Interaction Between Strategic and Local Traffic Flow Controls

Operational Need
The loosely coordinated set of traffic flow management initiatives that are operationally implemented at the national- and local-levels have the potential to under, over, and inconsistently control flights.

Approach
• Integrated NASA's Future ATM Concepts Evaluation Tool (FACET) with NASA's Traffic Management Advisor (TMA)
• Integrated system used to investigate the interactions between Ground Delay Programs and arrival scheduling, playbook rerouting and arrival scheduling and TMA Flow Programs and arrival scheduling

Benefits
• Better coordinated strategic and local traffic flow controls
• More equitable distribution of delays
• Reduced unnecessary delay and fewer delayed flights

Dallas/Fort Worth International arrivals controlled by an uncoordinated Ground Delay Program and arrival scheduling

Integrated system developed to explore interactions between strategic and local traffic flow controls

Dallas/Fort Worth scenario showing 52% of all arrivals receiving uncoordinated GDP and arrival scheduling delays

• Flights subject to excessive uncoordinated GDP and TMA delays
• Integrated system can be used to understand and correct this problem
Interaction Between Strategic and Local Traffic Flow Controls

Shon Grabbe

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Motivation

- GDP assigns pre-departure delays
- TMA assigns airborne delays

- GDP assigns pre-departure delays
- TMA assigns pre-departure delays
Key Messages

- Integrated environment under development to explore and improve the interaction of national, regional and local level Traffic Flow Management controls

- Systems used to identify potential sources of inequity ("double penalization") in the National Airspace System
Technical Challenges

- Traffic Flow Management consists of a loosely coordinated set of ground holding, airborne holding and rerouting controls.

- Integrated impact of these controls are not well understood.

- Controls tend to under, over and inconsistently control traffic flows.
Integrated Simulation Environment

User schedules and flight plans → Airspace Adaptation Data → NASA's Future ATM Concepts Evaluation Tool (FACET) → Observed traffic

x(t)
Integrated Simulation Environment

User schedules and flight plans

Airspace Adaptation Data

TFM Decisions

NASA's Future ATM Concepts Evaluation Tool (FACET)

x(t)

FAA's Flight Schedule Monitor (FSM)

Strategic Scheduling? (hourly)

Observed traffic
Integrated Simulation Environment

- User schedules and flight plans
- Airspace Adaptation Data
- NASA’s Future ATM Concepts Evaluation Tool (FACET)
- FAA’s Flight Schedule Monitor (FSM)
- NASA’s Traffic Management Advisor (TMA)

Observed traffic:
- Strategic Scheduling? (hourly)
- Local Scheduling? (every 20 sec.)
Sample Results

52% of all flights receive both TMA and GDP delays
Operational Ground Delay Program Scenario at DFW

64% of internal departures received ground delays from the Ground Delay Program and the Traffic Management Advisor.
Potential Benefits

- Reduction in avoidable delays and better use of NAS resources
- Improved coordination at the national-, regional and local-levels
- Better distribution of delays amongst all airline operators
- More consistently controlled and predictable traffic flows
Next Steps

- Integration with operational decision support tools (e.g., FSM, RRIA, TMA, CTOP, etc.)

- Enhance weather integrated decision making at the national-, regional- and local-levels

- Identify areas of collaboration with the service provider, industry and airline operators
Concluding Remarks

- Integrated environment under development to explore and improve the interaction of national, regional and local level Traffic Flow Management controls

- Systems used to identify potential sources of inequity (“double penalization”) in the National Airspace System