**NASA Space Mission AI Project Conceptual Design Track**

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**Project Proposal**

Title: AI-Based Space Mission Planner

**Goal:**

Design an artificial intelligence system that can simulate and optimize interplanetary mission planning.

**Justification:**

Space missions are complex and full of uncertainties. AI systems, especially those using reinforcement learning and simulation, can enhance mission planning capabilities.

**Scope:**

- Missions to Mars and the Moon - Cargo and crew mission planning - Emergency rerouting logic

**AI Techniques:**

- Reinforcement Learning - Supervised Machine Learning - Simulation-based AI planning

**Detailed Solution Plan System Architecture:**

1. Input Layer: - Destination, constraints, payload

2. Environment Simulation: - Gravity models, hazard zones

3. AI Engine: - Reinforcement Learning Agent - Predictive Models

4. Output Layer: - Mission timeline and route Tools: - Python, TensorFlow, OpenAI Gym, NASA SPICE Toolkit Challenges: - Hazard prediction, resource optimization, autonomous control

**Testing Plan**

Simulation Testing: - Earth-to-Mars and Earth-to-Moon scenarios - Stress tests: early fuel loss

Evaluation: - Fuel efficiency, mission success probability, hazard avoidance Validation: - Compare with NASA data - Simulated test flights

**README.md Summary**

This project proposes an AI-powered mission planning system that uses simulation and machine learning to optimize space missions.