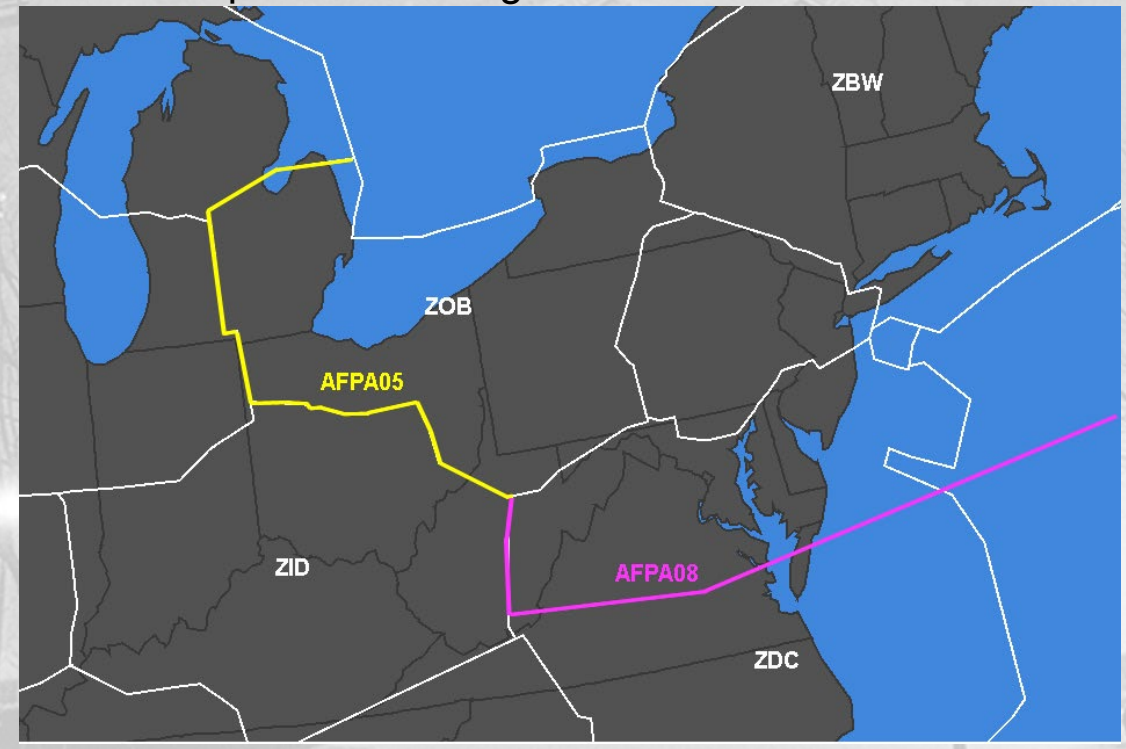
Aviation Weather Forecasts as Actionable Information: Support of Air Traffic Flow Management

Philip J. Smith
Department of Integrated Systems Engineering
The Ohio State University

- Advances in air traffic flow management reliant on weather information
  - Ground Delay Programs
  - Airspace Flow Programs
  - Coded Departure Routes
  - Playbooks
  - TBFM
  - Expected Departure Clearance (EDC)
  - Dynamic Weather Routes (DWR)
  - PDRR/ABRR
    - Use with trajectory Option Sets
    - Surface CDM
  - Collaborative Trajectory Operations Program
    - CTOP

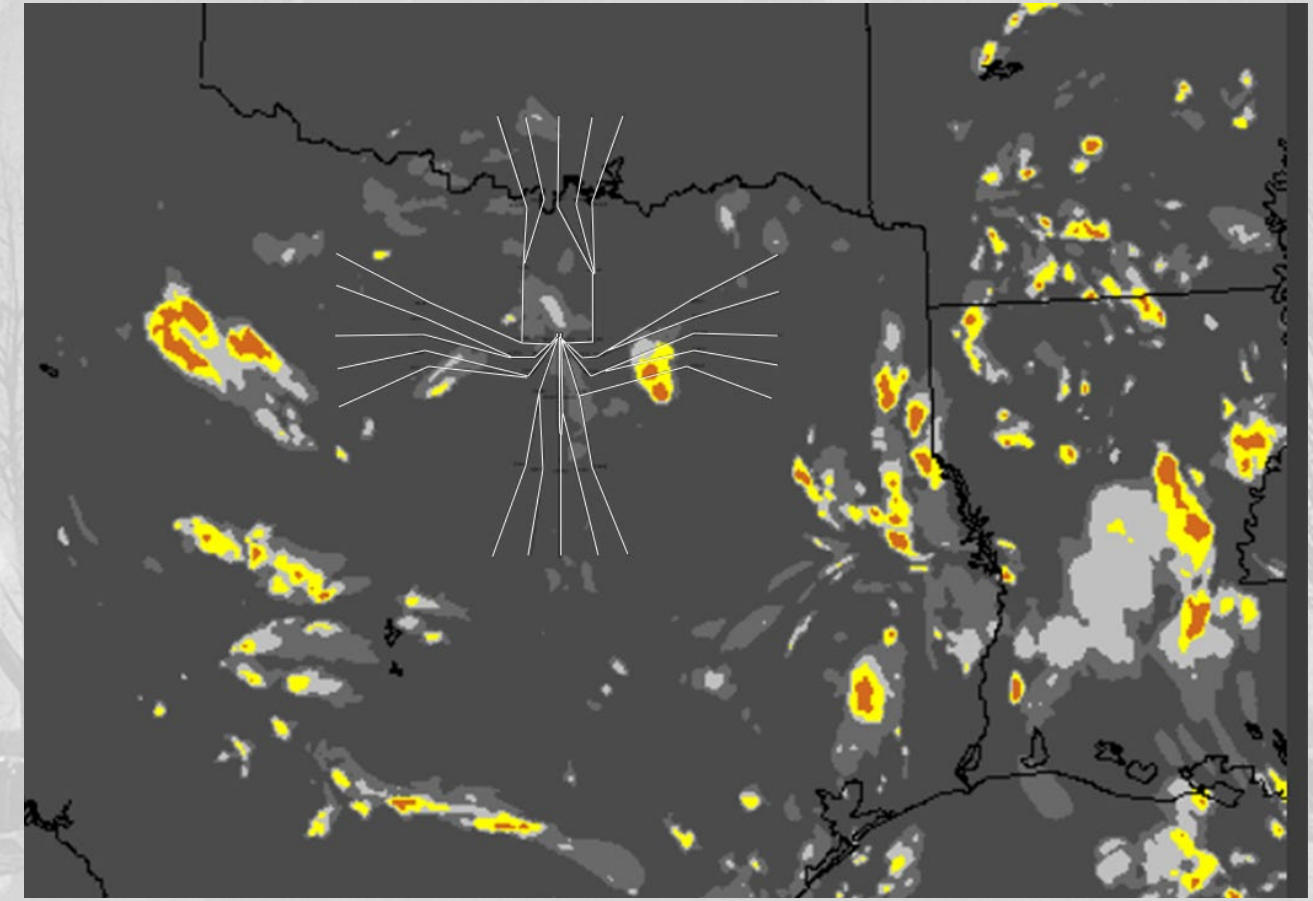
- Key concepts:
  - Time varying uncertainty (strategic planning to support tactical adjustments)
  - Development of reservoirs to enable adaptation based on uncertainties
- Solution: Continuous adaptive planning
  - Weather forecast - Needs:
    - Strategic planning
      - Assessment of uncertainties
      - Translation of weather data into TFM and FOC constraints
      - Development of contingency plans
      - Asynchronous collaborative constraint propagation to coordinate (TFM and FOCs)
    - Monitoring
    - Tactical adaptation

- Key concepts:
  - Development of reservoirs to enable adaptation
    - Airspace Flow Programs

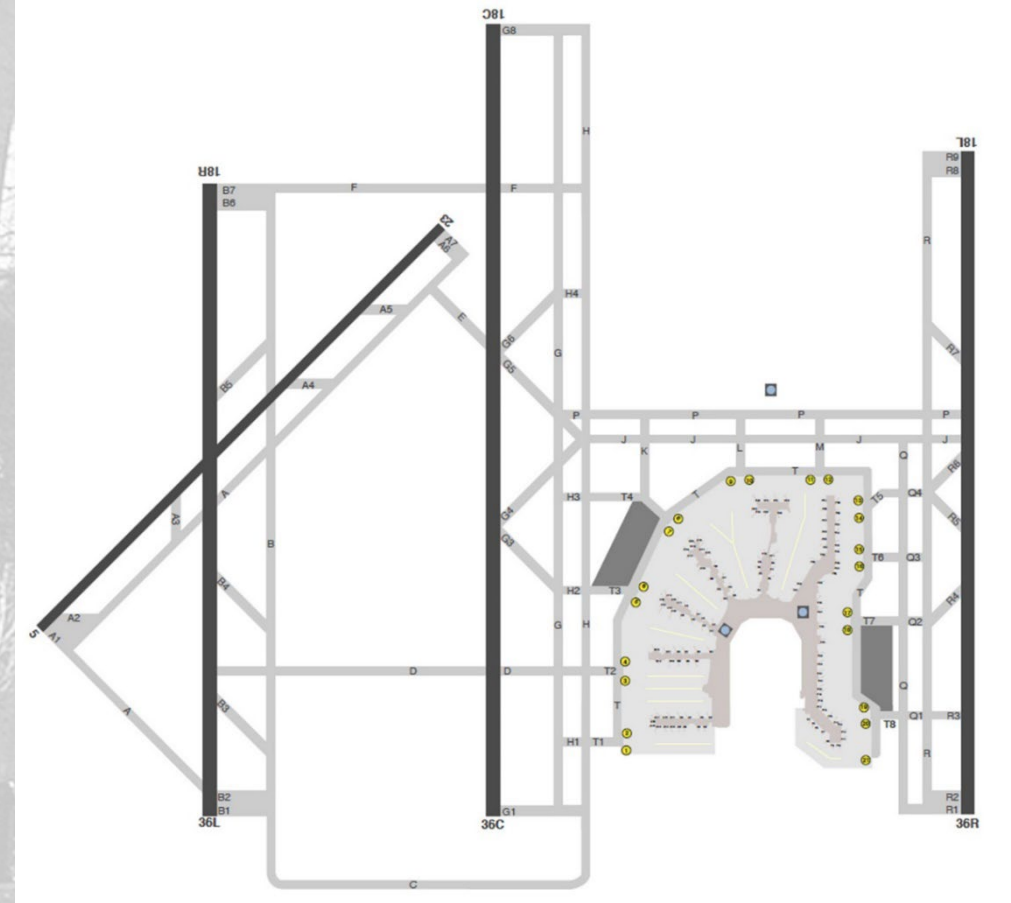


AFPA05: EDCTs plus call for release for ZOB departures

- Key concepts:
  - Asynchronous collaborative constraint propagation to coordinate (TFM and FOCs)



- Key concepts:
  - Asynchronous collaborative constraint propagation to coordinate (TFM and FOCs)



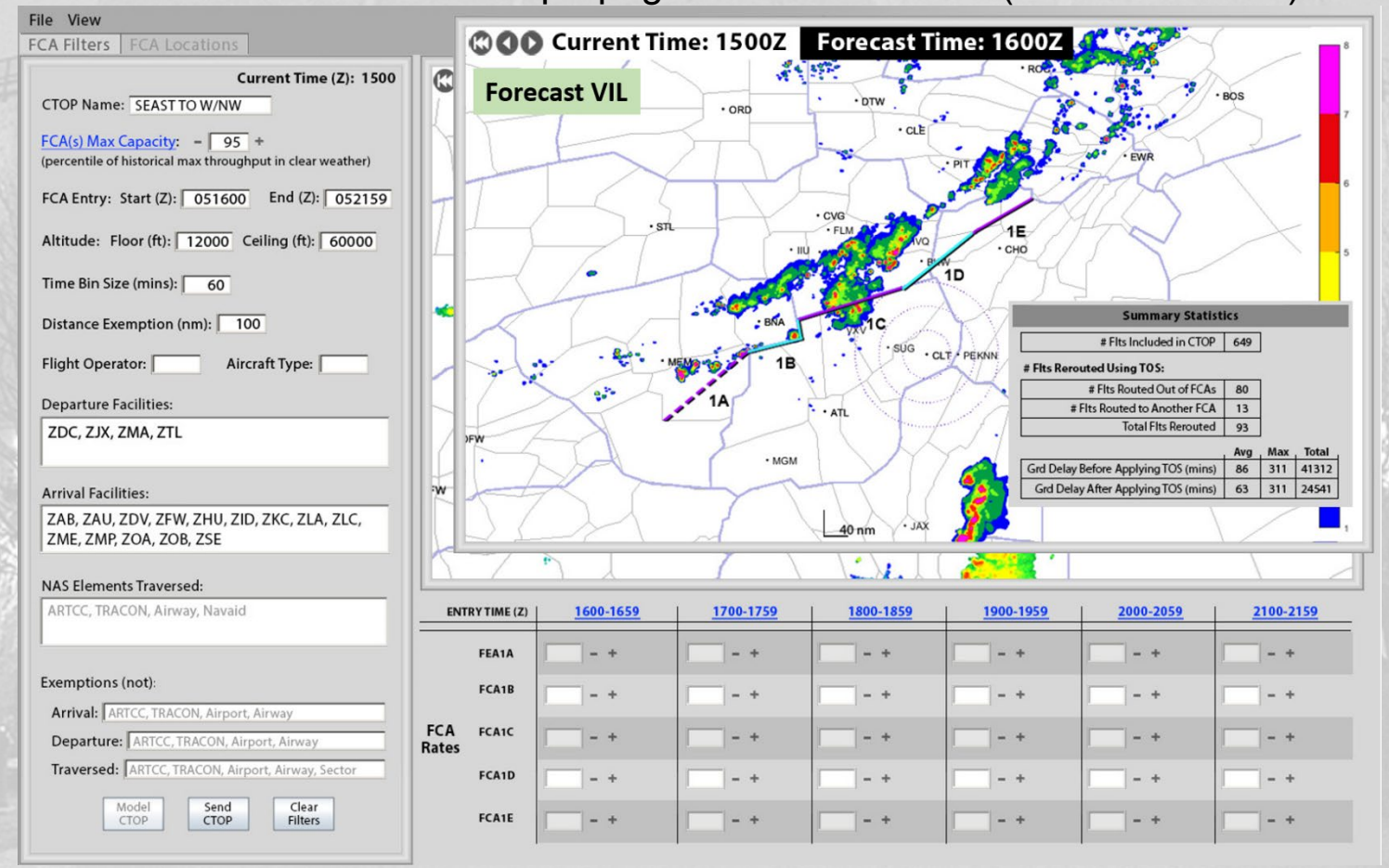
Future Concept

Past development→ Future integration of tools

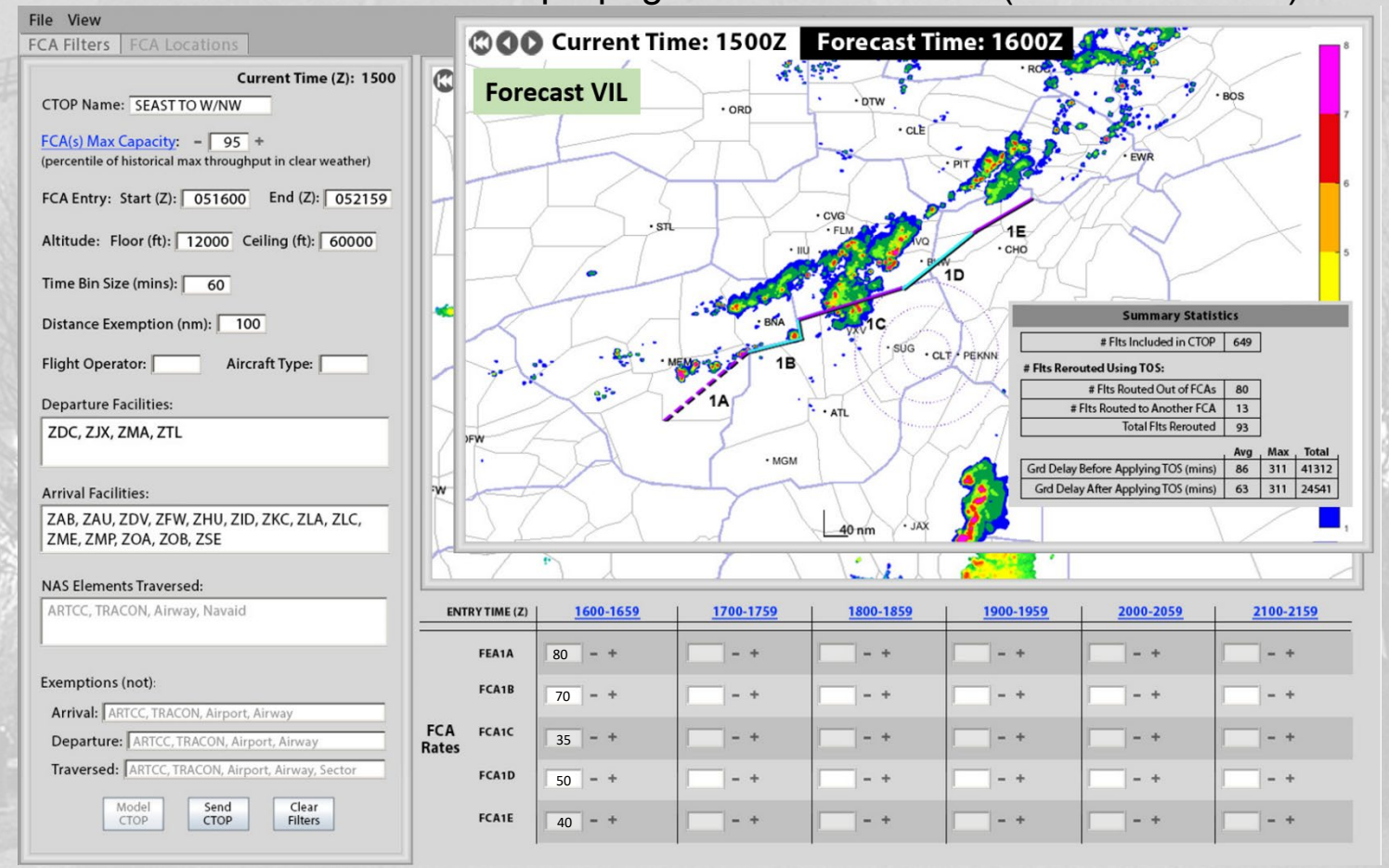
- Surface CDM for strategic planning to produce inventory (categorical SMPs)
- Integration of PDRR and EDC to indicate departure delays associated with alternative reroutes
  - TOS indicates flight-specific constraints
  - TM indicates At-or-After time
  - EDC indicates release times for alternative departure fixes (in PDRR)
  - TM reroutes using PDRR
  - Departure Controller plans for use of two departure queues and adjusts sequences within each queue

  ("Give the departure controller a fighting chance")

- Key concepts:
  - Collaborative constraint propagation to coordinate (TFM and FOCs)



- Key concepts:
  - Collaborative constraint propagation to coordinate (TFM and FOCs)



1600-1659
FEA1A: 80%
FEA1B: 70%
FEA1C: 35%
FEA1D: 50%
FEA1E: 40%