APOLLO 10

18-26 MAY 1969

an essay by

HAMISH LINDSAY

“Roger Houston, Apollo 10.
You can tell the world that we have arrived.”

Thomas Stafford

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Extracted from content on the
Honeysuckle Creek Tracking Station
website, developed by Colin Mackellar
www.honeysucklecreek.net

EDITORIAL NOTES

This description of the Apollo 10 mission includes tables listing key activities and times, plus tracking times, and duration, at Honeysuckle Creek.

Ground Elapsed Time (GET) is included for a quick sequential reference and to relate it directly to NASA's Apollo Flight Journal and Apollo Lunar Surface Journal.

Unless otherwise indicated, all times are Australian Eastern Standard Time (AEST, GMT +10), refer to the time of events in relation to the Honeysuckle Creek Tracking Station (HSK), near Canberra, Australia. Change of day is midnight HSK time.

Indented and italicised text are either excerpts from interviews by Hamish Lindsay with astronauts and NASA personnel, air-to-ground conversations, or other relevant commentary and quotes.

The honeysucklecreek.net website is regularly updated with new content, which also includes additions to the subject matter of this essay.

THE APOLLO 10 CREW

Eugene Cernan, Thomas Stafford, and John Young
Image: NASA

AS-505/CSM-106/LM-4 F MISSION NCG 724

PRIME CREW
Commander: Thomas P. Stafford
Command Module Pilot: John W. Young
Lunar Module Pilot: Eugene A. Cernan

BACK-UP CREW
Commander: Gordon L. Cooper
CM Pilot: Donn F. Eisele
LM Pilot: Edgar D. Mitchell

SPACECRAFT
Command Module: **CHARLIE BROWN** CSM-106
Lunar Module: **SNOOPY** LM-4
Saturn V: SA-505

Mission Fact Box

Launch
Launch Complex – 39A, Cape Kennedy
Sunday, 18 May 1969
1249:00 USEDT / 1649:00 UTC
[Monday, 19 May 1969, 0249:00 AEST]

Mission duration
8 days, 3 minutes, 23 seconds

CSM/LM docking/extraction
Docking – 18 May 1969, 20:06:36 UTC
Time docked – 3 days, 22 hours, 54 minutes

Lunar orbit insertion
21 May 1969, 20:44:54 UTC

Lunar orbital data
Lunar orbit – 109.6 x 113 kilometres
Inclination – 1.2°
Orbital period – 2 hours
Orbits – 31

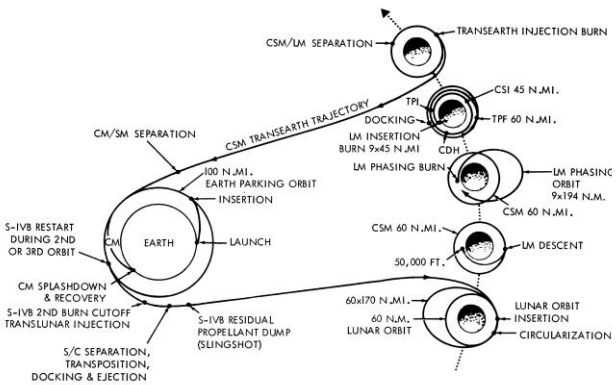
CSM/LM undocking
Undocking – 22 May 1969, 19:00:57 UTC

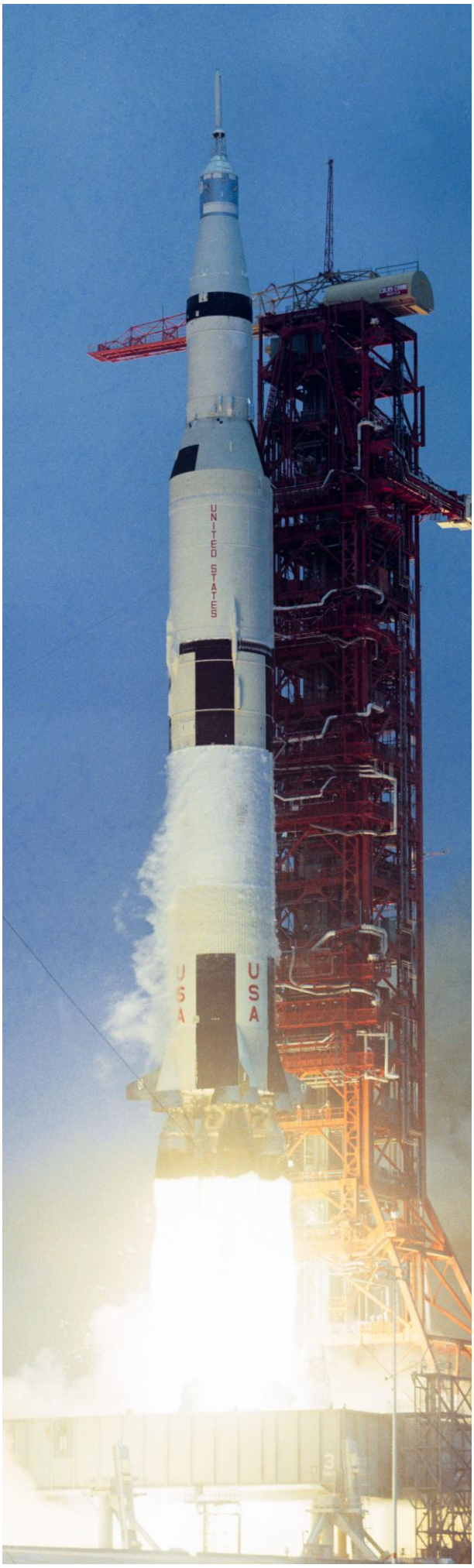
Lunar Module orbital data
Orbital insertion – 22 May 1969, 20:35:01 UTC
Orbital departure – 22 May 1969, 23:44:02 UTC
Orbital altitude – 14.4 kilometres (lowest)
Orbits – 4 (while solo)

CSM/LM ascent stage docking/undocking
Docking – 23 May 1969, 03:11:02 UTC
Undocking – 23 May 1969, 05:32:23 UTC

Lunar orbit departure
CSM – 24 May 1969, 10:25:38 UTC

Splashdown
CM – 26 May 1969, 1652:23 UTC
Pacific Ocean (near American Samoa)
15°2'S 164°39'W
Recovery ship: USS Princeton





The Apollo 10 crew – Cernan, Young and Stafford. Image: NASA/KSC

Apollo 10

Under normal circumstances the crew of Apollo 10 would appear to be the team to land, but there were a number of reasons to make it the penultimate mission.

There had been some thought given to Stafford and Cernan landing, for instance George Mueller pushed for a landing, but he was known for his aggressive approach, as one colleague said, *"He always shot from both hips."* A dress rehearsal mission had been planned since June 1967 and at that stage the mission wasn't quite ready to support a landing.

There was still work to do on a number of different docking techniques as well as checking out communications and tracking capabilities at lunar distances. Not enough was known about the Moon's environment for some of the manoeuvres, for example there were gravity peaks caused by heavy material under the moon's surface called Mascons, which affected a spacecraft's flight path; the lunar landing computer software wasn't quite ready; and the LM was a shade overweight (it had been planned to use it for an Earth orbit flight test) which may have caused problems lifting off the lunar surface.

So, it was planned that the Apollo 10 LM would fly within 15,000 metres of the lunar surface and sink into oblivion instead of celebrated world history.

The prime crew were Tom Stafford, John Young, and Eugene Cernan – all space veterans from Gemini. Backing them up were Gordon Cooper, Donn Eisele, and Edgar Mitchell.

On 3 April at the top of the NASA tree Democrat Dr Thomas Paine took over from James Webb as the NASA Administrator and carried the responsibility of the first Moon landing. With President Nixon a Republican no one was quite sure how NASA would fare with this mix.

LAUNCH

As the crew walk out to the transfer van, Gene Cernan's secretary, Jamye Flowers holds a giant Snoopy doll. Tom Stafford pats Snoopy (top), while Gene Cernan attempts to take Jamye and Snoopy with them. (Collage: Colin Mackellar.)

At 1249 USEDT on 18 May (0249 AEST 19 May) 1969 Apollo 10 left the Kennedy Space Center's Pad 39B and headed for the Moon on the second Earth orbit. This was the only time that Pad 39B and firing room 3 were used for an Apollo mission.

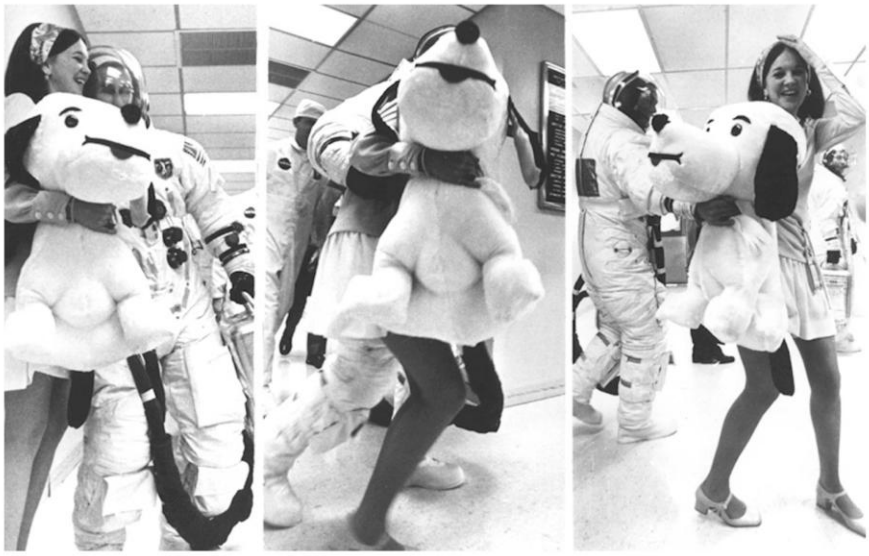

UNITED STATES


USA

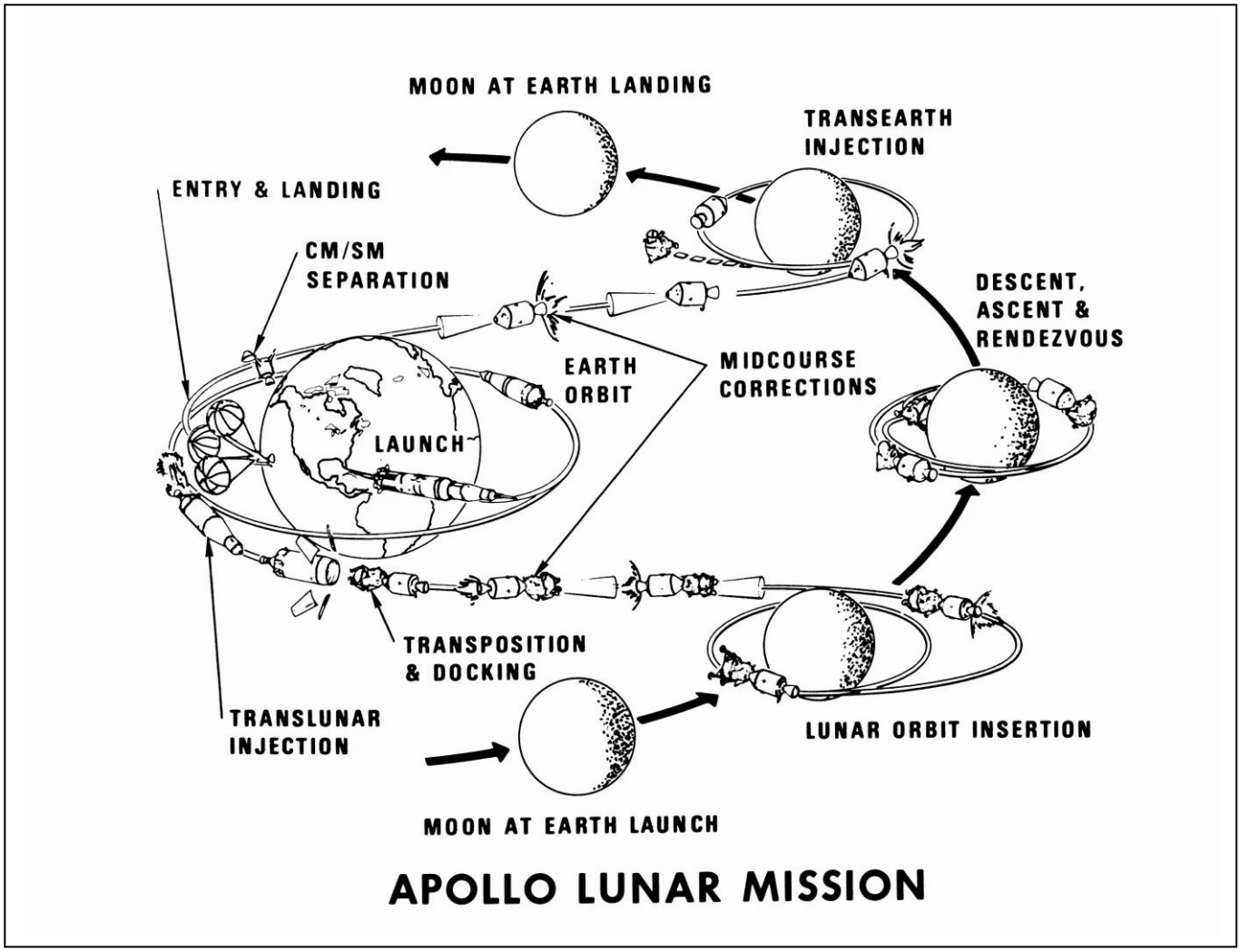
Apollo 10 on the pad at Launch Complex 39B at the Kennedy Space Center, Florida.
Image: NASA/KSC

Jamye Flowers with 'Snoopy'
at the Apollo 10 walkout
– on 18th May, 1969.

Above: with
Commander Tom Stafford.
Right: with Lunar Module Pilot
Gene Cernan.



As the crew walk out to the transfer van,
Gene Cernan's secretary, Jamye Flowers holds a giant Snoopy doll.
Tom Stafford pats Snoopy (top),
while Gene Cernan attempts to take Jamye and Snoopy with them.
(Collage of NASA/KSC images: Colin Mackellar.)



During the Trans Lunar Injection (TLI) burn the astronauts were suddenly shuddering to vibrations from the booster rocket pressure relief valves, and as their vision began to blur they all feared the mission was going to end before they had left the Earth. Stafford's fingers reluctantly curled around the abort handle as he called Houston through gritted teeth: *"Okay, we are getting a little bit of high frequency vibrations in the cabin."*

After five minutes of suspense the burn ended on time and they were safely on their way to the moon, later trying out the first colour television camera to be used on a lunar flight.

They went into Lunar orbit at 1645 EDT on 21 May (0645 AEST 22 May), to emerge on the other side full of the exciting views of the moon they were seeing:

Apollo 10: *"Houston, Ten."*

Houston: *"Go ahead, Ten."*

Apollo 10: *"It's amazing what you can see with earthshine on the surface of the moon it seems to be very well lit from our altitude here. The moon past the terminator is totally dark as long as we are in sunlight, but the minute we go out of the sunlight into darkness ourselves, the moon then glows right at us."*

Cernan: *"The LM thrusters stick out like a sore thumb in earthshine, but they don't keep you from seeing any of the stars at night it's real well lit up."*

Stafford: *"In earthshine you can see right into the craters, you can see shadows in the craters from the earthshine. The more you become adapted to it, it's phenomenal the amount of detail you can see."*

Houston: *"Roger Ten."*

Stafford: "There was a big thermal cover on the front of the Command Module filled with fibreglass, and when we opened up the tunnel to pressurise the Lunar Module the aluminium cover ripped and all the fibreglass just blew out as the air flowed in and the LM just filled full of the stuff.

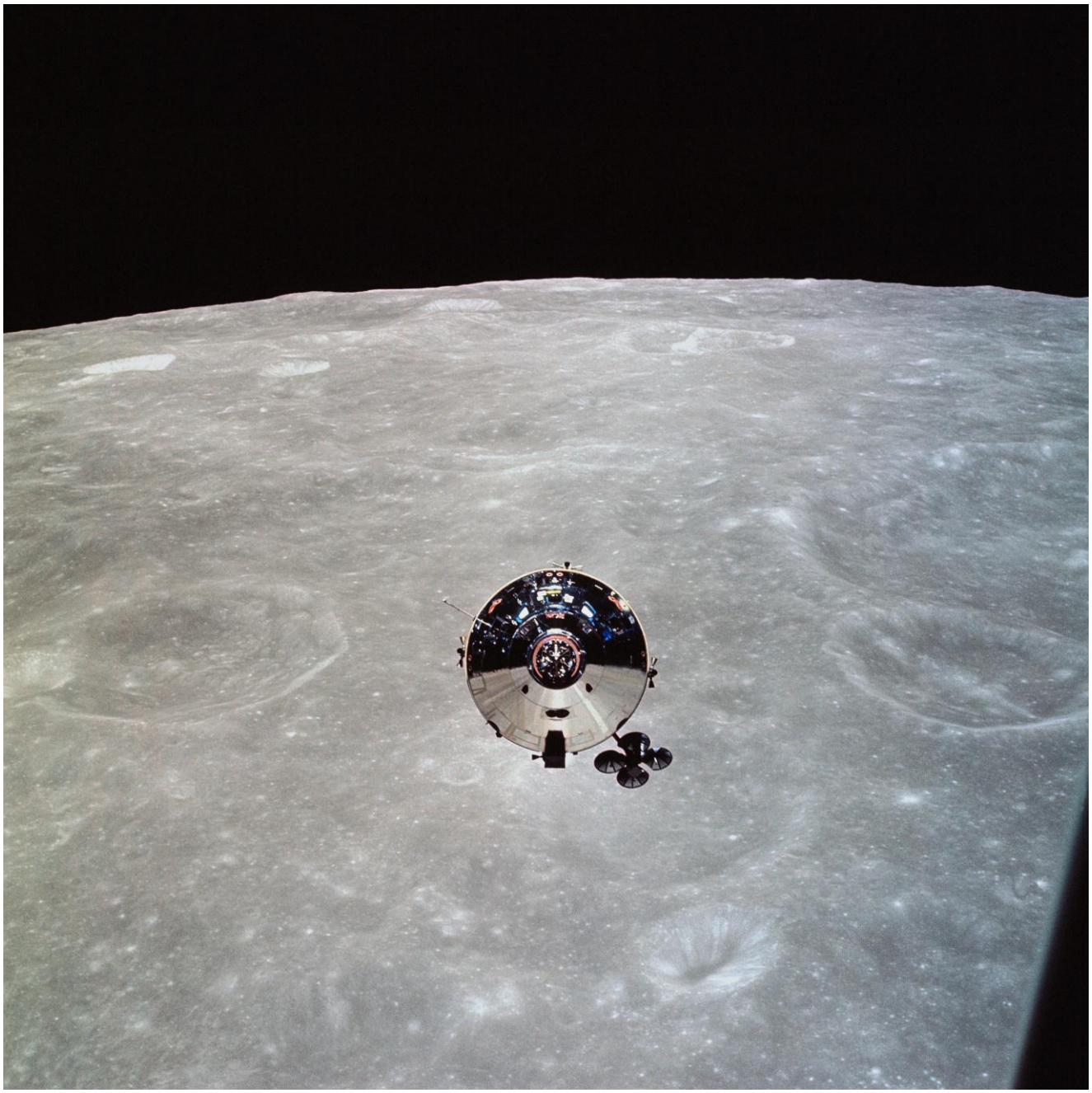
John Young holding a caricature of Snoopy for the camera during a telecast from space. Image: NASA.

Gene had the stuff in his eyebrows his hair looked like he'd just come out of a chicken coop. Then we all started to itch – we itched all the way back. It eventually went to the inlet screens of the air-conditioning, and we tried scraping it off there. We still had pieces of it all the way back."

THE FLIGHT OF SNOOPY

There was some concern about an unusual twist of 3.5 degrees in the two spacecraft's alignment while docked due to some holes that hadn't been drilled. Would the latches holding the two spacecraft together be damaged by undocking? Mission Control didn't want to take the risk, so Flight Director Glynn Lunney went to George Low and was given the okay go ahead. Charlie Brown and Snoopy separated.

Stafford and Cernan were now in a spacecraft that could not get them back onto the Earth. They were relying on the LM giving a faultless performance and their being able to rendezvous and dock safely. What if something went wrong on their return to Young, and they were unable to dock properly, as nearly happened on Apollo 14? Unless they could transfer from the LM to the CSM with an EVA, they would be stranded in lunar orbit, and Young would have to return home alone.



The gleaming CSM Charlie Brown soaring over the Moon's scarred surface. The S-Band steerable antenna we tracked is clearly visible. The pristine shine was soon wiped off by the fiery re-entry. Image: NASA

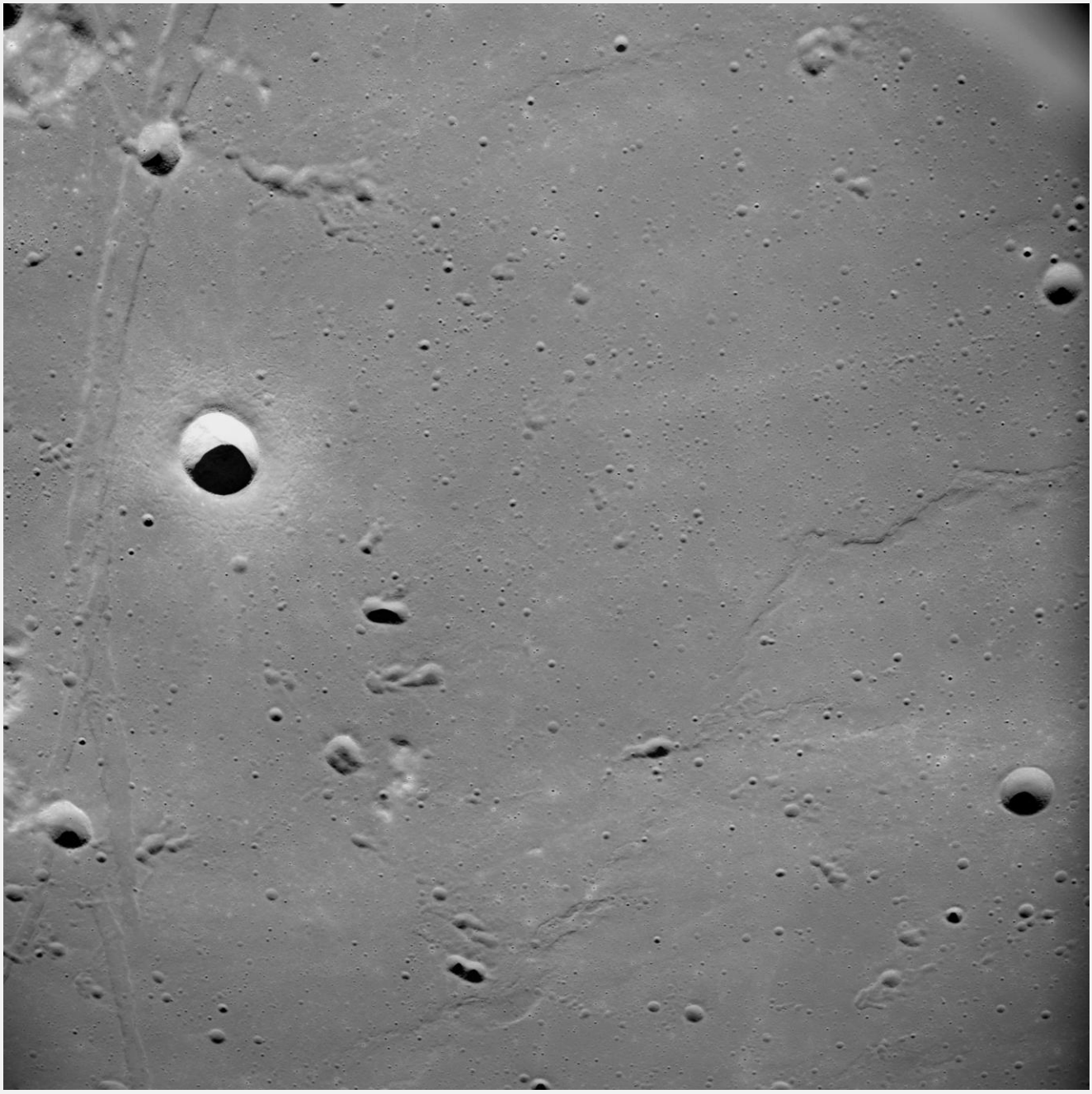
As Charlie Brown fell away Young called, *"Adios, we'll see you back in about six hours,"* and Cernan replied: *"Have a good time while we're gone, baby."* Stafford added: *"Yeah – don't get lonesome out there, John."*

They fired Snoopy's rocket to drop down to within 15,240 metres of the Sea of Tranquillity. Looking down from high above Young reported, *"They are ramblin' among the boulders."*

As they made their first pass over the southwestern corner of the Sea of Tranquillity an excited Cernan called out: *"I'm tell you, we are low. We're close baby!... we is down among 'em, Charlie."*

Capcom Charlie Duke responded, *"I hear you weaving your way up the freeway."*

Snoopy raced across the face of the planned prime Apollo 11 landing site at just under 6,000 kilometres per hour, Stafford giving a running commentary on the features he could see out the window and trying to take pictures with a faulty Hasselblad camera. They checked the computers, landing radar, and kept an eye open for any unexpected surprises.



One of Apollo 10's views of the Apollo 11 Tranquillity Base landing site. Image: NASA

AS10-31-4537 - This near vertical photograph taken from the Apollo 10 Command and Service Modules shows features typical of the Sea of Tranquility near Apollo Landing Site 2.

The proposed landing area for Apollo 11 (Lunar Landing Site 2) is a relatively smooth maria area in the upper right quadrant of the photographed area. Apollo 10 travelled from the bottom to the top of the picture.

The prominent linear feature at left is Hypatia Rille (called "U.S. 1" by the Apollo 10 crew).

The prominent crater cantered in Hypatia Rille at top left is Moltke AC (code name "Chuck Hole").

Moltke, the prominent crater to the right of Hypatia Rille, is cantered near 24.2 degrees east longitude, and 0.6 degrees south latitude.

During Apollo 10 Charlie Brown and Snoopy rode the consoles in Mission Control.
Capcom Charlie Duke at right. Image: NASA/JSC

They then looped back out to return for the second pass when they planned to simulate a launch above the landing point by firing the ascent stage rocket to separate from the descent stage and return to Charlie Brown.

As Stafford brought the Lunar Module down for the second pass he spoke to Houston, *"Okay, we are coming up over the site. There's plenty of holes there. The surface is actually very smooth, like a very wet clay... with the exception of the very big craters."*

SNOOPY GOES BESERK

At 1932 USCDT (1032 AEST) they were preparing to stage, to drop the descent part of the LM off, when without any warning, the two astronauts found themselves spinning around out of control as Snoopy began to jerk and buck about like a wild horse.

Stafford: "We were going along upside down and backwards about a minute before the descent stage thrusters were due to fire, I looked down and the instruments were showing we were yawing right, and I looked at the eight ball and I had no yaw, so it looked like we had a yaw right gyro failure and it also looked like an electrical glitch, so I started trouble shooting, but we had a wrong position on a switch and the whole thing started tumbling over at about 6 degrees per second. I just reached over and blew off the descent stage early. All the attitude control thrusters were on the ascent stage and the descent stage weighed about twice as much as the ascent stage so without the descent stage I had more control."

Cernan: "I saw the lunar horizon coming through my window about five times from different directions in about 8 seconds. We were able to throw the right switches to get it under control it was hard, but we did it. We weren't being banged around the cockpit, we were cinched down in our straps in a standing position."

Cernan: "Son of a bitch! I don't know what the hell that was, baby. The thing just took off on us. I tell you, there was a moment there.... I thought we were wobbling all over the sky."

Cernan: "Those words came involuntarily I didn't even know I had said them until I got home and somebody played the tape for me. It was just a natural emotion those words didn't come out until after we got things under control. You know, you're a long way from home at 50,000 feet above the lunar surface and all of a sudden you're spinning around in three different directions 8 seconds can be a long time."

Acutely aware of the menacing terrain racing past their windows, with mountains grinning at them like gigantic, decayed teeth (as Cernan described it), Stafford took over manual control and Snoopy promptly quietened down. The wild gyrations were caused by a switch in the navigation system set incorrectly.

The LM had two computers; the Primary Navigation Guidance System (PNGS pronounced "Pings") for indicating where they were, and the Abort Guidance System (AGS) for use near the Moon in an emergency launch. During the checks Cernan had correctly switched from PNGS to AGS, then unaware the switch had already been operated Stafford had switched it back to PNGS so instead of keeping Snoopy on a steady course, the system lost control looking for Charlie Brown that wasn't there.

To add to the confusion Stafford then threw the switch back to AGS thinking it was going to PNGS.

Cernan: "I was on the right hand side, and we were using both the Primary Guidance computer and the Abort Guidance computer for test purposes for that staging event and I put the switch in a specific position for Tom to go ahead and stage and Tom didn't know I had put it there, so he moved it back to the other position. It all happened so fast we weren't sure how it happened. I was always convinced that it was a switch that had been mistakenly, but legitimately, moved by each of us, both trying to do the right thing."

During all these fast moving events there were communications problems. Not keeping an eye on where the LM was spacecraft antennas were not always pointed for optimum signal, and the astronauts had difficulty in communicating, as well as telemetry and ranging were unreliable at times.

Ten minutes later the ascent engine fired to push them back up into orbit to meet Young in Charlie Brown. At 2300 (1400 AEST) they met, and Mission Control broke out a large cartoon showing Snoopy kissing Charlie Brown, saying,

Back on Earth in the colourful dawn off Pago Pago the USS Princeton's helicopter picked up the Apollo 10 crew from the Pacific Ocean.

Image: NASA/KSC

The Apollo 10 crew back on board the USS Princeton. Image: NASA/KSC

"You're right on target, Charlie Brown," and a little later Snoopy's engine was fired again for a test before it was cast off.

Cernan: "We sent Snoopy off into orbit around the sun I don't know if it's still there or not. Who knows? Who knows where that thing is now?"

After 31 orbits Apollo 10 and its crew left the moon, sending TV pictures of it back to Earth. On Sunday, during TEC, when the astronauts woke up they switched to down voice and played a tape of 'Come Fly with Me' and whistled to it, then pretended to be a breakfast announcer on a radio station. Then John Young observed that as they were rolling in the PTC (barbeque) mode at 3 revs per hour they were experiencing three days per Earth hour, so their spacecraft calendar now put them in the middle of August!

THE FASTEST HUMANS IN HISTORY

With extra fuel left over from the lunar activities they burnt it off to accelerate the spacecraft back to Earth at a record 39,897 kilometres per hour, making the crew of Apollo 10 the fastest humans in history.

At 1152:23 USCDT on Monday 26 May (0352:23 AEST 27 May), after a mission elapsed time of 192h 3m 23s they splashed down into the Pacific 635 kilometres east of Pago Pago, 5 kilometres from the recovery carrier USS Princeton. The crew aboard the carrier were treated to a spectacular sight of the Service Module streaking across the pre-dawn sky in a blazing fireball as it burned up, followed by the Command Module silhouetted against the brightening sky under its three big parachutes. Waiting beneath, the recovery helicopters buzzed about with their flashing running lights stabbing the dark velvet blue sky. When the astronauts in the rubber-ducky looked up at the helicopter hovering above they saw *"Hello there Charlie Brown"* written across the underside of the fuselage.

At Honeysuckle Creek we were now familiar with the lunar missions and the ground procedures and had moulded into an efficient team.

We were ready to support Apollo 11 for an attempt at landing on the Moon.

Essay by Hamish Lindsay.
Images, illustrations and captions by Hamish Lindsay and Colin Mackellar.
PDF formatted by Glen Nagle.

ABOUT THE AUTHOR

Hamish Lindsay (1937-2022) worked at the Muchea, Carnarvon and Honeysuckle Creek space tracking stations between 1963 and 1981.

He wrote many essays on the history of human spaceflight, and was the author of the book, Tracking Apollo to the Moon.