

BIRD STRIKES IN GREECE 1999-2000
Civil Aviation

Elias D. Nikolaidis Capt.
Manager Quality Audit Flight Operations Subdivision
Olympic Airways SA El. Venizelos Airport, Building 97, Spata 19019
Greece
Tel +30 210 4952767, Fax +30 210 4974780
E-mail en@attglobal.net

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 1999 and 2000.

The paper contains the strike seasons, risk per airport, strike altitudes, phase of flight, light conditions, reporting operators, top ten aircraft manufacturers model, Finally this paper proposes actions for the near and distant future.

Key words: Aviation safety bird strike statistics, bird hazard control, civil aviation, conservation, Greece, Hellas, Hellenic airports, reporting

(This paper is the work of the authors and may not reflect the full and final views
of the organisations, by which they are employed)

1. Introduction

Covering an area of 131,990 Km² 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 years 1999 and 2000 were 125.

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 1999 and 2000 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 has 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 at 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 comes from ICAO, which in 55.2% of the cases refers to bird species as well. Species involved in strikes are among others Laridae 24 (gulls), hirundinidae 13 (swallows), fringillidae 5 (sparrows), columbidae 3 (pigeons), accipitridae 3 (hawks, buzzard) falconiformes 2 (hawks, eagles, vultures), larus ridibundus 1 (black-headed gull), ardeidae 1 (herons) phasianidae 1 (partridges) strigiformes 1 (owls) hirundo rustica 1 (barn swallow).

3.2 Number of bird strikes per month of occurrence

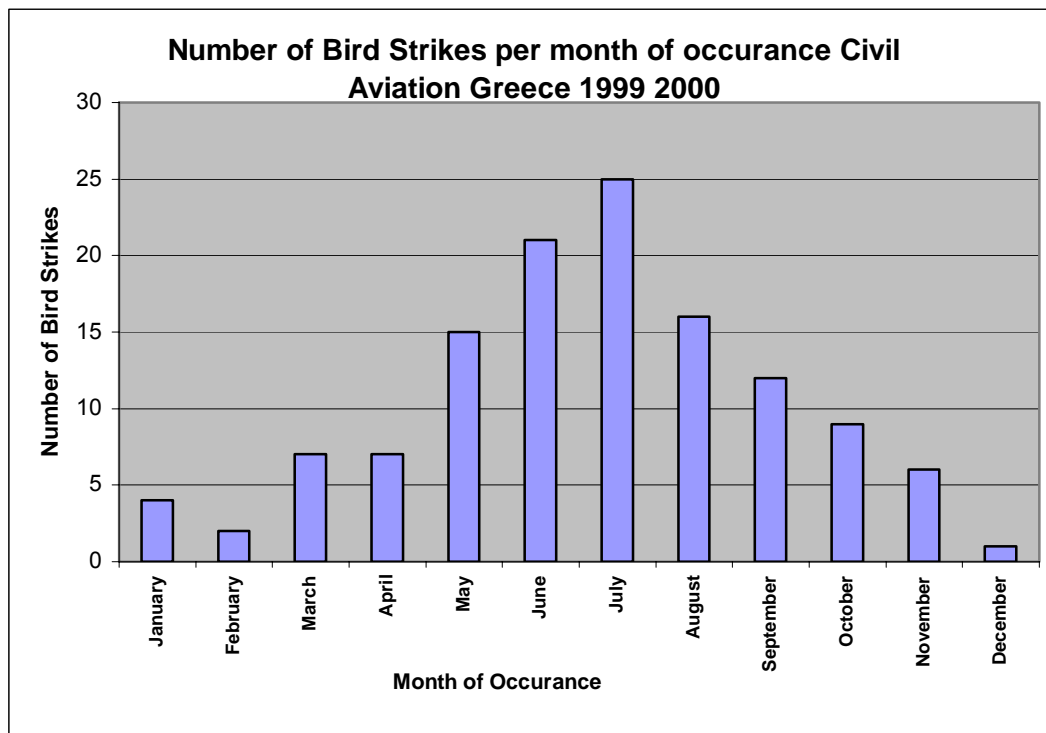


Figure 1.

According to these reports, there is an increase of strikes from May to September. This may be due to three main reasons:

- A) 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.
- B) The presence of a large number of birds during this specific period because of spring and autumn migration.
- C) The presence of non-Hellenic flights (foreign airlines) the reporting culture of these airlines gives us more reports

Further study on the bird species of bird strikes is needed in order to extract scientific conclusions. By examining the existing reports, 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

Table I.

Aerodrome	Number of bird strikes per 10000 flights
Araxos	14,11
Kerkira	11,75
Kalamata	10,16
Kavala	8,31
Preveza	7,19
Naxos	5,02
Limnos	4,73
Zakynthos	2,34
Kos	2,33
Thessaloniki	2,17
Hios	1,19
Iraklion	0,97
Mikonos	0,84
Rodos	0,84
Samos	0,77
Mitilini	0,65
Khania	0,40
Athinai	0,25

On the basis of data from ICAO, the risk of strike was evaluated for specific airports of the country. In table I the evaluation is expressed as the number of bird strikes per ten thousand (10,000) flights. In table II the possibility is presented as percentage. It is the possibility of an aircraft to register a bird strike during the approach or departure to/from the specific airport and it is based on the number of strikes that occurred in the period from **1999 to 2000** and on the number of flights for this specific period. Also data from previous studies (VASSILAKIS 1996, NIKOLAIDIS 1998, 2000) are registered in table II.

Table II.

The risk of having a bird strike while approaching or departing from one of the following airport in a civil aviation aircraft

Airport	1999-2000	1997-1998	Until 1996
Araxos	0,14%	N/A	N/A
Kerkira	0,1175%	0,029%	0.06%
Kalamata	0,10%	N/A	N/A
Kavala Chrisoupoli	0,08%	0,365%	0.14%
Preveza	0,07%	0,0465%	0.109%
Naxos	0,05%	N/A	N/A
Limnos	0,04%	0,0149%	N/A
Thessaloniki	0,02%	0,010%	0.024%
Zakynthos	0,02%	0,009%	N/A
Kos	0,02%	N/A	N/A
Hios	0,01%	N/A	N/A
Iraklion	0,009%	0,0046%	N/A
Mikonos	0,008%	N/A	N/A
Rodos	0,008%	0,0042%	N/A
Samos	0,007%	N/A	N/A
Mitilini	0,006%	0,0491%	N/A
Chania	0,004%	0,0061%	N/A
Athens	0,002%	0,0049%	0.0028%

Table III.

The number of bird strikes for the years 1998-1997 and 1999-2000

Aerodrome	Number of Strikes 1999-2000	Number of bird Strikes 1998-1997
Kerkira	37	5
Thessaloniki	21	6
Kavala	7	21
Iraklion	8	1
Rodos	5	2
Athinai	9	5
Kos	5	
Limnos	3	1
Preveza	3	2
Zakynthos	3	1
Araxos	2	N/A
Samos	1	2
Naxos	1	N/A
Mitilini	1	5
Hios	1	N/A
Kalamata	2	N/A
Mikonos	1	N/A
Khania	1	1

Regarding the relative high number of bird strikes per ten thousand flights, it must be taken into account that this number, for some airports, is elaborated from low traffic data, because some holiday destinations have low traffic and during the summer. Such airports are Araxos, which for the year 2000 had 805 flights and for the year 1999 had 612 flights, Kalamata which for the year 2000 had 964 flights

and for the year 1999 had 1004 flights, Preveza which for the year 2000 had 2331 flights and for the year 1999 had 1837 flights and other.

The traffic to these airports is mainly charter operators from Europe. These operators represent 40% of the airlines reporting bird strikes in Hellas [see table VII and figure 5]. That is why in some cases we cannot have valuable conclusions regarding the true and fair picture of the problem regarding the bird strikes.

It must also be underlined that the damages caused to the aircrafts because of bird strikes are minor at the airports with high number of strikes per ten thousand flights (Araxos, Kerkira, Kalamata).

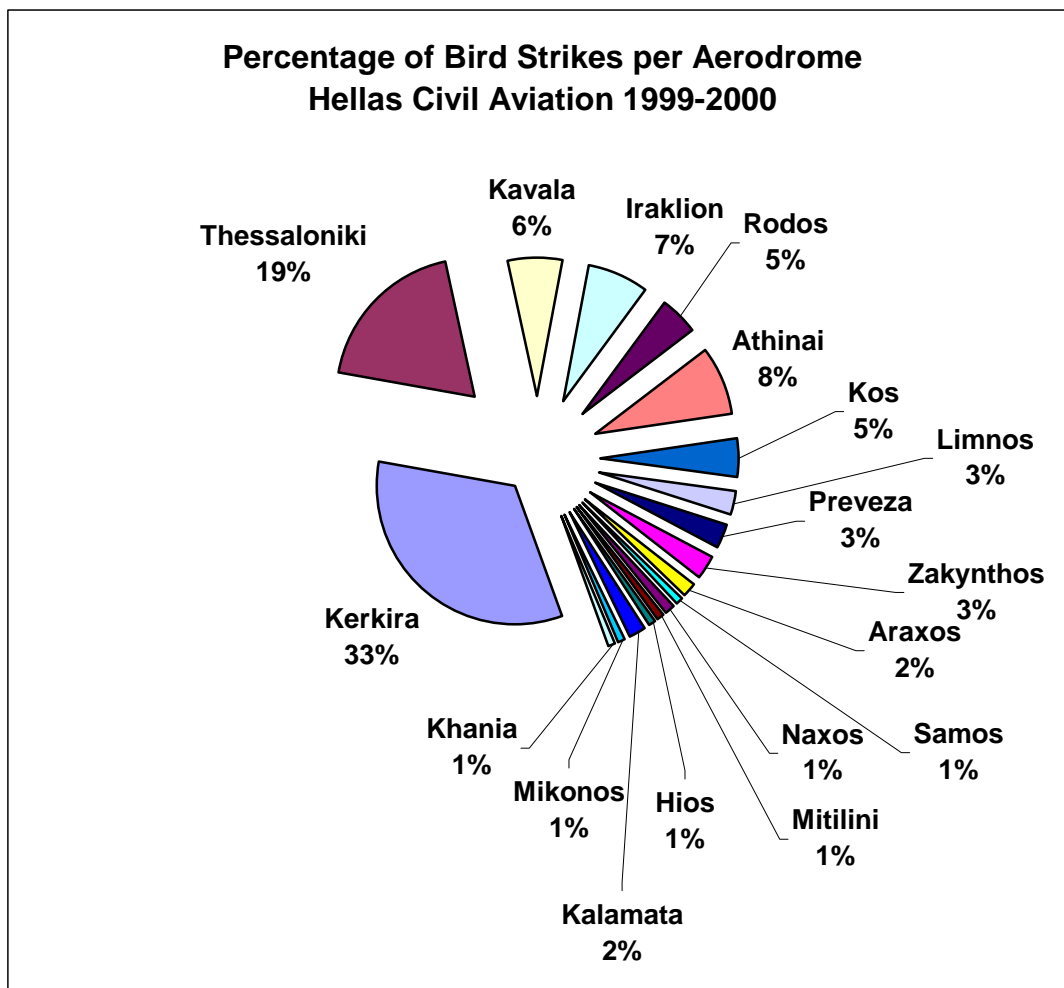


Figure 2.

3.4 Strike altitudes

Table IV.

Height AGL (FT)	Number of bird strikes
0-100	73
101-200	4
201-500	12
501-1000	1
1001-2500	8
Over 2500	11

According to ICAO data for the period from 1999 to 2000 We had 67% of the strikes below 100 feet, 4% between 101 and 200ft, 11% between 201 and 500ft. 501 ft to 1000ft we had 1% 1001 ft to 2500ft we had 7% of the strikes and over 2500ft we had 10%. The previous studies showed similar results.

3.5 Phase of flight

Table V.

Flight Phase	Number of bird strikes
Take-off	35
Climb	17
En route	5
Descent	1
Approach	39
Landing roll	28

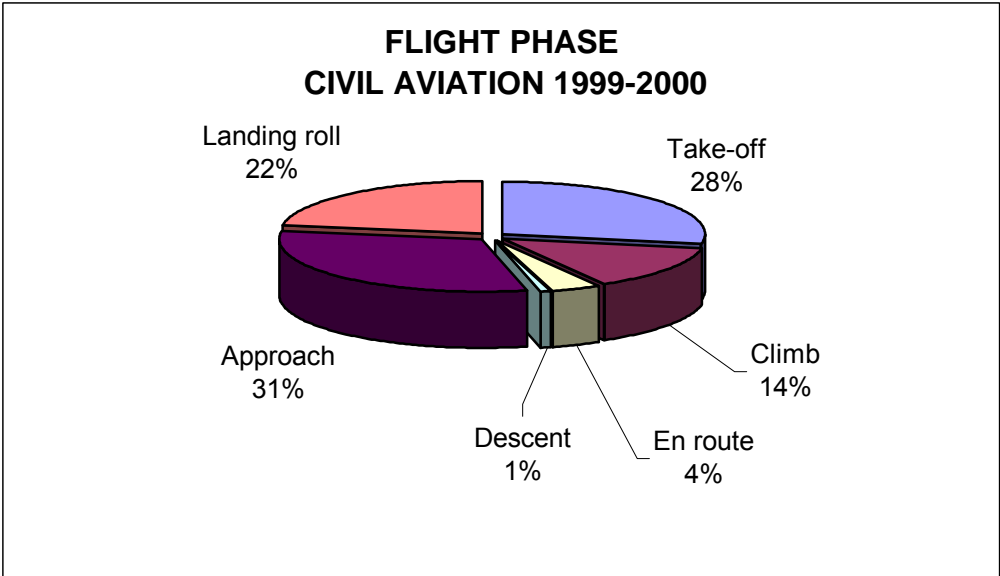


Figure 3.

Strikes occurred during all phases: approach (31%), take-off run (28%), landing (22%), climb (14%), en-route (4%) and descent (1%)

3.6 Light conditions

71% of the strikes occurred during the day.

Table VI.

Light Conditions	Number of bird strikes 1999-2000
Dawn	3
Day	88
Dusk	10
Night	23

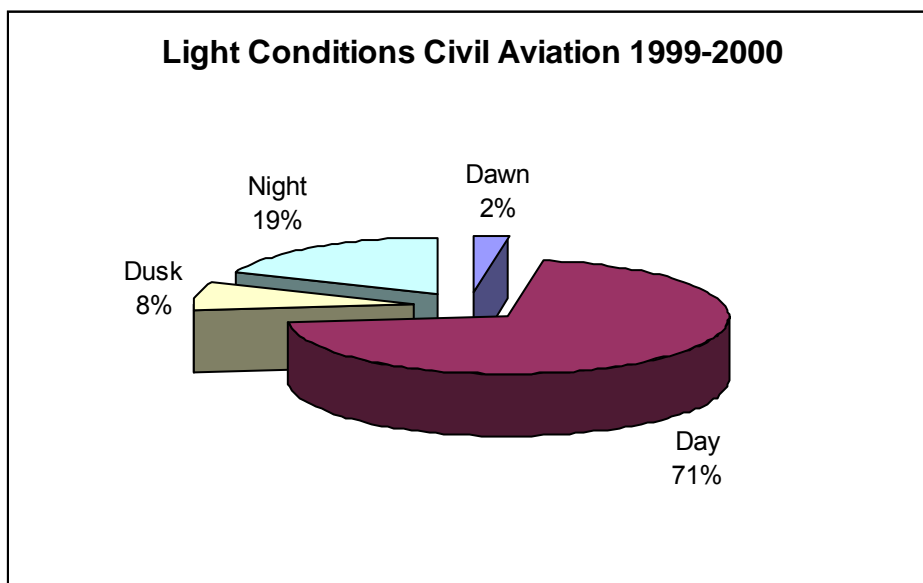


Figure 4.

3.7 Reporting operators

In Greece there were more than 20 AOC (air operators certificate) holders in 1999 and 2000. Olympic Airways (22 reports which represent 41% of the reports) was the only Greek operator, which reported bird strikes. Austrian Airlines comes second (10 reports which represent the 19%). We also like to underline that the bird strike reports come only from airlines Greece. There are no reports from other organisations or institutions (aero clubs, private owned aircraft, pilot training organisations, maintenance personnel, airports etc)

Table VII.

Reporting Airlines	Number of reports
Olympic Airways	22
Austrian Airlines	10
Sobelair	4
ADT Aviation LTD	4
Tyrolean Airways	3
Caledonian	3
British Airways	3
Britannia	3

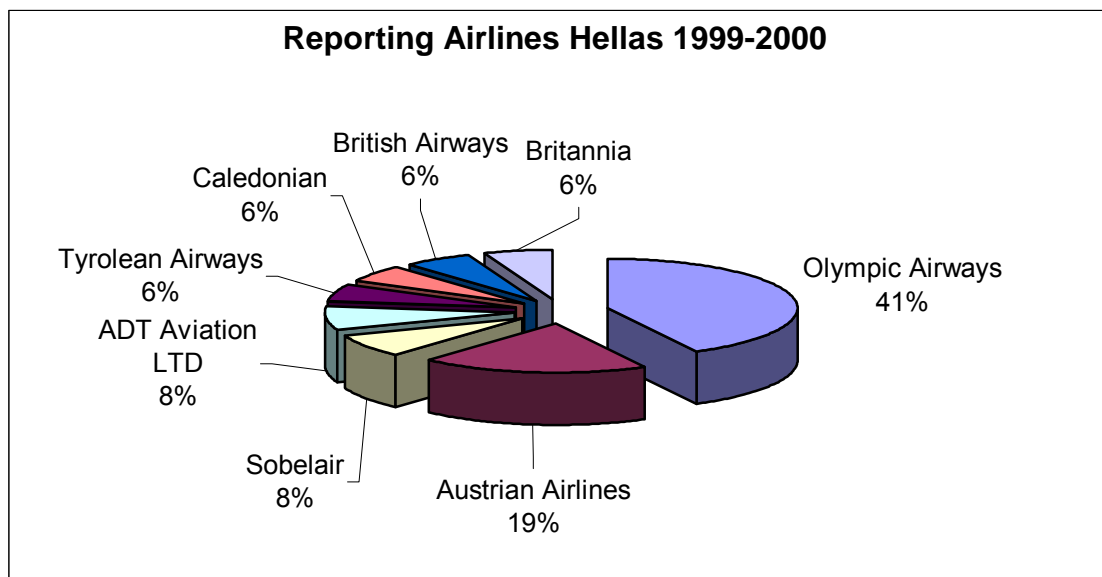


Figure 5.

3.8 Top Ten Manufacturers model

Table VIII.

Top Ten Manufacturers	Number of Strikes
B-737-800	21
B-737-400	17
MD-80 S	14
A-320	13
B-757	7
B-737-200	7
B-737-300	6
B-757-200	5
A-321	4
DC8	3

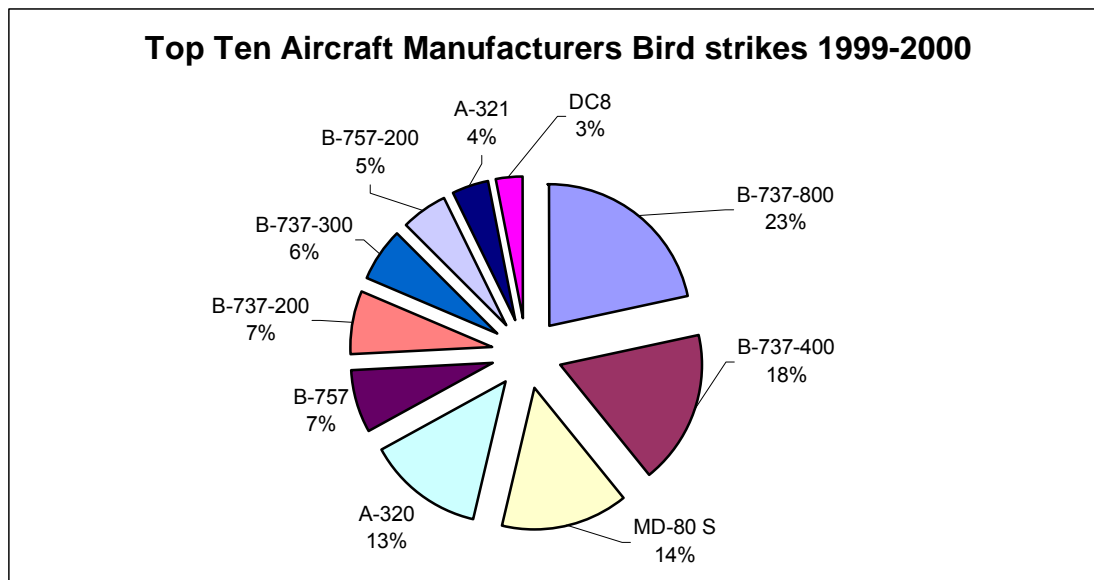


Figure 6.

4. Future directions

In the future

We should (all the stakeholders evolved) decide the national strategy for the management of birds (wildlife).

It will be necessary to pursue co-operation between HAF, CAA, airports, universities, research institutes, airlines, the Hellenic Ornithological Society in order to implement a research programme 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.

A research programme 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.

The HCAA have to start an awareness program, on bird strikes. It is the only method of encouraging pilots to report bird strikes.

A Bird Identification Method is vital. Our colleagues in other countries have developed contemporary methods, which easily can be introduced in Hellas.

Finally, it is necessary to set up in Greece a national committee 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.).

4. Acknowledgements

The author would like to thank Mr Alistair Pinos ICAO Aerodromes, the head of the CAA Airport Operation Section Mr Koumandakis and Mrs. Staupoulou M. HCAA statistics section

5. Reference

- BIRD STRIKE COMMITTEE EUROPE (1990), Aerodrome Working Group, 1990, "The Green Booklet" Some measures used in different countries for reduction of bird strike risk around airports, 4th edition, May, Helsinki.
- BLOKPOEL H. (1976) Bird Hazards to Aircraft, Canada.
- CIVIL AVIATION AUTHORITY (1990) Bird control on aerodromes, London.
- HELLENIC CAA, Organization and Development Division, Statistics section, Air traffic statistics 1978-1993
- HELLENIC CAA (1997) Organization and Development Division, Statistics section, Air traffic statistics.
- HELLENIC CAA (1998) Organization and Development Division, Statistics section, Air traffic statistics.
- HELLENIC CAA (1999) Organization and Development Division, Statistics section, Air traffic statistics.
- HELLENIC CAA (2000) Organization and Development Division, Statistics section, Air traffic statistics.
- HELLENIC ORNITHOLOGICAL SOCIETY (1994) Important areas for birds of Greece, Acquaintance with Greece's Vital biotopes, Special Edition, p. 272, Athens.
- ICAO (1978) Airport Services manual (Doc 9137-AN/898) Part 3, Bird Control and Reduction.
- ICAO, IBIS State Record Print, Greece 1980-1992.
- ICAO, IBIS State Record Print, Greece 1997-1998.
- ICAO, IBIS State Record Print, Greece 1999-2000.
- LUCID J.V. & S.R. SLACK (1980) Handbook on bird management and control, Final report, AFESC-TR-80-01, Florida.
- NIKOLAIDIS (1998) IBSC 24 Bird Strike in Greece, Civil Aviation.
- NIKOLAIDIS (1998) Bird Strike prevention methods Airsafe'98 Civil Aviation Authority. Athens Greece. Proceedings.
- NIKOLAIDIS (1998) Bird Strikes in Aviation. Proceedings ICAO Accident Investigation & Prevention Seminar. Cairo Egypt.
- NIKOLAIDIS (2000) Bird strikes in Greece, 1997-1998, Civil Aviation. IBSC 25 17-21 April, Amsterdam, Proceedings II, pp 47-57.
- STRANKS J., (1996) Law and Practise of Risk Assessment Financial Times.
- VASSILAKIS (1996) IBSC 23 London 13-17 May 1996 WP 12, Bird Strike in Greece.