CONFIDENTIAL

28 January 1966
Ref: LJC 374-1674

Post Office Box 8043
Southwest Station
Washington, D. C. 20024

Attention: [redacted] 25X1A
Contracting Officer

Subject: [redacted] 25X1A
Universal Data Block Reader

Dear Sir:

In accordance with the "Limitation of Cost" clause contained in the above subject contract, this is to advise you of an anticipated overrun for Phase I in the amount of [redacted] 25X1A These additional funds are over and above the funds negotiated in the basic contract, as well as ECP-135-1. This is to further advise you that these additional funds will be required on or before 28 February 1966 so as to enable us to complete Phase I of this program.

This program commenced on 30 June 1965 and was predicated upon the design approach set forth in our proposal, the heart of which was a concept which envisioned a straightforward optical path between image source, through lens, and thence to the read head device. It was anticipated that a 1:1 image ratio could be maintained through this network, utilizing commercially available lenses. Detail analysis indicated that this initial concept could not be maintained without drastic design effort. These problems were brought to your attention during an Engineering Design Review meeting held at your facility at the beginning of November 1965. These problems were adequately aired and viewed by all parties concerned, and it was decided that no recourse was available other than to develop the new lens technique.

We have, for the last two and one-half months, been proceeding against this design technique and have had a chance to evaluate our requirements to achieve this improved technology. As stated above, we now anticipate an additional funding requirement to complete Phase I in the amount of [redacted] 25X1A

It is to be noted that ECP-135-1 was proposed during September 1965 at a time prior to the realization that a drastic design change would be required in order to achieve satisfactory results. It is also to be noted that ECP-135-1

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contemplated the use of the same lens as employed in the basic design. When the problem above noted was thoroughly analyzed, it became evident that a second lens would have to be employed to accomplish the design objectives envisioned by this ECP.

As indicated above, the major reason for this cost increase results from the need to design a lens capable of overcoming the problems encountered. This new lens was not a commercially available item but had to be designed and fabricated by our optical laboratory in [redacted] In addition, we had to design two (2) different lenses as a result of the ECP impact. 25X1A

Not only did the cost of lens design, fabrication, and test increase significantly over that originally contemplated, but many other portions of the system had to be redesigned to accommodate this new lens technique. Briefly, these areas are as follows:

1. New lens mounts had to be designed and fabricated. It is to be noted that two (2) mounts have to be built in lieu of the one originally estimated.

2. Calibration fixtures had to be designed and built to check out the new lens configuration.

3. Two (2) read head devices have to be used instead of one as originally contemplated.

4. This redesign necessitated the dismantling of the film transport which had already been constructed in order to rework the base plate to accept the new lens mounts.

5. A different type of light source had to be employed than originally contemplated. This required new design, layout, and fabrication techniques. The old design had to be scrapped.

Attached hereto as Exhibit "A", is a detailed cost analysis of the anticipated effort required to complete Phase I of this program. This Exhibit reflects cost incurred through 31 December 1965, Estimates to Complete, and the estimated costs at the completion of Phase I. It is to be noted that the anticipated total costs 25X1A in the amount of [redacted] represent an increase of [redacted] beyond the negotiated cost of the combined original contract and ECP-135-1. In order to aid 25X1A

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you in your technical evaluation of this proposal, we are submitting, by way of Exhibit "B", a detailed analysis of the technical problems encountered and the solutions being employed to overcome these problems.

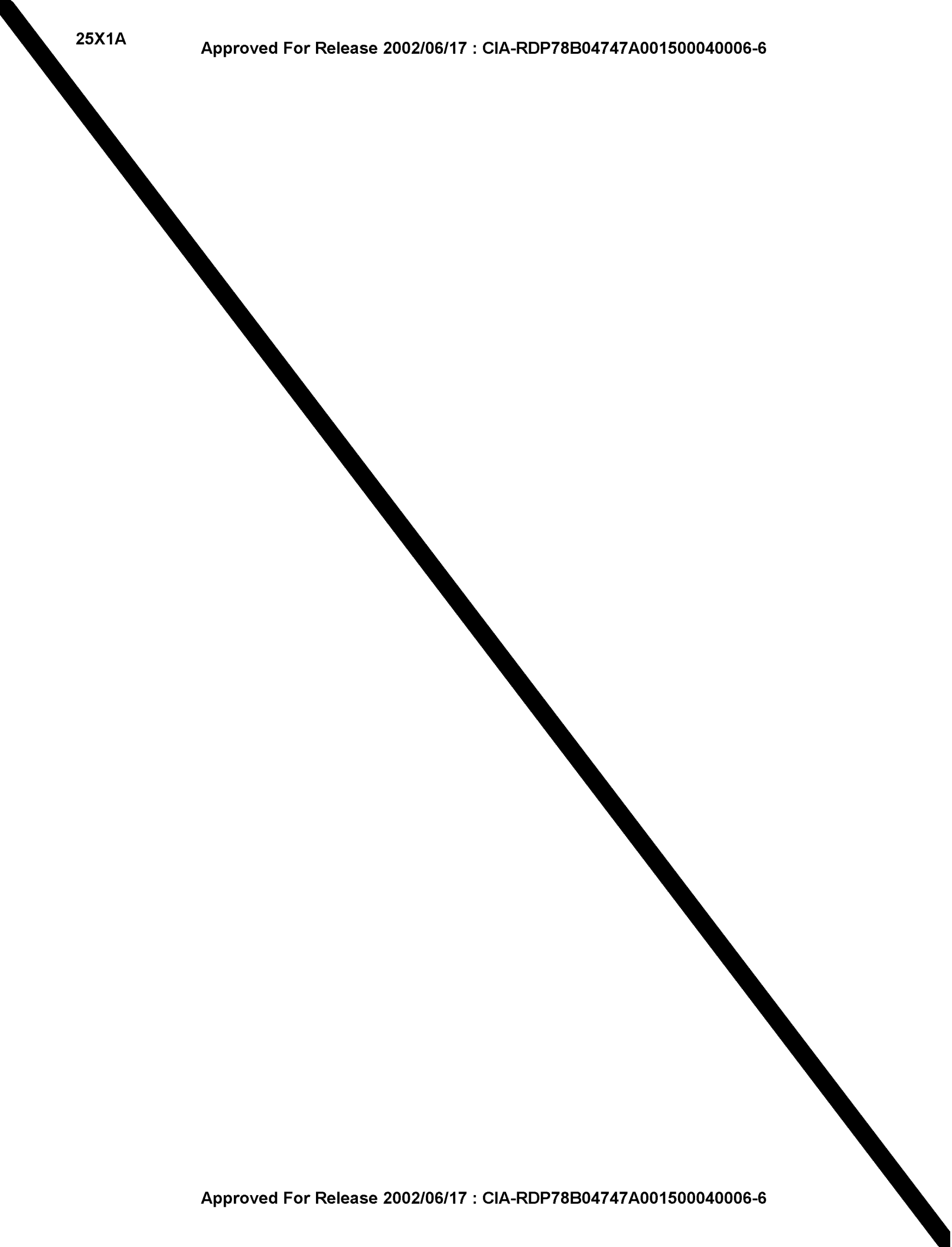
It is unfortunate that this situation has arisen; however, as is often the case in Research and Development type efforts, there was no way of anticipating the scope of the technical difficulties which we might encounter, especially since we did not presume any major problem in this optical area. However, the application of known techniques to an advanced state of development oftentimes presents unanticipated problems that could not be seen prior to the commencement of activities. At this point, we are confident that we have resolved this difficulty and hope to complete the remaining effort for Phase I in a timely and efficient manner.

To reiterate, it is requested that this overrun proposal be favorably considered and that additional funding be made available to the program by 28 February 1966.

Very truly yours,

[redacted] 25X1A
Contracts

avw
Encs.



Approved For Release 2002/06/17 : CIA-RDP78B04747A001500040006-6

EXHIBIT "B"

UNIVERSAL DATA BLOCK READER

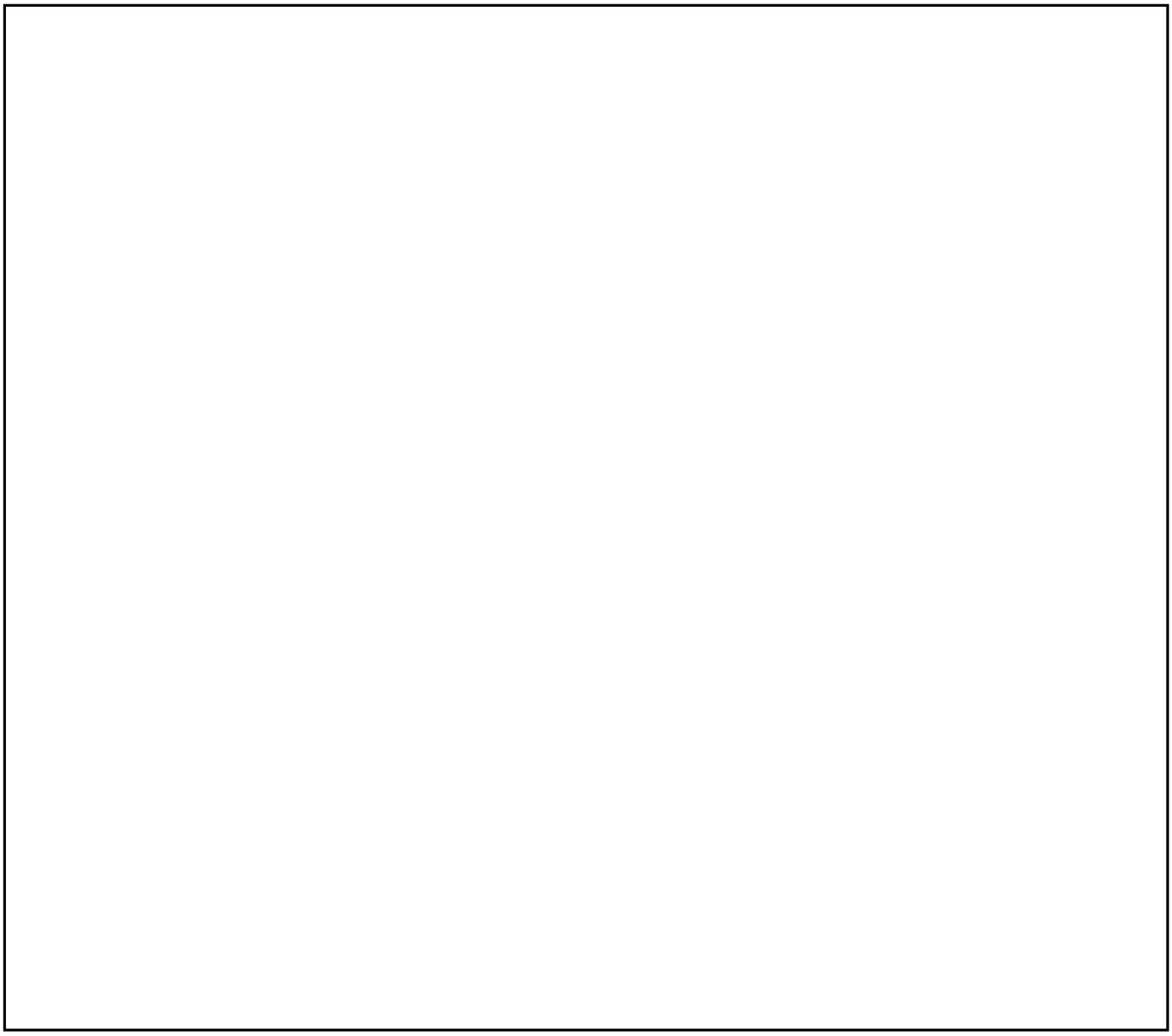
The Accuracy Requirements cited in Section 4.4.3 of Proposal SME-PR-09, which sets forth the contractually required Scope of Work, outlined the method by which the reader would correct for wander of the film in both the camera and the reader itself. This system employed a read head containing 108 diodes, each spaced .006 inches apart. The diodes are grouped in three sets, A, B, and C, creating three separate heads, interlaced with each other. As the film wanders, the distance between the edge of the film and the index bit of the data block will vary. A window of 12 diodes, 4 of each group, is used to locate the index bit. Since the wander varies continuously, and the resolution of the head is .006", the index bit may fall under any one or more of the 12 diodes in the window. Ideally, with a perfect dimensional match between the diode array and the data block, when the window picks up an index dot with a diode belonging to one group, all dots in the data file will also be picked up by the diodes in the same group. In actuality, a perfect match cannot be achieved and certain tolerances have to be considered. The following analysis will establish the maximum tolerable dimensional deviation which allows reliable reading.

The smallest geometric coverage of any diode will occur when the minimum size dot of .006" will be evenly covered by two adjacent diodes, such that each diode will see one-half of a dot or .003" of area coverage. The threshold of the read amplifiers is set to recognize .002" of coverage as a dot. Therefore, if any one diode group is selected, only .001" total deviation from nominal is allowed between the index dot image and the image of any other dot in the data block. By changing the logical scheme to one in which a split coverage of a dot by two adjacent diodes activates both diode groups, the allowable tolerance is doubled. This will effectively widen the pickup area of each head increment to .012" instead of the .006" of a single diode.

Under this scheme, the worst case condition is no longer the one described previously. Instead, the tightest dimensional accuracy will be required when a .006" dot will be covered unevenly by two diodes--one diode covering .004" and the other .002". Because of the amplifier threshold, the diode covering the .002" portion of the dot is on the verge of being ignored, and only one diode, the one with the .004" coverage, will provide a reliable output. Under these conditions, only one diode group will be selected, and the tolerable dot deviation is .002".

Since the diode array is dimensionally accurate to .0003" and the film shrinkage can reduce the recorded block by .0002", the system has an inherent basic inaccuracy of .0005". Allowing another .0005" for film thickness variations and a safety margin, a tolerance of .001" is left for the optical system.

25X1A



PROGRAM IMPACT

From the aforementioned analysis it is seen that a low distortion mapping type lens, corrected in the red region, was required. While the technology for designing and manufacturing such a lens exists, the need for this type of lens, to our knowledge, has not arisen in the past. Therefore, the new lens had to be designed, thereby necessitating an expenditure of additional funds to accomplish this lens design.