

Faith 7 for 22 Orbits

Thirteen seconds past 8: Q4, range-zero time, on the morning of May 15, 1963, Mercury-Atlas 9 lumbered upward the two inches that defined liftoff and thundered on toward its keyhole in the sky. Inside MA-9, Astronaut Gordon Cooper felt the smooth but definite push intensify as *Faith 7* gained altitude faster each second. His clocks marking the moments in synchronization, Cooper shouted through the din of the afterburner behind him to Walter Schirra, his predecessor and now capsule communicator at the Cape, "Feels good, buddy. . . . All systems Go "[55](#)

Sixty seconds upward, MA-9 initiated its pitch program, and Cooper felt the max-q vibrations grow, but the rate gyros sensed greater lateral oscillations than the pilot did. Six or seven swings from peg to peg on his instruments, and the flight smoothed out. Two minutes and 14 seconds upward Cooper heard "a loud 'glung' and then a sharp, crisp 'thud' for staging" as booster engines cut themselves out and off. Then away flew the needless escape tower, and at three minutes after launch cabin pressure sealed and held while Cooper reported, "*Faith Seven* is all go."

The Atlas sustainer engine continued to accelerate, and its guidance system performed perfectly for two more minutes before SECO. *Faith 7* and "*Sigma 7*" swapped remarks on the sweetness of the trajectory. Schirra, at the point of Cooper's orbital insertion and capsule separation, said, "Smack dab in the middle of the go plot. Beautiful." And Cooper replied, after turning around on the fly-by-wire, "Boy, oh, boy . . . working just like advertised!"

In full horizontal flight over Bermuda at 17,547 miles per hour, Cooper watched his booster lag and tumble for about eight minutes, then checked his temperatures and contingency recovery areas, and tried to adjust to the strange [495] new sensations and perspectives at a little more than 100 miles (near his perigee) above sea level. Floating higher in his couch, now that he was weightless, Cooper agreed with Carpenter's report that an astronaut's sense of the cockpit changes when he reaches zero g and no longer feels himself flying flat on his back. Status checks with the Canary Islands and Kano, Nigeria, came on so fast that Cooper could hardly believe he had crossed the Atlantic Ocean and half of Africa already.

Over Zanzibar, he learned that his orbital parameters looked good enough for at least 20 revolutions and that all *Faith 7*'s telemetry was working well. His suit temperature fluctuated somewhat erratically, but as he watched his first sunset from space over the Indian Ocean he forgot his discomfort while looking at the airglow, spotting the twinkleless stars, and observing sheet lightning in scattered thunderstorms "down under." He saw the lights of Perth, Australia, on schedule 55 minutes after liftoff, and over Canton Island, in the Polynesian Archipelago, just south of the equator, the Sun began to rise behind him (as he flew backward toward the sunrise), and Cooper reported observing Glenn's "fireflies," or Carpenter's "frostflies," drifting along with the spacecraft at five miles per second.

From Guaymas, Mexico, Grissom, acting as capsule communicator, officially relayed the computer-blessed "go for seven orbits." Cooper, audibly impressed with the perfection of the flight so far, said, "It's great. . . . quite a full night. . . everything appears very nominal on board here." As Cooper passed over the launch site at Cape Canaveral, Schirra raised him on the radio circuits once again and complained, "You son-of-a-gun, I haven't got anything to talk about. . . . I'm still higher and faster, but I have an idea you're going to go farther." The manned one-day mission was off to an auspicious start. Alan Shepard, who had been Cooper's backup pilot and was now also talking to *Faith 7* from Mercury Control, coached Cooper into his second orbit, saying, "All of our monitors down here are overjoyed. Everything looks beautiful."

Cooper thought so, too. All his spacecraft and physiological systems performed perfectly on his first two orbits. His only complaint concerned an oily film on his "windshield" that seemed to be on the outside pane of the window. Between Zanzibar and Muchea on his second pass, Cooper dozed off for a four-minute nap and then drifted across the Pacific, observing storms while inverted and stars when facing spaceward.

Beginning with his third orbit, the astronaut checked over the 11 experiments in which he was to participate. He prepared to eject a six-inch-diameter sphere, equipped with polar xenon strobe lights, that was to test his ability to spot and track a flashing beacon in a tangential orbit. At three hours and 25 minutes elapsed time, Cooper clicked the squib

switch and heard and felt the beacon kick away. But, try as he might, he could not see the flashing light in the dusk or on the night side during this round. On the fourth orbit, however, he did spot the beacon at sunset and later saw it pulsing. So he knew he had indeed launched a satellite from his satellite. Cooper jubilantly reported to Carpenter on Kauai, "I was with the little rascal all night."

[496] Subsequently, on his fifth and sixth orbits, Cooper saw the flashing xenon several more times, and likewise spotted the constant xenon ground light of 44,000 watts placed at Bloemfontein, a little horseshoe-shaped town in the Union of South Africa. Having eaten some bite-sized brownie and fruitcake foods and excreted periodic samples for urinalysis, Cooper also kept up with his calibrated exercises, took oral temperatures and blood pressure readings, and did other duties required for the highest priority experiments of the MA-9 mission, the aeromedical ones.

Also on his sixth orbit, after nine hours in space, the astronaut set his cameras, attitude, and switches to deploy a tethered balloon, similar to the one tried on MA-7, for aerodynamic studies of drag and for more visual experiments. The balloon, a 30-inch-diameter Mylar sphere painted fluorescent orange, was to be inflated with nitrogen and attached by a 100-foot nylon line to the spacecraft antenna canister; a strain gauge in the canister should be able to measure the differences in pull on the balloon at apogee (166 miles) and perigee (100 miles). Cooper carefully went through his checklist, then tried to eject the balloon package, but nothing happened. He tried again, and still nothing happened. Because the antenna canister was later lost, no one ever knew why the tethered balloon failed to eject. But the second failure of this experiment was more severely disappointing than the first.

When Cooper surpassed Schirra's record by moving into a seventh orbital pass, he was engaged with the radiation experiments and with the hydraulic work of transferring urine samples and condensate water from tank to tank. During the automatically recorded radiation measurements, he had to turn the recorders on and off precisely on time and estimate accurately, without benefit of gyros, his drifting spacecraft's attitude. The hydraulic work was more difficult, because the hypodermic-type syringes used to pump the liquid manually from one bag container to another were unwieldy and exasperatingly leaky. At 9:27 elapsed time, Cooper spoke into his tape recorder, "The thing about this pumping under zero g is not good. [Liquid] tends to stand in the pipes, and you have to actually forcibly force it through."

After 10 hours of the mission, Zanzibar officially informed Cooper that he had a go for 17 orbital passes. The tracking, communication, and computing facilities at Goddard Space Flight Center in Maryland had long since settled down to a routine in following *Faith 7* around the world. The actual orbital parameters for Cooper's flight were proving so close to those planned that the differences were measurable only in tenths of a mile and hundredths of a degree. MA-9 was circumnavigating Earth once every 88 minutes and 45 seconds at an inclination angle of 32.55 degrees to the equator. Soon, as Earth turned beneath Cooper, his orbital track would have shifted too much to keep him within range of most of the scattered tracking and communications sites in Mercury's worldwide network. Then, too, the word "orbit" would become confused, because passing [497] over the same meridian on the rotating planet is not the same as passing through the space-fixed point of orbital insertion.

Cooper spent his last "orbit" before his scheduled rest period, on orbits 9 through 13, in extensive activity. He finished the radiation measurements; he ate his supper of powdered roast beef mush and gulped some water; he took pictures over India and Tibet; and he checked all his machinery for readiness to power down and drift and dream for the next seven hours or so. Passing from the Himalayas to Japan in less than five minutes, Cooper was aroused by John Glenn's second transmission from the tracking ship *Coastal Sentry*, located near Kyushu. Veteran spaceman Glenn assured Astronaut Cooper, "You're sure looking good. Everything couldn't be finer on this pass." Ten minutes later Cooper had traversed the Pacific lengthwise in a southeasterly direction and had come over the telemetry command ship *Rose Knot*, positioned near Pitcairn Island, at latitude 25 degrees south and 120 degrees west. There he gave a full report on all systems; the shipborne communicator advised him to "settle down for a long rest."

But Cooper was still too excited and fascinated to feel sleepy. Orbit 9 was to carry him again around South America, over Africa, northern India, and Tibet during daylight, and he resolved to record on film some of the remarkable things he could see while looking down at open terrain. On this circuit Cooper snapped most of his best photographs, demonstrating his contention that he could see roads, rivers, small villages, and even individual houses if the lighting and background conditions were right. High over the highest plateau on Earth, the Tibetan highlands, where the air is

thin and visibility is seldom obscured by haze, Cooper thought he could even judge speed and direction of ground winds by the smoke from the house chimneys.

In their third radio contact, John Glenn, as "Coastal Sentry Quebec," advised Cooper, who had now been in space over 13 hours, 34 minutes, that he should "tell everyone to go away and leave you alone now." Cooper then relaxed and fell into a sound sleep. He awoke drowsily an hour later when his suit temperature got too high. Intermittently, for the next six hours, during orbital passes 10 through 13, Cooper napped, took more pictures, taped status reports occasionally, and cursed to himself over the bothersome body-heat exchanger that kept creeping away toward freezing or burning temperatures. At the end of his rest period, Cooper taped his surprise at having napped so soundly that neither floating arms nor weightless dreams had startled him into awareness of where he was when he woke. But he cautioned psychologists not to make too much of this:

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.

[499] Coming around Muchea again, on his fourteenth pass, Cooper checked over all his systems, found his oxygen supply plentiful, and reported his peroxide fuel for attitude control showing 69 percent remaining in the automatic tank and 95 percent in the manual. He was in good shape, and all systems were still working "as advertised." At this point, Gordon Cooper spoke a prayer into his tape recorder aboard *Faith 7*, high in the heavens over the South Pacific. The MA-9 mission was well beyond its midpoint in time and space, and Cooper was humbly grateful that everything was still nominal. Physiologically his vision he knew was abnormally good. Philosophically the vision of this eighth man in history to orbit Earth in a manned satellite was bound to his culture, his times, and his origins in Oklahoma. [56](#)

Orbit 15 was consumed largely in calibration of equipment and synchronization of clocks, since by now Earthmen had experienced one more full 24-hour day of grace, whereas *Faith 7*'s elapsed time was faster by some 16 seconds than range-zero elapsed time. Orbit 16 brought Cooper back over Cape Canaveral and onward, virtually retracing his first shadow over Earth. The President of El Salvador had radioed greetings on pass 15, and on 16 Cooper sent a similar political greeting to African leaders meeting in Ethiopia. Then he buckled down immediately to another high-priority experiment requiring elaborate timing precautions.

As he entered Earth's shadow, or night side, on this sixteenth orbit, Cooper caged and freed his gyros in such a manner as to allow his automatic attitude control system to torque the spacecraft slowly in pitch through the plane of the ecliptic. He could view, through his window, the mysterious phenomena of zodiacal light and night airglow layer. Together these two different objectives were called "dim light" phenomena, and the experimental photographs were designed to answer astrophysical questions about the origin, continuity, intensity, and reflectivity of visible electromagnetic spectra along the basic reference plane of the celestial sphere. They might also help answer some questions about solar energy conversion in the upper atmosphere. From Zanzibar, past the Canton Island station, Cooper called out the count as he clicked the series of astronomical photographs. Although the zodiacal light pictures turned out underexposed and the airglow shots overexposed, they were of usable quality and supplemented Carpenter's pictures from *Aurora 7* nicely.

Over Mexico, Cooper shifted to the next most important photographic task, that of snapping horizon-definition imprints in each quadrant around his local vertical position. Just as University of Minnesota scientists had prepared him for the zodiacal light task, so Massachusetts Institute of Technology researchers had arranged for these snapshots to aid in the design of a guidance and navigation system for Project Apollo. Cooper's horizon-definition pictures marked a significant advance beyond those from the MA-7 mission. In contact with the Cape once again, Cooper lightheartedly complained like a typical American tourist, "Man, all I do is take pictures, pictures, pictures!"

[500] But he was not through yet. On orbits 17 and 18 he took infrared weather photographs of good quality and a few excellent moonset Earth-limb pictures. Meanwhile, he resumed the geiger counter measurements for radiation, continued his aeromedical duties, and adjusted his television monitor at the request of ground observers. The eighteenth pass over the United States, like the sixteenth, gave his extraordinary vistas of his country from southern

California, across Dallas the first time and Houston the second, to the Florida peninsula. He sang during orbits 18 and 19, still surprised with every pass, still marveling at the greenery on Earth and on his instrument panel as he came toward his thirtieth hour in space.

Although "this fine plumbing they put in this thing" proved more troublesome later, Cooper had learned to adjust his suit temperatures for comfort and to eat and drink over the rim of his helmet fairly effectively, if awkwardly. Then on his nineteenth orbit, while checking his warning lights before a high-frequency antenna test over Hawaii, Cooper noticed the first potentially serious systems anomaly of his mission.

A small telelight lit up green, indicating that *Faith 7* was decelerating and that the centripetal force of gravity had overcome by .05 g the centrifugal force of the spacecraft's orbital moment of inertia. This had to be a false indication, reasoned Cooper, because he felt, and his loose gear still appeared, weightless. But were g forces building up imperceptibly? California confirmed no such indication. Mercury Control showed great concern over the implications of this little light for the attitude stabilization at retrofire. The fears of the flight controllers were realized on the next pass, when Cooper lost all attitude readings. Then, on the twenty-first orbit, a short-circuit occurred in a busbar serving the 250-volt main inverter, leaving the automatic stabilization and control system without electric power. The minor glitch had become a serious hitch.

Mercury Control Center was in a flurry of worried activity, cross-checking *Faith 7*'s problems and Cooper's diagnostic actions with identical equipment at the Cape and in St. Louis, then relaying to each communications site questions to ask and instructions to give. Cooper remained cool, if not calm, now that his alertness had been stimulated by a medically prescribed pill of dextroamphetamine.

On the twenty-first pass (over the tracking ship *Coastal Sentry*), John Glenn helped Cooper prepare a revised checklist for retrofire procedure during the next, and last, time around. Only Hawaii and Zanzibar were within voice radio range on this last circuit, but communications were good. When the ASCS inverter blew out, Cooper also noted that the carbon dioxide level was rising in both his suit and cabin. "Things are beginning to stack up a little" was his classic understatement to Carpenter, and then Zanzibar heard him say he would make a manual reentry.

Twenty-three minutes later Cooper came into contact with Glenn again, reporting himself in retroattitude, holding manually, and with checkoff list complete. Glenn gave the 10-second countdown, and Cooper, keeping his pitch down 34 degrees by his window reticle, shot his retrorockets manually on the "Mark!" Glenn reported: "Right on the old gazoo. . . . Dealer's choice on reentry here, [501] fly-by-wire or manual . . . It's been a real fine flight, Gordon. Real beautiful all the way. Have a cool reentry, will you."

"Roger, John. Thank you."

And that he did. All the complicated, crowded events of the next 15 minutes occurred precisely as planned, while *Faith 7* plummeted down through the atmosphere. Four miles ahead of the prime recovery ship, again the carrier *Kearsarge*, just south of Midway Island, the canopied capsule containing Gordon Cooper broke through a mild overcast and landed on the lazy waves of the blue Pacific.

Splashdown came 34 hours and 20 minutes after liftoff. Cooper professed disappointment that he too had "missed that third elevator" aboard "Begonia," meaning the *Kearsarge*. The spacecraft floundered in the water for a moment, then righted itself, as hovering helicopters dropped their swimmers and relayed Cooper's request as an Air Force officer for permission to be hoisted aboard the Navy's carrier. Permission was granted, and 40 hot, humid minutes later the explosive hatch blew open at the command of MSC engineer John B. Graham, Jr. Physicians examined Cooper for eight more minutes while he lay in the couch. Then they helped him emerge and steadied him during a moment of dizziness until he regained his equilibrium. Away in triumph marched the one-man crew of the one-day Mercury mission.⁵⁷

Like Schirra, Cooper went through arduous medical, technical, and operational debriefings aboard the *Kearsarge* and later back at the Manned Spacecraft Center. He, too, was found to be dehydrated and suffering from a slight case of orthostatic hypotension. He had lost seven pounds since suiting up, but after drinking "a few gallons of liquid," he was

fine, ebullient both mentally and physically, and convinced that "we certainly can elongate this mission." Robert C. Seamans, Jr., Associate Administrator of NASA, and Robert Gilruth, Director of MSC, had different ideas about MA-10, but Cooper reiterated the proof that "man is a pretty good backup system to all these automatic systems, and I think the mission was conducted just like it was planned . . . in spite of . equipment breaking down."⁵⁸

In addition to undergoing technical debriefings over the next several days, Cooper was honored by parades through Honolulu, Cocoa Beach, Washington - where he addressed a joint session of Congress - and New York City, where he was hailed by one of the largest tickertaped crowds ever to greet an individual. Other crowds in Houston and in his hometown of Shawnee, Oklahoma, also celebrated the return of the sixth Mercury astronaut from space.

The fact that Cooper, like Glenn, had had to take action to save his mission from a probable failure added luster and meaning to the glory he received. While postflight inspections, data reduction, and mission analyses proceeded through the following month to pinpoint the causes of the few electromechanical faults of the flight, Mercury systems engineers could find no fault with pilot performance. Physicians, however, were cautious about the implications for longer space missions of Cooper's hemodynamic response.

[503] Probably no other result of the MA-9 mission excited more interest than Cooper's claim to have seen from orbit objects on the ground as small as trucks and houses. Skepticism on this point abated after the astronaut explained in detail to representative scientists at the Cape on May 21 just where, when, and how he could see dust and smoke below, from 100 miles directly above - if the contrast was right. Also at this, the first and only "scientific debriefing" following a Mercury flight, the value of extensive questioning of the subject pilot was clearly demonstrated, when Cooper was asked whether he could see Earthshine on the Moon. "Well," he replied, "the Moon was fuller as it was setting than it was on the nightside. It was almost a full Moon. Gee, that's funny, I hadn't even realized that before. It seemed to be almost full as it was setting, whereas on the nightside it was only a third of a Moon."⁵⁹ This Moonshine was clearly Earthshine. Other postflight analyses added praise for the sunshine that blessed *Faith 7*. "The sun literally smiled on MA-9," wrote J. C. Jackson and Niles R. Heller in Goddard's report of the network radio performance. "It [MA-9] was favored with better than average radio frequency propagation conditions for the present phase of the solar sunspot cycle."⁶⁰

⁵⁵ The description and all quotations in the following account of the MA-9 flight are taken directly from the elaborate "Postlaunch Memorandum Report for Mercury-Atlas No. 9 (MA-9): Part I, Mission Analysis; Part II, Data; Part III, Mission Transcripts," MSC, June 24, 1963. For color parallel to the voice transcript, the unedited Mercury Control transcript of John A. Powers' broadcast commentary, "MA-9 Transcript," May 15, 1963, has been followed.

⁵⁶ The text of the prayer (taped at time 21:49:38) is as follows:

"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 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 are able to do things in a big way, are 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."

⁵⁷ See L. Gordon Cooper, Jr., "Everyone Was in a Sweat, I Was Secretly Pleased," *Life*, LIV (June 7, 1963); see also other contract articles: "His Mission Is the Longest U.S. Orbit," *Life*, LIV (May 17, 1963); "He Brings It Right in on the Old Gazoo," *Life*, LIV (May 24, 1963); and "Gordo Gets a Great Hello from the Kids and Kin," *Life*, LIV (May 31, 1963).

⁵⁸ "Status Report on Postlaunch Evaluation of Mercury-Atlas Mission No. 9," MSC, May 28, 1963. Quotations are

from "MA-9 Press Conference," transcript, May 19, 1963, 7a, 10, 10b.

⁵⁹ "MA-9 Scientific Debriefing," transcript, June 26, 1963, 47. Cf. 15. On the skepticism regarding Cooper's vision, see *Aviation Week*, LXXIX (June 17, 1963), 34; (July 1, 1963), 31; and (July 15, 1963), 98. For one of the more important comparative studies of the astronautical experiences of Glenn, Carpenter, Schirra, and Cooper, see A. Goldberg, L. Hromes, C. E. McLain, and J. Menkes, compilers, "Observations of the Near Wake Reentry Phenomena by the Mercury Astronauts," ARPA TN-64-2, Feb. 1965.

⁶⁰ J. C. Jackson, "Manned Space Flight Network Performance Analysis for MA-9," Goddard Space Flight Center publication X-551-63-108, Greenbelt, Md., June 6, 1963, 44. For other details on the results of the fourth manned orbital flight, see *Mercury Project Summary*, 231, 242, and *passim*.

