



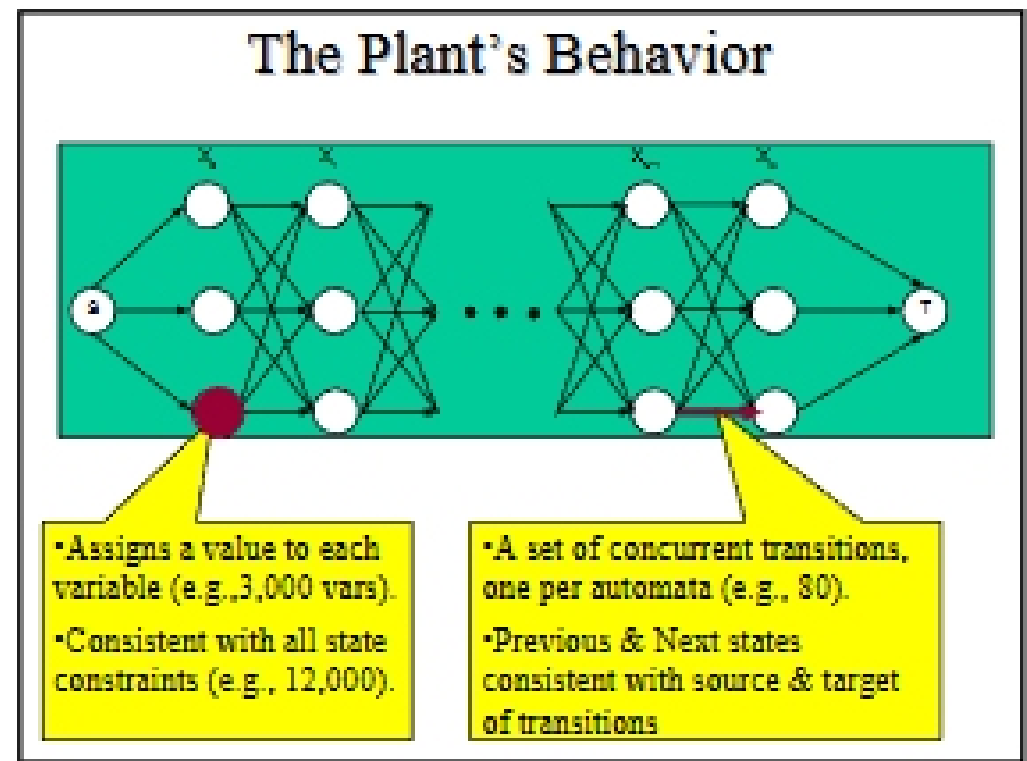
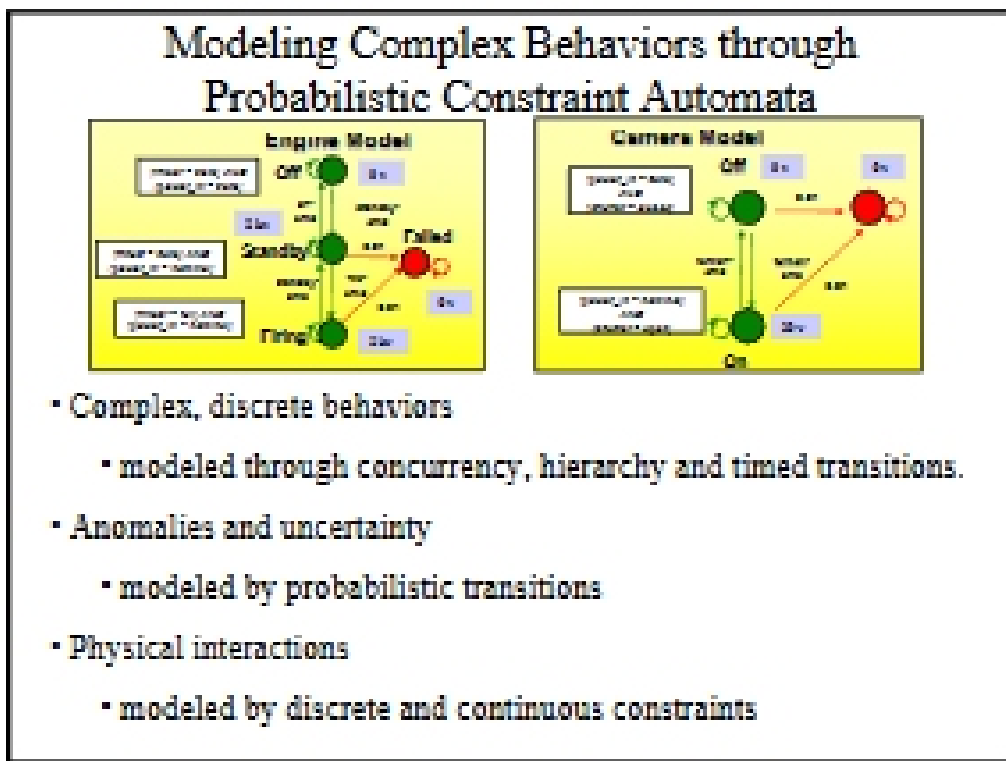
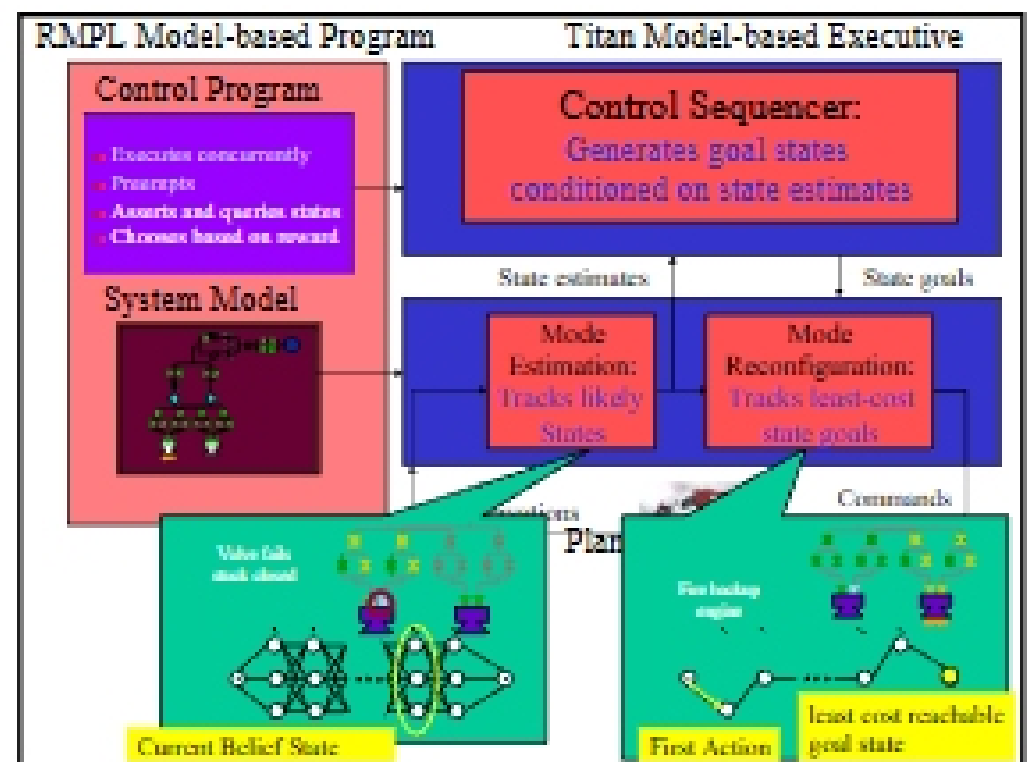
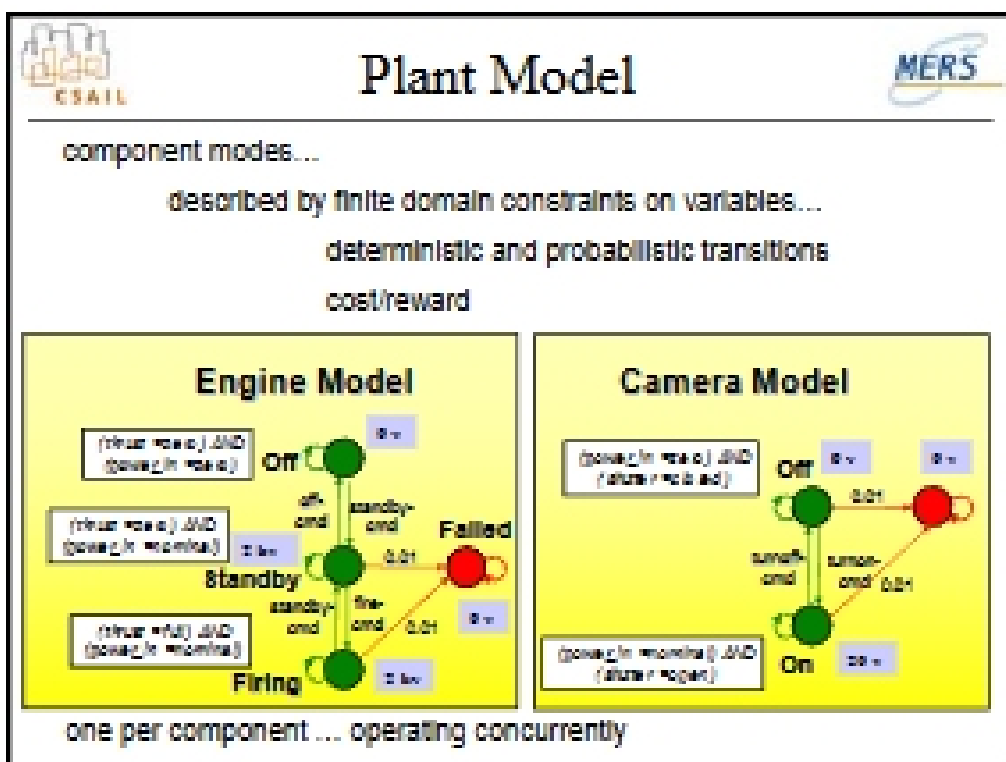
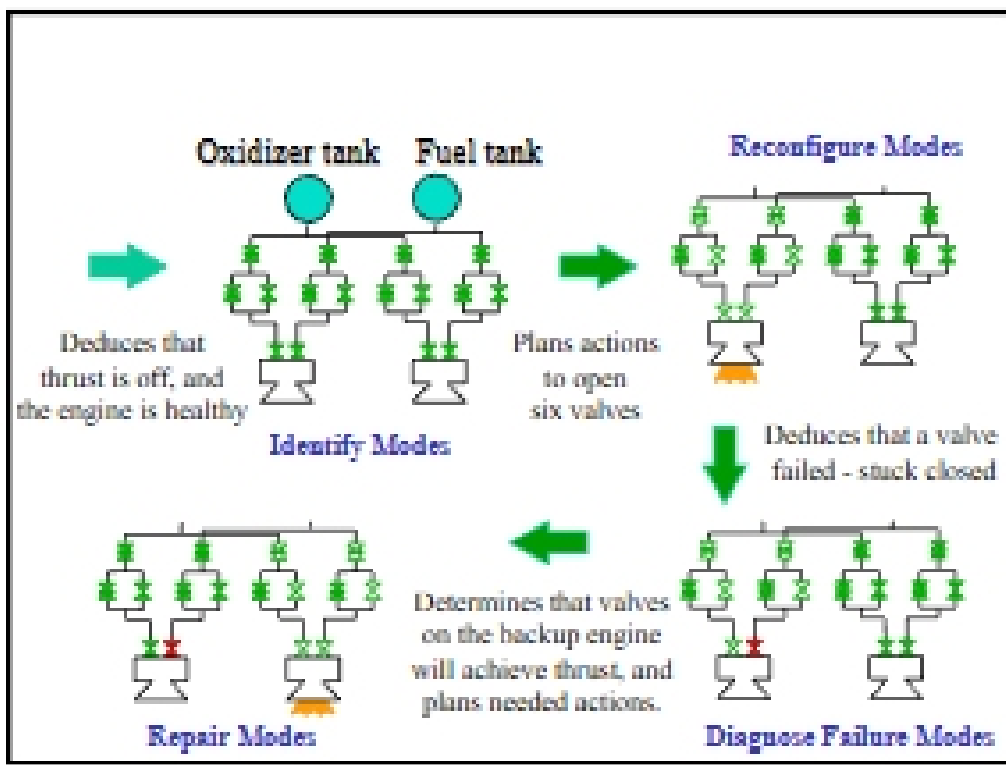
# Model-based Programs

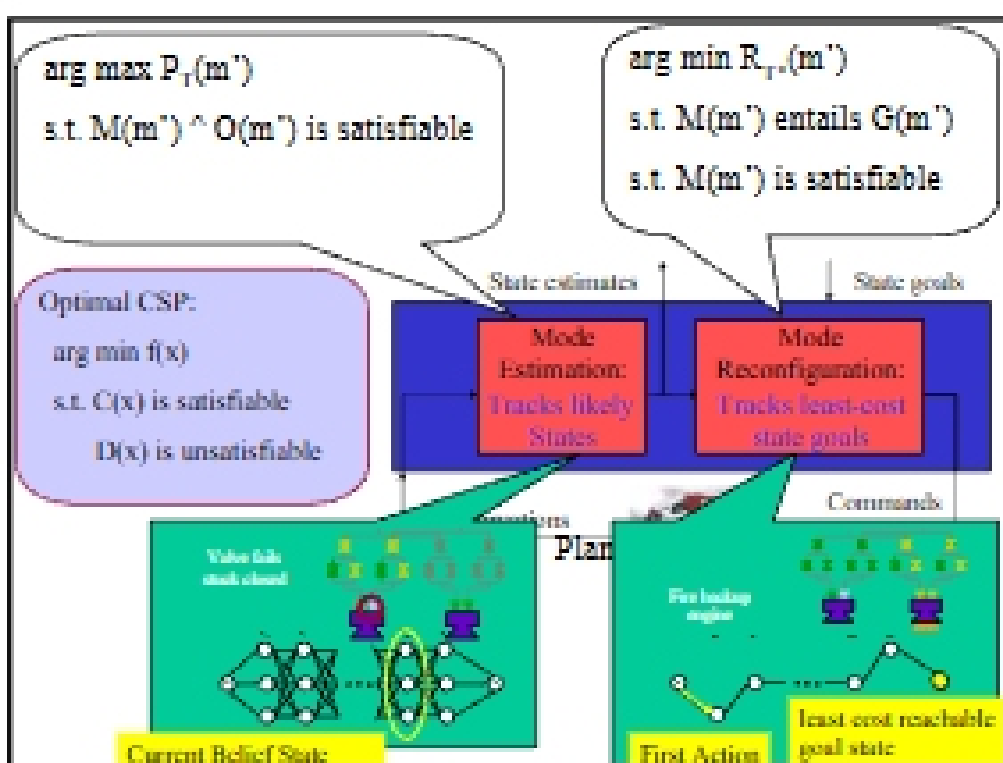
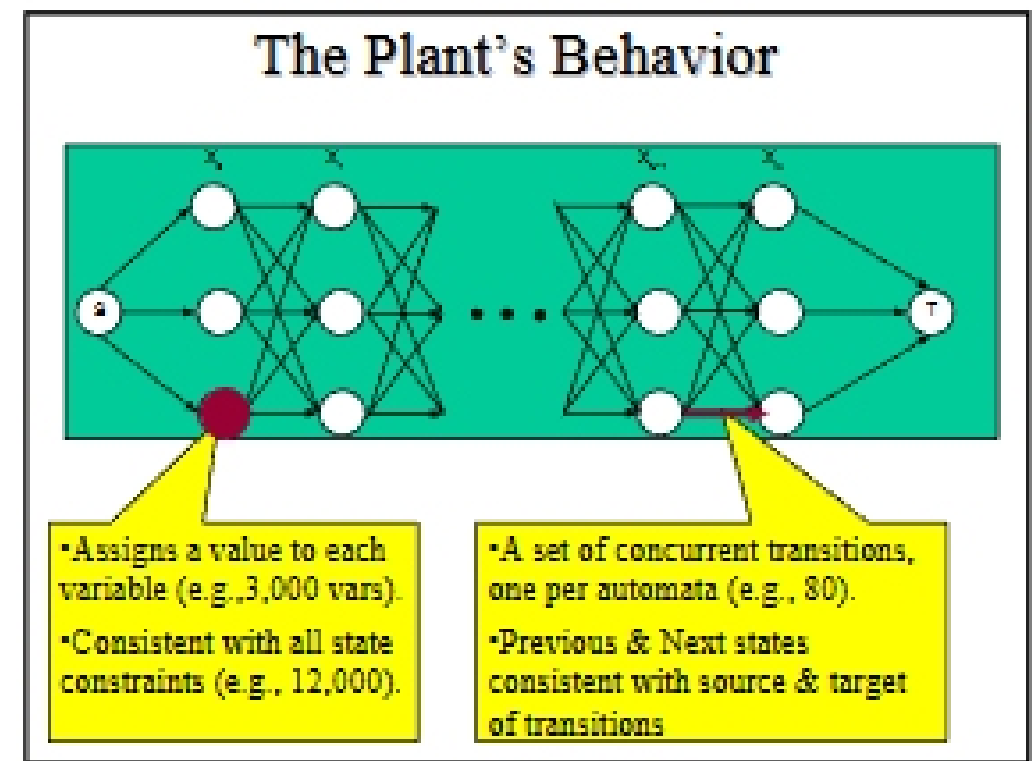
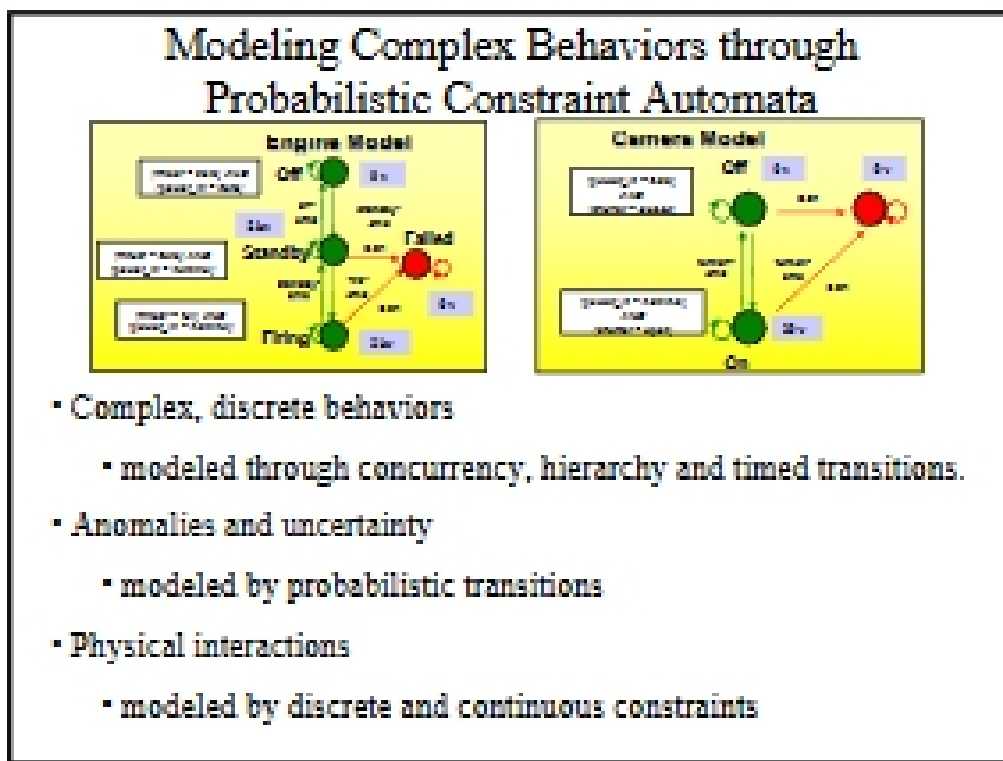
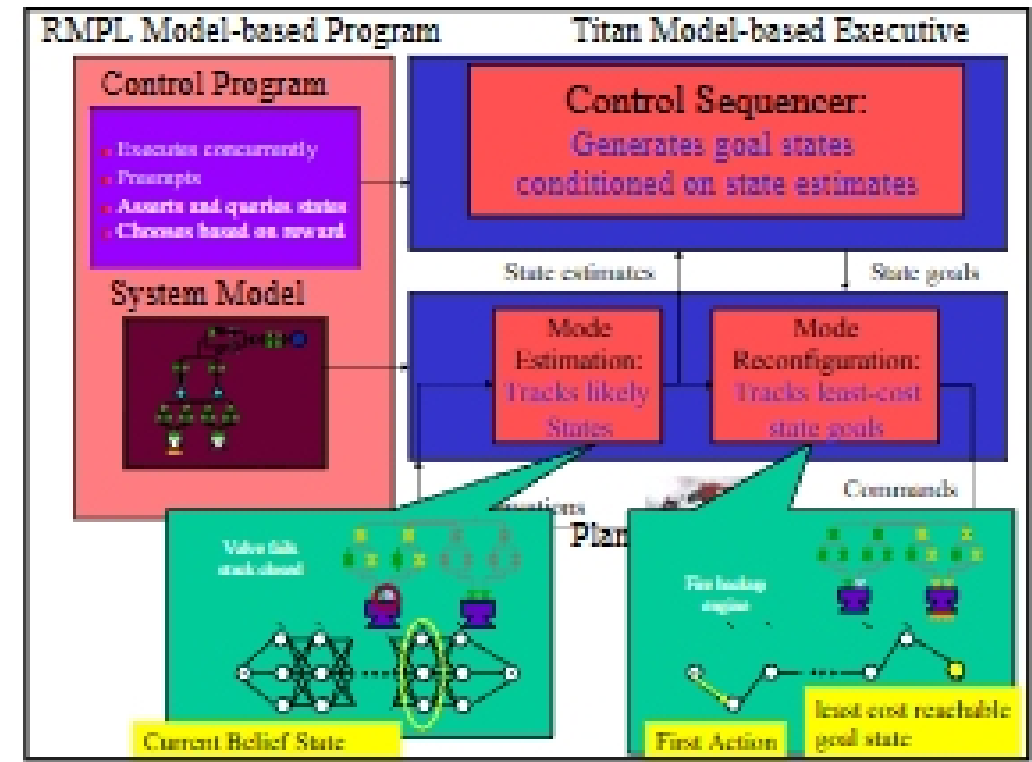
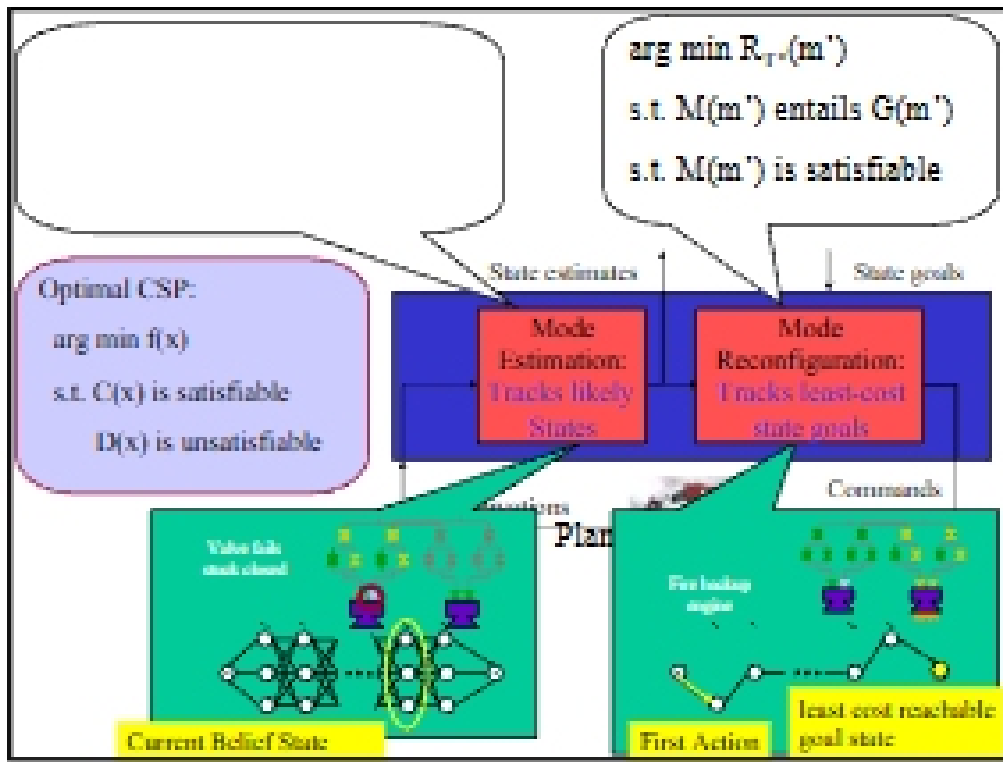
- Control program specifies **state trajectories**:
- fires one of two engines
  - sets both engines to 'standby'
  - prior to firing engine, camera must be turned off to avoid plume contamination
  - in case of primary engine failure, fire backup engine instead

```

Ordinate()
(do-waiting ((Engine1 = Thrusting) OR
            (Engine2 = Thrusting)))
(parallel
  (Engine1 = Standby)
  (Engine2 = Standby)
  (Camera = Off))
(do-waiting (Engine1 = Failed)
  (when-doneat ((Engine1 = Standby) AND
                (Camera = Off))
    (Engine1 = Thrusting)))
(when-doneat ((Engine1 = Failed) AND
              (Engine2 = Standby) AND
              (Camera = Off))
  (Engine2 = Thrusting))
  
```

- Plant Model describes behavior of each component:
- Nominal and **Off nominal**
  - qualitative constraints
  - likelihoods and costs





- ## Outline
- Fault Aware Systems Through Model-based Programming
  - Diagnosis as Detective Work
  - Model-based Diagnosis