Air Cargo:
Industry Overview and Recent Trends

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Lecture Outline

- **Air Cargo Industry**
  - **Types of air cargo and air cargo carriers**
  - **Largest air cargo carriers**
- **Demand for Air Cargo Services**
  - **Drivers of air cargo growth**
  - **Constraints on growth**
- **Recent Trends in Air Cargo**
  - **Traffic and tariffs**
  - **Industry structure**
  - **Impacts of recent recession and 9/11**

Air Cargo Industry

- Air Cargo Categories
  - Express/time definite: small packages (less than 100 lb.)
  - Heavyweight freight shipments (greater than 100 lb.)
  - Mail transport

Participants:

- All-Cargo Airlines
  - Integrated Express Carriers (express/small packages; door to door service)
  - Non-integrated Freight Carriers (heavyweight freight shipments; work with freight forwarders, etc.)
- Passenger (Combination) Airlines
  - Can carry air freight, express packages and mail in passenger aircraft belly or on “combi” aircraft
  - Also can have dedicated freight aircraft

Top Air Cargo Airlines Worldwide in 2000
Total Freight and Mail (Int'l + Domestic)

Carrier	Ton-miles (millions)
1. Federal Express	7,466
2. Lufthansa German Airlines	4,995
3. Singapore Airlines	4,188
4. Korean Air	3,873
5. Air France	3,553
6. Japan Air Lines	3,226
7. United Airlines	3,153
8. KLM Royal Dutch Airlines	2,969

Source: Aviation and Aerospace Almanac 2002

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Top U.S. Air Cargo Airlines in 2001
Total Freight and Mail (Int'l + Domestic)

Carrier	Ton-miles (millions)
1. Federal Express	7,565
2. UPS Airlines	4,081
3. United Airlines	1,919
4. Northwest Airlines	1,918
5. American Airlines	1,813
6. Delta Airlines	1,269
7. Atlas Air	1,072
8. Polar Air Cargo	892

Source: ATA Annual Report 2002

Selected Cargo Carriers 2001 (Source: ATA)

Carrier	Number of Aircraft	Air Cargo Ton-miles (millions)	Air Cargo Revenue ($ million)	% of Operating Revenue
FedEx	320	7,609	$ 6,948	45.8 %
UPS Air	258	4,094	$ 2,624	96.6 %
United	543	2,390	$ 704	4.3 %
Northwest	440	2,161	$ 715	7.5 %
KLM	132	2,512	$ 882	15.5 %

Demand for Air Cargo Services

- **Like demand for passenger air travel, demand for air cargo shipment is a "derived" demand.**
- **Primary drivers of air cargo demand include:**
  - Economic growth and trade (especially imports/exports)
  - Relative prices of air cargo versus alternatives – ocean, truck, rail
- **Difficult to quantify demand/supply accurately:**
  - No comprehensive sources of data on air cargo traffic and pricing
  - Lack of published schedule data (unlike passenger airlines)
  - Vertically integrated air cargo operators (like Fedex and UPS) only publish limited schedules for selected flights
  - All-cargo carriers tend to operate flexibly based on daily/weekly demands
  - Combination carriers provide joint supply of cargo and passenger capacity

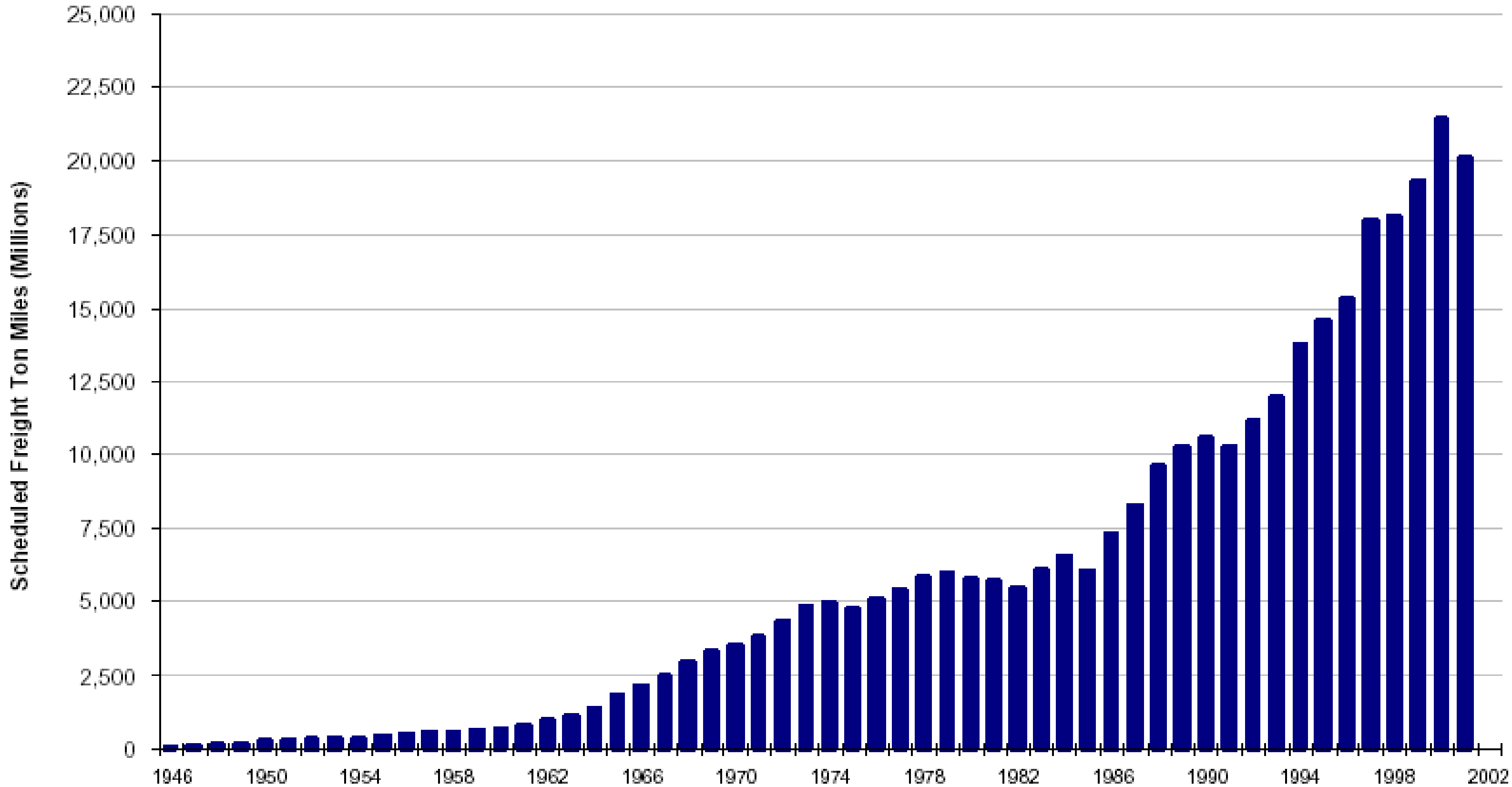
Drivers of Air Cargo Growth in 1990s

- Overall economic growth (especially world trade)
  - Historically, 2 to 2.5% increase in world trade with each 1% increase in total GDP
  - Air freight trade has been growing even faster, due to regional differences in economic growth
  - Since 1993, average 7-10% annual growth in world air freight traffic
- Globalization
  - Increasingly integrated and interdependent national economies
  - Liberalized (free) trade and reduced protectionism
- Lean Inventory Strategies
  - Reduced order-cycle times: "just in time" and "make to order"
  - Less stock on hand to avoid production shutdowns, retail stockouts
  - Air freight shortens delivery times to customer

Growth of Air Freight (Source: ATA 2002)

Air Freight Surged in the Modern Era

Post-WWII Growth in Freight Ton Miles—U.S. Scheduled Airlines

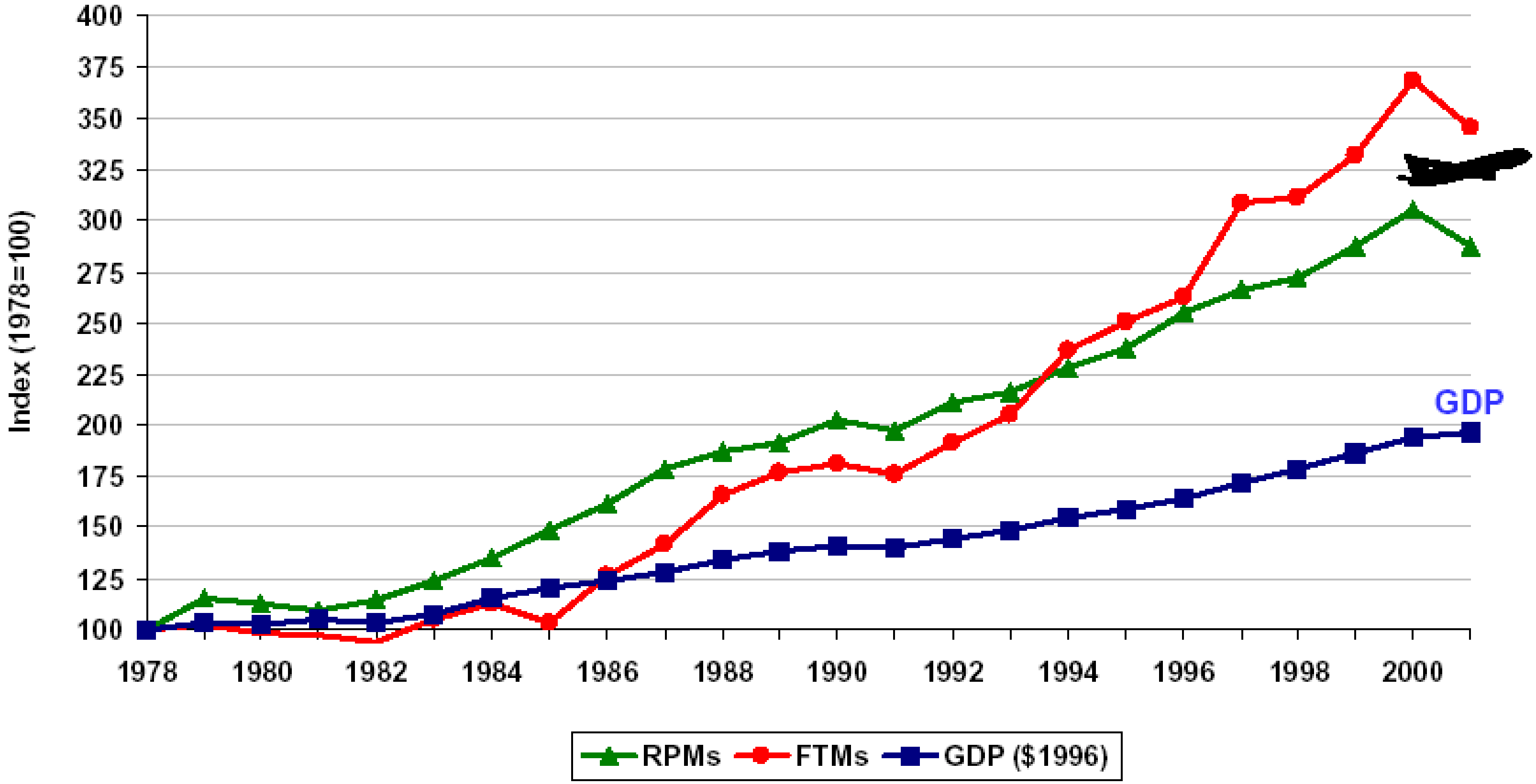


Source: DOT Form 41

Relationship to GDP Growth (Source: ATA)

Demand for Air Transport Has Outpaced the U.S. Economy

Air Travel and Air Cargo vs. Real GDP



Note: FedEx incorporated into DOT data in 1986

Sources: ATA Annual Reports and U.S. Department of Commerce (Bureau of Economic Analysis) via www.bea.gov/bea/dn/gdplev.xls

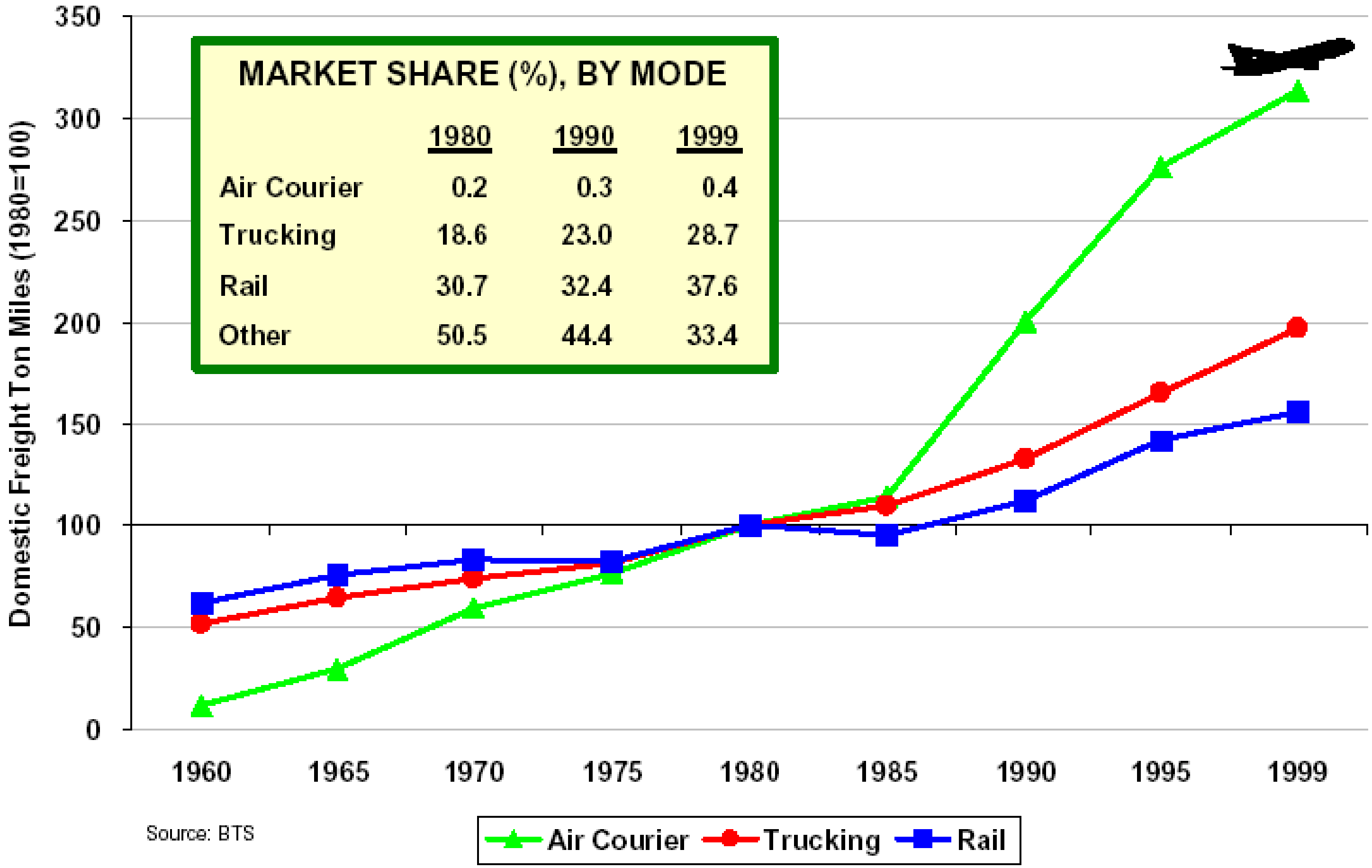
Constraints on Air Cargo Growth

- **Economic recession**
  - Reduced production, demand for goods, international trade
- **Trade barriers**
  - Tariffs or protectionism designed to limit free trade
- **Aircraft regulations**
  - Air cargo operators have used older aircraft that are most affected by new regulations on noise, emissions and safety
  - For example, noise hush-kits reduce cargo payloads
- **Modal competition**
  - Air freight has tremendous speed advantage for long distances, but is highest-cost option
  - Trucks very competitive for short haul (1000 miles, overnight)
  - Development of new “fast ships” for ocean cargo

Modal Market Shares (Source: ATA)

Versatile Transport Modes Gaining Share

Air Couriers Have Tripled Volume and Doubled Share Since 1980



MARKET SHARE (%), BY MODE

	1980	1990	1999
Air Courier	0.2	0.3	0.4
Trucking	18.6	23.0	28.7
Rail	30.7	32.4	37.6
Other	50.5	44.4	33.4

Source: BTS

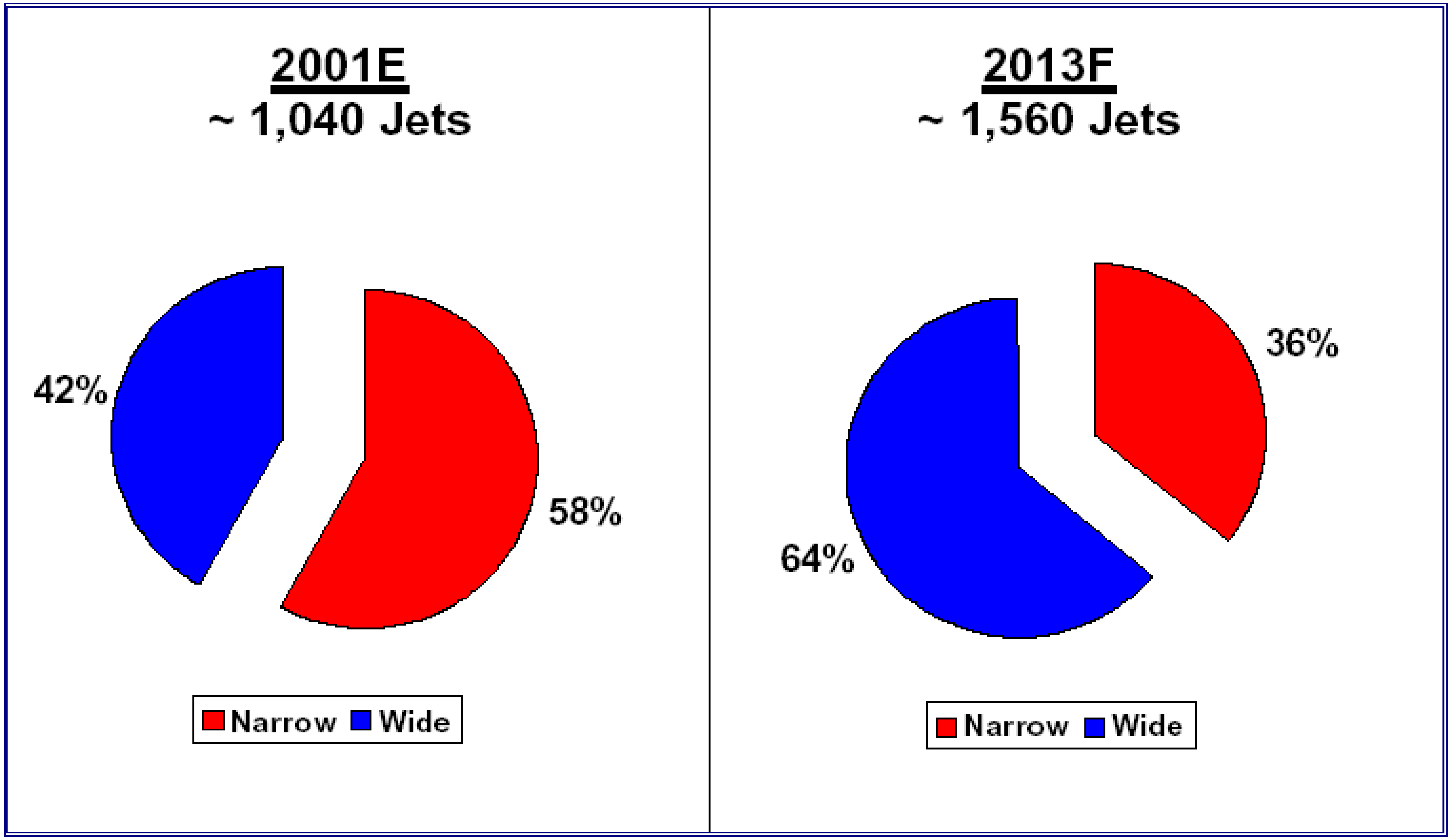
Recent Trends in Air Cargo

- **Rapid growth in demand for air cargo**
  - Intra-Asia is the largest true air freight market
  - Even during Asian economic crisis air freight traffic grew
  - Forecasts for continued traffic growth at 6% per year
- **Falling real yields (revenue per ton-mile)**
  - Average 2.5% decline in yields (CPI adjusted)
  - Growth in international trade has increased trip length, associated with lower tariffs per mile
  - Wide-body aircraft have unused belly capacity, viewed by passenger airlines as virtually “costless”
    - Passenger airlines have become price leaders in air freight
  - Regulatory liberalization has spurred price competition
    - Lower tariffs further stimulate demand, but also cause airlines to focus on lowering unit costs

Wide-body Aircraft Trends (Source: ATA)

Long-Term Cargo Jet Growth (50%) Fueled by Widebodies

Total up 50%, With 128% Widebody Increase Offsetting 6% Narrowbody Decline

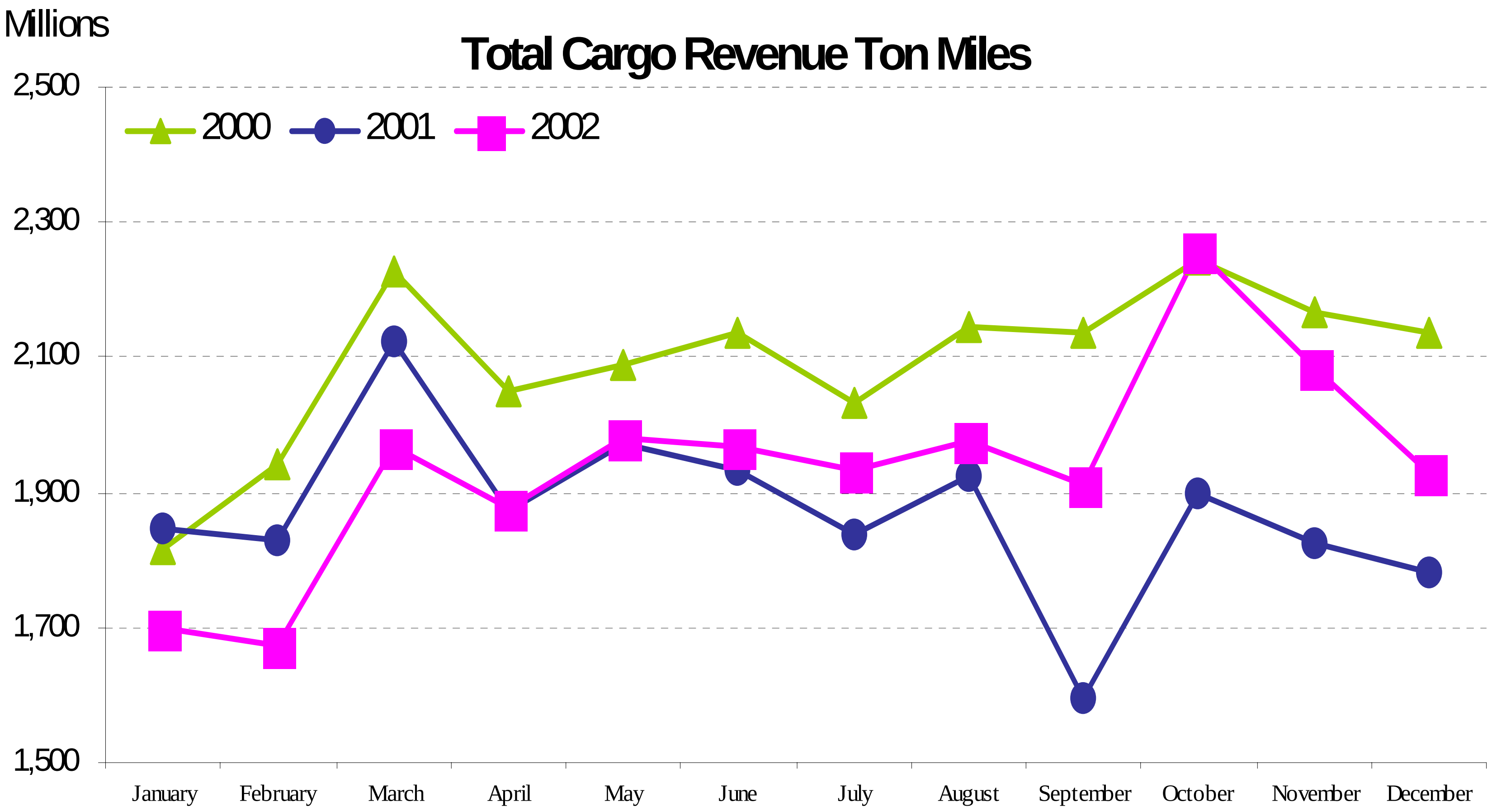


Source: FAA Aerospace Forecasts FY 2002-2013

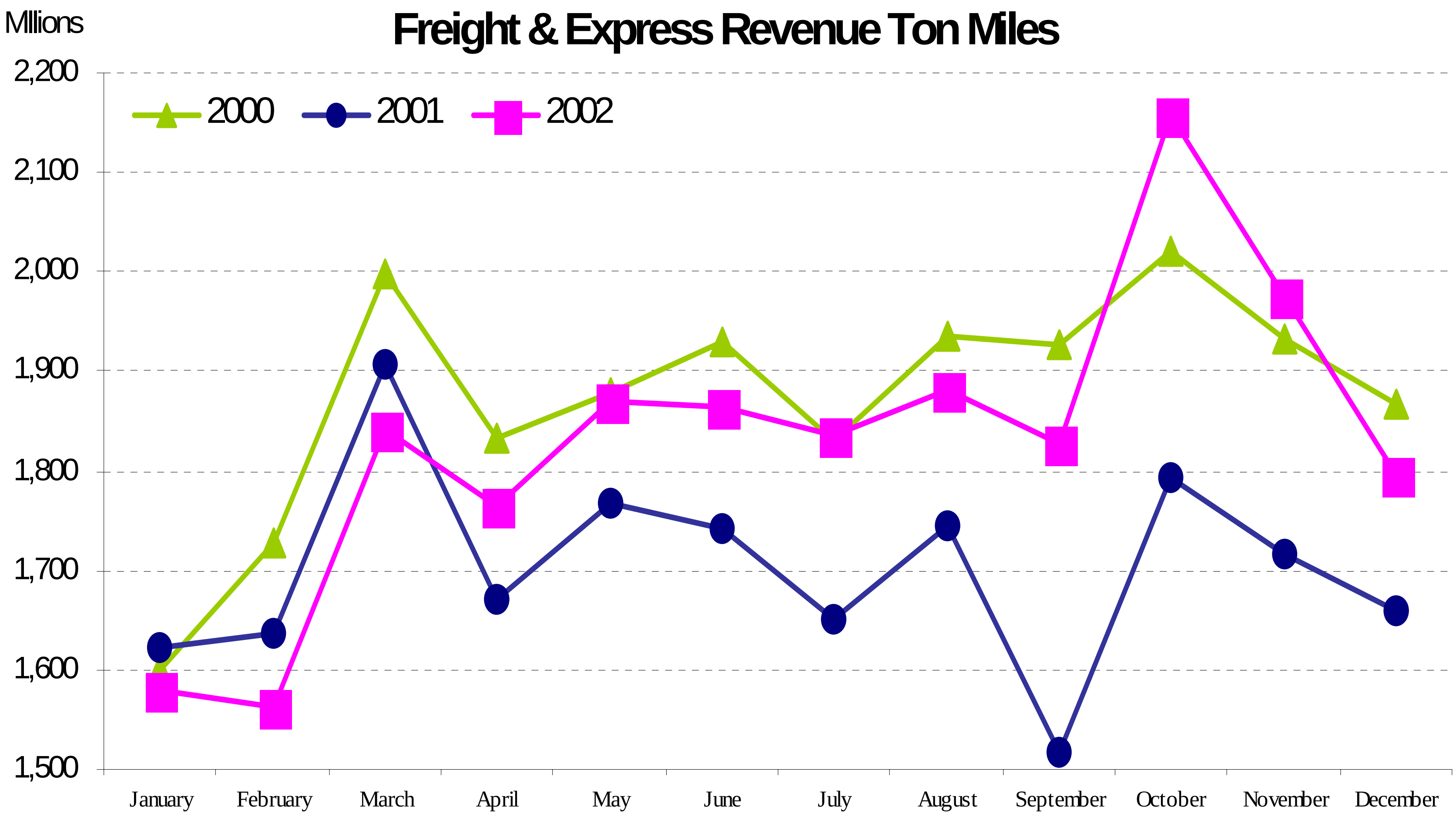
Trends in Air Cargo (cont'd)

- **Integrator expansion**
  - Integrated express carriers own air and ground assets to handle entire shipment journey
  - Fedex and UPS, facing competition and decreasing yields in express documents, expanded to international markets
  - With limited international small package growth, carry standard air freight (airport to airport) as "filler"
  - Trying to develop products for higher-yield industrial traffic
- **Consolidation of freight forwarders**
  - Non-integrated carriers receive majority of traffic from freight forwarders – FFs handle retail marketing and pick-up/delivery
  - Number of mid-sized freight forwarders has been shrinking, leaving largest operators and niche competitors

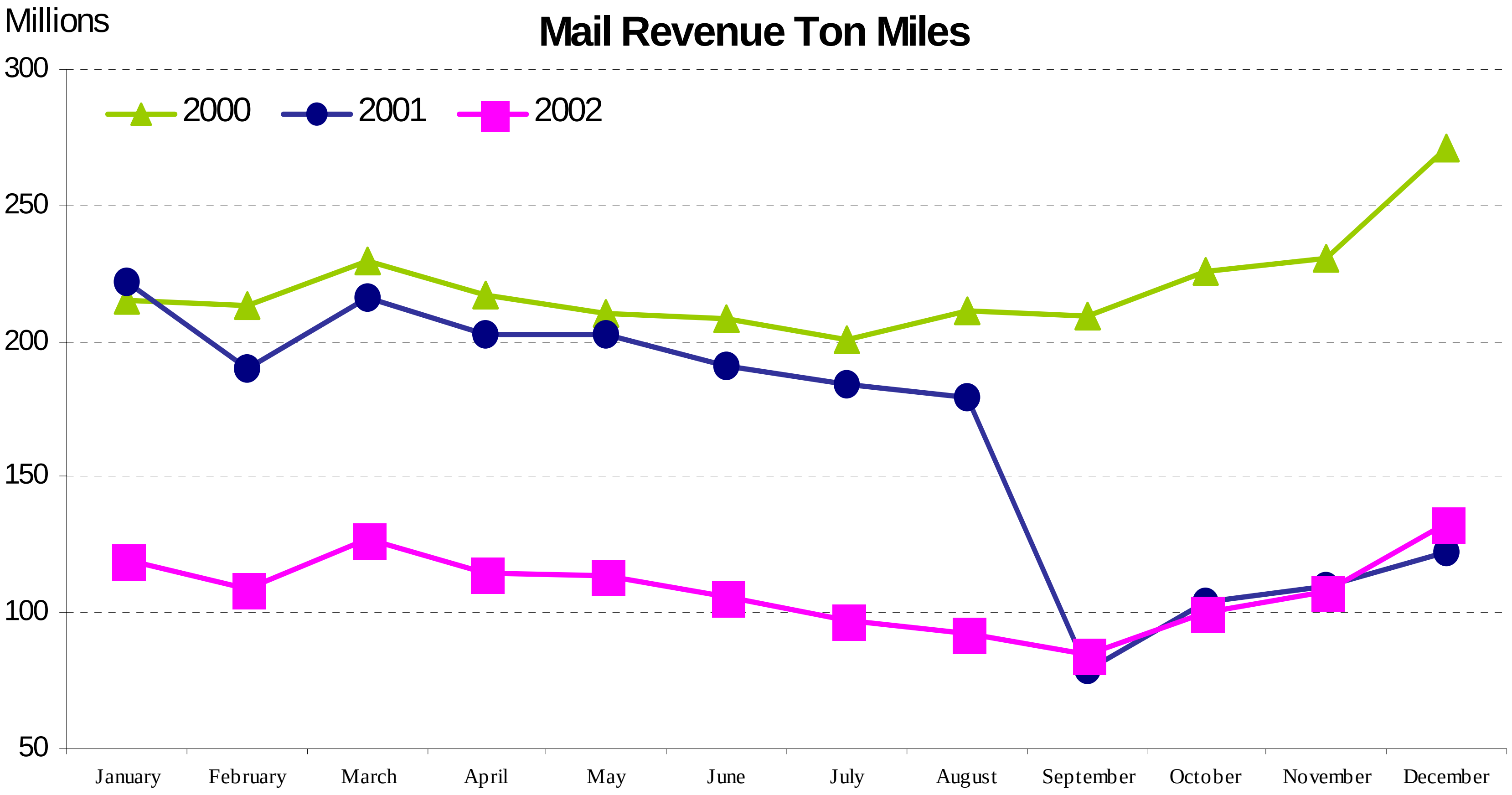
Total Air Cargo 2000-02 (Source: ATA)



Freight and Express 2000-02 (Source: ATA)



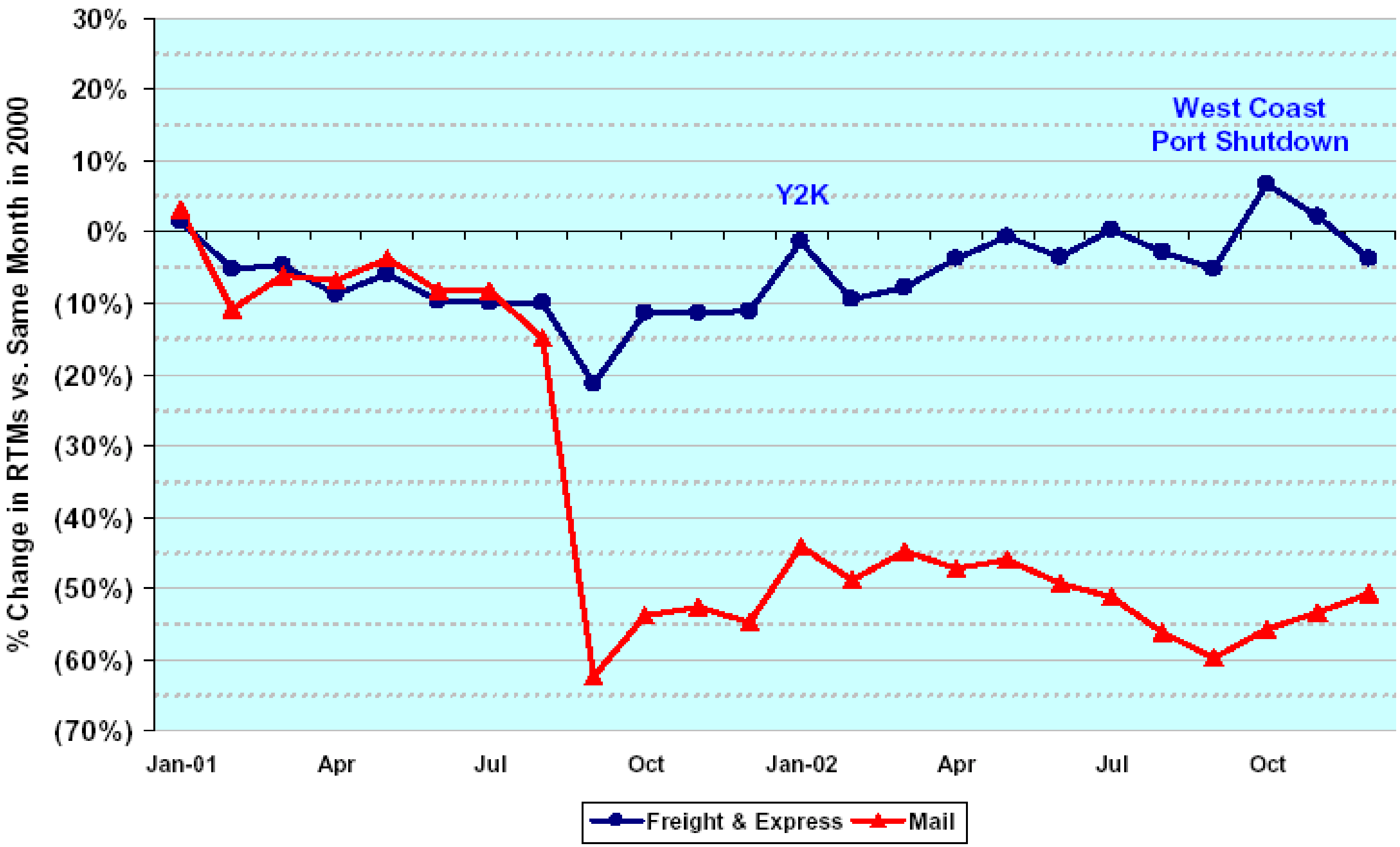
Mail Air Cargo 2002-02 (Source: ATA)



Freight and Mail 2001-02 (Source: ATA)

Total Air Cargo Volumes Still Trailing 2000 Levels

Economy and Security Restrictions Hurting Combination Carriers



Source: ATA Monthly Cargo Traffic Report — all services for combination and all-cargo carriers

Outlook for Air Cargo Growth

- **Short-term outlook is mixed, uncertain:**
  - Economic slowdown, end of high-tech boom responsible for cargo decreases, more so than 9/11
  - Asia air cargo traffic indicates potential recovery – largest Asian airports reporting 20-25% gains in 2002 over much weaker 2001
  - Total tonnage returning to 2000 levels, but yields are much lower
  - US West Coast seaport strike gave air cargo demand a boost
  - But continued economic weakness and threat of war will delay air cargo recovery
- **Longer term fundamentals support strong growth:**
  - China's economy grew 7.8% in 1st half 2002, air cargo grew 14%
  - "Normal" growth rates of 6-7% worldwide possible by 2004
  - Boeing predicts 6.4% annual air cargo growth for next 20 years

    (Source: Airline Business, November 2002)