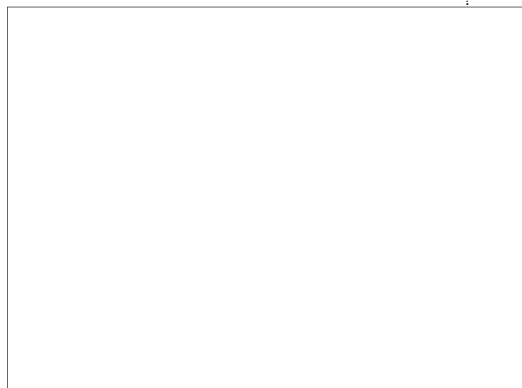
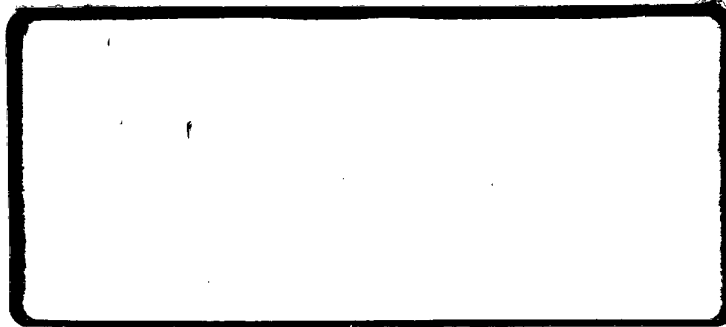


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STATUS REPORT
for Period
1 OCTOBER through 31 OCTOBER 1969
U. S. Government

[Redacted]

File No. 11038

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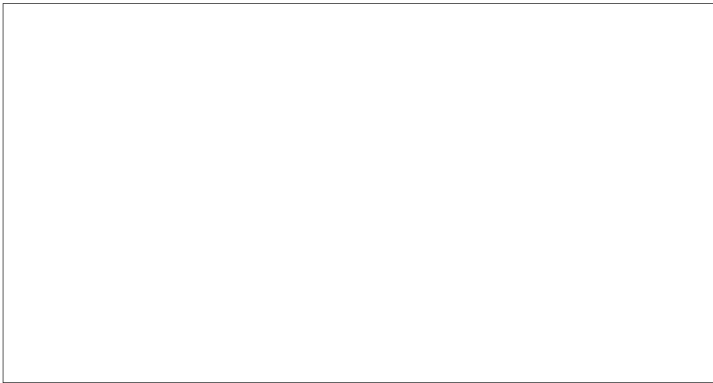
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This document is presented as the Monthly
Status Report under Contract to the U. S.

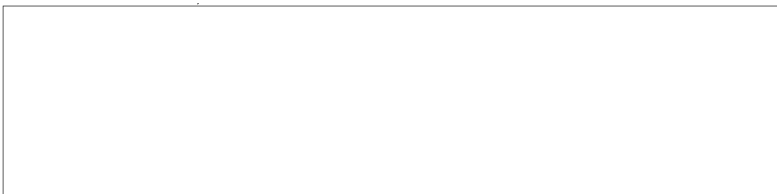
Government,

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The report period represented herein covers
the period 1 October through 31 October 1969.



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APPENDICES

Progress Report - for period ending
30 September 1969

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Appendix I

Customer Conference Trip Report

Appendix II

PROGRAM SUMMARY

Scheduled Percentage of Completion	78.5%
Actual Percentage this Date	74.3%

The Stereocomparator assembly is proceeding according to schedule.

The stages are complete; however, the servo drive loops cannot be closed around the computer as the laser measuring equipment is inoperative due to failure of both lasers (helium gas diffusion).

The checkout of the electronics, as a whole, is almost complete and has proceeded quite satisfactorily.

The acceptance testing schedule of the Image Analysis equipment, manufactured by the [redacted] slipped twice during this report period. The first slippage was from October 27, 1969, to November 3, 1969. The second slippage was to November 17, 1969.

STAT

The present schedule for the optical acceptance tests to be performed at the optical vendor's plant [redacted] is January 12, 1970. STAT

TASK 1

STATEMENT OF WORK, SPECIFICATIONS,
REPORT PREPARATION

Scheduled percentage of completion 86%

Actual percentage this date 86%

No new specifications were developed or issued during this report period.

Monthly reports from our subcontractors are incorporated into this document under appropriate task headings or in the Appendix.

TASK 2

SCHEDULING AND PLANNING

Scheduled percentage of completion	86%
Actual percentage this date	86%

At the beginning of October, [] was informed by Sopelem, the optical vendor, that the earliest they would be ready for [] acceptance testing would be the end of December 1969. This is a date one month later than reported earlier.

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In order to validate the date and review any last minute problems, an [] monitoring visit is planned for early in December. However, if the vendor appears to be having difficulties which might affect the date, the visit will be made earlier.

STAT

The Image Analysis test schedule has been revised to November 17, 1969, [] This date is not on the critical path.

STAT

TASK 3

TEST AND INSPECTION PROCEDURES

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

The optical acceptance test procedures are presently being formalized in preparation for the tests of the optical system at



STAT

TASK 4

MANAGEMENT, ADMINISTRATION AND SUPERVISION

Scheduled percentage of completion	86%
Actual percentage this date	86%

The coordination of the electronic interface between the optical system and the servo motor drive and control systems required an extended visit to the optical vendor's plant during this report period.

All significant problems have been resolved.

Effective with this report, all tasks that are not worked on will not be included in the monthly reports. This means that completed tasks, or tasks not scheduled for effort, will not appear unless work is performed or a problem develops.

TASK 5
MEETINGS

Scheduled percentage of completion 86%

Actual percentage this date 86%

visited the customer on October 23rd
and 24th, 1969. The trip report is in Appendix II.

STAT

Various computer programming and interface problems
were discussed and resolved.

TASK 6

FACILITIES REQUIREMENTS

Scheduled percentage of completion 98%

Actual percentage this date 93%

The clean room is presently controlling in the range of approximately $\pm 1^{\circ}\text{F}$.

STAT

An additional heater for the room system is due at in November and it is anticipated that after this is installed, the temperature control system and air flows can be integrated and balanced to optimize (minimize) the temperature control range.

STAT

Short cycling of the refrigeration compressor has been eliminated by the addition of a timer to control the compressor "off" cycle to at least a ten minute duration.

Balancing of the air flow in and out of the electronic cabinets has been completed and the stability of the system is approximately $\pm 0.4^{\circ}\text{F}$.

TASK 11

STAGE DRIVES

Scheduled percentage of completion	98%
Actual percentage this date	85%

When the stages were driven with velocity feedback loops, unacceptable amounts of breakaway torque and running friction were encountered in the threadless leadscrew drives. The situation was remedied by installing new bearings in the threadless leadscrews, and adjusting them. The positive feedback loop design is now continuing.

TASK 12

FILM DRIVE AND TRANSPORT SYSTEM

Scheduled percentage of completion	98%
Actual percentage this date	75%

The limited resolution of the joystick film slewing control, described in the previous report, has been remedied by means of a gear train which increases the angular rotation of the potentiometer. This appears to clear up the problem.

Testing of the film drive and transport system is continuing and is nearly complete. Some final modifications to the circuitry are being made which will improve the safety and reliability of the system.

Testing and adjustment of the system with the pneumatic lift-off and vacuum clamping apparatus is under way.

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 and 18

VIEWING OPTICS, VIEWING ILLUMINATION,
RETICLE PROJECTOR AND ILLUMINATION

Scheduled percentage of completion

90%

Actual percentage this date

90%

The [] technical monitor visited the plant of the
optical vendor [] to perform a final coordination
before the installation of the optical subassemblies in the [] optical
bridge.

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This work required a review of the [] hardware and
[] assembly drawings actually at the [] plant.

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Each potentiometer, servo motor, tachometer, gearbox,
cable, electric receptacle, electric plug and bracket was identified
and marked with the name of its optical subassembly.

Each electrical schematic was reviewed and corrected
with respect to errors and changes, and instructions for the proper
phasing of the electrical components with respect to the optical
parameters was incorporated in each drawing.

At this time, it can be stated that all components and
drawings are on hand for the completion of the optical subassembly.

[] has completed all the optomechanical subassem-
blies and much of their optical testing has been successfully completed.

STAT

TASK 22

INTERFEROMETER ASSEMBLY

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

Tests have been interrupted on the interferometer system due to wiring problems in the laser systems. It has been found that the long cables connecting the laser plasma tubes to the power supplies exhibit excessive leakage current between the various wires in the system, thereby causing improper operation of the laser.

Additionally, it was found that the helium gas contained in the plasma tubes had diffused out of the tubes to the extent that proper operation of the units is not possible. Accordingly, the laser assemblies and power supplies have been returned to the vendor for plasma tube replacement and adjustment and new cables for interconnection are being fabricated.

STAT

It is expected that all of this equipment will be ready for use within the next report period.

TASK 23

OPTICS DRIVE ASSEMBLY

Scheduled percentage of completion 98%

Actual percentage this date 90%

Checkout of the slaved servo system (e.g. reticle projector systems) is continuing and is nearly complete.

All components in the system appear to be performing satisfactorily. The modifications required in the analog control units which operate the automatic illumination control systems have been made and are under test.

TASK 24

IMAGE ANALYSIS SYSTEM

Scheduled percentage of completion

90%

Actual percentage this date

95%

Progress on this Task is detailed in Progress

STAT

Report for the period ending September 30th, 1969, which is included as Appendix I to this report.

has continued to experience technical difficulties in their checkout effort. They rescheduled their acceptance tests from October 27th, 1969 to November 3rd, 1969, and then again to November 17th, 1969.

STAT

2 TASK 29

CABLING

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

Some additional cables required for the vacuum clamping and lift-off control systems have been fabricated during this report period.

Several of the cables used in the digital logic have been modified in order to reduce the crosstalk between the data lines and control lines to an acceptable level.

TASK 30

CONTROL CONSOLE AND CHAIR

Scheduled percentage of completion 98%

Actual percentage of completion 92%

Electrical work on the control console is complete except for installation of the switches controlling the red and green optical filters in the optical system. Installation of these switches will not be done until the optical bridge is in place due to the critical clearances involved.

TASK 32
COMPUTER

Scheduled percentage of completion	98%
Actual percentage this date	100%

It was found that an overload was being tripped in the memory address drives. One CM006X address driver circuit board was replaced and the difficulty was solved.

In addition, technicians are maintaining an operation log so that any difficulties encountered may be properly catalogued and dealt with systematically.

STAT

TASK 33

ELECTRONIC RACKS AND CONTROL CABINETS

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

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

In addition, the cooling air distribution system within the racks was adjusted and balanced out between the various chassis. Presently, the air system is maintaining its temperature within $\pm 0.4^{\circ}\text{F}$ which is well within the requirements.

TASK 34

UTILITIES, VACUUM AND AIR SYSTEMS

Scheduled percentage of completion	90%
Actual percentage this date	92%

Preliminary testing of valves, pressure switches and air control solenoids for the right-hand portion of the system has been completed. Testing of the left-hand side has revealed that some retubing (changing one compressed air line to a larger size) was needed. This was done and the left-hand side testing is now proceeding.

As associated systems become operational, the adjustment of the trip points for the 22 alarm (failure) sensors is made.

TASK 35

VIBRATION ABSORPTION AND LEVELING

Scheduled percentage of completion 85%

Actual percentage this date 85%

The optical bridge is not yet available

STAT

Thus, the full load tests of the vibration absorption supports cannot be performed.

STAT

A definitive statement about vibration absorption and leveling cannot be made until the optical bridge is mounted and a fully loaded system is available for adjustment and test.

TASK 36

OVERALL ASSEMBLY

Scheduled percentage of completion	80%
Actual percentage this date	55%

Systematic testing of the digital logic interface is continuing.

The digital logic associated with manual modes of operation of the Stereocomparator has been tested and found to be satisfactory.

Final work is being performed to match certain automatic functions of the machine hardware to the computer program (software) to ensure smooth transitions between the various operating modes of the machine.

TASK 37

ELECTRICAL NOISE SUPPRESSION

Scheduled percentage of completion	70%
Actual percentage this date	60%

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	90%
Actual percentage this date	70%

Design work on a test panel to be used in the optical acceptance tests at is complete. Construction of the unit is in progress. The test panel will allow checkout of the various motors, tachometers, potentiometers and limit switches associated with the optical drive systems.

STAT

Additionally, a switching panel is being developed which will permit rapid selection of the individual drives of the optical subsystems. The optical parameters can then be adjusted to specified values, which is a requirement for the optical acceptance tests at the plant of the optical vendor.

This equipment will be shipped to when construction is completed.

STAT

TASK 43

COMPUTER PROGRAMMING AND SERVICES

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

Meetings have been held with the Informatics' programmer in order to ensure compatibility between the computer program software and the hardware implementation of the Stereocomparator interface functions. Certain modifications of the software have been agreed upon in order to facilitate operation of the machine. No major unresolved problems in this area are known to exist at this time.

is evaluating the transfer function of the Itek correlator outputs to the optics drives. This transfer function appears as a forward gain factor in the optics servo drives and apparently varies with optical settings. Thus, an investigation is being made to establish the range of values of this function so the optics servo drives can be properly stabilized.

STAT

TASK 47

INSTRUCTION MANUAL AND DRAWING SUBMITTAL

Scheduled percentage of completion 30%

Actual percentage this date 32%

technicians continued to revise design drawings to cover the "as built" status of the various subassemblies of the Stereocomparator during the report period.

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The table of contents for the Instruction Manual is presently in preparation.

PROGRESS REPORT FOR PERIOD ENDING 30 SEPTEMBER 1969

STAT

1.0 PROGRESS DURING REPORTING PERIOD

In making the final settings some circuit changes were introduced. The channel selection logic reverted to the original criteria; the correlation quality signal was derived from the A₁ band cross-correlation signal exclusively; the upper frequency cutoff of the distortion analyzer outputs reduced to 700 Hz; the network for sag compensation and the reset FET were bypassed; and gain adjustments made to the B band video correlator, channel selector, and integrators (time constants).

A wiring cleanup is in progress which will incorporate the underside component board, and finalize the wiring and subassembly component changes. This is being done so that final adjustments would not have to be repeated once they are made.

Drawings are being revised to reflect up to date information. Foil changes and changes to assembly of the distortion analyzer and channel selector will be made to permit subsequent boards to be produced to current revisions.

2.0 PLANS FOR NEXT PERIOD

The wiring cleanup and inspection should be done and final adjustments completed.

Complete performance measurements will determine the status of the equipment. Refinements to the test procedure will also be sought since it is still quite tedious to perform.

2.0 PLANS FOR NEXT PERIOD (continued)

The software submissions can then be revised to reflect the findings.

App. II

JOB #342

TRIP REPORT

Company Contacted:	Customer	
Contacted By:	<input type="text"/>	STAT
Contact Date:	October 23 & 24, 1969	
Purpose:	Conference With Customer	

October 23, 1969

Meeting all day with representatives from three groups - operations, computer, photogrammetry. Several observers from other groups popped in and out but took no active part. Attempts to devise methods for combining operator typed inputs to both computers simultaneously were eventually abandoned. Inputs will be typed to two computers separately - and serially in time. Use of paper tape is no help, and low speed paper tape capability may be removed (i.e., a KSR-35 teletype may eventually replace the ASR-35 which we deliver). Formats of typed inputs were essentially finalized, and work can now commence to put these in computer program.

Because of rumors that a switch on the teletype might be impractical, there was considerable sentiment favoring two teletypes - one for each computer. Meetings the next day resolved this to only one teletype (see 10/24).

Measurements of fiducials and time tics will be simultaneous for both computers. Since their internal computer cannot ignore a separately measured reference point, it was decided that the first measured point will be the first fiducial. The Honeywell will treat this also as the reference point (origin for recall points). This point may also be made one of the recall points as a convenience in returning to it for checking coordinate drift. It was emphasized that the recall button cannot be used for arriving at this first measured point the first time it's measured. For now, at least, it may be assumed that the second measured fiducial

Trip Report
Job 342

Page 2

will lie in the flight direction relative to the first. The Internal computer generally requires additional fiducials, which may be optionally ignored by the Honeywell computer.

There was much concern about a report carried back from an earlier visit to our plant that only 30 time tics could be accommodated. This was clarified as a limitation in the Honeywell storage provision and not a limitation effecting the internal computer. Since fiducials and time tics are recorded by separate buttons, the Honeywell computer can ignore time tics measured in number beyond those it requires.

Since stage measurements can be transmitted to both computers simultaneously there is no sense in having both computers instruct the operator in what to measure next. The internal computer will call for fiducials first (as many as needed) and then call for time tics (as many as it needs). The Honeywell computer will distinguish fiducials from time tics by the record button which is depressed and will accept only as many of each as it needs. Since the reference point will also be the first fiducial, it appears that the special reference record button will not be used.

October 24, 1969 - A

Meeting with personnel familiar with teletype and data link. A tentative agreement was reached that it should be practical to use only one teletype and to switch it between two computers. It was pointed out (and accepted) that responsibility ends with installing the switch (a 4 pole double throw rotary type switch). The customer will install whatever equipment is needed to make the teletype signals compatible with the data link to the internal computer. Basic to this agreement were three assumptions based on a cursory review of the Honeywell wiring manual. If these three assumptions are not valid, then the agreement will have to be reviewed:

STAT

Trip Report
Job 342

Page 3

1. The teletype keyboard and selector magnets act like passive (i.e., free of power) devices to the data lines.
2. The Honeywell computer contains a 24 volt power supply which powers the data lines to the teletype.
3. The installed switch will isolate the Honeywell computer from any external power supply which might be installed in the internal computer data link, and such a power supply will not conflict with any existing power supply.

STAT

A further agreement (at the customer's request) was that the time-out alarm on the coordinate data transmission would be set to time out 3. seconds after the first transmission without regard to whether there were any subsequent transmissions of the same data, and without regard to whether an error message or simply an absence of an acknowledge signal came back. (Obviously an acknowledge within the 3 seconds would reset the timing, and no alarm would occur.) There has been no change in the customer's specs for data link levels and polarity. The specs are still + 8 volts for space (logical zero on our side of the interface), and - 8 volts for mark (logical one on our side of the interface). The customer's equipment can, however, accept a very wide tolerance on the actual voltage levels (something like 0v. to +25v. for space, and -5v. to -25v. for mark) supplied. The confusion coming out of a certain telephone conversation was due to an understandable tendency to talk of a + level as a logical one, and a - level as a logical zero.

October 24, 1969 - B

Resumption of meeting held on 10/23/69. Results of earlier meeting (see 10/24/69-A) were transmitted and there was no further consideration of using two teletypes. This meeting was taken up with questions and clarifications of typed data format - nothing further need be stated.

Trip Report
Job 342

Page 4

October 24, 1969 - C

Visit to eventual installation site. Excavation is under way. Both the hole itself, and the existing concrete floor have turned out deeper than was expected. Present plans are to move our equipment in by fork lift from the loading dock to the actual site. The somewhat narrow, somewhat winding passage way is as we saw it previously.