Airline Industry Recent Trend Update (October 2006)

Prof. R. John Hansman

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

Traffic Source: Sage Analysis courtesy Prof Ian Waitz

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Scheduled Revenue Passenger-Kilometers by Region

Data source: ICAO, scheduled services of commercial air carriers
Freight Trends by Region

Data source: ICAO, scheduled services of commercial air carriers
U.S. Domestic RPMs

Data source: ATA, US member airlines, scheduled mainline service
U.S. Domestic Average Load Factor

Data source: ATA, US member airlines, scheduled mainline service (average of first 9 months for 2006)
U.S. Domestic ASMs and RPMs

Data source: ATA, US member airlines, scheduled mainline service (projection based on first 9 months for 2006)
U.S. Domestic Load Factors

Data source: ATA, US member airlines, scheduled mainline service
U.S. Average Domestic Yield

Data source: ATA Monthly Passenger Revenue Report, 7 US major airlines excluding Southwest (WN).
Spending on Air Travel Has Fallen as % of U.S. Economy

Recent Quarters’ Modest Recovery Still $28B Short of Historical Norm

- Systemwide Passenger Revenue as % of Nominal GDP

Historical Band

*Four-quarter rolling passenger revenue derived from government filings of U.S. passenger airlines

Sources: ATA, ATA Passenger Airline Cost Index; Bureau of Economic Analysis; U.S. Department of Transportation
Data source: ATA Passenger Yield Report, 7 US major airlines excluding Southwest (WN).
Airline Profits

Data source: Airline quarterly reports, profits and losses including reorganization items

9/11 Attacks

+23B including reorganization items

-17B including reorganization items
Cargo Operations Remain Profitable

 UPS  FedEx

Data source: Companies’ annual reports

Total Market Cap: $36.6 billion

Data source: Yahoo Finance.
Market Cap: US Majors, 26-May-2005

Total Market Cap: $21.2 billion

Data source: Yahoo Finance.
Current Market Cap vs. RPM Share
US Majors (RPMs: July 2006 / Market Cap: October 20th 2006)

Source: Yahoo! Finance and Bureau of Transportation Statistics
US Airline Net Profit Model
Best Fit of Undamped Oscillation
Cycle Period = 11.3 yr  eFolding Time = 7.9 yr

Estimates from 9 airlines* for Q1 & Q2 2006 and projection** for full year

* American Airlines, Delta Airlines, United Airlines, Northwest, Continental, Southwest, JetBlue, America West, Alaska.
** The projection for the full year is computed as 2 times the loss for Q1 & Q2 combined
US Airline Net Profit Model
Apparent 1 year phase advance in cycle

Estimates from 9 airlines* for Q1 & Q2 2006 and projection** for full year

* American Airlines, Delta Airlines, United Airlines, Northwest, Continental, Southwest, JetBlue, America West, Alaska.
** The projection for the full year is computed as 2 times the profits for Q1 & Q2 combined.
Low-Cost Carrier Envy
Emergence of LCCs

Canada (7, 1 in 2004)
- CanJet
- HMY Airways
- JetsGo Airlines
- Tango Airlines

USA (19, 4 in 2003/2004)
- AirTran
- Allegiant Air
- American West
- ATA
- Frontier Airlines
- Interstate Jet
- JetBlue Airways
- Midwest Express
- Pan American
- Southeast Airlines
- Southwest Airlines

Europe (60, 3 in 2004)
- Aer Arann
- Baboo
- Fare4U
- Sun Express
- Air 2000
- Basiq Air
- German Wings
- Swedline
- Air Baltic
- Bexx Air
- Germania Express
- ThomsonFly
- Air Berlin
- BMI Baby
- Globespan
- V Bird
- Air Finland
- British European
- Hapag Lloyd Express
- Virgin Express
- Air Luxor Lite
- BudgetAir
- Hellas Jet
- VLM Airlines
- Air Polonia
- Corendon
- Helvetic Airways
- VolareWeb
- Air Scotland
- Deutshe BA
- Ryanair
- Iceland Express
- Windjet Vola
- Air Southwest
- EasyJet
- Snalskjutsen
- Smart Wings
- Air Wales
- Evolavia
- SnowFlake Airlines
- Wizz Air
- Alpi Eagles
- Excel Airways
- Sterling
- Azzurra Air
- Fairline Austria
- Inter Sky
- Virgin USA

Asia/Pacific (20, 8 in 2004)
- Air Arabia
- ValuAir
- Air Asia
- Virgin Blue
- Air Deccan
- Air Blue
- Athena Air Services
- Air One
- Citilink
- BackpackersXpress
- Freedom Air
- Jetstar
- Lion Airways
- Nok Air
- One-Two-Go
- Pacific Blue
- Skymark Airlines
- SkyAsia
- Skynet Asia Airways
- Tiger Airways
- Aero Asia
- Bangkok Air
- Spring
- Awair
- Origin Pacific
- Spice Jet
- Kingfisher
- U Air
- 1Time
- Jazeera Airways

Legend:
- New in 2003 / 2004

Source: http://www.etn.nl/lcostair.htm, airline news
## Low-Cost Carrier Envy (or not)
### Emergence of LCCs

#### Canada (7, 1 in 2004)
- CanJet
- HMY Airways
- JetsGo Airlines
- Tango Airlines
- WestJet
- Zip
- CanWest

#### USA (19, 4 in 2003/2004)
- Air Tran
- Allegiant Air
- American West
- ATA
- Frontier Airlines
- Interstate Jet
- JetBlue Airways
- Midwest Express
- Pan American
- Southeast Airlines
- Southwest Airlines
- Spirit Airlines
- Sun Country Airlines
- USA 3000 Airlines
- Vacation Express
- Ted
- Independence Air
- Virgin USA

#### Europe (60, 3 in 2004)
- Baboo
- Basiq Air
- Bexx Air
- BMI Baby
- British European
- BudgetAir
- Corendon
- Deutshe BA
- EasyJet
- Eva Airlines
- Excel Airways
- Fairline Austria
- Monarch
- My Air
- Scand Jet
- Transavia
- Vueling
- Inter Sky
- Jet 2
- LTU
- Meridiana
- Fare4U
- German Wings
- Germania Express
- Globespan
- Hapag Lloyd Express
- Hellas Jet
- Helvetic Airways
- Iceland Express
- Ryanair
- Snaikjutens
- Snowflake Airlines
- Sterling
- Sun Express
- Swedline
- ThomsonFly
- V Bird
- VolareWeb
- Windjet Vola
- Smart Wings
- Wizz Air
- Hop

#### Asia/Pacific (20, 8 in 2004)
- Air Arabia
- Air Asia
- Air Deccan
- Athena Air Services
- Citilink
- Freedom Air
- Lion Airways
- One-Two-Go
- Skymark Airlines
- Skynet Asia Airways
- Aero Asia
- Bangkok Air
- ValuAir
- Virgin Blue
- Air Blue
- Air One
- BackpackersXpress
- Jetstar
- Nok Air
- Pacific Blue
- SkyAsia
- Tiger Airways
- Origin Pacific
- Kingfisher
- Jazeera Airways

#### South America (3)
- Bra
- Gol
- U Air

#### Africa (2)
- 1Time
- Kulula

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**Legend:**
- New in 2003 / 2004
- Not Operating

**Source:** [http://www.etn.nl/lcostair.htm](http://www.etn.nl/lcostair.htm), airline news
Trends in Fuel Price

Average Crude Oil and Jet Fuel Prices

Data source: ATA; U.S. major, national, large regional passenger and cargo airlines; all services (last data point: 10/13/06)
Airline Profits Adjusted for Constant Fuel Price

Assumptions:
- Fuel price: 69 c/gallon
- Adjustment made on the basis of:
  - difference between actual and assumed fuel price
  - annual fuel consumption

Projection for full year based on Q1 & Q2 2006
Fuel Efficiency Through Increased Load Factor

Source: ATA data
Unit Costs for Labor and Fuel

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
Employees Full Time: US Network Carriers 2001-2005

Source: US DOT
Employees Full Time: Low Cost Carriers 2001-2005

Low-Cost Carrier Employees

Source: US DOT
## Summary of US and United Plan Terminations

$( in billions)$

<table>
<thead>
<tr>
<th></th>
<th>US Airways</th>
<th>United Airlines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Termination Liability</td>
<td>$7.9</td>
<td>$16.8</td>
</tr>
<tr>
<td>Assets</td>
<td>$2.9</td>
<td>$7.0</td>
</tr>
<tr>
<td>Unfunded Termination Liability</td>
<td>$5.0</td>
<td>$9.8</td>
</tr>
<tr>
<td>PBGC Guaranteed Portion of Underfunding</td>
<td>$2.9</td>
<td>$6.6</td>
</tr>
<tr>
<td>Value of Lost Benefits</td>
<td>$2.1</td>
<td>$3.2</td>
</tr>
<tr>
<td>Lost Benefits as % of Total Term. Liability</td>
<td>26.58%</td>
<td>19.05%</td>
</tr>
</tbody>
</table>

Delta and NWA Chap 11 filings estimated at $16B Liability

Source: Subcommittee on Aviation Hearing on Airline Pensions: Avoiding Further Collapse, also NYT
http://www.house.gov/transportation/aviation/06-22-05/06-22-05memo.html
U.S.A. and Canadian Operators Accident Rates
Hull Loss and/or Fatal accidents – Worldwide Commercial Jet Fleet – 1959 through 2005

Accident rate (accidents per million departures)

Year

U.S.A. & Canadian operators
Rest of the World
U.S.A and Canadian Operators Accident Rates
Hull Loss and/or Fatal accidents – Worldwide Commercial Jet Fleet – 1986 through 2005

Year

Accident rate (accidents per million departures)

Rest of the World
U.S.A. & Canadian operators

86 88 90 92 94 96 98 00 02 04 05

2005 STATISTICAL SUMMARY, MAY 2006
US Flight Delays
from 1995 to 2006

National delays from 1995 to 2006

Data source: FAA Operational Network (OPSNET)
US Flight Delays
from 2000 to 2006

Source: FAA OPSNET data
New Delay Cause
TSA Power Failure’s

- LGA 7/16/06
- Hawaii 10/15/06
NO LIQUIDS OR GELS OF ANY KIND WILL BE PERMITTED IN CARRY-ON BAGGAGE. THESE ITEMS MUST BE IN CHECKED BAGGAGE. This includes all beverages, shampoo, suntan lotion, creams, tooth paste, hair gel, and other items of similar consistency. Read our Permitted and Prohibited Items list for more information.
Flight Cancellations from 1990 to 2006

Projection based on first 6 months of 2006

Consumer Complaints

Note: Consumer Complaint Data 1998-2006, OPSNET Data
Air Traffic Controller Staffing

ATO Hiring Forecast vs. Losses

Time to CPC (Certified Professional Controller)
Terminal; 8 - 24 months
Enroute: 36 - 60

Source: Air Traffic Controller Workforce Plan - 2004
Controller Contract
Congressional 60 day response period ended June 5, 2006

Federal Aviation Administration

Submission to the United States Congress Concerning the Agency’s Collective Bargaining Proposal to the National Air Traffic Controllers Association

April 5, 2006

NATCA’s Rebuttal to the FAA Administrator’s Submission to the United States Congress Concerning the Agency’s Collective Bargaining Proposal to the National Air Traffic Controllers Association

Considering that the FAA Administrator repeatedly demonstrated his disdain for the role of the United States Congress in setting our national aviation policy, it should come as no surprise that the FAA Administrator’s Submission to the United States Congress Concerning the Agency’s Collective Bargaining Proposal to the National Air Traffic Controllers Association is a collection of revisionist history, misrepresentation, and an attempt to conceal the facts of the legislative process. This coming from an Administrator who just last week told a U.S. Senator, during a public hearing, that there was not a list of TRACONs planned for co-location on Tuesday – by Friday that list was published in congressional channels. The same FAA that the Chairman of its oversight committee that notifies FAA in New York when there were not any results of FAA in New York notified Congress when the proposals were completed for the TRACON process. The FAA’s efforts to exclude Congress from exercising its oversight role extend to advocating a new bargaining process that would eliminate the FAA from the appropriations process, virtually eliminating the system of checks and balances envisioned under the Constitution when the founders crafted the FAA. Providing misleading information to Congress has sadly become status quo for this Administration.

After the FAA selected NATCA’s proposal, declined further bargaining, and ended mediation on Friday, March 31, the FAA issued numerous public statements denying that negotiations had ended and that the parties were still bargaining. It is clear that the FAA was simply buying time to prepare a submission to Congress and launch an attack by sending the submission to the Hill just prior to leaving for a two-week district work period. It is important to note that the FAA is not subject to any timeline with regard to making its submission to Congress. There is nothing that requires them to send it within one day, one week, or even a month of ending negotiations. The only other time the FAA chose to take this course of action regarding a bargaining impasse was several months after bargaining broke down before the submission. Once it was submitted, the FAA waited a year and a half to consider the proposal.

Throughout this process, the union has worked to meet the stated needs of the Administrator. With regard to pay, the major issue in dispute, the union came to the table proposing the status quo, including the government-wide pay raises set by Congress and the SCI which supplant the step increases. The union was asking to be treated as other government employees. As the talks progressed, NATCA made considerable movement on every pay provision. It offered to eliminate the two highest pay bands in the system, lower the top of all pay bands by 3%, and the bottom of the bands by 3%. This is but a few of the many reasonable pay movements which included pay increases that are above the controller pay bands. The NATCA proposal would have closed the gap by approximately 12% depending on the Administrator’s treatment of other pay bands. In contrast, the FAA proposal was to lower pay by 30%, when bargaining started in July of 2005 and at the end of negotiations in April of 2006. The FAA made no movement on the fundamentals of their pay proposals, with agency representatives amounting to 0% of base, and editorial changes. It is difficult to characterize the FAA’s actions as truly seeking a voluntary agreement when it was unwilling to make any progress on this key issue.

Revisionist History

The FAA submission states, “In 1996, as part of reauthorization, the Agency’s statute was amended to allow the Administrator from negotiating with labor unions over compensation and benefits under limited circumstances.” This odd sentence construction and emphasis on the word “allow” appears intended to lead the reader to believe that the 1996 reauthorization had a new provision to preclude bargaining. In fact, the FAA statute previously specified the scope of bargaining to subjects that did not include compensation and benefits. The amendments to the statute required bargaining over
OEP and NGATS

10 Year Plan
FAA

20 Year Plan
Multi-Agency
FAA, DOD, Commerce
DHS, NASA, DOT, OSTP
FAA Reauthorization ‘07

- Funding Modernization (NGATS)
- Contributions from the general fund
- The “battle” over user fees:
  - Airlines vs Business Aviation

<table>
<thead>
<tr>
<th>Tax</th>
<th>Rate</th>
<th>Percentage of Total Tax Collections in FY 2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ticket Tax</td>
<td>7.5% on Airfares</td>
<td>49.7%</td>
</tr>
<tr>
<td>Segment Tax</td>
<td>$3.20 per Flight Segment</td>
<td>19.6%</td>
</tr>
<tr>
<td>Rural Airport Tax</td>
<td>7.5% on Airfares from Rural Airports</td>
<td>0.8%</td>
</tr>
<tr>
<td>Waybill Tax</td>
<td>6.25% on Price of Freight and Mail Transferred by Air</td>
<td>5.4%</td>
</tr>
<tr>
<td>GA and Jet Fuel</td>
<td>GA Fuel: 19.3 cents/gallon, Jet Fuel: 21.8 cents/gallon</td>
<td>1.9%</td>
</tr>
<tr>
<td>Commercial Jet Fuel</td>
<td>4.3 cents/gallon</td>
<td>5.8%</td>
</tr>
<tr>
<td>International Departures/Arrivals</td>
<td>$14.10 per international departure/arrival</td>
<td>14.4%</td>
</tr>
<tr>
<td>Alaska/Hawaii Tax</td>
<td>$7.00 per domestic departure/arrival to Alaska or Hawaii</td>
<td>0.8%</td>
</tr>
<tr>
<td>Frequent Flyer Tax</td>
<td>7.5% on proceeds of third party sales of frequent flyer miles</td>
<td>1.6%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: FAA
Trends in Aircraft Size

Data source: Form 41 Traffic data from Bureau of Transportation Statistics (includes Regional Jets and Turboprops)
A-380

- **A380 Baseline**
  - Shrink
  - Stretch
  - ER Variants

- **555 passengers (3 class)**

- **14,800km/8,000nm range**

- **Payload: 330,000lbs over 10,400km/5,600nm**

- **Rolls-Royce Trent 900 engines or GP7200 engines**

A380 First Flight
(4/27/05)

QuickTime™ and a TIFF (Uncompressed) decompressor are needed to see this picture.
A-380 Delays

SELECTED A380 MILESTONE SCHEDULES

<table>
<thead>
<tr>
<th></th>
<th>ORIGINAL</th>
<th>CURRENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>First delivery to Singapore Airlines (19 a/c)</td>
<td>Early 2006</td>
<td>10/2007</td>
</tr>
<tr>
<td>First delivery to Emirates Airlines (43 a/c)</td>
<td>10/2006</td>
<td>8/2008</td>
</tr>
<tr>
<td>First freighter delivery (FedEx)</td>
<td>2008</td>
<td>2010</td>
</tr>
</tbody>
</table>

• **Bad News**:  
  - On Oct 4th Airbus announced a third delay to A380 production prompting airlines to review their orders (no cancellations yet).  
  - CEO Christian Streiff resigned after 100 days of tenure on Oct 10th.  
  - Cash-flow crisis at EADS puts the development of A350XWB (replacement of A330/A340) on hold.  
  - Financial analysts are skeptical that Airbus cost-cutting program Power8 can deliver.  
  - Lack of funds to develop the A320 replacement in the coming decade.  
  - Differences between the proposed A350XWB and the original A350 for which Airbus has contracts.

• **Good News**:  
  - Airbus Wake Vortex Steering Group found that 10 nm separation for following the A380 needs to be applied only to light aircraft, with 6 nm for heavy and 8 nm for medium-sized aircraft.  
  *(Approximately breakeven on airport seat throughput)*

*Data source: ¹Aviation Week & Space Technology 10/09/2006, ²Air Transport World Daily News 09/292006*
A 380 Orders
aprox 159 (17 Cargo)

- Singapore Airlines (10)
- Lufthansa (15)
- Emirates (43)
- Air France (10)
- Qantas (12)
- Malaysia Airlines (6)
- Virgin Atlantic (6)
- International Lease Finance (10)
- Kingfisher Airlines (5)
- Qatar Airways (2)
- Federal Express (10)
- Korean Air (5)
- Thai Airways (6)
- Etihad Airways (4)
- China Southern Airlines (5)

- Delivery Delays (normal)
  - 9 in 2007 vs 25 plan
- Wake Vortex Issue
  - ICAO 10 Mile in trail requirement

Source: http://www.aerospace-technology.com/projects/a380/
QuickTime™ and a TIFF (Uncompressed) decompressor are needed to see this picture.

-300 (290-330 pax) (3000-3500 nm)
-800 (210-250 pax) (8000-8500 nm)
-900 (250-290 pax) (8600-8800 nm)
# B 787 Orders

*aprox 432 Firm, 30+ Airlines*

<table>
<thead>
<tr>
<th>Airlines</th>
<th>Orders</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANA - All Nippon Airways (30)</td>
<td>300 (20)800</td>
</tr>
<tr>
<td>Japan Air Lines. (30) mix</td>
<td></td>
</tr>
<tr>
<td>Primaris Airlines (20)</td>
<td>800</td>
</tr>
<tr>
<td>Air India (20)</td>
<td>800</td>
</tr>
<tr>
<td>ILFC (20) mix</td>
<td></td>
</tr>
<tr>
<td>Northwest Airlines (18)</td>
<td>800</td>
</tr>
<tr>
<td>Air China (15)</td>
<td>800</td>
</tr>
<tr>
<td>China Eastern (15)</td>
<td>800</td>
</tr>
<tr>
<td>Air Canada (14)</td>
<td>- 14 787</td>
</tr>
<tr>
<td>China Southern Airlines (10)</td>
<td>800</td>
</tr>
<tr>
<td>Continental Airlines (10-13)</td>
<td>800</td>
</tr>
<tr>
<td>Ethiopian Airlines (10)</td>
<td>800</td>
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<tr>
<td>Garuda Indonesia (10)</td>
<td>800</td>
</tr>
<tr>
<td>Korean Air (10)</td>
<td>800</td>
</tr>
<tr>
<td>Shanghai Airlines (9)</td>
<td>800</td>
</tr>
<tr>
<td>Hainan Airlines (8)</td>
<td>800</td>
</tr>
<tr>
<td>LOT Polish Airlines (7)</td>
<td>800</td>
</tr>
<tr>
<td>First Choice UK (6)</td>
<td>800</td>
</tr>
<tr>
<td>LCAL (6) 800</td>
<td></td>
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<tr>
<td>Shanghai Airlines (6)</td>
<td>800</td>
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<tr>
<td>Blue Panorama (4)</td>
<td>800</td>
</tr>
<tr>
<td>Royal Air Maroc (4)</td>
<td>800</td>
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<tr>
<td>Vietnam Airlines (4)</td>
<td>800</td>
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<tr>
<td>Xiamen Airlines (3)</td>
<td>800</td>
</tr>
<tr>
<td>Air New Zealand (4)</td>
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<td>Icelandair (2)</td>
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<tr>
<td>Air Pacific (5)</td>
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<td>Kenya Airways (6)</td>
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<td>QUANTAS (45)</td>
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<tr>
<td>Air Canada (15)</td>
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<td>Northwest (18)</td>
<td></td>
</tr>
<tr>
<td>Air India (27)</td>
<td></td>
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</table>

Source: [http://www.zap16.com/civ%20fact/civ%20boeing%20787.htm](http://www.zap16.com/civ%20fact/civ%20boeing%20787.htm) and Boeing.com
“All New” A350
Not your fathers A330

Source: http://www.airbus.com
**Turboprops**

**ATR sales 2005/2006:**

- Record 90 orders for ATR 42/72 turboprops in 2005
- Sold 46 in the Q1 2006
<table>
<thead>
<tr>
<th>Aircraft characteristics*</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Passengers:</td>
<td>4 to 8</td>
</tr>
<tr>
<td>□ Acquisition price:</td>
<td>$m 1.4 to 3.6</td>
</tr>
<tr>
<td>□ Cruise speed:</td>
<td>340 to 390 kts</td>
</tr>
<tr>
<td>□ Operating ceiling:</td>
<td>41,000ft to 45,000ft</td>
</tr>
<tr>
<td>□ Range:</td>
<td>1100 to 1750 NM</td>
</tr>
<tr>
<td>□ Take off field length:</td>
<td>2200ft to 3400ft</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Orders</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Eclipse: 2300</td>
</tr>
<tr>
<td>□ Adam: 75</td>
</tr>
<tr>
<td>□ Mustang: 330+</td>
</tr>
</tbody>
</table>

* for twin-engine VLJs (excludes D-Jet)
Battle for New Nonstop Service between China and the U.S.

- Current services: from New York, Chicago and San Francisco.

- The U.S. Department of Transportation will award one last route (until 2008) between China and the U.S. by the end of the year.

- Four U.S. airlines are competing for the route:
  - United
  - Northwest
  - Continental
  - American

- Contest between airlines to develop support for a particular route.

Source: Detroit Free Press 10/18/2006
QuickTime™ and a Microsoft Video 1 decompressor are needed to see this picture.