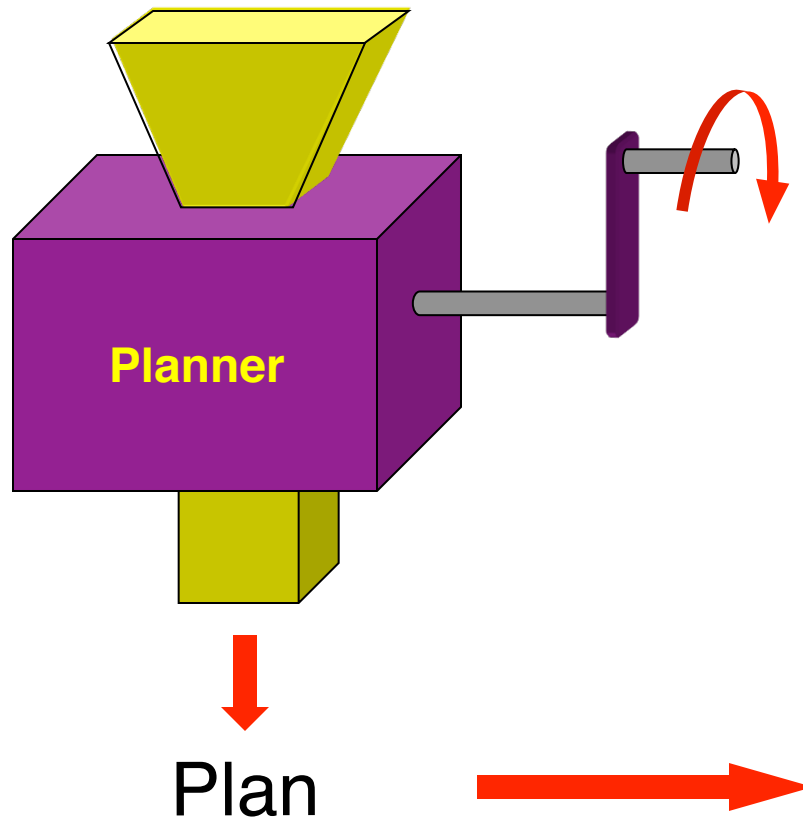


Planning as an Iterative Process

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The Classical Paradigm

Initial State
Goals
Action Descriptions



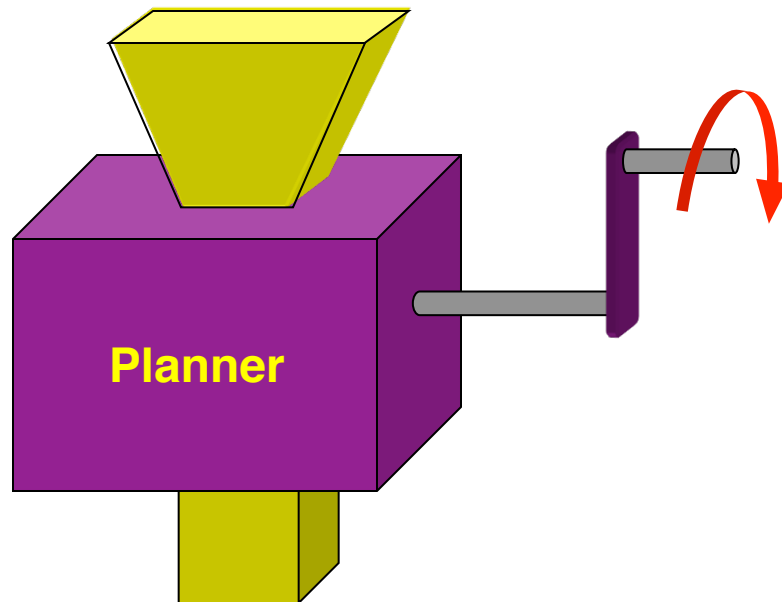
Improvements

Richer

Initial State
Goals
Action Descriptions

(timed initial literals)
(optimization, preferences, goal constraints)
(time, numeric fluents, derived predicates)

Faster
(heuristics)



Bigger

Plan



Rover SOWG



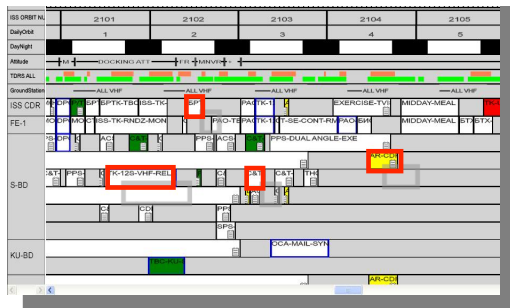
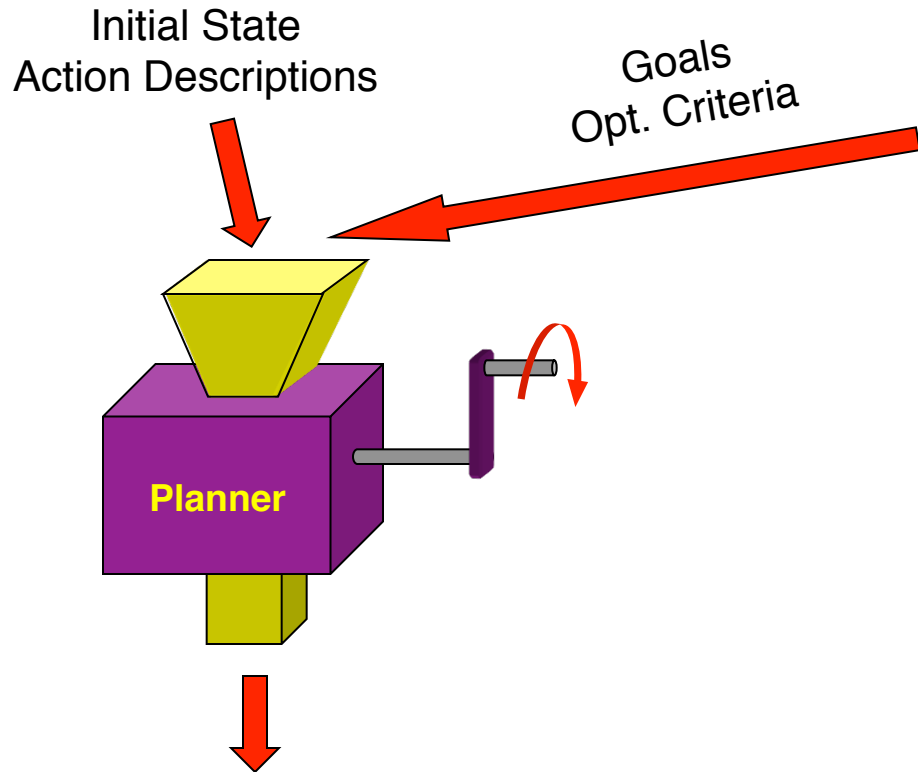
Planetary Geologists
Atmospheric Scientists
Biologists

Engineering specialists:

- rover mobility
- arm placement
- instruments
- power system
- thermal



We'd like to think that ...



Characteristics



- Over-subscription
 - multiple competing goals & limited resources
- Temporal
 - concurrency, durations, time constraints
- Resources
 - battery charge, data storage, duty cycles
- Uncertainty
 - pose, terrain, resource levels, action durations, ...
- Partially specified preferences
 - goals, times



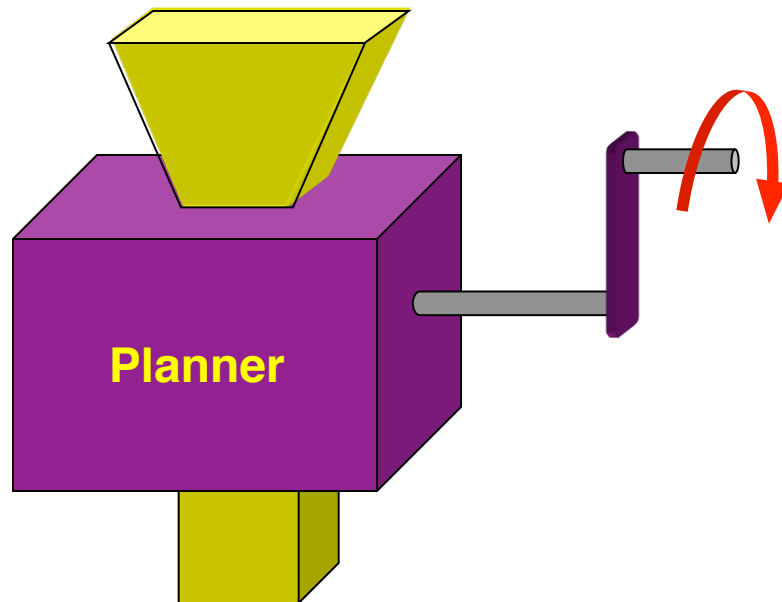
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Challenges

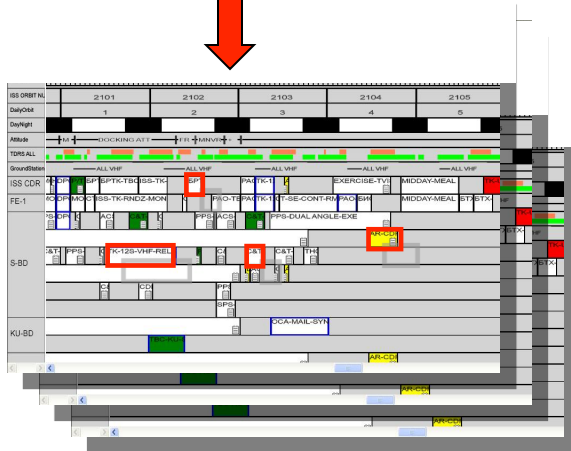
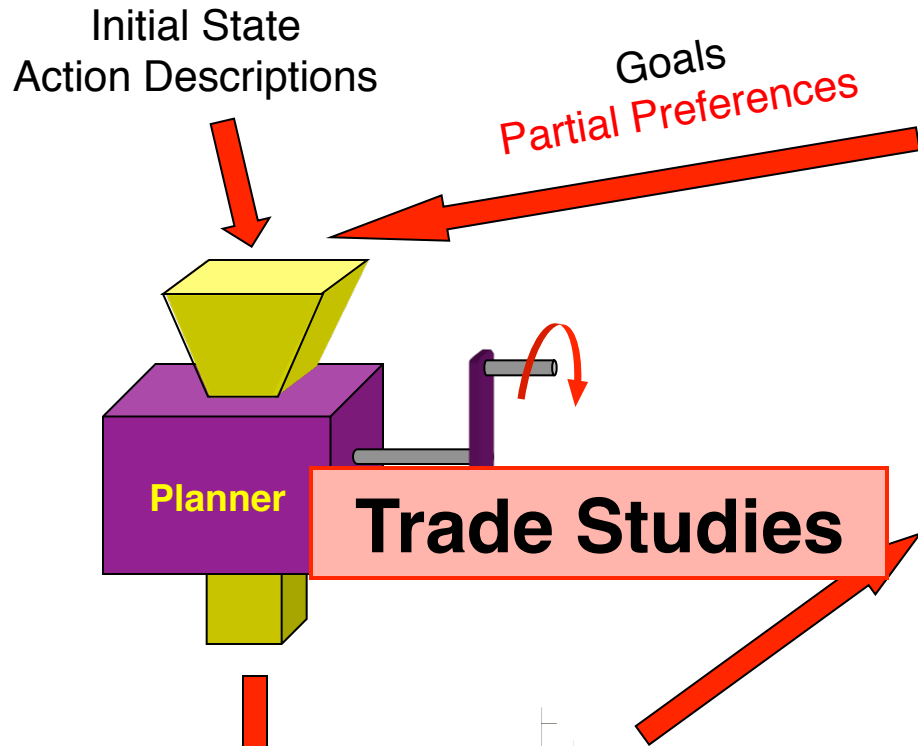


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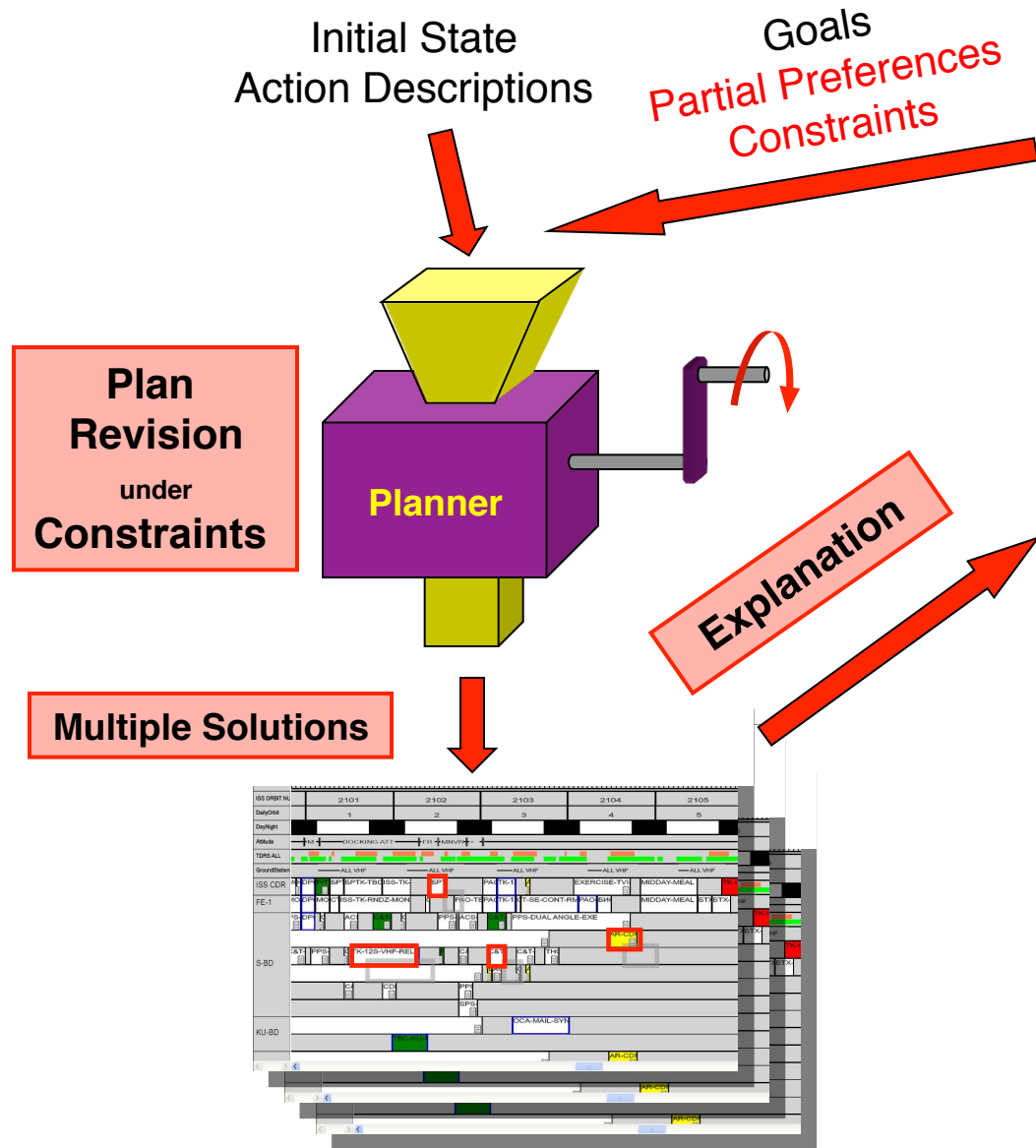
All these together!

The Process



How they reach agreement

Implications



Plan revision under constraints

- include these actions/goals, but don't do this before that
- don't include these goals unless nothing else will fit

Multiple, qualitatively different plans

- varying goal utilities
- varying resources/time consumption

Explanation

- abstraction
- answering questions about the plan

Answering Questions

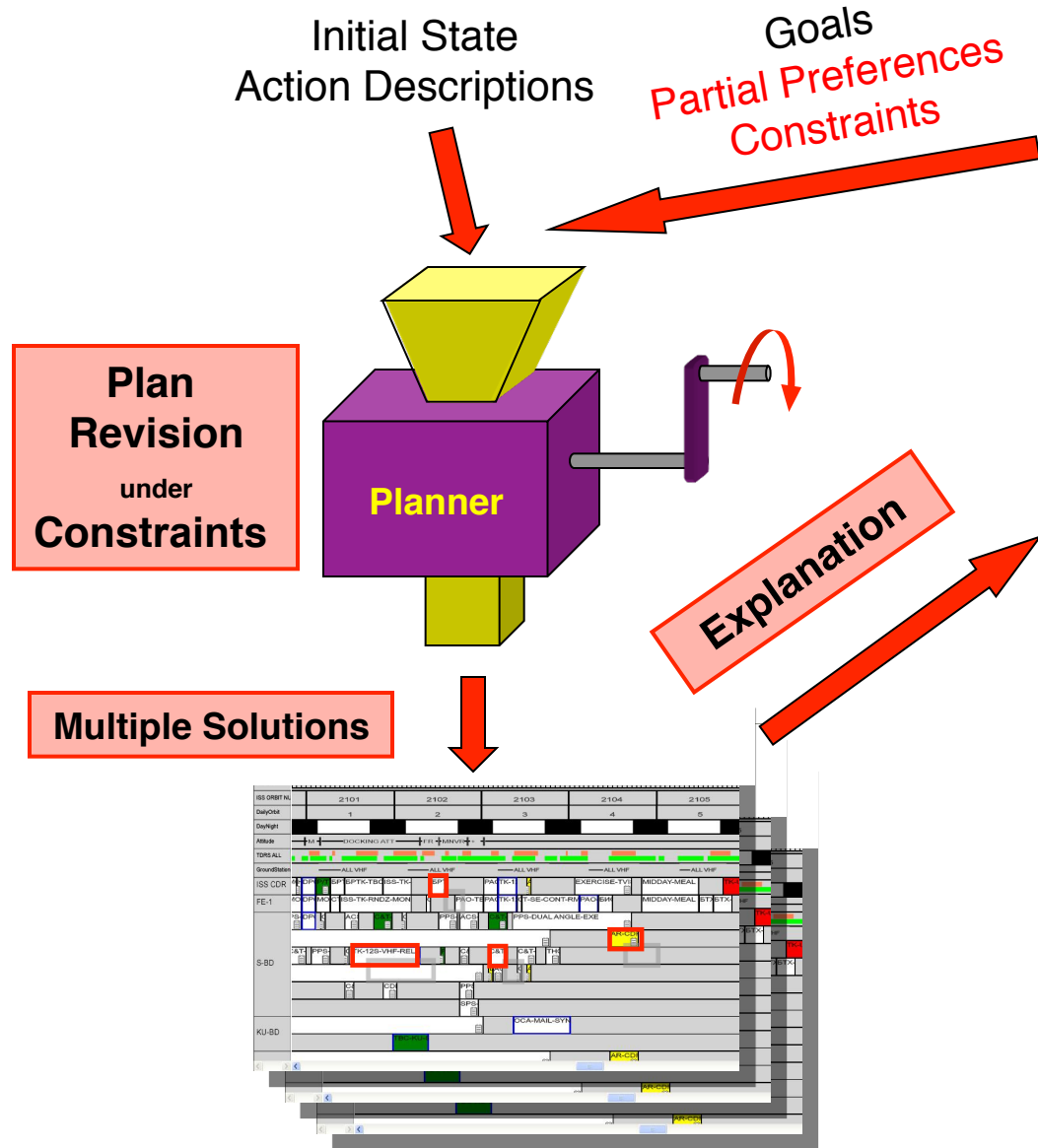
Why is this action in the plan?
Why is action A_1 before A_2 ? } Causal structure

What would happen if you delayed A_1 until 13:00?
Why wasn't this goal included instead?
Why didn't you satisfy this preference? } Hypothetical



Planning
+
Comparison

The Overall Picture



Preference Elicitation



Thanks!