Birds deterrent systems in Sudan

By

Dr. Abdelrahman Elamin

Energy & Environment consultant

EWASCO

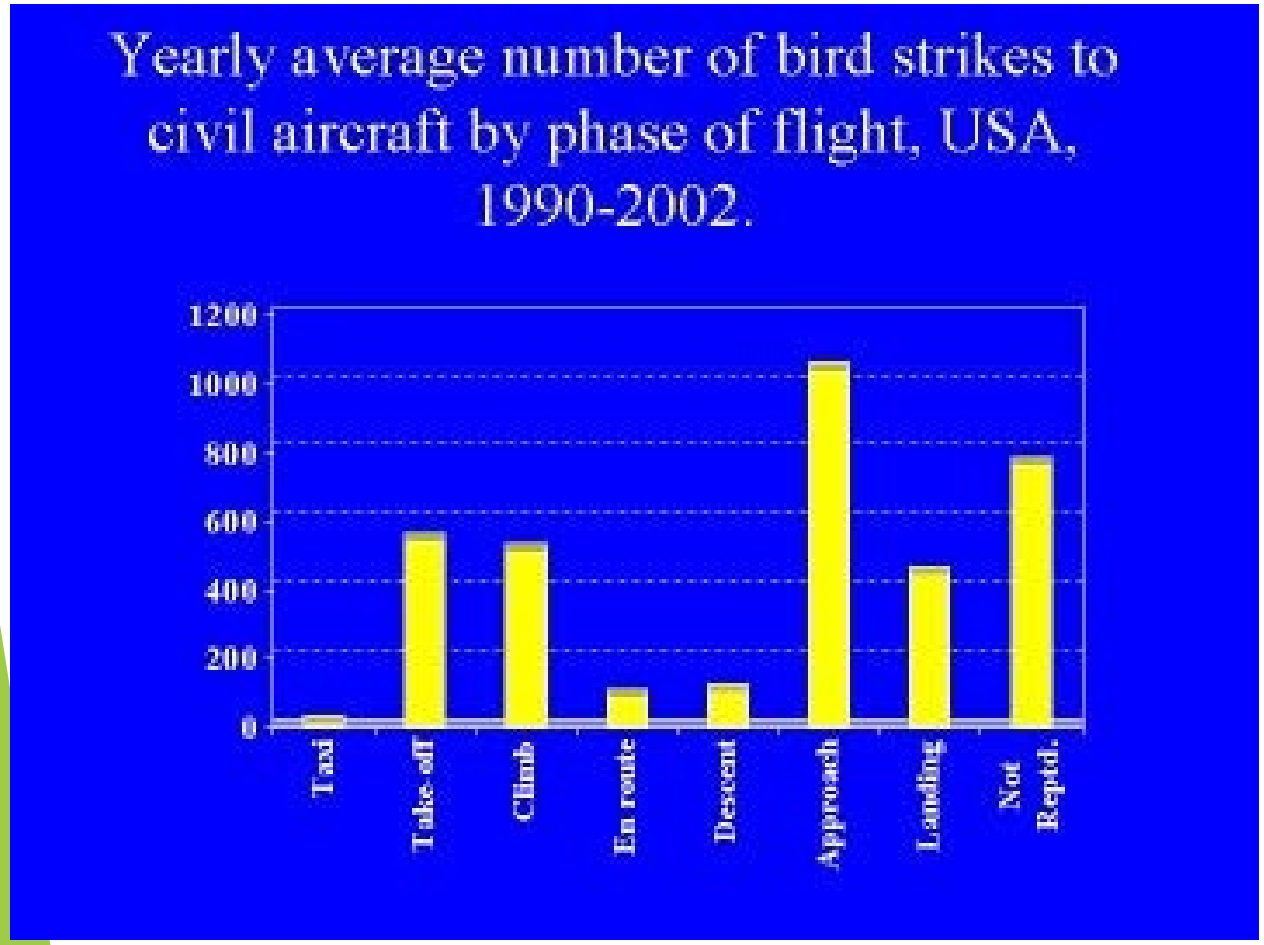
Background on Collisions and incidents between birds and aircrafts

- **- The first fatal accident occurred in 1912**
- **- Since 1960, approx. 400 aircraft have been destroyed**
- **- Over 370 people killed as a result of bird and other wildlife strikes**
- **Optimal locations for strikes**
- **Strike hazards exist throughout the world**
- **- Higher threats near migration routes**
- **- Favorable wildlife environments such as :**
- **wetlands or rubbish dumps often lead to accidents**

Relevant Statistics

- In USA, over 800 strikes per month occur
- Hundreds of lives at risk
- Millions of dollars spent on engine replacements

Where in flight do strikes happen?



- Most strikes occur at approach phase but also when landing
- Takeoff and climb are also
- Significant
- Bird deterrence must be an overall and continuous program

When do strikes happen? At what Altitude level?

- **Strikes time**
- **Most strikes in daytime (over 120 per year or >2 per week)**
- **- Night strikes also significant**
- **Altitude Level of Strikes**
- **More than half of strikes between 1990-2000 were at less than 100 feet (30 meters) above the ground**
- **Essential to have bird deterrence focused within this zone**

Collisions between birds and aircraft can cause minor damage or fatal results.

Learjet about to crash in paddock after hitting a flock of birds

Boeing engines cost over $1 million each to replace!

Damage can be minor but very expensive, causing delays to schedules

Birds Deterrent systems in Sudan

GNPOC electrical power and airport birds strikes on 2004

- Greater Nile Production oil Company “GNPOC” Producing oil company in 2003 claimed that ; birds sleep during the night on the electrical poles and causes “Trip” electrical Short, that leads to :-
  - stop oil pumping
  - Kill the Birds
  - Great loss, as it takes time and effort to locate and re- set the problem
  - GNPOC claimed incidents of bird strikes at Heglig oil field Air port

Assessment of GNPOC Field oil & Airport at Heglig

- Specify The birds of concerns by species
- Main cause of the their presence at/around the airport and why ?
- Propose the Best Available Technology to deterrent birds from the oilfield's and the airport

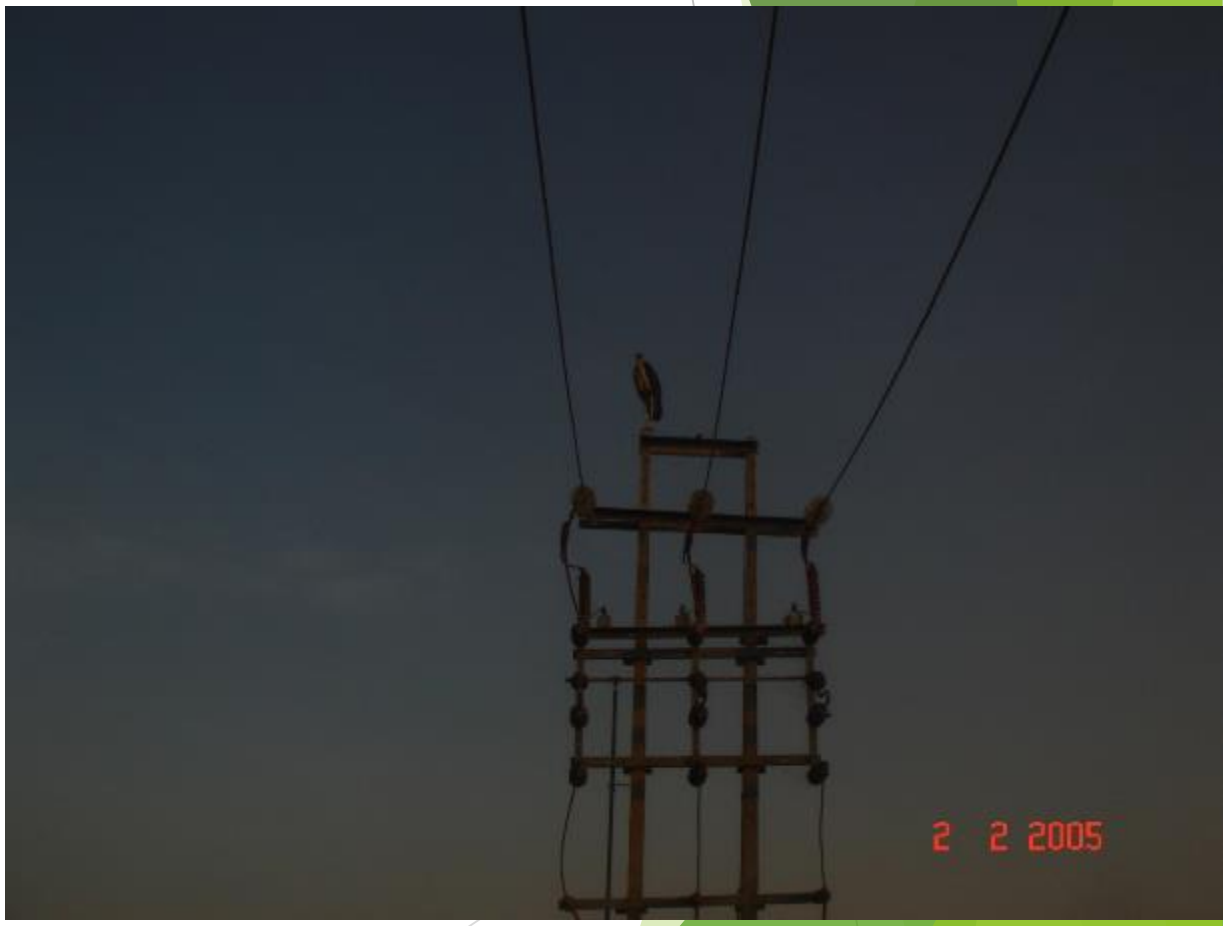
Findings of the Assessment

- **Location of–Heglig Oil Field**
- ✓ **Heglig falls on 29 23 73 east, 10 00 48 north. It is located in an area of the *Acacia seyal* Tall Grass Savanna Zone of the Sudan.**
- ✓ **Swamps - Wetland area , flooded with water during the rainy season from May to end of November. Some of the water pools remain all the year round.**
- ✓ **Such a habitat is very attractive to many species of birds such as migratory waders, ducks, pelicans, herons, marabou storks and white storks.**
- ✓ **Birds may suddenly appear on or over the airport on their annual migration.**
- ✓ **Water on/and around the run way .**
- ✓ **Waste dumping site is not far from the airport**

Wet land (Attractive for birds)

water on the runway very attractive to birds

Birds used to roosted on Electrical wire, on the lamps in Heglig oil field



Birds roosted on the Helicopter hanger

Birds Attracted by waste inside the camp and the airport

Waste dumping Sites attract birds nearby Heglig airport

Proposed Birds control Systems for Heglig oil field and Airport

It is not possible to change the immigration routes of the birds, but it is possible to minimize the collision between birds and airplane by the combinations of the followings:-

- **System to prevent birds to fly over the runway during takeoff and landing of airplanes**
- **System to prevent birds to roost or stay on the airport area such as water tank, lamps, runway, lamps and the nearby buildings.**
- **Clean and healthy Environment not attractive to Birds through "integrated waste management system"**

System to prevent birds to fly over the runway during take off and landing of airplanes

1. **Phoenix airport Wailer MK 111**

Phoenix wailer consist of the master unit, with 6 built on speakers and connected by shielded cables to 4-external horn speaks

2. Zone Propane Cannon

The Phoenix Wailer Master units with 4- horns Speakers

- **- Automated and Continuous**
- **- Combines:**
- **- sophisticated electronics computer technology**
- **- Surround sound concepts**
- **With high level wildlife knowledge**

Phoenix Wailer – general description

- Each system covers 760 meters (2500’) of runway

- Positioned alongside runway, approximately 45m (150’) back

- Master unit and four speakers on stands

- Shielded cables can be above ground or buried

Clearance from air traffic

Runway setback distance

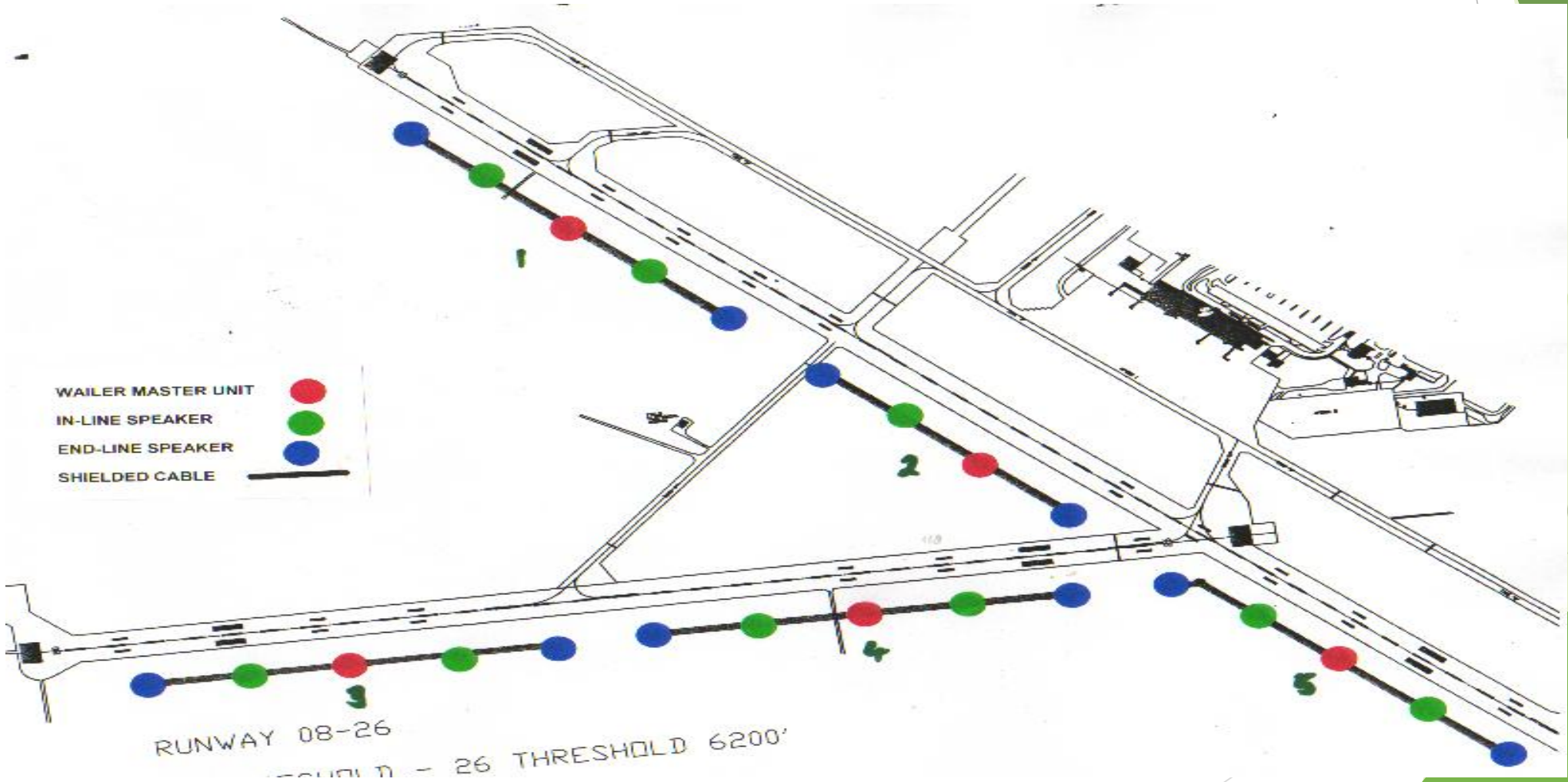
Solar panel – no power or labor required

Master unit with computer and sound chips

Speaker cables underground

Incoming aircraft – “bird free”

Example of Installation of Phoenix wailer Birds Deterrents systems to keep the run way free from birds for SAFE landing and take off



How does wailer phoenix system work?

- Master unit has up to 100 different electronic sounds, plus up to 35 natural sounds.
- Programmed to set up predator-prey situation
- Computer control
- Predator calls played from one channel
- Pest’s alarm calls played from another
- Then distress calls (a kill!)
- Then quiet time
- Then a different sequence
- with a different indigenous raptor

Stereo effect

- **4 speaker pairs**
- **1 external, 1 central**
- **Sounds appear to come from between speakers**
- **Each sound played from a different pair of speakers – gives effect of movement along runway section**
- **Predator appears from one section, alarm call comes from another, the “kill” from yet another one**
- **Gives effect of predator movement along runway section**

Birds are now on alert!

- **Several predator-prey sound sequences gets the flock nervous**
- **Start to warn each other and watch for predator but cannot see it**
- **No visual cues - audio (call from predator) is their only alert**

Electronic sound blanket

- **Birds now must listen for predator**
- **Computer program then brings in electronic noises – sweep up and down runway**
- **As well as not being able to see predator, birds realise they now cannot hear it either**
- **Being alert and nervous, their best option is to leave the area**
- **That is why the Phoenix Wailer is a deterrent – not a scarcer**

Do birds get used to the Wailer?

- **Short answer … NO!**
- **Other systems repeat sounds, birds get habituated**
- **Wailer is random and programming makes a real (not artificial) situation**
- **Works year after year in different countries worldwide**

More advantages

- **Very quiet compared with other airport noises**
- **Operates automatically either by light sensor (dawn to dusk) or programmable clock**
- **12 volt battery power – maintained by a solar panel or by a customized 220/110 vto 12 volt power supply**
- **No interference to radio communication olt and navigation systems**


SAN FRANCISCO AIRPORT

ZON GUN used in Heglig Oil Field, airport and Khartoum Airport

Master unit of phoenix wailer were installed in Sudan : Heglig and Khartoum airports

Fixing birds Spikes on the roof of a water and fuel tanks at Heglig Airport)

Daddy long legs to prevent birds to roost on the lamps

Outcome of Birds deterrent experience in Sudan

- **During the operation of the wailer systems and zon Gun**
- **In Heglig airport 2005-2010**
- **In Khartoum Airport 2008-2012 (the time EWASCO follow the project)**
- ***The number of birds around the airport were reduced and no any birds strikes recorded***

Reccommendations to minimize the collision between birds and airplane

- Airports zones should be uncomfortable and unattractive environment to the birds through the combinations of the followings
- Installation of birds deterrents systems along the runway
- Installation of spikes or Daday long legs to prevent birds from roosting on the roofs
- Airports should have efficient water drainage system(no water on the runway)
- Waste dumping site should min. 30km from the airports and not on the direction of the runway (to avoid birds to fly crossing the runway to the dumping site)
- Proper inside airport waste management handling , segregation & collection system

Thanks for ALL