Advantages and limitations of Radio-Controller aircraft in bird dispersal

(Albert E. Bivings, EE.UU.)

ADVANTAGES AND LIMITATIONS OF RADIO-CONTROLLED AIRCRAFT IN BIRD DISPERSAL

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ABSTRACT

Radio-controlled aircraft were utilized to attempt to scare birds out of agricultural crops, staging or loafing areas, transit lanes, and roosts. Positive results were obtained for most birds tested in crops, staging and loafing areas, and transit lanes. Poor results were obtained at roosting areas. Dense escape cover at roost sites was thought to be the major reason roost scaring was ineffective.

Simulation of a noisy aerial predator, lack of habituation, increased area covered, and better control of displaced birds were the major advantages of this technique. Difficulty in flying, limited endurance, high maintenance and acquisition costs, and limited ability to operate in adverse weather were the major limitations. The conclusion was that radio-controlled aircraft offer a good tool under a wide variety of circumstances, but should not be expected to be the only tool used to resolve all possible problems.

I - INTRODUCTION

There is a strong desire among wildlife managers to have a bird control system which is inexpensive, effective, and labor saving with no habituation problems. One obvious solution is an avian predator which can cover a large area, yet birds do not lose their fear of it. DeFusco and Nager (1983) reviewed published literature documenting most bird frightening devices. These included hawk kites, predator models, falconry, and radio-controlled (R/C) aircraft. They found data to support the effectiveness of R/C aircraft in dispersing many kinds of birds. However, not much practical field testing has been reported. The purpose of this paper is to allow the author, an experienced Naval Aviator and helicopter pilot, to examine the advantages and limitations of R/C aircraft for aerodrome bird control from the practical point-of-view of a working field wildlife biologist.

II - METHODS

Field work was conducted with two different aircraft over approximately a one year period. The initial aircraft was a high-wing trainer with a wingspan of approximately 1.5 meters requiring a 4-channel radio (throttle, rudder, elevator, and ailerons). The engine was a 2-cycle gasoline engine of approximately 6.5 cc displacement producing 1.2 bhp at 16,000 rpm. The second aircraft was a high-wing advanced trainer with a 2 meter wingspan requiring a 5-channel radio (throttle, rudder, elevator, ailerons and flaps). This engine was a 2-cycle gasoline engine of approximately 7.5 cc displacement producing 1.4 bhp at 16,000 rpm. Both had fixed landing gear and were brightly colored to enhance visibility.

Aircraft were flown over birds feeding in small grain crops or on water, loafing in trees or open areas, at roost sites or transiting the area. Results were subjectively compared to what would be expected from a conventional scaring program of bio-acoustics and pyrotechnics.

III - RESULTS

3.1 - Site results

Birds feeding in mature agricultural crops and on aquaculture ponds responded well to overflights of test aircraft. Lack of protective cover, loud noise, and high visibility are the principal factors. Birds that flushed could then be herded away from the area because of the slow air speed of the test aircraft.

Birds transiting the area also responded extremely well. Aircraft tested had sufficient power to climb above slow flying birds (especially herons and egrets) to make a high speed dive on the flocks simulating a falcon or eagle attack, which caused considerable distress to the birds. Herding the birds was then a matter of maintaining a high orbit to keep the birds moving in any desired direction.

Birds loafing or staging prior to roosting also responded well to R/C aircraft. Again, lack of escape cover and noise of the aircraft seemed to be the most likely reasons for this effectiveness. However, it was more difficult to herd birds away from their intended direction at staging areas prior to roosting than at other sites.

Birds at roost sites did not respond very well to scaring. This was the only category where R/C aircraft failed to perform as well as, or better than, an individual using conventional scaring techniques. Most of these roost sites tested had dense vegetation not normally encountered at aerodromes. As expected, R/C aircraft was not effective on nesting birds.

3.2 - Species-specific results

Of all birds tested, geese responded the best. It takes a fast aircraft to catch up with them because they respond to sight or sound at such a great distance. Ducks (Anatadae), herons and egrets (Ardeidae), house sparrows (*Passer domesticus*), and shore birds (Charadriidae and Scolopacidae) also responded extremely well. Hawks and vultures (Falconiformes) seem to be repelled, but do not respond as well as most other birds that were tested. Blackbirds (Icteridae) responded well except in roosts. One roost of double-crested cormorants (*Phalacrocorax auritus*) would not respond until pyrotechnics were used in addition to the test aircraft. Over half returned in spite of my efforts.

IV - DISCUSSION

4.1 - Advantages

A. Noisy aerial predator

These aircraft seem to do a good job of simulating a noisy aerial predator. Although equipped with a muffler, the screaming sound made by these engines

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operating above 10,000 rpm does an effective job of moving the birds. Electric engines are available, but were not selected because of lower sound levels. Four-cycle engines are also available, but were not selected because of increased price and lower sound levels.

B. Habituation

There were no incidents of habituation observed. The longer the exposure to the aircraft, the greater the observed effectiveness. However, the longest exposure at a single site was three days. Most problems were solved after two or three sorties. Problems of habituation after long exposures to resident birds were not addressed by this study.

C. Control of flight direction

With these aircraft, it is possible to not only scare birds, but also to determine (to some degree) where they will go. The birds are scared up by the aircraft where they can be herded in a convenient direction and allowed to outrun the aircraft with judicious use of throttle and flaps. By not crowding or overflying these birds, you can keep them flying away as long as you can maintain good visual contact with your aircraft.

D. Increased area covered

Because these aircraft are mobile, one man can cover a much larger area than with conventional tools, especially in an aerodrome environment where the area is large and there are rarely any visual obstructions. Under optimum conditions, I believe a good pilot can cover 30-50 hectares which is similar to the results reported by Briot (1986).

4.2 - Limitations

A. Challenging to fly

These aircraft are a considerable challenge to learn to fly well enough to be effective on birds. Since you have no "seat-of-the-pants-feel", or instruments from the aircraft, you must maintain constant visual contact. Also, the more acrobatic aircraft will not fly "hands-off" for very long. It is difficult for the pilot to concentrate on both the aircraft and how the birds are responding unless the conditions are ideal. Thus, the pilot's work load is high.

B. Endurance

Most R/C aircraft are designed to fly sorties of only 10-15 minutes. High performance R/C aircraft usually only fly 8-12 minutes per sortie. This requires landing frequently to refuel regardless of bird pressure. Standard battery packs only give 1-1.5 hours of flight time.

C. Weather

Weather is a major limitation in R/C aircraft operations. Wind greater than 20 knots is a major hazard to most trainer aircraft. They are slow and light and even moderate turbulence at ground level makes them difficult to launch and recover safely. Visibility is required and any weather that reduces the visibility reduces the pilot's effectiveness.

D. Maintenance

These aircraft require considerable maintenance. Batteries to run the ground transmitters and the airborne receivers and control servos must be kept charged. Spare battery packs must also be kept charged and handy. Wooden propellers easily break and carefully balanced spares must be available. The alcohol fuel is very destructive to the wood, so all surfaces must be carefully cleaned after flying. Balsa aircraft are delicate and after ruff handling or hard landings, repairs must often be made. Most of the maintenance costs depend on wages for personnel.

E. Cost

These aircraft are expensive. Current retail costs of similar kits in the U.S. are \$100 - \$150 plus another \$50 - \$75 for hardware, glue, coverings, etc. Construction time ranges from approximately 1 man-day to as many as 10 man-days depending on the complexity of the kit and the skill of the builder. Engines this size are \$75 - \$150 depending on quality. Radios are \$200 - \$250 and other required support equipment will cost \$100 - \$150. Thus, the costs for a single aircraft will typically run \$500 - \$800 at retail. Much of the equipment can be

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ordered by mail at 20-35% savings. Since these aircraft must operate close to the ground most of the time, the probability of a major crash is always significant. Fortunately, the engines survive most crashes with only minor damage, and radios and batteries are almost never damaged.

V - CONCLUSION

Radio-controlled aircraft offer a useful and potentially effective tool for solving bird problems at aerodromes. Potential habituation/non-response problems could probably be eliminated by adding pyrotechnic launchers. Most limitations, except weather, are surmountable. Brightly colored aircraft will probably be better than raptor simulating models because of the improved visibility under most weather conditions. Due to length of time to train good pilots, personnel turn-over rates or availability of local hobbyists may influence the decision to use this technique. It needs to be a long term project to be cost effective.

VI - LITERATURE CITED

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