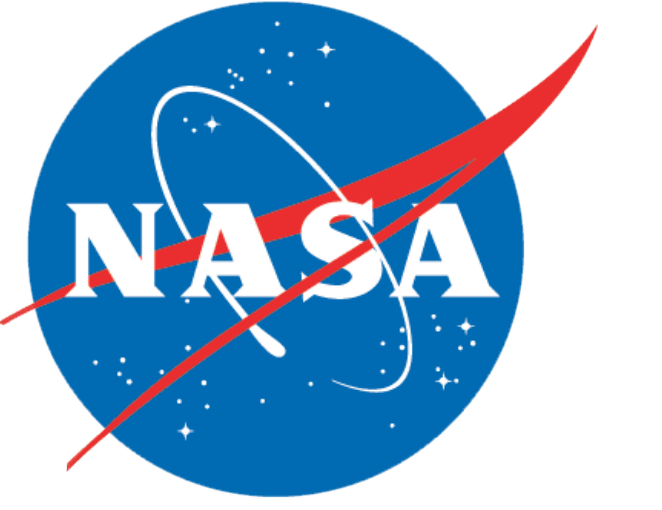




2022 Innovation Fair - Simulation Facility to Develop Synchronization Standards for VR Visuals and Motion

Integrating Virtual Reality into the Vertical Motion Simulator for research into the future of simulation and flight

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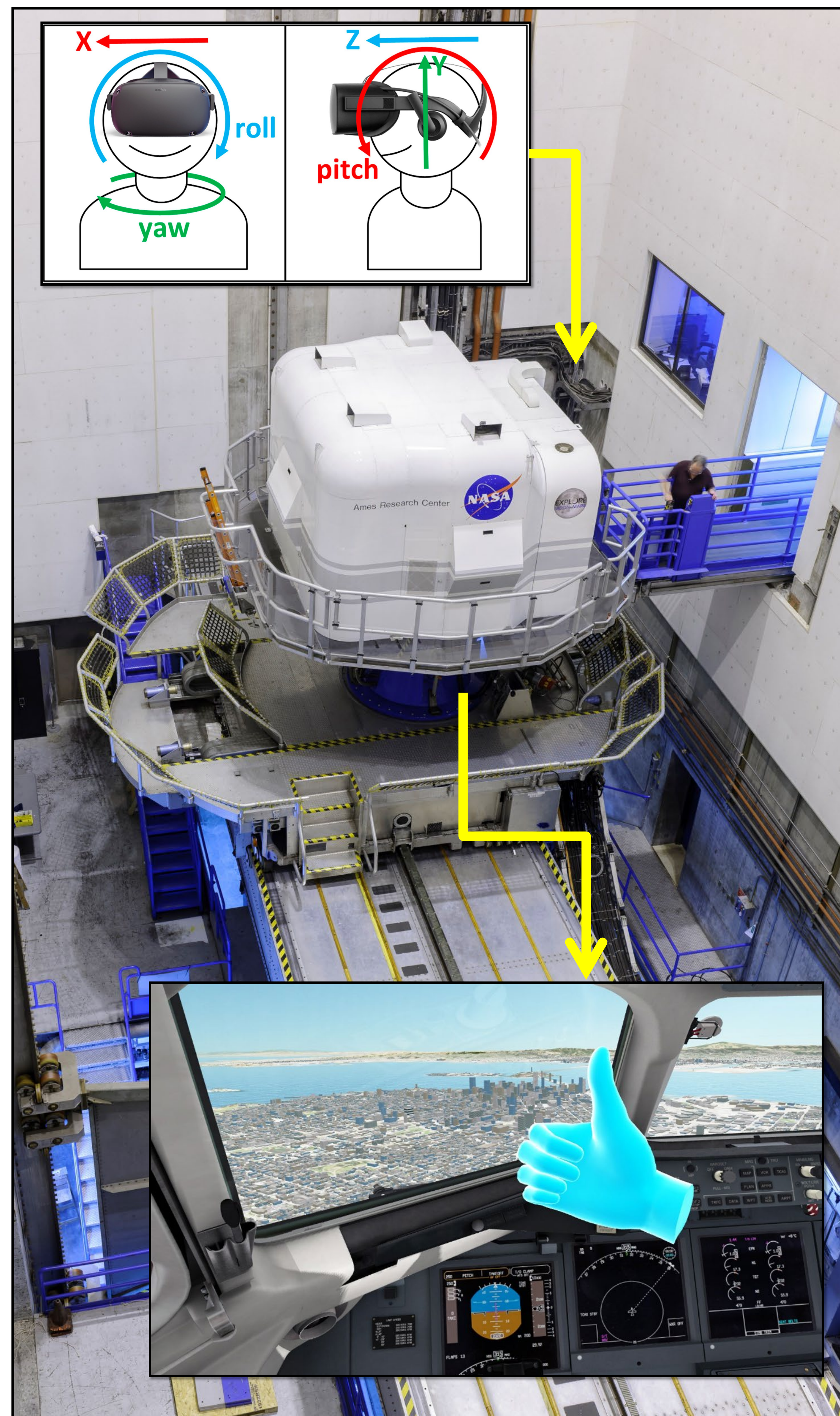
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Summary

To create software and hardware for integration of a **Virtual Reality (VR) Head Mounted Display (HMD)** into the **Ames Vertical Motion Simulator** for the purpose of developing and utilizing an empirical human-in-the-loop (HITL) testing method to determine spatial and temporal registration thresholds required for aligning VR Visuals with platform base motion.

Technical Approach

1. Integrate COTS HMD into existing VMS Image Generator system.
2. Develop motion tracking algorithm to combine HMD and VMS motion.
3. Design HITL motion study and VR protocol to develop synchronization standards using IEEE-3079-2020 with IRB approval.
4. Perform validation and HITL experiment.
5. Perform data analysis and write research paper.



Innovation

1. Compliments Ames' history of HMD research and development.
2. Aligns with Agency TX 11.3.4.
3. Research into pilot control and navigation aids for UAM, HLS, commercial, and military areas.

Budget Request - \$25,000

- Hardware budget for Varjo Aero HMD, SDK, and tracking kit.
- Labor for developing algorithm and HITL test.
- Code AFS mission support project.

Deliverables

1. VMS simulation graphics displayable on COTS HMD in simulation cab.
2. Algorithm combining VR sensors and VMS motion sensors for occupant head tracking.
3. Paper about HITL study with HMD and simulator motion to evaluate synchronicity registration between input/output response, fidelity of head tracking, and consistency of motion to image response.