

Airline Operations A Return to Previous Levels?



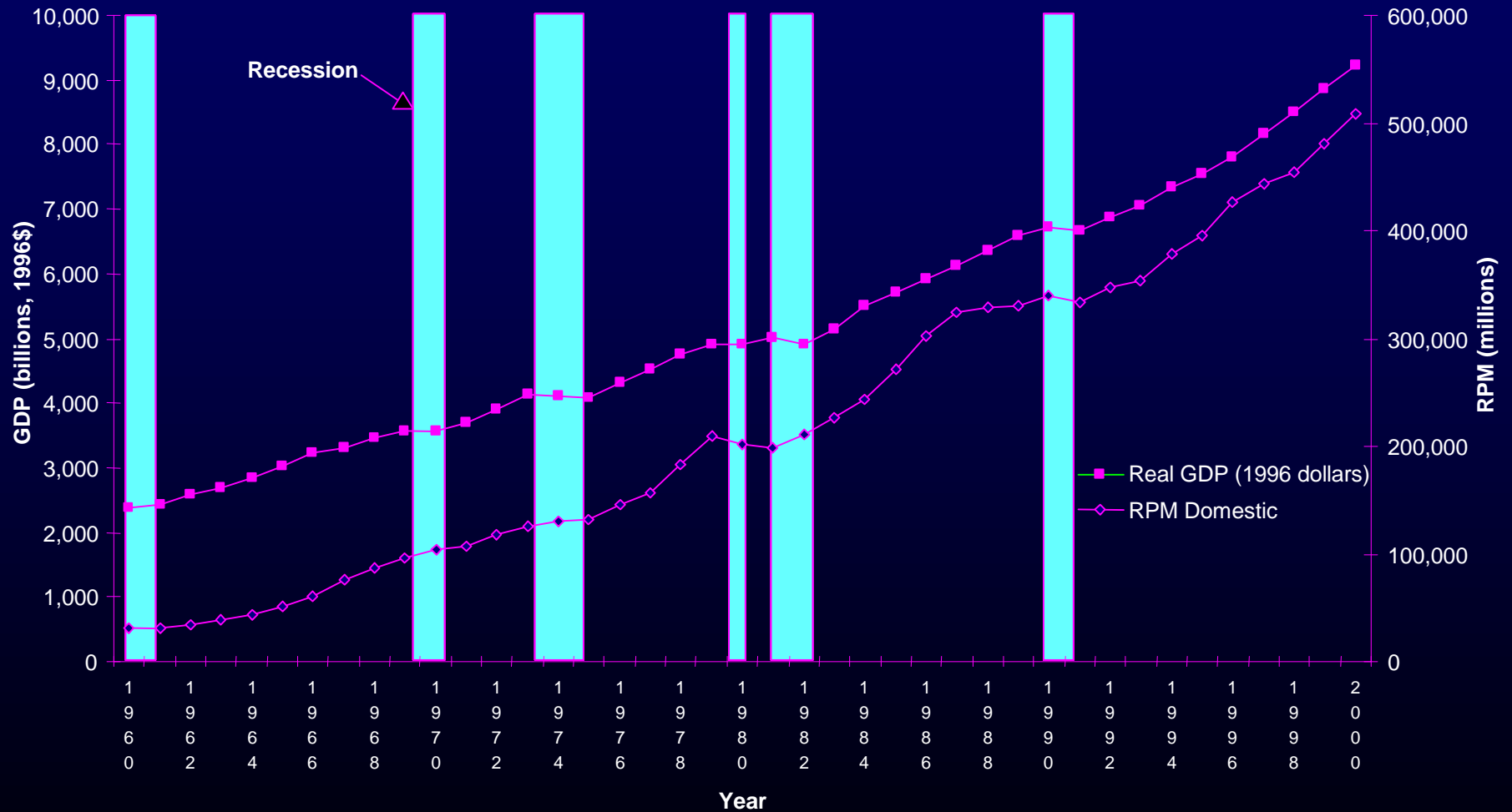
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MIT International Center for Air
Transportation

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Impact of Sept 11 on Demand

- Schedule Cutbacks 10-20%
 - Currently about 90% of pre 9/11
- Peak Demand Still High
 - Hubs
 - High traffic density airports
- Schedules and Delays Typically Reduced in Winter
- Demand Trends with Economy

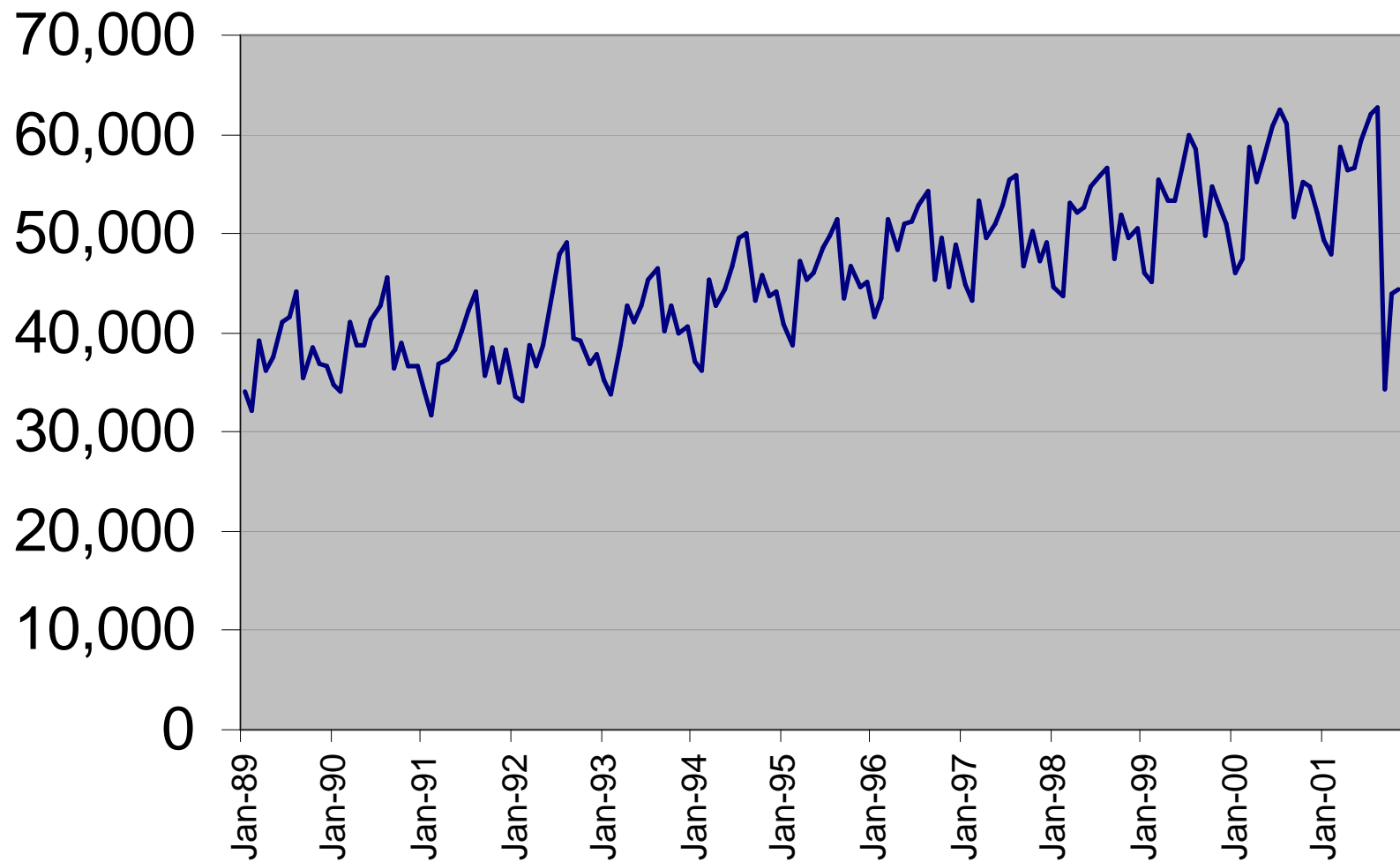
GDP and Domestic RPM: 1960-2000



RPM data from Air Transport Association
 GDP data from Bureau of Economic Analysis, DOC
 Recession markings from Dow Jones (approximate)

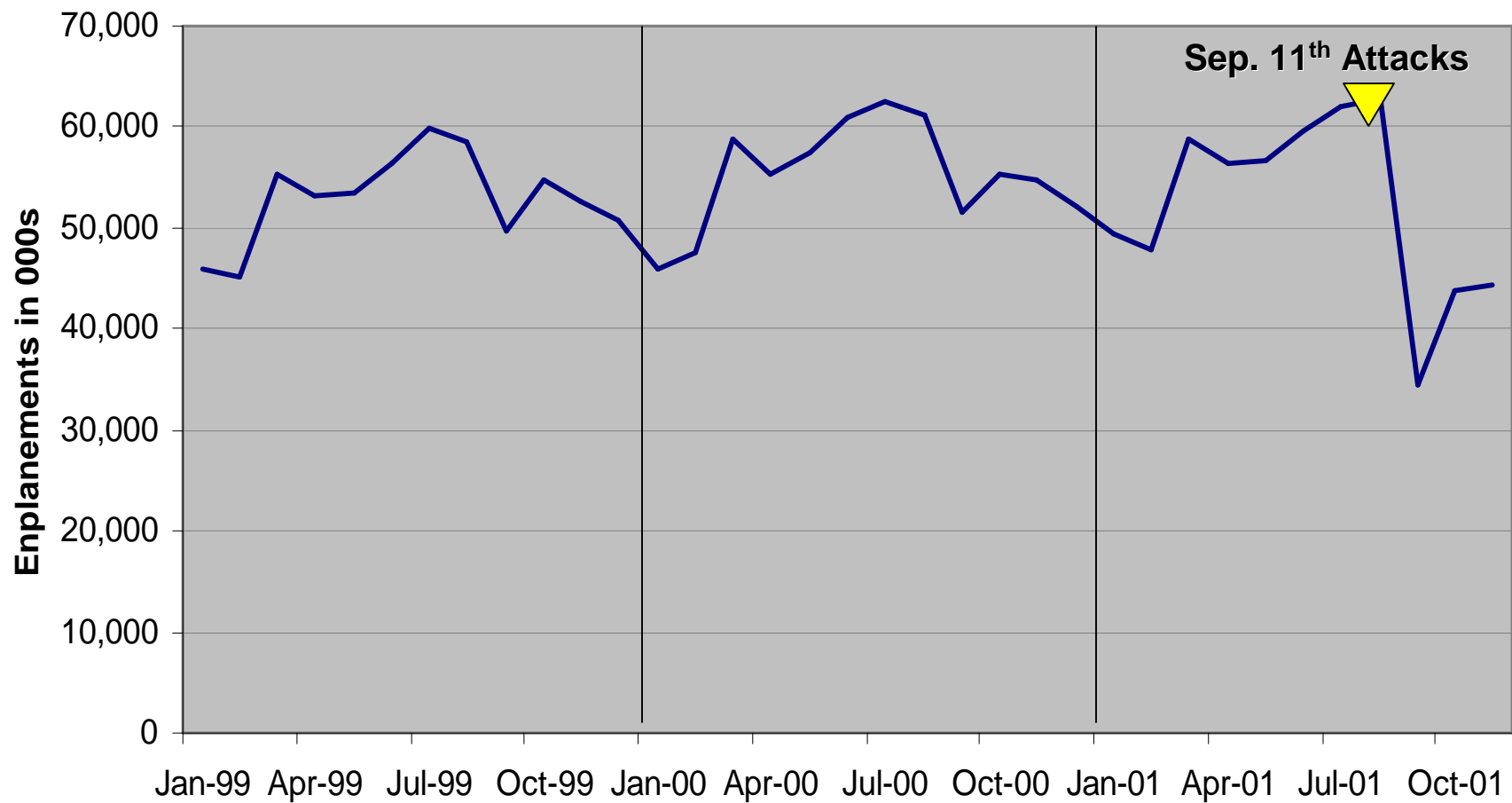
From FAA
 Charlie Keegan
 OEP briefing (Dec 9)

Enplanements, 1989-today



Data: BTS

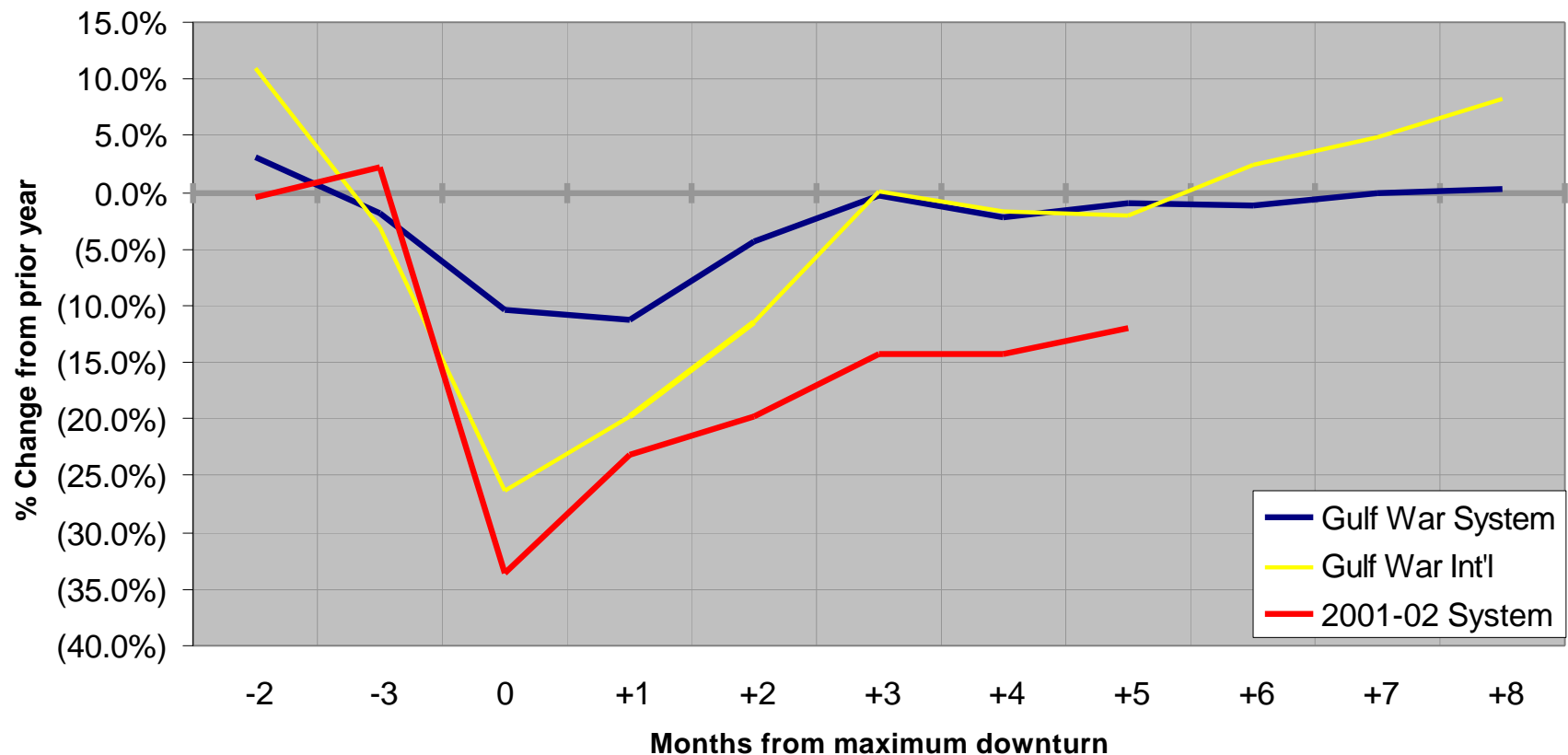
Enplanements: 1999-2001



Data: BTS

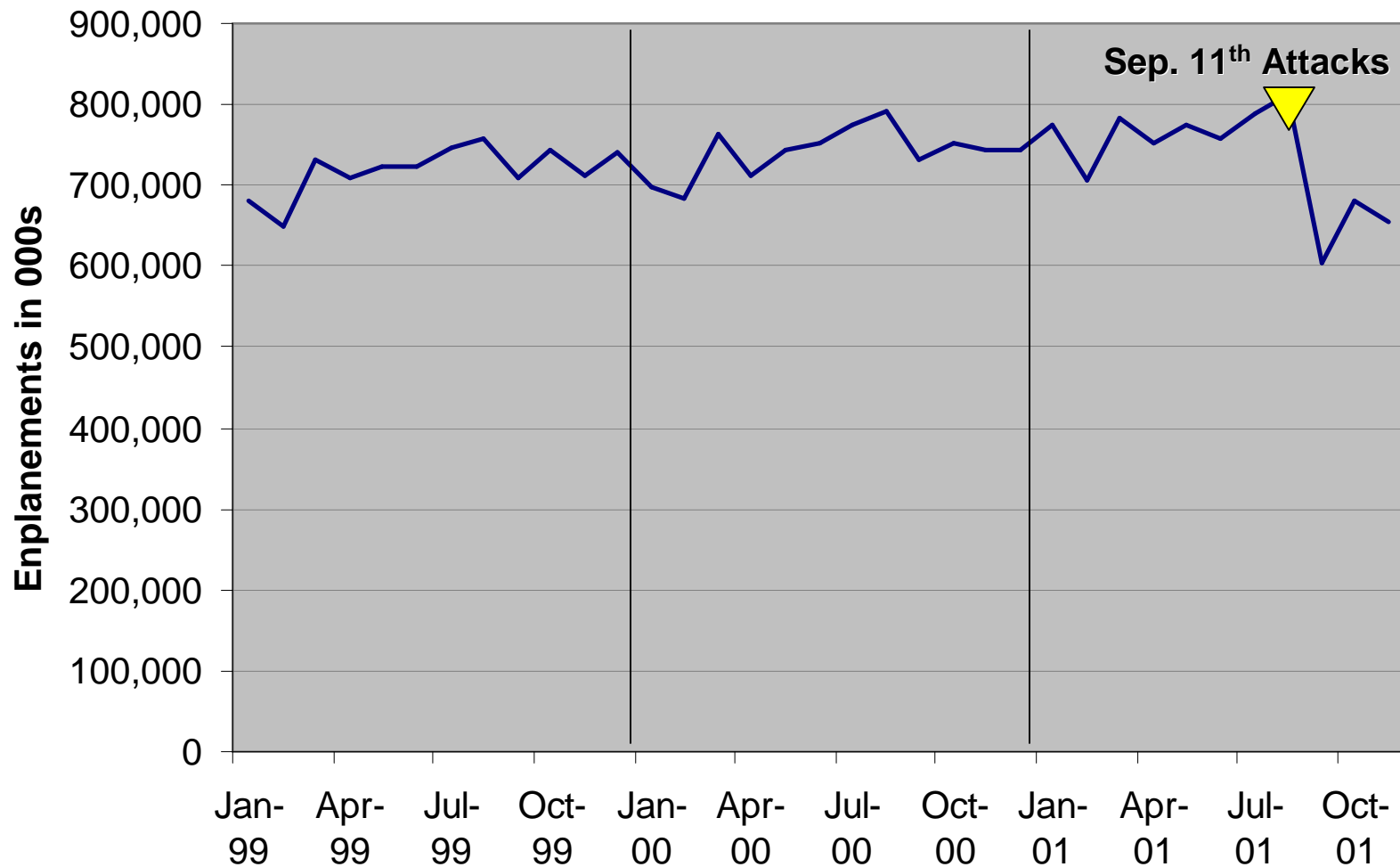
Gulf War & 9/11 Comparison

Systemwide Enplanements: 1990-91 and 2002-02



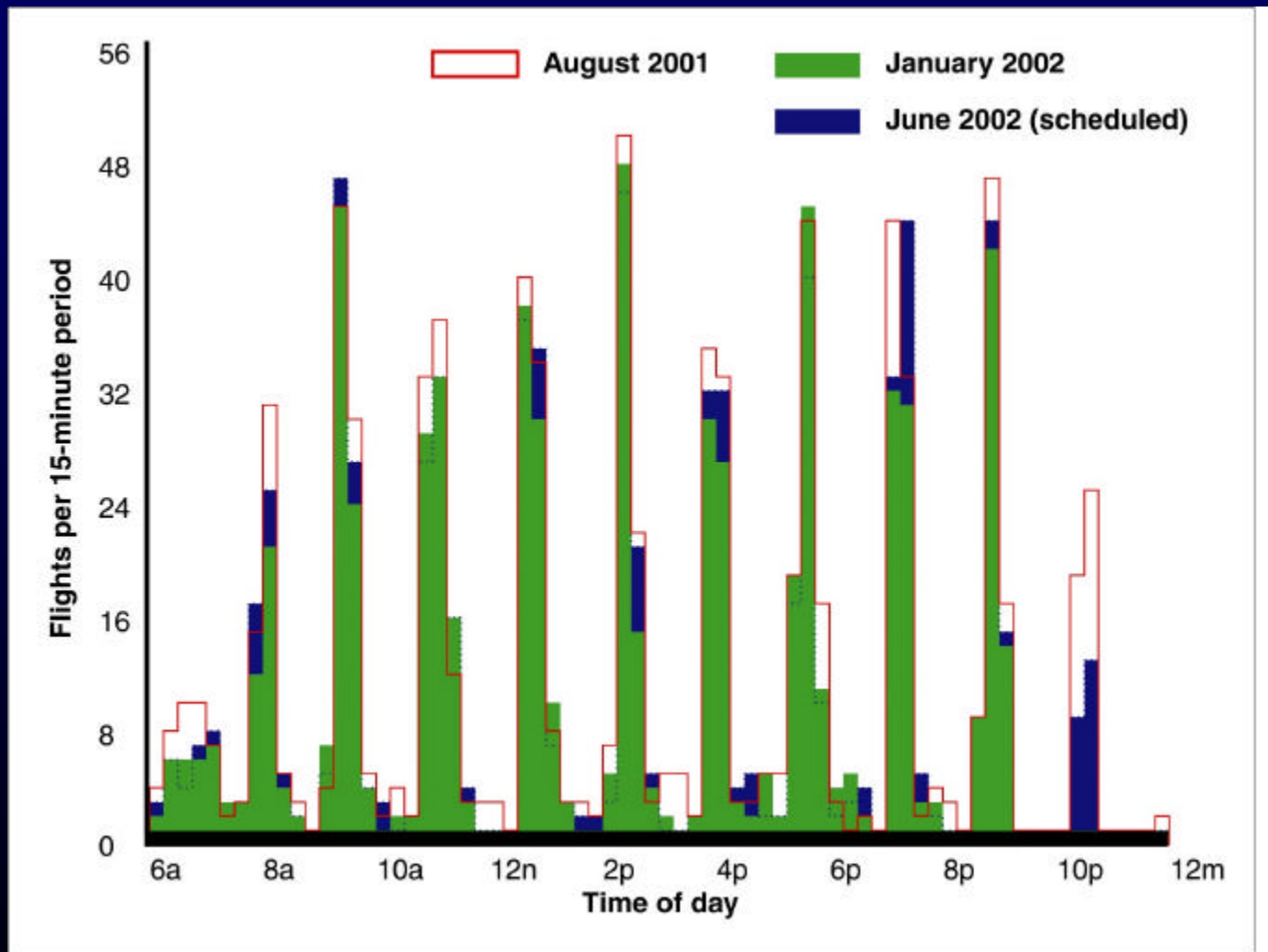
Data Source: ATA, Aviation Week and Space Technology

Scheduled Departures: 1999-2001

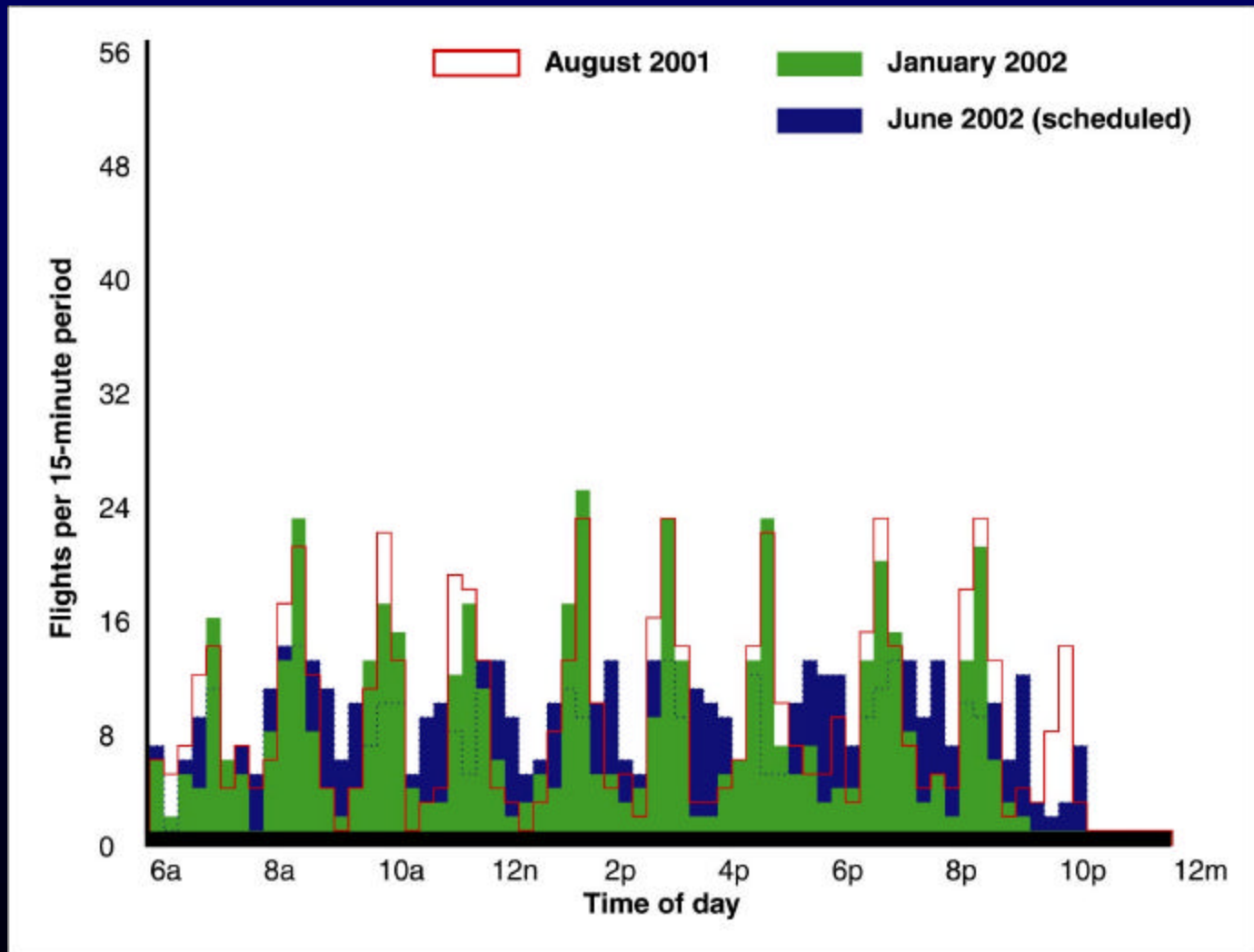


Data: BTS

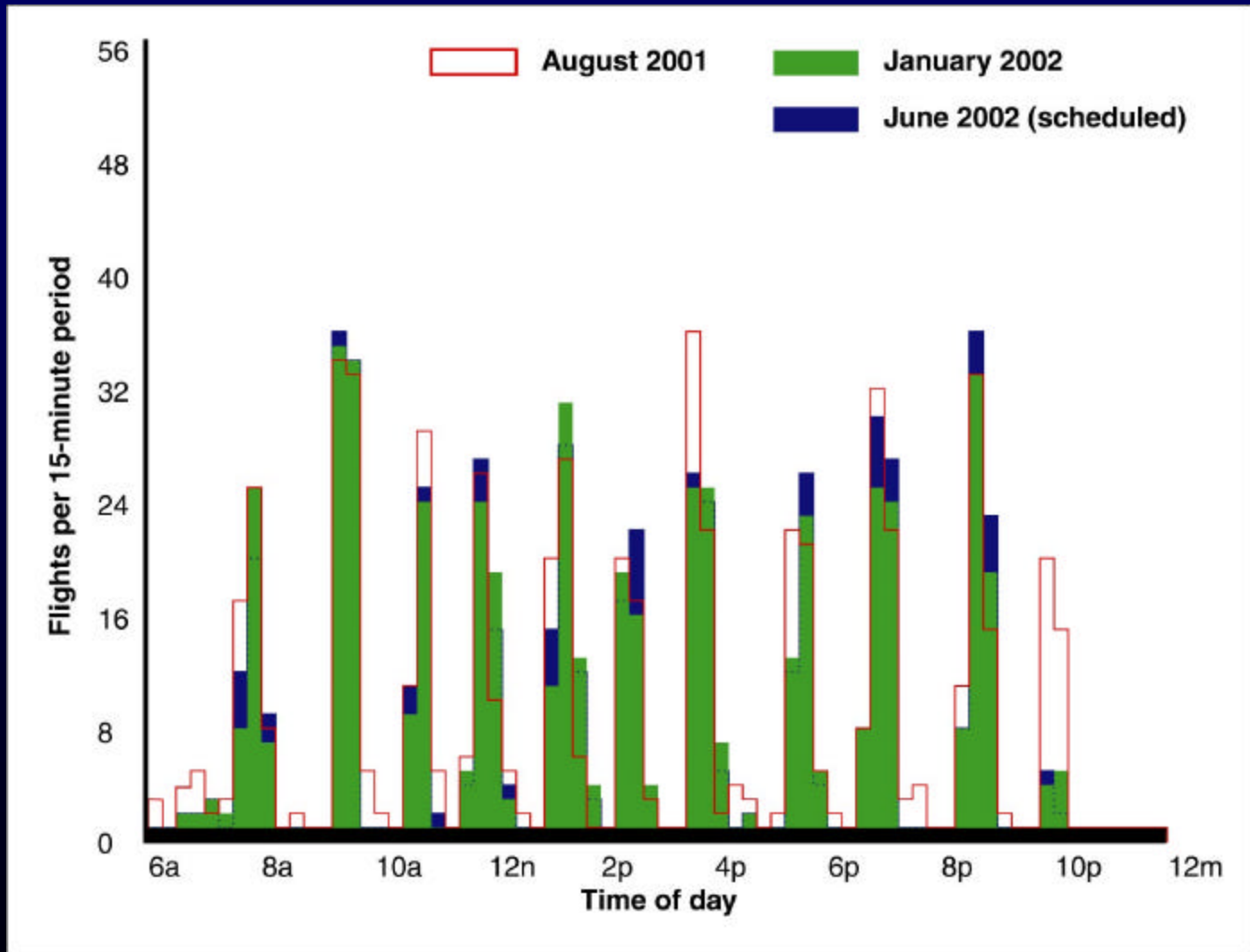
AA Schedule Changes: DFW



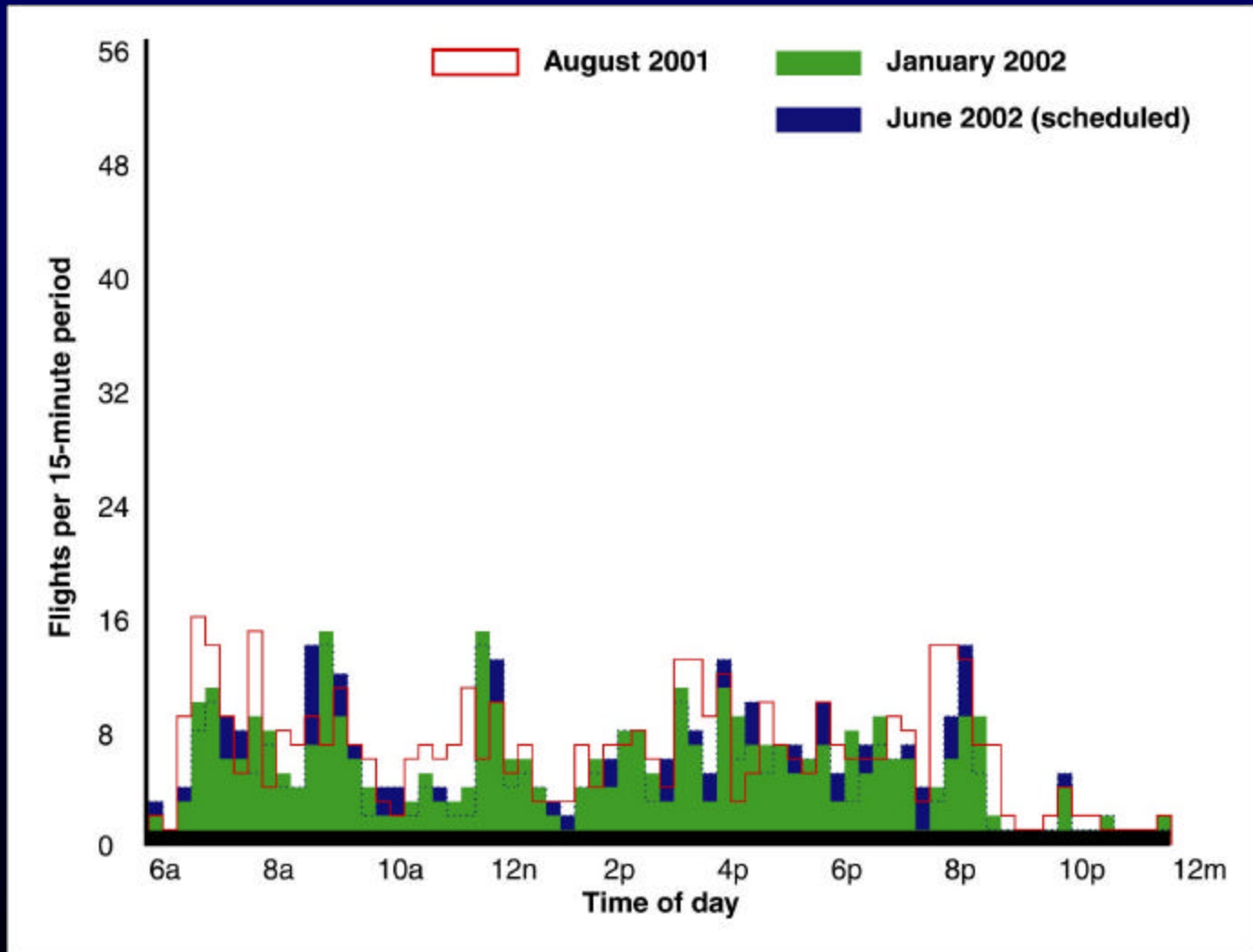
AA Schedule Changes: ORD



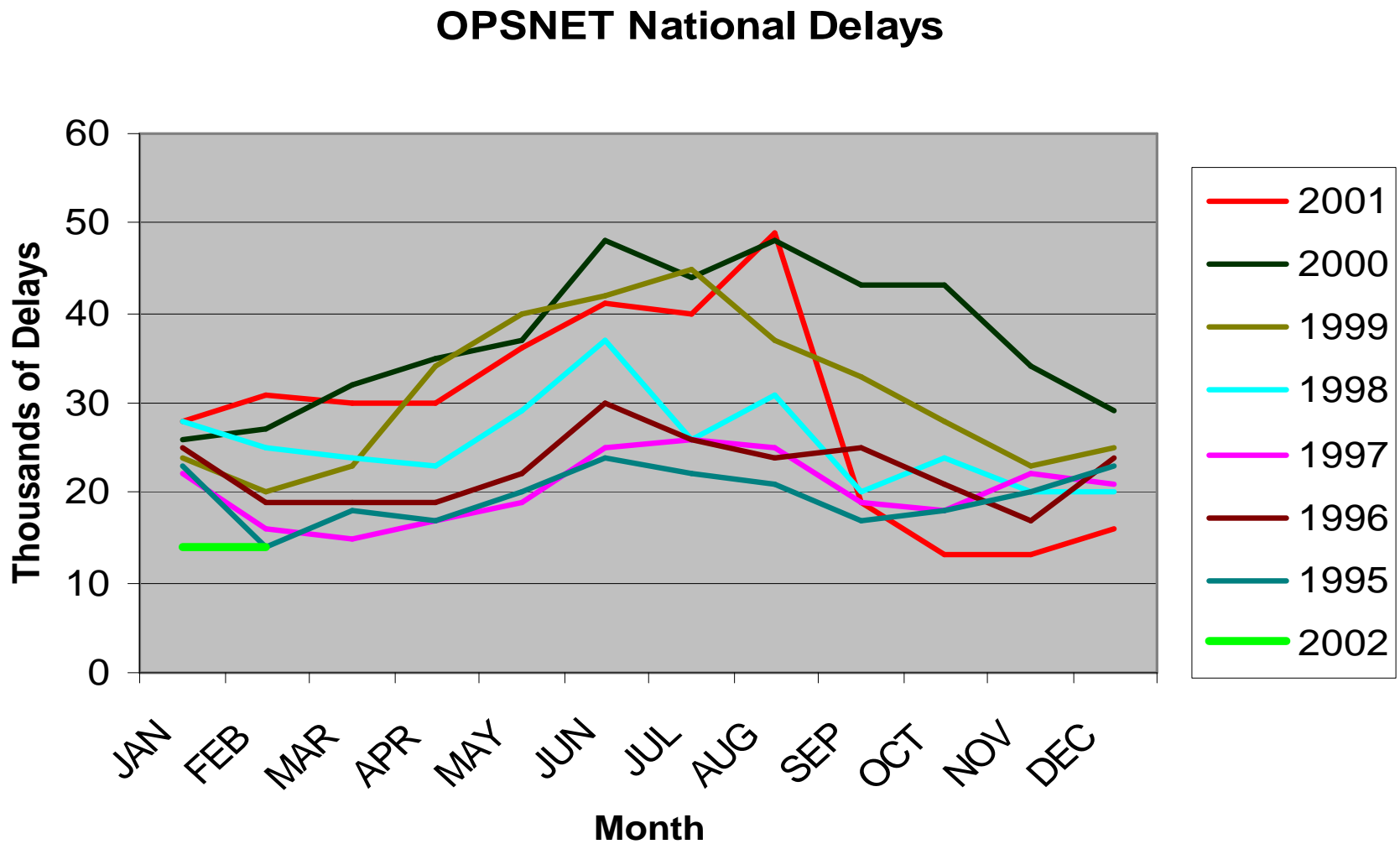
CO Schedule Changes: IAH



CO Schedule Changes: EWR



Delay Trends



Impact of Sept 11 on Capacity

- Pre-Sept 11, Runways key limit factor in US
- Airport is an Adaptive System
 - Service Elements Impedance Matched to Pre Sept 11 Flows
- Mismatch of Service Rates results in significant queuing
 - New Security Requirements
 - Staffing (Security and Airline)
- Security caused delays and cancellations
 - Security Breach Events
 - System Propagation
- Airspace constraints

(1,186 delays and 464 cancellations 9/11-12/31)* CNN

Airport System Capacity Limit Factors

Runways

Weather

- Capacity Variability

Gates

Downstream Constraints

Controller Workload

Security Processing

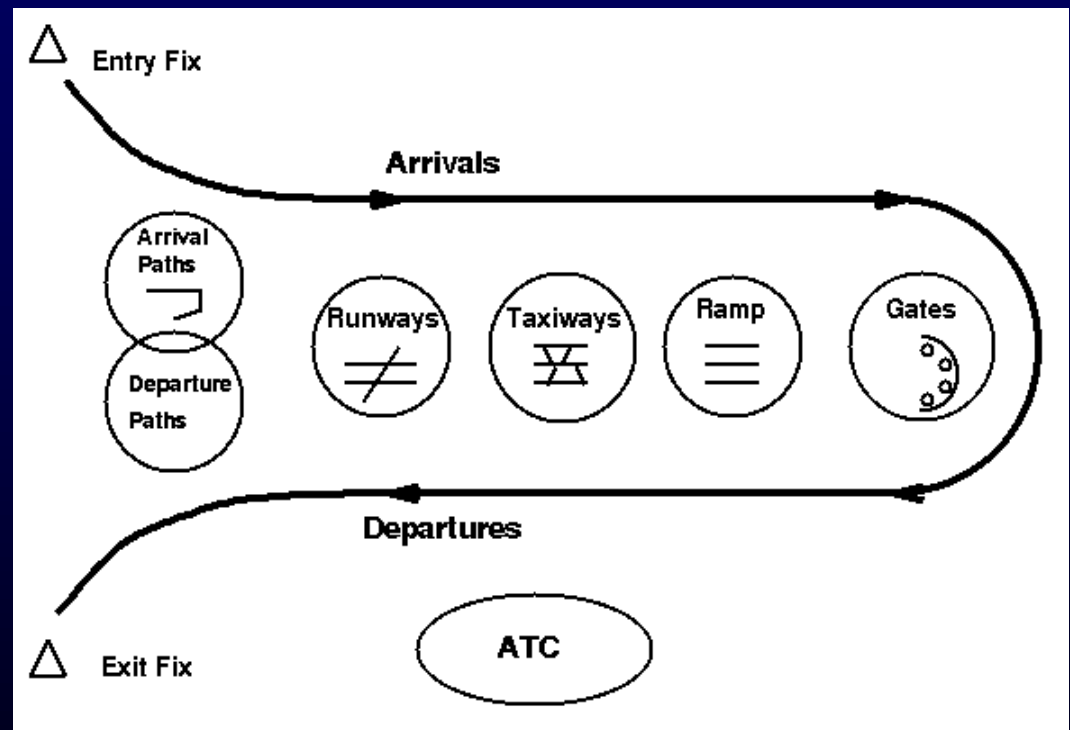
- Passenger
- Carry on Baggage
- Checked Baggage

Landside Access

Environmental

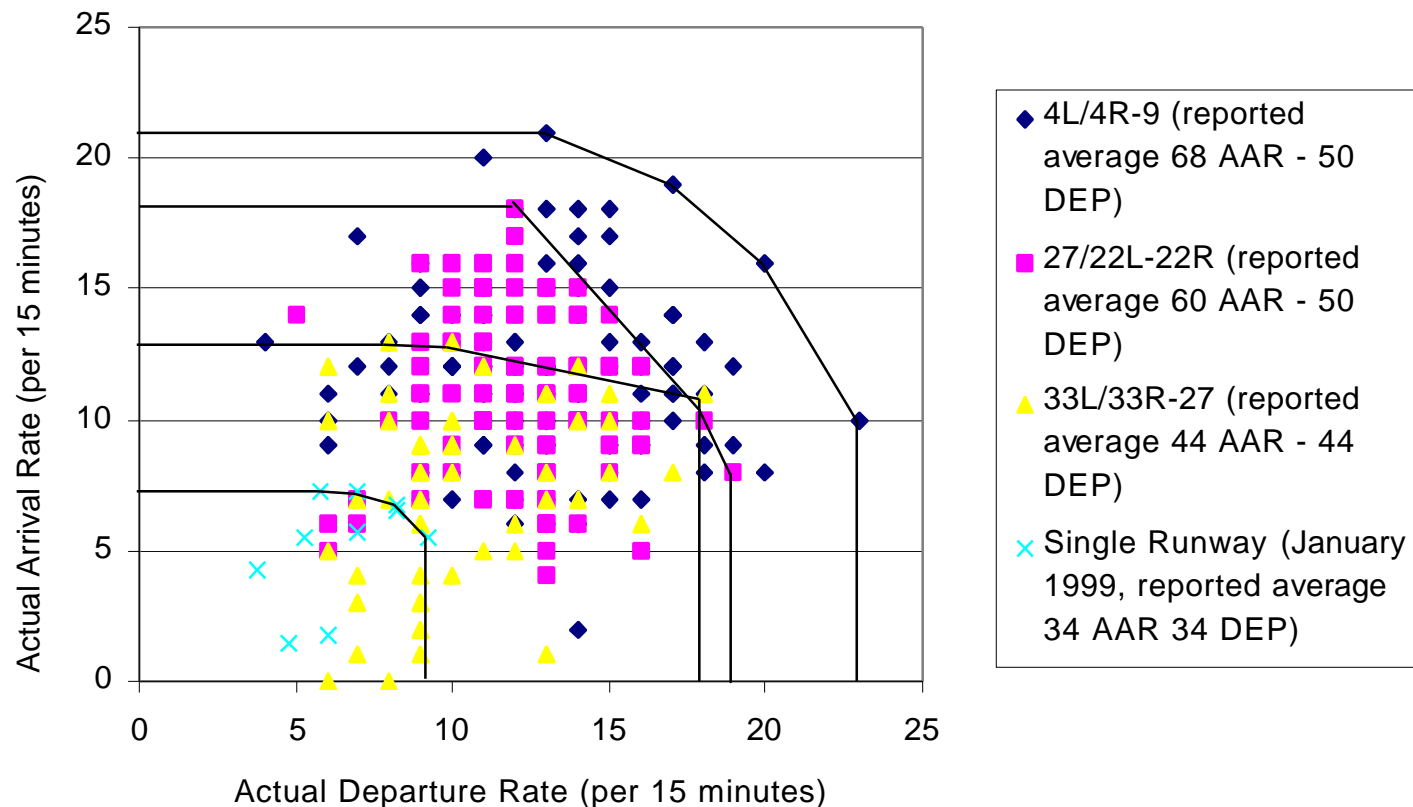
- Community Noise
- Emissions

Safety

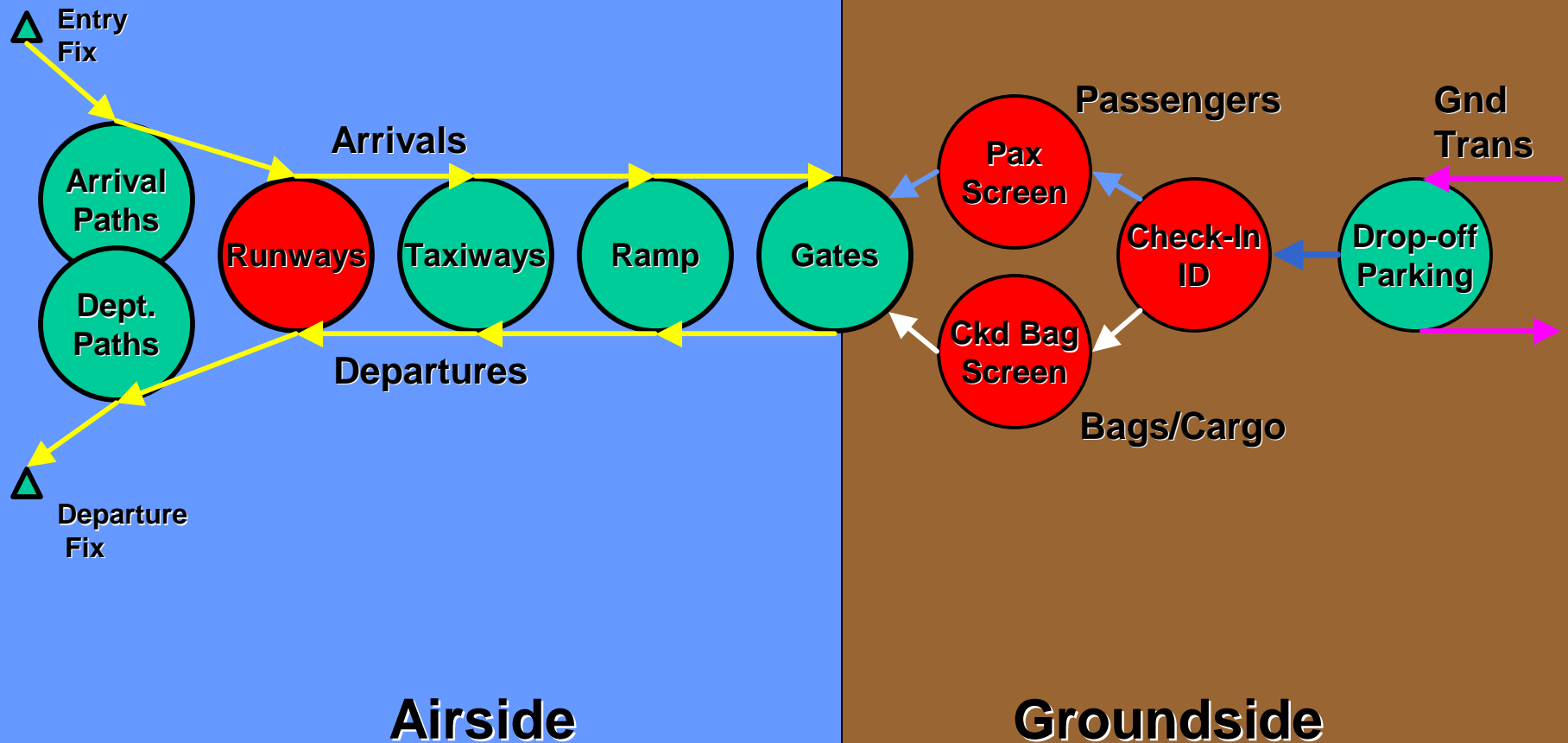


Runway Configuration Capacity Envelops

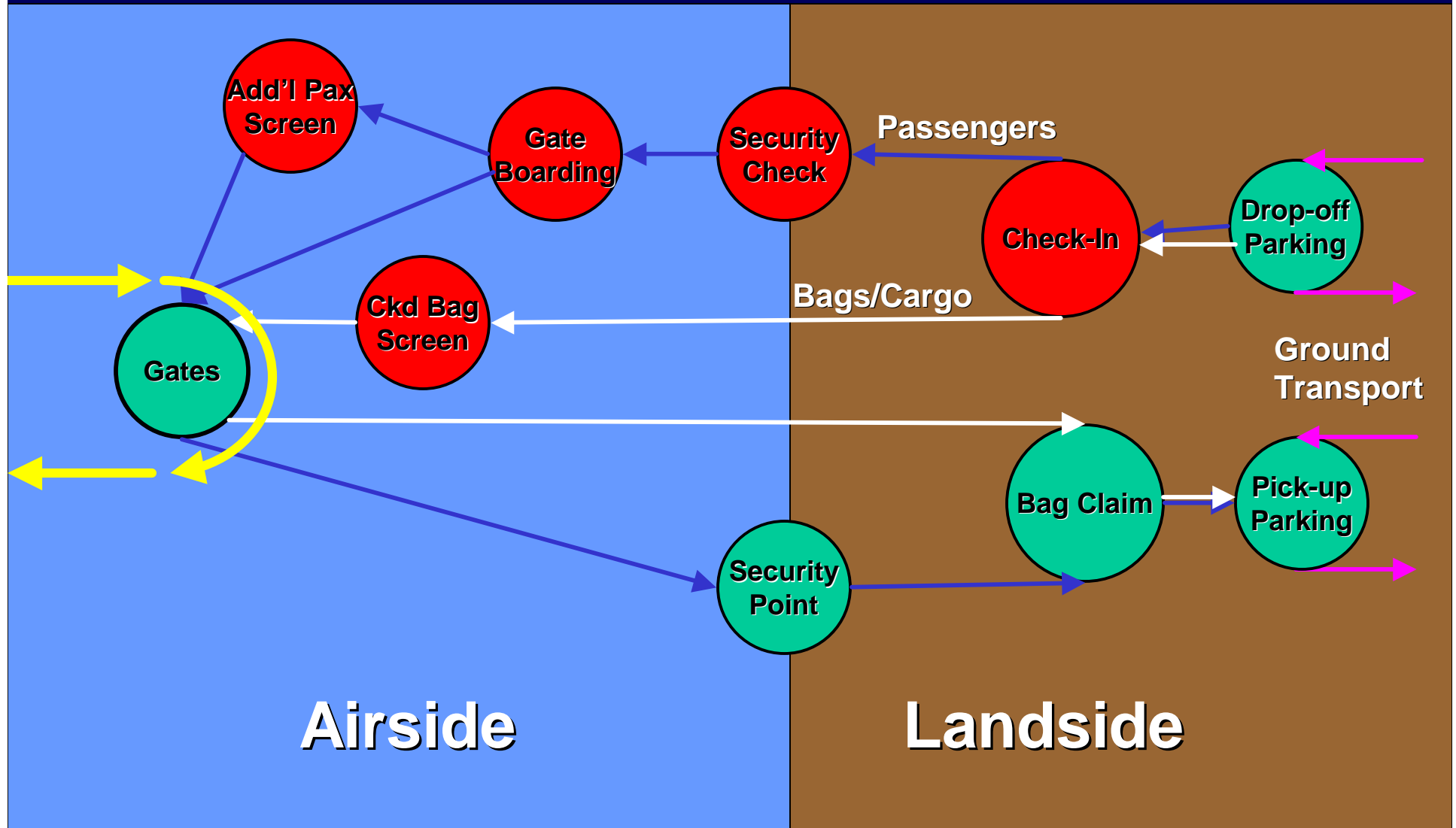
Runway Configuration Capacity Envelops
(Source: ETMS / Tower Records, 7-9 AM, 4-8 PM, July 1-15
1998 except Saturdays, Logan Airport)



Key Airport System Flows



Key Terminal System Flows



Security Induced System Interruptions

Terminal Evacuations Reported in Major Media

November				December					January			
Nov 4-10	Nov 11-17	Nov 18-24	Nov 25-1	Dec 2-8	Dec 9-15	Dec 16-22	Dec 23-29	Dec 30-5	Jan 6-12	Jan 12-19	Jan 20-26	Jan 27-2
DFW JFK	SEA ATL	MEM SEA SNA		CLE	BOS BWI BWI IAD JFK	BDL BWI BWI CLT		DEN HNL PDX STL	IND	DTW	MIA STL	SFO

Source: Lexis-Nexis Database

Security Induced System Interruptions

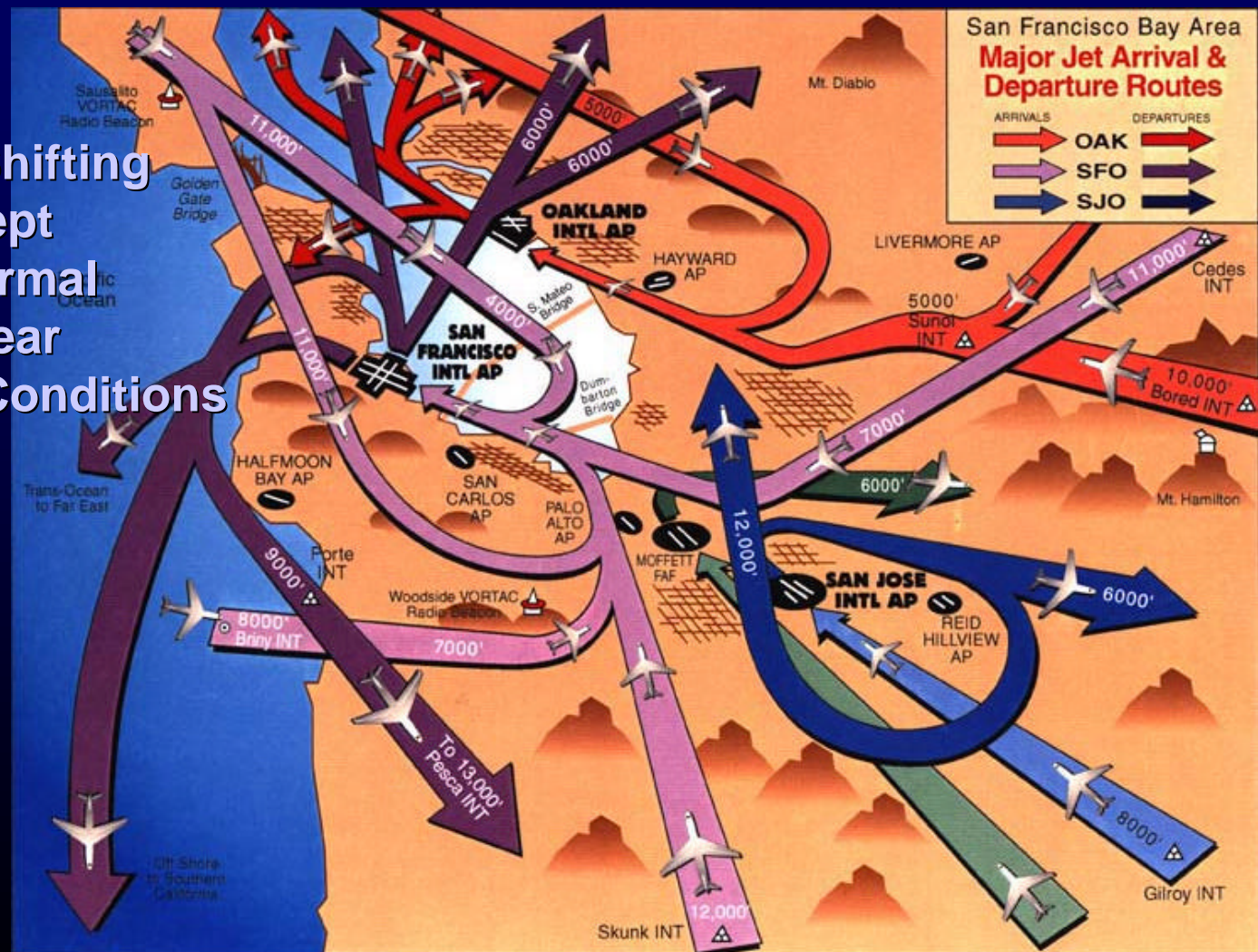
Terminal Evacuations Reported in Major Media

February				March				
Feb 2-9	Feb 10-16	Feb 17-23	Feb 24-2	Mar 3-9	Mar 10-16	Mar 17-23	Mar 24-30	Mar 31-6
BWI CLE DFW	LAX	AMA BOI LGA PHL SDF	ORD	LAX	OMA DEN EWR	BOS LGA		

Source: Lexis-Nexis Database

Constraints from Combat Air Patrol (CAP) Loitering Airspace

- CAP Coverage Shifting
- Impact of Intercept
- Criteria for abnormal behavior not clear
- Impact of Icing Conditions

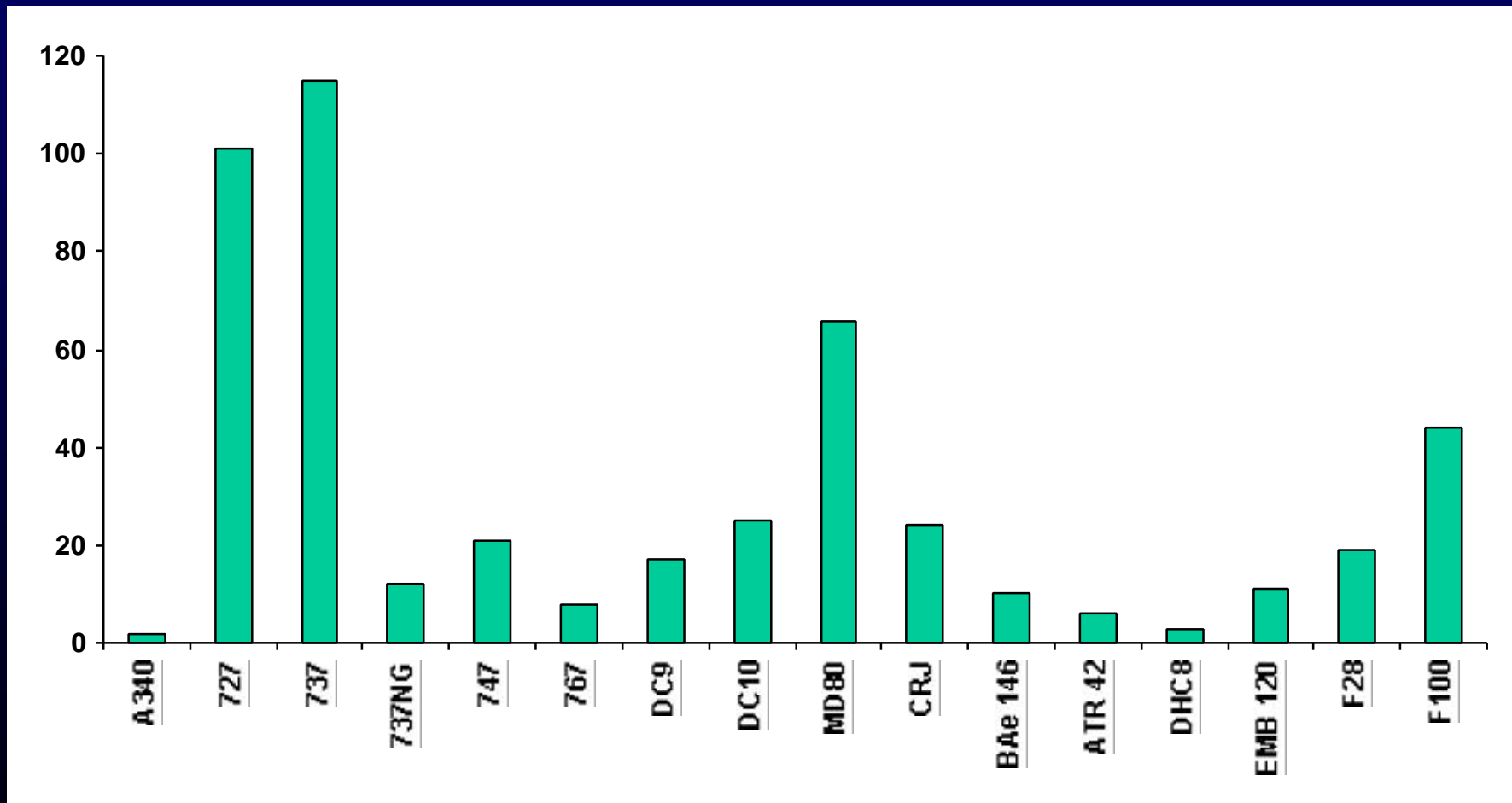


Other Operational Impacts

- Fleet
 - Indirect Modernization
 - Cockpit Doors
 - Hold on investment
- Fuel
- Information Systems
 - CAPS etc.

Operating Fleet Modernized

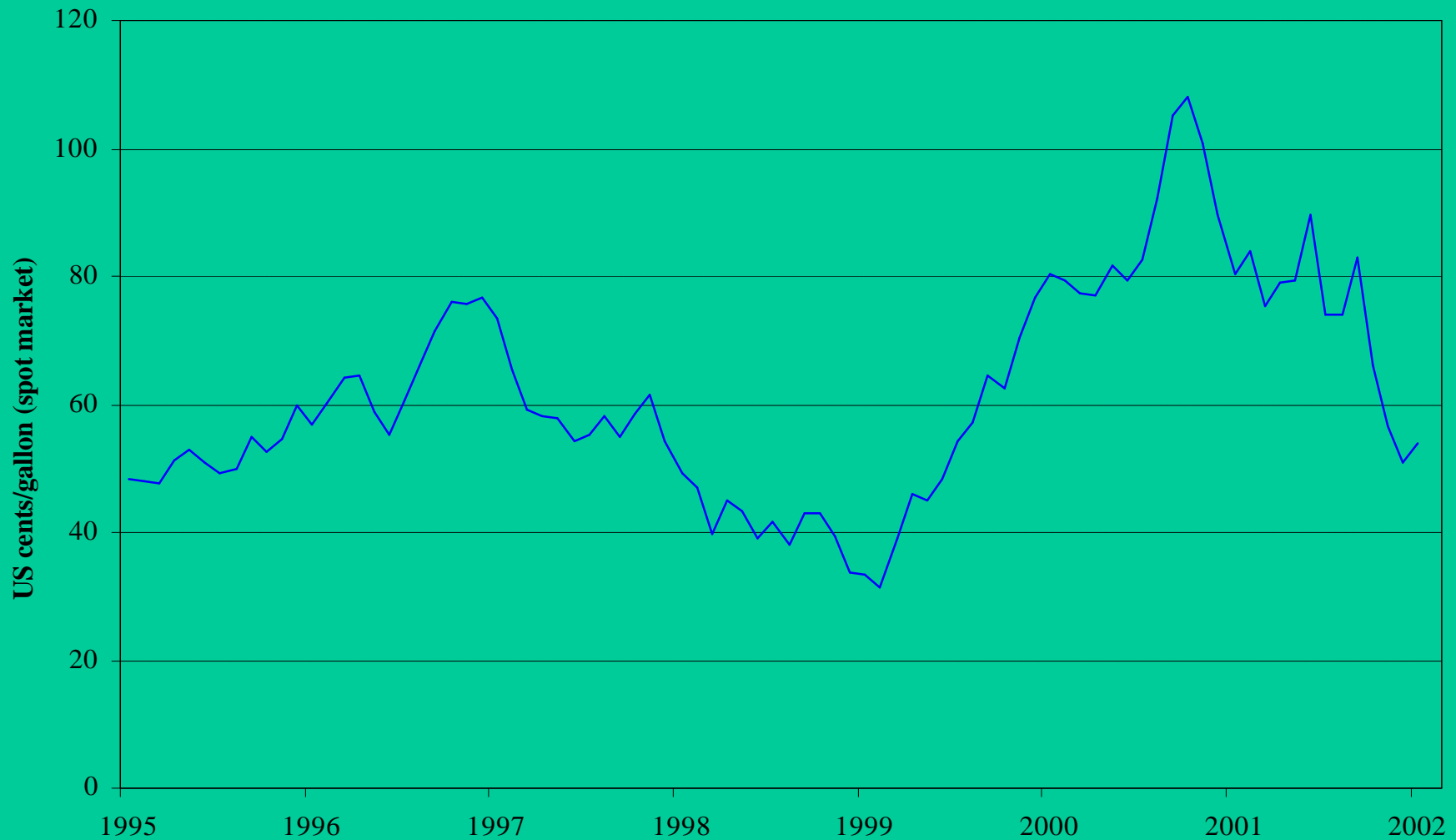
Estimated 484 Aircraft Parked/Retired Worldwide



(Source: Aviation)

Source: Katherine Andrus, Air Transport Association

Average Spot Prices for Jet Fuel



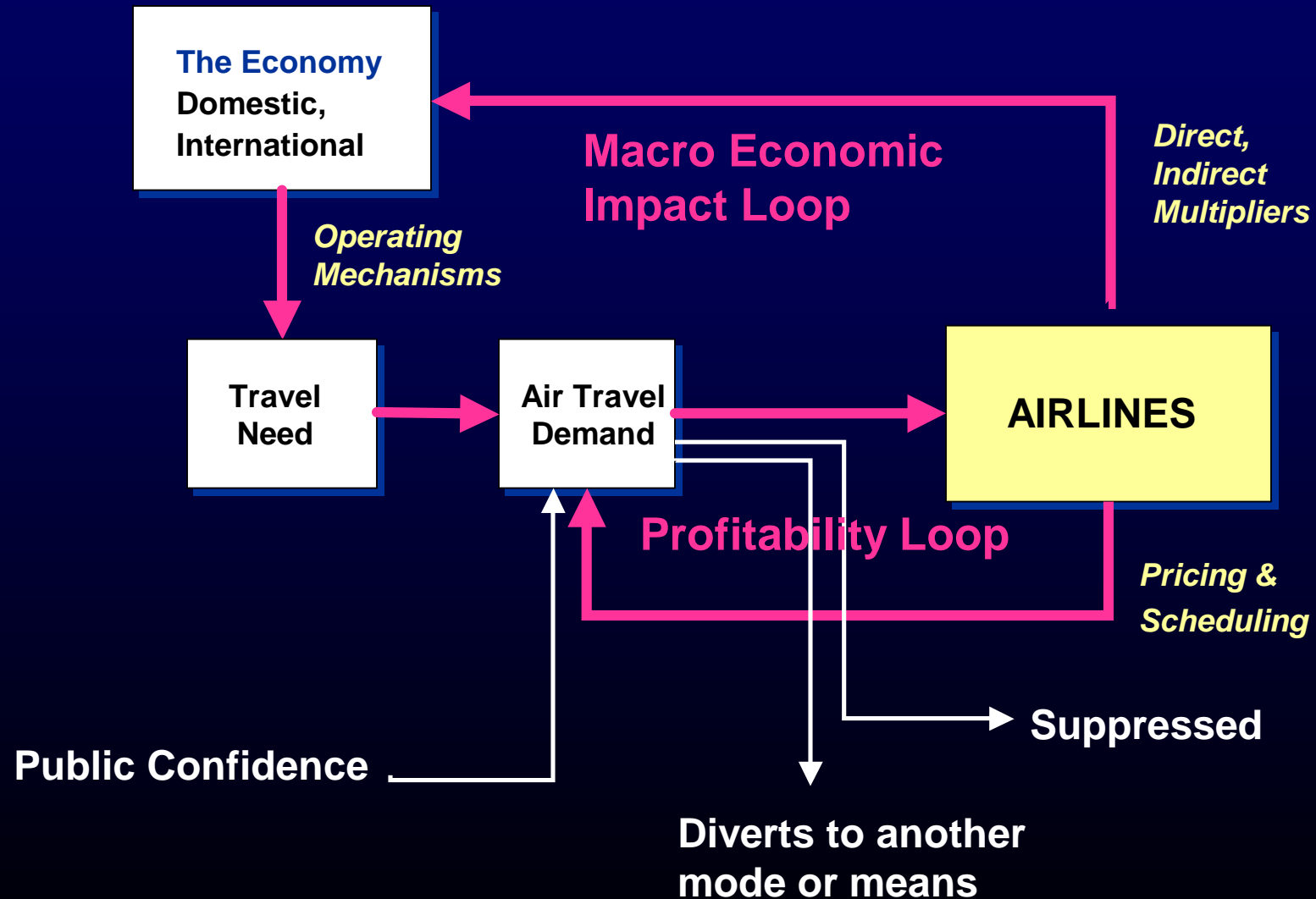
Source: *Air Transport World*

Backup

Impact of Sept 11 on Economy

- Airline Impacts
- Macroeconomic Impacts
 - Local
 - Regional
 - National
 - Offshore

Conceptual Structure

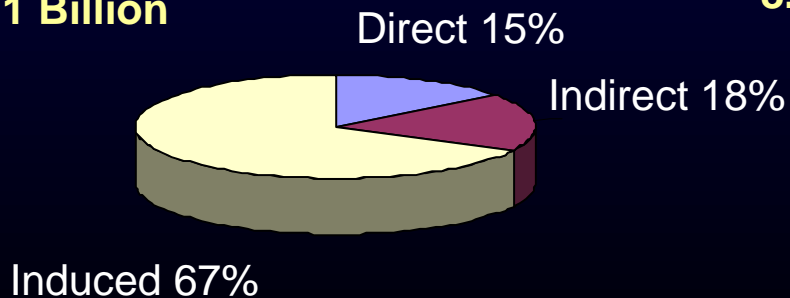


Aviation's Macro Economic Impact

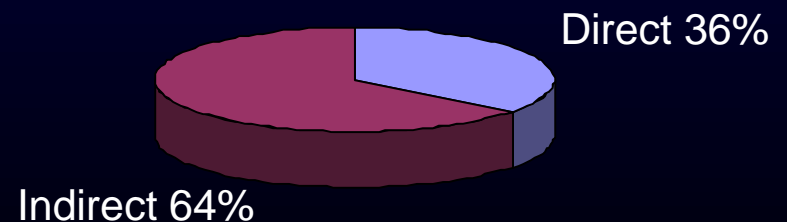
Air transportation has four types of effects:

- **DIRECT:** air carriers, airports, air navigation providers, etc
- **INDIRECT:** airline passengers and air freight forwarding business in other industries (hotels, rental cars, finance and banking, etc)
- **INDUCED:** expenses by the recipients of income generated by the direct and indirect economic activities
- **ENABLING:** provides access to markets and other activities that would not be possible without aviation

Economic activity in the US (1993):
\$771.1 Billion

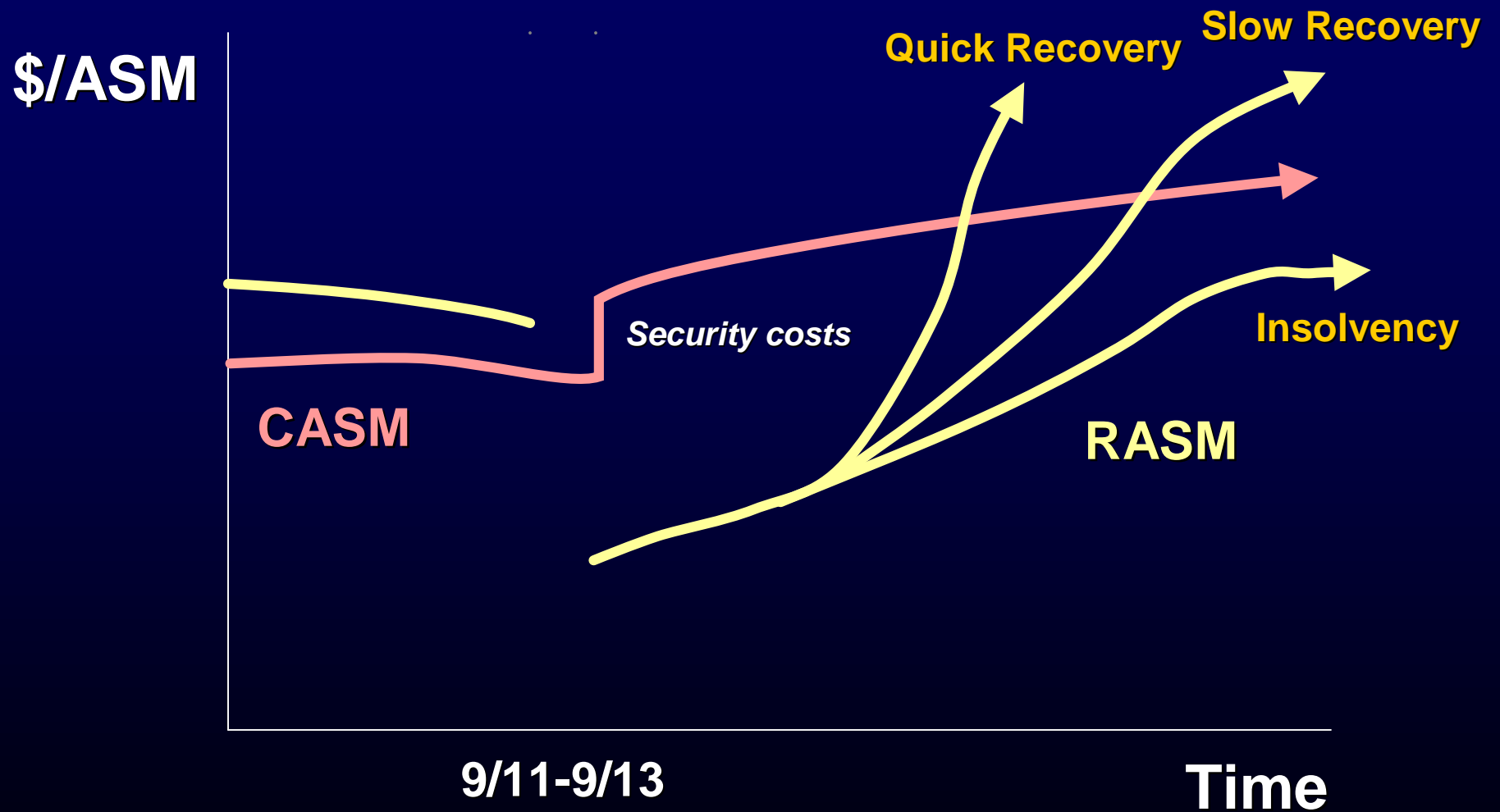


Employment in the US (1993):
8.84 Million jobs

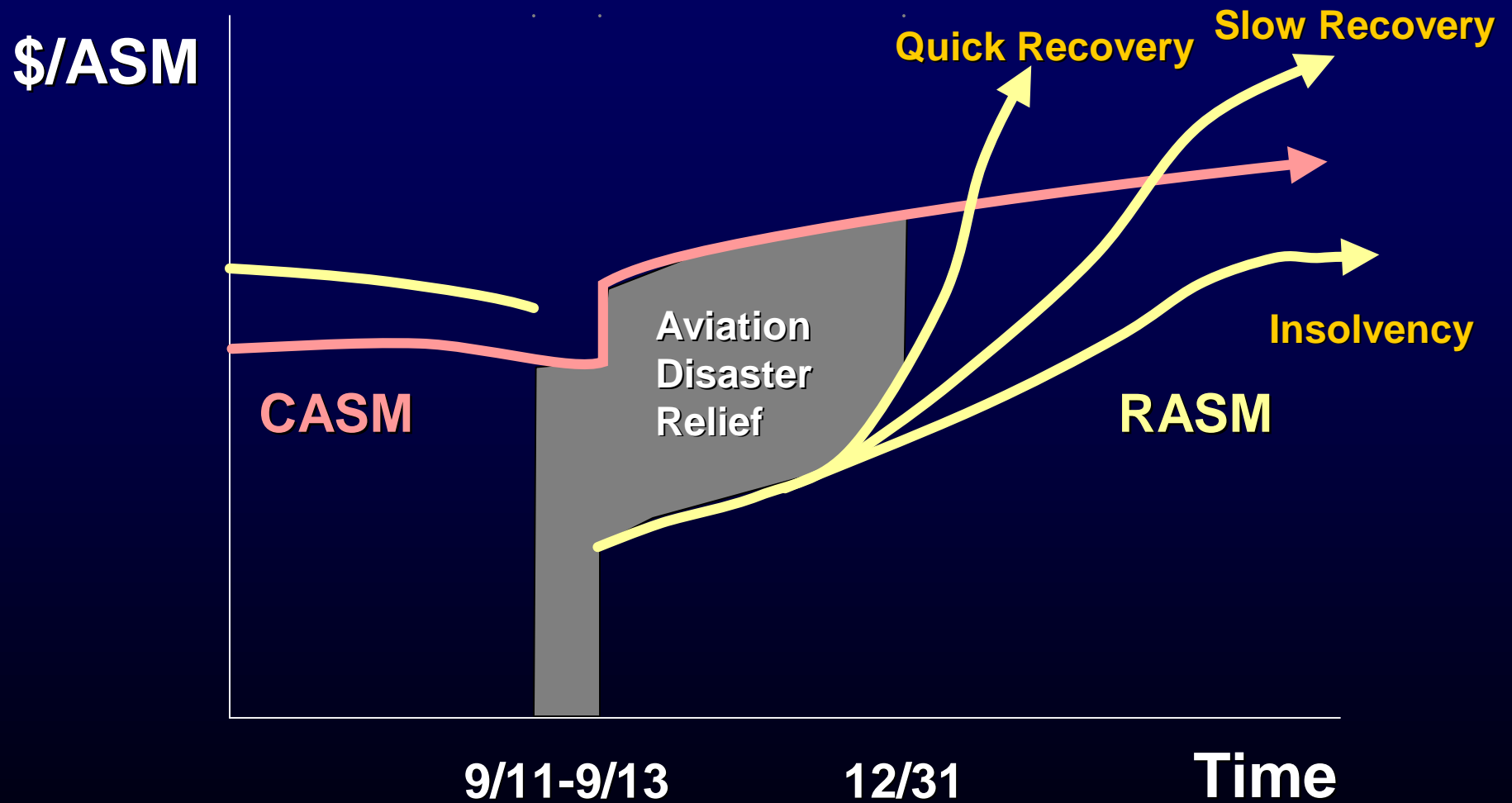


Excludes enabling effect. Source: ICAO, FAA

Airline Profitability Impact



Air Transportation Stabilization Act



Recent Security Interruptions

Date	Time	City	Location	Duration	Affected
2/28/02	5:30 AM	LAX	Term 4-7	45 min	terminals evacuated
2/27/02	5:00 PM	BUF	main term	40 min	500 pax (10 flights; 2 inbound)
2/25/02	n/a	BOS	Term B		1,200 pax (AA)
2/23/02	n/a	PHL	Term C		2,000 pax; 60 flights w/ 45 min delays
2/22/02	n/a	AMA	main term	3 hrs	terminal evacuated
2/19/02	6:30 AM	SDF	main term		1,000 pax; 23-25 sked departures
2/19/02	6:00 AM	BOI	main term		terminal evacuated
2/18/02	n/a	LGA	Term C	1 hr	flight took off; returned
2/18/02	3:00 PM	MHT	main term		terminal evacuated
2/13/02	n/a	LAX	int'l term		terminal evacuated
2/8/02	n/a	CLE			flight diverted
2/8/02	n/a	ATL	-	2 hr	flight to boston
2/7/02	11:40 AM	BWI	Pier B	90 min	1,000 pax
1/30/02	7:00 AM	SFO	North Terminal	2 hrs	3,000 pax; 80 UA flights; 6 flights took off; 2 diverted
1/24/02	5:16 PM	STL	Concourse C	2 hrs	12 flights rescreened; 10 delayed
1/20/02	n/a	MIA			concourse evacuated
1/16/02	n/a	DTW	Conc F	45 min	550 passengers
1/11/02	n/a	IND	Conc B & C		concourse evacuated
12/30/01	am	HNL	Main term	3 hrs	3,500 pax
12/30/01	10:44 AM	DIA	Conc A		2500 pax rescreened
12/13/01	9:45 AM	BOS	Term B	90 min	1,000 pax; 4 planes recalled
12/11/01	pm	JFK	DL Terms		4 flights
12/11/01	pm	IAD	main term		4 flights delayed
11/24/01	8:30 AM	SEA	AS gates		1,300 AS pax; 100 flights; 3-5 flights deplaned; re
11/24/01	1:00 PM	MEM	main term	105 min	1,000; possible security breach
11/16/01	11:45 AM	ATL	terminal	3 hrs	10,000 people
11/13/01	n/a	SEA	?	2 hrs	thousands of people
11/4/01	8:15 PM	DFW	AA terms	2 hrs	13 inbound; 37 outbound
11/3/01	n/a	PHL	?	90 min	terminal evacuated