BIRD STRIKE COMMITTEE EUROPE

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EURBASE:
POTENTIAL LESSONS FROM MILITARY BIRD STRIKE STATISTICS

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SUMMARY

Per april 1996 the European Military Bird Strike Database (EURBASE) contains 27.754 bird strike reports of 12 west and east european airforces. The growth now seems to be stable, but the progress tables also indicate that some air forces stay behind. The status of EURBASE has strenthened since the 22th BSCE meeting in Vienna. The European Bird Strike Form was adopted by the Military Agency for Standardisation in Bruxelles as annex to Standard NATO Agreement 3879 FS. Furthermore, progress reporting by custodian RNLAF became a fixed agenda item for the Air Forces Flight Safety Committee (Europe). Delivering data implies that contributing air forces consider BSCE, and in particular her Low Level WG, as their specialist group.

As the database contains non aggregated data the possibility exists to discern reporting biases by comparison. This in turn facilitates proper sampling which ultimately leads to improved separation of facts and feelings. Recent openness also favoured the exchange of formerly classified information, e.g. flying hours enabling the calculation of ratio's. As some examples may show, best professional judgement of the database already works. Scientific substructuring will follow, which in turn hopefully will contribute to the standardisation and certification of bird strike prevention measures.

Key Words: Statistics, Military Aviation, Mishap Investigation, Country

EURBASE, contributions by Air Force per april 1996; N=27,754

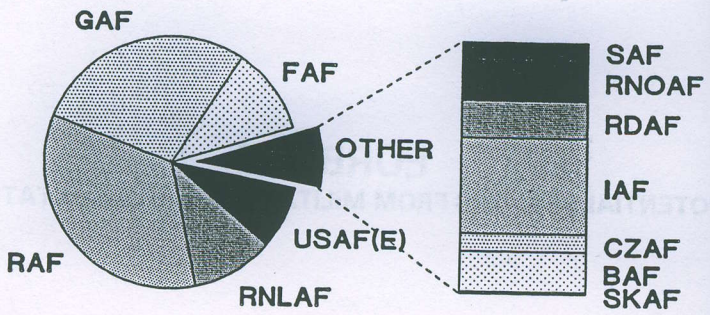


FIGURE 1

Introduction

The idea to set up a joint European Military Bird Strike Database (EURBASE) arose at the end of the Eighties. It became clear that the former summary reports per air force did not provide a firm basis for spatial and temporal comparisons. Therefore, we started to standardize the bird strike report form and to facilitate the entry of individual bird strikes per computer. Progress reports were presented during the BSCE meetings in Helsinki, Jerusalem and Vienna. A first more detailed study of EURBASE data was the analysis of 1471 helicopter strikes for the European Helicopter Association, also presented in Jerusalem. This paper summarizes the progress since last BSCE meeting, illustrates the possibilities by using flying hours, emphasizes the importance of bird species identification and calls up to formulate new questions.

Progress and status

Per april 1996 EURBASE contains 27.754 bird strike reports of 12 West and East European air forces (see figure 1 and 2). Since Vienna the Spanish, Czech and Slowak Air Force joined the database. The growth now seems to be stable, but table 1 also indicates that some air forces stay behind. They are kindly requested to resume their coöperation.

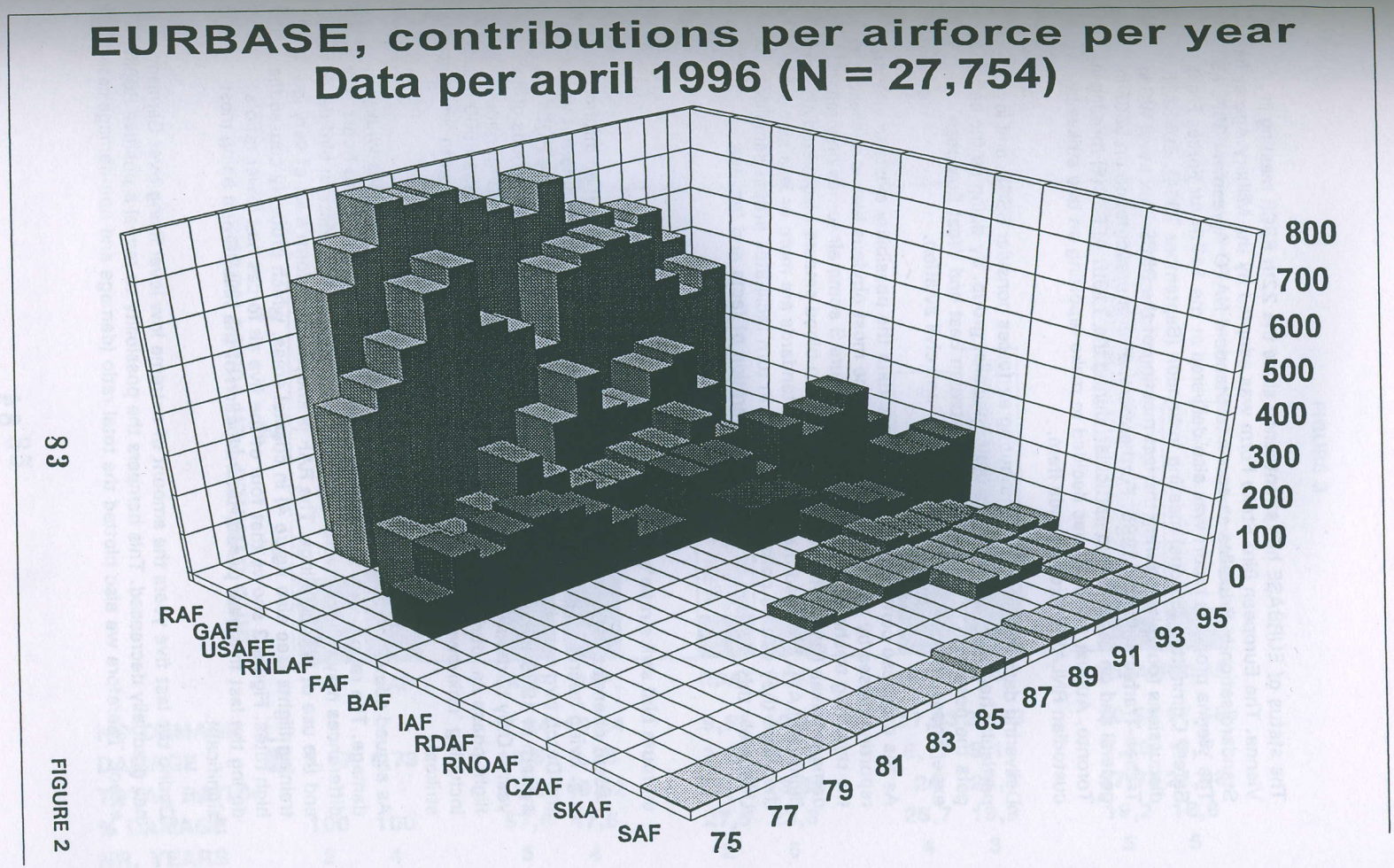

EURBASE, contributions per airforce per year
Data per april 1996 (N = 27,754)
800
700
600
500
400
300
200
100
0
RAF
GAF
USAFE
RNLAF
FAF
BAF
IAF
RDAF
RNOAF
CZAF
SKAF
SAF
75
77
79
81
83
85
87
89
91
93
95
YR. YEARS

FIGURE 2

The status of EURBASE has strenthened since the 22th BSCE meeting in Vienna. The European Bird Strike Form was adopted by the Military Agency for Standardisation in Bruxelles as annex to Standard NATO Agreement 3879 FS. The Vienna progress report was also delivered at the 117th Air Forces Flight Safety Committee (Europe) meeting in London (September 1994). EURBASE discussions took place during the last meeting of the BSCE Low Level WG in Traben-Trarbach, March 1995. Furthermore, after a presentation on BSCE in general and on EURBASE in particular, during the 119th AFFSC(E) meeting in Toronto, August 1995, it was decided to make reporting on bird strikes by custodian RNLAF a fixed agenda item.

Delivering data implies that contributing air forces consider BSCE, and in particular her Low Level WG, as their specialist group. By doing so the database gets the potention to create a bridge between East and West European experiences, as well as between military and civil aviation.

As the database contains non aggregated data the possibility exists to discern reporting biases by comparing air forces. The most obvious bias is caused by the reporting treshold. As is illustrated in figure 3 some air forces only report damage cases (FAF) while others report even blood smears discovered after the flight (RNLAF). Provided these reporting standards are more or less stable over the years they can be corrected for. This in turn facilitates proper sampling. Ultimately this will lead to improved separation of facts and feelings.

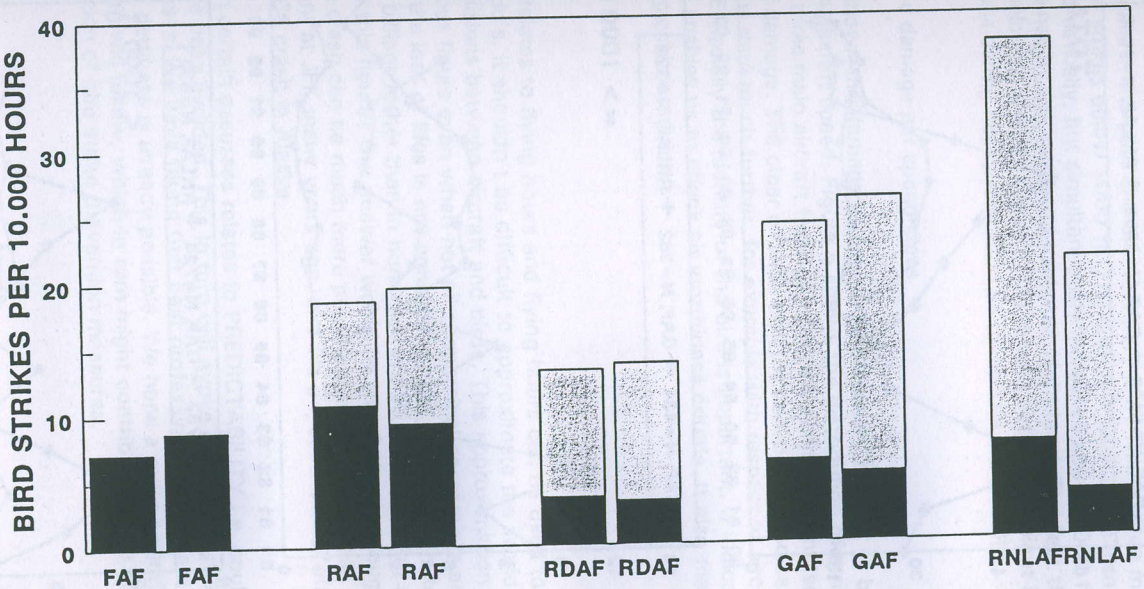
en route bird strike ratio's

Recent openness also favoured the exchange of formerly classified information, e.g. flying hours, enabling the calculation of ratio's. In order to find out whether the Dutch bird warning system improved by the introduction of the ROBIN system in 1989 we compare in figure 3 five airforces over two periods of five years. Only bird strikes by jetfighters/ trainers were selected during 'non-local' flight phase i.e. during flights faster than 300 kts and/or higher than 500 ft and including 'unknowns' (which almost all were proven to belong also to 'en route' strikes).

As argued above the best way to compare is looking at bird strikes with damage. The ratio's vary between 3.3 and 10.7 per 10.000 flying hours. The differences may reflect diversity of operations as well as variety in bird densities and the use of bird warnings. The RAF is known to perform a lot of very low training flights (see also figure 4) in coastal areas, which probably caused the high rates. Figure 3 shows that four of the five air forces had lower ratio's during the last five year period, the reduction of the RNLAF-rate being most significant.

During the last five years the amount of extreme low level flying over Germany has gradually decreased. This hampers the possibility to reveal a positive ROBIN effect. Therefore we also plotted the total ratio (damage and non-damage cases)

BIRD STRIKE RATIOS PER AIRFORCE AND PER PERIOD
NON-LOCAL JETFIGHTERS / TRAINERS ONLY
LEFT: 1985-1989 RIGHT: 1990-1994

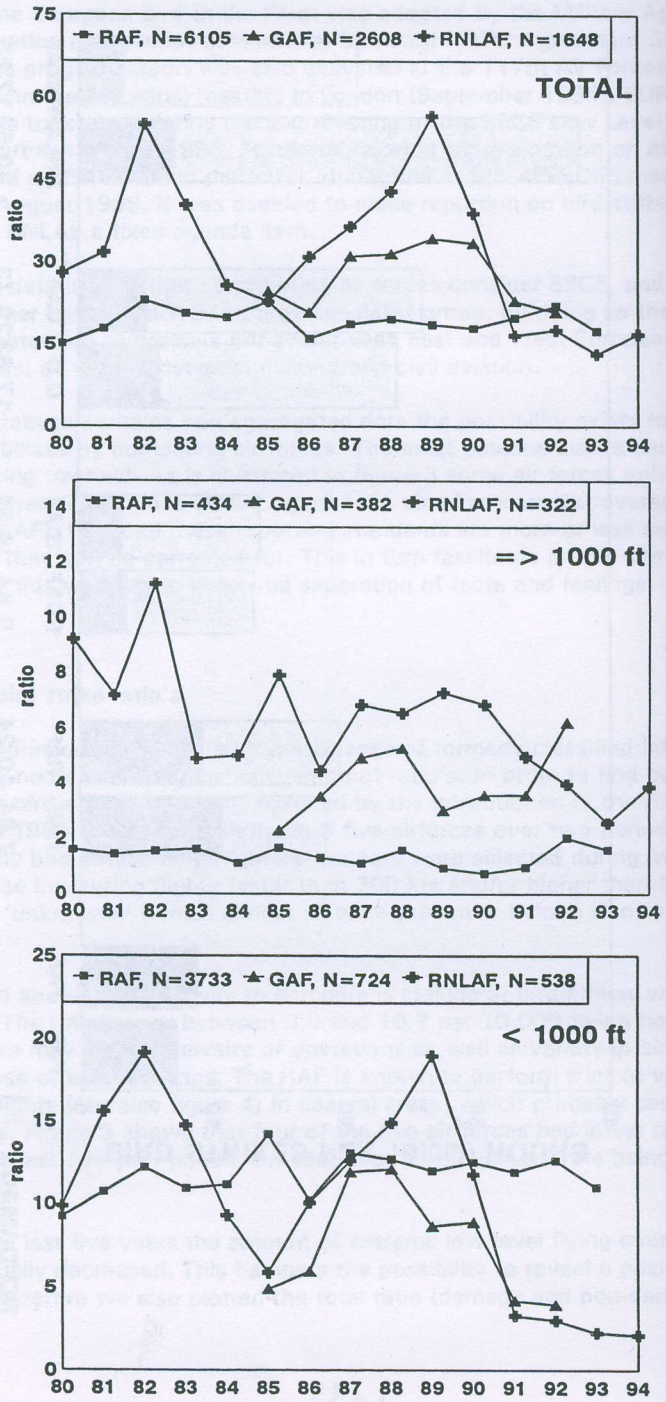


NO DAMAGE			7,84	10,24	9,54	10,31	17,83	20,73	30,53	17,58
DAMAGE	7,17	8,73	10,68	9,28	3,62	3,29	6,17	5,17	7,25	3,5
TOTAL RATIO			18,52	19,52	13,16	13,86	24	25,9	37,78	21,08
% DAMAGE	100	100	57,6	47,6	27,5	23,8	25,7	19,9	19,2	16,6
NR. YEARS	2	4	5	4	2	5	4	3	5	5

FIGURE 3

FIGURE 4

NON-LOCAL BIRD STRIKE RATIO (JETS)



for RAF, GAF and RNLAF (figure 4 - top) over the years and distinguished between bird strikes above 1000 ft (middle) and below 1000 ft (bottom). As can be seen the RAF ratio's are very stable. On the contrary the RNLAF values showed two peaks in the past and are now very low. This is even more the case in the bird strikes below 1000 ft. The GAF low level curve also went down although less drastically, but simultaneously increased above 1000 ft. This might be explained by the increased minimum flight level. The fact that the RNLAF rates below as well as above 1000 ft both decreased might be due to flight restrictions during heavy migration as measured with ROBIN.

bird strikes and damage per speed class

As is widely known the damage level and consequently the risk of bird strikes increases with aircraft speed. Figure 5 shows the distribution of strikes over speed for the three main aircraft families while the solid line denotes the percentage of damage. The clear relation and big sample size indicates that we can analyze the data much further, for example with respect of aircraft type and bird species. Especially the identity of the bird is important. It indicates bird weight which enables us to check air worthiness criteria. It also may reveal relevant biological information.

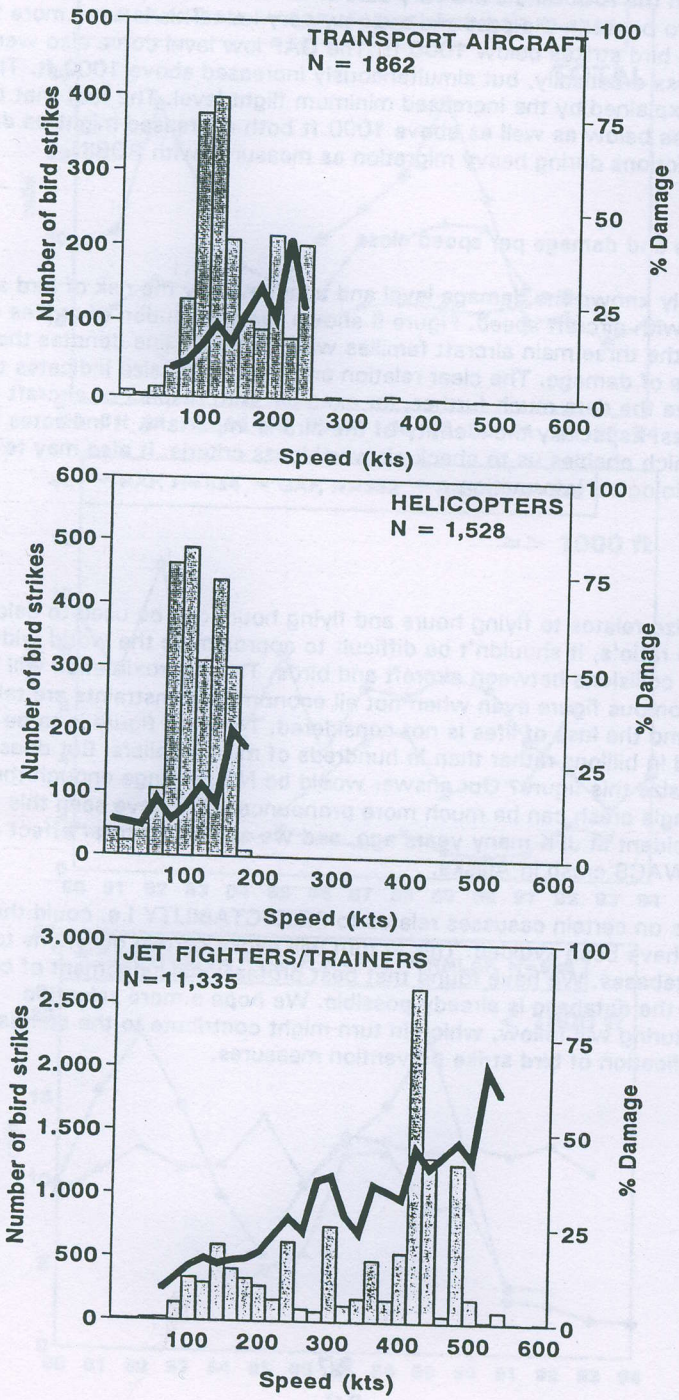
Prospects

As fleet size relates to flying hours and flying hours can be used to calculate bird strike ratio's, it shouldn't be difficult to approximate the world wide yearly impact of collisions between aircraft and birds. This approximation will result in an astronomous figure even when not all economical constraints are taken into account and the loss of lifes is not considered. The total figure is to be expressed in billions rather than in hundreds of million dollars. But does it help to emphasize this figure? Our answer would be NO. Strange enough the impact of one single crash can be much more pronounced. We have seen this with the DC10 accident at JFK many years ago, and we expect a similar effect of the recent AWACS crash in Alaska.

The focus on certain casusses relates to PREDICTABILITY i.e. could the accident have been avoided. This in turn will evoke certain questions to bird strike databases. We have found that best professional judgement of certain trends in the database is already possible. We hope a more scientific substructuring will follow, which in turn might contribute to the standardisation and certification of bird strike prevention measures.

FIGURE 5

EURBASE, SPEED VERSUS DAMAGE



Available data in EURBASE per Air Force and per year as per april 1996.

Year	Nr. of Forces	Total BS	BAF	CZAF	FAF	GAF	IAF	RAF	RDAF	RNLAF	RNOAF	SAF	SKAF	USAFe
1975	1	3										3		
1976	1	0										0		
1977	2	93			93							0		
1978	3	359			179					180		0		
1979	4	670			155	378				136		1		
1980	5	1370			188	429		621		131		1		
1981	5	1580			206	503		693		175		3		
1982	5	1879			196	615		785		281		2		
1983	5	1820			170	655		768		224		3		
1984	5	1585			126	505		778		176		0		
1985	7	1746			70	474		743		151	25	1		282
1986	7	1758			70	414		710		154	14	22		374
1987	7	1922			180	580		679		181	13	11		278
1988	9	2199	114		189	609		746	38	195	38	6		264
1989	9	2237	116		180	623		638	45	243	37	19		336
1990	11	2217	93	41	122	602	66	638	66	183	36	9		361
1991	10	1867		26	221	497	101	589	51	92	26	11		254
1992	10	1660		38	183	443	84	613	41	107	29	7		115
1993	10	1647		23	211	489	184	533	45	93	37	13	19	
1994	8	659		30	249		174		26	100	53	10	17	
1995	4	483			156		186			108	33			
Nr. years			3	5	19	15	6	14	7	16	11	20	2	8
Total BS		27754	323	157	3144	7816	795	9534	312	2910	341	122	36	2264

TABLE 1