

# *Surveillance Focus Group Status*

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# *Surveillance FG Progress*

- Identified Surveillance Services
- Integrated Surveillance into C/AFT Transition Diagrams
- Performed Probabilistic Benefits Analysis for one Surveillance Enabled Operational Enhancement
  - Benefits
  - Risks

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# *Surveillance Services*

- Conformance Monitoring
- Trajectory Prediction
- Conflict Avoidance
- Collision Avoidance
- Traffic Situational Awareness
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# *Probabilistic Benefits Analysis*

- Started with Enhanced Visual Acquisition
  - Minimal impact to ground infrastructure
  - Minimal impact to procedures and training
- Evaluated Benefits and Benefit Uncertainties
- Utilized C/AFT Decision Analysis Tools
- Developed Baseline Benefits Model
  - beginning of more complete benefit picture for ADS-B
  - will factor in costs once benefits established



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# *Enhanced Visual Acquisition*

## Description:

The flight crew is provided with position and near term intent information for airplanes flying in their airspace. The flight crew uses this information to enhance their ability to visually acquire other aircraft designated by ATC in support of visual approach operations.

## Surveillance Services:

Traffic Situational Awareness

## Benefit Mechanism:

Increased throughput and capacity during marginal VFR weather conditions.

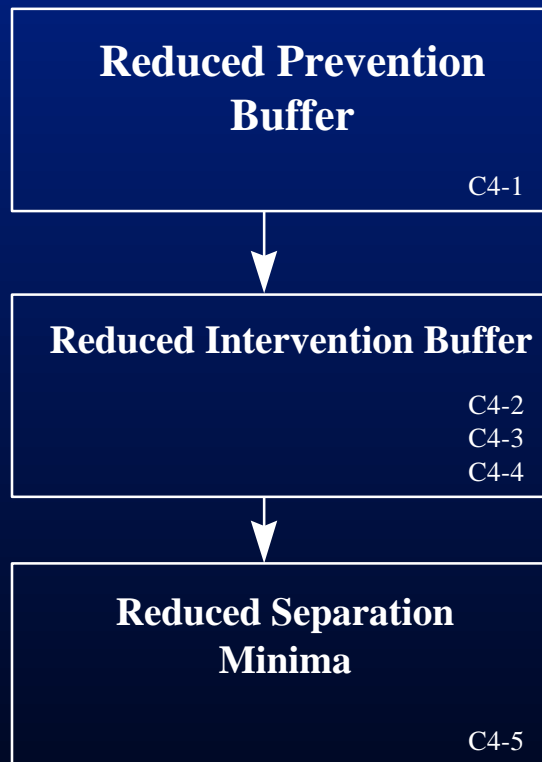


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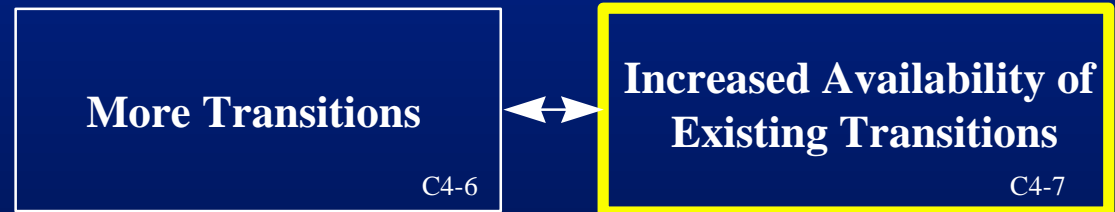
# C/AFT Transition Diagrams

## Departure/Approach Transitions

### Airplane-Level Capacity Effects



### System-Level Capacity Effects



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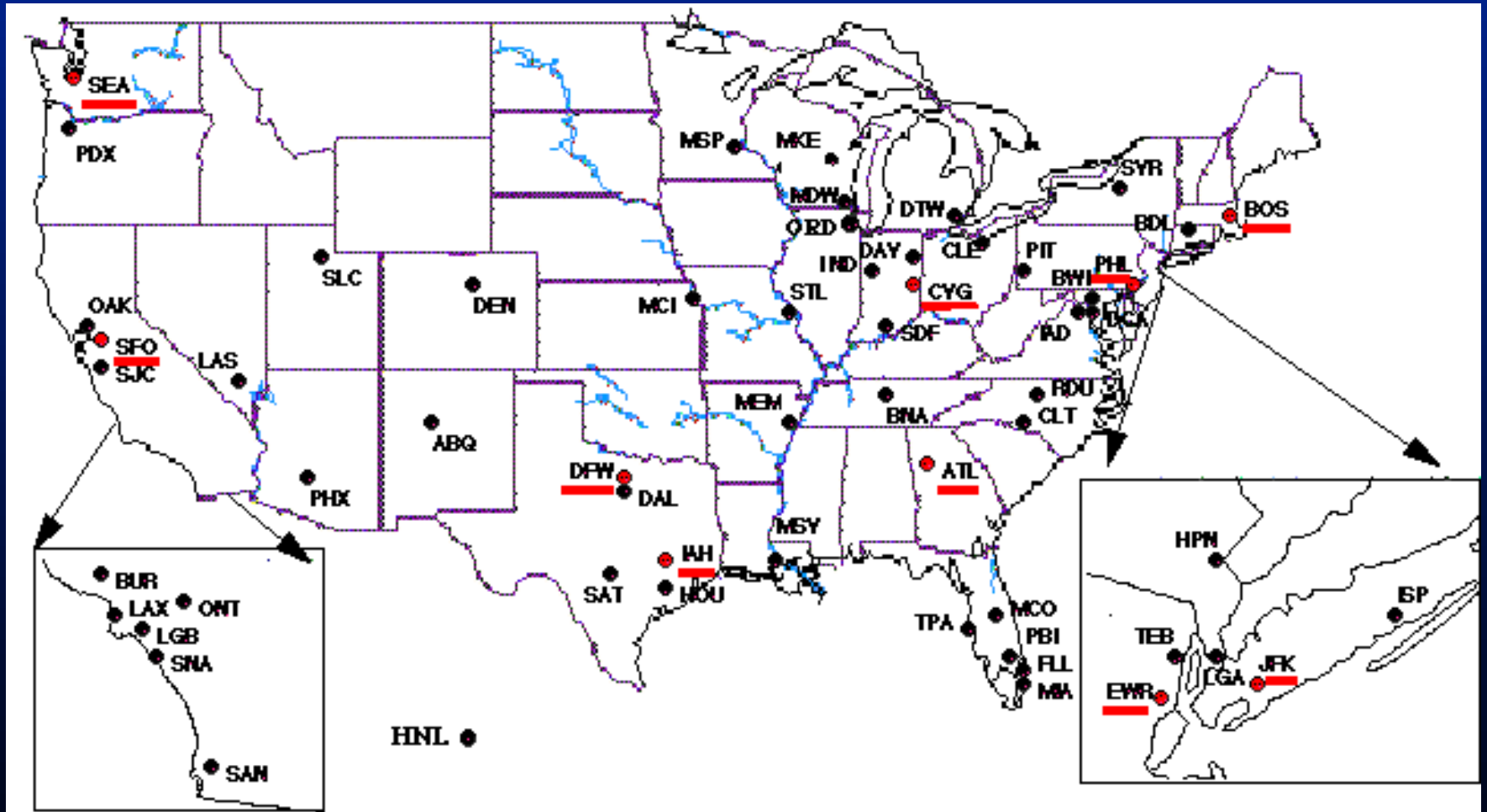
# Delay Modeling

- MITRE used NAS simulation model called DPAT
  - Uses OAG data for Air Carrier traffic simulation
  - General Aviation traffic modeled stochastically
- Integrates weather data to model changes in airport capacity
  - 1996 weather data base
- Airport capacity broken into 4 levels
- Potential Benefits from ADS-B/CDTI
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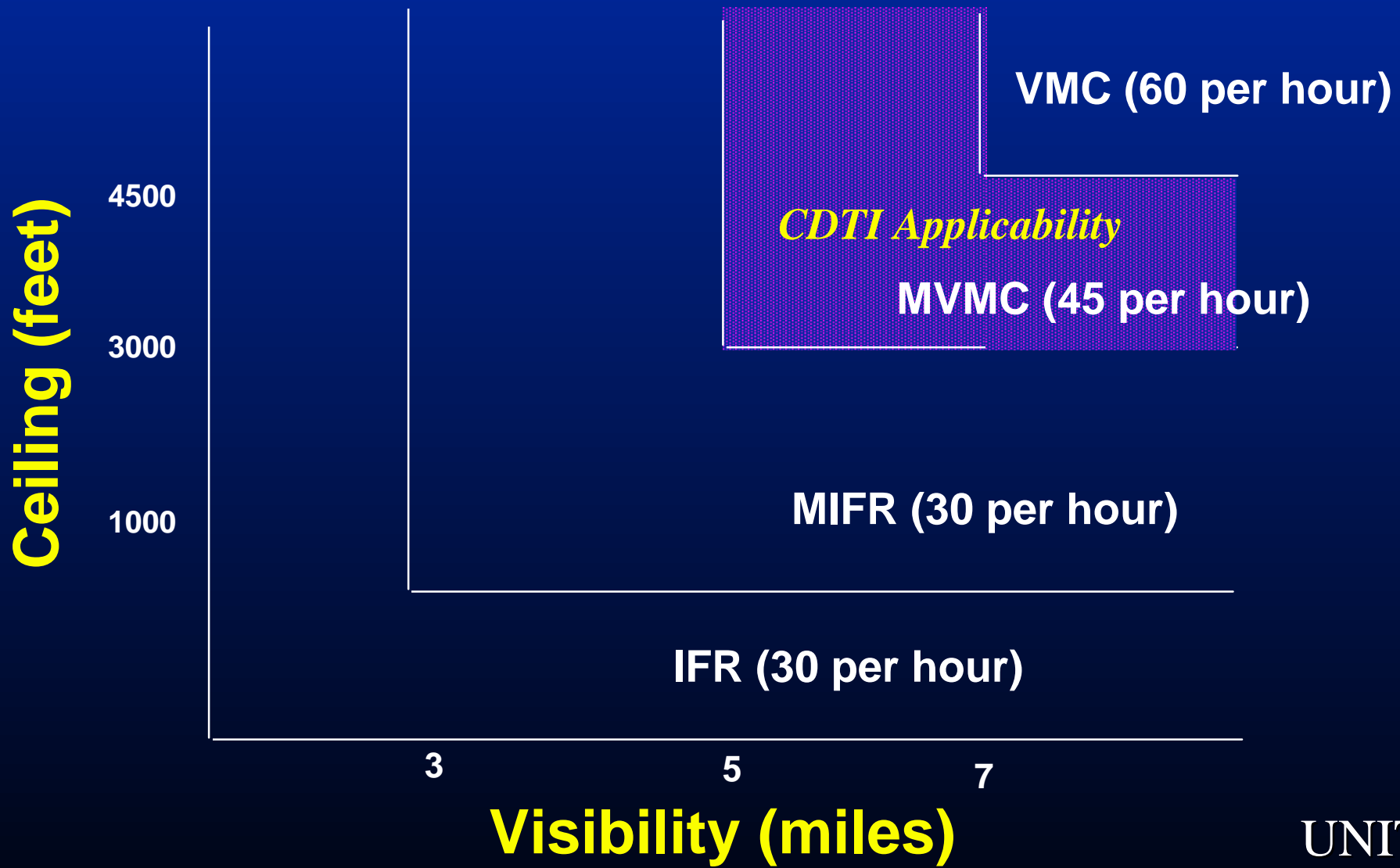


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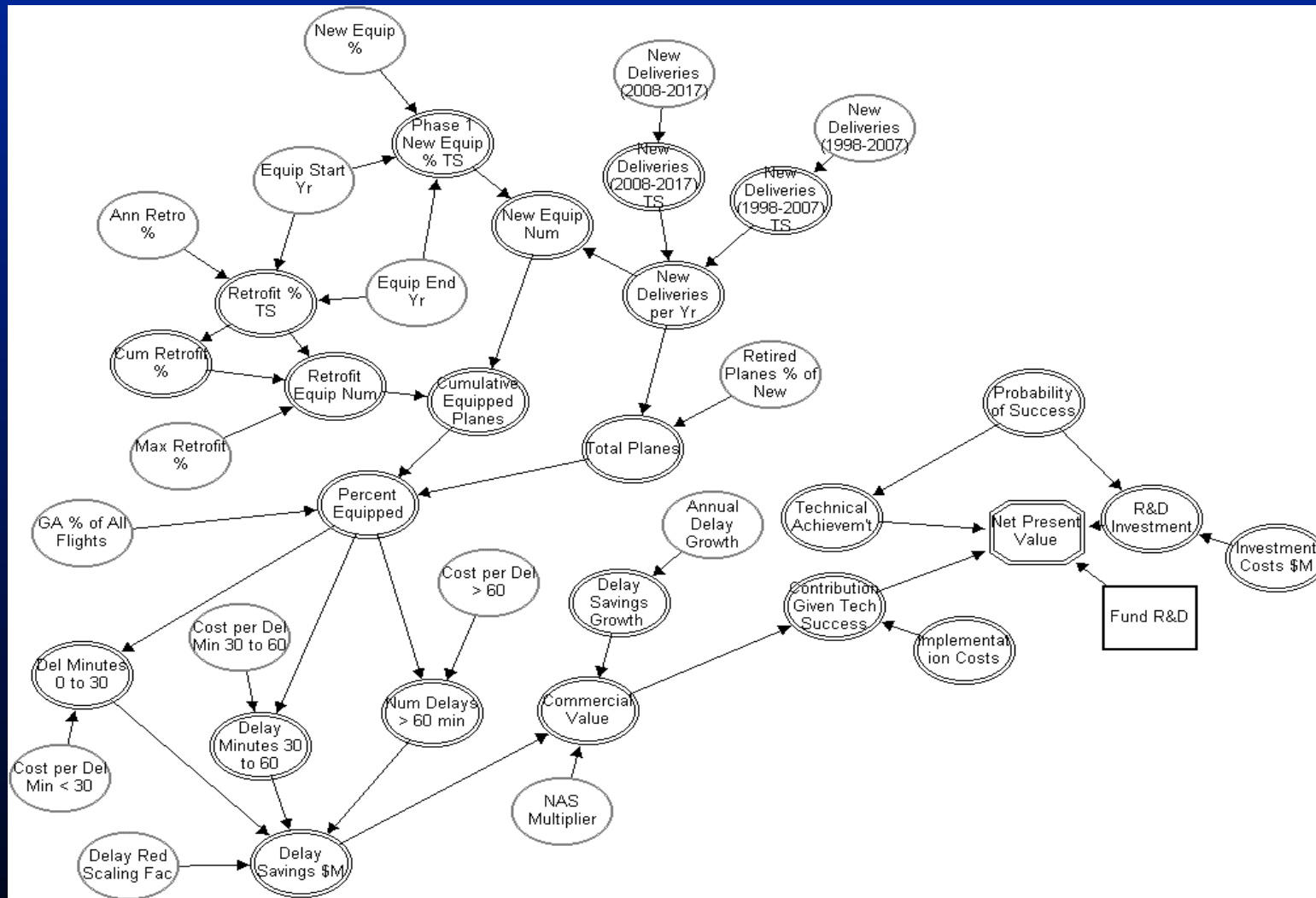
# Airports Modeled by DPAT



# SFO Capacities and Minima



# Influence Diagram



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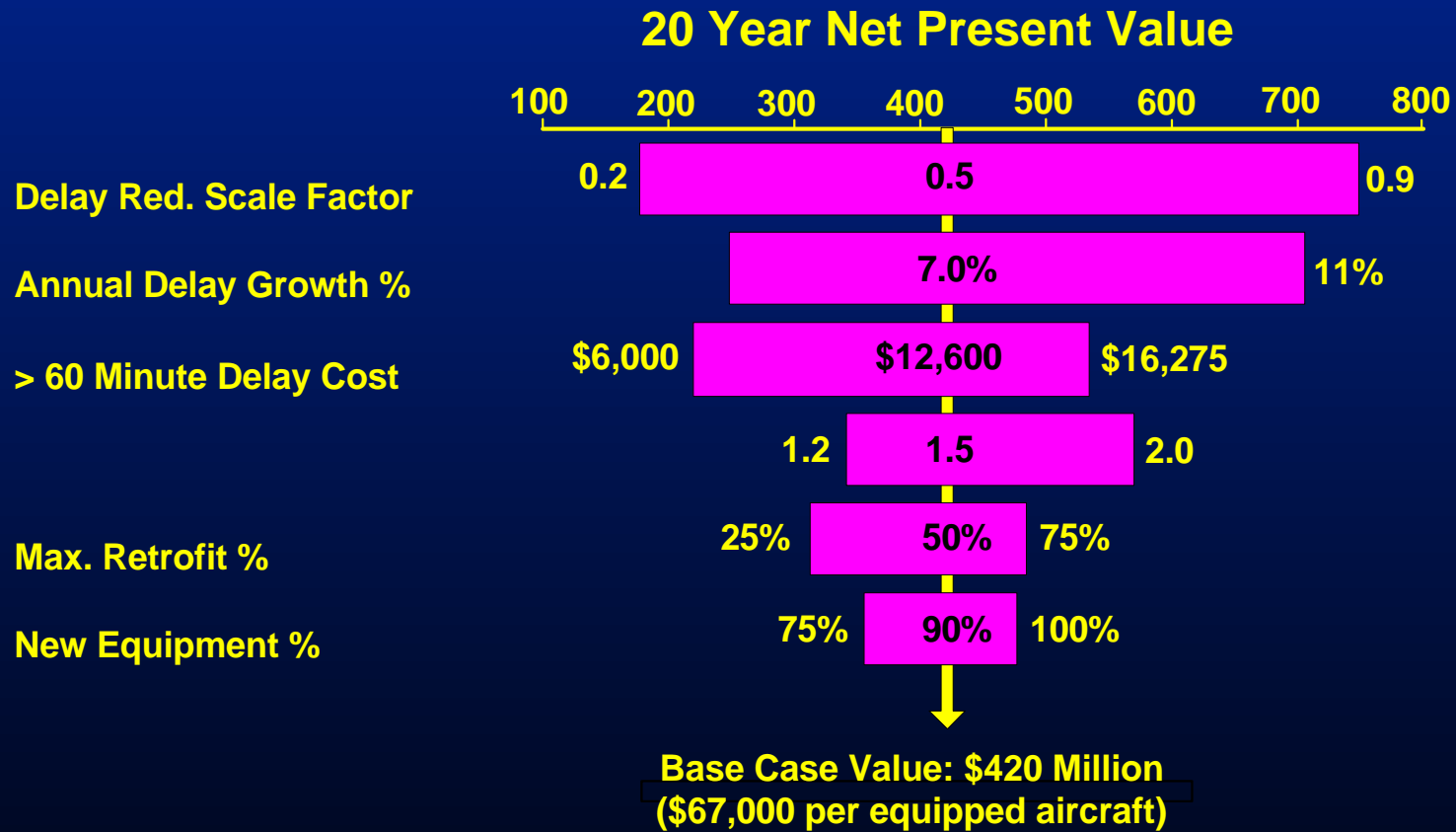
# *Scope of the Business Assessment*

- Limited to Approach Transitions in the NAS
- Quantifies Benefits
  - Delay Avoidance
  - Diversion and Flight Cancellation Avoidance
- Benefit Uncertainties
  - Delay Reduction
  - Retrofit and Forward Fit
  - NAS Delay Growth
- Does not Include Costs
- Does not Include Operational Implementation Risks
  - Procedures
  - ATC and Flight Crew Acceptance
  - Certification



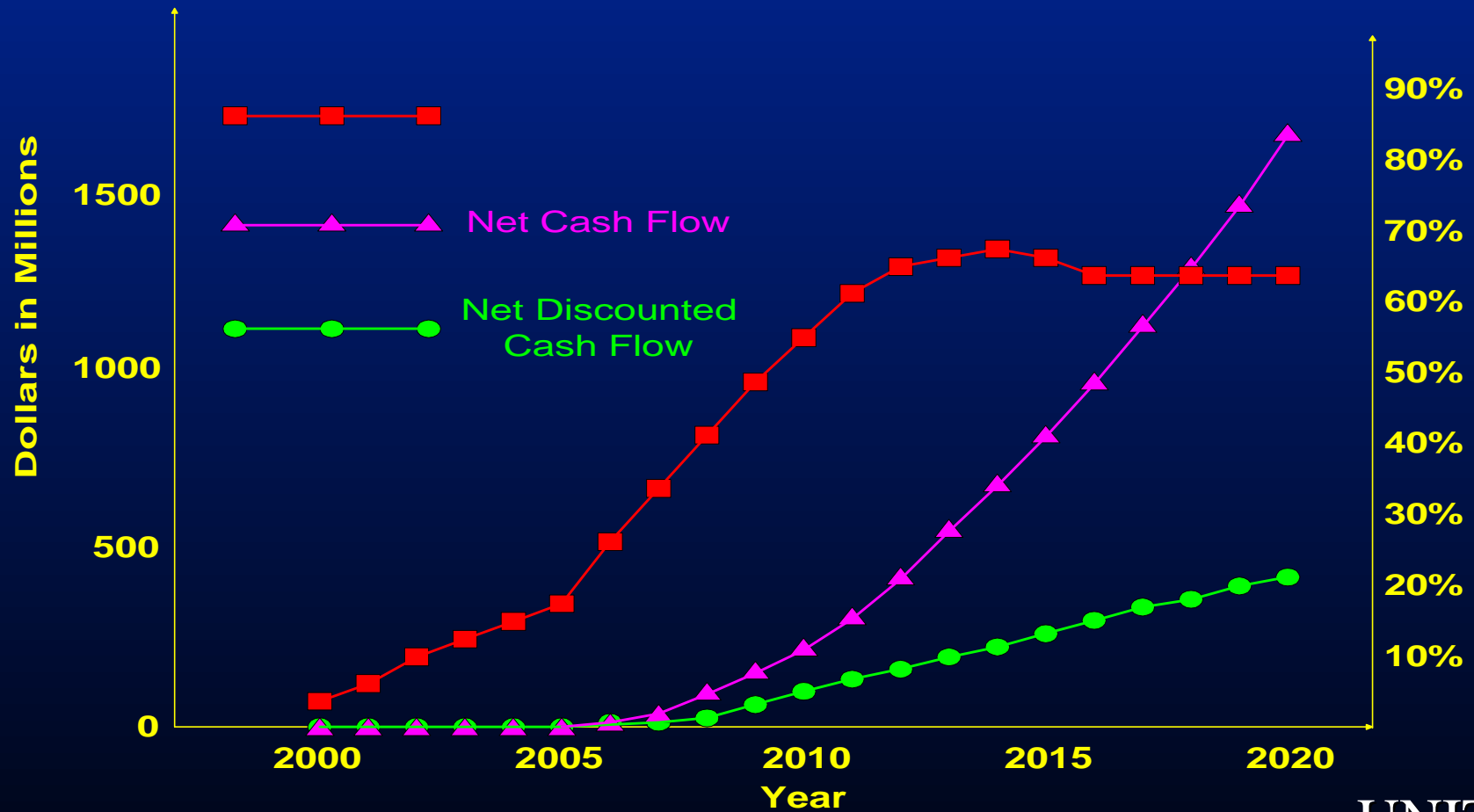
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# Enhanced Visual Acquisition Tornado Diagram



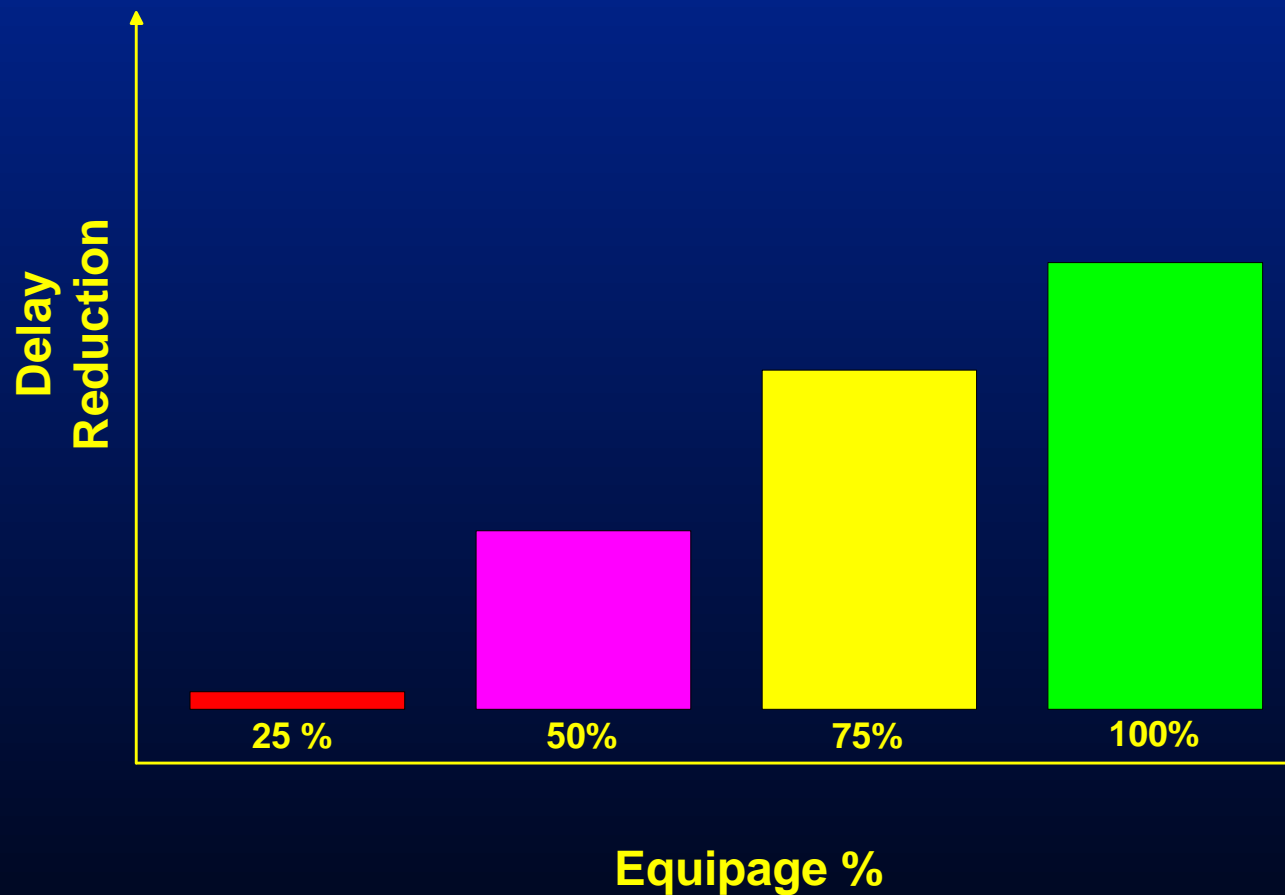
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# NPV versus Time

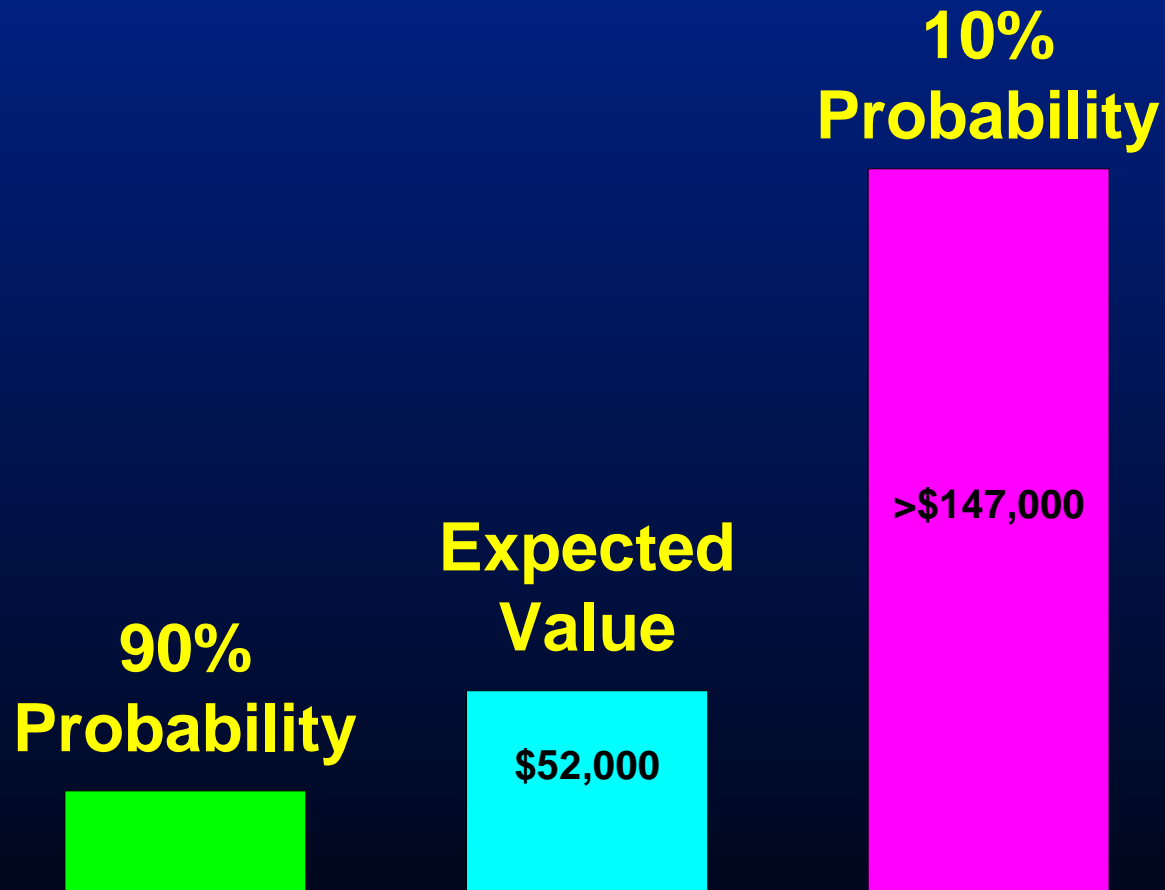


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# Total Delay Reduction Versus Equipage



# *NPV Probability Distribution of EVA Benefits*



# Conclusions

- Most of the cost savings come from reducing delays greater than 60 minutes
- Significant benefits begin at 25% equipage
- Potential long term value of ADS-B is significant
  - Uncertainties could be reduced with further study
  - Benefits will increase with the addition of other ADS-B applications



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# *Surveillance Focus Group*

## *What's Next?*

- Refine business analysis of EVA
  - Reduce uncertainties in existing model
- Add additional Operational Enhancements to the Benefits Assessment
  - Closely Spaced Parallel Approaches
  - Reduced Separations in Non-radar Environment
  - Self Separation in Non-radar Environment
  - ???



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