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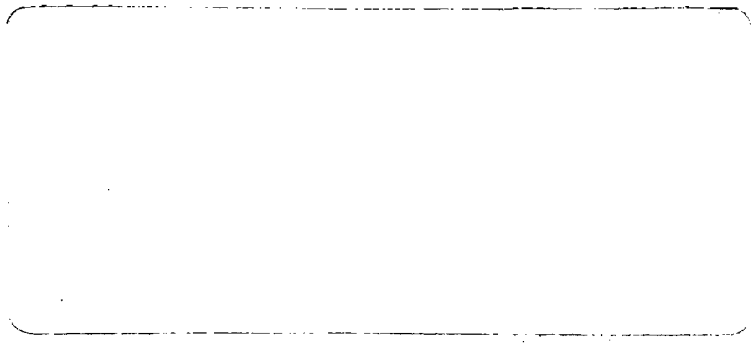

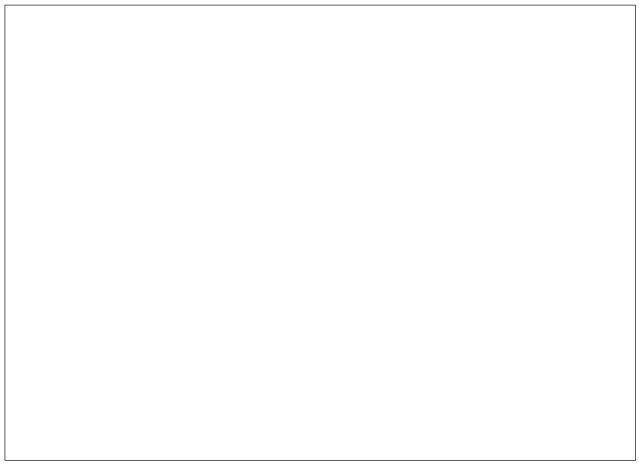

STAT

STATUS REPORT

for Period

1 October through 31 October 1968

Submitted under Contract to

U. S. Government

[redacted] STAT

File No. 11038

[redacted] STAT

This document is presented as the Monthly Status Report under contract to the U. S. Government, [redacted] STAT
The report period represented herein covers the period of 1 October through 31 October 1968.

[redacted] STAT

[redacted] STAT

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PROGRAM STATUS

Summary as of October 31 1968

Scheduled percentage of program completed - 34.2%
Actual percentage completed this date - 32.2%

There has been considerable progress during this report period which is outlined in detail under specific task heading.

Machine assembly, framing and skinning are proceeding according to schedule and items of peripheral equipment are being delivered as required.

The results of the Project Manager's trip to [redacted] STAT are included in this report under Task 16, 17 and 18.

Task 01 Statements of Work, Specifications, Report Preparation

Scheduled percentage of completion	32.0%
Actual percentage of completion	32.0%

There has been no requirement during this report period for any changes to existing work statements or specifications, and no additional items have been issued.

Subcontractor's progress report on Computer Programming status, Task 43, is included in this report.

Task 02 Scheduling and Planning

Scheduled percentage of completion	32.0%
Actual percentage of completion	32.0%

The program planning (PERT) chart is currently being revised to reflect the effect of [redacted] schedule revision which is reported in Task 16, 17 and 18. STAT

The impact of this schedule change upon the overall plan will be reported, and a new planning chart issued in November.

There have been no other schedule revisions during this report period.

Task 03 Test and Inspection Procedures

Scheduled percentage of completion	24.0%
Actual percentage of completion	19.0%

There is no change in the overall test procedure schedule which will be prepared for release during the early part of 1969.

All subassembly/assembly test procedures have been written and implemented as required.

Task 04 Management, Administration and Supervision

Scheduled percentage of completion	32.0%
Actual percentage of completion	32.0%

During this report period, the Project Manager visited the optical subcontractor's site to review overall progress. Results of this visit are outlined in the specific task report.

Management effort during this report period has been of a routine nature, with no major problems.

Task 05 Meetings

Scheduled percentage of completion 32.0%

Actual percentage of completion 32.0%

A meeting was held at the [redacted] facilities on STAT October 9 and 10 with various customer representatives. This meeting was convened for the purpose of reporting program progress and to resolve any technical questions which may have developed during the program's duration.

This meeting was adjudged to be beneficial and successful by both [redacted] personnel and customer representatives. STAT

Task 06 Facilities Requirements

Scheduled percentage of completion	60.0%
Actual percentage of completion	50.0%

During this report period, [redacted] has received the pump and compressor for the utilities vacuum system, the air conditioning motors and mounting blocks, the mounts and frames for the machine and room air conditioning filters.

STAT

Delivery of the air conditioning units and the condenser is scheduled for the early part of November.

No work has been performed on the Clean Room construction during this report period, as machine assembly, with the attendant drilling and grinding functions, has created a considerable amount of dust and dirt. Work is scheduled to begin on the balance of construction in November.

The contract for the installation and fabrication of the ductwork was awarded during this report period.

Task 07 Main Frame and Structural Elements

Scheduled percentage of completion	98.0%
Actual percentage of completion	93.0%

As previously reported, the main frame and structural elements have been installed.

No additional work was scheduled on this task during the month of October.

Task 08 Skin

Scheduled percentage of completion	25.0%
Actual percentage this date	24.0%

The aluminum skin which forms the protective covering for the various subassemblies of the Stereocomparator is being fabricated on schedule.

As reported previously, the skin sections housing the utilities and electronics on the rear of the machine have been completed, and the work of fabricating the skin which will house the optical bridge, as well as the front of the Stereocomparator, is in process.

Task 09 Granite and Ways Assembly for Stages

Scheduled percentage of completion	82.0%
Actual percentage this date	75.0%

As reported previously, the right hand granite base was installed on the main frame during the month of September.

The left hand granite base was received in October, and was drilled and tapped by the [redacted] Shop. This section has now been installed on the main frame also. STAT

The remaining granite sections have been re-scheduled to ship the month of November.

Task 10 Air Bearings

Scheduled percentage of completion	50.0%
Actual percentage this date	50.0%

As reported previously, the fabrication of the air bearings used to support and guide the two stages has been completed.

The assembly and installation of the air bearings which was originally scheduled for October is being rescheduled for November to coincide with the delivery of the granite sections.

Task 11 Stage Drives

Scheduled percentage of completion	52.0%
Actual percentage this date	44.0%

Both the mechanical and electronic portions of the stage drive assemblies have been completed and bench-tested by the [redacted] shop. STAT

Installation of these assemblies on the stages will proceed according to schedule.

Task 12 Film Drive and Transport System

Scheduled percentage of completion	50.0%
Actual percentage this date	50.0%

During the month of October, the electronic chassis required to operate the film drive were received and bench-tested by the [redacted] shop. STAT

They were found to be satisfactory, and the film drive and chassis have been connected and tested as a system.

Final servo alignment is now in process.

Task 13 Film Platen and Film Clamping

Scheduled percentage of completion	30.0%
Actual percentage this date	22.0%

The film platen assembly has been fabricated, and is being bench-tested in conjunction with the film drive electronical check out.

Experimental work in connection with vacuum clamping and air floating of the film is anticipated during November and December.

Task 14 Film Cooling

Scheduled percentage of completion	22.0%
Actual percentage this date	18.0%

The preliminary specifications for the film cooling refrigeration system have been completed, and a subcontractor to fabricate the air conditioning system is being selected by the customer.

It is presently proposed to send the film cooling conditioning unit to the optical subcontractor so that the equipment may be tested under simulated operating conditions. The details of this are being worked out with the site preparation subcontractor.

Tasks 16, 17, and 18 Viewing Optics, Viewing Illumination

Reticle Projector and Illumination

Scheduled percentage of completion	20%
Actual percentage this date	16%

[ ] visited the optical subcontractor [ ] during the week of October 14, 1968. STAT

All phases of the optics procurement were reviewed and a new performance schedule was developed.

This schedule reflects delays and procurement problems that have resulted from the disorders and strikes in Paris during the past summer.

The scheduled date of completion of the optical subcontract is now September 1, 1969. This produces a delivery date of March 15, 1970, for the Stereocomparator.

The report of the [ ] is given in Appendix I. STAT

Task 20 General Platen Illumination

Scheduled percentage of completion	50.0%
Actual percentage this date	41.0%

The high voltage connectors required for the electrical chassis used to operate the general platen illumination assembly were received in October.

Assembly of the mechanical components to the chassis has been completed by the [redacted] shop. STAT

Task 21 Optical Bridge and Supports

Scheduled percentage of completion	88.0%
Actual percentage this date	75.0%

The optical bridge, consisting of the center bridge, right and left hand bridges and optical support castings, has been mounted into position on the main frame.

Task 22 Interferometer Assembly

Scheduled percentage of completion	48.0%
Actual percentage this date	40.0%

The lasers, mirrors and beamsplitters constituting the interferometer system have been assembled.

Work is now in process connecting the electronic circuitry to the mechanical components.

It is anticipated that this sub-assembly will be ready to be mounted on the granite within the next report period.

Task 23 Optics Drive Assembly

Scheduled percentage of completion	33.0%
Actual percentage this date	30.0%

We have received and checked out all of the servo amplifiers for the optics drive assembly. Practically all of the motors and special potentiometers have been received, and the motors have been checked out. The check out of the potentiometers is now being accomplished.

During the month of October, breadboard simulation of the optical drives began, and at the present time we foresee no problems.

We are now planning a computer program which will test the accuracy and allow adjustment of the optics drives for final assembly. This computer program will be included in the deliverable items to provide a maintenance tool for calibration and adjustment of the optics drive systems after delivery of the Stereocomparator.

Task 24 Image Analysis System

Scheduled percentage of completion	18.0%
Actual percentage this date	18.0%

The subcontract negotiated with [redacted] STAT for the fabrication of the Image Analysis System has been signed by [redacted] STAT

The first progress report from [redacted] STAT covering the month of October is not due at [redacted] STAT until the 15th of November, and therefore will be included with our next month's status report.

Task 26 Digitizing Logic Subassembly

Scheduled percentage of completion	52.0%
Actual percentage this date	55.0%

The electronic chassis required for the digitizing logic subassembly was received from the vendor and bench-tested by the [ ] shop. STAT

Minor discrepancies were found in the P.C. boards for this chassis, and these were returned to the vendor for rewiring.

When these chassis have been reworked and returned, they will be assembled into the system.

Task 27 Metric Readout

Scheduled percentage of completion	59.0%
Actual percentage this date	65.0%

The two electronic chassis controlling the metric readout have been bench-tested by the [redacted] shop and found to be completely satisfactory. STAT

These chassis are now ready to be incorporated into the overall system.

Task 28 Output Logic and Interfaces

Scheduled percentage of completion	52.0%
Actual percentage this date	45.0%

The electronic chassis required for the output logic and interfaces are now being bench-tested by the [redacted] shop personnel. STAT

Work is now in process testing the stage position and mode logic chassis.

Task 29 Cabling

Scheduled percentage of completion	52.0%
Actual percentage this date	59.0%

The percent progress of the cabling required to interconnect the various electrical and electronic elements being assembled in the [redacted] shop is as follows: STAT

Cabinet #1	
(Stage drives, film drive and transport system)	99%
Cabinet #2	
(Optics drive, interface with Image Analysis System)	43%
Cabinet #3	
(Metric Readout, output logic and interfaces)	71%
Electrical arrangement (floor interconnection of all cables)	38%
Control Console	46%
Display Panel	10%
Optical Bridge	5%
Stage Assembly	32%

Task 30 Control Console and Chair

Scheduled percentage of completion	52.0%
Actual percentage of completion	48.0%

The switch assembly for the control console was received in October which completed the mechanical portion of this task.

The stainless shroud for the control console is being fabricated by the [ ] shop, and fit checks to assure proper alignment with the main assembly are in process. STAT

Task 32 Computer

Scheduled percentage of completion	90.0%
Actual percentage this date	95.0%

As reported previously, the DDP 516 computer has been temporarily installed, and is being used by [redacted] STAT personnel in their development of the computer program.

Task 33 Electronic Racks and Control Cabinets

Scheduled percentage of completion	58.0%
Actual percentage this date	60.0%

The electronic racks have been received from the vendor and were inspected by [redacted] personnel for compliance with the design drawings and specifications. STAT

Plenum chambers are being designed and fabricated to match the supply and return air system within the cabinet, to the input and output fans on the individual electronic chassis.

It has also been decided to provide eye bolts on the tops of the cabinets to facilitate handling at the customer site during installation.

Task 34 Utilities, Vacuum and Air Systems

Scheduled percentage of completion	30.0%
Actual percentage this date	27.0%

The cabinet to house the utilities, vacuum and air systems is scheduled for delivery the first week of November.

A field trip was made to the vendor supplying the electronic components, and [redacted] was advised that these chassis will be received from the vendor during the month of November. STAT

Upon receipt of the cabinet and the chassis, assembly of the systems will begin.

Task 35 Vibration Absorption and Leveling

Scheduled percentage of completion	90.0%
Actual percentage this date	85.0%

During the month of October, [redacted] STAT representative visited [redacted] STAT facilities to check out the vibration absorption and leveling system.

The system has now been activated, and the controls are now being prepared for acceptance testing by [redacted] STAT personnel.

Task 36 Overall Assembly

Scheduled percentage of completion	17.0%
Actual percentage this date	5.0%

The Stereocomparator has been assembled to the point where the optical bridge is being dowelled and pinned to assure correct optical alignment when it is returned from France.

The next major assembly to be installed will be the saddles and "T" sections which are scheduled for installation after the bridges are removed and shipped.

Task 37 Radio Frequency Noise Suppression

Scheduled percentage of completion	0.0%
Actual percentage this date	0.0%

No work was performed on this task during October 1968.

Task 38 Environmental Control

Scheduled percentage of completion	43.0%
Actual percentage this date	40.0%

There have been no changes in the environmental control requirements, and therefore no work was performed on this task during the month of October 1968.

Task 39 Reliability Analysis

Scheduled percentage of completion 0.0%

Actual percentage this date 0.0%

No work was performed on this task during the month of October 1968.

Task 40 Installation

Scheduled percentage of completion	0.0%
Actual percentage this date	3.0%

A meeting was held at the installation site between engineering representatives of [redacted] and the customer. The proposed site appears to be acceptable to [redacted] for installation of the Stereo-comparator. STAT STAT

There are many detailed problems related to handling of heavy equipment to and from the installation area, and the customer has proposed the use of overhead lifting equipment which appears to be a very satisfactory way of solving these particular problems.

The air conditioning, air, electrical power, and electronic cables are to be installed beneath the computer-type floor in accessible utility and cable trays. A layout of the tray arrangement has been delivered to the site preparation subcontractor.

[redacted] considers that it is essential that a continuing inter-change of information occur with customer representatives assigned to the site preparation. Only in this manner will a minimum cost and satisfactory installation be realized. STAT

Task 42 Breadboards and Test Devices

Scheduled percentage of completion	15.0%
Actual percentage this date	10.0%

Breadboard test services are being performed on the film platen and film clamping assembly. See Task #13.

Task 43 Computer Programming and Services

Scheduled percentage of completion	24.0%
Actual percentage this date	25.0%

[ ] has requested that the customer assign a representative to review mutual problems related to the installation and operation of the Stereocomparator computer interface. STAT

[ ] the subcontractor for the computer program, has submitted their October progress report which is included herein as Appendix II. STAT

[ ] experienced difficulty with sticking of the high speed paper tape punch and tearing of the tape. The Service Representative of the punch manufacturer was called in to service and adjust the punch head. It was learned that it is necessary to lubricate the punches whenever sticking occurs or at least once a week. Further it is important to use lubricated rather than dry paper tape. STAT

There appears to be no further problem with the punch unit.

Task 44 Preacceptance Test in Fabrication Plant

Scheduled percentage of completion	0.0%
Actual percentage this date	0.0%

No work was performed on this task during the month of October.

Task 45 Acceptance Test in Fabrication Plant

Scheduled percentage of completion	0.0%
Actual percentage this date	0.0%

No work was performed on this task during the month of October 1968.

Task 46 Acceptance Test after Installation

Scheduled percentage of completion	0.0%
Actual percentage this date	0.0%

No work was performed on this task during the month of October 1968.

Task 47 Instruction Manual and Drawing Submittal

Scheduled percentage of completion	4.0%
Actual percentage this date	3.0%

We have completed the schedule for production of the manuals.

[redacted] personnel are now in the process of writing the first draft of instruction information on Tasks 11, 27 and 28. STAT

Task 48 Spare Parts List

Scheduled percentage of completion	0.0%
Actual percentage this date	0.0%

No work has been performed on this task during the month of October 1968.

Task 49 · Operator Training

Scheduled percentage of completion	0.0%
Actual percentage this date	0.0%

We are continuing to compile information to be used in the Operator Training Manual.

TRIP REPORT

Company Contacted: [redacted] STAT

Contact Date: Week of October 14, 1968

Contacted by: [redacted] STAT

Persons Contacted: [redacted]

Reference: Job #342

The [redacted] visit was primarily for the purpose of determining the STAT schedule relative to production of the optical system for the Stereocomparator, and in addition to establish the level of the work over the fabrication time period in order to base the progress payments relative to the work performed.

At the outset of the discussions it was clear that there was no prospect for [redacted] STAT to meet the production requirement and retain the production solely in the [redacted] STAT plant as had been planned. The impact of the strikes and disorders in France during the summer of 1968 is now showing up in the form of a much delayed delivery of the optical glass, and a jamming up of the production facilities at the [redacted] STAT because of other orders which were not processed during the early part of the summer.

At the previous [redacted] it had been agreed that [redacted] STAT would examine the possibility of performing some of the fabrication work in their other facilities.

This was not a desirable step because of the obvious difficulties in maintaining technical and schedule control when the project work is

scattered over several facilities. However, in this case there appeared to be no alternative.

Agreement was therefore reached with [redacted] to use their [redacted] plants and additionally to send out to local machine shops whatever of the work could be handled in a practical manner. STAT STAT

Meetings were held including people from the various other production facilities and it was agreed that approximately 10,000 manhours of work would be jobbed out to other plants. This represents 53% of the fabrication effort.

It was not possible in the time available to arrive at the amount of job-shop work to be let out; however, as a specific, the castings were on hand at the [redacted] plant and it was agreed that they would be sent out immediately for machining. The same day that this agreement was made trucks picked up the castings and took them out for machining. STAT

[redacted] had ordered the glass for the zoom lenses from the French firm of [redacted]. The material that had been delivered to them for these lenses was not up to specification and on the basis of [redacted] calculations it had been determined that the ultimate resolution of the Stereocomparator would be degraded by 10%. STAT STAT STAT

This matter was considered sufficiently serious to [redacted] so that a special meeting was requested. It was learned in the technical discussions, that after surface polishing by [redacted] the zoom lens glass had been returned to [redacted] for determination of refractive index. From the resulting data, the [redacted] optical engineers had decided that the glass was not suitable. STAT STAT STAT

In actuality, it turned out that [redacted] had not determined the refractive index to the necessary tolerance or to the number of places of decimals that was required for proper evaluation. STAT

It was therefore decided to return the glass to [redacted] and have them perform proper refractive index determinations. This action was taken the same day and later in the week it was disclosed that [redacted] had determined the refractive index properly and that the data obtained, showed that the glass was quite usable and there would be no degradation of resolution provided the front element zoom lens package was positioned along with the other zoom lens moving elements. STAT STAT

[redacted] therefore agreed to make this design change in the interests of maintaining optimum resolution. STAT

As of now, 75% of the glass has been surface polished and returned to [redacted] for refractive index determination. 25% is in process of polishing at [redacted] Virtually 100% of the glass is on hand. STAT STAT

The [redacted] plant has a total of 12 workmen performing special lens grinding. Two of these men are working on the Stereocomparator job, and in addition, one man is finish grinding the tooling glass surfaces. STAT

At this time approximately 25% of the glass blanks have been roughed out to contour, reading for polishing.

Practically all of the metal castings are on hand at [redacted] 20 items were seen. STAT

Many of the castings are of aluminum, but the larger frame

pieces are of steel. It was noted that approximately 75% of the many machine tools at [redacted] were in operation, and a sign was up on the outside of the building saying there were shortages in various categories of machinists. STAT

Approximately 150 parts were in process of being machined and were in the various stages from roughing out to final machining.

The [redacted] estimate of work performed and in progress was very close to that anticipated by the latest schedule. Parts were physically in evidence and [redacted] appears to be working at capacity to get the job done. STAT STAT

On Drawing E6498C, the optical bridge center section, [redacted] requests that [redacted] show the center of gravity and the weight of the unit, one value for the bridge only, the other with the bridge and the optics. STAT STAT

[redacted] plans to equip the bridge elements with lifting eyes and the weights of all bridge elements are to be provided by [redacted] STAT STAT

[redacted] required a [redacted] servo motor for test work as part of the optical servo drive simulation. The [redacted] motor had been selected by [redacted] as the best unit for driving the condenser zoom system. It was not possible to use an American motor, in that none could be found with sufficient power and having the required small size. [redacted] has bought one of the motors and has air-mailed it to [redacted] (the motor has since arrived safely at [redacted] STAT STAT STAT STAT

There appeared to be much confusion in interpreting [redacted] drawings with respect to the direction of rotation of the potentiometers for position readout. STAT

That is, as for example, the zoom magnification increased, there was difficulty in understanding whether the potentiometer rotation was clockwise or counter clockwise.

This entire package of drawings was reviewed with the [redacted] STAT designers and a list was prepared covering the anamorphs, the zooms, and the image rotators for all elements of the optical system, which specified the direction of rotation of the readout systems.

Certain of the drawings were found to be in error and were marked up with corrections. [redacted] has agreed to send the revised STAT drawings to [redacted] STAT

Main 10X Zoom

For both left and right sides, potentiometers turn clockwise. The main and reticle zooms and anamorphs are arranged head to head so that due to the direction of the light rays, one unit magnifies while the other de-magnifies. The two units are mechanically and electrically equal. [redacted] must therefore not perform a compensation for this situation - STAT it is to be taken care of by the optical arrangement zoom potentiometer.

$\theta = 347(K) \log_{10}$ magnification. The left main zoom, Dwg. E4960A, is being revised by [redacted] because the lens items 4, 5, 6 STAT are in trouble as the proper N_d for the glass elements is not attainable. Parts 30, 31, 34 of the assembly must be adjustable for position and will be driven by the main cam. This is the item which otherwise would cut the peak resolution by 10%.

The functions for the main zoom 10X and the field condenser adjustable diaphragm, Dwg. E4680, are as follows:

E4960A - Ratio 4:1 potentiometer

Linear (condenser F = 40 drive)
Linear (diaphragm F = 40 drive)
Linear (condenser F = 80 drive)
Linear (diaphragm F = 80 drive)
Ratio 2:1 potentiometer
Exponential (zoom to reticle)
Linear (zoom to reticle)
Exponential (servo zoom computer)
Exponential (indicating meter)
Linear (spare)

a) Left zoom, Dwg. E4960A, position sense of main left zoom potentiometer as magnification increases, zoom cam rotates counter clockwise when viewed from the gear drive end. The 5-cup potentiometer turns clockwise when viewed from its drive shaft end. Likewise, the 4-cup potentiometer turns clockwise when viewed from its shaft end.

b) Right zoom, Dwg. E4961A, as the magnification increases, the 5-cup potentiometer turns clockwise. Also, the 4-cup goes clockwise, both viewed from their shaft ends. The cam rotates counter clockwise when viewed from its gear end.

Reticle 10X Zoom

Both left and right sides, potentiometers turn counter clockwise.

a) Left side, Dwg. E7040, potentiometer turns counter clockwise. When the main zoom magnification increases, the reticle zoom magnification must increase (see explanation for anamorph). This is accomplished when

the cam rotates clockwise as viewed from its gear end. The potentiometer turns counter clockwise when viewed from its shaft end.

b) Right side, Dwg. E7041, potentiometer turns counter clockwise. For increase of magnification, the cam rotates clockwise as viewed from its gear end, and the potentiometer rotates counter clockwise as viewed from its shaft end.

Reticle 4X Zoom

Both left and right side potentiometers turn clockwise.

a) Left side, Dwg. E7150A, when the spot diameter is increased, the cam revolves counter clockwise when viewed from its gear end. The potentiometer turns clockwise when viewed from its shaft end.

b) Right side, Dwg. E7151A, for increasing the size of the spot, the cam turns counter clockwise when viewed from its gear end and the potentiometer turns clockwise when viewed from its shaft end.

Main Condenser Diaphragm

The condenser diaphragm has a step function for an additional Globe motor which switches the diaphragm origin when the objective lenses are switched. The command for this motor and the two pairs of two limit switches must be provided by [redacted] during objective switching (Dwg. E7539A). STAT
The motors are Globe Type SD servo mount, 136A100-14; 12V, 8000 rpm.

a) Left side, Dwg. E7539A, when the magnification increases, the potentiometer shaft turns counter clockwise when viewed from its shaft end.

b) Right side, Dwg. E7540A. For increase of magnification,

the potentiometer shaft turns counter clockwise when viewed from its shaft end.

Main Condenser Lens Drives

Both left and right side potentiometers turn clockwise.

a) Left side, Dwg. E7469A. As the magnification increases, the condenser lenses approach the platen by rotating the body counter clockwise when viewed from the platen end. The potentiometer turns clockwise when viewed from its shaft end.

b) Right side, Dwg. E7470A. For increase in magnification, the potentiometer shaft turns clockwise when viewed from its shaft end.

Main Anamorph Expansion Ratio

Anamorph systems are based on the potentiometer sense required when increasing anamorph expansion is seen at the eyepieces. Allowance has been made for the fact of contraction by the reticle anamorph. The potentiometer turns one right and one left hand. Active single 274° - 34' - 33" for exactly 2 ratio. Actually, 5% over-travel optically so presumably there should be 5% electrical over-travel.

a) Left side, Dwg. E5120, potentiometer turns clockwise. Drawing shows ratio 1:1. When the expansion ratio increases, the potentiometer turns clockwise when viewed from outboard and towards its shaft (i.e., when viewed from its shaft end).

b) Right side, Dwg. E5121, potentiometer turns counter clockwise. Drawing shows ratio 1:1. When the expansion ratio increases, the potentiometer turns counter clockwise when viewed from its shaft end.

Tabulation for potentiometer shaft angle versus expansion ratio of the main anamorph:

Anamorph Ratio Expansion	Potentiometer Degrees	Shaft Minutes	Angle Seconds
1.0000	0	0	0
1.0794	033	52	33
1.1667	067	45	07
1.3704	135	30	14
1.6316	203	15	36
1.7932	237	08	09
1.9832	271	02	13
2.000	274	00	14

Main Anamorph Rotation

Anamorph rotation systems are based on the potentiometer sense required for clockwise rotation as seen at the eyepieces. Allowance has been made for the effect of the various prisms.

a) Left side, potentiometer turns clockwise, the anamorph prisms rotate counter clockwise when viewed from the end where the light rays enter. Thus the 4-cup potentiometer rotates clockwise when viewed from shaft end. Potentiometer ratio to anamorph 1:1.

b) Right side, potentiometer turns clockwise. When the right eyepiece rotates clockwise, the anamorph prisms rotate counter clockwise when viewed from the end that the light rays enter. The 4-cup potentiometer thus rotates clockwise when viewed from the shaft end.

Reticle Anamorph

The reticle anamorph is the same design and has the same function for the potentiometers.

a) Left side, Dwg. D6970, the potentiometer turns clockwise.

For increasing the expansion ratio, as shown by the main anamorph, the potentiometer revolves clockwise when viewed from its drive shaft end.

(Note: In actuality, the reticle anamorph is in a "decreasing" mode as it is compensating for the increasing ratio of the main anamorph. Nevertheless, the rotation "sense" as written above relates to the main anamorph.)

b) Right side, Dwg. D6971. Potentiometer turns counter clockwise. The right reticle anamorph potentiometer rotates counter clockwise when viewed from its shaft end, as the main anamorph expansion ratio increases.

Reticle Pechan Anamorphic Rotator

Both the left and right side potentiometers turn clockwise.

a) Left side. Prism is rotated counter clockwise when seen from the end that the light rays enter. The 4-cup potentiometer thus rotates clockwise when viewed from its drive shaft end.

b) Right side. For the right eyepiece rotation clockwise, the right reticle spot Pechan image rotator rotates counter clockwise when viewed from the end the light rays enter. The 4-cup potentiometer rotates clockwise when viewed from its drive shaft end.

Note: Potentiometer ratio to Pechan 2:1.

Main Pechan Image Rotator

For both left and right sides, potentiometers turn clockwise for clockwise rotation of the images as seen at the eyepieces. Allowance has been made for effects of prisms, etc.

a) Left eyepiece rotates clockwise when the Pechan rotates counter clockwise when viewed from the end the light rays enter. The 4-cup potentiometer thus rotates clockwise when viewed from the drive shaft end.

b) The right eyepiece rotates clockwise when the Pechan prism rotates counter clockwise when viewed from the end the light rays enter. The 4-cup potentiometer thus rotates clockwise when viewed from the drive shaft end.

Main Illumination Filter Wheels

The main illumination system filter wheels are arranged to be linear with respect to density. This means logarithmic with respect to transmission.

Early in the project, [redacted] suggested to [redacted] that a means should be found of shipping the optics, already installed, in the various elements of the optical bridge. STAT

[redacted] has resisted this situation and quite rightly, since it is not apparent just how the various optical parts can be properly held in position during shipping to insure that there will be no breakage, and it is certainly much more difficult to do this with the optical system installed in the optical bridge as compared with packing the optical elements in a dis-assembled condition. STAT

The reasons for shipping the optics assembled are even more valid at present than had been anticipated originally due to the increased schedule.

Note the requirement that the optical elements would have to be assembled, not only at [redacted] but also at the final installation site. This amount of optical dis-assembly and assembly could seriously extend the schedule and would probably require that the French optical technicians be present to make the various assemblies. STAT

An issue was therefore made of this situation and after considerable discussion, the optical designer and the technical director agreed that it should indeed be possible to pack the optics within the optical bridge in such a manner as to insure safe shipping. It was pointed out by [redacted] that unless very special precautions were taken to insure that the individual segments of the optical bridge are properly located at installation with respect to each other, then optical readjustment would still be required. STAT

[ ] has undertaken to review this aspect of the problem and STAT
to determine whether or not it is possible to provide tooling which will accurately locate the various portions of the optical bridge with respect to each other. By this means everything possible will have been done by [ ] to insure a minimum slippage of schedule due to the necessity STAT
for optical realignment.

It had been determined by [ ] that the glass refractive index as called STAT
out in the original specifications for the platen glass, was not possible of attainment in the quality of glass required for the Stereocomparator.

A glass was therefore selected of proper quality with the idea that a compromise would be required not only in the matter of refractive index, but also with respect to thermal expansion.

Since any changes in the refractive index of the platen glass would seriously influence the optical system as a whole, it was decided by [ ] that the only rational solution to this problem was to make the STAT
optical designers [ ] responsible for integrating the glass into STAT
the optical system.

The platen glass was therefore ordered from [ ] allowing STAT
them to specify the exact refractive index which would properly integrate with the optical system.

[ ] agreed to re-compute the optical system related to STAT
the condenser and objective lenses to allow for the change of the refractive index of the platen glass. In addition, they agreed to perform an experiment with a sample of the proposed glass which would determine the effect of its

increased coefficient of thermal expansion.

The purpose of this experiment was to determine the effect of the high intensity pencil of light rays focused at a point within the one and one-quarter inch thick platen glass. It is possible that stresses might be set up from local heating of the glass which could cause it to crack.

[ ] has ordered the glass blanks, in parallel with performing the experiment, with the expectation that the experiment will show that the effect is nil. STAT

[ ] has ordered a spare pair of platen glasses to insure that the start-up of the Stereocomparator will not be delayed due to breakage or damage to the platen glass. Assuming that the spare glasses are not required, then these items will be recommended for procurement by the customer as part of the Spares for the Stereocomparator. STAT

[ ] has begun the work of designing and fabricating the acceptance test fixture for holding the optical system. A building has been assigned for this work at the rear of their property, and thus will be as far as possible from [ ] with its vibration from heavy trucking. STAT STAT

A concrete fixture will be provided on the ground floor of this building with the concrete isolated from the existing concrete floor by a vibration absorbing media. A vibration consultant has been called in by [ ] and his preliminary recommendation is for a 4 ft. thick concrete base block mounted over a plastic resilient material. [ ] has also volunteered for the use of [ ] a small office with two desks to be adjace to the test area. STAT STAT STAT

[ ] has been experiencing considerable difficulty in understanding the hand and position of the various images as they pass through the Stereocomparator optical system. Some images are rotated and additionally, mirror reflections complicate the situation. The entire optical system was sketched on the blackboard and reviewed in a group meeting. Agreement was reached on this situation, and a sketch was prepared to show the position of the image as it passes through the system to the eye pieces. STAT

It was noted that one of the images presented to the image dissector tubes is rotated 180° with respect to the other image. This will have to be taken into account in the mounting and connecting of the image dissector tubes.

It was noted that [ ] is maintaining its past extremely cooperative attitude towards the Stereocomparator project, and is showing no evidence of compromising quality. In fact, the schedule is being somewhat sacrificed in order to maintain the maximum quality of optics. STAT

The scheduled date for completion of the optical subcontract is now September 1, 1969. The delivery of the Stereocomparator is thus scheduled for March 15, 1970.

[redacted] STAT

MONTHLY PROGRESS REPORT

October 1968

This technical report is for the reporting period from October 1 to October 31, 1968. It is prepared according to [redacted] STAT Specification number DB-1001 (as modified). [redacted] STAT

1. During the month steady progress has been made on the entire project but some unforeseen problems have delayed the completion of all of the planned activities for the month. A complete familiarization of the machine and the computer manufacturer's supplied software has uncovered some rather limiting (from the standpoint of computer programming) shortcomings:

   a. a random (non-periodic) punching failure occurs on the high speed paper tape punch

   b. the supplied loader will not automatically allow octal corrections to memory locations

   c. there is no easy automatic method of clearing or presetting core memory

   d. there is no method of duplicating very long program tapes.

   In order to overcome the above shortcomings, the following has been completed:

   a. two short self-loading program tapes to clear and preset core memory have been developed

   b. a complete history of all punching errors is being kept

   c. a new program loader system which loads all object programs, incorporates all available debugging aides (ASR-Dump, and DEBUG package), and automatically allows for octal corrections of memory locations has been developed

   d. a short tape duplicating program which will duplicate any length of tape has been designed and will be developed.

Including the above enumerated problems and their subsequent solutions, the percentage of work completed is about 20%.

2. Next month's activities will include the completion of the two executive programs, the selection of the necessary subprograms for the calibration system, and continued effort on producing detailed flow charts and coding of Fortran procedures.

3. At this time there exist no pending, unresolved technical problems.

4. There exist no pending, unresolved contractual problems.

5. There have been no oral agreements or understandings reached during this reporting period.

6. No changes or agreements have been made requiring approval of the contracting officer.

7. No other unresolved matters are known to exist.