ATTACHMENT 3 TO:

[redacted]

EXRAND-M-42

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WIDE FIELD HIGH POWER ANAMORPHIC STEREOVIEWER BRIEFING

Presented By

[redacted]

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17 March 1971

WIDE FIELD HIGH POWER ANAMORPHIC STEREOVIEWER

Narration

During this short briefing on the Wide Field High Power Anamorphic Stereoviewer, I will discuss the original thinking which launched this project, a brief history of its evolution, and the predicted characteristics of the instrument. Finally, I will discuss budgetary production cost of the equipment and make a request for some informal feedback from the members of your group.

Now, let us take a look at the original thinking behind this instrument.

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CONCEPT - To design and fabricate a table top instrument having optical qualities equivalent to those of the currently available high power stereoviewer but with a wider field of view.

Narration

The important words here are, "wider field of view". We will discuss this in more detail shortly.

Why do we need a Wide Field High Power Anamorphic Stereoviewer? Just what will it do for us; what is its purpose?

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PURPOSE - To improve the photographic interpreter's performance in the detailed analysis of specific targets by increasing the area on the film presented to his eye at each selected magnification.

Narration

To give you an idea of what the wider field of this equipment will look like to the photographic interpreter, we have prepared this set of simulated comparative views at four separate magnification powers; 10X, 30X, 50X, and 100X. There are two presentations at each magnification; the first shows the field of view as seen through the presently available High Power Stereoviewer, while the second shows the field of view which will be seen through the Wide Field High Power Anamorphic Stereoviewer. You will notice the increased amount of contextual information which will be available in the latter instrument.

Now, let us turn our attention to more specific data.

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REQUIREMENTS

10X to 180X Magnification

Wide flat field of view (at least 37 mm @10X magnification)

Image quality equivalent to the High Power Stereoviewer

Resolution of entire system:

10 line pairs/mm/magnification power at 10X magnification.
6 line pairs/mm/magnification power at 180X magnification.

Each optical path to have:

Zoom magnification
Image rotation
Anamorphic Correction (1.1 to 2.2X)

Eyepiece tilting range:

0 to 45 degrees from horizontal

Four 6" x 6" film chip stages having rotation and X and Y translation.

Separate illumination for each stage.

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In early 1967, these requirements were incorporated into a Development Objectives document and sent out with a Request for Proposal to these eight prospective bidders.

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PROSPECTIVE BIDDERS:

* Bausch & Lomb, Inc.
Perkin Elmer Corporation
* Stele Corporation
Link Group - General Precision, Inc.

* American Optical Company
  Northrup/Nortronics
* Diffraction Limited, Inc.
  The Boeing Company

Narration

Only the four contractors designated by a star submitted bids. Of particular importance, however, was the fact that all of these contractors stated that the attainment of the requirements would involve a great deal of risk. Without exception, the bidders noted that costing would be difficult since the construction of this instrument would involve pushing the state-of-the-art in optics. Bausch & Lomb, Inc., was finally chosen as the successful bidder and a contract was let in June 1967. This contract was for approximately [redacted] with a period of performance of 20 months. To protect the government, the contract was divided into two phases: I - a design analysis study and, II - final design and fabrication; prosecution of the second phase being contingent upon successful completion of the first. With a number of overruns and time extensions, Phase I was finally completed in March 1969 for about [redacted] considerably more than the originally planned [redacted]

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Evaluation of the preliminary design, both by our own technical personnel and our paid consultant, indicated that the instrument could be built to the original specifications. At the end of Phase I, the instrument was envisioned as being as shown in this wooden mock-up.

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(See attachment 1 to this briefing summary.)

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The upper structure, the portion containing the optics, had an open triangular shape, when viewed from the top, and rested on the three columns shown. To the inboard side of each lens turret and toward the rear, you will notice separate field lens carrousels. Each of these carrousels contained four separate field lenses which had to be mated with their appropriate objective lenses, an undesireable feature from the standpoint of convenience for the operator. The necessary controls for the instrument were arranged as captioned on the model.

Returning for a moment to the history of the contract, it was decided to proceed with Phase II. However, the contractor stated that, in the light of his experience in prosecuting Phase I, he could not attempt Phase II without a renegotiation of the price. This negotiation period lasted for one year, and work on Phase II was started in April 1970. The total contract price was increased to [redacted] with an

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additional period of performance of 22 months. Once again, for the protection of the government, Phase II was divided into three milestones with the prosecution of each of the latter two contingent upon successful completion of the previous. Milestone 1 would be devoted to the Optical and Opto-Mechanical Final Design, Milestone 2 to a Complete Optical Bench Test, and Milestone 3 to Fabrication of the prototype. Milestone 1 was completed on 19 February 1971 and we are now reviewing the contractor's report on this portion of the work.

The configuration of the instrument has changed somewhat; the upper structure now having an open rectangular shape, when viewed from the top, and resting on four columns rather than three. Also, the field lenses have been incorporated into the objective lens turrets, thus eliminating the carrousels. The lens turrets are now mounted in a horizontal plane rather than the tilted plane shown.

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RESOLUTION IN OBJECT PLANE

(Lines/mm - On Axis - 4% Response)

System Mag.	180X	95X	20X	10X
Development Obj.	1048	737	189	100
*Phase I Design	1225	766	209	107
*Phase II Design	1280	770	260	135

* = Without Anamorphic Magnification

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Resolution values in the object plane in lines/mm, on axis, and at 4% response (the minimum detectable by the eye) are shown for four system magnifications and at three distinct points in the evolution of the instrument. The magnification powers shown were selected to give performance indications of the four objective lenses. Anamorphic magnification effects could not be included in the values shown due to the inability of the computer to handle the tilted surfaces inherent in such systems. Even though the resolutions of the Phase II (final) design may ultimately be slightly less than the values shown due to minor degradations by the anamorphic elements, it is expected that they will still exceed the requirements written into the development objectives.

Based on our review of the Milestone 1 optical report, as well as a review by our consultant, [redacted] of the University of Rochester, 25X1 we have decided to proceed with Milestone 2 -- the optical bench test.

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The budgetary production cost data shown was furnished by the contractor on 30 July 1970 with a warning to use this information cautiously, since they were not far enough advanced in the design to make accurate predictions.

Using a per unit cost figure [redacted] and a production model availability sometime in the early part of 1973, we request that you, the various members of EXRAND, furnish us very informal estimates of the quantities of the production version of the Wide Field High Power Anamorphic Stereoviewer which your respective activities plan to purchase in FY-73 and/or later years. We will not hold you to these quantities. We merely need them for production planning purposes. It should be noted, however, that substantial savings may be realized through a unified purchase. 25X1

In order to insure timely use of this information, we request that it be forwarded to us on or before 1 July 1971. Transmittal may be through the EXRAND Executive Secretary or direct to me at this address.

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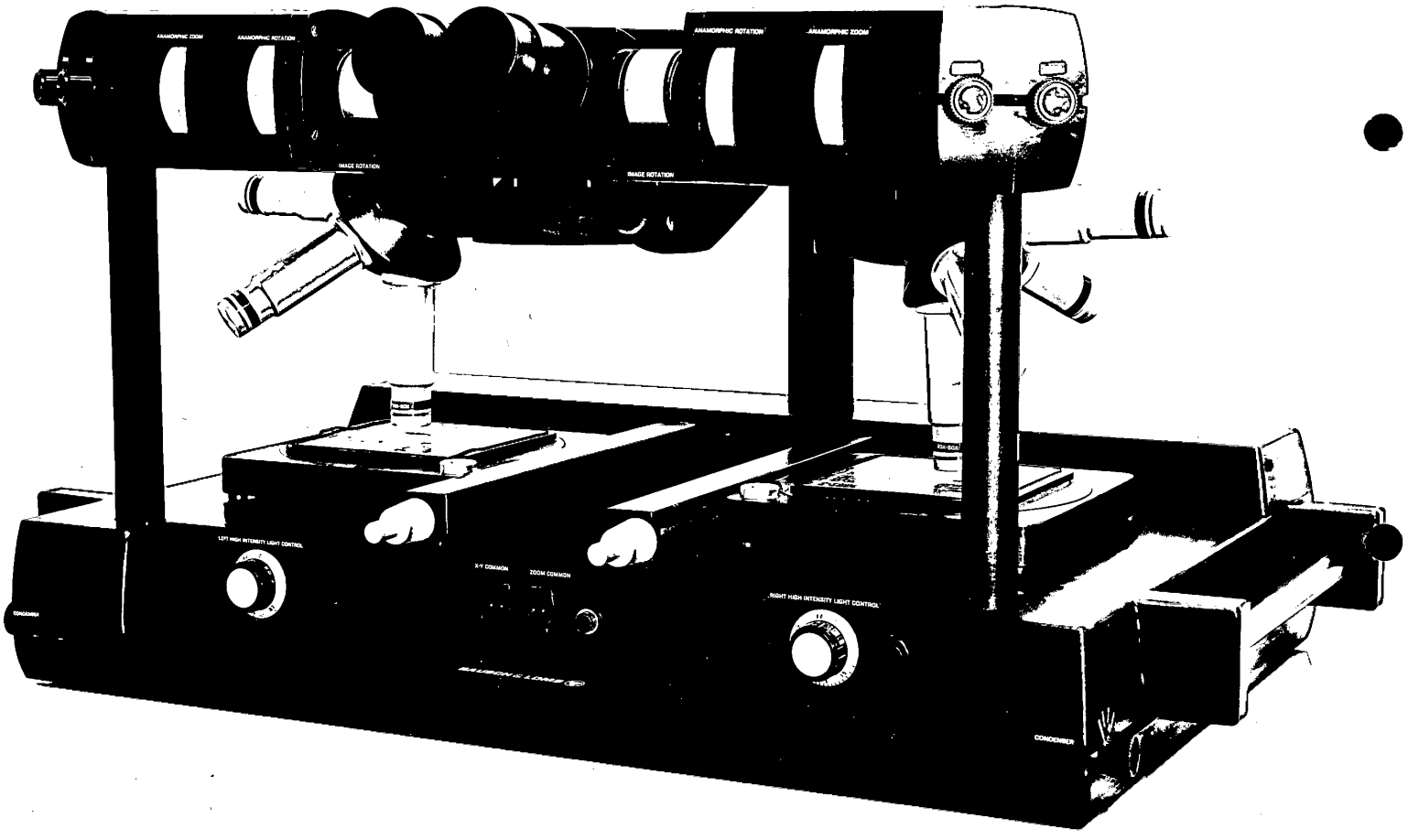

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