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)**

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

Source: Aviation and Aerospace Almanac 2002
### Top U.S. Air Cargo Airlines in 2001
**Total Freight and Mail (Int’l + Domestic)**

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

Source: ATA Annual Report 2002
### Selected Cargo Carriers 2001 (Source: ATA)

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

<table>
<thead>
<tr>
<th>MARKET SHARE (%), BY MODE</th>
<th>1980</th>
<th>1990</th>
<th>1999</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Courier</td>
<td>0.2</td>
<td>0.3</td>
<td>0.4</td>
</tr>
<tr>
<td>Trucking</td>
<td>18.6</td>
<td>23.0</td>
<td>28.7</td>
</tr>
<tr>
<td>Rail</td>
<td>30.7</td>
<td>32.4</td>
<td>37.6</td>
</tr>
<tr>
<td>Other</td>
<td>50.5</td>
<td>44.4</td>
<td>33.4</td>
</tr>
</tbody>
</table>

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

2001E
~ 1,040 Jets

2013F
~ 1,560 Jets

Source: FAA Aerospace Forecasts FY 2002-2013
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)

Total Cargo Revenue Ton Miles

- 2000
- 2001
- 2002

Millions

January February March April May June July August September October November December

1,500 1,700 1,900 2,100 2,300 2,500
Freight and Express Revenue Ton Miles

- 2000
- 2001
- 2002

January February March April May June July August September October November December
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)