brand equity

Extraordinary utility
Great usability
Memorable behavior



Ideal feature set
In the right form
At the right price

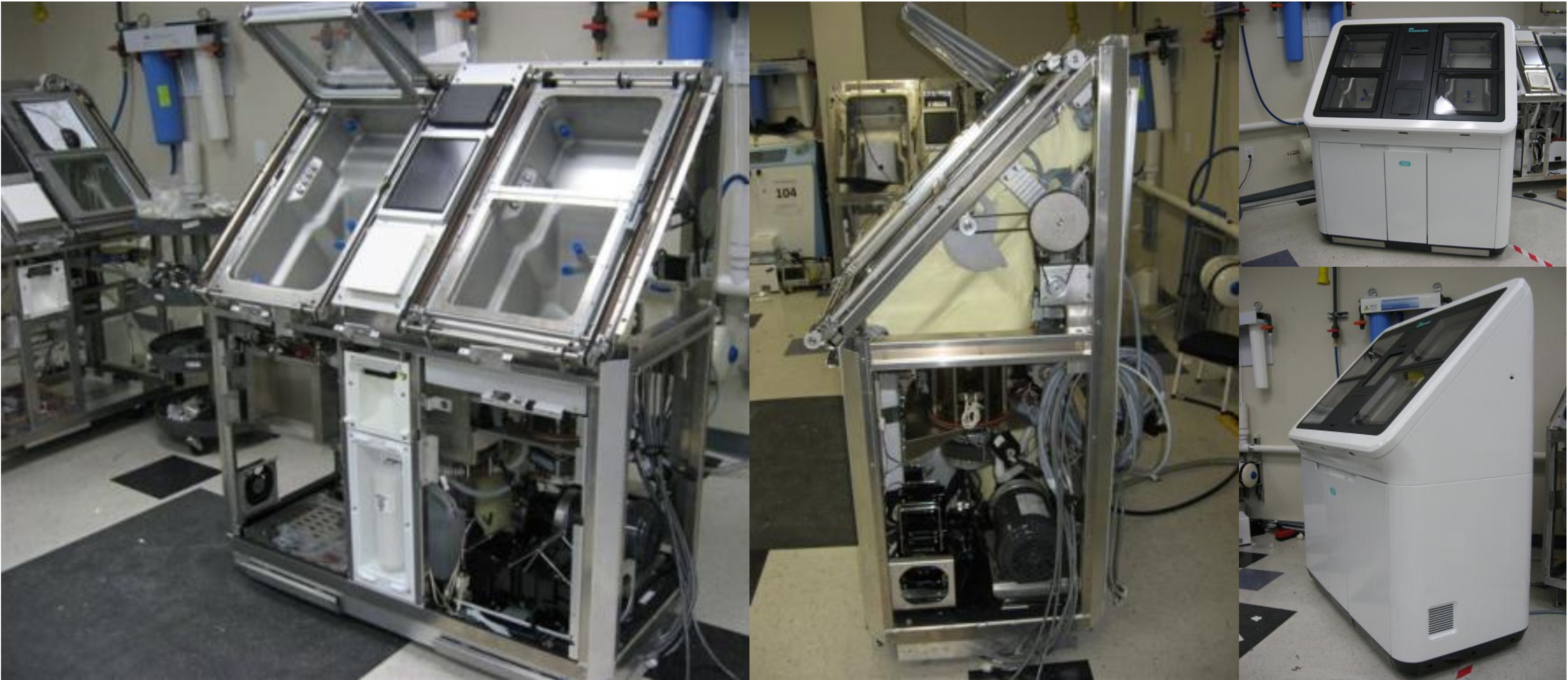




Prototype and test



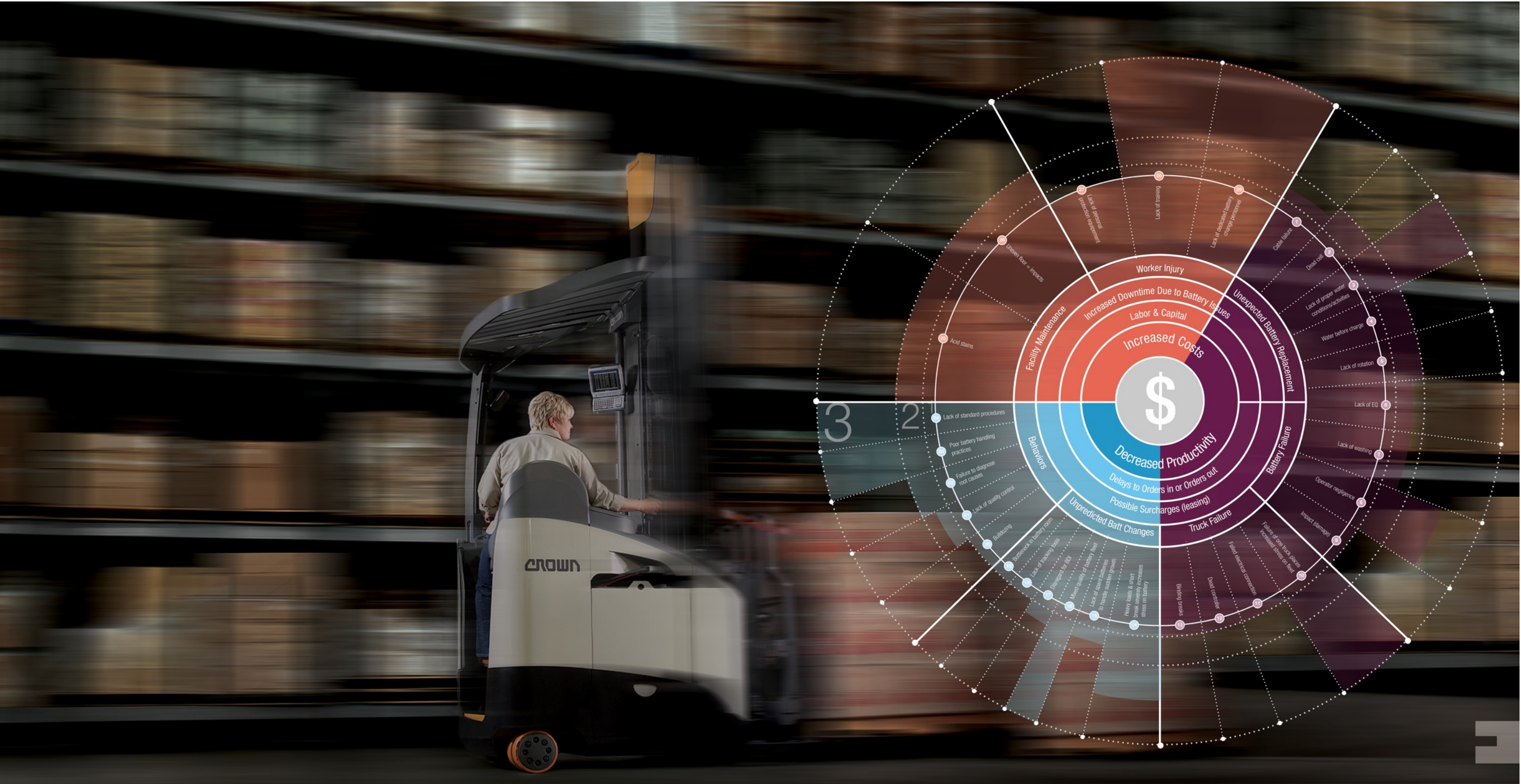
Prototype and test



Build platforms



Define value



Evaluate and refine



Thank you

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