



ENGINEERING SPECIFICATION FOR TSAFE STUDY

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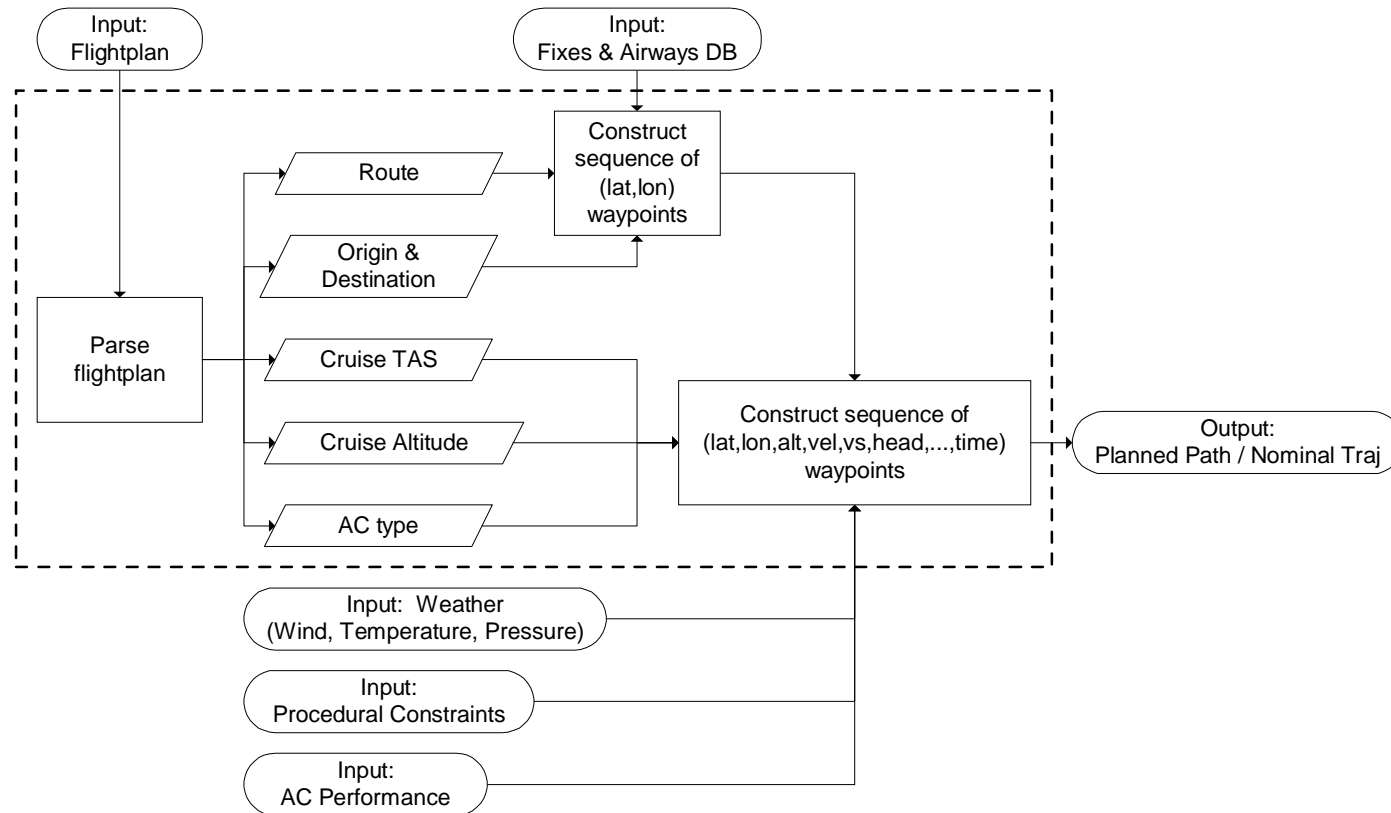
REQUIRED MODULES

- **Trajectory prediction (Planned path & Dead reckoning)**
 - † Horizontal vs. vertical
 - ⇒ Assumptions
 - ⇒ Equations of motion
 - † Conformance basis at any given position
- **Conformance monitor (AKA “Trajectory tracking module”)**
 - † Model-based
- **Conflict probe**
 - † Planned path
 - † Dead-reckoning





TRAJECTORY PREDICTION (Planned Path / Conformance Basis)

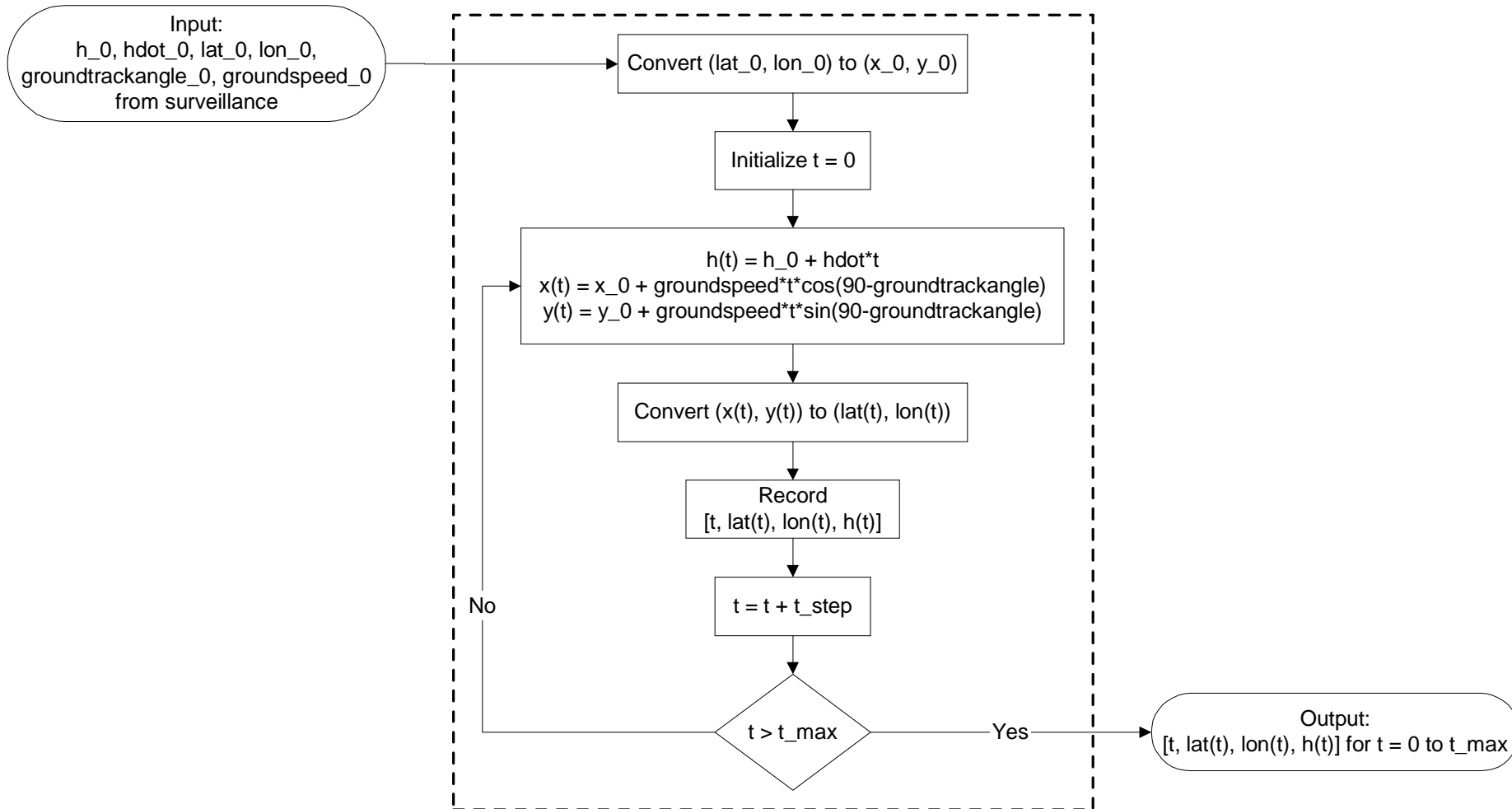


- **Questions**

- † When does planned path get updated?
- † How do we initialize time?
- † What parts of the planned path are based on ATC input and assumed A/C performance and what parts are based on actual aircraft states? (e.g. vertical speed)
- † Are straight lines between waypoints and discreet velocity jumps good enough, or do we need to model turns and accelerations?

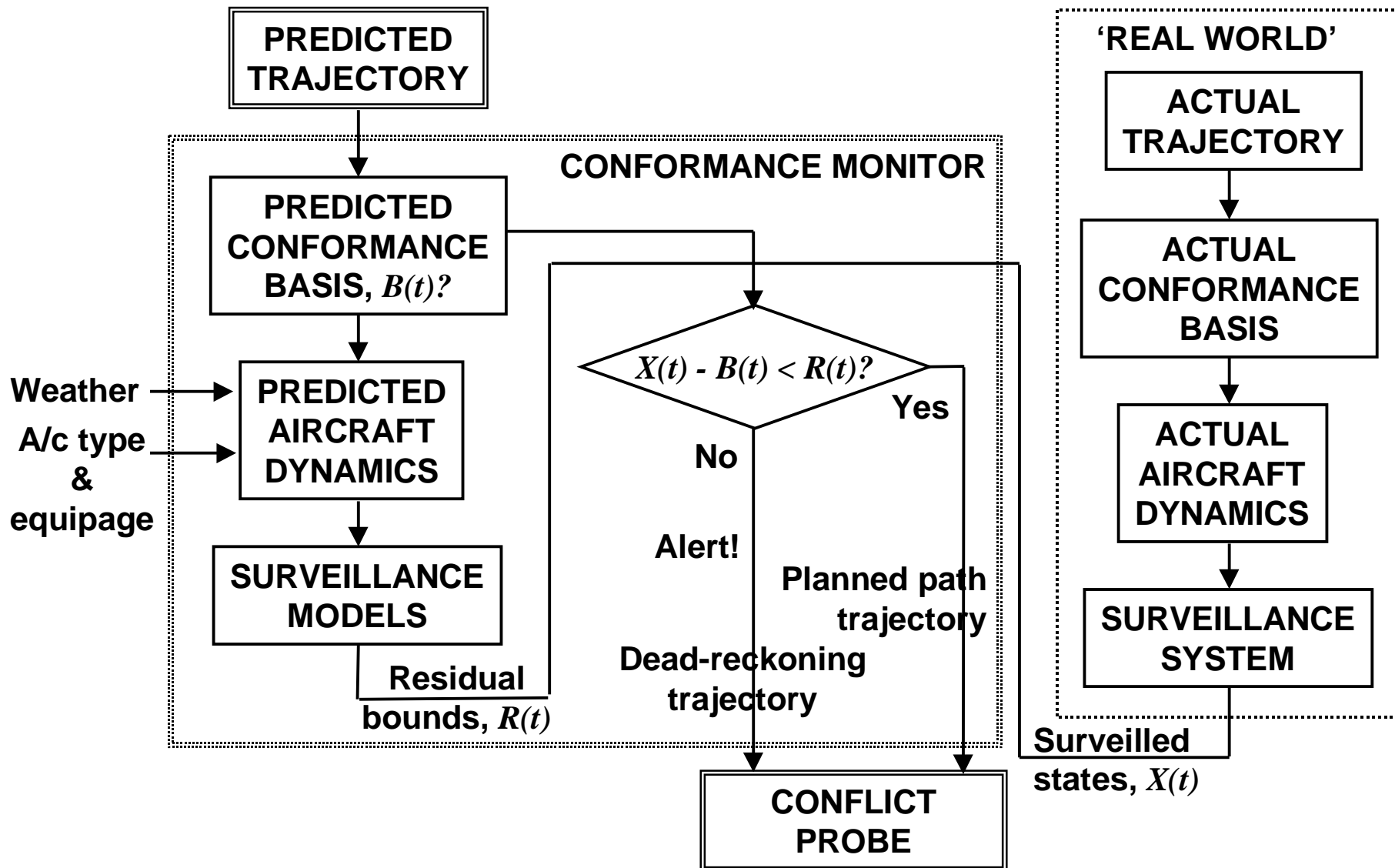


TRAJECTORY PREDICTION (Dead Reckoning)



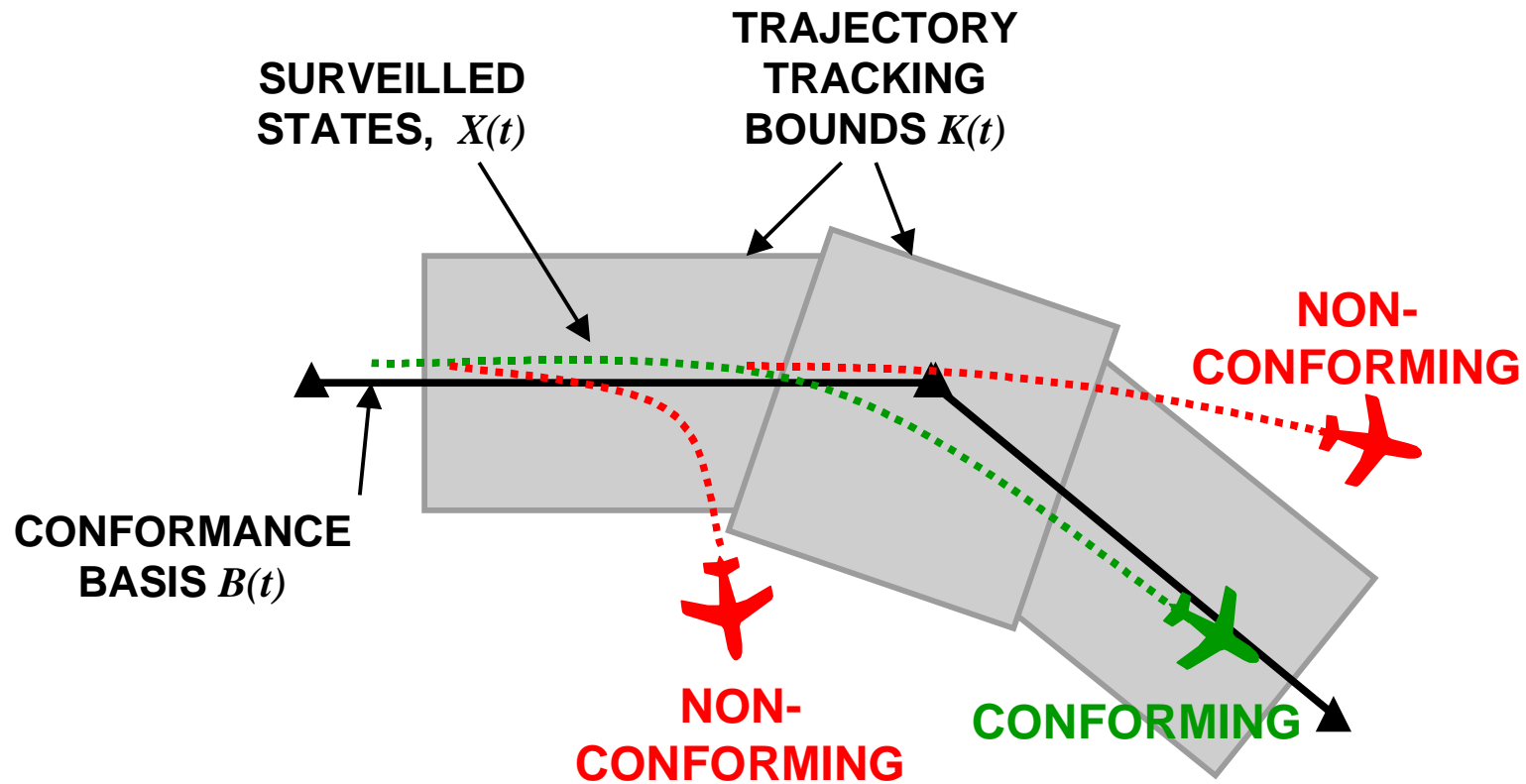


CONFORMANCE MONITORING (advanced: real-time modeling)



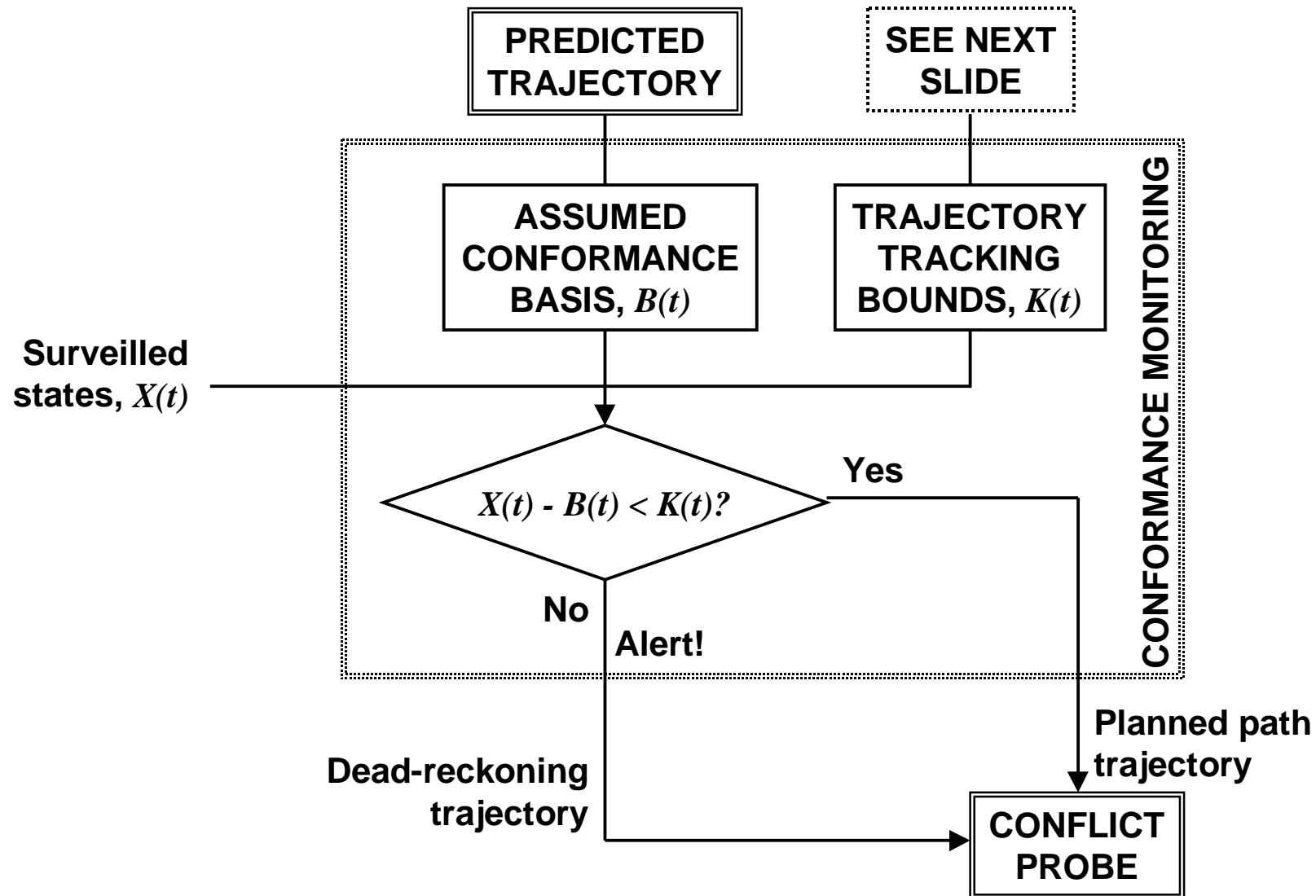


CONFORMANCE MONITORING (simplified)



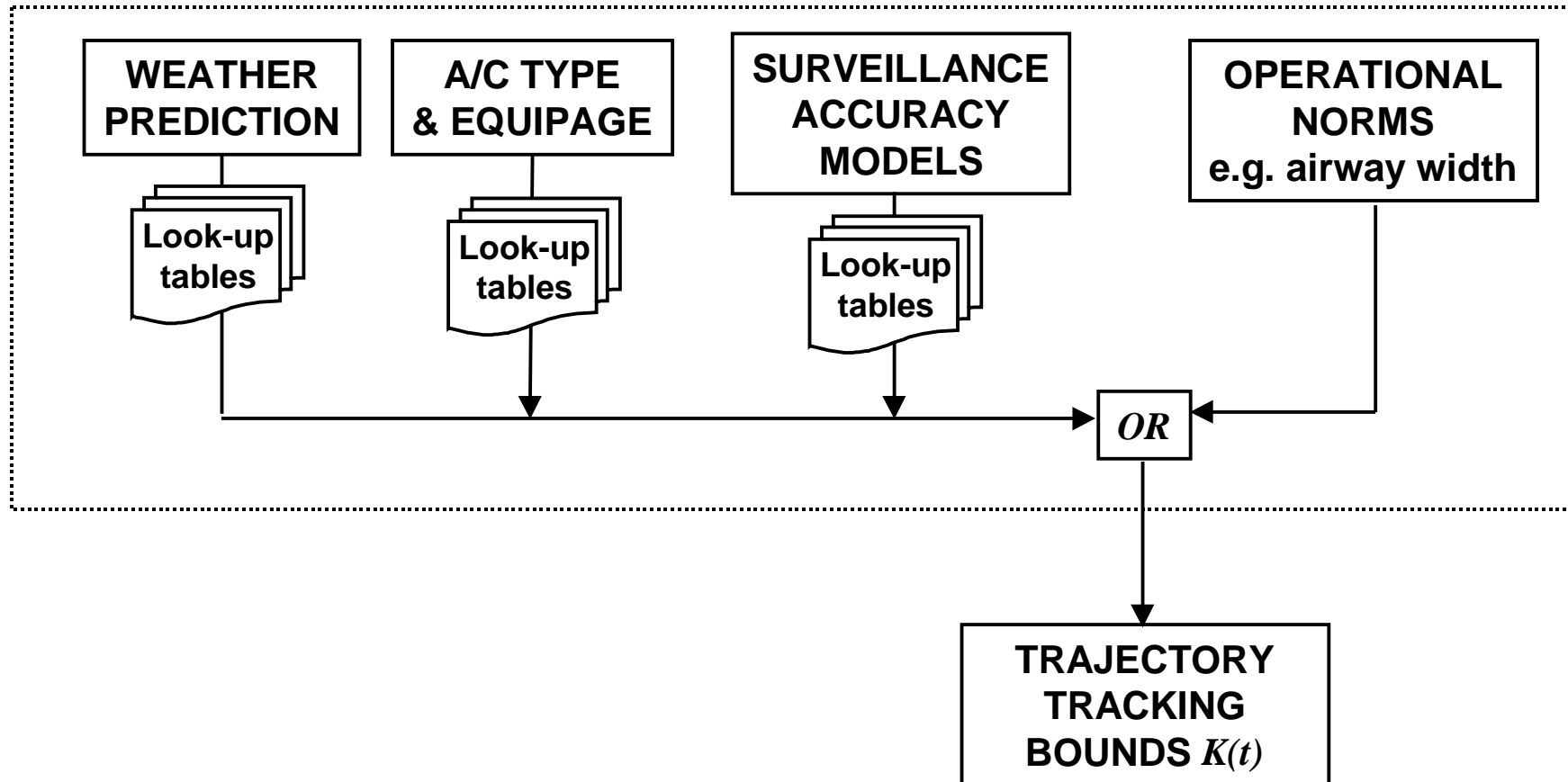


CONFORMANCE MONITORING (simplified: lookup tables)



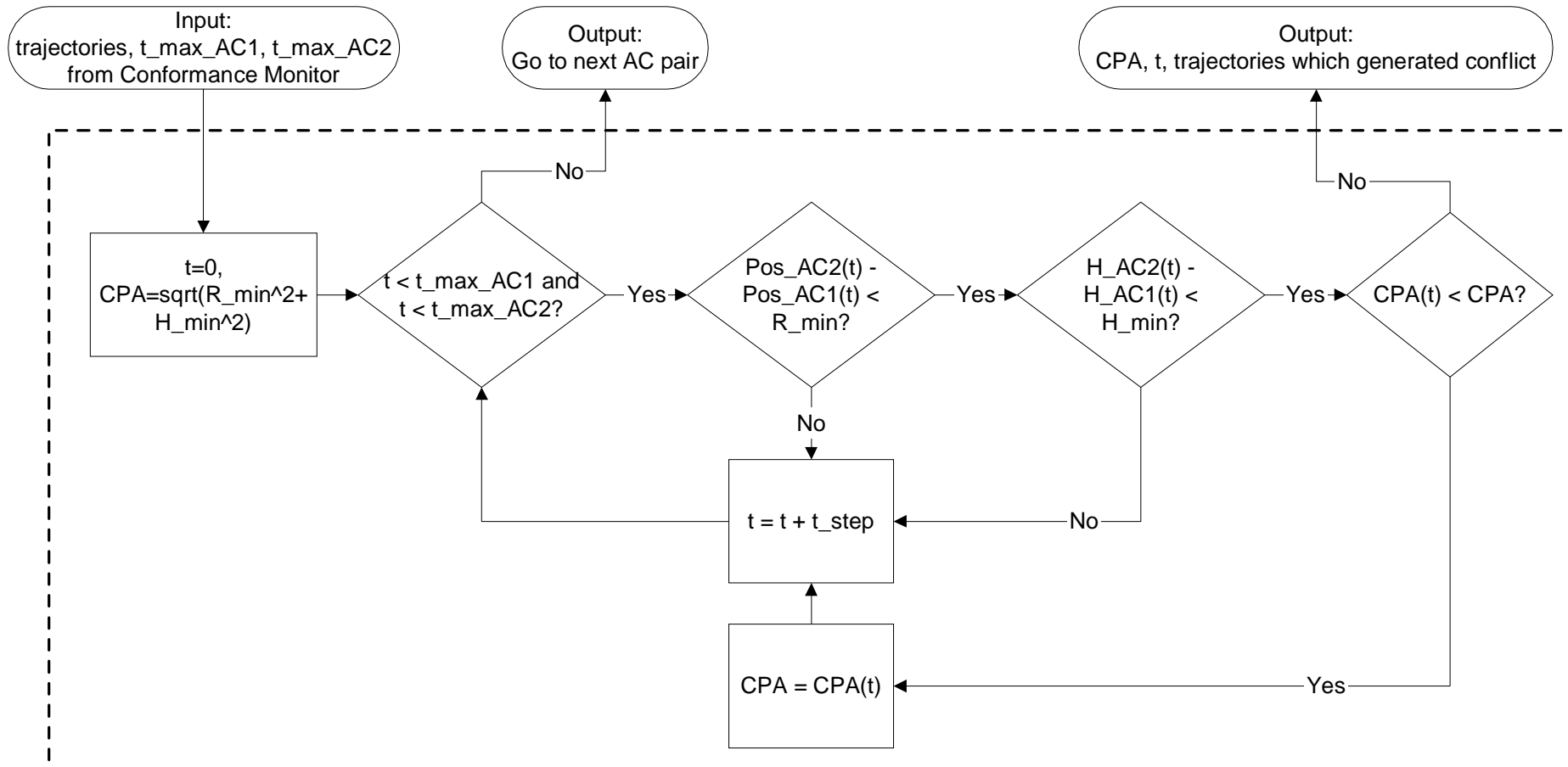


TRAJECTORY TRACKING BOUND INPUTS





CONFLICT PROBE



- **Supporting Functions**

- † Lat/Lon to cartesian coordinate transform
- † Logic to determine risk of conflict (moderate/high)