

Objective

Create high level model that relates airspace characteristics to overall airspace performance for use in FAA Strategy Simulator.

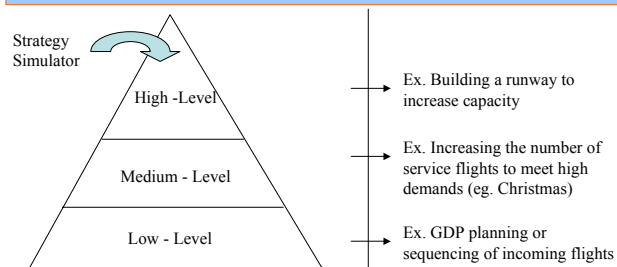
What is Strategy Simulator?

Strategy Simulator is a high level decision support tool for the Federal Aviation Administration to analyze the impact of new technologies for the entire NAS and devise new operational concepts and procedures.

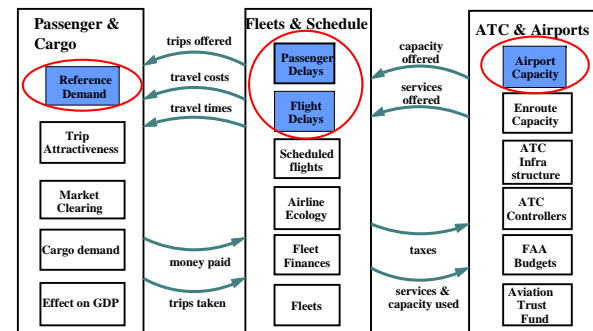
Some examples of problems addressed

- “Right” combination of demand management and infrastructure investments
- New FAA cost-recovery models
- Introduction of major new ATC technology

Where does it fit?



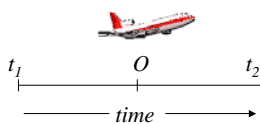
Strategy Simulator Model Overview



* UMD contributions for the model have been circled in red. R&D team consists of UMD, Ventana Systems, LMI, UC Berkeley, VPISU, MIT

Rho (ρ): Measure of airport utilization

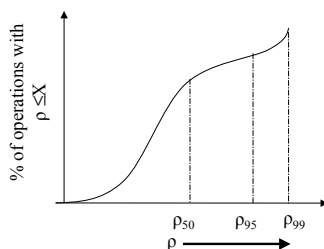
An airport operation is either a flight departure or flight arrival



$$\rho([t_1, t_2]) = \frac{\# \text{ Operations scheduled during } [t_1, t_2]}{\text{Capacity (in \# operations) during } [t_1, t_2]}$$

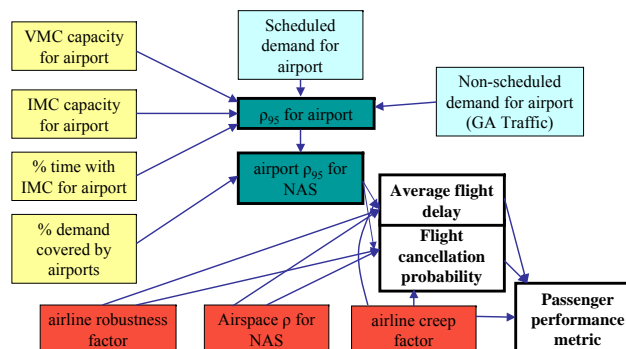
NAS- wide cumulative ρ distribution

A day-to-day ρ distribution is created across 32 NAS airports.

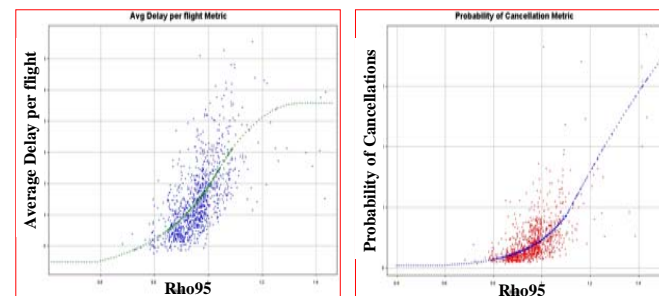


- ρ_{50}, ρ_{95} and ρ_{99} denote the median, 95th and 99th percentile of operations.
- ρ_{95} exhibited better prediction power than the other utilization measures.

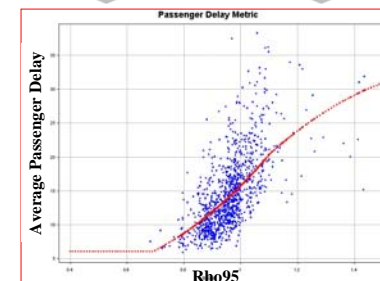
NAS Performance Model



Performance Metrics (NAS-wide daily model)



Passenger delay measure is derived using the Average delay per flight and Probability of Cancellation metric.



Conclusion

These functions map NAS capacity and demand into average flight delays and cancellation probabilities as well as passenger delay estimates

Ongoing Research Areas

- Extending the model to weekly, monthly and yearly model
- Refine passenger model based on real data
- Contribution of Passenger Load factor on flight delay
- Incorporation of unscheduled flights
- Consider schedule robustness effects