Missile Simulator Project Plan

Objective: Develop an interactive 3D missile simulator using React and Python that allows users to select real-world launch and target sites, choose missile types, simulate realistic flight trajectories, and calculate explosion damage.

✅Phase 1: Project Setup

1. Create a new Vite + React project
2. Set up a Python backend using FastAPI or Flask
3. Install necessary dependencies:
4. **Frontend**: `@react-three/fiber`, `@react-three/drei`, `three`, `react-router-dom`
5. **Backend**: `fastapi`, `uvicorn`, `numpy`

🔰Phase 2: User Inputs (Launch & Target)

1. Embed a 3D globe or real-world map using Mapbox/OpenLayers
2. Allow users to select:
3. Launch site (latitude/longitude)
4. Target site (latitude/longitude)
5. Convert coordinates to 3D positions for simulation
6. Display markers for launch and target sites

🚳Phase 3: Missile Selection

1. Create dropdown or menu to select missile type
2. Each missile has properties:
3. Initial velocity
4. Range
5. Explosion radius
6. Fetch missile presets from backend or local config

🆚Phase 4: Physics + Trajectory

1. Simulate projectile motion (consider gravity, Earth curvature)
2. Backend computes trajectory based on user inputs and missile type
3. Send 3D trajectory points to frontend for rendering

Phase 5: Explosion & Damage

1. Animate explosion when missile reaches or nears target
2. Calculate damage zone based on explosion radius
3. Visualize damage area on map/globe

4. Display impact statistics:
5. Damage radius
6. Area affected (e.g., in sq. km)
7. Casualty estimate (optional/future)

👁️Phase 6: Realistic Visuals

1. Add realistic terrain using 3D Earth textures
2. Integrate:
3. `Sky` (sunlight/turbidity effects)
4. `Stars` (night scene)
5. Lighting and shadows for realism
6. Option to toggle between day/night modes

✅Final Deliverable:

A full-screen interactive missile simulator with: - Real-world launch/target selection - Multiple missile types - Realistic 3D flight animation - Explosion and damage visualization - Detailed simulation report

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Next Steps: Start fresh tomorrow with project initialization.

Good Night #