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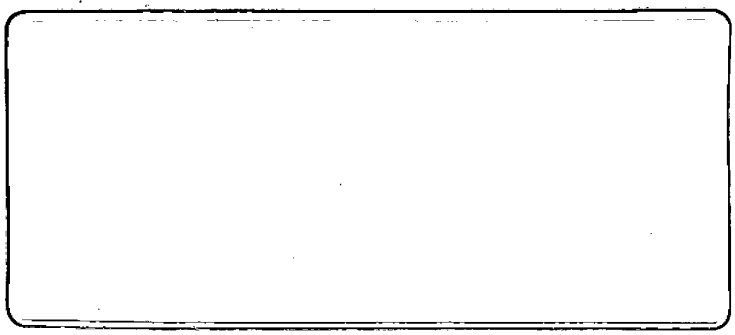

STAT

STATUS REPORT

for Period

1 NOVEMBER through 30 NOVEMBER 1969

U.S. Government

STAT

File No. 11038

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 1 November through 30 November 1969.

[redacted] STAT

[redacted] STAT

INDEX

APPENDICES

PROGRAM SUMMARY

Scheduled Percentage of Completion	79.9%
Actual Percentage this Date	75.5%

The stage drive systems are complete. However, the laser interferometer systems are still not available as the lasers failed in storage at [redacted] due to helium gas diffusion and STAT the repaired laser systems have not yet been received back from the manufacturer [redacted] STAT

The electronic logic systems have been checked out and are satisfactory.

The acceptance testing for Image Analysis Equipment, manufactured [redacted], slipped from 11/17/69 as STAT scheduled in October, to December 19, 1969. Howeyer, [redacted] is STAT presently reviewing [redacted] test program and there is no possibility STAT that the tests can occur during December because of the time required for mutual agreement between [redacted] on the test STAT procedures.

The January 12, 1970, schedule for optical acceptance tests at the optical subcontractor's plant [redacted] has been deferred STAT from January 12, 1970, to a later date not yet established. This is due to technical difficulties with certain of the reticle and illumination system subassemblies during their preacceptance testing by the optical subcontractor.

An interim rough draft of the Operating Instructions Manual has been prepared, and the outline appended (App. I).

TASK 1

STATEMENT OF WORK, SPECIFICATIONS, REPORT PREPARATION

Scheduled percentage of completion	87%
Actual percentage this date	87%

This Status Report has been prepared and submitted on schedule.

In the future, if preparation and submittal of the Monthly Status Report on schedule is the only activity under this Task, the Task will be omitted.

TASK 2

SCHEDULING AND PLANNING

Scheduled percentage of completion	87%
Actual percentage this date	87%

Discussion of re-scheduling related to subcontractor activity appears in this report under the appropriate Task heading.

The [ ] monitoring visit to [ ] remains scheduled for December. SSTAT

TASK 5

MEETINGS

Scheduled percentage of completion	87%
Actual percentage this date	87%

Technical presentations and status reports were made to four groups of customers on the following dates:

November 4, 1969, a different group on November 5, 1969, and two groups on November 20, 1969.

TASK 6

FACILITIES REQUIREMENTS

Scheduled percentage of completion	100%
Actual percentage this date	95%

The additional heater mentioned in the last Status Report arrived at [redacted] during the report period. Tests of its effect on the temperature control system and air flows are being conducted. STAT

TASK 11

STAGE DRIVES

Scheduled percentage of completion	100%
Actual percentage this date	90%

The stage drive rate loop design is essentially complete. Both stages are operating under velocity control, and the breakaway torque and running friction problem referred to in the last Status Report appears to have been remedied. As soon as the lasers are returned to [redacted] final position loop design will be completed. When this is accomplished this Task will be finished. STAT

TASK 12

FILM DRIVE AND TRANSPORT SYSTEM

Scheduled percentage of completion	100%
Actual percentage this date	80%

Testing and adjustment of the film drive and transport system with the pneumatic liftoff and clamping apparatus is continuing.

Final compensation for the reel servo systems has been completed and appears to be satisfactory.

Work is proceeding on the capstan rate loop compensation in order to provide precise control of film motion at low speeds. A non-linear network is being designed which provides wide loop bandwidth for small displacements of the film, (to allow precise film positioning on the platen) with reduced bandwidth at higher velocities, (to eliminate excess stresses on the film when slewing). This work should be completed during December.

TASK 13

FILM PLATEN AND FILM CLAMPING

Scheduled percentage of completion	98%
Actual percentage this date	93%

Checkout of the film platen and film clamping system is proceeding, in conjunction with the work mentioned under Task 34 in this report.

TASKS 16, 17 & 18

VIEWING OPTICS, VIEWING ILLUMINATION

RETICLE PROJECTOR and ILLUMINATION

Scheduled percentage of completion	91%
Actual percentage this date	90%

The optical fabricator has found technical discrepancies during performance testing of certain of the optical subassemblies.

Included are the main illumination condenser zoom, reticle 10X zoom, and reticle anamorph.

Preliminary information indicates the problem is due to image wander during operation of the subassemblies. This problem is presently being investigated by the optical subcontractor.

A delay is anticipated in the [ ] acceptance tests presently scheduled for January 1970, until the problems are solved. STAT

TASK 22

INTERFEROMETER ASSEMBLY

Scheduled percentage of completion	98%
Actual percentage this date	70%

The last status report stated that the laser assemblies and power supplies were returned to [redacted] for replacement and adjustment of the plasma tubes. [redacted] had said that the equipment would be returned to [redacted] within this report period, but it was not. They now estimate that the equipment will reach [redacted] during December, at which time work can commence on the measuring system. STAT STAT STAT STAT

TASK 23

OPTICS DRIVE ASSEMBLY

Scheduled percentage of completion	98%
Actual percentage this date	90%

Checkout of the complete servo system is complete. All components in the system appear to be performing satisfactorily. This Task is essentially complete until the optics are received from the optical subcontractor.

TASK 24

IMAGE ANALYSIS SYSTEM

Scheduled percentage of completion 95%

Actual percentage this date 95%

[ ] spent two days a [ ] to discuss the progress of the image analysis system. STAT STAT

In lieu of a trip report, the results of that meeting are included in this disucssion

During the meeting with [ ] it was found that the image analysis system appears generally to perform satisfactorily. Some of the minimum performance requirements, however, have not been met. A particular area of difficulty lies in the correlation quality signal which indicates to the computer system whether or not the imagery is satisfactory for analysis by the system. Several methods of improving the operation of the equipment were suggested [ ] but the problem is as yet unresolved. STAT STAT

A new and abbreviated [ ] test procedure was given to the [ ] representatives in a partially complete rough draft to be brought back to [ ] for study. Such study by [ ] personnel has led to the conclusion that in many areas the test procedure is unsatisfactory as written, and a revised test procedure is being generated at [ ] for discussion with [ ] STAT STAT STAT STAT STAT

[redacted] was requested to make a formal rough draft submittal STAT
of their modified test procedure because the rewritten procedure differed
greatly from the procedure originally submitted [redacted] STAT

Additionally, the five pairs of stereo slides for qualitative
testing of the instrument (to be furnished [redacted] have not been submitted STAT
[redacted] for approval. STAT

The predistorted slide pairs to be used for quantitative
testing of the instrument (also to be furnished [redacted] have been agreed STAT
upon for image content, but the distortions introduced into the slides for
test purposes are, in the opinion of [redacted] personnel, unsatisfactory in STAT
several areas. The principal difficulty is that no slides have been pro-
vided which contain only single first-order distortions, thus making it
impossible to test the single distortion cross-talk requirement per [redacted] STAT
Specification No. 10. This matter is being discussed [redacted] STAT

Delivery of the image analysis system was rescheduled
[redacted] to December 19, 1969, but in view of the extensive changes STAT
required in the test procedure and the possibility of having to make new
test slides, it appears doubtful that [redacted] will be ready for acceptance STAT
testing at that date.

[redacted] Progress Report for the period appears in STAT
Appendix II.

TASK 29

CABLING

Scheduled percentage of completion	98%
Actual percentage this date	97%

A few cables associated with the illumination system remain to be fabricated. This work should be accomplished during December.

One extra cable between Rack 3 and the control console was added in order to implement the multiple light level system incorporated in the data recording pushbuttons.

It is expected that this task will be completed during December.

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TASK 32

COMPUTER

Scheduled percentage of completion	100%
Actual percentage this date	100%

No further systematic difficulties have been found in the machine. [redacted] technicians are continuing to keep the operation log mentioned in the last status report. STAT

It was found necessary, during this report period, to replace the type box in the ASR 35 teleprinter. Additionally, a new set of punches and dies have been ordered for the high speed paper tape punch, since the volume usage of this equipment during the programming effort has caused it to wear out.

TASK 33

ELECTRONIC RACKS AND CONTROL CABINETS

Scheduled percentage of completion	98%
Actual percentage this date	98%

Noise and transmission losses in the digital logic system continue to be decreased by appropriate adjustments in the electronics cabinet #3 wiring.

This Task is substantially complete.

TASK 34

UTILITIES, VACUUM AND AIR SYSTEMS

Scheduled percentage of completion	95%
Actual percentage this date	93%

Testing of valves, pressure switches, and air control solenoids is nearly complete. The installation of larger compressed air lines mentioned in the previous report has been completed.

The adjustment of the trip points for the alarm failure sensors is essentially complete.

TASK 36

OVERALL ASSEMBLY

Scheduled percentage of completion	85%
Actual percentage this date	57%

Systematic testing of the digital logic interface is nearly complete. All of the digital logic associated with manual modes of operation of the Stereocomparator has been tested and found to be satisfactory. Also, the digital logic associated with computer operation of the machine has been tested and is now operational.

The remaining work to be done on this area consists of reducing noise levels in a few logic lines, and it is expected that this work will be completed in the next report period.

It was found necessary to move the current driver circuit boards for the IBM 526 Card Punch out of the output interface logic drawer into the punch control chassis proper. This move, combined with a reharnessing of the punch control chassis, has reduced electrical noise interference from the card punch system to acceptable levels. A small amount of electrical noise suppression is being performed on the IBM Card Punch itself, and it is contemplated that all of this work will be finished within the next report period.

TASK 37

ELECTRICAL NOISE SUPPRESSION

Scheduled percentage of completion	75%
Actual percentage this date	65%

Systematic elimination of internally generated cross-talk and spurious switching signals continues. The specific steps being taken are described under other Tasks in this report (Tasks 32, 33, etc.).

TASK 42

BREADBOARDS AND TEST DEVICES

Scheduled percentage of completion	92%
Actual percentage this date	80%

The test panel to be used in the optical acceptance test at Sopelem, and described in the last status report, is complete.

The switching panel mentioned in the previous report has been constructed and tested.

These two major assemblies, plus a dual voltage high current servo amplifier and associated cable, have all been shipped to Sopelem. With this equipment it will be possible to test the optical system under rate loop control which will allow precise setting of the optical elements during the acceptance test.

Task 43

COMPUTER PROGRAMMING AND SERVICES

Scheduled percentage of completion	80%
Actual percentage this date	80%

No further work has been performed by the [redacted] STAT programmer due to the fact that a point has been reached in the programming effort at which further software preparation is dependent on completion of the measuring system.

[redacted] STAT is continuing to evaluate the transfer function of the [redacted] STAT correlator outputs through the computer processing to the optics drives. The results obtained thus far are not conclusive, but indicate that a software automatic gain control subroutine may be required to maintain optical servo loop stability over the entire range of optics parameters. The variable-gain characteristics of the rectangular-to-polar-coordinate conversion required to change the first-order scale and skew signals, from the correlator into corresponding magnification, rotation, and anamorph corrections appear in the optics drive loops. It is necessary to be certain that at low gains sufficient accuracy is maintained, while at high gains, servo overshoots and instability are avoided through proper software control.

TASK 47

INSTRUCTION MANUAL AND DRAWING SUBMITTAL

Scheduled percentage of completion	40%
Actual percentage this date	40%

During this report period, an interim rough draft of the Operating Instructions Manual was prepared. An outline is appended (Appendix I).

11/13/69
12/1/67 - DRD

OUTLINE
OPERATING INSTRUCTIONS MANUAL
JOB 342

I. Introduction

A. Purpose of the Manual

B. Scope of the Manual

C. Organization of the Manual

II. Summary of Stereocomparator System Operation

A. Capabilities

1. Achieved by three component groups

a. Measuring engines

b. Optical train

c. Control elements

B. Discussion of measuring engines

1. Monolithic granite block

2. Granite tee

3. Top stage

4. Threadless leadscrew

5. Imagery drive units

6. Film platen and vacuum-clamping system

7. Light table

8. Laser-interferometer

9. Summary

d. Image

e. Reticle

6. Joystick

7. Trackballs

8. Imagery drive lever

9. Main control pushbuttons

a. Warning/Indicator buttons (8)

b. Operator communication with computer (28)

c. Mechanical adjustments (18)

d. Mode selection (3)

e. Customer mensuration programs (16)

B. Cabinets, computer, teletypewriter

C. Binocular eyepiece

1. Parallax

2. Tilt

3. Focus

IV. Specific Operations with the STEREOCOMPARATOR

A. Power on sequence

B. Up-loading the imagery

C. Up-loading the computer

D. Establishing stereo - Auto with Electronic Correlator mode

E. Establishing stereo - Auto without Electronic Correlator mode

F. Auto stereo scanning

G. Mensuration

H. Stage control summary

I. Optics control summary

App. II

PROGRESS REPORT FOR PERIOD ENDING 31 OCTOBER 1969

STAT

PROGRESS DURING REPORTING PERIOD

The wiring clean up and a workmanship inspection were completed on the Image Dissector assemblies, the chassis and a number of the printed circuit boards.

Drawings were updated to include all changes that were made to the system after the sub-assembly test.

The system was tested to determine its essential characteristics. The coefficients of the first order outputs required readjustments and were set to their previously established values. The parallax error scale factors were changed to 3.33 volts/mm. A change in the dimension of the scanning pattern from a 12mm to a 16mm diagonal to derive more information from the slides necessitated a change in the coefficient - determining resistors. The above setting is intended to enlarge the pull in range and did not appear to be inconsistent with the minimum callout of item 10E1 of Specification No. 10.

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PLANS FOR NEXT PERIOD

During the remainder of November the procedural aspects of the acceptance tests should be resolved and the test procedure resubmitted for approval. The procedures will be revised to reflect the new correspondence test for multiple errors and notations relative to image quality.

STAT

Testing will be continued to check out procedures as well as to avoid test problems associated with orientation and content of imagery on the test slides.

[ ] VISIT

STAT

[ ] visited [ ] STAT

[ ] on November 13 and 14. They were given a general STAT

briefing on the equipment and its performance. On both days they inspected and operated the equipment to obtain a private assessment of its operation and the problems inherent in testing the equipment. They were shown the results of the preacceptance testing, and the equipment performance was discussed relative to the performance of the [ ] equip- STAT

ment. The proposed alternation to the test procedures was reviewed and the resubmission suggested.