

LO BUGL

Number B-1

NASA - BOEING - JPL

Date October 27, 1966

The LO BUGL is issued for the world-wide Lunar Orbiter Flight Operations Team for non-operation information only.

WELCOM, FELLOW ORBITEERS

Thoughts of Mission B crowd out the memories of Mission A as we get back into the headset harness again and prepare ourselves for training and another successful mission. It's good to see so many of the "old pros" again and to recognize the high level of talent of many of our new team members. But even with all this talent Mission B doesn't look much like a picnic. Instead it looks like another challenge that will require our best efforts at all times.

WHERE DO WE STAND?

Orbiter I is still performing well, in spite of the problems we have learned to live with. When the computers and other equipment get properly coordinated with the latest conference results we should begin operating in earnest. Just now we're in the position where the old timers are marking time to some extent while the new team members catch up on procedures and general operations. You could also say that some of the old timers had a bit of catching up to do.

S/C 5 progress at the Cape was satisfactory at our last reading.

AIR FORCE/UCLA GAME TICKETS

Claudia Wickersham has two good tickets for Saturday's Air Force/UCLA game (10/29) at the LA Coliseum. Cost is \$5.00 each--if you can't locate Claudia today, see Dick Schiff or the BUGL editor.

INSIDE PARKING

Paul Siemers has parking passes for the NASA troops, Ken Esmaier for TBC folks. Passes are usable between 7:30 a.m. and 5:30 p.m. and admit you to the same lot we used last time (south of main cafeteria). We'll park in West lot at other times.

THANKSGIVING TOGETHERNESS?

Your family would probably jump at a chance to fly to L.A. to be with you over the Thanksgiving holiday—but your financial adviser might panic. Anyway, here's some info we extrapolated from some Western Airlines info.

1. Group Travel offers about 20% saving on regular tourist fares and is usually less expensive than Family Plan. "Group" requires 25 or more people - two children under 12 count as one. Group must leave Seattle together, but may return independently.
2. Family plan best for larger families, but can't be counted as part of a "group".
3. Excursion plan offers greater savings, but can't be used just before or just after a holiday.

Recommendation:

Form a group to leave Seattle at 5:55 p.m. Wednesday, November 23rd, Western Flight 639. We have 30 seats reserved.

	Group Travel	Family Plan	
		Mon. Noon/ Fri. Noon	Friday Noon/ Sunday Noon
A. Wife	103.74	129.68	129.68
B. Wife & 1 child 12 or over	207.48	216.20	227.02
C. Wife & 1 child under 12	155.61	194.57	194.57
D. Wife, 1 child over 12 1 child under 12	259.35	259.46	264.83
E. Each additional child 12-21	103.74	43.23*	48.63*
F. Each additional Child under 12	51.87	43.23*	48.63*

*Add to B or C, whichever gives larger total.

NOTE: Western would have to figure the exact fares. These are approximations only.

Action:

1. Make reservations with Virginia Kennicott in NPAC before Monday noon, October 31.
If fewer than 25 reservations are made by then, we will cancel the group reservation.
2. Make reservations for the return trip for your family "Reroutings will apply only to the group as a whole and not to individual members."**

**Quotes are from WAL brochure. Virginia will have a copy.

3. Make payment in full (by check payable to Western Air Lines) to Virginia before Monday noon, November 14. If fewer than 25 full fares are paid, your check will be returned. "If at departure time of the group transportation the number of passengers in the Travel Group is less than 25, the balance of the group may travel provided the appropriate flight coupons of the total tickets are deemed used and therefore ineligible for refund."***

PERSONNEL LOG

Thanks to Claudia W. and Ken E., names and numbers of (most) all the players are available at the mail distribution point outside of FPAC. To make sure all the numbers are there, be sure to sign in when you first arrive and out when you leave town. From Boeing people Ken also needs everyone's T/A number and, in addition, car license number from each driver.

NO WALLABIES AT JPL

The hills at JPL abound with wild life according to some of the guards but it just doesn't seem right to Bob Hahn. Bob spent 8 months with the wallabies and kangaroos on Mission A but gave up his GRE work for the Data Collector bit with Bill Burr. Glad to have you aboard, Bob.

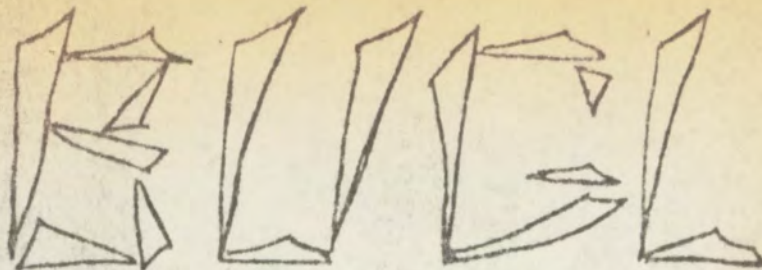
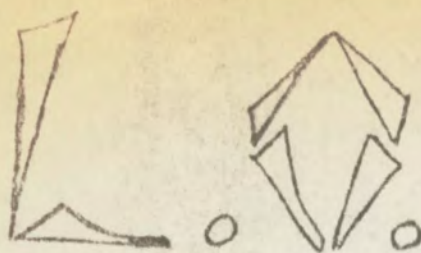
PHONE ANSWERING SERVICE

If you're likely to be away from your phone when you're expecting a call, plan ahead and provide the potential caller with the FPAC clerks number 5873. First the girls will try to locate you and second, they'll leave a message in your mail slot if you're out of the area.

NOT EVEN WITH A SHOEHORN!

It didn't take long after the 37 boxes of GRE components arrived at JPL to figure out that even a shoehorn wouldn't fit them all into the assigned floor space. So big Jim Kennady and little John Graham (TBC) got together with the appropriate people and arranged for more space. The GRE is installed and operating now but has some noise and non-linearity problems which Jim says will probably be eliminated today. John will operate the GRE with the help of Irv White and Cy Marchand.

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Number B-3

NASA - BOEING - JPL

Date October 29, 1966

The LO BUGL is issued for the world-wide Lunar Orbiter Flight Operations Team for non-operational information only.

SUCCESSFUL ENGINE BURN

A successful engine burn was initiated at GMT 302/1225:25. This event occurred 79 days, 17 hours after launch and represents the longest known time increment for restarting a liquid propellant propulsion system in deep space.

Normal engine operation lasted 94.4 seconds and imparted a velocity change of 168.85 mps; the system then continued in a "dribble" operation as the propellant became exhausted. This latter phase lasted another 23 seconds until the RTC closed the engine valves, imparting an additional 6.4 mps.

A second engine operation commenced at GMT 1246:20 and lasted until GMT 1249, thereby imparting an additional 2.77 mps.

Prior to the launch of S/C 4, the velocity increment capability was predicted to be 1027 \pm 43 mps. In normal operation a total velocity change of 1042.25 mps was imparted to the spacecraft. An additional velocity change of 9.17 mps was imparted in a nonstandard mode, for an overall total of 1051.4 mps.

During the initial burn, propellant tank pressures decayed from approximately 229 psia to approximately 195 psia. No change was observed during the second burn.

Gimbal actuators behaved in a normal manner during the first burn with excursions on the order of \pm 0.1 degrees. During the final burn, actuators cycled radically and at times went "hard over". This, plus the engine valves produced a battery current drain of over 13 amps.

Maximum recorded valve temperature was 97.9°F. At GMT 1311 the accelerometer was turned off, and then successfully turned on again at GMT 1315. The spacecraft concluded its operation with approximately 0.8 lbs of nitrogen. (Thanks to Jack Carhart for this story - Ed.)

"THE HOUR AFTER EARTHSET"

Twas the hour after earthset
and all thru the SFOF,
Not a printer was stirring
not even a punch.
The analysts were nestled all snug in their chairs,
while visions of the Pink Pussy Cat danced in their heads.

Deuce Two in his headset
and I in my cap
(secure in the knowledge the spacecraft had crashed)
had just settled down for a long earthset nap.
When out in the SPAC there arose such a clatter,
I sprang from my chair to see what was the matter.
Away to the doorway I flew like a flash
grabbed hold of the doorknob
and near broke the glass.

The Moon which was bright had just recently set
with our Orbiter I cratered deep in its net.
When what to my wondering eyes did emerge,
but eight startled analysts jolted out of their dirge.
With 41 Ops on the line saying
"She just came back chaps, and doing just fine".

To make a long story short, Station 41 (and a very few conniving critters at the SFOF) had arranged to start feeding canned data to the SFOF at the time earthrise would occur during the usual orbit. It was a bit of a shock to the SFOF team but it didn't take them long to solve the "anomaly". The BUGL will not reveal the names of the culprits - except to say Training ain't guilty.

HSDL CHRISTENED

At 2300 PDT or thereabouts on this date, the outbound High Speed Data Line (HSDL) from the SFOF was first used to send telemetry to Station 61 for a formal exercise. The station processed the data and returned it to the SFOF just as it would appear from a spacecraft. The BUGL blows for the hard working guys in the Training Unit who developed all the data to pump through the HSDL and the rest of the system. P-3 data "crashed" with Orbiter 1 and what you're seeing now is a complete re-do. So take heart, Bob Wegner and Company - the SPAC/FPAC types will appreciate the different data even though they'll let you know whenever your star map is showing.

CALLING STATION 61

There's a clipping from the 10/26 Seattle Times that really sings your praises. We have it posted on the SFOF bulletin board, pictures and all. Good show, Andy, Jim and company.

FASHION NOTE

Lee Helser and Dalton Webb get their haircuts from the same barber, both with OO clippers. Barber's name is "Myself".

ADDENDA

Understand the older Trick or Treaters around here carry a martini glass instead of a paper sack. They don't have to walk nearly as far as with a sack. After a few productive stops they can bob for olives instead of apples.

Looked at a nice apartment today with the idea of sharing same with someone else. Had lots of possibilities too. Completely furnished, big kitchen, bath, 2 bedrooms, pool, laundry, barbeque and carports, and only about half as much rent, with a maximum rent of ten dollars a day regardless of length of your stay.

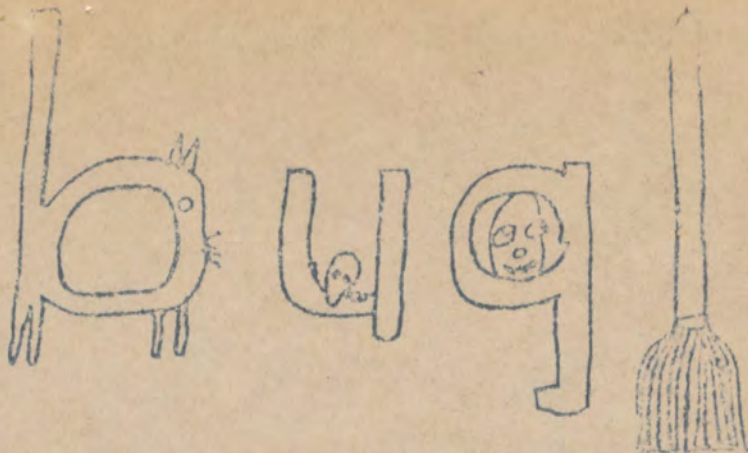
SCHEDULE INFO

All times are Pacific Standard Time

<u>RED</u>		<u>WHITE</u>		<u>BLUE</u>	
		10/29	2115		
10/30	1330 - 2230	10/30	0600	10/30	0530 - 1400
10/31	1230 - 1700 (1)	10/31	1630 - 2400	10/31	— —
11/1	0400 - 1500 (2)	11/1	— —	11/1	0300 - 1500 (2)
11/2	0930 - 1350 (3)	11/2	1320 - 2200 (4)	11/2	— —
11/3	0300 - 1600 (2)	11/3	— —	11/3	0300 - 1600 (2)

- (1) FPAC Red Team reports at 1300; computers come up at 1230. Day off for SPAC Red Team.
- (2) Red and Blue Teams will shift as on launch day.
- (3) FPAC Red Team reports at 1100; computers come up at 0930. Day off for SPAC Red Team.
- (4) SPAC reports at 1350; FPAC at 1320.

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Number B-4

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Date October 31, 1966

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SPACECRAFT STATUS

Spacecraft 5 - a leak in the camera pressure system made it necessary to remove the photo system. However, the leak was fixed, P/S reinstalled and it goes to the pad tonight. Should be mated to the Agena on 3rd Shift. Spacecraft delivery, by the way, was made on 10/26.

STATUS NUMBER REINSTATED

Pottio, Ellen, et al, at the SFOF Lobby are again putting LO status on the recorder for you, call 6211 for the latest info.

FIRST ORT-1 CANCELLED

Our call to 6211 confirmed that the first ORT-1 has been cancelled because of flight spacecraft rescheduling at ETE.

CONTINGENCY PLANNING

Just in case there was extra computer time available FPAC set up plans to get the most out of it. They set up four primary areas of interest, each with its own coordinator, and were ready to go to bat when their turn came with cancellation of ORT-1.

Matt Crogan is heading the effort on orbit determination analysis for Moon model selection with Ted Hansen heading preparation of an FPAC "Nominal Book" which will show FPAC details for a nominal mission from liftoff through reentry. Dick Radd has two related projects - first, development of the oblique photo technique and practice exercises and second, a supplement to the "Nominal Book" covering "Secondary Photos".

In addition, Dick Paulson is working on displays for launch and acquisition while Dale Shellhorn researches the entire FPAC operation looking for new and better methods of doing the job. That's what we call good contingency planning.

SHADES OF THE SFOF

Vending machines are being installed in Puget Sound area facilities of The Boeing Company for candy, cigarettes and beverages. (Ought to reduce the number of people traipsin' across to the HPC cafeteria by 80% or more. - Ed)

SIMULATION REALISM TO BE IMPROVED

You've probably noticed that there's some lack of realism with our existing simulation set-up because the simulated "spacecraft" can't respond to other than pre-planned commands. With the christening of the outbound HSDL on ORT-2 and more complete DSIF participation, realism

SIMULATION REALISM TO BE IMPROVED (Continued)

has been improved by knowledge that the stations are actually participating. But the PDP-1 computer still is a limiting factor, however, we expect to have the more sophisticated ASI 60 - 50 simulation computer in operation by next mission. With the 60 - 50, equations for various spacecraft functions can be "plugged in" to provide us with realistic spacecraft responses to transmitted commands. We're looking forward to full operation of the 60 - 50, though we haven't received a firm commitment as to when that will be.

AGM AWARDED TO BOEING

Word was received today (over the Seattle PA system) from a happy man named Lysle Wood that Boeing had been awarded the AGM Missile Contract, the largest DOD contract Boeing has received for many months.

AREA PAGING

When "volume" is the problem with the overhead speakers, don't call the trouble-shooter. Each speaker has its own independent volume control - wall mounted. They're numbered to key speakers to controls.

As there are several people within range of each speaker, you may have to establish a pecking order to preserve decorum.

SCHEDULE INFO

We reflected the "official schedule" in BUGL B-3 only to find that some additional time had to be provided to prepare for the mission, etc. We have added that time and modified things a bit to reflect the cancelled ORT-1. Also you'll see separate SPAC and FPAC schedules.

SPAC, Mission Control and DACON (All times are Pacific Standard Time)

<u>RED</u>		<u>WHITE</u>		<u>BLUE</u>	
11/1	0600 - 1530 (1)	11/1	1600 - 2400	11/1	0800 - 1630 (1)
11/2	0800 - 1400 (2)	11/2	1320 - 2200	11/2	_____
11/3	0630 - 1630 (1)	11/3	_____	11/3	0300 - 0830 (1)
11/4	_____	11/4	_____	11/4	_____
11/5	_____	11/5	_____	11/5	_____
11/6	0800 - 1830 (3)	11/6	1800	11/6	0500 - 1000 (3)
0430 (3)					

(1) Red and Blue Teams will shift as on launch day.

(2) Computers come up at 0930.

(3) Keep in touch!

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LO-BUGL

Number B-5

NASA - BOEING - JPL

Date November 1, 1966

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SPACECRAFT STATUS

S/C 5 is on the pad mated with the Atlas/Agena, thermal blanket on and back on schedule. Shouldn't cause any problems with the next ORT-1;

PARKING PASSES

We hear there are 40 parking places reserved for Boeing cards in the "inside" lot and thereby hangs the tale. JPL feels that with so many of us working day shift this week we'd use more than 40 spaces if more than 40 passes were available. However they have told us that additional passes will be issued when we are operating on a 3-shift basis, as we expect to next week. We expect to have the additional passes Friday night.

Listen for much wailing and "NASA-ing" of teeth about parking passes when the Mission Advisers arrive starting Thursday.

SFOF BADGES

All SFOF Lunar Orbiter badges that do not have all 4 LO area codes (A,F,O,R) shown are to be replaced. Please pick up your new badges at the SFOF lobby. Some of them are ready now; the others are to be ready by Thursday.

MICKEY & MINNIE IN "RETRIBUTION"

One of our folks caught a mouse in his room and "put it to sleep". Well, next night he kept hearing a scraping noise followed by a snapping sound. Couldn't find a thing till almost time to get up. Then he found his gold pen had been moved to the back edge of his dresser by Mrs. (or Mr. ?) Mouse, raised almost high enough to clear the edge and dropped -- many times. Seems the mouse wanted to get even.

VENDING MACHINE REFUNDS

Support Chief, Ray Stanford, is looking into reports the BUGL received that refunds for losses to the vending machines have not been received. We'll keep you posted on results of his investigation.

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Number B-6

NASA - BOEING - JPL

Date November 3, 1966

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SPACECRAFT STATUS

Latest report from ETR indicates S/C 5 is set for the ORT-1 Countdown with S/C 6 as backup.

VIP TREATMENT

The Los Angeles Times date-lined November 2 says President Johnson is expected to visit JPL at 12:45 Sunday afternoon. If the item is correct, better make sure your seams are straight for Sunday. And watch out - your boss' boss will probably be here too.

TRAINING OVER FOR NOW

By 4 pm today, the training will be over for this round. We sense a general feeling of confidence in the air -- but is it over-confidence? Bob Helberg hit the nail on the head when he wrote to all Boeing LO personnel, "It is essential that nothing be taken for granted. We must be sure of each action and think our way through each event, each condition of test or operation, and each maneuver before proceeding." As we learned during college days on a summer job as a carpenter, "Measure twice and cut once" saves a lot of goof-ups. Same thing applies to our business -- "Think twice and talk once" or, "Be sure brain is engaged before operating mouth."

Have at it, guys, and don't let the butterflies affect your thought processes. You proved you can do it once and you're on the spot to prove it again.

WELCOME, GIRLS!

The other half of the feminine part of the TBC Flight Operations crew has arrived at JPL - Harriet Roundsley is back and Virginia Johnson and Diane Nelson have joined the SFOF crew for the first time. Welcome to Spaceville, girls.

Generally the girls will be following the FPAC team schedules to ease transportation problems. On weekend and occasionally during the week Claudia and Valerie from the Boeing offices will take a turn so the others can take the days off required by law. With the help of Claudia and Valerie we will be able to provide 24-hour support, 7 days a week.

FOOTBALL TOO STRENUOUS?

White team challenge didn't elicit any response from Red or Blue so they've asked us to change the challenge to a game of fiddly winks. How about that?

LAUNCH DATA TABULATED

Here is a set of statistics about the November launch period you may find interesting - or just plain useful.

Launch Readiness Day (PST)	Launch Azimuth (deg)	Launch Time (PST)	Window Span	Injection Time	Injection Velocity (km/sec)
Nov. 6	90.5	3:02 pm	2 hrs. 22 min.	3:24 pm	10.5013
	111.8	5:24 pm		5:24 pm	10.5286
Nov. 7	87.0	4:21 pm	1 hr. 58 min.	4:41 pm	10.5016
	102.8	6:19 pm		6:33 pm	10.5110
Nov. 8	78.0	4:48 pm	2 Hrs. 23 min.	5:09 pm	10.5091
	73.9	7:11 pm		7:25 pm	10.5028
Nov. 9	66.0	5:03 pm	3 Hrs. 02 min	5:26 pm	10.5259
	86.7	8:05 pm		8:18 pm	10.5032
Nov. 10	66.0	5:56 PM	3 hrs. 08 min.	7:23 pm	10.5347
	82.5	9:04 pm		9:17 pm	10.5072
Nov. 11	66.0	7:00 pm	4 hrs 03 min	7:23 pm	10.5368
	87.0	11.03 pm		11.18 pm	10.5066

STOW THE GOODIES, IT'S CLEANUP TIME IN FPAC

Obsolete data can be a snare and a delusion. To guard against things like sending Orbiter II off on a training trajectory, FPAC is going to hide or discard all data accumulated before launch. The Blue Team is coming in before the countdown to support software checkout anyway. They will also shovel out all old data in sight unless it is plainly marked for salvation and neatly bundled. Red and White teams and all other interested parties had better save their goodies before the Blue Team goes on the cleanup rampage. (SPAC has already completed its cleanup effort.--Ed.)

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LO BUNGL

Viele

Number B-7

NASA - BOEING - JPL

Date November 6, 1966

The LO BUNGL is issued for the world-wide Lunar Orbiter Flight Operations Team for non-operational information only.

LAUNCH A COMPLETE SUCCESS

Another successful mission is under way! With the successful launch at 3:21.195 p.m. this afternoon (Pacific Standard Time) the trend toward nominal performance seems to be well established. Understand Capt. Sherer laughingly said he was disappointed that the time of lift-off was .195 seconds late. And now we understand that the trajectory is so precise the FPAC wants to wait as long as possible for the midcourse maneuver -- and they're talking in terms of a change in velocity around 10 to 40 meters per second. And that's only about 20 to 80 miles per hour! Injection accuracy was well within the advertised Atlas/Agna dispersion curve and actually appears to be better than that of Orbiter I.

By definition, we will have a midcourse maneuver -- even if the spacecraft were exactly on the planned trajectory because the SPACers need to know that the engine will work properly when that critical deboost maneuver is executed.

At this writing we are about six hours into the mission and all systems are "go". Some temperatures are different from Orbiter I but it looks as if we have a real swinger in the Orbiter II bird. Panels and antennas have been deployed, Sun has been acquired, and the Camera Thermal Door operated. Canopus acquisition is scheduled for about 6:00 a.m. PST, 11/7.

PEOPLE-TYPE REACTIONS

George Burmeister says this is a good time to get ulcers -- while waiting to see how the Star Tracker works.

Virginia Johnson says it's "tremendous"

Diane Nelson was having trouble concentrating during the final moments of the countdown -- finally asked if her predecessor had continued typing through all the excitement on Mission A. The answer apparently satisfied her because she stopped typing and sat on the edge of her chair like several others we could name including one BUNGL editor.

PEOPLE-TYPE REACTIONS (Continued)

There was a distinct difference in the level of excitement between the two missions, undoubtedly stemming from the background of Orbiter I experience. Remember the tension and the crescendo of words on the voice nets as liftoff approached last time? -- Much of that seemed to be missing on this one. Increased self-confidence and confidence in other members of the team had decreased the tendency to over control --- and also increased the ease with which questions and answers were passed back and forth. Streamlined procedures and many other factors led to what seemed to be a very routine and successful launch. In our opinion this one was a professional operation with no reservations.

FISHING FLUG

We had a bad case of "Fishing Pox" Saturday so went to Pierpoint Landing in Long Beach for the morning trip on the sports fisherman "Pierpoint". Ended the excursion with Bonita, Yellowtail, Halibut, Barracuda, and other miscellaneous species aboard. (Cost of trip was \$6 for the half day plus \$2 for tackle rental. Bait was furnished in abundance. Better make reservations first by calling HE 2-0408 or SP 5-2381.) Ended the day with a barbecue at the Westerner -- invited everyone we saw along the way to help eat the fish. Where were you?

BOEING PERSONNEL LOG BOOK FEELS NEGLECTED

If you don't fill in the needed information in the sign-in book at the mail distribution point, the book feels neglected and won't give out any good information at all about you. Matter of fact, it might even tell your boss in Seattle that you haven't reported for work yet. To avoid these dire consequences, just fill in the needed information and the book will be happy.

ODDS AND ENDS

Mission Advisor Chuck Engle has done his bit to insure success of the mission; he brought along the lucky wool sweater with all the holes in it. Oh well, its worked 100% so far. Wonder if mending the holes would affect the kind of luck it brings.

Bruce Agesen at the COMMAND position has a new set of "inspirational" coffee cups --- same type of inspiration as Playboy magazine. Says he can't bring more than one cup at a time because it might upset the troops.

During the countdown one of the SPAC Analysts was asked for status of his system. He replied that everything was OK. A little later he confessed that he didn't really know at that time because he didn't have any telemetry data.

Anita Oaks residents had a little party the other night. We hear they discovered some real talent in the guitar playing and Go-Go dancing line.

ODDS AND ENDS (continued)

Bob Helberg has a good looking and really original business card. It has a picture of the much publicized Earth/Moon picture across the middle.

Low Gain Antenna must have been pretty sad according to one report. The antenna was deplored.

SHE BOWLS 'EM OVER

Support Chief Ernie Gustavsen has a 12 year old daughter who is really following in her dad's footsteps. In the September 1 BUGL we told of Ernie's 603 bowling series and now daughter Karen has rolled a 548 scratch series with a high game of 244. She's a member of the Verdugo Hills Travelling League, Bantam Division, and obviously a tough competitor.

LOCKED ON CANOPUS

Locked on Canopus at 311:08:18:00 GMT so looks like Burmeister will have to worry about getting ulcers on the third mission.

OOPS - goofed again - sorry about the heading (Ed) but hthere was so much excitement in the SPAC area that I got flusterered and added another letter (when Canopus came into view).

SCHEDULE INFO (Pacific Standard Time)SPAC, MISSION CONTROL, DACON

		<u>Red Team</u>	<u>White Team</u>	<u>Blue Team</u>
Sun	11/6	- 1800	1730	
Mon	11/7		0330	0300 - 1300
	11/7	1230 - 2230	2200	
Tue	11/8	1730	0800	0730 - 1800
Wed	11/9	0400	0330 - 1400	1330 - 2400
	11/9	2330		
Thur	11/10	1000	0930 - 1930	

Notes Deboost expected at approximately noon 11/10; White Team to be on duty.

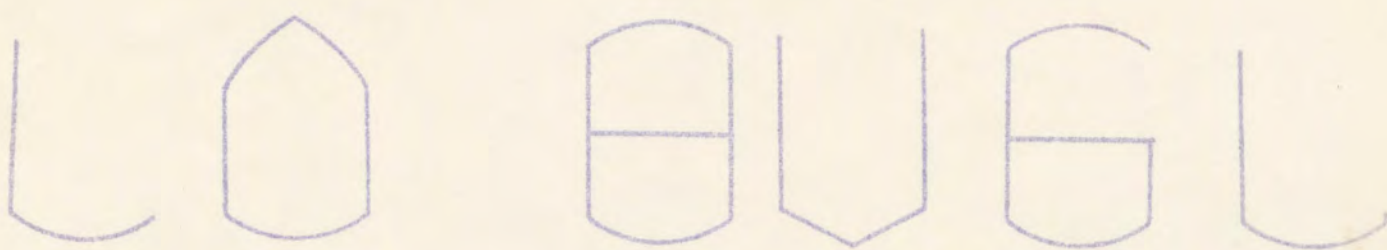
FPAC AND CLERKS*

		<u>Red Team</u>	<u>WHITE Team</u>	<u>Blue Team</u>
Sun	11/6		1700 -	
Mon	11/7	0900 - 1800	0200	0100 - 1000
	11/7		1700	
Tue	11/8	0900 - 1800	0200	0100 - 1000
	11/8		1700	
Wed	11/9	0900 - 1800	0200	0100 - 1000
	11/9		1700	
Thur	11/10	0900 - 1800	0200	0100 - 1000

* Clerks' shifts start at same time as FPAC; duration is 8-1/2 hours including 30 minute lunch.

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Number B-8

NASA - BOEING - JPL

Date Nov. 7, 1966

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UNNECESSARY MISSION CHANGES ARE OUT --- !

Thanks to the planning and expert handling throughout the pre-countdown, the countdown and launch phase of Lunar Orbiter Mission II, we appear to have an excellent spacecraft on a good translunar trajectory. Many milestones have been passed. Many are still ahead.

On the assumption that the spacecraft continues to perform as it now is and that midcourse correction and orbit injection perform well, there will be about 10 days of relative inactivity at the SFOF prior to photo-taking activity. These are dangerous days. Intelligent people become bored with inactivity and begin to think of means of getting extra data that may appear to come quite easily. Most of these ideas will be good, only a few will have potential hazard but none are required to complete the assigned mission. Any changes to the designed mission should be made strictly on the basis of necessity, to overcome a fault in the equipment or inability on the part of the team to meet all of the requirements of the mission.

When it is found necessary to make a change in the mission plan, such changes must be properly coordinated with all specialists, NASA and Boeing, in the field where the change is to be made to be sure that all angles are covered and that the timing is right before execution. One hastily or incompletely considered change in the flight plan could seriously endanger the mission.

Think it over.

R.J.H.

SPACECRAFT STATUS

Nominal. Canopus is right where it should be and everything else is o.k. Temperatures in the photo system remained above the dewpoint so we don't expect any haze on the lens.

S/C is pitched off-sun 39° at the moment to reduce the degrading effects of ultra-violet on the thermal paint. We'd like to be able to take pictures with the craft on the sun to eliminate a lot of the pitch maneuvers we required last time and conserve nitrogen. Keeping the paint in good shape as long as possible is a good way to work toward that objective.

While we're on the subject of paint is a good time to mention that the temperature of the paint coupons on the Equipment Mounting Deck is a few degrees higher than that of the EMD itself. Why?

COMPUTER TIME ID TO BE IMPROVED

Thanks to Mal Gray, TBC, Warren Schneider, DSN, and Gil Orozco, DSN, a correction has been made to the 7094 system such that the execution time identification which appears on off-line SFOF-printed output will be accurate to within a few minutes. It will be the same as the time of the most recent run of EDITOR and will avoid the possibility of having two different computer outputs with the same time word identification.

The change is expected to be approved early tomorrow and implemented soon after the mid-course maneuver on 11/8. After the change is operational, and you FPAC'ers want to ensure that two runs of the same program appear with different time tags even though they're made a few minutes apart, just ask DACON to request a new output tape for the second run.

NEW LIFE FOR SURVEYOR?

LO Operations Directive No. 6 stated that the Surveyor Project is planning a 12-hour series of tests beginning at 1009Z November 8 in an attempt to stir their slumbering Surveyor I to life. We wish them success in their efforts -- (unless it would interfere with the Orbiter II mission).

FPAC Has Own Backup Computer

We have finally unearthed the reason FPAC has been so successful in determining orbits, photo positions and like that. They have their own backup computer string -- stored in Dale Shellhorn's desk. It's an abacus!

SCHEDULE INFO (Pacific Standard Time)

SPAC, MISSION CONTROL, DACON:

	<u>Red Team</u>	<u>White Team</u>	<u>Blue Team</u>
Mon. 11/7		2200~	
Tue. 11/8	1730~	0800	0730 - 1800
Wed. 11/9	0400	0330 - 1400	1330 - 2400
11/9	2330~		
Thur. 11/10	1000	0930 - 1930	

NOTE: Deboost expected at approximately noon 11/10; White Team to be on duty.

FPAC & CLERKS*:

Mon. 11/7		1700~	
Tue. 11/8	0900 - 1800	0200	0100 - 1000
11/8		1700~	
Wed. 11/9	0900 - 1800	0200	0100 - 1000
Thur. 11/10	0900 - 1800	0200	0100 - 1000

*Clerks' shifts start at same time as FPAC; duration is 8-1/2 hours.

End of this
document

LO BUGL

Number B-9

NASA--BOEING--JPL

Date Nov. 8, 1966

The LO BUGL is issued for the world-wide Lunar Orbiter Flight Operations Team for non-operational information only.

SPACECRAFT STATUS

Midcourse maneuver at 1130 11/8 PST was a complete success and only changed velocity about 47 miles per hour. 18.05 Second engine burn produced 21.1 meters per second. Time of closest approach (TCA) is now estimated to be 36 seconds later than targeted.

Midcourse had been planned for about six hours earlier but was postponed when Canopus lock was lost temporarily. The news media played up the Canopus problem because of Mission A but they must have been as hard-pressed for news of the Orbiter as the BUGL. This mission hasn't created much news because most everything has already been written in the Flight Operations Plan and related documents. And the loss of lock wasn't as significant as the news reports indicated.

BIRD WATCHERS ARRIVE AT SFOF

Those two intrepid Boeing Bird Watchers George Hage and Bjarne Slind joined forces with equally intrepid Bird Watchers Cliff Nelson, Lee Sherer, Bill Boyer, Dick Mittauer, John Royal, Dave Jackson and Charlie Green to wage a courageous fight against wind and rain to reach the SFOF. This time their Dassault jet was well stocked with olives and other vineyard products but they had to stop anyway. Don't know whether it was the prospect of a good dinner or a shortage of "go juice" for the jet that caused them to stop at Dallas and Albuquerque but we suspect a combination of the two. (Ed note: If weather under the storm front was an indication of weather in the storm front, it's a wonder the olives didn't get spilled! Glad you made it down safely, gentlemen!)

SMOG WASHED AWAY

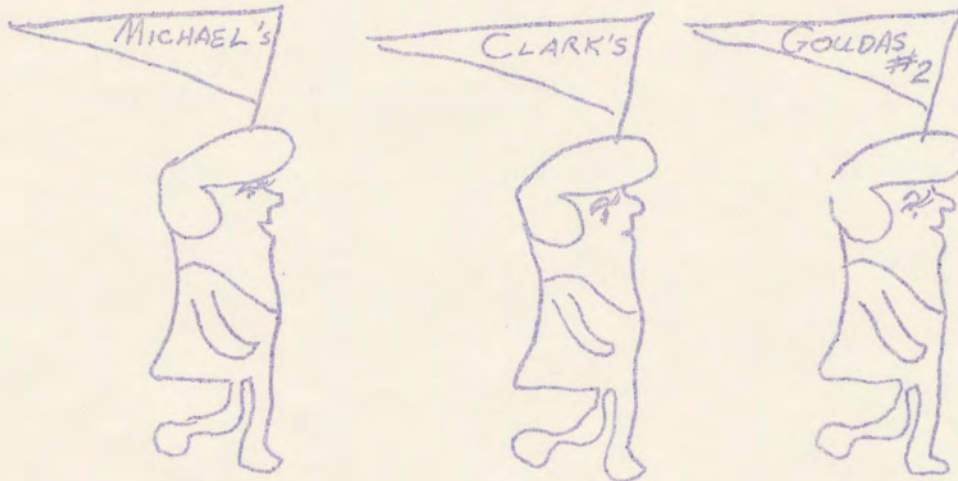
More than two inches of rain really cleaned the air over Los Angeles yesterday morning. But it caused a few problems at the same time. Some of the housing developments without adequate storm drains were favored with a foot or two of water in the lower areas - many streets were flooded, bridges damaged and some residents of the Anaheim area evacuated to higher ground. The Santa Ana Freeway was closed in both directions for hours because of slides and we even had some problems at JPL.

You out-of-towners may not realize the extent of construction underway here at JPL but one current project is the main road. With the surface torn up and the ballast not in place, it was a race to see whether rain water or mud could go downhill faster. Till this morning there was ample evidence that it had been a good race. The mud didn't win or place but it sure did show.

John Gray took his car into the temporary parking lot to which we've been assigned and the front wheels hit a soft spot. As John might tell it, they went in "Hup to the jolly 'ub." However, things are mostly back to normal now.

VENDING MACHINE REFUNDS

Vina Keeling in the Bendix office had a refund for Bob Hahn.



ANOTHER MOON MODEL BEAUTY CONTEST?
WHICH ONE WILL WIN?

<u>SCHEDULE</u>			<u>Red Team</u>	<u>White Team</u>	<u>Blue Team</u>
FPAC:	Tuesday	11/8		1700	
	Wednesday	11/9	0900 - 1800	0200	0100 - 1000
		11/9		1700	
	Thursday	11/10	0900 - 1800	0200	0100 - 1000
		11/10		1700	
	Friday	11/11	0900 - 1800	0200	0100 - 1000
		11/11		1700	
	Saturday	11/12	0900 - 2030	0200	0100 - 1000
	Sunday	11/13	1700		
	Monday	11/14	0200	0100 - 1000	0900 - 1800
		11/14	1700		
	Tuesday	11/15	0200	0100 - 1000	0900 - 1800

FPAC CLERKS: See published individual schedule posted on Bulletin Board.

11/8/66

SCHEDULE (Cont'd)

SPAC, MISSION CONTROL & DAON:

		<u>Red Team</u>	<u>White Team</u>	<u>Blue Team</u>
Wednesday	11/9	0400	0330 - 1400	1330 - 2400
	11/9	2330		
Thursday	11/10	1000	0930 - 1930	1900
Friday	11/11	0530 - 1630	1600	0600
Saturday	11/12		0300	

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LO BUGL

Number B-10

NASA - BOEING - JPL

Date Nov. 10, 1966

The LO BUGL is issued for the world-wide Lunar Orbiter Flight Operations Team for non-operational information only.

SPACECRAFT STATUS

A successful Orbit Injection maneuver was initiated at GMT 2026:37.3 on Day 314 and concluded after 611.6 seconds of engine operation, thereby imparting an 829.7 mps velocity change. Propellant tank pressures stabilized at 188 ± 1 psia during the maneuver. Pitch and yaw gimbal actuators cycled normally throughout engine operation, the pitch actuator cycling -0.196 to $+0.073$ degree and the yaw actuator cycling $+0.079$ to $+0.290$ degree. Engine valve temperature stabilized at $70-71^{\circ}\text{F}$ during the maneuver, and reached a maximum of 108.8°F at GMT 2153 as a result of soak-back.

VERY PRELIMINARY estimates of engine performance are a thrust level of 101 lbs. and a specific impulse of 276 seconds. Remaining "Delta V" is 166 ± 43 mps.

As of this status, propellant tank pressures are 191 and 192 psia, fuel and oxidizer, respectively. The nitrogen supply is estimated to be 11.1 lbs., slightly above the budgeted value for this phase of the mission. The Velocity Control Subsystem is "GO" at this time.

Beyond the enlightening information above, which is taken from Jack "BURNER" Carhart's shift summary, there is little to note. All telemetry and tracking data are "nominal." Though tracking data are still "preliminary," it would appear that the actual orbit is very close to the mission plan with perilune of 200 km and apolune of 1850 km.

Transfer to final ellipse has been scheduled for the apolune passage on Monday, Nov. 14, at about 1640 PST which occurs during the time both Stations 12 and 41 are tracking and can accommodate probable off-apolune transfer. This plan also allows for a limited amount of leeway in transfer timing or for a second transfer.

EYEWITNESS REPORT ON MADRID

Don Fries, Blue SPACECRAFT, spent his time on Mission A at DSIF 61, Madrid, and finds shifts a bit shorter here at SFOF. With a $14\frac{1}{2}$ -hour view period and $2\frac{1}{2}$ hours round trip to "home" in Madrid, shifts are likely to get a bit tiring. However, when view periods are shorter or LO tracking coverage is limited, life at Madrid can be very pleasant.

Although there are sleeping quarters at the station, beds were pre-empted for the firemen when the big fire was so close to the station. An interesting political sidelight of the fire-fighting operation was related to the turpentine and forest products operation on which many of the local folks depended for their livelihood. There's still a lot of discussion raging over whether the firemen should have saved the station or the surrounding woods. If you had been the fire chief charged with making that decision, how would you have made it? Quisen sabs? Fortunately for us, they chose to protect the station.

LO BUGL?

One or two of you may have missed the "typo" on the BUGL masthead a couple of issues ago but we feel sure most of you caught it so we thought we'd fill you in on some of the background to that story. Seems that a fellow in Seattle was making up some signs one October day that were to say "LO BUGL". So he made up an extra one with an "N" in the middle and put that one on top of the others for all to see. The other signs have been applied to appropriate locations but we're still carrying the Ugly Duckling around.

Not realizing the dangers involved, we showed it to the BUGL "staff artist" one day - and look what she did with the idea. (Special note to K. Y. Wong, Seattle: You and your cotton-picking signs! Next time we'll award the BUGL sign contract to Jerry or Dick.)

TEST FILM READOUT POSTPONED

Readout of test film from Orbiter II was set for 0630 Veterans Day, PST, but it has been postponed - probably until Saturday, Nov. 12. See Ops. Directive #11 for details.

CHAMPION BIRD-DOCTOR ARRIVES AT JPL

You can't deny that it has taken a lot of doctoring to fix some of the hardware problems at the Cape - but the troops there have risen to the task and demonstrated their championship caliber. And Rick Rasco, one of the chief bird-doctors is visiting the SPOF. Welcome aboard Rick, and tell us if it's true that during the ORT-1 one of the ETR types wanted to launch the SPOF on the next Saturn booster.

KLUDGE MISSES ITS FATHER

LOPO Bob Smith's pet Kludge apparently misses him. Tho it still shows relative earth-moon-sun-Orbiter positions properly when the heavy plexiglas part is rotating downward, there's some slippage on the driving shaft so that it loses time on the upswing. Sorry about that, Bob.

<u>SCHEDULE</u>		<u>Red Team</u>	<u>White Team</u>	<u>Blue Team</u>
FPAC:	Thursday 11/10		1700-	
	Friday 11/11	0900 - 1800	0200	0100 - 1000
	11/11		1700-	
	Saturday 11/12	0900 - 2030	0200	0100 - 1000
	11/12		2000-	
	Sunday 11/13	1700-	0730	0630 - 1800
	Monday 11/14	0200	0100 - 1000	0900 - 1800
	11/14	1700-		
	Tuesday 11/15	0200	0100 - 1000	0900 - 1800
	11/15	1700-		
	Wednesday 11/16	0200	0100 - 1000	0900 - 1800
	16	1700-		
	Thursday 11/17	0200	0100 - 1000	0900 - 1800

FPAC CLERKS: See published individual schedule posted on Bulletin Board.

SCHEDULE (Cont'd)

SPAC, MISSION CONTROL & DACON:

			<u>Red Team</u>	<u>White Team</u>	<u>Blue Team</u>
Day 314	Thursday	11/10			1900
315	Friday	11/11	0530 - 1730	1700	0600
316	Saturday	11/12	1600	0500	
317	Sunday	11/13	0330	0300 - 1430	1400
					0100

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LO BUGL

File

Number B-11

NASA - BOEING -

JPL

Date Nov. 11, 1966

The LO BUGL is issued for the world-wide Lunar
for non-operational information only.

Orbiter Flight Operations Team

SPACECRAFT STATUS

All systems are "GO". The tracker still seems to be picking up some light from somewhere such that its sensitivity is decreased when it's kept on continuously. So we've modified our plans to keep it turned off most of the time and use it when the spacecraft is in the moon's shadow. There are several theories on what's causing the "glint" and we're hoping for more info from G. Furmeister and company after a meeting tomorrow.

CONGRATULATIONS RECEIVED

Several congratulatory telephone and TWX messages have been received since the successful deboost maneuver - from Dr. Robert Seamans, NASA Deputy Administrator, Dr. Floyd Thompson, LRC Director, George Stoner, Boeing VP and others. Heres the text of George Stoner's message.

"Have just been advised that Lunar Orbiter II was put into a near perfect orbit around the moon. Would like to extend my congratulations to all the group on this excellent maneuver. Good luck and best wishes for continued success on each future maneuver."

With no wish to detract from the credit due the Flight Ops Team, we were reflecting upon some of the other reasons for our success. And most of those reasons turned out to be people - people in Engineering, Material, Manufacturing - people who filed blueprints, wrote memos, tested paint coupons, built test stands, arranged for passports (and shots), kept many kinds of records and performed all the other jobs that make possible such an achievement. It's nice to receive credit where credit is due but - there are a lot of people who share it with us.

SURVEYOR LIVES AGAIN

Our Surveyor associates have again interrogated their spacecraft and received more than 100 items of information.- after five lunar days of intense heat and five lunar nights of extreme cold. There's apparently a problem in the camera system that is preventing transmission of a video signal but the rest of the craft is still operating and they cycled through all commutator modes. The batteries of course take only a minimum charge now, but the solar panel furnishes plenty of power to transmit a good signal. The panel itself wasn't designed to carry

SURVEYOR LIVES AGAIN (Continued)

the whole electrical load so possibly insufficient power is the real reason for no more pictures. The BUGL sounds a hearty blast of congratulations for SURVEYOR I and its Flight Ops team.

STRIKE THREE, Y'ALL ARE OUT!

There was a young pitcher, DeRyder
whose fast ball changed into a slider;
For the Pirates he played
and he even got paid
Till NASA pay was the decider.

With apologies to Buddy for this limerick, we thought you'd like to know he used to play professional ball with the Brunswick, Georgia, Pirates.

WANT AD DEPT.

LOST: From ACE-2/SNOMAN area; three white SFOF badges. Monetary value is virtually zilch but they have great significance to anyone who needs access to 2nd Floor. Badges must be returned immediately so LO personnel can gain access to computer areas as needed.

MISSION C TRAINING ALREADY?

Bob Wegner is back at the SFOF to coordinate and reemphasize the training program for Mission C. There are still a lot of questions unanswered about the extended mission for Mission B and training for Mission C. We'd like to use Spacecraft 5 if it's still perking along and are basing our plans on that probability. But there are also various contingency plans being considered which involve additional simulation training in those functions for which the live bird is best - photo sequence, readout, and orbit transfer.

TRANSFER TO BE TUESDAY

Ops Directive 12 says that transfer to final orbit is planned for Tuesday, Nov. 15 at 1500 PST (2300 GMT). The FPAC'ers have planned for a second transfer or post-ponement of transfer if conditions warrant. The long two-station (DSIF 12/41) tracking period which follows is highly advantageous.

MISCELLANY

The ATLAS/AGENA which boosted Orbiter II into such a good trajectory was the 13th such booster to be launched from Pad 13 at the Cape. Chuck Engle's lucky sweater must be pretty potent to offset the 13's. But watch out now, guys, two of the larger "ventilation ports" have been sewn up - with white string and right after that was done we lost Canopus again.

Tonight at 10 p.m. the Pinkerton guard crew will be reduced leaving four posts manned. Front desk, 2nd floor, basement, and the roving guard post will continue to be manned.

SCHEDULE INFO

You SPAC'ers are vitally concerned with time required for 3 orbits - it is 10 hours 54 minutes which means an 11-1/2 hour shift length. To get in sync with earthset we put in one 12 hour shift per team. Then, as we gain 6 minutes per shift we'll have to give one team an 11 hour shift roughly every five shifts to continue in sync with earthset. We'll probably transfer to final orbit just as your turn for the short shift comes up. Sorry about that.

FPAC

		<u>RED</u>	<u>WHITE</u>	<u>BLUE</u>
Saturday	11/12	0900 - 2030	- 0200	0100 - 1000
	11/12		2000	
Sunday	11/13	1700	0730	0630 - 1800
Monday	11/14	0200	0100 - 1000	0900 - 1800
	11/14	1700		
Tuesday	11/15	0200	0100 - 1000	0900 - 1800
	11/15	1700		
Wednesday	11/16	0200	0100 - 1000	0900 - 1800
	11/16	1700		
Thursday	11/17	0200	0100 - 1000	0900 - 1800
Friday	11/18	0200	0100 - 1000	0900 - 1800
Saturday	11/19	0200	0100 - 1000	0900 - 2030
Sunday	11/20	0730	0630 - 1800	1700
Monday	11/21			0200

SPAC, MISSION CONTROL & DACON:

	<u>RED</u>	<u>WHITE</u>	<u>BLUE</u>
Day 316 Saturday 11/12	1600	- 0500	
Day 317 Sunday 11/13	0330	0300 - 1430	1400
Day 318 Monday 11/14	0030 - 1200	1130 - 2300	2230
Day 319 Tuesday 11/15	0930 - 2030*	2000	0100
Day 320 Wednesday 11/16		0700	1000

* Transfer to final orbit - 1500 PST.

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document

Number E-12

14 November 1966

NASA - BOEING - JPL

LO BUGL

Side

The LO BUGL is issued for the world-wide Lunar Orbiter Flight Operations Team for non-operational information only.

SPACECRAFT STATUS

Readout of the test film from the spacecraft was satisfactory although our GRE still seemed to need a little bit more tweeking. The processed film is on the light table in the Mission Advisors' area but don't be concerned at the scratches and graininess on some framelets; we understand they were actually on the test film at the Cape.

Spacecraft temperature is running about 7° cooler than last time - still pitched off the sun to reduce thermal paint degradation.

Understand things were so quiet in SPAC that they made a round trip from Tedium to Boredom once each orbit - and COMMAND had to take a refresher course in command procedures because of the long interval between commands. At least part of the inactivity was caused by the need to keep the spacecraft steady so the orbit determination types could get a good fix on the initial orbit prior to transfer Tuesday afternoon. Would you believe 3:00 p.m. (1500) PST?

PLACES TO GO HEREABOUTS

The Los Angeles Museum of Natural History and the Museum of Science and Industry are fascinating ... belay that. We hear there's a "fascinating" show at the Largo in Hollywood.

Just up Santa Anita Blvd. from the Westerner is a winding mountain road leading to a forest camp a couple of miles and 1500 feet up from the edge of town. On a clear day the many view points along the road afford excellent opportunities for swimming-pool counters. There is a good trail from the camp to the floor of Santa Anita canyon 600 feet below that gives you a feeling that you're miles away from the mass of people in Megalopolis. A leisurely round trip should take about 2 hours, including the canyon trail and viewpoints.

The San Gabriel mountains also furnish some spectacular scenery - something like the Ellensburg Canyon but at a higher altitude.

TASS REPORT

There are four "proper" satellites in orbit around the moon, of which three are Russian. (We count quality too. - Ed.)

FISHING POX ON THE INCREASE

After the BUGL article on fishing a la Pierpoint Landing, the fishing pox spread to eight of the Langley team members. They brought home a good catch of bonito, barracuda, sea bass, etc., and in addition Tom Young latched onto a manta ray which they wouldn't let him take aboard the ship. Even after the big fish fry, there's still a freezer full of fish at Cliff Nelson's.

VOCABULARY OF SPACE TALK

Syzygy - for the benefit (?) of those who didn't read our definition last time, it is the "nearly straight-line configuration of three celestial bodies (as the sun, moon, and earth during a solar or lunar eclipse) in a gravitational system."

Pericentron (& apocentron) - nearest (or farthest) point in an orbit from the center of a heavenly body. Same as perilune (or apolune) if the moon is the body under discussion but pericentron could also apply to Mars, Sun, Earth, etc. Besides, perilune is a combination of Greek (peri) and Latin (luna) while pericentron is all Greek to us. We hasten to add that this definition does not have universal acceptance.

SHOPPING NEWS: We're told that the FEDCO dept. store will accept Boeing, NASA and JPL members.

CROSSED ORBITS

With Orbiter II and the Russian spacecraft all speeding around the moon, we think there is a mathematical possibility of a crash between any two of them - a small possibility. Someone figured that a million spacecraft in a million random orbits around the earth between 100 and 1000 miles above the surface would average one crash every 100 billion years. We do a lot worse than that on the freeways.

SCHEDULE INFORMATION

The SPAC shifts were extended per the latest LIFL run and should eventually get down to 10½ hours after transfer. We're basing shift length after transfer on 10 hours and 24 minutes for 3 orbits, plus 1/2-hour overlap.

FPAC:

		<u>Red</u>	<u>White</u>	<u>Blue</u>
Monday	11/14		0100 - 1000	0900 - 1800
	11/14	1700		
Tuesday	11/15		0100 - 1000	0900 - 1800
	11/15	1700		
Wednesday	11/16		0100 - 1000	0900 - 1800
	11/16	1700		
Thursday	11/17		0100 - 1000	0900 - 1800
	11/17	1700		
Friday	11/18		0100 - 1000	0900 - 1800
	11/18	1700		
Saturday	11/19		0100 - 1000	0900 - 2030
	11/19	2000		
Sunday	11/20		0630 - 1800	1700
Monday	11/21			0200

SPAC, MISSION CONTROL & DACON:

Day 318 Monday	11/14	0030 - 1200	1130 - 2300	2230
319 Tuesday	11/15	0930 - 2100*	2030	1000
320 Wednesday	11/16	1730	0730	0700 - 1800
321 Thurs.	11/17	0430	0400 - 1500	1430
322 Friday	11/18			0130

*Transfer to final orbit - 1500 PST.

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LO BUGL

Number B-13

15 November 1966

NASA - BOEING - JPL

The LO BUGL is issued for the world-wide Lunar Orbiter Flight Operations Team for non-operational information only.

SPACECRAFT STATUS

Nominal. Except for using the Star Tracker on the shady side of the moon to avoid reducing its sensitivity, there isn't much news of interest. All systems are "GO".

A call to Seattle indicated that things are quiet there too. People walk into the Seattle Operations Center once or twice a day to see if there's anything new from the spacecraft and then return to their desks to try to stir up some excitement. A facetious report has it that one fellow even tried walking around on his hands but stopped because nobody bothered to look up.

Did find out that S/C #7 and its van are to leave Seattle for the Cape ^{today} ~~tomorrow morning~~, and S/C #6 is in storage for Mission C. So progress is being made in spite of the quiet time we are having just now. Just wait 'til ~~tomorrow at~~ 2:58 p.m. PST and transfer into final orbit. And don't let the seeming inactivity between now and the transfer maneuver lull you into getting a false sense of security. Orbiter 2 is a winner, but the Flight Ops Team still has to call the shots and push the buttons. And push the right buttons just like last time, will yuh, guys!

61 KEEPS SHOTS CURRENT

In a TWX about the problems of keeping the deionized water safe for film processing, the Madrid forest fire-fighters mentioned another agricultural problem. Seems there's a pasture nearby with sheep running on it and after a recent rain storm, organic materials appeared in the station water supply. So they're keeping the water filters changed frequently and getting their typhoid and tetanus shots up to date. (Maybe they could import a few kangaroos from Woomera to chase the sheep away. - Ed)

CONGRATULATIONS, JIMS

Found out why Jim Brossard and Jim Eagan suddenly disappeared. Both went home. And they each have a new baby girl in their family. After the practice they've had here, neither will have any problem in taking care of the little one at night. (Mrs. Brossard and Mrs. Eagan please note - Ed.)

DADDY, WHAT'S A STATE VECTOR?

O.K., perhaps you haven't been asked that yet, but can you answer it? The BUGL will try to have an answer for you tomorrow.

PURPLE HEART DEPT.

Jay Beacon came in tonight with a bandaid on his head and many comments ringing in his ears. So with the able assistance of our SFOD, we wormed the story out of him. Seems he was playing his way out of a sand trap, on a local cow pasture - and knocked his ball in the lake - he was "holding onto a rake with a spike in one end" as he climbed out of the trap - slipped and fell on the rake - Doctor took 20 stitches to close the cut. Jay was accused of trying to commit hari kari over one bad shot and similar charges. Even with his sorehead experience, he won the prize money so all we can can is, "Sorry about that!" Besides, it didn't seem to affect his cheerful disposition one little bit.

IT'S A FRAME-UP

If you have not acquired a frame for your large earth-moon photo taken during Mission I, you may find it worth your time to stop at the SPAC Logic station during the White team hours. Tom Steury has a frame made of walnut by his father on display. Due to the interest shown by several of the Operations personnel, Mr. Steury has agreed to construct a frame(s) for all those interested (of which there are already more than 40). The approximate cost is \$7.00. The frames will be shipped to Seattle, unless special arrangements are made (and they can be). Better see Tom before Friday because he plans to send the order in late Friday night.

THANKS, PATTI

Every once in awhile something or other gets lost in the ordering or shipping process - and we run out. But former SPAC'er, Patti Pierson hasn't forgotten what it is to try to "make do" without the supplies you need. On more than one occasion she has made a special effort to air mail some "emergency" supplies to the girls here, so we're using the BUGL to say, "Thanks, Patti!"

FOR SALE - CHEAP

Two dozen hush puppies, to a good home. May be reheated or used as a substitute for baking soda. See Chuck Engle in the Mission Advisor's area. (This ad looks like a deliberate attempt to sabotage Chuck's reputation as a cook - Ed.)

MISCELLANY

Some kind person just gave new ball-point pens to Dick Daly and Ed Protzeller with an appropriate brand name - - - SCRIPTO.

Would like to commend Griffith Observatory and Planetarium to your attention. Hall of Science is free Tuesday thru Friday, 2 to 10 p.m. and 1 to 10 p.m. Saturdays and Sundays. Planetarium admission for a one-hour show is 75 cents for adults, 30 cents for children 5 to 18, (children under 5 not admitted).

SCHEDULE INFO!

FPAC:

		Red	White	Blue
Tuesday	11/15		0100 - 1000	0900 - 1800
	11/15	1700		
Wednesday	11/16		0100 - 1000	0900 - 1800
	11/16	1700		
Thursday	11/17		0100 - 1000	0900 - 1800
	11/17	1700		
Friday	11/18		0100 - 1000	0900 - 1800
	11/18	1700		
Saturday	11/19		0100 - 1000	0900 - 2030

FPAC (Continued):

		<u>Red</u>	<u>White</u>	<u>Blue</u>
Saturday	11/19	2000		
Sunday	11/20	0700	0630--1800	1700
Monday	11/21			0200

SPAC, MISSION CONTROL AND DACON:

Day 319 Tuesday	11/15	0430 - 2100*	2030	2230
320 Wednesday	11/16	1730	0730	1000
321 Thursday	11/17	0430	0400 - 1500	0700 - 1800
322 Friday	11/18			1430
				0130

*

Transfer to final orbit - 1500 PST

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LO BUGL

November 16, 1966
Number B-14
NASA - BOEING - JPL

Editor - Jack Sutherland - Schedules

The LO BUGL is issued for the world-wide Lunar Orbiter Flight Operations Team for non-operational information only.

ORBIT TRANSFER SUCCESSFUL

The tension which had built slowly during the hours prior to transfer was suddenly relieved when confirmation of a good engine burn was received. As tracking information was plotted progressively, it verified the engine performance and smiles appeared everywhere. Bob Helberg, who had been watching somewhat apprehensively, expressed his gratitude for the successful performance, but also had just a bit of concern in his voice. "How long can such fantastic performance continue?" he asked.

Perhaps one reason for the accuracy is given in BURNER's report:

"28.1 meters per second,
17.4 seconds engine burn -
as expected."

Those two words, "as expected" can have a lot to do with team effectiveness on a mission like this. From confidence in one's product springs confidence in one's self. And such confidence spawns success.

The accuracy of the transfer maneuver is fantastic - and it should be well documented if the movies turn out o.k. FPAC had drawn a "Transfer Maneuver Doppler Shift" chart with the predict line in heavy black pencil. As the movies should show, Matt Grogan plotted the actual data as it was received and the points fell right on top of the predict line. The chart is on the FPAC #3 hard copy TV monitor for your amazement. Doppler shift tracking uses the same type of frequency change you notice when the sound of a speeding train drops in pitch as it passes you. From it FPAC can determine velocity and position of the spacecraft.

MICROMETEOROID HIT INDICATED

Micrometeoroid detector No. 4 has lost its pressure and thus is indicating the first micrometeoroid puncture of either mission. For a good description of the detectors, see NASA Mission B Status Report No. 8 dated 11/15/66.

NASA STATUS REPORT IS GOOD REFERENCE

For a good usable file of data on Mission B, we recommend you keep your copy of the gold status reports on file. Paul Siemers and Randy Nixon are putting a lot of meat into the reports and the result will be an accurate record of the most significant events of the mission. Keep up the good work, Paul and Randy.

APOLLO SURPLUS?

One of the NASA folks was telling of a high-level budget-cutting discussion he had heard about where the cost of rocket engine fuel was the subject. "There aren't enough funds left for our fuel" said the Orbiter rep. "How much do you need?" asked the head man. "300 pounds for each bird," said the Orbiter man. And the Apollo rep. generously replied, "you can have the spill-over from the Apollo." Thanks, fellas.

WE ALMOST MADE IT DEPARTMENT

The FPAC Red Team has tried their darndest to get everybody home early. First-off, they designed a perfect midcourse that would have sent the spacecraft to Venus, but because the maneuver had to be delayed and redesigned, and because the White and Blue teams weren't properly briefed, there was a perfect midcourse.

Then they had a lunar injection designed that would have resulted in a beautiful fly-by, sending the spacecraft on to Mars, but somebody made a mistake, and changed the sign on the pointing angles, resulting in a nominal, of all things, first ellipse.

They really thought they had things made when a transfer maneuver was designed that would have put L/O II smack dab in the middle of its own self made crater on the backside of the moon, but somebody misplaced a decimal point in the ΔV required, and a photo orbit that everybody thinks is just dandy, resulted.

Now it looks as if everybody will miss Thanksgiving at home. All that can be said is "Sorry, we goofed".

(Ed. note: FPAC Red Team submitted this tongue-in-cheek gem. And because so many of us have had to eat crow lately, maybe we should re-read paragraph 2 ^{above} and each give himself a "do-better slip".) (page 1)

SOLAR FLARE REARS ITS HEAD

In describing sun spot activity that looks ripe for a proton event, PROTON Maurie Wilkinson said there's about a 10% chance that such an event will occur on any day between now and Thursday 11-17. The U.S. solar weather prophet's (ESSA) "Solar Space Disturbance Forecast" say the area of sun spot activity will pass around the west limb of the sun in about five days.

Speaking of radiation, Orbiter 2 picked up 1.0 rads on the camera ^{cassette} loop dosimeter, but none at all on the ~~film~~ ^{cassette} dosimeter during its trip through the Van Allen belt. Same as Orbiter 1. ^{loopet}

NEW U.S. MAIL ADDRESS FOR BOEING-KENT AREA

A new mail processing center will begin operations November 21 for the Kent area. Though it won't affect a major part of the L.O. project at this time, the new address for the Kent facility is:

The Boeing Company
P. O. Box 3999
Seattle, Washington 98124

A STATE VECTOR IS:

The position of an object (spacecraft) in space at a specified time, together with its direction and speed of motion. For example, a state vector of a car at 10 p.m. November 16, 1966, PST, might be: at the Arroyo exit on Foothill Freeway, headed east at 85 mph. And that's just about what the traffic ticket would say.

For good measure, an EPOCH is an instant of time or a date selected as a point of reference.

***** SCHEDULE *****

11/16/66

DAY	FPAC			SPAC - MISSION CONTROL - DACON		
	RED	WHITE	BLUE	RED	WHITE	BLUE
Nov.	(15 th)				(15 th)	
320 Wed 16	1700-0200	0100 - 1000	0900 - 1800	1730-0430	0730-1430	0700 - 1800
321 Thur 17	1700-0200	0100 - 1000	0900 - 1800	0100 - 1200	1130 - 2230	2200-0130
322 Fri 18	1700-0200	0100 - 1000	0900 - 1800	0830 - 2000	1930-0630	0600 - 1700
323 Sat 19	2000-0200	0100 - 1000	0900 - 1800	1630-0330	0300 - 1400	
324 Sun 20	2000-0730	0630 - 1800	1700-0200			
325 Mon 21	-0730					

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LO BUGL

Number B-15
17 November 1966
NASA - BOEING - JPL
Editor - Jack Sutherland - Schedules

The LO BUGL is issued for the world-wide Lunar Orbiter Flight Operations Team for non-operational information only.

SPACECRAFT STATUS

All systems are "GO". Photo sequence starts on Orbit 52 Friday morning (PST) with Madrid set to receive first readout. The BUGL forecast for Friday afternoon in the Pasadena area is: Readout at Goldstone accompanied by micro-wave action to SFOF. A mild tornado will ensue as the GRE processes the films and the JPL film lab goes into high gear. A shower of reporters' questions and a hailstorm of popping flashbulbs will be met with a trace of snow at the press conference and followed by a flood of compliments.

EARTH-MOON PIX TO POPE

Mr. James Webb, NASA Administrator, is going to present an "earth-moon" picture from LO I to Father Hesburg, President of Notre Dame University. Father Hesburg intends to present this picture to the Pope in the near future.

GRE FILM PROCESSOR EXPERT ILL

Cy Marchand who has been working in the GRE area on the 2nd floor is in St. Luke's Hospital and wishing he was back on duty with the team. He can have visitors "for a short time", between 7 and 8:30 p.m. - hospital is at 2632 E. Washington.

BLOOD BANK ACCOUNT ESTABLISHED

With Cy's hospitalization in mind and as good insurance, Bjarne Slind made arrangements with the Pasadena chapter of the American National Red Cross to establish a Boeing Group account at the Blood Bank.

Donations can be made Monday, November 28, between 1:20 and 6:00 p.m. at the Scottish Rite Cathedral, 150 N. Madison Ave., Pasadena. You may make your appointment at 799-0841 or sign up with the FPAC clerks. Time off is authorized as at home except that we must not neglect the Orbiter. Readout will be well underway by then and our ranks somewhat thinner so only part of the on-shift team can be spared at a time - see your Area Directors. Off-shifters are especially encouraged to participate. (Hope they have a good supply of orange juice and cookies - Ed.)

BUGL BLOWS FOR VIELE/ELDRINKAMP

Don Viele and Lowell Eldrenkamp received many compliments for the fine presentation they made tonight on the feasibility of making certain changes in the mission design between Mission II and Mission III. The information they presented was clear and concise and obviously well thought out. The BUGL commends Don and Lowell - and the troops in Seattle who worked on it with them.

CONGRATULATIONS, WALLY

Asst. SLOE at Goldstone, Wally Proctor, is coming over Thursday and we heard one of the reasons for his trip (which he may not have heard yet) is the presentation of his 25 year pin. A lot of airplanes, missiles, and spacecraft have been rolled out in that time - but has any been more satisfying than Orbiter I? Good show, Wally.

MISCELLANY

Jim Brossard made it back to JPL in time for transfer, cigars and all.---

Bill Michaels left tonight for Langley - to continue work on his Moon model refinery.

Bill Burr, Dave Carter, and Bob Hahn caught fishing pox. We should have a report on their condition tomorrow.

MOVE AT MADRID

Looks like Andy Have and Company will have to learn to say "62" instead of "61" for next mission. There's a JPL internal memo that schedules the move from the "61 Forest Fire and Sheep Station" to a new location at DSIF 62, as yet unnamed.

SCHEDULEFPAC & CLERKS

	<u>RED</u>	<u>WHITE</u>	<u>BLUE</u>
320 11/16	1700		
321 11/17	1700 - 0200	0100 - 1000	0900 - 1800
322 11/18	1700 - 0200	0100 - 1000	0900 - 1800
323 11/19	2000 - 0200	0100 - 1000	0900 - 1800
324 11/20	2000 - 0730	0630 - 1800	1700
325 11/21	0730		0200

SPAC - MISSION CONTROL - DACON

	<u>Red</u>	<u>White</u>	<u>Blue</u>
321 11/17	- 0430	0400 - 1500	1430
322 11/18	0100 - 1200	1130 - 2230	2200 - 0130
323 11/19	0830 - 2000	1930	0900
324 11/20	1630	0630	0600 - 1700
325 11/21	0330	0300 - 1400	

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LO BUGL

Number B-16
18 November 1966
NASA - BOEING - JPL
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The LO BUGL is issued for the world-wide Lunar Orbiter Flight Operations Team for non-operational information only.

SPACECRAFT STATUS

All systems are "GO"! An "ACQUIRE CANOPUS" command was sent tonight after almost two days without any such activity - and the spacecraft locked on so fast we thought someone might have painted Canopus on the tube when ACE-2 wasn't looking.

Good luck on the first pix, troops.

SPACE TECHNOLOGY CHIEF TO VISIT

You former 2-5000 types better mind your manners and watch the proper channels on your monitors tomorrow. Your boss is coming to JPL. Don't know whether he has the proper badges or not, but you can bet he'll get in to see you. In case you don't know his name, it's R. L. Brock. And besides, with photos due, there'll be lots of other brass here too, so better keep your feet off the consoles if Mr. Brock isn't your boss.

IT'S A MIAD MIAD MIAD MIAD MIAD WORLD

The BUGL won't say who, but one of the Mission Advisors admitted to putting "Head and Shoulders" on his toothbrush the other morning.

Today's count of Mission Advisors who started into the wrong restroom by mistake: 2.

One sleepy MIAD was seen coming out of the mens' room, cup in hand, muttering to himself, "Mighty poor place to get coffee".

Trouble is that their dart board got lost in the shuffle.

VIELE/ELDRENKAMP REPEAT PITCH

The "Don and Lowell" show hit the top in the Langley house this morning when they went on stage for Dr. Thompson, LRC Director, with their pitch on mission design. We hope the "honorable customer" liked it.

FISHING POX REPORT

Buddy De Ryder joined the team of Hahn, Carter and Burr on the Pierpoint yesterday. They brought home a good catch of sea bass and mackerel and, in addition, Dave boated an 8 lb. bonita. Dave's fishing pox was definitely not cured by the trip - don't know about the others.

JOE MILLER DEPARTMENT

ACE-2 . . . "What do you call the offspring of a tiger and a parrot?"

DEUCE-2 . . . "I don't know, but when he talks you'd better listen!"

ACE-2 . . . "Where does a 1,000 lb. gorilla sleep?"

DEUCE-2 . . . "Man, he can sleep wherever he wants to!"

1c BUGL

The LO BUGL looks like the phantom has struck again. We have gone back to single line letters to foil the BUGL filler-inners.

ORDER OF THE WOODEN BLOCK

There is an award of somewhat questionable character being promulgated at the SFOF which the BUGL has chosen to ignore, even though it was presented to us on one occasion. However, we feel every worthwhile paper must have a "cause" to fight for, so we hereby initiate a campaign to "MAKE SAWDUST OF THE WOODEN BLOCK". En Garde!

SICK LIST

Glad to say Cy Marchand was improved today.

SCHEDULE INFORMATIONFPAC & CLERKS

	<u>RED</u>	<u>WHITE</u>	<u>BLUE</u>
Friday 11/18	1700	0100 - 1000	0900 - 1800
Saturday 11/19	2000 } 0200	0100 - 1000	0900 - 2030
Sunday 11/20	0730	0630 - 1800	1700
Monday 11/21	0100 - 1000	0900 - 1800	1700 } 0200
Tuesday 11/22	0100 - 1000	0900 - 1800	0200

SPAC - MISSION CONTROL - DACON

	<u>RED</u>	<u>WHITE</u>	<u>BLUE</u>
Friday 11/18	0100 - 1200	1130 - 2230	2200
Saturday 11/19	0830 - 2000	1930	0900
Sunday 11/20	1630	0630	0600 - 1700
Monday 11/21	0330	0300 - 1400	

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LO BUGL

Number B-17
19 November 1966
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Editor - Jack Sutherland - Schedules

The LO BUGL is issued for the world-wide Lunar Orbiter Flight Operations Team for non-operational information only.

CAMERA STATUS

Camera status is "GO"! And it didn't take long to reach that conclusion because Bob Helberg's broad smile told the story most eloquently!

It was a cliff-hanger for awhile though because the shutter telemetry was indicating a double exposure and the truth wasn't known till DSS 61 read the first framelet. Of course the press picked up the "double exposure" bit and made big news of it so the excellent pictures came almost as an anti-climax. And they are excellent pictures! The first ones received at the SPOF are on the light table in the MIAD area and prove that the whole system is performing well - DSS 12, microwave link, and the newly installed Ground Reconstruction Equipment on the second floor.

Dr. Feldman, it's time for you and your entire E-K team to stand up and take a bow! And Bruce Elle, when you head west next week, how about bringing one of those pretty E-K badges for Jim Smith to wear. All he has now is the "Boeing-Supplier" badge and an E-K badge is a status symbol here. Also, how about a couple of gold stars for Jim and for Bernie Wittman, Don Larsen and Paul Fromme for their part in the operation!

Now that we are getting one picture per two shutter impulses, "Who cares if the postman always rings twice as long as he delivers the mail?"

Ray Stevenson, who used to say in his training courses the LO pix would show up a card table on the moon has concluded that either: (a) there are no card tables on the part of the moon photographed or (b) the photos are not of the moon.

Someone on the radio commented that the pictures looked like a pancake about ready to turn.

Oh, yes, the spacecraft! - It's still doing fine but had to take a back seat to the camera today.

Lee Helser's angels, "Hurter and Driffield" probably had something to do with the double exposure signal. Named for two photographic pioneers, the angels now hover over Lee's desk holding a miniature camera.

SLIND/PROCTOR GET AWARDS

Bjarne Slind and Wally Proctor each received recognition Thursday as veterans of 25 years of service with The Boeing Company. Bob Helberg and George Hage made the presentations.

Wally joined Boeing in 1941 as a blueprint clerk but someone had the brilliant idea that attractive girls make better blueprint clerks than men. So they made Wally a supervisor and sent him to Goldstone where he is assistant Senior Lunar Orbiter Engineer. (There were about 24 years spent in the military service and on Parts Control, Spares and DSIF Support in between 1941 and his present job.)

Bjarne is a bit more difficult to write about as we learned when we talked with John Graham about Bjarne and Madrid. Seems they have a mutual agreement about Madrid and John wouldn't talk.

However, Bjarne was in the manufacturing end of things for awhile and in B-52 flight test with Tex Johnston. He put in a lot of hours in the air during his time with Tex and later switched over to the Minuteman project in Seattle and ETR. On at least two occasions after he moved to ETR, he was nominated as chief test pilot for the Minuteman 3rd Stage, but they couldn't catch him. During his 4 years at the Cape he became well acquainted with the "original" astronauts and even loaned his boat to two of them once. They clobbered the boat on a reef in the Indian River, but our source said Bjarne laughed it off even though he had to pay the repair bill.

The BUGL congratulates both Bjarne and Wally for weathering the wars, strikes, B-54's and Dyna Soars, and completing their 25th year.

WANTED:

Loan of Mac 210 or Homelite XL12 chain saw for just long enough to make one wooden block into sawdust.

THAT SYNC-ing FEELING or --- WALTZ ME AROUND AGAIN, NETWORKS

Probably most of you know that a TV camera viewing a TV picture must be synchronized with the picture. And so do the TV engineers!

Well, during the press conference tonight the network engineer aimed his camera at one of the SFOF monitors in the von Karman auditorium and things started to happen. First the picture started to roll, then the screen went blank and the sound went off - all over the network. Didn't take long for the engineers to realize that not only were they in sync with SFOF but SFOF was locked onto the network signal because the press conference was being picked up via the Mt. Wilson transmitter. An electronic merry-go-round! So we lost our monitor picture for the rest of the press conference and the network engineer had his tail mashed via long distance from New York and everyone was definitely not happy about it.

SICK LIST

Cy Marchand is up and about and expects to be back at work Sunday.

Even though Cy is better, let's get that Blood Bank account going. Sign up with the FPAC clerks.

ODDENDA

Someone asked if we couldn't put the FPAC orbit determination guys to work on the BUGL staff so they'd quit perturbing orbits and leave more computer time for the rest of us.

Dick Erwood please call Los Angeles 654-4800.

Lee Helser was headed off shift yesterday with "4 days beard showing" when he met Dr. Brock, Tech. Staff Chief, searching for the SFOF. "I got him located, badged, and pointed toward Dick Erwood and then went home," Lee said.

Beeing's Ed Nicholson had non-escort badge problems so the girls have started to work the problem so he can get in next time. Sorry about that.

SCHEDULE INFORMATIONFPAC (ALL TIMES ARE PST)

		<u>Red</u>	<u>White</u>	<u>Blue</u>
Friday	11/18	1700	0100 - 1000	0900 - 1800
Saturday	11/19	2000	0100 - 1000	0900 - 2030
Sunday	11/20	0730	0630 - 1800	1700
Monday	11/21	0100 - 1000	0900 - 1800	1700
Tuesday	11/22	0100 - 1000	0900 - 1800	1700
Wednesday	11/23	0100 - 1000	0900 - 1800	1700
Thursday	11/24	0100 - 1000	0900 - 1800	1700
Friday	11/25	0100 - 1000	0900 - 1800	1700
Saturday	11/26*	0100 - 1000	0900 - 2030	2000
Sunday	11/27	0630 - 1800	1700	0730
Monday	11/28		0200	

SPAC - MISSION CONTROL - DAGON

		<u>Red</u>	<u>White</u>	<u>Blue</u>
Friday	11/18	0100 - 1200	1130 - 2230	2200
Saturday	11/19	0830 - 2000	1930	0900
Sunday	11/20	1630	0630	0600 - 1700
Monday	11/21	0330	0300 - 1400	1330 - 0030
Tuesday	11/22	0000 - 1100	1030 - 2130	2100
Wednesday	11/23	0730 - 1830	1800	0800
Thursday	11/24	1500	0500	0430 - 1530
Friday	11/25	2230	0130 - 1230	1200 - 2300
Saturday	11/26*	0930	0900 - 1900	1830 - 0530

* Bimat Cut

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Number B-18

NASA - BOEING - JPL

Date Nov. 21, 1966

The LO BUGL is issued for the world-wide Lunar Orbiter Flight Operations Team for non-operational information only.

Editor - Jack Sutherland

Artist -

SPACECRAFT STATUS

First photos were right on target. Norm Crabill says they're 2-3 km off but we hear the ACIC charts he's using are up to 3 km off. Sorry about that, Norm. (Some was pencilled in on our rough copy, "That's close enough for Government work" and Norm added that his comment was "preliminary, only an estimate, and not to be regarded as a statement of position relative to contracts or incentives.")

All spacecraft systems are operating properly and a late comment from a mission adviser indicates that actual locations of photos taken so far appears to be within about one kilometer of the target, a fantastic performance which certainly called for a great deal of teamwork.

Shutter telemetry has started to count correctly--missed on one frame entirely and gave us a few more grey hairs in the process. But apparently it's working OK now. The shutter itself hasn't missed a cue. Snapped Site IIP-5 which conceivably could show the crater and debris from Ranger VIII.

What appears to us as the most spectacular discovery of this mission is the group of spires on the IIP-4 high resolution picture. One is an obelisk shaped structure that towers 70 -80 feet above the surrounding terrain and rises from a base 30-40 feet wide.

That'll stump the experts for a long time--probably till the astronauts can see it up close and find out something of its composition. The same pic also shows one crater shaped like the Rose Bowl that looks like a brand new one.

The pictures from Site P3 have some rills showing that look like they might be eyebrows on the man in the moon.

We're roughly half way through the Photo Sequence. As of the end of Orbit 69, a total of 1597 commands had been transmitted to the spacecraft.

All core maps through Map 24 have been transmitted to the spacecraft and Maps 25 and 26 are being prepared now. Map 35 will end of the photo sequence.

Our friendly SEAL says that Bimat Cut will be performed on Orbit 103 at 0200 11/26 (GMT) or 1800 11/25 (PST).

THE BUGL BLOWS FOR THE FLIGHT OPERATIONS TEAM

The Flight Operations Team--NASA, JPL, E-K, and TBC should stand up and take a bow or at least half a bow. You have put the spacecraft in a perfect picture taking orbit and the first pictures are excellent both in quality and site coverage. You have stood the test of eight days boredom while waiting for the first picture taking sequence and are now on the threshold of eight days of intense activity after which the FPAC can take a full bow. The full bow for the rest of the team can come on Dec. 13 after all of the pictures are back.

At this time you have the right to feel the pride in a job perfectly executed thus far and to feel high confidence that the last mile will be equally well run.

THANX

and good luck,

R. J. Helberg

UNDERGROUND KODAKERY

Bruce Elle, E-K, was agitating to get the spacecraft down closer to the moon--say about 15 km. Said the camera would take good pictures from there through the V-H sensor might not cooperate too well. He added that the camera wasn't designed to take underground pictures.

CORE MAP

Since we hadn't used the term "core map" much in the BUGL, we asked Ron COGL Kaufman for a definition we could use. Seems that the spacecraft Flight Programmer has a magnetic core storage "memory", like most computers, which can store 128 "words" of 20 "bits" each. These words are used to command the spacecraft and need to be changed or updated as the mission progresses. MATRIX is in charge of the updating and has to know at all times what the spacecraft will do if the Flight Programmer selects a stored command from any one of the memory locations. He has to keep a running record of what word is located in each memory position so he'll know which ones need to be modified. Hence the term "Core Update". A Core Map is generally much more extensive than a Core Update and normally affects from 30 to 90 of the memory locations. As the computer folks say, "It's all very logical." That's probably why they call it a Core Map.

GRANDPA PETTIBONE SAYS:

Now that we are free-wheeling along with a nominal mission, there is a natural tendency on the part of active minds to do some extra tweaking or experimenting. These urges must be resisted lest we forget what our primary objectives are. We have established flight plans and procedures - Let's use them. One hastily considered change in our flight plan could seriously endanger our primary mission. If it is necessary to make a change in the mission plan, use the proper process.

BUGL SALUTES THE LANGLEY PROJECT OFFICE

It was a very pleasant surprise to most of us to find copies of the first Orbiter II pix in the mailbox. We'd like to say thanks to the individuals responsible in the Project Office and to let them know that those pictures will undoubtedly get a lot of mileage and many "ohs" and "ahs". Thanks, LOPO.

PERSONAL NOTES

Jay Beacon is going to Spain the middle of December to help with the move to DSIF 62. Says his wife is going with him and she will have to do the Spanish language bit for both of them. Hope she tells him how to say "Fore!" in Spanish. Otherwise he might end up with a cut on the other side of his head, administered by one of the Spanish golfers.

Dan Collins, RCA, took his wife horseback riding out Asusa Canyon way. Didn't like it so he took her to Griffith Park stables next time and heartily recommends the stables there. Good trails, good horses, lots of competition between stables, and \$2.00 per hour weekdays. (\$2.50 per hour weekends and holidays).

Glad to report that Cy Marchand is back on the GRE again.

"Dangerous Dan" Wentz, LRC Public Information Officer, was held up in a restaurant parking lot in Pasadena. Dan had the presence of mind to ask for his credit cards back and he was **fortunate** that the robber returned the wallet, including the money that wasn't visible. That's the second robbery we've heard about in restaurant parking lots in the past three weeks - in Pasadena. Sorry it happened to a member of the team!

DAICON Jay Beacon was charged with extra energy yesterday and someone accused him of working faster since he got hit on the head during his golf game. He replied, (or someone replied for him), "A stitch in head saves time!"

We heard that a member of the team made a trip to Palm Springs but didn't think and plan ahead so he'd know how long it would take. He almost didn't make it back on time.

The new fella in the Acey-Deucey area is Howard Woody of the Boeing Test Engineering team that took such tender loving care of S/C 5. Don't know whether he doesn't trust anyone else with "his" spacecraft or just wants to see if the grass is any greener in Pasadena. Welcome aboard, Howard, and look out for the wooden block.

SIGNS OF THE TIMES

The FPAC Phantom has a new sign on the side of the FPAC file cabinet that says, "Good old Orbiter" - We concur!

SCHEDULE INFORMATION

FPAC (ALL TIMES ARE PST)

		<u>Red</u>	<u>White</u>	<u>Blue</u>
Sunday	11/20	0730	0630 - 1800	1700
Monday	11/21	0100 - 1000	0900 - 1800	1700 - 0200
Tuesday	11/22	0100 - 1000	0900 - 1800	1700 - 0200
Wednesday	11/23	0100 - 1000	0900 - 1800	1700 - 0200
Thursday	11/24	0100 - 1000	0900 - 1800	1700 - 0200
Friday	11/25	0100 - 1000	0900 - 1800	0200

Because FPAC will go onto a skeleton crew basis after the last photos are taken, their ~~schedule~~ has been truncated at 1800 PST Friday. The schedule of departures may be affected by unforeseen events so keep in touch with your Flight Chief.

SPAC - MISSION CONTROL - DAICON

		<u>Red</u>	<u>White</u>	<u>Blue</u>
Sunday	11/20	1630	0630	0600 - 1700
Monday	11/21	0330	0300 - 1400	1330 - 0030
Tuesday	11/22	0000 - 1100	1030 - 2130	2100 - 0800
Wednesday	11/23	0730 - 1830	1800	0800
Thursday	11/24	1500	0500	0430 - 1530
Friday	11/25	2230 - 0200	0130 - 1230	1200 - 2300
Saturday	11/26 *	0930	0900 - 1900	1830 - 0530

* Bimat Cut

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LO BUGL

Number B-19
22 November 1966
NASA - BOEING - JPL
Editor - Jack Sutherland - Schedules

The LO BUGL is issued for the world-wide Lunar Orbiter Flight Operations Team for non-operational information only.

SPACECRAFT STATUS

Temperatures are slowly rising but then we expected that. Flying "on the sun" for 4-5 days (since Orbit 49) is mighty harsh treatment for the thermal paint. Even at that, it's in better shape than last mission at this point in time. All other systems are in good shape and obviously transmitting back excellent photos.

Our friendly SCRIPTO Ed Protseller says his pet SEAL has changed his plans and now plans to cut Binat on Orbit 105 about midnight Friday night (2400 PST).

Here's a different slant on attitude maneuvers performed to date. Through Orbit 76 the spacecraft has rolled 68 times, pitched 48 times, yawed 37 times, acquired Canopus 39 times, and acquired Sun 76 times.

The "wide angle" view of Site S-5 showing the oblique of the backside is another proof that the team knows which way to point that bird when the shutter is snapped. The limb of the moon and the terminator are just where they should be to give a well composed picture. Contrast is excellent near the terminator and for most of the picture but it is overexposed in the area where the sun angle is more nearly vertical and the reflection from the moon greater.

BUGL PLAYS HIDE AND SEEK

Yesterday's BUGL was inadvertantly delayed several hours although the typed ditto masters were "hidden" in full view of FPAC and SPAC with a big sign on the desk tray that said "LO BUNGL". Obviously it was in the proper place and that must be why no one could find it. Sorry about that, troops.

EXTENDED MISSION PLANNING

Leo Daspit, Langley LO Experiment Coordinator, will be at the SFOF for about a week to compile all ideas concerning experiments which might be conducted on Orbiter II during the extended mission phase. How about jotting down any ideas you get while shaving (or any other time) - S/C systems tests, scientific experiments, or what have you. Leo will be happy to have them.

DON'T PANIC - PERILUNE ONLY DROPPING TO 41 km

That curve showing actual perilune altitudes against predicts on the FPAC #2 monitor doesn't mean a crash landing. It's just that FPAC hasn't had time (or inclination?) to re-draw it since altitude dropped out of sight on the chart. Perilune altitude is expected to "bucket out" at 41 km (would you believe 26 miles?)

TRAFFIC JAM AT ACEY/DEUCEY CAGE

There isn't very good TV monitor coverage of the Ace-2/Deuce 2 area but a BUGL reporter said it was almost as crowded as a Volkswagen with 13 elephants inside. Discussion ended when all agreed that Site 10.1 should be labeled 10-2 and mounted on wheels so they could move it around more easily. That particular picture is now planned for a region which scientists feel is hotter than the surrounding scenery and we'd guess the "hot rock" site is a firm selection as they just held the final command conference.

CAST AT WEDDING TO INCLUDE CLARK?

In a park near the "Ranch" yesterday, about 39 of the team members and their wives were playing football ("Touch", we heard). Gary Clark was on the receiving end of a pass (football, we assume) and here is where the stories begin to diverge. Gary says two of the girls tackled him but the girls tell us he simply zigged when he should have zagged. Result of such strenuous exercise is that Gary is confined to his room with torn ligaments in his leg and may even have to wear a cast after the swelling goes down. One other facet of the story you should know -- he's getting married December 3. With his leg in a cast yet? Just think, Gary - if it hadn't been smoggy, you'd have had your VFR clearance for your cross country flight and wouldn't have received the injury. Sorry about that.

MISSIONARIES MAY HAVE PRECEDED ORBITER

Our friendly ACE-2 said he had heard that Jack Graves' church had sent a group of missionaries to the moon some time ago. That would explain the spires in the Site II P-4 pix.

WANT AD DEPT.

Need loan of a herd of termites to make sawdust of one wooden block.

MISCELLANY

Ranger site pix were read out at Madrid and we at SPOF have to wait to look at them. Oh well, that's Space Biz.

Two of the upper echelon JPL types were admiring the newest moon picture when one said facetiously, "this terrain looks just like Goldstone". The other replied, "Yes it does - and I'll bet you're looking for the best place to put a 440 foot dish (antenna)".

Chuck Engle's lucky sweater - the one that was mended with white string - has been condemned by the Pasadena Health Dept., according to a sign on the sweater. How can we run Mission C without that sweater?

BUGL NOT ONLY BLOWS BUT IT ALSO HONKS

In last night's issue we ran a note of commendation for the Flight Ops team from Bob Helberg and in so doing inadvertently left RCA off the list. We hereby include RCA. Perhaps the reason was that the power system has worked so well on both missions that we just take it for granted. Sorry about the omission.

WIDE-ANGLE AND TELEPHOTO

Back in August, BUGL No. 12 to be exact, the names "Stereo" and "Telephoto" were suggested for the two lenses of the S/C camera. Those names didn't strike the proper chord with you then so let's try "WIDE-ANGLE" and "TELEPHOTO".

There was a spirited discussion in the MIAD area last night (Sunday) involving Bruce Elle and Dr. Feldman of Kodak and others and we learned that there could be some difference of opinion even among the lens experts. However, "Wide-angle" and "Telephoto" are more easily understood by the layman than "Moderate" and "High Resolution" so let's campaign for a change. Besides, the "Moderate" lens is technically a higher resolution lens than the "High Resolution" lens (we think).

SCHEDULE INFORMATION

FPAC (ALL TIMES ARE PST)

		<u>Red</u>	<u>White</u>	<u>Blue</u>
Tuesday	11/22	0100 - 1000	0900 - 1800	1700 - 0200
Wednesday	11/23	0100 - 1000	0900 - 1800	1700 - 0200
Thursday	11/24	0100 - 1000	0900 - 1800	1700 - 0200
Friday	11/25	0100 - 1000	0900 - 1800	- 0200

Because FPAC will go onto a skeleton crew basis after the last photos are taken, their schedule has been truncated at 1800 PST Friday. The schedule of departures may be affected by unforeseen events so keep in touch with your Flight Chief.

SPAC - MISSION CONTROL - DACON

		<u>Red</u>	<u>White</u>	<u>Blue</u>
Tuesday	11/22	0000 - 1100	1030 - 2130	2100 - 0800
Wednesday	11/23	0730 - 1830	1800 - 0500	0430 - 1530
Thursday	11/24	1500 - 0200	0130 - 1230	1200 - 2300
Friday	11/25	2230 - 0930	0900 - 2000	1930 - 0630
Saturday	11/26			

* Bimat Cut now expected on Orbit 105 about midnight (PST)

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LO BUGL



Number B-20
23 November 1966
NASA - BOEING - JPL
Editor - Jack Sutherland - Schedules

The LO BUGL is issued for the world-wide Lunar Orbiter Flight Operations Team for Non-operational information only.

SPACECRAFT STATUS

All systems are working although we did have some appearance of Bimat mottling on Frame 101 (Site P-7A).

Picked up one more count on the radiation dosimeters yesterday for a total of .5 rads at the looper and 1.25 at the cassette - due to dark current and Galactic Cosmic background, according to the PROTON log. Both of those terms refer to general background "noise" - in the photomultiplier tube and in outer space, respectively.

Spacecraft temperatures are climbing about one degree per day while it remains on the sun. Remember how we had to pitch off the sun last time?

Sites P-8 and S-11 photos have been taken; 15 more to go. Just for planning purposes we figured out that Readout could be completed late on 12/10, but don't base your airplane reservations on it.

WIDE-ANGLE AND TELEPHOTO

Several of the technical experts (and some "not-so-experts" in the optical field) have discussed our reference to Wide-angle and Telephoto lenses. Most of them felt that the terms are borderline as to technical accuracy but would better express the differences in the two lenses to the public than "moderate" and "high" resolution. Maybe we'll be able to give you the technical distinction between the two after things quiet down.

BATMAN AND ROBIN REPLACED

With Cal Broome and Chuck Engle many miles away, the troops at Langely have been busy. They changed the "Batman" sign on a file cabinet to read:

CHICKEN CAVE

Headquarters of the CHICKENMAN and CHICKENLITTLE who, disguised as Cal Broome and his youthful ward, Chuck Engle, fight a never ending battle against the forces opposing contractual obligations.

Operating from these modest surroundings this dynamic duo, equipped with the latest scientific equipment and knowhow, continues to sustain truth, justice, and the American way.

NOTE: Beware high-speed vehicle exiting without warning. Don't step in nothing.

They even sent photographic proof of the dastardly deed.

NET NITS

"Command, this is Blue Leader" on the net last night was answered by, "Roger, bandits at four o'clock!"

Earth occultation was described on the net this afternoon as "Earth osculation" - or was it "occultation"?

Woomera had a power transformer go out yesterday because a cat had climbed onto the terminals and been electrocuted. In the explanation TWX, they called it a "Cat-astrophe". (Bet it was actually a wallaby, but the name didn't fit so they re-christened it - Ed)

SICK LIST

Gary Clark limped in tonight after X-rays didn't show anything but torn ligaments and cartilage. Says he doesn't need a stand-in to walk down the aisle for him December 3rd. No need to get sore, Gary, he just wanted to help you.

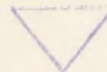
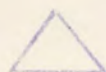
ASTRONOMICAL UNIT

To establish a unit of measure larger than the mile, but smaller than the "light year", the "Astronomical Unit" was developed. It was designed to be the average distance between the Earth and the Sun - about 93 million miles. Then the science of measurement became more precise and now one A.U. is the radius of that orbit described by a point mass which circles the sun in $365\frac{1}{4}$ days. How does that grab you? (For the technical-minded, the number of days was rounded-off.)

OLD SNOMEN NEVER DIE, THEY JUST MELT AWAY

The Supervisor of Network Operations who answers the SNOMAN acronym has worked himself out of a job. Rolland Rung, Joel Walker, John Neal and Booth Hartley have kept things right on the net for you and we'll say thanks for a job well done, guys. Now they can get back to their regular jobs in the project engineering field.

WANTED - hatchet, knife and matches, paper, anything that will burn. The wooden block must go because it has reproduced itself. Many small ones have appeared and we may be overrun by them. Urgent!

CAMERA TRADEMARK

Appears each time processing stops and must be due to a squeezing of the Bimat on one roller. Anyway, it leaves the two triangles in the middle of the effected framelet.

CRATER NAMING

Someone said most of the backside photos have Russian names. Someone else replied, "Yes, but they couldn't name the small ones and the spires because they couldn't see them!"

SCHEDULE INFORMATION

<u>FPAC (All Times are PST)</u>		<u>RED</u>	<u>WHITE</u>	<u>BLUE</u>
Wednesday	11/23	0100 - 1000	0900 - 1800	1700 - 0200
Thursday	11/24	0100 - 1000	0900 - 1800	1700 - 0200
Friday	11/25	0100 - 1000	0900 - 1800	0200

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<u>SPAC - MISSION CONTROL - DACON</u>		<u>RED</u>	<u>WHITE</u>	<u>BLUE</u>
Wednesday	11/23	0730 - 1830	1800 -	0800
Thursday	11/24	1500 -	0500	0430 - 1530
Friday	11/25	2230 - 0200	0130 - 1230	1200 - 2300
Saturday	11/26	0930	0900 - 2000	1930 -
Sunday	11/27	0600 - 1630	1600 -	0630
Monday	11/28	1300 - 2400	2330 - 0300	0230 - 1330
Tuesday	11/29		1030	1000 - 2100

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BUGL

Number B-22
NASA-BOEING-JPL
24 November 1966

The LO BUGL is issued for the world-wide Lunar Orbiter Flight Operations Team for non-operational information only.

To the person(s) who prepared the "Special Issue" of the BUGL yesterday: Thanks for your generous remarks. If you've had 1/10 as much pleasure out of reading the BUGL as we have in writing it for you, it is well worth the effort that goes into it. Thanks again!

Dale Shellhorn & Jack Sutherland

SPACECRAFT STATUS

Feeling fine except that the shutter "click" counter has the wobbles after Thanksgiving in outer space. It has a "normal" count that ranges from 0 to 2 even though it should count only once per picture. So when SPACECRAFT reported an anomaly on the net because the counter indicated one click, ACE 2 responded, "That's no anomaly. Normal range is 0 to 2."

Just reported our second micrometeoroid hit of the mission. Looks like Moon Maid has a powerful BB gun, but there are some serious implications if many more hits are registered.

IT'S A PRETTY COMPLICATED BROWNIE

It must be to have so much stuff in it - and to take such good pictures. But here's a list of where most of the major parts came from:

- | | |
|---|--|
| 1. V/H System | Bolsey Associates, Glenbrook, Conn. |
| 2. 24" Shutter | " |
| 3. Line Scan Tube (LST) | CBS Labs, Stamford, Conn. |
| 4. Photo Multiplier Power Supply (HMPS) | Lear Siegler |
| 5. High Voltage Power Supply (HVPS) | Lear Siegler |
| 6. Sync & Sweep (Conjunction with LST) | Barnes Stamford through CBS |
| 7. DC/DC Converter | Gulton Eng. Magnetics, Pasadena |
| 8. 24" Lens | "Paxoramic" Pacific Optical, Los Angeles |
| 9. Reference Frequency Generator (RFG) | American Time Standard |
| 10. Pressure Relief Valve | Arizona Gear, Phoenix |
| 11. Shells | Budd Co., Philly |
| 12. Photo Multiplier (PM) Tube | EMR |
| 13. Photo Subsystem | Eastman-Kodak |
| 14. GRE - Simulator - Test Gear | R. F. Communications |

Item 14, of course, isn't onboard the spacecraft but plays a major part in the total system.

THANKSGIVING DINNER NO TURKEY

That Thanksgiving dinner at the Westerner was a huge success - and certainly no "turkey". The BUGL and the 43 people who participated salute "General" Harriett Rounsley who had the courage to attempt such an undertaking and the skill to direct it so capably. It started out as an offer to fix Thanksgiving dinner and ended as a 3-turkey affair - 54 pounds of turkey. (Gayle Barrow, charged with peeling 20 pounds of potatoes, came up with one of the finest production lines in the history of mechanization - total time: 15 minutes!)

The Westerner Motel generously donated the use of the "Gay 90's" room and the set-ups. Margaret Akers of the Westerner staff helped with all sorts of chores and was termed by Jack Graves, "The coolest housemother a fraternity ever had." George Hage and Bjarne Slind supplied a plentiful supply of wine for the dinner, and most everybody got tagged for his share of the chores, including Norm Crabill of NASA.

MISSION PLAN FOLLOWED

103-100149 describes what Mission B is all about and we thought a comment would be in order on how well we have followed it. The photo sequence planned for Orbit 95 was done on Orbit 96 and pictures of a couple of new secondary sites added for Orbits 103 & 104. And that's about the extent of deviations from the plan. It speaks well for the Mission Design folks and for the Mission Director who surely had to resist pressure for some changes.

END OF READOUT FORECAST

Spacecraft performance is expected to continue so we'll go out on a limb (with the help of Dick Masterman) and predict end of readout on Pearl Harbor Day, Dec. 7. Primary sites have all been taken and the last secondary site is to be snapped early this afternoon; bimat cut at about 11:30 p.m. PST tonight.

PARKING PASSES, PERSONNEL LOG, & EXPENSE REPORTS

When you leave:

1. Turn parking passes (if you have one) in to Ken Essmeier or leave it with one of the girls.
2. Sign out in the log book at the mail stop.
3. Please mail a copy of your final expense report to Ken Essmeier to complete his files.

RENTAL CAR RETURN - WEE HOURS

Rite-Rate recommended that no rental cars be left at the airport for them because "abandoned" cars are towed away immediately and impounded. The fine is \$35 and it's our guess that the person who leaves the car would have to pay the fine eventually.

Recommended procedure during the hours Rite-Rate isn't open is to gas up after you leave the freeway, park in their drive, drop keys in their mail slot, and take a taxi to the airport. They said you can flag one down across the street.

SPACECRAFT (and Team?) RELIABILITY

A reliability man from Grumman called Bill Vernon, TBC reliability expert for LO, and said: "I regarded the success of your first LO mission as pure beginners luck, but now you've done it again and I have one question to ask; 'How did you do it?'" Bill's answer should make interesting reading.

OUR FEARLESS SPOT

One of the best hard copy TV pictures of Mission B appeared this morning. Original was taken when Dalton was in charge of the Bermuda tracking station and a good head of hair (Beatle style) was added in the Bendix photo lab. Dalton heard about the "doctored" version over a year after the artwork was done - and brought a copy in for your amusement today.

Then ~~someone~~ added a number and a striped jacket.

BUGL RESULTS

EK's Jim Smith stopped by to say that Bruce Elle had read the BUGL item and is sending a new Kodak "status symbol" badge to Jim.

SFOF PHONE PROBLEMS

By now some of you have learned that access to commercial long distance lines (by dialing 9) has been removed from most SFOF phones. Judging by some comments we've heard from JPL and TBC sources, the size of the SFOF phone bill should decrease considerably. As a taxpayer we're glad to see a much needed economy move, but as to our ease of making outside calls, sorry about that, troops.

MISCELLANY

The mission must be a success -- Jim Martin showed up today in his red slacks.

We heard that a reporter asked Bob Helberg how old he is the other day and Bob replied, "Missile Age". We had to ask for clarification as did the reporter. "Holding at 39 and counting," we were told.

A new position has been added to the Flight Operations Team. Must be true because we heard ob the net, "FPAC, this is TROUBLEMAKER".

Have you heard who won the "Argument of Perilune?"

Suggestion was made that TV program schedules be added to SEAL so no one will miss anything worth watching. Might also add weather reports, cafeteria schedules, and Western and United Airlines schedules for the Bimat Cut period.

An old expression has been revised in a punny way to read, "Saturday Night at the Moon Pictures," instead of "Saturday Night at the Movies."

Economy-minded taxpayers will applaud Israel Taback for his sparing use of paper when he writes drafts for Operations Directives. Would you believe 3" x 5"?

We hear NASA is applying to Kodak for a free roll of film because one frame had a processing problem shown on it.

FPAC has a copy of the Management Information bulletin that spells out the dates for Thanksgiving and Christmas holidays - with the appropriate portion circled in red. (Red circled part tells how things are being run back at the ranch but not at the SFOF where 2 a.m. is just about the same as 2 p.m. except that sometimes it's light outside when you go to the cafeteria.

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another copy is already being routed.

Number B-25

NASA - BOEING - JPL

Date December 1, 1966

The LO BUCL is issued for the world-wide Lunar Orbiter Flight Operations Team for non-operational information only.

Editor - Jack Sutherland

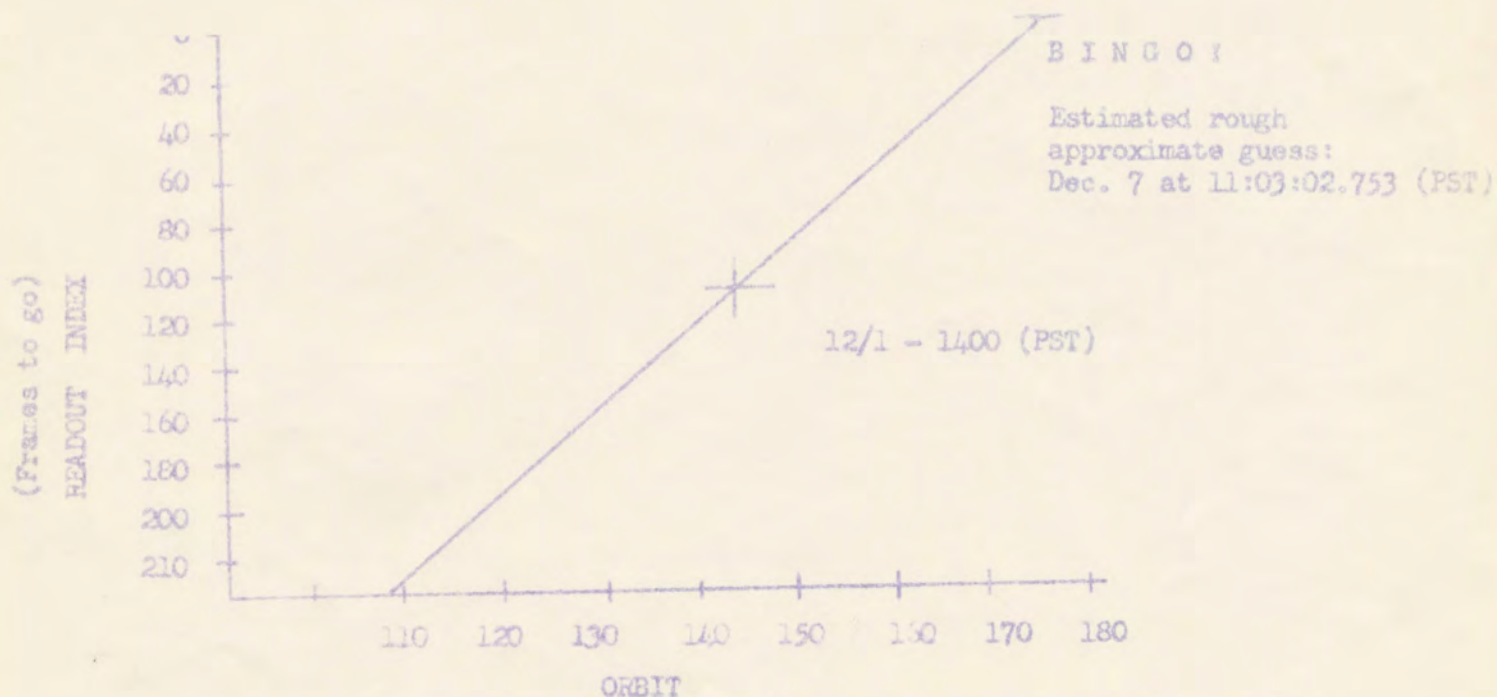
SPACECRAFT STATUS

That Copernicus photo was on all the network TV news programs last night with comments ranging from practically nothing to "The picture of the century!" We prefer the latter description.

We could probably label this one as our "serendipity" picture because we gained something we weren't actively seeking. The telephoto was selected at random for a special study but the implications for a press release were seen immediately when the mosaic was put on the light table and plans changed accordingly. The Orbiter luck is still with us, even though things at the SFOP did come unglued a bit when Copernicus first arrived.

As to the spacecraft itself, sometimes it's a bit reluctant to terminate readout but a little coaxing does the job.

READOUT STATUS



NOTE: SPACers - don't make firm plans to leave till you have the word from your area director!

MEANEST MAN NOMINEE

We heard that a local man, not a team member, really has his wife buffaloed. Seems she knows that he likes one breakfast egg fried and one boiled so she fixed them for him that way regularly. Then one morning he really read her out because, "You boiled the wrong egg!" Yep, he's our nominee.

RETROGRADE ORBIT VIEWS

Orbiter II is in a "positive" or "posigrade" orbit because it was placed into orbit in the same direction as the moon travels around the earth. Apollo spacecraft are supposed to go into orbit in the opposite direction, a "retrograde" orbit.

Why then can't we turn orbiter around and snap pictures as the approaching astronauts will see the lunar landscape? We almost tried it on Site 10 but decided against it because of power constraints. The solar panels would have to be off the sun and the battery alone wouldn't furnish quite enough juice so we chose not to risk a malfunction of the shutter mechanism. Two ways this type of picture could be taken on future missions are: (1) carry a greater reserve of battery power or (2) redesign the shutter mechanism to operate on 24 volts. Both are comparatively major changes and don't appear to be worth the effort.

Main reason the Apollo Project chose a retrograde orbit is that the spacecraft will coast back to earth if the deboost engine doesn't work. Of course if it didn't slow down near the earth, it would continue to orbit moon and earth in a figure eight shaped orbit. Wouldn't that give FPAC fits? -

NO LATE LATE SHOWS?

Heard there's a JPL directive out that cuts out commercial TV from SFOF monitors except for special mission-pertinent features. However, the OCC's are setting up ground rules so commercial TV can be used in a way which won't interfere with mission control.

POOR RICHARD'S PRIDE WOUNDED

In yesterdays BUGL we had a "typo" which sprang from a "writo" (illegible hand-write) and spoiled Ben Franklin's witty saying. It should have read, "a friend in need is - a pest."

CAN'T USE SPACECRAFT 6 OR 7

Or more specifically we can't use those spacecraft numbers with the DSN. Pioneer spacecraft 6 and 7 are already in orbit so we must choose different numbers. Numbers 8 to 15 have been assigned to the LO Project.

BENCHMARK "D" SOFTWARE DEMO

The demonstration of the Orbiter II software system started 11/30 and is expected to be completed 12/2 to give us a point of departure for new changes required for Mission C. All change requests are to be submitted by Dec. 1 and integrated into the system by Jan. 6. Then there will be another demo Jan. 12-16 in anticipation of February launch readiness. That means the software system for Mission C will be "frozen" on Jan. 12.

WEDDING BELLS

Congrats. to Les Helser - He hooked a live one and is getting married Friday. And with Gary Clark getting married Saturday, absence must make the heart grow fonder. Anyway, we wish both of these couples the best of luck and a bright future.

LOST AND FOUND

Anyone finding a sealskin hat, please return same to the SCRIPTO office. (Head shrank and hat fell off. - Ed.)

BUGL BUGS -

Bill Burr will help keep you honest around SFOF if orbits, SEALS, or schedules change. But other than that, you're just going to have to steel yourself to the job and forget about what the other half is doing till you finish your textbook mission, and we'll reveal a little secret - the other half hasn't been doing much - they say they're too busy. -

We'll try to write up a page or two every so often from Seattle and send copies to Langley, JPL, and the stations as we did last time so if you come across any hot items, give us a jingle.

One more item. Remember last time when everything and everyone we praised in these pages was stopped or went home? -- Hope it doesn't happen here but we sure have appreciated that Support Chief-supplied coffee - and the effort that went into keeping the urns filled. Thanks, guys. -

So the BUGL blows away for the Orbiter II Mission. Hots O' ruck!

SPAC -- MISSION CONTROL -- DAGON SCHEDULE INFO

		<u>RED</u>	<u>WHITE</u>	<u>BLUE</u>
Thursday	12/1	0400 - 1500	1430	2 0430
Friday	12/2	1130 - 2230	2200	0130 0100 - 1200
Saturday	12/3	1900	0900	0830 - 1930
Sunday	12/4	0600	0530 - 1630	1600
Monday	12/5	0230 - 1330	1300 - 2400	0300
Tuesday	12/6	0930 - 2030	2000	2330 - 1000
Wednesday	12/7	1700	0700	0630 - 1730
Thursday	12/8	0400		

Seattle -- here we come!!!

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