MINISTERIO
DE TRANSPORTES
Y MOVILIDAD SOSTENIBLE

AESA AGENCIA ESTATAL
DE SEGURIDAD AÉREA



Vulture management in airport environments: a case of multi-stakeholder collaboration

22/09/2026

SIG-GD-ITR01-F09 Ed.03 CLASIFICACION DE SEGURIDAD

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1. The problem
2. The multidisciplinary approach
3. Examples of actions taken
4. Lessons learned / Conclusions

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1. The problem

In recent years, the **number of collisions with vultures** in Spain has **risen significantly**.

14/9/26, 13:28 Sucked into left engine: Emergency landing of Madrid flight after collision with vulture causes damage - RTL Today

RTL TODAY

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Sucked into left engine

Emergency landing of Madrid flight after collision with vulture causes damage

RTL Today

A plane departing from Madrid was forced to make an emergency landing on Monday shortly after take-off, following a collision with a vulture that caused significant damage.

Published: 04.08.25 15:24, Update: 04.08.25 16:02



© https://x.com/ivancp25/status/1952070597074104770/photo/1 by X / Iván Castro Palacios

14/9/26, 13:28 Iberia Airbus A350-900 suffers bird strike on approach Madrid Airport - Aviation24.be

Iberia Airbus A350-900 suffers bird strike on approach Madrid Airport

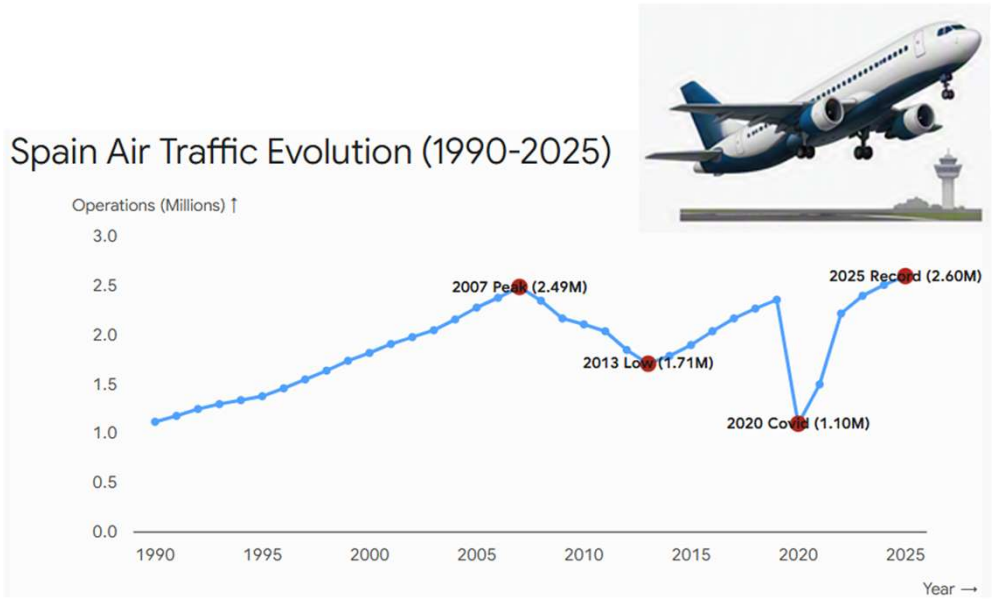
By **Bart Noëth** - 28 October 2021



On 26 October, an Iberia Airbus A350-900 (registered EC-NDR) approached Madrid Airport, Spain on a flight originating from Bogota, Colombia. During approach, however, the aircraft was hit by a vulture.

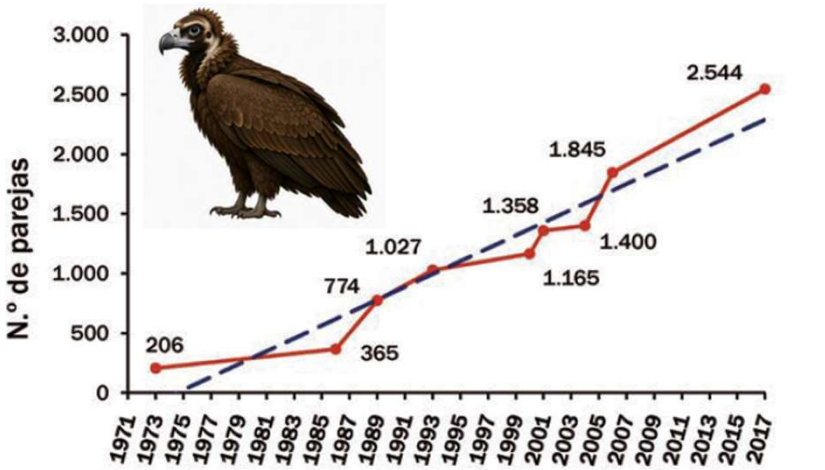
Why is there a problem?

The number of **air operations increases** every year, and **vulture populations have recovered significantly** since the late 20th century.



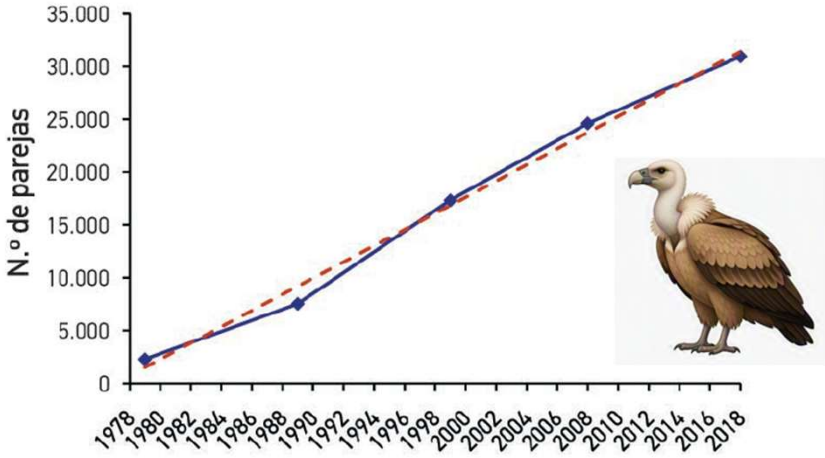
Source: Aena / Ministry of Transport and Sustainable Mobility

Number of Cinereous vulture pairs in Spain



Source: SEO-Birdlife

Number of Griffon vulture pairs in Spain



Why is there a problem?

Spain is home to **more than 90% of European vulture populations**

Distribution of the griffon vulture

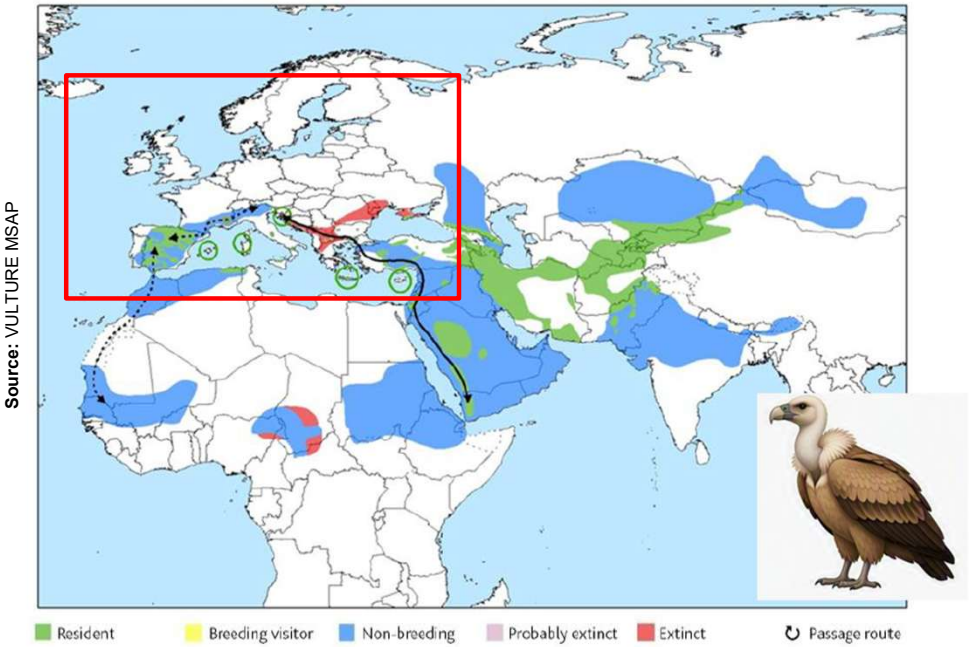


Figure 15: Distribution map of the Griffon Vulture *Gyps fulvus*.

Distribution of the cinereous vulture

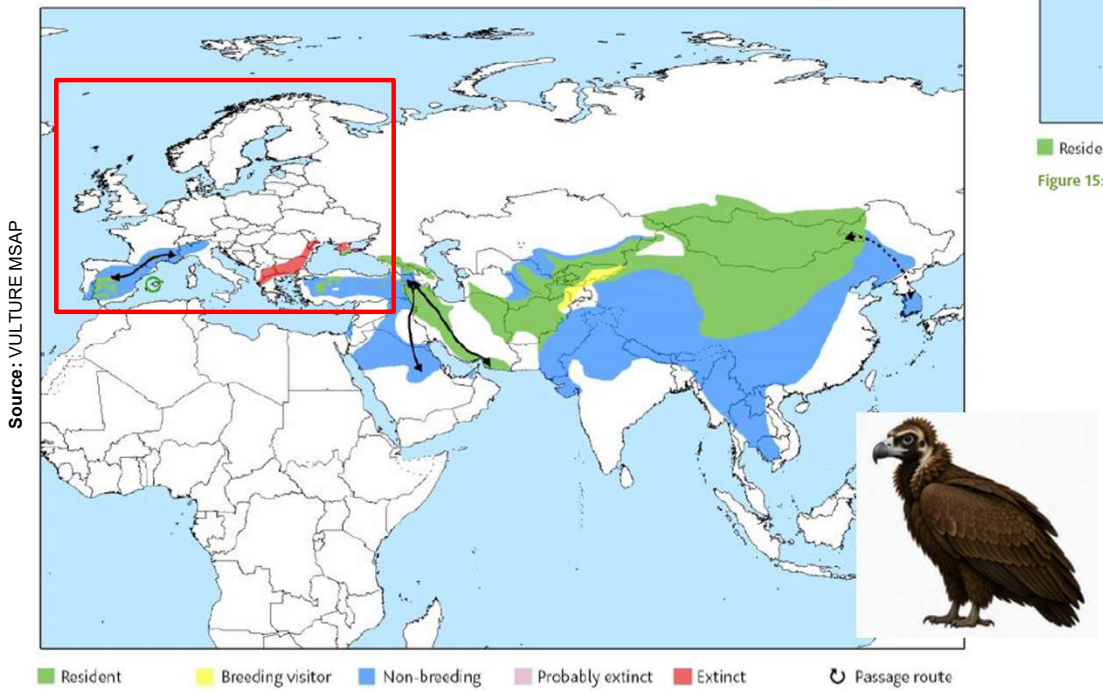


Figure 16: Distribution map of the Cinereous Vulture *Aegypius monachus*.

Why is there a problem?

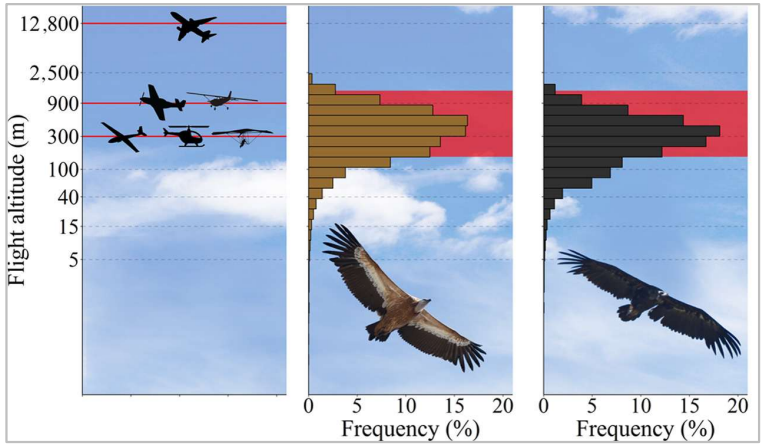
"Vultures" are:

- large birds (weighing up to 8–12 kg)
- gregarious in behavior
- capable of flying at great heights (typically 300 m, up to a maximum of 2,000 m) and over long distances (more than 100 km per day, with several hundred covered during dispersal or migration)



Source: Josefito123 - Own work, CC BY-SA 4.0

Vulture flight altitudes



Source: Use of avian GPS tracking to mitigate human fatalities from bird strikes caused by large soaring birds

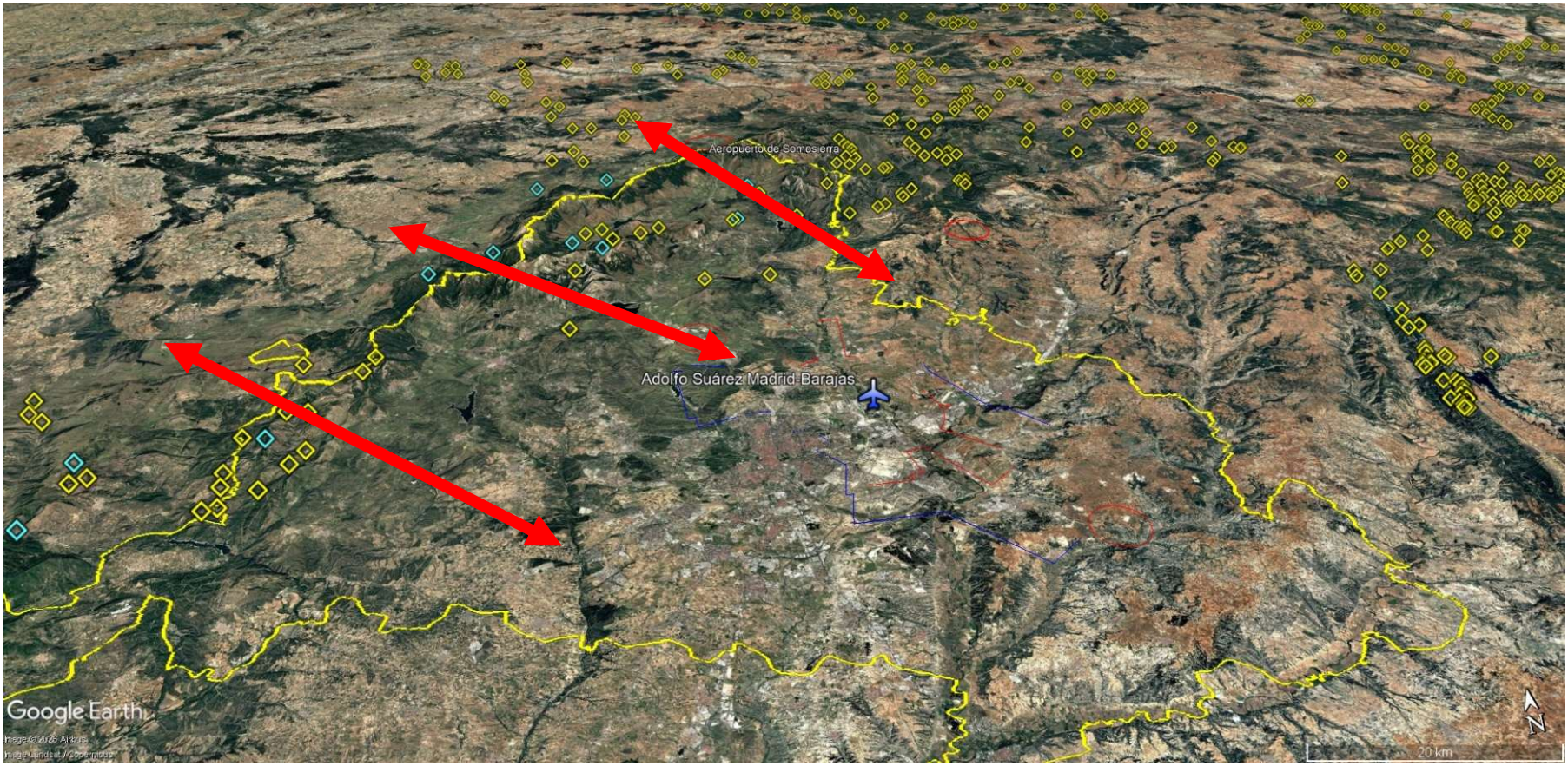
Movements of tagged cinereous vultures



Source: https://migraciondeaves.org/

Why are they approaching the airport?

The “local” vultures live in the mountainous areas and come down to the “plain” in search of food



Source: MITECO / AESA

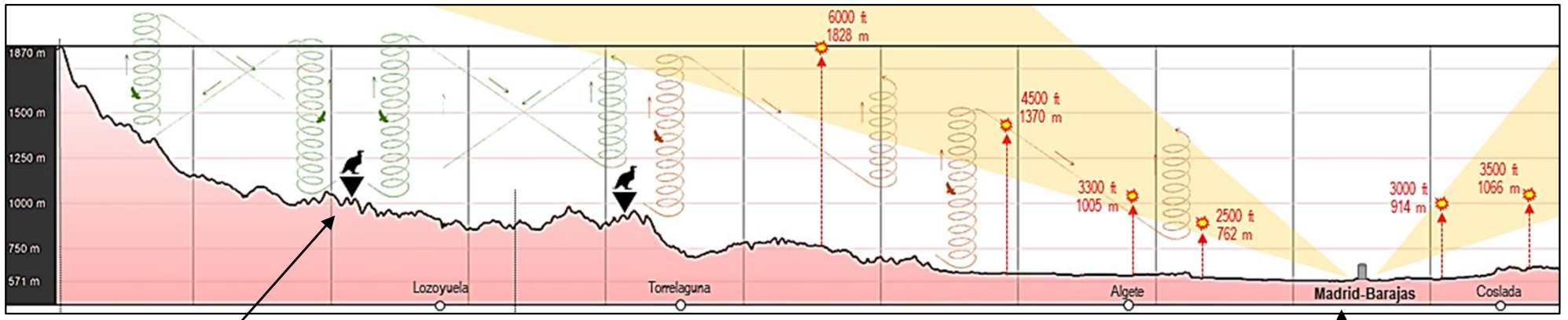
Griffon vulture colonies

Cinereous vulture colonies

Why are they approaching the airport?

The “local” vultures live in the mountainous areas and come down to the “plain” in search of food

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Source: Own elaboration



Source: gailhampshire - Own work, CC-A 2.0 Generic



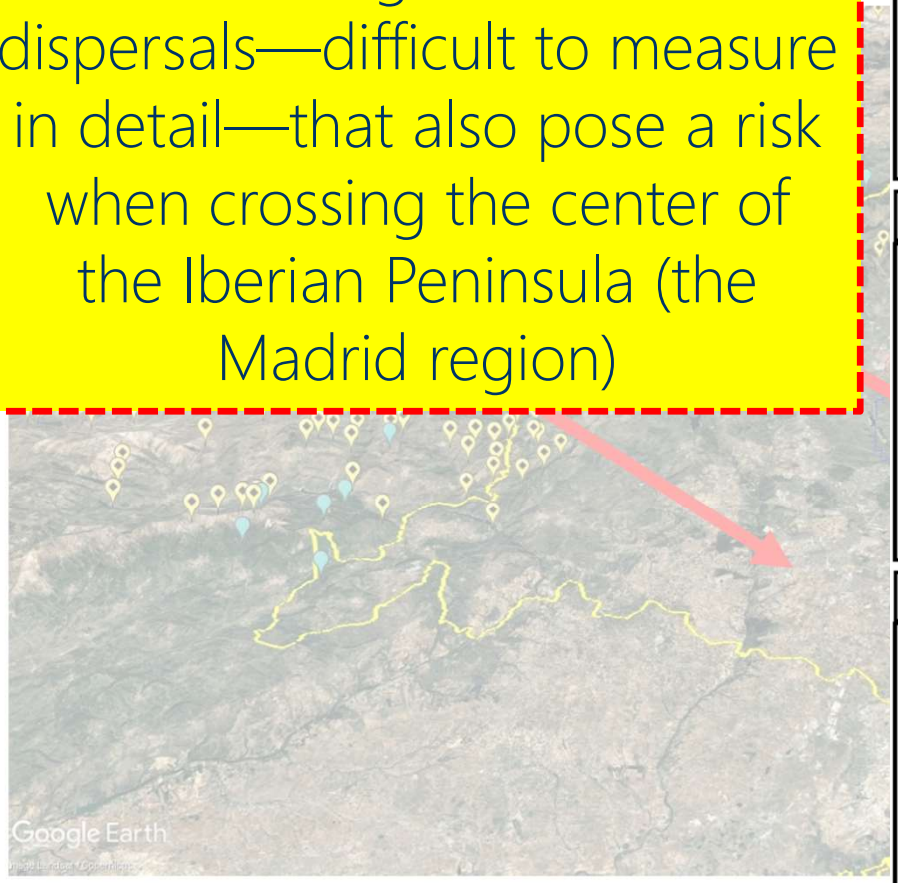
Source: Felipealvarez

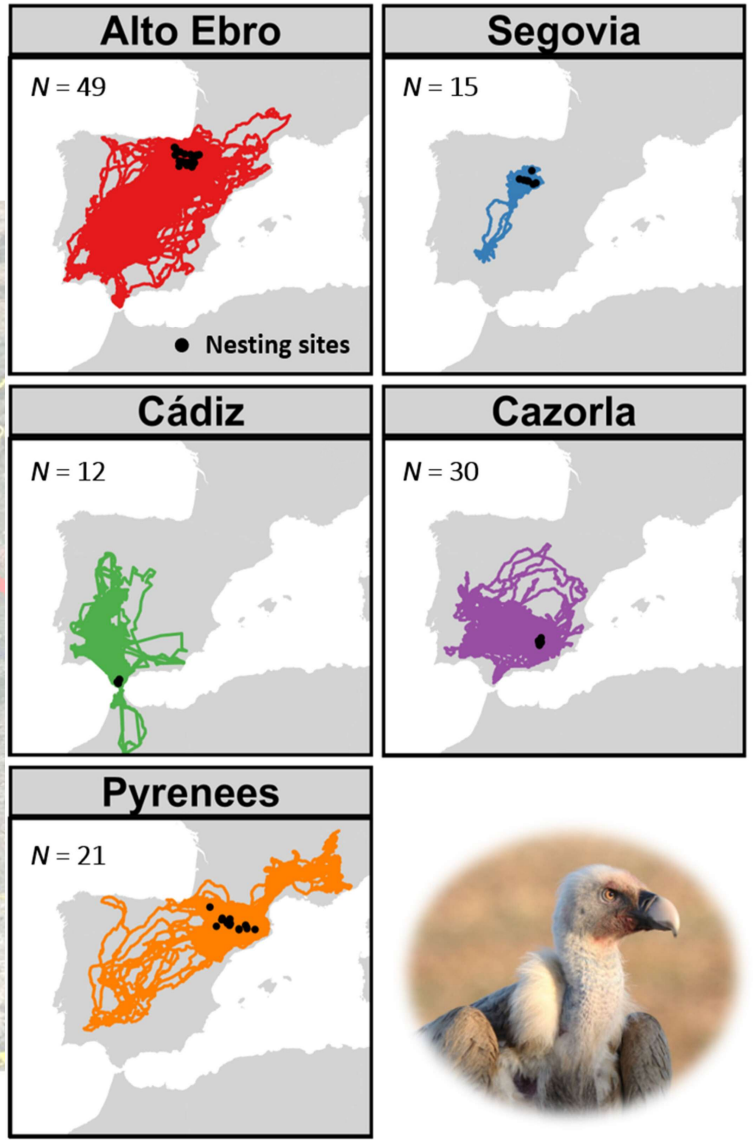
- Takeoff/approach ramp diagram
- Vulture movements in safer areas (mountains and foothills)
- Vulture movements in sensitive areas (plains)
- Vulture colonies
- Collisions with vultures

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Why are they approaching the airport?

NOTE: There are movements of a "floating population" and local migrations or dispersals—difficult to measure in detail—that also pose a risk when crossing the center of the Iberian Peninsula (the Madrid region)







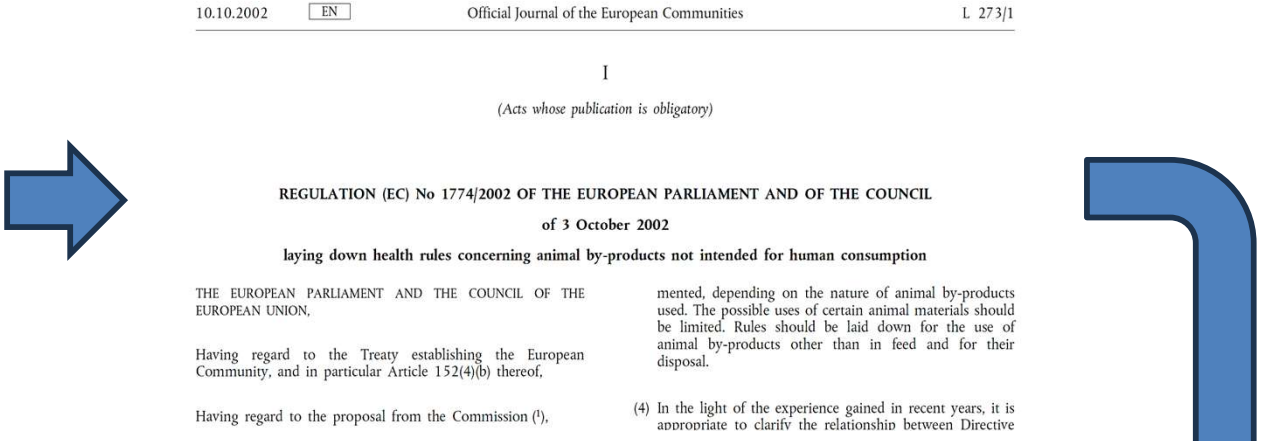
Source: Large-scale movement patterns in a social vulture are influenced by seasonality, sex, and breeding region

Why are they approaching the airport?

HYPOTHESIS: 2001 = "mad cow disease" → 2002 = legislation on the disposal of animal remains → since 2006, remains are no longer left in the field, carcass dumps are closed, etc. → vultures changed their foraging patterns…



Source: sverigesradio.se



10.10.2002 EN Official Journal of the European Communities L 273/1

I

(Acts whose publication is obligatory)

REGULATION (EC) No 1774/2002 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 3 October 2002

laying down health rules concerning animal by-products not intended for human consumption

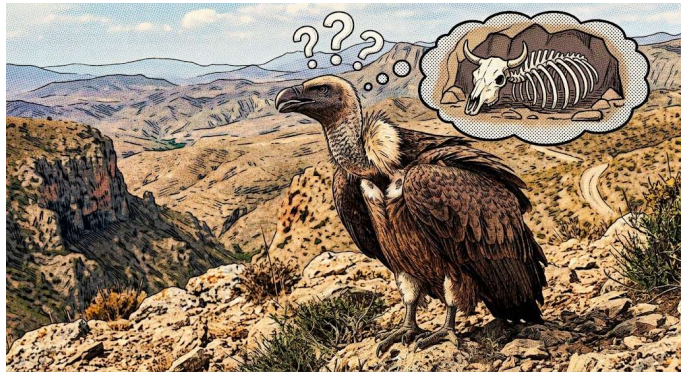
THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Community, and in particular Article 152(4)(b) thereof,

Having regard to the proposal from the Commission [1],

mented, depending on the nature of animal by-products used. The possible uses of certain animal materials should be limited. Rules should be laid down for the use of animal by-products other than in feed and for their disposal.

(4) In the light of the experience gained in recent years, it is appropriate to clarify the relationship between Directive



Source: "Propio" (IA)



Source: Mario Modesto Mata - Own work, CC BY-SA 3.0

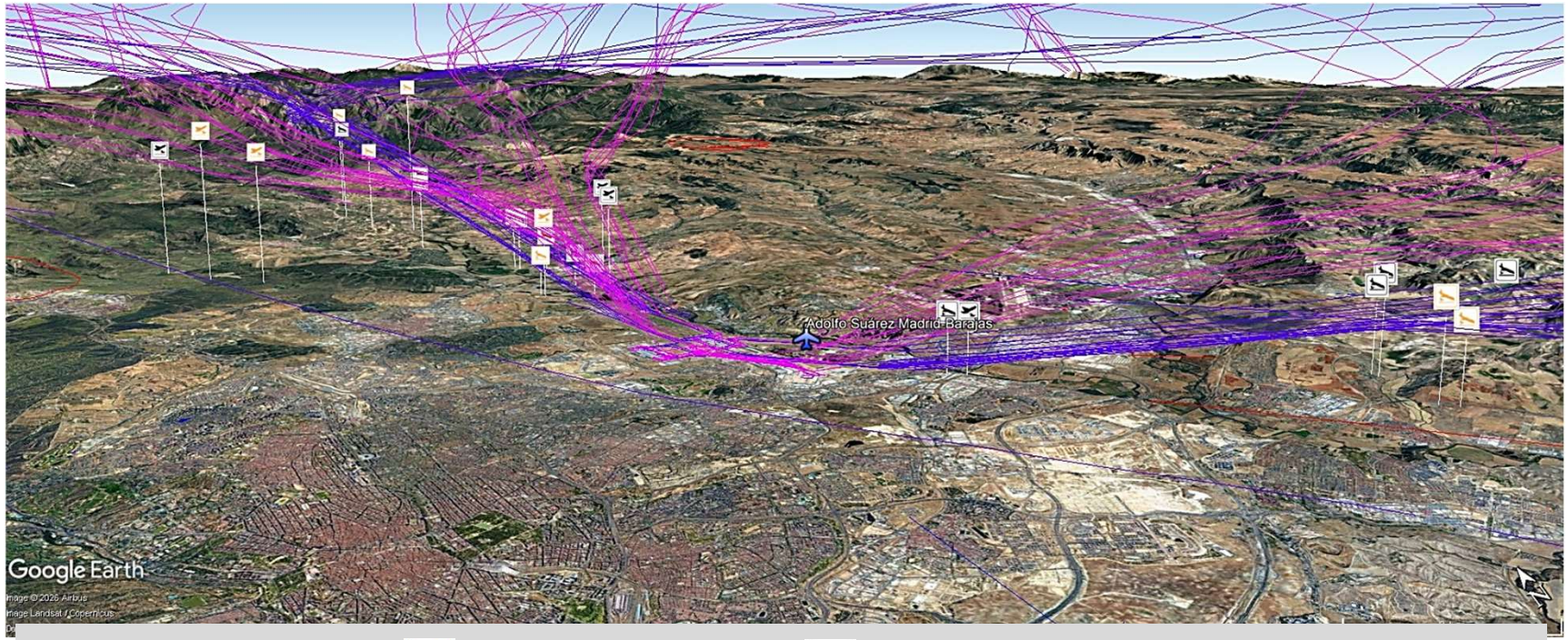
The problem lies outside the airport…

<u>All the collisions</u> are occurring **outside the airport**, at a certain distance and at a certain altitude…



Source: "Propio" (IA)

Collisions with vultures in the vicinity of Madrid-Barajas



Source: Aena / AESA

Examples of aircraft approaches and takeoffs

Griffon vulture (take-off)

Griffon vulture (landing)

Cinereous vulture (takeoff)

Cinereous vulture (landing)

Vulture sp. (takeoff)

Vulture sp. (landing)

2. Multidisciplinary approach

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2. Multidisciplinary approach

- This issue has been addressed in various discussion forums — initially at the **National Aviation and Wildlife Committee**, and subsequently in various **Specific Working Groups**.









National Aviation and Wildlife Committee



Promote liaison, awareness and coordination with stakeholders: Ministry of Environment, Spanish Air Force, Local Administrations...



Serve as an expert body: academic experts, aviation industry…



Promotion of research, methods, and technologies: GPS tracking project…

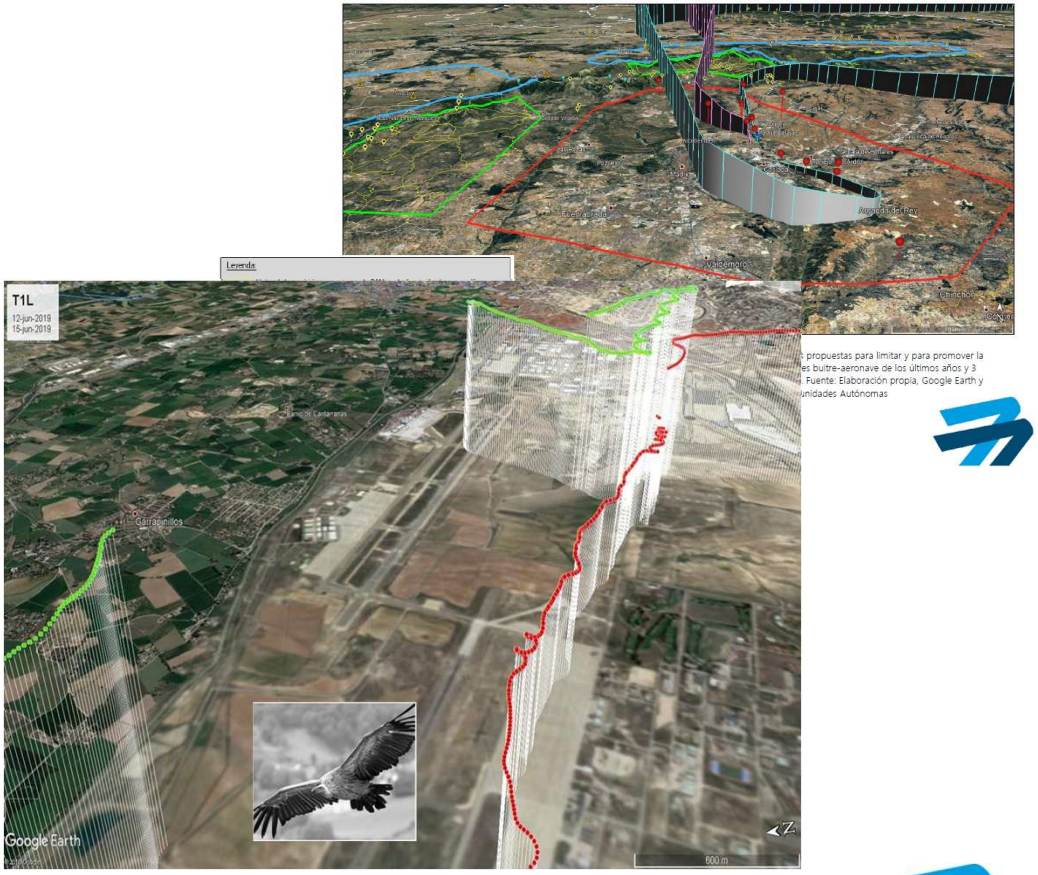
SIG-GD-ITR01-F05

2. Multidisciplinary approach

- This issue has been addressed in various discussion forums — initially at the **National Aviation and Wildlife Committee**, and subsequently in various **Specific Working Groups**.

Specific Working Groups: Large soaring birds (Vultures)

- AESA / Aena / Ministry of Environment coordination to know the behaviour and movements of vultures using GPS transmitters → adopt mitigation measures



- Project conducted by Aena



BOLETÍN OFICIAL DEL ESTADO
Núm. 159 Lunes 5 de julio de 2021 Sec. III. Pág. 79868

III. OTRAS DISPOSICIONES

MINISTERIO PARA LA TRANSICIÓN ECOLÓGICA Y EL RETO DEMOGRÁFICO

11150 *Resolución de 28 de junio de 2021, de la Dirección General de Biodiversidad, Bosques y Desertificación, por la que se publica el Convenio con la Agencia Estatal de Seguridad Aérea y AENA, S.M.E., SA, para realizar un estudio del comportamiento de buitres que permita tomar medidas para evitar la confluencia de estas aves con la aviación.*

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- Analysis of potential locations for new feeding areas and monitoring of the results

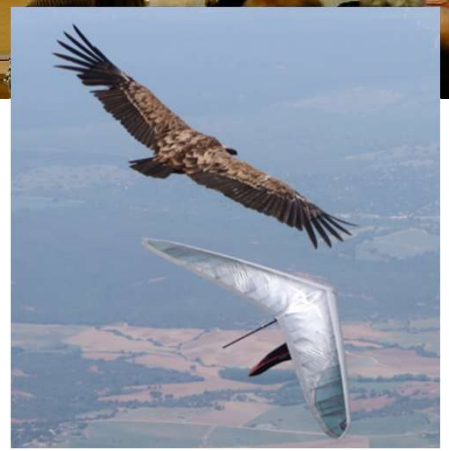
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2. Multidisciplinary approach

- This issue has been addressed in various discussion forums — initially at the **National Aviation and Wildlife Committee**, and subsequently in various **Specific Working Groups**.

Specific Working Groups: General Aviation and Vultures Workshop





Source: "AVIACION LIGERA CONDUCTAS DE VUELO PARA LA PREVENCION DE COLISIONES CON BUITRES"

- **More training** on bird strikes for pilots
- **Greater awareness** about the areas the pilots fly over
- **Outreach activities**: recommendations before the flight, during the flight, and after possible incidents:
  - Avoid dangerous areas (nesting areas depending on the vulture species…)
  - Avoid certain flight times
  - Fly at different altitudes depending on the time of year (summer or winter)
  - Reduce flight speed when sightings are made
  - Insist on reporting sightings or other incidents (evasive maneuvers)
  - Protective measures to be used

2. Multidisciplinary approach

- The scale of the problem and the need for solutions is immense (regional / state scale) involving multiple stakeholders

Programa Estatal de Seguridad Operacional
(State Operational Safety Programme)

Airport Operator. Actions

- Analysis of potentially risky hunting grounds near Airport
- GPS study of vulture movement

Local Administration. Actions

- Publication of Decree on Necrophagous Species
- Inclusion in hunting regulations of mandatory removal of carcasses hunted animals
- Livestock Study near Airport

CAA and Stakeholders. Actions

- Strategic Study for the integrated management of potential risk (vulture feeding areas, etc.)

2. Multidisciplinary approach

- The scale of the problem and the need for solutions is immense (regional / state scale) involving multiple stakeholders

Agencia Estatal de Seguridad Aérea

Estudio Estratégico para la gestión de los riesgos de los buitres leonado y negro en el entorno del Aeropuerto AS Madrid/Barajas

INFORMACIÓN PÚBLICA

ENAIRE

Junta de Castilla y León · Comunidad de Madrid · Castilla-La Mancha · AESA · aena · GOBIERNO DE ESPAÑA · MINISTERIO PARA LA TRANSICIÓN ECOLÓGICA Y EL RETO DEMOGRÁFICO

Strategic Study on Risk Management Regarding Griffon and Cinereous Vultures

- An executive mechanism under AESA (Ministry of Transport) that coordinates the stakeholders
- Strategic measures and actions (short, medium, and long-term)

PESO-FAU Working Group

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3. Examples of actions taken

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3. Examples of actions taken

A. GPS tracking study

B. Dump Site

C. Big Game Hunting

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Aena: the need to know the vulture movements

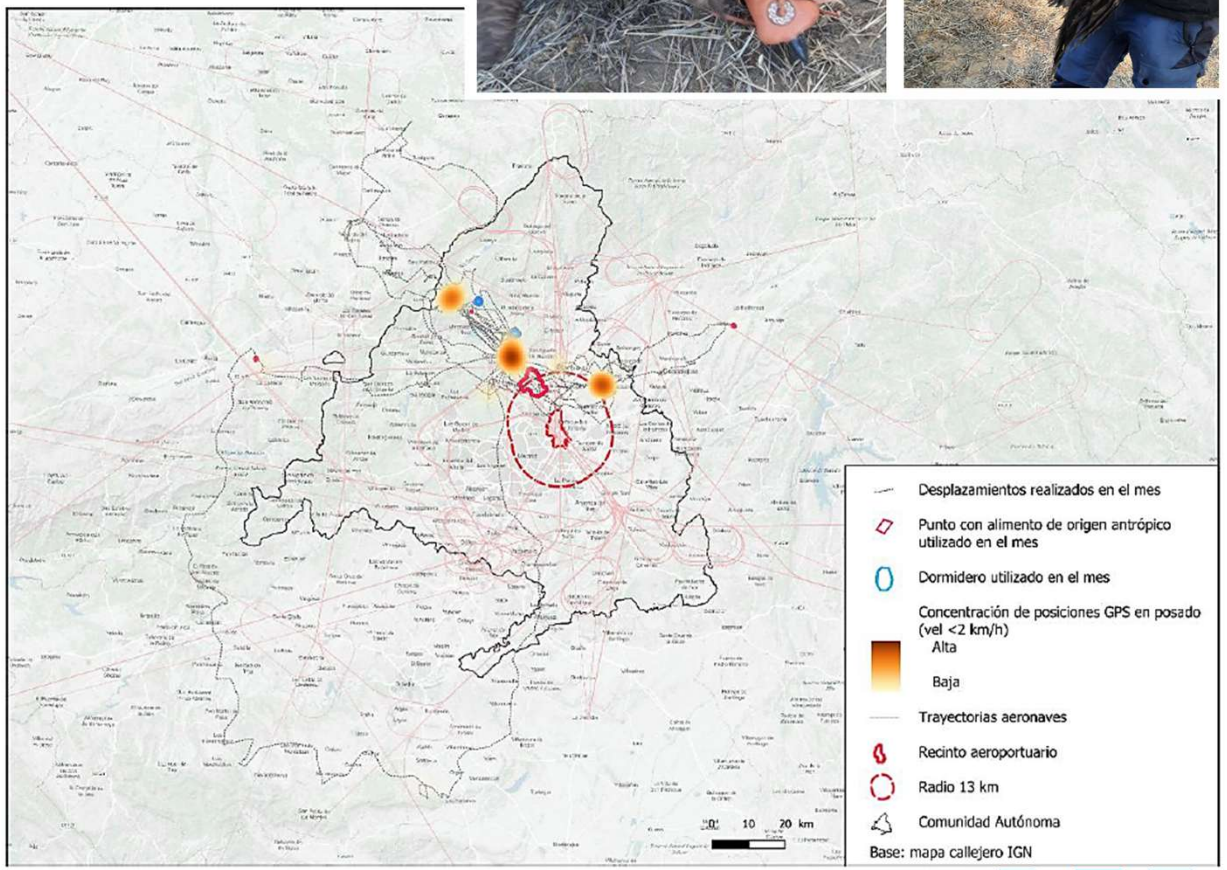
The **first fundamental step** is to try to better **understand** how and why the **vultures**.

- GPS Tagging and monitoring of 85 individuals (63 griffon vultures and 22 cinereous vultures) over a period of 3 years (in MAD and BIO)
- **Understanding** flight zones and altitudes, and knowing where they congregate (to feed, rest, etc.)
- **It provides the basis for implementing management measures** in areas where the presence of vultures could pose a hazard



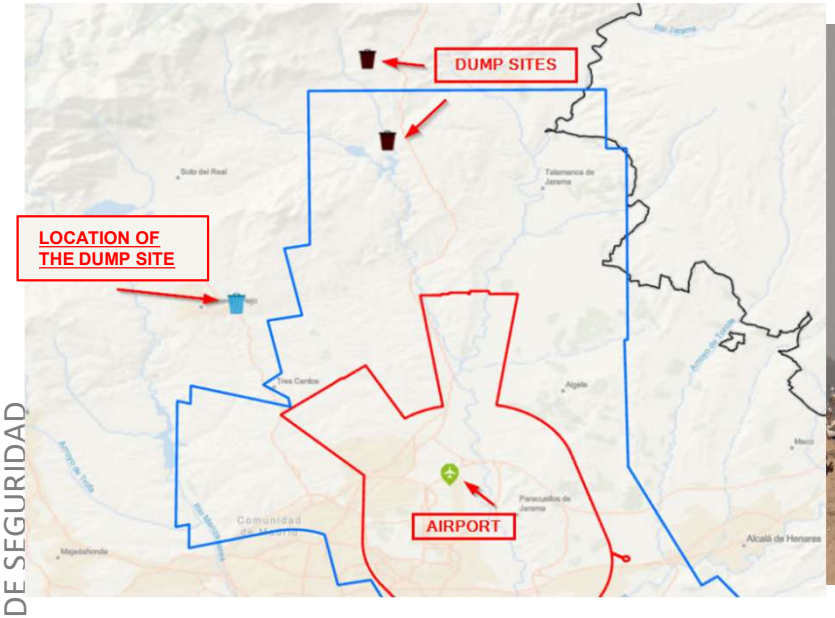


Source: Aena



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B. Dump Site





Source: AESA



Coordination Actions

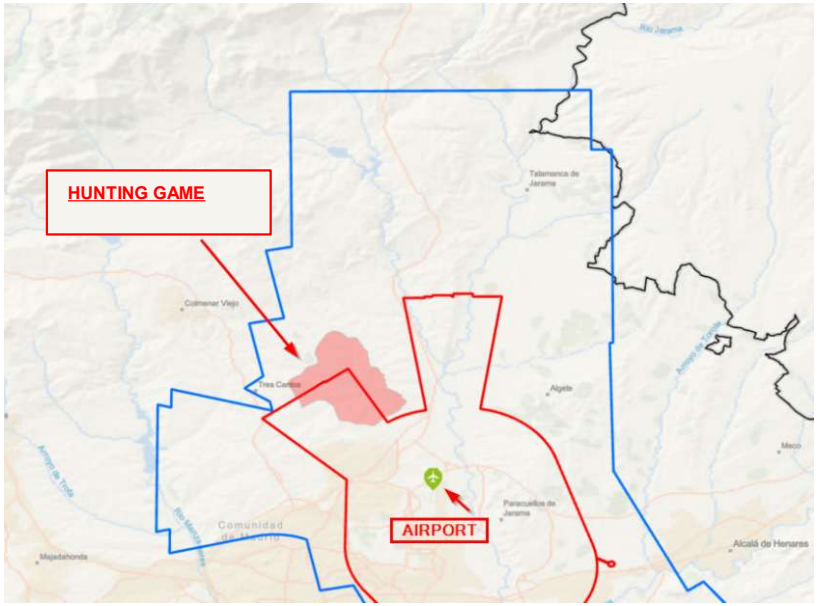
Implementation of improvements to wildlife dispersal operations at a landfill:

- Increase the frequency of dispersal actions during the summer (three times a day rather than the current 2).
- Schedule the three required dispersal operations throughout the day.
- Focus the bird dispersal efforts (pyrotechnics, gas cannon…) on vultures.

UNTIL THE WASTE MANAGEMENT METHOD CHANGES WITH A NEW ENCLOSED FACILITY, WITHOUT OPEN-AIR STORAGE

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C. Big Game Hunting





Source: AESA

Coordination Actions

Meetings with the managers of the hunting reserve.
Visit the site. Proposed actions:

- Drone (UAS) operations for surveillance
- Installation of acoustic and deterrent devices
- Silvicultural treatments at perching and roosting sites
- Improved management of carcass remains



MEASURES UNDER REVIEW

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4. Lessons learned / Conclusions

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4. Lessons Learned / Conclusions



- If the greatest hazard lies "outside" → the involvement of many stakeholders is absolutely essential = THE AIRPORT CANNOT HANDLE THIS ALONE…

- If there is a lack of knowledge → ACCURATE data are needed (bird movements, concentration, etc.) → to be able to implement EFFECTIVE measures





- New technologies must be applied or developed (detection, understanding of behaviors, movement prediction, etc.)

- No single measure or stakeholder suffices → it is necessary to implement multiple measures with varying approaches and scopes





- Multidisciplinary working groups are necessary → constant coordination and a multidisciplinary approach… = ESSENTIAL

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Thank you for your attention