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AN EVALUATION OF THE BIRD/AIRCRAFT STRIKE HAZARD AT BARKSDALE A--ETC(U)
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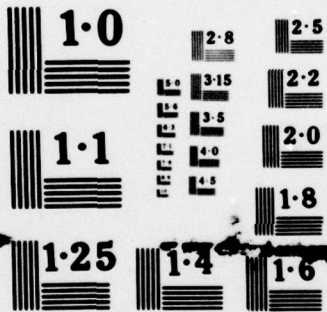
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AN EVALUATION OF THE BIRD/AIRCRAFT STRIKE HAZARD AT BARKSDALE AIR FORCE BASE, LOUISIANA (SAC)

JEFFREY I. SHORT, CAPT. USAF
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PREFACE

This study was performed under Program Element 91212 F, AFESC JON 00DEVN 11. Inclusive dates of the study were 31 January through 9 February 1979.

This report 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 for publication.

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SECTION I

SUMMARY OF OBSERVATIONS AND RECOMMENDATIONS

1. **Observation:** An organized system to delegate responsibility and authority for bird hazard reduction does not presently exist at Barksdale AFB, Louisiana.

Recommendation: Establish a Bird Hazard Working Group to prepare a Bird Hazard Reduction Program. The Group should have representatives from Civil Engineering, Flight Safety, and Airfield Operations and Management. It may function as part of the base's Air Traffic Control Board to suggest changes in policy affecting flight safety.

2. **Observation:** Large numbers of blackbirds roost on base near the sentry dog kennels during the winter. These birds cross the airfield at sunrise to feed west and south of Barksdale AFB. They return to the roost about sunset each day.

Recommendation: Make the site unsuitable for continued roosting by thinning the woods and brush at the present location. Active control using pyrotechnics and distress tapes may be required to complete the relocation.

3. **Observation:** In its present condition, the airfield grass allows feeding and loafing by many blackbirds.

Recommendation: The final cutting of grass each year should be no shorter than 15 centimeters (6 inches) to discourage blackbird flocks from using the airfield during the winter. The airfield should be managed to promote the growth of Bermuda grass.

4. **Observation:** Cattle Egrets eat insects on the airfield during the summer months, especially during hay cutting operations. A Cattle Egret rookery has been established on base at Flag Lake.

Recommendation: The airfield grass should be cut short in late spring and an insecticide applied to reduce the food source. Removal of standing water will also discourage Cattle Egrets from using the airfield. The Rookery at Flag Lake should be removed as a last resort.

5. **Observation:** Base stables near the departure end of Runway 32 attract blackbirds and provide an insect food source for birds during the summer.

Recommendation. The stables should be moved to a new location, e.g., near the 8th Air Force transmitter site west of Flag Lake. If this alternative is not feasible, manure should be removed from the stable as quickly as possible.

6. Observation: Standing water near the active runway attracts birds and provides mosquitoes with breeding areas.

Recommendation: After heavy rains portions of the airfield with standing water should be marked and later leveled and seeded with Bermuda grass. Drainage channels should be reditched (especially on the southeast side of the airfield) to facilitate run-off.

7. Observation: Persistent flocks of birds on the airfield present an immediate hazard and should be dispersed.

Recommendation: Active control with pyrotechnics, bioacoustics and live ammunition may be necessary to scare birds from the airfield and relocate blackbird roosts. The base should procure the equipment necessary to control on base bird hazards. Proper safety training of personnel for using bird control equipment is essential.

8. Observation: Flight Safety Officers have carried out an aggressive BASH reduction program on Barksdale AFB by identifying local hazards and issuing safety reminders.

Recommendation: All pilots should become more aware of bird hazards in the local area and on low-level routes. When large bird flocks cross the airfield, aircraft departures should be postponed until the flock has passed.

9. Observation: An operational method of warning pilots about bird hazards in the local areas has not been prepared. Tower personnel are usually in the best position to observe bird movements and their expertise should be used to the fullest.

Recommendation: A BIRD WATCH (similar to a METWATCH) system for Control Tower personnel to relay information about bird movements and concentrations to pilots should be designed. The terms used should be incremental to reflect increasing bird hazards.

10. Observation: Pigeon droppings in hangars create unsanitary working conditions and damage equipment. Pigeon flocks fly across the airfield creating a bird strike hazard.

Recommendation: Shoot the pigeons; this is most effective method of eliminating pigeons in this region. Pest Management and maintenance supervisors should coordinate hangar shootings during a period when there are no aircraft in the hanger.

SECTION II

INTRODUCTION

Barksdale AFB is located on the edge of Bossier City, Louisiana, approximately 3.2 kilometers (two miles) across the Red River from Shreveport, LA. The base covers an area of 9,300 hectares (23,000 acres). Aircraft assigned to the base include the B-52, KC-135, A-37, and the T-38. The host unit is the Second Bombardment Wing, whose mission is to develop and maintain the capability to conduct long range bombardment operations including air refueling support operations.

This survey was requested by HQ SAC to evaluate the current Bird/Aircraft Strike Hazard (BASH) reduction program at Barksdale AFB for its effectiveness. Various environmental factors such as vegetation, insect populations, and land use were analyzed to determine their effect on bird populations at the base.

Recommendations in this report for habitat modification, active control and flying operation changes are designed to reduce bird hazards in the airfield and on missions. Recommendations for each section in this report are listed in order of importance, i.e., if lack of manpower or funds delays implementation, subsequent recommendations should be accomplished in the order listed as resources become available.

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SECTION III

RECOMMENDATIONS FOR BIRD HAZARD REDUCTION

A. Bird Hazard Reduction Plan and Working Group

Effective compliance with AFR 127-15 requires an organized program for bird hazard reduction. A Bird Hazard Reduction Plan is necessary to provide continuity to the program and document reasons for habitat modifications, active control and operational changes to airfields. This plan should familiarize new personnel with local bird problems and corrective actions for dealing with them. A sample plan used successfully by another base is provided in this report (Appendix A). The Bird Hazard Reduction Plan should be drafted by a Bird Hazard Working Group (BHWG) which usually is composed of members from Flying Safety, Director of Operations, Flight Facilities, Base Operations and Civil Engineering. The BHWG should review all aspects of the bird hazard program. In addition to implementing recommendations in this report, the BHWG should periodically review the local flying operations and determine necessary modifications that would reduce bird hazards and make pilots more aware of the hazards. The BHWG should:

1. Define the local bird problem and identify possible changes in procedures to avoid the birds.
2. Develop the Bird Hazard Reduction Plan to carry out avoidance activities. The plan can be in the form of a supplement to AFR 127-15 or Operating Instructions.
3. Define responsibilities (OPRs) for the various aspects of bird hazard reduction.
4. Inform aircrews of procedural changes to be initiated.
5. Prepare briefings, posters, etc., for educating aircrews on bird strike hazards.
6. Continually review and modify procedures and recommendations to improve the base's BASH program.

The BHWG need not be a separate group that would increase workloads with meetings and reports. Ideally, the BHWG should be a subcommittee of an existing group such as the Air Traffic Control Board or the Integrated Safety Council. The BASH problem can be treated as an open agenda item, with the BHWG resolving problems concerning implementation of these recommendations in addition to developing and overseeing

the BASH program for the base. The BHWG acts as the primary contact between the base and other organizations regarding bird hazard reduction.

B. Habitat Modification

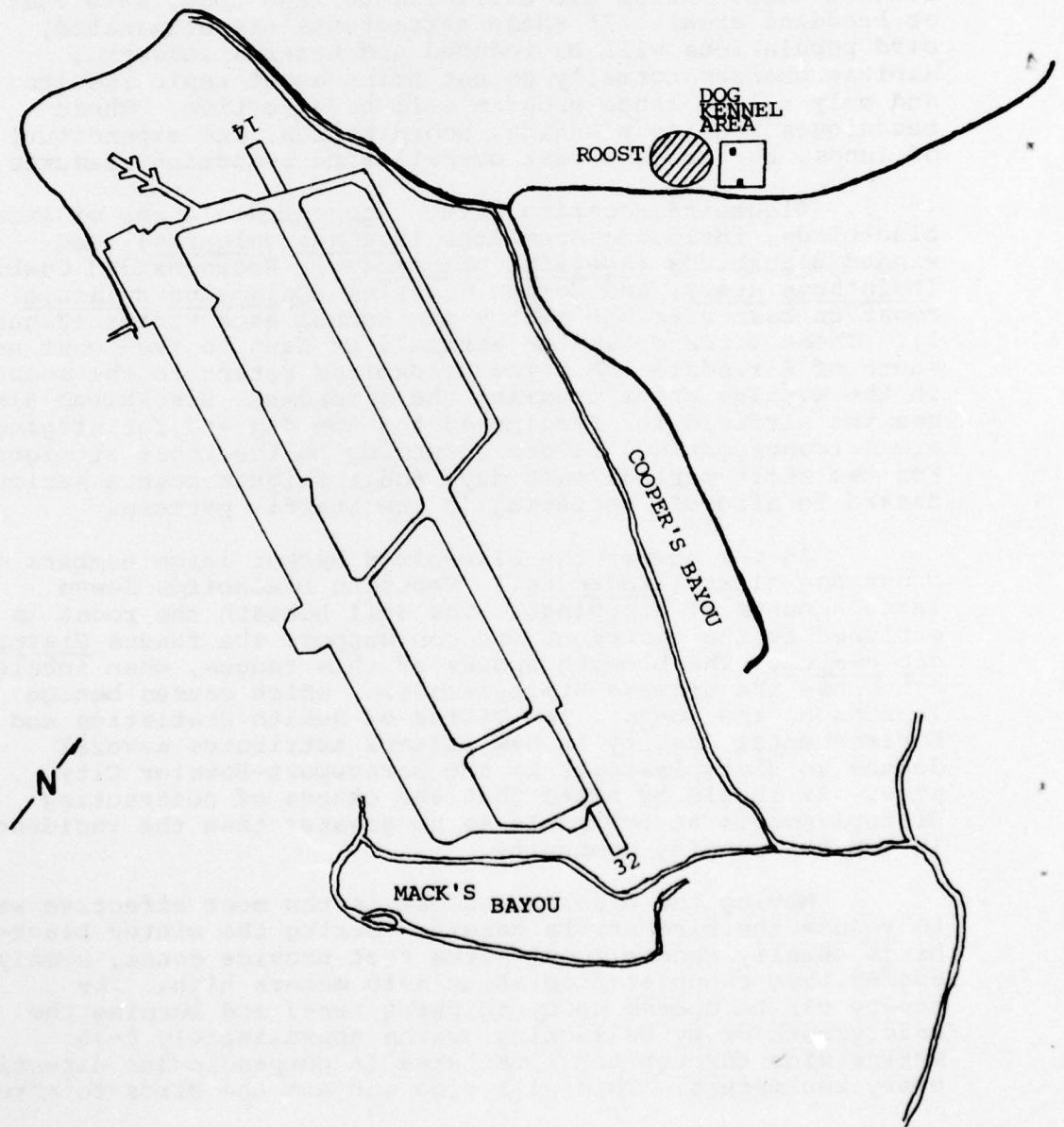
The most effective means of reducing bird populations around airfields is to eliminate those conditions which attract them. Birds use airfields to find food, safe rest or breeding areas. If these attractants are eliminated, bird populations will be reduced and hazards lessened. Habitat changes normally do not bring about rapid results, and only a long range program will be effective. These techniques require planning, coordination, and expenditure of funds, but are the best overall bird reduction measures.

1. Blackbird Roosting Site. Approximately one million blackbirds, including Starlings (Sturnus vulgaris), Red-winged Blackbirds (Agelaius phoeniceus), Brown-headed Cowbirds (Molothrus ater), and Common Grackles (Quiscalus quiscula), roost on base near the sentry dog kennel each winter (Figure 1). These birds cross the airfield at dawn to feed west and south of Barksdale AFB. The blackbirds return to the roost in the evening after crossing the airdrome. Blackbirds also use the airfield for feeding during the day and for staging areas (congregating) before returning to the roost at night. For two short periods each day, their flights pose a serious hazard to aircraft operating in the traffic pattern.

In the summer the blackbirds harbor large numbers of brown dog ticks (Ixodes sp.) Roosting blackbirds leave large amounts of droppings. The soil beneath the roost is enriched by the excrement and can support the fungus Histoplasma capsulatum. The blowing spores of this fungus, when inhaled, can cause the disease Histoplasmosis, which causes benign lesions on the lungs. The Office of Health Statistics and Environmental Quality in New Orleans attributes several deaths to Histoplasmosis in the Shreveport-Bossier City area. It should be noted that the chance of contracting Histoplasmosis at Barksdale is no greater than the incidence in the surrounding community.

Moving the blackbird roost is the most effective way to reduce the bird strike hazard. During the winter blackbirds usually choose roost sites that provide dense, evenly spaced tree canopies from about 5-10 meters high. The canopy can be opened up by thinning trees and burning the undergrowth or by bulldozing swaths approximately 5-10 meters wide through the roost area in perpendicular directions every ten meters. This will also subject the birds to more

FIGURE 1
BARKSDALE AIR FORCE BASE AIRFIELD



physiological stress and the roost should move or break up. It is unlikely that the roost would move to a location closer to the airdrome.

Since H. capsulatum fungus often extends down into the soil as much as six inches, personnel engaged in the bulldozing site should wear fitted respirators with biological filters during the operation. Guards at the sentry dog kennels and the munitions dump should spend as little time outside as possible without masks. Entry into the roost site should be restricted for at least one month after the soil is disturbed. A hot ground fire with little updraft can successfully destroy the spores.

2. Airfield Turf Management: Airfield grass control is currently accomplished through a hay cutting contract. Grass heights on the airfield are now kept relatively short during the winter, however, taller weed remnants provide perching sites for birds. The grass is allowed to grow to 36 inches (90 centimeters) in the summer in support of the hay mowing contract. The composition of the grass on the airfield is primarily Bermuda grass (Cynodon dactylon) mixed with Johnson grass (Sorghum halepense). Johnson grass typically produces long stems which degrades the quality of the turf and hay.

The hay cutting contract should be purchased for a period of at least five years. This will give the purchaser incentive to add fertilizer or treat with herbicides to improve the quality of the turf. These improvements could be credited toward the lease payment in lieu of cash. Johnson grass should be eliminated with a contact herbicide. The herbicide can be applied by soaking it into a rope, mounting the rope on a vehicle at a height that would only touch the taller Johnson grass stems, and driving across the airfield. The contract should also require the last grass cutting each year to be a minimum of six inches (15 cm) so that it will grow to a height of 8-12 inches for the winter. Hay cutting on weekends or during periods of reduced operations also can reduce the bird hazards to aircraft operating at Barksdale AFB.

Controlling grass height is one of the most effective techniques for reducing airfield attractiveness to birds (Reference 2). Flocking birds, such as Starlings, use airfields as secure areas to loaf and feed. Short grass allows birds to see each other to maintain flock integrity and to see predators at a great distance. Short grass also makes feeding easier since invertebrates are exposed and readily available to the birds. Long grass obscures the

birds' visibility making them less secure and making food more difficult to find. Statistically, long grass not only reduces the number of birds by at least half, but also reduces the frequency of occurrence.

3. Cattle Egret Control: Cattle Egrets (Bubulcus ibis) frequently follow hay mowers to feed on insects that are disturbed. This can present a hazard to flight operations as birds cross the airfield. When large numbers of Cattle Egrets are attracted, the birds should be dispersed with pyrotechnics (discussed later in this report). The Cattle Egrets have established a rookery at Flag Lake. If the birds become a severe flight hazard, moving the rookery by thinning trees at Flag Lake may be necessary. This would require prior coordination with appropriate state and federal wildlife agencies.

4. Food Control. Easy access to food on and near airfields is a strong bird attractant. The base horse stable and pasture north of the airfield attract mixed flocks of blackbirds in the winter, and the manure supports insects during the summer. To reduce the attractiveness of the stable area to birds, all animal droppings should be quickly removed from this site at all times. An alternative site for the stables away from the airdrome should be developed. An excellent location would be the 8th Air Force transmitter site on the west side of Flag Lake.

5. Standing Water. Birds are attracted to standing water on the airfield and the invertebrates that breed and live near water. Low areas with standing water are difficult to mow, and uncontrolled plant growth can provide additional habitat for birds. At Barksdale AFB the southeast side of the airfield has the poorest drainage. After heavy rains, portions of the airfield with standing water should be marked. Later, these low areas can be filled, leveled and reseeded with Bermuda grass. Drainage channels should be reditched to improve run-off and banks sloped to allow easy grass mowing.

C. Active Bird Control

Despite changes to the airfield, birds will continue to use the airdrome environment. Active bird control is needed for short-term solutions to bird hazards. Birds move quickly and unpredictably and even when situated in a "safe" portion of the airfield, can become a hazard at any time. The birds may also act as decoys, attracting others. For these reasons, all bird flocks should be dispersed immediately after they come to the airfield. Birds are persistent and require

constant harassment to discourage their use of the airfield. Coordination with the Control Tower is required before any birds are dispersed from the airfield. This will prevent scaring birds into the path of airborne aircraft. A variety of equipment has been authorized for active bird control in Table of Allowances 483 (Appendix B). Scaring birds will involve a vehicle, radio communication with the Control Tower, bioacoustics equipment, and pyrotechnics.

Responsibilities for active bird control must be delegated by the BHWG. At most bases, bird control is under the authority of Airfield Management with Base Operations personnel providing most of the manpower. Personnel from Security Police and the Fire Department may also be used as the situation dictates.

A vehicle must be made available for bird dispersal. Since driving off paved surfaces may be required, four-wheel-drive is essential (open tread tires will prevent foreign objects from adhering). When pyrotechnics are used, a sign, "Class B Explosives", must be displayed on each side of the vehicle during their transport from munitions storage to the airfield. Two fire extinguishers are required in the vehicle by AFR 127-100 when transporting pyrotechnics.

1. Bioacoustics. Bioacoustics are a bird control system using recordings of distress calls emitted by birds under stress. A speaker is mounted on a vehicle containing sound equipment capable of producing 30 to 50 watts of distortion-free sound in 90 to 110 dB with a frequency response of 14,000 HZ. In operation, the vehicle is driven 100 to 150 meters upwind of the birds and stopped with the speaker pointed toward the birds. The operator identifies the birds and selects the proper tape. Proper identification is important because distress calls are specific for each species, i.e., what is effective on Red-winged Blackbirds may not work for Grackles. The distress calls are played for 15 to 20 seconds and shut off. If the birds have not moved within 20 seconds, a second playing of the same duration should be used. If the birds have not moved by the third attempt, it is unlikely that they can be moved with this method. Do not allow the tape to continue playing indefinitely. Birds may become habituated, and the calls will be ineffective. When birds react to distress calls, they frequently fly toward the vehicle to investigate the "injured" bird. At this time pyrotechnics may be used to hasten the birds' dispersal and control their direction of flight. Using pyrotechnics earlier may confuse birds and cause them to remain near the airfields longer. Distress tapes require some time to remove birds, and this method is the most

useful during breaks in flying and before flying operations begin each day. Cattle Egrets do not emit distress sounds that will disperse flocks.

2. Pyrotechnics. Pyrotechnics are noise producing devices which are extremely effective for scaring birds. They include M-74 simulated airbursts, 12 gauge scare cartridges, and gas cannons. The only pyrotechnics presently approved for permanent use by the Air Force are gas cannons and airbursts. The Pest Management section at Barksdale AFB has several gas cannons in good working order. The M-74 airburst is fired from the M-1 flare pistol; the scare cartridges are fired from a single shot, breakopen, 12 gauge shotgun. Pyrotechnics are explosive projectiles which travel about 100 meters before a secondary explosion occurs. To be most effective, airbursts should be exploded above flocks on the ground on the side opposite the desired direction of the birds' departure. Ear protectors, gloves and goggles are required when using any pyrotechnic device. Pyrotechnics must never be fired towards aircraft, and Security Police and Control Tower personnel must be contacted before their use. Training in the use of pyrotechnics is necessary for each person involved in scaring birds. Such training is provided by the NCOIC for Small Arms. A sample of the Safety Operating Instructions for handling pyrotechnics is provided in this report (Appendix C). This sample must be modified for use by individual bases.

3. Depredation. In order to keep birds from becoming habituated to scaring techniques, reinforcement may be necessary by depredation. With the bird control equipment available, killing should be minimal. All birds with the exception of House Sparrows (Passer domesticus), Pigeons or Rock Doves (Columba livia) and Starlings are protected. A federal depredation permit is required before taking any protected species on air bases. These permits are available through the U.S. Fish and Wildlife Service. Annual reports at the regional U.S. Fish and Wildlife Service must be filed that account for the species and numbers of protected birds killed.

D. Flight Operation Changes to Reduce Bird Strikes

When environmental modifications and active control measures do not satisfactorily reduce bird hazards on the airfield, options must be considered for modifying flying operations 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 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 safety priority. However, during training to maintain operational readiness, certain changes can be made to improve safety and reduce costly repairs.

The BASH Team cannot provide all the possible operational 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.

The BHWG forms the foundation for developing a bird control program. The following recommendations will aid in reducing bird hazards through modification of operational procedures. Many of the recommendations will apply to the bird hazard reduction at any base.

1. Mission Aborts Due to Bird Strikes. Abort a takeoff or planned touch-and-go if a bird strike occurs and sufficient runway remains to stop. Bird strike damage cannot be accurately assessed inflight and may result in a complex airborne emergency. Damage assessments can only be made by maintenance personnel. Several bird strikes which appeared to cause minor damage have proven to be much more substantial and, had the pilots continued the mission, a serious emergency would have resulted. Structural damage, such as a dent in the wing, has led to fuel and hydraulic system failures.

2. Takeoff Procedures. Aircraft making formation departures, such as the A-37, increase their risk of damaging bird strikes when birds are feeding or loafing on and near the runway. This situation can be avoided by making single-ship departures and by using active control to scare off the birds before formation departures. Wing and interval takeoffs with the wingman taking six to ten second spacing often result in birds being scared up by the lead aircraft. The wingman then hits the birds. Pilots of lead aircraft must be alert and warn wingmen of bird hazards during takeoff roll. Wingmen may abort the formation takeoff if flocks of birds hit the wingman's aircraft. This is especially important for wing takeoffs where all of the wingman's concentration is on his leader and he is unaware of the size of the bird hit or its impact location. If large flocks of birds are scared up by the lead aircraft, his wingmen may want to delay their departure until the birds are clear of the runway.

3. Migratory Bird Problems. When flocks of migratory birds are a problem, aircraft formation departures involving

rejoins after takeoff increase the risk of serious bird strikes. Turning and straight-ahead rejoins require greater attention by pilots to the lead aircraft's position. Pilots cannot adequately clear for birds while simultaneously attempting to join on lead's wing. The increased speed necessary to overtake the lead aircraft after takeoff further increases the risk of damaging bird strikes. When birds are known to be flying in the area, departures under visual meteorological conditions may require modification to reduce the risks. Departures should be made in trail, with the rejoin beginning after the aircraft pass 2000 to 3000 feet AGL. If aircraft are to immediately enter a low level route or stay at an intermediate altitude for a prolonged period of time, a tactical formation is advised, providing sufficient aircraft clearance to allow wingmen to clear for birds. Where weather is a factor, wing takeoffs are preferred, realizing that many bird strikes occur just before entering a low overcast or immediately above an undercast sky condition.

4. Enroute Bird Strikes. Aircrews experiencing enroute bird strikes should abort the mission, and should land as soon as possible. While an engine ingestion or a canopy strike may be readily apparent from the cockpit, many fuselage, wing, tail or radome strikes cannot be adequately assessed for damage. Continuing a mission may result in greater structural damage and an emergency situation later in the flight.

5. Checklist Procedures and Pre-briefings. When flying low-level routes higher aircraft speed and greater exposure within the bird's flight environment have led to many damaging and injurious bird strikes. Many of these strikes occur at low level and bombing range entry points. Pilots and weapons systems operators are then involved in cockpit duties which cause crewmembers to reduce their eye contact outside of the cockpit. Greater emphasis needs to be placed on "heads-up" flying during these critical transitions. Checklist items should be accomplished in such a manner as to allow for maximum eye contact outside of the cockpit. Briefings of bird strike emergency procedures before each flight may save an airplane 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:

(1) Wear the double helmet visor down during daylight hours, the clear visor at night or during low level operations.

(2) Lost cockpit communications.

(3) Positive change in aircraft control between pilot and copilot.

(4) If flocks of birds are encountered, initiate a climb since most flocks are distributed in a downward direction in the air space.

(5) Evasive maneuvers at low altitude.

(6) The need and procedures for a controllability check in the event of a damaged airframe.

(7) Engine failure procedures if birds are ingested.

(8) Aircraft recovery procedures and routes of flight to return to base with a minimum of cockpit communication.

(9) Locking of shoulder harnesses of injured crewmembers to prevent falling forward onto flight controls.

(10) Crew egress procedures in the event that control cannot be maintained.

The aircrew's ability to react to a bird strike situation is further enhanced by briefing bird strike procedures during continuation training and safety meetings.

6. Inform Transient Aircrews of Local Bird Hazards. Transient crews are often unfamiliar with airfield hazards, including birds. This conclusion is supported by the facts that many bird strikes happen away from the home base and at some bases the most damaging bird strike incidents happen to transient aircraft. Information in the "Remarks" section of the FLIP IFR Enroute Supplement, use of NOTAMs, and broadcasting information on either Automatic Terminal Information Service (ATIS) or on initial radio contact can aid in informing the aircrew of potential bird hazards. Remarks in the IFR Enroute Supplement can explain procedures for BIRD WATCH (defined later in this report), NOTAMs can identify problems of long duration (migration, bird roosts, heavy feeding on the airfield, control measures being used, etc.), and broadcasts on ATIS and from the Tower can provide information of an immediate nature.

7. Pilot Responsibility. Pilots must share the responsibility for detecting birds on the airfield and in the local flying vicinity. When pilots sight birds they should notify other pilots and the Control Tower so others can be aware of

the hazard. Pilots can also help base personnel become aware of bird hazards by requesting bird hazard information from the Tower before takeoff or landing. These requests will remind Air Traffic Controllers to inspect for birds before authorizing aircraft movement.

8. Bird Hazard Warning Systems. Bird concentrations both in the local area and in regions where low-level sorties are flown should be tracked and pilots should be briefed on the potential hazards they may face on a particular mission. Several systems may facilitate these briefings.

(1) High Bird Risk Areas. Preflight safety briefings should include mapped information about potential bird problems in these areas. In addition to the information already posted on these maps, high bird concentrations could also be plotted to give aircrews an easily viewed warning of the potential hazards. For example, the 917 TFG at Barksdale AFB currently uses maps depicting Turkey Vulture concentrations to familiarize aircrews with the problem.

(2) BIRD WATCH. To assist in informing pilots of bird activities in the local area which require operational changes, the term BIRD WATCH should be used. Similar to a MET WATCH for severe weather, BIRD WATCH alerts aircrews to possible flight hazards due to increased bird activity. BIRD WATCH conditions should be incremental to reflect varying degrees of bird hazards. For example, BIRD WATCH RED would exist when blackbirds leave their roost in the morning and cross the airfield, BIRD WATCH YELLOW could signify Cattle Egrets near runways, and BIRD WATCH GREEN would indicate no unusual bird activity in the airdrome. Operational changes for each BIRD WATCH condition would be defined by the BHWG. BIRD WATCH could be declared by the Chief Controller, Supervisor of Flying or Air Traffic Control personnel. Pilots flying in the local area should be encouraged to use BIRD WATCH terminology to inform other pilots about bird hazards in the traffic pattern.

D. Pest Bird Reduction

Pest birds inhabit hangars and storage buildings at Barksdale AFB. The most common problem species are the pigeon and House Sparrow. Their droppings are caustic to equipment and aircraft and result in many wasted man-hours involved in otherwise unnecessary cleanup. An unaesthetic, unsanitary working environment is also detrimental to the morale of hangar personnel.

Documentation is necessary to justify pest bird control programs. The number of man-hours used cleaning up

bird droppings must be recorded. Pest bird control must be justified on a cost-effective basis or a recognized health hazard before any program can be initiated. Different methods can be used with varying degrees of cost effectiveness.

Several techniques for pest bird control have been tried without success. Each method may be effective for a few days, but birds soon become habituated, and the techniques become useless. Stuffed owls, rotating and flashing lights, rubber snakes and various sounds are examples of some ineffective techniques. Before any method is tried, the BASH team should be consulted.

The most effective and permanent solution to the pest bird problem is to exclude the birds from the building superstructure. It is not feasible to keep all doors to hangars closed, but two methods have been effective in keeping birds from roosting in large buildings. The most permanent solution to the problem is a plastic netting (Conwed plastic netting, OV1670 and OV1580, made in Minneapolis, Minnesota) used to establish a barrier to the hangar superstructures and denies birds access to roosting perches. Conwed netting meets Air Force fire protection standards. Several chemical repellents are also available which can be spread on the hangar superstructures. These chemicals resemble a sticky gel and give birds a chemical "hot foot". One of the chemicals, Roost-No-More, has a national stock number, NSN 6840-559-1550. Both physical exclusion and chemical repellents are expensive programs and must be justified on a cost-effective basis by man-hour documentation. The BASH Team has conducted an evaluation of commercial bird repellents. The results of this study are available upon request.

A practical short-term solution to the problem is a trapping program to be carried out by Pest Management personnel. Plans for trap construction are included in this report (Appendix D). Pigeons and House Sparrows spend time on hangar roofs, making these locations ideal trapping areas. Before trapping, pre-bait with corn for at least two weeks. Every morning place fresh bait near traps, but not inside them. Remove excess grain not consumed each day. After the birds begin feeding heavily in the area, place corn and water inside the trap. Remove trapped birds early in the morning and late in the afternoon and add fresh bait and water. Remove any bait not consumed from the previous day. Leave one or two healthy birds in the trap each day to act as decoys. Continue the trapping program until there is no longer a significant number of birds being caught. Pest birds including Pigeons, House Sparrows and Starlings are not

protected, and any humane means of disposal is legal.
Dispose of the birds as directed by the Base Veterinarian.

Pigeon numbers can be reduced by chasing the birds from the hangars and shooting them with shotguns as they fly out of the buildings. Number 6 bird shot should be used. This program creates safety problems, and considerable planning and coordination are necessary before using this method of pigeon control. Carried out over several days, shooting the birds will reduce the pigeon numbers. Careful use of pellet guns to shoot birds inside hangars also effectively reduces bird numbers. This is not a permanent solution; new pigeons will replace those shot, and the population will grow back to its original size. However, it may be the most practical solution for the pigeon problem at Barksdale AFB.

APPENDIX A
SAMPLE BIRD HAZARD REDUCTION PLAN

HEADQUARTERS

56TH TACTICAL FIGHTER WING

MACDILL AFB, FLORIDA



56 TFW PLAN 127-15
BIRD AIRCRAFT STRIKE HAZARD
30 JULY 1978

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 56TH TACTICAL FIGHTER WING (TAC)
MACDILL AIR FORCE BASE FLORIDA 33608

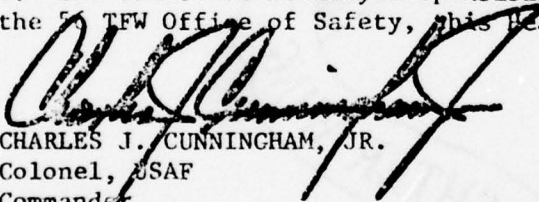


REPLY TO
ATTN OF SE

SUBJECT 56 TFW Plan 127-15 Bird Aircraft Strike Hazard

to See Distribution (ANNEX Z)

1. Forwarded herewith is the 56 TFW Plan 127-15 which provides guidance for reducing the bird strike hazard in the areas where the 56 TFW conducts flying operations.
2. This plan is effective for planning on receipt and for execution when directed by this Headquarters.
3. This plan was coordinated with all tasked organizations.
4. Tasked organizations will develop necessary checklists for implementation. Supporting plans are not required.
5. This plan will be reviewed as of 30 July each year and updated as appropriate. Tasked organizations will review this plan 30 days prior to that date and forward comments to 56 TFW/SEF by 30 July.
6. The Office of Primary Responsibility (OPR) for this plan is the 56 TFW Office of Safety, this Headquarters.


CHARLES J. CUNNINGHAM, JR.
Colonel, USAF
Commander

HEADQUARTERS 56TH TACTICAL FIGHTER WING
MACDILL AFB, FLORIDA 33608
30 JULY 1978

56 TFW PLAN 127-15

SECURITY INSTRUCTIONS/RECORD OF CHANGES/ANNUAL REVIEW

1. The long title of this plan is 56 Tactical Fighter Wing Bird Aircraft Strike Hazard Plan 127-15. The short title is 56 TFW BASH Plan.
2. The overall classification of this document is UNCLASSIFIED.
3. Reproduction of this document in whole or in part is prohibited except as required for preparation of supporting directives, operating instructions or checklists.

RECORD OF CHANGES

CHANGE NUMBER	DATE	DATE POSTED	POSTED BY

RECORD OF ANNUAL REVIEW

REVIEWED BY	DATE REVIEWED	REMARKS

HEADQUARTERS 56TH TACTICAL FIGHTER WING
MACDILL AFB, FLORIDA 33608
30 JULY 1978

56 TFW PLAN 127-15
PLAN SUMMARY

1. PURPOSE: To provide a base program designed to minimize aircraft exposure to potentially hazardous bird strikes where the 56 TFW conducts flying operations.

2. CONDITIONS FOR EXECUTION: This plan is based on hazards from both indigenous bird populations and seasonal bird migration. Implementation of specific portions of the Plan are continuous, while other portions require implementation as dictated by bird activity.

3. OPERATIONS TO BE CONDUCTED:

a. Specific Operations Include:

- (1) The establishment of a Bird Hazard Working Group.
- (2) Procedures for reporting hazardous bird activity and altering/discontinuing flying operations.
- (3) Provisions to provide information to all assigned aircrews and transient aircrews on specific bird hazards and procedures for avoidance.
- (4) Actions to eliminate/reduce environmental factors which attract birds to the airfield.

b. Organizations Tasked: As listed in ANNEX A

c. Supporting Plans not required.

56 TFW PLAN 127-15
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OPR: 56 TFW/SE

HEADQUARTERS 56TH TACTICAL FIGHTER WING
MACDILL AFB, FLORIDA 33608
30 JULY 1978

56 TFW PLAN 127-15 - BIRD AIRCRAFT STRIKE HAZARD
BASIC PLAN

REFERENCES: AFR 127-15
BASH Survey
Other (Reports, letters and supportive material provided
by competent biologists or wildlife managers)

TASK ORGANIZATION: ANNEX A

1. SITUATION:

a. GENERAL. This Plan establishes an overall bird control program for MacDill Air Force Base and is designed to minimize aircraft exposure to potentially hazardous bird strikes or strikes with terrestrial animals. The hazards to safe flying operations posed by birds are so varied that no single solution to the bird strike problem exists. This Plan is designed to:

- (1) Establish a Bird Aircraft Hazard Working Group.
- (2) Establish procedures to identify and to communicate high hazard situations to aircrews and supervisors to determine if altering/discontinuing flying operations is required.
- (3) Determine aircraft and airfield operating procedures to avoid high hazard situations.
- (4) Provide for dissemination of information to all assigned aircrews and transient aircrews on specific bird hazards and procedures for avoidance.
- (5) Decrease the attractiveness of the airfield to birds by eliminating, controlling or reducing environmental factors which support the birds.

b. AIRFIELD/LOCAL AREA. MacDill AFB occupies 5620 acres in Hillsborough County, Florida, and is located on a natural peninsula between old and new Tampa Bays. The mean elevation of the base is 13 feet above Mean Sea Level (MSL). MacDill AFB is drained into several natural creeks, drainage ditches and by tidal action. There are approximately 890 acres of undeveloped land on MacDill AFB most of which is on the south side of the base complex. The underdeveloped land mainly consists of Red, Black, and White Mangrove with a small proportion being planted Pine with varied understory, mature Pine with mixed understory of Pine, Grass, Pine Brush, Scrub Oak and Palmetto.

The southwestern portion of the base is being invaded by Florida Pepper and mixed brush. The area adjacent to the runway consists of a mix of Florida grasses where closely maintained. The infield area which is only periodically maintained is being invaded by Dog Fennel, Ragweed, Sesbania and some brush, consisting of Wax Myrtle, Florida Pepper, Willow and Scrub Oak. In addition, there is a 13 acre borrow pit which has been turned into a pond located just north of the field boundary adjacent to the runway and a sanitary landfill 8500 feet southeast of the runway. The Mangroves, wooded areas, pond and grasslands surrounding the airfield and the landfill provide a large variety of habitats capable of supporting birds hazardous to aircraft. In particular, the pond is attracting waterfowl; the landfill, seagulls, and the invasion by uplands vegetation is attracting upland species which have become permanent residents of the area. More specific hazards are listed in ANNEX C.

c. ENROUTE/LOW LEVEL FLYING AREAS. Aircraft flying out of MacDill generally use southern Florida as the primary enroute and low level flying area. This area has many features which attract a variety of birds from migratory waterfowl through upland species, to shore birds. The two most hazardous species being the raptors (vultures) and the migratory waterfowl. Specific enroute hazards are outlined in ANNEX C.

d. AVON PARK GUNNERY RANGE. Avon Park occupies 107,000 acres of land in Polk and Highlands counties in central Florida and most of the area is typically Southern Florida flatwoods comprised of nearly level sandy flatlands interspersed with small swamps and wet grasslands. Other parts of the area are fragmental remains of a relatively high sand ridge consisting of droughty sands interspersed with small, poorly drained areas and few ponds. The flatwoods represent approximately 57,000 acres of the area. Of this, 27,000 acres have been reforested with slash pine, starting in 1965. Plantations were established in various sized blocks and are distributed throughout the type. Approximately 4,000 acres of this type are stocked with natural stands of slash pine of 30-50 years of age. The remaining area is essentially unstocked, with saw palmetto, gallberry, and native grasses comprising the majority of the cover. Approximately 20,000 acres of small swamps and wet grasslands are interspersed throughout the flatwoods type. These areas vary considerably in size and vegetation, from open ponds with marsh grasses; dense hardwood swamps with various species of gums, bays, ash and maple; pond and bald cypress stands of varying ages; and two extensive marshes, one of approximately 3200 acres located along the southwest boundry of the installation, the other approximately 2800 acres located along the southeast boundry. The sand ridge area comprises 9400 acres, oriented north-south in the center of the installation. This type is made up of sand pine of 10-40 years of age in dense stands, open scrub oak associations with scattered long leaf pine, and long leaf pine stands, 40-60 years old. The terrain in and around Avon Park provides an abundant variety of habitats for birds that are hazardous to aircraft. Specifics are outlined in ANNEX C.

3. EXECUTION:

a. CONCEPT OF OPERATIONS:

(1) Overall OPR and monitor for the implementation of this Plan is the 56 TFW Office of Safety.

(2) Bird Aircraft Hazard Working Group.

(a) Function. Review data on bird strikes, identify and initiate actions to reduce hazards, review and implement changes in operational procedures, prepare informational programs for aircrews.

(b) Authority. The BASH Working Group submits all efforts to the operational commander for approval. Implementation is through normal chain of command.

(c) Composition. The chairman, as appointed by the Commander, will be the 56TFW Vice Commander. As a minimum, the group will consist of a representative from Current Operations, Standardization/Evaluation, Flight Safety, Airfield Management, Civil Engineering, the flying organizations and representatives from other Task Organizations (ANNEX A) as required.

(d) Meeting Schedule. Quarterly.

(3) Operating Procedures. (As defined by the BASH Working Group and approved by the Commander of Higher Headquarters as appropriate).

b. TASKS: ANNEX B outlines the general and continuing tasks and responsibilities for each organization. ANNEX C lists specific tasks to counter hazards that are discovered and will remain in effect only until the hazard is removed or reduced sufficiently as determined by the seasonal nature of the hazard or by the BASH Working Group.

ANNEXES:

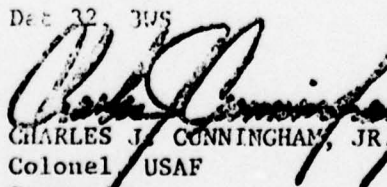
- A - Task Organization
- B - Tasks and Responsibilities
- C - Operations
- Q - Maps and Charts
- R - Reports and Forms
- S - Bird Hazard Warning System, Operation Birdwatch
- Z - Distribution


CHARLES J. CUNNINGHAM, JR.,
Colonel, USAF
Commander

HEADQUARTERS 56TH TACTICAL FIGHTER WING
MACDILL AFB, FLORIDA 33608
30 JULY 1978

ANNEX A TO 56 TFW PLAN 127-15
TASK ORGANIZATION

<u>ORGANIZATION</u>	<u>COMMANDER</u>
56 TFW	Commander
56TFW/DO	Deputy Commander
56 TFW/MA	Deputy Commander
56TFW/SE	Chief
56TFW/OI	Chief
USAF Regional Hospital	Commander
56CSG/DE	Chief
56CSG/SV	Chief
56CSG/DC	Chief
56CSG/OTM	Chief
56CSG/SS	Chief
56CSG/SP	Chief
1928CG/FFA	Chief
13TFTS	Commander
61TFS	Commander
62TFS	Commander
63TFS	Commander
56CSS/OT	Operations Officer
Det 32, 305	Commander


CHARLES J. CUNNINGHAM, JR.
Colonel USAF
Commander

OPR: 56TFW/SE

HEADQUARTERS 56TH TACTICAL FIGHTER WING
MACDILL AFB, FLORIDA 33608
30 JULY 1978

ANNEX B TO 56TFW PLAN 127-15
TASKS AND RESPONSIBILITIES

1. Safety:

- a. Include BASH group recommendations and actions in the agenda and minutes of the Wing Aerospace Safety Council.
- b. Establish procedures for reporting and recording all birdstrikes at MacDill or involving 56TFW aircraft.
- c. Monitor activities of all tasked agencies for compliance with this directive.
- d. Disseminate trend data to BASH group and flying units.
- e. Coordinate with Safety Offices at Homestead and Patrick AFB concerning their BASH activities in the local flying area and at Avon Park. (Crosstell)
- f. Provide the BASH Working Group with the current BASH reduction data received from Higher Headquarters, the U.S. Fish and Wildlife Service and other agencies.
- g. Provide a capability for and maintain a current bird situation/activity chart for use by all flying units. This will include:
 - (1) BASH activity plotting/recording for low level and Avon Park operations.
 - (2) MacDill activity, sightings and strikes.
- h. Provide in addition to the above, as much information concerning bird migratory activities as can be obtained through contact with the U.S. Fish and Wildlife Service and local bird study groups.
- i. Provide a capability for declaring, disseminating, and terminating BIRDWATCH Conditions on the Low Level routes and at Avon Park.
- j. Coordinate and establish procedures with the Security Police to provide an individual to use pyrotechnic devices for bird dispersal as required when Security Police personnel are not available.

2. HOSPITAL:

- a. The MacDill Regional Hospital will provide assistance, advise

and support to the MacDill BASH Program as required and within capabilities to include:

(1) Provide storage space within mortuary area for the storage of perishable bird remains.

(2) Assistance in packaging remains in dry ice for shipment to the bird and mammal laboratories.

3. MORALE, WELFARE AND RECREATION:

a. The 56CSG Chief of Morale, Welfare and Recreation will establish a program to minimize the attractiveness of assigned facilities to bird activity.

4. OFFICE OF INFORMATION:

a. The 56TFW Office of Information will participate as required and upon request will provide a public information program designed to inform base personnel, dependents and the general public on the hazards of uncontrolled bird activity and the measures being taken to minimize them.

5. BASE AUDIOVISUAL SERVICES:

a. Provide photographic services as required to document bird strikes and related activities as required.

b. Provide graphics as required to publicize the hazards and actions required to minimize them.

6. BASE CIVIL ENGINEER:

a. Provide an environmental officer to the BASH Working Group to monitor and advise the group on Environmental Modification. The Base Civil Engineer is responsible for developing procedures for removal or control of as many bird attractants as possible and initiating the necessary surveys and writing of environmental impact assessments and statements on procedures undertaken as required by law.

b. In addition to providing those services as required to eliminate specific habitats to counter identified hazards, the Civil Engineer should develop a long range program, in conjunction with all base improvements and modifications, in an attempt to make the airfield as unattractive to birds as feasible. This project/program should be termed operation "Bird Bare."

c. To assist in these programs the following general Civil Engineering considerations are provided:

(1) Control vegetation

- (a) Mowing Operations - (Time - height)
- (b) Ditches (cut) 50 to 1 slope (See (2)(a))
- (c) Filling low spots (See (2)(a))
- (d) Planting bare areas
- (e) Removing dead vegetation/rubble (Perches)
- (f) Remove high spots (Perches)
- (g) Remove edge effect
- (h) Remove plants with berries

(2) Control water

- (a) Modify ditches - slope and clear (See (1)(b))
- (b) Consider covering/culverts
- (c) Eliminate standing water (See (1)(c))
- (d) Patrol/clear beaches and rip edge of feeding materials
- (e) Drain marsh areas

(3) Control waste

- (a) Collect appropriately
- (b) Dispose of rapidly

(4) Control birds (Chemical/Physical Alterations)

- (a) Check/bird proof buildings - hangers
- (b) Check other perches towers, etc.
- (c) Use avitrol as required
- (d) Use naphthlene around perches (Alt)
- (e) Sticky material around perches (Alt)
- (f) Electrical charge around perches (Alt)

(g) Strobes in buildings

(h) Queletox (Kill)

(i) Control insects

7. FLYING ORGANIZATIONS:

a. Will insure aircrews participate in the BASH reduction program by promptly reporting all bird strikes and hazardous conditions IAW this directive.

b. Will coordinate unit flying activities, through scheduling, to minimize exposure to migratory birds based on data obtained from SEF/BASH.

c. Unit FSOs will periodically visit SEF, obtain the current bird activity data and post the information so that it is readily available for briefing aircrews. Frequency of visits will be determined by phase of training unit is currently undergoing.

d. Unit FSOs will insure that the current bird activity data is available and briefed in conjunction with the prephase briefing for both the ground attack and low level phases.

e. Unit FSOs will insure an adequate supply of bird strike/activity report forms are readily available for the aircrews.

8. STANDARDIZATION/EVALUATION:

a. Review with 56TFW/DOO all proposed new low level routes or changes to existing low level routes for BASH impact.

b. Monitor, on a regular basis, aircrew preflight briefings to insure BASH is covered during the briefing.

9. AVON PARK OPERATIONS:

a. Establish procedures to report significant bird activity noted on the gunnery ranges to SEF and advise aircrews under their control of same.

b. Establish procedures to notify SEF of any bird activity or strikes reported to Avon Control by aircrews.

10. FLIGHT FACILITIES:

a. Establish procedures to observe bird activity on and above the airfield visually and by radar, and report such to Wing Safety during normal 56TFW flight operations and to Airfield Management at other times.

b. Issue Birdwatch advisories to aircraft as required.

c. Provide Airfield Management immediate access to the runway under Birdwatch Condition Red if required.

d. Insure airfield lighting remains off except as required for aircraft operations.

11. AIRFIELD MANAGEMENT:

a. IAW ANNEX S of this Plan, during normal 56 TFW flight operations the authority to declare a Birdwatch condition is solely vested with the 56 TFW Safety Office. The MacDill AFB Chief of Airfield Management or his designated representative, is the declaring authority during all other periods.

(1) Declaration of a Birdwatch condition by the Chief of Airfield Management should be based upon the following:

(a) Information relayed by airborne aircraft.

(b) Observations made by and relayed to Base Operations by MacDill AFB Tower and Transient Alert personnel.

(c) Observations made by Base Operations personnel.

(2) Once a Birdwatch condition has been declared by Base Operations personnel, it is their sole responsibility to either cancel or downgrade the condition, commensurate with updated information.

b. The Chief of Airfield Management or his designated representatives, will be a prime source for observing conditions that could create a bird strike hazard and will react to disperse flocks of birds using available bioacoustic equipment when required.

(1) Primary Means (Prevention). Environmental conditions observed in the runway vicinity that could attract birds will be reported to the Environmental Section, 56CSG/DE, (ex., standing water areas/areas of recently mowed grass/confirmed and suspected roosting areas.)

(2) Secondary Means (Dispersion). The Chief of Airfield Management will:

(a) Insure the Base Operations emergency response vehicle is equipped and operationally maintained with bioacoustical equipment.

(b) Insure assigned personnel are properly trained to utilize the equipment.

(c) Coordinate directly with the 56TFW BASH Officer on results of bioacoustical dispersal of birds to insure tapes on hand are identifiable to bird species which are presenting a hazard to flight operations at MacDill AFB.

(3) Carry out those actions as required for implementation of Birdwatch procedures as outlined in ANNEX S.

12. 3RD WEATHER WING:

a. Display Birdwatch Condition notice on TV briefing equipment as required.

b. Advise aircrews of Birdwatch Conditions when briefing weather if required.

13. DEPUTY COMMANDER FOR OPERATIONS:

a. Issue specific guidance for aircrew and the SOF on procedures to be followed under Birdwatch Conditions.

b. Issue specific guidance to the Command Post concerning actions required to implement this Plan.

14. DEPUTY COMMANDER FOR MAINTENANCE:

a. Issue specific guidance to AGS personnel for the reporting of discovered bird strikes on aircraft to Quality Control and Safety.

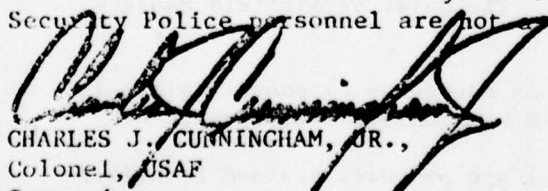
b. Issue procedures for the preservation of bird remains (feathers) during non-duty hours if discovered on an aircraft.

15. SECURITY POLICE:

a. Provide location and procedures for storing pyrotechnic bird dispersal devices.

b. Train personnel to use pyrotechnics as required.

c. Coordinate with Safety for alternate users from Safety when Security Police personnel are not available.


CHARLES J. CUNNINGHAM, JR.,
Colonel, USAF
Commander

HEADQUARTERS 56TH TACTICAL FIGHTER WING
MACDILL AFB, FLORIDA 33608
30 JULY 1978

ANNEX C TO 56 TFW PLAN 127-15
OPERATIONS

REFERENCES: (Bird/Aircraft Strike Hazard Team Reports, Reports from other wildlife agencies, etc.)

1. GENERAL:

a. PURPOSE. This ANNEX provides information on the different types of bird strike hazards and recommendations on countering each hazard.

b. MISSION. See Basic Plan.

2. CONCEPT OF OPERATIONS. The following is a summary, in order of seriousness, of the bird strike hazards and recommendations for reducing each hazard to flight operations. A brief description of each bird and how each method of control or avoidance is to be employed is provided. Each control measure will have a corresponding tasked organization in the Basic Plan.

3. SPECIFIC HAZARDS:

a. MACDILL AFB AREA:

(1) Brown Pelican (*Pelecanus Occidentalis*).

(a) Hazard: This protected species can be seen frequently on the catwalks of the approach lighting for runway 04. It also flies in small flocks (3-6 birds) in varied formations. Pelicans feed primarily on small fish and dive from altitudes of 30 feet or less. The primary threat occurs when the small flocks transit the runway approaches and departures in search of food.

(b) Hazard Reduction: Habitat modification is not feasible nor desirable for this species. The primary counter to this hazard is increased awareness by aircrews and runway supervisory personnel. The approaches should be closely monitored for their activity and appropriate advisories should be transmitted as required. OPR: 56TFW/DO/OTM.

(2) Seagulls (*Charadriiformes, Laridae*).

(a) Hazard: This species provides the largest threat to flight operations in the airfield area. Several subfamilies are permanent residents of the bay area as well as a migratory hazard. Seagulls are primarily scavengers and gather at garbage dumps, docks and other lucrative sources of food. Their travels from roost to food source to loafing areas constitute the greatest hazards.

OPR: 56TFW/SE

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(b) Hazard Reduction: Habitat modification and control techniques must be devised to effectively reduce the threat.

1. The source of easy food within the general airfield area must be reduced to an absolute minimum. The sanitary landfill operation must be closely monitored as it is the major attractant and food source. OPR: 56CSG/DE

2. Once the food source is eliminated, action should be taken to reduce the attraction of the loafing areas such as clear ramp space and closely mowed fields through the use of harassment and dispersal procedures such as:

- a. Pyrotechnics
- b. Bioacoustics
- c. Chemicals
- d. Mowing operations


OPR: 56CSG/OTM/DE

3. Sources of fresh drinking water near loafing areas must also be eliminated. OPR: 56CSG/DE

(Other resident species in the immediate area which need to be studied include:

Raptors; owls, nighthawks, doves, cattle; egrets, common crows, shorebirds, plovers, pipers, upland species; blackbirds, starlings.

In addition to the migratory species: Waterfowl, Ibus, Cranes.)


JOHN R. VICK, Major, USAF
Chief, Safety Division

HEADQUARTERS 56TH TACTICAL FIGHTER WING
MACDILL AFB, FLORIDA 33608
30 JULY 1978

ANNEX Q TO 56 TFW PLAN 127-15
MAPS AND CHARTS

1. GENERAL. This ANNEX outlines the use and requirements for the maps and charts required to implement the BASH Program to include:

- a. MacDill AFB Habitat Map.
- b. Low level Activity map.
- c. Avon Park Activity Plotting Charts.
- d. Airfield Activity Plotting Charts.
- e. (As required).

2. MACDILL AFB HABITAT MAP:

a. Background: A habitat survey was conducted at MacDill AFB in August 1978 and the specific habitats which are available to birds were determined. The description of the habitats and modifiers are in APPENDIX Q-1-1 of this ANNEX. A copy of the survey is maintained at the Environment Office (DEEV) and the Safety Office.

b. Use: Once a specific hazard is identified and the location of the activity can be isolated, the habitat map should be consulted to determine if a specific attractant to that species exists which can be altered within the scope of this program.

c. The habitat map will also be used as a guide for the long range Civil Engineering Program of removal of actual and potential habitats on MacDill AFB; proposed Operation "Bird Bare."

3. LOW LEVEL ACTIVITY MAP:

a. A large scale map with a depiction of all the current low level routes will be maintained at the Office of Safety, (SEF).

b. All bird strikes, near misses and areas of observed significant bird activity which are reported on the low level routes will be plotted on this chart.

c. This data will be studied and disseminated to the flying units IAW the procedures outlined in ANNEX B.

d. This data will also be used to determine if certain route usage be discontinued or altered.

4. AVON PARK ACTIVITY MAP:

OPR: 56TFW/SE

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a. A large depiction of the Avon Park Gunnery complex will be maintained at the Office of Safety, (SEF).

b. This depiction will be used in the same manner as the Low Level Map.

5. AIRFIELD ACTIVITY PLOTTING CHARTS AND LOGS:

a. Sufficient quantities of the Airfield Activity Plotting Chart will be kept available for use during surveys and bird study operations.

b. The specific use of these charts and log, APPENDIX Q-1-3, 4 and 5 will be outlined as required during the specific operation or as determined by the BASH Working Group.

6. (Other Maps & Charts will be added as required)


JOHN R. VICK, Major, USAF
Chief, Safety Division

HEADQUARTERS 56TH TACTICAL FIGHTER WING
MACDILL AFB, FLORIDA 33608
30 JULY 1978

APPENDIX 1 TO ANNEX Q TO 56 TFW PLAN 127-15
MACDILL AFB HABITATS

Water:

- Modifier - Drainage ditches Varies from fresh to salt.
 - Borrow ponds Strength depending upon site.
 - Natural ponds
 - Tidal creeks
 - Open bay

Mangrove: Red, Black and White

- Modifier - Mangrove along drainage ditches and on higher sites
 invaded by Florida Pepper bushes

Hardwood Hammock: Oak

Grass:

- Modifier - Closely maintained in and around runway and primary roads.
 - Periodically maintained in fields, irrigation site, etc.
 May be invaded by Dog Fennel, Ragweed, Sesbania and some
 brush.
 - Disturbed sites where grass is primary invader, but being
 replaced by brush.

Wet Grass:

- Modifier - Areas, either natural or manmade, where moist soil, plants,
 red root, Saggitaria, Beakrush, Cyperus, etc, dominate.

Borrichia, Glasswort Flats:

- Modifier - Type is largely being lost in invasion by Florida Pepper.
 - Type also contains Slat bush (Baccharis) invaders.

Brush: Wax Myrtle, Florida Pepper, Willow and Scrub Oaks

- Modifier: Bush areas closest to salt water environments are predo-
minantly Florida Pepper which has invaded and masked native species.
 - Upland sites are Wax Myrtle and Saltbush. They contain
 a variety of species as transition area to high uplands.
 - Upland brush contains Saw Palmetto, Scrub Oaks, Wax Myrtle,
 etc.
 - Disturbed areas contain a mixture of broad leaf (Dog
 Fennel and Ragweed) and brush (Wax Myrtle, Florida Pepper,
 etc.)

Planted Pines:

- Modifier - Understory varies depending upon original site.

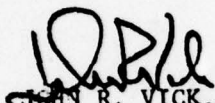
OPR: 56TFW/SE

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Mature Pines:

Modifier - Pine hardwood where pine is mixed with Scrub Oak and Palmetto.

- Pine/grass where grasses are mixed with broadleaf plants and appear to vary from closely to occasionally maintained.
- Pine/brush where pine over-story is reduced with heavy brush under-story varying with site from Florida Pepper to Palmetto, Cabbage Palm, Vita and Wax Myrtle.



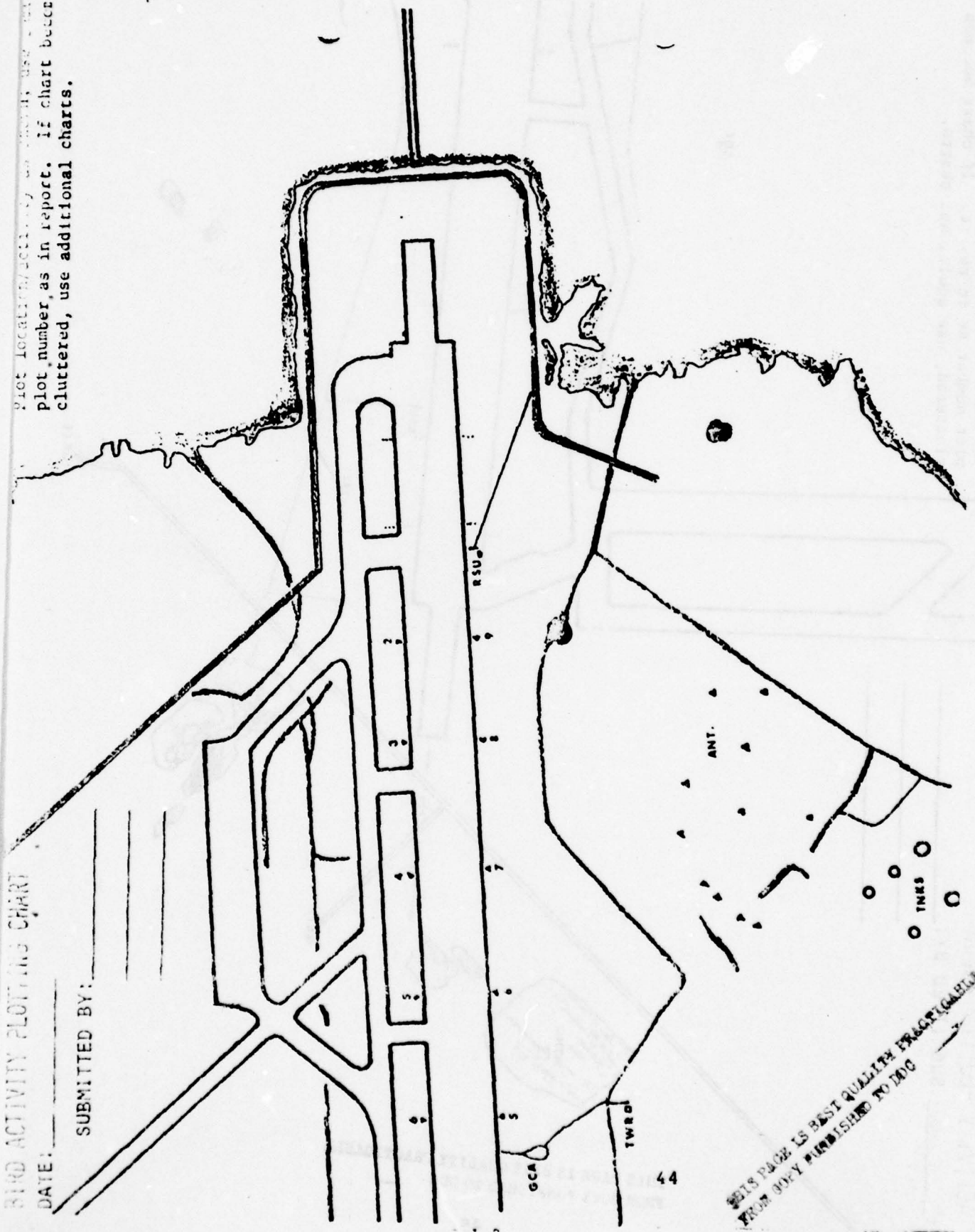
JOHN R. VICK, Major, USAF
Chief, Safety Division

BIRD ACTIVITY PLOTTING CHART

DATE: _____

SUBMITTED BY: _____

Plot location/activity as shown; use only plot number, as in report. If chart becomes cluttered, use additional charts.

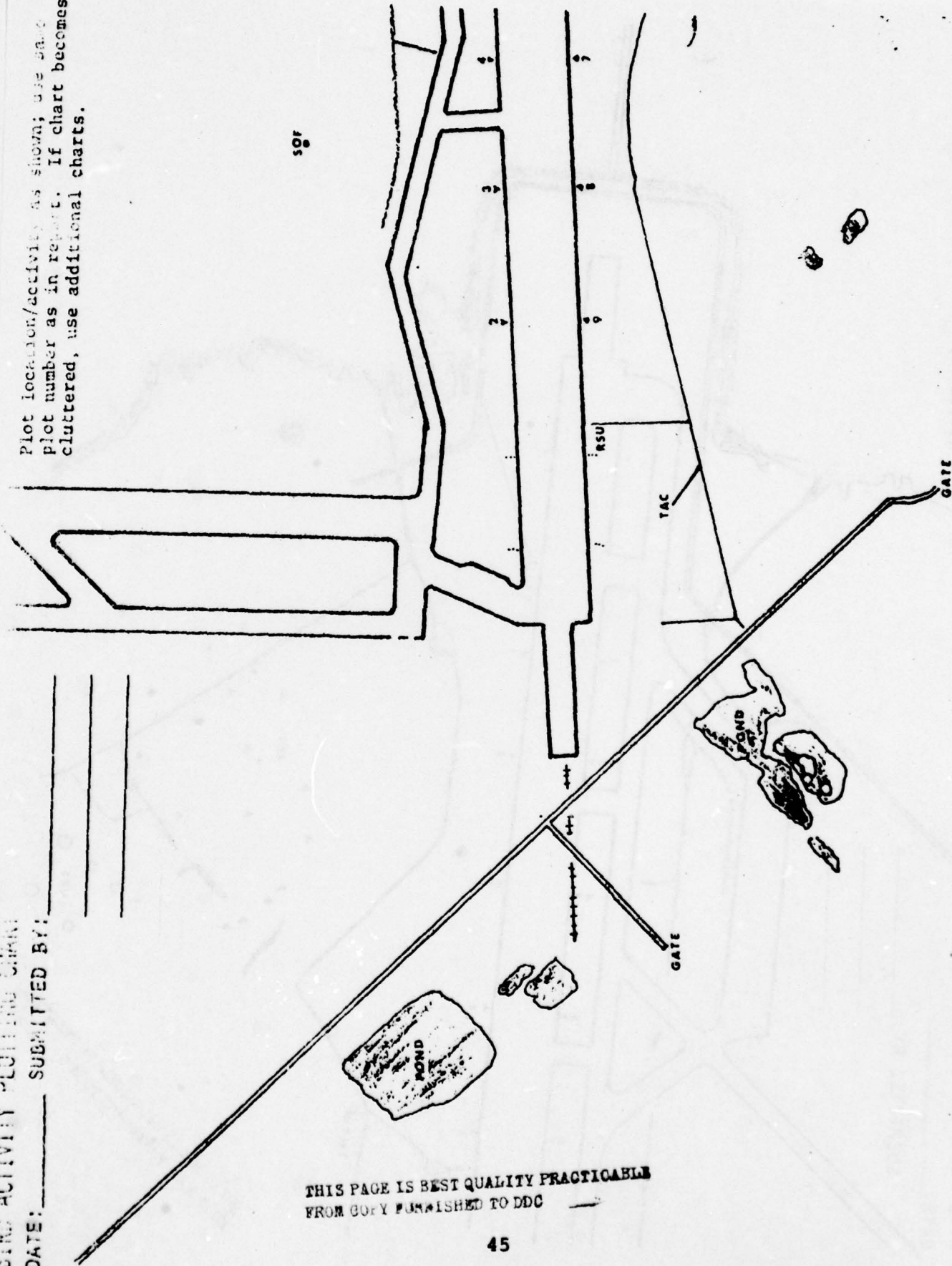


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BIRD ACTIVITY PLOTTING CHART

DATE: _____ SUBMITTED BY: _____

Plot location/activity as shown; use same plot number as in report. If chart becomes cluttered, use additional charts.



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HEADQUARTERS 56TH TACTICAL FIGHTER WING
MACDILL AFB, FLORIDA 33608
30 JULY 1978

ANNEX R TO 56 TFW PLAN 127-15
REPORTS AND FORMS

1. GENERAL. This ANNEX outlines the procedures and forms required to report birdstrikes IAW AFR 127-15 and near misses to enhance the BASH Program at MacDill AFB.

2. AFR 127-15, BIRD STRIKE REPORT. The Office of Safety will compile all reported bird strike data and submit the completed AF Form 441 to 9th Air Force not later than the 15th of the month following the reporting period (Quarterly). Information copies of this report will be furnished to the Wing Commander and the BASH Working Group. The data will be collected as indicated below:

56 TFW Bird Aircraft Strike Hazard (BASH) Report Form Letter.

a. 56TFW/SEF will insure sufficient copies of the form letter (R-1-1) are available to all squadron FSOs and at Base Operations.

b. This form letter is dual-functioned and only the actual strike function of the form will be discussed in this ANNEX. Near miss or activity reporting is discussed in ANNEXES B and Q.

3. PROCEDURES. All personnel discovering a bird strike will notify Safety as soon as possible. This is required to insure that the evidence and any remains are preserved to enable identification of the species of bird involved in the strike. During non-duty hours, Maintenance and Base Operations personnel will make arrangements for the preservation of remains until Safety assumes responsibility for them.

a. The aircrew involved in the strike will fill out the form, providing as much information as possible concerning circumstances of the incident.

b. Base Operations personnel will assist transient aircrews in this when applicable and will obtain unit/organization information when damage occurs.

c. For MacDill AFB aircraft, if the damage is sufficient for AFR 127-4 Mishap Reporting, a Mishap Report will be submitted in addition to the Bird Strike Report.

OPR: 56TFW/SE

FROM: SQUADRON: _____ AIRCREW: _____ CALL SIGN: _____ DATE: _____

SUBJECT: Bird Aircraft Strike Hazard (BASH) Report

TO: 56 TFW/SEF

This report is to be filled out for all actual birdstrikes and any near-miss situations. Your help, in particular, on close encounters will greatly help in getting action taken to reduce the hazards involved with birds in our local flying area. Fill in all blocks as well as you can. Give approximations if exact data is unknown and indicate that it is an approximation. If you have any questions, call 56 TFW/SEF, 3384.

- a. Month/day of occurrence: _____ Local time: _____
- b. Light conditions (circle or use other is significant): Dawn, Hazy, Bright, Dull, Dusk, Dark, Night, other: _____
- d. Aircraft type: _____ Aircraft serial number: _____
- e. Landing light (ON/OFF): _____ Beacon (ON/OFF): _____
- f. Phase of flight (describe): _____
- g. Aircraft speed: _____ Heading: _____ Altitude: _____ MSL.
- h. Flight path (in relation to clouds if any, i.e., above, below, etc.) _____
- i. Geographic location: (try to be as specific as possible) _____
coordinates: _____ if in pattern (flare, short final, etc.) _____
any ground references: _____
- j. Species and number of birds (if unknown, try to describe color, size, etc.): _____
- k. Impact point on aircraft (if applicable): _____
- l. Remarks (any information you may feel valuable to the program, i.e., what were the birds doing when you saw them?) _____

- m. Evasive action:
- (1) By pilot (YES/NO) _____ What? _____
- (2) By bird (YES/NO) _____ What? _____
- n. Bird remains on aircraft (YES/NO): _____
Send whatever feathers, flesh, etc., that are available into a plastic bag (obtainable from Maintenance) and notify Safety, ext. 3384 ASAP. _____
will be collected by a representative of the Safety for evaluation.

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BIRD STRIKE REPORT										REPORT SYMBOL						
(Note: Complete all columns. If any are unknown, enter "U".)																
MAJCOM			BASE				REPORT PREFIX									
MONTH	LOCAL TIME	DAY	LIGHT CONDITIONS	AIRCRAFT TYPE	AIRCRAFT NUMBER	LANDING LIGHTS (On/Off)	STRUCK LIGHTS (On/Off)	PHASE OF FLIGHT	AIR CRAFT SERIALIZED (Y/N)	AIR CRAFT HEAD ING	ALTITUDE (AGL and AMSL)	FLIGHT PATH (In relation to flight)	GEOGRAPHIC LOCATION	SPECIES AND NUMBER OF BIRDS	IMPACT POINT AIRCRAFT	REMARKS (Extent of damage and type of repair in outline and drawings)
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	

AF FORM 441
FEB 77

R-1-2

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HEADQUARTERS 56TH TACTICAL FIGHTER WING
MACDILL AFB, FLORIDA 33608
30 JULY 1978

ANNEX S TO 56 TFW PLAN 127-15
BIRD HAZARD WARNING SYSTEM: OPERATION BIRDWATCH

1. GENERAL. This operation establishes procedures to be used for the immediate exchange of information between ground agencies and aircrews concerning the existence and location of birds which could pose a hazard to flight.

2. BIRD WATCH CONDITIONS. The following terminology will be used for rapid communications to disseminate bird activity and implement unit operational procedures. The terminology will also be included and updated as required in the MacDill AFB portion of the Flight Information Publication (IFP Supplement -United States).

a. Bird Watch Condition Red. Heavy concentrations of birds above and immediately in the vicinity of the runway pose an immediate hazard to safe flying operations. The area declared "Red" shall be open only by specific pilot request upon being advised of the condition.

b. Bird Watch Condition Yellow. Concentrations of birds observed or predictable in locations which represent a probable hazard to safe flying operations. Declaration of Condition "Yellow" requires increased vigilance by all agencies and extreme caution by aircrews. Bird Watch Condition Yellow will also be used for warning aircrews of conditions on low level routes and at Avon Park as warranted.

c. Bird Watch Condition Green. Normal bird activity in the area. This condition will be in effect for the remainder of the flying day whenever a red or yellow condition had been declared and subsequently downgraded. Upon extended normal bird activity, no bird watch condition need be declared.

3. AUTHORITY. During normal 56TFW flight operations the authority to declare a Bird Watch Condition is solely vested with the 56TFW Safety Office. The MacDill AFB Chief of Airfield Management or his designated representative, is the declaring authority during all other periods.

Bird Watch Condition Yellow will be declared for a special area upon the advice of tower, RSU Officers, RCO at Avon Park, GCA, or flight leads on low level routes when significant activity is observed visually or on radar. All operations personnel should be alert for bird activity and should report such directly to Safety (ext 3384) or Airfield Management (ext 2231) as applicable, or through one of the following agencies:

- a. Wing SOF
- b. Control Tower or GCA

OPR: 56 TFW/SE

- c. Command Post
- d. RSU
- e. Avon Operations

4. COMMUNICATIONS. Bird Watch Conditions will be disseminated by the following means:

- a. During periods of 56 TFW Flight Operations:

(1) The reported Bird Watch Condition at MacDill AFB and associated low level routes will be displayed on Det 32, 3rd Weather Wing TV briefing equipment. The display (Attachment S-1-1) will be prepared and updated by Base Operations personnel based upon inputs from the 56TFW Safety Office. In addition to posting the Bird Watch Condition on the weather TV equipment, Base Operations personnel will insure that a duplicate copy of the information is posted in the Flight Planning Room to advise Transient aircrew personnel.

(2) Base Operations personnel will telephonically notify the following agencies of Bird Watch Conditions:

- (a) 56TFW Command Post
- (b) MacDill AFB Tower

b. During period of non-56TFW flight operations all procedures listed above will be implemented with the exception of posting the Bird Watch Condition on the TV briefing equipment.

c. The primary means of transmitting Bird Watch Conditions to airborne aircraft will be via ATIS. However, under Bird Watch Condition Red, the MacDill Air Traffic Control Agency will insure that the pilot understands the condition and is provided the option to delay, divert, or to continue the proposed operation into the hazardous area.

5. AIRCREW RESPONSIBILITIES AND PROCEDURES. If while in flight, an aircrew observes or encounters any bird activity that would constitute a hazard to flight the aircrew should contact either the SOF, Control Tower, Command Post, or Avon Operations and request that the observed bird activity be passed to SEF at extension 3384. The following information should be included:

- a. Call Sign
- b. Location
- c. Altitude

- d. Local time of sighting
- e. Approximate number of birds
- f. Type of bird (if known)

6. PROCEDURES FOR EOP AND DOC. If a bird activity report is received from an airborne aircraft, the Wing Safety Office or Base Operations will be notified as appropriate.

7. DOWNGRADING. Once a Bird Watch Condition has been declared by Safety or Base Operations personnel, it is their sole responsibility to either cancel or downgrade the condition commensurate with updated information.

8. BIRD WATCH ALERT. In addition to Bird Watch Conditions of RED, YELLOW and GREEN, a Bird Watch Alert may also be declared. This indicates that the weather, time of day and/or seasonal conditions are such as to expect an influx of birds onto the airfield.



JOHN R. VICK, Major, USAF
Chief, Safety Division

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BIRD WATCH

CONDITION

	MCF	IRs	Remarks
GREEN			
YELLOW			
RED			

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HEADQUARTERS 56TH TACTICAL FIGHTER WING
MACDILL AFB, FLORIDA 33608
30 JULY 1978

ANNEX 2 TO 56 TFW PLAN 127-15
DISTRIBUTION

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SE	3
OI	1
13 TFPS	1
61 TFS	1
62 TFS	1
63 TFS	1
<u>56TH COMBAT SUPPORT GROUP</u>	
DE	3
SV	1
DC	1
OTM	2
SS	1
SP	1
CSS	2
<u>OTHER UNITS</u>	
1928 CG/FFA	1
USAF Regional Hospital	1
Det 32, 3 WS	1

OPR: 56 TFW/SE

APPENDIX B

For bases requiring active bird scaring techniques the following equipment is authorized for bird identification and dispersal:

<u>Nomenclature</u>	<u>National Stock Number</u>	<u>Part Number</u>	<u>Table of Allowances</u>
Binoculars, prism type	1240-00-5300959YB	PN6702513	483
Shotgun, single barrel	1005NC121528L	PN870	483
Pistol, pyrotechnic	1095-00-726-5657	PN7265657	483
Simulator airburst	1370-00-028-6007		-
Scare Cartridges, 12 ga.	1305ND042951G		-
Cassette Tape Player	5835-01-053-3152	PNRS248S	483
Speaker	5965-01-053-6210	PN Model AP30	483
Amplifier, mobile	5830-01-054-4954	PN Model BT35A	483

This memorandum may be referenced to justify procurement of items from TA 483, which is a Civil Engineering TA. Any organization responsible for bird control on the base may procure this equipment.

APPENDIX C
SAMPLE SAFETY OPERATING INSTRUCTIONS
FOR HANDLING OF PYROTECHNICS

DIRECTORATE OF ENVIRONMENTAL PLANNING
AF Engineering and Services Center
Tyndall Air Force Base Florida 32403

DEV Operating
Instruction 127-1

Safety

HANDLING OF PYROTECHNICS

This OI establishes policies and procedures for safe handling of pyrotechnics used at Air Force installations by the Bird/Aircraft Strike Hazard (BASH) Survey team. It applies to all members of the BASH team conducting such surveys and to personnel at survey bases instructed in the use of pyrotechnics by BASH team personnel.

References: (1) AFR 127-100, Explosive Safety Standards; (2) 11A-1-10, Munitions Serviceability Procedure; (3) TO 11A10-24-7, Storage and Maintenance Procedures for Pyrotechnics; (4) TO 11A-1-42, General Instructions for Disposal of Air Munitions; (5) TO 11A10-27-7, Storage and Maintenance Procedures Simulators (Battlefield).

1. This OI covers the M74A1 simulator airburst and 12 gauge scare cartridges.

2. RESPONSIBILITIES:

a. Explosives Safety Officer/NCO: Responsible for insuring compliance with this OI by all personnel who are involved in Air Force Engineering and Services Center field assistance and training activities. They will periodically review and update this OI as safety and training requirements dictate.

b. Officer in Charge, BASH Reduction Program: Responsible under the guidance of the Explosive Safety Officer/NCO and acts in their absence to insure compliance with this OI by all personnel involved with AFESC field assistance activities.

c. BASH Survey Team Chief: Under the guidance of the Chief, BASH Reduction Program, performs all actions necessary to issue and control pyrotechnics as outlined in this OI and stated references.

d. Other BASH Team members: All field assistance team personnel must be fully knowledgeable of and adhere to the contents of this OI. Negligence or noncompliance will be considered grounds for dismissal from that portion of field assistance training and use, or administrative disciplinary action. This OI is part of the training/evaluation program and will be part of the AFESC/DEVN required reading file.

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3. PROCEDURES:

a. Nature of Operations: The BASH Team frequently uses and recommends the use of the M74A1 Simulator Airburst, NSN1370-00-028-6007 or the 12 gauge scare cartridge, NSN 1305ND042951G for use on the airfield to disperse birds which pose a threat to aircraft. These items are shipped from Hill AFB to the AFK account (Munitions Supply) at the base to be surveyed. All team members will strickly adhere to the following rules when pyrotechnics are being used or demonstrated.

(1) Pyrotechnics will be fired at an angle of not less than 45 degrees from ground level and never in the direction of any person, vehicle, or building closer than 1,000 feet.

(2) For shellcrackers, a single barrel, break open shotgun, NSN 1005NC121528L, or other approved methods will be used. The weapon will be visually inspected following each round fired to insure that it is free of obstructions. After each days use, the barrel will be thoroughly flushed with hot water, dried and oiled.

(3) All firearms safety rules listed on AF Form 497, Air Force Policy Statement - Firearms Safety and Use of Force will be followed (Atch 1). Failure to adhere to additional safety precautions could result in loss of limb, oversight, or life.

(a) No person shall ignite the M74A1 Airburst or 12 gauze scare cartridges without wearing leather gloves, goggles and earprotectors.

(b) There will be no smoking at any time within 50 feet of pyrotechnics.

(c) No pyrotechnics will be handled near open flames.

(d) Pyrotechnics will be kept under visual observation at all times after they are issued and until they are expended.

(e) If at any time any pyrotechnics malfunction, all personnel will stay clear of that area for a minimum of 30 minutes. The exact position of the malfunction will be brought to the attention of the OIC of the BASH team. If the malfunction presents a potentially greater hazard to personnel, it will be placed in a wooden lined, metal container and removed from the immediate area. The BASH team

chief will then notify the Base EOD and inform them of the malfunction. They will send a team out to the area for proper disposal. At no time will the BASH personnel dispose of any malfunctioned pyrotechnics.

b. Storage of Weapons: All weapons will be stored each night at the Security Police Armory and checked out on a daily basis to support the BASH survey.

c. Storage of Pyrotechnics: All pyrotechnics will be returned to Munitions Supply each night and taken from the armory on an "as needed" basis. Cartridges will be stored in sealed metal ammunition boxes when not in use. Spent M74A1 casings will be turned in for disposal.

d. Location of Operations: The location of operations will be on the airfield of the surveyed base for active bird repulsion only. The Explosives Safety Officer at the base being assisted may opt to use an area other than the airfield for pyrotechnic demonstration and personnel training. In such situations, the BASH team will insure that personnel being directed in pyrotechnic use strictly adhere to this OI.

e. The following equipment is required, as a minimum, when transporting pyrotechnics.

(1) Four "Explosives 'B'" placards for vehicle transporting pyrotechnics (provided by AFESC for BASH surveys only).

(2) Pyrotechnics carrying bags/boxes and leather gloves (provided by AFESC for BASH team members only).

(3) Portable 2-way radio for control tower clearance prior to firing pyrotechnics (provided by AFESC).

f. Procedures for Pyrotechnic Operations:

(1) Demonstrations and Training.

(a) Notify all applicable offices of the location and nature of pyrotechnic operations.

(b) Proceed to area where demonstration/training is to be conducted.

(c) Brief attending personnel on the proper, safe use of pyrotechnic devices. Insure that personnel firing pyrotechnics don all applicable safety equipment.

(d) Remove pyrotechnics from storage box and insert into the flare pistol/shotgun.

(e) Grip the pistol/shotgun with both hands, angle at a minimum 45 degrees, and fire.

(f) Inspect the weapon chamber prior to each loading to insure that it is free of obstruction.

(g) After demonstration, clear the weapon, return pyrotechnics to storage container, and return them to the appropriate office.

(2) BASH team dispersal of birds:

(a) Proceed to area identified to have birds.

(b) Obtain control tower clearance to fire pyrotechnics.

(c) Don all applicable safety equipment.

(d) Remove pyrotechnics from storage box, exit vehicle, and load the flare pistol/shotgun.

(e) Grip the weapon with both hands, angle high toward target and fire.

(f) Inspect the weapon chamber and barrel prior to reloading to insure that it is free of obstruction.

(g) After bird dispersal, return pyrotechnics to storage box and return to the appropriate office.

g. Personnel Safety Requirements.

(1) BASH team personnel must annually attend the AFESC/DEOT explosive safety training course at Tyndall AFB.

(2) Personnel receiving pyrotechnics instructions will be given a safety briefing prior to BASH demonstrations.

h. Issue of Pyrotechnics:

(1) Issuance will be by the BASH team chief in the minimum quantities required for a specific portion of bird control or pyrotechnics demonstration.

(2) Pyrotechnics will not be used on the airfield without advance coordination with the following base organizations:

- (a) Command Post
- (b) Hospital
- (c) Security Police
- (d) Fire Department
- (e) Ground Safety
- (f) Base Commander

In the event of an emergency situation requiring birds to be dispersed from the airfield, the BASH team will request by radio to the control tower that tower personnel notify the appropriate offices of pyrotechnics use and the general location of BASH team personnel.

i. Fire Protection:

(1) All personnel using pyrotechnics will comply with regulations, directives, manuals, and TO's pertaining to fire prevention/protection.

(2) Two class 10 B/C fire extinguishers will be immediately available and in operating order.

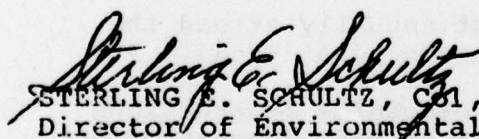
(3) In the event of a fire on the airfield or at the demonstration area, BASH personnel will:

(a) Halt use of pyrotechnics.

(b) Attempt to extinguish the fire using the fire extinguishers.

(c) Notify the control tower and have them relay information the the Fire Department.

OFFICIAL


STERLING E. SCHULTZ, Col, USAF
Director of Environmental Planning

1 Attachment
AF Form 497

AIR FORCE POLICY STATEMENT - FIREARMS SAFETY AND USE OF FORCE

1. Every member and civilian employee of the United States Air Force has the right under the law to use reasonable, necessary force to defend himself against violent and dangerous personal attack. The limitations described herein are not intended to infringe this right but to promote weapons safety, and prevent the indiscriminate use of firearms and other types of deadly force. This policy statement applies to all personnel who bear firearms in accordance with AFR 125-26.

2. FIREARMS SAFETY RESPONSIBILITIES:

a. To lessen the possibility of accidental discharge, firearms must be loaded and unloaded, whenever possible, at a clearing pit established at each firearms storage facility. As a minimum, loading and unloading will be supervised by a knowledgeable NCO who is also qualified with the weapon. (See AFR 125-26, paragraph 10c.)

b. Firearms will not be drawn or aimed except in compliance with Air Force policy on the use of force, if necessary to lawfully apprehend or if their authorized use appears imminent or the weapon is turned into storage.

c. Warning shots will not be fired. This firing is a hazard to innocent persons and may prompt a suspect to return the fire, further endangering innocent bystanders.

d. If firing at a person, the marksman should aim to wound, rather than to kill.

e. Because of the solemn responsibilities involved, it is imperative that prior to being authorized to bear firearms, all personnel are thoroughly indoctrinated in their use and the circumstances in which firearms may be justifiably used.

f. The unauthorized discharge of any firearm, whether it is an accidental or deliberate act, is a serious matter and must be thoroughly investigated. Any person who is aware of such an incident will report it to the Chief of Security Police who will immediately initiate an investigation.

3. FIREARMS SAFETY RULES: I will:

a. Promote firearms safety through my own actions.

b. Never carry a round of ammunition in the chamber of any weapon that uses a bolt assembly or slide operating mechanism, except at my commander's direction when in combat or other hostile situation.

c. Never draw firearms as a joke or jest.

d. Never use a firearm to play tricks, games, quick-draw, or engage in any other form of horseplay, or allow myself to become involved in unauthorized acts.

e. Never use firearms against individuals who have committed only minor offenses or crimes.

f. Regard all firearms as being loaded.

g. Know and use the safety devices of all firearms with which I am armed.

h. Never aim or point a firearm unless I intend to shoot.

i. First identify my target and insure a clear field of fire before discharging a weapon.

j. Be especially cautious when loading and unloading a firearm.

k. Never aim myself with a weapon I am not fully qualified to use.

l. Bear in mind at all times that my conduct in handling the weapon is my own responsibility.

4. USE OF FORCE:

a. Personnel may use force to discharge assigned duties only when force is absolutely necessary. The degree of force used must be the minimum necessary to accomplish the duty. Application of an excessive amount of force is detrimental to the maintenance of law and order and may subject the one who applies it to disciplinary action. The minimum force necessary may include physical apprehension and restraining techniques, chemical dispersers, the baton, or the military working dog, all of which result in an application of less than deadly force.

b. The use of deadly force (that force applied with the intent of causing, or which a reasonable person should know would cause, death or serious bodily harm) is prohibited, except as a last resort. The use of deadly force is justifiable only as a last resort under the following circumstances:

(1) To protect themselves from loss of life or serious bodily harm.

(2) To protect the life of another, or to prevent the commission of a serious offense involving violence and threatening death or serious bodily harm (such as arson, armed robbery, aggravated assault, or rape).

(3) To remove the threat of theft, destruction, or espionage aimed at property or information designated by an installation commander or other competent authority, as vital to national security.

(4) To prevent actual theft or destruction of property designated by an installation commander or other competent authority which - although not vital to the national security - is of substantial importance to the national security. Such property includes, within the purview of this instruction, property specifically designated as having substantial importance to the national security under the Base Resource Protection Program for example mission essential fuel storage areas, data processing installations, and other major support facilities or equipment.

(5) To prevent the actual theft of property which is inherently dangerous to others, for example: property which, in the hands of an unauthorized individual, presents a potential threat of death or serious bodily harm to others. This includes weapons, ammunition, explosives, and chemical munitions.

(6) To apprehend or prevent the escape of a person reasonably believed to have committed a act of the nature specified in paragraph 4b(2) above. If the official did not witness the offense, he must have sufficient information to know as a virtual certainty that the suspect either has committed, or attempted to commit, the offense.

(7) To apprehend or prevent the escape of a person whose unauthorized presence in the vicinity of property or information vital to the national security has presented an actual threat of theft, sabotage, or espionage.

(8) To apprehend or prevent the escape of a prisoner whose escape has been determined by the corrections officer or installation commander to create a threat of death or bodily harm to others.

(9) When directed by the lawful order of a superior official governed by AFR 125-26.

I HAVE READ AND U

DATE

SIGNATURE NAME (LAST, FIRST)

ATTACHMENT 1

62

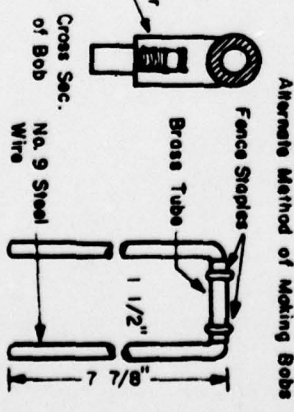
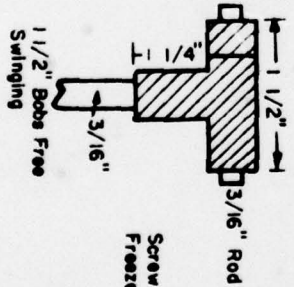
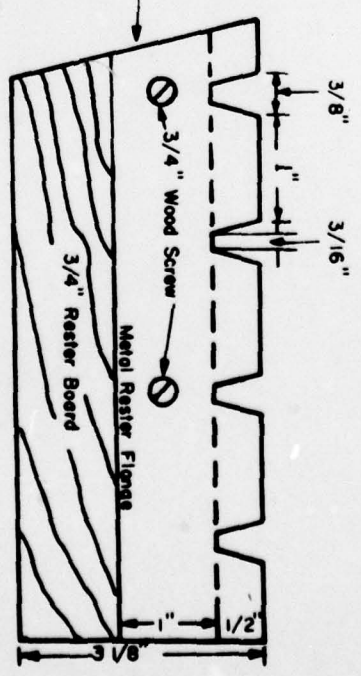
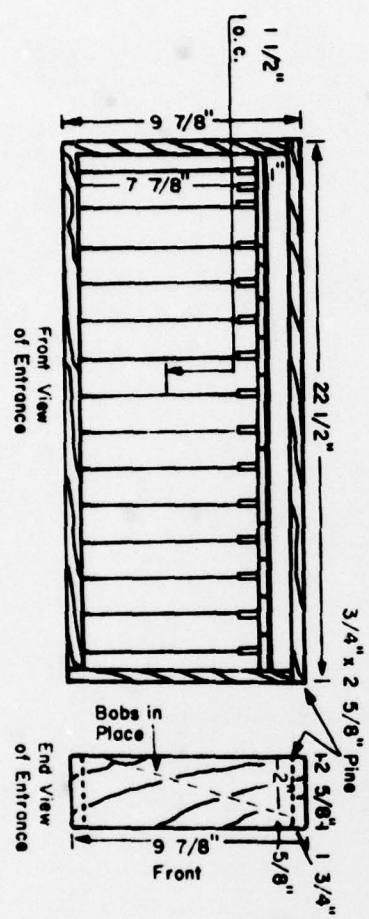
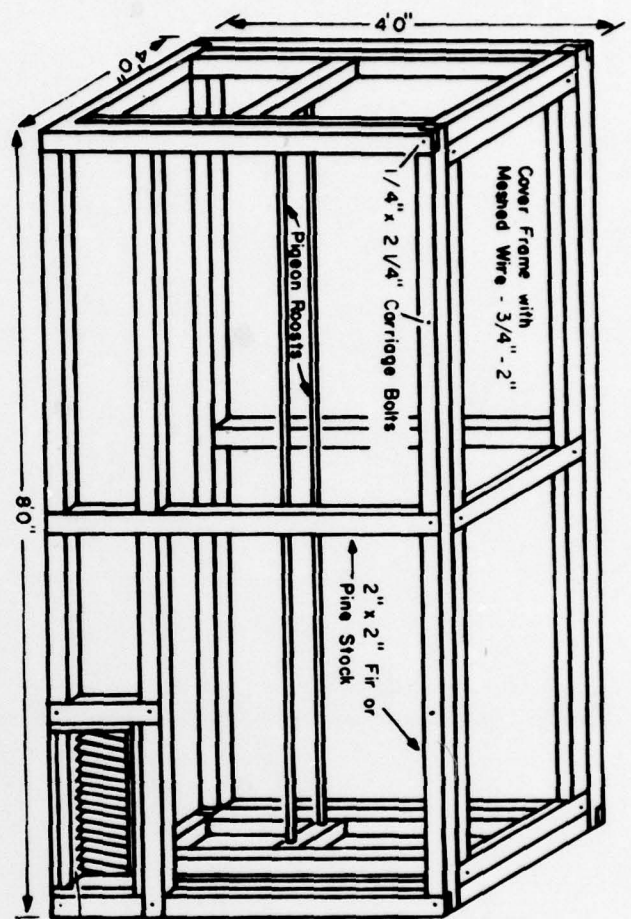
SAFETY AND USE OF FORCE.

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JUL 77

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APPENDIX D PIGEON TRAP DESIGN



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HQ USAF/ISC WASH DC 20330	1	HQ AFLC/DEV Wright-Patterson AFB OH 45433	1
AFISC/IGD Norton AFB CA 92409	1	AFESC/TST Tyndall AFB FL 32403	1
AFISC/SEFF Norton AFB CA 92409	1	3700 Tech Tng Wing TTGIC/48 (Entomology) Sheppard AFB TX 76311	1
HQ AFLC/DE Wright-Patterson AFB OH 45433	1	Federal Aviation Administration MAS/300 Attn: Capt Harrison 800 Independence Ave WASH DC 20591	1
HQ AFLC/DOV Wright-Patterson AFB OH 45433	1	2 BMW/CC Barksdale AFB LA 71110	1
DDC/TCA Cameron Station Alexandria VA 22314	2	2 BMW/DO Barksdale AFB LA 71110	1
HQ MAC/DEMM Scott AFB IL 62225	2	2 BMW/SE Barksdale AFB LA 71110	1
AFPCB/MEIS Forest Glen Section WRAMC WASH DC 20012	1	2 CSG/CC Barksdale AFB LA 71110	1
AFRCE/CR-ROV Main Tower Bldg 1200 Main St Dallas TX 75202	1	2 CSG/OT Barksdale AFB LA 71110	1
OEHC/CC Brooks AFB TX 78235	1	2 CSG/DE Barksdale AFB LA 71110	1
1 CSG/OTM Attn: MSgt Godsey Langley AFB VA 23665	1		

HQ SAC/DEV 1
Offutt AFB NE 68113

HQ SAC/DOTN 1
Offutt AFB NE 68113

HQ SAC/IGF 1
Offutt AFB NE 68113