

Innovation in a Changing World: Exploring PSS Design Through Prototyping



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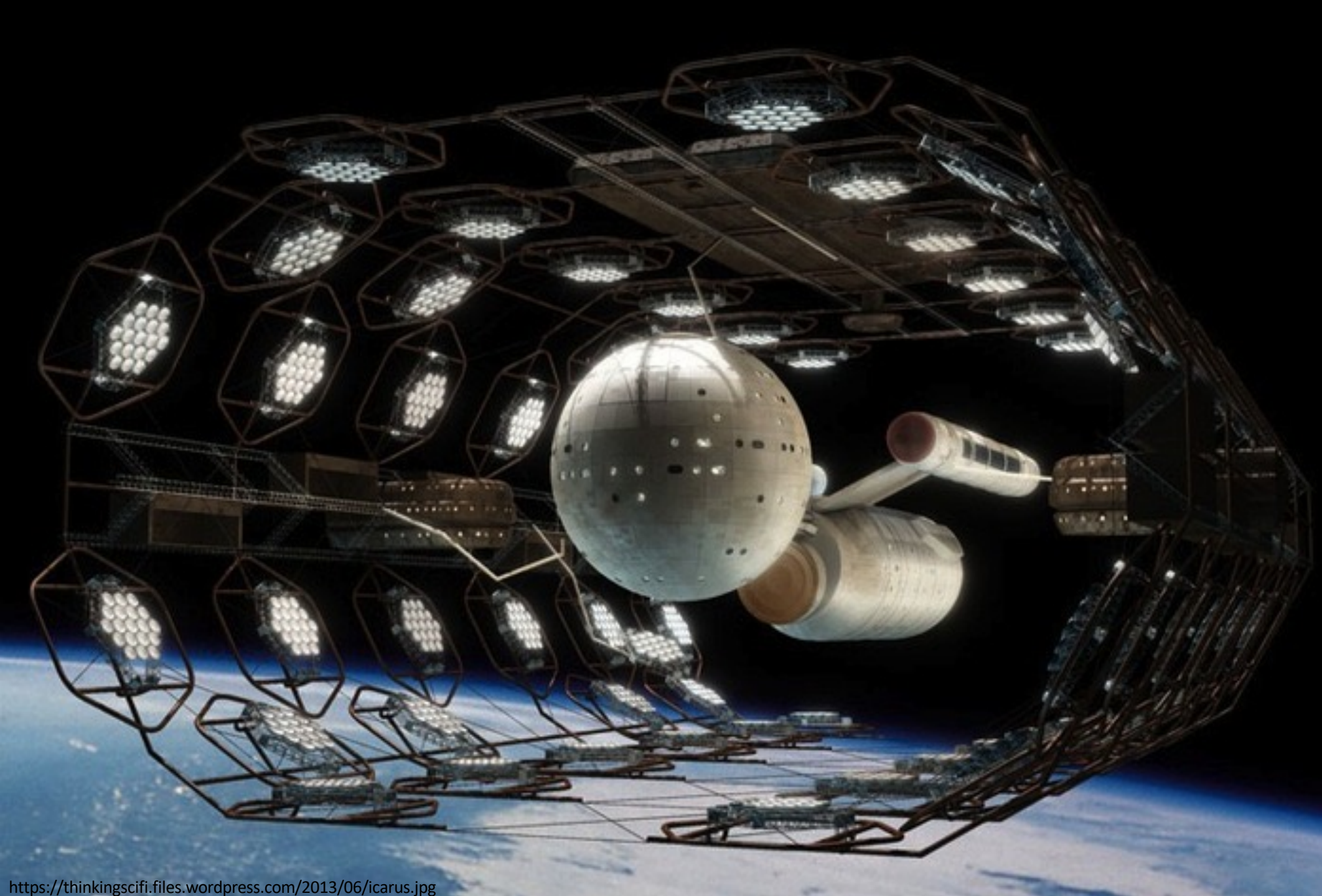
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**PRODUCT DEVELOPMENT
RESEARCH LAB**



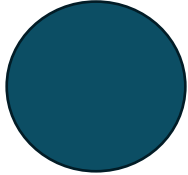
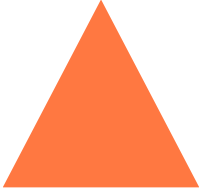

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How will you
design 'products'
that will interact
with us in ways we
can't imagine today

How to prototype for questions we don't know?



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| | Exploration | Insight |
|---|--|---|
|  | E1: How to prototype intangible aspects of future product service systems? | Experiential Prototypes can accelerate designer empathy and user contextual immersion with the future solution scenario. |
|  | E2: How to support co-creation in a diverse set of stakeholders conducting PSS design? | Building a functional PSS prototype engages stakeholders through shared cognition, suspension of disbelief and Productive Play. |
|  | E3: How to enable designers to ask the questions we don't know to ask? | Simple physical systems prototypes support designers' ability to adopt future oriented mindset to expand design space. |

Product



Product-Service System



Transformative PSS



Knowns

Unknowns

Questions we don't know HOW to ask



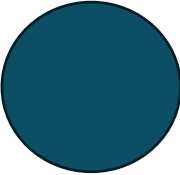
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Exploration Direction 1 – Initial Investigation



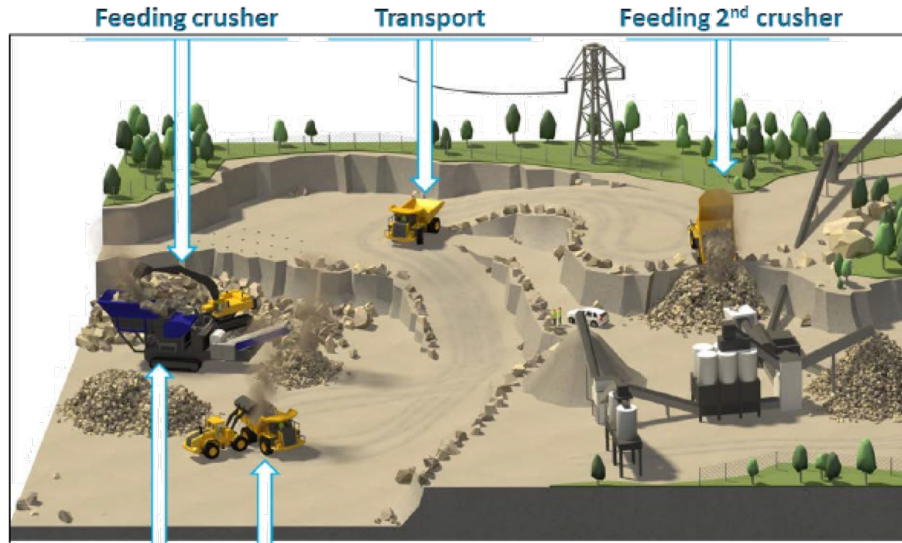
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| | Guiding Question: | Primary Insight Gathered |
|---|--|--|
|  | E1: How to prototype intangible aspects of future product service systems? | Experiential Prototypes can accelerate designer empathy and user contextual immersion with the future solution scenario. |

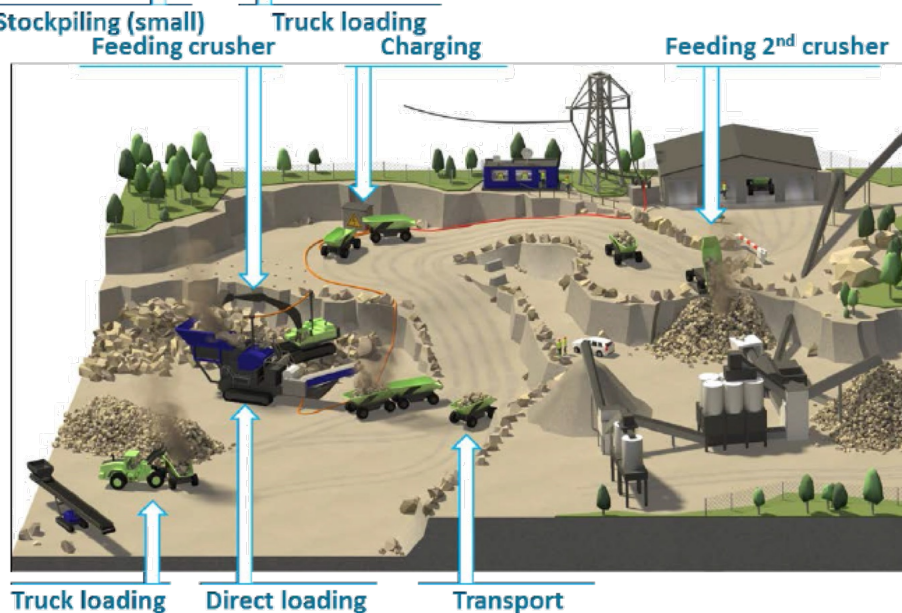
Building Trust Through Communication with Future Teammates



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Traditional Diesel Quarry



Electric Autonomous Quarry

Cx.Link

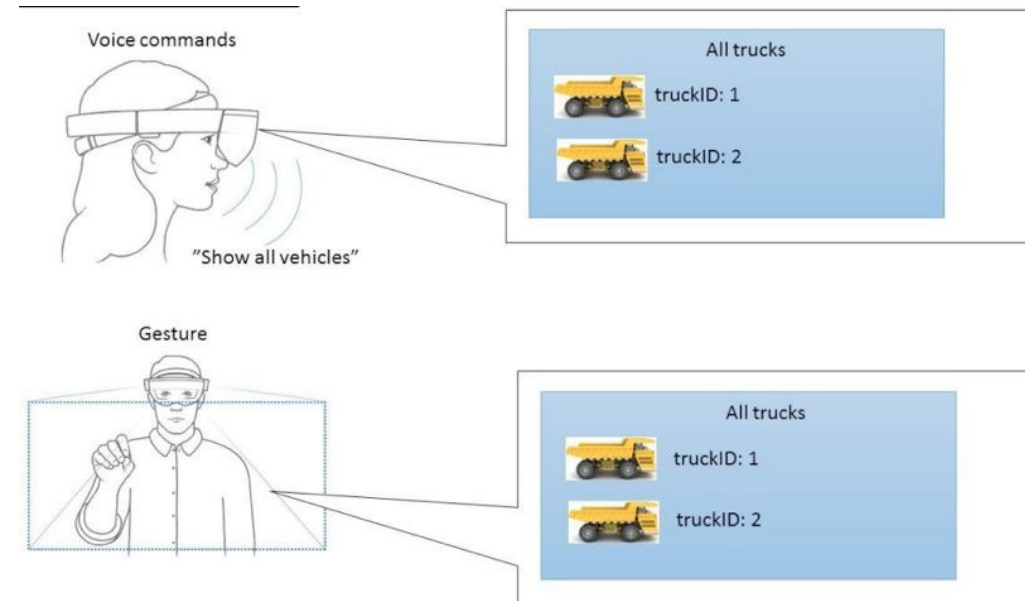
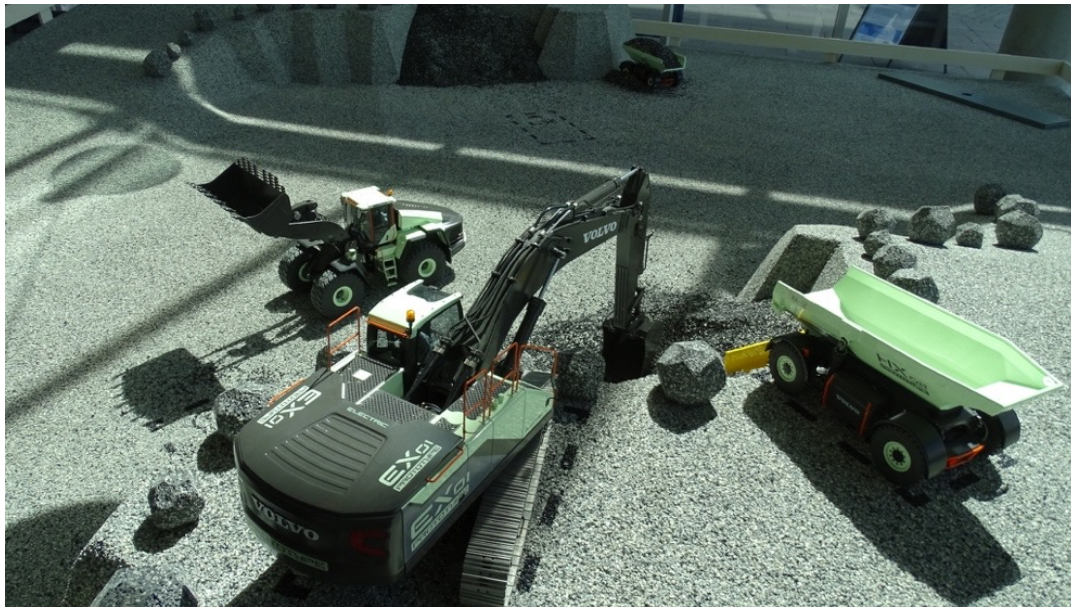


Physical Experiential Prototypes Combined for Contextual Immersion




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Cx.Link Augmented Reality



Exploration Direction 2 – Investigating the Phenomenon

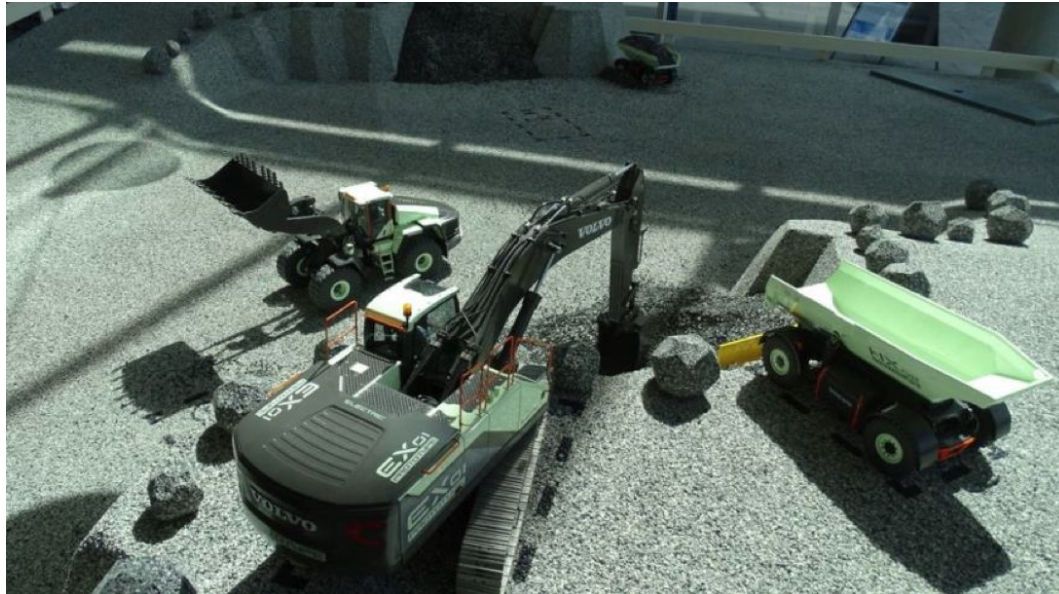
| | Guiding Question: | Primary Insight Gathered |
|---|--|---|
|  | E2: How to support co-creation in a diverse set of stakeholders conducting PSS design? | Building a functional PSS prototype engages stakeholders through shared cognition, suspension of disbelief and Productive Play. |

Electric Scale Site

A platform to conduct qualitative research and explore **tangible** PSS prototypes



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Scale Site as a mediating object

Scale Site serves as a focal point at 4 global events in the USA, India and China.

China



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India



USA

“Scale prototypes like the site enable visualization of the operations and systems of machines where the true gains in efficiency are realized.”

Exploration Direction 3 – Recreating the Phenomenon

| | Guiding Question: | Primary Insight Gathered |
|---|--|--|
|  | E3: How to enable designers to ask the questions we don't know to ask? | Simple physical systems prototypes support designers' ability to adopt future oriented mindset to expand design space. |

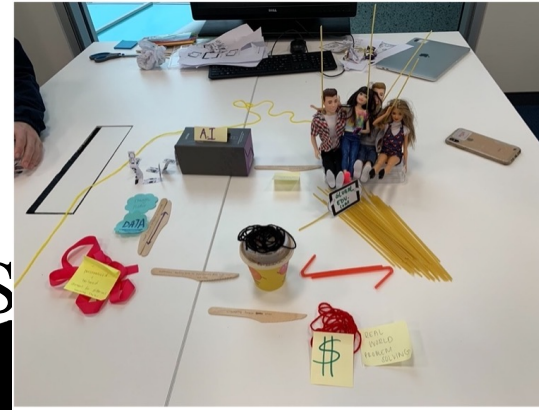
Conceptual PSS Prototyping



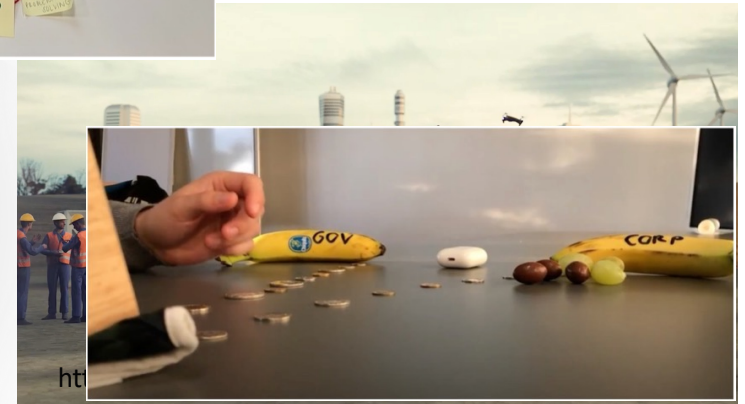
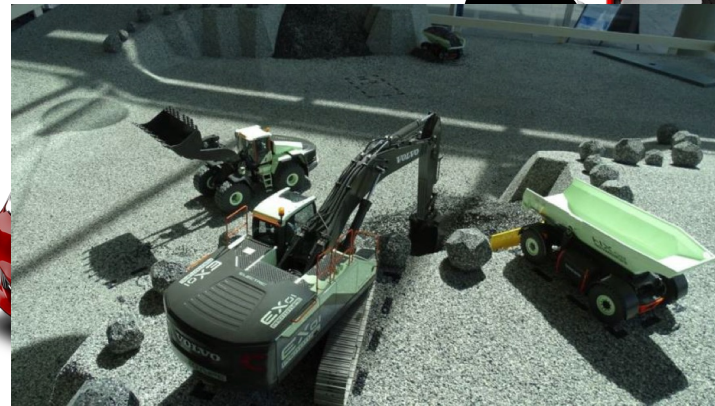
Prod



-Service S



nsformative PSS



Knowns
Certainty

Uncertainty

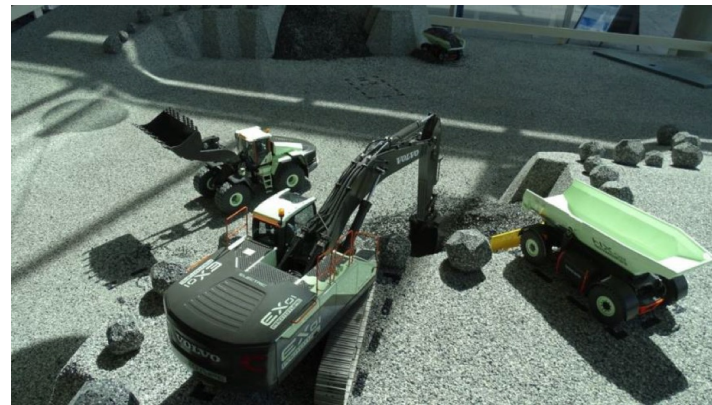
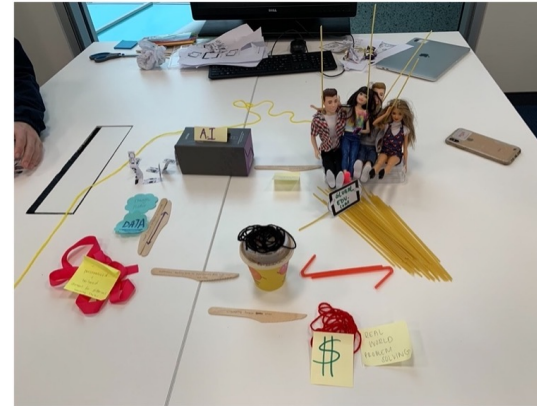
Unknowns
Ambiguity

How should engineers build prototypes for transformative PSS solutions?



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- My prototypes diverge from Design Thinking by not focusing on answering a question.
- Intentional PSS Design amplifies complexity and ambiguity necessitating GDQs for converting UU to KU.
- Not just feasibility prototypes, intentional design space exploration prototypes.
- Suspension of disbelief enables deeper design dialog.



Physical Prototypes can be used as a means of provoking Generative Design Questions



Knowns
Certainty

Uncertainty

Unknowns
Ambiguity

Design/Development knowledge



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Thank You



Questions are welcome now