THE STATUS OF AERONAUTICAL ORNITHOLOGY PROBLEM IN THE CIVIL AVIATION OF THE USSR.

A.I. ROGACHEV.

In the history of the Civil aviation of the USSR in contrast to foreign countries there were no severe accidents caused by birds. However Aeroflot workers also consider birds as a serious danger to flight safety and understand that its reduction is a difficult problem. It is quite obvious that a succussful solution of this problem is impossible without the use of the experience gained abroad. That is why the fact that the meeting of the Bird Strike Committee Europe - BSGE is for the first time held in the USSR is of great interest to the Soviet specialists.

At present among other factors of environment such as icing, turbulence, atmospheric electricity, birds occupy a leading position as a most numerous cause of potentional air accidents. Especially alarming is the fact that during the last years the number of registed collisions of birds with Aeroflot aircraft has a tendency to increase and in 1981 it reached it's maximum(260 cases).

This situation is partly due to a great organizational work being done at airports to register collision; as a result of this the form of registration, for example, has been improved three times. However it must be admitted that other causes have greater importance, namely: increasing number of some birds most dangerous to aircraft (gulls, pigeons, rooks, starlings and other); concentration of birds near populated areas, that is near airport areas(mainly in winter season); increasing number of flights in some regions of the country and operation of jet aircraft.

During the last years one more cause has become noticeable- invasion of some airports by birds. Research shows that this happens as a result of a simultaneous action of principally three factors: occurence of abnormal weather conditions, sharp increase in bird disturbance caused by the man as a result of the expansion of the acreage under crop

and agricultural activity intensification, existance of conditions favourable for rest and often for feeding of a great number of birds near some airports due to their specific location.

For example, extremely hot weather in Moldavia in autumn and winter of 1980 delayed crooks migrating through its territory. During the winter stay many of these birds selected the Kishinev airfield as a place for the daytime rest. On some days there gathered about 1000 species. Still more complicated situation was in the Sochi airport area at end of the last winter. Daily there gathered some tens of thousands of turtledoves that left the mountains because of heavy snowing. As a result the aircraft movement was practically blocked.

At present such phenomena are very rare in the life of birds. However it should be taken into account that antropogenic influence upon the nature is growing and this indirectly increance the attraction of airfields for birds. And because of this the invasion of airfields by birds may become in future not only a dangerous, but also a widely spread phenomenon.

The actuality of the aeronautical ornithology problem consists not only in a great number of collisions between birds and aircraft and consequently in a great pecuniary damage. But the main thing is that these collisions endanger lives of passengers and crew.

Some examples from practice. In March of 1981 a Tu-134A departing the Voroshilovgrad airport collided with a bird on lift-off. One of the engines failed right away and the aircraft banked with a tendency of loosing altitude. The captain not without difficulty managed to level off the aircraft and transition to a climb. The operating time of the other engine in take-off mode exceeded its prescribed limit. The flight and emergency landing were performed with only one engine operational.

In September of 1981 a Tu-154B taking-off from the Sheremetyevo airport collided with a flock of ducks on the run at a speed of 220 km/hr. The crew experienced a violent vibration of the engines, but were able to stop the aircraft on the runway. The inspection showed that two the three engines were seriously damaged. The ever increasing danger of bird strikes

in the last decade and the necessity of adoption of effective measures to reduce this danger have led to creation within the Civil Aviation Scientific and Research Institute of a special subdivision which is to define the tactics and strategy of flight safety support from the ornithological point of view. Initially the prime objectives of the subdivision were to define the directions of research, organize research in the interests of Aeroflot in other organizations and departments, provide effective data collection and analysis concerning collisions between birds and aircraft, develop urgent measures to reduce the danger caused by birds, make proposals on the organization of the ornithological flight safety control at the Civil aviation airports and provide the airport staff with consultative assistance.

At the present moment a significant success has been achieved in the accomplishment of the identified tasks and that has become possible owing to the effective assistance from the Civil Aviation Ministry officials and the operational establishment workers.

The Soviet delegation informed the participants of the last year's meeting of BSCE in Brussels (working paper 29) about all the most important results of the research carried out under the guidance and with the participation of the Civil aviation specialists. It slould be remembered that the research was carried out on the following questions: establishment of the origin of collisions between aircraft and birds, seasonal and regional pecularities of the ornithological situation in the USSR, methods of ecologo-ornithological investigation of the aerodrome areas; scaring the birds away with the use of bioacoustic equipment, pyrotechnics, birds of prey, chemicals and by use of the landing lights at the daytime; use of airfield radars for the effective detection of flying birds, influence of height of grass on the birds population, reaction of the birds to the aircraft in different closing situations.

It has recently been proved that there is no regional variations in the distress cries of gulls, jackdaws, crows and starlings within their areas on the whole territory of the USSR and this has a great practical importance as it significantly simplifies the use and spreading of the bicacoustic

method. Recently new forms of research have been initiated, among which most important are the following:development of a special adapter to the surveillance radars used for the automatic identification of echo signals from birds,estimation of the ornithological situation in the airport area provision of the controller with the necessary information concerning bird's flights and the danger they cause in a visual form, on the basis of which the controller can make the most expedient and effective decision. Development of production models of mobile, semimobile and stationary bioacoustics units that provide replay of the recorded cries of birds in danger in conformity with prescribed requirements.Development of synthesised cries of birds in danger that represent a certain combination of supersignals and because of this are more effective.
Development of a model of the optimum agricultural landscape in the vicinity of aerodromes and investigation of the most expedient methods of performing agricultural activity in the area surrounding the aerodrome territory taking account of aeronautical ornithology requirements.Regional division of the territory of the USSR on the basis of regional differences in collision distribution,character of the air movement and ornithological situation with the aim of showing and defining the actual expected danger from birds to aircraft in different regions of the country.And finally, development of a model for a short-term forecast of bird migration flights subject to weather conditions.

On the basis of the researh carried out in the USSR and abroad the Civil aviation specialists have composed a list of measures for preventing collisions between aircraft and birds, implementation of which can be achived using modern airport equipment. At present the list is put into effect.Some of the measures contained in the list which are of most interest to the participants of this meeting are as follows:

-cutting the grass on the ornithologically dangerous airfields as low as 20-25 cm above ground(after an ornithological study of an aerodrome has been carried out the height of cutting is determined taking account of the bird concentration on the airfield);

-prohibition on use of earth on the territiry of the aerodrome for sowing bird attracting crops and,in general,decrease of any agricultural activity in the vicinity of the aerodrome except

hay crops.

-prohibition on building fur-farms, cattle-breeding farms, fish-ponds and other bird attracting features and elimination of rubbish pits nearer than 15 km to the aerodrome area;

-at the beginning of the nesting season, cutting off the upper branches of trees growing near the aerodrome and on which there are bird nests;

-ploughing earth around the aerodromes only at the night-time and ploughing anew soon after the crop has been gathered (also at the night-time);

-visual observation of mass bird flights during migrations with the help of the staff of hydrometeostations located within the range of 100 km round the aerodrome and subsequent transmission of the information to the aerodrome;

-coordination of aircraft movement with radar observed bird movements;

-switching on landing lights during take-off and landing (from 0 to 200 m) when the crew is notified by the controller about a dangerous ornithological situation.

Experience shows that correct implementation by the aerodrome staff of even a part of the measures contained in the list allows a significant reduction in the number of collisions between aircraft and birds. For example, by means of a well organized bird scaring operation using guns and sky-rockets it was possible to prevent during a few weeks collisions between birds and aircraft at the Sochi aerodrome when there gathered some tens of thousands of turtle-doves though since the beginning of concentration similar incidents happened there practically every day.

As in any field of science it was most difficult to resolve organizational problems, that is why they were given much attention from the very beginning. At the present time a "Model instruction on ornithological flight safety control at civil aviation aerodromes" has been developed and put into effect; it regulates the activity of all airport services and officials concerned with prevention of collisions between birds and aircraft. At 11 large airports (Sheremetyevo, Vnukovo, Tallin, Kazan, Tashkent, Sochi and other) over which birds migrate ornithologist is included in the staff, this specialist has a biological education.

And though not all organizational difficulties are overcome, the basis to set work on collision prevention going has been created.

Great importance is given in Aeroflot to training special personell. Regularly, once a year, a number of airport supervising officers attend upgrading courses where they are lectured on aeronautical ornithology. In all flight schools and other aeronautical training facilities a special programme devoted to the main principles of aeronautical ornithology is provided for future pilots, air traffic controllers and members of airfield personell. A series of placards named "Assessment of ornithological situation" is used as a special training aid (their photoes were contained in the materials of the Soviet delegation presented to the Second meeting of ECOPS). Besides that a film "Use of airfield radars for detection of birds" has been produced for demonstration at this meeting. It is planned to produce in the nearest future a photo-album that will depict the use of aerodrome radars to detect flying birds and a special training aid on organization and implementation of measures that prevent collisions between birds and aircraft.

It is still a long way to the efficiency assessment of the work being done, but there is much hope its results will be favourable.

It is impossible in a report to tell in detail about all achievements of the Aeroflot workers in resolving the aeronautical ornithology problem. That is why we mentioned in our report only those of them that could characterize the status of this problem and assist in strengthening collaboration with foreign specialists.