

**BIRD STRIKES IN GREECE  
1997-1998 CIVIL AVIATION**

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**Abstract**

This paper gives a brief summary of the bird strikes in Greece (Civil Aviation). It presents the results of bird strikes statistical analysis for the years 1997 and 1998. The last analysis conducted for Civil Aviation in Greece covered the years 1980-1992.

The paper contains the

- strike seasons
- risk per airport
- strike altitudes
- phase of flight
- light conditions
- reporting operators
- top ten manufacturers model
- influence on flight

Finally this paper proposes actions for the near and distant future.

**Key Words:** Bird strike statistics, Civil Aviation, Cost, Greece, Reporting

## **1. Introduction**

Covering an area of 131,990 Km<sup>2</sup>, Greece is a relatively small country, which is unique in Europe in that it combines its climate with a large variety and constant alternation of biotopes. This feature in conjunction with its geographical position makes Greece particularly important as regards the abundance and variety of the birds living there. Its position favours the concentration of many migratory birds when these travel over eastern Mediterranean to and from Africa. This paper refers to the consequences of the presence of birds in the Greek space as regards strikes with aircraft.

According to information provided by the International Civil Aviation Organization (ICAO) bird strikes registered in our country for all airlines, for the year 1997 and 1998 were 74.

## **2. Method**

This paper is based on the elaboration of statistical data (note: only registered strikes in specific data collection forms) collected by the HCAA for 1997 and 1998 and from data received from ICAO.

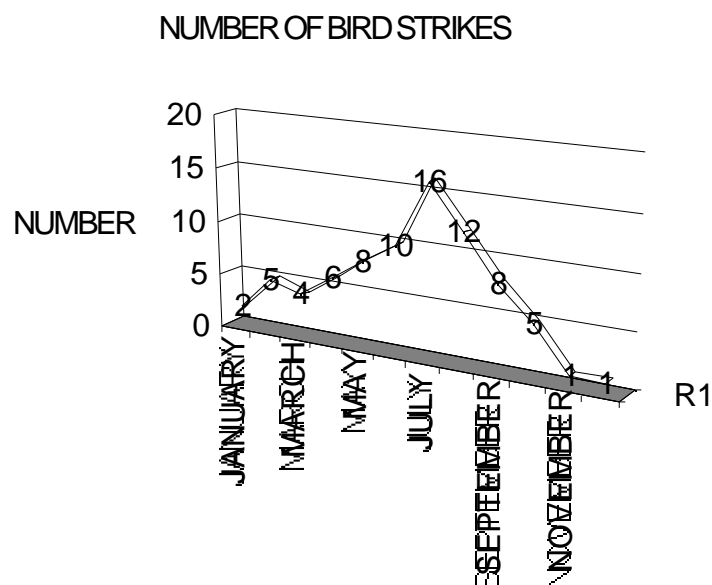
As regards our analysis, the current problem is that no reports exist for all strikes and when they do, not all data have been filled in. Significant voids are noted in parts of the form referring to bird species. We have to understand that the reporter is always the commander (pilot in command). Pilots are not familiar with bird species and often the speed at which the strike occurred was such, that the reporter was unable to see or identify the bird species. Other, modern, identification methods (feather identification, DNA etc) have to be introduced in order to have correct data.

## **3. Results**

### **3.1. Bird species involved in strikes**

In Greece, no special methods have been used up to now to identify birds (feathers, DNA) after each strike. Most strike reports do not mention bird species, this makes it difficult to draw precise conclusions, which may easily lead to erroneous estimations. Most data come from CAA which in 25% of the cases refer to bird species as well. Species involved in strikes are among others gulls, swallows, sparrows, doves, owls and hawks.

### 3.2. Strike seasons



The small number of bird strike reports makes it impossible for us to examine the distribution of strikes per month. According to these reports, there is an increase of strikes from May to September. This may be due to two main reasons: the first is that there is a significant increase in the number of flights (to more than 200%) at this specific time of the year as regards civil aviation aircraft. The second reason is the presence of a large number of birds during this specific period because of spring and autumn migration. Further study on the bird species of bird strikes is needed in order to extract scientific conclusions. By examining the existing reports of the species involved during the months when strikes increase, we come to the conclusion that there is a significant increase of strikes because swallows live in Greece at that specific period and because the increase of strikes noticed in June and July coincides with the period of separation of youngsters which, as regards gulls, have wide dispersion from their colonies.

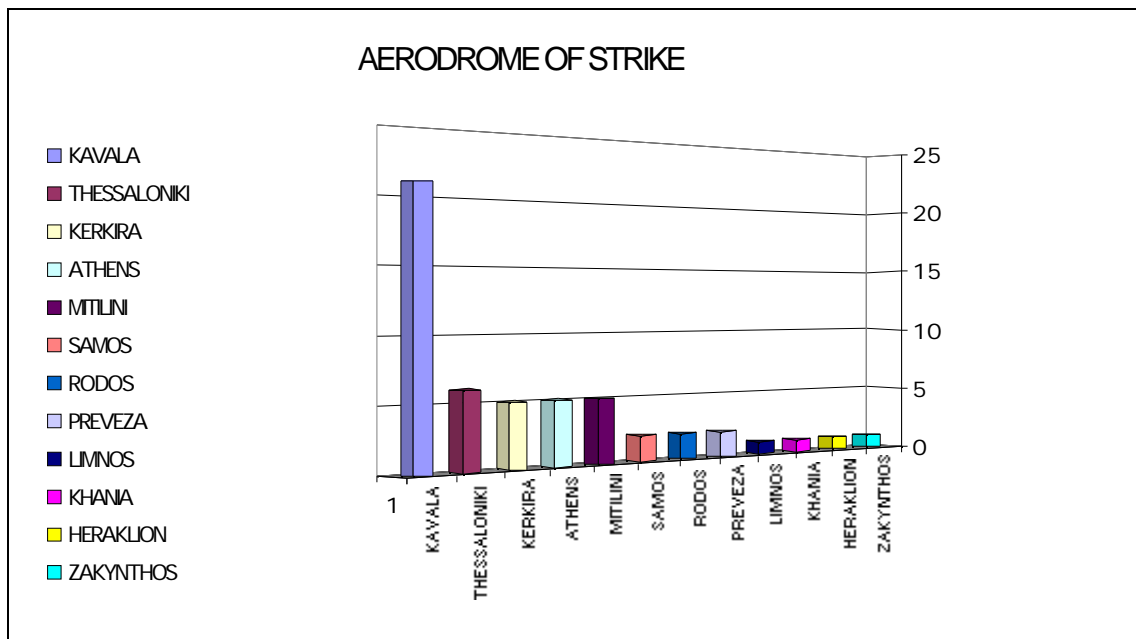
### 3.3. Evaluation of the risk of strike per airport

On the basis of data from ICAO, the risk of strike was evaluated for specific airports in the country. The evaluation is based on the percentage of the number of strikes that occurred in the period from 1997 to 1998 and of the number of flights for this specific period.

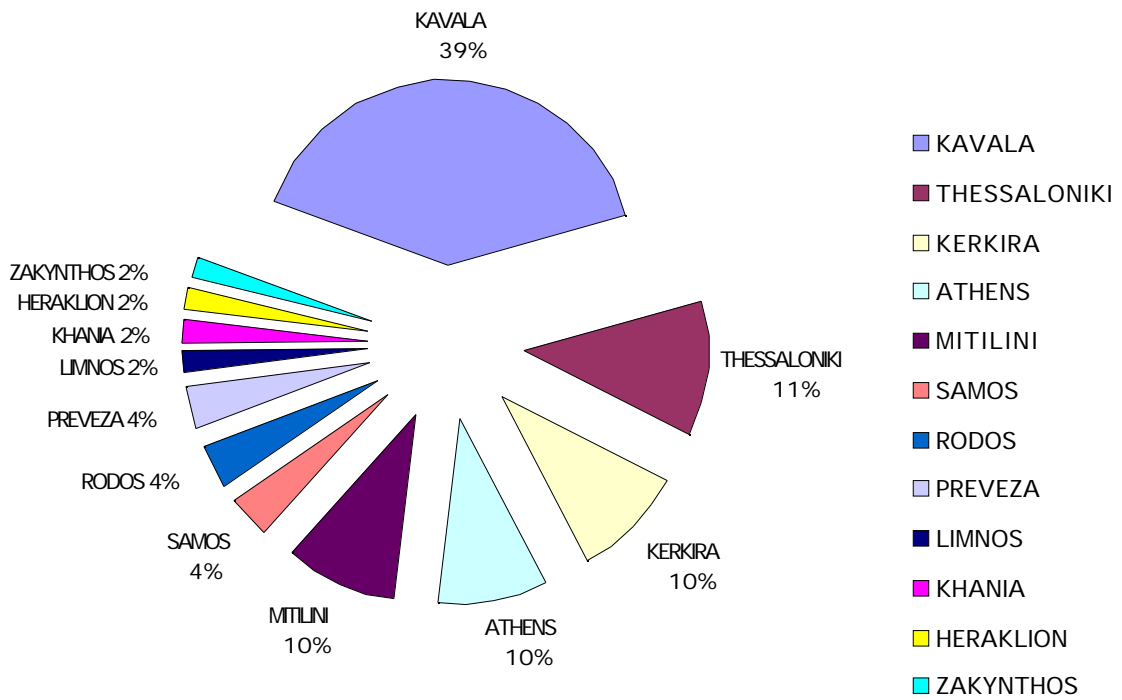
The risk of having a bird strike while landing or taking-off from one of the following airports in a civil aviation aircraft is:

1. Chrisoupoli	0,365%	(0.14%)
2. Mitilini	0,0491%	
3. Preveza	0,0465%	(0.109%)
4. Kerkira	0,029%	(0.06%)
5. Limnos	0,0149%	
6. Thessaloniki	0,010%	(0.024%)
7. Zakynthos	0,009%	
8. Chania	0,0061%	
9. Athens	0,0049%	(0.0028%)
10. Iraklion	0,0046%	
11. Rodos	0,0042%	

In the parenthesis is the risk, which was calculated for the period from 1980 to 1992.



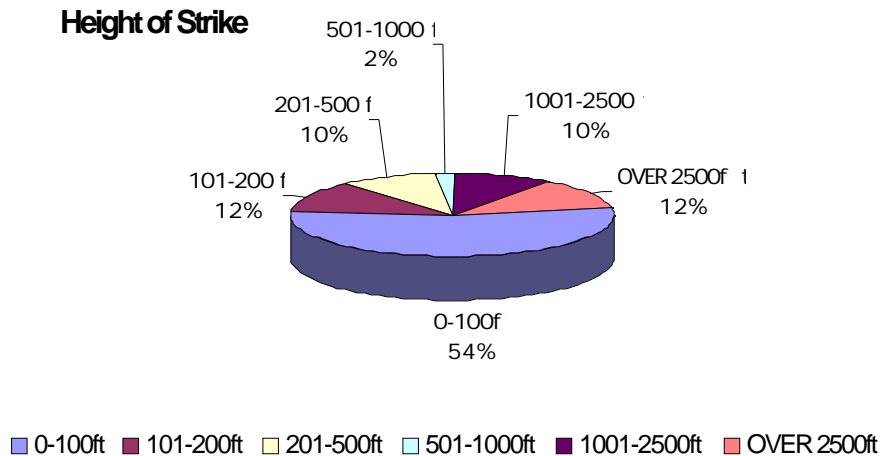
KAVALA	21
THESSALONIKI	6
KERKIRA	5
ATHENS	5
MITILINI	5
SAMOS	2
RODOS	2
PREVEZA	2
LIMNOS	1
KHANIA	1
HERAKLION	1
ZAKYNTHOS	1



### 3.4. Strike Altitudes

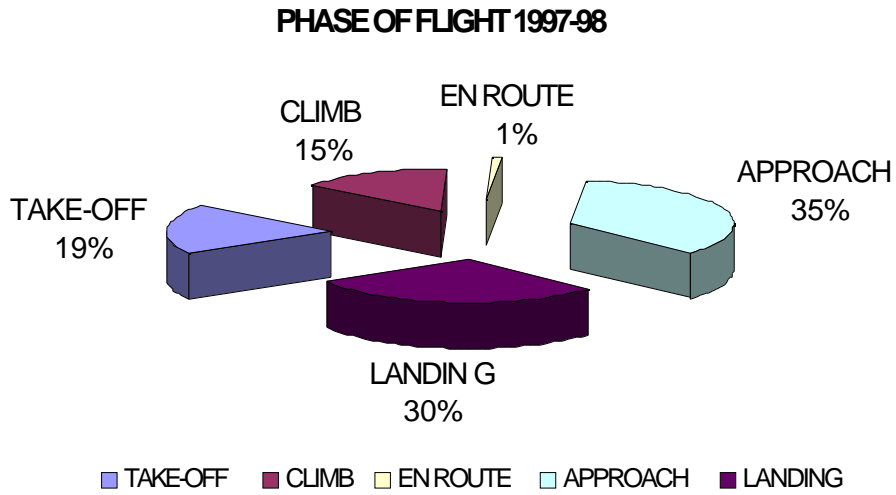
According to ICAO data for the period from 1997 to 1998.

We had 54% of the strikes below 100 feet, 12% between 101 and 200 ft, 10% between 201 and 500ft. That is 76% of the strikes occurred below 500ft. The last study showed similar results (82.46%) Above 501 ft to 1000 ft we had 2%, from 1001 ft to 2500 ft we had 10% of the strikes and over 2500 ft we had 12%. The last study showed similar results (5.5% from 501-1000', 4.26% from 1001-2500' and 7.77% over 2500').



### 3.5. Phase of Flight

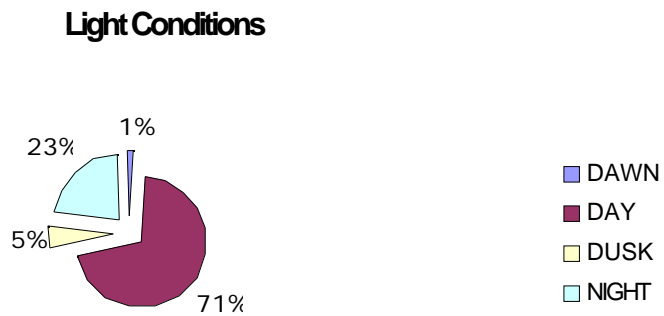
Strikes were registered at almost all phases: take-off run (19%), climb (15%), approach (35%) and landing (30%). Only a very low rate of strikes occurred en-route (1%) [The last study showed take-off run (27.32%), climb (20.24%), approach (32.44%) and landing run (18.78%), en-route (0.24%).]



### 3.6. Light Conditions

71% of the strikes occurred during the day

DAWN	1
DAY	51
DUSK	4
NIGHT	17

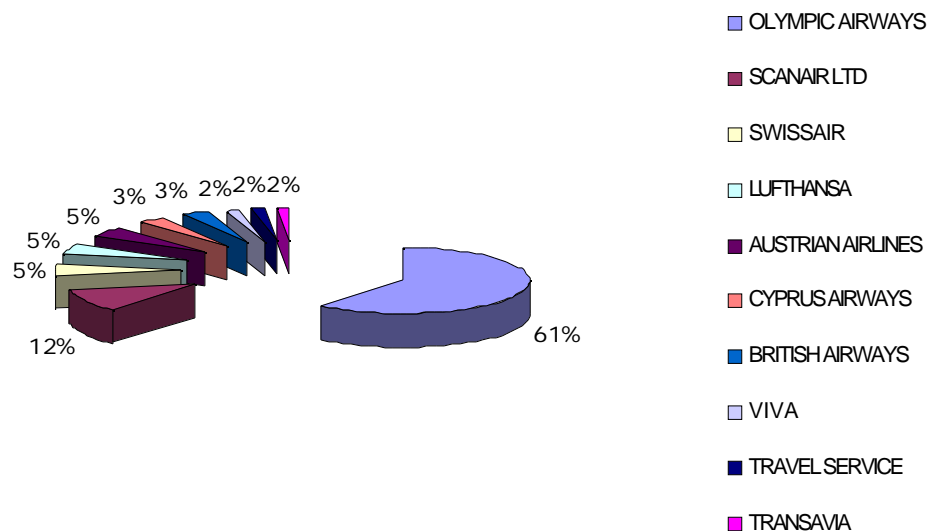


### 3.7. Reporting Operators

In Greece there were 21 AOC (Air Operators Certificate) holders in 1997 and 25 in 1998. Olympic Airways (36 reports and 61% of the reports) was the only Greek operator which reported bird strikes. ScanAir comes second with 7 reports and 12%.

OLYMPIC AIRWAYS	36
SCANAIR LTD	7
SWISSAIR	3
LUFTHANSA	3
AUSTRIAN AIRLINES	3
CYPRUS AIRWAYS	2
BRITISH AIRWAYS	2
VIVA	1
TRAVEL SERVICE	1
TRANSAVIA	1

#### TOP TEN REPORTING OPERATORS



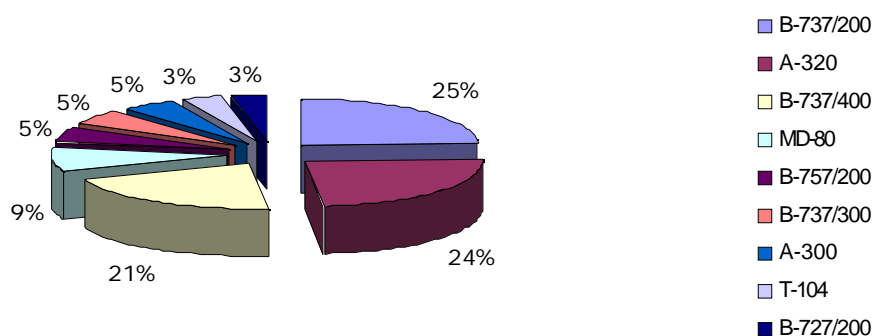


### 3.8. Top Ten Manufacturers model

We can see that of the 737 variants the 737-200 (operated in Greece only by Olympic Airways) is at the top of the list. The 737-200's were shown in 14 reports (25%) with A-320 in 14 reports (24%). The A-320's are used mainly by charter companies flying into Greece during the summer season. Third on the list is the 737-400, where 10 out of the 12 reports were filled by Olympic Airways.

B-737/200	14
A-320	14
B-737/400	12
MD-80	5
B-757/200	3
B-737/300	3
A-300	3
T-104	2
B-727/200	2

TOP TEN MANUFACTURES MODEL



### 3.9. Influence on the flight

On civil aviation flights, bird strikes had no effect on the flight.

On only two occasions engine ingestion was recorded (30/8/98 SCANAIR approaching LGKR –Kerkira (Corfu) and 13/5/98 AIRWORLD at LGKV-Kavala).

#### **4. Future Directions**

1. In the future it will be necessary to pursue co-operation between HAF, CAA, OA, the Hellenic Ornithological Society in order to implement a research program on bird migration in Greece so that bird flights may be monitored by radar for about 5 years. This will help to put down the precise routes followed by birds when they fly over Greece as well as the altitude, the range and the frequency of migration in specific time periods. Moreover, this research shall offer the possibility for HAF and CAA to make predictions on the flights of birds and to actively participate in the warning system.
2. A research program should also be implemented for the management of birds in airports in order to identify the intensity of the problem in each airport (collection of all registered bird strike cases, registering of aircraft types and frequency of movement etc.) and to offer management solutions with the help of experienced ornithologists, taking into account the bird species which cause the problem, their standard behaviour, the ecological conditions of each airport's site as well as the reasons for which birds are attracted to these airports.
3. The airline operators and the HCAA have to start an awareness program on bird strikes. It is the only method of encouraging the pilots to report bird strikes.
4. A Bird Identification Method is vital. Our colleagues in Israel, The Netherlands and elsewhere have developed contemporary methods which easily can be introduced in Hellas.
5. Finally, it is necessary to set up a national committee in Greece in which it will be necessary to have the participation of delegates from all parties dealing with this problem (HAF, CAA, airline operators, HOS, academics, etc.).

#### **5. Acknowledgements**

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