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AIR FORCE CIVIL ENGINEERING CENTER TYNDALL AFB FLA
AN EVALUATION OF THE BIRD/AIRCRAFT STRIKE HAZARD (BASH) AT TEST--ETC(U)
APR 78 M J HARRISON, L T CLARK, E R GODSEY
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6 AN EVALUATION OF THE BIRD/AIRCRAFT STRIKE HAZARD (BASH) AT TEST AREA C-62, EGLIN AFB, FL.

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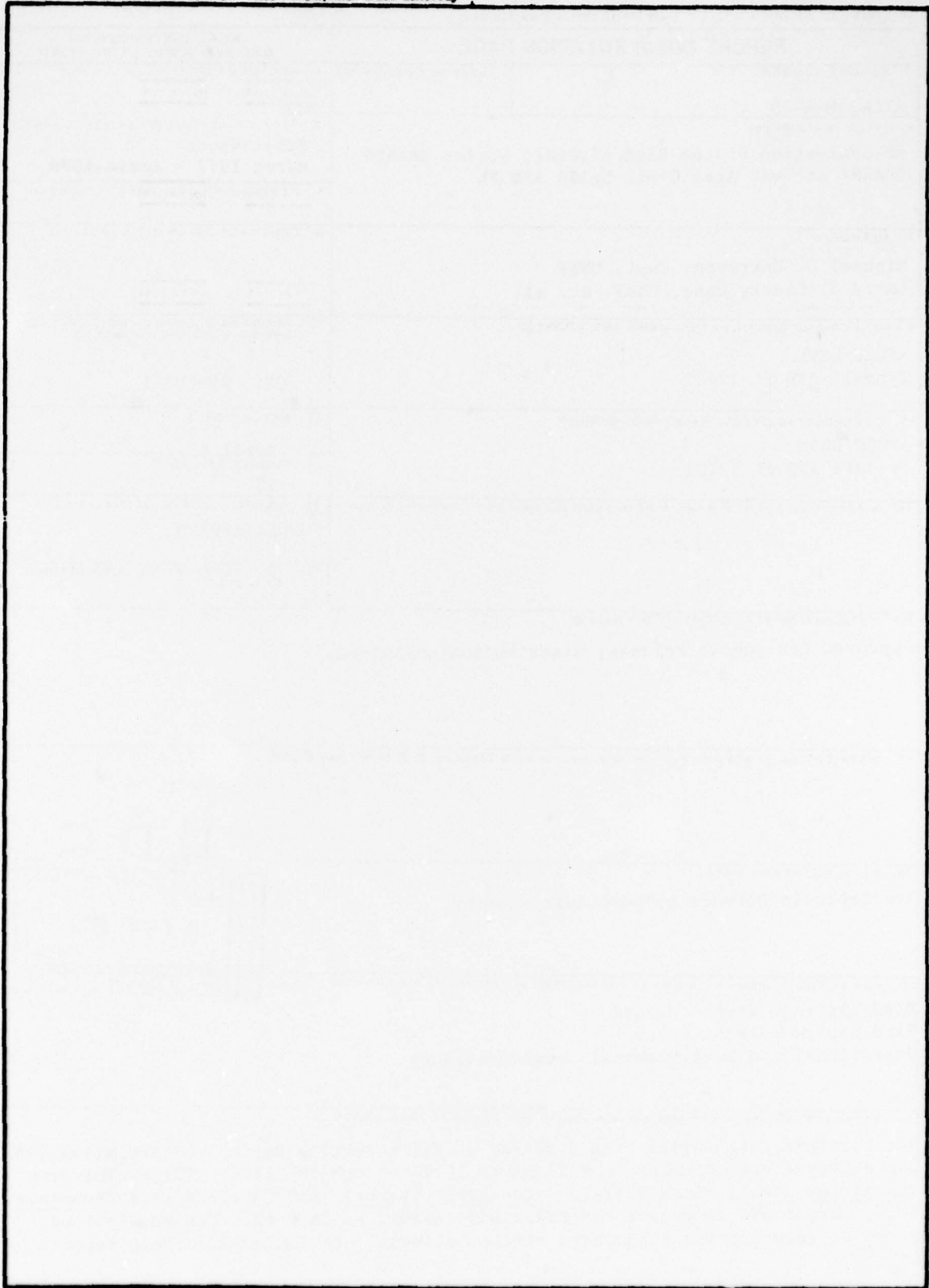
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PREFACE

This study was conducted under Program Element 91212F, AFCEC JON 00DEVN11. Inclusive dates of the study were 23 March 1977 to 30 March 1978.

For your quick reference and use, a concise summary of observations and recommendations follows the Table of Contents.

This memorandum has been reviewed by the Information Office (OI) and is releasable to the National Technical Information Service (NTIS). At NTIS it will be available to the general public, including foreign nations.

This memorandum has been reviewed and is approved.

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SUMMARY OF OBSERVATIONS AND RECOMMENDATIONS

1. Observations: A bird/aircraft strike hazard exists at Test Area (TA) C-62 because of the following factors:

- a. The presence of Turkey Vultures, Black Vultures, and Cattle Egrets.
- b. Large blackbird roosts found near TA C-62 may relocate onto the bombing range.

2. Recommendations

- a. Because vultures feed on dead animals (carrion), remove all carrion from the range.
- b. An insect control program should be initiated to reduce the food sources of the Cattle Egrets.
- c. If a blackbird or Starling roost becomes established on the range, the roost must be relocated.
- d. A Bird Hazard Working Group (BHWG) should be formed to develop a bird control and avoidance plan.
- e. BIRD WATCH should be set up to inform pilots of bird densities requiring temporary operational changes.
- f. The Range Control Officer (RCO) should be responsible for declaring BIRD WATCH, warning aircrews of bird locations, making operational changes, etc.
- g. Aircrews should transmit bird sightings to warn other pilots and the RCO.

SECTION I

INTRODUCTION

The Bird/Aircraft Strike Hazard (BASH) Team surveyed Test Area (TA) C-62, Eglin Bombing Range, from 23 March 1977 to 30 March 1978. Periodic one- and two-day observations were made to determine whether any operational or environmental changes could be used to reduce the risk of bird strikes. Field observations and discussions with range personnel indicate that the Turkey Vulture (Cathartes aura) and Black Vulture (Coragyps atratus) create the major bird hazard at TA C-62. Other species which could present problems include the Cattle Egret (Bubulcus ibis), blackbirds and several species of hawks.

No land management changes are required to reduce the risk of bird strikes. Environmental, active control, and operational changes are the only methods available. Range operating procedures defined in AFR 50-46, "Weapon Ranges" combined with local supplements provide for safe and efficient operation of the range. Some changes in AFR 50-46 supplements could incorporate recommendations contained in this report.

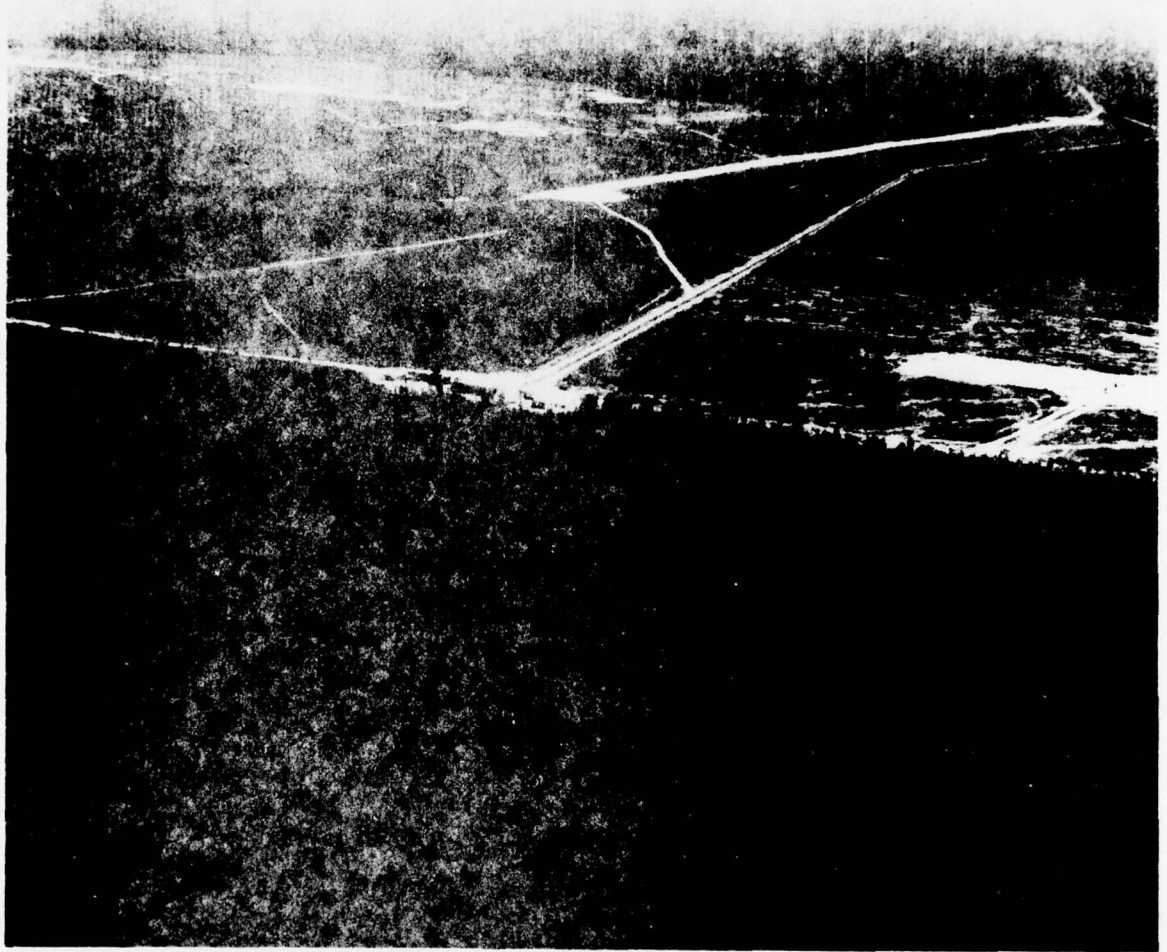


Figure 1. Test Area (TA) C-62, Eglin Air Force Base, Florida

SECTION II

OBSERVATIONS

Range TA C-62 is situated approximately 34 kilometers northeast of Eglin AFB. The range is an open meadow surrounded by pine forests. For safety reasons, observations were limited to the range tower and along the run-in line beyond the range boundary. Twenty-two man-days of field observations were recorded during all seasons. No environmentally unique bird attractants were noticed and no unusually large numbers of birds were observed transiting the area. Most migratory activity involved small songbirds, notably Robins (Turdus migratorius) and warblers (Dendroica sp.). The Turkey Vulture (Cathartes aura), Black Vulture (Coragyps atratus) and the Cattle Egret (Bubulcus ibis) are the only birds which presently represent a significant hazard to aircraft.

A. Vultures

Vultures can be easily identified in the field by their long wings, slow soaring flight, long tails and naked heads and necks. The Turkey Vulture has a red head and the Black Vulture a black head. Another distinguishing feature of the Black Vulture is the white patches near the wing tips. These white tips on the underside of the wings readily differentiate between the two species. These birds will usually roost in trees during the night and rise one to two hours after sunrise, searching the roads and open areas for dead animals.

Vultures were observed feeding and flying along the many access roads which surround the range, including the paved range access road. These roads not only provide birds with an open area to forage for food, but they also provide a source of heated air which produces slight thermals, sustaining the birds' soaring flight. Most of the morning flight activity is at low altitude, generally below 150-300 meters above ground level; however, in the afternoon vultures begin soaring on thermals to altitudes often exceeding 1500 meters. This afternoon soaring depends on available thermal air being produced by differential heating of the land. Open areas like the range provide greater heating of the air, with surrounding forested areas absorbing heat. This difference in heating makes open areas favorable places for soaring flight. The birds thus concentrate over the range until they gain sufficient altitude to glide to the next thermal updraft. Vultures circling the range are a common occurrence during late spring and summer months.

B. Cattle Egrets

Cattle Egrets are white, long-necked birds which feed daily in small flocks. They roost at night, often in trees and the roosts are usually small in size. Feeding flocks observed in northwest Florida have been composed of less than 8-12 birds per flock. Cattle Egrets can be distinguished from other egrets by the buff or reddish coloration on the back feathers

and backside of the head. The birds feed in open grassy areas on invertebrates (insects, worms, etc.) and generally fly at low altitudes between feeding areas. Cattle Egrets observed on and near the Eglin range rarely flew above 30-60 meters. Flight altitudes can be expected to be higher during spring and fall migration.

One bird strike in June 1976 involving a Cattle Egret and an F-4C resulted in canopy penetration and injury to a pilot (reference 1). The aircraft struck the bird during ordnance delivery. Unlike the vulture which can be a year-round problem, the Cattle Egret hazard is seasonal. The birds arrive in late May and leave in late September. Their presence on the range depends upon available insect food sources; therefore, bird populations can vary significantly from year to year and within a season of any one year. Populations can be controlled by using appropriate pesticides to remove the birds' food source.

C. Blackbirds

Since 1976, an increase in blackbird populations has been observed throughout northwest Florida. This increase has resulted in the formation of large wintering flocks in areas where no bird problems previously existed. De Funiak Springs is the site of a 20-30,000 bird roost during the winter months. Other smaller roosts were located north of the Eglin Range. These roosts could either combine to form a major roost or relocate to an area closer to the bombing range. Blackbirds can significantly degrade operational safety if roosts relocate in woods near the range or in a location placing the range between the blackbird roost and their feeding areas.

SECTION III

RECOMMENDATIONS

A. ENVIRONMENTAL. Little can be done to alter the environment to reduce bird attractants. No unique environmental factors contribute to the bird strike hazard on the range. Two recommendations are provided to protect against future bird population increases:

1. Dead Animal Removal on the Range. Dead animals (carrion) are the usual food source for vultures (reference 2). Using their keen eyesight to search for food, vultures also watch for other vultures circling and can quickly gather in large numbers when a dead animal is found. This attraction of large numbers of vultures to a single carcass creates the greatest risk of bird strikes on the range. If vultures begin circling over a specific location on the range, range activities should be stopped and the Range Control Officer (RCO) should investigate and remove any dead animals. If the vultures are actively feeding, they may be easily disturbed by anyone approaching and will fly off and circle nearby. After the carcass is removed, they will momentarily return to the area and then fly away. The RCO should have access to a shovel and a pair of rubber gloves to aid in picking up the carcass.

2. Insecticide Applications for Cattle Egret Control. When Cattle Egrets become a problem because they are feeding on insects, an insect control program should be started. The base Entomology Shop should be consulted regarding pesticide application. Proper application of pesticides will help control the insects, consequently reducing the number of birds using the range.

B. Active Control

1. Blackbird Roost Relocation. If a blackbird or Starling (Sturnus vulgaris) roost becomes established on Eglin AFB and near the range, the BASH Team should be contacted immediately so that arrangements can be made to relocate the roost. Roost relocation is a complex process which will require approximately one week to coordinate and a week to ten days to accomplish.

C. OPERATIONAL

When environmental modifications or active controls do not satisfactorily reduce bird hazards on the airfield, options must be considered for modifying the flying operation to reduce the risk of bird strikes. These operational changes will be dictated by the severity of the problem, the performance capability of the aircraft, and training or readiness requirements. Bird/aircraft strike hazards are like any other safety hazard which must be assessed with respect to operational requirements. Clearly, during contingency operations or advanced stages of readiness, bird hazards have little priority. However, during training to maintain an operational readiness, certain changes can be made to improve safety and reduce repair costs.

The BASH Team cannot provide all the possible changes which could be made in an operational unit to reduce bird hazards. A knowledge of unit operational and training requirements, combined with an understanding of local flying restrictions, is required to evaluate possible modifications to local procedures. For this reason, a Bird Hazard Working Group (BHWG) should be formed. The BHWG is composed of representatives from Flying Safety, the Director of Operations, Range Operations and Civil Engineering. These members work together to reduce the flying safety hazards associated with birds or other animals. The BHWG is the foundation for developing a bird control program. The following recommendations will aid in reducing bird hazards through modification of operational procedures.

1. Bird Hazard Working Group (BHWG). A BHWG should be created to review all aspects of the bird hazard problem and determine a course of action to implement a BASH program. In addition to following recommendations in this report, the group should review the local flying operation and determine what modifications could be made to reduce bird hazards and make pilots more aware of the hazards. The BHWG should:

- a. Define the local bird problem and recommend changes in procedures to avoid the birds.
- b. Develop a plan to implement avoidance procedures.
- c. Define responsibilities for various aspects of bird control.
- d. Inform aircrews of procedural changes to be initiated.
- e. Prepare briefings, posters, and other material for educating aircrews on bird strike hazards.
- f. Review and modify procedures and recommendations to improve the range's BASH program.
- g. Document BASH program requirements in local supplements to AFR 50-46.

2. BIRD WATCH. To inform pilots of bird densities which require temporary operational changes, the term BIRD WATCH should be used. Similar to a MET WATCH for weather, BIRD WATCH alerts aircrews to possible flight hazards due to increased bird activity. Pilots are then prepared to begin alternate procedures for bird avoidance as established by the BHWG.

Such procedures as holding high over the range until birds have dispersed, allowing only high altitude bombing, dive bombing instead of skip bombing, or high angle strafing in lieu of low angle strafing, may be considered appropriate for the particular threat.

Different bird densities may require varying degrees of caution. Incremental terms such as BIRD WATCH GREEN, YELLOW and RED may be useful in communicating to aircrews the changing nature of the bird hazards present. For example, BIRD WATCH Condition GREEN could denote normal operating conditions. BIRD WATCH Condition YELLOW may denote high bird densities in locations which represent a probable hazard to safe flying operations and specific procedures for avoidance should be implemented. BIRD WATCH Condition RED could mean that extremely high concentrations of birds are present on the range, posing an immediate hazard to aircraft. Procedures to divert or cancel range time will then be in effect until the bird dispersal team disperses the birds.

The RCO should be responsible for declaring BIRD WATCH conditions and advising aircrews of the condition when they report the Initial Point (IP) inbound to the target.

3. RCO Duties. The RCO is the key individual in the bird avoidance program. AFR 50-46 provides sufficient latitude to incorporate bird control and avoidance procedures in local supplements to the basic regulation. The RCO should be responsible for declaring BIRD WATCH, warning aircrews of bird locations on the range, reporting bird hazards to using agencies, making modifications or restrictions to ordnance delivery sequences to minimize the risk of bird strikes, and coordinating removal of bird attractants. The BHWG should clearly define the RCO's authority and responsibilities because his decisions in the interests of flying safety may result in an aborted mission.

4. Aircrew Duties. When vultures were observed on the range and soaring over the target areas, no aircrew radio communications were made to identify the bird hazard. When asked if the crews had seen the birds, some of the members of the flight acknowledged seeing the birds at their altitude. On one occasion, an F-4 had to perform an evasive maneuver to avoid hitting a vulture. In every case, the bird hazard was not relayed to the RCO or other aircraft in the flight. Radio transmissions identifying known bird hazards on the range are extremely important. Crews should call out bird to warn others in the flight, as well as inform the RCO so that he can take appropriate action.

5. Aircrew Mission Prebriefing. Low-level and range bird strikes with USAF fighter aircraft have resulted in the loss to date of 8 lives and 11 aircraft. Higher aircraft speeds and greater exposure within the birds' flight environment have also led to many damaging and injurious bird strikes. Many of these strikes occur at low level and bombing range entry points where pilots and weapons systems operators are involved in cockpit duties which cause crew members to reduce their eye contact outside of the cockpit. Greater emphasis must be placed on "heads-up" flying during these critical transitions. Checklist items should be accomplished to allow maximum eye contact outside of the cockpit.

In reviewing F-111 accidents where bird strikes have destroyed the aircraft and the crew has survived, certain factors are clear: wind blast, rapid deterioration of engine performance, failure of cockpit communications or personal injury have all resulted in disorientation and chaos. Briefing of bird strike emergency procedures before each flight may save an aircraft and its crew. An inflight bird strike is much like a takeoff emergency where urgency dictates a pre-planned course of action. As a minimum, pilots should brief or be briefed on the following:

- a. Wear of the double helmet visor during daylight hours, the clear visor at night.
- b. Loss of cockpit communications.
- c. Positive change in aircraft control.
- d. Action necessary if flocks of birds are encountered. A climb should be initiated since flocks are distributed in a downward direction in the airspace.
- e. Evasive maneuvers at low altitude.
- f. The need and procedures for a controllability check in the event of a damaged airframe.
- g. Engine failure procedures if birds are ingested.
- h. Aircraft recovery procedures and routes of recovery to be flown in the event cockpit communications are lost.
- i. Bail-out procedures under controllable flight conditions.
- j. Wingman procedures.

SECTION IV

CONCLUSION

Where no unique environmental attractants exist on the range, bird control depends upon operational changes. Eglin Range TA C-62 should not undergo land management changes without a thorough review of the possible impacts of such changes on wildlife populations. Seemingly simple changes in land use could significantly alter the bird populations on or near the range. The BASH Team can assist in reviewing any possible changes on this or other ranges.

Operational recommendations in this report are aimed at warning aircrews about the presence of birds on the range and providing operational procedures to avoid bird concentrations. RCO awareness of the bird hazards and willingness to take appropriate action are keys to reducing the bird hazards at the Eglin Range.

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2. Bent, Arthur C., Life Histories of North American Birds of Prey, Part 1, Dover Publications, New York, 1961.

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