Luminous Particles

On numerous occasions, when the sun was above the horizon, small luminous particles drifting generally backward along the spacecraft line of motion at relative velocities of a few meters per second were observed by the astronauts. Carpenter demonstrated by rapping on the hatch that such particles could be produced from the spacecraft itself. Given the very close coincidence in orbit velocity, which is implied by the small relative velocity, it is considered highly probable that all such particles originate from the spacecraft. From the remark of Glenn that the particles seemed to be about as luminous as fireflies, it is possible to estimate that the sizes of those seen by him are of the order of one millimeter (refs. 20 and 21). Some of them may have been bits of debris. The majority, however, appear to be ice crystals probably formed from the steam which is released by the life-support system.

Astronaut Cooper (paper 20) reported seeing particles emerging from the attitude jet nozzles. He was observing them under especially favorable circumstances, namely at a time when the sun was up but the window faced away both from the sun and from the earth, so that he had a black sky against which to see them. Furthermore, he was dark-adapted. Under these circumstances he could see objects as faint as the fourth magnitude, as compared with an estimated -9 magnitude for the objects seen by Glenn (refs. 20 and 21). They must thus have been as much as 100,000 times fainter, corresponding to the difference of 13 magnitudes. Thus, their diameters may have been as small as 25 microns. For such small particles, it is extremely difficult to be sure of the origin. Given the high temperature of the jet exhaust (approximately 1,300° F.), ice crystals would not be expected. Furthermore, most of the material leaving the nozzles should be moving at supersonic velocities if the jets are to be effective in moving mass of the spacecraft. However, Glenn reported seeing a small "V" of steam each time he activated the pitch down thruster (ref. 4). Such steam, under more favorable viewing conditions might appear as individual particles. It appears possible that some of the material in the periphery of the jet exhaust may be moving relatively slowly and cooling rapidly upon leaving the nozzle producing minute droplets or crystals which can be viewed under very favorable conditions. It is possible that these particles are tiny fragments of the catalyst eroded by the hydrogen peroxide blast. In any case, particles coming from the jets were not seen by Glenn, Carpenter, or Schirra, probably because the latter were observing them under less favorable circumstances. Cooper had the enormous advantage that his cabin lights could be completely extinguished and his window covered for extended periods of time to assist him in becoming fully dark-adapted.

Dim–Light Phenomena

At the time of the beginning of the orbital flight program, it was realized that the most promising field for nighttime observations was the study of extended dim objects, especially immediately after sundown or before sunrise. At all times, the astronaut is above a major portion of the airglow layer; and this means a major reduction in the background illumination. Near the time of twilight, the astronaut has the further advantage over the ground observer that his sky is without twilight except for the band along the horizon. Since the majority of comets are found by ground observers in twilight, the astronauts were urged to keep an eye out for them at this time. It should be noted that a new comet was discovered at the eclipse of July 20, 1963 (ref. 22). It was hoped that the astronaut would observe the no-man's land between the zodiacal light, which can be observed from the ground only at distances of 30° or more from the sun, and the outer corona, which is invisible at distances from the sun more than about 3° (ref. 23). This gap has been partially bridged by airplane flights, but more data are still needed.

Astronaut Cooper reported that at about 20 seconds after sunset, he saw a whitish arch extending some 15° or so out from the sun. Approximately 1 minute after sunset, Cooper successfully observed the zodiacal light as a faint band concentrated along the ecliptic. The failure of previous astronauts to see it was presumably because of lights in the cabin which could not be extinguished. As part of an experiment developed by Ney and his associates

a series of photographs were taken of the zodiacal light, but these were unsuccessful because of the problems described in paper 12.

Appearance of Earth and Sky at Night

Once the orbital twilight has faded, the visibility of the earth depends upon the phase of the moon. Even with no moon, the earth's horizon is visible to the dark-adapted eye.

According to Cooper, the earth's surface is somewhat darker than the space above it, which is filled not only with the visible stars, but also has a diffuse light produced by the countless stars, which cannot be individually resolved by the eye and by dim light phenomena, such as airglow and zodiacal light. With the aid of starlight, zodiacal light, and airglow, clouds and coastlines are just visible to the dark-adapted eye. With moonlight reflected on the earth, the horizon is still clearly defined, but in this case, the earth is brighter than the background of space. With moonlight, the clouds can be seen rather clearly and their motion is distinct enough to provide a cue to the direction of motion of the spacecraft. Lights from cities can be distinguished, even through thin clouds. Thus the lights of Shanghai shining through the clouds were used by Cooper to help aline his vehicle in yaw on the last night pass prior to retrofire.

The night sky appears quite black with the stars as well defined points of light which do not twinkle. Lights upon the earth do twinkle when viewed from above, according to Cooper.

Comparison of visual estimates of angles near the horizon with the corresponding measurements shows that the so-called "moon illusion" continues to exist in space; that is, objects near the horizon seem to be larger than their true angular dimensions (ref. 21). The fact is interesting, since it shows that this illusion is not related to any sensation of gravity, but is a consequence in some way of the visual perception of the location of the horizon.

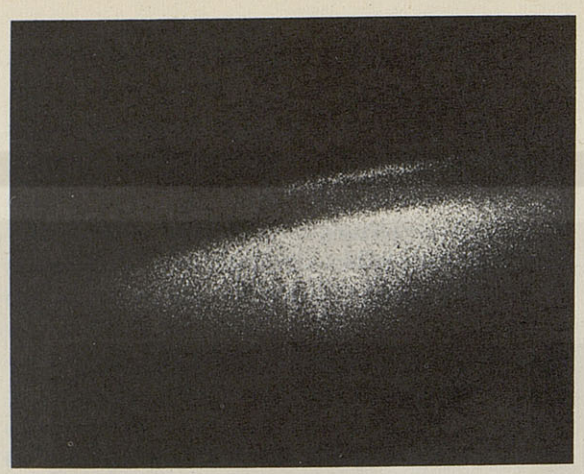
The Nightglow

Around the horizon, all the astronauts report that they saw a band of light, which appeared to them to be centered at a height of some 6° to 10° above the visible horizon. Astronaut Glenn describes it as "tan to buff"; similar descriptions were given by the others. The nature of the band was made clear by Astronaut Carpenter who employed a filter which passed only the 5577 Å line of the neutral oxygen atom (refs. 21 and 24). Through the filter, the band continued to be visible although all other details of the horizon had vanished. It was thus clear that the band resulted from the phenomenon of nightglow; that is, the emission of light by gases of the high atmosphere. In this emission, the line 5577 plays an important part; it constitutes about ⅙ of the total, according to Tousey and his associates. Carpenter reported that the light seen through the filter seemed to be about the same as that without; this remark should, however, be understood as an indication of order of magnitude rather than as a precise measurement, for which neither time nor instruments were available.

Carpenter also provided a rough estimate of the brightness, indicating that it was comparable with that of a bank of clouds near the horizon illuminated by the quarter moon, or about 30 kilorayleighs, according to later computations. This figure happens to agree closely with rocket measurements (ref. 25).

The height of the nightglow layer was also measured on the MA–7 flight. Carpenter observed the passage of the second magnitude star Gamma Ursae Majoris through the nightglow layer. He timed its entrance into the layer, its passage through the level of maximum brightness, and its emergence. From this information, it has been possible to calculate the height of the nightglow layer, by using the standard formulas for the dip of the horizon. A value of 91 kilometers was found; the close agreement with rocket measurements is probably to be expected, since the method is capable of considerable precision.

On the MA–9 flight, a camera with a f/0.8 lens of 3.8 cm focal length using Ansco H 529 color film was carried to photograph the nightglow (see paper 12). A total of 15 usable exposures were made. Some of these were degraded by roll of the spacecraft during the exposure, but a number of them show the nightglow layer as a thin line a few degrees above the horizon as can be seen in figure 19–13(a). The results of this study are summarized in table 19–II.



(a) Nightglow photograph number 29 (MA–9) (Unretouched).

FIGURE 19–13.—Nightglow photography.

supported by the densitometry of the photographs taken by Astronaut Cooper.

Table 19–II shows the altitudes of the spacecraft as a function of time and the measured angles that the airglow layer has with respect to the observable earth's limb. It also shows the inferred heights of the airglow layer, and these heights vary from somewhat in excess of 100 kilometers down to something just under 80 kilometers. The average height as determined from all the pictures is 88 kilometers, and the thickness of the layer is 24 kilometers. There is an indication (figs. 19–13 (a), (b), and (c)) that the earlier photographs of the airglow layer show it higher above the horizon as determined by lightning flashes on the horizon

Table 19–II.—MA–9—Nightglow Photographs Used for Geometrical Measurements

[From Gillett, Huch, and Ney, U. of Minn.]

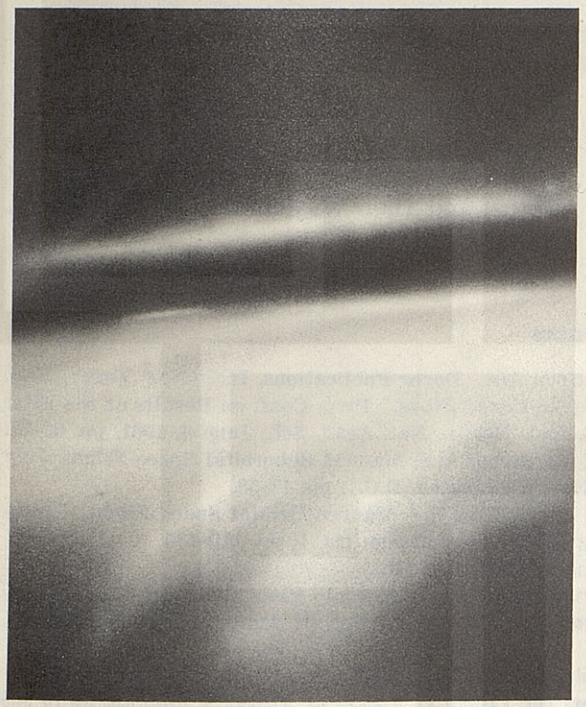
Picture No.	Time, G.m.t.	Angle between earth's limb and nightglow line, deg	Height of spacecraft above earth, km	Height of center of nightglow band, km	Latitude at which nightglow is observed	Angular width at half intensity of nightglow band, deg	Normal exposure time, sec
22	1342:50	3. 62	241	111	27° S.	0. 66	30
23	1343:10	3. 26	240	105	26.5° S.	. 69	10
25	1346:20	3. 00	232	97	23° S.	. 88	30
27	1349:30	2. 26	220	75	18° S.	. 71	120
28	1350:20	2. 40	218	78	17° S.	. 89	30
29	1350:40	2. 41	217	77	16.5° S.	. 87	10
31	1355:00	2. 66	202	81	8° S.	. 78	30
32	1355:10	2. 65	202	81	8° S.	. 78	10
35	1401:40	3. 20	181	87	8° N.	. 92	10
Average	---	2. 86	---	88	---	0. 80	---

The color of the nightglow band, as determined from the photographs, is greenish with respect to the bluish-white illumination of the earth. It is not, however, the same green as a pure 5577 Å line since, as noted above, the light of the 5577 Å line is diluted with other radiations.

On some of the photographs, the atmospheric clouds and haze near the horizon can be seen, illuminated by the moon, then at last quarter (fig. 19–13(b)). As remarked by Carpenter (ref. 24), the brightness of the nightglow layer is comparable with that of the clouds illuminated by the quarter moon; this conclusion is than the later pictures, in which the earth's limb is illuminated by the quarter moon. This could be true latitude effect, and, if it were, would indicate that the airglow layer has a higher altitude at high latitudes—the highest latitude in this case being about 27° S. where the layer is about 108 kilometers as measured from the lightning horizon references. The lowest altitude of the airglow layer is near 17° and is about 78 kilometers.

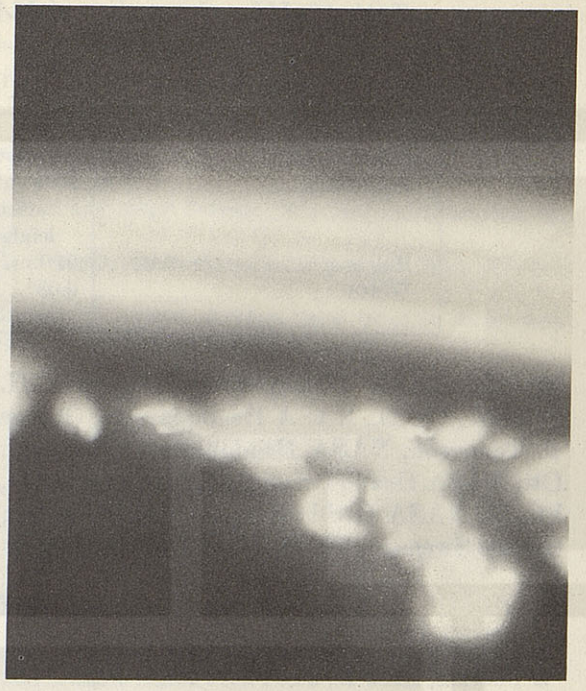
The width of the nightglow band at the half-intensity points was measured from the films as between 0.66° and 0.92°. By comparison, the distance from the center of the nightglow layer to the bottom was measured by Carpenter and his coworkers (ref. 24) as 0.34°; he did

not measure the entry of the star into the layer. Carpenter's half width is in good agreement with the photographed total width; both indicate that the nightglow layer is considerably narrower than the space between itself and the horizon. Table 19–III summarizes and compares the data from the MA–7 and MA–9 flights.



(b) Artist sketch based on nightglow photograph number 29 (MA–9).
FIGURE 19–13.—Continued.

Astronaut Schirra observed on one occasion on the night side, while over the eastern portion of the Indian Ocean and probably while looking in a northerly or northeasterly direction, a large luminous patch which he described as a brownish smog-appearing patch. He saw stars above and below this patch which he felt was higher and thicker (wider) than the "normal" nightglow. On the average, this higher patch or layer did not seem to be as bright as the "normal" nightglow layer. Some stars could be seen near the feathered edges of the layer, but he was not certain he could see any stars in the central denser portion (nor is it likely that, at the short period of observation, there was a rich and bright star field in the background). It is tempting to conclude that this phenomenon may have been a view of a



(c) Artist sketch based on nightglow photograph number 22 (MA–9).
FIGURE 19–13.—Concluded.

tropical 6300 Å atomic oxygen emission, first reported by Barbier and his associates (ref. 14). It is believed that the arc observed by Schirra is similar to that observed at Tamanrasset, Algeria, and Maui, Hawaii. On one occasion, Cooper noticed and immediately reported a patch, similar to that described by Schirra, above the "ordinary" nightglow layer while over South America. It had been predicted that there might be visual concomitants of the South Atlantic magnitude anomaly; however neither of these observations were in the correct geographical location to be related to this phenomenon.

Acknowledgments.—In addition to the individuals specifically referred to in the text of this section, the following scientists assisted in the development of the Mercury inflight research program as consultants, or members of the "Ad Hoc Committee on Scientific Experiments," or the "Panel on Inflight Scientific Experiments" of the NASA Office of Space Sciences: Jocelyn R. Gill, Ph. D., NASA Headquarters; Gordon C. Augason, NASA Ames Research Center; Maurice Dubin, NASA Goddard Space Flight Center; Frederick R. Gracely, NASA Headquarters; John E. Naugle,

Table 19–III.—Comparison of MA–7 and MA–9 Nightglow Observations

Type of measurement	Carpenter et al.	Cooper photographs
Color	At least partly 5577	Whitish green.
Brightness	Like a cloudbank under a quarter moon; 30 kilorayleighs.	Same.
Height	91 km	88 km.
Width	0.68°	0.66° to 0.89°

Ph. D., NASA Headquarters; Freeman H. Quimby, Ph. D., NASA Headquarters; George P. Tennyson, NASA Headquarters; Ernest J. Ott, NASA Headquarters; Albert Boggess, III, Ph. D., NASA Goddard Space Flight Center; George Swenson, Ph. D., U. of Illinois; Franklin Roach, National Bureau of Standards; Edward P. Ney, Ph. D., U. of Minnesota; Leslie Meredith, Ph. D., NASA Goddard Space Flight Center; and Dale W. Jenkins, Ph. D., NASA Headquarters.

References

1. Minnaert, N.: *The Nature of Light and Color in the Open Air.* Dover Publications, Inc. (New York), 1954.
2. Shepard, Alan B., Jr.: *Pilot's Flight Report, Including In-Flight Films.* Proc. Conf. on Results of the First U.S. Manned Suborbital Space Flight. NASA, Nat. Inst. Health, Nat. Acad. Sci., June 6, 1961, pp. 69–75.
3. Grissom, Virgil I.: *Pilot's Flight Report.* Results of the Second U.S. Manned Suborbital Space Flight, July 21, 1961. Supt. Doc., U.S. Government Printing Office (Washington, D.C.), pp. 47–58.
4. Glenn, John H., Jr.: *Pilot's Flight Report.* Results of the First U.S. Manned Orbital Space Flight, February 20, 1962. Supt. Doc., U.S. Government Printing Office (Washington, D.C.), pp. 119–136.
5. Strombros, W.: *Letter to the Editor,* Aviation Week, August 12, 1963, p. 118.
6. Middleton, W. E. K.: *Vision Through the Atmosphere.* University of Toronto Press, 1952, pp. 122 ff.
7. Blackwell, H. R.: *Contrast Thresholds of the Human Eye.* J. Optical Soc. of America, vol. 36, 1946, pp. 624–643.
8. Zoethout, W. D.: *Physiological Optics.* The Professional Press, Inc., 1947, pp. 247–353.
9. Baumann, R. C., and Winkler, L.: *Photography From the Viking II Rocket at Altitudes Ranging up to 158 Miles.* Naval Research Lab. Rep. 4489, 1955.
10. Lowman, Paul D., Jr.: *Photography of the Earth From Sounding Rockets and Satellites.* Photogrammetric Engineering Journal. (In press.)
11. Rod, E.: *Faul Pattern, Northwest Corner of Sahara Shield.* Bull. Am. Assoc. Petroleum Geologists, vol. 46, No. 4, 1962, pp. 529–552.
12. Soules, S. D,. and Nagler, K. M.: *Weather Observations From Manned Space Stations.* Paper presented at the XIV International Astronautical Congress of the International Astronautical Federation in Paris, France, September 25 to October 1, 1963.
13. Schirra, Walter M., Jr.: *Pilot's Flight Report.* Results of the Third United States Manned Orbital Space Flight, October 3, 1962. NASA SP–12. Supt. Doc., U.S. Government Printing Office (Washington, D.C.), pp. 49–55.
14. Barbier, Daniel, and Glaume, Jeanine: *Les Radiation de L'oxygène 6300 et 5577Å de la Luminescence du Ciel Nocturne dans Une Station de Basse Latitude.* Annales de Geophysiqué, vol. 16, Issue No. 3, 1960, pp. 319–334.
15. Alexander, E. N., McCracken, C. W., et al.: *Review of Direct Measurements of Interplanetary Dust From Satellites and Probes.* Space Research III. Proc. of 3d International Space Sciences Symposium, Washington, May 1962. North Holland Publishing Co. (Amsterdam).
16. Carpenter, M. Scott: *Pilot's Flight Report.* Results of the Second United States Manned Orbital Space Flight, May 24, 1962. NASA SP–6. Supt. Doc., U.S. Government Printing Office (Washington, D.C.), pp. 69–75.
17. Cameron, W. Sawtelle, Glenn, J. H., Carpenter, M. S., and O'Keefe, J. A.: *The Effect of Refraction on the Setting Sun as Seen From Space in Theory and Observation.* Astronautical Journal, vol. 68, no. 5 1963, pp. 348–351.
18. Volz, S. E., and Goody, R. M.: *The Intensity of the Twilight and Upper Atmospheric Dust.* J. Atmospheric Sciences, vol. 19, no. 5, 1962, pp. 385–406.

19. Dunkelman, L.: *Visual Observations of the Atmosphere From U.S. Manned Spacecraft in 1962.* Paper presented to the IV International Space Sciences Symposium of COSPAR, Warsaw, Poland, June 6, 1963.
20. Glenn, John H.: *The Mercury-Atlas 6 Space Flight.* Science, vol. 136, June 1962, pp. 1093–1095.
21. O'Keefe, John A., and Cameron, Winifred Sawtell: *Space Science Report.* Results of the Second United States Manned Orbital Space Flight, May 24, 1962. NASA SP–6. Supt. Doc., U.S. Government Printing Office (Washington, D.C.), pp. 35–42.
22. Dossin, F. D.: *Goddard News,* vol. 5, no. 7, September 9, 1963, p. 1.
23. Roach, F. E., and Van Biesbroeck, G.: *The Zodiacal Light and Solar Corona.* Sky and Telescope, vol. 13, no. 5, March 1954.
24. Carpenter, M. S., O'Keefe, J. A., and Dunkelman, L.: *Visual Observations of Nightglow From Manned Spacecraft.* Science, vol. 138, 1962, pp. 978–980.
25. Koomen, M. J., Gulledge, I. S., Packer, D. M., and Tousey, R.: *Night Airglow From Orbiting Spacecraft Compared With Measurements From Rocket Observations.* Science, vol. 140, 1963, p. 1087.

20. ASTRONAUT'S SUMMARY FLIGHT REPORT

By L. Gordon Cooper, Jr., *Astronaut, NASA Manned Spacecraft Center*

Summary

The MA–9 flight marked the conclusion to the United States' first manned space-flight program. From their initiation into the program in 1959, the seven Mercury astronauts participated as a specialist team, and their combined experiences, both in space and on the ground, constitute a valuable contribution to the nation's manned space-flight capability. The launch checkout activities constitute one of the most valuable portions of this experience, and the MA–9 flight demonstrated once again how critical this period is both to the preparation of the spacecraft and the pilot. The sensations and experiences of the flight were generally similar to those reported by the pilots of previous flights with the exception that better dark adaptation was obtained and therefore more dim light phenomena could be seen. During the MA–9 flight, the zodiacal light and what may have been the daytime airglow were observed for the first time. While some new observations were made on phenomena such as the airglow and space particles, the appearance of the earth features and weather patterns generally seemed to be similar to the description of the previous pilots. As on previous flights, several photographic studies were conducted and the results of these exercises have proved to be valuable. A series of new experiments and evaluations of Mercury systems were conducted, with generally good results. The mission appeared to be relatively routine until a malfunction in the control system late in the flight made it necessary to control attitude manually during retrofire and reentry. The flight of *Faith 7* concluded after some 34 hours in space with a landing within 4½ miles of the primary recovery ship, the *USS Kearsarge*, in the Pacific Ocean.

Introduction

When the seven of us came together as a group for the first time at Langley Field, Virginia, in April of 1959, neither we, any of the newly created NASA Space Task Group, nor anyone in the country knew what our exact roles as Project Mercury Astronauts would entail. We were unsure how we should train for space flights, how we would become familiar with the spacecraft and its many systems, or even how the pilot would be integrated into these systems. We were all starting from scratch, from the ground floor in manned space flight.

Looking back now on more than 4 years of concentrated training, detailed study of spacecraft systems, attending countless hundreds of coordination and planning meetings, participating in hundreds of hours of hardware development and checkout, we can all recognize that in some cases there would have been more efficient ways of doing things. However, considering the limited knowledge in this space business in the spring of 1959, I consider it remarkable that Project Mercury ran so close to its originally planned time schedule. Few programs in the history of airplane development ever ran as close, and no airplane program ever had so many unknowns staring the test operations team in the face.

By correlating all that we have learned in the last 4 years and properly applying it to future manned space programs, we should be able to increase the efficiency of our next program. This application of experience will be important because taking the step from the successful missions of Project Mercury to manned interplanetary flights involves many stumbling blocks and unknowns. These uncertainties must be uncovered and solved in a logical manner.

Back in 1959, the pilot was one of the real unknowns in space flight. No one could really say for certain how a pilot would react or how

well he could perform in a space environment. Partially for this reason and because unmanned flights were scheduled as part of the development program, the Mercury spacecraft was designed to perform the mission automatically. Manual controls for spacecraft control and systems management were included primarily as backups to the automatic program. From the start of the program we encouraged the concept of the pilot being a primary part of the overall system. Throughout the manned flight phase, this concept has become more and more of a reality.

While we adopted the team concept during most of our space-flight training, we were required to be at so many places and cover so many areas that each man was assigned a specialty area to monitor closely and brief the others on periodically.

"Faith 7" was the name I selected for the spacecraft which performed so well for me until the electrical problem late in flight. I chose this name as being symbolic of my firm belief in the entire Mercury team, in the spacecraft which had performed so well before, and in God. The "7," of course, as in the names used by the others before me is representative of the original astronaut team. This flight report will present a discussion of my entire flight experience, but I shall attempt to summarize the in-flight sensations and observations of the other astronauts and relate their experiences to my own. Beginning with the prelaunch activities which are so necessary to preparing for the mission and concluding with my landing in the Pacific after 34 hours of weightlessness, I shall try to discuss the many experiments and systems operation in which each of us took part.

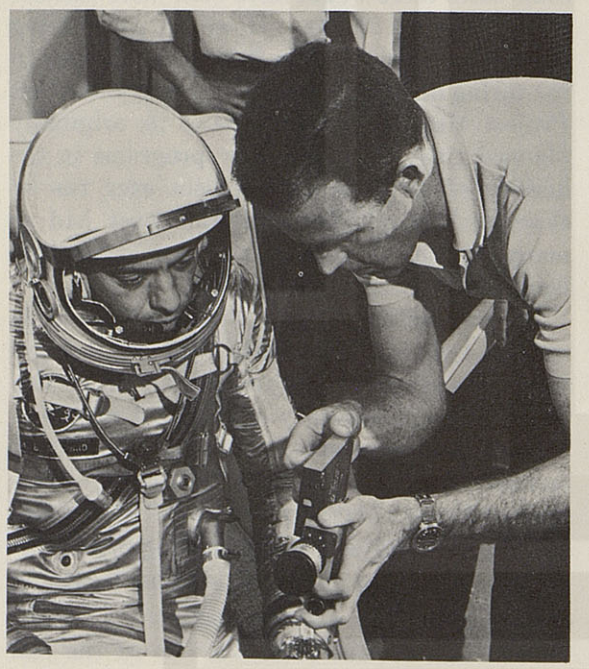


FIGURE 20–1.—Astronauts Cooper and Shepard discuss MA–9 camera during prelaunch activities.

Preflight And Launch

Spacecraft Readiness and Checkout

The period from the time the spacecraft arrived at Cape Canaveral until the time it was mated with the launch vehicle was the period where the pilot and his backup became completely familiar with the spacecraft and all its various systems (fig. 20–1). We learned all the individual idiosyncrasies of each system. We also became familiar with many of the members of the launch crew and learned whom to call on for expert advice on each system. It was also during this period that we had an opportunity to discuss the coming flight with team members who had flown before (fig. 20–2) and take advantage of their experiences.

The preflight phase was used to incorporate certain modifications into the spacecraft and

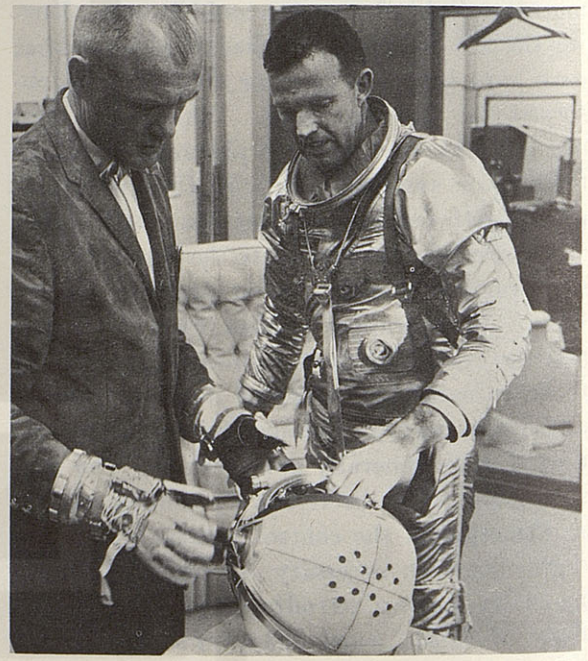


FIGURE 20–2.—Astronauts Glenn and Cooper discuss items of the pilot's personal equipment during the MA–9 prelaunch period.

to add some pieces of equipment necessary to meet operational requirements. Because of the limited usable cockpit space and the even more limited center-of-gravity travel and gross weight of the Mercury spacecraft, these configuration changes were always a soul-searching problem. Regardless of how they were accomplished, additions often resulted in some type of compromise to the pilot's comfort, freedom of movement, and/or operational smoothness.

The natural tendency was for everyone to want to improve on existing equipment and to add worthwhile experiments that could be fitted in. Space flight is so expensive that no one wants to waste a single second of orbital time. However, we all discovered that the entire flight is compromised when all equipment, all experiments, and all the flight plan detail are not frozen early enough to check out each piece of equipment and allow everyone, particularly the pilot, to become thoroughly familiar with all procedures.

On all our flights the cockpits have been cluttered to the point where the space remaining for the astronaut and the equipment with which he must work is very limited and inefficiently arranged. In most cases getting some of the equipment located and moved about provided more exercise than did the special onboard exercise device. Stowage of equipment is a very real problem that too often is not given enough consideration.

As the flights lengthened, a detailed flight plan and abbreviated checklists for experiments and operational procedures became a real necessity. It is impossible for a pilot to remember all the details of times, amounts, and so forth, of the many experiments and tests to be conducted. Proper formats and storage for these items had to be developed during the preflight preparation periods.

Integrated Checkout

Faith 7 passed all the spacecraft tests in fine shape and was taken to the launch complex to be mated with the Atlas 130D launch vehicle. At this time, a buildup of integrated launch vehicle and spacecraft tests, system by system, was initiated and proceeded until the program was culminated in a fully integrated simulated flight from countdown to recovery with all systems operating. This series of tests was felt by all of us to be a necessity not only to check out all the systems, but to train the launch crew, the pilots, and the personnel of the worldwide network.

Countdown

I believe that we can very readily shorten the time that the pilot is in the spacecraft prior to launch. I was busy enough with the countdown activities that time did not drag, but I did have time to take a short nap during this period. It seems to me that to conserve the pilot's energy it would be desirable to accomplish more of these checks with the backup pilot prior to insertion. Of course, you do need a few minutes to shift around and get settled, see that the equipment is located properly, before you are prepared for the flight.

Most of the countdowns in Mercury went fairly smoothly as a result of the practice that the launch crews had acquired on simulated flight tests. The first attempt to launch MA–9 on May 14 was delayed for a diesel engine that would not operate to drive the gantry back. Then it had to be postponed because a critical radar set became inoperative. I was in the cockpit for some 6 hours before we scrubbed on that first day. I was quite tired but felt ready to recycle for another count the following day.

The countdown on May 15, 1963, went almost perfectly. Everything was really in a "go" status and I think everyone felt that we were going to have a good launch. And it was!

I had thought that I would become a bit more tense as the count neared minus 1 or 2 minutes, but found that I have been more tense for the kick-off when playing football than I was for the launch on May 15. I felt that I was very well trained and was ready to fly a good flight.

Powered Flight

It is a wonderful feeling when the engines light and you have lifted off. The long period of preparation is over, and at last you are ready to settle down to your work.

The acceleration is not disconcerting or degrading at the levels encountered in the Mercury flights. In fact, it gives one somewhat the same feeling as that of adding full throttle on a fast car, or a racing boat, or a fighter airplane. The pilot can easily monitor several of the more

critical parameters, including his attitudes, throughout the entire launch phase. The task that he is given to do should be uncluttered with minor details if possible, but he is fully capable of functioning as an intricate part of the system throughout the entire launch. I was surprised at how many things I could keep track of and feel that I had plenty of time to do the exact item planned.

On previous flights, it had been noted that vibration encountered in the region of maximum dynamic pressure was feeding through the couch to the helmet and causing slight blurring of vision. We found that this could be eliminated by adequate padding between the helmet and the couch. I had approximately ¾ inch of foam rubber between my helmet and the couch and experienced no blurring of vision.

Booster engine cutoff (BECO) is very distinctive, by the decrease in both the acceleration and the noise. It was just as I had expected it to be from talking to the others.

John Glenn and Scott Carpenter had discussed with Wally Schirra and me how they had encountered some springboard effect from the guidance while in the latter phases of the sustainer flight. Wally Schirra experienced very little or none of this effect. I had an almost perfect sustainer trajectory with almost no guidance corrections at all, so it was an exceptionally smooth and almost perfect insertion.

Sustainer engine cutoff (SECO) is also quite distinctive, in the same manner as BECO. This is followed by the noise of clamp rings and posigrade rockets. The spacecraft is in orbit.

Orbital Flight

Insertion

We had all run many full launch profiles on the centrifuge, so I felt very well prepared for all the powered flight, but there is some difference between the transition from positive acceleration on a centrifuge back to 1–g and the transition from positive acceleration on the flight to zero–g. I felt somewhat strange for the first few minutes. The view out of the window is a tremendous distraction as the spacecraft yaws around and the earth and the booster come into full view for the first time. We all noted a strong desire to concentrate on the tremendous view out of the window. Atlas 130D was only about 200 yards away from me. It was certainly beautiful. I could read the lettering on the sides and could see various details of the sustainer. It was a very bright silver in color, with a frosty white band around the center portion of it. It was still wisping vapor from the aft end. It was yawed approximately 15° to 20° to its left. I had it in sight for a total of approximately 8 minutes. The front end was slowly turning in counterclockwise rotation.

Despite these distractions, the many hours of training took over and we all proceeded to do our tasks as scheduled. After a few minutes I readily adapted to the new environment and felt completely at ease. Weightlessness is extremely comfortable. After a pilot has once experienced weightlessness in space flight, he should almost immediately adapt to this condition when exposed to it again. We all even tended to forget we were weightless.

I agree with Scott Carpenter that the cockpit did seem to be somewhat differently located in respect to myself upon insertion into orbit. You move up forward in the seat, regardless of how tight your straps are cinched. The equipment storage kit on the right seems to be at a different angle to you than it is when you are on the launch pad. I did feel very distinctly that I was sitting upright. Most of the time I felt as if I were lightly floating. A couple of times I felt almost as if I were hanging upside down because of the feeling of floating into the shoulder straps. Because the spacecraft was weightless, equipment stayed where it was whenever I let go of it. Nevertheless, every time I "dropped" something, I had the tendency to grab below it, expecting it to fall.

You really need to have a low workload on the first pass in order to collect your senses, to acclimatize yourself to this new situation, and to organize the flight activities. I felt that I was not on top of the situation as completely as I would like to be right after insertion. Although I was thinking about all the items to be done and of how to do them, I did not feel completely at home. I felt that I was in a strange environment and was not at my best, until perhaps halfway through the pass. By the end of the first pass, I was feeling really adjusted to my new surroundings.

One indication of my adjustment to the surroundings was that I encountered no difficulty

in being able to sleep. When you are completely powered down and drifting, it is a relaxed, calm, floating feeling. In fact, you have difficulty not sleeping. I found that I was catnapping and dozing off frequently. Sleep seems to be very sound. I woke up one time from about an hour's nap with no idea where I was and it took me several seconds to orient myself to where I was and what I was doing. I noticed this again after one other fairly long period of sleep. You sleep completely relaxed and very, very soundly to the point that you have trouble regrouping yourself for a second or two when you come out of it. However, I noted that I was always able to awaken prior to having a task to do. I did not encounter any type of the so-called "break-off phenomena." Although this flight was very enjoyable, a thing of delight, it still is a strange environment to a human being and you have every desire to get back to earth at the planned time.

Comments on Systems Operation

The automatic control is rather sloppy due to the wide limit cycle it operates within. It is no problem as soon as you get accustomed to it. I found that Grissom's and Schirra's description of the manual proportional flight control system was very accurate. It is a rather sluggish system until you learn to use short blips. The fly-by-wire low is much more precise with the crispness of control produced by the firing of the 1-pound thrusters.

I found that orienting the spacecraft after drifting flight was quite easy on the day side and not too difficult on the night side, although orientation on the night side takes more time unless there is moonlight or broken clouds or land masses below. Stars and star patterns are more difficult to recognize because of the limited view through the window. You can slowly drift until you find a star pattern that is recognizable and from this you can pick up a zero yaw star. If you have moonlight, or any broken cloud masses or land masses, you can pick up zero yaw very readily if you turn all the lights off in order to become dark adapted and pitch down to approximately $-20°$.

Speed is very apparent when flying over clear or broken-cloud areas. However, if there is a solid cloud deck underneath you and no other motion cues are available, you have a very slow, floating feeling.

When I was drifting, the changing view out the window was not at all disconcerting, and the random orientation caused me no concern. In fact, it is a very relaxed way to travel. I might mention an item here on the natural dynamics of the spacecraft. When rates were near zero, and the spacecraft was powered down, I never observed any rate greater than 1°/sec about any one axis. Generally, if there were a rate about one axis as great as this, there were no rates about the other two axes. These rates would switch from axis to axis and more than likely only two axes would have any rate at all, and these rates would be between ¼°/sec and ½°/sec, at the most. Frequently, for long periods of time, the spacecraft would have absolutely no rates at all and would be almost completely motionless. The one axis that appeared to have more predominate rates than the others was the roll axis; and the rate, almost invariably, was to the left, approximately ½°/sec.

Although my suit temperature was satisfactory, like Wally Schirra I had to adjust the water flow continually to attempt to hold temperature in limit. The condensate pump that was added just prior to launch failed; so that the condensate tank filled up and the suit was very moist all the time.

The valve on the drinking water container was leaky, and I was unable to place water into the plastic freeze-dehydrated food containers. Therefore, I ate only the bite size foods.

Visual Sightings

During the day, the earth has a predominately bluish cast. I found that green showed up very little. Water looked very blue, and heavy forest areas looked blue-green. The only really distinctive green showed up in the high Tibetan area. Some of the high lakes were a bright emerald green and looked like those found in a copper-sulphate mining area. The browns of the Arabian desert showed up quite distinctly, but the Sahara was not quite so brown. If you are looking straight down on things, the color is truer than if you are looking at an angle.

I could detect individual houses and streets in the low-humidity and cloudless areas such as the Himalaya mountain area, the Tibetan plain, and the southwestern desert area of the U.S. I saw several individual houses with smoke coming from the chimneys in the high country around the Himalayas. The wind was apparently quite brisk and out of the south. I could see fields, roads, streams, lakes. I saw what I took to be a vehicle along a road in the Himalaya area and in the Arizona-West Texas area. I could first see the dust blowing off the road, then could see the road clearly, and when the light was right, an object that was probably a vehicle.

I saw a steam locomotive by seeing the smoke first; then I noted the object moving along what was apparently a track. This was in northern India. I also saw the wake of a boat in a large river in the Burma-India area.

At times during the day, the pattern of the sun coming through the window was hot on my suit. I could also feel heat on the inside of the window right through my glove. Like Scott, I never tired of looking at the sunsets. As the sun begins to get down towards the horizon, it is very well defined, quite difficult to look at, and not diffused as when you look at it through the atmosphere. It is a very bright white; almost the bluish white color of an arc lamp. As it begins to impinge on the horizon line, it undergoes a spreading, or flattening effect. The sky begins to get quite dark and gives the impression of deep blackness. This light spreading out from the sun is a bright orange color which moves out under a narrow band of bright blue that is always visible throughout the daylight period. As the sun sets farther, it is replaced by a bright gold-orange band which extends out for some distance on either side, defining the horizon even more clearly. The sun goes below the horizon rapidly, and the orange band still persists but gets considerably fainter as the black sky bounded by dark blue bands follows it on down. You do see a glow after the sun has set, although it is not ray-like. I could still tell exactly where the sun had set a number of seconds afterward.

At night I could see lightning. Sometimes five or six different cumulus buildups were visible at once. I could not see the lightning directly, but the whole cumulus mass of clouds would light up. From space, ground lights twinkle, whereas stars do not. I could not distinguish features on the moon. It was a partial moon at night, but it appeared full when it was setting in the daytime. It was quite bright at night, but on the day side it was a lightish blue color.

I immediately saw the airglow layer, which all the orbital pilots have seen, in which the stars appear to fade as they pass through it and then reappear below it before disappearing behind the horizon. The earth has a sharp horizon even at night. At the time, the layer appeared to be about 12° to 13° high. It was, of course, actually lower than this as discussed in paper 19.

At two different times, I saw a faint glow just after sunset or prior to sunrise; it was somewhat cone shaped, and I believe it was the faint glow of zodiacal light. It was not exactly perpendicular to the horizon. I had a feeling that this was just a glow off the sun. It was not as bright as the Milky Way. Another night phenomenon that I noticed occurred when I was over South America looking east or northeast. It appeared to be the lower edge of a cloud ceiling on an overcast day. It did not appear to have an upper edge. It was not distinct and did not last long, but it was higher than I was, was not well defined, and was not in the vicinity of the horizon. It was a good sized area, very indistinct in shape. It had a faint glow with a reddish brown cast. It seemed to be quite extensive, very faint, and contrasted as a lighter area in the night sky. It may have been the same high airglow layer that Wally reported.

When there is no moon, the earth is darker than the sky; there is a difference in the two blacks. In general, there was more light from the sky; the sky is a shining black as compared with a dull black appearance of the earth. There is a distinct line at the horizon and the earth is the darker.

I saw the lights of Perth, Australia, and a bright orange light from the British oil refinery to the south of the city. If there is moonlight, then cloud layers and ground features can be seen. The moonlight was bright enough to detect motion of the ground. On several occasions I could see light from cities on the ground through the clouds. On the last night pass, I

used the light of Shanghai glowing through the clouds to help me line up in yaw for retrofire.

At times I could see the glow from every one of the thrusters. I saw a tremendous amount of John Glenn's fireflies regardless of my attitude. They appeared to come out from the spacecraft and go back along the flight path. I could see some of them for as long as 30 or 40 seconds. I could see them coming directly out of the pitchdown thruster when it was activated. I had the feeling that the direction of their motion back along the orbital path was distinct enough that they could be used as a rough yaw reference.

The first indication I got of the sun coming up behind me was the lighting of the clouds from underneath. I noted the clouds getting lighter and lighter, and I could still see the stars. Suddenly, my window would get into the oblique sunlight and appear to frost over just as an aircraft canopy does. This was the result of a greasy coating on the inside of the outer pane, which completely occluded my vision under these lighting conditions.

Experiments

Since MA–9 was so much longer than previous flights, I had ample time to conduct numerous experiments. The first orbital flight had very few experiments. As the experimental program increased and the flights lengthened, the number of experiments carried on board increased. In addition to the experiments all of us have tried to make as careful observations as possible. We have been told that these observations of new phenomena can provide some of the most valuable data on features such as the spectacular colors in sunrises and sunsets, zodiacal light, airglow, space particles, stars on the day side, and various distinct earth features (see paper 19).

Photography.—All the orbital flight pilots have carried along a hand-held camera of some type for color photographs of interesting phenomena. These have all yielded some good photos of the earth from a new vantage point.

Several photographic programs were carried out during the orbital flight program. Scott Carpenter took horizon definition pictures for MIT, and Wally Schirra made an evaluation of several different filters for the Weather Bureau. These two studies were extended on my flight. In addition, I attempted to get dim light photographs as well as movies (see paper 12).

Ground light experiment.—The ground light experiment was attempted on all the orbital flights. However, weather precluded John, Scott, and Wally from seeing it. I was fortunate enough to have excellent weather and saw the ground light as scheduled. The lights from the town of Bloemfontein, S. Africa, were more distinctive than the signal light and helped me to locate it.

Flashing light experiment.—On the MA–9 flight, we tried a new experiment designed to provide information that would help us on future rendezvous missions. A 5.75-inch-diameter sphere with two xenon-gas discharge lamps which strobed at approximately one flash per second was ejected from the spacecraft into its own orbit. In this orbit, it moved back and forth relative to the spacecraft so that it would appear at different distances.

At 3:25:00 I went to fly-by-wire low, slowly pitched up to the −20° mark on the window, deployed the flashing beacon, and there was a loud "cloomp" as the squib fired and it departed. I then caged the gyros and powered down the ASCS a-c bus. I never did see the beacon on that first night after it was ejected. However, I was having some difficulty finding my 180° yaw and the spacecraft may not have been properly alined for making the observation. I tried unsuccessfully to observe the flashing beacon early on the day side also.

On the second night side after deploying the flashing beacon, shortly after going into the night side, I spotted the little rascal. It was quite visible and appeared to be only 8 to 10 miles away. I deliberately moved off target, waited until 5:40:00 and eased back to 180° yaw and saw the light again, at which time it appeared to be around 12 to 14 miles away and still quite visible.

On the third night side after deploying the flashing light, I had no anticipation of seeing it at all; but at 6:56:00 ground elapsed time (g.e.t.) there it was, blinking away. It was very faint and appeared to be at a distance of about 16 to 17 miles. I would say it was approximately the brightness of a fifth-magnitude star, whereas on the second night side after deployment it had appeared to be about that of a second-magnitude star.

Systems Difficulties Encountered Towards the End of the Flight

Partial pressure of oxygen in the cabin slowly dropped throughout the flight to about 3.5 psia. I was worried that the network might get concerned about this on the next to the last pass. Also, the partial pressure of CO_2 in the suit circuit had gradually increased to a reading of 3.5 mm Hg. I suspected the gage and went to emergency rate flow and did not get any apparent decrease in this reading. However, I did not stay on emergency rate flow very long. I recognized that my breathing was more rapid and deep. The PCO_2 gage indicated that we were up over 5 on the gage setting just prior to retrofire. However, I could have gone on emergency O_2 flow and accepted slightly higher suit temperatures because of the fans shutting down, which reduces suit circuit flow.

On the 19th orbital pass, I had been switching the warning light control switch to the "off" position in order to darken completely the interior of the spacecraft and thus become dark adapted. When I returned the switch from the "off" to "dim" position, the 0.05g green light illuminated. I immediately turned off the ASCS 0.05g switch fuse and the emergency 0.05g fuse. Thereafter, we made three checks to verify that the ASCS 0.05g relay functions were operative. Since the amp-cal was now latched into the reentry mode, the attitude gyros were no longer operational.

The 250 v-amp main inverter failed to operate on the 21st pass. At about 33 : 03 : 00 g.e.t. the automatic changover light for the standby inverter came on. I had noticed two small fluctuations in the ammeter just previous to this time and had gone through an electrical check; everything appeared normal. The temperature on the 250 v-amp inverter was about 115° F. The temperature on the fans inverter was about 125° F, and the standby inverter was about 95° F. At this point the light came on and I checked the inverters. The 250 v-amp inverter was still reading about 115° F on temperature, but it was indicating 140 volts on the ASCS a-c bus voltage. I then turned it off. At that time I selected the slug position (manual selection of the standby inverter for the ASCS) and found that the standby inverter would not start. I put the switch back to the "off" position of ASCS a-c power and elected to make a purely manual, or fly-by-wire, retrofire and reentry.

Analysis of these malfunctions illustrated that the entire Mercury network had developed an operational concept of teamwork that culminated in an almost perfect example of cooperation between the ground and the spacecraft on the MA–9 flight. Almost everyone followed the prestated ground rules exactly, and the radio discipline was excellent.

Retrofire

All of us believed that we could control attitude manually during retrofire. However, the flight plans call for autopilot control. Nevertheless, because of failures of one type or another, Wally's was the only flight in which only the autopilot controlled attitude during retrofire. John had trouble with a low-torque thruster and elected to assist the autopilot with the manual proportional system. Scott had a problem with the horizon scanner and controlled during retrofire with the fly-by-wire and manual proportional systems. I had a malfunction associated with one of the control relays which eliminated my autopilot as well as my attitude indicators. Therefore I had to initiate retrofire, use window view for attitude reference, and control the spacecraft with the manual proportional system. This was no problem, though I did have some difficulty reading the rate indicators due to the large variation in illumination between the inside and outside of the spacecraft. This disparity in illumination became a problem because I had to shift back and forth for attitude reference outside and readings of the rate indicators inside. In order to be ready for retrofire which had to occur just after first light, I oriented the spacecraft to the retrofire attitude on the night side. Night orientation is no problem, but it does take considerably longer, because yaw determination is more difficult than on the day side.

As with the others, there was no doubt in my mind when the retrorockets fired. They produce a good solid thump which you can see and hear. However, our sensations at the time they fired were different. John Glenn felt like he had reversed direction and was going "back toward Hawaii." Scott Carpenter felt that he came to a standstill. Wally Schirra and I did not feel that the motion of the spacecraft changed.

Reentry

After retrofire, there is a period of several minutes prior to the start of reentry (0.05g). As you approach 0.05g, the spacecraft control becomes sluggish and feels as though it wants to start reentry.

As in the retrofire case, all of us knew that we could reenter on manual control. However, the flight plans generally called for autopilot control during reentry. Nevertheless anomalies of system function resulted in partial manual control in all but Wally's flight. I used manual proportional control on MA–9 since I had lost the ASCS and standby inverters during the 20th orbital pass. The reentry worked out very successfully and showed again that the pilot can accomplish this control task very adequately.

I found that the oscillations of the spacecraft were not difficult to damp until I descended to an altitude of approximately 95,000 feet. At this point, the amplitude of spacecraft motions increased as they normally do and it took a substantial increase of control inputs to keep within comfortable limits. The oscillation became more severe at approximately 50,000 feet, but I deployed the drogue parachute at 42,000 feet, as planned, and the spacecraft was quickly stabilized.

The g-forces are more sustained on reentry than on launch but are still easily tolerable.

During reentry there was no uncomfortable increase in cabin temperature. If the pilot is performing a manual reentry, he will be perspiring profusely when landing, but mostly because of the work load rather than the increased temperature.

Landing And Recovery

Landing at a rate of 30 fps with the landing bag down is a good solid jolt, but certainly tolerable. In fact, one does not really have to be in an ideal position and braced tightly to be able to take this momentary shock in good shape.

There have been varied opinions among the pilots of all the Mercury space flights as to the sensations encountered upon landing in water. When the spacecraft rolls over and goes under the water, there is a natural tendency to wonder if it will sink or float and whether it will right itself. One item we stressed in training was that of preparing during the descent on the parachute to evacuate the spacecraft immediately after landing in the event it starts to sink. If the pilot knows that the recovery forces are in the immediate area, this first period on the water is considerably more relaxed and enjoyable.

By the time the landing occurs, the pilot is perspiring profusely. The air from the snorkels is quite cooling, but the cabin is fairly warm and humid.

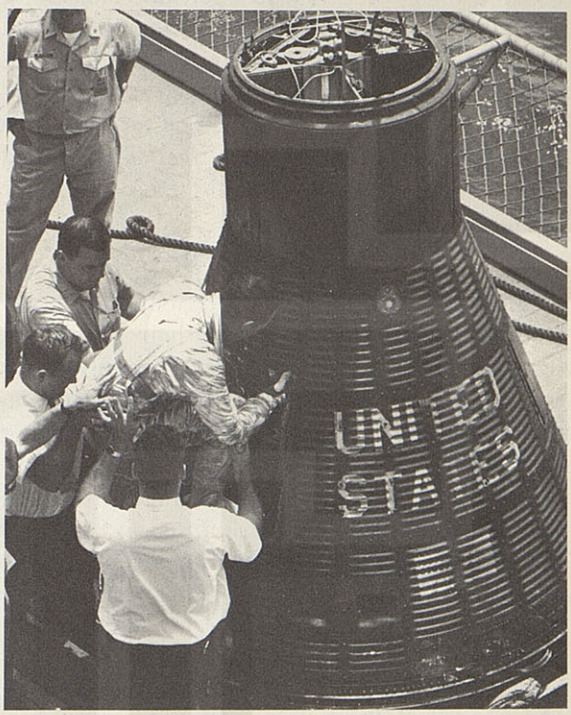


FIGURE 20–3.—Astronaut Cooper climbs out of *Faith 7* after the 34 hour MA–9 flight.

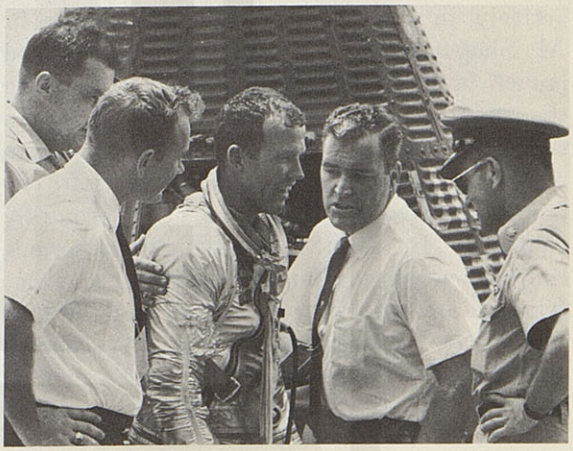


FIGURE 20–4.—Astronaut Cooper stands on the deck of the *USS Kearsarge* immediately after egressing from *Faith 7*.

Almost the full gamut of recovery procedures were used in the course of the Mercury program. The recovery procedure is greatly simpified if the spacecraft lands near a recovery ship. In this case, the spacecraft can be lifted out of the water directly onto the deck. However, all the procedures would be simplified even more if land landings were made.

When I first stepped from the spacecraft on board the *USS Kearsarge* I felt fine (figs. 20–3 and 20–4). As I stood still waiting on a blood pressure check, I began to feel dizzy. I mentioned this to the doctors, who then started moving me along. As soon as I took two or three steps, I immediately began to feel clear-headed once more, and at no time did I become dizzy again.

Concluding Remarks

After my recovery in the Pacific, the aeromedical specialists conducted their prescribed tests designed to glean as much from my flight as possible. Upon my return to the launch site, a series of formal debriefings covering every aspect of my space flight experience were begun. In these debriefings, I found it useful to refer to my previous training, and that of my six colleagues, in describing my sensations and observations. In the 4 years since we were first initiated into Project Mercury, a great deal has been accomplished and a great deal has been learned. Many of the anxieties and misgivings of space flight have been relieved. Although relatively brief, our early training was intensive and complete, and its effectiveness has been proven, we believe, by our ability to participate actively in the operation of the spacecraft. Al Shepard's flight was our first manned launch, and this initial experience in getting the spacecraft, launch vehicle, and the man ready at the same time was valuable. As a result of losing Gus Grissom's spacecraft, our landing and recovery procedures were promptly changed. In John Glenn's flight, a serious control system malfunction and a somewhat frightening but erroneous signal that the heat shield had been released caused some concern among us on the ground, but John's manual retrofire and reentry completed his mission successfully. Scott had a problem in the control system also, but his manual retrofire, although not quite as precise as he would have liked, brought the *Aurora 7* spacecraft home. Wally Schirra, after bringing his suit temperature under control, completed a "textbook" six-pass mission and landed just under 5 miles from the *USS Kearsarge*.

As I think back over my mission, which actually began right after Wally's flight, it has been an exciting experience indeed. The specific training for my 1-day mission, the many engineering reviews of the changes required for the *Faith 7* spacecraft, the physical conditioning, and even the low-residue diet were all memorable parts of the prelaunch preparation. The initial experience of prolonged weightlessness and the magnificent view of the earth takes a while to get used to just as it did for all the orbital pilots, but once I was accustomed to the new surroundings, events and activities proceeded as scheduled. In fact, until that infamous moment in the 19th orbital pass, it seemed like another Wally Schirra "textbook" flight. Only three more passes stood between me and a routine landing off the bow of the *USS Kearsarge*. When I received the first indication that the sequencing system had malfunctioned a number of interesting experiments and systems evaluations had been completed, with just a few more to go. Then, with the sudden electrical anomaly and the sequence of events which followed, I knew I had a job ahead of me. Unlike Scott's case, however, I had sufficient time to contemplate a plan of action and collaborate with the flight-control personnel on the ground. Their valuable assistance was instrumental in the completion of my successful retrofire, reentry, and landing.

Now that Mercury is over and we stand at the threshold of more ambitious programs, the lessons each of us have learned will be constant tools with which to accept and accomodate new developments. Mercury has been only a beginning for the seven of us. The job at hand is to work to meet our new challenge in space with the same enthusiasm that everyone exhibited throughout this program.

V

APPENDIXES

APPENDIX A

TYPICAL DOCUMENTS PREPARED FOR MERCURY

This appendix contains a listing of the types of documents prepared for use in the control and reporting of Project Mercury. Most of these documents are not available for general distribution.

Type of document	*Estimated number of different volumes of each type*	*Prepared by—*	*Remarks*
1. Mission Rules	8	MSC	
2. Technical Information Summary	14	MSC	
3. Flight Plan	4	MSC	
4. Mission Directive	17	MSC	All issued as working papers.
5. Data Acquisition Plan	13	MSC	
6. Instrument Calibrations	23	MSC	
7. Recovery Documents	27		
a. Recovery Operations			
b. Recovery Requirements			
c. General Information			
d. Recovery Procedures			
e. Operations Plan for Recovery Team.			
8. Postlaunch Reports	21	MSC	Issued as working papers prior to MR–1 (7 issues).
9. Working Papers	134	MSC	Includes Items 5 and 9.
10. Technical Memorandums	2	MSC	
11. Miscellaneous	61		Includes items (a) through (d).
a. Schedule and Cost Analysis	1		
b. Descriptive Synopsis of Project Mercury.	1		
c. Articles for journals	23		
d. Conference papers	30		
e. Operational Requirements	3		
12. Documentary Film	26	MSC	
13. Quarterly Reports	20	MSC	
14. Flight Controller Handbook–1	14	MSC	
15. Flight Controller Handbook–2	6	MSC	
16. Consolidated Remote Site Report	6	MSC	
17. Mercury-Redstone Monthly Status Report	12	MSFC	
18. Master Operational Schedule	4	MSFC	
19. Complete Firing Test Report (5 parts)	4	MSFC	
20. Operations Procedures	2	GSFC	
21. Network Countdown	5	GSFC	
22. Communications Operations Procedure	2	GSFC	

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Type of document	Estimated number of different volumes of each type	Prepared by—	Remarks
23. Network Performance Report	3	GSFC	
24. Network Operation Directive	1	GSFC	
25. Test Requests, covering such items as: vibration, shock, heating, systems tests, destruction tests, accoustical tests, Project Orbit, functional tests.	1, 125	Contractors	
26. Drawings (spacecraft)	>1, 800 (3, 200 pages)	McDonnell Aircraft Corp.	Does not include revisions.
27. Formal Report Releases	200	McDonnell Aircraft Corp.	Includes items (a) through (e).
a. Spacecraft configuration	20	----------	For each spacecraft.
b. Failure Summary Report	41		
c. Full Scale Simulated Mission Test.	25		
d. Contractor Furnished Equipment Status Report.	1	----------	Periodically revised.
e. Other	128		
28. Service Engineering Department Reports ((SEDR).	444	McDonnell Aircraft Corp.	Separate SEDR's were generally issued for each system and test for each spacecraft.
29. Miscellaneous:			
a. Contracts (formal)	85	MSC	
b. Contract change proposals	390	McDonnell Aircraft Corp.	
30. Detailed Test Objectives	9	Aerospace Corp.	
31. Operations Requirements	3	Air Force Missile Test Center	
32. Operations Directive	2	Convair/	
33. Flight-Test Reports	9	Astronautics	

APPENDIX B

NASA CENTERS AND OTHER GOVERNMENT AGENCIES

This appendix contains a list of government agencies that supported Project Mercury.

NASA Headquarters, Washington, D.C., and the following NASA Centers participated in Project Mercury:

- Ames Research Center, Moffett Field, Calif.
- Flight Research Center, Edwards, Calif.
- Goddard Space Flight Center, Greenbelt, Md.
- Langley Research Center, Langley Station, Hampton, Va.
- Launch Operations Center, Cocoa Beach, Fla.
- Lewis Research Center, Cleveland, Ohio
- Manned Spacecraft Center, Houston, Tex.
- Marshall Space Flight Center, Huntsville, Ala.
- Wallops Station, Wallops Island, Va.

Department of Defense, Washington, D.C.:

- Space Systems Division, U.S. Air Force, Los Angeles, Calif.
- U.S. Navy, 5th Naval District Headquarters, Norfolk, Va.
- Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
- El Centro Naval Parachute Test Facility, El Centro, Calif.
- Naval Air Development Center, Johnsville, Pa.
- Wright Air Development Center, Wright-Patterson Air Force Base, Ohio
- Air Force Missile Development Center, Holloman Air Force Base, N. Mex.
- Naval Ordnance Test Station, Pensacola, Calif.
- Pensacola Naval Air Station, Pensacola, Fla.
- Air Proving Ground Center, Eglin Air Force Base, Fla.
- Army Ballistic Missile Agency, Redstone Arsenal, Ala.
- U.S. Army Transportation Command, Ft. Eustis, Newport News, Va.
- U.S. Marine Corps Air Station, Cherry Point, N.C.
- Military Air Transport Sciences, Dover, Del.
- White Sands Missile Test Center, White Sands, N. Mex.
- Pacific Missile Range, Point Mugu, Calif.
- Naval Air Station, Corpus Christi, Tex.
- Atlantic Missile Range, Cape Canaveral, Fla.

State Department, Washington, D.C.

Weather Bureau, Washington, D.C.

Aeronautic Chart and Information Center, St. Louis, Mo.

Public Health Service, Washington, D.C.

APPENDIX C

PRIME CONTRACTORS

This appendix contains a list of the prime contractors for Project Mercury.

Aerospace Corp., El Segundo, Calif.
Chrysler Corporation, Highland Park, Mich.
General Dynamics/Astronautics, San Diego, Calif.
General Electric Co., Schenectady, N.Y.
Burroughs Corp., Detroit, Mich.
The B. F. Goodrich Co., Akron, Ohio
McDonnell Aircraft Corporation, St. Louis, Mo.
North American Aviation, Inc., El Segundo, Calif.
Pan American World Airways, Inc., Guided Missiles Range Division, Patrick Air Force Base, Fla.
Philco Corporation, Philadelphia, Pa.
Thiokol Chemical Corporation, Bristol, Pa.
Western Electric Company, Inc., New York, N.Y.

APPENDIX D

SUBCONTRACTORS AND VENDORS

This appendix contains a list of Project Mercury spacecraft subcontractors and vendors that had contracts totaling more than $25,000:

AiResearch Manufacturing Co., Los Angeles, Calif.
Airwork Corp., Miami, Fla.
American Welding and Manufacturing Co., Warren, Ohio
Ampex Corp., Redwood City, Calif.
Applied Electronics Corp., Metuchen, N.J.
Arnoux Corp., Los Angeles, Calif.
Atlantic Research Corp., Arcadia, Calif.
Barnes Engineering Co., Stamford, Conn.
Beckman and Whitley, Inc., San Carlos, Calif.
Beckman Instruments, Inc., Berkeley Div., Fullerton, Calif.
Bell Aerosystems Co., Div. of Bell Aerospace, Buffalo, N.Y.
The Bendix Corporation, Utica Division, Utica, N.Y.
Bohanan Manufacturing Co., Falcon Field, Mesa, Ariz.
Brush Beryllium Co., Cleveland, Ohio
Burton Manufacturing Co., North Ridge, Calif.
CTL Division of Studebaker-Packard Corp., Cincinnati, Ohio
Cannon Electric Co., Salem, Mass.
Cannon-Muskegon Corp., Muskegon, Mich.
Carlton Forge Works, Paramount, Calif.
Collins Radio Co., Chicago, Ill.
The Connecticut Hard Rubber Co., New Haven, Conn.
Consolidated Electrodynamics Corp., Pasadena, Calif.
Consolidated Vacuum Corp., Rochester, N.Y.
Corning Glass Works, Chicago, Ill.
Crucible Steel Co. of America, Pittsburgh, Pa.
Custom Printing Company, Ferguson, Mo.
DeHavilland Aircraft of Canada Ltd., Downsview, Ont.
Dit-MCO, Inc., Kansas City, Mo.
Donner Division, Systron-Donner Corp., Concord, Calif.
Dorsett Electronics Laboratories, Inc., Norman, Okla.
Dynamic Research, Inc., Los Angeles, Calif.
The Eagle-Picher Co., St. Louis, Mo.
Electro-Mechanical Research, Inc., Sarasota, Fla., and Princeton, N.J.
Electronic Associates, Inc., New York, N.Y.
Electronic Wholesalers, Inc., Melbourne, Fla.
Emerson Electric Manufacturing Co., St. Louis, Mo.
Endenco Corporation, Los Angeles, Calif.
F. M. C. Corp., Buffalo, N.Y.
Fairchild Camera and Instrument Corp., Cable Division, Joplin, Mo.
Filtors, Inc., E. Northport LI., N.Y.
General Devices, Inc., Princeton, N.J.
Gulton Industries, Metuchen, N.J.
Harris Manufacturing Co., St. Louis, Mo.
Haynes Stellite Co., Chicago, Ill.
Hurletron, Inc., Control Products Division, Wheaton, Ill.
Interelectronics Corp., New York, N.Y.
Johns Manville Sales Corp., Chicago, Ill.
Walter Kidde and Co., Inc., Chicago, Ill.
Kollsman Instrument Co., Elmhurst, N.Y.
Leach Corp., San Marino, Calif.
Linde Co., Chicago, Ill.
Lockheed Propulsion Co., Redlands, Calif.
J. A. Maurer, Inc., Long Island City, N.Y.
D. B. Milliken Co., Arcadia, Calif.
M. B. Electronics, Div. of Textron Electronics, New Haven, Conn.
Minneapolis-Honeywell Regulator Co., Boston Division, Boston, Mass.

Minneapolis-Honeywell Regulator Co., Aeronautical Division, Minneapolis, Minn. (2 locations)
Missouri Metal Shaping Co., Overland, Mo.
National Car Rental, Sarasota, Fla.
National Water Lift Co., Kalamazoo, Mich.
Olin-Mathieson Chemical Corp., Winchester Western Div., Eastern Alton, Ill., and Baltimore, Md.
The Perkin-Elmer Corp., Norwalk, Conn.
Radioplane, Division of Northrop, Van Nuys, Calif.
Raymond Engineering Laboratory, Middleton, Conn.
Rock County National Bank, Janesville, Wis.
Schmelig Construction Co., St. Louis, Mo.
Selb Manufacturing Co., St. Louis, Mo.
Southwest Truck Body Co., St. Louis, Mo.
Tarco, Inc., Santa Monica, Calif.
Teleflex, Inc., Philadelphia, Pa.
Thiokol Chemical Corp., Elkton Div., New York, N.Y.
Thompson Ramo Wooldridge, Inc., Cleveland, Ohio
Titanium Metals Corp. of America, New York, N.Y.
Unidynamics, A Division of Úniversal Match Corp., St. Louis, Mo.
United Aerospace Div. of United Electrodynamics, Inc., Pasadena, Calif.
Waltham Precision Instrument Co., Inc., Waltham, Mass.

APPENDIX E

NASA PERSONNEL WHO PARTICIPATED IN PROJECT MERCURY

This appendix contains a listing of NASA personnel that contributed to the Mercury Project and represents the best effort possible to obtain a complete listing; however, it is known that some names are missing, such as people from the Langley Research Center. Those contributors whose names are missing are recognized as a group.

Ackerman, Sylvester J.
Actor, J. Paul
Adams, Robert S.
Adams, Ruth Ann
Adams, Walter I.
Adkins, James E., Jr.
Aiken, Donna S.
Aldrich, Arnold D.
Aldridge, Roy C.
Alexander, James D.
Alexander, Nancy C.
Alexander, W. Carter
Algranti, Annebell
Algranti, Joseph S.
Allaback, Wilber
Allen, Charlie C.
Allen, David J., Jr.
Allen, Elizabeth D.
Allen, Louis D.
Allen, Thomas H., Jr.
Allen, Vera J.
Allison, Howard J.
Anastos, Steve
Anderson, Donald W.
Appel, Margaret C.
Arabian, Donald B.
Arbic, Richard G.
Ard, Elizabeth H.
Armistead, Lucille B.
Armitage, Peter J.
Armstrong, Carol A.
Armstrong, Curtis S.
Armstrong, Dale E.
Armstrong, Geri
Armstrong, Lawrence D.
Armstrong, Stephen
Armstrong, William O.
Arnette, Sandra A.
Arnold, James P.
Arslanian, John G.
Arthur, James S.
Ashe, Gloria Jean
Ashley, Fancine
Askew, Abner N.
Assadourian, Arthur
Atamanchuk, Ivan J.
Atkins, Jones, Jr.
Augerson, William J.
Ault, John W., Jr.
Avery, John J., Jr.
Babola, Robert J.
Bailey, Charles L., Jr.
Bailey, E. Lou
Bailey, Frederick J., Jr.
Bailey, Glenn F.
Bailey, James W.
Bailey, John R.
Bailey, Norman R.
Bailey, Robert J.
Baillie, Richard F.
Baker, Ben R.
Baker, Robert L.
Balinas, Verby Lee
Balisky, Eileen M.
Ball, George D.
Ball, William R.
Ballas, Bebe B.
Banks, Harold H.
Banks, Judith Bower
Barker, Edward S.
Barker, Joseph T.
Barkley, Garland B.
Barnard, Jack
Barnes, Harold F.
Barnes, Lyndon S.
Barnett, James H., Jr.
Barney, Walter F.
Barrow, John M.
Barsky, Jerome
Barton, Ruth A.
Bates, James Richard
Battaglia, Harold F.
Battin, Richard B.
Baum, Herman
Beach, Mary
Beane, Patricia B.
Beatty, Lamarr D.
Beck, Harold D.
Beck, Jeanette H.
Becker, Robert W.
Beckman, David A.
Beddingfield, Samuel T.
Beerman, Rebecca
Beers, Charles A.
Beeson, Willirie M.
Begnaud, Ellis L.
Behuncik, John A.
Bell, Anita S.
Bell, Daniel M.
Bell, John
Bell, Larry E.
Bell, Lawrence Wilson
Bender, David
Bennett, James A.
Bennett, Marvin L.
Benson, Donald D.
Benson, Richard B., Jr.
Bergman, Clayton M.
Bergtholdt, Charles P. I.
Bernardin, Robert M.
Berney, Kathryn C.
Bernstein, Ruth
Berry, Dr. Charles A.
Berry, Ronald Lewis
Bertram, Emil P.
Bias, A. Dell
Biggs, Charles
Billingham, John
Bilodeau, James W.
Bishop, Halley M.
Bivens, Virginia T.
Black, Dugald O.
Black, Thomas
Blackwood, Howard F., Jr.
Blakemore, Thomas L., Jr.
Blance, Lucille

Blanchard, Robert S.
Blanco, J. A.
Bland, William M., Jr.
Blankenbaker, Lloyd
Blanton, Fred B.
Blanton, Lelia M.
Blase, William A.
Blevins, Edwin K.
Blue, Barbara
Blume, Donald D.
Blumentritt, James
Bobik, Joseph M.
Bobo, Leonard F.
Bobola, Robert E.
Bodmer, James E.
Bogart, William M.
Boler, L. Joseph
Bond, Aleck C.
Bond, Arthur C., Jr.
Bone, Eric Dale
Bone, James E.
Bonham, Robert L., Jr.
Booher, Cletis R.
Boozer, Becky
Bopp, Marlin Leroy
Borgman, Elsa M.
Borgman, Richard R.
Boring, James W.
Bostick, Jerry C.
Bostick, Linda T.
Bost, James E.
Boswick, Guy W., Jr.
Bosworth, George L.
Bothmer, Clyde B.
Bott, Barbara E.
Bowen, Maureen E.
Bowman, Melvin D.
Bowman, Robert A.
Boyce, William M.
Boyd, Robert
Boydston, Donald L.
Boykin, Wilbur R.
Boynton, John H.
Bracey, Gerald W.
Bradford, Halley, Jr.
Bradford, William C.
Bradley, Raymond H.
Brady, James T.
Branscomb, Albert L., Jr.
Braquet, Louto J., Jr.
Braslow, Myrtle S.
Braun, Alois, Jr.
Braun, Jane D.
Bray, Donald O.
Bray, Julia F.
Brent, Mary Sue
Brenton, Westley H.
Brewer, Mary H.
Brewer, Gerald W.
Brickel, James R.
Briggs, Thomas
Brigham, Richens E.
Brinkman, John
Britt, Leon E.
Britt, Malcolm V.
Broadwell, James D.
Brock, Eugene H.
Broman, Roseanna A.
Brooks, Laura A.
Brooks, Melvin F.
Brooks, Russell G.
Broome, Douglas R.
Broughton, Thomas G., Jr.
Broussard, Marcus J.
Brown, Beverly P.
Brown, Constance G.
Brown, David
Brown, Doris J.
Brown, James T.
Brown, J. Robert
Brown, Richard L., Sr.
Brown, Shirley A.
Brown, Timothy Murphy
Brown, Woodridge C.
Browne, Robert A.
Brownstein, Herbert
Bruce, David F.
Bruce, D. Jean K.
Bruemmer, Carline M.
Brumberg, Dolores
Brumberg, Paul G.
Brums, Dr. Rudolf H.
Bryan, Catherine C.
Bryan, Comer B., Jr.
Bryan, Doris E.
Bryan, Frank G.
Bryant, George K.
Bryant, John P.
Bryant, William C.
Byrne, Frank
Buck, Ann L.
Buck, Kenneth J.
Buckley, Charles L., Jr.
Buckley, Robert Hunt
Buller, Elmer H.
Bullock, Edward C.
Burbank, LaRue W.
Burbank, Paige
Burge, Betty Shelton
Burgeson, Frances
Burgess, James A.
Burgh, Anabel
Burke, Richard J.
Burkett, James E.
Burton, Mary Shepherd
Burton, Walter G., Jr.
Busch, Arthur M.
Bush, William H., Jr.
Bushong, Wilton E.
Butler, Walter Emmett
Butler, Wilbur E.
Butterworth, Ronald C.
Byer, David L.
Byrnes, Martin A., Jr.
Byrum, Doris
Cagle, Jewel J.
Cain, James L., Jr.
Caldwell, Ernest S.
Call, Dale W.
Callaway, Shirley L.
Calloway, Willis G.
Calonna, Richard
Calvillo, Efren
Camady, John E.
Cameron, Winifred S.
Camp, Howard C.
Campagna, G. Edward
Campbell, Jack A.
Campbell, Janet S.
Campbell, Jewel T.
Campbell, Marianne C.
Campbell, Melvin E.
Cannon, William L.
Canright, Richard B.
Capo, Raymond V.
Capps, Charles H.
Carbaugh, James P.
Carley, Richard R.
Carlson, Robert L.
Carmines, Sidney D.
Carpenter, Edward A.
Carpenter, Malcom S.
Carr, Ronald
Carroll, James B.
Carson, June M.
Carson, Thomas M.
Carter, Dan S., Jr.
Carter, Elmer J., Jr.
Carter, Nancy K.
Carter, Rosemary
Carter, Thomas F., Jr.
Case, Darlene D.
Casey, Francis W., Jr.
Casey, L. O.
Cash, Wanda
Cashion, Kenneth D.
Cason, Barbara L.
Cassels, George A.
Cassetti, Marlowe D.
Catloth, Mary M.
Catron, Dora B.
Catterson, Dr. Duane
Cerven, James C.
Cessac, Robert J.
Chalkley, Lois G.
Chamberlin, James A.
Chambers, Jerome P.
Chambers, Milton
Chambers, Thomas V.
Chandler, Amie F.

Chandler, William
Chandler, William O., Jr.
Chaplick, Robert G.
Chapman, Arthur C.
Chaput, Paul Theodore
Charlesworth, Clifford E.
Charters, Richard E.
Chase, William Raymond
Chauvin, Leo T.
Chauvin, Theodore T.
Cheatham, Donald C.
Chicoine, Ervin L.
Childers, Frank M.
Childs, Dewey L., Jr.
Chilton, Robert G.
Chitwood, Willie N.
Chop, Al
Christman, Laurence M.
Christopher, Kenneth W.
Christopher, Maxwell G.
Claffey, Patricia L.
Clark, Bobbie W.
Clark, Howard E.
Clark, Robert H.
Clark, Stewart
Clarke, J. C.
Clary, Charles D.
Clason, Robert M.
Clay, Russell P.
Clayton, Elden G.
Clayton, Mance S.
Clemence, Raymond R., Jr.
Clemens, Joan
Clements, Henry E.
Clements, James R.
Clemmons, Margaret D.
Clever, Edwin C.
Clickner, Russel E., Jr.
Cline, Jack S.
Clinton, Thomas S.
Coats, Boyd R.
Cochran, Harold W.
Cobb, James B.
Coble, Bill M.
Cockerham, Earl D.
Coe, Frank S., III
Coffman, Sandra B.
Cofield, John T.
Cohen, Jack
Cohen, Robert
Cohen, William
Cohn, Stanley H.
Cole, Charles W.
Coleman, Donald J.
Coleman, Mary R.
Coler, Charles
Coley, Patsy M.
Colleps, Dorothy
Collier, Frank
Collins, Curtis C.
Collins, Daniel D.
Collins, Dorothy
Collins, Harold G.
Collins, Walter E.
Collner, Joseph D.
Collura, Salvadore J.
Colonna, Diane
Colonna, Richard A.
Comer, Howard E., Jr.
Compton, Harold R.
Conley, James O.
Conlon, John W.
Conn, W. Jane
Connelly, Russell
Conner, Alfred L.
Conneway, Fred D.
Conrad, Ralph
Contella, Janice E.
Contella, Milton C.
Conversano, Andrew
Cooke, Arthur M.
Cooper, James
Cooper, LeRoy G., Jr.
Coppedge, Frank O.
Corbett, Bailey L., Jr.
Corbett, Gloria C.
Corbett, Wayne W.
Corcoran, Donald M.
Corey, Donna
Cormany, Charles A.
Cornelius, Paul T.
Corn, Graydon F.
Correale, James V.
Coston, Charles L.
Cottee, Gatha F.
Cotton, Paul E.
Cour-Palais, Burton G.
Covington, Clarke
Covington, Ozro M.
Cowan, John R.
Cox, Flo
Cox, Roy L.
Cox, William M.
Craighead, Paul T.
Crain, Doris J.
Crain, Josephine C.
Crain, Ronald L.
Crane, Luther L.
Craven, John P.
Creech, Norwood
Creighton, Henry C.
Cressman, John H.
Cribb, Herbert E.
Crichton, Frank M.
Criddle, William S.
Critzos, Chris C.
Critzos, O. Constance
Crone, Norman A.
Crow, Frank G.
Crow, Pauline G.
Crutcher, Thomas M.
Crowell, James L.
Crunk, Henry G., Jr.
Cumberworth, Gloria E.
Cunningham, Monte T.
Curlee, Harvey L., Jr.
Currie, C. Elsie
Curry, T. Bradley, Jr.
Dabbs, John H.
Dalby, James F.
Dalke, Edgar A.
Dall, C. E.
Dalton, Danny A.
Daniel, Tom H., Jr.
Daniels, Patricia A.
Dasilva, Anibal J.
Davenport, William H.
Davidson, William L.
Davids, Irving
Davis, Lawrence
Davis, Mary S.
Davis, Walter A.
Dawn, Frederic S.
Day, Joe L.
Day, Richard E.
Davidson, John C.
Davis, Leo P.
Davis, Philip W.
De La Portilla, Martha
De La Rosa, Herman J.
Dealy, Kathleen R.
Deagro, Richard P.
Dean, Kenneth J.
Deans, Philip M.
Deason, William P.
Debus, Dr. Kurt H.
Decamp, Royal D.
Decker, William E.
Deering, Ross E.
Deese, James H.
Deluca, Louis A.
Dement, Marvin Ernest
Deming, James E.
Dennis, William R.
Der Bing, William
Deshields, Shirley R.
Dessens, Charles Wayne
Devine, Robert G.
Devore, Phoncille
Dewell, William G.
Diaz, Rodolfo A.
Dibella, Josephine
Dickinson, John H.
Dickinson, William B.
Dickson, Ernest L.
Dietlein, Lawrence F.
Dills, Judith
Dingman, Reece
Disher, John H.
Dittmer, Dr. Daniel

Divone, Louis V.
Dixon, Ruth H.
Dobbs, John H.
Dobbs, Nancy Lynn
Dodd, Richard P.
Dodson, Joe W.
Donadio, Sullivan C.
Donaway, A. Inez
Donegan, James J., Jr.
Donnelly, Paul C.
D'Onofrio, Gus A.
Dotts, Homer
Dougherty, Raymond
Douglas, William K.
Dowling, Carlise W.
Downs, James E.
Doyle, Eugene L.
Driskill, Billie R.
Driver, Mary H.
Driver, W. B.
Drone, Benjamin R.
Drummond, William E.
Dryden, Dr. Hugh L.
Duck, Kenneth J.
Dudley, Brenda T.
Dudley, Nan Goode
Duggan, Orton L.
Duggins, Alberta D.
Dugoff, Leon
Dukes, Francis B.
Dumay, William Henry
Dungan, Larry J.
Dunning, Robert W.
Dunseith, Lynwood C.
Dupree, B.
Duret, Eugene L.
Durocher, Charlotte
Durrett, William Reuben
Dutton, Richard E.
Dyal, Lawrence E.
Easter, William B.
Eaton, Albert J.
Eckert, Charles J.
Eddington, Chester E.
Eddy, B. Eugene
Edelberg, Robert E.
Edmonds, Eugene
Edmondson, Florence M.
Edmondson, F. William
Edrington, John W., II
Edwards, Elwood S.
Edwards, Kermit A.
Edwards, Marion D., Jr.
Edwards, Thomas M.
Eiband, A. Martin
Eicher, Grace E.
Eickmeier, Alfred B.
Eickmeier, Lester R., Jr.
Eik-Nes, Kristen B. D.
Ekeroot, Stig
Elk, Jimmy R.
Eller, Joseph M.
Ellis, Anna Whiteside
Ellis, Wilbert Edward
Elms, Charles P.
Emily, Jerry
Enders, John H.
Enderson, Laurence W., Jr.
Engel, Jerome N.
Engvall, John L.
Enlow, Roger D.
Ensley, Betty M.
Epperly, James W.
Epperly, Virginia H.
Erb, Bryan R.
Ernull, Robert E.
Ertel, Ivan
Ertl, Emily M.
Erwin, Sue R.
Esenwein, George F.
Evans, Norma M.
Everline, Robert T.
Ewart, David D.
Ezell, Melvin
Faber, Stanley
Fagan, John E.
Faget, Maxime A.
Fahlstrom, Paul G.
Fairchild, John J., Jr.
Falbey, Iola M.
Fannin, Lionel E.
Farley, John S.
Farmer, Norman B.
Farrior, Leona
Faulk, Ryan J., Jr.
Feddersen, William E.
Fellows, Mary E.
Fergerson, Shirley J.
Ferguson, Barbara
Ferguson, Clarence
Ferguson, Gordon M.
Ferguson, Helen L.
Ferguson, Nellie G.
Ferguson, Paul O.
Ferguson, Richard B.
Fernandez, Joseph
Ferrall, Gordon B.
Fielder, Dennis E.
Fields, E. M.
Filipowski, John J.
Filley, Charles C.
Filley, Charles W.
Finn, James E.
Finley, Robert P.
Fiorentino, Kelly A.
Firth, Ruth R.
Fisher Emmitt E.
Fisher, Frankie
Fisher, Jackie L.
Fisher, Lewis R.
Fisher, Vernon E.
Fitch, David C.
Fitzgerald, Evelyn B.
Fitzgerald, Hugh D.
Fitzgerald, James J.
Fitzgerald, Norma B.
Fitzkee, Archie L.
Flanagan, James R.
Fletcher, Calvin B.
Flournoy, Walter
Foley, Helen N.
Folkes, Doris P.
Folkes, William G.
Folwell, Paul A., II
Forquer, Madeline H.
Foster, Galloway B., Jr.
Foster, Mary P.
Foster, Norman G.
Foster, Richard W.
Fout, Blanche H.
Fowler, James W.
Fowler, Joe
Fowler, John F.
Frandsen, Niels P.
Franklin, Arthur E.
Franklin, Darold Bernard
Franklin, George C.
Franklin, Marion R., Jr.
Frank, M. P.
Frasier, Cline W.
Frazier, Jesse C.
Frazier, Thomas W.
Frazier, Violet M.
Freedman, Gilbert M.
Freeman, Gil
Freeman, James R.
French, Burrell O.
French, Harold N.
French, John C.
Frere, John A.
Fridge, Ernest Marion III
Friloux, Henry J., Jr.
Frye, C. Lawrence
Fugler, Bartley A.
Fuller, Carolee Boykin
Fulmer, Otis, Jr.
Funderburg, Paul E.
Fulton, Jeanne S.
Fultz, Bennet M.
Funk, J.
Funkhouser, Robert B.
Gadow, Charles G.
Gaffney, Patrick S.
Galezowski, Stanley H.
Gallagher, Thomas F.
Gallagher, Virginia M.
Galloway, Sarah Helms
Gambill, Ilona G.
Gammon, Frank M.
Gans, Barbara

Gant, William L.
Gantz, B. R.
Garbacz, Michael
Gardner, Benson B.
Gardner, Virgil F., Jr.
Garino, Joe D., Jr.
Garland, Benjamine J.
Garner, Charles W.
Garner, Iris A.
Garrett, Arnold W.
Garrett, Crayton
Garrison, John C., Jr.
Garza, Alfred M.
Gaster, Barbara J.
Gaster, Jeanne
Gatchell, Herbert L.
Gates, Sally D.
Gaughan, David
Geddes, Leslie A.
Geier, Douglas J.
Geier, Robert
Geisler, Phyllis A.
Geller, Samuel
Gerber, David L.
Gerstle, John E., Jr.
Gfeller, Virgil A.
Gibbons, Howard
Gibbons, Jim L.
Gibbons, Thomas F.
Gibson, Pearl C.
Gibson, Thomas F.
Gifford, Burton M.
Giles, June A.
Gilkey, John E.
Gillespie, Ben
Gillespie, Warren
Gill, William L.
Gills, Sidney
Gilruth, Robert R.
Glenn, John H., Jr.
Glenny, Virginia T.
Glover, Kenneth E.
Glynn, Francis I. P.
Goad, John W.
Goldcamp, Thomas F.
Goldenbaum, David M.
Goldsmith, Verl A.
Goldstein, Stan
Gonzalez, Jose L.
Goodman, Jerry R.
Goodson, Adolph
Goodwin, Burney H.
Goodwin, Haskell J.
Goodwin, Mary Ann
Gordon, Bob
Gordon, Donald L.
Gorman, Robert E.
Gorman, T. P.
Goslee, John W.
Gottuso, Vincent J.
Grace, Thomas J.
Grafe, Robert L.
Graffe, Robert T.
Graham, Glenn W.
Graham, John B., Jr.
Graham, Ralph E.
Graham, William
Grames, H. Jack
Grammer, Donald B.
Grana, David C.
Grandfield, Allen L.
Granger, Harold E.
Grant, Charles M., Jr.
Graves, Barry
Gray, Wilbur H.
Green, Don
Green, M. Linda
Green, Robert N.
Greene, L. Annette
Greene, Merton D.
Greenfield, Sarah F.
Greenfield, Terry B.
Greenglass, Bertram
Gregory, Donald T.
Greil, Karl F.
Griffin, Bobby G.
Griffin, Charles H.
Griffin, Oscar F.
Griffin, Wesley W.
Grimes, Walter E.
Griffis, Carl L.
Griffith, Jack A.
Grimbly, Samuel C.
Grimes, Walter E.
Grimwood, Jim
Grissom, Virgil I.
Gross, Bernard D.
Gross, Harry G.
Gross, Stanley A.
Grow, R. Bruce
Grow, Emily H.
Gruene, Dr. Hans F.
Guice, Mildred L.
Guidry, Mark A., Jr.
Gunnersen, Alf S., Jr.
Gundersen, Robert T.
Gurley, John R., Jr.
Guthrie, Alfred E.
Guthrie, George C.
Guy, Judith
Guy, Walter W.
Gwinn, Ralph T.
Habron, Betty H.
Hackworth, Robie
Hagan, Mason
Hager, Mary C.
Hagood, Martin L.
Hairston, Ernest
Hall, Charles J.
Hall, Eldon W.
Hall, Dr. Harvey
Hall, James L.
Hall, John B., Jr.
Hamblett, Edward B., Jr.
Hamby, William H.
Hammack, Jerome B.
Hammer, Louis
Hammersmith, John
Hammock, David M.
Hammond, James P.
Hammond, Joseph W., Jr.
Hampton, Harold D.
Hand, Arthur A.
Haney, Francis J.
Hannigan, James E.
Hansen, Paul
Hardin, Donald W.
Hardin, William G.
Hardwin, William B.
Hargrave, Claude S.
Harper, Richard H.
Harper, Velda B.
Harrelson, Patsy Ann
Harrin, Eziaslav N.
Harrington, Nancy J.
Harrington, Robert D.
Harris, Carl B.
Harris, Emory F.
Harris, Fred A.
Harris, George, Jr.
Harris, Janet E.
Harris, Joe
Harris, John B.
Harris, Russell
Harris, Sylvia
Harrison, Floyd L.
Harrison, Margaret R.
Harrison, Rena B.
Hart, Robert F.
Hartlein, John
Hartung, Jack B.
Harvey, Gordon W.
Hassett, Raymond
Hathcock, Juanita
Hatton, George
Haugew, Kenneth R.
Havenstein, Paul L.
Hawk, Willard E.
Hawkins, George M., Jr.
Hawkins, I. Edna
Hayes, Leroy
Hayes, Leslie E.
Hayes, Neisel M.
Hayes, William C.
Haynes, James F.
Hays, Edward L.
Hays, Robert D.
Hearn, Chase P.
Heathcote, Dennis E., Jr.
Heather, Gerald D.

Heaton, Sydney N.
Heberlig, Jack C.
Heckelmoser, Charles J.
Heetderks, H. Richard
Hegwood, Robert B.
Hegwood, Sarah E.
Hehn, Joseph A.
Heidler, Homer F., Jr.
Heinlein, Marjorie J.
Heiser, Robert F.
Heitman, Erwin W.
Heller, Niles R.
Heller, Robert H.
Helterbran, Irene J.
Henderson, Grady P.
Henderson, Joseph D.
Henderson, Melba S.
Henderson, Sharon
Henderson, Thomas Harder
Hendrickson, Douglas R.
Henry, James P.
Hensley, James B.
Henson, Kirby
Herbert, Frank J.
Herbert, Herbert L.
Herring, Hugh S.
Herring, Robert W., Jr.
Herrman, Dorothy M.
Hershey, Theodore P.
Hessberg, Rufus
Hesson, Robert K.
Hester, Randolph H.
Hettinger, Fredric L.
Hibbs, William C.
Hicks, Claiborne R., Jr.
Hicks, Wilburn
Hiers, Harry K.
Hiers, James R.
Higgins, Rodney F.
Hightower, Libbie L.
Hill, Ann W.
Hill, Elizabeth J.
Hill, Harold H.
Hill, Lawrence E.
Hill, Ralph E.
Hill, Norma L.
Hiller, Mary Jo
Hilyer, Euell
Hinds, James J.
Hinds, Noble F.
Hinson, James K.
Hirst, Carolyn W.
Histand, Dorothy B.
Hjornevik, Wesley L.
Hock, Catherine
Hodge, B. Leon
Hodge, John D.
Hoff, Orlo
Hoffman, Ernest E.
Hoffman, John P.
Hoffman, Raphael F.
Hogan, Edward J.
Hogg, Carolyn
Hoggard, Walter C.
Hoisington, Jerry E.
Holden, Joan S.
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Hollingsworth, Miles M.
Holloway, Tommy W.
Holman, Richard A.
Holmgren, Herbert L.
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Holt, Talmadge W.
Holt, Thomas E.
Honicker, Candy B.
Hoover, Ida B.
Hoover, Luther L.
Hoover, Richard A.
Hopton, Conrad E.
Horsman, Paul F.
Horstmann, Robert W.
Horton, Caroline L.
Horton, Elmer A.
Horton, Eugene E., Jr.
Hough, Agnes S.
House, Edward G.
Howard, Carole A.
Howard, Lalah
Howell, Joseph J.
Howerton, John C.
Huffman, Bobby R.
Huffstetler, William J., Jr.
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Hughes, Carroll V.
Hughes, Donald F.
Hughes, George H.
Hughes, Helen W.
Hughes, James
Hughes, Virginia B.
Hull, Anne L.
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Humphrey, John T.
Humphrey, William R.
Hungall, Robert G.
Hunt, Gerald L.
Hunt, Hal
Hunt, Phyllis S.
Hunt, Shirley A.
Hunter, Daniel S.
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Huss, Carl R.
Hutchens, Rachel B.
Hutchinson, Neil Barrie
Hux, Lillie R.
Hyle, Charles T.
Idomir, Kenneth
Incerto, Donald J.
Ingalls, Charles W., III
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Ireland, Fred H.
Irwin, Kenneth
Isley, William C.
Jaap, Fred S.
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Jackson, Bruce G.
Jackson, Carmault B.
Jackson, James
Jackson, Margaret M.
Jacobs, Donald L.
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Jacobsen, Stanley
Jafferis, William
Jakir, N. S.
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Jenkins, Morris V.
Jenness, Martin D.
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Jensen, Louisa
Jesen, Willard G.
Jeter, John D.
Jevas, Nickolas
Jezewski, Donald J.
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Johnson, Bryant L.
Johnson, Caldwell C., Jr.
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Johnson, Carol L.
Johnson, Edward T.
Johnson, Edwin Cyril
Johnson, Elizabeth P.
Johnson, Francis, Jr.
Johnson, Harold I.
Johnson, Jane
Johnson, Jeanne
Johnson, John H.
Johnson, Kenneth L.
Johnson, R. E.
Johnson, Robert
Johnson, Suellyn
Johnson, Virginia W.
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Johnston, Richard S.
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Jones, Enoch M.
Jones, Jack A.
Jones, Jeremy B.
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Jones, Z. Vance
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Katchmore, Betty R.
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Kelly, William R.
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Legg, Ruby L.
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Lishman, Penny P.
Little, George Watkins
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Markos, Athena T.
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Maronde, Del R.
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Martinkovic, Carol Ann
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Martin, Virginia A.
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Matthews, Hayword E., Jr.
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Maynard, Owen E.
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Mayo, Edward E.
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McBrayer. Robert O.
McCafferty, Riley D.
McCann, Robert R.
McConnell, James R.
McCown, Weldon B.
McCoy, Hugh E., Jr.
McCreary, Ben F.
McCurley, John H.
McCurry, Ollie E.
McCutcheon, Ernest P.
McElwee, Edward M.
McHenry, Jessie P.
McKay, Scott S., II
McMillan, Aron
McCollum, Marcia H.
McCrurey, Geneva E.
McGuire, Charles W.
McKee, Daniel D.
McCarthy, Bill J.
McCleece, Howard M.
McClendon, Mary Lou
McCloud, Mary W.
McCoy, Hugh E.
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McCraw, D.
McCreary, B. F.
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McDonald, Imogene C.
McDonnel, Robert H.
McDougall, G. F.
McDowell, James W.
McElyea, Bennie A.
McGeen, Bernard J.
McGuire, Charles W.
McGuire, Peggy D.
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McKann, Robert E.
McKaskle, Verdie M.
McKee, Charles W.
McKee, John
McKim, W. P.
McKinsey, Cynthia L.
McLane, John
McLaughlin, George W.
McLeaish, John
McMahan, M. Irene
McMann, Harold J.
McMath, Daniel C., Jr.
McMillion, Lee N.
McMurry, William C., Jr.
McNeece, James E.
McTavish, Charles J.
Meade, Nora H.
Meadows, May T.
Medina, Pete
Meeks, Emory J.
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Meintel, Alfred J., Jr.
Melga, Roy
Melton, Riley P.
Mendoza, Ted
Mengel, John T.
Mercer, Jinx
Mercer, Robert D.
Merchant, Ernestine C.
Merritt, Fred V.
Mersereau, Ann
Messier, Roger N.
Mething, Raymond H.
Meyer, Andre J., Jr.
Meyer, Grayden F.
Meyer, William R.
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Michael, James M.
Michel, Edward L.
Middleton, William A., II
Miller, Arthur, Jr.
Miller, Bobette J.
Miller, Blanche D.
Miller, Douglas H.
Miller, Harold G.
Miller, Henry W.
Miller, Robert D.
Miller, Ruth T.
Mills, Blanche H.
Mills, Ronald W.
Mills, Wayne L.
Minderman, Peter A.
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Minster, John E.
Minter, John B.
Mire, John L.
Mitchel, Harry
Mitchell, Arlene R.
Mitchell, John P.
Mitchell, Junior M.
Mitchell, Virden M.
Mitscherling, Mary A.

Mixson, Meryle W.
Mockbee, Jean
Monfalcone, Delores A.
Monroe, Tallulah T.
Montgomery, Carole A.
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Moor, Joel W., Jr.
Moore, Alan Joseph
Moore, Arthur H.
Moore, Dale E.
Moore, Frances A.
Moore, Gladys C.
Moore, James S.
Moore, Rebecca
Moore, Rose M.
Moore, Sarah H.
Moore, Thomas E.
Morewitz, Alvin H.
Morris, David P., Jr.
Morris, Dowsie W., Jr.
Morris, Norman S.
Morrison, Ned
Morrison, Nellie
Morrow, Lola H.
Morse, Archibald E., Jr.
Morton, John W.
Moseley, William A.
Moseley, William C., Jr.
Moser, Jacob C.
Moser, Robert E., Jr.
Moses, Claude S., Jr.
Muchinsky, Lawrence
Muhly, William C.
Mulcahey, William T., Jr.
Munford, Robert E.
Mungall, Robert G.
Murphy, James F.
Murphy, Richard
Murphy, Thomas P.
Murray, Charles S.
Murray, George W.
Muse, Gene F.
Musil, Mildred V.
Myer, Sheila J.
Myles, David T., Jr.
Myrsten, Antonette T.
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Nagle, Charles C.
Nagle, Margaret
Nanz, Robert A.
Nassiff, Samuel H.
Nau, Rowena S.
Neal, James L.
Nelms, Nick
Nelson, Clair D.
Nelson, Donald A.
Nelson, Helen G.
Nelson, Morris C.
Nelson, Richard David
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Ness, Harold J.
Ness, Lawrence A.
Newall, Robert
Newgent, Joyce L.
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Newman, Geraldine H.
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Nichols, Daniel G.
Nichols, Ralph E.
Nichols, Donald L.
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Nolan, James P., Jr.
Noll, Jean F.
Nonamaker, Laura S.
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North, Warren J.
Norton, Albert T.
Nuttall, John C.
O'Briant, Thomas E.
Odenwalder, Edgar P., Jr.
Oglesby, Theodore L.
Ohnesorge, Thomas E.
Okand, Kazuo Fred
Okeefe, Dr. John A.
Olasky, Charles C., Jr.
Oloughlin, Carol R.
Oloughlin, John C.
Olsen, Aaron B.
Oneal, Robert L.
O'Neill, James E.
Orman, Donald L.
Osgood, Catherine T.
Osgood, Donald R.
Ostrander, Robert F.
Ottinger, Jack
Ould, Wallace
Owen, Murline L., Jr.
Owen, Robert
Owens, Marion C.
Owens, Mary S.
Pace, Charles W.
Packard, Calvin A.
Packham, Leonard E.
Pairque, Hildred B.
Panizza, John R.
Pantano, Stephen T.
Pantoliano, Thomas D.
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Parker, Clarence O.
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Parker, Robert N.
Parks, Francis G.
Parsons, Nelson D.
Parsons, Walter E.
Parmenter, Frank
Parten, Richard P.
Pashby, Paul J.
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Patterson, Charles W.
Pavlosky, James E.
Payne, Stanley C.
Peake, Robert L.
Pearce, Fred T., Jr.
Peele, Theresa M.
Peerboom, Robert
Pendley, David D.
Penland, Dennis T.
Pennington, John B.
Pereboom, Robert L.
Perkins, E. Franklin
Perkinson, John A.
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Perreten, David E.
Perry, Donald M., Jr.
Perry, Harold Ethelbert
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Peters, Stanley, Jr.
Peterson, Jean L.
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Pettit, Richard V.
Petynia, William W.
Peytonel, Milton
Pfau, Robert W.
Pfeiffer, William A.
Phelps, Ellsworth, Jr.
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Phillips, Franklyn W.
Phillips, Paul J.
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Picos, Marvin N.
Pierce, Bobby J.
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Pinson, Vestor L.
Pitt, Patricia
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Plunkett, Robert A.
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Poole, Richard B.
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Pordon, Ellen
Porten, Rita
Porter, Diana S.
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Posavec, Catherine T.
Powell, Alice J.
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Preston, Richard K.
Price, Donald F.
Price, Thomas G.
Prim, James W., III
Prince, Robert N.
Prine, Elbert
Privette, James E., III
Proctor, LeRoy, Jr.
Proferes, Constantine Gus
Prothman, Lillian V.
Purser, Paul E.
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Rexroad, Eva O.
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Sitze, Roy F.
Sjoberg, Sigurd A.
Skinner, Francis J.
Skinner, Louise L.
Skopinski, Ted H.
Slack, Wanda S.
Slayton, Donald K.
Sleeman, William T.
Slight, John B.
Sloan, James E.
Small, John W., Jr.
Smart, James
Smead, Wilbur H.
Smith, Alva E.
Smith, Camilla M.
Smith, Charlotte R.
Smith, Dorothy P.
Smith, Earl
Smith, George B.
Smith, Henry A.
Smith, Leona G.
Smith, Norman F.
Smith, Richard F.
Smith, Robert
Smith, Wilma
Smitt, Joseph
Smylie, Robert E.
Snead, Wilbur H.
Snyder, Kenneth
Snyder, Richard G.
Sobel, Donald
Sobik, Joseph M.
Sordi, Joseph J.
Soulant, Matthew R., Jr.
Southers, Raymond C.
Spann, Robert L.
Span, Flo
Sparks, Charles E.
Spearing, Robert E.
Speilman, Natalie J.
Spence, Judith
Spencer, Bobby Theron
Spencer, Dwight
Spencer, Nancy L.
Spencer, Thomas
Sprake, Marvyn D.
Springfield, Carlos L., Jr.
Springfield, Miles G.
Spritzer, Edith K.
Stacey, Shirley
Stacey, Thomas A.
Stack, Mary J.
Stanford, I. Duke
Stanley, Howard J.
Standwood, Robert K.
Starkey, Sylvia L.
Steadham, Moody M.
Stealy, William T.
Steele, Evelyn G.
Steele, Robert H.
Stelges, William R.
Stenfors, Hal
Stephens, Emily W.
Stevens, Edwin H.
Stevens, James M.
Stevens, R. Lawrence
Stewart, Frederick F.
Stewart, Harry D.
Stewart, Lester A.
Stewart, Wallace Franklin
St. Leger, Leslie G.
Stilley, John David
Stimson, Bailey E.
Stockum, Frederick E.
Stodgill, Jo Ann
Stoffel, Bernard L.
Stokes, Davis A.
Stokes, James C.
Stokes, Katherine S.
Stone, Ivan E.
Stone, William, Jr.
Stonesifer, John C.
Stotler, Herbert J.
Stout, William H.
Stovall, Margie L.
Strass, H. Kurt
Strauss, Eugene J.
Strickland, James L.
Strohecker, Frances M.
Stuart, Thomas A.
Stubbs, Donald R.
Stullken, Donald Edward
Sturdivant, Vernon R.
Sturtevant, Paul M.
Stutz, Lillian G.
Suite, James F., Jr.
Suler, Frank J.
Sulester, James M.
Sullivan, Leslie J.
Sullivan, Walter B.
Summy, Ray, Jr.
Sumner, Kenneth
Superka, Joseph L.
Sustaita, Amelia V.
Sutton, Cermon S.
Swanson, Joanna E.
Swart, Leroy
Sweat, C. Downing, Jr.
Sweet, Floyd J.
Taeger, Paul E.
Tagsdale, Mary G.
Talani, Angelo J.
Talbert, Rexford H.
Tartaglia, Anthony D.
Tatham, Steven W.
Tatum, Emma Jo
Taub, William P.
Taub, Willard M.
Taylor, Dale H.

Taylor, Geneveive B.
Taylor, George D.
Taylor, James A.
Taylor, Lafayette C.
Taylor, Maggie S.
Taylor, Robert E.
Taylor, Virginia E.
Tepoel, Harold Eugene
Terry, James F.
Tessler, Martin
Thiberville, A. J., Jr.
Thibodeau, Joseph R., III
Thiel, Alphonse M.
Thiel, John J.
Thoman, Charles A.
Thomas, Geraldine
Thomas, Guy I.
Thamas, James A.
Thomas, James B.
Thomas, Juanita P.
Thompson, Alicia M.
Thompson, Clifford D.
Thompson, Ira T.
Thompson, Jeannine C.
Thompson, Julius T.
Thompson, Robert F.
Thorsen, Rolf E.
Tilson, Lois A.
Tilson, Paul E., Jr.
Timmons, Eddy
Tindall, Howard W., Jr.
Tindall, William
Tischler, A. O.
Tomberlin, James L.
Toney, Marshal A.
Toppen, Theodore
Toryak, Anna W.
Towey, James M.
Townsend, Quwatha S.
Toy, Harold D.
Trader, Arthur G.
Tredway, Harrison E.
Trombley, Joseph R.
Trovillion, Delores L.
Trueblood, Joseph R.
Trulson, Leroy
Tsitsera, Voula
Tucker, Charles M.
Tudge, Henrietta
Tuntland, Richard D.
Turner, Barbara
Turner, Bernadine E.
Turner, Charles A.
Turner, Connie R.
Turner, Don
Turner, Gordon I.
Turner, Kenneth L.
Turner, Thomas R.
Turnock, Dr. James H., Jr.
Turvy, Roscoe R.
Twigg, John M., Jr.
Tynan, Charles, Jr.
Tzaperas, Nick A.
Ulman, Inez L.
Underwood, Thomas C., Jr.
Underwood, William J.
Uzzell, Bobby R.
Vacca, Gennaro A.
Valdyke, George H.
Vale, Robert E.
Van Bockel, John J.
Van Ness, Cdr., Harper E.
Vandeveer, Doris B.
Varnado, Darol B.
Vaughan, Norma
Vaughn, Norbert B.
Vaughn, Patricia L.
Vaugn, Charles M.
Vavra, Paul H.
Velander, Wallace
Verostko, Charles E.
Vestal, Jim
Vetuski, Sims T.
Vincent, John L.
Vinograd, Sherman
Vitale, William V.
Voas, Robert B.
Vogel, Harle L.
Vogel, Kenneth J.
Vogt, Fred B.
Vohringer, Virginia D.
Volpe, Frank A.
Von Ehrenfried, Manfred H., II
Vonroeder, Robert H.
Voris, Capt., Frank B.
Wagoner, Ralph
Walden, Ann D.
Walder, Aden
Waldron, L.
Walker, Gary L.
Walker, Jefferson H., Jr.
Walker, Louie T.
Walker, Vivian
Wallace, Hugh O.
Waller, Barbara E.
Wallis, Robert J.
Walliser, Sylvan A.
Walsh, Leo F.
Walters, Ernest E.
Walters, Louise H.
Walters, William H., Jr.
Walton, Thomas S.
Walz, Joseph E.
Wanczyk, Eleanore
Waranch, Myer
Ward, George L.
Ward, Welby G.
Warnock, Charles F.
Warnock, James M.
Warren, Carlos S.
Warren, James W.
Warren, Lawrence
Wasel, Robert A.
Waters, John G.
Watkins, Edith N.
Watkins, Julia R.
Watson, Riley A.
Watt, John D.
Watts, George A.
Waugh, Merle G.
Webb, Dalton D.
Webb, James E.
Webster, George I.
Wedding, Michael A.
Weedon, Jack Sanford
Weinberger, Robert A.
Weinert, Robert
Weining, Roger F.
Welhan, Alex
Wells, James L., Jr.
Welly, Charles E.
West, Edward L.
West, Julian
West, Walter M., Jr.
Westbrook, Samuel S., Jr.
Westerlage, Lois R.
Westervelt, Maurice A.
Weston, Kenneth C.
Westphal, Ralph L.
Wetmore, Warren C.
Wetzel, Waunita D.
Whalen, John E.
Whatley, Billy G.
Wheeler, Andrew E.
Wheeler, William P.
Wheelwright, Charles D.
Whisenant, Elmo R.
Whitaker, Paul R., Jr.
Whitbeck, Philip
White, James R.
White, Robert
White, Ted A.
Whitehurst, Herman D.
Whiteman, Lynn R.
Whiteside, Carl A.
Whiting, Donald F.
Whitney, Ernest G.
Wible, Veronica A.
Wiggins, Judy
Wikstrom, Harold
Wiley, Alfred N., Jr.
Wilfert, Donald F.
Wilhelm, John R.
Wilkerson, Alex.
Wilkes, T. Marshall
Wilkinson, Reuben L.
Willadson, Richard D.
Williams, David C.
Williams, Elburta B.
Williams, Foster T., III

Williams, Grady F.
Williams, Jack H.
Williams, John Joseph
Williams, John T.
Williams, Joseph B.
Williams, Lawrence G.
Williams, Paul F.
Williams, Richard
Williams, Rose T.
Williams, Thomas N.
Williams, Walter C.
Williams, Wiley Edward
Willis, William E., Jr.
Wilson, Almeda P.
Wilson, Anne F.
Wilson, B. M.
Wilson, James M.
Wilson, Terry L.
Wilson, William T.
Windler, Milton L.
Winn, Grace
Winnette, Walter M.
Winterhalter, David L., Sr.
Winters, James G., Jr.
Wirhan, Nelson R.
Wirman, Nelson R.
Wise, John P.
Wisniewski, Richard J.
Witherington, Guy N.
Wobig, Orrin A.
Woldorff, Leon
Wolfe, Gayle N.
Wolfer, M. Ernestine
Wolhart, Walter D.
Wolman, Dr. William W.
Womack, William D.
Womick, Otto
Wood, Bruce M.
Wood, H. W.
Wood, Sandra
Wood, Wilfred
Woodling, Carroll H.
Woodman, Ray S.
Woodruff, James W.
Woodsmall, Charline W.
Woodward, Charles F.
Woodyard, Charles E.
Woods, Donald J.
Woods, Gary J.
Woods, Thomas F.
Woodyard, Jean M.
Worf, Dr. Douglas L.
Workman, Bob
Wright, David S.
Wright, William W.
Wrightsman, Harold E.
Yannotta, Lucille N.
Yarbrough, Alvie E.
Yates, Sandra S.
Yenni, Kenneth R.
Yodzis, Charles W.
Yokum, Charles O.
Yorker, Lloyd O.
Youmans, Henry B.
Youmans, Randall E.
Young, Earl B.
Young, Eugene N.
Young, Kenneth A.
Young, Minerva S.
Young, William J.
Yusken, John W.
Zarcaro, John G.
Zavasky, Raymond L.
Zedekar, Raymond G.
Zeigler, Irene B.
Ziegler, Thomas A.
Zelenevitz, Joyce
Zepp, John P.
Zetler, Albert
Zirnfus, Edward R., Jr.
Zita, Myrtle C.

APPENDIX F

MA–9 AIR–GROUND VOICE COMMUNICATIONS

The following is a transcript of the MA–9 flight communications derived from both the spacecraft onboard recordings and the Mercury network station recordings to form a single text. It is, therefore, a complete transcript of the air-to-ground and ground-to-air communications during station passes and inflight comments made by the pilot between stations. A few nonflight-related transmissions and an occasional repetitive word or partial sentence were removed by the astronauts and the editors to improve the clarity. Instances of this type are noted by an asterisk at the beginning of the altered transmission. Where a whole transmission has been deleted because of lack of confirmation or nonflight-relationship, the asterisk appears where the transmission was removed. The text is otherwise verbatim.

The format used for presentation is as follows, from left to right: The first column contains the spacecraft elapsed time (c.e.t.) from lift-off in hours, minutes, and seconds at which each communication was initiated. The second column identifies the communicator and the third column contains the text of the communication. The station in communication with the astronaut is designated at the initiation of communications. When no station contact was made for a complete orbital pass the text is headed with the orbital pass number only.

The c.e.t. was reduced from the recording of the spacecraft-clock commutated time segments on both the onboard tape and the network station tapes. These c.e.t. times are accurate to ±0.8 second. Timing of a few communications was not obtained because of either weak noisy signals on the network tapes, or the short sampling of onboard commutated time segments resulting from commutator sampling interruptions when the pilot was recording in the vox-record programed mode and paused longer than ½ second. When timing was not obtained for either of these reasons, the first column contains the notation "unreadable" for that communication.

The communicators are identified as follows:

P—Pilot
CC—Spacecraft communicator at the range station
SY—Systems monitor at the range station
F—Flight director at Mercury Control Center
R1—Pilot of primary recovery helicopter
R2—Pilot of backup recovery helicopter
Stony—Blockhouse communicator at launch complex 14
K—Communicator onboard the *USS Kearsarge*

At various times throughout the flight, the pilot or network station communicator would indicate a precise time, event, or action by the use of a significant word, such as "MARK", or "NOW". The transcript editors also selected a few significant words or events for timing. The timing of these words or events was accomplished by the same process as that used to determine the c.e.t. times for column one and is indicated by the time enclosed in brackets followed by the superscript T.

All temperatures are given in ° F; all cabin and suit pressures are in pounds per square inch, absolute (psia); fuel and coolant quantities are expressed in remaining percent of total nominal capacities; retrosequence times are expressed as ground elapsed time (g.e.t.) in hours, minutes, and seconds.

Within the test, a series of dots is used to designate communications or portions of communications which could not be deciphered. A single dash indicates a pause during a communication. Information contained within unmarked parentheses indicates editorial insertions for clarification.

	Stony	10, 9, 8, 7, 6, 5, 4, 3, 2, 1, 0.
00 00 01	CC	Lift-off.
00 00 02	P	Roger. I have a lift-off and the clock is operating.
00 00 05	CC	Roger, clock.
00 00 07	P	Sigma Seven, Faith Seven on the way.
00 00 14	P	Standing by to start the backup clock.
00 00 16	CC	Roger.
00 00 18	CC	3, 2, 1, MARK. [00 00 20]^{T}
00 00 23	P	Roger. And the backup clock is running.
00 00 25	CC	Roger. You look good here, Gordo.
00 00 27	P	Roger. Feels good, buddy.
00 00 29	CC	Good sport.
00 00 31	P	Thirty seconds, and fuel is go. Oxygen is go. Cabin pressure on the top peg. Altemeter is working.
00 00 38	CC	Roger. You're looking beautiful.
00 00 48	P	What an afterburner !
00 00 51	CC	That's a beauty, and your clock's are in sync.
00 01 01	P	One minute and fuel is go. Oxygen is go. Cabin pressure, 10 psi on schedule. All systems go.
00 01 09	CC	Roger. We have a good go here, and pitch, 50 [degrees].
00 01 29	CC	Still looks go.
00 01 30	P	Roger. One minute 30 seconds. Fuel is go. Oxygen is go. Cabin pressure is 6 psi.
00 01 37	CC	Roger. Pitch 32 [degrees], looks good.
00 01 41	P	Roger. The Sun is coming in the window now.
00 01 46	CC	Roger. Standing by for your BECO.
00 01 50	P	Roger.
00 01 58	P	Running pretty smooth now.
00 01 59	CC	Good show.
00 02 02	P	Two minutes. Standing by on BECO.
00 02 03	CC	Roger. Time out good.
00 02 14	P	Roger. Have BECO.
00 02 15	CC	Roger. Your BECO. Confirm staging.
		*[Undetermined transmission omitted.]
00 02 22	P	And you can feel the staging—waiting on tower.
00 02 27	CC	Very good on BECO time ; SECO should be nominal.
00 02 29	P	Roger.
00 02 38	P	And there goes the tower. Does she take off !
00 02 41	CC	Roger. Confirm your tower.
00 02 43	P	Roger. Retrojettison switch to off.
00 02 45	CC	Retrojettison switch off.
00 02 55	P	*Okay. Fuel is go ; oxygen is go ; cabin pressure sealed at 5.6 [psi] and holding.
00 03 03	CC	Roger. Sealed on 5.6 [psi] and holding. Very good. Pitch −4 [degrees].
00 03 10	P	Roger. I agree on pitch.
00 03 12	CC	You look real pretty here.
00 03 14	P	She felt real pretty.
		*[Nonflight-related transmission omitted.]
00 03 24	P	All electrical is go. Pressure is go. Oxygen is go. Sigma, Faith Seven is all go.
00 03 34	CC	We have a full go here for you, Gordo.
00 03 36	P	Roger.
00 03 38	CC	This is Sigma Seven down here, buddy.
00 03 40	P	That's what I said. Sigma, Faith Seven is go.
00 03 44	CC	Roger, Faith Seven.
00 04 00	P	Four minutes and fuel is still go. Oxygen go. Pressure holding. All systems look good.
00 04 08	CC	Roger. Your pitch indication is —4 [degrees] ; we concur.
00 04 11	P	Roger.
00 04 13	CC	Trajectory looks real good, Gordo. I'll give you a mark on 0.8 [V/V_r].
00 04 17	P	Roger.
00 04 32	P	Four plus 30 [seconds]. All systems still go.
00 04 35	CC	Roger. We're still go here. Coming up on 0.8 [V/V_r]. Stand by.
00 04 38	P	Roger.

00 04 40	CC	We have 0.8 V/V_r.
00 04 42	P	Good deal.
00 04 48	CC	You have a real sweet trajectory, Gordo.
00 04 50	P	Excellent.
00 04 58	CC	Go.
00 04 59	P	Roger.
00 05 04	P	Roger. I have SECO, sep cap. Going to aux damp.
00 05 09	CC	Right in there, baby.
00 05 12	P	Have sep cap green. SECO. I'm on aux damp. Going fly–by–wire.
00 05 24	P	Everything is green here.
00 05 30	CC	Seven, we're right smack dab in the middle of the plot.
00 05 34	P	Say again.
00 05 35	CC	Smack dab in the middle of the "go" plot. Beautiful.
00 05 45	CC	Seven. Your turnaround looks beautiful.
00 05 47	P	Roger. She's yawing around very nicely. What a view. Boy, oh boy!
00 05 59	P	And there's the booster.
00 06 03	CC	Real pretty.
00 06 04	P	Boy, oh boy, is it ever close, too.
00 06 08	CC	Fun, isn't it?
00 06 10	P	Yeah.
00 06 18	P	Fly–by–wire is working just like advertised.
00 06 21	CC	*We have good indications on systems here. You did a real good job of it.
00 06 44	P	Booster is still smoking. It looks silver, Wally.
00 06 48	CC	Good.
00 07 06	CC	Hello. Cape Cap Com.
00 07 17	CC	Faith Seven, Cape Cap Com. Seven, Cape Cap Com.
00 07 19	P	I'm in retroattitude or in orbit attitude.
00 07 23	CC	Faith Seven, Cape Cap Com. How do you read?
00 07 25	P	Roger, Cape Cap Com. Faith Seven reading you loud and clear.
00 07 29	CC	Roger. You're on Bermuda relay, and you're coming in real sweet, and everything looks perfect here.
00 07 33	P	Roger. Looks mighty good here. Booster is really in sight.
00 07 37	CC	Very good. What color is she?
00 07 39	P	*Silver. Silvery as can be with a white frosty band right around the middle.
00 07 45	CC	Roger. Understand.
00 07 53	CC	Faith Seven, this is Cape. Your 1–Alpha [contingency recovery area retrosequence] time is nominal.
00 07 57	P	Roger. Thank you.
00 08 05	P	Yaw shows up very well.
00 08 07	CC	Roger. Are you ready to copy [recovery area] 2–1 [retrosequence] time?
00 08 10	P	Negative. Stand by and let me get on auto here.
00 08 35	P	Going to auto control.
00 08 37	CC	Roger. How is she hitting in auto?
00 08 39	P	Roger. No quiver at all on the rates. I'm in auto. She seems to be holding so far.
00 08 45	CC	Very good. Let me know when you're ready for 2–1.
00 08 48	P	Roger.
00 08 51	CC	Pretty nice equipment, isn't it?
00 08 54	P	Very nice.
00 09 00	CC	Faith Seven, Cape. We had a cabin [heat exchanger] dome [temperature] of 65 [degrees] at Bermuda.
00 09 08	P	Roger. I have a cabin dome of 65 [degrees] and a suit dome of about 64 [degrees].
00 09 13	CC	Roger.
00 09 15	P	I'm increasing flow very slightly.
00 09 17	CC	Roger. You're increasing flow slightly.
00 09 23	CC	I'll give you your 2–1 [recovery area retrosequence] time, and you can write it later. It's 01+27+52. Over.
00 09 31	P	Roger. 01 27 52.
00 09 34	CC	Roger. And [contingency recovery area] 1–Alpha [retrosequence time] is nominal. Have a good ride, boy.
00 09 38	P	Thank you, buddy.

00 10 26	P	Roger. My T_s+314.5 lights have gone out. Squib switch to off. [A dome-temperature warning tone occurs at 00 11 00]^T
00 12 43	P	And the booster is still following me along at 12 minutes 45 seconds. It's coming down into the bottom of the window. ASCS is working nicely. It is diverging [drifting] off, to the 11 degrees. . . .
00 13 06	P	*Seems to be correcting properly. I have both suit and cabin dome temps on bottom peg. I'm going back to my initial setting. *[Nonflight-related transmission omitted.]

CANARY ISLANDS (FIRST PASS)

00 14 53	CC	Faith Seven. Faith Seven, this is Canary Cap Com. We have T/M solid. We would like a temperature readout, our segment is very low. That's dome temperature, Faith Seven, suit dome.
00 15 07	P	Roger, Canary Cap Com. Faith Seven reading you loud and clear. What temperatures would you like? Over.
00 15 14	CC	I would like a readout of suit [heat exchanger] dome temperature. Over.
00 15 19	P	Roger. My suit dome temp warning light is on. I have gone back to my initial suit setting. My cabin dome was on, and I have gone back to my initial setting on it. Cabin dome temperature is normal, about 52 degrees. Suit dome is still setting down rather low. I think it is coming back up though. Over.
00 15 45	CC	*Roger. Understand. I have a message from the Cape. [Contingency recovery] area 1–Bravo [retrosequence time] is nominal. Your apogee is 144.6 [nautical miles]. You will have no problems with nighttime. Also the Cape would like a blood pressure at this time. They missed it at Bermuda. Over.
00 16 08	P	Roger. Sending you blood pressure now.
00 18 31	P	Canary Cap Com.
00 18 35	CC	This is Canary Cap Com. Have you started your T^s+5 second check? Over.
00 18 39	P	I'm getting ready to start it right now.
00 18 43	CC	Roger.
00 19 47	CC	This is Canary Cap Com. Would you confirm your 16-millimeter camera is off? Over.
00 19 56	P	Roger. 16-millimeter camera is off.
00 19 58	CC	Roger.
00 21 12	CC	This is Canary Cap Com. Could you give us another readout on suit dome temp. We have lost T/M on that segment. Over.
00 21 20	P	Roger. Suit dome temp is slowly coming up here. It's still reading about 40 [degrees], but it's easing back up now.
00 21 31	CC	Roger.
00 21 35	CC	We are having T/M LOS. Could you give us a reading on cabin dome. It's going back down at LOS here.
00 21 44	P	Roger. At 50 [degrees], cabin dome.
00 21 53	CC	Faith Seven, this is Canary Cap Com. Do you read? Over.
00 21 58	P	Roger, Canary, Faith Seven. Still reading you.
00 22 11	CC	Faith Seven, this is Canary Cap Com. Do you read? Over.

KANO (FIRST PASS)

00 22 16	CC	Faith Seven, this is Kano Cap Com. We have T/M solid. We request the suit-dome temperature reading. We have no reading on the ground. Over.
00 22 28	P	Roger, Kano Cap Com. I have about 42 degrees. The suit-dome temp is easing back up now. Over.
00 22 36	CC	Roger. You are 42 degrees.
00 22 39	P	That is affirm.
00 22 44	CC	Kano, Roger.
00 22 49	CC	Faith Seven., this is Kano Cap Com. We have an indication that your TV is still on. Will you confirm? Over.
00 22 58	P	TV is off now.
00 23 01	CC	Kano, Roger.
00 23 09	P	Thank you.
00 23 13	CC	We request a cabin-dome temperature reading. Over.
00 23 21	P	Roger. Cabin-dome temp is bouncing around a little. It now reads 42 [degrees]. I've decreased my setting here slightly on it.
00 23 35	CC	Kano, Roger. We're reading 40 [degrees] on the ground.

00 26 46	CC	Faith Seven. Give us another cabin-dome temperature, please.
00 26 50	P	Roger. Cabin-dome temperature is 54 degrees.
00 26 57	CC	Please give us suit dome.
00 26 58	P	Roger. Suit dome is 40 [degrees]. I have decreased my setting a little more to ease it on up. Over.
00 27 07	CC	*Thank you. What is your present setting?
00 27 10	P	Roger. I am down below my nominal setting now.
00 27 13	CC	Roger.
00 27 43	CC	Faith Seven. We had a roll scanner ignore. Are you orienting the capsule at all? Over.
00 27 49	P	Negative.
00 27 51	CC	Roger.

ZANZIBAR (FIRST PASS)

00 30 47	CC	Faith Seven, Faith Seven, this is Zanzibar Cap Com. How do you read?
00 30 54	P	Roger, Zanzibar. Reading you loud and clear. Faith Seven here.
00 30 57	CC	Faith Seven. Our telemetry on the ground looks like you have a very good capsule at this time. We would like to confirm the suit-dome temperature, however.
00 31 07	P	Roger. The suit-dome temperature is still down low. I'm easing up on it.
00 31 12	CC	We're reading approximately 40 degrees on the ground.
00 31 15	P	Roger. I'm indicating about 42 [degrees] here, and I have decreased my setting. It should be coming up momentarily.
00 31 27	CC	Could you give me auto fuel, manual fuel, and oxygen readings?
00 31 32	P	Roger. Auto is still 101 [percent]. Manual is 102 [percent]. Oxygen is 196 [percent] on primary and 100 [percent] on secondary.
00 31 44	CC	Roger.
00 32 20	CC	Faith Seven, Zanzibar Cap Com.
00 32 24	P	Go ahead, Zanzibar.
00 32 25	CC	*We just had a report from the Cape. Based on Smithsonian 2, you have approximately 20 over 25 orbits. This gives you approximately three times as much on more conservative estimates.
00 32 45	P	Roger. I understand I have at least 25 then. Is that affirm?
00 32 51	CC	Faith Seven. Zanzibar Cap Com.
00 32 55	P	Go ahead, Zanzibar. Faith Seven.
00 32 58	CC	Have you confirmed your T_s+5 check and that the TV is off?
00 33 03	P	That is affirm. TV is off. I have confirmed my T_s+5 second check.
00 33 10	CC	Roger.
00 33 26	CC	Faith Seven, Zanzibar Cap Com.
00 33 28	P	Go ahead Zanzibar, Faith Seven.
00 33 31	CC	We've had a slight rise on both cabin and suit-dome temperature.
00 33 39	P	Roger. I have a cabin [heat exchanger] dome [temperature] up to 60 [degrees]. Suit [heat exchanger] dome is still about 42 [degrees]. Over.
00 33 45	CC	Cabin-dome 60 [degrees]. Suit-dome temp, 42 [degrees].
00 33 48	P	That's affirm.
00 33 51	CC	Roger. You received that [contingency recovery area] 1–B [retrosequence time] was nominal. Is that correct?
00 33 52	P	Roger. Understand it is nominal.
00 33 56	CC	Okay, do you have anything else for this time for us?
00 34 02	P	Negative. Not this trip, I don't believe.
00 34 05	CC	Please repeat.
00 34 07	P	Negative. Not this time.
00 34 09	CC	Roger. We'll leave you alone then.
00 34 11	P	Roger. Thank you.
00 36 46	CC	Zanzibar Cap Com. Do you read?
00 36 48	P	Roger.
00 36 50	CC	Negative. We had a small problem on T/M on the ground. What is your ASCS bus reading?
00 36 59	P	ASCS bus reading, 121 [volts].
00 37 02	CC	We confirm. We had a small T/M problem.
00 37 05	P	Roger.
00 37 06	CC	Zanzibar, out.
00 37 30	CC	Faith Seven, Zanzibar Cap Com. How about giving me a suit and dome right now? It'll be LOS time.

00 37 36	P	Roger. Suit dome is about 45 degrees. Cabin dome is about 61 degrees.
00 37 43	CC	Roger. Thank you very much. See you next time.
00 37 46	P	Roger. Will do.
00 38 35	P	Okay. I finally have my dome temps—fairly good handle on them. I have about 62 [degrees] on the cabin dome. I have approximately 45 [degrees] on the suit dome. These temperatures have taken a setting of 2.0 [comfort-control-valve setting] on the suit and about 3.8 [comfort control valve setting] on the cabin. I have checked my control systems out. Manual proportional is operational. It is very sloppy compared to fly-by-wire low. The Sun is very hot coming in the window. I have the Sun directly in the window. I have from fairly midway through the launch. Lost it at the top of the trajectory. And then picked it up again when I yawed back around to orbit attitude.
00 39 50	P	My cabin pressure has slowly dropped to the advertised value of 5.2 [psia] and appears to be holding. My suit dome has dropped down again now to about 42 [degrees] and seems to be oscillating about this point area. Body temperature is good, not quite as cool as I would prefer, but good. My suit inlet temperature indicates 60 degrees, however, so the sun is probably the biggest factor heating me up. I have drunk some water.
00 40 56	P	Time for my short status report. My N_2 low pressures, auto is 475 [psi]; manual is about 480 [psi]. B-nut temperatures: retro temp, 60 degrees; pitch down, 85 [degrees]; pitch up, 84 [degrees]; yaw left, 78 [degrees]; yaw right, 89 [degrees]; roll counterclockwise, 90 [degrees]; roll clockwise, 90 [degrees].
00 41 57	P	Peroxide reserve tank temperature, 68 [degrees]; peroxide manual tank temp, 69 [degrees]; peroxide auto fuel tank temp is 72 [degrees].
00 42 30	P	Isolated bus voltage is 28 [volts].
00 43 22	P	*First night side and I have a bright blue band. A thick diffused band of blue color. A bright blue band. The Sun is spread out very widely. It's setting now. And there it goes. A very bright blue band all the way around the earth.
00 44 03	P	Captured another washer. That's my second one.
00 45 16	P	*I believe I have the dome temps somewhat under control now. My face plate is open. Cabin air is indicating 100 degrees. Suit inlet temp is 60 degrees. Dome temperature has stabilized pretty well. There is a very pronounced band—a bright blue band—around the Earth. ASCS is holding attitude very well on this night side.
		*[Non-flight-related transmission omitted.]
00 47 14	P	Taking my pilot light out, NOW [00 47 15]^{T}—very good.
00 47 43	P	Turning my warning lights off—to dim.
00 47 58	P	And I have the haze layer that Wally was talking about. I can see the stars down in it. But it is—up and around the Earth—to a number of degrees. It is several degrees thick, perhaps 12 to 15 degrees thick. I can see the stars above it, I can see the stars down in it.
00 48 35	P	*I have seen several lightning flashes on the Earth, now. I see them on the Earth, now.
00 49 19	P	*Water squeezers are working.
00 49 53	P	Closing my face plate.
00 50 05	P	And there is Orion, Betelgeuse. What a beautiful night tonight.

MUCHEA (FIRST PASS)

00 51 02	CC	Faith Seven, Faith Seven, Muchea Cap Com. Over.
00 51 06	P	Roger, Muchea Cap Com, Faith Seven.
00 51 10	CC	Roger. Reading you loud and clear.
00 51 11	P	Roger. Likewise here. How are things down there?
00 51 12	CC	Very fine, very fine.
00 51 16	P	Roger.
00 51 21	P	You appear to be having a little lightning and thunderstorms down there.
00 51 26	CC	Looks clear from here.
00 51 29	P	Roger. Back out to the west of you there are some.
00 51 33	CC	Aeromed is standing by for your blood pressure.
00 51 41	P	Roger. Blood pressure coming now.
00 52 01	CC	Faith Seven. How does your cabin dome and suit dome temp look now?
00 52 17	P	Roger. I was waiting until the blood pressure got finished there.
00 52 25	CC	How does your suit and cabin [heat exchanger] dome [temperature] look now?
00 52 26	P	*Roger. My cabin dome and suit dome [temperatures] have been fluctuating somewhat.

00 52 36	CC	Stand by for emergency voice check.
00 52 38	P	Roger.
00 52 45	CC	This is Muchea Cap Com, transmitting on emergency voice for a short count. 1, 2, 3, 4, 5, 5, 4, 3, 2, 1. Do you copy?
00 52 58	P	Roger, Muchea Cap Com. Reading you loud and clear on emergency voice.
00 53 02	CC	Roger.
00 53 07	P	Roger. On these dome temps, I have decreased my setting again, and my cabin dome is running about 48 degrees. My suit dome is back on the bottom, 40 degrees now. I've decreased it; it should be coming back up momentarily.
00 53 25	CC	Roger. Stand by for an astro alarm check.
00 53 31	P	Roger.
00 53 34	CC	Command is on the way. [Command tone occurs at 00 53 35] [T]
00 53 36	P	Roger. I have retro reset light and the tone.
00 53 40	CC	Roger.
00 53 56	CC	Faith Seven, would you give me a reading on your cabin temperature please.
00 54 00	P	Roger. Cabin temperature is running 100 degrees.
00 54 04	CC	Roger.
00 54 12	CC	Faith Seven. Perth has their lights on tonight; you might look for them and see if they're visible.
00 54 19	P	Roger.
00 54 21	CC	They should be just slightly off to the right of your flight path.
00 54 27	P	Roger. I'll watch for them.
00 54 28	CC	Roger.
00 55 03	P	Roger. I have the lights of Perth in sight. Loud and clear.
00 55 08	CC	Roger, Faith Seven. People here will be glad to hear that.
00 55 11	P	Roger. Looks good.
00 55 23	P	Looks like the refinery down to the south is burning again too.
00 55 27	CC	*That's affirmative.
00 55 29	P	Roger. I can see that separately.
00 55 32	CC	Cape Flight would like to know how your ASCS is working now after selecting gyro slave.
00 55 37	P	Roger. ASCS appears to be operating as advertised. Over.
00 55 42	CC	Roger.
00 55 52	CC	This is Muchea Cap Com. We have about 1 minute to LOS.
00 55 56	P	Roger.
00 56 47	CC	Faith Seven, Muchea Cap Com. Could you give us your [comfort] control valve setting?
00 56 57	P	Roger. I'll give you my heat exchanger dome temps here.
00 57 00	CC	Roger.
00 57 03	P	Roger. I'm reading 52 degrees on cabin dome, and I'm reading 40 degrees on suit. I have decreased suit again, slightly. And it should be coming up again.
00 57 15	CC	Roger.
00 58 45	P	*This haze layer. I'm describing as light in color. It's a white haze, does not appear to have any color at all to it.
01 04 08	P	I now have the suit coolant valve set to 1.5, cabin valve set to launch mark, about 3.6, and cabin [dome temperature] reads 50 degrees, and suit [dome temperature] is coming up slowly, now reads about 45 degrees. Suit inlet temp is about 58 degrees.
01 05 18	P	There is considerable cloud cover over the Earth now. This haze layer is still up above that. I can see a dark hazy sky above the Earth, and then this haze layer appears to be sitting several degrees—it's hard to estimate the number of degrees—above the Earth. The stars are in the background. The stars are above this haze layer, and they're quite clear, of course, above it.
01 06 07	P	Long status report. B-nut temperature: Pitch down is 90 [degrees]; pitch up is 85 [degrees]; Yaw left is 82 [degrees]; yaw right is 95 [degrees]; roll counterclockwise is 92 [degrees]; roll clockwise is 92 [degrees]. Cabin outlet, 40 degrees; 250 inverter, 110 degrees; 150 inverter, 112 degrees; standby inverter, 90 (degrees). Cabin temperature, 102 degrees; suit temp 58 degrees. Heat exchanger dome temps: cabin is now 50 [degrees]; suit is now 46 [degrees].
01 08 04	P	I'm reading 18 amps on current. Main bus reads 24 [volts]; isolated [bus], 28 [volts]; number one battery, 24 [volts]; number two battery, 24 [volts]; number three battery, 24 [volts]; standby [battery] one, 25 [volts]; standby [battery] two, 25 [volts]; isolated [battery], 28 [volts].
01 08 36	P	I'm now opening my face plate to take an oral temp.

CANTON ISLAND (FIRST PASS)

01 10 02	CC	Faith Seven, this is Canton Cap Com. Over.
01 10 14	CC	Faith Seven, we have a valid body temp.
01 10 18	P	Roger, I'll talk to you then. Ha, ha ! Faith Seven here, reading you loud and clear.
01 10 24	CC	Roger. Would you give me a readout on your cabin heat exchanger dome temp, please.
01 10 31	P	*Roger, standby 1 second. Roger. Cabin heat exchanger dome temperature is 50 degrees; suit heat exchanger dome temp is 45 degrees; the suit inlet temperature is 58 degrees; and cabin outlet temperature is about 40 degrees.
01 11 03	CC	Understand, 43.
01 11 05	P	40.
01 11 07	CC	40.
01 11 35	CC	Seven, Canton.
01 11 37	P	Go ahead Canton, Faith Seven.
01 11 41	CC	[Recovery] area 2–1 retrosequence time 14 32 03. Over.
01 11 49	P	14 32 03. Roger.
01 11 52	CC	Affirmative.
01 11 54	P	Roger.
01 12 25	CC	Seven, Canton. Your c.e.t. [capsule elapsed] time on the 2–1 retrosequence time is 01 27 50. Over.
01 12 39	P	Roger. 01 27 50. That's on 2–1. Is that affirm?
01 12 45	CC	Affirmative.
01 12 47	P	Roger.
01 13 02	CC	*Seven, Canton. All readouts are in the green.
01 13 06	P	Roger, they all look green here, thank you.
01 18 01	P	*I have transferred the urine from the internal suit bag to the number one bag at this time.
01 19 27	P	Alpha and Beta Centauri.
		*[Non-flight-related transmission omitted.]
01 20 52	P	Sweet little baby.
01 21 15	P	*At this time I now have 1 hour and 21 minutes and I am observing John's fireflies drifting away from me. I can observe them—appear to be departing from the spacecraft and drifting out to the rear. I then can see some of them a considerable distance out to the rear.
01 22 02	P	The Sun is coming up behind me; I'm beginning to get the glow on the clouds.
01 22 22	P	*The fireflies appear to be white, very whitish, almost a green, like real fireflies.
01 23 01	P	The clouds on the Earth below are changing color, are getting quite light.
01 23 54	P	*I am now on the day side; the Sun is not yet quite up and I am observing stars. The Earth is light below me. The sun is still behind me, the sky looks dark above me, and I can see stars very distinctly.
01 24 41	P	I am decreasing cabin dome [comfort control valve setting] now to about 3.4.

GUAYMAS (FIRST PASS)

01 27 13	CC	Faith Seven, Guaymas Cap Com.
01 27 16	P	Roger, Guaymas Cap Com, Faith Seven here.
01 27 19	CC	Hey, Gordo, give me your heat exchanger outlet temperatures please.
01 27 24	P	Roger. I've got 50 [degrees] on the cabin, and 50 [degrees] on the suit.
01 27 31	CC	Roger. Are you comfortable?
01 27 34	P	Roger. Just slightly warmer than absolutely ideal, but well within a very comfortable range. My suit inlet temperature is 58 degrees. Over.
01 27 43	CC	Very good. Everything looks good down here. We give you a go for seven more.
01 27 48	CC	We are giving you a go for seven orbits.
01 27 51	P	Roger, for 30 how many?
01 27 55	CC	As many as you want.
01 27 56	P	Ha, ha ! Roger.
01 27 58	CC	And Gemini sends you their regards.
01 28 03	P	Roger. Thank you.
01 28 08	CC	Will you give me a short report?
01 28 12	P	Roger. It's great.
01 28 19	CC	That's good enough.
01 28 22	P	It's pretty hard to describe, but it really is. I've seen the haze layer that Wally talked about, and I've seen John's fireflies, saw the lights of Perth, and it's been quite a full night. Quite impressive. Everything appears very nominal on board here.

01 28 40	CC	How was the sunrise?
01 28 42	P	Quite impressive.
01 28 49	P	Everything seems very nominal on board here.
01 28 53	CC	Excellent.
01 29 11	P	How's the fishing?

CAPE CANAVERAL (SECOND PASS)

01 33 50	CC	Faith Seven, Cape Cap Com.
01 33 52	P	Roger, Cape Cap Com. Faith Seven here.
01 33 55	CC	Roger. You look real good. I'm going to send you a T/M command.
01 33 59	P	Roger.
01 34 05	CC	I will wait for your TV camera.
01 34 08	P	Roger.
01 34 14	CC	Gordo, could you give me a readout on your H_2O_2 pressures, please?
01 34 20	P	Pressure?
01 34 22	CC	Pressure.
01 34 23	P	I have 475 [psi] auto and I have 490 [psi] in manual.
01 34 29	CC	Roger. You're getting kind of chinchy on this fuel up there.
01 34 32	P	Roger. FQI [fuel quantity indicator]: I'm indicating 101 [percent] on auto and 102 [percent] on manual.
01 34 41	CC	You son-of-a-gun, I haven't got anything to talk about.
01 34 42	P	Ha, ha, ha!
01 34 46	CC	How's your H_2O separator lights working?
01 34 51	P	Fine. They're just beating their little hearts out every 10 minutes.
01 35 00	Stony	Faith Seven, this is Stony. Maybe, maybe the FQI is stuck. Why don't you try the hammer?
01 35 07	P	Ha, Ha! I'll save that for later. I'm thinking of using the hammer on the dome temp, however. On the dome temp light.
01 35 20	CC	We're starting to pick a picture up now. You look pretty casual.
01 35 27	P	Oh, I am.
01 35 41	CC	Do you want to do your KK experiment over us please?
01 35 45	P	Roger. Opening the KK clamp.
01 35 52	CC	Roger.
01 36 42	P	Roger. I'm getting ready to power down.
01 36 46	CC	Roger. I would like to have you open up your TV about one stop.
01 36 51	P	Roger. Is that any better? It's already wide open.
01 37 08	CC	Roger. I still see that fly on your nose.
01 37 13	P	Ha, ha, ha!
01 37 17	CC	Okay, Gordo. I guess you can shut your power down.
01 37 19	P	Roger. Going to fly-by-wire low. On fly-by-wire low.
01 37 22	CC	Roger.
01 37 30	P	Going to fly-by-wire low. Going to gyros caged, and they caged just as advertised. And ASCS a–c bus off.
01 37 50	CC	Roger. Checking volts down, and amps down.
01 37 54	P	Roger.
01 38 28	P	*Apparently the heat exchanger dome temps have stabilized pretty well now.
01 38 36	CC	Roger. It takes quite a while to get a grasp on it.
01 38 38	P	Roger.
01 38 43	CC	Before LOS, don't forget your TV camera. We're still reading you very well now.
01 38 50	P	Roger.
01 39 01	CC	The other item to check is your tape recorder on program.
01 39 05	P	Roger. Tape recorder going to program.
01 39 08	CC	You are program.
01 39 10	P	Are you still receiving the TV picture?
01 39 13	CC	That's affirm.
01 39 19	P	Roger. I'll hold. Turning it off for a moment.
01 39 21	CC	Okay.
01 39 30	P	Mode select switches to off.
01 39 33	CC	Roger. Mode, off.
01 39 35	P	Manual fuel is off.

01 39 38	CC	Manual, off.
01 39 44	CC	Frank [Samonski] says you can stop holding your breath any time and use some oxygen if you'd like.
01 39 49	P	Okay. You set such a good example ; I've got to equal you here.
01 40 01	CC	Yeah, you son-of-a-gun. I'm still higher and faster, but I have an idea you're gonna go farther.
01 40 09	P	Al, what is my apogee height?
01 40 15	CC	It's about 146 nautical [miles].
01 40 19	P	Roger.
01 40 20	CC	You can kill your TV, Gordo.
01 40 22	P	Roger. TV off.
01 40 24	CC	Roger. And put your C-band to ground command.
01 40 31	P	Roger. C-band's on ground command. S-band's on ground command.
01 40 37	CC	Roger.
01 40 40	P	Recorder on program ; I'm leaving telemetry on continuous.
01 40 50	CC	All of our monitors down here are overjoyed. Everything looks beautiful.
01 40 54	P	Very good. Looks mighty good up here, too.
01 41 02	CC	There's LOS on your T/M. Bermuda may have picked up, but I don't think they'll discover anything we haven't.
01 41 09	P	Roger.
01 41 43	CC	Faith Seven. This is Sigma Seven. Do you read?
01 41 46	P	Roger. Sigma Seven, Faith Seven reading you loud and clear.
01 41 49	CC	Roger. We have no messages for you. We'll let you have some quiet time. Have a good ball.
01 41 54	P	Roger. Thank you.
01 42 03	P	Might tell Bob Graham I've found a couple of those items that we were discussing. I can see the smudge layer on the window that Wally was discussing. It looks just like road grease splashed on a car. It also has spreckledy, streakedy, dots on it, smudged in with it. The smudge—the added smudges—run length of the window. Closing my visor now at 01 44 38.

CANARY ISLANDS (SECOND PASS)

01 48 26	CC	Faith Seven, this is Canary Cap Com. We have T/M solid, all systems look green. Over.
01 48 35	P	Roger, Canary Cap Com. I'm turning TV on here for you.
01 48 41	CC	Roger.
01 48 45	P	All systems are green here.
01 48 48	CC	Roger. Your [contingency recovery area] 2–Bravo [retrosequence] time is nominal.
01 48 52	P	Roger. Nominal, thank you.
01 50 19	CC	Faith Seven, this is Canary Cap Com. We're having T/M LOS. Turn off your TV. Over.
01 50 26	P	Tv control to off.
01 50 28	CC	Roger.
01 50 38	P	Drifting now ; I was upside down in roll attitude. Just passed over Canaries. Everything appears nominal.
01 51 09	P	I'm now receiving a Z and R cal apparently from program.
01 52 22	P	*Coming in over the coast of Africa. It's very clear here : no clouds, no haze. I'm drifting through an ideal location here. I'll try and snap off the 16 millimeter. Just took a 16-millimeter blurb coming over the Atlas Mountains in Africa. Coming over the coast. It's very dry, very clear over Africa. I'm drifting window down, ideal attitude. I'm now increasing my suit flow by just a hair. I'm opening my visor now. Cabin still appears drier than the suit. Apparently suit is running a little moist, although it doesn't feel it at all. Had six or seven large sips of water from the drinking-water container. I have put a little liquid into this little experimental ball and find that the liquid adheres to the surface just near as good as it should. Try a little bit more later on here.

KANO (SECOND PASS)

01 55 02	CC	Kano, has solid T/M.
01 55 09	P	Roger, Kano, Faith Seven. Everything's nominal here.
01 55 14	CC	Faith Seven, this is Kano Cap Com. Everything looks nominal on the ground. Have a good trip.
01 55 19	P	Roger. Thank you very much.
02 00 36	P	*At 2 hours, recording light is on; so I'll slip something on the tape. All systems appear nominal. My . . . cabin dome temp is 48 degrees; suit dome temp is about 56 degrees. Oxygen is still on the top peg on both systems. So is the fuel. Cabin temp, 98 [degrees]. . . . 2 hours and 3 minutes . . . 2 hours and 4 minutes. MARK [Unreadable].[T] Rate indicators are on, I am drifting at this point; I have left roll rate of about half a degree/sec. I have a pitch down rate of about one-quarter of a degree/sec and a right yaw rate of about one-half of a degree, and relatively constant. They're all considerably different than nominal. I don't feel that it's worth going into all the settings. I think the cabin dome temp is the important thing.

ZANZIBAR (SECOND PASS)

02 05 20	CC	Faith Seven, Zanzibar Cap Com.
02 05 23	P	Roger, Zanzibar. Faith Seven reading you loud and clear.
02 05 26	CC	Reading you loud and clear, also. I have your [contingency recovery area] 2–B [retrosequence] time. It is nominal. Do you need it?
02 05 34	P	Negative, I have it. Understand nominal.
02 05 37	CC	That is affirmative. Would you give me a readout of your cabin heat-exchanger dome temperature?
02 05 45	P	Roger. It is sitting on 40 [degrees]. It has just gone down here; it's bobbing around, and I am decreasing my flow to it.
02 05 54	CC	Roger.
02 06 02	CC	Can you give me fuel and oxygen readouts, please?
02 06 06	P	Roger. I am still indicating 101 percent on auto, 102 percent on manual. I'm reading 196 percent on primary oxygen, and 100 percent on secondary. Over.
02 06 22	CC	Roger.
02 06 28	CC	How do you feel about this heat situation?
02 06 34	P	What, the heat exchanger?
02 06 35	CC	No, how is your comfort?
02 06 38	P	Roger. My comfort is good.
02 06 43	CC	Your comfort is good.
02 06 44	P	That's affirmative.
02 06 54	P	My cabin heat exchanger [dome temperature] is easing back up now to about 42 [degrees]. Slowly coming back up.
02 07 00	CC	Roger.
02 07 02	P	I have about 42 [degrees], and it's coming back up slowly now.
02 07 05	CC	Roger.
02 07 07	P	. . . dome temp.
02 07 08	CC	T/M confirms all your systems go. Your clock is in sync.
02 07 14	P	Roger.
02 07 23	CC	T/M indicates you are getting a rise in your cabin [heat exchanger] dome temperature, also.
02 07 29	P	Roger.
02 09 12	CC	Faith Seven, Zanzibar Cap Com.
02 09 14	P	Roger, Zanzibar. Go ahead.
02 09 16	CC	We've had another increase in cabin heat exchanger dome temperature. It's now 48 degrees on the ground.
02 09 23	P	Roger. I agree.
02 09 25	CC	Roger.
02 09 32	CC	What is your dome setting—the handle setting at the present time?
02 09 42	P	Nominal. I don't feel that it's worth going into all the settings. I think the dome—the cabin [heat exchanger] dome temps are the important things.
02 09 49	CC	Roger. You're getting weak and fading. I'll sign off and see you later.
02 09 53	P	Roger.

02 14 12	P	The time is 02 14 15. People wonder if it's hard to sleep up here. I just drifted off for about 3 or 4 minutes on a quick little nap. Sleep here just like you do anywhere else. Status report. Nitrogen low pressure; auto source, 494 [psi]; manual 490 [psi]. FQI [fuel quantity indicator]; 101 [percent] on auto; 102 [percent] on manual. [B-nut] temps: pitch-down, 95 [degrees]; pitch-up, 85 [degrees]; yaw left, 82 [degrees]; yaw right, 96 [degrees]; roll counterclockwise, 95 [degrees]; roll clockwise, 95 [degrees]; reserve tank, 75 [degrees]; manual tank, 70 [degrees]; auto tank, 78 [degrees]. [Isolated] bus voltage, 28½.
02 21 41	P	I am now drifting on the night side. I have the Moon in sight; I'm upside down; I'm observing lightning flashes from considerable-size thunder storms that are below me. These create static in the radio every time the lightning flashes down there.

MUCHEA (SECOND PASS)

02 24 13	CC	Faith Seven, Muchea Cap Com. Over.
02 24 18	P	Roger, Muchea Cap Com. Faith Seven.
02 24 21	CC	Roger. Reading you loud and clear. Aeromed requests that you give him a mark when you begin your exercise and a mark when you stop your exercise. Over.
02 24 30	P	Roger. Will do.
02 24 34	CC	I have [recovery] area 3–1 retrosequence time, 02 58 05. Do you copy?
02 24 46	P	02 58 05. Is that affirm?
02 24 48	CC	That's affirmative.
02 24 55	P	Roger. I'll be sending a blood pressure in just 1 second.
02 24 58	CC	Roger.
02 25 43	CC	Faith Seven. Systems reports that your suit [heat exchanger] dome temp is decreasing rather rapidly. Would you check that, please?
02 25 51	P	*Roger. I'll just decrease the flow on both cabin and suit here.
02 25 57	CC	Roger. We confirm here.
02 26 08	P	Roger. I'm getting the exerciser now.
02 26 28	P	Starting the exercise.
02 26 55	P	Ending the exercise now.
02 26 57	CC	Roger.
02 27 01	P	Sending blood pressure now.
02 27 03	CC	Roger.
02 27 14	CC	We're reading your cabin heat [exchanger] dome temp at 44 [degrees] now.
02 27 19	P	Roger. I concur. 44 [degrees] on cabin and about 47 [degrees] on suit.
02 27 24	CC	Roger. We concur here.
02 27 44	P	How does your med. like those blood pressures?
02 27 50	CC	Stand by. They report they look very normal.
02 28 01	P	Roger.
02 28 25	CC	Could you give me a cabin air temp reading?
02 28 28	P	Roger. Cabin air temp is 98 degrees.
02 28 31	CC	Roger. 98.
02 28 33	P	Roger.
02 29 24	CC	Do you have the Perth lights in sight?
02 29 30	P	One moment, let me get my cabin lights down.
02 29 42	P	Negative, I'm upside down. I can't see them.
02 29 45	CC	Roger.
02 30 18	CC	We have approximately 1 minute to LOS.
02 30 22	P	Roger.
02 30 25	P	Tell Warren not to get lost out in the outback.
02 30 29	CC	We almost got lost last Sunday.
02 30 31	P	Ha, ha!
02 30 33	?	Astro, most of the boys have joined tennis clubs here.
02 30 36	P	Roger. This is more fun than tennis.

02 34 35	P	Long status report . . . . . temperature: Let's see, first, retro 60 [degrees]; pitch down, 95 [degrees]; pitch up, 82 [degrees]; yaw left, 80 [degrees]; yaw right, 95 [degrees]; roll counterclockwise, 92 [degrees]; roll clockwise, 92 [degrees]; 250 inverter, 102 [degrees]; 150 inverter, 118 [degrees]; standby inverter, 98 [degrees]: cabin temperature, 98 [degrees]; suit inlet temperature, 60 [degrees]. Heat exchanger dome temperatures: cabin 50 [degrees]; suit, 48 [degrees]. Just then decreased flow and is coming back up. Main d-c bus, 24 volts; isolated [bus], 28 [volts]; current, 8 amps. It is 02 36 40. Milky Way is quite distinct. Now looking at the False Cross. Upside down, drifting flight at the moment.
02 39 38	P	*And I have the constellation of Sagittarius in sight. Nunki right there. There's the Moon directly in the top of my window.

CANTON ISLAND (SECOND PASS)

02 43 39	CC	Faith Seven, Canton Cap Com. All systems look green on the ground. We're standing by.
02 43 45	P	Roger, Canton. All systems look green here, thank you.
02 47 39	CC	Faith Seven, Canton.
02 47 41	P	. . . Canton, Faith Seven.
02 47 47	CC	Seven, [contingency recovery area] 3–Alpha [retrosequence time] is nominal.
02 47 50	P	Roger, [contingency recovery area] 3–Alpha [retrosequence time is] nominal, thank you.
02 48 33	P	The time is 02 48 35 NOW [02 48 36]^{T}. Regulated pressure source on fuel, 475 [psi] auto; 490 [psi] on manual. Fuel, FQI 101 percent on auto; 102 percent on manual. Cabin dome temp, 50 [degrees]; suit dome temp, 50 [degrees]; cabin temp, 95 [degrees]; suit inlet temp. 60 [degrees]; cabin pressure holding at 5 psi. Main bus 24½ [volts]. I'm using 8 amps current.
02 49 53	P	Sunrise—and the sun is behind me, moving to the rear of me, with Saturn along by it. And I'm getting John's fireflies again, coming off the spacecraft. And you could almost aline yaw by the fireflies. They drift away to the rear of the spacecraft along to the rearward of the flight path.
02 50 32	P	Sunrise is coming in.
02 51 38	P	There's a coating of frost on the next to outside layer of window, which I believe, seems to be burning off as the sun hits the window.

HAWAII (SECOND PASS)

02 51 44	CC	Faith Seven, Faith Seven, Hawaii Cap Com. How do you read?
02 51 48	P	Roger, Hawaii Cap Com. Reading you loud clear.
02 51 52	CC	Roger. Everything looks good on the ground. Your suit [heat exchanger] dome [temperature] is 54 degrees. Aloha from Hawaii.
02 52 00	P	Roger. Aloha to you, too. Everything appears to be normal here.
02 52 04	CC	Roger. We're standing by.
02 52 07	P	Roger. Thank you.
02 53 37	P	And after having entered the day side, I've drifted around where I'm looking towards the black sky. I have seen a star again, and I've been observing the fireflies drifting away.
02 58 01	P	I'm in bright daylight now, at 2 hours 58 minutes. I'm upside down. I still have, oh, about ½ degree per second roll rate—very, very, very light—almost ½ degree [1 sec] yaw, and pitch is oscillating between ¼ and ½ [degree/sec], close to the rate of roll.

CALIFORNIA (SECOND PASS)

02 59 55	CC	Faith Seven, Faith Seven, this is California Cap Com.
03 00 00	P	. . .
03 00 01	CC	Faith Seven, Faith Seven. All systems here are green. You look real good here on the ground. Over.
03 00 21	P	. . .
03 00 48	CC	Faith Seven, Faith Seven. This is California, got you here, and you look real good all over on the board. The medics give you a clean bill of health. They would like to know if you just feel comfortable. Over.
03 01 01	P	Roger. I do feel comfortable, very comfortable. In fact, I had a little nap.
03 01 06	CC	Roger. We have a little news here from an old friend of yours, like Major Dick Shankle. Would you like to say hello?

03 01 14	P	Hello, Dick.
03 01 18	CC	I'll pass that on, Gordo.
03 01 20	P	Roger.
03 01 56	CC	Faith Seven, we see you have powered up your ASCS; and also, I believe you are scheduled for tape recorder, continuous.
03 02 06	P	Roger.
03 02 22	P	Roger. Tape recorder is on continuous.
03 02 25	CC	Roger. Your clocks look real good here, in sync. No problems that we see.
03 02 27	P	I'm on fly-by-wire low.
03 02 30	CC	We see.
03 02 31	P	Roger.
03 02 32	CC	California standing by.
03 02 34	P	Roger. I'm alining the spacecraft, very slowly, to go to auto. Coming in over the coastline now; it's very clear; looks like very good weather down there with clouds standing off shore.
03 02 54	CC	Ha, ha! Roger.
03 02 55	P	I see the islands off shore.
03 03 44	CC	Attitudes look really good on the ground. You must have her alined real good.
03 03 48	P	Roger.
03 04 00	CC	Oh, wait a minute. Your gyros are still caged, aren't they?
03 04 03	P	That's affirm.
03 04 11	SY	Cabin heat exchanger outlet temperature.
03 04 13	CC	Systems requests a cabin outlet heat exchanger temperature.
03 04 19	P	Roger, cabin heat exchanger outlet is about 48 degrees. I've decreased the flow very slightly a few minutes ago and it should be easing on up.
03 04 25	CC	Roger. 48 [degrees] and you've decreased the setting.
03 05 54	P	Okay. I'm just about in attitude here, getting ready to uncage the gyros.
03 07 19	P	I am on auto orbit.

CAPE CANAVERAL (THIRD PASS)

03 07 32	CC	Faith Seven, Cape Cap Com.
03 07 35	P	Roger, Cape Cap Com, Faith Seven.
03 07 38	CC	Roger. Read you loud and a little garbled.
03 07 42	P	Roger.
03 07 44	CC	Like to send you a T/M command, Gordo.
03 07 46	P	Roger. Go ahead.
03 07 54	CC	I have about three requests from you, cabin temperature?
03 07 59	P	Roger. Cabin temp is 92 degrees.
03 08 03	CC	Read 92.
03 08 05	P	Roger.
03 08 07	CC	Have you had any results on your **KK** clamp release?
03 08 11	P	Negative. I could not see any flow at all on it. so I clamped it off as planned.
03 08 18	CC	Roger, would you give us a readout of your cabin dome?
03 08 21	P	Roger. Cabin dome [temperature] is about 46 [degrees]. I have increased the flow slightly on it. Suit is 50 [degrees].
03 08 30	CC	Roger.
03 08 33	P	I mean I have decreased the flow on cabin.
03 08 41	CC	I'd like to give you a time hack, if you will.
03 08 43	P	Roger.
03 08 45	CC	Give you an elapsed time first at 50 seconds, that will be 3 hours, 8 minutes, 50. 2, 1, MARK. (03 08 52)[T]
03 08 53	P	Roger. I'm 1 second fast.
03 09 02	CC	Roger, 1 second fast.
03 09 03	P	I am on auto orbit.
03 09 06	CC	Roger. Getting into attitude. Your attitude looks good here.
03 09 14	P	*Roger. I've got my gyros alined very easily and went on auto; and the auto appears to be a little bit slow to move it into the smaller gates but it's working very nicely.
03 09 30	CC	Good.
03 09 34	P	TV camera coming on now.

03 09 39	CC	I'll give you a G.m.t. hack in a few seconds.
03 09 42	P	Roger.
03 09 43	CC	16 hours and 14 minutes. 2, 1, MARK. (03 09 48)[T]
03 09 54	P	Roger. What was that, 14 minutes?
03 09 56	CC	That's 16 hours, 14 minutes, 00 second.
03 09 59	P	Roger. On my standby clock I am about 10 seconds slow on that.
03 10 11	CC	Is this your G.m.t. clock?
03 10 15	P	Roger. Both of them—no on the wrist watches—both of my wrist watches are together; however, they are a little slow. I have 14 30 NOW. (03 10 31)[T]
03 10 34	CC	Say again, Faith Seven.
03 10 35	P	Never mind I'll catch you later.
03 10 38	CC	Okay.
03 11 01	CC	Faith Seven, Cap Com.
03 11 04	P	Go ahead Cap Com, Faith Seven.
03 11 05	CC	I have [recovery area] 3–2 [retrosequence] time if you're ready to copy.
03 11 09	P	All right, just a moment.
03 11 27	P	Go.
03 11 32	CC	Faith Seven this is Cape Cap Com. We have had four R and Z cals. Request you turn your R and Z cal switch off.
03 11 39	P	Roger.
03 11 49	P	Go ahead on the [recovery area] 3–2 [retrosequence] time.
03 11 59	P	Cape Cap Com. Faith Seven ready to copy 3–2 time.
03 12 29	CC	Faith Seven, Cape Cap Com.
03 12 33	P	Roger Cape, go ahead.
03 12 34	CC	Did you copy my 3–2? I did not read you.
03 12 37	P	Negative, I didn't copy it.
03 12 39	CC	Roger. It's 04 hours + 08 minutes + 10 seconds.
03 12 46	P	Roger. 04 08 10.
03 12 50	CC	That's correct.
03 13 15	CC	Faith Seven. Your scanners and attitudes agree very nicely. Over.
03 13 27	CC	Faith Seven, Cape Cap Com, you can turn TV off.
03 13 32	PC	Roger. I already have it off.
03 13 43	CC	Faith Seven, Cape Cap Com.
03 13 47	P	Go ahead Cape, Faith Seven.
03 13 49	CC	Are your tower sep lights and cap sep lights out?
03 13 52	P	Affirm.
03 13 54	CC	Roger.
03 13 56	P	They went out at 314.5.
03 14 00	CC	Roger. They should have been. We just had a T/M, and we wondered why.
03 14 02	P	Roger.
03 14 03	CC	No problem on these at all.
03 25 06	P	*I am on fly-by wire, have armed the squib, pitching up very, very slowly, and will deploy the flashing light at the —20 degree point. Flashing light is deployed. I'm marking the tape. Deploy light off. Squib is off. Gyros are caged, free to caged. Roger—and ASCS a-c bus off. NOW. [03 26 28][T] Stick is now cold.
03 27 01	CC	. . . Cape Cap Com. Do you read? Over. . . . Do you read? Over. . . .
Unreadable	CC	Faith Seven . . . on relay. Do you read? Over.
Unreadable	CC	Faith Seven . . . do you read?
03 28 15	P	*ASCS inverter, 110 [degrees] when I powered it down. Sitting at 90 degrees yaw right now. It is easy to determine that the angle is very large, so far as telling to a high degree of accuracy, in a short time; but I am yawing around to observe the flashing light on the night side—is very easy to determine that, it is about 90 degrees yaw, now. I'm getting directly away from the Sun now, observing the night side coming on. With the window head on, I can see the demarcation line between the Sun and the light side and the dark side. Light blue above the Earth, and a band of blue above the Earth that fades in the dark side. Observing fireflys taking off now. And there's a very, very distinct demarcation now.
03 37 17	P	At this point I have no way of knowing what my yaw is. Left cabin light only, with the red filter . . .
03 51 29	P	*I still have not observed the flashing light. I have Sagittarius right in the middle of the window. It is directly on my 80 degree yaw . . . .

MUCHEA (THIRD PASS)

03 58 33	CC	Faith Seven, Muchea Cap Com.
03 58 37	P	Go ahead, Muchea, Faith Seven.
03 58 39	CC	Roger. Will you confirm that your squib switch is off?
03 58 49	P	Affirm. Squib switch is off.
03 58 52	CC	Roger. Area [contingency recovery] 4–A [retrosequence] time is nominal.
03 59 00	P	Roger. Thank you.
03 59 05	CC	Aeromeds are standing by for your blood pressure.
03 59 08	P	Roger. Sending it now.
03 59 13	CC	Roger.
03 59 16	CC	Did the beacon deploy?
03 59 20	P	Affirmative. I'm still trying to find it out here in the dark.
03 59 25	CC	You haven't seen the light. Is this true?
03 59 28	P	Negative. I still haven't found it. Still looking, though.
03 59 37	CC	Roger.
04 00 34	P	Everything is nominal on this trip, Muchea. I don't believe anything went wrong at all.
04 00 38	CC	Roger. Understand. T/M reports you green here.
04 00 46	P	Roger.
04 00 49	CC	Aeromed the same.
04 00 52	P	Roger. Thank you.
04 01 17	CC	Faith Seven. How do you know that the beacon has deployed?
04 01 22	P	I felt it deploy.
04 01 24	CC	Roger.
04 01 27	P	I don't know which deployed the fastest, me or it.
04 01 28	CC	Ha, ha, ha! Roger.
04 01 51	P	I am directly on my 180 [degree] yaw, and with the Moon in the upper left hand corner of the window.
04 02 00	CC	Say again, Faith Seven.
04 02 02	P	. . . 180 degrees, and still haven't seen it.
04 02 05	CC	Would you say again your attitudes?
04 02 07	P	Roger. I'm zero roll, about —34 degree pitch, and yaw at 180 degrees. Small end forward.
04 02 17	CC	Roger, and you still haven't found the light?
04 02 20	P	Negative, still haven't found it.
04 04 08	CC	Faith Seven, Muchea Cap Com. We're approaching LOS. You found the light yet?
04 04 14	P	Negative. Not yet.
04 05 49	P	I am now yawed 180 degrees, 0 [degrees] roll, I have a very slight roll attitude into the right. The Moon is in the upper left hand corner of the window—the—directly on my 180-degree path; I'm not able to see the flashing light. I am observing the haze layer again that Wally described. At this time I am still looking for the light. I'm observing lightning flashes on the ground, down on Earth that is. Considerable cloud cover. Venus and Jupiter in the left-hand part of the window.
04 15 00	P	I should still be right on track, on the 180-degree yaw. Still no flashing light, and I'm beginning to get the brilliant blue of Sun rising in the East. Bright blue band underneath all this haze layer. I can see the haze layer, and the bright band of light demarcation coming underneath it. Quite distinctive. There's a faint greenish tint to it where there are clouds, apparently.

HAWAII (THIRD PASS)

Unreadable	CC	Faith Seven, Faith Seven, this is Hawaii.
04 16 39	P	Roger, Hawaii. Faith Seven reading you loud and clear. Roger, understand.
Unreadable	CC	Roger. Is your C-band beacon in a continuous position?
Unreadable	P	Negative. I have it on ground command. I'll bring it to continuous, now.
Unreadable	CC	Roger. On my mark will you switch your TV control switch to T/M, and read out your fuel and O_2 quantities?
Unreadable	P	Roger. Will do.
04 17 28	P	Roger. I am just small end forward. 180-degree yaw, approaching sunrise. Over.
Unreadable	CC (CNV)	Faith, Faith Seven, this is Cape Cap Com on Hawaii transfer for check. How do you read me, over?
Unreadable	P	Roger. Reading you loud and clear, Cape Cap Com.
Unreadable	CC (CNC)	Roger, Gordo. Pretty long talk-line here.

Unreadable	P	You're right.
Unreadable	CC	Stand by for my mark. MARK 04 23 35. Switch your TV control switch to T/M.
Unreadable	P	. . . now going over TV transmitter.
Unreadable	CC	Roger.
Unreadable	P	Roger. These small particles drift away from you, small end forward. In this light they appear brilliant white, without green at all in them. They appear to move on out, and around back toward the flight path.
Unreadable	CC	We're standing by for your readout of fuel and O_2.
Unreadable	P	Roger. My auto fuel, I have 96 percent; on manual, I have 102 percent. On oxygen I have 90 percent on primary and 100 percent on secondary.
Unreadable	CC	Roger. We understand. We also have a message from the Cape. It's possible that you only felt the squib blow and not the beacon deploy. Is there any way that you might check this?
04 24 31	P	Not from in here, I don't think.
04 24 34	CC	Roger, you haven't see the beacon at this time.
04 24 37	P	Negative. I still haven't seen the beacon.
04 24 40	CC	Check.
04 24 46	P	There was considerable noise, though, as if something were departing.
04 24 50	CC	Say again, Seven.
04 24 52	P	* There was considerable noise, which sounded like those doors blowing open so I assume the beacon has departed.
04 24 58	CC	Roger, understand.
04 24 06	CC	T/M looks real good on the ground.
04 25 08	P	Roger.

CALIFORNIA (THIRD PASS)

04 33 15	CC	Faith Seven, this is California Cap Com. Over.
04 33 18	P	Roger, California. Faith Seven.
04 33 21	CC	Roger, Faith Seven. Systems and medics are go here.
04 33 26	P	Roger. My date [flight plan] put my telemack to normal [switch position] . . .
04 33 35	CC	Roger. Just, just stand by a second until systems finish marking the meters.
04 33 45	P	. . .
Unreadable	CC	All right, at my mark then would you switch. I'll start a countdown then. 9, 8, 7, 6, 5, 4, 3, 2, 1, MARK.
Unreadable	P	Roger. . . .
Unreadable	CC	Okay. You confirm TV control switch to off?
Unreadable	P	Roger. TV control is off.
04 34 33	CC	We had a slight decrease in the two links on d-c current. Would you give us a readout?
04 34 41	P	Roger. D-c current: the main bus is 24 [volts]; isolated [bus], 28½ [volts].
04 34 50	CC	Roger.
04 35 32	CC	California standing by.
04 35 35	P	Roger.
Unreadable	P	. . . can see all up and down the California coast, here . . . very clear.
04 36 29	CC	Roger.
04 36 43	CC	I seem to have a little discrepancy between c.e.t. and g.e.t. You're 2 seconds fast according to my clock.
04 36 59	P	. . . I'll give you a mark . . . 4 37.
Unreadable	CC	Roger.
Unreadable	P	2, 1, MARK [Unreadable][T]
04 37 04	CC	Right. The ground shows that your readout there is confirmed with ground. However, it is 2 seconds fast from our g.e.t.
Unreadable	P	Roger.

CAPE CANAVERAL (FOURTH PASS)

04 40 04	CC	Faith Seven, Cape Cap Com.
04 40 08	P	Roger, Cape Cap Com. Faith Seven.
04 40 24	P	Roger, Cape Cap Com. Faith Seven here.
04 40 27	CC	Faith Seven. Cape Cap Com. Would you turn on your TV immediately?
04 40 32	P	Roger. Will do.

04 40 38	P	Faith Seven passing just about over Houston now.
04 40 45	CC	And would you program R and Z cal to auto.
04 40 53	P	Roger. TV coming on now. R and Z cal programer coming to auto.
04 41 01	CC	Understand TV on ; R and Z cal to auto.
04 41 13	CC	Seven, from Cape. Could you give us your best coolant valve settings, please.
04 41 22	P	Roger. Stand by 1 minute.
04 41 42	P	Roger. I'm below the nominal on the suit. I'm using about the 1¾ on suit.
04 41 54	CC	That's 1¾ on suit.
04 41 55	P	Roger, and using about 3.0 on the cabin.
04 42 01	CC	Understand 3.2 on the cabin.
04 42 06	CC	Give you [recovery area] 4–1 retro time. 05 43 41.
04 42 14	P	Roger, 43 41.
04 42 16	CC	Roger.
04 42 22	CC	Have you consumed any water up to this point?
04 42 26	P	Roger. I'm also giving the doctors their first space sample. For the Electro-Chancellor System, that is.
04 42 43	CC	Roger. We understand. We may send up another one ; we understand you're full.
04 42 49	P	Roger, who are you sending up with it?
04 42 59	CC	Seven, Cap Com. We'd like a cabin temp, cabin heat exchange outlet temp, and three H_2O_2 tank temps.
04 43 14	P	Roger. Cabin outlet is 42 degrees.
04 43 22	CC	Roger.
04 43 24	P	Peroxide auto tank is 80 degrees. Manual tank is 70 degrees. Reserve tank is 75 degrees. What else do you want?
04 43 40	CC	Like to know about the cabin air.
04 43 44	P	Roger. Cabin air temp is 90 degrees.
04 43 48	CC	Understand, 90 degrees.
04 43 52	CC	Gordo, this is Wally. Did you have anything to eat?
04 43 54	P	Negative, not yet. I'm planning to shortly, here, though.
04 44 02	CC	Roger. For your information, systems' last computations on fuel at Hawaii give 88 [percent] auto, 98 [percent] manual, which is somewhat better than you're indicating on board.
04 44 17	P	Roger. On board I'm indicating 96 and 102.
04 44 38	P	Oh, boy what a beautiful shot of Florida.
04 44 44	CC	Roger. Looks good from here once in awhile too.
04 44 46	P	*Roger. The whole state is clear. I can see just about all of it. It's been a beautiful view coming over Florida.
04 44 55	P	. . . looks very good.
04 45 01	CC	Roger.
04 45 05	P	. . .
04 45 12	CC	Roger, Faith Seven.
04 45 34	CC	Faith Seven, this is Cape Cap Com. We are very impressed with the work you're doing.
04 45 42	P	Thank you.
04 45 47	CC	We lay a pat on the back from Walt Williams.
04 45 52	P	Thank you.
05 05 03	P	Now on 180 [degrees] yaw. I got here on manual proportional control. I'm at last daylight, going into dark. Have been looking for the flashing beacon. 05 05 18 NOW, [05 05 17]^T 28, I'm sorry, not 18. That light in sight—it is below me. It is quite a brownish, reddish brown and considerable altitude above the ground. Every time I fire a pitch down thruster, I get a shower of these little fireflies. The light is flashing now. It is the light. It's quite bright, quite discernible . . . 1, 2, 3, 4, 5, 6, 7, rate. It appears to be about—it appears to be about 10 to 12 miles away. I'm keeping it directly in the window. About the order of a second magnitude star, NOW. [05 11 34]^T. Light is still in sight, directly in the center of the window. In the background I can make out a lot of cumulus activities, faced of course to the easterly direction at 180 degrees yaw.

05 13 40	P	*The Milky Way is quite distinct. I can see it out the window. The Milky Way is quite distinctive. It's right in the center of the window. Quite noticeable. 05 16 35 NOW. [05 16 35]^{T} Light is still in sight. Moved off from it and then moved back using it for visual—to see if I could pick it up. I am able to pick it up. . . . thunderstorms all in under it at the moment. It is quite distinctive. 05 18 05 NOW. [05 18 05]^{T} Status report: retro temperature, 62 [degrees]; pitch down is 82 [degrees]; pitch up is 72 [degrees]. Yaw left, 75 [degrees]; yaw right, 90 [degrees]. Roll counterclockwise, 92 [degrees], clockwise, 90 [degrees]. Main inverter temp., 98 [degrees]; fans inverter temp., 120 [degrees]; standby inverter, 98 [degrees]. The squeezers are working again as advertised. Okay, the cabin and suit temperature: the cabin air is 90 [degrees]; suit inlet temp. is 61 [degrees]. Heat-exchange dome temperatures: cabin, 56 [degrees]; suit, 56 [degrees]. D-c bus, 24 [volts]; isolated bus, 28 [volts]; and reading 7 amps, current.
05 34 58	P	*5 hours and 34 minutes; now it's 35 minutes MARK. [05 35 10]^{T} Am drifting now. Do have the light in sight at the moment, apparently right on track. I see Antares on up ahead of me, which indicates that I am on the 180-degree drift point. See Corona Australis and, saw Sagittarius with Nunki apparently. 5 hours 39 minutes 30 seconds, MARK. [05 39 31]^{T}
05 39 36	P	Have the little flashing light still in sight, out ahead of me. About the order of a first magnitude star, now. It's not very discernable . . . due to the flashes. However, it can be picked up. It appears like it's around 13—13 to 14 miles.

HAWAII (FOURTH PASS)

05 41 38	?	[Unintelligible, foreign language transmission recorded here.]
05 51 15	P	. . . there.
05 51 44	CC	Hello, this is Hawaii transmitting on air to ground relay. Do you read?
05 58 35	CC	Faith Seven, Faith Seven, Hawaii Cap Com. Over.
05 58 52	P	Roger, Hawaii Cap Com. Faith Seven, here. Over.
05 58 56	CC	Roger. Faith Seven. May we have an oral temperature at this time and also a readout of fuel and O_2 quantities?
05 59 03	P	Roger. . . .
05 59 06	CC	Roger. It looks good down here. Reading 100 [degrees].
05 59 11	P	Roger.
05 59 19	CC	Standing by for a fuel and O_2 quantity.
05 59 24	P	Roger. Auto fuel, 94 percent; manual fuel, 102 percent. Oxygen primary about 89 percent; secondary, 100 percent.
05 59 43	CC	Roger. Are you—are you in drifting flight?
05 59 47	P	That's affirm. I'm in drifting flight.
05 59 50	CC	Roger. Retrosequence time for [contingency recovery] area 5–A is nominal.
05 59 55	P	Roger. 5–A is nominal. Thank you.
06 00 17	CC	Seven. Cape has just advised you have enough time for 92 orbits.
06 00 27	CC	Hawaii, standing by.
06 00 30	P	Roger.
06 00 50	CC	Seven, this is Hawaii. Have you seen the beacon yet?
06 00 54	P	Affirm. I was with the little rascal all night last night.
06 00 58	CC	Roger. Very good.
06 01 01	P	I tracked it the first part of the night, and then went into drifting flight and then picked it up the last part of the night again. Over.
06 01 07	CC	Very good.

CALIFORNIA (FOURTH PASS)

06 05 55	CC	Faith Seven, this is California Cap Com.
06 05 59	P	Roger, California Cap Com. Faith Seven here.
06 06 02	CC	Roger. Systems and aeronmedics give you a go here; and I'd like to check position on your C-band switch.
06 06 24	P	Roger. C-band is on continuous. Over.
06 06 28	CC	Read you. That's continuous?
05 06 29	P	That's affirmative.

06 06 39	CC	Would you please change your S—C-band beacon switch to ground command.
06 06 43	P	Roger. Going to ground command.
06 06 48	CC	On your schedule, for a B.P. [blood pressure] over this station.
06 06 52	P	Roger. You ready?
06 06 55	CC	We are. Roger.
06 08 31	CC	Aeromeds said they received the B.P. and would you turn it off.
06 08 35	P	Roger, will do.
06 08 37	CC	Would you give me a reading on your cabin PO_2 pressure?
06 08 42	P	Roger. Partial pressure of oxygen is about 4.4 [psi].
06 08 46	CC	Roger. Thank you.
06 09 35	CC	Five Baker, Five Charlie, and five . . . [contingency recovery area retrosequence times] are nominal.
06 09 40	P	Roger, thank you.
06 10 14	CC	. . .
06 10 19	P	Roger.
06 10 26	P	Roger, go ahead.
06 10 30	CC	. . . +17 + 09.
06 10 35	P	Roger. 07 17 09.
06 10 38	CC	Affirm.

CAPE CANAVERAL (FIFTH PASS)

06 14 40	CC	Faith Seven, Cape Cap Com. Do you read, over?
06 14 45	P	Roger, Cape Cap Com. Faith Seven, here.
06 14 53	CC	Faith Seven, Cape Cap Com. Over.
06 14 56	P	Roger, Cape Cap Com. Faith Seven, here.
06 15 01	CC	Faith Seven, Cape Cap Com. Over.
06 15 05	P	Roger, Cape Cap Com. Faith Seven reading you loud and clear.
06 15 09	CC	Faith Seven, Cape Cap Com. Over.
06 15 17	P	Roger, Cape. Faith Seven is reading you loud and clear. How me? Over.
06 15 21	CC	Roger, Gordo. Read you same. Assume you have TV on. Are you looking out the window?
06 15 25	P	Affirmative.
06 15 28	CC	Can just see horizon line, sort of interesting.
06 15 38	CC	Gordo, how did the manual control check work out?
06 15 45	P	Worked out fine.
06 15 46	P	Very good. You're looking beautiful on fuel.
06 15 49	CC	Roger.
06 15 50	CC	Environment tells us that you are using about 4-percent oxygen per hour, indicated. Over.
06 15 59	P	Roger. It looks that way here.
06 16 04	CC	Well this is a computation that will show later on. This is as much as you're using.
06 16 10	P	This is 4 percent of your 200 percent. Roger.
06 16 12	CC	We'd like to have a brief rundown on the acquisition of the beacon if you acquired and an idea of about what distance away you would guess that it was.
06 16 22	P	Roger. When last I saw it, in the last orbit, looked like it was about 12 to 13 miles away. I first thought that it looked like it was about 8 or 10 miles away. And at the last it was getting fairly dim, about the order of a fourth or fifth magnitude star.
06 16 43	CC	Roger.
06 16 46	P	When I first . . . looked like a magnitude star.
06 16 51	P	There's Florida, should. . . .
06 16 54	CC	Roger. We're getting a pretty good picture on this, this time.
06 16 56	P	Roger.
06 16 58	CC	I'd say your f stop is ideal.
06 17 09	CC	Gordo, how did you initially acquire the beacon? Did it just come in your field of view?
06 17 14	P	Roger . . . .
06 17 21	CC	Roger, understand.
06 17 23	P	There it was.
06 17 27	CC	That was during the night side of this last orbit. Is that correct?
06 17 37	CC	Faith Seven, Cape Cap Com.
06 17 40	P	Go ahead, Cape.

06 17 41	CC	You acquired it during the night side of this past orbit. Was that correct?
06 17 44	P	It's affirmative. Just at night.
06 17 47	CC	You can see it only at night.
06 17 49	P	I acquired it just as it got dark, right.
06 17 52	CC	Very good.
06 17 53	P	It was just getting dark when I acquired it. It was shining, there was still sunlight and I could see it shining before I could see it flash, so apparently it had some light reflected off of it.
06 18 04	CC	Roger. Understand.
06 18 30	P	Roger. Turning off [TV] camera now.
06 18 39	P	Go ahead, Cape.
06 18 43	P	Go ahead, Cape, Faith Seven.
06 18 52	P	Roger, Cape. Faith Seven reading you loud and clear.
06 25 40	P	At 6 hours and 22 minutes I turned off the cabin coolant and the cabin fan. Now I'm preparing to eat a little bite. The sandwiches that I am looking at here are pretty crumbly, lot of crumbs floating all over in the bag that they're in. I may not open them.
06 32 23	P	*I just had two pieces of Brownie and nut, small cakes, and just now eating bacon. Will drink some water following this.
06 35 15	P	I have just drunk six or seven large sips of water from the McDonnell drinky drink.
06 54 31	P	* And it's 6 hours 54 minutes 37 seconds NOW. [06 54 38].[T] I have the flashing light in sight again—extremely weak, very, very weak. Actually, just barely discernible. I would estimate it to be somewhere in order of 18 to 20 miles away. The Moon is out, and the water is very, very bright, below. It's quite a lovely moonlit night.
07 03 39	P	Right on the flight plan, there's our old friend Delphinus. I am drinking water at 07 08 00, very fine. Took seven or eight large swallows from the McDonnell tank.
Unreadable	CC	. . .
07 18 09	P	*I was just called by CSQ and informed that Cape desired to leave C-band beacon off.
Unreadable	CC	. . .
Unreadable	P	Short report. Nitrogen low pressure: auto, 475 [psi]; manual 4 . . . B-nut: Pitch-down is 80 [degrees]; pitch up, 70 [degrees]. Yaw left is 72 [degrees]; yaw right is 75 [degrees]. Roll counterclockwise is 78 [degrees]; roll clockwise is 75 [degrees]. And auto tank temp., 79 [degrees]; manual tank, 71 [degrees]; reserve tank, 75 [degrees]. Isolated bus voltage, 28.

HAWAII (FIFTH PASS)

Unreadable	CC	Hello Faith Seven. Faith Seven, Hawaii Cap Com. Do you read?
Unreadable	P	Roger, Hawaii Cap Com. Loud and clear.
07 31 50	CC	Roger. Faith Seven, this is Hawaii Cap Com. For your information, all your experiments should be on time; you have two-tenths cloud coverage for the light experiment. Your electrical power usage has been below expected. [Contingency recovery] area 6–A [retrosequence time] is nominal. Stand by to copy [recovery area] 6–1 [retrosequence] time, 08 50 17. Did you copy?
07 32 08	P	08 50 17, for 6–1.
07 32 13	CC	Roger, and 6–Bravo is also nominal. Will you turn your beacons to ground command at this time and give me a readout on your fuel and oxygen quantities, also your peroxide reducer [regulated] pressure, auto and manual? Over.
07 32 34	P	Roger. Say again on the beacon. What do you want on them?
07 32 39	CC	Roger. Will you put your beacons to ground command at this time?
07 32 43	P	Roger. Beacons are on ground command. Peroxide regulated pressure: 475 [psi] on auto; 490 [psi] on manual. . . . 0_2 percent on manual; oxygen is 191 percent on primary, and 100 [percent on secondary].
07 33 12	CC	Roger, give me your fuel again please, Gordo.
07 33 15	P	Fuel is auto, 90 [percent], manual, 102 [percent].
07 33 24	CC	Roger. We've copied all. Did you turn your T/M on for CSQ? Over.
07 33 39	P	. . .
07 33 42	CC	Say again, Gordo.
07 33 44	P	Negative, I did not turn my T/M on for CSQ.
07 33 48	CC	Roger. They did report getting a short burst. Will you please leave T/M off for all periods greater than 30 minutes; no contact with ground stations.
07 33 52	P	Roger.

07 34 15	CC	Faith Seven, Hawaii Cap Com. Do you read?
07 34 17	P	Roger, Hawaii.
07 34 19	CC	Roger. I have [recovery area] 7–1 and 8–1 [retrosequence] times. Do you read?
07 34 23	P	Roger. Go.
07 34 25	CC	7–1 is 10 23 33. 8–1 time is 11 56 24. Did you copy?
07 34 37	P	Roger. 7–1 is 10 23 33; 8–1 is 11 56, and what was the second?
07 34 46	CC	24.
07 34 48	P	24, Roger.
07 34 49	CC	Roger. You're looking fine on the ground, Gordo.
07 34 53	P	Roger. Thank you. I saw the flashing beacon again last night.
07 34 58	CC	Roger. I understand you saw it throughout?
07 35 00	P	I saw the flashing beacon again last night.
07 35 04	CC	Roger. Understand.
07 40 22	P	*In auto orbit. I'm pumping the condensate tank out; and will open the KK clamp. Two strokes, both syringes full, third full syringe full, four syringes full, five syringes full.

CALIFORNIA (FIFTH PASS)

07 40 52	CC	Faith Seven, this is California Cap Com.
07 40 55	P	Roger, California. Faith Seven here.
07 40 58	CC	Roger. Faith Seven. Schedule for B.P. [blood pressure], exercise, and a B.P.'s.
07 41 03	P	Okay, you ready?
07 41 04	CC	Roger.
07 41 06	P	Understand.
07 41 09	CC	Same exercise as Muchea is requested by the medics.
07 41 13	P	Roger.
07 41 59	P	Here comes the exercise.
07 42 12	P	Starting exercise now.

GUAYMAS (FIFTH PASS)

07 42 28	CC	Faith Seven, Guaymas Cap Com.
07 42 29	P	Roger, Guaymas.
07 42 32	CC	Roger, Gordo. Have a little information to pass on to you.
07 42 36	P	Roger. Let me get my exerciser stored back in here.
07 42 39	CC	Roger. You through?
07 42 40	P	Blood pressure coming now, Cal.
07 42 53	P	Roger. I'm through with this.
07 42 56	CC	Roger. We would like to remind you to pump out your condensate and turn on your water wick at about 8 hours.
07 43 04	P	Roger.
07 43 06	CC	And would you give us oral temperature over CSQ. Start taking your temperature at about—elapsed time of—at about 08 45.
07 43 18	P	Roger. Over CSQ. Is that affirm?
07 43 20	CC	Roger. We want to get one over CSQ.
07 43 25	P	Roger.
07 43 26	CC	And the Cape would like to remind you to keep your T/M turned off when you're out of contact with stations. They're trying to keep a close track of the power you've used.
07 43 35	P	Roger.
07 43 39	CC	And you can turn off your blood pressure now.
07 43 51	CC	Did you read that, Gordo?
07 43 53	P	Roger.
07 43 58	P	You said turn off the blood pressure. Right?
07 44 00	CC	Roger. And you can power up your ASCS bus anytime.
07 44 03	P	Roger. Stand by.
07 44 14	P	Roger. Powered up. 120 volts.
07 44 19	CC	Roger, we can—you're okay down here.
07 44 26	P	Okay.
07 45 51	CC	Gordo, have you cut anything off? We get—just got a drop in current.
07 45 57	P	Negative.
07 45 58	CC	Roger.
07 46 03	P	I have ASCS a-c bus powered up. It draws more current when it starts, I suppose.
07 46 09	CC	Roger, I guess that's it.

07 59 04	P	*Scanners are not working very rapidly. Spacecraft is yawed to the left very, very, except in yaw is, all right I mean. Correction, is rolled to the left about 10 degrees and the gyros read okay. Here comes some correction in now. They're beginning to correct. And this syringe full is about full. There is a lot of air in it; this is the last one I'll take out.
08 00 47	P	I'll add it on to all the others, I believe that's 5½. Took 10 large swallows of water. And I am now opening the Kenney Kleinknecht clamp.
08 16 09	P	*Peroxide reserve tank is 72 degrees. Peroxide manual tank, 70 degrees; peroxide auto is 78 degrees. Cabin outlet is 66 [degrees]. 250 inverter is 105 [degrees]; 150 inverter is 120 [degrees]; standby inverter is 95 [degrees]. Oxygen, 90 and 100 [percent]. Fuel, 86 and 102 [percent] . . . Here, I have the light in sight, in the top portion of my window. Extinctometer reading I got was—not any good there, blocking out by the top part of the window. . . . I did observe the ground light; it's quite bright.
08 23 25	P	Very recognizable in the little town. A little horseshoe shaped town was quite distinctive; it was right beside it.
Unreadable	P	*Now in auto reentry. Gyros going to slave. I got there in fly-by-wire low to 0, 0, 0 [degrees], selected auto reentry, and have now put the gyros to slave.
08 26 15	P	*Manual pitch plane precession was a little too great, as the gyros are torquing a little bit of negative pitch in here to correct for the pitch torquing . . . overage. The damn desk is unusable; it's too far down on the lap, and it will not lock down. My legs are in the way at zero g. Cannot bring it down to lock down.
08 35 35	P	*There seems to be some difficulty with the number two urine collection bag. It's very difficult to pump more than the 1½ syringes full that I got into it. And I hear a hissing back behind me; so I suspect there is too much pressure on it, and I'm going to cease on this one.
08 44 29	P	Auto reentry. I see when each one of the thrusters fires, the little fireflies come out of the thrusters and drift away to the rear. Some of them impinging on the spacecraft but depart later. The auto reentry [ASCS reentry attitude mode] portion of the auto mode is holding within plus or minus—within a 11½ degree band. That is, is apears to be slightly more sloppy than ASCS orbit. However, this may not be true; ASCS orbit is not very fine control either. But it is controlling it fairly well.

COASTAL SENTRY QUEBEC (SIXTH PASS)

08 52 13	P	. . .
08 52 16	CC	Roger. We're not getting T/M very good here. Do you have T/M on? Over.
08 52 21	P	Roger.
08 52 22	CC	Roger. He has T/M on.
08 52 26	CC	Do you have TV on, Gordo? Over.
08 52 28	P	Negative.
08 52 30	CC	Roger.
08 52 31	P	TV coming on now.
08 52 33	CC	Roger.
08 52 37	CC	Are you ready to copy retro times? Over.
08 52 39	P	Roger. Go.
08 52 41	CC	Roger. [Contingency recovery area] 7–A [retrosequence time] is 09+11+42 and 7–B is 09+40+19. Over.
08 52 56	P	Roger. . . .
08 53 06	CC	This is CSQ. I didn't get your readback on that. Over.
08 53 30	CC	Faith Seven, CSQ. Cape wants a cabin air temp readout, please. Over.
08 54 00	CC	This is CSQ, Faith Seven. We're reading you very weak, barely readable. Repeat cabin air temp please. Over.
09 00 20	P	Now I am getting ready to release the balloon. I have tape on continuous; I'm on fly-by-wire low, going to three zeros. Camera is in place in the mount and really is in the way of the yaw indicators. And I am on three zeros, squib switch to arm, 16 millimeter camera on, going to extend, hold for 5 seconds; 1, 2, 3, 4, 5, off.
09 01 26	P	Squib off. Pitching slowly down, very, very slowly, going down—very slowly. I did not hear the balloon deploy. Perhaps you cannot hear it deploy; I don't know. Easing down ever so slowly. And I don't see the balloon anywhere yet. And I'm doing a rather sloppy job of flying now, trying to look for the balloon.

09 04 21	CC	Hello Faith, Faith Seven. Hawaii Cap Com. Do you read?
09 04 23	P	Roger. Faith Seven here.
09 04 26	CC	Roger. Gordo, reading you 3 by 3. We need a fuel, and oxygen and cabin-air temperature readouts please.
09 04 34	P	Roger. Cabin air, 90 [degrees]; fuel is 86 percent [auto]; 102 percent [manual]. Oxygen is 190 and 100 [percent].
09 04 46	CC	Roger, copied. Are you ready to begin your balloon experiment at this time? Over.
09 04 52	P	I have already tried to deploy the balloon at 9 hours. The balloon did not deploy.
09 05 01	CC	Roger. Understand you tried to deploy the balloon at 9 hours elapsed, and it did not deploy. Is that correct?
09 05 08	P	This is affirm.
09 05 11	CC	Roger. Have you had any food and water yet?
09 05 14	P	Roger. I have had food and water.
09 05 16	CC	Roger. Would you care to comment on the ground-light experiment?
09 05 20	P	Roger. I saw the ground-light experiment.
09 05 24	P	*Would you ask Cape if they would like me to try deploying this balloon again? Over.
09 05 30	CC	Roger. They are monitoring you; you will get an answer from them shortly. What's your control mode, your gyro switch position, and your status?
09 05 40	P	Roger. My status is go, my control mode is fly-by-wire low; gyros are on slave.
09 05 51	CC	And your gyro switch position, please?
09 05 54	P	Gyro switch position is slave. Over.
09 06 01	CC	Roger.
09 06 05	CC	*Faith Seven, Hawaii Cap Com. Cape advises that you try to deploy the balloon again, and would you give us a mark when you throw the switch. Over.
09 06 08	P	Roger.
09 06 17	P	Roger.
09 06 27	P	Roger, 16-mm camera is on.
09 06 33	CC	Roger, Gordo. Is your squib switch on?
09 06 35	P	Not yet. It will be before I try again, though.
09 06 38	CC	Roger. Just give us a countdown.
09 06 41	P	Roger. Squib is coming on NOW. [09 06 44]^{T}
09 06 45	CC	*Roger. Understand squib switch is on now.
09 06 56	P	5, 4, 3, 2, 1 [09 07 05]^{T}—no joy.
09 07 06	CC	Roger. Understand the balloon still does not deploy.
09 07 13	P	Squib switch is off.
09 07 16	CC	Roger. Understand squib switch is off. Hawaii standing by.
09 07 57	CC	Faith Seven. Hawaii Cap Com.
09 07 58	P	Go ahead, Hawaii.
09 07 59	CC	Roger. What's your status with respect to cabin temp and suit temp? Do you feel hot?
09 08 06	P	Roger. Cabin temp is 90 [degrees], suit temp is 61 [degrees].
09 08 11	CC	Okay. And you feel okay, not too hot?
09 08 12	P	Roger, feel fine.
09 08 15	CC	Sounds fine, you look fine. Have a good flight.
09 08 17	P	Roger, thank you.
09 10 04	P	*The balloon did not deploy; felt no shock; hear nothing on it. I will go continuous this portion where the balloon normally would have been used, in auto reentry. I will go around in auto orbit mode. Perhaps I can snap a few pictures for the ground people.
09 11 18	P	*. . . Bingo, I shifted into auto, orbit mode. I got no thrusters on the shift—and scanners seem to be holding it relatively close.
09 18 40	P	*What do you know? The Kenney Kleinknecht experiment is putting water in the exhaust tube, so maybe it is working here.
09 21 31	P	Short status report. . . . air outlet, 68 degrees. 250 inverter, 120 [degrees], 150 inverter, 128 [degrees], standby inverter, 102 [degrees]. Reserve peroxide tank, 71 [degrees]; manual peroxide tank, 69 [degrees]; auto peroxide tank, 78 [degrees]. [Retropack] is 61 [degrees]. Pitch down, 52 [degrees]; pitch up, 55 [degrees]. Yaw left, 68 [degrees]; yaw right, 68 [degrees]. Roll counterclockwise, 85 [degrees]; roll clockwise, 82 [degrees]. Regulated low nitrogen pressure, 475 [psi] auto; 490 [psi] manual. Isolated bus 28 volts.

09 27 08	P	. . . going to pump the rest of that urine into the number 2 tank. First . . . sample. I believe it is pumping correctly. The thing about this pumping under zero g is not good, tends to stand in the pipes, and you have to actually forcibly force it through.
09 40 20	P	Radiation experiment on at 09 39.
09 50 25	P	Radiation experiment coming off, NOW. [09 50 29]^{T}

ZANZIBAR (SIXTH PASS)

10 00 09	P	. . . O_2 primary is 79 percent.
10 00 18	CC	Reconfirm that, please.
10 00 19	P	Roger. Just a hair short of 80 percent. Over.
10 00 24	CC	O_2 primary?
10 00 27	P	O_2 primary. That's coming in at 180 percent. Over.
10 00 33	CC	Affirmative.
10 00 35	P	It's that Frank Samonski gage, and the secondary is 100 percent.
10 00 41	CC	Affirmative.
10 00 47	CC	Faith Seven, this is Zanzibar Cap Com. At this time, you are go for 17 [passes]. You are go for 17.
10 01 00	P	Roger. Thank you, Zanzibar.
10 01 04	CC	MCC advises that they do not want you to jettison your balloon. They are working on an alternate method for releasing the balloon.
10 01 17	P	Roger. Understand. I will not jettison.
10 01 20	CC	Roger.
10 01 29	CC	Faith Seven, Zanzibar Cap Com.
10 01 30	P	Go ahead.
10 01 31	CC	I have new [retrosequence] times for [recovery area] 7–1. Are you ready to copy?
10 01 35	P	Roger. Go.
10 01 37	CC	Your G.m.t. or c.—, do you want G.m or c.?
10 01 42	P	C.e.t.
10 01 47	CC	C.e.t. is 10 23 37 c.e.t. Do you read?
10 02 01	P	Roger. 10 23 37. Understand.
10 02 05	CC	That takes into account the 5-second error in your clock.
10 02 09	P	Roger. Thank you.
10 02 16	CC	Faith Seven, Zanzibar Cap Com. Check your cabin [heat exchanger] dome temperature.
10 02 23	P	Roger. Cabin dome temperature is 70 degrees.
10 02 28	CC	We confirm on the ground.
10 02 29	P	Roger.
10 02 39	CC	Can you give us a PO_2 cabin?
10 02 42	P	Roger. PO_2 cabin is about 4.4 psi.
10 02 51	CC	4.4?
10 02 54	P	Roger.
10 03 31	CC	Faith Seven, Zanzibar Cap Com.
10 03 34	P	Roger. Go.
10 03 37	CC	Everything looks good here.
10 03 39	P	Roger. Thank you very much. Everything looks good here.
10 03 42	CC	Okay, Zanzibar out.
10 03 44	P	Roger.
10 04 07	P	*Putting my visor back now. I've had to keep increasing the suit flow from a [comfort control valve] setting of 1.5 that I have right now to a setting of about 2.7. Dome is about 58 degrees. Inlet temp. is 58 degrees. This increase in the suit water flow is probably required by the cabin going on up. The heat load in the cabin is gradually going on up, using powered up, and having a cabin fan and cabin coolant turned off.
10 18 23	P	At a [comfort control valve] setting of 3 on the heat exchanger.

COASTAL SENTRY QUEBEC (SEVENTH PASS)

10 24 57	CC	Hello, Faith Seven, CSQ Cap Com. Over.
10 25 01	P	Roger, John. Faith Seven here.
10 25 03	CC	Faith Seven, CSQ. Cape advises you could go ahead and power down here, over our site if you like. Over.
10 25 11	P	Roger. Will do. You have any kind of a reproduction device down there?

10 25 16	CC	No, we're not, Gordo. We're not getting a doggone thing on that; don't know what's wrong with it. You are transmitting, is that affirm?
10 25 23	P	Roger.
10 25 25	CC	Nope. We're not getting any TV at the moment.
10 25 28	P	Okay. . . .
10 25 39	CC	Negative. The boys here tell me we're not getting any carrier on it at the moment.
10 25 47	P	Roger.
10 25 59	CC	This is CSQ Cap Com. You're going ahead and powering down, is that affirmative?
10 26 07	P	That is affirm. I'm going to fly-by-wire now. . . .
10 26 10	CC	Roger.
10 26 21	P	Roger. Auto is off.
10 26 24	CC	Roger. Auto off.
10 26 32	P	Gyros are caged.
10 26 34	CC	Roger. Gyros caged.
10 26 40	P	ASCS a-c bus off.
10 26 43	CC	Roger.
10 26 54	P	The highest my 250 inverter got up to was 130 degrees.
10 26 59	CC	Roger. Understand 250 only got up to 130, is that affirm?
10 27 03	P	Roger.
10 27 30	CC	Roger. We're dropping you.
10 27 40	CC	Gordo, the surgeon wants to know if you're sweating any at the moment. Over.
10 27 46	P	Very lightly, not very much.
10 27 49	CC	Roger.
Unreadable	P	*. . . At roughly 10 hours and 27 minutes, brought auto ASCS control to select. Lights are off. Caged the gyros. Have ASCS a-c bus. At the time the 250 inverter was reading 130 degrees, the highest it had been. The cabin was 96 degrees, the highest it has been. The cabin already is coming down; it's 91 degrees, already.

HAWAII (SEVENTH PASS)

10 37 27	CC	Hello Faith Seven, Hawaii Cap Com. Do you read?
10 37 45	CC	Faith Seven, Hawaii Cap Com. How do you read?
10 37 52	P	. . .
10 37 55	CC	Roger, Faith Seven. Reading you 3 by 4. Will you turn your tape recorder to program at this time.
10 38 05	P	Roger. It is on program. Over.
10 38 08	CC	Roger. R and Z cal to auto.
10 38 12	P	R and Z cal is in auto.
10 38 13	CC	And C-band beacon to ground command now.
10 38 17	P	C-band to ground command now.
10 38 19	CC	Roger. We're standing by for a blood pressure and a fuel and oxygen readout.
10 38 24	P	Roger. Fuel, 81 [percent] auto, 101 [percent] manual. Oxygen is 175 percent primary, 100 percent secondary. Cabin temp, 90 degrees. Here comes blood pressure.
10 38 44	CC	Roger. Understand blood pressure is on the air. Say again cabin temp.
10 38 48	P	Cabin temp is 90 degrees.
10 38 51	CC	Roger. Read 90.
10 39 12	CC	Faith Seven, Hawaii Cap Com. Turn your C-band beacon on at this time. Over.
10 39 18	P	Roger. Coming on now.
Unreadable	CC	Roger, your [contingency recovery area] 8-Alpha and 8–Bravo [retrosequence] times are nominal.
10 39 25	P	Roger. 8-Alpha and Bravo are nominal.
10 39 30	CC	T/M is commanded. Stand by.
Unreadable	CC	Roger, Faith Seven, Hawaii Cap Com. Commanding T/M on at this time.
10 39 56	P	I have it on continuous. You want it on ground command?
10 39 59	CC	Negative, that's fine.
10 40 05	P	Okay.
10 40 18	CC	Faith Seven, Hawaii Cap Com. Turn your T/M to ground command.
10 40 23	P	Roger. Going to ground command now.
10 40 29	P	On ground command.
10 40 35	CC	Roger.

10 41 03	?	. . . Cooper, can you come in on emergency frequency. Come up on 11176. Hickam out.
10 41 35	CC	Faith Seven, Hawaii Cap Com. Your mode and gyro switch position please.
10 41 40	P	Roger. Roger. ASCS control on select, mode select off, fly-by-wire thrust select low, pitch torquing on, gyros to cage, and pitch attitude on orbit.
10 41 53	CC	Hawaii. Roger.
10 42 29	CC	T/M commanded on this time. Faith Seven.
10 42 33	P	Roger.
10 43 14	CC	Faith Seven, Hawaii Cap Com. We're receiving R cal at this time. Will you make sure you have your C-band beacon to ground command before AOS. Over.
10 43 24	P	Roger, will do.
10 43 41	P	C-band beacon coming to ground command now.
10 43 44	CC	Roger. Understand C-band, ground command now.
10 49 34	P	Took some pictures out of the window with the remainder of the first roll of film on the 16 mm. The color film camera in the bracket.
10 50 18	P	* Low nitrogen pressure in 475 [psi] auto; 490 [psi] manual. B-nut temps: pitch down, 86 [degrees]; pitch up, 65 [degrees]; yaw left, 66 [degrees]; yaw right, 70 [degrees]; roll counterclockwise, 98 [degrees]; roll clockwise, 92 [degrees]. Auto peroxide tank, 82 [degrees]; manual peroxide tank, 68 [degrees]; reserve peroxide tank, 76 [degrees].
10 51 18	P	Isolated bus, 28 volts, and I am pulling 6 amps, right now.
11 16 18	P	Tape [and radiation] experiment is now on. I'm eating a pot roast or beef. I've had considerable difficulty getting the water in it from this water device on the McDonnell water tank. I spilled water all over my hands and all over the cockpit here trying to get some in it. I have succeeded in getting about half of it dampened and am proceeding to eat.
11 19 20	P	I am washing my face with a damp cloth now. Certainly feels good.
11 22 30	P	[Forcing grunt]. This is ridiculous. Come out of that damned ditty bag—Pandora's locker.
11 28 31	P	Radiation experiment is off. Tape recorder to program.
11 31 00	P	* It is rather a strange feeling to be able to place objects out into the cabin and let go of them and they'll stay in relatively their same position. This is worrisome as well as an odd sensation. Handy sometimes.

ZANZIBAR (EIGHTH PASS)

11 33 07	CC	Faith Seven, Zanzibar Cap Com. I'd like to get a c.e.t. time hack in about 30 seconds.
11 33 15	P	Roger. We have 11 34 30 on my mark. 5, 4, 3, 2, 1, MARK. [11 33 31]^{T}
11 33 36	P	That's 11 33 30.
11 33 38	CC	Roger.
11 33 49	CC	Faith Seven, Zanzibar Cap Com.
11 33 53	P	Go ahead.
11 33 54	CC	Your clock is now 7 seconds fast—plus 7 seconds.
11 34 01	P	Roger. Understand. Plus 7 seconds.
11 34 06	CC	[Recovery area] 9–1 [retrosequence] time is 13 19 20. 13 19 20.
11 34 21	P	Roger. 13 19 20.
11 34 25	CC	If you have to set your clock, you'll have to add 7 seconds to that.
11 34 30	P	Roger. Understand.
11 34 40	CC	Your T/M looks good on the ground, Faith Seven. Your T/M looks good.
11 34 45	P	Roger. Thank you.
11 34 49	CC	We'd like to have a TRF clock readout from the capsule also, please.
11 34 54	P	Roger. Time to retrograde will be 22 23 20 on my mark. MARK. [11 35 07]^{T} Retrograde time, 33 58 26.
11 35 15	CC	We concur.
11 35 17	P	Roger.
11 35 57	CC	Faith Seven, Zanzibar Cap Com.
11 36 01	P	Go ahead.
11 36 03	CC	Everything looks real good on the ground. Cape says they have nothing else for you at this time. We'll see you next time around.
11 36 09	P	Roger, Zanzibar. Thank you.

11 49 58	P	*All right on number 2 [photograph]. I've just taken [a picture, number 3] over India. And I'm just coming in over China very shortly. This is on the general purpose film in the Hasselblad.
11 51 21	P	*Photo 3 with the general purpose film. Here come the Himalayas. Number 4 [photograph] of the Himalayas. First three at 1/250, f/11. These are two . . . that last one was 1/250, f/16.

COASTAL SENTRY QUEBEC (EIGHTH PASS)

Unreadable	CC	Faith Seven.
Unreadable	CC	Hello, Faith Seven CSQ Cap Com. Over.
11 55 57	P	Roger. Faith Seven here.
11 55 58	CC	Roger. Reading you loud and clear, Gordo. Is the TV on?
Unreadable	P	Negative. I'll bring it on now. I didn't think it would work.
Unreadable	CC	Roger, go ahead. We didn't pick it up before here. I got your [contingency recovery area] 9-Able and Baker [retrosequence] times for you if you're ready for them.
11 56 13	P	Roger, stand by 1. Roger, go.
11 56 39	CC	Roger. 9–A is 12+18+24 and 9–B is 12+43+05. Over.
Unreadable	P	Roger 12 18 24. 12 43 05.
Unreadable	CC	That's affirmative, and Cape requests at the end of this pass you can turn your R and Z cal switch off so it will be off for the rest period. Over.
Unreadable	P	Roger.
11 56 57	CC	There we go. We're getting a little picture on you here now, if we can get the thing adjusted a little better.
11 57 07	P	Roger. How's that?
11 57 10	CC	We're receiving a carrier on you here but we're not getting very good modulation. Just big light spots going on and off. Over.
11 57 18	P	Roger. Probably not getting too much light. Just 1 second—I should be getting enough Earth shine off of it here to help.
11 57 25	CC	Okay, good. You upside down?
11 57 27	P	Roger.
11 57 37	CC	Is it on you?
11 57 39	P	Roger.
11 57 46	CC	Can you open the lens up a little bit on that. It's not getting enough light here.
11 57 50	P	Okay it's wide open now.
11 57 51	CC	Roger.
11 58 49	CC	You on fly-by-wire, Gordo?
11 58 52	P	Negative. I have everything powered down now.
11 58 56	CC	Roger. Just drifting. Affirm?
11 58 57	P	Roger.
11 58 58	CC	Roger.
11 59 04	P	Full drift with ASCS a-c powered down.
11 59 07	CC	Roger.
11 59 38	CC	You're sure looking good. Everything couldn't be finer on this pass.
11 59 43	P	Roger. Everything looks good here, John.
12 00 09	CC	How's cloud cover? Do you have a pretty good view?
12 00 14	P	Quite a bit of cloud cover right over you here. A little bit earlier there was a pretty good open area.
12 00 23	CC	It should be interesting to look at.
12 00 26	P	Roger.
12 01 07	CC	For your info, Gordo, we're getting good reports from the monitor aircraft for later on, for retro too.
12 01 13	P	Roger. Thank you.
12 01 30	CC	Surgeon would like to know what your cabin temp is now.
12 01 33	P	Roger. Cabin temp is about 87 degrees.
12 01 37	CC	Roger, very good. You're looking fine.
12 05 58	P	*An interesting aspect of this little liquid experiment that I have along is that the liquid remains on it in globules, hanging along the side in round globule form; and the air is trapped within it in globules and does not separate from it.

HAWAII (EIGHTH PASS)

12 11 40	CC	Faith Seven, Hawaii. Do you read?
12 11 46	P	Roger, Hawaii. Faith Seven reading you loud and clear.
12 11 48	CC	Roger. Reading you loud and clear. Standing by for blood pressure, fuel and oxygen.
12 11 52	P	Roger.
12 12 01	P	Blood pressure coming now.
12 12 03	CC	Roger.
12 12 09	P	Fuel is 81 percent auto; 101 percent manual. Oxygen is just about 170 percent primary, and 100 percent secondary.
12 12 30	CC	Roger, Faith Seven. Say again oxygen secondary.
12 12 33	P	100 percent.
12 12 35	CC	100, roger. Blood pressure off at this time, please. And did you say 101 manual fuel?
12 12 46	P	That's affirmative 101 manual and about 81 automatic.
12 12 51	CC	Roger. That's all we need. You look good on the ground, you're doing a great job.
12 12 57	P	Roger, thank you, Buddy.
12 13 24	CC	Faith Seven, Hawaii. You clock is holding 7-second error.
12 13 28	P	Roger. Thank you.
12 14 08	P	The eighth picture was shot over Hawaii to the south.
12 14 17	CC	Faith Seven, Hawaii. Could you give me suit [heat exchanger] dome temp, please.
12 14 21	P	*Roger. Suit dome temp is about 45 degrees. I increased flow. Got it down a little low, and I'm easing it back now.
12 14 31	CC	Roger. Understand, understand suit dome 45.
12 14 35	P	*That's right.
12 14 48	CC	Faith Seven, Hawaii. What about O_2 partial pressure.
12 14 53	P	Roger. O_2 partial pressure is about 4.2 [psi], cabin.
12 14 57	CC	4.2. Roger.
12 14 58	P	Roger.
12 15 18	P	Roger. Now back to the scribe mark on the suit temperature selector of about 2.7 with the power down.
12 15 31	CC	Faith Seven, Hawaii. Our T/M shows suit dome of about 38 degrees.
12 15 41	P	Roger. I just decreased the setting, just a minute ago, again.
12 15 45	CC	Roger.
12 17 33	P	*Suit dome temp.'s down to about—slightly below 40 degrees. Decreased the setting of the flow twice, and it's on its—should be on its way back up any moment.
12 21 36	P	*Short status report: Hydrogen peroxide and low nitrogen pressure: 475 [psi] auto, 490 [psi] manual. B-nut temps: pitch down, 85 [degrees]; pitch up, 60 [degrees]; yaw left, 55 [degrees]; yaw right, 70 [degrees]; roll counterclockwise, 85 [degrees]; clockwise, 92 [degrees] . . . auto tank, 85 [percent]; manual tank, 68 [percent]; reserve tank, 98 [percent]. Isolated bus voltage, 28 [volts]. Pumping from the condensate tank to the reserve tank, I have a syringe full. Suit circuit seems to be getting varying amounts of water, probably from the condensate tank, or tin can. Coolant water flow seems to vary considerably. I have it clear back down to a setting of 1. Still haven't gotten the heat exchanger dome temperature out of the warning light area. It is now about 45 degrees. Never have been able to put water in these containers, that have water, due to the leaking of this valve in the back of it. I'm unable to put it into the water, into the plastic neck of the container, and get water into it without leaking water all over the cockpit.

ROSE KNOT VICTOR (EIGHTH PASS)

12 26 00	CC	Faith Seven, RKV Cap Com.
12 26 05	P	Hello RKV.
12 26 07	CC	We have aeromed and systems go here.
12 26 18	P	Roger. Say again RKV.
12 26 21	CC	We have aeromed go here, and systems go.
12 26 25	P	Roger, very good. I'll take the temperature probe out now, then.
12 26 30	CC	We've got a long list of capsule readouts that the Cape requires before you go into the
12 26 42	P	rest period.
12 26 43	CC	Roger. Go.

12 26 53	P	Okay, 24 volts main. Just rotate the switch through, Gordo. All positions on your d-c volts.
		Roger, d-c volts: Main [bus], 24½ [volts], isolated [bus], 28 [volts]; main [battery] one is 25 [volts]; main [battery] two is 25 [volts]; main [battery] three is 25 [volts]; standby [battery] one is 25 [volts]; standby [battery] two is 25 [volts]; isolated [battery], 28½ [volts].
12 27 11	CC	Roger, understand. 150 v-a [inverter] volts?
12 27 17	P	Roger, 150 v-a is still 121 [volts]; fan, 121 [volts].
12 27 24	CC	Fans bus, 121 [volts]?
12 27 26	P	Roger.
12 27 27	CC	Suit-coolant and cabin-coolant control valve settings.
12 27 33	P	Roger. I'm back on 2.5 on the suit. Cabin is still shut down.
12 27 41	CC	Roger. Partial CO_2 and partial O_2.
12 27 45	P	Roger. Partial O_2 cabin is about 4.2 [psi], and suit CO_2 is on the bottom peg, zero.
12 27 55	CC	Roger. Auto and manual fuel pressure?
12 27 59	P	Roger. Auto fuel pressure, 475 [psi]; manual fuel pressure 490 [psi].
12 28 04	CC	Roger. Okay temperatures, just rotated through pitch, and all the way through.
12 28 13	P	Roger. Retro, 62 [degrees]. Pitch down, 75 [degrees]; pitch up, 60 [degrees]. Yaw left, 55 [degrees]; yaw right, 70 [degrees]. Roll counterclockwise, 95 [degrees]; roll clockwise, 93 [degrees].
12 28 37	CC	Roger, H_2O_2 reserve, manual and auto.
12 28 41	P	Roger. Auto peroxide tank is 85 [degrees], manual is 68 [degrees], and reserve is 78 [degrees].
12 28 52	CC	Roger. Cabin heat-exchanger-outlet temperature.
12 28 55	P	Cabin heat-exchanger outlet 72 [degrees]; 250 inverter, 112 [volts]; 150 inverter, about 1—just a second I'll get a light on, I'm getting in the dark—125 [volts].
12 29 13	CC	Roger.
12 29 14	P	Fans inverter about 110 [volts].
12 29 17	CC	Roger.
12 29 23	CC	Okay, that settles this. Can you give me some indication of your tape remaining?
12 29 29	P	Roger. Just a moment. Roger. I have about 75 percent remaining.
12 29 44	CC	Roger. Can you give us a blood pressure?
12 29 50	P	Roger. Coming now.
12 29 56	CC	Okay, the Cape advises that if you desire to turn your T/M to continuous, we'll cut down on the unnecessary communications for the rest of the rest period.
12 30 11	P	Roger.
12 30 31	CC	C.e.t. is showing plus 7, plus 7.
12 30 35	P	Roger. Plus 7.
12 31 12	CC	Seven, RKV. Do you intend to go on a rest period from this site?
12 31 17	P	Roger.
12 31 46	CC	Seven, RKV. Are you sweating any?
12 31 50	P	Negative.
12 31 52	CC	No sweat.
12 32 08	CC	We have you all go on aeromedical and systems. Looks like you can settle down for a long rest.
12 32 14	P	Roger. Thank you.
12 32 36	CC	Seven, RKV. We have LOS.

(NINTH PASS)

13 17 17	P	Photo number 8 being made over Africa, to the north.
		*(Non-flight-related transmission omitted.)
13 18 47	P	Another being made over Africa.
13 20 32	P	I can see roads, and rivers, and some small towns down here on the ground. Small villages are pronounced. Can almost make out the individual houses.
13 23 30	P	*Now we're in the next series of 12. Over . . . Africa. The first series were started over Africa and across on orbit 9—on across Arabia through India, and that last series of three or four pictures were made right over the Himalayas, and in the India, India-China area.
13 28 39	P	Checking fly-by-wire thrusters, they all work. Fly-by-wire lows, manual proportional, and checking manual thrusters now. Checking yaw, and yaw works, pitch down works, pitch up works, roll left works, roll right works. Manual handle off.

COASTAL SENTRY QUEBEC (NINTH PASS)

13 32 41	P	CSQ Cap Com. Faith Seven.
13 33 18	CC	Hello, Faith Seven, CSQ. Roger. Received you, go ahead with your message.
13 33 24	P	Roger. Just passing over. Everything's nominal here I haven't really started my rest period yet. I had a little tussle with the heat exchanger, with the suit, and I finally got it adjusted.
13 33 38	CC	Roger. Understand, heat exchanger is adjusted now for suit. We are still trying to pick up your TV here. We're not getting a very good picture on it. Over.
13 33 46	P	Roger.
13 33 48	CC	Roger. We had a message out around the range here to keep quiet that you were asleep, and we thought it looked like a typical asleep-type pass on your biosensors here.
13 33 59	P	Roger.
13 34 02	P	Roger. I was busy here just before the pass.
13 34 04	CC	Roger.
13 34 10	CC	Did you say you were asleep just before the pass. Over.
13 34 13	P	Negative. I was busy looking out the window and fiddling with this suit dome temp.
13 34 20	CC	Roger.
13 34 28	P	I've checked my manual and fly-by-wire thrusters and am ready to start my rest period now.
13 34 35	CC	Roger. Understand checked manual fly-by-wire. Ready to start rest period now.
13 34 39	P	Roger.
13 34 42	CC	All right. You will tell everyone to go away and leave you alone now. Okay?
13 34 48	P	Roger.
13 34 52	CC	You're looking real good, Gordo. Everything is going real fine, boy.
13 34 55	P	Roger. Thank you, John.
Unreadable	P	*. . . fourth picture on that second series was made just out from CSQ. Number 6 of second series, taken over at 13 56. Went to sleep at about 13 50. Slept 'til 14 46 quite soundly, slept quite heavily, awoke not realizing where I was—completely, soundly asleep. Picture 8 of second series in the Burma-India area at 14 58 30. Took number 9 over the Himalayas.

TENTH PASS

15 11 35	P	*Standby inverter, 102 [degrees]; 150 inverter, 110 [degrees]; 250 inverter, 102 [degrees]; H_2O_2 auto tank, 85 [degrees]; manual fuel tank, 70 [degrees]. Roll counterclockwise, 78 [degrees]; roll clockwise, 82 [degrees]; yaw right, 65 [degrees]; yaw left, 64 [degrees], pitch up, 58 [degrees]; pitch down, 70 [degrees]. Retro, 67 [degrees]. I put the window cover on 15 14 15 for a period of time and now have awakened.

ELEVENTH PASS

16 28 51	P	*Short status report: Peroxide low pressure regulated: 475 [psi] auto; 490 [psi], manual; clockwise thruster, 72 [degrees]; counterclockwise thruster, 78 [degrees]. Yaw right at 61 [degrees]; yaw left at 60 [degrees]; pitch up is 52 [degrees], pitch down is 58 [degrees]. Retro is 55 [degrees]; auto 85 [degrees]; manual is 70 [degrees]; . . . reserve is 70 [degrees]. Photo series at 16 hours and 40 minutes. Having the problem with the suit exchanger dome temp, . . . down to the freezing mark with a [comfort-control-valve] setting of about 1½. Take a setting of 1 to 1½ and then takes almost turning it off to get it back. It seems to be very inconsistent, in the settings that will take to hold an even heat exchanger dome temperature. Went asleep again and am awake now. Suit temperature is . . . 5.

TWELFTH PASS

18 04 20	P	Photo sequence number 3 made on the Indian coast line at 18 hours and 4 minutes. Next photo made at 18 hours and 5 minutes.
18 14 01	P	*The time is now 18 hours and 14 minutes. Short status report: Nitrogen low pressures: 475 [psi], auto; 490 [psi], manual. Retropack, 71 [degrees]. Pitch down thruster, 58 [degrees]; pitch up, 50 [degrees]. Yaw left, 58 [degrees]; yaw right 52 [degrees]; roll counterclockwise, 72 [degrees]; [roll] clockwise, 70 [degrees]. H_2O_2 auto tank, 82 [degrees]; peroxide manual tank, 72 [degrees]; peroxide reserve. . . . Main bus is 25½ [volts]; isolated bus voltage is 28½ [volts]. [Battery number 1] 25 [volts]; number 2 is 25 [volts]; number 3 is 25 [volts]; standby 1 is 25 [volts]; standby 2 is 25 [volts]; isolated is 28½ [volts]; back to main. Reading 121 volts on the fans. Everything is proceeding along very well. Everything is normal, except for this bothersome heat-exchanger dome temp, and I just can't seem to keep it either from being on the freezing mark or going on over. I vary the settings between . . . and completely off.

COASTAL SENTRY QUEBEC (THIRTEENTH PASS)

19 38 39	P	*Went to sleep again, slept very soundly. And it's time for a short status report: Nitrogen regulated pressure . . . auto, 475 [psi], manual, 490 [psi]. B-nut temps: First, retro temp, 75 degrees. Pitch down thruster, 55 [degrees]; pitch up thruster, 50 [degrees] yaw left, 56 [degrees]; yaw right, 50 [degrees]; Roll counterclockwise, 72 [degrees]. Roll clockwise, 70 [degrees]; Peroxide auto tank, 82 [degrees]; manual tank, 72 [degrees]; reserve tank, 75 [degrees]. Isolated bus voltage, 28.
19 42 15	P	*One comment on these various sleep periods that I've had; nearly everytime that I have awakened, I found that I have been so soundly asleep I don't even know where I am when I awake.
20 23 37	P	*Have a note to be added in for head-shrinkers. Enjoy the full drifting flights most of all, where you have really the feeling of freedom, and you aren't worried about the systems fouling up. You have everything turned off and just drifting along lazily. However, I haven't encountered any of this so called split-off phenomena. Still, note that I am thinking very much about returning to earth at the proper time and safely. Over.

FOURTEENTH PASS

21 00 35	P	Time for another short status report. Auto regulated pressure: 475 [psi], manual, 490 [psi]. Retropack temp, 75 [degrees], pitch down thruster, 51 [degrees]; pitch up, 49 [degrees]; yaw left, 55 [degrees]; yaw right, 50 [degrees]; roll counterclockwise, 72 [degrees]; roll clockwise, 70 [degrees]. Peroxide auto tank, 80 [degrees]; manual tank, 74 [degrees]; reserve tank, 74 [degrees].
21 02 39	P	Darned suit heat-exchanger [comfort-control valve] again. Setting is down to 1¼. One and one-half held it for a while. And now it's gone down to 40 [degrees] on the dome temp. Inlet temp, 62 [degrees].
21 05 16	P	Number 7, sequence 3 was made looking back at Arabia. At 21 05, cabin temp is now 82 degrees; 250 inverter is 95 [degrees]; 150 inverter is 115 [degrees]; a standby inverter is 95 [degrees].

MUCHEA (FOURTEENTH PASS)

[Extended garbled transmission here. It sounded as though it might have been Spanish.]

21 22 34	P	Hello, Muchea Cap Com. Faith Seven here. Over.
21 22 39	CC	Go ahead, Faith Seven. This is Muchea Cap.
21 22 43	CC	Go ahead, Faith Seven. This is Muchea Cap Com.
21 22 46	P	Roger, Muchea Cap Com. Faith Seven. I'm awake now. Just thought I'd check in with you.
21 22 50	CC	Roger. How was your sleep?
21 22 54	CC	How was your sleep?
21 22 56	P	Very good.
21 22 58	CC	Do you like your coffee white or black?
21 23 02	P	I'll have tea, thank you.
21 23 04	CC	*Roger.
21 23 10	P	In fact, hot black tea would go very well right now.
21 23 14	CC	Roger.
21 23 18	CC	When you get a chance, will you give us your spacecraft status and your status?
21 23 24	P	Roger. Everything is nominal heare. I've had some difficulty with the suit heat-exchanger dome temp, and it's been running with the light on most of the time; but I have it well under control and the suit inlet temp has been running very comfortably.
21 23 45	CC	Very good.
21 23 47	P	My status is excellent.
21 23 50	CC	Roger. Will you give me an auto and manual fuel reading?
21 23 55	P	Roger. Let me get some more lights on here, since I'm in the dark.
21 24 00	P	*Roger. Auto fuel is reading 69 percent and manual 95 percent.
21 24 10	CC	Say again last.
21 24 11	P	Oxygen 150 percent on primary; 100 percent on secondary. The manual fuel is 95 percent.
21 24 23	CC	Roger. I didn't copy your manual fuel.
21 24 25	P	Roger. Manual fuel is 95 percent.
21 24 28	CC	I copied auto at 79.
21 24 32	P	Roger. It's 69, 69.
21 24 35	CC	Roger.

21 24 37	P	Cabin temp is 84 degrees.
21 24 41	CC	Roger.
21 24 55	CC	Stand by, Faith Seven.
21 24 57	P	Roger.
21 25 13	CC	I have [recovery] area 15–1 retrosequence time. Please prepare to copy.
21 25 21	P	Roger. Go.
21 25 24	CC	22 02 13.
21 25 28	P	Roger. 22 02 13.
21 25 31	CC	That's affirmative. Area 15–1.
21 25 43	P	Roger. Got it.
21 25 45	CC	What's your present control mode?
21 25 49	P	I'm in full drift.
21 25 51	CC	Roger.
21 25 59	CC	We have about 1 minute to LOS.
21 26 02	P	Roger.
21 26 39	CC	Hello, Faith Seven, Muchea Cap Com. Do you have anything to report?
21 26 44	P	Negative. I guess not. Everything's fine here.
21 26 47	CC	Roger. Systems report, you go here and aeromed, also.
21 26 51	P	Roger. Thank you.
21 26 53	CC	Roger.
21 36 40	P	*It is 21 36 46 NOW. (21 36 46)[T] I am observing lights of several small cities and scattered areas on the ground. Apparently over the east coast of Australia.
21 46 18	P	*I am viewing to the east now; and I can see very clearly, as I mentioned before, a band of haze layer above the Earth's horizon through which the stars can be seen. Although they're quite faint here and then clear below it. It goes around the earth, approximately the same distance around, just a corona-type thing around the Earth's surface.
21 49 38	P	*I would like to take this time to say a little prayer for all the people, including myself, involved in this launch and this operation. Father, thank You, for the success we have had in flying this flight. Thank You for the privilege of being able to be in this position, to be up in this wondrous place, seeing all these many startling, wondrous things that You've created. Help guide and direct all of us that we may shape our lives to be good, that we may be much better Christians, learn to help one another, to work with one another, rather than to fight. Help us to complete this mission successfully. Help us in our future space endeavors that we may show the world that a democracy really can compete, and still is able to do things in a big way, is able to do research, development, and can conduct various scientific, very technical programs in a completely peaceful environment. Be with all our families. Give them guidance and encouragement, and let them know that everything will be okay. We ask in Thy name. Amen.

CAPE CANAVERAL (FIFTEENTH PASS)

22 03 39	P	Hello, Cape Cap Com. Faith Seven here.
22 03 47	P	Roger, shoot.
22 03 55	CC	The regulated low pressure scores.
22 04 00	P	Roger. I'm reading 475 [psi] auto and 490 [psi] manual.
22 04 10	CC	Could we have an H_2O_2 reading?
22 04 16	P	Roger. That's—say again.
22 04 21	CC	. . . .
22 04 28	P	Just a minute on the . . . .
Unreadable	P	Roger.
Unreadable	CC	Faith, can I have you on H_2O_2 tank temperature?
Unreadable	P	Auto tank is 81 degrees; manual tank is 74 degrees; reserve tank is 74 degrees.
22 06 05	CC	Faith Seven, Cape Cap Com. Over.
22 06 07	P	Cape, Faith Seven.
22 06 09	CC	Roger. Did you use any auto fuel during the sleep period?
22 06 15	P	Negative.[1]
22 06 19	CC	Would you put your R and Z cal to auto?
22 06 22	P	Roger.
22 06 26	CC	We reckoned your fuel to the 69 and 89 (percent). Over.
22 06 32	P	Roger. I read you 69 and 95.

[1] Pilot answer referred to current rest period only.

22 06 38	CC	Roger.
22 06 42	CC	Is your tape recorder on schedule?
22 06 57	CC	We are getting a good picture of you on TV now. Over.
22 07 01	P	Roger. Understand.
22 07 04	CC	Did you transfer any water or urine? Over.
22 07 10	P	Boy, did I ever!
22 07 17	CC	Do you have any air wick observation?
22 07 27	P	Roger. They seem to separate water all right.
22 07 39	CC	Faith Seven, did you make any air wick observation? Over.
22 07 43	P	Affirmative. It does separate water. Over.
Unreadable	P	Did you read me, Cape?
Unreadable	CC	Roger. I read you now. Did you make an air wick observation?
22 08 00	P	Affirmative. It works.
22 08 04	CC	Roger. How is your comfort and humidity level in the suit?
22 08 11	P	Fine.
22 08 12	CC	Very good.
22 08 15	CC	Our surgeon has some goodies. Did you have any dreams?
22 08 20	P	Negative. I slept too soundly to dream.
22 08 24	CC	Roger. We thought you might have had one one time when your suit dome light may have come on.
22 08 33	P	My suit dome light was on a good portion of the time.
22 08 36	CC	Roger. We understand that.
22 08 40	CC	We'd like you to give a body temperature to Canary on your next pass over them coming up. Would you set your oral probe on for that? Over.
22 08 50	P	Roger.
22 08 53	CC	Pass time at Canary is nominal, so about 2 or 3 minutes before would help.
22 09 00	P	Roger.
22 09 09	CC	Would you give us a reading on your coolant-control-valve settings, and what they are now?
22 09 16	P	Roger. Right at the moment I'm reading about 1.8 on suit temp and the cabin is still turned off.
22 09 27	CC	Roger. We concur.
22 09 45	CC	Faith Seven. R and Z cal program switch to off.
22 09 54	P	Roger. Off.
22 09 56	CC	And you can secure TV. We had a pretty fair picture.
22 10 00	P	Roger.
22 10 08	CC	We can see you were drifting and dreaming, can't we?
22 10 11	P	Roger.
22 10 30	CC	Faith Seven, Cape Cap Com.
22 10 32	P	Come in Cape Com, Faith Seven.
22 10 34	CC	I've been asked to relay a message to you from the president of the Republic of El Salvador. I will read: "In the name of the Salvadorian government and people, and in my own right, it gives me pleasure to send you cordial greetings and sincere congratulations on the occasion of your valiant exploit, which constitutes an historic triumph for the free world. Julio Adalberto Rivera, President, El Salvador."
22 11 06	P	Very good, very good.
22 11 07	CC	Roger.
22 12 00	CC	Faith Seven, Cape Cap Com.
22 12 02	P	Go ahead, Cape.
22 12 06	CC	I'll give you c.e.t. hack at 50 mark.
22 12 08	P	Roger.
22 12 09	CC	That was 22 11 50.
22 12 13	P	Roger.
22 12 16	CC	MARK 12 minutes.
22 12 18	P	Roger.
22 12 24	P	. . .
22 12 36	CC	Faith Seven, you're cutting out, it's about LOS. See you next time around boy-san.
22 12 41	P	Roger.

CANARY ISLANDS (FIFTEENTH PASS)

22 18 26	CC	Faith Seven, this is Canary Cap Com. You need not acknowledge this transmission, requesting you turn on your TV and your S-band beacon if you have not already done so.
22 18 40	P	Roger. TV's on.
22 18 49	CC	This is Canary Cap Com. Did you put your—wait a minute, we're getting the body temperature now.
22 19 17	CC	This is Canary Cap Com. Surgeon requests that you hold your body temp probe in your mouth for about 1 more minute.
22 20 01	CC	This is Canary Cap Com. You may take the body temperature probe from your mouth now. Over.
22 20 09	P	Roger. Thank you.
22 20 14	CC	Your [contingency recovery area] 15-Bravo [retrosequence] time is nominal and request a partial O_2 readout, please.
22 20 26	P	Roger. My 15-Bravo is nominal. Cabin partial pressure O_2 is about 4.2 [psi].
22 20 34	CC	Roger. Understand 4.2. I'd like to try to get a c.e.t. clock error here; so I'm going to give you a time hack. I'd like for you to give me the difference in the clocks. On my mark the time will be 22 20 40. MARK. (22 20 57)[T]
22 20 58	P	. . .
22 21 01	CC	Understand 15 seconds.
22 21 05	CC	Roger. . . . .
22 21 07	P	Roger. Understand.
22 21 29	CC	Astro confirms 15. Over.
22 21 35	?	Roger.
22 22 15	CC	This is Canary Cap Com. Could you give me a cabin-pressure readout, please?
22 22 20	P	Roger. Cabin pressure 5.2 [psi].
22 22 23	CC	Roger.
22 23 37	CC	We're getting pretty close to LOS here. Request you turn TV off and the S-band beacon to ground command. Over.
22 23 44	P	Roger. TV off and S-band beacon to ground command.
22 23 47	CC	Roger.

KANO (FIFTEENTH PASS)

22 27 16	CC	Faith Seven, this is Kano Cap Com. We have T/M solid. We would like a cabin (heat-
22 27 24	P	exchanger) dome temperature. That is the only high reading. Over.
		. . .
22 27 34	CC	Say again.
Unreadable	P	. . .
27 27 44	CC	Roger.
22 27 49	CC	Astro, have you eaten? Over.
22 27 58	CC	Astro, this is Kano Cap Com. Have you eaten? Over.
22 28 03	P	. . . Cabin dome is 72 degrees.
Unreadable	CC	Roger. Have you eaten? Over.

ZANZIBAR (FIFTEENTH PASS)

22 36 27	CC	Faith Seven, Zanzibar Cap Com.
22 36 29	P	Roger, Zanzibar, Faith Seven.
22 36 32	CC	T/M looks good on the ground here. We have no big problems. Like to have fuel and oxygen readings.
22 36 39	P	Roger. . . . fuel, auto . . ., manual 95 percent. Oxygen 150 percent primary, and 100 percent secondary.
22 36 53	CC	Please repeat primary oxygen.
22 36 56	P	150 percent.
22 36 58	CC	Roger. Your [recovery area] 16–1 [retrosequence] time, 23 31 03. 23 31 03.
22 37 12	P	23 31 03.
22 37 16	CC	That is affirmative. That is g.e.t. and does not include your clock error.
22 37 20	P	Roger.
22 37 26	CC	Faith Seven. Have you eaten this morning?
22 37 30	P	Negative. Not yet this morning.
22 37 33	CC	Roger.

22 37 53	CC	Faith Seven, Zanzibar Cap Com. The surgeon would like to know what—how you feel this morning?
22 37 58	P	Fine. Excellent.
22 38 04	CC	Very good.
22 49 25	P	And here comes the short status report again: Nitrogen regulated low pressure: auto, 475 [psi]; manual 490 [psi]. B-nut temperature: pitch down, 50 [degrees] pitch up, 49 [degrees]. Yaw left, 55 [degrees]; yaw right, 51 [degrees]. Roll counterclockwise, 78 [degrees]; roll clockwise, 78 [degrees]. Auto peroxide tank, 80 [degrees]; manual tank, 72 [degrees]; reserve tank, 73 [degrees]. Isolated bus voltage, 28.

MUCHEA (FIFTEENTH PASS)

22 53 25	CC	Faith Seven, Muchea Cap Com.
22 53 27	P	Roger, Muchea Cap Com. Faith Seven.
22 53 30	CC	Are you checking your high thrusters?
22 53 40	CC	Are you checking your high thrusters?
22 53 54	CC	Faith Seven, Muchea Cap Com. Do you copy?
22 53 56	P	Roger, Muchea Cap Com. I am not . . . my thrusters. Over.
22 54 01	CC	Say again last.
22 54 02	P	I am not checking my thrusters. Over.
22 54 05	CC	Roger. We had a partial T/M dropout.
22 54 10	P	Roger.
22 54 16	CC	Have you made any checks on thrusters?
22 54 19	P	Roger. I made a couple of them, three different ones of them. I'm going to bring up my rate indicators shortly and check the rest of them.
22 54 29	CC	Roger.
22 55 03	CC	Systems report T/M looks good and aeromeds report you look good.
22 55 07	P	Roger.
22 55 33	CC	Are you changing the control valve setting on your suit heat exchanger?
22 55 38	P	Roger. Suit dome is on its way down very slowly.
22 55 45	CC	Roger. We concur.
22 55 52	CC	Have you had your breakfast?
22 55 54	P	Negative.
22 57 00	CC	Faith Seven. Could you give me a report on that thruster check? Which thrusters are okay?
22 57 06	P	Roger. I've checked my yaw thrusters both auto and manual. I'm going to ASCS bus and then turn my rate gyros on, and in first-light then check the remainder of my thrusters.
22 57 24	CC	Roger.
22 57 26	P	While alining the spacecraft.
22 57 28	CC	Say again.
22 57 30	P	I will check thrusters while alining spacecraft, while uncaging gyros.
22 57 34	CC	Roger.
22 59 38	CC	We have approximately 1 minute to LOS.
22 59 42	P	Roger.
23 06 51	P	*Just brought the rate indicators to manual on position, and they're indicating about a half of a degree right roll rate, half a degree pitch up rate, and 1 degree left yaw rate. I have now checked my manual proportional thrusters, and they all function correctly and C-band beacon on continuous.

GUAYMAS (FIFTEENTH PASS)

23 31 02	CC	Faith Seven, Guaymas Cap Com.
23 31 07	P	Go ahead, Guaymas Cap Com, Faith Seven.
23 31 09	CC	You sound good, Gordo. Are you going to have time for the ASCS?
23 31 14	P	Roger. The ASCS is powered up. I powered it up about 1 minute ago. Right now, my rate indicators are powered up.
23 31 27	CC	Roger. Tape recorder continuous.
23 31 30	P	Roger. Tape recorder continuous.
23 31 32	CC	How about the C-band?
23 31 35	P	Roger. . . . .

23 31 36	CC	Roger. Are you going to check your thrusters over here?
23 31 44	P	Roger. I've already checked my manual thrusters, and I've checked about half of my fly-by-wires. I'm going to wait 'til daylight and I'll get the rest of my fly-by-wires while I aline the spacecraft.
23 31 59	CC	Roger. You say you're waiting for daylight.
23 32 01	P	Roger. I'm going to aline the spacecraft with the thrusters while getting a check on the rest of them.
23 32 08	CC	Roger.
23 32 21	P	I'll check my fly-by-wires now and aline my spacecraft manually on the manual proportional.
Unreadable	CC	Roger.
23 32 29	P	Checking fly-by-wires now. Man, do those ever throw out the fire at night.
23 32 48	CC	Say again, Gordo. I didn't read that.
23 32 49	P	You can really see the sparks from the thrusters at night.
23 32 53	CC	Ha, ha! Roger.
23 33 13	P	Roger. All fly-by-wire low thrusters work correctly.
23 33 18	CC	Roger.
23 33 29	CC	Could you give me your fuel readings, Gordo?
23 33 33	P	Roger. I have 65 percent auto and 95 percent manual.
23 33 38	CC	Roger.

CAPE CANAVERAL (SIXTEENTH PASS)

23 36 44	CC	Faith Seven, Cape Cap Com. Do you read? Over.
23 36 46	P	Roger, Cape Cap Com, Faith Seven.
23 36 49	CC	Roger. Welcome back, Gordo.
23 36 52	P	Roger. Thank you.
23 36 53	CC	I have a roll angle for you for your dim light study. Over.
23 36 59	P	Roger. Go ahead.
23 37 01	CC	Your angle is 34 degrees at sunset. That is, roll right, 34 degrees.
23 37 08	P	34 degrees. Understand.
23 37 10	CC	Could you give me a reading of your cabin air?
23 37 13	P	Roger. Cabin air temp's about 86 degrees.
23 37 17	CC	Roger, 86. Have you had a good meal today?
23 37 22	P	Fairly good.
23 37 25	CC	Roger.
23 37 27	P	I'm alining the spacecraft now.
23 37 33	CC	Roger. Your attitudes look like you're almost in.
23 37 39	P	It would because the gyros are still caged.
23 37 42	CC	That's interesting.
23 37 44	P	I say they would because the gyros are still caged.
23 37 47	CC	Good deal. You've got real good attitudes on the caged gyros.
23 37 50	P	Roger.
23 37 52	CC	Did you read that I said roll right 34 degrees?
23 37 55	P	Roll right 34 degrees. Roger.
23 38 09	CC	Would you give us some TV, Gordo?
23 38 27	CC	Hello dahr.
23 38 28	P	Hello dahr.
23 39 32	CC	Faith Seven, Cape Cap Com. Would you give us a yell if you get an auto fuel light? Over.
23 39 37	P	Roger.
23 40 57	P	*Caged gyros coming to slave.
23 41 02	CC	Roger.
23 41 20	CC	Our scanners are checking out quite closely, Gordo.
23 41 24	P	Roger.
23 42 36	P	Going to auto.
23 42 46	P	Foiled it again.
23 43 10	CC	Faith Seven, Cape Cap Com.
23 43 12	P	Go ahead, Cape Cap Com, Faith Seven.
23 43 15	CC	Roger. You can kill your TV. Your scanners and attitudes match perfectly at LOS.
23 43 21	P	Roger. Thank you.

23 43 26	P	I'm on auto control.
23 43 28	CC	Roger. Understand on auto control.
23 43 30	P	Roger.

*[Unconfirmed transmissions omitted.]

CANARY ISLANDS (SIXTEENTH PASS)

23 51 41	CC	Faith Seven, this is Canary Cap Com. We have T/M solid. All systems are green. Do you confirm TV on? Over.
23 51 53	P	Roger. TV is on.
23 53 34	CC	This is Canary Cap Com. Could you send us a blood pressure now, if you please?
23 53 39	P	Roger.
23 53 46	CC	We are receiving blood pressure now.
23 56 22	CC	Faith Seven, would you take a deep breath and hold it, please?
23 56 26	P	Roger.
23 56 31	CC	Okay, exhale, exhale.
23 57 03	CC	Faith Seven, inhale, please.
23 57 50	CC	This is Canary Cap Com, we are coming up on LOS. You may turn off your TV camera, please.
23 57 54	P	Roger.

KANO (SIXTEENTH PASS)

23 58 01	CC	Faith Seven, Kano has T/M solid.
23 58 04	P	Roger, Kano. All systems green here.
23 58 07	CC	I'll give you a check in a minute. Thank you.
23 58 10	P	Roger.
23 58 12	CC	They are all green on the ground.
23 58 14	P	Roger.
23 59 36	CC	Faith Seven, this is Kano Cap Com.
23 59 40	P	Go ahead, Kano.
23 59 41	CC	I thought I'd tell you that [contingency recovery] Area 16–B [retrosequence time] is nominal.
23 59 45	P	16–B is nominal. Roger. Thank you.
24 05 20	CC	Site of Kano will have LOS at 13 08 56.

ZANZIBAR (SIXTEENTH PASS)

24 06 39	P	Hello, Zanzibar, Faith Seven here.
24 06 42	CC	Faith Seven, Zanzibar Cap Com. Go ahead.
24 06 45	P	Roger. First, I have a message for you.
24 06 47	CC	Roger.
24 06 51	P	Hello Africa. This is Astronaut Gordon Cooper, speaking from Faith Seven. I am right now over 100 miles above Africa, speaking to the Zanzibar station. Just a few minutes ago, I passed Addis Ababa. I want to wish success to your leaders there. Good luck to all of you in Africa.
24 07 12	P	Are you ready for a consumable readout now?
24 07 14	CC	Go ahead.
24 07 16	P	Roger. Auto fuel, 63 [percent]; manual, 93 [percent]. Oxygen primary, 145 [percent], secondary 100 [percent].
24 07 29	CC	Confirmed. T/M looks good on the ground here.
24 07 36	P	Roger.
24 07 45	CC	How does it feel on the second day, Gordo?
24 07 48	P	Fine. I may get used to this thing, yet.
24 07 52	CC	Roger.
24 09 17	CC	Faith Seven. Zanzibar Cap Com.
24 09 18	P	Go ahead, Zanzibar.
24 09 20	CC	The surgeon would like to know how deep is your breathing at the present time.
24 09 26	P	Roger. Not very deep.
24 09 28	CC	Roger. Thank you.
24 09 30	P	Here is a full breath.

24 09 34	CC	Please repeat.
24 09 35	P	All right. Now I have a full breath in.
24 09 39	CC	You are taking full breaths. Very good. That's what our recording on the ground shows.
24 09 43	P	Roger.
24 10 18	P	I am now in auto control. Set up for the dim-light experiment. As soon as the Sun approaches the horizon, I will aline with the Sun. Fly-by-wire. Cage and put gyros free. Roll 34 degrees right, cage, gyros free. Back on auto and start taking the pictures.
24 11 03	CC	Faith Seven. Zanzibar Cap Com.
24 11 06	P	Go ahead, Zanzibar.
24 11 08	CC	How much tape do you have remaining on your recorder?
24 11 12	P	About 70 percent.
24 11 14	CC	Roger. Cape advises that you can go onto continuous tape recording.
24 11 20	P	Roger.
24 13 50	CC	Faith Seven. Zanzibar Cap Com.
24 13 52	P	Go ahead, Zanzibar.
24 13 54	CC	Clock readout now shows a +16 seconds. I will give you a mark at 24 13 50.
24 14 02	P	Roger.
24 14 06	CC	1. MARK. (24 14 07) T
24 14 10	P	Roger. I was reading 24 14 07 at the time. That's about right—16 seconds.
24 14 22	CC	Roger.
24 14 23	P	Yeah. I was reading just 6, going to 7. That would be right.
24 17 54	P	Okay. The Sun is almost to the horizon. I'm going to fly-by-wire low—yawing over to the left just a little to get to the Sun.
24 19 04	P	I'm perfectly alined. Caging the gyros. Bang, bang. Gyros to free. I'm going to have to get them again. Quite alined in yaw.
24 19 50	P	Boy! This is going to be a doozy, right into the Sun.
24 20 55	P	Okay, gyros caged, to free, 34 degrees right.
24 21 52	P	Gyros caged; gyros free; auto orbit mode; lights off; warning lights off.
24 22 31	P	Here comes 1. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15. 1,001. Number 2 exposure. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15. Third exposure. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15. Fourth exposure. Trip. 1,001. Release. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15. Trip. 1, 2, 3. Release. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15. Trip. 2, 3. Release. 1,001. 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15. Number 3. 1, 2, 3. Release. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15. Number 4. 1, 2, 3. Release. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, Here comes 1. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15. 1,001. Number 2 exposure. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15. Third exposure. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15. Fourth exposure. Trip. 1,001. Release. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15. Trip. 1, 2, 3. Release. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15. Trip. 2, 3. Release. 1,001. 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15. Number 3. 1, 2, 3. Release. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15. Number 4. 1, 2, 3. Release. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15. 10-second series. Trip. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10. Release. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15. Trip. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10. Release. 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15. Trip. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10. Release. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15. Trip. 2, 3, 4, 5, 6, 7, 8, 9, 10. Release. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15. 30-second exposures. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30. Release. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30. Trip. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30. Release. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30. 1, 2, 3. Go ahead, Muchea. 5, 6, 7, 8, 9, 10, 11, 12.

MUCHEA (SIXTEENTH PASS)

24 27 57	P	Roger. Status is green.
24 28 00	CC	Roger. We have it.
24 28 02	P	Dad burn it 21, 22, 23, 24. Roger. Thank you. Roger, I'm busy taking all these picture sequences, counting 1, 2, buckle-my-shoe type thing.
24 28 23	CC	Roger.