CNS/ATM Focused Team

All Airline Meeting

Paris, France

April 29, 1998

Agenda (1)

8:30	Welcome	Xavier Fron (Eurocontrol)
	Agenda and Overview	Russ Chew (American Airlines)
8:45	Airline Economics	
	U.S. Perspective	Russ Chew
	European Perspective	Ruediger Schwenk (Lufthansa)
9:45	Break	
10:15	ATS Perspective	
	European Perspective	Val Eggers (ATM 2000+)
	U.S. Perspective	Tony Vanchieri (FAA)
11:15	ATS Performance Focus	Russ Chew
12:15	Lunch	

Agenda (2)

1:45	Airline Economic Modeling	Eric Gaier (LMI)
2:15	ATS Datalink Focus Group	David Massy-Greene (Qantas)
3:15	Break	
3:30	European Datalink Trials	Rob Mead (Eurocontrol)
4:00	ADS-B Focus Group	Claudia Gerstle (United)
4:15	Advanced Navigation FG	David Allen (Boeing)
4:30	Discussion	Ruediger Schwenk
4:45	Concluding Remarks	Russ Chew
5:00	Adjourn	

C/AFT's Purpose

Facilitate CNS/ATM implementation progress by developing global airline economic consensus on problem issues.

- **Establish Problems -- Why do we need to change?**
  - Airline operating problems must be framed with common airline economic metrics to quantify and baseline a problem.
- **Evaluate Solutions -- What do we need to do, and when?**
  - Use common airline economic metrics to establish consensus on business and capital decisions related to proposed solutions.
  - Provide airline global perspective on proposed solutions to regional problems.
- **Develop Consensus -- How do we move industry forward?**
  - Provide airline consensus to facilitate decisions by government agencies and service providers.

C/AFT Structure

- **CNS/ATM Focused Team**
  - All Airlines (Core = United, American, Qantas)
  - Airline Trade Associations (Core = ATA, IATA)
  - Service Providers (Core = FAA, Eurocontrol)
  - OEMs (Core = Boeing, Airbus)
  - Others by Invitation
- **Focus Groups**
  - ATS Performance Focus Group (ATSPFG)
  - Data Link Focus Group (DLFG)
  - ADS Broadcast Focus Group (ADSBFG)
  - Advanced Navigation Focus Group (ANFG)

Airline Operating Economics
U.S. Perspective

CNS/ATM Focused Team

April 29, 1998

Captain Russell G. Chew
American Airlines

The Changing Airline Business

- The Safety Imperative
- The National Economy
- Competitive Aspects
- Capital Characteristics
- Labor Characteristics
- ATS and Our Product

The National Economy

- Wilbur-Smith Associates (April 1995)
  - The Economic Impact of Civil Aviation on the U.S. Economy
- Aviation was 5.9% of the 1993 GDP ($376 billion)
  - Commercial & General Aviation, Aircraft Manufacturing
  - $771 billion in economic activity
  - 8.8 million jobs, earning 230 billion in wages & salaries
- Commercial Aviation Contribution
  - $723 billion in economic activity
  - 8.3 million jobs, earning $214 billion in wages & salaries

Business Characteristics

- Perfect Competitive Environment
  - Computer Reservation Systems
- Revenue Aspects
- Airlines Mainly Compete on Costs
  - Surviving deregulation
- Return on Revenue
  - Typically averages 2 to 3 percent over time

Competitive Market

- Market Demand Elasticity
  - The “Premium” Carrier vs. “Low Cost” Carrier
  - The “Low Cost” Carrier vs. “New Entrant” Carrier
  - Return on Revenue
- Network Value Added Services
  - Product range availability
  - Advance seating and boarding passes
  - Connecting baggage services
  - Frequent Flyer programs

Airline Cost Drivers

- Capital Costs
  - Aircraft
  - Facilities
  - Ground Support Equipment
- Labor Costs
  - Skilled Labor
  - Labor Unions
- Fuel Costs
  - Consumption, Carrying Costs
- Distribution
  - Travel Agents

Leveraging Production Costs

- Hub-and-Spoke Systems
- Corporate Consolidation
- Code-Sharing
- Alliances

Legacy Airline Investments

- Operating Efficiency
  - Incremental Cost Savings (Fuel)
  - Optimize Routes (Time, Distance, Altitude)
- Safety
  - Pilot Situation Awareness Tools (EGPWS and Angle of Attack)
  - Pilot Training (AAMP)

Future Investment Focus

- Delivering Our Product: *The Flight Schedule*
  - Maintaining Network Integrity
- Airspace Capacity
  - Reduce Delays
  - Maximize Runway Usage
  - Minimize ATC Flow Control
  - Mitigate Impact of Adverse Weather
- Air Traffic Management
  - Central Information Sharing
  - Strategic Operations Control

Airline Capital Justification

- Revenue Enhancement
- Cost Avoidance
- Competitive Position
- Regulatory Mandate

Return on Investment

- Based on competing for capital
- Requirements driven by uncertainties
  - FAA commitment to providing a new ATC infrastructure
- High hurdle rates
- High discount rates
- Short term pay-back

Revenue Enhancement

- Capital used to increase revenue over costs
  - Increased market share
  - Increased load factors
  - New markets
- Current examples
  - Establishing new routes
  - Acquiring new aircraft capability

Cost Avoidance

- Capital used to avoid or reduce future costs
- Must establish future scenario assumptions
- Highly dependent on the probability of outcome
- Current examples
  - North Atlantic Reduced Vertical Separation Minimums
  - European 8.33 kHz Radio Requirement

Competitive Position

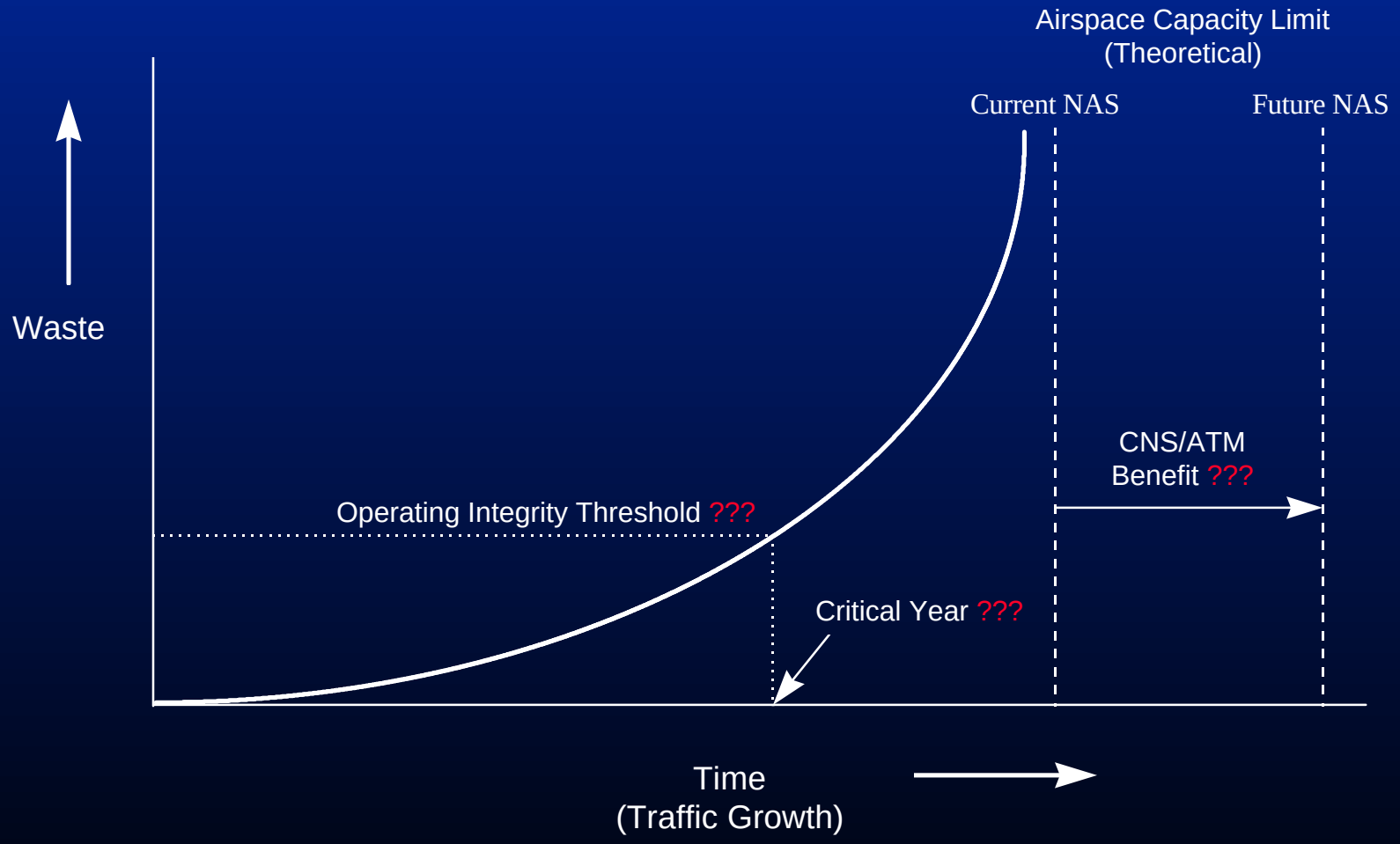
- Capital used to protect market share
- Projections of impact to revenue
- Current examples
  - Cabin Entertainment Systems
  - Cabin Satellite Phone Systems

AA NAS Congestion Study

- Understand risk to scheduled airline operations
- Compare to other industry studies to date
- Consider probability of outcome
- Estimate effects on airline schedules
  - Good VFR weather used as baseline scheduling opportunity

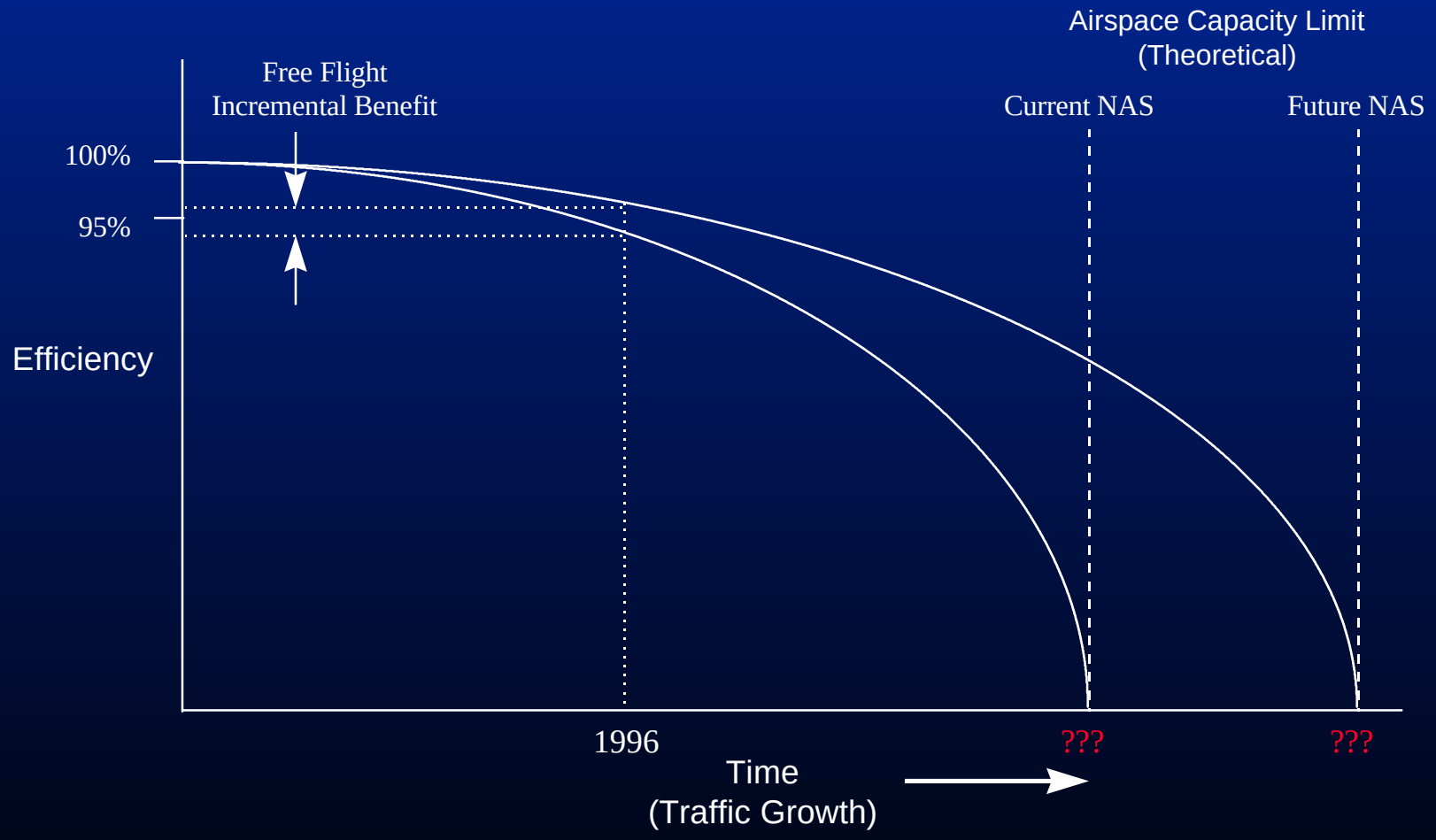
AA NAS Study

Notional Capacity Effects on Waste



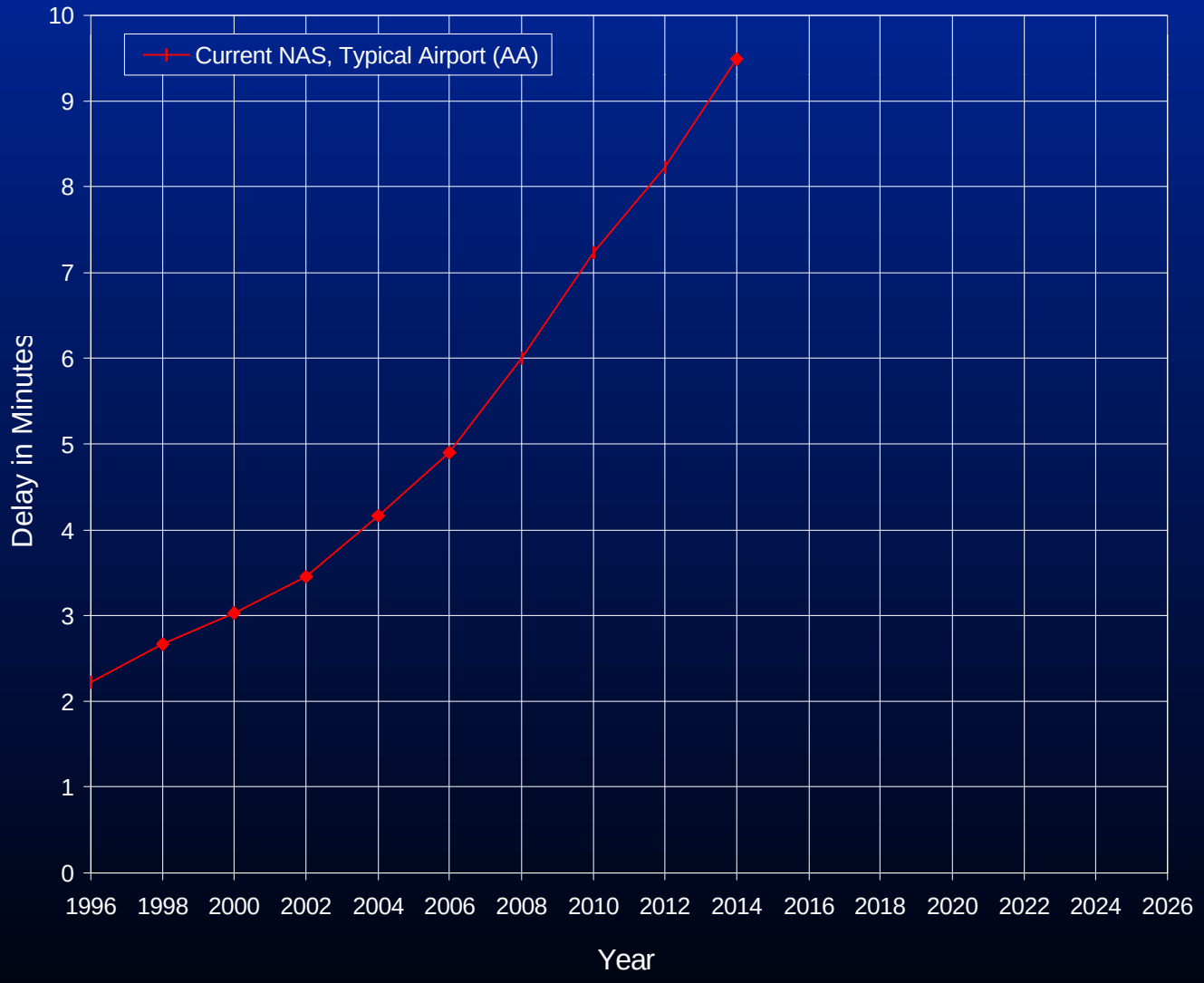
AA NAS Study

Notional Operating Efficiency Benefits



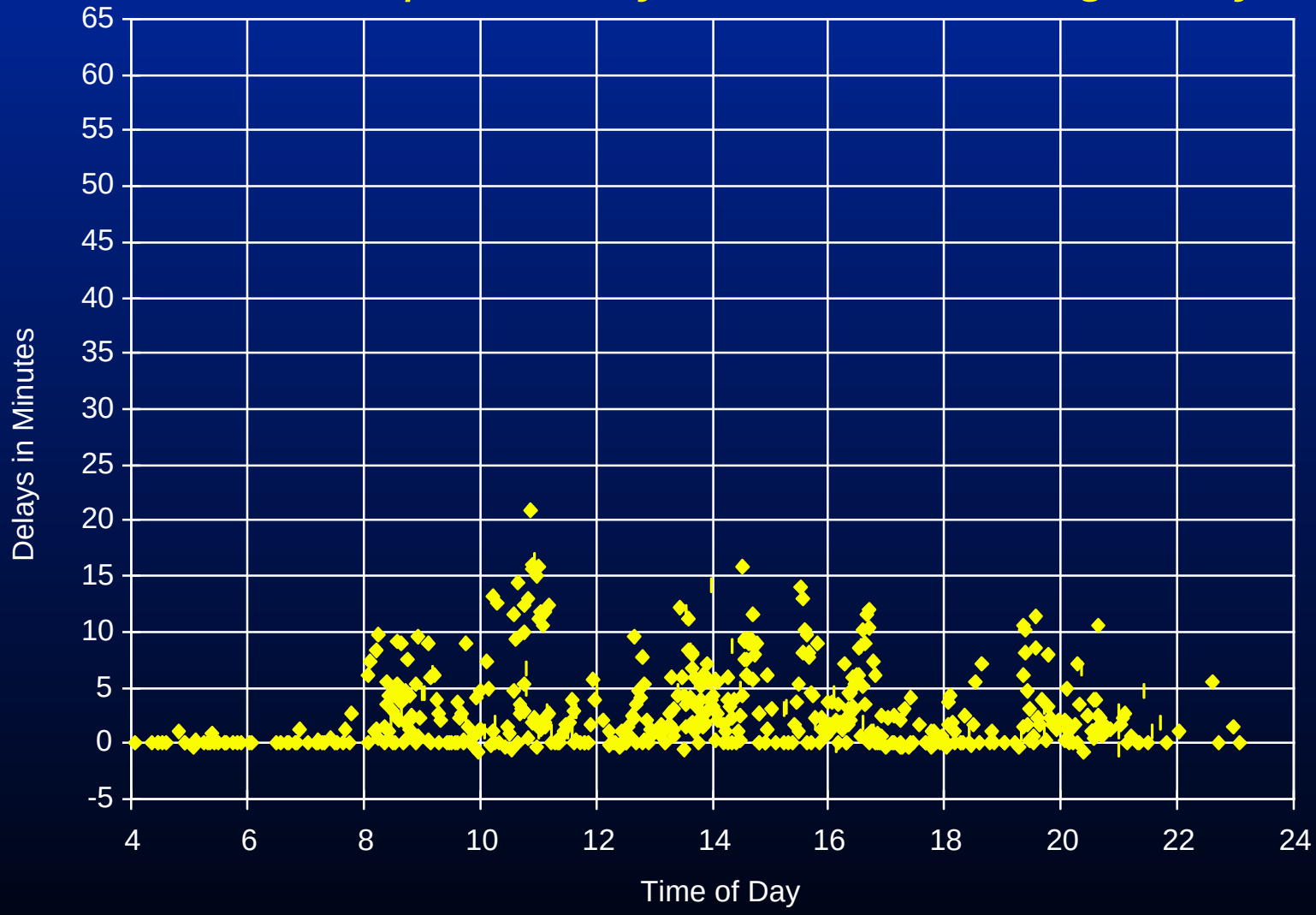
AA NAS Study Results
Average En Route Delay Per Flight

AA NAS Study Results
Typical Terminal Delay Per Flight

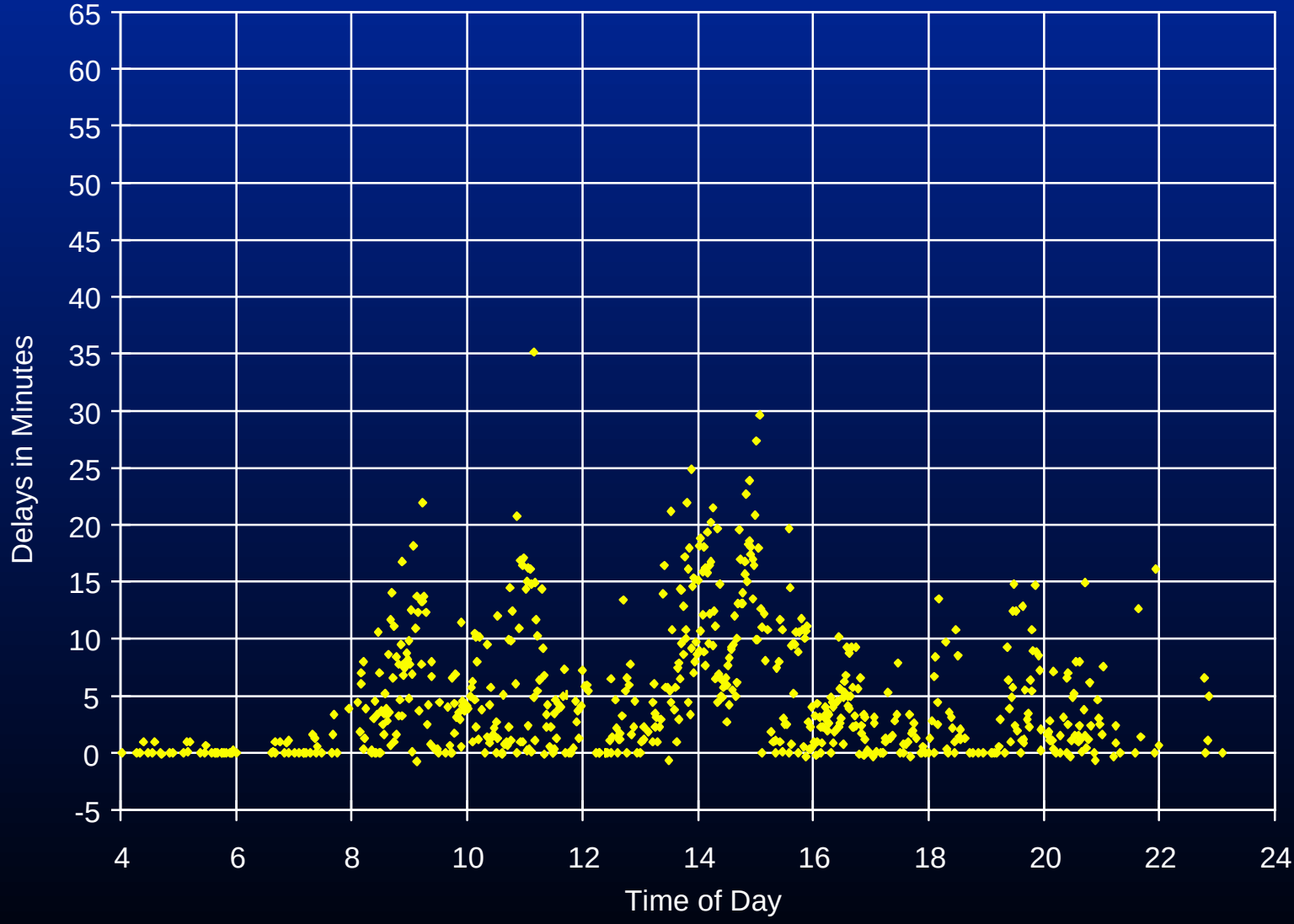


AA NAS Study Results
Estimated Departure Runway Queue

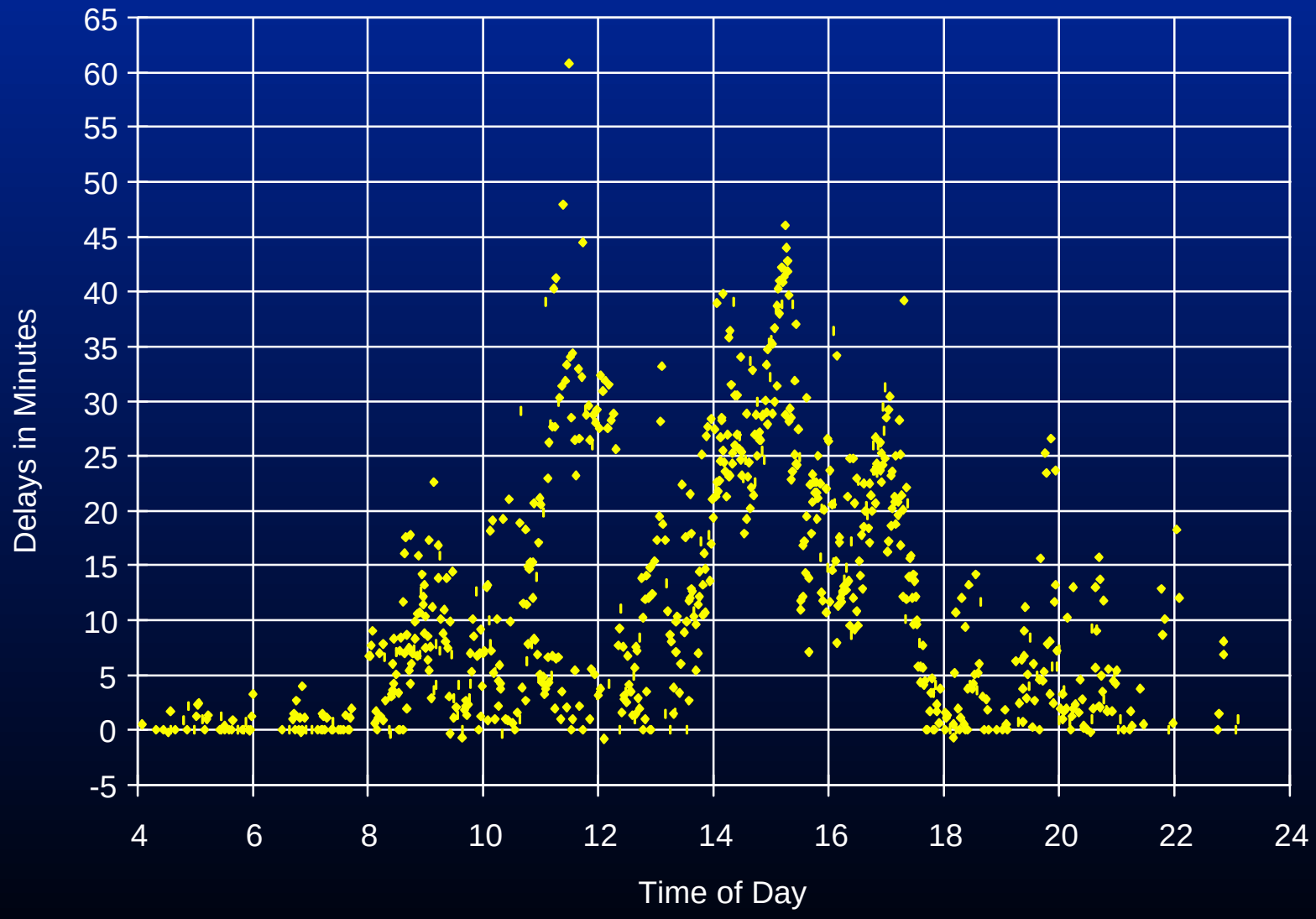
AA NAS Study
Arrival Dependability - 4.1 Minutes Avg Delay



AA NAS Study
Arrival Dependability - 7.0 Minutes Avg Delay



AA NAS Study
Arrival Dependability - 13 Minutes Avg Delay

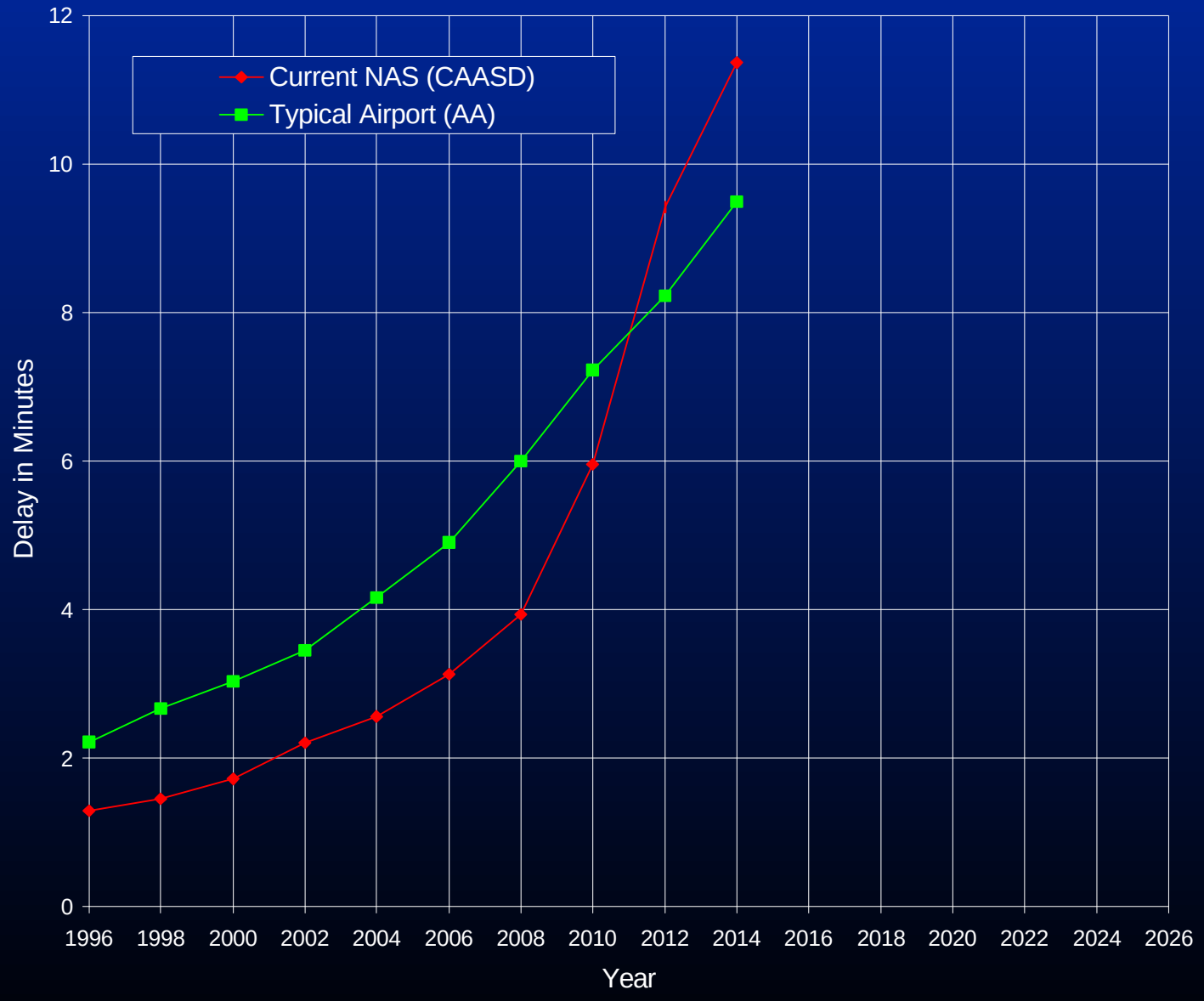


Corroborating Studies

- CAASD's Detailed Policy Assessment Tool
  - ATC Delay Trend Analysis Tool
  - Fast-Time Simulation
- CAASD's estimate of ATC automation benefits
  - User Request Evaluation Tool (URET)
    - En route conflict probe
  - Center Tracon Automation System (CTAS)
    - Terminal area traffic flow management and sequencing tools
  - Collaborative Decision Making (CDM)
    - Better central traffic flow management by sharing information
  - ATS Data Link
    - Improved throughput by reducing controller workload

CAASD's Detailed Policy Assessment Tool (DPAT)

System Delay vs. AA Typical Airport



CAASD's Detailed Policy Assessment Tool (DPAT)

Departure Runway Queue

CNS/ATM is essential to preserving the delicate economic equilibrium between market demand and cost of services.

Investment in CNS/ATM

- Primarily Cost Avoidance and Competitive Position
  - Justifying major, long-term infrastructure changes
  - Large near-term capital investments for long-term strategic operating benefits
  - Uncertain probability of outcome and risk due to complex operating assumptions
  - Long lead times vs. avionics and aircraft life cycles
- Limited Use of Revenue Enhancement Basis
  - Potential new long-haul routes and city pairs

Why C/AFT ??

- Traditional Cost/Benefit Analysis is Difficult
  - Many complex assumptions required for end state
  - Plans lack detailed transition path and operating concepts
  - More detail needed for cost, benefit, and safety analysis
- Previous Cost/Benefit Efforts
  - Overlapping benefit studies
  - Benefits sometimes overstated
  - Questionable financial credibility
- Government Capital Plan Uncertainties
  - Threatens ATC provider commitments
  - Higher risks makes capital commitments difficult

Developing the Business Case

- Strategic Business Case
  - "Top Down" approach
  - Long-term upside potential
  - Not "Stand-alone"
- Deterministic Business Case
  - Traditional "Bottom Up" approach
  - Short-term (less than 5 years) Return on Investment
  - Not very effective for long-term, infrastructure investment
- Probabilistic Business Case
  - Combines Strategic and Deterministic Business Cases
  - Quantifies Value of Risk and Uncertainties

Summary and Conclusions

- Time is of the Essence.
- Long term economic justification for capital is possible if a common transition path is defined and the confidence in success is improved.
- Confidence needed to justify the capital investments needed for new aircraft and air traffic systems.
- Policy-Maker's must view its investment in its air transportation system against its effect on the national economy.
- Preserving airlines' ability to meet the global demand for air travel is essential for sustaining economic growth.