

BSCE 21/ 18

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STATE OF AFFAIRS CONCERNING
THE BIRDSTRIKE WARNING SYSTEM
IN CENTRAL EUROPE

by

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SUMMARY

The Military Low-Flying Bird Strike Working Group shall develop preventive measures to minimize the bird hazard to low flying aircraft. As military aviation needs bird strike warnings covering larger areas, a dedicated observation and bird strike warning system was built up in several European countries. The paper gives a survey of the actual situation in the Netherlands, Belgium, Denmark, Germany, France and the United Kingdom and compares the bird strike warnings issued by adjoining countries in spring 1991. Future work must include improvements of the observation, reporting and warning system primarily with regard to military flight safety, but also civil aviation can benefit from the system.

1. Introduction

The procedures of bird strike warnings/BIRDTAM are mainly significant for military aircraft flying at low level. Therefore the military participants of BSCE 19 agreed to further contact on this subject besides the regular meetings of BSCE. In the meantime 7 meetings called "Bird Hazard at Low Level" were held at the German Military Geophysical Office, Traben-Trarbach/FRG, at HQ RAF Germany, Mönchengladbach/FRG, and at RNLAf Airstaff The Hague/NL, with the purpose of improving the bird strike warning system in Central Europe. The situation until 1990 was given at BSCE 20/WP 34. A survey of the current situation can be described as follows.

2. International Regulations for Bird Strike Warnings

The NATO countries agreed on the usefulness and importance of bird strike warnings covering larger areas. The format is laid down within the NATO by the standardization agreement STANAG 3879 FS-Birdstrike Risk/Warning Procedures (Europe). The ratification of the STANAG does not mean that all these countries are able to issue bird strike warnings, but they agree in principle to the content and format.

Bird strike warnings are based on real observations of bird migration mostly by radar, but also visually by pilots or ground staff. Visual detection as well as the identification of bird echoes on the radar screen, and the determination of the bird intensity are difficult, if standardized procedures and calibrated data are missing. Therefore two editorial changes of the STANAG concerning the calibration of warnings and the exponential structure of the intensity scale were accepted, whereas the question at which intensity the Air Forces should stop flying could not be answered on the existing data base.

3. Actual Survey of the Bird Strike Warning System in Several European Countries

The existing observation system of bird movements is unequal in several European countries. Only Belgium, Denmark, the Netherlands, and Germany observe regularly migratory movements of birds by radar, and issue bird strike warnings/BIRDTAM also to foreign countries. These observations are not calibrated with each other due to different equipments and techniques of identification. Therefore differences in bird intensities often occur at the borders of the warning areas covered by one country. The essentials of the system were outlined in BSCE 19/WP6 and BSCE 20/WP34. The current situation can be summarized as follows.

In the Netherlands the electronic counting system ROBIN (see BSCE 19/WP 40 and BSCE 20/WP 36) is taken into operational use.

ROBIN consists of a radar system located near the airport. The radar system is located near the airport, covering a large area. The radar system is located near the airport, covering a large area. The radar system is located near the airport, covering a large area.

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ROBIN consists of two cooperating systems: a registration system located near the radar and a presentation system which can be separated geographically. An interface between ROBIN and other radar types is in development. Then ROBIN can be implemented also at a smaller (e.g. ATC-)radar as planned for the South of Holland and in foreign countries (IL, UK). The results of ROBIN are influenced by the flight altitude of birds and the distance from the radar site. Therefore the best results would be expected by a dedicated pencil-beam bird radar which would be much cheaper than the existing radar systems, but the development of such a system would take several years.

The operational version of the ROBIN system proved to be very worthwhile in the detection and assessment of bird movements. During one migration period 10 - 15 days with bird intensities 7 and 8 were noted in accordance with the experience of other countries. The results are issued daily by the Air Staff, section Ornithology, in the form of an integrated bird migration report covering the Netherlands, Belgium, Luxemburg, and parts of Germany and France, and indicating per GEOREF the bird intensity and altitude of the bird strike danger.

In Belgium the electronic counting system BOSS (see BSCE 17/WP 37, and BSCE 18/WP 16) is implemented at Belga Radar. From 1985 to 1990 bird detection in Belgian FIR was performed by BOSS 1985. During 1990 studies were started at the military radarstation Semmerzake to develop a new system for bird observation, using a standard PC and making BOSS fully independant on any radar configuration. During spring migration 1991 the system was tested and calibrated. A high amount of plot files from different radar sources were recorded and processed by the system into track files with the highest number of tracks taken into account to give the bird intensity for each GEOREF.

By comparing the obtained results with data of BOSS 85 and also by taking into consideration BIRDTAM issued by RNLAF and GAF, tracking parameters were adapted and the algorithm to calculate the bird intensity was adjusted. After the analysis of the selected radarfiles

a plotter can produce a map with GEOREF of the Belgian FIR with the radars used showing each in their particular colour, their observed tracks, and in each GEOREF the bird intensity. Actual height indication was available from the two air defense radar stations involved in the system.

In a further step the bird info from airfield radars (RAPCON) can possibly be included into the program.

In Denmark the electronic counting system FAUST (see BSCE 8/WP 8-2) is still in use. Unfortunately bird intensities were often missing due to technical reasons. The intensities reported did not always correspond to the Belgian and Dutch messages due to technical and ornithological reasons, for in Denmark not only long term migratory movements but also local migratory patterns are recorded by radar.

In the Federal Republic of Germany all attempts to establish electronic counting procedures at the air defense stations have been failed 'till now. The photographic registration system is still in use (see BSCE 18/WP 5) at 10 air defense radar stations. The system is complemented by several ATC-airfield radars, two weather radars, and visual observers, mostly belonging to the German Military Geophysical Service. The main problem of these observations is the fact that ATC-radars operate within a smaller range than air defense radar stations, and record mostly bird movements at lower altitudes. Therefore the bird intensities reported do not correspond to each other. Furthermore the conversion of visual observations into bird intensities can only be an estimation. The visual observations refer only to larger birds as waterfowl, crane, and storks, and are used as an indicator for medium or heavy bird migration. These limitations are the reason that visual observations can only supplement the radar observation, but cannot take the place of it.

All observation messages are evaluated in the German Military Geophysical Office (GMGO) according to standing procedures, and converted into bird strike warnings/BIRDTAM, if necessary. For the area of East Germany observations of bird movements are still missing. The radar equipments will be tested for this purpose in 1992, and visual observations will be performed in the future mostly by the civil Weather Service, as the number of military airfields will be relatively small.

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In France the detection of migrating birds is possible by airfield radars (ALADIN) and CENTAUR-Radars, as well as by visual observations which will be facilitated by a booklet recently published by the Technical Services of the Air Navigation. When bird presence is considered as dangerous, bird movement forecasts (RPMO), respectively messages of local bird observations (ROPOM), are sent to the Operation Center of the Air Defense which spreads the message as a BIRDAM to each air base.

In the United Kingdom a dedicated warning system with regard to migratory movements of birds did not seem to be necessary, as the UK is situated at the end of the European migration routes. But the increasing number of LL flights, and the costs of bird strikes require a new assessment of the situation. In spring 1991 a program was performed with the aim to determine to what extent birds can be observed by the existing radar equipment. 26 airfield radars belonging to 4 radar types were included into the observation program, and the different radars could be assigned to 7 geographical groups. The range for the detection of birds was between 5 and 25 NM according to the different radar types. The reports contain date, time, location, flight direction, and bird intensity subjectively judged (low/medium/high) in relation to the number and size of radar echoes.

As LL flights were not restricted during the observation period days with high flight activity of birds, and bird strikes could be compared very well. In March the two graphs did correspond outstandingly proving the close connection between migratory movements, and bird hazard to aircraft, whereas in April - June such a correspondence was missing, mostly due to local bird movements detected by radar.

The positive results of the radar observation program makes it possible to include in the near future bird hazard information in the Low Flying Information System ALFIN used by civil and military aircraft.

4. Comparison of Bird Strike Warnings Issued by Adjoining Countries

Birdtam/Birdstrike Warnings are regularly distributed by Belgium and Denmark, The Netherlands and Germany. Except for Germany, all warnings

are based directly on radar observations. A comparison of warnings issued by adjoining countries can prove the effectiveness of the national systems and demonstrate the problems.

From January to June 1991 GMGO issued 182 BIRDTAM and received 218 Bird Warning Messages from NL, 116 Bird Risk Warnings from DK and 19 BIRDTAM from BE. The distribution of bird intensities over this period showed remarkable differences between those four countries (see Table 1). In Belgium the most frequent intensity in the warnings was 7, in Denmark 6, in Germany 5, and in the Netherlands there was a continuous decrease from below 5 to 8, which should be expected theoretically (see Table 2). In Belgium the low number of warnings, in Denmark the high amount of warnings with intensities not measured, and in Germany the high amount of BIRDTAM based on local radars and visual observations, seem to cause these differences.

Nevertheless the busiest days of bird migration were recognized very well by Belgium, Germany, and the Netherlands, differing only by one step on the intensity scale (see Fig. 1). The results show that in spite of the different observation systems the results correspond to some extent if all observation stations involved in the system are contributing continuously information to the system.

5. Future Work

According to BSCE 20/ WP 34 the bird strike warning system in Central Europe can only be improved significantly by

- continuous observation of bird movements based on radar, and providing calibrated data of bird intensities with respect to distinct areas and altitudes,
- quick exchange of data, respectively warnings between adjoining countries,
- standing procedures with respect to flight restrictions due to known bird strike danger.

These requirements are especially important for military flight safety. But also civil aviation can make use of the bird strike warnings/BIRDTAM with regard to the vicinity of airports. As a first step the German Federal Office of Air Traffic Control will convert the German BIRDTAM of intensities 7 - 8 into bird strike risk warnings with regard to Flight Information Regions (FIR) and aerodromes as part of the NOTAM data base.

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In the progress reports of the last meetings of the expert group "Bird Hazard at Low Level" the following recommendations were addressed to military authorities:

- 1) that nations pursue the aim of calibrated electronic assessment of radar data concerning the low level bird hazard
- 2) that nations evaluate the capability of currently deployed, and the future or projected radar systems to fulfill the aim of electronic assessment of such radar data
- 3) that nations investigate the possibility of contributing to a dedicated multi-national system for the detection, reporting, and the dissemination of birdstrike hazard warnings
- 4) that the national air staff consider/reconsider, how the bird strike warnings/BIRDTAM transmitted via ATC- and Wx-network can be obtained, and be upgraded to a comprehensive message
- 5) that nations note, that the most effective equipment for bird detection and warning is considered to be a small dedicated 3 D radar system
- 6) that nations explore the operational need of bird strike warning in the vicinity of the air bases
- 7) that nations support the proposal to MAS that the latest version of the European military bird strike reporting form should be added to STANAG 3879 FS as an Annex.

Money spent for these purposes would improve considerably the flight safety without hindering too much the Flying Units in their operational tasks.

Table 1:
Number of Bird Warning Messages January - June 1991

	Jan/Feb '91	Mar/Apr '91	May/June '91
BELGIUM	0	19	0
DENMARK	46	23	47
NETHERLANDS	56	115	47
GERMANY	28	120	34

Table 2:
Maximum Intensities of Bird Warning Messages January - June 1991

Max. Intensities	< 5	5	6	7	8	n.m.
BELGIUM	-	4	5	9	-	-
DENMARK	-	8	49	2	2	48
NETHERLANDS	95	52	49	19	6	-
GERMANY	39	79	29	32	3	-

n.m. = not measured

Figure 1:
Pattern of Bird Migration Intensities of Bird

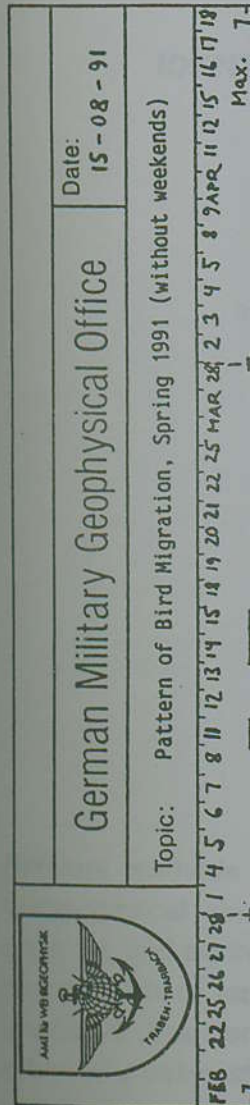


Figure 1:
 Pattern of Bird Migration in Central Europe, Spring 1991, Based on Maximum Intensities of Bird Warning Messages

