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ORD 1085-76

16 August 1976

MEMORANDUM FOR: NIO/SA

SUBJECT: TACANA TCT Report, 4 June 1976

TCT MEMBERS: [redacted] TCT Chairman
TCT Vice Chairman
, TCT Secretary

1. The primary purpose of the Avian contract is to train pigeons to carry an approximately thirty-seven gram camera from a release point (point A) to an offset target point (point B) three miles distant from the release point, obtain pictures of the target at (point B), and return to their home loft (point C) located approximately fifty miles from point B. In addition, an operational scenario requires that the birds be transported black approximately 3,500 miles to a new homesite, including homing to it from varying distances, and performing the A-B-C maneuver against a new target which they have only seen simulated versions of prior to leaving the United States. Progress toward these training goals has led to the modification of the Avian contract work plan in an effort to improve the likelihood of success for the upcoming operational test and future operational clandestine employment of the Avian System.

2. A schedule of Avian project activities was established early in the contract to ensure orderly progress toward the goals specified in the preceeding paragraph. The schedule was considered to be tentative because a number of factors, such as, bird training times, fabrication of appropriate simulated targets, logistics of moving the birds to several new homesites, and time periods involved in acclimating the birds to their new homes, might delay the scheduling of the simulated operational test. This has indeed been the case.

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3. The first order of business in the schedule was to train the birds to home fifty miles in California, move them to a new site in California and perform a complete test of the A-B-C scenario. This work appeared to progress in an excellent manner. The contract was initiated on 1 January 1976 and by the fifth week of the contract, the flock (kit) of birds used in the [redacted] demonstration (the latter part of 1973) had been successfully relocated from San Diego, California (approximately fifteen miles north of [redacted]). They learned to home from forty-four miles while wearing thirty-seven to forty gram simulated cameras. These birds were subsequently relocated four different times and they appeared to be "learning to learn". At this same time, additional birds obtained by [redacted] were homing to the farm, with weights, from approximately three miles.

4. The next step in the schedule called for training the A-B-C maneuver to an A to B distance of two to three miles and a B to C distance of twenty-five miles. Although this work progressed smoothly, it became apparent that the use of an area approximately 20 miles to the north [redacted] as a training site imposed a number of serious constraints limiting the capability to perform a preliminary test of the operational capability of the Avian System. [redacted] This topographical configuration resulted in a predominantly north to south orientation in bird flight paths. Second, the birds tended to use the freeways to ease their passage between intermediate mountain ranges and a number of excellent birds were lost to the program as they flew low along the freeways and were struck by automobiles. Finally, it was extremely difficult to obtain permission from area Landowners to set-up the inflatable, twenty foot in diameter radome at varying locations to train the birds to search for the target.

5. Despite these drawbacks, it was decided to complete the A-B-C scenario training in California on the scheduled date of 3 April 1976, and move the project to Oklahoma and perform the interim test of the Avian Systems in Oklahoma at a farm owned by an acquaintance of [redacted]. The bird lofts were moved to the top of the [redacted] and A-B-C training was initiated. The parking lot [redacted] was used in the early stages as the base for setting up the target. As

the birds extended their homing range and their learning of the A to B connection was strengthened, the inflatable radome was set-up at a location approximately twenty-seven and one-half miles from the home loft. Once again, the birds learned their tasks extremely well. So well in fact, that project personnel began to suspect that the birds were using topographical features of the area rather than a true search behavior to find the target. This fact was later verified in Oklahoma. Thus, although it was possible to test the system in California with the distance from A to B at two and three-quarters miles and the distance from B to C at twenty-seven and one-half miles, and with the collection of excellent photography, the birds had actually learned an inappropriate method of finding the target. In effect, this meant that although the project appeared to be three days ahead of schedule, the desired A-B-C behavior had yet to be established in such a way that it could be applied in the operational environment.

6. On the basis of the foregoing knowledge and an evaluation of time remaining on the project, it was obvious that Oklahoma was to become the "real" training site, and that another location would be needed to perform an interim test of the system in order to trouble-shoot the procedures to be utilized in deploying it for the operational test.

7. The birds were transferred to a farm in [redacted] Oklahoma, and training of the desired search behavior commenced on about 1 May 1976. It took three weeks for the birds to become accustomed to the Oklahoma homesite and "home" from distances of ten miles. By this time the A to B search behavior was also becoming well established.

8. Two factors interfered with rapid progress at the Oklahoma training site. The [redacted] training crew was due to be on site by 5 April 1976 and did not arrive until 11 April 1976 because [redacted] was forced to delay his California departure in deference to a serious illness suffered by his wife. [redacted] personally lost an additional four days to negotiating the disposition of a number of his other birds; crows, ravens, and eagles with the California Fish and Game Commission. [redacted] carried on at the Oklahoma training site for [redacted] Even so, approximately seven and one-half days were lost to rain,

high winds and tornadoes. By now it was evident to all concerned that although the work effort appeared to be making satisfactory progress, the project was approximately one month behind the originally scheduled completion date.

9. As a result of the delays incurred in Oklahoma, some modifications to the program were suggested to the TCT by ORD. These modifications included moving the birds directly from [redacted] Oklahoma to the Washington, D.C. area, acclimating them and training them to perform the A-B-C maneuver in geographical locations significantly removed from the [redacted] target. The rationale was that this procedure would probably allow the contractor to complete his program within the existing contractual funding and possibly enable the initiation of an operational exercise prior to October of this year.

10. In order to examine these recommendations with potential users, a TCT meeting was held on 6 May 1976. User representatives included [redacted] SE/COPS, and personnel from SE, OTS, and ORD. In general, the reaction to the proposed direct move to the Washinton, D.C. area from [redacted] Oklahoma was unfavorable. [redacted] stated his reservations in a formal memorandum on 7 May 1976. The memorandum noted that the required extension of approximately one month to complete the contractual work seemed to eliminate the possibility that an operation could be accomplished in the field this year. Therefore, it was felt that it would be inappropriate to bring the birds to Washington, D.C. until they were ready to perform the operational scenario agreed upon early in the program. In short, SE held the strong opinion that the birds should be held away from the Washington area until they could be trained against the [redacted] target, moved clandestinely to Washington, acclimatized covertly, and deployed against the [redacted] target with a return to home base. Further, the memorandum indicated that it was important for the TCT to obtain as complete an understanding as possible of the acclimatization process in terms of its impact on covert operations under simulated Moscow conditions. It also indicated a strong interest in determining whether the birds can demonstrate an ability to retain a target orientation after being relocated and acclimatized to a new geographical location.

11. In response to the memorandum issued by the SE/COPS, the TCT developed a modified work effort which provides a straightforward demonstration of whether or not the A-B-C flight behavior (with photography) can be accomplished successfully, and an interim test of the operational capability including acclimatization target training, and target retention capabilities prior to moving the birds to Washington, D.C. for their final test. This modified work plan includes a functional test of clandestine acclimatization procedures in [redacted] Oklahoma and an inspection of project status with regard to the A-B-C flight behavior by the NIO and the TCT to be completed by the latter part of June 1976.

12. The following procedures will be utilized in preparing for the June test.

a. Present Avian training of A-B-C flight behavior, including clandestine release at A and search behavior at A for B, will continue in [redacted] Oklahoma. The training will include clandestine release at point A which will be located two to three miles from target B, search-oriented flight to target B (in a direction that is opposite from the return flight to the home loft) landing on the target and obtaining pictures of the target and the target area, and, finally returning 50 miles to the home loft located in [redacted] Oklahoma.

b. On 28 May 1976, a collateral effort was initiated in [redacted] Oklahoma to determine if the Avian assets can be acclimatized to a new geographical location on a clandestine basis. On this date a simulated second story clandestine loft was fabricated. Ten additional birds will be moved from the [redacted] in California to the Oklahoma training area via air freight on 4 June, 1976. These birds will be housed in the simulated clandestine loft and their only view of the outside world will be provided through the housing of an air conditioner. These birds will be acclimatized by means of exercise releases and will return to the loft through the air conditioner until homing training is started. During homing training, the birds will still return to the home

loft through the air conditioner, however, they will be taken to an initial release distance of at least one mile for the initiation of homing training. One or two additional birds will be taken from the home loft after acclimatization and transported to a distance of fifty miles for their first release.

13. The results of the acclimatization procedures and the operational A-B-C behavior (including Avian camera photographs of the target area) will be demonstrated during the latter part of June 1976. This demonstration will be arranged to enable the NIO/SA and other designated visitors to observe the test from the various A-B-C positions.

14. On the assumption that the June test will be successful, a new interim test site will be prepared for the birds by the end of June 1976 (possibly California). and the ORD/COTR will travel to to make a final determination of the suitability of the area as an interim test site. If it turns out to be an acceptable area, the birds will be transported to this new test site acclimatized to a home loft by clandestine means, trained to "home" by clandestine means, and tested on A-B-C behavior against a simulated operational target. Upon satisfactory performance of this task, a short period of reinforced target training will be accomplished to strengthen the "flight-to target" behavior prior to moving the birds to Washington, D.C. The move to Washington will be completed during the first week of August and after a suitable period of acclimatization by clandestine means, separate A-B-C flight tests will be performed with three kits to determine the effects that differing time delays have on the retention of the A-B-C behavior.

Camera Development Progress

15. The final camera design has been completed and submitted to preliminary testing. This camera, referred to as "camera number three" has undergone ground tests and has been flown six times on birds at the Oklahoma training site. The camera used the MINOX lens, has a weight of 35 grams which includes timer, film and batteries. The total flight weight of the system, including the bird harness is 39.5 grams. A primary feature of this camera is the inclusion of a focal plain flattener which permits

accurate positioning of the film in the focal plain and a reduction in motor torque, and hence probability of jamming. Ultra thin base film appears to work well in this design and more pictures (200 black and white, 140 color) per roll are possible. The shutter speed on this version of the camera has been shortened to 1/1400 of a second.

16. The current camera production schedule calls for the completion of five additional cameras by 1 June 1976. Approximately one week will be required to complete performance reliability tests of these cameras. By approximately 14 June 1976, these five cameras will be ready for flight testing. By the end of June, six cameras of the new design and two cameras of the old design will be ready for demonstrational use.

17. A meeting was held with [redacted] Chief/APSD/NPIC, to discuss various films and processing techniques. A number of problems involving these matters for both color and black and white film were discussed. During the meeting it was agreed that a series of tests will be conducted with the new camera and several film selections in order to determine the best film and processing trade-offs between shutter speed, film speed, and film resolution. These recommendations will be integrated into the camera test in early June and verified during the flight test in the latter part of June. Analyses of flight tests to date by NPIC supports the original estimate of 1.5 to two inch resolution when pictures are taken at 100 feet altitude.

18. The [redacted] lens has been assembled and tested in comparison with the new camera (camera number 3) design. Both lens systems have field flatteners. The [redacted] lens is an F2.5 lens (about a stop faster), has about the same resolution in the center and slightly better resolution at the edge of the field of view. It's major advantage is a faster stop which should allow for faster shutter speed or resolution. As time permits, a camera will be designed to incorporate this lens and ground tests will be conducted to verify performance.

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