



الهيئة العامة للطيران المدني
General Authority of Civil Aviation

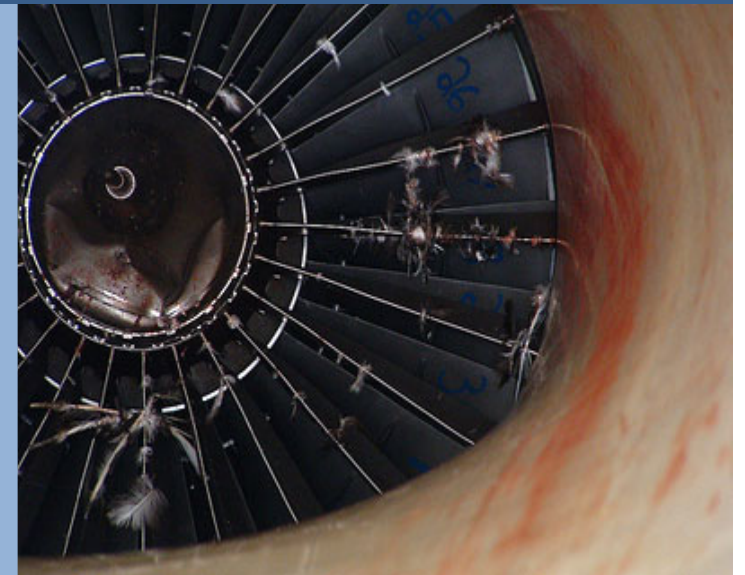
Bird Strike

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Safety Dept. – Safety &
Economic Regulation



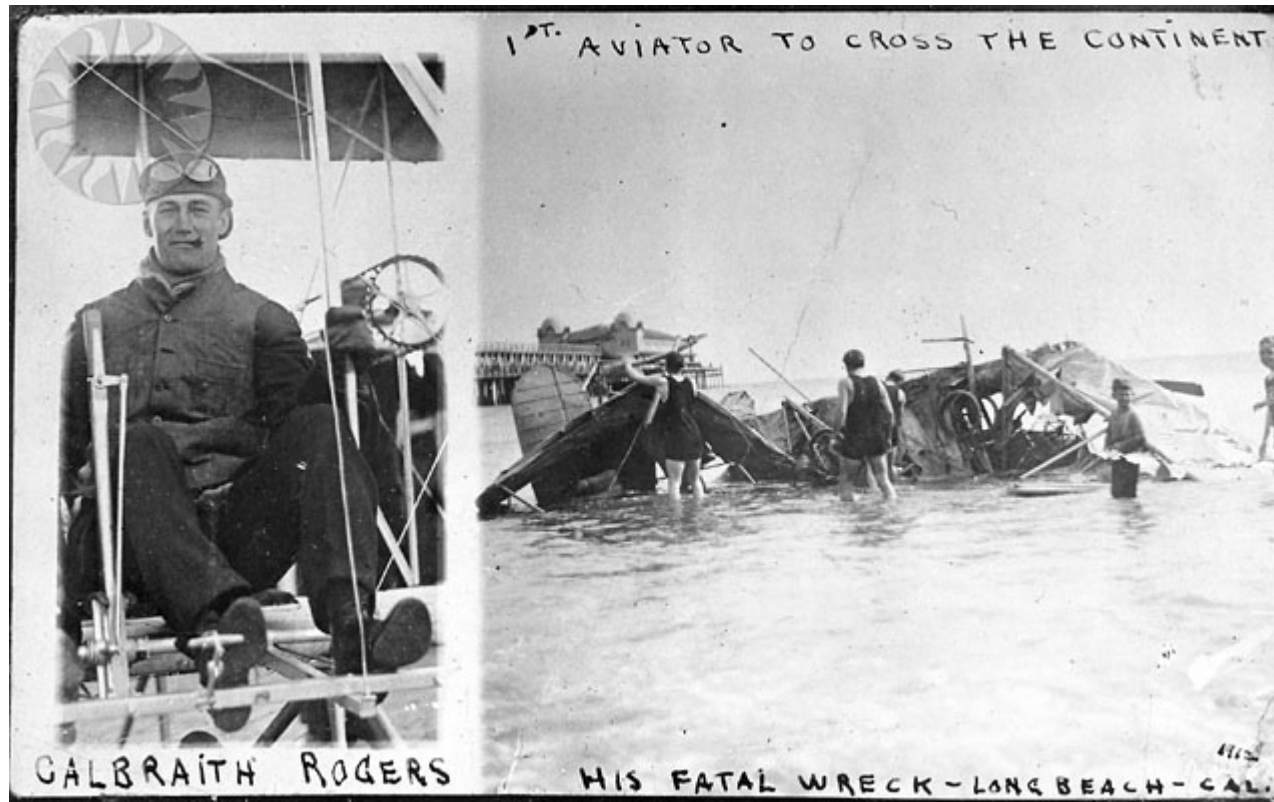
Bird Strike

History of Birds Strike

One of the first recorded incident of bird strike collision happened to the pilot Carl Rogers in 1912, on his journey from coast to coast, in the United States and through his exposure to a collision with a bird Seagull, which led to his downfall in the state of California and his death.



Bird Strike



Bird Strike

History of Bird Strike

An other OLD case occurred on March 10, 1960 involving one air disaster was due to the collision of birds with an (Electra), during takeoff from the airport (Boston Logan) all four engines where stalled and immediately lead to a quick crash within the port of Boston and the death of 62 people on board .



Bird Strike



Bird Strike

Civil Aviation Authorities response to manage incidents/accident of bird Strike :

In the United States, as an example, the Federal Aviation Administration (FAA) ,after the incident, developed minimum standards to minimize birds collisions to turbine engines that powered those aircrafts at the time.



Bird Strike

Civil Aviation Authorities response to manage incidents/accident of bird Strike :

Description

A bird strike is **strictly defined as a collision between a bird and an aircraft which is in flight or on a take off or landing roll.** The term is often expanded to cover other wildlife strikes - with bats or ground animals.

Bird Strike is common and can be a significant threat to aircraft safety. For smaller aircraft, significant damage may be caused to the aircraft structure and all aircraft, especially jet-engined ones, are vulnerable to the loss of thrust which can follow the ingestion of birds into engine air intakes. This has resulted in a number of fatal accidents.

Bird strikes may occur during any phase of flight but are most likely during the take-off, initial climb, approach and landing phases due to the greater numbers of birds in flight at lower levels. Since most birds fly mainly during the day, most bird strikes occur in daylight hours as well.



Bird Strike

Civil Aviation Authorities response to manage incidents/accident of bird Strike :

Typical Scenarios

- 1- **Bird ingestion to three out of four engines** of a departing jet transport occurs at 200 feet AGL after take off has been made despite ATC advice of the presence of large birds and an offer to have them dispersed. As a result, one engine is disabled completely and two others are sufficiently damaged to the extent of only producing reduced thrust. An emergency return to land is made.
- 2- **A flock of medium-sized birds is struck by a jet transport** just after V_1 but before V_r with a rejected take off response despite take off performance being limiting due to aircraft weight. As a result, an overrun occurs with substantial aircraft damage.
- 3- **A twin-engined light aircraft flies into a single heron** at 200 feet AGL after take off and it breaks through the windscreen and hits the pilot who temporarily loses control so that upon recovery, a forced landing ahead is the only option Wing root damage to a single-engined light aircraft caused by a vulture-strike during climb out causes structural damage to such an extent that control is lost and terrain impact results.



Bird Strike



Bird Strike



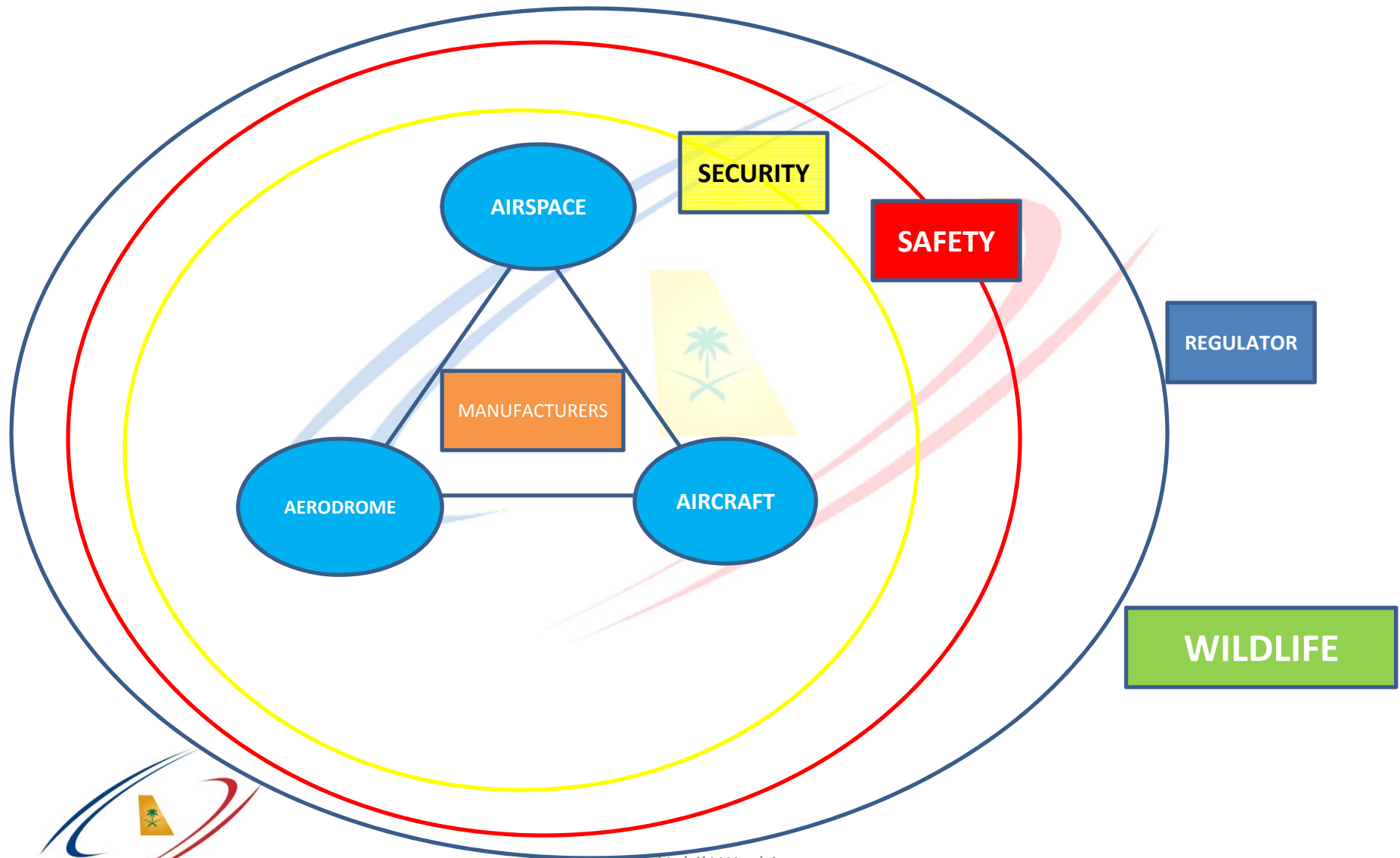
Bird Strike



Birds Strike



Bird Strike



Bird Strike



Bird Strike

Bird strike is of natural problems facing Saudi Arabia because of

- 1 - Geographical location, locating and itinerary of bird migration.
- 2 - large area of the Kingdom of Saudi Arabia.
- 3 - Number of airports.
- 4 - The large size of Flight Operations.



Bird Strike

The General Authority for Civil Aviation of SAUDI ARABIA (GACA) responded through Aerodromes Safety and Standards, Safety Dept., Safety and Economics Regulation

1.

- 1. Establish Environmental Protection Unit at Headquarter.**
- 2. Establish Environmental Protection Unit at each airport.**
- 3. Start in the process of enforcing of regulations and the adoption of benchmarks laid down by international organizations and applied to suit the environmental conditions in the kingdom.**



Bird Strike

International and local regulations used by the General Authority for Civil Aviation as references:

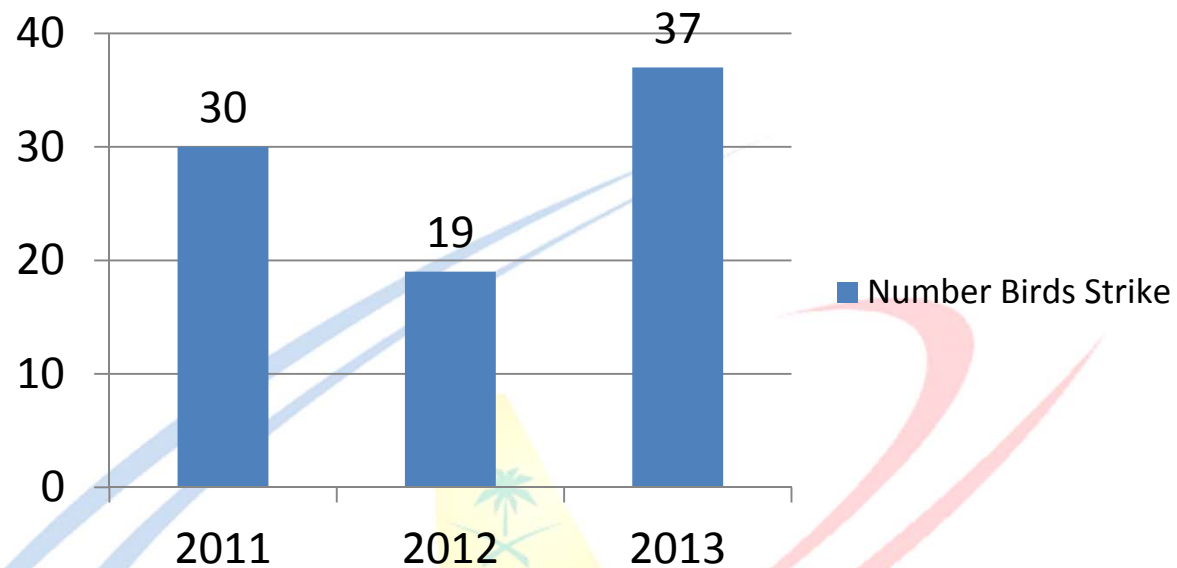
- GACARs Section 16 Environment Protection
- PME Saudi Environment Rules
- Airport Council International – Wildlife Hazard Management handbook.
- ICAO Doc 9137, Airport Service Manual, Part 3, Bird Control & Reduction, 4th edition (2012).
- ICAO Doc 9332, Manual on Bird Strike Information System (IBIS), 1989.
- FAA/USDA, AC 150/5200-36a, Wildlife Hazard Management at Aerodrome.
- IBSC, Standard for Aerodrome Bird/Wildlife Control (2006)



Bird Strike

Statistics:

The number of Birds Strike
in Saudi Arabia



Bird Strike

Contributory Factors

Habitat features, including open areas of grass and water as well as shrubs and trees, provide food and roosting sites for birds. Even transient water accumulation on uneven pavements can be a significant bird attractant

Landfill and other waste disposal sites often attract large numbers of birds if they are not carefully managed. Some types of agricultural activity, on or in the vicinity of an airport, may attract birds.



Bird Strike

Migrating birds often follow well-defined flight paths in considerable numbers. This can create a hazard if the flight paths are near an airport.

Airports in coastal locations often have a much higher level of unmanaged bird activity than do inland airports.

Most airports contain considerable areas of grass within their perimeters. Since even dry grass can be attractive as a loitering area for birds by day or night, appropriate grass management policies, especially the grass height maintained, can be very important.



Bird Strike

Contributory Factors

Flight path

Pilots have very little training in wildlife avoidance nor is training required by any regulatory agency. However, they should not takeoff or land in the presence of wildlife and should avoid migratory routes, wildlife reserves, estuaries and other sites where birds may congregate. When operating in the presence of bird flocks, pilots should seek to climb above 3,000 feet (910 m) as rapidly as possible as most birdstrikes occur below 3,000 feet (910 m). Additionally pilots should slow their aircraft when confronted with birds.



Bird Strike

Contributory Factors

Mathematical process

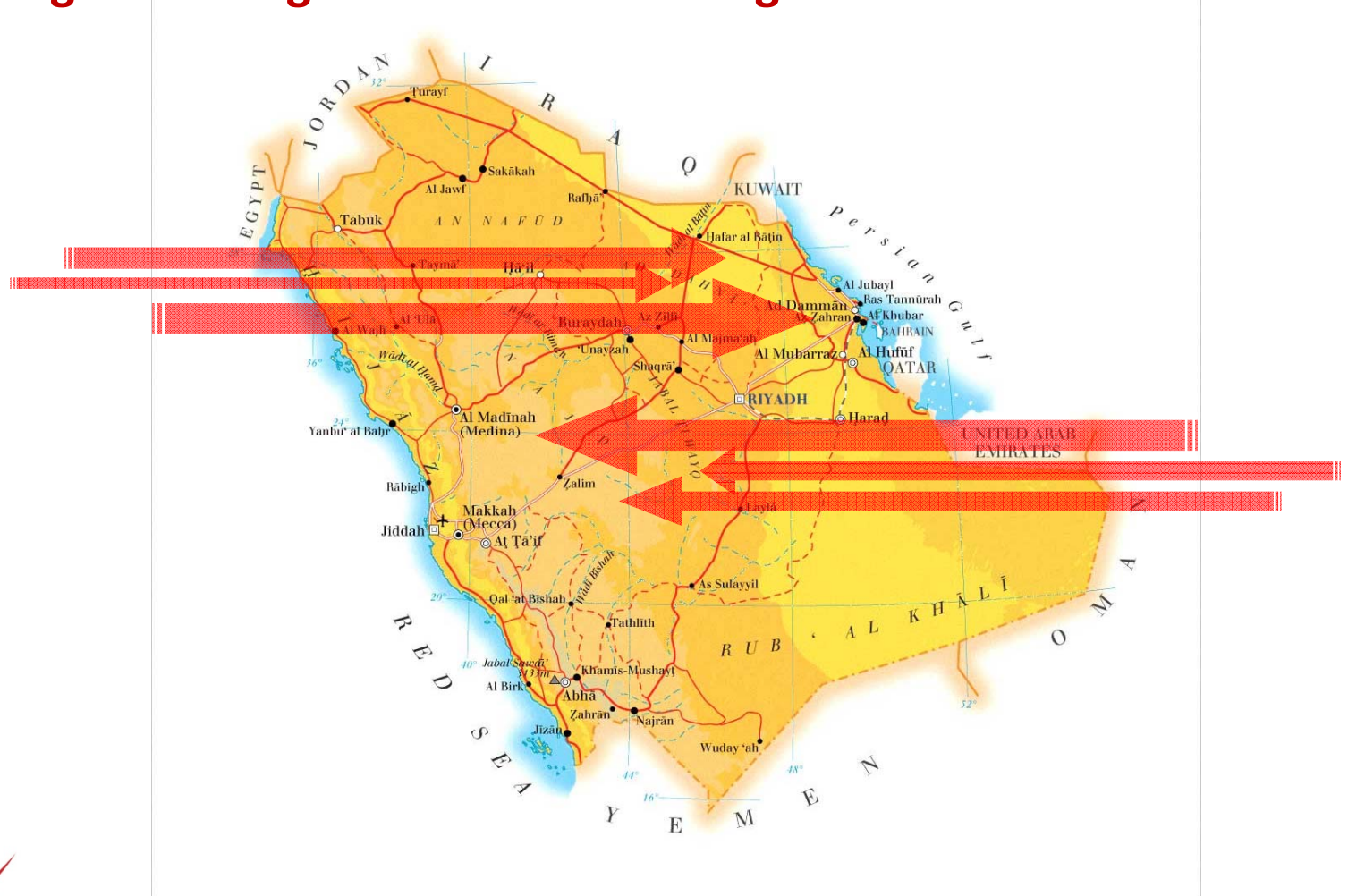
The energy that must be dissipated in the collision is approximately the relative kinetic energy of the bird, defined by the equation $E = \frac{1}{2} m v^2$ where m is the mass and v is the relative velocity (the difference of the velocities of the bird and the plane if they are flying in the same direction and the sum if they are flying towards each other). Therefore the speed of the aircraft is much more important than the size of the bird when it comes to reducing energy transfer in a collision. The same can be said for jet engines: the slower the rotation of the engine, the less energy which will be imparted onto the engine at collision.

The body density of the bird is also a parameter that influences the amount of damage caused.



Bird Strike

Progress of migrant birds on the Kingdom of Saudi Arabia



Dr.Nabil.Y.Kutbi

Bird Strike

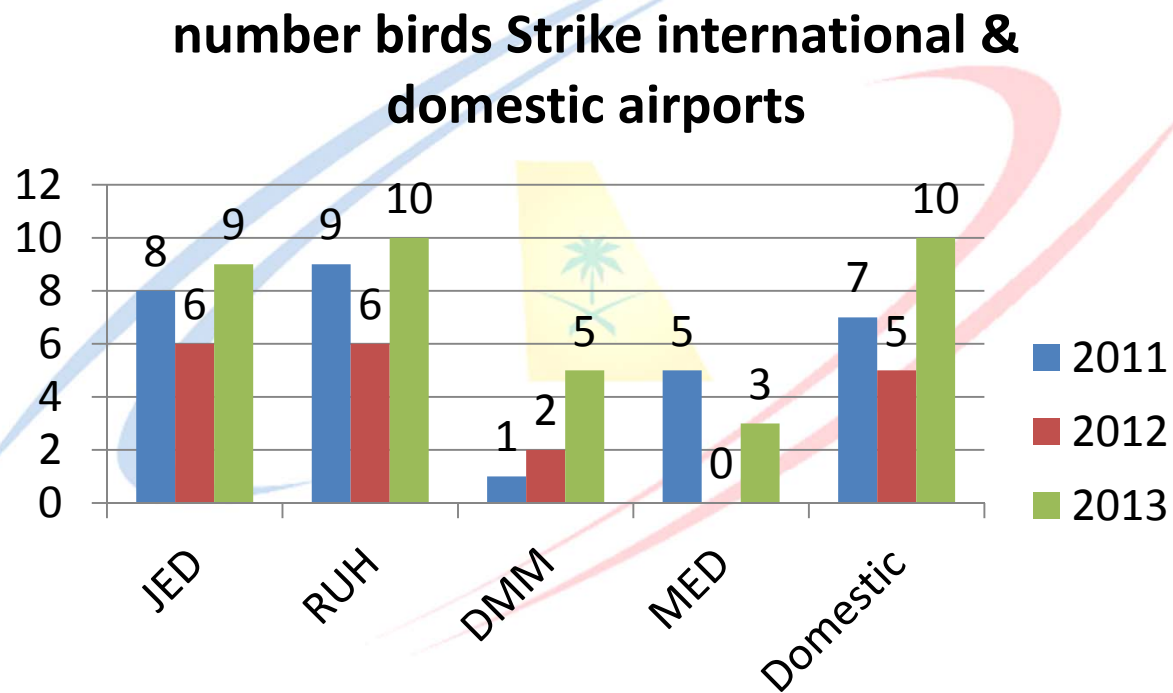
Methods of prevention and controlling of birds at airports in Saudi Arabia:

1. Landfill , dispose of waste from nearby airports that attract birds to it.
2. Elimination and removal of swamps and pools of water existing surroundings airports and treated.
3. Control of the factors contributing to the settlement of birds by removing the existing nests and provide a suitable environment far from the airport in cooperation with the General Presidency for the protection of the environment.



Bird Strike

Statistics:



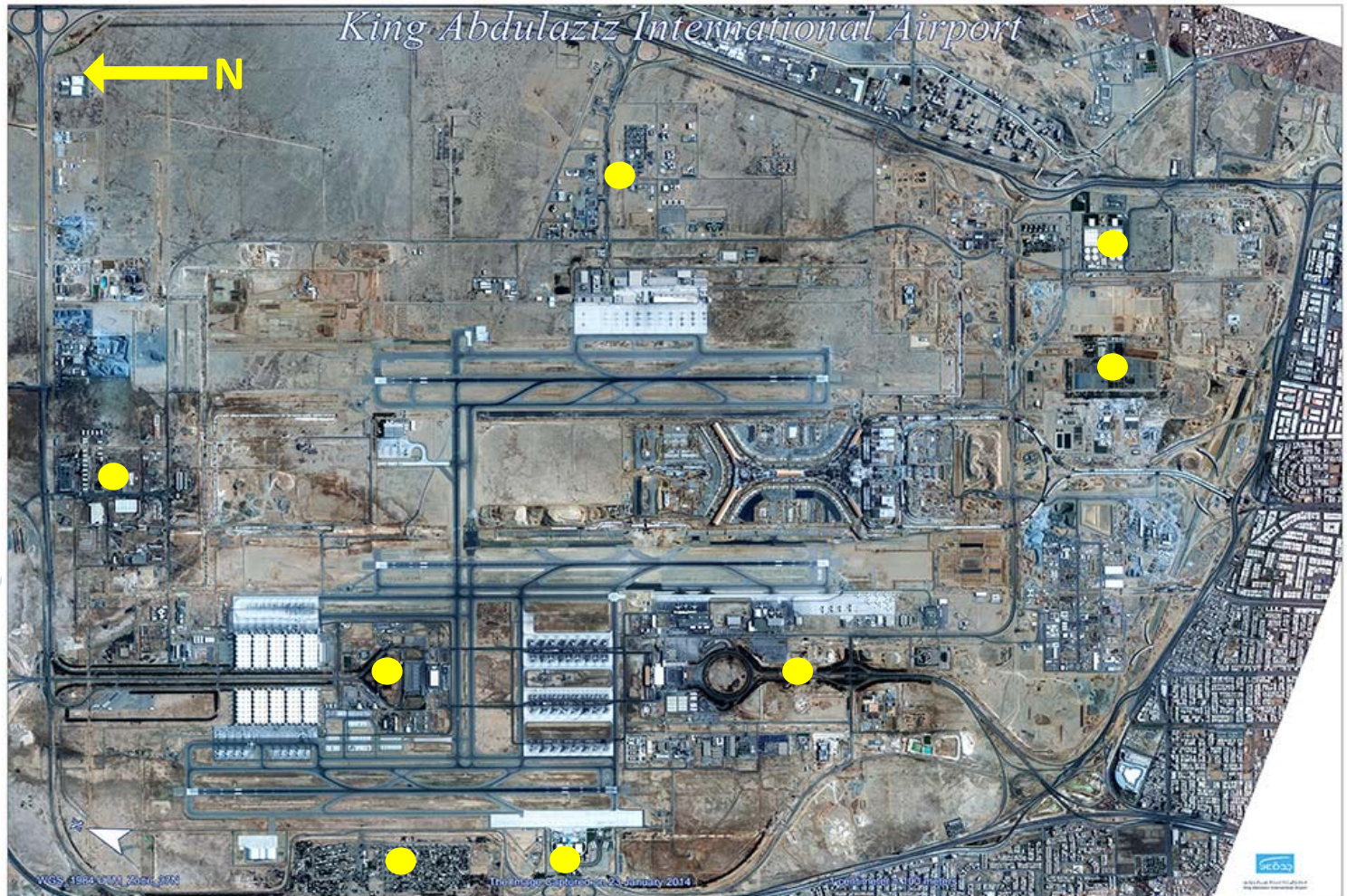
Bird Strike



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Bird Strike

Methods to fight birds at the airport:

1. Develop a device that beeps to scare the birds in areas existing.



Bird Strike

Methods to fight birds at the airport:

2. Remove nests in the trees.



Bird Strike

Wildlife Management

Though there are many methods available to wildlife managers at airports, no single method will work in all instances and with all species. Wildlife management in the airport environment can be grouped into two broad categories: non-lethal and lethal. Integration of multiple non-lethal methods with lethal methods results in the most effective airfield wildlife management strategy.

Non-Lethal

Non-lethal management can be further broken down into habitat manipulation, exclusion, visual, auditory, tactile, or chemical repellents, and relocation.



Bird Strike

Methods to fight birds at the airport:

- Habitat management, including reduction or elimination of trees, shrubs and other plants which provide food, shelter or roosting sites for birds.
- Netting or draining of streams, routinely wet grassland and areas of standing water. Prevention of transient formation of such areas after heavy rainfall.
- Aerodrome grass management appropriate to the prevalent species and the degree of risk that they pose.
- Liaison with local authorities to ensure that landfill waste disposal sites are not operated so as to create an aircraft hazard.
- Liaison with local farmers to limit the attraction of birds to fields.
- Use of bird scaring techniques such as:
 - Broadcast of bird distress signals;
 - Firing of pyrotechnic bird scaring cartridges.
- Tactical detection of large flocking birds using specialised ground-based radar equipment



Bird Strike

Technological methods

A Dutch R&D Institute, has developed the successful **ROBIN (Radar Observation of Bird Intensity)** for the Royal Netherlands Airforce. ROBIN is a near real-time monitoring system for flight movements of birds. ROBIN identifies flocks of birds within the signals of large radar systems. This information is used to give Air Force pilots warning during landing and take-off. Years of observation of bird migration with ROBIN have also provided a better insight into bird migration behaviour, which has had an influence on averting collisions with birds, and therefore on flight safety. Since the implementation of the ROBIN system at the Royal Netherlands Airforce the number of collisions between birds and aircraft in the vicinity of military airbases has decreased by more than 50%.



Bird Strike

Existing methods

The US Military Aviation Hazard Advisory System uses a **Bird Avoidance Model** based on data from the Smithsonian Institution, historical patterns of bird strikes and radar tracking of bird activity. This model has been extremely successful. Prior to flight USAF pilots check for bird activity on their proposed low level route or bombing range. If bird activity is forecast to be high, the route is changed to one of lower threat. In the first year this BAM model was required as a preflight tool, the USAF Air Combat Command experienced a 70% drop in birdstrikes to its mission aircraft.

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Bird Strike

Existing methods

There are no civil aviation counterparts to the above military strategies.

Some experimentation with small portable radar units has taken place at some airports. However, no standard has been adopted for radar warning nor has any governmental policy regarding warnings been implemented

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Bird Strike

Methods to fight birds at the airport:

3. Remove some of the swamps located around airport.



Bird Strike

Recommendations:

- Establishment of database that includes Progress of migrant birds between the Arab states to find out bird species and times and the direction of migration ([Aviation Hazard Advisory System](#))
- Adopting existing technologies to keep an acceptable level of safety
- [Establishment of Aviation Wildlife Hazard Group](#) with tasks including bird strike management
- Support full cooperation with CAEP to attract states attraction as a valuable tool to manage wildlife aspects of hazards concern.





Thank you



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