

# Owl SUITS

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# Objective

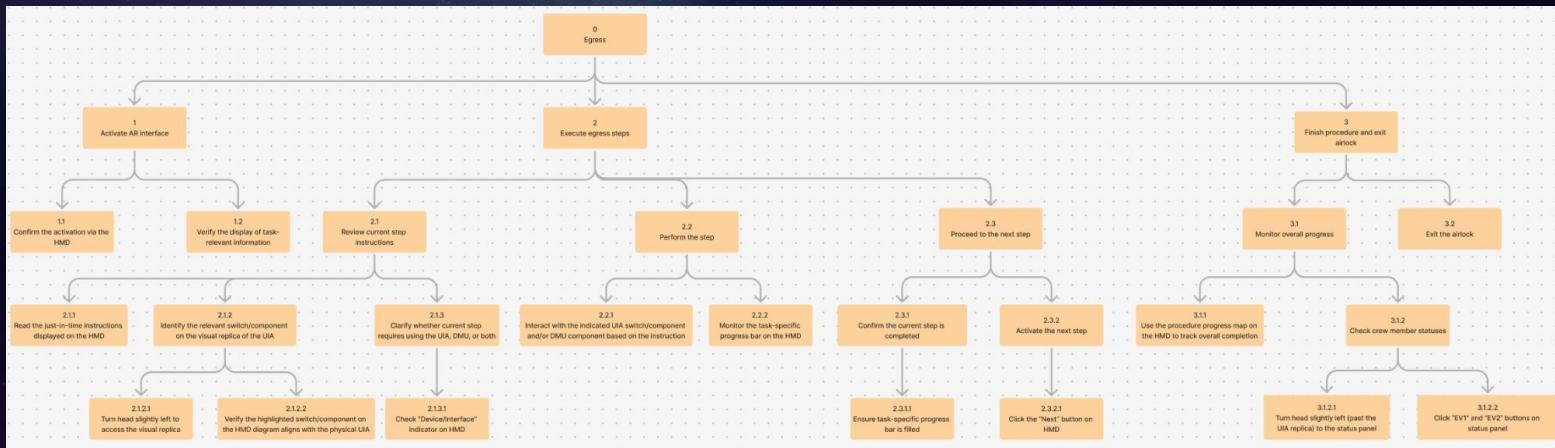
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To conduct formative usability assessments to iteratively refine an AR interface that supports astronauts through EVA operations.

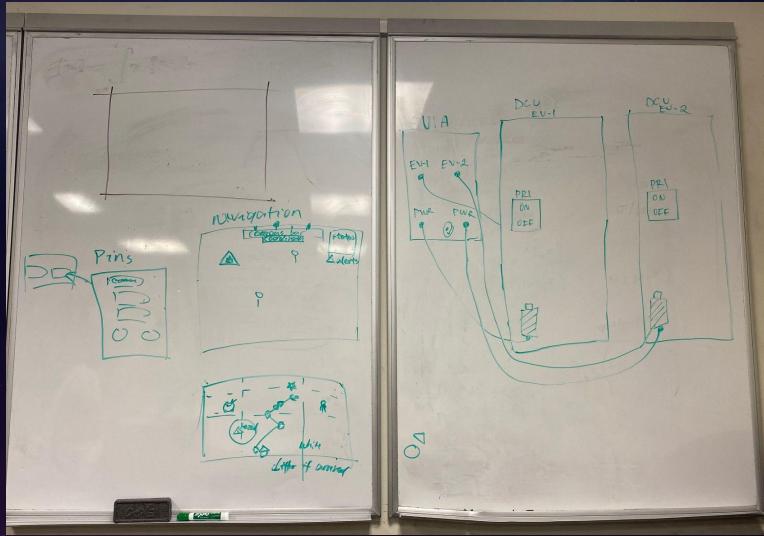
# Timeline



# Task Analysis



# Low-Fidelity Wireframe



# Cognitive Walkthrough

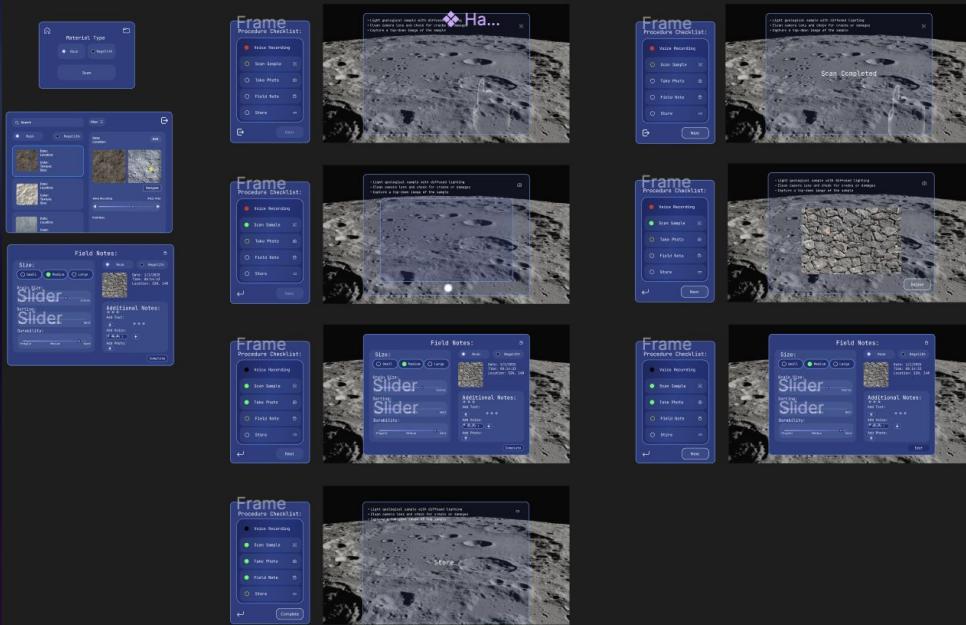
**Table 2.** Navigation

		Cognitive Walk Through	
Steps	Step Description	Will the user know what to do at this step?	If the user does the right thing, will they know that they did the right thing, and are making progress toward their goal?
1	Navigate to specimen	Yes. They will see the direction at the top.	Yes. They will see on the 2 D map that they are getting closer to target.
1.1	Begin mission	Yes.	Yes.
1.2	Follow the suggested route	Yes. They will see the route on the 2 D map.	Yes. They will see their location being closer to target.
1.2.1	Check direction suggestions in the HUD (top-left corner)	Yes.	Yes. The interface will show up.

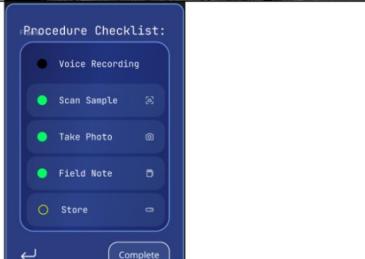
# uFMEA

Steps	Step Description	uFMEA			AVERAGE RISK INDEX	RISK LEVEL	MITIGATION STRATEGIES
		Potential failure mode	Potential cause of failure	Potential effects caused by errors			
1	Navigate to specimen						
1.1	Begin mission						
1.2	Follow the suggested route	The user interprets and follows the wrong route.	Wrong interpretation.	Delayed mission and potential danger	5.5	Medium	Provide <b>auditory</b> and <b>visual guidance cues</b> for the correct route. Include visual and auditory feedback when user deviates from suggested route.
1.2.1	Check direction suggestions in the HUD (top-left corner)	Interpret the direction wrong.	Unfamiliar with HUD.	Wrong direction.	5	Medium	Add alerts for routes-deviation and a "Help" button for real-time guidance.

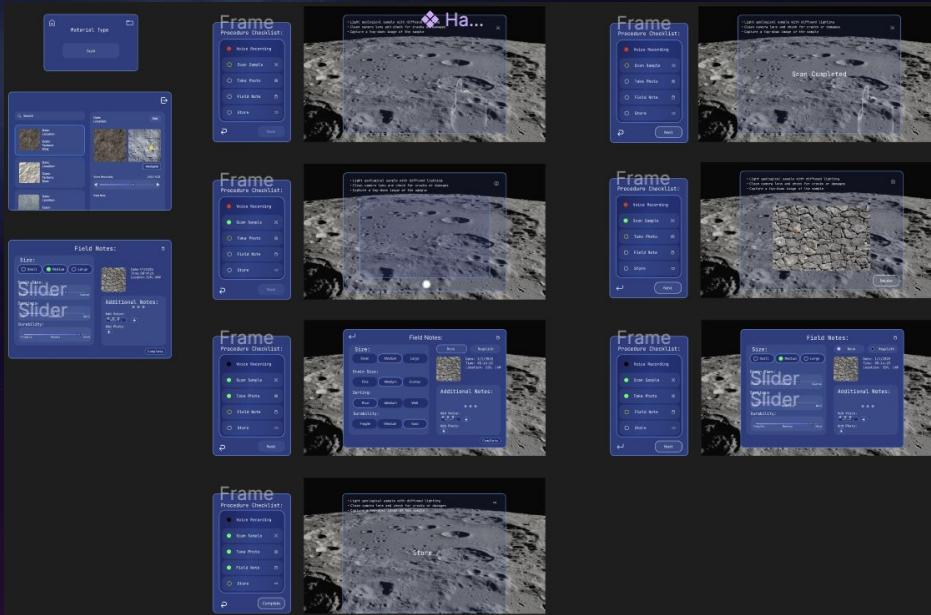
# UI Version 2



# Heuristic Evaluation

Heuristic	Definition	Violation Description	UI of the Violation	UI of the Redesign
Match Between System and Real World	Phrasing is familiar and follows real-world conventions	"Light" geological sample could refer to color or weight. Use clearer phrasing here.	<ul style="list-style-type: none"> <li>Light geological sample with diffused lighting</li> <li>Clean camera lens and check for cracks or damages</li> <li>Capture a top-down image of the sample</li> </ul> 	
User Control and Freedom	Be able to undo action	No back button once users captures image.		
Consistency and Standards	Follow industry conventions	The "Store" icon doesn't seem to follow conventional icons for what "storage" would look like. Instead, use a "library" or "moving box" icon to symbolize storage.		

# UI Version 3



# HITL Testing Methodology

- **5 participants** recruited from Rice University's SONA system
- Task performed under **low light conditions**

## Metrics (ISO 9241-11):

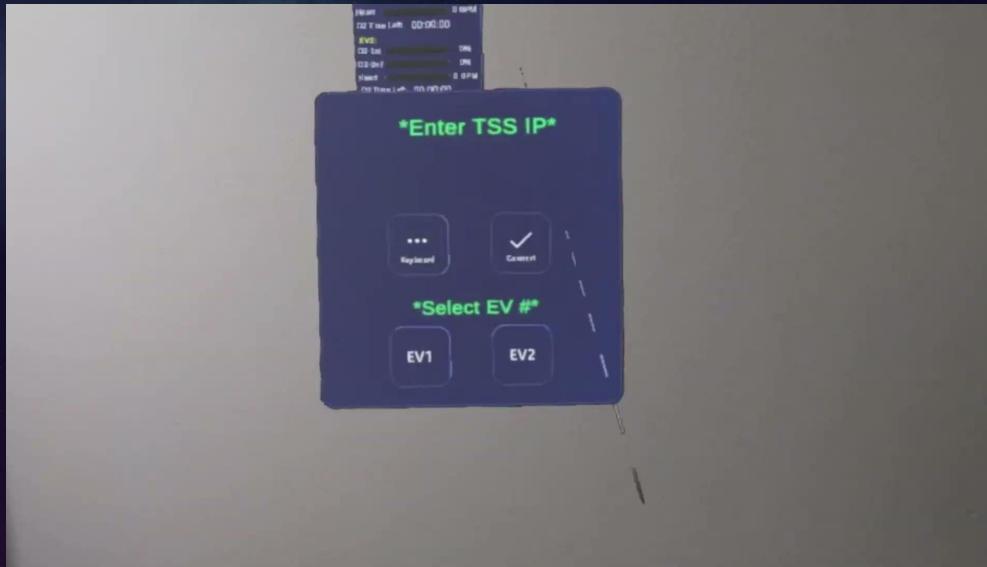
- **Efficiency:** task time
- **Effectiveness:** ability to complete the task, number of errors, number of assistance requests, subjective workload (via NASA-TLX)
- **Satisfaction:** subjective usability (via System Usability Scale)



# Final UI (V4) - ING / EGR



# Final UI (V<sub>4</sub>) - Geo



# Final UI (V4) - Nav



# *Thanks! Any questions?*

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