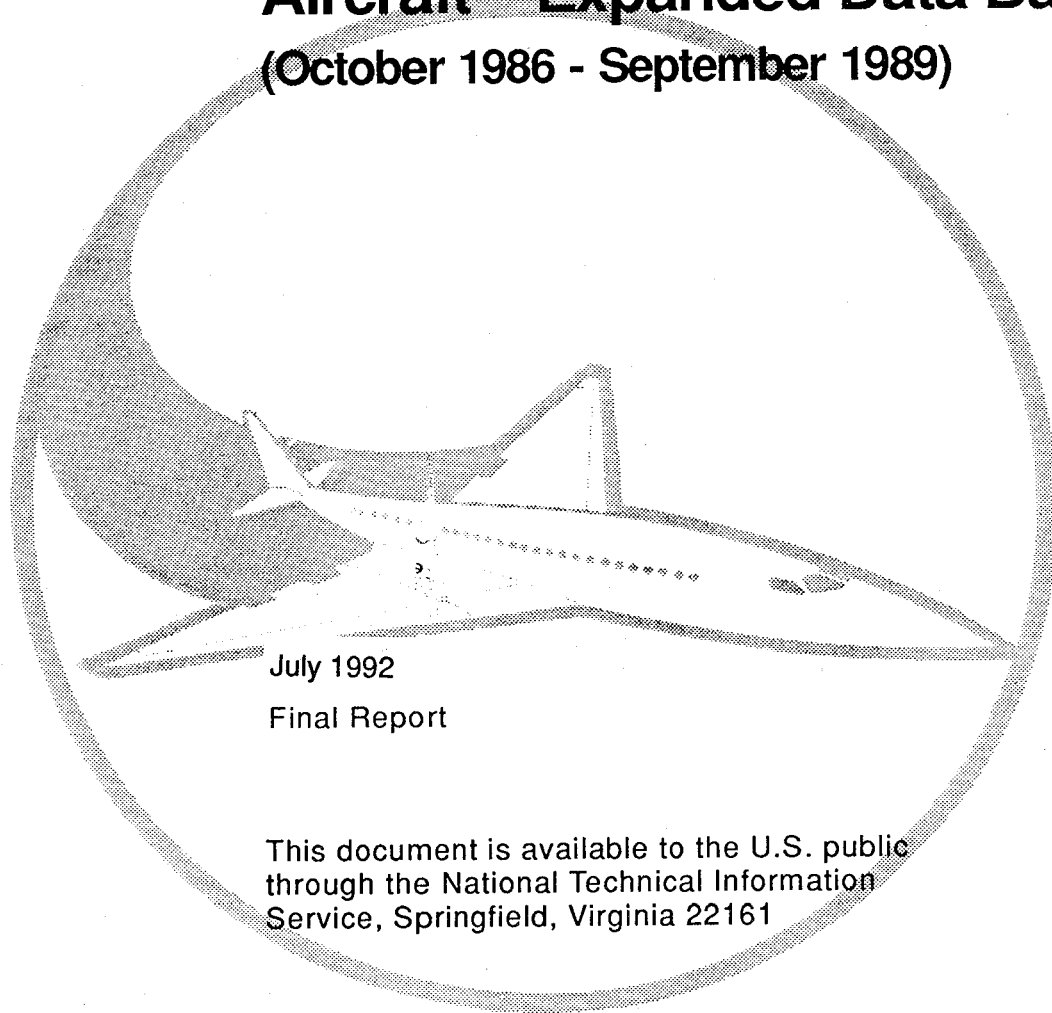


DOT/FAA/CT-91/32

FAA Technical Center
Atlantic City International Airport
N.J. 08405

Engine Bird Ingestion Experience of the Boeing 737 Aircraft - Expanded Data Base (October 1986 - September 1989)



July 1992

Final Report

This document is available to the U.S. public
through the National Technical Information
Service, Springfield, Virginia 22161



U.S. Department of Transportation
Federal Aviation Administration

NOTICE

This document is disseminated under the sponsorship of the U.S. Department of Transportation in the interest of information exchange. The United States Government assumes no liability for the contents or use thereof.

The United States Government does not endorse products or manufacturers. Trade or manufacturers' names appear herein solely because they are considered essential to the objective of this report.

Technical Report Documentation Page

1. Report No. DOT/FAA/CT-91/32		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle THE ENGINE BIRD INGESTION EXPERIENCE OF THE BOEING-737 AIRCRAFT - EXPANDED DATA BASE (October 1986 - September 1989)				5. Report Date July 1992	
				6. Performing Organization Code	
7. Author(s) Peter W. Hovey, Donald A. Skinn, and Joseph J. Wilson*				8. Performing Organization Report No. UDR-TR-91-125	
9. Performing Organization Name and Address University of Dayton Research Institute Structural Integrity Division 300 College Park (JPC 201) Dayton, OH 45469-0120				10. Work Unit No. (TRAIS)	
				11. Contract or Grant No. DTFA03-88-C-00024	
12. Sponsoring Agency Name and Address U.S. Department of Transportation Federal Aviation Administration Technical Center Atlantic City International Airport, NJ 08405				13. Type of Report and Period Covered Final Report: Medium/Large Inlet Area Engines Oct. 1986 - Sept. 1989	
				14. Sponsoring Agency Code ACD-210	
15. Supplementary Notes *COTR: Joseph J. Wilson; Project Manager: Bruce C. Fenton, Tech. Center					
16. Abstract DOT/FAA/CT-89/16 covers the period from October 1986 to September 1987 DOT/FAA/CT-89/29 covers the period from October 1986 to September 1988 DOT/FAA/CT-90/28 covers the period from October 1986 to September 1989 The Federal Aviation Administration (FAA) Technical Center initiated a study in October 1986 to determine the numbers, weights, and species of birds which are being ingested into medium and large inlet area turbofan engines and to determine what damage, if any, results. Bird ingestion data were collected for the Boeing-737 model aircraft which uses either the Pratt and Whitney JT8D medium inlet area turbofan engine or the CFM International CFM56 large inlet area turbofan engine. This report analyzes the entire 3 years of data collected by the engine manufacturers, the FAA, and the International Civil Aviation Organization (ICAO) during the period from October 1986 through September 1989.					
17. Key Words Probability of Ingestion Statistical Analysis Bird Ingestion JT8D Turbine Engine CFM56 Turbofan Engine Aircraft				18. Distribution Statement Document is available to the public through the National Technical Information Service, Springfield, VA 22161	
19. Security Classif. (of this report) Unclassified		20. Security Classif. (of this page) Unclassified		21. No. of Pages 196	
22. Price					

FOREWORD

This final report provides descriptive and statistical analyses of the data collected over a 3-year period on bird ingestion experiences for the B737 aircraft. The data described in this report were collected under separate Federal Aviation Administration (FAA) contracts with the engine manufacturers, by the FAA, and by the International Civil Aviation Organization (ICAO). This is the second report on the 3-year data collection period. At the time when the first report (number DOT/FAA/CT-90/28) was prepared, the ICAO bird ingestion data were not available for the full 3-year period. This report represents an update of the first report with the ICAO data included in the descriptive and statistical analyses.

The report was prepared by the University of Dayton under Department of Transportation, Federal Aviation Administration Contract DTFA03-88-C-00024. The principal investigator at the University of Dayton was Dr. Peter W. Hovey, and computer support was provided by Mr. Donald A. Skinn. Mr Joseph Wilson was co-author and the technical project monitor for the FAA during the preparation of the report.

TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
EXECUTIVE SUMMARY	xi
1 INTRODUCTION	1
1.1 Background	1
1.2 Objectives	1
1.3 Organization of Report	2
2 AIRCRAFT OPERATIONS AND AIRPORT OPERATIONS	3
3 CHARACTERISTICS OF INGESTED BIRDS	10
4 INGESTION RATES	23
4.1 Ingestion Rate Estimates	23
4.2 The Poisson Process	27
4.3 Validity of the Poisson Process Model for Bird Ingestions	30
4.4 Inlet Area Effect on Ingestion Rates	37
5 AIRPORT BIRD INGESTION EXPERIENCE	40
6 ENGINE DAMAGE DESCRIPTION	62
6.1 Engine Damage and Crew Action Descriptions	62
6.2 Probability of Damage	71
6.3 Crew Action and Engine Shutdown Probabilities	75
6.4 Engine Failures	75
7 PROBABILITY ESTIMATES	80
8 DATA QUALITY	87
8.1 Data Sources	87
8.2 Internal Consistency	87
9 CONCLUSIONS	94
10 REFERENCES	96
11 GLOSSARY	98
APPENDICES	
A - Airports with Scheduled Boeing-737 Flights and/or Reported Bird Ingestion Events	
B - Contents of FAA Bird Ingestion Data Base Boeing-737 Airplane	
C - Statistical Hypothesis Testing	

LIST OF ILLUSTRATIONS

<u>Figure</u>	<u>Page</u>
E-1 737 Aircraft Engine Bird Ingestion Study Data Summary	xiii
2.1 Histogram of Monthly Aircraft Operations by Engine Type	9
3.1 Contour Map of Domestic Aircraft Ingestion Events	11
3.2 Histogram of Bird Ingestion Events by State	12
3.3 Histogram of Number of Birds Ingested by Weight Class	18
3.4 Histogram of Monthly Worldwide Aircraft Ingestion Events	20
3.5 Histogram of Seasonal Aircraft Ingestion Rates	21
3.6 Histogram of Aircraft Ingestion Events by Time of Day	22
4.1 Histogram of Monthly Aircraft Ingestion Rates by Engine Type (Normalized for Inlet Area)	26
4.2 Comparison of Observed and Predicted CDFs for United States JT8D Aircraft Ingestion Events	31
4.3 Comparison of Observed and Predicted CDFs for Contiguous United States JT8D Aircraft Ingestion Events	32
4.4 Comparison of Observed and Predicted CDFs for Foreign JT8D Aircraft Ingestion Events	33
4.5 Comparison of Observed and Predicted CDFs for United States CFM56 Aircraft Ingestion Events	34
4.6 Comparison of Observed and Predicted CDFs for Contiguous United States CFM56 Aircraft Ingestion Events	35
4.7 Comparison of Observed and Predicted CDFs for Foreign CFM56 Aircraft Ingestion Events	36
5.1 Histogram of Aircraft Ingestion Events at Domestic Airports	50
5.2 Histogram of Aircraft Ingestion Events at Foreign Airports	52
6.1 Estimated POD Function for Any Damage with the 95 Percent Confidence Bound	74
6.2 Estimated POD Function for Moderate or Worse Damage with the 95 Percent Confidence Bound	74
6.3 Estimated POD Function for Severe Damage with the 95 Percent Confidence Bound	74

LIST OF ILLUSTRATIONS (Continued)

<u>Figure</u>	<u>Page</u>
8.1 Comparison of the United States Bird Weight Distributions for the First, Second, and Third Years	91
8.2 Comparison of the Foreign Bird Weight Distributions for the First, Second, and Third Years	92

LIST OF TABLES

<u>Table</u>	<u>Page</u>
2.1 Scheduled OAG Airport Operations by Seasonal Month	5
2.2 Scheduled OAG Airport Operations by Season	6
2.3 OAG Airport Operations by Month	7
2.4 Scheduled Aircraft Operations by Engine Type	8
3.1 Tally of Positively Identified Bird Species Broken Down by US, Foreign, and Overall	13
3.2 Weight Distribution of Ingested Birds by Origin	15
3.3 Summary Statistics for Ingested Bird Weights	19
4.1A Breakdown of Bird Ingestion Rates by Engine and Location (Based on Aircraft Operations)	24
4.1B Breakdown of Bird Ingestion Rates by Engine and Location (Based on Engine Operations)	25
4.2A Ingestion Rates for Engine Type by Phase of Flight (Based on Aircraft Ingestion Events)	28
4.2B Ingestion Rates for Engine Type by Phase of Flight (Based on Engine Ingestion Events)	29
4.3 Results of the Exponential GOF Tests to Verify the Poisson Process	38
5.1 Frequency Count of Aircraft Ingestion Events by Airport and Phase of Flight	42
5.2 Airport Bird Ingestion Rates	59
6.1 Definition of Engine Damage Categories	63
6.2 Types of Damage Caused by Bird Ingestions	64
6.3 Tally of Positively Identified Bird Species by Weight Range and Event Type	66
6.4A 737 Aircraft Engine Bird Ingestion Damage Summary (Total Bird Events)	67
6.4B 737 Aircraft Engine Bird Ingestion Damage Summary (Single Bird Events)	68
6.4C 737 Aircraft Engine Bird Ingestion Damage Summary (Multiple Bird Events)	69

LIST OF TABLES (Continued)

<u>Table</u>	<u>Page</u>
6.5 Phase-of-Flight (POF) Analysis	70
6.6 Aircraft Airspeed Analysis	70
6.7 Multiple Engine and Multiple Bird Analysis	70
6.8 Damage Severity Definitions	73
6.9 Conditional Probability of Crew Action Given The Engine Damage Severity	76
6.10 Engine Failure Summary by Bird Weight	78
7.1 Aircraft Operation Ingestion Probabilities	81
7.2 Aircraft Operation Ingestion Probabilities by Location and Engine Type	82
7.3A Probability of Ingestion as a Function of Bird Weight by Location and Engine Type (Based on Aircraft Operations)	83
7.3B Probability of Ingestion as a Function of Bird Weight by Location and Engine Type (Based on Engine Operations)	84
7.4A Probability of Ingestion as a Function of Bird Weight by Location (Based on Aircraft Operations)	85
7.4B Probability of Ingestion as a Function of Bird Weight by Location (Based on Engine Operations)	86
8.1 Counts for United States and Foreign Aircraft Events and Aircraft Operations by Year and Engine	89
8.2 Chi-Squared Test Statistics for Comparing Annual Ingestion Rates	89
8.3 Comparison of Weight Distributions Between Birds Ingested in the First, Second, and Third Years	90

THEORY OF THE EARTH

The theory of the earth is a branch of geology which deals with the origin and development of the earth and its various parts.

The theory of the earth is a branch of geology which deals with the origin and development of the earth and its various parts.

The theory of the earth is a branch of geology which deals with the origin and development of the earth and its various parts.

The theory of the earth is a branch of geology which deals with the origin and development of the earth and its various parts.

The theory of the earth is a branch of geology which deals with the origin and development of the earth and its various parts.

The theory of the earth is a branch of geology which deals with the origin and development of the earth and its various parts.

The theory of the earth is a branch of geology which deals with the origin and development of the earth and its various parts.

The theory of the earth is a branch of geology which deals with the origin and development of the earth and its various parts.

The theory of the earth is a branch of geology which deals with the origin and development of the earth and its various parts.

The theory of the earth is a branch of geology which deals with the origin and development of the earth and its various parts.

The theory of the earth is a branch of geology which deals with the origin and development of the earth and its various parts.

The theory of the earth is a branch of geology which deals with the origin and development of the earth and its various parts.

The theory of the earth is a branch of geology which deals with the origin and development of the earth and its various parts.

The theory of the earth is a branch of geology which deals with the origin and development of the earth and its various parts.

EXECUTIVE SUMMARY

An investigation was initiated by the Federal Aviation Administration (FAA) Technical Center in September 1986 to determine the numbers, weights, and species of birds which are ingested into medium and large inlet area turbofan engines during worldwide service operation and to determine what damage, if any, results. This report summarizes the three years of Boeing-737 (B737) data that were collected by the engine manufacturers, the FAA, and the International Civil Aviation Organization (ICAO) as part of a separate data collection.

This report includes the ICAO data in the statistical analysis. The previous report (report number DOT/FAA/CT-90/28 [1]) was based only on the three years of data collected by the engine manufacturers and the FAA because only the first two years of ICAO data were available. Previous reports covered just the first year of data (report number DOT/FAA/CT-89/16 [2]) and the first two years of data (report number DOT/FAA/CT-89/29 [3]).

The main difference between this report and the previous report is that there is a substantial increase in the number of foreign bird ingestion events that were reported. There was no change in the total number of B737 operations so that an increase in reported ingestion events results in an increase in estimated ingestion rates and probabilities for foreign operations. The statistical tests that were performed throughout the report were not significantly affected by the increased data.

Figure E-1 is an overall summary of the data that were collected during the 3 years of this investigation which extended from October 1986 through September 1989. A total of 8.91 million aircraft operations were flown by B737 commercial aircraft during the 3-year period. B737 aircraft equipped with Pratt and Whitney JT8D medium inlet area turbofan engines accounted for 71.8 percent of these flights. The remaining 28.2 percent of the flights were made by B737 aircraft having CFM International CFM56 large inlet area turbofan engines.

During the three years of data collection, birds were ingested by one or both engines during 1,410 aircraft operations which yields a probability of aircraft ingestion of 1.58×10^{-4} . One or more birds were ingested into both engines of the aircraft during 58 of the 1,410 aircraft ingestion events. Thus, a total of 1,468 engine ingestion events were reported during the data collection period. There were 17.82 million engine operations during this period which yields a probability of engine ingestion of 8.24×10^{-5} . A conclusion of these data is that bird ingestion events are rare, but probable events.

The species of the ingested bird was reliably identified 253 times. The order charadriiformes (shorebirds) was most frequently represented with 99 ingested birds. The majority of ingested birds (238) weighed 40 ounces or less. The bird weight distribution of ingested birds in the United States was different from the distribution in foreign countries. The median bird weight in the United States was 4 ounces higher than abroad; however, the domestic mean bird weight was 1.9 ounces lower than abroad. The bird ingestion rate within the United States was significantly lower than the foreign bird ingestion rate.

The majority of engine ingestion events (1,208 of 1,468) involved a single bird and a single engine on the aircraft. The remaining 260 engine ingestion events involved 144 single engine, multiple bird events, 23 dual engine, single bird aircraft ingestion events (46 engine ingestion events), or 35 dual engine, multiple bird aircraft ingestion events (70 engine ingestion events). Multiple birds were ingested in both engines in 29 of the 35 dual engine, multiple bird aircraft ingestion events which resulted in 208 multiple bird engine ingestion events. There were a total of 58 dual engine aircraft ingestion events which when combined with the 144 single engine, multiple bird engine ingestion events totaled to 202 aircraft ingestion events involving multiple engines and/or multiple birds.

Engine damage occurred in 39 percent of all engine ingestion events, and there were 180 engine ingestions that resulted in engine damage classified as moderately severe or worse. The majority of bird ingestions resulted in little or no engine damage.

The majority (856 of 1054) of aircraft ingestion events, for which the phase of flight was known, occurred within the airport environment during takeoff and landing. The probability of engine damage is greater when the bird ingestion occurs during the takeoff and climb phases of flight than when it occurs during approach and landing. Aircraft airspeed at or above 140 knots also increases the probability of engine damage.

It was determined that 2.9 percent of all engine bird ingestion events resulted in an engine failure. Eight engine failures were caused by birds that weighed less than or equal to 1 pound. Engine failures are also more likely to occur when multiple birds are ingested into an engine.

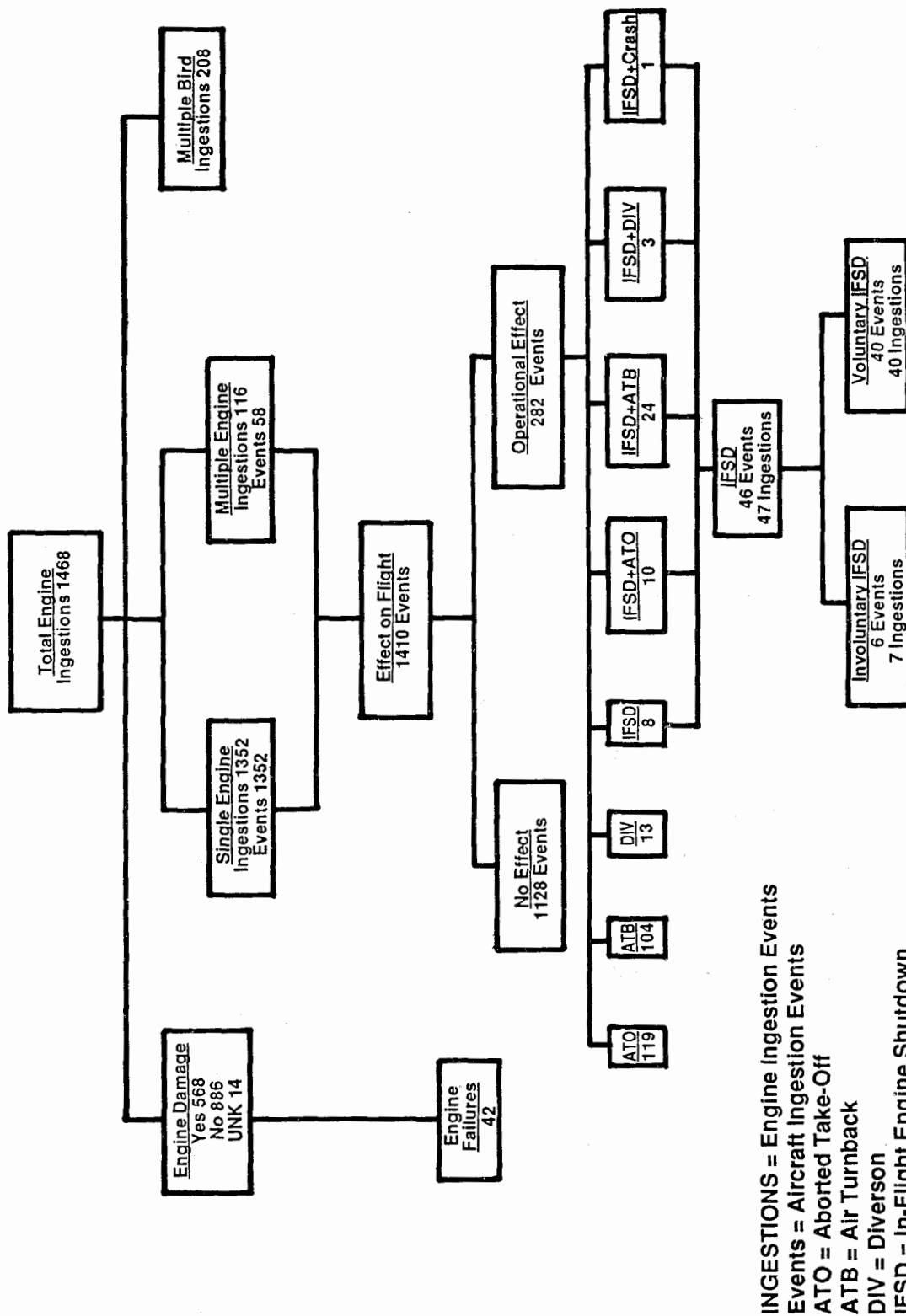


Figure E-1. 737 AIRCRAFT ENGINE BIRD INGESTION STUDY
DATA SUMMARY
(3 YEARS OF DATA, 10/86 TO 9/89)

The following summary shows the most pertinent statistics extracted from the three years of data for the B737 aircraft:

Median Bird Weight (oz)* Worldwide	10.0
Mode Bird Weight (oz)** Worldwide	40.0
Probability of Ingestion Per Aircraft Operation	
Worldwide	1.58×10^{-4}
United States	0.63×10^{-4}
Foreign	2.70×10^{-4}
Most Commonly Ingested Bird	
United States	Dove/Gull
Foreign	Gull/Lapwing
Engines Experiencing Moderate/Severe Damage	180
Multiple Bird, Engine Ingestion Events	208
Dual Engine Aircraft Ingestion Events	58
Dual Engine, Multiple Bird Aircraft Ingestion Events	35
Single Engine, Multiple Bird Aircraft Ingestion Events	144
Aircraft Ingestion Events By Phase-of-Flight	
Takeoff and Climb Phase-of-Flight	60.7%
Approach and Landing	36.7%
Airports Reporting Bird Ingestions	409
Ratio of Reported Events to Aircraft Operations	
United States	0.63×10^{-4}
Foreign	2.70×10^{-4}

* Divides the weights into two groups with half the weights below the median and half above.

** The weight that has the highest frequency.

SECTION 1 INTRODUCTION

1.1 BACKGROUND.

Contention for airspace between birds and airplanes has created a serious bird/aircraft strike hazard. Past studies [1,2,3,4] have indicated that birdstrikes to engines are statistically rare events. The probability of a birdstrike during any given flight is extremely low; however, when the number of flights is considered, the number of birdstrikes becomes significant.

The windshield and the engines are particularly vulnerable to the birdstrike threat. Although penetration of the windshield by a bird is primarily a concern for military airplanes operating at high speeds in a low-altitude environment, such a penetration has occurred on a civilian airplane resulting in the death of the co-pilot. Ingestion of birds into turbine engines is a safety problem for commercial as well as military airplanes for it can cause significant damage to the engine resulting in degraded engine performance and very possibly failure.

In their studies of bird ingestions on commercial flights, both Hovey [1,2,3] and Frings [4] indicated that nearly all bird ingestion events have occurred in the vicinity of airports during the non-cruise phases of flight. This is understandable because these phases of flight naturally occur closer to the ground where bird concentrations are higher, resulting in a higher probability of birdstrike.

The solutions to the problem of engine damage resulting from bird ingestion are similar to those for windshield birdstrike, e.g., structural design consideration to withstand impact or bird avoidance. Bird avoidance can be facilitated by either of two approaches: (1) keeping airplanes out of airspaces with large bird concentrations, and (2) removing birds from these regions of airspace. The bird avoidance approach can have various degrees of success or failure for commercial air fleets because flight schedules place airplanes in specific areas at specific times and the effectiveness of airport bird control programs (if any) varies from airport to airport and country to country.

Structural design of engines to withstand bird ingestions can be accomplished provided that requirements with respect to bird weights and numbers can be identified. Bird ingestion data for medium/large inlet area turbofan engines and small inlet area turbine engines [5,6] have been collected by several engine manufacturers. Statistical evaluation of bird ingestion data from these data collection efforts and previous bird ingestion studies will be useful in re-evaluating certification test criteria specified in Federal Aviation Administration (FAA) Regulation 14 CFR 33.77. As a result, future turbine engines can be designed to withstand more realistic bird threats.

1.2 OBJECTIVES.

The objective of this report is to determine the relationship of bird weight, number of birds ingested, geographic location, season, time of day,

phase of flight, and engine type to the frequency of bird ingestion events and the extent of engine damage, if any, resulting from the ingested birds. The statistical analysis of reported bird ingestions experienced by commercial B737 aircraft worldwide over a 3-year reporting period is used to summarize the service threat and level of engine damage experienced by these aircraft. The findings of the analysis will be helpful in defining minimum engine design requirements for resistance to damage as a result of bird ingestions. Moreover, this study will provide a comparison between the experiences of a contemporary high bypass ratio turbofan engine (CFM56) and an older low bypass ratio turbofan engine with a smaller inlet (JT8D) exposed to similar aircraft-bird ingestion environments.

This is the second report on the 3-year data collection period. There were three major sources of bird ingestion data for the 3-year period: the engine manufacturers, the FAA, and the ICAO. At the time the first report was prepared, the data from ICAO were not available for the full 3-year period. This report represents an update of the first report with the ICAO data included in the analyses.

1.3 ORGANIZATION OF REPORT.

Section 2 defines, discusses, and differentiates airport operations and aircraft operations. Section 3 identifies the characteristics of bird species that have been ingested and reliably identified. Section 4 describes bird ingestion rates by location, engine type, and phase of flight. Section 5 provides a geographic placement of bird ingestion events throughout the world. Section 6 summarizes engine damage resulting from bird ingestions. Section 7 examines the probabilities of various bird ingestion events. Section 8 summarizes the changes in the second edition and discusses the quality of the data collected in this study by examining the sources of the data and evaluating the consistency of the data from the first year to the third year. Section 9 provides a summary of the results obtained from this data analysis. Section 10 provides literature references. Section 11 is a glossary of terms.

SECTION 2

AIRCRAFT OPERATIONS AND AIRPORT OPERATIONS

Aircraft operations and airport operations data are used to determine bird ingestion rates. Operations data (and their sources) used to generate bird ingestion rates are discussed in this section. Definitions are provided to aid in understanding these data.

An aircraft operation as defined in the glossary is a nonstop flight from one airport (departure airport) to another airport (arrival airport) and consists of seven phases of flight which include: (1) taxi-out, (2) takeoff, (3) climb, (4) cruise, (5) approach, (6) landing, and (7) taxi-in. An airport operation is considered either a departure from or an arrival at an airport. When all scheduled flights are considered, the number of airport operations is twice the number of aircraft operations.

The Official Airline Guide (OAG) is the data source for scheduled airport operations. Counts of airport operations involving B737 airplanes were extracted from OAG magnetic tapes and maintained by airport code. The counts were further categorized by month of year and hour of day so that seasonal and time of day analyses could be performed.

Table 2.1 presents the OAG airport operations counts by seasonal months for the 3-year period. The counts are also broken down by several geographic regions. Table 2.2 presents the same airport operations counts as Table 2.1; however, an adjustment for hemisphere has been made. It should be noted that the number of aircraft operations for each of these categories is one-half the number of airport operations. Frings [4] defines autumn in the Northern Hemisphere and spring in the Southern Hemisphere as the months September, October, and November. The collection period for each year of B737 data was October through the following September. Consistency with Frings is maintained in Table 2.1 and Table 2.2 by grouping operations counts for October and November with the operations counts of the following September.

Table 2.3 presents two cross tabulations of airport operations by month and OAG destination-arrival code. The first tabulation includes all airports at which one or more B737 operations were scheduled during the reporting period. The second tabulation is a subset of the first and includes only those airports at which a bird ingestion event was reported during the 3-year period. The destination-arrival code is taken directly from the OAG tapes and its values are presented as a footnote in Table 2.3.

A tabulation of aircraft operations by engine type and geographic region is required to obtain bird ingestion rates for these parameters. Table 2.4 presents a tabulation of B737 aircraft operations by engine type and geographic region for the reporting period. The OAG operations data identify implicitly the geographic region through the airport code and also identify explicitly whether the airplane is a B737; however, the engine type of the airplane is not reliably identified in the OAG data. The aircraft operations presented in the ALL ENGINES column of Table 2.4 are derived by dividing the airport operations in the TOTAL column of Table 2.1 by 2. The aircraft operations for the CFM56 engine were provided by the engine manufacturer as actual flights flown during the reporting period and are considered reliable.

Similar data were not available for the JT8D engine. The JT8D aircraft operations were therefore derived by subtracting the CFM56 aircraft operations from the total aircraft operations for both engines.

The engine manufacturers provided the FAA with a listing of monthly operations counts for their respective engine types; however, the counts did not agree with the OAG counts. Monthly percentages for each engine type were calculated from the engine manufacturer's data and subsequently applied to the JT8D and CFM56 engine totals in Table 2.4 to estimate monthly aircraft operations for the reporting period. Figure 2.1 is a histogram showing the estimated aircraft operations for each engine type.

TABLE 2.1 SCHEDULED OAG AIRPORT OPERATIONS BY SEASONAL MONTH
(OCTOBER 1986 THROUGH SEPTEMBER 1989)

<u>Geographic Location</u>	<u>SEASONAL MONTHS</u>			
	<u>Mar-May</u>	<u>Jun-Aug</u>	<u>Sep-Nov</u>	<u>Total</u>
<u>Contiguous US</u>				
Oct'86-Sep'87	728,180	762,922	685,560	2,857,968
Oct'87-Sep'88	758,076	775,265	758,049	3,048,346
Oct'88-Sep'89	815,708	838,195	791,297	3,223,147
Three Year Total	2,301,964	2,376,382	2,234,906	9,129,461
<u>United States</u>				
Oct'86-Sep'87	771,231	807,492	726,309	3,027,493
Oct'87-Sep'88	801,058	819,890	800,388	3,219,949
Oct'88-Sep'89	862,495	889,311	836,328	3,410,902
Three Year Total	2,434,784	2,516,693	2,363,025	9,658,344
<u>Foreign</u>				
Oct'86-Sep'87	619,425	647,640	604,935	2,463,679
Oct'87-Sep'88	688,874	722,608	668,398	2,730,771
Oct'88-Sep'89	747,501	778,335	730,340	2,968,912
Three Year Total	2,055,800	2,148,583	2,003,673	8,163,362
<u>Northern Hemisphere</u>				
Oct'86-Sep'87	1,235,767	1,296,951	1,181,268	4,880,780
Oct'87-Sep'88	1,314,164	1,357,068	1,295,982	5,245,168
Oct'88-Sep'89	1,413,677	1,456,381	1,370,619	5,584,933
Three Year Total	3,963,608	4,110,400	3,847,869	15,710,881
<u>Southern Hemisphere</u>				
Oct'86-Sep'87	154,889	158,181	149,976	610,392
Oct'87-Sep'88	175,768	185,430	172,804	705,552
Oct'88-Sep'89	196,319	211,265	196,049	794,881
Three Year Total	526,976	554,876	518,829	2,110,825
<u>Worldwide</u>				
Oct'86-Sep'87	1,390,656	1,455,132	1,331,244	5,491,172
Oct'87-Sep'88	1,489,932	1,542,498	1,468,786	5,950,720
Oct'88-Sep'89	1,609,996	1,667,646	1,566,668	6,379,814
Three Year Total	4,490,584	4,665,276	4,366,698	17,821,706

TABLE 2.2 SCHEDULED OAG AIRPORT OPERATIONS BY SEASON
(OCTOBER 1986 THROUGH SEPTEMBER 1989)

Geographic Location	SEASONS OF THE YEAR			Total
	Spring	Summer	Autumn	
Contiguous US				
Oct '86-Sep '87	728,180	762,922	685,560	2,857,968
Oct '87-Sep '88	758,076	775,265	758,049	3,048,346
Oct '88-Sep '89	815,708	838,195	791,297	3,223,147
Three Year Total	2,301,964	2,376,382	2,234,906	9,129,461
United States				
Oct '86-Sep '87	771,231	807,492	726,309	3,027,493
Oct '87-Sep '88	801,058	819,890	800,388	3,219,949
Oct '88-Sep '89	862,495	889,311	836,328	3,410,902
Three Year Total	2,434,784	2,516,693	2,363,025	9,658,344
Foreign				
Oct '86-Sep '87	614,512	636,805	609,848	2,463,679
Oct '87-Sep '88	685,910	708,728	671,362	2,730,771
Oct '88-Sep '89	747,231	758,318	730,610	2,968,912
Three Year Total	2,047,653	2,103,851	2,011,820	8,163,362
Northern Hemisphere				
Oct '86-Sep '87	1,235,767	1,296,951	1,181,268	4,880,780
Oct '87-Sep '88	1,314,164	1,357,068	1,295,982	5,245,168
Oct '88-Sep '89	1,413,677	1,456,381	1,370,619	5,584,933
Three Year Total	3,963,608	4,110,400	3,847,869	15,710,881
Southern Hemisphere				
Oct '86-Sep '87	149,976	147,346	154,889	610,392
Oct '87-Sep '88	172,804	171,550	175,768	705,552
Oct '88-Sep '89	196,049	191,248	196,319	794,881
Three Year Total	518,829	510,144	526,976	2,110,825
Worldwide				
Oct '86-Sep '87	1,385,743	1,444,297	1,336,157	5,491,172
Oct '87-Sep '88	1,486,968	1,528,618	1,471,750	5,950,720
Oct '88-Sep '89	1,609,726	1,647,629	1,566,938	6,379,814
Three Year Total	4,482,437	4,620,544	4,374,845	17,821,706

TABLE 2.3 OAG AIRPORT OPERATIONS BY MONTH
(OCTOBER 1986 THROUGH SEPTEMBER 1989)

ALL AIRPORTS WITH SCHEDULED B737 OPERATIONS

MONTH	OAG DESTINATION-ARRIVAL CODES**					(Total)
	(0)	(1)	(2)	(3)	(4)	
OCT	641,872	776,446	11,516	212	8,986	1,439,032
NOV	630,484	750,104	11,174	146	9,064	1,400,972
DEC	653,862	786,540	12,090	108	10,228	1,462,828
JAN	661,904	791,504	12,556	174	9,682	1,475,820
FEB	607,282	733,084	11,566	174	8,394	1,360,500
MAR	669,266	805,420	12,456	180	8,934	1,496,256
APR	661,436	783,124	11,738	212	8,130	1,464,640
MAY	693,966	814,452	12,124	264	8,882	1,529,688
JUN	685,538	803,792	13,042	182	9,100	1,511,654
JUL	708,036	831,962	13,700	290	10,008	1,563,996
AUG	720,400	845,508	13,336	350	10,032	1,589,626
SEP	700,354	804,790	12,440	364	8,746	1,483,634
TOTAL	8,034,400	9,526,726	147,738	2,656	110,186	17,821,706

AIRPORTS EXPERIENCING BIRD INGESTIONS DURING REPORTING PERIOD

MONTH	OAG DESTINATION-ARRIVAL CODES**					(Total)
	(0)	(1)	(2)	(3)	(4)	
OCT	409,604	602,384	8,376	212	5,729	1,026,305
NOV	406,442	583,757	7,811	146	5,691	1,003,847
DEC	421,210	611,970	8,349	108	6,348	1,047,985
JAN	426,326	616,496	8,668	174	6,079	1,057,743
FEB	392,519	572,802	7,958	174	5,315	978,768
MAR	432,869	629,646	8,483	180	5,790	1,076,968
APR	427,835	611,822	8,084	212	5,359	1,053,312
MAY	450,877	638,458	8,484	264	5,860	1,103,943
JUN	447,965	629,500	9,118	182	5,997	1,092,762
JUL	459,566	649,333	9,370	290	6,550	1,125,109
AUG	466,043	660,417	9,063	350	6,528	1,142,401
SEP	453,994	627,456	8,646	364	5,842	1,096,302
TOTAL	5,195,250	7,434,041	102,410	2,656	71,088	12,805,445

- ** =0 Any Carrier. Operation begins and ends out of the US.
 =1 Domestic Carrier. Operation begins and ends in the US.
 =2 Domestic Carrier. Departure or arrival, but not both, in the US.
 =3 Foreign Carrier. Operation begins and ends in the US.
 =4 Foreign Carrier. Departure or arrival, but not both, in the US.

TABLE 2.4 SCHEDULED AIRCRAFT OPERATIONS BY ENGINE TYPE

<u>GEOGRAPHIC LOCATION</u>	<u>JT8D</u>	<u>CFM56</u>	<u>ALL ENGINES</u>
United States			
Oct'86 - Sep'87	1,160,091	353,656	1,513,747
Oct'87 - Sep'88	1,082,543	527,431	1,609,974
Oct'88 - Sep'89	1,007,797	697,654	1,705,451
	-----	-----	-----
Three Year Total	3,250,431	1,578,741	4,829,172
Foreign			
Oct'86 - Sep'87	1,057,633	174,206	1,231,839
Oct'87 - Sep'88	1,062,971	302,415	1,365,386
Oct'88 - Sep'89	1,025,228	459,228	1,484,456
	-----	-----	-----
Three Year Total	3,145,832	935,849	4,081,681
Worldwide			
Oct'86 - Sep'87	2,217,724	527,862	2,745,586
Oct'87 - Sep'88	2,145,514	829,846	2,975,360
Oct'88 - Sep'89	2,033,025	1,156,882	3,189,907
	-----	-----	-----
Three Year Total	6,396,263	2,514,590	8,910,853

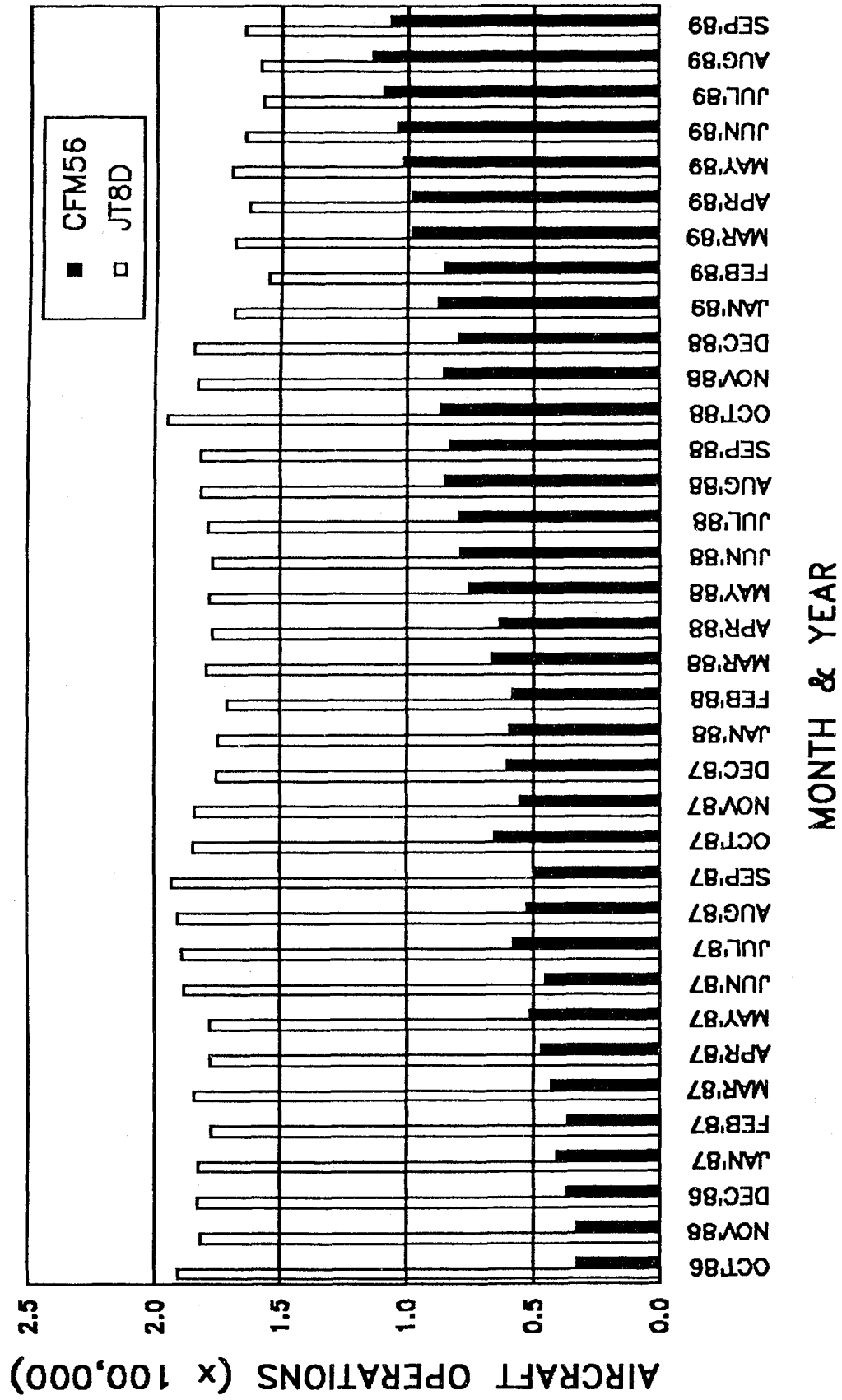


Figure 2.1. Histogram of Monthly Aircraft Operations by Engine Type.

SECTION 3 CHARACTERISTICS OF INGESTED BIRDS

This section provides a description of the birds that were ingested during the data collection period and an analysis of the extent of the bird ingestion threat. The bird related features that are described in this section include species, weight, seasonal trends, time of day trends, and geographic location.

A detailed breakdown of aircraft ingestion events in the United States is presented in Figures 3.1 and 3.2. Figure 3.1 is a contour map of the contiguous United States with the height of the contours being proportional to the number of aircraft ingestion events in each state while Figure 3.2 is a bar chart with the same information plus Alaska and Hawaii. Texas and California have the greatest number of ingestions followed by Hawaii, Florida, Illinois, and New York.

Table 3.1 provides a tally of all the species that were positively identified by an ornithologist during the collection period. The counts in the US, Foreign, and Overall columns of Table 3.1 indicate the number of aircraft ingestion events in which each bird species was ingested. The species are listed by order and family and it is apparent that the gulls, doves and lapwing/plover families of the order charadriiformes (shorebirds) are the most commonly ingested birds worldwide. The order columbiformes (doves/pigeons) appear to be a bird ingestion problem for the United States while the order falconiformes (hawks/vultures) poses a significant threat abroad.

One of the disappointing features of the B737 bird ingestion data base is the low bird identification rate. The bird species was positively identified in only 237 out of 1,410 aircraft ingestion events that were recorded giving a 16.8 percent identification rate. The identification rate for engine ingestion events in which an engine sustained damage (23.4 percent) was almost 74 percent greater than the identification rate for events which caused no engine damage (13.3 percent); which could indicate that the group of identified birds is biased to include more birds in the size and weight ranges that tend to damage engines when ingested. Any conclusions about the population of ingested birds should be viewed with the caution that the sample might be more representative of the population of birds that damage engines than of all birds that are ingested.

The species-related descriptions of ingested birds in this report probably provide a conservative view in that the birds that caused damage are better represented in the sample than birds that did not cause damage. The bird features that influence damage cannot be discerned, however, because of the possible bias in the identifications. That is, the differences between the birds that cause damage and the birds that don't cause damage cannot be readily identified since there is less information about the birds that didn't cause damage.

Table 3.2 is a frequency table of weights for the positively identified birds. The bird weights are derived from the species identification and when possible are adjusted for the age and sex of the ingested bird. The modes in

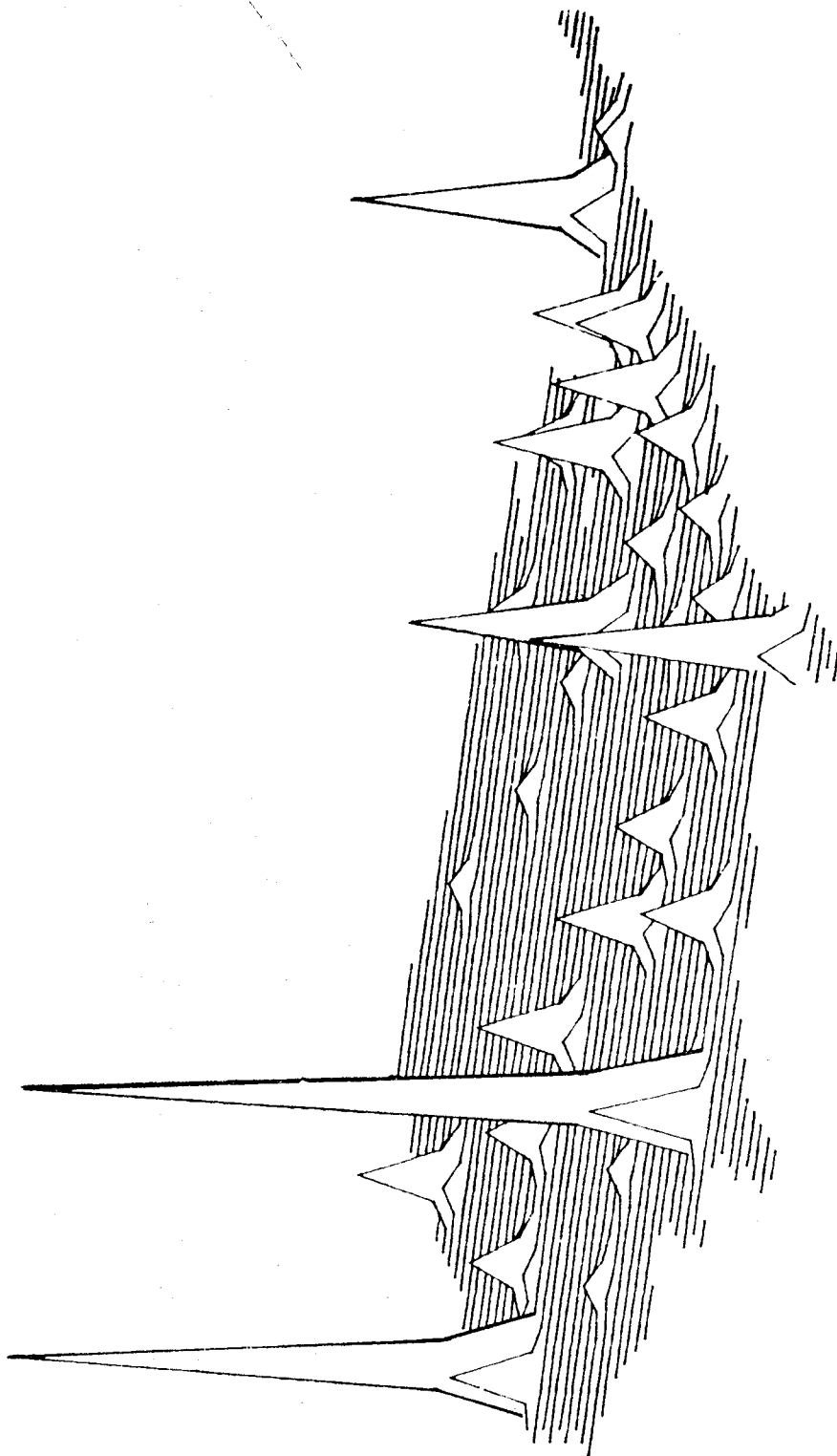


Figure 3.1 Contour Map of Domestic Aircraft Ingestion Events

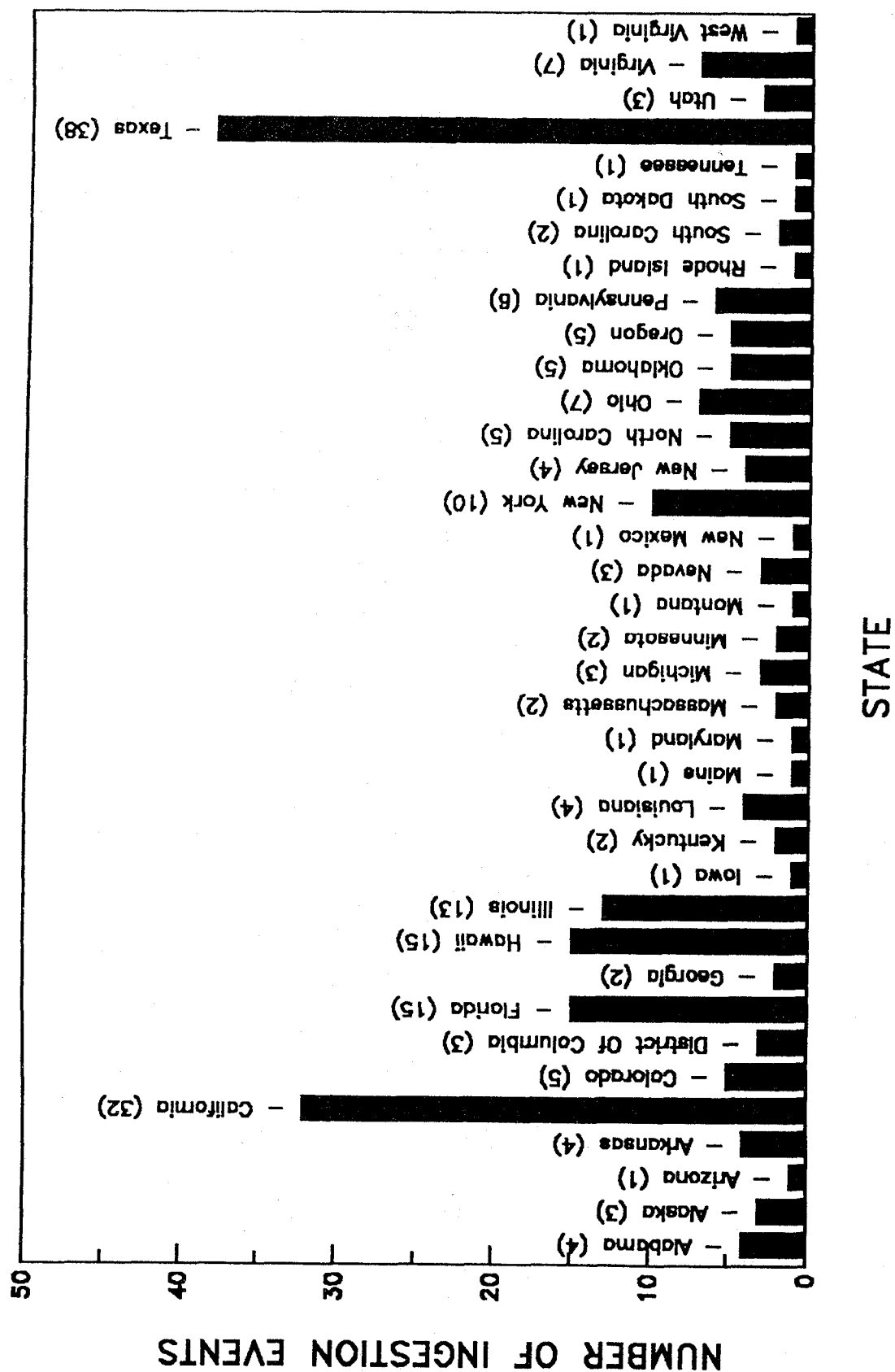


Figure 3.2. Histogram of Bird Ingestion Events by State.

TABLE 3.1 TALLY OF POSITIVELY IDENTIFIED BIRD SPECIES
BROKEN DOWN BY US, FOREIGN, AND OVERALL
(AIRCRAFT INGESTION EVENTS)

Latin Name	Common Name	Species Code	US	Foreign	Overall
Nycticorax nycticorax	Black-crowned night heron	1I24	1	0	1
Bubulcus ibis	Cattle egret	1I35	1	0	1
Egretta alba	Great egret	1I52	2	0	2
Hagedashia hagedash	Hadada ibis	6I12	0	3	3
Chen caerulescens	Snow goose	2J26	0	2	2
Branta canadensis	Canada goose	2J30	0	0	0
Anas americana	American wigeon	2J71	1	0	1
Anas platyrhynchos	Mallard	2J84	1	0	1
Coragyps atratus	Black vulture	1K4	2	0	2
Pandion haliaetus	Osprey	2K1	0	8	8
Milvus migrans	Black kite	3K28	1	2	3
Gyps bengalensis	Indian white-backed vulture	3K46	0	1	1
Aegypius monachus	Eurasian black vulture	3K55	0	0	0
Circus cyaneus	Northern marsh harrier	3K78	0	2	2
Accipiter nisus	European sparrowhawk	3K103	1	0	1
Accipiter striatus	Sharp-shinned hawk	3K105	1	0	1
Geraonaeetus melanoleucus	Gray eagle-buzzard	3K161	0	2	2
Buteo swainsonii	Swainson's hawk	3K171	1	1	2
Buteo buteo	Common buzzard	3K180	0	2	2
Falco sparverius	American kestrel	5K26	2	0	2
Falco tinnunculus	Eurasian kestrel	5K27	0	1	1
Falco berigora	Brown falcon	5K39	0	1	1
Alectoris barbara	Red-legged partridge	4L41	0	1	1
Francolinus francolinus	Barbary partridge	4L42	0	1	1
Perdix perdix	Black francolin	4L44	0	1	1
Phasianus colchicus	Hungarian partridge	4L85	0	3	3
Porsana carolina	Ring-necked pheasant	4L161	1	0	1
Haematopus ostralegus	Sora	7M84	1	0	1
Vanellus vanellus	Common oystercatcher	4N1	0	1	1
Vanellus spinosus	Common lapwing	5N1	0	1	1
Vanellus melanopterus	Spur-winged plover	5N4	0	2	2
Vanellus coronatus	Black-winged plover	5N10	0	1	1
Vanellus vanellus	Crowned lapwing	5N11	0	2	2
Vanellus miles	Gray-headed lapwing	5N20	0	2	2
Pluvialis apricaria	Masked plover	5N24	0	1	1
Charadrius dubius	Eurasian golden plover	5N25	2	0	2
Charadrius vociferus	Little ringed plover	5N31	2	1	3
Numenius americanus	Killdeer	5N33	1	2	3
Bartramia longicauda	Long-billed curlew	6N12	1	0	1
Gallinago gallinago	Upland sandpiper	6N13	0	2	2
Burhinus oedipnemus	Common snipe	6N47	0	1	1
Burhinus capensis	Eurasian stone-curlew	9N1	0	2	2
Stiltia isabellia	Cape dikkop	9N4	0	1	1
Stercorarius pomarinus	Australian courser	10N9	0	0	0
Larus canus	Pomarine jaeger	13N4	0	1	1
Larus argentatus	Ring-billed gull	14N12	1	0	1
	Common gull	14N13	3	0	3
	Herring gull	14N14	7	1	8

TABLE 3.1 (CONCLUDED) TALLY OF POSITIVELY IDENTIFIED BIRD SPECIES
BROKEN DOWN BY US, FOREIGN, AND OVERALL
(AIRCRAFT INGESTION EVENTS)

Latin Name	Common Name	Species Code	US	Foreign	Overall
Larus fuscus	Lesser black-backed gull	14N17	0	1	1
Larus marinus	Great black-backed gull	14N21	0	1	1
Larus glaucescens	Glaucous-winged gull	14N22	1	2	3
Larus cirrocephalus	Gray-headed gull	14N29	0	1	1
Larus novaehollandiae	Silver gull	14N32	0	3	3
Larus maculipennis	Brown-hooded gull	14N35	0	1	1
Larus ridibundus	Common black-headed gull	14N36	1	16	17
Larus philadelphia	Bonaparte's gull	14N38	0	1	1
Columba livia	Common rock dove	2P1	8	3	11
Columba guinea	African speckled pigeon	2P4	0	1	1
Pterocles gutturalis	Common wood-pigeon	2P9	0	4	4
Streptopelia turtur	Common turtle dove	2P50	0	1	1
Streptopelia chinensis	Spotted dove	2P65	1	1	2
Geopelia striata	Zebra dove	2P102	1	1	2
Geopelia humeralis	Bar-shouldered dove	2P103	1	1	2
Zenaidura macroura	American mourning dove	2P105	6	0	6
Zenaidura auriculata	Eared Dove	2P106	0	1	1
Cacatua roseicapilla	Galah	1Q15	0	2	2
Cuculus canorus	Common cuckoo	2R15	0	3	3
Coccyzus americanus	Yellow-billed cuckoo	2R51	1	0	1
Tyto alba	Common barn owl	1S2	0	3	3
Athene noctua	Common little owl	2S100	0	1	1
Speotyto cunicularia	Burrowing owl	2S102	1	0	1
Asio flammeus	Short-eared owl	2S124	0	1	1
Chordeiles minor	Nighthawk	5T5	1	0	1
Chaetura pelagica	Chimney swift	1U33	1	0	1
Apus apus	Common swift	1U55	1	0	1
Aeronautes saxatalis	White-throated swift	1U71	1	0	1
Alauda arvensis	Common skylark	17Z72	1	0	1
Eremophila alpestris	Horned lark	17Z74	4	0	4
Progne subis	Purple martin	18Z12	1	0	1
Delichon urbica	Common house martin	18Z69	4	1	5
Sturnus vulgaris	Common starling	21Z75	4	1	5
Corvus brachyrhynchos	Common crow	22Z85	1	1	2
Corvus corone	Carriion crow	22Z94	0	1	1
Gymnorhina tibicen	Australian bell magpie	23Z7	0	1	1
Catharus ustulatus	Swainson's thrush	41Z2246	1	0	1
Turdus merula	Common blackbird	41Z2269	0	1	1
Turdus iliacus	Red-winged thrush	41Z2281	0	1	1
Turdus philomelos	Common song thrush	41Z2282	0	1	1
Turdus migratorius	American robin	41Z314	1	0	1
Icteria virens	Yellow-breasted chat	63Z69	1	0	1
Sturnella neglecta	Western meadowlark	64Z68	2	0	2
Zonotrichia albicollis	White-throated sparrow	68Z218	1	0	1
Passer domesticus	House sparrow	70Z12	0	1	1
			83	154	237

TABLE 3.2 WEIGHT DISTRIBUTION OF INGESTED BIRDS* BY ORIGIN

Weight Range (Oz)	United States			Foreign			Worldwide		
	Multiple Bird Events	Single Bird Events	Total Bird Events	Multiple Bird Events	Single Bird Events	Total Bird Events	Multiple Bird Events	Single Bird Events	Total Bird Events
(0 < x <= 4)	3	30	33	8	17	25	11	47	58
(4 < x <= 8)	0	7	7	13	29	42	13	36	49
(8 < x <= 12)	0	1	1	8	29	37	8	30	38
(12 < x <= 16)	6	19	25	4	13	17	10	32	42
(16 < x <= 20)	1	1	2	2	5	7	3	6	9
(20 < x <= 24)	0	2	2	1	1	2	1	3	4
(24 < x <= 28)	0	2	2	0	5	5	0	7	7
(28 < x <= 32)	0	0	0	0	6	6	0	6	6
(32 < x <= 36)	0	2	2	1	1	2	1	3	4
(36 < x <= 40)	2	8	10	5	6	11	7	14	21
(40 < x <= 44)	0	1	1	0	0	0	0	1	1
(44 < x <= 48)	0	0	0	0	4	4	0	4	4
(52 < x <= 56)	0	2	2	1	0	1	1	2	3
(56 < x <= 60)	0	0	0	0	1	1	0	1	1
(76 < x <= 80)	0	0	0	0	1	1	0	1	1
(84 < x <= 88)	0	0	0	0	2	2	0	2	2
(124 < x <= 128)	1	0	1	0	0	0	1	0	1
(188 < x <= 192)	0	0	0	0	2	2	0	2	2
TOTAL	13	75	88	43	122	165	56	197	253

* Counted by Engine Ingestion Events

Table 3.2 therefore represent the weights of the more commonly identified bird species that were ingested. Figure 3.3 provides the same information in the form of a histogram. Most of the ingested birds (77.5 percent) that were identified in this study weighed less than or equal to 20 ounces; however, 6.7 percent weighed more than 20 ounces and less than or equal to 32 ounces and 15.8 percent of the identified birds weighed more than 2 pounds.

Summary statistics calculated from the raw data for the United States, foreign and worldwide bird weight distributions are presented in Table 3.3. Note that the weight of one ingested bird per event is included in the bird weight distribution for multiple bird engine ingestion events. The mean, median and mode are three different concepts for the typical or average value which measures the central tendency of the distribution. The mean bird weight is the sum of the bird weights for all ingestion events divided by the number of events included in the sum. The median weight divides the weights into two groups with half the weights below the median and half above. The mode of the bird weights is the weight that has the highest frequency in the data set. The median and mode are more relevant measures of the average for the bird ingestion problem. The mean weight would be important if damage were related to the cumulative weight of all birds ingested by a single engine since the mean is based on the total weight of the ingested birds.

A pattern suggestive of a sine function is seen in Figure 3.4 which is a bar chart of monthly bird ingestions for the data collection period. The cyclic pattern in aircraft ingestion events reflects seasonal bird activity. The start of a cyclic pattern is also seen in the ingestion rate data which indicates that the trends are due to the changing bird population and not changes in air traffic activity. Time trends in bird ingestions are further investigated on a seasonal basis in the following paragraphs.

The seasonal bird ingestion rates for the Northern and Southern Hemispheres, the United States and foreign countries and the whole world are presented in the bar chart of Figure 3.5. Here the ingestion rates are not being compared by engine type so the ingestion rate R is simply calculated as:

$$R = \text{Ing} \cdot \frac{10000}{\text{Ops}} \quad (3.1)$$

where Ing is the number of ingestions and Ops is the number of aircraft operations in the time period being considered. The rate is expressed as ingestions per 10,000 aircraft operations.

Seasonal trends were investigated using a Chi-squared goodness-of-fit (GOF) analysis. The Chi-squared value for testing the hypothesis that the number of aircraft ingestion events does not vary with the seasons is 170.3. The critical value for testing at the five percent level of significance is 7.81 while the 0.5 percent level is 12.8; therefore, the high value of the test statistic is a very strong indication that ingestions do vary with the seasons.

The winter data were eliminated in an effort to better identify the nature of the differences between the seasons. Testing for the equality of the ingestions for spring, summer and autumn also yields a significant difference with a test statistic of 82.19 and a five percent critical value of

5.99 which is also a very strong indication that ingestions vary between spring, summer, and autumn. Further testing between summer and autumn produces a test statistic of 23.9 which is also much larger than the five percent critical value of 3.84 for comparing two groups. Seasonal ingestion rates rank highest to lowest with summer, autumn, spring, and winter.

The time of day distribution of bird ingestion events is illustrated in Figure 3.6 with time of day reduced to the four basic segments of morning, mid-day, evening and night. There is a noticeable drop in the number of ingestions at night and the Chi-squared test for equality of the four time periods indicates that they are not the same. The Chi-squared test statistic is 104.9 while the 99th percentile of the Chi-squared with three degrees of freedom distribution is 11.34.

There are two likely reasons for a drop in ingestions during the night. Birds are not generally nocturnal so that bird activity is reduced at night. Also, there are fewer flights scheduled at night. A lessened exposure due to fewer flights and fewer birds results in a reduction in the number of ingestions at night.

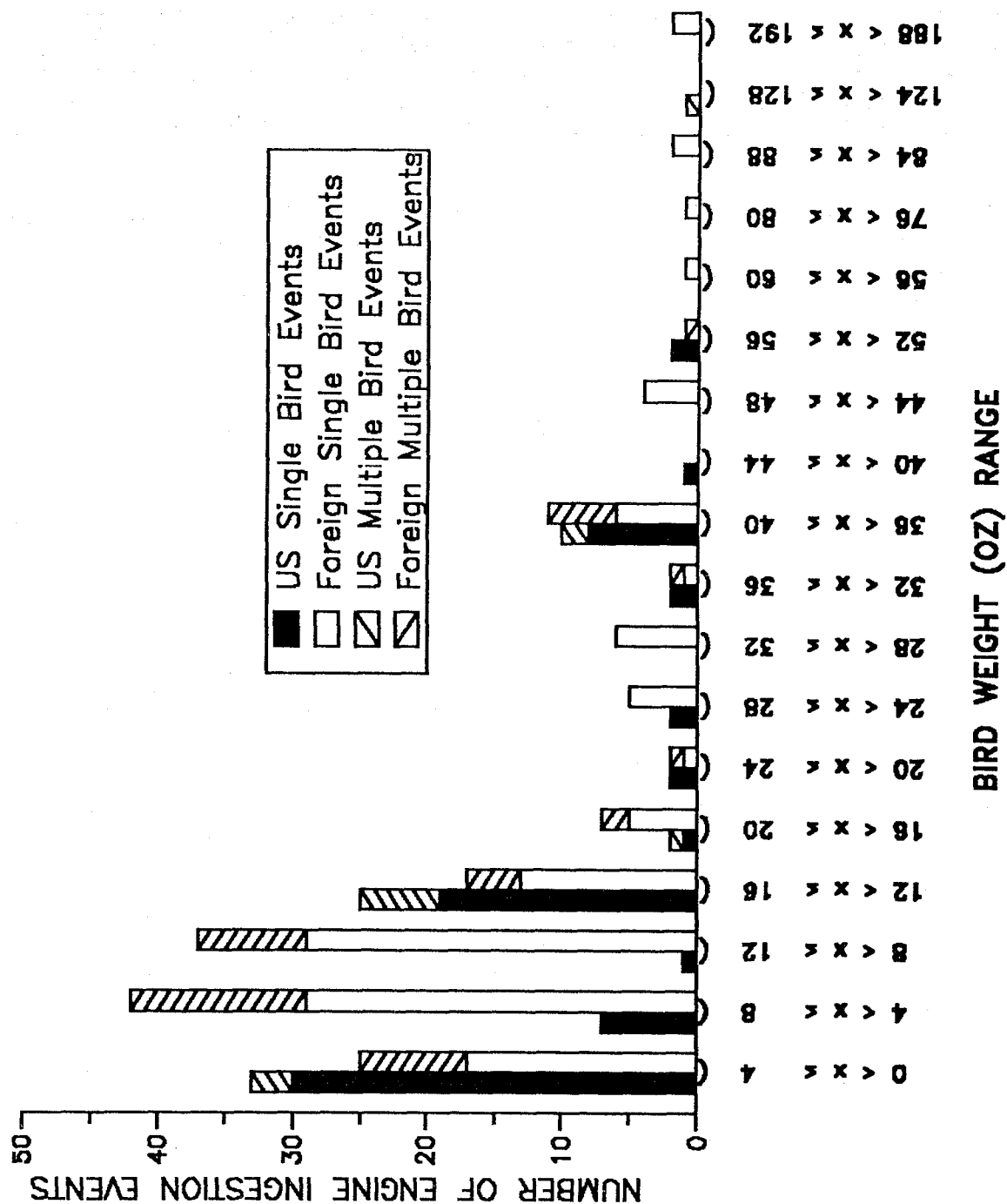


Figure 3.3. Histogram of Number of Birds Ingested by Weight Class.

TABLE 3.3 SUMMARY STATISTICS FOR INGESTED BIRD WEIGHTS

* STATISTIC	<u>United States</u>				<u>Foreign</u>				<u>Worldwide</u>			
	Multiple Bird Events	Single Bird Events	Total Bird Events		Multiple Bird Events	Single Bird Events	Total Bird Events		Multiple Bird Events	Single Bird Events	Total Bird Events	
NUMBER OF EVENTS**	13	75	88		43	122	165		56	187	253	
MODE(S)	14. 15.	4.	15.		7. 40.	10.	10. 40.		40.	40.	40.	
MEDIAN	14.	6.0	14.		8.0	10.0	10.0		10.1	10.0	10.	
MEAN (AVERAGE)	24.5	14.4	15.9		13.9	19.2	17.8		16.9	17.4	17.2	
STD DEVIATION	33.15	14.54	18.56		13.49	27.79	24.94		20.39	23.71	22.90	

* Bird Weights Given in Ounces

** Counted by Engine Ingestion Events

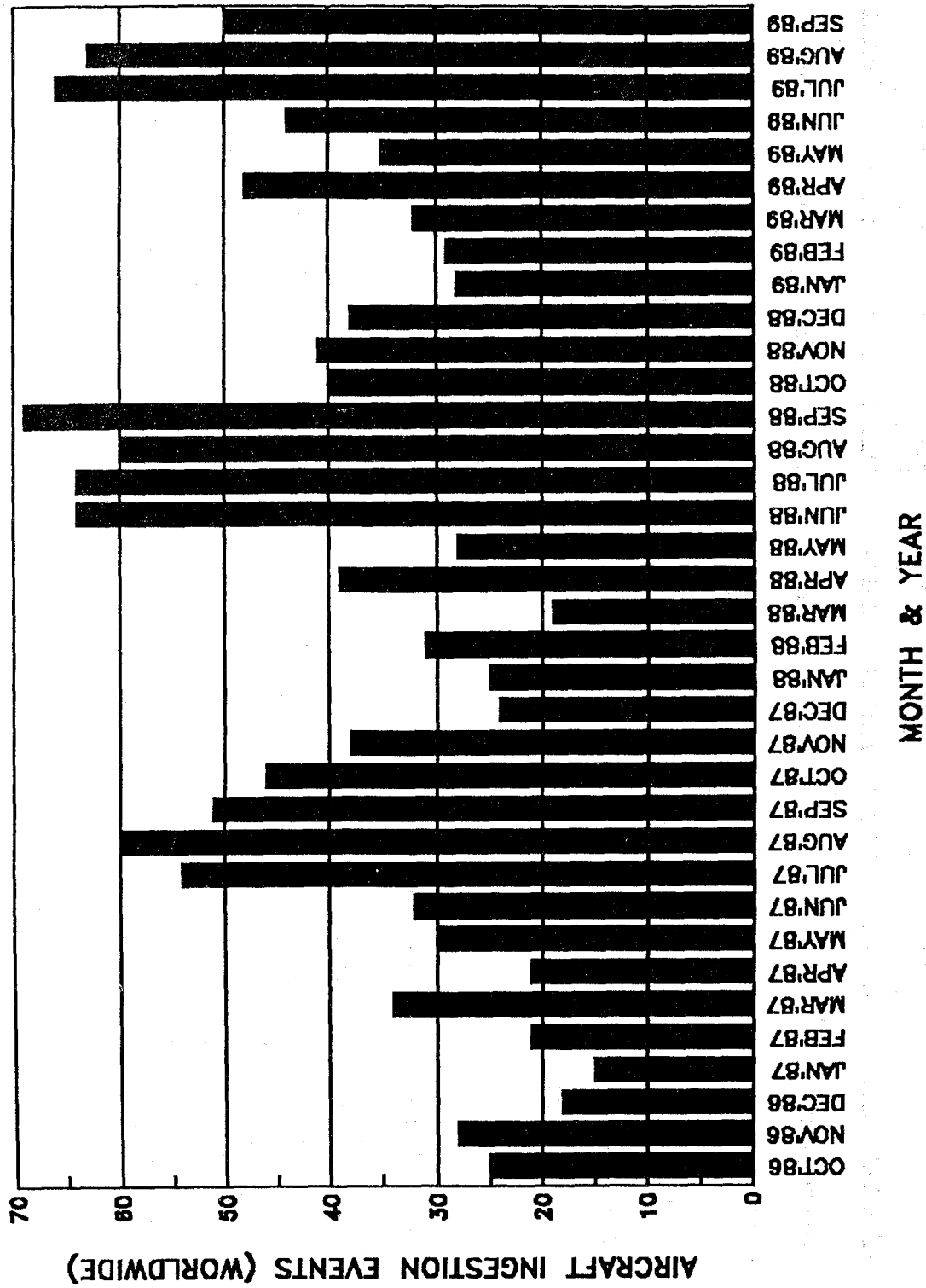


Figure 3.4. Histogram of Monthly Worldwide Aircraft Ingestion Events.

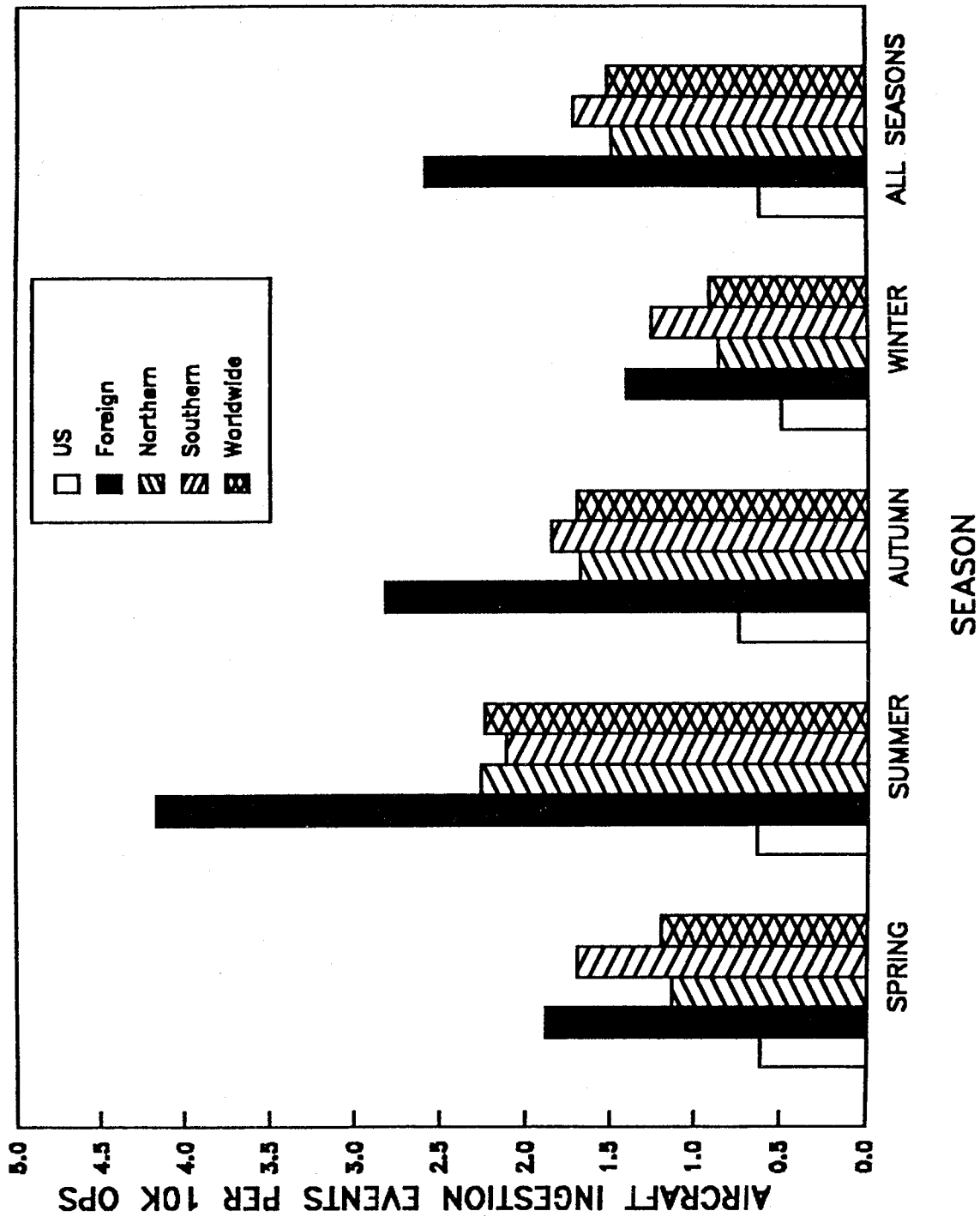


Figure 3.5. Histogram of Seasonal Aircraft Ingestion Rates.

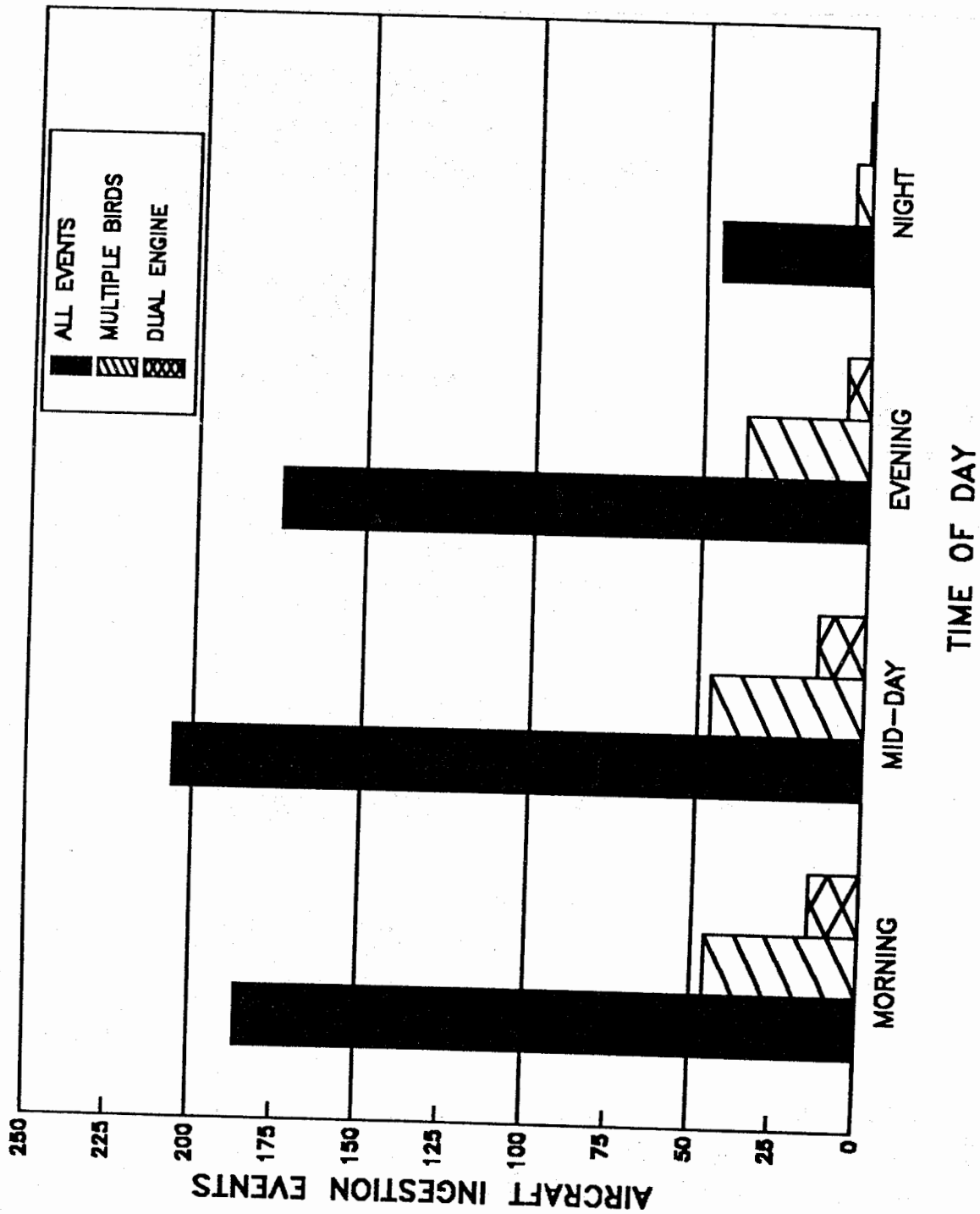


Figure 3.6. Histogram of Aircraft Ingestion Events by Time of Day.

SECTION 4

INGESTION RATES

This section describes the rates at which bird ingestions occurred during the 3-year collection period covered in this report. The Poisson distribution is commonly used to describe how events are randomly scattered in time and the bird ingestion data are shown to agree with the assumptions of a Poisson process. The first part of this section provides the estimates of the basic ingestion rates. The second part describes the Poisson distribution and how it relates to the bird ingestion events. The final parts discuss statistical analyses based on the assumption that bird ingestions follow a Poisson process.

4.1 INGESTION RATE ESTIMATES.

This sub-section provides a general description of ingestion rates broken down by location, engine and phase of flight. The rates are given in terms of ingestions per 10,000 aircraft operations and have been adjusted to the inlet area of the engine to allow size independent comparisons between engines. The inlet area used throughout this report is called the "fat lip area" and was specified by the Boeing Company for each type of engine installation. A more detailed statistical analysis of ingestion rates is covered in the next section using statistical techniques for Poisson processes.

Table 4.1A lists the United States, foreign and worldwide ingestion rates for both the JT8D and the CFM56 engines as well as a composite rate for all 737 aircraft. The inlet area adjustment was done using a 10-square-foot unit area on the basis of the total inlet area of both engines to keep the rates in a reasonable range. The composite rates in each geographical region are weighted means of the inlet area adjusted rates for the individual engines and are determined as follows: the number of ingestions per 10 square feet inlet area for each engine is projected by multiplying the rates by the number of aircraft operations. The composite rates are calculated by dividing the total projected ingestions for both engines by the total aircraft operations for the geographical region. Table 4.1B lists engine ingestion rates based on engine operations and normalized for the engine inlet area. The numbers in parentheses in Tables 4.1A and 4.1B reflect the number of ingestions where geographic location and/or engine type was not known.

The ingestion rates for the CFM56 engine were calculated using reported aircraft operations for specific geographical regions. The ingestion rates for the JT8D engine were calculated using estimated aircraft operations for specific geographical regions. The details of the calculation were presented in Section 3, equation 3.1.

Figure 4.1 shows monthly ingestion rates subdivided by engine type and adjusted for inlet area so that a comparison between engine types can be made. The adjusted monthly ingestion rate (R_{adj}) for an engine type is expressed as ingestions per 10 ft² per 10,000 aircraft operations is calculated as:

$$R_{adj} = \text{Ing} \cdot \frac{1440}{2 \text{ IA}} \cdot \frac{10000}{\text{Ops}} \quad (4.1)$$

TABLE 4.1A

BREAKDOWN OF BIRD INGESTION RATES BY ENGINE AND LOCATION
(BASED ON AIRCRAFT OPERATIONS)

ENGINE TYPE:	JT8D	CFM56	ALL ENGINES
INLET AREA: *	2234 in ²	4606 in ²	N/A
<u>UNITED STATES</u>			
Aircraft Ingestion Events	136	151	304 (17)
OAG Aircraft Operations	3,250,431	1,578,741	4,829,172
Ingestion Rate (Ing/10K Ops)	0.42	0.96	0.63
Normalized Ingestion Rate (Ing/10K Ops/10ft ²)	0.27	0.30	0.28
<u>FOREIGN</u>			
Aircraft Ingestion Events	784	293	1,104 (27)
OAG Aircraft Operations	3,145,832	935,849	4,081,681
Ingestion Rate (Ing/10K Ops)	2.49	3.13	2.70
Normalized Ingestion Rate (Ing/10K Ops/10ft ²)	1.61	0.98	1.46
<u>WORLDWIDE</u>			
Aircraft Ingestion Events	921 (1)	445 (1)	1,410 (46)
OAG Aircraft Operations	6,396,263	2,514,590	8,910,853
Ingestion Rate (Ing/10K Ops)	1.44	1.77	1.58
Normalized Ingestion Rate (Ing/10K Ops/10ft ²)	0.93	0.55	0.82

* Total Area for 2 Engines

TABLE 4.1B
BREAKDOWN OF BIRD INGESTION RATES BY ENGINE AND LOCATION
(BASED ON ENGINE OPERATIONS)

ENGINE TYPE:	JT8D	CFM56	ALL ENGINES
INLET AREA:	1117 in ²	2303 in ²	N/A
<u>UNITED STATES</u>			
Engine Ingestion Events	142	157	317 (18)
OAG Engine Operations	6,500,862	3,157,482	9,658,344
Ingestion Rate (Ing/10K Ops)	0.22	0.50	0.33
Normalized Ingestion Rate (Ing/10K Ops/10ft ²)	0.28	0.31	0.29
<u>FOREIGN</u>			
Engine Ingestion Events	811	310	1,149 (28)
OAG Engine Operations	6,291,664	1,871,698	8,163,362
Ingestion Rate (Ing/10K Ops)	1.29	1.66	1.41
Normalized Ingestion Rate (Ing/10K Ops/10ft ²)	1.66	1.04	1.52
<u>WORLDWIDE</u>			
Engine Ingestion Events	954 (1)	468 (1)	1,468 (48)
OAG Engine Operations	12,792,526	5,029,180	17,821,706
Ingestion Rate (Ing/10K Ops)	0.75	0.93	0.82
Normalized Ingestion Rate (Ing/10K Ops/10ft ²)	0.96	0.58	0.85

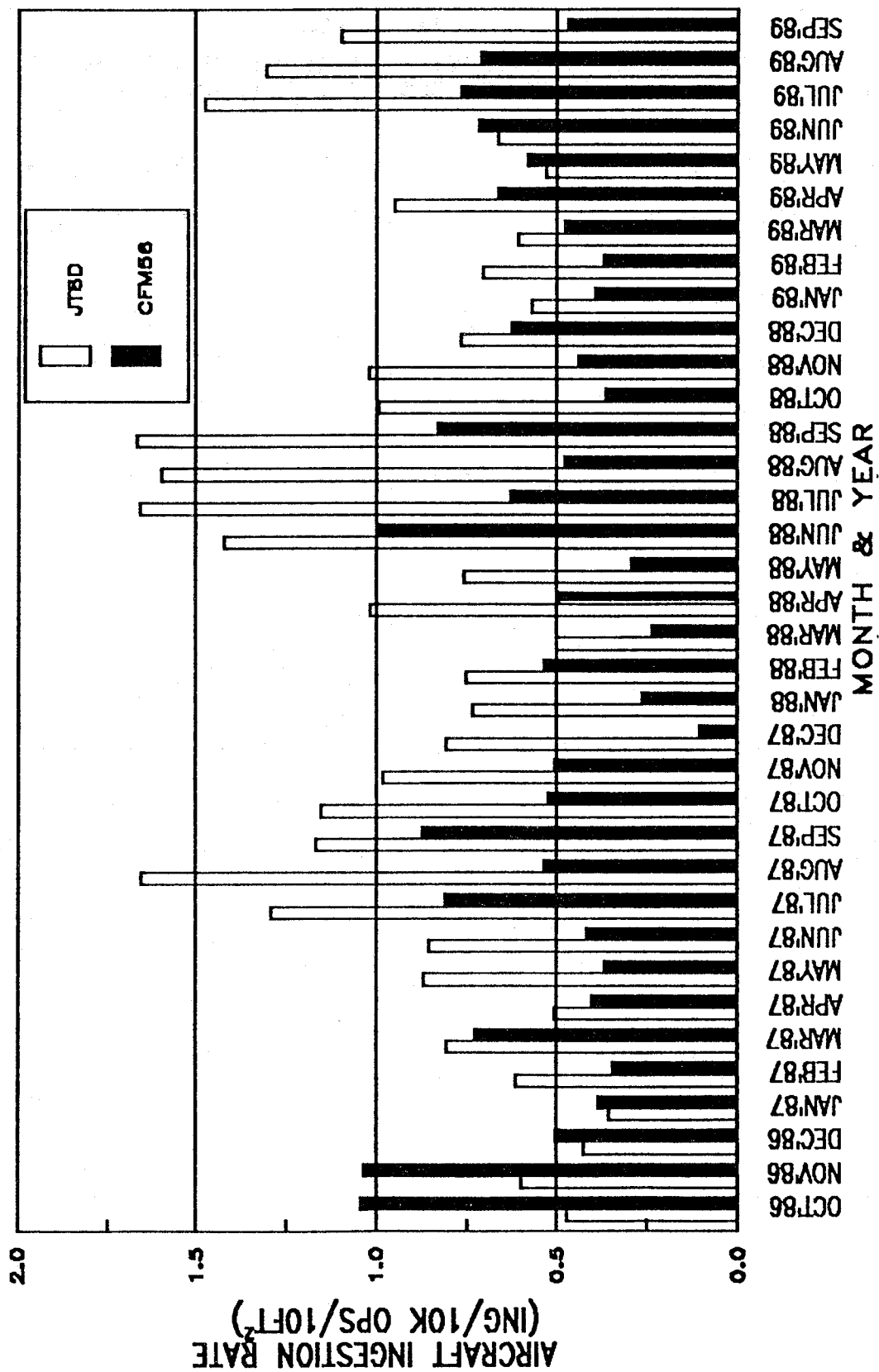


Figure 4.1. Histogram of Monthly Aircraft Ingestion Rates by Engine Type (Normalized for Inlet Area).

where Ing is the number of monthly aircraft ingestion events for an engine type, IA is the inlet area (in²) of the engine type, and Ops is the number of aircraft operations for the month. Twice the engine area is used because there are two engines on each B737 aircraft. The constant 1440 is the factor for converting square inches to units of 10-square-foot areas.

The phase of flight ingestion rate tabulation is presented in Table 4.2A. The method used to calculate ingestion rate 1 is expressed in Equation 3.1. The area adjustment used for ingestion rate 2 is implemented using Equation 4.1. The highest ingestion rates were in the takeoff and landing phases followed by the climb and approach phases. There were very few ingestions during the taxi and cruise phases of flight. This pattern is typically seen in bird strike and bird ingestion studies and is indicative of the fact that airports are often located in desirable bird environs. Since birds congregate around airports there is a greater chance of striking or ingesting a bird during the phases of flight that take place close to the airports. Also, commercial airline cruise routes are well above the altitude in which birds are usually found. Table 4.2B lists engine ingestion rates as a function of phase of flight. The differences in ingestion rates between Tables 4.2A and 4.2B are due to multiple engine ingestion events.

4.2 THE POISSON PROCESS.

The Poisson process is the simplest type of stochastic process which describes how events are distributed in time. The Poisson process is here taken to govern aircraft ingestion events and the times at which they occur are random. In a Poisson process the events are distributed somewhat evenly in time so that it appears that the times at which the events occurred form a uniform distribution. This section describes some of the properties of Poisson processes that will be useful in describing bird ingestions and in testing hypotheses about bird ingestion rates.

The basis of a Poisson process is a description of the probability distribution of the number of events that occur in a given time interval. The formula for the probability of n events in an interval of length T is:

$$P(X(T)=n) = \frac{e^{-\lambda T} (\lambda T)^n}{n!} \quad (4.2)$$

The parameter λ is the mean rate at which events occur and the mean number of events in the length T time interval is λT . The time scale that will be used in this study is number of aircraft operations. Ingestion rates are typically reported in events per 10,000 aircraft operations which implies the use of aircraft operations as the time scale in a Poisson process.

One derivation of the formula for the Poisson distribution is the limiting distribution of the binomial distribution for large sample sizes. If we assume that the probability of a bird ingestion is the same from flight to flight then the number of ingestions in a large number of flights has a binomial distribution. If the probability of ingestion is p and the number of flights is N then the probability that n ingestions occur in the N flights is:

$$P(X(N)=n) = \binom{N}{n} p^n (1-p)^{(N-n)} \quad (4.3)$$

TABLE 4.2A INGESTION RATES FOR ENGINE TYPE BY PHASE OF FLIGHT
(BASED ON AIRCRAFT INGESTION EVENTS)

PRATT-WHITNEY JT8D		CFM56	ALL ENGINES*
INLET**	2234 in ²	4606 in ²	----
AREA			
AIRCRAFT OPERATIONS	6,396,263	2,514,590	8,910,853
PHASE OF FLIGHT	AIRCRAFT***		AIRCRAFT***
	INGEST†	INGEST††	INGEST†††
	EVENTS	EVENTS	EVENTS
	RATE 1	RATE 2	RATE 1
	RATE 2	RATE 2	RATE 2
Parked	1 .002	.001	0 ---
Taxi	6 .009	.006	4 .016
Takeoff	540 .844	.544	189 .752
Climb	60 .094	.060	54 .215
Cruise	6 .009	.006	12 .048
Approach	64 .100	.064	44 .175
Landing	243 .380	.245	142 .565
Other	1 .002	.001	0 ---
All Phases	921 1.440	.928	445 1.770
			.553
			1366 1.533
			.822

* Includes Only Events Where Engine Type Known

** Total Area of 2 Engines

*** Contains Proportioned Apportionment of Events with Unknown Phase of Flight

† Ingestion Events Per 10,000 Operations

†† Ingestion Events Per 10,000 Operations Per 10 ft²

††† Function of JT8D Rate 2, CFM56 Rate 2, and Corresponding Operations

TABLE 4.2B INGESTION RATES FOR ENGINE TYPE BY PHASE OF FLIGHT
(BASED ON ENGINE INGESTION EVENTS)

	PRATT-WHITNEY JT8D		CFMI CFM56		ALL ENGINES*	
	1117 in ²	2303 in ²				
INLET AREA						---
ENGINE OPERATIONS	12,792,526	5,029,180				17,821,706
PHASE OF FLIGHT	ENGINE**		ENGINE**		ENGINE**	
	ING. EVENTS	INGEST† RATE 1	INGEST† RATE 1	INGEST† RATE 2	ING. EVENTS	INGEST† RATE 1
		RATE 2	RATE 2	RATE 2		RATE 2
Parked	1	.001	.001	0	1	.001
Taxi	6	.005	.006	4	10	.006
Takeoff	563	.440	.567	198	761	.427
Climb	64	.050	.064	54	118	.066
Cruise	6	.005	.006	12	18	.010
Approach	65	.051	.066	47	112	.063
Landing	248	.194	.250	153	401	.225
Other	1	.001	.001	0	1	.001
All Phases	954	.746	.961	468	1422	.798
						.854

* Includes Only Events Where Engine Type Known

** Contains Proportioned Apportionment of Events with Unknown Phase of Flight

† Ingestion Events Per 10,000 Operations

†† Ingestion Events Per 10,000 Operations Per 10 ft²

††† Function of JT8D Rate 2, CFM56 Rate 2, and Corresponding Operations

The binomial probabilities in Equation 4.3 can be approximated by a Poisson distribution with mean Np for large values of N . That is, the single flight probability of an ingestion, p , replaces λ in Equation 4.2.

An important question that can be investigated through the Poisson process model of bird ingestions is the influence of inlet area on the ingestion rates. Past studies [7,8] in bird strikes have used the assumption that the probability of a bird strike is proportional to the cross sectional area of the aircraft. Applying the same concept to engines implies that the bird ingestion rate should be proportional to the inlet area of the engine.

The inlet area effect can be incorporated into the Poisson process model by letting the parameter λ represent the ingestion rate per unit area. The probability of n ingestions in N operations for an engine with inlet area A is:

$$P(X(N)=n) = \frac{e^{-\lambda AN} (\lambda AN)^n}{n!} \quad (4.4)$$

4.3 VALIDITY OF THE POISSON PROCESS MODEL FOR BIRD INGESTIONS.

The applicability of the Poisson process model can be tested by analyzing the times between ingestions. The interarrival times in a Poisson process are random variables that have independent exponential distributions and the mean time between arrivals is the reciprocal of the ingestion rate. The validity of the Poisson process model can be tested by applying a goodness-of-fit (GOF) test for the exponential distribution to the times between ingestions.

The times between ingestions are measured by the number of days between aircraft ingestion events. Normally the number of aircraft operations between aircraft ingestion events would be used; however it is impossible to measure this directly. The number of days between aircraft ingestion events provides a suitable measure of the time between ingestions since daily aircraft operations are reasonably consistent.

The GOF test for the exponential distribution is a modified Kolmogorov-mirnov (K-S) test comparing the observed cumulative distribution function (CDF) to the predicted exponential CDF based on the sample mean. The K-S test uses the test statistic D defined as the maximum distance between the observed and predicted cumulative distribution functions. A modification to the critical values for the test statistic is required when the predicted CDF is derived from the mean of the sample. The critical values for the modified K-S test were computed by Liliefors [9]. The critical value for a 0.05 level of significance when the sample size, n , is larger than 30 can be approximated by $1.06/\sqrt{n}$.

The modified K-S test was run on six subgroups of the data broken down by engine and location. The six groups were (1) domestic (United States) JT8D, (2) contiguous United States JT8D, (3) foreign JT8D, (4) domestic CFM56, (5) contiguous United States CFM56, and (6) foreign CFM56. Figures 4.2 through 4.7 compare the observed and predicted cumulative distributions for each of the six groups, respectively. In each case there is a very close visual agreement between the observed and predicted CDF's.

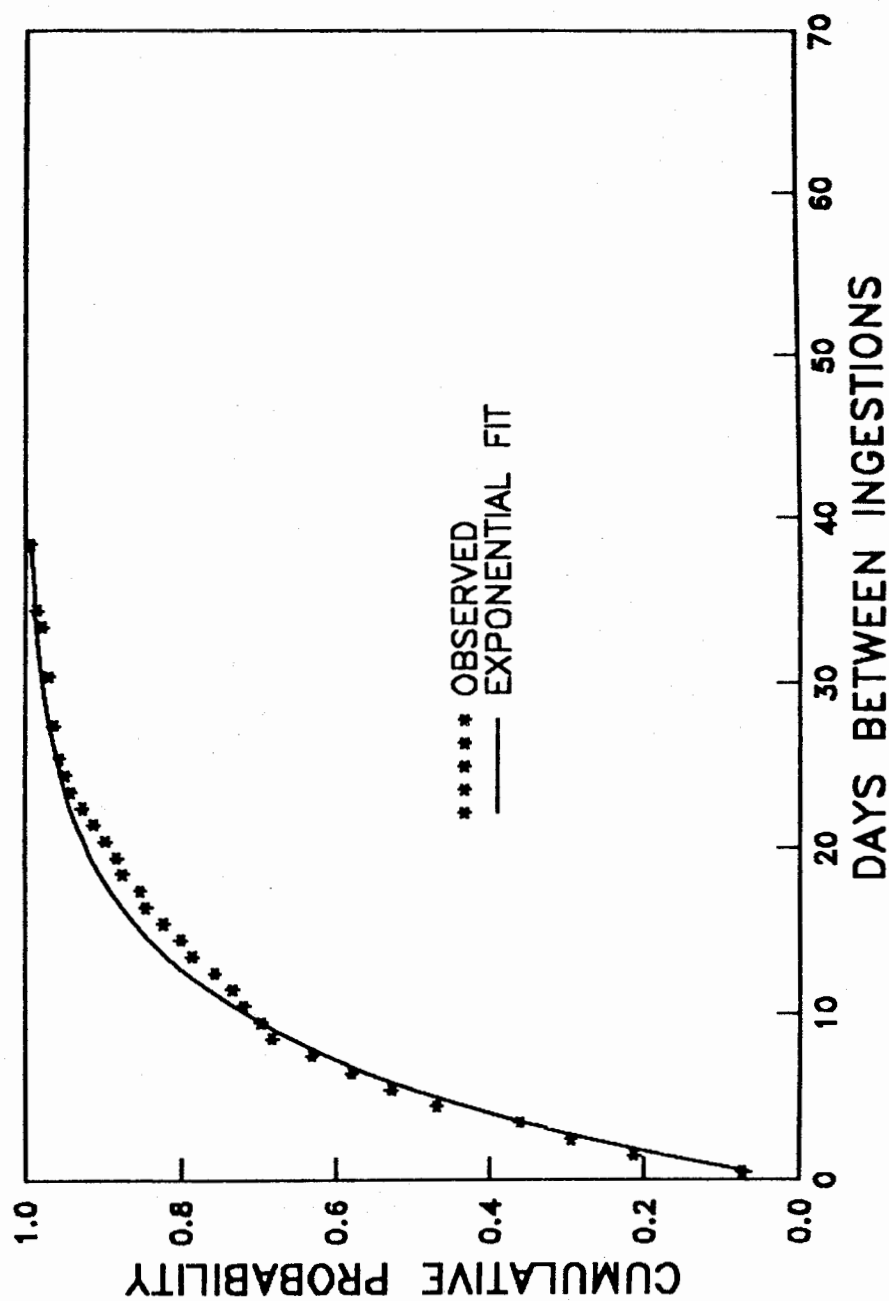


Figure 4.2. Comparison of Observed and Predicted CDFs for United States JT8D Aircraft Ingestion Events.

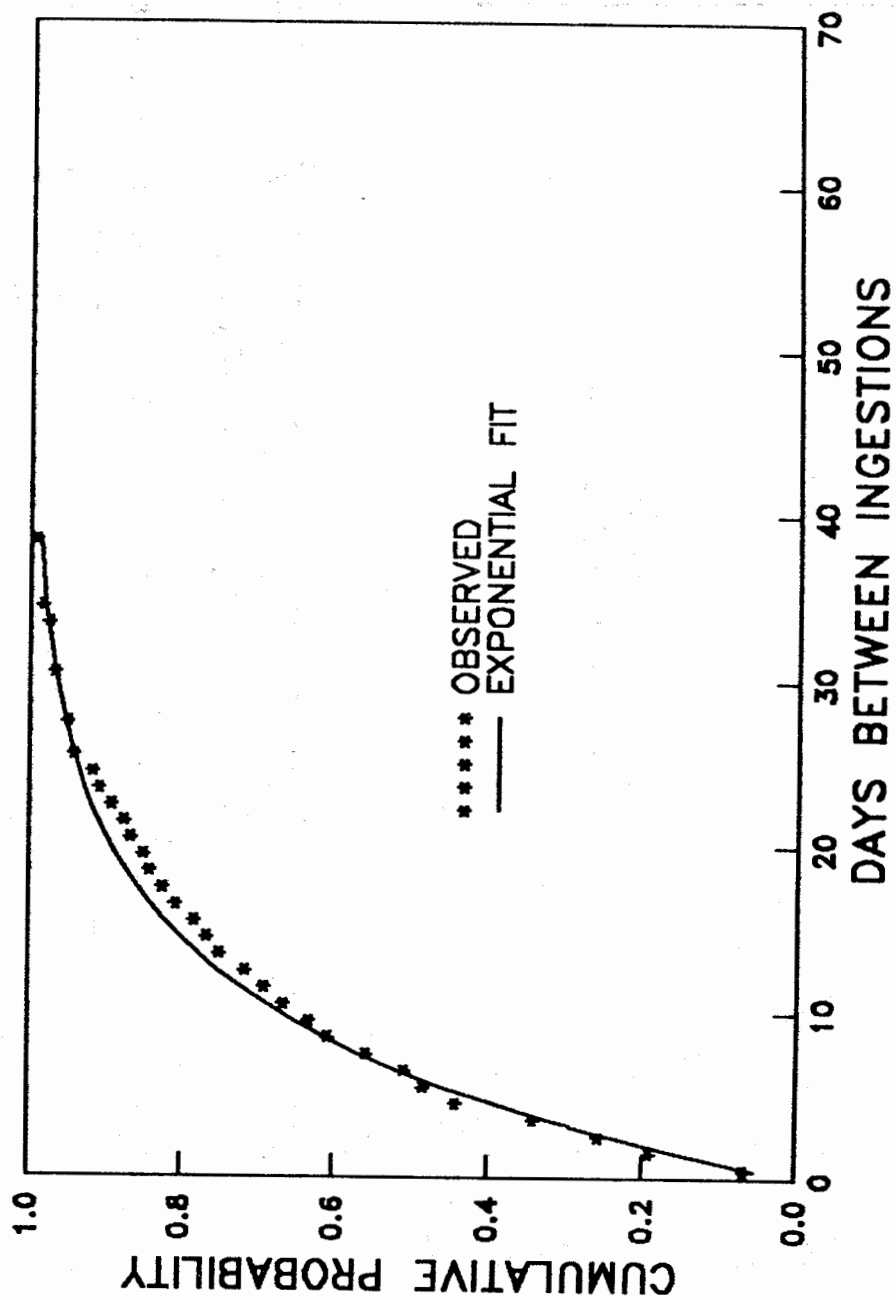


Figure 4.3. Comparison of Observed and Predicted CDFs for Contiguous United States JT8D Aircraft Ingestion Events.

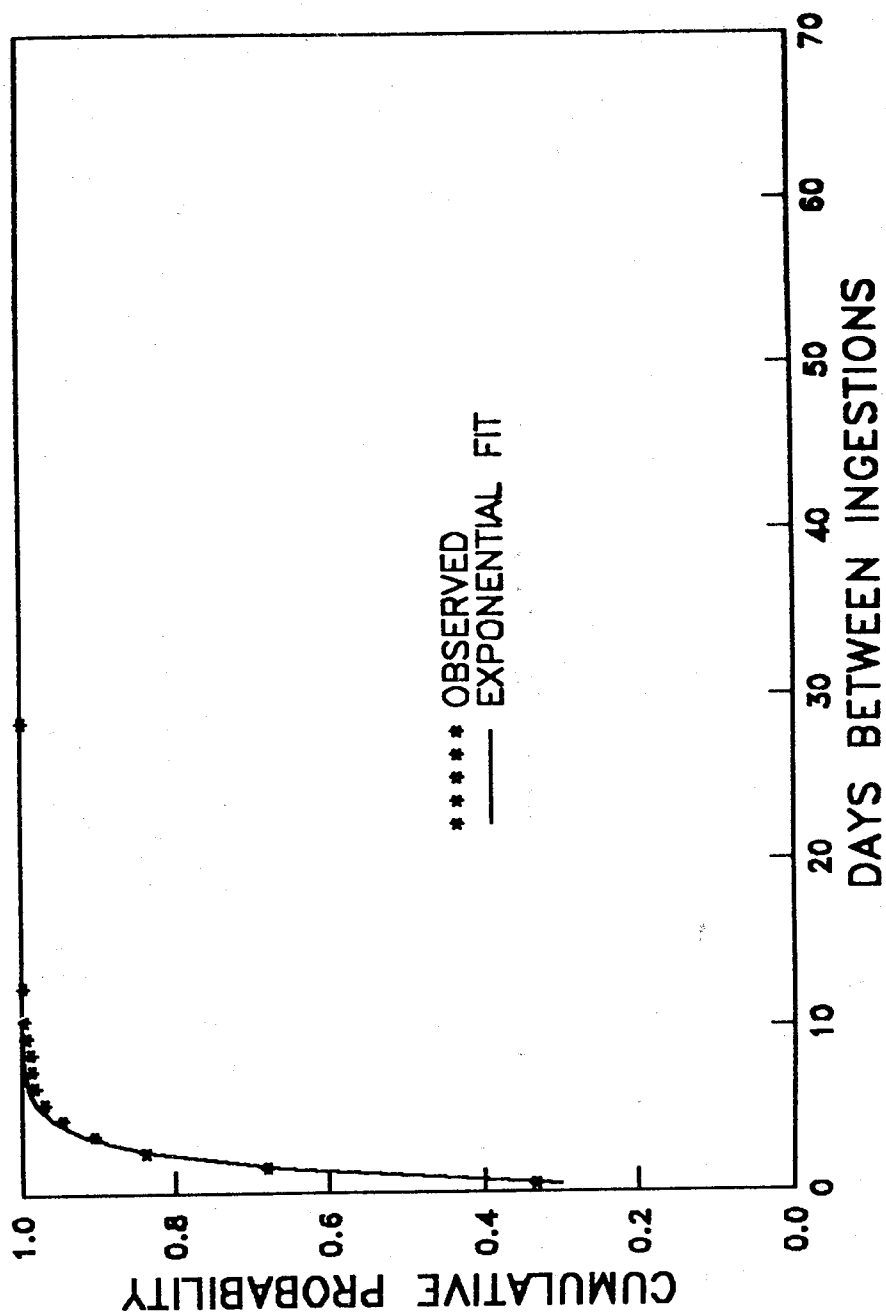


Figure 4.4. Comparison of Observed and Predicted CDFs for Foreign JT8D Aircraft Ingestion Events.

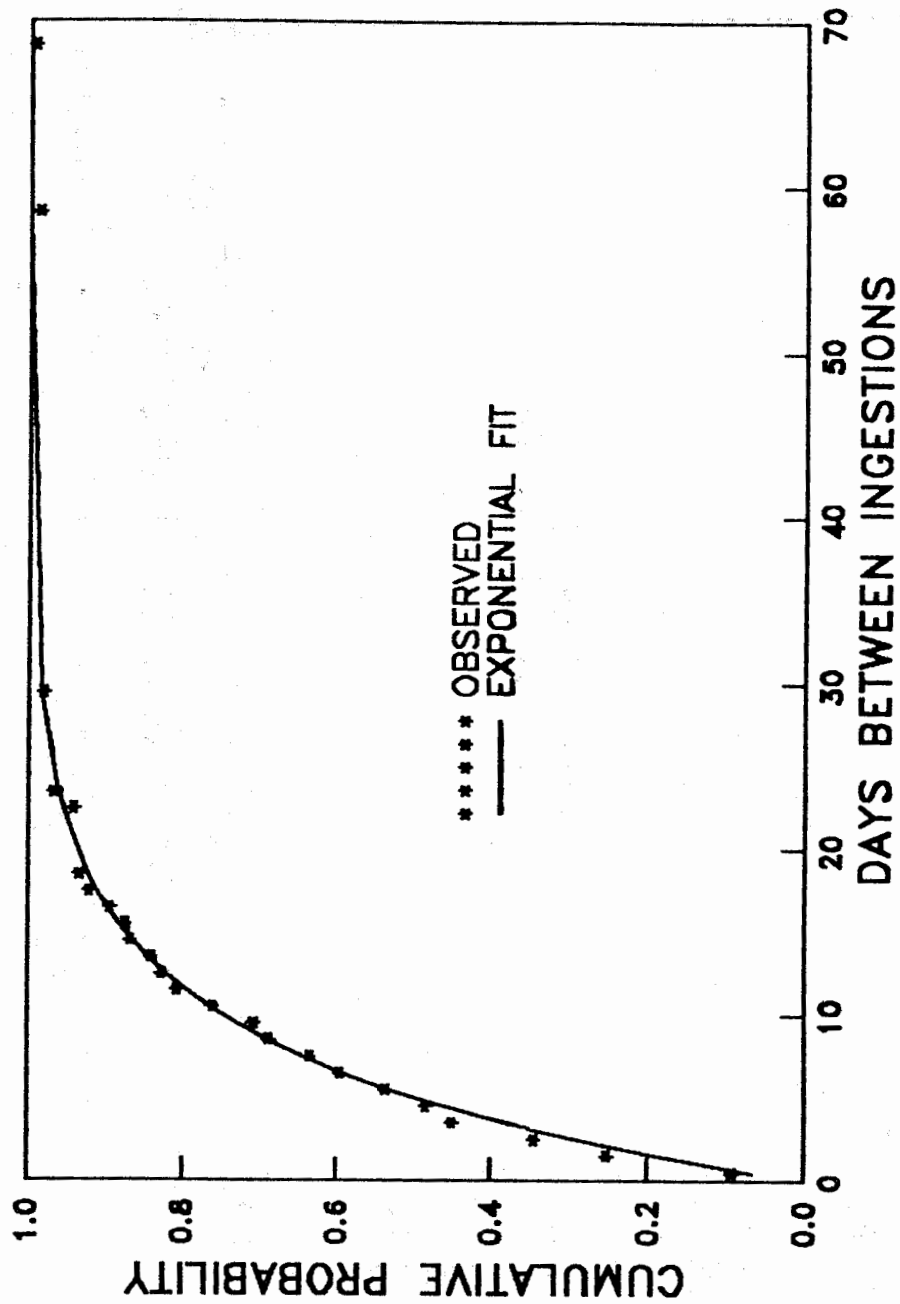


Figure 4.5. Comparison of Observed and Predicted CDFs for United States CFM56 Aircraft Ingestion Events.

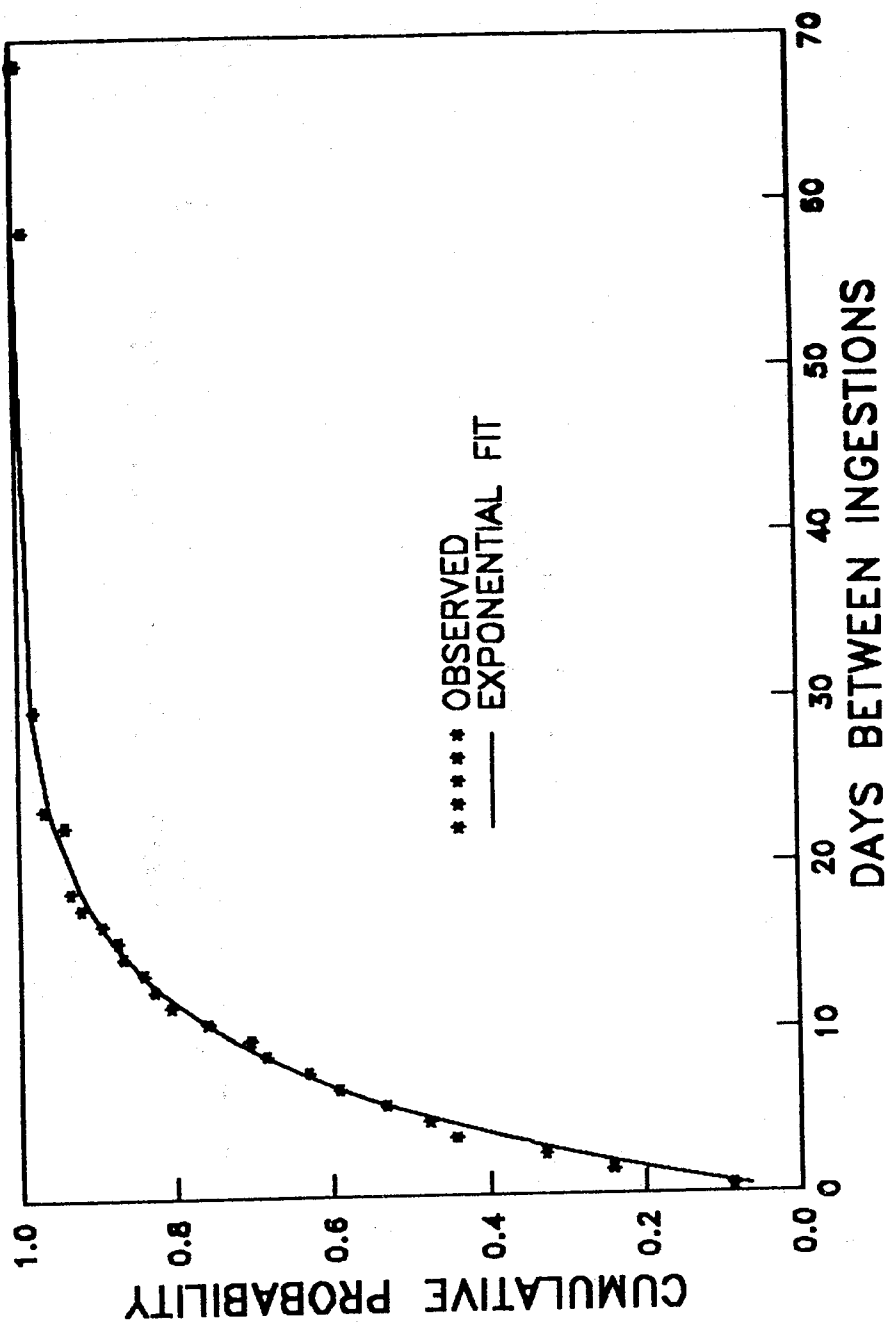


Figure 4.6. Comparison of Observed and Predicted CDFs for Contiguous United States CFM56 Aircraft Ingestion Events.

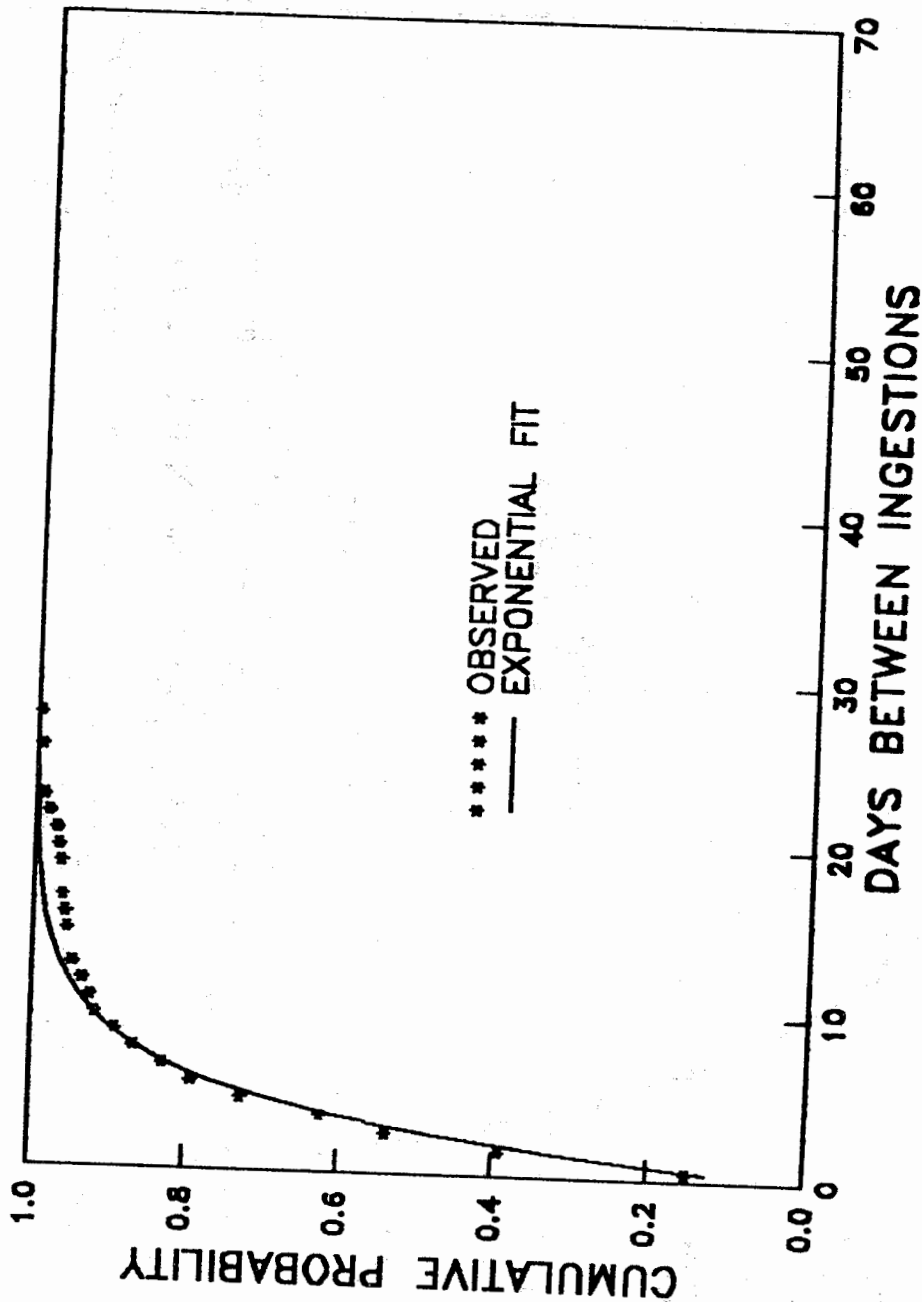


Figure 4.7. Comparison of Observed and Predicted CDFs for Foreign CFM56 Aircraft Ingestion Events.

The visual similarities are verified by the statistical tests which are summarized in Table 4.3. The mean time between ingestion events is given in column one. The sample size given in column two is the count of times between ingestions and is one less than the number of aircraft ingestion events. The critical value for a five percent significance level (D^*) is in column three and the test statistic (D) is in column four. The assumption that the times between ingestion events come from an exponential distribution cannot be rejected at the five percent level in five of the six groups. The use of a Poisson process to model bird ingestions is appropriate based on these test results.

The one group that does not pass the exponential goodness of fit test is the foreign CFM56 ingestions. The test statistic for the foreign CFM56 group is nearly equal to the critical value and the maximum deviation occurs at 1.5 days. Since the time between ingestions is recorded to the nearest day, round off error could adversely affect the observed CDF at 1.5 days. Since the other five groups are consistent with the Poisson model, the failed test for the foreign CFM 56 ingestions is not sufficient cause to reject the use of the Poisson model for bird ingestion events.

4.4 INLET AREA EFFECT ON INGESTION RATES.

One property of the Poisson process model described in Section 4.2 is that ingestion rates should be proportional to the inlet area of the engine. The size effect can be investigated in the B737 bird ingestion data by comparing the number of ingestion events of the JT8D with the number of ingestion events of the CFM56. According to Equation 4.4 the total number of ingestion events during the reporting period for a given engine has a Poisson distribution with a mean that is proportional to the number of aircraft operations in the reporting period and to the inlet area of the engine. The number of JT8D ingestion events out of the total number of ingestion events will have a Binomial distribution if the Poisson process model is valid.

The proportion of total ingestion events that occurred in JT8D engines for a particular geographic region should be:

$$P = \frac{OJ \cdot AJ}{OJ \cdot AJ + OC \cdot AC}, \quad (4.5)$$

where OJ and OC are the numbers of regional aircraft operations for, and AJ and AC are the inlet areas of, the JT8D and CFM56 engines, respectively. The relevant values for Equation 4.5 can be obtained from Table 4.1A giving an expected proportion of JT8D ingestion events of $P = 0.50$ for United States ingestion events and $P = 0.62$ for foreign ingestion events. The observed proportion of JT8D events is 0.47 for the United States and 0.73 for foreign ingestion events. The test statistic to compare the observed proportion to the predicted is the standard Z statistic for the binomial distribution given by:

$$Z = \frac{\hat{P} - P}{\sqrt{(P * (1-P) / N)}}, \quad (4.6)$$

where $\hat{P}$ is the observed proportion of JT8D engine ingestion events and N is the total number of aircraft ingestion events for the geographic region.

TABLE 4.3

RESULTS OF THE EXPONENTIAL GOF TESTS
TO VERIFY THE POISSON PROCESSJT8D ENGINE

<u>GEOGRAPHIC AREA</u>	<u>MEAN</u>	<u>SAMPLE SIZE</u>	<u>CRITICAL VALUE D*</u>	<u>TEST STATISTIC D</u>
United States	7.90	135	.091	.040
Contiguous US	8.97	119	.097	.047
Foreign	1.39	783	.037	.032

CFM56 ENGINE

<u>GEOGRAPHIC AREA</u>	<u>MEAN</u>	<u>SAMPLE SIZE</u>	<u>CRITICAL VALUE D*</u>	<u>TEST STATISTIC D</u>
United States	7.25	150	.086	.067
Contiguous US	7.34	148	.087	.064
Foreign	3.75	292	.062	.063

The Z statistic defined in Equation 4.6 is used to test the null hypothesis that there is no difference between the two types of engines in ingestion rates for each region after adjusting for area. The test statistics for the two geographic regions are computed by substituting the observed proportions for P and the expected proportions for P in Equation 4.6. The computed Z values are -0.87 for United States ingestion events and 7.310 for foreign ingestion events. The tests show no difference in ingestion rates between engines after adjusting for area for the United States events; however, the test for foreign events is significant at the five percent level of significance indicating that the area adjustment does not fully explain the observed difference in engine ingestion rates for foreign events.

A second school of thought suggests that the relationship between engine size and ingestion rate is described better as a linear function of inlet diameter than as a linear function of inlet area. A similar Z test can be computed by substituting inlet diameter for inlet area in Equation 4.5. The expected proportions of JT8D ingestion events after an adjustment for inlet diameter are $P = 0.59$ and $P = 0.70$ for the United States and foreign events, respectively. The test statistics are $Z = -3.97$ and $Z = 1.95$ for the United States and foreign events, respectively. The null hypothesis is that there is no difference in ingestion rates after adjusting for inlet diameter and the conclusion of the test is that there is no detectable difference at the five percent level of significance for the foreign events but is different for United States events.

There appears to be an engine size effect on ingestion rates; however, it is not clear whether it is best described by inlet area or diameter. The inlet area provides a good fit for the United States ingestions but not the foreign rates while inlet diameter provides a good fit for foreign rates but not for United States rates. The discrepancy could be due to differences in collection rates between the geographic regions; however, there are no data that could be used to determine whether collection rates varied geographically.

SECTION 5

AIRPORT BIRD INGESTION EXPERIENCE

The objective of the statistics of this section is to identify the frequency and location of bird ingestion events at airports worldwide. An aircraft ingestion event is the simultaneous ingestion of one or more birds by one or more engines of an aircraft. Bird ingestion data were provided by both the engine manufacturers and the ICAO. Airport ingestion rates are expressed in terms of aircraft ingestion events per 10K airport operations.

The OAG tapes indicate that there are 1,143 airports worldwide for which 17,821,706 B737 airport operations were scheduled during the reporting period. Appendix A lists the airport code, airport location, and both the number of scheduled airport operations and number of aircraft ingestion events at these airports for each of the three years in the data collection period. Bird ingestion events were reported at only 345 of these airports. The OAG tapes show that there were 12,805,445 scheduled airport operations at these 345 airports over the 3-year period. There were also bird ingestion events reported by unscheduled B737 flights at 65 additional airports. These 65 airports are included in Appendix A but there are no OAG operations counts for them.

A complete summary of the airports having reported aircraft ingestion events is presented in Table 5.1 as a frequency count of worldwide bird ingestion events by phase of flight. The majority of aircraft ingestion events occur during takeoff or landing. This table suggests that the threat of bird ingestion is posed primarily from birds which live near the airport and/or whose migratory path crosses over or near the airport property.

Figure 5.1 is a bar chart showing reported aircraft ingestion events at domestic airports during the reporting period. There are 91 domestic airports at which bird ingestion events have been reported. The largest number of aircraft ingestion events reported in the United States during the 3-year period was 10 at Dallas, Love (DAL) followed by 9 at both Houston (HOU) and Los Angeles (LAX). Of the 304 aircraft ingestion events reported in the United States, 89 events occurred at an unknown location and they are assigned to the airport code XUS on the bar chart.

Figure 5.2 is a bar chart showing reported aircraft ingestion events at foreign airports during the reporting period. There are 318 foreign airports at which bird ingestions have been reported. The largest number of aircraft ingestion events reported abroad during the period is 21 at Frankfurt, Germany (FRA) followed by 14 at Amsterdam, Netherlands (AMS). Of the 1,104 aircraft ingestion events reported outside of the United States, 265 events occurred at an unknown location and they are assigned to the airport code XFO on the bar chart.

Table 5.2 lists all airports worldwide which experienced three or more aircraft ingestion events during the reporting period. The airports are listed in descending order of airport operations. The table includes the number of ingestion events, the number of scheduled OAG airport operations, and the rate of aircraft ingestion events per 10,000 airport operations. Unscheduled B737 operations are not reflected in the operations counts,

whereas ingestion events occurring during either scheduled or unscheduled operations are included in the event counts. Therefore unscheduled B737 operations may account for the apparently higher ingestion rates.

The rates of bird ingestion events per aircraft operation summarized previously in Table 4.1A are twice the rates of bird ingestion events per airport operation. The number of reported foreign bird ingestion events exceeds the number of reported domestic ingestion events by a factor of 3.6; however, the number of foreign airport operations is slightly less than the number of domestic airport operations. The rate of reported bird ingestions per airport operation is 4.3 times higher at foreign airports than at domestic airports. This implies that either (1) there are far less birds in the environment of domestic airports, possibly due to environmental control programs, or (2) foreign airline operators are much more conscientious and cooperative in reporting bird ingestions.

TABLE 5.1

FREQUENCY COUNT OF AIRCRAFT INGESTION EVENTS BY AIRPORT AND PHASE OF FLIGHT

AIRPORT	AIRPORT DEFINITION	PARKED	TAXI	TAKEOFF	CLIMB	CRUISE	APPROACH	LANDING	UNKNOWN	TOTAL
AAE	ANABA, ALGERIA				1					1
ABCG	COOLANGATTA, AUSTRALIA							2		2
ABQ	ALBUQUERQUE, NM, USA				1					1
ACA	ACAPULCO, MEXICO			1						1
ADD	ADDIS ABABA, ETHIOPIA			1						1
ADL	ADELAIDE, SA, AUSTRALIA			2						2
ADQ	KODIAK, AS, USA							1		1
AEP	BUENOS AIRES - NEWBURY, ARGENTINA							1		1
AES	ALESUND, NORWAY							2		2
AGR	AGRA, INDIA							2		2
AJA	AJACCIO, CORSICA, FRANCE							1		1
AJU	ARACAJU, BRAZIL							2		2
AKL	AUCKLAND, NEW ZEALAND							1		1
ALB	ALBANY, NY, USA							1		1
ALC	ALICANTE, SPAIN				1					1
ALG	ALGIERS, ALGERIA				1		1			2
ALY	ALEXANDRIA, ARA REP OF EGYPT						1			1
AMD	AHMEDABAD, INDIA						1			1
AMS	AMSTERDAM, NETHERLANDS			8	1		1	2		12
AOR	ALOR SETAR, MALAYSIA			9				8		17
ARD	ALOR, INDONESIA			1					1	2
ASP	ALICE SPRINGS, N.T., AUSTRALIA						1			1
ATH	ATHENS, GREECE				1					1
ATL	ATLANTA, GA, USA			1						1
ATQ	AMRITSAR, INDIA				1					1
AUS	AUSTIN, TX, USA			1						1
AYT	ANTALYA, TURKEY			2						2
BAH	BAHRAIN, BAHRAIN							2		2
BBI	BHUBANESWAR, INDIA			1				1		2
BCN	BARCELONA, SPAIN			1			1			2
BDQ	VADODARA, INDIA			1				1		2
BEG	BELGRADE, YUGOSLAVIA			1						1
BFN	BLOEMFONTEIN, SOUTH AFRICA			5	2			2	1	10
BFS	BELFAST, N. IRELAND			3						3
BGO	BERGEN, NORWAY			1						1
BHT	BAHIA BLANCA, ARGENTINA			2						2
BHM	BIRMINGHAM, AL, USA			1				1		2
BHO	BHOPAL, INDIA						1			1
BHX	BIRMINGHAM, ENGLAND (UK)			3				1		4
BHZ	BELO HORIZONTE, BRAZIL			1				1		2
BJL	BANJUL, GAMBIA			1						1
BJR	BAHAR DAR, ETHIOPIA			1						1
BKK	BANGKOK, THAILAND									
BLR	BANGALORE, INDIA									
BNA	NASHVILLE, TN, USA									
BNE	BRISBANE, QLD, AUSTRALIA			3			1	4	1	8
BNJ	BONN, FRG							2		2
BOD	BORDEAUX, FRANCE			1						1
BOH	BOURNEMOUTH, ENGLAND, UK			1						1
BOM	BOMBAY, INDIA			2			1	2	1	6
BDO	BODO, NORWAY							1		1
BOS	BOSTON, MA, USA			1				1		2
BRE	BREMEN, FED REP OF GERMANY			4	1			1		6
BRS	BRISTOL, ENGLAND (UK)			3				2		5
BRU	BRUSSELS, BELGIUM			7	1		2	2		12

TABLE 5.1 (CONTINUED)
FREQUENCY COUNT OF AIRCRAFT INGESTION EVENTS BY AIRPORT AND PHASE OF FLIGHT

AIRPORT	AIRPORT DEFINITION	PARKED	TAXI	TAKEOFF	CLIMB	CRUISE	APPROACH	LANDING	UNKNOWN	TOTAL
BUD	BUDAPEST, HUNGARY			1						1
BUE	BUENOS AIRES, ARGENTINA			1						1
BWI	BALTIMORE, MD, USA			1						1
CAG	CAGLIARI, ITALY			1						1
CAS	CASABLANCA, MOROCCO			2			1	1		3
CBR	CANBERRA, A.C.T., AUSTRALIA						1	2		3
CCR	CONCORD, CA, USA						1	3		4
CCU	CALCUTTA, INDIA			4			1	6		12
CDG	PARIS DE GAULLE, FRANCE			4	1		1	1		2
CFU	CORFU, GREECE			1				1		2
CGN	COLOGNE BONN, FRG			1				1		2
CGR	CAMPO GRANDE, BRAZIL			3				2	1	8
CHC	CHRISTCHURCH, NEW ZEALAND			5				1		1
CID	CEDAR RAPIDS/IOWA CITY, IO, USA			1				1		4
CJB	COIMBATORE, INDIA			3						1
CJU	CHEJU, REP OF KOREA			1			1	1	1	3
CLE	CLEVELAND, OH, USA			1						1
CLT	CHARLOTTE, NC, USA			1						1
CMB	COLOMBO, SRI LANKA			1						1
CNG	CORUMBA, MATO GROSSO, BRAZIL			2				1	1	2
CND	CONSTANTO, ROMANIA			1					1	1
CNS	CAIRNS, QLD, AUSTRALIA			2						2
COK	COCHIN, INDIA			1						1
COR	CORDOBA, ARGENTINA			1						1
COS	COLORADO SPRINGS, CO, USA			1						1
CPH	COPENHAGEN, DENMARK			4						4
CPT	CAPE TOWN, SOUTH AFRICA			3						3
CRP	CORPUS CHRISTI, TX, USA			1						1
CRW	CHARLESTON, WV, USA			1			1			1
CTC	CATAMARCA, ARGENTINA							1		1
CTU	CHENGDU, P.R. CHINA		1					1		2
CWB	CURITIBA, PARANA, BRAZIL			2						2
CWL	CARDIFF, WALES, UK			1						1
CZL	CONSTANTINE, ALGERIA			2						2
DAB	DAYTONA BEACH, FL, USA			2	1		2		2	10
DAL	LOVE DALLS/FT. WORTH, TX, USA			2	2					4
DAY	DAYTON, OH, USA			2				1		1
DCA	NATIONAL, WASHINGTON, DC, USA			2	1		4	1		8
DEL	DELHI, INDIA			2	1		1	1		4
DEN	STAPLETON INT'L, DENVER, CO, USA			1			1	1		2
DET	DETROIT CITY, MI, USA			1			1	1		2
DFW	DALLAS/FT WORTH, TX, USA						1	1		1
DLH	DULUTH, MN, USA							1		1
DRW	DARWIN, N.T., AUSTRALIA				1		1			2
DTMB	HABIB BOURGIBA, TUNISIA							1		1
DTA	CARTHAGE, TUNISIA							1		1
DTW	WAYNE CO, DETROIT, MI, USA			1			1	1		3
DUB	DUBLIN, REPUBLIC OF IRELAND			1			1	1		3
DUD	DUNEDIN, NEW ZEALAND			6				1		6
DUR	DURBAN, SOUTH AFRICA			7			1			16
DUS	DUESSELDORF, FRG			1	2					1
EAM	NEJRAN, SAUDI ARABIA			1	1				1	1
EBCI	CHARLEROI/GOSSELIES, BELGIUM			1						1
EBOS	OOSTENDE, BELGIUM			3				2		5
EDI	EDINBURGH, SCOTLAND									

TABLE 5.1 (CONTINUED)
FREQUENCY COUNT OF AIRCRAFT INGESTION EVENTS BY AIRPORT AND PHASE OF FLIGHT

AIRPORT	AIRPORT DEFINITION	PARKED	TAXI	TAKEOFF	CLIMB	CRUISE	APPROACH	LANDING	UNKNOWN	TOTAL
EDUO	GUTERSLOH, GERMANY			2				1		1
EGNV	TEES-SIDE, ENGLAND							1		1
EICK	CORK, IRELAND							1		1
EINN	SHANWICK, IRELAND									1
ELP	EL PASO, TX, USA			1						1
ELS	EAST LONDON, SOUTH AFRICA			2				2		5
EMA	EAST MIDLANDS, ENGLAND			1			1	2		4
ERI	ERIE, PA, USA									1
EWK	NEWARK, NEW YORK, NY, USA			2				2		4
EZE	BUENOS AIRES-EZEIZA ARPT, ARGENTINA			1						1
FACT	D.F. MALAN, S. AFRICA			1						1
FAE	FAROE ISLANDS, DENMARK						1			1
FAO	FARO, PORTUGAL						1			1
FAT	FRESNO, CA, USA			1				1		2
FAW	WINDHOEK, STRIJDOM, NAMIBIA			1				1		2
FCO	DA VINCI, ROME, ITALY			1						1
FLI	FT LAUDERDALE, FL, USA			1				1		2
FLN	FLORIANOPOLIS, BRAZIL			1						1
FMA	FORMOSA, ARGENTINA			1						1
FMMI	IVATO, MADAGASCAR			1						1
FNC	FUNCHAL - MADEIRA, PORTUGAL			2					1	3
FNT	FLINT, MI, USA			1						1
FRA	FRANKFURT, FRG		1	7	4		4	4	1	21
FSC	FIGARI, FRANCE			1						1
FVCP	PRINCE CHARLES, ZIMBABWE			1						1
GAJ	YAMAGATA, HONSHU, JAPAN								1	1
GAU	GAUHATI, INDIA			2						2
GHB	GOVERNORS HARBOUR, BAHAMAS			1						1
GHU	GUATEMALA CITY, GUATEMALA			1						1
GIG	RIO DE JANEIRO INT'L, BRAZIL			1						1
GLA	GLASGOW, SCOTLAND	1						1		2
GMTT	BOUKHAUF, MOROCCO				1					2
GOA	GENOA, ITALY			2				1		3
GOI	GOA, INDIA									2
GOT	GOTHENBURG, SWEDEN		1					2		3
GRZ	GRAZ, AUSTRIA			1				1		2
GSO	GREENSBORO/HPT/WIN-SALEM, NC, USA			1				1		2
GSP	GREENVILLE/SPARTANBURG, SC, USA			1				1		2
GVA	GENEVA, SWITZERLAND			1			1			2
GWL	GWALTOR, INDIA			1						1
HAC	HACHIJO, JIMA ISLAND, JAPAN							1		1
HAI	HANOVER, FED REP OF GERMANY			2			1	2		5
HAM	HAMBURG, FRG			9		1		4		15
HKG	HONG KONG			1						1
HKNA	JOMO KENYATTA, NAIROBI, KENYA			1				1		2
HND	TOKYO-HANEDA, JAPAN			1						1
HNM	HANA, MAUI, HA, USA			1						1
HOU	HOUSTON, TX, USA			5				3		8
HRL	HARLINGEN, TX, USA							1		1
HYD	HYDERABAD, INDIA			4			1	2		7
IAD	DULLES INT'L, WASHINGTON, DC, USA							1		1
IAH	HOUSTON INTERCONT, TX, USA			3				2		5
IBZ	IBIZA, SPAIN			2						2
INU	NAURU, REP OF NAURU			1						1
ISA	MOUNT ISA, QLD, AUSTRALIA						1			1

TABLE 5.1 (CONTINUED)
FREQUENCY COUNT OF AIRCRAFT INGESTION EVENTS BY AIRPORT AND PHASE OF FLIGHT

AIRPORT	AIRPORT DEFINITION	PARKED	TAXI	TAKEOFF	CLIMB	CRUISE	APPROACH	LANDING	UNKNOWN	TOTAL
ISS	ISHIGAKI, JAPAN			5						5
ISP	LONG ISLAND MACARTHUR, NY, USA				1					1
ITO	HILO HAWAII, HA, USA			3						3
IVC	INVERCARGILL, NEW ZEALAND			1					1	1
IXB	BAGDOGRA, INDIA							3		3
IXC	CHANDIGARH, INDIA						1			1
IXE	MANGALORE, INDIA			1						1
IXJ	JAMMU, INDIA			1						1
IXR	RANCHI, INDIA			1						1
IXU	AURANGABAD, INDIA									2
IXV	ALONG, INDIA									1
IXZ	PORT BLAIR ANDAMAN ISLAND, INDIA									1
JAI	JAIPUR, INDIA				2			2		2
JAX	JACKSONVILLE, FL, USA			1						1
JDH	JODHPUR, INDIA			1			1			1
JNB	JOHANNESBURG, SOUTH AFRICA			4						4
JRH	JORHAT, INDIA			1					1	1
JRO	KILIMANJARO, TANZANIA			1						1
KCH	KUCHING, SARAWAK, MALAYSIA			1	1					2
KEF	REYKJAVIK-KEFLAVIK, ICELAND			1						1
KGS	KOS, GREECE			1						1
KHH	KAOHSIUNG, TAIWAN			1						1
KHI	KARACHI, PAKISTAN			2					1	2
KIM	KIMBERLEY, SOUTH AFRICA			2					1	2
KMG	KUNMING, P.R. CHINA			1						1
KOA	KONA, HA, USA			1						1
KOU	KAGOSHIMA, JAPAN								2	2
KRP	KARUP, DENMARK									1
KRT	KHARTOUM, SUDAN			1						1
KST	KOSTI, SUDAN						1			1
KTM	KATHMANDU, NEPAL									1
KUL	KUALA LUMPUR, MALAYSIA									1
LAS	LAS VEGAS, NV, USA			1						1
LAX	LOS ANGELES, CA, USA		1	6						7
LBB	LUBBOCK, TX, USA									1
LCA	LARNACA, CYPRUS									1
LDE	LOURDES/TARBES, FRANCE			5	1					6
LEAM	ALMERIA, SPAIN						1			1
LEGE	COSTA BRAVA, SPAIN			1						1
LEMG	MALAGA, SPAIN			1						1
LEMH	MENORCA, SPAIN			1						1
LEMS	REUS, SPAIN			1						1
LEX	LEXINGTON, KY, USA			3						3
LEBO	BLAGNAC, FRANCE			1						1
LGA	NEW YORK LA GUARDIA, NY, USA			3				3		6
LGG	LIEGE, BELGIUM			1						1
LGRP	PARADISI, GREECE									1
LGRX	ARAXOS, GREECE									1
LGSK	SKIATHOS, GREECE			1						1
LGW	LONDON-GATWICK, ENGLAND			3	3		2			8
LHE	LAHORE, PAKISTAN			4	1		4		1	10
LHR	LONDON HEATHROW, ENGLAND, (UK)			7						7
LIH	LITHUE, KAUAI, HA, USA			2						2
LIL	LILLE, FRANCE			3						3
LIN	MILAN LINATE, ITALY									3

TABLE 5.1 (CONTINUED)
FREQUENCY COUNT OF AIRCRAFT INGESTION EVENTS BY AIRPORT AND PHASE OF FLIGHT

AIRPORT	AIRPORT DEFINITION	PARKED	TAXI	TAKEOFF	CLIMB	CRUISE	APPROACH	LANDING	UNKNOWN	TOTAL
LIPE	BORGO PANICALE, ITALY			1						1
LIPZ	TESSERA, ITALY			1						1
LIS	LISBON, PORTUGAL			1						1
LIT	LITTLE ROCK, AK, USA			2	2			2		4
LJU	LJUBLJANA, YUGOSLAVIA			1						1
LKO	LUCKNOW, INDIA			3						3
LLW	LILONGWE, MALAWI			1						1
LNZ	LONZ, AUSTRIA			2						2
LOS	LAGOS, NIGERIA			1						1
LOWW	WIEN-SCHWEICHAU, OSTERREICH			1						1
LPA	GRAN CANARIA, CANARY ISLANDS									
LPL	LIVERPOOL, ENGLAND						2			2
LST	LAUNCESTON, TASMANIA, AUSTRALIA							1		1
LTBS	MUGLA, TURKEY			1						1
LTN	LONDON-LUTON INT'L, ENGLAND			2						2
LXR	LUXOR, ARAB REP OF EGYPT			3						3
LXS	LEMNOS, GREECE			1						1
LYS	LYON, FRANCE			2						2
MAA	MADRAS, INDIA			1						1
MAD	MADRID, SPAIN			4	1			1		6
MAF	MIDLAND, ODESSA, TX, USA			1						1
MAH	MAHON, MENORCA, SPAIN			1						1
MAN	MANCHESTER, ENGLAND (UK)			2						2
MCO	ORLANDO-INT'L, FL, USA			4			1			5
MDP	MINDIPTANA, INDONESIA									
MDQ	MAR DEL PLATA, ARGENTINA			1				1		2
MDT	HARRISBURG-OLMSTEAD ST, PA, USA			2						2
MDW	CHICAGO-MIDWAY, IL, USA			1				1		2
MED	MEDINA, SAUDI ARABIA			6			1			7
MEL	MELBOURNE, VICTORIA, AUSTRALIA			1						1
MFR	MEDFOR, OR, USA			2	3					5
MGA	MANAGUA, NICARAGUA			1				1		2
MIA	MIAMI, FL, USA			1						1
MIL	MILAN, ITALY									
MIA	MILAN, ITALY									
MLA	MALTA, MEDITERRANEAN SEA			1				1		2
MLAL	LUGA, MALTA									
MMY	MIYAKO JIMA, JAPAN									
MSO	MISSOULA, MT, USA			6						6
MSP	MINNEAPOLIS-ST PAUL, MN, USA			1						1
MSY	NEW ORLEANS, LA, USA			3						3
MUC	MUNICH, FRG			1						1
MVD	MONTEVIDEO, URUGUAY			3	1		2			6
MPX	MILAN-MALPENSA, ITALY			1						1
MYR	MYRTLE BEACH, SC, USA			1						1
NAP	NAPLES, ITALY			1						1
NCE	NICE, FRANCE			2			1			3
NCL	NEWCASTLE, ENGLAND						2			2
NGO	NAGOYA, JAPAN							5		5
NUE	NUREMBURG, FRG							2		2
OAK	OAKLAND, SAN FRANCISCO, CA, USA			2						2
OGG	KAHULUI, MAUI, HA, USA			1						1
OIT	OITA, JAPAN			2						2
OKC	OKLAHOMA CITY, OK, USA			1						1
OPO	OPORTO, PORTUGAL			1						1
OPRN	CHAKALA, PAKISTAN			1						1

TABLE 5.1 (CONTINUED)
FREQUENCY COUNT OF AIRCRAFT INGESTION EVENTS BY AIRPORT AND PHASE OF FLIGHT

AIRPORT	AIRPORT DEFINITION	PARKED	TAXI	TAKEOFF	CLIMB	CRUISE	APPROACH	LANDING	UNKNOWN	TOTAL
ORD	CHICAGO-O'HARE, IL, USA			4	1			1		6
ORF	NORFOLK-VA. BEACH, VA, USA			2				3		5
ORY	PARIS - ORLY ARPT, FRANCE			5				1		5
OSL	OSLO, NORWAY			1				3		3
PAT	PATNA, INDIA			4				1	1	8
PDB	PEDRO BAY, AS, USA			1	1			2		4
PDX	PORTLAND, OR, USA			1				1		2
PEK	BEIJIN, P. R. CHINA	1						1		2
PEN	PENANG, MALAYSIA			1	1			1		4
PER	PERTH, WA, AUSTRALIA				2			2		4
PHL	PHILADELPHIA/WILMINGTON, PA, USA					1				1
PHX	PHOENIX, AZ, USA			5				2		7
PJE	TAMPA-ST. PETERSBURG, FL, USA			4	1			1		6
PLZ	PORT ELIZABETH, SOUTH AFRICA			1				1		2
PME	PORTSMOUTH, UK			3	1			1		5
PMI	PALMA MALLORCA ISLAND, SPAIN							1		1
PMO	PALERMO, ITALY			1	1			2		4
PMR	PALMERSTON, NEW ZEALAND									1
PNA	PAMPLONA, SPAIN						1			1
PISA	PISA, ITALY			1						1
PTY	PANAMA CITY, PANAMA			1						1
PUD	PULA, YUGOSLAVIA			1						1
PVD	PROVIDENCE, RI, USA			1						1
PVH	PORTO VELHO, BRAZIL			2						2
PVK	PREVEZA/LEFKAS, GREECE							1		1
PWM	PORTLAND, ME, USA							1		1
QTV	TREVISO, ITALY							1		1
RAP	RAPID CITY, SD, USA			1						1
RBA	RABAT, MOROCCO			2						2
REC	RECIFE, BRAZIL			1			1		1	3
RES	RESISTENCIA, ARGENTINA									1
RKPC	CHENJU, KOREA			1						1
RNO	RENO, NV, USA			1	1					2
ROA	ROANOKE, VA, USA			1			1			2
ROC	ROCHESTER, NY, USA			1						1
ROK	ROCKHAMPTON, QLD, AUSTRALIA			1						1
RST	ROCHESTER, MN, USA			1				1		2
RUH	RIYADH, SAUDI ARABIA			1				1		2
SAB	SABA, NETH. ANTILLES									1
SAL	SAN SALVADOR, EL SALVADOR			1						1
SAN	SAN DIEGO, CA, USA				1					1
SAO	SAO PAULO, BRAZIL			2	1				1	4
SAT	SAN ANTONIO, TX, USA			1						1
SAV	SAVANNAH, GA, USA							1		1
SCC	PRUDHOE BAY, DEADHORSE, AS, USA						1			1
SCN	SAARBRUECKEN, FRG			1						1
SDF	LOUISVILLE, KY, USA									1
SDJ	SENDAI, JAPAN									1
SFN	SANTA FE, ARGENTINA									1
SFO	SAN FRANCISCO-OAKLAND, CA, USA			3	2			1	1	7
SHI	SHIMOJISHIMA, JAPAN			2				1		3
SJC	SAN JOSE, CA, USA			1						1
SIA	SALT, ARGENTINA					1				1
SLC	SALT LAKE CITY, UT, USA						1			1
SLL	SALALAH, OMAN			1						1

TABLE 5.1 (CONTINUED)
FREQUENCY COUNT OF AIRCRAFT INGESTION EVENTS BY AIRPORT AND PHASE OF FLIGHT

AIRPORT	AIRPORT DEFINITION	PARKED	TAXI	TAKEOFF	CLIMB	CRUISE	APPROACH	LANDING	UNKNOWN	TOTAL
SLZ	SAO LUIZ, MARANHÃO, BRAZIL			1						1
SMF	SACRAMENTO, CA, USA			1			2			3
SNI	SAMOS ISLAND, GREECE						1			1
SNA	ORANGE COUNTY, CA, USA			1						1
SRQ	SARASOTA/BRADENTON, FL, USA			2						2
STN	LONDON-STANSTED, ENGLAND, UK							1		1
STO	STOCKHOLM, SWEDEN			1						1
STR	STUTTGART, FRG			3				3		7
SVG	SURAT, INDIA			1	1					2
SVG	STAVANGER, NORWAY			1						1
SVO	MOSCOW-SHEREMETYE, U.S.S.R.			1				2		3
SXR	SRINAGAR, INDIA			1						1
SYD	SYDNEY, N.S.W., AUSTRALIA			2						2
SYR	SYRACUSE, NY, USA	1		1			2			4
SZG	SALZBURG, AUSTRIA			1				2		3
TBT	TABATINGA, BRAZIL						1			1
TCI	TENERIFE, CANARY IS.			2	1					3
TFS	TENERIFFE-REINASOFIA, CANARY ISLAND							1		1
TGD	TITOGRAD, YUGOSLAVIA			1						1
TIP	TRIPOLI, LIBYA			1	2					3
TLS	TOULOUSE, FRANCE			1						1
TLV	TEL AVIV-YAFO, ISRAEL			1						1
TNG	TANGIER, MOROCCO			3	1		1		1	6
TPA	TAMPA/ST PETERSBURG, FL, USA									
TRD	TRONDHEIM, NORWAY			1						1
TRN	TURIN, ITALY			1				5		6
TRV	TRIVANDRUM, INDIA			1					1	2
TSF	TREVISO, ITALY			1						1
TSV	TOWNSVILLE, QLD, AUSTRALIA			3				1		4
TTJ	TOTTORI, JAPAN			1				1		2
TUC	TUCUMAN, ARGENTINA		1	1			1		1	4
TUL	TULSA, OK, USA			3						3
TUN	TUNIS, TUNISIA			1				1		2
TVL	LAKE TAHOE, CA, USA			1	1					2
TXL	WEST BERLIN, GERMANY			1				1		2
UDR	UDAIPUR, INDIA							1		1
UET	QUETTA, PAKISTAN									
UTN	UPINGTON, SOUTH AFRICA			3					1	4
VAKJ	KHARJURAH, INDIA		1	1						2
VCE	VALVERDE, CANARY ISLANDS			4	1		1		1	7
VDM	VIENNA, AUSTRIA							2	2	4
VIE	VIENNA, AUSTRIA							4		4
VNS	VARANASI, INDIA			2				1		3
VOTR	TIRUCHCHIRAPPALLI, INDIA									
VTZ	VISHAKHAPATNAM, INDIA			1				1		2
WAW	WARSAW, POLAND			1				1		2
WBSB	BRUNEI INTL, MALAYSIA			1						1
WDH	WINDHOEK, NAMIBIA			1						1
WLG	WELLINGTON, NEW ZEALAND			3				2		5
XFO	UNKNOWN FOREIGN AIRPORT			14	1	8	1	9	226	259
XMN	XIAMEN, P. R. CHINA			2						2
XRY	JEREZ DE LA FRONTERA, SPAIN		1	1		3	1		83	89
XUS	UNKNOWN USA AIRPORT			1						1
YAM	SAULT STE MARIE, ONT., CANADA			1						1
YCG	CASTLEGAR, BC, CANADA			1						1

TABLE 5.1 (CONCLUDED)
FREQUENCY COUNT OF AIRCRAFT INGESTION EVENTS BY AIRPORT AND PHASE OF FLIGHT

AIRPORT	AIRPORT DEFINITION	PARKED	TAXI	TAKEOFF	CLIMB	CRUISE	APPROACH	LANDING	UNKNOWN	TOTAL
YHY	HAY RIVER, NWT, CANADA			2				2		2
YHZ	HALIFAX, NS, CANADA			1						1
YKA	KAMLOOPS, BC, CANADA			1			1			2
YLW	KELOWNA, BC, CANADA			1						1
YMM	FT McMURRAY, ALTA, CANADA			1				1		2
YOW	OTTAWA, ONT, CANADA			2						2
YQB	QUEBEC, QUE, CANADA			1						1
YQR	REGINA, SASK, CANADA			1						1
YQT	THUNDER BAY, ONT, CANADA			1						1
YSM	FT SMITH, NWT, CANADA			1				2		3
YUL	MONTREAL, QUEBEC, CANADA			5						5
YVO	VAL D'OR, QUE, CANADA			1						1
YVQ	NORMAN WELLS, NWT, CANADA			1				5	1	7
YVR	VANCOUVER, BC, CANADA			3			1	1		5
YWG	WINNIPEG, MAN, CANADA			1				1		2
YXD	EDMONTON-MUNICIPAL, ALBERTA, CANADA			3				1		4
YXJ	FT ST JOHN, BC, CANADA			2				2		4
YXS	PRINCE GEORGE, BC, CANADA			2				1		3
YYC	CALGARY, ALBERTA, CANADA			4				2		6
YYJ	VICTORIA, BC, CANADA			1				1		2
YYT	ST JOHNS, NFLD, CANADA			1			1			2
YYZ	TORONTO, ONTARIO, CANADA			2				1		3
YZF	YELLOWKNIFE, NWT, CANADA			1			1	2		4
YZP	SANDSPIT, BC, CANADA			1			1	1		3
ZRH	ZURICH, SWITZERLAND			1					6	7
ZTH	ZAKINTHOS, GREECE			1		2				3
-0-	AIRPORT UNKNOWN			1						1
	AIRPORTS WITH KNOWN INGESTIONS	1	10	555	85	15	86	301	357	1410

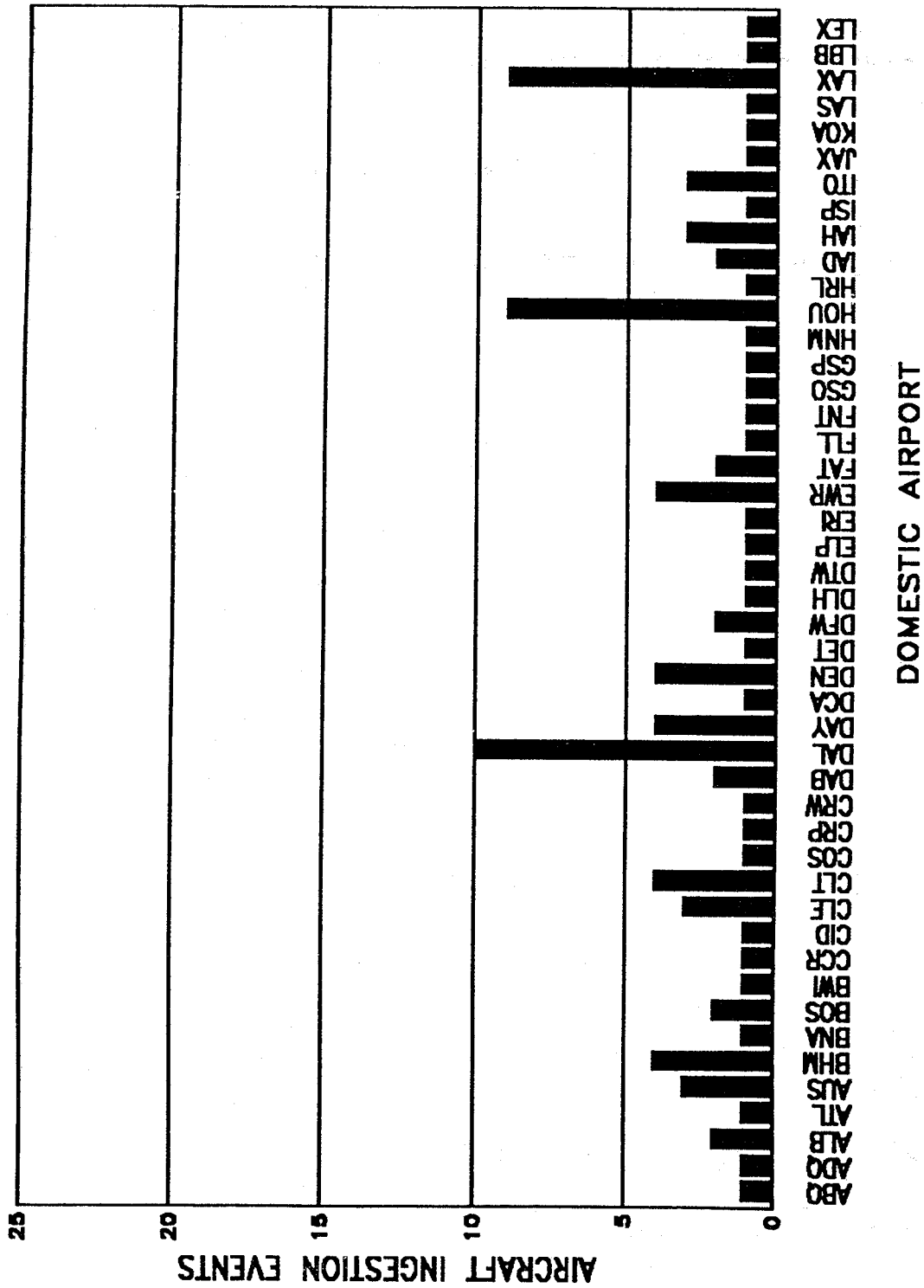


Figure 5.1. Histogram of Aircraft Ingestion Events at Domestic Airports.

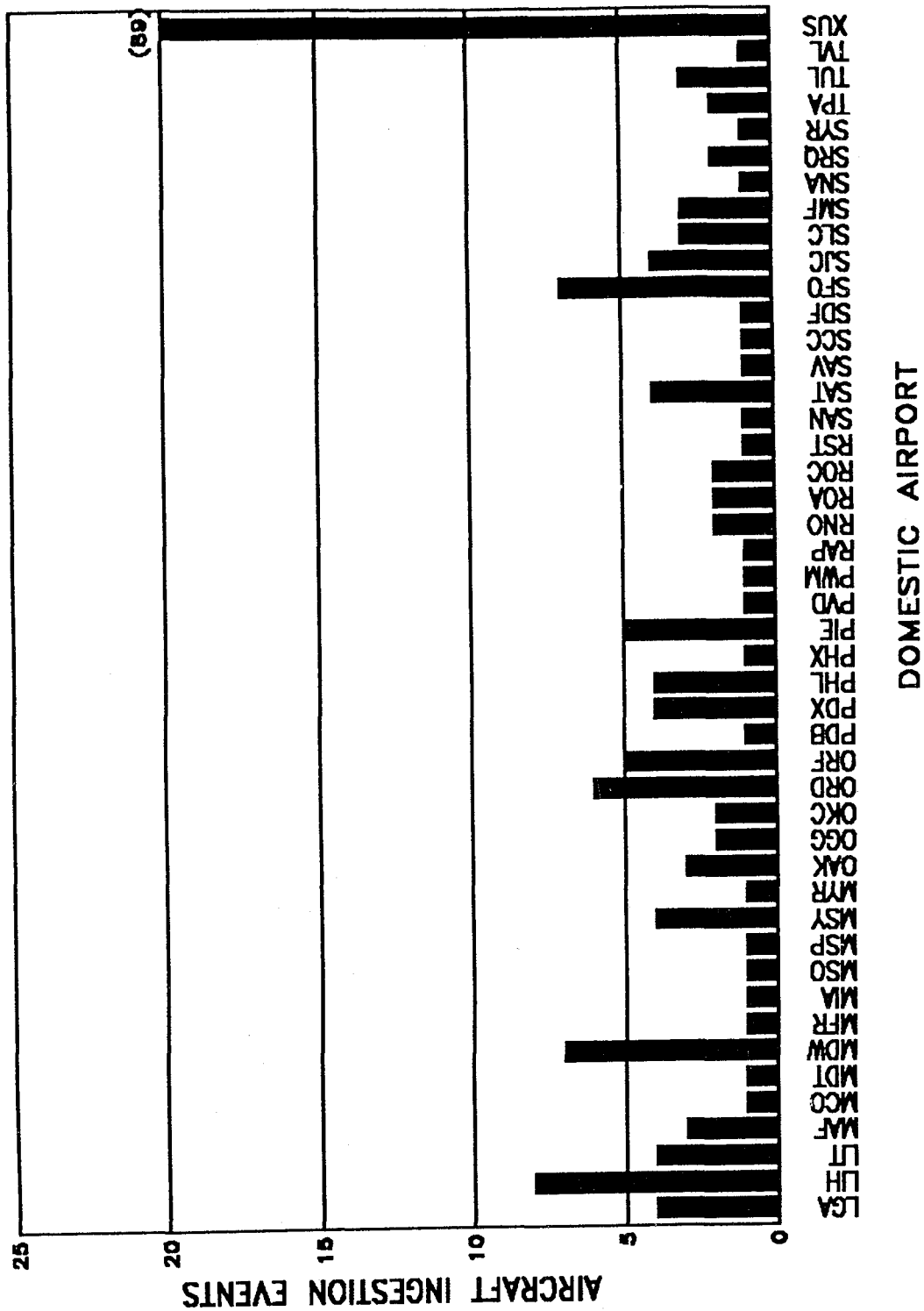


Figure 5.1. Histogram of Aircraft Ingestion Events at Domestic Airports. (Concluded)

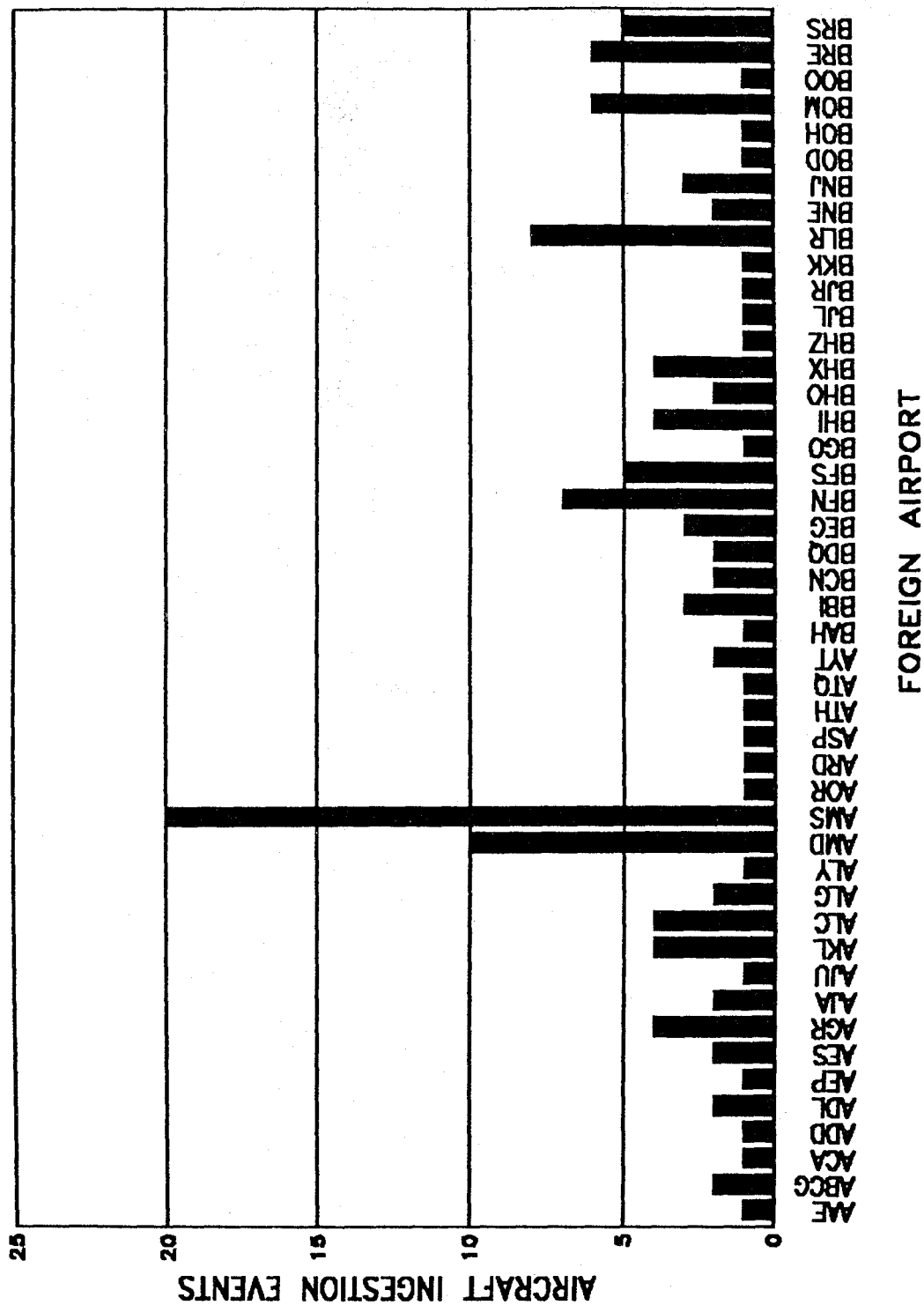


Figure 5.2. Histogram of Aircraft Ingestion Events at Foreign Airports.

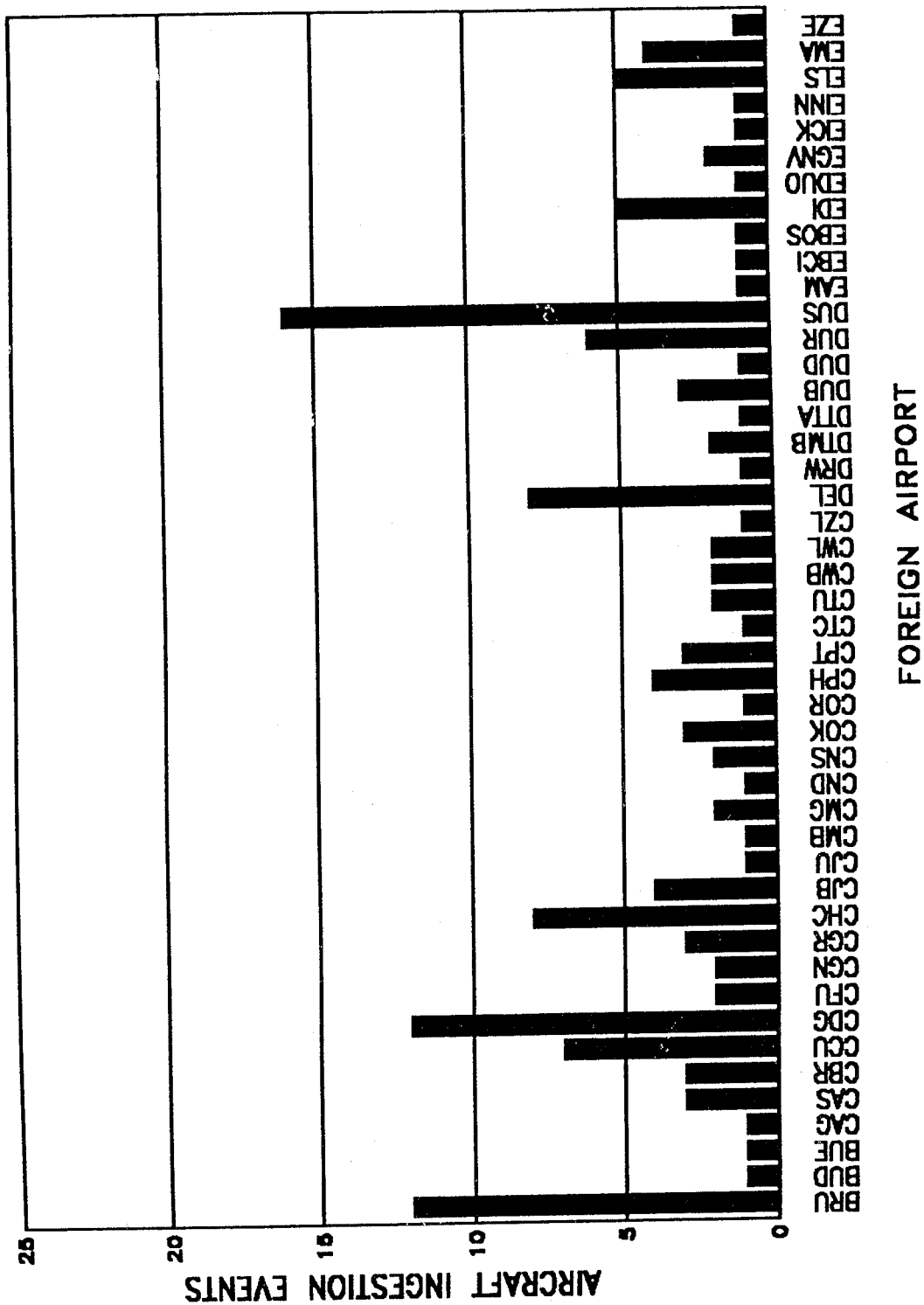


Figure 5.2. Histogram of Aircraft Ingestion Events at Foreign Airports. (Continued)

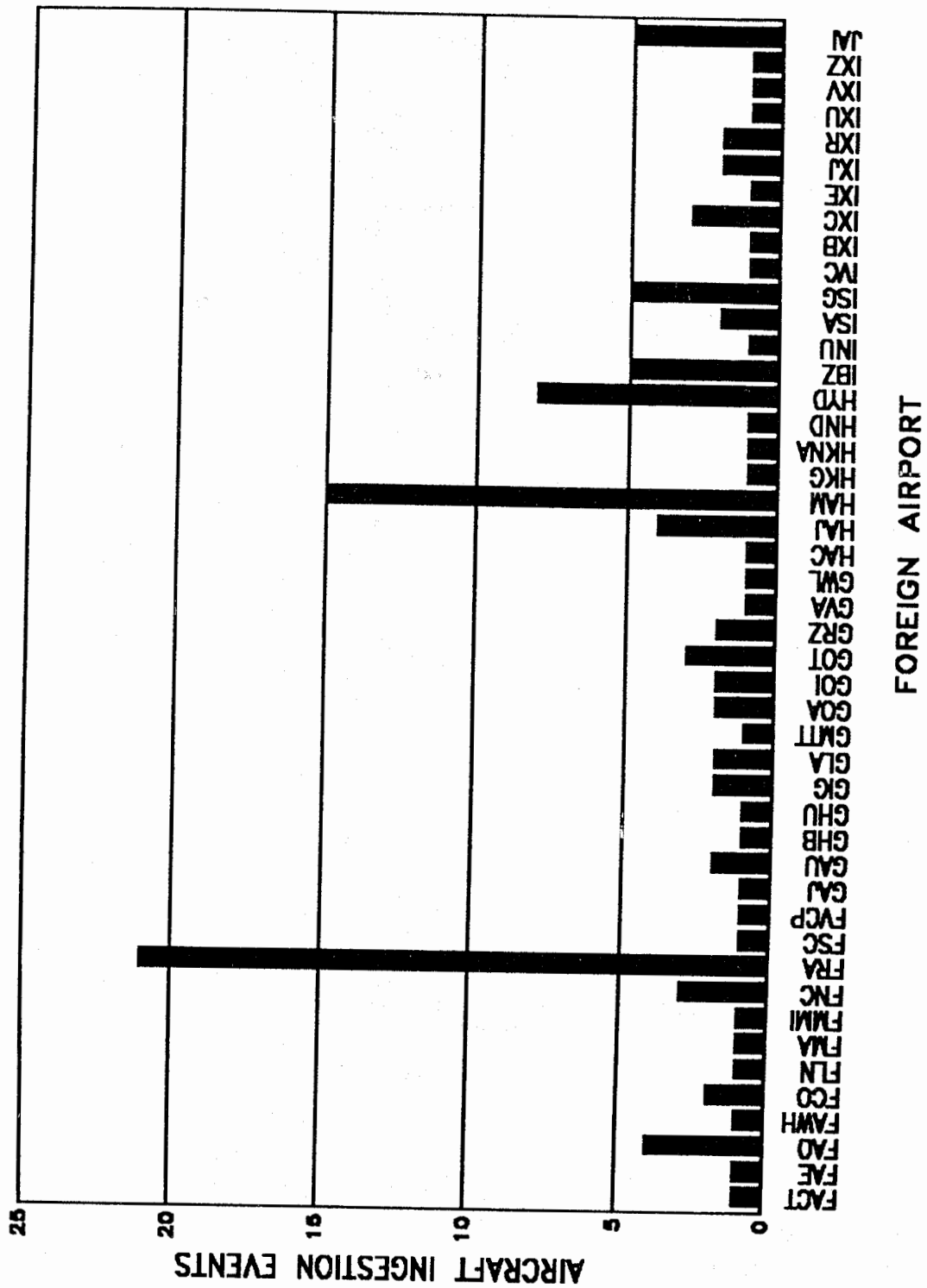


Figure 5.2. Histogram of Aircraft Ingestion Events at Foreign Airports. (Continued)

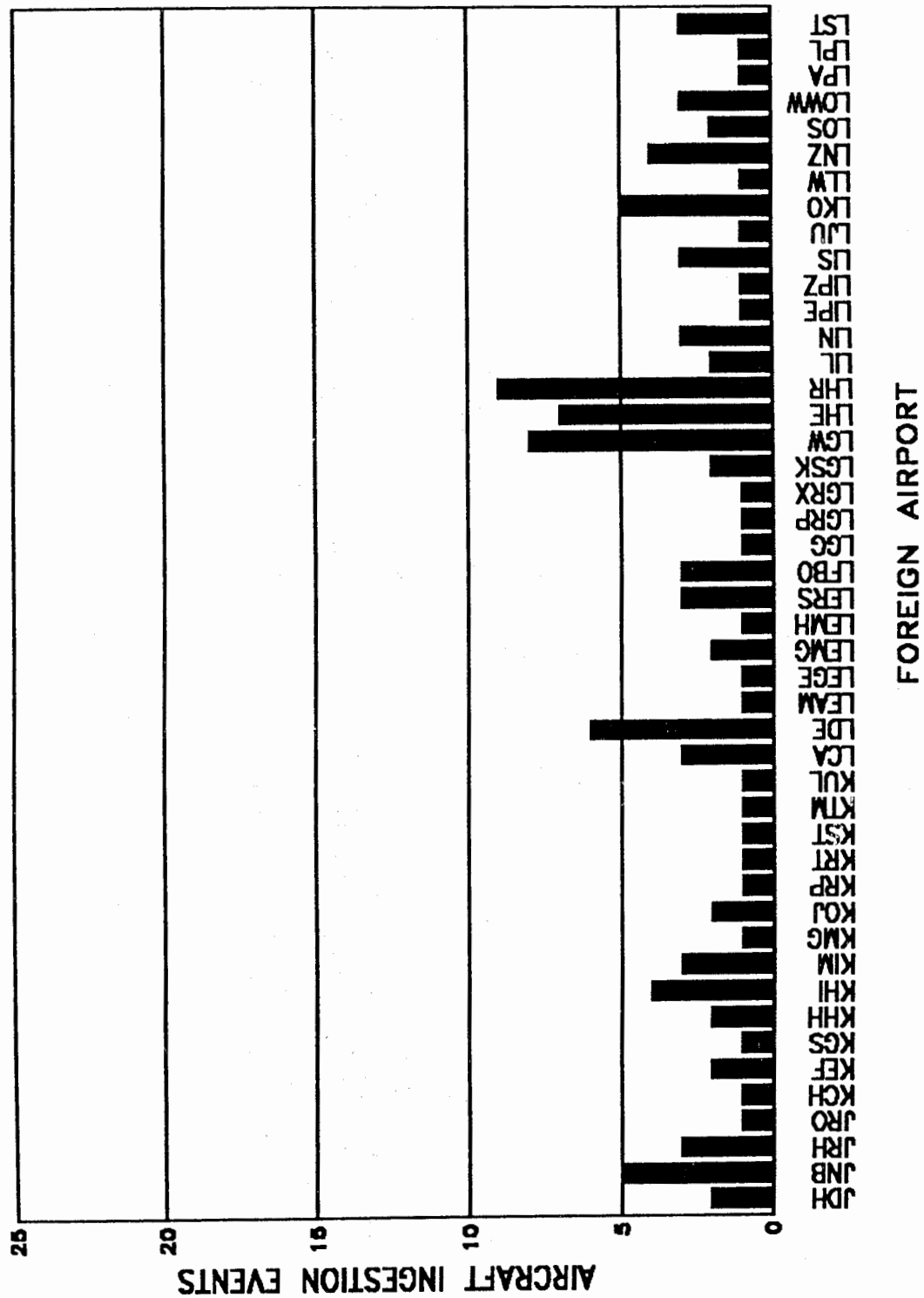


Figure 5.2. Histogram of Aircraft Ingestion Events at Foreign Airports. (Continued)

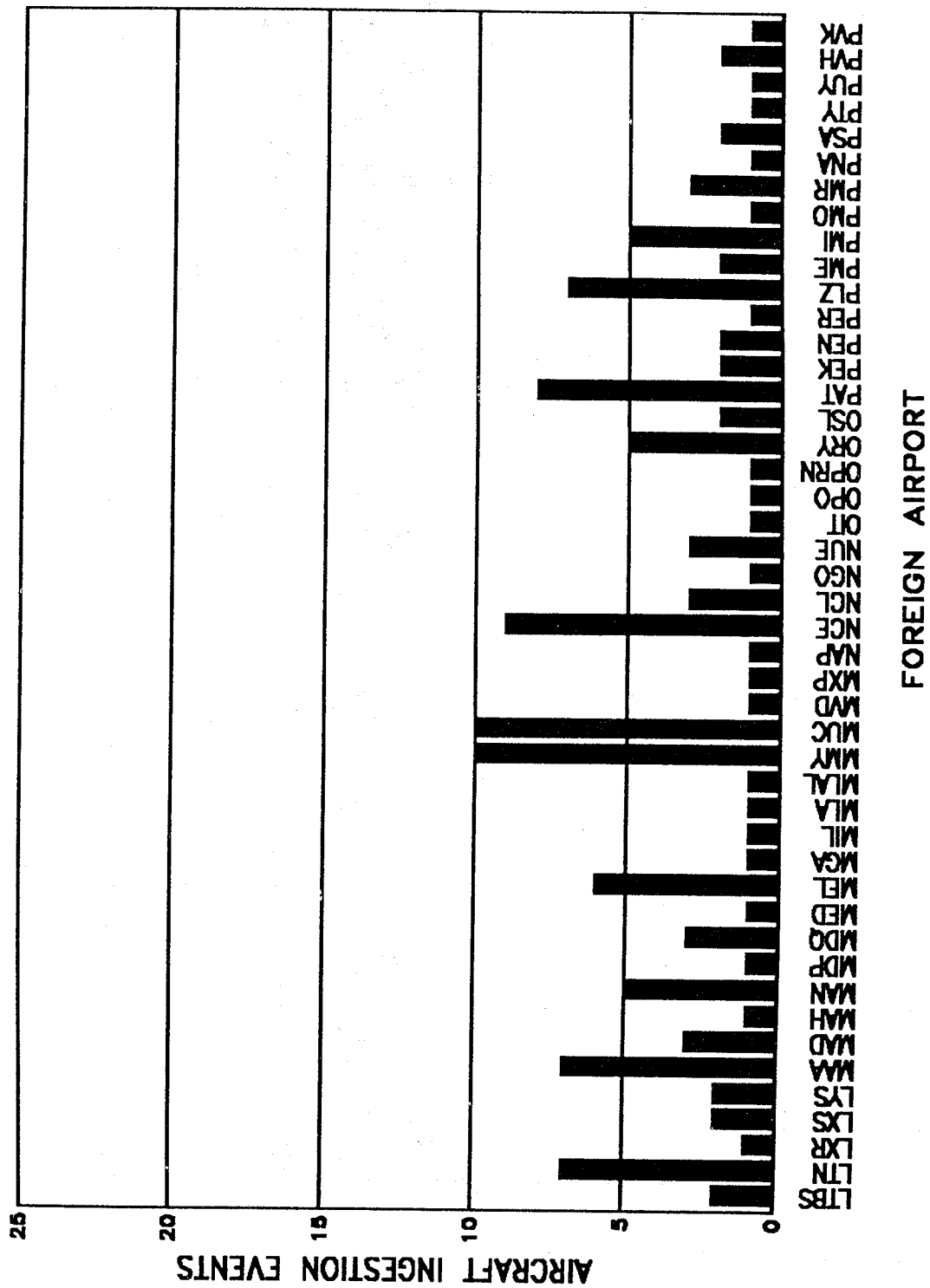


Figure 5.2. Histogram of Aircraft Ingestion Events at Foreign Airports. (Continued)

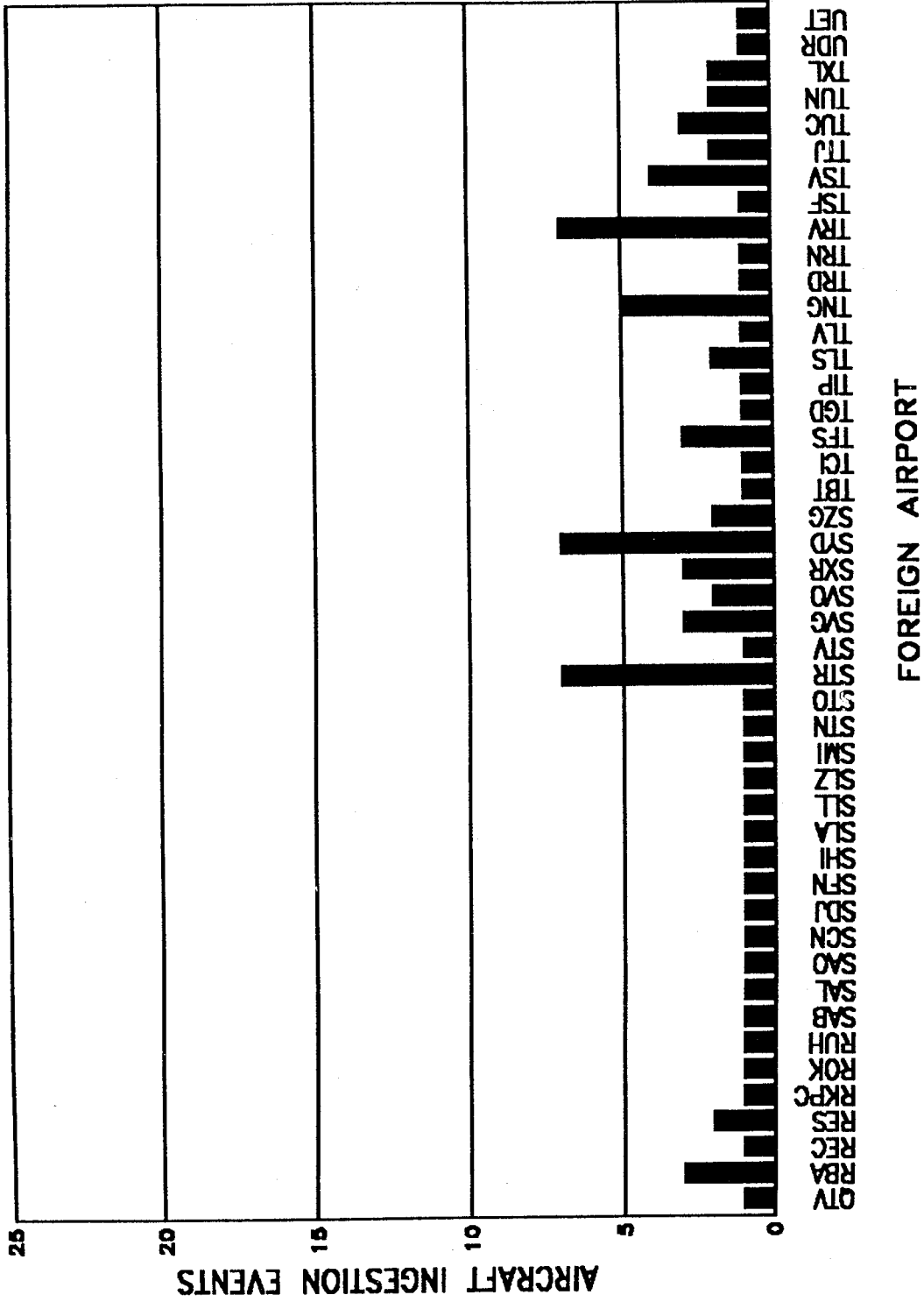


Figure 5.2. Histogram of Aircraft Ingestion Events at Foreign Airports. (Continued)

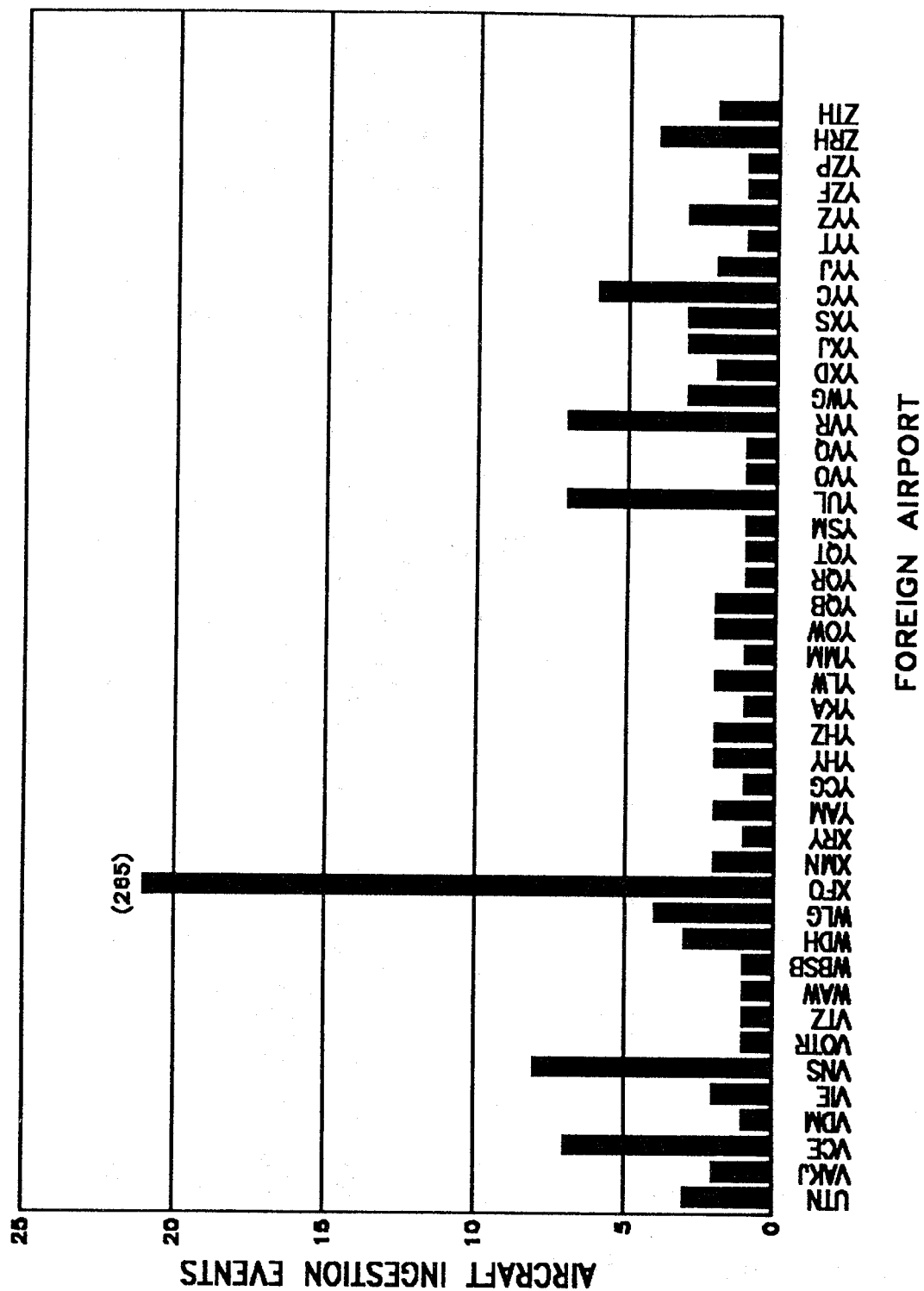


Figure 5.2. Histogram of Aircraft Ingestion Events at Foreign Airports. (Concluded)

TABLE 5.2 AIRPORT BIRD INGESTION RATES
(3 Or More Aircraft Ingestion Events)

Airport Code	Airport Operations	Ingestion Events	Ingestion Rate Events/10K Ops	Airport Location
LAX	355,538	9	0.25	LOS ANGELES, CA, USA
DEN	332,616	4	0.12	STAPLETON INT'L, DENVER, CO, USA
CLT	331,001	4	0.12	CHARLOTTE NC, USA
SFO	254,777	7	0.27	SAN FRANCISCO-OAKLAND, CA, USA
ORD	249,037	6	0.24	CHICAGO-O'HARE, IL, USA
EWR	247,201	4	0.16	NEWARK, NEW YORK, NY, USA
HOU	239,871	9	0.38	HOUSTON, TX, USA
LHR	238,809	9	0.38	LONDON HEATHROW, ENGLAND, (UK)
DAL	227,610	10	0.44	LOVE DALLS/FT. WORTH, TX, USA
SLC	221,234	3	0.14	SALT LAKE CITY, UT, USA
FRA	221,698	2	1.22	FRANKFURT, FRG
YYZ	136,511	3	0.22	TORONTO, ONTARIO, CANADA
MDW	128,958	7	0.54	CHICAGO-MIDWAY, IL, USA
DAY	128,873	4	0.31	DAYTON, OH, USA
MUC	127,730	10	0.78	MUNICH, FRG
PHL	125,578	4	0.32	PHILADELPHIA/WILMINGTON, PA, USA
IAH	124,385	3	0.24	HOUSTON INTERCONT, TX, USA
CLE	119,819	3	0.25	CLEVELAND, OH, USA
SJC	112,356	4	0.36	SAN JOSE, CA, USA
YVR	109,879	7	0.64	VANCOUVER, BC, CANADA
SAT	101,897	4	0.39	SAN ANTONIO, TX, USA
LGA	100,891	4	0.40	NEW YORK LA GUARDIA, NY, USA
BRU	96,890	12	1.19	BRUSSELS, BELGIUM
AUS	96,533	3	0.31	AUSTIN, TX, USA
DUS	96,280	16	1.66	DUESSELDORF, FRG
YYC	91,572	6	0.62	CALGARY ALBERTA, CANADA
MSY	89,704	4	0.44	NEW ORLEANS, LA
AMS	86,983	20	2.23	AMSTERDAM, NETHERLANDS
CDG	85,274	12	1.38	PARIS DE GAULLE, FRANCE
TUL	80,971	3	0.35	TULSA, OK, USA
HAM	77,470	15	1.85	HAMBURG, FRG
OAK	75,242	3	0.39	OAKLAND, SAN FRANCISCO, CA, USA
WLG	71,650	4	0.53	WELLINGTON, NEW ZEALAND
DUB	71,211	3	0.42	DUBLIN, REPUBLIC OF IRELAND
SYD	70,344	7	0.98	SYDNEY, N.S.W. AUSTRALIA
AKL	69,604	4	0.57	AUCKLAND, NEW ZEALAND
MEL	68,167	6	0.86	MELBOURNE, VICTORIA, AUSTRALIA
CHC	67,116	8	1.17	CHRISTCHURCH, NEW ZEALAND
LGW	65,366	8	1.19	LONDON-GATWICK, ENGLAND
YUL	64,753	7	1.07	MONTREAL, QUEBEC, CANADA
ORF	63,259	5	0.77	NORFOLK-VA. BEACH, VA, USA
SMF	59,973	3	0.47	SACRAMENTO, CA, USA
STR	55,447	7	1.17	STUTTGART, FRG
PDX	55,045	4	1.72	PORTLAND, OR, USA
SVG	54,320	3	0.55	STAVANGER, NORWAY
LIH	50,033	8	1.47	LIHUE, KAUAI, HA, USA
DEL	48,192	8	1.60	DELHI, INDIA
BOM	48,105	6	1.25	BOMBAY, INDIA
JNB	45,147	5	1.04	JOHANNESBURG, SOUTH AFRICA
MAF	44,751	3	0.66	MIDLAND ODESSA, TX, USA
YWG	41,321	3	0.67	WINNIPEG, MAN, CANADA
ZRH	41,237	4	0.97	ZURICH, SWITZERLAND
CPH	41,727	4	0.97	COPENHAGEN, DENMARK
PLZ	40	4	1.72	PORT ELIZABETH, SOUTH AFRICA

TABLE 5.2 (CONTINUED) AIRPORT BIRD INGESTION RATES

(3 Or More Aircraft Ingestion Events)

Airport Code	Airport Operations	Ingestion Events	Ingestion Rate Events/10K Ops	Airport Location
BEG	517	3	0.78	BELGRADE, YUGOSLAVIA
LIS	228	3	0.78	LISBON, PORTUGAL
CCU	422	7	2.09	CALCUTTA, INDIA
ELS	567	5	1.58	EAST LONDON, SOUTH AFRICA
LIT	026	4	1.29	LITTLE ROCK, AK, USA
CPT	773	3	0.97	CAPE TOWN, SOUTH AFRICA
ITO	787	3	1.08	HILO HAWAII, HA, USA
HAI	370	4	1.46	HANOVER, FED REP OF GERMANY
BHM	708	4	1.50	BIRMINGHAM, AL, USA
LHE	548	7	2.74	LAHORE, PAKISTAN
ORY	127	5	1.99	PARIS, ORLY ARPT, FRANCE
KHI	124	4	1.59	KARACHI, PAKISTAN
DUR	288	6	2.47	DURBAN, SOUTH AFRICA
MAA	266	7	2.88	MADRAS, INDIA
MAN	179	5	2.07	MANCHESTER, ENGLAND (UK)
CGR	424	3	1.28	CAMPO GRANDE, BRAZIL
MAD	424	3	1.28	MADRID, SPAIN
BLR	250	3	1.31	BANGALORE, INDIA
LIN	283	3	1.31	MILAN LINATE, ITALY
TSV	677	4	2.04	ISHIGAKI, JAPAN
CBR	383	3	1.73	TOWNSVILLE, OLD, AUSTRALIA
AMD	768	3	1.73	CANBERRA, A.C.T., AUSTRALIA
LST	076	10	5.86	AHMEDABAD, INDIA
BRE	185	3	1.86	LAUNCESTON, TASMANIA, AUSTRALIA
FNC	957	6	3.80	BREMEN, FED REP OF GERMANY
NCE	322	3	2.01	FUNCHAL - MADEIRA, PORTUGAL
COK	438	3	2.19	NICE, FRANCE
BFN	483	3	2.07	COCHIN, INDIA
GOT	158	7	4.94	BLOEMFONTEIN, SOUTH AFRICA
YXS	194	3	2.17	GOTHENBURG, SWEDEN
PAT	619	3	2.20	PRINCE GEORGE, BC, CANADA
LKO	223	3	2.05	PATNA, INDIA
KIM	869	3	3.88	LUCKNOW, INDIA
JAI	859	3	3.33	KIMBERLEY, SOUTH AFRICA
PMI	650	3	3.94	JAI PUR, INDIA
MMY	525	10	3.98	PALMA MALLOCA ISLAND, SPAIN
NUE	276	3	3.15	MIYAKO JIMA, JAPAN
BFS	227	3	2.60	NUREMBURG, FRG
EDI	351	4	4.40	BELFAST, N. IRELAND
YXJ	151	4	4.93	EDINBURGH, SCOTLAND
BHX	691	3	3.10	FT ST JOHN, BC, CANADA
MDO	442	4	3.60	BIRMINGHAM, ENGLAND (UK)
VNS	302	4	3.55	MAR DEL PLATA, ARGENTINA
PMR	038	3	3.64	VARANASI, INDIA
TRV	796	3	3.73	PALMERSTON, NEW ZEALAND
TUC	106	8	3.98	TRIVANDRUM, INDIA
BHI	174	7	4.22	TUCUMAN, ARGENTINA
SXR	850	5	4.74	BAHIA BLANCA, ARGENTINA
ING	639	4	3.38	SRINAGAR, INDIA
HYD	582	7	7.53	TANGIER, MOROCCO
BBI	254	12	12.15	HYDERABAD, INDIA
WDH	252	4	4.80	BHUBANESWAR, INDIA
AGR	670	5	5.18	WINDHOEK, NAMIBIA
		3	7.05	AGRA, INDIA

TABLE 5.2 (CONCLUDED) AIRPORT BIRD INGESTION RATES
(3 Or More Aircraft Ingestion Events)

Airport Code	Airport Operations	Ingestion Events	Ingestion Rate Events/10K Ops	Airport Location
NCL	5,293	3	5.67	NEWCASTLE, ENGLAND
CJB	4,662	4	8.58	COIMBATORE, INDIA
VCE	4,652	7	15.05	VALVERDE, CANARY ISLANDS
IXC	4,350	3	6.90	CHANDIGARH, INDIA
LCA	4,245	3	7.07	LARNACA, CYPRUS
FAO	4,081	4	9.80	FARO, PORTUGAL
ALC	3,014	4	13.27	ALICANTE, SPAIN
TFS	2,617	3	11.46	TENERIFFE-REINASOFIA, CANARY ISLAND
UTN	2,570	3	11.67	UPINGTON, SOUTH AFRICA
JRH	2,156	3	13.91	JORMAT, INDIA
LNZ	2,155	4	18.56	LNZ, AUSTRIA
RBA	1,093	3	(*)	RABAT, MOROCCO
LTN	1,018	3	(*)	LONDON-LUTON INT'L, ENGLAND
EMA	882	4	(*)	EAST MIDLANDS, ENGLAND
PIE	645	5	(*)	TAMPA-ST. PETERSBURG, FL, USA
IBZ	638	5	(*)	IBIZA, SPAIN
BRS	18	5	(*)	BRISTOL, ENGLAND (UK)
CAS	16	3	(*)	CASABLANCA, MOROCCO
LDE	8	6	(*)	LOURDES/TARBES, FRANCE
LOW	0	3	(**)	WIEN-SCHWEICHAU, OSTERREICH
LFB	0	3	(**)	BLAGNAC, FRANCE
LER	0	3	(**)	REUS, SPAIN
BNJ	0	3	(**)	BONN, FRG
	7,332,204	647	0.88 (***)	

(*) High proportion of unscheduled operations prevents calculation of meaningful ingestion rate.
 (**) Undefined ingestion rate.
 (***) Does not include airports whose rates are flagged with asterisks.

SECTION 6

ENGINE DAMAGE DESCRIPTION

The type of damage incurred by well-defined engine bird ingestion events is useful in refining bird certification test criteria that could lead to improved engine design. In general, three parameters are used to describe engine damage and failure. The first is the type of damage incurred, the second is whether or not the engine failed and the third is a description of the crew action taken during the engine ingestion event. The first part of this section provides descriptions of the types of damage incurred during the study, the relationships between engine damage and bird weight, engine damage and phase of flight, engine damage and aircraft airspeed, engine damage and multiple engine and multiple bird involvement, and the types of crew actions implemented as a result of the bird ingestion. The second part describes the statistical analysis of the relationship between bird weight and the likelihood of damage occurring in an engine ingestion event. The third part of this section provides estimates of the probabilities of a crew action or an engine shutdown. The fourth part describes the engine failures that were due to bird ingestions.

6.1 ENGINE DAMAGE AND CREW ACTION DESCRIPTIONS.

The types of damage that were identified in the data base were grouped into 14 categories which are defined in Table 6.1. Within the 3-year data collection period all 14 of the categories occurred. Tabulations of the occurrences of combinations of damage categories are presented in Table 6.2. The triangular top portion of the table provides tallies of co-occurrences for all pairs of damage categories. The number in the top portion represents the number of engine ingestion events in which both the row damage and the column damage occurred. The events in which more than two types of damage occurred were also included in the tallies of the top portion of Table 6.2. There were 39 events in which three types of damage occurred, 101 events in which two types of damage occurred and 314 events with a single type of damage.

There are insufficient data in the top portion of Table 6.2 to make any strong statements about correlations between types of damage. There is some indication that bent and dented fan blades accompany core damage and broken and shingled fan blades and that leading edge fan blade damage accompanies fan blade shingling; however, these trends cannot be strongly substantiated because of the small amount of data. The observed trends could provide the starting point for further investigations into the damage mechanisms of bird ingestions.

The bottom half of Table 6.2 provides tallies of the number of engine ingestion events in which each damage category was the only type of damage and the total number of events that involved each of the damage categories. Fewer than three bent and dented blades, shingled blades and nacelle and spinner damage seem more likely to occur by themselves than other types of damage. When more than three blades are bent or dented there is a much higher chance that some other type of damage will also occur. As with the trends identified in the top portion of Table 6.2, there is insufficient evidence to strongly substantiate these trends.

TABLE 6.1 DEFINITION OF ENGINE DAMAGE CATEGORIES

<u>DAMAGE CATEGORY</u>	<u>SEVERITY LEVEL</u>	<u>DAMAGE DEFINITION</u>
TRVSFRAC	Severe	Transverse fracture - fan blade broken chordwise (across) and piece liberated (includes secondary hard object damage).
CORE	Severe	Bent/broken compressor blades/vanes, blade/vane clash, blocked/disrupted airflow in low, intermediate, and high pressure compressors.
FLANGE	Severe	Flange separations.
TURBINE	Severe	Turbine damage.
BE/DE>3	Moderate	More than three fan blades bent or dented.
TORN>10	Moderate	More than ten torn fan blades.
BROKEN	Moderate	Broken fan blades, leading edge and/or tip pieces missing, other blades also dented.
SPINNER	Moderate	Dented, broken, or cracked spinner (includes spinner cap).
RELEASED	Moderate	Released (walked) fan blades (blade retention mechanism broken).
TORN<10	Mild	Ten or fewer torn fan blades.
SHINGLED	Mild	Shingled (twisted) fan blades.
NACELLE	Mild	Dents and/or punctures to the engine enclosure (includes cowl).
LEAD_EDG	Mild	Leading edge distortion/curl.
BEN/DEN	Mild	One to three fan blades bent or dented.

TABLE 6.2 TYPES OF DAMAGE CAUSED BY BIRD INGESTIONS

CORE	TRVSFRAC	CORE	FLANGE	TURBINE	BE/DE>3	TORN>10	BROKEN	SPINNER	RELEASED	TORN<10	SHINGLED	NACELLE	LEAD_EDG	BEN/DEN
CORE	11	CORE												
FLANGE	2	0	FLANGE											
TURBINE	0	2		TURBINE										
BE/DE>3	3	11	0	2	BE/DE>3									
TORN>10	2	0	0	0	1	TORN>10								
BROKEN	6	13	0	0	14	0	BROKEN							
SPINNER	0	0	0	0	0	0	0	SPINNER						
RELEASED	3	4	0	0	5	0	0		RELEASED					
TORN<10	0	2	0	0	1	0	1	0	0	TORN<10				
SHINGLED	2	3	0	0	19	0	6	0	5	1	SHINGLED			
NACELLE	0	0	0	0	0	0	1	0	0	0		NACELLE		
LEAD_EDG	0	1	0	0	1	0	5	0	0	2	23	0	LEAD_EDG	
BEN/DEN	6	9	0	0	0	0	16	0	2	0	25	2	6	
ONLY DAMAGE	7	12	0	1	38	0	30	1	0	1	89	5	31	99
TOTAL	29	48	2	3	80	2	70	1	11	6	159	7	64	151

Table 6.3 and 6.4 describe the relationship between the weight of the ingested bird and resulting engine damage. Table 6.3 shows the number of both multiple and single bird engine ingestion events as well as the total number of events with and without reported damage in each specified bird weight range where the bird was positively identified by an ornithologist. Engine damage summaries are shown in Tables 6.4A for all engine ingestion events, 6.4B for single bird events, and 6.4C for multiple bird events. These tables were made by tallying the damage codes from the events shown in Table 6.3 in each specified bird weight range.

Since many of the engine ingestion events have multiple damage categories, the total number of damage categories does not equal the number of engine ingestion events. Tables 6.4A, 6.4B, and 6.4C also show the damage sustained by those engines that were considered to have failed due to the bird ingestion. (See section 6.4 for more information on engine failure.)

The amount of data available is insufficient to draw any correlations between the weight of the ingested bird and the type of damage that occurs. However, Table 6.4A shows that 56 percent of the ingestions (111) in which the bird weighed less than or equal to 24 ounces caused no damage. In comparison only 17 percent of the birds ingested that weighed more than 24 ounces caused no engine damage.

The relationship between engine damage, phase of flight and aircraft airspeed is shown in Tables 6.5 and 6.6. Table 6.5 depicts the relationship between engine damage and phase of flight. Of the 1107 known phase of flight engine ingestion events, 61 percent occurred on takeoff and climb and 37 percent occurred during approach and landing. Forty-five percent of the engine ingestion events that took place during takeoff and climb resulted in engine damage; in comparison, only 24 percent resulted in damage during approach and landing. This suggests a relationship between engine speed (thrust) and bird ingestion engine damage, since engine speed would typically be higher during takeoff and climb than during approach and landing. However, engine speed or power was rarely reported during the study. It should be noted that 35 engine failures occurred during takeoff and climb and only 2 engine failures occurred during approach and landing.

Table 6.6 shows the number of engine ingestion events and the number of damaging engine ingestions known to have occurred below 140 knots airspeed and at or above 140 knots. The table also shows the phase of flight that these damaging engine ingestions occurred in those airspeed ranges. There were 13 percent (41 percent versus 28 percent respectively) more engine ingestions that resulted in engine damage at or above 140 knots airspeed than those that occurred below 140 knots. It is also shown that a significantly greater number of damaging ingestions occurred during takeoff and climb than during approach and landing at both aircraft airspeed ranges.

Multiple engine and multiple bird ingestion events present the greatest hazard to aircraft. Table 6.7 shows the number of these event that occurred. Fifty-eight aircraft had bird ingestions into both engines during the same event, and twelve events resulted in damage to both engines. There were also twenty-nine events where multiple birds were ingested into both engines;

TABLE 6.3. TALLY OF POSITIVELY IDENTIFIED BIRD SPECIES BY WEIGHT RANGE AND EVENT TYPE

Weight Range (oz.)	Bird Identifications*		
	Total Bird Events	Single Bird Events	Multiple Bird Events
$0 < x \leq 8$	107	83	24
$8 < x \leq 16$	80	62	18
$16 < x \leq 24$	13	9	4
$24 < x \leq 32$	13	13	0
$32 < x \leq 40$	25	17	8
$x > 40$	15	13	2
Total	253	197	56

*One counted for each engine ingestion event

TABLE 6.4A. 737 AIRCRAFT ENGINE BIRD INGESTION DAMAGE SUMMARY
(TOTAL BIRD EVENTS)*

<u>Severity</u>	<u>Damage Category</u>	<u>Bird Weight Range (oz.)</u>					
		(0<x≤8)	(8<x≤16)	(16<x≤ 24)	(24<x≤32)	(32<x≤40)	(x>40)
	None	69	36	6	2	4	3
	Damage Unknown	4	5/1	0	1	0	0
	Other	0	3/1	0	1	6	0
Mild							
	Lead-Edg	3	6	2	1/1	3	0
	Shingled	10	11/2	1	1	6/1	4/1
	Ben/Den	18/1	10/1	3	1	3/1	3
	Torn<3	0	1	0	1	0	1
	Nacelle	1	0	0	2	0	0
Moderate							
	Be/De>3	6	8/3	2/2	0	6/3	5/1
	Torn>3	0	0	0	0	2/2	0
	Broken	7/1	6/2	2/1	5/1	3/2	3/1
	Spinner	0	0	0	0	0	0
	Released	0	4/3	0	0	1	1
Severe							
	Trvs Frac	4/4	8/8	1/1	2/2	3/3	1/1
	Core	3/2	9/7	2/2	2/1	1	5/1
	Flange	0	1/1	0	1/1	0	0
	Turbine	1/1	2/2	0	0	0	0

*Number of occurrences/number of occurrences when engine failed

TABLE 6.4B. 737 AIRCRAFT ENGINE BIRD INGESTION DAMAGE SUMMARY
(SINGLE BIRD EVENTS)*

<u>Severity</u>	<u>Damage Category</u>	<u>Bird Weight Range (oz.)</u>					
		(0<x≤8)	(8<x≤16)	(16<x≤ 24)	(24<x≤32)	(32<x≤40)	(x>40)
	None	56	31	3	2	2	3
	Damage Unknown	3	5/1	0	1	0	0
	Other	0	3/1	0	1	4	0
Mild							
	Lead-Edg	2	4	1	1/1	3	0
	Shingled	7	7/1	1	1	3	3/1
	Ben/Den	13	8/1	2	1	2/1	1
	Torn<3	0	1	0	1	0	1
	Nacelle	1	0	0	2	0	0
Moderate							
	Be/De>3	3	3/1	2/2	0	5/2	5/1
	Torn>3	0	0	0	0	2/2	0
	Broken	5	6/2	2/1	5/1	3/2	2/1
	Spinner	0	0	0	0	0	0
	Released	0	1/1	0	0	1	1
Severe							
	Trvs Frac	3/3	4/4	1/1	2/2	3/3	1/1
	Core	3/2	3/2	2/2	2/1	1	4/1
	Flange	0	1/1	0	1/1	0	0
	Turbine	1/1	0	0	0	0	0

*Number of occurrences/number of occurrences when engine failed

TABLE 6.4C. 737 AIRCRAFT ENGINE BIRD INGESTION DAMAGE SUMMARY
(MULTIPLE BIRD EVENTS)*

<u>Severity</u>	<u>Damage Category</u>	<u>Bird Weight Range (oz.)</u>					
		(0<x≤8)	(8<x≤16)	(16<x≤ 24)	(24<x≤32)	(32<x≤40)	(x>40)
	None	13	5	3	0	2	0
	Damage Unknown	1	0	0	0	0	0
	Other	0	0	0	0	2	0
Mild							
	Lead-Edg	1	2	1	0	0	0
	Shingled	3	4/1	0	0	3/1	1
	Ben/Den	5/1	2	1	0	1	2
	Torn<3	0	0	0	0	0	0
	Nacelle	0	0	0	0	0	0
Moderate							
	Be/De>3	3	5/2	0	0	1/1	0
	Torn>3	0	0	0	0	0	0
	Broken	2/1	0	0	0	0	1
	Spinner	0	0	0	0	0	0
	Released	0	3/2	0	0	0	0
Severe							
	Trvs Frac	1/1	4/4	0	0	0	0
	Core	0	6/5	0	0	0	1
	Flange	0	0	0	0	0	0
	Turbine	0	2/2	0	0	0	0

*Number of occurrences/number of occurrences when engine failed

TABLE 6.5. PHASE-OF-FLIGHT (POF) ANALYSIS

	Known POF Aircraft Events/ Engine Ingestions <u>(1054/1107)</u>	Known POF Damaging Aircraft Events/ Engine Ingestions <u>(388/406)</u>	Known POF Engine Failure Ingestions <u>(37)</u>
Takeoff and Climb	640/674	289/300	35
Approaching and Landing	387/406	89/96	2

TABLE 6.6. AIRCRAFT AIRSPEED ANALYSIS

Aircraft <u>Airspeed</u>	Known Speed Engine Ingestions <u>(634)</u>	Known Speed Engine Ingestions, Takeoff And Climb <u>(387)</u>	Known Speed Engine Ingestions, Landing And Approach <u>(234)</u>
-----------------------------	--	--	---

< 140 Knots

412

215

190

≥ 140 Knots

222

172

44

Aircraft
AirspeedKnown Speed
Damaging Engine
Ingestions (206)Known Speed
Damaging Engine
Ingestions, Takeoff
And Climb (159)Known Speed
Damaging Engine
Ingestions, Landing
And Approach (47)

< 140 Knots

116

78

38

≥ 140 Knots

90

81

9

TABLE 6.7. MULTIPLE ENGINE AND MULTIPLE BIRD ANALYSIS

	Aircraft Events/ Engine Ingestions	Damaging Engine Ingestions	Engine Failure Ingestions
Multiple Engine	58/116	38/12*	2
Multiple Bird	179/208	79	9
Single Bird	1237/1260	489	21

*Aircraft events where more than one engine damaged

potentially the most hazardous bird ingestion condition an aircraft can encounter.

Table 6.7 also gives the number of engine ingestion events where more than one bird was ingested into the engine. Of the 208 multiple bird engine ingestions that occurred, 38 percent of the ingestions resulted in some engine damage. In comparison 39 percent of the engines that ingested a single bird resulted in some engine damage. Four percent of the multiple bird ingestions resulted in engine failures compared to three percent for single bird ingestions.

There were four types of crew action identified in connection with the aircraft ingestion events in the data base. An air turnback was performed in 128 of the events, the takeoff was aborted 129 times, a diversionary maneuver was performed 16 times and in 21 events the crew action was listed as other without specifying the type of action taken. There was no crew action taken in 719 of the aircraft ingestion events for which a crew action entry was recorded, which is nearly 71 percent of the time. (One airplane crashed on takeoff.) The crew action should correspond to the phase of flight in which the event occurred. No change in the flight is usually required when an ingestion occurs during a landing maneuver. The aborted takeoffs and air turnbacks would most likely occur during takeoff and climb phases since there were practically no ingestions during the cruise phase. However, there were three air turnbacks as a result of a bird ingestion during the cruise phase.

6.2 PROBABILITY OF DAMAGE.

One of the key questions that inspired the bird ingestion survey is the issue of what weight bird should be considered for certification test criteria. Two of the main issues in deciding what the certification bird size should be are (1) the likelihood of ingesting a bird of the certification size or larger and (2) the likelihood that damage will result from ingesting a bird of a specified weight. The issue of bird weights is discussed in Sections 3 and 7 while the probability of damage is the topic of this section.

The problem of relating bird weight to the probability of damage (POD) is similar to bio-assay experiments which try to predict the probability of a response as a function of dose size. The key elements of similarity are that the probability of success for a dichotomous (pass/fail) trial is related to a continuous stimulus variable. In bird ingestions the dichotomous trial is whether or not damage occurs and the stimulus variable is the weight of the ingested bird.

Linear logistic analysis is the most commonly used method of analyzing the dosage-response type of data and has been used successfully in relating the probability of transparencies breaking as a function of projectile size in dealing with the problem of propwash blown gravel breaking helicopter windshields [10]. The logistic distribution function is assumed to describe the relationship between the probability of damage and the bird weight in a linear logistic analysis. The logistic distribution function is given by:

$$\text{POD}(w) = 1 / \{1 + \exp[-(\pi/\sqrt{3})(w-\mu)/\sigma]\} \quad (6.1)$$

where w is the bird weight, μ is the weight with a 50 percent chance of causing damage and σ is a parameter that is related to the steepness of the POD function.

The estimation of the function given in Equation 6.1 has been extensively studied and the methods have been described in the literature [11,12]. The method of maximum likelihood provides the best estimates for the type of data in the bird ingestion study since there are only a few ingestions at each weight. The software for estimating the parameters of Equation 6.1 has been developed and extensively tested at the UDRI [13] and verified by researchers at other institutions.

The types of damage were categorized as mild, moderate or severe by the FAA. Table 6.8 itemizes the types of damage that were included in each of the severity categories. Three distinct analyses were conducted based on the severity ratings. The three analyses estimated the probability of any damage, the probability of at least moderate damage and the probability of severe damage as a function of bird weight. Figures 6.1, 6.2, and 6.3 show the estimated POD functions along with confidence bounds on the POD functions for the three analyses. Note that the figures are based on the weight of one ingested bird per event, not the total weight of all birds ingested in the case of a multiple bird ingestion event.

Figure 6.1 shows the probability of any damage occurring and includes all three severity levels as positive responses. The probability of any damage occurring rises very steeply reaching 50 percent at about 10.0 ounces and the curve levels off at the 90 percent level at about 120 ounces. The relationship between bird weight and the probability of any damage is very strong and results in the confidence bound being close to the mean trend curve.

The probability of moderate damage does not rise quite so steeply and a definitive weight cutoff between birds that cause damage and those that do not cause damage cannot be identified. The probability of moderate damage reaches 50 percent at 66 ounces and remains below 70 percent through the weight range collected in this study. The confidence bound shown in Figure 6.2 is further from the mean trend than the confidence bound in Figure 6.1 because the trend in the probability of moderate damage as a function of bird weight is not as strong as the trend in the probability of any damage.

The probability of severe damage and its confidence bound are plotted in Figure 6.3 as functions of bird weight. The probability of severe damage is much lower than the probabilities of any damage or moderate damage. As a result, the curves are much flatter and rise much more slowly than the curves in Figures 6.1 and 6.2. The probability of severe damage remains below 35 percent through the weight range collected in this study.

The probability of damage analysis is clouded by the poor bird identification rates. The estimated POD functions are likely to be biased toward higher POD values since there was a larger proportion of birds identified when engine damage occurred. The extent of the bias cannot be estimated accurately.

TABLE 6.8 DAMAGE SEVERITY DEFINITIONS

SEVERITY LEVEL	DAMAGE DEFINITION
SEVERE DAMAGE	Damage classified as severe. Achieved when reported damage category is TRVSFRAC, CORE, FLANGE, or TURBINE.
MODERATE DAMAGE	Damage classified as moderate. Achieved when reported damage category is BE/DE>3, TORN>10, BROKEN, SPINNER, or RELEASED AND no SEVERE damage has been reported.
MILD DAMAGE	Damage classified as mild. Achieved when reported damage category is LEAD EDG, BEN/DEN, TORN<10, SHINGLED, or NACELLE AND neither SEVERE nor MODERATE damage has been reported.

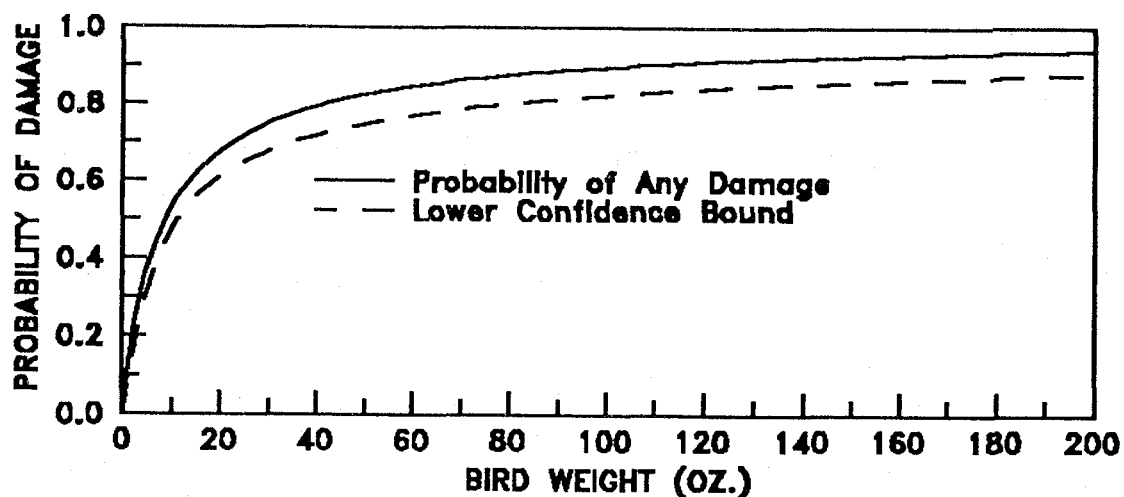


Figure 6.1. Estimated POD Function for Any Damage with the 95 Percent Confidence Bound.

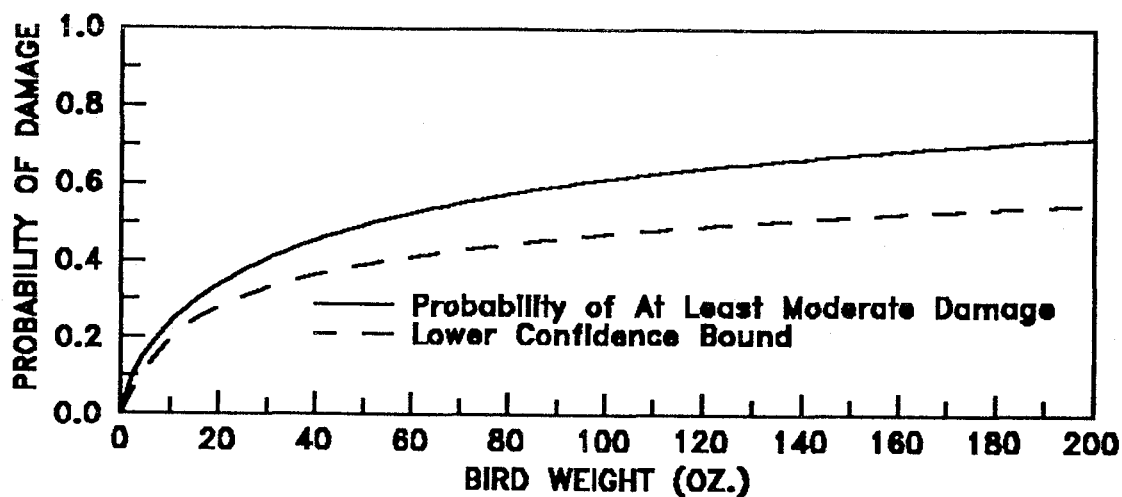


Figure 6.2. Estimated POD Function for Moderate or Worse Damage with the 95 Percent Confidence Bound.

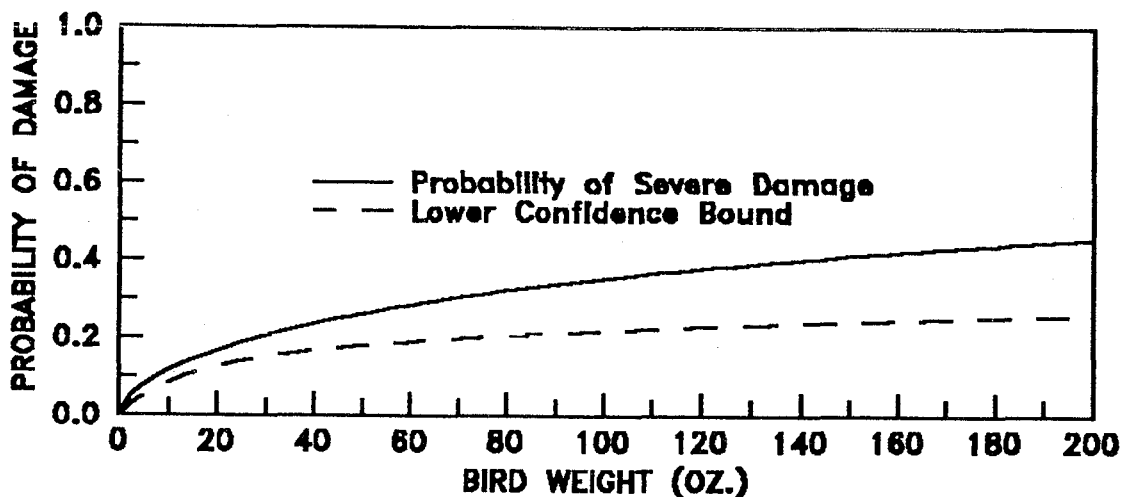


Figure 6.3. Estimated POD Function for Severe Damage with the 95 Percent Confidence Bound.

6.3 CREW ACTION AND ENGINE SHUTDOWN PROBABILITIES.

Two other factors that relate to the severity of engine damage are whether or not a crew action is required and whether or not an engine was shut down as a result of the ingestion. Table 6.9 lists the conditional probabilities that a crew action is required given the severity of damage that the engine incurs. The probability that a crew action is required increases with the severity of engine damage as expected. The third column of Table 6.9 contains the upper 95 percent confidence bound on the conditional probabilities given in column two.

The formulae for the estimates of the conditional probability of a crew action given the engine damage severity are:

$$\hat{P} = \frac{C}{N_s} \quad (6.2)$$

$$P_{CB} = \hat{P} + 1.645 \sqrt{\frac{\hat{P}(1-\hat{P})}{N_s}} \quad (6.3)$$

In Equations 6.2 and 6.3, $\hat{P}$ is the estimated conditional probability of a crew action, C is the number of aircraft ingestion events in which a crew action was taken and an engine sustained the given severity level, N_s is the number of aircraft ingestion events in which an engine sustained the given severity level and P_{CB} is the upper confidence bound on the conditional probability. The constant 1.645 is derived from the cumulative normal distribution function to give a 95 percent level of confidence.

An in-flight engine shutdown occurred in 46 of the 1,410 aircraft ingestion events; which corresponds to an estimated probability of an in-flight engine shutdown given that an ingestion has occurred of 0.033 with a 95 percent confidence bound of 0.0404. The reason for the shutdown was not known in 25 of the events. An involuntary shutdown occurred seven times. Excessive vibration precipitated the shutdown nine times. The engine was shut down because of incorrect engine pressure ratio three times, incorrect engine parameter readings once, and high exhaust gas temperature twice. Inferences about the causes of in-flight shutdowns cannot be drawn because of the large proportion of shutdowns in which the cause was not identified.

6.4 ENGINE FAILURES.

Engine failures are important areas to consider when analyzing these engine bird ingestion events. For the purpose of this study an engine failure was considered to have occurred when an engine was not able to produce and maintain usable thrust of at least 50 percent for the use by the pilot of the aircraft. A transverse fan blade fracture and an involuntary engine in-flight shutdown were considered to be engine failures in all cases. Otherwise an engineering judgement was made based on the extent of engine damage, effect on flight, phase of flight, and any other factors that may have been provided in the description of the event or investigation summary.

TABLE 6.9

CONDITIONAL PROBABILITY OF CREW ACTION
GIVEN THE ENGINE DAMAGE SEVERITY

<u>ENGINE DAMAGE SEVERITY</u>	<u>PROBABILITY OF CREW ACTION P(CA)</u>	<u>UPPER CONFIDENCE BOUND</u>
NO DAMAGE	.139	.161
ANY DAMAGE	.289	.329
AT LEAST MODERATE DAMAGE	.400	.487
SEVERE DAMAGE	.567	.743

Table 6.10 provides a summary of some of the important data categories for the engine ingestion events that resulted in an engine failure. The conditional probability of an engine failure given that an ingestion has occurred is 0.029 with a lower 95 percent confidence bound of 0.021. The lower confidence bound was calculated using the Z statistic for proportions. The overall engine failure rate for the 737 aircraft due to bird ingestion was 0.005 failures per ten thousand aircraft operations.

Table 6.10 shows that a voluntary or involuntary in-flight shutdown of the engine occurred in 21 of the 42 engine failures. There was also a power loss associated with 89 percent of the engine failures where there was information reported in the power loss category. The most significant cause of engine failures appears to be transverse fan blade fracture which caused 27 of the 42 engine failures.

Reviewing the bird threat data for these engine failures shows that the species of bird was identified and an estimated weight was available in only 28 of the 42 engine failure events. The percentage of identifications is too low to allow statistical inferences about bird weights. The trend for the weights that are available is that the birds ingested in failure events are heavier than the birds ingested in all events. The mean of the weights for the birds that were identified in failure events is 27.5 ounces which is 10.3 ounces heavier than the overall mean. The higher mean for the failure events should be interpreted as a pointer to a possible trend that should be investigated further since the weight identifications are low.

Twenty-one of the engine failures were caused by the ingestion of a single bird and nine were caused by the ingestion of multiple birds. This is a much higher percentage than the fraction of all ingestion events which involved multiple birds. This suggests that engine failure is more likely in cases of multiple bird ingestion. Also, in 7 of the 28 engine failures where the bird weight was known, the bird or birds weighed more than 2 pounds. However, 16 were caused by birds that weighed less than or equal to 1 pound. Comparing this with the number of engine ingestions where the bird weight was known (Table 6.3), shows that 18 percent and 9 percent of the engine ingestion events resulted in engine failures when the bird weighed more than 2 pounds and less than or equal to 1 pound, respectively.

Almost all of the failure events occurred during takeoff (33) with two failures during the climb, one during the approach and one during landing. The phase of flight was unknown in five of the failure events. The engine location was split almost in half with 22 failures occurring in the left engine and 20 in the right.

TABLE 6.10. ENGINE FAILURE SUMMARY BY BIRD WEIGHT

<u>Bird (oz.)</u> <u>Weight</u>	<u>Number</u> <u>of Birds</u>	<u>Damage</u> <u>Code</u>	<u>Phase of</u> <u>Flight</u>	<u>Power</u> <u>Loss</u>	<u>In-Flight</u> <u>Shutdown</u>	<u>Crew</u> <u>Action</u>
1.5	1	A,O	Takeoff	Epr Dec	Vibes	ATB
4.0	--	A,I	---	---	---	--
4.0	--	A,I,K	Takeoff	Compressor	No	ATO
4.0	1	A,I,K	Takeoff	---	No	ATO
7.0	*	A,C,G,I	Takeoff	Compressor	Parameters	ATB
10.0	*	A,H,I,N	Takeoff	Compressor	Voluntary	ATB
10.1	*	A,I,K	Takeoff	Compressor	Vibes	ATB
11.5	6	A,D,K,O	Takeoff	Compressor	Involuntary	Crashed
11.5	8	A,D,K,O	Takeoff	Compressor	Involuntary	Crashed
12.0	1	A,I,M,P	Takeoff	Yes	Involuntary	ATB
14.0	1	A,G,I,K	Takeoff	Compressor	---	ATB
14.0	1	A,C,G,I	Takeoff	---	---	ATO
14.0	3	A,I,K,N	Takeoff	Compressor	Egt	ATB
15.0	1	A,D,H	Takeoff	Compressor	Involuntary	ATB
16.0	1	A,I,K,N	Takeoff	Compressor	Involuntary	ATB
16.0	*	A,I,K	Takeoff	Compressor	No	ATO
22.0	1	A,D,G,K	Takeoff	None	No	ATB
24.0	1	A,D,I,K	Takeoff	Compressor	Voluntary	ATB
28.0	1	A,B,G,K	Takeoff	Spool Down	Involuntary	ATB
28.0	1	A,I,M	Takeoff	---	No	ATO
32.0	1	A,I	Takeoff	Epr Dec	Yes	DIV
38.4	1	A,D,G	Takeoff	---	No	ATO
40.0	1	A,D,F,I	Climb	---	---	ATB

TABLE 6.10. ENGINE FAILURE SUMMARY BY BIRD WEIGHT (Continued)

40.0	2	A,D,H	Takeoff	Compressor	Yes	DIV
40.0	1	A,F,I	Takeoff	Compressor	Vibes	ATB
40.0	1	A,C,G,I	Takeoff	---	---	---
80.0	1	A,H,I	Takeoff	Compressor	Yes	ATB
192.0	1	A,D,G,K	Approach	Yes	Epr	---
---	--	A,C,G,I	---	---	---	None
---	---	A,Q	Climb	Spool Down	Involuntary	ATB
---	---	A,G,K	Takeoff	---	Vibes	ATO
---	1	A,I,K,Q	Takeoff	---	No	ATB
---	---	A,C,I,K	Takeoff	---	No	None
---	1	A,B,G,P	Takeoff	None	No	ATO
---	---	A,I	---	---	---	---
---	1	A,I	Takeoff	Yes	Yes	ATO
---	---	A,I	Takeoff	---	No	---
---	---	A,I	---	---	---	---
---	---	A,C,G,I	Landing	None	No	---
---	---	A,I	---	---	---	---
---	2	A,D	Takeoff	Compressor	No	ATO
---	---	A,D,G,K	Takeoff	Compressor	Yes	ATO

*Means more than one bird ingested but the exact count is unknown.

Note: A description of the columns and column contents can be found in Appendix B.

SECTION 7

PROBABILITY ESTIMATES

This section provides a summary of the probabilities of various bird ingestion events. The probability of an event is a measure of the likelihood that the event will occur. The probabilities in this section are calculated on a per operation basis and present similar information to the ingestion rates. The ingestion rates that were presented in Section 4 were calculated on the basis of 10,000 aircraft operations; however, it was shown in Section 4.2 that the per operation ingestion rate is equal to the probability of ingestion for a single operation. This section provides more details on the probabilities of various categories of bird ingestion events.

Table 7.1 provides the estimated probabilities and 95 percent confidence bounds for the whole B737 fleet for various aircraft ingestion events. The overall likelihood of an aircraft ingestion event in a single operation is slightly more than one in sixty-five hundred; and although the odds of having a bird ingestion on any one operation are very small, there are millions of B737 operations each year so that hundreds of ingestions are expected each year. Most ingestions occur during the takeoff and landing phases so that the probabilities for takeoff and climb and the approach and landing phases are relatively large. Dual engine and multiple bird ingestions are relatively rare (which is reflected in the smaller probabilities for these events).

The inlet area effect on aircraft ingestion probabilities is shown in Table 7.2 which separates the probabilities by location and engine. With the exception of single engine multiple bird ingestion events in the United States, the probabilities for the CFM International CFM56 are always larger than the corresponding probabilities for the Pratt and Whitney JT8D. The larger probabilities for the CFM56 are expected since the inlet area of the CFM56 is nearly twice the inlet area of the JT8D.

The probability of an ingestion that causes moderate or severe engine damage (POI_d) is calculated with respect to engine operations, not aircraft operations. Moderate or severe engine damage occurred in 180 (49 domestic, 130 foreign, 1 unknown) of the 1,468 engine ingestion events reported in the data collection period. The respective worldwide, domestic, and foreign POI_d values for the B737 fleet are 1.01×10^{-5} , 0.50×10^{-5} , and 1.59×10^{-5} . The respective worldwide, domestic, and foreign 95 percent confidence bounds on the POI_d values are 1.14×10^{-5} , 0.64×10^{-5} , and 1.84×10^{-5} .

The effect of bird weight on the probabilities is estimated in Tables 7.3 and 7.4. The entries in Tables 7.3 and 7.4 were calculated by multiplying the overall probability for each location/engine combination by the relative frequency of each bird weight range. The relative frequencies for bird weight ranges were derived from the weights of positively identified birds and are based on the number of events that involved birds in each weight range, not the total number of birds ingested. The validity of this calculation depends on the randomness of bird identifications, as discussed in Section 3. Table 7.3 provides a breakdown of the probability of ingestion (POI) by location and engine while Table 7.4 combines the two engine types. The calculations in Tables 7.3 and 7.4 were made on both an aircraft operation basis (Tables 7.3A and 7.4A) and an engine operation basis (Tables 7.3B and 7.4B). Tables 7.4A

and 7.4B show that the worldwide probability of ingesting one or more birds as a function of bird weight is 0.210×10^{-5} and 0.102×10^{-5} respectively at the 52-to 56-ounce weight range for the B737 aircraft fleet. Above this weight range the probability of ingestion decreases.

TABLE 7.1 AIRCRAFT OPERATION INGESTION PROBABILITIES

<u>CONDITION</u>	<u>INGESTION EVENTS</u>	<u>PROBABILITY* OF INGESTION</u>	<u>CONFIDENCE* BOUND</u>
All Flights	1,410	15.82	16.53
Takeoff & Climb [†]	863	9.68	10.24
Approach & Landing [†]	516	5.79	6.23
Dual Engine / Single Bird Per Engine	23	0.26	0.37
Dual Engine / Multiple Birds	35	0.39	0.52
Multiple Birds / Single Engine	144	1.62	1.86

* Scaled by 10^5

† Contains prorated apportionment of events with unknown phase of flight

TABLE 7.2 AIRCRAFT OPERATION INGESTION PROBABILITIES* BY LOCATION AND ENGINE TYPE
(BASED ON AIRCRAFT INGESTION EVENTS)

	JT8D ENGINE				CFM56 ENGINE							
	UNITED STATES	FOREIGN	WORLDWIDE	UNITED STATES	FOREIGN	WORLDWIDE						
Aircraft Operations:	3,250,832	3,145,832	6,396,263	1,578,741	935,849	2,514,590						
Condition Under Consideration	Ing Ingestion Evt Prob'ility	Ing Ingestion Evt Prob'ility	Ing Ingestion Evt Prob'ility	Ing Ingestion Evt Prob'ility	Ing Ingestion Evt Prob'ility	Ing Ingestion Evt Prob'ility						
All Flights	136	4.18	784	24.92	921 [†]	14.40	151	9.56	293	31.31	445 [†]	17.70
Takeoff And Climb Phases	107	3.29	492	15.64	600 [†]	9.38	92	5.83	150	16.03	243 [†]	9.66
Approach And Landing Phases	27	0.83	280	8.90	307	4.80	54	3.42	132	14.10	186	7.40
Dual Engine - Single Bird Events	2	0.06	10	0.32	12	0.19	4	0.25	7	0.75	11	0.44
Multiple Birds - ^{††} Single Engine Events	12	0.37	71	2.26	83	1.30	4	0.25	44	4.70	48	1.91
Multiple Birds - ^{†††} Dual Engine Events	4	0.12	15	0.48	19	0.30	2	0.13	10	1.07	12	0.48

* Ingestion probabilities scaled by 10⁵

[†] Geographic region unknown for 1 takeoff event

^{††} Engine type unknown for 13 events

^{†††} Engine type unknown for 4 events

TABLE 7.3A
PROBABILITY OF INGESTION* AS A FUNCTION OF BIRD WEIGHT BY LOCATION AND ENGINE TYPE
(BASED ON AIRCRAFT OPERATIONS)

	JT8D ENGINE			CFM56 ENGINE		
	US	FOREIGN	WORLDWIDE	US	FOREIGN	WORLDWIDE
Aircraft Ops:	3,250,431	3,145,832	6,396,263	1,578,741	935,849	2,514,590
Bird Wt Range (Oz.)	Prob. of Ingestion	Prob. of Ingestion	Prob. of Ingestion	Prob. of Ingestion	Prob. of Ingestion	Prob. of Ingestion
(0 < X ≤ 4)	1.778	3.887	3.286	3.454	4.369	4.256
(4 < X ≤ 8)	0.628	6.859	3.479	0.266	6.553	2.240
(8 < X ≤ 12)	---	3.658	1.546	0.266	10.922	3.584
(12 < X ≤ 16)	0.732	2.515	1.739	2.923	3.641	3.584
(16 < X ≤ 20)	0.209	0.686	0.483	---	2.912	0.896
(20 < X ≤ 24)	0.105	0.457	0.290	0.266	---	0.224
(24 < X ≤ 28)	0.105	0.915	0.483	0.266	0.728	0.448
(28 < X ≤ 32)	---	1.372	0.580	---	---	---
(32 < X ≤ 36)	---	---	---	0.531	1.456	0.896
(36 < X ≤ 40)	0.313	2.286	1.256	1.328	---	1.120
(40 < X ≤ 44)	---	---	---	0.266	---	0.224
(44 < X ≤ 48)	---	0.686	0.290	---	0.728	0.224
(52 < X ≤ 56)	0.209	0.229	0.290	---	---	---
(56 < X ≤ 60)	---	0.229	0.097	---	---	---
(76 < X ≤ 80)	---	0.229	0.097	---	---	---
(84 < X ≤ 88)	---	0.457	0.193	---	---	---
(124 < X ≤ 128)	0.105	---	0.097	---	---	---
(188 < X ≤ 192)	---	0.457	0.193	---	---	---
All weights†	4.184	24.992	14.399	9.565	31.308	17.697

* Probability that either engine will ingest 1 or more birds of a given weight class per aircraft operation. Probabilities have been scaled up by 10⁵.

† Cumulative probability of all weight bands. Also probability of ingestion for engine, location combination.

TABLE 7.3B
PROBABILITY OF INGESTION* AS A FUNCTION OF BIRD WEIGHT BY LOCATION AND ENGINE TYPE
(BASED ON ENGINE OPERATIONS)

Bird Wt Range (Oz.)	JT8D ENGINE			CFM56 ENGINE		
	US	FOREIGN	WORLDWIDE	US	FOREIGN	WORLDWIDE
Engine Ops:	6,500,862	6,291,664	12,792,526	3,157,482	1,871,698	5,029,180
(0 < X ≤ 4)	0.884	2.000	1.652	1.963	2.114	2.299
(4 < X ≤ 8)	0.312	3.556	1.794	0.131	3.172	1.095
(8 < X ≤ 12)	---	2.111	0.897	0.131	6.343	2.080
(12 < X ≤ 16)	0.468	1.222	0.944	1.439	2.114	1.861
(16 < X ≤ 20)	0.104	0.333	0.236	---	1.410	0.438
(20 < X ≤ 24)	0.052	0.222	0.142	0.131	---	0.109
(24 < X ≤ 28)	0.052	0.444	0.236	0.131	0.352	0.219
(28 < X ≤ 32)	---	0.667	0.283	---	---	---
(32 < X ≤ 36)	---	---	---	0.262	0.705	0.438
(36 < X ≤ 40)	0.156	1.222	0.661	0.654	---	0.547
(40 < X ≤ 44)	---	---	---	0.131	---	0.109
(44 < X ≤ 48)	---	0.333	0.142	---	0.352	0.109
(52 < X ≤ 56)	0.104	0.111	0.142	---	---	---
(56 < X ≤ 60)	---	0.111	0.047	---	---	---
(76 < X ≤ 80)	---	0.111	0.047	---	---	---
(84 < X ≤ 88)	---	0.222	0.094	---	---	---
(124 < X ≤ 128)	0.052	---	0.047	---	---	---
(188 < X ≤ 192)	---	0.222	0.094	---	---	---
All Weights†	2.184	12.890	7.457	4.972	16.563	9.306

* Probability that an engine will ingest 1 or more birds of a given weight class per engine operation. Probabilities have been scaled up by 10⁵.

† Cumulative probability of all weight bands. Also probability of ingestion for engine, location combination.

TABLE 7.4A
PROBABILITY OF INGESTION* AS A FUNCTION OF BIRD WEIGHT BY LOCATION
(BASED ON AIRCRAFT OPERATIONS)

BOEING-737 COMMERCIAL FLEET			
	UNITED STATES	FOREIGN	WORLDWIDE
Aircraft Operations:	4,829,172	4,081,681	8,910,853
Bird Weight Range (Ounces)	Probability Of Ingestion	Probability Of Ingestion	Probability Of Ingestion
(0 < X ≤ 4)	2.351	4.215	3.672
(4 < X ≤ 8)	0.531	7.025	3.138
(8 < X ≤ 12)	0.076	5.445	2.136
(12 < X ≤ 16)	1.669	2.810	2.537
(16 < X ≤ 20)	0.152	1.229	0.601
(20 < X ≤ 24)	0.152	0.351	0.267
(24 < X ≤ 28)	0.152	0.878	0.467
(28 < X ≤ 32)	---	1.054	0.401
(32 < X ≤ 36)	0.152	0.351	0.267
(36 < X ≤ 40)	0.758	1.756	1.335
(40 < X ≤ 44)	0.076	---	0.067
(44 < X ≤ 48)	---	0.703	0.267
(52 < X ≤ 56)	0.152	0.176	0.200
(56 < X ≤ 60)	---	0.176	0.067
(76 < X ≤ 80)	---	0.176	0.067
(84 < X ≤ 88)	---	0.351	0.134
(124 < X ≤ 128)	0.076	---	0.067
(188 < X ≤ 192)	---	0.351	0.134
All Weights†	6.295	27.048	15.823

* Probability that either engine will ingest 1 or more birds of a given weight class per aircraft operation. Probabilities have been scaled up by 10^5 .

† Cumulative probability of all weight bands in geographic location.

TABLE 7.4B
PROBABILITY OF INGESTION* AS A FUNCTION OF BIRD WEIGHT BY LOCATION
(BASED ON ENGINE OPERATIONS)

BOEING-737 COMMERCIAL FLEET			
	UNITED STATES	FOREIGN	WORLDWIDE
Engine Operations:	9,658,344	8,163,362	17,821,706
Bird Weight Range (Ounces)	Probability Of Ingestion	Probability Of Ingestion	Probability Of Ingestion
(0 < X ≤ 4)	1.231	2.133	1.888
(4 < X ≤ 8)	0.261	3.583	1.595
(8 < X ≤ 12)	0.037	3.156	1.237
(12 < X ≤ 16)	0.932	1.450	1.367
(16 < X ≤ 20)	0.075	0.597	0.293
(20 < X ≤ 24)	0.075	0.171	0.130
(24 < X ≤ 28)	0.075	0.427	0.228
(28 < X ≤ 32)	---	0.512	0.195
(32 < X ≤ 36)	0.075	0.171	0.130
(36 < X ≤ 40)	0.373	0.938	0.684
(40 < X ≤ 44)	0.038	---	0.033
(44 < X ≤ 48)	---	0.341	0.130
(52 < X ≤ 56)	0.075	0.085	0.098
(56 < X ≤ 60)	---	0.085	0.033
(76 < X ≤ 80)	---	0.085	0.033
(84 < X ≤ 88)	---	0.171	0.065
(124 < X ≤ 128)	0.038	---	0.033
(188 < X ≤ 192)	---	0.171	0.065
All Weights†	3.282	14.075	8.237

* Probability that an engine will ingest 1 or more birds of a given weight class per engine operation. Probabilities have been scaled up by 10^5 .

† Cumulative probability of all weight bands in geographic location.

SECTION 8

DATA QUALITY

The interpretations derived from any large set of data are only as good as the data. The use of poor data can lead to invalid and misleading conclusions. The conclusions reached in this report should be interpreted in the context of the sources of the data and the quality of the data. The following paragraphs discuss the sources of data for the 3 years and the quality of the data as measured by the consistency of the data collected in each of the 3 years and by the consistency of the ICAO data with the data collected by the FAA.

8.1 DATA SOURCES.

The main body of data was collected by the manufacturers of the two engines used on B737 aircraft under separate contracts with the FAA. The FAA also collected data from the FAA Voluntary Bird Strike/Incident Report (FAA Form 5200-7) and from reports received from FAA field inspectors (see FAA Action Notice A8300.39). A second source of data used in this report is an ongoing effort by the ICAO to collect aviation bird strike data. A significant number of B737 bird ingestion events were recorded by the ICAO that were not collected through FAA sources. The additional events were included with the FAA data base for the preparation of this second report.

The engine manufacturers, FAA, and ICAO conducted a census rather than a survey, i.e., the goal of both studies was to collect information on every B737 bird ingestion event in the 3-year period. A complete census is nearly impossible to achieve under any circumstances; therefore, estimates involving the total number of ingestions, such as ingestion rates, should be viewed as lower bounds.

8.2 INTERNAL CONSISTENCY.

The data collected over the third year of the program appear to be consistent with the data collected in the first 2 years. Most of the tables, graphs and statistical tests presented in this report for the 3-year period are very similar to the corresponding data presented in earlier reports [1,2] for the data collected in the first 2 years. This section provides statistical verification of the similarities and discusses some of the differences.

The first feature for comparing the 3 years is the total number of aircraft ingestion events collected in each year. Section 4 provided evidence that aircraft ingestion events occur according to a Poisson process so that the proportion of events that were recorded in each year should be equal to the proportion of operations conducted in that year.

The same formulas used in Section 4 can be used here except that the area factor is no longer required since comparisons are made between years for the same engine. The formula for the expected proportion of events in year i becomes:

$$P_i = O_i / (O_1 + O_2 + O_3) \quad (8.1)$$

where O_i ($i=1,3$) represents the number of operations for the specific engine and geographic location for year i .

The Chi-squared goodness-of-fit test is used instead of a Z test since there are more than two years. The Chi-squared test statistic provides a measure of the closeness of the observed number of events in each year to the number that would be expected if the collection rates were the same in each year. The expected number of events in year i are given by:

$$E_i = P_i * N \quad (8.2)$$

where N is the total number of events for the 3 years. The test statistic is then given by:

$$\chi^2 = \sum_{i=1}^3 \frac{(X_i - E_i)^2}{E_i}, \quad (8.3)$$

where X_i is the observed number of events in year i .

The data for performing the test are presented in Table 8.1 and Table 8.2. The number of events and number of operations for each year are broken down by engine type and geographic location in Table 8.1. The calculated χ^2 values for the test are given in Table 8.2 for each engine and location combination. The Chi-squared test detects any type of change among the 3 years and the critical value for a five percent level of significance for a Chi-square with two degrees of freedom is 5.99. The only significant change is in the collection rate for the foreign JT8D data.

The large value of the test statistic for foreign JT8D ingestion rates is caused by a large number of ingestion events reported in the second year.

The change in collection rates for the JT8D could affect the test for size effect that was described in Section 4. In the first year report [1] both area and diameter provided adequate adjustments for the differences in ingestion rates between the two engines. In the 2-year report [2], area provided an adequate adjustment but diameter did not; while in the 3-year report diameter provided an adequate adjustment but area did not. The high second year collection rate would have an impact on the ingestion rate analysis so that investigations into the nature of engine size effects should be considered inconclusive.

Another check on the consistency of the data collection is to compare the birds that were identified in the 3 years. There were too many different species and locations of ingestions to allow comparisons of these features; however, if the species identifications are reduced to bird weights the cumulative weight distributions for the 3 years can be compared.

Table 8.3 provides a table of the cumulative weight distributions for each of the 3 years for birds ingested in the United States and for birds ingested in foreign countries. The data in Table 8.3 are plotted in Figures 8.1 and 8.2 to provide visual comparisons of the three yearly bird weight distributions for United States and foreign ingested birds. The distributions for the United States ingestions are moderately close, and the distributions for the foreign ingestions are very close.

TABLE 8.1
COUNTS FOR UNITED STATES AND FOREIGN
AIRCRAFT EVENTS AND AIRCRAFT OPERATIONS BY YEAR AND ENGINE

	<u>JT8D</u>		<u>CFM56</u>	
	EVENTS	OPERATIONS	EVENTS	OPERATIONS
<u>YEAR 1</u>				
UNITED STATES	40	1,160,091	40	353,656
FOREIGN	238	1,057,633	63	174,206
<u>YEAR 2</u>				
UNITED STATES	49	1,082,543	46	527,431
FOREIGN	314	1,062,971	88	302,415
<u>YEAR 3</u>				
UNITED STATES	47	1,007,797	65	697,654
FOREIGN	232	1,025,228	142	459,228

TABLE 8.2
CHI-SQUARED TEST STATISTICS
FOR COMPARING ANNUAL INGESTION RATES

	UNITED STATES	FOREIGN
JT8D	2.36	13.74
CFM56	1.56	1.81

TABLE 8.3

COMPARISON OF WEIGHT DISTRIBUTIONS BETWEEN
BIRDS INGESTED IN THE FIRST, SECOND, AND THIRD YEARS

WEIGHT (OZ)	<u>CUMULATIVE PROBABILITY</u>					
	<u>UNITED STATES</u>			<u>FOREIGN</u>		
	YEAR 1	YEAR 2	YEAR 3	YEAR 1	YEAR 2	YEAR 3
4	26.3	50.0	37.0	28.6	14.3	11.4
8	42.1	61.1	41.3	53.6	39.3	38.6
12	47.4	61.1	41.3	67.9	58.9	61.4
16	63.2	77.7	76.1	82.1	64.3	74.3
20	68.4	77.8	78.3	82.1	71.4	78.6
24	68.4	83.3	80.4	89.3	71.4	78.6
28	68.4	88.9	82.6	89.3	73.2	84.3
32	68.4	88.9	82.6	92.9	78.6	87.1
36	68.4	94.4	84.8	92.9	80.4	88.6
40	84.2	100.0	97.8	96.4	89.3	94.3
44	84.2	100.0	100.0	96.4	89.3	94.3
48	84.2	100.0	100.0	100.0	91.1	97.1
56	94.7	100.0	100.0	100.0	92.9	97.1
60	94.7	100.0	100.0	100.0	94.6	97.1
80	94.7	100.0	100.0	100.0	96.4	97.1
88	94.7	100.0	100.0	100.0	98.2	98.6
128	100.0	100.0	100.0	100.0	98.2	98.6
192	100.0	100.0	100.0	100.0	100.0	100.0

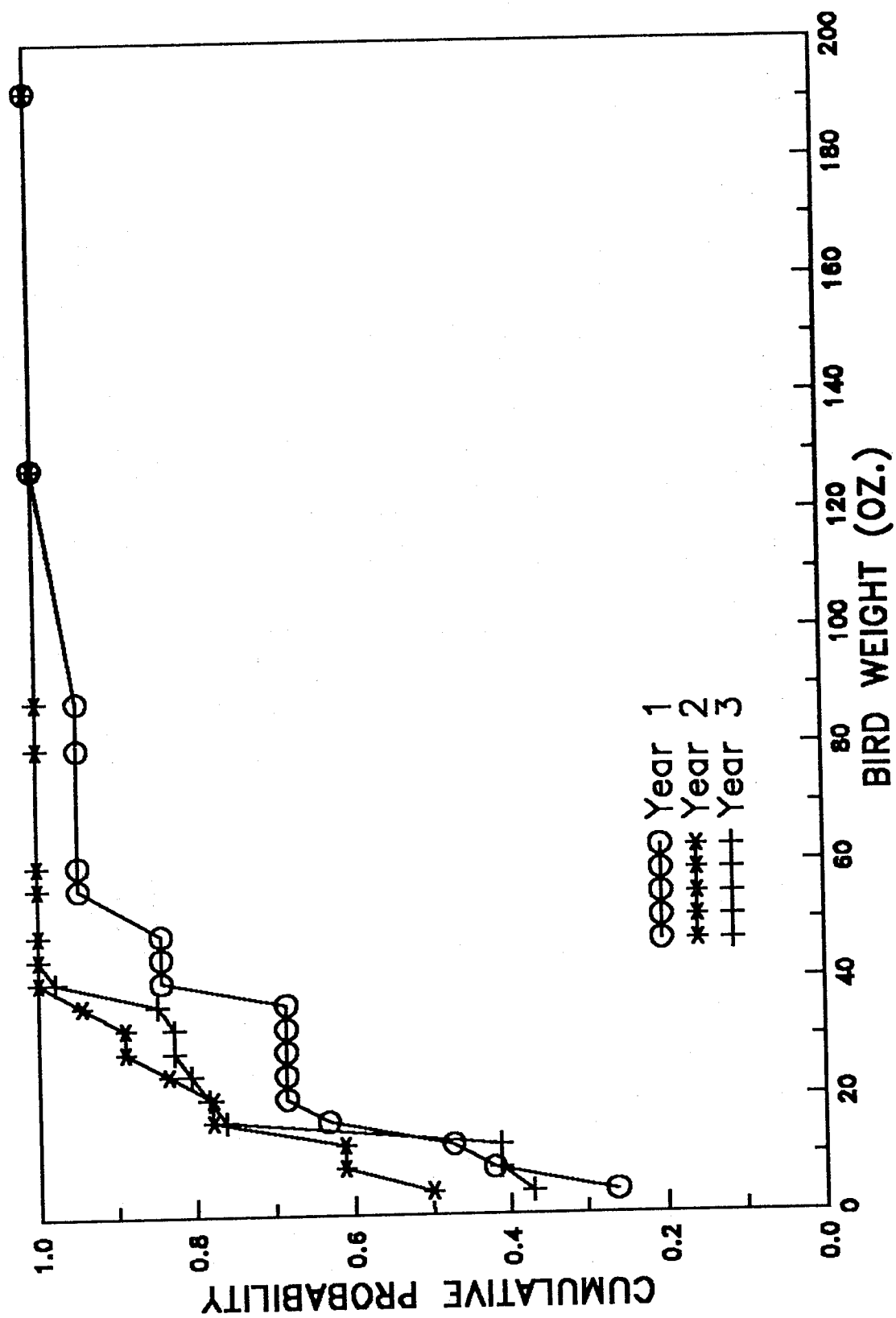


Figure 8.1. Comparison of the United States Bird Weight Distributions for the First, Second, and Third Years.

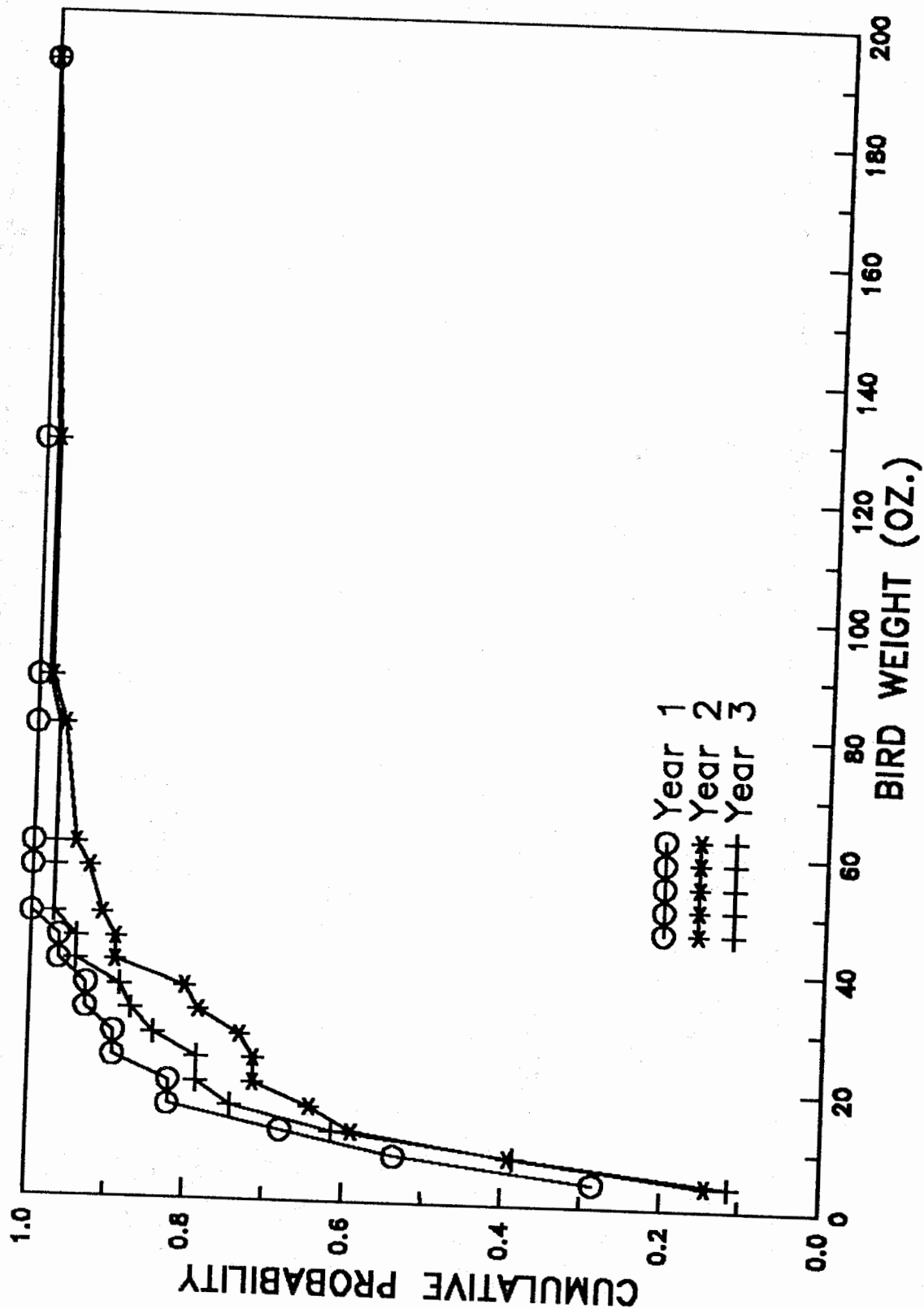


Figure 8.2. Comparison of the Foreign Bird Weight Distributions for the First, Second, and Third Years.

A statistical measure of the closeness of the cumulative distributions plotted in Figures 8.1 and 8.2 is provided by a multi-sample extension of the Kolmogorov-Smirnov D test, described by Kiefer [14]. The D statistic is the maximum vertical distance between two observed cumulative distribution functions while the T statistic described by Kiefer is the maximum vertical scatter among the three observed cumulative distribution functions. The formula for the T statistic is:

$$T = \max_x \sum_{j=1}^3 n_j [S_j(x) - \bar{S}(x)]^2, \quad (8.4)$$

where $\max_x$ indicates the maximum over x , n_j is the sample size in year j , $S_j(x)$ is the observed cumulative distribution function in year j and $\bar{S}(x)$ is the observed cumulative distribution function for all 3 years combined.

The Kiefer goodness-of-fit test shows very good consistency between the 3 years for the ingested bird weight distribution. The T statistic for the U. S. bird ingestions is 0.82 and for the foreign bird ingestions is 0.63 which are the twenty-seventh and twelfth percentiles of the null distribution of T. Large values of T indicate differences between the three distributions and the observed values given above are in the lower half of the likely range of T. There is no statistical evidence that the bird weight distributions have changed over the 3-year period.

The ICAO data seem to be consistent with the data collected by the FAA. The only substantial change from including the ICAO data is an increase in the estimated ingestion rates and probabilities. This is the result of an additional 392 aircraft ingestion events that were reported by the ICAO. Most of the additional events occurred during foreign operations.

If the ICAO data were inconsistent with the FAA data, some of the statistical tests would have shown different conclusions with the combined set of data. None of the conclusions in the report changed when the ICAO data were combined with the FAA data. Specific values of test statistics are different; however, the conclusions remained the same. The ICAO data seem to support the patterns in B737 bird ingestion events that are evident in the FAA data.

The overall quality of the data used in the report seems to be adequate. There is reasonable consistency from year to year with a slightly higher collection rate in the second year. The two sources of data show good compatibility so that there should be no bias due to different collection procedures. The data used in this report should provide valuable information about the bird ingestion hazard.

SECTION 9 CONCLUSIONS

This section summarizes conclusions based on the 3 years of data for the B737 aircraft.

Bird Descriptions

Gulls, doves, and lapwings are most often ingested.

There is a better species identification rate when the engine is damaged.

The weight of a bird most likely to be ingested outside the United States is significantly heavier than one most likely to ingested within the United States.

Ingestion Rates

Bird ingestion events are seasonal with the highest rates in the summer and the lowest in the winter.

Bird ingestion events are much more likely to occur during daylight than at night.

Bird ingestion events can be modeled as a Poisson process.

Bird ingestion rates are proportional to the inlet size of the engine.

Airport Experiences

The foreign bird ingestion rate is significantly higher than the United States ingestion rate.

Effect of Flight

The probability that a crew action is required increases with the severity of engine damage.

The effects of flight that occur most often are air turnbacks and aborted takeoffs.

The probability of experiencing an involuntary in-flight engine shutdown, given a bird ingestion has occurred, is approximately one-half of one percent.

Engine Damage

Some types of engine damage are correlated with other types of damage.

The majority of engine bird ingestion events result in either minor or no engine damage.

The probability of any damage increases with the weight of the bird ingested.

The probability of engine damage, given a bird ingestion has occurred, is greater when the ingestion occurs during the takeoff and climb phases of flight than those that occur during approach and landing.

The probability of engine damage, given a bird ingestion has occurred, is greater when the aircraft airspeed is greater than or equal to 140 knots than those that occur at less than 140 knots.

Engine failure appears more likely to occur when multiple birds are ingested.

The mean or average weight of the birds that caused engine failures was significantly heavier than the mean weight for all bird ingestion events.

Engine failure is not necessarily associated exclusively with severe engine damage.

Engine failure appears more likely to occur during the takeoff phase of flight.

Engine failure can be caused by a bird ingestion in any bird weight range.

The majority of engine failures are caused by transverse fan blade fractures.

The probability of experiencing an engine failure, given a bird ingestion has occurred, is approximately 3 percent.

Probabilities of Ingestion

Bird ingestions are more likely during the takeoff and landing phases of an aircraft operation.

The worldwide probability of a bird ingestion as a function of bird weight for the B737 fleet remains relatively high up to 56 ounces.

Data Quality

The overall quality of the bird ingestion data collected by the engine manufacturers for the FAA is adequate for a meaningful statistical analysis.

SECTION 10
REFERENCES

1. Hovey, P., Skinn, D., and Wilson, J., "Study of the Engine Bird Ingestion Experience of the Boeing-737 Aircraft (October 1986 - September 1989)," DOT/FAA/CT-90/28, Department of Transportation, Federal Aviation Administration, December 1991.
2. Hovey, P. and Skinn, D., "A Study of the Engine Bird Ingestion Experience of the Boeing-737 Aircraft," DOT/FAA/CT-89/16, Department of Transportation, Federal Aviation Administration, October 1989.
3. Hovey, P., Skinn, D., and Wilson, J., "Study of the Engine Bird Ingestion Experience of the Boeing-737 Aircraft (October 1986 - September 1988)," DOT/FAA/CT-89/29, Department of Transportation, Federal Aviation Administration, May 1990.
4. Frings, G., "A Study of Bird Ingestions into Large High Bypass Ratio Turbine Aircraft Engines," DOT/FAA/CT-84/13, Department of Transportation, Federal Aviation Administration, September 1984.
5. Martino, J. P. and Skinn, Donald A., "Study of Bird Ingestion into Small Inlet Area, Aircraft Turbine Engines (May 1987 through April 1988)," DOT/FAA/CT-89/17, Department of Transportation, Federal Aviation Administration, December 1989.
6. Martino, J. P., Skinn, Donald A., and Wilson, J. J., "Study of Bird Ingestion into Small Inlet Area, Aircraft Turbine Engines (May 1987 through April 1989)," DOT/FAA/CT-90/13, Department of Transportation, Federal Aviation Administration, October 1990.
7. Berens, A.P., West, B.W., and Turella, M.A., "On a Probabilistic Model for Evaluating the Birdstrike Threat to Aircraft Crew Enclosures," UDR-TR-78-124, University of Dayton Research Institute, Dayton, OH, November 1978.
8. Skinn, D.A. and Berens, A.P., "Bird Avoidance Model (BAM) Phase I Report: Feasibility Demonstration," UDR-TR-80-122, University of Dayton Research Institute, Dayton, OH, November 1980.
9. Liliefors, H.W., "On the Kilmogorov-Smirnov Test for the Exponential Distribution with Mean Unknown," Journal of the American Statistical Assoc., Vol. 64, March 1969, pp. 387-389.
10. Bertke, R.S. and Hovey, P.W., "Glass/Acrylic Coupon Impact Testing," UDR-TR-82-145, University of Dayton Research Institute, Dayton, OH, November 1982.
11. Cox, D.R., "The Analysis of Binary Data," Department of Mathematics Imperial College, Methuen & Co., Ltd., London, England, 1970.
12. Fienberg, S.E., "The Analysis of Cross-Classified Categorical Data," ISBN 0-262-06063-9, MIT Press, 1977.

13. Berens, A.P., Hovey, P.W., Donahue, R.M., and Craport, W.M., "User's Manual for Probability of Detection Software System (POD/SS)," UDR-TR-88-12, University of Dayton Research Institute, Dayton, OH, January 1988.
14. Kiefer, J. "K-Sample Analogues of the Kolmogorov-Smirnov and Cramer-von Mises Tests," Annals of Mathematical Statistics, Vol. 30, 1959, pp. 420-447.

SECTION 11
GLOSSARY

<u>Term</u>	<u>Definition of Term</u>
Aircraft Ingestion Event	Simultaneous ingestion of one or more birds into one or more engines of an aircraft.
Aircraft Operation	A nonstop aircraft flight from one airport to another. (Includes time from taxi-out from departure airport through taxi-in at arrival airport.)
Airport Operation	Takeoff (departure) from an airport or a landing (arrival) at an airport.
Engine Ingestion Event	Process whereby one or more birds pass through the engine inlet during engine operation.
Engine Operation	The participation of each engine of an aircraft in an aircraft operation (e.g., a twin engine aircraft would, ideally, experience two engine operations for each aircraft operation).
Ingested Bird	A bird having experienced the process of engine ingestion event.
Ingestion Rate	The number of aircraft or engine ingestion events per flight event. Flight event refers to aircraft, engine or airport operation. The components of ingestion rate are specified when used in the report. The influence of engine inlet area is not considered.
Normalized Ingestion Rate	Ingestion rate adjusted to a given nominal area. Allows statistical comparison of ingestion rates of engines with different inlet areas.

APPENDIX A

AIRPORTS WITH SCHEDULED BOEING-737 FLIGHTS AND/OR REPORTED BIRD INGESTION EVENTS

This appendix presents information about airports having scheduled Official Airline Guide (OAG) operations or aircraft ingestion events during the 3-year data collection period. The data are taken from a data base developed by the contractor. The data base contents are described below:

<u>COLUMN</u>	DESCRIPTION OF COLUMN CONTENTS
AIRPORT	Airport code. 3-letter ATA code 4-letter ICAO code
APTDEF	Location of airport.
HEMISPHR	Hemisphere in which AIRPORT is located. N - Northern Hemisphere S - Southern Hemisphere
CONUS	Indicates whether AIRPORT is located in the United States. YES - located in contiguous United States (48 states) NO - not located in the contiguous United States, but in the United States (Alaska or Hawaii) FGN - foreign airport
STGFY87	Scheduled OAG airport operations during first year.
ING1	Aircraft ingestion events during first year.
STGFY88	Scheduled OAG airport operations during second year.
ING2	Aircraft ingestion events during second year.
STGFY89	Scheduled OAG airport operations during third year.
ING3	Aircraft ingestion events during third year.
STG737	Scheduled OAG airport operations during 3-year period.
INGS	Aircraft ingestion events during 3-year period.

AIRPORT	APTDEF	HEMISPHR	CONUS	STGFY87	ING1	STGFY88	ING2	STGFY89	ING3	STG737	INGS
AAE	ANNABA, ALGERIA	N	FGN	2393	0	2237	0	2061	0	6691	0
AAY	AL GHAYDAH, YEMEN	N	FGN	210	0	314	0	162	0	686	0
ABE	ALLEN TOWN, PA, USA	N	YES	370	0	1573	0	2490	0	4433	0
ABJ	ABIDJAN, COTE D'IVOIRE (IVORY COAST)	N	FGN	1620	0	1806	0	1899	0	5325	0
ABQ	ALBUQUERQUE, NM, USA	N	YES	41942	0	43562	0	44079	1	129583	1
ABS	ABU SIMBEL, ARAB REP OF EGYPT	N	FGN	3366	0	5028	0	5496	0	13890	0
ABT	AL BAHA, SAUDI ARABIA	N	FGN	1148	0	642	0	626	0	2416	0
ABV	ABUJA, NIGERIA	N	FGN	1240	0	1178	0	1160	0	3578	0
ABZ	ABERDEEN, SCOTLAND	N	FGN	1519	0	1636	0	2871	0	6026	0
ACA	ACAPULCO, MEXICO	N	FGN	126	0	322	1	120	0	568	1
ACC	ACCRA, GHANA	N	FGN	486	0	0	0	216	0	702	0
ACE	LANZAROTE, CANARY ISLANDS	N	FGN	76	0	688	0	1115	0	1879	0
ACK	NANTUCKET, MA, USA	N	YES	0	0	7	0	9	0	16	0
ACV	EUREKA ARCATA, CA, USA	N	YES	2616	0	739	0	0	0	3355	0
ADB	IZMIR, TURKEY	N	FGN	0	0	236	0	426	0	662	0
ADD	ADDIS ABABA, ETHIOPIA	N	FGN	148	0	1538	1	1585	0	3271	1
ADE	ADEN, YEMEN	N	FGN	1346	0	1022	0	1242	0	3610	0
ADK	ADAK ISLAND, AS, USA	N	NO	0	0	16	0	0	0	16	0
ADL	ADELAIDE, SA, AUSTRALIA	S	FGN	4738	1	5568	0	9550	0	19856	1
ADQ	KODIAK, AS, USA	N	NO	2290	0	2500	0	2700	1	7490	1
ADZ	SAN ANDRES ISLAND, COLOMBIA	N	FGN	526	0	624	0	700	0	1850	0
AEP	BUENOS AIRES - NEWBERY, ARGENTINA	S	FGN	23291	0	22170	1	21296	0	66757	1
AES	ALESUND, NORWAY	N	FGN	8988	0	8364	0	8060	0	25412	0
AGA	AGADOR, MOROCCO	N	FGN	601	0	684	0	1164	0	2449	0
AGP	MALAGA, SPAIN	N	FGN	2434	0	3226	0	3213	0	8873	0
AGR	AGRA, INDIA	N	FGN	1980	1	2074	1	1616	1	5670	3
AGS	AUGUSTA, GA, USA	N	YES	1579	0	1881	0	1270	0	4730	0
AHB	ABHA, SAUDI ARABIA	N	FGN	2026	0	5425	0	5606	0	13057	0
AHU	AL HOCEIMA, MOROCCO	N	FGN	292	0	338	0	346	0	976	0
AJA	AJACCIO, CORSICA, FRANCE	N	FGN	59	1	87	0	177	1	323	2
AJF	JOUF, SAUDI ARABIA	N	FGN	1128	0	1258	0	1280	0	3666	0
AJU	ARACAJU, BRAZIL	S	FGN	1460	0	2592	1	5242	0	9294	1
AKL	AUCKLAND, NEW ZEALAND	S	FGN	16985	2	26503	0	26856	1	70344	3
AKN	KING SALMON, AS, USA	N	NO	1444	0	1832	0	1956	0	5232	0
AKR	AKURE, NIGERIA	N	FGN	238	0	354	0	244	0	836	0
ALB	ALBANY, NY, USA	N	YES	4461	2	6510	0	6964	0	17935	2
ALC	ALICANTE, SPAIN	N	FGN	148	0	1070	1	1796	1	3014	2
ALG	ALGIERS, ALGERIA	N	FGN	14258	1	13443	0	13905	0	41606	1
ALY	ALEXANDRIA, ARA REP OF EGYPT	N	FGN	2104	0	1507	0	2123	0	5734	0
AMA	AMARILLO, TX, USA	N	YES	12811	0	11122	0	10270	0	34203	0
AMD	AHMEDABAD, INDIA	N	FGN	5932	2	6180	4	4964	1	17076	7
AMM	AMMAN, JORDAN	N	FGN	2131	0	1859	0	1684	0	5674	0
AMS	AMSTERDAM, NETHERLANDS	N	FGN	19047	4	29304	4	41353	6	89704	14
ANC	ANCHORAGE, AS, USA	N	NO	18977	0	17295	0	18186	0	54458	0
ANF	ANTOFAGASTA, CHILE	S	FGN	1434	0	1635	0	2356	0	5425	0
ANI	ANIAK, AS, USA	N	NO	460	0	714	0	1108	0	2282	0
ANR	ANTWERP, BELGIUM	N	FGN	540	0	0	0	0	0	540	0
ANU	ANTIGUA, WEST INDIES	N	FGN	18	0	0	0	0	0	18	0
AOR	ALOR SETAR, MALAYSIA	N	FGN	1886	1	1884	0	2154	0	5924	1
APL	NAMPULA, MOZAMBIQUE	S	FGN	1144	0	1156	0	520	0	2820	0
APW	APIA, WESTERN SAMOA	S	FGN	858	0	264	0	158	0	1280	0
AQI	QAISUMAH, SAUDI ARABIA	N	FGN	494	0	552	0	642	0	1688	0
ARD	ALOR, INDONESIA	N	FGN	0	1	0	0	0	0	0	1
ARI	ARICA, CHILE	S	FGN	970	0	1308	0	1452	0	3730	0
ARN	STOCKHOLM ARLANDA, SWEDEN	N	FGN	7556	0	8439	0	10086	0	26081	0
ASM	ASMARA, ETHIOPIA	N	FGN	0	0	769	0	636	0	1405	0
ASP	ALICE SPRINGS, N.T., AUSTRALIA	S	FGN	1816	0	3728	0	5198	1	10742	1
ASU	ASUNCION, PARAGUAY	S	FGN	498	0	234	0	104	0	836	0
ASW	ASWAN, ARAB REP OF EGYPT	N	FGN	4968	0	7042	0	8616	0	20626	0
ATH	ATHENS, GREECE	N	FGN	24758	0	25267	0	31341	1	81366	1
ATL	ATLANTA, GA, USA	N	YES	42143	0	43773	0	47101	1	133017	1
ATM	ALTAMIRA, BRAZIL	S	FGN	416	0	420	0	416	0	1252	0
ATQ	AMRITSAR, INDIA	N	FGN	1846	0	1838	0	1460	0	5144	0
AUA	ARUBA, ARUBA	N	FGN	50	0	9	0	32	0	91	0
AUH	ABU DHABI, U. A. EMIRATES	N	FGN	4023	0	4381	0	4479	0	12883	0
AUS	AUSTIN, TX, USA	N	YES	33326	1	31454	2	32211	0	96991	3
AUX	ARAGUAINA, BRAZIL	S	FGN	244	0	420	0	582	0	1246	0
AVL	ASHEVILLE, NC, USA	N	YES	1298	0	1594	0	2212	0	5104	0
AVP	WILKES-BARRE/SCRANTON, PA, USA	N	YES	114	0	555	0	373	0	1042	0
AWZ	AHWAZ, IRAN	N	FGN	0	0	0	0	724	0	724	0
AXD	ALEXANDROUPOLIS, GREECE	N	FGN	908	0	1028	0	819	0	2755	0
AXT	AKITA, JAPAN	N	FGN	591	0	609	0	538	0	1738	0
AYT	ANTALYA, TURKEY	N	FGN	52	0	62	0	68	0	182	0
AZD	YAZD, IRAN	N	FGN	0	0	522	0	730	0	1252	0
AZO	KALAMAZOO, MI, USA	N	YES	2800	0	2802	0	2857	0	8459	0

AIRPORT APTDEF		HEMISPHR	CONUS	STGFY87	ING1	STGFY88	ING2	STGFY89	ING3	STG737	INGS
AZR	ADRAR, ALGERIA	N	FGN	818	0	718	0	732	0	2268	0
BAH	BAHRAIN, BAHRAIN	N	FGN	11933	1	10623	0	10944	0	33500	1
BAQ	BARRANQUILLA, COLOMBIA	N	FGN	105	0	104	0	104	0	313	0
BBI	BHUBANESWAR, INDIA	N	FGN	2086	1	2160	0	2008	0	6254	1
BCN	BARCELONA, SPAIN	N	FGN	4166	0	4707	0	7749	0	16622	0
BDH	BANDAR LENGEH, IRAN	N	FGN	1460	0	1464	0	832	0	3756	0
BDL	HARTFORD, CN, USA	N	YES	15001	0	14757	0	15366	0	45124	0
BDQ	VADODARA, INDIA	N	FGN	1925	0	1866	1	1888	0	5679	1
BDT	BADO LITE, ZAIRE	N	FGN	208	0	278	0	282	0	768	0
BEG	BELGRADE, YUGOSLAVIA	N	FGN	10759	1	13303	1	14455	1	38517	3
BEL	BELEM, BRAZIL	S	FGN	5505	0	9161	0	12314	0	26980	0
BEN	BENGHAZI, LIBYAN A JAMAHIRIYA	N	FGN	0	0	62	0	444	0	506	0
BET	BETHEL, AS, USA	N	NO	3190	0	3238	0	3158	0	9586	0
BEW	BEIRA, MOZAMBIQUE	S	FGN	1304	0	1112	0	1094	0	3510	0
BFL	BAKESFIELD, CA, USA	N	YES	2742	0	1037	0	0	0	3779	0
BFN	BLOEMFONTEIN, SOUTH AFRICA	S	FGN	3954	0	4710	1	5494	6	14158	7
BFS	BELFAST, N. IRELAND	N	FGN	1570	0	2915	2	6866	0	11351	2
BFX	BAFOUSSAM, CAMEROON	N	FGN	0	0	14	0	0	0	14	0
BGF	BANGUI, CEN. AFRICAN REPUBLIC	N	FGN	272	0	340	0	373	0	985	0
BGI	BARBADOS, BARBADOS	N	FGN	52	0	52	0	52	0	156	0
BGM	BINGHAMTOM, NY, USA	N	YES	0	0	130	0	484	0	614	0
BGO	BERGEN, NORWAY	N	FGN	12038	0	14288	0	15923	0	42249	0
BGR	BANGOR, MA, USA	N	YES	0	0	0	0	204	0	204	0
BGW	BAGHDAD, IRAQ	N	FGN	0	0	31	0	38	0	69	0
BHH	BISHA, SAUDI ARABIA	N	FGN	1740	0	1779	0	1517	0	5036	0
BHI	BAHIA BLANCA, ARGENTINA	S	FGN	2162	0	2412	0	2400	3	6974	3
BHJ	BHUJ, INDIA	N	FGN	730	0	732	0	730	0	2192	0
BHM	BIRMINGHAM, AL, USA	N	YES	6048	2	11193	1	9467	1	26708	4
BHO	BHOPAL, INDIA	N	FGN	1828	0	2462	1	1924	1	6214	2
BHU	BHAVNAGAR, INDIA	N	FGN	730	0	732	0	538	0	2000	0
BHX	BIRMINGHAM, ENGLAND (UK)	N	FGN	2307	1	2630	1	3753	0	8690	2
BHZ	BELO HORIZONTE, BRAZIL	S	FGN	0	0	0	0	0	1	0	1
BIA	BASTIA, CORSICA, FRANCE	N	FGN	234	0	300	0	200	0	734	0
BIL	BILLINGS, MT, USA	N	YES	7285	0	4583	0	3874	0	15742	0
BIO	BILBAO, SPAIN	N	FGN	622	0	628	0	677	0	1927	0
BIQ	BIARRITZ, FRANCE	N	FGN	52	0	52	0	52	0	156	0
BIS	BISMARCK, ND, USA	N	YES	3396	0	3760	0	2746	0	9902	0
BJL	BANJUL, GAMBIA	N	FGN	472	0	420	0	420	1	1312	1
BJM	BUJUMBURA, BURUNDI	S	FGN	245	0	245	0	384	0	874	0
BJR	BAHAR DAR, ETHIOPIA	N	FGN	0	0	572	1	296	0	868	1
BKI	KOTA KINABALU, SABAH, MALAYSIA	N	FGN	8699	0	9134	0	11424	0	29257	0
BKK	BANGKOK, THAILAND	N	FGN	7329	0	7596	0	7058	0	21983	0
BKO	BAMAKO, MALI	N	FGN	50	0	54	0	82	0	186	0
BKY	BUKAVU, ZAIRE	S	FGN	104	0	106	0	72	0	282	0
BLI	BELLINGHAM, WA, USA	N	YES	0	0	2	0	237	0	239	0
BLL	BILLUND, DENMARK	N	FGN	2177	0	2178	0	2393	0	6748	0
BLQ	BOLOGNA, ITALY	N	FGN	310	0	374	0	634	0	1318	0
BLR	BANGALORE, INDIA	N	FGN	5886	3	8160	2	9204	2	23250	7
BME	BROOME, W.A., AUSTRALIA	S	FGN	0	0	0	0	2	0	2	0
BNA	NASHVILLE, TN, USA	N	YES	17920	0	22380	1	21447	0	61747	1
BND	BANDAR ABBAS, IRAN	N	FGN	1460	0	1922	0	1354	0	4736	0
BNE	BRISBANE, QLD, AUSTRALIA	S	FGN	12830	0	15610	2	21839	0	50279	2
BNi	BENIN CITY, NIGERIA	N	FGN	2127	0	1875	0	1666	0	5668	0
BNJ	BONN, FRG	N	FGN	0	0	0	0	0	0	0	0
BOD	BORDEAUX, FRANCE	N	FGN	688	0	790	0	1016	0	2494	0
BOH	BOURNEMOUTH, ENGLAND, UK	N	FGN	0	0	0	0	0	1	0	1
BOI	BOISE, ID, USA	N	YES	5399	0	5655	0	8309	0	19363	0
BOM	BOMBAY, INDIA	N	FGN	16848	2	15854	2	15490	0	48192	4
BOO	BODO, NORWAY	N	FGN	2868	0	3254	0	3286	0	9408	0
BOS	BOSTON, MA, USA	N	YES	30820	0	34903	1	37878	0	103601	1
BRC	SAN CARLOS DE BARILOCHE, ARGENTINA	S	FGN	1663	0	1656	0	1176	0	4495	0
BRE	BREMEN, FED REP OF GERMANY	N	FGN	4526	0	5729	0	5530	2	15785	2
BRS	BRISTOL, ENGLAND (UK)	N	FGN	2	1	0	2	16	0	18	3
BRU	BRUSSELS, BELGIUM	N	FGN	31942	2	32748	4	36110	3	100800	9
BRW	BARROW, AS, USA	N	NO	1897	0	1960	0	1946	0	5803	0
BSB	BRASILIA, BRAZIL	S	FGN	22788	0	30251	0	35278	0	88317	0
BSK	BISKRA, ALGERIA	N	FGN	0	0	0	0	96	0	96	0
BSL	BASEL/MULHOUSE, SWITZERLAND	N	FGN	554	0	538	0	528	0	1620	0
BTM	BUTTE, MT, USA	N	YES	1460	0	1464	0	1454	0	4378	0
BTR	BATON ROUGE, LA, USA	N	YES	2944	0	2065	0	1273	0	6282	0
BTV	BURLINGTON, VT, USA	N	YES	2544	0	2678	0	6126	0	11348	0
BUD	BUDAPEST, HUNGARY	N	FGN	1660	0	1468	1	4764	0	7892	1
BUE	BUENOS AIRES, ARGENTINA	S	FGN	0	0	0	1	0	0	0	1
BUF	BUFFALO, NY, USA	N	YES	17704	0	16940	0	14779	0	49423	0
BUQ	BULAWAYO, ZIMBABWE	S	FGN	1834	0	2870	0	2808	0	7512	0

AIRPORT	APTDEF	HEMISPHR	CONUS	STGFY87	ING1	STGFY88	ING2	STGFY89	ING3	STG737	INGS
BUR	BURBANK, CA, USA	N	YES	11187	0	14262	0	20498	0	45947	0
BUX	BUNA, ZAIRE	N	FGN	210	0	208	0	166	0	584	0
BUZ	BUSHEHR, IRAN	N	FGN	88	0	24	0	0	0	112	0
BVB	BOA VISTA, BRAZIL	N	FGN	1314	0	1426	0	1914	0	4654	0
BVH	VITHENA, BRAZIL	S	FGN	0	0	62	0	254	0	316	0
BWI	BALTIMORE, MD, USA	N	YES	54435	1	60614	0	71566	0	186615	1
BWN	BASERI BEGAWAN, BRUNEI DARUSSALAM	N	FGN	2951	0	2782	0	3248	0	8981	0
BXO	BISSAU, GUINEA BISSAU	N	FGN	20	0	80	0	0	0	100	0
BZE	BELIZE CITY, BELIZE	N	FGN	3647	0	4416	0	5541	0	13604	0
BZN	BOZEMAN, MT, USA	N	YES	5200	0	4588	0	5762	0	15550	0
BZR	BEZIERS, FRANCE	N	FGN	0	0	0	0	1	0	1	0
BZV	BRAZZAVILLE, PEOP REP OF CONGO	S	FGN	1406	0	1321	0	1180	0	3907	0
CAB	CABINDA, ANGOLA	S	FGN	1042	0	966	0	730	0	2738	0
CAE	COLUMBIA, SC, USA	N	YES	8213	0	8051	0	4297	0	20561	0
CAG	CAGLIARI, ITALY	N	FGN	0	0	0	1	0	0	0	1
CAI	CAIRO, ARAB REP OF EGYPT	N	FGN	8057	0	8970	0	10132	0	27159	0
CAK	AKRON/CANTON, OH, USA	N	YES	2241	0	2582	0	1398	0	6221	0
CAN	GUANGZHOU, P. R. CHINA	N	FGN	13955	0	16177	0	14550	0	44682	0
CAS	CASABLANCA, MOROCCO	N	FGN	0	0	8	1	8	0	16	1
CAY	CAYENNE, FRENCH GUIANA	N	FGN	208	0	367	0	415	0	990	0
CBD	CAR NICOBAR, INDIA	N	FGN	40	0	106	0	104	0	250	0
CBH	BECHAR, ALGERIA	N	FGN	1455	0	1258	0	1274	0	3987	0
CBQ	CALABAR, NIGERIA	N	FGN	1935	0	1783	0	1221	0	4939	0
CBR	CANBERRA, A.C.T., AUSTRALIA	S	FGN	5600	1	5064	0	6719	0	17383	1
CCJ	CALICUT, INDIA	N	FGN	0	0	174	0	536	0	710	0
CCP	CONCEPCION, CHILE	S	FGN	1184	0	1484	0	1444	0	4112	0
CCR	CONCORD, CA, USA	N	YES	0	0	0	0	37	0	37	0
CCS	CARACAS, VENEZUELA	N	FGN	0	0	52	0	52	0	104	0
CCU	CALCUTTA, INDIA	N	FGN	10798	2	11583	1	11041	0	33422	3
CDG	PARIS DE GAULLE, FRANCE	N	FGN	25514	1	28834	2	32635	0	86983	3
CDV	CORDOVA, AS, USA	N	NO	1514	0	1516	0	1512	0	4542	0
CEO	WACO KUNGO, ANGOLA	S	FGN	10	0	4	0	0	0	14	0
CFU	CORFU, GREECE	N	FGN	746	0	1152	0	1224	0	3122	0
CGB	CUIABA MATO GROSSO, BRAZIL	S	FGN	9184	0	8652	0	8360	0	26196	0
CGH	SAO PAULO-CONGONHAS, BRAZIL	S	FGN	1082	0	2410	0	2600	0	6092	0
CGK	JAKARTA-SOEKARNO, INDONESIA	S	FGN	626	0	630	0	687	0	1943	0
CGN	COLOGNE BONN, FRG	N	FGN	18161	1	19445	0	19597	1	57203	2
CGO	ZHENGZHOU, P. R. CHINA	N	FGN	208	0	394	0	341	0	943	0
CGP	CHITTAGONG, BANGLADESH	N	FGN	0	0	0	0	80	0	80	0
CGQ	CHANGCHUN, P. R. CHINA	N	FGN	62	0	70	0	268	0	400	0
CGR	CAMPO GRANDE, BRAZIL	S	FGN	6770	0	7800	3	8854	0	23424	3
CHA	CHATTANOOGA, TN, USA	N	YES	1618	0	1704	0	984	0	4306	0
CHC	CHRISTCHURCH, NEW ZEALAND	S	FGN	17095	7	24202	0	26870	0	68167	7
CHM	CHIMBOTE, PERU	S	FGN	0	0	0	0	98	0	98	0
CHO	CHARLOTTESVILLE, VA, USA	N	YES	1814	0	808	0	831	0	3453	0
CHQ	CHANIA, CRETE, GREECE	N	FGN	856	0	793	0	1554	0	3203	0
CHS	CHARLESTON, SC, USA	N	YES	7219	0	8528	0	8385	0	24132	0
CID	CEDAR RAPIDS/IOWA CITY, IO, USA	N	YES	3800	0	2995	0	3565	1	10360	1
CIX	CHICLAYO, PERU	S	FGN	286	0	450	0	800	0	1536	0
CJB	COIMBATORE, INDIA	N	FGN	1528	0	1674	2	1460	0	4662	2
CJC	CALAMA, CHILE	S	FGN	626	0	420	0	630	0	1676	0
CJU	CHEJU, REP OF KOREA	N	FGN	0	0	0	0	1708	1	1708	1
CKG	CHONGQING, P. R. CHINA	N	FGN	714	0	787	0	1138	0	2639	0
CKS	CARAJAS, BRAZIL	S	FGN	417	0	417	0	188	0	1022	0
CKY	CONAKRY, GUINEA	N	FGN	550	0	707	0	947	0	2204	0
CLE	CLEVELAND, OH, USA	N	YES	24028	1	40166	1	55625	1	119819	3
CLT	CHARLOTTE, NC, USA	N	YES	95251	2	113302	1	122448	0	331001	3
CMB	COLOMBO, SRI LANKA	N	FGN	3021	0	3078	0	3254	1	9353	1
CMG	CORUMBA, MATO GROSSO, BRAZIL	S	FGN	1460	1	1464	0	1068	0	3992	1
CMH	COLUMBUS, OH, USA	N	YES	8004	0	9329	0	9980	0	27313	0
CMI	CHAMPAIGN, IL, USA	N	YES	2186	0	2195	0	2188	0	6569	0
CMN	MOHAMEDV, CASABLANCA, MOROCCO	N	FGN	4767	0	6241	0	6621	0	17629	0
CND	CONSTANTO, ROMANIA	N	FGN	0	0	0	0	0	0	0	0
CNF	BELO HORIZONTE-CONFINS, BRAZIL	S	FGN	19683	0	19554	0	17047	0	56284	0
CNQ	CORRIENTES, ARGENTINA	S	FGN	1100	0	544	0	312	0	1956	0
CNS	CAIRNS, QLD, AUSTRALIA	S	FGN	4850	1	6049	0	7815	0	18714	1
CNX	CHIANG MAI, THAILAND	N	FGN	728	0	435	0	18	0	1181	0
COK	COCHIN, INDIA	N	FGN	5457	1	4646	2	4380	0	14483	3
COO	COTONOU, BENIN	N	FGN	1120	0	1038	0	838	0	2996	0
COR	CORDOBA, ARGENTINA	S	FGN	6772	0	6194	1	5551	0	18517	1
COS	COLORADO SPRINGS, CO, USA	N	YES	8004	0	8313	1	10804	0	27121	1
CPH	COPENHAGEN, DENMARK	N	FGN	11419	1	14184	0	15634	1	41237	2
CPO	CUPIATO, CHILE	S	FGN	0	0	320	0	632	0	952	0
CPQ	CAMPINAS, BRAZIL	S	FGN	1056	0	1207	0	889	0	3152	0
CPR	CASPER, WY, USA	N	YES	4230	0	2902	0	2170	0	9302	0

AIRPORT	APTDEF	HEMISPHR	CONUS	STGFY87	ING1	STGFY88	ING2	STGFY89	ING3	STG737	INGS
CPT	CAPE TOWN, SOUTH AFRICA	S	FGN	8545	1	10490	0	11738	2	30773	3
CPV	CAMPINA GRANDE, BRAZIL	S	FGN	626	0	628	0	624	0	1878	0
CRD	COMODORO RIVADAVIA, ARGENTINA	S	FGN	2553	0	2041	0	1509	0	6103	0
CRP	CORPUS CHRISTI, TX, USA	N	YES	5584	0	5292	0	5290	1	16166	1
CRW	CHARLESTON, WV, USA	N	YES	4478	0	5070	1	2915	0	12463	1
CTA	CATANIA, ITALY	N	FGN	252	0	665	0	838	0	1755	0
CTC	CATAMARCA, ARGENTINA	S	FGN	778	0	782	1	730	0	2290	1
CTG	CARTAGENA, COLOMBIA	N	FGN	105	0	104	0	104	0	313	0
CTS	SAPPORO-CHITOSE, JAPAN	N	FGN	1398	0	2908	0	2784	0	7090	0
CTU	CHENGDU, P. R. CHINA	N	FGN	2138	1	1728	0	2749	1	6615	2
CUN	CANCUN, MEXICO	N	FGN	634	0	1212	0	602	0	2448	0
CUR	CURACAO, NETH ANTILLES	N	FGN	20	0	0	0	0	0	20	0
CUT	CUTRAL-CO, ARGENTINA	S	FGN	0	0	18	0	0	0	18	0
CVG	CINCINNATI, OH, USA	N	YES	14496	0	18777	0	16460	0	49733	0
CVT	COVENTRY, ENG, UK	N	FGN	0	0	0	0	42	0	42	0
CWB	CURITIBA, PARANA, BRAZIL	S	FGN	6532	0	8720	0	10110	2	25362	2
CWL	CARDIFF, WALES, UK	N	FGN	0	0	0	1	0	0	0	1
CXI	CHRISTMAS ISLAND, REP OF KIRIBATI	N	FGN	106	0	104	0	104	0	314	0
CYI	CHIAYI, TAIWAN	N	FGN	730	0	732	0	730	0	2192	0
CZL	CONSTANTINE, ALGERIA	N	FGN	3352	0	3129	0	3101	0	9582	0
CZS	CRUZEIRO DO SUL, ACRE, BRAZIL	S	FGN	344	0	436	0	454	0	1234	0
CZX	CHANGZHOU, P. R. CHINA	N	FGN	208	0	227	0	224	0	659	0
DAB	DAYTONA BEACH, FL, USA	N	YES	3532	1	4032	0	2840	1	10404	2
DAC	DHAKA, BANGLADESH	N	FGN	934	0	734	0	789	0	2457	0
DAL	LOVE DALLS/FT. WORTH, TX, USA	N	YES	75124	4	76295	3	76191	3	227610	10
DAM	DAMASCUS, SYRIA	N	FGN	523	0	883	0	905	0	2311	0
DAR	DAR ES SALAAM, TANZANIA	S	FGN	3407	0	2968	0	2961	0	9336	0
DAY	DAYTON, OH, USA	N	YES	37652	1	43020	2	48201	1	128873	4
DBV	DUBROVNIK, YUGOSLAVIA	N	FGN	1806	0	2366	0	2730	0	6902	0
DCA	NATIONAL, WASHINGTON, DC, USA	N	YES	22108	0	26412	0	30911	1	79431	1
DEC	DECATUR, IL, USA	N	YES	0	0	0	0	0	0	0	0
DEL	DELHI, INDIA	N	FGN	15987	0	16401	3	17645	2	50033	5
DEN	STAPLETON INT'L, DENVER, CO, USA	N	YES	112673	2	113634	2	106309	0	332616	4
DET	DETROIT CITY, MI, USA	N	YES	0	0	2064	0	10902	1	12966	1
DEU	SOMEWHERE OVER GERMANY	N	FGN	0	0	0	1	0	0	0	1
DFW	DALLAS/FT WORTH, TX, USA	N	YES	51130	1	48254	1	53615	0	152999	2
DHA	DHAHRAN, SAUDI ARABIA	N	FGN	7902	0	6474	0	6302	0	20678	0
DIB	DIBRUGARH, INDIA	N	FGN	816	0	864	0	852	0	2532	0
DIE	ANTSIRANANA, MADAGASCAR	S	FGN	610	0	610	0	576	0	1796	0
DIR	DIRE DAWA, ETHIOPIA	N	FGN	38	0	628	0	1100	0	1766	0
DJE	DJERBA, TUNISIA	N	FGN	547	0	267	0	303	0	1117	0
DJG	DJANET, ALGERIA	N	FGN	466	0	532	0	564	0	1562	0
DKR	DAKAR, SENEGAL	N	FGN	467	0	580	0	653	0	1700	0
DLA	DOUALA, REP OF CAMEROON	N	FGN	5262	0	4691	0	4654	0	14607	0
DLC	DALIAN, P. R. CHINA	N	FGN	0	0	44	0	130	0	174	0
DLG	DILLINGHAM, AS, USA	N	NO	1444	0	1622	0	1660	0	4726	0
DLH	DULUTH, MN, USA	N	YES	0	0	0	0	0	1	0	1
DMU	DIMAPUR, INDIA	N	FGN	0	0	0	0	326	0	326	0
DOD	DODOMA, TANZANIA	S	FGN	16	0	0	0	0	0	16	0
DOH	DOHA, QATAR	N	FGN	8859	0	9310	0	9325	0	27494	0
DPS	DENPASAR, INDONESIA	S	FGN	104	0	104	0	106	0	314	0
DRO	DURANGO, CO, USA	N	YES	2233	0	1462	0	1442	0	5137	0
DRW	DARWIN, N.T., AUSTRALIA	S	FGN	1107	0	2092	0	2513	0	5712	0
DSM	DES MOINES, IO, USA	N	YES	7748	0	9329	0	7785	0	24862	0
DTW	WAYNE CO, DETROIT, MI, USA	N	YES	16765	0	24028	0	21130	1	61923	1
DUB	DUBLIN, REPUBLIC OF IRELAND	N	FGN	19308	1	23823	1	28519	1	71650	3
DUD	DUNEDIN, NEW ZEALAND	S	FGN	4145	0	4379	1	5890	0	14414	1
DUR	DURBAN, SOUTH AFRICA	S	FGN	6925	2	7739	2	9624	1	24288	5
DUS	DUESSELDORF, FRG	N	FGN	30119	2	32964	5	33450	6	96533	13
DUT	DUTCH HARBOR, AS, USA	N	NO	828	0	1116	0	1432	0	3376	0
DXB	DUBAI, U. A. EMIRATES	N	FGN	3134	0	2234	0	2719	0	8087	0
EAM	NEJHRAN, SAUDI ARABIA	N	FGN	2392	0	2412	0	2552	1	7356	1
EBB	ENTEBBE KAMPALA, UGANDA	N	FGN	39	0	167	0	459	0	665	0
EBD	EL OBEID, SUDAN	N	FGN	632	0	968	0	512	0	2112	0
EBJ	ESBJERG, DENMARK	N	FGN	482	0	284	0	156	0	922	0
EDI	EDINBURGH, SCOTLAND	N	FGN	1040	0	1988	0	7123	1	10151	1
EFL	KEFALONIA, GREECE	N	FGN	780	0	786	0	776	0	2342	0
EJH	WEDJH, SAUDI ARABIA	N	FGN	784	0	736	0	730	0	2250	0
ELF	EL FASHER, SUDAN	N	FGN	0	0	8	0	164	0	172	0
ELG	EL GOLEA, ALGERIA	N	FGN	416	0	416	0	416	0	1248	0
ELM	ELMIRA, NY, USA	N	YES	0	0	260	0	0	0	260	0
ELP	EL PASO, TX, USA	N	YES	38902	0	39117	0	41757	0	119776	0
ELQ	GASSIM, SAUDI ARABIA	N	FGN	4652	0	4072	0	3224	0	11948	0
ELS	EAST LONDON, SOUTH AFRICA	S	FGN	9987	3	11104	0	10476	2	31567	5
ELU	EL OUED, ALGERIA	N	FGN	288	0	312	0	426	0	1026	0

AIRPORT	APTDEF	HEMISPHR	CONUS	STGFY87	ING1	STGFY88	ING2	STGFY89	ING3	STG737	INGS
EMA	EAST MIDLANDS, ENGLAND	N	FGN	291	0	269	0	322	2	882	2
ENU	ENUGU, NIGERIA	N	FGN	3138	0	2980	0	2199	0	8317	0
EQS	ESQUEL, ARGENTINA	S	FGN	1116	0	1066	0	850	0	3032	0
ERI	ERIE, PA, USA	N	YES	1772	0	1618	0	1535	0	4925	0
ESB	ANKARA-ESENBAGA, TURKEY	N	FGN	0	0	695	0	1329	0	2024	0
ESR	EL SALVADOR, CHILE	S	FGN	836	0	772	0	728	0	2336	0
ETH	ELAT, ISRAEL	N	FGN	4	0	14	0	2	0	20	0
EUG	EUGENE, OR, USA	N	YES	3493	0	2908	0	5201	0	11602	0
EUN	LAAYOUNE, MOROCCO	N	FGN	244	0	503	0	317	0	1064	0
EVE	EVENES, NORWAY	N	FGN	1520	0	1874	0	1778	0	5172	0
EVV	EVANSVILLE, IN, USA	N	YES	2468	0	2519	0	1898	0	6885	0
EWR	NEWARK, NEW YORK, NY, USA	N	YES	78323	1	85323	2	83555	1	247201	4
EZE	BUENOS AIRES-EZEIZA ARPT, ARGENTINA	S	FGN	424	1	838	0	1483	0	2745	1
FAE	FAROE ISLANDS, DENMARK	N	FGN	756	0	837	0	752	0	2345	0
FAI	FAIRBANKS, AS, USA	N	NO	3674	0	3816	0	3756	0	11246	0
FAO	FARO, PORTUGAL	N	FGN	1069	0	1712	1	1300	0	4081	1
FAR	FARGO, ND, USA	N	YES	1561	0	383	0	445	0	2389	0
FAT	FRESNO, CA, USA	N	YES	9993	1	6833	1	4983	0	21809	2
FAY	FAYETTEVILLE, NC, USA	N	YES	3260	0	3643	0	2786	0	9689	0
FBM	LUBUMBASHI, ZAIRE	S	FGN	262	0	378	0	444	0	1084	0
FBU	FORNEBU, OSLO, NORWAY	N	FGN	11420	0	29599	0	33347	0	74366	0
FCA	KALISPELL GLACIER NAT'L OK, MT, USA	N	YES	1460	0	1460	0	1067	0	3987	0
FCO	DA VINCI, ROME, ITALY	N	FGN	4538	0	6614	1	8484	1	19636	2
FEZ	FEZ, MOROCCO	N	FGN	146	0	408	0	640	0	1194	0
FIH	KINSHASA, ZAIRE	S	FGN	2324	0	2776	0	2920	0	8020	0
FJR	AL FUJAIRAH, U.A.E.	N	FGN	0	0	208	0	225	0	433	0
FKI	KISANGANI, ZAIRE	N	FGN	1170	0	1596	0	1388	0	4154	0
FLI	FT LAUDERDALE, FL, USA	N	YES	12566	1	12687	0	17037	0	42290	1
FLN	FLORIANOPOLIS, BRAZIL	S	FGN	4180	0	5040	0	3909	0	13129	0
FMA	FORMOSA, ARGENTINA	S	FGN	682	0	696	1	648	0	2026	1
FMI	KALEMIE, ZAIRE	S	FGN	524	0	440	0	414	0	1378	0
FMO	MUENSTER, GERMANY	N	FGN	0	0	0	0	69	0	69	0
FNA	FREETOWN, SIERRA LEONE	N	FGN	112	0	0	0	0	0	112	0
FNC	FUNCHAL - MADEIRA, PORTUGAL	N	FGN	3737	1	4944	0	6276	1	14957	2
FNT	FLINT, MI, USA	N	YES	2186	0	2300	0	2923	1	7409	1
FOC	FUZHOU, P. R. CHINA	N	FGN	534	0	1116	0	1082	0	2732	0
FOE	FORBES, TOPEKA, KA, USA	N	YES	1407	0	62	0	0	0	1469	0
FOR	FORTALEZA, CEARA, BRAZIL	S	FGN	4798	0	6068	0	8582	0	19448	0
FPO	FREEPORT, BAHAMAS	N	FGN	2666	0	5156	0	4876	0	12698	0
FRA	FRANKFURT, FRG	N	FGN	52274	8	56256	2	64168	6	172698	16
FRL	FORLI, ITALY	N	FGN	0	0	0	0	2	0	2	0
FSD	SIOUX FALLS, SD, USA	N	YES	6410	0	2897	0	5603	0	14910	0
FTU	FT DAUPHIN, MADAGASCAR	S	FGN	332	0	328	0	330	0	990	0
FUE	FUERTEVENTURA, CANARY IS.	N	FGN	0	0	216	0	228	0	444	0
FUK	FUKUOKA, JAPAN	N	FGN	730	0	410	0	62	0	1202	0
FWA	FT WAYNE, IN, USA	N	YES	2580	0	2344	0	2444	0	7368	0
GAJ	YAMAGATA, HONSHU, JAPAN	N	FGN	1154	0	1426	1	1330	0	3910	1
GAL	GALENA, AS, USA	N	NO	0	0	270	0	182	0	452	0
GAU	GAUHATI, INDIA	N	FGN	3934	1	5832	0	6143	0	15909	1
GBE	GABORONE, BOTSWANA	S	FGN	527	0	500	0	246	0	1273	0
GCI	GUERNSEY, CHANNEL IS, UK	N	FGN	0	0	0	0	40	0	40	0
GDL	GUADALAJARA, MEXICO	N	FGN	0	0	38	0	92	0	130	0
GEG	SPOKANE, WA, USA	N	YES	8549	0	5588	0	6999	0	21136	0
GEO	GEORGETOWN, GUYANA	N	FGN	0	0	8	0	28	0	36	0
GHA	GHARDAIA, ALGERIA	N	FGN	1014	0	858	0	1032	0	2904	0
GHB	GOVERNORS HARBOUR, BAHAMAS	N	FGN	36	0	0	1	0	0	36	1
GHU	QUALEGUAYCHU, ARGENTINA	S	FGN	0	1	0	0	0	0	0	1
GIB	GIBRALTAR, GIBRALTAR	N	FGN	1788	0	2904	0	3440	0	8132	0
GIG	RIO DE JANEIRO INT'L, BRAZIL	S	FGN	27048	0	33116	1	34612	1	94776	2
GIZ	GIZAN, SAUDI ARABIA	N	FGN	5781	0	6019	0	6070	0	17870	0
GJT	GRAND JUNCTION, CO, USA	N	YES	2416	0	3572	0	2962	0	8950	0
GLA	GLASGLOW, SCOTLAND	N	FGN	687	0	1605	0	5763	0	8055	0
GMA	GEMENA, ZAIRE	N	FGN	312	0	332	0	252	0	896	0
GOA	GENOA, ITALY	N	FGN	292	1	267	0	1064	0	1623	1
GOI	GOA, INDIA	N	FGN	1798	0	1554	0	1982	1	5334	1
GOM	GOMA, ZAIRE	S	FGN	104	0	446	0	554	0	1104	0
GOP	GORAKHPUR, INDIA	N	FGN	486	0	328	0	404	0	1218	0
GOT	GOTHENBURG, SWEDEN	N	FGN	3846	0	4517	2	5431	0	13794	2
GOU	GAROUA, REP OF CAMEROON	N	FGN	1954	0	1822	0	1338	0	5114	0
GOV	GOVE, N.T., AUSTRALIA	S	FGN	314	0	600	0	624	0	1538	0
GRB	GREEN BAY, WI, USA	N	YES	605	0	0	0	0	0	605	0
GRJ	GEORGE, SOUTH AFRICA	S	FGN	2178	0	2262	0	2253	0	6693	0
GRR	GRAND RAPIDS, MI, USA	N	YES	4831	0	3497	0	4465	0	12793	0
GRU	SAO PAULO-GUARULMOS, BRAZIL	S	FGN	41061	0	45163	0	47825	0	134049	0
GRZ	GRAZ, AUSTRIA	N	FGN	619	1	304	0	562	1	1485	2

AIRPORT	APTDEF	HEMISPHR	CONUS	STGFY87	ING1	STGFY88	ING2	STGFY89	ING3	STG737	INGS
GSO	GREENSBORO/HPT/WIN-SALEM, NC, USA	N	YES	18586	0	14989	0	15677	0	49252	0
GSP	GREENVILLE/SPARTANBURG, SC, USA	N	YES	1508	0	2324	0	2292	1	6124	1
GTF	GREAT FALLS, MT, USA	N	YES	4356	0	3398	0	2992	0	10746	0
GUA	GUATEMALA CITY, GUATEMALA	N	FGN	1667	0	2848	0	3522	0	8037	0
GUM	GUAM, GUAM	N	FGN	289	0	366	0	145	0	800	0
GVA	GENEVA, SWITZERLAND	N	FGN	10594	0	10520	1	11863	0	32977	1
GWL	GWALIOR, INDIZ	N	FGN	1460	0	1422	1	1460	0	4342	1
GWT	GALWAY, IRELAND	N	FGN	130	0	136	0	8	0	274	0
GXF	SEIYUN, YEMEN	N	FGN	26	0	0	0	0	0	26	0
GXG	NEGAGE, ANGOLA	S	FGN	382	0	314	0	0	0	696	0
GYE	GUAYAQUIL, ECUADOR	S	FGN	1609	0	0	0	0	0	1609	0
GYN	GOIANIA, BRAZIL	S	FGN	7891	0	8638	0	10582	0	27111	0
HAC	HACHIOJO, JIMA ISLAND, JAPAN	N	FGN	834	1	1396	0	842	0	3072	1
HAH	MORONI-HAHAYA, COMOROS	S	FGN	266	0	343	0	222	0	831	0
HAJ	HANOVER, FED REP OF GERMANY	N	FGN	8844	0	9804	1	8722	0	27370	1
HAK	HAIKOU, P. R. CHINA	N	FGN	770	0	1508	0	1270	0	3548	0
HAM	HAMBURG, FRG	N	FGN	25535	2	27695	3	27741	4	80971	9
HAN	HANOI, SOC REP OF VIETNAM	N	FGN	152	0	158	0	242	0	552	0
HAS	HAIL, SAUDI ARABIA	N	FGN	3642	0	2720	0	2568	0	8930	0
HBA	HOBART, TASMANIA, AUSTRALIA	S	FGN	3785	0	4822	0	5322	0	13929	0
HBT	HAFR ALBAPIN, SAUDI ARABIA	N	FGN	140	0	228	0	208	0	576	0
HDN	STEAMBOAT SPRINGS, CO, USA	N	YES	0	0	0	0	88	0	88	0
HDY	HAT YAI, THAILAND	N	FGN	3094	0	2434	0	2706	0	8234	0
HEL	HELSINKI, FINLAND	N	FGN	2797	0	3382	0	4373	0	10552	0
HER	HERAKLION, GREECE	N	FGN	1780	0	2406	0	2312	0	6498	0
HGH	HANGZHOU, P. R. CHINA	N	FGN	1390	0	1619	0	1610	0	4619	0
HIR	HONIARA, GUADALCANAL, SOLOMON IS.	S	FGN	436	0	648	0	672	0	1756	0
HJR	HIROSHIMA, JAPAN	N	FGN	1460	0	1464	0	1460	0	4384	0
HKD	HAKODATE, JAPAN	N	FGN	1030	0	566	0	416	0	2012	0
HKG	HONG KONG, HONG KONG	N	FGN	2792	0	6018	0	7074	0	15884	0
HKT	PHUKET, THAILAND	N	FGN	1932	0	2110	0	2290	0	6332	0
HLN	HELENA, MT, USA	N	YES	2046	0	2188	0	1800	0	6034	0
HLZ	HAMILTON, NEW ZEALAND	S	FGN	627	0	727	0	1151	0	2505	0
HME	HASSI MESSAOUD, ALGERIA	N	FGN	256	0	118	0	268	0	642	0
HND	TOKYO-HANEDA, JAPAN	N	FGN	14398	0	12095	0	9997	1	36490	1
HNL	HONOLULU, OAHU, HA, USA	N	NO	51139	0	51563	0	58525	0	161227	0
HNH	HANA, MAUI, HA, USA	N	NO	0	0	0	0	0	1	0	1
HOD	HODEIDAH, YEMEN	N	FGN	86	0	0	0	0	0	86	0
HOF	HOFUF, SAUDI ARABIA	N	FGN	992	0	960	0	854	0	2806	0
HOR	HORTA FAIAL ISLAND, PORTUGAL	N	FGN	92	0	144	0	188	0	424	0
HOU	HOUSTON, TX, USA	N	YES	71429	3	81688	4	86754	2	239871	9
HPN	WHITE PLAINS, NY, USA	N	YES	2159	0	2049	0	1990	0	6198	0
HRB	HARBIN, MANCHURIA, P. R. CHINA	N	FGN	210	0	147	0	204	0	561	0
HRE	HARARE, ZIMBABWE	S	FGN	3314	0	5238	0	5347	0	13899	0
HRG	HORGHADA, ARAB REP OF EGYPT	N	FGN	760	0	732	0	1024	0	2516	0
HRL	HARLINGEN, TX, USA	N	YES	7446	1	7653	0	7583	0	22682	1
HSV	HUNTSVILLE/DECATUR, AL, USA	N	YES	1817	0	1972	0	3316	0	7105	0
HTI	HAMILTON ISLAND, QLD, AUSTRALIA	S	FGN	1351	0	1648	0	1748	0	4747	0
HTS	HUNTINGTON, WV, USA	N	YES	1152	0	1174	0	538	0	2864	0
HUN	HUALIEN, TAIWAN	N	FGN	6508	0	7264	0	8030	0	21802	0
HYD	HYDERABAD, INDIA	N	FGN	2103	1	2214	5	2265	1	6582	7
IAD	DULLES INT'L, WASHINGTON, DC, USA	N	YES	84839	1	52922	1	50660	0	188421	2
IAH	HOUSTON INTERCONT, TX, USA	N	YES	35485	0	46187	1	42713	0	124385	1
IAM	IN AMENAS, ALGERIA	N	FGN	408	0	420	0	506	0	1334	0
IBA	IBADAN, NIGERIA	N	FGN	1382	0	706	0	484	0	2572	0
IBZ	IBIZA, SPAIN	N	FGN	124	1	220	0	294	1	638	2
ICT	WICHITA, KA, USA	N	YES	10698	0	6225	0	6858	0	23781	0
IDA	IDAHO FALLS, ID, USA	N	YES	2190	0	2756	0	2714	0	7660	0
IDR	INDORE, INDIA	N	FGN	1460	0	1426	0	1460	0	4346	0
IEV	KIEV, USSR	N	FGN	0	0	32	0	8	0	40	0
IFN	ISFAHAN, IRAN	N	FGN	2256	0	2874	0	2728	0	7858	0
IGL	IZMIR-CIGLI, TURKEY	N	FGN	26	0	22	0	0	0	48	0
IGR	IGUAZU, ARGENTINA	S	FGN	986	0	784	0	522	0	2292	0
IGU	IGUASSU FALLS, BRAZIL	S	FGN	1776	0	2764	0	3510	0	8050	0
ILG	PHILADELPHIA-WILMINGTON, PA, USA	N	YES	440	0	0	0	0	0	440	0
ILM	WILMINGTON, NC, USA	N	YES	6254	0	5363	0	4298	0	15915	0
ILR	ILORIN, NIGERIA	N	FGN	1568	0	1884	0	737	0	4189	0
IMF	IMPHAL, INDIA	N	FGN	1460	0	1464	0	1460	0	4384	0
IMP	IMPERATRIZ, BRAZIL	S	FGN	1186	0	1464	0	1456	0	4106	0
IND	INDIANAPOLIS, IN, USA	N	YES	12290	0	19730	0	25796	0	57816	0
INI	NIS, YUGOSLAVIA	N	FGN	57	0	0	0	106	0	163	0
INU	NAURU, REP OF NAURU	S	FGN	889	0	906	1	430	0	2225	1
INZ	IN SALAH, ALGERIA	N	FGN	586	0	504	0	606	0	1696	0
IOA	IOANNINA, GREECE	N	FGN	1354	0	1200	0	1200	0	3754	0
IOS	ILHEUS, BRAZIL	S	FGN	2920	0	2928	0	2954	0	8802	0

AIRPORT	APTDEF	HEMISPHR	CONUS	STGFY87	ING1	STGFY88	ING2	STGFY89	ING3	STG737	INGS
IQQ	IQUIQUE, CHILE	S	FGN	1460	0	1674	0	1868	0	5002	0
IQT	IQUITOS, PERU	S	FGN	210	0	304	0	844	0	1358	0
IRJ	LA RIOJA, ARGENTINA	S	FGN	860	0	768	0	736	0	2364	0
IRP	ISIRO, ZAIRE	N	FGN	104	0	156	0	210	0	470	0
ISA	MOUNT ISA, QLD, AUSTRALIA	S	FGN	546	0	1262	1	1660	0	3468	1
ISB	ISLAMABAD RAWALPINDI, PAKISTAN	N	FGN	3663	0	4673	0	4868	0	13204	0
ISG	ISHIGAKI, JAPAN	N	FGN	6936	1	7473	4	6358	0	20767	5
ISO	KINSTON, NC, USA	N	YES	2024	0	1464	0	495	0	3983	0
ISP	LONG ISLAND MACARTHUR, NY, USA	N	YES	5816	0	3036	0	3539	1	12391	1
IST	ISTANBUL, TURKEY	N	FGN	2551	0	2343	0	3213	0	8107	0
ITH	ITHICA, NY, USA	N	YES	182	0	2	0	151	0	335	0
ITO	HILO HAWAII, HA, USA	N	NO	8568	1	9273	2	9946	0	27787	3
IUE	NIUE ISLAND, NIUE	S	FGN	127	0	72	0	26	0	225	0
IVC	INVERCARGILL, NEW ZEALAND	S	FGN	2069	0	2076	1	2096	0	6241	1
IXA	AGARTALA, INDIA	N	FGN	1976	0	2720	0	2593	0	7289	0
IXB	BAGDOGRA, INDIA	N	FGN	2366	1	2196	0	2190	0	6752	1
IXC	CHANDIGAR, INDIA	N	FGN	1460	0	1464	1	1426	1	4350	2
IXD	ALLAHABAD, INDIA	N	FGN	392	0	500	0	1042	0	1934	0
IXE	MANGALORE, INDIA	N	FGN	2370	0	2168	1	1878	0	6416	1
IXJ	JAMMU, INDIA	N	FGN	1650	0	1576	1	1546	1	4772	2
IXL	LEH, INDIA	N	FGN	574	0	916	0	938	0	2428	0
IXM	MADURAI, INDIA	N	FGN	1200	0	1142	0	1344	0	3686	0
IXR	RANCHI, INDIA	N	FGN	1460	0	1464	1	1460	0	4384	1
IXS	SILOHAR, INDIA	N	FGN	1748	0	1832	0	1772	0	5352	0
IXU	AURANGABAD, INDIA	N	FGN	1820	0	1464	1	1460	0	4744	1
IXV	ALONG, INDIA	N	FGN	0	0	0	1	0	0	0	1
IXZ	PORT BLAIR ANDAMAN ISLAND, INDIA	N	FGN	706	0	928	0	994	0	2628	0
JAC	JACKSON, WY, USA	N	YES	2325	0	2179	0	2342	0	6846	0
JAI	JAIPUR, INDIA	N	FGN	4068	2	4876	2	3736	0	12680	4
JAN	JACKSON, MS, USA	N	YES	3392	0	3085	0	2959	0	9436	0
JAX	JACKSONVILLE, FL, USA	N	YES	10211	0	13077	0	15242	1	38530	1
JDH	JODHPUR, INDIA	N	FGN	2920	0	2928	0	2816	1	8664	1
JDO	JUAZEIRO DO NORTE CEARAH, BRAZIL	S	FGN	626	0	628	0	624	0	1878	0
JED	JEDDAH, SAUDI ARABIA	N	FGN	19745	0	20292	0	19897	0	59934	0
JER	JERSEY CHANNEL ISLANDS, UK	N	FGN	1263	0	1112	0	3011	0	5386	0
JFK	KENNEDY, NEW YORK, NY, USA	N	YES	13217	0	8785	0	8874	0	30876	0
JGA	JAMNAGAR, INDIA	N	FGN	730	0	732	0	730	0	2192	0
JHB	JOHOR BAHRU, MALAYSIA	N	FGN	4018	0	4164	0	4690	0	12872	0
JIB	DJIBOUTI, DJIBOUTI	N	FGN	508	0	686	0	868	0	2062	0
JKH	CHIOS, GREECE	N	FGN	1858	0	1720	0	1768	0	5346	0
JNB	JOHANNESBURG, SOUTH AFRICA	S	FGN	13746	2	15620	0	18693	1	48059	3
JNU	JUNEAU, AS, USA	N	NO	2255	0	2684	0	2686	0	7625	0
JOI	JOINVILLE, BRAZIL	S	FGN	626	0	628	0	624	0	1878	0
JOS	JOS, NIGERIA	N	FGN	2596	0	2022	0	1643	0	6261	0
JPA	JOAO PESSOA, BRAZIL	S	FGN	1460	0	1832	0	4074	0	7366	0
JRH	JORMAT, INDIA	N	FGN	694	2	732	0	730	0	2156	2
JRO	KILIMANJARO, TANZANIA	S	FGN	1667	0	1568	0	1405	0	4640	0
JSI	SKIATHOS, GREECE	N	FGN	412	0	342	0	448	0	1202	0
JTR	SANTORINI, THIRA ISLAND, GREECE	N	FGN	1126	0	884	0	1480	0	3490	0
JUB	JUBA, SUDAN	N	FGN	38	0	0	0	0	0	38	0
JUJ	JUJUY, ARGENTINA	S	FGN	600	0	226	0	26	0	852	0
KAD	KADUNA, NIGERIA	N	FGN	3896	0	3639	0	2650	0	10185	0
KAN	KANO, NIGERIA	N	FGN	700	0	708	0	765	0	2173	0
KBL	KABUL, AFGHANISTAN	N	FGN	208	0	208	0	78	0	494	0
KBR	KOTA BHARU, MALAYSIA	N	FGN	3024	0	3034	0	3091	0	9149	0
KCH	KUCHING, SARAWAK, MALAYSIA	N	FGN	5337	1	5482	0	6265	0	17084	1
KCZ	KOCHI, JAPAN	N	FGN	1522	0	816	0	170	0	2508	0
KDU	SKARDU, PAKISTAN	N	FGN	190	0	688	0	730	0	1608	0
KEF	REYKJAVIK-KEFLAVIK, ICELAND	N	FGN	561	0	936	0	992	1	2489	1
KER	KERMAN, IRAN	N	FGN	532	0	52	0	0	0	584	0
KGA	KANANGA, ZAIRE	S	FGN	420	0	366	0	490	0	1276	0
KGL	KIGALI, RWANDA	S	FGN	22	0	22	0	208	0	252	0
KGS	KOS, GREECE	N	FGN	550	1	566	0	894	0	2010	1
KHH	KAHHSIUNG, TAIWAN	N	FGN	14596	2	18764	0	20170	0	53530	2
KHI	KARACHI, PAKISTAN	N	FGN	7384	2	9030	0	8710	1	25124	3
KHN	NANCHANG KIANGSI, P. R. CHINA	N	FGN	228	0	190	0	52	0	470	0
KIJ	NIIGATA, JAPAN	N	FGN	2190	0	2224	0	2162	0	6576	0
KIM	KIMBERLEY, SOUTH AFRICA	S	FGN	3888	0	4182	0	4789	3	12859	3
KIN	KINGSTON, JAMAICA	N	FGN	338	0	88	0	208	0	634	0
KKC	KHON KAEN, THAILAND	N	FGN	2264	0	1942	0	1668	0	5874	0
KLX	KALAMATA, GREECE	N	FGN	782	0	742	0	730	0	2254	0
KMG	KUNMING, P.R. CHINA	N	FGN	2448	1	2577	0	3683	0	8708	1
KMI	MIYAZAKI, JAPAN	N	FGN	4686	0	3536	0	3474	0	11696	0
KMJ	KUMAMOTO, JAPAN	N	FGN	0	0	74	0	42	0	116	0
KMP	KEETMANSHOOP, NAMIBIA	S	FGN	174	0	0	0	0	0	174	0

AIRPORT	APTDEF	HEMISPHR	CONUS	STGFY87	ING1	STGFY88	ING2	STGFY89	ING3	STGF77	INGS
KMQ	KOMATSU, JAPAN	N	FGN	730	0	828	0	702	0	2260	0
KMX	KHAMIS MUSHAIT, SAUDI ARABIA	N	FGN	0	0	0	0	322	0	322	0
KND	KINDU, ZAIRE	S	FGN	480	0	622	0	522	0	1624	0
KNN	KANKAN, GUINEA	N	FGN	0	0	100	0	92	0	192	0
KNU	KANPUR, INDIA	N	FGN	1372	0	1578	0	1068	0	4018	0
KOA	KONA, HA, USA	N	NO	11308	0	11047	1	13819	0	36174	1
KOJ	KAGOSHIMA, JAPAN	N	FGN	843	0	1913	2	1095	0	3851	2
KRN	KIRUNA, SWEDEN	N	FGN	0	0	18	0	0	0	18	0
KRP	KARUP, DENMARK	N	FGN	0	0	0	0	72	0	72	0
KRS	KRISTIANSAND, NORWAY	N	FGN	7646	0	7990	0	7912	0	23548	0
KRT	KHARTOUM, SUDAN	N	FGN	1921	0	2623	1	1945	0	6489	1
KSA	KOSRAE, CAROLINE ISLANDS	N	FGN	10	0	132	0	104	0	246	0
KSD	KARLSTAD, SWEDEN	N	FGN	0	0	0	0	52	0	52	0
KSH	BAKHTARAN, IRAN	N	FGN	0	0	0	0	144	0	144	0
KSM	ST MARY'S, AS, USA	N	NO	420	0	562	0	722	0	1704	0
KST	KOSTI, SUDAN	N	FGN	0	1	0	0	0	0	0	1
KSU	KRISTIANSUND, NORWAY	N	FGN	2128	0	2024	0	2106	0	6258	0
KTM	KATHMANDU, NEPAL	N	FGN	2240	0	2200	1	2195	0	6635	1
KTN	KETCHIKAN, AS, USA	N	NO	1460	0	1464	0	1460	0	4384	0
KUA	KUANTAN, MALAYSIA	N	FGN	426	0	420	0	676	0	1522	0
KUH	KUSHIRO, JAPAN	N	FGN	1336	0	926	0	552	0	2814	0
KUL	KUALA LUMPUR, MALAYSIA	N	FGN	21147	1	22237	0	24379	0	67763	1
KVA	KAVALA, GREECE	N	FGN	1242	0	1160	0	1202	0	3604	0
KWE	GUIYANG, P. R. CHINA	N	FGN	684	0	660	0	834	0	2178	0
KWI	KUWAIT, KUWAIT	N	FGN	3659	0	2728	0	2536	0	8923	0
KWJ	KWANGJU, REP OF KOREA	N	FGN	0	0	0	0	668	0	668	0
KWL	GUILIN, P. R. CHINA	N	FGN	3855	0	4671	0	3365	0	11891	0
LAD	LUANDA, ANGOLA	S	FGN	5680	0	5112	0	3986	0	14778	0
LAN	LANSING, MI, USA	N	YES	1120	0	1646	0	1764	0	4530	0
LAS	LAS VEGAS, NV, USA	N	YES	82033	0	89149	1	96139	0	267321	1
LAX	LOS ANGELES, CA, USA	N	YES	113329	0	123390	2	118819	4	355538	6
LBB	LUBBOCK, TX, USA	N	YES	13600	0	16396	0	16240	0	46236	0
LBU	LABUAN SABAH, MALAYSIA	N	FGN	2398	0	2406	0	2709	0	7513	0
LBV	LIBREVILLE, GABON	N	FGN	1553	0	1955	0	1983	0	5491	0
LCA	LARNACA, CYPRUS	N	FGN	1352	0	1277	0	1616	1	4245	1
LCE	LA CEIBA, HONDURAS	N	FGN	380	0	570	0	1210	0	2160	0
LDB	LONDRINA, BRAZIL	S	FGN	0	0	440	0	1185	0	1625	0
LDE	LOURDES/TARBES, FRANCE	N	FGN	8	1	0	1	0	1	8	3
LDI	LINDI, TANZANIA	S	FGN	10	0	0	0	0	0	10	0
LED	LENINGRAD, U.S.S.R.	N	FGN	198	0	163	0	239	0	600	0
LEI	ALMERIA, SPAIN	N	FGN	100	0	104	0	130	0	334	0
LEJ	LEIPZIG, GDR	N	FGN	16	0	28	0	46	0	90	0
LEX	LEXINGTON, KY, USA	N	YES	3916	1	4165	0	3573	0	11654	1
LFT	LAFAYETTE, LA, USA	N	YES	0	0	0	0	302	0	302	0
LFW	LOME, TOGO	N	FGN	985	0	812	0	929	0	2726	0
LGA	NEW YORK LA GUARDIA, NY, USA	N	YES	32068	1	32703	1	36226	1	100997	3
LGB	LONG BEACH, CA, USA	N	YES	1299	0	3321	0	7605	0	12225	0
LGG	LIEGE, BELGIUM	N	FGN	0	0	0	0	0	1	0	1
LGK	LANGKAWI, MALAYSIA	N	FGN	0	0	206	0	448	0	654	0
LGW	LONDON-GATWICK, ENGLAND	N	FGN	13117	0	17634	1	36365	2	67116	3
LHE	LAHORE, PAKISTAN	N	FGN	7188	1	9191	2	9169	0	25548	3
LHR	LONDON HEATHROW, ENGLAND, (UK)	N	FGN	69405	2	75934	1	93470	2	238809	5
LHW	LANZHOU, P. R. CHINA	N	FGN	0	0	83	0	21	0	104	0
LIH	LIHUE, KAUAI, HA, USA	N	NO	17365	2	17708	3	19247	3	54320	8
LIL	LILLE, FRANCE	N	FGN	214	0	292	0	367	0	873	0
LIM	LIMA, PERU	S	FGN	1460	0	2157	0	2318	0	5935	0
LIN	MILAN Linate, ITALY	N	FGN	7588	1	7604	1	7641	0	22833	2
LIS	LISBON, PORTUGAL	N	FGN	10558	0	13190	0	14480	0	38228	0
LIT	LITTLE ROCK, AK, USA	N	YES	10791	1	10853	1	9382	1	31026	3
LJA	LODJA, ZAIRE	S	FGN	106	0	104	0	74	0	284	0
LJU	LJUBLJANA, YUGOSLAVIA	N	FGN	1741	0	1704	1	1615	0	5060	1
LKO	LUCKNOW, INDIA	N	FGN	4396	1	4264	1	4236	2	12896	4
LLA	LULEA, SWEDEN	N	FGN	0	0	8	0	0	0	8	0
LLW	LILONGWE, MALAWI	S	FGN	752	1	786	0	823	0	2361	1
LMT	KLAMATH FALLS, OR, USA	N	YES	1218	0	62	0	0	0	1280	0
LNK	LINCOLN, NB, USA	N	YES	5816	0	5847	0	4201	0	15864	0
LNZ	LONZ, AUSTRIA	N	FGN	768	1	704	0	683	0	2155	1
LOS	LAGOS, NIGERIA	N	FGN	16716	1	14969	1	11299	0	42984	2
LPA	GRAN CANARIA, CANARY ISLANDS	N	FGN	293	0	1439	0	2682	1	4414	1
LPB	LA PAZ, BOLIVIA	S	FGN	136	0	264	0	312	0	712	0
LPL	LIVERPOOL, ENGLAND	N	FGN	30	0	42	0	134	0	206	0
LRH	LA ROCHELLE, FRANCE	N	FGN	0	0	8	0	4	0	12	0
LST	LAUNCESTON, TASMANIA, AUSTRALIA	S	FGN	4721	1	5684	0	5723	2	16128	3
LTN	LONDON-LUTON INT'L, ENGLAND	N	FGN	192	0	270	0	556	1	1018	1
LUN	LUSAKA, ZAMBIA	S	FGN	2302	0	1961	0	2183	0	6446	0

AIRPORT	APTDEF	HEMISPHR	CONUS	STGFY87	ING1	STGFY88	ING2	STGFY89	ING3	STG737	INGS
LUO	LUENA, ANGOLA	S	FGN	434	0	472	0	556	0	1462	0
LUQ	SAN LUIS, ARGENTINA	S	FGN	196	0	0	0	0	0	196	0
LUT	LAURA STATION, AUSTRALIA	S	FGN	0	0	0	0	0	0	0	0
LUX	LUXEMBOURG, LUXEMBOURG	N	FGN	2615	0	3500	0	3753	0	9868	0
LXR	LUXOR, ARAB REP OF EGYPT	N	FGN	2161	0	2143	1	2995	0	7299	1
LXS	LEMNOS, GREECE	N	FGN	1040	0	996	0	1060	1	3096	1
LYH	LYNCHBURG, VA, USA	N	YES	1824	0	2306	0	1754	0	5884	0
LYP	FAISALABAD, PAKISTAN	N	FGN	790	0	1326	0	1324	0	3440	0
LYR	LONGYEARBYEN, NORWAY	N	FGN	14	0	223	0	255	0	492	0
LYS	LYON, FRANCE	N	FGN	5223	0	5439	0	5714	0	16376	0
MAA	MADRAS, INDIA	N	FGN	7714	0	8485	3	8067	1	24266	4
MAB	MARABA, BRAZIL	S	FGN	470	0	628	0	782	0	1880	0
MAD	MADRID, SPAIN	N	FGN	6813	1	7477	0	9134	0	23424	1
MAF	MIDLAND ODESSA, TX, USA	N	YES	16021	1	14942	0	14184	2	45147	3
MAH	MAHON, MENORCA, SPAIN	N	FGN	84	0	174	0	310	1	568	1
MAJ	MAJURO, MARSHALL ISLAND	N	FGN	92	0	132	0	104	0	328	0
MAL	MANGOLE, INDONESIA	N	FGN	0	0	0	0	0	0	0	0
MAN	MANCHESTER, ENGLAND (UK)	N	FGN	5780	3	7490	1	10909	0	24179	4
MAO	MANAUS, BRAZIL	S	FGN	6627	0	7820	0	9619	0	24066	0
MBA	MOMBASA, KENYA	S	FGN	0	0	0	0	21	0	21	0
MBJ	MONTIGO BAY, JAMAICA	N	FGN	218	0	0	0	0	0	218	0
MBS	SAGINAW, MI, USA	N	YES	794	0	272	0	2169	0	3235	0
MBX	MARIBOR, YUGOSLAVIA	N	FGN	0	0	0	0	40	0	40	0
MCG	MCGRATH, AS, USA	N	NO	0	0	0	0	204	0	204	0
MCI	KANSIS CITY, MO, USA	N	YES	26453	0	29842	0	50786	0	107081	0
MCO	ORLANDO-INT'L, FL, USA	N	YES	23551	1	28187	0	25069	0	76807	1
MCP	MACAPA, AMAPA, BRAZIL	N	FGN	1888	0	2337	0	2295	0	6520	0
MCT	MUSCAT, OMAN	N	FGN	4409	0	5241	0	5174	0	14824	0
MCY	MAROOCHYDORE, QLD, AUSTRALIA	S	FGN	104	0	136	0	10	0	250	0
MCZ	MACEIO, ALAGOAS, BRAZIL	S	FGN	978	0	1646	0	4088	0	6712	0
MDE	MEDELLIN, COLOMBIA	N	FGN	312	0	312	0	314	0	938	0
MDI	MAKURDI, NIGERIA	N	FGN	730	0	695	0	375	0	1800	0
MDK	MBANDAKA, ZAIRE	N	FGN	416	0	522	0	526	0	1464	0
MDP	MINDIPTANA, INDONESIA	-0-	FGN	0	0	0	0	0	1	0	1
MDQ	MAR DEL PLATA, ARGENTINA	S	FGN	2964	0	2816	2	2662	1	8442	3
MDT	HARRISBURG-OLMSTEAD ST, PA, USA	N	YES	3784	1	3265	0	2805	0	9854	1
MDW	CHICAGO-MIDWAY, IL, USA	N	YES	33077	2	46544	2	49337	1	128958	5
MDZ	MENDOZA, ARGENTINA	S	FGN	1578	0	1106	0	886	0	3570	0
MED	MEDINA, SAUDI ARABIA	N	FGN	4698	0	5236	0	4896	1	14830	1
MEG	MALANGE, ANGOLA	S	FGN	740	0	758	0	696	0	2194	0
MEL	MELBOURNE, VICTORIA, AUSTRALIA	S	FGN	17124	1	21097	3	31383	0	69604	4
MEM	MEMPHIS, TN, USA	N	YES	8599	0	7534	0	7035	0	23168	0
MES	MEDAN, INDONESIA	N	FGN	730	0	732	0	714	0	2176	0
MEX	MEXICO CITY, MEXICO	N	FGN	4170	0	5281	0	5092	0	14543	0
MFE	MC ALLEN, TX, USA	N	YES	288	0	1148	0	1052	0	2488	0
MFR	MEDFOR, OR, USA	N	YES	3529	0	2228	1	1784	0	7541	1
MFU	MFUWE, ZAMBIA	S	FGN	34	0	60	0	30	0	124	0
MGA	MANAGUA, NICARAGUA	N	FGN	3212	0	2689	0	1762	1	7663	1
MGM	MONTGOMERY, AL, USA	N	YES	148	0	896	0	1681	0	2725	0
MGQ	MOGADISHU, SOMALIA	N	FGN	94	0	46	0	50	0	190	0
MHD	MASHAD, IRAN	N	FGN	516	0	0	0	0	0	516	0
MHT	MANCHESTER, NH, USA	N	YES	0	0	1106	0	2733	0	3839	0
MIA	MIAMI, FL, USA	N	YES	28033	0	34912	1	29373	0	92318	1
MID	MERIDA, MEXICO	N	FGN	0	0	244	0	170	0	414	0
MIL	MILAN, ITALY	N	FGN	0	1	0	0	0	0	0	1
MIR	MONASTIR, TUNISIA	N	FGN	488	0	336	0	567	0	1391	0
MIU	MAIDUGURI, NIGERIA	N	FGN	887	0	1042	0	636	0	2565	0
MJM	MBUJI-MAYI, ZAIRE	S	FGN	364	0	510	0	618	0	1492	0
MJN	MAJUNGA, MADAGASCAR	S	FGN	402	0	336	0	298	0	1036	0
MJT	MYTILENE, GREECE	N	FGN	2852	0	2634	0	2820	0	8306	0
MKE	MILWAUKEE, WI, USA	N	YES	1056	0	3124	0	4861	0	9041	0
MKY	MALACCA, MALAYSIA	S	FGN	2109	0	2272	0	1316	0	5697	0
MLA	MALTA, MEDITERRANEAN SEA	N	FGN	2882	0	4492	0	5117	1	12491	1
MLB	MELBOURNE, FL, USA	N	YES	958	0	1474	0	1034	0	3466	0
MLE	MALE, MALDIVES	N	FGN	356	0	464	0	454	0	1274	0
MLH	MULHOUSE/BASEL, FRANCE	N	FGN	1	0	4	0	21	0	26	0
MLI	MOLINE, IL, USA	N	YES	1947	0	2284	0	2941	0	7172	0
MLU	MONROE, LA, USA	N	YES	3670	0	3712	0	2852	0	10234	0
MLW	MONROVIA, LIBERIA	N	FGN	0	0	0	0	124	0	124	0
MMY	MIYAKO JIMA, JAPAN	N	FGN	3606	5	4836	5	3834	0	12276	10
MNL	MANILA, PHILIPPINES	N	FGN	1232	0	1211	0	1321	0	3764	0
MOB	MOBILE AL/PASCAGOULA, MS, USA	N	YES	3013	0	2274	0	330	0	5617	0
MOC	MONTES CLAROS, BRAZIL	S	FGN	416	0	420	0	416	0	1252	0
MOL	MOLDE, NORWAY	N	FGN	2129	0	2263	0	2366	0	6758	0
MOQ	MORONDAVA, MADAGASCAR	S	FGN	112	0	204	0	150	0	466	0

AIRPORT	APTDEF	HEMISPHR	CONUS	STGFY87	ING1	STGFY88	ING2	STGFY89	ING3	STG737	INGS
MOT	MINOT, ND, USA	N	YES	737	0	964	0	648	0	2349	0
MPL	MONTPELLIER, FRANCE	N	FGN	52	0	52	0	52	0	156	0
MPM	MAPUTO, MOZAMBIQUE	S	FGN	2248	0	2289	0	1480	0	6017	0
MRS	MARSEILLE, FRANCE	N	FGN	3381	0	3805	0	4186	0	11372	0
MRU	MAURITIUS, MAURITIUS	S	FGN	321	0	437	0	446	0	1204	0
MRY	MONTEREY, CA, USA	N	YES	3559	0	1923	0	1844	0	7326	0
MSN	MADISON, WI, USA	N	YES	1695	0	1489	0	2132	0	5316	0
MSO	MISSOULA, MT, USA	N	YES	3537	1	3427	0	3307	0	10271	1
MSP	MINNEAPOLIS-ST PAUL, MN, USA	N	YES	8120	1	11799	0	16476	0	36395	1
MSR	MUENSTER, FRG	N	FGN	4	0	0	0	0	0	4	0
MSY	NEW ORLEANS, LA, USA	N	YES	25950	0	32656	1	32966	3	91572	4
MSZ	NAMIBE, ANGOLA	S	FGN	228	0	262	0	138	0	628	0
MTS	MANZINI, SWAZILAND	S	FGN	96	0	192	0	154	0	442	0
MTY	MONTERREY, MEXICO	N	FGN	0	0	62	0	48	0	110	0
MUC	MUNICH, FRG	N	FGN	36435	4	44305	1	46990	1	127730	6
MUX	MULTAN, PAKISTAN	N	FGN	2488	0	2344	0	2303	0	7135	0
MUZ	MUSOMA, TANZANIA	S	FGN	8	0	0	0	0	0	8	0
MVB	FRANCEVILLE, GABON	N	FGN	1	0	5	0	3	0	9	0
MVD	MONTEVIDEO, URUGUAY	S	FGN	4977	0	5351	0	5226	0	15554	0
MVR	MAROUA, REP OF CAMEROON	N	FGN	1190	0	1052	0	933	0	3175	0
MWZ	MWANZA, TANZANIA	S	FGN	79	0	530	0	785	0	1394	0
MXP	MILAN-MALPENSA, ITALY	N	FGN	4	0	21	1	26	0	51	1
MXZ	MEIXIAN, P. R. CHINA	N	FGN	0	0	328	0	420	0	748	0
MYJ	MATSUYAMA, SHIKIKU, JAPAN	N	FGN	290	0	862	0	762	0	1914	0
MYR	MYRTLE BEACH, SC, USA	N	YES	4864	0	5504	0	6440	1	16808	1
MYW	MTWARA, TANZANIA	S	FGN	370	0	312	0	290	0	972	0
MYZ	MIRI, SARAWAK, MALAYSIA	N	FGN	3024	0	3244	0	3730	0	9998	0
MZG	MAKUNG, TAIWAN	N	FGN	8877	0	10980	0	10180	0	30037	0
MZM	METZ, FRANCE	N	FGN	0	0	0	0	21	0	21	0
MZT	MAZATLAN, MEXICO	N	FGN	976	0	554	0	628	0	2158	0
NAG	NAGPUR, INDIA	N	FGN	2756	0	2440	0	1970	0	7166	0
NAK	NAKHON RATCHASIMA, THAILAND	N	FGN	0	0	0	0	82	0	82	0
NAN	NADI, FIJI	S	FGN	1373	0	1413	0	1724	0	4510	0
NAP	NAPLES, ITALY	N	FGN	739	0	584	0	662	0	1985	0
NAS	NASSAU, BAHAMAS	N	FGN	7440	0	9851	0	10501	0	27792	0
NAT	NATAL, BRAZIL	S	FGN	4380	0	4976	0	5422	0	14778	0
NBO	NAIROBI, KENYA	S	FGN	1051	0	1087	0	1344	0	3482	0
NCE	NICE, FRANCE	N	FGN	3675	1	5258	0	5599	0	14532	1
NCL	NEWCASTLE, ENGLAND	N	FGN	1825	0	1589	1	1879	0	5293	1
NDD	SUMBE, ANGOLA	S	FGN	10	0	0	0	0	0	10	0
NDJ	N'DJAMENA, CHAD	N	FGN	18	0	0	0	20	0	38	0
NGE	N'GAOUNDERE, REP OF CAMEROON	N	FGN	1006	0	902	0	870	0	2778	0
NGO	NAGOYA, JAPAN	N	FGN	5577	0	6995	1	6550	0	19122	1
NIM	NIAMEY, NIGER	N	FGN	62	0	0	0	0	0	62	0
NKC	NOUAKCHOTT, MAURITANIA	N	FGN	110	0	82	0	66	0	258	0
NKG	NANJING, P. R. CHINA	N	FGN	2476	0	2744	0	3005	0	8225	0
NLA	NDOLA, ZAMBIA	S	FGN	701	0	508	0	730	0	1939	0
NLK	NORFOLK ISLAND, PACIFIC OCEAN	S	FGN	420	0	581	0	628	0	1629	0
NNG	NANNING, P. R. CHINA	N	FGN	1157	0	1042	0	480	0	2679	0
NOS	NOSSIBE, MADAGASCAR	S	FGN	508	0	614	0	700	0	1822	0
NOU	NOUMEA, NEW CALEDONIA	S	FGN	219	0	209	0	949	0	1377	0
NOV	HUAMBO, ANGOLA	S	FGN	520	0	630	0	1254	0	2404	0
NPE	NAPIER, NEW ZEALAND	S	FGN	0	0	0	0	80	0	80	0
NQN	NEUQUEN, ARGENTINA	S	FGN	1876	0	1838	0	1598	0	5312	0
NRT	TOKYO-NARITA, JAPAN	N	FGN	0	0	640	0	730	0	1370	0
NUE	NUREMBURG, FRG	N	FGN	3516	1	4068	1	3943	1	11527	3
NVT	NAVEGANTES, BRAZIL	S	FGN	2608	0	2556	0	2500	0	7664	0
OAJ	JACKSONVILLE, NC, USA	N	YES	2428	0	1892	0	1588	0	5908	0
OAK	OAKLAND, SAN FRANCISCO, CA, USA	N	YES	27453	3	25240	0	24777	0	77470	3
ODE	ODENSE, DENMARK	N	FGN	567	0	496	0	503	0	1566	0
OGG	KAHULUI, MAUI, HA, USA	N	NO	27942	1	27757	1	29505	0	85204	2
OGN	YONAGUNI-JIMA, JAPAN	N	FGN	0	0	30	0	0	0	30	0
OGX	OUARGLA, ALGERIA	N	FGN	836	0	552	0	841	0	2229	0
OHD	OHRI, YUGOSLAVIA	N	FGN	292	0	523	0	452	0	1267	0
OIT	OITA, JAPAN	N	FGN	854	0	818	0	1472	1	3144	1
OKA	OKINAWA, RYUKYU IS, JAPAN	N	FGN	11818	0	13972	0	13660	0	39450	0
OKC	OKLAHOMA CITY, OK, USA	N	YES	25165	0	27072	1	26161	1	78398	2
OKJ	OKAJAMA, JAPAN	N	FGN	0	0	923	0	1444	0	2367	0
OLB	OLBIA, ITALY	N	FGN	40	0	42	0	92	0	174	0
OMA	OMAHA, NB, USA	N	YES	10800	0	10871	0	13689	0	35360	0
OME	OME, AS, USA	N	NO	2272	0	2232	0	2269	0	6773	0
OMO	MOSTAR, YUGOSLAVIA	N	FGN	0	0	0	0	178	0	178	0
ONT	ONTARIO, CA, USA	N	YES	33033	0	34539	0	35608	0	103180	0
OOL	GOLD COAST, QLD, AUSTRALIA	S	FGN	2812	0	3663	0	5208	0	11683	0
OPO	OPORTO, PORTUGAL	N	FGN	3349	1	3331	0	5553	0	12233	1

AIRPORT	APTDEF	HEMISPHR	CONUS	STGFY87	ING1	STGFY88	ING2	STGFY89	ING3	STG737	INGS
ORD	CHICAGO-O'HARE, IL, USA	N	YES	59542	2	79401	3	110094	1	249037	6
ORF	NORFOLK-VA. BEACH, VA, USA	N	YES	24618	2	20845	0	19290	3	64753	5
ORH	WORCESTER, MA, USA	N	YES	719	0	2976	0	1966	0	5661	0
ORK	CORK, IRELAND	N	FGN	2942	0	3322	0	4963	0	11227	0
ORN	ORAN, ALGERIA	N	FGN	4524	0	4495	0	4450	0	13469	0
ORY	PARIS - ORLY ARPT, FRANCE	N	FGN	6940	1	8806	1	9381	2	25127	4
OSA	OSAKA, JAPAN	N	FGN	1792	0	1262	0	1246	0	4300	0
OSD	OSTERSUND, SWEDEN	N	FGN	0	0	0	0	6	0	6	0
OSL	OSLO, NORWAY	N	FGN	14168	0	0	0	0	0	14168	0
OSM	MOSUL, IRAQ	N	FGN	312	0	314	0	314	0	940	0
OTP	BUCHAREST-OTOPENI, ROMANIA	N	FGN	487	0	405	0	481	0	1373	0
OTZ	KOTZEBUE, AS, USA	N	NO	2082	0	2050	0	2082	0	6214	0
OUA	OUAGADOUGOU, BURKINA FASO	N	FGN	14	0	0	0	0	0	14	0
OUD	OIJDA, MOROCCO	N	FGN	402	0	386	0	361	0	1149	0
OUE	QUESSO, PEOP REP OF CONGO	N	FGN	258	0	260	0	222	0	740	0
OZZ	OUARAZATE, MOROCCO	N	FGN	161	0	395	0	385	0	941	0
PAP	PORT AU PRINCE, HAITI	N	FGN	0	0	88	0	208	0	296	0
PAT	PATNA, INDIA	N	FGN	4973	2	4408	3	3842	0	13223	5
PBI	WEST PALM BEACH, FL, USA	N	YES	10310	0	9469	0	9081	0	28860	0
PBM	PARAMARIBO, REP OF SURINAME	N	FGN	104	0	106	0	104	0	314	0
PCL	PUCALLPA, PERU	S	FGN	586	0	110	0	182	0	878	0
PDB	PEDRO BAY, AS, USA	N	NO	0	0	0	0	0	1	0	1
PDL	PONTA DELGADA, PORTUGAL (AZORES)	N	FGN	886	0	933	0	451	0	2270	0
PDP	PUNTA DEL ESTE, URUGUAY	S	FGN	2332	0	1676	0	1863	0	5871	0
PDX	PORTLAND, OR, USA	N	YES	18968	3	17604	0	18875	1	55447	4
PEK	BEIJIN, P. R. CHINA	N	FGN	9169	2	9152	0	8951	0	27272	2
PEM	PUERTO MALDONADO, PERU	S	FGN	0	0	92	0	64	0	156	0
PEN	PENANG, MALAYSIA	N	FGN	9062	2	9591	0	10330	0	28983	2
PER	PERTH, WA, AUSTRALIA	S	FGN	1178	0	1503	0	3664	0	6345	0
PEW	PESHAWAR, PAKISTAN	N	FGN	418	0	440	0	578	0	1436	0
PHC	PORT HARCOURT, NIGERIA	N	FGN	208	0	707	0	821	0	1736	0
PHE	PORT HEDLAND, WA, AUSTRALIA	S	FGN	130	0	0	0	0	0	130	0
PHL	PHILADELPHIA/WILMINGTON, PA, USA	N	YES	34184	0	45759	2	45635	2	125578	4
PHS	PHITSANULOK, THAILAND	N	FGN	1460	0	1464	0	818	0	3742	0
PHX	PHOENIX, AZ, USA	N	YES	163588	0	177325	0	199769	1	540682	1
PIA	PEORIA, IL, USA	N	YES	389	0	603	0	993	0	1985	0
PIE	TAMPA-ST. PETERSBURG, FL, USA	N	YES	302	3	0	0	343	1	645	4
PIK	GLASGOW-PRESTWICK, SCOTLAND	N	FGN	52	0	104	0	97	0	253	0
PIT	PITTSBURGH, PA, USA	N	YES	69413	0	80005	0	65047	0	214465	0
PIU	PIURA, PERU	S	FGN	1068	0	62	0	338	0	1468	0
PLZ	PORT ELIZABETH, SOUTH AFRICA	S	FGN	12531	1	14399	2	13797	3	40727	6
PMA	PEMBA ISLAND, TANZANIA	S	FGN	8	0	0	0	0	0	8	0
PMC	PUERTO MONTT, CHILE	S	FGN	1400	0	1565	0	1861	0	4826	0
PME	PORTSMOUTH, UK	N	FGN	0	0	0	2	0	0	0	2
PMI	PALMA MALLORCA ISLAND, SPAIN	N	FGN	2449	0	3158	0	6948	1	12555	1
PMO	PALERMO, ITALY	N	FGN	0	0	46	0	246	0	292	0
PMR	PALMERSTON, NEW ZEALAND	S	FGN	2592	2	2752	0	2694	0	8038	2
PNA	PAMPLONA, SPAIN	N	FGN	0	0	0	0	0	1	0	1
PNQ	POONA, INDIA	N	FGN	842	0	1554	0	1968	0	4364	0
PNR	POINTE NOIRE, PEOP REP OF CONGO	S	FGN	1265	0	912	0	640	0	2817	0
PNS	PENSACOLA, FL, USA	N	YES	2180	0	1824	0	1328	0	5332	0
PNZ	PETROLINA, BRAZIL	S	FGN	720	0	732	0	732	0	2184	0
POA	PORTO ALEGRE, BRAZIL	S	FGN	8156	0	7765	0	5217	0	21138	0
POG	PORT GENTIL, GABON	S	FGN	18	0	139	0	263	0	420	0
POL	PEMBA, MOZAMBIQUE	S	FGN	260	0	262	0	150	0	672	0
POS	PORT OF SPAIN, TRINIDAD/TOBAGO	N	FGN	52	0	52	0	52	0	156	0
PPG	PAGO PAGO, SAMOA	S	FGN	434	0	147	0	26	0	607	0
PPP	PROSERPINE, QLD, AUSTRALIA	S	FGN	437	0	521	0	257	0	1215	0
PPT	PAPEETE, SOCIETY IS, FR POLYNESIA	S	FGN	0	0	0	0	51	0	51	0
PRG	PRAGUE, CZECHOSLOVAKIA	N	FGN	1231	0	1148	0	1510	0	3889	0
PSA	PISA, ITALY	N	FGN	1082	0	1026	1	458	0	2566	1
PSC	PASCO, WA, USA	N	YES	864	0	2035	0	2565	0	5464	0
PSG	PETERSBURG, AS, USA	N	NO	1460	0	1464	0	1460	0	4384	0
PSI	PASNI, PAKISTAN	N	FGN	208	0	208	0	210	0	626	0
PSP	PALM SPRINGS, CA, USA	N	YES	3083	0	3434	0	3653	0	10170	0
PSS	POSADAG, ARGENTINA	S	FGN	938	0	928	0	810	0	2676	0
PTY	PANAMA CITY, PANAMA	N	FGN	2683	0	2922	1	3258	0	8863	1
PUB	PUEBLO, CO, USA	N	YES	2569	0	2395	0	2190	0	7154	0
PUQ	PUNTA ARENAS, CHILE	S	FGN	760	0	782	0	827	0	2369	0
PUS	PUSAN, REP OF KOREA	N	FGN	0	0	0	0	1704	0	1704	0
PUY	PULA, YUGOSLAVIA	N	FGN	76	0	286	0	400	1	762	1
PVD	PROVIDENCE, RI, USA	N	YES	5358	0	7982	0	10925	1	24265	1
PVH	PORTO VELHO, BRAZIL	S	FGN	4700	0	4786	1	4888	1	14374	2
PVK	PREVEZA/LEFKAS, GREECE	N	FGN	0	0	0	0	0	0	0	0
PVR	PUERTO VALLARTA, MEXICO	N	FGN	880	0	888	0	540	0	2308	0

AIRPORT	APTDEF	HEMISPHR	CONUS	STGFY87	ING1	STGFY88	ING2	STGFY89	ING3	STG737	INGS
PWM	PORTLAND, ME, USA	N	YES	2450	0	3650	0	6679	0	12779	0
PXO	PORTO SANTO, PORTUGAL (MADEIRA)	N	FGN	58	0	78	0	102	0	238	0
PZO	PUERTO ORDAZ, VENEZUELA	N	FGN	0	0	0	0	74	0	74	0
PZU	PORT SUDAN, SUDAN	N	FGN	925	0	1517	0	1344	0	3786	0
QTV	TREVISIO, ITALY	N	FGN	0	0	0	1	0	0	0	1
RAE	ARAR, SAUDI ARABIA	N	FGN	1662	0	1576	0	1728	0	4966	0
RAH	RAFHA, SAUDI ARABIA	N	FGN	166	0	210	0	240	0	616	0
RAJ	RAJKOT, INDIA	N	FGN	730	0	732	0	692	0	2154	0
RAK	MARRAKECH, MOROCCO	N	FGN	529	0	777	0	1086	0	2392	0
RAP	RAPID CITY, SD, USA	N	YES	4703	1	2847	0	3554	0	11104	1
RAR	RAROTONGA, COOK ISLAND, S. PACIFIC	S	FGN	152	0	63	0	0	0	215	0
RAS	RASHT, IRAN	N	FGN	540	0	40	0	0	0	580	0
RBA	RABAT, MOROCCO	N	FGN	0	0	562	0	531	0	1093	0
RBR	RIO BRANCO, BRAZIL	S	FGN	3614	0	3146	0	3146	0	9906	0
RCU	RIO CUARTO, ARGENTINA	S	FGN	552	0	0	0	0	0	552	0
RDD	REDDING, CA, USA	N	YES	3151	0	737	0	0	0	3888	0
RDU	RALEIGH-DURHAM, NC, USA	N	YES	23607	0	20624	0	16416	0	60647	0
REC	RECIFE, BRAZIL	S	FGN	8974	0	11088	1	15588	0	35650	1
REL	TRELEW, ARGENTINA	S	FGN	2448	0	1928	0	1984	0	6360	0
RES	RESISTENCIA, ARGENTINA	S	FGN	730	0	556	2	752	0	2038	2
RGA	RIO GRANDE, ARGENTINA	S	FGN	1628	0	1278	0	1253	0	4159	0
RGL	RIO GALLEGOS, ARGENTINA	S	FGN	3170	0	2492	0	1838	0	7500	0
RGN	RANGOON, BURMA	N	FGN	0	0	0	0	44	0	44	0
RHO	RHODES, GREECE	N	FGN	728	0	1132	0	2254	0	4114	0
RIC	RICHMOND, VA, USA	N	YES	8252	0	9847	0	9821	0	27920	0
RIJ	RIOJA, PERU	S	FGN	338	0	600	0	192	0	1130	0
RIY	RIYAN, YEMEN	N	FGN	560	0	322	0	242	0	1124	0
RJK	RIJEKA, YUGOSLAVIA	N	FGN	76	0	370	0	378	0	824	0
RKT	RAS AL KHAIMAH, U. A. EMIRATES	N	FGN	236	0	237	0	238	0	711	0
RNN	RONNE, DENMARK	N	FGN	298	0	242	0	272	0	812	0
RNO	RENO, NV, USA	N	YES	25150	1	20535	1	20236	0	65921	2
ROA	ROANOKE, VA, USA	N	YES	3910	1	4468	0	4283	0	12661	1
ROB	MONROVIA ROBERTS, LIBERIA	N	FGN	320	0	210	0	296	0	826	0
ROC	ROCHESTER, NY, USA	N	YES	13533	0	13078	1	17916	1	44527	2
ROK	ROCKHAMPTON, QLD, AUSTRALIA	S	FGN	3570	0	3750	0	2933	0	10253	0
ROR	KOROR, PALAU ISLAND, PACIFIC OCEAN	N	FGN	132	0	39	0	0	0	171	0
ROS	ROSARIO, ARGENTINA	S	FGN	1704	0	1478	0	900	0	4082	0
ROT	ROTORUA, NEW ZEALAND	S	FGN	0	0	292	0	482	0	774	0
RPR	RAIPUR, INDIA	N	FGN	1460	0	830	0	738	0	3028	0
RRS	ROROS, NORWAY	N	FGN	782	0	792	0	790	0	2364	0
RSW	FORT MYERS REGIONAL, FL, USA	N	YES	2486	0	7120	0	6729	0	16335	0
RTB	ROATAN, HONDURAS	N	FGN	0	0	188	0	1482	0	1670	0
RUH	RIYADH, SAUDI ARABIA	N	FGN	21799	0	21703	1	22246	0	65748	1
RUN	REUNION ISLAND, INDIAN OCEAN	S	FGN	436	0	410	0	304	0	1150	0
SAB	SABA, NETH. ANTILLES	N	FGN	0	0	0	1	0	0	0	1
SAH	SANAA, YEMEN	N	FGN	1580	0	1379	0	1291	0	4250	0
SAL	SAN SALVADOR, EL SALVADOR	N	FGN	6574	0	7271	0	8073	1	21918	1
SAN	SAN DIEGO, CA, USA	N	YES	36109	0	46848	1	55661	0	138618	1
SAO	SAO PAULO, BRAZIL	S	FGN	0	0	0	1	0	0	0	1
SAP	SAN PEDRO, SULA, HONDURAS	N	FGN	3411	0	4099	0	3944	0	11454	0
SAT	SAN ANTONIO, TX, USA	N	YES	31907	2	36421	1	33551	1	101879	4
SAV	SAVANNAH, GA, USA	N	YES	5077	0	4364	0	6639	1	16080	1
SBA	SANTA BARBARA, CA, USA	N	YES	2895	0	3035	0	3666	0	9596	0
SBN	SOUTH BEND, IN, USA	N	YES	1496	0	1708	0	2294	0	5498	0
SCC	PRUDHOE BAY, DEADHORSE, AS, USA	N	NO	3834	1	3908	0	3878	0	11620	1
SCK	STOCKTON, CA, USA	N	YES	787	0	0	0	0	0	787	0
SCL	SANTIAGO, CHILE	S	FGN	3733	0	5184	0	5928	0	14845	0
SCN	SAARBRUECKEN, FRG	N	FGN	0	0	0	1	8	0	8	1
SCQ	SANTIAGO DE COMPOSTELA, SPAIN	N	FGN	0	0	0	0	348	0	348	0
SDA	BAGHDAD-SADDAM, IRAQ	N	FGN	2599	0	1451	0	1406	0	5456	0
SDD	LUBANGO, ANGOLA	S	FGN	862	0	784	0	694	0	2340	0
SDE	SANTIAGO DEL ESTERO, ARGENTINA	S	FGN	910	0	732	0	690	0	2332	0
SDF	LOUISVILLE, KY, USA	N	YES	11936	1	11837	0	9752	0	33525	1
SDJ	SENDAI, JAPAN	N	FGN	2796	0	3276	1	3527	0	9599	1
SDK	SANDAKAN, SABAH, MALAYSIA	N	FGN	2190	0	2196	0	4340	0	8726	0
SDQ	SANTO DOMINGO, DOMINICAN REP	N	FGN	0	0	124	0	208	0	332	0
SEA	SEATTLE/TACOMA, WA, USA	N	YES	27059	0	29147	0	26176	0	82382	0
SEL	SEOUL, REP OF KOREA	N	FGN	0	0	0	0	2376	0	2376	0
SEZ	MAHE IS. SEYCHELLES IS.	S	FGN	0	0	93	0	57	0	150	0
SFA	SFAX, TUNISIA	N	FGN	186	0	194	0	188	0	568	0
SFN	SANTA FE, ARGENTINA	S	FGN	624	0	784	0	686	1	2094	1
SFO	SAN FRANCISCO-OAKLAND, CA, USA	N	YES	82408	2	78067	4	94302	1	254777	7
SFT	SKELLEFTEA, SWEDEN	N	FGN	0	0	0	0	2	0	2	0
SGF	SPRINGFIELD, MO, USA	N	YES	3704	0	2335	0	2381	0	8420	0
SGN	HO CHI MINH, SOC REP OF VIETNAM	N	FGN	0	0	0	0	88	0	88	0

AIRPORT	APTDEF	HEMISPHR	CONUS	STGFY87	ING1	STGFY88	ING2	STGFY89	ING3	STG737	INGS
SHA	SHANGHAI, P. R. CHINA	N	FGN	1678	0	2060	0	2291	0	6029	0
SHE	SHENYANG, P. R. CHINA	N	FGN	208	0	400	0	444	0	1052	0
SHI	SHIMOJISHIMA, JAPAN	N	FGN	0	0	0	1	0	0	0	1
SHJ	SHARJAH, U. A. EMIRATES	N	FGN	2588	0	2845	0	2934	0	8367	0
SHV	SHREVEPORT, LA, USA	N	YES	3098	0	3472	0	2510	0	9080	0
SHW	SHARURAH, SAUDI ARABIA	N	FGN	730	0	730	0	732	0	2192	0
SIA	XI AN, P. R. CHINA	N	FGN	848	0	991	0	1265	0	3104	0
SID	SAL, CAPE VERDE ISLAND	N	FGN	10	0	40	0	0	0	50	0
SIN	SINGAPORE, SINGAPORE	N	FGN	6631	0	6354	0	6479	0	19464	0
SIT	SITKA, AS, USA	N	NO	778	0	782	0	778	0	2338	0
SJC	SAN JOSE, CA, USA	N	YES	37310	2	37278	0	37768	2	112356	4
SJD	LOS CABOS, MEXICO	N	FGN	0	0	38	0	0	0	38	0
SJJ	SARAJEVO, YUGOSLAVIA	N	FGN	174	0	356	0	564	0	1094	0
SJO	SAN JOSE, COST RICA	N	FGN	3317	0	3409	0	3128	0	9854	0
SJU	SAN JUAN, PUERTO RICO	N	FGN	0	0	60	0	0	0	60	0
SKG	THESSALONIKI, GREECE	N	FGN	1987	0	1721	0	2473	0	6181	0
SKO	SOKOTO, NIGERIA	N	FGN	1182	0	732	0	598	0	2512	0
SKP	SKOPJE, YUGOSLAVIA	N	FGN	210	0	710	0	722	0	1642	0
SKS	SKRYDSRUP, DENMARK	N	FGN	45	0	0	0	0	0	45	0
SKZ	SUKKUR, PAKISTAN	N	FGN	566	0	720	0	870	0	2156	0
SLA	SALTA, ARGENTINA	S	FGN	1934	0	1947	1	1622	0	5503	1
SLC	SALT LAKE CITY, UT, USA	N	YES	77961	1	72870	0	70403	2	221234	3
SLL	SALALAH, OMAN	N	FGN	882	0	964	0	1010	1	2856	1
SLZ	SAO LUIZ, MARANHAO, BRAZIL	S	FGN	3629	0	4701	1	7507	0	15837	1
SMF	SACRAMENTO, CA, USA	N	YES	18876	0	24452	1	19931	1	63259	2
SMI	SAMOS ISLAND, GREECE	N	FGN	1678	0	1608	0	1774	0	5060	0
SNA	ORANGE COUNTY, CA, USA	N	YES	24680	1	22489	0	23389	0	70558	1
SNN	SHANNON, IRELAND	N	FGN	1999	0	2715	0	3658	0	8372	0
SNO	SAKON NAKHON, THAILAND	N	FGN	566	0	282	0	0	0	848	0
SOF	SOFIA, BULGARIA	N	FGN	671	0	547	0	462	0	1680	0
SPC	SANTA CRUZ LA PALMA, CANARY IS.	N	FGN	0	0	1272	0	1186	0	2458	0
SPP	MENONGUE, ANGOLA	S	FGN	224	0	208	0	346	0	778	0
SPU	SPLIT, YUGOSLAVIA	N	FGN	1592	0	2213	0	1915	0	5720	0
SRQ	SARASOTA/BRADENTON, FL, USA	N	YES	657	0	994	1	2481	1	4132	2
SSA	SALVADOR, BRAZIL	S	FGN	9230	0	11330	0	16768	0	37328	0
SSG	MALABO, EQUATORIAL GUINEA	N	FGN	126	0	206	0	96	0	428	0
STL	ST LOUIS, MO, USA	N	YES	20660	0	25797	0	30162	0	76619	0
STM	SANTAREM, BRAZIL	S	FGN	3318	0	3913	0	4380	0	11611	0
STN	LONDON-STANSTED, ENGLAND, UK	N	FGN	0	0	874	0	1745	1	2619	1
STR	STUTTGART, FRG	N	FGN	18747	1	19270	4	21956	2	59973	7
STT	ST THOMAS, VIRGIN ISLANDS	N	FGN	748	0	732	0	730	0	2210	0
STV	SURAT, INDIA	N	FGN	0	1	0	0	0	0	0	1
STX	ST CROIX, VIRGIN ISLANDS	N	FGN	730	0	732	0	730	0	2192	0
SUB	SURABAYA, INDONESIA	S	FGN	0	0	0	0	80	0	80	0
SUV	SUVA, FIJI	S	FGN	650	0	582	0	565	0	1797	0
SUX	SIOUX CITY, IO, USA	N	YES	1536	0	2844	0	2127	0	6507	0
SVB	SAMBABA, MADAGASCAR	S	FGN	274	0	220	0	294	0	788	0
SVG	STAVANGER, NORWAY	N	FGN	16946	0	18466	0	19633	1	55045	1
SVO	MOSCOW-SHEREMETYE, U.S.S.R.	N	FGN	864	0	962	0	1320	0	3146	0
SVP	KUITO, ANGOLA	S	FGN	422	0	392	0	316	0	1130	0
SVQ	SEVILLE, SPAIN	N	FGN	0	0	804	0	2074	0	2878	0
SWA	SHANTON, P. R. CHINA	N	FGN	0	0	507	0	1166	0	1673	0
SXB	STRASBOURG, FRANCE	N	FGN	76	0	4	0	86	0	166	0
SXF	BERLIN, GDR	N	FGN	86	0	202	0	470	0	758	0
SRX	SRINAGAR, INDIA	N	FGN	2123	1	2035	1	2692	0	6850	2
SYA	SHEMYA IS., AS, USA	N	NO	0	0	16	0	0	0	16	0
SYD	SYDNEY, N.S.W., AUSTRALIA	S	FGN	16325	2	21343	0	33543	2	71211	4
SYR	SYRACUSE, NY, USA	N	YES	10961	0	18007	1	25961	0	54929	1
SYZ	SHIRAZ, IRAN	N	FGN	3868	0	3768	0	3554	0	11190	0
SZG	SALZBURG, AUSTRIA	N	FGN	648	0	653	0	650	0	1951	0
TAI	TAIZ, YEMEN	N	FGN	820	0	872	0	690	0	2382	0
TAO	QINGDAO, P.R. CHINA	N	FGN	0	0	0	0	157	0	157	0
TBO	TABORA, TANZANIA	S	FGN	36	0	0	0	0	0	36	0
TBP	TUMBES, PERU	S	FGN	404	0	576	0	338	0	1318	0
TBT	TABATINGA, BRAZIL	S	FGN	764	0	852	0	836	0	2452	0
TBU	TONGATAPU, TONGA ISLAND, PACIFIC	S	FGN	667	0	323	0	316	0	1306	0
TBZ	TABRIZ, IRAN	N	FGN	214	0	0	0	0	0	214	0
ICI	TENERIFE, CANARY IS.	N	FGN	0	0	0	0	0	1	0	1
TEE	TBESSA, ALGERIA	N	FGN	652	0	628	0	624	0	1904	0
TER	TERCEIRA, PORTUGAL (AZORES)	N	FGN	87	0	260	0	253	0	600	0
TET	TEFE, MOZAMBIQUE	S	FGN	364	0	364	0	158	0	886	0
TEZ	TEZPUR, INDIA	N	FGN	728	0	732	0	730	0	2190	0
TFF	TEFE, BRAZIL	S	FGN	246	0	208	0	264	0	718	0
TFN	TENERIFE, SPAIN	N	FGN	0	0	1842	0	1640	0	3482	0
TFS	TENERIFFE-REINASOFIA, CANARY ISLAND	N	FGN	244	1	874	1	1499	1	2617	3

AIRPORT	APTDEF	HEMISP	CONUS	STGFY87	ING1	STGFY88	ING2	STGFY89	ING3	STG737	INGS
TGD	TITOGRAD, YUGOSLAVIA	N	FGN	616	1	754	0	1002	0	2372	1
TGG	KUALA, TERENGGANU, MALAYSIA	N	FGN	438	0	418	0	640	0	1496	0
TGT	TANGA, TANZANIA	S	FGN	26	0	0	0	0	0	26	0
TGU	TEGUCIGALPA, HONDURAS	N	FGN	3746	0	4286	0	4645	0	12677	0
THE	TERESINA, PIAUI, BRAZIL	S	FGN	2920	0	3972	0	5418	0	12310	0
THR	TEHRAN, IRAN	N	FGN	4370	0	3536	0	4434	0	12340	0
TIA	TIRANA, ALBANIA	N	FGN	104	0	104	0	208	0	416	0
TIF	TAIF, SAUDI ARABIA	N	FGN	1484	0	926	0	888	0	3298	0
TIN	TINDOUF, ALGERIA	N	FGN	1006	0	962	0	966	0	2934	0
TIP	TRIPOLI, LIBYA	N	FGN	287	0	626	0	453	0	1366	0
TIV	TIVAT, YUGOSLAVIA	N	FGN	188	0	364	0	227	0	779	0
TKO	KIGOMA, TANZANIA	S	FGN	18	0	0	0	0	0	18	0
TLE	TULEAR, MADAGASCAR	S	FGN	490	0	528	0	348	0	1366	0
TLH	TALLAHASSEE, FL, USA	N	YES	0	0	1376	0	1711	0	3087	0
TLM	TILIMSEN, ALGERIA	N	FGN	1046	0	831	0	517	0	2394	0
TLS	TOULOUSE, FRANCE	N	FGN	1152	0	1107	0	1306	0	3565	0
TLV	TEL AVIV-YAFO, ISRAEL	N	FGN	2334	1	1608	0	2173	0	6115	1
TMM	TAMATAVE, MADAGASCAR	S	FGN	150	0	14	0	60	0	224	0
TMR	TAMANRASSET, ALGERIA	N	FGN	1228	0	1058	0	1136	0	3422	0
TMS	SAO TOME ISLAND, SAO TOME ISLAND	N	FGN	124	0	144	0	104	0	372	0
TNG	TANGIER, MOROCCO	N	FGN	2117	3	2241	0	2281	1	6639	4
TNN	TAINAN, TAIWAN	N	FGN	3324	0	3452	0	3444	0	10220	0
TNR	ANTANANARIVO, MADAGASCAR	S	FGN	1953	0	1801	0	1659	0	5413	0
TOE	TOZEUR, TUNISIA	N	FGN	86	0	18	0	4	0	108	0
TOL	TOLEDO, OH, USA	N	YES	1724	0	1192	0	545	0	3461	0
TOS	TROMSO, NORWAY	N	FGN	2080	0	2518	0	2557	0	7155	0
TOY	TOYAMA, JAPAN	N	FGN	1522	0	446	0	48	0	2016	0
TPA	TAMPA/ST PETERSBURG, FL, USA	N	YES	19425	0	19630	0	24615	1	63670	1
TPE	TAIPEI, TAIWAN	N	FGN	0	0	34	0	366	0	400	0
TPP	TARAPOTO, PERU	S	FGN	656	0	486	0	964	0	2106	0
TRD	TRONDHEIM, NORWAY	N	FGN	11039	0	13061	0	14345	0	38445	0
TRI	TRI-CITY AIRPORT, TN, USA	N	YES	2166	0	2926	0	2413	0	7505	0
TRN	TURIN, ITALY	N	FGN	932	0	1798	1	2048	0	4778	1
TRU	TRUJILLO, PERU	S	FGN	28	0	28	0	450	0	506	0
TRV	TRIVANDRUM, INDIA	N	FGN	2374	3	2708	1	2714	0	7796	4
TRW	TARAWA, REP OF KIRIBATI	N	FGN	106	0	104	0	52	0	262	0
TRZ	TIRUCHIRAPALLY, INDIA	N	FGN	2318	0	2094	0	2052	0	6464	0
TSA	TAIPEI-SUNG SHAN, TAIWAN	N	FGN	22439	0	26214	0	28454	0	77107	0
TSF	TREVISO, ITALY	N	FGN	0	0	0	0	110	0	110	0
TSN	TIANJIN, P. R. CHINA	N	FGN	954	0	1421	0	1550	0	3925	0
TSV	TOWNSVILLE, QLD, AUSTRALIA	S	FGN	6252	1	6051	0	7323	1	19626	2
TTJ	TOTTORI, JAPAN	N	FGN	1460	0	1464	1	1460	1	4384	2
TTT	TAITUNG, TAIWAN	N	FGN	1488	0	1802	0	1880	0	5170	0
TUC	TUCUMAN, ARGENTINA	S	FGN	2409	0	2433	2	2264	1	7106	3
TUI	TURAIF, SAUDI ARABIA	N	FGN	0	0	0	0	38	0	38	0
TUL	TULSA, OK, USA	N	YES	30215	0	29642	3	25417	0	85274	3
TUN	TUNIS, TUNISIA	N	FGN	5129	1	3906	1	4307	0	13342	2
TUR	TUCURUI, BRAZIL	S	FGN	419	0	417	0	187	0	1023	0
TUS	TUCSON, AZ, USA	N	YES	14844	0	14048	0	19849	0	48741	0
TUU	TABUK, SAUDI ARABIA	N	FGN	4152	0	3910	0	3222	0	11284	0
TVL	LAKE TAHOE, CA, USA	N	YES	2274	1	1985	0	1982	0	6241	1
TWU	TAWAU, SABAH, MALAYSIA	N	FGN	2920	0	2928	0	4256	0	10104	0
TXL	WEST BERLIN, GERMANY	N	FGN	17484	1	18958	0	28902	0	65344	1
TYL	TALARA, PERU	S	FGN	12	0	700	0	338	0	1050	0
TYN	TAIYUAN, P. R. CHINA	N	FGN	104	0	122	0	182	0	408	0
TYS	KNOXVILLE, TN, USA	N	YES	4917	0	5269	0	5066	0	15252	0
UAQ	SAN JUAN, ARGENTINA	S	FGN	546	0	706	0	614	0	1866	0
UBA	UBERABA, BRAZIL	S	FGN	1186	0	1464	0	1460	0	4110	0
UBJ	UBE, JAPAN	N	FGN	2496	0	1411	0	1247	0	5154	0
UBP	UBON PATCHATHANI, THAILAND	N	FGN	730	0	732	0	394	0	1856	0
UDI	UBERLANDIA, BRAZIL	S	FGN	1186	0	1464	0	1460	0	4110	0
UDR	UDAIPUR, INDIA	N	FGN	1460	0	2126	0	1866	1	5452	1
UEL	QUELIMANE, MOZAMBIQUE	S	FGN	418	0	420	0	208	0	1046	0
UET	QUETTA, PAKISTAN	N	FGN	832	1	1566	0	1652	0	4050	1
UIO	QUITO, ECUADOR	S	FGN	1609	0	0	0	0	0	1609	0
UNK	UNALAKLEET, AS, USA	N	NO	4	0	270	0	658	0	932	0
URT	SURAT THANI, THAILAND	N	FGN	798	0	1272	0	1202	0	3272	0
URY	GURAYAT, SAUDI ARABIA	N	FGN	740	0	942	0	866	0	2548	0
USH	USHUAIA, ARGENTINA	S	FGN	1804	0	1544	0	1532	0	4880	0
UTH	UDON, THANI, THAILAND	N	FGN	738	0	732	0	314	0	1784	0
UTN	UPINGTON, SOUTH AFRICA	S	FGN	882	0	856	0	832	1	2570	1
UTP	UTAPAO, THAILAND	N	FGN	0	0	184	0	356	0	540	0
UVL	NEW VALLEY, ARAB REP OF EGYPT	N	FGN	315	0	312	0	312	0	939	0
VBY	VISBY, SWEDEN	N	FGN	0	0	0	0	2	0	2	0
VCE	VALVERDE, CANARY ISLANDS	N	FGN	1729	0	1335	0	1588	1	4652	1

AIRPORT	APTDEF	HEMISPHR	CONUS	STGFY87	ING1	STGFY88	ING2	STGFY89	ING3	STG737	INGS
VCP	SAO PAULO - VIRACOPOS, BRAZIL	S	FGN	104	0	56	0	0	0	160	0
VDM	VIDEIA, ARGENTINA	S	FGN	416	1	460	0	540	0	1416	1
VFA	VICTORIA FALL, ZIMBABWE	S	FGN	610	0	1292	0	1232	0	3134	0
VHC	SAURIMO, ANGOLA	S	FGN	252	0	234	0	384	0	870	0
VIE	VIENNA, AUSTRIA	N	FGN	5820	0	6195	0	7904	2	19919	2
VIL	DAKHLA, MOROCCO	N	FGN	8	0	58	0	78	0	144	0
VIX	VITORIA, ESPIRITO SANTO, BRAZIL	S	FGN	2878	0	3794	0	4160	0	10832	0
VLC	VALENCIA, SPAIN	N	FGN	206	0	342	0	1296	0	1844	0
VLG	VILLA GESELL, ARGENTINA	S	FGN	154	0	148	0	104	0	406	0
VLI	PORT VILA, VANUATU	S	FGN	251	0	560	0	934	0	1745	0
VNC	VENICE, ITALY	N	FGN	0	0	0	0	0	1	0	1
VNS	VARANASI, INDIA	N	FGN	3150	4	2686	3	2466	1	8302	8
VRN	VERONA, ITALY	N	FGN	0	0	3	0	8	0	11	0
VTE	VIENTIANE, LAOS	N	FGN	0	0	52	0	142	0	194	0
VIZ	VISHAKHAPATNAM, INDIA	N	FGN	1722	0	1774	0	1902	0	5398	0
VVI	SANTA CRUZ, VIRU VIRU, BOLIVIA	S	FGN	104	0	208	0	466	0	778	0
VXC	LICHINGA, MOZAMBIQUE	S	FGN	312	0	318	0	110	0	740	0
WAW	WARSAW, POLAND	N	FGN	1027	0	755	0	1162	0	2944	0
WDH	WINDHOEK, NAMIBIA	S	FGN	1862	1	1988	0	1942	1	5792	2
WKJ	WAKKANAI, JAPAN	N	FGN	0	0	550	0	562	0	1112	0
WLG	WELLINGTON, NEW ZEALAND	S	FGN	17828	2	28370	1	29044	1	75242	4
WLS	WALLIS IS, WALLIS & FUTUNA IS	S	FGN	0	0	0	0	180	0	180	0
WRG	WRANGELL, AS, USA	N	NO	1460	0	1464	0	1460	0	4384	0
WUH	WUHAN, P. R. CHINA	N	FGN	2002	0	2073	0	1307	0	5382	0
XMN	XIAMEN, P. R. CHINA	N	FGN	2254	0	3433	1	4474	1	10161	2
XRY	JEREZ DE LA FRONTERA, SPAIN	N	FGN	0	1	0	0	0	0	0	1
YAK	YAKUTAT, AS, USA	N	NO	1460	0	1464	0	1460	0	4384	0
YAM	SAULT STE MARIE, ONT., CANADA	N	FGN	3540	1	3286	1	1338	0	8164	2
YAO	YAOUNDE, REP OF CAMEROON	N	FGN	4147	0	3353	0	3493	0	10993	0
YBC	BAIE COMEAU, QUEBEC, CANADA	N	FGN	276	0	106	0	252	0	634	0
YBG	SAGUENAY, QUE, CANADA	N	FGN	520	0	264	0	244	0	1028	0
YBR	BRANDON, MAN, CANADA	N	FGN	1252	0	948	0	224	0	2424	0
YCB	CAMBRIDGE BAY, NWT, CANADA	N	FGN	239	0	296	0	338	0	873	0
YCG	CASTLEGAR, BC, CANADA	N	FGN	626	0	364	0	0	0	990	0
YCH	CHATHAM, NB, CANADA	N	FGN	626	0	550	0	56	0	1232	0
YCL	CHARLO, NB, CANADA	N	FGN	626	0	550	0	56	0	1232	0
YDF	DEER LAKE, NFLD, CANADA	N	FGN	2855	0	2432	0	2131	0	7418	0
YDQ	DAWSON CREEK, BC, CANADA	N	FGN	626	0	310	0	0	0	936	0
YEG	EDMONTON, ALTA, CANADA	N	FGN	11693	0	10938	0	10359	0	32990	0
YEV	INUVIK, NWT, CANADA	N	FGN	745	0	912	0	1232	0	2889	0
YFB	IQALUIT, NWT, CANADA	N	FGN	1769	0	1576	0	1714	0	5059	0
YFC	FREDERICTON, NB, CANADA	N	FGN	1342	0	1054	0	1120	0	3516	0
YFO	FLIN FLON, MAN, CANADA	N	FGN	420	0	374	0	406	0	1200	0
YFS	FT SIMPSON, NWT, CANADA	N	FGN	0	0	0	0	42	0	42	0
YGI	YONAGO, JAPAN	N	FGN	2190	0	2008	0	2180	0	6378	0
YGL	LA GRANDE, QUE, CANADA	N	FGN	1044	0	1092	0	1050	0	3186	0
YGW	KUUJJUARAPIK, QUE, CANADA	N	FGN	522	0	524	0	520	0	1566	0
YGX	GILLAM, MAN, CANADA	N	FGN	832	0	848	0	844	0	2524	0
YHD	DRYDEN, ONT, CANADA	N	FGN	2699	0	1520	0	0	0	4219	0
YHY	HAY RIVER, NWT, CANADA	N	FGN	1252	0	1256	1	1252	1	3760	2
YHZ	HALIFAX, NS, CANADA	N	FGN	14221	0	14832	0	14257	2	43310	2
YJT	STEPHENVILLE, NFLD, CANADA	N	FGN	144	0	0	0	0	0	144	0
YKA	KAMLOOPS, BC, CANADA	N	FGN	2650	0	2804	1	1498	0	6952	1
YLW	KELOWNA, BC, CANADA	N	FGN	8790	0	7473	2	5321	0	21584	2
YMM	FT MCMURRAY, ALTA, CANADA	N	FGN	1148	0	1152	1	1144	0	3444	1
YMS	YURIMAGUAS, PERU	S	FGN	210	0	264	0	96	0	570	0
YMX	MONTREAL MIRABEL, QUE, CANADA	N	FGN	569	0	138	0	1	0	708	0
YNB	YANBU, SAUDI ARABIA	N	FGN	2513	0	2511	0	2533	0	7557	0
YNG	YOUNGSTOWN, OH, USA	N	YES	330	0	0	0	0	0	330	0
YOL	YOLA, NIGERIA	N	FGN	1279	0	1261	0	792	0	3332	0
YOW	OTTAWA, ONT, CANADA	N	FGN	10695	0	15822	0	15489	1	42006	1
YPR	PRINCE RUPERT, BC, CANADA	N	FGN	1436	0	1412	0	1548	0	4396	0
YQB	QUEBEC, QUE, CANADA	N	FGN	1356	0	1003	1	1309	1	3668	2
YQD	THE PAS, MAN, CANADA	N	FGN	630	0	628	0	624	0	1882	0
YQG	WINDSOR, ONT, CANADA	N	FGN	2351	0	1093	0	14	0	3458	0
YQH	WATSON LAKE, YT, CANADA	N	FGN	335	0	184	0	0	0	519	0
YQM	MONCTON, NB, CANADA	N	FGN	0	0	557	0	525	0	1082	0
YQR	REGINA, SASK, CANADA	N	FGN	3925	0	4110	1	5168	0	13203	1
YQT	THUNDER BAY, ONT, CANADA	N	FGN	6659	0	5058	1	3257	0	14974	1
YQU	GRANDE PRAIRIE, ALBA, CANADA	N	FGN	1568	0	912	0	0	0	2480	0
YQX	GANDER, NFLD, CANADA	N	FGN	748	0	675	0	62	0	1485	0
YQY	SYDNEY, NS, CANADA	N	FGN	1846	0	1464	0	1342	0	4652	0
YQZ	QUESNEL, BC, CANADA	N	FGN	442	0	304	0	0	0	746	0
YRB	RESOLUTE, NT, CANADA	N	FGN	417	0	418	0	416	0	1251	0
YRT	RANKIN INLET, NWT, CANADA	N	FGN	0	0	0	0	328	0	328	0

AIRPORT	APTDEF	HEMISPHR	CONUS	STGFY87	ING1	STGFY88	ING2	STGFY89	ING3	STG737	INGS
YSB	SUBDURY, ONT, CANADA	N	FGN	1092	0	0	0	0	0	1092	0
YSJ	SAINT JOHN, NB, CANADA	N	FGN	1358	0	1464	0	1319	0	4141	0
YSM	FT SMITH, NWT, CANADA	N	FGN	1252	0	1256	0	1252	0	3760	0
YSR	NANISIVIK NWT, CANADA	N	FGN	208	0	210	0	246	0	664	0
YTH	THOMPSON, MAN, CANADA	N	FGN	1006	0	1008	0	1016	0	3030	0
YUL	MONTREAL, QUEBEC, CANADA	N	FGN	19081	1	23752	2	22533	4	65366	7
YUM	YUMA, AZ, USA	N	YES	31	0	408	0	0	0	439	0
YUX	HALL BEACH, NWT, CANADA	N	FGN	210	0	210	0	208	0	628	0
YUY	ROUYN-NORANDA, QUEBEC, CANADA	N	FGN	0	0	0	0	48	0	48	0
YVO	VAL D'OR, QUE, CANADA	N	FGN	1887	0	1204	0	1299	1	4390	1
YVP	FT CHIMO, QUE, CANADA	N	FGN	1178	0	1036	0	1408	0	3622	0
YVQ	NORMAN WELLS, NWT, CANADA	N	FGN	1133	0	1618	0	1588	1	4339	1
YVR	VANCOUVER, BC, CANADA	N	FGN	38426	0	38128	3	33322	3	109876	6
YWG	WINNIPEG, MAN, CANADA	N	FGN	13898	0	16176	2	14677	1	44751	3
YWK	WABUSH, NFLD, CANADA	N	FGN	964	0	976	0	1050	0	2990	0
YWL	WILLIAMS LAKE, BC, CANADA	N	FGN	442	0	304	0	0	0	746	0
YXC	CRANBROOK, BC, CANADA	N	FGN	2712	0	2800	0	1714	0	7226	0
YXD	EDMONTON-MUNICIPAL, ALBERTA, CANADA	N	FGN	10271	1	11878	0	11943	1	34092	2
YXE	SASKATOON, SASK, CANADA	N	FGN	3934	0	4688	0	5216	0	13838	0
YXJ	FT ST JOHN, BC, CANADA	N	FGN	3958	1	3491	1	2242	0	9691	2
YXS	PRINCE GEORGE, BC, CANADA	N	FGN	5052	1	4592	0	3975	1	13619	2
YXT	TERRACE, BC, CANADA	N	FGN	1790	0	1412	0	1594	0	4796	0
YXU	LONDON, ONT, CANADA	N	FGN	422	0	992	0	341	0	1755	0
YXY	WHITEHORSE, YT, CANADA	N	FGN	1479	0	1382	0	1552	0	4413	0
YYC	CALGARY, ALBERTA, CANADA	N	FGN	33327	1	33794	0	29159	4	96280	5
YYD	SMITHERS, BC, CANADA	N	FGN	904	0	1274	0	1306	0	3484	0
YYE	FT NELSON, BC, CANADA	N	FGN	962	0	548	0	0	0	1510	0
YYF	PENTICTON, BC, CANADA	N	FGN	2964	0	1643	0	0	0	4607	0
YYG	CHARLOTTETOWN, PEI, CANADA	N	FGN	1699	0	1403	0	852	0	3954	0
YYJ	VICTORIA, BC, CANADA	N	FGN	871	0	1265	1	690	1	2826	2
YYL	LYNN LAKE, MAN, CANADA	N	FGN	32	0	32	0	0	0	64	0
YYQ	CHURCHILL, MAN, CANADA	N	FGN	412	0	424	0	422	0	1258	0
YYR	GOOSE BAY, NFLD, CANADA	N	FGN	1733	0	1721	0	1898	0	5352	0
YYT	ST JOHNS, NFLD, CANADA	N	FGN	4331	0	4782	1	4680	0	13793	1
YYY	MONT JOLI, QUE, CANADA	N	FGN	276	0	106	0	242	0	624	0
YYZ	TORONTO, ONTARIO, CANADA	N	FGN	44100	1	49334	1	43077	1	136511	3
YZF	YELLOWKNIFE, NWT, CANADA	N	FGN	3253	0	3578	0	5142	1	11973	1
YZP	SANDSPIT, BC, CANADA	N	FGN	774	0	1282	0	1260	1	3316	1
YZT	PORT HARDY, BC, CANADA	N	FGN	708	0	0	0	0	0	708	0
YZV	SETP-ILES, QUE, CANADA	N	FGN	603	0	612	0	640	0	1855	0
ZAD	ZADAR, YUGOSLAVIA	N	FGN	52	0	109	0	164	0	325	0
ZAG	ZAGREB, YUGOSLAVIA	N	FGN	6743	0	8422	0	9322	0	24487	0
ZAH	ZAHDAN, IRAN	N	FGN	88	0	210	0	160	0	458	0
ZCO	TEMUCO, CHILE	S	FGN	0	0	558	0	834	0	1392	0
ZHA	ZHANGJIANG, P. R. CHINA	N	FGN	416	0	579	0	723	0	1718	0
ZIH	IXTAPA/ZIHUATANEJO, MEXICO	N	FGN	44	0	146	0	482	0	672	0
ZNZ	ZANZIBAR, TANZANIA	S	FGN	1098	0	412	0	210	0	1720	0
ZRH	ZURICH, SWITZERLAND	N	FGN	12226	3	13751	0	15344	0	41321	3
ZTH	ZAKINTHOS, GREECE	N	FGN	676	1	718	0	748	1	2142	2
ZUM	CHURCHILL FALLS, NFLD, CANADA	N	FGN	216	0	210	0	192	0	618	0

APPENDIX B

CONTENTS OF FAA BIRD INGESTION DATA BASE BOEING 737 AIRCRAFT OCTOBER 1986 - SEPTEMBER 1989

This appendix presents the contents of the Boeing 737 bird ingestion data base maintained by the FAA. The appendix presents actual data extracted from the FAA data base which contains bird ingestion data supplied by the engine manufacturers, FAA, and ICAO. The data base contents are described below:

<u>COLUMN</u>	<u>DESCRIPTION OF COLUMN CONTENTS</u>
EDATE	Date (mm/dd/yyyy) of ingestion event.
EVT#	FAA bird ingestion event sequence number reflecting order in which events were entered into the FAA bird ingestion data base.
ENG_POS	Engine position of engine ingesting bird. Since each engine ingestion event has a unique record in the data base, duplicate event numbers indicate multiple engine ingestion events. This column provides record uniqueness in such cases. 1 - left engine of 737 airplane 2 - right engine of 737 airplane
MFG_NO.	Manufacturer's event number. The prefix values 87, 88, and 89 imply ICAO events reported in years 1987, 1988, and 1989 respectively. The value 0 implies events reported from FAA sources.
ETIME	Local time of bird ingestion.
SIGN_EVT	Significant event factors. AIRWRTHY - engine related airworthiness effects INV POS LOSS - involuntary power loss MULT BIRDS - multiple birds in one engine MULT ENG - multiple engine ingestion (1 bird in each engine) MULT ENG-BIRDS - multiple engine ingestion and one or both engines sustained multiple bird ingestion TRVS FRAC - transverse fan blade fracture OTHER - other significant factor, may be reported in REMARKS NONE - no significant factor noted
AIRCRAFT	737 aircraft type.
POF	Phase of flight during which bird ingestion occurred. (TAXI;TAKEOFF;CLIMB;CRUISE;APPROACH;LANDING;UNKNOWN)
ALTITUDE	Altitude (ft. AGL) at time of bird ingestion.
SPEED	Air speed (kn) at time of bird ingestion.
FL_RULES	Flight rules in effect at time of bird ingestion. IFR - instrument flight rules VFR - visual flight rules UNK - unknown

LT_CONDS Light conditions at time of bird ingestion.
 (DARK;LIGHT;DAWN;DUSK;etc.)

WEATHER Weather conditions at time of bird ingestion.

CREW_AC Crew action taken in response to bird ingestion.
 ATO - aborted takeoff
 ATB - air turnback
 DIV - diversion
 UNK - unknown
 NONE - no crew action taken
 N/A - not applicable
 OTHER - some action taken, may be specified in narrative remarks

CREW_AL Indicates whether crew alerted to presence of birds at time of
 bird ingestion.
 (YES;NO;UNKNOWN)

BIRD_SEE Indicates whether ingested bird(s) seen prior to ingestion
 NO - not seen
 YES - seen
 SEVERAL - two to ten birds observed
 FLOCK - more than ten birds observed

BIRD_NAM Common bird name. Trailing asterisk (*) implies bird not
 positively identified as such.

BIRD_SPE Species of positively identified bird. Alphanumeric
 identification code which conforms to Edward's[†] convention.

#_BIRDS Number of birds ingested. An asterisk (*) implies more than one
 bird; however, the exact count is unknown.

WT_OZ_1 Weight (oz.) of first ingested bird.

CTY_PRS Scheduled city pairs of aircraft operation.
 (from code:to code) 3-letter city airport code. Reference
 AIRPORT column in Appendix A.

AIRPORT Airport at which bird ingestion event occurred.
 3- or 4-letter airport code. See AIRPORT column in Appendix A.

LOCALE Nearest town, state, country, etc.

US_INCID Indicates whether bird ingestion occurred within US boundaries.
 (YES;NO)

ENGINE Engine model.
 (CFM56;JT8D)

DASH Engine dash number.

[†] Edwards, E.P., "A Coded List of Birds of the Worlds,"
 IBSN:911882-04-9, 1974

DMG_CODE Letter codes summarizing engine damage resulting from the bird ingestion. This column does not exist in the actual FAA data base, but was developed by the contractor to compress 17 YES/NO damage fields into a single column. A letter code appears for damage columns whose values are YES. In the explanation of damage codes below, a number in parentheses indicates the damage severity code which is further explained in the SEVERITY column. The data base column name is given in the explanation of the damage code.

- A(4) - ENG DAM; engine damaged due to bird ingestion
- B(3) - LEAD_EDG; leading edge distortion/curl, minor fan blades
- C(3) - BEN/DEN; one to three fan blades bent or dented
- D(2) - BE/DE>3; more than three fan blades bent or dented
- E(3) - TORN<10; one to ten fan blades torn
- F(2) - TORN>10; more than ten fan blades torn
- G(2) - BROKEN; broken fan blade(s), leading edge and/or tip pieces missing; other blades also dented
- H(3) - SHINGLED; shingled (twisted) fan blades
- I(1) - TRVSFRAC; transverse fracture - a fan blade broken chordwise (across) and the piece liberated (includes secondary hard object damage)
- J(2) - SPINNER; dented, broken, or cracked spinner (includes spinner cap)
- K(1) - CORE; bent/broken compressor blades/vanes, blade/vane clash, blocked/disrupted airflow in low, intermediate, and high pressure compressors
- L(3) - NACELLE; dents and/or punctures to the engine enclosure (includes cowl)
- M(1) - FLANGE; flange separations
- N(2) - RELEASED; released (walked) fan blades (blade retention mechanism broken)
- O(1) - TURBINE; turbine damage
- P - OTHER; any damage not previously listed
- Q - UNKNOWN;

SEVERITY Numeric code indicating the severity of engine damage resulting from the bird ingestion. This column was developed by the contractor after analyzing reported damage in the data base. The lower the severity code, the more severe the damage. The severity rating of a flight is determined as the lowest severity rating attained by any of the damage categories. Corresponding severity ratings for each damage category were presented in the DMG_CODE discussion above.

- 1 - most severe damage (damage is known)
- 2 - moderately severe damage (damage is known)
- 3 - least severe damage (damage is known)
- 4 - damage indicated, but not specified
- 9 - no damage reported

POW_LOSS Degree of power loss as a result of bird ingestion

- NONE - no power loss
- EPR DEC - engine pressure ratio decrease
- SPOOL DOWN - engine spooled down
- N1 CHANGE - N1 rotor change
- N2 CHANGE - N2 rotor change

COMPRESSOR - compressor surge/stall
UNKNOWN - unknown whether power loss occurred

MAX_VIBE Maximum vibration reported as a dimensionless unit.

THROTTLE Voluntary throttle change by crew in response to bird ingestion.
ADVANCE - voluntary throttle advance
RETARD - voluntary throttle retard
IDLE - voluntary throttle retard to idle
CUTOFF voluntary throttle retard to cutoff
NONE - no voluntary throttle change

IFSD Indicates whether in-flight shutdown occurred in response to bird ingestion.
NO - no shutdown
VIBES - shutdown due to vibrations
STAL/SURG - shutdown due to compressor stall/surge
HI EGT - shutdown due to high exhaust gas temperature
EPR - shutdown due to incorrect engine pressure ratio
INVLNTRY - involuntary engine shutdown
PARAMTRS - shutdown due to incorrect engine parameters
OTHER - other reasons, may be listed in remarks
UNKNOWN - unknown cause for shutdown

REMARKS Narrative description providing additional information concerning some aspect of the ingestion.

EDATE	EVT#	ENG POS	BIRD NAM	BIRD SPE	# BIRDS	WT OZ	1	CTY	PRS	AIRPORT	LOCALE	US_INCID	ENGINE	DASH
10/01/86	1									BEG	BELGRADE, YUGOSLAVIA	NO	CFM56	3
10/02/86	2									TVL	LAKE TAHOE, CA	YES	CFM56	3
10/02/86	235									CTU	CHENGOU, CHINA	NO	CFM56	3
10/04/86	235		GULL*							XFO	CHINA	NO	CFM56	3
10/05/86	235									MDT	HARRISBURG, PA	YES	CFM56	3
10/08/86	235									PEK	BEIJING, CHINA	NO	CFM56	3
10/10/86	234									XFO	INDIA	NO	CFM56	3
10/13/86	232		GRAY-HEADED LAPWING							MAN-CDG	MANCHESTER, ENGLAND	NO	CFM56	9A
10/13/86	232		GRAY-HEADED LAPWING							9.6	KUNMING, CHINA	NO	CFM56	3
10/14/86	232		STARLING							BOM	KUNMING, CHINA	NO	CFM56	3
10/16/86	232		STARLING							3.	BOMBAY, INDIA	NO	CFM56	3
10/19/86	230									DAL	DALLAS/FT WORTH, TEX-LOVE	YES	CFM56	3
10/19/86	231									TRV	DALLAS/FT WORTH, TEX-LOVE	YES	CFM56	3
10/20/86	228									ELS-	TRIVANDRUM, INDIA	NO	CFM56	9A
10/20/86	229									XFO	EAST LONDON, SOUTH AFRICA	NO	CFM56	17
10/21/86	227									CCU-	CHINA	NO	CFM56	17
10/21/86	227									XFO	CALCUTTA, INDIA	NO	CFM56	17
10/23/86	236									GAU-	GAUHATI, INDIA	NO	CFM56	17
10/25/86	236									GHU	GAUHATI, INDIA	NO	CFM56	17A
10/26/86	8									XFO	GUATEMALA, CHINA	NO	CFM56	17A
10/28/86	8		ROCK DOVE							SNA	ORANGE COUNTY, CA	YES	CFM56	3
10/28/86	9		ROCK DOVE							ROA	ORANGE COUNTY, CA	YES	CFM56	3
10/28/86	9									ROA	ROANOAK, VA	YES	CFM56	3
10/28/86	10									ROA	ROANOAK, VA	YES	CFM56	3
10/29/86	11		ROBIN OR PIGEON*							DAL	DALLAS/FT WORTH, TEX-LOVE	YES	CFM56	15
10/29/86	12		BLACK-HEADED GULL							CLT	CHARLOTTE, NC	YES	CFM56	3
10/30/86	235									BHM	BIRMINGHAM, ALA	YES	CFM56	3
11/01/86	235									XFO	INDIA	NO	CFM56	3
11/02/86	423		NIGHTHAWK							XUS	MIDWAY AIRPORT	YES	CFM56	15
11/03/86	14									MDW	KARACHI, PAKISTAN	YES	CFM56	15
11/04/86	13									KHI	ALBANY, NY	NO	CFM56	3
11/04/86	13									ALB	HYDERABAD, INDIA	YES	CFM56	3
11/04/86	16									HYD	CHRISTCHURCH, NEW ZEALAND	NO	CFM56	15
11/07/86	74									XFO	SRI NAGAR, INDIA	NO	CFM56	15A
11/09/86	17									SXR	SAN ANTONIO, TEX	YES	CFM56	3
11/10/86	18									SAT	DENVER, COL	YES	CFM56	3
11/10/86	19									DEN	CHARLOTTE, NC	YES	CFM56	3
11/10/86	20									CLT	PENANG, MALAYSIA	NO	CFM56	15A
11/14/86	75									PEN	BANGALORE, INDIA	NO	CFM56	15A
11/14/86	76									BLR	BHUBANESWAR, INDIA	NO	CFM56	15A
11/15/86	21		ROCK DOVE							BBI	CHICAGO, IL	NO	CFM56	15
11/15/86	21		ROCK DOVE							ORD	CHICAGO, IL	YES	CFM56	15
11/15/86	22									ORD	CHICAGO, IL	YES	CFM56	15
11/18/86	23		GRAY-HEADED LAPWING							CNS	CAIRNS, OLD AUSTRALIA	NO	CFM56	3
11/20/86	24									AMS	AMSTERDAM, NETHERLANDS	NO	CFM56	3
11/22/86	25									LIH	DALLAS/FT WORTH, TEX	YES	CFM56	9A
11/22/86	27									KUL	LIHUE, KAUAI, HAWAII	YES	CFM56	15
11/23/86	27									ARD	KEDAH, MALAYSIA	NO	CFM56	3
11/23/86	27									LHE	LAHORE, PAKISTAN	NO	CFM56	3
11/23/86	27									LHE	LAHORE, PAKISTAN	YES	CFM56	3
11/24/86	300									HOU	HOUSTON, TEX	NO	CFM56	3
11/24/86	300									XFO	WELLINGTON, NEW ZEALAND	NO	CFM56	17A
11/26/86	309		BLACK WINGED PLOVER							WLG	WELLINGTON, NEW ZEALAND	NO	CFM56	17A
11/26/86	309		RING BILLED GULL							XFO	WELLINGTON, NEW ZEALAND	NO	CFM56	3
11/26/86	31									LLW	LILONGWE, MALAWI	YES	CFM56	3
11/27/86	31									LGA	NEW YORK, NY	YES	CFM56	3
11/27/86	424									PDX	PORTLAND, ORE	YES	CFM56	3
11/29/86	72									PDX	PORTLAND, ORE	YES	CFM56	15
12/02/86	32									BLR	BANGALORE, INDIA	NO	CFM56	15
12/03/86	32									VDM	CHRISTCHURCH, NEW ZEALAND	NO	CFM56	15
12/08/86	34									DAL	DALLAS/FT WORTH, TEX-LOVE	YES	CFM56	3
12/12/86	35									TFS	TENERIFE	NO	CFM56	3
12/13/86	36									AMS	AMSTERDAM, NETHERLANDS	NO	CFM56	3
12/13/86	37									XFO	AMSTERDAM, NETHERLANDS	NO	CFM56	3
12/14/86	37		HERRING GULL							SFO	SAN FRANCISCO/OAKLAND, CA	YES	CFM56	3
12/14/86	57									CHC	CHRISTCHURCH, NEW ZEALAND	NO	CFM56	15

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

EDATE	EVT#	ENG_POS	DMG_CODE	SEVERITY	POW_LOSS	MAX_VIBE	THROTTLE	IFSD	REMARKS
10/01/86	1	A,B		3	NONE	2.0	NONE	NO	
10/02/86	2	A,B		3		4.0	NONE	NO	
10/02/86	3	A,B		3			NONE	NO	
10/04/86	235	A,G		3	NONE		NONE	NO	AM EVENT, MEDIUM BIRD
10/05/86	4	A,H		3	NONE		NONE	NO	
10/08/86	5	A,H		3			NONE	NO	
10/10/86	235	A,B,E		3		5.0	IDLE	NO	CCOC PS4 CRACK
10/13/86	6			3	NONE		NONE	NO	
10/14/86	232			3	NONE		NONE	NO	THUD REPORTED
10/16/86	7			3	NONE		NONE	NO	
10/19/86	230			3					
10/19/86	232			3					
10/20/86	233			3					
10/21/86	236	A,C,G		3		YES			
10/21/86	237	A,B		3					
10/21/86	238	A,C		3					VIBRATION, THUD, SMELL 7 FAN BLADES REQUIRED LE TIP REPAIR 3 FAN BLADES BENT
10/25/86	235			3					
10/26/86	8	A,H		3		3.0			
10/28/86	8			3					
10/28/86	9			3					
10/28/86	10			3					
10/28/86	11			3					
10/28/86	12	A,C,H		3		5.0	IDLE	NO	
10/29/86	13			3					
10/30/86	235			3					
11/01/86	423			3		3.8			
11/02/86	14	A,H		3					
11/03/86	15	A,B,H		3					
11/04/86	17			3					
11/04/86	16	A,C		3					
11/07/86	19			3					
11/07/86	74			3					
11/09/86	18			3					
11/10/86	20			3		4.0			
11/10/86	21	A,C		3					
11/14/86	205			3					
11/15/86	79	A,C		3					
11/15/86	21	A,C,H		3					
11/15/86	22			3					
11/15/86	23			3					
11/15/86	24	A,H		3		5.0	IDLE	NO	SMALL BIRD
11/20/86	25	A,B,C		3					
11/22/86	26	A,D,H		3					
11/23/86	27	A		3					
11/23/86	28	A		3					
11/23/86	29	A,B,H		3		HIGH			
11/24/86	300			3					
11/24/86	301			3					
11/26/86	30	A,D,G		3	NONE		NONE	NO	ODOR
11/26/86	31	A,C,G		3	COMPRESSOR		NONE	NO	ODOR IN CABIN
11/27/86	427			3	NONE				
11/29/86	77			3	NONE				
12/03/86	72	A,G		3					
12/03/86	32			3					
12/08/86	34	A,H		3		2.0			
12/11/86	35	A,B		3	NONE	OFFSC	IDLE	NO	VIBES
12/12/86	36			3					
12/12/86	37	A,B,H		3	NONE				
12/12/86	37			3	COMPRESSOR				
12/12/86	37			3	NONE	NONE	NONE	NO	ODOR

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

EDATE	EVT#	ENG POS	MFG NO	ETIME	SIGN EVT	AIRCRAFT	POF	ALTITUDE	SPEED	FL RULES	LT_CONDS	WEATHER	CREW AC	CREW AL	BIRD	SEE
12/14/86	80	2	1074		NONE	200	UNKNOWN	1000	210	IFR	DAY	OVERCAST				
12/14/86	457	2			NONE	300	CLIMB	0	145						NO	NO
12/15/86	81	55			NONE	200	TAKEOFF	200								
12/17/86	58	9			NONE	200	LANDING						ATB		NO	YES
12/17/86	162	46			NONE	200	UNKNOWN									
12/19/86	82	55			NONE	200	LANDING	0	90							
12/20/86	58	17			NONE	200	TAKEOFF	0	130							
12/24/86	237	70			NONE	200	TAKEOFF	500	150			BELOW CLOUDS	ATB			YES
12/26/86	237	10		8:30:00	FRAC	200	CLIMB				LIGHT	CLEAR				
12/31/86	32	33		11:39:00	TRYS	300	LANDING	0	50							
12/31/86	33	43		11:39:00	MULT ENG	300	TAKEOFF	0	115							
01/02/87	301	11			NONE	200	TAKEOFF	0	130							
01/02/87	302	120			NONE	200	LANDING									
01/04/87	44	120			NONE	200	TAKEOFF									
01/07/87	85	871001			BIRDS	500	LANDING	0								
01/08/87	85	55			NONE	200	TAKEOFF									
01/09/87	34	110			NONE	200	LANDING	0								
01/09/87	238	130			NONE	200	TAKEOFF	0	130			SCATTERED				
01/09/87	303	130			NONE	200	UNKNOWN									
01/09/87	45	871002			NONE	500	UNKNOWN									
01/10/87	40	12			NONE	200	LANDING									
01/11/87	40	871003			NONE	200	TAKEOFF	0	-V1	VFR		ICY	NONE		SEVERAL	NO
01/19/87	41	13		17:30:00	BIRDS	300	CLIMB	200	150	VFR	DUSK	SCATTERED	ATB			
01/28/87	47	871004			MULT ENG	300	LANDING									
01/31/87	614	871005		12:58:00	MULT ENG	300	LANDING	0	110							
02/06/87	355	160			NONE	200	TAKEOFF	0								
02/08/87	923	87		10:40:00	MULT	200	TAKEOFF									
02/10/87	305	130			NONE	200	UNKNOWN									
02/10/87	428	0			NONE	200	TAKEOFF	0	140	VFR	DAY	PARTLY CLOUD	ATB		NO	
02/10/87	458	0			NONE	200	TAKEOFF	0	140	VFR	DAY	PARTLY CLOUD	ATB		YES	
02/10/87	458	0			NONE	200	TAKEOFF	0	140	VFR	DAY	PARTLY CLOUD	ATB		YES	
02/10/87	633	85		18:41:00	ENG	200	CLIMB	350							YES	FLOCK
02/11/87	85	0			NONE	200	UNKNOWN	0	140	VFR	DAY	CLOUDY	ATB		NO	
02/13/87	430	0		12:52:00	NONE	300	TAKEOFF									
02/13/87	589	357		17:45:00	NONE	200	LANDING									
02/17/87	50	1327			NONE	200	UNKNOWN	35	150	VFR	DAY	CLEAR			SEVERAL	
02/17/87	50	19		10:30:00	NONE	200	TAKEOFF	0							ONE	
02/21/87	683	87		16:00:00	NONE	200	TAKEOFF	0								
02/22/87	690	87		12:12:00	NONE	200	TAKEOFF	0	150			CLOUDY	NONE			
02/22/87	690	87		12:12:00	MULT	200	TAKEOFF	0	150			CLOUDY	NONE			
02/23/87	61	87		10:30:00	NONE	200	CLIMB	15000	350	VFR	DAY	CLEAR	NONE		NO	
02/25/87	241	100		11:55:00	NONE	200	TAKEOFF	0	145	VFR		SCATTERED	NONE		YES	
02/27/87	49	871006			NONE	300	CLIMB	0	100	VFR		RAIN	NONE		SEVERAL	
02/28/87	242	100		6:10:00	NONE	200	TAKEOFF	0				CLEAR	ATB			
02/28/87	306	130		7:30:00	NONE	200	UNKNOWN					CLEAR	NONE			
03/02/87	667	87		16:20:00	NONE	200	TAKEOFF	0	120	VFR	NIGHT	CLEAR	NONE		NO	FLOCK
03/03/87	460	0			NONE	200	UNKNOWN					CLEAR	NONE			
03/07/87	590	87		6:35:00	NONE	300	TAKEOFF					OVERCAST	NONE		NO	
03/10/87	50	871007			NONE	200	LANDING	100	124							
03/11/87	358	160			NONE	200	UNKNOWN									
03/12/87	359	87		7:09:00	NONE	200	TAKEOFF									
03/12/87	595	225		13:20:00	NONE	200	TAKEOFF	50	125	VFR	DAY	CLOUDY	NONE		YES	SEVERAL
03/13/87	87	255			NONE	200	UNKNOWN								NO	
03/16/87	67	87		21:00:00	NONE	200	TAKEOFF	0		VFR		CLOUDY	NONE		NO	
03/17/87	647	235		7:45:00	NONE	200	TAKEOFF	400								
03/17/87	647	235			NONE	200	UNKNOWN									
03/18/87	88	871008		13:50:00	NONE	300	APPROACH									
03/19/87	511	871009		19:00:00	NONE	300	TAKEOFF	1200	150	IFR		CLEAR	NONE		NO	
03/21/87	523	871010		13:00:00	NONE	200	TAKEOFF	0								
03/21/87	559	245			NONE	200	UNKNOWN									
03/21/87	89				NONE	200	UNKNOWN									

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

DATE	EVT#	ENG_POS	BIRD_NAM	BIRD_SPE	# BIRDS	WT_OZ_1	CTY_PRS	AIRPORT	LOCALE	US_INCID	ENGINE	DASH
12/14/86	80	2	GULL*		1			CHC	CHRISTCHURCH, NEW ZEALAND	NO	JT8D	15
12/14/86	457	2			1			SFO	SAN FRANCISCO, CA	YES	CFM56	3
12/15/86	81	2	MALLARD	2J84	1	40.		MAD	MADRID, SPAIN	NO	JT8D	
12/17/86	38	2			1			MSO	MISSOULA, MT	YES	JT8D	
12/17/86	163	2			1			XFO		NO	JT8D	9A
12/19/86	358	2			1			TRV	TRIVANDRUM, INDIA	NO	JT8D	15
12/20/86	237	2	HERRING GULL	14N14	1	40.	ORD-MSY	CHC	CHRISTCHURCH, NEW ZEALAND	NO	JT8D	17A
12/26/86	42	2			1			XFO	BRAZIL	YES	JT8D	7
12/31/86	39	2			1			ORD	CHICAGO, IL	YES	JT8D	3
12/31/86	39	2			1			HOU	HOUSTON, TEX	YES	CFM56	3
12/31/86	39	2			1			FAT	HOUSTON, TEX	YES	JT8D	17
01/02/87	301	1			1			MEL	FRESNO, CA	NO	JT8D	
01/02/87	302	1			1			MNY	MIYAKO JIMA, JAPAN	NO	JT8D	3
01/04/87	44	1			2			MEL	MELBOURNE, AUSTRALIA	NO	JT8D	3
01/08/87	83	1			1	4.		JAT	JAIPUR, INDIA	NO	CFM56	
01/09/87	83	1			1			VNS	VARANASI, INDIA	NO	JT8D	
01/09/87	338	1			1			MAN	MANCHESTER, ENGLAND	NO	JT8D	
01/09/87	303	1			1			XFO	AUCKLAND, NEW ZEALAND	NO	JT8D	
01/09/87	304	1			1			LST	CHRISTCHURCH, NEW ZEALAND	NO	JT8D	
01/09/87	45	1	CROW*	17Z74	1	1.5	OAK-NR	OAK	LAUNCESTON, TASMANIA	NO	CFM56	3
01/10/87	40	1	HORNED LARK	2J30	2	128.	RNO-DEN	RNO	SAN FRANCISCO, CA-OAKLAND	YES	JT8D	17
01/16/87	46	1			1			MUC	MUNICH, GERMANY	YES	CFM56	17
01/17/87	46	1			1			TGD	RENO, NEV	YES	JT8D	3
01/19/87	47	1	CANADIAN GOOSE		2			TGD	RENO, NEV	YES	JT8D	17
01/28/87	47	2	GULL*		1			TGD	TITOGRAD, YUGOSLAVIA	NO	CFM56	3
01/28/87	614	2	GULL*		1			LCA	TITOGRAD, YUGOSLAVIA	NO	CFM56	3
01/31/87	614	2	GULL*		1			XFO	LARNACA, CYPRUS	NO	CFM56	17
02/06/87	356	2			1			FRA	SOUTH AFRICA	NO	CFM56	3
02/06/87	356	2			1			XFO	FRANKFURT, GERMANY	NO	JT8D	15
02/08/87	340	2			1			XFO	AUCKLAND, NEW ZEALAND	NO	JT8D	9
02/10/87	305	1			1			AKL	AUCKLAND, NEW ZEALAND	YES	JT8D	9
02/10/87	428	1			1			SJC	SAN JOSE, CA	YES	JT8D	15
02/10/87	429	1			1			MDW	SAN JOSE, CA	YES	JT8D	15
02/10/87	458	1	GULL*		1			MDW	MIDWAY, ILL	YES	JT8D	15
02/10/87	458	1	GULL*		1			MDW	MIDWAY, ILL	YES	JT8D	15
02/10/87	655	1			1			EINN	SHANWICK, IRELAND	NO	JT8D	3
02/11/87	85	2			1			TRV	TRIVANDRUM, INDIA	NO	CFM56	3
02/13/87	430	2	GULL*		1			XFO	HAMBURG, GERMANY	NO	CFM56	9A
02/13/87	589	2	HAWK*		1			CBR	CANBERRA, AUSTRALIA	NO	JT8D	9A
02/14/87	357	1			1			OGG	ARGENTINA	YES	JT8D	17A
02/14/87	59	1	GOLDEN PLOVER	5N25	1		6.	DUR-PLZ	KAHULUI, MAUI, HAWAII	NO	JT8D	17A
02/19/87	60	1			1			DUR	DURBAN, SOUTH AFRICA	NO	JT8D	
02/21/87	663	1	KITE*		1			OGG	CHAKALA, PAKISTAN	YES	JT8D	
02/22/87	690	1	KITE*		1			PIE	CLEARWATER, FL	YES	JT8D	
02/22/87	690	1	KITE*		1			PIE	CLEARWATER, FL	YES	JT8D	
02/23/87	61	2	GLAUCOUS WINGED GULL	14N22	1		56.	PDX-RNO	MUNICH, GERMANY	YES	JT8D	7
02/25/87	241	1			1			MUC	PORTLAND, ORE	YES	JT8D	3
02/27/87	49	1			1			ALB	ALBANY, NY	YES	CFM56	15
02/27/87	242	1	BLACK-BACKED GULL	14N21	1		31.	CHC	STUTTGART, GERMANY	NO	JT8D	15
02/28/87	306	2			1			CHC	CHRISTCHURCH, NEW ZEALAND	NO	JT8D	
03/02/87	366	2	GULL*		1			FNC	CHRISTCHURCH, NEW ZEALAND	NO	JT8D	
03/02/87	667	2			1			PIE	FUNCHAL, MADEIRA	NO	JT8D	
03/03/87	660	1	TRUE SPARROW*		1			ABC	ST. PETERSBURG, FL	YES	JT8D	
03/07/87	500	1	SHORE (HORNED) LARK	17Z74	1		1.5	PEK	COOLANGATTA, AUSTRALIA	NO	CFM56	3
03/10/87	300	1			1			OAK	BEIJING, CHINA	NO	CFM56	3
03/11/87	328	1			1			XFO	SAN FRANCISCO, CA-OAKLAND	YES	JT8D	17A
03/12/87	359	1			1			TSV	TOWNSVILLE, AUSTRALIA	NO	CFM56	3
03/13/87	595	1	HAWK*		1			LTH-HNL	LIHUE, KAUAI, HAWAII	YES	JT8D	9A
03/13/87	63	2			1			LTH	BAGDOGRA, INDIA	NO	JT8D	
03/16/87	647	1	BLACK-HEADED GULL	14N36	1		10.	BAH-DHA	BAHRAIN, INDIA	NO	JT8D	15
03/16/87	64	1			1			JAT	JAIPUR, INDIA	NO	JT8D	
03/18/87	88	1			1			SYD	SIDNEY, NSW, AUSTRALIA	NO	JT8D	3
03/19/87	51	1			1			ZRH	ZURICH, SWITZERLAND	NO	CFM56	3
03/21/87	523	1	DUCK OR GOOSE*		1			MSP	MINN./ST. PAUL, MINN	YES	CFM56	9A
03/21/87	525	1			1			PIE	ST. PETERSBURG, FL	YES	JT8D	17
03/21/87	89	1	GULL*		1			PAT	PATNA, INDIA	NO	JT8D	

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

[illegible]

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

EDATE	EV#	ENG POS	MFG NO	ETIME	SIGN EVT	AIRCRAFT	POF	ALTITUDE	SPEED	FL RULES	LT CONDS	WEATHER	CREW AC	CREW AL	BIRD SEE
03/21/87	90	2	50		MULT BIRDS	200	UNKNOWN						NONE		
03/23/87	54	1	871011		NONE	300	UNKNOWN					RAIN	ATB		YES
03/25/87	307	2	120	18:35:00	INV POW LOSS	200	TAKEOFF	0 120				CLEAR	ATB		NO
03/26/87	66	1	26		NONE	200	LANDING	0 139				CLEAR	ATB		NO
03/26/87	67	1	26	20:17:00	MULT ENG-BIRDS	200	CLIMB	0 80				CLEAR	ATB		ONE
03/26/87	627	2	87	20:17:00	MULT ENG-BIRDS	200	CLIMB	700 160				CLEAR	ATB		ONE
03/26/87	627	2	87	20:17:00	MULT ENG-BIRDS	200	CLIMB	700 160				CLEAR	ATB		ONE
03/27/87	91	1	50		NONE	200	UNKNOWN	6000				CLOUDY	ATB		ONE
03/27/87	664	2	87	7:08:00	NONE	200	CLIMB	1000	VFR			CLEAR	ATB		ONE
03/28/87	55	2	871012		NONE	200	TAKEOFF	0 145				SCATTERED	ATB		ONE
03/28/87	93	2	30		NONE	200	TAKEOFF	0 114				SCATTERED	ATB		ONE
03/29/87	243	2	100	12:47:00	NONE	200	LANDING	0					ATB		
03/29/87	360	2	170	10:47:00	NONE	200	TAKEOFF	0					ATB		
03/30/87	56	1	871013		NONE	200	TAKEOFF	0					ATB		
03/30/87	308	2	130		NONE	200	UNKNOWN						ATB		
03/31/87	425	2	87	9:30:00	NONE	200	TAKEOFF	0 90				CLOUDY	ATO		FLOCK
03/31/87	684	2	27	14:10:00	MULT BIRDS	200	TAKEOFF	0 40				SCATTERED	ATO		SEVERAL
04/01/87	68	2	160	9:00:00	NONE	200	TAKEOFF	0					ATO		FLOCK
04/03/87	244	2	130	23:59:00	NONE	200	TAKEOFF	10 140				SCATTERED	OTHER		SEVERAL
04/05/87	309	2	110		NONE	200	CLIMB	0 140					OTHER		SEVERAL
04/06/87	657	2	87		NONE	200	TAKEOFF	0 90					OTHER		SEVERAL
04/07/87	93	2	55		NONE	200	LANDING						OTHER		SEVERAL
04/07/87	361	2	140		NONE	200	UNKNOWN						OTHER		SEVERAL
04/07/87	665	2	87	13:00:00	NONE	200	UNKNOWN	200 140		OVERCAST		CLEAR	NONE		SEVERAL
04/08/87	106	2	872001	19:40:00	NONE	200	LANDING	0 -V1				CLEAR	NONE		SEVERAL
04/11/87	107	1	872002	22:30:00	NONE	300	TAKEOFF	600 160	IFR		DARK	SCATTERED	NONE		SEVERAL
04/12/87	246	1	100		MULT BIRDS	200	CLIMB	100 140					NONE		ONE
04/12/87	596	1	87	10:50:00	NONE	200	TAKEOFF	200 175				CLEAR	NONE		ONE
04/12/87	108	1	87		NONE	200	UNKNOWN	0 130					ATB		NO
04/14/87	681	1	87	11:15:00	NONE	200	TAKEOFF	210				CLEAR	NONE		YES
04/17/87	109	1	872004		TRVS	200	CLIMB	0 110					NONE		NO
04/21/87	70	1	29	8:03:00	NONE	200	TAKEOFF						NONE		YES
04/22/87	247	1	110	10:38:00	NONE	200	TAKEOFF	0					NONE		NO
04/23/87	248	1	130		NONE	200	UNKNOWN						NONE		NO
04/26/87	310	1	130		NONE	200	LANDING	0					NONE		NO
04/26/87	311	1	130		NONE	200	UNKNOWN						NONE		NO
04/26/87	660	1	87	20:05:00	MULT BIRDS	200	UNKNOWN						NONE		NO
05/01/87	312	1	130		NONE	200	TAKEOFF	0 150					ATB		ONE
05/01/87	362	1	160		NONE	200	TAKEOFF	0 +V1					NONE		ONE
05/03/87	69	1	28	18:38:00	NONE	200	TAKEOFF	0					NONE		ONE
05/04/87	110	1	872005	20:00:00	NONE	300	LANDING						NONE		ONE
05/06/87	591	1	87	20:38:00	NONE	300	UNKNOWN						NONE		ONE
05/08/87	592	1	87		NONE	200	TAKEOFF						NONE		ONE
05/10/87	94	1	872006	22:00:00	NONE	200	UNKNOWN						NONE		ONE
05/10/87	622	1	87	15:30:00	NONE	200	UNKNOWN						NONE		ONE
05/10/87	687	1	87		NONE	200	UNKNOWN						NONE		ONE
05/12/87	363	1	1330		NONE	200	UNKNOWN						NONE		ONE
05/12/87	363	1	1329		NONE	200	UNKNOWN						NONE		ONE
05/16/87	364	1	130		NONE	200	UNKNOWN						NONE		ONE
05/17/87	313	1	110	13:40:00	MULT BIRDS	200	APPROACH	300 140				SCATTERED	ATB		YES
05/18/87	249	1	110	8:17:00	MULT BIRDS	200	TAKEOFF	0 100				CLEAR	NONE		SEVERAL
05/20/87	250	1	110		NONE	200	UNKNOWN	0 85					ATB		YES
05/22/87	96	1	55		NONE	200	TAKEOFF	0 140				OVERCAST	ATB		ONE
05/22/87	97	1	50	7:35:00	TRVS	200	TAKEOFF	0 90				CLEAR	NONE		YES
05/24/87	99	1	33	6:30:00	NONE	200	TAKEOFF	15					NONE		ONE
05/24/87	251	1	110	8:53:00	NONE	200	LANDING	300					NONE		YES
05/25/87	252	1	110	16:00:00	NONE	200	TAKEOFF						NONE		YES
05/26/87	252	1	110		NONE	200	APPROACH						NONE		YES
05/27/87	252	1	130		NONE	200	UNKNOWN						NONE		YES
05/28/87	100	1	50	20:30:00	NONE	200	APPROACH	300 150				SCATTERED	NONE		YES
05/28/87	165	1	872007	10:50:00	NONE	200	UNKNOWN	82 140				CLEAR	NONE		YES
05/30/87	253	1	100	14:55:00	NONE	200	APPROACH	150 135				CLEAR	NONE		SEVERAL
05/31/87	253	1	872008	17:06:00	NONE	200	APPROACH						NONE		YES
05/31/87	254	1	100		NONE	200	APPROACH						NONE		YES

DATE	EVT#	ENG_POS	BIRD_NAM	BIRD_SPE	#_BIRDS	WT_OZ_1	CTY_PRS	AIRPORT	LOCALE	US_INCID	ENGINE	DASH
03/21/87	90	2						XFO	QUETTA, PAKISTAN	NO	JT8D	
03/23/87	54	1						UET	MIYAKO, JAPAN	NO	CFM56	3
03/25/87	307	2						MMY	MIYAKO, JAPAN	NO	JT8D	
03/26/87	66	1	SPOTTED THICK-KNEE	9N4	1	15.		JNB-DUR	JOHANNESBURG, SOUTH AFRICA	NO	JT8D	17A
03/26/87	67	1			*			JNB-WDH	JOHANNESBURG, SOUTH AFRICA	NO	JT8D	17A
03/26/87	627	1			*			BNJ	NAHIBITIA, S.W. AFRICA	NO	JT8D	
03/26/87	627	1			*			BNJ	BONN, GERMANY	NO	JT8D	
03/27/87	91	1			1			XFO	BONN, GERMANY	NO	JT8D	
03/27/87	665	1			1			LHE	LAHORE, PAKISTAN	NO	JT8D	
03/28/87	55	2			1			FLL	FT. LAUDERDALE/HOLLYWOOD, FL	YES	CFM56	3
03/28/87	72	1			1			AKL	AUCKLAND, NEW ZEALAND	NO	JT8D	15
03/29/87	243	1			1			XFO	GERMANY	NO	JT8D	
03/29/87	360	1			1			NCE	NICE, FRANCE	NO	JT8D	15
03/30/87	56	1			1			DEN	DENVER, COL	YES	CFM56	3
03/30/87	308	1			1			-AKL	AUCKLAND, NEW ZEALAND	NO	JT8D	
03/31/87	425	1			1			XUS	LONDON-HEATHROW, ENGLAND	YES	CFM56	3
03/31/87	684	1			1			LHR	PORT ELIZABETH, S. AFRICA	NO	JT8D	17A
04/01/87	68	2	SWALLOW*		1			PLZ	FRANKFURT, GERMANY	NO	JT8D	
04/03/87	244	2	COMMON BLACKBIRD	412269	1	2.8		FRA	CHRISTCHURCH, NEW ZEALAND	NO	JT8D	
04/03/87	309	2			*			CHC	KUCHING, MALAYSIA	NO	JT8D	
04/05/87	245	2			1			KCH	JOMO KENYATTA, KENYA	NO	JT8D	
04/06/87	657	2			1			CCU	CALCUTTA, INDIA	NO	JT8D	
04/07/87	93	2			1			XFO	ZAIRE	NO	JT8D	17
04/07/87	361	1			1			FAO	PORTUGAL	NO	JT8D	15
04/08/87	665	2			1			CPH	COPENHAGEN, DENMARK	NO	JT8D	
04/09/87	106	1			2			SYD	SYDNEY, NSW, AUSTRALIA	NO	CFM56	3
04/11/87	107	1			1			ZTH	ZAKINTHOS, GREECE	NO	CFM56	3
04/12/87	246	1			1			TSV	TOWNSVILLE, AUSTRALIA	NO	JT8D	
04/12/87	596	1			1			FRA	FRANKFURT, GERMANY	NO	CFM56	3
04/14/87	108	1	HOUSE SPARROW	70212	1	1.		BNX	BIRMINGHAM, ENGLAND	NO	CFM56	3
04/17/87	681	2	AMERICAN KESTREL	5226	1	4.		DAL	DALLAS/FT. WORTH, TEX-LOVE	YES	CFM56	3
04/21/87	109	1	ROCK DOVE	2P1	1	14.		XFO	PENANG, MALAYSIA	NO	JT8D	17A
04/23/87	247	1			1			PEN	MANCHESTER, ENGLAND	NO	JT8D	
04/23/87	248	2			1			MAN	CHRISTCHURCH, NEW ZEALAND	NO	JT8D	
04/26/87	310	1			1			-CHC	WELLINGTON, NEW ZEALAND	NO	JT8D	
04/26/87	311	1			*			WLG-DUD	AMSTERDAM, NETHERLANDS	NO	CFM56	3
04/26/87	660	1			1			AMS	AUCKLAND, NEW ZEALAND	NO	JT8D	
05/01/87	312	1			1			-AKL	NIGERIA	NO	JT8D	15A
05/01/87	366	2			1			XFO	ST. PETERSBURG, FL	YES	JT8D	9A
05/03/87	69	1			*			PIE-YYZ	SAN ANTONIO, TEX	YES	CFM56	3
05/04/87	110	1			1	2.5		SAT-HOU	DARWIN, AUSTRALIA	NO	CFM56	3
05/06/87	591	1	AUSTRALIAN COURSER	10N9	1			DRW	SYDNEY, AUSTRALIA	NO	CFM56	3
05/08/87	592	1	GULL*		1			SYD	JORHAT, INDIA	YES	CFM56	3
05/10/87	94	1			1			JRH	LITTLE ROCK, ARK	YES	JT8D	
05/10/87	111	1			1			LIT-HOU	FRANCE	NO	JT8D	3
05/10/87	623	1			1			LIT	EAST MIDLANDS, ENGLAND	NO	JT8D	
05/10/87	687	1			1			EMA	BOMBAY, INDIA	NO	JT8D	15A
05/12/87	93	1			1			BOM	ENGLAND	NO	JT8D	15
05/12/87	363	1			1			XFO	CHRISTCHURCH, NEW ZEALAND	NO	JT8D	
05/16/87	364	1			2			CHC	LONDON, ENGLAND-HEATHROW	NO	JT8D	15
05/18/87	240	1			2			LHR	ALOR SETAR, MALAYSIA	NO	JT8D	
05/20/87	250	1			1			AOR	BANGALORE, INDIA	NO	JT8D	
05/22/87	96	1			1			BLR	VARANASI, INDIA	NO	JT8D	15
05/22/87	97	1			1			VNS	LAGOS, NIGERIA	NO	JT8D	
05/22/87	98	1			1			XFO	EAST LONDON, SOUTH AFRICA	NO	JT8D	15
05/24/87	99	1	CATTLE EGRET	1135	1	16.		LOS	COLOGNE/BONN, GERMANY	NO	JT8D	
05/24/87	251	1	HADADA IBIS	6112	1	48.		ELS	KUALA LUMPUR, MALAYSIA	NO	JT8D	
05/25/87	164	1	SPARROW*		1	3.		CGN	CHRISTCHURCH, NEW ZEALAND	NO	JT8D	
05/26/87	252	1			1			KUL	FRANKFURT, GERMANY	NO	JT8D	15
05/27/87	314	1			1			-CHC	AMSTERDAM, NETHERLANDS	NO	CFM56	3
05/28/87	100	1			1			XFO	ALGIERS, ALGERIA	NO	JT8D	15
05/28/87	165	1	SWALLOW*		1			-FRA	TANGER, MOROCCO	NO	CFM56	3
05/30/87	112	1			1			FRA	DUBLIN, IRELAND	NO	JT8D	
05/30/87	253	1			1			AMS		NO	JT8D	
05/31/87	254	1			1			TNG		NO	JT8D	
05/31/87	254	1			1			DUB		NO	JT8D	

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

EDATE	EVT#	ENG POS	DMG CODE	SEVERITY	POW LOSS	MAX VIBE	THROTTLE	IFSD	REMARKS
03/21/87	90	2	A,D,E	2	NONE		NONE	NO	
03/23/87	54	1		2				NO	
03/25/87	307	2	A,D,H	2	COMPRESSOR	HIGH	CUTOFF	NO	INVOLUNTARY RPM ROLLED BACK BELOW IDLE THEN SHUTDOWN
03/26/87	66	1	A,D,H	3	NONE		NONE	NO	MEDIUM BIRD, MINOR DAMAGE
03/26/87	67	1	A,C	3				NO	MEDIUM BIRD, MINOR DAMAGE
03/26/87	67	1	A,Q	4				NO	SMALL BIRD
03/26/87	67	1	A,Q	4				NO	
03/26/87	67	1	A,Q	4				NO	
03/27/87	91	2		2				NO	
03/27/87	64	2	A,D	2	NONE		NONE	NO	
03/28/87	55	2	A,D,H	2				NO	
03/29/87	92	2	A,D,H	2				NO	
03/29/87	243	2		2				NO	
03/29/87	360	2	A,H	3	NONE		NONE	NO	
03/30/87	308	2		3	COMPRESSOR		IDLE	NO	SMALL BIRD
03/31/87	425	2		3				NO	
04/01/87	68	2		3				NO	
04/03/87	244	2		3				NO	
04/03/87	309	2		3				NO	
04/05/87	245	2		3				NO	
04/06/87	657	2		3				NO	
04/07/87	93	2	A,C	3				NO	
04/07/87	361	2		3				NO	
04/08/87	665	2	A,H	3	NONE	3.9		NO	
04/09/87	106	1	A,C	3	NONE			NO	
04/11/87	107	1	A,C	3				NO	
04/12/87	246	1		3				NO	
04/12/87	596	1		3				NO	
04/14/87	108	1		3				NO	
04/14/87	681	1		3				NO	
04/17/87	109	1	A,G,I,K	3	COMPRESSOR			NO	
04/21/87	170	1	A,C	3				NO	
04/22/87	247	1		3				NO	
04/23/87	310	2		3				NO	
04/26/87	311	2		3				NO	
04/26/87	360	2		3				NO	
04/26/87	362	2		3				NO	
05/01/87	69	1	A,G	2	COMPRESSOR		NONE	NO	
05/03/87	110	1		2	NONE			NO	
05/04/87	591	1		2				NO	
05/06/87	592	1		2				NO	
05/08/87	94	1	A,H	2	NONE			NO	
05/10/87	111	1		2				NO	
05/10/87	622	1		2				NO	
05/10/87	687	1		2				NO	
05/12/87	95	1	A,C	2				NO	
05/12/87	363	1	A,C	2				NO	
05/16/87	364	1		2				NO	
05/17/87	313	1		2				NO	
05/18/87	249	1		2				NO	
05/20/87	250	1		2				NO	
05/22/87	97	1	A,H	2	COMPRESSOR			NO	POWER LOSS
05/22/87	98	1		2				NO	
05/22/87	99	1	A,I,K,N	2	COMPRESSOR			NO	COMPLETE FRAC OF #2 BEARING RET BOLTS
05/24/87	251	1		2	NONE			NO	
05/25/87	164	1		2				NO	
05/25/87	252	1		2				NO	
05/26/87	314	1		2				NO	
05/27/87	100	1	A,H	2	NONE			NO	
05/28/87	165	1		2	NONE			NO	
05/29/87	112	1		2				NO	
05/30/87	253	1		2				NO	
05/31/87	113	1	A,D	2	NONE	3.8		NO	EVENT OCCURED DURING GO-ROUND
05/31/87	254	1		2				NO	SMALL BIRD

EDATE	EVT#	ENG_POS	MFG_NO	ETIME	SIGN	EVT	AIRCRAFT	POF	ALTITUDE	SPEED	FL_RULES	LT_CONDS	WEATHER	CREW_AC	CREW_AL	BIRD_SEE
06/02/87	71	1	30	16:05:00	NONE		200	TAKEOFF		0	VFR		CLEAR	ATO	NO	YES
06/03/87	315	1	120		NONE		200	LANDING		50				NONE		
06/04/87	114	1	872009	14:45:00	NONE		300	TAKEOFF		+V1						
06/05/87	115	2	872010		NONE		300	LANDING					CLEAR			
06/05/87	694	2	872011	10:00:00	NONE		300	CRUISE		0			CLOUDY			
06/08/87	116	1	87	7:48:00	NONE	BIRDS	300	LANDING		150			CLOUDY			SEVERAL
06/09/87	255	1	100	20:20:00	NONE		200	TAKEOFF		0			SCATTERED		YES	SEVERAL
06/10/87	101	1	31	18:10:00	NONE		200	LANDING		0	VFR					SEVERAL
06/10/87	608	1	87	10:40:00	NONE		200	LANDING		12						ONE
06/10/87	608	2	87	1:25:00	NONE		UNK	TAXI		0			CLEAR		NO	SEVERAL
06/12/87	117	1	872012	4:03:00	NONE	ENG	300	TAKEOFF		0			CLOUDY		NO	
06/13/87	256	1	110	4:03:00	MULT	ENG	200	TAKEOFF		0			SCATTERED		YES	YES
06/13/87	345	1	170		NONE		200	TAKEOFF		0			SCATTERED			
06/13/87	345	2	120		NONE		200	TAKEOFF		0						
06/15/87	257	1	110	16:45:00	NONE		200	TAKEOFF		0			CLEAR		NO	YES
06/17/87	118	1	872013		NONE		200	UNKNOWN		0						
06/17/87	317	1	120	9:09:00	NONE		300	UNKNOWN		50	VFR	DAY	PARTLY CLOUD		NO	FLOCK
06/19/87	609	1	872014	9:12:00	NONE		300	LANDING		0			SCATTERED		NO	SEVERAL
06/22/87	166	1	87	15:45:00	NONE		200	TAKEOFF		500	VFR		CLOUDY		NO	ONE
06/22/87	238	1	100	18:35:00	NONE	BIRDS	200	APPROACH		114			CLOUDY		NO	FLOCK
06/23/87	674	1	87	4:40:00	NONE		200	TAKEOFF		0			CLOUDY			ONE
06/24/87	676	1	87	10:07:00	NONE		200	CLIMB		300	VFR		OVERCAST		NO	ONE
06/25/87	102	1	34	12:56:00	NONE		200	CLIMB		500			CLEAR		NO	ONE
06/27/87	102	1	32		NONE		200	LANDING		0			SCATTERED			YES
06/27/87	259	1	110	10:07:00	NONE	BIRDS	200	UNKNOWN		0			RAIN		NO	SEVERAL
06/27/87	318	1	130	15:18:00	MULT		200	LANDING		0					NO	
06/28/87	677	1	87	7:50:00	NONE		200	TAKEOFF		0			CLEAR		NO	ONE
06/30/87	628	1	87	17:38:00	NONE		200	CLIMB		50			SCATTERED		NO	SEVERAL
07/01/87	630	1	87	14:15:00	NONE		200	TAKEOFF		135			CLEAR		NO	ONE
07/02/87	630	1	80		NONE		200	APPROACH		10			SCATTERED		NO	SEVERAL
07/02/87	566	1	170		NONE		200	UNKNOWN		80					NO	YES
07/02/87	431	1	0		NONE		200	UNKNOWN								
07/03/87	319	1	120		NONE		200	TAKEOFF		+V1			SCATTERED		NO	
07/04/87	261	1	80	15:15:00	NONE		200	LANDING								
07/05/87	133	1	873001	8:25:00	NONE		200	TAKEOFF					CLEAR		NO	
07/06/87	134	1	873002		NONE		200	UNKNOWN								
07/06/87	104	1	50		NONE		200	UNKNOWN								
07/07/87	1064	1	1667	0:42:00	NONE		200	TAKEOFF		0		NIGHT				
07/09/87	135	1	873003	12:20:00	NONE		200	LANDING		0			SCATTERED		NO	YES
07/11/87	262	1	100		NONE		200	CLIMB		3000					NO	
07/13/87	105	1	37		NONE		200	UNKNOWN		170						
07/13/87	171	1	58		NONE		200	UNKNOWN								
07/13/87	692	1	87		NONE		200	UNKNOWN								
07/13/87	1061	1	1664		NONE		200	UNKNOWN								
07/13/87	1062	1	1665		NONE		200	UNKNOWN		0						
07/14/87	136	1	873004		NONE		200	UNKNOWN								
07/14/87	137	1	873005		NONE		200	UNKNOWN								
07/14/87	138	1	873006		NONE		200	APPROACH								
07/15/87	203	1	110	9:35:00	NONE		200	TAKEOFF		0			CLEAR		NO	NO
07/15/87	1063	1	1666		NONE		200	TAKEOFF					CLEAR		NO	NO
07/16/87	320	1	170		NONE		200	UNKNOWN								
07/17/87	367	1	130		NONE		200	UNKNOWN								
07/17/87	432	1	0	18:39:00	NONE		200	CLIMB		1000						ONE
07/17/87	632	1	87	17:55:00	NONE		200	APPROACH		155			CLOUDY		NO	ONE
07/19/87	139	1	873007		NONE		200	TAKEOFF		300						
07/19/87	264	1	100	20:26:00	NONE	BIRDS	200	UNKNOWN		0			SCATTERED		NO	SEVERAL
07/19/87	685	1	87	16:54:00	MULT		200	TAKEOFF		0			OVERCAST		NO	
07/21/87	140	1	873008	7:00:00	NONE		200	TAKEOFF		+V1			CLEAR		NO	YES
07/21/87	265	1	100	15:20:00	NONE		200	APPROACH		100					NO	
07/21/87	425	1	0		NONE		200	TAKEOFF		125					NO	YES
07/23/87	615	1	87	15:20:00	NONE		200	TAKEOFF		100			CLEAR		NO	ONE
07/23/87	122	1	44	19:00:00	NONE		200	LANDING		0	VFR				NO	ONE
07/24/87	606	1	87	18:20:00	MULT	BIRDS	200	TAKEOFF		0			CLOUDY		YES	SEVERAL

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

EDATE	EVT#	ENG POS	BIRD NAM	BIRD SPE	#_BIRDS	WT_OZ_1	CTY_PRS	AIRPORT	LOCALE	US_INCID	ENGINE	DASH
06/02/87	71	1	GULL*		1		ORF-CVG	ORF	NORFOLK, VA	YES	JT8D	15A
06/03/87	315	1					ISG-MMY	MMY	MIYAKO JIMA, JAPAN	NO	JT8D	
06/04/87	114	1					KGS-GEN	KGS	KOS, GREECE	NO	CFM56	3
06/05/87	115	2	CROW*					GRZ	GRAZ, AUSTRIA	NO	CFM56	3
06/05/87	694	2	VULTURE*					TRV	TRIVANDRUM, INDIA	NO	JT8D	
06/08/87	116	1			*			SLC	SALT LAKE CITY, UT	YES	CFM56	3
06/08/87	662	1	GULL*		1	20.8		CHC	CHRISTCHURCH, NEW ZEALAND	NO	JT8D	
06/09/87	255	1	BLACK KITE		1			LDE	LOURDES, FRANCE	NO	JT8D	9A
06/10/87	101	1			1			XFD	EDMONTON, ALTA-MUN., CANADA	NO	JT8D	
06/10/87	698	1			1			YOW	OTTAWA, CANADA	NO	JT8D	
06/10/87	697	1			1			BKK	BANGKOK, THAILAND	NO	UNK	
06/12/87	817	2						LNZ	LINZ, AUSTRIA	NO	CFM56	3
06/13/87	117	1						LIN	MILAN, ITALY	NO	JT8D	
06/13/87	256	2						LIN	MILAN, ITALY	NO	JT8D	15
06/13/87	325	1						MIL	MILAN, ITALY	NO	JT8D	
06/14/87	327	1			1			XFO	JAPAN	NO	JT8D	3
06/15/87	273	2						ELS	EAST LONDON, SOUTH AFRICA	YES	CFM56	
06/17/87	317	2						IAD	WASHINGTON, DC-DULLES	NO	JT8D	3
06/17/87	119	2						XFO	JAPAN	YES	CFM56	3
06/19/87	609	1	GULL*		1			HRL	HARLINGEN, TEX	YES	JT8D	15
06/22/87	166	1	SWALLOW*		1	3.		FRA	PRINCE GEORGE, CANADA	NO	JT8D	
06/23/87	258	1	SWALLOW*		1	2.		CDG	FRANKFURT, GERMANY	NO	JT8D	
06/23/87	274	1	COMMON SWIFT		1			LEH	PARIS, FRANCE-DEGAULLE	NO	JT8D	
06/23/87	277	1	GULL*		*			PMI	REUS, SPAIN	NO	JT8D	
06/24/87	876	2						GLA	PALMA MALLORCA, SPAIN	NO	JT8D	
06/24/87	682	1	NORTHERN MARSH HARRIER		1	18.		OKK	GLASGOW, SCOTLAND	YES	JT8D	9A
06/25/87	102	1	FERAL PIGEON*		1	14.		KHH	SAN FRANCISCO, CA-OAKLAND	NO	JT8D	17A
06/27/87	103	1			1			TUN	KAOSUNG, TAIWAN	NO	JT8D	
06/27/87	250	1	SPUR-WINGED PLOVER		*	5.4		CHC	TUNIS, TUNISIA	NO	JT8D	
06/27/87	318	1			1			MAD	CHRISTCHURCH, NEW ZEALAND	NO	JT8D	
06/28/87	277	1	RED TAI*		1			DAY	MADRID, SPAIN	YES	JT8D	
06/29/87	427	1			1			TXL	DAYTON, OH	NO	JT8D	
06/30/87	628	1	GULL*		1			LGS	W. BERLIN, GERMANY	NO	CFM56	3
07/01/87	629	1			1			LHR	SKIAATHOS, GREECE	NO	JT8D	15
07/02/87	260	1			1			TNG	LONDON, ENGLAND-HEATHROW	NO	JT8D	15
07/02/87	366	1			1			EZE	HANOVER, GERMANY	NO	CFM56	3
07/03/87	310	1			1			FRA	TANGER, MOROCCO	NO	JT8D	
07/04/87	291	1			1			SDF	BUENOS AIRES, ARGENTINA	NO	JT8D	15
07/05/87	133	1			1			-IAD	FRANKFURT, GERMANY	YES	CFM56	3
07/06/87	134	1			1			XFO	LOUISVILLE, KY	YES	JT8D	
07/07/87	104	1			1			AND	WASHINGTON, DC-DULLES	NO	JT8D	9A
07/07/87	1064	1			1			ORV	AHMEDABAD, INDIA	NO	CFM56	3
07/09/87	135	1			1			BRU	AJACCIO, CORSICA, FRANCE	NO	JT8D	
07/11/87	205	1			1			VNS	BRUSSELS, BELGIUM	NO	JT8D	17
07/13/87	171	1	PARTRIDGE*		1			-LAX	VARANASI, INDIA	YES	JT8D	
07/13/87	692	1			1			VNS	LOS ANGELES, CA	NO	JT8D	
07/13/87	1061	1			1			DEL	VARANASI, INDIA	NO	JT8D	17A
07/13/87	1062	1			1			XFO	INDIA	NO	JT8D	17
07/14/87	136	1			1			-TVL	KARACHI, PAKISTAN	NO	CFM56	3
07/14/87	137	1			1			MUC	LAKE TAHOE, CA	NO	CFM56	3
07/14/87	138	1			1			DUR	TELAVIA-YAFO, ISRAEL	YES	CFM56	3
07/15/87	263	1			1			XFO	DURBAN, SOUTH AFRICA	NO	JT8D	17
07/15/87	320	1			1			-CHC	INDIA	NO	JT8D	
07/16/87	322	1			1			NUE	CHRISTCHURCH, NEW ZEALAND	NO	JT8D	15
07/17/87	367	1			1			MUC	MUNICH, GERMANY	NO	CFM56	3
07/17/87	432	1			1			AMD	MUNICH, GERMANY	NO	JT8D	
07/19/87	636	1	KITE*		1			XFO	AHMEDABAD, INDIA	NO	CFM56	3
07/19/87	264	2	BLACK KITE		2	20.8		LFB	MUNICH, GERMANY	NO	JT8D	
07/19/87	685	1			1			LTN	BLAGNAC, FRANCE (LFBO)	NO	JT8D	3
07/21/87	140	1			1			DAB	LONDON-LUTON, ENGLAND	NO	JT8D	
07/21/87	265	1			1			KST	DAYTONA BEACH, FL	YES	CFM56	3
07/21/87	426	1			1			EWR	KOSTI, SUDAN	NO	JT8D	9A
07/21/87	615	1			1			KRP	NEW YORK, NY-NEWARK	YES	JT8D	
07/23/87	122	1			1			MMY	KASTRUP, DENMARK	NO	UNK	
07/24/87	606	1	KILLDEER		*	3.		YCG	MIYAKO JIMA, JAPAN	NO	JT8D	17
									CASTLEGAR, CANADA	NO	JT8D	

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

EDATE	EVT#	ENG_POS	DMG_CODE	SEVERITY	POW_LOSS	MAX_VIBE	THROTTLE	IFSD	REMARKS
06/02/87	71	1	A,D	2				NO	
06/03/87	315	1		3	NONE			NO	
06/04/87	114	1		3	NONE			NO	
06/05/87	115	2	A,H	3	NONE			NO	SUBSTANTIAL DAMAGE
06/05/87	694	2	A,Q	3	NONE			NO	2 F BLDs BLENDING
06/08/87	116	1	A,B	3	NONE			NO	MEDIUM BIRD
06/08/87	665	1		3	COMPRESSOR			NO	
06/09/87	255	1		3				NO	SURGED ON GROUND
06/10/87	101	1		3				NO	SMALL BIRD
06/10/87	608	1		3				NO	
06/12/87	677	2	A,H	3	NONE	5.0	RETARD	NO	
06/13/87	117	1		3				NO	
06/13/87	256	1		3				NO	
06/13/87	365	2	A,C	3				NO	MEDIUM BIRD
06/14/87	316	1		3				NO	
06/15/87	257	2		3	NONE			NO	
06/17/87	118	2		3	NONE			NO	
06/17/87	317	2		3	NONE			NO	SMALL BIRD
06/19/87	110	1		3	NONE			NO	
06/19/87	609	2		3	NONE			NO	
06/22/87	166	1		3	NONE			NO	
06/22/87	258	1		3	NONE			NO	
06/23/87	674	1	A,Q	4				NO	SUBSTANTIAL DAMAGE, ENGINE CHANGED
06/24/87	676	2		3				NO	
06/24/87	682	1		3				NO	
06/25/87	103	2	A,C,H	3	NONE		RETARD	NO	
06/27/87	105	1	A,G	3				NO	
06/27/87	259	1	A,C	3				NO	
06/28/87	318	2		3				NO	
06/29/87	671	2		3				NO	LARGE BIRD
06/30/87	427	1		3				NO	SMALL BIRD
07/01/87	658	2		3				NO	LARGE BIRD
07/01/87	659	2		3				NO	MEDIUM BIRD
07/02/87	260	1		3				NO	
07/02/87	366	1		3				NO	
07/02/87	431	1		3				NO	
07/03/87	319	2	A,C	3				NO	
07/04/87	249	1	A	3		4.9		NO	REPLACED 1 PAIR OF F BLDs
07/05/87	133	2		3	NONE			NO	
07/06/87	134	1		3	NONE			NO	
07/07/87	104	1		3	NONE			NO	
07/07/87	1064	1		3	NONE			NO	
07/09/87	135	2	A,G	3				NO	
07/11/87	262	1	A,C,N	3				NO	AIRCRAFT GROUNDED DUE TO FOD
07/13/87	105	1	A,D,N	3				NO	FOUND DURING GROUND INSPECTION
07/13/87	1061	2	A	3				NO	MEDIUM BIRD
07/14/87	137	1		3	NONE			NO	8 FBLDS REPLACED, BLD TANG BROKEN
07/14/87	138	1		3	NONE			NO	FOUND ON GRD INSP
07/14/87	139	1		3	NONE			NO	FOUND ON GRD INSP
07/15/87	263	1		3	NONE			NO	1 F BLD DAMAGED
07/15/87	1063	1		3	NONE			NO	FOUND ON GRD INSPECTION, SMALL BIRD
07/16/87	320	1		3				NO	
07/17/87	327	1		3				NO	FOUND ON GRD INSP
07/17/87	432	2	A	3				NO	
07/17/87	433	2		3				NO	
07/19/87	139	2		3	NONE			NO	MEDIUM BIRD
07/19/87	264	1		3				NO	FOUND DURING GROUND INSPECTION
07/19/87	685	1	A,D	3	NONE			NO	
07/21/87	140	1		3	NONE	3.2		NO	
07/21/87	265	1	A	3	YES			NO	FAN BLADE DAMAGE
07/21/87	426	1	A,C,H,N	3				NO	MEDIUM BIRD
07/23/87	615	2		3				NO	SMALL BIRD
07/23/87	122	2		3				NO	
07/24/87	606	2		3				NO	

[illegible]

EDATE	EVT#	ENG POS	BIRD_NAM	BIRD_SPE	# BIRDS	WT_OZ_1	CTY	PRS	AIRPORT	LOCALE	US_INCID	ENGINE	DASH
07/25/87	605	1	GULL*		1				YYC	CALGARY, ALTA, CANADA	NO	JT8D	
07/26/87	123	1	GLAUCOUS-WINGED GULL	14N22					GOA-LGW	GENOVA, ITALY	NO	JT8D	15A
07/26/87	124	2							40. YFZ-YGG	TORONTO, ONT, CANADA	NO	JT8D	9A
07/26/87	141	1							-DUS	DUSSELDORF, GERMANY	NO	CFM56	3
07/26/87	266	1							XFO	ITALY	NO	JT8D	
07/26/87	321	1							XFO	NPEARSON INTL, CANADA	NO	JT8D	
07/27/87	321	1							XFO	AMRITSAR, INDIA	NO	JT8D	
07/27/87	635	1							ATO	INDIA	NO	JT8D	
07/27/87	1065	1	SPOTTED DOVE	2P65					6. ITO-HNL	HILO, HAWAII	YES	JT8D	9A
07/29/87	126	1							AMS-	AMSTERDAM, NETHERLANDS	YES	CFM56	3
07/29/87	328	1							XUS		NO	JT8D	7
07/29/87	617	1							LDE	LOURDES, FRANCE	NO	JT8D	
07/30/87	127	1							TXL	BERLIN, WEST GERMANY	NO	JT8D	
07/30/87	322	1							ISG	ISHIGAKI, JAPAN	NO	JT8D	
07/30/87	658	1	PIGEON*						MLAL	LUGA, MALTA	NO	JT8D	15A
07/31/87	143	1							HRL-HOU	HOUSTON, TEX	YES	CFM56	3
07/31/87	147	1	GALAH	1Q15					ADL	ADELAIDE, S. AUSTRALIA	NO	CFM56	3
07/31/87	624	1							EDUO	GUTERSLOH, GERMANY	NO	CFM56	
08/01/87	600	1							SZG	SALZBURG, AUSTRIA	NO	JT8D	
08/03/87	128	1							XFO	JOHANNESBURG, SOUTH AFRICA	NO	JT8D	
08/03/87	129	1							RAP-FSD	RAPID CITY, S. DAK	YES	JT8D	9
08/03/87	205	1							-YYZ	TORONTO, ONT, CANADA	NO	JT8D	
08/03/87	267	1	GULL*						MUC-ZRH	ZURICH, SWITZERLAND	NO	JT8D	15
08/03/87	369	1							XRY	JEREZ DE LA FRONTERA, SPAIN	NO	JT8D	15
08/04/87	206	1							YAM-YYZ	SAULT STE. MARIE, CANADA	NO	JT8D	9A
08/04/87	323	1							WLG-DUD	WELLINGTON, NEW ZEALAND	NO	CFM56	3
08/05/87	145	1	GULL*						-BRS	IBIZA, SPAIN	NO	CFM56	3
08/05/87	146	1							-IBZ	IBIZA, SPAIN	NO	CFM56	3
08/05/87	146	1							-YVR	VANCOUVER, B.C., CANADA	NO	CFM56	3
08/05/87	207	1							XFO	FRANKFURT, GERMANY	NO	JT8D	15
08/05/87	370	1	KITE*						FRA	PATNA, INDIA	NO	JT8D	
08/05/87	643	1							PAT	AMSTERDAM, NETHERLANDS	NO	CFM56	3
08/06/87	626	1	LAPWING*						-AMS	MUNICH, GERMANY	NO	JT8D	
08/06/87	649	1							MUC	VISAKHAPATNAM, INDIA	NO	JT8D	9A
08/07/87	647	1							VTZ	INDIA	NO	JT8D	17A
08/07/87	1067	1							MAA-VTZ	LUCKNOW, INDIA	NO	JT8D	3
08/07/87	1068	1							JAI-BOM	LONG, AUSTRIA	NO	CFM56	3
08/08/87	1066	1							LKO-DEL	TORONTO, ONT, CANADA	NO	JT8D	
08/12/87	597	2							-YYZ	RANCHI, INDIA	NO	JT8D	
08/12/87	693	2							XFO	TANGIER, MOROCCO	NO	JT8D	3
08/13/87	208	2							TNG	BOUKHALF, MOROCCO	NO	JT8D	
08/14/87	645	2							GNTT	CALGARY, ALTA, CANADA	NO	CFM56	3
08/15/87	433	2	FALCON*						YYR-YYC	ORANGE COUNTY, CA	YES	JT8D	17A
08/15/87	659	2	HAWK*						-SNA	HAMBURG, GERMANY	NO	CFM56	3
08/17/87	130	2							XUS	MUGLA, TURKEY	NO	JT8D	
08/17/87	148	2	GULL*						HAM	PRINCE GEORGE, B.C., CANADA	NO	JT8D	15
08/18/87	625	1							YXJ-YXS	JORHAT, INDIA	NO	JT8D	17
08/18/87	670	1	KILLDEER AND STARLING	5N33					LTBS	KELOWNA, B.C., CANADA	NO	JT8D	
08/19/87	131	1							YXJ-YXS	BRUSSELS, BELGIUM	NO	JT8D	
08/19/87	1069	1							JRH-GAO	FORTALEZA, GEARA, BRAZIL	NO	JT8D	9A
08/20/87	209	1							YXJ-YXS	DELHI, INDIA	NO	JT8D	9A
08/22/87	324	1							-YLV	AMHEDABAD, INDIA	NO	JT8D	
08/22/87	371	1							ISG-OKA	AMHEDABAD, INDIA	NO	JT8D	
08/22/87	371	1							-BRU	AMHEDABAD, INDIA	NO	JT8D	
08/22/87	372	1							-FOR	AMHEDABAD, INDIA	NO	JT8D	
08/22/87	373	1							AND	AMHEDABAD, INDIA	NO	JT8D	
08/22/87	650	2							DEL	AMHEDABAD, INDIA	NO	JT8D	
08/22/87	1070	1							AND-DEL	AMHEDABAD, INDIA	NO	JT8D	
08/22/87	1071	1							XFO	AMHEDABAD, INDIA	NO	JT8D	
08/23/87	680	1	COMMON LAPWING	5N1					STV	AMHEDABAD, INDIA	NO	JT8D	
08/23/87	683	1							SVI	AMHEDABAD, INDIA	NO	JT8D	
08/23/87	210	1							SVO	AMHEDABAD, INDIA	NO	JT8D	
08/23/87	370	1							-YEG	MOSCOW-SHEREMETYE, USSR	NO	JT8D	9A
08/23/87	370	1							TYO-HAC	EDMONTON, ALTA., CANADA	NO	JT8D	15
08/26/87	188	1							HAC	HACHIGO, JAPAN	NO	JT8D	
08/26/87	374	1							HAM	HACHIGO, JAPAN	NO	JT8D	
08/26/87	451	1							LEX	HAMBURG, GERMANY	NO	JT8D	
08/27/87	666	1							FAC	LEXINGTON, KY	YES	JT8D	
08/27/87	669	1							NCL	FARO, PORTUGAL	NO	JT8D	
08/28/87	325	1							OPO	NEW CASTLE, ENGLAND	NO	JT8D	
08/28/87										PORTO, PORTUGAL	NO	JT8D	

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

EDATE	EVT#	ENG_POS	DMG_CODE	SEVERITY	POW_LOSS	MAX_VIBE	THROTTLE	IFSD	REMARKS
07/25/87	605	1		9	EPR DEC			NO	MEDIUM BIRD
07/26/87	123	1	A,B,G,H	2	COMPRESSOR	YES		YES	STRONG ODOR IN CABIN
07/26/87	141	2		9	NONE			NO	METAL IN TAILPIPE
07/26/87	266	1		9					
07/26/87	612	2	A,G,H	2					EPR SYMPTOM
07/27/87	321	1	A,H,Q	3					SMALL BIRD, SUBSTANTIAL DAMAGE
07/27/87	635	1		3				NO	STRONG ODOR IN CABIN
07/27/87	1065	1		0				NO	
07/29/87	126	1		9	NONE			NO	
07/29/87	142	1	A,C	3				NO	
07/29/87	368	2		9				NO	
07/29/87	619	1	A,C,G,K	1	EPR DEC		CUTOFF	EPR	LARGE BIRD
07/30/87	127	1		0					FAN CHANGE, ENG SHUTDOWN ON TAXI, COMP DAM
07/30/87	322	2		0					
07/30/87	658	2		9					MEDIUM BIRD
07/31/87	143	1		9	NONE		RETARD	NO	STRONG ODOR IN CABIN
07/31/87	144	1	A,B,D,H	2				NO	
07/31/87	624	1		9					MEDIUM BIRD
08/01/87	600	1		0					SMALL BIRD
08/03/87	128	1		0	COMPRESSOR			NO	#2 ENGINE STALLED AT 80 KTS, PM EVENT
08/03/87	205	2		0					
08/03/87	267	2		9					
08/03/87	369	2		9					TIRE FAILURE
08/04/87	206	1		9					
08/04/87	323	1	A,C	3	NONE	3.5		NO	EVENT OCCURRED IN PM
08/04/87	175	1	A,H	3	NONE	2.2		NO	
08/05/87	146	1	A,H	3	NONE			NO	
08/05/87	207	1		9					
08/05/87	370	1		9					
08/05/87	643	1	A	4	NONE			NO	MEDIUM BIRD
08/06/87	177	2		9					FOUND ON GRD INSPEC, 4 FAN BLADES REPLACED
08/06/87	626	1		9					MEDIUM BIRD
08/07/87	649	1	A,H	3				NO	SMALL BIRD
08/07/87	1067	1		9				NO	FOUND ON GRD INSPEC
08/07/87	1068	1		9				NO	
08/08/87	1067	1	A	4	COMPRESSOR			NO	UNK POWER LOSS, 6 F BLDG UNKNOWN DAMAGE
08/12/87	599	2		9					MEDIUM BIRD
08/12/87	633	2	A,Q	4					SMALL BIRD
08/13/87	208	2		9					
08/14/87	645	2		9					
08/15/87	433	2	A,Q	4					
08/15/87	659	2	A,H	3				NO	
08/17/87	1130	2	A,C,H	3	NONE	HIGH		NO	
08/17/87	145	2		9				NO	
08/18/87	625	2		9					
08/18/87	629	1		9				NO	MOMENTARY EGT INC OF 70 DEG.C, 2-4 BIRDS
08/19/87	131	1		9				NO	
08/19/87	1069	1		9					
08/20/87	209	1		9					
08/20/87	324	1		9					
08/22/87	372	1		9					
08/22/87	633	1		9					
08/22/87	650	1		9				NO	MEDIUM BIRD
08/22/87	1070	1		9				NO	LARGE BIRD
08/22/87	1071	2		9					
08/22/87	373	2		9					
08/23/87	680	2		9					
08/23/87	210	1		9				NO	MEDIUM BIRD
08/25/87	188	1	A,C,G,I	1	NONE				1,1st STAGE F BLADES WERE FRAC, 2nd DAM
08/26/87	374	1		9					PM EVENT, LOUD ENGINE NOISE
08/26/87	451	1		9					
08/26/87	666	1		9					
08/27/87	689	1		9					
08/28/87	325	1		9					

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

DATE	EVT#	ENG_POS	BIRD_NAM	BIRD_SPE	# BIRDS	WT_OZ_1	CTY_PRS	AIRPORT	LOCALE	US_INCID	ENGINE	DASH
08/28/87	607	1	COMMON SNIBE	6N47	*	4.4	FRA-LNZ	YXJ	FT ST JOHN, CANADA	NO	JT8D	
08/29/87	211	1	COMMON SNIBE	6N47	2	3.4	PMR-AKL	FRA	FT ST JOHN, B.C., CANADA	NO	JT8D	15
08/29/87	268	1	SWALLOW*					PMR	FRANKFURT, GERMANY	NO	JT8D	
08/29/87	326	2						PMR	PALMERSTON, NEW ZEALAND	NO	JT8D	
08/29/87	598	1	SWALLOW*		*			LNZ	LONG AUSTRIA	NO	UNK	
08/29/87	620	1	EURASIAN KESTREL	5K27	1	7.4	COK-TRV	LDE	LOURDES, FRANCE	NO	JT8D	17
08/30/87	1012	2			1		-IAH	COK	COCHIN, INDIA	YES	CFM56	3
08/31/87	149	1			1		-KHI	XUS	HOUSTON, TEX	YES	CFM56	3
08/31/87	151	1			1		-PHX	XUS	KARACHI, PAKISTAN	YES	CFM56	3
08/31/87	269	1	GULL*		1		DUS-ZRH	DUS	PHOENIX, ARIZ	YES	JT8D	15
08/31/87	269	1			1			FAMH	DUSSELDORF, GERMANY	NO	JT8D	
08/31/87	327	1	PIGEON*		1			FNC	J.G. STRIDON, S. AFRICA	NO	JT8D	
09/01/87	603	1			1			EROS	FUNCHAL, PORTUGAL	NO	UNK	
09/01/87	604	1			1			WBSB	OOSTENDE, BELGIUM	NO	JT8D	15
09/02/87	328	1	COMMON GULL	14N13	1	15.2	MZG-KHH	KHH	BRUNEI INTL, MALAYSIA	NO	JT8D	9A
09/03/87	375	1						XFO	KAHSIUNG, TAIWAN	NO	CFM56	3
09/04/87	593	2						MEL	ENGLAND	NO	JT8D	
09/04/87	672	2						IBZ	MELBOURNE, AUSTRALIA	NO	JT8D	
09/04/87	672	2						IBZ	IBIZA, SPAIN	NO	JT8D	
09/04/87	696	1			*			YSM	IBIZA, SPAIN	NO	JT8D	
09/04/87	696	1			*			YSM	FT SMITH, CANADA	NO	JT8D	
09/05/87	618	2	OSPREY	2K1	1	56.1	IAD-MCO	NCE	FT SMITH, CANADA	NO	CFM56	3
09/06/87	132	1	GULL*		1		-DUS	XFO	NICE, FRANCE	YES	JT8D	3
09/06/87	132	1			1			LNZ	ORLANDO, FL, GERMANY	NO	CFM56	3
09/07/87	329	1	GULL*		1			PMR	DUSSELDORF, GERMANY	NO	CFM56	3
09/08/87	449	1			1		-BOM	XFO	LONG AUSTRIA	NO	JT8D	15
09/08/87	1073	2	EURASIAN KESTREL	5K27	1	7.2	-MUC	ORY	PALMERSTON, NEW ZEALAND	YES	JT8D	9A
09/09/87	330	1			1			FRA	NORFOLK, VA	NO	JT8D	
09/10/87	434	1	BUZZARD OR FALCON*		1		-YYC	XFO	INDIA	NO	JT8D	3
09/12/87	212	2	HAWK*		1		BEG-MUC	MUC	PARIS-ORY, FRANCE	NO	CFM56	3
09/12/87	270	2			1		YUL-SDF	YUL	MUNICH, GERMANY	NO	CFM56	15
09/13/87	154	1			1		PLZ-JNB	XFO	FRANKFURT, GERMANY	NO	CFM56	3
09/13/87	172	2			1		ORD-BHM	BHM	CALGARY, ALTA., CANADA	NO	CFM56	17A
09/15/87	376	1	SHARP-SHINNED HAWK	3K105	1	6.1	AUS-DAL	AUS	MONTREAL, QUE., CANADA	YES	CFM56	3
09/16/87	377	1	YELLOW-BILLED CUCKOO	2R51	1	2.1		XFO	SOUTH AFRICA, TEX	YES	JT8D	3
09/16/87	377	1			*			PAT	MIDLAND/ODESSA, TEX	YES	CFM56	9A
09/17/87	157	1	KITE*				ZRH-AMS	ZRH	AUSTIN, TEX	NO	JT8D	17
09/17/87	271	1	DOVE*				BHX-FRA	BHX	PATNA, INDIA	NO	CFM56	3
09/17/87	331	2	GULL*		1		-CBR	CBR	ZURICH, SWITZERLAND	NO	JT8D	15
09/18/87	167	1	MASKED PLOVER	5N24	1	11.8	JNB-PLZ	JNB	BIRMINGHAM, ENGLAND	YES	JT8D	3
09/18/87	175	1	SPARROW*		1	4.1	DEL-AGR	AGR	PRUDHOE BAY, ALASKA	NO	JT8D	17A
09/18/87	175	1			1			XUS	CANBERRA, A.C., AUSTRALIA	YES	JT8D	15A
09/20/87	352	1			1			BRU	JOHANNESBURG, SOUTH AFRICA	YES	JT8D	17
09/21/87	621	1	SWIFT*		1			LDE	AGRA, INDIA	NO	JT8D	
09/21/87	621	1			1			IBZ	BRUSSELS, BELGIUM	NO	UNK	
09/22/87	159	2	DOVE*		1		TUL-STL	STL	LOURDES, FRANCE	NO	JT8D	3
09/22/87	169	1	VULTURE*		1		CPT-PLZ	CPT	IBIZA, SPAIN	YES	CFM56	9
09/22/87	226	1	DOVE*		1			CMG	ST. LOUIS, MO	NO	JT8D	
09/22/87	226	1			1		-PAT	XFO	CAPE TOWN, SOUTH AFRICA	NO	JT8D	17
09/22/87	1076	2			1		AUS-HOU	XUS	CORUMBA, BRAZIL	NO	CFM56	3
09/23/87	160	2	DOVE*		1			BWI	D.F. MALAN, S. AFRICA	YES	JT8D	
09/24/87	380	2			1			XFO	HOUSTON, TEX	YES	JT8D	9A
09/24/87	1077	2			1			XFO	BALTIMORE, MD	YES	JT8D	
09/24/87	333	2			1			XFO	INDIA	NO	JT8D	
09/25/87	333	2			1			XFO	JAPAN	NO	JT8D	9A
09/27/87	334	1			1			XFO	AUCKLAND, NEW ZEALAND	NO	JT8D	
09/28/87	170	2			1			XFO	CLEVELAND, O	YES	JT8D	7
09/29/87	173	2			1			XUS	DENVER, COL	YES	JT8D	
09/30/87	204	1			1			XUS	TOWNSVILLE, AUSTRALIA	YES	CFM56	3
10/01/87	189	1			1			XUS	TORONTO, ONT., CANADA	YES	JT8D	
10/01/87	213	1			1			XUS	NPEARSON INTL, CANADA	NO	JT8D	

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

EDATE	EV#	ENG_POS	DWG_CODE	SEVERITY	POW_LOSS	MAX_VIBE	THROTTLE	IFSD	REMARKS
08/28/87	607	1	A,Q	4					SMALL BIRD, MINOR DAMAGE
08/29/87	211	2	A,C	3		YES			SYMPOM - VIBRATION
08/29/87	268	1		3			NO		SMALL BIRD
08/29/87	326	1		3			NO		MEDIUM BIRD
08/29/87	598	1		3		YES	NO		3 F BLD BENT, DROP IN EPR
08/29/87	602	1	A,C	3			NO		FOUND DURING GROUND INSPECTION
08/30/87	101	2	A	3			NO		3 FAN BLADES DAMAGED
08/31/87	140	2	A	4		<2	NO		1 FAN BLADE DAMAGED
08/31/87	151	1	A	4			NO		MEDIUM BIRD
08/31/87	269	1		3			NO		MEDIUM BIRD
08/31/87	327	1		3			NO		SMALL BIRD
09/01/87	327	1		3			NO		SMALL BIRD
09/01/87	603	1		3			NO		SMALL BIRD
09/01/87	604	1		3			NO		SMALL BIRD
09/02/87	328	1	A,H	3			NO		3 FAN BLADES SHINGLED
09/03/87	375	1	A,C	3			NO		MEDIUM BIRD
09/04/87	592	2		3			NO		SMALL BIRD
09/04/87	672	2		3			NO		SMALL BIRD
09/04/87	676	2		3			NO		SMALL BIRD
09/04/87	696	2		3			NO		SMALL BIRD
09/05/87	618	2		3			NO		SMALL BIRD
09/06/87	132	2	A,K	3			NO		SMALL BIRD
09/06/87	152	2		3			NO		LPC DAMAGED
09/06/87	159	2		3			NO		FOUND DURING GROUND INSPECTION
09/07/87	329	2		3			NO		LARGE BIRD
09/08/87	449	2		3			NO		AM EVENT
09/08/87	1073	2		3			NO		ODOR
09/09/87	330	2		3			NO		FOUND DURING GROUND INSPECTION
09/10/87	153	2		3			NO		ODOR
09/10/87	474	2		3			NO		FOUND DURING GROUND INSPECTION
09/12/87	270	2		3			NO		MEDIUM BIRD
09/13/87	154	2		3		2	NO		4 FAN MID ACOUSTICAL PANELS REPLACED
09/14/87	172	1	A,H	3			NO		
09/15/87	155	1	A,C,B,H	3			NO		
09/15/87	376	1	A,C	3			NO		
09/15/87	376	1	A,C	3			NO		
09/16/87	377	1	A,C	3			NO		
09/16/87	1074	1	A,C	3			NO		
09/17/87	157	1	A,C	3			NO		
09/17/87	271	1	A,C	3			NO		
09/18/87	331	1		3			NO		
09/18/87	158	1		3			NO		
09/18/87	159	1		3			NO		
09/18/87	379	1	A,G	3			NO		
09/20/87	1075	1		3			NO		
09/21/87	332	1		3			NO		
09/21/87	621	1		3			NO		
09/22/87	673	2	A,C	3			NO		
09/22/87	159	2	A,C,L	3			NO		
09/22/87	169	2	A,C,L	3			NO		
09/22/87	272	1		3			NO		
09/22/87	668	1	A,H	3			NO		
09/23/87	1076	1	A,B	3			NO		
09/23/87	160	1	A,B	3			NO		
09/23/87	450	1	A,D	3			NO		
09/24/87	380	2	A,G	3			NO		
09/24/87	1077	2	A,D	3			NO		
09/25/87	333	1		3			NO		
09/28/87	334	1	A,C	3			NO		
09/28/87	170	1	A	3			NO		
09/29/87	172	1		3			NO		
09/30/87	204	1		3			NO		
10/01/87	189	1	A,B,H	3		2.5	NO		
10/01/87	213	1		3			NO		
10/01/87	613	1		3			NO		

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

DATE	EVT#	ENG POS	MFG NO	ETIME	SIGN EVT	AIRCRAFT	POF	ALTITUDE	SPEED	FL RULES	LT_CONDS	WEATHER	CREW AC	CREW AL	BIRD SEE
10/02/87	335	1	120	8:55:00	NONE	200	UNKNOWN		10			CLEAR	NONE	NO	ONE
10/04/87	630	1	87	19:10:00	NONE	200	TAKEOFF		75			CLOUDY	NONE		
10/04/87	686	2	87	19:10:00	NONE	UNK	TAKEOFF		140						NO
10/05/87	336	1	120		NONE	200	LANDING		100						
10/05/87	381	1	180		NONE	200	CLIMB								
10/06/87	190	1	874002		NONE	300	TAKEOFF		0						
10/06/87	337	1	120		NONE	200	UNKNOWN		110						
10/06/87	338	1	120		NONE	200	LANDING		0			CLOUDY	NONE	NO	
10/07/87	654	1	87	11:43:00	FRAC	200	UNKNOWN								
10/07/87	382	1	190		TRVS	200	UNKNOWN								
10/08/87	1078	1	1681		MULT	200	UNKNOWN								
10/08/87	1078	1	1681		MULT	200	UNKNOWN		115						YES
10/08/87	383	2	160	10:30:00	NONE	200	TAKEOFF								
10/10/87	448	2	170		NONE	200	TAKEOFF		250						
10/11/87	384	1	87		NONE	300	APPROACH		170			CLEAR	NONE	NO	ONE
10/11/87	601	1	87	16:11:00	NONE	100	TAKEOFF		140				ATB	NO	
10/11/87	616	1	87		NONE	200	PARKED		0						
10/11/87	685	1	87	9:30:00	NONE	200	TAKEOFF		0			CLEAR	NONE		SEVERAL
10/11/87	1079	1	1079	8:08:00	NONE	200	UNKNOWN		0			CLEAR	NONE		ONE
10/11/87	1080	1	1683		NONE	200	TAKEOFF		60						
10/11/87	1081	1	1684	12:00:00	NONE	300	CRUISE								
10/13/87	191	1	874003		NONE	200	UNKNOWN								
10/14/87	214	1	90		NONE	200	UNKNOWN								
10/14/87	385	1	160		NONE	200	UNKNOWN								
10/15/87	385	1	160		NONE	200	UNKNOWN								
10/16/87	192	1	874004		NONE	200	UNKNOWN								
10/17/87	386	1	170		NONE	200	APPROACH		190						
10/17/87	193	1	874005	15:00:00	NONE	300	LANDING		4000			DARK	NONE		
10/19/87	387	1	87	20:15:00	MULT	300	UNKNOWN		0						
10/19/87	661	1	160		NONE	200	UNKNOWN		0						FLOCK
10/20/87	388	1	180		NONE	200	TAKEOFF			VFR				NO	
10/21/87	388	1	874006		NONE	200	UNKNOWN								
10/23/87	194	2	874006		NONE	200	UNKNOWN								
10/24/87	195	2	874007	14:36:00	NONE	200	UNKNOWN		100				ATO		
10/25/87	339	1	70		NONE	200	UNKNOWN								
10/26/87	176	1	70		NONE	200	UNKNOWN								
10/26/87	182	2	74		NONE	200	UNKNOWN								
10/28/87	197	2	74		TRVS	200	UNKNOWN								
10/28/87	435	2	170		NONE	200	UNKNOWN								ONE
10/28/87	435	2	170		NONE	200	UNKNOWN								ONE
10/29/87	594	1	87	7:00:00	NONE	200	TAKEOFF		210			CLOUDY	NONE		ONE
10/29/87	1082	1	1685		NONE	200	TAKEOFF		130			CLEAR	NONE		ONE
10/30/87	273	1	110		NONE	200	TAKEOFF		140						
10/31/87	174	1	110	14:02:00	NONE	200	TAKEOFF		0						FLOCK
10/31/87	673	1	87	18:13:00	NONE	200	TAKEOFF		80			CLOUDY	ATO		SEVERAL
11/02/87	196	1	874008	7:00:00	MULT	200	LANDING		200	VFR				NO	
11/02/87	196	1	874009	7:00:00	MULT	200	APPROACH		125			DAY			
11/02/87	340	1	130		NONE	200	TAKEOFF		200	IFR		DAWN			
11/02/87	340	1	130		NONE	200	TAKEOFF		135	IFR		DAWN			
11/04/87	422	1	130		NONE	200	TAKEOFF		115						FLOCK
11/04/87	390	1	1375	19:50:00	MULT	200	TAKEOFF		100				ATO		FLOCK
11/05/87	390	1	1375		NONE	200	TAKEOFF		130						
11/05/87	728	1	215		NONE	200	CLIMB		5000	VFR		BELOW CLOUDS	NONE		
11/05/87	183	1	70		NONE	200	UNKNOWN		250						
11/07/87	184	1	64	22:15:00	NONE	200	UNKNOWN								
11/08/87	652	1	87	20:10:00	NONE	200	LANDING		275	VFR				YES	ONE
11/08/87	652	1	87	20:10:00	NONE	200	UNKNOWN		120			CLEAR	NONE	NO	ONE
11/08/87	1083	1	1686	8:10:00	NONE	200	TAKEOFF		128			CLEAR	NONE	NO	SEVERAL
11/08/87	1083	1	1687	22:22:00	MULT	200	LANDING		250			CLEAR	NONE	YES	
11/09/87	1084	1	1687		NONE	200	UNKNOWN		130						
11/10/87	185	1	874010	14:45:00	NONE	200	TAKEOFF		90	VFR		BRIGHT	ATO	NO	YES
11/10/87	198	1	70		NONE	200	UNKNOWN		0						
11/10/87	452	1	130		NONE	200	LANDING		0						
11/11/87	341	1	87		NONE	200	UNKNOWN		0						
11/11/87	617	1	87	13:50:00	MULT	200	TAKEOFF		0			CLEAR	OTHER	NO	SEVERAL
11/12/87	175	1	874011	12:40:00	NONE	200	TAKEOFF		75	VFR		CLEAR	ATO		
11/14/87	436	2	182	9:52:00	NONE	200	CLIMB		150	VFR		BRIGHT	DIV		
11/14/87	436	2	182		NONE	200	UNKNOWN								
11/15/87	260	2	874012		NONE	200	UNKNOWN								
11/15/87	274	2	40		NONE	200	UNKNOWN								

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

EDATE	EVT#	ENG_POS	BIRD_NAM	BIRD_SPE	# BIRDS	WT OZ	1	CTY	PRS	AIRPORT	LOCALE	US_INCID	ENGINE	DASH
10/02/87	335	1	LAPWING*	ISG-OXA	XFO	JAPAN	NO	JT8D						
10/04/87	630	1		HKG		HONG KONG, HONG KONG	NO	JT8D						
10/04/87	686	2		EGNV		TEES-SIDE, ENGLAND	NO	UNK						
10/05/87	326	1		MMY		MIYAKO JIMA, JAPAN	NO	JT8D						
10/05/87	381	2		DCA-IAD	PSA	WASHINGTON, DC-DULLES	YES	JT8D						
10/06/87	150	1		ISG-OXA	ISG	PISA, ITALY	NO	CFM56						3
10/06/87	337	1		ISG-OXA	ISG	ISHIGAKI, JAPAN	NO	JT8D						
10/07/87	654	2		MMY-OXA	EICK	JAPAN	NO	JT8D						
10/08/87	382	1			XFO	CORK, IRELAND	NO	JT8D						
10/08/87	1078	1		-BOM	XFO	INDIA	NO	JT8D						
10/08/87	1078	2		-BOM	XFO	INDIA	NO	JT8D						9A
10/10/87	383	1		STR-HAD	STR	STUTTGART, GERMANY	NO	JT8D						9A
10/10/87	448	2		BHM	BHM	BIRMINGHAM, ALA	NO	JT8D						15
10/11/87	384	1		32.	LOW	ROME-DA VINCI, ITALY	YES	JT8D						
10/11/87	616	1		3K180	FCO	WIEN-SCHWEDAU, AUSTRIA	NO	JT8D						15
10/11/87	683	1			LFB	BLAGNAC, FRANCE	NO	CFM56						3
10/11/87	1079	1		AMD-BLR	AMD	GLASGOW, SCOTLAND	NO	JT8D						
10/11/87	1080	1		-AMD	XFO	AMSTERDAM, INDIA	NO	JT8D						
10/13/87	1081	1		BEG	BDQ	VADODARA, INDIA	NO	JT8D						17
10/14/87	191	1		-YUL	XFO	BELGRADE, YUGOSLAVIA	NO	JT8D						17A
10/14/87	214	1		14N13	XFO	MONTREAL, QUE., CANADA	NO	CFM56						3
10/15/87	385	2			XFO	MAKASSAR, INDONESIA	NO	JT8D						
10/15/87	385	2			XFO	FAO, PORTUGAL	NO	JT8D						15
10/16/87	192	1			XFO	NEWCASTLE, ENGLAND	NO	CFM56						3
10/17/87	386	1			XFO	AMSTERDAM, NETHERLANDS	NO	CFM56						15
10/19/87	193	1			XFO	SAN FRANCISCO/OAKLAND, CA	YES	JT8D						3
10/19/87	661	1			XFO	BEIJING, CHINA	YES	JT8D						9A
10/20/87	387	1			XFO	MIAMI, FL	YES	JT8D						3
10/21/87	388	1			XFO	AUSTIN, TEX	YES	JT8D						
10/21/87	388	1			XFO	GERMANY	NO	JT8D						17
10/23/87	194	1			XFO	ROCKHAMPTON, AUSTRALIA	NO	CFM56						3
10/24/87	168	1			XFO	MADRAS, INDIA	NO	CFM56						15
10/24/87	195	1			XFO	CAMPO GRANDE, BRAZIL	NO	CFM56						3
10/25/87	339	1			XFO	MEDFORD, OR	NO	JT8D						9A
10/26/87	176	1			XFO	REUS, SPAIN	YES	JT8D						7
10/28/87	182	1			XFO	MANCHESTER, ENGLAND	NO	CFM56						3
10/28/87	187	1			XFO	MANCHESTER, ENGLAND	NO	CFM56						3
10/28/87	435	1			XFO	INVERCARGILL, NEW ZEALAND	NO	JT8D						15
10/29/87	389	1			XFO	LOS ANGELES, CA	YES	JT8D						15
10/29/87	594	1			XFO	AMSTERDAM, NETHERLANDS	NO	JT8D						15
10/29/87	1082	1			XFO	FRANKFURT, GERMANY	NO	JT8D						
10/30/87	273	1			XFO	VANCOUVER, B.C., CANADA	NO	JT8D						17A
10/31/87	174	1			XFO	HYDERABAD, INDIA	NO	JT8D						
10/31/87	174	1			XFO	INDIA	NO	JT8D						17
10/31/87	675	1			XFO	VANCOUVER, CANADA	NO	JT8D						17
11/02/87	196	1			XFO	HOUSTON, TEX	YES	CFM56						3
11/02/87	196	1			XFO	SAN FRANCISCO/OAKLAND, CA	YES	JT8D						
11/03/87	340	1			XFO	WELLINGTON, NEW ZEALAND	NO	JT8D						17A
11/03/87	422	1			XFO	BLAGNAC, FRANCE	NO	CFM56						3
11/05/87	390	1			XFO	ADDIS ABABA, ETHIOPIA	NO	JT8D						17A
11/05/87	728	1			XFO	BIRMINGHAM, ENGLAND	NO	CFM56						3
11/06/87	183	1			XFO	MUNICH, GERMANY	NO	JT8D						17A
11/07/87	184	1			XFO	BRUSSELS, BELGIUM	NO	CFM56						3
11/08/87	652	1			XFO	DUSSELDORF, GERMANY	NO	JT8D						15
11/08/87	1083	1			XFO		NO	JT8D						
11/09/87	611	1			XFO		NO	JT8D						
11/09/87	1084	1			XFO		NO	JT8D						
11/10/87	185	1			XFO		NO	JT8D						
11/10/87	188	1			XFO		NO	JT8D						
11/11/87	452	1			XFO		NO	JT8D						
11/11/87	341	1			XFO		NO	JT8D						
11/12/87	617	1			XFO		NO	JT8D						
11/12/87	175	1			XFO		NO	JT8D						
11/14/87	199	2			XFO		NO	JT8D						
11/14/87	436	2			XFO		NO	JT8D						
11/14/87	739	2			XFO		NO	JT8D						
11/15/87	290	2			XFO		NO	JT8D						
11/15/87	274	2			XFO		NO	JT8D						

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

EDATE	EVT#	ENG_POS	DMG_CODE	SEVERITY	POW_LOSS	MAX_VIBE	THROTTLE	IFSD	REMARKS
10/02/87	335	1		9					SMALL BIRD
10/04/87	630	1		9					MEDIUM BIRD
10/04/87	686	2		9					SMALL BIRD
10/05/87	356	1		9					
10/05/87	381	1	A,B,H	3	NONE			NO	
10/06/87	337	1		9					
10/06/87	358	1		9					LARGE BIRD
10/07/87	354	1		9					
10/08/87	382	2	A,I	1		HIGH			FOUND ON GRD INSPEC
10/08/87	1078	2		9				NO	FOUND ON GRD INSPEC
10/08/87	1078	2	A,D,G	2				NO	ENG REMOVED FAN AND DOWNSTREAM DAMAGE
10/10/87	383	2	A,B	3	NONE			NO	FOUND DURING GROUND INSPECTION
10/10/87	448	2		2					
10/11/87	384	1		3					SMALL BIRD
10/11/87	601	1		9					LARGE BIRD
10/11/87	616	2		9					
10/11/87	683	2	A,B	3				NO	3 F BLS MINOR LE DAMAGE
10/11/87	1079	2	A,B	3				NO	1 F BLD MINOR LE DAMAGE
10/11/87	1080	2	A,B	3				NO	TIP CORNER LE BENT ON 5 FAN BLADES
10/13/87	1081	2	A,C	3				NO	
10/14/87	2114	2		3				NO	
10/15/87	385	1		9				NO	NIGHT EVENT
10/16/87	192	1		9				NO	3 FAN BLADES DAMAGED
10/17/87	386	1	A,H	3					
10/19/87	103	1	A,Q	3					
10/19/87	661	1	A,C	3					
10/20/87	387	1		3					
10/21/87	388	2	A,B,H	3				NO	FOUND DURING GROUND INSPECTION
10/23/87	194	2	A,C	3				NO	1 FAN BLADE BENT
10/24/87	195	2		3					
10/25/87	339	2		3	COMPRESSOR				
10/26/87	176	2	A,C	3					
10/28/87	182	2	A,C	3					
10/28/87	187	2	A,I	3					2, 1st STAGE F BLADES WERE FRAC, 2nd DAM
10/28/87	435	2		3					NIGHT EVENT
10/29/87	380	1		9				NO	MEDIUM BIRD
10/29/87	504	2		9					
10/30/87	1082	1	A,D,G,K	1	COMPRESSOR			YES	SMALL BIRD
10/31/87	174	1		9					HPC+LPC DAMAGE, 1 COMP BLADE TRVS FRAC
11/01/87	675	1	A,H	3				NO	
11/02/87	196	2		3	NONE	NONE		NO	
11/02/87	196	2		3	NONE			NO	
11/03/87	340	2	A,H	3					
11/04/87	422	2		3				NO	
11/05/87	390	2	A,H	3				NO	
11/05/87	728	2	A,C	3					
11/06/87	183	2	A,D,H,N	3					
11/07/87	184	2		3					
11/08/87	177	2		3					SMALL BIRD
11/08/87	652	2		3				NO	MINOR DAMAGE, LARGE BIRD
11/08/87	1083	2	A,Q	3				YES	FOUND ON GRD INSPEC
11/09/87	611	2		3				NO	TIP PCE BRK (3.5X2.5IN), ACQU LINER TORN
11/09/87	1084	2	A,B,C	3					
11/10/87	185	2	A,D,G	3					
11/10/87	198	2		3					
11/10/87	452	2		3					
11/11/87	341	2		3					
11/11/87	617	2		3					SMALL BIRD
11/12/87	175	2	A,D	3				NO	SURGES CONTINUES AT IDLE HIGH EGT
11/12/87	190	2	A,H	3				NO	ODOR IN CABIN,EVIDENCE OF DEBRIS IN CORE
11/14/87	436	2	A,E,K	3					IMPACT DAMAGE IN LOW + HIGH COMPRESSOR
11/14/87	729	2		3					
11/15/87	200	2	A,H	3		5.0		NO	FOUND DURING GROUND INSPECTION
11/15/87	274	2		3					

[illegible]

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

EDATE	EVT#	ENG_POS	BIRD_NAM	BIRD_SPE	#_BIRDS	WT_OZ	1_CTY	PRS	AIRPORT	LOCALE	US_INCID	ENGINE	DASH
11/16/87	437								HAM	HAMBURG, GERMANY	NO	CFM56	3
11/18/87	391								XFO	HAMBURG, GERMANY	NO	JT8D	15
11/20/87	695								FVCP	PRINCE CHARLES, ZIMBABWE	NO	JT8D	9A
11/22/87	1085								BOM	BOMBAY, INDIA	NO	CFM56	3
11/23/87	201								DAY	DAYTON, OH	YES	JT8D	
11/23/87	205								XFO	OTTAWA, ONT., CANADA	NO	JT8D	
11/23/87	215								SLZ	SAO PAULO, BRAZIL	NO	CFM56	3
11/23/87	215								DAY	DAYTON, OH	YES	CFM56	3
11/23/87	421								DAY	DAYTON, OH	YES	JT8D	15
11/23/87	421								DUS	DUESSELDORF, GERMANY	NO	JT8D	
11/24/87	392								SXR	KARACHI, PAKISTAN	NO	CFM56	3
11/24/87	416								XFO	SAN FRANCISCO/OAKLAND, CA	YES	JT8D	17
11/25/87	393								SFO	TSINGTAI, JAPAN	NO	JT8D	
11/26/87	342								ISS	LIHUE, KAUAI, HAWAII	YES	JT8D	9A
11/26/87	453								LH	LIHUE, KAUAI, HAWAII	YES	JT8D	9A
11/26/87	453								LIPE	BORGIO, PANIGALE, ITALY	NO	JT8D	
11/26/87	453								BOM	BOMBAY, INDIA	NO	JT8D	9A
11/26/87	1087								KOA	KONA, HAWAII	YES	JT8D	9A
12/01/87	1087								XFO	JAPAN	NO	JT8D	
12/02/87	179								GAU	GAUHATI, INDIA	NO	JT8D	
12/02/87	343								YQB	QUEBEC, QUE., CANADA	NO	JT8D	
12/03/87	639								ISG	ISHIGAKI, JAPAN	NO	CFM56	3
12/04/87	344								LHR	LONDON-HEATHROW, ENGLAND	NO	JT8D	17A
12/04/87	588								ACA	ACAPULCO, MEXICO	NO	JT8D	7
12/06/87	217								XFO	ARACAJU, BRAZIL	NO	JT8D	15A
12/08/87	276								AJU	CHANDIGARH-DELHI, INDIA	NO	JT8D	17
12/08/87	651								HJ	HANOVER, GERMANY	NO	CFM56	3
12/11/87	180								XFO	DUBLIN, IRELAND	NO	JT8D	17
12/12/87	394								DUB	CARTHAGE, TUNISIA	NO	CFM56	3
12/13/87	731								DTT	PARIS-ORLY, FRANCE	NO	JT8D	
12/15/87	203								ORY	LASHAM, ENGLAND	NO	JT8D	
12/15/87	678								CLT	CHALOTTE, NC	YES	JT8D	17
12/15/87	732								XFO	CALGARY, ALTA., CANADA	NO	JT8D	15
12/17/87	181								SXR	SRI NAGAR, INDIA	NO	JT8D	17
12/20/87	219								MAA	MADRAS, INDIA	NO	JT8D	
12/24/87	1086								JNB	JAN SMUTS, S. AFRICA	NO	JT8D	15
12/27/87	641								LOS	LAGOS, NIGERIA	NO	JT8D	7A
12/28/87	670								XFO	TAIWAN	NO	JT8D	9A
12/29/87	186								CJB	COIMBATORE, INDIA	NO	JT8D	
01/03/88	723								NCE	NICE, FRANCE	NO	JT8D	9
01/03/88	1088								MDQ	MAR DEL PLATA, ARGENTINA	NO	JT8D	
01/04/88	1234								SMI	SANOS, GREECE	NO	JT8D	
01/04/88	535								COK	COCHIN, INDIA	NO	JT8D	17
01/05/88	1297								DUR	DURBAN, S. AFRICA	NO	JT8D	15
01/07/88	1089								-KIN	KINGSTON, JAMAICA	NO	CFM56	3
01/07/88	595								MEL	MELBOURNE, AUSTRALIA	NO	JT8D	9
01/11/88	283								XFO	MAR DEL PLATA, ARGENTINA	NO	JT8D	17A
01/14/88	734								BLR	BANGALORE, INDIA	NO	JT8D	15
01/15/88	220								-YYC	CALGARY, ALTA., CANADA	NO	JT8D	
01/17/88	1690								HYD	HYDERABAD, INDIA	NO	JT8D	17A
01/19/88	1221								XFO	INDIA	NO	JT8D	9A
01/19/88	1091								CNS	CAIRNS, AUSTRALIA	NO	CFM56	3
01/20/88	1092								CNS	CAIRNS, AUSTRALIA	NO	CFM56	3
01/20/88	1225								SLA	SALTA, ARGENTINA	NO	JT8D	9
01/21/88	725								XFO	BUENOS AIRES, ARGENTINA	NO	JT8D	
01/22/88	725								-AEP	CASABLANCA, MOROCCO	NO	CFM56	3
01/23/88	262								-AMS	AMSTERDAM, NETHERLANDS	NO	CFM56	3
01/25/88	285								GHB	GOVERNORS HARBOR, BAHAMAS	NO	JT8D	
01/25/88	1272								LTN	LUTON, ENGLAND	NO	JT8D	9A
01/27/88	1202								SMF	SACRAMENTO, CA	YES	JT8D	
01/28/88	1233								LH	LIHUE, KAUAI, HAWAII	YES	CFM56	3
01/30/88	386								XUS	ONTARIO, CA	YES	JT8D	
02/01/88	396								-ONT	GOTHENBURG, SWEDEN	NO	JT8D	

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

DATE	EV#	ENG_POS	DMG_CODE	SEVERITY	POW_LOSS	MAX_VIBE	THROTTLE	IFSD	REMARKS
11/16/87	437	A		4					NIGHT EVENT SMALL BIRD
11/18/87	391	A,B A,C		3	NONE	INC.		NO NO	
11/20/87	695			3					
11/22/87	1085			3					
11/23/87	2015	A,D		2					CABIN ODOR REPLACED FOUR PAIRS OF FAN BLADES
11/23/87	421			2					
11/23/87	421			2					
11/24/87	392			2	NONE			NO	
11/24/87	646	A		4	NONE	4.5		NO NO	SMALL BIRD 3 STAGE 1 BOOSTER VANES SHEARED OFF
11/25/87	2035	A,C		3					
11/26/87	453			3					
11/26/87	453			3					
11/26/87	656	A,Q,K A,G,K A,C		4		HIGH		VIBES NO	PM EVENT PM EVENT MEDIUM BIRD MINOR DAMAGE BLD PIECES THRU CORE OIL PRESS DROPPING FOUND ON GROUND INSPC DUE TO ENG ODOR
12/01/87	1087			1	NONE				SMALL BIRD
12/02/87	3435			3					
12/03/87	2716	A,C		3					
12/04/87	3444			3					
12/04/87	688	A,D A,C		3	COMPRESSOR			NO	EPR SYMPTOM, CABIN ODOR, SMALL BIRDS
12/06/87	2176			2					
12/08/87	2777			2					
12/08/87	651	A,Q,H A,D,H A,C,G		3	NONE	HIGH		NO	SUBSTANTIAL FAN BLADE DAMAGE
12/11/87	180			1					
12/12/87	394			2					ENGINE REMOVED
12/13/87	731			2					
12/15/87	203	A,Q A,G A,C,G		3	NONE	NONE		NO	6 FAN BLADES DAMAGED, ENGINE REMOVED
12/17/87	678			2	COMPRESSOR COMPRESSOR	HIGH		VIBES	
12/17/87	181			1					ENGINE REMOVED
12/20/87	278			2				NO	MEDIUM BIRD LARGE BIRD
12/23/87	1086			3					
12/27/87	641			2					
12/28/87	186	A,C A,D A,K		3				NO	4 FAN BLADES BLEND ON WING FAN CHANGED, COMP BLD BENT
01/03/88	1088			3				NO	DECREASE OF .05 IN EPR AND A DROP IN RPM
01/03/88	1234			3					
01/04/88	535			3				NO	
01/04/88	1297			3				NO	
01/05/88	1089			3				NO	
01/07/88	270	A,G		2				NO	
01/07/88	652			2	NONE			NO	ENGINE REMOVED
01/11/88	273	A,C A,C		3				NO	
01/14/88	734			3				NO	
01/15/88	1090			3				NO	
01/17/88	221			3				NO	
01/19/88	1091			3				NO	
01/19/88	1091			3				NO	
01/20/88	1092			3				NO	
01/20/88	1235			3				NO	
01/21/88	735			3				NO	
01/22/88	1093	A,C		3				NO	2 FAN BLADE SETS REPLACED FOUND DURING GROUND INSPECTION
01/25/88	2282	A,C,H A,G		3	NONE NONE	3.0		NO NO	3 MATCHED PAIRS OF FAN BLADES REPLACED 4 F BLD UNK DAMAGE
01/27/88	285			3					
01/27/88	1236	A,C		3	NONE			NO	INGESTION CAUSED ENGINE "HUM" FOUND DURING GROUND INSPECTION
01/30/88	386			3					
01/31/88	396			3					

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

EDATE	EVT#	ENG_POS	MFG	NO	ETIME	SIGN	EVT	AIRCRAFT	POF	ALTITUDE	SPEED	FL	RULES	LT	CONDS	WEATHER	CREW	AC	CREW	AL	BIRD	SEE
02/04/88	1264	1	88	19:40:00	NONE			300	LANDING							OVERCAST	NONE					
02/05/88	1277	1	260		NONE			200	UNKNOWN							OVERCAST	NONE					
02/05/88	1253	2	88	7:18:00	NONE			300	LANDING		0 125					OVERCAST	NONE				ONE	FLOCK
02/06/88	287	1	881005	16:35:00	MULT	BIRDS		200	CLIMB		500 160	VFR		DUSK		CLEAR	NONE					
02/06/88	738	1	260		NONE			200	UNKNOWN								NONE				SEVERAL	
02/06/88	739	1	260		NONE			200	UNKNOWN		0						NONE					
02/07/88	289	2	881607	8:30:00	NONE			300	LANDING								NONE					
02/08/88	290	1	881008		NONE			300	CRUISE								NONE					
02/08/88	740	2	260		NONE			200	UNKNOWN								NONE					
02/08/88	740	2	881006		NONE			300	UNKNOWN		100 128			DARK		RAIN	NONE			NO		
02/09/88	288	1	881009	22:00:00	INV	POW LOSS		300	TAKEOFF								ATB					
02/10/88	291	2	881010		NONE			300	UNKNOWN								NONE					
02/11/88	392	1	1306	18:15:00	NONE			200	LANDING		250 145	VFR					DIV			YES		
02/11/88	280	1	72		NONE			200	TAKEOFF													
02/13/88	358	2	1331	12:20:00	NONE			200	UNKNOWN		4000 210					CLOUDY	NONE			NO		SEVERAL
02/13/88	1093	1	1696		NONE			200	APPROACH								NONE			NO		
02/15/88	1223	1	88	12:30:00	NONE			100	TAKEOFF		0					CLEAR	NONE			NO		
02/16/88	1094	1	1697		NONE			200	TAKEOFF		0 146						NONE			NO		
02/16/88	1094	1	1311		NONE			200	UNKNOWN								NONE			NO		
02/18/88	1095	1	1698	6:55:00	NONE			200	LANDING		0 80					OVERCAST	NONE			NO		SEVERAL
02/18/88	1095	2	76		NONE			200	UNKNOWN								NONE			NO		
02/19/88	281	2	881011	7:10:00	NONE			300	UNKNOWN		0 60	VFR				CLEAR	NONE			YES		ONE
02/19/88	293	1	220		NONE			200	TAKEOFF		0 10						ATO			NO		
02/20/88	741	1	1699	5:55:00	NONE			200	TAXI		0					FOG	NONE					ONE
02/21/88	1096	1	881012	14:40:00	NONE			300	TAKEOFF		0 125					CLOUDY	NONE					
02/24/88	742	1	200		NONE			200	UNKNOWN													
02/24/88	742	1	1309		NONE			200	UNKNOWN													
02/26/88	400	1	881013		NONE			300	CRUISE		200 140						NONE					
02/27/88	293	1	220		NONE			200	LANDING								NONE					
02/28/88	743	1	160		NONE			200	UNKNOWN		0 65						NONE			NO		ONE
03/02/88	1097	1	1700	14:45:00	NONE			200	LANDING								NONE					
03/02/88	1097	1	180		NONE			200	LANDING		100 150						NONE			NO		ONE
03/07/88	1304	1	88	17:30:00	NONE			200	APPROACH		0 100					OVERCAST	NONE					
03/10/88	744	1	196		NONE			200	TAKEOFF								NONE					
03/11/88	282	2	81		NONE			200	TAKEOFF								NONE					
03/13/88	296	1	881014	10:35:00	NONE			300	LANDING		0 110					CLEAR	NONE					SEVERAL
03/13/88	1228	1	88		NONE			200	TAKEOFF								ATO					
03/14/88	297	1	881015		NONE			300	UNKNOWN								NONE					
03/18/88	745	1	220		NONE			200	APPROACH		500 160					CLEAR	OTHER					ONE
03/18/88	1284	1	88	11:05:00	NONE			300	LANDING		100					CLOUDY	NONE					ONE
03/20/88	298	1	881016	11:10:00	NONE			300	APPROACH		1150 120					OVERCAST	NONE			NO		NO
03/21/88	746	1	198	10:40:00	NONE			200	APPROACH		140						NONE			NO		ONE
03/22/88	1098	1	1701	19:37:00	NONE			200	LANDING		0 130						NONE			NO		ONE
03/22/88	1270	1	88	17:55:00	MULT	ENG-BIRDS		200	TAKEOFF		50 145					CLEAR	NONE			NO		
03/22/88	1270	1	88	17:55:00	MULT	ENG-BIRDS		200	TAKEOFF		50 145					CLEAR	NONE			NO		
03/24/88	299	2	881017	18:40:00	NONE			300	CLIMB		300				OVERCAST	CLOUDY	ATB					
03/25/88	403	1	1308		NONE			200	UNKNOWN													
03/25/88	1249	1	88	11:30:00	MULT	ENG-BIRDS		200	CLIMB		700 170					CLEAR	OTHER			NO		FLOCK
03/29/88	1249	1	88	11:30:00	MULT	ENG-BIRDS		200	CLIMB		700 170					CLEAR	OTHER			NO		FLOCK
03/29/88	1259	1	88	20:02:00	MULT	BIRDS		200	TAKEOFF		0 130					CLEAR	NONE			NO		FLOCK
03/30/88	1099	1	1702	8:53:00	NONE			200	LANDING		0 110					CLOUDY	NONE					
04/01/88	404	1	96		NONE			200	TAKEOFF													
04/02/88	346	2	82	3:10:00	NONE			200	TAKEOFF		90	VFR				PARTLY CLOUD				NO		
04/02/88	405	1	102		NONE			200	TAKEOFF								ATO					
04/03/88	462	1	882001		NONE			300	UNKNOWN		0						ATB					
04/03/88	747	1	220	6:10:00	NONE			200	TAKEOFF		50 145					CLEAR						
04/04/88	461	1	882002		NONE			300	TAKEOFF													
04/06/88	406	1	140		NONE			200	UNKNOWN													
04/06/88	407	2	180		NONE			200	LANDING													
04/07/88	748	1	169		NONE			200	TAKEOFF													
04/08/88	408	1	95		NONE			200	UNKNOWN													
04/09/88	463	1	882003	6:10:00	NONE			300	UNKNOWN								ATO					
04/09/88	464	1	882004		NONE			200	UNKNOWN								NONE					
04/10/88	480	2	200		NONE			200	UNKNOWN													
04/12/88	347	1	83		NONE			200	TAKEOFF													
04/12/88	409	1	1307		NONE			200	TAKEOFF		350 170	VFR				CLEAR				NO		NO
04/13/88	411	1	1826		NONE			200	UNKNOWN													
04/13/88	465	1	882005		NONE			300	TAKEOFF		+V1											

EDATE	EVT#	ENG_POS	BIRD_NAM	BIRD_SPE	#_BIRDS	WT_OZ_1	CTY_PRS	AIRPORT	LOCALE	US_INCID	ENGINE	DASH
02/04/88	1564	1	GULL*					SYD	SYDNEY, AUSTRALIA	NO	CFM56	3
02/05/88	1737	2						XFO	TAIWAN	NO	JT8D	7A
02/05/88	1253	1		*				HAI	HANOVER, GERMANY	NO		
02/06/88	287	1						ALC	ALICANTE, SPAIN	NO	CFM56	3
02/06/88	238	1						XFO	TAIWAN	NO	JT8D	9A
02/06/88	720	1						XFO	TAIWAN	NO	JT8D	7A
02/07/88	289	2	KITE*					LHE	LAHORE, PAKISTAN	NO	CFM56	3
02/07/88	290	2	LONG BILLED CURLEW	6N12				XUS	CA	YES	CFM56	7A
02/08/88	740	2						XFO	TAIWAN	YES	JT8D	3
02/08/88	288	2						-PHX	PHOENIX, ARIZONA	YES	CFM56	3
02/10/88	291	2	BARN OWL	1S2				XUS	RIO DE JANEIRO, BRAZIL	YES	CFM56	3
02/11/88	292	2						GIG		NO	CFM56	3
02/11/88	597	1						DUD	DUNEDIN, NEW ZEALAND	NO	JT8D	3
02/11/88	598	1						SRQ	SARASOTA/BRADENTON, FL	YES	JT8D	7
02/15/88	280	1						XFO	ENGLAND, INDIA	NO	JT8D	7
02/15/88	398	2						BHO	BHOPAL, INDIA	NO	JT8D	9A
02/15/88	1093	1	BARN OWL	1S2				BRU	BRUSSELS, BELGIUM	NO	JT8D	9A
02/15/88	1223	1						IXR	RANCHI, INDIA	NO	JT8D	9A
02/16/88	1094	1						XFO	HYDERABAD, INDIA	NO	JT8D	17
02/18/88	399	2	KITE*					HYD		NO	JT8D	17
02/18/88	1095	2						SFO	SAN FRANCISCO/OAKLAND, CA	YES	JT8D	3
02/19/88	281	1	SPARROW*					DAL	DALLAS/FT. WORTH, TEX-LOVE	YES	CFM56	3
02/19/88	293	1	PODAGER NACUNDA*					TUC	TUCUMAN, ARGENTINA	YES	JT8D	9A
02/20/88	741	1						DEL	DELHI, INDIA	NO	JT8D	9A
02/21/88	1096	1	HAWK*					BNE	BRISBANE, AUSTRALIA	NO	CFM56	3
02/24/88	394	1						XFO	CHRISTCHURCH, NEW ZEALAND	NO	JT8D	9
02/24/88	742	1						XFO	GRANCANARIA, CANARY ISLANDS	NO	JT8D	3
02/26/88	400	1	GULL*					XFO	BUENOS AIRES, ARGENTINA	NO	CFM56	9A
02/27/88	295	1	MILVAGO CHIMANGO*					AEP		NO	JT8D	17A
02/28/88	743	1						XFO	VARANASI, INDIA	NO	JT8D	17
03/02/88	401	1						VNS	NEW YORK, NY-NEWARK	YES	JT8D	17
03/02/88	1097	1						EMB	TABATINGA, BRASIL	NO	JT8D	17
03/07/88	402	1	AMERICAN BLACK VULTURE	1K4				TBT	STUTTGART, GERMANY	NO	JT8D	15
03/07/88	1304	1						STR	HILO, HAWAII	YES	JT8D	9A
03/10/88	744	1						ITO	NEW YORK-LA GUARDIA	YES	CFM56	3
03/11/88	282	2						LGA	CARRASCO, URUGUAY	NO	JT8D	3
03/11/88	296	2						MVD	SALEM, NC	YES	CFM56	3
03/13/88	1229	2						-GSO	CATAMARCA, ARGENTINA	NO	JT8D	3
03/14/88	297	2						CTC	MT. ISA, AUSTRALIA	NO	CFM56	3
03/18/88	745	1						ISA	HOUNT, ISA, AUSTRALIA	NO	CFM56	3
03/18/88	1284	1						ISA	GENEVA, SWITZERLAND	NO	CFM56	3
03/20/88	298	1						GVA	BANGALORE, INDIA	NO	JT8D	15
03/21/88	746	1						BLR	DURBAN, S. AFRICA	NO	JT8D	9A
03/22/88	1098	1	SWALLOW*					DUR	DURBAN, S. AFRICA	NO	JT8D	3
03/22/88	1270	2	SWALLOW*					MSY	NEW ORLEANS, LOUISIANA	YES	CFM56	3
03/24/88	299	2						-CHC	CHRISTCHURCH, NEW ZEALAND	NO	JT8D	17
03/25/88	403	2						DMB	HABIB BOUGIBA, TUNISIA	NO	JT8D	9A
03/25/88	1240	2						JNB	HABIB BOUGIBA, TUNISIA	NO	JT8D	9A
03/29/88	1250	2						IXN	JOHANNESBURG, S. AFRICA	NO	CFM56	3
03/29/88	1099	2						MAA	MADRAS, INDIA	NO	JT8D	15
03/30/88	404	2						ITO	HILO, HAWAII	YES	JT8D	17
04/01/88	346	1						YVJ	CALGARY, ALTA. CANADA	NO	JT8D	9A
04/02/88	405	1	PLOVER*					YVJ	LIHUE, KAUAI, HAWAII	YES	JT8D	9A
04/03/88	462	1						LH	VANCOUVER, CANADA	NO	CFM56	3
04/03/88	747	1						-YVR	TUCUMAN, ARGENTINA	NO	CFM56	3
04/03/88	461	2	BLACKCROWNED NIGHT HERON	1124				XFO	SACRAMENTO, CA	YES	CFM56	15
04/04/88	461	2						KIN	KINGSTON, JAMAICA	YES	JT8D	17
04/06/88	406	2						OCX	OKLAHOMA, CITY, OKLA	YES	JT8D	15
04/06/88	407	2						INU	NAURU, REP OF NAURA	NO	JT8D	17
04/08/88	748	1	KITE*					XFO	NIGERIA	NO	JT8D	15
04/08/88	408	1						XFO	GREECE-YUGOSLAVIA	NO	CFM56	3
04/09/88	463	1						XFO	BEIJING, CHINA	NO	CFM56	3
04/09/88	464	2						XFO	KAGOSHIMA, JAPAN	NO	JT8D	9A
04/10/88	489	2	PLOVER*					XFO	KAGOSHIMA, JAPAN	YES	JT8D	9A
04/12/88	347	2						OGG	CHRISTCHURCH, NEW ZEALAND	NO	JT8D	9A
04/12/88	409	2						OGG	FORMOSA, ARGENTINA	NO	JT8D	9A
04/13/88	411	2						-CHC	HAMBURG, GERMANY	NO	CFM56	3
04/13/88	465	2						FMA		NO		

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

EDATE	EVT#	ENG_POS	DMG_CODE	SEVERITY	POW_LOSS	MAX_VIBE	THROTTLE	IFSD	REMARKS
02/04/88	1264			0					4 FAN BLADES CHANGED
02/05/88	1277		A,D	0					3 MATCHED PAIRS OF FAN BLADES REPLACED
02/05/88	1252		A,C,H	0					7 BLADES BLEND ON WING
02/06/88	738		A,D	0					9 FAN BLADES CHANGED
02/06/88	739		A,D	0					FLUCTUATING VIBRATION INDICATION
02/07/88	280		A,I	0	NONE	SOME			4 FAN BLADES BLEND ON WING
02/08/88	740		A,D	0	NONE				HEAVYDAMAGED ACOUSTIC PANELS, LOW OILPRES
02/09/88	288		A,I,M,P	0	YES	HIGH			FOUND DURING GROUND INSPECTION
02/10/88	291			0	NONE				LARGE BIRD
02/11/88	292			0	COMPRESSOR				3 F BLDs UNK DAMAGE
02/15/88	397			0					ODOR
02/15/88	398		A,C	0					LPC+HPC DAMAGE, FOUND ON GROUND INSPCT.
02/15/88	1093		A	0					ODOR IN COCPIT
02/16/88	1094			0					AM EVENT
02/18/88	399			0					SMELL
02/18/88	1095		A,C,K	0					FOUND DURING GROUND INSPECTION
02/19/88	281			0	NONE				8 F BLDs DAMAGED
02/19/88	283			0	COMPRESSOR				IFSD+POW LOSS NOT DUE TO BIRD INGESTION
02/20/88	741			0	NONE				ODOR
02/21/88	1096			0					HEAVY DAMAGE, HPC DAMAGE
02/24/88	742		A,H	0					FOUND DURING GROUND INSPECTION
02/26/88	401		A,B,E,H	0					ODOR, MEDIUM BIRD
02/27/88	293		A,H	0					ODOR AND NOISE, ENG CHANGED
02/28/88	743			0					
03/02/88	401			0					
03/07/88	1097			0					
03/07/88	402			0					
03/10/88	744			0					
03/11/88	282		A,L	0					
03/13/88	296			0					
03/13/88	1228			0					
03/14/88	297			0					
03/18/88	745			0					
03/18/88	1284			0					
03/20/88	298			0					
03/21/88	746		A,G	0					
03/22/88	1098			0					
03/22/88	1270		A,D	0					
03/22/88	1270			0					
03/24/88	299			0					
03/25/88	403			0					
03/29/88	1249			0					
03/29/88	1249			0					
03/30/88	1099			0					
04/01/88	404		A,C	0	COMPRESSOR				
04/02/88	346			0					
04/02/88	405		A,D	0					
04/03/88	462			0					
04/03/88	747		A,D,G,K	0					
04/04/88	461		A,G	0					
04/06/88	406			0					
04/06/88	407			0					
04/07/88	748		A,D,G,K	0					
04/08/88	408		A,H	0					
04/09/88	463			0					
04/09/88	464			0					
04/10/88	464			0					
04/12/88	347			0					
04/12/88	409			0					
04/13/88	411		A	0					
04/13/88	465			0					

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

EDATE	EVT#	ENG_POS	MFG	NO	ETIME	SIGN	EVT	AIRCRAFT	POF	ALTITUDE	SPEED	FL	RULES	LT	COND	WEATHER	CREW	AC	CREW	AL	BIRD	SEE
04/14/88	410	2	1305			NONE		200	UNKNOWN													
04/16/88	1215	1	88		14:30:00	NONE		200	TAKEOFF		0 150					CLOUDY	NONE			ONE		
04/16/88	1265	88	88		18:30:00	NONE		300	TAXI		0 10					CLOUDY	NONE			SEVERAL		
04/18/88	1247	2	88		4:40:00	NONE		300	TAKEOFF		0 128					CLEAR	NONE			SEVERAL		
04/19/88	466	1	882006		15:20:00	NONE		300	TAKEOFF		+V1					CLEAR	ATO	NO		SEVERAL		
04/20/88	1289	1	88			MULT	BIRDS	200	LANDING		75 135					BRIGHT	NONE					
04/21/88	490	2	200			NONE		200	UNKNOWN													
04/22/88	749	1	1293			NONE		200	LANDING		7000 180											
04/24/88	348	1	1293			NONE		200	CLIMB		0											
04/25/88	412	1	1257			NONE		200	TAXI													
04/26/88	349	1	180			NONE		200	UNKNOWN													
04/26/88	413	1	88		6:50:00	NONE		200	CLIMB		0 125											
04/26/88	1246	1	1294			NONE		200	TAKEOFF		0 119					CLEAR	NONE					
04/27/88	351	1	1295			NONE		200	TAKEOFF								ATB					
04/27/88	351	1	882007			NONE		200	TAKEOFF													
04/28/88	467	1	91			NONE		200	TAKEOFF		+V1											
04/28/88	352	1	88		23:10:00	NONE		200	UNKNOWN													
04/28/88	1319	1	88			MULT	BIRDS	200	APPROACH		1000 142					CLOUDY	NONE			SEVERAL		
04/29/88	414	1	180			NONE		200	LANDING													
04/29/88	1100	1	1703		22:38:00	NONE		200	LANDING		30 126					CLEAR	NONE	NO		ONE		
04/29/88	1303	1	88		7:50:00	NONE		200	LANDING		50 130					CLEAR	NONE	NO		ONE		
04/30/88	1293	1	88		21:28:00	NONE		200	TAKEOFF		20 135					CLEAR	OTHER	NO		ONE		
05/01/88	353	1	92			NONE		100	TAKEOFF													
05/01/88	750	1	230		19:22:00	NONE		200	LANDING		0 90					CLOUDY	DIV	NO		SEVERAL		
05/02/88	354	1	86		20:00:00	MULT	FRAC	200	TAKEOFF		0 115											
05/04/88	415	1	103		14:30:00	NONE		200	LANDING		0 90					CLEAR						
05/05/88	468	1	882008			NONE		300	CLIMB													
05/06/88	469	1	882009			NONE		300	UNKNOWN													
05/10/88	1212	1	88			MULT	ENG	100	TAKEOFF		0											
05/11/88	470	1	160			MULT	ENG	100	TAKEOFF		0											
05/11/88	471	1	882010		8:46:00	NONE		200	UNKNOWN													
05/11/88	1251	1	882011		6:30:00	NONE		300	TAKEOFF		0 92					OVERCAST	NONE	NO		SEVERAL		
05/11/88	471	2	88		11:05:00	NONE		200	CLIMB							CLOUDY	NONE			ONE		
05/15/88	120	1	94			NONE		200	APPROACH													
05/17/88	355	1	88			NONE		200	TAKEOFF		500 140					CLEAR	NONE			SEVERAL		
05/19/88	472	1	92			NONE		200	UNKNOWN													
05/20/88	456	1	0			NONE		200	CLIMB													
05/20/88	751	2	202			NONE		200	TAKEOFF		130					RAIN	NONE	NO		NO		
05/21/88	473	1	882013		15:14:00	NONE		200	LANDING		0 80					CLEAR	NONE	NO		ONE		
05/21/88	1256	1	88			NONE		300	LANDING		0 110					PARTLY	NONE	YES		ONE		
05/22/88	1288	1	88		9:00:00	NONE		200	TAKEOFF		0					CLOUD	NONE					
05/22/88	1288	1	88			TRVS	FRAC	200	TAKEOFF		0 110					CLEAR	NONE	NO		SEVERAL		
05/23/88	419	1	88			NONE		200	LANDING								OTHER	NO				
05/23/88	419	2	96			NONE		200	APPROACH		400 140						ATB					
05/23/88	438	1	112			NONE		200	CLIMB		0 70											
05/23/88	1306	1	88		15:25:00	TRVS	FRAC	200	TAKEOFF		0 110											
05/25/88	474	1	882014		9:45:00	MULT	BIRDS	200	TAKEOFF		0 125					CLEAR	NONE			SEVERAL		
05/27/88	1101	1	1704		7:10:00	NONE		200	LANDING		0 120					CLEAR	NONE			SEVERAL		
05/29/88	1260	1	88		14:18:00	NONE		200	TAKEOFF		0 130					OVERCAST	NONE	NO		SEVERAL		
06/01/88	533	1	882015			MULT	BIRDS	300	LANDING		100 150					CLOUDY	NONE			SEVERAL		
06/02/88	533	1	210		12:10:00	NONE		200	LANDING		5 128					CLEAR	NONE			SEVERAL		
06/02/88	577	1	88			MULT	BIRDS	200	APPROACH		0					CLEAR	NONE			YES		
06/04/88	752	1	220			NONE		200	TAKEOFF		0 140					CLEAR	ATO	NO		NO		
06/06/88	754	1	203		15:50:00	NONE		200	TAKEOFF							OVERCAST	NONE	NO		NO		
06/07/88	439	1	107			NONE		200	UNKNOWN		0						ATB					
06/08/88	476	1	882016		11:42:00	NONE		200	TAKEOFF							CLEAR						
06/08/88	492	1	143			NONE		200	LANDING		0 120					RAIN	NONE	NO		SEVERAL		
06/09/88	1221	1	88		11:10:00	MULT	BIRDS	200	UNKNOWN		0 95					CLOUDY	ATO	NO		ONE		
06/10/88	1308	1	88		13:30:00	NONE		200	LANDING													
06/10/88	1261	1	98		13:25:00	NONE		200	TAKEOFF		0 70					CLEAR	NONE			FLOCK		
06/11/88	1102	1	882020		9:05:00	NONE		200	TAKEOFF		500 120					CLEAR	NONE	NO		NO		
06/11/88	1102	1	1705		14:42:00	NONE		200	UNKNOWN		50 150					CLEAR	NONE	NO		SEVERAL		
06/11/88	1273	2	88			NONE		200	TAKEOFF													

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

EDATE	EVT#	ENG_POS	BIRD_NAM	BIRD_SPE	#_BIRDS	WT_OZ	1	CTY_PRS	AIRPORT	LOCALE	US_INCID	ENGINE	DASH
04/14/88	410	2			1			-WLG	XFO	WELLINGTON, NEW ZEALAND	NO	JT8D	
04/16/88	1215	2	PIGEON*		1				ALC	ALICANTE, SPAIN	NO	JT8D	
04/18/88	1265	2	WOOD PIGEON		1				SYD	SYDNEY, AUSTRALIA	NO	CFM56	3
04/19/88	1247	2			1				EBCI	GOSSELIES, BELGIUM	NO	CFM56	3
04/20/88	1289	2			*				REC	RECIFE, BRAZIL	NO	CFM56	3
04/21/88	490	2			1				PER	PERTH, AUSTRALIA	NO	CFM56	17
04/22/88	729	2			1				SHI	SHIMOI, JAPAN	NO	JT8D	9A
04/24/88	348	2			1				MOU	MAR DEL PLATA, ARGENTINA	YES	JT8D	9A
04/25/88	412	2			1				HOU	HOUSTON, TEX	YES	JT8D	17A
04/26/88	413	2			1				IAD-MSY	WASHINGTON, DC - LA	YES	JT8D	9A
04/27/88	1250	1			1				LIT-OKC	LITTLE ROCK, ARK	YES	JT8D	17A
04/28/88	351	1			1				DAL	LONDON, ENGLAND	YES	JT8D	9A
04/29/88	352	1			1				TUL	DALLAS/FT WORTH, TEX-LOVE	YES	JT8D	9A
04/30/88	353	1			1				DEN-BUR	TULSA, OKLA	YES	JT8D	9A
05/01/88	354	1			1				HOU	DENVER, COL	YES	CFM56	9A
05/02/88	415	1			1				ORD-SAB	HOUSTON, TEX	YES	JT8D	9A
05/03/88	468	1			1				ORD-SAB	MADRAS, INDIA	NO	JT8D	15
05/04/88	469	1			1				ORD-SAB	SABA, NETH ANTILLES	NO	JT8D	15
05/05/88	470	1			1				ORD-SAB	DELHI, INDIA	NO	JT8D	15
05/06/88	471	1			1				ORD-SAB	STAVANGER, NORWAY	NO	JT8D	15
05/07/88	472	1			1				ORD-SAB	RABAT, MOROCCO	NO	JT8D	15
05/08/88	473	1			1				ORD-SAB	CAMPO GRANDE, BRAZIL	NO	JT8D	15
05/09/88	474	1			1				ORD-SAB	MIYAKOJIMA, JAPAN	NO	JT8D	15
05/10/88	475	1			1				ORD-SAB	LOURDES/TARBES, FRANCE	NO	JT8D	15
05/11/88	476	1			1				ORD-SAB	WELLINGTON, NEW ZEALAND	NO	JT8D	15
05/12/88	477	1			1				ORD-SAB	DALLAS/FT WORTH, TEX-LOVE	YES	CFM56	3
05/13/88	478	1			1				ORD-SAB	HOUSTON, TEX	YES	CFM56	3
05/14/88	479	1			1				ORD-SAB	CONSTANTINE, ALGERIA	NO	JT8D	15A
05/15/88	480	1			1				ORD-SAB	AMSTERDAM, NETHERLANDS	YES	CFM56	3
05/16/88	481	1			1				ORD-SAB	SAN ANTONIO, TEX	YES	CFM56	3
05/17/88	482	1			1				ORD-SAB	HANBURG, GERMANY	YES	JT8D	15
05/18/88	483	1			1				ORD-SAB	AUSTIN, TEX	YES	JT8D	15
05/19/88	484	1			1				ORD-SAB	BARCELONA, SPAIN	YES	JT8D	7B
05/20/88	485	1			1				ORD-SAB	NY-WASHINGTON, DC	YES	CFM56	17
05/21/88	486	1			1				ORD-SAB	SAO PAULO, BRAZIL	YES	JT8D	15
05/22/88	487	1			1				ORD-SAB	MIDWAY, ILL	YES	JT8D	15
05/23/88	488	1			1				ORD-SAB	PARIS-DE GAULLE, FRANCE	YES	CFM56	3
05/24/88	489	1			1				ORD-SAB	HOUSTON, TEX	YES	JT8D	15
05/25/88	490	1			1				ORD-SAB	ALGIER, ALGERIA	YES	CFM56	15
05/26/88	491	1			1				ORD-SAB	TUNIS, TUNISIA	NO	JT8D	15
05/27/88	492	1			1				ORD-SAB	PATNA, INDIA	NO	JT8D	15
05/28/88	493	1			1				ORD-SAB	ZURICH, SWITZERLAND	NO	JT8D	15
05/29/88	494	1			1				ORD-SAB	DENVER, COL	YES	JT8D	15
05/30/88	495	1			1				ORD-SAB	LUXOR, EGYPT	YES	JT8D	15
05/31/88	496	1			1				ORD-SAB	TESSERA, ITALY	NO	JT8D	15
06/01/88	497	1			1				ORD-SAB	TREVISO, ITALY	NO	CFM56	3
06/02/88	498	1			1				ORD-SAB	HYDERABAD, INDIA	NO	JT8D	17A
06/03/88	499	1			1				ORD-SAB	KEFLAVIK, ICELAND	NO	CFM56	3
06/04/88	500	1			1				ORD-SAB	FRANKFURT, GERMANY	YES	CFM56	3
06/05/88	501	1			1				ORD-SAB	CHICAGO, ILL-OHARE	NO	JT8D	15A
06/06/88	502	1			1				ORD-SAB	NAPLES, ITALY	YES	JT8D	15
06/07/88	503	1			1				ORD-SAB	ROCHESTER, NY	NO	JT8D	15
06/08/88	504	1			1				ORD-SAB	CORDOBA, ARGENTINA	NO	JT8D	15
06/09/88	505	1			1				ORD-SAB	DUESSELDORF, GERMANY	NO	JT8D	15
06/10/88	506	1			1				ORD-SAB	WINNIPEG, CANADA	NO	JT8D	15
06/11/88	507	1			1				ORD-SAB	FRESNO, CA	YES	CFM56	3
06/12/88	508	1			1				ORD-SAB	BIRMINGHAM, ENGLAND	NO	JT8D	9A
06/13/88	509	1			1				ORD-SAB	TRONDHEIM, NORWAY	NO	JT8D	9A
06/14/88	510	1			1				ORD-SAB	REGINA, SASK., CANADA	NO	JT8D	9A
06/15/88	511	1			1				ORD-SAB	CORFU, GREECE	NO	CFM56	3
06/16/88	512	1			1				ORD-SAB	CA	YES	JT8D	9A
06/17/88	513	1			1				ORD-SAB	HYDERABAD, INDIA	NO	JT8D	9A
06/18/88	514	1			1				ORD-SAB	LUTON, ENGLAND	NO	JT8D	9A

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

EDATE	EVT#	ENG_POS	DMG_CODE	SEVERITY	POW_LOSS	MAX_VIBE	THROTTLE	IFSD	REMARKS
04/14/88	110	2		0					
04/16/88	1215	1		0					
04/18/88	1265	2		0					
04/19/88	1247	2		0					
04/20/88	1266	1	A,D	0	NONE			NO	AM EVENT, REPLACED 2 FAN BLADES
04/21/88	1289	2		0					
04/22/88	1290	2		0					
04/22/88	1249	2		0					
04/24/88	348	2		0					
04/25/88	412	2		0					
04/26/88	346	1	A,C	0					ODOR
04/26/88	413	2		0					
04/26/88	1246	1		0					
04/27/88	350	1		0					
04/27/88	351	1		0					ODOR
04/27/88	467	1		0				NO	ODOR
04/28/88	352	1		0	NONE				ODOR
04/28/88	3519	1		0					
04/29/88	414	1		0					
04/29/88	1100	1	A	0				NO	3 F BLDs UNKNOWN DAMAGE
04/29/88	1303	1	A,Q	0					
04/30/88	1293	1		0					
05/01/88	353	1		0					
05/01/88	350	2		0					
05/01/88	750	1	A,I	0				YES	ODOR
05/02/88	354	1		0					
05/04/88	415	2		0	EPR DEC	HIGH			EGT INCREASED TO FULL SCALE
05/05/88	468	2	A,B,H	0	NONE			NO	
05/06/88	469	2		0	NONE			NO	FOUND DURING GROUND INSPECTION
05/10/88	1212	1		0					
05/10/88	1212	1	A,C	0					
05/11/88	470	1		0				NO	
05/11/88	471	1	A,B,H	0		3.5		NO	
05/15/88	1251	1		0					
05/15/88	417	1		0					
05/17/88	1220	1	A,Q	0					
05/17/88	1255	1	A,G	0					
05/17/88	472	1	A,H	0					ODOR
05/19/88	456	1		0				NO	
05/20/88	751	2		0		2.9		NO	PM EVENT, CHANGED 1 FAN BLADE
05/21/88	473	1		0				NO	AM EVENT
05/21/88	1256	1		0					
05/22/88	418	1	A,C,G,I	0					TRVS FRAC 1 INCH FROM TIP
05/22/88	1288	1		0		HIGH			
05/23/88	1314	1		0					
05/23/88	419	1	A,C,G,I	0					ODOR, SMALL BIRD
05/23/88	438	1		0					HPT METALIZATION
05/24/88	1306	1	A,D,H	0				NO	FAN ABRADABLE SLIGHTLY DAMAGED
05/25/88	474	1		0		2.5		NO	
05/27/88	1101	1	A,C,K	0				NO	2 BENT F BLDs, 1 COMP BLD DAMAGED
05/29/88	1260	1		0					
06/01/88	533	2		0					
06/02/88	1227	2		0					
06/04/88	1577	2	A,H	0				VOLUNTARY	AM EVENT, MEDIUM BIRD, 1 BLADE SHINGLED
06/06/88	752	2	A,G	0					
06/06/88	753	2		0				NO	
06/07/88	754	2		0				NO	ODOR
06/08/88	439	1		0					
06/08/88	492	1		0					
06/09/88	1221	1		0					
06/09/88	1308	1	A,Q	0					
06/10/88	420	2	A,C	0		HIGH			UNK DAMAGE TO F BLDs
06/10/88	1261	2		0					ODOR, HUM, 3 FAN BLADES DAMAGED
06/11/88	1576	2	A	0				NO	ENGINE REMOVED FOR HIGH EGT
06/11/88	1103	2		0				NO	
06/11/88	1275	2		0					

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

EDATE	EVT#	ENG_POS	MFG_NO	ETIME	SIGN_EVT	AIRCRAFT	POF	ALTITUDE	SPEED	FL_RULES	LT_CONDS	WEATHER	CREW	AC_CREW	AL	BIRD	SEE
06/12/88	477	2	882017	20:30:00	NONE	300	UNKNOWN	500	155			CLEAR	NONE	NO		SEVERAL	
06/12/88	1219	1	88	7:02:00	MULT BIRDS	100	CLIMB	0	125			CLEAR	NONE			ONE	
06/12/88	1274	88	882018	6:12:00	MULT BIRDS	300	LANDING	0	115			CLOUDY	NONE				
06/13/88	755	260	88		NONE	300	TAKEOFF										
06/13/88	1281	88	88		NONE	300	UNKNOWN										
06/14/88	440	104	88		NONE	300	CLIMB										
06/14/88	479	882019	88		NONE	200	TAKEOFF										
06/14/88	480	882020	88		NONE	300	UNKNOWN										
06/14/88	756	230	88	18:15:00	NONE	300	LANDING	0	70								
06/14/88	1254	88	88	19:31:00	NONE	300	TAKEOFF	0	120			CLEAR	NONE	NO		ONE	
06/15/88	1581	88	882021		NONE	300	TAKEOFF	0	+V1								
06/15/88	757	220	88		NONE	300	OTHER	0	10								
06/16/88	441	111	88		NONE	200	UNKNOWN										
06/16/88	584	88	88	21:05:00	NONE	200	TAKEOFF	0	90			CLEAR	ATB	NO		SEVERAL	
06/16/88	1217	105	88		MULT BIRDS	300	LANDING	0	140				NONE				
06/18/88	442	106	88		MULT BIRDS	200	TAKEOFF						ATB				
06/18/88	758	181	88		NONE	200	TAKEOFF										
06/18/88	1582	88	88	20:28:00	NONE	200	UNKNOWN	0	140			CLOUDY	NONE			ONE	
06/19/88	759	260	88		NONE	200	TAKEOFF	0									
06/20/88	482	108	882022		NONE	300	TAKEOFF						ATO				
06/20/88	483	882023	88	7:20:00	MULT BIRDS	300	LANDING	0	+V1				NONE			FLOCK	
06/20/88	1302	88	882024		MULT BIRDS	300	TAKEOFF	0	115				NONE				
06/21/88	443	113	882025		NONE	200	UNKNOWN										
06/22/88	484	88	882026		NONE	300	UNKNOWN										
06/23/88	1222	88	88	19:30:00	MULT BIRDS	200	UNKNOWN	10	130			OVERCAST	NONE	NO		SEVERAL	
06/24/88	587	109	88		NONE	200	LANDING	0	110				ATO			YES	
06/25/88	587	0	882027	8:30:00	NONE	200	TAKEOFF	0	70			CLEAR	NONE	NO		ONE	
06/26/88	1103	1706	882028	11:00:00	NONE	300	LANDING	0	+V1				ATB				
06/26/88	485	88	882026		NONE	300	TAKEOFF									FLOCK	
06/26/88	1268	88	88	6:15:00	MULT BIRDS	300	UNKNOWN										
06/27/88	591	200	88		NONE	200	LANDING										
06/27/88	761	230	88		NONE	200	UNKNOWN										
06/27/88	1262	88	882027	20:10:00	NONE	300	UNKNOWN	600	135			CLOUDY	NONE	NO		SEVERAL	
06/28/88	487	88	882027	11:12:00	NONE	300	APPROACH	4000	210			CLOUDY	NONE				
06/28/88	488	88	882028	11:00:00	NONE	300	UNKNOWN										
06/28/88	494	200	88		NONE	200	UNKNOWN										
06/28/88	762	207	88	7:13:00	NONE	200	TAKEOFF	0	110			CLEAR	NONE	NO		ONE	
06/29/88	1107	1707	88		NONE	200	UNKNOWN										
06/29/88	1267	88	88	8:00:00	NONE	300	TAKEOFF	50	145			CLEAR	NONE	NO		ONE	
06/29/88	1285	88	88	17:02:00	MULT BIRDS	300	TAKEOFF	50	150			CLOUDY	ATB	NO		SEVERAL	
06/30/88	1105	1708	88		MULT ENG	200	UNKNOWN										
06/30/88	1105	1709	88		MULT ENG	200	UNKNOWN										
06/30/88	1106	1709	88		NONE	200	UNKNOWN										
07/01/88	597	115	883001	20:00:00	NONE	200	LANDING	0	140			OVERCAST	NONE	NO		YES	
07/01/88	536	88	883001	8:44:00	NONE	300	TAKEOFF	10	135			CLOUDY	ATB	NO		SEVERAL	
07/01/88	1107	1710	88	7:30:00	MULT BIRDS	200	CLIMB	20	135				NONE	YES			
07/01/88	1108	1711	88	4:40:00	NONE	200	UNKNOWN										
07/02/88	763	88	88	9:10:00	NONE	200	TAKEOFF	0	100			CLOUDY	ATO	NO		FLOCK	
07/02/88	1109	230	88		NONE	200	UNKNOWN	30	140			OVERCAST		NO		YES	
07/03/88	578	0	88		NONE	300	TAKEOFF	0	120			CLEAR	NONE	NO		FLOCK	
07/05/88	764	260	88	9:39:00	MULT BIRDS	300	UNKNOWN	0	60			CLOUDY	NONE	NO		SEVERAL	
07/07/88	1291	1360	88	15:50:00	NONE	200	LANDING	20	160			CLOUDY	NONE	NO		FLOCK	
07/07/88	1110	1713	88	19:45:00	NONE	200	TAKEOFF	50	160			CLOUDY	NONE	NO		SEVERAL	
07/07/88	1286	208	88	18:43:00	NONE	200	TAKEOFF	50	160			CLOUDY	NONE	NO		SEVERAL	
07/08/88	765	117	88		NONE	200	UNKNOWN										
07/09/88	495	88	88	6:20:00	MULT BIRDS	300	LANDING	50	130			RAIN	NONE			SEVERAL	
07/11/88	1233	200	88		NONE	200	UNKNOWN										
07/12/88	496	1714	88		NONE	200	UNKNOWN										
07/14/88	1111	230	88		NONE	200	UNKNOWN										
07/15/88	766	114	88		NONE	200	UNKNOWN										
07/15/88	498	88	88		NONE	200	UNKNOWN										

EDATE	EVT#	ENG POS	BIRD_NAM	BIRD_SPE	# BIRDS	WT_OZ_1	CTY_PRS	AIRPORT	LOCALE	US_INCID	ENGINE	DASH
06/12/88	477	2						XUS		YES	CFM56	3
06/12/88	1219	1			*			MAD	MADRID, SPAIN	NO	JT8D	
06/12/88	1274	1	GULL*		*		BRS-CWL	LTN	LUTON, ENGLAND	NO	CFM56	3
06/13/88	478	2			*			BRS	BRISTOL, ENGLAND	NO	CFM56	3
06/13/88	755	1	SILVER GULL	14N32				XFO	TAIWAN	NO	JT8D	7A
06/13/88	1281	2						MEL	MELBOURNE, AUSTRALIA	NO	CFM56	3
06/13/88	440	2				12.	YUL-YOW	YUL	MONTREAL, CANADA	NO	JT8D	17
06/14/88	479	1					-FRA	XFO	FRANKFURT, GERMANY	NO	CFM56	3
06/14/88	480	2	HAWK*					BNE	BRISBANE, AUSTRALIA	NO	CFM56	3
06/14/88	480	1			1		OKA-MMY	MNY	MIYAKO JIMA, JAPAN	NO	JT8D	17
06/14/88	736	1						LHR	LONDON, ENGLAND	NO	CFM56	3
06/14/88	1254	1					EMR-ORD	RES	NEW YORK, NY-NEWARK	YES	CFM56	3
06/15/88	481	1			1			RES	RESISTENCIA, ARGENTINA	NO	JT8D	9
06/15/88	757	1	GULL*				-GIG	XFO	RIO DE JANEIRO, BRAZIL	NO	JT8D	9A
06/16/88	441	1						PTY	PANAMA CITY, PANAMA	NO	JT8D	15
06/16/88	584	2						LRX	ARAXOS, GREECE	NO	JT8D	7A
06/16/88	1217	2	BONAPARTE'S GULL	14N38	*		7. YKA-YVR	YKA	KAMLOOPS, CANADA	NO	CFM56	9A
06/18/88	442	2	HERRING GULL	14N14	*	40.	YIT-YHZ	YIT	ST. JOHNS, CANADA	NO	JT8D	9A
06/18/88	443	2			1			XFO	BELGIUM	NO	JT8D	15
06/18/88	758	1			1			LEMH	MENORCA, SPAIN	NO	JT8D	7A
06/18/88	759	1						XFO	TAIWAN	NO	JT8D	7A
06/20/88	444	1						XFO	RIYADH, SAUDI ARABIA	NO	JT8D	3
06/20/88	482	1	PIGEON*		1		RUH-AHB	RUH	PORTSMOUTH, ENGLAND	NO	CFM56	3
06/20/88	483	1	PIGEON*		*		PME-PME	PME	PORTSMOUTH, ENGLAND	NO	CFM56	3
06/20/88	1302	1	GULL*		*		PME-PME	PME	PORTSMOUTH, ENGLAND	NO	JT8D	
06/21/88	445	1						LUSK	SKIAATHOS, GREECE	NO	JT8D	
06/21/88	484	1	CATTLE EGRET	1135	1	16.	-OKC	XUS	OKLAHOMA CITY, OKLA	YES	CFM56	3
06/22/88	760	1			*			XUS	JAPAN	NO	JT8D	17
06/22/88	760	1	GULL*				ISG-OKA	XFO	BODO, NORWAY	NO	JT8D	9A
06/23/88	1222	2						BOO	THUNDER BAY	YES	CFM56	3
06/24/88	446	1					YQT-YAM	YQT	BOSTON, MASS	NO	JT8D	17A
06/25/88	587	1	KITE*				CLE-BOS	BOS	JAMMU, INDIA	NO	CFM56	3
06/25/88	1103	1			*		IXC-IXJ	IXJ	MILAN-MALPENSA, ITALY	NO	CFM56	3
06/26/88	485	1					MXF-FUE	MXF	BREMEN, GERMANY	NO	CFM56	3
06/26/88	486	1	KITE*				-BRE	XFO	LAHORE, PAKISTAN	NO	CFM56	17
06/26/88	488	1						LHE	MAGAYA, JAPAN	NO	JT8D	17
06/26/88	1289	1						NGO	JAPAN	NO	JT8D	3
06/27/88	493	1	COMMON LAPWING	5N1	1	7.75	OKA-MMY	XFO	CORFU, GREECE	NO	CFM56	3
06/27/88	761	1			1		STR-SCN	SCN	SAARBRUECKEN, GERMANY	NO	CFM56	3
06/28/88	1262	1					CTU-SHA	XFO	CHINA	NO	CFM56	3
06/28/88	488	1						GAL	YAMAGATA, HONSHU, JAPAN	NO	JT8D	15
06/28/88	494	1	SPARROW*		1	2.	NUE-HAM	NUE	NUREMBERG, GERMANY	NO	JT8D	9A
06/29/88	1104	1			*		JDH-JAI	XFO	INDIA	NO	CFM56	3
06/29/88	1285	1	SWALLOW*				DEL-JAI	XFO	MILAN, ITALY	NO	CFM56	3
06/30/88	1105	1					DEL-JAI	XFO	MUNICH, GERMANY	NO	JT8D	9A
06/30/88	1105	1						MUC	INDIA	NO	JT8D	17A
06/30/88	1106	1	VULTURE*		1		DUS-VIE	DUS	KATHMANDU, NEPAL	NO	CFM56	3
06/30/88	497	1	GULL*		*	36.	BRU-CDG	CDG	DUESSELDORF, GERMANY	NO	JT8D	9A
07/01/88	536	1	HERRING GULL	14N14				JAI	PARIS-DE GAULLE, FRANCE	NO	CFM56	17
07/01/88	1107	1						XFO	JAIPUR, INDIA	NO	JT8D	17
07/01/88	1108	1	OWL*					MAN	MANCHESTER, ENGLAND	NO	JT8D	17
07/01/88	1280	1					OKA-MMY	XFO	JAPAN	NO	JT8D	17
07/02/88	763	1	PARTRIDGE*		1			CJB	COIMBATORE, INDIA	NO	JT8D	17
07/02/88	1109	1	PIGEON*		1			DFW	DALLAS/FORT WORTH, TEX	YES	CFM56	3
07/03/88	578	1			*			XFO	TAIWAN	NO	CFM56	3
07/05/88	764	1	SWALLOW*				YH-ZUL	YUL	PREVEZA, GREECE	NO	CFM56	17
07/05/88	1291	1			1		LKO-PAT	PAT	MONTREAL, CANADA	NO	JT8D	17A
07/07/88	747	1	KITE*					LTBS	PATNA, INDIA	NO	JT8D	15
07/07/88	1110	1			1	3.	TRN-FRA	TRN	MULGA, TURKEY	NO	JT8D	9A
07/07/88	1286	1	SWALLOW*		*		-BNA	XUS	TURIN, ITALY	YES	JT8D	9A
07/08/88	765	1						ABC	NASHVILLE, TENN	NO	CFM56	3
07/09/88	495	1						TTJ	COOLANGATTA, AUSTRALIA	NO	JT8D	17
07/11/88	1232	1						ABC	TOTTORI, JAPAN	NO	JT8D	9A
07/12/88	766	1						XFO	INDIA	NO	JT8D	17
07/12/88	1111	1						XFO	KELOWNA, CANADA	NO	JT8D	9A
07/15/88	498	1					ISG-OAK	XFO		NO	JT8D	
07/15/88	766	1					YLV-YVR	YLV		NO	JT8D	

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

EDATE	EVT#	ENG POS	DMG CODE	SEVERITY	POW LOSS	MAX VIBE	THROTTLE	IFSD	REMARKS
06/12/88	477	2		0	NONE			NO	FOUND DURING GROUND INSPECTION
06/12/88	1219	1		0					
06/12/88	1274	1		3	NONE			NO	1 FAN BLADE BLEND ON WING
06/13/88	478	2	A,B	3					
06/13/88	755	1	A,C	0					
06/13/88	1281	2		0					
06/13/88	440	2		3	NONE			NO	SYMPTOM-EGT
06/14/88	479	1	A,C	0	NONE			NO	FOUND DURING GROUND INSPECTION
06/14/88	480	2		0					
06/14/88	756	1		0					
06/14/88	1254	1	A,C	0	NONE			NO	
06/15/88	781	1		0					
06/15/88	757	1		0					
06/16/88	441	1	A,K	0					2 1ST STG COMPRESSOR BLADES DAMAGED
06/16/88	584	2		1					
06/16/88	1217	2	A,C,G,I	2	COMPRESSOR	HIGH		PARAMETERS	METAL IN TAILPIPE, SYMPTOM-EGT, 2 BLADES
06/18/88	442	2	A,D,N	2					4 FAN BLADES DAMAGED, ODOR
06/18/88	743	1	A,G	2					
06/18/88	758	1	A,K,q	2	COMPRESSOR			VOLUNTARY	F BLDS, 2ND + 6TH STG COMP UNK DAMAGE
06/18/88	1282	2	A,D	1	COMPRESSOR			NO	5 FAN BLADES BLEND ON WING
06/19/88	444	1		2					
06/20/88	482	1	A,H	1	NONE			NO	M/S SHROUD DISTORTED, CSD COOLER CLOGGED
06/20/88	483	1	A,H	1	NONE	SOME		NO	
06/20/88	1302	2		0					
06/21/88	445	1	A	0	NONE			NO	ODOR
06/22/88	760	1		4				NO	FOUND DURING GROUND INSPECTION
06/23/88	1222	2	A,D	2					BENT F BLDS # UNK
06/23/88	1242	2	A,C	0	COMPRESSOR				ODOR IN CABIN
06/23/88	587	1		2					
06/25/88	1103	1		3		2.6		NO	REPLACED 5 PAIR OF FAN BLADES
06/26/88	485	1	A,B	4	NONE			NO	REPLACED 3 PAIR OF FAN BLADES
06/26/88	486	1	A	0	NONE				
06/26/88	1262	2		0					
06/27/88	761	1		0					
06/27/88	1262	1		0					
06/28/88	487	1	A,H	1	NONE			NO	ENGINE NOISE
06/28/88	488	1	A,K	3	NONE			NO	FOUND DURING GROUND INSPECTION, UER
06/28/88	489	1		0					
06/28/88	742	2		1	NONE			NO	FOUND ON GRD INSP
06/29/88	1104	2		0					
06/29/88	1267	1	A,C	2				NO	FOUND ON GRD INSP
06/29/88	1285	1		0				NO	FOUND ON GRD INSP
06/30/88	1105	1		0				NO	4 F BLDS SHINGLED
06/30/88	1106	1	A,H	3		HIGH		NO	2 BLDS BROKEN TANGS SEVERE COMP BLD DAM
07/01/88	437	2	A,D,K,N	1		3.0		NO	REPLACED 6 PAIR OF FAN BLADES
07/01/88	536	1	A,H	1				NO	2 F BLDS UNK DAMAGE
07/01/88	1107	2	A	4				NO	FBLDS DAMAGED, 7TH+8TH STG BLD DAMAGE
07/01/88	1108	1	A,C,G,K	1					
07/02/88	1280	1		0				NO	
07/02/88	1281	1		0					
07/02/88	1109	1		0				NO	MEDIUM BIRD
07/03/88	578	1	A,D	2					4 FAN BLADES BLEND ON WING
07/05/88	764	1		0					
07/05/88	1291	2		0				NO	2 F BLDS SHINGLED
07/07/88	447	1	A,H	0				NO	
07/07/88	1110	1		0					
07/07/88	1286	1		0					
07/08/88	765	1		0				NO	ODOR
07/09/88	495	1		0					
07/11/88	1233	2		0					
07/12/88	496	1	A,H	0				NO	FOUND ON GRD INSP
07/12/88	1111	1		0					
07/14/88	766	1		0					
07/15/88	498	2		0					

EDATE	EVT#	ENG_POS	MFG_NO	ETIME	SIGN_EVT	AIRCRAFT	POF	ALTITUDE	SPEED	FL_RULES	LT_CONDS	WEATHER	CREW_AC	CREW_AL	BIRD_SEE
07/15/88	499	2	118		NONE	300	UNKNOWN					CLEAR			
07/15/88	537	1	883002	19:48:00	NONE	200	LANDING		+V1	VFR		OVERCAST	NONE		NO FLOCK
07/15/88	767	1	209		NONE	200	TAKEOFF		0 120			OVERCAST	NONE	NO	ONE
07/15/88	1112	1	1715		NONE	200	TAKEOFF		0 80			OVERCAST	ATO		ONE
07/15/88	1252	2	88	11:50:00	NONE	200	LANDING		0 100			OVERCAST	NONE		ONE
07/15/88	1322	2	883003		NONE	200	LANDING		0			CLOUDY	NONE		NO
07/16/88	338	2	260		NONE	200	UNKNOWN								
07/16/88	1245	2	88	9:40:00	MULT BIRDS	200	LANDING		30 125			CLEAR	NONE	NO	SEVERAL
07/16/88	1310	2	88	20:15:00	NONE	200	LANDING		0 120			CLEAR	NONE	NO	ONE
07/18/88	501	1	132		NONE	200	LANDING		50 120	DAY		CLEAR	NONE	NO	SEVERAL
07/18/88	502	1	138	15:45:00	NONE	200	TAKEOFF		0			CLEAR	NONE	NO	ONE
07/19/88	503	2	139	19:30:00	NONE	200	TAKEOFF		0			CLEAR	NONE	NO	YES
07/19/88	1317	2	200		NONE	200	UNKNOWN								
07/19/88	1320	2	88	5:04:00	NONE	200	TAKEOFF		0 120			CLEAR	NONE		ONE
07/20/88	539	2	883004		NONE	200	TAKEOFF								
07/20/88	540	1	885005	11:25:00	NONE	300	CLIMB		100			CLEAR	NONE	NO	ONE
07/20/88	1307	1	88		NONE	300	LANDING						ATB		NO
07/21/88	504	1	200		NONE	200	TAKEOFF					CLEAR	NONE	NO	SEVERAL
07/21/88	505	1	88		NONE	200	UNKNOWN								
07/23/88	541	1	119		NONE	200	UNKNOWN								
07/23/88	542	1	883006		NONE	300	CLIMB								
07/23/88	543	1	260		NONE	300	UNKNOWN								
07/23/88	1229	2	88	6:00:00	NONE	200	TAKEOFF		0 80			RAIN	NONE	NO	NO
07/24/88	543	2	883008	8:15:00	NONE	300	TAKEOFF						NONE	NO	SEVERAL
07/25/88	1224	2	132	7:02:00	INV POW LOSS	200	TAKEOFF		0 120			CLOUDY	ATB	NO	SEVERAL
07/26/88	544	2	88	22:10:00	MULT BIRDS	200	TAKEOFF		70 140			CLEAR	ATB	NO	NO
07/26/88	545	2	883009	15:20:00	NONE	300	TAKEOFF		+V1			CLEAR	ATO	NO	SEVERAL
07/26/88	1243	2	883010	21:00:00	NONE	200	TAKEOFF		0 140			CLEAR	ATO	NO	SEVERAL
07/26/88	1245	2	88	17:40:00	NONE	200	CLIMB		3500 250			CLEAR	NONE		SEVERAL
07/27/88	508	2	137		NONE	200	LANDING		10 130			CLEAR	NONE		SEVERAL
07/27/88	509	2	88		NONE	200	TAKEOFF		0 100			CLEAR	NONE	NO	ONE
07/28/88	1235	2	88	11:21:00	NONE	200	APPROACH		1500 180	VFR		CLOUDY	ATO	NO	ONE
07/28/88	1236	2	88	8:17:00	NONE	200	TAKEOFF		0 40			CLEAR	NONE	NO	SEVERAL
07/29/88	546	2	883011	15:00:00	NONE	300	LANDING					CLEAR	NONE	NO	ONE
07/30/88	510	2	142		NONE	200	APPROACH								
07/30/88	1315	2	88		NONE	200	LANDING								
07/31/88	1312	2	88	13:00:00	NONE	300	APPROACH		50 140			CLEAR	NONE	NO	SEVERAL
08/01/88	1239	2	1716	14:00:00	NONE	200	LANDING		0 90			CLEAR	NONE	NO	SEVERAL
08/01/88	1240	2	88	1:55:00	NONE	200	TAKEOFF		0 145			CLEAR	NONE	NO	SEVERAL
08/05/88	547	2	883012		NONE	300	APPROACH								
08/05/88	1174	2	883013	17:55:00	NONE	200	UNKNOWN		5 130			OVERCAST	NONE	NO	ONE
08/05/88	1177	2	1603		NONE	200	LANDING		0			CLEAR	NONE	NO	ONE
08/07/88	512	2	116		NONE	200	TAKEOFF					CLEAR	NONE	NO	ONE
08/07/88	513	2	151	9:46:00	NONE	200	TAKEOFF		0 110	VFR		CLEAR	DIV	NO	ONE
08/07/88	770	2	1718	16:03:00	NONE	200	UNKNOWN		225 136			CLEAR	NONE	NO	ONE
08/07/88	1006	2	88		NONE	200	TAKEOFF								
08/09/88	1248	2	230		NONE	200	TAKEOFF								
08/09/88	1249	2	88	14:48:00	NONE	300	UNKNOWN		0 122			CLOUDY	NONE		SEVERAL
08/09/88	1250	2	88	9:48:00	MULT BIRDS	200	LANDING		0 130			RAIN	NONE	NO	SEVERAL
08/10/88	1251	2	88		NONE	200	TAKEOFF		0 50			CLEAR	OTHER	NO	SEVERAL
08/10/88	1252	2	125		NONE	200	LANDING					OVERCAST	NONE	NO	SEVERAL
08/11/88	1007	2	1719		NONE	200	UNKNOWN								
08/11/88	516	2	126		NONE	200	UNKNOWN								
08/12/88	517	2	134		NONE	200	TAKEOFF								
08/12/88	518	2	134		NONE	200	TAKEOFF								
08/13/88	771	2	193	7:13:00	NONE	200	TAKEOFF		0 120	DAY		PARTLY CLOUD	ATB	NO	ONE
08/13/88	772	2	230	8:50:00	NONE	200	TAKEOFF		0 123	VFR		CLEAR	NONE	NO	ONE

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

EDATE	EVT#	ENG POS	BIRD_NAM	BIRD_SPE	# BIRDS	WT_OZ_1	CTY_PRS	AIRPORT	LOCALE	US_INCID	ENGINE	DASH
07/15/88	499	2			1		BRR-ANC	XFO	SCOTLAND-ALASKA	NO	JT8D	17A
07/15/88	537	1	EURASIAN KESTREL	5K27	1			LJU	LJUBLJANA, YUGOSLAVIA	NO	CFM56	3
07/15/88	767	1			1	8.	MAD-STR	STR	STUTTGART, GERMANY	NO	JT8D	15
07/15/88	1112	1	HAWK*		1		GWL-BHO	GWL	GUALIAR, INDIA	NO	JT8D	17
07/15/88	1252	2	BLACK-HEADED GULL	14N36	1	8.8		HAM	HAMBURG, GERMANY	NO	JT8D	3
07/16/88	538	2			1			BRU	BRUSSELS, BELGIUM	NO	CFM56	7A
07/16/88	768	2			*			XFO	TAIWAN	NO	JT8D	3
07/16/88	1245	2	PIGEON*					OSL	OSLO, NORWAY	NO	JT8D	7A
07/16/88	1310	2	GULL*					AES	ALESUND, NORWAY	NO	JT8D	15
07/18/88	300	2	BLACK BIRD*		1	40.	BRU-LHR	BRU	PHILADELPHIA, PA	YES	JT8D	15A
07/18/88	501	2	EURASIAN KESTREL	5K27	1	8.	CAG-BRU	CAG	BRUSSELS, BELGIUM	NO	JT8D	15
07/19/88	502	2			1			SDJ	CAGLIARI, ITALY	NO	JT8D	9A
07/19/88	503	2	EUROPEAN SPARROW HAWK	3K103	1	6.7		BRU	SENDAI, JAPAN	NO	JT8D	3
07/19/88	1317	2			1			TUL	BRUSSELS, BELGIUM	YES	JT8D	3
07/19/88	1320	2			1			BEG	TULSA, OK	NO	CFM56	3
07/20/88	339	2			1	19.	CDG-AMS	AMS	BEUGRADE, YUGOSLAVIA	NO	CFM56	3
07/20/88	540	1	CARRION CROW	22Z94	1				AMSTERDAM, NETHERLANDS	NO	JT8D	9A
07/20/88	1307	1			1				UNKNOWN	NO	JT8D	3
07/21/88	504	1			1			KOJ	KOGOSHIMA, JAPAN	NO	CFM56	3
07/21/88	588	1	CHIMNEY SWIFT	1U33	1		-DEN	XUS	COL	NO	CFM56	3
07/21/88	595	1			1		YVR-YLW	YLR	KELOWNA, CANADA	YES	JT8D	9A
07/21/88	541	1			1	1.		SAN	SAN DIEGO, CA	YES	CFM56	3
07/23/88	542	1			1			XUS	TAIWAN	NO	JT8D	7A
07/23/88	769	1			1			CDG	PARIS, FRANCE	NO	CFM56	3
07/23/88	1229	2	GULL*	3K161	1	80.	BRU-CDG	BRU	BRUSSELS, BELGIUM	NO	JT8D	3
07/24/88	543	1	GREY EAGLE-BUZZARD		1			PVH	PORTO VELHO, BRAZIL	NO	JT8D	7
07/25/88	506	1			1			PLZ	BRUSSELS, BELGIUM	NO	JT8D	3
07/25/88	1224	1			1			LHE	PORT ELIZABETH, S. AFRICA	NO	CFM56	3
07/26/88	507	1	CROW*		1			FAO	LAHORE, PAKISTAN	NO	JT8D	3
07/26/88	544	1			1			LTN	CARDIFF, WALES	NO	CFM56	3
07/26/88	545	1			1			FAO	FARO, PORTUGAL	NO	JT8D	7
07/26/88	1243	1			1			GRU	LUTON, ENGLAND	NO	JT8D	3
07/27/88	508	1			1			BNJ	CAMPO, GRANDE, BRAZIL	YES	JT8D	17A
07/27/88	586	1	BURROWING OWL	2S102	1			PAE	NASHVILLE, TENN	NO	JT8D	3
07/28/88	509	1	HERRING GULL	14N14	1	5.	YVR	NCE	FAROE ISLANDS, DENMARK	NO	JT8D	3
07/28/88	1235	1	HAWK*		1	40.		AMS	NICE, FRANCE	NO	CFM56	9A
07/28/88	1246	1	COMMON SWIFT	1U55	1	2.	YSM-YHY	YHY	BONN, GERMANY	NO	JT8D	9A
07/29/88	510	1			1			FRA	AMSTERDAM, NETHERLANDS	NO	JT8D	3
07/30/88	511	2	GULL*		1		DEL-AGR	AGR	HAY RIVER, CANADA	NO	JT8D	9A
07/31/88	1315	1	SPARROW*		1			LIS	VANCOUVER, CANADA	NO	CFM56	3
08/01/88	1317	1	BARN OWL	1S2	1	11.25		BRU	FRANKFURT, GERMANY	NO	JT8D	17
08/01/88	1267	1			1			XFO	WIEN-SCHWÉCHAT, OSTERREICH	NO	CFM56	3
08/05/88	547	1			1			COK	AGRA, INDIA	NO	JT8D	17
08/05/88	548	1			1			XFO	BRUSSELS, BELGIUM	NO	CFM56	3
08/05/88	1188	2	GULL*		1			DUR	FRANCE	NO	JT8D	9A
08/07/88	511	2	BUZZARD*		1	4.	DUR-PLZ	PLZ	COCHIN, INDIA	NO	JT8D	17A
08/07/88	513	2			1	32.	YXJ-YXJ	YXJ	ARGENTINA	NO	JT8D	9A
08/07/88	770	2			1		DUS-LIN	DUS	DURBAN, S. AFRICA	NO	JT8D	17A
08/07/88	1006	2			1			PLZ	FT. ST. JOHN, CANADA	NO	JT8D	15
08/07/88	1248	2			1			XFO	DUESSELDORF, GERMANY	NO	JT8D	17
08/09/88	514	2	HOUSE MARTIN	18Z69	1	0.5	YMG-YVR	YMG	AGRA, INDIA	NO	JT8D	17A
08/09/88	540	2			1			XFO	PORT ELIZABETH, S AFRICA	NO	JT8D	17
08/09/88	1213	2			1			BFS	WINNEPEG, CANADA	NO	JT8D	17
08/09/88	1214	1			1			BFS	JAPAN	NO	CFM56	3
08/09/88	1230	1	VULTURE*		1			YMM	BEFEST, N. IRELAND	NO	JT8D	9A
08/10/88	515	1			1			YMM	PARIS, FRANCE	NO	JT8D	17A
08/10/88	1007	1			1			YMM	FORT MCMURRAY, CANADA	NO	JT8D	9A
08/11/88	516	1	LITTLE RINGED PLOVER	5N31	1	1.		XFO	CHANDIGARH, INDIA	NO	JT8D	17A
08/12/88	517	1			1	4.	SYR-IAO	IAO	CHINA	NO	JT8D	9A
08/12/88	518	1			1			SYR	HOUSTON, TEX	YES	JT8D	17A
08/13/88	585	1	MOORING DOVE	2P105	1		BNF-KIM	BNF	SYRACUSE, NY	YES	JT8D	17A
08/13/88	771	1			1			MMY	BLOENFONTEIN, S. AFRICA	NO	JT8D	17
08/13/88	772	1			1				MIYAKO JIMA, JAPAN	NO	JT8D	17

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

DATE	EVT#	ENG_POS	DMG_CODE	SEVERITY	POW_LOSS	MAX_VIBE	THROTTLE	IFSD	REMARKS
07/15/88	499	2		9	NONE			NO	FOUND DURING GROUND INSPECTION
07/15/88	537	1		9				NO	AM EVENT
07/15/88	767	1		9				NO	
07/15/88	1112	1		9				NO	
07/15/88	1252	1		9				NO	
07/16/88	1533	2	A,D	9	NONE			NO	12 FAN BLADES REPLACED
07/16/88	1688	2		9					
07/16/88	1245	2		9					
07/16/88	1310	2	A,D	9		HIGH			INVESTIGATED, AM EVENT
07/18/88	500	2	A,C	9					
07/18/88	501	2	A,C,G	9					
07/18/88	502	2		9		HIGH		NO	CREW NOTED NOISE AND VIBES AT TO
07/19/88	503	2		9					
07/19/88	505	2		9					
07/19/88	1317	2	A,H	9				NO	MOMENTARY 10% DEC. IN FAN SPEED
07/19/88	1320	2		9	N1 DECREASE			NO	4 F BLADES HAD LE TIP CURL
07/20/88	539	2	A,B	9	NONE			NO	
07/20/88	540	2		9					
07/20/88	1307	1		9					
07/21/88	1308	1		9					
07/21/88	1309	1		9					
07/21/88	1310	1		9					
07/23/88	505	1	A,H	9	NONE	3.0		NO	FOUND ON GRD INSPECTION, BLOOD ON COWL
07/23/88	541	1		9	NONE			NO	3 F BLADES SHINGLED, 1 BLADE REPLACED
07/23/88	542	1	A,D	9				NO	FOUND DURING LTR CHECK
07/23/88	726	1	A,Q	9				NO	5 FAN BLADES BLENDING ON WING
07/23/88	1323	1	A,H	9				NO	1 F BLD UNK DAM
07/24/88	543	1	A,H,I,K	9	NONE	3.0		YES	REPLACED 3 PAIR OF FAN BLADES
07/25/88	506	1		9	COMPRESSOR			YES	1 F BLADE FRACTURED BELOW MSS
07/25/88	1324	1		9	COMPRESSOR			YES	MOMENTARY THRUST LOSS FOR APPROX. 10 SEC
07/26/88	507	1	A,H	9	NONE	HIGH		NO	
07/26/88	544	1	A,B,H	9	NONE	5.0		NO	
07/26/88	545	1		9	NONE	NONE		NO	
07/26/88	1327	1		9					
07/27/88	508	1		9					
07/27/88	1309	1		9					
07/27/88	1310	1		9					
07/28/88	509	1	A,C,H,K	9					ODOR IN CABIN, SMALL BIRD
07/28/88	535	1	A,Q	9					SMALL BIRD
07/28/88	1266	1		9					HPC DAMAGED AND REMOVED
07/28/88	1266	1		9					4 F BLD UNK DAM
07/29/88	546	1	A	9	NONE			NO	BSI FOUND HPC STG6 BLD WITH A NICK
07/30/88	511	1		9					SMALL BIRD
07/30/88	1311	1		9					
07/31/88	1312	1		9					
08/01/88	1113	1		9				NO	
08/01/88	1269	1	A,Q	9				NO	
08/05/88	547	1	A,H	9		2.0		NO	6 FAN BLADES REPLACED
08/05/88	548	1		9	NONE			NO	ODOR
08/05/88	1114	1	A	9	NONE			NO	4 F BLD UNK DAMAGE
08/05/88	1188	1		9					
08/07/88	512	1		9					
08/07/88	513	1		9					
08/07/88	770	1	A,H	9				NO	MOMENTARY SMALL DROP IN EPR
08/07/88	1006	1		9				NO	2 F BLD SHINGLED
08/07/88	1048	1		9					ODOR IN CABIN, SMALL BIRD
08/09/88	1314	1		9					
08/09/88	1315	1		9					
08/09/88	1316	1		9					
08/09/88	1317	1		9					
08/10/88	1318	1	A,H	9				NO	4 F BLD SHINGLED
08/10/88	1319	1		9					FOUND DURING GROUND INSPECTION
08/11/88	1320	1		9					FOUND DURING GROUND INSPECTION
08/12/88	518	1		9					
08/13/88	519	1		9					
08/13/88	571	1		9					
08/13/88	772	1		9					SMALL BIRD

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

EDATE	EVT#	ENG_POS	MFG_NO	ETIME	SIGN_EVT	AIRCRAFT	POF	ALTITUDE	SPEED	FL_RULES	LT_CONDS	WEATHER	CREW_AC	CREW_AL	BIRD_SEE
08/13/88	1008	2	1720	19:14:00	NONE	200	LANDING						NONE		
08/14/88	549	2	883014	19:27:00	NONE	300	UNKNOWN						NONE		
08/14/88	773	1	212	18:27:00	NONE	200	LANDING		0 110	VFR		CLEAR	NONE	NO	ONE
08/15/88	519	1	128		NONE	200	UNKNOWN						NONE		
08/15/88	520	1	129		NONE	200	UNKNOWN						NONE		
08/15/88	550	1	883015	21:45:00	MULT BIRDS	300	UNKNOWN						ATB		
08/15/88	581	2	0		NONE	200	CRUISE								
08/15/88	774	2	260		NONE	200	UNKNOWN						NONE		
08/15/88	1009	2	1721		NONE	200	UNKNOWN		50 150				ATB		
08/16/88	521	2	154	15:45:00	MULT BIRDS	200	UNKNOWN		0 145			BRIGHT	ATB		
08/16/88	522	2	883016		NONE	200	TAKEOFF					CLOUDY	NONE		FLOCK
08/16/88	523	2	883017		NONE	300	TAKEOFF						NONE		NO
08/17/88	553	2	883018		NONE	300	UNKNOWN						NONE		ONE
08/18/88	1358	1	88		NONE	100	UNKNOWN		0 140			CLEAR	ATB	YES	
08/19/88	522	1	135		NONE	200	TAKEOFF		0				ATO		
08/19/88	554	1	883019	15:14:00	NONE	300	CLIMB		10 150			RAIN	NONE	NO	ONE
08/19/88	1010	2	1722		NONE	200	TAKEOFF						ATO		
08/19/88	1011	2	1723		NONE	200	LANDING						NONE		
08/20/88	1287	1	88	20:26:00	NONE	200	TAKEOFF		0 150			CLOUDY	NONE		SEVERAL
08/20/88	1294	1	88	9:20:00	NONE	200	TAKEOFF		0 120			CLEAR	ATO	YES	ONE
08/21/88	555	1	883020	8:52:00	NONE	300	TAKEOFF		+V1				ATB		NO
08/21/88	1012	2	1724		NONE	200	CLIMB		500				ATB		ONE
08/22/88	524	2	88	12:30:00	NONE	100	LANDING		150 138			CLEAR	NONE	NO	SEVERAL
08/22/88	525	2	88	6:20:00	NONE	200	TAKEOFF		0 100			FOG	ATO	NO	SEVERAL
08/23/88	523	2	131	6:18:00	MULT ENG	200	TAKEOFF		0 100			CLOUDY	ATO	NO	SEVERAL
08/23/88	523	2	131	6:18:00	MULT ENG	200	TAKEOFF		0 100			CLOUDY	ATO	NO	SEVERAL
08/24/88	1187	1	1595	8:50:00	NONE	200	APPROACH		0 135	VFR			NONE	NO	SEVERAL
08/24/88	524	2	883021		MULT ENG	300	TAKEOFF		0 +V1				NONE		NO
08/24/88	525	2	883021		MULT ENG	300	TAKEOFF		0 +V1				NONE		NO
08/26/88	526	2	883022		NONE	200	UNKNOWN						ATO		
08/26/88	773	1	1725		NONE	200	TAKEOFF		0				ATB	NO	FLOCK
08/26/88	1013	2	883024	8:43:00	MULT ENG-BIRDS	300	TAKEOFF		20 145	IFR		CLEAR	ATB	NO	FLOCK
08/26/88	557	2	883023	8:43:00	MULT ENG-BIRDS	300	TAKEOFF		20 145	IFR		CLEAR	NONE	NO	SEVERAL
08/29/88	1014	2	1726		NONE	200	UNKNOWN		1000 140				NONE		NO
08/29/88	1274	2	88	14:56:00	NONE	100	APPROACH						NONE		
08/30/88	525	2	132	14:30:00	NONE	300	UNKNOWN						NONE		
08/31/88	776	1	883025		NONE	200	UNKNOWN						NONE		
08/31/88	1186	1	1639		NONE	200	UNKNOWN						NONE		
09/01/88	1255	2	88	7:12:00	MULT ENG-BIRDS	200	TAKEOFF		0 60			RAIN	ATO	NO	FLOCK
09/01/88	1255	2	88	7:12:00	MULT ENG-BIRDS	200	TAKEOFF		0 60			RAIN	ATO	NO	FLOCK
09/01/88	1257	2	88	14:50:00	MULT ENG-BIRDS	100	TAKEOFF		0 135			CLEAR	ATO	NO	FLOCK
09/01/88	1277	2	883026	13:00:00	NONE	300	UNKNOWN		0 135				NONE	NO	NO
09/02/88	559	2	883027		NONE	300	UNKNOWN			IFR			NONE	NO	NO
09/03/88	560	2	883027		NONE	300	UNKNOWN						NONE		
09/04/88	529	2	153		NONE	200	APPROACH						NONE		
09/04/88	561	2	883028		NONE	200	UNKNOWN		0 60				NONE	NO	ONE
09/04/88	1015	2	1727	7:16:00	NONE	300	TAKEOFF		+V1			CLEAR	ATB	NO	NO
09/05/88	562	2	883029		NONE	300	TAKEOFF						NONE		
09/05/88	1017	2	1729		NONE	200	UNKNOWN		0 125			CLOUDY	NONE	YES	FLOCK
09/05/88	1311	2	88	13:59:00	MULT ENG-BIRDS	200	LANDING		0 +V1			CLOUDY	NONE	YES	FLOCK
09/05/88	1311	2	88	13:59:00	MULT ENG-BIRDS	200	TAKEOFF		0				NONE		NO
09/06/88	563	2	883030		NONE	300	TAKEOFF						NONE		
09/07/88	777	2	230		NONE	300	LANDING		0 130			CLEAR	NONE		NO
09/07/88	1226	2	88	9:40:00	NONE	300	LANDING		0 132			OVERCAST	ATB	NO	ONE
09/08/88	1018	2	883031	11:00:00	TRVS FRAC	200	TAKEOFF		0 130			CLEAR	ATB	NO	ONE
09/08/88	1267	2	1730		NONE	200	LANDING		0 131				NONE	NO	NO
09/08/88	1267	2	88	8:39:00	NONE	200	TAKEOFF						NONE		
09/09/88	527	2	144		NONE	300	UNKNOWN						NONE		
09/10/88	528	2	883032		NONE	200	UNKNOWN		0 125			RAIN	NONE	YES	SEVERAL
09/11/88	1241	1	88	15:45:00	NONE	200	TAKEOFF		2500 245			CLEAR	NONE		
09/12/88	778	1	187	13:40:00	INV POW LOSS	200	APPROACH		800				NONE		
09/12/88	1019	2	1731		INV POW LOSS	300	CLIMB						ATB		FLOCK
09/12/88	1207	2	0		NONE	200	UNKNOWN								
09/14/88	779	2	230		NONE	300	UNKNOWN								

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

EDATE	EV#	ENG_POS	DMG_CODE	SEVERITY	POW_LOSS	MAX_VIBE	THROTTLE	IFSD	REMARKS
08/13/88	1008	2	A,C,G	2	NONE			NO	2 F BLS DAMAGED
08/14/88	549	2		2				NO	FOUND DURING GROUND INSPECTION
08/14/88	773	2		2				NO	
08/15/88	519	2		2				NO	ODOR IN COCKPIT
08/15/88	520	2	A,C,G	2				NO	FOUND DURING GROUND INSPECTION
08/15/88	550	2	A,D,I	2				NO	8 F BLS REPLACED, 1 WITH .5 IN CRACK
08/15/88	581	2	A,C	2				NO	
08/15/88	774	2		2				NO	
08/15/88	1009	2		2	COMPRESSOR	5.0	IDLE	NO	5% EPR LOSS
08/16/88	321	2	A,B,H	2	NONE			YES	6 FAN BLADES REPLACED
08/16/88	351	2	A,D	2	NONE			NO	4 FAN BLDS REPLACED, FOUND ON GRD INSPEC
08/17/88	352	2		2	NONE			NO	
08/18/88	353	2		2				NO	
08/18/88	358	2		2				NO	
08/19/88	352	2		2				NO	MOMENTARY INCREASE IN EGT
08/19/88	354	2	A	2	COMPRESSOR			NO	6 F BLS UNK DAMAGE
08/19/88	1010	2		2				NO	
08/19/88	1011	2		2				NO	
08/20/88	1287	2	A,Q	2				NO	ENG CHANGED
08/20/88	1294	2		2				NO	ODOR IN COCKPIT
08/21/88	1295	2		2				NO	
08/21/88	1296	2		2				NO	
08/21/88	1297	2		2				NO	
08/21/88	1298	2	A,Q	2				NO	
08/22/88	1295	2	A,C	2				NO	
08/23/88	1297	2		2				NO	
08/23/88	1298	2		2				NO	
08/23/88	1299	2	A,D	2				NO	SOME ABRADABLE MISSING
08/24/88	1297	2		2				NO	
08/24/88	1298	2		2				NO	
08/24/88	1299	2		2				NO	
08/25/88	1013	2	A,B,H	2				NO	REPLACED 5 PAIRS OF FAN BLADES
08/26/88	1015	2		2				NO	27 BIRDS CLEARED FROM RUNWAY
08/26/88	1016	2		2				NO	FOUND ON GRD INSPEC
08/26/88	1017	2		2				NO	
08/26/88	1018	2	A,B	2				NO	1 F BLADE 1 1/4 INCH TIP CURL, GRD INSPEC
08/26/88	1019	2		2				NO	INGESTED PIECE OF TIRE ALSO, FOUND BIRD
08/26/88	1020	2	A,C	2				NO	3 FAN BLADES BLEND ON WING
08/26/88	1021	2	A,G	2				NO	
08/26/88	1128	2		2				NO	
08/26/88	1129	2		2				NO	
08/26/88	1130	2		2				NO	
08/26/88	1131	2		2				NO	
08/26/88	1132	2		2				NO	
08/26/88	1133	2		2				NO	
08/26/88	1134	2		2				NO	
08/26/88	1135	2		2				NO	
08/26/88	1136	2		2				NO	
08/26/88	1137	2		2				NO	
08/26/88	1138	2		2				NO	
08/26/88	1139	2		2				NO	
08/26/88	1140	2		2				NO	
08/26/88	1141	2		2				NO	
08/26/88	1142	2		2				NO	
08/26/88	1143	2		2				NO	
08/26/88	1144	2		2				NO	
08/26/88	1145	2		2				NO	

EDATE	EVT#	ENG_POS	MFG	NO	ETIME	SIGN	EVT	AIRCRAFT	POF	ALTITUDE	SPEED	FL	RULES	LT	CONDS	WEATHER	CREW	AC	CREW	AL	BIRD	SEE
09/14/88	1016	2	1728			NONE		200	TAKEOFF	0							ATO					
09/14/88	1020	1	1732			NONE		200	UNKNOWN								NONE					
09/15/88	529	1	149		9:45:00	MULT	ENG-BIRDS	200	TAKEOFF	0	155	VFR		LIGHT		CLEAR	NONE		YES		FLOCK	
09/15/88	529	2	149		9:45:00	MULT	ENG-BIRDS	200	TAKEOFF	0	155	VFR		LIGHT		CLEAR	CRASHED		YES		FLOCK	
09/15/88	566	1	883033		18:50:00	MULT	BIRDS	300	TAKEOFF	25	130					OVERCAST	ATB		NO		FLOCK	
09/15/88	1021	1	1732		13:55:00	MULT	BIRDS	200	TAKEOFF	0	122					CLOUDY	NONE		NO		SEVERAL	
09/16/88	567	1	883034			NONE		300	CRUISE								NONE		NO		SEVERAL	
09/16/88	1022	1	1734		8:45:00	NONE		300	TAKEOFF	0	120					CLOUDY	NONE		NO		SEVERAL	
09/17/88	579	1	188		13:00:00	NONE		200	TAKEOFF	1600	160					CLOUDY	ATB		NO		ONE	
09/17/88	780	2	188		8:17:00	NONE		200	CLIMB							CLOUDY	ATB		NO		NO	
09/18/88	568	1	883035			NONE		200	LANDING								NONE		NO		NO	
09/18/88	1023	1	1735		8:15:00	NONE		200	TAKEOFF	0	80					CLOUDY	ATO		NO		FLOCK	
09/19/88	781	1	216		13:14:00	MULT	ENG-BIRDS	200	TAKEOFF	30	160	VFR				CLEAR	NONE		NO		FLOCK	
09/19/88	781	2	216		13:14:00	MULT	ENG-BIRDS	200	TAKEOFF	30	160	VFR				CLEAR	NONE		NO		FLOCK	
09/20/88	530	1	145			NONE		200	UNKNOWN								NONE		NO		NO	
09/20/88	569	1	883036		1:25:00	NONE		300	TAXI	0	10					OVERCAST	NONE		NO		ONE	
09/20/88	782	1	217		8:05:00	NONE		200	TAKEOFF	0	135					CLEAR	NONE		NO		ONE	
09/20/88	783	2	230		16:24:00	NONE		200	TAKEOFF	0	80						NONE		NO		ONE	
09/20/88	784	1	1736			NONE		200	TAKEOFF	0	71						ATO		YES		YES	
09/20/88	1024	1	1737			NONE		200	UNKNOWN								NONE		NO		NO	
09/20/88	1026	1	1737			NONE		200	UNKNOWN								NONE		NO		NO	
09/20/88	570	1	883037			NONE	ENG	200	TAKEOFF	0	VR						ATB		NO		FLOCK	
09/21/88	570	1	883038			NONE	ENG	200	TAKEOFF	0	VR						ATB		NO		FLOCK	
09/23/88	531	1	146			NONE		200	UNKNOWN								NONE		NO		NO	
09/23/88	785	1	230		14:06:00	NONE	BIRDS	200	UNKNOWN								ATB		NO		NO	
09/23/88	1210	1	88			MULT		300	TAKEOFF							CLOUDY	NONE		NO		NO	
09/24/88	571	1	883039			NONE		300	UNKNOWN								ATB		NO		NO	
09/24/88	580	1	1731			NONE		200	TAKEOFF								NONE		NO		NO	
09/25/88	572	1	883040			NONE		200	TAKEOFF								ATB		NO		NO	
09/25/88	1027	1	1739			NONE		200	TAKEOFF								NONE		NO		YES	
09/25/88	1185	1	1535			NONE		200	LANDING								NONE		NO		NO	
09/25/88	1218	1	88		14:20:00	NONE		200	TAKEOFF	0	140						NONE		NO		ONE	
09/26/88	532	1	147		9:30:00	MULT	BIRDS	200	TAKEOFF	0	80						ATO		NO		FLOCK	
09/26/88	573	1	883041			NONE		200	CLIMB	100	150					CLEAR	DIV		NO		NO	
09/26/88	786	1	155		12:23:00	NONE		200	UNKNOWN							RAIN	NONE		NO		NO	
09/27/88	574	1	883042		16:30:00	NONE		200	TAKEOFF							CLEAR	NONE		NO		NO	
09/27/88	787	1	158			NONE		200	UNKNOWN								NONE		NO		NO	
09/27/88	1028	1	1740			NONE		200	UNKNOWN								NONE		NO		NO	
09/28/88	788	1	159		12:45:00	NONE	BIRDS	200	UNKNOWN								NONE		NO		NO	
09/28/88	1029	1	1741		7:27:00	NONE		200	LANDING								ATO		NO		NO	
09/28/88	1250	1	88		9:10:00	NONE		200	TAKEOFF	600	150					CLOUDY	NONE		NO		ONE	
09/28/88	1271	1	88		9:30:00	NONE		200	APPROACH	0	140					OVERCAST	DIV		NO		FLOCK	
09/29/88	789	1	200		17:19:00	TRVS	FRAC	200	TAKEOFF	0	140					CLEAR	NONE		NO		ONE	
09/30/88	1291	1	88			NONE		200	UNKNOWN								NONE		NO		NO	
09/30/88	575	1	883043			NONE		300	APPROACH								NONE		NO		NO	
10/01/88	697	1	884001			NONE		300	UNKNOWN								NONE		NO		NO	
10/02/88	698	1	884002			NONE		300	APPROACH								NONE		NO		NO	
10/02/88	700	1	161			MULT	ENG-BIRDS	200	UNKNOWN								NONE		NO		NO	
10/02/88	701	1	194			NONE		200	UNKNOWN								NONE		NO		NO	
10/02/88	701	1	194			NONE		200	TAKEOFF								NONE		NO		NO	
10/03/88	831	1	247		10:47:00	NONE		200	TAKEOFF	0	130					OVERCAST	NONE		NO		ONE	
10/03/88	699	1	884003			NONE		200	UNKNOWN								NONE		NO		NO	
10/04/88	1030	1	1742		7:55:00	NONE		200	APPROACH	6500	250					CLOUDY	NONE		NO		NO	
10/04/88	1030	1	88		10:04:00	NONE		200	TAKEOFF	10	130					OVERCAST	ATB		NO		ONE	
10/05/88	1031	1	1743		20:53:00	NONE		200	TAKEOFF	10	140					OVERCAST	NONE		NO		FLOCK	
10/06/88	832	1	248		8:35:00	NONE	BIRDS	200	LANDING	0	VR						ATB		NO		NO	
10/06/88	1032	1	1744			NONE		200	LANDING								NONE		NO		NO	
10/08/88	1033	1	1745			NONE		200	TAKEOFF								NONE		NO		NO	
10/08/88	1034	1	1746			NONE		200	LANDING								NONE		NO		NO	
10/08/88	1035	1	1747			NONE	ENG	200	LANDING								NONE		NO		NO	
10/08/88	1035	1	1747			NONE	ENG	200	LANDING								NONE		NO		NO	
10/08/88	1036	1	88		7:05:00	NONE		200	TAKEOFF	5	130					CLEAR	ATB		NO		ONE	
10/10/88	792	1	163			NONE		200	UNKNOWN								NONE		NO		YES	
10/12/88	793	1	163			NONE		200	APPROACH	0	130					CLOUDY	NONE		YES		FLOCK	
10/12/88	1390	1	88			NONE	BIRDS	300	LANDING							FOG	NONE		NO		NO	
10/13/88	700	1	884004			NONE		200	UNKNOWN	100	120						NONE		NO		NO	
10/14/88	1276	1	88		10:25:00	NONE		200	LANDING								NONE		NO		NO	

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

EDATE	EVT#	ENG_POS	BIRD_NAM	BIRD_SPE	# BIRDS	WT_OZ	1	CTY	PRS	AIRPORT	LOCALE	US_INCID	ENGINE	DASH
09/14/88	1016	2								AMC	INDIA	NO	JT8D	17
09/14/88	1020	1								-NAG	INDIA	NO	JT8D	17A
09/15/88	529	1	SPECKLED PIGEON	2P4			11.5	BJR-ASM	BJR	BAHAR DAR, ETHIOPIA	INDIA	NO	JT8D	17A
09/15/88	529	1	SPECKLED PIGEON	2P4			11.5	BJR-ASM	BJR	BAHAR DAR, ETHIOPIA	INDIA	NO	JT8D	17A
09/15/88	526	1	LAPWING*							BELFAST, IRELAND	IRELAND	NO	CFM56	3
09/15/88	1021	1								VARANASI, INDIA	INDIA	NO	CFM56	17
09/15/88	1021	1								YUGOSLAVIA-SWITZERLAND	INDIA	NO	CFM56	3
09/16/88	567	1								ZAG-ZRH	INDIA	NO	JT8D	17A
09/16/88	1022	1								HYD-HYD	INDIA	YES	JT8D	15
09/17/88	579	1								CHICAGO, ILL-MIDWAY	INDIA	NO	JT8D	17A
09/17/88	579	1								MADURAI, INDIA	INDIA	NO	JT8D	17A
09/18/88	568	1	WOOD PIGEON	2P9			16.4	MAA-TRZ	MAA	LONDON-HEATHROW, ENGLAND	INDIA	NO	CFM56	3
09/18/88	568	1	KITE*							AURANGABAD, INDIA	INDIA	NO	JT8D	9A
09/19/88	781	1								BUDAPEST, HUNGARY	INDIA	NO	JT8D	15
09/19/88	781	1								BUDAPEST, HUNGARY	INDIA	NO	JT8D	15
09/19/88	781	1								CANADA	INDIA	NO	JT8D	9A
09/20/88	530	1								YGT-YTC	INDIA	YES	CFM56	6
09/20/88	529	1	BARRED DOVE	2P102						XUS	INDIA	NO	JT8D	15
09/20/88	782	1	GULL*							GOTENBURG, SWEDEN	INDIA	NO	JT8D	15
09/20/88	783	1	GULL*							MILAN, ITALY	INDIA	NO	JT8D	17
09/20/88	783	1	SWALLOW*							ISHIGAKI, JAPAN	INDIA	NO	JT8D	17
09/20/88	784	1								LUCKNOW, INDIA	INDIA	NO	JT8D	9A
09/20/88	1024	1								INDIA	INDIA	NO	JT8D	15
09/20/88	1025	1								INDIA	INDIA	NO	JT8D	17
09/21/88	1026	1								VNS-LKO	INDIA	NO	CFM56	3
09/21/88	570	1								LAS VEGAS, NEV	INDIA	YES	CFM56	3
09/21/88	570	1								LAS VEGAS, NEV	INDIA	YES	CFM56	3
09/23/88	351	1								CANADA	INDIA	NO	JT8D	17
09/23/88	785	1								XFO	INDIA	NO	JT8D	17
09/23/88	1210	1	GALAH	1015			11.5	OKA-MMY	ADL	ADELAIDE, AUSTRALIA	INDIA	NO	CFM56	3
09/24/88	571	1								STL-HOU	INDIA	YES	CFM56	3
09/24/88	571	1								MO-TEX	INDIA	YES	JT8D	9A
09/24/88	572	1	ROCK DOVE	2P1			14.			CHARLESTON, W. VA	INDIA	YES	JT8D	3
09/25/88	1027	1								LOS ANGELES, CA	INDIA	NO	JT8D	9A
09/25/88	1185	1								INDIA	INDIA	NO	JT8D	17
09/25/88	1218	1								KHARTOUM, SUDAN	INDIA	NO	JT8D	17
09/25/88	532	1	HERRING GULL	14N14			40.	BRS-TCI	BRS	BANGALORE, INDIA	INDIA	NO	JT8D	15
09/26/88	573	1	PARROT*							BRISTOL, ENGLAND	INDIA	NO	CFM56	3
09/26/88	573	1	SPARROW*							MELBOURNE, AUSTRALIA	INDIA	NO	JT8D	17
09/27/88	786	1								JAPAN	INDIA	NO	JT8D	17
09/27/88	787	1	MOURNING DOVE	2P105						PHOENIX, AZ	INDIA	YES	CFM56	3
09/27/88	1028	1								JAIPUR, INDIA	INDIA	YES	JT8D	9A
09/28/88	788	1								BUENOS AIRES, ARGENTINA	INDIA	NO	JT8D	9A
09/28/88	1250	1								ALONG, INDIA	INDIA	NO	JT8D	17
09/28/88	1250	1								HABIB, BOUGIBA, TUNISIA	INDIA	NO	CFM56	3
09/28/88	1271	1								BRISTOL, ENGLAND	INDIA	NO	JT8D	17
09/29/88	789	1								PARIS, FRANCE	INDIA	NO	JT8D	17
09/29/88	1231	1	BLACK-BACKED GULL	14N17			29.			SUDAN	INDIA	NO	JT8D	17
09/30/88	575	1	EURASIAN KESTREL	5K27			7.			FRANKFURT, GERMANY	INDIA	YES	CFM56	3
10/01/88	697	1								FRANKFURT, GERMANY	INDIA	NO	CFM56	3
10/02/88	698	1								CANADA	INDIA	NO	CFM56	3
10/02/88	790	1								QUEBEC, CANADA	INDIA	NO	JT8D	9A
10/02/88	791	1								STUTTGART, GERMANY	INDIA	NO	JT8D	9A
10/02/88	831	1								PITTSBURGH, PA	INDIA	NO	JT8D	15
10/03/88	699	1								JAMMU, INDIA	INDIA	YES	CFM56	3
10/04/88	1030	1								BERGEN, NORWAY	INDIA	NO	JT8D	17
10/04/88	1030	1	GULL*							LUCKNOW, INDIA	INDIA	NO	JT8D	17
10/05/88	1031	1								VIENNA, AUSTRIA	INDIA	NO	JT8D	17
10/06/88	832	1								VARANASI, INDIA	INDIA	NO	JT8D	17
10/07/88	1032	1								AGRA, INDIA	INDIA	NO	JT8D	17
10/08/88	1033	1								LUCKNOW, INDIA	INDIA	NO	JT8D	9A
10/08/88	1034	1								INDIA	INDIA	NO	JT8D	9A
10/08/88	1035	1								AGRA, INDIA	INDIA	NO	JT8D	9A
10/08/88	1035	1	EAGLE*	2P105						DALLAS, TX	INDIA	YES	JT8D	9A
10/08/88	1211	1	MOURNING DOVE				4.	-DAL	AGR	VANCOUVER, CANADA	INDIA	NO	JT8D	9A
10/10/88	792	1								PORTLAND, ME	INDIA	YES	JT8D	9A
10/12/88	793	1								PHOENIX, AZ	INDIA	YES	CFM56	3
10/12/88	1200	1								PHX	INDIA	YES	CFM56	3
10/13/88	700	1								PHX	INDIA	YES	CFM56	3
10/14/88	1276	1	WHITE-THROATED SWIFT	1U71			1.5	-PHX	LTN	LUTON, ENGLAND	INDIA	NO	JT8D	3

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

DATE	EVT#	ENG_POS	DMG_CODE	SEVERITY	POW_LOSS	MAX_VIBE	THROTTLE	IFSD	REMARKS
09/14/88	1016	2		9				NO	
09/14/88	1020	1	A,D,K,O	1	COMPRESSOR		ADVANCED	NO	CONTINUOUS SURGING, ERRATIC EPR
09/15/88	529	1	A,D,K,O	1	COMPRESSOR		ADVANCED	NO	CONTINUOUS SURGING, ERRATIC EPR
09/15/88	566	2	A,H	3	NONE	5.0	IDLE	NO	ODOR IN CABIN
09/15/88	1021	1	A	2	NONE			NO	1ST F BLD'S UNK DAMAGE
09/15/88	1027	1	A,D	2	NONE			NO	8 PAIRS OF FAN BLADES REPLACED
09/16/88	567	1		2				NO	ODOR
09/16/88	1022	1	A,C	2		SOME	IDLE	NO	DAMAGE TO C2 FAN BLADES, REPLACED C2 ASS
09/17/88	579	1	A,D,G,K	2	NONE	2.8		NO	FAN AND COMP BLD'S DAMAGED, ODOR
09/18/88	588	1	A,G	2	NONE			NO	1STG F BLD'S DAMAGED
09/18/88	1023	1		2	NONE			NO	SMALL BIRDS
09/19/88	781	1		2	NONE			NO	FOUND DURING GROUND INSPECTION
09/19/88	781	1		2	NONE			NO	
09/20/88	530	1		2	NONE	1.9		NO	
09/20/88	569	1		2	NONE			NO	
09/20/88	782	1		2	NONE			NO	
09/20/88	783	1		2	NONE			NO	
09/20/88	784	1		2				NO	
09/20/88	1024	1		2				NO	FOUND ON GRD INSPEC
09/20/88	1025	1		2				NO	FOUND ON GRD INSPEC
09/21/88	1026	1		2				NO	
09/21/88	570	1	A,H	2	NONE			NO	FOUND ON GRD INSPEC
09/21/88	571	1		2	NONE			NO	
09/23/88	531	1		2				NO	
09/23/88	785	1	A,K	2	NONE			NO	UNK DAMAGE TO COMPRESSOR BLD'S
09/23/88	1210	1	A,K	1	NONE			NO	1 STG 4 HPC BLADE DAMAGED
09/24/88	571	1		2				NO	14 PAIRS OF FAN BLADES REPLACED
09/24/88	580	1	A	2	NONE			NO	3 F BLD'S DAMAGED
09/25/88	572	1		2				NO	
09/25/88	1027	1	A,G	2	NONE			YES	POWER LOSS, EPR SYMPTOM, EGT FAIL CODE
09/25/88	1185	1		2			CUTOFF	NO	12 FAN BLADES SHINGLED
09/25/88	218	1	A,D,H	2	COMPRESSOR	5.0	RETARD		
09/26/88	532	1	A,H	2					15 FAN BLADES DAMAGED, LE NICKS
09/26/88	573	1		2					ENGINE REMOVED
09/26/88	786	1	A,B	2	NONE				UNK # OF F BLD'S DAMAGED, DAM UNK
09/27/88	577	1		2				NO	
09/27/88	787	1		2				NO	HPC BLADES BEYOND MM LIMITS
09/27/88	1028	1	A,G	2				NO	FOUND DURING GROUND INSPECTION
09/28/88	788	1		2				NO	3 FAN BLADES DAMAGED
09/28/88	1029	1		2				NO	FOUND ON GRD INSPEC
09/28/88	1250	1	A,Q	2				NO	FOUND ON GRD INSPEC
09/28/88	1271	1	A,I	2				NO	FAN RUB STRIP GOUGED, 1+2 STG F BLD'S REP
09/29/88	789	1	A,C,K	2	NONE			NO	FOUND ON GRD INSPEC, 3 F BLD'S SHINGLED
09/29/88	1231	1	A,H	2	NONE	4.0		NO	1 F BLD SHINGLED
10/01/88	575	1		2				NO	
10/01/88	697	1		2				NO	
10/02/88	698	1	A,G,K	2	NONE			NO	
10/02/88	700	1	A,H	2	NONE	YES		NO	
10/02/88	791	1		2				NO	
10/02/88	831	1		2				NO	
10/03/88	699	1		2				NO	
10/04/88	1030	1		2				NO	
10/04/88	1244	1		2				NO	
10/05/88	1031	1		2				NO	
10/05/88	832	1		2				NO	
10/07/88	1032	1		2				NO	
10/08/88	1033	1		2				NO	
10/08/88	1034	1		2				NO	
10/08/88	1035	1		2				NO	
10/08/88	1035	1		2				NO	
10/08/88	1211	1		2				NO	
10/08/88	792	1		2				NO	
10/10/88	793	1		2				NO	
10/12/88	1290	1	A,Q	2				NO	FOUND ON GRD INSPEC.
10/13/88	1700	1		2				NO	
10/14/88	1276	1		2				NO	

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

DATE	EVT#	ENG_POS	MFG_NO	SIGN EVT	AIRCRAFT	POF	ALTITUDE	SPEED	FL RULES	LT CONDS	WEATHER	CREW AC	CREW AL	BIRD SEE
10/15/88	1036	1	1748	16:57:00	NONE	200					LANDING	NONE	NO	SEVERAL
10/17/88	701	2	884005		NONE	300		0 120			TAKEOFF	NONE	NO	NO
10/18/88	1240	2	88		NONE	300					APPROACH	NONE	NO	
10/19/88	704	2	164		NONE	200					LANDING	NONE	NO	
10/20/88	1183	2	1828	14:40:00	NONE	200					APPROACH	NONE	NO	SEVERAL
10/20/88	1184	2	1612	17:50:00	MULT BIRDS	200		0 25			LANDING	NONE	NO	YES
10/21/88	795	1	167	21:00:00	NONE	200		120			TAKEOFF	NONE	NO	SEVERAL
10/22/88	1037	1	1749	20:25:00	NONE	200		80			LANDING	NONE	NO	SEVERAL
10/23/88	833	1	237	19:27:00	MULT BIRDS	200		80			TAKEOFF	ATO	YES	SEVERAL
10/23/88	1182	1	1538		NONE	200					UNKNOWN	NONE		
10/24/88	706	1	250	15:45:00	NONE	200		100			LANDING	NONE		
10/24/88	1209	1	0		NONE	200					UNKNOWN	NONE		
10/24/88	702	2	884006	8:00:00	NONE	300		130			TAKEOFF	NONE	NO	NO
10/26/88	703	1	884007		NONE	300					UNKNOWN	NONE	NO	NO
10/26/88	704	2	884008	9:00:00	NONE	300					TAKEOFF	NONE	NO	FLOCK
10/26/88	1216	2	88	12:53:00	MULT BIRDS	200		0 VR			LANDING	NONE	NO	
10/26/88	709	2	250	10:30:00	NONE	200		130			LANDING	NONE	NO	ONE
10/26/88	1238	2	1750	9:10:00	NONE	200		130			LANDING	NONE	NO	FLOCK
10/28/88	1038	1	88	9:19:00	NONE	200		160			TAKEOFF	NONE	NO	YES
10/29/88	1236	1	88	21:35:00	NONE	200		150			CLIMB	ATB	YES	SEVERAL
10/31/88	801	1	169	7:50:00	MULT BIRDS	200		146			TAKEOFF	DIV	NO	NO
11/02/88	705	2	884009	20:00:00	NONE	300		140			TAKEOFF	NONE	NO	
11/03/88	1039	1	1751		NONE	200		130			TAKEOFF	NONE		
11/03/88	802	1	250		NONE	200					UNKNOWN	NONE		
11/04/88	803	1	171	6:30:00	NONE	200		5			TAKEOFF	ATB	YES	ONE
11/05/88	706	1	884010	7:40:00	INV POW LOSS	300		150	VFR		TAKEOFF	ATO	NO	NO
11/07/88	707	1	884011		NONE	300		0 +V1			TAKEOFF	ATB	NO	SEVERAL
11/07/88	804	2	172	9:15:00	MULT BIRDS	200		15 133			TAKEOFF	ATB	NO	
11/07/88	805	1	270		NONE	200					TAKEOFF	NONE	ONE	NO
11/09/88	806	1	174	17:30:00	NONE	200					TAKEOFF	NONE	NO	
11/09/88	1305	1	173	13:30:00	ATM WTHY	200					CLIMB	NONE	NO	NO
11/09/88	1305	1	88	14:03:00	MULT ENG-BIRDS	200		137	VFR		TAKEOFF	NONE	NO	FLOCK
11/09/88	1258	2	88	21:55:00	MULT ENG-BIRDS	200		125			TAKEOFF	NONE	ONE	NO
11/12/88	807	1	179		NONE	200					TAKEOFF	NONE	NO	
11/13/88	808	2	270		NONE	200					CLIMB	NONE	NO	NO
11/14/88	708	1	884012	18:45:00	NONE	300					APPROACH	NONE	NO	FLOCK
11/14/88	1237	1	88	13:44:00	MULT BIRDS	200		5 135			LANDING	NONE	NO	
11/14/88	1278	1	88	6:00:00	NONE	200		140			TAKEOFF	NONE	NO	
11/15/88	1238	1	88	16:15:00	NONE	300					APPROACH	NONE	NO	
11/15/88	808	1	175	11:00:00	NONE	200					UNKNOWN	NONE	NO	FLOCK
11/16/88	1206	2	88	7:31:00	NONE	300		120			LANDING	NONE	NO	
11/17/88	809	2	178		NONE	200					UNKNOWN	NONE	NO	
11/17/88	1279	1	1752	13:49:00	NONE	200		0			LANDING	NONE	ONE	NO
11/18/88	836	2	88		NONE	200					TAKEOFF	NONE	FLOCK	FLOCK
11/18/88	837	2	112	7:43:00	MULT BIRDS	200		0 130			LANDING	NONE	NO	
11/19/88	810	1	249	17:00:00	INV POW LOSS	200		200			TAKEOFF	ATB	NO	
11/19/88	1041	1	1733		NONE	200		0 VT			LANDING	NONE	FLOCK	
11/19/88	1300	2	88	16:20:00	MULT BIRDS	300		0 130			LANDING	NONE	NO	ONE
11/20/88	838	2	252	18:45:00	NONE	300		80			TAKEOFF	ATO	NO	NO
11/21/88	709	2	884013		NONE	200					LANDING	NONE	NO	NO
11/22/88	710	1	884014		NONE	300					UNKNOWN	NONE	NO	NO
11/22/88	711	2	884015		MULT BIRDS	300					TAKEOFF	NONE	YES	FLOCK
11/23/88	811	1	185		INV POW LOSS	200		0			TAKEOFF	ATO	NO	
11/24/88	1042	1	884016		MULT BIRDS	300		4000			CRUISE	NONE	NO	
11/24/88	1205	1	1754		NONE	200		0			TAKEOFF	ATO	NO	FLOCK
11/26/88	812	2	191	21:40:00	NONE	200		0 120			UNKNOWN	NONE	NO	NO
11/26/88	813	2	189	8:47:00	NONE	200		128			LANDING	NONE	NO	NO
11/27/88	839	2	251	11:35:00	NONE	200					LANDING	OTHER	NO	NO
11/30/88	814	1	884017		NONE	300					UNKNOWN	NONE	NO	NO
12/01/88	815	1	186	7:45:00	MULT BIRDS	200		50 160	IFR		TAKEOFF	ATB	NO	FLOCK
12/04/88	816	1	884018	9:00:00	MULT BIRDS	300		123			CLIMB	ATB	NO	SEVERAL
12/05/88	817	1	224		NONE	200		0			UNKNOWN	ATO	NO	
12/05/88	840	2	270	20:25:00	NONE	200		130			LANDING	NONE	NO	SEVERAL
12/05/88	1318	1	162	9:41:00	NONE	200		140			TAKEOFF	ATB	NO	

EDATE	EVT#	ENG_POS	BIRD_NAM	BIRD_SPE	#_BIRDS	WT_OZ	CTY_PRS	AIRPORT	LOCALE	US_INCID	ENGINE	DASH
10/15/88	1036	1	COMMON SONG THRUST	412282	1	2.6	IDR-BHO	BHO	BHOPAL, INDIA	NO	JT8D	9A
10/17/88	701	2	SNOW GOOSE	2J26	1			CLT	PARIS-ORLY, FRANCE	NO	CFM56	3
10/18/88	1240	2						YHY	CHARLOTTE, NC	YES	CFM56	3
10/19/88	794	2						TUC	HAY RIVER, CANADA	NO	JT8D	9A
10/20/88	1183	2						SFN	TUCUMAN, ARGENTINA	NO	JT8D	9A
10/20/88	1184	2	GULL*		*			DUR	SANTA FE, ARGENTINA	NO	JT8D	9A
10/21/88	705	1	STONE CURLEW	9N1	1	20.	DUR-SBP	DUR	DURBAN, S. AFRICA	NO	JT8D	9A
10/22/88	1037	1	HORNED LARK	17274	1	16.	DEL-AMD	AMD	AMMADABAD, INDIA	NO	JT8D	15
10/23/88	833	1			*	1.5	SLL-MCT	SLL	SALALAH, OMAN	YES	JT8D	9A
10/24/88	798	1			1			XFO	JAPAN	NO	JT8D	17
10/26/88	1209	2			1			XUS		YES	JT8D	9A
10/26/88	702	2			1			XUS		YES	JT8D	15
10/26/88	703	2	SPARROW*		1		CWB-GRU	CWB	CURITIBA, BRAZIL	NO	CFM56	3
10/26/88	704	2	KITE*		1		-DFW	XUS	DALLAS/FORT WORTH, TX	NO	CFM56	3
10/26/88	1216	2	GULL*		1		OKC-SLC	OKC	OKLAHOMA CITY, OK	YES	CFM56	3
10/28/88	799	2			*			AYT	ANTALYA, TURKEY	NO	CFM56	3
10/29/88	1038	2	BLACK PARTRIDGE	4L44	1		MAA-BLR	BLR	BANGALORE, INDIA	NO	JT8D	9A
10/31/88	800	2			1		PNA-DEL	PNA	NICE, FRANCE	NO	JT8D	17
11/02/88	801	2			*		EMA-ACE	EMA	PATNA, INDIA	NO	JT8D	15
11/03/88	705	2			1			PVH	EAST MIDLANDS, ENGLAND	NO	JT8D	3
11/03/88	1039	1			*			HYD	PORTO VELHO, BRAZIL	NO	CFM56	3
11/05/88	802	1			1			XFO	HYDERABAD, INDIA	NO	JT8D	9A
11/07/88	803	1			1			BHM	TAIWAN	NO	JT8D	7
11/07/88	706	2	HAWK*		1			MAF	BIRMINGHAM, AL	YES	JT8D	3
11/07/88	804	2	COMMON LAPWING	5N1	1	7.6		AMS	MIDLAND/ODESSA, TX	YES	CFM56	3
11/07/88	834	2	BROWN-HOODED GULL	14N35	*	10.1	MDQ-BUE	MDQ	AMSTERDAM, NETHERLANDS	NO	CFM56	3
11/09/88	805	1			1		SRQ-TPA	SRQ	MAR DEL PLATA, ARGENTINA	NO	JT8D	9A
11/09/88	806	1	BLACK KITE	3K28	1	28.	BFN-JNB	BFN	WINDYPTANA, FL	YES	JT8D	7B
11/09/88	1302	1	LAPWING*		*			EGNV	SARASOTA, FL	NO	JT8D	17A
11/09/88	1305	1	LAPWING*		*			EGNV	BLOEMFONTEIN, S. AFRICA	NO	JT8D	17A
11/10/88	1258	2			*			JAI	TEES-SIDE, ENGLAND	NO	JT8D	3
11/12/88	807	1			1		YOW-YYZ	YOW	JAIPUR, INDIA	NO	JT8D	3
11/13/88	835	1			1			BHI	OTTAWA, CANADA	NO	JT8D	9A
11/14/88	708	1	PIGEON*		*		-LGW	LGW	BAHIA BLANCA, ARGENTINA	NO	JT8D	9A
11/14/88	1237	1			1			NCE	LONDON-GATWICK, ENGLAND	NO	CFM56	3
11/15/88	1238	1			1			NCE	NICE, FRANCE	NO	JT8D	3
11/16/88	808	1			1		MCI-DEN	XUS	MADRAS, INDIA	NO	JT8D	3
11/16/88	1296	1	GULL*		1			SZG	NICE, FRANCE	NO	CFM56	3
11/17/88	809	1			1		DAY-ORD	XUS	SALZBURG, AUSTRIA	YES	JT8D	17
11/17/88	1040	1			1		MAA-BLR	BLR	OH-L	NO	CFM56	7B
11/18/88	1279	1			1			LEM	BANGALORE, INDIA	NO	JT8D	17
11/18/88	836	2	GULL*		*		CGN-HAM	HAM	MALAGA, SPAIN	NO	JT8D	15
11/18/88	837	2	AMERICAN WIGEON	2J71	1	28.	PDX-SFO	PDX	HAMBURG, GERMANY	NO	JT8D	15
11/19/88	810	1			1		IXV-UDR	UDR	PORTLAND, OR	YES	JT8D	7
11/19/88	1041	1			*			AMS	UDAIPIUR, INDIA	NO	JT8D	9A
11/20/88	338	2	GULL*		1			GRZ	AMSTERDAM, NETHERLANDS	NO	CFM56	3
11/21/88	709	1	BURROWING OWL	2S102	1	5.3		CWB	GRAZ, AUSTRIA	NO	CFM56	15
11/22/88	710	1			1			XFO	CURITIBA, BRAZIL	NO	CFM56	3
11/23/88	811	1	STARLING*		*			PTE		NO	CFM56	3
11/23/88	812	1	STARLING*		*			BHZ-MIN	TAMPA/ST. PETERSBURG, FL	YES	CFM56	3
11/24/88	712	1			1		-LHR	XFO	BELO HORIZONTE, BRAZIL	NO	CFM56	17A
11/24/88	1042	1			*		CMB-TRZ	CMB	LONDON-HEATHROW, ENGLAND	NO	CFM56	3
11/24/88	1205	2	OWL*		1			XUS	COLOMBO, SRI LANKA	YES	JT8D	17
11/26/88	812	2	HADADA IBIS	6112	1	48.	CPT-PLZ	PLZ	PORT ELIZABETH, S. AFRICA	NO	JT8D	17A
11/26/88	813	2			1		DUR-ELS	ELS	EAST LONDON, S. AFRICA	NO	JT8D	17A
11/30/88	839	2	BLACK-HEADED GULL	14N36	1	9.7		MLA	MALTA, MEDITERRANEAN SEA	NO	JT8D	15
12/01/88	814	1	BLACK-HEADED GULL		*	10.	AMS-ENS	XFO	NETHERLANDS	NO	CFM56	3
12/04/88	714	1	BLACK-HEADED GULL		*			BRU	BRUSSELS, BELGIUM	NO	CFM56	15A
12/05/88	815	1	STARLING*		*			LST	LAUNCESTON, AUSTRALIA	NO	CFM56	3
12/05/88	816	1			1			XFO	BAHIA BLANCA, ARGENTINA	NO	JT8D	15A
12/05/88	817	1	GULL*		1	10.		HND	ARGENTINA	NO	JT8D	9A
12/05/88	1318	1	BROWN-HOODED GULL	14N35	1	10.1		BHI	TOKYO-HANEDA, JAPAN	NO	JT8D	9A
12/05/88	1318	1			1			BHI	BAHIA BLANCA, ARGENTINA	NO	JT8D	9A

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

DATE	EVT#	ENG_POS	DMG_CODE	SEVERITY	POW_LOSS	MAX_VIBE	THROTTLE	IFSD	REMARKS
10/15/88	1036			9	NONE			NO	
10/17/88	701			4				NO	
10/18/88	1240		A,Q	9					
10/19/88	794		A,C	9					1 F BLD BENT
10/20/88	1183		A,C	3	NONE			NO	
10/20/88	1187		A,D	3				NO	1 STG FAN ASSEMBLY CHANGED
10/21/88	795		A,D	2				NO	
10/22/88	1037		A,I,K	9	COMPRESSOR	HIGH		NO	10 OTHER FBLS SEVERE DAM, DAM THRU COMP FOUND ON GRD INSPC
10/23/88	833		A,I,K	1	NONE			NO	BENT F BLS REPLACED FAN ASSEMBLY
10/23/88	1182		A,D	9	NONE			NO	5 F BLS SHINGLED
10/24/88	798		A,D	2	NONE			NO	'LOUD VIBRATING SOUND' FROM ENGINE
10/24/88	1200		A,D	3	NONE			NO	
10/26/88	702		A,H	9	NONE			NO	
10/26/88	703		A,D	2	NONE			NO	
10/26/88	704		A,D	9				NO	
10/26/88	1216			9				NO	
10/28/88	700			9				NO	
10/28/88	1038			9				NO	
10/29/88	1236			9				NO	
10/31/88	800		A,D,G	2	COMPRESSOR		IDLE	VOLUNTARY	ENGINE CHANGE, 1STG F BLS REPLACED
11/02/88	801		A,D,H,N	2	NONE			YES	ENG REMOVED, ENG SURGED TWICE ON POW RED
11/03/88	705		A,C	3				NO	
11/03/88	1039		A,C	3	COMPRESSOR			NO	1 F BLD CHANGED
11/04/88	802		A,C	3	COMPRESSOR			NO	LOUD BANG AT LIFTOFF
11/05/88	803		A,D,H	3				NO	3 FAN OGV'S DAMAGED
11/07/88	706		A,D,H	2	NONE			NO	7 F BLS WITH TRAILING EDGE TIP CURL
11/07/88	804		A,D,H	2	COMPRESSOR	HIGH		VIBES	SEVERE GAS PATH DAMAGE
11/07/88	707		A,I,K	1				NO	
11/07/88	834			9				NO	
11/07/88	805		A,E,G,K	1	COMPRESSOR			NO	AC SWUNG TO LEFT, DAMAGE THRU GAS PATH
11/09/88	806		A,E,G,K	1				NO	
11/09/88	1303			9				NO	
11/09/88	1305		A,Q	4				NO	ODOR IN CABIN
11/10/88	1258		A,Q	9				NO	SMALL DAM IN 13TH STG COMP
11/12/88	807		A,C,K	1	NONE			NO	
11/13/88	835		A,C,K	9	NONE			NO	
11/14/88	708			9				NO	
11/14/88	1237			9				NO	
11/15/88	1238		A,G	9				NO	FOUND ON GRD INSPC, C1+C2 DAMAGE
11/16/88	808		A,G	1				NO	FOUND ON GRDINSPEC,C1 DISK+BLDS REPLACED
11/16/88	1236		A,D	2				NO	
11/17/88	809			9				NO	LPC DAMAGE
11/17/88	1040			9				NO	
11/17/88	1239		A,H,K,N	1	NONE			NO	INVOLUNTARY 3X5IN LE PIECE LIBERATED
11/18/88	836		A,H,K,N	2	SPOOL DOWN			NO	
11/18/88	837		A,B,G,K	1				NO	
11/19/88	810		A,B,G,K	1				NO	
11/19/88	1041			9				NO	
11/19/88	1300			9				NO	
11/20/88	838			9	NONE			NO	
11/21/88	709			9	NONE			NO	FOUND ON SHOP INSPC. FOR OTHER REASON
11/22/88	710		A,B,C	9	NONE			NO	
11/22/88	711		A,I	1	NONE			YES	TRVS FRAC .75IN ABOVE MIDSPAN SHROUD
11/23/88	811		A,I	1	YES	1.3 HIGH		NO	N1 ENG CORE INLET PARTIALLY BLOCKED
11/23/88	812			9	NONE			NO	CHANGED FAN DUE TO BENT BLDS # UNK
11/24/88	712		A,D	1				NO	FAN CHANGE, ING WHILE IN REVERSE THRUST
11/24/88	1042		A,D	1				NO	
11/26/88	813		A,C	2				NO	
11/26/88	814		A,D	2	NONE			NO	FOUND ON GRD INSPC
11/29/88	839			9	NONE			NO	ONE F BLD TRVS FRAC, 100% LOSS OF THRUST
11/30/88	713		A,H,I,N	2	COMPRESSOR	HIGH	CUTOFF	VOLUNTARY	ACOUSTIC LINING AT REAR OF FBLS MISSING
12/01/88	814		A,C,H	1		HIGH		YES	EPR SYMPTOM
12/04/88	714		A,D	1	NONE			NO	4 F BLS BENT
12/05/88	815		A,D	2				NO	
12/05/88	816			9				NO	
12/05/88	841			4				NO	
12/05/88	1318		A,Q	1				NO	

DATE	EV#	ENG_POS	MFG_NO	ETIME	SIGN_EVT	AIRCRAFT	POF	ALTITUDE	SPEED	FL_RULES	LT_CONDS	WEATHER	CREW_AC	CREW_AL	BIRD_SEE
12/07/88	715	2	884019	11:00:00	NONE	300	TAKEOFF	0 VR			BRIGHT	CLEAR	ATB	NO	ONE
12/07/88	716	2	884020		ENG-BIRDS	300	APPROACH						NONE	NO	FLOCK
12/07/88	716	2	884021		ENG-BIRDS	300	APPROACH						NONE	NO	FLOCK
12/07/88	1239	2	884022	16:46:00	MULT	300	LANDING	0 100				OVERCAST	NONE	NO	FLOCK
12/07/88	1239	2	884023	16:46:00	MULT	300	LANDING	0 100				OVERCAST	NONE	NO	FLOCK
12/10/88	1239	2	884022	8:36:00	NONE	300	TAKEOFF	0 130				CLOUDY	NONE	NO	FLOCK
12/11/88	717	2	884023	8:36:00	NONE	300	UNKNOWN						NONE	NO	NO
12/11/88	882	2	884024	9:20:00	ENG	200	CLIMB					CLEAR	NONE	NO	YES
12/11/88	882	2	884025	9:20:00	ENG	200	CLIMB					CLEAR	NONE	NO	YES
12/12/88	883	2	884026	18:15:00	MULT	200	LANDING	50 125				BELOW CLOUDS	NONE	NO	FLOCK
12/13/88	883	2	884027	10:22:00	MULT	200	TAKEOFF	50				RAIN	ATB		
12/13/88	1043	2	884028	17:55:00	MULT	200	UNKNOWN						NONE		
12/14/88	881	2	884029	17:55:00	MULT	200	UNKNOWN						NONE		
12/14/88	1242	2	884029	16:40:00	MULT	200	TAKEOFF	0 125				CLEAR	NONE	NO	FLOCK
12/15/88	882	2	884030	15:00:00	NONE	300	LANDING	0 130				RAIN	NONE	NO	ONE
12/18/88	8818	2	884031	7:45:00	MULT	300	LANDING	70				RAIN	NONE	NO	FLOCK
12/19/88	720	2	884032	17:47:00	NONE	300	CLIMB	1500				RAIN	NONE	NO	SEVERAL
12/19/88	8820	2	884033	10:30:00	NONE	200	TAKEOFF	0 133				RAIN	ATB	YES	ONE
12/20/88	8844	2	884034	15:15:00	NONE	200	CLIMB					CLEAR	NONE	NO	NO
12/20/88	1011	2	884035	15:15:00	MULT	300	LANDING	100 130				CLEAR	NONE		FLOCK
12/20/88	8821	2	884036	15:15:00	MULT	300	LANDING	10 120				OVERCAST	NONE		FLOCK
12/21/88	8821	2	884037	7:00:00	MULT	200	TAKEOFF	20 145				CLEAR	NONE		FLOCK
12/21/88	8822	2	884038	7:00:00	MULT	200	TAKEOFF	20 145				CLEAR	NONE		FLOCK
12/21/88	721	2	884039	8:00:00	NONE	300	UNKNOWN						NONE		ONE
12/22/88	1242	2	884040	16:25:00	NONE	300	LANDING	0 124				OVERCAST	NONE	YES	FLOCK
12/22/88	1242	2	884041	16:25:00	MULT	100	LANDING	30					NONE		ONE
12/23/88	723	2	884042	8:45:00	NONE	300	UNKNOWN	0 +V1				BRIGHT	NONE	NO	FLOCK
12/23/88	8823	2	884043	8:45:00	NONE	300	TAKEOFF					CLEAR	NONE	NO	FLOCK
12/25/88	8825	2	884044	17:36:00	NONE	300	UNKNOWN						NONE		NO
12/28/88	725	2	884045	17:36:00	NONE	300	TAKEOFF	0 140				OVERCAST	NONE	NO	NO
12/30/88	726	2	884046	8:34:00	NONE	300	TAKEOFF	3600 210				OVERCAST	ATB	YES	ONE
12/31/88	727	2	884047	10:15:00	NONE	300	TAKEOFF	0 VR					NONE	NO	NO
12/31/88	8824	2	884048	8:34:00	NONE	200	LANDING	0 145				CLEAR	ATB	NO	NO
01/01/89	1359	2	884049	10:15:00	NONE	100	UNKNOWN	5 130				CLEAR	NONE	NO	ONE
01/06/89	8826	2	884050	19:38:00	NONE	200	LANDING	0 60				CLEAR	ATB	NO	FLOCK
01/08/89	8827	2	884051	12:45:00	NONE	200	TAKEOFF	0 VR				OVERCAST, DRY	DIV		FLOCK
01/11/89	8833	2	891001	12:45:00	MULT	300	TAKEOFF	0 VR				OVERCAST, DRY	DIV		FLOCK
01/11/89	8833	2	891002	10:45:00	MULT	300	TAKEOFF	0 VR				OVERCAST, DRY	DIV		FLOCK
01/11/89	1349	2	891003	12:30:00	NONE	100	LANDING	100 120				OVERCAST	OTHER	NO	SEVERAL
01/12/89	1350	2	891004	12:30:00	MULT	300	LANDING	0 125				OVERCAST	OTHER		FLOCK
01/13/89	8864	2	891005	12:30:00	NONE	300	APPROACH	0 120				SOME CLOUDS	NONE	NO	SEVERAL
01/14/89	1424	2	891006	19:13:00	NONE	200	LANDING						NONE	NO	
01/16/89	8855	2	891004	19:13:00	NONE	300	UNKNOWN						NONE	NO	
01/17/89	8855	2	891004	19:13:00	NONE	300	UNKNOWN						NONE	NO	
01/17/89	1342	2	891005	16:00:00	NONE	200	APPROACH						NONE	NO	
01/19/89	8828	2	234	16:00:00	MULT	200	TAKEOFF	0 50				FOG	ATB	YES	YES
01/19/89	8829	2	219	16:00:00	NONE	200	TAKEOFF	100 140					NONE	NO	YES
01/20/89	1866	2	891005	10:30:00	NONE	300	TAKEOFF	0					NONE	NO	YES
01/20/89	8853	2	891005	10:30:00	NONE	100	CLIMB	1000					OTHER	NO	NO
01/22/89	8845	2	1756	16:00:00	NONE	200	UNKNOWN					CLEAR	ATB	NO	NO
01/23/89	1044	2	1757	10:30:00	NONE	200	TAKEOFF	0 100					NONE	YES	YES
01/23/89	1045	2	891008	10:30:00	NONE	200	TAKEOFF	0 100				OVERCAST	NONE	NO	SEVERAL
01/23/89	1410	2	891009	10:30:00	NONE	200	LANDING	0 160				OVERCAST	ATB	NO	NO
01/26/89	1334	2	891010	10:00:00	NONE	100	CLIMB	1000				OVERCAST	NONE	NO	
01/27/89	8847	2	238	19:20:00	NONE	200	LANDING	0 100				CLEAR	ATB	NO	NO
01/27/89	8867	2	891009	19:20:00	NONE	300	UNKNOWN						NONE	NO	
01/27/89	8867	2	891009	19:20:00	NONE	300	UNKNOWN						NONE	NO	
01/27/89	8868	2	891007	19:20:00	NONE	300	UNKNOWN						NONE	NO	
01/29/89	8869	2	891008	19:20:00	NONE	300	TAXI	0 0					NONE	NO	ONE
01/29/89	870	2	891009	19:20:00	MULT	300	TAKEOFF	0 -V1				CLEAR	ATB	NO	SEVERAL
01/29/89	1204	2	891010	19:20:00	NONE	300	TAKEOFF	0 130					NONE	NO	SEVERAL
01/30/89	1871	2	891010	19:20:00	NONE	300	LANDING	0				CLEAR	NONE	NO	ONE
02/01/89	1411	2	891011	17:37:00	NONE	300	TAKEOFF	0					NONE	NO	
02/05/89	8817	2	249	17:37:00	MULT	200	TAKEOFF	50 140				CLEAR	NONE	NO	ONE

DATE	EV#	ENG	POS	BIRD	NAM	BIRD	SPE	#	BIRDS	WT	OZ	1	CTY	PRS	AIRPORT	LOCALE	US	INCID	ENGINE	DASH
12/07/88	715	2					1	1					GSP			GREENVILLE, SC	YES		CFM56	3
12/07/88	716	1					1	1					FRA			FRANKFURT, GERMANY	NO		CFM56	3
12/07/88	717	1					*	*					DUS			DUSSELDORF, GERMANY	NO		CFM56	3
12/07/88	1239	1					*	*					DUS			DUSSELDORF, GERMANY	NO		CFM56	3
12/10/88	1283	1					*	*					BOD			BORDEAUX, FRANCE	NO		CFM56	3
12/11/88	717	1					1	1					DUS-TFS			DUSSELDORF, GERMANY	NO		CFM56	3
12/11/88	718	1					1	1					-AMS			AMSTERDAM, NETHERLANDS	NO		CFM56	3
12/11/88	842	2					1	1					BHI			BAHIA BLANCA, ARGENTINA	NO		CFM56	9A
12/11/88	843	2					1	1					BHI			BAHIA BLANCA, ARGENTINA	NO		CFM56	9A
12/11/88	843	2					*	*					TTJ			TOTTORI, JAPAN	NO		CFM56	9A
12/13/88	816	2					*	*					-GOI			AUKLAND, NEW ZEALAND	NO		CFM56	15A
12/13/88	1043	2					8.						AKL			AKLAND, NEW ZEALAND	NO		CFM56	17
12/14/88	817	1											XFO			INDIA	NO		CFM56	9A
12/14/88	817	1											XFO			ARGENTINA	NO		CFM56	9A
12/14/88	817	1											ELP			EL PASO, TX	YES		CFM56	9A
12/15/88	719	1					*	*					AMS			AMSTERDAM, NETHERLANDS	NO		CFM56	3
12/15/88	818	2					1	1					AMS			AMSTERDAM, NETHERLANDS	NO		CFM56	3
12/18/88	820	2					1	1					ANC-ADQ			KODIAK, ALASKA	YES		CFM56	17A
12/19/88	820	2					1	1					ISP-PIT			LONG ISLAND, NY	YES		CFM56	17A
12/19/88	819	1					1	1					SLA-BUE			SALTA, ARGENTINA	NO		CFM56	9A
12/20/88	820	1					1	1					BFN-KIM			BLOEMFONTEIN, S. AFRICA	NO		CFM56	17A
12/20/88	844	2					*	*					AMS			AMSTERDAM, NETHERLANDS	NO		CFM56	3
12/20/88	844	2					*	*					AMS			AMSTERDAM, NETHERLANDS	NO		CFM56	3
12/20/88	1301	1					*	*					BFN-JNB			BLOEMFONTEIN, S. AFRICA	NO		CFM56	17A
12/21/88	821	1					*	*					BFN-JNB			BLOEMFONTEIN, S. AFRICA	NO		CFM56	17A
12/21/88	821	1					*	*					BFN-JNB			BLOEMFONTEIN, S. AFRICA	NO		CFM56	17A
12/21/88	822	1					*	*					ALB-PHL			PHILIA, PA	YES		CFM56	3
12/22/88	721	1					1	1					CDG			PARIS, FRANCE	NO		CFM56	17A
12/22/88	722	1					*	*					-HOU			HOUSTON, TX	YES		CFM56	3
12/23/88	727	1					1	1					SJC			SAO JOSE, CA	YES		CFM56	3
12/23/88	727	1					1	1					SAT-DAL			SAN ANTON				

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

DATE	EV#	ENG POS	DWG CODE	SEVERITY	POW LOSS	MAX_VIBE	THROTTLE	IFSD	VIBES	REMARKS
12/07/88	715	2	A,C	3	NONE	HIGH			NO	1 F BLD BENT AT TIP
12/07/88	716	2		3	NONE				NO	
12/07/88	1239	1	A,Q	4					NO	
12/07/88	1239	1	A,K,Q	4					NO	
12/10/88	1283	1	A,H	1	NONE	4.0			NO	18 F BLDs + 8 COMP BLDs UNK DAMAGE 4 F BLDs MARKED DUE TO SHINGLING FOUND ON GRD INSPEC.
12/11/88	718	2	A,C	3	NONE				NO	
12/11/88	842	1	A,C	3	NONE				NO	
12/12/88	843	1	A,C	3	NONE				NO	
12/13/88	816	0		0					NO	
12/13/88	1043	0		0		YES			NO	
12/14/88	811	3	A,H	3	NONE				NO	
12/14/88	1242	1		3	NONE				NO	
12/15/88	719	1	A,C	3	NONE				NO	
12/18/88	818	2	A,C	3	NONE				NO	
12/19/88	709	2	A,C,H	3	NONE				NO	ODOR IN CABIN 2 FBLDS SHINGLED, OTHER BLDs LIGHT DENTS
12/20/88	820	1	A,H	3	NONE				NO	
12/20/88	844	3	A,Q	3	NONE				NO	
12/20/88	1301	1	A,Q	4	NONE				NO	
12/21/88	821	1	A,C	0	NONE				NO	
12/21/88	825	1		0	NONE				NO	
12/21/88	825	1		0	NONE				NO	
12/22/88	1232	1		0	NONE				NO	SEVERE DAMAGE ON C12 BLDs AND C11 STATOR
12/23/88	797	2		0	NONE				NO	FOUND ON GRD INSPEC
12/25/88	723	2	A,C,H	0	NONE				NO	
12/25/88	723	2	A	0	NONE				NO	ATO/STALL ON 12/27 CORE DAM UNK CAUSE ENGINE REMOVED, 3 F BLDs REPLACED
12/28/88	823	3	A,C,H	3	NONE				NO	FOUND ON GRD INSPEC
12/30/88	725	1	A,J	4	NONE		IDLE		NO	ENG NOISE CHANGED AT ROTATION
12/31/88	726	1	A	4	NONE		IDLE		NO	SPINNER BATTERED
12/31/88	727	1		4	NONE				NO	ENG NOISE CHANGED AT ROTATION
12/31/88	834	1		0	SLIGHT				NO	EPR SYMPTOM, SLIGHT MOMENTARY POW LOSS
01/01/89	1355	1	A,C,K	1	NONE				NO	FOUND ON GRD INSPEC, 2 F BLDs MINOR BENDS
01/03/89	825	2	A,C	1	YES	SOME			NO	
01/06/89	826	1		3					NO	
01/08/89	827	1	A,B,H	3					NO	
01/11/89	863	1	A,B,H	3					NO	
01/11/89	863	1	A,B,H	3			RETARD		NO	PILOT REDUCED POWER TO REDUCE VIBS
01/11/89	863	1	A,B,H	3					NO	
01/12/89	1350	1		4					NO	
01/12/89	1350	1		4					NO	
01/14/89	1424	1		0					NO	
01/16/89	865	1		0					NO	
01/17/89	1342	1		0					NO	
01/19/89	828	1	A,C,H	3	COMPRESSOR	HIGH			NO	FOUND ON GRD INSPEC
01/19/89	829	1	A,C	3	COMPRESSOR				NO	AC YAWED, NOTICEABLE CHANGE IN ENG PARAM PM EVENT
01/20/89	1333	1		3	NONE				NO	
01/20/89	1333	1		3	NONE				NO	
01/22/89	845	1		0					NO	FOUND ON GRD INSPEC
01/23/89	1044	1		0					NO	
01/23/89	1045	1		0					NO	
01/23/89	1410	1	A,Q	4					NO	
01/26/89	1334	1		0					NO	
01/27/89	846	1	A,H	3	NONE				NO	FOUND ON GRD INSPEC, 2 F BLDs CHANGED
01/27/89	867	1	A,H	3	NONE				NO	FOUND ON GRD INSPEC
01/27/89	868	1		3	NONE	IDLE			NO	
01/29/89	869	1		3	NONE				NO	
01/29/89	870	1	A,D	3	NONE				NO	AM EVENT
01/29/89	1204	1	A,D	3	NONE	3.5			NO	
01/30/89	871	1	A,Q	4		2.0			NO	
02/01/89	1411	1	A,Q	2	NONE				NO	ODOR, 5 F BLDs BENT
02/05/89	847	1	A,D	2	NONE				NO	

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

EDATE	EV#	ENG POS	MFG NO	ETIME	SIGN EVT	AIRCRAFT	POF	ALTITUDE	SPEED	FL RULES	LT CONDS	WEATHER	CREW AC	CREW AL	BIRD SEE
02/05/89	1046	1	1758	20:25:00	NONE	200	TAKEOFF	0 80				CLEAR	ATO	NO	SEVERAL
02/05/89	1435	1	89	9:14:00	MULT BIRDS	300	LANDING	10 135				SOME CLOUDS	NONE	NO	FLOCK
02/06/89	848	1	239	9:20:00	NONE	200	TAKEOFF	0 70		VFR	DAY	PARTLY CLOUD	NONE	NO	SEVERAL
02/06/89	1351	1	89	9:20:00	MULT ENG	100	CLIMB	500 150				OVERCAST	ATB	NO	ONE
02/06/89	1351	1	89	9:20:00	MULT ENG	100	CLIMB	500 150				OVERCAST	ATB	NO	ONE
02/07/89	850	2	241	20:20:00	NONE	200	TAKEOFF	0 140				FOG	NONE	NO	SEVERAL
02/07/89	850	2	891011	20:20:00	MULT BIRDS	300	APPROACH					FOG	NONE	NO	SEVERAL
02/08/89	1206	2	1759	14:32:00	NONE	200	TAKEOFF						ATB	NO	SEVERAL
02/08/89	1206	2	1759	14:32:00	NONE	200	TAKEOFF						ATB	NO	SEVERAL
02/10/89	1047	2	243	14:32:00	NONE	200	CLIMB	20 130			DAY	CLEAR	NONE	NO	FLOCK
02/11/89	1047	2	243	14:32:00	NONE	200	CLIMB	200 145				CLEAR	NONE	NO	FLOCK
02/11/89	1194	1	242	9:12:00	NONE	200	LANDING	200 160				CLEAR	ATB	NO	FLOCK
02/12/89	851	1	89	9:12:00	MULT ENG-BIRDS	100	TAKEOFF	200 160				CLEAR	ATB	NO	FLOCK
02/13/89	1417	2	89	9:12:00	MULT ENG-BIRDS	100	TAKEOFF	200 160				CLEAR	ATB	NO	FLOCK
02/13/89	1417	2	89	9:12:00	MULT ENG-BIRDS	100	TAKEOFF	200 160				CLEAR	ATB	NO	FLOCK
02/13/89	873	2	891012	9:59:00	NONE	300	TAKEOFF				OVERCAST	RAIN	NONE	NO	SEVERAL
02/14/89	1388	2	89	9:59:00	MULT ENG-BIRDS	300	TAKEOFF	0 130				SOME CLOUDS	NONE	NO	SEVERAL
02/14/89	1388	2	89	9:59:00	MULT ENG-BIRDS	300	TAKEOFF	0 130				SOME CLOUDS	NONE	NO	SEVERAL
02/15/89	852	2	245	10:44:00	MULT BIRDS	200	TAKEOFF	0 130				CLEAR	NONE	NO	FLOCK
02/15/89	852	2	891013	10:44:00	MULT BIRDS	200	TAKEOFF	0 130				CLEAR	NONE	NO	FLOCK
02/16/89	853	1	244		NONE	300	TAKEOFF						NONE	NO	FLOCK
02/20/89	1193	1	891014		NONE	300	LANDING	0 200 145		VFR	DAY	RAIN	NONE	NO	FLOCK
02/21/89	876	2	891015	23:27:00	NONE	500	TAKEOFF	5 140				CLEAR	ATB	NO	SEVERAL
02/22/89	854	2	246	23:27:00	NONE	300	TAKEOFF	0 120			NIGHT	CLEAR	ATB	NO	FLOCK
02/22/89	877	1	891016		NONE	300	CLIMB	3500 220		VFR		PARTLY CLOUD	NONE	YES	ONE
02/24/89	1191	2	0		NONE	300	LANDING	0 125				CLEAR	NONE	NO	FLOCK
02/24/89	1192	2	0		NONE	300	TAKEOFF	50 140				CLEAR	NONE	NO	FLOCK
02/26/89	855	1	247	20:00:00	NONE	500	TAKEOFF	4 160		VFR	DAY	CLEAR	NONE	YES	FLOCK
02/27/89	878	1	891017		NONE	300	TAKEOFF	0 80					NONE	NO	YES
02/28/89	1201	1	89	6:57:00	NONE	300	TAKEOFF						NONE	NO	YES
03/01/89	1446	1	248	18:35:00	NONE	300	TAKEOFF						NONE	NO	YES
03/02/89	856	1	891018		NONE	300	TAKEOFF						NONE	NO	YES
03/02/89	879	1	1760		NONE	300	TAKEOFF						NONE	NO	YES
03/02/89	1329	1	89		TRVS	200	LANDING	0					NONE	NO	ONE
03/03/89	857	1	156		NONE	300	LANDING	10 120		VFR	DAY	CLEAR	NONE	NO	ONE
03/03/89	880	1	891019		NONE	300	LANDING						NONE	NO	ONE
03/03/89	1202	1	0		NONE	300	TAKEOFF						NONE	NO	ONE
03/05/89	891	1	891020		NONE	300	TAKEOFF						NONE	NO	ONE
03/05/89	936	1	1625		NONE	300	TAKEOFF						NONE	NO	ONE
03/06/89	1316	1	101389		NONE	300	TAKEOFF						NONE	NO	ONE
03/08/89	937	1	1803		NONE	300	TAKEOFF						NONE	NO	ONE
03/08/89	1049	1	1761		NONE	300	TAKEOFF						NONE	NO	ONE
03/10/89	858	1	1633	6:40:00	NONE	200	TAKEOFF	10 140		IFR		CLEAR	ATB	NO	YES
03/11/89	858	1	157		NONE	200	TAKEOFF	0				SOME CLOUDS	NONE	NO	YES
03/11/89	858	1	157		NONE	200	TAKEOFF	0				SOME CLOUDS	NONE	NO	YES
03/14/89	882	1	891021	13:53:00	MULT ENG-BIRDS	300	LANDING	0				SOME CLOUDS	NONE	NO	FLOCK
03/14/89	882	1	1624	13:53:00	MULT ENG-BIRDS	300	LANDING	0				SOME CLOUDS	NONE	NO	FLOCK
03/15/89	939	1	89	7:27:00	NONE	200	TAKEOFF	20 150		VFR	DAY	SOME CLOUDS	NONE	NO	ONE
03/15/89	1366	1	1622		NONE	200	TAKEOFF	0 110				SOME CLOUDS	NONE	NO	ONE
03/16/89	1366	1	89		NONE	200	TAKEOFF	0 70			NIGHT	CLEAR	ATO	NO	FLOCK
03/18/89	859	1	253	13:45:00	NONE	200	LANDING				NIGHT	PARTLY CLOUD	NONE	NO	ONE
03/18/89	861	1	254	17:10:00	NONE	200	TAKEOFF	3000		VFR		CLEAR	NONE	NO	ONE
03/19/89	883	1	891022		NONE	400	APPROACH						NONE	NO	ONE
03/20/89	884	1	891023		NONE	300	LANDING						NONE	NO	ONE
03/23/89	860	1	1632		TRVS	300	UNKNOWN						NONE	NO	ONE
03/23/89	860	1	1632		TRVS	300	UNKNOWN						NONE	NO	ONE
03/23/89	860	1	1632		TRVS	300	UNKNOWN						NONE	NO	ONE
03/24/89	885	1	891024		NONE	300	UNKNOWN						NONE	NO	ONE
03/24/89	886	1	891025		NONE	300	UNKNOWN						NONE	NO	ONE
03/24/89	887	1	891026		NONE	300	UNKNOWN						NONE	NO	ONE
03/28/89	1338	1	891027	9:55:00	NONE	300	TAKEOFF	0 125			BRIGHT	CLEAR	NONE	NO	YES
03/28/89	1338	1	891027	8:00:00	NONE	300	TAKEOFF	0 10				OVERCAST	NONE	NO	ONE
03/31/89	942	2	1637	12:25:00	NONE	300	LANDING	0 110					NONE	NO	ONE
04/01/89	889	1	892001		NONE	200	UNKNOWN	50 124		VFR	DAY	CLEAR	NONE	NO	ONE
04/01/89	1050	1	1762		NONE	300	LANDING	0		VFR	DAY	CLEAR	NONE	NO	ONE
04/02/89	1051	1	1763		NONE	300	LANDING	0 200		VFR	DAY	CLEAR	NONE	NO	ONE
04/03/89	890	2	892002	9:15:00	NONE	300	UNKNOWN						NONE	NO	ONE

DATE	EVT#	ENG_POS	BIRD_NAM	BIRD_SPE	# BIRDS	WT_OZ_1	CTY_PRS	AIRPORT	LOCALE	US_INCID	ENGINE	DASH
02/05/89	1046	1	DOVE*	5N1	1	10.	LIH-MAU	MAA	MADRAS, INDIA	NO	JT8D	9A
02/05/89	1435	1	COMMON LAPWING	5N1	1	7.7		AMS	AMSTERDAM, NETHERLANDS	NO	CFM56	3
02/06/89	848	1	COMMON LAPWING	5N1	1	7.7		LIH	LIHUE, KAUAI, HAWAII	YES	JT8D	9A
02/06/89	1351	1			1	7.7		CDG	PARIS-DE GAULLE, FRANCE	NO	JT8D	
02/07/89	850	2			1		WDH-JNB	WDH	PARIS-DE GAULLE, FRANCE	NO	JT8D	
02/07/89	850	2			1			LAX	WINDHOEK, NAMIBIA	NO	JT8D	17A
02/08/89	1208	2			1		HYD-HYD	MYR	LOS ANGELES, CA	YES	CFM56	3
02/08/89	1047	2			1	32.	PLZ-ELS	PLZ	MYRTLE BEACH, SC	YES	JT8D	15
02/10/89	849	1	FALCON*		1	38.		ORF	INDIA	NO	JT8D	17A
02/11/89	1194	1	MALLARD		2			XUS	PORT ELIZABETH, S. AFRICA	YES	JT8D	17A
02/12/89	851	1			1		-LAX	CAS	NORFOLK, VA	YES	JT8D	7
02/13/89	1417	1	COMMON LAPWING	5N1	1	7.7		CAS	CASABLANCA, MOROCCO	NO	JT8D	
02/13/89	1417	1	COMMON LAPWING	5N1	1	7.7		CAS	CASABLANCA, MOROCCO	NO	JT8D	
02/14/89	873	2	COMMON GULL	14N13	1	15.	HAM-FRA	IAH	HAMBURG, GERMANY	NO	CFM56	3
02/14/89	1388	2	COMMON GULL	14N13	1	15.		IAH	HOUSTON, TX	YES	JT8D	
02/15/89	852	2	COMMON GULL		1	3.	KIM-CPT	KIM	KIMBERLEY, S. AFRICA	YES	JT8D	
02/15/89	852	2	COMMON GULL		1		YH2-YYT	YH2	GRAN CANARIA, CANARY ISL	NO	JT8D	17A
02/15/89	874	1	SWALLOW*		1			TOI	HALIFAX, CANADA	NO	JT8D	3
02/16/89	853	1			1			LAX	TENERIFE, CANARY ISL	YES	JT8D	
02/20/89	1193	1	SWALLOW*		1		-PHX	XFO	LOS ANGELES, CA	YES	JT8D	
02/21/89	876	1	KIEWIT*		1		CPT-JNB	CPT	PHOENIX, AZ	NO	JT8D	
02/22/89	854	1	GULL*		1		BEG-MOW	BEG	CAPE TOWN, S. AFRICA	NO	JT8D	17A
02/22/89	877	1	GULL*		1			PHL	BEUGRADE, YUGOSLAVIA	NO	JT8D	
02/24/89	1191	1	HAWK*		1		BFN-KIM	BFN	PHILA, PA	YES	JT8D	15
02/26/89	855	1	KIEWIT*		1		-TFS	MSY	NEW ORLEANS, LA	YES	CFM56	3
02/27/89	878	1	COMMON CROW	22Z85	1	16.8		XFO	BLOEMFONTEIN, S. AFRICA	NO	JT8D	
02/28/89	1201	1			1			MSY	JENNERF, LA	NO	JT8D	3
03/01/89	1446	2	SPUR-WINGED PLOVER	5N24	1	12.	WLG-AKL	WLG	TRIPOLI, LIBYA	YES	CFM56	
03/02/89	879	1			1		TGD-BEG	XFO	WELLINGTON, NEW ZEALAND	NO	JT8D	7B
03/02/89	1048	1			1		-TRV	XFO	YUGOSLAVIA	NO	CFM56	17
03/03/89	1320	1			1			AKL	INDIA	NO	JT8D	
03/03/89	857	1	MOURNING DOVE	2P105	1	4.		XUS	AUCKLAND, NEW ZEALAND	NO	JT8D	15
03/03/89	880	1			1		-PHX	XUS	PHOENIX, AZ	YES	CFM56	
03/05/89	1202	1	WESTERN MEADOW LARK	64Z68	1	4.		MAF	MIDLAND, TX	YES	CFM56	3
03/05/89	881	1			1		-DAL	XUS	DALLAS/FT WORTH, TX	YES	CFM56	3
03/05/89	936	1	PURPLE MARTIN	18Z12	1	2.		LIT	LITTLE ROCK, AR	YES	JT8D	9A
03/06/89	1316	1	GREY-HEADED GULL	14N29	1	7.6		XFO	HAMBURG, GERMANY	NO	CFM56	3
03/08/89	937	1			1		HAM-MUC	HAM	INDIA	NO	JT8D	15
03/09/89	1049	1	BLACK KITE	3K28	1	28.	HJR-VNS	XFO	HANOI, VIETNAM	NO	JT8D	9A
03/10/89	938	1	SPOTTED DOVE	2P65	1	6.	HAI-MUC	HAI	XIAMEN, CHINA	NO	JT8D	15
03/12/89	858	1	STARLING*		1		XNN-GHO	XNN	NEWCASTLE, ENGLAND	NO	CFM56	17A
03/14/89	882	1	STARLING*		1			NCL	NEWCASTLE, ENGLAND	NO	CFM56	3
03/15/89	930	2			1		-HOU	XUS	HOUSTON, TX	YES	CFM56	9A
03/15/89	1366	2	BLACK-HEADED GULL	14N36	1	10.		EDI	EDINBURGH, SCOTLAND	NO	JT8D	3
03/16/89	1399	2	WHITE THROATED SPARROW	68Z218	1	1.		MDW	CHICAGO, IL	YES	CFM56	9A
03/17/89	859	1	COMMON GULL	14N13	1	15.		LGA	LA GUARDIA, NY	YES	JT8D	17A
03/18/89	861	1	SECRETARY*	9N4	1	20.	KIM-JNB	KIM	KIMBERLEY, S. AFRICA	NO	JT8D	17A
03/19/89	883	1	SPOTTED THICK-KNEE		1		UTN-JNB	UTN	UPINGTON, S. AFRICA	NO	CFM56	3
03/20/89	884	1	GULL*	14N13	1	15.	CLT-LGA	LGA	LA GUARDIA, NY	YES	CFM56	9A
03/23/89	860	1	COMMON GULL		1			SJC	SAN JOSE, CA	YES	CFM56	3
03/23/89	860	1			1		PHC-	XFO	INDIA	NO	JT8D	17A
03/23/89	941	1			1		-SEA	XUS	PORT HARCOURT, NIGERIA	NO	JT8D	15
03/24/89	885	1			1		-BEG	XFO	SEATTLE/TACOMA, WA	YES	CFM56	3
03/24/89	886	1			1		-PHX	XUS	BEUGRADE, YUGOSLAVIA	NO	CFM56	3
03/28/89	1338	1			1			BRE	PHOENIX, AZ	YES	CFM56	3
03/28/89	1338	1			1		CJU-KWJ	CJU	BREMEN, GERMANY	NO	CFM56	3
03/31/89	942	2			1		MCI-MDW	XUS	CHEJU, KOREA	YES	CFM56	3
04/01/89	889	1	GULL*		1		COK-GOI	XFO	MO - IL	YES	JT8D	9A
04/01/89	1050	1			1		IXJ-IXC	IXC	EAST MIDLANDS, ENGLAND	NO	CFM56	3
04/02/89	1051	1			1			DCA	CHANDIGARH, INDIA	NO	JT8D	17
04/03/89	1199	1	COMMON ROCK DOVE	2P1	1	14.	-DAL	XUS	WASHINGTON, DC	YES	CFM56	3
04/03/89	890	1			1				DALLAS, TX	YES	CFM56	3

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

DATE	EVT#	ENG_POS	DMG_CODE	SEVERITY	POW_LOSS	MAX_VIBE	THROTTLE	IFSD	REMARKS
02/05/89	1046	1		0				NO	
02/05/89	1435	1		0					
02/06/89	848	1	A,C	3					ODOR, 2 ADJACENT BLDs BENT, AM EVENT
02/06/89	1351	1	A,Q	3					
02/06/89	1351	2	A,Q	4					
02/07/89	850	2	A,H	0	NONE			NO	ODOR
02/08/89	872	2	A	3	NONE			NO	ENG CHANGE
02/08/89	1208	2	A	4	NONE	HIGH		VIBES	FOUND ON GRD INSPEC
02/10/89	1047	2		0				NO	
02/11/89	1194	1		0	NONE			NO	PM EVENT
02/12/89	851	1	A,Q	0	NONE			NO	FOUND ON GRD INSPEC, ENG CHANGED
02/13/89	1417	1		4					
02/13/89	1417	2		0	NONE			NO	ODOR IN CABIN
02/14/89	873	2		0					
02/14/89	1388	2		0					
02/14/89	1388	2		0					
02/15/89	852	2	A,H	0	NONE			NO	ODOR
02/15/89	852	2	A,C	3	NONE			NO	
02/16/89	853	2	A,H	3	NONE	3.5		NO	
02/20/89	1193	1	A,C	0	NONE			NO	AM EVENT, ODOR
02/21/89	876	2	A,B	3	NONE			NO	FOUND ON GRD INSPEC, 1F BLD LE DISTORTED
02/22/89	854	2	A,H	0	COMPRESSOR			NO	AC YAWED
02/22/89	857	2	A,H	0	NONE			NO	ODOR, 4 F BLDs SHINGLED, 2 REPLACED
02/24/89	1191	2	A,H	0	NONE	4.0		NO	PM EVENT
02/24/89	1191	2	A,H	0					
02/26/89	1192	1		0	NONE			NO	FOUND ON GRD INSPEC
02/27/89	878	1		0	NONE			NO	PM EVENT
02/28/89	1210	1		0					
03/01/89	1446	2	A,G,K	0	NONE			NO	ODOR
03/02/89	856	2	A,B	3	NONE			NO	FOUND ON GRD INSPEC, 1F BLD LE DISTORTED
03/02/89	879	2	A,Q	0	NONE			NO	FOUND ON GRD INSPEC
03/02/89	1048	1	A,I	4	NONE			NO	ODOR, PM EVENT
03/03/89	1329	1		0	NONE			NO	FOUND ON GRD INSPEC
03/03/89	880	2		0	NONE			NO	ODOR, PM EVENT
03/03/89	880	2		0	NONE			NO	ODOR
03/05/89	1202	1		0	COMPRESSOR			NO	
03/05/89	881	1		0				NO	
03/05/89	936	1		0				NO	
03/06/89	1316	1		0				NO	
03/08/89	937	1		0				NO	
03/09/89	1049	1	A,G	0	NONE			NO	ODOR
03/10/89	938	1	A,D,G	0				NO	3 F BLDs BROKEN, 1 LARGE BIRD
03/10/89	938	1		0				NO	
03/12/89	882	1		0		HIGH		NO	
03/14/89	882	1		0	NONE			NO	
03/14/89	882	1		0	NONE			NO	
03/15/89	939	2		0	NONE			NO	
03/15/89	1360	2		0				NO	AM EVENT
03/16/89	1740	2		0	COMPRESSOR			VOLUNTARY	
03/17/89	1399	2	A,Q	4				NO	3 F BLDs DAMAGED
03/18/89	859	2	A,B,C	3	NONE			NO	PM EVENT
03/18/89	861	2	A,C,H	3	NONE			NO	ODOR
03/19/89	883	2		0				NO	
03/20/89	884	2	A,I	0	NONE			NO	FOUND ON GRD INSPEC
03/23/89	880	1	A	0	NONE			NO	1 BENT F BLD
03/23/89	941	1	A,C	4	NONE			NO	FOUND ON GRD INSPEC
03/24/89	885	1		0	NONE			NO	FOUND ON GRD INSPEC
03/28/89	887	1		0	NONE			NO	2 F BLDs WITH LE DENTS
03/28/89	1378	1	A,B	0	NONE			NO	
03/31/89	888	1		0	NONE			NO	
04/01/89	942	2		0	NONE			NO	
04/01/89	889	1		0				NO	
04/02/89	1051	1		0				NO	
04/02/89	1190	2		0				NO	
04/03/89	1890	1		0	NONE			NO	AM EVENT

EDATE	EVT#	ENG_POS	MFG_NO	ETIME	SIGN_EVT	AIRCRAFT	POF	ALTITUDE	SPEED	FL RULES	LT CONDS	WEATHER	CREW AC	CREW AL	BIRD	SEE
04/04/89	891	1	892003		NONE	300	TAKEOFF	0				CLEAR	NONE	NO		
04/04/89	1448	2	89		NONE	100	TAKEOFF						NONE	NO		
04/06/89	1413	1	89		NONE	300	LANDING						NONE	NO	YES	
04/07/89	892	2	892004		NONE	300	TAKEOFF						NONE	NO		
04/07/89	1357	1	89		NONE	200	TAKEOFF	0 70				CLEAR	NONE	NO	SEVERAL	
04/07/89	1427	1	89	19:10:00	NONE	300	TAKEOFF						NONE	NO		
04/08/89	893	1	892005		NONE	300	UNKNOWN						NONE	NO		
04/08/89	894	2	892006		NONE	300	TAKEOFF						NONE	NO		
04/08/89	895	1	892007	20:40:00	NONE	300	APPROACH	1500 180			OVERCAST	RAIN	NONE	NO	ONE	
04/09/89	896	1	892008		NONE	300	UNKNOWN						NONE	NO		
04/10/89	897	2	892009		NONE	200	TAKEOFF						NONE	NO	NO	
04/11/89	898	2	892010		NONE	400	LANDING	0					NONE	NO		
04/13/89	898	2	892011		NONE	300	CLIMB						NONE	NO		
04/14/89	1387	2	89		NONE	200	UNKNOWN						NONE	NO		
04/15/89	899	2	892012	20:06:00	NONE	300	LANDING	80 250				CLEAR	NONE	NO	SEVERAL	
04/16/89	900	2	892013	16:00:00	NONE	300	TAKEOFF	0 135					NONE	NO		
04/16/89	943	1	1631		BIRDS	200	UNKNOWN	0			CLEAR		NONE	NO		
04/16/89	944	2	1630		MULT	200	UNKNOWN						NONE	NO		
04/16/89	1373	1	89	18:42:00	NONE	200	TAKEOFF	0 102			SOME CLOUDS		NONE	NO	ONE	
04/16/89	1428	2	89	19:31:00	NONE	200	TAKEOFF	0 90			CLEAR		NONE	NO	SEVERAL	
04/19/89	901	1	892013		NONE	300	TAKEOFF	1000 155					NONE	NO	ONE	
04/19/89	946	1	1640	17:49:00	NONE	200	APPROACH	530 150					NONE	NO	ONE	
04/20/89	947	1	1638	20:00:00	NONE	200	CLIMB						NONE	NO	ONE	
04/21/89	948	2	1632	11:30:00	NONE	200	LANDING						NONE	NO	FLOCK	
04/21/89	949	2	1648		NONE	200	UNKNOWN						NONE	NO		
04/21/89	1052	2	1764	7:30:00	NONE	200	LANDING	100					NONE	NO	SEVERAL	
04/23/89	951	1	1633		NONE	200	TAKEOFF						NONE	NO		
04/23/89	951	1	1634		NONE	200	TAKEOFF						NONE	NO		
04/23/89	1430	2	89		NONE	100	UNKNOWN						NONE	NO		
04/25/89	902	1	892014	15:45:00	NONE	200	LANDING	0 80			BRIGHT		NONE	NO	YES	
04/25/89	1365	1	89	16:30:00	NONE	200	TAKEOFF	0 100					NONE	NO	ONE	
04/25/89	1449	1	89		NONE	200	TAKEOFF						NONE	NO		
04/26/89	903	2	892015		NONE	300	UNKNOWN						NONE	NO		
04/27/89	952	2	1635		NONE	200	TAKEOFF	100					NONE	NO	FLOCK	
04/27/89	953	2	1636		NONE	200	TAKEOFF						NONE	NO		
04/28/89	904	1	892016	9:45:00	BIRDS	200	UNKNOWN						NONE	NO		
04/28/89	905	2	892017		NONE	300	UNKNOWN						NONE	NO		
04/29/89	906	1	892018		NONE	300	UNKNOWN						NONE	NO		
04/30/89	907	1	892019		NONE	300	UNKNOWN						NONE	NO		
04/30/89	954	2	1637	19:31:00	BIRDS	200	TAKEOFF						NONE	NO		
04/30/89	1209	1	89		NONE	200	CLIMB	2700 190		VFR	NIGHT		NONE	NO	SEVERAL	
04/30/89	1343	1	89	18:35:00	NONE	200	LANDING	0 135				BELOW CLOUDS	NONE	NO	ONE	
05/01/89	1330	1	89	14:16:00	NONE	300	TAKEOFF	0 100				CLEAR	NONE	NO	ONE	
05/06/89	1053	1	1765	15:45:00	NONE	200	TAKEOFF	0 120					NONE	NO	YES	
05/07/89	908	1	892020	18:00:00	BIRDS	200	LANDING				LIGHT		NONE	NO		
05/07/89	955	1	1647		NONE	200	TAKEOFF	150 250					NONE	NO		
05/08/89	909	1	892021		NONE	200	APPROACH						NONE	NO		
05/08/89	910	1	892022		NONE	400	LANDING	0					NONE	NO		
05/08/89	956	1	1641		NONE	200	UNKNOWN						NONE	NO		
05/10/89	911	1	892023		NONE	300	UNKNOWN						NONE	NO		
05/12/89	912	1	892024		NONE	300	UNKNOWN						NONE	NO		
05/12/89	1381	1	89		NONE	400	UNKNOWN						NONE	NO		
05/13/89	1374	2	89	17:00:00	NONE	300	TAKEOFF	200 145				OVERCAST	NONE	NO	ONE	
05/13/89	1431	1	89	8:45:00	NONE	300	TAKEOFF	0 110				SOME CLOUDS	NONE	NO	SEVERAL	
05/14/89	913	1	892025		NONE	200	APPROACH	300 140				RAIN	NONE	NO	SEVERAL	
05/15/89	1321	1	89		NONE	300	TAKEOFF	0 60					NONE	NO	ONE	
05/16/89	957	1	1642		NONE	300	CLIMB	3000 250			BRIGHT	SOME CLOUDS	NONE	NO	SEVERAL	
05/17/89	1054	2	1766		NONE	200	LANDING	0					NONE	NO	YES	
05/17/89	1340	1	89	18:34:00	BIRDS	200	UNKNOWN						NONE	NO	FLOCK	
05/18/89	914	1	892026		NONE	300	TAKEOFF	0 100				SOME CLOUDS	NONE	NO	SEVERAL	
05/19/89	1419	1	89	4:10:00	BIRDS	300	CLIMB	1000 170				CLEAR	NONE	NO		
05/20/89	915	2	892027		NONE	300	UNKNOWN						NONE	NO	SEVERAL	
05/20/89	958	1	1662		NONE	200	UNKNOWN						NONE	NO		
05/20/89	1055	1	1767		NONE	200	UNKNOWN						NONE	NO		
05/20/89	1382	1	89	16:35:00	NONE	200	APPROACH	2500 190					NONE	NO	ONE	
05/24/89	1367	1	89	8:20:00	NONE	300	LANDING	0 110				CLEAR	NONE	NO	ONE	
05/25/89	916	1	892028		NONE	400	LANDING						NONE	NO		

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

EDATE	EV#	ENG_POS	BIRD_NAM	BIRD_SPE	# BIRDS	WT_OZ_1	CTY_PRS	AIRPORT	LOCALE	US_INCID	ENGINE	DASH
04/04/89	891	1	RED-WINGED THRUSH	41Z281	1	2.4	KHI-LHE	KHI	KARACHI, PAKISTAN	NO	CFM56	3
04/04/89	1448	2	COMMON STARLING	21Z75	1	2.8	FNC-BRU	XFO	UNKNOWN TX	NO	JT8D	
04/06/89	1413	1			1			LBB	FUNCHAL, PORTUGAL	YES	CFM56	3
04/07/89	892	1			1			FNC	BREMEN, GERMANY	NO	CFM56	3
04/07/89	1339	1	COURSER*		1			BRE	UPINGTON, S. AFRICA	NO	JT8D	
04/07/89	1427	1			1			UTN	DALLAS/FT. WORTH TX	YES	CFM56	3
04/08/89	893	2			1			XUS	FRANKFURT, GERMANY	NO	CFM56	3
04/08/89	894	1			1			FRA	ATHENS, GREECE	NO	JT8D	
04/08/89	895	1			1			DUS	FRANKFURT, GERMANY	NO	CFM56	3
04/09/89	896	1	HUNGARIAN PARTRIDGE	4L85	1	14.1	-ATH	XFO	DUSSELDORF, GERMANY	NO	CFM56	3
04/10/89	862	1			1			ORF	NORFOLK VA	YES	CFM56	3
04/11/89	897	1			1			ORD	LONDON-STANSTED, ENGLAND	NO	JT8D	
04/11/89	898	2			1			STN	FRANKFURT, GERMANY	NO	CFM56	3
04/13/89	898	2			1			FRA	AFRICA	NO	JT8D	15
04/14/89	1181	2	GOOSE*		1			XFO	GREENSBORO, NC	YES	CFM56	3
04/14/89	1387	2			1			GSO	AMSTERDAM, NETHERLANDS	NO	CFM56	3
04/15/89	899	2			1			AMS	AMSTERDAM	NO	JT8D	9A
04/16/89	900	2			1			AMS	CANADA	NO	JT8D	9A
04/16/89	943	2	HERRING GULL	14N14	1	40.	YHZ-YUL	XFO	MIDLAND/ODESSA, TX	YES	CFM56	3
04/16/89	944	2	KILLDEER	5N33	1	3.	-MAF	XFO	OSLO, NORWAY	NO	JT8D	
04/16/89	1373	2	PIGEON*		1			UTN	UPINGTON, S. AFRICA	NO	JT8D	
04/16/89	1428	2	LAPWING*		1			OSL	SAN FRANCISCO, CA	YES	CFM56	3
04/19/89	901	1			1			SFO	DELHI, INDIA	NO	JT8D	17
04/19/89	946	1	INDIAN WHITE VULTURE	3K46	1	192.	-LGB	SFO	EAST LONDON, S. AFRICA	YES	CFM56	17A
04/20/89	947	2	CROWNED PLOVER	5N11	1	3.	ELS-DUR	ELS	SALT LAKE CITY, UT	YES	JT8D	
04/21/89	948	2	AMERICAN ROBIN	41Z314	1		SUC-SLC	SUC	COIMBATORE, INDIA	NO	JT8D	17
04/21/89	949	2			1			XFO	MEDINA, SAUDI ARABIA	NO	JT8D	9A
04/21/89	1052	1	KITE*		1		BLR-CJB	CJB	TX	YES	JT8D	9A
04/23/89	950	1	CUCKOO	2R15	1	4.	MED-JED	MED	PALEMO, ITALY	NO	CFM56	3
04/23/89	951	1	HORNED LARK	1Z774	1	2.	DAL-	XUS	TOMNSVILLE AUSTRALIA	NO	JT8D	
04/23/89	1430	2			1			PHO	EAST MIDLANDS, ENGLAND	NO	CFM56	3
04/23/89	902	1	KITE HAWK*	2S124	1	13.		TSV	UNKNOWN	NO	JT8D	
04/23/89	1365	1	SHORT-EARED OWL		1			EMA	DALLAS TX	YES	CFM56	3
04/25/89	1449	1	WARBLER*	2P1	1	14.	-DAL	XUS	CHICAGO, IL	YES	JT8D	7B
04/26/89	903	2	COMMON ROCK DOVE		1	16.	CID-DEN	CID	NEWARK, NJ	YES	CFM56	3
04/27/89	952	2	GULL*	2P1	1	14.	ORD-LNK	ORD	PHOENIX, AZ	YES	CFM56	3
04/28/89	953	2	ROCK DOVE		1		-EWR	XUS	BELGRADE, YUGOSLAVIA	NO	CFM56	3
04/28/89	905	1			1		-BEG	XFO	AMSTERDAM	NO	JT8D	7B
04/28/89	906	1			1		-SPL	XFO	SAVANNAH, GA	YES	JT8D	
04/30/89	907	2	COMMON STARLING	21Z75	1	2.8	SAV-IAD	SAV	ATLANTA, GA	YES	JT8D	
04/30/89	954	1	COMMON GULL	14N13	1	15.		ATL	CALCUTTA, INDIA	NO	CFM56	3
04/30/89	1200	1			1			CCU	BARCELONA, SPAIN	NO	JT8D	17
05/01/89	1333	1			1			BCN	DELHI, INDIA	NO	CFM56	3
05/01/89	1330	1			1			CTU	CHENGDU, CHINA	NO	CFM56	3
05/06/89	1053	1			1			DEL	MANAGUA, NICARAGUA	NO	CFM56	3
05/07/89	908	1	SWAINSON'S HAWK	3K171	2	32.	MGA-SJO	MGA	BRUSSELS, BELGIUM	NO	CFM56	3
05/07/89	955	1			1			BRU	DETROIT, MI	YES	CFM56	3
05/08/89	909	1	RING-NECKED PHEASANT	4L161	1	44.	-YHZ	XFO	CANADA	NO	JT8D	9A
05/08/89	910	1			1			DET	IOWA - ARIZONA	YES	CFM56	3
05/08/89	926	2	SORA	7M84	1	3.	SUX-PHX	XUS	LONDON-GATWICK, ENGLAND	NO	CFM56	3
05/10/89	911	1			1		-LGM	XFO	BOSTON, MA	YES	CFM56	3
05/12/89	912	1	SPARROW*		1			BOS	FRANKFURT, GERMANY	NO	CFM56	3
05/13/89	1381	1			1			FRA	REUS, SPAIN	NO	JT8D	
05/13/89	1374	1			1			LEH	AJACCIO, FRANCE	NO	CFM56	3
05/13/89	1431	1	ROCK DOVE*	14N14	1	14.	AJA-ORY	AJA	LITTLEROCK, AK	YES	CFM56	3
05/13/89	913	1	HERRING GULL		1			LIT	ROME-DA VINCI, ITALY	NO	JT8D	15A
05/15/89	1361	1	GULL*		1		LHR-FCO	FCO	INDIA	NO	JT8D	9A
05/17/89	1054	2			1		IXU-UDR	XFO	BREMEN, GERMANY	NO	CFM56	3
05/17/89	1340	1	PIGEON*		1			BRE	TENERIFE, CANARY ISLANDS	NO	CFM56	3
05/18/89	914	1	ROCK DOVE*		1			TFS	MUNICH, GERMANY	NO	CFM56	3
05/19/89	914	1	STARLING*		1			MUC	FRANKFURT, GERMANY	NO	JT8D	15A
05/19/89	1410	2	SWIFT	1U55	1	2.	1ST-LHR	XFO	TURKEY - ENGLAND	NO	JT8D	15
05/20/89	915	1			1		-HYD	XFO	INDIA	NO	JT8D	
05/20/89	928	1	LAPWING*		1			LHR	LONDON-HEATHROW, ENGLAND	NO	CFM56	3
05/20/89	1055	2			1			EDI	EDINBURGH, SCOTLAND	NO	CFM56	3
05/20/89	1386	1			1			REF	REYKJAVIK, ICELAND	NO	CFM56	3
05/24/89	1367	1			1							
05/25/89	916	1			1							

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

DATE	EVT#	ENG_POS	DMG_CODE	SEVERITY	POW_LOSS	MAX_VIBE	THROTTLE	IFSD	REMARKS
04/04/89	891			9	NONE	2.5		NO	
04/04/89	1448			9	NONE			NO	
04/06/89	1413			3	NONE			NO	2 F BLDs WITH SERVICEABLE LE TIP CURL
04/07/89	892	A,B		4	NONE			NO	FOUND ON GRD INSPEC
04/07/89	1357	A,Q		9	NONE			NO	STAINS ON 3 F BLDs AND IGV'S
04/07/89	1427			9	NONE			NO	1 F BLD WITH LE TIP CURL
04/08/89	893			9	NONE			NO	2 IN. CHIP OUT OF FAN BLADE
04/08/89	894			9	NONE			NO	1 F BLD DAMAGED, DAMAGE UNKNOWN
04/08/89	895	A,B		9	COMPRESSOR			NO	OIL COOLER CLOGGED, 3 F BLDs LE DAMAGE
04/09/89	896	A,G		3	NONE			NO	
04/10/89	897	A		2	NONE			NO	
04/11/89	898	A,B		3	NONE			NO	
04/13/89	898	A,C		3	NONE			NO	
04/14/89	1181			3	NONE			NO	
04/14/89	1387	A,H		3	NONE			NO	
04/15/89	899			3	NONE			NO	
04/16/89	900			3	NONE			NO	
04/16/89	943	A,H		3	NONE			NO	
04/16/89	944	A,C,G,H		2	NONE			NO	
04/16/89	1373			0	NONE			NO	
04/16/89	1428			0	NONE			NO	
04/19/89	901			0	NONE			NO	
04/19/89	946	A,C		3	NONE			NO	
04/20/89	947			3	NONE			EGT	
04/21/89	948			2	NONE			NO	
04/21/89	949	A,B,C,G		2	NONE			NO	
04/21/89	1052	A,C		3	NONE			NO	
04/23/89	950			0	NONE			NO	
04/23/89	951			0	NONE			NO	
04/23/89	1430			0	NONE			NO	
04/25/89	902	A,B,G		2	NONE	2.8		NO	
04/25/89	1365			0	NONE			NO	
04/25/89	1449			0	NONE			NO	
04/26/89	903			0	COMPRESSOR			NO	
04/27/89	952			0	COMPRESSOR	HIGH		NO	
04/27/89	953	A,I,K,N		1	NONE			EGT	
04/28/89	904			9	NONE			NO	
04/28/89	905			9	NONE			NO	
04/28/89	906			9	NONE			NO	
04/30/89	907			9	NONE			NO	
04/30/89	954	A,G		2	NONE	YES		NO	
04/30/89	1200			0	NONE			NO	
04/30/89	1343	A,Q		4	NONE			NO	
05/01/89	1353			2	COMPRESSOR			NO	
05/06/89	1053	A,D,G		3	NONE			NO	
05/07/89	908	A,B		2	NONE			NO	
05/07/89	955	A,C,G,L		3	NONE			NO	
05/08/89	909			3	NONE			NO	
05/08/89	910	A,E		3	NONE	NONE		NO	
05/08/89	911			9	NONE			NO	
05/10/89	912			9	NONE			NO	
05/12/89	1381	A,Q		4	NONE			NO	
05/13/89	1374	A,Q		4	NONE			NO	
05/13/89	1431			4	NONE			NO	
05/14/89	913	A,H		3	NONE	3.0	RETARD	NO	
05/15/89	1321	A,Q		3	NONE			NO	
05/16/89	957	A,C		4	NONE			NO	
05/17/89	1054			0	NONE			NO	
05/17/89	1340			0	NONE			NO	
05/18/89	914	A		4	NONE			NO	
05/19/89	1419			9	NONE			NO	
05/20/89	915			9	NONE			NO	
05/20/89	958			0	NONE			NO	
05/20/89	1055			0	NONE			NO	
05/20/89	1382			0	NONE			NO	
05/22/89	1367			0	NONE			NO	
05/25/89	916			9	NONE			NO	

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

EDATE	EV#	ENG POS	MFG NO	ETIME	SIGN EVT	AIRCRAFT	POF	ALTITUDE	SPEED	FL RULES	LT_CONDS	WEATHER	CREW AC	CREW AL	BIRD SEE
05/25/89	959	1	1643	19:45:00	NONE	200	CLIMB	4000	120			CLEAR	NONE		ONE
05/25/89	960	1	1644		NONE	200	TAKEOFF	200	150	VFR	DAY	CLEAR	NONE	YES	ONE
05/25/89	1361	1	89	8:00:00	NONE	200	LANDING	200	135			SOME CLOUDS	NONE	NO	ONE
05/26/89	917	2	892030	14:15:00	NONE	300	UNKNOWN					SOME CLOUDS	NONE	NO	SEVERAL
05/27/89	918	2	892030		NONE	400	APPROACH	3500	210			SOME CLOUDS	DIV		FLOCK
05/28/89	1347	1	89	19:01:00	ENG	300	TAKEOFF	0	140		DUSK	RAIN	ATB		FLOCK
05/28/89	919	1	892031	19:01:00	MULT ENG	400	TAKEOFF	0	140		DUSK	RAIN	ATB		FLOCK
05/28/89	919	1	892032	19:01:00	MULT ENG	400	TAKEOFF	0	140				NONE		ONE
05/31/89	1056	2	1768	7:37:00	NONE	200	UNKNOWN	0	160			SOME CLOUDS	NONE	NO	ONE
05/31/89	1354	2	89	21:20:00	NONE	200	TAKEOFF	2000	165		NIGHT	CLEAR	NONE	NO	NO
05/31/89	1403	1	89		NONE	400	CLIMB	3000	240	VFR		CLEAR	NONE	NO	NO
06/01/89	1197	1	892033		NONE	300	CLIMB						NONE		
06/02/89	920	1	892033		NONE	300	UNKNOWN						NONE		
06/02/89	921	1	892033		NONE	300	APPROACH						NONE		
06/02/89	922	1	892033	4:20:00	NONE	300	TAKEOFF	0	90		OVERCAST	RAIN	NONE	NO	NO
06/03/89	923	1	892036		NONE	300	TAKEOFF						NONE	NO	ONE
06/03/89	1450	1	89		NONE	300	APPROACH	420	115	VFR	DAY	OVERCAST	NONE	NO	SEVERAL
06/04/89	1196	1	892037	12:26:00	NONE	300	TAKEOFF	0	134			LIGHT RAIN	ATB	NO	ONE
06/05/89	924	1	892038	12:50:00	NONE	300	TAKEOFF	0	135		LIGHT	LIGHT RAIN	ATB	NO	SEVERAL
06/07/89	925	1	892038		NONE	400	TAKEOFF						NONE	NO	ONE
06/07/89	926	1	892039		NONE	400	UNKNOWN						NONE	NO	ONE
06/08/89	1420	2	89	20:09:00	NONE	300	APPROACH	2500	180			SOME CLOUDS	NONE	NO	ONE
06/09/89	927	1	892040		NONE	300	UNKNOWN						NONE	NO	FLOCK
06/10/89	1360	1	89	9:40:00	MULT	300	LANDING	40	140			OVERCAST	NONE	NO	SEVERAL
06/11/89	1367	1	89	12:03:00	NONE	200	TAKEOFF	0	120			CLEAR	ATO	YES	FLOCK
06/11/89	1367	1	1649	16:48:00	MULT	200	TAKEOFF	0	90				ATO	NO	FLOCK
06/12/89	1406	1	89	7:11:00	NONE	200	TAKEOFF	0	110			SOME CLOUDS	ATO	YES	SEVERAL
06/13/89	962	1	962	21:05:00	FRAC	200	TAKEOFF	50	145	IFR	DAY	OVERCAST	ATB	YES	ONE
06/13/89	1057	1	1769		TRVS	200	TAKEOFF						NONE	NO	YES
06/14/89	1058	1	1770		NONE	200	UNKNOWN						NONE	NO	ONE
06/15/89	928	1	89	7:43:00	NONE	200	TAKEOFF	0					ATO	NO	ONE
06/15/89	928	1	892041		NONE	200	UNKNOWN						NONE	NO	NO
06/16/89	929	1	892042		NONE	300	CRUISE						NONE	NO	SEVERAL
06/18/89	1377	2	89	10:35:00	MULT	300	TAKEOFF	0	100			CLEAR	NONE	NO	SEVERAL
06/18/89	1418	2	89	12:00:00	NONE	300	TAKEOFF	0	165				NONE	NO	FLOCK
06/19/89	930	2	892043		MULT	300	TAKEOFF						NONE	NO	SEVERAL
06/19/89	963	2	1650		NONE	200	TAKEOFF	500	137				ATO	NO	SEVERAL
06/19/89	1362	1	89	10:56:00	NONE	200	APPROACH						NONE	NO	ONE
06/20/89	964	2	1651		NONE	200	UNKNOWN					OVERCAST	NONE	NO	ONE
06/20/89	1059	2	1771	10:50:00	NONE	200	LANDING	110					NONE	NO	SEVERAL
06/21/89	931	1	892044		NONE	500	UNKNOWN						NONE	NO	SEVERAL
06/21/89	1322	1	89	6:50:00	NONE	300	LANDING	0	120			SOME CLOUDS	NONE	NO	SEVERAL
06/21/89	1325	1	89	8:47:00	NONE	300	LANDING	0	110			CLEAR	NONE	NO	SEVERAL
06/22/89	965	1	1652	18:10:00	NONE	200	TAKEOFF	0	110			CLEAR	ATO	NO	ONE
06/22/89	1055	1		17:45:00	NONE	200	TAKEOFF		V2	VFR	NIGHT		NONE	NO	SEVERAL
06/23/89	932	2	892045	19:30:00	NONE	400	CLIMB	0					NONE	NO	SEVERAL
06/24/89	933	1	892046	5:50:00	TRVS	300	LANDING	0	135			CLEAR	ATO	NO	ONE
06/24/89	966	1	1653	6:05:00	ENG-BIRDS	200	TAKEOFF					SOME CLOUDS	NONE	NO	SEVERAL
06/24/89	1378	1	89	6:05:00	MULT	300	TAKEOFF					OVERCAST	NONE	NO	ONE
06/24/89	1378	1	89	6:05:00	ENG-BIRDS	300	TAKEOFF					OVERCAST	ATB	NO	FLOCK
06/25/89	934	2	892047	16:25:00	NONE	300	CLIMB	300	130			SOME CLOUDS	NONE	NO	SEVERAL
06/26/89	935	1	892048	12:30:00	NONE	300	LANDING	100	133			CLEAR	ATO	NO	SEVERAL
06/26/89	1324	1	89	19:30:00	MULT	200	TAKEOFF	0	110			CLEAR	NONE	NO	SEVERAL
06/28/89	967	1	1654	6:30:00	NONE	200	TAKEOFF						NONE	NO	SEVERAL
06/28/89	968	1	89	10:36:00	NONE	200	TAKEOFF	0	97			SOME CLOUDS	NONE	NO	SEVERAL
06/29/89	1415	2	89	6:18:00	MULT	300	LANDING	10	135			CLEAR	NONE	NO	SEVERAL
07/02/89	1415	2	89	6:18:00	MULT	200	LANDING	0	80			SOME CLOUDS	NONE	NO	ONE
07/03/89	1060	2	1772	22:55:00	NONE	300	CLIMB			VFR	DARK		NONE	NO	ONE
07/04/89	969	1	892001		NONE	200	TAKEOFF						ATO	NO	ONE
07/06/89	1347	1	1656	3:24:00	NONE	200	TAKEOFF						NONE	NO	ONE
07/07/89	1347	1	892002		NONE	300	UNKNOWN						NONE	NO	ONE
07/07/89	1116	1	1784		NONE	200	UNKNOWN						NONE	NO	ONE
07/08/89	1422	2	89	13:43:00	NONE	100	TAKEOFF	0				SOME CLOUDS	NONE	NO	ONE
07/09/89	1117	2	892003		NONE	300	TAKEOFF					CLEAR	NONE	NO	ONE
07/09/89	1344	2	89	17:20:00	NONE	200	LANDING	0	80			SOME CLOUDS	NONE	NO	ONE
07/10/89	971	2	1778		TRVS	200	TAKEOFF		120				ATO		

EDATE	EV#	ENG	POS	BIRD	NAM	BIRD	SPE	#	BIRDS	WT	OZ	1	CTY	PRS	AIRPORT	LOCALE	US	INCID	ENGINE	DASH
05/25/89	959	1	1	1	1	5K27	1	1	1	8.	14.	1	8.	EAM-JED	EAM	NEJRAN, SAUDI ARABIA	NO	NO	JT8D	15
05/25/89	960	1	1	1	1	2P1	1	1	1	14.		1	14.		DAL	DALLAS/FT. WORTH, TX	YES	YES	JT8D	9A
05/25/89	1361	1	1	1	1		1	1	1			1			GOI	GOA, INDIA	NO	NO	JT8D	
05/26/89	918	2	2	2	2		1	1	1			1		-IAH	XUS	HOUSTON, TX	YES	YES	CFM56	3
05/27/89	918	2	2	2	2		1	1	1			1		ALC	ALC	ALICANTE, SPAIN	NO	NO	CFM56	3
05/28/89	1347	1	1	1	1		1	1	1			1		CWL	CWL	CARDIFF-WALES, ENGLAND	NO	NO	CFM56	3
05/31/89	919	1	1	1	1		1	1	1			1		VCE	VCE	VENICE, ITALY	NO	NO	CFM56	3
05/31/89	919	1	1	1	1		1	1	1			1		VCE	VCE	VENICE, ITALY	NO	NO	CFM56	3
05/31/89	1056	2	2	2	2		1	1	1			1		MAA-BLR	XFO	INDIA	NO	NO	JT8D	17A
05/31/89	1354	1	1	1	1		1	1	1			1		RPK	RPK	CHENJU, KOREA	NO	NO	JT8D	
05/31/89	1403	1	1	1	1		1	1	1			1		LCA	LCA	LARNACA, CYPRUS	NO	NO	CFM56	3
05/31/89	1197	1	1	1	1		1	1	1			1		TPA	TPA	TAMPA, FL	YES	YES	CFM56	3
06/01/89	920	1	1	1	1		1	1	1			1		FRA	FRA	FRANKFURT, GERMANY	NO	NO	CFM56	3
06/02/89	921	2	2	2	2		1	1	1			1		-FRA	XFO	FRANKFURT, GERMANY	NO	NO	CFM56	3
06/02/89	922	1	1	1	1		1	1	1			1		SVI	SVI	SYDNEY, AUSTRALIA	NO	NO	CFM56	3
06/03/89	923	1	1	1	1		1	1	1			1		CPH	CPH	COPENHAGEN, DENMARK	NO	NO	CFM56	3
06/03/89	1450	1	1	1	1		1	1	1			1		XFO	XFO	UNKNOWN	NO	NO	CFM56	3
06/04/89	1196	1	1	1	1		1	1	1			1		SAN-SLC	SLC	SALT LAKE CITY, UT	YES	YES	CFM56	3
06/05/89	924	1	1	1	1		1	1	1			1		LHR-GLA	LHR	LONDON-HEATHROW, ENGLAND	NO	NO	CFM56	3
06/07/89	925	2	2	2	2		1	1	1			1		EDI	EDI	EDINBURGH, SCOTLAND	NO	NO	CFM56	3
06/08/89	926	2	2	2	2		1	1	1			1		-SEL	XFO	SEOUL, S. KOREA	NO	NO	CFM56	3
06/08/89	1420	2	2	2	2		1	1	1			1		MUC	MUC	MUNICH, GERMANY	NO	NO	CFM56	3
06/09/89	927	1	1	1	1		1	1	1			1		-IAH	XUS	HOUSTON, TX	YES	YES	CFM56	3
06/10/89	927	1	1	1	1		1	1	1			1		NCE	NCE	NICE, FRANCE	NO	NO	CFM56	3
06/10/89	1360	1	1	1	1		1	1	1			1		TNG	TNG	TANGIER, MOROCCO	NO	NO	CFM56	3
06/11/89	1337	2	2	2	2		1	1	1			1		PLZ	PLZ	PORT ELIZABETH, S. AFRICA	NO	NO	CFM56	17A
06/12/89	961	1	1	1	1		1	1	1			1		LXS	LXS	LEMOS, GREECE	NO	NO	CFM56	17A
06/12/89	1406	2	2	2	2		1	1	1			1		PDB	PDB	PEDRO BAY, ALASKA	YES	YES	CFM56	17A
06/13/89	962	1	1	1	1		1	1	1			1		-BOM	XFO	INDIA	NO	NO	CFM56	3
06/13/89	1058	1	1	1	1		1	1	1			1		FMMI	FMMI	INDIA	NO	NO	CFM56	3
06/14/89	1390	2	2	2	2		1	1	1			1		XFO	XFO	INDIA	NO	NO	CFM56	3
06/15/89	928	1	1	1	1		1	1	1			1		LHR-CPH	XFO	IVATO, MADAGASCAR	NO	NO	CFM56	3
06/16/89	929	2	2	2	2		1	1	1			1		-HAJ	XFO	ENGLAND - DENMARK	NO	NO	CFM56	3
06/18/89	1377	1	1	1	1		1	1	1			1		LQW	LQW	HANOVER, GERMANY	NO	NO	CFM56	3
06/18/89	1418	2	2	2	2		1	1	1			1		CAS	CAS	LONDON-GATWICK, ENGLAND	NO	NO	CFM56	3
06/19/89	930	2	2	2	2		1	1	1			1		HOU	HOU	CASABLANCA, MOROCCO	NO	NO	CFM56	3
06/19/89	963	1	1	1	1		1	1	1			1		PUY	PUY	PULA, YUGOSLAVIA	NO	NO	CFM56	3
06/19/89	1362	1	1	1	1		1	1	1			1		ORD	ORD	HOUSTON, TX	YES	YES	CFM56	7B
06/20/89	964	2	2	2	2		1	1	1			1		DEL	DEL	DELHI, INDIA	NO	NO	CFM56	15
06/20/89	1059	1	1	1	1		1	1	1			1		XFO	XFO	JEDDAH, SAUDI ARABIA	NO	NO	JT8D	17
06/21/89	931	1	1	1	1		1	1	1			1		TRV	TRV	TRIVANDRUM, INDIA	NO	NO	CFM56	3
06/21/89	1322	1	1	1	1		1	1	1			1		AMD	AMD	SYDNEY, AUSTRALIA	NO	NO	CFM56	3
06/21/89	1325	1	1	1	1		1	1	1			1		MAH	MAH	MAHON, MENORCA, SPAIN	NO	NO	CFM56	3
06/22/89	965	1	1	1	1		1	1	1			1		IBZ	IBZ	IBIZA, SPAIN	NO	NO	CFM56	15
06/23/89	1195	1	1	1	1		1	1	1			1		PMI	PMI	DAYTONA BEACH, FL	YES	YES	CFM56	9
06/23/89	932	2	2	2	2		1	1	1			1		IBZ	IBZ	IBIZA, SPAIN	NO	NO	CFM56	3
06/24/89	933	1	1	1	1		1	1	1			1		LCA	LCA	LARNACA, CYPRUS	NO	NO	CFM56	7B
06/24/89	966	1	1	1	1		1	1	1			1		LDE	LDE	TARRES, FRANCE	NO	NO	CFM56	3
06/24/89	1378	2	2	2	2		1	1	1			1		SVG	SVG	LONDON-GATWICK, ENGLAND	NO	NO	CFM56	3
06/25/89	934	1	1	1	1		1	1	1			1		LQW	LQW	LONDON-GATWICK, ENGLAND	NO	NO	CFM56	3
06/26/89	935	2	2	2	2		1	1	1			1		YHZ	YHZ	STAVANGER, NORWAY	NO	NO	CFM56	3
06/27/89	1324	1	1	1	1		1	1	1			1		ALY	ALY	LONDON-GATWICK, ENGLAND	NO	NO	CFM56	3
06/28/89	967	2	2	2	2		1	1	1			1		BN	BN	ALEXANDRIA, EGYPT	NO	NO	CFM56	17A
06/28/89	968	1	1	1	1		1	1	1			1		YHZ	YHZ	BLOEMFONTEIN, S. AFRICA	NO	NO	CFM56	9A
06/29/89	1368	2	2	2	2		1	1	1			1		EDI	EDI	HALIFAX, CANADA	NO	NO	CFM56	3
07/02/89	1415	1	1	1	1		1	1	1			1		BRN	BRN	EDINBURGH, SCOTLAND	NO	NO	CFM56	3
07/02/89	1415	1	1	1	1		1	1	1			1		BRN	BRN	BRISTOL, ENGLAND	NO	NO	CFM56	9A
07/03/89	1060	2	2	2	2		1	1	1			1		GOI	GOI	GOA, INDIA	NO	NO	CFM56	9A
07/04/89	1115	1	1	1	1		1	1	1			1		BRN	BRN	BREMEN, GERMANY	NO	NO	CFM56	3
07/04/89	969	2	2	2	2		1	1	1			1		FRA	FRA	CALGARY, CANADA	NO	NO	CFM56	9A
07/06/89	1394	2	2	2	2		1	1	1			1		YHC	YHC	COPENHAGEN, DENMARK	NO	NO	CFM56	3
07/06/89	1116	1	1	1	1		1	1	1			1		CPH	CPH	MONTREY, MEXICO	NO	NO	CFM56	9A
07/07/89	970	2	2	2	2		1	1	1			1		XFO	XFO	DALLAS, TX	YES	YES	CFM56	3
07/08/89	1422	2	2	2	2		1	1	1			1		ORV	ORV	PARIS-ORLY, FRANCE	NO	NO	CFM56	9A
07/08/89	1422	2	2	2	2		1	1	1			1		ROA	ROA	ROANOK, VA	YES	YES	CFM56	3
07/09/89	1117	2	2	2	2		1	1	1			1		CCU	CCU	ROANOK, VA	NO	NO	CFM56	3
07/09/89	1344	2	2	2	2		1	1	1			1		MSY	MSY	NEW ORLEANS, LA	YES	YES	CFM56	9A
07/10/89	971	1	1	1	1		1	1	1			1		MSY	MSY	NEW ORLEANS, LA	YES	YES	JT8D	9A

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

DATE	EV#	ENG POS	DMG CODE	SEVERITY	POW LOSS	MAX VIBE	THROTTLE	IFSD	REMARKS
05/25/89	959	1	A,C	3	YES	YES		NO	3 BLDs BENT, IMMEDIATE EPR+3%N1 RECOVERY
05/25/89	960	1	A,C	3				YES	ODOR, AM EVENT
05/25/89	1301	1		3					
05/26/89	917	2	A,H	3	NONE			NO	FOUND ON GRD INSPEC
05/27/89	918	2	A,H	3	NONE	5.0		NO	3 F BLDs MIDSPAN SHROUD DAMAGE
05/28/89	1347	1	A,C,H	3	SOME	3.0		NO	
05/31/89	919	1	A,C,H	3	SOME	1.5		NO	AIRCRAFT SPEED DROPPED, 2 BENT F BLDs
05/31/89	919	1	A,D,H	3	SOME			NO	AIRCRAFT SPEED DROPPED, 5 F BLDs BENT
05/31/89	1056	2	A,D,G,H	3				NO	5 F BLDs DAMAGED
05/31/89	1354	1		3					
05/31/89	1403	1	A	4					
06/01/89	1197	1	A,H	3	NONE	3.8		NO	3 F BLDs UNK DAMAGE, PM EVENT
06/02/89	920	1	A,H	3	NONE			NO	ENGINE NOISE, 2 PAIR OF F BLDs REPLACED
06/02/89	921	2	A,H	3	NONE			NO	CABIN ODOR, CONFIRMED ON GRD INSPEC
06/02/89	922	1	A,H	3	NONE	2.5	RETARD	NO	3 F BLDs SHINGLED
06/03/89	923	1		3					
06/03/89	1450	1		3					
06/04/89	1196	1		3					
06/05/89	924	1	A,C,H	3	NONE			NO	AM EVENT
06/07/89	925	1	A,C,H	3	NONE	1.8		NO	4 PAIR F BLDs REPLACED
06/07/89	925	1	A,C,H	3	NONE	2.0		NO	2 BENT F BLDs, 2 SHINGLED F BLDs
06/08/89	926	2	A,C,H	3	NONE			NO	ACOUSTIC PANEL DAMAGE, 3 F BLDs DAMAGED
06/09/89	1420	1	A,C,H	3	NONE			NO	3 F BLDs DAMAGED, FOUND ON GRD INSPEC
06/10/89	927	1		3					
06/11/89	1337	1	A,Q	4				NO	2 F BLDs BENT
06/12/89	921	1	A,C	3					
06/12/89	1466	2	A,D,I,K	3	COMPRESSOR	HIGH	IDLE	VOLUNTARY	4 SURGES RETARD TO IDLE THEN VOL IFSD
06/13/89	922	1		1				NO	FOUND ON GRD INSPEC
06/13/89	1057	1		1				NO	
06/13/89	1058	1		1				NO	
06/14/89	1390	1	A,D,H	2	NONE			NO	ACOUSTIC PANEL DAMAGE, 5 F BLDs DAMAGED
06/15/89	928	1	A,B	2	NONE			NO	2 F BLDs HEAVY TIP CURL
06/16/89	929	2		2					
06/18/89	1377	1		2					
06/18/89	1418	1	A,D,G,H	2	NONE	SOME	RETARD	NO	1 F BLD TIP CORNER MISSING, 25F BLDs DAM
06/19/89	930	2	A	2	COMPRESSOR				
06/19/89	933	2		2					
06/19/89	1322	1	A,H	4	NONE			NO	FOUND ON GRD INSPEC
06/20/89	934	1		3					
06/20/89	1029	1		3					
06/21/89	931	1		3					
06/21/89	1325	1		3					
06/22/89	935	1	A	4	COMPRESSOR			NO	SEVERE F BLD DAM, AC YAWED
06/23/89	1155	1	A,B	4	NONE	3.5		NO	2 F BLDs REPLACED DUE TO LE
06/23/89	933	2	A,I,M,P	3	NONE	2.2	RETARD	NO	FAN CASE SEPARATED AND MOVED FORWARD
06/24/89	936	1		1		YES			
06/24/89	1378	1		1					
06/24/89	1378	1	A,C,H	2	NONE	4.0		NO	SEVERAL F BLDs DAMAGED
06/25/89	935	1	A,B,H	3	NONE	3.5	IDLE	NO	9 F BLDs DAMAGED
06/26/89	935	1		3					
06/27/89	1324	1		3				NO	ODOR
06/28/89	967	2		2	NONE			NO	
06/28/89	968	1	A,Q	2	NONE			NO	
06/29/89	1368	1		2				NO	
07/02/89	1415	1		2				NO	
07/02/89	1415	1		2				NO	
07/03/89	1060	1		2				NO	
07/04/89	1115	1	A,Q	2	NONE			NO	FOUND ON GRD INSPEC
07/06/89	1394	1	A,C	4	NONE			NO	
07/07/89	1116	1		3				NO	
07/08/89	970	2		2				NO	
07/08/89	1422	2	A,G	2	NONE	SOME		NO	9 F BLDs DAM, 1 BLD TIP PIECE BROKEN OFF
07/09/89	1117	2		2				NO	
07/09/89	1344	1	A,I,K	1	COMPRESSOR			NO	ENG OIL LIGHT CAME ON
07/10/89	971	1		1					

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

DATE	EV#	ENG_POS	MFG_NO	ETIME	SIGN_EVT	AIRCRAFT	POF	ALTITUDE	SPEED	FL_RULES	LI_CONDS	WEATHER	CREW_AC	CREW_AL	BIRD_SEE
07/10/89	1118	2	892004		NONE	300	CLIMB						NONE		
07/11/89	972	2	1657		NONE	200	APPROACH						NONE		
07/11/89	1119	1	892005		NONE	300	LANDING	0					NONE		
07/12/89	973	1	1658		NONE	200	TAKEOFF	0					ATO		
07/12/89	974	1	1659		NONE	200	LANDING	0					NONE		
07/12/89	975	1	1780		NONE	200	UNKNOWN	0					NONE		NO
07/12/89	976	2	1660		NONE	200	TAKEOFF	0					ATO		
07/13/89	977	2	1661		NONE	200	LANDING						NONE		
07/13/89	978	2	1783	19:20:00	NONE	200	TAKEOFF	0					NONE		ONE
07/15/89	1400	1	89	8:55:00	NONE	300	LANDING	50				RAIN	NONE		SEVERAL
07/15/89	1180	1	1820	15:05:00	TRVS	200	LANDING	130				CLEAR	NONE		
07/17/89	979	1	1785	18:40:00	NONE	200	UNKNOWN					SOME CLOUDS	NONE		NO
07/17/89	980	2	1784		NONE	200	APPROACH	137					ATO		
07/18/89	995	2	1786	21:35:00	TRVS	200	TAKEOFF						NONE		
07/18/89	1120	2	892006		NONE	400	UNKNOWN						NONE		
07/18/89	1121	1	892007	18:00:00	NONE	300	TAKEOFF						DIV		
07/18/89	1122	1	892008		NONE	400	LANDING	0		VFR		CLEAR	NONE		ONE
07/18/89	1371	1	89		NONE	300	TAKEOFF	0					NONE		NO
07/18/89	1451	1	89		NONE	200	TAKEOFF	135				SOME CLOUDS	NONE		SEVERAL
07/19/89	1335	1	89	15:40:00	NONE	200	APPROACH	600				CLEAR	NONE		ONE
07/19/89	1382	1	89	6:33:00	NONE	300	TAKEOFF	120				CLEAR	NONE		SEVERAL
07/20/89	1381	1	1787		NONE	200	LANDING						NONE		
07/20/89	1436	1	89		MULT	300	TAKEOFF	0					NONE		SEVERAL
07/20/89	1437	1	892009		NONE	300	UNKNOWN						NONE		
07/21/89	1123	1	89	11:15:00	NONE	300	LANDING	200				OVERCAST	NONE		NO
07/22/89	1352	1	89	8:25:00	NONE	200	TAKEOFF	135					NONE		NO
07/22/89	1356	1	89	7:00:00	NONE	300	TAKEOFF	0					NONE		
07/22/89	1357	1	89		NONE	200	APPROACH	1000				CLEAR	NONE		ONE
07/22/89	1374	1	89	7:20:00	NONE	200	LANDING	90				SOME CLOUDS	NONE		
07/23/89	1371	1	89		NONE	300	UNKNOWN						NONE		
07/24/89	1124	1	892010		NONE	500	UNKNOWN						NONE		
07/25/89	982	1	1788	14:30:00	NONE	200	TAKEOFF						NONE		
07/26/89	983	1	892011		NONE	200	UNKNOWN						NONE		
07/26/89	1125	1	892012		NONE	300	UNKNOWN						NONE		
07/27/89	1127	1	892013	9:57:00	MULT	300	LANDING	0				SOME CLOUDS	NONE		SEVERAL
07/27/89	1127	1	89	9:57:00	MULT	300	LANDING	110				SOME CLOUDS	NONE		SEVERAL
07/27/89	1421	1	89	14:00:00	NONE	200	LANDING	0				CLEAR	NONE		SEVERAL
07/27/89	1425	1	89	12:00:00	NONE	200	UNKNOWN	400					NONE		YES
07/28/89	984	1	1791	18:00:00	TRVS	200	TAKEOFF	20					ATB		
07/28/89	985	1	1790		NONE	300	CRUISE						NONE		
07/28/89	1128	1	892014		NONE	300	UNKNOWN						NONE		
07/28/89	1129	1	892015		NONE	300	UNKNOWN						NONE		
07/28/89	1189	1	1461	8:17:00	NONE	200	LANDING	0				CLEAR	NONE		
07/28/89	1441	1	89	12:00:00	MULT	200	TAKEOFF	132				SOME CLOUDS	NONE		FLOCK
07/28/89	1441	1	89	12:00:00	MULT	200	TAKEOFF	132				SOME CLOUDS	NONE		FLOCK
07/29/89	1130	1	892016		NONE	400	LANDING	0					NONE		SEVERAL
07/29/89	1370	1	89		MULT	200	CLIMB	500				CLEAR	NONE		ONE
07/29/89	1432	1	89		NONE	200	LANDING	140					NONE		
07/30/89	986	1	1792		NONE	200	LANDING	0					NONE		NO
07/30/89	1131	1	892017		NONE	300	APPROACH	0				CLEAR	NONE		ONE
07/30/89	1132	1	892018		NONE	300	TAKEOFF	0				CLEAR	NONE		ONE
07/30/89	1404	1	89	12:40:00	NONE	100	TAKEOFF	0				DAY	ATO		
07/31/89	1133	1	892019		NONE	300	UNKNOWN					OVERCAST	NONE		ONE
07/31/89	1134	1	892020		NONE	300	CLIMB	0					NONE		
07/31/89	1341	1	89	8:20:00	NONE	300	TAKEOFF	0					NONE		ONE
07/31/89	1353	1	89	15:59:00	NONE	100	TAKEOFF	0					ATO		
08/01/89	1135	1	892021		NONE	400	UNKNOWN						NONE		NO
08/01/89	1266	1	89	12:50:00	NONE	200	TAKEOFF	35				OVERCAST	NONE		1
08/01/89	1424	1	89	10:30:00	MULT	200	APPROACH	140				CLEAR	NONE		FLOCK
08/01/89	1425	1	89	10:30:00	MULT	200	APPROACH	0				CLEAR	NONE		FLOCK
08/01/89	1425	1	892022		NONE	300	TAKEOFF	0					NONE		YES
08/02/89	1136	1	0		NONE	300	CLIMB	0					NONE		YES
08/02/89	1190	1	0		NONE	200	TAKEOFF	0					NONE		NO
08/02/89	1198	1	0		NONE	200	UNKNOWN	100		VFR		CLEAR	NONE		SEVERAL
08/02/89	1206	1	89	9:05:00	NONE	200	LANDING	0				SOME CLOUDS	NONE		SEVERAL
08/02/89	1209	1	89	9:05:00	MULT	200	LANDING	0				SOME CLOUDS	OTHER		SEVERAL
08/02/89	1259	1	89		MULT	200	LANDING	0					OTHER		YES
08/03/89	1467	2	1793		NONE	200	LANDING	110					NONE		

EDATE	EVT#	ENG POS	BIRD NAM	BIRD SPE	# BIRDS	WT OZ	1	CTY_PRS	AIRPORT	LOCALE	US_INCID	ENGINE	DASH
07/10/89	1118	2			1		1	YOW-YYZ	ABQ	ALBUQUERQUE, NM	YES	CFM56	3
07/11/89	972	1			1		1		YYZ	TORONTO, CANADA	NO	JT8D	17
07/11/89	1119	1			1		1		BRU	BRUSSELS, BELGIUM	NO	CFM56	3
07/12/89	973	2							DUB	DUBLIN, IRELAND	NO	JT8D	9
07/12/89	974	2						YPR-YZP	XFO	SANDSPIT, CANADA	NO	JT8D	9A
07/12/89	975	2						-DHA	YF	DHAHRAN, SAUDI ARABIA	NO	JT8D	17
07/13/89	976	1	HERRING GULL	14N14	1		1	YZF-YYC	YZF	YELLOWKNIFE, CANADA	NO	JT8D	9A
07/13/89	977	2			1		1	YEG-YVR	YVR	VANCOUVER, CANADA	NO	JT8D	17A
07/13/89	978	2			1		1		DEL	DELHI, INDIA	NO	JT8D	17A
07/15/89	1400	1			1		1		LHE	LAHORE, PAKISTAN	NO	CFM56	3
07/16/89	1180	1	BLACK KITE	3K28	1		1	LHR-LYS	LYS	JORHAT, INDIA	NO	JT8D	17
07/17/89	979	2	WESTERN MEADOWLARK	64Z68	1		1	4.		LYON, FRANCE	YES	JT8D	15A
07/17/89	980	2	SPARROW*								YES	JT8D	9A
07/17/89	1440	1	COMMON CUCKOO	2R15	1		1		TPA	TAMPA, FL	YES	JT8D	9A
07/18/89	995	2			1		1	LXS-ATH	LXS	LEMNOS, GREECE	NO	JT8D	9A
07/18/89	1120	2			1		1	-PUS	XFO	PUSAN, KOREA	NO	CFM56	3
07/18/89	1121	1			1		1	BOH-FAO	BOH	BOURNOUTH, ENGLAND	NO	CFM56	3
07/18/89	1122	1			1		1		DUS	DUSSELDORF, GERMANY	NO	CFM56	3
07/18/89	1371	1			1		1		FSC	FIGARI, FRANCE	NO	CFM56	3
07/18/89	1451	1			1		1		PAT	PATNA, INDIA	NO	JT8D	3
07/19/89	1335	2			1		1		BOM	BOMBAY, INDIA	NO	JT8D	3
07/19/89	1382	1			1		1		HAM	HAMBURG, GERMANY	NO	CFM56	3
07/20/89	981	2	SANDPIPERS*		1		*	YEG-YVR	YVR	VANCOUVER, CANADA	NO	JT8D	9A
07/20/89	1436	1			*		*	AMS	AMS	AMSTERDAM, NETHERLANDS	NO	CFM56	3
07/21/89	1123	1			1		1	-IND	XUS	INDIANAPOLIS, IN	YES	CFM56	3
07/22/89	1352	2			1		1		CDG	PARIS-DE GAULLE, FRANCE	NO	JT8D	3
07/22/89	1356	1	VULTURE*						CJB	COIMBATORE, INDIA	NO	JT8D	3
07/22/89	1401	1							LHE	LAHORE, PAKISTAN	NO	CFM56	3
07/22/89	1434	1							PSA	PISA, ITALY	NO	JT8D	3
07/23/89	1391	1	DOVE*	1152	1		1	-DAL	XUS	J.G. STRIDOM, S. AFRICA	YES	CFM56	3
07/24/89	1124	1	COMMON EGRET					IAD-TPA	XUS	DALLAS, TX	YES	JT8D	9A
07/25/89	982	1						YXS-YVR	XUS	PRINCE GEORGE, CANADA	YES	CFM56	3
07/26/89	983	2			1		1	-DAL	XUS	DALLAS, TX	YES	CFM56	3
07/26/89	1125	1			1		1		LGG	LIEGE, BELGIUM	NO	CFM56	3
07/27/89	1126	1			*		*		ZTH	ZAKINTHOS, GREECE	NO	CFM56	3
07/27/89	1127	2			*		*		WAW	WARSAW, POLAND	NO	CFM56	3
07/27/89	1421	1							LGRP	PARADISI, GREECE	NO	JT8D	15
07/27/89	1425	2					1	RUH-HBT	XFO	SAUDI ARABIA	NO	JT8D	9A
07/28/89	984	2	CUCKOO	2R15	1		1		YUL	AMSTERDAM	NO	CFM56	3
07/28/89	985	1	HERRING GULL	14N14	1		1	-YOW	XFO	COLOGNE/BONN, GERMANY	NO	JT8D	3
07/28/89	1128	2			1		1	-PMI	XFO	VENICE, ITALY	NO	JT8D	3
07/28/89	1129	2			1		1	BNN-CGN	CGN	BREMEN, GERMANY	NO	CFM56	3
07/28/89	1441	1	SWALLOW*		*		*		VCE	VENICE, ITALY	NO	JT8D	3
07/28/89	1441	1	SWALLOW*		*		*		BRE	BREMEN, GERMANY	NO	JT8D	3
07/28/89	1441	2	PARTRIDGE*		1		1		ERI	ERIE, PA	YES	CFM56	3
07/29/89	1130	1	SPARROW*		1		1		RST	ROCHESTER, MN	YES	JT8D	9A
07/29/89	1370	2	HAWK		1		1	YEV-YYC	YYC	CALGARY, CANADA	YES	CFM56	3
07/30/89	986	1	GULL*		1		1		PHX	PHOENIX, AZ	YES	CFM56	3
07/30/89	1131	1			1		1	ROC-PHL	ROC	ROCHESTER, NY	YES	JT8D	3
07/30/89	1132	1	HAWK*		1		1		LIL	LILLE, FRANCE	NO	JT8D	3
07/30/89	1404	2	BLACK-HEADED GULL	14N36	1		1	10.	XFO	LONDON-HEATHROW, ENGLAND	NO	CFM56	3
07/31/89	1133	1			1		1	-LHR	ASP	ALICE SPRINGS, AUSTRALIA	NO	CFM56	3
07/31/89	1341	1	GULL*	5K27	1		1	ASP-ADL	BRE	BREMEN, GERMANY	NO	CFM56	3
07/31/89	1353	2	EURASIAN KESTREL		1		1		CDG	PARIS-DE GAULLE, FRANCE	NO	JT8D	3
08/01/89	1135	1			1		1	-SEL	XFO	SEUL, KOREA	NO	CFM56	3
08/01/89	1426	1			1		1		PAT	PATNA, INDIA	NO	JT8D	3
08/01/89	1442	1	SWALLOW*		*		*		VCE	VENICE, ITALY	NO	CFM56	3
08/01/89	1442	2	SWALLOW*		*		*		VCE	VENICE, ITALY	NO	JT8D	3
08/02/89	1136	1			1		1	SYD-BNE	SYD	SYDNEY, AUSTRALIA	YES	CFM56	3
08/02/89	1190	1	GULL*	14N13	*		*		DAY	DAYTON, OH	YES	JT8D	9
08/02/89	1198	1	COMMON GULL		*		*		FNT	FLINT, MI	YES	JT8D	3
08/02/89	1206	1			*		*		XUS	CHICAGO, IL	YES	JT8D	3
08/02/89	1429	2			*		*		IXZ	PORT BLAIR, INDIA	NO	JT8D	3
08/03/89	987	2	COMMON BUZZARD	3K180				32.	TXL-DUS	DUSSELDORF, GERMANY	NO	JT8D	15A

EDATE	EVT#	ENG POS	DMG CODE	SEVERITY	POW LOSS	MAX VIBE	THROTTLE	IFSD	REMARKS
07/10/89	1118	2	A,C	3	NONE	3.0		NO	3 F BLS BENT
07/11/89	972	2		3	NONE			NO	
07/11/89	1119	2	A,H	3	NONE			NO	4 SHINGLED F BLS
07/12/89	973	1	A,G	2	NONE			NO	EXTENSIVE ENG DAM, GOUGING OF F BLS
07/12/89	974	1		2	NONE			NO	
07/12/89	975	1	A	4	NONE			NO	FOUND ON GRD INSPEC
07/13/89	976	1	A,D,K	1	NONE			NO	2ND+6TH STG BLADES NICKED
07/13/89	977	2		9	NONE			NO	
07/13/89	978	2		9	NONE			NO	
07/15/89	1400	1	A,Q	4				NO	7 FAN BLADES DAMAGED
07/15/89	1401	1	A,C,G,I	1				NO	BROKEN PIECE OF F BLD FOUND IN EXIT CASE
07/16/89	1180	1	A,H	3	NONE			NO	3 SHINGLED F BLS, FOUND ON GRD INSPEC
07/17/89	980	1		3				NO	ODOR
07/17/89	981	1	A,Q	4				NO	EXTENSIVE GUIDE VANE DAM, 2 BLS TRVSFRA
07/18/89	1440	1	A,I,K	3				NO	FOUND ON GRD INSPEC, 4 F BLS DAMAGED
07/18/89	995	2	A,B,H	3				NO	2 F BLS SHINGLED
07/18/89	1120	2		3				NO	ODOR
07/18/89	1121	1		3				NO	
07/18/89	1122	1		3				NO	
07/18/89	1371	1		3				NO	
07/18/89	1372	2		3				NO	
07/18/89	1373	2		3				NO	
07/18/89	1374	2		3				NO	
07/18/89	1375	2		3				NO	
07/18/89	1376	2		3				NO	
07/18/89	1377	2		3				NO	
07/18/89	1378	2		3				NO	
07/18/89	1379	2		3				NO	
07/18/89	1380	2		3				NO	
07/18/89	1381	2		3				NO	
07/18/89	1382	2		3				NO	
07/18/89	1383	2		3				NO	
07/18/89	1384	2		3				NO	
07/18/89	1385	2		3				NO	
07/18/89	1386	2		3				NO	
07/18/89	1387	2		3				NO	
07/18/89	1388	2		3				NO	
07/18/89	1389	2		3				NO	
07/18/89	1390	2		3				NO	
07/18/89	1391	2		3				NO	
07/18/89	1392	2		3				NO	
07/18/89	1393	2		3				NO	
07/18/89	1394	2		3				NO	
07/18/89	1395	2		3				NO	
07/18/89	1396	2		3				NO	
07/18/89	1397	2		3				NO	
07/18/89	1398	2		3				NO	
07/18/89	1399	2		3				NO	
07/18/89	1400	2		3				NO	
07/18/89	1401	2		3				NO	
07/18/89	1402	2		3				NO	
07/18/89	1403	2		3				NO	
07/18/89	1404	2		3				NO	
07/18/89	1405	2		3				NO	
07/18/89	1406	2		3				NO	
07/18/89	1407	2		3				NO	
07/18/89	1408	2		3				NO	
07/18/89	1409	2		3				NO	
07/18/89	1410	2		3				NO	
07/18/89	1411	2		3				NO	
07/18/89	1412	2		3				NO	
07/18/89	1413	2		3				NO	
07/18/89	1414	2		3				NO	
07/18/89	1415	2		3				NO	
07/18/89	1416	2		3				NO	
07/18/89	1417	2		3				NO	
07/18/89	1418	2		3				NO	
07/18/89	1419	2		3				NO	
07/18/89	1420	2		3				NO	
07/18/89	1421	2		3				NO	
07/18/89	1422	2		3				NO	
07/18/89	1423	2		3				NO	
07/18/89	1424	2		3				NO	
07/18/89	1425	2		3				NO	
07/18/89	1426	2		3				NO	
07/18/89	1427	2		3				NO	
07/18/89	1428	2		3				NO	
07/18/89	1429	2		3				NO	
07/18/89	1430	2		3				NO	
07/18/89	1431	2		3				NO	
07/18/89	1432	2		3				NO	
07/18/89	1433	2		3				NO	
07/18/89	1434	2		3				NO	
07/18/89	1435	2		3				NO	
07/18/89	1436	2		3				NO	
07/18/89	1437	2		3				NO	
07/18/89	1438	2		3				NO	
07/18/89	1439	2		3				NO	
07/18/89	1440	2		3				NO	
07/18/89	1441	2		3				NO	
07/18/89	1442	2		3				NO	
07/18/89	1443	2		3				NO	
07/18/89	1444	2		3				NO	
07/18/89	1445	2		3				NO	
07/18/89	1446	2		3				NO	
07/18/89	1447	2		3				NO	
07/18/89	1448	2		3				NO	
07/18/89	1449	2		3				NO	
07/18/89	1450	2		3				NO	
07/18/89	1451	2		3				NO	
07/18/89	1452	2		3				NO	
07/18/89	1453	2		3				NO	
07/18/89	1454	2		3				NO	
07/18/89	1455	2		3				NO	
07/18/89	1456	2		3				NO	
07/18/89	1457	2		3				NO	
07/18/89	1458	2		3				NO	
07/18/89	1459	2		3				NO	
07/18/89	1460	2		3				NO	
07/18/89	1461	2		3				NO	
07/18/89	1462	2		3				NO	
07/18/89	1463	2		3				NO	
07/18/89	1464	2		3				NO	
07/18/89	1465	2		3				NO	
07/18/89	1466	2		3				NO	
07/18/89	1467	2		3				NO	
07/18/89	1468	2		3				NO	
07/18/89	1469	2		3				NO	
07/18/89	1470	2		3				NO	
07/18/89	1471	2		3				NO	
07/18/89	1472	2		3				NO	
07/18/89	1473	2		3				NO	
07/18/89	1474	2		3				NO	
07/18/89	1475	2		3				NO	
07/18/89	1476	2		3				NO	
07/18/89	1477	2		3				NO	
07/18/89	1478	2		3				NO	
07/18/89	1479	2		3				NO	
07/18/89	1480	2		3				NO	
07/18/89	1481	2		3				NO	
07/18/89	1482	2		3				NO	
07/18/89	1483	2		3				NO	
07/18/89	1484	2		3				NO	
07/18/89	1485	2		3				NO	
07/18/89	1486	2		3				NO	
07/18/89	1487	2		3				NO	
07/18/89	1488	2		3				NO	
07/18/89	1489	2		3				NO	
07/18/89	1490	2		3				NO	
07/18/89	1491	2		3				NO	
07/18/89	1492	2		3				NO	
07/18/89	1493	2		3				NO	
07/18/89	1494	2		3				NO	
07/18/89	1495	2		3				NO	
07/18/89	1496	2		3				NO	
07/18/89	1497	2		3				NO	
07/18/89	1498	2		3				NO	
07/18/89	1499	2		3				NO	
07/18/89	1500	2		3				NO	

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

EDATE	EVT#	ENG POS	MFG	NO	ETIM	SIGN	EVT	AIRCRAFT	POF	ALTITUDE	SPEED	FL RULES	LT CONDS	WEATHER	CREW AC	CREW AL	BIRD SEE
08/03/89	1463	2	89	892023	8:25:00	NONE		300	LANDING	100	225			CLEAR	NONE	NO	ONE
08/05/89	1137	1	1663	892023		NONE		200	TAKEOFF	0	110				ATO		
08/06/89	988	1	89	892023	20:00:00	NONE		200	TAKEOFF	0	80			CLEAR	NONE	NO	ONE
08/06/89	1348	2	89	892023	20:33:00	NONE		200	LANDING	0	100			CLEAR	NONE	NO	SEVERAL FLOCK
08/06/89	1444	1	89	892023	12:31:00	MULT	BIRDS FRAC	200	CLIMB	0	140			OVERCAST	NONE	YES	
08/07/89	989	2	1779	892024		TRVS		200	TAKEOFF						NONE		
08/09/89	1138	2	89	892024	5:40:00	NONE		200	CLIMB	0	70			SOME CLOUDS	DIV		
08/09/89	1345	2	89	892025		NONE		200	TAKEOFF	0	90			OVERCAST	ATO	NO	ONE FLOCK
08/10/89	990	2	1781	892025	6:32:00	MULT	BIRDS	200	LANDING	0	+V1			CLEAR	NONE	NO	FLOCK
08/10/89	1140	2	89	892026	11:00:00	NONE		300	TAKEOFF	20				BRIGHT	NONE		
08/10/89	1141	1	89	892027		NONE		300	TAKEOFF	30					NONE		
08/10/89	1409	2	89	892028	20:55:00	NONE		200	LANDING	0	+V1			RAIN	NONE		ONE FLOCK
08/11/89	1142	2	89	892028	11:15:00	NONE		300	TAKEOFF	0	+V1			RAIN	NONE		
08/12/89	1143	2	89	892029		NONE		300	TAKEOFF	1000	150				NONE		
08/12/89	1392	1	89	892029	20:00:00	NONE		200	APPROACH	0	140				ATO		
08/13/89	991	1	1782	892030		NONE		300	TAKEOFF						NONE		
08/13/89	1144	2	89	892030		NONE		300	UNKNOWN						NONE		
08/14/89	1145	1	89	892031		NONE		300	UNKNOWN						NONE		
08/14/89	1146	1	89	892032		NONE		300	UNKNOWN						NONE		
08/14/89	1385	1	89	892032	19:35:00	NONE		200	TAKEOFF	0	-V1			CLEAR	NONE	NO	ONE
08/15/89	992	1	1795	892033		NONE		300	TAKEOFF	0	100				ATO		
08/15/89	1147	1	89	892033		NONE		300	LANDING	0				CLEAR	NONE		YES
08/15/89	1148	1	89	892034		NONE		300	LANDING	0				CLEAR	NONE		SEVERAL SEVERAL
08/15/89	1402	1	89	892034	8:51:00	NONE		200	TAKEOFF	0	150			OVERCAST	NONE	NO	
08/16/89	1396	2	89	892035	20:20:00	NONE		200	TAXI	0	5			OVERCAST	NONE		
08/16/89	1149	1	89	892035		NONE		300	UNKNOWN						NONE		
08/18/89	1150	1	89	892036		NONE		300	UNKNOWN						NONE		
08/18/89	1369	1	89	892036		NONE		100	CLIMB						NONE		
08/19/89	1151	1	89	892037		NONE		300	LANDING	0	120			CLEAR	NONE	NO	FLOCK
08/19/89	1327	2	89	892037	17:08:00	MULT	BIRDS	300	LANDING	0	10			CLEAR	NONE	NO	ONE
08/19/89	1375	2	89	892037	18:55:00	NONE		300	TAKEOFF	50	150			CLEAR	ATO		
08/20/89	993	1	1796	892038	11:30:00	NONE		200	UNKNOWN	0	80			CLEAR	NONE	NO	SEVERAL SEVERAL
08/20/89	1405	2	89	892038	10:55:00	NONE		300	TAKEOFF	0	115			CLEAR	NONE	NO	
08/23/89	1393	1	89	892038	19:45:00	NONE		200	TAKEOFF	0	115			CLEAR	NONE	NO	SEVERAL SEVERAL
08/24/89	1358	1	89	892038		MULT	ENG-BIRDS	300	LANDING	0	120			CLEAR	NONE	NO	SEVERAL FLOCK
08/24/89	1358	1	89	892038		MULT	ENG-BIRDS	300	LANDING	25	150			SOME CLOUDS	NONE		
08/25/89	994	2	1797	892038	6:12:00	NONE		200	UNKNOWN	0	145			CLEAR	NONE	NO	
08/25/89	994	2	1797	892038		NONE		300	UNKNOWN					CLEAR	NONE		
08/26/89	996	2	1798	892038	17:58:00	NONE		200	UNKNOWN	0	120			CLEAR	NONE		
08/26/89	1438	2	89	892039	12:40:00	MULT	BIRDS	200	TAKEOFF	0	120			CLEAR	NONE		
08/26/89	1445	2	89	892040		MULT	BIRDS	200	TAKEOFF	25	150			SOME CLOUDS	NONE		
08/27/89	997	2	1799	892040	6:12:00	NONE		200	UNKNOWN	0	145			CLEAR	NONE	NO	
08/27/89	1363	1	89	892040		NONE		300	TAKEOFF	100	+V1			CLEAR	NONE		
08/28/89	1152	1	89	892040	20:16:00	NONE		300	UNKNOWN	0				CLEAR	NONE		
08/28/89	1326	1	89	892040	15:36:00	NONE		300	LANDING	0				CLEAR	NONE		
08/29/89	1153	2	89	892041		NONE		300	TAKEOFF	0				CLEAR	NONE		
08/29/89	1154	2	89	892041		NONE		300	UNKNOWN					CLEAR	NONE		
08/29/89	1155	2	89	892041		NONE		300	UNKNOWN					CLEAR	NONE		
08/29/89	1156	2	89	892041		NONE		300	UNKNOWN					CLEAR	NONE		
08/29/89	1157	2	89	892041		NONE		300	UNKNOWN					CLEAR	NONE		
08/29/89	1379	2	89	892041	14:55:00	NONE		200	UNKNOWN					CLEAR	NONE		
08/30/89	998	2	1800	892042	13:00:00	NONE		200	UNKNOWN	50	160			SOME CLOUDS	NONE		SEVERAL
08/30/89	1433	2	89	892042		NONE		200	TAKEOFF	0				CLEAR	NONE		
08/31/89	1156	2	89	892043		NONE		300	UNKNOWN	0	100			CLEAR	NONE	NO	ONE
09/01/89	1157	2	89	892043		NONE		300	UNKNOWN	0	140			OVERCAST	NONE	NO	
09/01/89	1389	2	89	892043	11:57:00	NONE		300	TAKEOFF	0				CLEAR	NONE	NO	
09/01/89	1395	2	89	892043		NONE		300	TAKEOFF	0				CLEAR	NONE	NO	
09/01/89	1439	2	89	892043		NONE		300	TAKEOFF	0				CLEAR	NONE	NO	
09/03/89	1159	2	89	892045		NONE		300	TAKEOFF	0	+V1			CLEAR	NONE	YES	SEVERAL
09/03/89	1355	2	89	892045		NONE		300	TAKEOFF	20	150			CLEAR	NONE		SEVERAL
09/04/89	1160	2	89	892046		NONE		300	UNKNOWN	10	132			CLEAR	NONE		SEVERAL
09/04/89	1407	2	89	892046	17:26:00	NONE		200	LANDING	0				CLEAR	NONE		
09/05/89	999	2	1804	892046	17:30:00	MULT	ENG	200	TAKEOFF	0				CLEAR	NONE		
09/05/89	999	2	1804	892046	17:30:00	MULT	ENG	200	TAKEOFF	0				CLEAR	NONE		
09/05/89	1000	2	1801	892046		NONE		200	TAKEOFF	0				CLEAR	NONE		
09/05/89	1416	1	89	892046	17:22:00	MULT	BIRDS	200	LANDING	0	100			CLEAR	NONE		FLOCK
09/06/89	1001	2	1802	892046		NONE		200	TAKEOFF					CLEAR	NONE		

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

EDATE	EVT#	ENG POS	BIRD NAM	BIRD SPE	# BIRDS	WT OZ	1	CTY	PRS	AIRPORT	LOCALE	US	INCID	ENGINE	DASH
08/03/89	1443	2	SWALLOW*		1			YUL	YVR	VCE	VENICE, ITALY	NO		CFM56	3
08/05/89	1137	1			1					ORY	PARIS-ORLY, FRANCE	NO		JT8D	17
08/06/89	988	1								IXC	MONTREAL, CANADA	NO		JT8D	
08/06/89	1348	1	BUZZARD*							HAM	CHANDIGARH, INDIA	NO		JT8D	
08/06/89	1383	1	SWALLOW*							VCE	HAMBURG, GERMANY	NO		JT8D	
08/06/89	1444	2			*					BUL	VENICE, ITALY	NO		JT8D	15
08/07/89	989	2								DKR	BANJUL, GAMBIA	NO		JT8D	3
08/09/89	1138	2			1					STR	STUTTGART, GERMANY	NO		CFM56	9A
08/09/89	1345	2			*					CCU	CALCUTTA, INDIA	NO		JT8D	
08/10/89	990	2	SWALLOW*		*					YYJ	VICTORIA, CANADA	NO		CFM56	
08/10/89	1130	2	GULL*		*					HAM	HAMBURG, GERMANY	NO		CFM56	
08/10/89	1140	1	SWALLOW*		1					AMS	AMSTERDAM, NETHERLANDS	YES		CFM56	
08/10/89	1141	1	SWALLOW*		1					DTW	DETROIT, MI	YES		JT8D	
08/10/89	1409	2	BLACK-BILLED GULL		14N12					LPL	LIVERPOOL, ENGLAND	NO		JT8D	
08/11/89	1142	2	BLACK-HEADED GULL		14N36					VCE	VENICE, ITALY	NO		CFM56	
08/12/89	1143	1	EURASIAN KESTREL		5K27					MUC	MUNICH, GERMANY	NO		CFM56	
08/12/89	1392	1			1					JDH	JODHPUR, INDIA	NO		JT8D	3
08/13/89	991	1	ROCK DOVE		2P1					TNG	TANGIER, MOROCCO	NO		JT8D	15
08/13/89	1144	2			1					-DAL	DALLAS, TX	YES		CFM56	
08/14/89	1145	1			1					XFO	AMSTERDAM, NETHERLANDS	NO		CFM56	
08/14/89	1146	1			1					ATH	ATHENS, GREECE	NO		CFM56	
08/14/89	1385	1			1					HAI	HANOI, VIETNAM	NO		CFM56	
08/15/89	992	1			1					YVQ	NORMAN WELLS, CANADA	NO		JT8D	9A
08/15/89	1147	2	BLACK-HEADED GULL		14N36					VIE	VIENNA, AUSTRIA	YES		CFM56	
08/15/89	1148	1			1					ORF	NORFOLK, VA	YES		CFM56	
08/15/89	1402	1			1					GOT	GOTHENBURG, SWEDEN	NO		JT8D	
08/16/89	1396	1			1					VAKJ	KHAJURAHO, INDIA	YES		CFM56	
08/16/89	1149	1			1					XUS	DALLAS, TX	YES		CFM56	
08/18/89	1150	1			1					-DAL	ANNABA, ALGERIA	YES		JT8D	3
08/18/89	1360	1			1					DLH	DULUTH, MN	YES		CFM56	
08/18/89	1151	1	SWALLOW*		*					AYT	ANTALYA, TURKEY	NO		CFM56	
08/19/89	1327	1			1					FRA	FRANKFURT, GERMANY	NO		CFM56	
08/19/89	1375	1			1					XFO	CANADA	NO		JT8D	9A
08/20/89	993	1	COMMON WOOD PIGEON		2P9					YUL	LILLE, FRANCE	NO		CFM56	
08/23/89	1397	1			1					KHI	KARACHI, PAKISTAN	NO		JT8D	3
08/23/89	1397	1			*					VAKJ	KHAJURAHO, INDIA	NO		CFM56	
08/24/89	1358	1	QUAIL*		*					LEGE	COSTA BRAVA, SPAIN	NO		CFM56	
08/24/89	1358	1	QUAIL*		*					LEGE	COSTA BRAVA, SPAIN	NO		CFM56	
08/25/89	994	2			1					YVQ	MONTREAL, CANADA	NO		JT8D	9A
08/26/89	996	2			*					XFO	AMSTERDAM, NETHERLANDS	NO		JT8D	9A
08/26/89	1438	2	HAWK*		*					SVO	SHEREMETYEVO, SOVIET UNION	NO		JT8D	
08/26/89	1445	2	SWALLOW*		*					VCE	VENICE, ITALY	NO		JT8D	
08/27/89	997	2			1					XFO	CANADA	NO		JT8D	9A
08/27/89	1363	2			1					DUS	DUESSELDORF, GERMANY	NO		JT8D	
08/28/89	1152	1			1					XUS	CHICAGO, IL	YES		CFM56	3
08/28/89	1326	1			1					LEAM	ALMERIA, SPAIN	NO		CFM56	
08/29/89	1153	1	RED-LEGGED PARTRIDGE		4L41					DUS	DUESSELDORF, GERMANY	YES		CFM56	
08/29/89	1154	1			1					CLE	CLEVELAND, OH	YES		CFM56	
08/29/89	1155	1			1					-AMS	AMSTERDAM, NETHERLANDS	NO		JT8D	17
08/29/89	1179	2			1					-OKA	JAPAN	NO		JT8D	
08/29/89	1379	2	SPARROW*		18Z69					XFO	LONDON-GATWICK, ENGLAND	NO		JT8D	17
08/30/89	998	2			1					TSF	TREVISO, ITALY	NO		JT8D	
08/30/89	1433	2	HOUSE MARTIN							XFO	AMSTERDAM, NETHERLANDS	NO		CFM56	3
08/31/89	1157	1			1					-DUB	DUBLIN, IRELAND	NO		CFM56	
09/01/89	1157	1	SPARROW*		1					XFO	HOUSTON, TX	YES		CFM56	
09/01/89	1389	2			1					IAH	HOUSTON, TX	YES		JT8D	3
09/01/89	1395	2			1					CPH	COPENHAGEN, DENMARK	NO		JT8D	7B
09/01/89	1439	2			1					SVG	STAVANGER, NORWAY	YES		JT8D	15
09/03/89	1150	2			1					PVD	PROVIDENCE, RI	YES		JT8D	
09/03/89	1355	2	YELLOW-BREADED CHAT		63Z69					MDW	CHICAGO, IL	YES		JT8D	3
09/04/89	1160	2			1					-DAL	DALLAS, TX	YES		CFM56	
09/04/89	1407	2			1					LIS	LISBON, PORTUGAL	YES		JT8D	3
09/05/89	999	2			1					HOU	HOUSTON, TX	YES		JT8D	7B
09/05/89	999	2			1					HOU	HOUSTON, TX	YES		JT8D	15
09/05/89	1000	2			1					XFO	NIGERIA	NO		JT8D	
09/05/89	1416	1	DUCK*		*					LEMG	MALAGA, SPAIN	NO		JT8D	9A
09/06/89	1001	2								YYC	CALGARY, CANADA	NO		JT8D	

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

DATE	EV#	ENG_POS	DMG_CODE	SEVERITY	POW_LOSS	MAX_VIBE	THROTTLE	IFSD	REMARKS
08/03/89	1443	2		3	NONE			NO	3 F BLDs BENT
08/05/89	1137	1	A,C	9	COMPRESSOR			NO	ENG RECOVERED IMMEDIATELY FROM STALL
08/06/89	988	1		9				NO	
08/06/89	1348	1		9				NO	
08/06/89	1383	1		9				NO	
08/06/89	1444	1		9		YES		NO	3 FBLDS BENT, 4 FBLD TIPS WERE CUT OFF
08/07/89	989	2	A,C,I,K	1				NO	11 F BLDs DAMAGED, 13 F OGV'S LE NICKS
08/09/89	1138	2	A,B,G	2				NO	
08/09/89	1345	1		9				NO	MINOR HPC BLADE IMPACT DAMAGE
08/10/89	990	1	A,K	9	NONE			NO	ODOR
08/10/89	1139	1		9	NONE			NO	MULT AC STRIKES
08/10/89	1140	1		9	NONE			NO	
08/10/89	1141	1		9	NONE			NO	
08/10/89	1409	1		9	NONE			NO	
08/11/89	1142	2		9	NONE			NO	
08/12/89	1143	1		9	NONE			NO	
08/12/89	1392	1	A,Q	4				EPR	1 F BLD SHINGLED
08/13/89	991	1		3	NONE			NO	1 F BLD TWISTED WITH LE DEFORMATION
08/13/89	1144	2	A,H	3	NONE			NO	SEVERAL F BLDs BENT
08/14/89	1145	1	A,B,C	2	NONE			NO	
08/14/89	1146	1	A,D	2	NONE			NO	
08/14/89	1385	1		0				NO	ODOR, MULT AC STRIKES
08/15/89	992	1		9	NONE			NO	
08/15/89	1147	2		9	NONE			NO	
08/15/89	1148	1		9				NO	
08/15/89	1402	1		9				NO	FOUND ON GRD INSPEC, 2 F BLDs SHINGLED
08/16/89	1396	1	A,B,H	3	NONE			NO	ODOR
08/18/89	1149	1		9	NONE			NO	
08/18/89	1509	1	A,Q	4	NONE			NO	
08/18/89	1510	1		9				NO	
08/19/89	1327	1		9				NO	
08/19/89	1375	2		9				NO	FOUND ON GRD INSPEC
08/20/89	993	1	A,Q	4	NONE			NO	6 FAN BLADES DAMAGED
08/20/89	1405	1	A,Q	4					CONSIDERABLE FAN DAMAGE, DEBRIS IN CORE
08/23/89	1397	1		9				NO	FOUND ON GRD INSPEC
08/23/89	1398	1	A,Q	4				NO	
08/24/89	1358	1		9				NO	
08/24/89	1358	1		9				NO	
08/25/89	994	1		9	NONE			NO	
08/26/89	994	1		9				NO	
08/26/89	1437	2		9				NO	
08/26/89	1438	2		9				NO	
08/27/89	997	1	A,C	3	NONE			NO	2 F BLDs BENT, FOUND ON GRD INSPEC
08/27/89	1363	2	A,Q	4	NONE			NO	2 F BLDs SHINGLED, 1 F BLD TIP BENT .5IN
08/28/89	1152	1	A,C,H	3	NONE			NO	
08/28/89	1320	1		9	NONE			NO	VIBES INCREASED THEN RETURNED TO NORMAL
08/29/89	1153	1	A,L	3	NONE	3.9		NO	1 STG F BLD ASSEMBLY CHANGED
08/29/89	1155	1	A,H	9	NONE			NO	FOUND ON GRD INSPEC
08/29/89	1179	1	A,D	2	NONE			NO	FOUND ON GRD INSPEC
08/29/89	1379	1		9				NO	FOUND ON GRD INSPEC, 2 F BLDs DAMAGED
08/30/89	998	1		9	NONE			NO	
08/30/89	1438	2		9	NONE			NO	
08/31/89	1156	1		9	NONE			NO	
09/01/89	1157	2	A,C,H	3	NONE			NO	ENG REM, 11 HPC BLDs IMPACT DAMAGE
09/01/89	1389	1		9				NO	ODOR, FOUND ON GRD INSPEC
09/01/89	1395	1	A,D,K	9				NO	
09/01/89	1439	1		9				NO	
09/03/89	1159	1		9				NO	
09/03/89	1355	1		9	NONE			NO	
09/04/89	1160	1		9	NONE			NO	
09/04/89	1407	1		9	NONE			NO	
09/05/89	999	1		9	NONE			NO	FAN CHANGED
09/05/89	999	1	A	9				NO	
09/05/89	1000	1		9				NO	
09/05/89	1416	1		9				NO	
09/06/89	1001	1	A,L	3	NONE			NO	ODOR, NACELLE DAMAGE, 6 RIVETS SHEERED

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

DATE	EVT#	ENG POS	MFG NO	ETIME	SIGN EVT	AIRCRAFT	POF	ALTITUDE	SPEED	FL RULES	LT CONDS	WEATHER	CREW AC	CREW AL	BIRD	SEE
09/06/89	1161	2	892047	8:50:00	NONE	300	UNKNOWN	0 80					NONE			
09/06/89	1372	1	89	8:50:00	NONE	200	TAKEOFF	0 95					NONE		YES	
09/07/89	1357	2	1805	18:55:00	NONE	200	TAKEOFF	0 105					NONE			
09/08/89	1002	1	892048		NONE	300	UNKNOWN						NONE			
09/09/89	1162	2	89	18:14:00	MULT BIRDS	200	TAKEOFF	0 120				CLEAR	NONE		SEVERAL	
09/09/89	1324	1	89	9:45:00	MULT	200	LANDING	0 80					NONE		NO	
09/10/89	1336	1	89	9:45:00	MULT	200	LANDING	0 80					NONE		NO	
09/10/89	1437	2	89	15:23:00	ENG-BIRDS	200	TAKEOFF	10 135				SOME CLOUDS	OTHER		FLOCK	
09/10/89	1437	2	89	15:23:00	MULT	200	TAKEOFF	10 135				SOME CLOUDS	OTHER		FLOCK	
09/11/89	1003	2	1806	6:05:00	NONE	200	TAKEOFF	0 140				CLEAR	ATO		NO	
09/11/89	1331	2	89	9:15:00	MULT BIRDS	200	TAKEOFF	0 132				SOME CLOUDS	NONE		SEVERAL	
09/11/89	1408	1	89	18:25:00	MULT BIRDS	200	LANDING	250 137				CLEAR	NONE		FLOCK	
09/12/89	1004	1	1807	21:55:00	NONE	200	TAKEOFF	0 126				CLEAR	NONE		ONE	
09/12/89	1414	2	89		NONE	200	TAKEOFF						NONE			
09/13/89	1163	1	892049	10:35:00	MULT BIRDS	300	UNKNOWN	0				CLEAR	ATO		SEVERAL	
09/13/89	1328	1	89		NONE	200	TAKEOFF	100 160				CLEAR	NONE		SEVERAL	
09/14/89	1412	2	1808		NONE	200	TAKEOFF	0 80					ATO			
09/14/89	1398	2	89	15:20:00	NONE	200	LANDING	0 90				SOME CLOUDS	NONE		ONE	
09/16/89	1447	2	89	15:27:00	NONE	200	TAKEOFF	35 120				CLEAR	NONE		SEVERAL	
09/17/89	1323	1	89	10:35:00	NONE	200	TAKEOFF	0 140				CLEAR	ATB		SEVERAL	
09/19/89	1364	1	89	15:36:00	NONE	300	LANDING	50 140				OVERCAST	NONE		SEVERAL	
09/20/89	1164	2	892050	12:00:00	NONE	300	UNKNOWN	0 130		VFR	BRIGHT	CLEAR	NONE		ONE	
09/21/89	1175	1	892051		NONE	200	UNKNOWN						NONE			
09/21/89	1178	1	1813		NONE	200	UNKNOWN						NONE			
09/21/89	1346	1	89	17:00:00	NONE	200	TAKEOFF	0 100				OVERCAST	NONE		ONE	
09/22/89	1376	1	892044	17:12:00	NONE	300	LANDING	150 135					NONE		YES	
09/22/89	1376	1	89		NONE	300	LANDING	0				CLEAR	NONE		NO	
09/23/89	1166	2	892052		NONE	300	LANDING	134				CLEAR	NONE		YES	
09/23/89	1167	1	892053		NONE	300	UNKNOWN						NONE			
09/24/89	1168	1	892054		NONE	400	UNKNOWN						NONE			
09/24/89	1352	1	89	6:34:00	NONE	200	LANDING	0 90				SOME CLOUDS	NONE		ONE	
09/25/89	1169	2	89	8:10:00	MULT	300	LANDING	0 130				CLEAR	NONE		SEVERAL	
09/26/89	1169	2	892055	8:10:00	MULT	300	LANDING	0 130				CLEAR	NONE		SEVERAL	
09/27/89	1380	1	89	9:45:00	NONE	200	CLIMB	1800 200				OVERCAST	NONE		ONE	
09/28/89	1423	2	89	19:27:00	NONE	200	TAKEOFF	0 40				OVERCAST	ATO		ONE	
09/29/89	1170	1	892056	20:06:00	NONE	200	TAKEOFF	150				CLEAR	ATB		YES	
09/29/89	1176	1	1812		NONE	200	TAKEOFF						NONE			
09/29/89	1177	1	1607		NONE	200	TAKEOFF						ATB			
09/30/89	1175	2	1809		AIRWORTHY	200	TAKEOFF						NONE		NO	

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

EDATE	EVT#	ENG_POS	BIRD_NAM	BIRD_SPE	# BIRDS	WT OZ	1	CTY	PRS	AIRPORT	LOCALE	US_INCID	ENGINE	DASH
09/06/89	1161	2			1	16.		-CTU		XFO	CHENGDU, CHINA	NO	CFM56	3
09/06/89	1372	1	CATTLE EGRET	1135						FLN	FLORIANOPOLIS, BRAZIL	NO	JT8D	
09/07/89	1357	1	GULL*							CMG	CORUMBA, BRAZIL	NO	JT8D	9A
09/08/89	1002	2			1			YWG-YVR		XUS	WINNIPEG, CANADA	NO	JT8D	3
09/09/89	1384	2	LAPWING*		*			-SFO		HAM	SAN FRANCISCO, CA	YES	CFM56	
09/10/89	1336	1	KITE*		*					BOM	HAMBURG, GERMANY	NO	JT8D	
09/10/89	1437	1	GULL*		*					GOA	BOMBAY, INDIA	NO	JT8D	
09/10/89	1437	2	GULL*		*					GOA	GENOA, ITALY	NO	JT8D	
09/11/89	1003	2	GULL*		*					GOA	GENOA, ITALY	NO	JT8D	
09/11/89	1331	2	GULL*		*					GOA	GENOA, ITALY	NO	JT8D	9A
09/11/89	1408	1	KITE*		*					BBI	JOHANNESBURG, S. AFRICA	NO	JT8D	
09/12/89	1004	1						JNB-PLZ		LIS	BHUBANESHWAR, INDIA	NO	JT8D	
09/12/89	1414	2						YYC-LAX		YXC	LISBON, PORTUGAL	NO	JT8D	17
09/12/89	1414	2								LKO	CALAGARY, CANADA	NO	JT8D	
09/13/89	1163	1	GULL*		*			-AMS		XFO	LUCKNOW, INDIA	NO	CFM56	3
09/13/89	1328	1								STO	AMSTERDAM, NETHERLANDS	NO	JT8D	
09/13/89	1412	2								LAX	STOCKHOLM, SWEDEN	NO	JT8D	
09/14/89	1005	1	HAWK*	3K103		6.7		YXD-YZF		YXD	LOS ANGELES, CA	YES	JT8D	9A
09/14/89	1398	2	EUROPEAN SPARROW HAWK							BNJ	EDMONTON, CANADA	NO	JT8D	
09/16/89	1447	1	HAWK*							TRV	BONN, GERMANY	NO	JT8D	
09/17/89	1323	1								BFS	TRIVANDRUM, INDIA	NO	JT8D	
09/19/89	1364	2	GULL*							DUS	BELFAST, N. IRELAND	NO	CFM56	3
09/20/89	1164	2	GULL*							AMS	DUESSELDORF, GERMANY	NO	CFM56	3
09/21/89	1165	1								XFO	AMSTERDAM, NETHERLANDS	NO	CFM56	3
09/21/89	1178	1						-LTN		XFO	LUTON, ENGLAND	NO	JT8D	9A
09/21/89	1346	1						YWG-YVR		CCU	CANADA	NO	JT8D	
09/22/89	1158	1	BLACK VULTURE	3K55		48.				GIG	CALCUTTA, INDIA	NO	CFM56	3
09/22/89	1376	1	COMMON GULL	14N13		15.				FRA	RIO DE JANEIRO, BRAZIL	NO	CFM56	3
09/23/89	1166	2								EWK	FRANKFURT, GERMANY	NO	CFM56	3
09/23/89	1167	2								XFO	NEWARK, NJ	YES	CFM56	3
09/24/89	1168	1						-LGW		XFO	GERMANY	NO	CFM56	3
09/25/89	1332	1								BBI	LONDON, ENGLAND	NO	JT8D	
09/26/89	1169	1	HUNGARIAN PARTRIDGE	4L85		14.1				LTN	BHUBANESHWAR, INDIA	NO	CFM56	3
09/26/89	1169	2	HUNGARIAN PARTRIDGE	4L85		14.1				LTN	LUTON, ENGLAND	NO	CFM56	3
09/27/89	1380	1			2					LGM	LUTON, ENGLAND	NO	CFM56	
09/28/89	1423	2			1					PMI	LONDON-GATWICK, ENGLAND	NO	JT8D	
09/29/89	1170	1			1					NUE	PALMA MALLORCA, SPAIN	NO	JT8D	3
09/29/89	1176	1			1					YVO-YUL	NURENBERG, GERMANY	NO	CFM56	
09/30/89	1177	1			1			JAX-IAD		JAX	VAL D'OR, CANADA	NO	JT8D	7
09/30/89	1175	2			1			YUL-YYZ		YUL	JACKSONVILLE, FL	YES	JT8D	9A
09/30/89	1175	2			1						MONTREAL, CANADA	NO	JT8D	

DATA SOURCES: ENGINE MANUFACTURER OR ICAO

DATE	EV#	ENG POS	DMG CODE	SEVERITY	POW LOSS	MAX VIBE	THROTTLE	IFSD	REMARKS
09/06/89	1161	2	A,B	3	NONE			NO	1 FBLD LE SLIGHT BEND, FOUND ON GRD INSPE
09/06/89	1372	1		9					
09/07/89	1357	1		9					
09/08/89	1002	2	A,H	3	COMPRESSOR			NO	
09/08/89	1182	1	A	4	NONE			NO	FOUND ON GRD INSPEC, 2 F BLD UNK DAMAGE
09/09/89	1384	2		9					
09/10/89	1336	1	A,Q	4					
09/10/89	1437	1	A,Q	4					
09/11/89	1003	2	A,Q	9				NO	
09/11/89	1331	2		4					
09/11/89	1408	1		9					
09/12/89	1004	1		9				NO	ODOR
09/12/89	1414	2		9					
09/13/89	1163	1	A,B	3	NONE			NO	FOUND ON GRD INSPEC, 2 F BLD LE DISTORT
09/13/89	1358	1	A,Q	9				YES	
09/13/89	1412	2		4				YES	
09/14/89	1005	1		9	COMPRESSOR			VOLUNTARY	3 COMP STALLS
09/14/89	1398	2		9					
09/16/89	1447	2	A,Q	9					
09/17/89	1323	1		4					
09/19/89	1364	1		9					
09/20/89	1164	2		9	NONE			NO	ODOR
09/21/89	1155	1	A,H	3	NONE			NO	3 ACOUSTIC PANELS CRACKED, 3 FBLDS SHING
09/21/89	1178	1		9	NONE			NO	FOUND ON GRD INSPEC
09/22/89	1346	1	A,K	9		NONE		NO	ENG REM AFT FLT TO GRU, HPC DAM ALL STGS
09/22/89	1158	1		9					
09/23/89	1376	1		9	NONE			NO	
09/23/89	1166	2		9	NONE			NO	FOUND ON GRD INSPEC
09/23/89	1157	2		9	NONE			NO	FOUND ON GRD INSPEC
09/24/89	1168	1		9					
09/25/89	1332	1		9					
09/26/89	1169	1		9					
09/26/89	1199	2	A,B,H	3				NO	8 F BLD SHINGLED+7 FBLDS LE DISTORTION
09/28/89	1380	1		9					
09/28/89	1423	2		9					
09/29/89	1170	1	A,B	3	NONE			YES	11 F BLD LE DISTORTION
09/29/89	1176	1		9				NO	
09/29/89	1177	1		9	COMPRESSOR			NO	EXPERIENCED A BANG AND AC 'YAWED'
09/30/89	1175	2		9					

APPENDIX C

STATISTICAL HYPOTHESIS TESTING

Statistical analyses are based on an underlying probabilistic model of the processes that give rise to the data. For example, to provide the basis for comparing the weights of ingested birds in the United States and overseas it is necessary to hypothesize an underlying random distribution of bird weights. Statistical analyses are somewhat more sophisticated than descriptive data analyses and more care is required to ensure that the methods are appropriate for the data.

Statistical analysis is basically formalized inductive reasoning. Hypotheses about bird ingestion hazards are evaluated for consistency with the data that have been collected. Statistical analysis provides the rules for quantifying the level of consistency forming the basis for objective unbiased decisions. The process is known formally as statistical hypothesis testing and a brief outline of the procedure is presented here.

The basis of a statistical hypothesis test is the hypothesis; which is a formal statement about a relationship in the data. In comparing the weight distributions of United States ingestions versus foreign ingestions, one hypothesis is that there is no difference in the sizes of the birds ingested here versus those ingested overseas. If the data are found to be consistent with the hypothesis it is accepted; otherwise the hypothesis is rejected.

The rules for deciding whether to accept or reject the hypothesis are based on the possible errors that could be made. A type I error refers to the situation in which the hypothesis is true; however we reject the hypothesis. Alternatively when we accept the hypothesis when it is not true we commit a type II error.

The goal of the statistician is to minimize the likelihood of both types of errors. Unfortunately the likelihood of a type I error is reciprocally linked to the likelihood of a type II error so that lowering the likelihood of a type I error will increase the likelihood of a type II error. Since only one error can be fully controlled it has become standard practice to control the likelihood of a Type I error; which is called the significance level of the test. The test hypothesis is chosen so that it should be accepted unless there is strong evidence that it is not true and the test is constructed to minimize the likelihood of a type II error for the given significance level over a broad range of alternatives.

The mechanics of conducting a statistical hypothesis test are implemented by calculating a test statistic. The test statistic is a function of the data that is related to the test hypothesis. It is usually constructed so that small values are consistent with the null hypothesis and large values are consistent with the alternative hypothesis. The cutoff for accepting or rejecting the null hypothesis is called the critical value and is a function of the desired significance level.

Another aspect in evaluating the efficiency of a statistical test is its ability to detect when the test hypothesis is false. This ability is called the power of the test and is defined to be the probability of rejecting the test hypothesis when it is false. Generally there are many alternatives to

the test hypothesis so that the power of the test is a function of the specific alternate hypothesis.

A variation on the statistical hypothesis test is the calculation of a confidence interval for a parameter such as the overall probability of ingestion (POI). Since there is no specific hypothesis about the POI, a confidence interval is used to describe the range of probabilities that are consistent with the data. The confidence level associated with a confidence interval corresponds to one minus the significance level of a hypothesis test and is a measure of the likelihood that the true value of the parameter (in this case the POI) is contained in the interval.

