Surveyor Project Newsletter

LUNAR LANDMARKS

HUGHES AIRCRAFT COMPANY
SPACE SYSTEMS DIVISION

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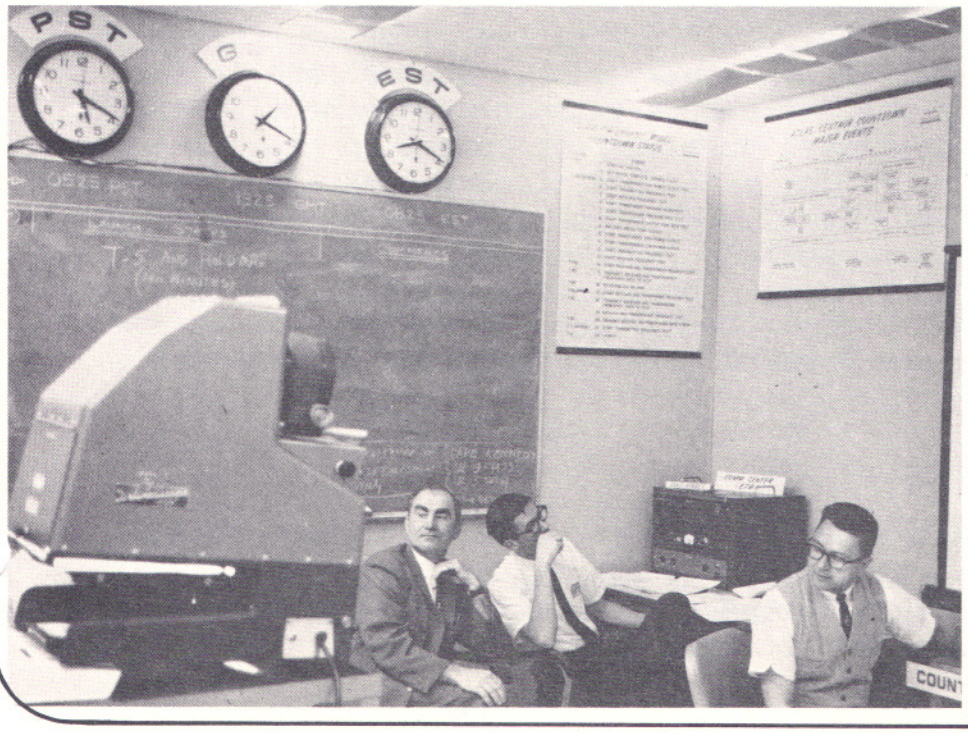
SC-1 ON SCHEDULE FOR UPCOMING KEY MILESTONE

Second key milestone to accomplish SC-1 delivery by Aug. 2 is approaching rapidly: Start mission sequence testing March 23. John Chamberlain, head of SC-1 Test Operations, says current phase (integrated system checkout) is on schedule. Top test team performance got telecommunications integration procedures done in less time than allotted. Early delivery of some units, including a modified transmitter and flight control sensor group, also helped.

SD-1 MISFORTUNE

March 2 attempt to launch Surveyor dynamic model SD-1 on the AC-5 Atlas Centaur from Cape Kennedy failed when the boost vehicle burned on the



Horace Maxey, Dave Windes and John Selak are shown in Surveyor Launch Operations Center in Bldg. 366 just minutes before SD-1/ AC-5 test Tuesday. Note Pacific, Greenwich, and Eastern times on clocks.

launch pad after rising only a few feet. Several SD-1 objectives were achieved, however. The spacecraft transponder operated in a normal manner for 12 minutes after lift-off, with two-way lock and transfer to high power after 8 minutes. Valuable structural data were obtained during the short interval after lift-off. This test is expected to have no effect on the Surveyor lunar flight schedule. Another Atlas-Centaur test is planned for this summer.

ACTIVITIES AT THE CAPE

Prior to SD-1/AC-5 test, Dusty Miller, Fred Weber, and Sam Crutchfield checked out Surveyor operations console at the Cape Blockhouse 36, as shown in the photo at right. Other Surveyor Launch Operations people, Leo Ferguson, Hal Cloud, and Bob Manley, returned from the Cape March 1 after observing mating and demating operations for SD-1 and running time studies to determine how Explosive Safe Area/Launch Pad operations could be modified to speed launch procedure for SC-1. Main retro operations sequence also was finalized for the storage, checkout and final assembly areas.

T-21 SOLAR-THERMAL-VACUUM TESTS COMPLETED

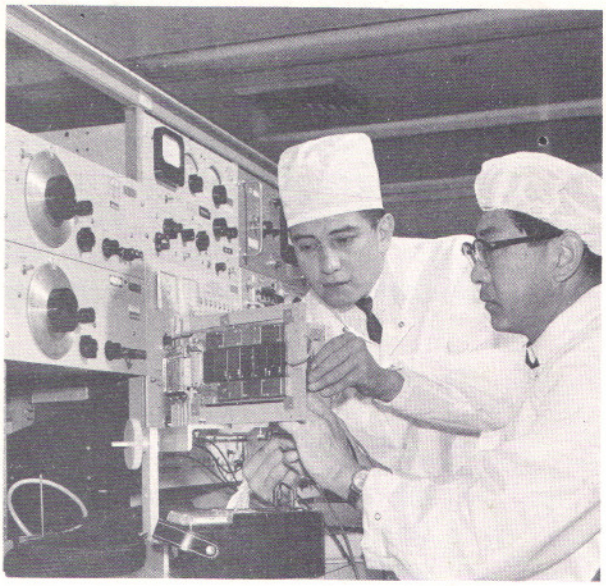
T-21 received a full-term 66-hour transit test and three 24-hour "condensed" transit simulations (normal sun, high temp, and low temp) to complete STV testing on Feb. 24. T-21 now is receiving an upgrade preparatory to starting vibration tests next week. Thermal specialists Paul Ohanesian and Harlan Knudson report temperatures generally within specifications. Minor functional problems were noted in the low-temp test with altitude sensing, solar panel positioning, and signal processing. Chuck Fairbrother and his STV test team did a great job on this 24-hour-a-day program. Data handling, spearheaded by Maury Young of 22-54, was a special accomplishment: Berl Griffin (22-54) and Ed Hengenius and Chet des Voign (both of 24-03) ensured proper data recording on the test floor and Gordon Barnett (24-03) conducted data reduction in Bldg. 25.

QA ON REWORK

Surveyor Quality Assurance sounds a word of caution on unauthorized rework. All rework must be authorized by 1) engineering drawings, 2) Material Review Board action, 3) variance engineering orders, 4) variance authorizations, or 5) parts substitution authorizations.

GUIDANCE AND CONTROLS CONTRIBUTES

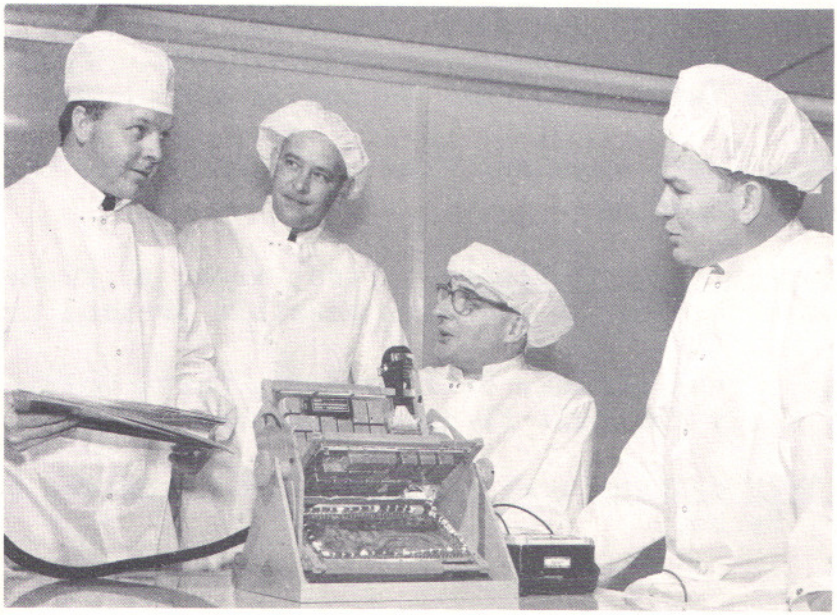
ESP UPGRADE



On Feb. 24, the Engineering Signal Processor (ESP) for T-21 spacecraft was received by G&C for upgrade repair and retest. Darrell Jones, Marion Knott, and Barbara Wisniewski completed module removal and replacement, rewired the unit, and turned it over to test for Flight Acceptance Test. Don Nakamura performed the FAT. ESP should be back on T-21 by the time you read this. In the picture are Control Item Planner Ray Aragon (left) and Don Nakamura, both of whom begrudged even the time for the picture due to the tightness of schedule.

AFCP REDESIGN

Changes in scope of the Advanced Flight Control Programmer required a redesign within time to meet SC-1 schedule. This meant new modules, solder-free boards, and other additions within an abbreviated period. Chuck Agnew and Jack Klein came up with the circuit design in record time; Sam Simpson product designed the AFCP faster than anticipated; John Poprac's manufacturing team produced the hardware on a priority basis, all of this within approximately two and one-half weeks for a normal four to five-week operation. Then Don Arvesen's test group, especially Erik Nilsson, worked extra hours testing the units in order that Control Item Planner Wayne Robinson, who ran with it all the way, could deliver it to CICP by the date promised. Pictured are Robinson, Klein, Simpson and Test Engineer Mel Lands during conference over the redesigned AFCP. Mention must be made of the fact that Chuck Williams of CICP accepted the unit at



7:20 on a Friday night. Also, cooperation came from Ed Howard, head of Surveyor Quality Assurance, and Burt Fischler, Quality Engineer, when sorely required due to the need to obtain the proper items to solve a parts problem.

G&C THANKS:

Stan Kimball, supervisor of Surveyor Material Release Section, and Clyde Thompson for sparking receipt of Class II parts for the PATE system by efforts which reduced the normal procurement cycle. Fran Brock and Sabra Dillon of the CICP group for extraordinary cooperation on numerous occasions when time was important.

SURVEYOR INCREASINGLY IN PUBLIC EYE

Those who watched NBC-TV coverage of the brilliant success of Ranger 8 also saw the interview with Program Manager Bob Roderick on Surveyor. Newspaper stories resulted from interviews with Roderick and Surveyor Chief Scientist Shel Shallon at Chicago Press Club last Friday. There's no denying it--the nation is watching Surveyor.

S-2A DROPS TWICE...AS PLANNED

Dynamics engineer Ralph Deitrick got off the first two drop tests of the S-2A structural test spacecraft in Bldg. 365. The results appeared completely successful. The remaining two drops will be made by today. Dick Harvout was responsible for rigging and dropping; Harry Chandler, assisted by Jack Sowards, did the instrumentation.

PROPULSION NOTES

Propellant Tanks. Following a bladder failure in flight acceptance tests, a modification incorporating a teflon "mushroom" standpipe tip was accomplished. Modified tank passed qualification tests. Frank Danis, Bill Mascenik, George Bates, and Phil Donatelli rate kudos.

Titanium nitrogen tanks. Larry Bean and Fred Anderson pushed through delivery two weeks ahead of schedule.

Tests on helium absorption in propellants. First tests at Placerita Canyon by Norm M$_O$rgan and Dave Frizell indicate possible control problems.

S-6 goes to Placerita. Frank Kramer, Bill Kundrat, Morry Goldin, and staffs have the facility ready for full-fledged system test.

Propulsion for first T-2N descent test vehicle. Good progress being made by Ward Putt and Roy Barber.

POWER PLAYS

Warren Brown, SSD Engineering Labs, recently set up the Surveyor battery lab at the Cape and cleared paths for AFETR acceptance test and delivery of the two main batteries for SD-1. The first six main batteries for the T-2N descent test vehicles have been delivered, reports George Serbu. Three main power switches are in Bonded Stores and three more were received on Feb. 26. Early arrival is credited to manufacturer Kinetics Corp., Bob West of Quality Assurance, Pete Rice of Procurement, and unit engineer Dean Garth.

HAC JOHANNESBURG TEAM

Moving out in preparation for the first Surveyor launch is the Johannesburg Command and Data Handling Console and members of the installation and operations team. Ken Nelson, fourth from right, head of Space Communications Stations Section, is shown with men and equipment being airlifted to Johannesburg, Republic of South Africa, early in March. Installation and operation of the South Africa complex will be under John Buskirk, center in photo, Hughes resident manager of the Johannesburg Station. Assisting him will be, from left, Bob Putnam, Jim Russell, Dode Adger, Jim Hoose, Ron Peterson (next to Nelson), Duane Patten, and Roger Erickson. Jack Kern, the ninth team member, is not in photo. Several members of the team arrived in South Africa this week.

RESEARCH, DEVELOPMENT DIVISION HUSTLING

R&D personnel expect to deliver all SC-1 units by April 24--just 35 days remain to deliver or retrofit the SC-1 units. Here's how they are doing and on what:

ALTITUDE MARKING RADAR

The altitude marking radar (AMR) team hustled to repair and re-test the SC-1 AMR after a vibration failure. Bill Johnson, John Case (Plastics Lab), Dick Woytyna, Tom Garrity (inspection), Brain Todd (planner), Nobu Izumoto (expediter) were responsible for the fast turn around. Don Manser and Don Musgrave did everything possible to meet the March 1 schedule date.

SC-1 TRANSMITTER

When it was discovered that the SC-1 transmitter did not meet outline and mounting requirements, the "panic" crew, John Keller, Hy LaVere, Elmersa Mistuloff, Del Church, Harold Earnest, Larry Whalen, and Bill Olsen, redesigned, reworked, retested, and delivered the unit back to O&M check within two days.

SC-1 RECEIVERS

The SC-1 receivers were delivered to the Control Item Control Point (CICP) two weeks ahead of schedule. Units are being held until jack screws for the Atlas connectors are received. Don Cook's testers (Ed Carter, Larry Booty, Cliff Wells) pushed these units.

SC-2 TV CAMERA

SC-2 TV camera retrofit is ahead of schedule. Harry Plath did a good job in producing the shutter subassemblies. Sue Richards, Gloria Vigilante, Helen Rydlek, and Edna Alekel picked up two days in the assembly time.

TRAINING FOR DEEP SPACE NETWORK CREWS

Taking a two-month comprehensive course on the Command and Data Handling Console and spacecraft are Klaus Geyer and Jeff Dyas from Johannesburg, Africa; John Flaxman and Bob Cudmore from Canberra, Australia; and Philip DeLario, George Kreisel, Everett Martin, and Charles Gee serving at Goldstone. F. O. Davis of Surveyor Mission Operations is the training coordinator, and instructors are being provided by Divisions 22, 27, 28, 29, and vendors.