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THE FIGHT AGAINST THE WILDLIFE HAZARD IN FRANCE (CIVIL AVIATION)

SUMMARY

I. BIRD STRIKE STATISTICS

700 Bird strikes are registered in France each year in civil aviation. 20% considered as "significant" i.e. causing traffic delays (aborted take-off, precautionary landings, endoscopy of engines) or damage of all kinds (dented radomes and leading edges of the wings, antennas tom away, windshields opacified, engines more or less seriously damaged, etc.).

The repair costs range from a few hundred Euros to 4 millions Euros for three Herring gulls which were ingested into a B767 engine in 2007.

On the 22 civil commercial airplanes crashes registered in the last 30 years in the world, one occurred in France on an executive aircraft with engines not certificated to bird ingestion.

The most spectacular being the DC10 at Kennedy airport in 1975 when the engine exploded on take-off after ingesting several gulls.

At the French level, all the incidents are reported on bird impact forms filled in by the pilots, repair workshops and aerodromes controllers. They are centralized at the STAC (Service Technique de l'Aviation Civile) then forwarded to the ICAO to feed the IBIS (ICAO Bird Information System) file.

These forms are managed by the french PICA program developed on a computer. This program can indicate at any time the trend of the problem in France or per aerodrome, the dangerous species, the vulnerable engines, etc. Most of the birdstrikes occurred during take-off and landing (60%) below 500 feet.

Even with aircraft such as the Airbus, 10 times more "bird hungry" than MD 11 or CRJ (because of the size of the engines and their positions), the rate of significant incidents remain constant for the last 10 years.

Repair costs have even decreased by a factor of three. These results were obtained thanks to efforts made by manufacturers and aerodromes to reduce the hazards.

II. ECOLOGICAL MEASURES

Here the question is to understand properly why birds are attracted to aerodromes, then modify the factors governing their presence. An ecological diagnosis is made by STAC experts in order to define the steps to be taken to render aerodrome areas inhospitable to birds.

For instance, the great amounts of clover along the sides of the Paris-Orly runways attracted thousands of pigeons. The clover was eliminated by selective herbicides and replaced by graminaceous plants inattractive to birds (Festuca ovina). This dispenses with the need for multiple mowing operations because the shorter the grass, the more easily the birds find their food;

This rule is valid for many dangerous species as concerns air traffic (seagulls, lapwings). That is why grass areas along the runways are often in an unkempt state, much to the despair of airport managers. Water points are dried out or covered with nets

In some cases, the populations of rodents which attract birds of prey are controlled by rodent poison. Finally, nearby garbage dumps are closed or managed cleanly (garbage balling). Because the measures do not apply to all cases (birds sitting on runways for instance), and involve technical and financial difficulties, the ecological fight has to be completed by "manual" or automatic methods of scaring off the birds.

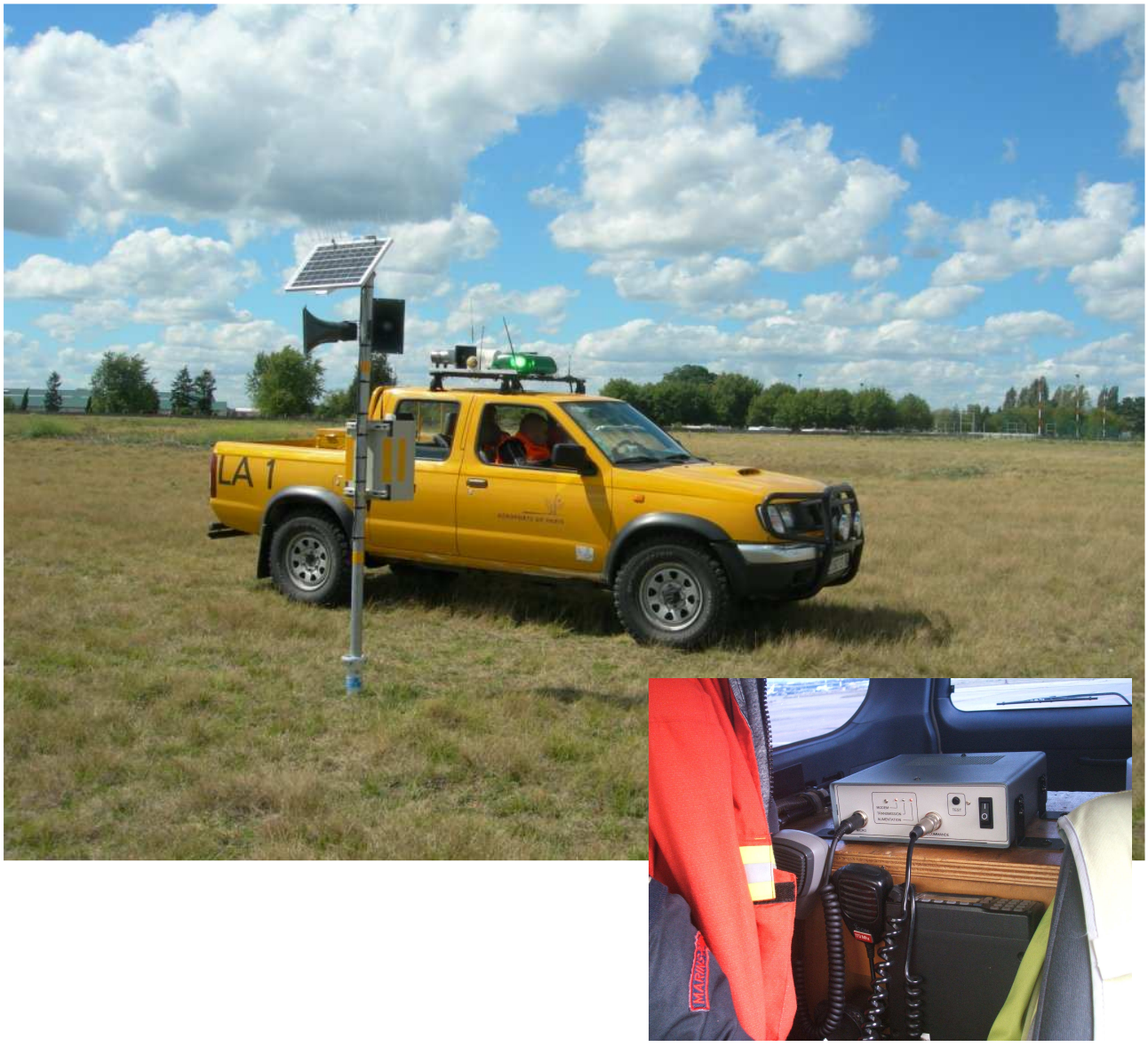
III. BIRDSCARING TECHNIQUES

Birds are particularly sensitive to visual and acoustic stimuli. Therefore, much research has been done in these two areas to evaluate the cost/efficiency of different methods.

Among the "manual" methods requiring personnel assigned full-time to bird fighting, traditional scaring means appear to be best suited to aerodromes, offering a reasonable operating cost and easy operation.

The means include:

- The broadcasting of distress calls from a vehicle or remote control scarers carrying extremely reliable electro acoustic equipment (digitised distress calls synthesizer built specifically for the method, power amplifier, and loudspeakers).



Most of the time, the fight against bird risk in airports is organised around an intervention vehicle. The agent responsible for anti-bird measures must be able to :

- trigger the bird-scarer from his vehicle.
- trigger several fixed bird scarer along the runway

Link between the vehicle and the fixed bird scarer is made by radio.

Airports can also be equiped with a PC unit which is used to :

- Control the fixed bird scarers with selection of bird species.
- Monitor all the bird scarers: the unit cyclically queries the bird scarers to find out their status.
- Back up the history of events: each change of status in a bird scarer (broadcast, alarm, etc) is recorded in a log.

- The firing of double detonation cartridges and shellcrakers using specific guns and rifles.

- The selective shooting of some species when authorised by the Ministry of the Environment, using hunting guns and live ammunitions.

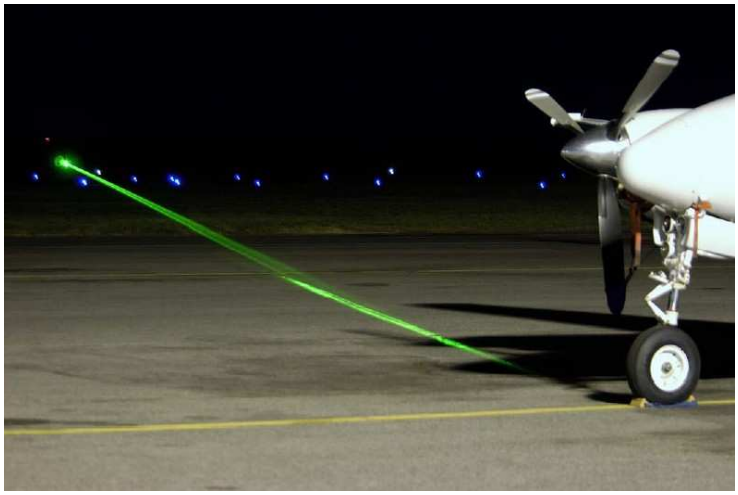
These means were compared with falconry put through experiment at Toulouse-Blagnac and Paris-Charles de Gaulle. The results were identical in terms of lessening the number of birdstrikes with birds hunted by falconers or teams using traditional scaring facilities; the operating cost was lower in the latter case and there were no problems of responsibility (such as a falcon getting into a jet engine!)

The use of radio controlled models flying-similarly to- a bird of prey gave very limited results compared with falconry or tradional means and required highly qualified agents to fly the models on aerodromes in total conditions of safety (problems of responsibility were also significant in that case).

Among the automatic methods of scaring off birds, gas cannons which regularly generate "rifle shots" were tested along the runways on several aerodromes. The results were tested disappointing for most species (the birds very soon became used to their sound).

Far more interesting tests were carried out from 1988 to 2006 on different sites with lasers;

The method consist to approach a green laser on sitting birds in order to get their flying off; range around one kilometer under lighting conditions of less than 13000 lux.



In 2000, a prototype of automatic system scanning the runways with a low low height laser beam is developed in France. The beam's specifications guarantee a complete ocular safety for both ground staff and cabin crew.

To date, these automatic lasers are installed on 4 runways and work well on a lot of gregarious birds without habituation (birdstrikes decrease by 40%).

Remote distress calls scarers and lasers must be looked as additional frightening systems to classical equipments in order to help birds patrols during hard meteorological conditions (dawn, dusk, rainy and foggy days etc…).

IV. REDUCTION OF THE ROUTE BIRD HAZARD

Preventive measures based on crew briefing have been fully investigated. Bird migratory and local movement patterns were studied from 1967 to 1977 using primary radar video recordings.

Forecast models for bird migratory routes were deduced as a function of weather parameters and could thus by issued as NOTAM's to all users of the air space. Another result of these studies was that air traffic controllers could be taught to recognize bird echoes on approach radars and so inform flight crews. This procedure was of course implemented after the raw video was abandoned.

Last of all, bird movement maps in the vicinity of airfields (published in the Aeronautical Information Publication) were drawn up as part of this program.

V. AIRCRAFT PROTECTION

Certification tests on bird impact on airframes and engines set down in EUROPE by EASA (European Aviation Safety Agency) are, quite rightly so, more and more stringent. They have encouraged manufacturers to make considerable improvements, in particular to the engine fan and windshields. The damage sustained is far less serious and less costly than 15 years ago for birds of the same weight.

VI. CONCLUSION: APPLICATION OF METHODS INVESTIGATED

These many experiments taught us that there is no "miraculous method" which solves the problem of collisions between birds and aircraft for once and for all.

Scale models, falconry, on-board flash-lights have not produced the results hoped for and for the time being have been abandoned.

Conversely, considerable improvements in safety have been obtained on several aerodromes through:

- the application of the recommended methods to make runway areas inhospitable to birds,
- the careful information of crews about the hazards they will encounter,
- the intensive and co-ordinated use of simple scaring means (distress calls, pyrotechnics, hunting) used by well trained personnel and assisted by remote control scares and lasers.

The three methods have been generalized in France since 1989 within the framework of new regulations implemented in 2007 (annexe 1 and 2).

For more technical details, these regulations:

- Specify the responsibility of the airports managers in the wildlife control.

- Determine a permanent wildlife control during daylight conditions on the airports where the commercial traffic is over than 25 000 commercial movements.

On the others French Airports, the bird control is implemented only before each commercial movement.

- Emphasize the information role played by the local air traffic organization. (ATC)
  The control tower ATC staff can detect the birds on the airport ,and inform the wildlife control unit to schedule scare operations in the air traffic).

The airport manager in responsible of scaring techniques performed most of the time by the Security Fire and Rescue Service trained in a private school or by the DGAC.

The application of all these new measures since 2007 and applied to all airports in 2009 will contribute to improve the flight safety on the french airports.