Integration Plan

The integration plan focuses on unifying all system components—data ingestion, reasoning, generation, and visualization—into a seamless end-to-end workflow. The backend, built with FastAPI, will serve as the central controller, managing data flow between the Neo4j knowledge graph, model inference modules (Stable Diffusion, ControlNet, and Stable Video Diffusion), and the Streamlit frontend. Real-time data from NOAA, NASA, and FEMA APIs will continuously update the database, ensuring that the visual outputs and analytical reasoning remain current and contextually accurate.

The Streamlit interface will integrate with the backend through REST endpoints, enabling users to interact with four key functions: 3D video visualization, current imagery comparison, voice narration, and the forthcoming forecasting module. The Graph-RAG reasoning pipeline will connect the Neo4j database to the model layer, supporting multi-hop query responses and interpretability. This modular integration ensures scalability, allowing the system to evolve into a fully automated, cross-disaster simulation platform capable of real-time forecasting and multimodal educational engagement.