

Airline On-Time Performance (AOTP)

Lance Sherry
SYST 461/660

Scope

- Scheduled and Actual departure and arrival times
- non-stop domestic flights
- certified U.S. air carriers
 - account for at least one percent of domestic scheduled passenger revenues
- 1997 – present
- Monthly

Data Summary

- departure and arrival delays
- origin and destination airports
- flight numbers
- scheduled and actual departure times
- scheduled and actual arrival times
- cancelled flights
- diverted flights
- taxi-out and taxi-in times
- air time,
- non-stop distance.

OOOI Data

- Gate - Out
- Wheels– Off
- Wheels – On
- Gate – In

OOOI Data

- Out - Gate Departure Time
 - pilot releases the aircraft parking brake after passengers have loaded and aircraft doors have been closed
 - In cases where the flight returned to the departure gate before wheels-off time and departed a second time, report the last gate departure time before wheels-off time
 - In cases of an air return, report the last gate departure time before the gate return
 - If passengers were boarded without the parking brake being set, record the time that the passenger door was closed.
 - Carriers using a Docking Guidance System may record the official gate-departure time based on aircraft movement. For example, one DGS records gate departure time when the aircraft moves more than 1 meter from the appropriate parking mark within 15 seconds. Fifteen seconds is then subtracted from the recorded time to obtain the appropriate out time.

OOOI Data

- Off – Wheels-off time that an aircraft lifts off from the origin airport.
- On – Wheels-on time that an aircraft crosses a certain point (landing or metering fix).

OOOI Data

- In - Gate Arrival Time - pilot sets the aircraft parking brake after arriving at the airport gate or passenger unloading area (or opening of the passenger door, or Docking Guidance System (DGS) when the aircraft is stopped at the appropriate parking mark)

Late Arrival

- A flight arriving or departing **15 minutes** or more after the scheduled time.

Time

- In-flight Time: The total time an aircraft is in the air between an origin-destination airport pair, i.e. from **wheels-off** at the origin airport to **wheels-on** at the destination airport.
- Elapsed Time: The time computed from **gate** departure time to **gate** arrival time.

Reading the Data

YEAR	QUARTER	MONTH	DAY_OF_MONTH	UNIQUE_CARRIER	AIRLINE_IATA	TAIL_NUM	FL_NUM	ORIGIN_A	ORIGIN_CITY	ORIGIN_C	ORIGIN_CITY	DEST_AIR	DEST_CITY	DEST_CITY
2014	1	1	1	1	AA	19805 N3LBAA	23	11278	1127802	30852	DCA	13303	1330303	32467 MIA
2014	1	1	2	AA	19805 N3FWAA		23	11278	1127802	30852	DCA	13303	1330303	32467 MIA
2014	1	1	3	AA	19805 N3DWAA		23	11278	1127802	30852	DCA	13303	1330303	32467 MIA

CRS_DEP	DEP_TIME	TAXI_OUT	WHEELS_OUT	WHEELS_IN	TAXI_IN	CRS_ARR	ARR_TIME	CANCELLED	CANCELLATION	DIVERTED	CRS_ELAP	ACTUAL_ELAP	AIR_TIME	DISTANCE
715	714	8	722	939	8	1000	947	0		0	165	153	137	919
715	707	14	721	942	9	1000	951	0		0	165	164	141	919
715	716	36	752	1016	8	1000	1024	0		0	165	188	144	919

American Airlines, flight No 23, Washington Nation to Miami

Scheduled Departure 7:15 am, Scheduled Arrival 10:00am

Actual Departure 7:14am, Actual Arrival 9:47

Taxi-out 8 mins, Taxi-In 8 mins

Exercise

- Download
 - Geography
 - Year
 - Period
- Sort by Flights Inbound to DCA
- Sort by Flights Outbound from DCA

Outbound Analysis

1. Draw Histogram by Flight Distance Outbound DCA (250nm increments up to 2500nm)
2. Draw Histogram of Gate-to-Gate Velocity (knots) (50 knots, upto 500 knots)
 - Compute Gate-to-Gate Velocity (Distance/Elapsed Time)
 - Convert time from mins to hours
 - Strip out Cancelled flights
3. Plot Gate-to-Gate Velocity by Distance
 - What is basic shape of data? Explain
 - What variance by distance? Explain
 - Add a trend-line. What is best fit? Explain
 - Plot G-t-G Velocity by Distance by Airline
 - See any differences by airline?
4. Draw Histogram of Off-to-On Velocity (knots) (50 knots, upto 500 knots)
5. Compare Gate-to-Gate Velocity vs Off-to-On Velocity
 - Compare via Histogram (avg, std dev)
6. Plot Off-to-On Velocity by Distance
7. Plot Histogram of Departure Delays
 - Compute Departure Delay (CRS Dep – Dep Time)
 - Plot Dep Delays by Time of Day
 - See any patterns