



# NASA Space Apps Challenge (Hackathon) 2025

ADDRESS REAL-WORLD CHALLENGES ON EARTH & IN SPACE

(04<sup>th</sup> & 05<sup>th</sup> October 2025)



## Team Details

- a. Team name: LIFE ROBO
- b. Team leader name: Amit Chauhan
- c. Problem Statement: Deep Dive: Immersive Data Stories from Ocean to Sky



## BlueSkyX

BlueSkyX is an innovative VR experience that transforms NASA's satellite data into a captivating, narrative-driven adventure. Users embody a water molecule, traveling from ocean depths to atmospheric heights, exploring real-time visualisations of ocean health, sea level changes, and climate interconnections. This 3-5 minute immersive story educates non-experts on Earth's dynamic systems, blending science with emotional storytelling to foster environmental awareness.

### Key Points

Research suggests that VR can enhance understanding of complex environmental data by making it interactive and visceral, though adoption remains limited by hardware accessibility.

It seems likely that narrative-focused VR experiences, unlike passive visualizations, can build stronger emotional connections to issues like ocean conservation, but evidence is emerging and depends on user engagement.



The evidence leans toward integrating multiple datasets for richer context, yet challenges in data accessibility for general audiences persist, highlighting the need for inclusive design.



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## Differentiation from Existing Solutions

While tools like Google Earth VR offer exploratory ocean views and apps such as The Hydrous: EXPLORE provide marine ecosystem simulations, AquaVista stands out with its guided narrative arc using NASA-specific datasets (e.g., PACE for plankton, SWOT for water topography). Unlike analytical tools for scientists, it prioritizes storytelling for broad audiences.

## Problem-Solving Approach

BlueSkyX addresses the inaccessibility of remote sensing data by translating it into intuitive visuals and interactions, enabling users to "experience" phenomena like rising sea levels or plankton blooms. This solves the challenge by democratizing NASA data, turning abstract numbers into memorable stories that inspire action.

## Unique Selling Proposition (USP)

Interactive branching narratives where user choices reveal data impacts (e.g., pollution effects on biodiversity), combined with spatial audio synced to data trends, create a personalized, emotionally resonant experience not found in static VR explorers.



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## List of Features Offered by the Solution

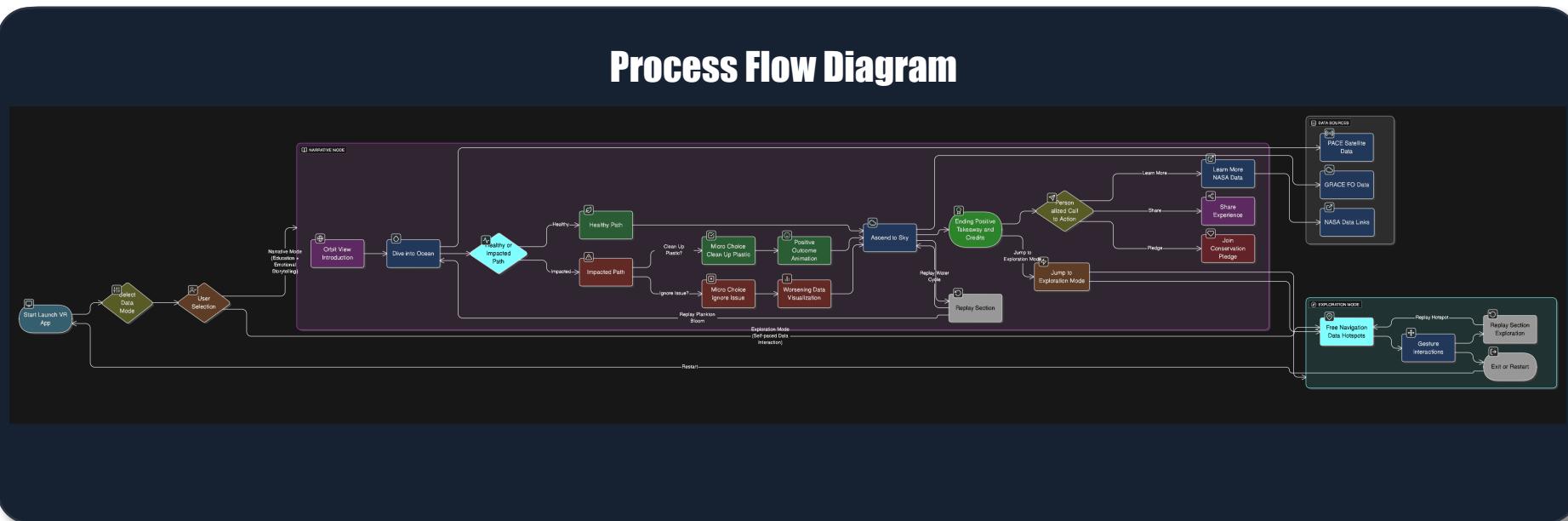
1. **Guided Narrative Mode:** A 3-5 minute story arc with voiceover, spatial audio, and animations based on NASA data.
2. **Free Exploration Mode:** Post-narrative sandbox for users to navigate data-driven environments at their pace.
3. **Interactive Data Layers:** Gesture-based interactions (e.g., hand tracking) to peel back visuals, revealing stats like ocean temperature or biodiversity metrics.
4. **Accessibility Options:** Subtitles, color-blind palettes, seated/standing modes, and audio descriptions for inclusivity.
5. **Multi-Dataset Integration:** Combines PACE plankton visuals, SWOT water height maps, and GRACE-FO gravity data for layered storytelling.
6. **Educational Overlays:** Subtle credits and pop-ups acknowledging data sources without disrupting immersion.
7. **Fallback Versions:** WebXR or 360-video alternatives for non-VR users.
8. **Haptic Feedback:** Optional vibrations syncing with events like currents or storms for enhanced realism.



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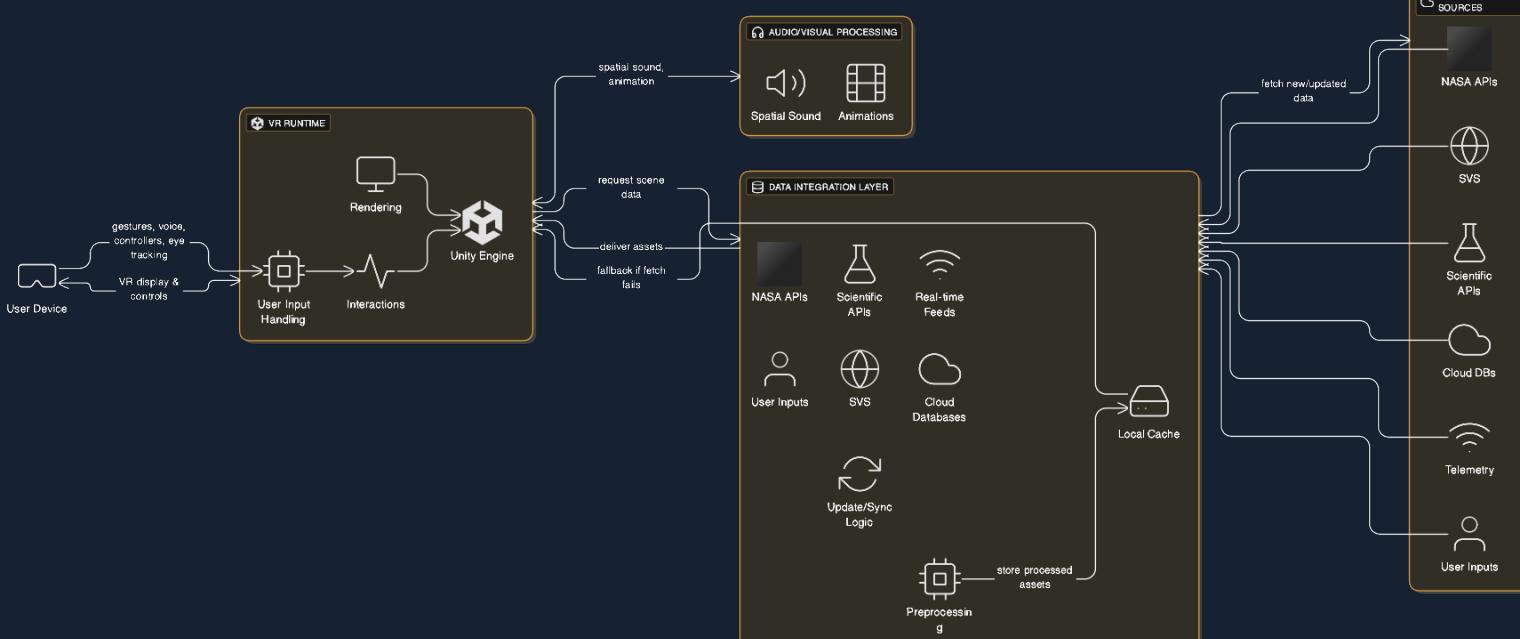
# Process flow diagram





## Architecture diagram of the proposed solution

### Architecture Diagram



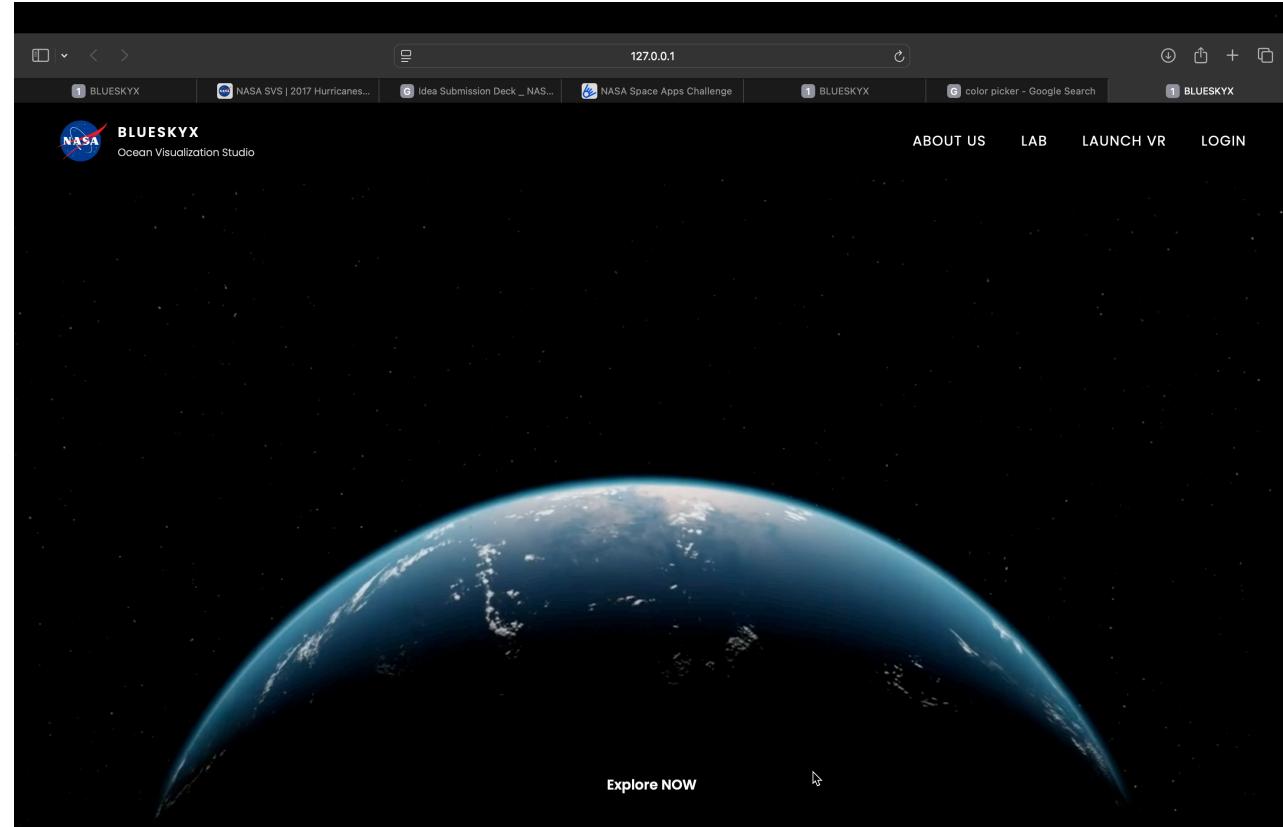


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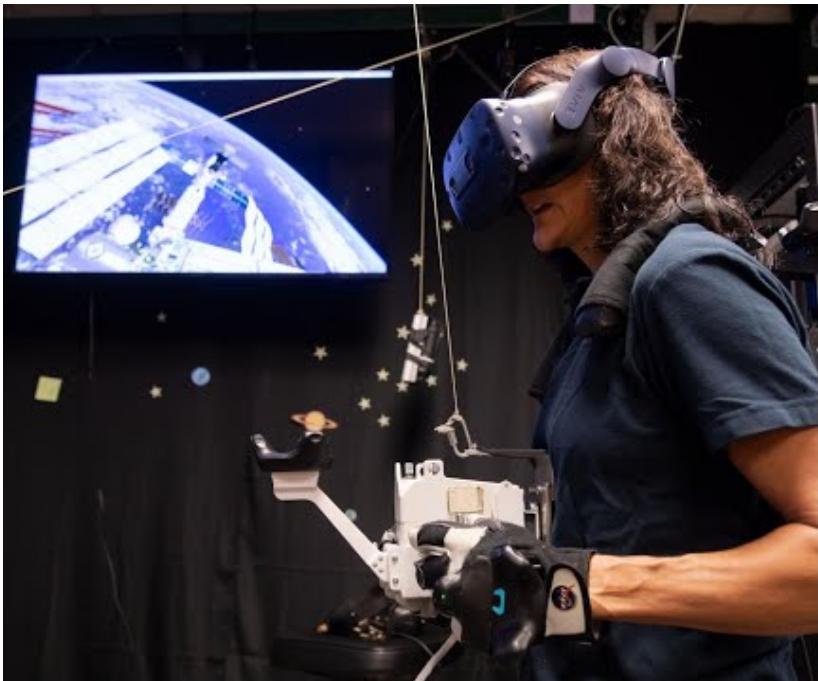
## Our Prototype

BlueSkyX lets users explore Earth's water cycle in VR. Users can choose narrative or free mode, interact with data layers, and experience oceans, skies, and climate changes with immersive visuals and controls.



## to be used in the solution Technologies

- **VR Development Framework:** Unity Engine (with XR Interaction Toolkit) for cross-platform HMD compatibility (e.g., Meta Quest, HTC Vive).
- **Data Access:** NASA Earthdata APIs (e.g., CMR for metadata search, OPeNDAP for subsetting datasets) to fetch PACE, SWOT, GRACE-FO data programmatically.
- **Visualization Tools:** Integrate SVS assets (videos, models) as textures/meshes; use Shader Graph for dynamic effects like particle systems for plankton.
- **Audio:** FMOD or Unity Audio for spatial soundscapes.
- **Interaction:** Oculus SDK for hand/eye tracking; WebXR for non-VR fallback.
- **Optimisation:** LOD (Level of Detail) techniques and async loading to ensure 90 FPS on consumer hardware.
- **Blender** for 3d model manipulation.





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# Thank you!

