

Stage 1

Natural Language Problem Description

Domain, objects, initial state, goals

LLM Plan Generation

DSPy + Gemini Flash | domain-specific prompts + few-shot demos

retry with
error history

Stage 2

Structural Verification

Format check | precondition validation | action schema match

Layer 1

pass

Stage 3

Symbolic Verification

VAL validator | full state-space trace

Layer 2

pass

Three-Layer
Verification
Pipeline

Stage 4

Domain-Specific Physics Validation

Physical constraint checking | state transition simulation

Layer 3

fail

Stage 5

LLM Auto-Repair

Cumulative error history | targeted re-generation

max retries
exceeded → fail

pass

pass

Verified Plan

Formally validated PDDL plan