
Office of Inspector General

Audit Report

Air Carrier Arrival Data

Department of Transportation

Report Number: FE-1998-103

Date Issued: March 30, 1998





**U.S. Department of
Transportation**

Office of the Secretary
of Transportation

Office of Inspector General

Memorandum

Subject: ACTION: Report on Air Carrier Arrival Data, DOT
Report Number: FE-1998-103

Date: March 30, 1998

From: 

Reply to JA-1
Attn of:

foi Lawrence H. Weintrob
Asistant Inspector General for Auditing

To: Assistant General Counsel for Aviation Enforcement
and Proceedings

Director, Bureau of Transportation Statistics

BACKGROUND AND OBJECTIVE

This is our report on air carrier arrival data. The audit was performed in response to a complaint to the Department of Transportation's (DOT) Office of Aviation Enforcement and Proceedings, alleging two air carriers were submitting falsified arrival data to DOT. Specifically, the complainant alleged the two air carriers were falsely recording late flights as having arrived on time for the purpose of scoring higher in DOT's performance rankings. The objective of our audit was to determine the validity of this allegation.

According to Federal regulation and DOT policy, a flight is on time when it arrives at, or departs from, the "*gate or passenger loading area*" less than 15 minutes after its scheduled arrival or departure time. As such, an aircraft could land at an airport within 15 minutes of its scheduled arrival and be reported as late if it did not reach the gate in time. Similarly, an aircraft could wait an hour or more on the airport runway for takeoff and be reported as having departed on time if it left the gate within 15 minutes of its scheduled departure. Late flights also include those which are: (i) delayed 15 minutes or more due to mechanical problems or (ii) canceled within 7 calendar days of the scheduled departure.

Domestic air carriers that account for at least one percent of domestic scheduled passenger revenues are required to submit monthly flight data to DOT's Office of Airline Information, Bureau of Transportation Statistics (BTS). The 10 reporting air carriers are:

Alaska Airlines	Northwest Airlines
American Airlines	Southwest Airlines
American West Airlines	Trans World Airlines
Continental Airlines	United Airlines
Delta Air Lines	U.S. Airways

The Office of Aviation Enforcement and Proceedings, in turn, uses the data to generate the Air Travel Consumer Report. This monthly report provides consumers with information on the quality of air carrier services--including such measures as percentage of on-time arrivals, rate of mishandled-baggage reports, and number of consumer complaints. For each measure, the Air Travel Consumer Report includes a ranking of the 10 air carriers' monthly performance.

SCOPE AND METHODOLOGY

We met with DOT representatives from the Office of Aviation Enforcement and Proceedings; Office of Airline Information, BTS; and the Federal Aviation Administration's (FAA) Office of Aviation Policy and Plans, and Air Traffic Control System Command Center, Herndon, Virginia. We also interviewed representatives from the 10 reporting air carriers and Aeronautical Radio Incorporated.

For the two air carriers, we recorded--through unannounced¹ on-site observations at eight airports--the arrival times of 372 flights during January 1998. We also obtained and analyzed air carrier data submissions to BTS for January 1996 to October 1997. We also reviewed flight logs, instruction manuals, and internal reports pertaining to the two air carriers' flight data reporting systems and arrival statistics.

The audit was conducted from October 1997 to March 1998, and was performed in accordance with Government Auditing Standards prescribed by the Comptroller General of the United States.

¹ Neither air carrier was notified of our activities at the eight airports until after our observations had been completed.

RESULTS-IN-BRIEF

Due to the lack of comparable or benchmark data on which to verify the accuracy of air carrier arrival data, we could not substantiate the complainant's allegation. Nevertheless, based on our flight observations, discussions with DOT and air carrier representatives, and review of relevant documents and reporting systems, we found no significant evidence that either air carrier was submitting falsified arrival data to DOT. For example, for 367 of the 372 observations we made during January 1998, our audit team observed the same flights as either on time or late as reported by the air carriers. Of the five remaining flights, we observed three late flights that the air carriers reported as on time; and two as on time that they reported as late.

However, in conducting this audit, we identified two areas for DOT's consideration. First, DOT defines arrival as that time at which the aircraft arrives at the gate or passenger loading area. DOT provides no specifics as to what arrival "at the gate or passenger loading area" entails, and the air carriers are using five different methods to report arrival. Some of these methods could result in an aircraft being reported as on time, while another aircraft, in the same situation, could be reported as late. To ensure consistency of arrival data, DOT should require one method for all air carriers.

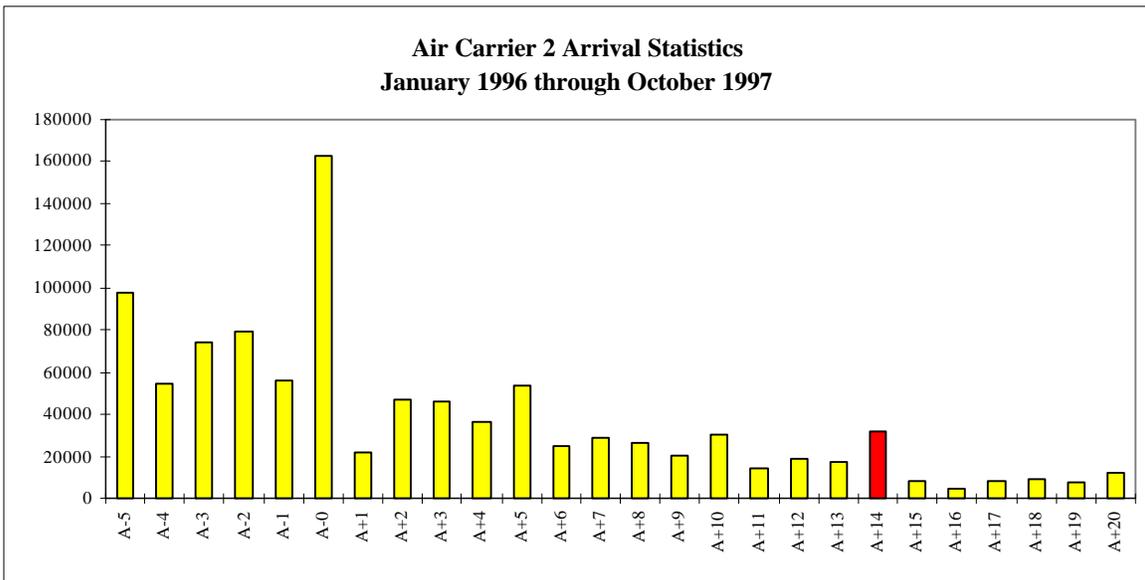
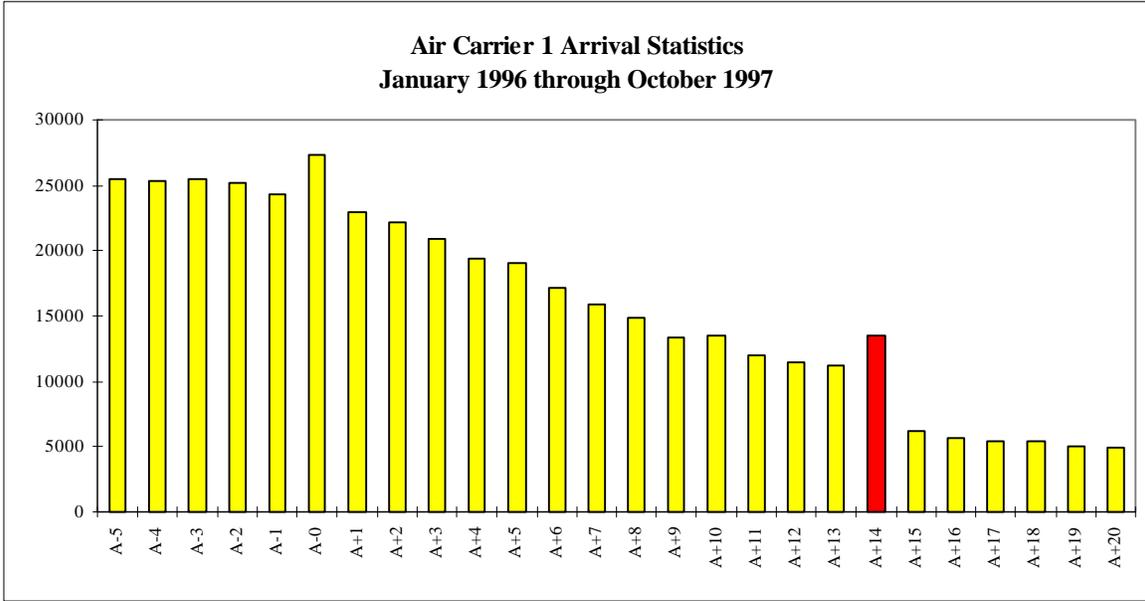
Second, both automated and manual systems are used to record flight arrival times. Although both are acceptable to DOT, manual, self-reporting systems afford air carriers greater leeway than automated systems in recording arrival times. Yet, in the Department's monthly ranking of the 10 air carriers' on-time performance, no distinction is made between those air carriers using automated, manual, or a combination of the two systems for recording arrival times.

FINDINGS

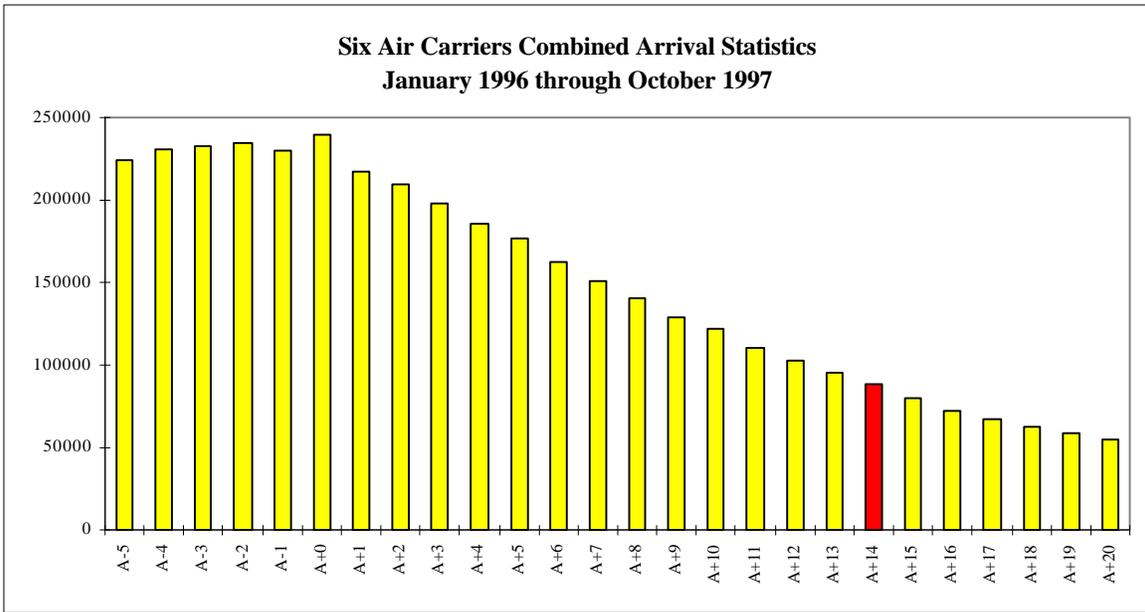
Assessment of Allegation

The complainant alleged two air carriers were falsely recording late flights as having arrived on time for the purpose of scoring higher in DOT's performance rankings. Title 14, Code of Federal Regulations (CFR), Chapter II, Part 234, defines a late flight as one that arrives at the gate 15 minutes or more after its published arrival time (A+15). In support of the allegation, the complainant noted an abnormally high number of flights were reported by the two air carriers as having arrived on time at 14 minutes after scheduled arrival times (A+14).

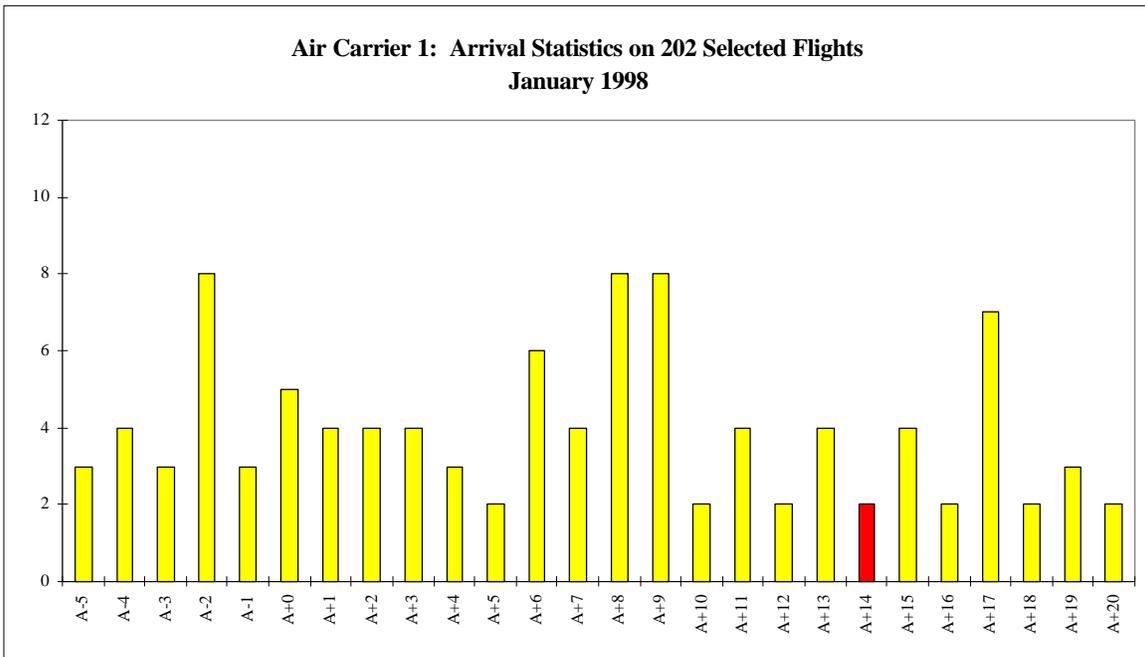
We conducted frequency distribution analyses of the two air carriers' data submissions to BTS from January 1996 through October 1997. Our analyses disclosed increases, or spikes, in the number of A+14 flights in comparison to flights arriving several minutes before or after (e.g., A+12, A+13, A+15, and A+16). These spikes are illustrated by the following two charts for the air carriers (designated as Air Carrier 1 and Air Carrier 2).



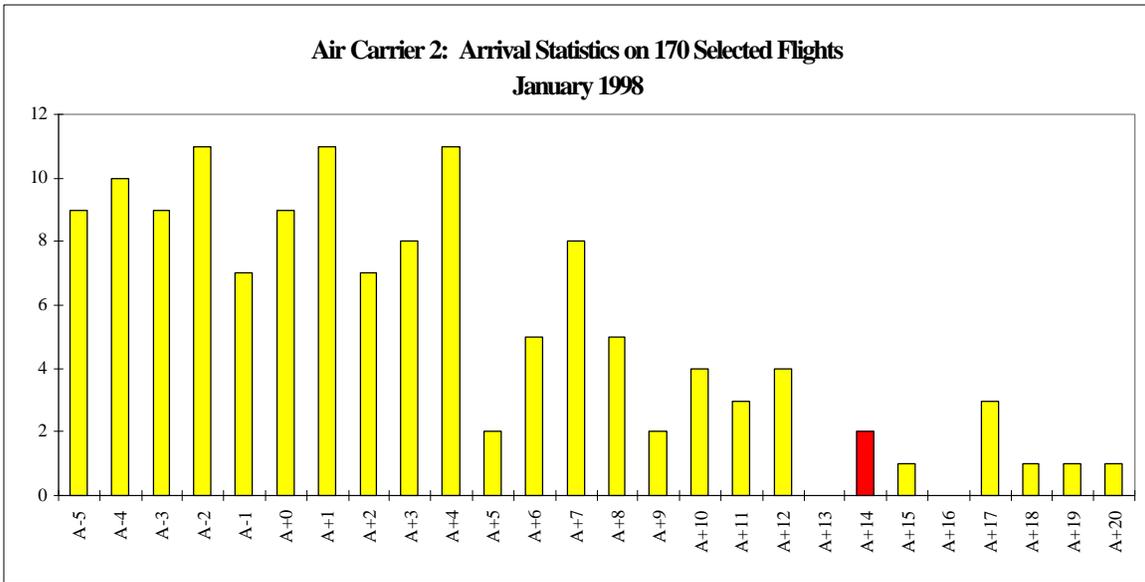
While A+14 spikes also were identified in two other air carriers, spikes for the two air carriers identified by the complainant were significantly larger. Moreover, of the remaining six air carriers, we found no A+14 spikes, as illustrated by the following chart.



Because no comparable or benchmark data existed on which to verify the accuracy of the two air carriers' A+14 data,² we conducted unannounced observations of 372 arriving flights. These observations represented less than one percent of the two air carriers' total flights for January 1998. In analyzing the resulting data, we found no indication of the A+14 spikes--which had been evident in our frequency distribution analyses of BTS data. This point is demonstrated by the following two charts.



² Only the air carriers record gate arrival times. Whereas FAA records runway landing times, it does not record the aircraft's arrival at the gate or passenger loading area.



More importantly, in comparing our arrival data, based on our observations, with those reported by the two air carriers, we were in agreement in 367 of 372 (98 percent) of the flights (i.e., same flights were recorded as either on time or late). Of the five flights in question, three were reported by the two air carriers as on time, whereas we observed them as late. However, for the two remaining flights, the air carriers reported them as being late, even though we observed them as on time.

Although we could not substantiate the allegation due to the lack of comparable or benchmark data, based on our 372 observations, discussions with DOT and air carrier representatives, and review of relevant documents and reporting systems, we found no significant evidence that either air carrier was submitting falsified data to BTS.

Different Methods for Reporting Gate Arrival

According to Title 14, CFR, Chapter II, Part 234.4, “actual arrival time shall be measured by the time at which the aircraft arrives at the gate or passenger loading area.” No further guidance is provided by DOT on determining gate arrival times. The 10 air carriers have adopted the following methods for reporting gate arrival.

Airline	Gate Arrival Definition
American, Northwest, Trans World, and United	Setting Parking Brake
America West	Shutting Off Engines
Alaska and Southwest	Placing Blocks Behind Aircraft Wheels
Continental and US Airways	Opening Passenger or Cargo Door
Delta	Opening Passenger Door

Based on our analysis of the 372 flights, we found that these different methods can result in variations in reported arrival times. For instance, the cargo door was opened before the passenger door in 75 percent of the flights we observed.³ In over 17 percent of these cases, the air carrier's ground crew opened the cargo door 1 to 4 minutes before the passenger door. Although these variances had no effect on those flights we observed (i.e., the flight would have been recorded as on time or late no matter which door was opened first), they do indicate the potential advantages one methodology may have over another in reporting arrival times, especially when only 1 minute can make the difference of a flight being on time or late. To ensure consistency of arrival data, one method should be required for all air carriers, which from the passengers' perspective would be the opening of the passenger door.

Different Systems for Recording Flight Arrival Data

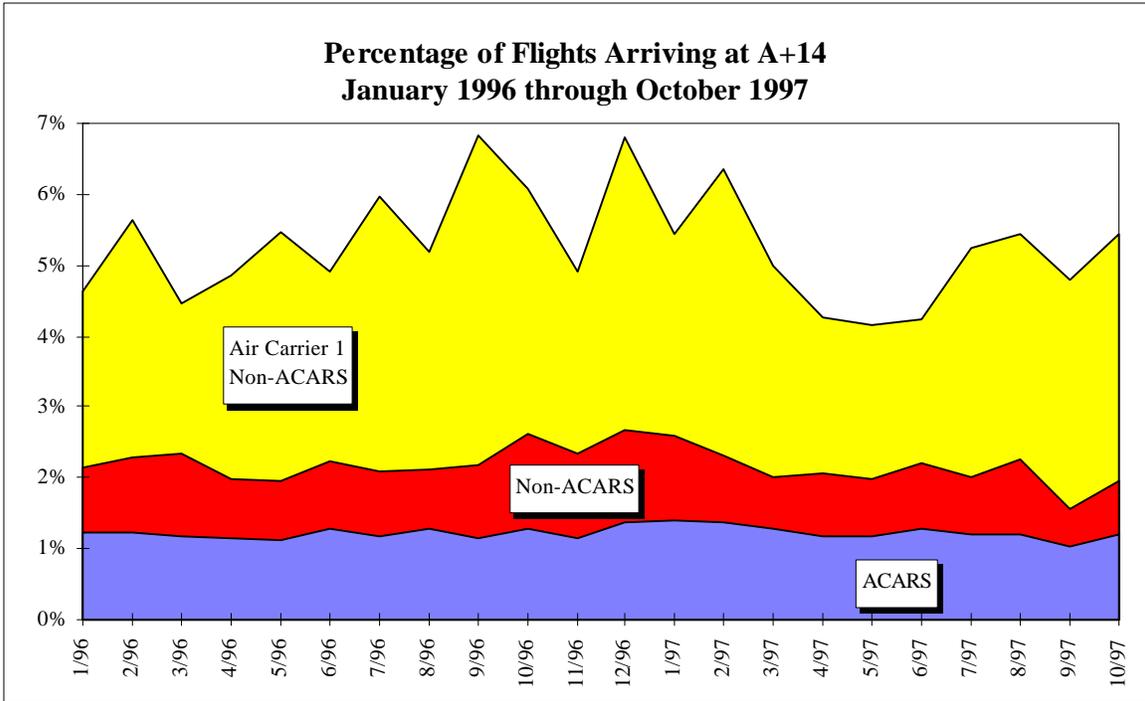
In fulfilling DOT's data reporting requirements, the air carriers use a combination of electronic and manual systems for collecting flight data. Those using an electronic system rely on the Aircraft Communication Addressing and Reporting System (ACARS).⁴ ACARS is an air/ground satellite communication network that receives transmissions from an aircraft's onboard computer system, which is then transmitted to the air carriers' host computer. The system, which is maintained by Aeronautical Radio Incorporated, costs about \$60,000 per aircraft to install. Beyond recording arrival times, ACARS supports a number of air traffic control and operational requirements of the participating air carriers.

Of the 10 reporting air carriers, 4 use ACARS exclusively; 3 rely solely on their pilots, gate agents, and/or ground crews to manually record arrival times; and 3 use a combination of ACARS and manual reporting systems. Overall, ACARS is installed in 82 percent (2,881 of 3,500) of the 10 reporting air carriers' aircraft. Regarding the two air carriers in question, Air Carrier 1 uses ACARS on 96 percent of its aircraft, with the remainder being manually reported. Air Carrier 2 relies on a manual, self-reporting system for its entire fleet. According to the complainant, those air carriers that did not use ACARS (i.e., manually record arrival times) were more likely to "manipulate" their arrival data.

³ We were able to observe the opening of the cargo doors in only 74 of the 372 flights due to visual limitations (e.g., location of the cargo door on the aircraft).

⁴ DOT does not require industry to use ACARS, or any other electronic or manual reporting system.

In our analysis of arrival data for 8 of the 10 reporting air carriers,⁵ we found a higher percentage of non-ACARS flights reported arriving at A+14 than ACARS flights. For instance, from January 1996 to October 1997, about 2.2 percent of manual reported flights arrived at A+14, as compared with 1.2 percent of ACARS flights. This variance was even greater for Air Carrier 1, with over 5.2 percent of its non-ACARS flights reporting A+14. The following chart illustrates these variances.



Whereas non-ACARS aircraft comprised about 4 percent of Air Carrier 1’s entire fleet during this time period, they represented nearly 15 percent of its total A+14 flights. When asked about the high rate of A+14 flight arrivals, officials of the air carrier were not able to provide any specific reasons. Nevertheless, they noted that the company is in the process of phasing out its remaining non-ACARS aircraft.

In analyzing the 372 flights, we found a higher correlation between our observed arrival times and those reported by ACARS, than the times reported by manual systems. For instance, as illustrated by the following table, about 60 percent of the ACARS reported arrival times equal those observed by our audit team. In comparison, only 41 percent of the manual reported times were the same.

⁵ Due to the time needed to separate ACARS and non-ACARS flight data, 2 of the 10 air carriers were excluded from this portion of our analysis.

	Equivalent to Observed Times	Not Equivalent to Observed Times**	Total
Manual	65 (41%)	95 (59%)	160
ACARS	113 (60%)	75 (40%)	188
Totals*	178 (51%)	170 (49%)	348

* Excludes 24 canceled flights.

** Average variance between our observed times and those reported by the air carriers was less than 2 minutes for these flights.

Although these variations had no effect on the two air carriers on-time statistics with respect to the 372 flights, they do illustrate the greater permissiveness of manual reporting as compared with an automated system such as ACARS.

In the Air Travel Consumer Report's monthly ranking of the 10 air carriers by on-time performance, no distinction is made between the two types of methods used by the air carriers for recording arrival times. Yet, given the greater reporting leeway afforded those using manual, self-reporting systems, a distinction should be made. Such a distinction could be achieved by noting in the Air Travel Consumer Report the type of system(s) used (i.e., ACARS, manual, or combination) by each air carrier in recording arrival times.

RECOMMENDATIONS

We recommend the Director, Bureau of Transportation Statistics, define arrival as the opening of the passenger door, and require all air carriers to report accordingly. We also recommend the Assistant General Counsel for Aviation Enforcement and Proceedings insert information in the Air Travel Consumer Report indicating the type of system(s) used by each air carrier to record its arrival times.

MANAGEMENT COMMENTS

Senior DOT officials agreed with our report findings and recommendations. The Director, Office of Airline Information, noted that BTS will work with the air carriers to achieve a uniform definition of arrival. The Assistant General Counsel for Aviation Enforcement and Proceedings stated that information will be included in the Air Travel Consumer Report describing the different types of systems used by the air carriers to record arrival times.

ACTION REQUIRED

Please provide written comments within 30 days on specific actions taken or planned. We appreciate the courtesies and assistance of DOT and air carrier representatives. If you have any questions, or require additional information, please contact me at (202) 366-1992, or John Meche at (202) 366-1496.

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