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ORD-5290-75

16 December 1975

MEMORANDUM FOR THE RECORD

SUBJECT: Bird Camera Program

1. On 4 December 1975 a meeting was held with [redacted] to review requirements and program scheduling for delivery of two cameras for ultimate test at the [redacted] facility in late April 1976. Review of the current cameras now being used determined that the shutter speeds were too slow to adequately compensate for image motion. It was decided to modify two cameras to use external battery packs for providing sufficient power to operate the faster shutter speeds and to take pictures at a rate of at least one or two per second. These cameras will be flown on birds in mid-January for the purpose of taking pictures of Air Force resolution charts which will properly calibrate image motion, bird altitude, shutter speed, and film selection.

2. A trip was also made on 8 December to the West Coast to coordinate efforts with [redacted] and to get preliminary estimates of the bird orbit altitude and orbit diameter. A bird harness currently used by [redacted] was obtained for redesign and for the purpose of fitting a camera fairing to reduce aerodynamic drag. The redesigned harness and fairing are planned to be ready for the mid-January tests.

3. A third trip was made to see [redacted] (an optical consultant) on 11 December. The purpose of this trip was to initiate the design of the lower F-number lens (larger aperture) which would permit the faster shutter speed for minimizing motion blurring. It is expected that the lens design will be completed by early February.

4. The results of the mid-January tests will be used to configure a final camera design to be completed in early February. Two cameras are scheduled to be constructed,

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that will include the low F-number lens and some older backup cameras will include the lens currently being used. At this time, the new camera design will increase the film size from 9 mm to 16 mm in width. The film roll will be capable of taking 180 pictures at a rate of one picture per second for a total coverage time of three minutes. The field of view in the direction of motion will be roughly 30° and approximately result in contiguous pictures along the ground. The increased film width will result in almost a factor of two increase in lateral field of view and, therefore, increase the probability of photographing the target. In addition, this new design would increase the number of pictures by a factor of two which results in an overall increase in the probability of recording the target by approximately a factor of four.

5. This new camera design is scheduled for final construction and flight tests by the end of March. Final modifications and analysis should be completed by early April. The following is a list of line items which must be completed by mid-April:

a. Obtain ground resolution charts.

b. Design new harness and camera fairing.

c. Receive initial test cameras and loaded film cassettes.

d. Obtain fresh batteries from [redacted] and configure flight battery packs.

e. Perform ground tests of resolution charts and mechanical shake tests of cameras.

f. Conduct preliminary flight tests of resolution charts.

g. Finalize camera design and select film.

h. Receive low F-number lens from [redacted]

i. Build final cameras and test.

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j. Effect final modifications.

k. Conduct mission analog tests and analysis.

6. It is anticipated that a task order support contract will be required for the purchase of miscellaneous equipment, batteries, film, etc. The film must be loaded in a clean room with facilities for splitting the film to the proper format and checking the cassettes or film holders for adequate freedom of movement to prevent camera jamming. Also at this time, there are several battery candidates which must be investigated and tested for both reliability and current drain capacity. Large quantities of film must be processed rapidly from both the ground tests and the flight tests in order to meet the program schedule. Movie camera coverage is advised during both the ground-test and flight-test phases of the program. It is felt that a task order contract for the sum of $30,000 would be required for dealing with these miscellaneous tasks on a timely basis.

Charles N. Adkins
Operations Technology, ORD

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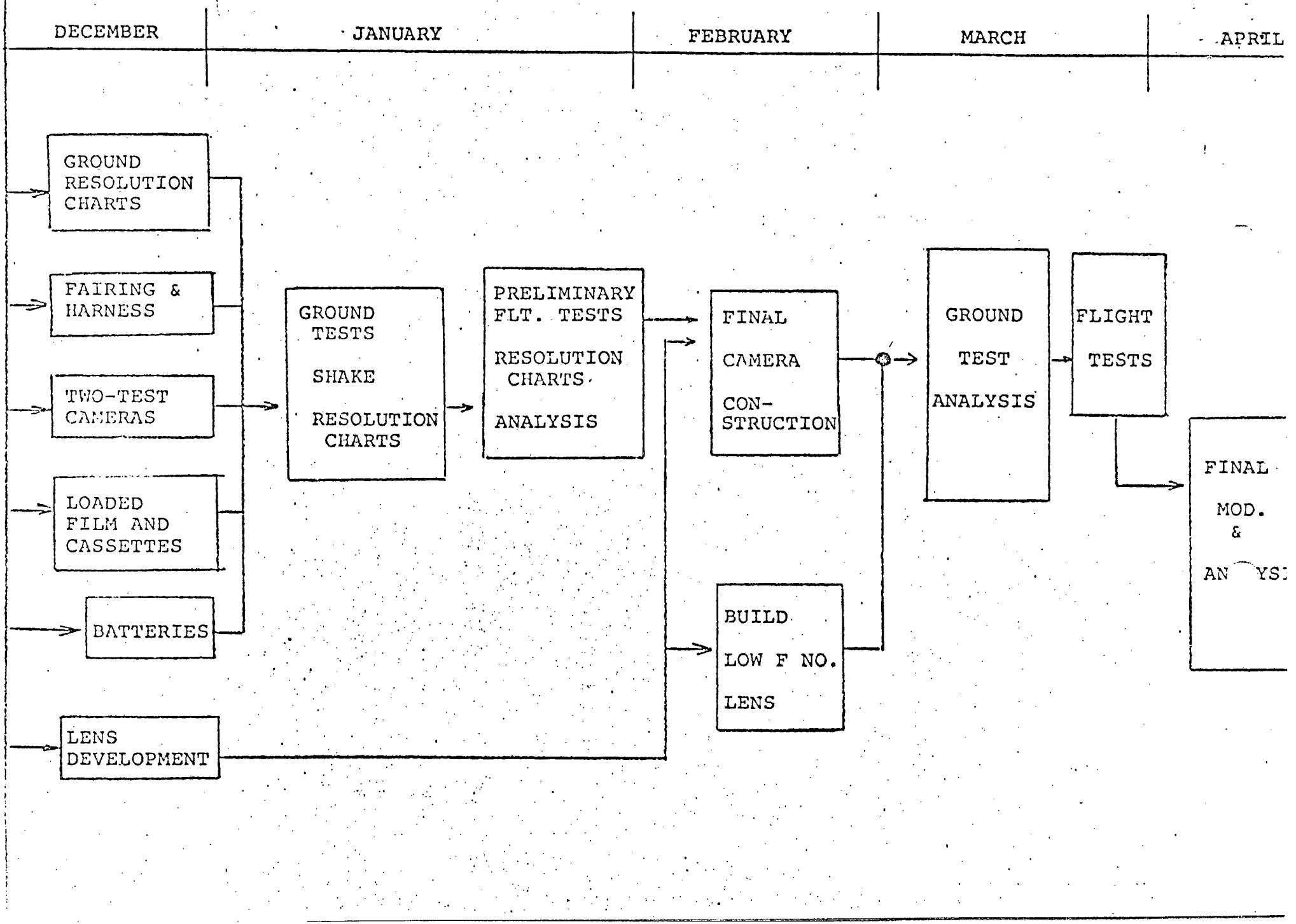

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