

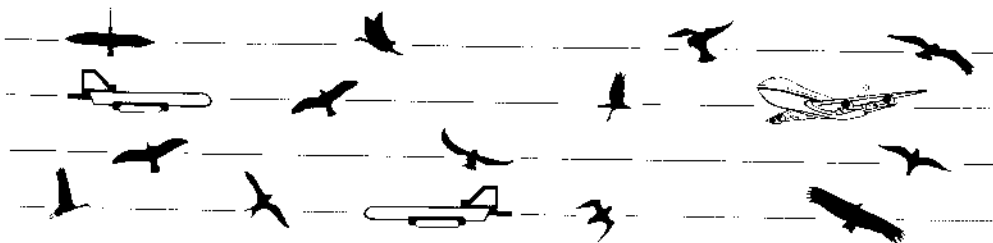


**Bird Strike Deterrence and Threat Management
at Ben Gurion International Airport, ISRAEL**

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ABSTRACT

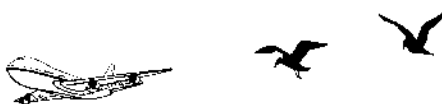
Ben Gurion International Airport is subject to a constantly shifting focus of threats from bird activity which depends upon multivariate factors that include bird migration, season of the year, weather and crop growth in the cultivated fields adjacent to the operational area. This calls for an active and aggressive posture from the **Bird Strike Control Unit** in order to cope with the threat to aircraft safety in and around the airport which is inherent to this situation. The methods employed to deal with the problem are presented in this paper.



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Ben Gurion International Airport is subject to a great deal of bird activity from various sources owing : (1) to its location within a developed area of agriculture which attracts birds congruent with this type of environment and supports a large and varied ecosystem, (2) the fact that Israel serves as a major conduit for bird migration between Europe/Asia and Africa. Consequently, the airport is exposed to a wide variety of bird threat from resident populations, transient migrating populations and migrants that remain the winter. In addition, to make things more interesting, the major municipal refuse dump for the greater Tel Aviv area is located about 4 km. west of the airport and lies along the final approach to the main runway at Ben Gurion. An additional smaller refuse tip is located about 6 km. east of the airport perimeter.

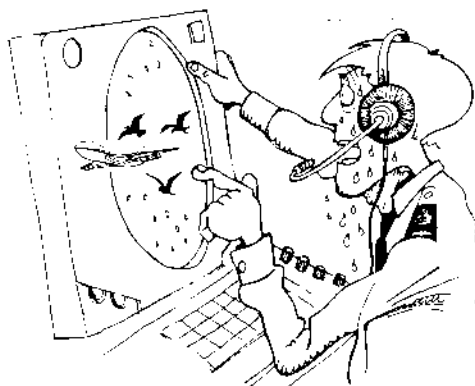
In order to cope with the varied threats the Bird Strike Control Unit has developed an integrated approach of preventative and determined measures designed to attenuate the focus of attraction for birds near the airport and active deterrent procedures designed to limit and deter bird activity. Different methods are used in order to cope with the threat posed by bird activity found in and around the agricultural areas proximate to the operational areas and more distant locations such as the refuse dump which carry a high threat potential to aircraft.



The Threat

Bird populations active throughout the year in, and around Ben Gurion Airport include pigeons, doves, crows, cattle egrets, spur-winged plover, stone curlew, larks, sparrows and the chucker partridge. Resident birds of prey include kestrels, falcons and barn owls. The approach of winter is characterized by the appearance of migrating birds many of which are seen at the airport throughout the winter. These include lapwings, ducks, coots, terns and most significantly the black-headed gull. Large formations of storks and pelicans pass over and near the airport during migration. Winter raptors which hunt in the area include the black kite and buzzard.

The threat from bird strike in winter is greatly increased with the appearance of the black-headed gull which in their thousands congregate at the refuse dump where they spend most of the day feeding and then gliding above in thermal updrafts where they can achieve altitudes that threaten aircraft on final approach. In addition the gulls and also raptors fly over the airport in early morning to hunt and feed in the fields east of the airport and cross back over in the late afternoon on the way back to their resting areas. Heavy rains which cause water to build up in the fields attract gulls, lapwings, ducks etc. Stormy nights can be more problematic as the gulls which normally spend the night at sea look for a refuge from the severe weather and are attracted by the landing lights where the reflection off the wet runway makes it appear to be a calm body of water.



Threat Management

In order to deal with the threat to aircraft from bird activity the Bird Strike Control Unit operates at two levels. The first is preventative and is geared towards limiting the potential sources of attraction for birds within and around the airport perimeter. The second is aimed at maintaining an active and aggressive posture in and around the operational areas by using static deterrent devices such as gas cannon, but more importantly manned patrols in the operational areas using a variety of methods to ward off and avert threatening bird activity.

Reducing the attractiveness to birds of the fields within the perimeter of the airport is accomplished by controlled land management. This is done by allowing the available arable land under Airport Authority control to be used by two nearby agricultural concerns in order to raise crops, but with restrictions designed to limit bird activity. Accordingly, cultivation of crops that do not generally attract birds are permitted while seed producing crops such as wheat or vetch intended for silage are harvested before reaching maturity when they would constitute a major source of attraction for seed eating birds such as pigeons. Immediately following the harvest the fields are plowed under in order to ensure that any exposed spillage is limited. It should be noted that agriculture adjacent to but beyond the airport perimeter is not controlled and these restrictions are not within the realm of the Airport Authority to enforce outside of the airport. Areas not under cultivation are maintained by the Airport Authority in order to contain any wild plant growth, which could attract bird activity, from spreading. Proper and adequate drainage is also important especially during the rainy winter months to ensure that there is no buildup of water in the fields which might attract water fowl.

Deterrence

The Bird Strike Control Unit employs a specially equipped vehicle for use in the operational areas and from which noxious audio output at high volume is used including synthetic and species specific recorded distress calls. Cracker shells fired from both pistol and shotgun are frequently used and lethal force is employed as a last resort when other remedies have failed. Non-lethal techniques are most effective against transient and non-resident bird populations. However, certain resident populations which have become accustomed to the methods employed and which by their type of behavior constitute an ongoing threat to aircraft (e.g. the chuckar partridge) are culled on a regular basis. Regular patrols are carried out throughout the day both on the runways and in the fields nearby with the most important being at first light. Patrols at night are done only on the runways with special emphasis on the areas bordering the runway to ensure that there is no ongoing nocturnal activity and that no birds are resting nearby.

During the winter the Bird Strike Control Unit deploys a team to deal with the threat posed by the thousands of seagulls at the municipal refuse dump which lies along the final approach to landing. The team operates on site a specially adapted drone aircraft capable of firing shell crackers in flight. The use of this brightly colored aircraft, which has intentionally been made more noisy, to fly in and around the bird formations and to harass them while firing shell crackers is effective in causing the birds to move offsite and over time reduces the number of birds that come to the refuse dump.



In summary, while the general threat potential from bird activity is known, the constantly changing variables and conditions in the field modulate the intensity and site of the activity impact. While potential problem areas can be reduced by appropriate prophylactic measures, determined steps must be taken to terminate hazardous bird activity in the operational areas. The Bird Strike Control Unit must maintain the flexibility to react to the constantly changing conditions on the ground and respond appropriately.