

**CYPRUS' FLAMINGOES COMMUTING ACROSS THE RUNWAY:  
ADAPTING THE AIRCRAFT'S OR BIRDS' FLIGHT SCHEDULE?**

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**Abstract**

Cyprus is a popular holiday destination. Most tourists enter the country by plane via Larnaca airport. The water bodies surrounding the airport attract many waterfowl, including up to 4,000 Flamingoes. Commuting between those different water bodies, the birds cross the runway and pose a threat to the departing and landing aircraft.

According to the new ICAO standards, ***the bird strike hazard shall be assessed and appropriate action shall be taken to decrease this hazard.*** Although data of bird strikes at Larnaca airport are missing, it's obvious that the waterfowl and especially the Flamingoes, with their big numbers, big size and poor manoeuvrability, are a potential hazard while crossing the runway.

According to the EU Habitat and Bird Directives, ***areas of nature importance and their species shall be protected.*** The wetland complex surrounding the airport will be designated as a special protection area with special interest for the conservation of the Flamingo.

What to do with these conflicting laws?

We compared two opposite strategies; how do the bird control units of JFK New York and Woensdrecht (NL) deal with gulls crossing their runways? Which strategy is the best to reduce the risk of colliding with Flamingoes at Larnaca airport?

**Key words:** bird control, bird strike, commuting birds, aircraft movements, flight schedule, airport vicinity, ICAO, nature laws, Cyprus, Flamingo.

## INTRODUCTION

### Commuting birds

Not only birds present at airports, but also birds in the airport vicinity may pose a threat to departing and landing aircraft. Many species, among which gulls, geese, cormorants, ducks and flamingoes, have (partial) separate foraging and roosting sites. If these sites are on both sides of an airport, the birds' commuting flights between these sites coincide with the flight path of the aircraft.

### Flamingoes around Larnaca airport

Cyprus is a popular holiday destination visited by tourists from Europe, Russia and the Middle-East. Larnaca is its largest airport with 2.5 million passengers and 45,000 aircraft movements per year. The airport of Larnaca is surrounded by several water bodies that are important overwintering and migratory stop-over sites for thousands of waterfowl. During the winter months, up to 4,000 Flamingoes (*Phoenicopterus ruber*) stay in the lake complex surrounding the Larnaca airport. They fly frequently between the different water bodies. Although data of bird strikes at Larnaca airport are missing, it's obvious that the Flamingoes with their big numbers, big size and poor manoeuvrability, are a big hazard.

### ICAO bird strike standard

According to the ICAO bird control standards, ***the bird strike hazard shall be assessed and appropriate action shall be taken to decrease this hazard.*** What action is appropriate? For most people, the instinctive reaction is: "Kill the pink winged rats!" Is that a good solution? Let's look at the following example...

## BIRDS

### Laughing gulls at JFK New York

Adjacent to New York JFK airport (USA) a colony of a couple of thousand Laughing gulls is present in the marshes of Jamaica Bay Wildlife Refuge (JBWR) during the breeding season (May till September). Not only the JBWR marshes are protected under strict nature laws, but also all birds, nests and eggs within its borders. For this reason, affecting the gulls, their nests, eggs or habitat is strictly forbidden. The gulls' feeding grounds are widespread throughout metropolitan New York. Making these feeding grounds in this vast and urban area less attractive is asking for the moon. Thus, controlling the birds at both their breeding and feeding areas is impossible.

Since the safety of the aircraft was at stake, JFK decided to use the shotgun within the airport fences. As many gulls as possible that fly over the airport are being shot in an attempt to divert their flying route to avoid the airport. A gull strike reduction of 97 % was obtained by shooting a total of 70,000 gulls in the last 15 years (Dolbeer, IBSC26/WP-BB5, 2003).

### Nature laws in Cyprus

In Cyprus different nature laws (for example the European Union Habitat & Bird Directive) regulate the protection of the Flamingoes and other waterfowl. According to these laws, ***areas of nature importance and their species shall be protected.*** This implies, in contrary with the New York laughing gulls, that the Flamingoes themselves, regardless their geographical position, are fully protected. This makes it illegal to shoot them when they fly over Larnaca airport.

The ICAO standards and nature laws are diametrically opposed to each other. What to do with these conflicting laws? Is there a way out?

### Gulls at Woensdrecht pilot school airbase, The Netherlands

Outside the breeding season, up to 16,000 gulls (Black-headed, Common and Herring) roost in the huge wetland of the Markiezaatsmeer west of the pilot school airbase of Woensdrecht (NL). This is a small airbase with just one runway, east-west orientated. They feed on soil invertebrates in a vast agricultural area east of the airbase. Around dawn and dusk the gulls commute through air bridges between the roost and feeding sites and pose a threat towards departing and landing aircraft while crossing the runway. Like at JFK, the only place to control the gulls is at the airport itself. But, like Cyprus, The Netherlands have to abide nature laws that not only protect the birds in their habitats, but at any place, also when they fly over the airport. How to safeguard the aircraft? Is there a way out?

→ Both JFK as Woensdrecht have not the whole year around gulls posing their aircraft at risk.

→ At JFK the gulls commute all day and all over the airport, at Woensdrecht only around dawn and dusk, through air bridges.

**AIRCRAFT MOVEMENTS**

**Flight schedule at JFK New York Airport & Woensdrecht pilot school airbase**

JFK New York is a huge airport with 4 runways from which aircraft is flying 7 days a week, 24 hours a day. On average, JFK New York has 300,000 movements per year, which means an average of 35 movements per hour. Most flights are from noon till midnight, with a peak from 15 till 17 pm. The gulls fly continuously during the whole daylight period, which ranges, in the months May till September, on average from 5 am till 9 pm. During this 'gull season', approximately 80 % of the aircraft movements take place within these 'gull hours'.

Woensdrecht is the pilot school for the RNLAf. It's open 256 days a year during office hours; Monday – Friday from 8h00 till 16h45. It has 12,500 movements per year. This means an average of just 5.6 movements per hour, equally divided over the day. The gulls commute in the first and the two last hours of the daylight period and coincide with the aircraft in the months October – February in which the daylight period is on average from 7 am till 6 pm. During this 'gull-season' approximately 22 % of the aircraft movements take place within these 'gull-hours'.

Furthermore, all JFK flights are flying to / coming from airports from all over the world and have to fit in the time schedules of other airports. The aircraft departing from Woensdrecht also return to this base. Figure 1 shows both the characteristics of the gulls and aircraft at JFK and Woensdrecht.

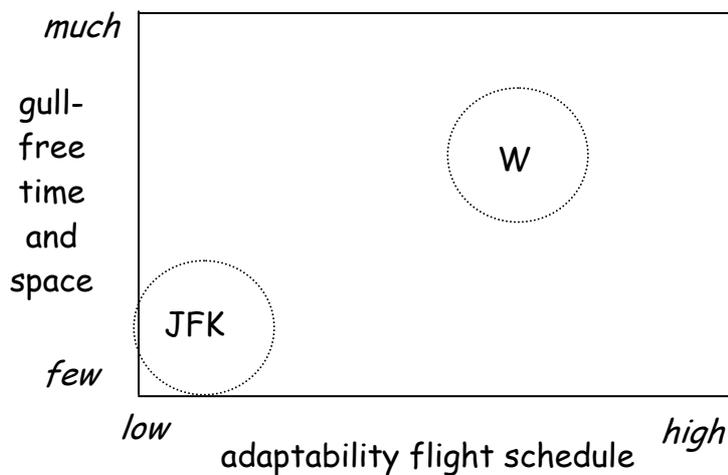


Figure 1. Schedule of gull-free time / space and adaptability of the flight schedules at JFK New York and airbase Woensdrecht (NL).

**SOLUTIONS**

As figure 1 shows, Woensdrecht's flight schedule has some flexibility to reschedule all aircraft movements within gull-free hours. JFK doesn't have this possibility, the only way out would be to fly only in the dark!

However, Woensdrecht wants to close the runway as few hours as possible. Furthermore, many times the gull air bridges just lie parallel next to the runway (both are east-west directed) and don't interfere with the aircraft. In these situations, rescheduling the flight schedule is not necessary. To avoid not flying when it would have been possible, the strategy is that the flight schedule is not rescheduled at all. The bird control unit is keeping an eye on the gulls.

Due to the lack of appropriate knowledge the BCU is not able to predict the position of the gulls in advance and gives ad hoc bird warnings. The ad hoc “no go” decisions cause a lot of frustration and costs. In order to decrease the uncertainty of the gull passage time, the Major in charge of the Air Traffic Control demanded a decision support system.

Two Biology students conducted observations on the gulls’ commuting route above the airport during January – April 2005. The meteorological service of the airbase collected information on wind direction, wind speed, cloudiness, visibility, temperature, pressure, precipitation and inversion height. Statistical analyses showed that the position of the gull air bridge in the afternoon only has a poor correlation with the wind direction. The wind force and precipitation show a very poor correlation. The other parameters don’t show a correlation at all, nor for the morning, neither the afternoon.

As a start a “gull warning” will help the planners to adapt the flight schedules a few days ahead. Since more data is needed, the only weather variable used now is the wind direction. When in the period of October - February and in the last two hours of the daylight period the wind direction is between 350° and 150° the gulls have tail wind and are expected to fly in a broad front length wise over the runway. In all other occasions, the gulls are expected to fly parallel to the runway, avoiding the head wind by skimming the trees. In order to fine-tune the prediction model, more research will be carried out by two master Biology students in the winter season of 2005 – 2006.

According to the number of aircraft movements, the adaptability of the flight schedule of Larnaca airport lies between that of JFK and Woensdrecht. The few observations of the Flamingoes show that they only fly around dawn and dusk and just take a few minutes to cross. This would make the ‘Flamingo free time and space’ even bigger than the one from Woensdrecht.

A decision support system based on season, daylight period and weather conditions would increase the predictability of the Flamingo commuting flights. In this way both the aircraft and the Flamingoes can coexist without harming each other.

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