

THE ROLE OF AIR TRAFFIC CONTROL IN THE PREVENTION OF WILDLIFE STRIKES AT AIRPORTS. THE ICAO REGULATION AND ITS LOCAL APPLICATIONS

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Abstract

Air traffic control plays a fundamental role in accident prevention within a generally clear and detailed regulatory framework. However, some air navigation service providers have been involved in legal proceedings following birdstrike events; at least in one case the Control Tower has been sentenced by a Court to refund part of the damage following an assignment of liability. This paper aims to provide an analysis of the ICAO regulation on this matter, not just to ascertain possible liabilities of air traffic control in birdstrike events, but rather to assess whether and how the aforementioned regulation takes into account the role of ATC in preventive actions for safety purposes. It will also seek to understand whether the ICAO regulation is applied in a uniform way in the technical manuals of different countries, or if dissimilar interpretations exist. This is also in consideration of the introduction in several airports of new remote sensing instruments, avian radars, which will also pose additional problems of management and responsibility.

During a recent civil lawsuit for birdstrike damage compensation (1), the ENAV (the Italian Air Navigation Provider - ANSP) , through its appointed expert, made the following statement:

“ the Flight Information Service (FIS), that the airport ATS unit had to provide, did not impose at all any task/obligation/duty on them to inform pilots about the presence of bird concentrations if their existence had been properly and previously published in the AIP by the Aeronautical Information Service (AIS)... in this regard the FIS should have become active and provided information only if a change had occurred in this matter that had not yet been included in the AIS publications...” and since that did not happen *“no flight information on this topic had to be provided by the Control Tower of Genoa to any aircraft, as well as to the Antonov crew as actually happened in the case in point”* (2)

The argument is moreover supported by plentiful citation of parts of ICAO documents which, according to the reporting expert, would incontrovertibly confirm his statements.

Furthermore on another occasion ENAV, even though not directly but speaking through a third party, made their position known informally on the matter: *“ENAV, just like any other ANSP, **in line with international and domestic regulations**, has no role or responsibility in monitoring and controlling airport wildlife, nor wants any. If observed by the airport operator or by the aircraft flight crew and reported to the ATS unit, the presence of wildlife may constitute information to be disseminated by the FIS or, in the case of recurrent presence, may be published through the usual tools of AIS (i.e. AIP, NOTAMS).An ANSP is required to do nothing else.* (3).

In a nutshell therefore, in the field of communications regarding the presence of birds at an airport or its vicinity, Air Traffic Services, and in particular the FIS, cannot be considered as information originators, but only “repeaters” of what was observed or learnt from other sources, in particular the airport operator, the BCUs (Bird Control Units) on the ground or the pilots themselves.

While waiting for the appeal judgment, that has not handed down yet, we can however try to make a thorough analysis of the ICAO regulation applicable to this case, which goes well beyond the party positions and interpretations in the above-mentioned lawsuit.

Air Traffic Services are provided by each State further to the signature and acknowledgment of the Chicago Convention, stipulated on 7.12.1944, which in Article 28 states:

Each contracting State undertakes, so far as it may find practicable, to:

*(a) Provide, in its territory, airports, radio services, meteorological services and other **air navigation facilities** to facilitate international air navigation.....*

(1) We refer to the incident that occurred on 29.6.1997 involving an Antonov An124 cargo plane, that on take-off flew through a flock of birds (*Larus michaellis*), a number of which were ingested into the engines causing the shutting down of one and strong vibrations in another one. The aircraft then managed to land without injuries to people. In the 1st degree the Court found for the liability of the airport operator, ENAC (CAA) and ENAV, sentencing them to heavy damage compensation. For further details see the website www.birdstrike.it in the page “Investigations and Legal” and “Papers”

(2) Report of the ENAV’s appointed expert.

(3) Communication from the appointed expert regarding conversations with ENAV on the subject.

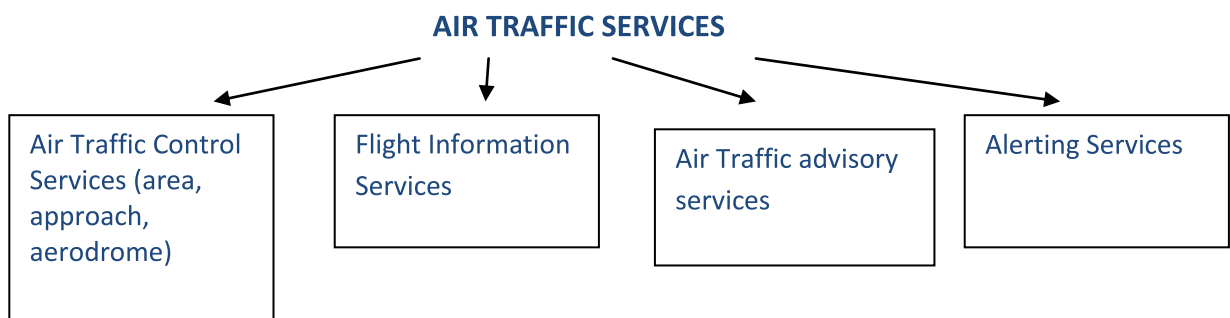
The Convention also includes several technical annexes that regulate the many branches of civil aviation. One of them, Annex 11, titled "Air Traffic Services", enters into the specific merits of the matter, listing in its initial part the general objectives that the various "services" must pursue:

§ 2.2

*The objectives of the **air traffic services** shall be to:*

- a) prevent collisions between aircraft;*
- b) prevent collisions between aircraft on the maneuvering area and obstructions on that area....*
- d) **provide advice and information useful for the safe and efficient conduct of flights.....***

It will be appropriate at this point to describe even visually the partition of the various "Air Traffic Services" as outlined by ICAO



Earlier, in the section on definitions (Chapter 1) Annex 11 defines the "Air Traffic Control service", that is one of the several services of the air traffic, as:

A service provided for the purpose of:

- a) preventing collisions:*
 - 1) between aircraft, and*
 - 2) on the maneuvering area **between aircraft and obstructions**; and*
- b) expediting and maintaining an orderly flow of air traffic.*

Flight Information Services are "a service provided for the purpose of giving advice and **information useful** for the safe and efficient conduct of flights."

Hereinafter (§ 4.2.1) Annex 11 better defines the FIS goals:

Flight information service shall include the provision of pertinent:

- e) **information on changes in condition of aerodromes and associated facilities**, including information on the state of the aerodrome movement areas when they are affected by snow, ice or significant depth of water.....*
- and of **any other information likely to affect safety**.*

A first problem in interpretation arises from the term "obstruction" whose definition is not provided by ICAO within Annex 11 itself. Can flocks of birds settling on the ground or flying in the air be considered as "obstructions" and so constitute a further subject of prevention by the air traffic control service?

One possible affirmative answer comes from another ICAO document, the DOC 4444, which will be later discussed in detail (4).

(4) The DOCS are a sort of practical manuals for an easier application of the Annexes to the Convention;

In such document it is clearly stated (although only in a footnote to § 7.4.1.4.1) that "***Animals and flocks of birds may constitute an obstruction with regard to runway operations.***"

FIS instead regards not only the communication of changes in the aerodrome conditions and the associated facilities, but also any other information that likely could affect safety.

It is hard not to include, at least in the latter category, the information on the presence of birds, provided that the operator recognizes a danger in it. We will return to this very important aspect of the aerodrome controller skill and training.

So far we have not found any reason why an operator assigned to air traffic service is not required to prevent a collision between an aircraft and a flock of birds, at least for the operations on the maneuvering area and at least at the simple level of information to pilots (5).

The crux of the problem, however, lies not so much in this, which after all is a point fairly shared, but rather in identifying the source of the information to be provided. In other words if, in addition to what has been said, the ATS operator is required to achieve directly and visually the information, i.e. the presence of birds, regardless of what he may receive from other sources.

To an outsider this may seem a futile debate, but it is the key point on which the very concept of liability is in discussion, both for the operator and the Agency on which he depends.

In any case, it is a fact that the operators of this service are located in the airport's highest building, with a 360° visibility and the greatest limitation of shaded areas. Therefore they must be able to see every part of the maneuvering areas and the entire traffic pattern.

In other words, the controllers have a good chance of observing and detecting the presence of birds within a limited range of vision, whose amplitude depends on several factors, not least the size of the observed object, but in any case **within an area useful for safety purposes**.

Let us now consider the various ICAO DOCs dealing with this subject, and from which it would be reasonable to expect a clear answer to the above question.

One of the documents – if you will - explanatory of Annex 11 is the DOC 9426 (ATS Planning Manual). It provides criteria for the planning and managing of Air Traffic Service. With regard to aerodrome control, the DOC emphasizes the need for cooperation between the Control Tower and the other agencies responsible for providing services. In this sense it deems necessary detailed agreements between the Tower and all those agencies conducting activities on the maneuvering area, ensuring that the Tower can exercise its control powers over aircraft in that area without interferences and dangers. As regards wildlife, it is therefore necessary for ICAO that a regulated form of coordination be established between the Tower and the bird dispersal staff on the ground (BCU, Bird Control Unit).

(5) *Inside the technical Annexes the terms "bird" or "wildlife" are not very recurrent, appearing in particular in Annex 8 (Airworthiness of Aircraft), 10 (Telecommunications), 13 (Investigations on aircraft accidents) and mainly 15 (Aeronautical Information Services), but for reasons that fall beyond the present discussion.*

Further food for thoughts comes from the DOC 9426 Chapter 10, *"Information from other sources"*.

At first it must be granted that aeronautical information is the subject of a specific service, parallel and distinct from that of Air Traffic (ATS), called AIS (Aeronautical Information Service). It provides a range of information on the most various aspects of aviation through printed or digital documentation, bulletins, circulars, etc. ... (6).

Such information regards situations having a certain temporal stability, such as for example the failure of one system, the lack of a visual aid and even the endemic presence of birds and other wildlife in the airport surrounding areas. It is obvious that, given the speed inherent in air transport and the possible fluidity of certain situations, a pilot can start a flight with obsolete information, or while new information has come into being in the meantime. Therefore, another task provided by ATS is the Flight Information Service (FIS) i.e. that activity complementary to AIS aimed at informing pilots about what is new or changed with respect to what they knew through the AIS when planning the flight.

The document recognizes that ATS is responsible for providing essential information for safe and efficient conduct of the flight, but that such information does not originate entirely from the service itself but can come from other sources. ATS therefore sometimes works only as an intermediary between pilots and other agencies on the ground in a mutual exchange to complement each other's knowledge.

That is also because the ATS unit is usually the only one that can talk to pilots in flight. It is clear that also with regard to their location, ATS operators may not know directly and continuously all the aerodrome conditions; therefore they need to be continuously informed by the airport operator; the DOC mentions construction or maintenance works, perpetual sources of operational problems, and other issues such as temporary obstacles resulting from works, loss of visual aids, downgrading of fire-fighting service and special security measures. Immediate notice must also be given to ATS about *"runway conditions when water, slush, snow or ice are present and their removal by the speediest means"*.

No mention is made of information about the presence of birds, but by analogy we believe that this phenomenon should **also** be part of the communications that the operator is required to provide **immediately** to ATS and through it to the pilots.

Furthermore the DOC 9426 itself (§ 1.2.3) is very clear **in** stating that: *"since ATS is normally the only ground service which is in direct contact with aircraft in flight, care must be taken in assigning additional responsibilities emanating from other national requirements to ATS..... **In general, experience seems to indicate that the less additional responsibilities that are given to ATS the better it is able to meet its primary objectives.**"*

And also (§ 1.2.4): *"Similar considerations apply with respect to the provision of information by ATS to aircraft not directly derived from the activities of ATS (e.g. information on the status of other than ATS facilities and services, meteorological information, etc.).*

Such information should be provided to ATS for onward transmission in a manner and form which requires the least amount of interpretation and/or responsibility for the accuracy and timeliness of the information in question."

(6) AIS usually produces and issues the AIP, NOTAM, AIRAC, METEO information etc...

On the other hand, another DOC, 9137 part three (Wildlife Control and Reduction), states that *“It is especially important that quick communication is possible between those involved in bird/wildlife dispersal and air traffic control. **Upon receipt of notice of a specific wildlife threat, air traffic control should issue appropriate warnings to aircraft operating on, and in the vicinity of, the airport (4.8)**”*

This implies the need for a direct BCU/ATC contact when operations are in progress.

Reading these documents can actually lead to a **restrictive interpretation**, in the sense that it seems reasonable to affirm that when wildlife is the issue the controller depends completely on other sources of information to transmit promptly to pilots or to adopt limiting measures.

Is all that I stated above sufficient to exclude the possibility that it is the ATC himself who is to originate the information about the presence of birds at an airport or nearby, within the limits of his visual range? The question is based on the consideration that not all airports have a permanent and exclusive BCU service always in action on the maneuvering areas, while indeed in many airports all over the world this service is unfortunately still carried out in a rough and unprofessional way; on the other hand, the BCU itself is in the worst position to locate the serious danger posed by birds settled on the ground during the critical phases of takeoff and landing, when moreover the unit must abandon the active runway (7).

Further useful information comes from the analysis of another ICAO document, the aforementioned DOC 4444 (Air Traffic Management). The document aims to ensure that the safety levels in the provision of ATS are respected and that the necessary improvements are implemented where necessary.

Chapter 7 (Procedures for aerodrome control service) in particular has three points of particular interest.

The first is the essential information on local traffic (§ 7.4.1.3), defined as *“any aircraft, vehicle or personnel on or near the maneuvering area, or traffic operating in the vicinity of the aerodrome, which may constitute a hazard to the aircraft concerned”*.

Such information must be issued in a timely manner, either directly (*by aerodrome control N.d.A*), or by the Approach control service when, **in the judgment of the controller**, this information is necessary in the interests of safety, or when requested by the aircraft.

It is true that neither *“obstructions”* nor birds are mentioned, but the rule points out the principle of the free assessment of the controller about what is needed for the safety at that time; if a vehicle on the runway surely constitutes an *“obstruction”*, in the same way similar judgment should be used for a flock of birds, similarly called *“obstruction”* in the next paragraph, settling on the maneuvering area.

(7) *Birds settled on the ground, invisible to ground staff, that suddenly take flight have caused many serious accidents. We can cite the event that occurred in Rome Ciampino in 2009 when a landing B737 was damaged beyond repair, fortunately without casualties, after its engines had ingested starlings.*

The second point concerns the "Runway incursion or obstructed runway." The following is the full text of the paragraph as special attention has to be paid to the terms used.

§ 7.4.1.4.1 – *In the event the aerodrome controller, after a take-off clearance or a landing clearance has been issued, **becomes aware** of a runway incursion or the imminent occurrence thereof, or **the existence of any obstruction** on or in close proximity to the runway likely to impair the safety of an aircraft taking off or landing, appropriate action shall be taken as follows:*

- a) cancel the take off clearance for a departing aircraft;*
- b) instruct a landing aircraft to execute a go around or missed-approach;*
- c) in all cases inform the aircraft of the runway incursion or obstruction and its location in relation to the runway.*

*Note: **Animals and flocks of birds may constitute an obstruction with regard to runway operations.** In addition an aborted take-off or a go around executed after a touchdown may expose the aeroplane to the risk of overrunning the runway. Moreover, a low altitude missed approach may expose the aeroplane to the risk of a tail strike. Pilots may, therefore, have to exercise their judgement in accordance with Annex 2 2.4 concerning the authority of the pilot in command of an aircraft.*

It is important to note the use of the term "becomes aware" that does not specify how the controller comes into possession of the information (8).

If one reflects on the fact that a takeoff clearance is normally followed by the take-off itself after a few seconds, it seems reasonable to assume that an "obstruction" consisting of a flock of birds that suddenly appears on or in the immediate vicinity of a runway is unlikely to be reported in good time to the controller by radio or telephone from the staff on the ground.

It seems equally reasonable to believe that one of the possible sources of "awareness" may be the aerodrome controller's direct observation. On the other hand, there is no doubt that the controller has to "watch out" on the runway before clearing takeoffs and landings just to detect such "aircraft, vehicle or personnel that may constitute a hazard." Why should he pay direct attention to these "obstructions" and not to those consisting of animals and flocks of birds?

The third point on which one should reflect is the § 7.5 "Essential information on aerodrome conditions" which is reported below, at least in the parts that concern the present discussion:

*7.5.1 – Essential information on aerodrome conditions is **information necessary** to safety in the operation of aircraft, which pertains to the movement area or any facilities usually associated therewith. For example.....omissis....*

*7.5.2 – Essential information on aerodrome conditions **shall include** information relating to the following:*

Omissis....

(8) *We shall return later to this expression noting that in the domestic regulations of some countries it has been replaced by a clearer form.*

f) Other **temporary hazard**, included parked aircraft **and birds on the ground or in the air**;

*Note: Up-to-date information on the conditions of aprons may not be available to the aerodrome control tower. The responsibility of the aerodrome control tower **in relation to aprons** is, with respect to the provisions of 7.5.1 and 7.5.2 limited to the transmission to aircraft of the information **which is provided to it by the authority responsible for the aprons.***

7.5.3. – Essential information on aerodrome conditions shall be given to every aircraft, except **when it is known** that the aircraft already has received all or part of the information from other sources. The information shall be given in sufficient time for the aircraft to make proper use of it, and **the hazards shall be identified as distinctly as possible.**

*Note: "Other sources" include **NOTAM, ATIS broadcasts** and the display of suitable signals.*

7.5.4 – When a not previously notified condition pertaining to the safe use by aircraft of the maneuvering area is reported to **or observed by the controller**, the appropriate aerodrome authority shall be informed and operations on that part of the maneuvering area terminated until otherwise advised by the appropriate aerodrome authority

It is also possible to learn that essential information is also information necessary for safety and it must be provided to pilots; it must include the presence of birds on the ground and in the air. The term "shall" is there to indicate the dutifulness of information. Obviously the aerodrome controller cannot be required to know all the apron conditions at all times; his responsibility is therefore limited to the correct transmission of the information he receives from the appropriate authorities. Note, however, that this limitation expressly regards the apron; a similar indication is not established for birds and other wildlife, because it is implicit that the controller is able to autonomously see these "hazards" and report them, regardless of the communication from *bird control* teams on the ground.

One point from which many controversies arise has to be explained: it is contained in § 7.5.3. and in the note below.

Some say that when information regarding the possible presence of birds is present in one of the mentioned sources, the aerodrome controller is dispensed from repeating it to pilots.

However, when examining the published information related to wildlife, it is normal to find things like: "possible presence, possible concentration, presence etc. ... and, in the most detailed publications, sometimes data on the species, seasonality and hours are also provided. How useful is this information to pilots?

According to most of the flight crew such information is absolutely irrelevant and useless, because it does not show or clarify the current issue and its real dimension, it cannot lead to the adoption of special procedures and is rarely the subject of pre-flight briefing: in practice, it is mentally set aside (9).

(9) C.B. Sulleberger: "When there have been sightings of birds by ground crews, air traffic controllers, or pilots, airports and the FAA may put out a general warning. "But that's like saying 'Be careful out there!' It's not useful. It's not effective". Interview in *National Geographic*, Nov. 2013. Capt. Sulleberger was the pilot of the USAir 1549 flight that was forced to ditch in the Hudson river on 15.1.2009 following a multiple impact with Canada geese.

In fact, the only useful information regards the actual presence of birds in a given area, observed by the controller a few moments before take-off or landing. This information warns the pilot and leads him to take some action such as requiring a runway inspection, asking for the intervention of the bird control team or even suspend the take-off or landing.

Considering a NOTAM or an AIP remark equivalent to direct information seems to be misleading and also dangerous, and in any case the DOC clearly states that it may be a *"not previously notified condition pertaining to the safe use by aircraft of the maneuvering area"* and that it can be *"reported"* but also directly *"observed"* by the controller. What better definition about a flock of birds flying dangerously above a runway threshold?

We reaffirm that the controller's direct information, the result of his observation, is not and cannot be the only, nor the principal, source of information to pilots about the presence of these "temporary obstacles"; but experience shows that sometimes a small BCU (Bird Control Unit) team, maybe on a single vehicle, in some critical situations cannot keep the whole area under control, as well as at airports with more active runways, or when the birds are hidden in the grass and hardly visible from the ground.

At least in these cases there is no doubt that the controller's action offers a valuable contribution to flight safety, in some cases even irreplaceable.

In conclusion, we believe that the ICAO regulation shows a rather confused and ambiguous picture, one that allows formulation of different opinions: either the aerodrome controller is required to directly detect the presence of birds, or he can be dispensed if only generic information has been released by other sources. Also the above mentioned statement *"Essential information on aerodrome conditions shall be given to every aircraft, except when it is known the aircraft that already has received all or part of the information from other sources"* does not seem very clear, suggesting that the controller should be certain that the pilot really knows the information, while it is usually interpreted as a presumption of knowledge (since the news is published, it is assumed to be known), which is not exactly the same thing. In addition, in view of the imperative target (to prevent collisions of aircraft with "obstructions"), Annex 11 does not give a definition of the term that we find instead in a footnote of DOC 4444, but with the expression *"animals and flocks of birds may constitute an obstruction"* which does not clarify the topic and even suggests that sometimes the flocks of birds can be an obstacle and sometimes not, as well as not explaining how to fix the issue. There is no mention of controller training (DOC 9137 3rd Part, § 12.3.4) that can provide assistance in the problem management, thus corroborating the view of those who argue that bird and wildlife issues are out of the ATS area of expertise, while we have seen that things are not exactly like that.

A demonstration of the "reticence" of the ICAO regulation in this field – it has also been written that it seems drafted by lawyers (10) – and of the subsequent freedom of interpretation, can be achieved by examining the various national technical regulations, which adopt its principles (and sometimes the same text) but adapting them to the cultural sensitivities, experiences and traditions of the different countries.

And that is what we are going to examine right now.

(10) Paper by Prof. Bruno Franchi, Chair of ANSV (National Agency for Flight Safety), at the Conference "Profiles of criminal responsibility in air traffic control" Rome, 12.4.2012

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It is close to impossible to examine all Air Traffic Manuals in force in dozens of countries all over the world. In our analysis we have taken into account those available online or otherwise provided by the agencies that helped in drafting this paper, which incidentally are also those in force in the countries where civil aviation is particularly developed. For some of them statements and declarations kindly released by ATS providers will also be reported.

For the moment it is possible to immediately affirm that our assumption about a certain reticence and ambiguity of the ICAO regulation about the relationship between ATS and birdstrikes, hopefully incidental, is confirmed by its different interpretation and application in different countries.

It ranges from wide and extensive interpretations of the role of aerodrome control, to others equally extensive but perhaps less explicit, up to a total reproduction of DOC 4444, which however brings with it the same interpretation problems **mentioned** above. Even changes **in** the ICAO text in a restrictive way have been found.

Certainly the regulations of the USA, Canada and South Africa belong to the first group.

In the **United States** FAA Order JO 7119.65 U (ed., 2012) in Chapter 2 § 2.1.22 "*Bird Activity Information*", reads as follows:

- a. Issue advisory information on pilot-reported, **tower-observed**, or radar-observed and pilot-verified bird activity. Include position, species or size of birds, if known, course of flight, and altitude. Do this for at least 15 minutes after receipt of such information from pilots or from adjacent facilities **unless visual observation** or subsequent reports reveal the activity is no longer a factor.*
- b. Relay bird activity information to adjacent facilities and to FSSs whenever it appears it will become a factor in their areas.*

Further comments are not needed; the aerodrome controller's full involvement is clearly evident. The presence of birds, having received the dignity of privileged information, is no longer included among the essential information to be provided, while it should still be included in the ATIS broadcast: "*Include available information of known bird activity.*"

Canada, a country traditionally at the forefront in prevention of birdstrikes, has released for their ATS the document TP-14371, Transport Canada Aeronautical Information Manual (Ed. October 2013) where at RAC § 1.7 "ATC Clearances, Instructions and Information" we can read:

*"ATS personnel routinely inform pilots of conditions, **observed by others or by themselves**, which may affect flight safety and are beyond their control. Examples of such conditions are observed airframe icing and **bird activity**.*

Shortly before the instructions at § 1.1.1 are even clearer:

*"**Information concerning bird activity, obtained through controller's observations or pilot reports, will be provided to aircraft operating in the area concerned. In addition, pilots may be warned of***

possible bird hazards if radar observation indicates the possibility of bird activity. Information will be provided concerning:

- (a) size or species of bird, if known;
- (b) location;
- (c) direction of flight; and
- (d) altitude, if known"

Also in this case comments are superfluous.

Also in **South Africa**, the aerodrome controller's duty to monitor any animals or birds is explained very clearly; the Air Traffic Service Manual at § 2.5 states that:

*As far as visibility permits, Aerodrome Controllers **are required to keep a constant visual watch over the manoeuvring area and the aerodrome circuit**, irrespective of whether or not IMC prevails at an aerodrome situated within a CTR, in order to:*

.....

*b) Ensure that, **where birds or animals are observed on or near runways**, the appropriate airport authorities are informed to remove them and pilots warned of their presence;*

This is to say that it is the controller who has to inform the BCU and not the contrary, because of the better opportunity to look down from high above on the maneuvering areas and the traffic pattern. Very interesting then appears, from our perspective, the mention of a "*constant visual watch*", which implies a controller's different mental attitude.

In the **United Kingdom**, the topic is regulated by document CAP 493 "Manual of Air Traffic Service" (Ed. November 2012) where the issue is discussed in the 2nd chapter "Aerodrome Services." Basically, the aerodrome controller has to inform pilots about "*changes in essential aerodrome information*," evidently already provided by AIS, and in particular:

*"Essential aerodrome information is that concerning the state of the manoeuvring area and its associated facilities that may constitute a hazard to a particular aircraft. It shall be issued to pilots in sufficient time to ensure the safe operation of aircraft. **This may include the provision of urgent information to pilots during aircraft take-off and landing runs.** Essential aerodrome information shall include:*

*i) bird formations or individual large birds reported **or observed** on or above the manoeuvring area or in the immediate vicinity of the aerodrome and the extent of any bird dispersal action being carried out. When flocks of birds or **single large ones are seen**, the Aerodrome Operator or Bird Control Unit must be informed;"*

The threat is considered as coming not only from bird concentrations but also from a single large bird, since for some time the U.K. is experiencing the presence of Canada geese in the vicinity of their airports. There is no doubt about the direct observation by the aerodrome controller, who is also required to inform the BCU.

India is fundamentally based on the DOC 4444 model, which is implemented almost entirely, but with a significant difference: in the matter of "*obstructed runway*" ICAO in § 7.4.1.4.1 uses the expression "*In the event the aerodrome controller **becomes aware**.... of the existence of any obstruction*," while the Indian Manual of Air Traffic Service states "*In the event the aerodrome*

controller **observes** ... any obstruction such as animals or flock of birds ..) which is not a small change, clarifying that the controller does not have to wait **to receive** the message from outside but is called upon to observe on his own behalf, though not as explicitly as in the South African "*keeping a constant and a visual watch*"

Even the African state of **Liberia**, in its Manual of Standards ATM, in the section Aerodrome Control Services at § 1.7 (Essential Aerodrome Information) summarizes the DOC 4444 content but specifies that the essential information must include: "*Bird formation or individual large reported or **observed** on or above the maneuvering areas or in the immediate vicinity of the aerodrome and the extent of any bird dispersal action being carried out (**when flocks of birds or single large ones, are seen the aerodrome authority or bird control unit must be informed**)*"

clarifying that **it is** a controller's duty to notify the BCU when he detect flocks or large single individuals.

Among the countries that repeat almost entirely DOC 4444, inevitably with all the doubts we have described, there is **Brazil**, whose Agency for Air Traffic Control, DECEA (Departemento de Controlo do Espaco Aereo), released the following declaration:

*"On the other words the Air traffic Controllers must issue the information about the presence of bird in the vicinity of the aerodrome **as soon as they see this "situation"**. **Most of the time the Air Traffic Controllers are the first to realize the presence of bird in the vicinity** and for this reason they soon share this important warning to the Airport administration (ground staff), to the pilots and to the other ATC facilities. To sum up: no matter if the Air Traffic Controllers see or if they get the information coming from other sources, they always share (issue) the information to the pilots."*

We take it into account, but specifying that the text of the ICA-100-12document, which is quoted in the declaration, appears to be a Portuguese translation in of DOC 4444.

A contrary opinion is instead shown by the Aviation Authority of **Singapore** which, in its Manual of Standards - Air Traffic Services, repeats the full text of DOC 4444 with a small supplement in Chapter 7, "Essential Information on Aerodrome Conditions "*Aerodrome control towers and units providing approach control service shall be kept currently informed of the operationally significant conditions of the movement area, including the existence of temporary hazards, and the operational status of any associated facilities at the aerodrome(s) with which they are concerned*". Without further specifications, and together with the remaining part of the paragraph indicating what information is essential - including the usual "*birds on the ground and in the air*" - the statement seems to suggest that the controller is a passive receiver of information (to be then transmitted to the pilots) rather than a careful and active observer.

Going on to the discussion about the prevention policies against impacts with birds at airports, in **Australia** the Manual of Standards, Part 172, Air Traffic Services, makes no specific reference to "*bird and other animal hazards*". The § 6.1.1.1 (f) states only that the SMS (Safety Management System) of every airport must include "*the process for the identification, assessment, control and mitigation of existing and potential safety hazards*", a rather vague statement that does not clarify if the hazards arising from wildlife are included.

Moreover, the Air Services, ATS service provider in Australia, informs that:

" Bird and wildlife mitigation is managed by the individual airports. Airports can issue a NOTAM advising of bird or wildlife activity at their airport (including where Air Services does not have a tower). Air Services air traffic controllers do (occasionally) use the ATIS to broadcast

location details of sighted birds, whether they **observe them** or pilots have observed them and passed this info on. Controllers **will also broadcast details of bird or wildlife activity during take-off and landing clearances as well**".

We should conclude that all the initiatives are almost completely under the responsibility of the airport operator, even though direct observation by the controller is not totally excluded.

In **Japan**, they decided to follow the American regulation but reducing its scope with some significant omissions.

Where the FAA speaks of "*Issue advisory information on pilot-reported, tower-observed, or radar-observed and pilot-verified bird activity*", the Japanese Manual ATC Procedural Regulation § 2.19 cancels instead the words "**tower-observed,**" as well as in the statement "*unless visual observation or subsequent reports reveal the activity is no longer a factor*" from which they remove the words "**visual observation**". Since that could not have happened by chance, it is clearly a political decision aimed to give all the tasks and responsibilities to the bird control services on the ground.

At the end of this brief analysis, let us return to **the Italian regulation**, from which we started. The Operation Manual of Air Traffic Management (Ed. November 2012) edited by ENAV, not available online, states that the aerodrome controller has to inform pilots about the presence of birds and other wildlife on the ground and in the air, but adds that "*The information provided by the Tower in relation to aprons is limited to that which is received by the airport operator.*" In theory it seems that at least for birds on the maneuvering areas the controller has a direct responsibility, but the expression is ambiguous and actually leads to restrictive interpretations such as that shown by ENAV itself in Court and that we mentioned at the beginning.

Like DOC 4444, also the Italian MO-ATM excludes that the information we are talking about (including that relating to birds) has to be provided "*when it is known that the aircraft has already received all or part of the information from other sources*". In conclusion, since ENAV believes that in order to inform pilots about the presence of birds a remark in the AIP or even a repetitive NOTAM is sufficient, the knowledge (of what?) is assumed as true, and the controller is not required to observe, assess, or communicate anything.

Given this complex regulatory framework, which is based on ICAO standards and their local implementation, the issue of *remote sensing* instruments will shortly appear. The main problem that seems to emerge in the few cases where the avian radars are operating at civilian airports is their management.

The main purposes of these tools, the reason for which they were designed, are the immediate detection of mobile obstacles, the communication to the pilots in real time wherever it is possible to avoid them, and the adoption of the subsequent measures. Given the extent of the instrument range (up to 10 km.) it is possible to consider corrective maneuvers, changes of the runway in use, temporary flight interruptions, bird removal teams on the site and so on.

It is therefore reasonable to assume that the instrument display would be located in the Control Tower.

The problem was immediately resolved in the military airports where airport management, bird removal and air traffic control are in the hands of the same subject. This is also the reason why in the United States the avian radars are an almost ordinary tool (widely used even by NASA). But at civilian airports, the three functions are normally managed by at least two different subjects, one of which, the air traffic control agency, has so far proved to be absolutely and fiercely contrary to

their installation in the Control Towers and to use by their staff. To be honest, in general these agencies do not agree with the idea of external personnel in the towers to manage these radars and, in this case with more justification, with a direct radio contact between aircraft and other entities.

In any case, the avian radars in civilian airports are currently still *on test*; as far as we know, apart from those installed in the USA, of which little is known (11), there are two interesting cases. The airport of **Riga** in Latvia is in the fortunate circumstance of having the airport operator and ATS both under government control. Despite initial reluctance, the political pressures **following** some serious impacts have led the air traffic control agency to accept the presence of a display in the tower; however, data are automatically read by a **computer** and flow into a database; currently there is no tactical use and also for a database strategic management the human resources available are insufficient.

The radar in service at the King Shaka airport of **Durban** (South Africa) is instead especially designed to detect only a species of migratory birds, the Barn Swallow (*Hirundo rustica*), which is a local source of problems. It is positioned outside the airport, in the line of the main runway, and the main display is in the fire station. The radar is designed to send out three possible signals, Green = no danger, Yellow = moderate danger and Red = High Risk. There is no display unit in the Tower where they receive only a signal warning if and when the swallows penetrate into the area defined as High Risk.

Even when it receives one of these signals, the Tower waits for a telephone call from the radar operators before relaying the information to the pilots who then can decide whether to adopt the proper measures. The main controller's concern seems to take no responsibility to act except after a radar operator's call, and especially not to take any "final decision for the airlines", but only to warn pilots of the danger. After a period of initial controller opposition, the system is now working.

As is evident, the adoption of these new safety tools will impact more and more on the role of ATC in wildlife strike prevention.

We can now draw some conclusions.

Some ambiguity and vagueness in the ICAO regulation, which seem to us to be evident drawbacks to be corrected, probably derive from the application of those general and abstract features that are appropriate for a rule, or from the basic principle of granting full freedom to the States about its application, and sometimes from the fear of encroaching on the field of criminal and civil laws of each country.

Firstly, we can conclude that national differences on the role of ATC in the birdstrike issue depend primarily on a) internal political decisions, b) the greater or lesser awareness of the problem, c) the will to be excluded from possible litigations in the event of accidents and d) probably the number and significance of birdstrikes in the country's aviation history.

(11) The airport of Seattle Tacoma employs an avian radar; however *"the airport's radar isn't being used to warn about potential midair bird strikes, which would require a seamless integration between radar technicians and the control tower. Eventually there will be a protocol for that."* Interview with Steve Osmeck, biologist at Seattle airport, in National Geographic, cit.

Who is therefore right and who is wrong in the interpretation of international regulations?

The discussion has so far focused on legal and formal aspects, but omitting to point out that ultimately ICAO and the national regulations together aim to promote and ensure flight safety, which is the primary goal to achieve.

We therefore believe that the Canadian, South African, United States and British regulations are clearer and more safety-oriented, and should therefore serve as an example to follow, while the other countries that follow a more conservative approach probably fool themselves into thinking they can avoid legal consequences (as we have seen in the Italian case), but we do not think they can be used as models in terms of safety.

ICAO recently released the new edition of DOC 9137 (2012) "Wildlife Control and Reduction", which replaces the previous one (1991), clearly outdated. There are not many references to the role of ATS, but at least the following paragraph seems to be creditworthy and may constitute a good starting point: "*12.3.4 Clear and precise procedures should be developed for air traffic control, and controllers should be trained such that they are able to give specific and timely information to pilots and wildlife control crews to avoid identified hazards.*"

To this day in fact some countries are behind not only in specific training for controllers, but also in raising awareness of the danger posed by birds, and of the damage they can cause, as well as the preventive means currently in use, except those incidentally learned by observing the bird control teams on the ground.

To be honest, a similar awareness is often missing also in other actors on the civil aviation stage, many pilots for example, the drafters of airline flight manuals, many airport managers, and so forth (12).

While in the past specific training of ATS controllers was only desirable, now with the new DOC it becomes imperative and must be implemented by all countries.

It may be useful to point out that a greater awareness is also in the interests of the controllers themselves, who usually do not know they may be exposed to the risk of incurring legal consequences for this particular type of aviation hazard.

Therefore we strongly **urge** that the next stage will also be a review of DOC 4444, **to explain** with more emphasis the meaning of the ambiguous expressions and **introduce** in explicit forms the concept, so skillfully rendered in **the** South African regulation, of a "*constant visual watch*" about the possible presence of birds and other wildlife.

12) We cannot confirm nor refute the "urban legend" according to which the First Officer of USAir flight 1549, who ditched in the Hudson River on 15 January 2009, while visiting La Guardia Airport after the accident, would have been very surprised to learn that there was a bird dispersal service there.

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