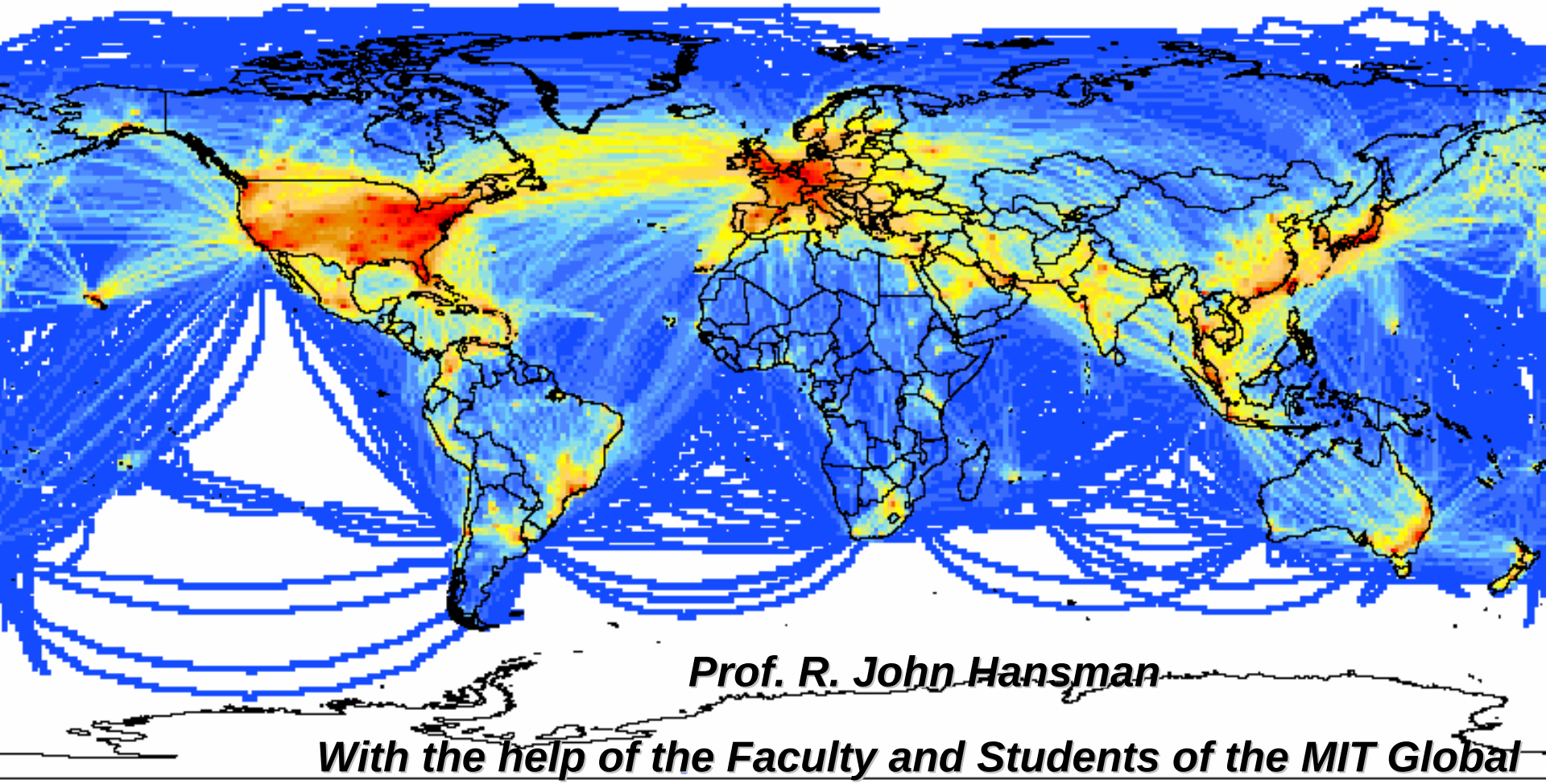
Airline Industry Recent Trend Update (October 2009)



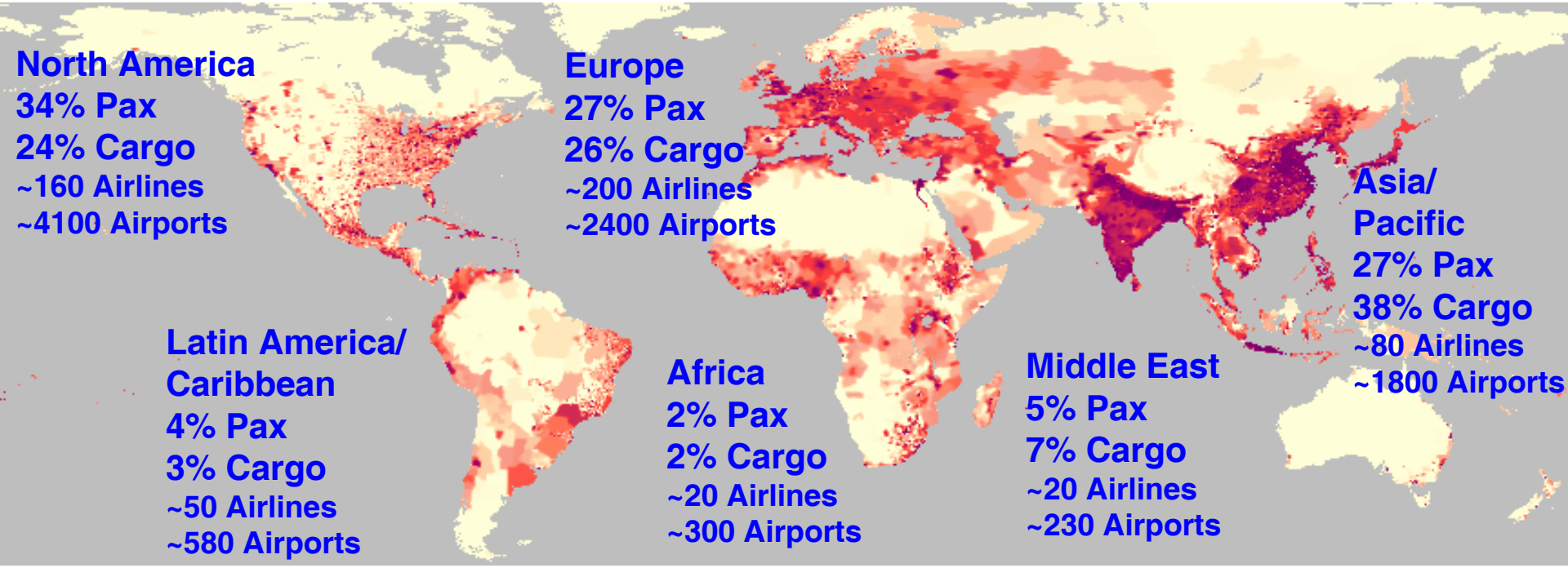
Prof. R. John Hansman

With the help of the Faculty and Students of the MIT Global Industry Study

rjhans@mit.edu

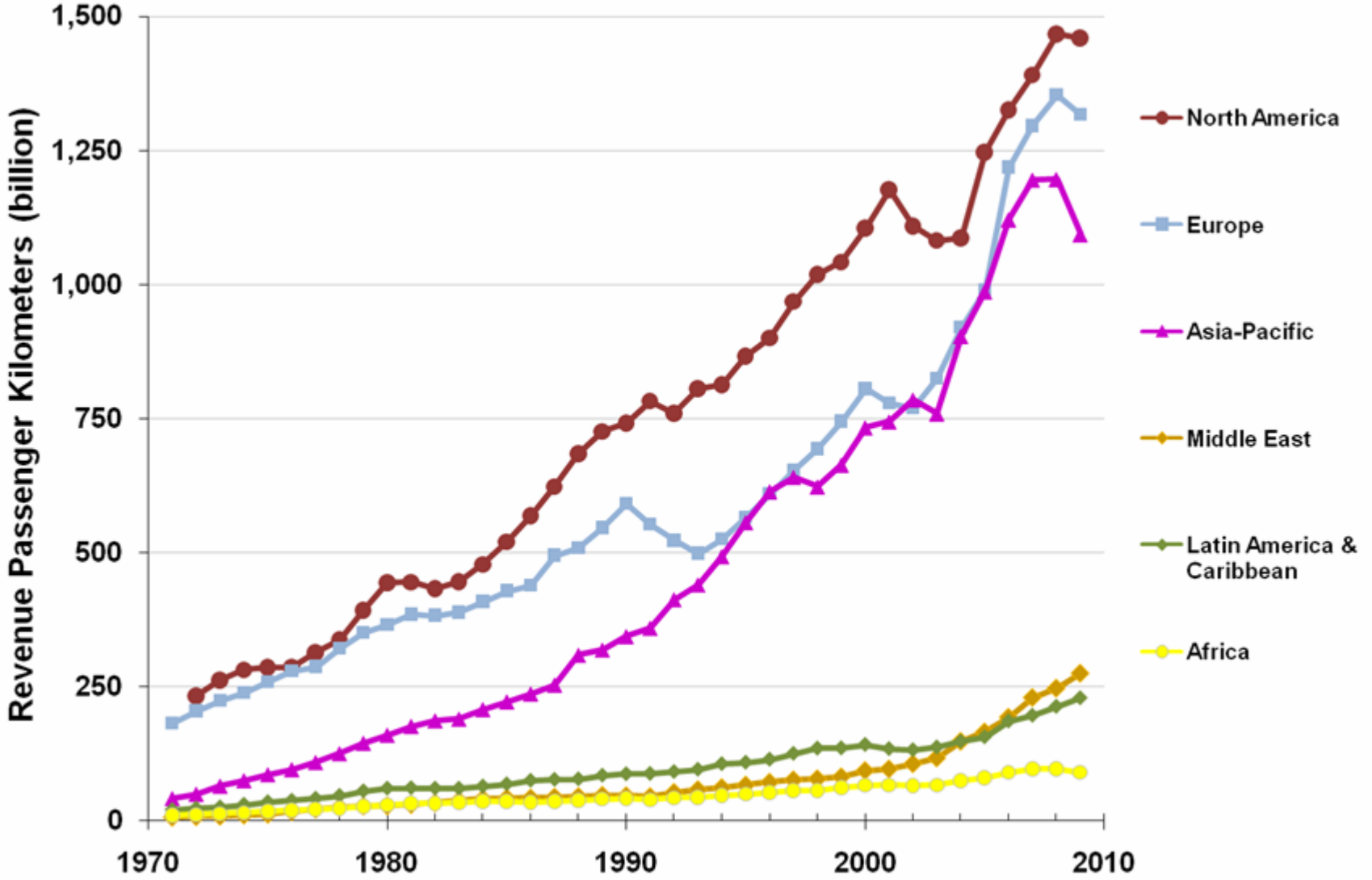
Traffic Source: Sage Analysis courtesy Prof Ian Waitz

World Population Distribution & Air Transportation Activity



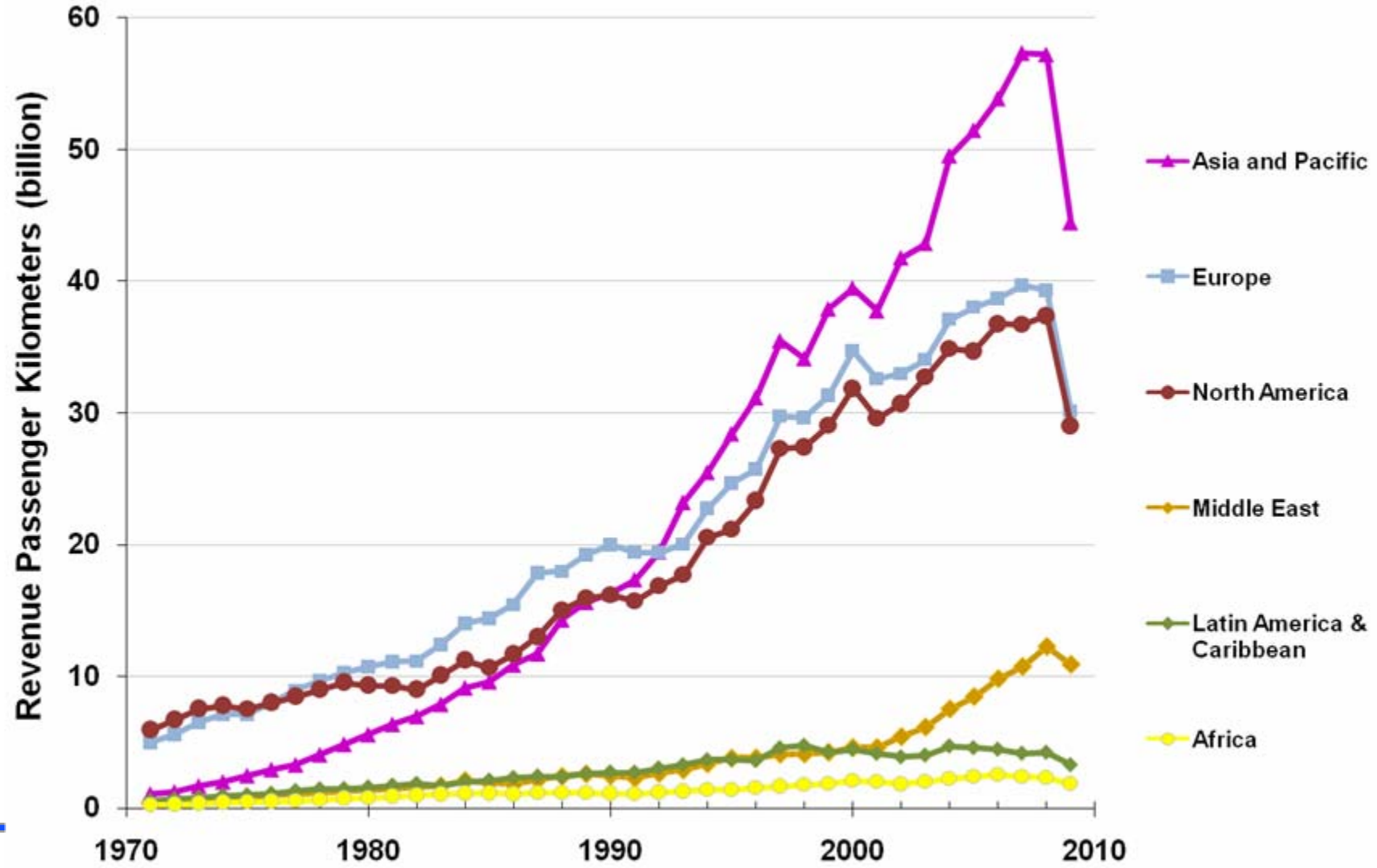
Data source: Population: [URL:http://www.ciesin.org/datasets/gpw/globldem.doc.html]
Air Transport: ICAO, R. Schild/Airbus
Passenger and freight traffic represent 2007 RPK and FTK share estimates from ICAO & IATA data

Revenue Passenger Kilometers (RPK) by Region



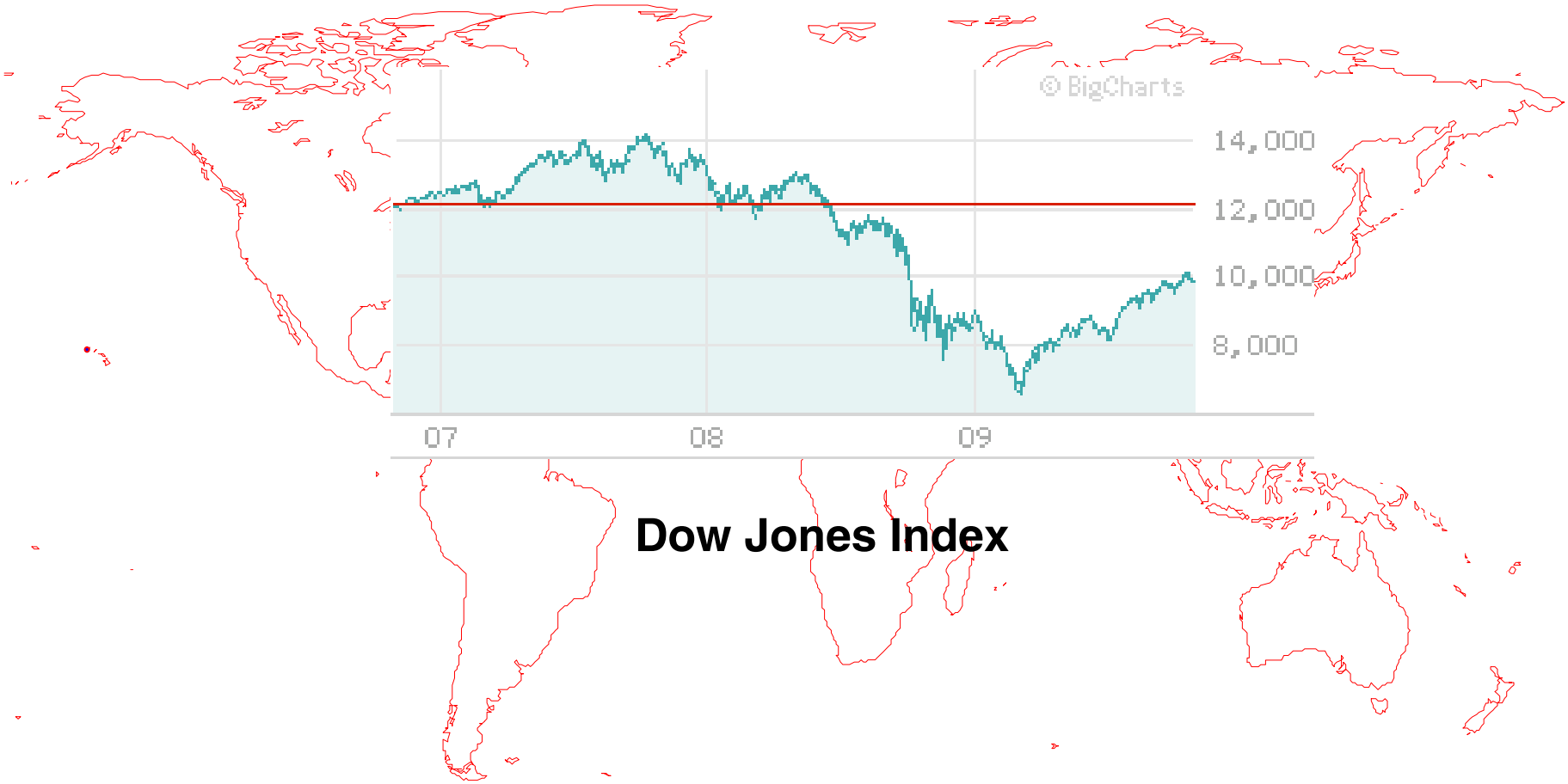
Data source: ICAO for 1970 to 2008 – IATA for 2009 estimate based on May2009-May2008 year over year data

Freight Tonne Kilometers (FTK) by Region



Data source: ICAO for 1970 to 2008 – IATA for 2009 estimate based on May2009-May2008 year over year data

Economic Shocks
Demand Uncertainty

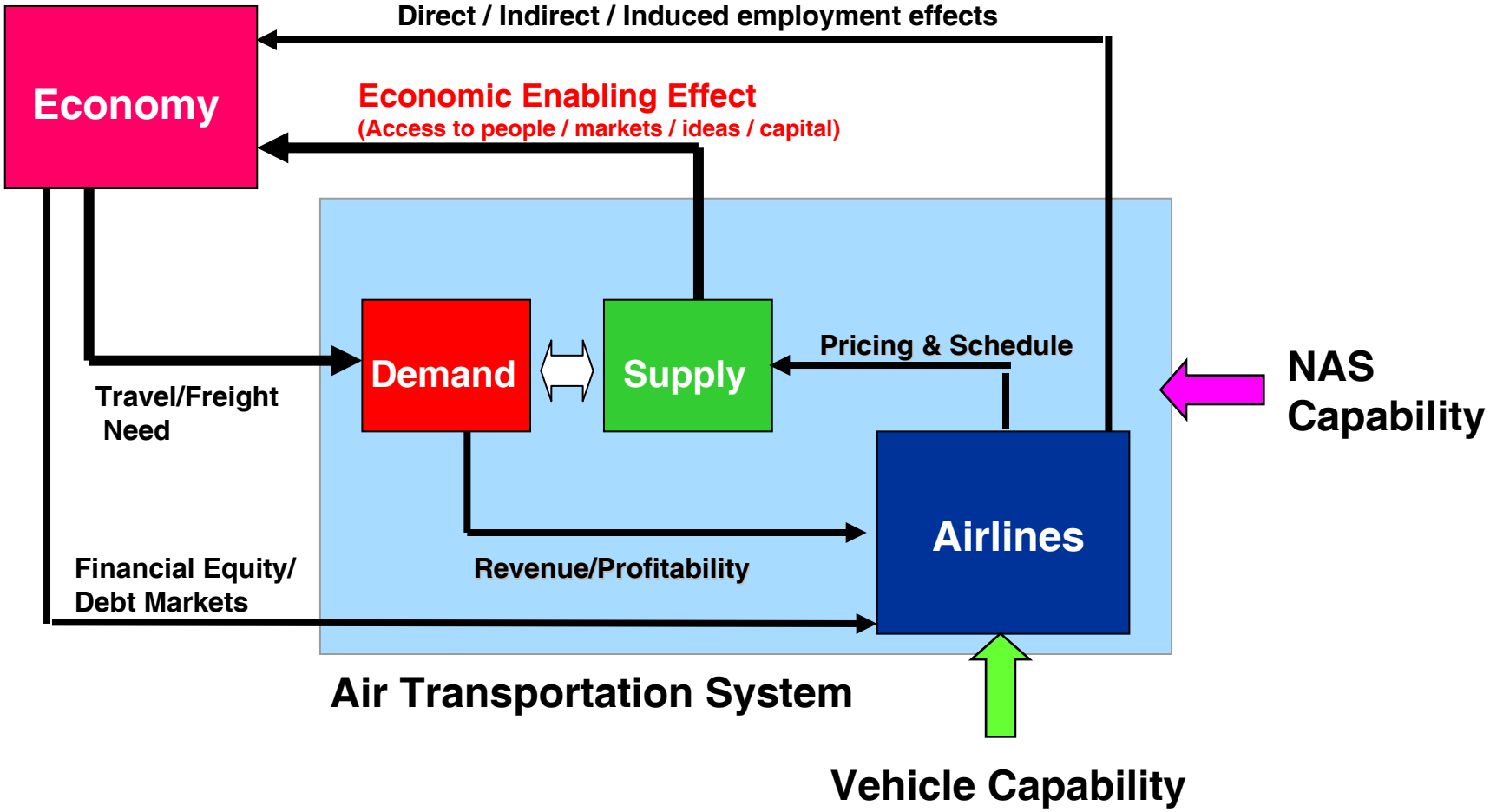


Dow Jones Index

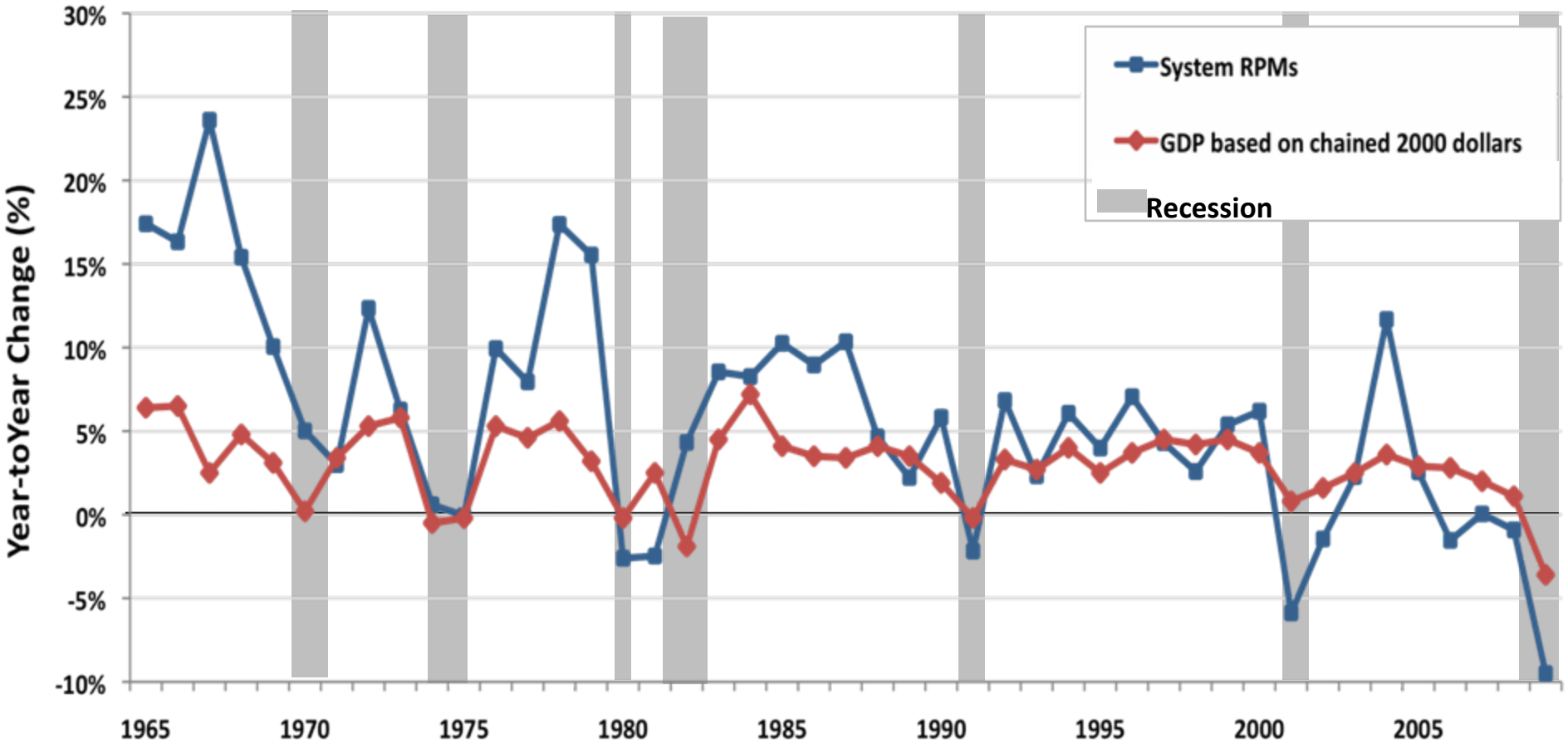
Market Indices 8/4/08-10/31/08

Source: Capital Link Shipping

Relationship Between Economy and Air Transportation

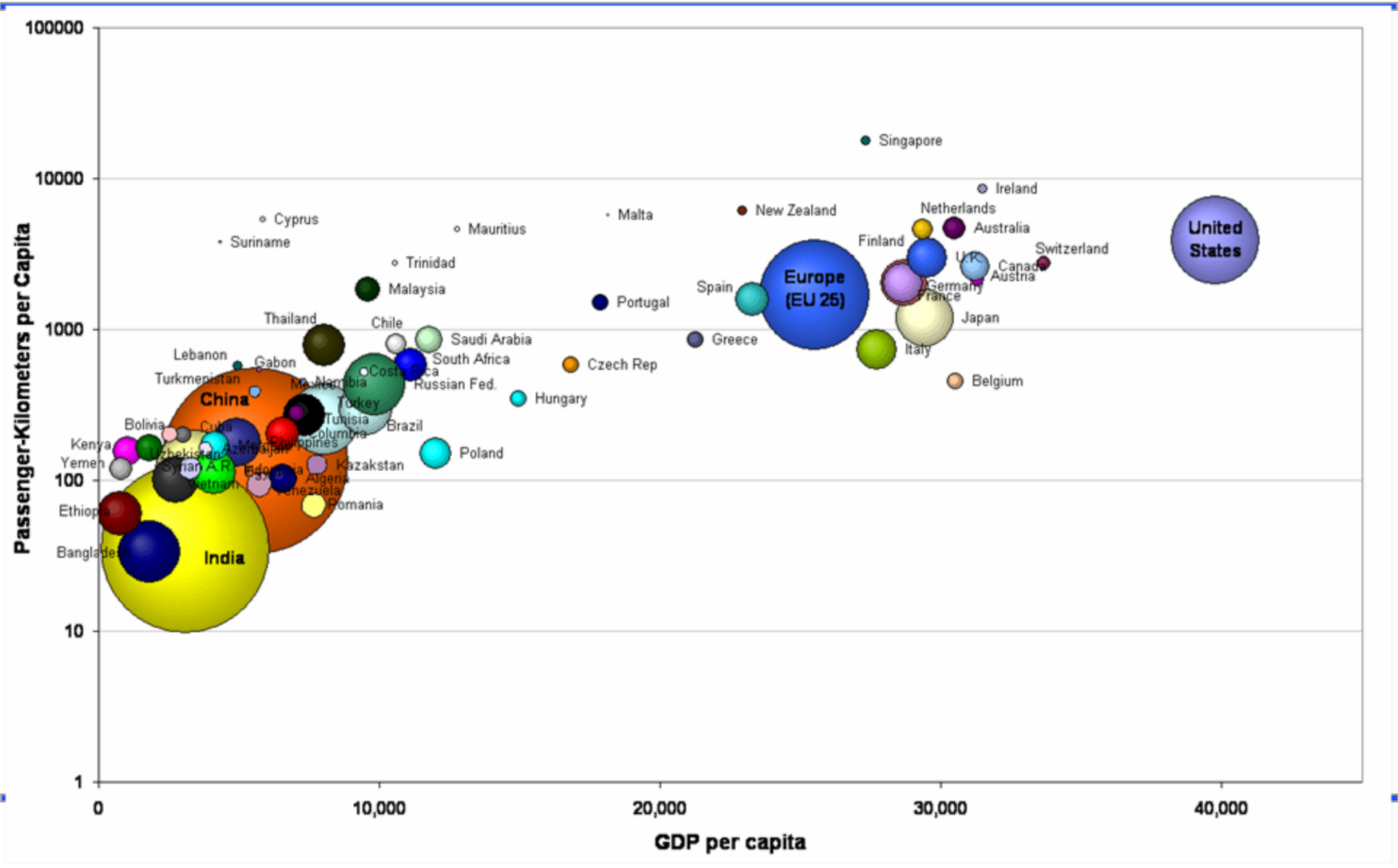


Correlation Between US GDP and Passenger Traffic



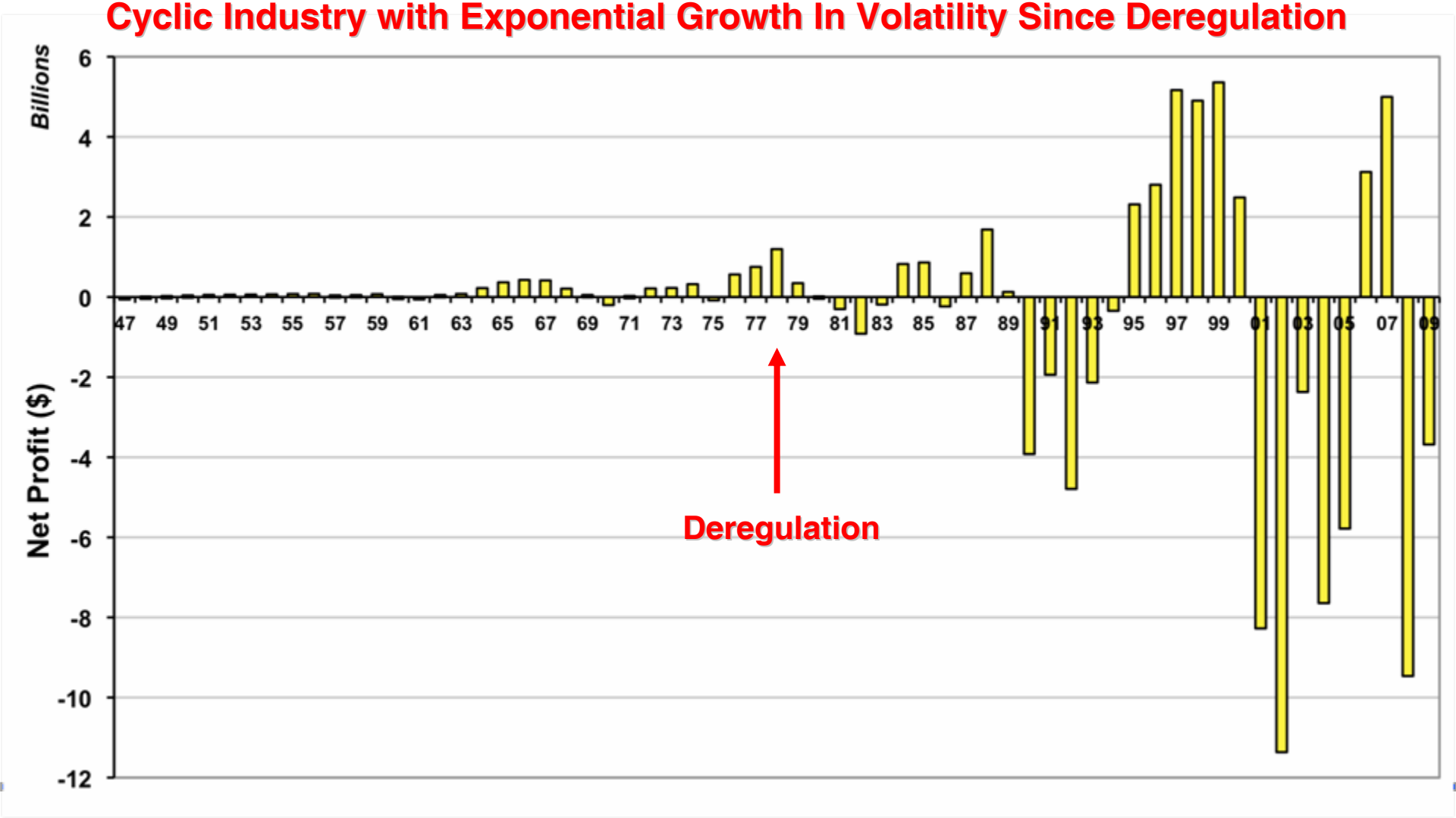
Data source: *RPMs: Bureau of Transportation Statistics, (BTS) for 1965 to 2008 and May 2009-May 2008 year-over-year data for 2009 (source: Dallas News)*
GDP: US Bureau of Economic Analysis through Q1 2009
Recession data: National Bureau of Economic Research

Air Transportation Markets
2004 Data



Macro Scale Drivers
US Airline Net Profit

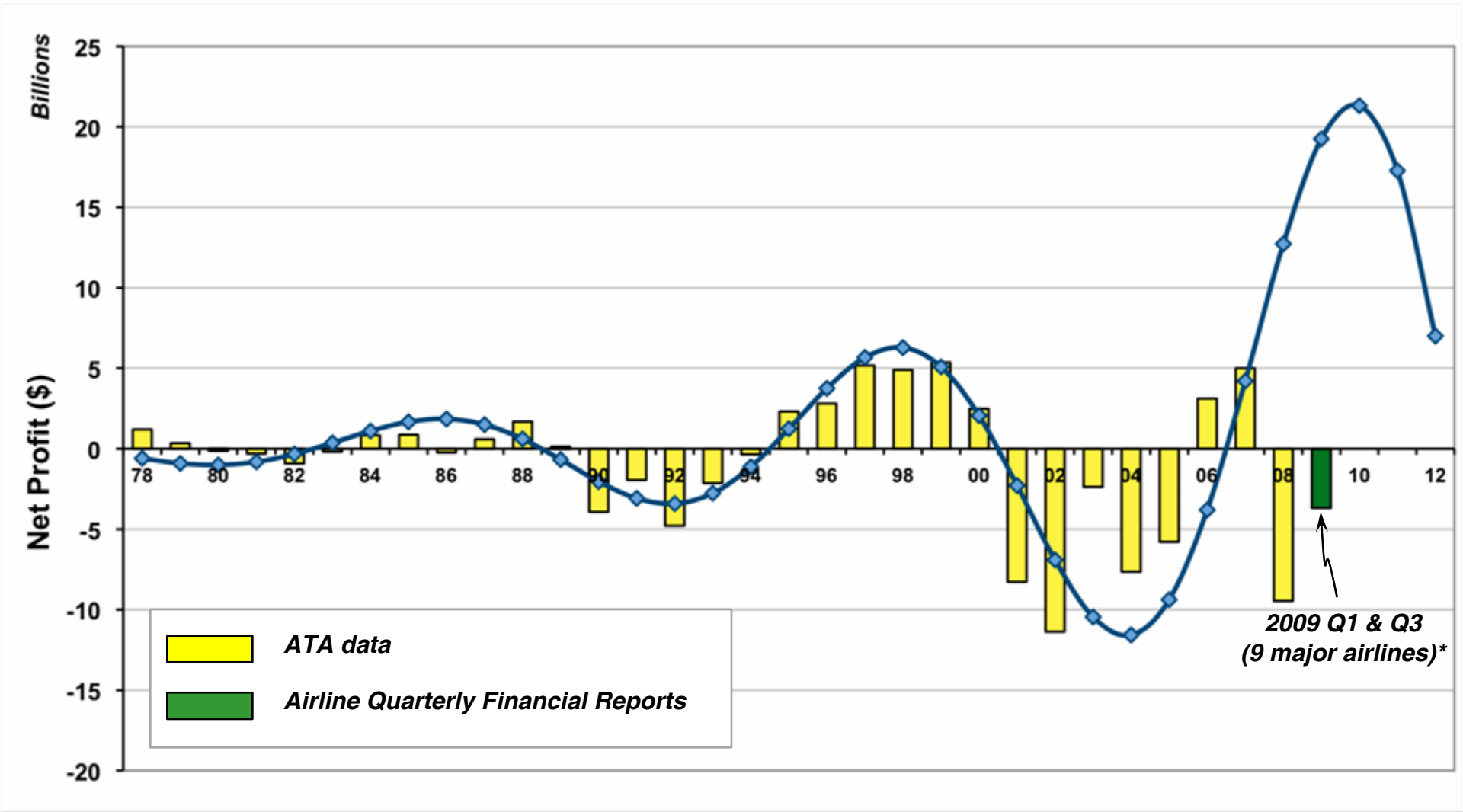
Cyclic Industry with Exponential Growth In Volatility Since Deregulation



Data source: ATA Annual Revenue and Earnings - Net Profit and Loss

U.S. Airlines Net Profit

Best Fit of Undamped Oscillation – Cycle Period = 11.3 yr

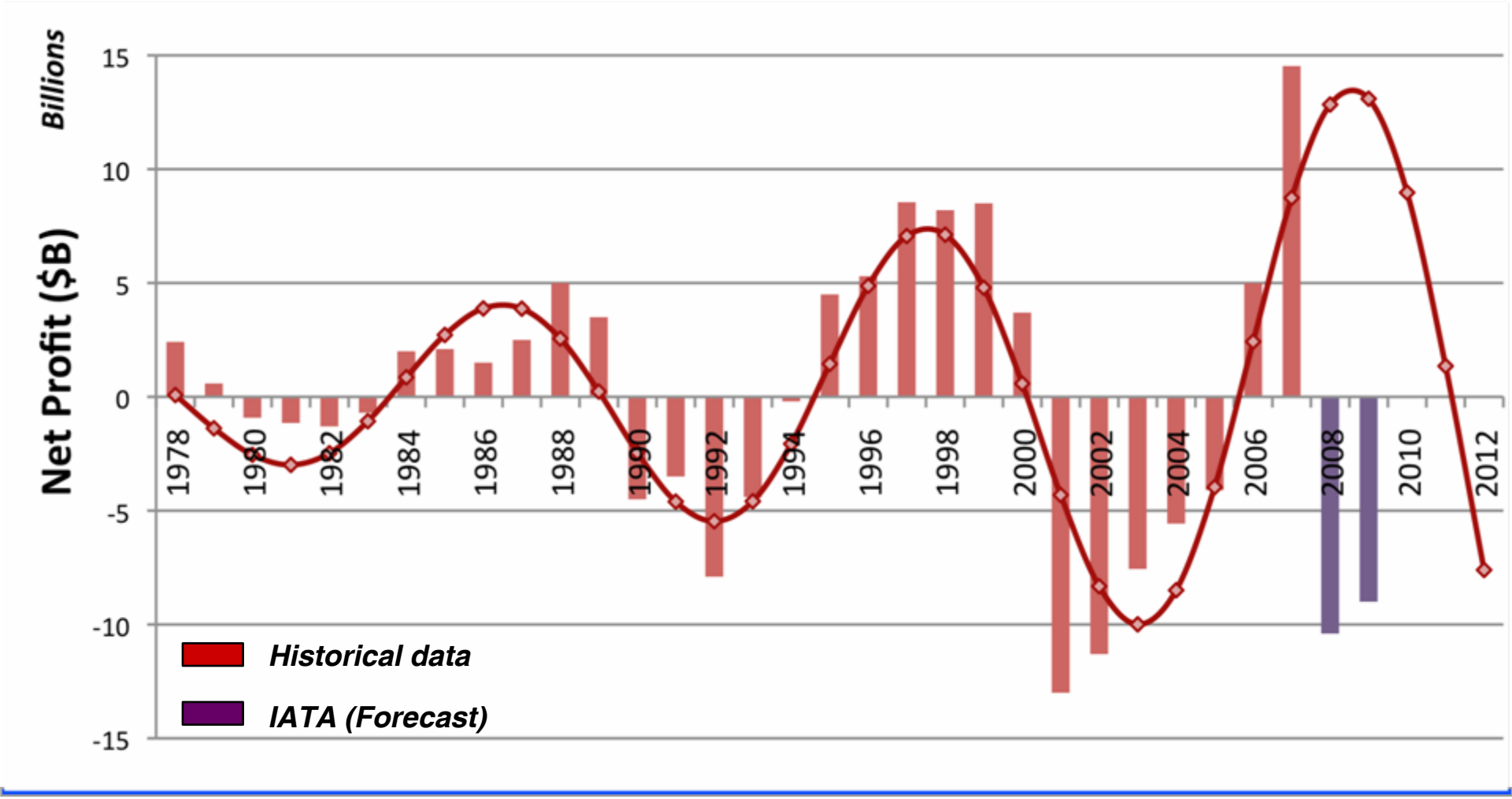


Data source: ATA - available at: www.airlines.org & Airline Quarterly Reports (Net Profits and Losses Exclude Special Items)

** American Airlines, United Air Lines, Delta Air Lines, Northwest Airlines, Continental Airlines, US Airways, Southwest Airlines, JetBlue Airways, Alaska Airlines,*

World Airlines Net Profit

(from 1978 to 2009)

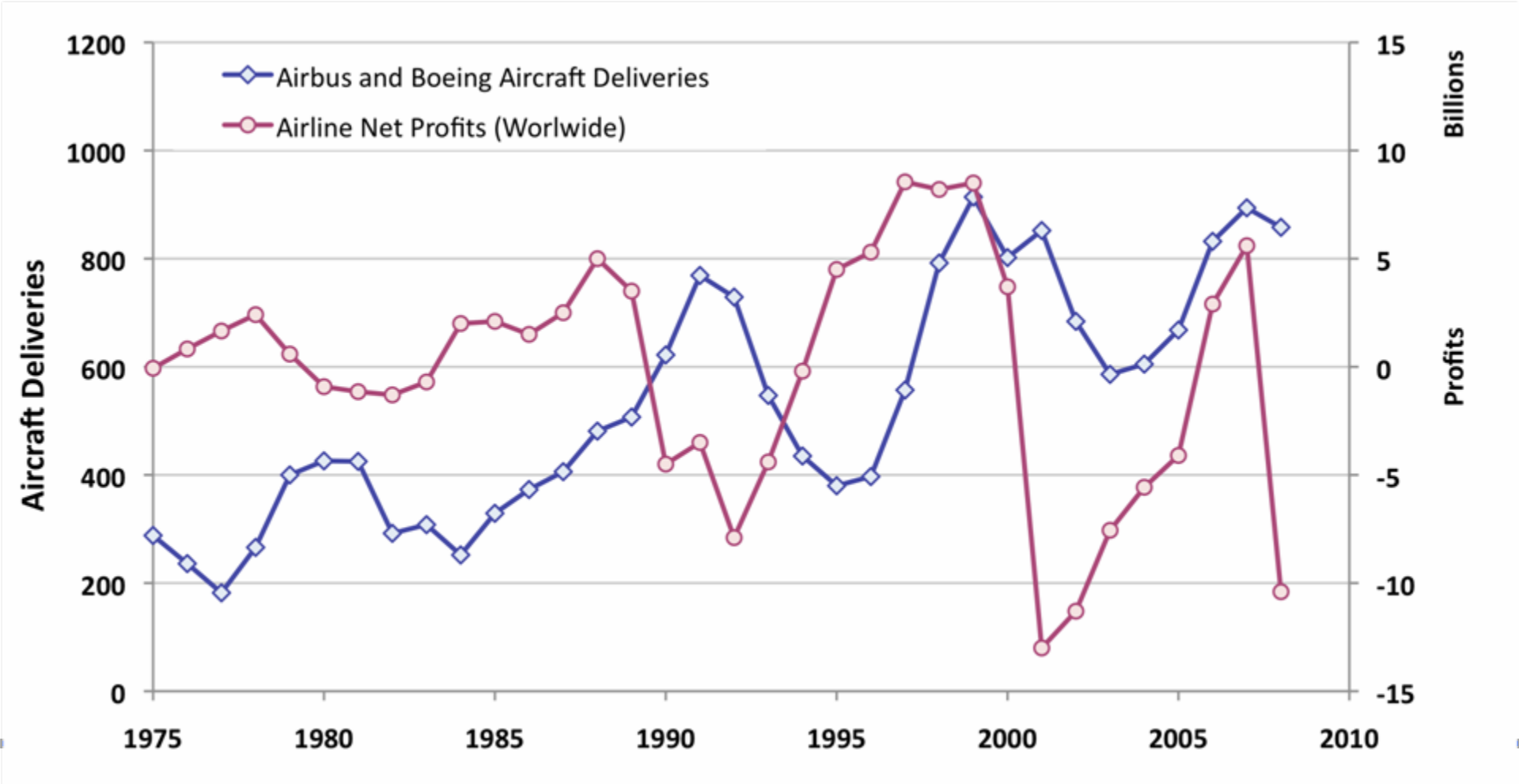


Note: IATA represents 250 airlines comprising 94% of the international scheduled air traffic

Data source: ICAO data (1978 to 2007) and IATA (2007-2009) Forecast from June 9th 2009

World Airlines Net Profits vs. Aircraft Deliveries

Phase Lag between Airline Net Profits & Aircraft Deliveries: Hypothesize that instability driven by capacity response phase lag

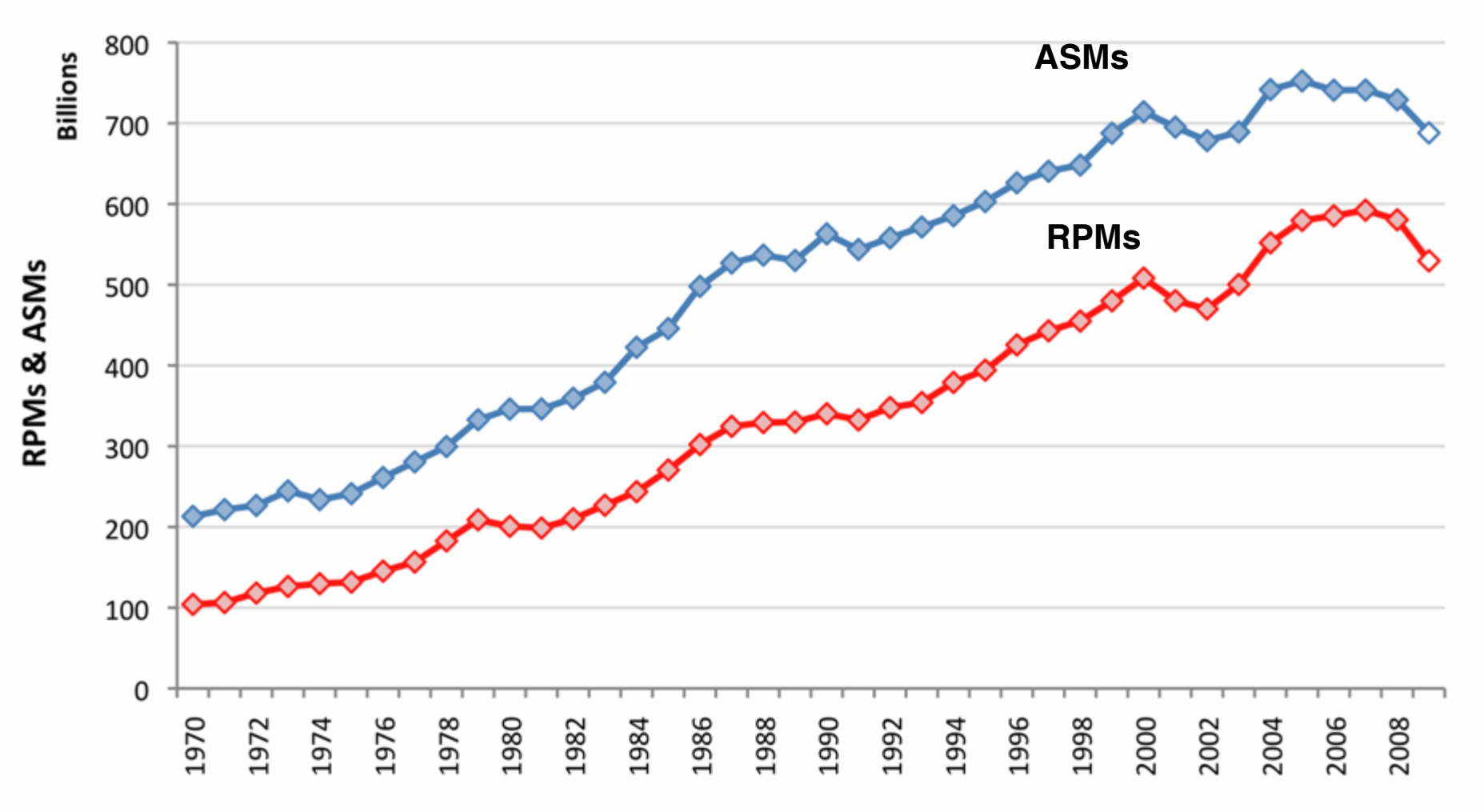


Data source: ICAO data (Profit) and SpeedNews data (Aircraft deliveries)

World Airlines Net Profits vs. Aircraft Orders

Data source: ICAO data (Profit) and SpeedNews data (Aircraft orders)

U.S. Domestic ASMs and RPMs

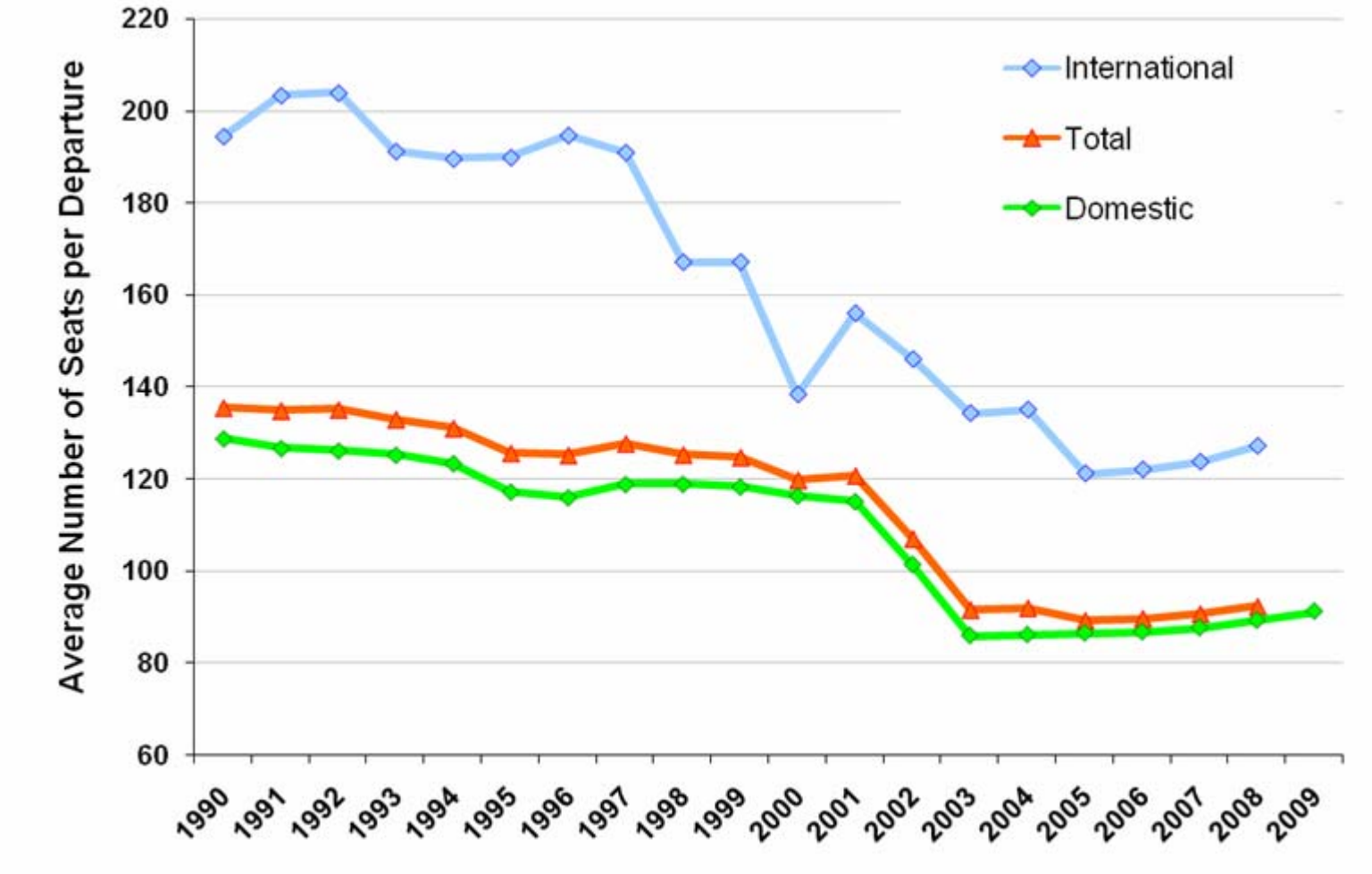


Note: Data for 2009 - Jan to May - from DOT Form 41 available from BTS – Projected to full year 2009 based on Jan-May data

Data source: ATA for 1970-2008, "U.S. Airlines" defined as U.S. Department of Transportation (DOT) in Form 41 Financial and Traffic Reports (total of 89 airlines).

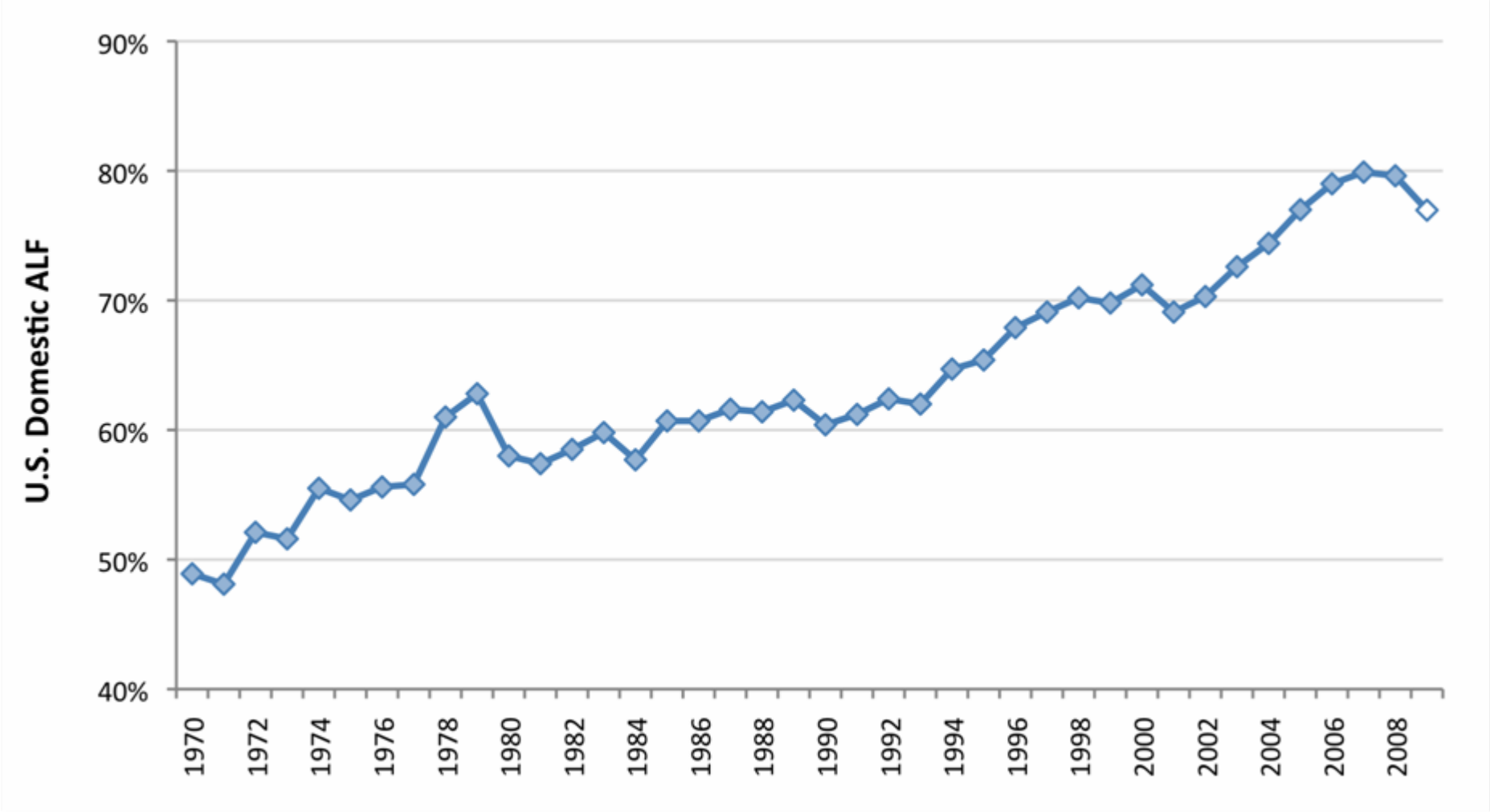
Trends in Aircraft Size

U.S. Airlines



Data source: Form 41 Traffic data from Bureau of Transportation Statistics (US carriers)

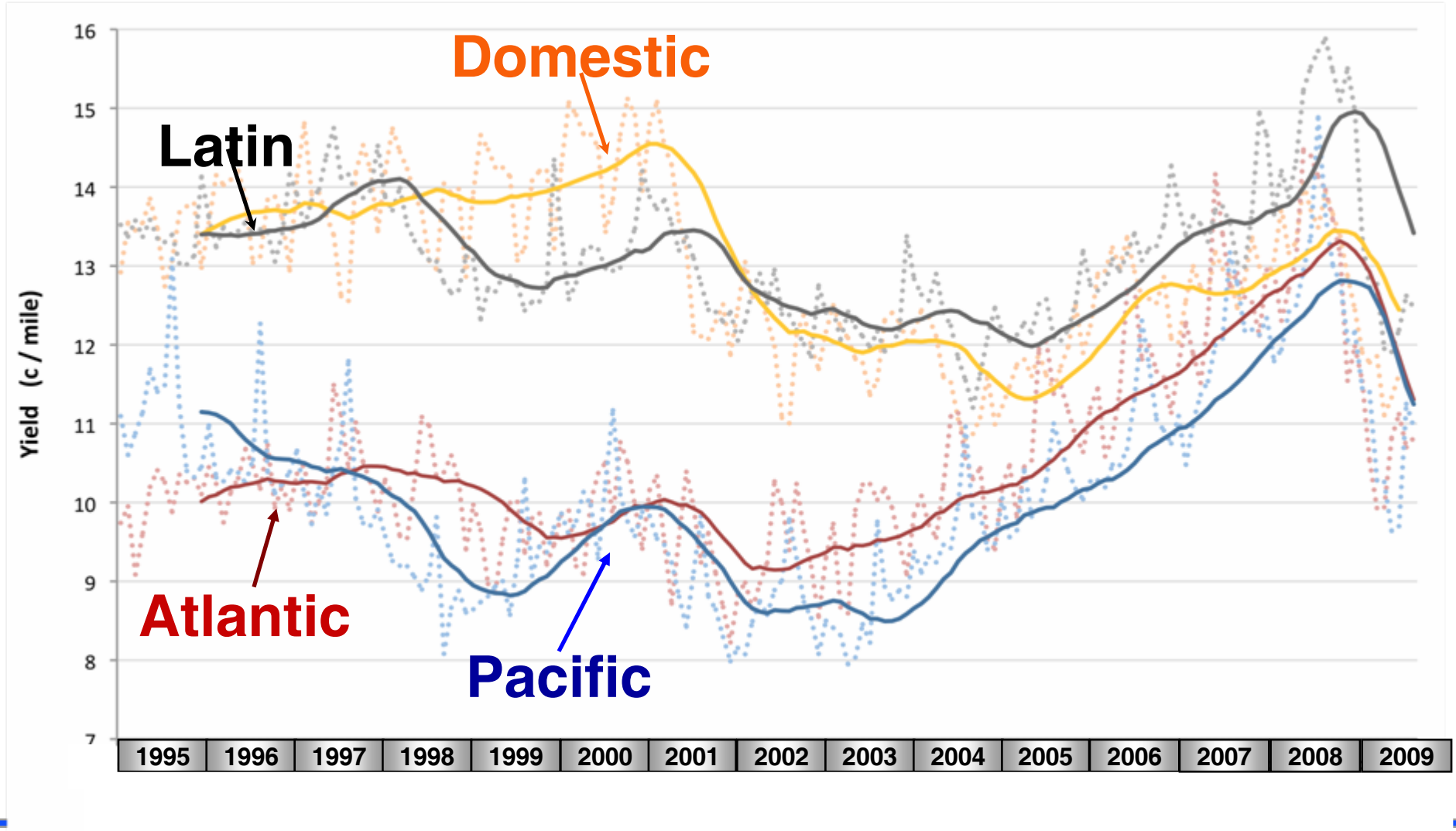
U.S. Domestic Average Load Factor



Note: Data for 2009 - Jan to May - from DOT Form 41 available from BTS

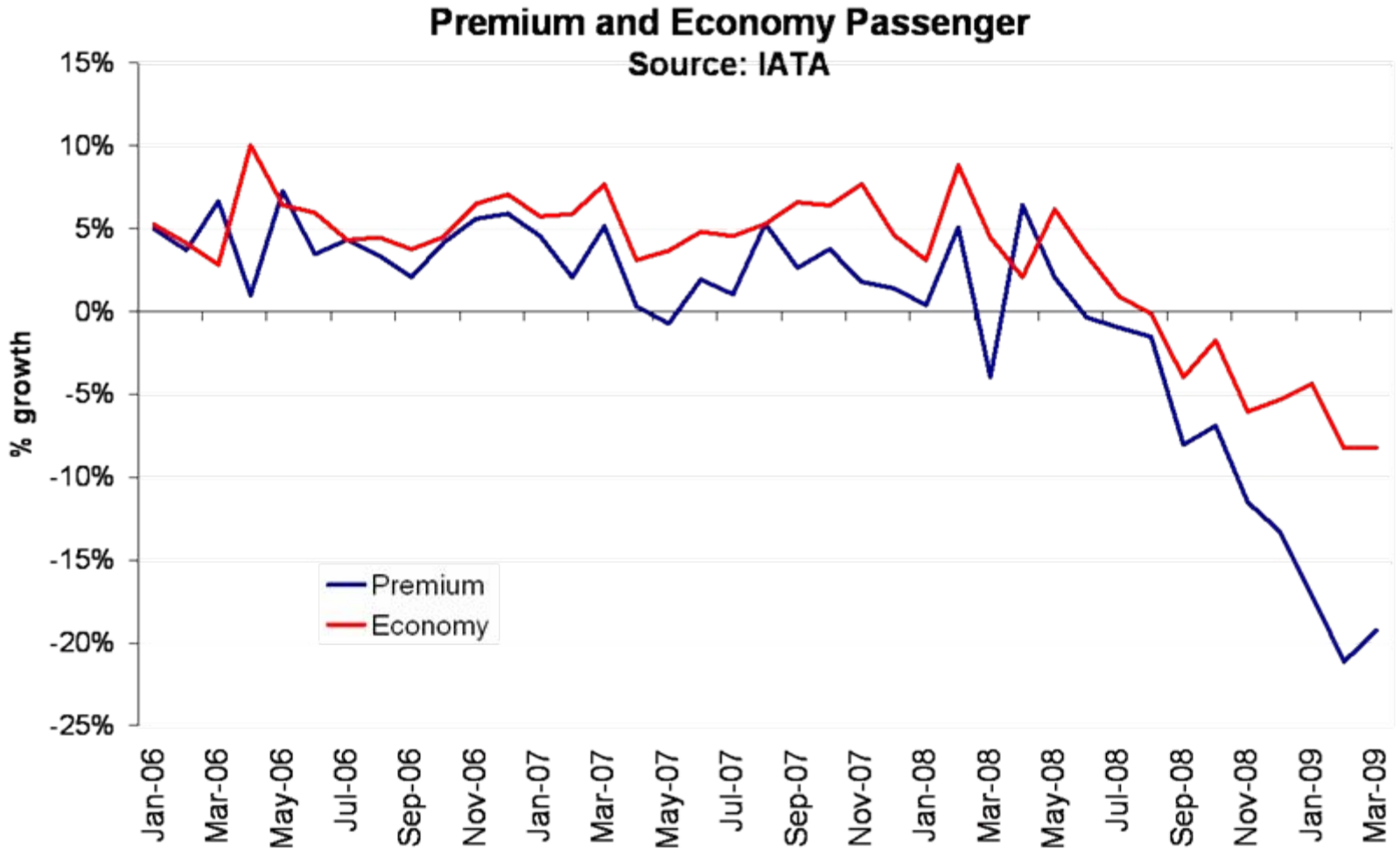
Data source: ATA for 1970-2008, "U.S. Airlines" defined as U.S. Department of Transportation (DOT) in Form 41 Financial and Traffic Reports (total of 89 airlines).

Historic Yield by Region (1995-2009)



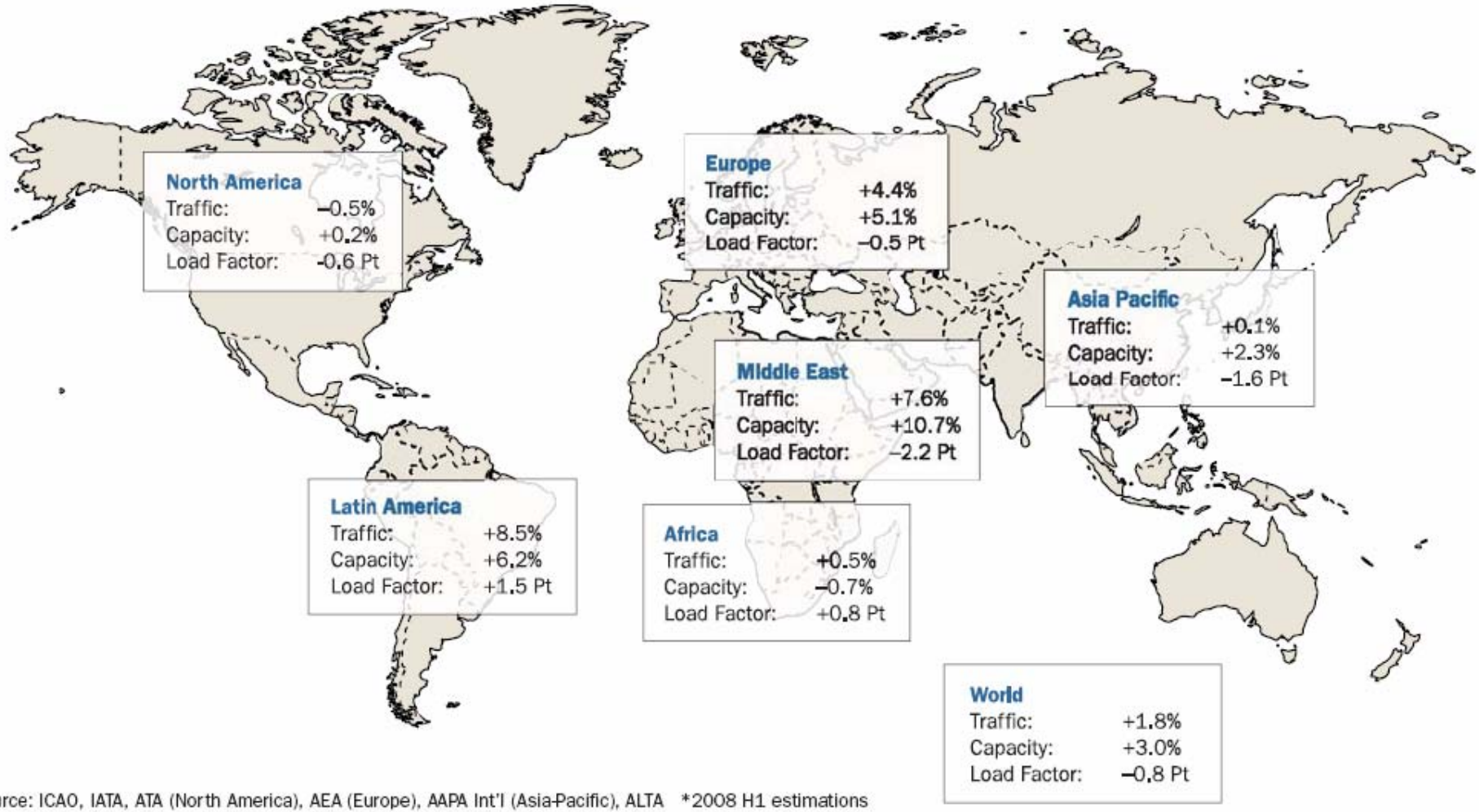
Data source: *ATA Passenger Yield Report. Data through July 2009*

Weakness in High Yield Passengers



Source: IATA 2009

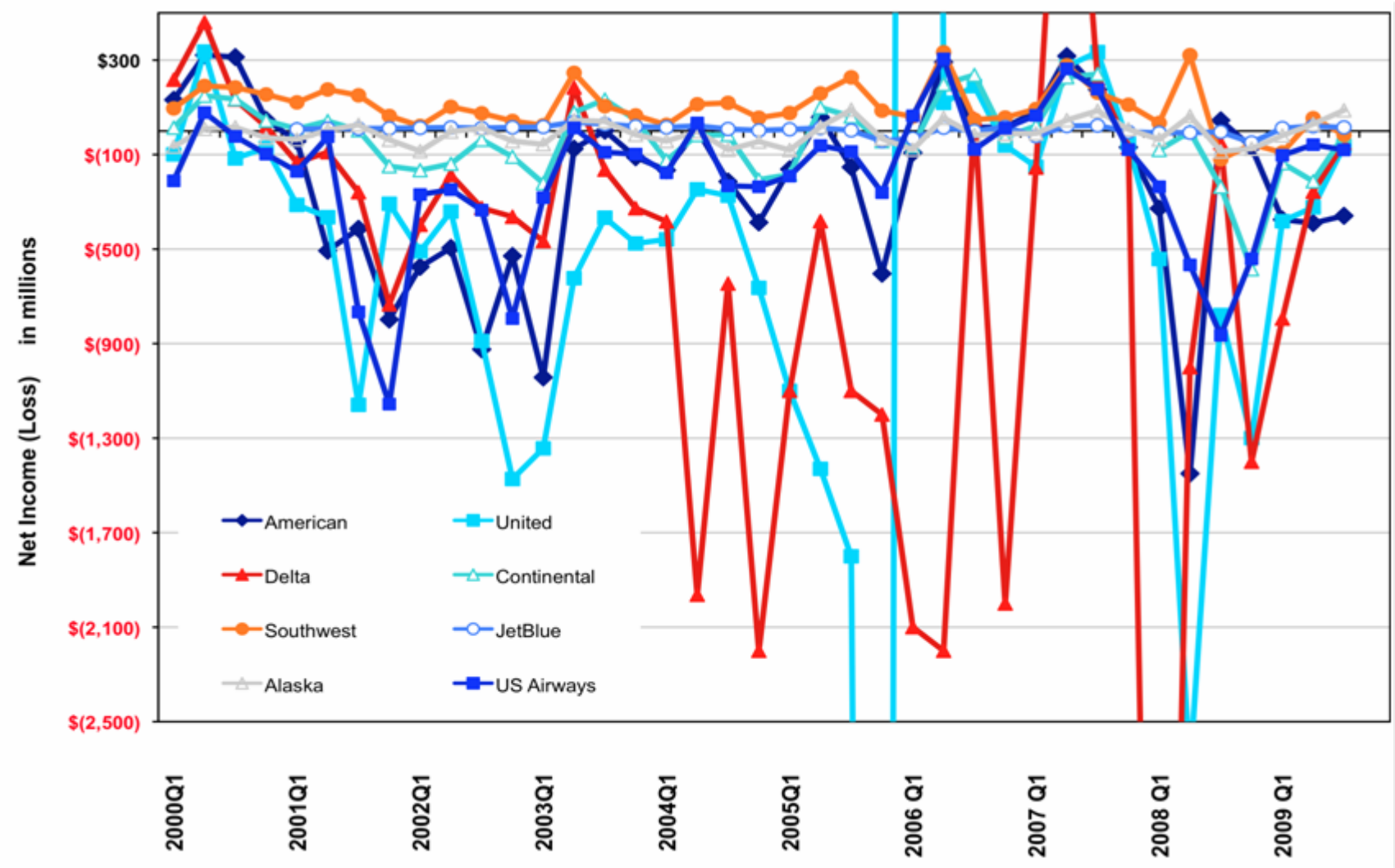
Regional Passenger Traffic Overview (% change 2008 vs. 2007)



Source: ICAO, IATA, ATA (North America), AEA (Europe), AAPA Int'l (Asia-Pacific), ALTA *2008 H1 estimations

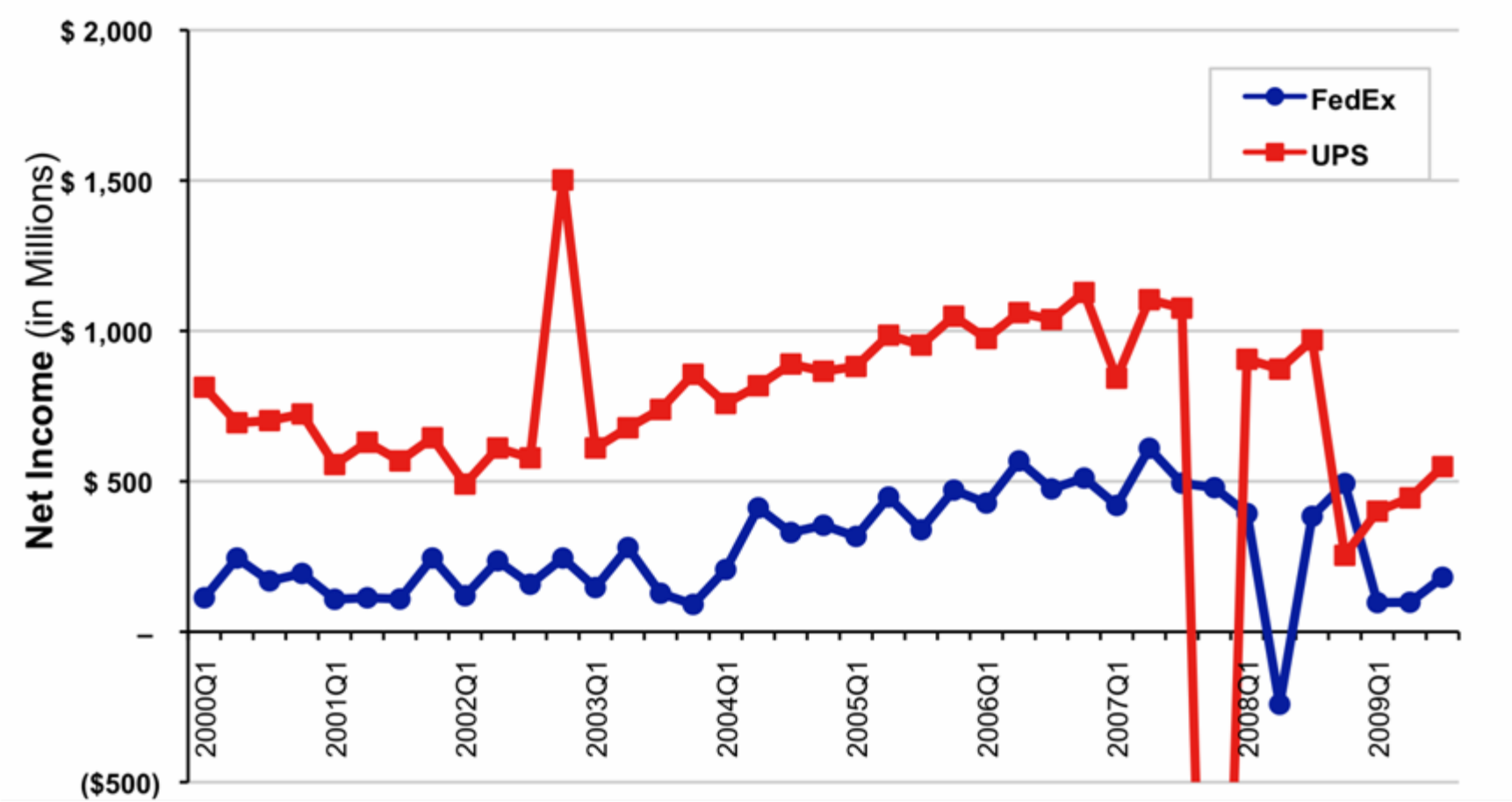
Source: ICAO, Journal Vol.1 2009

U.S. Airline Quarterly Profits



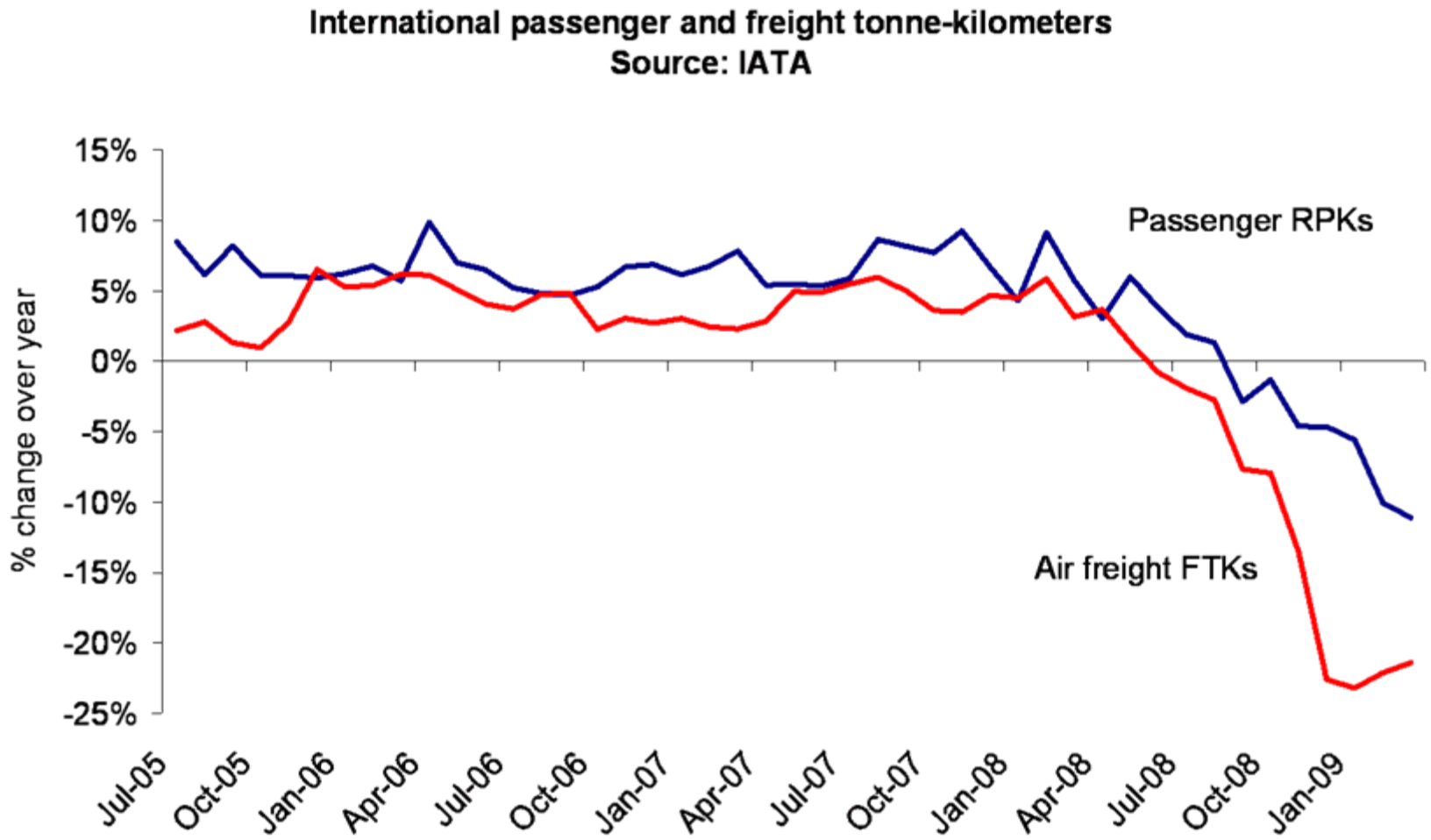
Data sources: Airline Quarterly Reports (Net Profits and Losses Include Special Items)

Cargo Net Income



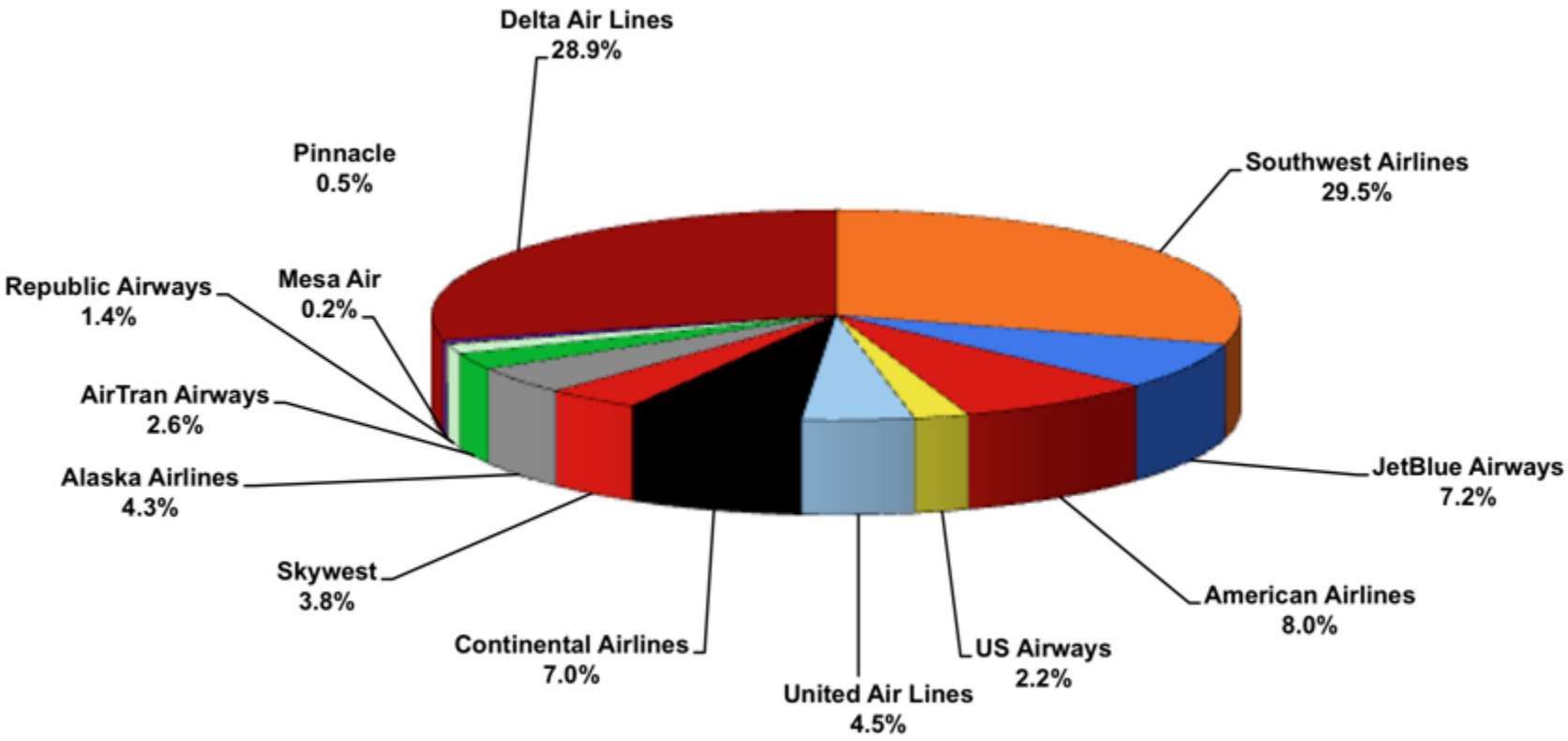
Data sources: Company Financial Information

Relative Growth
Cargo and Passengers



Source: IATA 2009

Market Cap: US Majors
Oct. 24th 2009

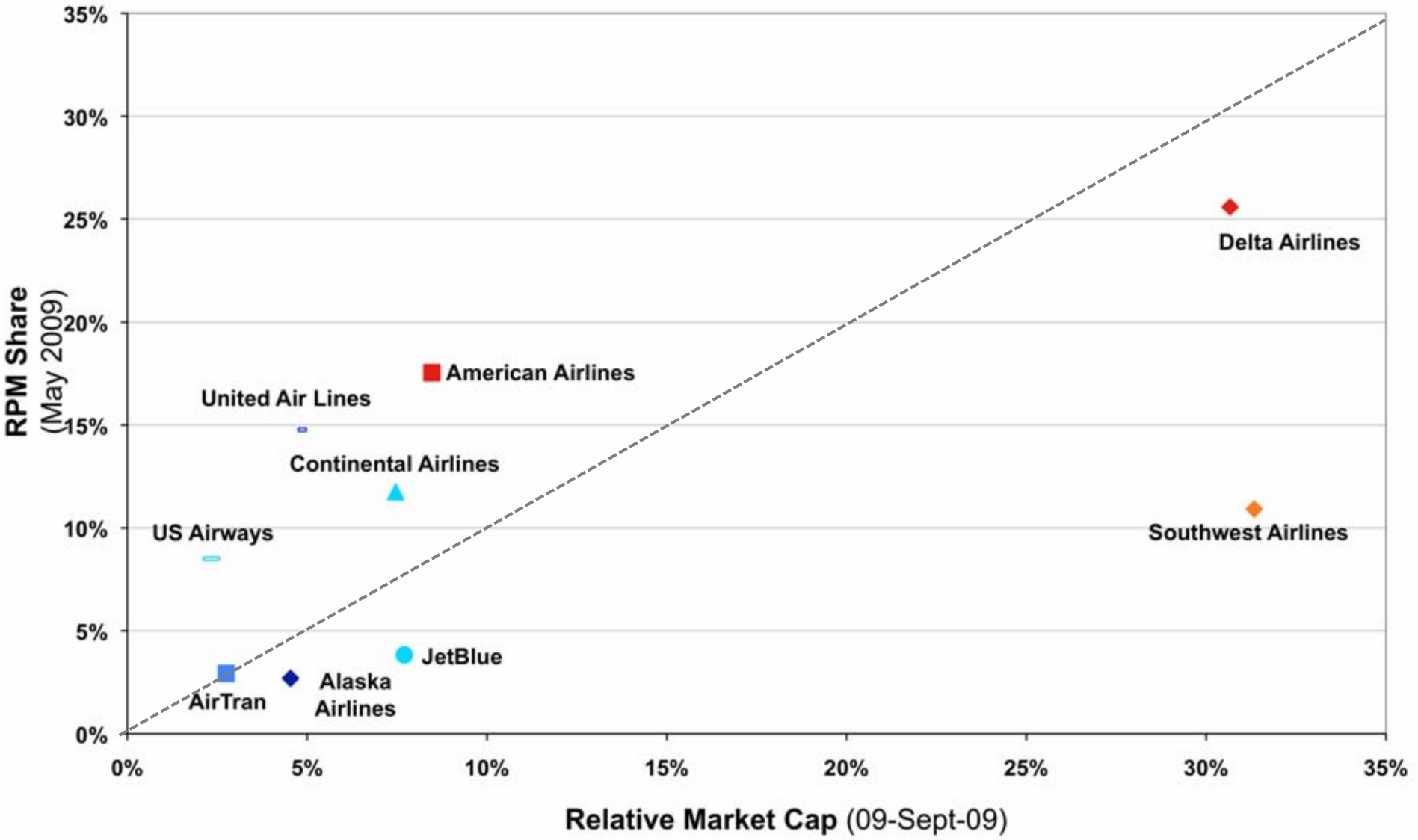


Total Market Cap: $ 22.9 billion

Data source: Google Finance.

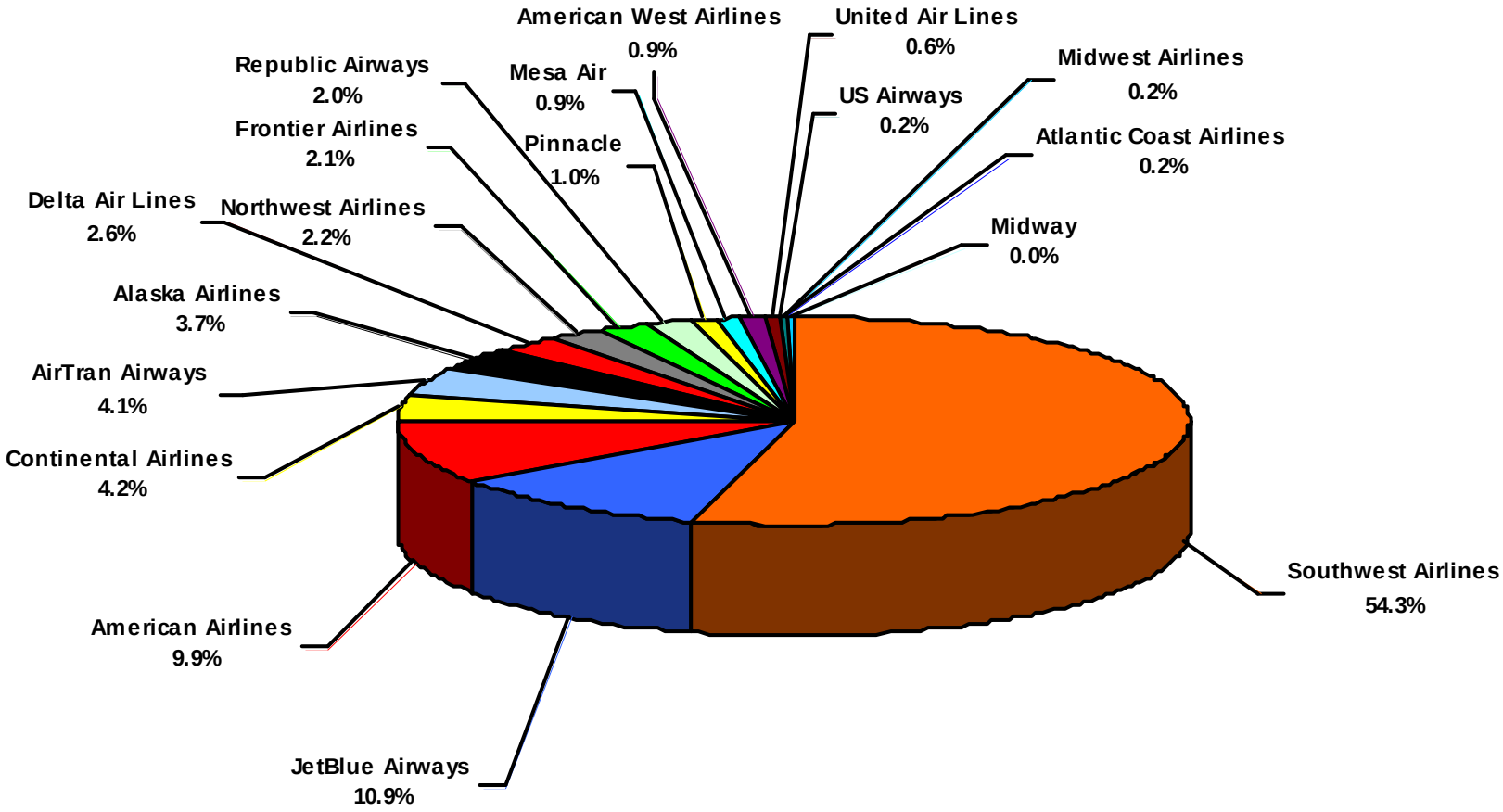
RPM Share vs. Market Cap

(RPMs: May 2009 - Market Cap: Sept. 9th 2009)



Source: Google Finance for Market Cap data and Bureau of Transportation Statistics for RPM data

Market Cap: US Majors
26-May-2005



Total Market Cap: $21.2 billion

Data source: Yahoo Finance.

Consolidations

- **Recent US Consolidation**
  - ☐ Delta and Northwest (Oct 09)
  - ☐ USAir and America West
  - ☐ Potential for Additional Reactionary Moves
- **Recent International Consolidation**
  - ☐ Lufthansa and Austrian
  - ☐ Air France and KLM
  - ☐ Air France and Alitalia ??
  - ☐ Lufthansa and Swiss
  - ☐ China Southern and China Northern and Xingiang
  - ☐ Cathy Pacific and Dragon
  - ☐ BMI and Lufthansa (Virgin?)
- **International Strategic Investment in US Carriers**
  - ☐ Lufthansa and JetBlue
  - ☐ Virgin and Virgin America

EU-US Open Skies Agreement

- **On April 30, 2007 E.U. and U.S. signed a preliminary Open Skies accord**
  - ☐ Allows EU airlines to operate direct flights between U.S. and any EU country (and some others)
  - ☐ Allows U.S. airlines reciprocal right, and ability to fly between EU city-pairs
  - ☐ Agreement will replace 22 bilateral air service agreements currently in place between the U.S. and the Member States
  - ☐ Implications for Alliance Anti-Trust Immunity
  - ☐ In effect March 30, 2008

- **E.U. has made liberalized foreign control a prerequisite for a permanent agreement**
  - o U.S. domestic market lucrative as standalone and hub-feeder
    - ◆ Cabotage rights only granted to U.S. Incorporated airlines
    - ◆ U.S. incorporation requires meeting ownership caps
    - ◆ Without control, network composition cannot be shaped
  - o Match EU's 49% foreign control restriction

Airline Alliances
US DOT Antitrust Immunity

Star Alliance

- Adria Airways (JP)
- Air Canada (AC)
- Air New Zealand (NZ)
- ANA (NH)
- Asiana Airlines (OZ)
- Austrian Airlines (OS)
- Blue1 (KF)
- bmi (BD)
- Continental (CO) NEW
- Croatia Airlines (OU)
- LOT Polish Airlines (LO)
- Lufthansa (LH)
- SAS (SK)
- Singapore Airlines (SQ)
- South African (SA)
- Spanair (JK)
- Swiss Intl Air Lines (LX)
- TAP Portugal (TP)
- Thai Airways Intl (TG)
- Turkish Airlines (TK)
- United (UA)
- US Airways (US)

Oneworld

- American Airlines (AA)
- British Airways (BA)
- Cathay Pacific (CX)
- Finnair (AY)
- Iberia (IB)
- Japan Airlines (JL)
- LAN (LA)
- Malév (MA)
- Qantas (QF)
- Royal Jordanian (RJ)

SkyTeam

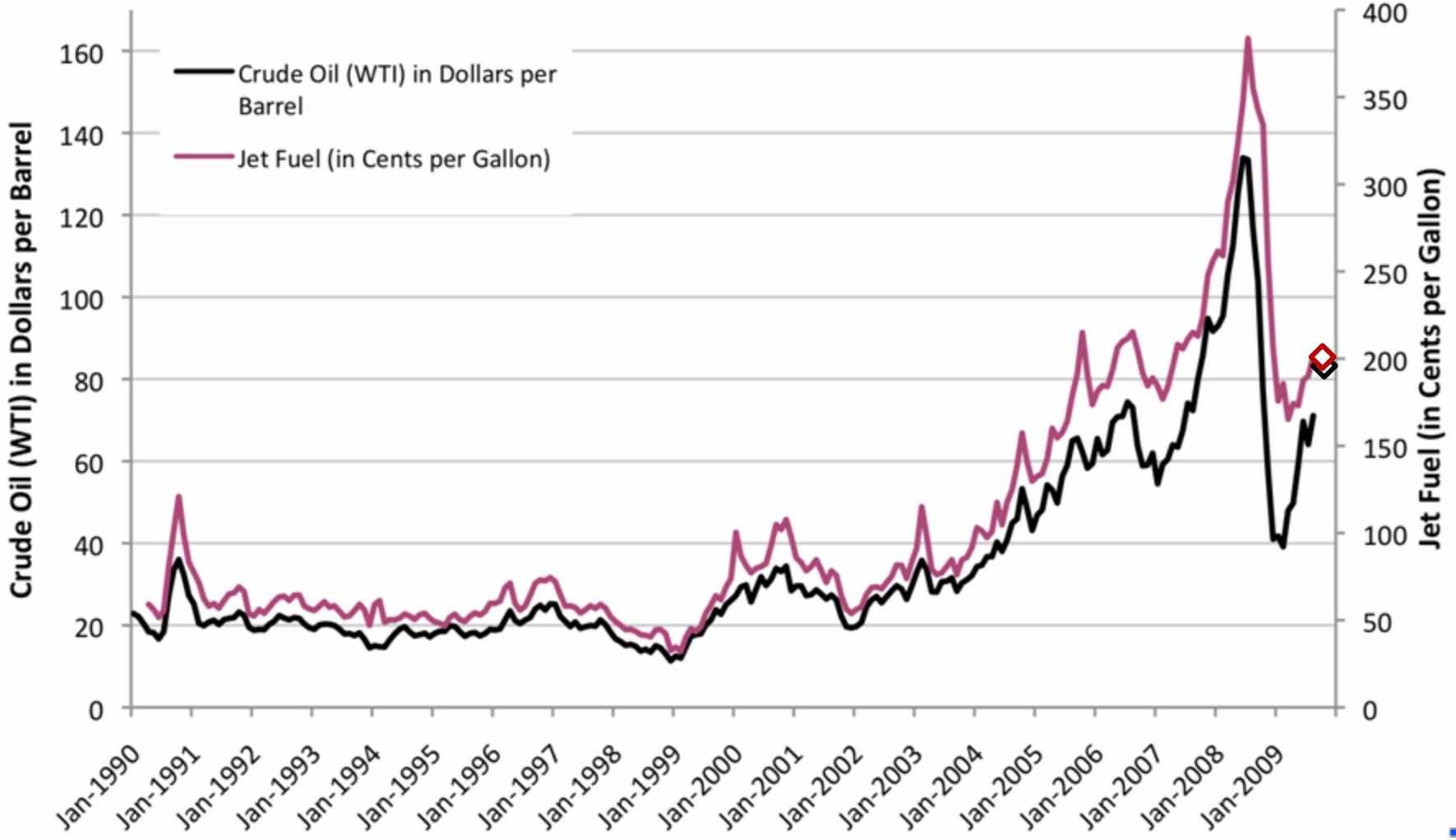
- Aeroflot (SU)
- Aeroméxico (AM)
- Air France (AF)
- Alitalia (AZ)
- Czech Airlines (OK)
- Delta (DL)
- KLM (KL)
- Korean Air (KE)
- Northwest (NW)

Prior Immunity

Immunity Application In Progress or Recently Approved

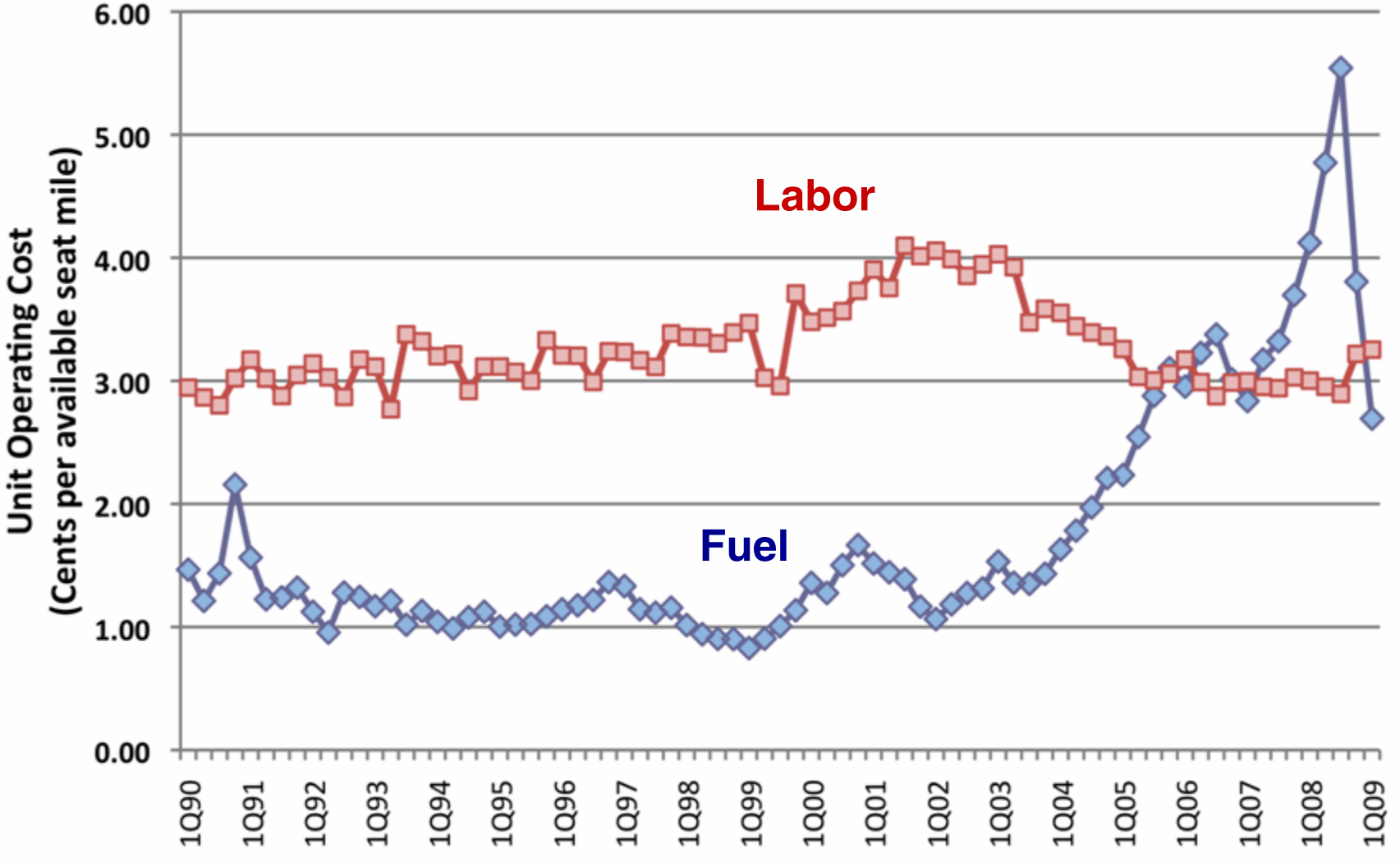
Source: Wikipedia, BTN Online

Trends in Crude Oil and Jet Fuel Price



Data sources: ATA Fuel Cost and Consumption (oil data through Mar. 2009, jet fuel data through Aug. 2009) – Data for June 2009: market price for Oct 24th 09

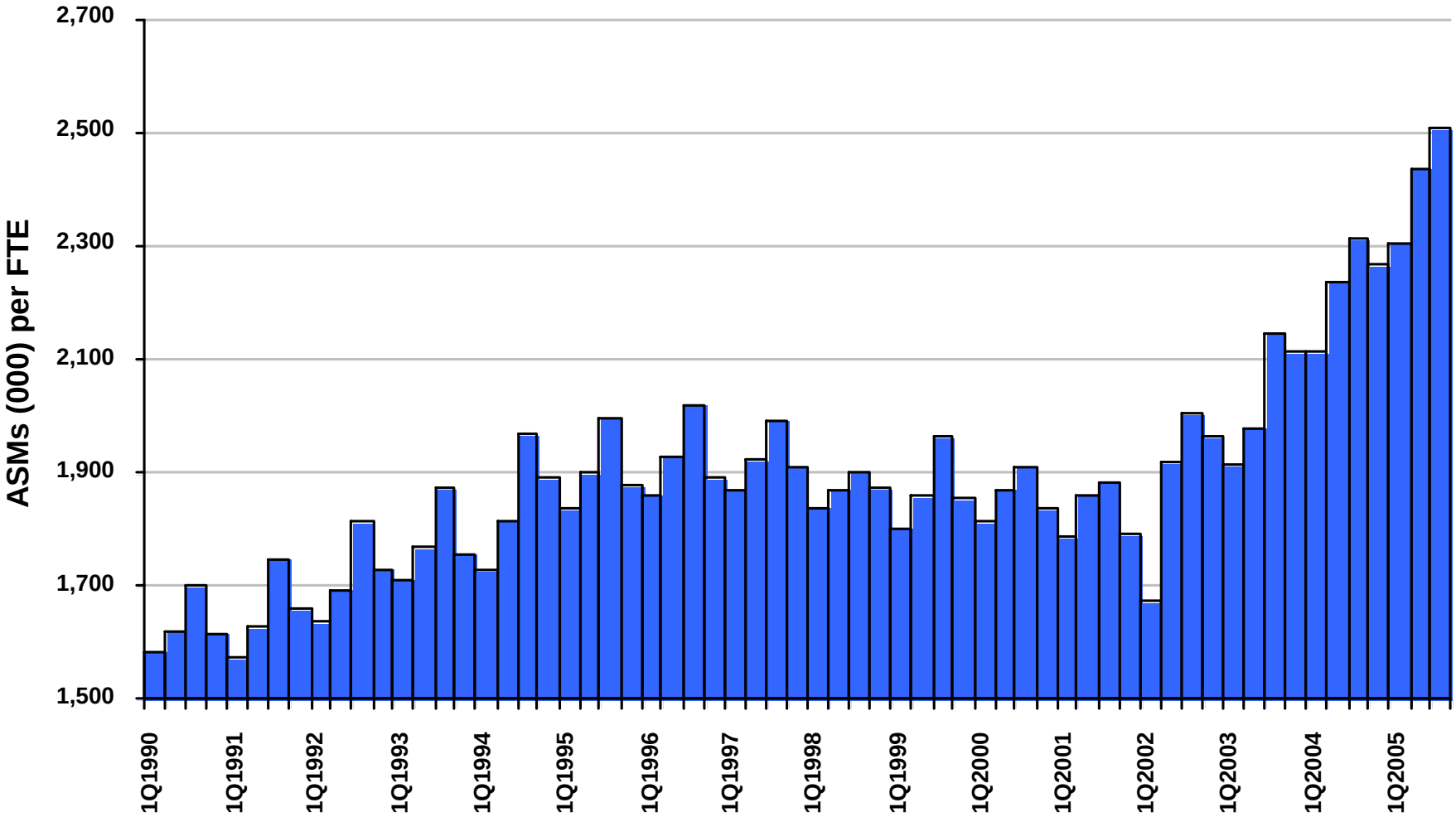
Unit Costs of Labor and Fuel



Data source: ATA U.S. Airline Cost Index,

Productivity Improvements Driving Cost Relief

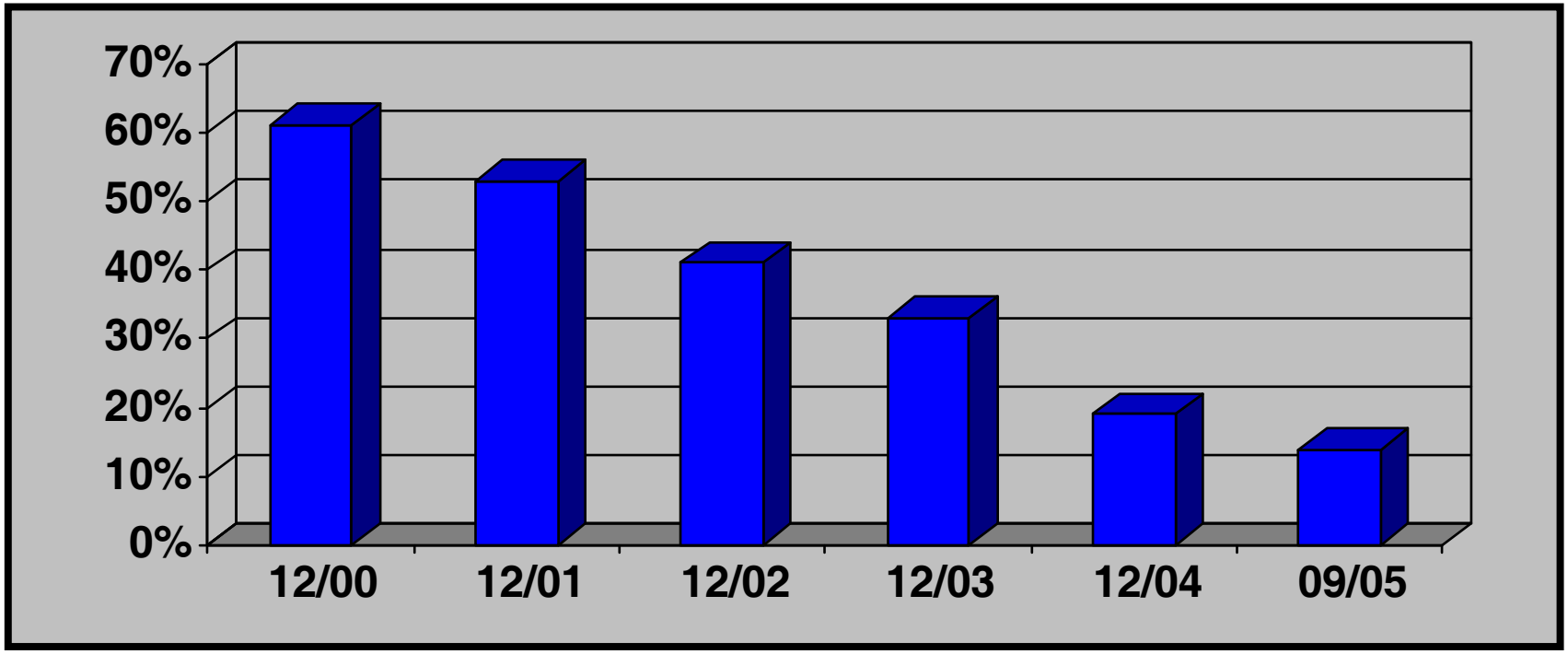
Network Restructuring, Work Rules, Human Capital, Outsourcing, Technology



Source: ATA US Airline Cost Index: Major & National Passenger Carriers, Q3 2005

Positive Views of Employee Morale

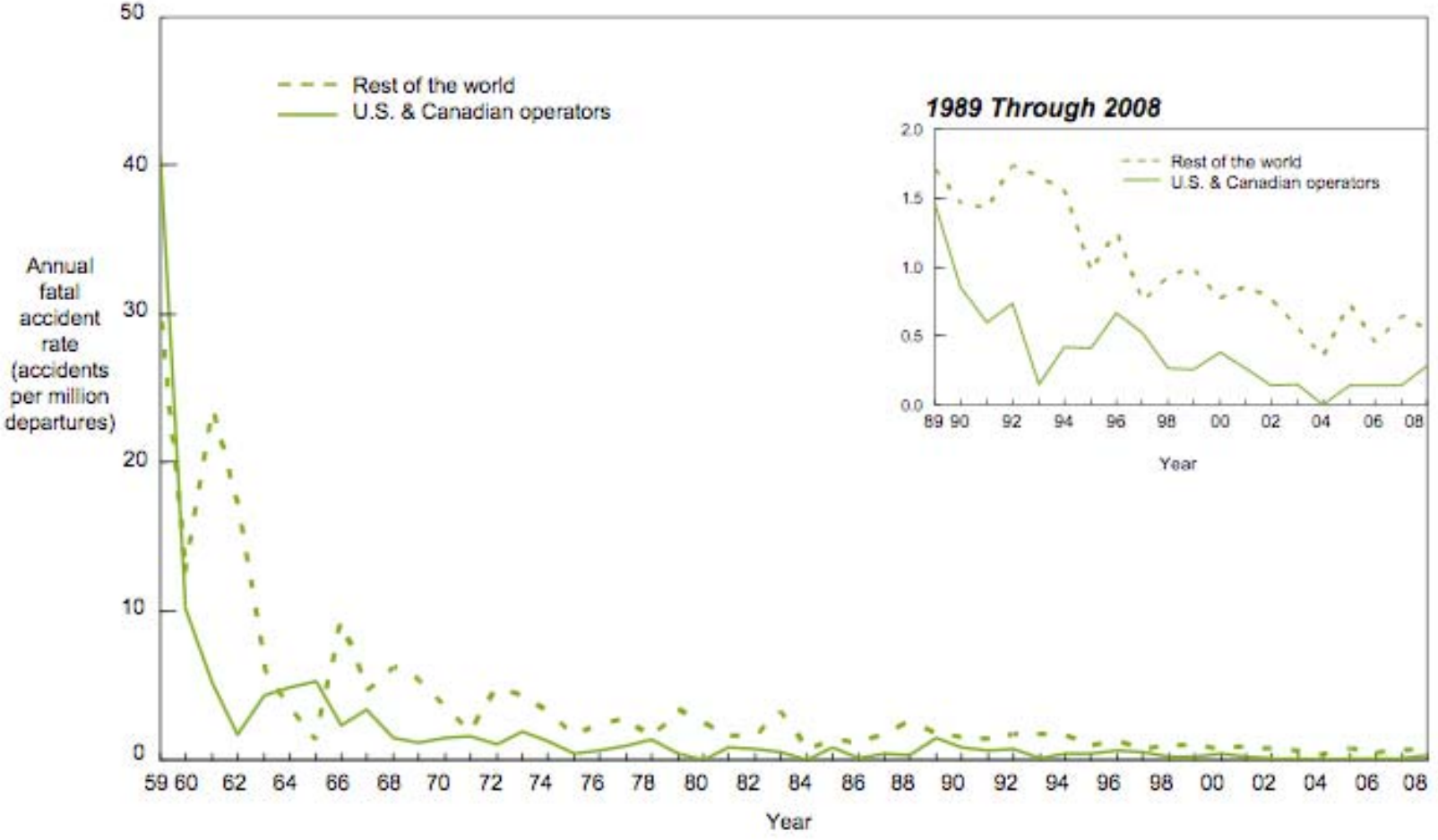
Don't have current survey data trend may have reversed



***Source*: The Wilson Center for Public Research, Inc. – based on 150,674 interviews conducted with pilots or flight attendants from 1/1/2001 to 9/20/2005**

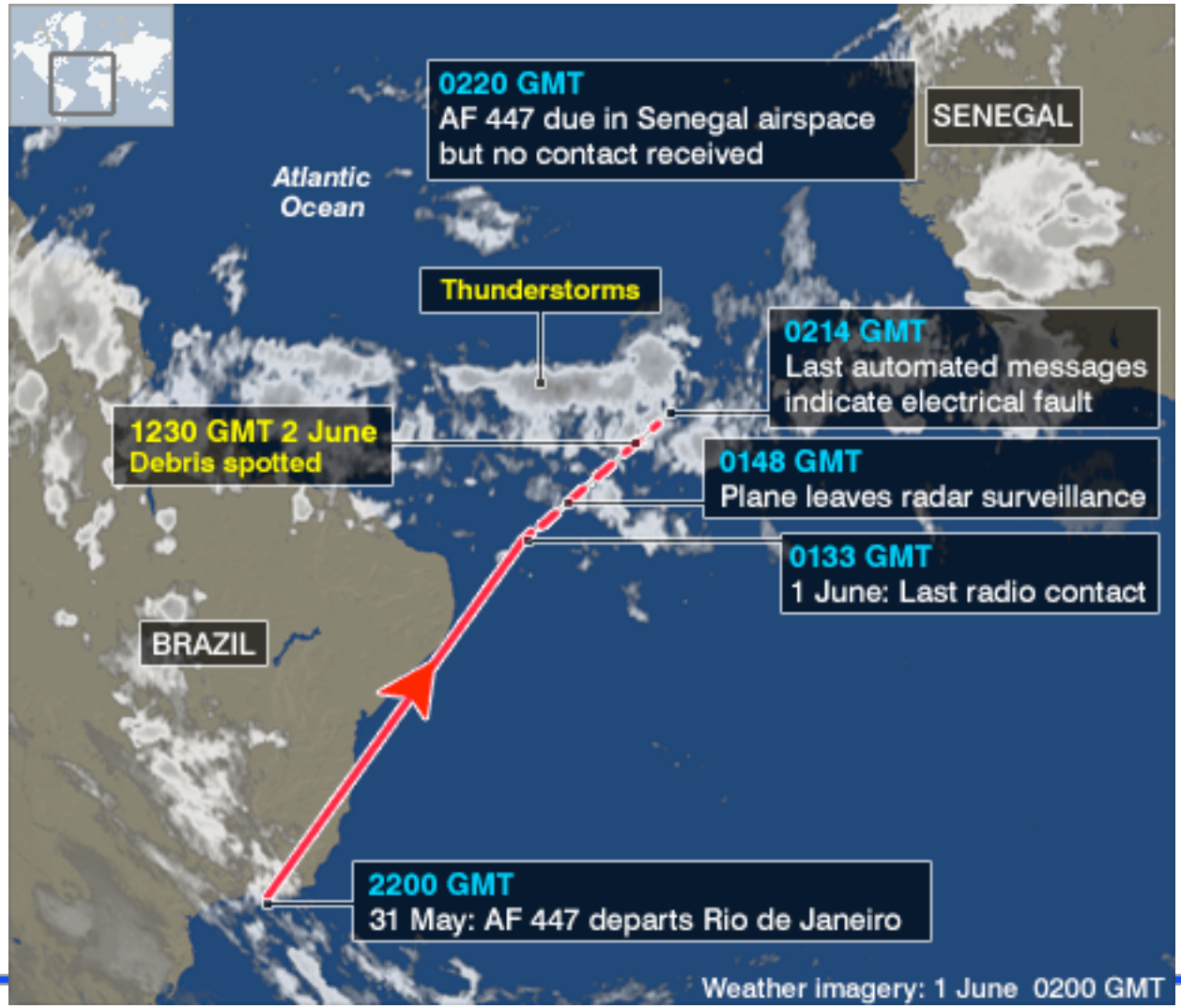
U.S. and Canadian Operators Accident Rates by Year

Fatal Accidents – Worldwide Commercial Jet Fleet – 1959 Through 2008



USAir 1549
15 - Jan - 2009

Air France 447
27 - Aug - 2006

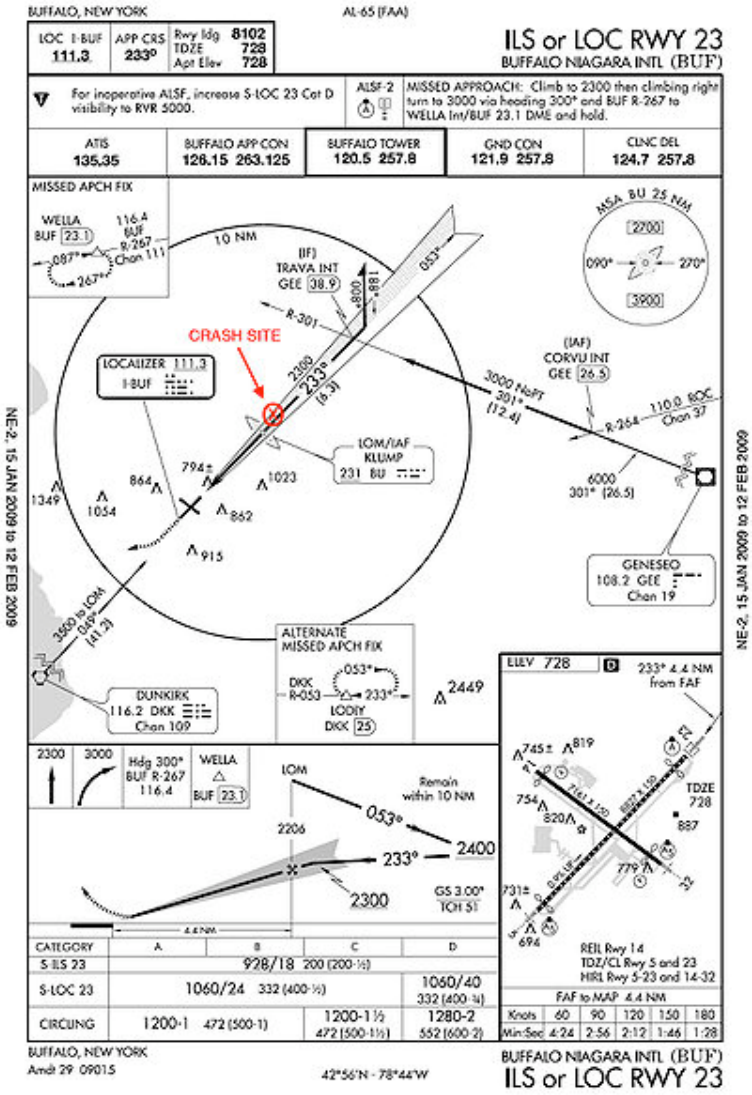


Source: BBC

Colgan Air
12 – Feb - 2009

Crew Issues

- **Training**
- **Commuting and Fatigue**
- **Compensation ($16K - $20K)**
- **Professionalism**

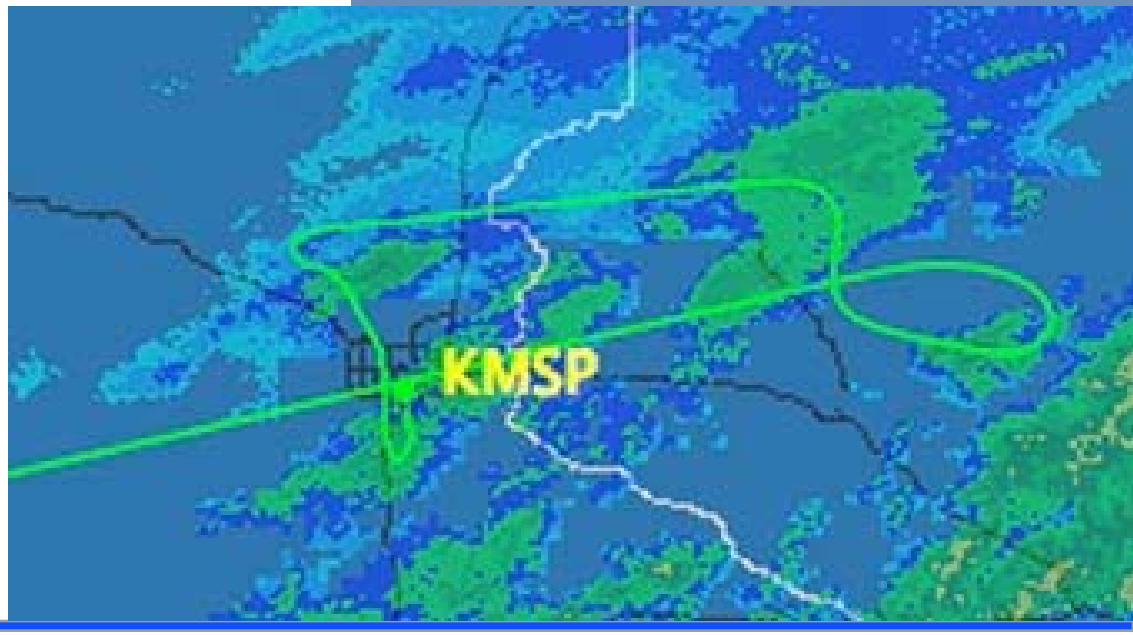


Northwest 188
Oct 21, 2009

- **NW 188 overflew destination airport (MSP) by approximately 150 miles**

- **Flight from San Diego to Minneapolis/St. Paul**

- **Cause under investigation but has re-raised concerns over crew fatigue**



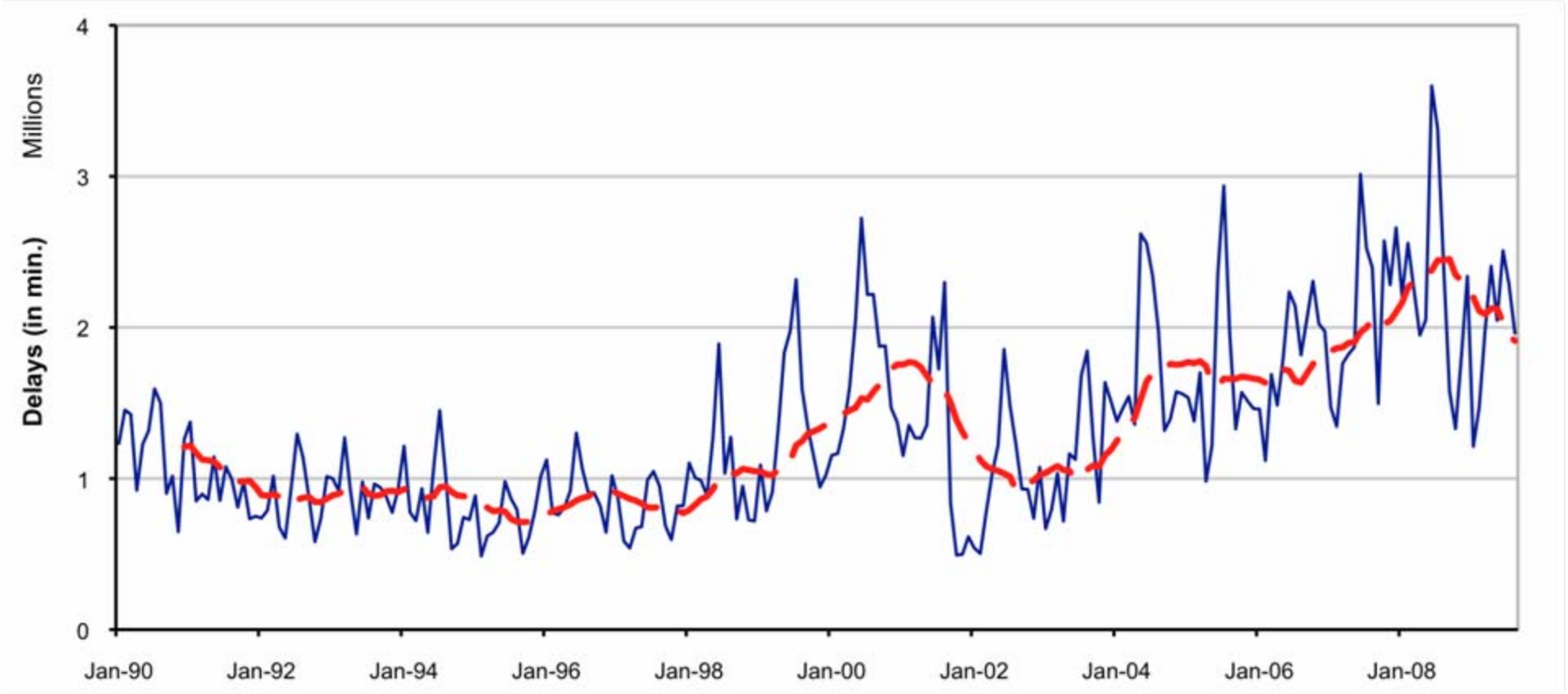
Source: Times online

Pilot Fatigue Rulemaking

- Congressional Hearings on Fatigue
- FAA formed Flight and Duty Time Limitations and Rest Requirements ARC
- Were scheduled to submit draft NRPM language by Sept 1, 2009

US Flight Delays

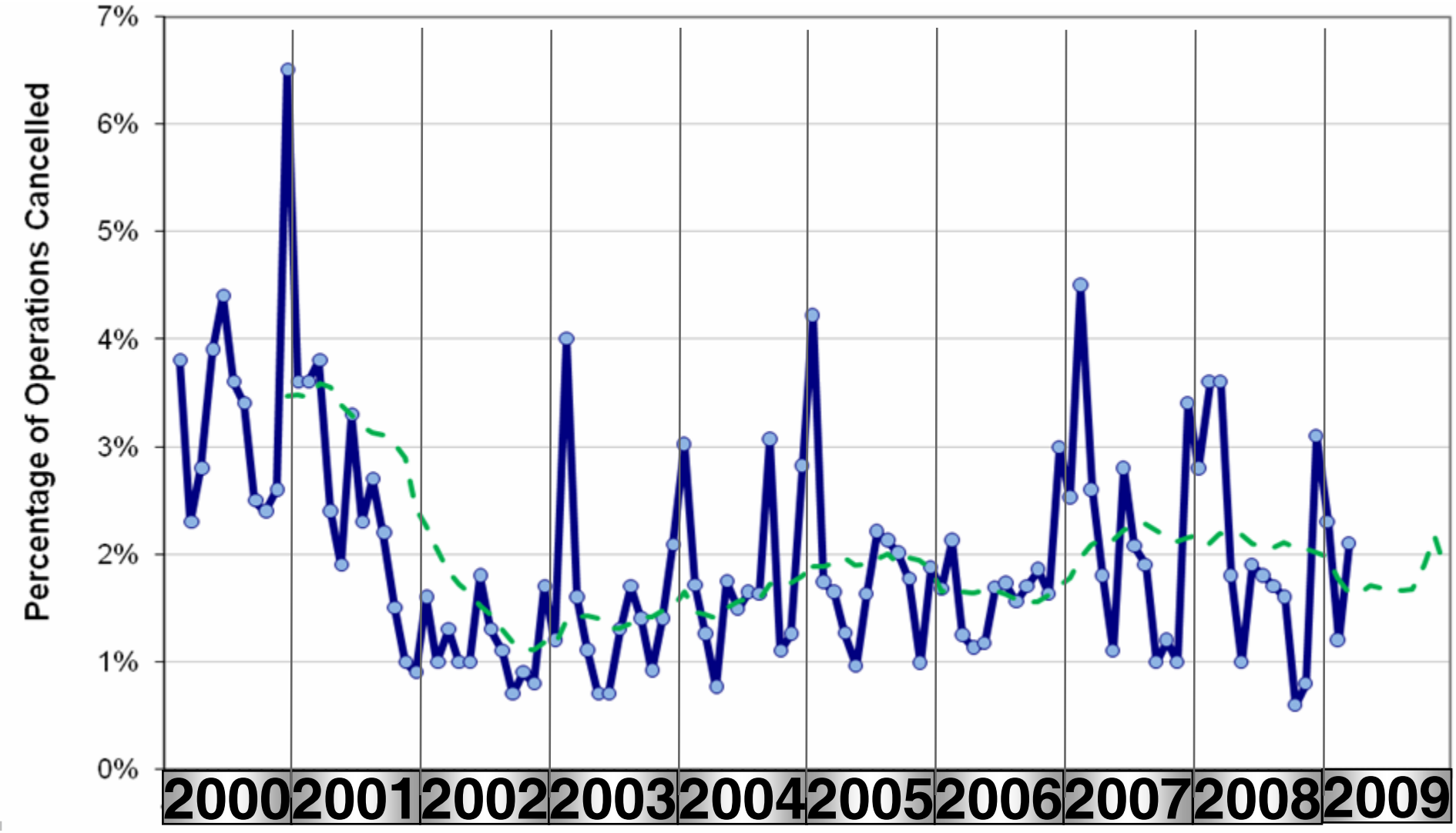
from 1995 to 2009



Data source: FAA Operational Network (OPSNET)

Flight Cancellations

from 2000 to 2009 (by month)

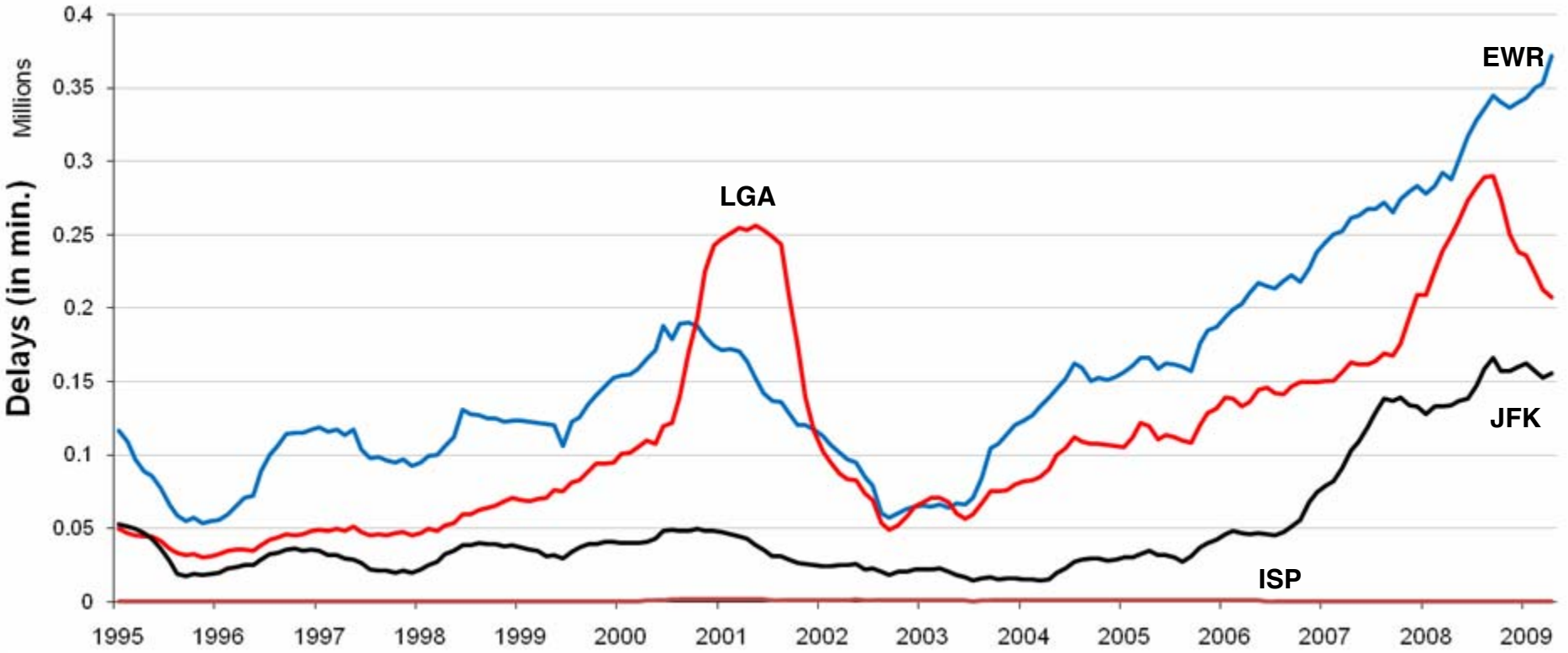


Source: DOT, Air Travel Consumer Report, http://airconsumer.ost.dot.gov/ & BTS On Time Performance data

(top 11 airlines from 2000 to 2002, top 20 airlines from 2003 to 2007)

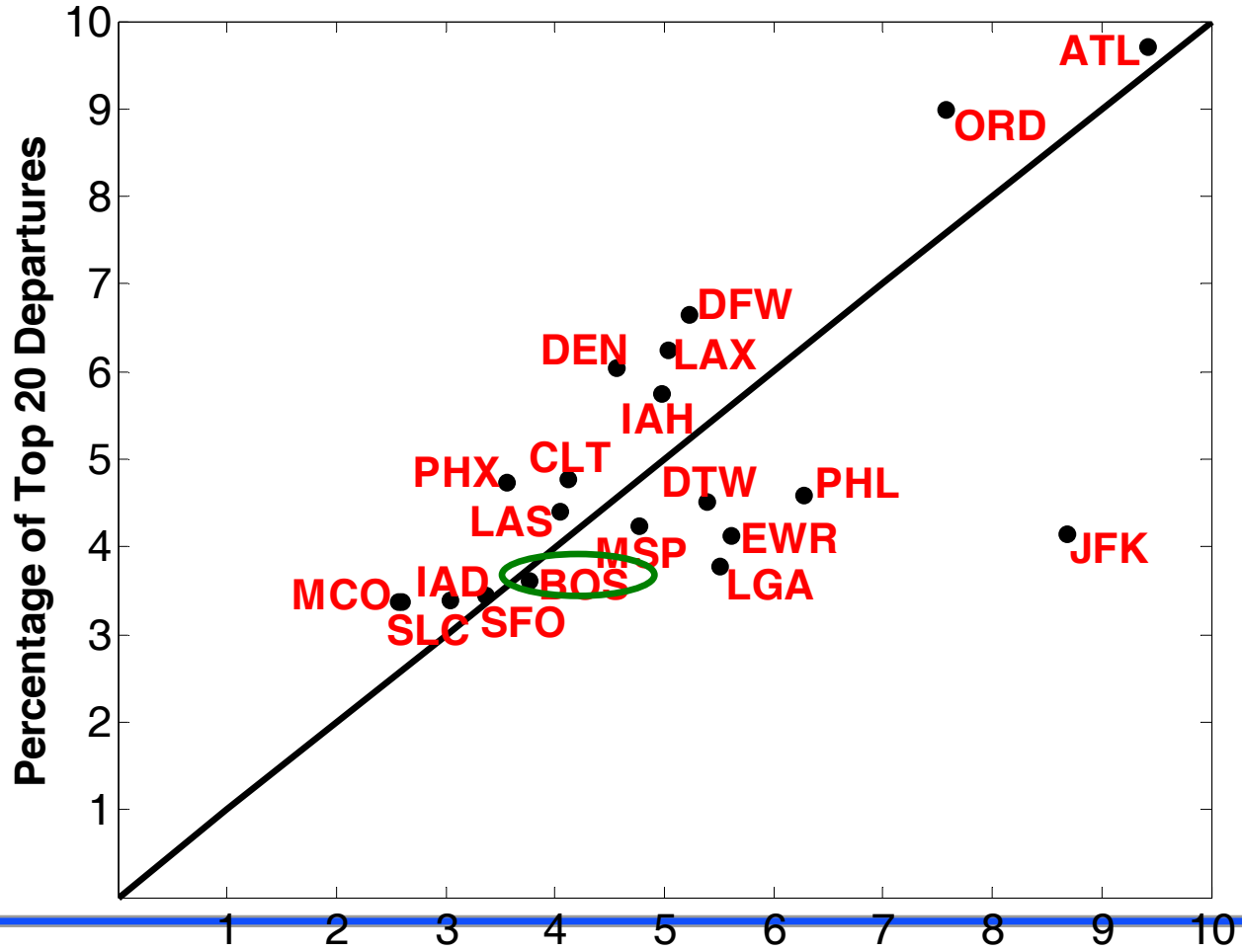
New York Airport Flight Delays*
from 1995 to 2009

*** Note: 12 month moving average**

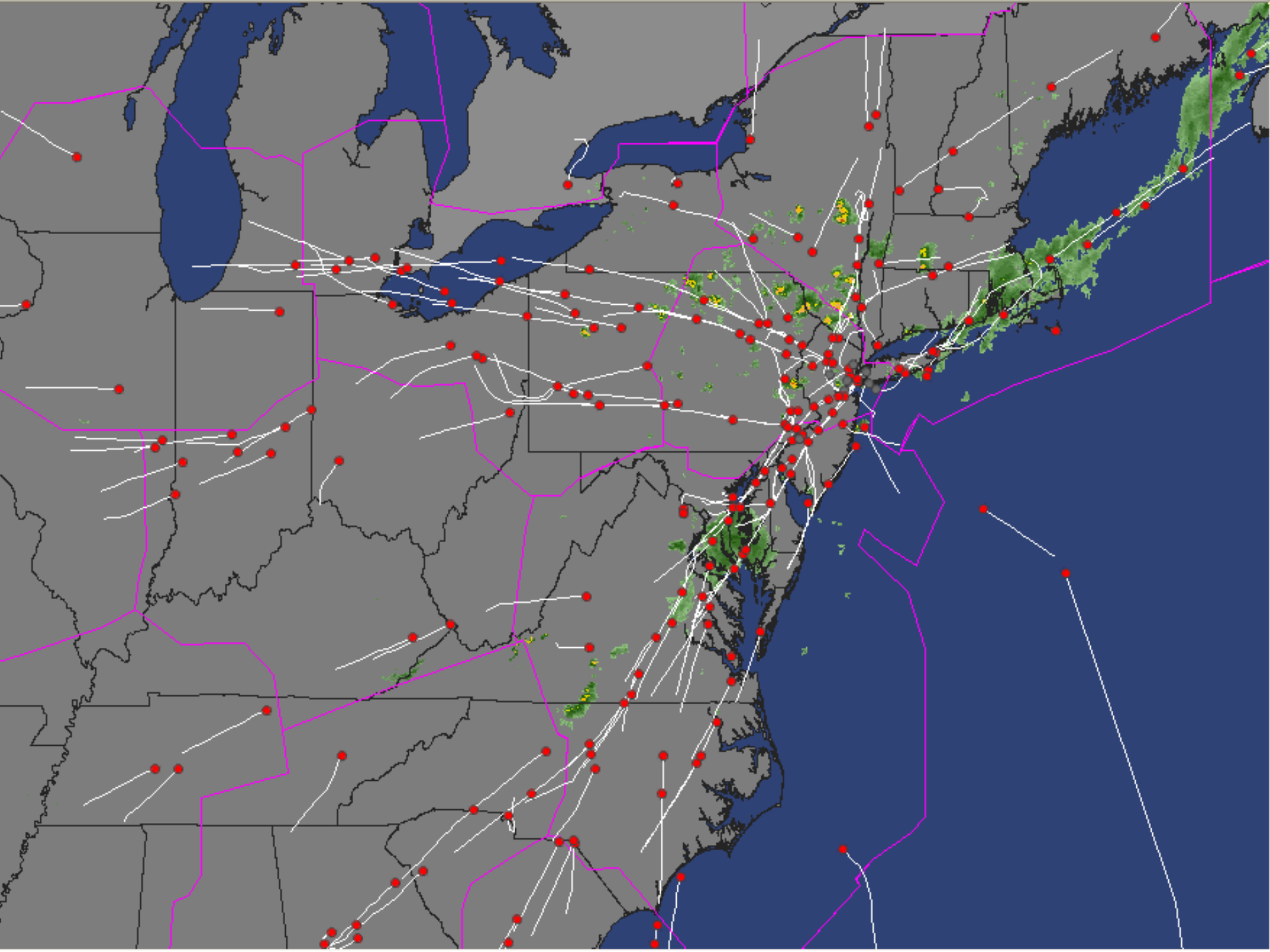


Data source: FAA Operational Network (OPSNET)

Evaluation of Taxi Out Fuel Burns for Major Airports

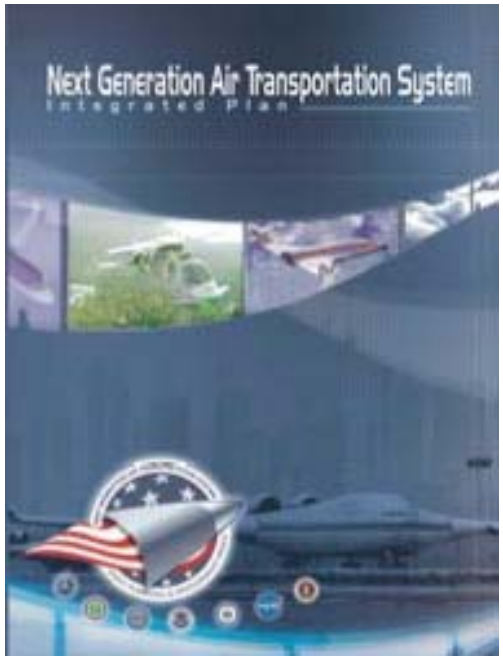


Source: H Balakrishnan



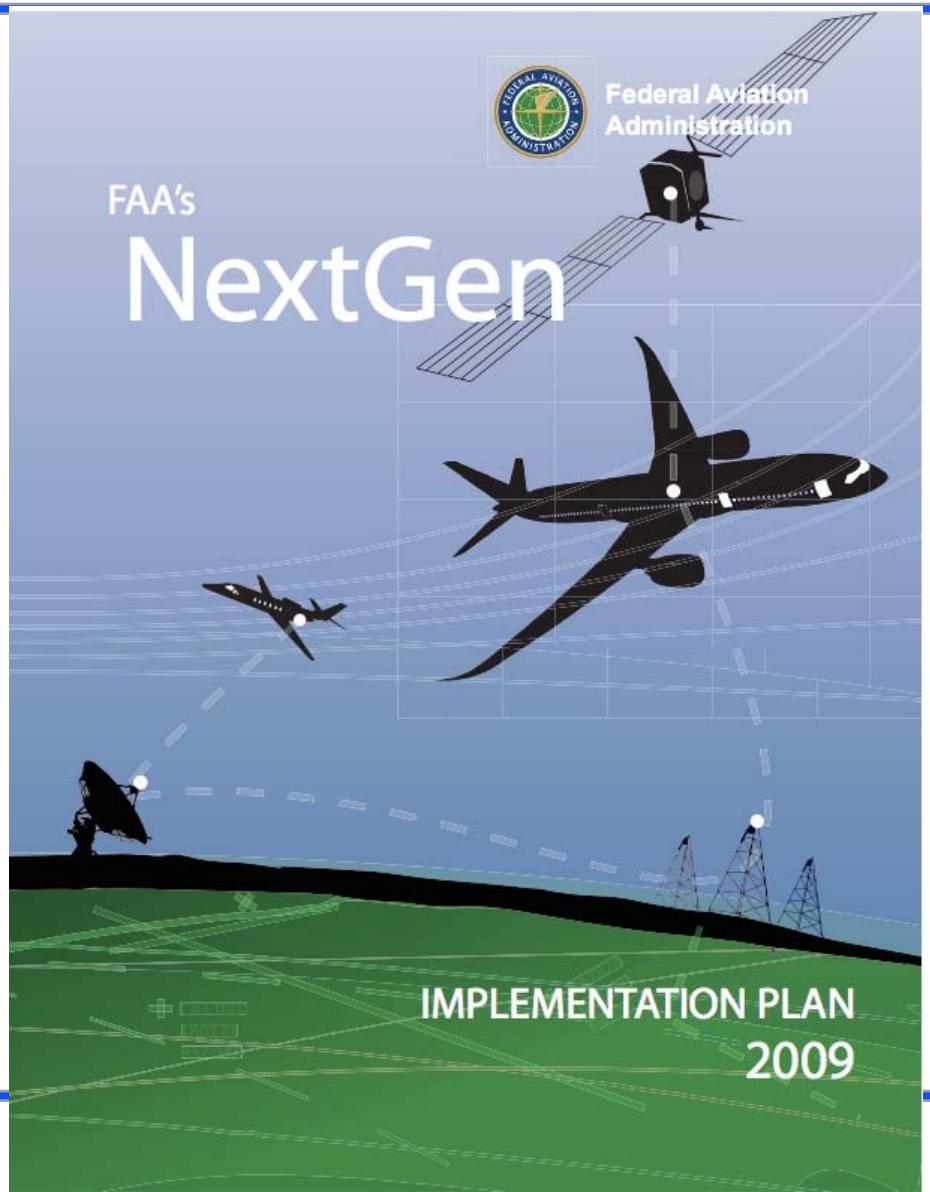
Long Term Plans for System Transformation

- **Common recognition that existing US and European ATM systems will not scale to meet future demand**
- **Reflected in major long term initiatives**
  - ☐ **US** **NextGen**
  - ☐ **Europe** **SESAR**

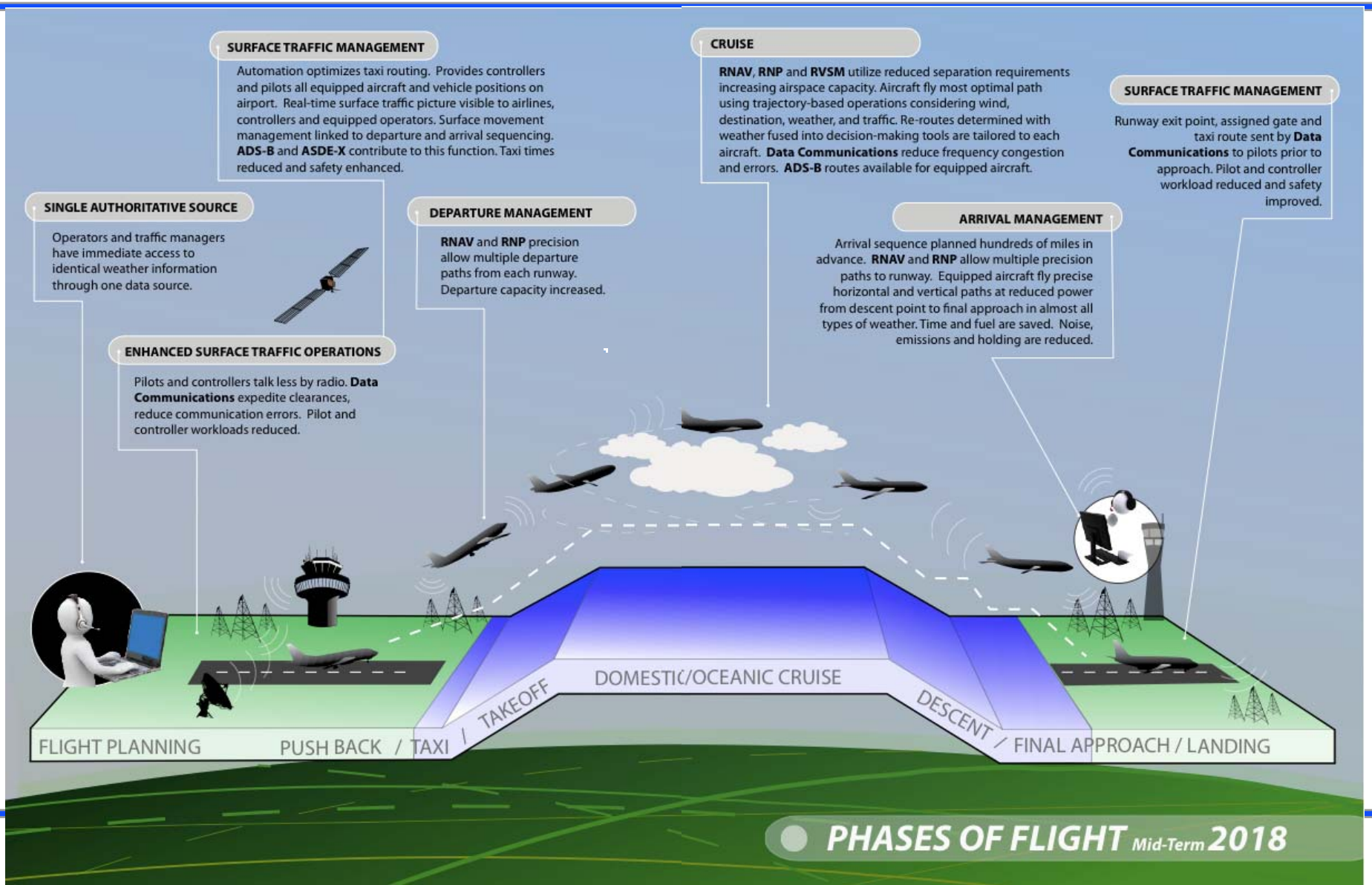


NextGen Implementation Plan

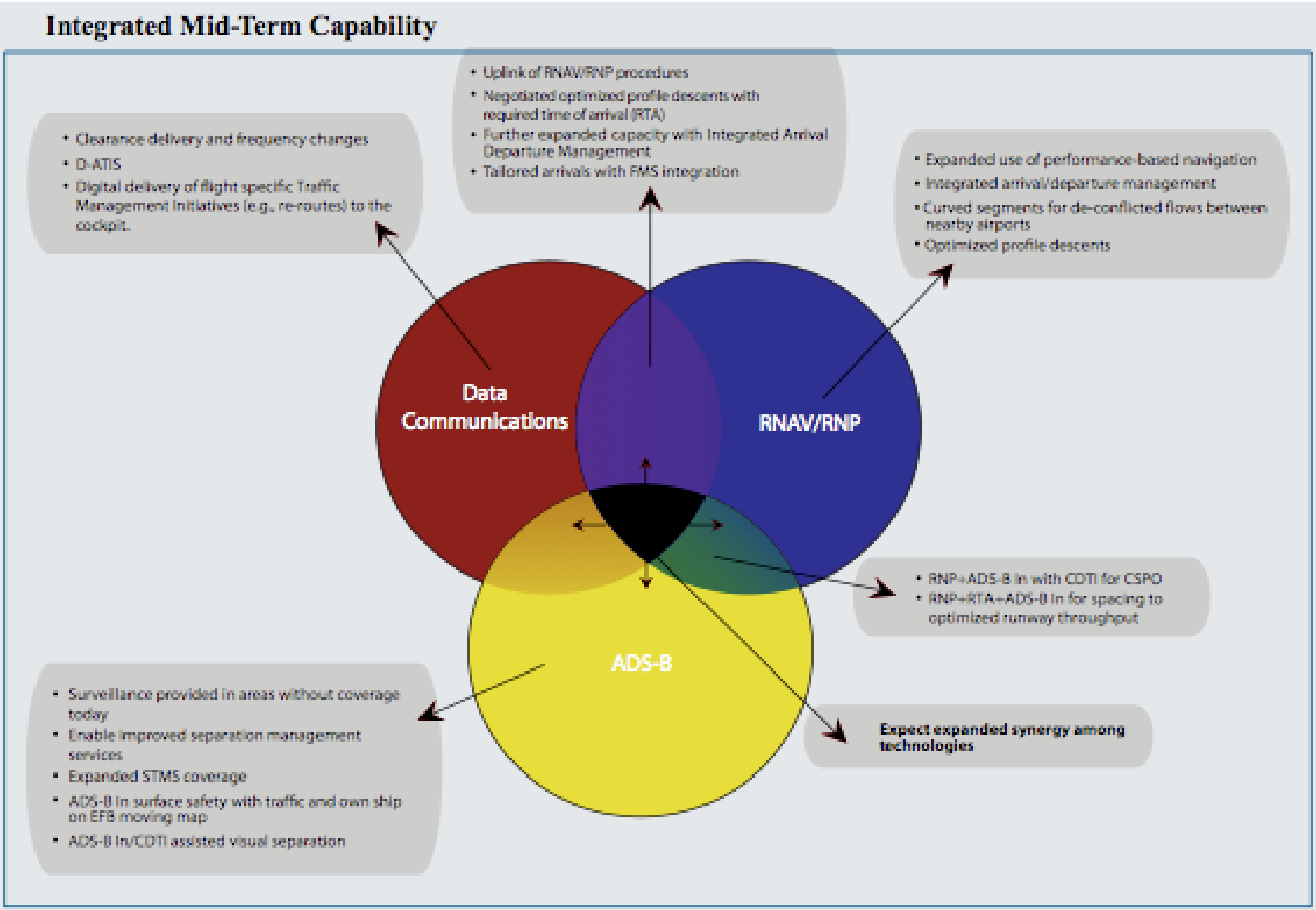
- **Focus on first phase of NextGen Transition to 2018**
-



NextGen Implementation Plan



NextGen Implementation Plan



NextGen Mid Term Implementation Task Force Recommendations

- **Surface**
  - ☐ Surface Situational Awareness Phase 1: Deploy ground infrastructure to capture and integrate surface activities (40)
  - ☐ TFM Common Operational Picture: Define consistent views of operational data for collaborative decision-making (43)
  - ☐ Surface Connectivity & Surface Situational Awareness Phase 2 among FOCs, FAA, Airports (38, 41)
- **Runway Access**
  - ☐ Increase capacity and throughput to converging and intersecting runways (9)
  - ☐ Improve parallel runway operations in a phased manner, where near-term commitment and implementation successes dictate the need for mid-term investments (37a, 12, 13, 14)

NextGen Mid Term Implementation Task Force Recommendations

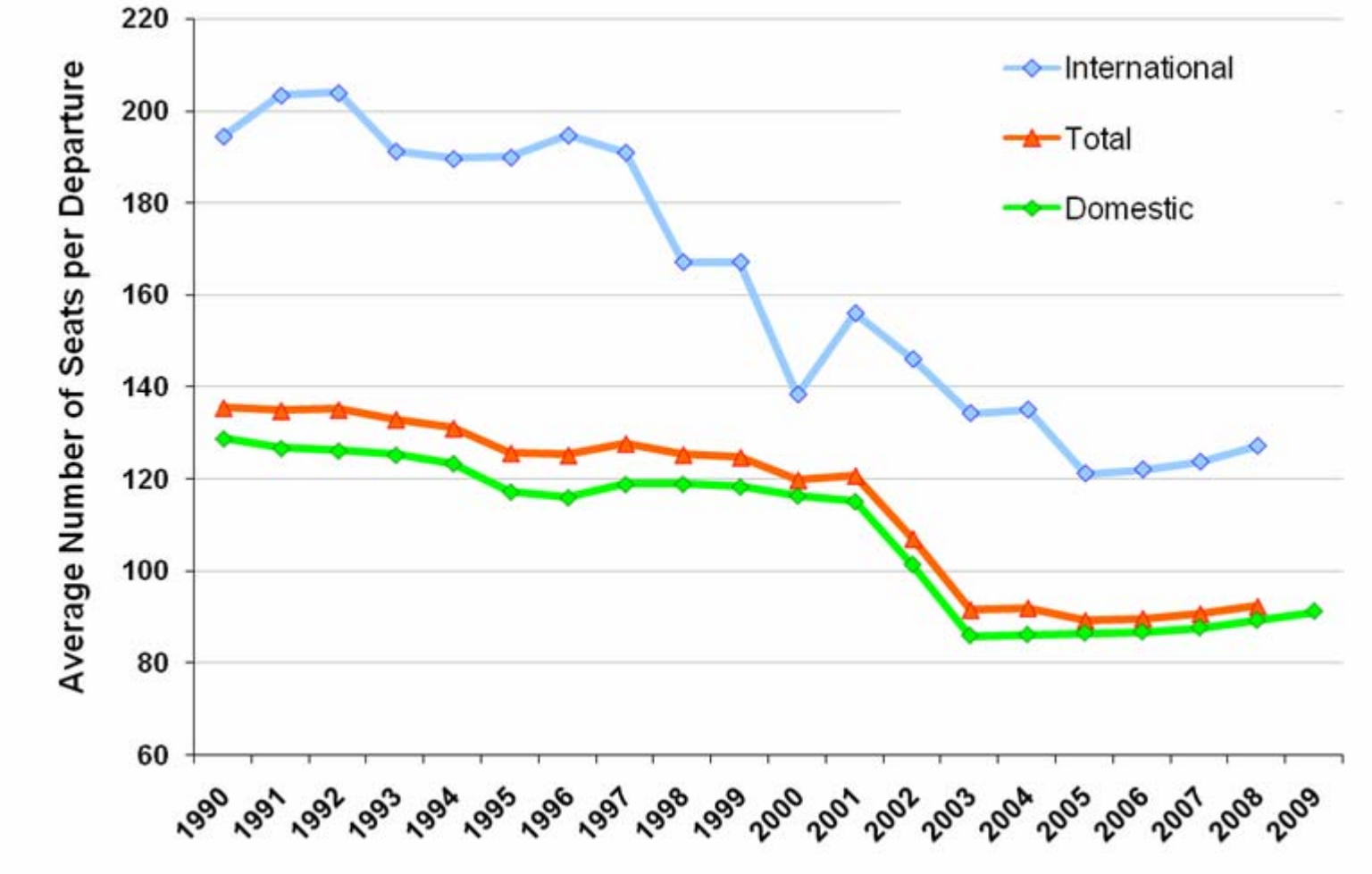
- **Metroplex**
  - ☐ Optimize RNAV and RNP operations, institute tiger teams that focus on quality at each location (29, 32a, 32b)
  - ☐ Integrate procedure design to deconflict airports and expand use of terminal separation rules (4, 21a)
- **Cruise**
  - ☐ Special Activity Airspace: Efficient management and use of SAA through real-time data exchange of status and schedules (35)
  - ☐ Improve time-based metering and leverage operator capabilities (24, 25)
  - ☐ Develop Area Navigation-Based En Route System (30)
- **Access to the NAS**
  - ☐ Low Altitude Non-Radar: Extend radar-like services to low altitude airspace without radar surveillance (28)
  - ☐ Implement LPV procedures for airports without precision approaches (22)

NextGen Mid Term Implementation Task Force Recommendations

- **Data Communications**
  - ☐ Digital ATC-Aircraft Communications for Revised Departure Clearances, Weather Reroutes, and Routine Communications (16, 17, 39, 42a, 44)
- **Integrated Air Traffic Management (I-ATM)**
  - ☐ Integrated CDM/TFM/ATC Solution to traffic flow problems (47)
  - ☐ Improved Collaborative ATM (C-ATM) Automation: C-ATM automation to negotiate user- preferred routes and alternative trajectories (7b, 8, 46)
- **Overarching Recommendations**
  - ☐ Achieving Existing 3 and 5 Mile Separation Standards
  - ☐ Incentivizing Equipage
  - ☐ Streamlining Operational Approval and Certification

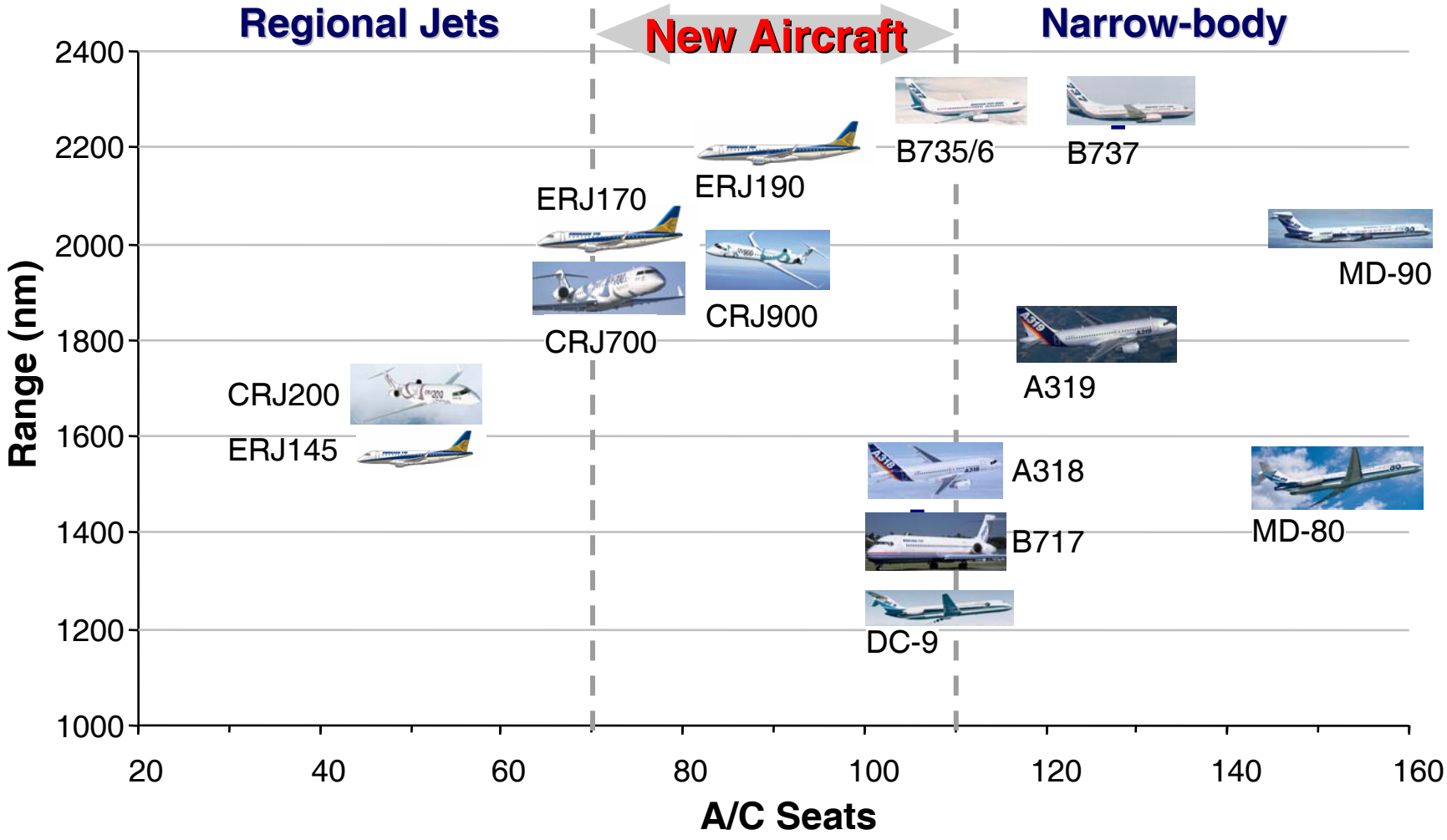
Trends in Aircraft Size

U.S. Airlines



Data source: Form 41 Traffic data from Bureau of Transportation Statistics (US carriers)

RJ-NB Boundary Blurred



Source: based on manufactures' a/c specifications. Full pax range of standard version

A-380

B 787 Delayed First Flight

A 350

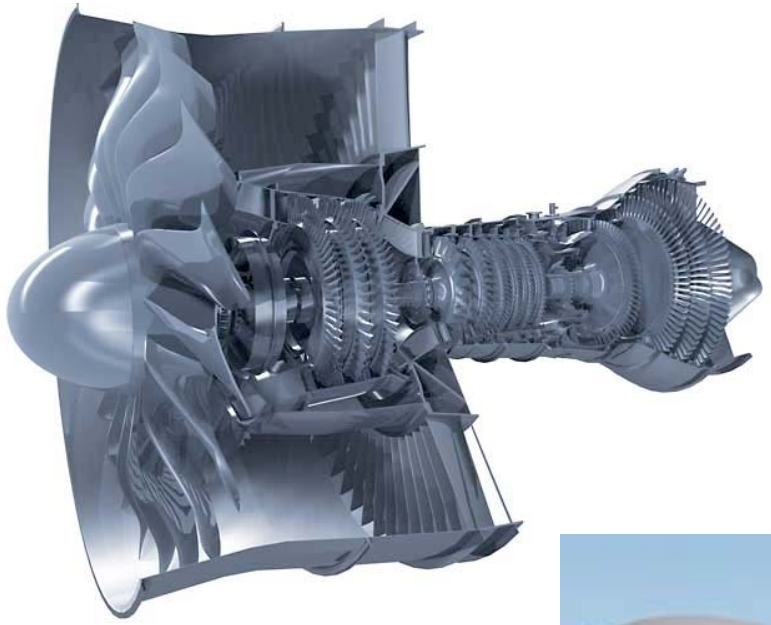
250-300 Seats

7500-8800 nm Range

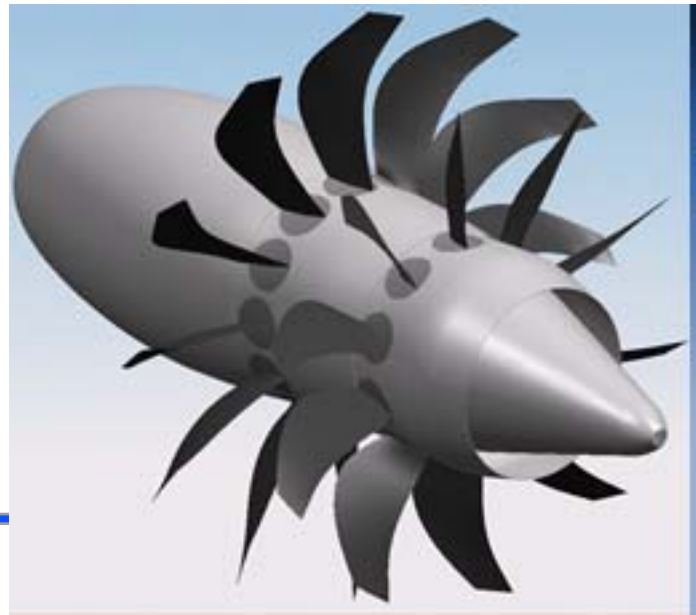
Approximately 483 Firm Orders

Source: http://www.airbus.com

Advanced Engines in Development

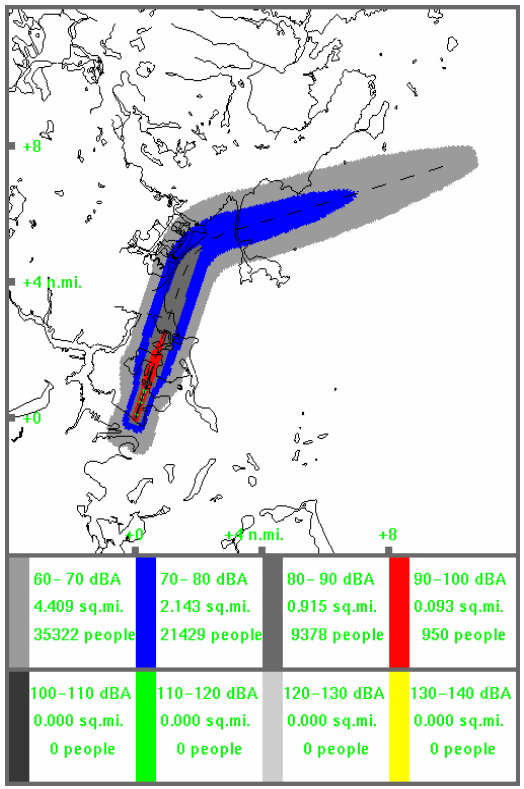


- P&W Geared Turbofan
- GE Unducted Rotor



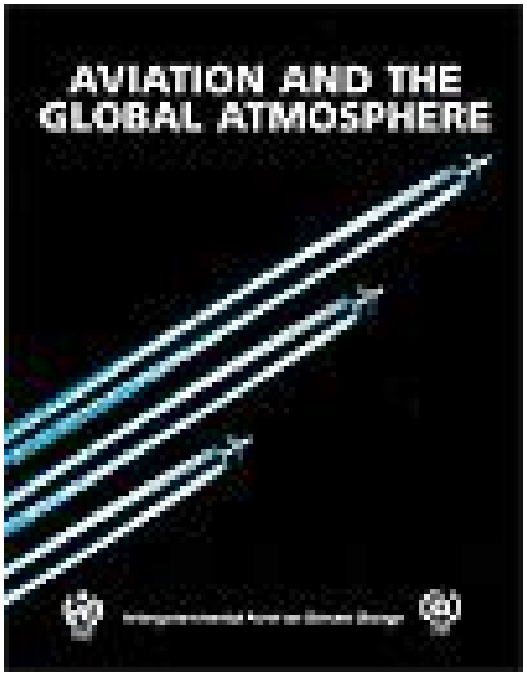
Environmental Issues

Noise



- ☐Stage 4 (Equipment)
- ☐Airports (Capacity)

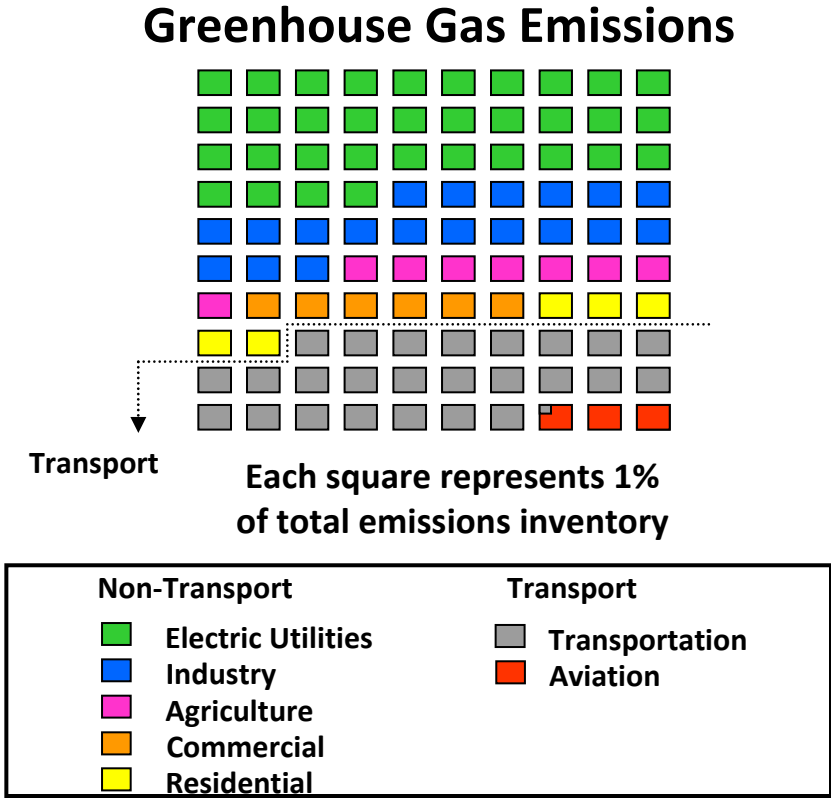
Emissions



Intergovernmental Panel on Climate Change

Green House Gas Emissions

- Cap and Trade Discussions
- CO2 Efficiency Standards
- Alternative Fuel Demonstrations
- Copenhagen Climate Conference
  - Dec 2009



Source: US EPA data, 2005