

21 March 1955

MEMORANDUM FOR THE FILES

SUBJECT: Photographic Equipment Meeting 11 March 1955

1. Present were Dr. Scott, Mr. Martin, Dr. Baker, Dr. Purcell, Mr. Acker, Mr. Lundahl and Mr. Herbert Miller.
2. The purpose of this meeting was to look into the weights of the B and C configurations and to settle the problem of timing and appropriately marking each exposure. While the problem of timing and marking exposures came up for discussion late in the afternoon, for the purpose of continuity on the weight reductions of the B and C configurations, the conclusions reached are recorded first.
3. The basic concept developed by Dr. Purcell and agreed to by Drs. Baker and Scott calls for a binary coding system triggered by an electrically driven clock motor. The binary system is essentially a scaler which counts impulses and indicates the summation of the impulses counted through nine argon bulbs. These bulbs are arranged in such a manner that light from them passes through the shutter and optical system of the camera and is recorded on each frame exposed. The electronic system feeding the scaler acts as a memory and a shutter switch is provided so that the lights are turned on only at the time the exposure is made. The opening of the shutter is the event which will be recorded on the timer channel of the electronic recorder provided by Ramo-Wooldridge. It was agreed that it would be highly desirable if a single designator could also be included with the scaler indication so that the mission and date could also be included with the scaler indication so that the mission and date could also be automatically recorded on each exposed frame. It was also agreed that it would be desirable for each camera to carry the timing indicator. A box diagram of the circuit was sketched by Drs. Purcell and Scott and Dr. Scott agreed to undertake design and construction of the units required.
4. In the discussion of the B configuration, Dr. Baker immediately raised the point of reduction on the stereo overlap as a weight saving device. It was noted that the film weight given in the B configuration weight summary appearing in the 4 March 1955 project plan was in error. This weight should have read 320 lbs. Thus the total weight should have been 624 lbs. instead of 664 lbs. After examining the layout of the various stereo shots it was ascertained that six of the 21 exposures in three cycles of the camera could be dropped without any substantial loss of

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information. It was also ascertained that the stereo overlap of 60% could be reduced to 55%. In this fashion, the film weight for a 2,200 mile mission could be reduced to 260 lbs., and a total for the configuration brought to something like 550 lbs. Under these circumstances, it appeared that the essential cut in weight would depend upon development of 2 mil base which would permit a reduction in film weight to 180 lbs. for a 2,200 mile mission or alternatively, a film weight of 195 lbs. could be achieved by dropping the stereo requirement for the lowest oblique shots. The sacrifice of information which might be involved would be minimal especially when it is borne in mind that mapping coverage of the area with the A-1 configuration would very likely be available. With a film weight of 180 lbs. and other weight savings which can be accomplished in the size of the spools, cassettes, and lens and of the charting camera a total weight for the B configuration of 460 lbs. appears to be quite feasible.

5. Lengthy discussion of the C configuration led to the conclusions that only a radical change could bring the total weight given as 698 lbs. down to military load specifications of 450 lbs. Such a drastic change was proposed by Dr. Baker and included modifying the camera to call for a focal length of 144" in place of 200", development of thin base film and concurrent development of high gamma emulsion to make up for the reduction in focal length. A detailed analysis of each of the parts based on this recommendation led to an estimated weight of 442 lbs. for a camera, film load, charting camera and a periscope. In the run away mode this C camera would provide roughly 2,000 miles of track coverage by 1.4 miles wide. The format would be 9" x 18" equivalent to coverage on the ground of roughly 7/10 mile x 1.4 miles. The system appears to be capable of attaining at least 30 lines per millimeter and quite likely up to 60 lines per millimeter with geometric F number equal to 12. It was agreed during the discussion that at least 8 exposures would be made in each burst in the burst mode of operation, that 60% stereo overlap would be provided and that the area covered around the particular target would be roughly 3 to 5 miles by 3 to 5 miles. Dr. Scott agreed to undertake an investigation of the details of a camera according to the new specifications and advise promptly on what was involved in the change.

6. During luncheon I discussed with Dr. Baker the possibility of developing a small camera which would periodically plot the position of the sun with respect to the horizon and which would permit the pilot to observe a print from which (by comparison with a prepared diagram for the mission) he could fix his position to an accuracy of less than 100 miles. Dr. Baker thought that such a camera was feasible and could be built weighing only several pounds and undertook to discuss this further with Dr. Land. Such a camera would provide an alternate navigation aid for the pilot and could supplement other navigation proposals now under study. It could also provide additional data to be filed in conjunction with the data record obtained from the charting camera.

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7. The last hour of the meeting was confined to a discussion with [redacted] Dr. Scott of the informal quotation received from P-E dated 8 March 1955. The discussion was general and comprised principally a protest that the prices as given seemed unusually high for the kind of work that was being done. Particular mention was made of the discrepancy which appears to have crept into the concept on ground handling equipment. The impression held by P-E was that three bases required would each have three associated advance bases. This was changed so that ground handling equipment for four bases would be provided and that such equipment would include equipment useful at a single advance base. Dr. Scott and Mr. Acker both agreed that a fixed price per unit would appear to point up the high cost of the work done and that recomputation was in order. Neither would make any commitment as to possible reductions. I noted that we would not be niggardly in our treatment of the contractor in the fee negotiation if their cost estimates were made more realistic. The recomputation should take approximately three to four weeks.

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